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ENGINEERING SUPPORT STUDIES REPORT
Geotechnical and Treatability Results for the
Technical Work Plan for Surface Impoundments Operable Unit
Engineering Support Studies

Prepared for:
Lockheed Martin Energy Systems
Oak Ridge National Laboratory
Environmental Restoration Program

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OAK RIDGE NATIONAL LABORATORY
Oak Ridge, Tennessee 37831
managed by
LOCKHEED MARTIN ENERGY SYSTEMS, INC.
for the
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under contract DE-AC05-84OR21400

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ACRONYMS

ASTM	American Standard Testing Materials
ASO	Analytical Support Office
BC	40 Gallon Base Composite
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COMP1	Ponds 3513 and 3524 composite as defined in the ESSW
CP	Composite identifier used with sample ID's
CPCP1	Initial COMP1
CPCPD	Gravity Thickened COMP1 Following Clear Supernatant Decant of CPCP1
cpm	Counts per minute
CS	TC for ASTM D2166-91 Unconfined Compressive Strength
DOE	Department of Energy
DS	TC for ASTM D2937-83 Density of Soil in Place by the Drive-Cylinder Method
EP	TC for EPA Method SW846 9095
EPA	Environmental Protection Agency
ER	Environmental Restoration
ESSW	Technical Work Plan for Surface Impoundments Operable Unit Engineering Treatability Studies (ORNL/ER-324 report)
FWP	Field Work Plan
g	gram
GD	TC for Gravity Drained Composite Samples
GT	TC for Gravity Thickening Test
HCl	Hydrochloric Acid
HDPE	High Density Polyethelene
HEPA	High Efficiency Particulate Air
Hg	Mercury
HM	TC for Harvard Miniature Compaction Test
HP	Health Physicist
I.D.	Identification
LMES	Lockheed Martin Energy Systems
LR	TC for Modified Liquid Release Test
LRT	Liquid Release Test
MAD	Measurement Applications and Development Group
MC	TC for Moisture Content using ASTM 2216-92 Procedure
mg/L	milligram per liter
mL	milliliter
mL/min	milliliter per minute
mm	millimeter
mRem/hr	milliRem (Rem included in Acronyms list) per hour
OpTech	Operational Technologies Corporation
ORNL	Oak Ridge National Laboratory
PCB	Polycholorinated biphenyl
pcf	Pounds per Cubic Foot

pH	Number expressing relative acidity and alkalinity
PID	Photo ionization Detector
PPE	Personal Protective Equipment
ppm	Parts per million
PS	TC for ASTM D422-63 Particle Size Analysis
psi	Pounds per square inch
Rem	Roentgen equivalent man (unit used for dose equivalence)
SG	TC for ASTM D854-92 Standard Test Method for Specific Gravity of Soils
SSHO	Site Safety and Health Officer
Singleton	Singleton Laboratories
SIOU	Surface Impoundments Operable Unit
SO	Sample Origin identifier or TC for Bench-Scale Solidification Test
SOP	Standard Operating Procedure
SOW	Statement of Work
SPT	Sample Type
ST	TC for Gravity Settling Test
T#	Test Repetition Number
TC	Test Code Identifier
TCLP	Toxicity Characteristic Leaching Procedure
TS	TC for Total Suspended Solids
tsf	Tons per square foot
TSS	Total Suspended Solids
UCS	Unconfined Compressive Strength
WAG	Waste Area Grouping
WBS	Work Breakdown Structure
ZHE	Zero Headspace Extractor
%S	TC for Percent Solids Analysis Identifier
μm	micrometer
1D	TC for ASTM D2435-90 Standard Test Method for One-Dimensional Consolidation Properties of Soils
13BC1	BC from Northwest Area of Pond 3513
13BC2	BC from Northeast Area of Pond 3513
13BC3	BC from Center Area of Pond 3513
13BC4	BC from Southwest Area of Pond 3513
13BC5	BC from Southeast Area of Pond 3513
13CP1	Initial 3513 Pond Composite of 13BC1 through 13BC5
13CPD	Gravity Thickened 13CP1 by Decanting Clear Supernatant
24BC1	BC from Southwest Area of Pond 3513
24BC2	BC from Northwest Area of Pond 3513
24BC3	BC from Center Area of Pond 3513
24BC4	BC from Southeast Area of Pond 3513
24BC5	BC from Northeast Area of Pond 3513
24CP1	Pond 3524 Composite of 24BC1 through 24BC5

EXECUTIVE SUMMARY

The work performed by Operational Technologies Corporation (OpTech) under Subcontract Number 18X-JFA98C and by the Lockheed Martin Energy Research Measurement Applications and Development Group was to support the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) remediation of the Surface Impoundments Operable Unit (SIOU), Waste Area Grouping (WAG) 1, located at Oak Ridge National Laboratory (ORNL), Oak Ridge, Tennessee. The purpose of this report is to provide geotechnical and treatability characteristics results of the SIOU sediments to be used for evaluation of remedial design processes as outlined in the Technical Work Plan for Surface Impoundments Operable Unit Engineering Treatability Studies, ORNL/ER-324 report (ESSW). Because much of the content necessary for this document is contained in the ESSW and in the Field Work Plan (FWP) for the Technical Work Plan for Surface Impoundments Operable Unit Engineering Support Studies (PRN X1995-0023), redundancies are reduced through cross-references. This deliverable meets the Task 5.3, Engineering Support Studies Report requirements as outlined in the Statement of Work (SOW) under Subcontract Number 18X-JFA98C.

Due to the nature of unknowns associated with this scope of work, task-specific modifications were required for several of the ESSW tasks in order to meet project objectives. This report includes details on all modifications and deviations implemented during this scope of work. Potential sources of errors are also noted. To summarize the conclusions:

- Sediments were self-flocculating and settled well without chemical additives.
- Gravity thickened sediments could be reduced in volume by approximately 25% through gravity drainage treatment.
- Sediments gravity drained quickly and effectively.
- An additional 45 - 50% volume reduction of gravity drained sediments could be induced from overburden pressures of approximately 10 pounds per square inch (psi)[1].
- Use of a 50% mix of Portland cement/fly ash on a wet weight basis could solidified a gravity thickened sample up to a 25 psi strength at a 7-day curing with less than a 27% increase in original gravity thickened volume.
- Use of a 75% mix of Portland cement/fly ash on a wet weight basis could exceed 60 psi solidification strength on gravity thickened samples at a 7-day curing with less than 30% increase in original gravity thickened volume.
- Pond sediments exhibited self-solidification characteristics and reduced to a mere fraction of the in-situ volume when allowed to fully air dry.
- The 50, 75, and 100% mixes (on wet weight basis) of Portland cement/fly ash passed the Toxicity Characteristic Leaching Procedure (TCLP) analysis. Total PCB results ranged from 4.6 to 5.7 μg/g for these solidified samples.

[1]If using a soil density of 120 pounds per cubic foot, 10 psi is equivalent to 12 feet of soil.

1.0 INTRODUCTION

The purpose of this report is to document the results from the work performed by Operational Technologies Corporation (OpTech) under Subcontract Number 18X-JFA98C and by the Lockheed Martin Energy Research, Measurement Applications and Development (MAD) Group. To help reduce cost, Singleton Laboratories (Singleton) was subcontracted through OpTech to support selected tests which otherwise would have required the purchase of costly equipment. Effective teamwork between OpTech, the MAD Group, and Singleton kept project cost down and the project on schedule. This work was performed to support the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) remediation of the Surface Impoundments Operable Unit (SIOU), Waste Area Grouping (WAG) 1, located at Oak Ridge National Laboratory (ORNL), Oak Ridge, Tennessee.

This report provides geotechnical and treatability characteristics results of the SIOU sediments to be used for evaluation of remedial design processes as outlined in the November 1995, Technical Work Plan for Surface Impoundments Operable Unit Engineering Treatability Studies, ORNL/ER-324 report (ESSW). Because much of the content necessary for this document is contained in the ESSW and Field Work Plan (FWP) for the Technical Work Plan for Surface Impoundments Operable Unit Engineering Support Studies (PRN X1995-0023), redundancies are reduced through cross-references. This deliverable meets Task 5.3, Engineering Support Studies Report requirements as outlined in the Statement of Work (SOW) under Subcontract Number 18X-JFA98C.

Figure 1-1 illustrates the SIOU ponds, the staging area used during this scope of work, and the laboratory trailer location. Extensive site history details can be obtained in the Remedial Investigation/Feasibility Study for Surface Impoundments Operable Unit WAG 1, Oak Ridge National Laboratory, document DOE/OR/02-1346&D2. The DOE/OR/02-1346&D2 document also contains information on pond contaminants and risk assessments.

Section 2.0 of this report summarizes the scope of work as performed by OpTech and the MAD Group. Unknowns associated with this scope of work required task-specific modification to ESSW tasks in order to meet project objectives. Section 3.0 of this report provides details on all modifications and deviations implemented during this scope of work. Section 4.0 provides results and field mass balances while Section 5.0 provides details on potential sources of errors and sensitivity evaluations. Section 6.0 provides report conclusions.

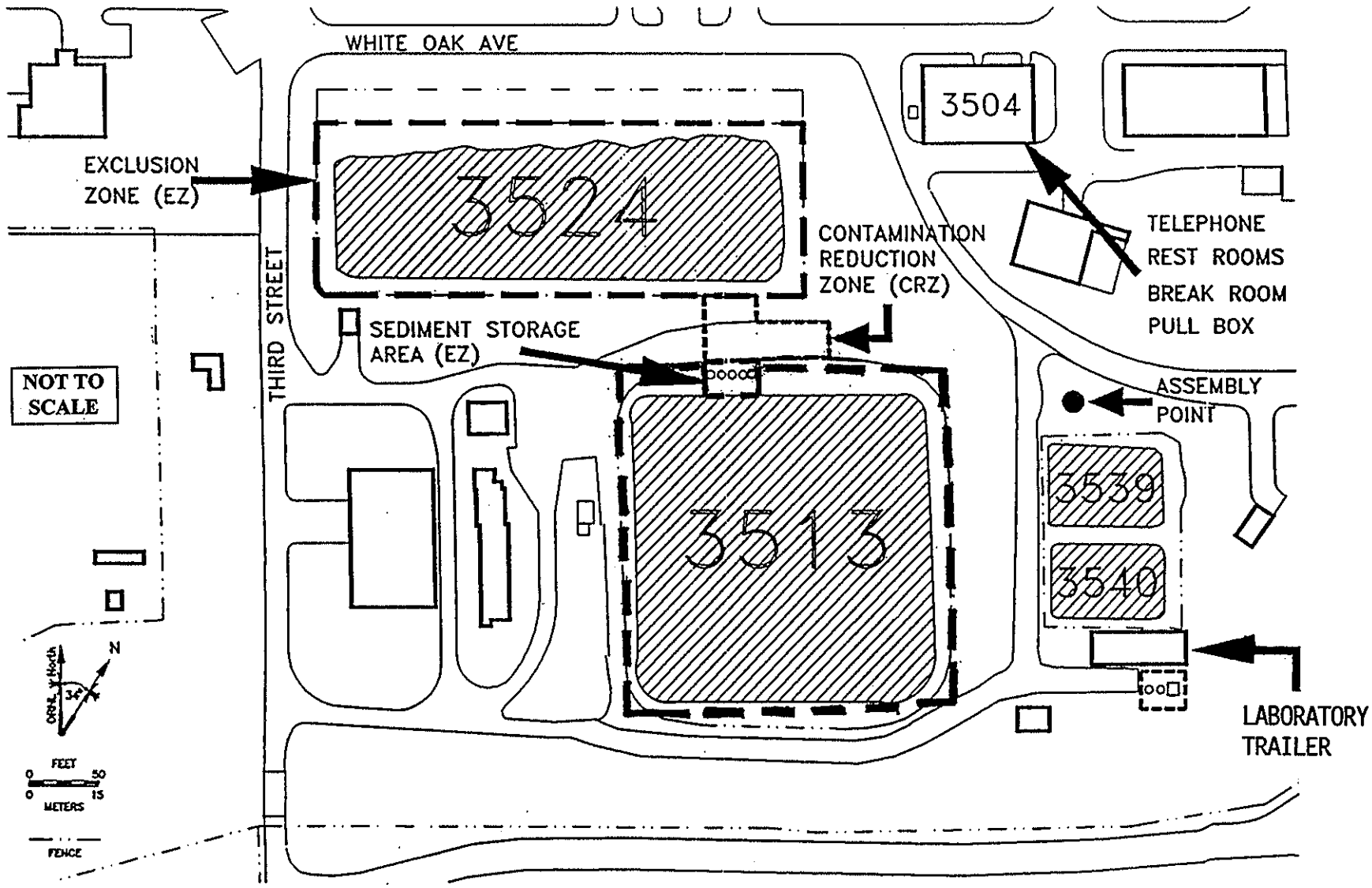

Figure 1-1: Overview of SIOU ponds, control zones, and laboratory locations.

2.0 DESCRIPTION OF ESSW REMEDIAL ALTERNATIVE IMPLEMENTED

2.1 OVERVIEW

Alternative 3, less the pump loop test, from the ESSW was selected for implementation. The Alternative 3 outline in the ESSW in addition to the Field Work Plan (FWP) for the Technical Work Plan for Surface Impoundments Operable Unit Engineering Support Studies (PRN X1995-0023) as prepared by OpTech and submitted to the Lockheed Martin Energy Systems (LMES) on March 27, 1996 provides details on implementation of these tasks. This section provides a brief overview of the sample collection, storage, and laboratory testing procedures used for implementation of ESSW Alternative 3. Additional details can be obtained from the site logbooks in the attached appendices. Deviations or modifications to these implementations are listed in detail under Section 3.0 of this report.

2.2 SAMPLE COLLECTION AND STORAGE PROCEDURE SUMMARY

The MAD Group was responsible for the acquisition, transfer, and containerization of pond bottom sediments from ponds 3513 and 3524 at ORNL. MAD Group personnel used a modified 16 foot pontoon boat equipped with a double diaphragm air operated pump for collection and transfer of pond sediments. A rope and pulley type system was utilized to maneuver the pontoon boat across the ponds to each sampling location. Air supply lines for pump operations and discharge hoses to carry the sediment to shore were attached to four-foot sections of capped four-inch PVC tubing utilized as flotation devices.

The suction end of the pump set-up resembled an inverted funnel attached to aluminum suction tubes to reach the varying sediment depths of the ponds. As illustrated in Figure 2-1, suction tubes were attached to the pump intake hose and the inverted funnel end used to vacuum the sediments through the pump. The funnel contained a 1/4-inch screen used to prevent large debris from entering and damaging the pump. The inverted funnel, suction tubes, and all other equipment modifications and fabrications were performed by ORNL Plant and Equipment Personnel.

The sediments were pumped through the flotation hose to the 275-gallon storage containers on the north bank of pond 3513. The storage containers were stored within a bermed area sloped to drain into pond 3513 in the event of an accidental spill. The sloped area was lined with impermeable herculite which was prefabricated along the edges to fit hay bales and create a leak proof bermed border.

The time associated with filling a container with approximately 200-gallons of material ranged between 1 to 2 hours. Only part of this time would be associated with the pumping operations due to other variables encountered during this tasks. These variables include but are not limited to: clogging of the 1/4-inch screen during the collection process causing transfer delay while the intake was cleared; moving of the pontoon boat to a neighboring collection location when the first location did not contain enough material for stock development; and halting of pump operations for routine maintenance or to check transport lines to ensure proper operation.

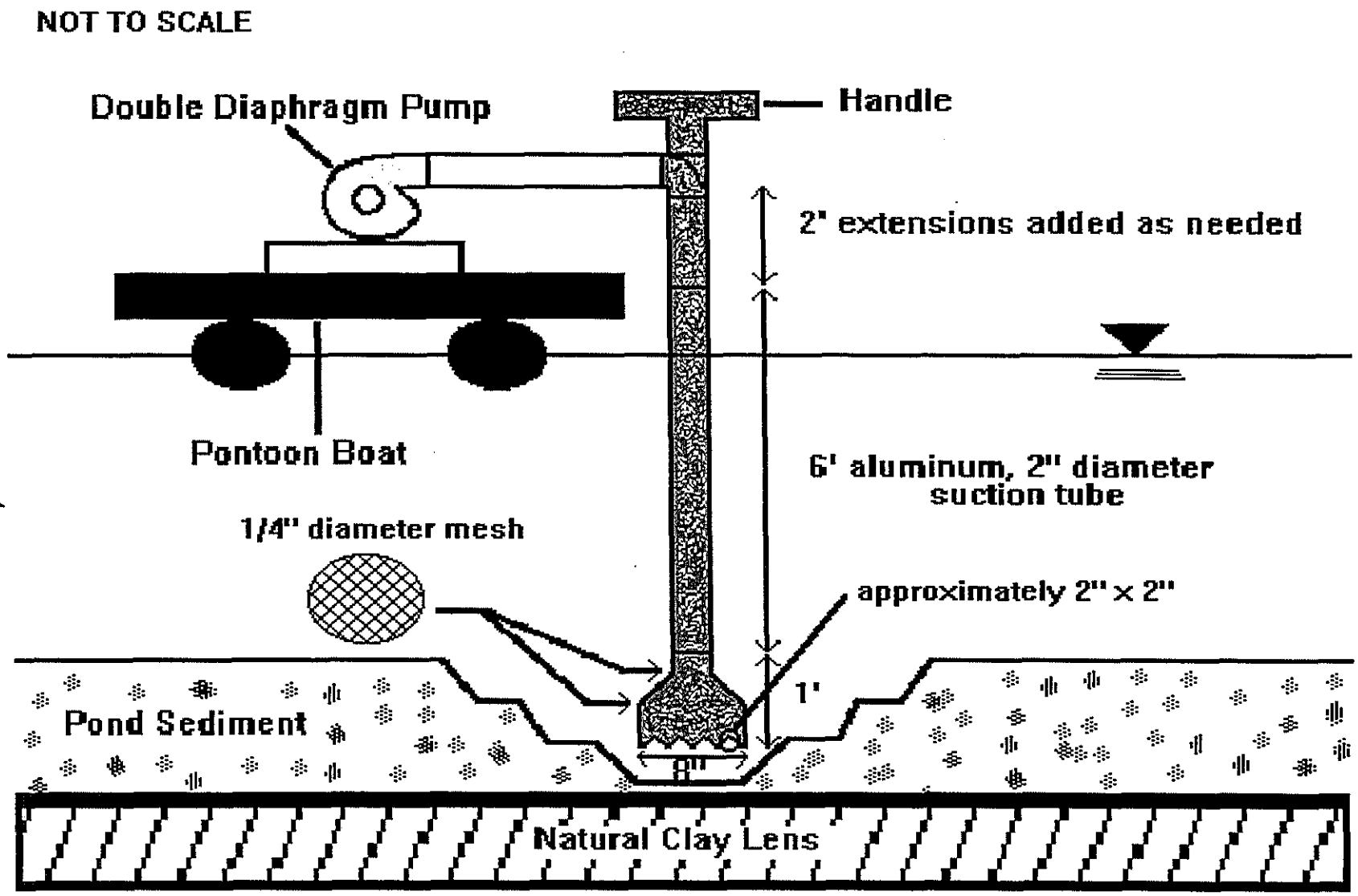

Figure 2-1: Schematic of pond sediment collection apparatus.

As outlined in the ESSW, the sediments were collected from five different locations within pond 3513 and pond 3524. A minimum of 40-gallons of sediment was collected from each location. To obtain a desirable slurry concentration, the holding containers were completely filled, allowed to settle until the supernatant was visually clear, then decanted down to the sedimentation layer or 40-gallons (which ever came first). If the sedimentation layer was significantly below the 40-gallon depth (less than 20% desirable depth), additional sediment was pumped from the corresponding pond location, allowed to resettle, and decanted again when the supernatant was visually clear.

For sample tracking, each of these locations were given an identifier of SOSPT, where SO is the Sample Origin and SPT is the Sample Type as outlined in the FWP (PRN X1995-0023). The SO was 13 for pond 3513, 24 for pond 3524, and CP for the 60/40 composite mix of ponds 3513 and 3524. The SPT was BC# for the base composite (BC) samples and CP1 for each pond composite (CP) or the 60/40 composite mix. The BC samples were collected in the regions as outlined in the ESSW Figure A.2. Table 2-1 provides details on the MAD Group's sample collection number (as used in their Appendix B logbook), the BC labeling (as used for laboratory sample tracking), and the corresponding collection region.

Table 2-1: Collection regions for base composite samples.

MAD Group's Sample Collection No.	Base Composite Identification	Collection Region
1 from 3513	13BC1	Northwest area of pond 3513
2 from 3513	13BC2	Northeast area of pond 3513
3 from 3513	13BC3	Center of pond 3513
4 from 3513	13BC4	Southwest area of pond 3513
5 from 3513	13BC5	Southeast area of pond 3513
1 from 3524	24BC1	Southwest area of pond 3524
2 from 3524	24BC2	Northwest area of pond 3524
3 from 3524	24BC3	Center of pond 3524
4 from 3524	24BC4	Southeast area of pond 3524
5 from 3524	24BC5	Northeast area of pond 3524

The MAD Group also developed all pond composites. The pond composites, or 13CP1 and 24CP1, were mixtures of corresponding BC1 through BC5 containers, while the CPCP1 was the 60/40 composite mix of 13CP1 and 24CP1 respectively. All BC and CP samples were collected or developed in 275-gallon storage containers with the exception of BC5, which was collected in two 55-gallon drums. Container volumes were determined for the 275-gallon containers by using the rating curve in Figure 2-2, while Figure 2-3 was used for the 55-gallon drums. The 275-gallon rating curve was developed following field calibration (details in Appendix C) while the 55-gallon drum calibration was based on the diameter (22.5 inches) and depth (33 inches) of the 55-gallon container [calculated as 20.65 gallons per linear foot or 0.0677 gallons per linear millimeter (mm)]. To minimize exposure and cleaning requirements, the volume readings were based on depth measurements taken from the top of the containers to the surface of the fluid so only the tip of the ruler needed cleaning.

Due to the need for a higher solids concentration, additional decants were required from the 13CP1 and CPCP1 composite samples. Upon dewatering, the 13CP1 thickened composite was relabeled as 13CPD while the thickened CPCP1 sample was labeled as CPCPD.

Once the MAD Group collected and thickened the shored samples to a desirable concentration, OpTech ensured the onshore holding container samples were throughly mixed, performed aliquot withdrawals, double contained the aliquots, and transported them back to the laboratory for testing. A brief overview of these processes follows.

Samples were mixed using an electric 1/4 horse power mixer. Only one mixing blade was used for the 40-gallon composites while 3 mixing blades were used with larger composites. Samples containing up to 40-gallons were mixed for a minimum of 20 minutes while samples exceeding 40-gallons were mixed for a minimum of 30 minutes. Aliquots were gravity drained from the 275-gallon holding containers through a bottom ball valve and 1½-inch transfer hose. Aliquots were taken from 55-gallon drums using a dipper designed by the MAD Group which consisted of a long arm apparatus with a one 1-liter, hinged stainless steel bucket (dipper only used to collect the 13BC5 aliquot).

The first two aliquots taken from 13BC1 and 13BC2 were collected in lined 5-gallon buckets, while all other aliquots were collected in one-liter, high density polyethylene (HDPE) bottles. The one-liter bottles proved more efficient and easier to mix and handle than the bulk samples collected in the 5-gallon buckets. Additionally, moisture content results from randomly selected one-liter bottles from the same composite mix compared well (see Section 4.1.1 for moisture content details), indicating these smaller aliquots were representative of the stock composite.

Once collected, the aliquot bottles were cleaned and placed in a secondary container (usually 5-gallon buckets). The on-site Health Physicist (HP) would ensure the containers were clean and safe for transport to the on-site laboratory located on the south side of pond 3540. Once in the laboratory, the samples were stored behind a lead blanket shield to help reduce background levels for proper exit scans during doffing procedures.

See Appendix B (MAD Groups logbook) and Appendix C (OpTech's field logbook) for additional sample collection and storage details.

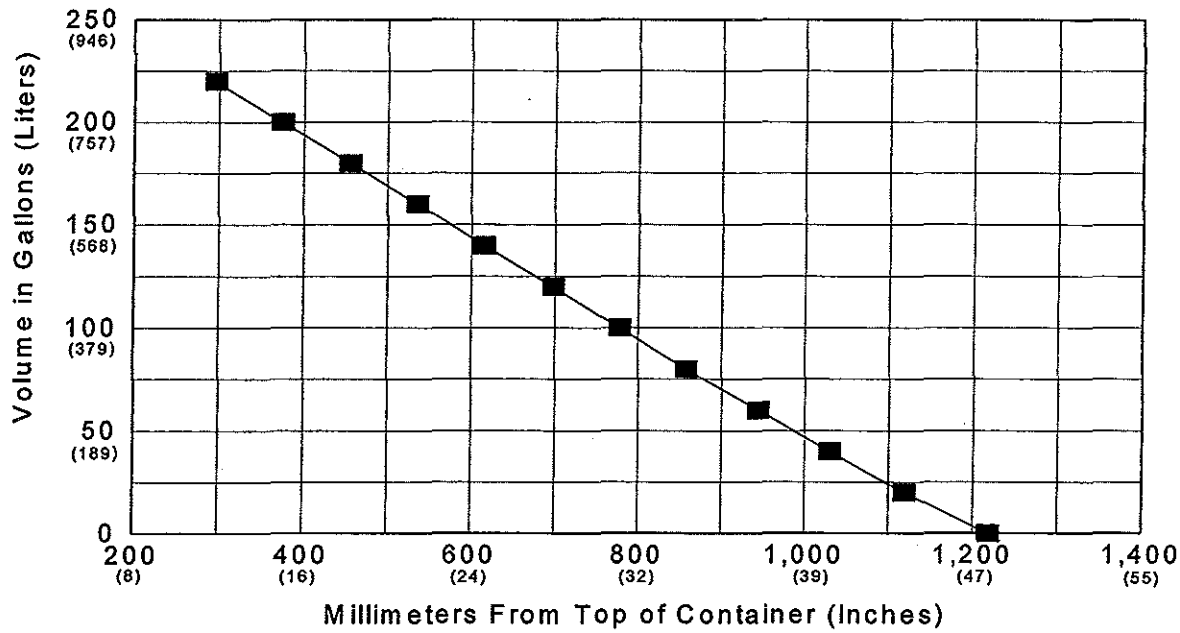

Figure 2-2: Rating curve for 275-gallon storage containers.

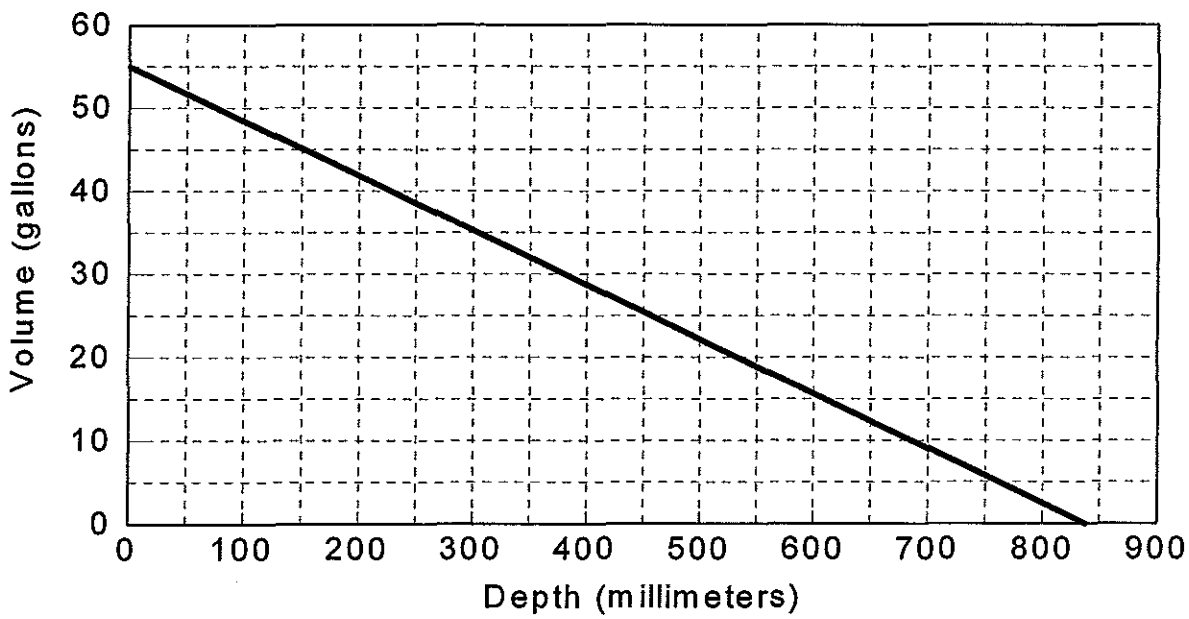

Figure 2-3: Rating curve for 55-gallon drums.

2.3 LABORATORY TESTING SUMMARY

Laboratory testing was conducted in accordance with Alternative 3 as outlined in the ESSW and the FWP for the Technical Work Plan for Surface Impoundments Operable Unit Engineering Support Studies (PRN X1995-0023). Initial uncertainties in the sediment characteristics resulted in a need to modify some of the ordinally selected ESSW tests in order to obtain the desirable results. The Jar Tests with Polymers task as outlined in ESSW-Task 2.2 was eliminated after being considered nonessential based on results from the gravity settling tests. Section 3.0 of this report details any modifications and the Jar Tests deviation.

To help reduce cost, Singleton Laboratories (Singleton) was subcontracted through OpTech to support selected tests which otherwise would have required the purchase of costly equipment. Singleton provided the necessary equipment and support to perform the Particle Size Analysis (ASTM D422), Modified Liquid Release [ESSW-Standard Operation Procedure (SOP) 1], Harvard Miniature Compaction (ESSW-SOP15), One-Dimensional Consolidation (ASTM D2435), and Unconfined Compressive Strength (ASTM D2166) tests. See Section 4.1 for test details and results.

Additional cost reduction was accomplished using LMES laboratory equipment provided from several on-site divisions and through use of an existing LMES laboratory trailer. The laboratory trailer was relocated south of pond 3540, next to an existing power supply. The trailers' existing hood was modified with a High Efficiency Particulate Air (HEPA) filter to meet health and safety requirements.

Aliquots were staged in such a manner to prevent exceeding 24 liters of sample within the laboratory at any one time. If the background was excessive [over 120 counts per minute (cpm)] then background was reduced by temporarily storing some of the samples in 55-gallon drums at the staging area until ready for laboratory use. The 13BC1 and 13BC2 aliquots were initially contained in lined 5-gallon buckets. The 5-gallon buckets were half full, containing approximately 2.5 gallons of sample. Mixing and withdrawal of subsamples from the 5-gallon bucket aliquot proved to be messy so future aliquots were withdrawn in one-liter HDPE bottles. The one-liter bottles were easier to mix and handle than the aliquots in the 5-gallon buckets. Additionally, moisture content results (see Section 4.1.1 for details) from randomly selected bottles compared well, indicating collection of aliquots in several bottles was a valid approach. Subsamples were taken from the aliquots following vigorous mixing for a minimum of 5 minutes for one-liter samples and 10 minutes for the 5-gallon bucket samples.

Subsamples were tested as outlined in the ESSW and corresponding FWP (PRN X1995-0023). Results and testing highlights are detailed in Section 4.0 of this report while modifications or deviations are detailed in Section 3.0. Following testing, the spent sediments and rinse waters were placed in a staging carboy. As previously outlined in the FWP (PRN X1995-0023), the sediments from this carboy were placed back into pond 3513. Wash waters containing detergents or spent fluids with chemical additives were placed in a separate carboy for disposal. Section 2.4 of this report provides waste disposal details.

Demobilization commenced at the conclusion of laboratory testing. Most laboratory equipment on loan had been previously used in radiological areas. During demobilization it was considered feasible to release these equipment items (following HP approval) to the original owner for continued use in radiological areas. Equipment that could not be released was discarded and replaced as outlined in the FWP (PRN X1995-0023) and Section 2.4 of this report.

2.4 WASTE DISPOSAL

Waste generated during this scope of work was handled as outlined in the FWP (PRN X1995-0023). Incineratable waste was separated from non-incineratable waste. The non-incineratable material consisted of equipment which could not be properly decontaminated or could not be cleared for removal by the on-site HP. The incineratable material consisted of items which would be accepted by the on-site Waste Management Group, such as personal protective equipment (PPE) or certain plastics.

Two on-site B-25 boxes were used to store and transport the incineratable waste. The non-incineratable material was placed in a separate on-site B-25 box. The two B-25 boxes with incineratable waste were considered full while the B-25 box with non-incineratable material was classified as half-full at project conclusion. All B-25 boxes were turned over to the Waste Management Division who is responsible for determining if the incineratable waste can be handled by the Scientific Ecology Group for incineration. All non-incineratable wastes will most likely be transported to the on-site Solid Waste Storage Area (SWSA) 6 Tumulus Pad for disposal.

Following laboratory testing, spent sediments were disposed of as outlined in the FWP (PRN X1995-0023). Sediments and rinse waters which did not have chemical additives were placed in one staging carboy, while sediments and rinse waters with chemical additives were placed in a separate carboy. Approximately 23 liters of chemically altered waste were generated during this scope of work and all of this waste was stored in one 50-liter carboy. The carboy containing chemical additives (such as detergents or HCl) was turned over to the Liquid/Gaseous Waste Operations Group for proper disposal. Bricks generated during the solidification process could not be placed in the chemically altered carboy and were, instead, disposed of in the non-incineratable B-25 box (following HP approval).

As outlined in the FWP, the contents of the carboy without chemical additives were placed back into the pond. Including HP and Site Safety and Health Officer (SSHO) oversight, this process was accomplished by carrying the carboy to the staging area and carefully pouring the contents out at the drainage pad and pond water interface. This process was performed each time the carboy was about one-half full (or contained approximately 25 liters). Afterwards and at a safe distance, a water hose was used to flush the sediments from this process further into the pond. This was to help reduce the chance of exposure during low pond water levels, which could potentially uncover these sediments and increase contamination risk.

3.0 MODIFICATIONS/DEVIATIONS FROM WORK PLAN

3.1 OVERVIEW

For the purpose of this report, deviation will imply a change in course as outlined in the ESSW which could effect final laboratory results, while modification will imply a change in a given standard as outlined in the course of the ESSW which does not effect the desired laboratory results. The following table provides a quick summary on any modifications/deviations associated with this task.

Table 3-1: ESSW task modifications or deviations and brief description of rational for such.

TASK or ANALYSIS	TYPE OF CHANGE	RATIONALE
Sample Collection and Storage Task	Modification	Waste stream reduction
Paint Filter Test	Modification	Early drainage results
Particle Size Analysis Test	Modification	To obtain natural results
Jar Test With Polymer Test	Deviation	Natural settling ability sufficient
Bulk Density Test	Modification	Slurry density test for fluid samples
Bulk Density Test	Modification	Concrete density test for solidified samples
Modified Liquid Release	Modification	Less expensive apparatus
Unconfined Compressive Strength Test	Modification	Duplications to ensure valid results: based on entrapped air observations
Chemical Analysis	Deviation	Regulators' need for TCLP results

Some of the above modifications required investigative man hours to locate proper analytical procedures and/or equipment for proper task or analysis selection and implementation. Additionally, some man hours were spent investigating potential modifications which never materialized, such as exotic solidification reagents. All non-implemented potential modifications are not included in this report. A detailed description follows for each implemented modification or deviation summarized in Table 3-1.

3.2 SAMPLE COLLECTION AND STORAGE MODIFICATION

The ESSW called for ten 55-gallon drums to contain each 40-gallon BC sample. Instead, four 275-gallon containers were used to store each 40-gallon BC samples. This was accomplished by collecting two or three 40-gallon BC samples at one time (each in one of the 275-gallon containers), extracting the aliquots for the necessary lab work, and then transferring the material to the corresponding pond composite containers. Once transferred to the pond composite containers, the empty containers were cleaned and the cycle repeated until all BC samples were collected and transferred to the appropriate pond composite containers. Using the 275-gallon containers originally purchased for pond composite containment dramatically reduced the waste stream and was the key factor for implementation of this change.

The ESSW called for two each of 100-gallon containers for each pond composite (total of four containers). Instead, a single 275-gallon container was used for each pond composite (total of two containers). This was feasible due to the waste stream reduction and composite time development.

3.3 PAINT FILTER TEST MODIFICATION

No preliminary test could be used to provide early indications on the drainability of the pond sediments. Early drainability results were necessary to determine if efforts should continue for implementation of a dewatering alternative for remediating the SIOU site. Therefore, the paint filter test was selected to be performed on the initial BC samples in order to provide immediate drainability results. Results and highlights are detailed in Section 4.1.3 of this report.

3.4 PARTICLE SIZE ANALYSIS TEST MODIFICATION

The ASTM D422 particle size analysis standard requires a dispersing agent to be incorporated during the hydrometer part of the test. Research indicates that chemically altered tests can vary dramatically when compared to non-chemically altered results (Clevenger, 1995). Since effective (or naturally induced) particle size results were desirable, all chemically altering procedures were omitted from these tests.

The ASTM D422 standard also requires the hydrometer part of the test to incorporate a water bath or be able to maintain a constant temperature at or near 68 °F. To help minimize waste, a water bath was not purchased. Water temperature readings were taken at each hydrometer reading (all readings ranged between 62 and 69 °F). Any corrections necessary for temperature deviations were incorporated accordingly. Results and test highlights are detailed in Section 4.1.6

3.5 JAR TEST WITH POLYMERS TEST DEVIATION

As outlined in the ESSW, slowly settling sediment solids induced during transfer of pond sediments could increase radiation levels and result in extensive downtimes during construction activities. The original purpose of the jar test with polymers was to investigate potential means to accelerate pond sediment settling rates. However, earlier results from the gravity settling test (or ESSW-SOP3) indicate the pond sediments settle quickly and surface dose rates decrease at a rapid rate. Additionally, extensive discussions from three major distributors[2] indicate excessive dosages of polymer would probably be required to properly work in the concentration range being investigated. This is because polymers are typically used for treatment following initial sedimentation removal processes which reduce suspended concentration levels to those more in the colloid classification range. Because the pond sediments settled well under natural conditions and since excessive (and costly) polymer dosages would most likely be required to properly increase settling characteristics at high concentrations, it became feasible to reduce cost and exposure times by omitting the jar test with polymers.

Historically, soda lime and fly ash were employed to help induce settlement of suspended materials prior to release into White Oak Creek (Inventory of ORNL Remedial Action Sites, ORNL/RAP/LTR-86/14[3]). Spreading of a reagent on the surface of the ponds was a desirable alternative for implementation since this method could be controlled and only implemented if deemed necessary. Polymers were not feasible for surface application treatments because flash mixing must be incorporated to prevent the polymers from reacting with each other and bypassing the suspended material. Since lime appeared to be effective in past treatment applications, a modified jar test was performed using lime. Various concentrations were investigated to determine the effectiveness of sprinkling lime over the surface following one-day settling of the ponds 3513 and 3524 composite mix (COMP1). Test procedure details and results are provided in Section 4.1.10 of this report.

3.6 DENSITY TEST MODIFICATION

The originally selected ASTM D 2937-94 Standard Test Method for Density of Soil in Place by the Drive-Cylinder Method is typically used on firm, in-situ sediments. The sediment samples requiring density results under ESSW-Task 3.1 were in a slurry form and would not conform to the drive cylinder apparatus required under the ASTM D 2937-83 standard. However, the ASTM D 4380-84 (reapproved 1993) Standard Test Method for Density of Bentonitic Slurries was developed for determining the density of slurry mixes similar to those to be tested under Task 3.1. Therefore, ASTM D 4380-84 was used in place of ASTM D 2937-94 to provide a more representative density result under Task 3.1.

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[2]Calgon Corporation (800-955-0090), Nalco Chemical Company (704-541-2230), and Betz Liquid Polymer (215-355-3300).

[3]Section 3. Processed Ponds; To: T.E. Myrick, From: F.G. Taylor; July 15, 1986; p.41.

The originally selected ASTM D 2937-94 density test was not considered applicable for determining solidified sample densities as noted under ESSW-Task 5.2 because the drive cylinder required for this standard was not designed for 'solidified' sample extraction. The ASTM C138 (Concrete Unit Weight) is typically used to determine concrete densities. This standard's apparatus basically consists of a mold of known volume and weight. Weight of concrete required to fill the mold is determined and divided by the known volume, thus generating a concrete density.

The molds used for the unconfined compressive strength tests during this scope of work are uniformly three-inches in diameter. After sample extraction from these molds, the samples were weighed, a vernier caliper used to determine the heights, and sample volumes calculated. A density could then be determined using the same basic concept as the ASTM C138 standard by dividing the calculated volume by the measured weight. Two tests (the unconfined compressive strength and density tests) were performed using this single mold, thus making this process feasible by minimizing laboratory exposure times. Test procedure details and results are provided in Section 4.1.5 of this report.

3.7 MODIFIED LIQUID RELEASE TEST MODIFICATION

Standard Liquid Release Tests (LRT) typically employ an apparatus known as the zero-headspace extractor (ZHE). Except for a few rings and gaskets, the ZHE is comprised of high precision stainless steel parts for contaminant analysis purposes. Therefore, the ZHE is a costly apparatus, but necessary for valid chemical analysis. However, the Modified LRT as outlined in SOP1 of the ESSW focused on liquid release volumes at various pressures, and did not require contaminant analysis. Therefore, a less costly apparatus which exhibits the same features necessary for liquid release analysis could be employed to obtain the required results as outlined in the ESSW-SOP1.

Singleton Laboratories modified an existing apparatus to meet the ESSW-SOP1 requirements. This apparatus was machined from aluminum, had a three-inch core, consisted of a virtually frictionless air pressure feed piston (moved at < 1 psi load), and bottom drained through a fast flow rated filter [160 milliliter per minute (mL/min.)] supported by a porus stone (stone meeting requirements for ASTM D2435) which bled into a tube leading into a volumetric cylinder. At a reduced cost, this apparatus accomplished the same task as the ZHE. Test procedure details and results are provided in Section 4.1.8 of this report.

3.8 UNCONFINED COMPRESSIVE STRENGTH TEST MODIFICATION

Visual observation of various solidified mixes indicated that as the volume of reagents increased, so did the number of voids caused by air entrapment. Excessive air voids could weaken a solidified mass and potentially cause premature failure or nonrepresentative results with additional testing on such. Due to this, it was determined that duplicate unconfined compressive strength (UCS) tests should be performed to help validate results. Test procedure details and results are provided in Section 4.1.12 of this report.

3.9 CONSTITUENT ANALYSIS DEVIATION

Constituent analysis was not included in the original scope of work but was implemented following questions from the regulatory agencies[4] concerning the potential leaching characteristics of the overall composite, or the ponds 3513 and 3524 composite mixture (COMP1). Slurry aliquots taken from the COMP1 mixture and Portland cement/fly ash solidified COMP1 samples at various mixtures were sent through the Analytical Support Office (ASO) to the K-25 lab. These samples were extracted using Toxicity Characteristic Leaching Procedure (TCLP) for compound/analyte analysis. Mercury (Hg) and polycholorinated biphenyl (PCB) totals were determined from the slurry samples while the TCLP leachate procedures were performed on the solidified samples.

The constituent analysis results are provided in Section 4.3.5 of this report while supporting documents are included in Appendix F of this report.

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[4]Regulators of concern included the Tennessee Department of Environmental Conservation (TDEC) and the Environmental Protection Agency (EPA).

4.0 RESULTS

Section 4.0 provides concise results as derived from Appendix A (Laboratory Forms and Supporting Documentation), Appendix B (MAD Group's Logbook), Appendix C (OpTech's Field Logbook), Appendix D (OpTech's Laboratory Logbook), and Appendix E (Singleton's On-site Logbook and Supporting Documents). Any pertinent modifications and deviations as outlined in Section 3.0 of this report are included in this section and referenced accordingly.

Section 4.1 provides results relevant to the SOP and standard test methods as required under Task 3 in the ESSW. Section 4.2 highlights any additional observations that could prove beneficial in the selection and implementation of a remedial alternative. Section 4.3 provides mass balance details from initial collection of base composite (BC) samples to the COMP1 (or ponds 3513 and 3524 composite mixture) development.

4.1 ESSW LABORATORY TEST RESULTS

This section provides concise results relevant to the SOP and standard test methods as outlined in the ESSW and includes pertinent modifications and deviations as described in Section 3.0 of this report. Table 4-1 provides a summary of the test methods performed during this scope of work, the subsections containing results from each analytical method, and a brief description of the data use as outlined in the ESSW. Highlights and/or testing details which require emphasis are discussed in the analytical subsections.

A copy of the raw laboratory control forms is provided in Appendix A of this report. These are copied directly from the original data forms in which each analysis was in a separate bound booklet. These control forms are in the same chronological order as the following subsections with each analysis section separated by a copy of the original title page from its bound booklet. Blank or void pages were not included in this appendix.

4.1.1 Moisture and Solids Content

The water contents were measured in accordance to the ASTM D2216-92 Standard Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock. In accordance to this standard, 100% of the sediment passed a No. 10 sieve so the minimum required mass of 20 grams could be incorporated. The slurry samples were poured into the aluminum tins and placed in a convection oven set at 110 +/- 5 °F. As detailed in the ASTM D2216-92 standard, the sample would be dried overnight and additional weights measured each day following cooling in a desiccator until duplicate dry weight readings were within a 0.1% comparison range. Although this was accomplished, the last reading was sometimes slightly higher than the next to last reading (humidity probable cause). Due to this, the water content results in this section are averaged from the last two calculations taken from the Laboratory Data Forms in Appendix A.

Table 4-1: Summary of sediment characterization analyses performed during this statement of work.

Section: Analysis	Analytical method	Data Types	Data use/interpretation
4.1.1: Moisture and Solids Content	ASTM D2216-80, SOP 2 and SOP 8	Weight ratio of water to total sediment	Data used to determine the amount of water and solids in the sample.
4.1.2: Gravity Settling Tests and Total Suspended Solids	SOP 3 and SOP 4	Settling rates for sediment solids under gravity and corresponding total suspended solids	Data will be used to determine the settling rates of sediment solids suspended because of remedial construction activities in the impoundment.
4.1.3: Paint Filter Test	SW846-9095	Drainable free liquids under gravity	Volume of gravity drainable free liquids and initial sediment settlement due to such liquids removal.
4.1.4: Specific Gravity	ASTM D854	Specific gravity of sediment sample	Used in the calculation of unit weights of sediment at different moisture contents.
4.1.5: Density	ASTM 43890-84 or ASTM C138	Density of sediment sample	Used in determination of weight and volume relationship for sediment samples.
4.1.6: Particle Size Distribution	ASTM D422-63	Percent distribution of sediment solid size	Used to estimate characteristics such as: soil classification, soil-water behavior, solidification, and soil compressibility.
4.1.7: One-dimensional Consolidation Test	ASTM D2345	Consolidation index, consolidation rate at various stress conditions	Data used to estimate the total settlement and the rate of settlement during and after impoundment closure construction.
4.1.8: Modified Liquid Release Test	SW846-1311 (Mod) and SOP 1	Amount of dewatered liquids at various pressures	Estimate the amount of liquids released under surcharge pressure.
4.1.9: Harvard Miniature Compaction Test	SOP 15	Moisture and dry density relationship for a given compactive effort	Estimate the achievable compaction at various sediment moisture contents.
4.1.10: Jar Settling Tests With Lime	SOP 5 (Mod)	Settling rates for sediment solids treated with lime	Same as gravity settling data, except that lime will be used to evaluate/enhance sediment solids settling.
4.1.11: Solidification	SOP 13	Solidification reagent and mix ratio	Used to identify the best suited reagent and mix ration for sediment physical solidification.
4.1.12: Unconfined Compressive Strength	ASTM D2166	Compressive strength	Used in compressive strength evaluation of solidified sediment.
4.1.13: pH	SW846-9045	pH of the sediment samples	To determine the compatibility for flocculation and solidification studies.

References: American Society for Testing and Materials, Vol. 04-08, Soil and Rock, 1994. SW-846, *Test Methods for Evaluation of Solid Wastes, Physical/Chemical Methods*, EPA, 1988.

The water content results determined from ASTM D2216-80 are based on a constant solids percentage of 100. Due to this, the water content results often exceed 100% for slurry specimens. The percent moisture and percent solids, where the sum of both equals 100, is a more useful data set. The percent moisture was determined from the water content as outlined in ESSW-SOP8, while percent solids were calculated in accordance to ESSW-SOP2. Table 4-2 provides these results for slurry stocks and the gravity drained samples.

Table 4-2: Percent moisture and percent solids results for slurry stocks and gravity drained samples.

Sample I.D.	Percent Moisture (%)	Percent Solids (%)
13BC1MC01	88.2	11.8
13BC2MC01	94.2	5.8
13BC3MC01	94.2	5.8
13BC4MC01	85.9	14.1
13BC5MC01	88.1	11.9
13CP1MC01	92.1	7.9
13CP1MC02	92.0	8.0
13CP1MC03	92.0	8.0
13CP1MC04	91.9	8.1
13CP1MC05	92.0	8.0
13CPDMC01	87.6	12.4
24BC1MC01	84.6	15.4
24BC2MC01	87.6	12.4
24BC3MC01	83.8	16.2
24BC4MC01	83.9	16.1
24BC5MC01	82.3	17.7
24CP1MC01	82.9	17.1
24CP1MC02	82.9	17.1
24CP1MC03	83.0	17.0
CPCP1MC01	81.7	18.3
CPCP1MC02	81.7	18.3

Sample I.D.	Percent Moisture (%)	Percent Solids (%)
CPCP1MC03*	74.7	25.3
CPCP1MC04*	75.0	25.0
CPCPDMC01	80.1	19.9
CPCPDMC02	80.1	19.9
CPCPDMC06	80.1	19.9
CPCPDMC07	80.1	19.9
CPCPDMC08	80.2	19.8
CPCPDMC09	80.8	19.2
CPCP1LR01**	67.8	32.2
CPCP1LR02**	66.7	33.3
CPCP1D01**	69.3	30.7
CPCP1D02**	67.9	32.1

* These samples were taken from the drained paint filter sediment.
** These results from gravity drained sample. Note the sample ID corresponds to the test the specimen was used for.
--- Dashed lines separate comparative results taken from the same stock.

As detailed in Sections 2.2 and 2.3 of this report, 5-gallon buckets were originally initiated for aliquot collection but subsamples proved messy so future aliquots were withdrawn in one-liter HDPE bottles. The one-liter bottles were easier to mix and handle than the aliquots in the 5-gallon buckets. Due to the uncertainties associated with split aliquots from the same stock, percent solids results from several randomly selected one-liter bottles from the same stock were compared. The dashed lines in Table 4-2 separate comparative results taken from the same stock. Initial comparisons from 13CP1 varied by less than 3%[5], indicating collection of aliquots in several bottles was a valid approach. The maximum deviation of 4%[5] corresponded to the CPCPD results but only varied by less than 1%[5] if omitting the one result creating the largest variance (CPCPDMC09).

Using the corresponding water content results in Appendix A, the percent moisture and percent solids for solidified samples at various mix ratios and curing times were calculated in accordance to ESSW-SOP2 and 8. All ID's ending with an "A" are from the Phase 1 test while all ID's ending with "B" are from the Phase 2 test as detailed in the ESSW-SOP13. Although ASTM D2216-92 was used to determine the moisture content of these samples, duplicate readings used to determine if the dry weights were within a 0.1% comparison range were not taken on the CPCPDMC01A, CPCPDMC02A, CPCPDMC04A, CPCPDMC05A samples. Duplicate readings were not taken on

[5] Determined by taking the difference between the maximum and minimum value, dividing by average, then multiplying by 100.

these Phase 1 samples, but water contents from the Phase 2 task using identical mix ratios appear to be similar to those in Phase 1. All of the solidification tests were performed on the CPCPD stock (or gravity thickened COMP1 composite) comprising of an initial percent solids content of 19.8% (averaged CPCPDMC01 through CPCPDMC09 percent solids results from Table 4-2).

Table 4-3: Water content, percent moisture, and percent solids results for solidified tests.

Sample I.D.	% Mix	Curing Time (Days)	Moisture Content (%)	Percent Solids (%)
CPCPDMC01A	100	3	30.8	69.3
CPCPDMC02A	50	3	47.9	52.1
CPCPDMC03A	150	3	21.1	78.9
CPCPDMC04A	75	3	38.8	61.2
CPCPDMC05A	30	3	57.1	42.9
CPCPDMC01B	100	1	28.8	71.2
CPCPDMC02B	100	1	33.8	66.2
CPCPDMC03B	75	1	35.6	64.4
CPCPDMC04B	75	1	40.2	59.5
CPCPDMC05B	50	1	49.5	50.5
CPCPDMC06B	50	1	48.7	51.3
CPCPDMC07B	40	1	53.0	47.0
CPCPDMC08B	40	1	52.6	47.4
CPCPDMC09B	100	3	31.1	68.9
CPCPDMC10B	100	3	30.9	69.1
CPCPDMC11B	75	3	37.1	63.0
CPCPDMC12B	75	3	38.1	61.9
CPCPDMC13B	50	3	46.2	53.8
CPCPDMC14B	50	3	46.4	53.6
CPCPDMC15B	40	3	51.6	48.4
CPCPDMC16B	40	3	50.8	49.2
CPCPDMC17B	100	4.84	29.1	70.9

Sample I.D.	% Mix	Curing Time (Days)	Moisture Content (%)	Percent Solids (%)
CPCPDMC18B	75	4.79	37.3	62.7
CPCPDMC19B	50	4.74	46.1	53.9
CPCPDMC20B	40	4.71	52.3	47.7
CPCPDMC21B	100	7	29.2	70.8
CPCPDMC22B1	100	7	28.8	71.3
CPCPDMC22B2	75	7	35.9	64.1
CPCPDMC23B	75	7	35.8	64.3
CPCPDMC24B	50	7	45.7	54.3
CPCPDMC25B	50	7	45.7	54.3
CPCPDMC26B	40	7	50.0	50.1
CPCPDMC27B	40	7	49.6	50.4

4.1.2 Gravity Settling Test and Corresponding Total Suspended Solids

The gravity settling test was conducted in accordance to ESSW-SOP3 and Task 2.1. These tests were performed on each of the 10 initial BC's as outlined in Table 2-1 and on the 3513 pond composite (13CP). Using concentrations calculated from the Water Content Data Forms subsection in Appendix A and using the formula supplied under the ESSW-Task 2.1, calculations were made to determine the necessary amounts from the initial BC stock to develop one-liter test specimens at concentrations of 1,000, 4,000, 8,000, 12,000, 16,000, and 20,000 mg/L. The amount of stock added for each gravity settling test is supplied in the table added within Appendix A, Gravity Settling Test subsection (immediately prior to gravity settling test raw laboratory data forms). The samples were mixed for a minimum of five minutes with an appropriate stirring rod containing a propeller-like blade on the end (designed for one-liter graduated cylinder applications). Samples were then allowed to set undisturbed throughout the testing duration and readings taken at predetermined time intervals provided on the laboratory data forms. Additionally, radiation readings were taken on the fully mixed and settled samples. This information was recorded in the lab log book (Appendix D) and results reported in Section 4.2.2 of this report.

In most cases, a distinguishable interface of clear water column over sediment was not apparent until well into the test and sometimes never was clearly distinguishable. On a typical 13BC sample, this interface would sometimes appear between five and eight minutes while a typical 24BC sample interface sometimes appeared after twenty minutes. However, the southern samples from pond 3513 (13BC4 and 13BC5) and western samples from pond 3524 (24BC1 and 24BC2) never developed this interface during the one-hour test duration. Sediments were highly turbulent throughout the water column except at the bottom, where a turbulent over a non-turbulent interface would appear.

This interface would appear first, prior to the clear water over sediment interface. Both interfaces would eventually "merge" usually prior to 10 minutes of settling, except for the worst cases from the southern pond 3513 and western pond 3524 sediments. It was believed that the turbulent over the non-turbulent interface was a more accurate representation of settled material. Therefore, this interface was selected to be recorded on the appropriate Gravity Settling Test Data Forms in Appendix A (additional notes on page 17 in Appendix D Lab Logbook).

Using ESSW-SOP4, total suspended solids (TSS) were determined on the gravity settling test supernatant following a one-hour settling period. This was accomplished by using either a pipet or siphon hose to decant the supernatant down to a level which was one-inch from the surface of the settled sediment interface. The volume decanted was recorded and the supernatant filtered through a 0.45 μm, Millipore mixed cellulose ester (nitrate + acetate) Hydrophilic membrane filter. Depending upon the concentration, sometimes more than one filter was necessary to filter the material in a timely manner. The number of filters used per TSS test is recorded on the Appendix A, Total Suspended Solids Data Forms. Samples were dried overnight at 110 +/- 5 °F, cooled in a desiccator, and weighed.

Blanks were performed for each TSS testing series to ensure no filter loss was occurring, but the first two series of tests (on 13BC5 and 13BC4) experienced some unexpected losses. It was believed temperature fluctuations and humidity effects caused the scales to fluctuate more than usual (more details under Section 5.1 Sources of Errors). Once the problem was observed, weight readings were taken until triple corresponding readings were obtained to ensure more accurate results (note that all additional blanks did not experience losses once triple readings were required). It was determined that the most accurate TSS result for these first two series would be from totals which included the observed filter loss. For example, a filter loss of 0.04 grams was observed during the 13BC4 series (pages 1 and 2 of Total Suspended Solids Data Forms in Appendix A). Since two filters were used for each 13BC4 TSS test, this loss was doubled and added to each of the final dry weights prior to calculating the concentrations (results at top of corresponding data forms in Appendix A). Results were also calculated neglecting this observed loss but they were much lower in value (results also at top of data forms). To be conservative, TSS results for the 13BC4 and 13BC5 samples which accounted for the observed loss was recorded as the representative test results in this report.

Tables 4-4 through 4-14 provides the initial stock location, gravity settling test results at various concentrations and time intervals, and TSS results taken following the one-hour gravity settling test period. Due to slow filtering times experienced with some of the samples, some of the supernatant decants were performed in excess of the one-hour settling period but never exceeded 2.33 hours of settling. The TSS results which exceeded a one-hour settling period were noted as such at the bottom of the corresponding table. Note that some settling readings exceed the one-hour criteria. These readings were taken on samples which were prestaged and ready for testing but were in the queue in excess of one hour. When this occurred, additional settlement readings were recorded. It is interesting that settling times in excess of a day induced an increase in the total settled solids at lower concentrations while a significant decrease was observed at higher concentrations. The increase was caused by settled fines which were still in the water column following the one-hour testing period. The higher concentration range was most likely due to the overburdened pressures compacting and forcing the waters to expel out from the underlying material, while the lower concentrations may not have had enough mass to effect underlying materials.

Table 4-4: Gravity settling test results from northwest area of pond 3513.

SAMPLE I.D.:13BC1ST02 LAB DATA FORM #:000005

Time (min.)	Milliliters of Settled Material					
	1,000 mg/L Solution	4,000 mg/L Solution	8,000 mg/L Solution	12,000 mg/L Solution	16,000 mg/L Solution	20,000 mg/L Solution
0	0	0	0	0	0	0
1	0	0	10	15	25	30
2	0	10	50	65	70	80
3	0	25	80	120	140	120
4	0	30	100	190	180	200
5	0	33	100	190	320	280
6	0	34	95	190	300	430
7	0	35	90	175	285	390
8	0	36	90	170	270	365
9	0	36	90	160	255	350
10	0	37	85	155	240	330
15	2	37	80	140	215	280
20	2	37	75	130	195	260
25	5	33	70	120	180	240
30	5	33	70	120	175	230
40	5	33	65	110	160	210
50	6	32	60	105	150	200
60	6	32	60	100	145	180
900	10	30	55	80	100	120
TSS* (mg/L)	N\A**	N\A	N\A	N\A	N\A	N\A

*TSS = Total Suspended Solids results following a 60 minute settling period.
**N\A = Not available.

Table 4-5: Gravity settling test results from northeast area of pond 3513.

SAMPLE I.D.:13BC2ST01 LAB DATA FORM #:000002

Elapsed Time (min.)	Milliliters of Settled Material					
	1,000 mg/L Solution	4,000 mg/L Solution	8,000 mg/L Solution	12,000 mg/L Solution	16,000 mg/L Solution	20,000 mg/L Solution
0	0	0	0	0	0	0
1	0	2	20	30	50	60
2	1	20	60	90	100	120
3	2	40	80	130	160	210
4	2	55	150	180	220	370
5	2	65	200	250	570	715
6	3	60	210	380	540	670
7	3	60	190	350	500	640
8	3	58	180	330	470	610
9	3	57	170	310	450	585
10	3	55	160	290	425	560
15	3	50	140	245	350	470
20	5	47	130	220	315	415
25	5	45	120	205	290	382
30	6	43	113	190	270	360
40	8	42	105	180	250	330
50	9	41	100	170	230	305
60	9	40	95	160	220	290
900	20	42	75	108	130	158
8400	20	41	70	96	120	141
TSS* (mg\L)	N\A**	N\A	N\A	N\A	N\A	N\A

*TSS = Total Suspended Solids results following a 60 minute settling period.
**N\A = Not available.

Table 4-6: Gravity settling test results from center area of pond 3513.

SAMPLE I.D.: 13BC3ST01 LAB DATA FORM #:000007

Time (min.)	Milliliters of Settled Material					
	1,000 mg/L Solution	4,000 mg/L Solution	8,000 mg/L Solution	12,000 mg/L Solution	16,000 mg/L Solution	20,000 mg/L Solution
0	0	0	0	0	0	0
1	0	30	30	40	50	0
2	0	40	40	50	60	80
3	1	50	60	70	120	180
4	1	60	70	100	160	220
5	1	90	90	160	200	280
6	2	100	140	200	250	350
7	2	150	150	270	300	440
8	3	160	200	300	350	580
9	3	140	250	350	480	690
10	4	140	300	400	580	880
15	10	115	290	470	665	825
20	10	100	240	405	605	770
25	11	91	211	352	550	720
30	11	85	198	322	500	675
40	11	75	175	285	423	585
50	14	70	160	261	380	510
60	14	68	150	250	350	465
900	20	52	90	128	162	200
TSS* (mg/L)	[1] 86.0	67.4	N\A**	41.7	N\A	57.7

*TSS =Total Suspended Solids results following a 60 minute settling period.
**N\A = Not available.
[1] First filter was placed under the hood in a heavy draft while second filter was being used in filtration. This may have caused loss of sample since forced air dried sample prematurely.

Table 4-7: Gravity settling test results from southwest area of pond 3513.

SAMPLE I.D.: 13BC4ST01 LAB DATA FORM #:000008

Time (min.)	Milliliters of Settled Material					
	1,000 mg/L Solution	4,000 mg/L Solution	8,000 mg/L Solution	12,000 mg/L Solution	16,000 mg/L Solution	20,000 mg/L Solution
0	0	0	0	0	0	0
1	0	0	20	30	25	30
2	1	10	30	40	40	50
3	1	20	50	60	90	110
4	2	30	70	80	100	110
5	2	45	90	100	110	110
6	2	60	110	140	120	150
7	2	80	130	180	150	170
8	2	70	150	190	170	210
9	2	70	160	220	190	260
10	3	70	190	250	250	340
15	3	60	140	265	380	500
20	3	55	120	212	322	435
25	4	50	110	190	270	380
30	5	47	100	172	240	332
40	5	43	90	152	212	285
50	6	40	80	140	195	255
60	7	40	78	130	180	240
1320	8	33	53	72	95	115
4080	7	32	51	72	92	112
TSS* (mg/L)	198	180	~188	197	160	153

*TSS = Total Suspended Solids results taken back to back starting at 1-hour settling for 1K concentration to more than 2-hours for 20K.

Table 4-8: Gravity settling test results from southeast area of pond 3513.

SAMPLE I.D.: 13BC5ST01 LAB BOOK DATA #:000006

Time (min.)	Milliliters of Settled Material					
	1,000 mg/L Solution	4,000 mg/L Solution	8,000 mg/L Solution	12,000 mg/L Solution	16,000 mg/L Solution	20,000 mg/L Solution
0	0	0	0	0	0	0
1	10	10	8	30	4	4
2	5	10	50	60	70	70
3	7	21	70	100	110	110
4	7	33	110	150	160	150
5	6	50	130	200	200	200
6	4	57	160	220	230	250
7	2	59	180	250	270	300
8	2	58	162	300	330	410
9	2	56	151	288	422	575
10	2	53	142	268	403	549
15	5	50	120	212	321	460
20	8	45	110	190	280	390
25	8	43	100	174	255	350
30	8	42	95	160	240	322
40	8	40	85	149	212	290
50	8	40	80	138	195	265
60	9	40	80	130	187	250
TSS* (mg/L)	139.8	144.4	N\A**	170.7	N\A	121.6

*TSS =Total Suspended Solids results following a 60 minute settling period.

**N\A = Not available.

Table 4-9: Gravity settling test results from pond 3513 composite sample.

SAMPLE I.D.: 13CP1ST01 LAB DATA FORM #:000014

Time (min.)	Millimeters of Settled Material					
	1,000 mg/L Solution	4,000 mg/L Solution	8,000 mg/L Solution	12,000 mg/L Solution	16,000 mg/L Solution	20,000 mg/L Solution
0	0	0	0	0	0	0
1	0	0	2	2	10	15
2	0	5	10	30	40	60
3	0	10	30	50	60	80
4	0	30	50	80	90	100
5	1	40	80	110	120	140
6	1	50	100	150	150	160
7	1	60	150	180	170	200
8	2	68	170	210	210	280
9	2	70	200	250	250	300
10	2	70	210	340	350	380
15	3	60	160	290	405	560
20	5	55	142	240	345	490
25	5	50	130	220	305	430
30	7	50	120	205	282	390
40	10	45	110	192	255	350
50	10	42	100	170	235	320
60	10	40	93	157	220	300
1140	16	39	64	90	115	142
TSS* (mg/L)	141.3	177.8	131.7	126.9	125.4	138.5

*TSS =Total Suspended Solids results following a 60 minute settling period.

Table 4-10: Gravity settling test results from southwest area of pond 3524.

SAMPLE I.D.: 24BC1ST01 LAB DATA FORM #:000010

Time (min.)	Milliliters of Settled Material					
	1,000 mg/L Solution	4,000 mg/L Solution	8,000 mg/L Solution	12,000 mg/L Solution	16,000 mg/L Solution	20,000 mg/L Solution
0	0	0	0	0	0	0
1	0	0	5	20	20	0
2	0	10	30	40	60	60
3	0	20	50	70	90	110
4	0	25	90	120	120	160
5	1	30	110	155	160	180
6	1	30	100	175	200	230
7	1	30	95	185	210	390
8	2	30	90	170	280	365
9	2	30	85	160	260	340
10	2	30	80	153	240	322
15	2	25	72	130	199	261
20	2	25	66	118	179	235
25	2	24	61	108	168	217
30	2	24	59	102	157	201
40	2	24	58	97	144	185
50	2	24	56	90	135	N/A**
60	2	24	55	88	130	162
4320	6	28	48	68	83	100
TSS* (mg/L)	108.7	225.2	240.0	294.1	315.2	314.5

*TSS = Total Suspended Solids results at 1 hour settling for 1K and 4K, at 1 hour 20 minutes settling for 8K, at 1 hour 50 minutes settling for 12K, 2 hour settling for 16K, at 2 hour 40 minutes for 20K.

**N\A = Not available.

Table 4-11: Gravity settling test results from northwest area of pond 3524.

SAMPLE I.D.: 24BC2ST01 LAB DATA FORM #:000011

Time (min.)	Millimeters of Settled Material					
	1,000 mg/L Solution	4,000 mg/L Solution	8,000 mg/L Solution	12,000 mg/L Solution	16,000 mg/L Solution	20,000 mg/L Solution
0	0	0	0	0	0	0
1	0	10	20	30	40	40
2	0	25	40	70	100	110
3	1	40	110	160	150	160
4	1	40	110	200	240	220
5	1	40	103	180	260	360
6	1	40	95	165	235	320
7	2	38	90	155	220	290
8	2	38	88	150	210	275
9	2	37	83	140	200	262
10	3	37	80	138	190	252
15	5	34	70	120	165	220
20	6	32	68	110	150	200
25	6	32	68	110	150	200
30	8	30	60	100	135	177
40	8	30	60	90	128	162
50	8	31	58	85	120	152
60	8	31	58	85	115	148
1500	10	31	52	71	90	110
TSS* (mg/L)	86.5	143.2	248.9	253.2	315.2	308.5

*TSS =Total Suspended Solids results following a 60 minute settling period.

Table 4-12: Gravity settling test results from center of pond 3524.

SAMPLE I.D.: 24BC3ST01 LAB DATA FORM #:000009

Time (min.)	Milliliters of Settled Material					
	1,000 mg/L Solution	4,000 mg/L Solution	8,000 mg/L Solution	12,000 mg/L Solution	16,000 mg/L Solution	20,000 mg/L Solution
0	0	0	0	0	00	0
1	0	0	0	8	30	20
2	0	0	10	20	40	50
3	0	10	30	30	50	70
4	0	20	50	60	80	100
5	0	25	60	80	100	140
6	2	30	80	100	120	150
7	2	40	100	130	170	180
8	2	50	120	160	210	210
9	2	58	150	230	220	230
10	2	63	170	260	230	250
15	3	60	160	275	380	535
20	5	52	130	210	310	450
25	5	50	120	185	265	390
30	5	45	110	170	235	335
40	5	42	100	150	208	280
50	6	40	90	140	190	240
60	6	40	82	130	180	228
TSS* (mg/L)	118.9	110.9	91.7	71.6	76.9	41.4

*TSS = Total Suspended Solids results at 1 hour settling for 1K and 4K, at 1 hour 10 minutes settling for 8K, at 1 hour 40 minutes settling for 12K, 1 hour 50 minutes settling for 16K, at 2 hour 20 minutes for 20K.

Table 4-13: Gravity settling test results from southeast area of pond 3524.

SAMPLE I.D.: 24BC4ST01 LAB DATA FORM #:000012

Time (min.)	Millimeters of Settled Material					
	1,000 mg/L Solution	4,000 mg/L Solution	8,000 mg/L Solution	12,000 mg/L Solution	16,000 mg/L Solution	20,000 mg/L Solution
0	0	0	0	0	0	0
1	0	0	2	2	10	5
2	1	2	4	5	20	20
3	1	3	8	10	40	50
4	1	3	10	15	70	80
5	1	5	20	15	70	80
6	1	5	20	20	100	110
7	2	7	30	40	100	120
8	2	10	50	70	100	120
9	2	15	50	80	110	120
10	2	18	60	100	120	120
15	4	28	70	130	150	180
20	5	30	110	220	250	280
25	5	30	100	190	300	410
30	5	30	93	165	255	345
40	8	30	82	140	205	280
50	10	30	75	130	185	245
60	10	30	70	120	170	220
1440	12	30	55	70	92	110
TSS* (mg/L)	151.4	177.8	127.9	107.9	166.5	122.4

*TSS =Total Suspended Solids results following a 60 minute settling period.

Table 4-14: Gravity settling test results from northeast area of pond 3524.

SAMPLE I.D.: 24BC5ST01 LAB DATA FORM #:000013

Time (min.)	Millimeters of Settled Material					
	1,000 mg/L Solution	4,000 mg/L Solution	8,000 mg/L Solution	12,000 mg/L Solution	16,000 mg/L Solution	20,000 mg/L Solution
0	0	0	0	0	0	0
1	0	0	0	10	0	20
2	0	0	20	30	10	20
3	0	10	20	40	20	30
4	0	10	20	40	30	40
5	1	10	25	40	30	50
6	1	10	25	45	50	60
7	1	15	40	50	50	60
8	1	20	45	70	70	80
9	1	20	50	80	80	100
10	1	25	60	90	100	140
15	1	28	90	200	160	220
20	3	28	80	150	230	330
25	3	28	75	130	195	280
30	3	28	70	122	175	250
40	3	25	60	110	155	210
50	4	25	60	100	140	190
60	4	25	55	90	130	180
350	5	29	46	62	83	111
4320	6	30	45	60	80	92
TSS* (mg/L)	161.8	207.7	217.1	186.5	148.1	171.1

*TSS =Total Suspended Solids results following a 60 minute settling period.

Figure 4-1 represents the TSS results at the various concentrations for supernatant withdrawals falling between a 60 to 70 minute settling period. Overall it appears that the supernatant concentrations for one-hour settling cases will most likely fall below 350 mg/L. This plot also indicates that the supernatant concentration is not dependent upon the range of initial concentrations investigated, except for the 24BC2 region. This may be due to excessive vegetative material associated with sample extraction from shallow western sediments in pond 3524 (see last paragraph in Section 4.2.1 Physical Characteristics for more details). Through visual observations, it appears the supernatant decreases substantially following one day settling because all experienced drinking water clarity except for western samples from pond 3524 and southern samples from pond 3513. However, even these samples developed a visually clear supernatant following an additional day or two of settling.

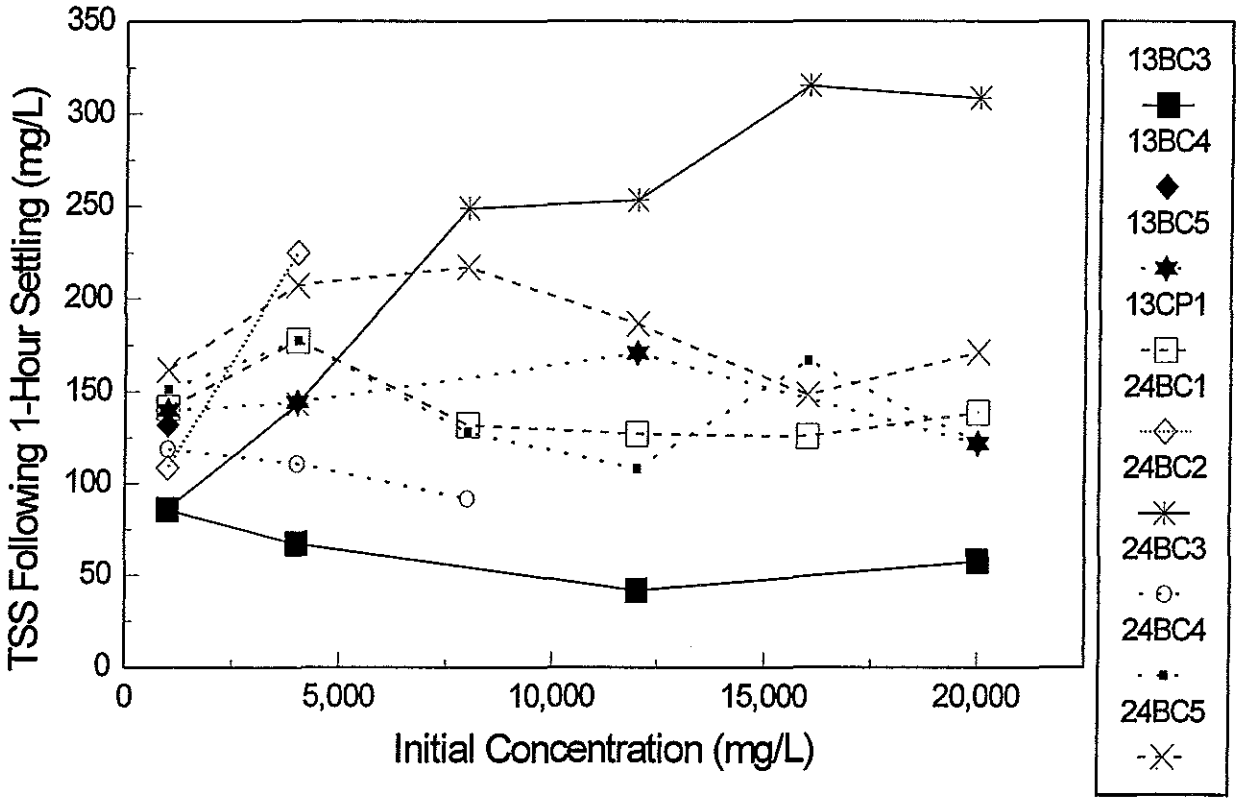

Figure 4-1: Plot of Total Suspended Solids (TSS) results from Gravity Settling Tests for extractions taken between 60 to 70 minutes of non-disturbed settling.

Additional details on gravity settling tests, TSS, and visual turbidity data can be obtained from Appendix A, Gravity Settling Test Laboratory Data Forms and Total Suspended Sediments Laboratory Data Forms subsections, and from Appendix D: OpTech's Laboratory Logbook.

4.1.3 Paint Filter

The EPA SW-846 Method 9095, or paint filter test, was implemented to determine the presence of free liquids. To determined the drainability of these free liquids, the testing period was extended as outlined in the ESSW. The testing period was considered to be the time necessary to reduce the rate of release to one drop every two minutes. The key values of interest were the total drainage time, released liquid volume during this drainage time, and moisture content reduction.

As detailed in the procedures on page B-69 of the ESSW, the filtering media sometimes separates from the filter cone, especially when exposed to alkaline materials. Due to the nature of these sediments, this failure occurred on several occasions prior to meeting the one drop every two minutes rate of release requirement. Some of these tests were rerun until the release rate requirement was meet. Results from paint filter tests failing prior to the one drop every two minutes release rate requirement was not included in Table 4-15. However, the laboratory control forms with intermittent results prior to failure are included in the Paint Filter Test Data Forms subsection of Appendix A in this report.

Table 4-15: Paint filter testing and analysis results.

Sample I.D.	Testing Duration (minutes)	Initial Sample Weight (g)	Liquid Released (mL)	Initial Moisture Content (%)	Final Moisture Content (%)	Final Solids Content (%)
13BC3EP01	111	99.04	69.0	94.2	80.9	19.1
13BC4EP01	137	99.93	36.0	85.9	78.0	22.0
13BC5EP01	81	98.81	32.0	88.1	82.4	17.6
24BC2EP01	188	99.95	41.9	87.6	78.6	21.4
24BC4EP02	171	100.32	34.0	83.9	75.6	24.4
CPCP1EP04	160	99.37	24.0	81.7	74.7	25.3
CPCP1EP05	170	100.45	25.0	81.7	75.0	25.0

The sample I.D., testing duration, initial sample weights, and cumulative liquid released were taken from the Paint Filter Test Data Forms subsection in Appendix A. The initial sample weight used in the above table was determined by taking the sample weight from the Paint Filter Test Data Form and subtracting the weight of the material left in the transfer container following placement into the paint filter. The initial moisture contents were taken from Table 4-2 for each corresponding stock sample used in the above table. The final moisture contents are measured values for the CPCP1EP04 and CPCP1EP05 tests above while all other final moisture contents are back calculated. Back calculations were performed by using the following formula:

$$MCf = 100* [(MCi*Wi)-L]/[(Wi*(1-MCi))+((MCi*Wi)-L)]$$

Where:
MCf = percent final moisture content
MCi = initial moisture content
Wi = initial sample weight (g)
L = weight of released liquid (g)[6]

When using the above formula for back calculating the final moisture content for CPCP1EP04 and CPCP1EP05, the results are 75.9 and 75.6%. These back calculations vary by less than 1.6% when compared to the corresponding measured final moisture contents of 74.7 and 75.0% as reported in Table 4-15. The difference is most likely associated with the lost moisture associated with evaporation and absorption of the paint filter cone. However, these loses are small, indicating final moisture content back calculations are relatively precise.

Final sediments from the paint filter tests visually appeared to be thoroughly saturated, so it may be safe to assume that the amount of moisture released is proportional to the volume reduction associated with gravity drainage. Samples which had a higher initial moisture content would have the potential to release more fluids and, thus, experience a higher volume reduction. This can be seen from Table 4-15 where the sample with the highest initial moisture content of 94.2% drained approximately 69 milliliters (mL) of fluid while the sample with the lowest initial moisture content of 81.7% drained only 25 mL of fluid. This indicates the 13BC3EP01 test experienced close to 70% (assuming 69 mL is proportional to 69 grams released from the initial 99.04 gram base sample) volume reduction while the CPCP1EP05 test only showed a 25% reduction.

The CPCP1 paint filter tests were performed from the COMP1 stock prior to gravity thickening. However, the CPCP1 average initial moisture content of 81.7% only dropped by 1.5% when compared to the average gravity thickened (CPCPD) moisture content of 80.2% (average of corresponding stock results in Table 4-2). This indicates that the volume reduction of 25% calculated for the CPCP1 samples above may be a good estimate on the volume reduction which could be achieved through gravity drainage following gravity thickening of the pond sediments.

Although initial concentrations varied significantly between the samples used in the above paint filter test, one would expect the final percent solids to be similar if the sediments throughout the ponds were fairly uniform in composition. The gravity settling tests illustrated that some regions vary slightly from others, indicating the sediments are not necessarily uniform throughout the ponds. Even though, the final percent solids in Table 4-15 only differ by 7.7% (maximum value of 25.3 less minimum value of 17.6%), a variance of approximately 35% if divided by the percent solids average of 22.1% (average of all values in Table 4-15). Regardless of the region and initial moisture contents, the sediments appear to be able to gravity drain to a 17% or higher solids content.

Paint filter test comparisons with the ESSW-Task 4.2 gravity drained specimen is provided in Section 5.2 of this report.

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[6]Following the initial release, filtrate was close to drinking water clarity. If a density of 1 g/cm^3 is assumed, the liquid volume released is basically proportional to the grams of fluid released. So for the purpose of final moisture content determination, the liquid released values in the Table 4-15 are assumed to be proportional to the grams released.

4.1.4 Specific Gravity

As outlined in the ESSW, ASTM D854-92 Standard Test Method for Specific Gravity of soils was used to determine the specific gravity of the pond 3513 composite and of the pond 3524 composite. Because 100% of the material passed a 2.00 mm (#10) sieve, only 20 grams of material was required for this test. The pycnometer was calibrated for the temperature range used during this test by performing linear regression analysis on measured masses at various temperatures, as outlined in ASTM D854-92. The calibration formula was as follows:

$$M@T = 695.18 - 0.1409992*C$$

Where: M@T = the mass in grams of pycnometer and water at desirable temperature C,
C = the desirable temperature in Celsius.

The above formula was used to obtain the mass of the pycnometer and water for the same temperature recorded during mass determination of the pycnometer, water, and soil (details in ASTM D854-92). Prior to adding the specimen to the pycnometer, the sample was broken up by using a mortar and pestle. The sample was allowed to soak overnight prior to air entrapment removal. Test Method A (for dried specimens) and entrapped air removal by boiling the specimen in a pycnometer as outlined in the ASTM D854-92 standard was implemented. Results are provided in Table 4-16 while the raw data forms are located in the Specific Gravity subsection of Appendix A.

Table 4-16: Specific gravity test results.

Sample I.D.	Specific Gravity Results
13CP1SG01	2.44
13CP1SG02	2.41
24CP1SG01	2.25
24CP1SG02	2.43
24CP1SG03	2.43

Because 24CP1SG01 and 24CP1SG02 varied by approximately 8%, a third specific gravity test was performed from the pond 3524 stock (24CP1SG03). This result compared to the 24CP1SG02 result, indicating a minor error could have occurred during the 24CP1SG01 test. Above results indicate pond 3513 has a specific gravity of approximately 2.43 (average of 2.44 and 2.41) while pond 3524 specific gravity is 2.43 if neglecting the 24CP1SG01 result.

4.1.5 Densities

As outlined in Section 3.6 of this report, the originally selected ASTM D2937-94 Standard Test Method for Density of Soil in Place by the Drive-Cylinder Method is typically used on firm, in-situ sediments. The sediment samples requiring density results under ESSW-Task 3.1 were in a slurry form and would not conform to the drive cylinder apparatus required under the ASTM D2937-83 standard. Therefore, the ASTM D4380-84 (reapproved 1993) Standard Test Method for Density of Bentonitic Slurries was selected for determining the density of slurry mixes similar to those to be tested under ESSW-Task 3.1. Table 4-17 provides the slurry density results. Readings were taken directly from a mud balance apparatus meeting the ASTM D4380-84 requirements.

Table 4-17: Slurry Density Results.

Sample I.D.	Slurry Density (g/cm^3)
13CP1DS01	1.04
13CP1DS02	1.04
24CP1DS01	1.11
24CP1DS02	1.11
CPCPDDS01	1.125
CPCPDDS02	1.12

Also as outlined in Section 3.6, the originally selected ASTM D2937-94 bulk density test was not considered practicable for determining solidified sample densities required under ESSW-Task 5.2 because the drive cylinder required for this standard was not designed for 'solidified' sample extraction. The ASTM C138 (Concrete Unit Weight) is typically used to determine concrete densities. This standards' apparatus basically consists of a mold of known volume and weight. Weight of concrete required to fill the mold is determined and divided by the known volume, thus generating a concrete density.

Molds used for the unconfined compressive strength tests during this scope of work were uniformly three inches in diameter. The sample was extracted from these molds, weighed, a vernier caliper used to determine the diameters and heights, and volumes calculated. The density could then be determined using the same basic concept as the ASTM C138 standard by dividing the calculated volume by the measured weight. Two tests (the unconfined compressive strength and density tests) were performed using this single mold, thus making this process feasible by minimizing laboratory exposure times.

Because the solidified samples were capped upon pouring into the molds and not allowed to dry, these samples were classified as wet solidified samples. Accordingly, density calculations from these samples were labeled as the solidified wet density. Moisture contents were determined as outlined in Section 4.1.1 of this report for each of the wet solidified samples used for density determination. The solidified dry density could then be determined by deducting the mass of moisture from the solidified wet density sample [or in other words, dry density = wet density - (moisture content × wet density)]. Solidified wet and dry density results are provided in Table 4-18.

Table 4-18: Solidified wet and dry density results at various mixes and curing times.

Sample I.D.	Cure Time (days)	% of Mix[7]	Moisture Content (%)	Solidified Wet Density (g/cm^3)	Solidified Dry Density (g/cm^3)
CPCPDDS03	3	100	31.1	1.54	1.06
CPCPDDS04	3	100	30.9	1.55	1.07
CPCPDDS05	3	75	38.1	1.49	0.93
CPCPDDS06	3	75	37.1	1.48	0.93
CPCPDDS07	3	50	46.4	1.38	0.74
CPCPDDS08	3	50	46.2	1.39	0.75
CPCPDDS09	3	40	50.8	1.34	0.66
CPCPDDS10	3	40	51.6	1.35	0.65
CPCPDDS11	7	100	28.8	1.55	1.10
CPCPDDS12	7	100	29.2	1.56	1.10
CPCPDDS13	7	75	35.8	1.49	0.96
CPCPDDS14	7	75	35.9	1.46	0.94
CPCPDDS15	7	50	45.7	1.40	0.76
CPCPDDS16	7	50	45.7	1.39	0.75
CPCPDDS17	7	40	50.1	1.33	0.67
CPCPDDS18	7	40	50.4	1.34	0.67

[7] A 50/50 blend of Portland cement/fly ash was used as the reagent. Percent of mix of reagent was determined on a wet weight basis of CPCPD (or gravity thickened COMP1 stock).

4.1.6 Particle Size Distribution

The particle size distribution for the 3513 pond composite and 3524 pond composite was determined through implementation of ASTM D422-63 Standard Test Method for Particle-Size Analysis of Soils. As outlined in Section 3.4 in this report, the dispersant agent was not incorporated during the hydrometer part of the test because research indicates that chemically altered test can vary dramatically when compared to non-chemically altered results (Clevenger, 1995). Since effective (or naturally induced) particle size results were desirable, all chemically altering procedures were omitted from these tests. Also outlined in Section 3.4, a water-bath used to maintain a constant temperature was not implemented but temperature readings were taken at each hydrometer reading and mathematical corrections incorporated accordingly. Table 4-19 provides the particle size fractions as determined from the particle size distribution results. Figure 4-2 provides the particle size distribution curve results for pond 3513 and for pond 3524. Results indicate pond 3513 and pond 3524 composites yield comparative particle size distributions.

