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REVISED SAMPLING PLAN FOR THE BARIUM CHLORIDE WASTE SALT TREATMENT UNIT WASTE RESIDUES

07/14/89

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DOE-FN USEPA
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LETTER

Department of Energy
Oak Ridge Operations
P.O. Box 2001
Oak Ridge, Tennessee 37831—

6223

July 14, 1989
DOE-1209-89

Mr. Basil G. Constantelos, Director
Waste Management Division
U.S. Environmental Protection Agency
Region V - 5H-12
230 S. Dearborn Street
Chicago, IL 60604

Dear Mr. Constantelos:

REVISED SAMPLING PLAN FOR THE BARIUM CHLORIDE WASTE SALT TREATMENT UNIT WASTE RESIDUES

Reference: Letter, James A. Reafsnyder to Richard Shank of Ohio EPA, "Sampling Plan for the Waste Residue of Barium Chloride Waste Salt Treatment Facility - Feed Materials Production Center", dated March 18, 1988.

Enclosed is a revised Sampling Plan for the Barium Chloride Waste Salt Treatment Unit Waste Residues. The plan was updated to include revised Remedial Investigation/Feasibility Study Work Plan Procedures and QA monitoring of sampling operations. The updated sampling procedures and QA monitoring will ensure consistency with the RI/FS and also enhance the execution of the sampling.

If you have any questions, please contact Jack Craig, of my staff, at FTS 774-6159.

Sincerely,

James A. Reafsnyder
FMPC Site Manager

DP-84:Craig

Enclosure

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6223

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SAMPLING PLAN FOR THE BARIUM CHLORIDE WASTE SALT TREATMENT UNIT WASTE RESIDUES

UNITED STATES DEPARTMENT OF ENERGY

FEED MATERIALS PRODUCTION CENTER

FERNALD, OHIO

REVISION 1

JUNE 1989

Prepared by:

Advanced Sciences, Inc.

for

THE WESTINGHOUSE MATERIALS COMPANY OF OHIO

622

DOCUMENT APPROVAL SHEET

DOCUMENT TITLE Sampling Plan for the Barium Chloride Waste Salt Treatment Unit Waste Residues

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REVISION LOG

Revision Number	Date	Changes Made
0	March, 1988	o Initial issue of document
1	June, 1989	o Update to include specification of revised RI/FS Work Plan Procedures for all activities o Details added to existing descriptions of activities to facilitate QA monitoring of sampling operations o Sump sampling will be broken down into two parts o Tank F13A-164 will be sampled during subsequent rinseate sampling activities

TABLE OF CONTENTS

Section	Page
Revision Log	ii
List of Tables	iv
List of Figures	v
Preface	1
1.0 Introduction	2
2.0 Objective	7
3.0 Sampling Plan	8
3.1 Statistical Evaluation	9
3.1.1 Waste Classification	9
3.1.2 Number of Samples	13
3.2 Sampling Procedures	16
3.3 Chain-of-Custody	19
3.4 Sample Analysis	21
3.5 Decontamination Procedures	25
3.6 Waste Management	27
3.7 Sampling Equipment	27
3.8 Report of Findings	28
3.9 Health and Safety	29
3.10 Quality Assurance and Quality Control	30

LIST OF TABLES

Table No.	Title	Page
1	Summary of Barium Chloride Waste Salt Treatment Unit Tanks	6
2	Regulatory Threshold of Contaminants for Characterization of EP Toxicity	12
3	Student's 't' Value for Statistical Evaluation	14
4	Test Methods for Analyzing for EP Toxicity Metals	26

LIST OF FIGURES

Figure No.	Title	Page
1.0	Map of the Barium Chloride Waste Salt Treatment Unit	3
2.0	Barium Stabilization Process Flow Diagram	4
3.0	Chain-of-Custody Form	22
4.0	Sample Label	23
5.0	Request for Analysis Form	24

PREFACE

This sampling plan was prepared for the Feed Materials Production Center (FMPC), Fernald, Ohio, as part of the Barium Chloride Waste Salt Treatment Unit Sampling Project. This facility is owned/operated by the U.S. Department of Energy (DOE) and is managed under contract to DOE by the Westinghouse Materials Company of Ohio (WMCO). This sampling effort is not part of the Remedial Investigation/Feasibility Study (RI/FS) currently being conducted at FMPC. However, existing RI/FS facilities and procedures (Volume I: Sampling Plan, Rev. 3; Volume II: Health and Safety Plan, Rev. 3; and Volume IV: Quality Assurance Project Plan, [QAPP] Rev 3) are utilized as applicable. The sampling effort is part of the closure of the Barium Chloride Waste Salt Treatment Unit being performed by WMCO which must be certified as conforming to this sampling plan for the DOE and Environmental Protection Agency (EPA). R1

