This document was retrieved from the Boeing ISEARCH System.

Accession #: D196115719

Document #: SD-W252-FDC-001

Title/Desc:
FDC FOR PROJECT W-252 PHASE II LIQUID EFFLUENT TREATMENT & DISPOSAL
ENGINEERING CHANGE NOTICE

2. ECN Category
   (mark one)
   [ ] Supplemental
   [ ] Direct Revision
   [ ] Change ECN
   [ ] Temporary
   [ ] Standby
   [X] Cancel/ Void

3. Originator's Name, Organization, MSIN, and Telephone No.
   C.E. Hatch, LEE, H6-28, 3-1989

3a. USC Required?
   [ ] Yes  [X] No

4. Date
   05/08/95

5. Project Title/No./Work Order No.
   Phase II Liquid Effluent Treatment and Disposal/W-252/A2081

   N/A

7. Approval Designator
   ESQD

8. Document Numbers Changed by this ECN
   (includes sheet no. and rev.)
   WHC-SD-W252-FDC-001, REV 1-A

9. Related ECN No(s).
   N/A

10. Related PO No.
    N/A

11a. Modification Work
     [ ] Yes (fill out Blk. 11b)
     [X] No (NA Blks. 11b, 11c, 11d)

11b. Work Package No.
     N/A

11c. Modification Work Complete
     N/A

11d. Restored to Original Condition (Temp. or Standby ECN only)
     N/A

Cog. Engineer Signature & Date

12. Description of Change
This revision is a complete rewrite of this document. The changes to this FDC reflect the changes in the BAT/AKART for this project. The effect of this change is to reduce the project scope to the cooling towers at B-Plant and a tie-in of the B-Pond line to the 200 Area TEDF.

13a. Justification (mark one)
     Criteria Change [X]  Design Improvement [ ]  Environmental [ ]  Facility Deactivation [ ]
     As Found [ ]  Facilitate Const [ ]  Const. Error/Omission [ ]  Design Error/Omission [ ]

13b. Justification Details
The revision to the BAT/AKART report for this project requires this accompanying change to the FDC.

14. Distribution (include name, MSIN, and no. of copies) / in /
BP Atencio H6-25  CE Hatch H6-28  DL Flyckt S6-71
TS Basra R1-51  RA Wahlquist R1-43  MW Peres S6-71
AJ Diliberto H6-32  JD Williams H6-28  WE Tosebe H6-22
WJ Evelo A5-18  JA Pettler B4-49  DW Fritz H6-22
RD Gustavson R1-51  OM Jake R3-38  GC Host S2-55
DP Hughes R3-35  RD Weissensels S6-70  AF Crane S6-71
KS Pedersen R3-35  EM Bright $2-63  NJ Sullivan S6-76
Proj Files G6-51  GL Sinton $7-55  JR Kelly R3-35
Central Files A3-22

RELASE STAMP
OFFICIAL RELEASE
BY WHC
DATE OCT 27 1995

A-7900-013-2 (11/94) GEF095
### Engineering Change Notice

**1. ECN (use no. from pg. 1)**
- 622264

**2. Engineering Change Review**
- [ ] Yes
- [X] No

**3. Change Impact Review**
- Indicates the related documents (other than the engineering documents identified on Side 1) that will be affected by the change described in Block 12. Enter the affected document number in Block 19.

<table>
<thead>
<tr>
<th>Document Number/Revision</th>
<th>Document Number/Revision</th>
<th>Document Number/Revision</th>
</tr>
</thead>
<tbody>
<tr>
<td>SDD/DD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Functional Design Criteria</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating Specification</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Criticality Specification</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conceptual Design Report</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equipment Spec.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Const. Spec.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Procurement Spec.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vendor Information</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OM Manual</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FSAR/SAR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Safety Equipment List</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Radiation Work Permit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental Impact Statement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental Report</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental Permit</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**4. Other Affected Documents**
- (NOTE: Documents listed below will not be revised by this ECN.) Signatures below indicate that the signing organization has been notified of other affected documents listed below.
- Document Number/Revision
- Document Number/Revision
- Document Number/Revision

**5. Approvals**

<table>
<thead>
<tr>
<th>Signature</th>
<th>Date</th>
<th>Signature</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cog. Eng. CE Hatch</td>
<td>6/1/95</td>
<td>ARCHITECT-ENGINEER</td>
<td></td>
</tr>
<tr>
<td>Cog. Mgr. JD Williams</td>
<td>6/1/95</td>
<td>PE</td>
<td></td>
</tr>
<tr>
<td>QA JA Peltier</td>
<td>6/1/95</td>
<td>QA</td>
<td></td>
</tr>
<tr>
<td>Safety OM Jack</td>
<td>6/1/95</td>
<td>Safety</td>
<td></td>
</tr>
<tr>
<td>Environ. WE Toebbe</td>
<td>6/1/95</td>
<td>Design</td>
<td></td>
</tr>
<tr>
<td>Other Programs AD Dilberto</td>
<td>6/1/95</td>
<td>Environ.</td>
<td></td>
</tr>
<tr>
<td>Tank Farms RA Wahlgquist</td>
<td>6/1/95</td>
<td>Other</td>
<td></td>
</tr>
<tr>
<td>Projects KS Pedersen</td>
<td>6/1/95</td>
<td>DEPARTMENT OF ENERGY</td>
<td></td>
</tr>
<tr>
<td>Projects JR Kelly</td>
<td>6/1/95</td>
<td>Signature or a Control Number that tracks the Approval Signature</td>
<td></td>
</tr>
<tr>
<td>B-Plant RD Weisennfel</td>
<td>6/2/93</td>
<td>Signature or a Control Number that tracks the Approval Signature</td>
<td></td>
</tr>
<tr>
<td>284-E EM Bright</td>
<td>10/11/93</td>
<td>Signature or a Control Number that tracks the Approval Signature</td>
<td></td>
</tr>
<tr>
<td>TDF Ope MW Peres</td>
<td>10/12/93</td>
<td>Signature or a Control Number that tracks the Approval Signature</td>
<td></td>
</tr>
<tr>
<td>TDF ECO DL Flyckt</td>
<td>10/12/93</td>
<td>Signature or a Control Number that tracks the Approval Signature</td>
<td></td>
</tr>
</tbody>
</table>

A-7900-013-3 (11/94) GEF096
RELEASE AUTHORIZATION

Document Number: WHC-SD-W252-FDC-001, Rev. 2

Document Title: Functional Design Criteria for Project W-252, "Phase II: Liquid Effluent Treatment and Disposal"

Release Date: 10/27/95

This document was reviewed following the procedures described in WHC-CM-3-4 and is:

APPROVED FOR PUBLIC RELEASE

WHC Information Release Administration Specialist:

[Signature]

Janis Bishop

10/27/95

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

This report has been reproduced from the best available copy. Available in paper copy. Printed in the United States of America. To obtain copies of this report, contact:

