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Project Design Concept - Primary Ventilation System

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Richland, WA 99352

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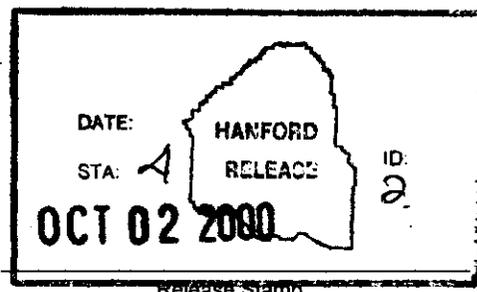
Abstract: Supports the Phase 2 upgrades and provides an overall description of the operations concept for the W-314 Primary Ventilation Systems.

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Project Design Concept

Primary Ventilation System

Project W-314
Tank Farm Restoration and Safe Operations

Prepared by Fluor Federal Services
For CH2M HILL Hanford Group, Inc.

September 21, 2000

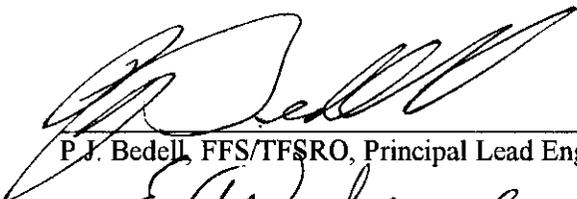
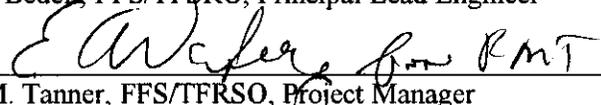
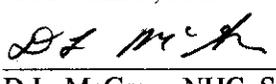
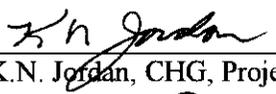
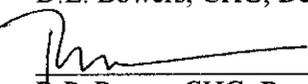
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ABBREVIATIONS/ACRONYM LIST

ABU	Acceptance for Beneficial Use
ATP	Acceptance Test Procedure
CAM	Continuous Air Monitor
DBE	Design Basis Earthquake
CEMS	Continuous Effluent Monitoring System
DD	Decontamination and Decommissioning
GEMS	Generic Effluent Monitoring System
HEGA	High Efficiency Gas Adsorber
HEPA	High Efficiency Particulate Air
HLW	High Level Waste
HMI	Human Machine Interface
I&C	Instrumentation and Control
LAW	Low Activity Waste
MCS	Monitoring and Control System
OTP	Operational Test Procedure
PDC	Project Design Concept
PDS	Project Development Specification
PID	Pressure Indicator Differential
PLC	Programmable Logic Controller
QCM	Quality Conformance Matrix
RPP	River Protection Project
SSC	Structures, Systems and Components
STEP	Specific Test and Evaluation Plan
TFLAN	Tank Farm Local Area Network
TFRSO	Tank Farm Restoration and Safe Operations
USSR	Upgrade Scope Summary Report

PROJECT DESIGN CONCEPT PRIMARY VENTILATION SYSTEM

1.0 DESCRIPTION OF PROBLEM

Tank Farm Restoration and Safe Operation (TFRSO), Project W-314 was established to provide upgrades that would improve the reliability and extend the system life of portions of the waste transfer, electrical, ventilation, instrumentation and control systems for the Hanford Site Tank Farms. An assessment of the tank farm system was conducted and the results are documented in system assessment reports. Based on the deficiencies identified in the tank farm system assessment reports, and additional requirements analysis performed in support of the River Protection Project (RPP), an approved scope for the TFRSO effort was developed and documented in the *Upgrade Scope Summary Report (USSR)*, WHC-SD-W314-RPT-003, Rev. 4. The USSR establishes the need for the upgrades and identifies the specific equipment to be addressed by this project.

This Project Design Concept (PDC) is in support of the Phase 2 upgrades and provides an overall description of the operations concept for the W-314 Primary Ventilation Systems. Actual specifications, test requirements, and procedures are not included in this PDC. The PDC is a "living" document, which will be updated throughout the design development process to provide a progressively more detailed description of the W-314 Primary Ventilation Systems design. The Phase 2 upgrades to the Primary Ventilation Systems shall ensure that the applicable current requirements are met for:

- Regulatory Compliance
- Safety
- Mission Requirements
- Reliability
- Operational Requirements