Updating of this sampling plan has been necessary due to the lengthy review and approval process during which the revised RI/FS procedures became effective. Revisions made in this sampling plan incorporate only those changes necessary to update and specify the latest revisions of the RI/FS procedures and other applicable reference documents. Also, clarification and additional details have been added to the descriptions of sampling activities as well as provision for the use of alternate materials and methods if necessary in executing the plan. These expansions have been made to ensure that activities are sufficiently documented for quality assurance purposes. For the purposes of clarity, changes and additions will be discussed in the text by stating how the original statements have been changed in order to show what the previously approved plan consisted of and what is now being set forth. R1

1.0 INTRODUCTION

This sampling plan covers the sampling and analytical methodology for evaluation of the waste residues contained in three (3) tanks and two (2) sumps at the FMPC Barium Chloride Waste Salt Treatment Unit (Figure 1). Originally three (3) tanks and one sump were to be sampled. The sump system associated with the Treatment Unit has been found to consist of two separate sump pits which will be sampled separately. The treatment unit was used to convert barium chloride waste salt, a Resource Conservation and Recovery Act (RCRA) hazardous waste, to barium sulfate, a nonhazardous waste. Barium sulfate is nonsoluble and will pass the extraction procedure (EP) toxicity test for barium, indicating it is safe for land disposal. Operation of the unit was suspended when corrosion problems developed in the unit equipment. The unit is now undergoing closure under the guidelines of 40 Code of Federal Regulations (CFR) 265.110 through 265.120. The closure is being performed by the Westinghouse Materials Company of Ohio. R1

There are four tanks associated with the treatment unit (Figure 2). A summary of the pertinent tank data is provided in Table 1. Three of these tanks will be sampled as part of this sampling plan. The fourth tank (F13A-164) was originally included in the following discussion only to allow a clear understanding of the treatment process. Tank D-1, a 1,069-gallon tank, was used as a salt dissolution tank. In this tank, barium chloride waste salt was combined with water and agitated until the salt dissolved completely. Tank F13A-164, a 2,142-gallon tank, was used as a precipitating tank for converting barium chloride to barium sulfate. Tank F13A-164 will not be sampled as part of the residue sampling effort due to its not containing significant amounts of materials for evaluation. It will, however, be sampled as part of the approved rinseate sampling activities to be conducted on the entire Barium Chloride Treatment Unit after the system is decontaminated. Tank D-15, a 720-gallon tank, was used as a holding tank for storing barium sulfate filtrate. Tank W-10, a 2,200-gallon tank, was used for stripping ammonia from the filtrate. R1