Table 4-19: Particle Size Fraction Results.

SAMPLE I.D.	GRAVEL (%)	SAND (%)	SILT (%)	CLAY (%)
13CP1PS01	0	6	86	8
13CP1PS02	0	6	83	11
24CP1PS01	0	6	90	4
24CP1PS02	0	7	90	3

4.1.7 One-dimensional Consolidation

The one-dimensional consolidation test was performed in accordance to ASTM D2435-90. As outlined in ESSW-Alternative 3 and SOP13, the one-dimensional consolidation test was performed on the gravity thickened COMP1 sediments and on a solidified sample. Details on development of the gravity drained sample is provided in Section 4.2.4 of this report. A three day cured, 50% mix of Portland cement/fly ash (on a wet basis) was developed by allowing the sample cure in the consolidation trimming ring. Samples were extracted from the gravity drained sample using a shelby tube shortened to approximately one-foot, the sample was taken to the lab and extruded, and a one-inch thick sample cut and trimmed to meet the ASTM D2435-90 requirements. All specimens were placed in the fixed ring consolidometer containing a porous disks on each face of the sample. Gradual loads were applied and deformation recorded over time as outlined in ASTM D2435-90.

The point in time corresponding to each applied load, the time consolidation curve, and void ratio-effective stress curves for the gravity thickened samples are provided in Figures 4-3 and 4-4 while Figure 4-5 provides these results for the solidified 50% Portland cement/fly ash mix. The

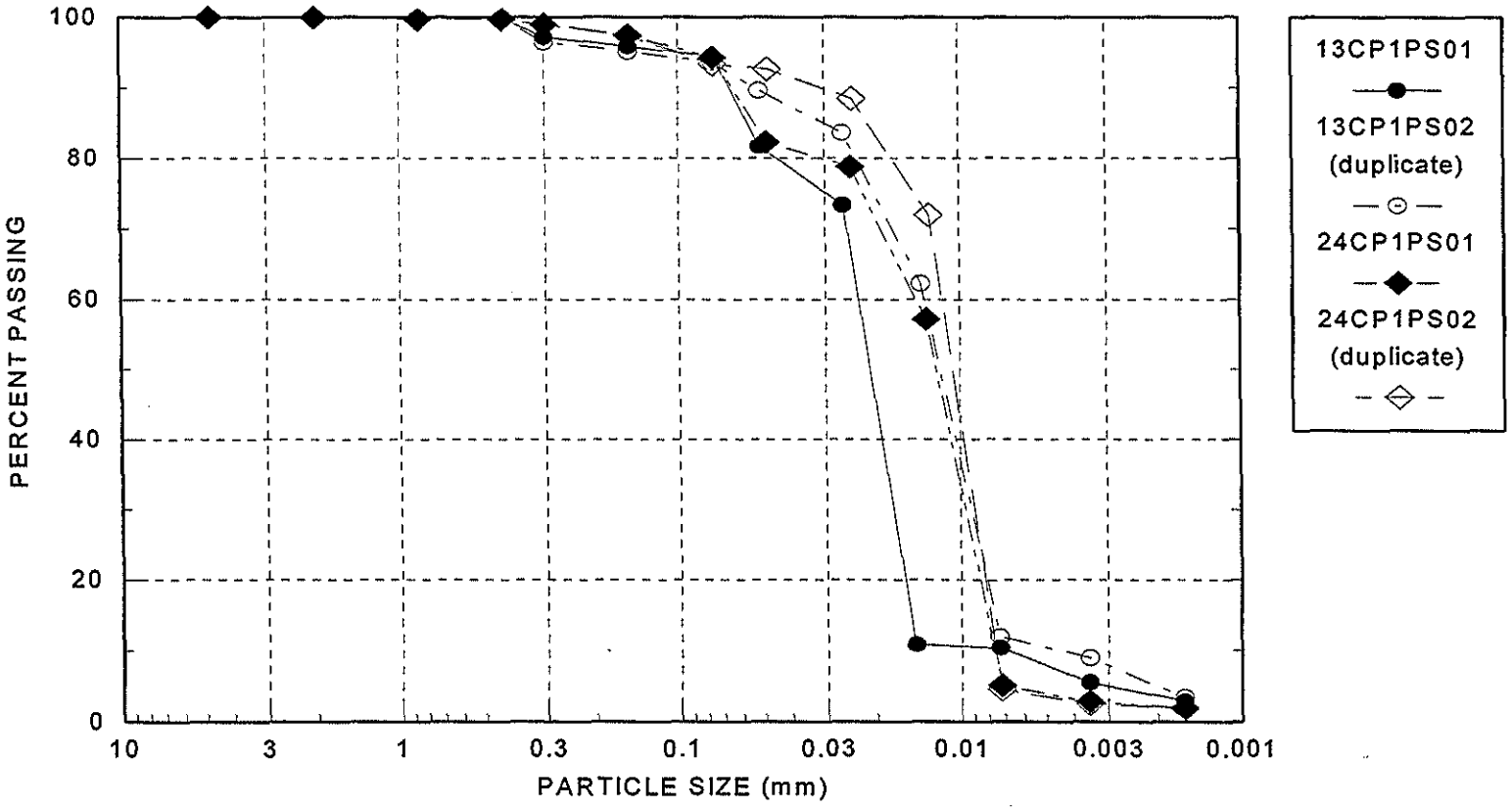

Figure 4-2: Particle size distribution curves for ponds 3513 and 3524.

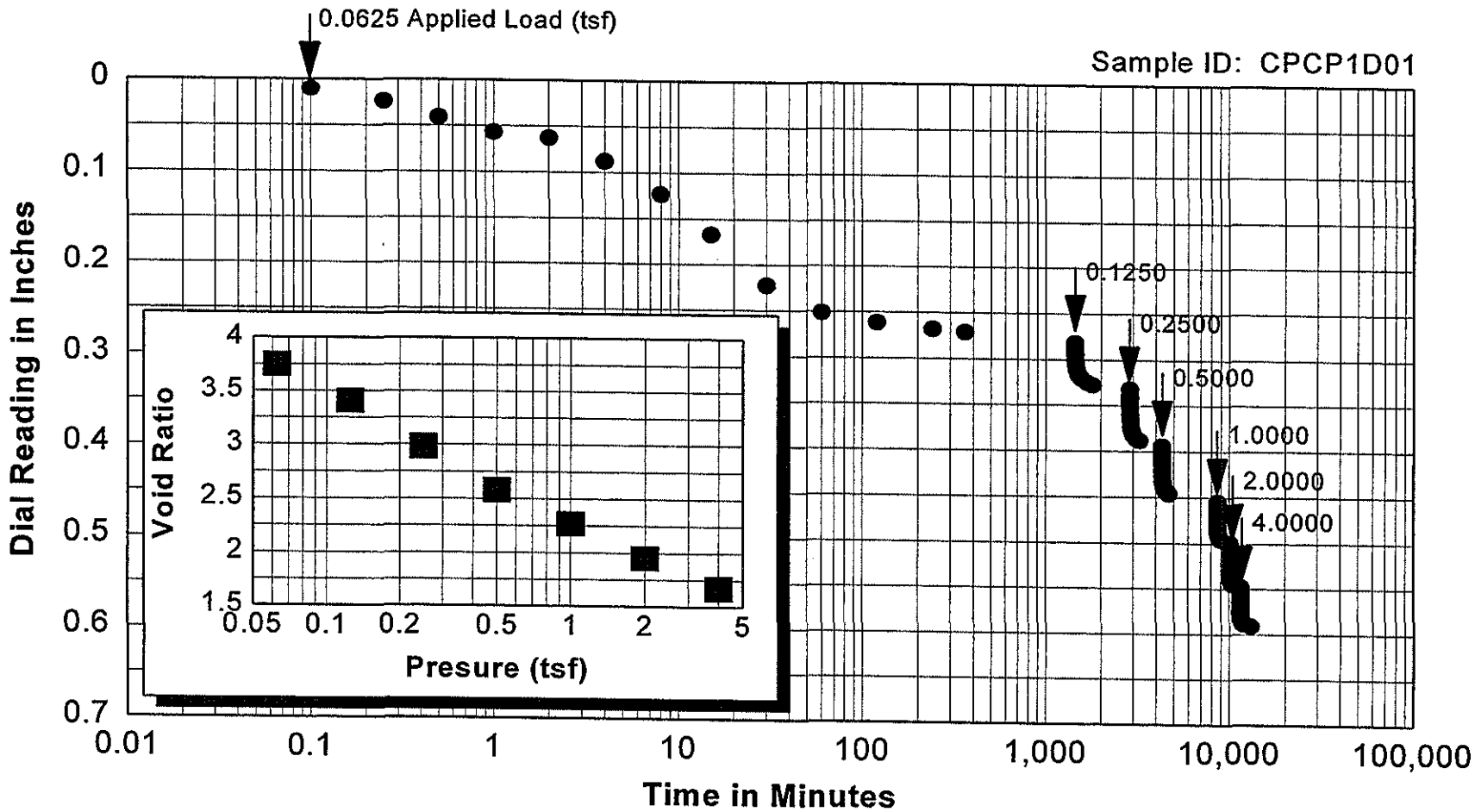

Figure 4-3: Time consolidation curve for various applied loads and void ratio-pressure curve for first gravity drained sample.

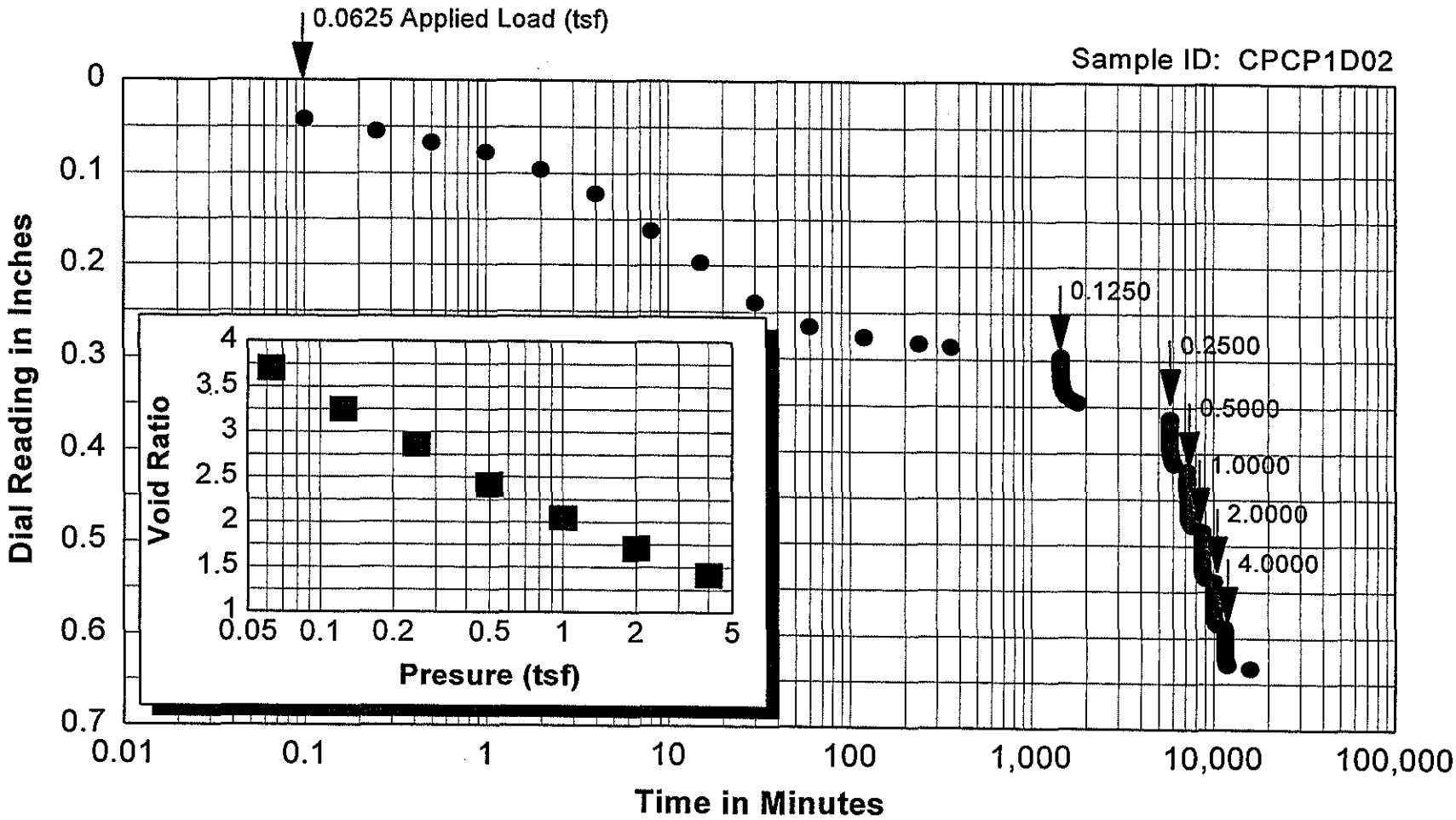

Figure 4-4: Time consolidation curve for various applied loads and void ratio-pressure curve for second (or duplicate) gravity drained sample.

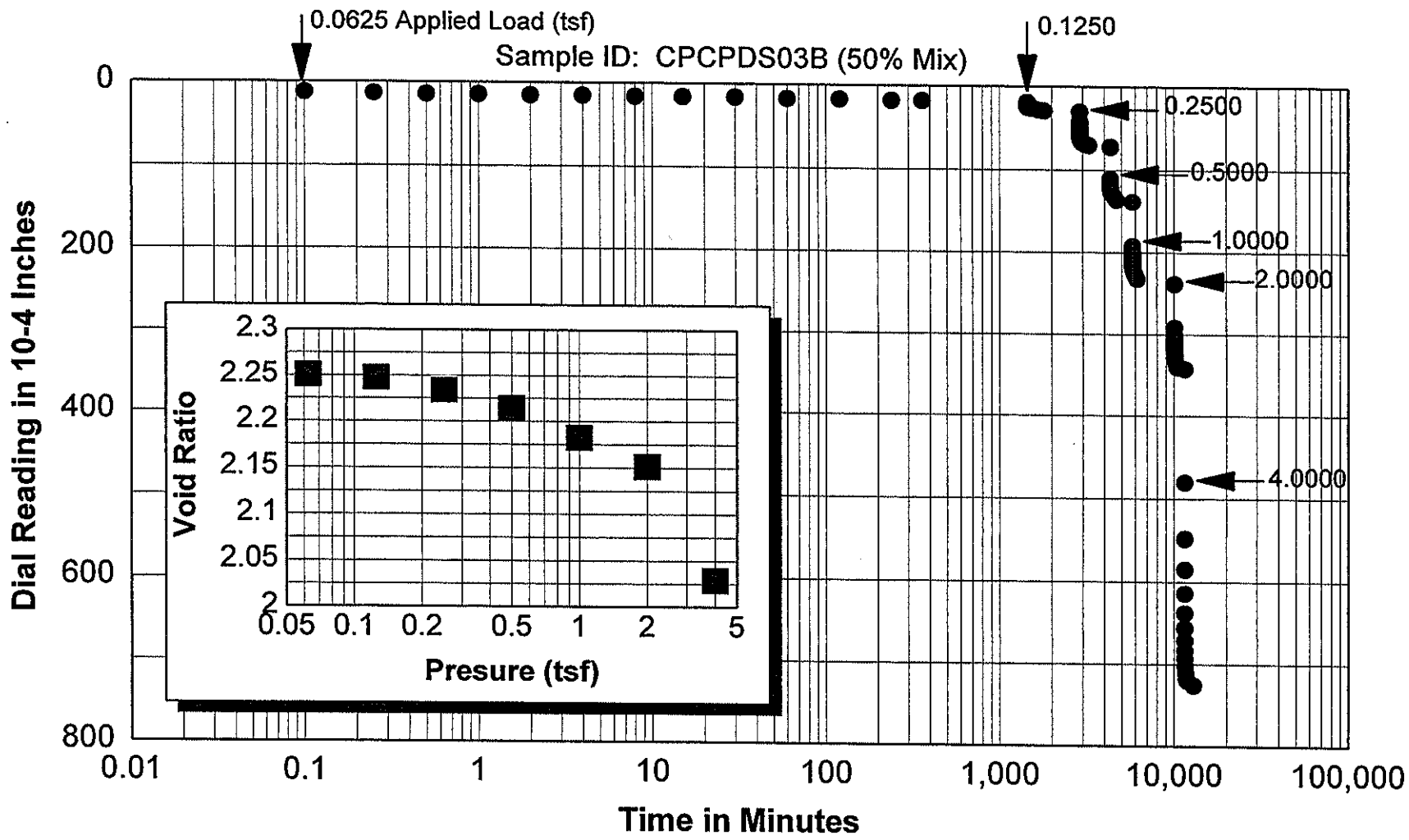

Figure 4-5: Time consolidation curve for various applied loads and void ratio-pressure curve for 50% Portland cement/fly ash mix (on wet weight basis).

duplicate (or Figure 4-4) gravity drained consolidation results appears equivalent to the original (or Figure 4-3) plots. As illustrated in Figures 4-3 and 4-4, the original one-inch thick sample consolidated approximately 6/10 of an inch (or 60%) for the gravity drained samples at loads up to 4 tsf (56 psi) while approximately 50% of this compaction occurred under the 1 tsf (14 psi) load. As illustrated in Figure 4-5, less than 1/10 of an inch (or less than 10%) consolidation occurred with the solidified specimen loaded up to 4 tsf (56 psi). The percent strain (consolidation) versus vertical effective stress for the gravity thickened samples are illustrated in Figure 4-6 while Figure 4-7 provides these results for the solidified sample.

Due to the excessive consolidation associated with these samples, various interpretations can be made on where the primary consolidation ends and the secondary consolidation begins (see ASTM D2435-90 for types of analysis). The coefficient of consolidation will vary based on design criteria and method used for determining the primary consolidation. Additionally, the stress versus strain curve for the gravity drained samples does not adhere to standard curves necessary for the Casagrande method, preconsolidation pressure determination (ASTM D2435-90). However, the one-dimensional consolidation test was originally selected to determine how much consolidation could occur if a consolidation cell was selected as the remedial alternative. The following figures could be a useful tool in providing consolidation estimates for various loadings or overburdened pressures[8].

For the gravity drained samples, Figures 4-3 and 4-4 illustrates the original one-inch specimen settled almost 0.3 inches (or 30%) under the 0.0625 tsf (0.87 psi) load. Approximate percent settlement for a 10 psi (0.7200 tsf) load could be estimated to fall between 45 and 50% (or between the 0.5000 and 1.000 tsf load results). As illustrated in Figures 4-3 and 4-4, 59 to 64% consolidation resulted following the maximum applied load of 4.0000 tsf (55.56 psi).

As illustrated in Figure 4-5, the Portland cement/fly ash solidified one-inch specimen settled less than 0.01 inch, or consolidated less than 1%, under the 0.0625 tsf (0.87 psi) load. Approximate percent settlement for a 10 psi (0.7200 tsf) load could be estimated to fall between the 0.5000 and 1.000 tsf load results, or below 0.03 inches (which is less than 3% settlement). As illustrated in Figure 4-5, less than 8% consolidation resulted following the maximum applied load of 4.0000 tsf (55.56 psi).

The raw data is provided in the Appendix A: One-Dimensional Consolidation Laboratory Data Forms subsection while intermediate results can be obtained from corresponding sections in Appendix E: Singleton On-site Logbook and Supporting Documentation.

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[8]If using a conservative soil density of 120 pounds per cubic foot (pcf), then a 1 psi overburden load is equivalent to 1.2 feet of soil, 10 psi is equivalent to 12.0 feet of soil, and 56 psi is equivalent to 67.2 feet of soil.

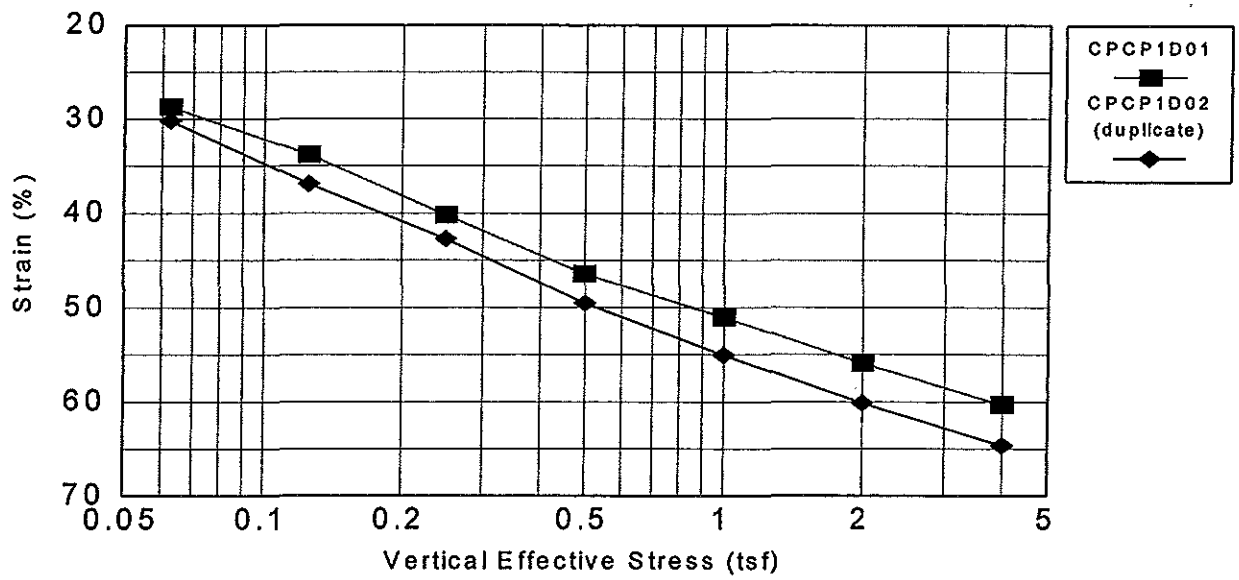


Figure 4-6: Vertical effective stress versus percent strain curve for the one-dimensional consolidation tests performed on the gravity drained samples.

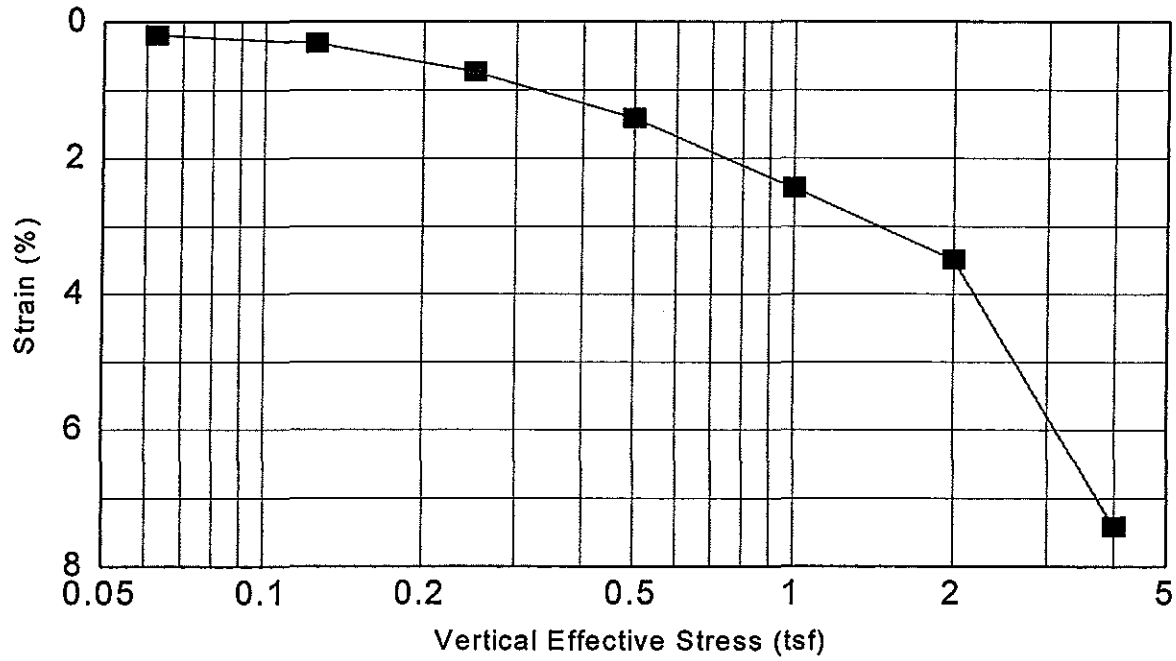


Figure 4-7: Vertical effective stress versus percent strain curve for the one-dimensional consolidation tests performed on the 50% Portland cement/fly ash sample.

4.1.8 Modified Liquid Release

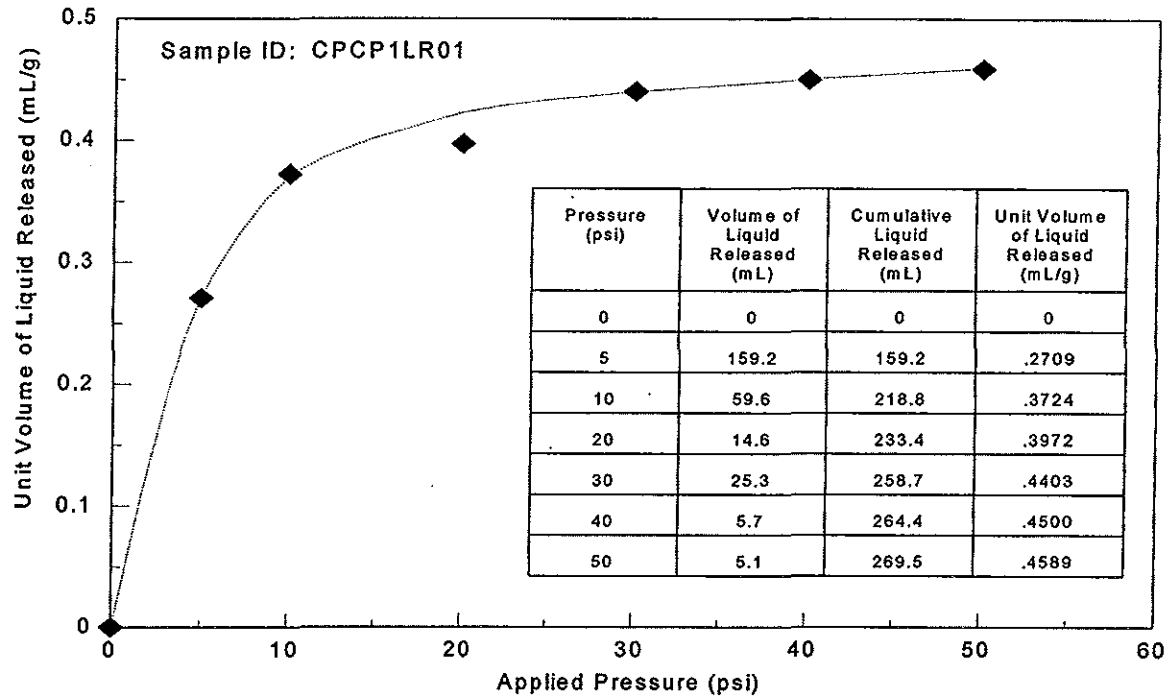
The modified liquid release test (LRT) was performed in accordance to ESSW-SOP1. The zero headspace extractor (ZHE) typically used for this test consist of a stainless steel apparatus for proper contaminant analysis. As detailed in Section 3.7 of this report, no contaminant analysis was scheduled for this test under this scope of work. Therefore, the ZHE was substituted with a less costly aluminum apparatus. This apparatus consisted of a virtually frictionless air pressure feed three inch piston (moved at < 1 psi load) with a chamber approximately five inches in height. The sample was placed in the chamber and bottom drained through a fast flow rated (160 mL/min.) filter supported by a porus stone (stone meeting requirements for ASTM D2435) which bled into a tube leading into a volumetric cylinder.

Two tests were performed on the gravity drained COMP1 sample. Details on development of the gravity drained samples is provided in Section 4.2.4 of this report. Subsamples were extracted from the gravity drained sample using a shelby tube shortened to approximately one-foot. After the sample was extracted, a section was cut from this aliquot and placed in the modified LRT apparatus. Gradual air pressures were applied as outlined in ESSW-SOP1. Each pressure was held constant until the rate of release was under one drop in two minutes. During the initial part of the tests, the specimen was left overnight to accomplish this goal. When left overnight, no drips were observed the following morning and the next pressure increment was applied.

The first test specimen, or CPCP1LR01, initially weighed 587.6 grams with an initial moisture content of 67.8%. At test completion, the total volume of fluid released was 269.5 mL and the final moisture content was 40.3%. If saturated conditions are assumed with the final sediment cake, then the volume reduction is estimated at 45.8% (mass of volume released divided by original sample weight) for the total applied pressure of 50 psi. Approximately 37.2% reduction occurred under a 10 psi force. Incremental releases at the various applied pressures and unit volume releases for CPCP1LR01 are provided in Figure 4-8.

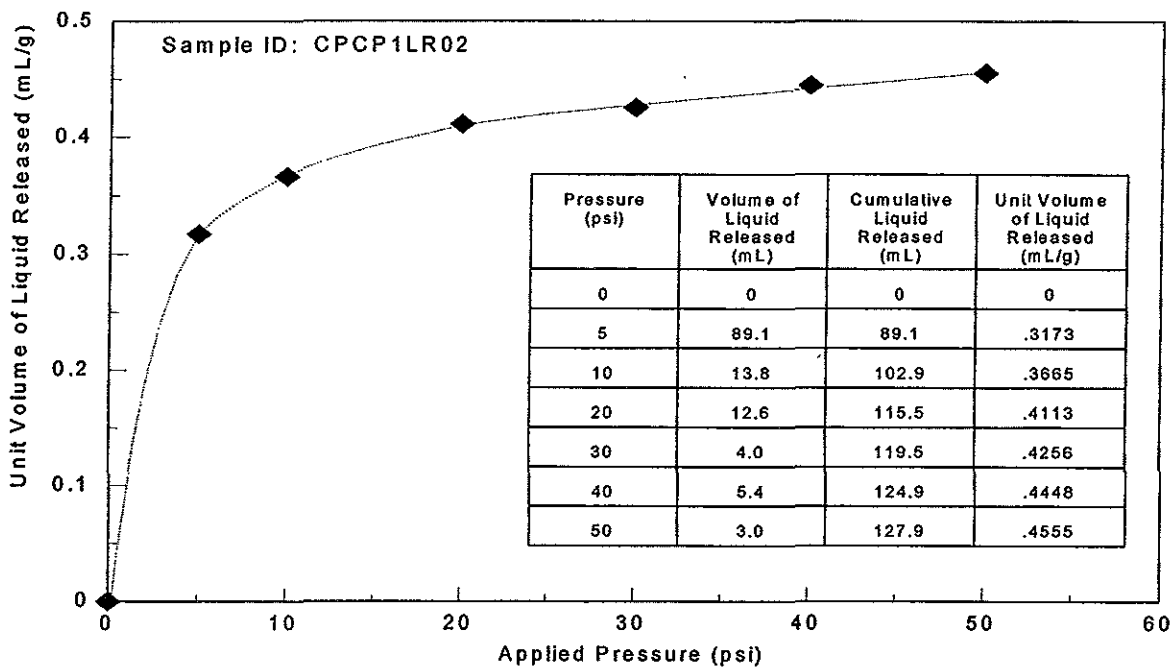
Similarly, the second (or duplicate) test specimen (CPCP1LR02) initially weighed 280.9 grams with an initial moisture content of 66.7%. At test completion, the total volume of fluid released was 127.9 mL and the final moisture content was 39.1%. If saturated conditions are assumed with the final sediment cake, then the volume reduction is estimated at 45.5% (mass of volume released divided by original sample weight) for the total applied pressure of 50 psi. Approximately 36.6% reduction occurred under a 10 psi force. Incremental releases at the various applied pressures and unit volume releases for CPCP1LR02 are provided in Figure 4-9.

Additional modified liquid release details may be obtained from the Modified Liquid Release Test Data Forms subsection in Appendix A and from Appendix E: Singleton On-site Logbook and Supporting Documentation.



Pressure (psi)	Volume of Liquid Released (mL)	Cumulative Liquid Released (mL)	Unit Volume of Liquid Released (mL/g)
0	0	0	0
5	159.2	159.2	.2709
10	59.6	218.8	.3724
20	14.6	233.4	.3972
30	25.3	258.7	.4403
40	5.7	264.4	.4500
50	5.1	269.5	.4589

Figure 4-8: First modified liquid release results for the COMP1 gravity drained sample.



Pressure (psi)	Volume of Liquid Released (mL)	Cumulative Liquid Released (mL)	Unit Volume of Liquid Released (mL/g)
0	0	0	0
5	89.1	89.1	.3173
10	13.8	102.9	.3665
20	12.6	115.5	.4113
30	4.0	119.5	.4256
40	5.4	124.9	.4448
50	3.0	127.9	.4555

Figure 4-9: Second (or duplicate) modified liquid release results for the COMP1 gravity drained sample.

4.1.9 Harvard Miniature Compaction

The Harvard miniature compaction test was performed as outlined in the ESSW-SOP15. The sample was prepped by first gravity draining the COMP1 sample (additional details in Section 4.2.4 of this report) and placing it under the laboratory hood for further drying. The additional drying was necessary to ensure a sufficient moisture content range was achieved for proper analysis. The drying sample was periodically mixed to help prevent excessive drying of exposed surfaces and to help ensure uniformity. Once dried to approximately a 40 percent moisture content value, the sample was divided into separate splits and moisture added at increasing increments to develop subsamples at various moisture contents. The subsamples were well mixed, allowed to set in sealed bags overnight, and remixed the next day prior to compaction.

As outlined in ESSW-SOP15, each subsample was compacted in a standard mold in five-layer increments with each layer containing approximately two heaping teaspoons of material. The compacted, precalibrated mold was striked and weighted for density determination. Two Harvard miniature compaction test were performed on the COMP1 composite and results of each are illustrated in Figures 4-10 and 4-11. The duplicate (Figure 4-11) was comparable to the original (Figure 4-10) result with both yielding an average optimum moisture content of 48.3% and maximum dry density of 67.7 pcf.

4.1.10 Jar Test

One remedial alternative involves consolidation of all SIOU pond sediments into a single unit. Once disturbed, it was believed the pond sediments might require extensive settling times and the increase in suspended material might cause exposure hazards -- possibly causing project delays. Originally, the jar test with polymers were to help determine if chemical additives could help increase the settling rates of sediments. As outlined in Section 3.5, the jar test with polymers was omitted because earlier tests indicated the pond sediments settle well under natural conditions. However, spreading of a reagent on the surface of the ponds was a desirable alternative for inducing settlement since this method could be controlled and only implemented if deemed necessary. Historically, soda lime and fly ash has been employed to help induce settlement of suspended material while polymers could not be effectively applied using this approach. (see Section 3.5 for additional details). Due to this, a jar test with lime was implemented to determine if additional material could be settled by sprinkling lime over the surface.

The jar test with lime was performed by adding the COMP1 stock to one-liter graduated cylinders and allowing to set overnight. The stock was diluted to obtain a settled sediment volume which was approximate 1/4 of the total volume. Except for the control, lime was added at increments ranging from 0.1 to 3.0 grams. The lime was sprinkled over a 7.07 in.^{2} surface area and allowed a reaction time of 30 minutes prior to supernatant withdrawal used for TSS comparison. Results are provided in Table 4-20.

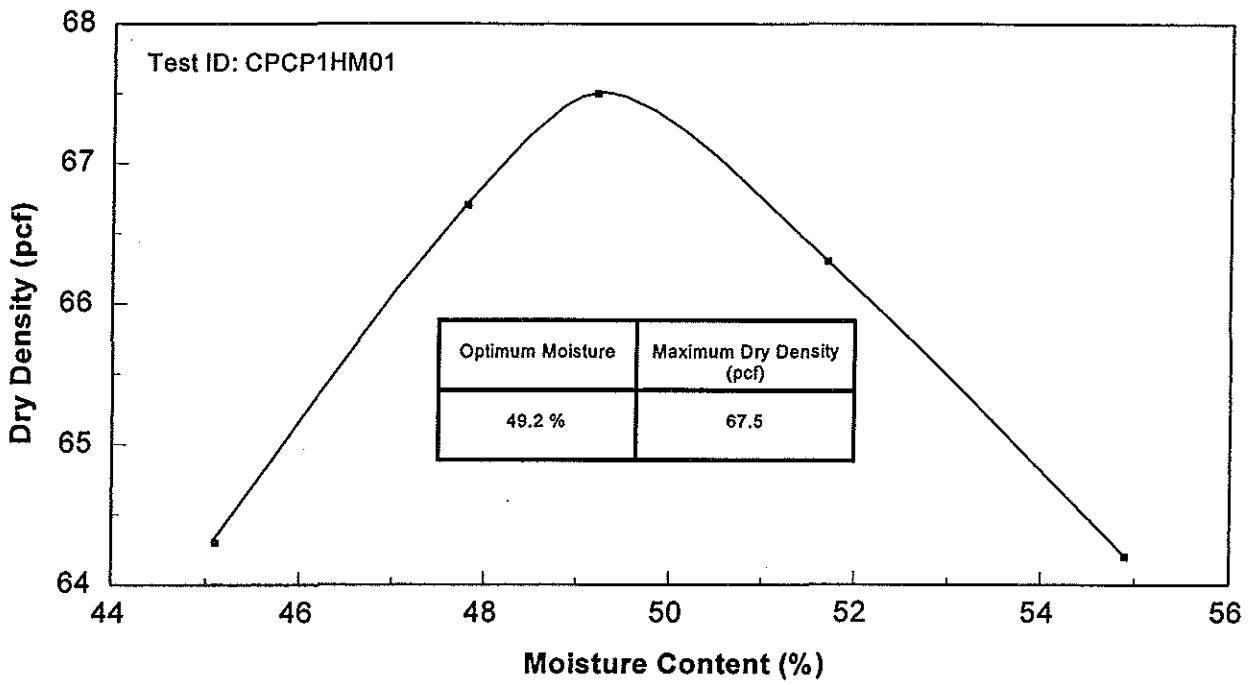


Figure 4-10: First Harvard miniature compaction test result for the COMP1 composite.

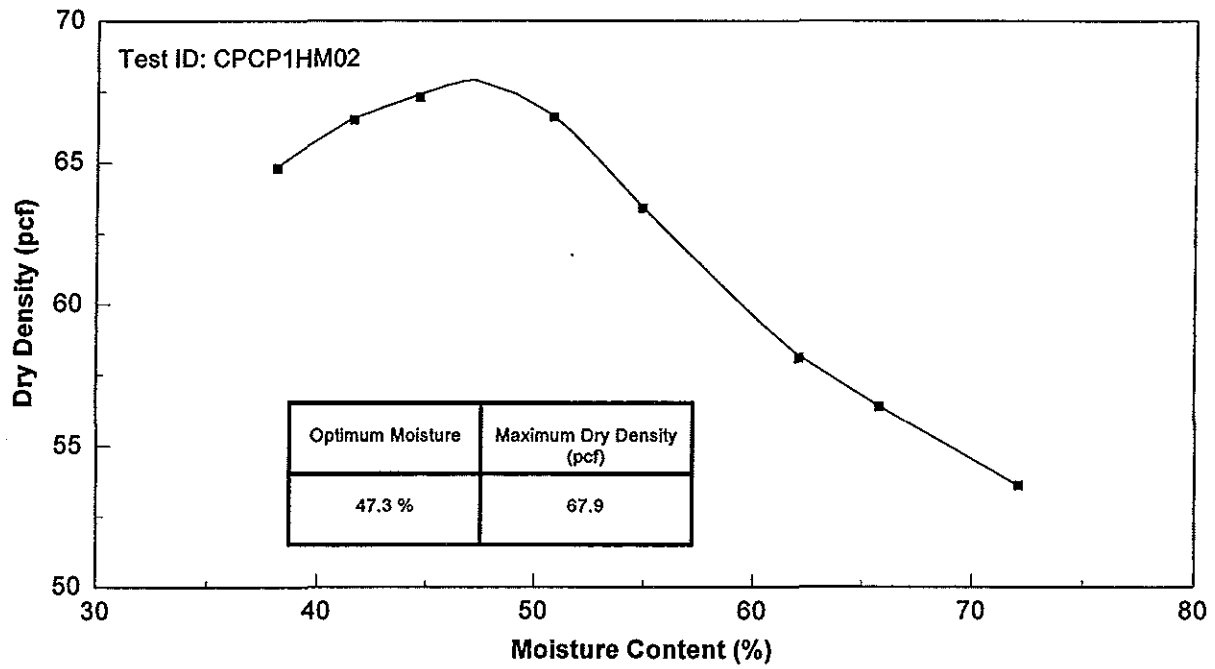


Figure 4-11: Second (or duplicate) Harvard miniature compaction test result for the COMP1 composite.

Table 4-20: Treatment results using a lime additive.

Sample I.D.	Amount of Lime Added (g)	Volume* Prior to Lime (mL)	Volume** After Lime (mL)	Supernatant pH	Total Suspended Solids (mg/L)
control	0	282	N/A***	7.5	30.8
1	0.1	270	270	9.0	78.1
2	0.2	270	270	9.0	N/A
3	0.5	272	272	9.5	111.1
4	1.0	280	280	9.5	206.3
5	3.0	267	290	10.0	109.4

*Sediment volume following a one day settling time.
**Settling volume following 30 minutes from lime additive.
***N/A = not available.

Through visual observations, it appeared the 3.0 gram lime additive sample developed the clearest supernatant but as the results in Table 4-20 indicate, the control sample had the minimum. Based on the above results alone, lime may not be very practicable if applied following a one-day settling period.

4.1.11 Solidification

Solidification tests were performed following the ESSW-SOP13 specifications. The three mixes of reagents selected for testing were: 96% sand plus 4% bentonite; 50% Portland cement plus 50% fly ash; and 25% lime plus 75% sand. The sediment slurry used during these test was from the gravity thickened COMP1 sample (or CPCPD stock), developed in accordance to the ESSW-Tasks 3.2 and 4.3. Phase 1 of SOP13 was initially recommended to be performed on one batch of samples using each of the three reagents at various mixes. However, preliminary results indicated a percent mix on a dry weight basis (formula in part 3 of Phase 1) contained too much water to properly set, resulting in samples with no strength gains. The ESSW-SOP13, Phase 1 task was repeated but this time using mixes based on wet weights rather than dry weights. The formula replacing the original Phase 1, part 3 formula is as follows:

$$\text{Weight of reagent required, } K = X \times Y' \text{ grams}$$

Where: X = Wet weight of thickened sediment, and
Y'= Solidification mix ratio expressed as a percent value of wet sediment solids.

Significant strength gains was observed in several of the Portland cement/fly ash mixes but the lime/sand and bentonite/sand mixes did not experience any strength gains. Based on the Phase 1

results, the Portland cement/fly ash reagent at a 40, 50, 75, and 100% mix was selected for Phase 2 testing. Table 4-21 provides the pocket penetrometer results for the Phase 1 and Phase 2 tests. The percent mixes used in this table were based on the above formula and not the original formula in ESSW-SOP13, Phase 1, part 3. Additionally, the results from the initial Phase 1 tests which were based on the formula under part 3 are not included since no strength gains were observed and because these initial tests were considered failures. The sample ID's ending with "A" in Table 4-21 indicate the sample is from the Phase 1 task while ID's ending with "B" are from Phase 2. The penetrometer readings are the averages from two checks. Penetrometer readings of >4.5 indicate the strength exceeded the maximum penetrometer reading of 4.5 tons per square foot (tsf)[9].

Table 4-21: Pocket penetrometer results for various reagents, mixes and cure times.

Sample I.D.	% Mix	Composition	Penetrometer Reading (tsf[9]) for following cures			
			@ 1 days	@ 3 days	@ 5 days	@ 7 days
CPCPDS03A	50	50% Portland Cement, 50% fly ash	0.7	3.6	N/A*	N/A
CPCPDS03A	100	50% Portland Cement, 50% fly ash	>4.5	>4.5	N/A	N/A
CPCPDS03A	150	50% Portland Cement, 50% fly ash	>4.5	>4.5	N/A	N/A
CPCPDS03A	30	50% Portland Cement, 50% fly ash	0	0.4	N/A	N/A
CPCPDS03A	75	50% Portland Cement, 50% fly ash	3.4	>4.5	N/A	N/A
CPCPDS04A	30	96% Sand, 4% Bentonite	0	N/C**	N/A	N/A
CPCPDS04A	60	96% Sand, 4% Bentonite	0	N/C	N/A	N/A
CPCPDS04A	100	96% Sand, 4% Bentonite	0	0	N/A	N/A
CPCPDS04A	130	96% Sand, 4% Bentonite	0	0	N/A	N/A
CPCPDS05A	30	25% Lime, 75% Sand	0	N/C	N/A	N/A
CPCPDS05A	60	25% Lime, 75% Sand	0	N/C	N/A	N/A
CPCPDS05A	100	25% Lime, 75% Sand	0	0	N/A	N/A
CPCPDS03B	40	50% Portland Cement, 50% fly ash	0.1	1.25	2.2	2.5
CPCPDS03B	50	50% Portland Cement, 50% fly ash	0.65	3.45	>4.5	>4.5
CPCPDS03B	75	50% Portland Cement, 50% fly ash	3.2	>4.5	>4.5	>4.5
CPCPDS03B	100	50% Portland Cement, 50% fly ash	>4.5	>4.5	>4.5	>4.5

*N/A = NOT APPLICABLE
**N/C = NOT CHECKED

[9]Pounds per square inch (psi) = tons per square foot (tsf) × 13.889.

Figure 4-12 illustrates the strength increase over time for each of the Portland cement/fly ash mixes obtained during Phase 1 and Phase 2 testing. As illustrated, the maximum pocket penetrometer reading of 4.5 tsf (or 62.5 psi) was achieved at one-day curing for the samples at or above the 100% mix. Only one and three-day readings were available for the 30 and 150% mixes since performed during Phase 1 and not selected for Phase 2. A 40% mix was chosen for the Phase 2 test since Phase 1 results from the 30% mix indicated it may not provide the necessary strength required in the event solidification is selected as a remedial alternative.

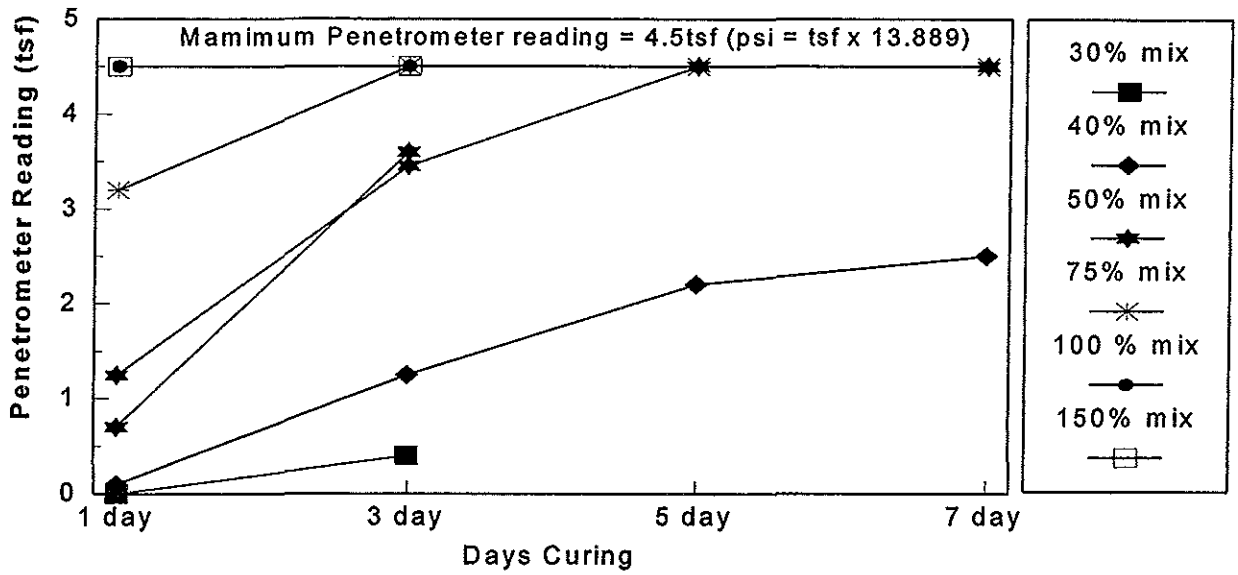
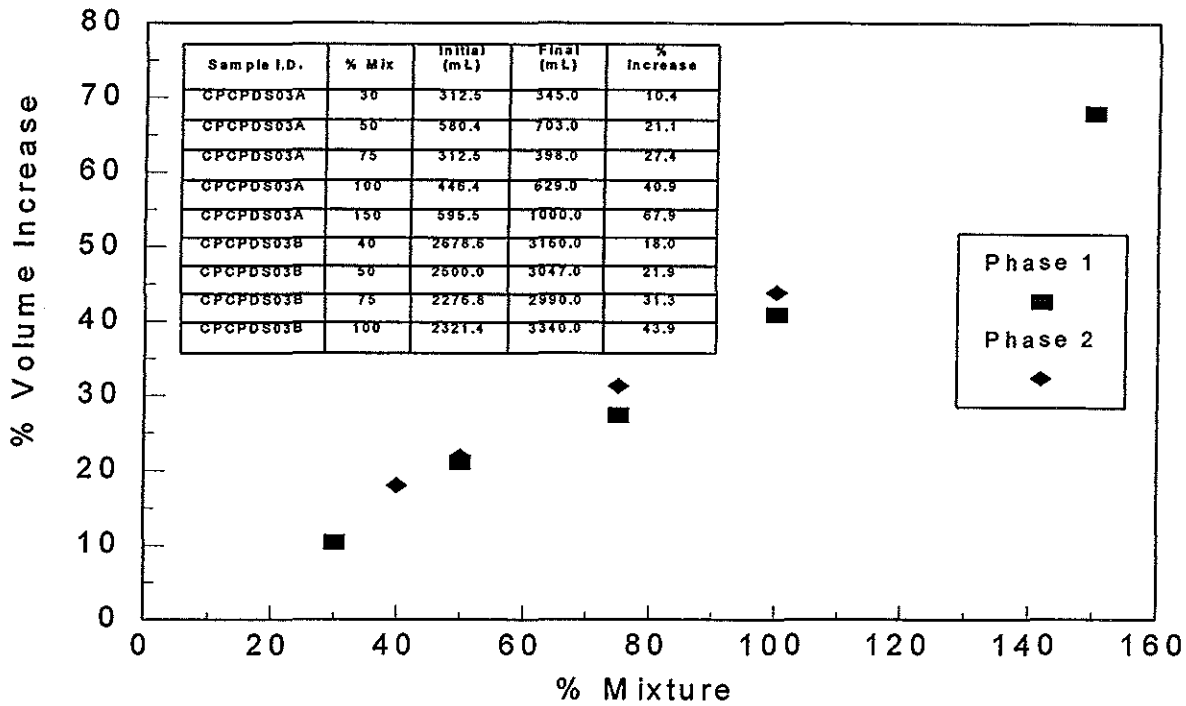


Figure 4-12: Pocket penetrometer results for various cures and mixes of Portland cement/fly ash.

Figure 4-13 provides the volume increase results observed during the solidification testing for all the Portland cement/fly ash mixes. The initial volume was determined by taking the initial stock weight, dividing by the CPCPD stock density of 1.12 g/cm^3 (as reported in Table 4-17), and converting cm^3 into mL. The final mL was the cumulative sum of material in the molds used for the solidified mixes. Approximately 22% increase in volume occurred for the 50% mixes while as much as 44% increase was observed with 100% mixes. Results indicate a near linear relationship occurs with increasing mixes.

Temperatures of the solidification mixes were measured but none ever exceeded 77 °F. For the most part, the Portland cement/fly ash mixes would experience the largest temperature rise, but none ever exceeded 10% of the ambient conditions. Maximum temperatures observed during the various solidification tests are available in the Solidification Test Data Forms subsection of Appendix A.



Sample I.D.	% Mix	Initial (mL)	Final (mL)	% Increase
CPCPDS03A	30	312.5	345.0	10.4
CPCPDS03A	50	580.4	703.0	21.1
CPCPDS03A	75	312.5	398.0	27.4
CPCPDS03A	100	446.4	629.0	40.9
CPCPDS03A	150	595.5	1000.0	67.9
CPCPDS03B	40	2678.6	3160.0	18.0
CPCPDS03B	50	2500.0	3047.0	21.9
CPCPDS03B	75	2276.8	2990.0	31.3
CPCPDS03B	100	2321.4	3340.0	43.9

Figure 4-13: Estimated volume increase for various Portland cement/fly ash mixes.

As required under Phase 2 of SOP13, 8-ounce molds were used to develop samples for the unconfined compressive strength (UCS) tests. Section 4.1.12 of this report provides the UCS results while Section 3.8 of this report provides additional details on implemented modifications based on air entrapment concerns.

The Phase 3 Characterization Tests outlined in ESSW-SOP13 were selected to assist with estimating effects of the solidified sediments under closure surcharge. No additional UCS tests were performed since no new mixes were selected for investigation. Because the penetrometer readings exceeded the 5 psi limitations outlined in Phase 3, no Harvard miniature compaction tests were performed. A one-dimension consolidation test was performed on a 50% mix using Portland cement/fly ash following a three-day cure. The solidified one-dimensional consolidation result is provided in Section 4.1.7 of this report. A constituent analysis was performed on the 50, 75, and 100% Portland cement/fly ash mixes to determine if these solidified masses could pass the TCLP extraction for compound/analyte analysis. Section 3.9 of this report provides details on the constituent analysis deviation while the constituent results and supporting documentation are provided in Appendix F of this report.

As required under ESSW-SOP13, organic emissions and pH were checked at various phases during solidification testing. The pH results are provided in Section 4.1.13 while organic emission results are provided in Section 4.2.3 of this report. Additional solidification testing details can be

obtained in the Appendix A, Bence Scale Solidification Data Forms subsection and in the Appendix D: OpTech's Laboratory Logbook.

4.1.12 Unconfined Compressive Strength

The unconfined compressive strength (UCS) was performed in accordance to the ASTM D2166-91 Standard Test Method for Unconfined Compressive Strength of Cohesive Soil. As detailed in Section 3.8 of this report, it was believed the increase in air voids could cause premature failure of some UCS tests, so duplicates were performed to help ensure accuracy. As outlined in Phase 2 of ESSW-SOP13, UCS tests were to be performed on 3- and 7-day cures. Solidification details are provided in Section 4.1.11 of this report.

The original air supply was capable of only providing a maximum stress of 1.8 tsf (or 25 psi). Another air supply was obtained by the 7-day cure inducing a maximum stress of 4.3 tsf (or 60 psi). Table 4-22 provides the major principle stress applied to the 3- and 7-day cured samples and rather the sample failed at this stress for the various Portland cement/fly ash mixes (on a wet weight basis) tested. Stress versus strain plots for each of these tests are provided in Singleton's final report located in Appendix E.

Table 4-22: Unconfined compressive strength results for various Portland cement/fly ash mixes.

% Mix	Major Principle Stress for 3 day cure (tsf)	Did Failure Occur?	Major Principle Stress for 7 day cure (tsf)	Did Failure Occur?
100	1.80	No	4.23	No
100 (dup)	1.73	No	4.32	No
75	1.83	No	4.17	No
75%	1.81	No	4.19	No
50	1.28	Yes	1.92	Yes
50 (dup)	1.28	Yes	1.92	Yes
40	0.51	Yes	0.97	Yes
40 (dup)	0.45	Yes	0.87	Yes

Results above tend to indicate that entrained air did not cause any notable differences with the UCS test. Comparisons of the UCS to the pocket penetrometer results indicate the penetrometer results for the 40 and 50% mix is more than twice that of the UCS. This is not uncommon and is typically observed with most soil labs performing both tests on common samples. Overall, the UCS results should be the most accurate of the two tests.

Additional UCS details can be viewed in the UCS subsection of Appendix E: Singleton On-site Logbook and Supporting Documentation while solidification details are in Section 4.1.11 of this report, SOP13 subsection in Appendix A, and Appendix D: OpTech's Laboratory Logbook.

4.1.13 pH

As outlined under ESSW Alternative 3, various pH measurements were required. A hand held probe equipped with a glass pH electrode was originally used to obtain pH readings but after the first use, the probe could not be recalibrated. Although cleaning was attempted, it is believed the sediment slurry blinded the probe membrane to an irreversible condition. Even though less accurate and since additional probes could potentially experience the same fate, pH indicator strips were selected for following measurements. Table 4-23 provides the pH indicator strip results for slurry and solidified tested samples.

Table 4-23: Slurry and solidified samples pH results.

SAMPLE I.D.	pH	COMMENTS
Potable Water	7.0	Water used with various tests.
13BC3	7.0	Slurry from center area of pond 3513.
13BC4	7.0	Slurry from southwest area of pond 3513.
13BC5	7.25	Slurry from southeast area of pond 3513.
13CP1	7.0	Slurry from pond 3513 composite.
24BC1	6.8	Slurry from southwest area of pond 3524.
24BC2	7.0	Slurry from northwest area of pond 3524.
24BC3	7.6	Slurry from center area of pond 3524.
24BC4	7.0	Slurry from southeast area of pond 3524.
24BC5	7.5	Slurry from southwest area of pond 3524.
SOLIDIFICATION SAMPLES*		**COMPOSITION**
CPCP1S01 for 10% Mix	8.0	96% Sand, 4% Bentonite
CPCP1S01 for 25% Mix	8.0	96% Sand, 4% Bentonite
CPCP1S01 for 40% Mix	8.0	96% Sand, 4% Bentonite
CPCP1S01 for 50% Mix	8.0	96% Sand, 4% Bentonite
CPCPDS01for 10% Mix	10.5	50% Portland Cement, 50% fly ash

SOLIDIFICATION SAMPLES*		COMPOSITION
CPCPDS01for 25% Mix	10.5	50% Portland Cement, 50% fly ash
CPCPDS01for 40% Mix	11.0	50% Portland Cement, 50% fly ash
CPCPDS01for 50% Mix	11.0	50% Portland Cement, 50% fly ash
CPCPDS02 for 10% Mix	10.0	25% Lime, 75% Sand
CPCPDS02 for 25% Mix	12.0	25% Lime, 75% Sand
CPCPDS02 for 40% Mix	12.0	25% Lime, 75% Sand
CPCPDS02 for 50% Mix	12.5	25% Lime, 75% Sand
CPCPDS04 for 30% Mix	7.0	96% Sand, 4% Bentonite
CPCPDS04 for 60% Mix	7.5	96% Sand, 4% Bentonite
CPCPDS04 for 100% Mix	8.0	96% Sand, 4% Bentonite
CPCPDS04 for 130% Mix	8.0	96% Sand, 4% Bentonite
CPCPDS05 for 30% Mix	12	25% Lime, 75% Sand
CPCPDS05 for 60% Mix	12	25% Lime, 75% Sand
CPCPDS05 for 100% Mix	12.3	25% Lime, 75% Sand
CPCPDS03B for 40% Mix	11.5	50% Portland Cement, 50% fly ash
CPCPDS03B for 50% Mix	11.5	50% Portland Cement, 50% fly ash
CPCPDS03B for 75% Mix	12.0	50% Portland Cement, 50% fly ash
CPCPDS03B for 100% Mix	12.0	50% Portland Cement, 50% fly ash

*Percent mix on a wet weight basis and developed from a gravity thickened sample.

The solidified samples at the various curing days were tested by either applying the pH strip to existing free fluids on the solidified specimens or by adding enough fluid to the solidified specimens to use a pH strip. After obtaining the initial weights, small quantities of potable water would then be added to the solidified samples extracted for water content analysis and allowed to set for a few minutes prior to immersing the pH strips. Each water content analysis required a duplicate with only one of these samples used for the pH analysis. Since both water content results were comparable, the addition of water used for the pH analysis did not appear to effect final results.

Results indicate the overall pond pH is approximately 7, pH of bentonite/sand reagents at various mixes remained a constant 8, pH of Portland cement/fly ash reagents ranged between 10 to 12 for various mixes, and pH of lime/sand reagents was 12 or higher.

4.2 ADDITIONAL OBSERVATIONS

This section provides additional information observed during this scope of work which could be useful in selecting or implementing a remedial alternative. This information was not included in Section 4.1 because it fell outside the final report requirements as outlined in the ESSW.

4.2.1 Physical Characteristics

All of the BC pond sediments were classified as dark-brown to black-brown in color. This classification typically indicates that the material is high in organics. However, the dried material exhibited characteristics more typical of clays (excessive shrinkage and cracking) and dried to a medium tan color. However, the particle size distribution test results classified the pond composites as a silty material (over 80% fell in the silt range).

Once re-wetted, the previously dried material maintained its form even after soaking for several months, illustrating some adhesive qualities as well. It was believed that the historic lime treatments (as mentioned in Section 3.5 in this report) may be the adhesive catalyst, but questions arose as to the potential of organic materials inducing some adhesive qualities. A simple test was implemented using hydrochloric acid (20%) and mineral spirits. The mineral spirits had no effect on the dried sediments while the hydrochloric acid reacted appeared to dissolve the material. The effervesce of the reaction with HCl may be an indication of high concentrations of lime in the dried materials. Since no reaction occurred with the mineral spirits, the adhesive characteristics were most likely not organic in nature. This test is inconclusive that lime is definitely the factor causing the adhesive characteristics in these pond sediments but helped to narrow the possibilities.

Another interesting observation with the BC samples was their self-flocculating ability. The SIOU sediment characteristic was that of a fine material since 100% of the pond sediments passed a No. 10 (2 mm) sieve. During the gravity settling test this fine material would coagulate into large flocculants, sometimes as large as 2 mm in diameter. Through visual observations, the flocculant would appear to have a solid core (similar to a grain of sand) with a "fluffy", hairy looking, translucent outer sphere. The pH of the settling media was around 7 for all tests. It would be interesting to know what catalyst induced these large, interesting flocks.

All of the above characteristics were most prominent in all BC sample from pond 3513 and less notable in the western BC samples from pond 3524. It is believed variances in the western sediments from pond 3524 are basically due to the shallow sediment depth in this region, as illustrated in the May 1984, ORNL/TM-8682 titled An Investigation of the Concentration, Distribution, and Inventory of Radio nuclides in the Sediment of Process Waste System Basin 3524. Each BC composite required 40-gallons of material, preferable from minimal coring processes of vacuuming from the surface of the sediment layer down to the bottom natural clay strata (sample collection details in Section 2.2 of this report). But the low sediment depth in the western end of pond 3524 required a larger surface area to be extracted from this region -- a surface area covered with a highly vegetative layer. Therefore, the western end of pond 3524 would have a larger vegetation to

sediment ratio than other BC samples, perhaps inducing the variances observed during laboratory testing of these materials.

Excessive vegetation in the western BC samples from pond 3524 are believed to be the reason behind excessive TSS results (some exceeding 300 mg/L) taken during the gravity settling tests on these samples. Although not as high as the western 3524 results, southern BC samples from pond 3513 also experienced TSS results higher than other areas of pond 3513. Bentonite had been used on the southern bank of pond 3513 to help reduce piping through the bermed area which runs parallel to White Oak Creek (E-mail reference supplied in Appendix G). Historic bentonite treatments could be the culprit behind the higher TSS results in southern BC samples from pond 3513, because bentonite is a clay and clays require longer settling times.

4.2.2 Radiation Measurements

Radiation measurements were taken by using an alpha detector [measuring counts per minute (cpm)], a hand held pancake meter (measure of beta plus gamma in cpm), or a Bicron RSO-50E meter (for detecting beta and/or gamma in mRem/hour). Table 4-24 provides results for some various independent sample checks for both wet and dried samples. Alpha readings were never above background except with the dried samples, which read less than 10 cpm. The dried samples appeared to reach a maximum just above 15 mRem/hour and did not appear to be effected by the amount of dried material checked during this scope of work (masses ranged between 15 to 200 grams). Additionally, it did not take much distance to substantially reduce these levels (close to background when a few feet from samples). Moist samples (at or above 80% moisture content) contained in one-liter HDPE bottles appeared to typically fall below 2 mRem/hour (or 35,000 cpm). It did not appear to take much water to reduce the reading substantially, indicating that the main emitter was beta related.

Table 4-24: Radiation mesaurements for various SIOU samples.

Sample I.D.	cpm	mRem/Hr	Comments
13BC1	N/A*	~ 2	bottom of 5 gal. bucket holding ~2.5 gal. of samples
13BC2	N/A	~ 2	bottom of 5 gal. bucket holding ~2.5 gal. of samples
13BC3	~ 3,800	N/A	wet but not saturated sample
13BC3	N/A	~ 1	side of full, one-liter ISCO bottle
13BC3	~ 1,600	N/A	~ 1 cup of rinsed gravel
13BC4	N/A	~ 0.8	side of full, one-liter ISCO bottle
13CP1	N/A	~ 1.5	side of full, one-liter ISCO bottle
13BC5MC01	30,000	16	10.7 grams of oven dried sample

Sample I.D.	cpm	mRem/Hr	Comments
13CP1MC05	N/A	8	18.3 grams of oven dried sample
24BC4	25,000	N/A	side of full, one-liter ISCO bottle
24BC4MC01	N/A	15	18 grams of oven dried sample
24BC5	35,000	N/A	side of full, one-liter ISCO bottle
24BC5MC01	N/A	17	22 grams of oven dried sample
CPCP1	29,000	N/A	side of full, one-liter ISCO bottle
CPCP1MC01	162,000	12 Beta/Gamma 6 Gamma	30.3 grams of air dried sample
CPCP1LR01	N/A	15	~200 grams of oven dry sample, diameter = 2.85 in.

*N/A = Not available.

Table 4-25 provides radiation measurements from various field measurements during the collection, transfer, and storage of the SIOU sediments. It is interesting that the maximum reading obtained here was with the shored samples, which did not appear to exceed 15 mRem/hour. Although not shown in the table, it did not take much distance to reduce the readings to those closer to background.

Table 4-25: Radiation measurements during collection, transfer, and storage of SIOU sediments.

Sample I.D.	MRem/Hr	Comments
13BC1	3-5	at 275 gal. container containing ~ 40 gal. of sediment
13BC1	2-7	at suction hose during sampling
13BC2	~3	on boat during sampling
13BC3	~ 7	on boat during sampling
13BC3	10-15	at 275 gal. container containing ~ 40 gal. of sediment
13BC4	~ 1	on boat during sampling
13BC5	2	on boat during sampling
CPCP1	10	near bottom of 275 g. unmixed container
CPCP1	15	at middle of 275 g. unmixed container
CPCP1	5	near top of 275 g. unmixed container

Sample I.D.	MRem/Hr	Comments
24BC1	1	on boat during sampling
24BC1	6	at 275 gal. container containing ~ 40 gal. of sediment
24BC2	3	at 275 gal. container containing ~ 40 gal. of sediment
24BC3	3	on boat during sampling
24BC3	6	at 275 gal. container containing ~ 40 gal. of sediment
24BC4	~ 3	during sampling operations
24BC4	10	at 275 g. container
24BC5	~ 5	during sampling operations
24BC5	12	at 275 gal. container containing ~ 40 gal. of sediment
CPCPD	15	at 275 gal. container containing ~ 200 gal. of sediment

Radiation measurements were desirable during the gravity settling tests to help determine the effects of sediment concentrations with radiation levels and to better understand how these levels vary over a one-hour settling period. Figure 4-14 illustrates where these measurements were made relative to the plastic one-liter graduated cylinder used during the gravity settling test. The first cylinder represents a fully mixed sample at a settling time equal to zero. The second cylinder represents the settled sample following a one-hour settling period. A pancake probe was used to measure beta and gamma levels at the top and sides for both cases. Note that the probe was approximately three-inches from the surface of the sample for the top reading and was placed as close to the side as possible for the side reading. The maximum side reading recorded in these results was typically observed in the center cylinder area for the total mix and in the center of the sediment layer for the final condition. An alpha meter was randomly used but no notable emissions were observed.

Figures 4-15 through 4-19 provides radiation results for the various gravity settling tests at each of the four scanned areas illustrated in Figure 4-14. Figure 4-19 provides scan results taken from the top of the one-hour settled sample as illustrated in Figure 4-14 but the difference is that the supernatant was decanted down to a depth one-inch above the sedimentation layer. Therefore, the distance from the probe to the sample will vary depending upon the amount of settlement and supernatant decanted. If there is a need for the probe-to-sample-interface distance value, it can be computed by taking the one-hour sediment layer measurement (mL value recorded in Tables 4-4 through 4-14), dividing it by 72 (72 mL is proportional to a one-inch depth in the graduated cylinders used for these tests), adding 1 inch to this value (1 inch of supernatant left on sediment interface), and subtracting this value from 16.9 inches (total height of the graduated cylinder).

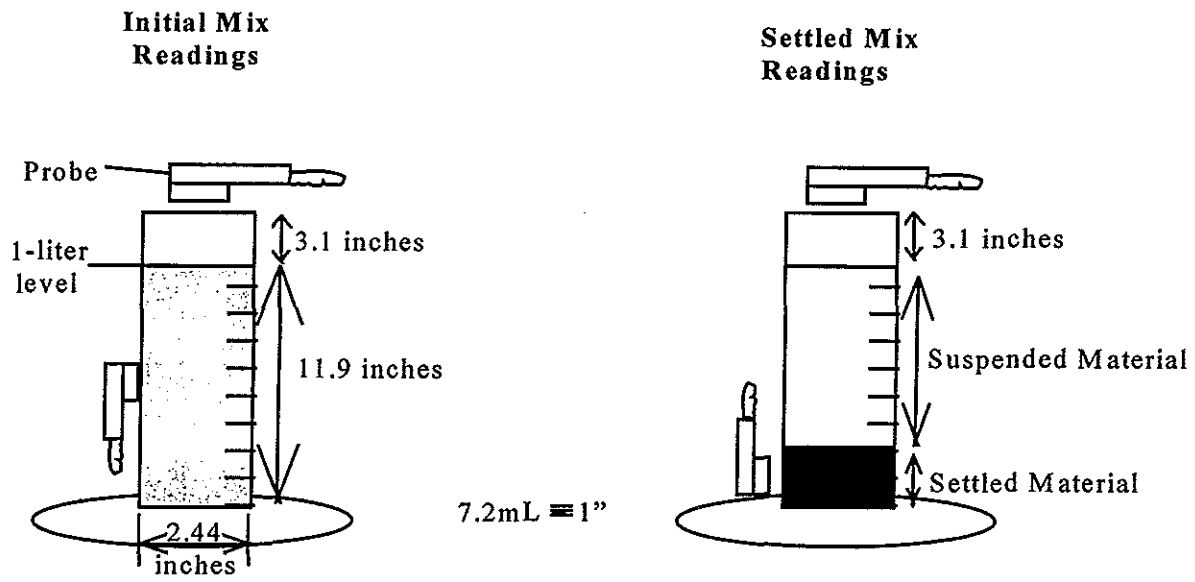


Figure 4-14: Illustration of where the fully mixed and one-hour settled radiation measurements were taken relative to the plastic one-liter graduated cylinder used for the gravity settling test.

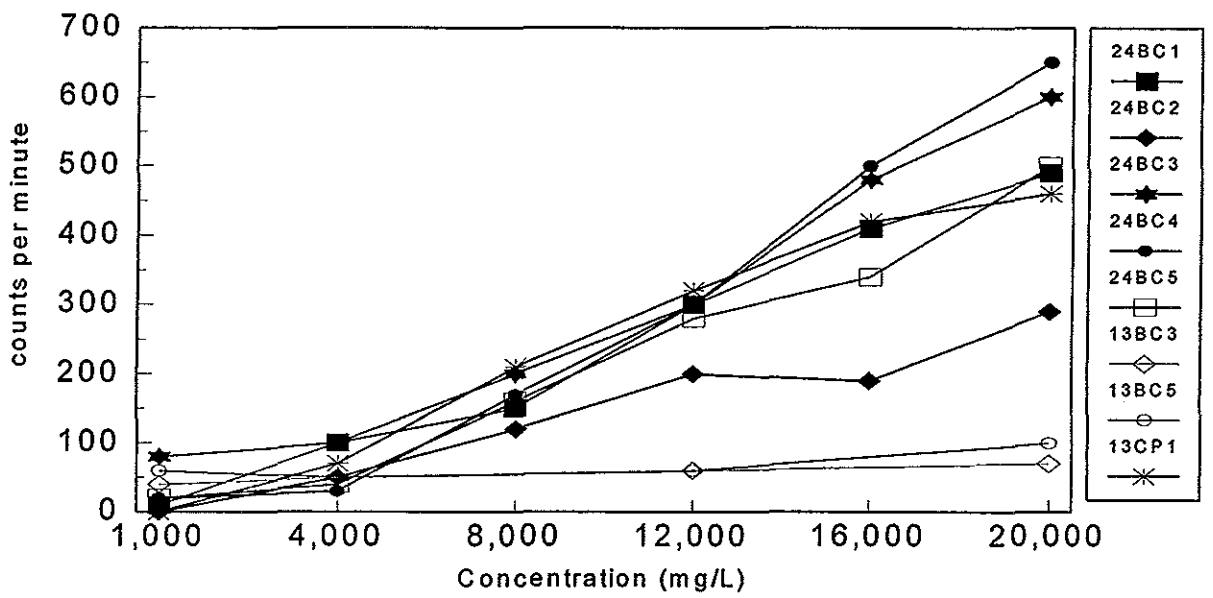


Figure 4-15: Maximum radiation measurements taken from the top of a throughly mixed one-liter graduated cylinder used for gravity settling tests on numerous pond regions at various sediment concentrations.

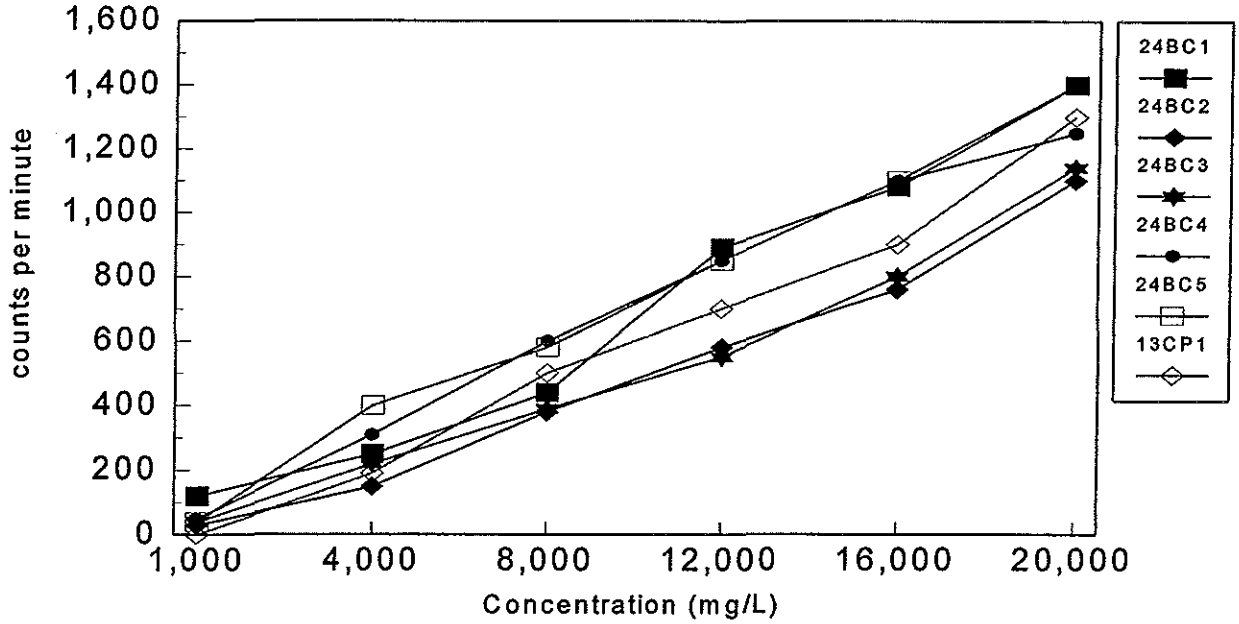


Figure 4-16: Maximum radiation measurements taken from the side of a throughly mixed one-liter graduated cylinder used for gravity settling tests on numerous pond regions at various sediment concentrations.

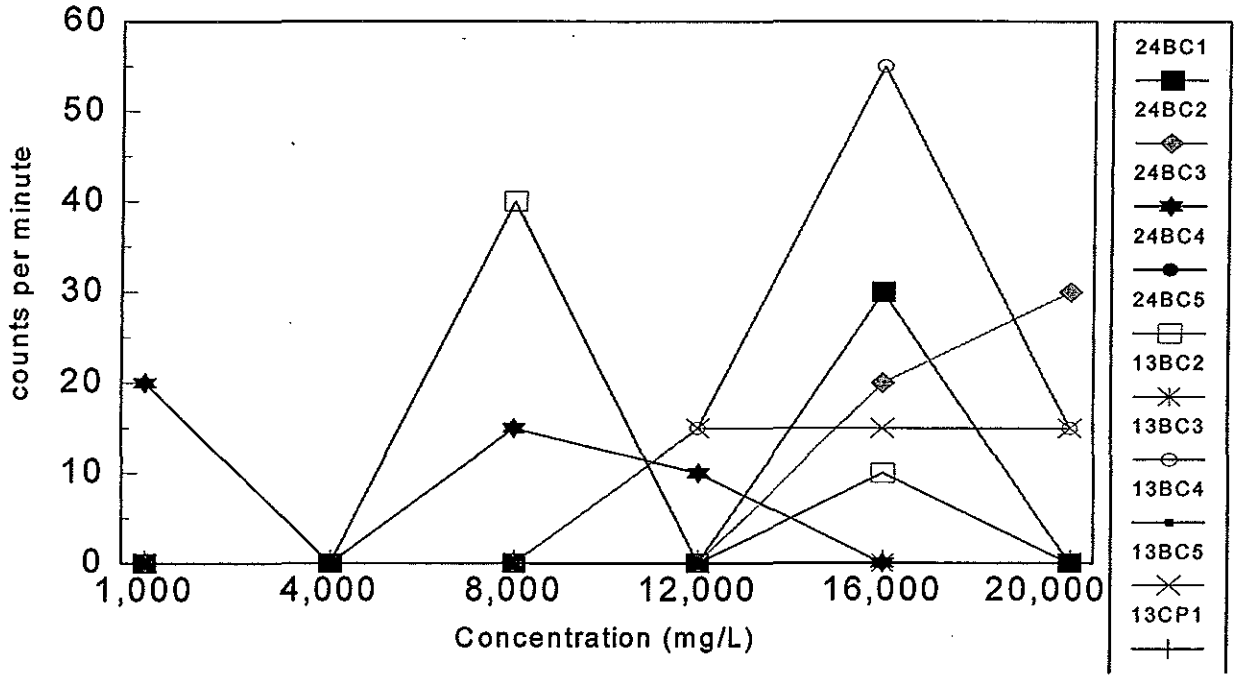


Figure 4-17: Maximum radiation measurements taken from the top of a one-liter graduated cylinder following one-hour settling of gravity settling tests from numerous pond regions at various sediment concentrations.

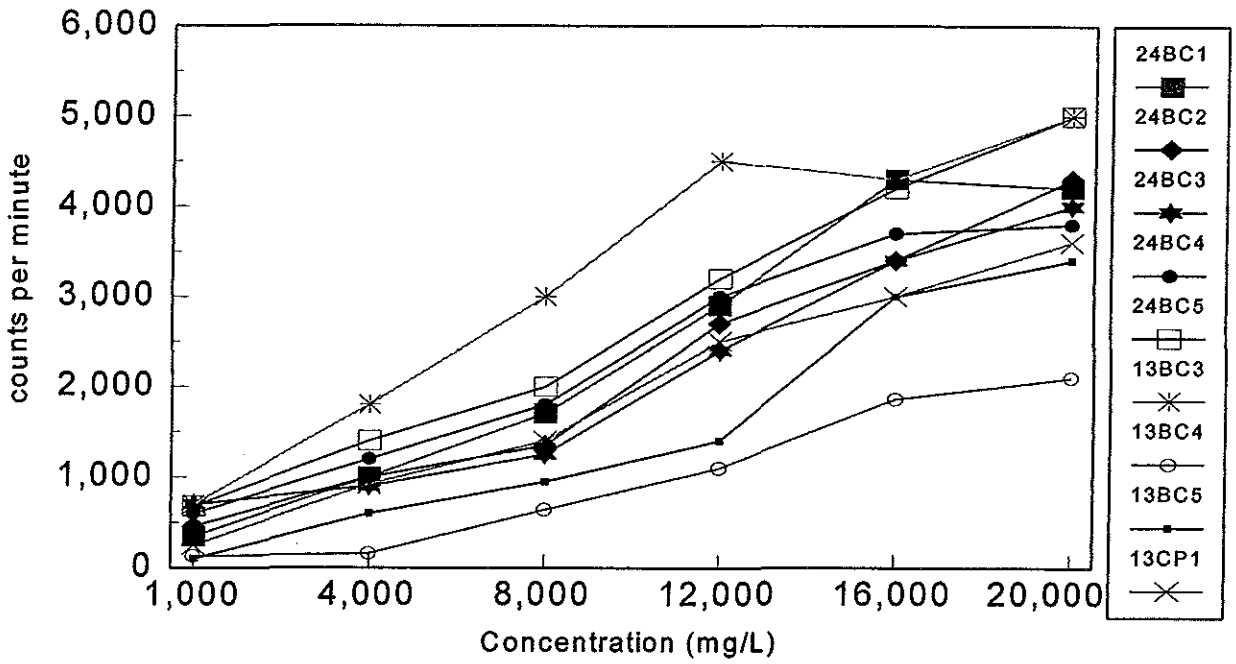


Figure 4-18: Maximum radiation measurements taken from the side of a one-liter graduated cylinder following one-hour settling of gravity settling tests from numerous pond regions at various sediment concentrations.

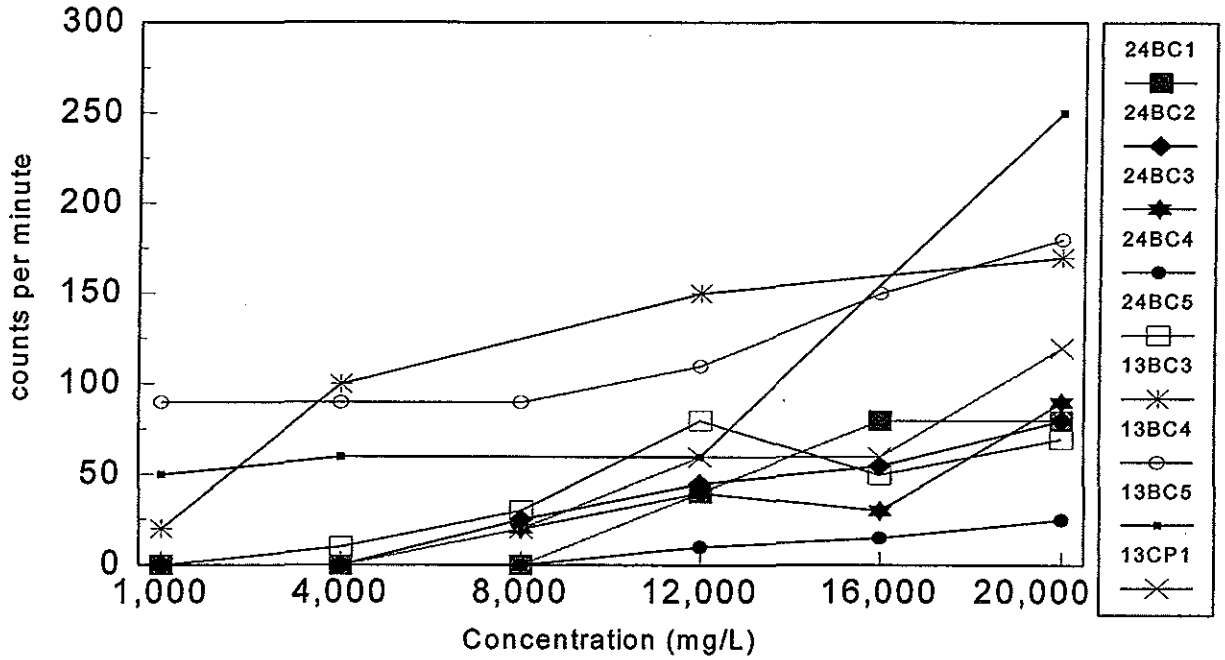


Figure 4-19: Maximum radiation measurements taken from the top of a one-liter graduated cylinder following decant of supernatant following one-hour settling of gravity settling tests from numerous pond regions at various sediment concentrations.

The top readings from the initial mix illustrated counts at lower concentrations are typically less than 100 cpm while higher concentrations can climb to nearly 700 cpm (Figure 4-15). However, counts at the top of the settled samples fluctuated but never measured above 60 cpm (Figure 4-17), a 90% drop from the maximum reading of the initial mix. Once the supernatant was decanted, top readings were taken again with the settled samples (Figure 4-19) and as expected, the reading raised slightly from that of the sample shielded with the supernatant (Figure 4-17) but was still substantially lower than the initial mix illustrated in Figure 4-15. Measurements taken following decant (Figure 4-19) most likely yielded low radiation readings due to the increased probe to sample surface distance. The non-linear relationships for top measurements illustrated in Figure 4-17 could be due to some of the samples containing particulates that would float and/or stick to the top of the cylinder and left to be counted after all other particles had settled.

Counts from the side of the initial mix increased linearly with concentration from approximately 200 cpm to 1,400 cpm (Figure 4-16). The side readings increased and varied from 1,000 to 5,000 cpm as the concentration and sediment layer increased with the settled samples (Figure 4-18), raising the activity by approximately 70% from initial conditions.

Figure 4-20 provides the maximum radiation measurement results for various Portland cement/fly ash mixes as observed from 7-ounce molds (approximately 2-inches in diameter by 3-inches high). It is interesting that this relationship appears to drop at a linear rate between the 30 and 100% mixes, while the 150% mix skewed to illustrate less of a radiation drop.

4.2.3 Photo Ionization Detector (PID) Measurements

A photo ionization detector (PID) was used for measuring organic vapor emissions. The PID was calibrated with an isobutylene gas standard immediately prior to use. Background levels typically fell between 0.8 and 3.0 parts per million (ppm). While checking samples, the meter would sometimes spike very quickly to values as high as 20 ppm but these values did not hold and would often quickly decrease. Extremely quick rise and falls occurring within a second or two were discarded as invalid readings. Spikes often occurred following immediate opening of a bottle that had been closed for days or even weeks. Although some of the BC bottled samples were pungent, PID readings usually did not exceed 5 ppm with the maximum reading appearing close to 15 ppm. Some of these spikes could be caused by high moisture content within the contained air, causing a false reading, which quickly decrease as the entrapped air dissipated into ambient conditions.

Spikes were not as common during solidification testing. The bentonite/sand mixes did not result in any increases above background PID levels while the lime/sand and Portland cement/fly ash samples appeared to experience some increase. Although one reading exceeded 12 ppm, most increases were usually less than 5 ppm and typically occurred within a few minutes of adding solidification reagents. Readings would slowly decrease close to background levels within a few more minutes of mixing.