Westinghouse Hanford Company - Document Control Services
P.O. Box 1970, Mailstop H6-08, Richland, WA 99352
Telephone: (509) 372-2420; Fax: (509) 376-4989
This document is the Functional Design Criteria for Project W-252. Project W-252 provides the scope to provide BAT/AKART to 200 Liquid Effluent Phase II streams. This revision (Rev. 2) incorporates a major descoping of the project. The descoping was done to reflect a combination of budget cutting measures allowed by a less stringent regulatory posture toward the Phase II streams.
## FUNCTIONAL DESIGN CRITERIA FOR PROJECT W-252, PHASE II LIQUID EFFLUENT TREATMENT AND DISPOSAL

### CHANGE CONTROL RECORD

<table>
<thead>
<tr>
<th>Revision</th>
<th>Description of Change - Replace, Add, and Delete Pages</th>
<th>Authorized for Release</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Initial release per EDT 158712, 01/06/93</td>
<td>N/A</td>
</tr>
<tr>
<td>1</td>
<td>Incorporate ECN 603992 to remove (1) work at the 183-D Water Treatment Facility and (2) requirement for standby electrical power at the 242-A to support equipment installed by this project.</td>
<td>C. E. Hatch, J. D. Williams, 11/8/94</td>
</tr>
<tr>
<td>1-A</td>
<td>Remove existing Rev 1 pages vii, 2, 3, 7, 15, 16, and insert the corresponding Rev 1-A pages in accordance with ECN 609364.</td>
<td>C. E. Hatch, J. D. Williams</td>
</tr>
<tr>
<td>2 RS</td>
<td>Complete Revision <strong>ECN-622864</strong></td>
<td>C. E. Hatch, N. J. Sullivan, 10-23-95</td>
</tr>
</tbody>
</table>
FUNCTIONAL DESIGN CRITERIA

for

PROJECT W-252

PHASE II LIQUID EFFLUENT TREATMENT AND DISPOSAL

Prepared by
C. E. Hatch

May 1995

Westinghouse Hanford Company
Remediation and Restoration
Liquid Waste Disposal

for the

United States Department of Energy
Richland Operations Office
Richland, Washington
This page intentionally left blank.
This page intentionally left blank.
This page intentionally left blank.
GLOSSARY

ALARA as low as reasonably achievable
AMU aqueous makeup unit
BAT/AKART Best Available Technology/All Known, available, and reasonable methods of prevention, control and Treatment
BTU British thermal unit
CASS Computer-Automated Surveillance System
CERCLA Comprehensive Environmental Response, Compensation, and Liability Act
DCG Derived Concentration Guide
DOE U.S. Department of Energy
DW dangerous waste
ECL effluent comparative level
Ecology State of Washington Department of Ecology
EPA U.S. Environmental Protection Agency
FDC Functional Design Criteria
FSAD Final Safety Analysis Document
FSAR Final Safety Analysis Report
GPM gallon per minute
HLAN Hanford Local Area Network
HVAC heating, ventilating, and air conditioning
LCCA Life Cycle Cost Analysis
LCCS Laboratory Customer Communications System
LCU Local Control Unit
MCLG Maximum Contaminant Level Goals
MCS Monitor and Control System
MSDS Material safety data sheets
NESHAPS National Emission Standards for Hazardous Airborne Pollutants
NPDES National Pollutant Discharge Elimination System
OCS operator control station
PAX private automatic exchange
PC process condensate
PMCL (Safe Drinking Water Act) Primary Maximum Contaminant Levels
PSAD Preliminary Safety Analysis Document
PSAR Preliminary Safety Analysis Report
GLOSSARY (cont.)

PSD  Prevention of Significant Deterioration
PSE  Preliminary Safety Evaluation
PTECS (200 East Area) Phase II Effluent Collection System
QA  Quality Assurance
QAPP Project Specific Quality Assurance Program Plan
RL  U.S. Department of Energy, Richland Field Office
RMW  radioactive mixed waste
RQ  reportable quantity
RW  radioactive waste
SMCL Secondary Maximum Contaminant Level
TEDF Treated Effluent Disposal Facility
TOE Total operating efficiency
Tri-Party Agreement Hanford Federal Facility Agreement and Consent Order
UPS Uninterruptable Power Supply
WAC Washington Administrative Code
WESF Waste Encapsulation and Storage Facility
Westinghouse Hanford
WRAP West Central Waste Complex
WTF Water Treatment Facility
# TABLE OF CONTENTS

1.0 INTRODUCTION ........................................ 1  
  1.1 BACKGROUND ........................................ 1  
  1.2 SCOPE ............................................ 3  

2.0 FUNCTIONAL CRITERIA .................................. 4  
  2.1 SITE LOCATION ...................................... 5  
  2.2 PROJECT INTERFACES ................................ 5  

3.0 PROCESS DESIGN CRITERIA .............................. 6  
  3.1 INSTRUMENTATION AND CONTROL ....................... 6  
    3.1.1 BAT/AKART INSTRUMENTATION AND CONTROL ........ 6  
    3.1.2 B_POND/TEF TIE-IN INSTRUMENTATION ............ 7  
  3.2 PIPING ............................................ 7  
  3.3 GENERAL MECHANICAL/ CHEMICAL PROCESS ............... 8  
    3.3.1 B Plant Cooling Water ......................... 8  
    3.3.2 Collection System ............................ 9  
    3.3.3 Disposal System ............................. 10  
    3.3.4 Sample Collection and Analysis ................ 10  
    3.3.5 Support Systems ............................. 10  

4.0 FACILITY DESIGN CRITERIA ............................ 10  
  4.1 ARCHITECTURAL ..................................... 11  
  4.2 HEATING, VENTILATION, AND AIR CONDITIONING (HVAC) 11  
  4.3 UTILITIES ......................................... 11  
  4.4 LIGHTING .......................................... 12  
  4.5 ELECTRICAL ....................................... 12  
  4.6 ENERGY CONSERVATION ................................ 12  
  4.7 MAINTENANCE ....................................... 12  
    4.7.1 Equipment ................................... 12  
    4.7.2 Materials ................................... 13  
  4.8 SITE IMPROVEMENTS .................................. 13  
  4.9 DESIGN LIFE ........................................ 13  
  4.10 RELIABILITY ...................................... 14  

5.0 GENERAL REQUIREMENTS ............................... 14  
  5.1 SAFETY ........................................... 14  
    5.1.1 Criticality .................................... 14  
    5.1.2 Safety Analysis ............................... 14  
    5.1.3 Contamination Control ......................... 14  
    5.1.4 Shielding .................................... 15  
    5.1.5 Industrial .................................... 15  
    5.1.6 Fire Protection ............................... 15  
  5.2 ENVIRONMENTAL PROTECTION .......................... 15  
    5.2.1 Air ........................................ 15  
    5.2.2 Permitting Documentation ...................... 16
5.2.3 Hazardous Material Usage ........................................ 16
5.3 SAFEGUARDS AND SECURITY ....................................... 16
5.4 NATURAL FORCES .................................................. 17
5.5 DESIGN FORMAT ................................................... 17
5.6 QUALITY ASSURANCE ............................................... 17
5.7 DECONTAMINATION AND DECOMMISSIONING ..................... 18
5.8 OPERATING PERSONNEL AND SERVICES ......................... 18
5.9 COMMUNICATIONS .................................................. 18