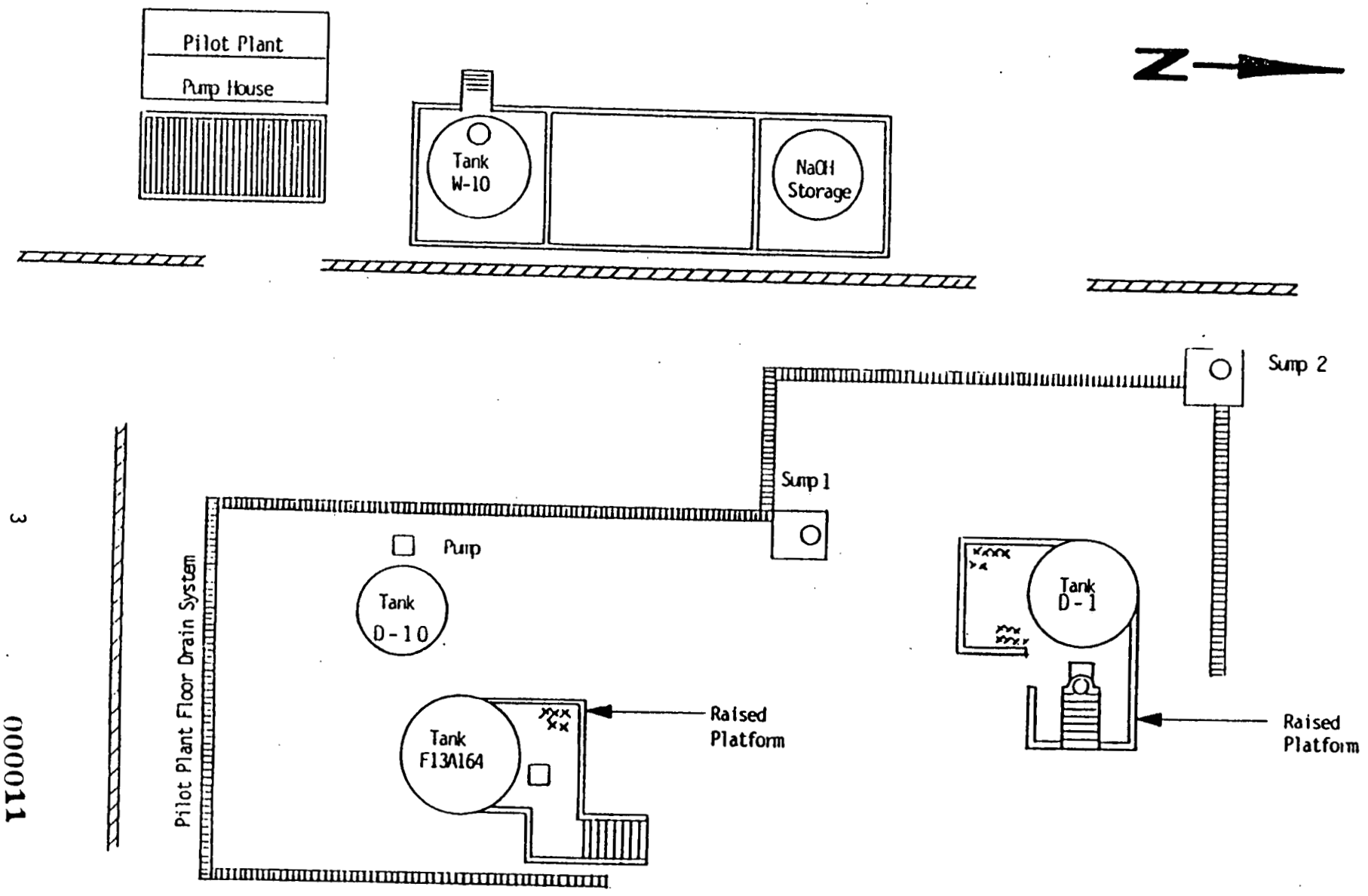

FIGURE 1

MAP OF THE BARIUM CHLORIDE WASTE SALT TREATMENT UNIT

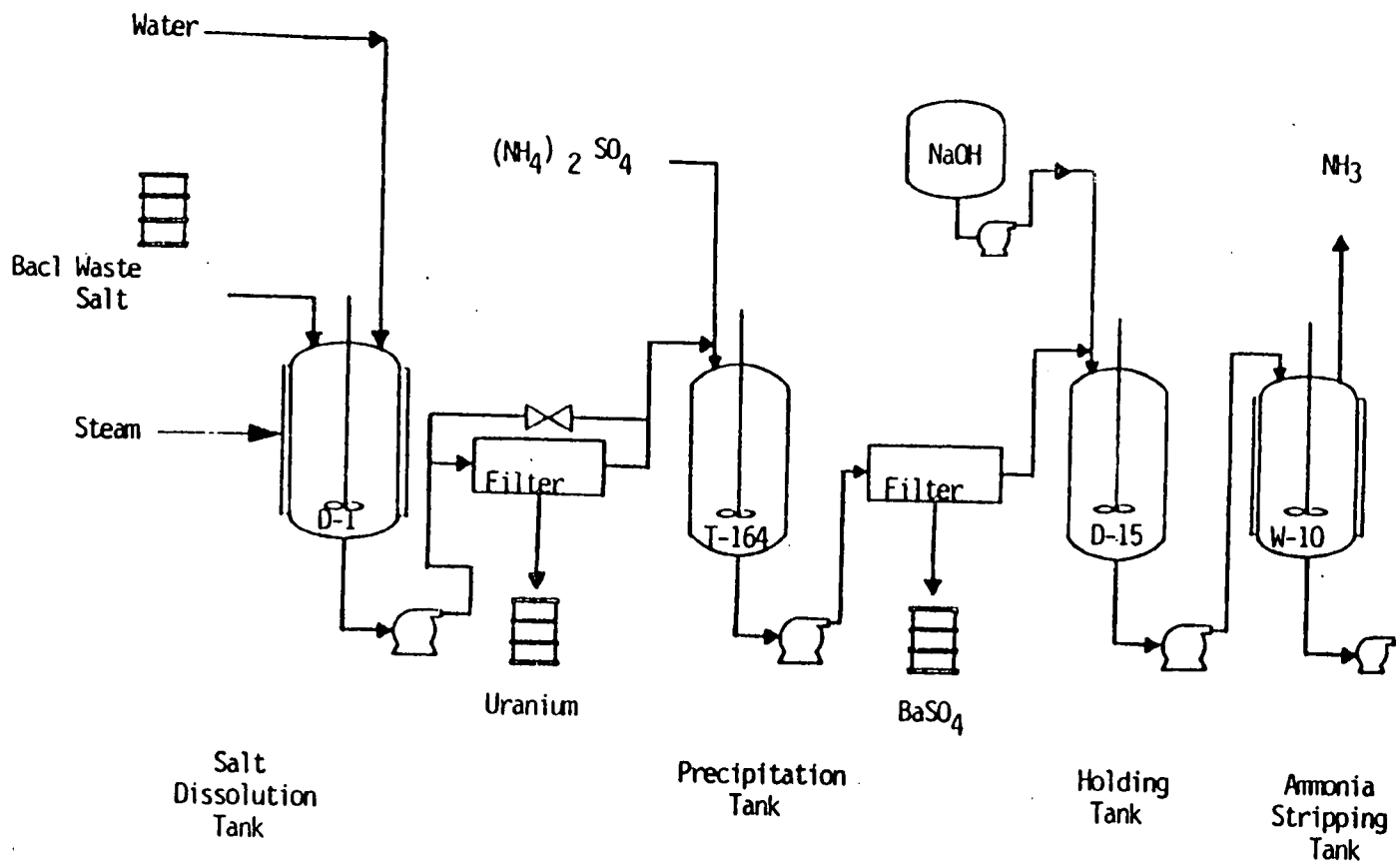

FIGURE 2

BARIUM STABILIZATION PROCESS FLOW DIAGRAM

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Tank D-1 contains approximately 900 gallons of what is assumed to be dissolved barium chloride waste salt material. Tank F13A-164 is empty and contains a small amount of scale at the bottom of the tank. Tank D-15 contains approximately a 1/2-inch thick layer of dried sludge. Tank W-10 contains approximately two inches of liquid, that is assumed to be mainly rainwater. Finally, the sumps potentially contain residues of the approximately 450 gallons drained from Tank D-15 as well as other materials accumulated as the result of thirty five years of Pilot Plant operations. R1