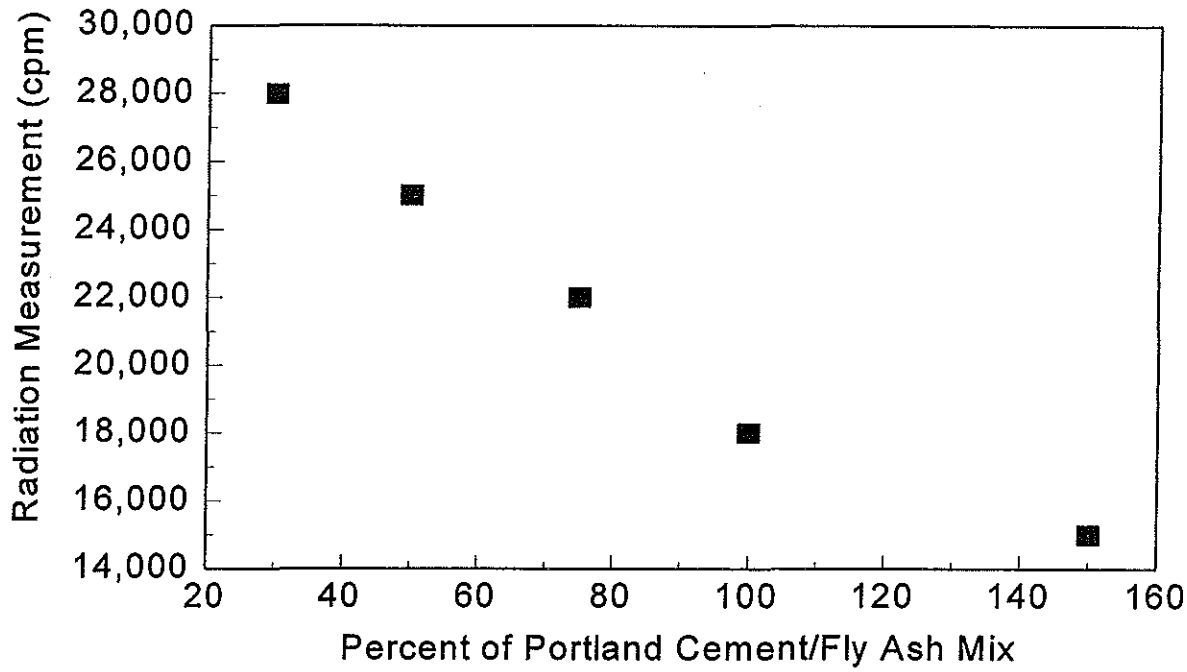


Figure 4-20: Radiation measurements from various Portland cement/fly ash mixes.

The breathing zones were periodically checked but never appeared to exceed 0.8 ppm above background. Once, the monitor continued to read approximately 15 ppm regardless of where the reading was taken. This occurred following re-taping of the protective plastic bag covering the monitor. Further investigation revealed the adhesive properties on the tape used to seal the bag was causing the false reading. Care was taken to ensure the tape did not interfere with future readings.

4.2.4 Gravity Draining Using Perforated Bucket

Gravity drainage of the COMP1 sample was performed in accordance to ESSW-Task 4.2 by using a bottom perforated 5-gallon bucket lined with a 50 cm × 50 cm, 5-10 μm, 60 mL/min flow rated filter paper. A plastic mesh was used as a liner between the filter and bucket to allow better drainage by preventing the filter from sticking to the sides of the bucket. The samples were allowed to drain a minimum of three days prior to sample extraction for performing tests as outlined in ESSW-Task 4.2. The duplicate was taken from a separate gravity draining bucket which had been allowed to stand for 10 days prior to sample extraction. The moisture content result for the three day drained samples were 67.8 and 69.3% (under CPCP1LR01 and CPCP1D01 in Table 4-2) and for the 10 day drained samples were 66.7 and 66.7% (under CPCP1LR02 and CPCP1D02 in Table 4-2). The moisture contents did not appear to vary much between the 3 and 10 day drained samples, indicating that most of the drainage occurred within a three day period.

Gravity drainage comparisons to paint filter test drained sediments are detailed in Section 5.2.3 of this report.

4.2.5 Constituent Results

As outlined in Section 3.9, constituent analysis was not included in the original scope of work but was implemented following concerns with leaching characteristics (see Section 3.9 for more details). Submitted specimens included a COMP1 sediment slurry, a native dried sample, and various solidified samples. The samples were sent through ASO to the internal labs (Y-12 or K-25) and extracted in accordance to Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (EPA SW-846), TCLP method 1311, for TCLP target compound/analyte analysis. Nickel (Ni), Hg, herbicides, pesticides, and PCB's were also analyzed. Composition of the slurry and solidified materials is presented below.

Slurry aliquots taken from the gravity thickened COMP1 mixture were sent through the Analytical Support Office (ASO) to the K-25 lab and analyzed for herbicides, pesticides, PCB's, Hg, and extracted for TCLP compound/analyte analysis. The Ni, Hg, and TCLP results for the slurry sample is provided in Table 4-26. Herbicides, pesticides, and PCB's tests results for the slurry samples are provided in Table 4-27.

Table 4-26: TCLP Results for COMP1 slurry.

Procedure #	Analysis	CPCPD-TCLP1		CPCPD-TCLP2 (duplicate)	
		Results (mg/L)	Q Qual*	Results (mg/L)	Q Qual*
EPA-6010 ACD-096010	Arsenic	0.25	U d	0.25	U d
EPA-6010 ACD-096010	Barium	1.5		3.9	
EPA-6010 ACD-096010	Cadmium	0.015	U d	0.015	U d
EPA-6010 ACD-096010	Chromium	0.050	U d	0.050	U d
EPA-6010 ACD-096010	Lead	0.25	U d	0.25	U d
EPA-6010 ACD-096010	Nickel	0.29		0.20	
EPA-6010 ACD-096010	Selenium	0.25	U d	0.25	U d
EPA-6010 ACD-096010	Silver	0.035	U d	0.035	U d
EPA-7470	Mercury	0.001	U	0.001	U

*Q Qual: (U)= Compound was analyzed for but not detected, and
(d)= Dilution required for accurate determination of all analytes; reporting limits raised accordingly.

Table 4-27: Herbicides, pesticides, and PCB results for COMP1 slurry.

CAS #	Herbicide and Pesticide Analysis	CPCPD-TCLP1		CPCPD-TCLP2(duplicate)	
		Results (μg/L)	Q Qual*	Results (mg/L)	Q Qual*
12674112	2,4-D	20	U	20	U
93-72-1	2,4,5-TP (Silvex)	20	U	20	U
72-20-8	Endrin	0.80	U	0.80	U
58-89-9	gamma-BHC (Lindane)	0.80	U	0.80	U
72-43-5	Methoxychlor	0.80	U	0.80	U
8001-35-2	Toxaphene	13	U	13	U
57-74-9	Technical Chlordane	13	U	13	U
76-44-8	Heptachlor	0.80	U	0.80	U
1024-57-3	Heptachlor-Expoxide	0.80	U	0.80	U
PCB	**Analysis**	**CPCPD-PCB1**		**CPCPD-PCB2 (duplicate)**	
12674-11-2	Aroclor-1016	2,400	U	2,500	U
11104-28-2	Aroclor-1221	2,400	U	2,500	U
11141-16-5	Aroclor-1232	2,400	U	2,500	U
53469-21-9	Aroclor-1242	2,400	U	2,500	U
12672-29-6	Aroclor-1248	2,400	U	2,500	U
11097-69-1	Aroclor-1254	29,000		35,000	
11096-82-5	Aroclor-1260	2,400	U	2,500	U

*Q Qual: (U)= Compound was analyzed for but not detected.

As indicated in Table 4-26, barium (Ba) and Ni was detected in the slurry samples. Barium and the other target compounds/analytes fell below the maximum concentration allowable for non-hazardous waste, indicating the slurry sample passed the TCLP test. No herbicides or pesticides (Table 4-27) were detectable but Aroclor-1254 was detected at 29 and 35 mg/L in the gravity thickened COMP1 slurry.

Portland cement and fly ash was mixed at various concentrations with the gravity thickened COMP1 sample for solidification purposes (see Section 4.1.11 for more solidification details). A 40% (040CPCPDSO3), 50% (050CPCPDSO3), 75% (075CPCPDSO3), and 100% (100CPCPDSO3) mix on wet weight bases was sent through ASO to the Y-12 lab for herbicides, pesticides, PCB's, and Hg analysis and for TCLP extraction and target compound/analyte analysis. Because of its self adhesive characteristics, a raw, dried sediment sample (000CPCPD000) was also submitted for the same set of analysis. The TCLP and Hg results for the solidified samples are provided in Table 4-28. Table 4-29 provides additional leachate analysis results for herbicides, pesticides, and PCB's.

Although barium and silver were present in some of the Portland cement/fly ash solidified samples and Hg was present in the raw, dried sediment sample, all were significantly below the maximum concentration limits for the toxicity characteristics. Therefore, the results in Table 4-28 indicate the solidified samples have passed the TCLP test.

As shown in Table 4-29, no herbicides or pesticides were detectable but PCB's were detected between 4.6 and 5.7 μg/L in the Portland cement/fly ash solidified samples while the raw, dried sediment sample results were 55 μg/L.

Copies of the official laboratory documents for the constituent tests results reported above are included in Appendix F of this report.

4.3 FIELD MASS BALANCES

Volumes were tracked through use of rating curves (Figures 2-2 and 2-3). The volumes were read to the nearest 5-gallon increment. Initially, 40-gallons were collected from each of the ten BC locations as outlined under Section 2.2 of this report. Because the jar test with polymers tests were omitted (see Section 3.5 for more details), initial laboratory tests required slightly less than three gallons of aliquots from each BC sample. Upon extraction of these aliquots, the 13BC1 through 13BC5 samples were consolidated into one pond composite (13CP1) consisting of approximately 190-gallons of material. Additionally, 24BC1 through 24BC5 samples were consolidated into one pond composite (24CP1) containing approximately 190-gallons of material. Less than 2-gallons were necessary from each of the 13CP1 and 24CP1 composites to complete ESSW-Task 3.1.

Moisture Content results from Task 3.1 indicated that 24CP1 had a significantly higher sediment concentration than 13CP1. This large difference could cause adverse effects during COMP1 development since the selected mixes were based on assumptions that the pond composites had similar concentrations. Due to this, 13CP1 was thickened by decanting the clear supernatant prior to development of the COMP1 sample (ESSW-Task 3.2). Upon decanting, 13CP1 was reduced to approximately 150 gallons and relabeled as 13CPD. See Section 5.2 for sensitivity check on COMP1 development.

Table 4-28: TCLP results for solidified samples.

Procedure Number	Analysis	000CPCPD000		040CPCPDS03		050CPCPDS03		075CPCPDS03		100CPCPDS03	
		Results (mg/L)	Q Qual*	Results (mg/L)	Q Qual*	Results (mg/L)	Q Qual*	Results (mg/L)	Q Qual*	Results (mg/L)	Q Qual*
EPA-6010 ACD-096010	Arsenic	0.50	U	0.25	U p d	0.25	U p d	0.25	U p d	0.25	U p d
EPA-6010 ACD-096010	Barium	5.0	U	3.4	p	5.0	p	4.9	p	7.9	p
EPA-6010 ACD-096010	Cadmium	0.10	U	0.015	U p d	0.015	U p d	0.015	U p d	0.015	U p d
EPA-6010 ACD-096010	Chromium	0.50	U	0.050	U p d	0.050	U p d	0.050	U p d	0.050	U p d
EPA-6010 ACD-096010	Lead	0.23		0.25	U p d	0.25	U p d	0.25	U p d	0.25	U p d
EPA-6010 ACD-096010	Selenium	0.020	U	0.25	U p d	0.25	U p d	0.25	U p d	0.25	U p d
EPA-6010 ACD-096010	Silver	0.20	U	0.035	U p d	0.035	U p d	0.037	p	0.040	p
EPA-7470	Mercury	0.03		0.001	U p	0.001	U p	0.001	U p	0.001	U p

*Q Qual: (d)= Dilution required for accurate determination of all analytes; reporting limits raised accordingly.
(p)= This sample was found to have a pH above 2 (no preservative added).

Table 4-29: Herbicides, pesticides, and PCB results for solidified samples.

CAS Number	Herbicide and Pesticide Analysis	000CPCPD000		040CPCPDS03		050CPCPDS03		075CPCPDS03		100CPCPDS03	
		Results (mg/L)	Q Qual*	Results (mg/L)	Q Qual*	Results (mg/L)	Q Qual*	Results (mg/L)	Q Qual*	Results (mg/L)	Q Qual*
94-75-7	2,4-D	0.020	U	0.0040	U	0.0040	U	0.0040	U	0.0040	U
93-72-1	Silvex	0.020	U	0.0040	U	0.0040	U	0.0040	U	0.0040	U
93-76-5	2,4,5T	0.020	U	0.0040	U	0.0040	U	0.0040	U	0.0040	U
57-74-9	Chlordane	0.013	U	0.013	U	0.013	U	0.013	U	0.013	U
72-20-8	Endrin	0.0008	U	0.0008	U	0.0008	U	0.0008	U	0.0008	U
58-89-9	Lindane	0.0008	U	0.0008	U	0.0008	U	0.0008	U	0.0008	U
76-44-8	Heptachlor	0.0008	U	0.0008	U	0.0008	U	0.0008	U	0.0008	U
1024-57-3	Heptachlor-Expoxide	0.0008	U	0.0008	U	0.0008	U	0.0008	U	0.0008	U
72-43-5	Methoxychlor	0.0008	U	0.0008	U	0.0008	U	0.0008	U	0.0008	U
8001-35-2	Toxaphene	0.013	U	0.013	U	0.013	U	0.013	U	0.013	U
PCB Analysis**		000CPCPD000		040CPCPDS03		050CPCPDS03		075CPCPDS03		100CPCPDS03	
		Results (μg/g)	Q Qual*	Results (μg/g)	Q Qual*	Results (μg/g)	Q Qual*	Results (μg/g)	Q Qual*	Results (μg/g)	Q Qual*
12674-11-2	Aroclor-1016	20	U	2	U	2	U	2	U	2	U
11104-28-2	Aroclor-1221	20	U	2	U	2	U	2	U	2	U

PCB	Analysis**	000CPCPD000		040CPCPDS03		050CPCPDS03		075CPCPDS03		100CPCPDS03	
		Results (μg/g)	Q Qual*	Results (μg/g)	Q Qual*	Results (μg/g)	Q Qual*	Results (μg/g)	Q Qual*	Results (μg/g)	Q Qual*
11141-16-5	Aroclor-1232	20	U	2	U	2	U	2	U	2	U
53469-21-9	Aroclor-1242	20	U	2	U	2	U	2	U	2	U
12672-29-6	Aroclor-1248	present		2	U	2	U	2	U	2	U
11097-69-1	Aroclor-1254	present		present		present		present		present	
11096-82-5	Aroclor-1260	20	U	2	U	2	U	2	U	2	U
ELIMS001	Total PCB as received	55		4.6		5.4		3.8		5.7	

*Q Qual: (U)= Compound was analyzed for but not detected.

** Sample was reported on as received basis only, insufficient amount did not allow dry basis report.

As detailed in ESSW-Task 2.3, the COMP1 composite was to contain approximately 60% from pond 3513 and 40% from pond 3524 stock. To obtain 200 gallons of the COMP1 composite mixture (labeled as CPCP1), 120 gallons of 13CPD was mixed with 80 gallons of 24CP1. The remaining 24CP1 and 13CPD stocks were discarded since the CPCP1 sediment volume exceeded those necessary for completing the ESSW COMP1 tests. Additionally, this allowed the MAD Group to demobilize all field equipment except the bermed staging area containing the single 275-gallon container filled with the COMP1 stock.

Approximately 6 gallons were extracted from the CPCP1 sample to perform ESSW-Tasks 4.1 and 4.2. CPCP1 was allowed to thicken in accordance to ESSW-Task 4.3 and decanted accordingly. The thickened CPCP1 sample was relabeled as CPCPD and contained approximately 170 gallons of sediment slurry. Approximately 7 additional gallons were used to perform ESSW-Task 5.1 and the contaminant analysis. At the conclusion of this field effort, 170 gallons were left in the CPCPD container. At the conclusion of this report, the CPCPD stock was still being held in the event additional testing was required to obtain results outside of this scope of work.

Details of holding containers volumes (MAD Group logbook), and sample aliquots collection procedures (OpTech field logbook) are provided in Appendix B and C respectively. Details of aliquot use is provided in Appendix D (OpTech lab logbook).

5.0 DATA EVALUATION

5.1 SOURCES OF ERROR

As with most geotechnical tests, standard sources of errors could be: improperly calibrated laboratory equipment; non-representative sample; inappropriate type of test; voids induced during sample preparation; computational mistakes; inaccurate determination of water content; non-uniform conditions such as temperatures; aggregations of particles not throughly broken or throughly washed; disturbance of samples during testing or preparation; and human errors associated with equipment handling and scale/gage readings. Precision was ensured through duplicate testing or dual readings. The remainder of this section attempts to focus on the known and most probable potential sources of errors as observed or determined during this scope of work.

All of the geotechnical tests were performed in the trailer laboratory located south of pond 3540. The trailer was placed on blocks for stabilization but electrical equipment, including the HEPA filter apparatus and the air conditioning unit, induced excessive vibrations that are suspected to cause minor errors. These vibrations were most noticeable with the dial gage from the consolidation apparatus used for the one-dimensional consolidation test. The dial was sensitive enough to pick up heavy walking movement inside the trailer and opening and closing of the entrance door. The extra vibrations may have caused some accelerated compression with the consolidometer and modified liquid release. However, the accelerated compression is considered minor since the samples were easily compressible and plots were smooth between work hours (highest induced vibration periods) and non-work hour (less or minor vibration induced periods).

The trailer vibrations could have caused some error with the settling column tests outlined in ESSW-SOP3 and with those used for the hydrometer tests (for the particle size distribution). These tests are typically performed in a quiet, non-disruptive environment. The vibrations could have slowed the settling processes associated with these tests, since ultra sonic vibrations are sometimes used as a dispersion media for particle size distribution tests. However, any hindered settling induced by these vibrations are considered minor since most results indicated the pond sediments settled quickly even with these induced vibrations.

Additionally, the paint filter tests may have been effected by the vibrations mentioned above. It is believed that the vibrations may have increased the drainability of the paint filters due to vibrations keeping the sediment slurry loose, thus reducing clogging of the paint filter. However, these effects are considered minor since the gravity settling buckets used a smaller pore size filter paper and drained all free fluids quickly in a quiet, non-disruptive environment (outside on stable ground).

The vibrations appeared to primarily effect the electric balance when the air conditioning unit was operating. Additionally, the larger the temperature range between outside and laboratory conditions, the more variable the balance. This variability went unnoticed for the first few weeks of the project when the range between the outside and inside temperatures was low, but became more

apparent as the outside temperatures increased and the air conditioner was continuously operating. This was corrected by taking differences in TSS filter paper blanks which should have been zero (as indicated in later TSS results) and applying these differences to other weights on corresponding dates. Once this problem was recognized, balance readings were checked until corresponding triple readings were obtained to help ensure representative values were being recorded. Section 4.1.2 provides more details on TSS determination and how these errors were handled.

Air entrapment was observed in most of the cured solidified sample mixtures from ESSW-SOP13. The entrapped air could cause some errors in the solidified density results. Additionally, the air voids could weaken a solidified mass and cause premature failure during unconfined compressive strength tests or result in excessive settlement during one-dimensional consolidation tests. These results are most likely representative for full-scale solidification processes unless extra steps are taken to reduce air entrapment. If air entrapment reduction processes are applied, then the solidified density and compressive strength results could be slightly higher than those in this report while the consolidation results could be lower than those in this report.

Distilled water was used when called upon in the standards outlined in the ESSW. Due to accessability and since no chemical analysis was performed on such, potable water was used for all other tests requiring water additives. Potable water may skew tests results due to the possible addition of dissolved solids contained. However, solids concentrations of test samples were high enough to cause insignificant differences induced by the dissolved solids associated with potable water use. Plus, true processing of the ponds would most likely involve potable water.

The humidity in Tennessee is typically known to be excessive through most of the summer months, which was the time frame for this scope of work. To help combat the humidity effects, the samples were cooled in a desiccator and weighed immediately upon removal from such. An accuracy check of potential humidity effects is provided in the following section.

5.2 PRECISION/ACCURACY CHECKS

This section provides a few interesting findings observed during various methods implemented to help check precision and accuracy of the results.

5.2.1 Humidity

Due to humidity, some samples had the potential to gain weight when set aside for a few minutes (outside the desiccator) prior to reweighing. The relative percent difference would have a greater impact with low mass samples (such as TSS filters) and smaller impact on larger mass samples (such as water content tests). It appears the samples could gain as much as 0.1 grams if allowed contact (sometimes within 5 minutes) with the moist air outside the desiccator environment. Typical dry TSS sediments did not fall below 0.1 grams, so a 0.1 gram moisture increase could induce an error of 100%. The dried samples used with water content analysis typically weighed over 5.0 grams, so a 0.1 gram increase could induce an error of only 2%. Other tests required over 5

grams of moist samples, so the humidity effects were considered negligible. To help minimize this effect, care was taken to ensure the desiccant was dry (or blue), the cooled samples were weighed immediately following extraction from the desiccator, and the desiccator resealed immediately following sample extraction. Additionally, most samples were either reheated and recooled in the desiccator or placed back into the desiccator overnight and reweighed the following day to help ensure accurate results.

5.2.2 COMP1 Development

As outlined in the ESSW, the COMP1 stock (CPCP1) was to consist of 60% from pond 3513 stock (13CP1) and 40% from pond 3524 stock (24CP1). However, the original 13CP1 concentration was less than half of that measured from 24CP1 (8.0 mg/L versus 17.1 mg/L). The COMP1 development assumed comparable concentrations, thus a thicker 13CP1 stock was necessary. Additional decants were taken from 13CP1 and the stock relabeled as 13CPD. The COMP1 stock was then developed using 60% of 13CPD and 40% 24CP1.

Upon analyzing 13CPD, the concentration was still slightly lower than 24CP1 (12.4 mg/L versus 17.1 mg/L). To determine the exact COMP1 mix, 60 parts of 13CPD was added to 40 parts of 24CP1 [(60*12.4) + (40*17.1) = 1428]. The percentage from pond 3513 was then estimated to be 52% [(60*12.4)/1428] while pond 3524 contributed 48% [(40*17.1)/1428].

The 52/48 COMP1 stock appeared to be slightly off from the desirable 60/40 split but may be more closely related if comparing volumes rather than masses. The original 60/40 selection was based on volumes calculated from historic sediment depth information. These values indicate that if sediments from ponds 3513 and 3524 were combined, approximately 60% of the volume would be from 3513 while 40% would be from 3524. Gravity settling test comparisons of the one-hour settled volume for the 20,000 mg/L concentrated samples indicate the pond 3513 sediments may be "fluffier" than the pond 3524 sediments. For example, the average one-hour, 20,000 mg/L settled volume for pond 3513 was 288 mL while pond 3524's average was 188 mL. Based on this, perhaps the COMP1 mix is actually closer to the desirable 60/40 mix since pond 3513 could potentially occupy more space when compared to the same concentration as pond 3524. However, additional results also indicate the "fluff" is less notable at times exceeding the one-hour settling periods but still distinguishable in the gravity settling test with extended settling time data observed during this scope of work. This "fluff" difference could even be indistinguishable over periods of months or years but difficult to determine based on these results alone.

5.2.3 Gravity Drainage

It was desirable to compare the final moisture content of the paint filter test with the moisture content of the gravity drained sample. The average paint filter final moisture content was 77.9% (average of all final moisture content results in Table 4-15) while the average moisture content of the gravity drained sample was 67.6 (average of last four results in Table 4-2). It is not surprising that the gravity drained moisture content is less than that of the paint filter. This is because the paint

filter results were taken from a sample which decreased its release rate to one drop every two minutes (thus, still having some free fluids) while the gravity drained sample had a minimum of three days for complete drainage. Additionally, the gravity drained specimen was developed to be at least six-inches thick while the maximum thickness of the drained paint filter sample was barely one-inch. The extra weight associated with the gravity drained specimen could have forced additional drainage through overburden pressures. Based on this comparison, it appears that the sediments from the paint filter tests could have released approximately 15% more fluids if allowed to completely drain or in a layer thick enough for overburden pressures to induce forced drainage.

Based on the paint filter results, an average volume reduction of 25% was estimated for gravity thickened samples experiencing gravity drainage. However, using the average final moisture content of 67.9% from the gravity drained specimens from ESSW-Task 4.2 and the initial moisture content of 80.2% (average of the CPCPD gravity thickened stock) for back calculations[10] indicates volume reduction was in excess of 35% during the gravity drainage task.

5.2.4 Compaction

As discussed in Section 4.1.7 of this report, the one-dimensional consolidation tests indicated the gravity drained sample could compress by 60% under a 56 psi load. Back calculations from the modified LRT (Section 4.1.8) indicated the gravity drained specimen compressed approximately 46% under a 50 psi load, a 14% drop from the one-dimensional compaction results. Part of this may be due to the larger applied load used with the one-dimensional test, which is approximately 6 psi more than the modified LRT maximum load. However, if comparing the one-dimensional compression results at the previous loading of 28 psi, the sample still compressed approximately 55% which is almost 10% more at half the loading used with the modified LRT.

One explanation for the large difference may deal with drainage paths and testing durations. The one-dimensional sampling chamber had porous stones on both faces of the one-inch specimen and was compressed over a one-week period. The modified LRT chamber had a filter mesh over a porous stone on one face of the 3- to 5- inch specimen and was typically performed over a three day period. Perhaps the differences in the effective drainage paths and testing durations would account for part of the 14% drop differences mentioned above.

---

[10]For example, if you start with 100 grams and 80.2 grams (80.2 % initial moisture content) is water, then 19.8 grams must be sediment. If the final moisture content is 67.9 % and you have 19.8 grams of solids, then the final water weight must be 41.8 grams. Thus, 80.2 grams initial less 41.8 grams final equals 38.4 grams of moisture lost from the initial 100 gram sample, for a 38.4% volume reduction (assuming no air voids developed).

6.0 CONCLUSIONS

Reduction of unknowns associated with the SIOU sediments provided the rational behind implementation of this geotechnical and treatability study. Acquisition of information on geotechnical and treatability characteristics will enhance the evaluation of remedial design processes.

Assumptions were made during the development of the technical work plan (or ESSW). Some modifications and deviations were necessary to meet project objectives outlined in Alternative 3 of the ESSW and to ensure sufficient data for proper selection of a remedial alternative. Section 3 of this report details all modifications and deviations implemented to obtain the necessary results which are summarized as follow:

- Gravity settling tests indicate pond sediments are self-flocculating and settle at a relatively rapid rate. A visually clear supernatant was usually achieved following a 1 to 4 days settling time (based on a calm control environment). The total suspended solids following a 1 hour settling time ranged between 40 to 325 mg/L, but typically fell below 200 mg/L. Surface radiation levels following one-hour settling often dropped to background even at the highest concentrations;

- Paint filter and gravity drainage tests indicated the pond sediments are capable of gravity draining in a relatively short time (few hours for 100 gram masses and less than 3 days for estimated 3 gallon masses);

- Volume reductions of gravity thickened samples by gravity drainage only is estimated to exceed 25%;

- Once gravity drained, sediment samples used for the one-dimensional consolidation tests compressed by as much as 60% under a 50 psi load. Approximately 45 to 50% compression occurred under a 10 psi load;

- Once gravity drained, the modified liquid release test results indicate approximately 46% of the remaining fluid can be forced out of the sample under a 50 psi load. Approximately 37% of the remaining fluid was forced out under a 10 psi load;

- The dried sediments were self-adhesive to the point that they did not dissolve, even when soaked in water for several months. Pond 3513 dried sediments were more adhesive than pond 3524 dried sediments. Adhesive properties are believed to be lime related;

- Harvard miniature compaction test results estimated optimum moisture content at 48% with an optimum density of 67 pcf;

- Gravity thickened sediments solidified with a 75% mix (on wet weight basis) of Portland cement/fly ash experienced a 30% volume increase and exceeded a 60 psi strength at 5 days curing. A 50% mix experienced a 22% volume increase with a maximum strength gain of 28 psi following 7 days curing (based on UCS results);

- The 50, 75, and 100% mixes (on wet weight basis) of Portland cement/fly ash passed the TCLP contaminant analysis. Total PCB results ranged from 4.6 to 5.7 μg/g for these solidified samples; and

- The COMP1 (or pond 3513 and 3524 gravity thickened composite stock) slurry and dried samples passed the TCLP contaminant analysis. Aroclor-1254 was detected between 29,000 and 35,000 μg/L on the slurry sample while total PCB's on the dried COMP1 sample was reported at 55 μg/g.

To conclude, the sediments were self-flocculating and drained freely indicating remedial Alternative 3 as outlined in the ESSW could successfully be implemented.

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APPENDICES

for

ENGINEERING SUPPORT STUDIES REPORT
Geotechnical and Treatability Results for the
Technical Work Plan for Surface Impoundments Operable Unit
Engineering Support Studies

Prepared for:
Lockheed Martin Energy Systems
Oak Ridge National Laboratory
Environmental Restoration Program

Prepared by:
OPERATIONAL TECHNOLOGIES CORPORATION
683 Emory Valley Road
Oak Ridge, Tennessee 37830

September 12, 1996

Prepared for the
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X-OE-791

APPENDIX A

Laboratory Forms and Supporting Documentation

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SOP - 2
WATER CONTENT DATA FORMS

BOOK 1 of 2

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SOP - 2
Water Content Data Form

Date of Test 4/22/96

Alternative # 3 from SESS

Task # _____

After heating over night

		29APR96	Analyst	30APR96 REWEIGH	Analyst		Analyst		Analyst		Analyst		Analyst
Sample ID		13-BCI-MC-01	NW	"									
Planchet (g)		61.44	NW	"									
Wet soil + planchet (g)		270.16	NW	"									
Dry soil + planchet (g)		86.11		86.05									
Water content	W %	746%		748%	A 742%	%		%		%		%	

$$W\% = \frac{(\text{planchet + wet soil}) - (\text{planchet + dry soil})}{(\text{planchet + dry soil}) - (\text{planchet})} \times 100 = \frac{M_W}{M_S} \times 100 = 746.05$$

270.16 − 86.11 = 184.05; 86.11 − 61.44 = 24.67

Remarks used container "C" Note- dry sediments were light brown and appeared to dry in a cohesive pattern (looked like broken cookie once dry).

Computed by _____ Checked by NW 30 APR 1996

Note: After reweighing overnight, % difference in weights ≈ 0.07% GOOD! will use first weight

A-2

SOP - 2
Water Content Data Form

Date of Test 4-23-96
Alternative # 3 from SESS
Task #

Heat over night

		29APR96	Analyst	30APR96 REWEIGH	Analyst		Analyst		Analyst		Analyst		Analyst
Sample ID		13BC2MC01	[illegible]	SAME									
Planchet (g)		62.01	[illegible]	"									
Wet soil + planchet (g)		190.91	[illegible]	"									
Dry soil + planchet (g)		69.44	[illegible]	69.42	[illegible]								
Water content	W %	1635%	[illegible]	1639%	Δ = 0.2% [illegible]	%		%		%		%	

$$W\% = \frac{(\text{planchet + wet soil}) - (\text{planchet + dry soil})}{(\text{planchet + dry soil}) - (\text{planchet})} \times 100 = \frac{M_W}{M_S} \times 100 = 1634.86$$

190.91 69.44 121.47
69.44 62.01 7.43

Remarks used container "A". Note - dry sediments were light brown in color and cohesive-like features (soil stuck to itself in fractured clumps).

Computed by [illegible] Checked by AW 3JUN96

Note: After reheating overnight, % difference in weights ≈ 0.03%. GOOD! will use first weight.

A-3

000002

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Water Content Data Form

Date of Test 30 APR96
Alternative # 3 from SESS
Task #

		6 MAY96 weigh	Analyst	7 MAY96 Reweigh	Analyst		Analyst		Analyst		Analyst		Analyst
Sample ID		13BC3ACØ1		"									
Planchet (g)		61.44		"									
Wet soil + planchet (g)		148.62		"									
Dry soil + planchet (g)		66.45	NW	66.48	NW								
Water content	W %	1640 %	NW	1630 %	NW	%		%		%		%	

$$W\% = \frac{(planchet + wet\ soil) - (planchet + dry\ soil)}{(planchet + dry\ soil) - (planchet)} \times 100 = \frac{M_W}{M_S} \times 100 = 1640.12\%$$

148.62 66.45 82.17
66.45 61.44 5.01

Remarks Used plat "C". Did not sieve because visual observations indicate this sample is similar in nature to 13BC1 and 13BC2

Computed by NW Checked by 30 MAY96

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SOP - 2
Water Content Data Form

Date of Test 02MAY96
Alternative # 3 from SESS
Task #

		weigh 6MAY96	Analyst	7MAY96 Reweigh	Analyst		Analyst		Analyst		Analyst		Analyst
Sample ID		13BC5MC02	[illegible]	"									
Planchet (g)		62.02	[illegible]	"									
Wet soil + planchet (g)		152.68	[illegible]	"									
Dry soil + planchet (g)		72.78	[illegible]	72.78	NW								
Water content	W %	742.6 %	NW	742.6 %	NW	%		%		%		%	

$$W\% = \frac{\overset{152.68}{(planchet + wet\ soil)} - \overset{72.78}{(planchet + dry\ soil)}}{\underset{72.78}{(planchet + dry\ soil)} - \underset{62.02}{(planchet)}} \times 100 = \frac{\overset{79.90}{M_W}}{\underset{10.76}{M_S}} \times 100 = 742.6\%$$

Remarks used plat "A". Temp. of slurry = 70.5°F.

Computed by NW Checked by [illegible] 30MAY1996

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SOP - 2
Water Content Data Form

Date of Test 02MAY96
Alternative # 3 from SESS
Task #

			Analyst	Reweigh 7MAY96	Analyst		Analyst		Analyst		Analyst		Analyst
Sample ID		13BC4MC001		SAME "									
Planchet (g)		61.69		"									
Wet soil + planchet (g)		172.71		"									
Dry soil + planchet (g)		77.37		77.32									
Water content	W %	608.0%	NW	610.3%	NW	%		%		%		%	

$$W\% = \frac{(\text{planchet + wet soil}) - (\text{planchet + dry soil})}{(\text{planchet + dry soil}) - (\text{planchet})} \times 100 = \frac{M_W}{M_S} \times 100$$

172.71 − 77.37 = 95.34 (95.39) NW 5/7/96
77.37 − 61.69 = 15.68 (15.63)

$= 608.0\%$ (610.3%)

Remarks Used plat "B". Slurry temperature = 65.3°F. Water content % difference between weighing is 0.3%. No further testing is necessary.

Computed by NW Checked by 30MAY1996

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SOP - 2
Water Content Data Form

ate of Test 06MAY96
lternative # 3 from SESS
ask #

			Analyst	reweigh 5-14-96	Analyst		Analyst		Analyst		Analyst		Analyst
Sample ID		13PC1MC01	[illegible]	"									
Planchet (g)		60.77	[illegible]	"									
Vet soil + planchet (g)		211.05	[illegible]	"									
ry soil + planchet (g)		72.64	[illegible]	72.65	NW								
Vater content	W %	11.66 %	NW	11.65 %	NW	%		%		%		%	

$$W\% = \frac{(planchet + wet\ soil) - (planchet + dry\ soil)}{(planchet + dry\ soil) - (planchet)} \times 100 = \frac{M_W}{M_S} \times 100$$

M_W: 138.41 (138.40); M_S: 11.87 (11.88)

emarks used Platch "H". After reweighing, % difference in weights = 0.09 %. OK - stop here

Computed by NW Checked by [illegible] 31MAY1996

000006

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AUG 19 1995

SOP - 2
Water Content Data Form

Date of Test 06 MAY 96
Alternative # 3 from SESS
Task #

			Analyst	RE weight 5-14-96	Analyst		Analyst		Analyst		Analyst		Analyst
Sample ID		13PC1MC02	[illegible]	"									
Planchet (g)		61.21	[illegible]	"									
Wet soil + planchet (g)		225.96	[illegible]	"									
Dry soil + planchet (g)		74.42	[illegible]	74.43	NW								
Water content	W %	114.7 %	NW	114.6 %	NW	%		%		%		%	

$$W\% = \frac{(planchet + wet\ soil) - (planchet + dry\ soil)}{(planchet + dry\ soil) - (planchet)} \times 100 = \frac{M_W}{M_S} \times 100$$

M_W 151.54 (151.53)
M_S 13.21 (13.22)

Remarks Used Platch "F" After reweighing, % difference in weights = 0.09% ok - stop here

Computed by NW Checked by [illegible] 31 MAY 96

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Water Content Data Form

Date of Test 16MAY96
Alternative # 3 from SESS
Task #

			Analyst	REWEIGH 22MAY96	Analyst	BROKE UP AND REWEIGH 23MAY96	Analyst	Reweigh 24MAY96	Analyst		Analyst		Analyst
Sample ID		~~24~~BC3MC01		"		"		"					
Planchet (g)		61.70	Bottle 2	"		"		"					
Wet soil + planchet (g)		216.38	NW	"		"		"					
Dry soil + planchet (g)		5/22/96 87.00	NW	86.89	[illegible]	86.84	[illegible]	86.81	[illegible]				
Water content	W %	511.4 %	NW	514.1 %	NW	515.3%	NW	516.0%	NW	%		%	

$$W\% = \frac{(planchet + wet\ soil) - (planchet + dry\ soil)}{(planchet + dry\ soil) - (planchet)} \times 100 = \frac{M_w\ 129.57}{M_s\ 25.11} \times 100$$

Remarks Used Plat "I", Soil/slurry temp = 68.4°F. % diff in Reweigh from 22MAY96 and 23MAY96 is ~ 0.06% will ~~use~~ use the 23 MAY96 result for the gravity settling results (see SOP3 for concentration results).

Computed by NW Checked by [illegible] 31 MAY 1996

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Water Content Data Form

Date of Test 14 MAY '96
Alternative # 3 from SESS
Task #

		22MAY96 MC03	Analyst	22MAY96 MC04	Analyst	Reweigh 5/24/96 Plan. B	Analyst	REWEIGH planB	Analyst	REWEIGH 28MAY96	Analyst	REWEIGH 28MAY96	Analyst
Sample ID		13CP1DS03	Bottle 1	13CP1DS04	Bottle 2	13CP1MC03		13CP1MC03		13CP1MC03		13CP1MC04	
Planchet (g)		61.71	B	60.52	E	B		B		B		E	
Wet soil + planchet (g)		122.40	NW	130.34	NW	—		—		—		—	
Dry soil + planchet (g)		66.55		66.17		66.52	NW	66.54	NW	66.53		66.11	
Water content	W %	1154 %	NW	1136%		1162 %	NW	1157 %	NW	1159%		1149%	

% diff ≅ 0.9%
GOOD!

$$W\% = \frac{(planchet + wet\ soil) - (planchet + dry\ soil)}{(planchet + dry\ soil) - (planchet)} \times 100 = \frac{M_W}{M_S} \times 100$$

Remarks Samples Air dried and placed in dessicator overnight prior to rewighing.

Computed by REG & TM Checked by 03JUN1996 and

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Water Content Data Form

Date of Test 16MAY96

Alternative # 3 from SESS

Task #

			Analyst	REWEIGH 24MAY96	Analyst		Analyst		Analyst		Analyst		Analyst
Sample ID		24BC2MC01		"									
Planchet (g)		62.42	Bottle 2	"									
Wet soil + planchet (g)		237.43		"									
Dry soil + planchet (g)		84.04		84.05									
Water content	W %	709.5 %	NW	709.1 %	NW	%		%		%		%	

$$W\% = \frac{(planchet + wet\ soil) - (planchet + dry\ soil)}{(planchet + dry\ soil) - (planchet)} \times 100 = \frac{M_W}{M_S} \times 100$$

Remarks Used plat "D", Soil/Slurry temp = 64.4 °F

Computed by NW Checked by 03JUN1996

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Water Content Data Form

Date of Test 16 MAY 96

Alternative # 3 from SESS

Task #

			Analyst	REWEIGH 24MAY96	Analyst		Analyst		Analyst		Analyst		Analyst
Sample ID		24BC1MC01		"									
Planchet (g)		60.97		"									
Wet soil + planchet (g)		249.49	NW	"									
Dry soil + planchet (g)		90.01		89.98									
Water content	W %	549.2%	NW	549.8 %	NW	%		%		%		%	

$$W\% = \frac{(planchet + wet\ soil) - (planchet + dry\ soil)}{(planchet + dry\ soil) - (planchet)} \times 100 = \frac{M_W}{M_S} \times 100$$

Remarks used plat "J". Soil/slurry temp = 64.1 °F

Computed by NM Checked by 03Jun1996

A-12

000011

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SOP - 2
Water Content Data Form

Date of Test 23 MAY 96
Alternative # 3 from SESS
Task #

			Analyst		Analyst		Analyst		Analyst		Analyst		Analyst
Sample ID		24BC4 (Acid)	Bottle #3	"									
Planchet (g)		62.02	"	"									
Wet soil + planchet (g)		175.01	"	"									
Dry soil + planchet (g)		80.17	NW	80.16	"								
Water content	W %	522.5%	NW	522.9%	"	%		%		%		%	

$$W\% = \frac{(planchet + wet\ soil) - (planchet + dry\ soil)}{(planchet + dry\ soil) - (planchet)} \times 100 = \frac{M_W}{M_S} \times 100$$

Remarks Used Planchet "A". Slurry temp = 67.5°F. % difference in reweighed result ≅ 0.08% good -- leave at this.

Computed by NW & TS Checked by TS 03 Jun 1996 and

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Water Content Data Form

Date of Test 23 MAY 1996
Alternative # 3 from SESS
Task #

			Analyst	REWEIGH	Analyst		Analyst		Analyst		Analyst		Analyst
Sample ID		24BC5MC01	Bottle # 3										
Planchet (g)		61.49											
Wet soil + planchet (g)		187.40											
Dry soil + planchet (g)		83.72	NW	83.71									
Water content	W %	466.4% (466.4%)	NW	466.8%		%		%		%		%	

$$W\% = \frac{(planchet + wet\ soil) - (planchet + dry\ soil)}{(planchet + dry\ soil) - (planchet)} \times 100 = \frac{M_W}{M_S} \times 100$$

Remarks Used Planchet "L". slurry temp = 67.3°F. % difference in reweighed WC is 0.09%. Leave at this.

Computed by NW

Checked by 03JUN1996 and

A-14

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SOP - 2
Water Content Data Form

Date of Test 28 MAY 1996
Alternative # 3 from SESS
Task #

			Analyst		Analyst		Analyst		Analyst		Analyst		Analyst
Sample ID		13CP1MC05											
Planchet (g)		60.77											
Wet soil + planchet (g)		281.89											
Dry soil + planchet (g)		79.00		78.34		78.36							
Water content	W %	1112.9%		1158.5%		1157.1%		%		%		%	

$$W\% = \frac{(planchet + wet\ soil) - (planchet + dry\ soil)}{(planchet + dry\ soil) - (planchet)} \times 100 = \frac{M_W}{M_S} \times 100$$

Remarks used platch "H". This test was performed to obtain enough mass for Specific gravity test. Used bottle no. 4

Computed by

Checked by NW 3JUN1996

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SOP - 2
Water Content Data Form

Date of Test 28 MAY 1996
Alternative # 3 from SESS
Task #

		weighed 6/6/96	Analyst	REWEIGH 07 JUL 1996	Analyst		Analyst		Analyst		Analyst		Analyst
Sample ID		24CPMC01	NW	"									
Planchet (g)		61.69	NW	"									
Wet soil + planchet (g)		266.68	NW	"									
Dry soil + planchet (g)		96.63	NW	96.64	NW								
Water content	W %	486.7%	REG	486.5%	REG	%		%		%		%	

$$W\% = \frac{(planchet + wet\ soil) - (planchet + dry\ soil)}{(planchet + dry\ soil) - (planchet)} \times 100 = \frac{M_W}{M_S} \times 100$$

Remarks used planchet "B" used bottle # 4.

Computed by REG Checked by NW 23 JUL 1996

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Water Content Data Form

Date of Test 28 MAY 1996
Alternative # 3 from SESS
Task # _____

			Analyst	REWEIGH	Analyst		Analyst		Analyst		Analyst		Analyst
Sample ID		24CPMC02	NW										
Planchet (g)		60.48	NW										
Wet soil + planchet (g)		271.15	NW										
Dry soil + planchet (g)		96.46	NW	96.49									
Water content	W %	485.5 %	NW	485.0%	REC	%		%		%		%	

$$W\% = \frac{(planchet + wet\ soil) - (planchet + dry\ soil)}{(planchet + dry\ soil) - (planchet)} \times 100 = \frac{M_W}{M_S} \times 100$$

174.69
35.98

Remarks Used planchet "E" used Bottle #2.

Computed by NW/REC Checked by NW 23 JUL 1996

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SOP - 2
Water Content Data Form

Date of Test 05JUN1996
Alternative # 3 from SESS
Task #

			Analyst	Reweigh 14JUN96	Analyst	Reweigh 17JUN96	Analyst		Analyst		Analyst		Analyst
Sample ID		CPCPINC01											
Planchet (g)		62.00	NW										
Wet soil + planchet (g)		227.54	NW										
Dry soil + planchet (g)		92.37		92.33		92.31							
Water content	W %	445.1%	REC	445.8%	REC	446.2%	NW	%		%		%	

$$W\% = \frac{(planchet + wet\ soil) - (planchet + dry\ soil)}{(planchet + dry\ soil) - (planchet)} \times 100 = \frac{M_W}{M_S} \times 100 \quad \frac{135.23}{30.31}$$

Remarks Used Planchet "A" and bottle #1

Computed by NW/REC Checked by NW 23JUL1996

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Water Content Data Form

Date of Test 05 JUN 1996

Alternative # 3 from SESS

Task #

			Analyst	RE weight 14 JUN 96	Analyst	Recheck 17 JUN 96	Analyst		Analyst		Analyst		Analyst
Sample ID		CPCPM6Ø2											
Planchet (g)		61.22											
Wet soil + planchet (g)		237.86											
Dry soil + planchet (g)		93.64		93.55		93.54							
Water content	W %	44~~7.8~~%	REG	446.4 %	REG	%	446.5	NN %		%		%	

$$W\% = \frac{(planchet + wet\ soil) - (planchet + dry\ soil)}{(planchet + dry\ soil) - (planchet)} \times 100 = \frac{M_W}{M_S} \times 100 \quad \frac{144.32}{32.32}$$

Remarks Used Planchet "F" bottle #3

Computed by REG / NW Checked by NW 23 JUL 1996

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Water Content Data Form

Date of Test 05 JUN 1996
Alternative # 3 from SESS
Task #

		Weight Hrs 10	Analyst	Remeasured 17 JUN 96	Analyst		Analyst		Analyst		Analyst		Analyst
Sample ID		CPCP1MC03											
Planchet (g)		1.92	NW										
Wet soil + planchet (g)		30.18	NW										
Dry soil + planchet (g)		9.06	~~[illegible]~~	9.08	~~[illegible]~~								
Water content	W %	295.8%	NW	294.7%	NW	%		%		%		%	

$$W\% = \frac{(planchet + wet\ soil) - (planchet + dry\ soil)}{(planchet + dry\ soil) - (planchet)} \times 100 = \frac{M_W}{M_S} \times 100$$

21.12 21.10
7.14 7.16

Remarks Used bottle #3. SEDIMENT from Paint Filter test CPCP1EP04

Computed by NW Checked by NW 23 JUL 1996

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SOP - 2
Water Content Data Form

Date of Test 07JUN 1996
Alternative # 3 from SESS
Task #

			Analyst	Reweighed 17JUL96	Analyst		Analyst		Analyst		Analyst		Analyst
Sample ID		14JUN96 13CPDMC01 ~~13CP2MC01~~	NW										
Planchet (g)		61.95	NW										
Wet soil + planchet (g)		230.63	NW										
Dry soil + planchet (g)		82.99 "G"	LEC	82.90									
Water content	W %	701.7 ~~[illegible]~~ %	RSC	705.2 %	NW	%		%		%		%	

$$W\% = \frac{(planchet + wet\ soil) - (planchet + dry\ soil)}{(planchet + dry\ soil) - (planchet)} \times 100 = \frac{M_W}{M_S} \times 100$$

147.73 / 20.95

Remarks 13 COMP SAMPLE After removal of supernatant used planchet "G"

Computed by LEC/NW Checked by NW 23JUL1996

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SOP - 2
Water Content Data Form

Date of Test 10 JUN 1996
Alternative # 3 from SESS
Task #

		14 Jun 96 Weigh	Analyst	Recweigh 17 Jun 96	Analyst		Analyst		Analyst		Analyst		Analyst
Sample ID		CPCPIMC01											
Planchet (g)		1.99	NW										
Wet soil + planchet (g)		23.73	NW										
Dry soil + planchet (g)		7.43		7.42									
Water content	W %	299.6%	NW	NW ~~300.9~~ 300.4%	NW	%		%		%		%	

$$W\% = \frac{(planchet + wet\ soil) - (planchet + dry\ soil)}{(planchet + dry\ soil) - (planchet)} \times 100 = \frac{M_W}{M_S} \times 100$$

16.30
5.44

Remarks used bottle #1. SEDIMENT from Paint Filter test CPCPIEP05

Computed by NW Checked by NW 23JUL1996

A-22

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Water Content Data Form

Date of Test 13JUN 1996
Alternative # 3 from SESS
Task #

			Analyst		Analyst		Analyst		Analyst		Analyst		Analyst
Sample ID		24CP1 MC.03											
Planchet (g)		62.43											
Wet soil + planchet (g)		190.89											
Dry soil + planchet (g)		84.31 ~~9.08~~		84.33									
Water content	W %	487.1 %	NW	486.6 %	NW	%		%		%		%	

$$W\% = \frac{(planchet + wet\ soil) - (planchet + dry\ soil)}{(planchet + dry\ soil) - (planchet)} \times 100 = \frac{M_W}{M_S} \times 100$$

Remarks Used plat "D". Used bottle #4

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Water Content Data Form

Date of Test 6-18-96
Alternative # 3 from SESS
Task #

		21JUN96	Analyst	RBW 21GH 24JUN96	Analyst		Analyst		Analyst		Analyst		Analyst
Sample ID		CPCPDMC01											
Planchet (g)		60.97	NW										
Wet soil + planchet (g)		131.47	NW										
Dry soil + planchet (g)		75.00	[illegible]	75.03	[illegible]								
Water content	W %	402.5%	[illegible]	409.4%	[illegible]	%		%		%		%	

$$W\% = \frac{(planchet + wet\ soil) - (planchet + dry\ soil)}{(planchet + dry\ soil) - (planchet)} \times 100 = \frac{M_W}{M_S} \times 100$$

Remarks Used planchet "J", bottle #5

Computed by [illegible] Checked by NW 23JUL1996

A-24

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Water Content Data Form

Date of Test 18JUN1994
Alternative # 3 from SESS
Task #

			Analyst	WEIGH 24JUN96	Analyst		Analyst		Analyst		Analyst		Analyst
Sample ID		CPCMDAC02											
Planchet (g)		61.69	NW										
Wet soil + planchet (g)		137.37	NW										
Dry soil + planchet (g)		~~84.52~~	24JUN96 wet + Ready	76.76									
Water content	W %	%		402.2%		%		%		%		%	

$$W\% = \frac{(planchet + wet\ soil) - (planchet + dry\ soil)}{(planchet + dry\ soil) - (planchet)} \times 100 = \frac{M_W}{M_S} \times 100$$

Remarks Used Planchet "B", bottle #8

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SOP - 8
MOISTURE CONTENT
DATA FORMS

BOOK 2 of 2

SOP - 2
Water Content Data Form

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Date of Test 11 JUL 1996
Alternative # 3 from SESS
Task #

recorded 8/2 371.55 reweighed 8/6 379.36 8/7 378.80

		Analyst		Analyst		Analyst		Analyst		Analyst		Analyst
Sample ID	CPCPDMC01A		CPCPDMC02A		CPCPDMC03A		CPCPDMC04A		CPCPDMC05A			
Planchet (g)	1.93	NW	1.93	NW	62.01	NW	1.94	NW	1.92	NW		
Wet soil + planchet (g)	22.51	NW	22.04	NW	463.9	NW	24.29	NW	25.29	NW		
Dry soil + planchet (g)	16.18		12.41		381.93	NW	~~15.73~~ 15.61	NW	~~12.05~~ 11.94	NW		
Water content W %	44.4 %	NW	91.9 %	NW	25.6 %	NW	63.5 %	NW	133.2 %	NW	%	
	↑ 100% mix		↑ 50% mix		↑ 150% mix		↑ 75%		↑ 30%			

50% Portland cement / 50% Fly Ash ⟹ 100% mix (based on wet weights)

$$W\% = \frac{(planchet + wet\ soil) - (planchet + dry\ soil)}{(planchet + dry\ soil) - (planchet)} \times 100 = \frac{M_W}{M_S} \times 100$$

A-27

Remarks Moisture content for Bench Scale Solidification test CPCPDS03

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Water Content Data Form

Date of Test 16 JUL 96
Alternative # 3 from SESS
Task #

			Analyst	Reviewed 23 JUL 96	Analyst		Analyst		Analyst		Analyst		Analyst
Sample ID		CPCPDMCØ1B	←		CPCPDMCØ28	←	Reviewed 24 JUL 96						
Planchet (g)		1.93	NW		1.96	NW							
Wet soil + planchet (g)		24.57	NW		31.02	NW							
Dry soil + planchet (g)		18.05	←	18.05 NW	21.21	←	21.21	NW					
Water content	W %	40.4 %	NW	40.4 % NW	51.0	NW %	51.0	NW %		%		%	
		↑ 100 %			↑ 100%								

$$W\% = \frac{(planchet + wet\ soil) - (planchet + dry\ soil)}{(planchet + dry\ soil) - (planchet)} \times 100 = \frac{M_W}{M_S} \times 100$$

Remarks 1 Day Moisture Contents.

Computed by NW Checked by NW

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Water Content Data Form

Date of Test 16 JUL 1996

Alternative # 3 from SESS

Task #

			Analyst	Reweighed 23JUL96	Analyst		Analyst	Reweighed 23JUL96	Analyst		Analyst		Analyst
Sample ID		CFCPDMC028			CACPDMC048								
Planchet (g)		1.94	NW			1.95	NW						
Wet soil + planchet (g)		22.46	NW			23.14	NW						
Dry soil + planchet (g)		15.15		15.16	NW	14.63		14.62	NW				
Water content	W %	55.3 %	NW	55.2%	NW	67.1 %	NW	67.2%	NW	%		%	

75% 75%

$$W\% = \frac{(planchet + wet\ soil) - (planchet + dry\ soil)}{(planchet + dry\ soil) - (planchet)} \times 100 = \frac{M_W}{M_S} \times 100$$

Remarks 1 Day Moisture Contents

Computed by NW Checked by NW

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Date of Test 16 JUL 1996
Alternative # 3 from SESS
Task #

			Analyst	Rewighed 23 JUL 96	Analyst		Analyst	Rewighed 24 JUL 96	Analyst		Analyst		Analyst
Sample ID		NW 16 JUL 96	CPCPDMC058		CPCPDMC058								
Planchet (g)		~~1.89~~ 1.91	NW			1.89	NW						
Wet soil + planchet (g)		27.30	NW			24.62	NW						
Dry soil + planchet (g)		14.74		14.74	NW	13.55		13.55	NW				
Water content	W %	97.9 %	NW	97.9 %	NW	94.9%	NW	94.9%	NW	%		%	
		50%				50%							

$$W\% = \frac{(planchet + wet\ soil) - (planchet + dry\ soil)}{(planchet + dry\ soil) - (planchet)} \times 100 = \frac{M_W}{M_S} \times 100$$

A-30

Remarks 1 Day Moisture Content

Computed by NW Checked by NW

~~000030~~ 18 JUN 1996
~~000029~~

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Water Content Data Form

Date of Test 16 JUL 1996

Alternative # 3 from SESS

Task #

			Analyst	Reweigh	Analyst		Analyst	Reweigh	Analyst		Analyst		Analyst
Sample ID		CPCPDMCP3B				CPCPDMCP3B							
Planchet (g)		1.91	NW			1.92	NW						
Wet soil + planchet (g)		26.77	NW			23.71	NW						
Dry soil + planchet (g)		13.60	NW	13.60	NW	12.25	NW	12.26	NW				
Water content	W %	112.7 %	NW	112.7 %	NW	110.9 %	NW	110.7 %	NW	%		%	

40% 40%

$$W\% = \frac{(planchet + wet\ soil) - (planchet + dry\ soil)}{(planchet + dry\ soil) - (planchet)} \times 100 = \frac{M_W}{M_S} \times 100$$

Remarks 1 Day Moisture Content weighed 8-1-96 Reweighed 8-2-96

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Water Content Data Form

Date of Test 18JUL1996
Alternative # 3 from SESS
Task #

			Analyst	Reweigh	Analyst		Analyst	Reweigh	Analyst		Analyst		Analyst
Sample ID		CPCPDAC09B		CPC		CPCPDAC10B							
Planchet (g)		1.85				1.86							
Wet soil + planchet (g)		30.66				37.26							
Dry soil + planchet (g)		21.72	NW	21.70	NW	26.34	NW	26.32	NW				
Water content	W %	45.0 %	NW	45.1 %	NW	44.6%	NW	44.7%	NW	%		%	
		100%		100%		100%							

$$W\% = \frac{(planchet + wet\ soil) - (planchet + dry\ soil)}{(planchet + dry\ soil) - (planchet)} \times 100 = \frac{M_W}{M_S} \times 100$$

Remarks 3 Day Moisture Content Weighed 8/1/96 Reweighed 8/2/96

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Water Content Data Form

Date of Test 18 JUL 1996
Alternative # 3 from SESS
Task #

← Reweighed 8/5/96

			Analyst	Reweigh	Analyst		Analyst	Reweigh	Analyst		Analyst		Analyst
Sample ID		CPCPDMC11B	[illegible]			CPCPDMC12B	[illegible]				CPCPDMC11B	[illegible]	
Planchet (g)		1.91	[illegible]			1.92	[illegible]						
Wet soil + planchet (g)		44.01	[illegible]			40.21	[illegible]						
Dry soil + planchet (g)		24.66	NW	28.42	NW	25.66	NW	25.62	NW		28.41	NW	
Water content	W %	85.1%	NW	58.8%	NW	61.3 %	NW	61.6%	NW	%	58.9	NW %	
		75 %				75 %							

$$W\% = \frac{(planchet + wet\ soil) - (planchet + dry\ soil)}{(planchet + dry\ soil) - (planchet)} \times 100 = \frac{M_W}{M_S} \times 100$$

Remarks @ 3 DAYS CURRING Weighed 8/1/96. Reweighed 8/2/96.

Computed by NW Checked by NW

A-33

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SOP - 2
Water Content Data Form

Date of Test 18JUL1996
Alternative # 3 from SESS
Task #

			Analyst	Reweigh	Analyst		Analyst	Reweigh	Analyst		Analyst		Analyst
Sample ID		CPCPDMC13B				CPCPDMC14B							
Planchet (g)		1.88				1.89							
Wet soil + planchet (g)		41.79				37.44							
Dry soil + planchet (g)		23.37	NW	23.35	NW	20.97	NW	20.94	NW				
Water content	W %	85.7 % ↑50%	NW	85.9 %	NW	86.3% ↑50%	NW	86.6 %	NW	%		%	

$$W\% = \frac{(planchet + wet\ soil) - (planchet + dry\ soil)}{(planchet + dry\ soil) - (planchet)} \times 100 = \frac{M_W}{M_S} \times 100$$

Remarks @ 3 DAYS CURRING Weighed 8/1/96 Reweighed 8/2/96

Computed by NW Checked by NW

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SOP - 2
Water Content Data Form

Date of Test 18 JUL 1996

Alternative # 3 from SESS

Task #

			Analyst	Reweigh	Analyst		Analyst	Reweigh	Analyst		Analyst		Analyst
Sample ID		CPCPDMC15B				CPCPDMC16B							
Planchet (g)		1.85				1.86							
Wet soil + planchet (g)		30.01				32.71							
Dry soil + planchet (g)		15.48	NW	15.48	NW	17.05	NW	17.03	NW				
Water content	W %	106.7% ↑40%	NW	106.7%	NW	103.1%	NW	103.4%	NW	%		%	

$$W\% = \frac{(planchet + wet\ soil) - (planchet + dry\ soil)}{(planchet + dry\ soil) - (planchet)} \times 100 = \frac{M_W}{M_S} \times 100$$

A-35

Remarks @ 3 DAYS CURRING Weighed 8/1/96. Reweighed 8/2/96.

Computed by NW Checked by NW

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SOP - 2
Water Content Data Form

Date of Test 18JUL1996
Alternative # 3 from SESS
Task #

* All samples weighed 7/31/96

Reweigh 8/1/96		110.67	Analyst	108.88	Analyst	112.73	Analyst	114.46	Analyst		Analyst		Analyst
Sample ID		CPCPDMC06	401.9%	CPCPDMC07	402.3%	CPCPDMC08	405.6%	CPCPDMC09	420.3%				
Planchet (g)		60.97	NW	61.21	NW	60.49	NW	62.42	NW				
Wet soil + planchet (g)		310.40	NW	300.64	NW	324.60	NW	333.19	NW				
Dry soil + planchet (g)		110.71	NW	108.90	NW	112.89	NW	114.44	NW				
Water content	W %	401.5%	NW	402.1%	NW	404.0%	NW	420.5%	NW	%		%	
		Plan. J		Plan. F		Plan. E		Plan. D					

$$W\% = \frac{(planchet + wet\ soil) - (planchet + dry\ soil)}{(planchet + dry\ soil) - (planchet)} \times 100 = \frac{M_W}{M_S} \times 100$$

Remarks Samples CPCPDMC06 & 07 taken from same bottle. Sample CPCPDMC08 taken from an additional bottle. Sample CPCPDMC09 taken from a combination of 2 bottles. 4 bottles in total.

Computed by NW Checked by NW

AUG 21 1995

SOP - 2
Water Content Data Form

Date of Test 20 JUL 1996
Alternative # 3 from SESS
Task #

		weighed 8/1/96	Analyst	Reweighed 8/2/96	Analyst	weighed 8/5/96	Analyst	Reweighed 8/6/96	Analyst		Analyst		Analyst
Sample ID		CPCPDMC178				CPCPDMC178							
Planchet (g)		1.91	NW			1.90	NW						
Wet soil + planchet (g)		32.95	NW			158.15	NW						
Dry soil + planchet (g)		23.91	NW	23.91	NW	99.90	NW	99.92	NW				
Water content	W %	41.1 %	NW	41.1 %	NW	59.4%	NW	59.4%	NW	%		%	
		100%				75%							

$$W\% = \frac{(planchet + wet\ soil) - (planchet + dry\ soil)}{(planchet + dry\ soil) - (planchet)} \times 100 = \frac{M_W}{M_S} \times 100$$

A-37

Remarks @ 5 day curing. actual Δt for 100% = 4 days 19 hrs 20.25 hrs, for 75% 4 days 19.00 hrs

Computed by NW Checked by NW

000036

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SOP - 2
Water Content Data Form

Date of Test 20 JUL 1996
Alternative # 3 from SESS
Task #

			Analyst	Reweigh	Analyst		Analyst	Reweigh	Analyst		Analyst		Analyst
Sample ID		CPCPDMC19B				CPCPDMC20B							
Planchet (g)		1.91	NW			1.92	NW						
Wet soil + planchet (g)		25.69	NW			24.88	NW						
Dry soil + planchet (g)		14.74	NW	14.73	NW	12.90	NW	12.86	NW				
Water content	W %	55.3 %	NW	55.5 %	NW	109.1 %	NW	109.9%	NW	%		%	

50% 130%

$$W\% = \frac{(planchet + wet\ soil) - (planchet + dry\ soil)}{(planchet + dry\ soil) - (planchet)} \times 100 = \frac{M_W}{M_S} \times 100$$

A-38

Remarks @ 5 day curing Actual Δt for 50% = 4 days 17.75 hrs, for 40% 4 days 17.00 hrs.
Weighed 8/1/96. Reweighed 8/7/96

Computed by NW Checked by NW

000037

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SOP - 2
Water Content Data Form

Date of Test 22 JUL 1996
Alternative # 3 from SESS
Task #

			Analyst	Reweigh	Analyst		Analyst	Reweigh	Analyst		Analyst		Analyst
Sample ID		CPCPDMC2B				CPCPDMC2B1							
Planchet (g)		1.91				1.92							
Wet soil + planchet (g)		32.42				26.32							
Dry soil + planchet (g)		23.50	NW	23.53	NW	19.31	NW	19.30	NW				
Water content	W %	41.3 %	NW	41.1 %	NW	40.3%	NW	40.4%	NW	%		%	
		100%				100%							

$$W\% = \frac{(planchet + wet\ soil) - (planchet + dry\ soil)}{(planchet + dry\ soil) - (planchet)} \times 100 = \frac{M_W}{M_S} \times 100$$

Remarks @ 7day curing Weighed 8/5/96. Reweighed 8/6/96.

Computed by NW Checked by NW

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SOP - 2
Water Content Data Form

f Test 22JUL1996
ative # 3 from SESS

			Analyst	Reweigh	Analyst		Analyst		Reweigh Analyst		Analyst		Analyst
Sample ID		CPCPDMC26B					CPCPDMC27B						
'lanchet (g)		1.89					1.86						
ɔil + planchet (g)		31.36					39.37						
ɔil + planchet (g)		16.64	NW	16.64	NW		20.77	NW	20.76	NW			
content	W %	99.8 %	NW	99.8 %	NW	%	98.4	NW %	98.4	NW %		%	
		40%					40%						

$$W\% = \frac{(planchet + wet\ soil) - (planchet + dry\ soil)}{(planchet + dry\ soil) - (planchet)} \times 100 = \frac{M_W}{M_S} \times 100$$

ks @ 7 day curing weighed 8/5/96. Reweighed 8/6/96

Computed by NW Checked by NW

A-40

AUG 21 1995

SOP - 2
Water Content Data Form

'Test 22 JUL 1996
.tive # 3 from SESS

			Analyst	Reweigh	Analyst		Analyst	Reweigh	Analyst		Analyst		Analyst
Sample ID		CPCPDMC24B				CPCPDMC25B							
lanchet (g)		1.90				1.89							
il + planchet (g)		69.22				36.33							
il + planchet (g)		38.43	NW	38.43	NW	20.58	NW	20.58	NW				
content	W %	84.3 %	NW	84.3 %	NW	84.3%	NW	84.3%	NW	%		%	
		50%				50%							

$$W\% = \frac{(planchet + wet\ soil) - (planchet + dry\ soil)}{(planchet + dry\ soil) - (planchet)} \times 100 = \frac{M_W}{M_S} \times 100$$

ks @ 7day curing weighed 8/5/96. Reweighed 8/6/96.

Computed by NW Checked by NW

A-41

000040

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SOP - 2
Water Content Data Form

f Test 22 JUL 1996
ative # 3 from SESS

			Analyst	Reweigh	Analyst		Analyst	Reweigh	Analyst		Analyst		Analyst
Sample ID		CPCPDMC22B2				CPCPDMC23B							
'lanchet (g)		1.88				1.92							
›il + planchet (g)		45.89				38.43							
›il + planchet (g)		30.09	NW	30.07	NW	25.39	NW	25.37	NW				
· content	W %	56.0%	NW	56.1%	NW	55.6%	NW	55.7%	NW	%		%	
		75%		75%		75%							

$$W\% = \frac{(planchet + wet\ soil) - (planchet + dry\ soil)}{(planchet + dry\ soil) - (planchet)} \times 100 = \frac{M_W}{M_S} \times 100$$

:ks @ 7day Curring Weighed 8/5/96. Reweighed 8/6/96.

Computed by NN Checked by NW

A-42

000039

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SOP - 3
GRAVITY SETTLING TEST

AUG 19 1996

000001

SOP-3
Gravity Settling Test

Sample ID: 13BC1ST01
Date of Test: 30 APR 96
Technician:
Alternative #: 3 from SESS
Task #:

mg/L sediment slurry added per liter to get desired solution.

Time (Mins)	Inches of Settled Material					
	1,000 mg/L Solution (7.39)	4,000 mg/L Solution (29.54)	8,000 mg/L Solution (59.08)	12,000 mg/L Solution (88.65)	16,000 mg/L Solution (118.17)	20,000 mg/L Solution (147.71)
0	~950 mL / ~13 in	~998 / ~13.5"	1000	1000	1000	1000
1	~940 / ~12.8	~970 / 13.2	990	990	990	990
2	~940 / 12.8	~970 / 13.2	985	985	985	985
3	~929 / 12.4	~960 / 13.0	980	982		
4	~900 / 12.2	~950 / 12.8	975	980		
5	~880 / 12.0	940 / 12.8	972	978		
6	—	—	970	975		
7	870 / 11.9	940 / 12.8	970	975		
8	870 / 11.9	940 / 12.8	970	975		
9	860 / 11.8	940 / 12.8	968	975		
10	850 / 11.6	940 / 12.8	968	975		
15	850 / 11.6	940 / 12.8				
20						
25						
30						
40						
50						
60						
Total Settled Volume (mL)						

Note: Initial total suspended solids concentration before dilutions or concentration 135401. mg/L.

NOTE: RERUN TEST - SEE PAGE

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AUG 19 1996

000002

SOP-3
Gravity Settling Tests

Sample ID: 13BC2ST01
Date of Test: 5-1-96
Technician: NW and TM
Alternative #:: 3 from SESS
Task #:

mg/L sediment slurry added! Liter to get desired solution.

Time (Mins)	Inches of Settled Material					
	16.19 1,000 mg/L Solution	64.76 4,000 mg/L Solution	129.53 8,000 mg/L Solution	194.29 12,000 mg/L Solution	259.04 16,000 mg/L Solution	323.82 20,000 mg/L Solution
0	0	NW ~~0~~ 0	0	0	0	0
1	NW ~~1~~ ~~0~~ 0	NW ~~20~~ 2	20	30	50	60
2	NW ~~2~~ 1	NW ~~40~~ 20	60	90	100	120
3	2	40	80	130	160	210
4	2	55	150	180	220	370
5	2	65	200	250	570	715
6	3	60	210	380	540	670
7	3	60	NW ~~180~~ 190	350	500	640
8	3	58	180	330	470	610
9	3	57	170	310	450	585
10	3	55	160	290	425	560
15	3	50	140	245	350	470
20	5	47	130	220	315	415
25	5	45	120	205	290	382
30	6	43	113	190	270	360
40	8	42	105	180	250	330
50	9	41	100	170	230	305
60	9	40	95	160	220	290
Total Settled Volume (mL)	@15hour=20	42	75	108	130	158
	@5DAY+20hr 20mL	+3mL FLUFF 38	+10 mL FLUFF 60	+3mL FLUFF 83	+15mL FLUFF 105	+16 mL FLUFF 125

distinct separation 16K, 20K

distinct separation 8K, 12K

7.2 mL ~ 1"

Note: Initial total suspended solids concentration before dilutions or concentration ✓ mg/L. 61763

7.2 mL ~ 1"

FLUFF looked like green Algea
Supernatant ~ drinking water clear.

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SOP-3
Gravity Settling Tests

Sample ID: _____
Date of Test: _____
Technician: _____
Alternative #: 3 from SESS
Task #: _____

Time (Mins)	Inches of Settled Material					
	1,000 mg/L Solution	4,000 mg/L Solution	8,000 mg/L Solution	12,000 mg/L Solution	16,000 mg/L Solution	20,000 mg/L Solution
0						
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
15						
20						
25						
30						
40						
50						
60						
Total Settled Volume (mL)						

Note: Initial total suspended solids concentration before dilutions or concentration _____ mg/L.

Checked By _____

000004

SOP-3
Gravity Settling Tests

Sample ID: 13BC1ST02 (see page)
Date of Test:
Technician:
Alternative #: 3 from SESS
Task #:

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% of Sediment Slurry Added per Liter to get desired Solution

Time (Mins)	Inches of Settled Material					
	7.39 1,000 mg/L Solution	29.54 4,000 mg/L Solution	59.08 8,000 mg/L Solution	88.62 12,000 mg/L Solution	118.17 16,000 mg/L Solution	147.71 20,000 mg/L Solution
# ml of sediment	10 ml	30 ml	55 ml	80 ml	100 ml	120 ml
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
15						
20						
25						
30						
40						
50						
60						
Total Settled Volume (mL)						

15 min. Sec.

Note: Initial total suspended solids concentration before dilutions or concentration 135401 mg/L.

Checked By

SOP-3
Gravity Settling Test

Sample ID: 13BC1ST02
Date of Test: 5-1-96
Technician: NN REG
Alternative #: 1 3 from SESS
Task #:

mg/L of SEDIMENT SLURRY ADDED per LITER TO GET desired SOLUTION

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Time (Mins)	Inches of Settled Material					
	7.39 1,000 mg/L Solution	29.54 4,000 mg/L Solution	59.08 8,000 mg/L Solution	88.65 12,000 mg/L Solution	118.17 16,000 mg/L Solution	147.71 20,000 mg/L Solution
15 Hr of Settlement	10	30	55	80	100	120
1	0	0	10	15	25	30
2	0	10	50	65	70	80
3	0	NN 5/16 2.5 25	80	120	140	120
4	0	30	100	190	180	200
5	0	33	100	190	320	280
6	0	34	95	190	300	430
7	0	35	90	175	285	390
8	0	36	90	170	270	365
9	0	36	90	160	255	350
10	0	37	85	155	240	330
15	2	37	80	140	215	280
20	2	37	75	130	195	260
25	5	33	70	120	180	240
30	5	33	70	120	175	230
40	5	33	65	110	160	210
50	6	32	60	105	150	200
60	6	32	60	100	145	180
Total Settled Volume (mL)						

7.2 mL ≈ 1" Depth

Note: Initial total suspended solids concentration before dilutions or concentration 135401 mg/L. 7.2 mL ~ 1"

Checked By

AUG 19 1996

SOP-3
Gravity Settling Tests

Sample ID: 13BC5ST01
Date of Test: 07MAY96
Technician: NW
Alternative #: 3 from SESS
Task #:

* note: Dosage off by ~5% for this test See lab Logbook for details

Water TEMP = 71.7°F

Time (Mins)	Inches of Settled Material					
	6.7ml 1,000 mg/L Solution	26.8 4,000 mg/L Solution	53.6 8,000 mg/L Solution	80.4 12,000 mg/L Solution	107.1 16,000 mg/L Solution	133.9 20,000 mg/L Solution
0	0	0	0	0	0	0
1	10	10	8	30	4	4
2	5	10	50	60	70	70
3	7	21	70	100	110	110
4	7	33	110	150	160	150
5	6 ~~7~~	50	130	200	200	200
6	4	57	160	220	230	250
7	2	59	180	250	270	300
8	2	58	162	300	330	410
9	2	56	151	288	422	575
10	2	53	142	268	403	549
15	5	50	120	212	321	460
20	8	45	110	190	280	390
25	8	43	100	174	255	350
30	8	42	95	160	240	322
40	8	40	85	149	212	290
50	8	40	80	138	195	265
60	9	40	80	130	187	250
Total Settled Volume (mL)						

Note: Initial total suspended solids concentration before dilutions or concentration 149332 mg/L.

NOTE: ~ 7.2 mL = 1" depth for all graduated cylinders

Checked By

SEE SOP4 for TSS RESULTS (FROM RERUN)

SOP-3
Gravity Settling Tests

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Sample ID: 13BC3ST01
Date of Test: 08 MAY 96
Technician: NW
Alternative #: 3 from SESS
Task #:

Time (Mins)	Inches of Settled Material					
	145.5 ml 1,000 mg/L Solution	59.2 4,000 mg/L Solution	117.3 8,000 mg/L Solution	177.5 12,000 mg/L Solution	236.7 16,000 mg/L Solution	295.8 20,000 mg/L Solution
0	0	0	0	0	0	0
1	0	~~60~~ 30	30	40	50	0
2	0	~~50~~ 40	40	50	60	80
3	1	50	60	70	120	180
4	1	60	70	100	160	220
5	1	90	90	160	200	280
6	2	100	140	200	250	350
7	2	150	150	270	300	440
8	3	160	200	300	350	580
9	3	140	250	350	480	690
10	4	140	300	400	580	880
15	10	115	290	470	665	825
20	10	100	240	405	605	770
25	11	91	211	352	550	720
30	11	85	198	322	500	675
40	11	75	175	285	423	585
50	14	70	160	261	380	510
60	14	68	150	250	350	465
Total Settled Volume (mL)	@15 HRS. 20	52	90	128	162	200

7.2 ml ≈ 1" depth

Note: Initial total suspended solids concentration before dilutions or concentration 67610 mg/L.

SEE SOP4 for TSS results (FROM ATTACH)

Checked By

SOP-3
Gravity Settling Tests

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Sample ID: 13BC4ST01
Date of Test: 08MAY96
Technician: NW+TM
Alternative #: 3 from SESS
Task #:

Time (Mins)	Inches of Settled Material					
	5.5 1,000 mg/L Solution	22.0 4,000 mg/L Solution	44.0 8,000 mg/L Solution	66.0 12,000 mg/L Solution	88.1 16,000 mg/L Solution	110.1 20,000 mg/L Solution
0	0	0	0	0	0	0
1	0	0	20	30	25	30
2	1	10	30	40	40	50
3	1	20	50	60	90	110
4	2	30	70	80	100	110
5	2	45	90	100	110	110
6	2	60	110	140	120	150
7	2	80	130	180	150	170
8	2	70	150	190	170	210
9	2	70	160	220	190	260
10	3	70	190	250	250	340
15	3	60	140	265	380	500
20	3	55	120	212	322	435
25	4	50	110	190	270	380
30	5	47	100	~~27~~ 172	240	332
40	5	43	90	152	212	285
50	6	40	80	140	195	255
60	7	40	78	130	180	240
Total Settled Volume (mL)	@22hrs. 8 @68hrs. 7	33 32	53 51	72 72	95 92	115 112

Trial ≈ 1" depth

Note: Initial total suspended solids concentration before dilutions or concentration 181,695 mg/L.

See SOP4 for Total Suspended Solids Results on Supernatant.

Checked By

SOP-3
Gravity Settling Tests

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Sample ID: 24BC3 ST01
Date of Test: 23MAY1996
Technician: TM + NW
Alternative #: 3 from SESS
Task #:

Time (Mins)	Inches of Settled Material					
	4.6 mL 1,000 mg/L Solution	18.6 4,000 mg/L Solution	37.2 8,000 mg/L Solution	55.8 12,000 mg/L Solution	74.3 16,000 mg/L Solution	92.9 20,000 mg/L Solution
0	0	0	0	0	0	0
1	0	NW ~~5~~ 0	0	8	30	20
2	0	NW 20 0	10	20	40	50
3	0	50 10	30	30	50	70
4	0	20	50	60	50	100
5	0	25	60	80	100	140
6	2	30	80	100	120	150
7	2	40	100	130	170	180
8	2	50	120	160	210	210
9	2	58	150	230	220	230
10	2	63	170	260	230	250
15	3	60	160	275	380	535
20	5	52	130	210	310	450
25	5	50	120	185	265	390
30	5	45	110	170	235	335
40	5	42	100	150	208	280
50	6	40	90	140	190	240
60	6	40	82	130	180	228
Total Settled Volume (mL)	@ 60 min ↑					

Note: Initial total suspended solids concentration before dilutions or concentration 215,204 mg/L.

used bottle #2 SEE SOP4 for TSS RESULTS
H_2O temp. 68.6°F

 supernatant Checked By TM

SOP-3
Gravity Settling Tests

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Sample ID: 24BC1ST01
Date of Test: 24MAY96
Technician: TM & NW
Alternative #: 3 from SESS
Task #:

Time (Mins)	Inches of Settled Material					
	4.9 mL 1,000 mg/L Solution	19.8 4,000 mg/L Solution	39.7 8,000 mg/L Solution	59.5 12,000 mg/L Solution	70.3 16,000 mg/L Solution	99.2 20,000 mg/L Solution
0	0	0	0	0	0	0
1	0	0	NW 5/24/96 5	20	20	0
2	0	10	30 ~~30~~ ~~50~~	40	60	60
3	0	20	50 ~~50~~ ~~90~~	70	90	110
4	0	25	~~80~~ 90	120	120	160
5	1	30	~~100~~ 110	NW 5/24/96 ~~72~~ 155	160	180
6	1	30	~~105~~ 100	175	200	230
7	1	30	~~115~~ 95	185	210	390
8	2	30	90	170	280	365
9	2	30	85	160	260	340
10	2	30	80	153	240	322
15	2	25	72	130	199	261
20	2	25	66	118	179	235
25	2	24	61	108	168	217
30	2	24	59	102	157	201
40	2	24	58	97	144	185
50	2	24	56	90	135	
60	2	24	55	58	130	162
Total Settled Volume (mL)	6	28	48	68	83	100

3 days 5/25/96 1200

Note: Initial total suspended solids concentration before dilutions or concentration 201,673 mg/L.

used bottle #3 SEE SOP4 for supernatant results

H_2O temp = 68.3 °F

Checked By

SOP-3
Gravity Settling Tests

RECEIVED
AUG 19 1996

Sample ID: 24BC2STØ1
Date of Test: 28 MAY 96
Technician: TM & NW
Alternative #: 3 from SESS
Task #:

Time (Mins)	Inches of Settled Material					
	6.4 mL 1,000 mg/L Solution	25.6 4,000 mg/L Solution	51.2 8,000 mg/L Solution	76.8 12,000 mg/L Solution	102.4 16,000 mg/L Solution	128.0 20,000 mg/L Solution
0	0	0	0	0	0	0
1	0	10	20	30	40	40
2	0	25	40	70	100	110
3	1	40	110	160	150	160
4	1	40	110	200	240	220
5	1	40	103	180	260	360
6	1	40	95	165	235	320
7	2	38	90	155	220	290
8	2	38	88	150	210	275
9	2	37	83	140	200	262
10	3	37	80	138	190	252
15	5	34	70	120	165	220
20	6	32	68	110	150	200
25	6	30	65	105	142	188
30	8	30	60	100	135	177
40	8	30	60	90	128	162
50	8	31	58	85	120	152
60	8	31	58	85	115	148
Total Settled Volume (mL)	@ 1 DAY (25 hours) 10	31	52	71	90	110

Note: Initial total suspended solids concentration before dilutions or concentration 156,296 mg/L.

H_2O temp = 65.9 °F SEE SOP4 for Supernatant Results

Used bottle # 2

Checked By

SOP-3
Gravity Settling Tests

Sample ID: 24BC4ST01
Date of Test: 30 MAY 1996
Technician: UW & TM
Alternative #: 3 from SESS
Task #:

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Time (Mins)	Inches of Settled Material					
	4.7 mL 1,000 mg/L Solution	18.9 4,000 mg/L Solution	37.7 8,000 mg/L Solution	56.6 12,000 mg/L Solution	75.4 16,000 mg/L Solution	94.3 20,000 mg/L Solution
0	0	0	0	0	0	0
1	0	0	2	2	10	5
2	1	2	4	5	20	20
3	1	3	8	10	40	50
4	1	3	10	15	70	80
5	1	5	20	15	70	80
6	1	5	20	20	100	110
7	2	7	30	40	100	120
8	2	10	50	70	100	120
9	2	15	50	80	110	120
10	2	18	60	100	120	120
15	4	28	70	130	150	180
20	5	30	110	220	250	280
25	5	30	100	190	300	410
30	5	30	93	165	255	345
40	8	30	82	140	205	280
50	10	30	75	130	185	245
60	10	30	70	120	170	220
1 DAY Total Settled Volume (mL)	12	30	55	70	92	110

Note: Initial total suspended solids concentration before dilutions or concentration 212074 mg/L.

SEE SOP4 for Supernatant results

Used bottle #3

Checked By TWO

SOP-3
Gravity Settling Tests

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Sample ID: 24BC55T01
Date of Test: NW 6/3/96 ~~10 JUN 1996~~ 3 JUN 1996
Technician: MW
Alternative #: 3 from SESS
Task #:

Time (Mins)	Inches of Settled Material					
	4.2 mL 1,000 mg/L Solution	16.8 4,000 mg/L Solution	33.7 8,000 mg/L Solution	50.5 12,000 mg/L Solution	67.3 16,000 mg/L Solution	84.2 20,000 mg/L Solution
0	0	0	0	0	0	0
1	0	0	0	10	0	20
2	0	NW 6/3/96 ~~20~~ 0	20	30	10	20
3	0	~~30~~ 10	20	~~40~~	20	30
4	0	~~40~~ 10	20	40	30	~~40~~
5	1	~~30~~ 10	25	40	30	50
6	1	10	25	45	50	60
7	1	15	40	50	50	60
8	1	20	45	70	70	80
9	1	20	50	80	80	100
10	1	25	60	90	100	140
15	1	28	90	200	160	220
20	3	28	80	150	230	330
25	3	28	75	130	195	280
30	3	28	70	122	175	250
40	3	25	60	110	155	210
50	4	25	60	100	NW 6/3/96 9 140	190
60	4	25	55	90	130	180
Total Settled Volume (mL)	6 @ 3 days / 3	30 / 29	45 / 46	60 / 62	80 / 83	92 / 111

Note: Initial total suspended solids concentration before dilutions or concentration 237627 mg/L. @ 4.5 hours
Used bottle #3 SEE SOP4 for Supernatant TSS Results
*readings extremely difficult until ~20 min mark.

