0026014

START

ENGINEERING CHANGE NOTICE

Page 1 of 2

1. ECN № 171172

Proj. ECN

2. ECN Category (mark one)		Supplemental	[x] (struck out)	Change ECN	[]	Supersedure	[]
Cancel/Void	[]	Direct Revision	[X]	Temporary	[]	Discovery	[]

3. Originator's Name, Organization, MSIN, and Telephone No. W. E. Davis, 7E141, S6-70, 2-0014	4. Date January 20, 1992

5. Project Title/No./Work Order No.	6. Bldg./Sys./Fac. No.	7. Impact Level 1 ~~3~~EQ WED
8. Document Number Affected (include rev. and sheet no.) WHC-SD-WM-PLN-037, Rev. 0	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 Doc. No. N/A	11c. Complete Installation Work N/A Cog. Engineer Signature & Date	11d. Complete Restoration (Temp. ECN only) N/A Cog. Engineer Signature & Date

12. Description of Change

1. Change from alphabetic sections to numeric sections.
2. Add a missing period.
3. Acronyms and abbreviation page.
4. Change QAPP to QAPjP.
5. Add a "the" on page 2.

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

13b. Justification Details

Better document

14. Distribution (include name, MSIN, and no. of copies) See distribution sheet	RELEASE STAMP OFFICIAL RELEASE BY WHC (23) DATE APR 29 1992 Sta #10

A-7900-013-2 (11/88) (EF) GEF095
Engineering Change Notice

ENGINEERING CHANGE NOTICE

1. ECN (use no. from pg. 1): 171172

15. Design Verification Required	16. Cost Impact		17. Schedule Impact (days)
	ENGINEERING	CONSTRUCTION	
☐ Yes	Additional ☐ $ N/A	Additional ☐ $ N/A	Improvement ☐ N/A
☒ No	Savings ☐ $	Savings ☐ $	Delay ☐

18. Change Impact Review: Indicate 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.

SDD/DD	☐	Seismic/Stress Analysis	☐	Tank Calibration Manual	☐
Functional Design Criteria	☐	Stress/Design Report	☐	Health Physics Procedure	☐
Operating Specification	☐	Interface Control Drawing	☐	Spares Multiple Unit Listing	☐
Criticality Specification	☐	Calibration Procedure	☐	Test Procedures/Specification	☐
Conceptual Design Report	☐	Installation Procedure	☐	Component Index	☐
Equipment Spec.	☐	Maintenance Procedure	☐	ASME Coded Item	☐
Const. Spec.	☐	Engineering Procedure	☐	Human Factor Consideration	☐
Procurement Spec.	☐	Operating Instruction	☐	Computer Software	☐
Vendor Information	☐	Operating Procedure	☐	Electric Circuit Schedule	☐
OM Manual	☐	Operational Safety Requirement	☐	ICRS Procedure	☐
FSAR/SAR	☐	IEFD Drawing	☐	Process Control Manual/Plan	☐
Safety Equipment List	☐	Cell Arrangement Drawing	☐	Process Flow Chart	☐
Radiation Work Permit	☐	Essential Material Specification	☐	Purchase Requisition	☐
Environmental Impact Statement	☐	Fac. Proc. Samp. Schedule	☐		☐
Environmental Report	☐	Inspection Plan	☐		☐
Environmental Permit	☐	Inventory Adjustment Request	☐		☐

19. 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

20. Approvals

OPERATIONS AND ENGINEERING	Signature	Date
Cog./Project Engineer	W. E. [illegible]	4/29/92
Cog./Project Engr. Mgr.	[illegible]	4/29/92
QA	[illegible] / M Britain	4/29/92
Safety	M K Lacey	4-29-92
Security		
Proj.Prog./Dept. Mgr.	[illegible]	4/29/92
Def. React. Div.		
Chem. Proc. Div.		
Def. Wst. Mgmt. Div.		
Adv. React. Dev. Div.		
Proj. Dept.		
Environ. Div.	S. A. Burros	4-29-92
IRM Dept.		
Facility Rep. (Ops)		
Other		

ARCHITECT-ENGINEER	Signature	Date
PE		
QA		
Safety		
Design		
Other		
DEPARTMENT OF ENERGY	C. A. Bonds	4.29.92
	J. G. Rasmussen	4/29/92
ADDITIONAL		

RECORD OF REVISION

(1) Document Number ~~Rev. 1~~ WHC-SD-WM-PLN-037

Page 1

(2) Title

B Plant Cooling Water Sampling and Analysis Plan

CHANGE CONTROL RECORD

(3) Revision	(4) Description of Change – Replace, Add, and Delete Pages	Authorized for Release: (5) Cog./Proj. Engr.	Authorized for Release: (6) Cog./Proj. Mgr.	Date
~~1~~ 0	(7) EDT 157167, April 16, 1992			
RS 1	1. Add abbreviation and acronym page. 2. Replace alphabetic sections with numeric. 3. Add a missing period on page 14. 4. Replace QAPP with QAPjP. 5. Add "the" on page 2. incorporate 171172	W E Davis	W.E. Davis per telecon M W Stevenson	4/29/92

9 3 1 2 5 3 7 2 3

A-7320-005 (12/89)

SUPPORTING DOCUMENT

1. Total Pages 26

2. Title	3. Number	4. Rev No.
B Plant Cooling Water Sampling and Analysis Plan	WHC-SD-WM-PLN-037	1

5. Key Words

Cooling Water, Sampling, Chemical, and Radiological Analysis

6. Author

Name: William E. Davis

William E. Davis 4/29/92

Signature

Organization/Charge Code 7E141/D319B

7. Abstract

A sampling and analysis plan for B Plant cooling Water is described. The purpose of the plan is to characterize chemical and radiological content of the liquid effluent and to confirm the streams designation as not a dangerous waste.

9. Impact Level 1EQ

10. RELEASE STAMP

B PLANT
COOLING WATER
SAMPLING AND ANALYSIS PLAN

April, 1992

PREPARED BY

W. E. Davis

B Plant Environmental Engineering

WESTINGHOUSE HANFORD COMPANY
HANFORD OPERATIONS AND ENGINEERING CONTRACTOR
FOR THE
U.S. DEPARTMENT OF ENERGY

TABLE OF CONTENTS

ACRONYMS/ABBREVIATIONS

ASTM	American Society for Testing Material
BCE	B Plant Chemical Sewer
CBC	B Plant Cooling Water
CERCLA	Comprehensive Environmental Response Compensation & Liability Act
CFR	Code of Federal Regulations
DOT	Department of Transport
EPA	U.S. Environmental Protection Agency
ETP	Effluent Treatment Programs
HEIS	Hanford Environmental Information System
QAPjP	Quality Assurance Project Plan
RCRA	Resource Conservation and Recovery Act
SAP	Sampling and Analysis Plan
SML	Sampling and Mobile Laboratory
WAC	Washington Administrative Code
WESF	Waste Encapsulation Storage Facility
WHC	Westinghouse Hanford Company

1. INTRODUCTION

The Sampling and Analysis Plan (SAP) is designed to document the requirements and procedures for the B Plant Cooling Water (CBC) sampling and analysis. This CBC SAP will be revised as necessary to ensure that it will document any changes in sampling and analysis requirements for the CBC effluent.