TABLE 1

Summary of Barium Chloride Waste Salt Treatment Unit
Tanks and Sumps to be Sampled

System Component	Description	Contaminant Previously Handled, Present Form of Residue
Tank D-1	1069 gal capacity, Salt solution tank	barium chloride solution, 900 gallons remaining
Tank F13A-164	2124 gal capacity, Precipitation tank	barium chloride barium sulfate solutions/ suspensions, dried scale
Tank D-15	720 gal capacity, Holding Tank for filtrate liquids	Dilute solutions of barium and other contaminants, dried sludge
Tank W-10	2200 gal capacity, Filtrate receiving tank	Dilute solutions of barium and other contaminants, 2 inches rainwater
Floor Sumps (2)	450 gallons each	Pilot Plant Floor Washings, liquid/solid sludge

R1

2.0 OBJECTIVE

The objective of this sampling plan is to provide a plan for sampling and analysis of the waste residues contained in Tanks D-1, D-15, W-10 and the two sumps, for purposes of identifying whether the waste residues are hazardous or nonhazardous as defined by 40 CFR 261. Originally only Tanks D-1, D-15, W-10 and only one sump pit were to be sampled. R1

3.0 SAMPLING PLAN

The sampling plan section includes the following information:

- Number of samples to be taken based on a statistical analysis and the U.S. EPA Test Methods for Evaluating Solid Wastes (U.S. EPA SW-846, Third Edition).
- Sampling procedures and equipment.
- Chain-of-custody procedure.
- Sample analysis requirements.
- Statistical data evaluation procedure.
- Health and safety program description.
- Quality assurance program summary.

The intent of this evaluation of the FMPC Barium Chloride Waste Salt Treatment Unit is to determine whether the wastes remaining in the tanks and sumps specified are to be classified as hazardous or nonhazardous using the EP toxicity procedure of SW-846, Third Edition, Method 1310. The following sampling plan and statistical data evaluation procedure was developed to classify the wastes in Tanks D-1, D-15, W-10 and the two sumps with a specified degree of confidence in the classification.

In developing the sampling plan and data evaluation scheme that follows, it is assumed that after agitation, the wastes in Tanks D-1 and W-10 can be assumed to be homogeneous in the liquid phase as well as homogeneous in the solid phase. It is not necessary that the liquid and solid phases be homogeneous together because the EP toxicity procedure requires that the solid and liquid phases will be analyzed separately (the solid phase is filtered out and analyzed for its leachability). R1

Agitation of the wastes in the sumps will be performed to the maximum extent possible since limited access restricts available sampling locations. R1

3.1 STATISTICAL EVALUATION

The following subsections present statistical procedures to determine whether a waste is hazardous or nonhazardous with a specified degree of confidence, and to determine the quantity of samples required to support this confidence level. These procedures are those described in U.S. EPA SW-846, Third Edition.

3.1.1 Waste Classification

According to the EP toxicity procedure, if an extract of the sample (or the filtrate if the sample contains less than 0.5 percent filterable solids) contains any of the contaminants listed in 40 CFR 261.25 at levels equal to or greater than the regulatory threshold, then the sample is EP toxic and is a hazardous waste as defined by 40 CFR 261.3. A list of the EP toxicity thresholds for metals is provided in Table 2.

In addition to these criteria, according to 40 CFR 264.4(b)(6), wastes that fail the EP toxicity test only for chromium may be excluded as hazardous wastes if:

- The chromium in the waste is exclusively (or nearly exclusively) trivalent chromium; and

- The waste is generated from an industrial process that uses trivalent chromium exclusively (or nearly exclusively) and the process does not generate hexavalent chromium; and
- The waste is typically and frequently managed in non-oxidizing environments.

