**F/H SEEPAGE BASIN GROUNDWATER PROCESS TANK
SETTLING CHARACTERIZATION TASK TECHNICAL PLAN**

by

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**F/H SEEPAGE BASIN GROUNDWATER PROCESS TANK SETTLING
CHARACTERIZATION TASK TECHNICAL PLAN (U)**

1.0 INTRODUCTION

The Environmental Restoration (ER) Department is responsible for environmental remediation projects on Site. ER requested Interim Waste Technology Section (IWTS) to conduct a treatability study to develop a system which would reduce the groundwater contaminant levels in the aquifers at the F/H seepage basins.

A task technical plan [Siler(1993)] has been initiated to support the remediation system development. The work described in the referenced plan is directed towards the characterization of the influent, effluent and precipitated sludge that will be generated during treatment. This task plan provides the methodology for conducting further investigations into the behavior of groundwater in the tanks. This task plan is not designed to answer any design questions but is directed towards providing operating data for the treatment units.

Potential concerns exist that are related to the settling characteristics of particulate matter in the groundwater. During periods of operation, the injection system water tank and extraction system water tank will probably maintain some minimum water level. During periods of extended treatment system downtime, groundwater may remain within the injection system water tank and extraction system water tank. The settling of particulate matter is of potential concern due to the following:

- Radioactivity-related safety issues may need to be investigated and documented.
- Accumulation of particulate matter will reduce the tanks' operating volumes.
- The characteristics of the settled particulate matter need to be determined and appropriate cleaning and/or decommission procedures developed for the tanks.

2.0 TASK DELIVERABLES

Reports

Reports documenting the results of this research project will be compiled as internal WSRC reports. These reports will be reviewed and received by ER and other appropriate organizations. The reports will be issued a WSRC-RP-93-### number.

3.0 TASK REQUIREMENTS

The requirements of this task are to:

- Divide each composite sample into two portions, one portion will be archived for potential future uses.
- Determine if pH change in the composite sample occurs due to exposure to ambient air.
- Obtain qualitative characteristics of the settling process by visual inspection.
- Obtain radionuclide and chemical characteristics of the settled particulate through laboratory analysis for safety documentation.

4.0 TASK PREREQUISITES

Task Technical Plan

This task plan will be reviewed by ER. IWTS and ER will approve this Task Technical Plan.

Task QA Plan

The Task QA Plan developed for the task technical plan WSRC-RP-93-0941 will support this Task Technical Plan. IWTS and SRTC-QS will approve the Task QA Plan. No special training is necessary. Chain of custody will be addressed in the Task QA Plan.

Procedure(s)

IWTS will generate the required procedure(s) for operation of the test equipment. IWTS will approve the procedure(s).

5.0 TASK ACTIVITIES AND DESCRIPTION

Experimental Procedure Outline

The experimental studies to be conducted will be performed in laboratory B-122 (building 773-A) for the actual groundwater. The test solution will be actual well water from the F/H Area wells. All samples will be submitted for analysis in duplicate to SRTC and offsite laboratories. The offsite laboratories function will be governed according to QA level 1 requirements. Listed below is the experimental procedure.

- Step 1. WELL WATER PROCUREMENT- Well water for this technical task plan is obtained through technical task plan WSRC-RP-93-0941. Four gallons from each of the two composite samples (one from F Area and one from H Area) are reserved for this technical task plan.
- Step 2. WELL WATER SAMPLES PREPARATION - Each four gallon composite sample will be divided into one gallon and three gallon portions. The one gallon portion will be placed into an appropriate, clear, open container. The three gallon portion will be placed into an appropriate storage container for future use. The one gallon sample will be placed in an appropriate location where the sample will be undisturbed by other lab work and yet remain exposed to normal air flow.
- Step 3. EXPERIMENTAL WORK - The one gallon container will be inspected twice per week for a three month period. The inspection shall include a visual inspection of water clarity and particulate accumulation, and a measurement of the pH. A log book will be kept of all observations, both qualitative and quantitative.
- Step 4. ANALYTICAL WORK - At the end of the three month period, the one gallon sample will be analyzed for Total Suspended Solids, heavy metals and isotopic content providing enough solids have settled to allow for a sufficient sample size. See Table 1 for a listing of constituents for which to analyze.
- Step 5. THEORETICAL WORK - Calculations will be made to estimate the amount of precipitation that will occur. A theoretical model such as the ESP program (developed by E. Orebaugh) may be used for this task.