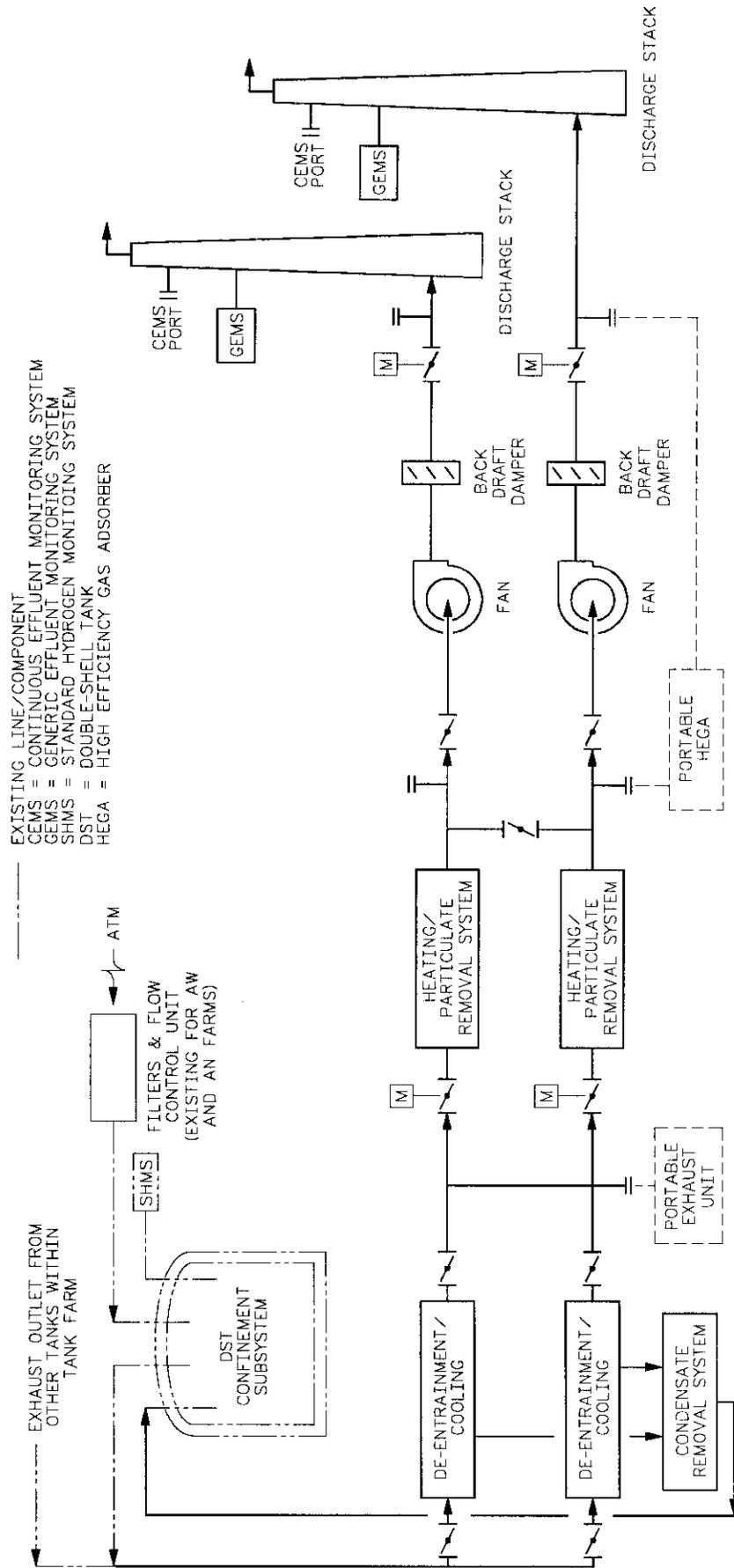
2.0 SYSTEM DESCRIPTION

2.1 Primary Ventilation System Overview (AN, AP, AW)

The Ventilation System addressed by this PDC is part of the Hanford Double Shell Tank (DST) waste storage System for the AN, AP & AW Tank Farms.

Refer to Figure 2.1A for the conceptual flow diagram of the Primary Ventilation System for AN, AP & AW. Primary Ventilation air is drawn into the tanks through a High Efficiency Particulate Air (HEPA) filtered flow control unit (Ref. WHC-SD-WM-DB-030 and -032). Primary tank vapors will be pulled from the vapor space of each of the tanks in a Tank Farm by an induced draft fan. Entrained liquids will be removed from the vapor by a mist eliminator. The vapor will be cooled by the glycol condenser unit and pass through a second mist eliminator to remove liquid carryover from the condenser. A glycol heater will next heat the vapor to raise its temperature above the

FIGURE 2.1A TYPICAL DOUBLE-SHELL TANK PRIMARY VENTILATION SYSTEM



dew point to a relative humidity of 70% or less, which will prevent condensation and thereby protect the downstream HPEA filters.

A dual train of HEPA filters and induced draft fans, ducted to dual exhaust stacks are employed for the DST waste storage exhaust system. Each train is on a separate skid and normally will operate independently of the other. The two trains may also share components using cross connection ducts with isolation dampers. The filters remove radioactive and other particulate prior to the fan exhausting the cleaned up vapors to the atmosphere. A Generic Effluent Monitoring System (GEMS) shall be installed in each exhaust stack to monitor and record any radionuclides emitted to the atmosphere. The GEMS will be standardized with the equipment used on Project W-420, *Stack Monitoring System Upgrades* (see HNF-S-0400, Rev. 2, Procurement Specification for Generic Effluent Monitoring System). A Continuous Effluent Monitoring System (CEMS) port shall be installed in each exhaust stack to allow connection of a monitor (not in scope) for gaseous pollutants. Dual stacks provide the benefit of 100% backup flow monitoring instrumentation. Connections shall be installed in each train to facilitate the addition of possible carbon adsorbers/dry scrubbers if needed. Various instruments, isolation valves, and control dampers shall be used to monitor and control the functioning of the exhaust station.

2.2 Boundaries and Constraints

The assessment of the tank farms documented in the USSR showed specific, detailed tank farm end-items needing upgrade and/or replacement to support current operations and Phase 1 Low Activity Waste/High Level Waste (LAW/HLW) immobilization. This leads to a Primary Ventilation System constrained by existing systems and current operating philosophies. These constraints are detailed below for the end-items and major components of the W-314 Primary Ventilation System.