6.0 CODES AND STANDARDS ............................................. 20

7.0 REFERENCES ....................................................... 23

APPENDIX G  B PLANT COOLING WATER BAT/AKART SYSTEM ........... 29
APPENDIX J  PROCESS AND SUPPORT FACILITY DESIGN CONSIDERATIONS .... 31
LIST OF FIGURES

Figure G-1  B Plant Cooling Water System Flow Diagram  . . . . . . . . . . .  30

LIST OF TABLES

Table 1  Project W-252 Wastestreams  . . . . . . . . . . . . . . . . . . . . . . . .  2
This page intentionally left blank.
FUNCTIONAL DESIGN CRITERIA
PHASE II LIQUID EFFLUENT TREATMENT AND DISPOSAL
PROJECT W-252

1.0 INTRODUCTION

This document provides the functional design criteria required for the Phase II Liquid Effluent Treatment and Disposal Project, Project W-252. Project W-252 shall provide new facilities and existing facility modifications required to implement Best Available Technology/All Known, Available, and reasonable methods of prevention, control, and Treatment (BAT/AKART) for the 200 East Phase II Liquid Effluent Streams (Table 1). The project will also provide a 200 East Area Phase II Effluent Collection System (PTECS) for connection to a disposal system for relevant effluent streams to which BAT/AKART has been applied. For Phase II streams other than B-Plant, this connection will be accomplished by a 216-B-3 Pond System (B-Pond) to Treated Effluent Disposal Facility (TEDF) Tie-in. The Definitive Design of the B-Pond to TEDF tie-in is part of this project. The construction of this tie-in from existing project funds may be performed if there is adequate funding based on the construction estimates for both the B-Plant scope and the tie-in. If funding is not adequate for both pieces of scope, then only the B-Plant construction will be performed.

The BAT/AKART to be applied shall be that identified in WHC-SD-W252-ER-001, Rev. 0, as modified by Engineering Change Notice (ECN) #609363, except for the B-Plant scope which will be done in accordance with Alternative #3: Source Control and Collection Disposal Facility Discharge. The BAT/AKART method selected by the original 240 Engineering Report included source control measures for each facility and discharge to the 200 Area TEDF. The ECN noted above changes the BAT/AKART to the current status option. Necessary monitoring requirements at B-Plant for permitting will still be within the project scope.

1.1 BACKGROUND

Liquid wastestreams generated in the 200 East Area are currently discharged to the soil column. Included in these wastestreams are cooling water, steam condensate, raw water, and sanitary wastewaters.

It is the policy of the U.S. Department of Energy (DOE) to conduct operations in a safe, cost-effective, and environmentally-sound manner. This includes ensuring that discharges of radioactive and non-radioactive material to the environment meet applicable regulatory requirements, and are as low as reasonably achievable (ALARA). It is also the policy of the DOE that the use of soil columns to treat and retain radionuclides and nonradioactive contaminants be discontinued at the earliest practical time in favor of
wastewater treatment and waste minimization. These policies are implemented through DOE Orders and based on federal and state environmental regulations.

In support of these policies, the U.S. Department of Energy, Richland Field Office (RL) issued a document entitled "Plan and Schedule to Discontinue Disposal of Contaminated Liquids into the Soil Column at the Hanford Site" (RL 1987). The Plan and Schedule, and its annual updates, contain a strategy for implementing alternative treatment and disposal systems for each of the thirty-three major waste streams discharged to the soil column. In this strategy, the wastestreams were prioritized into Phase I and Phase II categories. A revised effluent prioritization, based on available information, was presented in the "Annual Status Report of the Plan and Schedule," WHC-EP-0196-1 and WHC-EP-0196-2, (WHC 1988a and WHC 1989b).

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Project W-252 Wastestreams</th>
</tr>
</thead>
</table>

200 East Area

242-A Evaporator Cooling Water
242-A Evaporator Steam Condensate
B Plant Cooling Water
284-E Powerplant Wastewater
241-A Tank Farm Cooling Water

Note: BAT/AKART for these streams is current status, however the source control option will be implemented for B-Plant. Disposal requirements for the streams other than B-Plant will be accomplished by a B-Pond/TEDF Tie-in at a single point downstream. (Subject to funding restrictions identified in the Introduction.)

The following criteria were utilized to prioritize the effluents:

- Criterion 1, Radionuclide Concentration--The effluent contains radionuclides in excess of DOE Order 5400.5, Derived Concentration Guide (DCG) values.
- Criterion 2, Hazardous Waste Characteristics--The effluent exceeds WAC 173-303 dangerous waste threshold levels.
- Criterion 3, Reportable Quantity or Listed Waste--The effluent released has a potential to contain a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) reportable quantity (RQ) of a hazardous constituent or has the potential to contain a dangerous waste listed in WAC 173-303.
0 Criterion 4, Disposal Facility Life--The duration of the facility mission exceeds the minimum estimated life of the disposal site.

Wastestreams designated as a Phase II effluent did not meet any of the above criteria. Additional information regarding the prioritization and criteria are in the Plan and Schedule (RL 1987) and the 1988 and 1989 status reports (WHC 1988a and WHC 1989).

A key element of the plan is the selection of BAT/AKART for the effluent streams. These studies determine the best management practices to assure discharged effluents meet environmental standards. The completed BAT/AKART studies have been incorporated into a Washington Administrative Code (WAC) 173-240 Engineering Report and submitted to the State of Washington Department of Ecology (Ecology) and the U.S. Environmental Protection Agency (EPA).

In 1989, the DOE entered into an interagency agreement with Ecology and EPA. This agreement is referred to as the "Hanford Federal Facility Agreement and Consent Order" (Tri-Party Agreement) (Ecology, et al. 1989). Project W-252 is one of the projects required to achieve the milestones set forth in the Tri-Party Agreement. One of the milestones, M-17-00B, requires BAT/AKART implementation for Phase II streams by October 1997. The wastestreams included in Project W-252 are the Phase II streams that are not addressed as part of the 200 Area Treated Effluent Disposal Facility (TEDF), Project W-049H and Project W-291H.

This Functional Design Criteria (FDC) document provides the technical baseline required to initiate Project W-252 to meet the Tri-Party Agreement milestone for the application of BAT/AKART to the Phase II effluents. In April 1995 the BAT/AKART determination was revised per ECN #609363 to current status.

1.2 SCOPE

Within the scope of Project W-252 is BAT\AKART Alternative #3 implementation at B Plant, including the Waste Encapsulation and Storage Facility (WESF).