Checked By DA

SOP-3
Gravity Settling Tests

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Sample ID: 136P1ST01
Date of Test: 6/7/96
Technician: AW
Alternative #: 3 from SESS
Task #:

Time (Mins)	Inches of Settled Material					
	10.5 mL 1,000 mg/L Solution	41.6 mL 4,000 mg/L Solution	83.3 mL 8,000 mg/L Solution	124.9 mL 12,000 mg/L Solution	166.5 mL 16,000 mg/L Solution	208.2 mL 20,000 mg/L Solution
0	0	0	0	0	0	0
1	0	0	2	2	10	15
2	0	5	10	30	40	60
3	0	10	30	50	60	80
4	0	30	50	80	90	100
5	1	40	80	110	120	140
6	1	50	100	150	150	160
7	1	60	150	180	170	200
8	2	68	170	210	210	280
9	2	70	200	250	250	300
10	2	70	210	340	350	380
15	3	60	160	290	405	560
20	5	55	142	240	345	490
25	5	50	130	220	305	430
30	7	50	120	205	282	390
40	10	45	110	192	255	350
50	10	42	100	170	235	320
60	10	40	93	157	220	300
Total Settled Volume (mL)	@ 19 hours 16	39	64	90	115	142

Note: Initial total suspended solids concentration before dilutions or concentration 96,087 mg/L.

see SOP 4 for supernatant TSS results

Checked By AN

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SOP - 4
TOTAL SUSPENDED SOLIDS
DATA FORM

SOP - 4
Total Suspended Solids
Data Form

Date of Test 10MAY96

Alternative # 3 from SESS

Task # ~~NEGlecting filter loss = 131.9~~ 112.6 ~118 118.4

SUPERNATANT RESULTS FROM 13BC4ST01: PAGE 1 of 2

RESULTS (-filter loss)	198 mg/L	NW Analyst	180 mg/L	NW Analyst	~188 mg/L*	Analyst NW	197 mg/L	Analyst NW	N/A	NW Analyst
Sample ID	13BC4TS01 ~~13BC4TS~~		13BC4TS02		13BC4TS03		13BC4TS04		BLANK A	
Sample Volume (mL)	910		890		~932*		760		100 (DI water)	
Filter Paper (mg)(g)	2.07 ~~2.00~~		2.08		2.07		2.05		2.02	
Dry Sample + Filter Paper (mg) (g)	(2) Filters 2.19		(2 Filters) 2.18		2 Filters 2.17		2 Filters 2.14		1 Filter 1.99	
	from 1K solute		from 4K solute		from 8K solute		from 16K solute			

$$SS_{mg/L} = \frac{(\text{dry sample + filter paper}) - (\text{filter paper}) \times 1{,}000}{\text{sample volume (mL)}} \times 1000 \text{ mg/g}$$

Remarks * did not get reading prior to dumping but had ~850 if need estimate
Performed decants back to back but 2 hours had passed prior to starting 20K decant

Computed by NW and [illegible] Checked by [illegible] 03JUN1996

Decanted to 1" from top of sediment layer

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SOP - 4
Total Suspended Solids
Data Form

Date of Test 10MAY96
Alternative # 3 from SESS
Task # ~~Neglecting filter loss~~ 86.4 69.4

Supernatant results from 13BC4ST01 (continued from previous page) PAGE 2 of 2

Results (- filter loss)	160 mg/L	Analyst NW	153 mg/L	Analyst NW		Analyst		Analyst		Analyst
Sample ID	13BC4TS05 ~~13BC4ST05~~ 10MAY96		13BC4TS06							
Sample Volume (mL)	810		720	NW						
Filter Paper (~~mg~~) (g)	2.08		2.05							
Dry Sample + Filter Paper (~~mg~~) (g)	2 Filters 2.15		2 Filters 2.10							

from 12K solute from 20K solute

$$SS_{mg/L} = \frac{(dry\ sample + filter\ paper) - (filter\ paper) \times 1{,}000}{sample\ volume\ (mL)} \times 1000\ mg/g$$

Remarks see page 1 of 2 comments

Computed by NW and Checked by 03JUN96

Decant to ~1" from top of Sediment layer

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SOP - 4
Total Suspended Solids
Data Form

Date of Test 10 MAY96 SUPERNATANT RESULTS FROM

Alternative # 3 from SESS

Task # neglecting filter loss = 139.8 301 mg/L 144.4 mg/L 311 mg/L 170.7 mg/L 354 mg/L 13BC5 5T-Rerun 121.6

Results (-filter loss)	140 mg/L	NW Analyst	144 mg/L	NW Analyst	171 mg/L	NW Analyst	N/A	Analyst	324 mg/L	Analyst
Sample ID	13BC5T5Ø1		13BC5T5Ø2		13BC5T5Ø3		BLANK B		13BC5T5Ø4	
Sample Volume (mL)	930		900		820	NW	100		740	
Filter Paper (mg)	2.10 ~~2.02~~ 10MAY96		2.10		2.09	NW	1.99		2.10	
Dry Sample + Filter Paper (mg)	3 Filters 2.23		3 Filters 2.23		3 Filters 2.23		1.94		3 Filters 2.19	

from 1K solute from 4K solute from 12K solute from 20K solute

$$SS_{mg/L} = \frac{(\text{dry sample} + \text{filter paper}) - (\text{filter paper}) \times 1{,}000}{\text{sample volume (mL)}} \times 1000 \text{ mg/g}$$

Remarks YES - Ø1, Ø2, and Ø3 All weighed 2.23g (unusual, but they did)

Computed by NW and Checked by Ø3 JUN96

Decanted to ~ 1" from top of sediment layer

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SOP - 4
Total Suspended Solids
Data Form

Date of Test 13MAY96 SUPERNATANT RESULTS FROM ~~13~~ 24 BC3ST-RERUN 13MAY96

Alternative # 3 from SESS

Task #

Results	* ~~116~~ 86.0 mg/L	Analyst	N/A	Analyst	67.4 mg/L	Analyst	41.7 mg/L	Analyst	57.7 mg/L	Analyst
Sample ID	13BC3TS01		BLANK C		13BC3TS02		13BC3TS03		13BC3TS04	
Sample Volume (mL)	930		100		890		720		~~48~~ 520 13MAY96	
Filter Paper (mg)(g)	2.02		1.96		1.96		1.96		1.92	
Dry Sample + Filter Paper (~~mg~~)(g)	2 Filters ~~2.13~~ 2.10 15MAY96 RE-WEIGH		1 Filter 1.96		1 Filter 2.02		1 Filter 1.99		1 Filter 1.95 ~~1.94~~ VW 5-14-96	
	from 1K solute				from 4K solute		from 12K solute		from 20K solute	

$$SS_{mg/L} = \frac{(\text{dry sample} + \text{filter paper}) - (\text{filter paper}) \times 1{,}000}{\text{sample volume (mL)}} \times 1000\ mg/mg$$

Remarks * 1st Filter was placed under hood in heavy draft while second Filter was being used in filtration. This may have caused loss of sample since forced air dried sample prematurely.

Computed by VW and ~~TO~~ Checked by ~~TO~~ 03JUN96

Decanted to ~ 1" from sediment layer.

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SOP - 4
Total Suspended Solids
Data Form

Date of Test 23MAY 1996 SUPERNATANT RESULTS FROM 24BC3ST01
Alternative # 3 from SESS PAGE 1 of 2
Task #

RESULT (mg/L)	118.9	Analyst	110.9	Analyst	91.7	Analyst	71.6	Analyst	76.9	Analyst
Sample ID	24BC3TS01		24BC3TS02		24BC3TS03		24BC3TS04		24BC3TS05	
Sample Volume (mL)	925		902		872		838		780	NW
Filter Paper (mg) 23MAY96	2.06		2.06		2.06		2.06		1.98	
Dry Sample + Filter Paper (mg) 23MAY96	2 filters 2.17		2 filters 2.16		2 filters 2.14		2 filters 2.12		1 filter 2.04	
	from 1K solute		from 4K solute		from 8K solute		from 12K solute		from 16K solute	

$$SS_{mg/L} = \frac{(dry\ sample + filter\ paper) - (filter\ paper) \times 1{,}000}{sample\ volume\ (mL)} \times 1000$$ mg/g

Remarks Note! Decant from the 1 and 4K was after 1 hour of settling, decant from 8K was after 1hr 10min settling, decant from 12K was at 1hr 40min settling, decant from 16K was 1hr 50min

Computed by Checked by 03JUN96

Decanted to ~1" from sediment layer

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SOP - 4
Total Suspended Solids
Data Form

Date of Test 23MAY1996
Alternative # 3 from SESS
Task #

CONT. - SUPERNATANT RESULTS from 24BC3ST01 : PAGE 2 of 2

RESULTS (mg/L)	41.4	Analyst	Ø (n/A)	Analyst		Analyst		Analyst		Analyst
Sample ID	24BC3TS06		BLANK D							
Sample Volume (mL)	725		100 mL							
Filter Paper (mg) 23MAY96	2.00		1.98							
Dry Sample + Filter Paper (mg) 23MAY96	1 filter 2.03		1 filter 1.98							

from 20K solute

$$SS_{mg/L} = \frac{(dry\ sample + filter\ paper) - (filter\ paper) \times 1{,}000}{sample\ volume\ (mL)}$$ X100 ~~mg~~ mg/g

Remarks Decant from 20K was After 2hr 20min settling.

Computed by Checked by 03JUN1996

Decanted to ~ 1" from sediment layer

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SOP - 4
Total Suspended Solids
Data Form

Date of Test 28 MAY 1996 SUPERNATANT RESULTS from 24BC1ST01
Alternative # 3 from SESS PAGE 1 of 2
Task #

RESULTS (mg/L)	108.7	Analyst	225.2	NW Analyst	240.0	NW Analyst	294.1	Analyst	315.2	NW Analyst
Sample ID	24BC1TS01		24BC1TS02		24BC1TS03		24BC1TS04		24BC1TS05	
Sample Volume (mL)	920	NW	888	NW	875	NW	850	NW	825	NW
Filter Paper (mg) 28 MAY 96	2.10		2.08		2.10		2.11		2.09	
Dry Sample + Filter Paper (mg) 28 MAY 96	2 filters 2.20		2 filters 2.28		2 filters 2.31		2 filters 2.36		2 filters 2.35	
	from 1K solute		from 4K solute		from 8K solute		from 12K solute		from 16K solute	

$$SS_{mg/L} = \frac{(\text{dry sample} + \text{filter paper}) - (\text{filter paper}) \times 1{,}000}{\text{sample volume (mL)}}$$ X1000 mg/g

Remarks Decant from 1K and 4K following 1hr settling, 8K following 1hr 20min settling, 12K following 1hr 50min, and 16K following 2hr settling.

Computed by + NW Checked by 03 JUN 1996

Decanted to ~ 1" from sediment layer

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AUG 21 1995

SOP - 4
Total Suspended Solids
Data Form

Date of Test 28MAY 1996 SUPERNATANT RESULTS from 24BC1ST01
Alternative # 3 from SESS CONT. PAGE 2 of 2
Task #

RESULTS (mg/L)	314.5	Analyst	Ø	Analyst NW		Analyst		Analyst		Analyst
Sample ID	24BC1T5Ø6		BLANK E							
Sample Volume (mL)	795	NW	100	NW						
Filter Paper (mg) 28MAY96	2.10		2.01							
Dry Sample + Filter Paper (mg) 28MAY96	2 filters 2.35		1 filter 2.01							

from 20 K solute

$$SS_{mg/L} = \frac{(dry\ sample + filter\ paper) - (filter\ paper) \times 1{,}000}{sample\ volume\ (mL)} \times 1000\ mg/g$$

Remarks Decanted from 20K following 2hr 40min settling.

Computed by + NW Checked by 03JUN96

Decanted ~ 1" from top of sediment layer

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AUG 21 1995

SOP - 4
Total Suspended Solids
Data Form

Date of Test 29MAY1996 SUPERNATANT RESULTS FROM 24BC2ST01
Alternative # 3 from SESS PAGE 1 of 2
Task #

RESULTS (mg/L)	86.5	NW Analyst	143.2	NW Analyst	248.9	Analyst	253.2	Analyst	315.2	Analyst
Sample ID	24BC2TS01		24BC2TS02		24BC2TS03		24BC2TS04		24BC2TS05	
Sample Volume (mL)	925	NW	908	NW	884	NW	869		~~860~~ 825	NW
Filter Paper ~~(mg)~~ (g)	2.06		2.05	NW	2.08		2.09		2.09	
Dry Sample + Filter Paper ~~(mg)~~ (g)	2 filters 2.14		2 filters 2.18		2 filters 2.30		2 filters 2.31		2 filters 2.35	NW
	from 1K solution		from 4K solution		from 8K solution		from 12K solution		from 16K solution	

$$SS_{mg/L} = \frac{(\text{dry sample + filter paper}) - (\text{filter paper}) \times 1{,}000}{\text{sample volume (mL)}} \times 1000 \text{ mg/g}$$

Remarks All decants @ 1hr (following settling test)

Computed by 4NW Checked by 03JUN96

Decanted to ~ 1" from top of sediment layer

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AUG 21 1995

SOP - 4
Total Suspended Solids
Data Form

Date of Test 29 MAY 1996 Supernatant Results from 24BC2ST01

Alternative # 3 from SESS PAGE 2 of 2

Task #

RESULTS (mg/L)	308.5	NW Analyst	N/A	Analyst		Analyst		Analyst		Analyst
Sample ID	24BC2TS06	[illegible]	Blank F	[illegible]						
Sample Volume (mL)	778	NW	100	[illegible]						
Filter Paper (~~mg~~) (g)	2.09	[illegible]	1.97	[illegible]						
Dry Sample + Filter Paper (~~mg~~) (g)	2 filters 2.33	NW	1 Filter 1.97	[illegible]						

from 20K solution

$$SS_{mg/L} = \frac{(dry\ sample + filter\ paper) - (filter\ paper) \times 1{,}000}{sample\ volume\ (mL)} \times 1000\ mg/g$$

Remarks

Computed by [illegible] + NW Checked by [illegible] 20JUN1996

Decanted to ~ 1" from top of sediment layer

000010

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AUG 21 1995

SOP - 4
Total Suspended Solids
Data Form

Date of Test 30 MAY 1996 SUPERNATANT RESULTS from 24BC4TS01

Alternative # 3 from SESS PAGE 1 of 2

Task #

RESULTS (mg/L)	151.4	NW Analyst	177.8	NW Analyst	127.9	NW Analyst	107.9	NW Analyst	166.5	NW Analyst
Sample ID	24BC4TS01	TD	24BC4TS02	TD	24BC4TS03	TD	24BC4TS04	TD	24BC4TS05	TD
Sample Volume (mL)	925	NW	900	NW	860	NW	834	TD	781	TD
Filter Paper ~~(mg)~~ (g)	2.09	TD	2.08	TD	2.07	NW	2.05	NW	2.08	TD
Dry Sample + Filter Paper ~~(mg)~~ (g)	2 filters 2.23	TD	2 filters 2.24	NW	2 filters 2.18	NW	2 filters 2.14	NW	2 filters ~~2.22~~ 2.21	NW 6/6/96 NW
	from 1K solute		from 4K solute		from 8K solute		from 12K solute		from 16K solute	

$$SS_{mg/L} = \frac{(\text{dry sample} + \text{filter paper}) - (\text{filter paper}) \times 1{,}000}{\text{sample volume (mL)}}$$ X1000 mg/L

Remarks

Computed by TD + NW Checked by TD 20JUN1996

Decanted to ~1" from top of sediment layer

000011

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SOP - 4
Total Suspended Solids
Data Form

Date of Test 30 MAY 1996
Alternative # 3 from SESS
Task #

SUPERNATANT RESULTS from 24BC45T01
PAGE 2 of 2

	122.4	NW Analyst	Ø	Analyst		Analyst		Analyst		Analyst
Sample ID	24BC4TS06		Blank 6							
Sample Volume (mL)	735	NW	100							
Filter Paper ~~(mg)~~ (g)	2.08		2.02							
Dry Sample + Filter Paper ~~(mg)~~ (g)	2 filters 2.17	NW	1 filter 2.02 6/7/96	NW						

from 20% solute

$$SS_{mg/L} = \frac{(dry\ sample + filter\ paper) - (filter\ paper) \times 1{,}000}{sample\ volume\ (mL)} \times 1000\ mg/g$$

Remarks

Computed by NW Checked by 20 JUN 1996

Decanted to ~1" from top of sediment layer

000012

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AUG 21 1995

SOP - 4
Total Suspended Solids
Data Form

Date of Test 06 JUN 1996
Alternative # 3 from SESS
Task #

RESULTS mg/L	161.8	NW Analyst	207.7	NW Analyst	217.1	NW Analyst	186.5	NW Analyst	148.1	NW Analyst
Sample ID	24BCSTS01	[illegible]	24BCSTS02	[illegible]	24BCSTS03	[illegible]	24BCSTS04	[illegible]	24BCSTS05	[illegible]
Sample Volume (mL)	927	[illegible]	915	NW	875	NW	858	[illegible]	510	NW
Filter Paper ~~(mg)~~ (g)	2.07	NW	2.08	NW	2.08	NW	2.09	NW	2.10	[illegible]
Dry Sample + Filter Paper ~~(mg)~~ (g)	2 filters 2.22	NW	2 filters 2.27	NW	2 filters 2.27	NW	2 filters 2.25	NW	2 filters 2.22	NW
	from 1K solute		from 4K solute		from 8K solute		from 12K solute		from 16K solute	

$$SS_{mg/L} = \frac{(dry\ sample + filter\ paper) - (filter\ paper) \times 1{,}000}{sample\ volume\ (mL)} \times 1000\ mg/g$$

Remarks

Computed by [illegible] + NW Checked by [illegible] 20 JUN 1996

Decanted to ~1" from top of sediment layer. All decants at 1 hr. after mixing.

A-71

000013

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AUG 21 1995

SOP - 4
Total Suspended Solids
Data Form

Date of Test ~~16 JUN 1996~~ NW 6/10/96 06JUN 1996

Alternative # 3 from SESS

Task #

RESULTS (mg/L)	171.1	NW Analyst	N/A	Analyst		Analyst		Analyst		Analyst
Sample ID NW 6/5/96	24BC5T3BC ~~24BC6T~~		Blank H							
Sample Volume (mL)	760	NW	100 ml							
Filter Paper (~~mg~~) (g)	2.09		2.02							
Dry Sample + Filter Paper (~~mg~~) (g)	2 filters 2.22		1 filter 2.02	NW						

from 20% solute

$$SS_{mg/L} = \frac{(dry\ sample + filter\ paper) - (filter\ paper) \times 1{,}000}{sample\ volume\ (mL)} \times 1000\ mg/g$$

Remarks

Computed by NW Checked by 20JUN1996

000014

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AUG 21 1995

SOP - 4
Total Suspended Solids
Data Form

Date of Test 10 JUN 1996
Alternative # 3 from SESS
Task #

Results (mg/L)	141.3	Analyst	177.8	Analyst	131.7	Analyst	126.9	Analyst	125.4	Analyst
Sample ID	13CP1TS01	—	13CP1TS02	—	13CP1TS03	—	13CP1TS04	—	13CP1TS05	—
Sample Volume (mL)	920	NW	900	NW	835	NW	788	NW	718	NW
Filter Paper (~~mg~~) (g)	2.11	NW	2.12	NW	2.12	NW	2.11	NW	2.12	NW
Dry Sample + Filter Paper (~~mg~~) (g)	2.24 2 filters	—	2 filters 2.28	—	2 filters 2.23	—	2 filters 2.21	—	2 filters 2.21	—
	from 1K solute		from 4K solute		from 8K solute		from 12K solute		from 16K solute	

$$SS_{mg/L} = \frac{(dry\ sample + filter\ paper) - (filter\ paper) \times 1{,}000}{sample\ volume\ (mL)} \times 1000\ mg/g$$

Remarks

Computed by — Checked by — 19JUL1996

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AUG 21 1995

SOP - 4
Total Suspended Solids
Data Form

Date of Test 10 JUN 1996
Alternative # 3 from SESS
Task #

Results (mg/L)	138.5	Analyst	N/A	Analyst		Analyst		Analyst		Analyst
Sample ID	13CP1T3Ø6		BLANK I							
Sample Volume (mL)	650	NW	100ml							
Filter Paper (mg)	211	NW	2.02	NW						
Dry Sample + Filter Paper (mg)	2 Filters 2.20		1 Filter 2.02							

from 20K solve

$$SS_{mg/L} = \frac{(dry\ sample + filter\ paper) - (filter\ paper) \times 1{,}000}{sample\ volume\ (mL)} \times 1000\ mg/g$$

Remarks

Computed by Checked by 19 JUL 1996

000016

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AUG 21 1995
ESD

SOP - 4
Total Suspended Solids
Data Form

Date of Test 18 JUN 1996
Alternative # 3 from SESS
Task #

"visually" the clearest

Results (mg/L)	30.4	NW Analyst	111.1	NW Analyst	206.3	NW Analyst	109.4	NW Analyst	N/A	Analyst
Sample ID	CPCPITS01	~~[illegible]~~	CPCPITS02	~~[illegible]~~	CPCPITS03	~~[illegible]~~	CPCPITS04	~~[illegible]~~	CPCPITS05	~~[illegible]~~
Sample Volume (mL)	650	NW	540	NW	630	NW	640	NW	640	NW
Filter Paper (~~mg~~)	1.99	~~[illegible]~~	2.05	~~[illegible]~~	2.02	~~[illegible]~~	2.01	~~[illegible]~~	2.02	~~[illegible]~~
Dry Sample + Filter Paper (~~mg~~)	1 filter 2.01	NW	1 filter NW, 6/2/96 ~~2.13~~ 2.11	NW	1 filter 2.15	NW	1 filter 2.08	NW	1 filter VOID	~~[illegible]~~
Amount of Lime Added per liter	0 g CONTROL		0.5 g		1.0 g		3.0 g		NW ~~6.0~~ 6/12/96 ~~0.2~~ g	

$$SS_{mg/L} = \frac{(dry\ sample + filter\ paper) - (filter\ paper) \times 1{,}000}{sample\ volume\ (mL)}$$

x1000 mg/g

NOTE: ~~Suspend~~ Settled material was allowed to set for over a week while finishing the second MLR test. It developed algae and is now not considered a valid sample, thus was discarded

Remarks TSS results from Jar Test results with Lime added to it.
Samples weighed on 02JUL1996.

Computed by ~~[illegible]~~ + NW Checked by ~~[illegible]~~ 19JUL1996

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SOP - 4
Total Suspended Solids
Data Form

Date of Test 18 JUN 1996

Alternative # 3 from SESS

Task #

Results (mg/L)	78.1	NW Analyst	N/A	Analyst		Analyst		Analyst		Analyst
Sample ID	CPCPTS06	NW	BlankJ	~~[illegible]~~						
Sample Volume (mL)	640	NW	100	~~[illegible]~~						
Filter Paper (mg)	2.00	~~[illegible]~~	2.01	~~[illegible]~~						
Dry Sample + Filter Paper (~~mg~~)	1 filter 2.05	NW	1 filter 2.01	NW						

Amount of Lime added per liter NW 6/18/96 ~~10.0g~~ 0.1g

$$SS_{mg/L} = \frac{(dry\ sample + filter\ paper) - (filter\ paper) \times 1{,}000}{sample\ volume\ (mL)} \times 1000\ mg/g$$

Remarks

Computed by ~~[illegible]~~ + NW Checked by ~~[illegible]~~ 19JUL1996

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PAINT FILTER TEST DATA FORM

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Paint Filter Test
Data Form

Date of Test 4-22-96
Alternative # 3 from SESS
Task #

		Analyst		Analyst		Analyst		Analyst		Analyst		Analyst
Sample ID	13-BCL-EP-01	NW	"	NW	"	NW	"	NW	"	NW	"	
Sample Weight (g)	100.6	"	"	↓	"	NW	"	↓	"	↓	"	
Time Drained (minutes)	1 min	↓	2 min	↓	3 min	↓	4 min	↓	5 min	↓		
Released liquid volume (mL)	8	↓	10	↓	11	↓	12	↓	14	↓		

Remarks After 1 min. the ~~water~~ liquid draining from filter became clear. weight of sediment remaing in platelet = 1.5g. Filter failed at 15 min and 40 sec with 22 ml in cylinder. Sample gently stirred for 2 min. before collection.

Computed by NW Checked by

* Note: Did not scrape container clean. reweighed After sample extracted, had 1.5 grams of residue on container

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Paint Filter Test
Data Form

Date of Test 4-23-96

Alternative # 3 from SESS

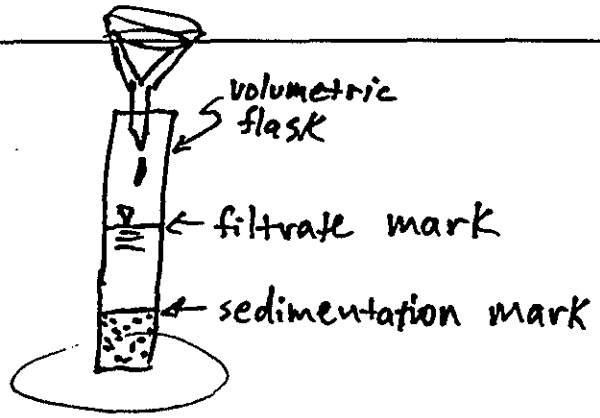
Task #

		Analyst		Analyst		Analyst		Analyst		Analyst		Analyst
Sample ID	13BC2F101		"		"		"		"		"	
Sample Weight (g)	102.64		"		"		"		"		"	
Time Drained (minutes)	1 min		2 min		3 min		4 min		5 min			
Released liquid volume (mL)	20.5		~~28.0~~ 24.0 23 APR 96		26.0		28.0		30.0			

Remarks Sample stirred for 2 minutes prior to withdrawal. Black-brown withdrawal for first 45 secs, clear drops after that. Sedimentation mark in filtrate at ~14.5 mL (see note below)

Computed by

Checked by NW



NOTE: Did not scrape container free of all materi, reweighed and had 1.63g still on tranfer container.

Failure at 8 min 39 sec, reading was ~34 mL. was still dripping at ~ 1 drop per 2 seconds

200002

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Paint Filter Test
Data Form

Date of Test 5-1-96

Alternative # 3 from SESS

Task #

		Analyst		Analyst		Analyst		Analyst		Analyst		Analyst
Sample ID	13-RC3-ER-01	NW	"	NW	"	NW	"	NW	"	NW	"	[illegible]
Sample Weight (g)	100.04	↓	"	↓	"	↓	"	↓	"	↓	"	[illegible]
Time Drained (minutes)	1 min	↓	2 min	↓	3	↓	4	↓	5	↓	111	[illegible]
Released liquid volume (mL)	33	↓	36	↓	38	↓	40	↓	41	↓	69	[illegible]

Remarks Solution clear at 1 min. Sedimentation layer visable at 29.5 ml. No failure occurred. The water was completely drained when we came back from lunch. No more drip was observed. lunch time = 30 min

Computed by VW Checked by NW

note - was still dripping ~ 1 drip every 10-12 sec at 40 min from start of test with a cummulative of 62 mL of fluid when we went to lunch. ~ 1 g of sediment was still on platchet after dumping into paint filter

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Paint Filter Test
Data Form

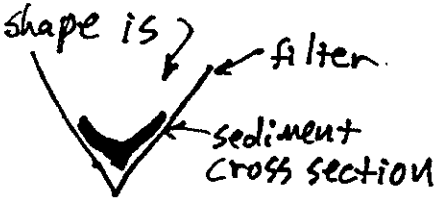
Date of Test 02 MAY 96
Alternative # 3 from SESS
Task #

		Analyst		Analyst		Analyst		Analyst		Analyst		Analyst
Sample ID	13BC5FP01	"	"	"	"		"		"		"	
Sample Weight (g)	10.06	"	"	"	"		"		"		"	
Time Drained (minutes)	1	"	2	"	3	"	4	"	5	"	81	"
Released liquid volume (mL)	5	"	7	"	8.5	"	10	"	11	"	32	"

Remarks drips were clear at ~ 1 min. Note: Approx 2.25g of sediment was left in transfer container After dumping into paint filter. Tried to scrape clean but sediments were VERY thick.

Computed by " Checked by AW

Note: at 37.5 min the sample had 26 mL and was dripping ~ 1 drop per 13 to 14 sec
Filter still working at 78 min with ~ 1 drop every 40 sec. From looks of sediment in filter, not much left to release any fluids (looks thick and fairly dry) shape is
Filter failed at 81 min immediately after a manipulation of the filter occured.



000004

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Paint Filter Test
Data Form

Date of Test 02 MAY 96

Alternative # 3 from SESS

Task #

		Analyst		Analyst		Analyst		Analyst		Analyst		Analyst
Sample ID	13BC4EP01		"		"		"		"		"	
Sample Weight (g)	101.26		"		"		"		"		"	
Time Drained (minutes)	1	NW	2	NW	3	NW	4	NW	5	NW	137	NW
Released liquid volume (mL)	8	NW	10	NW	11	NW	12	NW	13	NW	36	NW

Remarks drips were clear in <1 min. left 1.33 gram in transfer container after pouring into paint filter. Clearly marked sedimentation layer at 7mL

Computed by NW Checked by NW

Note: at 48 min the sample had 30 ml and was dripping ~1 drop every 17 sec. At 137 min drips slowed to 1 drop per 2 min., volume was 36 ml.

000005

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Paint Filter Test
Data Form

Date of Test 16MAY96
Alternative # 3 from SESS
Task #

		Analyst		Analyst		Analyst		Analyst		Analyst		Analyst
Sample ID	24BC3EP02 ~~24BC3EP01~~	"	"		"		"		" FAILED!			
Sample Weight (g)	102.51	"	"		"		"		"			
Time Drained (minutes)	1	"	2	"	3	"	5	"	6 min	"		
Released liquid volume (mL)	7.5	"	8.8	"	9.5	"	10.2	"	12.0	"		

Remarks Clear drops after 1min -- black filtrate prior to that. NOTE: 2.44 grams of sediment left in plat. After dumpping - we had failure right at 6 min -- was dripping ~ 1 dr every 2 sec.

Computed by " Checked by AM

used bottle(1)

A-83

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Paint Filter Test
Data Form

Date of Test 16 MAY96
Alternative # 3 from SESS
Task #

		Analyst		Analyst		Analyst		Analyst		Analyst		Analyst
Sample ID	24BC2EP01	"	"		"		"		"	"	"	
Sample Weight (g)	102.56	"	"		"		"		"		"	
Time Drained (minutes)	1	"	2	"	3	"	5	"	10	"	188	"
Released liquid volume (mL)	7.0	"	8.8	"	10.0	"	[illegible]	11.9	16.8	"	41.9	"

Remarks Clear drops after 40 sec. Note: 2.61g left in plat. After dumping. A fine line sedimentation mark was at ~ 4mL. At 35min was dripping at a rate of ~ 1 drop per 6sec

Computed by " Checked by NW

at 1hr 9min was dripping ~ 1 drop/20 sec (had ~34.5mL)
@ 2hr 21min was dripping ~ 1drop/59sec (had ~40.2mL)
Finished (or would drop once every two min) at 3hr and 8 min (or 188 min)

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Paint Filter Test
Data Form

ate of Test 20 MAY 96
lternative # 3 from SESS
ask #

		Analyst		Analyst		Analyst		Analyst		Analyst		Analyst
Sample ID	24BC1E9d	NW	"		"		"		"		"	
Sample Weight (g)	102.65	NW	"		"		"		"		"FAILED	
Time Drained (minutes)	1	NW	2	NW	3	NW	5	NW	10	NW	23:37	NW
Released liquid volume (mL)	5	NW	6.5	NW	7	NW	8.8	NW	11.5	NW	17	NW

emarks Clear drops after 50 sec. NOTE: 5.41 g. of sediment left in plate after dumping. A fine line sedimentation mark was at ~3 mL. Used baffle #3 Drips occuring ~ every 7-9 seconds right before ~~open~~ failure. NW 5/21/96

Computed by NW Checked by NW

A-85

800008

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Paint Filter Test
Data Form

Date of Test 23 MAY 1996

Alternative # 3 from SESS

Task #

		Analyst		Analyst		Analyst		Analyst		Analyst		Analyst
Sample ID	24BC4EP01	←	"		"		"		"			
Sample Weight (g)	101.98	NW	"		"		"		failure			
Time Drained (minutes)	1	←	2	←	3	←	5	←	6:44s	NW		
Released liquid volume (mL)	8	←	9	NW	10	NW	11.3	NW	~12	NW		

Remarks Drips clear at ~1 min. Note: Approx 1.42 g of sediment was left in transfer container after dumping into paint filter. At 6:00 mark 1 drop every 4 sec. Failure at 6:44.

Computed by NW ← Checked by NW

Used bottle #3.

A-86

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Paint Filter Test
Data Form

Date of Test 23 MAY 1996
Alternative # 3 from SESS
Task #

		Analyst		Analyst		Analyst		Analyst		Analyst		Analyst
Sample ID	24BC5EP01	"	"		"		"		"			
Sample Weight (g)	101.65	"	"		"		"		Failure			
Time Drained (minutes)	1	"	2	"	3	"	5	"	7:42	NW		
Released liquid volume (mL)	5	NW	7	NW	8	NW	10	NW	~12	NW		

Remarks Clear drops in < 1 min. 1.77g left on plat after dumping into paint filter. 6:00 1 drop every 6 sec. Failure at 7:42 1 drop every 6 to 7 sec. on failure. used bottle #3.

Computed by NW Checked by NW

* Sample appeared to drain very slowly compared to previous tests.

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Paint Filter Test
Data Form

Date of Test 29 MAY 1996

Alternative # 3 from SESS

Task #

		Analyst		Analyst		Analyst		Analyst		Analyst		Analyst
Sample ID	24BC4EF02											
Sample Weight (g)	103.95											
Time Drained (minutes)	1		2		3		5		17		2:51:26 (17 min)	
Released liquid volume (mL)	9.2		10.0		11.2		12.9		19.0		34.0	

Remarks RERUN to try and get non-failure result, 3.63 g left in transfer container. Clear drops in 45 sec 1 drop every 7 sec. at 17 min. 1 drop every 11 sec. at 30 min.

Computed by

Checked by NW

Used bottle #4 Temp. of sed. = 68.9°F At 1 hr. Release volume at 28 ml, sed. layer at 7 ml, 1 drop every 22 sec
At 2:51:26 1 drop every 2 min 29 sec.

000011

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Paint Filter Test
Data Form

Date of Test 05JUN1996
Alternative # 3 from SESS
Task #

		Analyst		Analyst		Analyst		Analyst		Analyst		Analyst
Sample ID	LPCP1 EP01	NW										
Sample Weight (g)	103.81	NW							Failure			
Time Drained (minutes)	1	NW	2	NW	3	NW	5	NW	8:20	NW		
Released liquid volume (mL)	3	NW	5	NW	6	NW	8	NW	10	NW		

Remarks Used bottle #1. 2.64g. left on container 1 drop every 5 sec. at 5 min 1 drop every 6 sec. at failure. Clear drops after 70 sec.

Computed by NW Checked by NW

TEMP OF SED. 72.3°F

000012

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Paint Filter Test
Data Form

Date of Test 05 JUN 1996
Alternative # 3 from SESS
Task #

		Analyst		Analyst		Analyst		Analyst		Analyst		Analyst
Sample ID	9901EP02											
Sample Weight (g)	103.60	NW									Failure	
Time Drained (minutes)	1	NW	2	NW	3	NW	5	NW	10	NW	10:53	NW
Released liquid volume (mL)	4.0	NW	5.5	NW	6.0	NW	7.0	NW	9.0	NW	9.5	NW

Remarks Used bottle # 1. 1.78 g left on container. 1 drop every 5 sec. at 5 min. 1 drop every 6 sec. at 10 min. clear drops after ~1 min.

Computed by NW Checked by NW

TEMP OF SEDIMENT 72.3°F

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Paint Filter Test
Data Form

Date of Test 05 JUN 1996
Alternative # 3 from SESS
Task #

		Analyst		Analyst		Analyst		Analyst		Analyst		Analyst
Sample ID	CPCP/EP03											
Sample Weight (g)	~~102~~ 102.50	MW							Failure			
Time Drained (minutes)	1	MW	2	MW	3	MW	5	MW	8:30	MW		
Released liquid volume (mL)	4.5	MW	5.5	MW	6.0	MW	7.0	MW	7.5	MW		

Remarks Used bottle #1 2.38 g left on container 1 drop every 5 sec. at 5 min. clear drops at ~50 sec.

Computed by MW Checked by MW

TEMP OF SED. 72.3°F

A-98

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Paint Filter Test
Data Form

Date of Test 06JUN1994
Alternative # 3 from SESS
Task #

		Analyst		Analyst		Analyst		Analyst		Analyst		Analyst
Sample ID	CPCMEP014											
Sample Weight (g)	102.93	NW										
Time Drained (minutes)	1	NW	2	NW	3	NW	5	NW	10	NW 60 NW	160	NW
Released liquid volume (mL)	4.0	NW	5.0	NW	5.5	NW	6.0	NW	8.0	NW	24mL	NW

Remarks Clear drops at 1:20 3.56g. left on container 1 drop every 5sec at 5min 1 drop every 6 sec at 10min At 30 min Released volume = 14mL 1 drop every 12 sec. Sediment layer to 1.5 mL

Computed by NW Checked by NW

* used bottle #3 Temp of sediment 68.3°F At 1 hr. 18.5 mL 1 drop every 23sec. At 2 hr 10 min 1 drop every 1min 8sec. Released volume = 23mL 1 drop every 2min at 2hr 40min

000015

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Paint Filter Test
Data Form

Date of Test 10JUN1996
Alternative # 3 from SESS
Task #

		Analyst		Analyst		Analyst		Analyst		Analyst		Analyst
Sample ID	CPCP1EP05											
Sample Weight (g)	102.45	NW										
Time Drained (minutes)	1	NW	2	NW	3	NW	5	NW	20	NW	170	NW.
Released liquid volume (mL)	4.0	NW	5.5	NW	6.0	NW	7.0	NW	13.0	NW	25.0	NW

Remarks Clear drops at ~ 1:30 2.00 g left on container 1 drop every 6 sec at 6 min. 1 drop every 9 sec. at 20 min. Sediment layer at 2.5 mL 1 drop every 1 min. at 2 hrs. Released volume = 18.5 mL

Computed by NW Checked by NW

*used bottle #1 Sediment temp. = 69.9°F 1 drop every 2 min. at 2hr 50 min

000016

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SPECIFIC GRAVITY
(ASTM D854-92)
DATA FORM

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Specific Gravity (ASTM D854-92)
Data Form

Date of Test _____

Alternative # 3 from SESS

Task # _____

	23MAY96 REDO - BIGGER BOTTLE	Analyst	03JUN96	Analyst	23MAY96	Analyst		Analyst		Analyst		Analyst
Sample ID	13CP156Ø1		13CP156Ø2		13CP156Ø1							
Sieved Size	100% passed #10 sieve		100% passed NO 10 sieve		100% passed NO.10 sieve							
Mass of Oven Dry Soil (g)			23.1Ø		21.67							
Mass of Pycnometer with water (g)	193.86 ~~115.76~~ Got bigger 23MAY96 bottle		692.Ø		692.3							
Temperature of Pycnometer with water (C)	18.3		(°C) 72.3°F		(°C) 70.5°F							
Mass of Pycnometer, Water, Soil (g)			705.5		705.1	NW						
Temperature Pycnometer, Water, and Soil (g)			(°C) 72.1°F		(°C) 68.6°F							
* Specific Gravity			2.41		2.443	NW						

Pycnometer = ~~44.79g~~ 193.86 23MAY96 (Δ to 500 ml)

$$\text{Specific Gravity} = \frac{(\text{Oven Dried Soil})}{(\text{Oven Dried Soil}) + (\text{Pycnometer, Water}) - (\text{Pycnometer, Water, Soil})}$$

Remarks Both test brought to a rolling boil and then boiled for 15 min. prior to cooling. Air dried samples used with 13CP156Ø2 while oven dried used with 13CP156Ø1

Computed by _____ and NW _____ Checked by _____

* Not corrected for temp. differences

A-95

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Specific Gravity (ASTM D854-92)
Data Form

Date of Test 11 JUN 1996

Alternative # 3 from SESS

Task #

	Planchet "B" Bot 4	Analyst	Planchet "E" Bot 2	Analyst	Plat "D" Bot 4 (REBAN 24 JUN 96)	Analyst		Analyst		Analyst		Analyst
Sample ID	24CP156Ø1		24CP156Ø2		24CP156Ø3							
Sieved Size	100% passed #10		100% passed #10		"							
Mass of Oven Dry Soil (g)	~~36.424~~	34.62 NW	~~36.316~~	35.63 NW	21.76							
Mass of Pycnometer with water (g)	692.4	REUSE NW	692.4		691.6							
Temperature of Pycnometer with water (C)	(66.7°F)	NW	66.7°F		77.4°F							
Mass of Pycnometer, Water, Soil (g)	711.6	NW	713.6		704.4 ~~704.1~~ 24 JUN 96							
Temperature Pycnometer, Water, and Soil (g) °F	(68.4°F)	NW	66.5°F		77.7°F							
Specific Gravity	2.245	NW	2.45		2.43							

$$\textit{Specific Gravity} = \frac{(\textit{Oven Dried Soil})}{(\textit{Oven Dried Soil}) + (\textit{Pycnometer, Water}) - (\textit{Pycnometer, Water, Soil})}$$

Remarks Due to the difference between 24CP156Ø1 and 24CP156Ø2 of 8.5%, we decided to run one additional test (24CP156Ø3).

Computed by NW + Checked by NW

A-96

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BULK DENSITY
(ASTM METHOD 2937-83)
DATA FORM

Bulk Density (ASTM Method ~~2937-83~~) D 4380-84
Data Form 14MAY96

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Date of Test 14 MAY96
Alternative # 3 from SESS
Task #

			Analyst		Analyst		Analyst		Analyst		Analyst		Analyst
Sample ID		13CP1D501	(Bottle 1)	13CP1D502	(Bottle 2)								
Drive Cylinder + Soil (g)													
Cylinder (g)													
Volume of Sample (cm³)													
Sample Dimension													
Dry Mass													
Slurry ~~Dry~~ Density g/cm³			1.04	NW	1.04	NW							
Water content	W %	%		%		%		%		%		%	

See Note

$$Dry\ Mass = \frac{(Mass\ of\ Cylinder + wet\ soil) - (Mass\ of\ Cylinder)}{(100 + Water\ Content)} \times 100$$

$$Dry\ Density = \frac{Dry\ Mass}{Sample\ Volume} \times 3.810$$

Remarks USED A Modified Test for determining Density of A Slurry -- The Originally ~~to~~ chosen test would not work with A slurry. See ASTM D4380-84 for details.

Computed by REG/NW Checked by NW

* Reading taken directly from MUD BALANCE.

A-98

Bulk Density (ASTM Method ~~2937-83~~) D 4380-84
Data Form NW 5/30/96

AUG 21 1995

Date of Test 30 MAY 1996
Alternative # 3 from SESS
Task #

			Analyst		Analyst		Analyst		Analyst		Analyst		Analyst
Sample ID		24CP1DS01	Bottle 2	24CP1DS02	Bottle 4								
Drive Cylinder + Soil (g)													
Cylinder (g)													
Volume of Sample (cm³)													
Sample Dimension													
Dry Mass													
* Slurry ~~Dry~~ Density	g/cm³	1.11	NW	1.11	NW								
Water content	W %	%		%		%		%		%		%	

$$Dry\ Mass = \frac{(Mass\ of\ Cylinder\ +\ wet\ soil)\ -\ (Mass\ of\ Cylinder)}{(100\ +\ Water\ Content)} \times 100$$

$$Dry\ Density = \frac{Dry\ Mass}{Sample\ Volume} \times 3.810$$

Remarks Temp of Slurry 65.1°F (Bottle 2) 64.6°F (Bottle 4)

Computed by NW Checked by NW

* Reading taken directly from mud balance.

Bulk Density (ASTM Method 2937-83)
Data Form

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Date of Test 18 JUL 1996
Alternative # 3 from SESS
Task #

			Analyst		Analyst		Analyst		Analyst		Analyst		Analyst
Sample ID		CPCPDDS01		CPCPDDS02									
Drive Cylinder + Soil (g)													
Cylinder (g)													
Volume of Sample (cm³)													
Sample Dimension													
Dry Mass													
Slurry ~~Dry~~ Density		1.125	NW	1.12	NW								
Water content	W %	%		%		%		%		%		%	

$$Dry\ Mass = \frac{(Mass\ of\ Cylinder\ +\ wet\ soil)\ -\ (Mass\ of\ Cylinder)}{(100\ +\ Water\ Content)} \times 100$$

$$Dry\ Density = \frac{Dry\ Mass}{Sample\ Volume} \times 3.810$$

A-100

Remarks

Computed by NW Checked by NW

~~Bulk~~ Density (ASTM Method 2937-83)
Data Form

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Date of Test 18 JUL 1996
Alternative # 3 from SESS
Task #

FROM 3 DAY CURE

		Analyst		Analyst		Analyst		Analyst		Analyst		Analyst
Sample ID	CPCPDDS03		CPCPDDS04		CPCPDDS05 ~~CPCPDDS05~~ 18JUL		CPCPDDS06		CPCPDDS07		CPCPDDS08	
~~Drive Cylinder~~ + Soil (g)	962.6 ~~1036.3~~ 18JUL96		959.5 ~~1039.1~~ 18JUL96		921.8		927.7		854.6		858.1	
height ~~Cylinder~~ Diameter 3"	× 5.413" high		× 5.345" high		× 5.325" high		× 5.401" high		× 5.329" high		× 5.329" high	
~~Volume of Sample (cm³)~~	~~3"dia × 18JUL1996~~		~~3"dia × 18JUL1996~~									
~~Sample Dimension~~												
wet Density ~~Dry Mass~~ PCF ~~g/cm³~~	95.9		96.8		93.3		92.6		86.5		86.8	
Dry Density PCF ~~g/cm³~~	66.3		66.7		58.3		57.8		46.4		46.7	
~~Water~~ moisture content W %	31.1 %		30.9 %		38.1 %		37.1 %		46.4 %		46.2 %	
	100 % (14:30) portland cement Fly Ash		100 % (14:05)		75 %		75 %		50 %		50 %	

$$\text{Dry Mass} = \frac{(\text{Mass of Cylinder + wet soil}) - (\text{Mass of Cylinder})}{(100 + \text{Water Content})} \times 100$$

A-101

$$\text{Dry Density} = \frac{\text{Dry Mass}}{\text{Sample Volume}} \times 3.810 = \text{wet density} - (\text{wet density} * \text{moisture content})$$

18JUL96

$$\text{wet density} = \left\{ \frac{\text{wet soil weight (g)}}{\left[\frac{\pi (3/2)^2}{4} * \text{height}''\right] * 28316.8 \frac{cm^3}{ft^3} \left(\frac{2.54\ cm}{in}\right)^3} \right\} \div 0.016018 \quad (\text{pounds}/ft^3)$$

Remarks

Computed by NN Checked by

Bulk Density (ASTM Method 2937-83)
Data Form

RECEIVED AUG 21 1995

Date of Test 18JUL 1996
Alternative # 3 from SESS
Task #

FROM 3 DAY CURE

		Analyst		Analyst		Analyst		Analyst		Analyst		Analyst
Sample ID	CPCPDDS09		CPCPDDS10									
~~Drive Cylinder~~ moist + Soil (g)	818.4 ~~897.0~~		840.6									
height + Cylinder ~~(g)~~ 3" ×	5.260" high	high	×5.389" high									
~~Volume of Sample (cm³)~~												
~~Sample Dimension~~												
wet Density ~~Dry Mass~~ NW 16SEP1996 ~~g/cm³~~ PCF	84.1		83.9									
Dry ~~Dry~~ Density NW 16SEP1996 ~~g/cm³~~ PCF	41.4		40.6									
moisture ~~Water content~~ W %	50.8 %		51.6 %		%		%		%		%	

40% (17:30) 40%

$$Dry\ Mass = \frac{(Mass\ of\ Cylinder + wet\ soil) - (Mass\ of\ Cylinder)}{(100 + Water\ Content)} \times 100$$

$$\text{wet density (pcf)} = \left[\frac{\text{moist Soil (g)}}{\left[\frac{\pi (3")^2}{4} * \text{height}"\right] * \left(\frac{2.54cm}{in}\right)^3}\right] \div 0.016018$$

$$Dry\ Density = \frac{Dry\ Mass}{Sample\ Volume} \times 3.810 = \text{wet density} - [\text{wet density} * \text{moisture content}]$$

Remarks NOTE: 40% mix had ~ 4 ml of free fluid on the surface. This fluid was decanted off prior to density & UCS testing.

Computed by NN Checked by

A-102

Bulk Density (ASTM Method 2937-83)
Data Form

RECEIVED AUG 21 1995

Date of Test 22 JUL 1996
Alternative # 3 from SESS
Task #

FROM 7 DAY CURE

		Analyst		Analyst		Analyst		Analyst		Analyst		Analyst
Sample ID	CPCPDDS11		CPCPDDS12		CPCPDDS13		CPCPDDS14		CPCPDDS15		CPCPDDS16	
~~Drive Cylinder~~ + moist Soil (g)	953.9		980.8		910.80		916.7		857.9		856.6	
height + Cylinder ~~(g)~~ 3" Diameter	X5.328" high		X5.440" high		X5.261" high		X5.410" high		X5.289" high		X5.336 high	
~~Volume of Sample (cm³)~~												
~~Sample Dimension~~												
wet density ~~Dry Mass~~ NW 16 SEPT 1996 ~~g/cm³~~ PCF	96.5		97.2		93.3		91.3		87.4		86.5	
Dry Density NW 16 SEPT 1996 ~~g/cm³~~ PCF	68.8		68.8		59.9		58.5		47.5		46.9	
moisture ~~Water~~ content W %	28.8 %		29.2 %		35.8 %		35.9 %		45.7%		45.7%	
	100%		100%		75%		75%		50%		50%	

$$\text{Dry Mass} = \frac{(\text{Mass of Cylinder + wet soil}) - (\text{Mass of Cylinder})}{(100 + \text{Water Content})} \times 100$$

$$\text{wet density (pcf)} = \left[\frac{\text{moist soil (g)}}{\left(\frac{\pi (3'')^2}{4} * \text{height}''\right) * \left(\frac{2.54\text{cm}}{\text{in}}\right)^3}\right] \div 0.016018$$

$$\text{Dry Density} = \frac{\text{Dry Mass}}{\text{Sample Volume}} \times 3.810 = \text{wet density} - [\text{wet density} * \text{moisture content}]$$

Remarks

Computed by NW Checked by

A-103

Bulk Density (ASTM Method 2937-83)
Data Form

RECEIVED AUG 21 1995

Date of Test 22 JUL 1996
Alternative # 3 from SESS
Task #

FROM 7 DAY CURE

		Analyst		Analyst		Analyst		Analyst		Analyst		Analyst
Sample ID	CPCPDDS17		CPCPDDS18									
~~Drive Cylinder~~ + moist Soil (g)	839.0		800.9									
height + Cylinder (~~g~~) 3" Diameter	X5.426' high		X5.152 high									
~~Volume of Sample (cm³)~~												
~~Sample Dimension~~												
wet density ~~Dry Mass~~ NW 16SEP1996 PCF g/cm³	83.4		83.8									
Dry Density NW 16SEP1996 PCF g/cm³	41.7		41.6									
moisture ~~Water~~ content W %	50.1 %		50.4 %		%		%		%		%	

40% 40%

$$Dry\ Mass = \frac{(Mass\ of\ Cylinder + wet\ soil) - (Mass\ of\ Cylinder)}{(100 + Water\ Content)} \times 100$$

$$\text{wet density (pcf)} = \left[\frac{\text{moist soil (g)}}{\left(\frac{\pi (3'')^2}{4} * \text{height}''\right) * \left(\frac{2.54\ cm}{in}\right)^3}\right] \div 0.016018$$

$$Dry\ Density = \frac{Dry\ Mass}{Sample\ Volume} \times 3.810 = \text{wet density} - \left[\text{wet density} * \text{moisture content}\right]$$

Remarks No moisture on top of 7 day cure molds. * note: 40% Appeared very brittle and broke easily

Computed by NW Checked by

A-104

RECEIVED
AUG 21 1995

PARTICLE SIZE DISTRIBUTION (ASTM D422) DATA FORM

RECEIVED
AUG 21 1995

Partical Size Distribution (ASTM D422)
Data Form

Date of Test 5-14-96
Technician REG
Alternative # 3 from SESS

Sample ID: 13CP1 PS01 (B)

Flask No. B @8:00 Hydrometer No. 50/HY-3

Hydrometer Analysis (use computer program for calculation)					
Time	Temp F	Hyd Read	Corr	% Pass	Size
1 min	62°	16.9	-1.9		
4 min	62.°	15.0	-1.9		
15 min	62.°	0.6	-1.9		
1 hour	63°	0.5	-1.9		
4 hours	69	-0.6	-1.9		
24h	64°	1.3	-2.0		

Cap No. _____ Tare No. B (E)*

Air Dry Wt _____		
Sieve	Wt. Ret.	% Pass
3"		
2"		
1.5"		
1.0"		
3/4"		
3/8"		
No. 4		
No. 10 (100% PASSED)	0.00	
Hyd Soil Wt ~~47.6~~ 67.4gm		
No. 20	0.03	
No. 40		
No. 50	0.61	
No. 100	0.31	
No. 200	0.32	

Hygroscopic Moisture	
Wet Wt & Tare (g)	~~+0.25~~ 11.62
Dry Wt & Tare (g)	5.22
Tare Wt (g)	1.90
Moisture %	192.8

Tare No. _____

Air Dry Moisture	
Dry Wt & Tare (g)	
Tare Wt (g)	
Wet Wt & Tare (g)	

*-+200 TARE: J
* Moist in As

Remarks: *TARE IS MIS-MARKED - REG (5-13-96)
** NO SUSPENSION MATERIAL USED - REG (5-13-96)

Checked by: _____ A-106 Tested by: REG

RECEIVED
AUG 21 1995

Partical Size Distribution (ASTM D422)
Data Form

Date of Test 5-14-96
Technician
Alternative # 3 from SESS

Sample ID: 13CP1 PS02 (E)

Flask No. E

Hydrometer No. 50/Hy-3

@8:06

use computer program to calculate

Hydrometer Analysis					
Time	Temp F	Hyd Read	Corr	% Pass	Size
1 min	62.0	20.1	-1.9		
4 min	62.0	18.9	-1.9		
15 min	62.0	10.6	-1.9		
1 hour	63.8°	~~0.0~~ 0.5	-1.9		
4 hours	69.0	-0.1	-1.9		
24 h	69.0	-1.6	-2.0		

Cap No.

Tare No. E *(B)

Air Dry Wt		
Sieve	Wt. Ret.	% Pass
3"		
2"		
1.5"		
1.0"		
3/4"		
3/8"		
No. 4		
No. 10 100% passed		
Hyd Soil Wt. ~~67.4~~ 47.6		
No. 20	0.03	
No. 40	—	
No. 50	0.67	
No. 100	0.26	
No. 200	0.33	

Hygroscopic Moisture	
Wet Wt & Tare (g)	~~11.62~~ 10.85
Dry Wt & Tare (g)	5.42
Tare Wt (g)	1.90
Moisture %	137.2

Tare No.

Air Dry Moisture	
Dry Wt & Tare (g)	
Tare Wt (g)	
Wet Wt & Tare (g)	

Sieve Wt

* +200 TARE L

Remarks: * TARE IS MIS-MARKED - REG - (5-13-96)
** NO SUSPENSION MATERIAL USED - REG (5-13-96)

Checked by:

A-107

Tested by: REG

RECEIVED
AUG 21 1995

Partical Size Distribution (ASTM D422)
Data Form

Date of Test 04JUN1996
Technician
Alternative # 3 from SESS

Sample ID: 24CP1P501

Flask No. B

Hydrometer No. So/Hy-3

Hydrometer Analysis 7:45					
Time	Temp °F	Hyd Read	Corr	% Pass	Size
1 min	63.7°	24.0	-1.9		
4 min	"	22.9	"		
15 min	"	16.1	"		
1 hour	"	~~-3~~	"		
4 hours 24h	67.0 66h	-1.0 -1.3	" -1.9		

use computer program to calculate

Cap No.

Tare No. D

Hygroscopic Moisture	
Wet Wt & Tare (g)	27.47
Dry Wt & Tare (g)	10.91
Tare Wt (g)	1.91
Moisture %	184%

Tare No. D

Air Dry Moisture	
Dry Wt & Tare (g)	
Tare Wt (g)	
Wet Wt & Tare (g)	

Air Dry Wt		
Sieve	Wt. Ret.	% Pass
3"		
2"		
1.5"		
1.0"		
3/4"		
3/8"		
No. 4		
No. 10 100% passed		
Hyd Soil Wt. 78.85		
No. 20	0.1	
No. 40	~~0.2~~	
No. 50	0.2	
No. 100	0.5	
No. 200	1.04	

Remarks:

Checked by: A-108 Tested by: REG

RECEIVED
AUG 21 1995

Partical Size Distribution (ASTM D422)
Data Form

Date of Test 04JUN1996
Technician
Alternative # 3 from SESS

Sample ID 24CP1PS02

Flask No. E

Hydrometer No. 50/Hy-3

Hydrometer Analysis					
Time	Temp	Hyd Read	Corr	% Pass	Size
1 min	63.7	26.6	-1.9		
4 min	"	25.0	"		
15 min	"	22.0	"		
1 hour	"	-0.5	"		
4 hours 24h	67.0 66.2	-1.1 -1.3	" -1.9		

~~7:55~~ 7:55

use computer program to calculate

Cap No.

Tare No. J

Hygroscopic Moisture	
Wet Wt & Tare (g)	25.22
Dry Wt & Tare (g)	10.88
Tare Wt (g)	1.93
Moisture %	164.2 %

Air Dry Wt

Sieve	Wt. Ret.	% Pass
3"		
2"		
1.5"		
1.0"		
3/4"		
3/8"		
No. 4		
No. 10 100% passed	0.0	
Hyd Soil Wt. 79.13		
No. 20	0.1	
~~No. 40~~	0	
No. 50	0.2	
No. 100	0.5	
No. 200	1.4	

Tare No.

Air Dry Moisture	
Dry Wt & Tare (g)	
Tare Wt (g)	
Wet Wt & Tare (g)	

Remarks:

Checked by:

Tested by: REG

ONE DIMENSIONAL CONSOLIDATION TEST (ASTM D2435) DATA FORM

Consolidometer
Load Corrections

Consolidometer No. So/C-6 QC No. _____
Extensometer No. _____ QC No. _____
Tested by REG Computed by REG Checked by _____
Date 6-10-96 Date Last Corrections _____

Load Increments (tsf)	Deflection (in)			Average Deflection (in)
	1	2	3	
0.0000	.0000	.0000	.0000	.0000
0.0625	.0004	.0002	.0002	.0003
0.125	.0006	.0004	.0004	.0005
0.250	.0008	.0006	.0006	.0007
0.500	.0012	.0009	.0011	.0011
1.000	.0017	.0015	.0017	.0016
.125	.0007	.0004	.0007	.0006
.250	.0009	.0006	.0009	.0008
.500	.0012	.0010	.0013	.0012
1.00	.0018	.0015	.0018	.0017
2.00	.0028	.0024	.0028	.0027
4.00	.0045	.0040	.0044	.0043
8.00	.0073	.0065	.0069	.0069

One Dimensional Consolidation Test (ASTM D2435)
Data Form

Date of Test 11 JUNE 96
Technician REC
Alternative # 3 from SESS

Sample ID: CP CP

Tare No. CO Tare No. ~~Solfr-6~~ H

Moisture Content			
	Trimmings	Initial	Final
Wet wt and Tare (g)	55.41	~~175.19~~	105.65
Dry wt and Tare (g)	19.33	94.03 28.86	89.63
Wt of Water (g)	36.58	65.17	16.02
Wt of Tare (g)	1.98	~~81.16~~ REC	60.77
Dry Weight (g)	17.35	28.86 Ø.Ø	28.86
Moisture	210.8	225.8	55.5

Sample Volume (cc) =
Sample Height (in) =
Specific Gravity =
Ring No. = Solfr-6

No.	Load (tsf)	Remarks	No.	Load (tsf)	Remarks	No.	Load (tsf)	Remarks
1	0.065		11			21		
2	0.125		12			22		
3	0.250		13			23		
4	0.500	FLOOD	14			24		
5	1.000		15			25		
6	2.000		16			26		
7	4.000		17			27		
8	8.000		18			28		
9			19			29		
10			20			30		

Remarks: (For E-P curve: Max. of 3 lines, each line allows max of 36 characters)

Calculated by REC Plotted by REC Checked by REC

One-Dimensional Consolidation Test (ASTM D2435)
Time-Deformation Data

Date of Test 12 June
Technician LEG
Alternative # 3 from SESS

Sample ID: CPCP1D01

Load .0625 tsf

Time Started 8:38

	Time	Time (min)	Dial Reading	Corr.	$\sqrt{t}$
(2)	0		.0000	0000	
	6 sec	.1	.0100	.0003	.316
(3)	15 sec.	.25	~~.0290~~		.500
(4)	30 sec	.5	.0410		.707
(4)	1 min	1	.0567		1.000
(5)	2 min	2	.0632		1.414
(6)	4 min	4	.0880		2.000
(8)	8 min	8	.1230		2.828
(10)	15 min	15	.1666		3.873
(13)	30 min	30	.2221		5.477
(14)	1 hr	60	.2509		7.746
(15)	2 hr	120	.2613		10.955
(15)	4 hr	240	.2677		15.492
(15)	6 hr	360	.2709		18.974
(16)	24 hr	1440	.2813		

Tested by: _____ Plotted by: _____ Checked by: _____

One Dimensional Consolidation Test (ASTM D2435)

Boring No. _____ Range _____

Depth or Elev. _____ Sample No. CPCPID01 Part No. _____

Offset _____

Tested by: RES Calculated by: _____ Plotted by: _____ Checked by: _____

Load .125 Time Started 8:30

	Time	Time (min)	Dial Reading	Corr.	$\sqrt{t}$
0	0	.2813	.0003		
"	6 sec	.1	.2837	.0005	.316
"	15 sec	.25	.2846		.500
"	30 sec	.5	.2860		.707
"	1 min	1	.2878		1.000
"	2 min	2	.2908		1.414
"	4 min	4	.2945		2.000
"	8 min	8	.2994		2.828
1	15 min	15	.3048		3.873
1	30 min	30	.3107		5.477
1	1 hr	60	.3159		7.746
2	2 hr	120	.3202		10.955
2	4 hr	240	.3248		15.492
2	6 hr	360	.3275		18.974
2	24 hr	1440	.3350		

Remarks Note: Sample FLOOD IS ALREADY SATURATED

Load .250 Time Started 8:30

	Time	Time (min)	Dial Reading	Corr.	$\sqrt{t}$
2	0	0	.3350	.0005	
"	6 sec	.1	.3368	.0007	.316
3	15 sec	.25	.3400		.500
"	30 sec	.5	.3414		.707
"	1 min	1	.3438		1.000
3	2 min	2	.3475		1.414
	4 min	4	.3526		2.000
	8 min	8	.3595		2.828
4	15 min	15	.3658		3.873
"	30 min	30	.3723		5.477
"	1 hr	60	.3776		7.746
5	2 hr	120	.3820		10.955
5	4 hr	240	.3861		15.492
5	6 hr	360	.3885		18.974
5	24 hr	1440	.3941		

Remarks _____

Load .5 TSF Time Started 8:30

	Time	Time (min)	Dial Reading	Corr.	$\sqrt{t}$
5	0		.3941	.0007	
	6 sec	.1	.3975	.0012	.316
	15 sec	.25	.3991		.500
6	30 sec	.5	.4009		.707
"	1 min	1	.4040		1.000
"	2 min	2	.4088		1.414
6	4 min	4	.4138		2.000
7	8 min	8	.4207		2.828
7	15 min	15	.4267		3.873
	30 min	30	.4329		5.477
7	1 hr	60	.4367		7.746
7	2 hr	120	.4403		10.955
7	4 hr	240	.4439		15.492
	6 hr	360	.4460		18.974
	72 hr	4320	.4544		

Remarks _____

Load 1.0 TSF Time Started _____

	Time	Time (min)	Dial Reading	Corr.	$\sqrt{t}$
8	0	0	.4544	.0012	
	6 sec	.1	.4570	.0017	.316
	15 sec	.25	.4589		.500
9	30 sec	.5	.4607		.707
	1 min	1	.4633		1.000
	2 min	2	.4669		1.414
	4 min	4	.4714		2.000
	8 min	8	.4763		2.828
10	15 min	15	.4809		3.873
	30 min	30	.4848		5.477
10	1 hr	60	.4887		7.746
	2 hr	120	.4915		10.955
10	4 hr	240	.4945		15.492
	6 hr	360	.4961		18.974
11	24 hr	1440	.5000		

Remarks _____

Boring No. _____ Station _____ Range _____

Depth or Elev. _____ Sample No. CPCRID01 Part No. _____

Offset _____

Tested by: RSC Calculated by: _____ Plotted by: _____ Checked by: _____

Load 2.0 TSF Time Started 8:30

Time	Time (min)	Dial Reading	Corr.	$\sqrt{t}$
0		.5000	.0017	
6 sec	.1	.5042	.0027	.316
15 sec	.25	.5061		.500
30 sec	.5	.5086		.707
1 min	1	.5118		1.000
2 min	2	.5159		1.414
4 min	4	.5220		2.000
8 min	8	.5275		2.828
15 min	15	.5316		3.873
30 min	30	.5350		5.477
1 hr	60	.5378		7.746
2 hr	120	.5406		10.955
4 hr	240	.5430		15.492
6 hr	360	.5448		18.974
24 hr	1440	.5476		

Remarks _____

Load _____ Time Started _____

Time	Time (min)	Dial Reading	Corr.	$\sqrt{t}$
0		.5476	.0027	
6 sec	.1	.5520	.0043	.316
15 sec	.25	.5537		.500
30 sec	.5	.5558		.707
1 min	1	.5591		1.000
2 min	2	.5635		1.414
4 min	4	.5684	.5728	2.000
8 min	8	[illegible]	(Feb)	2.828
15 min	15	.5758		3.873
30 min	30	.5783		5.477
1 hr	60	.5837		7.746
2 hr	120	.5859		10.955
4 hr	240	.5877		15.492
6 hr	360	.5887		18.974
24 hr	1440	.5907		

Remarks _____

Load _____ Time Started _____

Time	Time (min)	Dial Reading	Corr.	$\sqrt{t}$
0				
6 sec	.1			.316
15 sec	.25			.500
30 sec	.5			.707
1 min	1			1.000
2 min	2			1.414
4 min	4			2.000
8 min	8			2.828
15 min	15			3.873
30 min	30			5.477
1 hr	60			7.746
2 hr	120			10.955
4 hr	240			15.492
6 hr	360			18.974
hr				

Load _____ Time Started _____

Time	Time (min)	Dial Reading	Corr.	$\sqrt{t}$
0				
6 sec	.1			.316
15 sec	.25			.500
30 sec	.5			.707
1 min	1			1.000
2 min	2			1.414
4 min	4			2.000
8 min	8			2.828
15 min	15			3.873
30 min	30			5.477
1 hr	60			7.746
2 hr	120			10.955
4 hr	240			15.492
6 hr	360			18.974

One Dimensional Consolidation Test (ASTM D2435)
Data Form

Date of Test _____
Technician REC
Alternative # 3 from SESS

Sample ID: CPCP1D Ø2

Tare No. 1D Tare No. H

Moisture Content			
	Trimmings	Initial	Final
Wet wt and Tare (g)	35.35	89.28	104.44
Dry wt and Tare (g)	12.95	28.63	89.38
Wt of Water (g)	22.40	60.65	15.06
Wt of Tare (g)	1.96	0.0	60.75
Dry Weight (g)	10.99	28.63	28.63
Moisture	203.8	211.8	52.6%

Sample Volume (cc) = _____
Sample Height (in) = _____
Specific Gravity = _____
Ring No. = _____

* SAMPLE ALREADY SATURATED

No.	Load (tsf)	Remarks	No.	Load (tsf)	Remarks	No.	Load (tsf)	Remarks
1	.0625		11			21		
2	.125		12			22		
3	.250		13			23		
4	.500	Flood	14			24		
5	1.000		15			25		
6	2.000		16			26		
7	4.000		17			27		
8			18			28		
9			19			29		
10			20			30		

Remarks: (For E-P curve: Max. of 3 lines, each line allows max of 36 characters)

Calculated by REC Plotted by REC Checked by REC

One-Dimensional Consolidation Test (ASTM D2435)
Time-Deformation Data

Date of Test 6-20-96
Technician REG
Alternative # 3 from SESS

Sample ID: CPCP1D Ø2

Load .0625 tsf

Time Started 9:ØØA

	Time	Time (min)	Dial Reading	Corr.	$\sqrt{t}$
0	0	0	.0000		
2	6 sec	.1	.0419	.0003	.316
	15 sec	.25	.0545		.500
3	30 sec	.5	.0665		.707
4	1 min	1	.0770		1.000
	2 min	2	.0958		1.414
5	4 min	4	.Ø1220		2.000
8	8 min	8	.Ø1620		2.828
9	15 min	15	.Ø1972		3.873
11	30 min	30	.2394		5.477
13	1 hr	60	.2653		7.746
14	2 hr	120	.2760		10.955
14	4 hr	240	.2828		15.492
14	6 hr	360	.2860		18.974
14	24 hr	1440	.2964		

Tested by: REG Plotted by: _____ Checked by: _____

One Dimensional Consolidation Test (ASTM D2435)

Data Form

Depth or Elev. _____ Sample No. CPCP1D02 Part No. _____

Offset _____

Tested by: LCL Calculated by: _____ Plotted by: _____ Checked by: _____

Load .125 tsf Time Started 9:10

Time	Time (min)	Dial Reading	Corr.	6-21 $\sqrt{t}$
0		.2964	.0003	
6 sec	.1	.3005	.0005	.316
15 sec	.25	.3018		.500
30 sec	.5	.3030		.707
1 min	1	.3056		1.000
2 min	2	.3077		1.414
4 min	4	.3113		2.000
8 min	8	.3160		2.828
15 min	15	.3213		3.873
30 min	30	.3273		5.477
1 hr	60	.3328		7.746
2 hr	120	.3378		10.955
4 hr	240	.3427		15.492
6 hr	360	.3453		18.974
72 hr	~~4320~~ 71.5	.3621		

Remarks

*FLOOD (.5 tsf)

Load .250 Time Started 8:40

Time	Time (min)	Dial Reading	Corr.	$\sqrt{t}$
0		.3621	.0005	
6 sec	.1	.3674	.0007	.316
15 sec	.25	.3687		.500
30 sec	.5	.3703		.707
1 min	1	.3725		1.000
2 min	2	.3756		1.414
4 min	4	.3798		2.000
8 min	8	.3851		2.828
15 min	15	.3900		3.873
30 min	30	.3956		5.477
1 hr	60	.4002		7.746
2 hr	120	.4043		10.955
4 hr	240	.4086		15.492
6 hr	360	.4112		18.974
24 hr	1440	.4186		

Remarks

Load .500 Time Started _____

Time	Time (min)	Dial Reading	Corr.	$\sqrt{t}$
0		.4186	.0007	
6 sec	.1	.4257	.0012	.316
15 sec	.25	.4280		.500
30 sec	.5	.4304		.707
1 min	1	.4337		1.000
2 min	2	.4386		1.414
4 min	4	.4450		2.000
8 min	8	.4523		2.828
15 min	15	.4584		3.873
30 min	30	.4646		5.477
1 hr	60	.4690		7.746
2 hr	120	.4726		10.955
4 hr	240	.4760		15.492
6 hr	360	.4782		18.974
24 hr	1440	.4838		

Remarks

Load 1.00 Time Started _____

Time	Time (min)	Dial Reading	Corr.	$\sqrt{t}$
0	0	.4838	.0012	
6 sec	.1	.4900	.0017	.316
15 sec	.25	.4922		.500
30 sec	.5	.4942		.707
1 min	1	.4980		1.000
2 min	2	.5024		1.414
4 min	4	.5081		2.000
8 min	8	.5138		2.828
15 min	15	.5189		3.873
30 min	30	.5232		5.477
1 hr	60	.5269		7.746
2 hr	120	.5301		10.955
4 hr	240	.5328		15.492
6 hr	360	.5350		18.974
24 hr	1440	.5388		

One-Dimensional Consolidation Test (ASTM D2435)

Depth or Elev. _____ Sample No. CPCP1D42 Part No. _____

Offset _____

Tested by: RES Calculated by: _____ Plotted by: _____ Checked by: _____

Load 2.00 Time Started _____

Time	Time (min)	Dial Reading	Corr.	$\sqrt{t}$
0		~~5388~~	.0027	
6 sec	.1	.5455	.0027	.316
15 sec	.25	.5477		.500
30 sec	.5	.5501		.707
1 min	1	.5532		1.000
2 min	2	.5581		1.414
4 min	4	.5636		2.000
8 min	8	.5687		2.828
15 min	15	.5723		3.873
30 min	30	.5758		5.477
1 hr	60	.5790		7.746
2 hr	120	.5813		10.955
4 hr	240	.5841		15.492
6 hr	360	.5856		18.974
24 hr	1440	~~5886~~		

Remarks _____

Load 4.00 Time Started _____

Time	Time (min)	Dial Reading	Corr.	$\sqrt{t}$
0		~~.5936~~	.0027	
6 sec	.1	.5936	.0043	.316
15 sec	.25	.5960		.500
30 sec	.5	.5985		.707
1 min	1	.6022		1.000
2 min	2	.6067		1.414
4 min	4	.6115		2.000
8 min	8	.6148		2.828
15 min	15	.6188		3.873
30 min	30	.6218		5.477
1 hr	60	.6242		7.746
2 hr	120	.6264		10.955
4 hr	240	.6284		15.492
6 hr	360	.6294		18.974
72 hr		.6332		

Remarks _____

Load _____ Time Started _____

Time	Time (min)	Dial Reading	Corr.	$\sqrt{t}$
0				
6 sec	.1			.316
15 sec	.25			.500
30 sec	.5			.707
1 min	1			1.000
2 min	2			1.414
4 min	4			2.000
8 min	8			2.828
15 min	15			3.873
30 min	30			5.477
1 hr	60			7.746
2 hr	120			10.955
4 hr	240			15.492
6 hr	360			18.97
hr				

Load _____ Time Started _____

Time	Time (min)	Dial Reading	Corr.	$\sqrt{t}$
0				
6 sec	.1			.316
15 sec	.25			.500
30 sec	.5			.707
1 min	1			1.000
2 min	2			1.414
4 min	4			2.000
8 min	8			2.828
15 min	15			3.873
30 min	30			5.477
1 hr	60			7.746
2 hr	120			10.955
4 hr	240			15.492
	360			18.974

One Dimensional Consolidation Test (ASTM D2435)
Data Form

Date of Test 29 JUL 96
Technician REG
Alternative # 3 from SESS

Sample ID: CPCPDSO

Tare No. _____ Tare No. B

Moisture Content			
	Trimmings	Initial	Final
Wet wt and Tare (g)		181.10	169.97
Dry wt and Tare (g)		~~130.74~~	120.94
Wt of Water (g)		49.39	40.03
Wt of Tare (g)		71.46	61.69
Dry Weight (g)		59.25	59.25
Moisture		83.4	82.8

Sample Volume (cc) = _____
Sample Height (in) = _____
Specific Gravity = _____
Ring No. = _____

No.	Load (tsf)	Remarks	No.	Load (tsf)	Remarks	No.	Load (tsf)	Remarks
1	.0625		11			21		
2	.125		12			22		
3	.250		13			23		
4	.500	FLOOD	14			24		
5	1.00		15			25		
6	2.00		16			26		
7	4.00		17			27		
8			18			28		
9			19			29		
10			20			30		

Remarks: (For E-P curve: Max. of 3 lines, each line allows max of 36 characters)

50% MIX

Calculated by _____ Slotted by _____ Checked by _____

One-Dimensional Consolidation Test (ASTM D2435)
Time-Deformation Data

Date of Test 29 JULY '96 Sample ID: CPCP050 (?)
Technician REG
Alternative # 3 from SESS

Load .0625 tsf Time Started 8:35

Time	Time (min)	Dial Reading	Corr.	$\sqrt{t}$
0	.0	.0000	-.0003	0
6 sec	.1	.0012		.316
15 sec	.25	.0013		.500
30 sec	.5	.0014		.707
1 min	1	.0014		1.000
2 min	2	.0015		1.414
4 min	4	.0015		2.000
8 min	8	.0016		2.828
15 min	15	.0016		3.873
30 min	30	.0016		5.477
1 hr	60	.0017		7.746
2 hr	120	.0017		10.955
4 hr	240	.0018		15.492
6 hr	360	.0018		18.974
24 hr		.0019		

Tested by: REG Plotted by: _____ Checked by: _____

One Dimensional Consolidation Test (ASTM D2435)
Data Form

Depth or Elev. _____ Sample No. _____ Part No. _____

7/30 Offset _____

Tested by: REG Calculated by: _____ Plotted by: _____ Checked by: _____

Load .125 tsf Time Started 8:35

Time	Time (min)	Dial Reading	Corr.	$\sqrt{t}$.
0	0	.0019	.0003	0
6 sec	.1	.0023	.0005	.316
15 sec	.25	.0023		.500
30 sec	.5	.0023		.707
1 min	1	.0024		1.000
2 min	2	.0024		1.414
4 min	4	.0024		2.000
8 min	8	.0025		2.828
15 min	15	.0025		3.873
30 min	30	.0025		5.477
1 hr	60	.0026		7.746
2 hr	120	.0026		10.955
4 hr	240	.0028		15.492
6 hr	360	.0029		18.974
24 hr		.0030		

Remarks _____

Load .250 tsf Time Started 8:35

Time	Time (min)	Dial Reading	Corr.	$\sqrt{t}$.
0	0	.0030	.0005	0
6 sec	.1	.0042	.0007	.316
15 sec	.25	.0045		.500
30 sec	.5	.0049		.707
1 min	1	.0052		1.000
2 min	2	.0055		1.414
4 min	4	.0058		2.000
8 min	8	.0060		2.828
15 min	15	.0062		3.873
30 min	30	.0063		5.477
1 hr	60	.0065		7.746
2 hr	120	.0067		10.955
4 hr	240	.0069		15.492
6 hr	360	.0070		18.974
24 hr		.0072		

Remarks _____

Load .500 Time Started 8:35

Time	Time (min)	Dial Reading	Corr.	$\sqrt{t}$.
0	0	.0072	.0007	
6 sec	.1	.0110	.0012	.316
15 sec	.25	.0115		.500
30 sec	.5	.0117		.707
1 min	1	.0119		1.000
2 min	2	.0121		1.414
4 min	4	.0122		2.000
8 min	8	.0123		2.828
15 min	15	.0124		3.873
30 min	30	.0126		5.477
1 hr	60	.0127		7.746
2 hr	120	.0129		10.955
4 hr	240	.0132		15.492
6 hr	360	.0135		18.974
24 hr		.0138		

Remarks 36 FLOOD

Load 1.00 Time Started 8:35

Time	Time (min)	Dial Reading	Corr.	$\sqrt{t}$.
0	0	.0138	.0011	0
6 sec	.1	.0192	.0018	.316
15 sec	.25	.0198		.500
30 sec	.5	.0201		.707
1 min	1	.0204		1.000
2 min	2	.0208		1.414
4 min	4	.0210		2.000
8 min	8	.0213		2.828
15 min	15	.0216		3.873
30 min	30	.0219		5.477
1 hr	60	.0221		7.746
2 hr	120	.0224		10.955
4 hr	240	.0228		15.492
6 hr	360	.0232		18.974
24 hr		.0233		

Remarks

One-Dimensional Consolidation Test (ASTM D2435)

Depth or Elev. _____ Sample No. _____ Part No. _____

Offset _____

Tested by: _____ Calculated by: _____ Plotted by: _____ Checked by: _____

Load 2.00 Time Started 8:35

Time	Time (min)	Dial Reading	Corr.	$\sqrt{t}$
0	0	.0238	.0017	0
6 sec	.1	.0291	.0027	.316
15 sec	.25	.0300		.500
30 sec	.5	.0305		.707
1 min	1	.0309		1.000
2 min	2	.0313		1.414
4 min	4	.0317		2.000
8 min	8	.0321		2.828
15 min	15	.0324		3.873
30 min	30	.0327		5.477
1 hr	60	.0330		7.746
2 hr	120	.0333		10.955
4 hr	240	.0338		15.492
6 hr	360	.0340		18.974
24 hr		.0342		

Remarks _____

Load 4.00 Time Started _____

Time	Time (min)	Dial Reading	Corr.	$\sqrt{t}$
0		.0342	.0027	
6 sec	.1	.0480	.0043	.316
15 sec	.25	.0548		.500
30 sec	.5	.0585		.707
1 min	1	.0614		1.000
2 min	2	.0638		1.414
4 min	4	.0656		2.000
8 min	8	.0671		2.828
15 min	15	.0683		3.873
30 min	30	.0693		5.477
1 hr	60	.0702		7.746
2 hr	120	.0710		10.955
4 hr	240	.0716		15.492
6 hr	360	.0720		18.974
24 hr		.0726		

Remarks _____

Load _____ Time Started _____

Time	Time (min)	Dial Reading	Corr.	$\sqrt{t}$
0				
6 sec	.1			.316
15 sec	.25			.500
30 sec	.5			.707
1 min	1			1.000
2 min	2			1.414
4 min	4			2.000
8 min	8			2.828
15 min	15			3.873
30 min	30			5.477
1 hr	60			7.746
2 hr	120			10.955
4 hr	240			15.49
6 hr	360			
hr				

Load _____ Time Started _____

Time	Time (min)	Dial Reading	Corr.	$\sqrt{t}$
0				
6 sec	.1			.316
15 sec	.25			.500
30 sec	.5			.707
1 min	1			1.000
2 min	2			1.414
4 min	4			2.000
8 min	8			2.828
15 min	15			3.873
30 min	30			5.477
1 hr	60			7.746
2 hr	120			10.955
4 hr	240			15.492
6 hr	360			18.974
hr				

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SOP - 1
MODIFIED LIQUID RELEASE TEST DATA FORM

SOP-1
Modified Liquid Release Test (LRT)
Data Form

Sample ID CPCP LR 01

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Date of Test: 6.18.96
Technician: RFG
Alternative #: 3 from SESS
Task #:

Initial Moisture Content on Gravity Drained Sample	210.8	(%)
Final Moisture Content After LRT	67.4%	(%)

Pressure (psi)	Cumulative Volume of Liquid (mL)	Δt
0	0.0	START @ 9:3[illegible] AT 3:00 P
5	159.2 START = 9:[illegible] (6/18)	*SEE NOTE ON BACK →
10	218.8 START = 8:15 (6/19)	
20	233.4 START = 8:25 (9/20)	
30	258.7 START = 1:15 (9/20)	
40	264.4 START @ 8:05 (9/21)	
50	269.5 START @ 11:00 (9/21)	

Checked By: [illegible]

INITIAL Sample WT

W/MOLD = 2892.1 gm

MOLD = 2304.5 gm

587.6 gm

INITIAL Wd = 70.2 pcf

INITIAL m% = 210.8

VOL = Aprox ≈ 31.897 in³
↳ 522.698 cm³

* DIA = 2.85 in
* HT = 5.0 in

FINAL m%

WET = 377.28
DRY = 250.11
TARE = 61.49

67.4%

1) 18 June '96 – @3:00 pm, H_2O is still coming out at 1 drop / 11 sec.
and 72.1 ml has accumulated under 5 psi – RES
@8:15 (6-19-96) – 87.1 ml – sample not dripping at all

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NOTES on CPCPLR01

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6-19-96 - TEST sample is still dripping at the rate of 1 drop / 65 sec. at 2:30pm and 31.3 ml has collected since test was raised to 10psi

9/20/96 - No additional H_2O is being forced from sample; under 10 psi - 59.6 (not cumulative) ml

→ at 8:25, test increased to 20 psi *(sample flask not emptied)

→ at 1:15pm - Δt between drops is +2min and vol = 74.2 (10.0 & 20.0 psi total; overall cumulative vol. is 233.4 ml) and press. increased to 30 psi

* NOTE: I could only increase press. to 25psi due to a leak at the fitting on the pump → I then took down the press, disassembled the hose/fitting, and used high vac. grease, reassembled apparatus and this solved the problem — total down time = 15min

At 3:00p - ΔT = 1min 10sec
↳ has accumulated ≈ 8ml in 1.5hr

9/21/96 - → at 8:00, no additional H_2O being forced from sample → accumulated 25.3 ml under 30psi (total of 258.7ml)

→ at 11:00, Δt was greater than 2 min and press. was increased to 50psi

* NOTE: when increasing press to 40 psi, there was a leak on the line where it connected to the pump fitting; I had to take down the pump to repair it; total down time was aprox 5 min

At 40 psi; 31.0 ml was recorded (additional 5.7ml)

→ at 1:30; test stopped; Δt = 2:15
total vol = 269.5ml

SOP-1
Modified Liquid Release Test (LRT)
Data Form

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Sample ID _____

Date of Test: _____
Technician: _____
Alternative #: 3 from SESS
Task #: _____

Initial Moisture Content on Gravity Drained Sample	_____ (%)
Final Moisture Content After LRT	_____ (%)

Pressure (psi)	Cumulative Volume of Liquid (mL)
0	
5	
10	
20	
30	
40	
50	

Checked By: _____

"INTENTIONALLY BLANK"
6-26-96
REG

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SOP-1
Modified Liquid Release Test (LRT)
Data Form

Sample ID CPCPLRØ2

Date of Test: 6-26-96
Technician: REC
Alternative #: 3 from SESS
Task #:

Initial Moisture Content on Gravity Drained Sample	200.6	(%)
Final Moisture Content After LRT		(%)

Pressure (psi)	Cumulative Volume of Liquid (mL)	
0	Ø	
5	89.1	START @ 10:30 (6/26)
10	102.9	START @ 8:00 (6/27)
20	115.5	START @ 2:45 (6/27)
30	119.5	START @ 805 (6/28)
40	124.9	START @ 1005 (6/28)
50	127.9 ml	START @ 1300 (6/28)

INITIAL SAMPLE WT
W/MOLD: 2585.3
MOLD: 2304.5
2808 gm

Checked By: [illegible]

2.325 in ht
2.845 in diam. } APPROX VOL: 14.78 in³

Wd = 72.4 pcf

INITIAL MOISTURE CONT.
WET: 34.47
DRY: 12.87
TARE: 1.93 (LR)
19.24
cons. m% = 203.8

FINAL M%
WET = 228.21
DRY = 150.86
TARE = 61.48 (L)
64.7

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SOP-1
Modified Liquid Release Test (LRT)
Data Form

NOTES ON CPCP LR#2

6-26-96 - @ 2:30, 60 ml has accumulated under 5 psi; - Emptied cyl., Δt < 10sec

6-27-96 - @ 8:10; an additional 29.1 ml has accumulated - (total: 89.1 ml) and press is increased to 10 psi

NOTE: the effluent is ~~primarily~~ essentially clear with a slight amber tint.

@ 2:45pm - Δt > 2min an additional 13.8 ml accumulated under 10 psi
sample is then raised to 20 psi
(* flask is emptied)

6-28-96 @ 8:05 Δt > 2min; an additional 12.6 ml has accumulated under 20 psi; sample is then increased to 30 psi

@ 10:00 Δt > 2min, press is increased to 40 psi - an additional 4 ml accumulated (reading = 16.6 ml)

@ 1:00 - Δt < 2min; an additional 5.4 ml has accumulated (reading 22.0 ml)
Press. increased to 50 psi

@ 3:00 - Δt > 2min; accum. add'l 5.0 ml.
Total accum 127.9 ml

Test Ended

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SOP - 15
HARVARD MINIATURE COMPACTION TEST DATA FORM

Analyst							
%							

COMPACTION DATA

RECEIVED AUG 21 1995

Project: CPCPHM01 Sample No.: ____

Class: ____ Group: ____ Station: ____ Range: ____

El: ____ Borrow Area: ____ Machine No. __ Date: 6-19-96

Tested By: REG Calculated By: REG Plotted By: REG Checked By: ____

Point No.	1	2	3	4	5	6	7	8	9
Percent Water			12%	14%	16%	18%	20%		
Wt of Soil & Cyl, gms			232.48	235.78	239.87	239.72	238.56		
Wt of Cyl, gms			139.54	139.54	139.54	139.54	139.54		
Wt of Soil, gms			92.94	98.24	100.33	100.18	99.04		
Wet Density, lb per ft			93.30	98.62	100.72	100.57	99.42		
Cup No.			1	2	3	4	5		
Wt of W Soil & Cup			35.95	29.50	36.47	35.55	31.47		
Wt of D Soil & Cup			25.39	20.69	25.08	24.10	21.01		
Wt of Cup			1.96	1.94	1.94	1.94	1.96		
Wt of D Soil			23.43	18.75	23.14	22.16	19.05		
Wt of Water			10.56	8.81	11.39	11.45	10.46		
% Moist			45.1	47.8	49.2	51.7	54.9		
Dry Density			64.3	66.7	67.5	66.3	64.2		
Needle No.									
Needle Reading									
Resistance, lb per in									

Harvard Miniature Compaction Test Data Form

S -15

Date of Alternat Task # ____ | Mold Asse | Mold. | Wet Soil + 1

Remarks: ____

Analyst							
							%

The Critical Link.