2.2.1 Exhaust Station

The exhaust station has the following constraints:

- The exhaust station shall be connected to the existing exhaust header upstream of the existing de-entrainers.
- The exhaust system is constrained by existing tank farm primary exhaust duct sizes and inlet air capacity.
- The exhaust system shall be installed and tested while the existing exhaust system is in operation.
- The exhaust station shall be connected to the existing tank farm electrical power system.
- The exhaust station location shall be inside the applicable Tank Farm and shall not impede normal access.
- Auxiliary support equipment that normally operates in an uncontaminated environment (such as glycol heaters/coolers) which require routine maintenance should be located outside the tank farm fenced area where practical.
- The exhaust station shall accommodate existing tank dome loading criteria.

- The exhaust station shall allow for proper sloping of the exhaust ducting and condensate drain lines.
- The exhaust station shall perform its intended function in chemical and radiation environment to which its components will be exposed.
- The exhaust station shall perform its intended function under confinement exhaust temperatures ranging from minimum ambient temperature to 195°F at 100% relative humidity.

2.2.2 Inlet Station

The inlet station (new for AP Tank Farm) has the following constraints:

- The inlet station design shall include HEPA filters and an adjustable constant flow device as shown in WHC-SD-WM-DB-030 (AW Tank Farm) or WHC-SD-WM-DB-032 (AN Tank Farm).
- The inlet station shall be connected to an existing 12" riser at each tank.

2.2.3 Condensate Drain Subsystem

- The Condensate drain subsystem shall be connected to an existing available tank riser and collected condensate shall be returned to a tank.

2.2.4 Instrumentation and Control

A Programmable Logic Controller (PLC) system shall monitor and control all Primary Ventilation Exhaust System instruments and subsystems and shall operate as a separate node on the Tank Farm Local Area Network (TFLAN).

2.3 Performance Requirements

The W-314 Primary Ventilation System upgrades shall meet the following system level performance requirements with appropriate design margins:

- a. Support the tank farm operations as identified in the *Tank Waste Remediation System Operation and Utilization Plan (TWRS, SOUP)*, HNF-SD-WM-SP-012.
- b. Confine radioactive and toxic material in primary ventilation and tank vapor space to maintain emissions within allowable limits.
- c. Remove moisture from the primary ventilation exhaust.
- d. Collect and drain liquid from primary ventilation exhaust ducting and components back to a waste tank.
- e. Remove radioactive particulates from primary ventilation exhaust.
- f. Provide capability to add a system for removal of selected toxic and hazardous gases from primary ventilation exhaust.
- g. Prevent condensation on the HEPA filters by reducing the relative humidity (RH) of the air stream to 70% or less.
- h. Draw air through primary ventilation inlet station to control tank vapor space flammable gas concentrations.

- i. Continuously monitor primary ventilation system radioactive air emissions.
- j. Continuously sample primary ventilation system radioactive air emissions.
- k. Draw air through primary ventilation inlet station for heat removal to maintain the DSTs within applicable temperature limits when mixer pumps are operating.
- l. Disperse emissions from primary ventilation exhaust.
- m. Measure primary ventilation exhaust system flow rate.
- n. Provide for non-automatic switching of filter trains.
- o. Maintain DST's vapor space pressure negative.
- p. Provide adjustable inlet and exhaust flowrates.
- q. Remotely monitor open and closed positions of motor operated valves and dampers.
- r. Monitor differential pressure (dp) across mist eliminator sections.
- s. Monitor dp across HEPA filters and across entire filter train.
- t. Provide interlocked fan shutdown and alarm upon detection of filtration system upsets (e.g., hi/lo dp or high radiation).
- u. Provide automatic shutdown of heater and alarm upon detection of high temperature at filter train inlet plenum.
- v. Enable remote isolation of each vent subsystem through motor operated isolation valves at inlets and outlets.

3.0 OPERATIONS CONCEPT DESCRIPTION

3.1 Operational Environment

The W-314 Primary Ventilation System exists in the outdoor tank farm environment at Hanford, with some buried components and some components in radiation environments. Specific environmental requirements for the end-items and major components will be documented in the Project Development Specifications (PDSs).

3.2 Concept/Modes of Operations

3.2.1 Process Operational Concept

The Primary Ventilation Exhaust System is used to draw ambient air through the system of DSTs. The airflow through each DST is manually adjustable at each air inlet to address flammable gas levels, heat removal, and tank vapor space pressure.

The Primary Ventilation Exhaust System conditions and filters the exhaust gas to prevent unpermitted releases to the environment. Water and water vapor is reduced by de-entrainment, cooling/condensing and reheating. Particulates are removed by filtering. The condensate is returned to a DST and the final conditioned gas is monitored and sampled as it is released via an exhaust stack.

The dual de-entrainment/filter bank/exhaust fan/stack trains normal operation is one train operating and the other train in standby. When the operating train requires maintenance (e.g. filter change) the switch over to the standby train is done non-automatically and requires starting the standby fan. When a de-entrainer requires flushing the standby de-entrainer is valved in to service and the operating de-entrainer is valved out or isolated

manually and does not require operation of the standby fan. Operation of the systems is generally non-automatic for simplicity and reliability. However, high radiation detected in the exhaust will automatically shut down and isolate the exhaust system.

Exhaust system fans have variable speed motors, which provides additional control for exhaust flowrate and tank vapor space pressure.

