START

0032345

ENGINEERING CHANGE NOTICE

Page 1 of 2

1. ECN 162354

Proj. ECN

2. ECN Category (mark one) Supplemental [] Direct Revision [X] Change ECN [] Temporary [] Standby [] Supersedure [] Cancel/Void []	3. Originator's Name, Organization, MSIN, and Telephone No. W. E. Davis, B Plant Environmental Engineering, S6-70, 2-0014 16410	4. Date 11/16/92
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[] Yes (fill out Blk. 11b) [X] No (NA Blks. 11b, 11c, 11d)	N/A	N/A Cog. Engineer Signature & Date	N/A Cog. Engineer Signature & Date

12. Description of Change

See Record of Revision

13a. Justification (mark one)	Criteria Change []	Design Improvement [X]	Environmental []
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13b. Justification Details

Reflect review comments and to conform with PFP and U03 SAPs

14. Distribution (include name, MSIN, and no. of copies)

See distribution sheet

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ENGINEERING CHANGE NOTICE

1. ECN (use no. from pg. 1)
162354

15. Design Verification Required	16. Cost Impact				17. Schedule Impact (days)	
	ENGINEERING		CONSTRUCTION			
[] Yes	Additional	[] $ N/A	Additional	[] $ N/A	Improvement	[] N/A
[X] 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

	Signature	Date		Signature	Date
OPERATIONS AND ENGINEERING			ARCHITECT-ENGINEER		
Cog Engineer	W E Laws	11/12/92	PE		
Cog. Mgr.	D L Haysom	11/16/92	QA		
QA	D McCaf	11/16/92	Safety		
Safety			Design		
Security			Environ.		
Environ.	S.A. Burris	11/16/92	Other		
Projects/Programs					
Tank Waste Remediation System					
Facilities Operations			DEPARTMENT OF ENERGY		
Restoration & Remediation			Signature or Letter No.		
Operations & Support Services					
IRM			ADDITIONAL		
Other					

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SUPPORTING DOCUMENT

1. Total Pages 29

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5. Key Words

Sampling, Chemical, and Radiological Analysis

APPROVED FOR PUBLIC RELEASE
V. Burkland 11/23/92

6. Author

Name: William E. Davis

William E. Davis
Signature

Organization/Charge Code
16410/D607B

7. Abstract

A sampling and analysis plan for B Plant Chemical Sewer 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 3EQ

10. RELEASE STAMP

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WHC-SD-WM-PLN-029
Revision 1

B Plant Chemical Sewer Sampling and Analysis Plan

Prepared for the U.S. Department of Energy
Office of Environmental Restoration and
Waste Management

Westinghouse
Hanford Company Richland, Washington

Hanford Operations and Engineering Contractor for the
U.S. Department of Energy under Contract DE-AC06-87RL10930

Approved for Public Release

Date Received: 11/23/92 VO

INFORMATION RELEASE REQUEST

Reference: WHC-CM-3-4

Complete for all Types of Release

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ID Number (include revision, volume, etc.)
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List attachments.
WHC-SD-WM-PLN-029, Rev. 1

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Title B Plant Chemical Sewer Sampling and Analysis Plan

Unclassified Category UC-

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New or novel (patentable) subject matter? [X] No [] Yes
If "Yes", has disclosure been submitted by WHC or other company?
[] No [] Yes Disclosure No(s).

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Intended Audience
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Responsible Manager (Printed/Signature) Date
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Rev 1

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WHC-SD-WM-PLN-029	Page a

(2) Title
B Plant Chemical Sewer Sampling and Analysis Plan

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B PLANT
CHEMICAL SEWER
SAMPLING AND ANALYSIS PLAN

November, 1992

PREPARED BY

W. E. Davis and J. E. Beiler

B Plant Environmental Engineering

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

B PLANT CHEMICAL SEWER SAMPLING AND ANALYSIS PLAN

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B PLANT CHEMICAL SEWER SAMPLING AND ANALYSIS PLAN

ACRONYMS/ABBREVIATIONS

AMU	Aqueous Makeup Unit
ASTM	American Society for Testing Material
BCE	B Plant Chemical Sewer
CBC	B Plant Cooling Water
CFR	Code of Federal Regulations
DOE	Department of Energy
EDMC	Environmental Data Management Center
EPA	U.S. Environmental Protection Agency
ETP	Effluent Treatment Programs
HVAC	Heating Ventilation and Air Conditioning
QAPP	Quality Assurance Program Plan
SAP	Sampling and Analysis Plan
SML	Sampling and Mobile Laboratories
WAC	Washington Administrative Code
WESF	Waste Encapsulation and Storage Facility
WHC	Westinghouse Hanford Company

B PLANT CHEMICAL SEWER SAMPLING AND ANALYSIS PLAN

A. BACKGROUND

A.1 Introduction

The Sampling and Analysis Plan (SAP) is designed to document the requirements and procedures for implementing the Liquid Effluent Sampling Program for B Plant Chemical Sewer (BCE). This BCE SAP will be revised as necessary to ensure that it will document any changes in sampling and analysis requirements for the BCE effluent.

