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7. Abstract

This document defines the scope of work that Los Alamos National Lab (LANL) and Westinghouse Hanford Company (WHC) will perform to create a supervisory data acquisition and control facility for 200 west area farm SY. It identifies the deliverables, tasks, and milestones required to complete the Data Acquisition and Control System referred to as DACS-2a.

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W O R K P L A N

FOR SY FARM INTEGRATED

DATA ACQUISITION & CONTROL SYSTEM

(DACS-2a)

For

SY Farm Hydrogen Mitigation Program

By

Westinghouse Hanford Co.

Program Manager, Jack Lentsch

Cognizant Project Manager,  
Roger Bauer

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TWRS Safety Programs Engineering Support

October 11, 1994

**MASTER**

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## ACRONYMS

The following are acronyms used in this and/or referenced documents:

ABU	Acceptance for Beneficial Use
CM	Controlled Manuals
CX	Categorical Exclusion
DACS	Data Acquisition and Control System
DACS-1	Current SY-101 Hydrogen Mitigation Data Acquisition and Control System
DACS-2a	SY Farm Data Acquisition and Control System
EA	Environmental Assessment
EDT	Engineering Data Transmittal
EG&G	Edgerton, Germeshausen & Grier
EIS	Environmental Impact Statement
FONSI	Finding-of-No-Significant-Impact
FRD	Functions and Requirements Document
FDC	Functional Design Criteria
FDDI	Fiber Distributed Data Interface
FFBD	Functional Flow Block Diagram
FDM	Facility Description Manual
FMEA	Failure Modes and Effects Analysis
HLAN	Hanford Local Area Network
I&C	Instrumentation and Control
I.D.	Identification
I/O	Input / Output Device (Module)
IEFD	Instrument/Equipment Flow Diagram
LANL	Los Alamos National Laboratories
NEPA	National Environmental Policy Act
ORRB	Operational Readiness Review Board
OMM	Operation and Maintenance Manual
PLC	Programmable Logic Controller
QAPjP	Quality Assurance Project Plan
RSS	Remote Supervisory Station
ROM	Rough-Order-of-Magnitude
SA	Safety Analysis
SAR	Safety Analysis Report
SC	Safety Classification
SD	Supporting Document
SDD	System Design Description
SEL	Safety Equipment List
TWRS	Tank Waste Remediation Systems
VI	Vendor Information
WBS	Work Breakdown Structure
WHC	Westinghouse Hanford Company
WM	Waste Management
WP	Work Plan
W-211	Initial Waste Tank Retrieval Systems, Project W-211
WTO	Waste Tank Operations

## EXECUTIVE SUMMARY

The SY Farm currently has a temporary Data Acquisition & Control System (DACS) housed in a mobile trailer. The system is currently referred to as DACS-1. It was designed and configured to support engineers and scientists conducting the special performance evaluation and testing program for the safety mitigation test equipment located in waste tank 241-SY-101 (101-SY). It is currently being maintained and utilized by engineering personnel to monitor and control the 101-SY mitigation pump activities.

Based upon the results of the mitigation testing program, some of the temporary test mitigation equipment (such as mixing pump) will be replaced with longer-term "operational" mitigation equipment. This is resulting in new requirements for the Data Acquisition and Control System which will be fulfilled by a newer control facility referred to as the DACS-2.

A teaming between Westinghouse Hanford Company (WHC) and Los Alamos National Laboratory (LANL) has been established for the SY farm mitigation program in order to develop and implement the "next generation" of the data acquisition and control system for the mitigation pump operations. The new system will be configured for use by the tank farm operational personnel. It will support the routine operations necessary for safety mitigation and the future waste retrieval of Project W-211. It is intended to replace the existing DACS-1 and provide the necessary control room space for future integration of W-211.

It is intended that the basic design of the DACS-2 be modular and support cloning to allow easy duplication for procurement of additional systems for use at other tank farms without the expense of extensive control system redesigns. It is envisioned that a DACS-2b (AW farm) and DACS-2c (AN farm) will be procured by the Safety Mitigation Program; provided, the tank characterization program concludes that tanks in those farms require safety mitigation due to flammable gas generation.

The refinement of the mitigation designs and their requirements is being managed by other WHC organizations and is outside the work scope of this work plan. Timely and initial inputs to the DACS-2 project of the new mitigation equipment designs and requirements is necessary to support the work necessary to develop the new DACS-2 systems and facility.

This work plan addresses the direct work necessary to conduct the SY Farm WHC/LANL DACS-2a project as defined by the Functions & Requirement document WHC-SD-WM-FRD-014. The work plan consist of six (6) different work phases.

### PHASE (A): DACS-2a Control System Development and Fabrication by LANL.

LANL has project management responsibility for providing the "next generation" DACS-2 facility to WHC for use at the SY farm. LANL has the lead responsibility for the development of concepts, design, fabrication and/or procurement and delivery to WHC at the Hanford site of the Hardware/Software Control System integrated into a facility structure designed by LANL or its subcontractors. WHC has responsibility to provide LANL with system and facility requirements.

This work phase corresponds to the Sub-Project numbers S-301, S-302, and S-303 as listed in section 8.0. Also reference Functional Design Criteria (FDC) WHC-SD-WM-FDC-037, 38, and 39.

PHASE (B): Hanford SY Farm Site Preparation for DACS-2a by WHC.

WHC has team leadership for work needed to prepare the SY Farm site for installation of the DACS-2a control facility in a permanent manner. This includes foundations, cable ways, Motor Control Center upgrades, road ways, etc.

This work phase corresponds to the Sub-Project numbers S-304, S-305, S-306 and S-322 as listed in section 8.0. Also reference Functional Design Criteria (FDC) WHC-SD-WM-FDC-040.

PHASE (C): DACS-2a Facilities Installation and Field Integrations by WHC.

WHC will provide the team leadership with the assistance of LANL to install the LANL supplied facilities (DACS-2a), connect SY site utilities, and connect tank 241-SY-103 mitigation equipment.

This work phase corresponds to the Sub-Project numbers S-305 and S-306 as listed in section 8.0.

PHASE (D): DACS-2a System and Personnel Operational Readiness by WHC.

WHC will provide the team leadership with the assistance of LANL to assure final site Acceptance Testing, personnel training/readiness, and obtaining the necessary Hanford approvals for system startup.

PHASE (E): Transfer DACS-1 Mitigation Controls to DACS-2a by WHC.

WHC will provide the team leadership with the assistance of LANL to transition and reconnect/interface the monitoring and controls for 241-SY-101 from the existing DACS-1 to the new DACS-2a.

This work phase corresponds to the Sub-Project numbers S-313 as listed in section 8.0.

PHASE (F): Integrate Project W-211 Waste Retrieval Controls into DACS-2a Facility by WHC.

WHC will provide the team leadership to install and integrate the waste retrieval program's monitoring and control system into the DACS-2a facility. The responsibilities for execution of Phase (F) are not covered in this work plan. Project W-211 activities are beyond the scope of the DACS-2 project, although they will eventually be integrated into the same facility.

This work phase corresponds to the Sub-Project number S-314 as listed in section 8.0. Also reference Functional Design Criteria (FDC) WHC-SD-W211-FDC-001.

**NOTE:** Typically, when other organizations within WHC and/or its sub-contractors are utilized to conduct work activities, or deliver documentation, the work to produce will be initiated and defined by one or more of the following:

- a. Letter-of-Instruction (LOI)
- b. Statement-of-Work (SOW)
- c. Internal Work Order (IWO)
- d. External Work Order (EWO)

# WORK PLAN FOR SY FARM INTEGRATED DATA ACQUISITION AND CONTROL SYSTEM (DACS-2a)

## 1.0 INTRODUCTION

### 1.1 Objectives

The primary objective of this Work Plan is to identify and plan the work necessary to meet the Functions and Requirements defined in Westinghouse Hanford Company's document WHC-SD-WM-FDR-014.

The project will design and construct a second-generation Data Acquisition and Control System (DACS-2a) facilities to manage the safety mitigation "watch list" waste tanks 101-SY and 103-SY. The new DACS-2a system will replace the current temporary test trailer (DACS-1 system) which was installed at the SY farm about June 1993 to operate the mitigation pump on tank 241-SY-101.

The new SY farm DACS-2a will provide the tank farm operators with a more user friendly, flexible, and expandable system capable of possessing greater numbers of Input/Output modules (I/O) with higher speeds, improved accuracies, and dependability than the original DACS-1. These improvements will allow the DACS-2a the capability to oversee not just a single tank, but an entire tank farm operations.

Once the DACS-2a is constructed and operating on SY tanks, the entire system can be easily replicated for systems needed on AN and AW farms.

This work plan defines the tasks required for designing and constructing the DACS-2a systems and facility. It also addresses the task necessary to prepare the SY Farm site for installation of the facility structures, road ways, cable ways and related support items. It identifies deliverables, responsible organizations, interfaces, and schedules. This project shall employ system engineering principles where applicable.

### 1.2 Background

In early 1992, LANL and EG&G were teamed by DOE with Hanford contractors to provide a data acquisition and control system for the hydrogen mitigation testing program of Tank 241-SY-101. The original DACS-1 system specification was drawn up by LANL/EG&G on May 1, 1992. The trailer and associated systems were delivered in October 1992. The DACS-1 was accepted by WHC in June 1993. The DACS-1 has provided data monitoring, display, and storage since that time.

The DACS-1 was designed and configured to specifically operate and monitor the mixer pump in Tank 241-SY-101. A more powerful and flexible system is needed to perform data acquisition and control of more than one tank.

### 1.3 DACS-2a Facility Description

In accordance with the Functions and Requirements, the DACS-2a facility will be modular in design. The design is intended to support cloning and versatile applications at various Hanford sites. The objective is to only incur control system design once, thus save cost by eliminating redundant design efforts from site to site.

The plan is to locate the integrated facility north of the existing SY farm's existing DACS-1 trailer which is positioned just beyond the north perimeter farm fence.

The DACS-2a facility will function as the primary SY farm control center. The control system will function as the primary operator computer workstations for SY Tank Farm monitoring, data processing, and control of tank safety mitigation equipment for both the 241-SY-101 and 241-SY-103 tanks.

The initial focus of the DACS-2a facility will be support of the Tank Safety Mitigation Program starting in early 1996. Future support will be a transition to the Waste Retrieval Program (Project W-211) in early 1998.

### 1.4 DACS-2a Subsystem Descriptions

The overall system will support multiple workstations operating in a multi-tasking preemptive "real-time" mode. The system is composed of:

- 1) Computer Modules
- 2) Software Module
- 3) Un-interruptible Power Supply (UPS) Module
- 4) Heating, Ventilation, and Air Conditioning (HVAC) Module
- 5) Auxiliary Utility & Support Modules

This includes all other DACS-2a items not covered in the previous subsystems/module descriptions.

- a. DACS-2a facility
- b. Fire Detection/Suppression Module
- c. In-tank and Tank Farm Perimeter Video Module
- d. Instrumentation Signal Conditioning Module
- e. Monitoring & Control Input/Output Module
- f. Data Recording & Archiving Module
- g. Motor Variable Speed Drive Module
- h. Electrical Switch Gear Module
- i. Electrical Utility & Lighting Module
- j. Communications Modules
  1. HLAN Network Interface
  2. Telephone System
  3. Local SY Farm Fiber Optics Network
- k. Water & Sewer Interfaces

## 2.0 TEAM SCOPE

This section addresses the scope of work necessary to successfully complete each phase of the DACS-2a project, assuring compliance with all technical and administrative requirements of the WHC Safety Mitigation Program.

### 2.1 PHASE (A) Scope - DACS-2a Control System

LANL will provide the team lead in the design and procurement of the DACS-2a system and facility. WHC will provide requirements and assistance to LANL as necessary to assure compliance with WHC requirements.

The LANL scope shall include:

1. Develop and generate the DACS-2a Conceptual Design of the Control System and Facility.
2. Develop and provide DACS-2a Functional Design Criteria (FDC)/Design Specifications (suitable for WHC formal release) for the monitoring, data acquisition, and control hardware, along with the systems associated software that is necessary to provide full management of the SY tank farm mitigation program.
2. Develop and provide DACS-2a Functional Design Criteria/Design Specifications (suitable for WHC formal release) for the control facility and structure.
3. Select, procure, and integrate a commercial DACS-2a control system into a LANL provided facility structure. This will include:
  - a. Operator Work Stations and associated hardware
  - b. Graphical User Friendly Interfaces
  - c. CRT Monitors
  - d. Video Equipment
  - e. Data Storage Devices
  - f. Input/Output (I/O) devices
  - g. Cabling
  - h. Monitoring Alarms
  - i. Fire Detection and Suppression Equipment
  - j. Associated system support equipment
  - k. Control facility structures
3. Develop and design interfaces for utilities for the DACS-2a. The scope will address:
  - a. Basic Electrical Power for system and facilities
  - b. UPS Power
  - c. Sanitary Water and Sewage
  - d. Facility and Equipment Air Conditioning and Heating
  - e. Communications
  - f. Motor Control Centers
  - g. SY Farm Weather Monitors
  - h. Fire Detection and Suppression

4. Develop and generate sufficient DACS-2a documentation to support system operations, maintenance, and design upgrading of the integrated systems provided by LANL. The technical, format, and content requirements for the following list of documentation will be specified in a revision to the DACS-2 functions and requirement document WHC-SD-WM-FRD-014. The documentation will include as a minimum such things as:
  - a. Design drawings
  - b. Hardware and Software Specs
  - c. Recommended spare parts list
  - d. System detail technical and physical description
  - e. Vendor supplied documentation files
  - f. Operations and Maintenance Manuals (O&M)
  - g. Recommended minimum training requirements
  - h. Conduct a Failure Modes & Effects Analysis of the control system design
5. Select, procure, and install all DACS-2a network interfaces: Areas to be addressed are:
  - a. Hanford Local Area Network (HLAN) interfaces
  - b. DACS-2a Fiber Optic Distributed Control Interfaces
6. Recommend and aid Hanford as necessary in the selection and procurement of field instruments for installation in the tanks. This is done in team cooperation with WHC.

## 2.2 PHASE (B) Scope - Hanford SY Farm Site Preparation for DACS-2a

WHC will provide the team leadership for site preparation of the SY farm for the installation of the DACS-2a facilities to be provided by LANL. WHC shall obtain the assistance of LANL as necessary to install and integrate the facilities to the site. WHC will also utilize KEH engineering and construction talent where appropriate to accomplish site preparation.