3.2.2 Modes of Operation

The following is a list of the Primary Ventilation Exhaust System modes of operation:

- a). Normal: Operation requires continuous fan operation with one exhaust train in service.
- b). Crossover: The crossover operation allows two filter trains to be in service momentarily while transferring from a dirty filter train to a clean filter train.
- c). Planned Shutdown: Operation requires exhaust fans to be off and a portable exhaust unit to be operating. This mode is used to perform maintenance on the exhaust trains for a period longer than a few hours, or to install a High Efficiency Gas Adsorber (HEGA) in the event that a toxic gas release above allowable limits is detected.
- d). Emergency Shutdown: Operation requires that exhaust fan be immediately shut down and damper/valves automatically closed to isolate tanks from atmosphere. This mode is required whenever the exhaust filters fail as sensed by low filter differential pressure(s) or high exhaust gas particulate radiation. Continued normal operation of the exhaust ventilation is allowed to maintain tank negative pressures and allowable flammable gas concentrations after a portable exhaust unit is connected.

3.2.3 Instrumentation and Control Concepts

Instrumentation and Control (I&C) equipment shall monitor the status and control the operation of the Primary Ventilation Systems. Refer to Figure 3.2.3A, "Primary Exhaust Station Instrument Engineering Flow Diagram."

The major ventilation systems containing I&C components are:

- Exhaust Station (dual train)
- Generic Effluent Monitoring System
- Condensate Drain Subsystem
- Tank Ventilation Intake System
- Ventilation PLC System

The Ventilation PLC System shall connect to the Monitoring and Control System (MCS) and provide remote monitoring of all Ventilation PLC System variables by the MCS HMI. Some limited remote control of the exhaust station by the MCS Human Machine Interface (HMI) may also be provided. The need for remote control at the HMI will be evaluated during definitive design.

3.2.3.1 Exhaust Station

Sensors and associated transmitters for measuring inlet and differential pressures, and glycol heater system level and temperature shall be installed on the exhaust station. Local control shall be provided by the ventilation PLC system for the exhaust train isolation valves, exhaust heaters, and exhauster fans.

3.2.3.1.1 Inlet Pressure

The exhaust train inlet pressure (Refer to Items PDIT-1A and -1B on Fig 3.2.3A) shall be measured with respect to atmosphere. A pressure sense tap will be located on the exhaust manifold duct and routed to a local instrument rack. The inlet pressure tubing will connect to an indicating differential transmitter furnishing an analog signal to the ventilation PLC system.

3.2.3.1.2 Differential Pressure

Differential pressures across the mist eliminators, condensers and HEPA filters (Refer to Items PDIT -1A, -1B, -2A, -2B, -4A, -4B, -5A, -5B, -7A, -7B, -10A, -10B, -12A, -12B on Fig 3.2.3A) and exhauster fan (Refer to PDIT -14A and -14B on Fig 2.2.3A) shall be measured. The pressure sensing tubing will connect to indicating pressure transmitters installed in the instrument rack furnishing analog signals to the ventilation PLC system.

3.2.3.1.3 Exhaust Train Temperature

Temperatures of the condenser inlet, glycol heater inlet, inlet plenum (one for each train), and test sections (two for each train) shall be measured (Refer to Items TT -2A, -2B, -6A, -6B, -8A, -8B, -9A, -9B, -11A, -11B, -13A, -13B on Fig 3.2.3A). Temperature elements shall be installed in wells mounted on the housing of the device measured and the temperature signals from the sensors shall be wired to temperature indicating transmitters installed in the local instrument racks. The temperature indicating transmitters will furnish analog signals to the ventilation PLC system.