From 1992 to 1995 the B-Plant Chemical Sewer (BCE) effluent will be combined with the CBC effluent. A separate sampling plan has addressed the sampling of the BCE effluent (WHC, 1992a). However, since the two effluent streams are combined, the sampling plans for both effluent will be co-ordinated to extract the maximum information on the chemical and radiological content of each effluent and the combined effluents. This document will also describe how the samples are to be co-ordinated.

2. SAMPLING OBJECTIVES

This sampling plan provides information on how the B Plant Cooling Water liquid effluent will be sampled and analyzed to accomplish the following:

1. Provide characterization data for the CBC liquid effluent stream during different facility operational configurations.

2. Determine the waste designation for the B Plant Cooling Water per WAC 173-303-070.

In addition, the data collected by this sampling plan will be available for use: to provide confirmatory data for the WAC 173-240 Engineering Report to support the Best Available Technology-Economically Achievable evaluations and liquid effluent treatment system design, and to provide data on chemical and radiological constituents in order to determine loading and rate of migration to support the assessment of impacts on continued discharge.

Quality Assurance objectives associated with the sampling protocol for this sampling plan are described in the Liquid Effluent Sampling Quality Assurance Project Plan (QAPjP) (WHC, 1992b).

3. SITE BACKGROUND

This section describes the B Plant Facility that produces the CBC liquid effluent, the CBC liquid effluent stream and its sources, and the disposal site receiving the CBC liquid effluent.

3.1 B Plant FACILITY DESCRIPTION

The B Plant Facility is located in the 200 East area at Hanford. This facility contains two major operating system areas, the Waste Encapsulation and Storage Facility (WESF) located in the 225-B Building and the 221-B Building. Both operating system areas are required to carry out B Plant Facilities's mission which is to ensure safe storage and management of radiological inventories. In 225-B the inventory consist of Strontium and Cesium capsules while the 221-B Building has a substantial radiological inventory remaining from previous production campaigns. Although no production activities are currently taking place at this facility, several operating systems are required to accomplish the B Plant Facility mission.

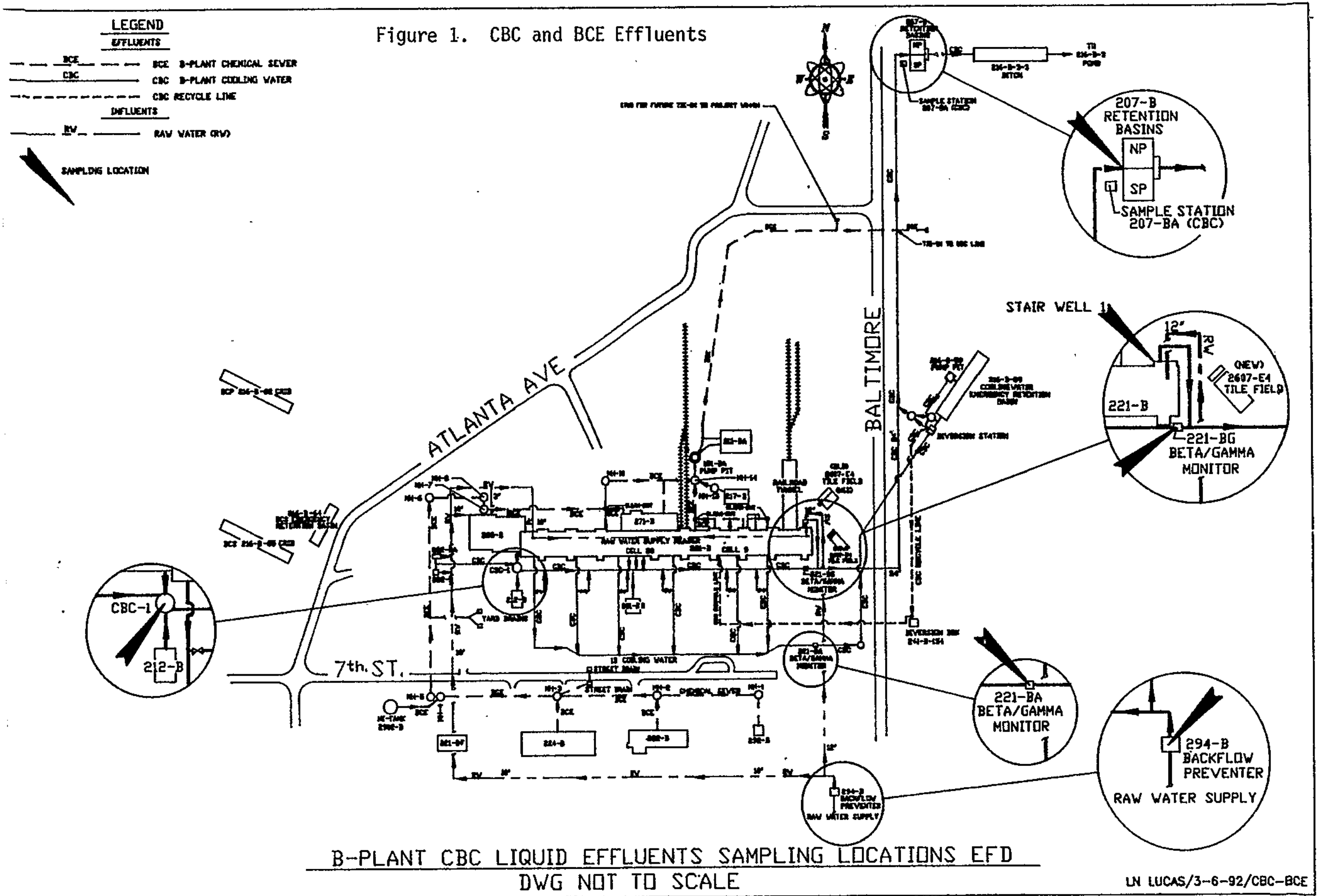
The major operating systems contributing to the CBC liquid effluent stream from the B Plant Facility are the systems for cooling the 221-B Process Tanks and WESF Pool Cells, and the deep well emergency backup pumps.

3.2 STREAM DESCRIPTION

The CBC is an active stream and receives the majority of the effluent from raw water discharge from a single pass through the B Plant Process Tanks cooling coils and 225-B Pool Cells heat exchangers. In addition, the CBC receives raw water from the testing of deep well emergency backup pumps and steam condensate from minor contributors. This effluent stream produces a flowrate of approximately 1750 gpm (WHC, 1990c). However, from 1992 to 1995 the B Plant Chemical Sewer (BCE) effluent with a flowrate of approximately 190 gpm (WHC, 1990c) is joined to the CBC to produce a combined flowrate of approximately 1940 gpm that is discharged to the 216-B-3 Pond. The majority of this combined effluent, approximately 70%, is from the single pass-through cooling water through heat exchangers in the 225-B Pool Cells.