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COMPACTION DATA

Project: CPCP HM 02 Sample No.: 1

Class: 1 Group: 1 Station: 1 Range: 1

El: 1 Borrow Area: 1 Machine No. 1 Date: 25JUN96

Tested By: [illegible] Calculated By: [illegible] Plotted By: [illegible] Checked By: [illegible]

Point No.	1	2	3	4	5	6	7	8	9
Percent Water	1	2	3	4	5	6	7	8	
Wt of Soil & Cyl, gms	229.22	233.90	237.32	240.43	238.21	234.23	233.53	232.36	
Wt of Cyl, gms	140.06	140.06	140.06	140.39	140.39	140.39	140.39	140.39	
Wt of Soil, gms	89.16	93.84	97.26	100.04	97.82	93.84	93.14	91.97	
Wet Density, lb per ft	89.5	94.2	97.6	100.4	98.2	94.2	93.5	92.3	
Cup No.	1	2	3	4	5	6	7	8	
Wt of W Soil & Cup	31.92	43.71	31.11	32.03	38.03	28.38	30.30	39.77	
Wt of D Soil & Cup	23.65	31.44	22.11	21.98	25.24	18.25	19.04	23.92	
Wt of Cup	1.94	1.94	1.94	1.94	1.94	1.94	1.94	1.94	
Wt of D Soil	21.71	29.50	20.17	19.95	23.30	16.31	17.10	21.98	
Wt of Water	8.27	12.27	9.00	10.14	12.79	10.13	11.26	15.85	
% Moist	38.1	41.6	44.6	50.8	54.9	62.1	65.8	72.1	
Dry Density	64.8	66.5	67.3	66.6	63.4	58.1	56.4	53.6	
Needle No.									
Needle Reading									
Resistance, lb per in									

3.795 in ~ .002196 ft

Harvard Miniature Compaction Test

S_ -15

Date of: Alternati Task # _ | Mold As | Mol | Wet Soil -

Remarks:

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AUG 21 1995

SOP - 13
BENCH SCALE SOLIDIFICATION DATA FORMS

SOP-13
Bench Scale Solidification
Data Form

Test Date 19JUN96
Alternate # 3 from SESS
Task #

Sample ID CPCP1 SO1

96% SAND / 4% Bentonite for Solidification Agent

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Screening, Phase 1

% Solidification Agent	10 %		Analyst	25 %		Analyst	40 %		Analyst	50 %		Analyst
Weight of Sample Aliquot (g)	500.0		—	500.0		—	500.0		—	500.0		—
*Solidification Agent (g)	9.15		—	22.88		—	36.60		—	45.75		—
Volume Upon Mixing (mL)	~450		NW	~450		NW	~468		—	~480		NW
Mixing Time (min)	1		—	3.5		—	5.0		—	5.0		—
pH / VOC	8.0 / Ø		—	8.0 / Ø		—	8.0 / Ø		—	8.0 / Ø		—
Temperature	76.8°F		NW	75.0°F		NW	73.2		NW	73.2°F		NW
Fraction	1	2		1	2		1	2		1	2	
Elapsed Time (min)												
Volume Change (mL) @ 2 days	Ø	Ø	—	Ø	Ø	—	Ø	Ø	—	Ø	Ø	—
*Penetrometer Reading @ 5 days	Ø	Ø	—	Ø	Ø	—	Ø	Ø	—	Ø	Ø	—
Average Penetrometer Reading	Ø		—	Ø		—	Ø		—	Ø		—
Solidified Moisture Content												
Average Solidified Moisture Content												

Since we gained absolutely no strength, we chose not to waste time with moisture content test

A-135

**% Moisture, slurry (aliquot 1) CPCP1MCØ1 = 81.69
**% Moisture, slurry (aliquot 2) CPCP1MCØ2 = 81.70
Average % Moisture, slurry 81.70

* calculated using k=[x-(x*w/100)] * (y/100) = $\left[500-\left(500*\frac{81.70}{100}\right)\right]*\frac{Y}{100}$
x=weight of sediment = 500g
w=average moisture content
y=solidification mix ratio expressed as a percent value of dried sediment solids
** follow ASTM method 02216

Checked By: —

— Penetration reading was zero at one day curing!
Decanted ~30ml of supernatant @ 2 days curing
Decanted ~10ml more after 5 days

S-P-13

Bench Scale Solidification Data Form

Test Date 25 JUN 1996
Alternate # 3 from SESS
Task # _____

MIX USED: 50% Type I Portland Cement + 50% FLY ASH Class F [ON A DRY WEIGH BASES]

Sample ID ~~CPCPD502~~ CPCPDS01

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Screening, Phase 1

% Solidification Agent	10 %		Analyst	25 %		Analyst	40 %		Analyst	50 %		Analyst
Weight of Sample Aliquot (g)	1000		~~NW~~	1000		~~NW~~	1000		~~NW~~	1000		~~NW~~
*Solidification Agent (g)	19.90		~~NW~~	49.75		~~NW~~	79.60		~~NW~~	99.50		~~NW~~
Volume Upon Mixing (mL)	~912		NW	~~878~~ 908		NW	~913		NW	~934		~~NW~~
Mixing Time (min)	3.0		NW	5.0		NW	50		NW	5.0		~~NW~~
pH / VOC(max) background = 2.3	10.5 / ~~7.2~~		~~NW~~ / ~~NW~~	10.5 / 7.2		NW / ~~NW~~	11.0 / 7.8		NW / ~~NW~~	11.0 / 7.0		NW / ~~NW~~
Temperature	70.4°F		NW	71.6°F		NW	71.4°F		NW	72.2		~~NW~~
Fraction	1	2		1	2		1	2		1	2	
Elapsed Time (~~min~~ hrs) NW 6/20/96	24 / 72.5	24 / 72.5	NW / NW	24 / 72	24 / 72	NW / NW	24 / 72	24 / 72	NW / NW	24 / 72	24 / 72	NW / NW
Volume Change (mL)	Ø / Ø	Ø / Ø	NW / NW	Ø / Ø	Ø / Ø	NW / NW	Ø / Ø	Ø / Ø	NW / NW	Ø / Ø	Ø / Ø	NW / NW
Penetrometer Reading	Ø / Ø	Ø / Ø	NW / NW	Ø / Ø	Ø / Ø	NW / NW	Ø / Ø	Ø / Ø	NW / NW	Ø / Ø	Ø / Ø	NW / NW
Average Penetrometer Reading	Ø	Ø	NW / NW	Ø	Ø	NW / NW	Ø	Ø	NW / NW	Ø	Ø	NW / NW
Solidified Moisture Content @ 3 days												
Average Solidified Moisture Content												

NOT PERFORMED SINCE CONSIDERED FAILURE

A-1363

**% Moisture, slurry (aliquot 1) CPCPDMCØ2 = 80.1 %
**% Moisture, slurry (aliquot 2) CPCPDMCØ2 = 80.1 %
Average % Moisture, slurry 80.1%

* calculated using k=[x-(x*w/100)] * (y/100)
x=weight of sediment
w=average moisture content
y=solidification mix ratio expressed as a percent value of dried sediment solids
** follow ASTM method 02216

Decanted ~10 mL of supernatant @ 1 day curing on 10% mix.
~5 mL on 25%
~4 mL on 40%
Decanted additional ~6 mL of supernatant @ 3 day on 10%.
No supernatant observed on 25%, 40% and 50%

Checked By: NW

S -13

Bench Scale Solidification Data Form

RECEIVED AUG 21 1995

Test Date 25 JUN 1996
Alternate # 3 from SESS
Task #

Mix used:
25% Lime
75% SAND

Sample ID CPCPDS01

~~Screening, Phase 1~~

% Solidification Agent	10 %		Analyst	25 %		Analyst	40 %		Analyst	50 %		Analyst
Weight of Sample Aliquot (g)	1000		~~[illegible]~~	1000		~~[illegible]~~	1000		~~[illegible]~~	1000		~~[illegible]~~
*Solidification Agent (g)	19.90		~~[illegible]~~	49.75		~~[illegible]~~	79.60		~~[illegible]~~	99.50		~~[illegible]~~
Volume Upon Mixing (mL)	898		NW	908		NW	922		NW	924		NW
Mixing Time (min)	5.0		NW	5.0		NW	5.0		NW	6.0		NW
pH / max PID (background ~2.0)	10 / 7.0		NW / ~~[illegible]~~	12 / 8.0		NW / ~~[illegible]~~	12 / 7.2		NW / ~~[illegible]~~	12.5 / 8.5		NW / ~~[illegible]~~
Temperature	71.6°F		NW	71.7		~~[illegible]~~	71.8°F		NW	71.3		NW
Fraction	1	2		1	2		1	2		1	2	
Elapsed Time (~~min~~ hrs. NW 6/28/96)	24/72	24/72	NW / NW	24/72	24/72	NW / NW	24/72	24/72	NW / NW	24/72	24/72	NW / NW
Volume Change (mL) NW 6/28	3/~~3~~	3/~~3~~	NW / NW	2/2	3/3	NW / NW	~~0~~/~~0~~	3/3	NW / NW	1/1	3/3	NW / NW
Penetrometer Reading	~~0~~/~~0~~	~~0~~/~~0~~	NW / NW	~~0~~/~~0~~	~~0~~/~~0~~	NW / NW	~~0~~/~~0~~	~~0~~/~~0~~	NW / NW	~~0~~/~~0~~	~~0~~/~~0~~	NW / NW
Average Penetrometer Reading	~~0~~	~~0~~	NW / NW	~~0~~	~~0~~	NW / NW	~~0~~	~~0~~	NW / NW	~~0~~	~~0~~	NW / NW
Solidified Moisture Content												
Average Solidified Moisture Content												

NOT PERFORMED SINCE CONSIDERED FAILURE

A-137 9

*Volume change from initial volume.

**% Moisture, slurry (aliquot 1) CPCPDM~~0~~01 = 80.1

**% Moisture, slurry (aliquot 2) CPCPDM~~0~~02 = 80.1

Average % Moisture, slurry 80.1 %

Decanted ~ 10 mL of supernatant @ 1 day curing from ~~10%~~ all NW 6/25/96 mixes.

Decanted ~ 5 mL of supernatant @ 3 day curing from ~~10%~~ all mixes. 6/28/96

* calculated using k=[x-(x*w/100)] * (y/100)
x=weight of sediment
w=average moisture content
y=solidification mix ratio expressed as a percent value of dried sediment solids

** follow ASTM method 02216

Checked By: NW

S -13

Bench Scale Solidification Data Form

RECEIVED AUG 21 1995

Test Date Ø8JUL1996 Sample ID CPCPDS03

Alternate # 3 from SESS

Task #

Mix used 50% 50%PORTLAND CEMENT / FLY ASH

NOTE: % based on volume: 50% = 500g slurry + 500g Reagent; 100% = 650g slurry + 325g Reagent

Screening, Phase 1

% Solidification Agent	~~10%~~ 50%	Analyst	~~25%~~ 100%	Analyst	★ ~~40%~~ 200%	Analyst	~~50%~~ 150	Analyst
Weight of Sample Aliquot (g)	650	NW	500	NW	500	←	667	←
*Solidification Agent (g)	325	NW	500	NW	1000	←	1000	←
Volume Upon Mixing (mL)	703	~~629~~ NW	629	NW	VOID		1,000 (some air entrapped)	NW
Mixing Time (min)	3:20	NW	~3	NW	8 seconds		~20	NW
pH / max PID *pkg=3	/ 5.2	/ NW	/ 5	NW	/ 3	←	/ 3	←
Temperature moist temp = 69.9°F air temp = 70.0°F	71.9°F	NW	73.0°F	NW	~~74.1°F~~ ← Ø8JUL1996 NW		74.1	←
Fraction	1 / 2		1 / 2		1 / 2		1 / 2	
Elapsed Time (~~min~~ hours)	24/72 24/72	NW/NW	24/72 24/72	NW/NW			24/72 24/72	NW/NW
Volume Change (mL)	Ø/Ø Ø/Ø	NW/NW	Ø/Ø Ø/Ø	NW/NW			Ø/Ø Ø/Ø	NW/NW
Penetrometer Reading	.7/3.6 .7/3.6	NW/NW	>4.5/>4.5 >4.5/>4.5	NW/NW			>4.5/>4.5 >4.5/>4.5	NW/NW
Average Penetrometer Reading	.7/3.6	NW/NW	>4.5/>4.5	NW/NW			>4.5/>4.5	NW/NW
Solidified Moisture Content								
Average Solidified Moisture Content (%)	47.9	←	30.8	←			21.1	←

A-138 BOOK NWD LIMITED DATA SEE WATER CONTENT DATA

13

% @ 7days pen reading = >4.5 (maxed out)

**% Moisture, slurry (aliquot 1) CPCPD MCØ1=80.1

**% Moisture, slurry (aliquot 2) CPCPD MCØ2=80.1

Average % Moisture, slurry 80.1 %

* calculated using k=~~[x (x*w/100)] * (y/100)~~ = X * Y ← 08JUL1996

x=weight of sediment

w=average moisture content

y=solidification mix ratio expressed as a percent value of dried sediment solids

** follow ASTM method 02216

Checked By: NW

NOTE: Could not get a 200% mix -- ended up with with a "shorten + flour" looking mix (small crumbly balls with no cohesion). Added enough additional slurry to get a 150% mix (which was VERY difficult to mix).

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SOP-13
Bench Scale Solidification
Data Form

Beginning Test Date 15JUL96 **Sample ID** CPCPD503B
Alternate # 3 from SESS
Task #

Confirmation, Phase 2

% Solidification Agent	40%	Analyst	50%	Analyst
Weight of Sample Aliquot (g)	750 750 750 750		650 750 650 750	
*Solidification Agent (g)	300 300 300 300		325 375 325 375	
Mixing Time (min)	5.0		4.0 4.0 4.0 4.0	
Volume Upon Mixing (mL)	3160	NW	tot+41 3047 pH=11.3	
pH/PID (max ppm) (background ~2.5)	11.5	NW		
Temperature (°F)	74.5	NW	74.0	NW

	Date Tested						
Fraction		1	2		1	2	
Volume Change (mL), Day 1	16JUL96	Ø	Ø	NW	Ø	Ø	NW
Penetrometer Reading, Day 1	16JUL96	Ø.1	Ø.1	NW	Ø.6	Ø.7	NW
Penetrometer Reading, Day 1 Avg	16JUL96	Ø.1		NW	Ø.65		NW
Solidified Moisture Content, Day 1	"	52.6 48.7	53.0		49.5	48.7	
Solidified Moisture Content, Day 1 Avg	"	52.8			49.1		
Volume Change (mL), Day 1	"	Ø	Ø		Ø	Ø	
Volume Change (mL), Day 1 Avg	"	Ø			Ø		
Penetrometer Reading, Day 3	18JUL96	1.25	1.25	NW	3.3	3.6	NW
Penetrometer Reading, Day 3 Avg	18JUL96	1.25		NW	3.45		NW
Solidified Moisture Content, Day 3	"	51.6	50.8		46.2	46.4	
Solidified Moisture Content, Day 3 Avg	"	51.2			46.3		
Volume Change (mL), Day 3	"	Ø	Ø	NW	Ø	Ø	NW
Volume Change (mL), Day 3 Avg	"	Ø		NW	Ø		NW

Air temp = 68.6 F
water temp = 68.0 F

Sample ID 20 JUL 96

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SOP-13
Bench Scale Solidification
Data Form

Confirmation, Phase 2

% Solidification Agent		40%		Analyst	50%		Analyst
Fraction		1	2		1	.2	
	Date Tested						
* Penetrometer Reading, Day 5	20JUL96	2.2	2.2	MW	>4.5	>4.5	MW
Penetrometer Reading, Day 5 Avg	20JUL96	2.2		MW	>4.5		MW
Solidified Moisture Content, Day 5	20JUL96	—	—	—	—	—	—
Solidified Moisture Content, Day 5 Avg	"	52.3		—	46.1		—
Volume Change (mL), Day 5	"	Ø	Ø	MW	Ø	Ø	MW
Volume Change (mL), Day 5 Avg	"	Ø		MW	Ø		MW
Penetrometer Reading, Day 7	22JUL1996	2.4	2.6	—	>4.5	>4.5	—
Penetrometer Reading, Day 7 Avg	22JUL1996	2.5		—	>4.5		—
Solidified Moisture Content, Day 7	"	50.0	49.6	—	45.7	45.7	—
Solidified Moisture Content, Day 7 Avg	"	49.8		—	45.7		—
Volume Change (mL), Day 7	"	Ø	Ø	—	Ø	Ø	—
Volume Change (mL), Day 7 Avg	"	Ø		—	Ø		—

* calculated using k=[x-(x*w/100)] * (y/100)
x=weight of sediment
w=average moisture content
y=solidification mix ratio expressed as a percent value of dried sediment solids

Checked By: —

MW 20JUL96
* Δt for ~~40~~ 50% 4 days 17.75 hrs.
* Δt for ~~60~~ 40% 4 days 17.00 hrs.

AUG 1995

SOP-13
Bench Scale Solidification
Data Form

Test Date 10JUL1996
Alternate # 3 from SESS
Task #

MIX USED: 96% SAND / 4% Bentonite

Sample ID CPCPD504

Screening, Phase 1

NOTE: % BASED ON ~~VOLUME~~ 10JUL96 WET WEIGHT

% Solidification Agent	~~10 %~~ 30 %	Analyst	~~25 %~~ 60 %	Analyst	~~40 %~~ 100 %	Analyst	50 % 130 %	Analyst
Weight of Sample Aliquot (g)	~~500~~ 400 10JUL96		350		250		250 10JUL96	
*Solidification Agent (g)	~~150~~ 120 10JUL96		210	NW	250		325	
Volume Upon Mixing (mL)	402	NW	395	NW	323	NW	342	NW
Mixing Time (min)	3:00	NW	3:15	NW	3:00	NW	3:00	NW
pH / PID max bkg. = 2.0	7.0 / 4.0	NW / NW	7.5 / 4.0	NW / NW	8.0 / 3.6	NW / NW	8.0 / 3.8	NW / NW
Temperature °F	66.7		67.3	NW	68.7	NW	68.9	NW
Fraction	1 / 2		1 / 2		1 / 2		1** / 2**	
Elapsed Time (~~min~~) hour	24 / 24	NW	24 / 24	NW	24 / 118 / 24 / 118	NW	24 / 118 / 24 / 118	NW
Volume Change (mL)	Ø / Ø	NW	3 / 3	NW	Ø / Ø / Ø / Ø	NW	Ø / Ø / Ø / Ø	NW
Penetrometer Reading	Ø / NC*	NW	Ø / NC	NW	Ø / Ø / NC / Ø	NW	Ø / Ø / NC / Ø	NW
Average Penetrometer Reading	Ø	NW	Ø	NW	Ø / Ø	NW	Ø / Ø	NW
Solidified Moisture Content								
Average Solidified Moisture Content								

NOT PERFORMED SINCE CONSIDERED FAILURE

A-141

* NC = not checked

**% Moisture, slurry (aliquot 1) CPCPDMCØ1=80.1
**% Moisture, slurry (aliquot 2) CPCPDMCØ2=80.1
Average % Moisture, slurry 80.1 %

** Second reading taken on 15JUL96 (5 days curing)

Air temp = 70.2

10JUL1996

* calculated using k=~~[x-(x*w/100)] * (y/100)~~ = X * Y
x=weight of sediment
w=average moisture content
y=solidification mix ratio expressed as a percent value of ~~dried~~ sediment solids

** follow ASTM method 02216

Checked By:

AUG 21 1995

S -13
Bench Scale Solidification Data Form

Test Date 10JUL96
Alternate # 3 from SESS
Task #

MIX USED: 75% SAND / 25% ~~BENT~~ 10JUL96 LIME

Sample ID CPCPDS05

Screening, Phase 1

% Solidification Agent	~~10 %~~ 30 %		Analyst	~~25 %~~ 60 %		Analyst	~~40 %~~ 100 %		Analyst	50 %		Analyst
Weight of Sample Aliquot (g)	350			350			300					
*Solidification Agent (g)	105			210			300					
Volume Upon Mixing (mL)	362		NW	388		NW	386		NW			
Mixing Time (min)	5			5			5					
pH	12		NW	12		NW	12.3		NW			
Temperature °F	70.7		NW	69.8		NW	69.4		NW			
Fraction	1	2		1	2		1**	2**		1	2	
Elapsed Time (min)	24	24	NW	24	24	NW	24	24	NW			
Volume Change (mL)	Ø	Ø	NW	4	4	NW	Ø Ø	Ø	NW			
Penetrometer Reading	Ø	NC*	NW	Ø	NC	NW	Ø Ø	Ø	NW			
Average Penetrometer Reading	Ø		NW	Ø		NW	Ø	Ø	NW			
Solidified Moisture Content												
Average Solidified Moisture Content												

NOT PERFORMED SINCE CONSIDERED A FAILURE

A-142 21

**% Moisture, slurry (aliquot 1) CPCPDMCØ1 = 80.1
**% Moisture, slurry (aliquot 2) CPCPDMCØ2 = 80.1
Average % Moisture, slurry 80.1 %

* NC = not checked
** Second reading taken at 7:20 am on 15JUL96 (5 days)

* calculated using k=~~[x-(x*w/100)] * (y/100)~~ 10JUL96 = X * Y
x=weight of sediment
w=average moisture content
y=solidification mix ratio expressed as a percent value of dried sediment solids
** follow ASTM method 02216

Checked By:

S -13

Bench Scale Solidification Data Form

* CONTINUED FOR *

Test Date 10 JUL 1996
Alternate # 3 from SESS
Task #

50% Portland/50 % FLY Ash

Sample ID CPCPD S03

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Screening, Phase 1

% Solidification Agent	~~10 %~~ 30 %		Analyst	~~25 %~~ 75%		Analyst	40 %		Analyst	50 %		Analyst
Weight of Sample Aliquot (g)	350			350								
*Solidification Agent (g)	105			262.5								
Volume Upon Mixing (mL)	345		NW	398		NW						
Mixing Time (min)	~3		NW	3		NW						
pH / PID bkg 2.0	/ 5.0		/ NW	/ 4.4		/ NW						
Temperature °F	70.9		NW	72.9		NW						
Fraction	1	2		1 **	2 **		1	2		1	2	
Elapsed Time (~~min~~) hour	24	24	NW	24	24	NW						
Volume Change (mL)	Ø / Ø	Ø / Ø	NW	Ø / Ø	Ø / Ø	NW						
Penetrometer Reading	Ø / Ø.4	Ø / Ø.4	NW	3.2 / >4.5	3.5 / >4.5	NW						
Average Penetrometer Reading	Ø / Ø.4		NW	3.35 / >4.5		NW						
Solidified Moisture Content	—	—		—	—							
Average Solidified Moisture Content	57.1			38.8								

**% Moisture, slurry (aliquot 1) CPCPD MCØ1 = 80.1
**% Moisture, slurry (aliquot 2) CPCPD MCØ2 = 80.1
Average % Moisture, slurry 80.1 %

* calculated using k=~~[x (x*w/100)] * (y/100)~~ = X * Y
x=weight of sediment
w=average moisture content
y=solidification mix ratio expressed as a percent value of dried sediment solids
** follow ASTM method 02216

** Second reading @ 7:20 am 15 JUL 96 (5 days)

Checked By:

AUG 21 1995

SOP-13
Bench Scale Solidification Data Form

Beginning Test Date 15JUL96
Alternate # 3 from SESS
Task #

Sample ID CPCPDS03B

Confirmation, Phase 2

% Solidification Agent	75 %	Analyst	100 %	Analyst
Weight of Sample Aliquot (g)	650 / 650 / 650 / 600		650 / 650 / 650 / 650	
*Solidification Agent (g)	487.5 / 487.5 / 487.5 / 450		650 / 650 / 650 / 650	
Mixing Time (min)	4.0 / 4.0 / 5.0 / 5.0		4.0 / 4.0 / 5.0 / 5.0	
Volume Upon Mixing (mL)	NW ~~total = 2990~~	NW	NW ~~total = 3240~~	NW
pH / PID max (background = 2.5) pH/PID day	~~5.0~~ / ~~5.0~~ / ~~NT~~	pH=12.0	~~12.0~~ / ~~5.0~~ / ~~5.5~~ / ~~NT~~	pH=12.0
Temperature (°F)	74.3	NW	73.6	

	Date Tested						
Fraction		1	2		1	2	
Volume Change (mL), Day 1	16JUL1996	Ø	Ø	NW	Ø	Ø	NW
Penetrometer Reading, Day 1	16 JUL 1996	3.1	3.3	NW	>4.5	>4.5	NW
Penetrometer Reading, Day 1 Avg	16JUL1996	3.2		NW	>4.5		NW
Solidified Moisture Content, Day 1	"	35.6	40.2		28.8	33.8	
Solidified Moisture Content, Day 1 Avg	"	37.9			31.3		
Volume Change (mL), Day 1	"	Ø	Ø		Ø	Ø	
Volume Change (mL), Day 1 Avg	"	Ø			Ø		
Penetrometer Reading, Day 3	18 JUL1996	>4.5	>4.5	NW	>4.5	>4.5	NW
Penetrometer Reading, Day 3 Avg	18JUL1996	>4.5		NW	>4.5		NW
Solidified Moisture Content, Day 3	18JUL1996	38.1	37.1		31.1	30.9	
Solidified Moisture Content, Day 3 Avg	"	37.6			31.0		
Volume Change (mL), Day 3	"	Ø	Ø	NW	Ø	Ø	NW
Volume Change (mL), Day 3 Avg	"	Ø		NW	Ø		NW

Air temp = 68.6 F
water temp = 68.0 F

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AUG 21 1995

Sample ID CPCPDS03B

SOP-13
Bench Scale Solidification
Data Form

Confirmation, Phase 2

% Solidification Agent		75%		Analyst	100%		Analyst
Fraction		1	2		1	.2	
	Date Tested						
* Penetrometer Reading, Day 5	20JUL 96	>4.5	>4.5	NW	>4.5	>4.5	NW
Penetrometer Reading, Day 5 Avg	20JUL 96	>4.5		NW	>4.5		NW
Solidified Moisture Content, Day 5	"	37.3	—	[illegible]	29.1	—	[illegible]
Solidified Moisture Content, Day 5 Avg	"	37.3		[illegible]	29.1		[illegible]
Volume Change (mL), Day 5	"	~~NW~~ Ø	Ø ~~NW~~	NW	Ø ~~NW~~	Ø ~~NW~~ 20JUL96	NW
Volume Change (mL), Day 5 Avg	"	20JUL96 NW Ø		NW	20JUL96 NW Ø		NW
Penetrometer Reading, Day 7	22JUL96	>4.5	>4.5	[illegible]	>4.5	>4.5	[illegible]
Penetrometer Reading, Day 7 Avg	22JUL996	>4.5		[illegible]	>4.5		[illegible]
Solidified Moisture Content, Day 7	22JUL1996	35.8	35.9	[illegible]	28.8	29.2	[illegible]
Solidified Moisture Content, Day 7 Avg	"	35.9		[illegible]	29.0		[illegible]
Volume Change (mL), Day 7	"	Ø	Ø	[illegible]	Ø	Ø	[illegible]
Volume Change (mL), Day 7 Avg	"	Ø		[illegible]	Ø		[illegible]

* calculated using k=[x-(x*w/100)] * (y/100)
x=weight of sediment
w=average moisture content
y=solidification mix ratio expressed as a percent value of dried sediment solids

Checked By: [illegible]

* Δt for 75% = 4 days 19.00 hrs
Δt for 100% = 4 days 20.25 hrs

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UNCONFINED COMPRESSION STRENGTH (ASTM D2166-91) DATA FORM

Unconfined Compression Strength (ASTM D2166-91)

Date of Test 18JUL1996
Technician
Alternative # 3 from SESS
Task #

Sample ID: CPCPD503B
40% Cement mix.
3 day Cure time.

Gs

Tare No. ____ Moisture Con T. No. ____			
	Trimmings	Initial	Final
Wet wt. and Tare (g)		818.4	
Dry wt. and Tare (g)			
Wt. of Water (g)			
Wt. of Tare (g)			
Dry Weight (g)			
Moisture %	~~See Moisture Content #~~		

SEE SINGLETON FINAL REPORT

Tube No.	
Sample Vol. (cc)	~~5.250~~
Specific Gravity	
Sample Height (in)	5.260
Sample Area	~~30~~ 7.065

Init. P. R. Reading

Init. Pore Pressure

Proving Ring No.	2223
Slope	1
Inter	0
Range	500 lbs.
Confining Pressure	0 psi

Time (min)	Deflection	Proving Ring Reading
.5	.023	.0003
1.0	.043	3
1.5	.069	3
2.0	.095	.0043
2.5	.122	.0087
3.0	.145	.0123
3.5	167	.0141
4.0	188	.0148
4.5	213	.0150
5.0	238	.0152
5.5	258	.0153
6.0	.282	.0153
6.5	.305	.0135
7.0	.333	.0110

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Remarks

Sketch of Specimen at Failure

Tested by: REG

Checked by:

Unconfined Compression Strength (ASTM D2166-91)

Date of Test 18 JUL 1996
Technician
Alternative # 3 from SESS
Task #

Sample ID: CPCPD5038

100% cement mix.
3 day cure time.

Gs

SEE SINGLETON FINAL REPORT

Tare No. ____ Moisture Con T. No. ____			
	Trimmings	Initial	Final
Wet wt. and Tare (g)		962.6	
Dry wt. and Tare (g)			
Wt. of Water (g)			
Wt. of Tare (g)		0.0	
Dry Weight (g)			
Moisture %	~~See SOP 13~~	18 JUL 96	

Tube No.	
Sample Vol. (cc)	
Specific Gravity	
Sample Height (in)	5.413
Sample Area	

Init. P. R. Reading

Init. Pore Pressure

Proving Ring No.	2223
Slope	1
Inter	0
Range	500 lbs.
Confining Pressure	0 psi.

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Time (min)	Deflection	Proving Ring Reading
.5	.029	.0289
1.0	.051	.0196
1.5	.067	.0294
2.0	.081	.0390
2.5	.095	.0490
3.0	.107	.0588
3.5	.114	.0571
4.0	.118	.0591
4.5	—	—
5.0	.119	.0594
5.5	—	—
6.0	.119	.0594
6.5	—	—
7.0	.119	.0594

Remarks

Sketch of Specimen at Failure

No Failure

Tested by: REG

Checked by:

Unconfined Compression Strength (ASTM D2166-91)

Date of Test 18JUL1996
Technician
Alternative # 3 from SESS
Task #

Sample ID: CPCPD503B

100% Cement mix.
3day cure time

Gs

SEE SINGLETON FINAL REPORT

Tare No.	Moisture Con T. No.		
	Trimmings	Initial	Final
Wet wt. and Tare (g)		959.5	
Dry wt. and Tare (g)			
Wt. of Water (g)			
Wt. of Tare (g)			
Dry Weight (g)			
Moisture %			

Tube No.	
Sample Vol. (cc)	
Specific Gravity	
Sample Height (in)	5.345
Sample Area	

Init. P. R. Reading

Init. Pore Pressure

Proving Ring No.	2223
Slope	1
Inter	0
Range	500 lbs.
Confining Pressure	0 psi

Time	Deflection	Proving Ring Reading
-5	.024	.0093
1.0	.054	.0183
1.5	.078	.0296
2.0	.096	.0388
2.5	.113	.0464
3.0	.125	.0511
3.5	.135	.0560
4.0	.138	.0570
4.5	.138	.0573
5.0	.139	.0572
5.5	—	—
6.0	.139	.0572
6.5	—	—
7.0	.139	.0572

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Remarks

Sketch of Specimen at Failure

No Failure

Tested by: REG

Checked by:

Unconfined Compression Strength (ASTM D2166-91)

Date of Test 18JUL1996
Technician
Alternative # 3 from SESS
Task #

Sample ID: CPCPD503B

75% cement mix.
3day curing time

Gs

SEE SINGLETON FINAL REPORT

Tare No.	Moisture Con T. No.		
	Trimmings	Initial	Final
Wet wt. and Tare (g)		921.8	
Dry wt. and Tare (g)			
Wt. of Water (g)			
Wt. of Tare (g)			
Dry Weight (g)			
Moisture %			

Tube No.	
Sample Vol. (cc)	
Specific Gravity	
Sample Height (in)	5.325
Sample Area	

Init. P. R. Reading

Init. Pore Pressure

Proving Ring No.	2223
Slope	1
Inter	0
Range	500 lbs.
Confining Pressure	0 psi.

Time	Deflection	Proving Ring Reading
.5	.029	.0085
1.0	.056	.0195
1.5	.077	.0279
2.0	.097	.0417
2.5	.113	.0494
3.0	.123	.0540
3.5	.133	.0574
4.0	.134	.0602
4.5	.135	.0604
5.0	.135	.0605
5.5	—	—
6.0	.135	.0605
6.5	—	—
7.0	.136	.0605

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Remarks

Sketch of Specimen at Failure

no Failure

Tested by: REG

Checked by:

Unconfined Compression Strength (ASTM D2166-91)

Date of Test 18JUL1996
Technician
Alternative # 3 from SESS
Task #

Sample ID: CPCPDS03B
75% cement mix
30 DAY curing time

Gs

SEE SINGLETON FINAL REPORT

Tare No. ____ Moisture Con T. No. ____			
	Trimmings	Initial	Final
Wet wt. and Tare (g)		727.7	
Dry wt. and Tare (g)			
Wt. of Water (g)			
Wt. of Tare (g)			
Dry Weight (g)			
Moisture %			

Tube No.	
Sample Vol. (cc)	
Specific Gravity	
Sample Height (in)	5.401
Sample Area	

Init. P. R. Reading

Init. Pore Pressure

Proving Ring No.	2223
Slope	1
Inter	0
Range	500 lbs.
Confining Pressure	0 psi

Time	Deflection	Proving Ring Reading
.5	.031	.0125
1.0	.054	.0238
1.5	.072	.0347
2.0	.096	.0493
2.5	.114	.0572
3.0	.120	.0591
3.5	.122	.0596
4.0	.122	.0596
4.5	—	—
5.0	.123	.0597
5.5	—	—
6.0	.124	.0597
6.5	—	—
7.0	.124	.0597

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Remarks

Sketch of Specimen at Failure NO Failure

Tested by: REG

Checked by:

Unconfined Compression Strength (ASTM D2166-91)

Date of Test 18JUL1996
Technician
Alternative # 3 from SESS
Task #

Sample ID: CPCPDS03B

50% cement mix
3day cure time

Gs

SEE SINGLETON FINAL REPORT

Tare No. ____ Moisture Con T. No. ____			
	Trimmings	Initial	Final
Wet wt. and Tare (g)		854.6	
Dry wt. and Tare (g)			
Wt. of Water (g)			
Wt. of Tare (g)			
Dry Weight (g)			
Moisture %			

Tube No.	
Sample Vol. (cc)	
Specific Gravity	
Sample Height (in)	5.329
Sample Area	

Init. P. R. Reading

Init. Pore Pressure

Proving Ring No.	2223
Slope	1
Inter	0
Range	500 lbs.
Confining Pressure	0 psi.

Time	Deflection	Proving Ring Reading
.5	.029	.0039
1.0	.053	.0089
1.5	.069	.0156
2.0	.094	.0261
2.5	.118	.0355
3.0	.144	.0416
3.5	.168	.0427
4.0	.196	.0355
4.5	.243	.0257
5.0		.0
5.5		.0
6.0		.0
6.5		.0
7.0		.0

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AUG 21 1995

Remarks

Sketch of Specimen at Failure

Tested by: REG

Checked by:

Unconfined Compression Strength (ASTM D2166-91)

Date of Test 18JUL1996
Technician
Alternative # 3 from SESS
Task #

Sample ID: CPCPD 503B

50% Cement mix
3 DAY cure time.

Gs

SEE SINGLETON FINAL REPORT

Tare No.	Moisture Con T. No.		
	Trimmings	Initial	Final
Wet wt. and Tare (g)		858.1	
Dry wt. and Tare (g)			
Wt. of Water (g)			
Wt. of Tare (g)			
Dry Weight (g)			
Moisture %			

Tube No.	
Sample Vol. (cc)	
Specific Gravity	
Sample Height (in)	5.329
Sample Area	

Init. P. R. Reading

Init. Pore Pressure

Proving Ring No.	2223
Slope	1
Inter	0
Range	500 lbs.
Confining Pressure	0 psi.

Time	Deflection	Proving Ring Reading
.5	.031	.0085
1.0	.057	.0159
1.5	.074	.0237
2.0	.092	.0305
2.5	.115	.0390
3.0	.140	.0436
3.5	.159	.0448
4.0	.184	.0441
4.5	.226	.0190
5.0		
5.5		
6.0		
6.5		
7.0		

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AUG 21 1995

Remarks

Sketch of Specimen at Failure

Tested by: REG

Checked by:

Unconfined Compression Strength (ASTM D2166-91)

Date of Test 18JUL1996
Technician
Alternative # 3 from SESS
Task #

Sample ID: CPCP DS03B

40% cement mix
3 DAY cure time

Gs

SEE SINGLETON FINAL REPORT

Tare No.	Moisture Con T. No.		
	Trimmings	Initial	Final
Wet wt. and Tare (g)		840.6	
Dry wt. and Tare (g)			
Wt. of Water (g)			
Wt. of Tare (g)			
Dry Weight (g)			
Moisture %			

Tube No.	
Sample Vol. (cc)	
Specific Gravity	
Sample Height (in)	5.389
Sample Area	

Init. P. R. Reading

Init. Pore Pressure

Proving Ring No.	2223
Slope	1
Inter	0
Range	500 lbs.
Confining Pressure	0 psi

Time	Deflection	Proving Ring Reading
.5	.029	.0045
1.0	.052	.0094
1.5	.076	.0140
2.0	.104	.0162
2.5	.130	.0169
3.0	.157	.0169
3.5	.190	.0169
4.0	.228	.0130
4.5	.254	.0065
5.0		
5.5		
6.0		
6.5		
7.0		

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AUG 21 1995

Remarks

Sketch of Specimen at Failure

Tested by: REC

Checked by:

Unconfined Compression Strength (ASTM D2166-91)

Date of Test 22JUL1996
Technician
Alternative # 3 from SESS
Task #

Sample ID: CPCPDS03B
100% cement mix
7 day cure time

Gs

Tare No.	Moisture Con T. No.		
	Trimmings	Initial	Final
Wet wt. and Tare (g)		953.9	
Dry wt. and Tare (g)			
Wt. of Water (g)			
Wt. of Tare (g)			
Dry Weight (g)			
Moisture %			

SEE SINGLETON FINAL REPORT

Tube No.	
Sample Vol. (cc)	
Specific Gravity	
Sample Height (in)	5.328
Sample Area	

Init. P. R. Reading

Init. Pore Pressure

Proving Ring No.	2223
Slope	1
Inter	0
Range	500 lbs
Confining Pressure	0 psi

Time	Deflection	Proving Ring Reading
.5	.030	.0180
1.0	.065	.0375
1.5	.093	.0515
2.0	.123	.0655
2.5	.150	.0830
3.0	.185	1090
3.5	.200	.1240
4.0	.217	1365
4.5	.225	.1400
5.0	.227	.1415
5.5		
6.0		
6.5		
7.0		

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AUG 21 1995

Remarks

Sketch of Specimen at Failure

No Failure

Tested by: REG

Checked by:

Unconfined Compression Strength (ASTM D2166-91)

Date of Test 22 JUL 1996
Technician
Alternative # 3 from SESS
Task #

Sample ID: CPCPD 503B
100% cement mix
7 DAY cure time

Gs

SEE SINGLETON FINAL REPORT

Tare No.	Moisture Con T. No.		
	Trimmings	Initial	Final
Wet wt. and Tare (g)		980.8	
Dry wt. and Tare (g)			
Wt. of Water (g)			
Wt. of Tare (g)			
Dry Weight (g)			
Moisture %			

Tube No.	
Sample Vol. (cc)	
Specific Gravity	
Sample Height (in)	5.440
Sample Area	

Init. P. R. Reading

Init. Pore Pressure

Proving Ring No.	2223
Slope	1
Inter	0
Range	500 lbs
Confining Pressure	0 psi

Time	Deflection	Proving Ring Reading
.5	.050	0300
1.0	.085	.540
1.5	.120	780
2.0	.155	980
2.5	.175	1150
3.0	.194	1300
3.5	.208	1420
4.0	.211	1440
4.5	212	1450
5.0		
5.5		
6.0		
6.5		
7.0		

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AUG 21 1995

Remarks

Sketch of Specimen at Failure

NO FAILURE

Tested by: REC

Checked by:

Unconfined Compression Strength (ASTM D2166-91)

Date of Test 22JUL1996
Technician
Alternative # 3 from SESS
Task #

Sample ID: CPCPDS03B
75% Cement mix
7day cure time

Gs

SEE SINGLETON FINAL REPORT

Tare No.	Moisture Con T. No.		
	Trimmings	Initial	Final
Wet wt. and Tare (g)		9167	
Dry wt. and Tare (g)			
Wt. of Water (g)			
Wt. of Tare (g)			
Dry Weight (g)			
Moisture %			

Tube No.	
Sample Vol. (cc)	
Specific Gravity	
Sample Height (in)	5.410
Sample Area	

Init. P. R. Reading

Init. Pore Pressure

Proving Ring No.	2223
Slope	1
Inter	0
Range	500 lbs
Confining Pressure	0 psi

Time	Deflection	Proving Ring Reading
.5	28	74
1.0	48	140
1.5	74	255
2.0	.100	.0400
2.5	.128	.0490
3.0	.145	.0575
3.5	.165	.0685
4.0	.183	.0800
4.5	.202	.0915
5.0	.218	.0995
5.5	.228	.1070
6.0	.240	.1138
6.5	.248	.1185
7.0	.253	.1220

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Remarks

Sketch of Specimen at Failure

NO Failure

Tested by: REG

Checked by:

11

Unconfined Compression Strength (ASTM D2166-91)

Date of Test 22JUL1996
Technician
Alternative # 3 from SESS
Task #

Sample ID: CPCPDS03B

75% Cement mix
7day cure time

Gs

SEE SINGLETON FINAL REPORT

Tare No.	Moisture Con T. No.		
	Trimmings	Initial	Final
Wet wt. and Tare (g)		910.8	
Dry wt. and Tare (g)			
Wt. of Water (g)			
Wt. of Tare (g)			
Dry Weight (g)			
Moisture %			

Tube No.	
Sample Vol. (cc)	
Specific Gravity	
Sample Height (in)	5.261
Sample Area	

Init. P. R. Reading

Init. Pore Pressure

Proving Ring No.	2223
Slope	1
Inter	0
Range	500 lbs
Confining Pressure	0 psi

Time	Deflection	Proving Ring Reading
.5	27	20
1.0	47	185
1.5	63	270
2.0	85	400
2.5	115	520
3.0	140	630
3.5	163	745
4.0	185	870
4.5	210	1010
5.0	230	1140
5.5	.243	1220
6.0	.257	1325
6.5	.265	1400
7.0	.272	1420
8.0	.275	1426

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Remarks

Sketch of Specimen at Failure NONE

Tested by: REG

Checked by:

Unconfined Compression Strength (ASTM D2166-91)

Date of Test 22JUL1996
Technician
Alternative # 3 from SESS
Task #

Sample ID: CPCPDS03B

50% cement mix
7 day cure time

Gs

SEE SINGLETON FINAL REPORT

Tare No.	Moisture Con T. No.		
	Trimmings	Initial	Final
Wet wt. and Tare (g)		857.9	
Dry wt. and Tare (g)			
Wt. of Water (g)			
Wt. of Tare (g)			
Dry Weight (g)			
Moisture %			

Tube No.	
Sample Vol. (cc)	
Specific Gravity	
Sample Height (in)	5.289
Sample Area	

Init. P. R. Reading

Init. Pore Pressure

Proving Ring No.	2223
Slope	1
Inter	0
Range	500 lbs.
Confining Pressure	0 psi

Time	Deflection	Proving Ring Reading
.5	.031	.0112
1.0	.057	.0230
1.5	.080	.0361
2.0	.105	.0470
2.5	.127	.0540
3.0	.151	.0608
3.5	.179	.0641
4.0	.210	.0580
4.5		
5.0		
5.5		
6.0		
6.5		
7.0		

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Remarks

Tested by: REG

Checked by:

Sketch of Specimen at Failure

Unconfined Compression Strength (ASTM D2166-91)

Date of Test 22 JUL 1996
Technician
Alternative # 3 from SESS
Task #

Sample ID: CPCPD503B

50% Cement mix
7 day cure time

Gs

SEE SINGLETON FINAL REPORT

Tare No.	Moisture Con T. No.		
	Trimmings	Initial	Final
Wet wt. and Tare (g)		856.6	
Dry wt. and Tare (g)			
Wt. of Water (g)			
Wt. of Tare (g)			
Dry Weight (g)			
Moisture %			

Tube No.	
Sample Vol. (cc)	
Specific Gravity	
Sample Height (in)	5.336
Sample Area	

Init. P. R. Reading

Init. Pore Pressure

Proving Ring No.	2223
Slope	1
Inter	0
Range	500 lbs.
Confining Pressure	0 psi

Time	Deflection	Proving Ring Reading
.5	.025	0125
1.0	.051	0237
1.5	.075	0380
2.0	.100	0505
2.5	.128	0610
3.0	.151	0638
3.5	.178	0638
4.0	.336	0570
4.5		
5.0		
5.5		
6.0		
6.5		
7.0		

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Remarks

Sketch of Specimen at Failure

Tested by: REG

Checked by:

Unconfined Compression Strength (ASTM D2166-91)

Date of Test 22JUL1996
Technician
Alternative # 3 from SESS
Task #

Sample ID: CPCPD503B
40% cement mix
7day cure time

Gs

SEE SINGLETON FINAL REPORT

Tare No.	Moisture Con T. No.		
	Trimmings	Initial	Final
Wet wt. and Tare (g)		839.0	
Dry wt. and Tare (g)			
Wt. of Water (g)			
Wt. of Tare (g)			
Dry Weight (g)			
Moisture %			

Tube No.	
Sample Vol. (cc)	
Specific Gravity	
Sample Height (in)	5.426
Sample Area	

Init. P. R. Reading

Init. Pore Pressure

Proving Ring No.	2223
Slope	1
Inter	0
Range	500 lbs
Confining Pressure	0 psi

Time	Deflection	Proving Ring Reading
.5	.030	.0025
1.0	.057	.0127
1.5	.075	.0200
2.0	.094	.0273
2.5	.122	.0320
3.0	.150	.0322
3.5	.187	.0300
4.0	.220	.0176
4.5		
5.0		
5.5		
6.0		
6.5		
7.0		

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AUG 21 1995

Remarks

Sketch of Specimen at Failure

Tested by: REC

Checked by:

Unconfined Compression Strength (ASTM D2166-91)

Date of Test 22JUL1996
Technician
Alternative # 3 from SESS
Task #

Sample ID: CPCPDS03B

40% cement mix 7 day cure time

Gs

SEE SINGLETON FINAL REPORT

Tare No.	Moisture Con T. No.		
	Trimmings	Initial	Final
Wet wt. and Tare (g)		800.9	
Dry wt. and Tare (g)			
Wt. of Water (g)			
Wt. of Tare (g)			
Dry Weight (g)			
Moisture %			

Tube No.	
Sample Vol. (cc)	
Specific Gravity	
Sample Height (in)	5.125
Sample Area	

Init. P. R. Reading

Init. Pore Pressure

Proving Ring No.	2223
Slope	1
Inter	0
Range	500 lbs.
Confining Pressure	0 psi

Time	Deflection	Proving Ring Reading
.5	.030	30
1.0	070	0158
1.5	095	0223
2.0	120	0270
2.5	143	0288
3.0	174	0290
3.5	209	0295
4.0		
4.5		
5.0		
5.5		
6.0		
6.5		
7.0		

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AUG 21 1995

Remarks

Sketch of Specimen at Failure

Tested by: REG

Checked by:

APPENDIX B

MAD Group's Logbook (Sample Collection and Storage)

Page

3-29-96 READINESS REVIEW MEETING
FRIDAY

Representatives from ORNL ER, ORNL MAD GROUP, & TOCH ANALYTICAL AND subcontractors were present during meeting. No outstanding items that could hold up progress on sampling activities were discussed or discovered. All participating organizations are ready to begin site preparation and mobilization.

Mad group responsibilities that were discussed, were details for issuance of RWP's through Jo Ellen Francis (Radiation Protection). Jo Ellen stated she could issue blanket RWP except for special jobs where continuous coverage was required, start-up pumping operations and P&E job coverage were examples of items requiring continuous coverage.

A few minor items such as a written agreement from facility manager at BLDG 3504 stating permission to use bathroom facilities was discussed. P. Alston requested a cost run-down on money spent by the Mad Group to date. Chris Taylor (Pm) stated he would supply Paul with the information.

Everything appears to be in order for 4-1-96 startup date.

Mad group is continuing equipment and supply acquisition for Monday's mobilization and site preparation. P&E Fab Shop is putting final touches on pump and sampling devices for Monday start-up.

4-1-96
MONDAY

TEAM Members: J.F. Allred, J. Wade, D. Rose

Spent all day preparing for sampling activities after R.D Foley's LM Technician meeting. No site preparation could be performed due to inclement weather. Rained all day. Previous discussions with Joel Miller (Radiation Protection) indicate that RWP will not be issued for such activities when conditions are bad due to safety requirements.

Went over a few last minute items with Fab Shop folks. Changes needed will be ready tomorrow. The rest of the afternoon was spent making contacts with P&E personnel concerning lifting boat into water and details associated with safe access to boat from the bank of ponds.

Talked with Steve Rose (RIGGER FOREMAN) to schedule, coordinate putting protective plastic on bottom of boat and placement of boat into pond. He said he could possibly do the job on Thursday (4-3) and positively have it done Monday.

Spoke with Rob Coe (PROJECT ENGINEER) concerning MAD group readiness. I passed on the information discussed with Steve Rose. Rob suggested that overtime work for the lift of boat may be in order. I stated that I wasn't comfortable with authorizing overtime on the project. He indicated that I had that authority. I told him I would approach Steve with the idea and call him back tomorrow.

Team Members: J.F. Allred, J. Wade, D. Rose

4-2-96
TUESDAY

Met with Steve Rose this morning. I suggested that possibly the work could be done on overtime to expedite the placement of plastic on bottom of boat and getting the boat on the water. He indicated that his crews were already scheduled for the day and for overtime work. He stated he would try his best to get the job done ~~tomorrow~~ Thursday after they completed their other scheduled jobs.

Proceeded to Fab Shop to see if work had been completed. Everything was ready as promised. Team decided it would be beneficial to test hoses and pump at the Fab Shop. If there was a problem we could have it corrected with P&E support right there. Team members and P&E personnel prepared equipment and hoses for testing.

One connection/fitting at the discharge end of the pump failed test. P&E personnel corrected the problem and Team proceeded with test. A drum full of water was used to check pump and connections. Everything checked out good with no leaks. Minor adjustments will need to be made when actual pumping of sludge begins to get correct pressure and flow for pumping of sludge.

Began putting protective plastic on boat for contamination control purposes. Containment box for pump was lined in case of leaks. Area where sampling device will be used in bottom of boat was lined to prevent contamination of boat.

Rob Coe paged late afternoon and updated him of our plans.

4-3-96
WEDNESDAY

Team Members: J. Allred, J. Wade, D Rose

Spoke with Steve Rose concerning placement of boat into pond 3513. Everything is set to go for tomorrow.

Went by Fab Shop to acquire supplies. It was mentioned by J. Allred that an idea of a mirror to view levels in 275 gallon tanks might be beneficial. This would allow personnel to observe from a distance to reduce dose rate if contents of drums and tanks was beginning to increase.

Discussed RWP with Joel Miller concerning the site preparation work. He gave MAD team our copy of RWP with additional pages for IN/OUT times.

Had a phone call from Rob Cole. apparently there is concern that things aren't going as they would like them to. I explained the situation to him as far as Riggers schedules, budgets etc. He seemed to understand that I can't dictate for R&E.

4-4-96 TEAM MEMBERS: J. Allred, J. Wade, D. Rose

THURSDAY

Stopped by B&E Fab Shop to acquire in line emergency air shut-off valve. Team decided a valve should be installed near staging area in case there was a problem on shore. This would allow personnel to halt pumping if communications broke down to the boat or we needed immediate shut down (from shore) of pumping operations.

Proceeded to Pond area. OPTECH and OENL Radiation Protection (Joel Miller) were on site. Spoke with Joel concerning access to staging area. Final placement of tanks needed to be performed. Joel entered zone with MAD group personnel to observe staging area changes and placement of tanks.

Rigger Foreman (Harold Wade) showed up on site to let us know they would be there with crane after lunch. Decision was made not to put boat on water until after Holiday weekend. The possibility of contaminating the boat was taken into consideration as well as the short time frame that we would be up against.

Loaded boat with necessary equipment and supplies before Riggers arrived. Crane and Riggers lifted boat so we could get protective plastic secured to the pontoons. MAD Team put plastic in position and Riggers lowered boat back on trailer. Team members began carefully securing plastic to pontoons to prevent contamination of the bottom of the boat. Sheeting was placed on air line that will be on land to prevent contamination of hose.

Spoke with Nathan Wright (OPTECH). He indicated that they needed access to AC power to operate the sample mixers. Checked Waste Operations B&E.

west of ponds. There was an empty outlet available. Will need to check with Danny Brewer Monday morning to get his consent for OPTECH use of outlet.

4-8-96
MONDAY

Clouds were moving in and protective plastic on boat wasn't complete. To complete job MAD Team had to stay past normal working hours to finish. There would not be enough time Monday morning to do anything since Riggers would be there first thing to lift boat to the pond. Phoned Mike Murray (MWD) to get authorization for overtime. He agreed that it was the best possible solution.

After boat job was complete team proceeded to west side of pond to run air line from BCDG-3518 to staging area. When hooking up air it was noticed that fittings were a little loose. Will check with Danny Brewer to find tighter fittings.

Team returned to BDG 770 and loaded up supplies before departing for the evening.

4-8-96 Team Members: J. Allred, J. Wade, D. Rose
MONDAY

Spoke with D. Cofer concerning SSHO coverage for the upcoming work. Glen wasn't aware that his services were needed at this time. Mike Murray (MAD) had conveyed to me that Glen would be available this week. Some wires got crossed somewhere along the line.

Departed 7110 to meet riggers for boat placement. Nobody on site upon arrival. Tried calling Steve Rose several times from job-site to no avail. Decided to drive to 1000 area to see if we could locate him.

Spoke with Steve when we got there. His crews were in a Division Safety Meeting this morning and wouldn't be able to do the job. He mentioned this afternoon and I told him that MAD Team was scheduled for RAD WORKER II test at 1:00. Discussed doing the job on overtime. After discussing this with team members we decided not to try it after regular hours due to the uncertainty of the weather conditions at this time it is raining and wet outside. Scheduled Riggers crew for Tuesday AM.

Team went to Bldg 1062 to load up PPE for OPTECH personnel and returned to job site. ORNL/OPTECH trailer wasn't accessible due to padlocked doors.

Joel Miller pulled up. Discussed details about pumping and storage operations.

OPTECH personnel arrived and we unloaded PPE onto trailer. Talked over a few items with Telma Moore and Nathan Wright.

Team returned to 7110 for lunch and RAD WORKER training at Scarboro Rd. location.

4-9-96 Team Members: J. Allred, J. Wade, D. Bore, G. Cofer (SSHO) 4-10-96
Weather

Received phone call this am from Joel Miller. He requested a copy of Health & Safety plan. I told him I would bring one over on our way to job site. Supplied him with copy of H&S plan and SPCCP work plan.

Arrived on site and Rigger Crew was present to perform boat placement. Made last minute preparations to put boat on pond.

Joel Miller arrived with RWP to perform necessary work. Mad Team signed off on RWP. Glen Cofer (Site Safety & Health Officer) conducted PRE-ENTRY HEALTH & SAFETY BRIEFING for team members entering pond area. Riggers did not enter pond area. Their participation in briefing was not necessary. See page 151 of this logbook for sign-up sheet for briefing.

Rigger Crew performed simple lift and placement of boat. Mad Team personnel secured boat and began task of running rope and pulley set up to ferry boat back and forth across the pond.

Spoke with J. Allred concerning SSHO training. John contacted Ann Saulsbury about certification to be Site Safety & Health Officers. Ann indicated that she would give us needed training after lunch. J. Allred, D. Bore and Joel Miller met at Ann's office for training.

After training team proceeded to job site to secure boat and route air and discharge hoses. Glen Cofer and Joel Miller began setting up HAZWOPER and EZ zones.

Team departed and returned to TTO

4-10-96 Team members: J. Wade, J. Allred, D. McKinney, D. Rose
Wednesday

Duane McKinney (MAD/MTI) joined work team today as additional support. Briefly explained MAD Team responsibilities for upcoming work. Supplied D. McKinney with copy of Health & Safety Plan for his review.

Team discussed events planned for the day. There are only a few items left to take care of before operations begin.

D. Rose and D. McKinney departed to job site to continue HAZWOPER zoning and sign preparation. Upon arrival Waste Operations personnel were on site performing pumping operations on Pond 3513 to reduce water level. Discussed dewatering techniques used by Waste Operations and compared ideas for tank dewatering of pond sludge.

Transported air line guard to BUG 3518 on west side of Pond. Encountered subcontractor HP setting up RAD ZONES which were blocking road to 3518. He indicated we could go ahead and work through since no work was to begin until later that day. I asked if road was to be blocked for a long period of time since we would need access to west side of pond for our air, water and electricity hookups. He stated that the job should only take about four hours to complete and there shouldn't be a problem with access after they were done.

Proceeded to Ann Saulsbury's office to drop off THIS record for SSHO documentation file. She was on travel so I left it on her desk and informed Allen White that if anyone needed to see my records, they were on her desk.

Continued on the BUG 1062 to acquire more

signs and postings to complete zones at pond. Returned to Pond 3513 and continued making up EXCLUSION, CONTAMINATION REDUCTION AND SUPPORT ZONE signage.

After lunch, J. Allred and J. Wade went to Fab Shop to have a discharge spout made up that would alleviate a potential contamination problem on cam-lock couplings. They then proceeded to BLDG 1062 to load up PPE needed for Mud Team and OPTECH personnel.

Joel Miller arrived on site. We used excess dikeing material to create step-off pad out of exclusion zone for doffing of PPE. RAD crew was routed around staging area to designate exclusion zone / rad area.

Upon exiting pond area Telena Moore and Nathan Wright were present with John Allred discussing details of pumping operation and dewatering of tanks. They were under the impression that we would be using the pumping method used previously (casing and peristaltic pump) to acquire samples. Allred had informed them of the method we would be using to pump a much greater volume of sludge than was needed in '94(?). I informed them that I had mentioned the changes from the H&S plan to P. Abstoran & he didn't see a need to change plan since the changes would not impact Health & Safety Concerns.

Discussed a few more items with Telena & Nathan before returning to TTO.

* Spoke with Kent DeRoos today. Asked if he could meet at Impoundment to go over some waste details. He apparently wasn't able to find transportation to meet us this afternoon.

4. The

4-11-96
Thursday

Team Members: J. Allred, J. Wade, D. McKinney, [illegible]

Began morning trying to acquire plastic sleeving for instrumentation (Sonic Tom) which will be lowered through water to sediment layer. Went to Bldg. 7503 where MAD supply of sleeving had been stored. No sleeving could be found. Went to stores to see if plastic sleeving was in stock. Found sleeving that would serve our purpose and went to job site.

Arrived on site and Waste Operations personnel were on site. Pumping operations were still going on reducing water level of Pond 3513. It appeared to be raising background levels in the area according to instrumentation.

Kirk Wilson arrived on site to check water level. We informed him of background level increase. Kirk notified Waste Operations to cease pumping operation. Joel Miller was on site for HP coverage. He noticed the increase in background levels with his instrumentation as well.

Phoned Kent DeRoos again this morning to set up a time to meet about waste characterization details. He mentioned he had delivered needed items (Drum Labels, Vermiculite, Spill Kit) yesterday afternoon late. Kent said he would come over this A.M. to discuss waste.

Kent arrived mid-morning, after a little discussion concerning waste characterization and certification, he assured us that there would be no problems that would involve Health Sciences Research Division (HSRD) Waste Minimization Officer or other representatives.

Received a phone call from Charles Clark (ER) this morning. He asked a few questions concerning our operation and HAZWOPER zoning. Charles informed me that some representatives from FOSTER WHEELER

organization would be taking a tour of the site tomorrow morning. I asked if they would need to actually ~~need~~ ~~to~~ enter the HAZWOPER zones or was this just a walkby tour. Foster Wheeler Safety person Ken Eggers indicated it would probably be a walkby. During the three way phone call I informed Ken that if personnel needed to actually enter HAZWOPER area we would need medical, training and all other pertinent records before we could allow them access to area.

Access to BLDG 3518 was still blocked today by subcontractor crew performing grouting operations on NORTH & EAST sides of 3518. Spoke with HP covering the job. She went to check how long the roadway would be blocked. She returned and told MAD Team the job would be complete around lunchtime. She will let us know when job is complete.

Charles Clark showed up on site, asked a few questions about operation and MAD Team departed.

Began hose hookups to front. Checked air lines and tested plant air supply. Supply valve in 3518 is apparently shut off at another location. Spoke with waste operations personnel about another air supply. They found another hook-up on east side of their facility for us to use.

Joel Miller was on site providing HP coverage for personnel entering Exclusion area.

Notified Telena Moore we would need more water hose for DE-CON operations. She said she would bring more tomorrow.

Team departed and returned to 7710.

4-12-
Friday

4-12-96 Team Members: D. Rose, J. Allred, J. Wade, V. Patania
Friday

Vaughn Patania joined team today to replace D. McKinney due to his schedule of 4-ten hour days. His support was extremely valuable due to rest of Team dressed out in exclusion area. He supplied Team with needed supplies and equipment to complete necessary work in exclusion area.

Finished hooking all hoses to boat and supply lines. Tested air supply. Everything seems to be ready to go.

Team needed restroom break before dressing out in PPE. P. Alston had checked with Facility Mgr at Bldg 3504 for use of facilities. Team members tried to access 3504 but could not due to some kind of construction going on.

Danny Brewer was on site. Talked to him about use of Waste Operations facilities. He said we could use PORT-A-JOHNS on west side of Treatment Facility.

Joel Miller was on site with BWP and available to supply coverage for work performed.

Mad group personnel boarded boat via gangplank to commence pumping operations. Decided it would be best to try a water only pump to see how equipment would respond to ~~unused~~ actual pond conditions. Water test went smoothly. Made air supply regulator adjustments to minimum flow.

Began actual sludge pumping operations after lunch. Things went fairly smooth considering it was the first time experience for all involved. Thickness of the pond sludge and ¼" diameter screen filter caused the sampling apparatus to clog quite often. We will have to have sufficient amount of water to keep sampling equipment and discharge lines from clogging completely. Although a larger

amount of water will be needed to carry silt & sludge to the staging area, the undesirable water volume will be a much easier item to deal with versus a clogged line or sampling tool. The risk of contaminating personnel or equipment (boat) greatly increases if we have to disconnect a hose full of radioactive sludge and try to clear it.

Mad team personnel tried several different ideas and techniques to optimize pumping operation and a few hours later had a 275 gallon tank full of sludge and water mix. Settling time is unknown at this point as well as actual sludge volume. We will have a better idea after Dewatering on monday.

Preliminary readings taken by Joel Miller indicate a 3-5 mR/hr near bottom of tank. Measurements taken from the boat were 2-7 mR/hr, taken by Mad personnel.

Chris Taylor & Rob Coe arrived on site as team members were doffing PPE and exiting HAZ/OPER AREA. Discussed items concerning sampling operations and future plans for closure of compound.

Team departed job-site and returned to TTIO for the day.

Team Mee
4-15-96
monday

Sampling Information

	LOCATION #	AREA SAMPLED	SAMPLE DATE	COMMENTS
PLE # 1	50'S, 50'N OF NW CORNER OF PND 3513	5' RADIUS FROM LOCATION	4-12-96	2-7 MR/HR AT SECTION HOSE DURING SAMPLING

Team Members: D. Rose, J. Allred, J. Wade, V. Patania, D. McKinney
4-15-96
monday

Mobile Lab is finally back from New York and available for use. Bus will provide shelter and storage space for all supplies used during job. This will be much more efficient and convenient for ongoing operations. Took Bus to 7000 area to fuel-up. arrived at Impoundment area and positioned bus on level ground near entry/exit location of HAZWOPER AREA.

Rob Coe (L-TEAM), Joel Miller (Radiation Protection) and OPTECH team members were on-site. Contacted by Rob Coe and Joel Miller about possible tampering by unauthorized personnel of boat and equipment. It appears that over the week-end someone had boarded the boat. The gangplank that was left on the bank Friday had been lowered to the boat and not pulled back to the bank as Team members do when exiting the boat. one end of gangplank was down in the sediment near the bank. All personnel discussed possibilities of what could have occurred. Decided it best to report event to Security. Phoned ISS who directed me to Sheila Tomkins (OENL Security). Sheila phoned investigator O.J. Sheppard at K-25 concerning the event. We were told to leave site as it is and not to disturb things until they arrived.

In the meantime, team members downloaded supplies from vehicles to bus.

R.D. Foley (MAIS GROUP LEADER) arrived on site to check on activities and bus use. Informed him of unauthorized access to HAZWOPER area and boat, and call to Security.

Sheila Tomkins and O.J. Sheppard arrived shortly after phone conversation. Discussed events that could have possibly occured. Sheppard asked if any steps on boat were missing. Told him that we didn't boarded boat so we didn't know. We also wanted to check

boat for contamination before we boarded. Sheppard and Tomkins suggested we call them back after we take our smears and inventory boat to let them know what we find. I agreed and they departed job site.

Team de-rinned gangplank and took smears on surfaces (floor) of boat. Joel Miller will take them to HP office for counting.

Spoke with Tolena Moore and Nathan Wright. It appears they have a little problem in their trailer. Oven thermometer broke and mercury spilled out. They have called appropriate entities to take care of problem.

*(62) Team members began dewatering operations of the first tank.

Racked-out this afternoon. Took care of supplies that had been loaded onto bus while the weather took a turn for the worse.

Returned to 7716.

Called Sheila Tomkins back to let her know that we did not find any missing items from boat and there had not been any contamination tracked onto boat by whoever might have been inside Exclusion Zone.

*(62) Dewatering went fairly well. Team primed hose with potable water with pond end pinched off. Put other end into tank and released primer and at pond end water flowed readily. Water was a little murky at first and then cleared up a few seconds later. Team left for lunch as tank was draining.

4-16-9
Tuesd

4-16-96
Tuesday

Team Members: D. Rose, J. Allred, J. Wade, D. Mikmey

Team arrived on site to begin preparation for dewatering and pumping operations. Completed dewatering of 1st Sample Tank. Will get Telena Moore to view sediment level and water to get her approval of 1st sample.

Team boarded boat to begin pumping/sampling operations at location #2 in Northeast corner of Pond 3513

Difficulties experienced when suction/sampling end of is lowered to bottom of sediment layer (approximately 2.5'-3' deep). Sampling device and suction hose wants to clog up. Added volume of water is needed to clear lines up. Sampling process appears to be an exhausting task. Raising and lowering sampling suction tube from top to bottom of sediment layer with material inside, as well as clogging of device makes task difficult. Will discuss alternatives with team concerning an easier way of sampling.

Mike Murray (MDD SCAQMD) appeared in support zone in civilian clothing. Joel Miller immediately apprised M. Murray that he was not allowed in zone and needed to exit after frisking.

Rob Coe was on site this morning and Chris Taylor arrived as team was preparing to leave for lunch. Discussed sampling activities and length of sampling process. Process for two locations so far have taken ~ 3-4 hours each which in my opinion is extremely good.

Discussed sampling device with Coe this afternoon. Solid filter screen (1/4") at 2" end of sampling head seems to be causing clogging problem. Took spare head to Sam Turner to knock out screen at 2" end and have head fitted with screen at 8" end. This may alleviate or aid in clogging.

Requested hole (2¾") be drilled in 55 gallon drum lid to allow insertion of discharge end down into drum during pumping. This will avoid splashing of material while sampling. Dipping device for sampling from previous Pond job was dropped off to be modified to use this time. Cup will be attached with swivel apparatus to allow dipping through 12" opening of tank. Dan replied that he would do what he could to have items ready by Thursday.

Spoke with Telena Moore and Nathan Wright as to whereabouts of extra drum liners. Two of the liners in tanks with 2" openings need to be replaced with liners with 12" opening. Team members replaced liner in one drum. 2nd liner appeared to have defects. Will need to take liner to Plastic Fab Shop for repair.

Telena requested supplies for their work inside trailer. She needed safety glasses and latex gloves. Told her we would pick up supplies from BLDG 1062 and bring them over tomorrow.

Team returned to BLDG 7710.

4-17-96
WEDNES

Sampling Information

SAMPLE #2	LOCATION #2	AREA SAMPLED	SAMPLE DATE
	CENTER OF LOCATION - 55' W, 40'S OF NE CORNER OF POND 3513	SAMPLED FROM AREA w/10' RADIUS OF LOCATION #2	4-16-96

COMMENTS

- MAXIMUM RADIATION READING FOR THIS SAMPLING LOCATION WAS ~ 3μR/HR, READING TAKEN WITH SIDE WINDOW (CLOSED) ON BOAT DURING SAMPLING PROCESS.
- OILY SHEEN APPEARED ON SURFACE OF WATER AT SAMPLING LOCATION (DURING SAMPLING) AND AT DISCHARGE LOCATION AT STAGING AREA WHILE PURGING LINE.

4-17-96 WEDNESDAY

Team Members: J. Wade, J. Allred, D. Roe, D. Makinney

Team prepared to start dewatering process of Sample #2 contained in the second of four 275 gallon tanks in staging area. Dewatering with primed tygon tubing seems to be working very well. So far there hasn't been any need for a pump or mechanical device to dewater samples. After dewatering it was noticed that pond sediment in tank was not distributed as evenly in tank as was the first sample. This was apparently due to the positioning of the discharge end inside the 12" opening of the tank. We will try to attain a better distribution of sediment at next location. This should make it easier to determine actual sediment volume after dewatering. By our estimates we should have approximately 45-50 gallons of sediment. Team members used OPTECH's measuring rule to estimate volume.

Plastic Fab Ship couldn't fix tank liner. Spoke with Linda White concerning Purchase Requisition for more liners. She took care of all details through Buyer. Liners should arrive at Receiving tomorrow morning.

Team geared-up for repositioning of boat to next sampling location near center of Pond 3513. Phoned Joel Miller to provide HP support while in the exclusion area. Since no actual sampling operations were to be performed he indicated that we could access zone without him being present. Joel requested that we be sure and sign in on RWP, as we have been doing and will continue to do each time exclusion zone is accessed. I also asked him about future activities aside from sampling in exclusion area. He authorized MAD team members to go in area without his presence for activities other than sampling. Repositioned boat to middle of pond.

Rob Coe was on site discussing consistency of

4-18-9
THURSDY

pond sediment. Joe suggested to Telena Moore and Nathan Wright that they might want to enter staging area to check consistendy of sediment for mixing and sampling purposes.

Phoned Joel Miller again to request coverage for OPTECH personnel. He said he would be over shortly. Meanwhile, MAD Team personnel continued repositioning of boat.

Joel dressed out with OP TECH personnel for testing of sediment. Using stainless steel tool, Telena probed and stirred sediment to check consistency and dewatering of sediment. Telena said everything was to her liking and that they might be able to mix sediment as they had planned (w/mixer). She also stated that sediment had been dewatered sufficiently.

L-TEAM exited HAZWOPER AREA to prepare for departure. MAD TEAM discussed days activities before leaving for the day. As Mad team was locking up Mobile Lab, Robert Sherles (ER Waste Mgmnt Coordinator) showed up at site. He was looking for Telena with signage for Satellite area to store waste, etc from Mercury incidant. Robert also mentioned that he would come back tomorrow to take a look at items associated with Waste Management Plan Checklist.

Team departed job site and returned to TTC.

4-18-96
THURSDAY

Team Members: J. Allred, J. Wade, D. Rose, D. McKinney (VACATION)

Team arrived on site for preparation of todays activities. OP-TECH team members were on site this morning. Instrumentation and supplies were loaded onto bus.

Sam Turner (FAB SHOP) had contacted Team to inform us that modifications on equipment was complete. Personnel went to shop to pick-up 55 gallon drum lid with 2¾" hole cut, sampling head with 8" mesh filter (¼") and sample dipping tool.

Returned to impoundment. Winds apparently had been strong overnight. HAZWOPER signage was in disarray due to high winds. Team corrected signs so that zones were properly indicated according to HAZWOPER guidelines.

L-Team members that had not yet accessed HAZWOPER area were given Pre-Entry Health & Safety briefing (see page 151).

After briefing L-Team discussed sampling operations and devices to be used for OP-TECH sample mixing, dipping and transfer. Modifications done to sample dipping device will not be utilized due to open ended pipe used for handle. Joel Miller stated that the possibility of contaminated sediment that could run through handle and out the other end once end of handle was not solid would not work. This was an obvious oversight on my part in communicating exactly what we need to B&E personnel. Rob Coe suggested taking dipping tool back to B&E for more modification.

Helena and Nathan were wanting to try mixing operations and first sample acquisition this morning. Clearance of mixer blades to bottom of Tank was discussed. I emphasized again the importance of being very cautious as not to

tear plastic liners in tanks with mixing blades. If 275 gallon tanks get contaminated I feel we would have a disposal problem on our hands.

Decided to dress out and double check clearance and to see if liner could be pulled through 12" opening and still screw lid (with mixer mounted) onto threaded opening. Inside the area the clearance was checked and we appear to have approximately 3" between blades and bottom of drum. Still have concerns that plastic liner may get torn in mixing process. 12" lid can be tightened even with excess liner pulled out of tank as far as possible.

Called Receiving to see if replacement liners had come in yet. No luck. Try back later.

Water pressure reducing regulator was installed before garden hose hook-up. Hose will be used in staging area for de-con purposes or in case of spill. Regulator was installed due to concerns that pressure in line was more than a garden hose could handle. With regulator there shouldn't be a problem with excessive water pressure.

OP-TECH personnel put protective sleeving on power cord to protect from contamination and save Radiation Protection survey time when removed. Cord will be used to run mixer. Plug-in is located in building 3518.

Tarps were placed over B-25 boxes as stated in H&S Plan (Waste Management Plan).

Team continued searching for options to modify dipping tool on site so OP-TECH could get sample. Team found extension pole on MAD group Mobile Lab which will allow swivel sampling apparatus to hook up to. This should work sufficiently for sampling purposes.

Sample was not taken due to time restraints of OP-TECH personnel.

Team Returned to 770. Tank Liners were at 770. Delivered sometime during the day.

4-19-91
FRIDAY

4-19-96 Team Members: J. Allred, J. Wade, D. Dore
FRIDAY

Heavy rain showers and thunderstorms with lightning were in the area this morning. May possibly clear this afternoon according to forecast.

Daily Instrument checks were performed as usual before departure to Impoundments.

Two team members attended mandatory training needed to continue work at Impoundments. Members were scheduled for practical Factors portion (dress-out) of RAD WORKER II training at ORR Building. Upon completion of training team members returned to job site to prepare for possible sampling operations.

New liners were unpacked and inspected for any defects.

Weather was not clearing. Doesn't look like any sampling operations will be taking place this afternoon. Team members took care of some work that needed to be done on the Mobile Lab.

Joel Miller & Jo Ellen Francis arrived on site. Informed us that Joel would be covering a different job from here on out. Jo Ellen said we would be assigned another H.P. We told them that we hated to see Joel assigned to another job. Joel has been very helpful to this point with everything relative to the sediment sampling and any kind of coverage we have needed. Joel and Jo Ellen departed.

Team members locked down bus and returned to 1710.

4-26-96
Monday

Team Members: J. Allred, J. Wade, D. McKinney, D. Rose

Daily instrument checks were performed at SISG 7710. See page 111 of this logbook.

Team arrived on site. Joel Müller, Rob Coe, Telena Moore & Nathan Wright were on site. Team members prepared to dress out for sampling activities.

Discussions were taking place at OP-TEXH trailer concerning hood surface working space. Joel had concerns about OP-TEXH's plans to remove samples from hood working space.

Spoke with Joel about Mad Team members accessing exclusion area for sampling operations. He gave his O.K. and personnel entered area. New liner was screwed into ball valve opening. Tape was added to prevent any tearing of liner. Team boarded boat with ~~new~~ modified sampling ~~head~~ head. 1/4" screen was moved from 2" section of suction tube and placed (tack welded) to end of 2" opening at bottom of sampling head. L-Team members thought this will prevent the frequency of clogging. (old head was replaced with new.)

Team positioned boat near the center of the pond according to fence posts spaced 10' apart surrounding the pond. Discharge end of hose was taken to pond's edge. Excess water pumped was returned to pond until sediment could be seen in hose near staging area. At this point air supply was shut-off and discharge end placed in third 275 gallon tank. This process was used previously to direct unwanted water into pond instead of sample containers.

Sampling/pumping operations began. New sampling head was working very well. It appeared that more sediment and less clogging would result with

the modification to the head. The tank was nearing the full point when clogging began. Team members on boat tried several times to unclog the head while boat was positioned over sampling location. Decided to bring boat to bank so members could provide assistance. Once at the bank it was noticed that the screen on sampling head was missing. After further investigation it appeared that the screen had broken loose at the welds and had been pulled up toward 2" suction tube. Team members assumed that with the filter screen not in place particles larger than 1/4" had been pulled up into pump and that we had a serious clog inside the pump. This could be a major setback for our operation. We do have a spare pump that can be used but it is not equipped with all the proper fittings and modifications as our present pump.

Team members decided to break for a late lunch and discuss options to remedy the situation. Sampling head was sprayed off and wiped down so Joel could check for contamination for Fab Shop to be able to repair screen. Joel smeared for green tag purposes. Smears were above contamination limits. He cleaned and scrubbed sampling head until it was below limits. Called Sam Turner to let him know weld had broken. He said he would do what he could to fix it as quickly as possible. Transported head to shop for repair.

Team decided that it would be much easier to take care of clogged pump/lines near staging area. This will save time when certain tools and supplies might be needed to switch out pumps, fittings, etc. Boat was repositioned near staging area. The rear of boat was positioned next to bank for easy access to pump and connections.

Team thought it best to check all avenues before

we tear down pump set-up. Disconnected suction hose from sampling device, dropped it end into POND to prevent contamination in hose from getting on boat. Disconnected suction end from pump carefully placing plastic barrier other ends to prevent splash from sediment in lines & pump. No splashing occurred. Sediment oozed out onto trough designed by John Allred specifically for this purpose. Washed sediment back into pond with spray washer. Hooked up suction end with new hose and tried pump again. Pump started to work. Turns out hose was clogged instead of pump. Connected clogged hose to discharge end and forced clogged sediment material out of line.

Hooked up discharge end back to original hose set-up. An additional 100' section of hose was connected to allow for sampling locations at South end of Pond 3513.

Repositioned boat to South end of pond for tomorrows sampling. Weather forecast for tonight is predicting rain and stormy conditions. Secured boat and HAZWOPER area to withstand bad weather.

Team returned to BDG 7710

4-23-96 TUESDAY

Sampling Information:

	LOCATION #3	AREA SAMPLED	SAMPLE DATE
AE #3	~100'S, 100'W OF NW CORNER OF POND 3513, CENTER OF POND	SAMPLED FROM AREA W/6 RADIUS OF LOCATION #3	4-22-96

COMMENTS

- MAXIMUM RADIATION READING FOR THIS LOCATION WAS ~ 7MR/HR TAKEN WITH SIDE WINDOW (CLOSED) ON BOAT DURING SAMPLING PROCESS
- READING AT TANK IN STAGING AREA ~ 10-15 MR/HR.
- SAMPLE AGAIN HAD ONLY APPEARANCE AND ODOR.

4-23-96 Team Members: J Wick, D. McKinney, D. Rose
TUESDAY

Daily instrument checks were performed at 0800 7710 prior to departure to impoundment.

Team arrived on site. Rain was predicted to stand somewhere around 8:00 am. Team members dressed out to begin dewatering process of Sample #3 from 275 gallon tank. Mad personnel primed Tygon tubing and water was pulled from top of sediment. As Dewatering was about complete rain showers were starting to come down. Team doffed PPE and sought shelter on bus.

OP-TECH team members were beginning to collect sample out of tank #2 as we were departing area. HP coverage was supplied for OP-TECH during their sampling operations. Samples are fluid enough to be drawn from ball valve at bottom of the tank.

Telena observed that sample in tank #2 was more fluid than previous sample collected. I asked if they checked before mixing to see if it needed further dewatering. She stated that she didn't check but thought that it was typical of the characteristics for the sediment. She further stated that the thick sludge level at bottom of tank was not as deep as first tank ~~as the first~~.

A discussion took place this afternoon concerning methods of transfer for samples collected. Rob Coe, Telena Moore, MAD Team and Kirk Wilson were present. It was suggested that another option of transfer aside from present set up on boat be used. Mad Team had planned to use what we already have available. I asked Telena if their tests were complete on the samples they have in trailer. She said they were not finished yet, and the background readings had been increased with the samples in the trailer.

4-24
WEDNES

He stated they could not take any more samples at this time. In my opinion, I couldn't see the necessity of purchasing another pump and gearing up for transfer when the levels of activity in trailer were above what they felt comfortable with. Transferring existing samples for composite sample takes away from our time on the boat to complete sampling operations. I just don't see an immediate need to justify a change in plans.

Discussion continued. I agreed to call Danny Brewer to check on borrowing a pump from Waste Operations. Couldn't reach him by phone. Try tomorrow.

High winds and rain threatening all day today. Team decided to pack-up and return to TTO for the day.

* Picked up repaired sampling head from the shop today. Not much of an improvement over last set-up.

* Barry Berven (DIVISION DIRECTOR), Paul Rohwer (ASSOCIATE DIVISION DIRECTOR) showed up on site this afternoon. They said they just wanted to take a look at our operation. While speaking with them it was noticed that R.D. Foley (MAD GRAVE LOADER) and R.E. Swaja (Section Head) were observing from parking lot South of Impoundment area

4-24-96 Team Members: J. Wade, D. McKinney, D. Box, M. Murray, K. Beaver (
WEDNESDAY

Daily instrument checks were performed at BLDG 7710 prior to departure to impoundments.

Spoke with Mike Murray concerning a need for another person to help with pumping operations today. V. Patania was requested to assist. Murray stated that Patania was out on vacation. He indicated that he could help out today as well as take some photos and film footage.

Team arrived on site. I made phone call to Debbie Dickerson to have Murray's training records faxed to BLDG 1062 for pick-up. Murray mentioned if we could possibly use another support person on site. Told him things were going well with four people but would try to accomodate for a fifth person.

Discussed the "repaired" sampling head and decided we would need to be careful during sampling to prevent another failure. Hopefully we won't have any more trouble.

Phoned Rick Chadwick concerning removal of nylon string (bird wire) over POND 3524. Rick wants me to give him a call on Monday to set things up.

Team dressed out to begin sampling at location #4 in Southwest corner of POND 3513. Joel Millin was on site to provide HP coverage. Team prepared at staging area and on boat. "Repaired" sampling head was attached to suction tube. Sampling operations commenced and continued for approximately 10 minutes before pump/lines appeared to get clogged.

Team went through routine previously used to determine where clogging had occurred. It was discovered that screen on sampling head

head failed again. Team members swapped to back-up head with screen in 2" portion of head. Restarted operations to no avail. Team decided suction or discharge lines were clogged. Lines didn't appear to be clogged after further investigation. Tried everything possible and finally concluded that pump was clogged with rocks bigger than 1/4". Returned boat to bank to figure out plan to unclog or swap pumps.

Sampling Head was taken to staging area for decon. Old screen was forced out of head and scrubbed down head for green tagging by Radiation Protection. Head was checked and smeared by Joel Miller. It checked out clear. Rob Cox and Myself transported head to Jim Turner to let him know about screen failure. We also wanted to make sure that he understood that every time our sampling head broke it brought all our operations to a halt. He said that he would fix screen so that it won't break loose again. Jim had to find a welder that would work on overtime for a quick turnaround of repair work.

Removed pump from back of boat. Joel was on site to provide his expertise during removal and tear-down of pump. Removed suction and discharge sections of pump. Heraklite sheeting was put down on ground to prevent spread of contamination to bank area where work was being performed. Upon removal of sections of pump it was evident that clogging probably occurred in pump due to the large rocks contained inside. Valve balls inside the pump were jammed by the rocks. All rocks were removed and the pump reassembled and secured back on boat. Careful contamination controls were performed to prevent personnel, pump or area from spreading

SAMPLE

being exposed to contaminated materials.

Team attempted again to resume pumping operations. For some unknown reason pump would not pull any water. Team assumed that diaphragms could have been damaged by rocks that had been pulled through pump. The only thing left to do is replace pump with spare that we acquired at TENCARVA.

Pulled pump off of boat again and replaced with spare. Thought this to be the only solution to getting back in operation. The spare pump would not pull any material through the lines. Since the spare pump wasn't working properly the only thing left to check was the regulator. Team made adjustments to regulator and attempted several times to pump water, when all of the sudden everything started working. No explanation as to why or how it started pumping.

Team repositioned back over sample location #4 and continued to collect the rest of sediment for this location. Completed sampling, returned to bank, secured boat and HAZWOPER area and returned to BLDG 7710.

Sampling Information:

SAMPLE #4

LOCATION #4	AREA SAMPLED	SAMPLE DATE
50'N, 50'E OF SW CORNER OF POND 3513	SAMPLED FROM AREA W/6' RADIUS FROM LOCATION	4-24-96

COMMENTS

MAXIMUM RADIATION READING OBSERVED WAS ~1 MR/HR, TAKEN WITH SIDE WINDOW (CLOSED) ON BOAT DURING SAMPLING OPERATION.

4-25-96 THURSDAY

Team Members: J. Wade, D. McKinney, D. Rose (½ day)

4-26-96 FRIDAY

Team members performed daily instrument checks at BLDG 7710.

Went to Fab Shop first thing this morning to retrieve repaired/modified sampling head. An extra screen had been added behind ¼" screen as well as a few other modifications to "beef-up" 6" filter. It appears that modifications may be a little more restrictive for sediment flow. As long as the screen doesn't break loose it should work O.K.

Team members dewatered contents of Tank/Sample #4. We have possibly acquired more sediment than the forty gallons that was needed. Will talk with Talena and Nathan about what to do with the excess.

Team checked out pump that had given us problems yesterday. Broke pump down to the diaphragms to check for breakage, etc. Everything seemed to be operational so pump was reassembled and put on stand-by for other use.

Team members took care of a few things around job site. Secured B-25 boxes with locks as is written in the Waste Management Plan. Prepared wooden base to attach pump to for transferring sediment for composite samples and returning sediment to pond.

Team returned to BLDG 7710.

SAMPLE

4-26-96 Team Members: J Wade, D. McKinney, J Allred, D. Doze
FRIDAY

Team Members performed daily instrument checks at Bldg 7710.

Rainy conditions this morning. Team began making preparations to get second pump set-up with all the necessary fittings to use for transfer/compositing of samples. There was major discussion concerning the benefits, at this point, to set up the extra pump. There are numerous fittings and adaptors that are needed to get second pump operational. With only one location to sample in 3513, team decided to continue as planned using the pump on boat for transfer. The time it would take to acquire parts and put everything together, we could have fifth sample taken and boat moved to staging area for transfer.

Team positioned boat at Sample Location #5 and began sample operation. For this sample two-55 gallon drums will be used instead of 275 gallon tank. 55 gallon drums are also fitted with liners to hopefully prevent contaminating drums. Drum lid for discharging sediment has 2¾" hole cut in it to insert discharge end into drum. This will prevent splashing any material out of drum. Both drums were filled to insure the forty gallons required for each location.

Sampling Information

SAMPLE #5	LOCATION #5	AREA SAMPLED	SAMPLE DATE
	~50'W, 40'N OF SE CORNER OF POND 3513.	SAMPLED FROM AREA W/10' RADIUS OF THIS LOCATION	4-26-96

COMMENTS
- ~3-4' OF WATER, ~2-3' OF SEDIMENT, 2MR/HR W/SIDE WINDOW ON BOAT.
- OILY APPEARANCE/ODOR

-2-96
MONDAY

Team Members: J. Wade, J. Allred, D. McKinney, D. Rose

Team performed daily instrument checks at BOG 7710.

Team dressed out and entered Exclusion Zone to begin repositioning of boat to staging area.