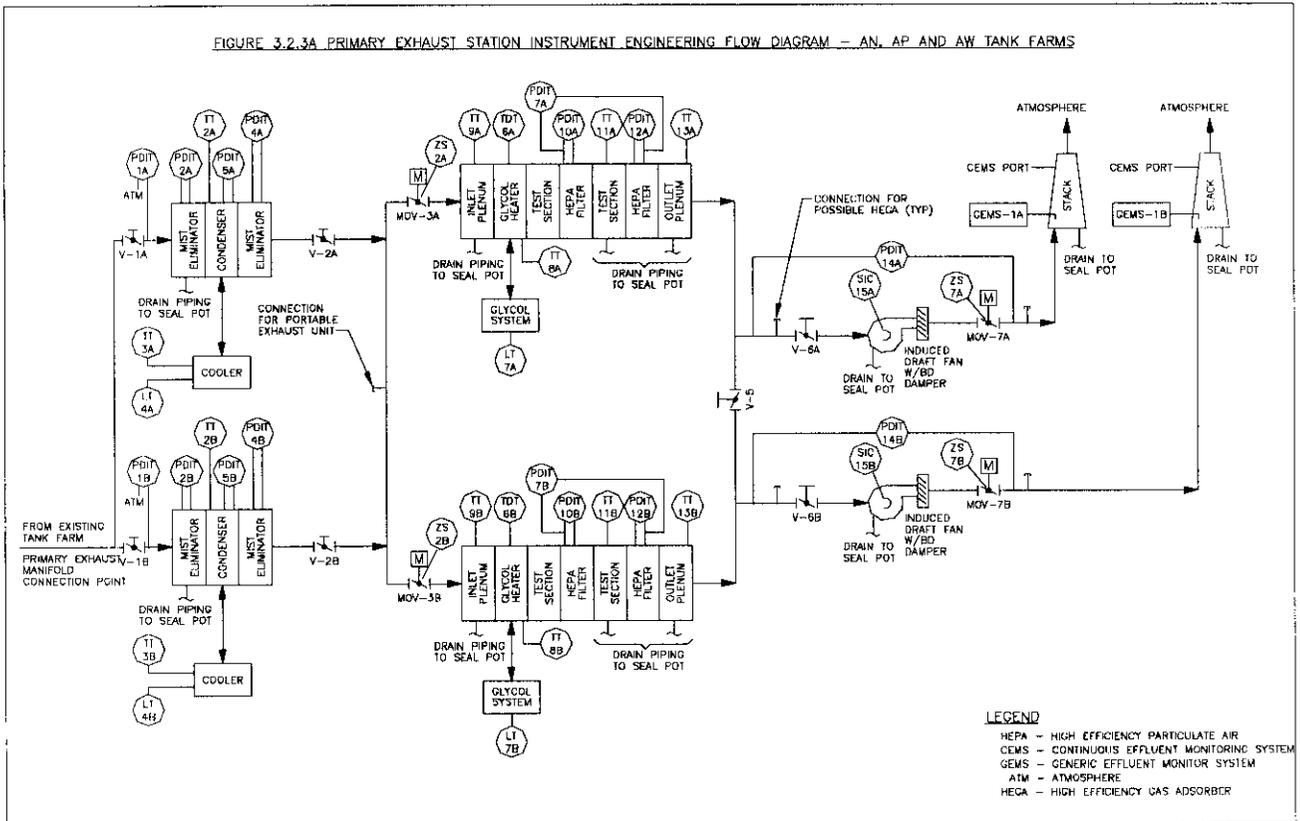
3.2.3.1.4 Level Detector

The level in the condenser and the glycol heater system (Refer to Items LT -4A, -4B and LT -7A, -7B on Fig 3.2.3A) shall be measured. A level sensor installed on the condensing and glycol-heating units shall transmit analog signals to the ventilation PLC system.

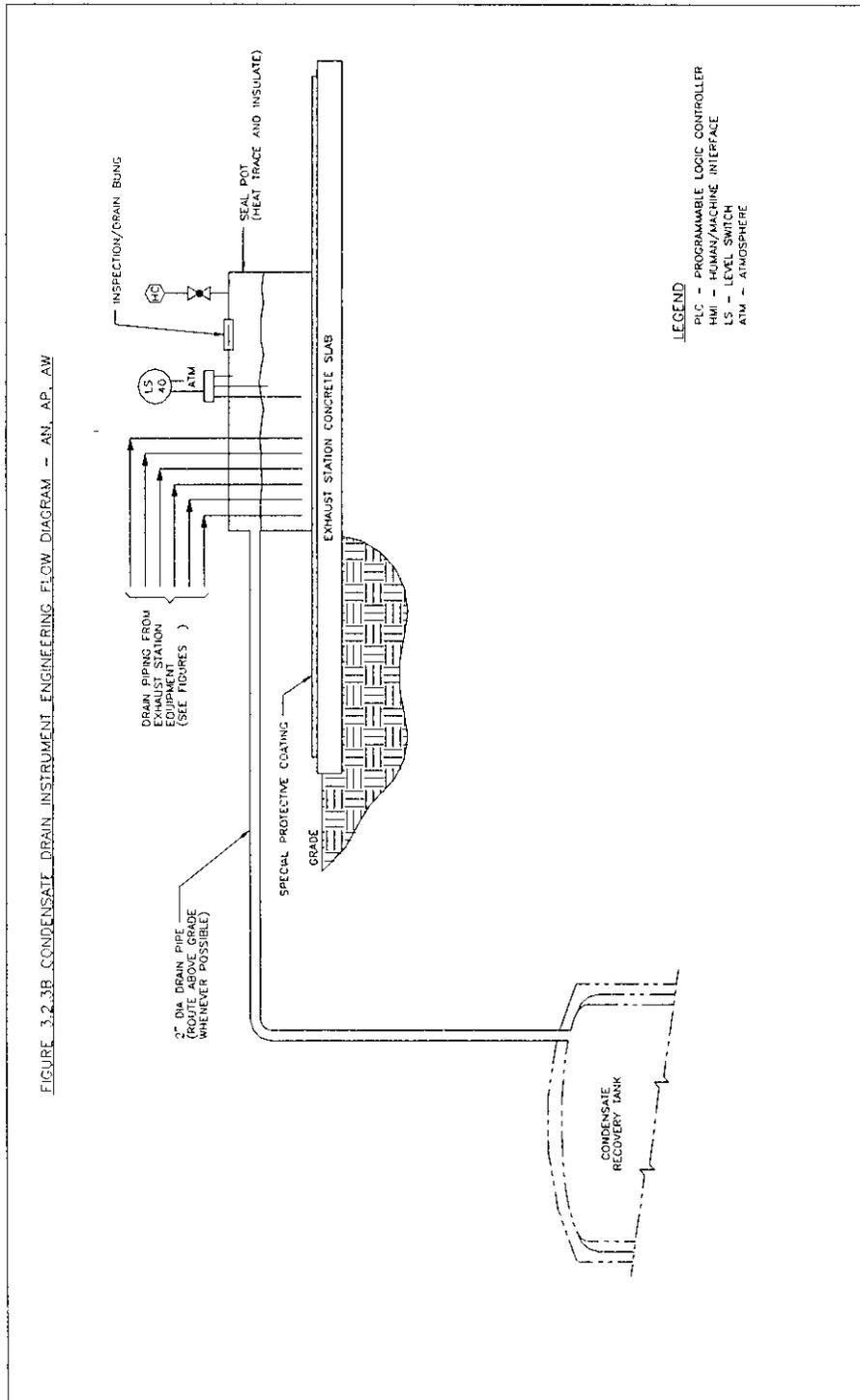
3.2.3.1.5 Exhaust Heater

The heater controller shall be controlled by an analog signal from the ventilation PLC system. Power to the heater controller shall be interrupted, both locally and remotely, by a hard-wired manual on/off switch or by deactivating a permissive (flow) interlock wired from the ventilation PLC system. The heater will shut off upon high temperature detection (TT-8A, TT-8B). Inadequate temperature rise across heater (TDT-6A, -6B) will activate an alarm.