Raw water is supplied to B Plant from two sources: a reservoir in 200 East and an emergency source utilizing two emergency wells. The raw water from the Columbia River is pumped to the 282-E Pumphouse and reservoir in the 200 East Area. From the reservoir, the water is pumped north to a backflow preventer building, 294-B (Figure 1, page 3). North of 294-B the raw water header separates with a 10-in.-dia. header leg going west and a 12-in.-dia. header leg going north. The raw water leg routed west passes south of the 222-B and 224-B Buildings then turns north passing west of the 224-B and 225-B Buildings and then turns east north of the 221-B and 225-B Buildings. From this header three smaller supply headers, a 3-in., 4-in., and 10-in.-dia. enter 225-B on the north, east, and west sides respectively. Also from this header, a 10" supply header enters the northwest corner of 221-B Building. This 221-B header enters the west end of the 221-B Electrical Gallery near Cell 40.

Figure 1. CBC and BCE Effluents



The raw water leg routed north from 294-B enters the northeast corner of 221-B Building in the Pipe Gallery. This header then reduces from 12-in-dia. to a 10-in.-dia. header in the Operating Gallery. The header runs the entire length of the 221-B Building and supplies cooling water to the process cell vessels cooling coils. This header is a common header with the 10-in-dia. raw water header that enters the west end of the Electric Gallery of the 221-B Building.

In the event of loss of raw water supply from the 282-E Facility reservoir, two emergency wells located west of 225-B in 282-B and 282-BA can supply sufficient raw water for cooling to the 221-B and 225-B Buildings.

Two CBC discharge lines serve 225-B and 221-B Buildings, a 24-in.-dia. line and a 15-in.-dia. line running parallel south of B Plant. The cooling water from the heat exchangers in 225-B Pool Cells and in the closed loop cooling system, water from 212-B drains, raw water from testing the pumps on the two emergency wells, condensate from three condensers; E-20-3, E-22-4, and E-24-4, and some small miscellaneous sources discharge to the 24-in.-dia. line.

The cooling water from the Process Tank cooling coils in 221-B normally discharges to the 15-in-dia. line. However, this discharge can be diverted to the 24-in-dia. line. Valves located on lines draining the sub headers from the 221-B Building can be opened to divert the effluent to the 24-in.-dia. line (see Figure 2, pages 6 & 7).

Both the 24-in. and the 15-in.-dia. lines route the effluent east and then to the north east of B Plant where the two lines join into a 24-in.-dia. line just north of the 216-B-59 Crib (see Figure 1, page 3). This line continues northward where it is joined with the B Plant Chemical Sewer (BCE) liquid effluent. The combined stream, BCE and CBC, discharges into the 207-B Retention Basin. From the Retention Basin the effluent is discharged to the 216-B-3 Pond via the 216-B-3-3 Ditch. (Note: The BCE liquid effluent sampling plan is described in the B Plant Chemical Sewer Sampling and Analysis Plan (WHC, 1992a) and sampling the BCE will not be covered in this sampling plan).

Portions of the CBC liquid effluent stream have the potential for radiological contamination. Possible contamination of the effluent could occur in the 225-B Pool Cell heat exchangers and in the cooling water coils for the Process Tanks cooling coils in 221-B (Figure 3 and 4, pages 8 & 9). To minimize possible contamination of the CBC effluent, these cooling streams are pressurized with respect to the possibly contaminated solutions. If a leak occurs in the pressurized line, the cooling water in the heat exchanger or coils would leak out into a pool cell or process vessel.

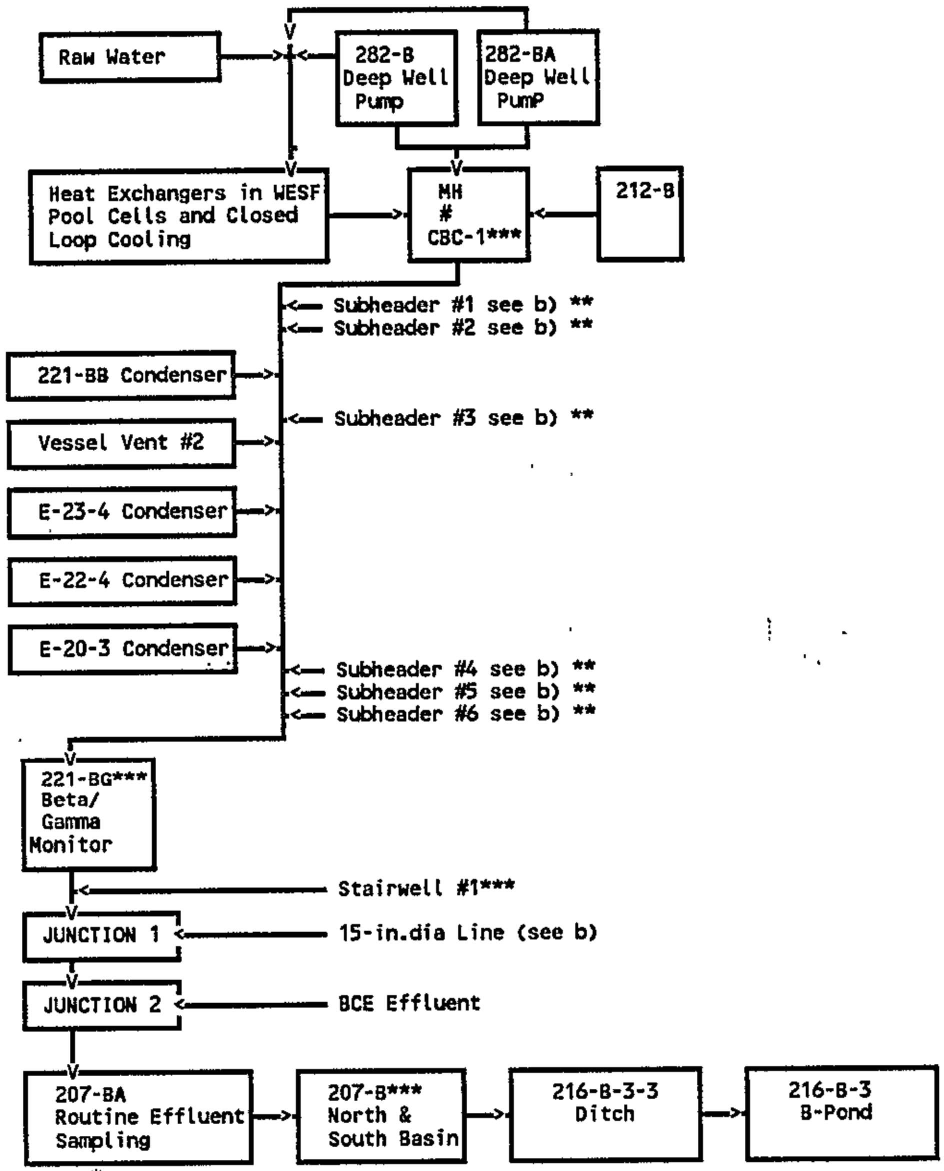
The major contributors to the 15-in-dia. line have a single barrier, the pressurized coils, between the raw water and radiological fluids in the tanks. However, the major contributor to the 24-in-dia. line has three barriers between the radiological material stored in the capsules and the cooling water. The first two barriers are the inner and outer walls of the capsules. The third is pressurized water in the pool cell heat exchangers.