Some of the equipment and systems of this facility to be impacted by Project W-252 may include, but are not limited to, modification of effluent producing systems such as heating, ventilating, and air conditioning (HVAC), replacement of effluent producing equipment, replacement or modification of once-through cooling water systems, modification of piping systems, and/or additional instrumentation.

BAT/AKART implementation for the 241-A Tank Farms cooling water wastestream (Table 1) is excluded from this project. The systems necessary to implement BAT/AKART for this stream shall be provided by Tank Farms Ventilation Upgrade, Project W-030. Collection and transport of the wastestream remaining after
Project W-030 has implemented BAT/AKART will be in the scope of Project W-252. This will be accomplished by utilizing existing B-Pond piping, and the TEDF Tie-in. (Subject to funding restrictions identified in the Introduction.)

Project W-252 will provide the facilities and equipment to collect, sample, monitor, and transport to TEDF for disposal the effluent from B-Plant. In addition the project will collect and transfer to TEDF the remaining Phase II streams by a single downstream connection. (Subject to funding restrictions identified in the Introduction.) Required sampling, monitoring and signal interface of those streams will be done by others, except for pump interface signals.

The project will include the necessary utilities, communications, fire protection, and other safety-related items or features to make the project operational. In addition, these utilities will be designed to allow this project to be integrated with the 200 Area TEDF. Site improvements will be provided by the project where necessary to construct, maintain, or operate the provided systems.

The final treatment and disposal of secondary solid radioactive mixed waste (RMW), dangerous waste (DW), and/or radioactive waste (RW) is excluded from the scope of this project. Treatment and disposal of these wastes shall utilize existing or planned Hanford Site facilities including:

- 200 East Burial Grounds
- 200 West Central Waste Complex (WRAP)
- 616 Facility.

### 2.0 FUNCTIONAL CRITERIA

Project W-252 shall provide the necessary systems, components, facility modifications, and buildings required to implement BAT/AKART Alternative #3 at B-Plant, including the Waste Encapsulation and Storage Facility (WESF). If funding is available Project W-252 will provide the necessary systems, components, and buildings to collect, and transport the effluents (Table 1) to a common disposal system. The effluents collected for discharge are to meet negotiated permit discharge requirements through the application of BAT/AKART, in accordance with WHC-EP-0137, "Best Available Technology Guidance Document," (WHC 1988j), as modified by ECN #609363. Interface points for application of BAT/AKART and connection of the generating facility to the PTECS will be identified during the project definitive design. The project shall include the necessary utilities, communications, fire protection, safety related systems, features, and site improvements required to make the project operational as required to comply with this Functional Design Criteria (FDC), as well as applicable local, state, and federal codes, regulations, statutes,
and standards. The project systems shall be designed to minimize interruptions to existing facility operations.

The project shall incorporate commercially available equipment and technologies, wherever practical. The use of technologies which are not currently used by private industries shall be minimized. The project will be designed to meet the applicable -99 sections and Division 13 of DOE Order 6430.1A (DOE 1989b).

Design of the project shall consider the following measures to reduce overall life cycle costs by:

- Utilization of common facilities, components, and manufacturers wherever practical;
- Siting to minimize operations support requirements and area site improvements such as roadways, fencing, and utility services; and

2.1 SITE LOCATION

Upgrades and additions required to implement BAT/AKART shall be at, or near, the effluent generating facility. This work will be done at one site in the 200 East Area. Collection and transport systems for effluents remaining after BAT/AKART application will be located within the 200 East Area. The PTECS will use TEDF piping whenever practical.

A site evaluation report shall be prepared to assess site location alternatives. The report will be prepared according to the guidance in DOE Order 4320.2C (DOE 1990) and WHC-CM-8-7 (WHC 1988). As part of the site review, a cultural resource review will also be conducted according to WHC-CM-7-5 (WHC 1988).

2.2 PROJECT INTERFACES

The design and construction at B-Plant for BAT/AKART Implementation will result in the following integration and responsibilities:

- Projects will integrate the design and construction with the B-Plant.
- B-Plant will then be responsible for the operation and maintenance of the equipment and processes involved.
- The design and construction of the PTECS collection and transport system at the B-Plant will be coordinated with the B-Plant and the TEDF organizations.
The design and construction of the TEDF tie-in will be coordinated with the TEDF organization. TEDF will then be responsible for the operation and maintenance of the tie-in.

3.0 PROCESS DESIGN CRITERIA

3.1 INSTRUMENTATION AND CONTROL

3.1.1 BAT/AKART Instrumentation and Control at B-Plant

Project W-252 shall provide instrumentation for control and monitoring of all systems and equipment associated with BAT/AKART implementation, including connection to generating facility instrumentation and control systems. Adequate instrumentation will be provided for monitoring hazardous and radioactive materials to provide environmental and personnel safety. Instrumentation shall be provided to enable self-functioning or automated routine equipment operation. The instrumentation and controls shall be integrated with the facility monitoring and control systems, if available.

Project W-252 shall provide Local Control Units (LCU) at the installed B-Plant system. LCU control functions shall have sufficient hardware redundancy to preclude interruption of system operation. Any generator control system add-on equipment shall be of a similar type and same manufacturer as used in the existing system for ease of interface and reduction of maintenance and operating costs.

Local operator interface at the LCU and/or field instrumentation shall be provided for operations, trouble-shooting, maintenance, and personnel safety. Instrument monitors and sensors shall be located in a non-corrosive environment, rated for corrosive service, or placed in a suitable enclosure. The LCU and associated instrumentation shall comply with applicable referenced standards and provide the following minimum requirements:

- Failure alarms for individual system and/or unit operation.
- Pumps and other required equipment shall be automatically switched to the backup units by the respective LCU controller software upon primary pump failure or associated alarm conditions.
- Temperature, conductivity, pH, level, flow, and pressure indication and alarms, where necessary, to assure proper system operation and support preventative maintenance.
Position indication on all actuated valves and on any manual valves which are critical to providing routing or process information. Separate on/off confirmation, indication of all positions of multi-way valves, and 0-100% position indication for modulating valves.

On/off confirmation for all motor starters, contractors, etc.

Current equipment status indication (e.g., rotating equipment).

Placement and location of local operator interfaces, calibration equipment, and maintenance access areas shall strictly comply with human factors requirements specified in the DOE Orders, Westinghouse Hanford Company (WHC) manual WHC-CM-4-9, "Radiological Design," (WHC 1988c), and NUREG 0700.

Real-time level indication and high level alarms.

Real-time indication and historical record of influent and effluent wastestream indicating parameters (e.g., flow, conductivity, pH, total beta).

Primary leak detection alarms where required.

All information concerning the general functions of packaged sampling systems shall be integrated into each respective LCU.

3.1.2 B-Pond/TEDF Tie-in Instrumentation

Provide pump operation signals to the TEDF control room.

3.2 PIPING

Piping systems shall be provided by Project W-252 for the collection, transport, and disposal of wastewater as required to meet the functional design requirements of the project. Piping system materials of construction shall be compatible with wastestream characteristics, intended service, and existing piping, if applicable.