The requirements in this document are in addition to those in the Liquid Effluent Sampling Quality Assurance Program Plan (QAPP) (WHC 1992b). The QAPP provides the Hanford Site requirements for liquid effluent characterization sampling activities. These include: overall scope and direction to the sampling activities, the control of samples, the laboratory analyses, the processing of data, the control of data, the quality assurance requirements, and corrective actions.

The SAP is a facility specific document for describing how the requirements of the QAPP shall be implemented for activities occurring at the facility. The SAP provides a general description of the facility and the liquid effluent to be characterized and it identifies procedures that will be used to execute the work needed to implement the QAPP requirements. In addition, the SAP describes how the liquid effluent characterization samples and data will be integrated with an existing liquid effluent monitoring program.

The QAPP was written to allow each facility some flexibility in accommodating its requirements in surveying radiation sources and choosing analytes for analysis. The primary reason for this flexibility is because of differences in procedures used for surveying radiation sources at each facility and the differing makeup of chemicals used in each facility. This SAP identifies facility specific exceptions to the QAPP, which include changes to the required list of analytes. However, the QAPP requirements for chain of custody, laboratory analysis, validation of data, control of records, and corrective actions are not modified by this SAP.

The SAP may affect the routine liquid effluent monitoring program. The routine monitoring program was implemented to meet the requirements of the Department of Energy (DOE) Order 5400.1. The DOE Order requires each facility develop a Facility Effluent Monitoring Plan. The routine monitoring program complies with the requirements in the Quality Assurance Program Plan for the Facility Effluent Monitoring Plan, WHC-EP-0446. The existing routine monitoring plans and procedures will not be altered unless the liquid effluent characterization sampling in this SAP has a significant discrepancy in analyte concentration data as compared to the data obtained from routine monitoring.

From 1992 to 1995 the B Plant Cooling Water (CBC) effluent will be combined with the BCE effluent. A separate sampling plan has addressed sampling the CBC effluent (WHC 1992a). However, since the two effluent streams are combined and are monitored as a composite stream, the sampling plans for both streams will be coordinated.

B PLANT CHEMICAL SEWER SAMPLING AND ANALYSIS PLAN

A.2 Sampling Objectives

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

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

2. Determine the waste designation for the B Plant Chemical Sewer in accordance with WAC 173-303-070.

The data collected by this sampling plan will be available 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. The data may also be used to provide data on chemical and radiological constituents in order to determine applicable loading and rates 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 Program Plan (QAPP) (WHC 1992b).

B. SITE DESCRIPTION

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

B.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) 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. WESF inventories 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 BCE liquid effluent stream from the B Plant Facility are the systems for generation of demineralized water, for generating compressed air, and for conditioning of water used in heating, ventilation, and air conditioning (HVAC) units.

Other support buildings at B Plant include the 271-B Building, the 217-B Building and the 211-BA Building. The 271-B Building contains operations offices and the Aqueous Makeup Unit (AMU), chemical makeup tanks, while the 217-B Building is used to produce demineralized water used in the facility. The 211-BA Building is a liquid effluent neutralization facility for the BCE liquid effluent.