First, dewatering of two 55 gallon drums was done. Calculations were done to determine volume of sediment in both drums. Calculations show that we have ~50 gallons in both drums.

Team repositioned boat to staging area for transfer of sediment. We wanted to be sure we had enough sediment from location #5 before we repositioned boat. Boat was positioned just west of staging area, with rear of boat tied up to the North bank for access to hose connections.

Rob Coe was on site this A.M. Discussed modifications of sampling head. We did not have screen failure at last location but due to screen added to ~~to~~ reinforce everything we experienced similar clogging as we did with small screen at 2" end of head.

Spoke with Telena concerning transfer of sediments. She is short handed due to illness of Nathan Wright. Mentioned that she could get additional help for sampling activities tomorrow. Telena mentioned that she could draw off extra sediment for their use so that we could go ahead with compositing and returning sediment to impoundment in preparation to move to Pond 3524.

Team began preparation of hoses for transfer purposes. Two suction hoses 24' were connected to reach from pump on boat to tanks in

staging area. Existing discharge hose (50') in staging area will be used for transfer. ~~Hoses and air lines~~ 50' with floats attached was disconnected from pump discharge on boat. We will use air line already hooked to pump.

Began transfer of sediment from 1 drum to the other to consolidate for 40 gallon sample. Things went well during transfer. There was some excess sediment left in drum that suction device could not pull out. Rinsed this out into pond at staging area.

Joel Miller took readings at both drums before transfer. First drum that we pumped into read ~ 5mR/hr. Second drum we pumped into read ~ 10mR/hr.

There wasn't enough time left today to begin transfer of Tank/Sample #2 to Sample #1 which will be 3513 pond composite.

Team exited HAZWOPER area and returned to BLDG 7710.

4 5-96 TUESDAY

Team Members: J. Wade, B. McKinney, D. Dose, J. Allred

Team Members performed daily instrument checks at BLDG 7110.

Team discussed transfer of hoses to Pond 3524. Decided we could use Heralite material for transfer of hoses to other pond. Team members went to stores to purchase material and other supplies we were running low on.

Team members dressed out to enter Exclusion area. We needed to double check levels of samples in all containers. Team was under the impression and were told that samples needed to be as near to 40 gallons as was achievable. Samples 1 & 2 were close enough to 40 gallons as we could get them. Levels of samples 3, 4, 5 needed to be measured to see if we needed to dispose of excess before OP-TECH performed their sampling. Sample / Tank #3 had excess of ~80 gallons. Sample #4 had excess of ~25 gallons. Team members decided we could drain excess through valve at bottom of tank to bring levels to 40 gallons.

SAMPLE #5 APPROX 50gal

Mixer was in Tank #2, so we first decided to transfer contents of #2 into Tank / sample #1 and use this tank for 200 gallon Pond composite. Turned mixer on to mix contents so we could readily transfer ~~contents~~ sediment. Mixed contents ~10-15 minutes and set-up to transfer. Tilted tank up on one end to move sediment to one side of tank for suction. Liner inside tank made it difficult to see and get to some of sediment inside. Transferred everything that we could into Tank #1. Checked level of Tank #1, should have near 80 gallons. Level was short of 80 gallon mark on OP-TECH ruler. Put discharge end into pond to use water to push remaining

sediment in discharge line through to tank #1. This brought level very close to 80 gallon mark.

Before transfer team had moved mixer to tank #3 and had begun mixing. OP-TECH team members Telena Moore & Raul Gonzalez were dressed out & accessed exclusion area to pull samples from 3, 4, 5. Explained to Telena that we were mixing Tank #3 so we could drain off excess in the tank to put level at 40 gallons. She stated that the sediment level for single locations did not matter, only for the composite did we need to have the levels as close to 40 gallons as possible. This went contrary to what we had been thinking to this point. We apparently misunderstood previous statements that have been made concerning volume of sediment. She said she could pull samples no matter what volume as long as it was mixed homogeneously.

Tank #2 was rinsed as best as possible after transfer. Ball valve and hose connection were inserted into a discharge line and directed into pond. Watered down tank with garden hose to rinse residual sediment back into pond. Turned out to be fairly slow process. Decided to also use pump to pull out excess.

Team packed up and returned to BDG 7710.

5-1-'96
WEDNESDAY

Team Members: D. Rose, J. Wade, J. Allred, D. McKinney

Performed daily instrument checks at BLDG 7710.

Team arrived on site and prepared for the days activities. Sediment composition will continue. Sample #3 will be transferred this morning. Turned mixer on in ~~drum~~ tank #3 to attain a more fluid sample for transfer.

Rechecked sediment level in 55 gallon drum #5. After transfer more settling had occurred with sample. a water layer of ~ 2-3" was visible at top of drum. Team decided to dewater to give a more representative sediment sample.

By this time sample #3 was mixed thoroughly and we were ready to begin transfer to Pond 3513 composite in Tank #1.

Inserted tubing from ball valve of tank #3 into discharge line and placed discharge end into pond to return sediment. Again the thickness of the sediment doesn't allow free flow of sediment back into the pond. Water was added to change consistency for a better flow.

Team used pump to suction sediment out of tank and used drain valve of tank to return sediment to pond.

Team experienced difficulties throughout process of cleaning Tank #3. The liner of this tank had numerous holes. Sediment had escaped out of liner and was contained in the tank and liner. Team decided it best to drain sediment out of liner into tank then suction remaining sediment from tank into the pond. a razor blade was secured to a plexiglass rod. This was used to cut liner

out of valve attachment at bottom of tank. Liner was carefully rolled up and placed in rad waste bag. There was a considerable amount of sediment left in the liner. Liner was taken to pond edge and rinsed out with garden hose. Vermiculite was added to absorb any free liquids in liner before disposing as waste.

Continued pumping operation removing the remaining sediment out of Tank #3. Team noticed there were several handfuls of rocks contained in bottom of tank. Rocks were possibly pulled through pump at times we had screen failure on sampling head. Rinsed #3 as best we could.

Joel Miller and Kent DeBoos were on site. Kent was on site taking down information about waste generation.

OP-TECH Team members also on site as usual. They mixed and pulled sample out of tank #4. Upon completion of sampling #4, Team members switched mixer over to drum #5 and attempted to secure mixer set-up to drum (55gall.) in some fashion. Did not have proper equipment to use at this time.

Team decided we had time enough to transfer contents of Tank #4 to Pond 3513 Composite in Tank #1. This transfer operation went relatively well compared to #3 transfer.

Team departed to bldg 7710.

5-2-92
THURSDAY

Team Members: J. Wade, D. McKinney

5-3
FRID

Team arrived on-site and prepared for daily activities

Talked with OP Tech personnel about sampling activities scheduled this date. After everyone was on-site, protective clothing was donned and area was entered.

Mixer was placed in the 55 gallon drum for 20 minutes. While mixing, we prepared to consolidate the final sample into the 275 gallon container along with the other four samples. After the twenty minute mixing period, ORNL supported the OP Tech personnel as they collected their final sample from the 55 gallon drum. Once this was complete, we consolidated the sample by pumping it from the 55 gallon to the 275 gallon container.

All equipment and containers were cleaned out and are now ready for further sampling activities. The consolidated sample is now ready to be sampled, whenever the OP Tech personnel are ready.

Team doffed protective clothing and exited the area.

5-3-96
FRIDAY

Team Members: J. Wade, J. Allred, D. Roe

Team performed daily instrument checks at BLDG 7710.

Team arrived on site and discussed activities for the day. Phoned Telena Moore to check on their plans for the day. We discussed sampling and use of containers when we move to Pond 3524. She did not feel comfortable with the use of the 55 gallon drum and sampling techniques used yesterday. Telena would rather do sampling out of the 275 gallon tanks if possible. Talked through sampling scenario for 3524. Mud Team would have to sample three locations, sample, transfer for composite, then go back and sample remaining two locations. This process would take a little bit longer but would allow OP-TECH to sample out of tanks instead of drums.

Rob Coe and Robert Dean were on site this morning. Discussed Telina's concerns with Rob and Robert. Rob mentioned purchasing more tanks. We will consider this option with reservation of creating more rad waste that we may have trouble disposing of.

Team members went to Fab Shop to acquire fittings to set-up spare pump. The pump will be needed to do transfer from upper pond without using pump on the boat. Shop had some fittings that we need but will have to get the rest on Monday.

Three DOE employees were by asking a few questions. I inquired if there was some kind of audit taking place. They replied by saying no they were just checking on levels around the pond.

5-6
MON.

Telena called back. She was wondering if there would be personnel available to provide coverage for sampling 3513 composite. I told her I would call Joel to see if his available this afternoon since there is not time to do it this morning. Joel stated Telena had told him yesterday that OP-TECH would not be doing any sampling today. He was scheduled to cover another job and would not be available, Mod Team was scheduled for a group lunch meeting at 7710 this afternoon as well. Telena decided she could do the sampling Monday morning.

Team returned to BLDG 7710.

5-6-96 MONDAY

Team Members: J. Allred, J. Wade, D. McKinney, D. Rose

Team members performed daily instrument checks at BLDG. 7710.

Team members went by Fab Shop to pick up remainder of fittings needed to get second pump operational.

Jo Ellen Francis stopped by to see how job was going. Joel Miller arrived to provide his assistance for sampling of composite for 3513.

Team members began work on second pump all necessary fittings were tightened down on pump, regulator set-up to ensure a leak-proof operation of pump, air lines etc.

Joel Miller took measurements on composite sample in tank #1. Near bottom of tank, 10mR/HR; at middle of tank, 15mR/HR; top of tank 5mR/HR, all measurements taken at contact.

Team began preparations for movement of boat to upper pond. Contents of boat were secured so nothing could fall off of boat during transport. Hoses were disconnected from pump and regulator.

OP-TECH personnel were ready to sample Pond composite in Tank #1. Extra blades were added to mixer for better mixing of composite sample. Sample was mixed for approximately thirty minutes.

One more section of fence was taken down (3513) near staging area to make room for transfer of 200' of discharge hose, air lines with buoys attached. Herculite material was layed down to pull hoses across to Pond 3524. Herculite will be used for containment of contamination

on hoses. Team decided along with Joel Miller. To use Herculite to pull hoses to across to Pond 3524, then wrap Herculite around hoses and tape closed for protective cover. Joel would rather use protective cover around hose versus creating a new extended exclusion area between ponds. This would cause an entry/exit problem getting back and forth (EAST & WEST) between the two ponds.

Small slit was cut in silt fence at pond 3524 to feed hoses/buoys through to pond. Team Members transferred 200' of hoses to west end of pond. Wrapped tape around Herculite for containment.

Weather conditions took a turn for the worse. Sky darkened and rain set-in. Team doffed PPE and exited area.

Team locked down site and returned to BLDG 7710.

5-7
TUES

5-7-96
TUESDAY

Team Members: D. Rose, J. Wade, D. McKinney.

Team performed daily instrument checks at BLDG 7710.

Rain showers, thunder and lightning were forecast for most of the morning. Team departed 7710 and relocated to impoundment to wait for rain to cease.

Team discussed the need to set-up more discharge hose and air line to reach sampling locations at 3524. We thought we might need an additional 50' of hose to reach locations. Team made a few calculations and decided if we re-route lines from present set-up, we will have enough existing hoses to reach all locations.

Fifty feet of lines were wrapped and taped in Heraulite and pulled out of exclusion zone at 3524 and routed at an angle from staging area to center of pond area. This should give us enough distance to reach all sampling locations from this point.

Rain showers picked-up again.

Spoke with Steve Rose today concerning transfer of boat to Pond 3524. He asked if we would want to do it next week. I replied we were ready whenever they could get there. Steve would not give a definite date. He will try to squeeze us in as soon as possible.

Spoke with Doug Peterson (WASTE OP) concerning weedeating on 3524. Possible hazards (holes, wire, etc) are difficult to see due to height of grass around the pond. Weedeating would alleviate a potential trip hazard and allow easier movement on the bank. Peterson will check with his people

to make sure we are O.K.

Bob Coe had suggested we make sure to let proper personnel know of our intentions before we have any workdone at Pond 3524.

Joel Miller arrived on site as team was preparing to access exclusion area for boat repositioning. He mentioned Lynn Cox and crew would be working on South side of pond spraying Bentonite material in area where we were going to reposition boat. Joel called Lynn on radio to come to meet us.

Lynn arrived on site and we decided to position boat in northeast corner to stay out of their way until we hear from Steve Rose and rigger crew.

Team dressed out and pulled stakes on boat to reposition boat. During transfer to northeast corner we noticed that some plastic had come loose from bottom of boat. We will probably have to put new plastic on boat before we move to pond 3524. Secured boat in NE corner of pond.

Team departed to OSC 7710.

5-8
WEW

5-8-96 Team Members: J. Wade, D. Rose, D. McKinney, J. Allred
WEDNESDAY

Team members performed daily instrument checks at BLDG 7710.

Joel Miller and Kent DeRoos were on-site this morning. They were preparing rad waste packages and paperwork to deposit in B-25 boxes on-site

Spoke with Joel concerning weedeating activities at Pond 3524. Joel stated that Bill Alexander had given the official O.K. to permit cutting. Doug Peterson did not call back to let me know, but I assume there's not a problem.

Talked to Steve Rose concerning transfer and placement of boat. Steve wanted to build a ramp with gravel between the two ponds for the crane to drive onto. The best place to do the transfer is in an area that is wet and muddy. Steve wanted to know if there would be a need for crane work at impoundments in the future. If so, it would benefit everyone to build the ramp now. Told him I would talk to Rob Coe concerning ongoing studies at the impoundment and the need for crane activities in the future.

The only other location to place boat from is NW corner of 3524. Due to electrical lines this is a problem. With pump set-up on boat a I-Beam spreader has to be used to keep chokers from tearing pump off of boat. Steve stated that with the I-Beam spreader we can't get past the electrical lines. Mentioned that we could take housing and pump off of the boat so the spreader would not have to be used. He preferred to have gravel put down and work between the

5-9-
THURS

two ponds, especially if these services would be needed in the future. I will talk to Coe about this.

Steve and Harold Woods(?) asked if I could find out information about replacement wire on Pond 3513. Thought John Allred might have some idea concerning Part no. and Vendor.

Two D.O.T. auditors arrived on-site to do safety inspection on the bus. Ken McCormack and Mark Simmons requested license and paperwork (D.L.R). Checked paperwork and working order of lights, etc., and departed.

Bob Coe on-site this afternoon. Spoke with him concerning gravel ramp suggested by Rogers. Bob had reservations due to the time that would be necessary to set-up laborers, get gravel and have it laid down. Might take a few days. He also was concerned that even with gravel the crane might sink down anyway. This being the last time a crane will be needed in this area, cost vs. benefit is not justifiable. Will talk to Steve Rose tomorrow.

Team departed impoundment and returned to BLDG 7710.

* Talked with Peggy Richardson (FIRE DEPT) to coordinate spray of boat before transfer. She called shift commander and got approval.

5-9-96 Team Members: D. Rose, J. Wade, D. McKinney, J. Allred (C/3)
THURSDAY

Team performed daily instrument checks at BLDG 7710

Members dressed out and entered Exclusion area. Today we will have to remove pump housing and pump for riggers to connect chokers to boat. accessed boat and performed removal of pump from rear of boat. Pump was rad bagged and taped to avoid spread of any possible contamination. all items on boat were secured for lifting.

Rob Coe and Steve Rose were on site this morning. Steve asked me about the lift details and he and Rob discussed gravel ramp and areas to perform lift. They departed to scout out the situation.

Later, they returned and advised us to the situation. Steve will have to get division approval to perform lift in NW corner of pond 3524. The decision was made to work from NW corner instead of between ponds since this should be last time the crane will be needed in this area.

Team departed impoundment area to attend mandatory Division Safety Meeting.

at the conclusion of the meeting, team members made preparations for boat transfer. Plastic sheeting will be used to wrap around boat for contamination control purposes. new rope was cut for riggers. Picked up 4-WD vehicle to transport boat. Discussed plan of action with team members.

Riggers arrived on-site. Immediately notified the Fire Dept. so their pumper truck could be dispatched. Joel Miller arrived on-site to provide coverage for transfer and personnel. Boat was positioned in SE corner of 3513. all ropes attached

to boat were untied due to contamination.
J. Wade attached chokers to boat so riggers would not have to enter area on board boat. New ropes were attached and handed to riggers outside exclusion zone. Boat was lifted, as soon as boat came out of water the plastic cover on one pontoon had too much water inside (rainwater hopefully) and the tape broke loose dumping water back into pond. The plastic on other pontoon had an ample amount of water also, tape had not broken loose. Fire Dept. began spraying boat down. Spray water got inside plastic cover and caused the other cover to break loose. Water was drained out of plastic and secured back to boat. Boat was loaded onto trailer with plastic sheet beneath boat. Boat was wrapped with plastic and secured for transport to 3524.

Riggers repositioned crane to NW corner of 3524. Containment plastic was pulled loose from boat and boat was lifted and set into pond. Containment plastic was carefully folded up and placed in red bag.

Team pulled boat to bank at SW end of pond and secured. Heat stress was becoming a factor for team members in exclusion area. Team members exited zone. Will secure pump on boat tomorrow.

Riggers crew departed. Team members secured site and returned to 7110.

14-96 Team Members: J Allred, J Wade, D McKinney, D. Bore
TUEDAY

Team members performed daily instrument checks at BIG 7710.

Phoned Doug Peterson this morning to confirm P&F would be weedeating 3524. Peterson stated that Bill Alexander had given approval to cut weeds back.

Team Members entered zone and boat to reattach pump to platform on boat. Temperatures to reach mid to upper 80's today. Already very warm this morning. Heat will be an important factor to watch.

Pump was mounted securely back to the boat. All suction and discharge hoses were reattached and routed in a safe manner.

The boat was rotated 180° to allow for hoses to be on south end of pond. This will keep them out of the way of sampling activities.

Joel Miller was on site. Spoke with him about his conversation with John Hendley (P&F foreman). Joel mentioned that he and Hendley had talked about weedeating the same evening that they were working at Tank Farm. Since I personally had not talked to him, I called by radio to check situation. John said he was going to weedeat Pond 3524 Monday evening.

Rob Coe on site.

Team members mentioned that due to steep banks at Pond 3524, gangplank was somewhat difficult to walk on. When crew exited Exclusion area some skid-proof tape was put down on gangplank to help remedy the problem.

P. TECH team members were dressed out and working in Exclusion/Staging area.

Telesa and Nathan were depositing portions of samples collected previously back into 3513.

Team departed impoundments and returned to 7710.

5-13-96
MONDAY

Team Members: D. Rose, J. Wade, D. McKinney

Team members performed daily instrument checks at BLDG 7710.

Team made preparation to begin sampling activities from pond 3524. Members dressed out, entered Exclusion area and performed tests on pump. All air valves were opened for check. No air pressure was present. Checked with Waste Operations personnel to find the problem. Waste Op had needed air hook-up for process they were performing. Discussed our need and agreement for access to Plant Air hook-up. Waste Op personnel rendered assistance to remedy situation. An in-line tee was added so we could have air also. Waste Ops reconnected and turned air pressure. Team members noticed air line by BLDG 3518 had broken or blown apart. Shut pressure back down. Team cannot operate with air line broken. Team doffed PPE and exited area. Picked up necessary tools to try and repair line. Connection had come loose where two 50' sections join together. Hose section needs to be repaired by P&E personnel.

The situation was fixed by pulling slack in our air-line and Waste Ops air-line. We had enough to be able to reconnect without needing broken 50' section.

Team members re-entered Exclusion area to try pumping operations again. Team positioned boat to sample from Southwest Corner of 3524. Team began pumping operations. Encountered difficulties during pumping due to algal/growth abundant all over in 3524. The algae was being pulled in by sampling device and kept clogging

the sampling head. This made acquisition of sample somewhat time consuming. There is not much that can be done to make the situation any better.

Sample from SW corner of pond was discharged into container #2 in staging area. Sample was black and was possibly very fine silt. Petroleum odor associated with samples in 3513 was not present during pumping of 3524.

Team filled tank #2 near to capacity and repositioned boat to Northwest corner to start sampling second location. Excluding the clogging caused by the algae growth, sampling at location #2 went relatively smooth. Location #2 was discharged into the third holding tank.

5-14-9
TUESI

Sampling Information (POND 3524)

	LOCATION #1	AREA SAMPLED	SAMPLE DATE
SAMPLE #1	80'E, 30'N OF SW CORNER OF POND 3524	SAMPLED FROM AREA W/5' RADIUS OF LOCATION #1	5-13-96

COMMENTS
- WATER LEVEL ~3.5' DEEP. SAMPLE HAD VERY LIQUID CONSISTENCY.
- MAXIMUM RADIATION READING ~ 1MR/HR TAKEN ON BOAT.
- EXPERIENCED DIFFICULTIES DURING SAMPLING, CLOGGING CAUSED BY ALGAE/GROWTH. UNABLE TO DISTINGUISH SEDIMENT LEVEL DUE TO ALGAE
- ROCK OUTCROP AT THIS LOCATION

	LOCATION #2	AREA SAMPLED	SAMPLE DATE
SAMPLE #2	80'E, 30'S OF NW CORNER OF POND 3524	SAMPLED FROM AREA W/20' RADIUS OF LOCATION #2	5-13-96

COMMENTS
- WATER LEVEL ~3.5' DEEP. UNABLE TO DETERMINE SEDIMENT LEVEL DUE TO ALGAE/GROWTH IN POND. STRONG ODOR ASSOCIATED.

5-14-96
TUESDAY

Team Members: J. Allred, J. Wade, D. Roy, D. McKinney

Team Members performed daily instrument checks at BSG 7710

Team entered Exclusion area to begin dewatering of Samples 1 & 2. Team utilized reinforced tubing to dewater samples. New tubing will not collapse as in the past when Tygon tubing was used.

Samples were black in color and very watery. The samples out of 3524 did not appear to contain thick sludge as did samples from 3513. This is possibly due to the algae/growth contained in 3524. Team members mentioned that due to the abundance of the growth in the pond, each time sampling head was lowered to the bottom during pumping, the algae would clog the head and act as a filter to sediment material. At discharge end in staging area it appeared that we were pumping a very fine black silt material from pond. The level of sediment could not be determined due to the thickness of algae in pond. We will need to discuss this with Rob Coe after OP-TECH pulls their samples ~~to~~ and we have a better idea of what type of material we sampled.

Tanks 2 & 3 were dewatered to 40 gallon levels. Tank #3 was dewatered and never did feel that we had a significant amount of sediment material. We will resample at this location this afternoon to bring level back to 40 gallon mark.

Rob Coe was on site. Discussed weedeating of Pond 3524 to alleviate tripping hazards. Rob had made arrangements to get this taken care of by John Hardeys people this evening.

Talked with Talena concerning the material in the 3rd containers. We agreed that it would

be best to wait until OP-TECH had pulled their sample before we resampled location #2. Teleq would check consistency to determine if we had ample amount of sediment. 5.15 WEON

Location #2 will have to be resampled anyway at this point. We did not have 40 gallons of sediment material after dewatering. Team positioned boat over location in NW corner (#2) and pumped enough material to fill 275 gallon tank.

Bob Coe on site this afternoon. Discussed minor issues relative to work in & took snapshots of team working on Pond 3524.

Team exited exclusion zone and disposed to building 7110.

Team members relocated boat to middle section of pond to set-up for sampling 3rd location. SHOLB

5-15-96 WEDNESDAY

Team Members: D. Rose, J. Wade, J. Allred, D. McKinney

Team Members performed daily instrument checks at BLDG. 7710.

Heavy rains this morning prevented team members from performing tasks scheduled for ~~today~~ first part of the day. Rain eventually let-up and team dressed out and began deratching of task #2 for the second time. Team members concerned about liquidity of sample. We will continue to move forward to 3rd location knowing that we may have to backtrack to 2ND sample location in NW corner.

Used a different approach to sample location #3 in middle of pond. Sampling (suction) end of pump was used to "rake" algae away from sample location. Team would sample for awhile, then rake for awhile. This produced a sample that was thick with much less water content than the first two samples that were taken on Pond 3524. A much better sample was acquired with extra time and effort. Took most of the afternoon to pull sample.

Team secured job site and returned to BLDG 7710.

Sampling Information

SAMPLE #3	LOCATION #3	AREA SAMPLED	SAMPLE DATE
	160'E, 60'N OF SW CORNER OF POND 3524	SAMPLE FROM AREA W/5' RADIUS OF LOCATION	5-15-96

COMMENTS

WATER LEVEL ~ 4.0' DEEP. UNABLE TO DETERMINE SEDIMENT DEPTH DUE TO THICK ALGAE ATOP OF SEDIMENT. MAX. RAD READING TAKEN ON BOAT 3mR/HR

5-16-96
THURSDAY

Team Members: J. Wade, J. Allred, D. McInniney, D. Rose

5-1
FRI

Team members performed daily instrument checks at BLDG 7710.

Spoke with Telena Moore this morning. She indicated that they were ready to pull some samples if everything was ready. Told her that if we could go ahead and start dewatering of sample #3 we could have first 3 samples ready to sample. She agreed and Team members dressed out and began dewatering of third sample. Due to the thickness of sample #3, not much time was needed to dewater. Tank #2 contained approximately 40 gallons, Tank #3 contained approximately 50 gallons, Tank #4 contained approximately 80 gallons. Direct rad readings taken by Joel Miller, Sample #1 = 6mr/hr, Sample #2 = 3mr/hr, Sample #3 = 6mr/hr.

Team exited exclusion area to make room for OP-TECH personnel (Telena Moore & Raul Gonzalez. Joel Miller provided Radiation Protection coverage and D. Rose provided Safety and Health coverage for OP-TECH personnel.

Telena and Raul dressed out and entered exclusion area. Samples were pulled from Tanks 2, 3, 4. According to Telena, Sample #2 was sufficient after mixing process. Sample appeared much thicker than was expected, we will not have to resample at Location #2.

Team members spent the rest of the afternoon rounding up parts and fittings for second pump that will be used for transfer of sediment at staging area.

Returned to BLDG. 7710.

5-17-96 FRIDAY

Team Members: J. Wade, J. Allred, D. Rose (2)

Team members performed daily instrument checks at BLDG 7710.

Forecast for today is sunshine with a high near 90°. Due to forecast, team members prepared quickly this morning to try and accomplish our scheduled work before the heat gets unbearable.

Team entered exclusion area and set up gas pump with necessary fittings and hoses. Parts from boat were transferred to staging area to use instead of contaminating spares.

Kent DeBoos and Joel Miller were on-site this morning. Both were taking care of waste that has been generated by the J-Team. Vermiculite was added to red bags that had any water droplets visible. Bags were checked and deposited into B-25 boxes.

Team was ready to begin consolidation and transfer process. All samples from Pond 3524 will be transferred into Tank #2 for 3524 pond composite. Team began transfer of contents in Tank #3 (Sample #2) to Tank #2. This tank does not have a liner which had been removed previously because of tearing problem. No liner makes it much easier to do transfer. There is not a problem with liner being pulled into suction and transfer of Tank #3 to Tank #2 went relatively smooth with not much trouble.

Sediment level in composite tank was checked periodically to ensure 40 gallon sample from each location. Levels were checked using OP-TECH sediment ruler.

Sediment in Tank #4 (SAMPLE #3) measured ~82 gallons after dewatering before transfer. We transferred the 40 gallon sample to Tank #2 from the total 82

gallon sample. We have less trouble pulling lines into suction end if there is more volume to work with. Sediment in Tank #4 (sample #3) was the thickest of any that we have dealt with so far.

Transfer of 40 gallon sample went smoothly. Ran into some difficulty cleaning out Tank #4. The thickness of the sediment coupled with the lines pulling into suction end added problems to cleaning of Tank. Team decided to use different approach. Attached dewatering hose to hose attached to Ball Valve at bottom of Tank and tried to drain sediment out of tank. This worked for a short while until thickness of sediment restricted flow. Water from hose was sprayed at valve to thin sediment approaching drain valve. This allowed a better flow and eliminated other troubles.

Team flushed suction and discharge lines with pond water to remove residual sediments. Lines were then purged with air to remove remaining pond water.

Team returned to BLDG 7710.

5-20
MOND

5-24-96 Team Members: J. Allred, J. Wade, D. McKenney, D. Rose
MONDAY

Team Members performed daily instrument checks at BDG 7710.

Forecast for today is about the same as yesterday, Hot and Humid with a high temperature around 90°. Heat and heat stress problems will be a factor in today's activities.

Team members prepared quickly at BDG 7710 in order to get to job site early. Team arrived on site and donned PPE to begin work before the weather got too hot.

Team entered exclusion area to sample at new location. Pontoon boat was repositioned from middle of pond to Southeast portion of Pond 3524. This is the last location the boat will have to be positioned for sampling purposes.

Team positioned boat over sample location #4 in Southeast corner of pond. Samples continue to be difficult to acquire due to the large amount of algae on bottom and floating throughout the pond. Algae had to be raked away from sampling location continuously. Clogging of sampling head, also had to be raked free of algae.

Constant raking and start and stop of pumping operations make sampling operations difficult in the extreme temperatures. Tank was filled close to the top to make sure we had enough sediment.

Team exited Hazmoper area for cool down period and Gatorade to replenish fluids.

Ray Foley on site to check on progress.

Sampling Information:

SAMPLE #4

LOCATION #4	AREA SAMPLED	SAMPLE DATE
80' W, 30' N OF SE CORNER OF POND 3524	SAMPLED FROM AREA W/5' RADIUS OF LOCATION #4	5-24-96

COMMENTS

- WATER DEPTH ~4.5' SAMPLE HAD THICKER CONSISTENCY THAN MOST LOCATIONS. MOST LIKELY DUE TO THE RAKING AWAY OF ALGAE TO ACCESS BOTTOM.
- SEDIMENT DEPTH ~3.5'
- MAXIMUM RAD READING OBSERVED DURING SAMPLING OPERATIONS ~3 mR/hr.
- FILLED TANK NEAR TO TOP.

5-21-96
TUESDAY

Team Members: D. Rose, J. Allred, J. Wade, D. Rose

Team Members performed daily instrument checks at BLDG 7710.

Team prepared quickly again this morning to get on site and perform work before temperatures get too hot.

Personnel boarded boat and moved to North East corner of pond for sampling of last location.

Team member videotaped sampling process from boarding boat to exit of boat. Should be ample footage to show process at a later date if there is a need.

This location is typical of the rest of Pond 3524. The algae growth is a major obstacle when trying to pump a sample. Algae is "stratified" in layers down to the sediment layer.

Algae was raked away prior to pumping at this location. Raking process was continued throughout sampling of sediment as algae was pulled towards suction head while pump was on.

Team pulled approximately 120 gallons of sediment/water from location #5. This should be adequate volume of sample after dewatering.

Bob Coe on site checking on progress and needs of S-Team. Bob requested estimate of time needed for wrap-up and demobilization of job. Bob stated that Chris Taylor wanted the estimate for cost estimates. Team members will be consulted to gather a consensus.

Bob also requested some assistance with

a dye test on Pond 3513. Entered Exclusion area at South end of pond. Rob had calibrated liquid dye in gallon containers. Dye was poured at approximately 6-8 locations at South bank into pond. Dye was mixed to create a band from SW to SE corner of pond. An old rake was used to mix dye back and forth. Finished out and exited area. Rob started in area to monitor creek for signs of leakage.

Team secured job site and returned to BLDG 7710.

5-22-
WEDNESD

Sampling Information:

SAMPLE #5	LOCATION #5 80'W, 30'S OF NE CORNER OF POND 3524	AREA SAMPLED ~4'x10' SECTION	SAMPLE DATE 5-21-96

COMMENTS
- SEDIMENT DEPTH ~ 2' DEEP
- WATER DEPTH ~ 4' DEEP
- MAXIMUM RAD READING OBSERVED DURING SAMPLING OPERATIONS ~ 5MR/HR.
- PUMP ~ 120 GALLONS OF MATERIAL (WATER/SEDIMENT)

5-22-96 WEDNESDAY

Team Members: J. Wade, D. Rose, D. McKinney,

Team performed daily instrument checks at BLDG 7710.

Team made preparations early this morning to take advantage of cooler weather.

Nathan Wright was on-site this morning. He came by to inquire about our plans for today. OP-TECH was ready to pull samples #4 & #5. I informed him that we were going in to dewater samples first thing. Dewatering should only take approximately 30 minutes. Phoned Joel Miller to inform him of OP-TECH's plans. Joel said he was tied up at the moment and could be here in an hour. This will give team enough time to dewater and be out of OP-TECH's way.

Team dressed out and began dewatering operations of samples 4 & 5 from 3524. While dewatering was performed Joel Miller took rad readings on Tanks #2, 3, & 4. Tank #2 is composite of locations 1, 2, & 3. The tank was reading 10 mr/hr. Tank #3 containing sample #4 was reading 10 mr/hr also. Tank #4 containing sample #5 was reading 12 mr/hr. Dewatering process was completed.

OP-TECH personnel arrived to make preparations for sampling. Joel Miller had not yet arrived to provide HP coverage. Telena Moore radioed Joel to inquire about estimated time of arrival. Joel stated he would be at site shortly.

Joel arrived and OP-TECH personnel entered yard and began sampling/mixing operations. Tanks were mixed for 20 minutes before sampling. D. Rose provided SSHO coverage for OP-TECH personnel.

Temperatures near 90° this afternoon made work this afternoon difficult. Symptoms of heat stress evident among team members.

Team members exited Exclusion area after securing site.

Departed Impoundment and returned to BSG 7710.

5-23-
Times

5-23-96 Team Members: J. Wade, D. McKinney, D. Rose
THURSDAY

Team performed daily instrument checks at BLDG 7710.

Arrived at Impoundments and discussed the days activities. Tanks 3 & 4 needed to be transferred to Composite in #2. We also decided to begin demobilization air and discharge lines will need to be transferred from 3524 to 3513 for decon. To keep from going through dress-out routine twice team began with decon of hoses at 3524.

Hoses were disconnected at pump on boat pad moved connections to bank of 3524. Pump was unbolted from platform on back of boat. Suction and discharge ends of pump were contained with rubber gloves over openings secured by tape. Pump was removed from boat and placed on bank. Hoses were then sprayed with 409 cleaner and wiped down as they were pulled out of pond. PVC floaters were disconnected from hoses as well. Floaters were stacked at silt fence inside area of 3524. These will also have to be cleaned as time allows.

Algae once again makes job difficult. As hoses were being pulled to bank, clumps of algae floating on surface would entangle itself on hoses and floats algae had to be sprayed off before team handled the hoses.

Cleaned hoses were transferred near staging area at 3513 inside exclusion zone. Cleaning and transfer took most of the morning. Team members wanted to continue on with transfer of sediments rather than break for lunch. Temperatures in the afternoon with PPE on, make conditions

difficult to work in.

Team moved to Staging area at 3513 to begin transfer of sediments. Team Transferred contents of Tank #3 (without liner) into composite sample container #2. Transfer was relatively easy since there is no liner to contend with. Tank # (sample location #5) had approximately 80 gallons of sample. Excess volume made transfer go smoother because suction end did not get hold of the drum liner as often.

Team moved down both Tanks to remove residual sediment. Tank #4 was drained/moved out of line valve on bottom to keep from tearing liner.

Site was secured and locked down before team returned to BOG 7710.

5-29-96
WEDNESDAY

Team members: D. Rose, D. McKinney

Team members performed daily instrument checks at BLDG 7710.

Team arrived on site. A message to "CAL ROB COE" was posted on door of mobile lab. Spoke with Rob. He said he would come to impoundments with something to discuss.

Rob arrived and we discussed a possibility of some work on the tail end of our present operation. Rob mentioned some money available to transfer contents of smaller ponds 3539 and 3540 to pond 3513. I stated that without talking to R.D. Foley (MAD GROUP LEADER) I couldn't see any reason why our group would turn away any work. Rob and I went on to discuss possible equipment needs and techniques to perform the job. Told Rob I would talk it over with R. Foley and get back with him.

Team dressed out and entered Exclusion Area. Bad weather/storms over the holiday week-end had moved the boat out onto pond a few feet. This caused the gang plank to pull away from bank into the edge of the pond. Team pulled boat back in and retrieved the plank. Gang plank had mud and algae attached. Plank was sprayed off with garden hose to knock off the mud & algae. Boat was pulled closer to bank and re-secured.

MAD GROUP members P. ASSTON and D. RICE had picked up group high pressure washer from garage. Team decided this would work better for de-con of boat versus using the Fire Dept. Tanker Truck. Hose will need to be sleeved to prevent contamination of equipment. Washer will be

5:30
THU

trailered to area where boat will be lifted out of water for spray down & decon. Experienced some difficulty with burner on washer. Washer will spray cold water but burner doesn't seem to be working.

Returned to impoundment after working on washer. OP-TECH personnel were performing sampling activities from Pond 3524 composite sample. Joel Miller on site providing HP coverage.

A group of people showed up on site on what appeared to be a tour. Charlie Valentine (Environmental Compliance Division) and several other people (State officials) were on hand. Questions were asked concerning our operation. Explained what we were working on (Treatability Studies) and group continued on with tour.

Team secured site and returned to BCOC 7710.

0-96
UESDAY

Team members: D. Rose, J. McKinney

Team members performed daily instrument checks at BLDG 7710.

Team dressed out and entered Exclusion area to begin decon operations of equipment. Relocated boat to west end of 3524 to make it accessible for riggers to perform lift. Team will decon boat in NW corner of 3524 grass area.

Began decon of Tank #4 which will not be needed for the remainder of this project. Hose was attached to tubing at ball valve of tank. There was a small amount of sediment remaining in Tank after lines was cut away at valve drain. Tank was flushed with water from garden hose to remove sediment. Valve was left open while water drained back into the pond.

Filled 55 gallon drum with water to use for rinsing/flushing of suction and discharge hoses. One 50' section of hose was flushed with water. During operation it was discovered that hose had a pin hole sized leak. Hose was put to the side to go for disposal in rad waste. Joel Miller was on-site observing and assisting in operations.

Telena Moore came by with a request for some equipment to perform gravity test on sediment. She needed some sort of set-up that would accomodate 5 gallon bucket of sediment and a catch basin to drain sediment into. Team discussed several different options and equipment that could possibly be used. We will

get something fixed up for her.
Paul Alston was by looking for photos of sediment sampling for a training class. He took film in camera to Photography for processing. Paul will return with photos tomorrow.
Team secured site and returned to BIDC 770.

5-31-
FRI

5-31-96
FRIDAY

Team Members: D. Box

Performed daily instrument checks at BLDG 7710.

arrived on site this morning and began catch up of logbook entries. Team members were in training and on vacation today. Took advantage of this time to update paperwork.

Paul Alston arrived on site with photos of sampling operations. Discussed activities in photos and other possible locations of sediment sampling photos for training class. Paul took of few photos to use for R.E. Swaya's class.

Joel Milles arrived on site. Inquired about work activities for the day. Informed him of manpower shortage today and that I would be catching up on a few things for most of the day.

Rob Cox showed up a while later. Rob and I discussed the possible work at the small ponds (3539 & 3540). Told him I had not been able to get in touch with R.D. Foley yet. Foley is on vacation this afternoon and it will be Monday before I can talk with him. I left a note on Roy's desk and told him to contact me first thing Monday morning about doing the work.

Returned to BLDG 7710.

6-3-96
MONDAY

Team Members: D Rose, J. Wade, J Allred, D. McKinney

Team performed daily instrument checks at BLDG 7/10.

R. D. Foley received message from Friday and passed first thing this morning. I explained briefly about the work on the small ponds and Rob Coe's request for the MAD group to perform the job. Set up meeting with R. Foley Rob Coe and myself for 2:00 PM this afternoon to discuss the job.

Team was ready to make composite of Pond 3513 and 3524. Instructions from Telena Moore was to transfer 60% of 3513 composite and 40% of 3524 composite into one tank for final sample. Before team started the transfer operation I double checked with Telena to make sure she had all samples required. She verified that she had what she needed.

Telena requested that composite from 3513 be dewatered with only approximately 3-4" of water left to aid mixing process. Team performed this operation before transfer. Composite from 3513 had not been accessed for several weeks and sediment had completely settled. Dewatering took total volume down to approximately 150 gallons with ~4 inches of water left as requested.

Composite samples were mixed twenty minutes before transfer. Telena also requested MAD Team to draw one more sample from 3513 composite before transfer. One liter container supplied by OP-TECH was filled as requested.

Joel Miller on site providing HP coverage.

Rob Coe, Ray Foley and Mike Murray arrived on site to discuss ponds 3539

and 3540. Rob gave an overview of what Environmental Restoration's needs were. Schedules and timeframes were discussed. Rob stated that he had given an estimated start date at a meeting with DOE, State of Tennessee, EPA and other officials of July 15.

R.D. Foley told Rob that he would let him know by ~~Thursday~~ Wednesday if we could commit personnel for the job.

Mike Murray asked if Coe had checked with Chris Scott (Waste Operations) concerning plans for 3539 & 3540. Coe said he hadn't but would speak with him when he had a chance.

Team members continued flushing hose lines and pumps.

Team secured site and returned to OSG 7710.

6 96
TUESDAY

Team Members: J. Wade, J. Allred, D. McKinney
D. Rose

Team performed daily instrument checks at BLDG 7710.

Team began emptying of leftover sediments out of Tanks 1 & 2 which held composite samples. Liners were filled with pond water to flush out sediment. Garden hose could not supply enough volume to drain sediment. Pump using pond water supplied ample volume to drain sediment back into pond through ball valve hose.

Liners were then cut away from ball valve connection and removed. Liners were deposited into rad waste after adding vermiculite to inside. Tanks were moved near pond in the staging area and rinsed out with garden hose.

Air hoses were wiped down with 409 cleaner and put into plastic bags. Remaining discharge hoses were flushed with soapy water and rolled up for removal. Another hose was discovered to have a pin-hole leak. Hose was marked and put to the side for disposal.

Fifty-five gallon drums were set-up to perform Gravity Settling test by OP-TECH personnel. Contaminated liners were carefully removed from drums. Vermiculite was added to absorb moisture leftover from sediment sampling. Clean liners were put into drums for testing purposes.

Vermiculite material used for sleeving was stripped from sections of air & discharge hoses and disposed in rad waste. General clean-up of equipment and staging area was performed.

I spoke with Velena Moore and Joel Muller concerning Gravity Testing of

Pond composite for 3513 & 3524. Telna requested to begin operations first thing in the morning. Joel will be available to provide HP coverage and we will be on site to provide Site Health & Safety oversight.

Team came to a good stopping point and secured the area. Returned to Bldg 7710.

6 5-96
WEDNESDAY

Team Members: N. Rose, J. Wade, V. Patania, J. Allred
D. McInney

Team performed Daily Instrument checks at BLDG 7710.

Phoned Paul Alston this morning and asked if he could transport pressure washer to West side of 3524. Paul said he would bring washer over as soon as he could.

OP-TECH were inside area withdrawing more sediment to continue gravity settling test. Sample was mixed prior to collection for 30 minutes. SSHO coverage was provided.

Joel Miller on site this morning. Joel took rad reading on Tank with composite sample from both ponds. Sample read 15 mr/hr after sediment had been mixed thoroughly.

Paul Alston arrived with Dennis Rice and hot water washer was backed into rad area at NW corner of 3524. Tires of vehicle were frisked before driving onto roadway. Checked out clean.

Team members dressed out and entered area at 3524. All material and equipment were removed from boat in preparation of decon with pressure washer. Several bags of equipment and rad waste were transferred to Contamination Reduction Zone after exiting the boat. All equipment was deconned before transfer.

Steve Rose (RIGGER FOREMAN) phoned to let us know that boat lift was scheduled for Thursday evening. He also wanted the water washer moved from its present location. Steve stated that he wanted to perform lift exactly like the last time. I agreed to move the washer to another location and to move

the boat trailer in its place.

Kent DeBoo on site this morning working with Joel on disposal of rad waste that had been generated. Waste is being generated at a quicker rate due to decon and demobilization.

Spoke with Dennis and Paul again about Steve Rose's request. They came back over with dually to move pressure washer. Washer was moved to West side of 3524 leaving enough room for crane to set up under wrapped portion of overhead power lines. Boat trailer was backed into place where washer had been in NW corner.

Team members dressed out and performed topside washdown of pontoon boat. Pressure washer was used to clean accessible surfaces while boat was still in the water. Accessible surfaces were scrubbed with cleaner and rinsed clean.

Team departed and returned to BOG 7710.

6 .96
THURSDAY

Team Members: D. Rose, J. Wade, J. Allred, V. Patania
D. McKinney

Team members performed daily instrument checks at BLDG 7710.

Arrived on site this morning. Riggers were dropping off B-25 box as we prepared for workday.

OP. TECH personnel ready this morning to continue drawing sediment for gravity settling test. Sediment mixed for 30 minutes prior to withdrawal. Samples were drawn and poured into five gallon bucket with filter. 5 gallon bucket is contained in 55 gallon drum with liner. SSHO coverage was provided for their operation.

Other team members continued with decon of equipment located in 3524 Exclusion Area. Buoys used to float air and discharge lines were deconned. Equipment used during sampling operations was deconned also. Deconned supplies and equipment are being staged in Contamination Reduction Zone. Plastic sheeting has been laid on the ground to prevent any possible contamination from ground surfaces.

Began preparation for boat lift and decon to be performed this evening. Brushes were attached to extension poles to be able to scrub surfaces without getting under boat while crane has boat lifted. All necessary equipment to perform the job was gathered up and transported to west end of 3524.

Asked permission of Waste Operations personnel to use water hose on West side of their building to refill water tank on Washer. Team hose was used and kept in contamination area

to extend their hose far enough to reach water tank.

Discussed lift operation with Joel Miller to make sure there would be no confusion when Riggers arrived. Joel had an idea to use wood blocks perpendicular to runners on trailer to keep all pontoon surfaces accessible for smearing. Wood was acquired for this purpose.

Riggers arrived, Team dressed out and entered area. J. Wade attached cables for riggers so they wouldn't have to dress out and board boat. Boat was lifted and held in place by riggers. Boat was sprayed with wide angle nozzle to knock the bulk of algae and other material. Boat was sprayed with cleaner and brushed with scrub brushes. Plastic sheeting had been removed and placed into red bag.

Team exited zone to replenish fluids and get a break from the heat. In the meantime, boat was drying so Joel could take gross smear of the pontoons. Joel went back to smear a while later. Gross smear was checked and Joel gave approval to load boat onto trailer. Joel began taking smears on boat surfaces.

Team cleaned all equipment and supplies from exclusion area. Equipment was bagged and transported to Contamination Reduction Zone at Staging Area. Joel completed smears on all surfaces. Total number of smears was 60.

Team departed impoundment and returned to BIDG 7110.

6-7-96
FRIDAY

Team Members: J. Wade, D. McKinney, J. Allred, D. Rose

Team performed daily instrument checks at BCDG 7710.

OP-TECH ready to begin sampling again this morning. Discussed with Telena Moore & Nathan Wright yesterday our need to get equipment and Tanks out of Exclusion Area. They stated that their operation, after 30 minute max, should take an additional 30 minutes and we could begin our decon work. I told them yesterday that we may have to come in while they are sampling to continue with our tasks. This is not the ideal route to take with sampling and decon operations occurring at the same time. Hopefully we will be able to perform both operations without interfering with one another.

Joel Miller was on site this morning. Joel stated that the smears that were taken looked good enough that we could transport boat to DOSAR Facility. He wanted Team to remove wood platform from boat and dispose of wood first. Team complied with this request. Team also removed wooden pieces that boat was resting on to allow pontoons to fit securely in trailer rails. Boat is ready for transfer to DOSAR. Will get P. Alston to move boat and pressure washer on Monday.

Continued packing, cleaning and staging of supplies and equipment. We took care of items that needed to be done outside of the Exclusion Area to stay out of OP-TECH operations.

Team departed to BCDG 7710.

6-10-96 Team Members: J. Wade, D. McKinney, J. Allred & D. Rose
MONDAY

Team performed daily instrument checks at BLDG 7710

OP-TEK personnel (Telena Moore & Paul Longley) ready to continue with ongoing gravity settling test this morning. Telena said their work would only take about thirty minutes.

Team members entered Staging area after OP-TEK personnel had exited zone. Team began decon of 275 gallon tanks. Joel Miller had requested the removal of the pallet attached to bottom of tanks so he could smear surfaces. Team removed pallets of three tanks. Tanks were deconned with cleaner and scrub brushes and rinsed with garden hose. Joel had also requested ball valve assemblies be removed from tanks. Ball valves were removed and deconned as good as possible.

Telena mentioned that they were through with one of the 55 gallon drums that had been used for gravity testing of sediment. We will try to get to decon and removal of this tank tomorrow.

Phoned Paul Alston to request some help to move pressure washer and pontoon boat out of rad area at 3529. Paul stated that he had whole body count this morning and would be down to assist after lunch.

Phoned Joel to inform him of our plans. Joel gave his permission to let us decon tires on trailers to be sure we did not spread any contamination onto roadway. Tires on washer trailer and boat trailer flushed out clean. Paul Alston assisted in transport of trailers to DOSAR area. Discussed with Joel Miller

6-11
TUES

our plans to perform proper scan of boat and pressure washer. Joel wants to scan both in low background area ~~of~~ at DOSAR with our assistance. We will have to schedule this at a later date.

Washer and boat were parked in gravel parking area at DOSAR facility.

Team continued demobilization operations.

Returned to BDG 770 after sechring site.

11-96 Team Members: D. Roe, J. Wade, J. Allred, D. McKinney
TUESDAY

Team performed daily instrument checks at BLDG 7710.

Phoned Joel Miller first thing this morning. Informed Joel that a majority of our equipment has been disassembled and deconned and is ready for Radiation Protection smear and survey. Joel stated that he has been tied up on priority filter changes in the tank farm area. He stated that he would get to us as soon as he could.

Team dressed out and entered Staging Area. Tanks that had deconned yesterday were moved to Contamination Reduction Zone. Plastic sheeting was laid down in CRZ to put deconned equipment on. Pallets were moved as well as suction tubing and various other equipment. One pump was moved to CRZ after removing extensions and fittings.

Pumps and other equipment that would fit in rad bags were taped and bagged, then transferred to Contamination Reduction Zone.

Phoned Rob Coe to discuss potential work at Ponds 3539 & 3540. Rob stated that the possibility of paperwork and approvals being granted looked good at this point. He further stated that he received an E-mail from Greg Rowland (OPNL HAZARDOUS PROGRAM COORDINATOR) saying that he did not see a problem with granting a variance request to do work at 3539 & 3540. I told Rob that I would call Paul Abston and we could get variance paperwork started. In the meantime we need to start acquiring equipment needed to perform the job.

Discussed possible methods to perform work with team members. Measured ponds to determine the length of some type of walkboard equipment needed to access pond area. Ponds measured approximately 40' (N TO S) and 75' (E TO W).

Paul Alston arrived with Variance Request and we discussed and filled out paperwork. Paul will get secretary to type it up so he can submit it to appropriate entities.

Secured site and returned to BLDG T110.

WEDNE
6-12-

WEDNESDAY
6-12-96

Team Members: D. Rose, J. Wade, J. Allred, D. McKinney

Team performed daily instrument checks at BLDG 7710.

Team arrived at Impoundments this morning. Rain showers prevented outdoor work from being performed.

Joel Milby phoned to let us know about some pumps that might be available for use at Ponds 3539 & 3540. Lynn Cox has 2 pumps that have been in use on another job site.

Mentioned this possibility to Rob Coe. Rob is aware of these pumps. He doesn't seem to think they are suitable for what we will be doing. Rob believes these pumps will give us a clogging problem similar to what we experienced on 3513 & 3540.

Looked over and discussed literature on pumps that Rob had brought to us. These pumps have a chopper/mulcher for debris that is pulled into pumps. The pumps look like what we need if we can find one to best fit the job.

Paul Alston brought Field Change Form/Variance Request for work on Ponds 3539 & 3540. Greg Rowland has already signed off on changes and Rob Coe and myself signed off after review of the form. We need one more signature from Jo Ellen Francis (Radiation Protection) to complete the approvals.

Rain and lightening throughout the afternoon prevented outdoor work of any kind.

Team returned to BLDG 7710.

6-13-96
THURSDAY

Team Members: D. Rose, J. Wade, D. McKinney

Team performed daily instrument checks at BLDG. 7110.

arrived at Impoundments and began wiping down tanks and equipment. Rain and dew have left quite a bit of moisture on everything. To assist and expedite the removal of items out of the area, we dried everything so Joel could take samples when he arrived.

Joel arrives on site and OK'd removal of a few items that he had sampled yesterday. Loaded these items onto van for delivery to Bldg 7110 for further surveying in lower background area.

D. McKinney entered Exclusion area to decon 55 gallon drum and 5 gallon bucket used for Of-Tech gravity testing. Screen and filter were removed from 5 gallon bucket and disposed of in rad waste container. Bucket was washed out and set aside for later use. 55 gallon drum liner was removed and disposed of. Drum was washed down and transferred to CRZ.

Rob Coe requested our assistance with a dye test at Pond 3524. Dye was mixed and poured into Pond at numerous locations on the South bank of pond. Dye was then mixed to form a complete line all the way across the south bank of pond. Team assisted in observation of potential seep locations inside the HAZWOPER area.

Telena Moore mentioned a need to enter area to decon a carboy used in their operations. Told her we would provide her with SSHO coverage as assistance with her request.

Joel Miller returned to site after taking care of other responsibilities elsewhere. He continued

smearing equipment to assist in the removal of the numerous items to a lower background area for proper frisking.

Rain and lightning delayed outdoor work for a portion of the day.

Team Returned to Bldg 7710.

6 1-96
FRIDAY

Team Members: D. Bose, D. McKinney

Team performed daily instrument checks at BLDG 771C.

Joel Miller was on site this morning with some results from smearing equipment. A couple of smears from the tanks came back slightly over guidelines. Tanks and pallets will be scrubbed down again. Joel also mentioned removing another piece out of the valve assembly on the tanks. I told him that we would remove the valves and clean tanks again before he smears again.

Bob Coe on-site this morning. He requested that we do some investigation at Ponds 3539 and 3540. To best determine the type of pump that we might need, we thought it might be helpful to check the sediment at the bottom of the ponds. Joel Miller assisted with Radiation Protection. I used the 12' pole with hoe attachment to scour the bottom and pull it to the top to examine the type of material we will need to remove/transfer before sampling. There was lots of debris; leaves, sticks, etc on top of the actual sediment layer. It appears that a chopping action would be needed before the ponds could be pumped out, otherwise any type of pump that is used would definitely get clogged up during operation.

Pond does appear to have a layer of sediment approximately 2-4 inches thick. Hoe was used to dig out sediment down to clay cap at the bottom of pond.

Bob had mentioned that we could possibly use old pumps on western end of pond to position the pump, then force sediment and debris

to the sump and transfer material from the one location. Poked around sump areas in both ponds with hoe. Sumps were clogged with leaves and debris. Pulled material back and bubbles appeared at water's surface. It seemed to have partially unclogged the sumps.

Investigation gives us a better idea of the material we will be dealing with when all approvals come down.

Discussion continued concerning the best way to go about performing the job. Told Bob I would continue gathering information on pumps and ~~would~~ would have a better idea in a few days.

Team returned to BDC 7710.

6-1-96
MONDAY

Team Members: D. Rose, J. Wade, J. Allred, D. McKinney

Team performed daily instrument checks at BLDG 7710.

Arrived on site and entered Exclusion Area. Team began removing remaining parts of ball valve mechanism on tanks as Joel Miller had requested. Parts were decomned and set aside for smearing. Tanks were given another once over with 409 cleaner and brushes.

Telena Moore arrived and inquired about dewatering of remaining composite sample. Informed Telena that we had not dewatered yet. She indicated that they would like to draw their samples tomorrow if possible. I told her we would take care of the dewatering today so they could sample tomorrow.

Team entered Exclusion area and pulled all water off the top of tank except for a couple of inches as Telena had requested.

OP-TECH personnel entered Exclusion Area and began acquisition of sample from gravity settling test drum. OP-TECH also deposited excess sediment from testing back into 3513.

Joel Miller continued smearing equipment that is no longer being used in Exclusion area.

Robert Charles on site today discussing waste related issues with Joel Miller.

Kent DeRoos on site, as well, filling out waste disposal paperwork.

Team continued with demobilization.

Returned to BLDG 7710.

6-18-96
TUESDAY

Team Members: J. Wade, D. Rose, D. McKinney

Team performed daily instrument checks at BLDG. 7710

Telena Moore and Nathan Wright arrived on site this morning ready to begin sampling activities from tank with 3513 & 3524 composite. Telena & Nathan were trying to get an early start to keep from working in TYVEK in the hot part of the day. Working in TYVEK, even in the morning, is a very difficult task due to the very high temperatures. Telena & Nathan were working in the exclusion area all morning.

Joel Miller was on site this morning taking care of smearing tools and equipment. Joel has taken over one hundred smears to this point on boat and equipment.

Transferred R/C floaters to support zone to get them out of the way in the contamination Reduction zone. We might be able to use these papers in some fashion on 3539 & 3540.

Joel returned with data from smears. Data shows that the inside bottom of one of the tanks and the lid threads are above guidelines. We will have to do more decon work on these items. One of the hoses also was barely above guidelines. Team will resume decon work tomorrow in cooler morning weather.

A majority of the equipment that Joel had smeared came back O.K. for transport according to smear data. Loaded up a couple of trucks with equipment and moved to low background area at DOSAR (7710) facility for further investigation by Radiation Protection.

R.E. Rodriguez was on site this afternoon

looking for volunteers to accompany him to verification job in New Jersey. Since work is winding down, Duane McKenney volunteered to assist Rick next week.

Team secured site and returned to building 1710. Joel Miller met us there and we began survey of pontoon boat. Completed top surface of floor and upper surfaces of pontoon boat. Only one spot above guidelines was found in carpet at back deck portion of boat. (950 cm) a spot of carpet ~ 3"x3" was removed from back deck. Joel Miller took piece of carpet for disposal. Will continue with survey the next time Joel is able to take time from his regular schedule.

Team departed for the evening.

6-19-
WEDNE

6-19-96 WEDNESDAY

Team Members: J. Wade, D. Rose, D. McKinney

Team performed daily instrument checks at BLDG 7710.

Team entered exclusion area and continued with decon of 275 gallon tank and lid that smeared over guidelines. Tank and lid were scrubbed again to try and remove contamination. Tanks were rinsed with garden hose and drained at Pond 3513.

Joel Miller had recommended a more thorough cleaning of ball valve assembly. Valves were taken apart as far as possible and deposited in cleaning solution contained in a five gallon bucket. Parts were soaked in solution and then scrubbed to try and remove contamination. Tanks and ball valves will be checked again by Radiation Protection. Joel did smear again today.

Team continued with equipment and supply removal from job site. The numerous air lines and pump hoses that have been used were neatly wrapped up in red bags and set at egress area for tagging by Joel Miller. Joel had previously performed smearing of air lines and smears had come back O.K. for transport. Loaded air lines and moved to supply storage area at DOSAR facility.

Continued with clean-up of site in general

Returned to 7710 to situate equipment and supplies that had been transferred from work area to DOSAR Facility. Equipment that had smeared out O.K. for transport was put in a temporary storage area (covered) for further scanning by Radiation Protection with our assistance. Large items were hard to find

a storage location for. The clutter of old equipment made storage a problem. Team began moving old equipment around to allow for suitable storage.

Team departed for the evening.

6-2
Thu

·20·96 Team Members: D. Fox, J. Allred, J. Wade
Thursday

Team Members performed daily instrument checks at BLDG 7710

Spoke with Joel Miller this morning concerning what equipment we can transport. Joel indicated that he was tied up on other jobs and could not make it to impoundments this morning. He said he would try to come by after lunch.

J. Allred and J. Wade returned to BLDG 7710 to reorganize old equipment and make room for tanks, hoses, etc. I continued catching up on logbook and other items at the job site.

Joel returned with air gas data on valves. Some valves came back elevated above guidelines. More cleaning was performed and sweeps were taken again. If valves do not pass guidelines after this final cleaning, we will affix red tags and find proper storage place at 7710.

Received a call from Judy White, Section Purchasing Officer, stating that she had received a call from Amy Smith, in EE purchasing concerning an order for Gatorade. I in turn called Amy to see what the concerns were. It seems that there were questions regarding the amounts ordered and the cost. I explained to and Chris Taylor that we had been given a case of Gatorade by Sym Cox which needed to be repaid and that twice already our own people had to purchase drink mix on Division credit card. The necessity of the order is obvious for team members in the field working in extreme temperatures in required PPE. Chris Taylor approved the order.

Chris Taylor requested some technical

6-21-9
FRIDAY

information during our phone conversation. He needed to know rad readings at the 275 gallon tank at 3 meters. I informed Chris that we had taken readings at contact but had not taken any at 3 meters. Told Chris I would get with Joel Miller and take some measurements and pass them to him.

Contacted Joel late this afternoon. Joel was preparing to leave for the day but said he would meet me at job site shortly. Joel arrived and we checked rad levels at different intervals (distances).

Departed job site and returned to 7710. Phoned Chris Taylor and left message for him concerning our measurements. Readings at 3 meters was <0.5 mR/HR, reported to Chris Taylor

15 mR/HR @ contact of Tank
5 mR/HR @ 1'
1 mR/HR @ 5'
<0.5 @ 10'

1-96
24

Team Members: D. Rose (Vanatrow), J. Wade, D. McKinney

Team members continued efforts to remove equipment and supplies from impoundments. Team transported cleared items to BDG-7710 for storage.

1 4-96 MONDAY

Team Members: D. Day (VACATION), J. Wade.

Daily instrument checks were performed at Bldg. 7710.

Team members continued with decontamination and demobilization of supplies & equipment.

6-25 TUESDA

6-25-96
TUESDAY

Team Members: D Roe,

Daily Instrument checks were performed at BLDG. 7710.

Received a memo this morning concerning issuing of new badges. A Division representative will be at ORNL today with badges for pick up. Ran by 1062 to sign off on pick-up list and receive badge.

Spoke with R.D Foley (Crane worker) concerning our present work and future possibilities of jobs. Told him that after speaking with Chris Taylor the other day I wasn't sure if work at 3539 & 3540 would begin as quickly as expected.

Checked with Paul Alston about supplies that had been ordered for OP-TECH personnel. Part of the order had arrived at 1062. Loaded van with supplies (gloves, shoe covers) and delivered them to Talena Moore at the trailer.

Spoke with Joel Miller about remaining equipment needing to be removed from work area. Joel said he would try and get by to discuss the equipment, some steel contamination, and what our options are.

Jeff Hill, Lockheed Martin Health & Safety (ATLC), showed up on site with some questions. Jeff stated that a "pipefitter" had raised some questions concerning our water hose which was hooked up at BLDG 3578. Jeff mentioned that the "pipefitter" was concerned that we did not have a backflow preventor in our line. Since our hose is only used for rinsing and not hooked up to any equipment there is no need for a backflow preventor. Jeff stated that if the

Rose had been hooked up to a piece of equipment and conditions were right it was conceivable that a possible event could take place that would contaminate the water through backflow. This is not the case in our situation. He agreed and departed.

Telena mentioned a meeting with Chris Taylor that might take place Monday or Tuesday. She thought it would be a good idea if a team member were in attendance to answer potential questions. Told her I would not be here the whole week because of the Holiday, and I'm not sure if anyone from our team would be available to attend.

Telena also mentioned the need for information about volumes in tanks at various stages of sampling and compositing. I told her I would have to go through logbook and try and find what she needed.

Returned to 608 710 to make phone calls. Rob had wanted me to check on pumps for work on Ponds 3539 & 3540. Spoke with Sales Rep of CRISAFULLI Pump Co. about their chopper pumps (scum). He indicated they no longer manufacture these pumps. Jeff Morrell tried to assist me in something else that might be suitable, after some discussion we decided that the available equipment was more than what we might need to do this job.

Called Max McAdams at Tonkawa Pump Co. He was out, left message to call me.

6-2 WED

6-26-96
WEDNESDAY

Team Members: D. Rose, J. Wade

Performed daily instrument checks at BLDG 7710.

Received a phone call this morning from Scott Matthews (Radiation Protection). Scott stated that he was standing-in for Joel Miller this morning. He needed to get in OP-TECH trailer to do survey and checks. Scott could not get in trailer because it was locked. Told him I did not know what time he could gain access. Scott said he would try to stop by after he finished another scheduled job.

Took some time to try and catch up on logbook and mail that had been building up.

Told Telena Moore that I was going to take the afternoon and try to catch up on a few things back at the office. I asked her if she would be needing our assistance this afternoon. She stated that she didn't think so. I told her to page me if she needed anything.

Went to BLDG 1062 and spoke with Paul Alston concerning supplies that were needed by OP-TECH personnel. Supplies had not arrived as we had expected. Will check back tomorrow.

Returned to BLDG 7710 to make phone calls about pumps and take care of other business matters.

6-27-96
THURSDAY

Team Members: K. Ross, J. Wade

Performed daily instrument checks at BDG 7710.

Went to BDG 1062 this morning to drop off timesheets since there was nobody available to do this. Picked up supplies that had arrived for OP-TECH personnel.

Dropped off supplies to OP-TECH trailer.

Phoned Joel Miller to check on smear data associated with equipment that is left in Contamination Reduction Zone. Joel said he could come by and go over smear data and what equipment we could transport to 7710.

Glen Cofer, Peggy Tines and Bill Winton stopped by to see if anyone wanted to work this weekend at VP12. I told Glen I would have to let him know later.

Paul Longley had also stopped by in between tests that he was working in OP-TECH trailer. Discussed scheduling work activities.

Mac McAdams from Tentarra Pumps returned my call from yesterday. We talked about pumps that they carried that might work at Ponds 3539 & 3540. Mac mentioned that they had a trash pump that would pass 3" solids might serve our needs. The trash pump had easy access to unclog/remove any debris that might not pass through the pump. I requested that he send any information on pumps that handle large solids. He said he would FAX over some information.

Joel Miller and Kent DeRoos arrived to take care of rad waste. Joel went over items that we can transport. At this time, we only have the final tank and associated ball

valves that can be moved. Joel still needs to
rack tag suction & discharge hoses left in
contamination reduction zones.
Returned to BIDG 7910.

6-28-90
FRIDAY

Team Members: J. Allred, J. Wade, D. Rice

Team members performed daily instrument checks at BLDG. 7710.

Team prepared for OP-TECH sampling operations to be performed this morning. Telena Moore requested our assistance in recording sampling times and cleaning of sample jars as they were taken out of Exclusion Area. Site Safety and Health coverage was performed by Team members as well. Joel Miller was covering other jobs and could not be on site until later.

Joel Miller requested more rad bags to dispose of waste. Apparently the roll of bags that had been purchased for the job were defective. The bags kept falling apart after placing items into them. The potential for spread of contamination and disposal problems is present. Returned rad bags to stores and got replacement.

OP-TECH began sampling operations of composite sample from both ponds. Samples were drawn from ball valve on tank as usual. Seven different samples were drawn for chemical analysis. Samples were labeled with information as requested by Telena Moore. Samples containers were wiped down to ensure that surfaces were free of possible contamination and placed in coolers.

Joel Miller arrived to check samples before they were brought out of the area. Joel tagged coolers before OP-TECH personnel transported samples to analytical Chemistry.

Dennis Rice was on site. We took advantage of the truck he was driving and transported additional equipment and 275 gallon tank to BLDG 7710.

~~6-29-93~~ 7-1-96 TO 7-5-96 VACATION/HOLIDAY DR

7-8-96 MONDAY Team Members: D. Rose, J. Wade, J. Wilhelf (1/2 personal)

Team continued with decontamination and demobilization of equipment & supplies.

7-9-96 TUES Team Members: D. Rose, J. Wade

Spoke with Bob Coe concerning possible work at small ponds 3539 & 3540. Bob stated that the possibility for more work is dead. Since the additional job will not be required plans can be made to demobilize completely.

Tried to make contact with Joel Mills this morning, he was unavailable. Left word with Jo Ellen Francis for him to call.

Kirk Wilson showed up on site with a special request. Kirk needed is to enter exclusion area at 3513 and try to clean water level gauge at east side of pond. Water level was low and algae had dried on gauge so levels couldn't be read. Accomodated Kirk and cleaned gauge with extension pole with scrub brush attached.

Spoke with Steve Rose concerning the replacement of bird wire over pond 3513

Talked to Joel about equipment and demobilization plans. He is busy on other jobs for next couple of days then he will assist with removal of equipment to BLDG 7710.

Returned to BLDG 7710.

CONTINUED AT PAGE 123

10-96 Team Members: D. Rose, J. Wade
WEDNESDAY

Team continued with demobilization items and transfer of materials out of impoundment area to storage areas.

Talked with Telena Moore concerning re-sampling of 3513 & 3524 composite apparently ones the holiday the samples did not get analyzed. The holding time for the samples expired. Telena rescheduled for Monday morning.

Harold Woods was on-site this morning to assess the replacement of bird wire back ones pond 3513. Harold inquired about replacement of nylon back on 3524. Told him I would check with Rob Coe to see if they had a preference between nylon or cable.

D. Rose had a scheduled appointment for whole body count today.

Worked over with Joel Miller this evening finishing and tagging equipment out BldG 7710 in low background area.

Rob Coe requested cost estimate for the month of July to help bean counters crunch numbers. Spoke with Mike Murray concerning this matter. Mike will send E-mail to Coe with requested information.

Mentioned to Rob the bird wire ones pond 3524. Rob said he would check with responsible parties concerning nylon or wire on 3524.

Returned to BldG 7710.

7-11-96 THURSDAY

Team Members: D. Bore, J. Wade

Spoke with Joel Waller this morning concerning the continued work on rad survey of pontoon boat. We planned to finish survey of boat this evening.

Talked with Rdz Coe about plans to survey boat and other business items.

Since OP-TEST will have to resample pond composite on Monday, plans to move mobile lab to 7710 were delayed until OP-TEST performs sampling operations.

Team members had to perform computer Security awareness training this afternoon.

Began scan of lower section of boat (pontoons). Several areas were detected to be over Rad Con guidelines. Areas were marked with pens to designate areas needing to be deconned. Areas to be cleaned were approximately 300 cpm BK with Bicron pancake probes.

7-12-96 Team Members: D. Rose, J. Wade.
FRIDAY

Talked with Steve Rose about placement of wire at Pond 3513. Order for wire has been made by Harold Brooks. Told Steve I would run by 3524 to see if cable ratchets had ever been utilized on this pond. Steve mentioned he had some ratchets available but not enough to cover the whole crew. I mentioned to Steve that it was doubtful that ratchets would be purchased to accomodate the placement of cable over 3524.

Checked around 3524 to see if ratchets had been used previously. No ratchets have been used.

Returned to RSC 7710 to work on logbook and equipment.

15-96 Team Members: N. Rose, J Wade
MONDAY

Telena Moore and Nathan Wright on site to begin resampling of Pond Composite. Joel Miller arrived to provide coverage for sampling operation.

Samples were cleaned with KG9 to remove any possible material on the outside of sample containers. Samples were labeled with sampling times and proper information as required by Analytical Chemistry. Samples were placed in cooler and chain of custody seals were placed on jars and cooler for proper transport to lab. Joel Miller placed proper transfer tag on outside of cooler.

After sampling was complete team continued with general site clean-up and demobilization. Hazwoper signs on outside of support house at pond 3513 were removed as well.

Returned to BASE 7710.

7-16-96 Team Members: D. Rose, J. Wade
TUESDAY

Began review of OP-TECH report. Reviewed logbook for information which Telina Moore had requested for report. Wrote up additional information and comments for Telina.

Spoke with Steve Rose and Rob Coe about proper P&E groups to replace cable and nylon bridwire. Rob stated that it would be best to use nylon on upper panel to save expense of purchasing ratchets. Coe said to contact Lynn Cox for work on 3524.

7-17-96 WEDNESDAY

Team Members: D. Rose, J. Wade, J. Allred

Due to completion of sampling operations there is no further need for mobile lab to be on site. Team proceeded to impoundments to transfer mobile lab to BLDG 7710. Supplies and equipment around pond area were loaded onto bus for transfer. Still a few items remain to be picked up at a later date.

Moved bus to BLDG 7710 and began clean-up of vehicle. Supplies were downloaded to proper storage area.

Continued with review and comments on OI-TECH report.

7-18 THUR

7-19- FRIDA

7-18-96 Team Members: D. Rose, J Wade
THURSDAY

Delivered timesheets for group members located at BLDG 7710 to group secretary at BLDG 1062. Normal personnel not available to turn in time due to meetings scheduled. Spoke with P. Abston, B. Winton and R.D. Foley concerning closure of impoundment work and new upcoming projects.

Continued review and comment on OP-TECH draft report.

7-19-96 Team Members: D. Rose, J Wade
FRIDAY

Telena Moore called this morning concerning a need for a compressor for Singleton lab personnel to perform some testing at lab trailer. Advised Telena that we had a compressor that could be used if needed.

Called Joel Miller to green tag compressor for OP-TECH's/Singleton's use on Monday morning.

Telena called back with word that MAD group compressor would not give enough pressure for their tests. Discussed several different options that might possibly be used.

Telena called back to say she had found compressor that might work with adjustments to get proper pressure. Told Telena we would bring regulators etc on Monday morning to assist with their problem.

Continued on draft report.

7-22-96
MONDAY

Team Members: D. Rose, J. Wade

Called Joel Miller first thing this morning to cancel request for green lit on compressor. Notified Joel that OP-TECH had found one elsewhere and wouldn't need to borrow ours.

Met with Telena Moore and Paul Dingaley at lab trailer this morning. Borrowed compressor was regulated to shut down at 40 psi even though it could produce much greater pressure. Further investigation by J. Wade allowed for adjustments to be made that would give the needed pressure for testing purposes.

Returned to RISC 7710 to continue with bus clean-up and storage of materials used at impoundments

7-23-96
TUESDAY

Team Members: D. Rose, J. Wade

Unloaded pick-up truck with equipment and tools on board. Cleaned up all three vehicles that had been utilized on job at impoundments.

7-24-96 WEDNESDAY

Team Members: D. Bose, J. Wade

Rounded up supplies that will be needed to begin decon of elevated spots on pontoon boat. Contacted Joel Miller to let him know about operation.

Covered area with blotter paper to contain any contamination removed from pontoons. Used wire brushes with 409 and other cleaning solutions to remove contamination. Elevated readings 2-300 cpm β/γ were limited to an area on the front of the left pontoon going back ~ 8'. Removed portions of contamination by soaking area with cleaning solution and scrubbing with wire brush.

Will continue decon of pontoon tomorrow.

7-25-96 THURSDAY

Team Members: D. Bose, J. Wade

Continued with manual scrubbing of pontoon this A.M. Wire brush seems to be removing elevated spots with continuous scrubbing and rinsing method.

Elevated areas were scrubbed, rinsed and wiped until elevated readings could no longer be detected.

Boat is ready to be checked by Radiation Protection for approval.

7-26-96
FRIDAY

Team Members: D. Bore, J. Wade

Nathan Wright came by to pick up comments on draft report today. A copy of logbook had also been requested. Began making copy of daily entries for OP-TECH. Nathan arrived before I could complete copying the logbook. He stated that the main things that Helena was concerned about were the comments on the draft report. Nathan further stated that he thought that they could wait until a later date to picking logbook copy.

J. Wade cut PVC floaters with hacksaw to ensure that no free liquids were contained inside so PVC could be disposed of according to OSNL procedures.

7-29-96
MONDAY

Team Members: D. Bore, J. Wade

Made phone calls to tie up a few loose ends to close out job. Spoke with Lynn Cox concerning placement of nylon cable across pond 3524. Had Joel Miller contact Lynn by radio since I could not reach her by phone.

7-30-96 TUESDAY

Team Members: D. Rose, J. Wade

Finished preparation of bus before sending to garage for repairs. Unloaded all important documents and paperwork associated with Treatability Study to file away for future reference.

7-31-96 WEDNESDAY

D. Rose on vacation.

8-1-96
THURSDAY

D. Rose

Had a message on my desk from John Phillips concerning a QA surveillance that was being performed on work that has been completed at the impoundments.
Returned his call today. Secretary informed me that Mr Phillips was out of the office. Left message that I had returned his call.

8-2-96
FRIDAY

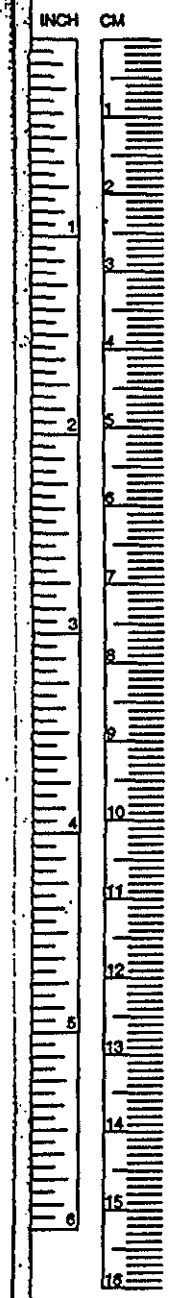
D. Rose

Spoke with Mr. Phillips today about his QA surveillance. Discussed a few items of concern and set up a meeting for Monday morning at BLDG 7710.

APPENDIX C

OpTech's Field Logbook (Staging Area Work)

MEASUREMENT CONVERSIONS



IF YOU KNOW	MULTIPLY BY	TO FIND
LENGTH		
inches	2.540	centimeters
feet	30.480	centimeters
yards	0.914	meters
miles	1.609	kilometers
millimeters	0.039	inches
centimeters	0.393	inches
meters	3.280	feet
meters	1.093	yards
kilometers	0.621	miles
WEIGHT		
ounces	28.350	grams
pounds	0.453	kilograms
grams	0.035	ounces
kilograms	2.204	pounds
VOLUME		
fluid ounces	29.573	milliliters
pints	0.473	liters
quarts	0.946	liters
gallons (U.S.)	3.785	liters
milliliters	0.033	fluid ounces
liters	1.056	quarts
liters	0.264	gallons (U.S.)
TEMPERATURE		
°C = (°F - 32) x .555		
°F = (°C x 1.8) + 32		

Inches	Decimals of foot	Milli-meters
1/16	.0052	1.5875
1/8	.0104	3.1750
3/16	.0156	4.7625
1/4	.0208	6.3500
5/16	.0260	7.9350
3/8	.0313	9.5250
1/2	.0417	12.700
5/8	.0521	15.875
3/4	.0625	19.050
7/8	.0729	22.225
1"	.0833	25.400
2"	.1667	50.800
3"	.2500	76.200
4"	.3333	101.60
5"	.4167	127.00
6"	.5000	152.40
7"	.5833	177.80
8"	.6667	203.20
9"	.7500	228.60
10"	.8333	254.00
11"	.9167	279.40
1 foot	1.0000	304.80

FIELD LOG BOOK

"Rite in the Rain"®
ALL-WEATHER WRITING PAPER

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SUBCONTRACT # 28X-JFA98C

Project SIOU Engineering Support Studies, LMES/ER, X-10
[Chris Taylor ER Project Manager]

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CONTENTS

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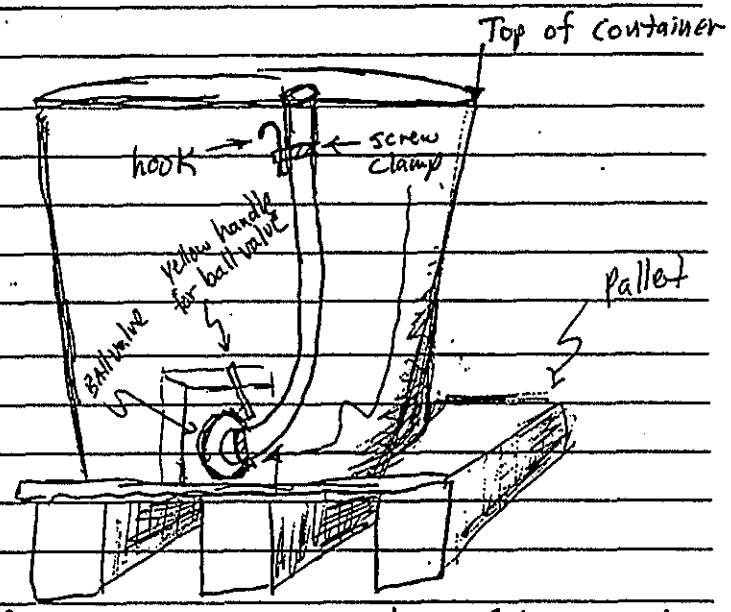
04/02/96 1

Telena Moore, Nathan Wright, and Raul Gonzalez finished unloading laboratory equipment to on-site SIOU trailer-lab. Note - trailer lab was unlocked and nobody was around but a ladder was setup at back side of trailer positioned where an earlier roof leak had occurred.

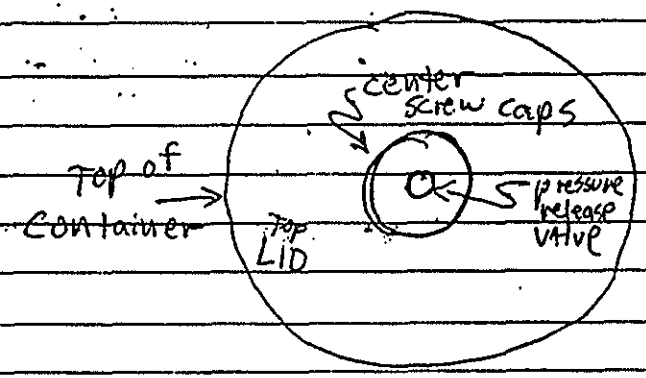
Main objective today was to calibrate 275 gallon containers. Took the one container sitting outside from rad zone and placed in truck bed. hooked up hose and drove to backside of building 3544 where a potable water ~~spi~~ faucet was. Calibrated two 5 gallon buckets using a graduated cylinder. Following formula was used.

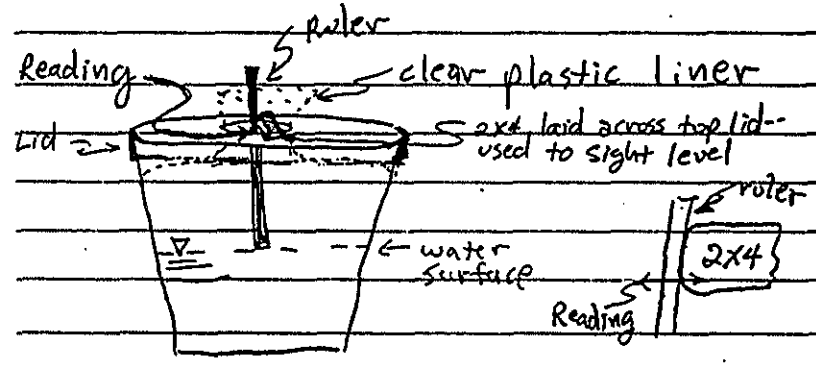
1 gal = 3.785 L (taken from front of this book)

Hose was cut at top of container. This will be used as A safety feature in the event the ball valve freezes open. Picture on following page →



5 gallon buckets were used to fill in 20 gal increments. 20 gallons intervals were measured from center cap:

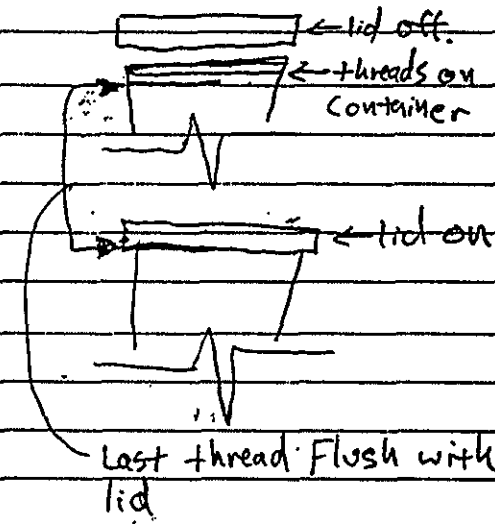




Results were as follows:

gallons	mm
0	~~1119~~ 1218 empty
20	1119
40	1030
60	944
80	858
100	778
120	698
140	615
160	536
180	455
200	375
220	296
240	
260	
280	
300	

NOTE: LID hand tightened just enough to cover threads ie:



After filling the tank, we then practiced withdrawals using the attached ball valve, two 5 gallon buckets, and one graduated cylinder. Results indicate we should be able to withdraw samples with little splash when container is full. All three team members (top p.1) practiced withdrawals (or ball valve control) and controlling the hose. We concluded that if the ball valve jammed, the individual holding the end of the hose would stand and pull hose to top of the container to stop any uncontrolled flow until the ball valve error could be fixed. Additionally, prior to sampling from the container, the line will be flushed (at least 2 gallons) and sample withdrawn in a container contained within a clean 5 gallon bucket. Left site at 4:00 pm.

02 APR 1996

Today was to be the first day we were to collect samples but the dipper must be modified with a solid rod, rather than hollow rod, due to the chance of spreading any "stuck" sediments caught in the hollow stem during scooping process. The MAD group will take the lead on this.

We did not try to mix the samples because the air monitor inside the lab does not appear to be functioning properly. However, we did set everything up (outlets, mixer, containers) and double checked the mixer length to ensure we had an adequate setup. Everything appears to be ready to operate and we are now planning to sample Monday.

Site briefing was performed by John Allred (see their, or MAD group, site log book 21 150 R)

22 APR96

Collected first sample from 13BCØ1, or the sample from the N-W area of the 3513 pond, using the ball valve and hose (see p. 2 of this log book) to drain into 5gallon buckets lined with turkey bags (title used by MAD group). The bag was wrapped Around the hose intake to prevent splash outside of sample container. The sample was mixed prior to withdrawal using a 1/4 HP mixer with extended arm to place mixing blade ~ 2½" from bottom of 275gal. Container. The mixer was mounted onto center screw cap (see p. 2 of this logbook) with mixing rod placed where the pressure release valve was. The withdrawal was slow moving due to the thickness of the sediments, but it appears we obtained a representative sample. The sample was capped and the 5gal bucket taken outside Hazwopper area. Joel Miller (HP) reported the sample was reading ~ 2 mREM/hr from

22 APR96

bottom of container and ~1mREM/hr from side of the container. We collected ~ 3gallons of sediment. The hose rinsed clean After 3 flushes. The sample was transported to the lab After Joel Miller took a smear from the bottom of the container. See Lab Log book for testing information on 13BC1. The key individuals involved in this mixing and withdrawal process was myself, or Telent Moore, and Nathan Wright while the HP coverage was by Joel Miller. The SSHO was John Allred.

Additional Note: Sample was mixed for 20 min. prior to withdrawal.

Telent Moore
22APR96

23 APR96

Collected first sample from 13BC2, or the sample from the N-E area of pond 3513. Telena Moore and Nathan Wright prepped, mixed, and withdrew the sample ~~as~~ using the same method as mentioned on p. 6 of this Field Log Book. The onsite HP at the time was Dan Brown. This withdrawal was much thinner than the 13BC1 withdrawal but appeared thick enough to suit our needs. We collected ~2.5 gallons and transported them to the lab. This sample also read ~2 mREM/hr at the bottom and ~1 mREM/hr at the sides. The sample was mixed for 20 min. prior to withdrawal and also appeared to be representative of the sample as a whole. This is determined by visual observations of the sediments in the container versus those from the withdrawal. Plus, it does not appear that heavier sediments accumulated along the edge of the container (also based on visual observations). ~~END~~ 23 APR96

Telena Moore 23 APR96

30 APR96

Took the 13BC1 container (5 gal bucket) back to staging area and dumped the remaining sediment back into the pond. The bag must have had a ~~small~~ small pin-hole because a small amount (~30mL) had leaked out of the bottom onto the bucket. Got all the free liquid from the elephant bag and disposed of as told by Joel Miller (with old PPE). The MAD group had already composited 13BC1 and 13BC2 containers (275 gallon tanks). Each container had ~40 gallons each, and was consolidated into the 13BC1 container. The MAD Group had already moved the mixer to the 13BC3 container and had been mixing it for more than 30 min. by the time we arrived. It took us about 20 min. longer to get a sample (dump 13BC1 5 gal sample, clean 5 gal bucket, determine how to work around MAD without getting in their way, get ready to take withdrawal). Raul Gonzalez and myself collected 2 liters of the 13BC3 container. The 13BC3 container was filled

30APR96

10

from sediments collected in the CENTER Area of pond 3513. Cleaned intake and took 13BC3 samples to Lab.