All piping shall be designed to drain freely with features incorporated for leak detection (as required), location, and repair of failures. Pipe systems will use gravity flow whenever practical and be designed to minimize accumulation of contaminants.
Piping shall be protected from the environmental conditions anticipated for the Hanford Site. Freeze protection will be provided, where required, by burial or other applicable methods. Underground piping shall be marked, within the backfill of the piping, with continuous plastic identification markers. All cross-country pipelines shall be staked, or otherwise marked, providing location, notification requirements, and wastestream identity. Above ground piping shall be labeled to indicate the contents, direction of flow, and any applicable warnings. The piping and installation shall meet the applicable sections of the "Hanford Plant Standards," (RL 1990a).

The piping systems installation will be designed to prevent interruption of generating facility operation.

3.3 GENERAL MECHANICAL/CHEMICAL PROCESS

The systems and processes required to implement BAT/AKART Alternative #3 at the B-Plant have been determined in the "Phase II Liquid Effluent Program, Project W-252, Engineering Report," (WHC 1992). This section provides the functional criteria for implementation of this alternative.

Project W-252 shall supply all facilities and equipment required to implement BAT/AKART Alternative #3 for the B-Plant effluent, as required in WAC 173-216 and the Tri-Party Agreement. The facilities provided by the project shall use commercially available equipment and technologies where practicable. Existing piping, equipment, and facilities should be used wherever feasible. Any new facility or equipment upgrades shall be designed to minimize interruptions to existing facility operations. Specific criteria are given in the following sections.

3.3.1 B Plant Cooling Water

The B Plant cooling water effluent stream is mainly non-contact, once-through cooling water from the WESF pool cell heat exchangers.

The cooling system implemented as BAT/AKART must eliminate the normal use of once-through cooling water for the B Plant cooling water contributors. The system must supply a minimum of 3.26 million BTU/hour of heat removal from the WESF heat exchangers and other equipment. The system shall be designed to meet a variable heat removal demand based on the number of WESF cells being used. The WESF pool cells have a temperature safety limit of 50 degrees C, an operational limit of 45 degrees C, and a normal operational limit of 35 degrees C. The system shall be designed to meet these requirements at all ambient environmental conditions.
All pumps used to circulate coolant in a closed-loop system shall be redundant. Other pumps used to supply makeup water or secondary loop cooling shall also be redundant. The redundant pump shall be capable of supplying 100% of the required capacity. The pumps shall be electrically powered and connected to the standby power system. Pumps and associated valves shall be capable of remote operation and monitoring.

All contributors remaining after BAT/AKART implementation shall be combined, sampled, monitored, and discharged to the PTECS for transport to a disposal site. Flow proportional sampling capabilities and required monitoring shall be provided. A description of a proposed system to implement BAT/AKART for the cooling water stream is contained in Appendix G.

3.3.2 Collection System

The 200 East Area PTECS will utilize existing piping wherever practical. Collected wastestreams shall require no additional treatment before disposal. The wastestreams continuing to be discharged to the B-Pond are listed in Table 1. These combined streams shall be routed to the TEDF in the most cost effective manner.

The collection system at B-Plant shall be designed to minimize impacts to the generating facilities through compliance with the following minimum requirements:

- Pumps shall be redundant to prevent unforeseen interruption or shutdown of either the PTECS or generating facility operations. The redundant pump shall be capable of providing 100% of the design capacity.
- Pumps shall be electric-powered and connected to standby power, as required.
- Pumps and motors shall be equipped with monitoring and control features to permit remote operation and surveillance from the control room.
- Sumps shall have liquid levels monitored on a real-time basis with high level alarms and other overflow protection, as required to meet the functional requirements of the PTECS.
- Provision for clean-out and verification of sump integrity shall be provided by design.
- Flow-proportional composite sampling capability shall be provided at each generator waste interface to the PTECS through the implementation of BAT/AKART.
3.3.3 Disposal System

The PTECS disposal system shall dispose of the combined 200 East Area effluents meeting the permitted release limits to a soil disposal site approved by RL and Ecology under WAC 173-216. The TEDF disposal site will be used.

3.3.4 Sample Collection and Analysis at B-Plant

All equipment required for sample collection, storage, and analysis to meet the regulatory compliance needs for the PTECS shall be provided by Project W-252. TEDF Interface Control Document (ICD) requirements are included in these requirements.

Sampling systems for the PTECS shall be redundant with connection to standby power to provide flow-proportional composite sampling capability. All sampling equipment shall be monitored and controlled via the respective LCUs, with data archived by the MCS. Sampling systems shall be in accordance with the sampling and analysis methods specified by SW-846, "Test Methods for Evaluating Solid Wastes - Physical Chemical Methods" or other appropriate methods.

3.3.5 Support Systems

Secondary solid wastes, derived from the maintenance operations of the PTECS, shall be packaged and shipped utilizing facilities and equipment provided in 2025E.

Utilities and site services for the PTECS and BAT/AKART systems shall be extensions from the nearest available source, if practical. The services shall include raw water, sanitary water, electrical power, and communication systems. Project W-252 shall provide standby power, as required, utilizing existing standby power systems wherever possible. No standby power is required at the B-Pond to TEDF Tie-in.

4.0 FACILITY DESIGN CRITERIA

The project facilities and systems shall be designed to comply with the laws and regulations applicable to industrial water pollution control found in ANL/ESS TM-264 Rev 1, "Environmental Protection Appraisals: A Suggested Guide for U.S. Department of Energy Field Organizations." The project shall also give consideration to the guidelines found in the overview of the laws and regulations of the above appraisal. Design criteria for the individual
facility implemented BAT/AKART systems and the PTECS are to be based upon the applicable provisions of DOE Order 6430.1A and DOE Order 5400.1.

The modifications under Project W-252 will, as a minimum, comply with the applicable requirements of DOE Order 6430.1A, including Division 0275, "Industrial Waste Facility." Other key DOE Orders pertinent to the project design and function are the following: DOE Orders 5400 series; DOE Order 5440.1C; DOE Orders 5480 series; DOE Order 5820.2A; and DOE Order 5400.1C. In addition, national consensus standards specified in the Orders, including NUREG-0700, are applicable to Project W-252. Project W-252 shall also comply with applicable federal, state, and local regulations specified in Section 6.0.

The following subsections define the general requirements that shall be included in the project to meet the functions of Project W-252.

4.1 ARCHITECTURAL

The auxiliary equipment and control/monitoring equipment and components shall be housed in buildings, structures, enclosures, or otherwise designed to withstand the Hanford environment. No additional building space is anticipated for operations and maintenance personnel.

Special consideration shall be given to personnel access to elevated portions of the architectural design (e.g. tank supports). Where appropriate, protection shall be provided at openings and clear drops by handrails or other engineered barriers.

Where applicable, a tank(s) shall have but shall not be limited to, ready access at its base for modifications, equipment inspections, maintenance repair, and expedient removal of waste.