WHC's site preparation scope will include the following areas:

1. Develop SY site requirements, design field details, and produce all associated documentation for site preparation. KEH will be utilized where appropriate. WHC will also oversee site construction activities. The site areas to be addressed are:
  - a. Providing Cable Trenches, Poles, etc.
  - b. Providing foundations, roadways, and parking lots
  - c. Providing parking lot and area lighting
  - d. Routing Field Wiring
  - e. Landscaping Facilities Area
  - f. Siting I/O Enclosures
  - g. Siting Instrument Signal Conditioning Enclosures
  - h. Providing Utility Structures and Interfaces
  - i. Extending Utilities (water, sewage, electrical, communications)
  - j. Upgrading the DACS-1 Motor Control Center
  - k. Connecting HLAN and telephone services

2. Procure or oversee procurement of the necessary construction materials to support all items identified in items (a) through (j) above.

### 2.3 PHASE (C) Scope - DACS-2a Facilities Installation & Field Integrations

WHC will provide the team leadership to communicate and coordinate with the responsible WHC organizations to assure all interfaces with the tank mitigation equipment has been identified. WHC will integrate and connect interfaces as necessary to the DACS-2a system. WHC will utilize as necessary the assistance of LANL to install the LANL supplied facilities (DACs-2a), connect SY site utilities, and connect tank 241-SY-103 mitigation equipment.

1. The DACS-2a Facilities Installation team leader will provide interfaces and integration with the items listed below; however, the development, design, procurement and/or fabrication of the listed hardware will be provided by others. DACS-2a team leadership will coordinate with the appropriate cog engineer for each of the areas identified to assure proper interface and system integration:
  - a. In-tank Mitigation Pumps
  - b. In-tank Instrument trees & Monitoring Equipment
    1. Temperature
    2. Pressure
    3. Strain
    4. Levels
    5. Speed
    6. Video
    7. Gas Monitoring
  - c. Fiber Optic Interfaces
  - d. Valve Controls
  - e. Tank Ventilation Hardware
2. The DACS-2a Facilities Installation team leader will coordinate and oversee the field integration and testing of interfaces and connections with the above items and other site support systems necessary to fully integrate and operate the DACS-2a. Those areas not listed above are:
  - a. Basic Electrical Power
  - b. UPS Power
  - c. Emergency Power
  - d. Sanitary & Process Water and Sewage
  - e. Communications Systems (HLAN and Telephone)
  - f. Motor Control Centers
  - g. Weather Monitoring Equipment

## 2.4 PHASE (D) Scope - DACS-2a System & Personnel Operational Readiness

WHC will provide the team leadership with the assistance of LANL, to assure final site Acceptance Testing, personnel training/readiness, and obtaining the necessary Hanford approvals for system startup.

1. The WHC DACS-2a team leader will oversee the validation that all required final site integration and acceptance testing has been completed. TWRS Test Engineering will conduct the testing activities.
2. The WHC DACS-2a team leader will oversee the validation that all required operational and maintenance personnel have been properly trained. He will utilize the assistance of LANL and TWRS Training Organization to assure personnel are operationally ready. The training will include the following:
  - a. Program Management and Supervision Personnel
  - b. Hardware and Software Engineers
  - c. Control System Operational Personnel
  - c. Hardware and Software Maintenance Personnel
3. The WHC DACS-2a team leader will oversee the validation that all required operational documentation has been updated or Engineering Change Notices generated and that documents are properly approved. The documents will include:
  - a. As built drawings
  - b. Hardware and Software specifications
  - b. Operational Procedures
  - c. Operational and Maintenance Manuals which include System Descriptions
  - c. Training Records

## 2.5 PHASE (E) Scope - Transfer DACS-1 Mitigation Control to DACS-2a

WHC will provide the team leadership with the assistance of LANL to transition and reconnect/interface the monitoring and controls for 241-SY-101 from the existing DACS-1 to the new DACS-2a.

1. The WHC team leader will interface and coordinate with LANL and DACS-2a team leader to develop and implement the necessary design interfaces to allow a complete transfer of the necessary operational mitigation data acquisition and control functions associated with 241-SY-101 tank safety mitigation from the existing DACS-1 system to the new DACS-2a. This will include the following:
  - a. Mitigation Pump Motor Controls
  - b. In-tank Instrument Trees and Monitoring equipment
  - c. In-tank Video
  - d. Flammable Gas Monitoring Equipment
  - e. HLAN Interfaces
  - f. Electrical Power controls and distribution
  - g. Telephone communications

2. The WHC team leader will oversee all final acceptance testing of the transferred controls and systems. TWRS Test Engineering will be utilized as required to conduct the testing.

## 2.6 PHASE (F) Scope - Integrate W-211 Waste Retrieval Controls into DACS-2a

WHC will provide the team leadership with the assistance of Project W-211 to oversee the installation and integration of the waste retrieval programs monitoring and control system into the DACS-2a facility.

1. Project W-211 (Waste Retrieval) will design and document the necessary controls, inputs, and interfaces needed to control the waste retrieval systems and subsystems. They will be responsible for routing interface cables from their waste retrieval equipment to the DACS-2a facility.
2. Project W-211 will also procure and provide any additional monitoring and control workstations (above and beyond the DACS-2a mitigation scope) needed for the waste retrieval program. W-211 subsystems and provisions will include such areas as:
  - a. Additional Mixer Pumps
  - b. Waste Transfer Pumps
  - c. Valve controls
  - d. In-tank Monitoring Instruments
  - e. In-tank blending, mixing & Waste Characterization monitors
  - f. Interlocks for cross-site waste transfer lines and valves
  - g. Piping and valve pit leak detection instruments

## 3.0 VERIFICATION

WHC will provide project overview of all six phases (Phase-A through Phase-F) of the DACS-2 project. WHC will verify the WHC requirements are met by routine communications with all lead organizations and points-of-contacts within WHC and LANL throughout the project cycle. The communications will be in the form of telecons, video conferences, on-location visitations, and direct meetings with the appropriate responsible persons. WHC will utilize quality assurance inspections, document reviews, and testing to verify the project progress, work efforts, and final products.

Development of the DACS-2a testing program will be the responsibility of the lead organization.

- a. LANL will develop and implement DACS-2a testing plans, procedures, and test reports for major items provided by LANL to WHC.
- b. The appropriate WHC organization will develop and implement DACS-2a on-site testing plans, procedures, and test reports for the final integration and acceptance testing of the overall control system and facility at the Hanford site.

## 4.0 SAFETY, QUALITY ASSURANCE & ENVIRONMENTAL COMPLIANCE

### 4.1 Approval Levels and Safety Classifications

The following guidelines for selection of approval levels and safety classifications apply to all documents, software, hardware, components, and systems. Approval level and safety class determinations shall be assigned per EP-1.4, WHC-CM-3-5, Section 12.7, and MRP 5.46. All approval levels and safety class determinations shall, at minimum, be reviewed and approved. It is intended that the DACS-2a components and overall system will be designed to a Hanford Safety Class three (SC-3) and supported by a Failure Modes and Effects Analysis (FMEA) to assure the failure modes will be to a safe state for maintaining tank safety.

### 4.2 Safety Assessment

The DACS-2a project and product documentation shall follow strict compliance with all safety controls identified in LA-UR-92-3196, "Safety Assessment for Proposed Pump Operation to Mitigate Episodic Gas Release in Tank 241-SY-101," and WHC-SD-WM-ISB-001, "Hanford Site Tank Farm Facility Interim Safety Basis." In addition, design and operational changes will be implemented as necessary to conform to any safety documentation yet to be released for the tank safety of tank 241-SY-103.

### 4.3 Procurements & Quality Assurance

All materials and components that are procured by WHC shall be procured in accordance with WHC-CM-2-1. All materials and components procured by LANL/subcontractors shall be procured within their respective procurement requirements. Vendor certification, in accordance with the applicable ASTM (or other) material standard, shall be required for all safety class 3 (or higher) purchased materials and components. Available vendor information (VI) and manuals shall accompany the appropriate procurements.

Quality Assurance inspection shall be performed on all WHC safety class 3 (or higher) procurements and work packages in accordance with WHC-CM-4-2. Identification and traceability shall be maintained for all critical items. To the greatest extent possible, all equipment and materials shall be ordered as "off-the-shelf" items.

#### 4.4 Environmental Assessment and Compliance

The environmental assessment and compliance documentation currently in place for the SY farm will be utilized where possible. The generic and general tank farm assessment document is DOE/EA-0915 (Environmental Assessment; Waste Tank Safety Program, Hanford Site Richland). The issue date of the document was Feb. 94 and the Finding-of-No-Significant-Impact (FONSI) was issued by DOE Headquarters Feb. 24, 1994. If the existing SY environmental documentation does not provide adequate generic scope to envelope the new DACS-2a project, then the planned scope of the DACS-2a will be further evaluated to determine if parts of the scope should be deleted. Any area outside the scope of DOE/EA-0915 that remains in the final work scope will have the appropriate National Environmental Policy Act (NEPA) documentation produced. Compliance with the Federal Code of Regulations 10CFR-21 will apply.

## 5.0 DOCUMENTATION

### 5.1 Checklist & Responsibilities for Documentation

The deliverable documents judged necessary to support the DACS-2a project shall meet the requirements shown in the previously released Functions and Requirements document WHC-SD-WM-FRD-014, section 7.13.

The following TWRS "Acceptance-for-Beneficial-Use" checklist clarifies which specific documents are required and the company and/or organization responsible for delivering the required documents. The schedules for delivery are shown in section 10. Typically, when other organizations within WHC and/or its sub-contractors are utilized to conduct work activities, or deliver documentation, the work to produce the documentation will be initiated and defined by one or more of the following:

- a. Letter-of-Instruction (LOI)
- b. Statement-of-Work (SOW)
- c. Internal Work Order (IWO)
- d. External Work Order (EWO)

WHC organizations responsible for documentation shall supply one (1) original and four (4) work copies of all final documents. Contracted companies shall also provide one (1) original and four (4) work copies of all documents they have responsibility for. One copy of all documentation will be retained in a central project file managed by the DACS-2a lead engineer. The original will be formally released into the WHC central files for maintainability and retrieval. One copy will be forwarded to the TWRS Engineering organization, one copy to TWRS Operations, and one copy to TWRS Training Organization.

**DOCUMENTATION CHECKLIST for  
ACCEPTANCE - FOR - BENEFICIAL - USE**

✓	DESCRIPTION	RESPONSIBLE	✓	DESCRIPTION	RESPONSIBLE
	<u>ENGINEERING</u>			<u>ENGINEERING cont'd</u>	
Y	Engineering Work Plan (EWP)	WHC Engr'g Support	Y	IEFD Drawing(s)	WHC Engr'g Support
Y	Activity Schedule	WHC Engr'g Support	Y	Drawing Tree	WHC Engr'g Support
N/A	Final Safety Analysis Report (FSAR)	(see LANL work)	Y	Incorporate outstanding project generated ECNs	WHC Engr'g Support
N/A	Interim Safety Basis - update	N/A	N/A	Hazardous Waste Disposal Plan/Procedure(s)	N/A
Y	Safety Assessment	LANL	N/A	Solid Waste Disposal Plan/Procedure(s)	N/A
Y	Safety Equipment List	TWRS Engineering	Y	Software Configuration Management Plan	WHC Operations
N/A	Operational Safety Requirements (OSR)	N/A	Y	System Requirements Specifications	LANL
Y	Operational Safety Document(s) (OSD)	WHC/LANL	Y	Software Design Description	LANL
Y	Functional Design Criteria (FDC)	LANL/WHC		<u>TRAINING</u>	
Y	Conceptual Design Report (CDR)	LANL	Y	Training Plan	TWRS Training
N/A	Supplemental Design Requirements Document (SDRD)	N/A	Y	Training Manuals	TWRS Training
Y	System Design Description (SDD)	LANL	Y	Training to Operating Crews	TWRS Training
Y	Test Specifications	WHC Test Engineering	Y	Training to Maintenance Crews	TWRS Training
Y	Acceptance Test Procedures (ATPs)	LANL/WHC Test Engineering		<u>OPERATIONS/MAINTENANCE</u>	
Y	Operational Test Procedures (OTPs)	WHC Operations	Y	Operating and Maintenance Manuals	LANL
Y	Environmental Assessment	See DOE/EA-0915	Y	Operating Procedures	WHC Operations
N/A	Environmental Report	N/A	Y	Surveillance Procedures	WHC Operations
Y	Environmental Permit	See DOE/EA-0915	Y	Calibration Procedures	WHC Operations
N/A	Stress/Seismic Analysis	N/A	Y	Preventative Maintenance Procedures	WHC Operations
N/A	Stress/Design Report	N/A	TBD	CRBS Data Sheets	TBD
Y	Design Specifications/Report	See WHC & LANL FDC's		<u>QUALITY ASSURANCE</u>	
Y	Equipment Specifications	Vendor Supply	Y	Inspection Plan	WHC QA
Y	Procurement Specifications	LANL	Y	Qual. Assur. Project Plan ( QAPJP)	WHC QA
Y	Construction Specifications	WHC Engr'g Support		<u>PROCUREMENT ACTIVITIES</u>	
N/A	Essential Material Specifications	N/A	Y	Vendor Information Files	LANL
Y	Final Design Drawing(s)	LANL/WHC	Y	Spare Parts List	LANL
Y	Installation Drawing(s)	WHC Engr'g Support	Y	Stock Spare Parts	WHC Engr'g Support
Y	As-built Drawing(s)	LANL/WHC Engr'g Support		<u>DECOMMISSIONING</u>	
Y	Interface Control Drawing(s)	LANL/WHC Engr'g Support	Y	Facility Decommissioning Plan	WHC Engineering Support

## 6.0 ORGANIZATIONAL RESPONSIBILITIES

The task responsibilities are outlined in the following sections. Approval signatures on the Engineering Data Transmittal (EDT) of this document indicate those persons and their associated organization who agree to provide leadership for the task responsibilities and schedules contained within this document. Some of the responsibilities shown below have previously been agreed to by organizations not included for approval signature on this document's EDT.

### 6.1 LANL

Project Manager  
Lead Control System Engineer  
Lead Structure Engineer

1. Provide lead engineering support for development of hardware, software, and structures for DACS-2a project.
2. Provide all procurement activities for all hardware, software, and structures.
3. Provide cost and schedule estimates.
4. Assist in the generation of documentation.
5. Provide new equipment calibration information per manufacturer's recommendations.
6. Review and provide pertinent ABU documentation.
7. Provide a recommended spare parts/equipment list for all equipment.
8. Transfer applicable property and software licenses to WHC.

### 6.2 WASTE TANK HYDROGEN MITIGATION

Program Manager

1. Provide Funding and Program Direction for DACS-2a project

### 6.3 WHC TWRS SAFETY PROGRAMS ENGINEERING SUPPORT

Lead Manager  
Lead Engineer

1. Provide engineering direction and support to LANL as required to ensure WHC technical and administrative requirements are satisfied.
2. Act as the WHC Point-Of-Contact (POC) with LANL for the exchange of information and documentation.
3. Provide implementation of DACS-2a work plan.
4. Ensure WHC organizations respond in a timely and sufficient manner to provide engineering, drafting, clerical, and technical writing support for program deliverables.
5. Establish WHC organizational responsibilities and work assignments.