However, should the CBC stream become contaminated, on line Beta and Gamma monitors located on the 24-in.-dia. line in 221-BG and on the 15-in.-dia. line in 221-BA would detect the contamination. The 24-in-dia line would be diverted to either the north or south basin in 207-B while the 15-in.-dia would be diverted to the 216-B-69 Emergency Retention Basin (Figure 1, page 3). Contaminated water in 207-B basins could either be diverted to 216-B-63 ditch or be trucked back to B Plant. Current procedures allow contaminated water in the 216-B-59 Retention Basin to be diverted back to B Plant.

The volume of the combined CBC and BCE effluent is approximately 2.9×10^6 gal/d (WHC 1990a and 1990b), 1,940 gpm, with approximately 90% of the volume from the CBC effluent and 10% from the BCE effluent. The major contributor to the combined effluent is the cooling water for WESF pool cells, 70% (Table 1, page 10). The second major contributor, 15% of the volume, is from the cooling water for the Process Tanks cooling coils in 221-B. The remaining 5% is from miscellaneous sources.

Figure 2. CBC Stream Flow Schematic

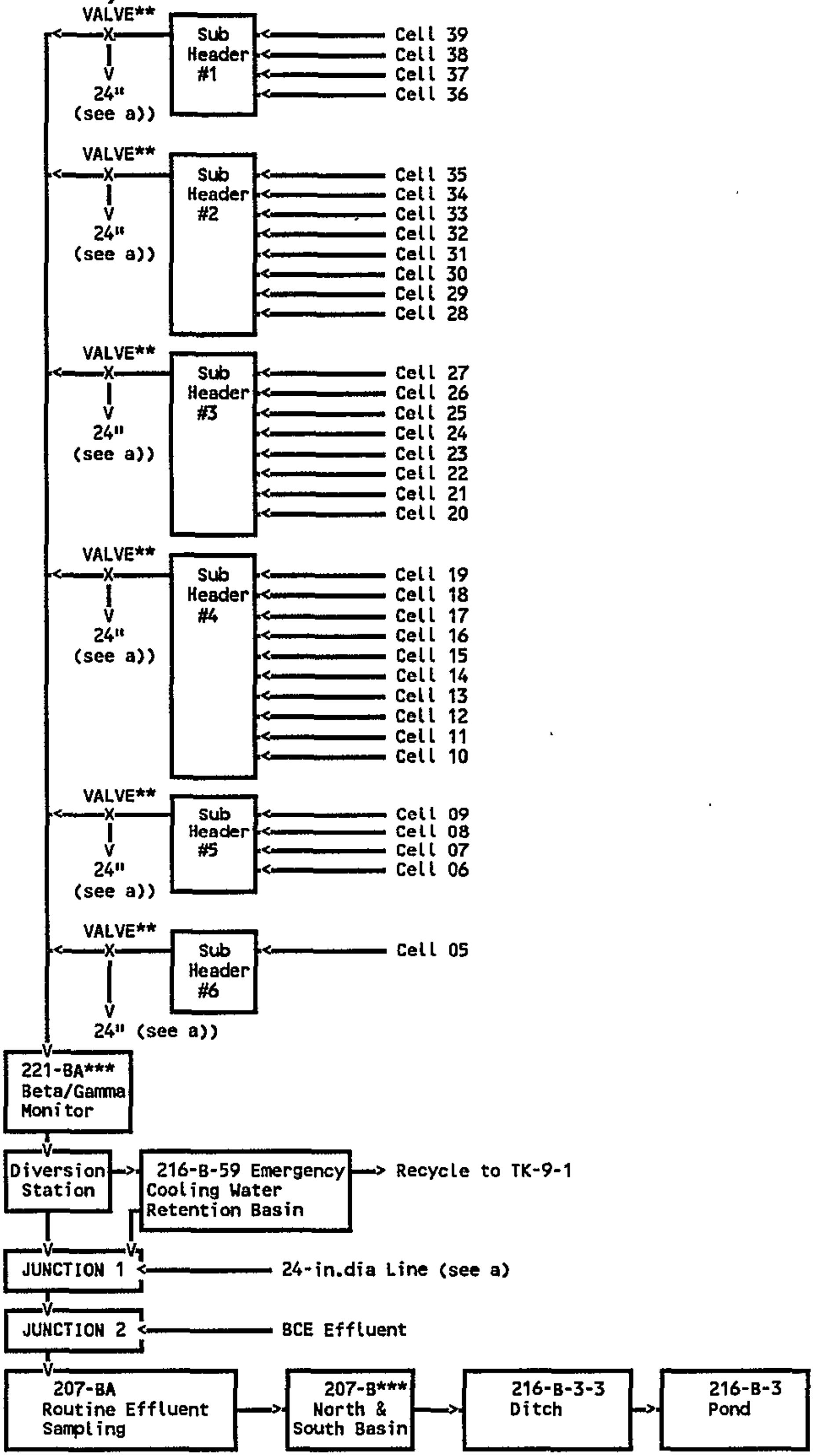
a) 24-in.-dia Line



* Manhole-MH