B PLANT CHEMICAL SEWER SAMPLING AND ANALYSIS PLAN

B.2 Stream Description

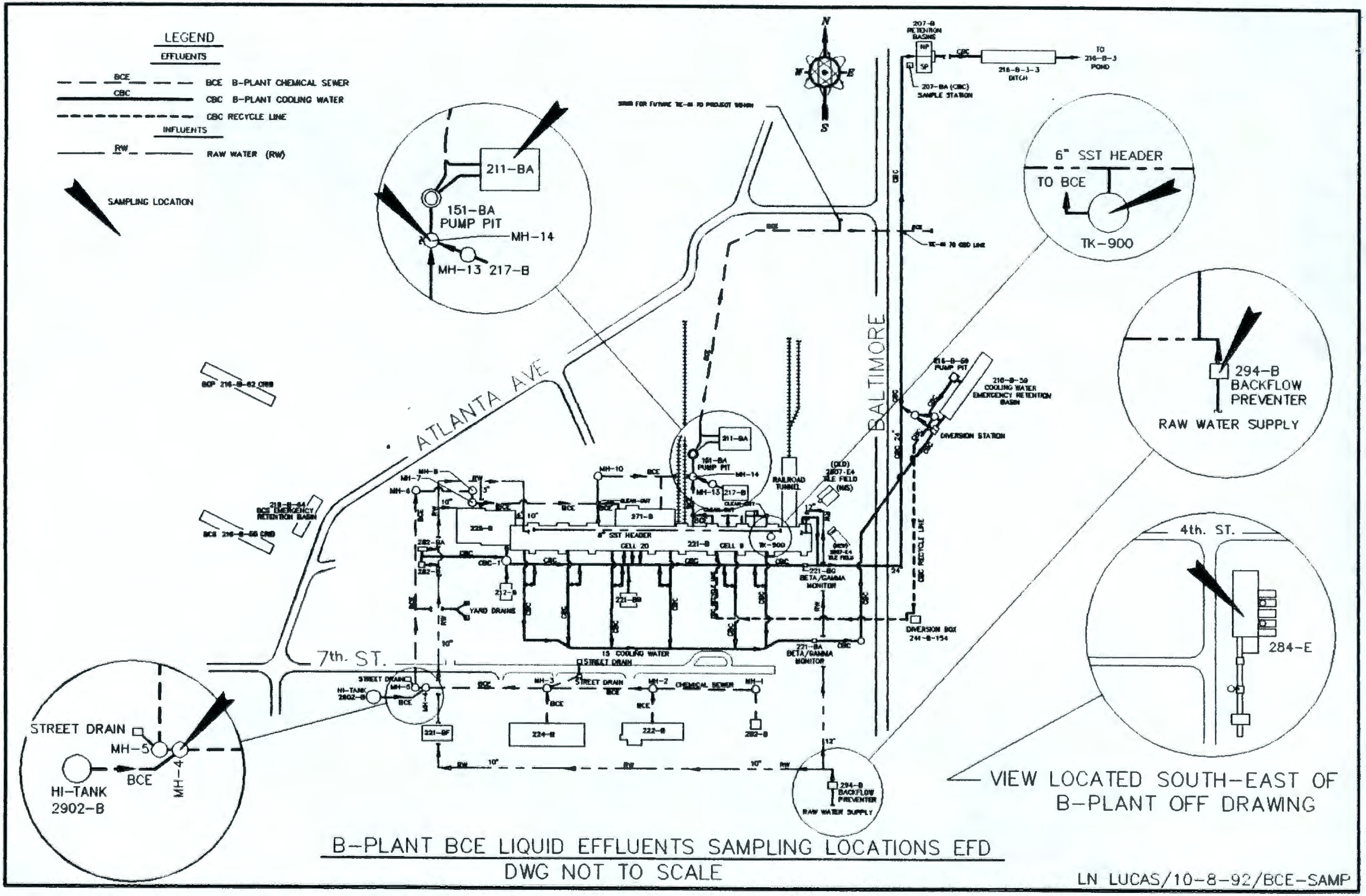
The BCE liquid effluent stream consists of heating, ventilation, and air conditioning condensate, steam condensate, cooling water for air compressors, condensate from air compressors, potentially radiologically contaminated water from floor drains, overflow discharge from 2902-B Emergency Sanitary Water supply, effluent from the demineralizer during periodic regeneration of the cation and anion columns, and storm water runoff from three street drains (Figure 1). Page 43 Appendix A contains a description of the individual stream contributors.

The volume of the BCE effluent stream is approximately 185,000 gal/d (WHC 1991c). Two major contributors to this volume are cooling water for the air compressors in 225-BC and 271-B (Table 1, page 6). These two contribute approximately 80% of the volume of the liquid effluent. Another major contributor to the volume of the stream, approximately 10%, is the overflow from the Emergency Sanitary Water Tower. This overflow maintains fresh sanitary water.

Portions of the BCE liquid effluent stream have the potential for contamination from radiological and non-radiological contamination. To avoid the release of radiological contaminated water to the BCE liquid effluent stream, water from potentially radiologically contaminated areas in 221-B are collected in tank TK-900. When the liquid volume in TK-900 reaches 730 gallons, the flow is diverted to tank TK-10-1, samples are collected from TK-900 and analyzed for total Alpha, total Beta, and pH to determine if contaminated water has accumulated in the tank. If the water in TK-900 is determined to be radiologically contaminated, the contents are diverted to tank TK-10-1 and sent to the 200-E Tank Farms for disposal. If the samples are found to be free of radiological contamination, tank TK-900 is discharged to the BCE.

A small fraction of the stream comes from HVAC units. Both 225-B and 221-B HVAC units are operated continuously. Since the HVAC treats the inflow air, potentially contaminated air, being drawn downstream, has a low probability of reaching and contaminating the HVAC condensate.