Table 1. Constituents to be Analyzed

Constituent	Analysis	SRTC/Offsite
<u>Organics</u>		
Benzene	GC/MS	both
Chloroethylene	GC/MS	both

Dichloroethylene	GC/MS	both
Dissolved organic carbon	Filter then TC	both
Methylene chloride	GC/MS	both
Phenols	GC/MS	both
Tetrachloroethylene	GC/MS	both
Total Organic Carbon	TIC/TOC	both
Trichloroethylene	GC/MS	both
Trichlorofluoromethane	GC/MS	both
Bis(2-ethyl(hexyl))Phthalate	GC/MS	both
1,1 Dichloroethane	GC/MS	both
Chloroform	GC/MS	both
Metals		
Aluminum	ICP/MS & AppIX	both
Antimony	ICP/MS & AppIX	both
Arsenic	ICP/MS & AppIX	both
Barium	ICP/MS & AppIX	both
Cadmium	ICP/MS & AppIX	both
Calcium	ICP/MS & AppIX	both
Chromium	ICP/MS & AppIX	both
Cobalt	ICP/MS & AppIX	both
Copper	ICP/MS & AppIX	both
Cyanide	AppIX	both
Dissolved inorganic carbon	Filter then TIC	both
Mercury	AA & AppIX	both
Lead	ICP/MS & AppIX	both
Manganese	ICP/MS & AppIX	both
Magnesium	ICP/MS & AppIX	both
Nickel	ICP/MS & AppIX	both
Chloride	IC & AppIX	both
Fluoride	IC & AppIX	both
Iron	ICP/MS & AppIX	both
Nitrate	IC & AppIX	both
Potassium	AA & AppIX	both
Selenium	ICP/MS & AppIX	both
Silver	ICP/MS & AppIX	both
Silicon	ICP/MS & AppIX	both
Sodium	ICP/MS & AppIX	both
Sulfate	IC & AppIX	both
pH	pH meter	both
Thallium	AppIX	both
Total Phosphates	EPA method	both
Tributyl phosphate	GC	SRTC
Vanadium	ICP/MS & AppIX	both
Zinc	ICP/MS & AppIX	both
Tin	ICP/MS * AppIX	both

Radionuclides		
Total Uranium	EPA method	Off
U-233	EPA method	Off
U-234	EPA method	Off
U-235	EPA method	Off
U-236	EPA method	Off
U-238	EPA method	Off
Pu-238	EPA method	Off
Pu-239	EPA method	Off
Pu-240	EPA method	Off
Pu-241	Calculations	SRTC
Pu-242	Calculations	SRTC
Tritium (H-3)	EPA method	Off
Ra-226	EPA method	Off
Ra-228	EPA method	Off
Total Ra	EPA method	Off
Sr-90	EPA method	Off
I-129	EPA method	Off
Cs-137	EPA method	Off
Co-60	EPA method	Off
Cu-244	EPA method	Off
Tc-99	EPA method	Off
Th-228	EPA method	Off
Th-232	EPA method	Off
Th-234	EPA method	Off
Am-241	EPA method	Off
Am-243	Calculations	SRTC
C-14	EPA method	Off
Nb-94	EPA method	Off
Ni-59	EPA method	Off
Np-237	EPA method	Off
Se-79	EPA method	Off
Rb-87	EPA method	Off
Gross alpha	EPA method	Off
Gross nonvolatile beta	EPA method	Off
Cm-243	EPA method	Off
U-233	EPA method	Off
Ac-228	EPA method	Off
Sr-89	Calculations	SRTC
Th-230	EPA method	Off
Cm-242	EPA method	Off
Cm-243/244	EPA method	Off
Cm-246	EPA method	Off
Count pre-digested solids	EPA method	SRTC
Other		
Solids content	TS, TDS, TSS	SRTC

Particle size distr.	Size Analyzer	SRTC
BOD	EPA method	Off
COD	EPA method	Off
Determine oxygen state of chromium	EPA method	Off
Modified TCLP	Acetic Acid Ext.	SRTC/Off

Experimental Logistics

These experiments will be conducted by J. L. Siler and IWT technicians using procedures/instructions. Data collected will be entered on data sheets by the technicians and also in a laboratory notebook by J. L. Siler.

The work with actual groundwater will be performed in the 773-A, B-122 laboratory. All onsite samples will be analyzed by ADS using customer-assisted QA level. The ICP/MS work will be exploratory in nature. Off-Site analyses will be handled by ADS.

6.0 EXPERIMENTAL ACTIVITIES

The following preliminary schedule outlines the experimental plan to be conducted:

1. Obtain samples from selected wells (August).
2. Perform experimental work (August 1993 through November 1993).
3. Conduct analyses (December 1993 through March 1994).
4. Issue final report (June 1994).

CHANGES TO THE TASK TECHNICAL PLAN

Minor changes to this task technical plan will be noted in laboratory notebook #WSRC-NB-90-256. Major revisions will result in a revised task technical plan.

7.0 REFERENCES

Siler, J. L., "F/H Seepage Basin Groundwater Influent, Effluent, and Precipitated Sludge Characterization Task Technical Plan (U)", WSRC-RP-93-0941, July 7, 1993.

REVIEW AND APPROVALS

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