** Normally diverted to the 15-in-dia. line
*** Sampling Site

Figure 2 continued on next page

b) 15-in.-dia Header



** Normally diverted to 15-in-dia. line
*** Sampling Site

Figure 3. WESF Pool Cell Heat Exchanger

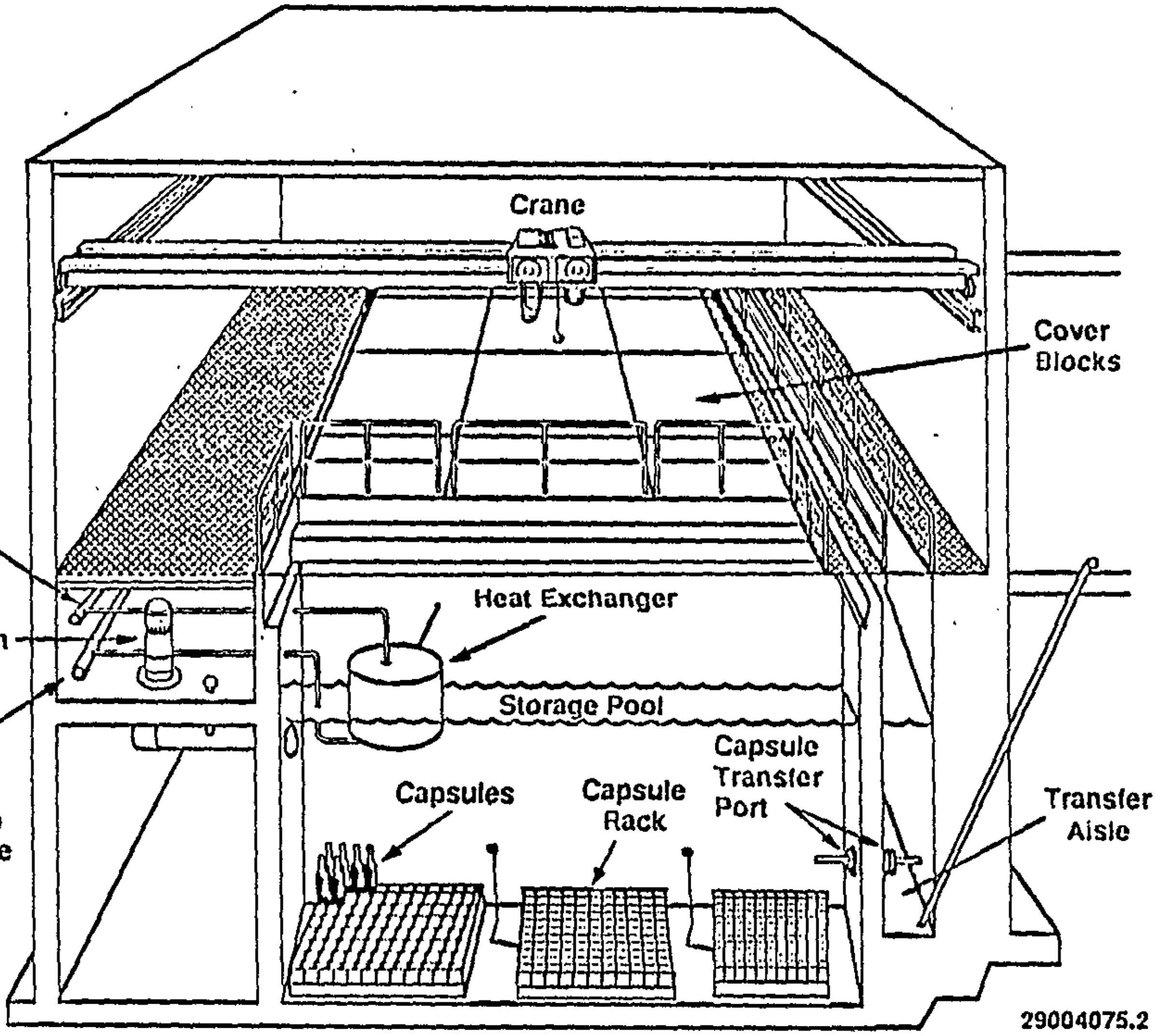


Figure 4. B Plant Process Vessel Cooling Coils

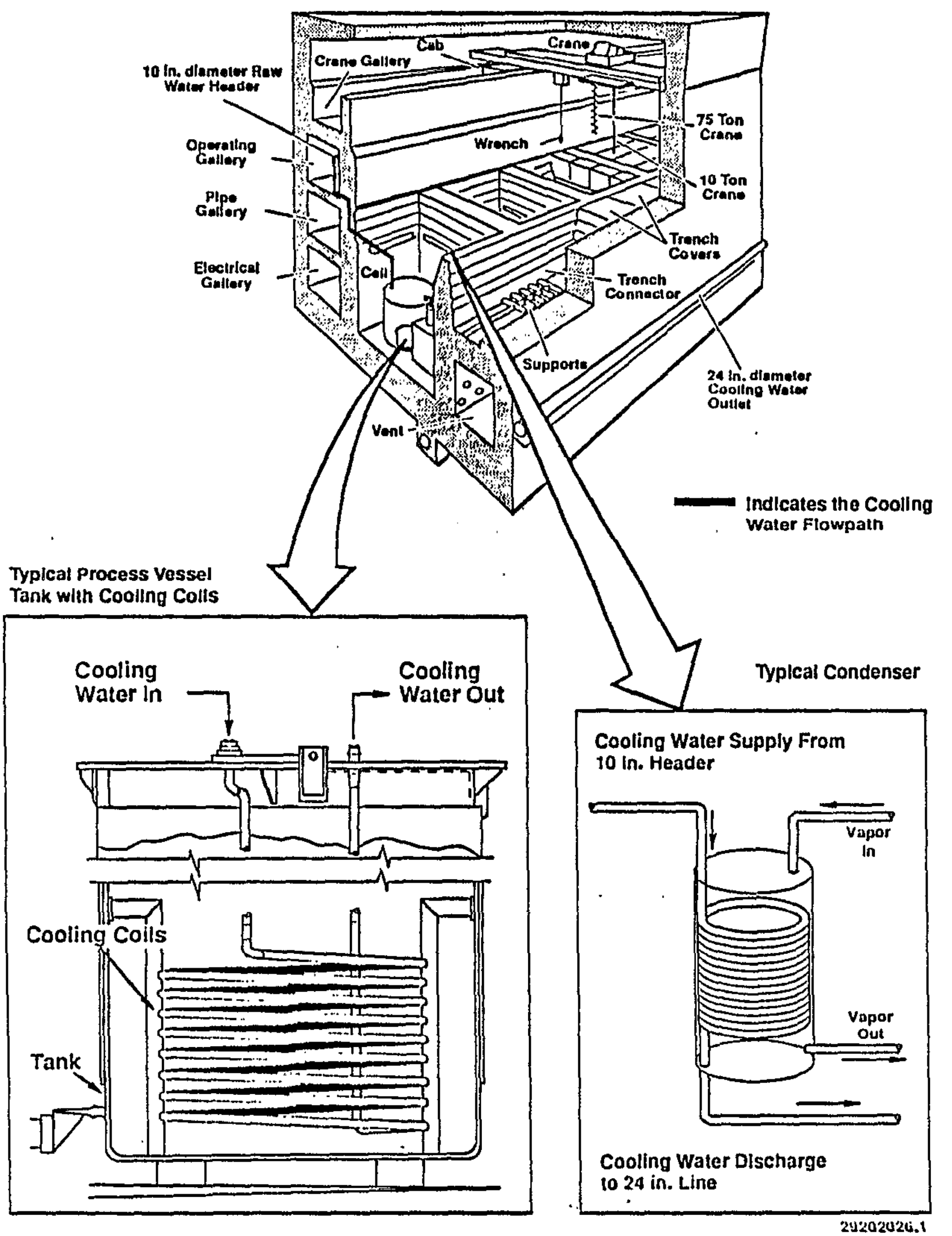


Table 1 Major Volume Contributors to The Combined CBC and BCE

Contributors	Present Per Cent of Total Volume (Estimated)
225-B Cooling Water For Pool Cells Heat Exchangers and Closed Loop Cooling	70
BCE Liquid Effluent	10
Cell 20, 22, and 23 Condensers	<1
Raw Water From Testing The 282-B/BA Emergency Raw Water Wells	<1
Cooling Water For Process Tanks Coils	15
Miscellaneous	5
TOTAL =	100

3.3 207-B RETENTION BASIN, 216-B-3-3 DITCH AND 216-B-3 POND DESCRIPTION

After the BCE effluent combines with the CBC effluent, the combined effluent discharges into the 207-B retention basins, North and South Basin, and then into a 4000' 22" underground polyethylene pipe to a concrete diversion. From the diversion the waste stream travels 1000' in a 22" underground polyethylene pipe to the 216-B-3-3 Ditch. This ditch discharges into the 216-B-3 Pond, B Pond.