## 6.4 TEST ENGINEERING

Cognizant Manager  
Cognizant Engineers

1. Perform Hanford Acceptance Test Procedures (ATP).

## 6.5 WASTE TANK QUALITY ASSURANCE

Cognizant Manager  
Cognizant Engineer

1. Review and approve all ABU documentation as it pertains to quality engineering.
2. Perform the necessary surveillance and inspection activities to assure conformance to the appropriate documents and procedures throughout the upgrade effort.
3. Perform design verification activities to ensure that the as-built engineering documentation reflects final system configuration.
4. Review and approve safety class and approval level designations.

## 6.6 SAFETY ASSURANCE

- Cognizant TWRS Safety Manager
- Cognizant TWRS Safety Engineer

1. Review and approve all ABU documentation where applicable to safety. Verify compliance with the mitigation safety assessment and the tank farm interim safety basis.

- TWRS Industrial Health/Safety Manager
- Fire Protection Cognizant Engineer

1. Review and approve all DACS-2a facility designs for compliance industrial health and safety requirements including fire protection.
2. Provide general fire protection guidance and industrial safety design recommendations to the responsible engineering design organizations.

## 6.7 WASTE TANK FARM OPERATIONS

Cognizant Operations Manager  
Tank Farm Technical Support Manager  
Tank Farm Technical Support Cog Engineer  
Operations Tech. Support Point-of-Contact

1. Advise, review, and approve ABU documents (design, etc. as necessary).
2. Provide qualified craft and operations personnel for DACS-2a, as it becomes operational.
3. Maintain and upgrade the system as necessary.
4. Function as the property owner of the DACS-2a system.

## 6.8 WEST TANK FARMS SYSTEMS ENGINEERING

West Systems Engineering Manager  
SY Farm Cognizant Engineer

1. Coordinate SY farm overall systems integrations.
2. Act as the SY farm point-of-contact for overall farm management.
3. Advise, review, and approve applicable functional and design criteria, subsystem and system designs, safety, training, operating, and maintenance documents.
4. Accept primary engineering responsibility for the system design provided by this project following approval of all ABU documentation by Waste Tank Operations (WTO).

## 7.0 MILESTONE GOALS

The DACS-2a project schedules, shown in section 10.0, depict the primary task and top level deliverables. The following are milestone goals which will be developed into official milestones within the Flammable Gas Mitigation Program Schedule. The schedule details within this document will not be revised and maintained current in this work plan, but will be maintained on a weekly basis by the manager of Waste Tank Hydrogen Mitigation.

The work plan's detail schedules will initially be inputted to the WHC Safety Mitigation Program schedule which will track the work plans progress. Progress and adjustments to the schedule's milestones will be maintained separate from this work plan and inputted and "rolled-up" and updated into higher level program milestones on a routine basis by Program Management.

The following is a listing of sequential calendar dates of the major DACS-2a program milestone completions. No work initiation dates have been established as milestones. The emphasis is placed upon work completion dates in order to support the Safety Mitigation Program Schedule.

1. November 24, 1994      LANL -      Complete procurement specification for DACS-2a control system.
2. January 27, 1995      LANL -      Complete the design of the DACS-2a facility structures.
3. February 8, 1995      LANL -      Award contract for DACS-2a hardware/software control system.
4. March 31, 1995      WHC -      Complete the design of the SY Farm DACS-2a site preparation.
5. March 31, 1995      LANL -      Award contract for DACS-2a facility structure.
6. July 12, 1995      LANL -      Deliver DACS-2a structure to Hanford.
7. July 12, 1995      WHC -      Complete construction for the SY Farm DACS-2a site preparation.
8. December 1, 1995      LANL -      Complete assembly and preliminary testing of DACS-2a integrated control system and facility, at Hanford.
9. February 12, 1996      WHC -      Complete SY Farm integration final Hanford acceptance testing of the DACS-2a control system and facility.
10. March 1, 1996      WHC -      Complete Operational Readiness Review, operator training, and initiate system startup.

## 8.0 WORK BREAKDOWN STRUCTURE

The following is a set of outlines and diagrams of the required tasks to provide the hardware, software, facilities, and operations deliverables, along with the assigned responsibility. For this section 8.0, reference should be made to the module diagram "Figure 3 Flammable Gas Mitigation System Modules" shown on page 5 of the DACS-2 Functions and Requirements document WHC-SD-WM-FRD-014.

As previously note, the DACS-2a project is broken down into six (6) phases. These include: Phase (A) the control systems, Phase (B) site preparation, Phase (C) field integration, Phase (D) operational readiness, Phase (E) transfer DACS-1 to DACS-2, and Phase (F) integrate W-211.

The control system consists of all the modules that will be needed for the DACS-2a to perform its mission. Site preparation includes all of the work that must be done before and while the DACS-2a facilities are installed for the systems to operate. Systems field integration consists of interfacing, subsystem testing, and oversight of all the site system modules. In addition it assures integration of the documentation process. Operational readiness and startup is the result of the previous modules and includes the validation of final acceptance testing and training.

The following List 1.0 is a program listing of planned activities at SY farm. The work is divided into three main program areas. A work breakdown is made by subdividing these three program areas into specific sub-projects (work activities or tasks) with special identification (I.D.) numbers assigned to some items that must be interfaced with the Hydrogen Mitigation supervisory control system. The purposes of the special "S" numbers are:

- 1) For better identification of select documentation.
- 2) to enhance verbal communications between programs.
- 3) Help clarify the scope (boundaries) of work for each activity to assure all interfaces are provided where needed.

The long-term vision for the SY farm supervisory consoles is to provide 3-D models of the farm structures and interfaces. Also included would be on-line procedures of the farm systems and graphical control and data information that would be interfaced to the Hanford central information system such as TMACS or other future central systems.

The work task should provide the DACS-2a control system expandability to supervise all appropriate SY farm controls and data information and provide space for relocating select alarms from the 242S-Evaporator Building (once that facility has been closed) to the DACS-2a. The work task should also provide ability to expand the DACS-2a to an area control system (similar to the W-314 concept) to supervise other farms such as "S" & "U" farms should that be desired in the future. The DACS-2a will initially be configured to control SY-103 and later all mitigation/mixer pumps in all other SY tanks requiring mitigation or retrieval.

As previously noted the DACS-2a is the I.D. for the SY farm. There are plans to clone the control system into a DACS-2b for AW farm and DACS-2c for AN farm.

A team effort is required to manage, fund, and accomplish the vision of the new SY farm. SY farm will be utilized for a number of years during the waste retrieval process.

LIST 1.0 WORK BREAKDOWN STRUCTURE PROJECT NUMBERS

(List Rev. Date 9/23/94)

NOTE: All items designated with an "S" series number is a special number issued by the WHC Projects control office (Kay Walter 376-7290) which has been issued to internally coordinate and manage WHC project type efforts. The "S" numbers will not be status by the Project office (unless requested) nor will they be identified in the routine reporting of the "W" series projects.

Bob Conner is currently assigned as the Point-of-Contact for all "S" series numbers until agreements are reached and reassignment made to the proper person/organization or another TWRS numbering/tracking system is identified. \* = Design Organization

NOTE: Also note that an alternate numbering/management system is available for use for activity management. TWRS Remediation System's "Task Plan" desk instruction is utilized by some TWRS organizations. They issue tracking identification numbers with a prefix of "ETN" which can be referenced on drawings, documents, etc. to help manage, track, and tie task, designs, and systems together in a central data base. The "ETN" numbers are issued only by the Document Control Release Station #4 in the 200 area, P.O.C. Kathy Epperley 373-2995.

1. SY Farm - HYDROGEN MITIGATION PROGRAM - Special Project S-300

S-301 (* LANL)	SY Farm Data Acquisition & Control System (DACS-2a) Supervisory Control, Project
S-302 (* LANL)	SY Farm DACS-2a Control Facility
S-303 (* LANL)	SY Farm Office Facility
S-304 (* KEH)	Facility foundations/parking, facilities installations on site, and site landscaping
S-305 (* KEH)	Cable trenches, routing, and final field connections and operational readiness
S-306 (* WHC/LANL)	SY 103 Motor Control & I/O Module installations and final field connections
S-307 (* KEH)	Nitrogen Supply Tank design, installation and operational readiness
S-308 (* WHC/LANL)	Gas Monitoring System designs, installations, testing, and operational readiness
S-309 (* WHC)	SY-101 Mitigation Pump Removal & Replacement
S-310 (* WHC)	SY-103 Mitigation Pump Installation
S-311 (* WHC)	Dual Purpose Mitigation/Mixer Pump Design/Fab/Testing
S-312 (* WHC)	In-tank & Farm overview Video System
S-313 (* WHC/LANL)	Transition of SY-101 controls from DACS-1 to new DACS-2a and operational readiness

2. SY Farm - WASTE RETRIEVAL PROGRAM - PROJECT W-211

S-314 (* KEH)	Integrate Controls for Mixer & Transfer Pumps and Valve controls into DACS-2a facility & operational readiness
S-315 (* KEH)	Retrieval Interface Building (RIB) {MCC & I/O}
S-316 (* KEH)	Waste Retrieval Support Systems
S-317 (* KEH)	SY Northwest corner fence relocation
W-322 (* KEH)	Electrical Substation & Power Distribution & Fiber Optics Upgrades

3. SY Farm - GENERAL TANK FARM UPGRADES PROGRAM

S-318 (* KEH)	Emergency Generator Facility
S-319 (* KEH)	SY Farm Road Upgrade
S-320 (* WHC/KEH)	Tank Exhauster Upgrades
S-321 (* WHC/KEH)	In-Tank Instrument Upgrades
S-322 (* WHC/KEH)	SY farm north side road upgrades
W-365 (* KEH)	Breathing Air System
W-058 (* WHC/KEH)	Cross-site Transfer Line Interfaces at SY Farm

The following sections are outlines of what each individual task area and module is made up of, followed by self explanatory diagrams demonstrating how they interact with each other. The DACS-2 project's top level System Project Diagram is shown in Figure 1-a. This diagram shows the flow and relationship of the DACS-2a system work areas. The starting point of the project is to receive vital design and requirements information from those organizations responsible for the mitigation and waste retrieval equipment and their associated operations. Next are the three parallel efforts necessary to provide a control system, facility, and Hanford site to place and connect the facility. These are followed by the Hanford on-site integration of the system and facility to the tank farm and mitigation equipment. Then there are the other follow-on parallel efforts to train personnel, ready the facility for operations, operate, maintain, and manage system data.

The overall system is sub-divided into subsystem projects which in general follow a common Subsystem Project Cycle from design through system startup. The subsystem project cycle is shown in Figure 1-b. From these two basic diagrams we move into more specific diagrams that reflect task elements as related to the "Flammable Gas Mitigation System Modules" shown in "Figure 3" of the associated Functions and Requirement document WHC-SD-WM-FRD-014.

Figures 1-a and 1-b of this document require project coordination for the life cycle of the facility. They relate with System Module #1 "PROJECT COORDINATION" of the functions and requirement document.

The next key system module is System Module #2 "DOCUMENTATION" from the functions and requirement document. There are a number of key documents such as the DACS-2 functions and requirements, functional design criteria, safety assessments, etc. that document and guide the work to be accomplished on the program. The Documentation Project Cycle is shown in Figure 3 of this document.

The DACS-2a functions and requirements in conjunction with the necessary follow-on work tasks are primarily derived and subsequently track the technical requirements and schedule of the tank mitigation hardware and future waste retrieval hardware.

#### Out-of-Scope Task: Tank Mitigation Hardware (WHC)

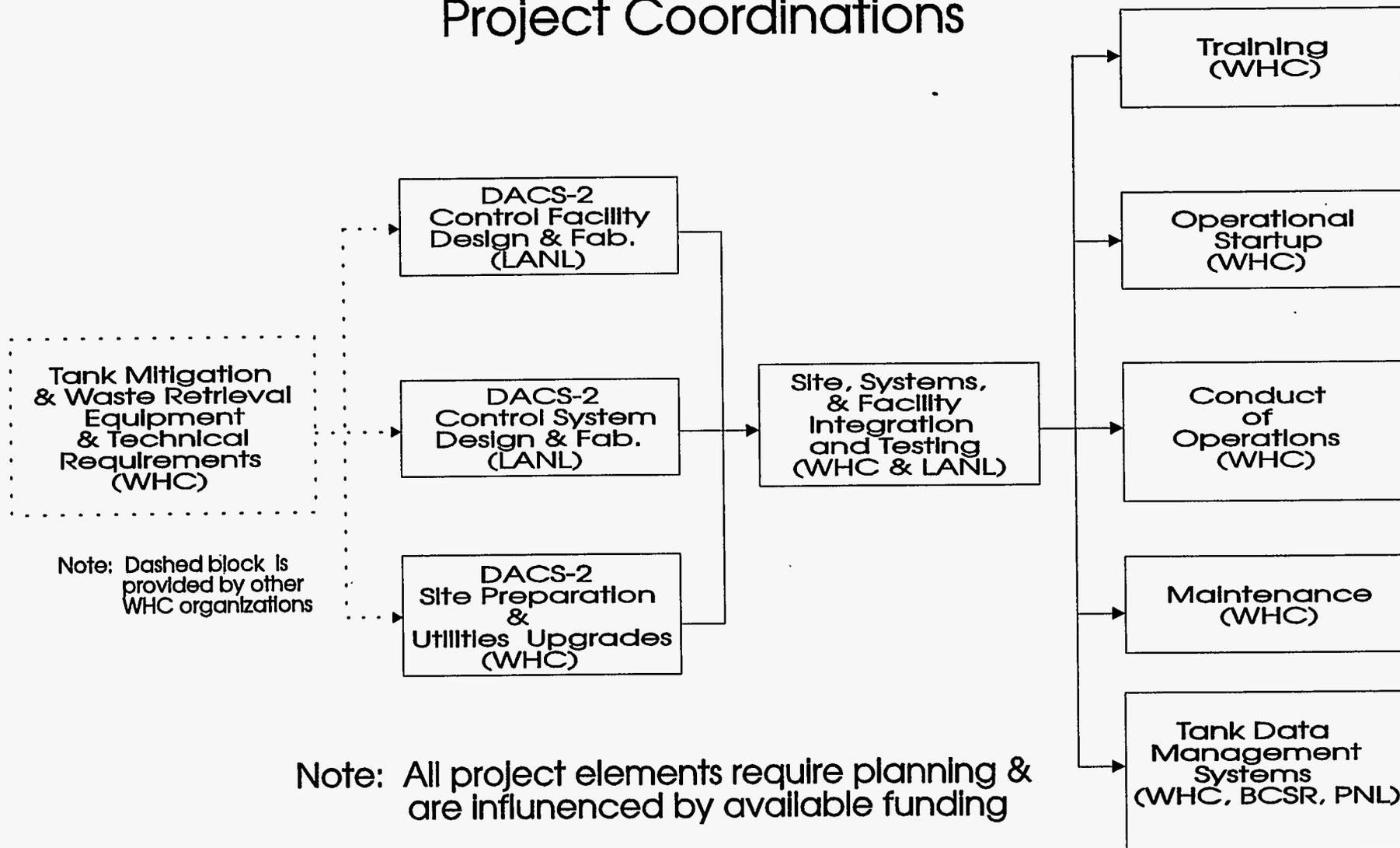
This task is outside the scope of this work plan. It is being managed by WHC TWRS Engineering but requires project interface communications to assure the proper DACS-2a technical requirements, functions, interfaces, and integration. This task outline relates to System Module #6 "TANK MITIGATION HARDWARE" of the DACS-2 functions and requirements document. The sub-task are as noted below.