30APR96

01MAY96

11

Started mixing 13BC4 at 13:20. will wait till 14:00 to enter area for dumping 13BC2 and the Sediment Carboy (which has ~ 10 Liters in it). At 15:00, cleaned (or emptied) the carboy and brought it with the 13BC4 sample back to lab. The 13BC4 dose is ~0.4 mREM/hr on the sides and ~0.8 mREM/hr on the bottom (2-Liter bottles stored and checked in 5 gal buckets). The 13BC3 sample had a side reading of ~0.5 mREM/hr with A bottom reading of 1.0 mREM/hr (Also has 2-Liter bottles stored in 5 gal bucket). 13BC4 from S-W Area. POND 3513

01MAY96

02MAY96

The MAD Group preped the 55 gallon drum containing the 13BC5 sample collected from the S-E Area of pond 3513. We mixed the drum for 20 min, turned the mixer off, moved lid, and collected 2 liters using the dipper designed by the MAD group. There was a lot of splash but it appears it did not travel far ~~for~~ from withdrawal area. Nathan Wright held the funnel and bottles while ~~Wayne~~ Duane McKinney dumped the dipper (which I, or Telena Moore) that was raked from bottom to top of drum. Jimmy Wade held the mixer and lid during this process. The area around the withdrawal area was sprayed with 409 and ~~whip~~ wipped down to help ensure all splashes were cleaned up. It appeared one bottle was slightly thicker than the other but another sample was not taken because of the mess associated with this process. The withdrawals from the 275 gal containers using the ball valve is much cleaner than the

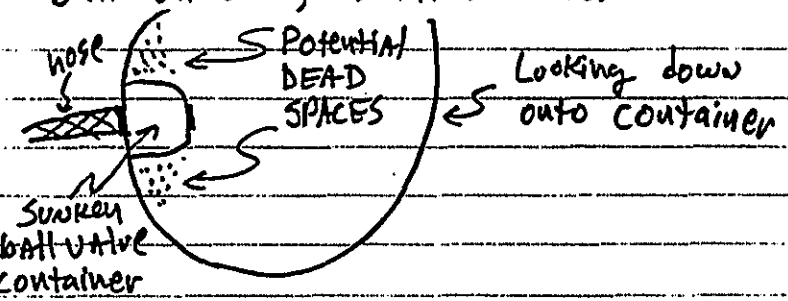
02MAY96

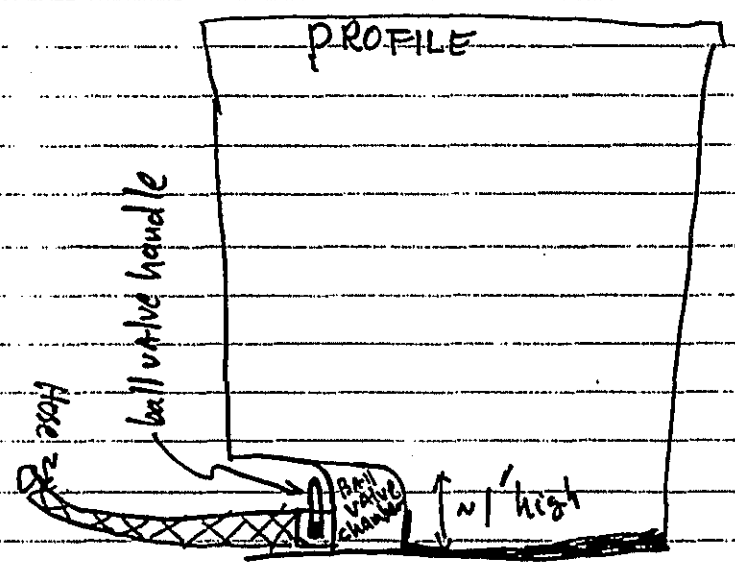
setup used with the 55 gal drums. Suggest modifications if this process must be used again. Because one of the samples collected in the one-liter bottle was extremely thick, it was believed it contained enough sample for the necessary lab test (Based on amount of material necessary for 13BC1 which was ≈ as thick as this sample). It was then decided to free 13BC5 for consolidation.

NOTE: Jimmy pointed out some gravel in 13BC3 found during the consolidation process. This gravel did NOT APPEAR IN the 13BC3 samples nor could we see it when doing our visual observations from the 1' opening at top. He said they had removed ~ 5 handfulls. I had him scoop a sample for me to take to the lab. It appeared to be "natural" rock and did not look like all of it was manufactured gravel. See lab log book for further description. The influx of gravel in 13BC3 was due to a screen failure

02MAY96

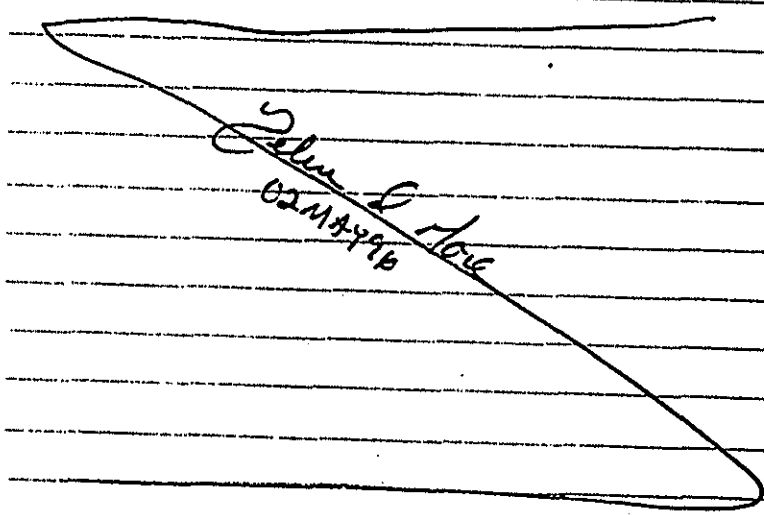
used to keep 1/4" rocks from entering pump (see MAD Group log book for more details). No other rocks have been observed in any other samples. The rocks may not have dispersed during the withdrawals due to A potential "DEAD SPACE" Region in the 275 gallon tanks Around the ball value, as illustrated below





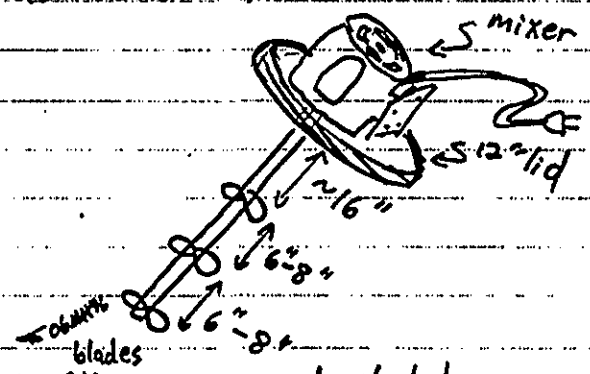
02MAY96

The potential Dead Spaces could have had a slow enough velocity to prevent the gravel from homogeneously mixing with the rest of the sediments. No current plans to try and fix this potential problem. Additionally, the liner was observed to have holes All over. It Appears A hole must have developed during the mixing process, fluids got to the outside of the liner, and the plastic then moved with the liquid, occasionally getting A smack by the mixer blade. Perhaps the gravel had something to do with this As well ??



06MAY96

~~Kathy~~ 06MAY96 Nathan Wright and Telena Moore collected the Laboratory Aliquot from the 3513 pond composite (13CP1). ~~13P~~ 06MAY96 13CP1 is a combination of 13BC 1, 2, 3, 4, and 5 (~ 40 gal. from each). See the MAD groups project log book for more details on the 3513 pond composite development). Due to the mass quantity of sediments requiring mixing, some extra blades were added onto the mixer to help increased the mixing efficiency. Setup as follows:



The mixers were spaced slightly more than a foot apart but placed deep enough to ensure mixing in the sediment slurry. Let samples mix for 30 min. prior to withdrawal. Samples appeared to be very

06MAY96

representative of the sample as a whole. The MAD groups 06MAY96 is now setting up to move their sampling equipment to 3524 and start their sampling there. LAB samples were taken ~~to~~ 06MAY96 to the trailer.

Telena Moore

08 MAY 96

Bentonite was spread Along South bank of 3513 pond. Very thick Along bank (cannot see much vegetation through it).

Helen O Mure
08 May 96

14 MAY 96

The MAD Group has collected two of the 5 samples from pond 3524. We will call the first sample, taken from the North west area in pond, 24BC1. We will call the second sample, ~~called 24BC~~ taken from the South west area of the pond, 24BC2. Visual observations from the MAD Group indicate the samples have A lot of Algae and less sediment mass than those collected from pond 3513. We will try to take some withdrawals tomorrow and start testing on these pond sediments (Paint Filter and Moisture content).

Helen O Mure
14 MAY 96

16MAY96

Collected 4 liters each from 24BCØ1 (from N-W area of pond 3524), 24BCØ2 (from S-W area of pond 3524), and 24BCØ3 (from Center of 3524). All samples looked thick and good. I told the MAD groupwe had enough sample from these containes and that they can start their ~~Cop~~ 16MAY96 composits for 3524. They will ~~collected~~ 16MAY96 collect the last two locations in pond 3524 After they composit the ones on the shore. The samples were taken to the lab and ready to test!

Helen L Mane
16MAY96

22MAY1996

Collected 4 ~~literes~~ 22MAY96 liters each from 24BCØ4 (from S-E area of pond 3524) and 24BCØ5 (from N-E area of pond 3524). Samples looked good. The 24BCØ5 was the thinnest (or "appeared" the thinnest). The MAD group now plans to consolidate these last two BC containers to develop the 24CP1 sample.

We decided to store part of the samples in the Lab within the staging area. This transfer was to lower background and exposure in lab area. Samples currently stored (in a 55-gal container) is 3 bottles of 13CP1, 2 bottles each of 24BC1, 24BC2, 24BC3, 24BC4, and 24BC5. We will dump the 24BC samples After we perform necessary ~~S~~ 22MAY96 lab test.

Rad info on sediment samples in storage area and sampling information is noted in the MAD group's site log book.

22MAY96
Helen L Mane

NW 29 MAY 1996

Collected 5 liters from 24CP1. Dumped waste carboy labeled Pond Sediment and water back into Pond 3513. Also dumped remaing samples 24BC1, 24BC2, and 24BC3 into Pond 3513. ~~Kept~~ NW ~~sediment~~ Left one liter of 24BC3 in lab.

Prior to collecting 24CP1 samples the sediment was mixed for 30 min. Samples were taken to lab for testing

[signature]
29 MAY 1996

TW 03 JUNE 1996

After reviewing the 13CP1 and 24CP1 concentration results, I suggested we decant more of the supernatant from 13CP1 container in staging area prior to COMP1 development. Rob Coe agreed that the ~~COMP~~ TW 03 JUNE 96 60/40 mix was based on volume and from the looks of the settled sediments in the ISCO (or 1-Liter bottles) -- it was obvious that 13CP1 has excessive water when ~~than~~ TW 03 JUNE 96 compared to 24CP1. We (Coe and myself) decided to ask the MAD group to decant 13CP1 prior to mixing to ensure we have a more representative mix. I mentioned this plan to Doug Rose today and he had no problem with this task. I gave Rose an ISCO bottle to collect one sample from the NEW 13CP1 container following decant and prior to mixing into the COMP1 container. He said it should not be a problem for them to collect some sediment for us. We will use

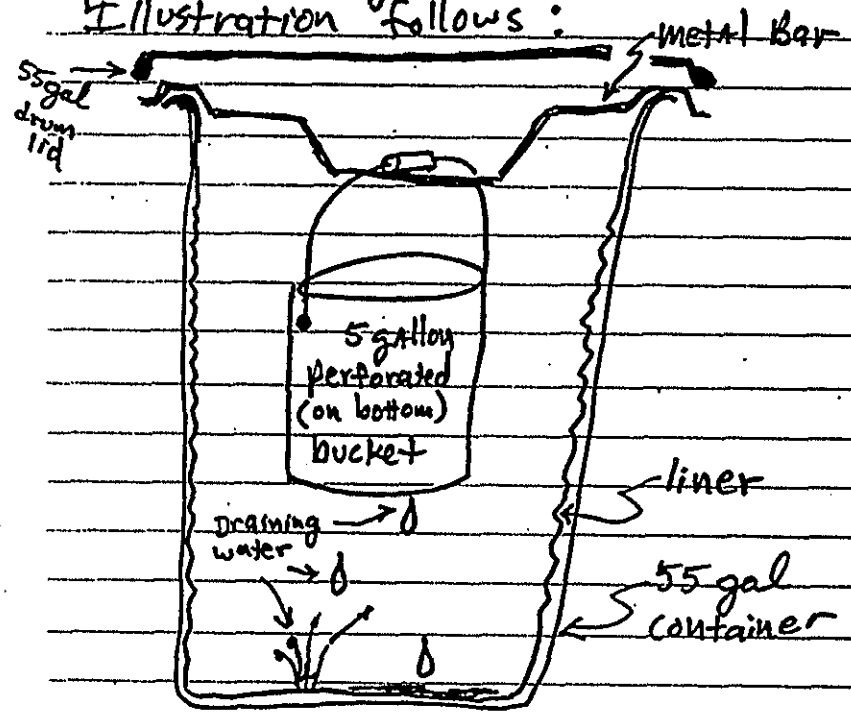
03JUN96

this sample to determine the new concentration and to get A better estimate on the mix ratio ~~to~~ of 03JUN96 developed with the COMP1 sample.

Helen Moore
03JUN96

05JUN1996

N. Wright and T. Moore mixed the COMP 1 Container for 30 min. The COMP 1 sample was developed by the MAD group (see their site logbook for details). We then collected samples in 1-Liter bottles used to fill the gravity drainage buckets. The mad group prepped two 55 gallon drums with A support bar to hang the perforated 5-gal buckets from. Illustration follows:



05JUN1996

We filled the bucket up as much as possible without surpassing the top of the filter paper. We plan to add more sediment tomorrow After given A chance to drain down some. Currently, we plan to drain down A sediment mass ~~A~~ of at least 5". Due to this, we may need to add several liters during several time frames to achieve this goal.

We Also collected 5 liters to take back to the lab and perform lab test on.

We dumped the carboy filled with sediment and rinse waters.

The MAD Group had finished dumping the 3513 and 3524 pond sediments following the COMP 1 development. They have Started Cleaning those containers. See lab logbook for details on COMP 1 sample testing. Thats All! For Now

06JUN1996

T. Moore and N. Wright mixed the COMP 1 Container for 30 min. The gravity draining buckets Appeared to have fully drained All free fluids. We added ~5 Liters more to each gravity draining bucket. We Also ~~dumped~~ dumped All remaining 24BC samples stored at the staging area. We plan to go back tomorrow and check the gravity draining buckets. Thats All for now.

Ellen Orrel
06 Jun 1996

07 JUN 1996

T. Moore and N. Wright mixed the Comp 1 sample for 30 min. The gravity draining buckets appear to be completely drained of free fluids again. We only had enough room to add 2 Liters to one and 3 to the other. It appears we now have enough sediment to meet the 5" depth requirement for the Zero-headspace test (or the 3"X5" core used to run this test). I contacted Singleton Laboratories and Raul Gonzalez has made plans to ~~start~~ cut the necessary samples out of the gravity drained sample and start testing of such on Monday. We took the mixer out of the Comp1 container at 10:35am and started the Gravity Thickening Test (as outlined in the ESSW, Task 4.3). We will check this container in ~1 week to see if additional dewatering is necessary. End todays log.

07 JUN 1996

10 JUN 1996

8:50

T. Moore and R. Gonzalez obtained the first series of samples from one of the gravity drainage buckets. The zero headspace extraction core was collected using a modified shelby tube, cut to ~9" inches in length. The one-dimensional consolidation core was collected using a 3"X2.75" tube. This ~~sortium~~ shorter tube ended up being ~~rather messy~~ ~~sorum~~ messy. Due to this, Raul decided to make another extractor like the ~9" one for also extracting the one-dimensional consolidation sample. We also collected the Harvard minature compaction sample. This sample appeared very moist and will require additional drying prior to performing the Harvard minature compaction test. Per the MAD groups request, we left the remaining sediment and bucket in the setup as described on page 25 of this logbook. The MAD group said they would take care of ~~the~~ 10 JUN 96 cleaning this equipment for us.

TS 10 JUN 1996

Based on our observation, we decided to let the second gravity draining bucket set for a few more days prior to extracting the next series of samples.
The extracted samples were taken to the lab -- see lab logbook for further details.
End of log.

Eileen Lenane
10 JUN 1996

TS 17 JUN 1996

9:20
T. Moore and Raul Gonzalez enter the Hazwapper area to dump carboy (with spent sediments) and collect gravity drained samples. We used longer Shelby tubes this time (12" long) for ~~the~~ TS 17 JUN 96 collecting the ~~HMC~~ TS 17 JUN 96 ZHE and consolidation sample. This was less messy and we plan to use them again (if necessary) for the last gravity drainage sample. We also collected the next HMC sample. (ps. ZHE = Zero headspace extraction and HMC = Harvard minature compaction -- thought I defined these earlier but obviously not).

The MAD group has decanted the Gravity thickening ~~samples~~ TS 17 JUN 96 sediment from the 60/40 pond composit sample. Decant was completed at ~10:00am, and the sample had been sitting undisturbed since 10:35am on 07 JUN 96. Rob Coe and I (T. Moore) had decided that ~1 week would be sufficient since the gravity settling test indicated that limited settling occurrs

17 JUN 1996

following a day or two of settling. Due to the heat and limited time available from Raul today (has to ensure he gets his readings on time with the test he is performing), we decided to wait until tomorrow to collect the gravity thickened samples.

Selim Omar
17 JUN 1996

8:30
T. Moore & Nathan Wright enter Hazwopper area and started mixing the gravity thickened sample. We decided to label this mix CPCPD (orginally called CPCP1 prior to decant -- now "1" replaced with "D" to indicate decanted sample). We checked the surface for thickened sediment and supernatant interface but there did not appear to be one. It seems the MAD group was successful in decanting all the free supernatant. The sample was mixed using the ~~samp~~ 18 JUN 96 same apparatus noted on page 16 of this logbook (3 mixing blades on one rod). The extracted samples were VERY thick (the thickest yet!). I believe they were fluid enough though to be homogeneously mixed.
We also started the third gravity drainage bucket using the same method as written in the 05 JUN 1996 log (pages 25 and 26). We filled the bucket almost ½ full and it

did not appear to be draining as quickly as the first two did. We may wait a few days to see if we need to add more sediment to it. Based on the first two gravity drainage results (visual observations only), the sample was still a tad thin after 3 days of draining and they appeared to have a slightly thicker texture following 10 days of settling -- yet they were still slightly over saturated, but would hold a form better than the first. If we do use the third gravity drainage sample, we should wait a minimum of 10 days prior to extraction due to its higher workability characteristics.

Weather was Hot today -- we lost 5lbs each in sweat (it seems) in the two hours out there. Summer is Here.

Samples were taken to the lab -- see lab logbook for details.

End todays log.

9:00 due to the high background readings which was a result of bringing the 16-Liters of CPCPD samples to the lab, we decided to take 8 of the liters back to the storage drum in the staging area. Background has now dropped in the lab to ~120cpm. We took the remaining CPCPI samples from the staging area and brought them back to the lab to start the bentonite/SAND solidification test (see lab logbook for more details).

Helen O Lore
19JUN96

8:30. T. Moore, N. Wright, and R. Gonzalez Arrive at S10a. Raul continued with his test (in laboratory) 28Jun96 ~~and~~ while T. Moore and N. Wright prepped to take samples from Staging area CPCPD Container.

Per my conversation with Robert Dean yesterday, It was concluded that we were to collect some samples for TCLP, Hg, and PCB's. Even though the holding times had been exceeded for most of these tests, Dean said to go ahead and process these because these results could still be usefull in classifying these slurries as a RCRA material.

Working through Ben Burgoa (Monitoring group: 4-5975), we got sampling containers through Patric Buckley (1-5051). It was decided that we needed 1 liter ~~each~~ 28Jun96 for the TCLP (including Pb) and Hg tests and we needed 125 ml for the PCB test. We used Amber glass jars for these samples. We did not have 1-liter containes, so we used 2 ea 500 ml containers instead. Duplicates were taken for each test.

Prior to withdrawal for chemical Analysis, the CPCPD container was mixed for 45 minutes and 7 liters were withdrawn to use for solidification testing. The samples for chemical Analysis was then withdrawn and ~~tabled~~ 28Jun96 labeled as follows:

ID#	Additional identifier	Container (All Amber glass)
CPCPD-TCLP1	Bottle 1 of 2	500 mL
CPCPD-TCLP1	Bottle 2 of 2	500 mL
CPCPD-TCLP2	Bottle 1 of 2	500 mL
CPCPD-TCLP2	Bottle 2 of 2	500 mL
CPCPD-PCB1		250 mL
CPCPD-PCB2		250 mL

As indicated by the ID#, the 500 mL

28JUN 1996

samples were to be used for TCLP and Hg tests while the 250 mL samples were to be used for PCB test. The sample time was written on the labels by Doug Rose, and he placed them on the bottles, put the bottles in ziplock baggies, and placed them in a cooler with Fresh Blue Ice (taken from freezer one hour earlier). Joel Miller tagged the cooler, we sealed it and took it to Patric Buckley. Patric gave me the necessary paperwork to drop the samples off at 4500 South, to Marlean Moore in Room S-159. So, to sum up, we collected the samples at ~ 9:15am and dropped them off at ~ 10:45am.

The one-liter samples collected for additional solidification tests were placed in the 5-gallon bucket with an "elephant" bag liner, scanned by Joel Miller, then taken to the onsite laboratory. See lab logbook for additional details on testing of these samples.

END TODAYS LOG.

15JUL1996

8:30 T. Moore and N. Wright enter HAZWOPER Area with ½ full carboy and sample bottles. The CPCPD sample was mixed for 30 minutes. While mixing, we dumped the carboy, rinsed the sediments into the pond, and ensured our sample bottles were properly labeled. The sampling today was to replace the previous samples sent to ASO for chemical analysis (see pp. 36-38 of this logbook). The holding times were exceeded from the time we withdrew the last 28JUN96 samples (It was determined that we could use our withdrawal time from the composite as our sample collection time -- thus submit valid samples), therefore, we needed to resubmit these samples. After discussing our options with Maryland Moore (w/ASO, phone 4-4890), we decided to use the same bottles as last time, use the same ID's as last time (see p. 37 of this logbook), and just exchange these

15JUL96

"Fresh" samples with the "old" samples. COC's were exchanged and the "old" sample were brought back to the lab to be disposed of (since no preservative was used, the samples were disposed of in the regular carboy to be placed back into the ponds).

We Also took some pictures of the gravity drained sample. Joel Miller was the onsite HP and Doug Rose was the ~~SSHO~~ SSHO. The empty carboy was brought back to the lab following HP approval. We Also brought the remaining CPCPD samples stored in the 55-gallon drum to the lab for solidification testing. See lab log for solidification ~~tests~~ details.

Note: we flushed the withdrawal hose with ~ 2.5 gallons of sediment slurry prior to withdrawal of samples sent off for chemical Analysis. The sediment flushed ~~from~~ ~~through~~ the container, hose was placed back

into the pond.

Weather was HOT but cloudy. Has rained off and on all day but no rain while performing this work.

Left HAZWOPPER area at ~10:00.

END ~~todays~~ log.

[signature]

15JUL96

NW 01 AUG 1996

1100 Sample # 000CPCPD000 collected for TCLP analysis. 229.5 g. of dried sample was collected in 500 mL amber jar for delivery to bldg. 450 80c under C.O.C. # 101033. J. Miller (H.P.) took readings (RAD) from container and ~~jar~~ NW 8/1/96 cooler. Results were 2 mrem/hr from contact with jar. 1 mrem/hr from contact with cooler, < 0.1 mrem/hr at a distance of 1 foot from cooler. Additional items demobilized and removed from RAD area by J. Miller.

J. Miller
8/1/96

NW 02 AUG 1996

1300 Enter HAZWOPER AREA UNDER supervision of J. Miller (H.P.). Place COC seals on 275 gal. container and both 55 gal. drums. Exit area.

J. Miller
8/2/96

NW 06 AUG 1996

0815 The Hazardous Waste Operations Group arrived at trailor to pick up our Hazardous Waste (Mercury spill).

0930 R. Gonzalez and N. Wright enter HAZWOPER area to measure sediment in 275 g. container. sediment surface was measured at 21 inches from top of container by method described on page # 3 of this logbook. J. Miller (H.P.) and D. Rose (SSHO) observed. Tamper seal broken on 275 g. container by our activities. Replaced with new one.

Jeff Wright
06 AUG 1996

23 AUG 1996

8:00 T. Moore, Raul Gonzolez, and Nathan wright arrive at site to dump and dispose of carboy with sediment and water (Placed back into pond 3513). Joel miller was the on-site HP & Doug Rose was the on-site SSHO.

We also disposed of the last gravity drainage sample in 55-gal. drum by putting the ~~solidified~~ 23 AUG 96 drained sediment mass in the pond and disposing of the bucket (HP. to place in B-25 box).

The last remaining one-liter ISCO bottles containing 13CPD, 13CP1, 24CP1, and CPCPD stock was placed in pond 3513 and the ISCO bottles disposed of in the incineratable waste bags.

We took some of the solidified samples to the HAZWOPER area for storage. One each of a 40, 50, 75, and 100% mixture of COMP1 (or CPCPD) plus 50/50 Portland cement/fly ash was

23AUG96

placed in a double-lined bag and placed in a 5-gallon bucket. The bucket was capped and placed in the 55-gallon drum next to the 275-gallon container in the HAZWOPER area. Doug Rose will label the 55-gallon drum. We labled each sample prior to sealing in the 5-gallon bucket. A COC seal was placed on the 55-gallon drum upon capping.

We cleaned up the site, placing all incenerateable material in the container as designated by the HP, and placed all non-incenerateable material in A seperate pile for the HP to scan and then determine proper disposal.

The only thing left from this task in the HAZWOPER area was 1-5gallon bucket, 1-55gallon drum (containing the 3"X6" molds of solidified samples mentioned Above), 1-275gallon Century 21 container (containing ~ 160 gallons of COMP1, or CPCPD, sediment) and the bermed area. The area

is currently designated to be left like this until it is determined if additional testing of the COMP1 Stock is necessary.

We all left the site at 12:00.

End todays log.

Delan R. Rose
23AUG96

APPENDIX D

OpTech's Laboratory Logbook

MEASUREMENT CONVERSIONS

INCH CM

IF YOU KNOW	MULTIPLY BY	TO FIND
LENGTH		
inches	2.540	centimeters
feet	30.480	centimeters
yards	0.914	meters
miles	1.609	kilometers
millimeters	0.039	inches
centimeters	0.393	inches
meters	3.280	feet
meters	1.093	yards
kilometers	0.621	miles
WEIGHT		
ounces	28.350	grams
pounds	0.453	kilograms
grams	0.035	ounces
kilograms	2.204	pounds
VOLUME		
fluid ounces	29.573	milliliters
pints	0.473	liters
quarts	0.946	liters
gallons (U.S.)	3.785	liters
milliliters	0.033	fluid ounces
liters	1.056	quarts
liters	0.264	gallons (U.S.)

TEMPERATURE

°C = (°F - 32) x .555
°F = (°C x 1.8) + 32

Inches	Decimals of foot	Milli-meters
1/16	.0052	1.5875
1/8	.0104	3.1750
3/16	.0156	4.7625
1/4	.0208	6.3500
5/16	.0260	7.9350
3/8	.0313	9.5250
1/2	.0417	12.700
5/8	.0521	15.875
3/4	.0625	19.050
7/8	.0729	22.225
1"	.0833	25.400
2"	.1667	50.800
3"	.2500	76.200
4"	.3333	101.60
5"	.4167	127.00
6"	.5000	152.40
7"	.5833	177.80
8"	.6667	203.20
9"	.7500	228.60
10"	.8333	254.00
11"	.9167	279.40
1 foot	1.0000	304.80

LAB LOG BOOK

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CONTENTS

PAGE	REFERENCE	DATE
1	INITIALS used in Lab Work	16APR96

Recorded by Telena Moore 16APR96

The purpose of this log book is to record meaningful information relevant to the Laboratory testing only for the SIOU task. The Key individuals working in the Lab and their official initials are as follows:

Full name / Badge #	initials
Telena D. Moore / 624087	TM
Nathan Wright / 700569	NW
Raul E. Gonzalez / 700812	RG 4/30/96

These initials will be used to indicate who has recorded information on the laboratory data sheets or in this log book.

The laboratory is setup and ready to accept samples. Several dry runs have been performed and was completed sucessfully. All equipment functional except one thermometer which busted in the oven on first usage. The Environmental Hazardous Waste Management Team (headed by

Bill Alexander) cleaned the Mercury up from the oven and hooded area. No reportable fumes were present in trailer due to the incident occurring in the hooded area. Another Non-Mercury Thermometer has been ordered to replace the broken one.

The first two lab test to be performed is the Paint Filter test and moisture content test The moisture content test minimum sample requirement is based on the minimum sieve size 100% of the sample will pass. Wet sieving was selected for this process to minimize airborn particulates.

We are currently waiting for our first test specimen from container 13BC1. Hold up is mixer Alteration and dip modification should be able to collect tomorrow.

End of todays log.

TIME	EVENT
1350	T. Moore & N. Wright enter RAD zone to begin testing on 13-BC1. D. Brown (H.P.) observing operations.
1400	Balance checked and is calibrated to 50 g., is off by 2/100th at 100 g.
1405	T. Moore collects 100g of sample for Paint filter test. Aluminum Platchet C used weighing 61.44 g. Actual sample collected weighs 100.60 g.
1415	Began Paint filter test #1. Results were recorded in Paint Filter Test Data Form Book page #1. Material in platchet poured out well. Therefore to minimize contamination Platchet was not scraped clean using spatchula. Weight of sediment left in platchett was 1.5 g. Filter failed at 15:40 with 22 ml in cylinder ~4 ml of sediment was observed in cylinder shortly before failure.
1445	Contents of sample ran wet thru #10 sieve. All material passed except one blade of grass

Sieves were stuck together. Had a hard time seperating. All equipment was rinsed with potable water and scrubbed with 409. Rinse water was placed in containers in lab. ~~[illegible]~~ NW 4/22/96

1540 Placed sample in oven at < 100°F. Still waiting on thermometer. Oven setting at 12.

Exit Rad area

Nathan Wright 4/22/96

Nathan Wright 4/22/96

TIME	Event
12:00	T. Moore and N. Wright entered rad zone to begin testing of 13BC2. Checked scales. 500g calibration weight registered as 500.1 (or off by .02%) and 100g registered at 100.02 (or off by .02%). Did not recalibrate scales.
12:10	opened bucket took ~~OVA rea~~ VOC reading. averaged ~ 3.2 got as high as 5.2 (only for about 5 seconds) ppm. used an "hnu systems Inc photo-ionizer model HW-101 made in USA". Background is ~0.8 ppm. 23 APR 96
12:17	took paint filter sample. Data form for 13BC02EP02 for details.
12:47	Started sieving using a No. 10 sieve. 100% passed.
12:50	Begin ~~decon~~ cleaning of equipment. Since we did not "stick" sieves together this time, ~~cleaning~~ cleaning went smooth. 23 APR 96
13:15	Filled plachet ~ 3/5 full for moisture

6 23APR 96

content test. See SOP2, 13BC2MC01 for details.

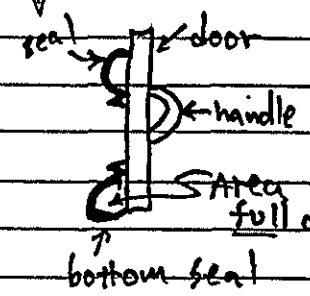
13:20 took dipper from 5gallon container and sealed container. Cleaned dipper and departed

Helen Lane 23APR96

25APR96

TIME	EVENT
13:20	checked oven samples to see if dry yet. They were closer to a "jello" state. The first sample may be dry by tomorrow. Oven temp was 106.8°F.

NOTE: A very strange thing has happened during this drying process within the oven. It appears that "excessive" condensation as developed on the door of the oven. So much has occurred that it filled the seal in the bottom of the door (see figure below) and rust has developed on all four corners. I wipped all free condensation up using a paper towel and discared it in Rad bag.



Cross section of oven door

Perhaps the condensation was due to the samples having MASS quantities of moisture -- perhaps > 300 mL. Will try to keep an eye on seal and keep dry in future.

13:30 Left the area.

Robert Ostler
25APR96

TIME	EVENT
10:50	checked oven samples. Oven temperature 103.8 and rising (on heat mode) waited until it went off, max temp. was 109.0 °F at end of cycle. Since want oven 110 ± 5, turned oven up less than one notch. Samples were still moist but very firm. Assume they will be dry by Monday. waited through another oven cycle, max temp. was 113.5 °F - GOOD! ∴ start using oven setting at 2.6 for all future moisture content test. Oven turned back on at 109.8 °F. Air temperature = 63.5 °F
11:10	waited a few cycles on the oven and ended up with a max temp of 120 °F which exceeds the 110 ± 5 degree criteria. cut back a notch and continued to observe

26APR96

11:48 Have let oven stabilize for more than 30 min. now. will now note temperature cycles to see if meets our criteria. Came on at 107.6°F, max was 113.7°F This meets the 110 ± 5°F criteria so the Dial setting should now be at 2.5 and NOT 2.6 for future test. Will check again on Monday prior to opening oven.

11:55 Calibrated volumetric flask for inch readings, starting at bottom as noted in the SESS. Appears Approximately 7.2 mL ≅ 1 inch.

12:10 Filled potable water bottles (ISCO bottles) using a clean container from other side of rad. area and pouring into bottles (not touching them) in Rad area.

12:15 leave Area

Eden Moore
26 Apr 96

29APR96

TIME	EVENT
10:10	Came in to put samples in dessicator. Oven temp. was 111.5°F. Waited for one cycle prior to removal to check current setting. max temp. was 114.1 and minimum was 109.6°F. This still meets the 110 ± 5°F criteria. The air temperature was 64.9°F Placed samples in dessicator
10:25	and left the area.

Eden Moore
29 APR 96

← 29 APR 96

TIME EVENT

12:40 Here to finish moisture content test for 13BC01 & 13BC02 See Moisture Data forms (SOP-2) page numbers 1 and 2. Checked calibration of scales, results as follows:

Calibration wt.	Reading	% diff
10g	10g	0
20g	19.99	0.05
100g	100.01	0.01

Scales are within expected guidelines.

Note - Dry soil was light brown in color while the wet soil was more Black-Brown (very dark) in color. The soil looked more organic when wet but once dry - it did not look very organic. The soil Also Appeared to have some cohesive properties, because it dryed in A cake form that broke into Several large chunks -- much like A broken cookie. Will try to break into smaller parts After moisture check

← 29APR96/3

(or After samples are reheated and re-weighed to ensure accuracy) to see if Actually does have dry cohesive properties.

13:15 Placed samples back into oven to reheat.

13:16 ~~AM~~ 29APR96 AIR TEMP = 68.4 °F

13.18 EXIT LAB AREA

Helen L. Moore
29APR96

30 Apr 96

TIME EVENT

8:29 placed samples 13BC1 and 13BC2 in dessicator. Current oven temp is 111.2°F. Lab temp is 55.8°F (note-- Air Condition has been on in Lab for past week and due to last nights low being ≈ 48°F, plus since no heat is on in lab other than oven under hood, the lab was cooler than normal).

8:40 checked scales, results as follows:

Calibration wt.	Reading	% Diff.
2g	2g	0%
20g	20g	0%
100g	100.01g	0.01%
200g	200.00g	0%

Scales look good.

12:00 Reweighed 13BC1 & 13BC2 and results were good (see SOP-2 forms pages 1 and 2).

12:10 Tried to break up samples to see how tough dry sediment was. Was very difficult to break but when did break, broke into large chunks and did not leave very much fines

behind. Wet samples and placed in pond carboy.

★ Note: dried samples did not absorb water very easily. They wanted to remain in "chunks". water remained very clear dispite efforts to "mix" sediments with the water.

12:47 opened 13BC1 5 gallon bucket. noticed top 2" + was clear as drinking water. Raul Gonzalez has now joined me and is calibrating the equipment for gravity settling test. I am to mix 5 gallon bucket for 10 min. prior to withdrawals to ensure representative sample.

3:05 Started gravity settling test (BC1).

4:00 Must redo gravity settling because confusion on what sediment layer to read. Will consult with Coe to get better ideal on what results he wants. wrapped top of volumetric ~~Flat~~ 30APR96 cylinders, cleaned equipment and left.

Note: Took 13BC01 back to pond to dump. brought in 13BC3 in 2 each one-

Liter bottles. 13BC3 appears to have similar viscosity to 13BC2. Put moisture content test in oven (see SOP-2, page 3). Fluid temp was 64.8°F.

Helen Lane
30 APR 96

TIME	EVENT
7:46	Checked moisture content 13BC3 container. Still very wet. Oven was slightly hot (at 120.1 F). Turned down a notch. will check cycle later. Checked scales, results as follows:

calibration wt.	Reading.	% diff
2g	2.00 g	0 %
20g	20.0g	0 %
100 g	100.00g	0 %
200g	200.00g	0%

8:00 The pH of the settling column test ranged between 7.2 to 7.4. pH meter was calibrated right before taking the pH reading. The temp. of the gravity settling test water was 51.4° F.

NOTE: The settle measurement of the settling column test was taken at the mark ~~while~~ 01 MAY 96 where the flocs were not moving (appeared to stop settling or falling). Note that the material looked very "Fluffy" through most of the column of during most of the test except

01MAY96

at the 15 hour reading, when it looked "milky" in the 1000 mg/L test and the rest looked light brown, and fairly turbid (could not see movement behind four highest concentration test). The Amount of sediment slurry Added to each column test to Create the desired solution is listed on the top of the forms ~~in pages~~ to 01MAY96 in the data book. For ~~13BC01~~ 01MAY96 13BC1 and 13BC2, A water density of .9998 g/cm³ was used with the dry, wet, and platchet weight results from the moisture content tests to get A slurry concentration of 135401 mg/L for 13BC1 and 61763 mg/L for 13BC2. Using these concentrations ~~with~~ to 01MAY96 with the formula in the SESS (p.3-14) the results were as follows:

SOLUTION	13BC1 Added per L	13BC2 Added per L
1K mg/liter	7.39 mL	16.19 mL
4K	29.54	64.76
8K	59.08	129.53
12K	88.63	194.29
16K	118.17	259.04
20K	147.71	323.82

01MAY96

8:50 Air temp 62.0°F (and warming, turned on heat).

940 Gravity settling tests complete. Begin preparation for Paint Filter test on 13-BC3. Using platchet A, weight = 62.02 g. 100.04 g. of sample collected 17.5°C, 6.59 pH. Results recorded on pg. #3 of the Paint filter test data form.

1230 Open 5-gallon ~~dens~~ NW 5/1/96 bucket containing 13-BC2. Note: Approximately 4 inches of clear water was observed on top of sediment in bucket. 2 liquots taken for gravity settling tests. Results recorded on pg. #2 of Gravity Settling tests Data Form.

Helen O. Moe
01MAY96

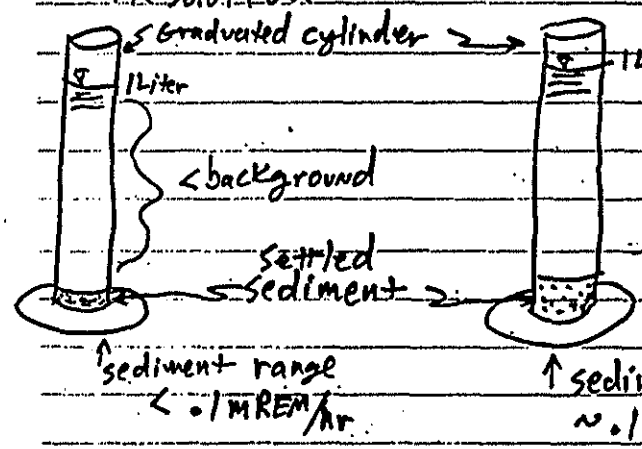
← 02MAY96

TIME	EVENT
8:00	Gathered and prepared material necessary for collecting 13BC5 and placed by door and put materials brought back from yesterdays event (empty carboy and sample 13BC4) in their appropriate spots.
8:05	checked 13BC3 moisture content sample. current oven temp = 109.8°F will check one cycle prior to opening oven door. Min = 97.0 while the max = 104.9 °F. The initial reading and this range does not correspond ?? will more gage (dial) up just a tad to see if get more stable readings. The sediment sample in the oven (13BC3) was a very thick sludge. No condensation was on the door. Air temp in lab is ~ 68.1°F.
8:45	The following Figures show the approximate gamma readings from the 13BC2 Gravity Settling Test. The test had settled for 15 hours prior to the measurements:

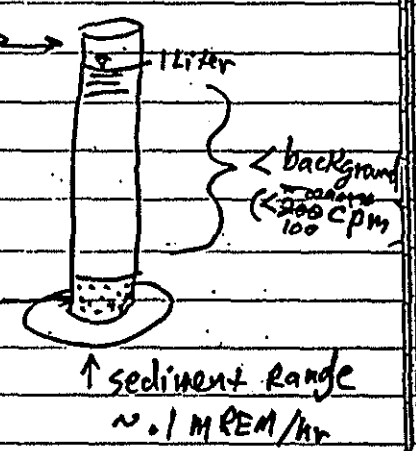
→ 02MAY96

NTS

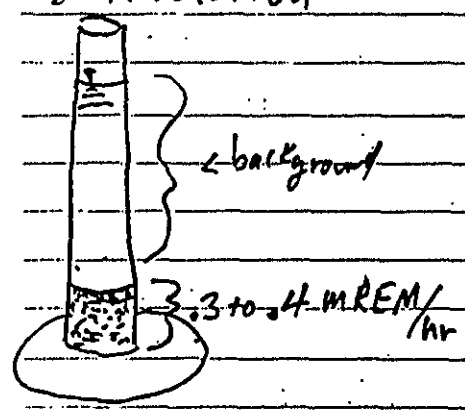
1K Solution + 4K Solution



8K solution



16K Solution + 20K Solution



note: background was ~100 cpm using pancake and 0 mREM/hr using Bicron RSO-50E. No Alpha detected

9:00 It is interesting that the supertant with 13BC2 is very clear when compared to that of 13BC1. The 13BC2ST supertant was all clear enough to see object fairly well on the other side of the cylinder while 13BC2ST supertant was still very turbid at the end of 15 hours (see pages 17 and 18 of this logbook).

13:20 checked scales. Results as follows

Calibration wt.	Reading	% difference
2.0 g	2.00	0
10.0	10.01	0.1%
20.0	20.00	0
100.0	100.02	0.02
200.0	200.02	0.01%

The vibrations in the trailer make calibrating difficult, however the above should be sufficient since we will be working with 100 + grams today

1410 check oven setting for one cycle prior to placing 13BC5 moisture content sample in it. Min = 102.0°F while max = 115.2°F Good for our Criteria.

We tried to calibrate the pH probe but the only pH it could read from the buffers was 7.0 (I would get errors with 4 and 10). We soaked it in pH 4 with no good results. will soak overnight and see if it will work properly tomorrow. ∴ we only got a temp reading from 13BC5 (= 70.5°F for sample used with moisture content test, see SOP2 forms page 000004). Air temp in trailer = 64.9°F (outside containers were black and HOT, therefor samples were a little warm)

14:30 checked the VOC's of 13BC4 when first opened the bottle. at the mouth of the bottle, the VOC meter reached a level as high as 15 ppm. In the ~~p~~ breathing zone, the meter read ~0.8 ppm. After about 10 seconds the meter only read ~5ppm at the mouth of the sample bottle. Temp of the 13BC4 sample is 65.3°F (sat in lab overnight). The VOC meter was just calib. by N. Wright.

15:00 Ended the other paint filter test (13BC5) to start 13BC4. All samples ~~coll~~ 02MAY96 collected in the ISCO (or 1-liter bottles) are broken into ~~A log~~ 02MAY96 subsamples by: ① Mixing the sample by shaking the ISCO bottle back and forth but not forcefully. This is accomplished by using the air bubble in the bottle and tilting back and forth (~45° angle) while rotating the bottle. ② As soon as air bubble gets to lid, bottle is opened and ~~an~~ 02MAY96 the subsample is quickly poured out. If too much sample is poured out, the receiving container is stirred while some of the sample is scooped up and placed back into ISCO bottle. If not enough material is poured into the receiving container, steps ① & ② are repeated and more material is poured into the container. Although 13BC3, 4, and 5

had 2 separate bottles (each containing one liter of sample), the samples should be identical since taken back to back and mixer was on during withdrawals -- EXCEPT for 13BC5 which was in a drum. The drum was mixed for 20 min and then the mixer turned off while the lid was moved aside to collect the sample. The sample was extracted using the dipper developed by the MAD group (see their site log book for dipper details). One sample appears to be thicker than the other and it is the focus of our work for the 13BC5 laboratory analysis. The thinner 13BC5 sample will be sit aside and only used if necessary.

Some gravel collected from the bottom of the 13BC3 container were scooped from the bottom of the "cleaned" container (noticed after the transfer or consolidation of 13BC3 into 13BC1) by the MAD

02MAY96

Group. We may sieve these to get an Ideal of what sizes did not become suspended enough to be withdrawn when we collected the 13BC3 lab (or 1-liter bottle) samples. No gravel has appeared in this sample from our collection taken through the ball valve thus far. See Field Log book for explanation on why this may have happened. No gravel was observed for 02MAY96 from the other containers yet (must still add 13BC4 + 13BC5 to pond composit container).

16:00 Still waiting for paint filter to finish dripping (from 13BC4).

02MAY96 moisture contents in oven are 13BC3, 4, and 5.

17:30 Paint Filter test completed. cleaned and left lab.

Zelma D Moore
02MAY96

345 N.Wright NW 5/3/96 ~~arrives~~ enters Red zone. Begins monitoring temp. of oven. 104.3°F and falling. Oven came on at 97.3°F. Temp. ↑ to 104.0°F. Turned up oven ~ 1/4 to 1/2 notch; Oven turned on at 99.7 F°. Temp. ↑ to 109.2 F°. Will leave at that setting for now.

Nancy Wright
5/3/96

06MAY96

TIME EVENT

12:15 Nathan Wright had entered the RAD area at ~9:00 and placed 2 of the moisture content samples in the dessicator. I (Telena Moore) are now here to weigh them and place ~~final~~ 06MAY96 the other dry sample in the dessicator (the dessicator is very small and can only handle 2 samples at a time. check scales:

calibration wt.	Reading	% diff.
2.0 g	2.00 g	0%
5.0 g	5.00 g	0%
50.0 g	50.00 g	0%
100.0 g	100.02	0.02%
200.0 g	200.01	0.005%

Scales look good. See SOP 2 forms for sample results.

Checked oven cycle: max = 115.5°F

~~min~~ 06MAY96 min = 107.2°F

Labeled the 6 each 1-Liter bottles from 13PC1 CP 07MAY96. Randomly picked two for moisture content test. ~~Placed at least~~ 06MAY96 Filled Al platchetts at least ½ full each so we will have enough sample for

06MAY96

grain size distribution and specific gravity test (need dry material for these). See SOP 2 pages 6 & 7 for more details on Moisture content test.

13:10 The Gravity settling test have been sitting for 5 days now and the supernatant is very clear -- but not drinking water clear. However they are clear enough to read easily any writting on the other side.

13:15 The 13PC1 CP 07MAY96 samples combined were reading ~ 7/10 mREM/hr while one sample bottle (well mixed) read ~4/10 mREM/hr. Note: with the shield open, the maximum reading held right next to one sample was ~1.5 mREM/hr. 13PC1 CP 07MAY96 temp ~ 66.8°F. Shook ISCO bottles for 5 min. prior to pouring samples. Since the moisture from these could effect the current moisture content test specimens in the oven, these 13PC1 samples were placed on top of

06 MAY 96

oven until A final reading can be achieved from the 13BC test specimens. Lids were left off so they could evaporate some while waiting for oven.

13:30 Checked 13BC1 bottle ~~2~~ 06MAY96 4 for VOC. Opened bottle and put monitor at mouth. Average was ~5 to 10 ppm while ~~got~~ 06MAY96 two quick spikes occurred reaching A hight of 15 ppm. Calibrated before use.

13:35 Air temp. is 70.7°F. Could not get pH meter to balance at the 4.0 range (refused to read buffer but is taking the 10 buffer now). May look into obtaining another pH probe. This probe Appeard to quit working properly once used on the sediment slurry.

13:40 Exit Rad area

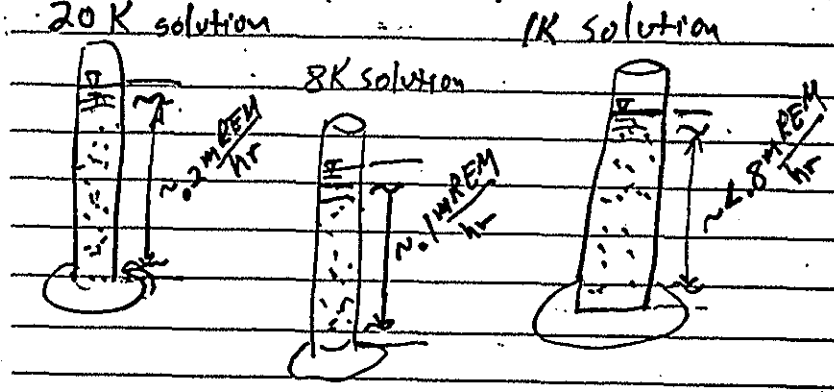
Selwyn Q. Stone
06MAY96

745 N. Wright enters RAD zone. Placed two samples in desicator from oven. Check scales

Calibration wt.	Reading	% diff.
2.0 g	2.00 g	0
5.0 g	5.00 g	0
50.0 g	50.00 g	0
100.0 g	100.02 g	0.02
200.0 g	200.02 g	0.01

845 Removed samples from dessicator and weighed. Plotlot A and C. Results in Water Content Data Form pg#'s 3 & 4. Placed plotlot B in dessicator. Placed the 13CP1 samples in oven.

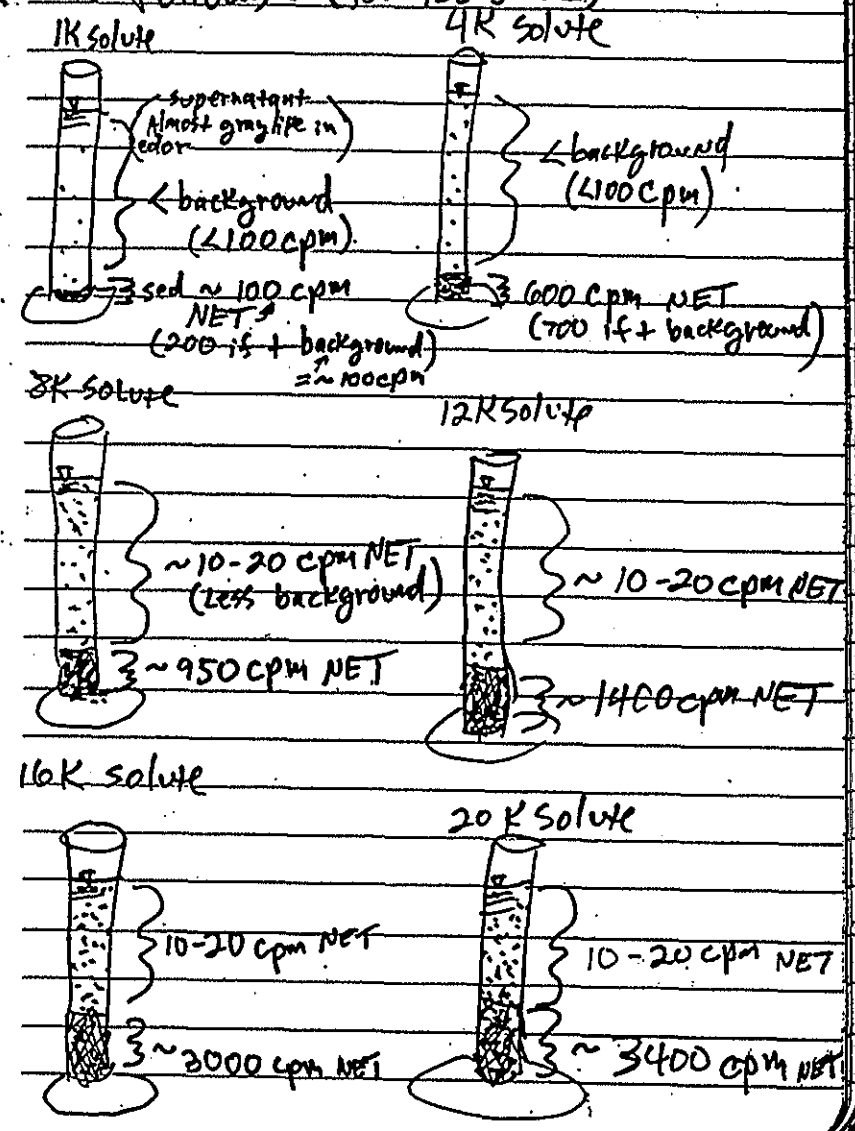
9:45 Resuspended 13BC2 settling column Test. RAD Readings on suspended material (total mix)



~~to~~ 07MAY96

13BC25T sample dumped and proceed with 13BC55T test (see p. 6 of SOP-3 lab data forms).
Lab temp. = 68.9°F
Covered 13BC3MCØ1 dried sample with water at 9:45 on 07MAY96. Like past sample it does not appear to want to dissolve. will check again to see if dissolving yet. Checked the reading of the dry 13BC5MCØ1 sample. NOTE: covered with plastic bag prior to relocating to meters. This sample had a maximum Reading of 30,000 cpm and 16 mREM/hr ~~25 to 30~~ mREM/hr (placing detectors directly over sample. Note that the bottom shield had to be opened to read the ~~25-30~~ 16 mREM/hr and if this shield was closed only read ~Ø.2 mREM/hr -- indication most of the emitters are Beta in nature. Alpha on the dry sample was ~100 cpm (outside of baggie but only ~10 cpm if left in baggie). The wet sample

had an α (alpha) of ~10 cpm.
14:00 The counts on the Gravity Settling test after 1 hour is as follows: (for 13BC55T1)



15:00 An error was just determined in the 13BC5ST1. A 10 mL max variable volume pipet was used to calibrate the Dosage ~~rates~~ rates for each preset volumes for 13BC5ST1 test. For example, the 1000 mg/L solution required only 6.7 mg mL of sediment slurry 13BC5. However, an extra push on the calibration pipet gave this volume an extra 0.5 mL, causing an error of ~7.5%. This error is reduced on the larger Dosage's; ~~determination~~ causing an average error of 5% to occur. Because this error is small and because several other Gravity settling test are being performed, it was determined not to rerun this test but make note that an extra .5 mL per pump incurred while calibrating the volumetric flask used to collect the dosages ~~from~~ for the settling column

test. This was the first time Nathan had used such a pipet and this error will not occur again (nor did it occur with the previous gravity settling test).

16:00 Tried to calibrate pH probe again. Now only reading a pH of 7, does not read 4 or 10 buffers. Give up on this probe -- did everything the literature said to do but still does not work. Look into a replacement.

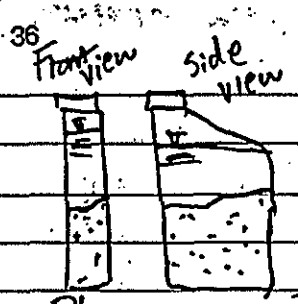
Pulled 13BC3 samples to prep for settling test. Both 1 liter bottles settled as follows:

	Bottle (1)	(2)
$\frac{\text{in of sediment}}{\text{in of liquid}}$	$= \frac{2\frac{5}{8}}{3\frac{5}{8}} = \frac{2.63}{3.63}$	$= \frac{3\frac{3}{8}}{4.0} = \frac{3.38}{4.0}$
ratio	~ = .72	= .84

Avg diff ~ $\frac{.12}{.78}$ ~ 15%

This is a ROUGH approximation but the ratio's are not too far off. Big cause for error is uneven settling of sediment, for example, → see Figure

07MAY96



example of sediment settled bottles.

Plus, since these samples were withdrawn back to back, they should be representative of each other. Both bottles used to obtain sediment for settling column test.

1720 Prep samples for Grain Size Distribution Test. Sample 13PC1. Platchett Br weight = 61.69g. Platchett Es weight = 60.48g. weight of planchet B + wet soil = 320.02g. weight of planchet E + wet soil = 288.37g. Temp. of sediment was 70.3°F samples placed in oven to dry.

1730 Took PID reading = 0.5. Calibration checked, still calibrated.

1745 Activities complete for the day. Leave RAD zone.

7MAY96

TIME	EVENT
7:30	Nathan Wright + Telena more enter rad area and start testing on 13BC35T01. Telena took several pictures of this test and of the dry + soaking moisture content samples. Note on this -- the sample we started soaking 24 hours ago is still firm and does not readily dissolve. will let soak for a few more days to see if a difference occurs then. Also took pictures of the settled ISCO bottles from the same base composits to show ~~similarities~~ similar features which help to prove they are representative of each other. Air Temp of lab is 68.1°F Potable water temp is 70.3°F. The water has been sitting in the trailer for 2 days and should be ~ same or slightly cooler than the Average Trailer air temp. will monitor air temp to obtain maximum reading between Air

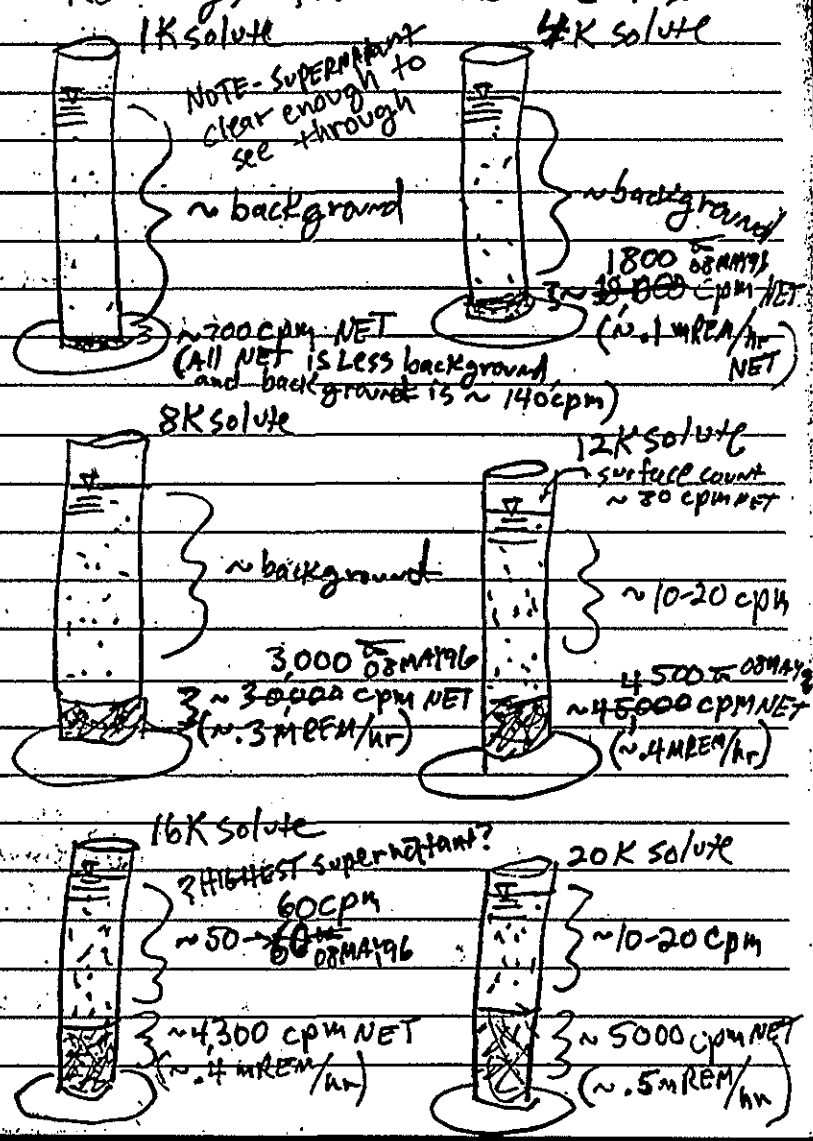
08MAY96

08MAY96

Conditioning cycles.

8:55 calibrate volumetric cylinder for 13BC4 Gravity Settling Test.

9:45 Readings from 13BC3ST01



Note - ~~past~~ 08MAY96 readings were ~ 2 hours from start of test. The one high supernatant reading looked as if there was excessive material "stuck" to the sidewalls when compared to the others. Perhaps this container was not cleaned as well from previous test which could result in a buildup? Will ensure ~~futer~~ 08MAY96 future cylinders are more adequately cleaned in case this is the cause.

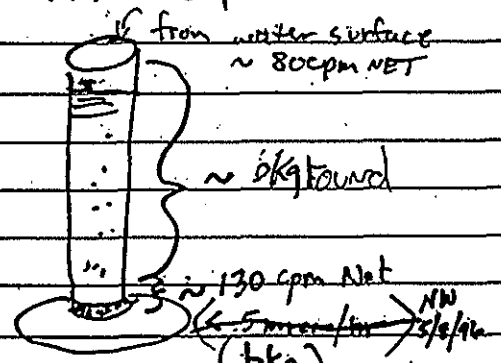
11:45 Started 13BC4ST01. Note - when preping samples, we noticed that these test had a lot of sand (A lot as in more than the others).

12:10 so far, our maximum Air temp. Reading has been 72.9°F Potable water temp is now reading 71.9°F. The Rad readings were as follows: (see next page)

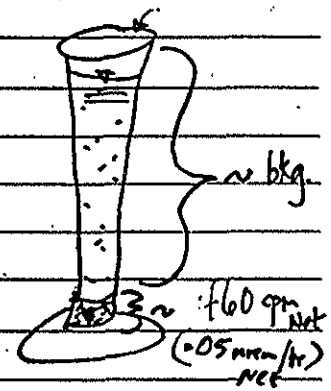
Eden Moore 08MAY96

40 NTS 13BC4STØ1 08MAY96

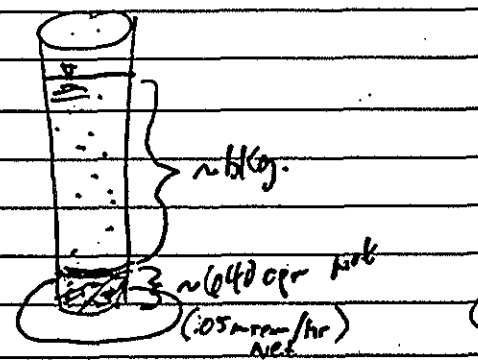
1K solution



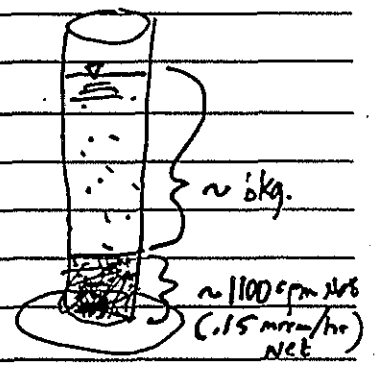
4K solution



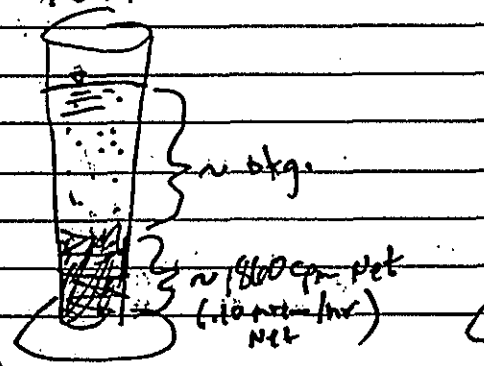
8K



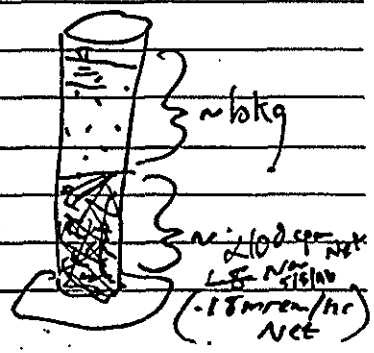
12K



16K



20K



08MAY96 41

The Rad readings were take right at the end of each test (or after settled for 1 hour). Will let samples settle overnight and get a total settled volume then.

1310 Lab activities completed for the day

[signature] 5/8/96

10 MAY 96

Time	EVENT
8:00	checked the soaking oven dried sample, water bath still clear. stirred some to see if tendency to break-up, but remained firm and unbreakable (unless forced to break).

Check scales

Calibration wt.	Reading	% diff
2.0 g	2.00 g	0 %
10.0 g	10.00 g	0
100.0 g	100.02	0.02 %
200.0 g	200.01	0.005 %

Scales look good. will start TSS test on 13BC4 ST01, Re-suspended the samples, let set for 1hr. (test duration time) and decanted supernatant. Did not do this right after test because we wanted to see effects of settlement over a few days.

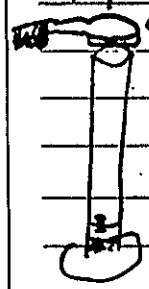
9:00 ~5 grams of the limestone looking gravel was extracted (and washed) from the handfull of ~~[illegible]~~ at the Bottom of 13BC3 (see Field log book for more details). This

sample was damp but not saturated and gave a Rad reading of ~3,800 cpm. Checked with vinager (Kroger Distilled white vinegar) and not one bubble formed. This stuff crumbles very easily -- perhaps its bentinite rather than lime??

Air temp of lab is 70.5°F

Also extracted some of the riprap (or manmade looking) gravel from this sample and washed it off. The Rad count on this was ~1600 cpm. Both gravel samples were checked damp (but not saturated) and at a distance of ~1/2" to 1". The gravel weighed ~32 grams.

After Decanting the ~~Filtrates~~ ~~[illegible]~~ Supernatant, the Readings from top of Graduated cylinder is as follows



← probe Reading 13BC4ST01

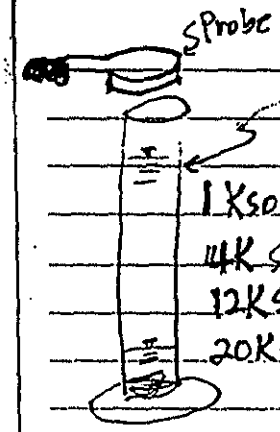
@1K solute, = ~90cpm
@4K solute, = ~90cpm NET
@8K solute, = ~90cpm "
@12K " , > ~110cpm "
@16K " , = ~150 cpm
@20K " , = ~150 cpm "

10MAY96

10:00 Since the ~~color~~ pH meter is still not working properly, we got some color pH Indicator strips to use when practical (i.e. may not get "true" color on thick sediment slurry). The pH of the 13BC4 ST01 samples all read around 7 on the pH scale.

11:30 Just realized the TSS were not taken from other Gravity settling test but should have been. Reset 13BC5 for obtaining TSS only readings. Added the predetermined volume to the ~~graduated~~ graduated cylinders, mixed for 5 min, then decanted at the end of one hour. Did not have enough sample to do All 6 solutions, so picked the two low, a middle, and a highest concentration to get overall range. (or created a 1K, 4K, 12K, and 20K solute). The Rad readings are on following page. Temp. of potable water is 68.2°F. See SOP4 for TSS results from 13BC5ST-RERUN.

13BC5 ST-RERUN



	Reading Prior to Decant	Reading After decant
1K solute	~60 cpm NET	~50 cpm NET
4K solute	~50 cpm "	~60 cpm NET
12K solute	~60 cpm "	~60 cpm NET
20K solute	~100 cpm "	~250 cpm NET

Also setup for the 13BC3ST-RERUN. Did not have enough for All test so ran the same series as rerun with 13BC5ST-RERUN (or in other words, ran 1K, 4K, 12K, and 20K). See SOP4 for TSS results from 13BC3ST-RERUN.

NOTE: Earlier I mentioned that 13BC5 had A "thicker" looking supernatant than the others, and it is Also filtering slower than the others. It is interesting that the RAD counts are lower Although the supernatant is thicker.

Galen R. Morse
10MAY96

13MAY96

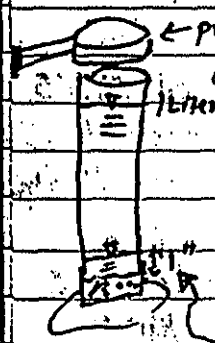
TIME EVENT

7:45 Check Scales:

Calibration wt.	Reading	% diff
1.0 g	1.00 g	0 %
2.0 g	2.00	0
10.0 g	10.00	0
100.0 g	100.01	0.01
200.0 g	200.02	0.01

Scales are good, weighed samples in Dessicator And put new ones in Dessicator (from oven). Oven temp is 111.3°F.

TSS was performed on 13BC35T-RERUN. Rad results as follows



Concentration	Reading Prior to Decant	Reading After Decant
1K	~ 40cpm NET*	~ 20cpm NET
4K	~ 50cpm NET	~ 100cpm NET
12K	~ 60cpm NET	~ 150cpm NET
20K	~ 70cpm NET	~ 170 cpm NET

*NET means less background of ~ 90 cpm

Air temp is = 63.5 °F
Water temp is = 61.8 °F

13MAY96

turned heat on when came in -- lab was much cooler.

12:10 - Raul setup the hydrometer test. NOTE: we had last decided to run two different grain size test: 1) using a dry sieve method and 2) using a wet sieve method. We now just plan to go with the original plan but use an "air dry" sample that was not completly dry. The ASTM D422 Standard is vague on the meaning (or standard) of "air dry". Yung Chung has said that our moist slurry could classify as an "air dry" sample. Since this sample appears to be easily resuspended, there now appears to be no need to perform the grain size test on the sediment slurry (Rob Coe just came in and agreed that this method should be sufficient).

Thats all for today.

Edward Moore
13MAY96

NW 14MAY96

750 Air Temp. 67.0°F Temp of Potable water = 64.9°F

800 Check scales:

Calibration wt.	Reading	% diff.
1.0 g	1.00 g	0
2.0 g	2.00	0
10.0 g	10.00	0
100.0 g	100.01	0.01
200.0 g	200.02	0.01

8:30 – NATHAN WRIGHT INSPECTED THE MUD BALANCE AND Verified CALIBRATION USING POTABLE H_2O, RECORDING THE TEMPERATURE WHICH WAS 64.9, AND USING THE MUD BAL., READ A DENSITY/SPECIFIC GRAVITY of 1 gm/cm³. THIS WAS Verified TWICE.

1030 – Ph IS CHECKED AND RECORDED ON THE following Samples: CP1 15MAY96

13BC5 – 7.25. 13BC – 7.00

13BC3 – 7.00 13BC – 7.00 CP1 15MAY96

Telena May 15MAY96

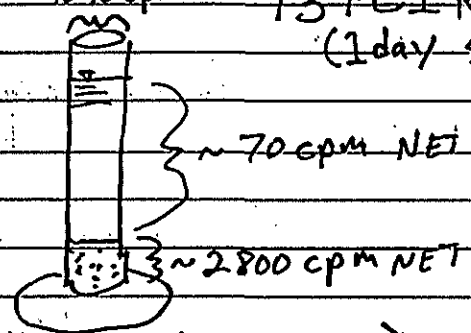
7:50 Raul and Telena entered the lab. Raul started sieving the grain size distribution test (hydrometer) material. Telena cleaned the hood due to potential contamination caused during the breaking down of the dry sample to be used for the specific Gravity test. Future break downs will be performed wet and NOT DRY.

8:40 Tested Another withdrawal from the 13BC3 container. Pages 42 and 43 details this gravel-like material. Took some of the ~~time~~ 15MAY96 chunks that broke easily, dryed until just damp chunks and placed ~ 3ml of 20% HCl on it. Although the Vinager did not cause any bubbles, the HCl did. We did not get An excessive reaction but it continued to bubble for at least 15 to 20 min (and is still producing a bubble or two at a very slow rate). This should help to prove our lime theory. A picture was taken.

15MAY96

9:30 checked the settled grain size dist. test (or hydrometer test) for Rad counts. Results as follows

13 PC1 RESULTS
(1 day settlement)



(Background ~ 90 cpm)

Took a picture of settled material, checked the scales:

Calibration wt.	Reading	% diff.
1.00g	1.00	0 %
2.00g	2.00	0 %
20.00	20.00	0 %
100.00 g	100.01	0.01%
200.00	200.01	0.005%

Scales look good.

1100 - AFTER WASHING GRAIN-SIZE (HYDROMETER) SAMPLE THROUGH A NO. 200 SIEVE, I SURVEY THE

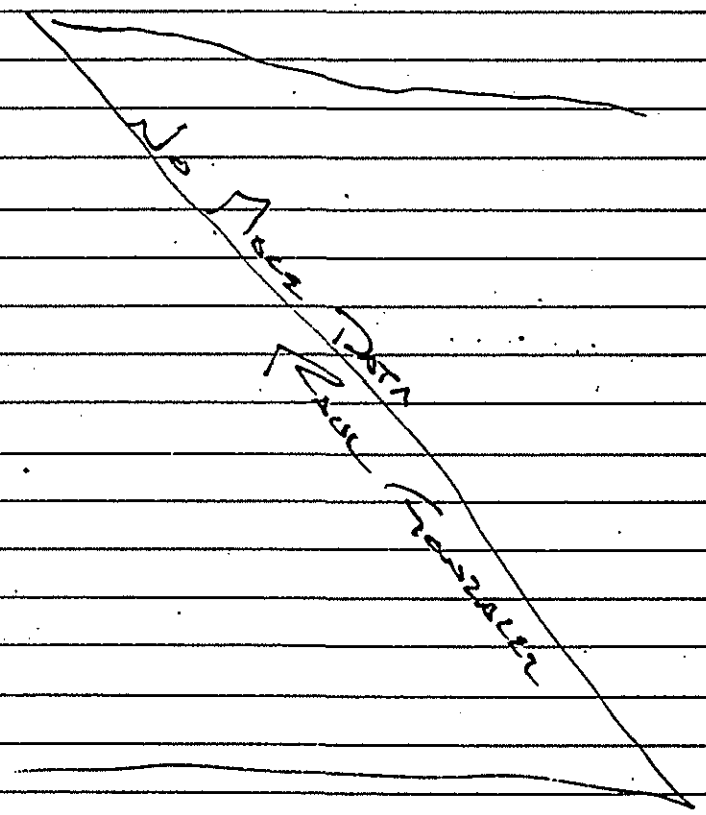
+200 MATERIAL IN AN ALUMINUM TARE AND RECORD THE FOLLOWING DATA:

WITH APROX 1/4" OF H_2O IN TARE, THE TOP OF THE SAMPLE RECORDED:

~2300 cpm (NET)

THE BOTTOM OF THE TARE RECORDED:

~ 2900 cpm (NET)



16MAY 96

7:30 TELINA MOORE & RAUL GONZALEZ ARRIVE AT LAB.
SITE H.P. IS TAKING SCUPPE SAMPLES AND USED SAMPLE CANOY IS REMOVED FROM LAB TO BE RETURNED TO POND.
RAUL REMOVED PARTICLE SIZE SAMPLE FROM OVEN AND PLACED IN DESICATOR.

8:15 CK SCALES:

CALIB. WT	READING	VAR
1.00	1.00	0.0%
2.00	1.99	0.5%
5.00	5.00	0.0%
20.00	20.00	0.0%
100.00	100.02	0.02%
200.00	200.02	0.01%

SCALES IN GOOD CONDITION

TEMPS: POTABLE H_2O: 66.8°F
AMBIENT: 64.0°F

13:00 Raul placed the dried sample containing material >200µm sieve in larger sieves to complete the

grain size distribution test. It is interesting to note that this dry material was like "brittle rubber". It would break up but not too easily.
The ~~24BC1~~ 24BC1, 24BC2 and 24BC3 samples were collected from the staging area and brought into the lab. I am sure they are thick enough for performing the required test. Sample 24BC3 temp. is 68.4°F. Air temp. is 64.2°F (samples warmer than air since just brought in from outside). Slurry temp of 24BC2 is 64.4°F. Slurry temp of 24BC1 is 64.1°F.
Performed paint filter test and started moisture content test.
Check of oven temp cycle: Max = 110.5, min = 99.7°F. Slightly low (should be 110 ±5) -- turned up just a tad. will check temp later.
15:30 check oven again. Max = 113.9 min = 109.4°F. Too hot -- turn down a tad.
END of DAY.

NW 17 MAY 96

1515 NW arrives in lab. Take pH –
24BC1 ~ 6.8
24BC2 ~ 7.0
24BC3 ~ 7.6
1530 Monitor oven temp.
Oven come on at 101.3°F
High temp. = 108.8°F will adjust.
~~Shut~~ NW 5/17/96 Oven on at 105.1°F High = 115.6°F
1540 Check scales

Calib. wt(g)	Reading (g)	% diff.
1.00	1.00	0
2.00	1.99	0.5
5.00	5.00	0
20.00	20.00	0
100.00	100.00	0
200.00	200.01	0.005

1550 Oven temp. high at 116.4°F will adjust
Took sample 24BC1MC01, placed in Oven (wet soil + plat. = 249.4 g) used plat. J. NOTE: almost no condensation on oven door. Oven high temp. at 112.4°F. Will leave at that setting. Activities complete.

[signature] 17 MAY 96

NW 20 MAY 96

1015 NW arrives in lab. Check moisture content samples in oven. They are still wet. A large amount of condensation was found on oven door. Water removed using paper towels. Check oven cycle. Max. temp 108.0°F. Will adjust.
Check Scales

Calib. wt(g)	Reading (g)	% diff.
1.00	1.00	0
2.00	2.00	0
5.00	5.00	0
20.00	20.01	0.05
100.00	100.02	0.02
200.00	200.02	0.01

1050 Perform Point Filter test ~~[illegible]~~ NW 5/20/96
24BC1EP01.

[signature] 20 MAY 96

NW 21 MAY 96

1420 NW arrives in lab. place ~~planchet~~ planchet I in ~~oven~~ NW 5/21/96 dessicator
check scales:

Calib. wt (g)	reading (g)	% diff.
1.00	1.00	0
2.00	2.00	0
5.00	5.01	0.2
20.00	20.01	0.05
100.00	100.02	0.02
200.00	200.01	0.005

1510 Check oven cycle. max temp 114.0°F
will leave at that setting.
1530 Remove planchet I from dessicator.
weight = 87.00 g. Placed back
in oven. Removed condensation
from oven door. Finished for day

21 May 96

8:00 T. Moore & N. wright arrives
at lab. check scales.

Calib wt.	Reading	% diff
1.00 g	1.00 g	0%
2.00 g	2.00 g	0
5.00 g	5.01	.2%
20.00	20.00	0%
100.00	100.02	.02
200.00	200.02	.01%

Appear ok
oven temp = 111.4°F
Air dryed sample was placed in
dessicator over night (13CP1MC01)
and weighed this morning: will be
placed in dessicator overnight again
and reweighed tommorrow.
NOTE: The ovendryed samples from
pond 3524 are drying differently
than those of 3513. For one,
the are drying uncracked (solid
cake) and thicker than the ones
from 3513. These samples are
Also more difficult to dry (been
baking for Almost A week now and
Still are not dry!).

NW 23 MAY 96

0850 T. Moore and N. Wright arrive in lab. Check scales:

Calib. wt. (g)	Reading (g)	% diff.
1.00	1.00	0
2.00	2.00	0
5.00	5.00	0
20.00	20.00	0
100.00	100.00	0
200.00	200.9	0.005

Cooled and reweighed 24BC1MC01, 24BC2MC01, and 24BC3MC01.

0920 Readings from Isco bottle sample 24BC4 Bottle #3 totaled 25,000 cpm. Bottle #3 from 24BC5 totaled 35,000 cpm.

Air Temp is 66.7

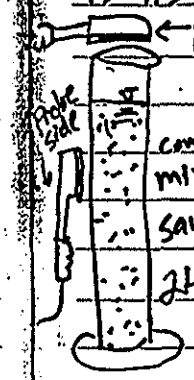
Perfomed paint filter test on 24BC4 and 24BC5. Took P.I.D. readings on 24BC5. Bkg. = 0.2 reading in breathing zone = bkg. reading at mouth of bottle = 0.8 with spikes up to 2.0.

1220 Obtained a rolling boil on the specific gravity sample 13CP1SG01. Hot plate is under hood and set to just under 6

on the dial. NOTE: First attempt at Specific Gravity test was aborted due to volume of ~~bo~~ NW specific gravity bottle. A 500 ml volumetric flask was ordered and recieved and will take the place of the 100 ml specific gravity bottle.

Note - After boiling the sample (for specific gravity test) - it actually looked lighter in color than initially. Also, the supernatant also looked very green. After about 2 hours of cooling, the supernatant was fairly clear but still had a green hue to it.

1330 started gravity settling test - initial rad readings (prior to settling) is as follows:

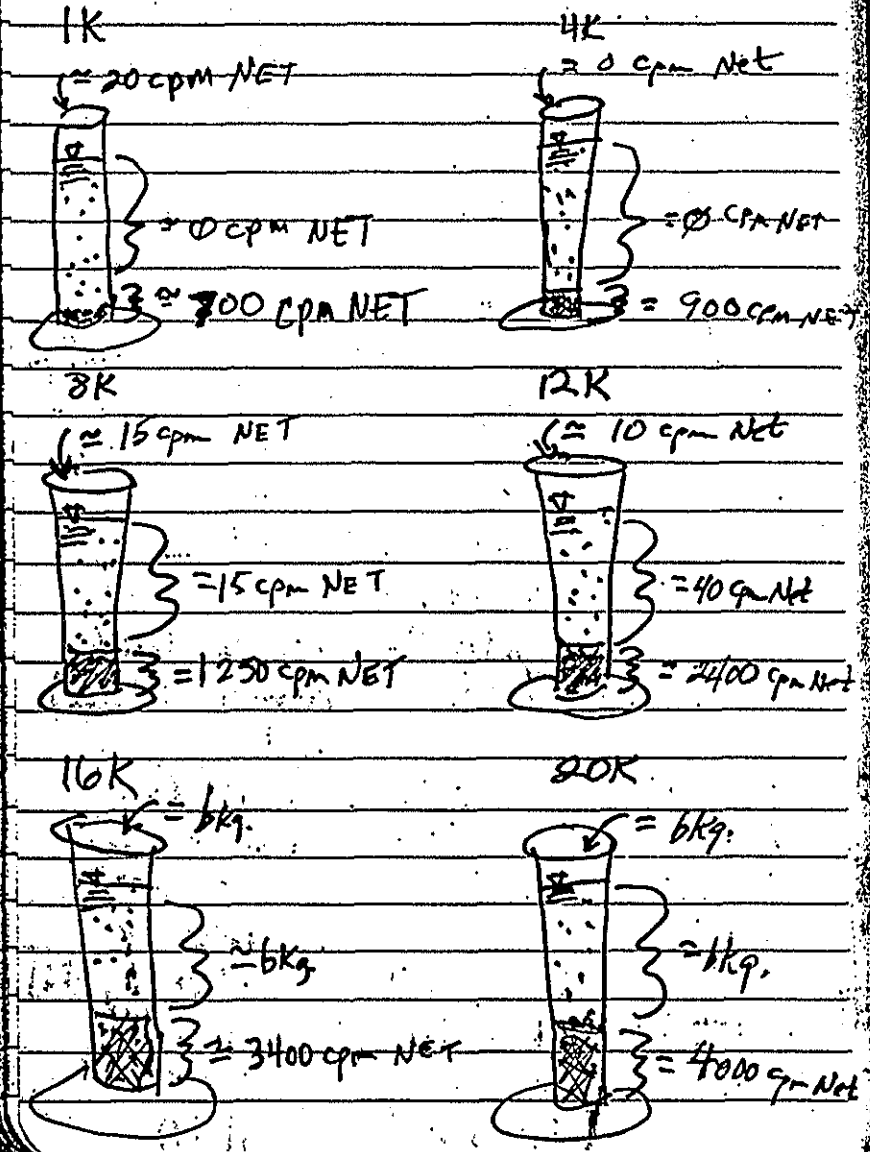


		Top Reading NET (less background)	Side Reading
completely mixed sample 24BC3	1K	80 cpm	40 cpm
	4K	100	220
	8K	200	390
	12K	300	550
	16K	480	800
	20K	600	1140

≈110 cpm

23MAY1996

Results After gravity settling test (settle for 1 hour) for 24BC3ST01:



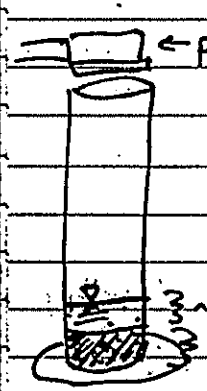
14:35 Tested a theory on how to determine if the organics or the lime was holding the samples together once dryed; Since they won't dissolve in water. we took two small chunks (~ 2 grams each) and placed in two different al boats. we put 20% HCl in one and mineral spirits in the other on the DRY sample. The one with acid bubble viplently and dissolved completly while the one with mineral spirits stayed the same. we took pictures. This helps to verify that it is not organics that is holding these samples together but must be something like lime (since likes dissolve likes).

14:50 the pH of 24BC4 & 24BC5 was checked. 24BC4 had a pH of ~7.0 while 24BC5 had a pH of ~7.5. pH paper was used to determine this.

15:35 The ~~g~~ 23MAY96 counts following ~~from~~ 23MAY96 the decanted 24BC3ST01 (used for suspended Solids test)

23MAY96

is as follows:



Solute	CPM (NET)
1K	~0
4K	~0
8K	~20
12K	~40
16K	~30
20K	~90

NOTE: After 3 hrs. the Al boat with the 20% HCl is still bubbling. (the one with the oven dryed sample in it).

16:45 Filtered All but the 16K and 20K decant. will finish the next morning. TM + NW left lab at ~ 4:50pm.

Felix O Moe
23MAY96

7:00 check scales

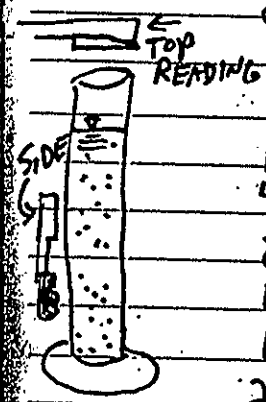
calib wt.	Reading	% diff
1g	1.00 g	0
2	2.00	0
10	10.00	0
50	50.00	0
100	100.02	.02
200	200.01	.005

9:00 Started 24BC1 ST01

Note - sample (oven dryed) that had the HCl added to it is STILL Bubbling (very slight). Plan to discard today.