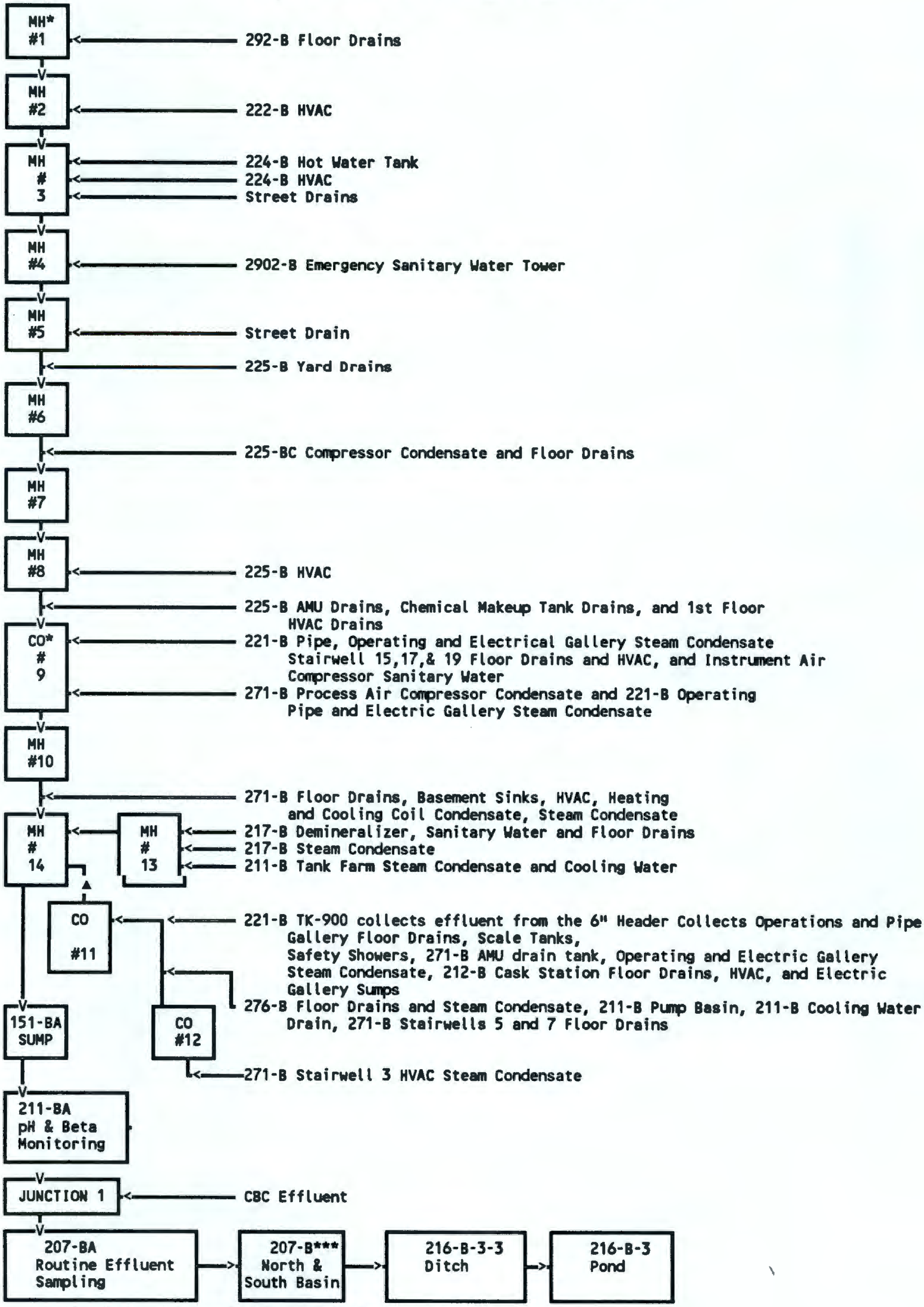
The BCE is routed north from the 211-BA building, and eventually turns to the east where it combines with the CBC effluent. The combined stream, BCE and CBC, discharges into the 207-B Retention Basin. From the Retention Basin the effluent is discharged to the 216-B-3 Pond via the 216-B-3-3 Ditch. The 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. (Note: The CBC liquid effluent sampling plan is described in the B Plant Cooling Water Sampling and Analysis Plan (WHC 1992a) and sampling the CBC will not be covered in this sampling plan).



B-PLANT BCE LIQUID EFFLUENTS SAMPLING LOCATIONS EFD
DWG NOT TO SCALE

B PLANT CHEMICAL SEWER SAMPLING AND ANALYSIS PLAN

Figure 2. BCE Stream Flow Schematic



* Manhole-MH and Cleanout-CO

Table 1. Major Volume Contributors to the BCE

Contributors	Percent of Total Volume (Estimated)
225-BC Air Compressors Cooling Water	40
271-B Air Compressors Cooling Water	40
2902-B Emergency Sanitary Water Overflow	10
Others (See Appendix A)	10
TOTAL =	100

B.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 or South Basin, and then into a 4000' 22" underground polyethylene pipe to a concrete diversion. From the concrete 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.

The 216-B-3 Pond, the first lobe, was placed into service in 1945 and covers a surface area of approximately 35 acres with a depth from 2 to 20 ft deep. Overflow from this first lobe runs into the second lobe, 216-B-3A or A lobe. This lobe covers approximately 11 acres and is about 2.0 ft deep. Overflow from A lobe runs into C lobe, which has a designed surface area of 41 acres. This lobe has eight, parallel trenches, approximately 8 to 14 ft wide and 4 ft deep, cut into the bottom of it to increase percolation into the soil. At the present time, water covers about 1/3 the trench area within the lobe.

Flow between the ponds or lobes is via galvanized, corrugated, steel pipes, and is controlled by downward-opening slide gates. Liquid levels within the ponds are measured with staff gages while the flowrate in the 216-B-3-3 Ditch is measured with a flume and flowmeter. The pond liquid levels, gate settings, and cumulative flowmeter readings are recorded daily while the flowrate data from the 216-B-3-3 Ditch is recorded on a stripchart.

A network of groundwater monitoring wells has been established around the B Pond System to measure water levels, obtain groundwater samples, and evaluate aquifer properties.

B PLANT CHEMICAL SEWER SAMPLING AND ANALYSIS PLAN

C. RESPONSIBILITIES

The responsibility descriptions below are related to activities occurring at B Plant. Overall responsibilities covering other areas are the same as found in the QAPP.