- a. Functions and Requirements Document
- b. Function Design Criteria
- c. In-Tank Instruments
- d. Mitigation Pumps
- e. Design and Fabrication
- f. In-Tank Installations
- g. Tank Farm Miscellaneous
- h. Valve Controls
- i. Tank Ventilation Hardware
- j. Special Housings and Other

# System Project Diagram System Module #1 Project Coordinations

DACS-2\_1.cdr  
10/4/94  
Corel Draw

Figure 1-a: System Project Diagram



# Subsystem Project Cycle System Module #1 Project Coordination

DACS2sub.cdr  
10/04/94  
Corel Draw

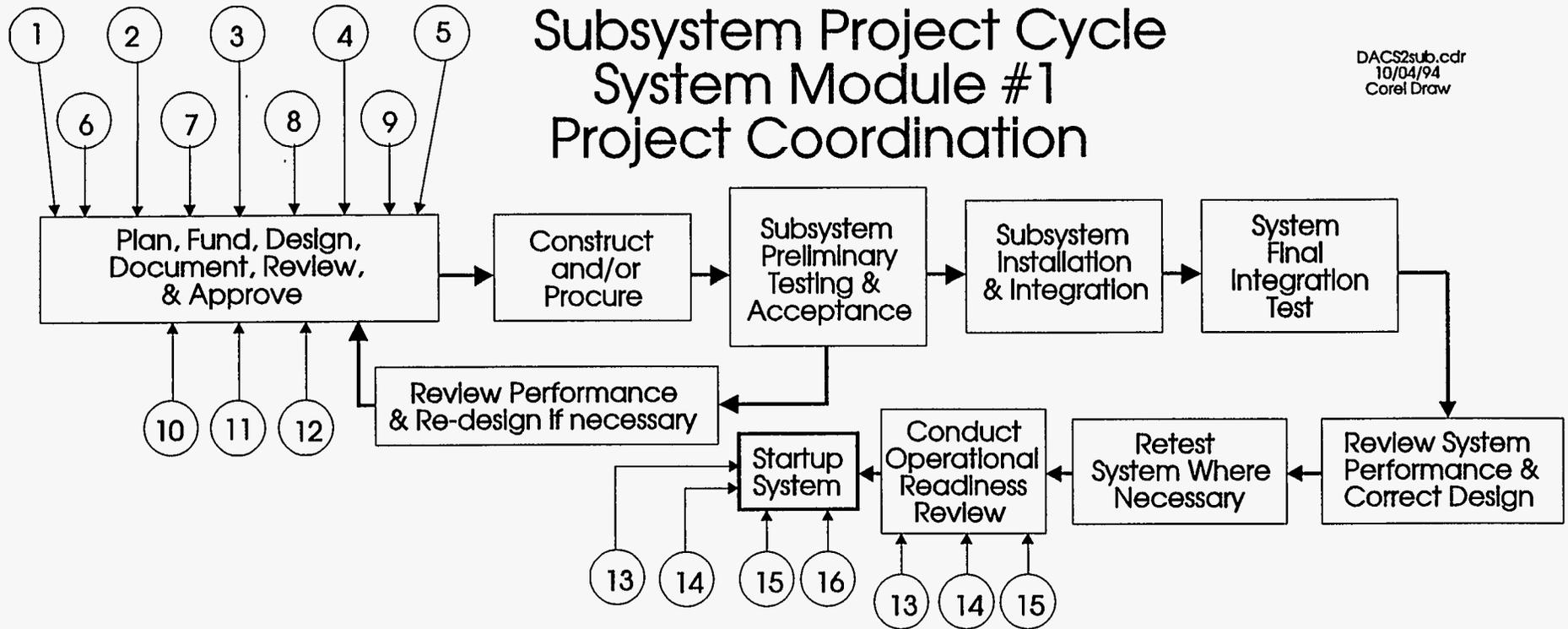


Figure 1-b: Subsystem Project Cycle

## ○ Subsystem Functions & Requirements and \*Constraints

1. Computer Hardware
2. Computer Software
3. Input/Output Modules
4. In-tank Instrumentation & signal conditioning
5. In-tank Mitigation Equipment/pumps
6. Facility Electrical, water, sewage, phones, HLAN
7. Facility UPS
8. Facility HVAC
9. Facility Fire Detection & Suppression
10. Facility Area lighting
11. Facility roads and parking
12. Structures & Enclosures (above & below ground)

- \*13. Complete Hardware/Software
- \*14. Complete System Documentation and Operating Procedures
- \*15. Available Trained Ops & Maintenance Personnel
- \*16. Management Authorization to start operations (signatures)

# System Module #2 Documentation Project Cycle

DACS-2.2.cdr  
10/4/94  
Corel Draw

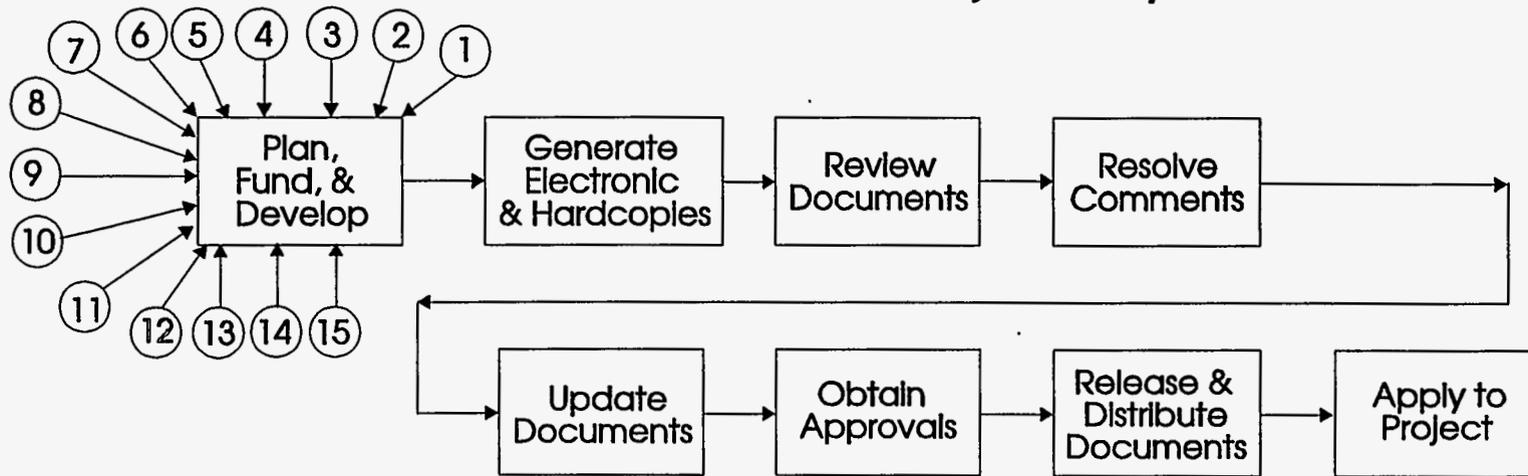


Figure 2: Documentation Project Cycle

## ○ Technical & Functional Inputs for Documentation Generation

1. DACS-2 Functions & Requirements
2. DACS-2 Control System Functional Design Criteria
3. DACS-2 Facility Functional Design Criteria
4. DACS-2 Site Functional Design Criteria
5. Tank Farm Facility ISB Upgrade (WHC-SD-WM-ISB-001)
6. Environmental Checklist & Evaluation of DOE/EA-0915
7. Upgrade Tank Farm Safety Equipment List
8. Upgrade Mitigation Program Management Plan
9. Conceptual Design Report
10. Hardware & Software Specifications
11. Work, Test, and Training Plans & Procedures
12. Test Reports
13. As-built drawings & Document Upgrades
14. Operating Procedures
15. Operational Readiness Review Report & Approvals

The following sub-levels of this section 8 outline the DACS-2 task and responsible organizations as related to the Flammable Gas Mitigation System Modules referred to in the previous paragraphs.

## 8.1 PHASE (A) Control System [Sub-projects S-301, S-302, S-303]

### Task 2.A Field Instruments (WHC & LANL)

This task is being managed by WHC TWRS Engineering but requires project communications to assure the proper DACS-2a interfaces and integration. Like the tank mitigation hardware module, this knowledge about the selection by WHC of the in-tank instrumentation is required to be provided to LANL for technical interface requirements for the development of the DACS-2a. This task outline relates to System Module #8 "FIELD INSTRUMENTS" of the DACS-2 functions and requirements document. The sub-task within this work plan are as noted below.

- a. Functions and Requirements Document
- b. Functional Design Criteria
- c. Instrument Type: Temperature, Pressure, Strain, Level, Speed
- d. Instrument Signal Conditioning
- e. Selection and Procurement

### Task 3.A I/O Hardware (LANL)

The selection of I/O hardware is being managed by LANL in conjunction with information and requirements from WHC and WHC overview. It is envisioned that the LANL system vendor will select the I/O type and manufacture as a part of his integrated system design. This task outline relates to System Module #9 "I/O HARDWARE" of the DACS-2 functions and requirements document.

- a. Functions and Requirements Document
- b. Functional Design Criteria
- c. Field Instrument Types
- d. Smart Monitoring and Control Requirements
- e. Technology and Product Availability
- f. Heating and Cooling Requirements
- g. Power Requirements
- h. Electrical Interface Methods
- i. Physical Sizing and Attributes

#### Task 4.A Operator Control Hardware (LANL)

The selection of control hardware is being managed by LANL in conjunction with information and requirements from WHC with WHC overview. This task outline relates to System Module #11 "OPERATOR CONTROL HARDWARE" of the DACS-2 functions and requirements document.

- a. Functions and Requirements Document
- b. Functional Design Criteria
- c. Operator Work Station Layout
- d. CRT Monitor Size
- e. Data Storage Devices
- f. Video Equipment Access and Visibility
- g. Frequency of Use

#### Task 5.A DACS-2a Networking Systems (WHC & LANL)

This task as related to Phase (A) is being managed by LANL teaming with WHC, BCSR and other BCSR network organizations to define the requirements and criteria necessary to design, interface, and make operational the LANL control system. This task outline relates to System Module #12 "NETWORK SYSTEMS" of the DACS-2 functions and requirements document.

- a. Functions and Requirements Document
- b. Functional Design Criteria
- c. RF Link
- d. TMACS
- e. Data Archiving Requirements
- f. Fiber Optic Interfaces
- g. HLAN Interfaces
- h. Assembled I/O Racks
- i. Field Instruments

#### Task 6.A Operating Software (LANL)

The selection of system software is being managed by LANL in conjunction with information and requirements from WHC and WHC overview. This task outline relates to System Module #10 "OPERATING SOFTWARE" of the DACS-2 functions and requirements document.

- a. Functions and Requirements Document
- b. Functional Design Criteria
- c. Basic Control and Monitoring Requirements
- d. Data Archiving
- e. Graphical Screen Development
- f. Analysis
- g. Communications
- h. DACS-2a Network
- i. Motor Control Centers
- j. Data Storage Devices
- k. Weather Monitoring Software

### 8.2 PHASE (B) Site Preparation [Sub-projects S-304, S-305, S-306]

#### Task 1.B Site Preparation (WHC & KEH)

This task is being managed by WHC utilizing design and construction support from KEH and WHC. This task outline relates to System Module #4 "SITE PREPARATION" of the DACS-2 functions and requirements document.

- a. Review Functions and Requirements
- b. Draft Work Plans
- c. Generate Functional Design Criteria
- d. Subcontractors provide detail designs
- e. Provide Conduit Trenches, Poles, etc.
- f. Route Field Wiring
- g. Extend Utilities & connect to facility & equipment
- h. Landscape Structure Locations

#### Task 2.B Utility Support Systems (WHC & KEH)

This task is being managed by WHC utilizing design and construction support from KEH and WHC. This task outline relates to System Module #5 "UTILITY SUPPORT SYSTEMS" of the DACS-2 functions and requirements document.

- a. Functions and Requirements
- b. Basic Electrical Power
- c. UPS Power
- d. Sanitary Water and Sewage
- e. Communications
- f. Motor Control Centers
- g. Weather Monitors

### Task 3.B Facility Structures (WHC & LANL & KEH)

LANL has responsibility for providing the project management for the design and fabrication of the DACS-2a facility structures. WHC is responsible to provide funding from the WHC Program's office. In addition WHC must provide design information, documentation support, and technical and operational requirements from WHC to LANL. WHC has also responsibility to monitor LANL's progress and program accountability. This task outline relates to System Module #7 "FACILITY STRUCTURES" and System Module #2 "DOCUMENTATION" of the DACS-2 functions and requirements document.

- a. Design and fabrication of DACS-2a Facilities (LANL), including I/O and Instrument housings.
- b. Functions and Requirements (WHC)
- c. Facility Functional Design Criteria (WHC) with assistance from LANL
- d. SY farm site Utility Structures (WHC)
- e. SY farm siting of Instrument Signal Conditioning Enclosures (WHC)
- f. SY farm siting of I/O Enclosures (WHC)

### Task 4.B Networking Systems (WHC & LANL)

This task of site preparation for interface with the Hanford and DACS-2a networking systems is being managed by WHC teaming with BCSR and LANL. The focus is to assure the necessary interface cables and hardware have been put into place at the site. This task outline relates to System Module #12 "NETWORK SYSTEMS" of the DACS-2 functions and requirements document.

- a. DACS-2a Distributed Control
- b. Fiber Optics Interfaces
- c. HLAN Interfaces
- d. Field Instruments
- e. TMACS

### 8.3 PHASE (C) Systems Field Integrations [Ref. Sub-project S-305 & S-306]

#### Task 1.C Integrate Controls and Site Prep. Subsystems (WHC)

This task is being managed by WHC.

#### Task 2.C Draft O&M Procedures (WHC & LANL)

This task is being jointly managed by WHC teaming with LANL along with WHC TWRS Operations.