4. RESPONSIBILITIES

Effluent Treatment Programs Group (ETP) is responsible for the project management of the sampling and for the selection of the analytical laboratory. In addition, Environmental Assurance personnel will provide technical support to the sampling activities. The CBC Cognizant Engineer or designee from B Plant Environmental Engineering will be the Sampling Task Leader and will be responsible for scheduling operators and health physics technicians to support the sampling team, reviewing data logs, sampling, surveying chain of custody of samples and data.

Protocol sampling (non-routine sampling) will be performed by Westinghouse Hanford Company (WHC) Sampling and Mobile Laboratory (SML) personnel. These sampling personnel are qualified CERCLA and RCRA samplers, and will not require observation by a QA representative. These personnel will also ensure that the protocol samples meet the quality assurance criteria of the U.S. Environmental Protection Agency's (EPA) SW-846 (EPA 1990). (These personnel are responsible for preservation, collection, security, and shipment of the samples).

The SML personnel will deliver radiological screening samples, taken at each sampling event to classify total activity for shipping purposes, to the 222-S Laboratory after B Plant health physics technicians have surveyed and released the sample containers. If the samples meet Department of Transport, DOT, guidelines for non-hazardous and non-radioactive materials, SML personnel will prepare the shipping papers and carry the samples to WHC Shipping for offsite shipment. If the samples do not meet the DOT guidelines, Field Shipping Support personnel will check that the protocol samples have been correctly packaged and will prepare the samples for shipment to the offsite analytical laboratory. The handling and shipping of the protocol samples will meet the requirements of Westinghouse Hanford Company's Environmental Investigation Instruction 5.11.

5. SAMPLING LOCATION AND FREQUENCY

This section describes sampling location and frequency of protocol sampling for the CBC effluent stream.

5.1 SAMPLING LOCATION

The protocol grab sampling of the combined BCE and CBC effluent will be performed at the 207-B Basin, since this location is downstream from all contributors. Two samples are necessary to document the 24-in-dia. effluent and the 15-in-dia. effluent. A sample representative of the 24-in-dia. effluent will be taken at 221-BG or manhole CBC-1 (see Figure 1, page 3, and appendix A, page 18-22) while a sample taken at 221-BA will represent the 15-in-dia. effluent. The alternate sampling location for the 24-in-dia. effluent at manhole CBC-1 can be used only when the condensers E-23-4, E-22-4, E-20-3 and the condenser in 221-BB are not operating. Since a sampling position of the combined 24-in-dia. line does not exist downstream of where Stairwell #1 effluent enters the line, a sample will be taken of the Stairwell #1 steam condensate where it enters the drain. However, if no steam condensate is present during the time of sample collection, the stairwell #1 sample will be omitted.

The raw water background protocol grab sample at 294-B will represent the input raw water stream to B Plant. This protocol grab sample (shown in Table 2, page 12) will be taken at 294-B. Since protocol sampling will also be performed for the BCE effluent stream (WHC, 1992a) of the raw water supply, the CBC sampling will be co-ordinated with the BCE sampling to avoid duplication of background samples.

TABLE 2 PROTOCOL SAMPLING LOCATIONS

Sample	Sample Location	Description
1.	207-B	Combined CBC and BCE effluent stream*
2.*	294-B	Raw Water Supply to B Plant
3.	221-BA or CBC-1	24-in-dia. effluent
4.	221-BG	15-in-dia. effluent
5.**	Stairwell #1	Steam Condensate in Stairwell #1

* The BCE samples specified in B Plant Chemical Sewer Sampling and Analysis Plan (WHC 1992a) will be co-ordinated with CBC samples.

** Flowrate is less than 0.1 gpm during winter and essentially 0 gpm in summer.

5.2 FREQUENCY

The set of protocol samples listed in Table 2 will be taken initially to characterize the effluent stream. Additional protocol samples will be collected, as determined by the CBC cognizant engineer, to obtain data representative of process operational conditions.

Following the initial characterization of the CBC stream with protocol samples, the additional protocol samples of the inflow raw water at 294-B, at Stairwell #1, 221-BA, and 221-BG will not be performed unless needed. The protocol sample characterizing the CBC and BCE combined effluent will be taken twice annually. The CBC protocol sampling will continued to be co-ordinated with the BCE protocol sampling. If the BCE protocol samples when compared with the combined CBC and BCE sample can be used to characterize the CBC stream, the 221-BA or CBC-1 and 221-BG sampling will only be performed as needed.

Protocol sampling will be initiated within 3 months after the regulators (U. S. Environmental Protection Agency/State of Washington Department of Ecology) approves this plan.

6. PROTOCOL SAMPLE DESIGNATION

Protocol samples labels will be furnished by the sampling team from the Mobile Sampling Unit. The labels will be required to contain the following for each sample; a unique sample identification number, date and time of the sample collection, and the place of collection. The unique sample identification number shall be obtained from the Hanford Environmental Information System (HEIS). In addition, each sample bottle shall be identified with a bar code sticker attached by the bottle manufacturer. The bar code shall identify the lot number and the individual bottle during each sampling.

7. SAMPLING EQUIPMENT AND PROCEDURES

Protocol samples will be taken using grab samples. Grab samples will be taken in a manner similar to the ASTM E300-73, EPA-600/4-79-0929, Bottle On A String, an SW-846 (EPA 1990) approved procedure. Grab sampling of the combined CBC and BCE effluent will use a Long Handled Dipstick for lowering the collecting device into the stream. This method of drawing the sample will be substituted for the Bottle On A String method and will be adapted to the sampling point.

Since grab sampling is performed for all sampling, no preventive maintenance will be required.

A sampling procedure is being developed by SML for the CBC and BCE effluents. This procedure will be approved by WHC and the Department of Energy before sampling is initiated.

8. SAMPLE HANDLING AND ANALYSIS

Protocol samples will be initially analyzed for analytes listed in 40 CFR 264 Appendix IX (EPA, 1986) using analytical method , precision and accuracy listed in the QAPjP Appendix A, Table A-1 (WHC, 1992b). In addition the samples will be analyzed for:

Ion Chromatography Anions
Inductive Coupled Plasma Metals
Graphite Furnace Atomic Absorption Metals
pH
Total Organic Carbons
Gross Alpha and Beta
Gamma Energy Analysis
Strontium 90 and Cesium 137
Total Uranium
Total Dissolved Solids per EPA 160.1
Conductivity
Biochemical Oxygen Demand
Chemical Oxygen Demand
Total Coliforms
Total Suspended Solids
Total Oil and Grease

The above list was selected based on process knowledge. Conductivity, anions, total dissolved solids, and metals were selected since they give a good indication of overall water quality. Volatile organics, semi-volatile organics, and total organic carbons analyses were selected to confirm whether these constituents are present in the liquid effluent. Gross alpha and beta analysis will provide information on radionuclide content of the liquid effluent at the time sampling was performed. Total uranium plus the specific radionuclide analysis for Strontium 90 and Cesium 137 will provide information on the radionuclide content of the liquid effluent.