FIGURE 3.2.3A PRIMARY EXHAUST STATION INSTRUMENT ENGINEERING FLOW DIAGRAM - AN, AP AND AW TANK FARMS



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3.2.3.1.6 Exhaust Fan

The exhaust fan power shall be controlled by a magnetic starter. Power to the exhaust fan starter shall be interrupted, both locally and remotely, by a on/off switch or by deactivating a permissive interlock wired from the ventilation PLC system.

Fan speed (Refer to Items SIC -15A, -15B on Fig 3.2.3A) shall be controlled by analog signal from the ventilation PLC system to a variable speed fan drive. The fan drive shall also provide a fan drive speed or frequency signal as feedback to the ventilation PLC system. Failure of the drive shall not cause the exhaust flow rate to exceed permitted values.

3.2.3.1.7 Motor Operated Dampers

The inlet and outlet dampers (Refer to Items MOV -2A, -2B, -7A, -7B on Fig 3.2.3A) shall be controlled by an analog signal from the ventilation PLC system to the damper motor controller. Damper open and closed position (refer to items ZS-2A, -2B, -7A, -7B on Fig. 3.2.3A) shall be indicated by MCS HMI.

3.2.3.1.8 Isolation Dampers

Isolation dampers/valves (refer to items V-1A, -1B, -2A, -2B, -5, -6A, -6B, on Fig. 3.2.3A) for switching filter trains, exhaust fans and mist eliminators shall be manually and locally operated.

3.2.3.2 Generic Effluent Monitoring System

A GEMS for each stack (Refer to Items GEMS -1A, -1B on Fig 3.2.3A) shall continually monitor the concentration of radioactive materials released into the environment through the exhaust stacks. GEMS shall consist of a sampler cabinet, pump cabinet, instrument cabinet and stack instruments.

3.2.3.2.1 Sampler Cabinet

The sampler cabinet shall contain the record sample filter holder Beta/Gamma Continuous Air Monitor (CAM) sample head, sample flow instruments and control, and space for an optional Alpha CAM sample head.

3.2.3.2.2 Pump Cabinet

The vacuum system located in the pump cabinet shall provide a steady, non-pulsating vacuum source to ensure collection efficiency over the full range of operating conditions.

3.2.3.2.3 Instrument Cabinet

The instrument cabinet shall contain the data collection system, including a Beta/Gamma CAM, an (optional) Alpha CAM, and GEMS controls.

3.2.3.2.4 Stack Instruments

The stack instruments shall include a stack flow measurement element and transmitter, temperature element and transmitter, and stack pressure transmitter.

3.2.3.2.5 Data Collection System

The ventilation PLC system shall perform all necessary data acquisition and control of the GEMS. Process signals will be transmitted between the GEMS instrument cabinet and the ventilation PLC system, including stack and sample flow rates; total stack and sample flow volumes, stack temperature; radiation measurement signals and alarms, and various data collection system inputs and outputs. In addition, remote monitoring and control of the GEMS shall be provided by the MCS HMI, including remote adjustment of the sample flow rate as well as Beta CAM and optional Alpha CAM radiation measurements, and stack instruments outputs.

3.2.3.3 Continuous Effluent Monitoring System

A port shall be provided at each stack for a CEMS (Refer to Fig 3.2.3A). The CEMS (not in scope) will continually monitor and trend the concentration of pollutants released into the environment through the exhaust stacks. CEMS will consist of a sampler cabinet, pump cabinet, instrument cabinet, stack instruments, and a data collection system.

The stack instruments will include a stack flow measurement element and transmitter, temperature element and transmitter, and stack gas oxygen concentration transmitter.

3.2.3.4 Condensate Drain Subsystem

The seal pot condensate level shall be continually monitored by a resistive/conductivity level measurement system (Refer to Item LS -40 on Fig 3.2.3B) installed in the seal pot. Seal pot low, high, and fill level information shall be sent to the ventilation PLC system. Alarms for "low," "high," and "below fill" levels shall be displayed locally and on the MCS HMI.

3.2.3.5 Ventilation PLC System

A PLC system, including analog and discrete I/O, shall monitor and control the primary exhaust ventilation trains and stack monitoring systems, and shall monitor the seal pot level.

HEPA filter and other exhaust train differential pressure setpoints as well as stack flow will be programmed into the ventilation PLC system. The PLC will compare the pressure differential measurements to the differential pressure set points. The PLC will have the capability of controlling the variable speed fan drive based either on ventilation manifold pressure or on stack flow as desired.

Local indicators and manual controls, including hard-wired interlocks, shall be provided to facilitate manual operation of the ventilation system independent of

the PLC system. At least one set of hard-wired interlocks (for high and low-pressure events) and a hard-wired relay for a CAM/fan interlock and/or a filter dp/fan interlock will be provided to initiate an exhaust shutdown.

The ventilation PLC system shall be connected to the MCS, operating as a separate node on the MCS TFLAN system. The ventilation PLC system shall communicate Primary Ventilation Exhaust Systems status and alarms to the MCS HMI.