B Plant Environmental Engineering will:

- Prepare the Sampling and Analysis Plan.
- Ensure procedures are updated to support the sampling activities.
- Provide the Sampling Task Leader.
- Initiate scheduling of personnel required for sampling.
- Provide technical support for sampling activities.
- Review data logs and sampling activities.
- Surveil chain of custody activities.
- Review liquid effluent grab sampling data for completeness and consistency.
- Ensure liquid effluent grab sampling data and flow information are transferred to the Effluent Treatment Programs for filing with Environmental Data Management Center (EDMC).
- File routine sample data at the Plant and the EDMC.

B Plant Operations will:

- Provide a trained operator for escort during liquid effluent characterization sampling.
- Provide sampling and transportation of routine samples.
- Complete sample log sheets for routine samples.
- Assist in moving liquid effluent characterization samples through radiation zone barriers.

B Plant Health Physics will:

- Provide a Health Physics Technician for radiation surveying of liquid effluent characterization sample packages.
- Provide the Radiation Work Permit instructions for zone entry.
- Verify radiation worker training requirements of sampling personnel.

B Plant Quality Assurance will:

- Provide surveillance of the liquid effluent characterization sampling program.

Sampling and Mobile Laboratories will:

- Provide one sampler with a WHC Certificate of Qualification from the Sampling and Mobile Laboratories Organization. The certified sampler shall direct liquid effluent characterization sampling, packaging, and shipping.
- Prepare the Plant liquid effluent characterization sampling procedure.
- Document sampling activities in a log book.
- Transport liquid effluent characterization samples to laboratory or shipping center.

- Initiate "Chain of Custody" documentation for liquid effluent characterization samples.
- Package liquid effluent characterization samples for shipping.
- Ensure copies of field logs and other sampling data sheets are filed with Sampling Task Leader.

Office of Sampling Management will:

- Identify and approve the contracted laboratory to perform analysis of samples.
- Monitor the contracted laboratory for quality performance.
- Act as interface between the Sampling Task Leader and the contracted laboratory.
- Verify that all laboratory results are received.
- Validate contracted laboratory data packages.

D. SAMPLING LOCATION AND FREQUENCY

This section describes sampling location and frequency of characterization sampling for the BCE effluent stream.

D.1 Sampling Location

The characterization grab sampling of the combined BCE liquid effluent will be performed at the 211-BA Building or Manhole 14, since these locations are downstream from all contributors. A characterization grab sample will be collected from tank TK-900 in the 221-B building due to the fact that TK-900 effluent is discharged to the BCE on a batch basis. Three additional characterization grab samples will represent background of the input liquid streams entering B Plant and the BCE. These characterization grab samples (Table 2, page 9) will be taken at Manhole 4, 294-B, and 284-B. The grab sample at Manhole 4 will characterize the sanitary water overflow background contribution to the BCE liquid effluent while the grab sample at 294-B will characterize the background raw water supply to B Plant Facility. The grab sample at 284-B Powerhouse will characterize the background steam condensate from the steam supply to the B Plant Facility.

TABLE 2. Characterization Sampling Locations

SAMPLE	SAMPLE LOCATION	DESCRIPTION
1.	211-BA or Manhole 14	Combined BCE Stream
2.	Tank TK-900	221-B 6" Header
3.	Manhole 4	Sanitary water overflow into BCE
4.	294-B*	Raw water supply to B Plant
5.	284-B Powerhouse	Steam condensate from steam supply to B Plant

* The CBC samples specified in the B Plant Cooling Water SAP (WHC 1992a) will be taken at the same time as the BCE Samples.

D.2 Sampling Frequency

Characterization samples at all five locations will initially be taken twice a year to characterize the different operating conditions affecting the effluent stream. The first set of characterization samples will be taken when no regeneration liquid from the demineralizer ion columns is being added to the BCE liquid effluent, while the second set will be taken during the time when the neutralized regeneration is being released to the BCE effluent stream. The regeneration of the ion exchange columns uses sodium hydroxide and sulfuric acid solutions which are buffered and stored in tank SK-161. This effluent, approximately 20,000 gallons, is released into the BCE over a multi-day period. The regeneration takes place periodically, i.e. approximately 2-3 times a year. Additional characterization samples will be collected, as determined by the BCE Cognizant Engineer, to obtain data reflective of changes in process operational conditions.

Implementation of the SAP will be initiated after written approval is obtained by both the U.S. Environmental Protection Agency and the Washington State Department of Ecology.

Characterization sampling will be initiated within 3 months after the SAP has been approved by the Environmental Protection Agency/Department of Ecology.

E. SAMPLE IDENTIFICATION

E.1 Liquid Effluent Characterization Sample Labeling

Sample labels for liquid effluent characterization samples shall be furnished by the sampling team from the Sampling and Mobile Laboratories. The labels will require the following information to be recorded by a member from the sampling team: identification of the person in charge of collecting the sample; unique sample identification number; date and time the sample was collected; the place the sample was collected; the stream identification; preservatives added; and the analysis to be performed on the sample. The unique sample number shall be obtained from the Hanford Environmental Information System. In addition, each bottle shall be identified with a bar code sticker attached to the bottle by the bottle manufacturer. The bar code shall identify the bottle lot number and individual bottle number.

E.2 Liquid Effluent Routine Sample Labeling

The numbers on the label will be assigned by the laboratory in accordance with the sample schedule in Procedure LO-090-304, "Receiving, Handling and Disposal of Routine Laboratory Process Samples".