Hexavalent chromium should not be analyzed for on the leachate at this time since the EP toxicity procedure, which requires acetic acid, can convert hexavalent chromium to the trivalent state. Therefore, it would be prudent to first evaluate the total chromium analyses before addressing the hexavalent chromium issue. There should not be any regulatory concern for hexavalent chromium if the total chromium concentrations are below the RCRA maximum concentration levels. In the event that analysis detects a total concentration of chromium in excess of the maximum RCRA concentration in any leachate sample, an additional de-ionized water extract will be performed on a new sample and the leachate from these extracts will be analyzed for both total and hexavalent chromium. R1

In any sampling effort, some indication of the degree of sampling precision and accuracy is required. Based on EPA Test Methods for Evaluating Solid Wastes (SW-846), it is recommended that a confidence interval (CI) of 95 percent be used for evaluating whether a waste is hazardous. For a given contaminant, the upper limit of the 95 percent confidence interval is compared to the regulatory threshold (RT) to determine the regulatory classification of the waste. If the upper limit of the 95 percent CI exceeds the regulatory threshold, the waste is classified as a hazardous waste. It is important to note that even if the upper limit of the 95 percent CI is only slightly less than the regulatory threshold, there is only a 2.5 percent (not 5 percent) chance of incorrectly classifying the waste as nonhazardous. This is due to the two-tailed characteristic of the CI curve. A 2.5 percent error is possible at the lower and upper limit of the CI curve for a total of 5 percent possible error. Only the upper limit of the CI curve is near the regulatory threshold and so there is only a 2.5 percent chance of incorrect classification.

The confidence interval (CI) is calculated as follows:

$$CI = x \pm t_{.05}\, s_x$$

where:

CI	=	confidence interval,
x	=	mean concentration,
$t_{.05}$	=	Student's 't' value for 95% (two-tailed) confidence interval
s_x	=	Standard error of the mean.

TABLE 2

Regulatory Threshold Of Contaminants For Characterization Of EP Toxicity[1]

Contaminant	Maximum Concentration (mg/l)
Arsenic	5.0
Barium	100.0
Cadmium	1.0
Chromium	5.0
Lead	5.0
Mercury	0.2
Selenium	1.0
Silver	5.0

[1] From 40 CFR 261.24

The standard error of the mean is computed as follows:

$$s_x = s/n$$

$$s = \sqrt{\frac{\sum x_i^2 - (\sum x_i)^2/n}{n - 1}}$$

where:

s	=	Standard deviation of the sample,
x_i	=	individual concentration measurements,
n	=	number of samples

Table 3 presents a list of students 't' values for the 95 percent confidence interval.

3.1.2 Number of Samples

The appropriate number of samples (n) to be collected is normally determined using the following expression:

$$n = \frac{(t_{.05})^2 \; s^2}{(RT - x)^2}$$

where:

n	=	appropriate number of samples
x	=	mean concentration
$t_{.05}$	=	Student's 't' value for 95% (two-tailed) confidence interval,
RT	=	regulatory threshold,
s	=	standard deviation of the sample.

Use of this procedure requires a preliminary estimate of the mean (x) and the standard deviation (s).

TABLE 3

Student's 't' Value For Statistical Evaluation[1]

Number of Samples (n)	't' Value (95% CI)
2	12.706
3	4.303
4	3.182
5	2.776
6	2.571
7	2.447
8	2.365
9	2.306
10	2.262

[1] Two-tailed Student's 't' data.

Since this preliminary data is unavailable, a determination has been made to collect 8 samples from each sampling source, with a breakdown as follows: 4 from each tank or sump for laboratory analysis, and 4 additional samples from each tank or sump for subsequent confirmatory analysis. The original plan required that an additional sample be collected for WMCO analysis which will not be necessary. The selection of four samples is considered reasonable due to the nature of the materials in the tanks and sumps. For example, if the results from a given tank indicate that all samples exceed the regulatory threshold, it can be conclusively established that the material is hazardous. Likewise, if the mean and confidence interval of all samples from a tank are less than the threshold, a non-hazardous designation can be considered reliable. Situations in the middle ground, where the mean concentration is less than the threshold value, but the confidence interval is not, are less clear and will likely require the analysis of the additional four confirmatory samples to achieve better statistical confidence. Since the standard deviation will not be significantly reduced if more samples are analyzed over and above the proposed eight samples, it is not considered necessary to exceed this number of samples to satisfy the objectives of this task. R1

The exact number of samples was also specified originally (36 total). According to the plan, eight samples are now specified to be taken from each tank or sump which results in a total of 40 samples. At least two sets of duplicate samples will also be collected for QA purposes which will result in the total being 48. However, circumstances may make it impossible to collect all samples mentioned above, or that additional samples might need to be added beyond the 48 total specified. It will be left to the judgement of the WMCO/ASI sampling team coordinators to determine the need to add or delete samples from the program and these changes will be documented and additional sampling efforts planned if necessary. R1

3.2 SAMPLING PROCEDURES

Sampling methods to be implemented for collection of samples from the tanks and sumps are those outlined in U.S. EPA SW-846, Third Edition. R1

Liquid wastes in the tanks may be stratified, necessitating the agitation of the wastes before sample collection in order to obtain sufficient quantities of solid materials in the samples. Mixing will be accomplished using an air sparger or manual long-handled stirring device depending on which device is determined to be capable of providing adequate mixing. The existing agitators on Tanks D-1 and W-10 will be used if they are present and operable. Other devices may be used as necessary if mixing with any of these devices is not possible due to the difficult working conditions associated with the Treatment unit. The sumps will be agitated as necessary to obtain sufficient solid material for inclusion in the samples. Agitation will be accomplished with the devices previously mentioned or with a shovel device used in the sump system trenches for moving solid material into the sump pits. Other agitation devices will be used as necessary if circumstances or difficult working conditions require. Sample coordinator's judgement in accordance with the applicable RI/FS procedures will be used in the choice of alternate sampling and agitation devices. The tanks and sumps will be sampled using one of the following devices: R1

- A containerized liquid waste sampler (COLIWASA),
- A bailer,
- A weighted bottle,
- A beaker
- A specially constructed long-handled dipper
- A pump.