4.2 HEATING, VENTILATION, AND AIR CONDITIONING (HVAC)

Facilities and systems provided by Project W-252 shall include building and process ventilation in compliance with applicable DOE Orders.

4.3 UTILITIES

The project shall take advantage of existing utilities and site services, wherever practical. The services shall include raw water, sanitary water,
electrical power, and communications systems. The project shall provide air
delivery systems for process and ancillary services as required. Oil-less air
compressors, air dryers, and dew point monitoring shall be provided for the
instrument air supply, if needed.

4.4 LIGHTING

Occupied areas shall use white light with water resistant NEMA 4
installations. Exterior areas may be lighted by low-pressure sodium, if color
rendition is not required for safety or operation. Emergency lighting shall
be provided as required.

4.5 ELECTRICAL

Electric power for the BAT/AKART implemented systems shall be provided from
existing services located in the 200 East Area as required by the project
design. Electrical modifications shall comply with national and Hanford Site
requirements.

Standby electric power at B-Plant only for the systems shall be provided from
existing sources where practical and shall comply with the National Electrical
Code, ANSI/NFPA 70 and NFPA 110, "Emergency and Standby Power Systems." UPS
will be provided, where required, to maintain safe operations, compliance with
environmental regulations, or where loss of power could require excessive
effort for recovery and restart.

4.6 ENERGY CONSERVATION

The systems provided shall comply with the energy conservation requirements
and shall be justified by Life Cycle Cost Analysis (LCCA) as defined in DOE
Order 6430.1A, 110-12.

4.7 MAINTENANCE

The project will provide the documentation, and the initial complement of
equipment and services required, to initiate operation of all systems.
This shall include, but not be limited to: equipment identification tags, and
necessary computer software development for operations and maintenance
activities.

4.7.1 Equipment

Ease of maintenance will be a design goal. Access will be provided for all
piping, process and ancillary equipment, for regular maintenance, repair, and
replacement. The design shall provide for maintenance activities to be completed in place to minimize exposure, in accordance with ALARA guidelines. The design shall provide for equipment lock out capabilities where applicable. Replacement of equipment or piping will occur with minimal relocation or removal of other equipment and piping. Regular maintenance will include lubrication, calibration, and testing of the equipment and piping. Regular maintenance, repair, and replacement will be completed in a manner to minimize cost of disassembly and interruption of service.

4.7.2 Materials

All equipment will be constructed of materials selected for compatibility with the intended service. Special protective coatings will be considered per DOE Order 6430.1A, 0900-99. Construction materials will be selected to minimize the potential for the buildup of hazardous and/or radioactive materials.

4.8 SITE IMPROVEMENTS

Road access to the process and support services systems and facilities, constructed by this project, shall be provided. Fencing at impacted facilities may require modification. Project W-252 shall provide for fence relocation and modification of installation.

Cross-country pipelines shall be provided with graded, gravel-surfaced access roads to facilitate periodic inspection, maintenance, or emergency access, as required. Access to outdoor pipelines will be adjacent to the pipeline right-of-way to facilitate surveillance and repair. Road access to the PTECS facilities will be provided. Specifically, road access must be included for operations, maintenance, and waste removal.

New roads or extensions will be designed for economical maintenance and upkeep based on their expected service and use. Existing streets and roads disturbed by the installation of the project are to be restored to a condition at least equivalent to that existing prior to the project. Existing roads will be used to the maximum extent practical.

4.9 DESIGN LIFE

All systems shall be designed to function for a minimum of 30 years. Equipment, instrumentation, and consumable components may have a design life less than 30 years if designed to accommodate repair and/or replacement, and are economically justified.
4.10 RELIABILITY

The degree of reliability provided shall be sufficient to ensure the systems, equipment, and components function efficiently and safely throughout the useful life of the facility without undue maintenance and repair. The project design shall provide for ease-of- and cost-effective upgrades to maintain flexibility to service future mission needs.

5.0 GENERAL REQUIREMENTS

5.1 SAFETY

5.1.1 Criticality

The project design goal will be to prevent a criticality event, or any other unacceptable safety consequence through implementation of BAT/AKART. The criteria that at least two unlikely, independent, and concurrent changes (contingencies) in processing and/or operating conditions must happen before a criticality accident is possible is met for systems of this project. A criticality event is anticipated to be an unlikely event for this project. Designs will be in accordance with DOE Order 6430.1A, 1300.4

5.1.2 Safety Analysis

New or revised safety documentation will verify the design features, operating requirements, and administrative controls required of the facilities prior to operation. The documentation shall include as a minimum: a Preliminary Fire Hazards Analysis and Final Fire Hazards Analysis, a Preliminary Safety Evaluation (PSE), Preliminary Safety Analysis Document (PSAD) or Preliminary Safety Analysis Report (PSAR), Final Safety Analysis Document (FSAD) or Final Safety Analysis Report (FSAR).

New safety documentation to be prepared by the operating and engineering contractor will verify the safety design features, operating requirements, and administrative controls required of the facilities before operation. The interactions of systems, components, and structures between TEDF and PTECS will be analyzed to ensure required safety functions survive under normal and unplanned conditions during W-252 operations. At facilities modified by BAT/AKART implementation the responsible operating organization will be responsible for updating the affected safety documentation.

5.1.3 Contamination Control

Contamination risks during construction are expected to be relatively low, however, some work shall be performed in and near existing non-reactor nuclear facilities. Existing work procedures will be implemented as appropriate to ensure the safety of the construction and operations personnel.
Facilities provided by this project will greatly reduce the quantity of liquid effluents being discharged and provide additional control measures to assure all discharges meet the permitted limits. Diversion capabilities for the effluents at B Plant shall be retained and used if an unplanned release were to occur. The projected concentration of radionuclides are below the levels requiring secondary containment as specified in DOE Order 5820.2A. The PTECS shall be designed to prevent unacceptable radionuclide or chemical exposures to the operating personnel in the event of an unplanned release to the project by a generating facility.

5.1.4 Shielding

Personnel shall be protected from exposures to potential radiation sources from generator facility upset conditions. The risks of personnel radiation exposure shall be minimized through appropriate shielding methods. The amount of shielding will be determined by analysis and will comply with ALARA principles in DOE Order 6430.1A; WHC-SD-GN-DGS-30011, "Radiological Design;" Hanford Site Radiological Control Manual (HSRMC-1); and WHC-CM-4-11, "ALARA Program Manual," (WHC 1988g). In any case, personnel radiation exposure shall not exceed .5 rem/yr to the individual (maximum), based on predicted exposure time in normally occupied areas. The use of lead shielding shall be minimized.

5.1.5 Industrial

Risks associated with construction activities are to be considered through applicable, referenced DOE Orders and WHC manuals. Compliance during construction will be considered during design to minimize the risks. Design will ensure that construction of this project is accomplished in accordance with the Code of Federal Regulations, Part 1926, "Occupational Safety and Health Administration, Labor."