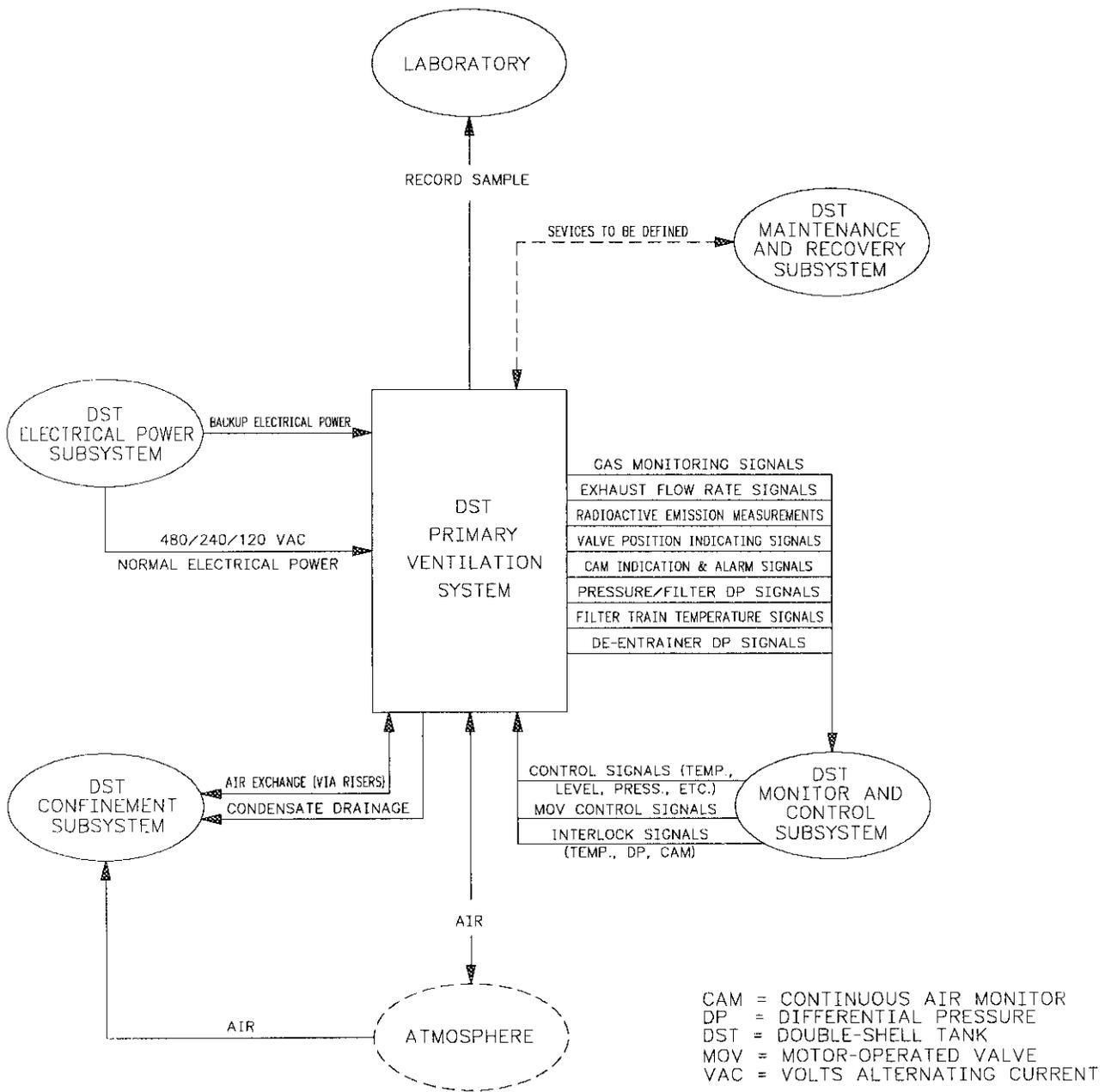
3.3 Constraints and Boundary Conditions

The main operational constraints and boundary conditions are with the existing intake and exhaust duct designs as well as the uncontrolled in-leakage through existing pit and tank penetrations.

3.4 Interfaces

The W-314 Primary Ventilation Exhaust System interfaces are shown on Fig. 3.4A and are described below:

FIGURE 3.4A
MAJOR INTERFACES OF THE DST
VENTILATION SYSTEM



3.4.1 Functional Interfaces

3.4.1.1 Double-Shell Tank Confinement System

The DST Confinement System is the barrier between gaseous waste and other systems. The system includes the Primary Confinement System and Annulus. The Primary Confinement System provides the riser openings where air is supplied and emissions are exhausted. The system includes Condensate collection and containment. Condensate is collected from the Primary Ventilation Exhaust System and returned to a tank. The interface points with the Primary Ventilation Exhaust Systems are at the tank riser flanges.

3.4.1.2 Double-Shell Tank Electrical Power System

The DST Electrical Power System provides normal electrical power to the exhaust systems. The physical interfaces to the Ventilation System are the connections to the electrical breakers that supply power to these systems. Backup power is supplied for Primary Ventilation instrumentation and control functions that provide confinement or emission monitoring functions. Backup power is also provided to exhaust fans and associated filtration train components that require power to perform their safety functions(s).

The backup power is limited to providing an alternate source of power by manually connecting it through a prewired receptacle and manual transfer switch. Uninterruptible power supply (UPS) or any automatic transfer to a Diesel Generator is not required.