- a. I/O Hardware
- b. Operations Software
- c. Operator Control Hardware
- d. Network Systems
- e. Utility Systems

### 8.4 PHASE (D) Operational Readiness and Startup

The following tasks are being managed by WHC and LANL.

#### Task 1.D Training (WHC & LANL)

The task of training personnel for DACS-2a operations and maintenance is being managed by WHC teaming with TWRS Training. The objective is to validate all required operational and support personnel are adequately trained and ready for startup. This task outline relates to System Module #13 "TRAINING" of the DACS-2 functions and requirements document.

- a. Develop preliminary training procedures for basic system operation
- b. Pre-train WHC select personnel at LANL & finalize draft training procedures
- c. Train WHC Engineers at Hanford
- d. Train WHC Operators at Hanford
- e. Train WHC Maintenance Personnel at Hanford

#### Task 2.D Testing (LANL & WHC)

This task has elements required at either the LANL site or the Hanford site. The objective is to assure and validate all final acceptance testing and test reports are complete and can support startup. This task outline relates to System Module #16 "CONDUCT-OF-OPERATIONS" of the DACS-2 functions and requirements document. The testing involves the following task:

- a. Vendor subsystem testing
- b. LANL integration hardware and software testing
- c. System Acceptance Testing
- d. Hanford final site integration operational readiness testing

### Task 3.D Operational Readiness Review

This task involves establishing an Operational Readiness Review Board (ORRB) and initiate their review process. It also requires obtaining all necessary Startup Approval signatures. This task outline relates to System Module #13 "CONDUCT-OF-OPERATIONS" of the DACS-2 functions and requirements document.

## 8.5 PHASE (E) Transfer DACS-1 Controls to DACS-2a [Ref. Sub-project S-313]

The following tasks are being managed by WHC teaming with LANL. This task outline relates to System Module #3 "SYSTEM INTEGRATION & TRANSITIONS" of the DACS-2 functions and requirements document.

- Task 1.E Evaluate and identify the essential DACS-1 data acquisition signals, tank monitors, video signals, and control features required to be transferred from DACS-1 to DACS-2a in order to support 241-SY-101 "operational" mitigation. Keeping in mind that the SY-101 "mitigation testing program" has been completed and thus only those items necessary for operational mitigation should be required for transfer.
- Task 2.E Design, procure, and/or fabricate the necessary schemes and methods to transfer the essential SY-101 mitigation signals (instrumentation/video) and controls features to DACS-2a.
- Task 3.E Plan, coordinate, and execute the transfer of DACS-1 essential features and controls to DACS-2a in a manner which will minimize any impact on tank farm operations and the routine mitigation of tank SY-103.

## 8.6 PHASE (F) Integrate Project W-211 into DACS-2a [Ref. Sub-project S-314]

The following task is being managed by WHC teaming with Project W-211 management and engineering. This task outline also relates to System Module #3 "SYSTEM INTEGRATION & TRANSITIONS" of the DACS-2 functions and requirements document.

- Task 1.F Identify and allocate the required physical space within the DACS-2a facility to add the future control workstations and interfaces necessary to support Project W-211.

**NOTE: \*** These future task are not included in the scope of this work plan are as follows:

- \*Task 2.F Plan and coordinate the design and provision of the necessary interfaces between the W-211 monitoring and control system and DACS-2a monitoring and control system.
- \*Task 3.F Plan and coordinate the field connections and integrated testing and readiness of the new integrations.
- \*Task 4.F Plan and coordinate the updating of all required system documentation.
- \*Task 5.F Plan and coordinate the re-training of operators and maintenance personnel.

## 9.0 WBS FLOW, INPUTS and/or CONSTRAINTS

Section 9 provides support of the work breakdown structure utilizing a graphical view of the project process and major work task as related to the Flammable Gas Mitigation System Modules identified in the Functions and Requirement WHC-SD-WM-FRD-014, Figure 3. Section 9 contains some limited discussion on the diagrams. In general, the following "system module" WBS figures are simple and self explanatory.

This section presents a specific diagram constructed for each system engineering module of the DACS-2a project. The idea behind this was to see what parts of the basic engineering process for each module were effected by other parts of other modules. This gives a better idea of what tasks must be done first, and what the critical paths for the project are.

The circled numbers on the following figures correspond to either inputs and/or constraints to that specific part of the work process. They are identified on a list below the figure.

### 9.1 System Module #1 - System Project Diagram (Ref. Figure 1-a - previous page 19)

The primary input to the system project is the program management plan/direction and project funding. The system project diagram illustrates the top level flow of the DACS-2a work and responsibilities. Both the design and construction of the control systems, site, and utilities must go on concurrently. This way there is no lag time waiting for a task to be completed to allow the project to continue. Systems integration oversees the progress of all modules and brings them together at the proper time for testing and startup. Conduct-of-operations begins at the time of systems integration and testing and continues through eventual tank farm operation of the DACS-2a system. Maintenance begins after systems integration, and continues until the system is retired.

### 9.2 System Module #1 - Subsystem Project Cycle (Ref. Figure 1-b - previous page 20)

The subsystem project cycle is the process which applies to each system module. The major inputs are the functions and requirements and adequate funding to initiate design of each subsystem required to assemble a complete DACS-2a control and office facility. The work process consists of the following basic work areas:

1. Design  
The process starts off with conceptual design, detailed design, and prototyping where needed.
2. Construction/Procurement  
The process continues with selecting supply and/or construction vendors and overseeing their subsystem construction and/or procurement activities.
3. Preliminary Testing  
Once hardware and/or software is available, preliminary testing of subsystems and necessary calibrations for fulfillment of design expectations are conducted. The results of the test are documented.

4. Subsystem Performance Review  
From the test results, performance of the system is reviewed against the design and test criteria. Any part of the design or subsystem that fails preliminary testing will go through additional design reviews to find faults in the design or construction. If necessary, a redesign will be performed or a different product will be procured.
5. Installation & Integration  
The subsystem is installed and integrated with all other elements of the DACS-2a system. In addition, integration of site utilities and other influencing projects will occur.
6. Final Integration Testing  
Once all subsystems are integrated, testing will begin on the entire system. Any problems found must be worked out before operational startup begins.
7. Review System Performance & Correct Design  
A review of the overall integrated system performance experienced during the final integrated system test must be conducted. If the performance does not meet the test and design specifications then the appropriate system design corrections should be made.
8. System Retest after Modifications  
If design mods are required, then the appropriate parts of the system must be retested.
9. Operational Readiness Review for Startup  
When all the testing, training, and documentation has been completed, then an Operational Readiness Review Board (ORRB) and be assembled who will validate the readiness of the "hardware/software", "people", and "documentation". The necessary authorized signatures can then be obtained that will allow operations to begin.
10. Startup System  
The system can now be "turned over" to its final "line level" management organization who will take ownership of the system and begin long-term operations and maintenance of the system.

### 9.3 System Module #2 - Project Documentation Cycle (Ref. Figure 2 - previous page 21)

The documentation project cycle is the process each document associated with the DACS-2a project must go through to be approved and used. The process consists of:

1. Plan, Fund, & Develop  
Brain storm, conceive ideas, outline objectives and functions, identify issues and potential resolutions.
2. Generate Electronic & Hardcopies  
Draft and write the documents and drawings using electronic medium.
3. Review  
Submit the documents to be reviewed and critiqued.
4. Resolve Comments  
Discuss and agree upon resolutions to reviewers comments and communicate resolutions to other parties prior to document revisions to assure acceptance.

5. Update  
Revise the documents where necessary to incorporate resolutions to comments and issues.
6. Obtain Approvals  
Obtain final approval of revised documents.
7. Release & Distribute  
Officially release the documentation and distribute it to the appropriate organizations and people.
8. Apply to Project  
Apply the documentation to the intended project.

#### 9.4 System Module #3 - System Integration & Transitions (Ref. Figure 3)

The individual parts of the DACS-2a system must be integrated together. In addition, the DACS-2a must be integrated with the W-211 Waste Retrieval project and all other projects that affect the SY farm mission and operations.

A transition from the existing DACS-1 control facility, along with a transition from flammable gas mitigation to waste retrieval mission must also occur. Some of the key inputs and constraints are the top level Hanford mission decisions, waste characterization program, size of the mitigation/mixer pumps, etc.

#### 9.5 System Module #4 - Site Preparation Task (Ref. Figure 4)

The inputs and/or constraints on the work activities associated with the site preparation are shown in figure 4. Since LANL has responsibility for the DACS-2a facility, it is understood that the facility will be constructed off-site and shipped to the Hanford site for final assembly. Even though the site preparation phase is less design-intensive, a functional design criteria document will be produced.

All of the tasks shown must be completed before the facilities are brought on site. Otherwise the facilities must sit there until the utility and instrument hookups are finished.

Landscaping will be completed after the DACS-2 facility has been located upon its foundations. This will be followed by a final site cleanup of any left-over construction debris just prior to authorizing the facility for operation.

#### 9.6 System Module #5 - Utility Support Systems (Ref. Figure 5)

The inputs and/or constraints on the utility support systems work activities are shown in figure 5. All of these must be designed, procured, or performed to complete the task of providing the utilities necessary to operate the DACS-2 facility.

All of the inputs and constraints must be taken into account for the actual installation of the utility support systems. All utilities must be hooked up and must have interfaces routed to the site of the DACS-2a facility.

The motor control center will be supervised through the dedicated DACS-2 network. It will provide electrical power to drive the pump motors.

# System Module #3 System Integration & Transition

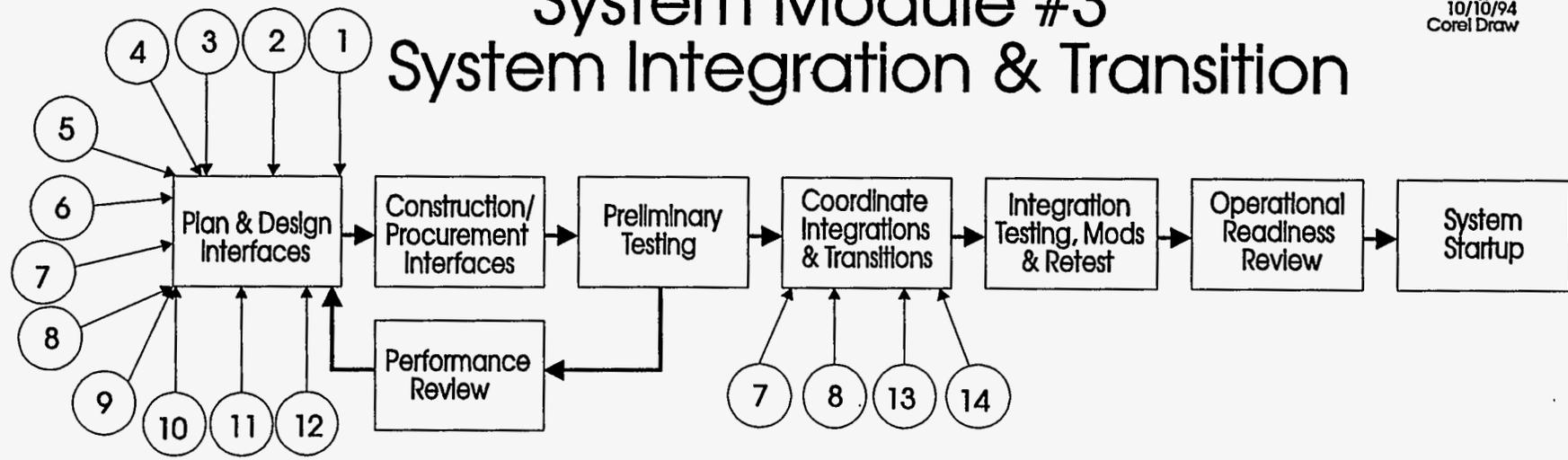


Figure 3: System Integration & Transition

## ○ Inputs and/or Constraints

1. Functions and Requirements
2. Functional Design Criteria
3. In-Tank Instruments connection req'mts.
4. I/O connection req'mts.
5. Mixer Pumps connection req'mts.
6. Utility connection req'mts.
7. Project W-211 Designs & Equip.
8. DACS-1 and DACS-2 Designs & Equip.
9. Site Location of DACS-1 & 2, W-211 Equip.
10. Video Equipment Interfaces
11. Subsystems Physical Size and Desired Location within facilities.
12. Motor Driver Req'mts.
13. Equip. Accessibility Req'mts.
14. Tank Farm Access Req'mts.

# System Module #4 Site Preparation

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10/04/94  
Corel Draw

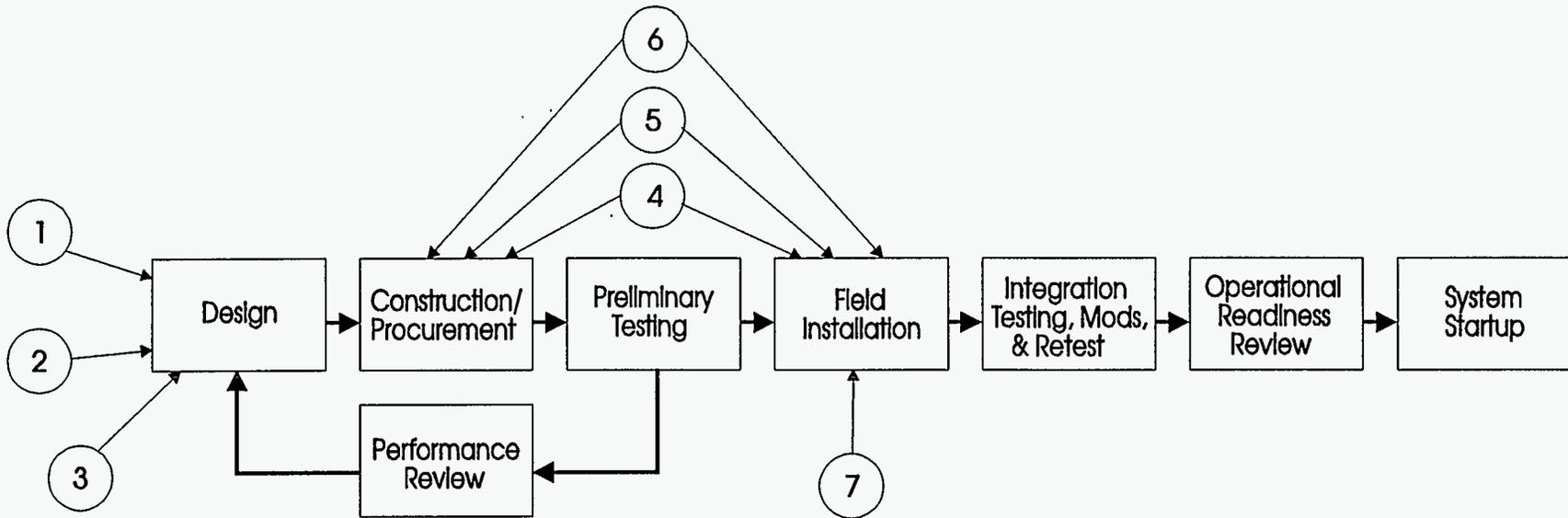


Figure 4: Site Preparation

## ○ Inputs and/or Constraints

1. Functions and Requirements Document
2. Draft Work Plans
3. Functional Design Criteria
4. Providing Trenches, Poles, etc.
5. Extending Utilities
6. Routing Field Wiring
7. Landscaping