5.1.6 Fire Protection

Fire protection will be provided as required by DOE Order 6430.1A, DOE Order 5480.7A, Fire Protection, and RLID 5480.7A. Any new fire alarm system provided by this project will be connected to the Hanford Radio Fire Alarm System. Fire extinguishers will be installed as required.

5.2 ENVIRONMENTAL PROTECTION

5.2.1 Air

Air effluent treatment, sampling, and monitoring will be commensurate with Clean Air Act permit requirements, state and local regulations, and Westinghouse Hanford Company (WHC) policy, as defined in the "Environmental
Compliance Manual," WHC-CM-7-5 (WHC 1988). The following will define permit requirements:

- Prevention of Significant Deterioration (PSD) permit per 40 CFR 52 (EPA 1991a).
- Requirements generated under the State of Washington per WAC 173-400, 173-460, 173-480, and 246-247, and the Air Pollution Control Authority of Benton, Franklin, and Walla Walla Counties.

5.2.2 Permitting Documentation

The reports, calculations, specifications, and drawings shall be prepared, as required, to support the permitting submittal requirements of the system. The permitting of the streams addressed by Project W-252 will be accomplished by modifying the existing 200 Area TEDF State Industrial Waste Discharge Permit # ST4502 to accept these streams after the appropriate BAT/AKART has been applied.

5.2.3 Hazardous Material Usage

The project design shall minimize the use and generation of hazardous substances for the construction, maintenance, operation, and decommissioning of the project. Hazardous substances shall be noted, or otherwise identified, in the definitive design media and, if used, shall be encapsulated to prevent contamination while permitting recovery, recycle, and/or reuse wherever feasible. Encapsulated hazardous materials shall be permanently marked identifying contents. Material safety data sheets (MSDS) shall be provided for all materials utilized in the construction and operation of the facility as required. Examples of materials requiring data sheets include, but are not limited to, paints, sealants, oils, lubricants, chemicals, and instrumentation fluids. Activities at each of the facilities will follow the applicable Hazardous Communication Program.

5.3 SAFEGUARDS AND SECURITY

Project W-252 will be in the 200 East Area and may be in the 600 Area if the B-Pond to TEDF tie-in is constructed. Design and construction activities will comply with requirements of DOE Order 6430.1A and WHC security procedures. A
construction security plan will be prepared for this project. The systems will not contain accountable quantities of special nuclear material.

5.4 NATURAL FORCES

The facility structures provided by this project all comply with the criteria defined in DOE Order 6430.1A, paragraph 0110-5.2. Analysis shall be performed in accordance with "Hanford Plant Standard," SDC 4.1, Design Loads for Facilities.

5.5 DESIGN FORMAT

As-built drawings for the 200 East Area PTECS, including modifications to TEDF facilities and systems, shall be provided by Project W-252. As-built drawings for the BAT/AKART implementation systems, including modifications to the impacted facility, shall also be provided by Project W-252. Existing drawings and project drawings shall be consolidated to the extent practical to enhance facility configuration. Other facility drawings affected by the project shall also be as-built, as required by the DOE and contractor procedures. Logic diagrams required for the MCS shall be in the same format as those provided by TEDF. Drawings provided shall be verified after completion of construction as "as-built."

5.6 QUALITY ASSURANCE

Quality Assurance (QA) activities for all contractors involved in the design, construction, testing, and inspection of the proposed project shall be formulated and executed through the use of a Project Specific Quality Assurance Program Plan (QAPP). The QAPP shall establish quality assurance program requirements used for verification, inspection, and testing activities. The QAPP shall provide the means to ensure the facility complies with program requirements; the project plans and specifications are adequate; and tests and inspections are sufficient to confirm the adequacy of design and the quality of construction and manufactured components. The quality assurance program requirements will be in accordance with DOE Order 6430.1A, 0140, "Quality Assurance;" CFR Part 830.120, "Quality Assurance Requirements"; and WHC-CM-4-2, "Quality Assurance Manual," (WHC 1989d).

The QA program requirements are based on impact levels and safety classifications that are established in accordance with documented procedures. Safety classification of systems, components, and structures will be determined by risk analyses in accordance with WHC-CM-1-3, MRP 4.46. Details on safety classification will be listed in the QAPP and verified in subsequent safety documentation. A final safety equipment list will be included in a Final Safety Analysis Document/Final Safety Analysis Report (FSAD/FSAR). All
safety classifications are to be supported by documented analysis. Impact levels are determined in accordance with WHC-CM-1-3, MRP 5.43.

5.7 DECONTAMINATION AND DECOMMISSIONING

The design will incorporate ease of decontamination and decommissioning of all project systems, in accordance with DOE Order 6430.1A and other referenced standards. The project shall minimize the buildup of residual contamination by avoiding practices (such as socket weld fittings) which promote accumulation of contamination in piping or equipment. All equipment and components provided by the project shall be designed to facilitate eventual decontamination and decommissioning. All underground piping removed from service by this project shall be isolated in an environmentally acceptable manner.

5.8 OPERATING PERSONNEL AND SERVICES

The design will consider human factors for maintenance and operations activities, including equipment, valve location and orientation, secondary waste handling, and building layout. To the extent practical, design will follow the guidelines and standards of DOE Order 6430.1A, 1300-12, NUREG 0700, Mil-STD 1472D and WHC-SD-GN-DGS-30011, "Radiological Design."

- Rapid, safe, economical operations and maintenance.
- Anthropometric design for male and female personnel.
- Minimal distraction, discomfort, stress, and fatigue during operations and maintenance.

The completed project will, to the extent possible, accommodate physical limitations such as hearing impairment and color blindness. Gauges, instruments, etc., shall be placed in accordance with the human factors requirements of the referenced standards.

5.9 COMMUNICATIONS AND TELECOMMUNICATIONS SYSTEMS

Radio station communications, telephones, and extensions to the private automatic exchange (PAX) associated with each facility shall be provided, as required to support the functional requirements of the project. Telephones will be installed in the occupied work areas to permit communications within the new facilities and with other area facilities. The number of telephones installed will be determined in the definitive design. Crash alarm phones,
evacuation sirens, and other safety-related communications will be provided in accordance with safety standards. Connections to the Computer-Automated Surveillance System (CASS), Hanford Local Area Network (HLAN), and a data link to the laboratories, via a Laboratory Customer Communications System (LCCS) terminal, will be provided as required to meet the functional requirements of this project.
6.0 CODES AND STANDARDS

The project will be designed to handle low-level radioactive wastestreams which are below the requirements of secondary containment found in DOE Order 5820.2A. Design criteria for Project W-252 are to be based upon the applicable provisions of DOE Order 6430.1A and DOE Order 5400.1.

The following list identifies the appropriate codes, standards, regulations, guidelines, orders, etc., which are not defined within DOE Order 6430.1A. Revisions to the codes and standards during the project shall be administered by the project, with assessments prepared to identify the impact of these revisions. Impacts shall be managed in accordance with DOE, contractor, and project specific requirements and procedures.