The general numbering convention will be as follows:

B - XXXX

where B indicates the sample was collected at B Plant and XXXX represents a 4 digit, computer generated sequential serial number.

F. SAMPLING EQUIPMENT AND PROCEDURES

The liquid effluent characterization sampling will comply with an approved written procedure prepared for the liquid effluent streams from the BCE. This sample procedure will comply with the requirements of "Test Methods for Evaluating Solid Waste," EPA SW-846, latest revision. This procedure will identify specific sampling requirements, which include the following: sample locations, description of the sampling equipment, containers, and reagents, safety precautions, including personnel protective equipment, and specific steps for collecting the sample. 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 approved procedure. Grab sampling of the combined BCE stream 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 to be used for obtaining samples, no preventive maintenance will be required.

G. SAMPLE HANDLING AND ANALYSIS

Characterization samples will be initially analyzed for analytes listed in 40 Code of Federal Regulations (CFR) 264 Appendix IX (EPA 1991) using analytical method, precision and accuracy listed in the QAPP Appendix A, Table A-1 (WHC 1992b). The list of analytes are noted in Table 3.

B PLANT CHEMICAL SEWER SAMPLING AND ANALYSIS PLAN

Table 3. Analytical Methods

Analyte	Method of Analysis
Sulfides	9030
Semivolatile Organics	8270
Volatile Organics	8240
Chlorinated herbicides	8150
Organophosphorus Pesticides	8140
Organochlorine Pesticides and PCBs	8080
Tin	7870
Thallium	7841
Selenium	7740
Mercury	7470
Lead	7421
Chromium	7196
Arsenic	7060
Antimony	7041
Inductively Coupled Plasma	6010
Phenolics	420.1/9065/9066/9067
Total Organic Carbon	415.2/9060
Oil and Grease, total recoverable	413.2/9070/9071
Chemical Oxygen Demand	410.1
Biochemical Oxygen Demand	405.1
Sulfate	375.4
Phosphorus, all forms	365.2
Nitrogen and Nitrite	354.1
Nitrogen, Nitrate, Nitrite	353.3
Ammonia	350.1
Fluoride	300.0
Total Cyanide	335.2
Chloride	300.0
Bromide	300.0
Alkalinity	310.1/310.2
Acidity	305.2
Residue	160.2
Total Dissolved Solids	160.1
pH	150.1/9040
Specific Conductance	120.1
Total Alpha	WHC approved laboratory method

Analyte	Method of Analysis
Total Beta	WHC approved laboratory method
Gamma Scan	WHC approved laboratory method
Cesium 137	WHC approved laboratory method
Isotopic Uranium	WHC approved laboratory method
Strontium 89/90	WHC approved laboratory method
Uranium Isotopes	WHC approved laboratory method
Total Uranium	WHC approved laboratory method

The above list in Table 3 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. Since no sanitary sewer effluent is present in the BCE, an analysis for coliform was not included. 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.

Sample bottles shall be new, commercially available, certified precleaned containers. The certificate of precleaned condition shall accompany the containers. The sample volumes and number of containers are prescribed by the analytical laboratory and are subject to change. After the sample has been added to the container, their caps will be sealed with tamper proof tape. The containers will be labeled and packaged in accordance with EII 5.11 "Sample Packaging and Shipping". 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".

When preservatives are added to a sample container, a preservative chain-of-custody form will be filled out. When a sample is collected, with or without preservative, a sample chain-of-custody form will be initiated. Since a sample may consist of several containers, the sample chain-of custody form 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

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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. EII 5.1 (WHC 1991a) 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 characterization samples will be transported to an approved Westinghouse Hanford Company participant contractor or subcontractor laboratory for analysis.

Duplicate sampling will be performed in co-ordination with the CBC 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 4 list the analysis to be performed on the duplicate and blanks.

Table 4. 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			
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 C, WHC 1990d) by the Office of Sample Management. Data will be flagged during validation if any QC requirements are not met. If necessary, corrective action in accordance with the QAPP (WHC 1992b) will be taken which could require repeating the sampling and analysis activity.

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H. REFERENCES

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

WHC, 1990a, B Plant Chemical Sewer Stream Specific Report, WHC-EP-0342 Addendum 6.

WHC, 1990b, B Plant Cooling Water Stream Specific Report, WHC-EP-0342 Addendum 22.

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

WHC, 1991b, Liquid Effluent Sampling Quality Assurance Program Plan, WHC-SD-WM-QAPP-011, Rev 2A.

WHC, 1991c, Environmental Release Report For Calendar Year 1990, WHC-EP-0527.

WHC, 1992a, B Plant Cooling Water Sampling and Analysis Plan, WHC-SD-WM-PLN-037, Rev 2.