# System Module #5 Utility Support Systems

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10/04/94  
Corel Draw

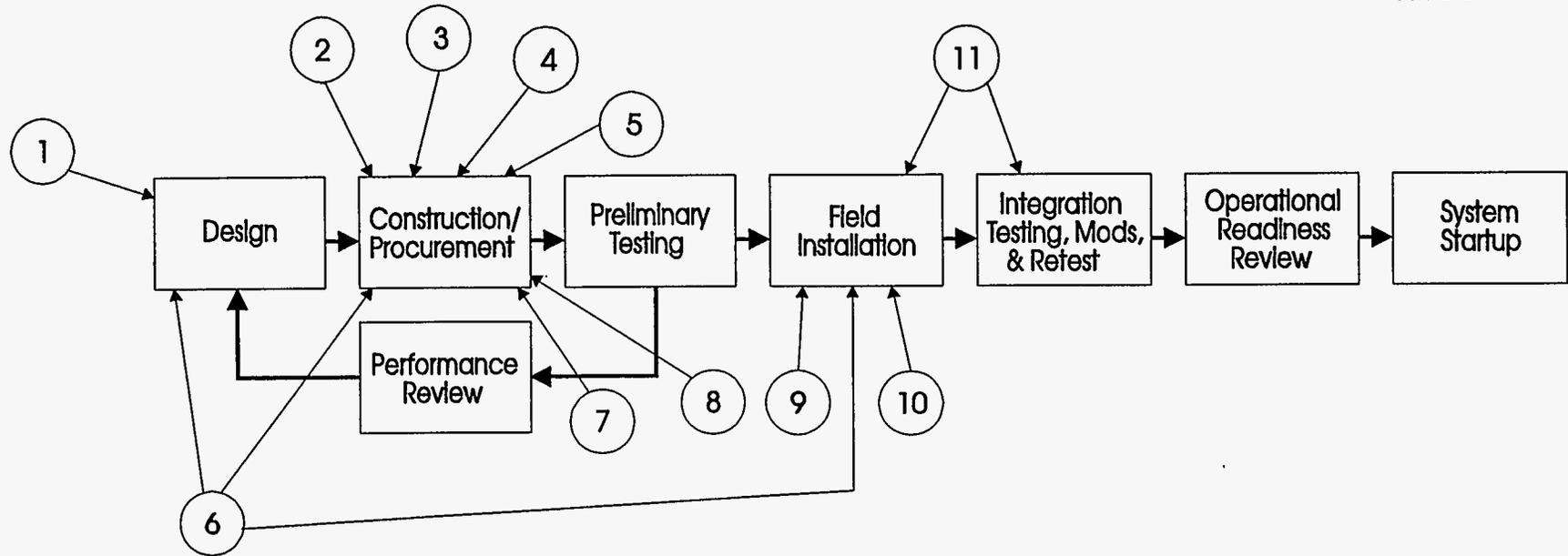


Figure 5: Utility Support Systems

## ○ Inputs and/or Constraints

1. Functions and Requirements
2. Extending Utilities
3. Basic Electric Power
4. UPS Power
5. Routing Field Wiring
6. Weather Monitoring
7. Sanitary Water & Sewage
8. Providing Trenches, Poles, etc.
9. Communications
10. DACS-2 Network
11. Motor Control Centers

### 9.7 System Module #6 - Tank Mitigation Hardware (Ref. Figure 6)

The inputs and/or constraints to the tank mitigation hardware work activities are shown on figure 6. All of these must be considered and dealt with before the design portion of the subsystem is finished. The F&R document and the FDC must both be finished for the subsystem before work can be done. The design for the in-tank instruments, the mixer pumps, and the valve controls must be done before they can be procured or constructed.

The additional constraints or inputs to the preliminary testing and field installation portions of the tank mitigation hardware module included:

1. Special housings (Both preliminary testing and field installation)
2. In-tank installations (Field Installation Only)

### 9.8 System Module #7 - Facility Structures (Ref. Figure 7)

The inputs and/or constraints on the facility structures work activities are shown in figure 7. A functions and requirements document, along with a functional design criteria will have to be generated on each of these structures. In addition, the specific details of each structure must be taken into account during the design phase. Each one of the structures must be procured and installed or constructed on-site. All of the structures must interface together properly for the system to operate correctly.

### 9.9 System Module #8 - Field Instruments (Ref. Figure 8)

The inputs and/or constraints on the field instrument work activities are shown in figure 8. The different types of instruments and their signal characteristics must be decided upon before the procurement process can begin. The only other constraint is on the construction or procurement portion of the subsystem. It is affected by the selection of instruments. This includes the price, the precision, the accuracy, the sample rate, etc.

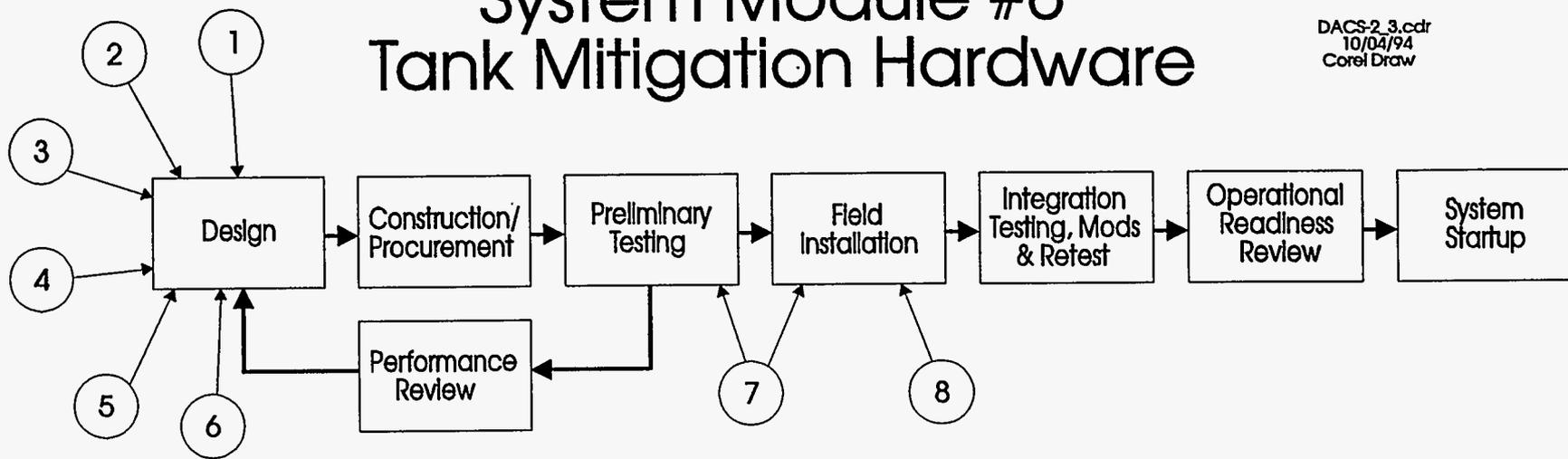
### 9.10 System Module #9 - I/O Hardware (Ref. Figure 9)

The inputs and/or constraints on the I/O hardware work activities are shown in figure 9. The field instrument types will effect the type of I/O system designed or procured. The I/O hardware must also be able to support smart monitoring and control of its inputs.

The availability of the product to meet the WHC schedule will be a key factor in the selection and procurement process. The technical performance, product attributes, and utility requirements will also influence the procurement and construction process. The cost effectiveness, standardization, and simplicity of the electrical interface method will also act as a constraint.

# System Module #6 Tank Mitigation Hardware

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Corel Draw



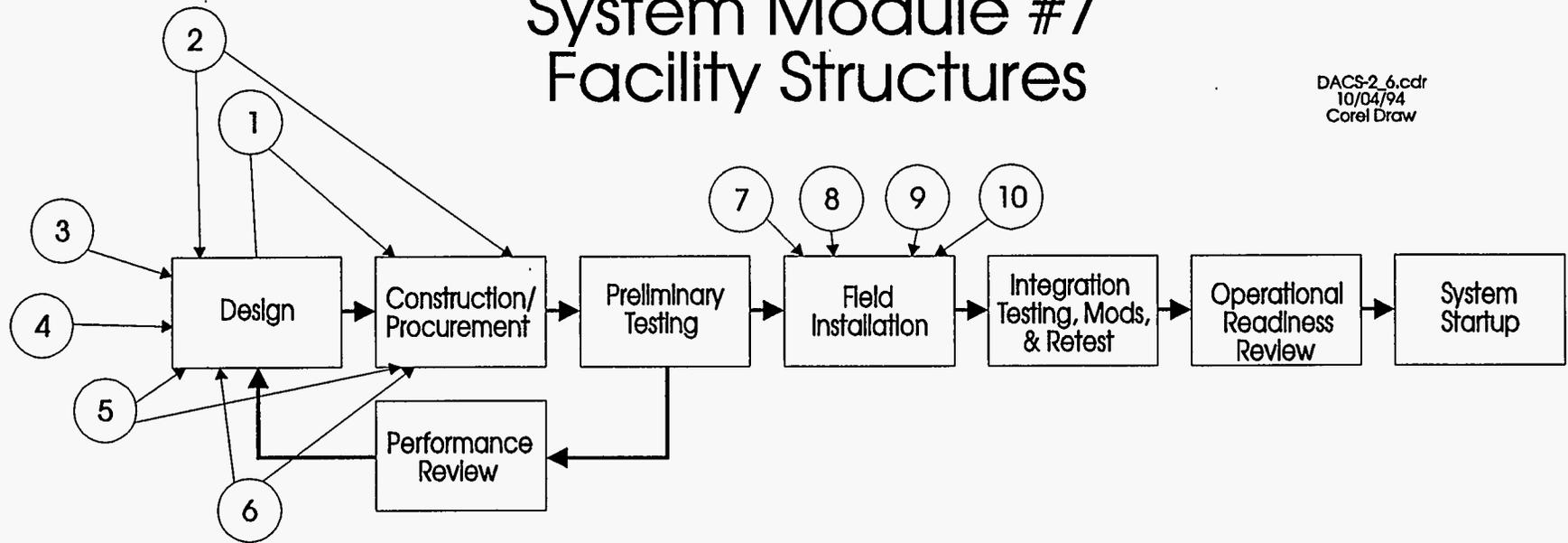
## ○ Inputs and/or Constraints

1. Functions and Requirements Document
2. Functional Design Criteria
3. In-Tank Instruments
4. Tank Ventilation Hardware
5. Mixer Pumps
6. Valve Controls
7. Other & Special Housings
8. In-Tank Installations

Figure 6: Tank Mitigation Hardware

# System Module #7 Facility Structures

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10/04/94  
Corel Draw



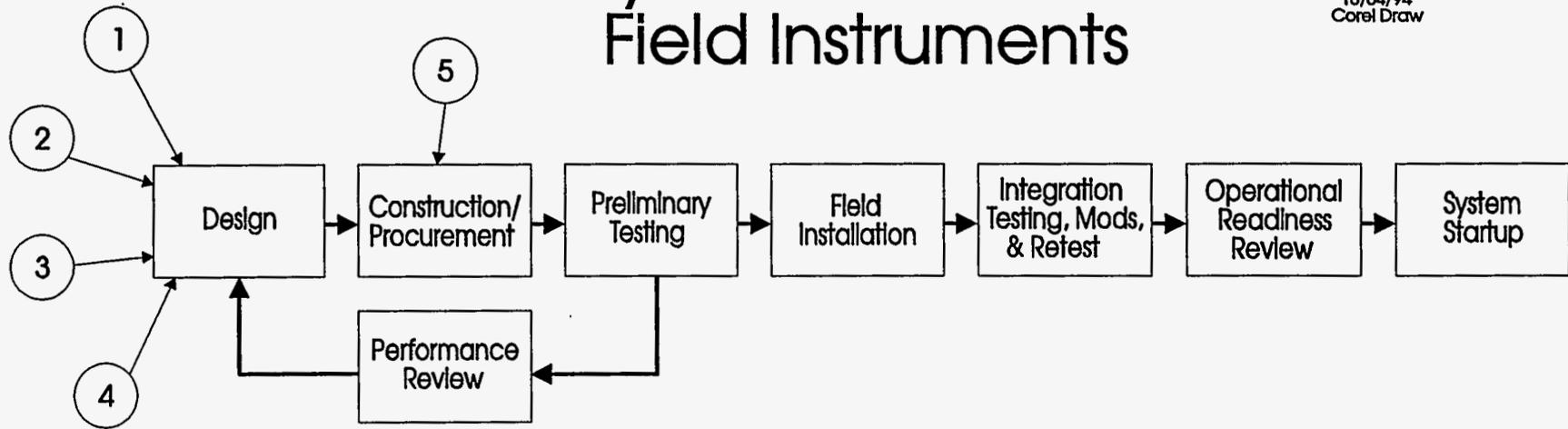
○ Inputs and/or Constraints

1. Utility Structures
2. Instrument Shacks
3. Functions and Requirements Document
4. Functional Design Criteria
5. DACS-2 Facility
6. I/O Shacks
7. DACS-2 Network
8. Assembled I/O Racks
9. Field Instruments
10. Basic and UPS Electrical Power