R1

Other sampling devices will be used as deemed appropriate by the sampling team coordinator. All sampling and agitation devices will be decontaminated appropriately and in accordance with Volume II: Section V, Health and Safety Plan, Rev 3 and Volume V: Section 6, QAPP, Rev 3. A field inspection of the tanks will be made by the Sampling Coordinator prior to sampling to determine the appropriate sampling device. R1

The COLIWASA consists of a plastic tube which is equipped with a stopper that can be opened and closed while submerged. The sample is collected by carefully lowering the COLIWASA into the tank. When the sampler reaches the tank bottom, the T-handle on the COLIWASA is closed to seal the sample collection tube. Because of the depth of the tanks (8 to 15 feet), specially constructed, long-handled COLIWASAs will be required if it is to be used.

An alternate procedure would use a bailer instead of a COLIWASA. The bailer consists of a length of plastic or metal pipe, with a check valve in the base. The bailer is lowered into the tank using a retrieval line. Liquid enters the bailer through the check valve in the pipe. As the bailer is lifted, the check valve closes, collecting the sample. The bailer is easily used and less expensive than the COLIWASA, and is the preferred sampling device for this situation.

A weighted bottle sampler consists of a weighted plastic or glass bottle attached to a retrieval line. A clean bottle will be used for each sample, avoiding sampler decontamination problems between samples. Samples collected using a bailer will be withdrawn and transferred into the appropriately sized sample bottle as specified in RI/FS Sampling Plan and QAPP. R1

One of the tanks, W-10, is reported to contain approximately two (2) inches of liquid. Use of the COLIWASA or bailer to sample this tank would require multiple lifts

(approximately 10) to collect a 500 ml sample. Prior to sampling this tank, the liquid level will be determined. If the tank contains less than five (5) inches of liquid, the samples may be collected using a peristaltic or suction pump. Clean tubing (weighted at one end) would be lowered into the tank and the sample pumped directly into sample bottles. If this is not possible the weighted bottle will be used or other method as deemed appropriate and in accordance with applicable RI/FS procedures.

No preservatives are to be added to any samples as specified in Method 1310. Samples can be refrigerated if it is determined that refrigeration will not affect the integrity of the sample. No ice preservation is required for any samples being taken except hexavalent chromium samples if they are necessary. All activities involved with these sample preparations and all other sample packaging and shipping activities will be done in accordance with Volume V: Section 6, QAPP, Rev 3. Appropriate sample containers will be chosen using Table 3-2 of Volume I: Sampling Plan, Rev 3 and Table 6-5 of Volume V: QAPP, Rev 3; however larger sample containers may be necessary depending on the solids content of the sample fluid as judged in the field by the sampling coordinator. R1

The dried sludge in Tank D-15 may be dislodged using a long-handled scraper, broom, wire brush or other device appropriate for reaching into the tank without requiring human entry. Retrieval of sample material may be done with a modified "dust pan" device or by removing side or bottom hatch coverings from this tank. Previous inspection of this tank indicates that access and working space are very limiting with respect to reaching and obtaining significant and sufficient quantities of the solid materials from this tank. Therefore, alternate techniques and devices for obtaining these samples will be used as necessary and deemed appropriate by the sampling team. All techniques and devices will be safe and will not violate any requirements of RI/FS or WMCO procedures.

Sampling will include all applicable requirements of the Field QA/QC Program, Volume I: Section 3.6, Sampling Plan, Rev. 3. This includes the collection of appropriate numbers of QA/QC samples and duplicate samples.

3.3 Chain-of-Custody

A formal chain-of-custody procedure will be implemented for all samples collected. A sample is defined as being "in custody" when:

- It is in the physical possession of the designated responsible party,
- It is in view of the designated responsible party,
- It is placed in a secure area by the designated responsible party, or
- It is in a secure area restricted to access by authorized personnel only.

The chain-of-custody documentation provides the ability to trace the possession and handling of the samples from time of collection through analysis and final disposition. Chain-of-custody is required for all regulatory sampling. A sample chain-of-custody is shown in Figure 3. All chain-of-custody procedures outlined in this section will be done in accordance with Volume V: Section 7, QAPP, Rev 3.