Protocol samples will be collected in commercially available, certified precleaned glass or plastic bottles. The sample volumes and number of containers are prescribed by the analytical laboratory and are subject to change. Tentative sample volumes, container types, and preservatives are:

1. 125 ml polyethylene container with tetrafluoroethylene lined cap, no preservative for Ion Chromatograph anions and pH.

2. 250 ml polyethylene container with tetrafluoroethylene lined cap, pH<2 by nitric acid preservative for Inductive Coupled Plasma Metals.

3. 500 ml polyethylene container with tetrafluoroethylene lined cap, pH<2 by nitric acid preservative for mercury.

4. Six 40 ml amber glass containers with septum caps (tetrafluoroethylene lined), for Volatile Organics, filled without bubble formation and with no head space.

5. 1 liter amber glass container with tetrafluoroethylene lined cap for Semi-volatile organics, filled without bubble formation and with no head space.

6. 1 liter amber glass container with tetrafluoroethylene lined cap for pesticides.

7. 1 liter amber glass container with tetrafluoroethylene lined cap for herbicides.

8. 1 liter polyethylene container with tetrafluoroethylene lined cap preserved with 2 ml nitric acid, for gross Alpha and Beta.

9. 1 liter polyethylene container with tetrafluoroethylene lined cap preserved with 2 ml nitric acid, for Gamma Energy analysis.

10. 1 liter polyethylene container with tetrafluoroethylene lined cap preserved with 2 ml nitric acid, for Strontium 90, Cesium 137, and Total Uranium.

11. 250 ml polyethylene container with tetrafluoroethylene lined cap, no preservative for Total Dissolved Solids.

12. Two 1 liter amber glass container with tetrafluoroethylene lined cap for phenols.

13. Three 1 liter amber glass containers with tetrafluoroethylene lined cap for dioxins.

14. 1 liter polyethylene container with tetrafluoroethylene lined cap for Biochemical Oxygen Demand.

15. 500 ml polyethylene container with tetrafluoroethylene lined cap, preserved with H_2SO_4 <pH 2 for Chemical Oxygen Demand.

16. 1 liter amber glass container with tetrafluoroethylene lined cap, preserved with H_2SO_4 <pH 2 for Total Oil and Grease.

17. 250 ml polyethylene container with tetrafluoroethylene lined cap, preserved with 0.008% $Na_2S_2O_3$ for Total Coliforms.

18. 125 ml amber glass container with tetrafluoroethylene lined cap for Total Suspended Solids.

Preservatives required above will be supplied by WHC Sampling and Mobile Laboratory and will be added to the containers before taking them to the field. After the sample has been added to the container, their caps will be sealed with tamper proof tape. The containers will be labelled, then bagged and re-bagged. The outer bag will be taped with tamper-proof tape. After bagging, the samples will be refrigerated at 4 degrees Celsius until ready to ship when they will be placed and shipped in a cooler containing ice.

Field logs will be completed following the "Environmental Investigations and Site Characterization Manual", WHC-CM-7-7 (WHC 1991a) and procedure EII 1.5 "Field Logbooks" and meet the requirements listed in section 6.0 of the QAPjP (WHC, 1992b) at the time of sampling by the sampling team.

A chain-of-custody form will be filled out at the time the sample is placed in the cooler. Since a sample may consist of several containers, the chain-of-custody will account for each container. Once the sample has been drawn, it must be in the physical control or view of the custodian, locked in an area where it can not be tampered with, or prepared for shipping with tamper-proof tape applied. Physical control includes being in the sight of the custodian, being in a room which will signal an alarm when entered, or locked in a cabinet. When more than one person is involved in sampling, one person shall be designated the custodian and only the custodian signs as sampler. This person remains the custodian until the samples are transferred to another location or group when the custodian signs over to the designated receiver the released samples. The QAPjP (WHC, 1992b) contains a copy of the chain-of-custody form to be used. A private carrier used to transport the samples and chain-of-custody documentation shall be bonded.

The protocol samples will be transported to an approved Westinghouse Hanford Company participant contractor or subcontractor laboratory for analysis consistent with SW-846 (EPA 1990) requirements.

Duplicate sampling will be performed in co-ordination with the BCE sampling with a single duplicate sample taken at 207-B of the combined CBC and BCE stream. In addition, a field blank, an equipment blank if required, and a trip blank will be taken (WHC, 1992b). Table 3 list the analysis to be performed on the duplicate and blanks.

Table 3
Analytical Schedule for Field Quality Control Samples

Parameter Group	Sample Type			
	Duplicate	Field Blank	Equipment Blank*	Trip Blank
Volatile Organics	X	X	X	X
Semivolatile Organics	X		X	
Pesticides and PCBs	X			
Herbicides	X			
Dioxin/Furins	X			
Metals	X			
Radionuclides	X			
Field Parameters: pH, Temperature, and Conductivity	X			

* Will only be taken if equipment other than collection bottles is used.

The duplicate sample taken at 207-B will be taken with the same sampling equipment and sampling technique and will be place into identically prepared and preserved containers. The duplicate will be analyzed independently for an indication of gross errors in sampling and analysis techniques.

The field blank is pure deionized water that is transferred into the sample container at the sampling site and preserved for volatile organics. A single field blank will be collected. The field blank will be used for a check on the environmental and reagent contamination.

If chemically deconned equipment is used, an equipment blank will be taken by transferring deionized water using the sampling equipment to a sample container before sampling. This sample will be preserved for volatile and semi-volatile organics. If sample bottles are used for collecting all of the samples, no equipment blank will be taken.

The trip blank is pure deionized water that is transferred into the sample container before the trip to the sampling site and it is preserved for volatile organics. A single trip blank will be collected. The trip blank will be used for a check on the environmental and reagent contamination.

The data from the analysis of the samples will be considered representative so long as at least 90 percent of the data points meet the established requirements in the laboratory contract for precision and accuracy. Data will be reviewed and validated (Level B, WHC, 1990d) by the Office of Sample Management to determine whether the data can be used or whether corrective action should be taken. If necessary, corrective action in accordance with QR 16-0, WHC-CM-4-2 (WHC, 1988) will be taken which could require repeating the sampling and analysis activity.

9. REFERENCES

EPA, 1990, Test Methods For Evaluating Solid Waste, Physical/Chemical Methods, SW-846, 3rd Edition

EPA, 1991, Code of Federal Regulations, 40 CFR 264, Appendix IX, US Environmental Protection Agency, Wash. D. C.