Figure 7: Facility Structures

# System Module #8 Field Instruments

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10/04/94  
Corel Draw



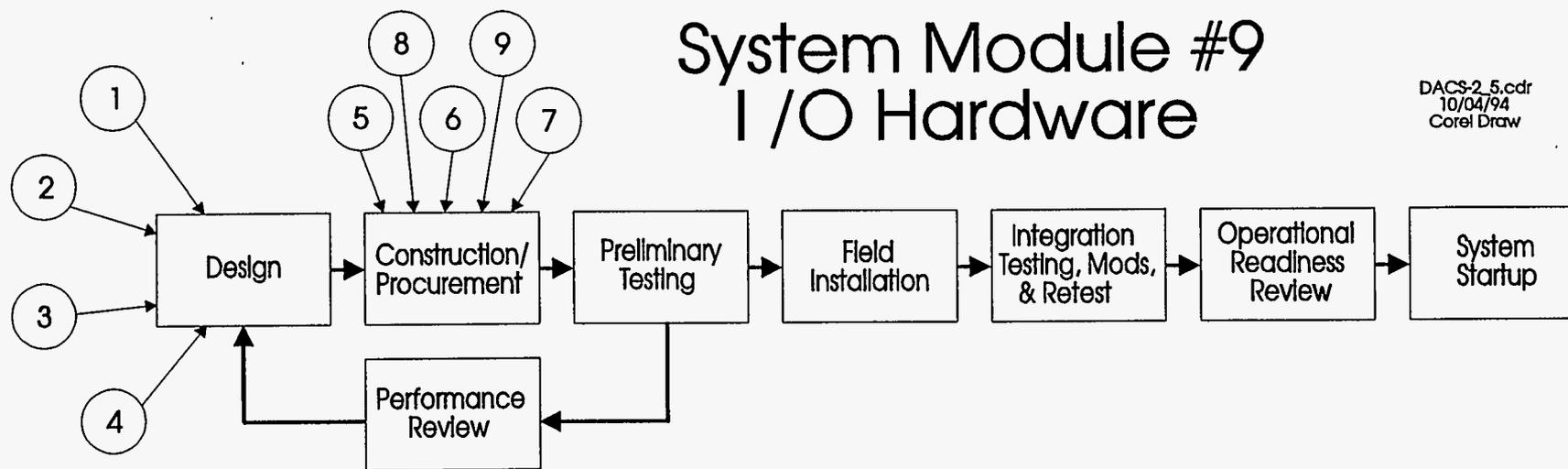
## ○ Inputs and/or Constraints

1. Functions and Requirements Document
2. Functional Design Criteria
3. Temperature, Pressure, Strain, Level, Speed
4. Instrument Signal Conditioning
5. Selection

Figure 8: Field Instruments

# System Module #9 I/O Hardware

DACS-2\_5.cdr  
10/04/94  
Corel Draw



## ○ Inputs and/or Constraints

1. Functions and Requirements Document
2. Functional Design Criteria
3. Field Instrument Types
4. Smart Monitoring And Control Requirements
5. Technology and Product Availability
6. Heating and Cooling Characteristics
7. Power Requirements
8. The Electrical Interface Methods
9. Physical Sizing and Attributes

Figure 9: I/O Hardware

### 9.11 System Module #10 - Operating Software (Ref. Figure 10)

The inputs and/or constraints which effect the development and work efforts of the operating software are shown in figure 10. Technical performance requirements establish the base inputs for the software development. The other major input should come from operations who must identify their intent of use and level of skilled personnel who will utilize and maintain the system. The software to run all the hardware and display must be designed to interface correctly.

### 9.12 System Module #11 - Operator Control Hardware (Ref. Figure 11)

The inputs and/or constraints on the operator control hardware work activities are shown in figure 11. The design of this subsystem is greatly affected by the needs for the operator work stations, the CRT monitors, the type of data storage devices, and the video equipment. The work stations must be the correct dimensions, operate correctly, and interface with the CRT's correctly. The data storage equipment must be both temporary and permanent for both program storage, data archiving, and system backup. The video equipment must be accessible and easily visible.

### 9.13 System Module #12 - Network Systems (Ref. Figure 12)

The inputs and/or constraints on the network systems work activities are shown in figure 12. All of these must be considered in developing and interfacing the new and existing networks necessary to operate the DACS-2 system.

### 9.14 System Modules #13, 14, 15, & 16 - Training, Maintenance, Data Mgt., & Ops

No diagrams were generated for system modules 13, 14, 15, and 16. These are primarily the responsibility of other support organizations who will plan and develop these areas based upon the system documentation and recommendations of the DACS-2a engineers.

The inputs to the training module are design and operational documentation. In addition, available operational and maintenance personnel are required. Maintenance requires inputs from training and engineering maintenance data. Data management requires guidance from program management and data requirements from data analyst. Conduct-of-Operations must have inputs from all elements of the DACS-2a project.

# System Module #10 Operating Software

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10/04/94  
Corel Draw

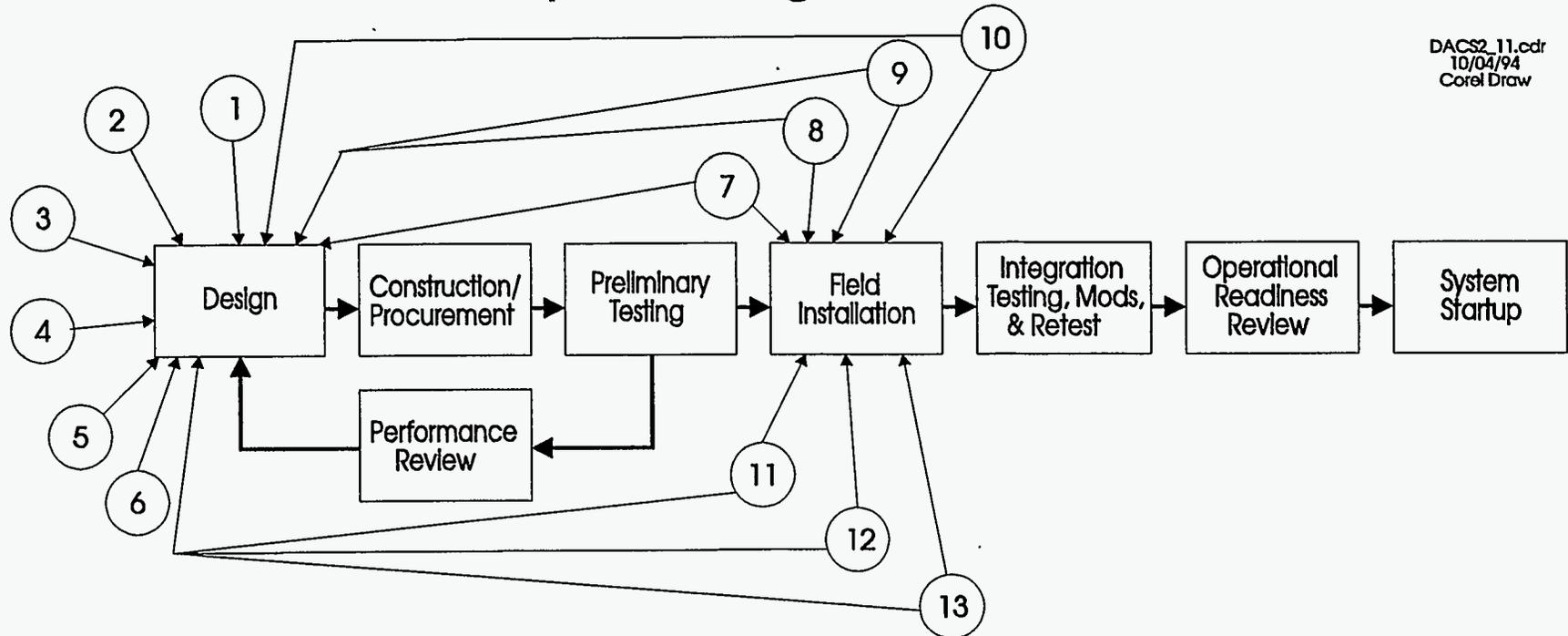


Figure 10: Operating Software

## ○ Inputs and/or Constraints

1. Functions and Requirements Document
2. Functional Design Criteria
3. Basic Control and Monitoring Requirements
4. Graphical Screen Development
5. Data Archiving Requirements
6. Analysis
7. Communications
8. DACS-2 Network
9. Motor Control Centers
10. Data Storage Devices
11. Assembled I/O Racks
12. In-Tank Mitigation Hardware
13. Weather Monitoring

# System Module #12 Network Systems

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Corel Draw

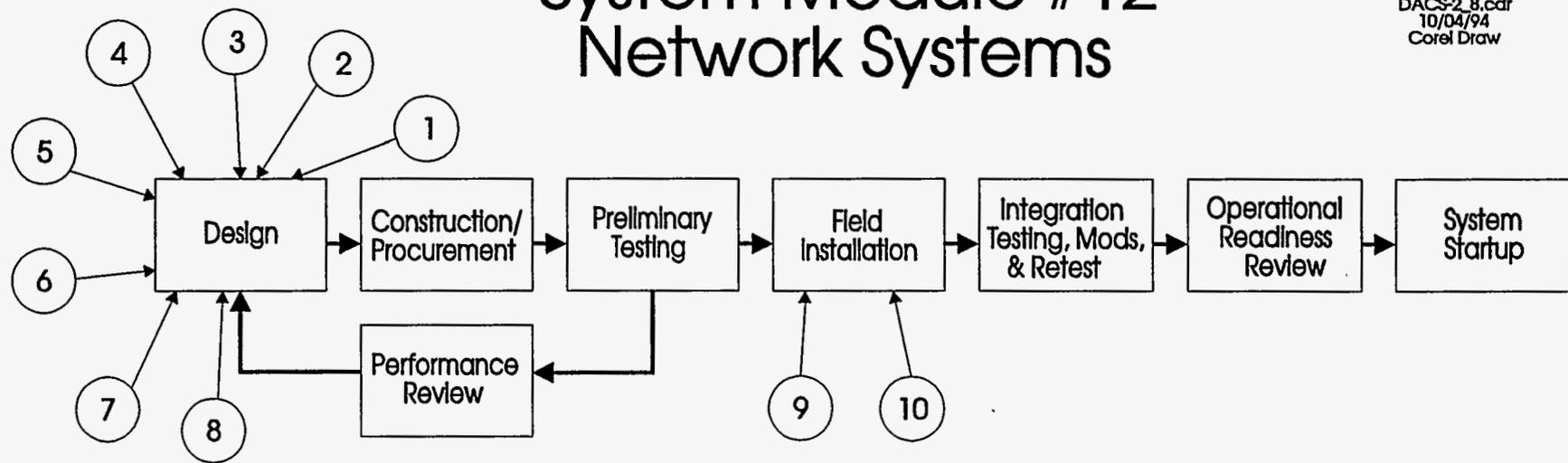


Figure 12: Network Systems

## ○ Inputs and/or Constraints

1. Functions and Requirements Document
2. Functional Design Criteria
3. RF Link
4. TMACS
5. HLAN Interfaces
6. Fiber Optic Interfaces
7. Data Archiving Requirements
8. DACS-2 Network
9. Assembled I/O Racks
10. Field Instruments

## 10.0 DACS-2a PROJECT SCHEDULES

The overall DACS-2a planning/detail/preliminary work schedule is shown on the following pages in the form of bar graphs (Figure 13) using Microsoft Project scheduling software as produced by the DACS-2a team leader. This schedule reflects significant but limited details for the LANL and WHC phases of the project. LANL is responsible for providing an official LANL project schedule that meets the deliver dates shown on the official TWRS Gas Mitigation Program Schedule maintained by the WHC Program office.

The official bar graph schedule will be maintained by the TWRS support scheduler utilizing the Hanford site's schedule software standard "Primavera Series X". The following data is "rolled up" into the Tank Safety Mitigation Program's higher level management schedule which is maintained for Jack Lentsch, Hydrogen Mitigation Program Manager.

The site preparation engineering schedule bar graphs are followed by additional supporting schedule details in the form of a listing of calendar goals as shown in Tables 1.0. A similar type listing was drafted by WHC and provided to LANL for their general reference in developing their Project schedules.

**DACS-2a "Data Acquisition & Control System"**  
**Tank Farm Flammable Gas Mitigations**  
 PROJECT MANAGER - D. Tate WHC Hanford

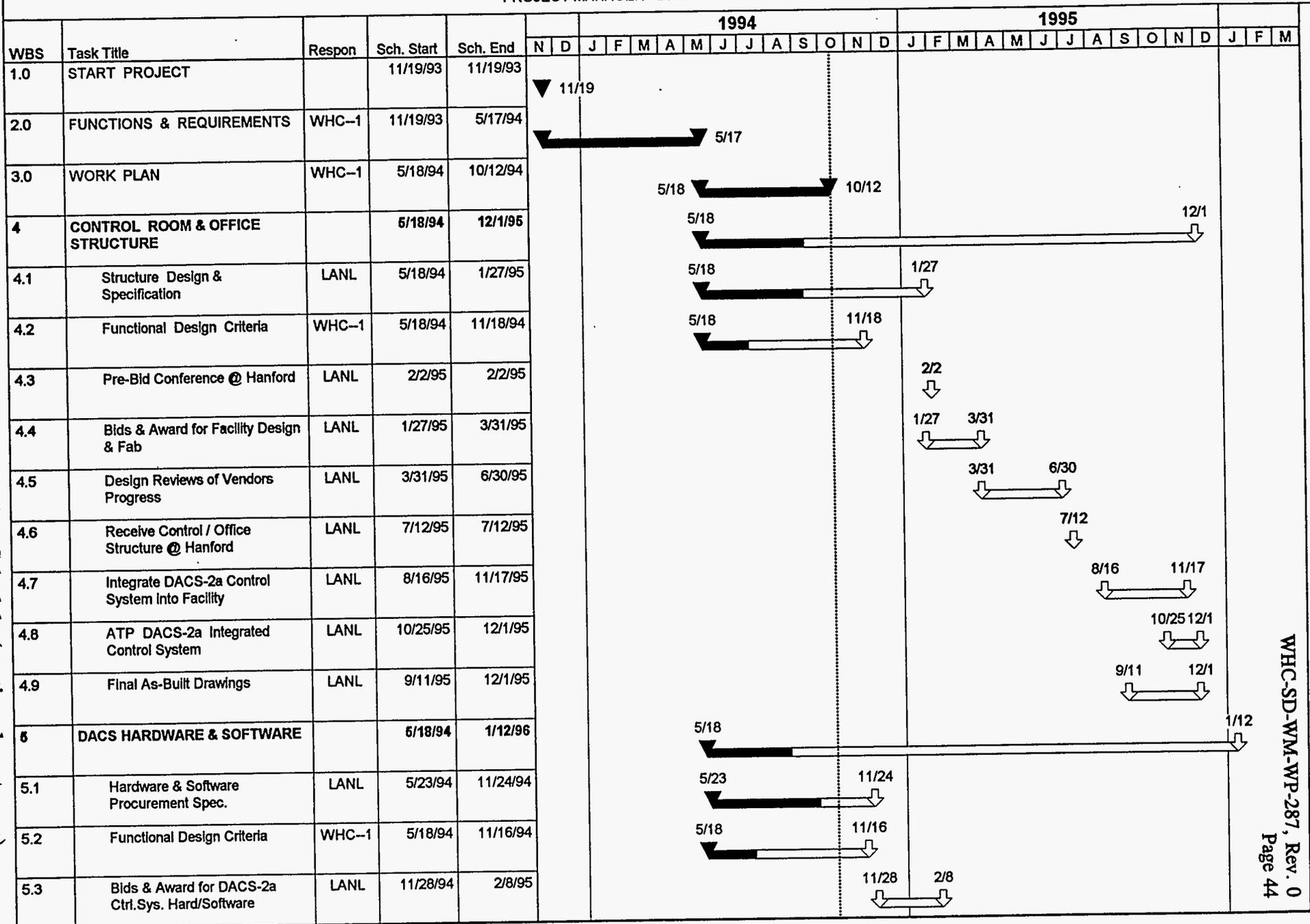


Figure 13: DACS-2a Preliminary Project Schedule (continued next page)

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**DACS-2a "Data Acquisition & Control System"**  
**Tank Farm Flammable Gas Mitigations**  
 PROJECT MANAGER - D. Tate WHC Hanford

WHC-1 WHC Engineering Support Team (Team Lead Daron Tate)  
 WHC-2 WHC TWRS Engineering (SY Farm Cog. Engr. Bill Clemans)  
 WHC-3 WHC Operations (Team Lead Dan Nunamaker)  
 LANL LANL Design Team (Team Lead Hiroshi Hoida)  
 LANL-2 LANL Sub-Contractor EG&G  
 KEH KEH Hanford Construction Contractor

Project: DACS-2a "Data Acquisition &  
 Date: 10/13/94

Planning Milestone	⇩
Committed Milestone	▽
Completed Milestone	▼
Customer Controlled Planning Milestone	⊕
Customer Controlled Committed Milestone	⊖
Rolled Up	⊲

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Figure 13: DACS-2a Preliminary Project Schedule (see previous pages)

### 10.1 Schedule For Los Alamos National Labs

The project management schedule for the LANL DACS-2 Control System & Facility is the responsibility of LANL. WHC has derived a recommended detail schedule and provided this to LANL for their reference. The three main activity categories are listed below. The schedule goals for these areas are listed in the milestones shown in section 7.0.