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APPENDIX

B PLANT CHEMICAL SEWER 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 Chemical Sewer

Building	System	Contributor	Flowrate (gal/d) Average Variation
211-B	Chemical Storage Tanks	Raw Water Steam Condensate Sanitary Water and Neutralized Spent Reagent (H_2SO_4, NaOH, $NaPO_4$, $NaCO_3$)	0-100 20,000gal/ multi-day
212-B	HVAC	Steam Condensate	0-50
217-B	Demineralizer	Sanitary Water	0-100
221-B	HVAC	Steam Condensate Sanitary Water	0-20
221-B	Instrument Air Compressor	Sanitary Water	<20,000
221-B	Pipe and Operating Gallery	Steam Condensate Cooling Water Raw and Sanitary	100
221-B	Scale Tanks	Overflow	Administrative Lock out
221-B	Electrical Galley Sumps	Steam Condensate Leaks	0-750
222-B	HVAC	Steam Condensate Sanitary Water Dearborn* 730	0-500
224-B	HVAC	Steam Condensate Sanitary Water Dearborn* 730	0-500
225B	Yard Drains	Storm Water	0-100
225-B	AMU Tanks Floor Drains	Steam Condensate Raw Water	0-500

* Dearborn Division of WR Grace & Co. Lake Zurich, IL

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Building	System	Contributor	Flowrate (gal/d) Average Variation
225-B	HVAC	Sanitary Water Condensation	0-50
225-BC	Air Compressor	Raw Water	70,000
271-B	Basement Floor Drains	Steam Condensate Raw Water Janitor Supplies Maintenance Supplies	0-1000 total
	1st Level Floor Drains	Sanitary Water Janitor Supplies	
	2nd Level Floor Drains	Sanitary Water Janitor Supplies	
	3rd Level Floor Drains	Sanitary Water Steam Condensate	
271-B	HVAC	Steam Condensate Sanitary Water Dearborn* 727 and 730	0-2000
271-B	Process Air Compressor	Raw Water, Condensate	70,000
276-B	Floor Drains	Steam Condensate	0-100
292-B	Floor Drains	Steam Condensate	0-50
2902-B	Sanitary Water Storage Tank	Sanitary Water	20,000
Manhole 5	Street Drain	Storm Water	0-50
		Total =	**185,000**

* Dearborn Division of WR Grace & Co. Lake Zurich, IL

A.2 DESCRIPTION OF THE BCE FLOW PATH

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

MANHOLE 1

Manhole 1 receives liquid effluent from steam condensate from the 292-B Building. Routine effluent flow at Manhole 1 is estimated to average less than 20 gal/d.

292-B Building

This building is used for stack monitoring equipment. Only building heating steam condensate during the heating season is being released into the BCE effluent stream.

MANHOLE 2

Manhole 2 receives liquid effluent from Manhole 1 and from the 222-B Building. Routine effluent flow to Manhole 2 is estimated to average less than 50 gal/d.

222-B Building

Sanitary water and steam condensate from the HVAC system are discharged into the BCE from the 222-B Building. A Dearborn chemical Dearborn 730™ is used to treat the water in the HVAC.

MANHOLE 3

Manhole 3 receives liquid effluent from Manhole 2, the 224-B Building and from two street drains. Routine effluent flow to Manhole 3 is estimated to average less than 100 gal/d.

224-B Building

Sanitary water and steam condensate from the ventilation system are discharged into the BCE from the 224-B Building. Dearborn 730 is used to treat the water in the HVAC. In addition, condensate from the water heater is discharged into the BCE.

Street Drains

Two street drains north of 224-B on 7th Street drain storm water into the BCE.

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MANHOLE 4

Manhole 4 receives liquid effluent from Manhole 3 and from 2902-B Emergency Sanitary Water. Routine effluent flow to Manhole 4 is estimated to average 20,000 gal/d.

2902-B Emergency Sanitary Water

Overflow from a 50,000 gallon, emergency sanitary water supply tank is drained into the BCE. Overflow is required to maintain chlorine levels in the tank, to avoid freezing of the tank, and to maintain circulation within the tank. In addition, once a year, this 50,000 gallon tank is drained and flushed into the BCE over a twelve hour period.

MANHOLE 5

Manhole 5 receives liquid effluent from Manhole 4 and from a street drain. Routine effluent flow to Manhole 5 is estimated to average 20,000 gal/d.

Street Drain

Storm water runoff from a drain on 7th Street is drained into the BCE.

MANHOLE 6

Manhole 6 receives liquid effluent from Manhole 5 and from two yard drains south of the 225-B Building. Routine effluent flow to Manhole 6 is estimated to average 20,000 gal/d.

225-B Yard Drains

Storm water runoff from two drains in the 225-B yard is drained into the BCE.

MANHOLE 7

Manhole 7 receives liquid effluent from Manhole 6 and from the 225-BC Building. Routine effluent flow to Manhole 7 is estimated to average less than 90,000 gal/d.

225-BC Building

A liquid effluent stream is generated by the use of one of the two oil-less air compressors. The largest stream is raw water used to cool the air compressors while the second stream is liquids removed by the compressor from the air. Both streams are drained to the BCE.

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MANHOLE 8

Manhole 8 receives liquid effluent from Manhole 7 and from HVAC from the 225-B Building. Routine effluent flow to Manhole 8 is estimated to average 90,000 gal/d.

225-B Building

Condensate and chemicals used to treat the HVAC system is drained to the BCE.

CLEANOUT 9

Cleanout 9 receives liquid effluent from Manhole 8, the 225-B Building, the 221-B Building's Pipe and Operating Galleries, and air compressors in the 271-B basement. Routine effluent flow to Cleanout 9 is estimated to average 185,000 gal/d.