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WHC, 1991a, Environmental Investigations and Site Characterization Manual, WHC-CM-7-7

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WHC, 1992a, B Plant Chemical Sewer Sampling and Analysis Plan, WHC-SD-WM-PLN-029, Rev 1

WHC, 1992b, Liquid Effluent Sampling Quality Assurance Project Plan, WHC-SD-WM-QAPP-011, Rev 0

WHC-1990d, Sample Management and Administration, WHC-CM-5-3

APPENDIX

B Plant COOLING WATER SAMPLING AND ANALYSIS PLAN

A description of the contributing streams and the effluent flow path is presented.

A.1 CONTRIBUTING STREAMS

Table A-1 Contributing Streams to B Plant Cooling Water

Building	System	Contributor	Flowrate(gal/d) Average Variation
225-B	Pool Heat Exchanger	Raw Water	2,000,000
225-B	Closed Loop Heat Exchanger	Raw Water	150,000
B Plant Chemical Sewer	BCE	Effluent	190,000
221-B	Cooling Coils Process Tanks	Raw Water	145,000-600,000
282-B	Emergency Deep Well Raw Water Pump	Raw Water	<18,000
282-BA	Emergency Deep Well Raw Water Pump	Raw Water	<18,000
Miscellaneous	Condensers* (E-20-3, E-22-4, E-23-4),	Raw Water	<18,000
	Stairwell #1, 212-B**, and 221-BB**	Steam Condensate	<18,000
		Approximate Total=	2,800,000

* At present the condensers are not operating.

** 212-B and 221-BB are currently not contributing.

A.2 DESCRIPTION OF THE CBC FLOW PATH

The following is a description of individual contributors to the CBC in the sequence of the flow chart shown in Figure 2.

a) 24-in.-dia. Header

MANHOLE CBC-1

Manhole CBC-1 receives effluent from the 212-Cask Station, raw water from the testing of the emergency well pumps, and the cooling water from the WESF Pool Cells heat exchangers (see Figure 2, pages 6 & 7). The heat exchangers are maintained with a positive pressure differential between the coolant and process solution to minimize the potential for contamination of the coolant through any leaks. The cooling water from the WESF heat exchanger contributes about 1,000 to 1,400 gal/min to the 24-in.-dia. header.

Manhole CBC-1 is an alternate sampling site for the 24-in-dia. line (see Figure 1, page 3 and Table 2, page 12).

221-BG

221-BG receives the effluent from Manhole CBC-1, 221-BB, and condensers E-20-3, E-22-4, and E-23-4. In 221-BG the stream form the 24-in.-dia. header is monitored for gamma/beta contamination and if contaminated the stream is diverted to one of the retention basins in 207-B. The contaminated water would be trucked to the 200-E Tank Farm.

221-BG is an alternate sampling site for the 24-in-dia. line (see Figure 1, page 3 and Table 2, page 12).

JUNCTION 1

Junction 1 receives the effluent 221-BG, Stairwell #1, and the effluent from the 15-in.-dia. line to form the combined CBC effluent.

JUNCTION 2

The CBC effluent from line Junction 1 is joined with the effluent from the BCE at Junction 2.

207-BA

The combined effluent from CBC and BCE is received at 207-BA. At 207-BA routine sampling is taken of the combined CBC and BCE effluent stream.

207-B

The combined effluent from CBC and BCE is received from 207-BA into the 207-B retention basin. The basin is divided into a north and south basin. Either of these basins can be used to store the effluent if monitoring of the CBC at 221-BG or a monitor on the BCE stream shows the stream to be contaminated.

207-B is a sampling site of the combined effluent from the CBC and BCE (see Figure 1, page 3 and Table 2, page 12).

216-B-3-3 DITCH

The 216-B-3-3 ditch receives the combined BCE and CBC effluent from 207-B.

216-B-3 POND

The 216-B-3 Pond receives the BCE and CBC effluent from the 216-B-3-3 ditch.

b) 15-in.-dia. Header

SUBHEADER 1

The effluent enters Header 1 from the cooling coils in cells 36 through 39. The effluent from Header 1 joins the 15-in.-dia. CBC line. However, the effluent can be diverted to the 24-in-dia. line.

SUBHEADER 2

The effluent enters Subheader 2 from the cooling coils in cells 28 through 35. The effluent from Subheader 2 joins the 15-in.-dia. CBC line. However, the effluent can be diverted to the 24-in-dia. line.

SUBHEADER 3

The effluent enters Subheader 1 from the cooling coils in cells 20 through 27. The effluent from Subheader 3 joins the 15-in.-dia. CBC line. However, the effluent can be diverted to the 24-in-dia. line.

SUBHEADER 4

The effluent enters Subheader 2 from the cooling coils in cells 10 through 19. The effluent from Subheader 4 joins the 15-in.-dia. CBC line. However, the effluent can be diverted to the 24-in-dia. line.

SUBHEADER 5

The effluent enters Subheader 5 from the cooling coils in cells 06 through 09. The effluent from Subheader 5 joins the 15-in.-dia. CBC line. However, the effluent can be diverted to the 24-in-dia. line.

SUBHEADER 6

The effluent enters Subheader 6 from the cooling coils in cell 05. The effluent from Subheader 6 joins the 15-in.-dia. CBC line. However, the effluent can be diverted to the 24-in-dia. line.

221-BA

221-BA receives effluent from Subheaders 1 through 6. Monitoring of gamma/beta radiation of the 15-in-dia. line is performed in 221-BA. If the stream is contaminated, a diverter valve in the diversion station is tripped and the effluent is sent to 216-B-59, Emergency Cooling Water Retention Basin.

221-BA is a sampling site for the 15-in-dia. line (see Figure 1, page 3 and Table 2, page 12).

DIVERSION STATION

The Diversion Station receives effluent from 221-BA. If the effluent is uncontaminated, it is diverted NW to joint the 24-in-dia. effluent. If the stream is contaminated, a signal from the radiation monitor in 221-BA will trip the valve diverting the effluent to the 216-B-59 Emergency Cooling Water Retention Basin. If sampling of 216-B-59 determine that the effluent is contaminated, the diverter station can divert the effluent from the 216-B-59 Basin back to TK-9-1 in 221-B Building.

JUNCTION 1

Junction 1 receives the effluent from the Diversion Station, 221-BG, and Stairwell #1 to form the combined CBC effluent.

JUNCTION 2

The CBC effluent from line Junction 1 is joined with the effluent from the BCE at Junction 2.

207-BA

The combined effluent from CBC and BCE is received at 207-BA. At 207-BA routine sampling is made of the combined CBC and BCE effluent stream.

207-B

The combined effluent from CBC and BCE is received from 207-BA into the 207-B retention basin. The basin is divided into a north and south basin. Either of these basins can be used to store the effluent if monitoring of the CBC at 221-BG or a monitor on the BCE stream shows the stream to be contaminated.

216-B-3-3 DITCH

The 216-B-3-3 ditch receives the combined BCE and CBC effluent from 207-B.

216-B-3 POND

The 216-B-3 Pond receives the BCE and CBC effluent from the 216-B-3-3 ditch.

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