3.4.1.3 Double-Shell Tank Monitoring and Control System

The DST Monitoring and Control System provides for local startup of the Primary Ventilation Systems. The Ventilation System provides instrumentation signals to the MCS. Ventilation System parameters to be monitored by the Monitoring and Control System include; the exhaust fan/blower operating on/off status; primary exhaust stack CAMs, stack flow ventilation exhaust component pressure differentials, and temperatures. The MCS also monitors vapor space pressure and primary exhaust radioactive emission levels. The physical interfaces with the DST Primary Ventilation Exhaust Systems are at the terminal connections at the local junction box or instrument enclosure in the tank farm.

3.4.1.4 Double-Shell Tank Maintenance and Recovery System

The DST Maintenance and Recovery System provides routine maintenance to the Ventilation Systems. This includes calibration of effluent monitoring systems and CAMs, high-efficiency particulate air (HEPA) filter testing and change-out, calibration and instrument loop checks on ventilation instrument and control systems functional testing of filtration exhaust trains and interlocks, and predictive/preventive and corrective maintenance on exhaust fans and MOVs.

3.4.1.5 Laboratory Interfaces

Samples of air emissions collected by the DST Primary Ventilation Exhaust Systems are sent to a laboratory for testing. The interface with the laboratory is the sample collection containers which are transported to the laboratory for analysis.

3.5 Operational Support Equipment

The W-314 Primary Ventilation Exhaust Systems shall use existing operational support equipment. No new equipment or resources have been identified. However, if any special support equipment is identified during definitive design it shall be provided by the Project.

3.6 Critical Issues and Technologies

The W-314 Primary Ventilation Exhaust Systems shall use existing technologies. No new technologies or unknowns have been identified.

3.7 Reliability

3.7.1 Design Life

The design life of the Primary Ventilation System shall be 35 years.

3.7.2 Redundancy

Portions of the Primary Ventilation System and components that are required to control or limit the release of radioactive material to the environment or for safe operation of the system shall be provided with redundancy.

3.7.3 Qualification for Operation

Equipment shall be appropriately qualified to ensure reliable operation during normal operating conditions and anticipated operational occurrences.

4.0 SUPPORT CONCEPT DESCRIPTION

The equipment planned to be installed in support of the W-314 Primary Ventilation Systems shall minimize the use of any specialized support equipment to keep the system operational throughout its design life. To the greatest extent possible, all equipment shall be Commercial Off-The-Shelf equipment which can function in the tank farm environment (i.e., radiological and chemical environmental).

Hanford support infrastructure is set up to support this concept. The constraints on maintainability will be the location of the equipment in contaminated areas.

5.0 TRAINING CONCEPT DESCRIPTION

The W-314 Primary Ventilation Systems shall use technologies that are common at the Hanford Site. The design of the system shall be readily available commercial codes and standards. Therefore, it is not anticipated that any specialized training, course work, or special facilities need to be addressed during design of the Primary Ventilation Systems.

6.0 DEVELOPMENT CONCEPT DESCRIPTION

No systems or components of the W-314 Primary Ventilation Systems shall require proof-of-concept or development testing to confirm that the concepts can be translated into workable solutions.

7.0 MANUFACTURING CONCEPT DESCRIPTION

No specialized manufacturing processes, requirements, or constraints have been identified for the W-314 Primary Ventilation Systems.

8.0 VERIFICATION CONCEPT DESCRIPTION

The W-314 Primary Ventilation Systems shall use readily available, commercial grade equipment, where possible, that complies with applicable codes and standards. Testing and inspection will be per the applicable Specific Test and Evaluation Plan (STEP) and the Quality Conformance Matrix (QCM) contained in the PDS. For non-safety class Structures, Systems and Components (SSCs), vendor invoices, commercial labels, and visual examination may be utilized upon receipt to verify components meet the identified requirements.

The primary ventilation systems will be tested after installation into the tank farm simulating operating conditions prior to being tied into the existing ventilation system. The existing primary ventilation systems will remain in operation until the new system has successfully completed the in farm cold testing and the final tie in is made.

The operational and maintenance testability features to be included in the design shall be aerosol test ports for HEPA filter testing, instrumentation calibration and instrumentation loop testing. All other validation and verification shall be by examination and/or analysis and shall not require any specialized equipment or resources. The exhaust stacks will require platforms for maintenance and testing.

9.0 INSTALLATION AND START-UP DESCRIPTION

The development of new or unique SSCs and technology is not planned for the W-314 Primary Ventilation Systems. Test and acceptance procedures will be utilized as defined in the project STEP. These will include approved Acceptance and Operational Test Procedures (ATPs and OTPs). Start-up and turnover will be in accordance with current Operational Readiness and Acceptance for Beneficial Use (ABU) procedures.

10.0 SYSTEM DECONTAMINATION AND DECOMMISSIONING (D&D)

Before installation of new equipment, decontamination and removal of contaminated equipment for disposal may be required. After installation, testing, and tie in of the new primary ventilation exhaust system the existing system will be decontaminated and decommissioned resulting in removal from the tank farm and final disposal in accordance with approval procedures.

D&D activity, at closure, shall be minimal and shall consist of eventual disposal of the end-items and major components of the system upon decommissioning of the system. The design of the W-314 Primary Transfer Ventilation Systems shall consider measures that could be incorporated into the design for facilitating D&D. The selection of materials and avoiding the trapping of waste in the components are the major design influences on D&D. However, no special constraints on the design activities need to be addressed.