225-B Building

Floor drains, overflow drains in the AMU, and safety shower drains have the potential to contribute to the BCE. Administrative controls and/or locks and tags placed on the tanks in the AMU have been implemented to eliminate the addition of chemicals to the BCE.

Potentially radiologically contaminated effluent can enter the BCE from the chill water in the Truck Port and the drain vent lines leading to TK-100.

221-B Pipe and Operating Gallery

Two liquid streams from the Pipe and Operating galleries, condensate from steam heating, and sanitary water from cooling the instrument air compressor, are drained into the BCE.

271-B Basement

A funnel drain collects effluent from two process air compressors which drain into the BCE.

MANHOLE 10

Manhole 10 receives liquid effluent from Cleanout 9. Routine effluent flow is estimated to average 185,000 gal/d.

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MANHOLE 14

Manhole 14 receives liquid effluent from all sources in the BCE including the 271-B basement sump and floor drains, Manhole 10, Manhole 13, and Cleanout 12. Since Manhole 14 receives all of the effluents from the BCE, the average flowrate is the same as for the BCE liquid effluent of 185,000 gal/d.

271-B Building Basement Sump and Floor Drains

A number of effluent streams drain into the BCE. Effluents from hot water tanks, heating-cooling coils in the AMU, the HVAC unit, water treatment chemicals for the HVAC, and common janitorial chemicals. In addition, steam condensate from the steam radiators is drained to the BCE.

CLEANOUT 12

Cleanout 12 receives liquid effluent from Stairwell 3. The average flowrate at the cleanout is estimated to average less than 50 gal/d

CLEANOUT 11

Cleanout 11 receives liquid effluent from Cleanout 12, the 221-B 6" Stainless Steel Header via tank TK-900, and the 276-B building. The average flowrate of the effluent is estimated to be less than 70 gal/d.

221-B 6" Header

The 6" header drains to tank TK-900 in the electrical gallery. The header receives effluent from floor drains, scale tank overflow drains, funnel drains, and sumps which discharge into the 6" stainless steel header located in the Electric Gallery. In addition, the floor drains can collect chemical spills, water from safety showers, and common janitorial chemicals used for housekeeping operations. Further, AMU tanks and scale tanks in the operating gallery drain and can overflow into 3" drain pipes which drain to the 6" header. Vent headers for these tanks also drain through funnels into the 6" header. Administrative Controls have locked out effluent from the AMU tanks and scale tanks to avoid the introduction of chemicals into the BCE.

In addition, 18 sumps in the electrical gallery collect liquids from spills, chemicals used for housekeeping operations, and condensate from steam heating. The sump pumps in these sumps will discharge the collected liquids into the 6" header. Since the sumps liquid level indicators are alarmed, an operator can manually divert the header effluent to TK-10-1.

Floor drains from the 212-B Cask Handling Building are also discharged into the 6" header. However, no operations are presently taking place in the building and no discharge is presently occurring.

The 6" header is also monitored for radiological contamination. If the effluent is contaminated, a diverter valve will automatically route the effluent to TK-10-1.

276-B

Waste stream contributions from 276-B come from floor drains and inactive vessel overflow drains.

MANHOLE 13

Manhole 13 receives liquid effluent generated from the 217-B Building and the 211-B Tank Farm. The average flowrate at Manhole 13 is estimated to average less than 100 gal/d. However, during the periodic regeneration of the demineralizer approximately 13,000 gallons is released into the BCE over a period of 48 hours.

217-B Building

The 217-B demineralizer is regenerated periodically. Both the anion and cation column are regenerated using sodium hydroxide and sulfuric acid respectively. Monosodium phosphate, and sodium carbonate are added to buffer the regeneration effluent. These solutions are transported by hose to tank SK-161. Some bleeding off of these buffered solutions is released to the 217-B floor drain.

211-B Tank Farm

The 20,000 gallons of regeneration solution buffered in tank SK-161 is released through a drain into the BCE over a multi-day period. This non-regulated buffered solution effluent has a pH ranging from 4 to 10 when released.

Condensate/cooling water from the heating/cooling coils of the vertical and horizontal chemical storage tanks is discharged to the BCE through two 4" steel headers.

151-BA SUMP

The 151-BA sump receives all of the BCE liquid effluent from Manhole 14. The sump has two pumps used to pump the BCE liquid effluent into 211-BA neutralization facility.

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211-BA NEUTRALIZATION FACILITY

211-BA receives the liquid effluent from 151-BA sump. The neutralization facility is designed to neutralize the effluent by adding sodium hydroxide or sulfuric acid to the effluent to ensure that the effluent is between a pH of 4 and 9 before it is released into the 216-B-63 Ditch. This facility also houses pH and beta gamma monitors of the BCE stream.

JUNCTION 1

The BCE effluent combines with the effluent from the CBC at Junction 1.

207-BA

The combined effluent from CBC and BCE is received at 207-BA. At 207-BA routine sampling is performed on 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.

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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Project Title/Work Order: WHC-SD-WM-PLN-029, Rev. 1
B Plant Chemical Sewer Sampling and Analysis Plan

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