1. Control Facility Schedule
2. Control Hardware/Software Schedule
3. Office Facility Schedule

### 10.2 Preliminary Schedule For Westinghouse Hanford Co. Site Preparation

The following list is a preliminary planning schedule of activities listed in sequential order by date. The list is separated into different construction task phases by shaded title bars.

Table 1.0 Preliminary Schedule For DACS-2a <u>Site Preparation</u> For SY Farm			
WHC/KAISER WORK ACTIVITIES			
DATE	ACTIVITY DESCRIPTION	COMMENTS	STATUS
<b>SITE PREPARATION DESIGN</b>			
October 14, '94 (Friday)	Draft Letter of Instruction and submit to Kaiser for site prep. work.	Beginning of site design efforts.	
January 3, '95 (Tuesday)	Begin site work and worker permitting for project.		
March 31, '95 (Friday)	a. Conclude site preparation design work.  b. Conclude site and worker permitting process.	Conclusion of site design efforts.	

Table 1.0 Preliminary Schedule For DACS-2a <u>Site Preparation</u> For SY Farm			
WHC/KAISER WORK ACTIVITIES			
DATE	ACTIVITY DESCRIPTION	COMMENTS	STATUS
<b>SITE PREPARATION DESIGN</b>			
<b>ABOVE AND BELOW-GROUND CONSTRUCTION INTERFERENCES</b>			
January 3, '95 (Tuesday)	Begin survey of site for radiological ground contamination.		
March 1, '95 (Wednesday)	Begin surveying site for non-radiological obstructions to construction.		
March 31, '95 (Friday)	a. Complete survey of site for radiological ground contamination.  b. Complete survey of site for non-radiological ground contamination.		
April 26, '95 (Wednesday)	Complete survey of site for underground obstacles. i.e.- power cables, pipes, etc.		
April 27, '95 (Thursday)	Complete survey and research of site for any zoning restrictions.		
April 10, '95 (Monday)	Complete survey and research for native artifacts on construction site.		
<b>CLEARING OF SITE</b>			
April 10, '95 (Monday)	a. Have worker facilities available. i.e.- Water supply, restrooms.  b. Begin clearing road work area of weeds, rocks, etc.  c. Begin clearing work site of rocks, grass, etc. for construction.		
April 17, '95 (Monday)	a. Complete clearing of road upgrade area.  b. Complete clearing of construction site.		

Table 1.0 Preliminary Schedule For DACS-2a <u>Site Preparation</u> For SY Farm			
WHC/KAISER WORK ACTIVITIES			
DATE	ACTIVITY DESCRIPTION	COMMENTS	STATUS
<b>SITE PREPARATION DESIGN</b>			
<b>SITE SURVEY FOR ROADS AND FOUNDATIONS</b>			
March 1, '95 (Wednesday)	a. Begin survey for road upgrade. b. Survey for facility foundations.		
April 17, '95 (Monday)	Complete survey of road for upgrade work.		
April 18, '95 (Tuesday)	Begin blocking out new road.		
April 26, '95 (Wednesday)	a. Complete survey for foundations. b. Begin blocking out foundation.		
April 28, '95 (Friday)	a. Complete blocking out of new road. b. Complete foundation work site blocking.		

Table 1.0 Preliminary Schedule For DACS-2a Site Preparation For SY Farm

WHC/KAISER WORK ACTIVITIES

DATE	ACTIVITY DESCRIPTION	COMMENTS	STATUS
<b>SITE PREPARATION DESIGN</b>			
<b>Excavation</b>			
May 1, '95 (Monday)	<ul style="list-style-type: none"> <li>a. Begin grading road surface from 16th street to SY farm DACS-2a facility.</li> <li>b. Begin extending cableway from DACS-1 site to DACS-2a site.</li> <li>c. Begin grading/leveling foundation and parking lot work area.</li> </ul>	NOTE: Extending the roadway from the DACS-2a facility over the SY farm steamline into the farm north gate is not within the scope of this work plan nor the DACS-2a project.	
May 3, '95 (Wednesday)	<ul style="list-style-type: none"> <li>a. Complete grading of road surface.</li> </ul>	NOTE: Preparation of steamline near SY fence for future road overpass is not within the scope of this work plan nor the DACS-2a project.	
May 4, '95 (Thursday)	Complete grading of foundation area.		
May 15, '95 (Monday)	<ul style="list-style-type: none"> <li>a. Complete extension of cableway to DACS-2a site.</li> <li>b. Begin laying gravel on road surfaces.</li> </ul>		
May 17, '95 (Wednesday)	Complete laying gravel on road surfaces.		
May 22, '95 (Monday)	<ul style="list-style-type: none"> <li>a. Dig for foundation footings.</li> <li>b. Dig for septic and water tanks</li> </ul>		
May 24, '95 (Wednesday)	Begin installing septic and water tanks.		
May 26, '95 (Friday)	<ul style="list-style-type: none"> <li>a. Complete digging for foundation footings.</li> <li>b. Complete installation of septic and water tanks.</li> </ul>		

Table 1.0 Preliminary Schedule For DACS-2a Site Preparation For SY Farm

WHC/KAISER WORK ACTIVITIES

DATE	ACTIVITY DESCRIPTION	COMMENTS	STATUS
<b>SITE PREPARATION DESIGN</b>			
<b>SITE CONSTRUCTION</b>			
May 29, '95 (Monday)	a. Begin routing power, phone, and HLAN lines to site.  b. Begin laying asphalt and steamrolling.		
June 5, '95 (Monday)	a. Complete laying asphalt for upgraded road.  d. Begin painting lines and installing parking curbs.		
June 6, '95 (Tuesday)	Complete line painting and installing parking curbs.		
June 7, '95 (Wednesday)	Begin inserting any hookups needed in and through the foundation. (Wiring, etc.)		
June 12, '95 (Monday)	Completion of power, phone, and HLAN line routing.		
June 16, '95 (Friday)	Complete inserting hookups in foundation.		
June 19, '95 (Monday)	Begin pouring foundation.		
June 26, '95 (Monday)	a. Complete pouring foundation.  b. Begin pouring sidewalks and facility access-ways.		
July 7, '95 (Friday)	Complete pouring sidewalks and access-ways to facility.		
<b>RESOLUTION OF UNDEFINED PROGRAM PROBLEMS</b>			
July 10, '95 (Monday)	Work problems		
August 11, '95 (Friday)	Complete problem resolutions.		

Table 1.0 Preliminary Schedule For DACS-2a <u>Site Preparation</u> For SY Farm			
WHC/KAISER WORK ACTIVITIES			
DATE	ACTIVITY DESCRIPTION	COMMENTS	STATUS
<b>SITE PREPARATION DESIGN</b>			
<b>STRUCTURE INSTALLATIONS</b>			
August 14, '95 (Monday)	Transport office facility from receiving to site.		
August 16, '95 (Wednesday)	Mount office facility on foundation.		
August 18, '95 (Friday)	a. Build stairways to facility doors. b. Begin hookup of utilities to office facility.		
August 28, '95 (Monday)	a. Begin installing I/O cabinets at tank areas. b. Begin routing data and control lines to DACS-2a via cableway, and ringout/test each line. This includes fiber optics. c. Begin expanding the motor control center.		
Sept. 4, '95 (Monday)	Complete utility hookup to office facility.		
Sept. 6, '95 (Wednesday)	Complete installing I/O cabinets at tank areas.		
Oct. 27, '95 (Friday)	a. Complete laying of data and control lines to DACS-2a site and testing. b. Complete expansion of motor control center.		
<b>RESOLUTION OF UNDEFINED PROGRAM PROBLEMS</b>			
Oct. 27, '95 (Friday)	Work problems		
Dec. 4, '95 (Monday)	Complete problem resolutions.		

Table 1.0 Preliminary Schedule For DACS-2a Site Preparation For SY Farm

WHC/KAISER WORK ACTIVITIES

DATE	ACTIVITY DESCRIPTION	COMMENTS	STATUS
<b>SITE PREPARATION DESIGN</b>			
<b>STRUCTURE INSTALLATIONS (CONTINUED)</b>			
Dec. 4, '95 (Monday)	DACS-2a Integrated Control System Facility arrives at Hanford's receiving facility (1163 bldg.) for escort by cog engineer to final drop point at SY farm.		
Dec. 11, '95 (Monday)	Transport control facility from receiving to site.		
Dec. 12, '95 (Tuesday)	Mount control facility on foundation.		
Dec. 14, '95 (Thursday)	Mount stairways to control facility's access doors.		
Dec 18, '95 (Monday)	Begin hookup of utilities, control, and data lines to control facility.		
Jan. 12, '96 (Friday)	Conclude hookup of utilities, control, and data lines to control facility.		
<b>OPERATIONAL READINESS</b>			
Oct. 2, '95 (Monday)	Initiate operator training at LANL.		
Jan. 15, '96 (Monday)	a. Begin final system integration test. b. Initiate Operational Readiness Review process.		
Jan. 22, '96 (Monday)	Initiate resolution of system "bugs".		
Feb. 12, '96 (Monday)	a. Complete debugging & integration testing. b. Complete operator training/certification at Hanford.		
March 1, '96 (Friday)	a. Complete Operational Readiness Review. b. System Startup		

Table 1.0 Preliminary Schedule For DACS-2a <u>Site Preparation</u> For SY Farm			
WHC/KAISER WORK ACTIVITIES			
DATE	ACTIVITY DESCRIPTION	COMMENTS	STATUS
<b>SITE PREPARATION DESIGN</b>			
<b>LANDSCAPING</b>			
Feb. 19, '96 (Monday)	Begin final landscaping work - soil - grass - trees		
March 1, '96 (Friday)	a. Conclude landscaping work. b. Begin final site cleanup of work materials.		
March 8, '96 (Friday)	a. Conclude final site cleanup of work materials. b. DACS-2a open house visitation / party		

## 11.0 DACS-2a PROJECT COST

### 11.1 LANL DACS-2a Project Cost

The project cost for the Los Alamos National Lab support is being managed by the WHC Program Office under the direction of the WHC Safety Mitigation Program manager Jack Lentsch. The WHC team leader for this work plan provides guidance and recommendations direct to LANL in an effort to identify cost savings ideas but does not have direct responsibility for LANL funding, management, nor accountability.

### 11.2 WHC DACS-2a Project Cost

The project cost for the WHC support of the DACS-2a are provided from the Program office under the direction of Jack Lentsch to Roger Bauer (Engineering Support) who has management and accountability for the WHC cost.

#### 11.2.1 Projected Rough-Order-Of-Magnitude (ROM) Cost for Site Preparation Phase (B)

Table 2.0 ROM Cost For DACS-2a SY Site Preparation	
DESCRIPTION OF TASK OR ITEM	ESTIMATED COST
Project Coordination Support	\$ 175K
Design Requirements and Engineering Design Support	\$ 175K
Project Primary Construction Materials	\$ 275K
Field Construction of Foundations, Cable Ways, Roads, etc.	\$ 250K
WHC and KEH Craft Support	\$ 115K
Field Utility Upgrades	\$ 175K
Cable Materials and Installations	\$ 75K
Field Interfaces and Connections	\$ 75K
Special Interface Hardware Cost	\$ 75K
Acceptance Testing	\$ 125K
Documentation Generation	\$ 100K
Misc. Problem resolutions and integration	\$ 200K
Total Contingency Funds @ 25% for Engineering, Hardware, Construction and Testing.	\$ 454K
<b>Totals</b>	<b>\$2.269M</b>

## 12.0 REFERENCES

### WHC FUNCTIONS & REQUIREMENTS & FUNCTIONAL DESIGN CRITERIA

- WHC-SD-WM-FRD-014 Functions and Requirements for Data Acquisition and Control of Tank Farm Flammable Gas Mitigations
- WHC-SD-WM-FDC-037 Functional Design Criteria for CONTROL SYSTEM HARDWARE & SOFTWARE for SY Farm Hydrogen Mitigation Program Data Acquisition and Control System (DACS-2a)
- WHC-SD-WM-FDC-038 Functional Design Criteria for CONTROL FACILITY for SY Farm Hydrogen Mitigation Program Data Acquisition and Control System (DACS-2a)
- WHC-SD-WM-FDC-039 Functional Design Criteria for OFFICE FACILITY for SY Farm Hydrogen Mitigation Program Data Acquisition and Control System (DACS-2a)
- WHC-SD-WM-FDC-040 Functional Design Criteria for SITE PREPARATION FOR DACS-2a DATA ACQUISITION AND CONTROL SYSTEM for SY Farm Hydrogen Mitigation Program
- WHC-SD-W211-FDC-001 Project W-211, Functional Design Criteria, Initial Waste Tank Retrieval Systems

### WHC LEVEL II CONTROLLED MANUALS

- WHC-CM-1-3 Management Requirements and Procedures (MRP)
- WHC-CM-2-1 Procurement Manual
- WHC-CM-4-2 Quality Assurance Manual
- WHC-CM-6-1 Standard Engineering Practices (EP)
- WHC-CM-3-10 Software Practices

### WHC SUPPORT DOCUMENTATION

- LA-UR-92-3196 "Safety Assessment for Proposed Pump Operation to Mitigate Episodic Gas Release in Tank 241-SY-101"
- WHC-SD-WM-ISB-001 "Hanford Site Tank Farm Facility Interim Safety Basis"

### DOE DOCUMENTATION

- DOE/EA-0915 Environmental Assessment; Waste Tank Safety Program, Hanford Site Richland