Each set of four samples from a sampling location will be assigned a unique sample number from an available block of RI/FS sample numbers as defined in the RI/FS procedures (Volume I: Section 1, Sample Plan, Rev 3) by the RI/FS Field Sample Coordinator (individual samples from each location will be designated as 1 of 4, 2 of 4, etc). Samples will also be identified using a three (3) character identifier (D01, D15, W10, SM1, SM2, etc.), for use in easily identifying and associating samples with their source on chain-of-custody and request for analysis forms and in sample logs, etc. As indicated above, the three (3) character identifier for the tanks will be D01, D15, and W10 and the R1

sumps will be SMI and SM2. Each sample will be labeled using a sample label as shown in Figure 4. All requests for analysis and sample logging activities being done in this section will be done in accordance with Volume V: Section 7, QAPP, Rev 3. R1

A field log will be maintained containing the following minimum information for each sample collected:

- Date and time of sample collection
- Initials of field technicians
- Sample location
- Sample number
- Sampler preservatives
- Site specific observations

The on-site RI/FS Sample Coordinator will serve as the sample custodian to receive the samples after collection, maintain the samples in a secured environment, and ship the samples to the laboratory. RI/FS sample packaging and shipping procedures shall be followed. R1

In order to assure proper handling, the following information will accompany each sample:

- Request for analysis form
- Purchase order information
- Hazard identification
- Name and address of person to receive report.

A sample "Request for Analysis" form is shown in Figure 5.

Unused sample portions and archived samples will be maintained by the laboratory in unrefrigerated storage until notified in writing to return the samples to the site for disposal. The archived samples and unused sample portions will be returned to the FMPC Plant 1 Supervisor. If notification to return the samples is not received by January 1, 1992, the contracting officer will be notified of the need to extend this storage period and to renegotiate storage terms.

3.4 SAMPLE ANALYSIS

The tank samples will be analyzed for RCRA metals including arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver. Table 4 lists the specific EPA test methods from SW-846 to be used for analyzing the samples, the detection limits of those methods, and the allowable sample holding times.

FERNALD RI/FS

CHAIN-OF-CUSTODY RECORD

R/A Control No. _____

C/C Control No.

PROJECT NAME/NUMBER _____

LAB DESTINATION _____

SAMPLE TEAM MEMBERS _____

CARRIER/WAYBILL NO. _____

Sample Number	Sample Location and Description	Date and Time Collected	Sample Type	Container Type	Condition on Receipt (Name and Date)	Disposal Record No

Special Instructions: _____

Possible Sample Hazards: _____

SIGNATURES: (Name, Company, Date and Time)

1. Relinquished By: _____

   Received By: _____

2. Relinquished By: _____

   Received By: _____

3. Relinquished By: _____

   Received by: _____

4. Relinquished By: _____

   Received By: _____

WHITE - To accompany samples
YELLOW - Field copy

FIGURE 3

FERNALD RI/FS 23-8-85

Project Name _____ Project No. _____

Sample Location _____ Number _____

Boring/Well No. _____ Date _____

Collector's Name _____ Time _____

Sample Type: _____ Ground Water _____ Surface Water

_____ Soil _____ Sludge/Waste

Parameters _____ Preservative _____

Bottle _____ of _____ _____ Filtered _____ Nonfiltered

FIGURE 4

FERNALD RI/FS

REQUEST FOR ANALYSIS

R/A Control No.
C/C Control No. _____

PROJECT NAME _____
PROJECT NUMBER _____
PROJECT MANAGER _____
BILL TO _____

PURCHASE ORDER NO. _____

DATE SAMPLES SHIPPED _____
LAB DESTINATION _____
LABORATORY CONTACT _____
SEND LAB REPORT TO _____

DATE REPORT REQUIRED _____
PROJECT CONTACT _____
PROJECT CONTACT PHONE NO. _____

Sample No	Sample Type	Sample Volume	Preservative	Requested Testing Program	Special Instructions

TURNAROUND TIME REQUIRED: (Rush must be approved by the Project Manager.)

Normal _____ Rush _____ (Subject to rush surcharge)

POSSIBLE HAZARD IDENTIFICATION: (Please indicate if sample(s) are hazardous materials and/or suspected to contain high levels of hazardous substances)

Nonhazard _____ Flammable _____ Skin Irritant _____ Highly Toxic _____ Other _____ (Please Specify)

SAMPLE DISPOSAL: (Please indicate disposition of sample following analysis. Lab will charge for packing, shipping, and disposal.)

Return to Client _____ Disposal by Lab _____

FOR LAB USE ONLY

Received By _____ Date/Time _____

WHITE - Original, to accompany samples
YELLOW - Field copy

FIGURE 5

As mentioned above, SW-846, Third Edition will be the source of test methods required for the RCRA metals analysis to be done on all samples. The laboratory performing these analyses shall utilize SW-846, Third Edition and the task coordinator shall review the applicable laboratory procedures and policies regarding the analyses being done and reported.