Utilize the codes and standards established for the 200 Area TEDF for interconnecting piping and instrumentation and as much as possible for all other comparable equipment.

- RL Order 5440.1A, "Implementation of the National Environmental Policy Act at the Richland Operations Office," (RL 1987)
- DOE Order 5440.1D, "National Environmental Policy Act Compliance Program," (DOE 1991a)
- DOE Order 5400.2A, "Environmental Compliance Issue Coordination," (DOE 1989a)
- RL Order 5480.4B, "Environmental Protection, Safety and Health Protection Standards," (RL 1989)
- RL Order 5480.10, "Industrial Hygiene Program," (RL 1990c)
- DOE Order 5400.1, "General Environmental Protection Program," (DOE 1988)

o DOE Order 5483.1A, "Occupational Safety and Health Program for Department of Energy Contractor Employees at Government Owned-Company Operated Facilities," (DOE 1983)

o RL Order 5484.1, "Environmental Protection, Safety, and Health Protection Information Reporting Requirements," (RL 1983a)

o DOE Order 5700.6C, "Quality Assurance," (DOE 1991b)

o DOE Order 5820.2A, "Radioactive Waste Management," (DOE 1990)


o WAC 173-216, "Waste Discharge Permit," (Ecology 1986)


o WHC-CM-4-2, "Quality Assurance Manual," (WHC 1988a)

o WHC-CM-4-3, "Industrial Safety Manual," (WHC 1988b)


o WHC-CM-4-41, "Fire Protection Program Manual"

o WHC-CM-4-11, "ALARA Program Manual," (WHC 1988c)


o WHC-CM-6-2, "Project Management," (WHC 1988f)

o WHC-CM-7-5, "Environmental Compliance," (WHC 1988g)


In addition to the above standards, applicable national consensus codes and standards and pertinent state and local codes and standards will be used. The
latest edition of all codes and standards at the time of the conceptual design will be used.
7.0 REFERENCES


Clean Air Act, 1955, 42 USC 7401 et seq.


*Safe Drinking Water Act of 1974*, 42 USC 300f et seq.


27


HSRCM-1, Hanford Site Radiological Control Manual


APPENDIX G

B PLANT COOLING WATER BAT/AKART SYSTEM

Installation of a cooling tower that can provide a minimum of 7 million BTU/hr was the selected alternative of the B Plant Cooling Water BAT Evaluation in the W-252 Engineering Report. The cooling tower will eliminate the once through condenser cooling water effluent, as shown in Figure G-1. The exact type of wet cooling tower (e.g. open tower, closed tower) will be determined in the subsequent design process.

As part of the cooling tower system, equipment and facilities will be installed to supply chemicals, such as biocides and scale inhibitors, as required for proper cooling tower operation and maintenance. Capability to perform routine cooling tower water quality checks shall also be provided in the support facility. Freeze protection will be required for the tower and outside pipelines. The use of filtration shall be considered as a means to keep solids from building up in the system.

All pumps used for circulating liquid in the cooling loop, supplying cooling water, and supplying makeup or return water shall be redundant. The redundant pump shall supply 100% of the required capacity. Controls shall be supplied that will automatically energize the backup pump on failure of the primary pump. Any other equipment or controls identified during subsequent design as critical to the operation of the cooling system shall have a redundant backup. Such redundancy will reduce the possibility of interruption of the cooling tower system operation.

Routing of the emergency water supply wells, 282-B and 282-BA, shall be changed to supply well water as makeup to the cooling tower during loss of normal makeup water supply. The well will not directly supply cooling water to the condensers.

Contributors to the existing B Plant cooling water effluent that would not be eliminated by installation of closed-loop cooling will be used as makeup water to the cooling tower. This includes the demineralized water flushed from the WESF pool cells and the steam condensate from the Stairwell No.1 HVAC system. Piping changes will be required to route these contributors to the cooling tower thus eliminating them from the effluent. A flow diagram of the system is shown in Figure G-1.

This Appendix for A/E Information Only
APPENDIX J

PROCESS AND SUPPORT FACILITY DESIGN CONSIDERATIONS

The design of the Project W-252 systems shall consider the following design features:

- Heating, ventilation, and air conditioning (HVAC) systems will be installed in facilities as required for BAT/AKART implementation and PTECS support facilities. The purpose of the HVAC systems will be to control airborne contamination, provide environmental control for instrumentation and electrical systems, and maintain human comfort in areas of personnel occupancy.

- Equipment and services required to flush and decontaminate internal components and exterior surfaces of Project W-252 systems and support facility building interior surfaces will be provided to maintain them in a relatively clean condition.

- Safety showers and eyewash stations in compliance with DOE Order 6430.1A requirements will be installed.

- Permanent and/or portable breathing air systems will be provided where required to support maintenance activities or recovery from postulated accident conditions.

- Posts, guards, and other types of protection needed to prevent damage to equipment, piping, and structures will be installed.

- Guard rails, or other fall protection, around all pits, platforms, and surfaces where a fall from more than four feet could occur will be installed.

- A system of cranes and/or hoists (including monorail systems) and equipment for equipment handling and transport will be installed as necessary for maintenance.

- A network of stairways, walkways, and maintenance platforms for access to equipment and instrumentation where routine or frequent maintenance and surveillance inspections will be required. Elevators will be considered for use when frequent and rapid access is needed to higher elevations in facilities where bulky or heavy items must be moved. The use of ladders shall be minimized.

- Service doors will be installed to enable movement of equipment to and from the facility.
The following flow information reflects current system design information as of the date of REV 2 of this FDC.

The facilities addressed by this FDC are the 241-A, 242-A, 244-AR, B-Plant, and the 284-E. The changes being made to this project per REV 2 is to delete all of the source control scope on all but the B-Plant. The tie-in to the 200 Area TEDF is being handled differently, therefore, by a direct tie to the TEDF line downstream of all the facilities, (except B-Plant which will be tied in to TEDF E-Line at B-Plant). The flow information is thus being tabulated in two parts:

B-Plant......With cooling towers running......Approx 30-50 GPM
B-Plant......Emergency Raw water..................Normal 600 GPM
Design Max. 1300 GPM

Others that will discharge through the current B-Pond line, but be collectively tied in are:

241-A.......................10-20 GPM (evaporative cooler blowdown)
244-AR......Descoped...no flow
284-E.........................110 GPM When evaporator operates, 0 GPM when not.
242-A.......................2725 GPM

Total 2855 GPM

The B-Plant emergency raw water flow will occur rarely, if ever. In the event this occurs, other streams such as the evaporator will be curtailed until the emergency situation is corrected.

The design of the tie-in with a pump assist can be accomplished in two ways, on the B-Pond leg only or on the combined leg. If the design is on the B-Pond leg, the pump capacity will be sized per the 2855GPM flow value. If the combined leg design is used, the maximum flow value shall be 4000GPM.

This Appendix for A/E Information Only