The samples will be submitted to Enwright Laboratories for analysis due to backlog of samples at the IT Radiological Sciences Laboratory. Short turnaround time requirements also necessitate the use of Enwright Laboratories for these analyses at this time. Samples will be submitted to the individual at the following address:

Enwright Laboratories
25 Woods Lake Road
P. O. Box 5287
Greenville, SC 29606
Attn: James Westmoreland

R1

Sample analysis results are to be returned to:

Advanced Sciences, Incorporated
120 South Jefferson Circle, #101
Oak Ridge, TN 37830
Attn: M. B. Foard

3.5 DECONTAMINATION PROCEDURES

All sampling and agitation devices not dedicated to a particular tank or sump will be decontaminated before use and between sample sets (sampling locations). R1

TABLE 4

Test Methods For Analyzing For EP Toxicity Metals

SW-846, Third Edition

Parameter/ Item	Detection Method[1]	Holding Limit	Time
EP Toxicity (for solid residue only)	1310	—	—
Acid digestion (for solid residue only)	3010	—	—
Arsenic	6010	200	6 mo.
Barium	6010	2	6 mo.
Cadmium	6010	2	6 mo.
Total chromium	6010	20	6 mo.
Hexavalent chromium	7196	200	24 hrs.
Lead	6010	50	6 mo.
Mercury	7470	0.2	28 days
Selenium	6010	200	6 mo.
Silver	6010	10	6 mo.

[1] Alternate test methods may be identified if interferences occur with the specified method.

Decontamination procedures will be followed as outlined in Volume II: Health and Safety Plan, Section V, Rev 3 and Volume V: QAPP, Section 6, Rev 3 (groundwater sampling techniques). This includes the use of two (2) successive deionized water rinses rather than the tap water and deionized water rinse as stated previously. A single rinseate sample will be collected and archived from the final deionized water rinse to verify decontamination. If the weighted bottle sampler is used, a clean sample bottle will be used to collect each sample. If tank W-10 is sampled by pumping, new tubing will be used for each sample and decontamination is not required. R1

3.6 WASTE MANAGEMENT

Waste materials generated by the sampling activities will be disposed of according to the existing WMCO and RI/FS procedures. This waste may include, but is not limited to, plastic ground cloths, disposable protective clothing, retrieval lines, disposable toweling, and plastic tubing. Unless preliminary radiological information to be supplied by WMCO indicates the tanks to be sampled are not uncontaminated, all wastes generated during sampling will be assumed contaminated; therefore, they will be disposed of in yellow radiological waste trash bags or other receptacle as instructed. WMCO plant personnel will be contacted for disposal of the trash bags.

The waste management activities described under this section as well as all other waste management will be done in accordance with Volume II: Health and Safety Plan, Rev 3, Section 5. R1

3.7 SAMPLING EQUIPMENT

R1

The following sampling equipment is required. Quantities required will be determined by the judgement of the sampling coordinator based on preliminary inspection of the

Treatment Unit.

Bailers
Weighted bottle samplers (optional)
Long-handled dust pan
Long-handled wire brush
Long-handled broom
Long-handled dipper
Long-handled scraper
COLIWASA (optional)
Portable pump (if required)
Tygon tubing (if required)
Sample bottles for liquid and solid samples
Nonphosphate detergent
Deionized water
Sample bottles
Plastic ground cloths
Sample labels
Retrieval line

R1

This is not intended to be a comprehensive list and may be added to with appropriate items as judged necessary by the sampling coordinator in accordance with RI/FS procedures. R1

3.8 REPORT OF FINDINGS

A report of findings, including the laboratory analysis data and the assessment of contaminant levels, will be prepared and submitted to WMCO. This report will include

the following information:

- The total number of samples taken
- The location of each sample taken
- The date and time each sample was obtained
- The type of analysis performed on each sample
- The concentration of each metal in each sample
- The results of statistical analysis for data evaluation and identification of waste residues which must be handled as hazardous waste, or recommendations for further testing before a hazardous designation can be made.

3.9 HEALTH AND SAFETY

The sampling of the barium chloride tanks will be performed under the provisions of the RI/FS Health and Safety Plan of March 3, 1988 (Revision 3), including the Health and Safety Addendum. Based on the information available at this time, the following protective equipment will be used for tank sampling:

- Cotton coveralls (WMCO issue)
- Safety boots (WMCO issue)
- Nitrile gloves
- Safety glasses
- Boot covers
- Saranex coveralls

Modifications to the protective equipment for sampling will depend on information supplied by WMCO and on-site evaluation and assessment of risk. An additional item of R1

protective equipment which has been determined to be necessary for all individuals working in the process area of the Pilot Plant Facility housing the Barium Chloride Treatment Unit is a full-face respirator. Gloves should also be worn by all personnel who will be touching any equipment due to the extensive presence of low-levels of residual radioactive contamination throughout the process area of the facility. R1

In addition, radioactivity levels measured by WMCO will be used to determine if the samples can be analyzed at Enwright Laboratories. Additional screening may be required on the samples before shipment to the laboratory to further categorize the samples according to the level of hazard. Radiation survey procedures and limits on samples prior to shipment will be in accordance with Volume 5: QAPP, Section 6.8 (Rev 3). Analysis at IT Mixed Waste laboratory will not be done due to considerations mentioned in Section 3.4. R1

3.10 QUALITY ASSURANCE AND QUALITY CONTROL

Quality Assurance (QA) and Quality Control (QC) procedures from the RI/FS shall be implemented during this sampling program. These procedures are defined in the "Quality Assurance Project Plan for the Remedial Investigation and Feasibility Study" (Revision 3, dated March 3, 1988).