10:00 started Gravity settling test (Init(A)) Read readings prior to settling as follows:

24BC1 ST01

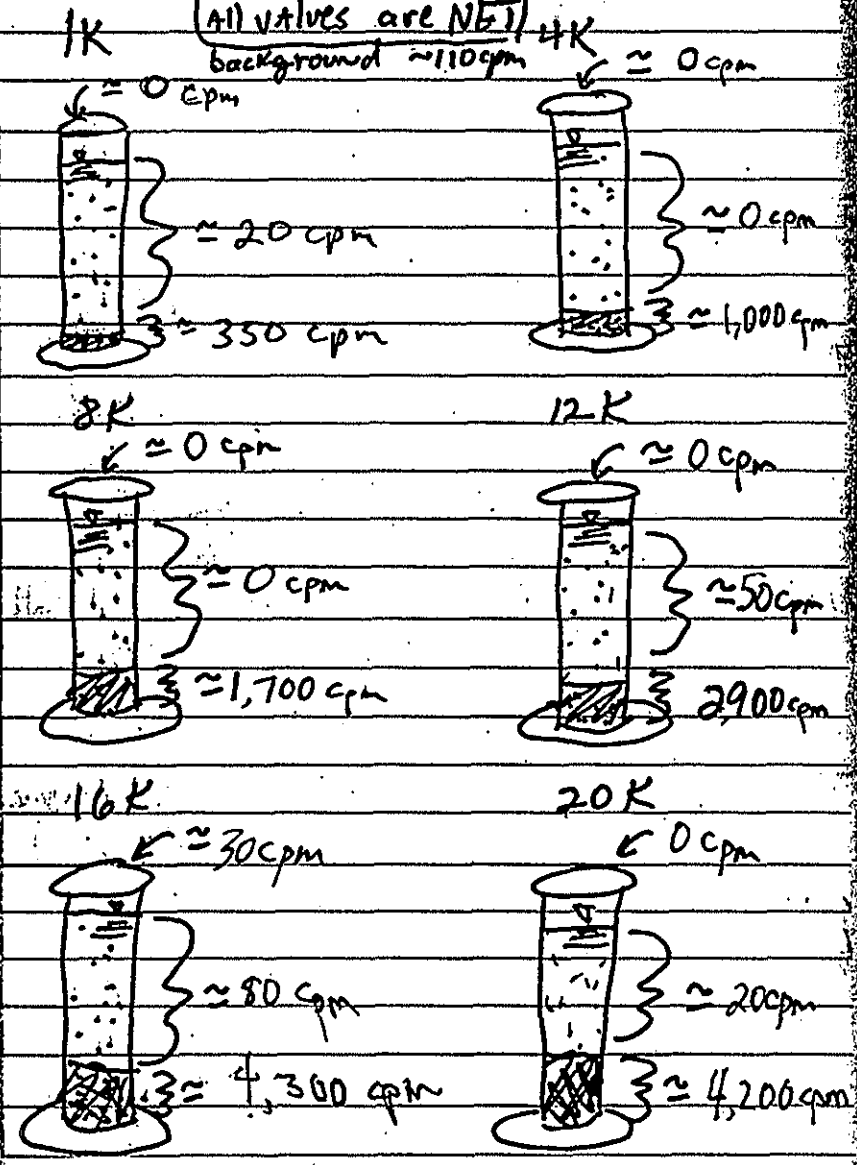


	TOP READING CPM (NET)	SIDE READING CPM (NET)
1K	<10	~120
4K	~100	~250
8K	~150	~440
12K	~300	~890
16K	~410	~1080
20K	~490	~1400

24MAY96

Results after gravity settling of 1 hour is as follows for 24BC1ST01

All values are NET
background ~110cpm



NOTE: The water column associated with the gravity settling test sample 24BC1ST01 had the most visual turbid supernatant to date per visual observation after 1 hr.

11:30 Added HCl (20%) to 24BC2 and 24BC3 oven dryed samples. They reacted violently and bubbled excessively. Took a picture. Added water to these samples and they broke down some, but not a lot. will check after soaking for several days to see if breakdown further. Took a picture of 24BC3 after soaking for 3 hours.

11:40 Started mixing 13CP1, bottle no. 4, to run one more moisture content test so we would have enough sample for the second specific gravity test. put in oven.

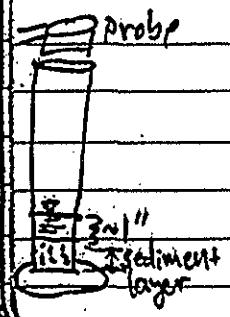
24 MAY 1996

1145 NN + TM arrive' at lab. Took picture of gravity settling test after 3 days. Water column Clear. Turbid look is due to a large amount of particulates adhering to the sides of the graduated cylinder. Will mix for one hour in prep. for the TSS test.

CHECK SCALES

CALIB. WT.	READING	% DIFF.
1	1.00	0
2	2.00	0
10	10.00	0
50	50.00	0
100	100.02	0.02
200	200.02	0.01

Counts following Decant of 24BC1ST01 (Decant used for suspend solid concentration test - SOP4):



solute	CPM (NET) [background ~110 cpm]
1 K	bkg.
4 K	bkg.
8 K	bkg.
12 K	~40
16 K	~80
20 K	~80

1500 Air temp = 65.9 °F. Water temp is 65.9 (Yes, they were same).

Preped 24BC2ST01. Mixed and took initial readings (prior to allowing to settle). Results as follows:

	top Reading cpm (NET)	SIDE READING CPM
1K	Background	~30
4K	~50	~150
8K	~120	~380
12K	~200	~580
16K	~190	~760
20K	~290	~1100

Note: we noticed a few bugs in the concentrated solute. The bugs ~~like~~ looked like small water spiders -- about the size of KNat's. Checked the concentrate for alpha emitters but none detected from wet samples.

17:20 left the lab for the day

7:40 check scales:

calib wt.	Reading	% diff
1.00	1.00	Ø
2.00	2.00	Ø
10.00	10.01	Ø.1%
50.Ø	50.00	Ø %
100.00	100.02	Ø.Ø2
200.00	200.02	Ø.Ø1

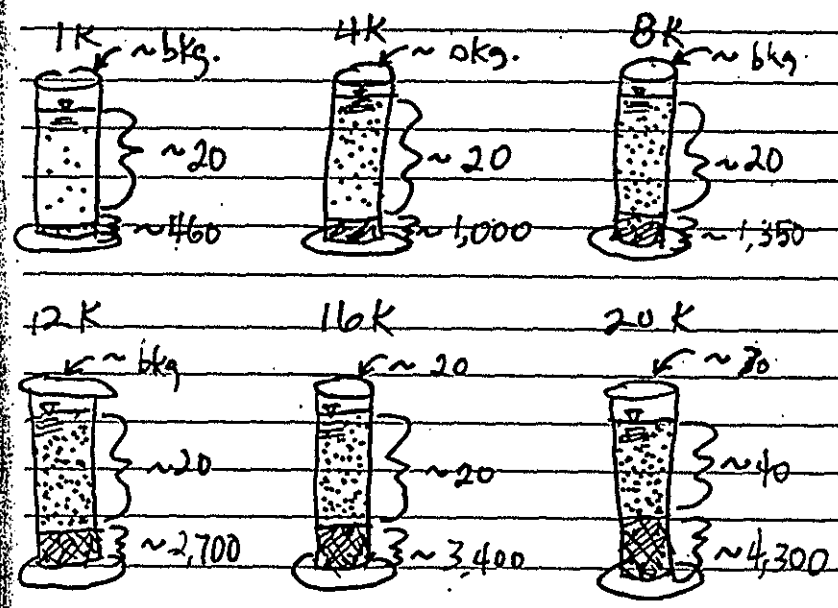
Oven temp = 117°F (slightly warm, turn down just a tad)

Air temp = 72.1°F, water temp = 68.7°F. N. Wright started the 24BC2STØ1 runs. T. Moore proceeded to run some filtrates (or TSS) and weigh dry samples. Checked air dryed 13BC1 sample that had been soaking since yesterday. Like the oven dryed samples, it does not want to dissolve either.

NOTE: we had prepped the 24BC2STØ1 last night. After setting overnight, the supernatant was still very dark (especially on 8K and up). Durring the test, the supernatant was so dark

that we had to look hard for the sediment layer. We did notice that the sediment appears to be settling out more quickly (looks more ~~grainy~~ granular than most) but this one may exceed 24BC2STØ1 when it comes to turbidity of the supernatant!

RAD counts from 24BC2STØ1 is as follows: All counts are NET in CPM



Counts above were after 1 hour settling.

29 MAY 1996

Took 24BC1, 24BC2 and 24BC3 back to pond for dumping. Also took carboy and emptied it. Collected and brought back to lab the 24CP ~~composite~~ pond composite. Setup 24CP1 moisture content test and prep for Singleton Laboratories grain size distribution sample. Prep sample info as follows:

Plantchette	Empty wt.(g)	Full wt.(g)
D	62.42	336.61
J	60.97	313.66 g

Slurry temp = 78.8°F
used bottle #4 for D
used bottle #2 for J
Note - temp of slurry slightly high because just came in from outdoors.
Lab air temp = 68.7°F

Eileen O'Leary
29 May 96

30 MAY 1996

845 N. Wright & T. Moore enter LAB. Took picture of 1 day settled 24BC2 settling test. Note - Samples had a significant ~~Amount of~~ Tremendous Amount of particulates stuck to the side walls -- especially the more concentrated solutes. Resuspended and decanted supernatant for TSS (Sop 4) test. Check scales:

Calibration wt.	Reading	% diff.
1.00	1.00	0
2.00	2.00	0
10.00	10.00	0
20.00	20.00	0
100.00	100.02	0.02%
200.00	200.01	0.005%
500.00	500.1	0.02%

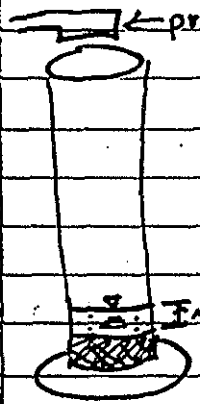
Recalibrated scales & recheck:

wt.	Reading	% diff
1.00	1.00	0
10.00	10.00	0
20.00	20.00	0
100.00	100.01	0.01
200.00	200.01	0.005
500.00	500.0	0
1000.0	1000.0	0

72 — 29MAY1996 30 31MAY96

9:30 ~~to~~ check our validity in assuming the pond 3524 sediments would all pass through a #10 sieve, we took the pond composit (24CPI) and ran 102.26 g through the no. 10 sieve. 100% passed through this sieve.

The Rad counts following Decant of 24BC2ST01 is as follows



solute	READING cpm (NET)
1 K	Background (~0)
4 K	Background
8 K	20 to 30
12 K	40 to 50
16 K	50 to 60
20 K	~80

NET = TOT(cpm) − background(cpm)
↑ ~110 cpm

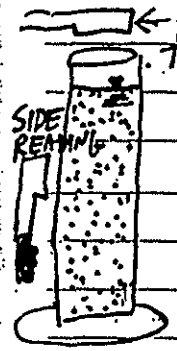
Checked β-γ readings on some of the dry samples. Results are

Sample ID	~weight (g)	βγ (mREM/hr)
13CP1MC05	18.2	8
24BC4MC01	18.2	15
24BC5MC01	22.2	17

29MAY1996 30 31MAY96

The meter was held ~2" from sample. All three samples were oven dryed.

24BC4ST01 was preped. The starting Rad count is as follows:



	TOP Reading NET cpm	SIDE Reading NET cpm
1K	20	50
4K	30	310
8K	170	600
12K	300	850
16K	500	1100
20K	650	1250

17:00 T Moore & N Wright leaves for home.

Helen L Hoel
29MAY96

7:30 N. Wright and T. Moore enters Rad area. N. Wright begins 24BC4 ST Ø1 test. It is interesting that these settled to A near drinking water clearity overnight while 24BC1 and 24BC2 was still VERY thick After one day of settling. This indicates the west end is slower to settle than the East end of pond 3524. This may be due to the west end having a more shallow sediment depth, thus requiring collection of more of the algea from this Area (One Theory).

We decided to compare overnight β-γ counts on the supernatant from the WEST and East end. Results as follows

WEST END (24BC4)	EAST END (24BC2)
solute:	solute:
All (1K → 20K)	All (1K → 20K)
γ-β: All counts Below background	γ-β also

So even though the supernatant is much higher on the west area of pond 3524, the γ-β counts are obviously below background (currently at ~100 cpm) indicating most of the rad material settles out for the concentration range we are testing.

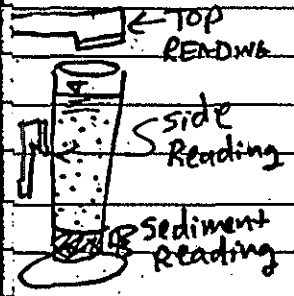
Checked scales:

Calib. wt. (g)	Reading (g)	% drift
1.00	1.00	0
2.00	2.00	0
5.00	5.00	0
10.00	10.00	0
20.00	20.00	0
50.00	50.00	0
100.00	100.02	Ø.02
200.00	200.0Ø 1 = 31 MAY 96	Ø.005 %
500.0	500.0	0
1000.0	1000.0	0

oven temp = 110.4 °F. Air temp = 69.6 °F, water temp = 65.2 °F.

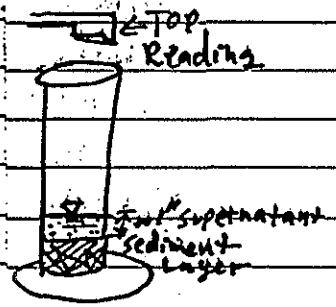
9:15 am γ-β counts for the 1hr 24BC4 sediments are as follows:

31 MAY 1996



Solute	CPM NET TOP	SIDE	SEDIMENT
1K	0	0	600
4K	0	0	1200
8K	0	0	1800
12K	0	30	3000
16K	0	30	3700
20K	0	50	3800

Results After decant are as follows:



solute	Top cpm (NET)
1K	background
4K	background
8K	background
12K	< 10
16K	10 to 20
20K	20 to 30

Prepped the 24BC5ST01 test. As with All the ST test, the sample was mixed virgeously for 5 min. prior to extraction of concentrate. The β-γ results from the complete mix is As follows:

31 MAY 1996

24BC5 ST01

Solute	CPM NET Top	Side
1K	20	40
4K	40	400
8K	160	580
12K	280	850
16K	340	1100
20K	500	1400

Background ~110 cpm

Eden Rose 31 MAY 96

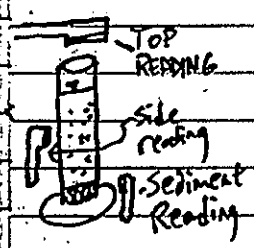
03JUN1996

7:45 T.M. + N.W. arrive at lab. Begin Gravity settling Test 24BC5ST01. Took 3 day readings - very clear. Note: It was extremely difficult to get an accurate reading until ~ 20 min. mark, material settling very slowly.

Check Scales:

Calib. wt.	Reading	% diff.
1	1.00	0
2	2.00	0
10	10.00	0
20	20.00	0
100	100.01	0.01
200	200.02	0.01
500	500.0	0

4:15 β-γ counts for the 1hr 24BC5 as follows:



	CPM NET		
Solute	TOP	SIDE	SEDIMENT
1K	0	0	680
4K	0	0	1400
8K	40	30	2000
12K	0	20	3200
16K	40	40	4200
20K	20	100	5000

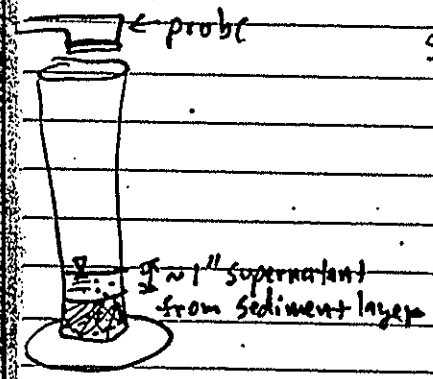
03JUN1996

Started second 13CP1 specific gravity test. will boil sample today and Allow to cool overnight.

10:30 Air temp = 68.0°F, water = 66.2°F

Note - Started filtering 24BC4ST01 decants. These decants were more "rust" color ~~with~~ 03JUN96 while 24BC1, 2, and 3 were more "black-brown" in color (closer to black). 24BC5 Also Appears more rusty in color.

β-γ counts on decanted 24BC5ST01 are as follows:



Solute	Top Reading NET CPM
1K	< background
4K	~ 10
8K	~ 30
12K	~ 80
16K	~50
20K	~70

(Background was ~90 cpm)

John O'Mare 03JUN96

NW 04 JUN 1996

7:45 NW + TM arrive in lab
check scales:

Calib. wt.	Reading	% diff
1	1.00	Ø
2	2.00	Ø
10	10.00	Ø
20	NW 6/4/96 ~~1.99~~ 2000	Ø
100	100.01	0.01
200	200.01	Ø.005

Finished Settling column test and decants. Filtering process is slow for pond 135 24 but at the rate we are going -- we should be through by Friday. 12:00 Raul Gonzalez has made an appearance to start the grain size distribution test on the 24CP1 sample. Filtrates continue as well.

Teresa Moore
04 JUN 1996

7:30 T. Moore, N Wright, and Raul Gonzalez
Check scales:

Calib. wt.	Reading	% diff.
1	1.00	Ø
2	2.00	Ø
10	9.99	0.1
20	20.00	Ø
100	100.00	Ø
200	200.01	0.005

Took β & count on CPCP1 bottle #1. Results = 29,000 cpm. Completed several Filtrates. Attempted 3 Paint filter tests on CPCP1 bottle #1. All three failed within 11:00 min. Began moisture content for CPCP1.

Nathan Wright
Ø5 JUN 1996

06 Jun 96

7:30 N. Wright, T Moore, and R. Gonzalez enter lab. Paul continues his work on the grain size distribution test on 24CP1. T. Moore and N. Wright continue their decant-filtering and tries to run the COMP 1 paint filter test to Non-Failure length of time.

Checked scales:

calib. wt. (g)	Reading (g)	% diff
1.00	1.00	0
2.00	2.00	0
10.00	10.00	0
100.00	100.02	0.02
200.00	200.02	0.01

After discussing the matter with Rob Coe, we decided to perform one more 3513 pond sediments gravity settling test. We chose 13CP1 to perform this test on. We chose to do one more test on pond 3513 because we lacked a few suspended solids

results from some of the base composits from this pond. We succeded with one of the paint filter test. will try to run the second test on another day. We set-up the gravity settling test prior to leaving the lab. We will get an overnight reading then resuspend them and get the regular results. Test ID is 13CP1ST01.

1640 We are out of here for today

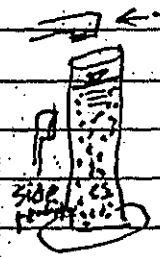
Eileen O Maul
06 JUN 1996

1230 NW enters lab.

Check scales:

Colib. wt	reading	% diff.
1.00	1.00	0
2.00	2.00	0
10.00	10.00	0
100.00	100.02	0.02
200.00	200.01	0.005

13CP1STØ1

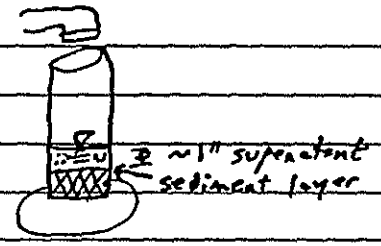


Solute	CPM NET TOP	CPM NET SIDE
1K	0	0
4K	70	190
8K	210	500
12K	320	700
16K	420	900
20K	460	1300

13CP1STØ1 1 hr. reading

Solute	CPM NET TOP	CPM NET SIDE	CPM NET SEDIMENT
1K	0	0	250
4K	0	0	920
8K	0	0	1400
12K	0	40	2500
16K	0	20	3000
20K	0	60	3600

Results after decant 13CP1STØ1



Solute	Top cpm Net
1K	0
4K	0
8K	20
12K	60
16K	60
20K	120

1630 Began Moisture content test 13CP2MCØ1. This is the sample collected from COMP 13 after supernatant was removed.

Ø7JUN1996
NW 6/7/96

10 JUN 1996

800 T. Moore, R. Gonzalez, and N. Wright arrive on site.

check scales

Calib. wt.	Reading	% diff.
1.00	1.00	0
2.00	2.00	0
10.00	10.01	0.01
20.00	20.00	0
100.00	100.02	0.02
200.00	200.02	0.01

Air dried sample 13CP1 was removed from under hood where it had been soaking in potable water since 28 MAY 1996. No difference between oven-dried and air dried was noticed. Sediment very cohesive. Performed Paint filter test CPCP1EP05 and started moisture content on sediment in filter. Completed Total Suspended solids.

Nathan Wright
10 JUN 1996

10 JUNE '96

8:00A – N. WRIGHT & R. GONZALEZ ARRIVE AT SITE LAB

– CHECK SCALES:

CALIB WT	READING	% diff
1.00	1.00	Ø
2.00	2.00	Ø
10.00	10.00	Ø
20.00	20.00	Ø
100.00	100.02	.02
200.00	200.02	.01

SET UP AND BEGAN running 1-DEMENSIONAL CONSOLIDATION TEST on SAMPLE CPCP1 DØ1

SpG's on 24CP1SGØØ and 24CP1SGØ2

R. GONZALEZ
11 JUNE 96

7:30 T. Moore & R. Gonzalez enter lab.
Raul continued with the consolidation test. The oven was still collecting moisture around the door and some of the samples still look damp (but not "wet"). We decided to wait another day before weighing the samples from the oven.
Notes on Comp 1 gravity drained samples used for the consolidation, Harvard Minature Compaction (HMC), and Zero headspace Extraction (ZHE) test: The sediment was still very damp but was thick enough to put into the molds. Raul also noted that if the sample was taken from the molds that they held their form but would slump. The sample was too wet for the HMC test and had to be spread out to dry (in hooded area) to desirable dampness. This sample has been drying for 3 days and today we noticed it had several Knat's (small flying

insects). Needless to say, some were mixed into the HMC sample when turning the mix. We have been turning the mix daily to prevent the outer crust from drying. No additional "free fluids" appeared to drain from this sample into to bottom gaps of the container (see through plastic). Took picture of container and HMC sample.
The ZHE apparatus is not available due to the machine shop holdup. We are ready to run the test but apparently will have to wait until Friday for this item. I will call Yung Chung at Singleton and see if we can speed up this process.
→ I checked the soaking oven dryed samples from 3513 and 3524. Both samples do not appear to be dissolving anymore however, the samples do appear to be breaking up more easily when provoked. As suggested by Paula Watts (OpTech, Oak Ridge), I checked the pH of the soaking waters on both

12JUN1996

samples. The pH of 3513 was 7.0 while the 3524 pH was 8.0. This indicates that after drying and then resaturation, the 3513 pond did not appear to "leach" ~~and~~ ~~[illegible]~~ any material that would effect the pH (since the water added to the bath was close to 7.0 also) BUT, since the pH of the 3524 sample appeared to go up a scale, it appears it may be leaching more than 3513. However, the amount of material in each bath may effect this comparison since 13BC3 only contains ~7grams of material while ~~13~~ ~~[illegible]~~ 24BC3 contains ~25grams of sediment. Perhaps if 13BC3 had an equivalent sediment mass, it too may have a higher pH ???

Check scales:

Calib wt (g)	Reading (g)	% diff
1.00	1.00	0
2.00	2.00	0
20.00	20.00	0
100.00	100.01	0.01
200.00	200.01	0.05
1000.0	1000.0	0

12JUN96

water temp = 66.5 , Air temp = 68.3°F
Raining outside.

13 JUN 1996

0700 T. Moore & R. Gonzalez enter lab. Raul continued with consolidation test. Air temp = 66.8°F, Fluid temp = 65.3°F

check scales:

calib wt (g)	Reading (g)	% diff
1.00	1.00	0
2.00	2.00	0
10.00	10.00	0
20.00	20.00	0
100.02	100.02	0.02
200.00	200.02	0.01
500.0	500.0	0
1000.0	1000.0	0

A COMPARISON TEST WAS RUN ON THE pH PAPER USING THE BUFFER SOLUTIONS AND THE RESULTS of our VISUAL OBSERVATIONS ARE As follows:

Buffer Sol. pH		pH Paper Reading
4.0	≈	3.8
7.0	≈	7.2
10.0	≈	10.2

Results from the specific gravity tests for 24CP1 were 2.45 and 2.25. Due to these differing by 8.5 %, we decided to run one more test to see which is the more accurate result.

Julian O'Neill

14JUN 1996

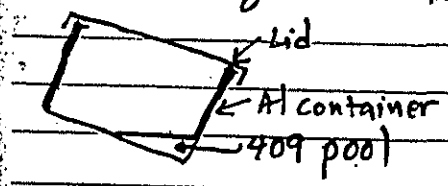
8:00 R. Gonzalez and T. Moore entered Lab. Raul continued consolidation ~~test~~ test. check scales.

calib. wt. (g)	Reading	% diff.
1.00	1.00	0
2.00	2.00	0
10.00	10.00	0
20.00	20.00	0
100.00	100.02	0.02
200.00	200.02	0.01
500.00	500.0	0
1000.0	1000.0	0

NOTE: If a sample container was decanted and additional samples were collected out of it, the new ID number would be labled with a "D" in the name. The following two were changed accordingly

ORIGINAL ID	ID AFTER DECANT
13CP1	13CPD
~~CPPC~~	
CPCP1	CPCPD

Additional note: The large Al containers with lids (or "soil containers") have been reused several times. Even after cleaning the containers, a discolored irridized black film remained. N. Wright added a little 409 to one of the containers, tilted it to where the 409 puddled on one side (see picture below) and let it set overnight. It is interesting



that the one spot where the pooled 409 was came clean as new yet just cleaning with 409 does not remove this irridized film. Took a picture.

Air Temp = 66.0 °F, water temp = 67.2

Zelen D Moore
14JUN96

17JUN1996

8:00 T. Moore & R. Gonzalez enter lab. Raul continues with Consolidation test. Although the ASTM D2435 standard mentions that we can take the load up to 8 tons/ft², After consulting with Rob Coe we decided 4 tsf is a sufficient consolidation load for ~~the purpose~~ 17JUN96 this task. This is because the 4 tsf (~56 psi) is closer to the maximum bearing load being studied while the 8 tsf (~112 psi) is rather excessive since no skyscraper is to be built on the sediments final resting spot.

The Harvard Miniature compaction (HMC) sample was partly dry around the edges. Raul is mixing the dry sediment in with the moist sediment to obtain a good mix for the first run.

Raul brought the zero headspace extractor (ZHE) apparatus in today. We will get this test setup today and hopefully start running it tommorrow.

Air temp = 64.4 °F, water temp = 68.1°F

Note -- outside temp is warmer this morning than it has been for several weeks -- the air conditioner has been running most of the morning.

Checked scales:

Calib wt.	Reading	% diff
1.00	1.00	0
2.00	2.00	0
10.00	10.00	0
20.00	20.00	0
100.00	100.02	0.02
200.00	200.02	0.01
500.0	500.0	0
1000.0	1000.0	0

Prepped the "Jar Test" in graduated cylinders. Will perform "Jar Test" after the sample has set for a min of 20 hours. Instead of using polymers, we decided to add varying concentrations of Lime to see if we can get additional settlement from supernatant.

End log for today

18 June '96

Arrive on-site at 8:00. T. Moore, N. Wright, and R. Gonzalez

The scales are checked & calibrated:

Cal Wt	Reading	% Diff
1.00	1.00	0.0
2.00	2.00	0.0
10.00	10.00	0.0
20.00	20.00	0.0
100.00	100.01	.01%
200.00	200.01	.005%
5000	5000	0.0
10000	10000	0.0

→ The 24hr reading on the consolidation test CPCP1D01 is taken on load 1.0 tsf and is increased to 2.0 tsf as test is continued.

→ The zero head extractor is then set up and the modified liquid release

TBT Begun on Sample CPCP1R01

N. Wright started the "jar test" with lime. The concentrations were not based on weight of dry sediment but was based on surface area coverage. We only wanted to see if we could get some more of the suspended material to settle by "sprinkling" some lime on the surface. This will help to determine if lime treatment will help increase the settling rate of the pond sediments once they are all consolidated into a single pond. The surface area of each test is ~ 7.07 in² (or 3" diameter) and it appears we have ~3.7 times the depth of sediment of supernatant. Surprisingly, the supernatant is already fairly clear even though some of the BC# samples were very ~~cloudy~~ turbid. We chose to start with 0.5g of lime for the first sample since it gave us enough to sprinkle a thin layer over the entire surface of this

18JUN1996

column. Results as follows

Jar Test	LIME ADDED (g)	Settling volume prior to Lime	Volume @30 min of lime	Supernatant pH
Control	Ø	282 mL	N/A	7.5
1	Ø.5	272 mL	272	9.5
2	1.Ø	280 mL	280	9.5
3	3.Ø	267 mL	290	10.0
4	~~Ø.2~~ 2.Ø	270 mL	270	9.0
5	~~Ø.1~~ 6.Ø	270 mL	270	9.0

Jun 18/96

Jun 18/96

Settling time = 1350 min.

18JUN1996

The suspended solids were tested in accordance with the SOP 4 proceedures.

Once we started this test, it appears that we raised the pH to ~9.5 even with Ø.5 grams of lime. It also appears that 3.Ø grams of lime was way excessive. Therefore, we decided to run some test below the Ø.5g test, so the 6.Ø g was replaced with Ø.2 g and the 10.Ø g was replaced with the Ø.1 g test.

We brought in 8 liters of the gravity thickened sample (now called CPCPD where D stands for decant). Two moisture content test were ~~performed~~ started. We will start the solidification test on the CPCPD samples following moisture content results.

NOTE: ON THE HARVARD Mini COMPACTION SAMPLE - THE DRY (AIR-DRIED) SAMPLE WAS SURVEYED AFTER being PROCESSED AND PREPED FOR THE TEST AND THE ACTIVITY WAS MEASURED AT →

VLB 18 June '96

162,000 cpm (CPCP HCØ1) on 17 June '96. THE SITE H.P. Surveyed IT on 18 June '96 AFTER THE 5 points where WET Down to + 12%, +14%, +16%, +18%, & +20% M.C. AND THE Following was Recorded: 12 MR/hour on Beta/GAMA and 6 MR/hour on GAMA. – THE H.P. Also Recommended THAT THE SAMPLE be STORED IN AN ELEPHANT BAG AND A 5 gal. Bucket when not being TESTED.

No MORE DATA

WED. 19 JUNE '96

T. MOORE; N. WRIGHT; AND R. GONZALEZ ARRIVE AT LAB @ 8:00

* ON CONSOLIDATION: 24 hr READING on 20 ft IS TAKEN AND 4.0 ft RUN BEGIN

* ON M.L.R. TEST: OVERNITE, APROX 87 ml WAS FORCED OUT of THE SAMPLE under 5 psi (A TOTAL of 159.2 ml). THE H_2O coming OUT of THE SAMPLE WAS SLIGHTLY Amber in TINT AND when Surveyed, HAD NO ACTIVITY ABOVE BACKGROUND

CHECK SCALES:

Calib. Wt.	Reading	% diff.
1.00	1.00	Ø
2.00	2.00	Ø
5.00	5.00	Ø
10.00	10.00	Ø
20.00	20.00	Ø
100.00	100.02	0.02
200.00	200.01	0.005
500.00	500.0	Ø

NOTE: After setting overnight the supernatant from the 3.0 g. lime settling test appeared very clear with an accumulation

of line on bottom. Thru visual observation the control supernatant appears to have the most settlement. Total suspended Solids will be run when vacuum is available (following conclusion of Modified liquid ~~realse~~ Release test (M.L.T.) NOTE: the M.L.T. is basically the same as the Zero headspace extraction (ZHE) test referenced earlier in this logbook.

Raul finished compacting the HMC test. The moisture contents were started and placed in oven. Oven had condensation on the door -- we will dry it again prior to leaving lab.

Raul R. Lopez
19JUN96

7:45 R. Gonzalez and T. Moore enter lab. Raul is breaking down the first consolidation test and is setting up the second one.

Check Scales:

Calib wt.	Reading	% diff
1.00	1.00	0
2.00	2.00	0
10.00	10.00	0
20.00	20.00	0
100.00	100.02	0.02
200.00	200.02	0.01
500.0	500.0	0
1000.0	1000.0	0

After Raul took the consolidated sample (CPCP11D2) from the consolidator ~~and~~, it looked like a thick cookie (~4/10"); we took pictures.

The second consolidation test started ~~with~~ the same ~~fashion~~ way as the first in that it also seeped a small quantity of sediment from the top stone and then released clear water. The water release was large enough that it had to be pipetted out to prevent

overflow (just like first test).
The MLR test is still running.
the 5 & 10 psi readings could
not be taken during work hours
because the Δt between drips
were way below the 2 min
criteria. However, by the time
we arrived the next morning,
the MLR was not dripping at
all. The 20 psi reading appears
to require a much shorter Δt
with little additional accumulation
~~with~~ to zero of fluids. Perhaps we
can finish this test by tomorrow
morning?

10:30 T. Moore checked the solidification
sample -- NONE had any strength
(0 psi with pocket penetrometer). I
will check them again in 3 days
but it appears this mix is not
sufficient. If 3 day still shows
no strength, then will nord the
Sand / Bentonite mix -- will discuss
with Coe.
END todays Log.

8:00 T. Moore and R. Gonzalez enter
Lab. Raul continues with second
consolidation and first zero headspace
(or modified liquid release). We
had a problem with the pump
leaking and the MLR test was
stopped twice to fix the leaks.
One was in the transfer line but
the second one was with the
pump. Raul seems to have fixed
the problem but we may go over
it prior to the next test to try
and prevent this problem from
occurring again.

Check scales:

Calib wt. (g)	Reading (g)	% diff
1.00	1.00	0
2.00	2.00	0
10.00	10.00	0
50.00	50.00	0
100.00	100.02	0.02
200.00	200.01	0.05
500.0	500.0	0
1000.0	1000.0	0

21JUN96

Raul finished first MLR test.

Delu C Moore
21JUN96

8:00 T. Moore and Raul Gonzalez enter lab. Started decanting supernatant from lime settling test. Will decant what we can today but must start next MLR test ~~tom~~ 24JUN96 no later than tues, to be done by Friday.

Check scales:

Calib. wt. (g)	Reading (g)	% diff
1.00	1.00	0
2.00	2.00	0
10.00	10.00	0
50.00	49.99	0.02
100.00	100.01	0.01
200.00	200.02	0.01
500.0	500.0	0
1000.0	1000.0	0

The lab feel more humid than usual -- and hotter than usual for early morning. The air temp reading is currently 68.3°F and the water temp is 68.7°F.

Note - started the last specific gravity test. Very strange thing happend while boiling the sample. We typically boil at ~6 but we had to turn the

24JUN1996

hot plate upto 9 (out of 10) just to get it to boil. Once it started, we were able to cut it down some but I just thought this was unusual.

The solidification test using sand and Bentonite were still in a "slurry" form after setting for 5 days. No noticable strength occurred using the 96% sand, 4% bentonite mix @ the predetermined increments of 10, 25, 30, and 50% mix with the COMP1 sample. Due to this, we decided to pass on the moisture content test to save time for looking into other potential mixes which can provide some stability. Will start some additional solidification test tomorrow.

Celia A. Mire
24JUN1996

25 June '96

800 - T. MOORE; N. WRIGHT & R. GONZALEZ arrive at SITE LABORATORY.

SCALE CHECK:

CAL. WT	Rd'g	Dif.
1.00 gm	1.00	Ø
2.00	2.00	Ø
5.00	5.00	Ø
10.00	10.00	Ø
20.00	20.00	Ø
100.00	100.01	.01%
20000	200.01	.005%
1000.00	1000.0	Ø

Raul continues with the consolidation test and will start compacting the second HMC test. Nathan continues filtering the supernatant from the lime test and is starting the Portland cement/Fly Ash solidification test.

Air Temp = 67.9°F water temp = 69.8°F

We also started the Lime/SAND solidification test.

END todays log.

26 June '96

R. Gonzalez & N. Wright arrive at lab followed by T. Moore a short time later. Lab Amb. Temp = 68.9°F

*Scale check:

Cal. Wt.	Reading	Var.
1.00	.99	1%
2.00	2.00	Ø
10.00	10.01	.1%
20.00	20.00	Ø
100.00	100.01	.01%
200.00	200.01	.005%
1000.0	10000	Ø

1000 Took readings for CPCPDSØ1. Decanted ~ 10 mL of supernatant before taking penetrometer Reading.* All pH readings taken using colorpHast® Indicator strips.
*on 10% mix, on 25% mix ~ 5 mL, on 40% and 50% ~ 4 mL.

1520 Took readings for CPCPDSØ2. Decanted ~ 10 mL from 40% of supernatant before taking Penetrometer readings from 10%, 25%, 40% and 50% mix.

(after Wright) 26 JUNE 1996

27 June '96

800 - R. Gonzalez arrives on-site

- 24 hr Reading on Consolidation Test No CPCP1DØ2 under 1 tsf is Recorded and the load increased to 2 tsf.

- Compaction Test CPCPHMØ2 is set up (3 additional points)

- The MLR Test (CPCPLRØ2) Vol of Effluent is Recorded and Press. increased to 10 psi

Scale check:

Cal. Wt.	Rdg	Var %
1.00	1.00	Ø
2.00	2.00	Ø
10.00	10.01	.1
20.00	19.99	.05
100.00	100.01	.01
200.00	200.01	.005
1000.0	10000	Ø

2:45 - MLR Test is increased to 20 psi.
300 - I depart Lab - Reese

28 June '96

8:00 - R. GONZALEZ ARRIVES ON-SITE
→ MODIFIED LIQUID RELEASE TEST No. CPCPLR02 IS CHECKED AND PRESSURE INCREASED TO 30 psi
→ MOISTURE SAMPLES FROM CPCPHM02 ARE TAKEN FROM oven AND PLACED IN DESICCATOR; AS IS INITIAL MOIST. CONTENT FROM CPCPLR02

8:15 - N. WRIGHT & T. MOORE ARRIVE AT LAB

SCALE CHECK

CAL Wt	Rd'g	VAR %
1.00	1.00	Ø
2.00	2.00	Ø
10.00	10.01	.1
20.00	20.00	Ø
100.00	100.02	.02
200.00	200.02	.01
1000.0	1000.0	Ø

Modified Liquid Release test Sample CPCPLRP1 produced a reading of

15 mRem/hr. This sample was dry and weighed ~200 g.
Readings for the CPCPDSØ1 sample again produced no strength. Decanted an additional ~6 mL of supernatant from 10% mix. The 25, 40 and 50% mixes had no supernatant. Removed ~1 inch of sediment from 50% mix container #4. Retested strength using penetrometer, results were Ø. Although penetrometer reading was Ø in all cases this sample appears to have developed more strength than other two samples/per visual observation.
Penetrometer readings from the CPCPDSØ2 sample ~~again produced~~ NW 6/28/96 were Ø for all mixes. Decanted an additional ~5 mL of supernatant from all mixes.

28 JUN 1996

7:30 T. Moore and R. Gonzalez enter lab. Raul finished cleaning the MLR apparatus, took his last reading from the second consolidation sample, and broke the consolidrometer down.

T. Moore ~~to~~ then checked the solidification samples to see if they gained any strength since the last readings on 28JUN96. Surprisingly, none have enough strength to even get a reading on the pocket penetrometer (Range = 0 → 4.5 tsf or kg/cm²). I have decided to wait until consulting with Coe and Taylor before attempting to continue with the solidification test.

SCALE CHECK

CAL WT.	Rdg	Acc %
1.00	1.00	Ø
2.00	2.00	Ø
10.00	10.00	Ø
20.00	19.99	.1
100.00	100.01	.01
200.00	200.02	.01
1000.0	1000.0	Ø

Note: we had set aside the Lime settlement test, supernatant sample that used Ø.2 grams of lime. All of the other dosages were filtered to obtain TSS results. the Ø.02 supernatant was set aside while the second MLR test was run (did not want to run both at same time due to variances with pump/vacuum when running both). The second MLR test took 3days and did not finish until late Friday. we planned to run this "Ø.2 g of Lime" supernatant early this morning (Monday) but due to the algae growth that occurred over the weekend, we decided this test was void (Algae covered bottom of beaker).

Finished labwork today at 9:00am.

01JUL96

NW 02 JUL 1996

900 N. Wright arrives in lab.
check scales:

Calib. wt.	Reading	% diff.
1.00	1.00	Ø
2.00	2.00	Ø
10.00	10.00	Ø
20.00	20.00	Ø
100.00	100.01	0.01
200.00	200.01	0.005

Take weights of CPCPITS01-06.
935 Activities completed for the day.

02 JUL 1996

Ø8 JULY '96

7:45 — N. WRIGHT, R. GONZALEZ, & T. MOORE ARRIVE ON-SITE.

CHECK SCALES:

CALIB. WT	Rd'g	VAR. %
1.00	1.00	ØØ
2.00	2.00	ØØ
10.00	10.00	Ø.Ø
20.00	20.01	Ø5%
100.00	100.01	.01%
200.00	200.01	.005%
1000.0	1000	Ø.Ø

No strenght has developed in the solidification test. dumped all but the ~~25~~ 10 % & 50 % portland cement/Fly Ash mix. Tryed a new mix based on the volume of the slurry. mix as follows: 50% ~~(650g slurry + 350~~ 08JUL96 650g slurry + 325g reagent), 100% (500g slurry + 500g reagent), and 200 % (500g Slurry + 1000g reagent). The reagent was 50% Portland Cement + 50 % fly ash.
~~Thats all for today~~ 08JUL96

The 200% mix did not work -- we ended up with light fluffy non-cohesive balls (in other words, it needed some more water). Instead of adding more water, we added enough slurry to create a 150% mix instead (total slurry = 667g, total reagent = 1000g). This mix was VERY tough and difficult to work with (lost <5g from mixing process causing some debris forced to fly out) however, it was cohesive enough to pat into the molds -- much like ice cream forced to the bottom of a cone. Due to the thickness, some air was entrapped thus leading to a larger volume increase reading than what actually exist. We will check strength tomorrow. Left lab at ~12:00.

Galen O Mace
08JUL1996

0950 N. Wright enters lab.
Took penetrometer reading on CPCP1503 - 100%. Penetrometer was maxed out, so we have very good strength >4.5.
Check scales:

Calib. wt. (g)	reading (g)	% diff.
1.00	1.00	0
5.00	5.00	0
10.00	10.00	0
20.00	20.00	0
100.00	100.02	0.02
200.00	200.01	0.005

Reweighed CPCP1TS03 and CPCP1TS04
No change.
Penetrometer reading on CPCP1503 - 50% measured 0.7 tons/ft². On CPCP1503 - 200g it again maxed out, reading is >4.5
Activities complete for the day.

N. Wright
09JUL1996

800 T. Moore + N. Wright enter lab.
Check scales:

Calib. wt.	Reading	% diff.
1.00	1.00	Ø
2.00	2.00	Ø
5.00	5.00	Ø
10.00	10.00	Ø
20.00	20.00	Ø
100.00	100.01	0.01
200.00	200.01	0.005
500.0	500.0	Ø

Theodore Moore
10 JUL 1996

830 N Wright arrives at lab.
Check scales:

Calib. wt.	Reading	% diff
1.00	1.00	Ø
2.00	2.00	Ø
5.00	5.00	Ø
10.00	10.00	Ø
20.00	20.01	0.1
100.00	100.02	0.02
200.00	200.02	0.01

Checked 24-hr readings on CPCPDS04
Decanted ~15 mL from 30% mix
~11 mL from 60% mix
~5 mL from 100% mix
~2 mL from 130% mix
no strength was found on any mix.

Checked 24-hr readings on CPCPDS05
Decanted ~8 mL from 30% mix
Decanted ~5 mL from 60% mix
Decanted ~2 mL from 100% mix
no strength was found on any mix.

Nathan Wright
11 JUL 1996

12:45 T. Moore enters lab. Check oven range: max = 109.8 °F, min = 101.8 °F
Air temp = 71.6 °F, water temp = 96.6 °F
Rob Coe and Chris Taylor came by for a visit. We checked the rad readings for the portland cement fly ash mix. Results as follows:

Concentration	CPM (total)
50 %	25K
75 %	22K
100 %	18K
30 %	28K
150 %	15.5K

14:00 left lab.

12JUL1996

7:00 T. Moore + N Wright enter lab.
Check scales:

Calib. wt.	Reading	% Diff.
1.00	1.00	0
2.00	2.00	0
5.00	5.00	0
10.00	10.00	0
20.00	20.00	0
100.00	100.01	0.01
200.00	200.00	0

Nathan tried to come in Saturday to get the three day reading for the solidification test samples that were prepped on Wed. (10JUL96). But the area had a power outage 15JUL96 that effected the lab area also. Because Nathan needed to frisk from the area (using electric friskers) plus since the hooded area was not on (potential airborns from penetration tests), he could not get 3rd day reading. When he ASK about the duration of the power outage, he was told 5:00pm +. We got a reading early this

morning.
After discussing our current results with Rob Coe, we decided to run Phase 2 solidification test using a 40%, 50%, 75%, and 100% mix (based on wet weights). Although the ESSW calls for samples 6" in height, we only poured upto ~~5.6"~~ 15JUL96 5.4". This is because the top of the molds went upto 6" and to reduce the chance of contamination spread, we decided to leave a 1.5 cm headspace on the pours. ~~Like wise~~ 15JUL96
We also decided to pour a duplicate for each UCS test. We may get results for all the UCS pours to use for comparisons.
Dumped carboy this morning and brought in the rest of the stored CPCPD samples stored in the 55 gallon drum. We used all but one liter of the CPCPD samples for the solidification test -- Phase 2.
Left lab @ 6:15

9:30 T. Moore & N. Wright arrive at lab. We began cleanup of lab and prepping of equipment to be scanned out of lab.
Check scales:

calib wt (g)	reading (g)	% diff.
1.00	1.00	0
2.00	2.00	0
10.00	10.00	0
20.00	20.00	0
100.00	100.02	0.02
200.00	200.01	0.005

Since we are using pH strips for our pH readings, we could not take pH readings upon mixing of the samples. The strips were unreadable. So pH was taken after 1 day curing by adding D.I water to sample.
↳ Refering to CPCPD503B.

18 JUL 1996

8:15 T. Moore & R. Gonzalez enter Lab. Raul is to perform Unconfined Compressive strength tests on the 3 day cure; 40, 50, 75 and 100% mixes of portland cement/Fly Ash. check scales:

Cal. wt. (g.)	Reading (g.)	% diff
1.00	1.00	0
2.00	2.00	0
20.00	20.00	0
100.00	100.01	0.01%
200.00	200.01	0.005%
500.00	500.0	0
1000.0	1000.0	0

1040 N. Wright enters lab.
Take penetrometer readings on CPCP7503B. Penetrometer reading on 50% mix >4.5 actual reading ~ 4.7. To be consistent I recorded a reading of >4.5 on Data Form.

Check scales:

Calib. wt.	reading	% diff.
1.00	1.00	0
5.00	5.00	0
20.00	20.00	0
100.00	100.01	0.01
200.00	200.00	0

Took 5 day moisture contents and placed in oven. Removed moisture from oven door.

Kathe W. 20 JUL 1996

22 JUL 1996

10:00 T. Moore & R. Gonzalez enter lab. Took all morning getting an air compressor setup that will work for providing the maximum, permissable load for the UCS apparatus. The air compressor will go to 200 psi, but we can only use 150 psi due to UCS apparatus limitation.

Check scales:

Calib. wt.	Reading	% diff
1.00	1.00	0
2.00	2.00	0
20.00	20.00	0
100.00	100.01	0.01
200.00	200.01	0.005
500.0	500.0	0
1000.0	1000.0	0

Oven was saturated with excess moisture. Wiped it down but none of the samples are dry enough to come out yet. The oven is also full. We placed todays moisture content samples outside oven, in hooded area.

Weighed the samples in dessicator. Put back in dessicator for overnight check.

Raul completed the UCS tests on the 7 day samples. Note -- could not fail the 75% & 100% mixes.

Set aside the samples to be sent for TCLP analysis (solidification TCLP). Will send 40%, 50%, 75% and 100% mixes. Had planned to send one dried, non-mixed sample (raw, dry, sediment) But the samples are still too moist. Will have to finish drying out before we send them off.

Raul left lab at ~13:00. We took the air compressor back to the FOF (where we borrowed it from). Nice compressor -- got 195 psi from it.

T. Moore left lab at 16:00

Helen Moore
22 JUL 96

23JUL1996

9:00 Prepped samples to be sent off for TCLP analysis. Needed a minimum of 210g of sample (105g for Analysis and 105g for Duplicate). Empty 8 oz cups typically weigh about 22g, so we needed a minimum of 240g per cup to meet these requirements. We Also checked the gamma+beta on each cup. Results as follows:

Sample ID	weight	counts per min (cpm)	
Ø4ØCPCPDS03	266 g	30K ~~80K~~ 23JUL bottom	24K ~~19K~~ 23JUL96 side
Ø5ØCPCPDS03	259 g	27K "	24K
Ø75CPCPDS03	262 g	25K "	23K ~~21K~~ 23JUL96
1ØØCPCPDS03	316g	80K "	19K "

Joel Miller checked and approved the samples for transport. He got A maximum reading of Ø.3 mR/hr. Dried oven off (lots of moisture still accumulating) and left @ 10:30.

Helen O Lane
23JUL1996

23JUL96

1615 N Wright enters lab.
check scales:

calib. wt. (g)	reading (g)	% diff.
1.00	1.00	Ø
2.00	2.00	Ø
5.00	5.00	Ø
10.00	10.00	Ø
20.00	20.00	Ø
100.00	100.01	Ø.01

Reweigh moisture content samples left in descicator. Wipe excess moisture from oven.

23JUL1996

815 N. Wright enters lab.
Wipe excess moisture from oven
check scales:

calib. wt. (g)	reading (g)	% diff
1.00	1.00	Ø
2.00	2.00	Ø
10.00	10.00	Ø
20.00	20.00	Ø
100.00	100.01	Ø.01
200.00	200.00	Ø

Remoisten samples left in dessicator.

Jeff Wright
24 JUL 1996

810 R. Gonzalez + N. Wright enter rad zone.
Check scales:

Calib. wt. (g)	reading (g)	% diff
1.00	1.00	Ø
2.00	2.00	Ø
10.00	10.00	Ø
20.00	20.00	Ø
100.00	100.01	Ø.01
200.00	200.01	Ø.ØØ5

Prepared sample for One Dimensional Consolidation test to be performed Monday 29th of July after 3 day curing. A 50% mix was made using 100 g. of sediment and 50 g of the Portland Cement/Fly Ash mix.

Jeff Wright
26 JUL 1996

NW 29 JUL 1996

810 N. Wright + R. Gonzalez enter lab.
Check scales:

calib. wt.	reading	% diff.
1.00	1.00	Ø
2.00	2.00	Ø
5.00	5.00	Ø
10.00	10.00	Ø
20.00	20.00	Ø
100.00	100.01	Ø.Ø1
200.00	200.01	Ø.ØØ5

Kaul began One-Dimensional Consolidation test (ASTM 2435) on the 50% solidification sample CPCP1503B.
Continue Demobilization.

29 JUL 1996

30 JULY '96

R. GONZALEZ ENTER LAB AND RECORDS 24hr READING ON 1-D CONSOLIDATION TEST; AFTERWARDS, THE LOAD IS INCREASED TO .125 TSF AND THE TEST CONTINUED.

31 JULY '96

R. GONZALEZ ENTER LAB AND RECORDS 24hr reading on 1-D CONSOLIDATION TEST; AFTERWARDS, THE LOAD IS INCREASED TO .250 tsf AND THE TEST CONTINUED

Check scales:

Calib. wt.	Reading	% diff.
1.00	1.00	Ø
2.00	2.00	Ø
5.00	5.00	Ø
10.00	10.01	Ø.1
20.00	20.00	Ø
100.00	100.01	Ø.Ø1
200.00	200.02	Ø.Ø1

NW 01 AUG 1996

810 R. Gonzalez + N. Wright enter lab. check scales:

calib. wt.	reading	% diff.
1.00	1.00	Ø
2.00	2.00	Ø
10.00	10.00	Ø
20.00	20.00	Ø
100.00	100.01	0.01
200.00	200.00	Ø

Moisture Content results taken on CPCPD Samples. Dried samples collected in 500 mL Amber Jar & NO preservative. Sample wt. = 229.5 g. Bottle yielded 16 K cpm. Joel Miller (H.P.) scanned bottle reading 2 mrem/hr at contact with bottle. Bottle placed in cooler & blue ice, labled 000CPCPD000. J. Miller's reading of cooler was 1 mrem/hr at contact & cooler and <0.1 at a distance of 1 foot. COC seales placed on cooler and delivered cooler to bldg 4508. Sample will be shipped to Y-12 bldg 9995 for TCLP analysis under C.O.C. # 101033.

02 AUG '96

CHECK SCALES:

CALIB. WT	RDG	% dif
1.00	1.00	Ø
2.00	2.00	Ø
10.00	10.00	Ø
20.00	20.00	Ø
100.00	100.02	.02%
200.00	200.01	.005%
1K	1000.0	Ø

Continue Moisture content.

02 AUG 1996

NW 05 AUG 1996

800 R. Gonzalez + N. Wright enter rad zone.

check scales:

calib. wt.	reading	% diff.
1.00	1.00	Ø
2.00	2.00	Ø
5.00	5.00	Ø
10.00	10.00	Ø
20.00	20.00	Ø
100.00	100.01	Ø.Ø1
200.00	200.01	Ø.ØØ5

Continue moisture contents.

R. Gonzalez
05 AUG 1996

800 R. Gonzalez + N. Wright enter rad zone.

check scales:

calib. wt.	reading	% diff.
1.00	1.00	Ø
2.00	2.00	Ø
5.00	5.00	Ø
10.00	10.00	Ø
20.00	20.00	Ø
100.00	100.01	Ø.Ø1
200.00	200.01	Ø.ØØ5

Continue moisture contents.

07 Aug '96

8:00 - R. GONZALEZ & N. WRIGHT
ARR. AT FIELD LAB

I-D CONSOLIDATION TEST IS COMPLETED
AND APPARATUS IS BROKEN DOWN

SCALE CHECK:

CAL. WT	Rdg	% Var
1.00	1.00	Ø
2.00	2.00	Ø
10.00	10.00	Ø
20.00	20.00	Ø
100.00	100.01	.01%
200.00	200.00	Ø
1000.0	1000.0	Ø

12 Aug '96

830 N. WRIGHT & R. GONZALEZ
ENTER LAB

SCALE CHECK:

CAL. WT.	Rdg	% Var
1.00	1.00	Ø
2.00	2.00	Ø
5.00	5.00	Ø
10.00	10.01	.1%
20.00	20.01	.05%
50.00	50.00	Ø
100.00	100.01	.01%
200.00	200.00	Ø
1000.0	1000.0	Ø

NW 23 AUG 1996

8:00 T. Moore, R. Gonzalez and N. Wright arrive on site. Carboy was dumped into pond 3513. Also dumped in the pond were the last remaining ISCO bottles and the gravity drainage sample. All samples have been removed from the lab. (See pg. 45-47 in field log book for more detail). Demobilization activities continue.

Nathan Wright
23 AUG 1996

NW ~~28~~ 27 AUG 1996
NW 8-27-96

8:00 T. Moore and N. Wright arrive on site. Most items have been removed from rad zone by J. Miller (H.P.) and either green tagged or rad tagged. Several items including descicator, beakers, aluminum boats etc. were distributed out to various labs at the 1505 bldg. The HNu, radio, unused ISCO bottles, etc. were returned to the F.O.F. Doug Rose (MAD group) took many left over items to the MAD group's supply room. These items included the vacuum pump, lab cart, buckets, dolly and many other items. The wrapping on the floor and counter tops was completely removed and disposed of.

Nathan Wright
27 AUG 1996

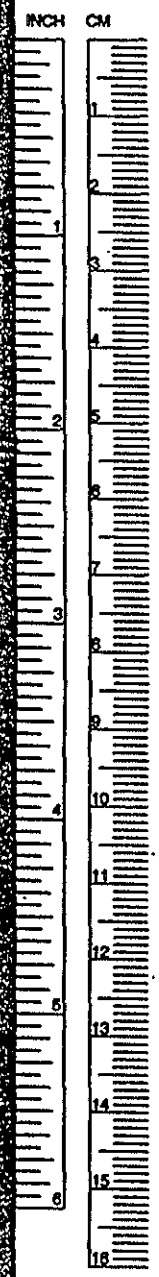
APPENDIX E

Singleton On-site Logbook and Supporting Documentation

TABLE OF CONTENTS

Page

SINGLETON ON-SITE LOGBOOK E-1
SINGLETON FINAL REPORT E-27



MEASUREMENT CONVERSIONS

IF YOU KNOW	MULTIPLY BY	TO FIND
LENGTH		
inches	2.540	centimeters
feet	30.480	centimeters
yards	0.914	meters
miles	1.609	kilometers
millimeters	0.039	inches
centimeters	0.393	inches
meters	3.280	feet
meters	1.093	yards
kilometers	0.621	miles
WEIGHT		
ounces	28.350	grams
pounds	0.453	kilograms
grams	0.035	ounces
kilograms	2.204	pounds
VOLUME		
fluid ounces	29.573	milliliters
pints	0.473	liters
quarts	0.946	liters
gallons (U.S.)	3.785	liters
milliliters	0.033	fluid ounces
liters	1.056	quarts
liters	0.264	gallons (U.S.)

TEMPERATURE

°C = (°F - 32) x .555
°F = (°C x 1.8) + 32

Inches	Decimals of foot	Milli-meters
1/16	.0052	1.5875
1/8	.0104	3.1750
3/16	.0156	4.7625
1/4	.0208	6.3500
5/16	.0260	7.9350
3/8	.0313	9.5250
1/2	.0417	12.700
5/8	.0521	15.875
3/4	.0625	19.050
7/8	.0729	22.225
1"	.0833	25.400
2"	.1667	50.800
3"	.2500	76.200
4"	.3333	101.60
5"	.4167	127.00
6"	.5000	152.40
7"	.5833	177.80
8"	.6667	203.20
9"	.7500	228.60
10"	.8333	254.00
11"	.9167	279.40
1 foot	1.0000	304.80

E-4

"Rite in the Rain"®
ALL-WEATHER WRITING PAPER

Name RAUL F. GONZALEZ
SINGLETON LABS → OPTECH

Address

Phone

Project SIOU ENGINEERING SUPPORT STUDIES
LMES/ER ; X-10
ER PROJECT MANAGER : CHRIS TAYLOR

"Rite in the Rain" - a unique all-weather writing surface created to shed water and to enhance the written image. Makes it possible to write sharp, legible field data in any kind of weather.

a product of

J. L. DARLING CORPORATION
TACOMA, WA 98421-3696 USA

OPTECH 483 3520

CONTENTS

PAGE	REFERENCE	DATE

ALL WORK PREVIOUS TO MAY 13, 1996 HAS BEEN IN A SUPPORT CAPACITY

MONDAY — 13 MAY

ARRIVE ON-SITE AT 11:30 AM (FOF)
SET UP SAMPLES 13CP1 PSØ1 AND 13CP1 PSØ2 FOR PARTICLE SIZE DIST. AND ASSIST N. WRIGHT IN LAB. WORK.
DEPART AT 3:30 pm

TUE. - 14 MAY

ARRIVE ON-SITE AT 7:00 AM
BEGIN RUNNING PARTICLE SIZE (Hydrometer) AND ASSIST WITH LABORATORY WORK
ALSO, RUN 2 UNIT WEIGHT TESTS ON USING A MUD BALANCE
I DEPART SITE AT 2:00 pm

Wed. May 15, 96

I ARRIVE ON-SITE AT 7:00 AND CHANGE INTO DOE CLOTHES

* THE Hydrometer 24 hr READINGS ARE TAKEN AND MOISTURE CONTENT weights Recorded.

THE PARTICLE SIZE TEST SPECIMENS ARE THEN WASHED over A No. 200 SIEVE

→ NOTE: A RADIATION SURVEY ON THE SAMPLES IS TAKEN AND READING RANGE between 2K to 3K cpm

I DEPART SITE AT NOON

THUR, 16 MAY '96

I ARRIVE ON-SITE AT 7:00 AM

PARTICLE SIZE SAMPLES ARE REMOVED FROM THE OVEN AND PLACED IN A DECICATOR, I THEN ASSIST IN LAB. WORK.

↳ TELINA AND I THEN Collect 12 SAMPLES AT THE STAGING AREA for LAB TESTING

I THEN complete SIEVING PARTICLE SIZE TEST AND ASSIST WITH LAB WORK - ie: ~~GRAD~~ PAINT FILTER TEST, ETC.

I ALSO complete paperwork on equipment Delivered TO X-10

I RECORD ALL PARTICLE SIZE TEST DATA AND WILL complete IT BACK AT SINGLETON LABS.

DEPART SITE AT 5:00pm

FRI - MAY 17 -
WORK ON PARTICLE SIZE TEST AT
SINGLETON LABS *

TUE - JUNE 4TH '96 - ARRIVE AT FOF
AT 11:45 AND CHANGE
INTO DOE CLOTHES.
→ I SET UP MAs AND
ASSIST IN LABORATORY WORK for OPTECH
Before Doffing clothes AND Returning
to FOF - I DEPART SITE AT
2:15

WED - JN 5TH '96 - ARRIVE AT
FOF @ 7:00A & CHANGE
INTO DOE CLOTHES
↳ complete 4 hr. log on
2 Hyd. Samples
(NO: _____)
AND ASSIST IN FIELD LAB
for OPTECH - I DEPART
SITE AT 11:55 & CHANGE,
DEPARTING X-10 @ 12NOON

THUR. JUN 6 '96 Arrive on-site at 7:00A and change into DOE Clothes.

Take #24hr Reading on Hyd. Tests and wash samples over No. 200 sieve.

I then Discuss Testing Schedule w/ T.M.

NEEDED → CASS Dish for HAN.M. Comp.
↳ BAGGIES → Tape for ⊗ ZERO HEAD EXT.'r.

Depart at 10:00

MON - 6-10-96 - Arrive at 7:00 and change into DOE Clothes

*At X-10 - Collect → (1) 8" Shelby tube for Z.H.E.
(2) Collect 3" D.C. for Consol.
(3) Collect Grab Sample for Hardned M.C.
CP-CP1-Hmol

*↳ CP-CP1 Sample

*→ Calibrate Consolidometer

Run Sieve on Hyd. Sample 24CP1
↳ 24CP1-P501

1min	63.7	24.0	-1.9	
4min	63.7	22.9		
15min	63.7	16.1		
1hr	63.7	-0.3		
4hr	67.0	-1.0		
24hr	66.2	-1.3		

7:00 (Out)

7:05

CONT. ON NEXT Pg

6-10-96 (cont)

24 CP1 PS01

#20 – 0.1
#50 – 0.2
#100 – 0.5
#200 – 1.0 * Init. wt.

wet = 24.41
Dry = 10.91
Tare = 1.91
M% = 184.0

24 CP1 PS02

1 min	63.7	26.5	-1.9	Hyd. wt
4 min	63.7	25.0		
15 min	63.7	20.0		
1 hr	63.7	-.5		
4 hr	67.0	-1.1		79.13
24 hr	66.2	-1.3		

#20 = 0.1
#50 = 0.2
#100 = 0.5
#200 = 1.4

wet = 25.22
Dry = 10.88
Tare = 1.93
M% = 160.2

on others – 2.41 + 2.41 → 2.43 Avg

Sp.G

6-10-96

Process SpG samples (CPCP?)

6-11-96

Arrive on site at 7:00 & change into POE clothes.

Arrive at Site Lab and set up and begin to run consolidation on sample CPCP1 D01
* Load = .0625 tsf
* Note: Consolidates very rapidly & bleeds off much H2O

Spoke w/ K.L. Tyler – The work will not be completed until next week

Assisted w/ Sp.G tests (N. Wright)

To make data

Depart site at 3:30

6-13-96

Arrived on Site at 7:00 and changed into DOE work clothes -
→ Got 24 hr reading on consolidation test No. CPCP1D01 and increased load to .125 tsf, and ran test
↳ I also stirred sample for Harvard Miniature Compaction test (CPCPHM01)

No More Data

6-14-96

Arrive on-site at 7:30 and changed into DOE clothes -
→ Got 24 hr reading on consolidation test and began .25 tsf load

T. Moore departed site at noon and I remain on-site to get consolidation readings

No More data

MON
6-17-96

Got 72 hr reading on Consol. at Load = ½ tst and increased Load to 1.0 tst

Set-up Modified Liquid Release Test in ZHE for CPCP LR Ø1

Set up sample for Hardard Mini Comp.
*NOTE → on Rad Survey Device; sample gave 162,000 cpm
→ Asked Joel to Survey Dose

No Other Data

TUE 6-18-96

Got Consol. 24 hr Reading and started 2.0 tst Load

Begin ZHE; Mod. Liq. Rel Test - on 5 psi; was still releasing fluid after 6 hrs

No more data

WED- 19 JUNE 96

RECORDED 24hr reading on CONSOLID. TEST (LOAD 2.0 tsf) and INCREASED LOAD TO 4.0 tsf

ALSO RECORDED ADDITIONAL H_2O RELEASED from Sample on Modified Liquid RELEASE TEST (2HE) AND INCREASED pressure TO 10psi

RAN HANNAD Mini. COMPACTION TEST on CPCPHM01 → RESULTS:

	2			3	1
+ M%					
SOIL & MOLD (gm)	237.78	239.72	238.58	238.09	232.78
MOLD (gm)	139.54	139.54	139.54	139.54	139.54
SOIL (gm)	98.24	100.18	99.04		92.94
Wd (pcf)	98.6	100.6	99.4	~~97.6~~ 100.1	93.3
TARE #	1	2	3	4	5
WET	29.98	35.93	31.41	28.62	35.95
DRY	20.69	24.10	21.01	25.09	25.39
TARE (gm)	1.94	1.94	1.96	1.94	1.94
%M					
Dd	47.8	51.7	54.9	49.2	45.1

*To Be completed when samples ARE Dried BACK completely

* Vol of H.M.C. MOLD = 3795 in^3 → 0.002196 ft^3

I HAD H.P. coverage during the first 3 points AND ALL WENT O.K.

MISC.

3000 Grout

25#	cement	
10#	H_2O	N/A
56#	Fine Ag	
89.8#	Course Ag	
.3#	AEA	

E-9

THUR, 20 JUNE '96

→ GOT 24hr reading on CONSOLIDATION SAMPLE CPCP1DØ1 (4.0tsf) AND broke down TEST.

→ I ALSO RECORDED VOLUME of RELEASED H_2O on M.L.R.T on SAMPLE CPCPLRØ1; AND INCREASED LOAD TO 20psi

→ I THEN SET UP CONSOLIDATION SAMPLE No. CPCP1DØ2 AND BEGUN TEST

THE following IS THE TEST DATA from CPCP1DØ1:

SAMPLE VOL: 4.825 in³ ; 79.068 cm³

* SpG: 2.45

MOISTURE CONTENTS:

TRIMMINGS		INITIAL	FINAL
~~19.33~~ 51.91	wet	94.83	105.65
1.98	TARE	0.0	60.77
19.33	Dri		
210.8	%		

* TO be completed AT A LATER DATE

LOAD: .0625	CORR: .0003	
6sec = .0100	4min = .0860	2hr = .2613
15sec = .0240	8min = .1230	4hr = .2677
30sec = .0410	15min = .1666	6hr = .2709
1min = .0567	30min = .2221	24hr = .2813
2min = .0632	1hr = .2509	
LOAD: .125	Corr = .0005	
6sec = 2837	4min = 2945	2hr = 3202
15sec = 2846	8min = 2994	4hr = 3248
30sec = 2860	15min = 3048	6hr = 3275
1min = 2878	30min = 3107	24hr = 3315
2min = 2908	1hr = 3159	
LOAD: .250	Corr: .0007	
6sec: 3388	4min: 3526	2hr: 3820
15sec: 3400	8min: 3595	4hr: 3862
30sec: 3414	15min: 3658	6hr: 3885
1min: 3438	30min: 3723	24hr: 3941
2min: 3475	1hr: 3776	
LOAD: .5	Corr: .0012	*FLOODED
6sec = 3975	4min = 4138	2hr = 4403
15sec = 3991	8min = 4207	4hr = 4439
30sec = 4009	15min = 4267	6hr = 4460
1min = 4040	30min = 4329	12hr = 4544
2min = 4088	1hr = 4367	

* NOTE: pg 17 & 18 WAS TORN OUT DUE TO EXCESS MISTAKES made IN coping RESULTS. KEB 6-20-96

6-20-96

Sample: CPCPID01

LOAD: 1.0 Corr: .0017

6sec: 4570	4min: 4714	2hr: 4915
15sec: 4589	8min: 4763	4hr: 4945
30sec: 4607	15min: 4809	6hr: 4961
1min: 4633	30min: 4848	24hr: 5000
2min: 4669	1hr: 4887	

LOAD: 2.0 Corr: .0027

6sec: 5042	4min: 5220	2hr: 5406
15sec: 5061	8min: 5275	4hr: 5430
30sec: 5086	15min: 5316	6hr: 5448
1min: 5118	30min: 5350	24hr: 5476
2min: 5159	1hr: 5378	

LOAD: 4.0 corr: .0043

6sec: 5520	4min: 5684	2hr: 5859
15sec: 5537	8min: 5728	4hr: 5877
30sec: 5558	15min: 5758	6hr: 5887
1min: 5591	30min: 5783	24hr: 5907
2min: 5635	1hr: 5837	

LATER IN THE DAY, THE M.L.R. TEST IS INCREASED TO 30 psi.

21 JUNE '96

→ THE M.L.R. TEST IS INCREASED TO 40 psi AFTER THE VOLUME IS RECORDED

→ I TAKE 24 hr READING on CONSOLIDATION SAMPLE CPCPID02 AND INCREASE LOAD TO .125 tsf

↳ NOTE: THE MOISTURE CONTENT TESTS for THE HARVARD MINI COMPACTION TEST (B) HAS to be RE-RUN & I SET UP THE ADDITIONAL TESTS.

☆ MID-DAY, I INCREASE MLR TEST pressure TO 50psi. AFTER approx 2.5hrs; Δt is >2min & I BREAK TEST DOWN

DOWN. CPCPLR01

TEST DATA IS AS follows

psi	cum. H_2O
5	159.2
10	218.8
20	233.4
30	258.7
40	264.4
50	269.5

INITIAL MOIST CONT: 210.8

INITIAL WT: 587.6

PINK H_2O CONT. = 67.4

INITIAL WT = 70.2

CPCPLR01

Mon, 24 June '96

→ I Record 72 hr reading on CPCP1D02 and increase Load to .250 tsf

→ Paper work for Test Documentation is ~~prepared for~~ completed.

→ Set up Harvard Mini Comp. Test on Sample CPCPHM02

No More Data

25 June '96

→ Recorded 24 hr reading on consolidation Test (CPCP1D02) and increased Load to .5 tsf

*Note: Sample Flooded at this time

→ Weighed back moisture content tests from CPCPHM01

→ Ran Harvard Comp. Test on Sample CPCPHM02, but sample was not dried back enough, and the test was not completed.

No More Data

26 June '96

- TAKE 24 hr rd'g on Consolidation and INCREASE LOAD TO 1.0tsf
- SET-UP Modified Liquid RELEASE TEST on CPCPLRØ2
- CHECK on Additional H.M.C. Points Being Air-Dried under Hood.

27 June:

TAKE 24 hr rd'g on Coils, and ↑ LOAD TO 2.0TSF

BEGAN MLR TEST on CPCPLRØ2

28 June

TAKE 24 hr on Consolidation AND INCREASE LOAD TO 4.0TSF

Continued MLR TEST

1/0 Made Data

1 July '96

Complete running CPCP1D02

Additional test data is as follows:

CPCPLR02

Psi	ml
0	0
5	89.1
10	102.9
20	115.5
30	119.5
40	124.9
50	127.9

Initial m% = 200.6

Initial wt = 280.8

Initial Wd = 72.4 pcf

* Final m% = 64.2%

CPCPHM02

	1	2	3	4	5
W/mold =	240.43	238.37	234.23	233.53	233.32
mold =	140.39	140.39	140.39	140.39	140.39
sample =	100.04	97.82	93.84	93.14	91.97
Wd =	100.4	98.2	94.2	93.5	92.3

	1x	2x	3x
W/mold =	228.22	233.90	237.32
mold =	140.39	140.39	140.39
sample =	89.16	93.84	97.26
Wd =	89.5	94.2	97.6

	1	2	3	4
Wet =	32.03	31.11	28.38	28.30
Dry =	21.99	22.11	18.25	19.04
Tare =	1.94	1.94	1.94	1.94
m%	58.8	44.6	62.1	65.8

	5	1x	3x	2
Wt	39.77	31.92	43.71	38.03
Dry	23.92	23.65	31.44	25.24
Tare	1.94	1.94	1.94	1.94
m%	72.1	38.1	41.6	54.9

CPCP1D02

	Trimings	Initial	Final
Wet	35.35	89.28	104.44
Dry	12.95	28.63	89.38
Tare	1.96	0	60.75

Sample Volume =

S.G = 2.45 2.44

LOAD: .0625 corr: .0003

6 sec: .0419 8 min: .1620
15 sec: .0545 15 min: .1972
30 sec: .0665 30 min: .2394 6 hr: .2860
1 min: .0770 1 hr: .2653
2 min: .0958 2 hr: .2760 24 hr: .2964
4 min: .1220 4 hr: .2828

LOAD: .125 corr: .0005
6 sec: 3005 8 min: 3160 6 hr 3453
15 sec: 3018 15 min: 3213 72 hr: 3620
30 sec: 3030 30 min: 3273
1 min: 3056 1 hr: 3328
2 min: 3077 2 hr: 3378
4 min: 3113 4 hr: 3427

LOAD: .250 corr: .0007
6 sec: 3674 8 min: 3851
15 sec: 3687 15 min: 3900 6 hr: 4112
30 sec: 3703 30 min: 3956
1 min: 3725 1 hr: 4002 24 hr: 4186
2 min: 3756 2 hr: 4043
4 min: 3798 4 hr: 4086

LOAD: .500 * Flood corr: .0012
6 sec: 4257 2 min: 4386
15 sec: 4280 4 min: 4450
30 sec: 4304 8 min: 4523
1 min: 4337 15 min: 4584

30 min: 4646 6 hr: 4782
1 hr: 4690 24 hr: 4838
2 hr: 4726
4 hr: 4760

LOAD: 1.0 corr: .0017
6 sec: 4900 8 min: 5138 6 hr: 5350
15 sec: 4922 15 min: 5189
30 sec: 4942 30 min 5232 24 hr: 5388
1 min: 4988 1 hr: 5269
2 min: 5024 2 hr: 5301
4 min: 5081 4 hr: 5328

LOAD: 2.0 corr: .0027
6 sec: 5455 8 min: 5687 6 hr: 5856
15 sec: 5477 15 min: 5723
30 sec: 5501 30 min: 5758 24 hr: 5886
1 min: 5532 1 hr: 5790
2 min: 5581 2 hr: 5813
4 min: 5636 4 hr: 5841

LOAD: 4.0 corr: .0043
6 sec: 5936 15 min: 6188
15 sec: 5960 30 min: 6218
30 sec: 5985 1 hr: 6242
1 min: 6022 2 hr: 6264
2 min: 6067 4 hr: 6284
4 min: 6115 6 hr: 6294
8 min: 6148 72 hr: 6332

July 18, 1996

I arrive on site at 7:00 am and change into DOE Clothes.

In Lab, I run ~~Some~~ Unconfined Strength Tests (8) and prelim. results are as follows:

Sample: CPCPD5C03B -40%

Initial wt: 818.4 Ht 5.260

dia = 3.0 = Area: 7.065

Time	Deflection	Rdg
5	.023	.0003
10	.043	.0003
15	.069	.0003
20	.095	.0043
25	.122	.0087
30	.145	.0123
35	.167	.0141
40	.188	.0150
45	.213	.0152
50	.238	.0153
55	.258	.0153
60	.282	.153

Sample = 100 %

Initial wt: 962.6 ht: 5.413

Time	Deflection	Rd'g
.5	.029	.0089
1.0	.051	.0196
1.5	.067	.0294
2.0	.081	.0390
2.5	.095	.0470
3.0	.107	.0520
3.5	.114	.0571
4.0	.118	.0591
5.0	.119	.0594
6.0	.119	.0594
7.0	.119	.0594

Sample = 100 %

Initial wt = 959.5 ht = 5.345

Time	Defl.	Rd'g
.5	.024	.0093
1.0	.054	.0183
1.5	.078	.0296
2.0	.096	.0388
2.5	.113	.0464
3.0	.125	.0511
3.5	.135	.0560
4.0	.138	.0576
4.5	.138	.0573
5.0	.139	.0572
6.0	.139	.0572
7.0	.139	.0572

Sample: 75%

INITIAL WT: 921.8 KT: 5.325

Time	Defl	Kdg
.5	0.029	.0085
1.0	.056	.0195
1.5	.077	.0299
2.0	.097	.0417
2.5	.113	.0494
3.0	.123	.0540
3.5	.133	.0594
4.0	.134	.0602
4.5	.135	.0604
5.0	.135	.0605
6.0	.135	.0605
7.0	.136	.0605

75%

INITIAL WT: 921.1 KT: 5.401

TIME	defl.	Kdg
.5	.031	.0125
1.0	.054	.0238
1.5	.072	.0347
2.0	.096	.0493
2.5	.114	.0572
3.0	.120	.0591
3.5	.122	.0596
4.0	.122	.0596
5.0	.123	.0597
6.0	.124	.0597
7.0	.124	.0597

Sample 50%

INITIAL WT: 854.6 ht = 5.329

Time	Defl.	Rdg
.5	.029	.0039
1.0	.053	.0089
1.5	.069	.0156
2.0	.094	.0261
2.5	.118	.0350
3.0	.144	.0410
3.5	.168	.0427
4.0	.196	.6355
4.5	.243	.0257

FINAL WT = 858.1 ht: 5.329

Time	Defl	Rdg
.5	.031	.0085
1.0	.057	.0159
1.5	.074	.0237
2.0	.092	.0305
2.5	.115	.0390
3.0	.140	.0436
3.5	.159	.0448
4.0	.184	.0441
4.5	.226	.0190

Sample: 40%

INITIAL WT: 840.6 ht = 5.389

Time	defl	Rdg
.5	.029	.0045
1.0	.052	.0094
1.5	.076	.0140
2.0	.104	.0162
2.5	.130	.0169
3.0	.157	.0169
3.5	.190	.0169
4.0	.228	.0130
4.5	254	.0065

			TSF	psi
40% — AVG	.0461	48.95	.499	6.93
50% — AVG	.0438	133.17	1.356	18.83
75% — AVG	.0601	182.73	1.861	25.85
100% — AVG	.0584	177.41	1.807	25.16

AREA = 7.0686

Fri - 19 July '96

Discusses U.C. testing w/ T.M.

Mon. 22 July '96

RUN 7 day U.C tests:

100%

time	def.	P.R.	def.	Pr
.5	.030	.0180	.050	300
1.0	.065	.0375	.085	540
1.5	.093	.0515	.120	780
2.0	.123	.0655	.155	980
2.5	.150	.0830	.175	1150
3.0	.185	.1090	.194	1300
3.5	.200	.1240	.208	1420
4.0	.217	.1365	.211	1440
4.5	.225	.1400	.212	1450
5.0	.227	.1425		
5.5				
6.0				
	Wt: 453.9		980.8	
	Hr: 5.328		5.440	

Tev. 50

Time	det	Pr	det	PR
.5	031	112	25	125
1.0	57	230	51	237
1.5	80	361	75	380
2.0	105	470	100	505
2.5	127	540	128	560
3.0	151	608	151	638
3.5	179	641	178	638
4.0	210	580	230	570
4.5				
5.0				
5.5				
6.0				
6.5				
7.0				
		WT 857.9		856.6
		HT 5.289		5.336

60
92%

Time	Red	Pr	det	Pr
.5	30	25	30	30
1.0	57	127	70	158
1.5	75	200	95	223
2.0	94	273	120	270
2.5	122	320	143	280
3.0	150	322	174	290
3.5	187	300	209	195
4.0	220	170		
4.5				
5.0				
5.5				
6.0				
6.5				
7.0				
	839.0		800.9	
	5.426		5.125	

~~50~~% 75%

Time	Def	Pr	Def	Pr
.5	27	120	28	74
1.0	47	185	48	140
1.5	63	270	75	255
2.0	85	400	100	400
2.5	115	520	128	490
3.0	140	630	145	575
3.5	163	745	165	685
4.0	185	870	183	800
4.5	210	1010	202	915
5.0	230	1140	218	995
5.5	243	1220	228	1070
6.0	257	1325	240	1138
6.5	265	1400	248	1185
7.0	272	1420	253	1220
8.0	275	1426	258	1265
			9 260	~~1350~~ 1265
			10 270	1350
			11 281	1425
	910.8		916.7	
	5.261		5.410	

*Need Pore Size on Stones & Filter paper for MLL

26 July '96

Arr @ 7:00

SET up Sampe (50% Solitified mix)

for 1-D CONSOLIDATION TEST TO begin on 3 day cure

29 JULY 96

Solitified (50% mix) Sample is PLACED IN TEST APARATUS AND LOADED TO .0625 tsf, TEST Begun

30 JULY '96

LOAD INCREASED TO .125 tsf

31 JULY '96

LOAD INCREASED TO .250 tsf

1 Aug '96

LOAD INCREASED TO .5 tsf AND Sample IS FLOODED

2 Aug '96

5 Aug '96

72 hr Reading on Consolidation Load 1 to 2.0 tsf

U.C. Moisture Contents:

Mix	mc	
40%	106.7	& 103.3
50%	85.8	& 86.5
75%	58.8	& 61.5
100%	45.1	& 44.7

* 3 day Cure

6 Aug '96

Consolidation Test

7 Aug '96

Complete 1-D Consolidation Test on CPCP0563B - 50% Mix - 3 day

Results are as follows:

Moisture Contents

Trimmings	Initial	Final
From	181.10	169.97
earlier		* 169.94
Tests	71.46	61.49

Sample Volume: 4.825 in³
79.068 cm³

Load: .0625 tsf corr: .0003

	30 min - .0016
6 sec - .0012	1 hr - .0017
15 sec - .0013	2 hr - .0017
30 sec - .0014	4 hr - .0018
1 min - .0014	6 hr - .0018
2 min - .0015	24 hr - .0019
4 min - .0015	
8 min - .0016	
15 min - .0016	

[Dry Density -> 86.6 pcf

LOAD: .125 tsf corr: .0005

6 sec -	23	15 min -	25
15 sec -	23	30 min -	25
30 sec -	23	1 hr -	26
1 min -	24	2 hr -	26
2 min -	24	4 hr -	28
4 min -	24	6 hr -	29
8 min -	25	24 hr -	30

LOAD: .250 tsf corr: .0007

6 sec -	.0042	15 min -	62
15 sec -	45	30 min -	63
30 sec -	49	1 hr -	65
1 min -	52	2 hr -	67
2 min -	55	4 hr -	69
4 min -	58	6 hr -	70
8 min -	60	24 hr -	72

*FLOOD

LOAD: .5 tsf - corr. - .0012

6 sec -	110	15 min -	124
15 sec -	115	30 min -	126
30 sec -	117	1 hr -	127
1 min -	119	2 hr -	129
2 min -	121	4 hr -	132
4 min -	122	6 hr -	136
8 min -	123	24 hr -	138

LOAD: 1 tsf corr. .017

6 sec -	.0192	15 min -	216
15 sec -	198	30 min -	219
30 sec -	201	1 hr -	221
1 min -	204	2 hr -	224
2 min -	208	4 hr -	228
4 min -	210	6 hr -	232
8 min -	213	72 hr -	238

LOAD: 2 tsf corr: .0027

6 sec -	291	15 min -	324
15 sec -	300	30 min -	327
30 sec -	305	1 hr -	330
1 min -	309	2 hr -	333
2 min -	313	4 hr -	338
4 min -	317	6 hr -	340
8 min -	321	24 hr -	342

LOAD: 4 tsf corr: .0043

6 sec	.0480	15 min	683
15 sec	548	30 min	693
30 sec	585	1 hr	702
1 min	614	2 hr	710
2 min	638	4 hr	716
4 min	656	6 hr	720
8 min	671	24 hr	726

23 Aug '96

ASSISTED TELINA MOORE &
NATHAN Wright w/ Demos

August 26, 1996

Prepared For:
OPERATIONAL TECHNOLOGIES CORPORATION
683 Emory Valley Road
Oak Ridge, TN 37830
As Requested By: T. Moore

SUBCONTRACT NO. 8053-511-S001
ONSITE LABORATORY TESTING
IN SUPPORT OF PRE-REMEDIAL DESIGN
(TREATABILITY STUDIES) ACTIVITIES AT
WAG 1-SIOU-ORNL

SL Report 3101-96-033

Prepared By: _____

Reviewed By: _____

QA By: _____

Approved By: _____

All work contained in this report was conducted in accordance with the requirements of the referenced procurement documents and the Singleton Labs, Inc. QUALITY ASSURANCE MANUAL, Volume I, Revision 0, dated May 1, 1996.

SINGLETON LABS, INC.
1413 Topside Road
Louisville, Tennessee 37777
423-970-2299

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Introduction	1
Scope and Procedures	1
Results	1

Attachments:

A Laboratory Test Data Sheets of Unit Weight, Particle Size, Compaction, and Modified Liquid Release
B Laboratory Test Data Sheets of Consolidation
C Laboratory Test Data Sheets of Unconfined Compressive Strength

Appendix:

A Equipment Usage Logs

INTRODUCTION

Singleton Laboratories has completed a requested onsite laboratory testing program for the subject project. This testing program was conducted in general accordance with Subcontract No. 8053-511-S001 and Singleton Laboratories Proposal No. 96-023 R1, dated February 9, 1996. The purpose of the onsite testing program was to determine physical, consolidation, and shear strength properties of soils from WAG 1-SIOU at Oak Ridge National Laboratory (ORNL) in Oak Ridge, Tennessee. The work was performed between March 20 and August 26, 1996. The following report presents the activities and results of the testing program.

SCOPE AND PROCEDURES

The testing program consists of particle size analysis (ASTM D421 and D422), bulk density (ASTM C138), modified liquid release, Harvard miniature compaction, one dimensional consolidation (ASTM D2435), and unconfined compressive strength (ASTM D2435) tests. The tests assigned were performed in accordance with appropriate American Society for Testing and Materials (ASTM) methods. The modified liquid release tests were performed in accordance with ESSW-SOP1 using modified ZHE (Zero Headspace Extractor) to determine the volume of liquid released from the sample under specified pressures.

RESULTS

Individual test data sheets of unit weight, particle size, compaction, and modified liquid release are enclosed in Attachment A. Individual test data sheets of consolidation and unconfined compressive strength are enclosed in Attachments B and C, respectively. Equipment usage log is enclosed in Appendix A.

Attachment A

Laboratory Test Data Sheets
Unit Weight, Particle size, Compaction
and Modified Liquid Release

Singleton Laboratories
General Classification Tests

Project: OpTech
Feature: SIOU Eng. Support Study
Station:
Range :
Boring :

El. :
Sample: 13CP1PS01
Part :

FILE : 849
TESTED BY : REG
Computed By:TRB
Checked By :
Report Date:06-20-96

Specific Gravity =2.450(Assumed)

Moisture Determination
Dry Wt.+Tare(gm)= 0.00 Tare Wt(gm) = 0.00
Hygroscopic Moisture
Wet Wt.+Tare(gm)= 11.62 Dry Wt.+Tare(gm)= 5.22
Tare Wt(gm) = 1.90 Moisture(%) = 192.77
Sieve and Hydrometer Analysis
Total Dry Weight(gm) = 0

Sieve	Wt.Ret.	% Pass.	Size(mm)
3 in.	0.0	100.0	76.2000
2 in.	0.0	100.0	50.8000
1.5 in.	0.0	100.0	38.1000
1 in.	0.0	100.0	25.4000
3/4 in.	0.0	100.0	19.0500
3/8 in.	0.0	100.0	9.5300
NO.4	0.0	100.0	4.7500
NO.10	0.0	100.0	2.0000
NO.20	0.0	99.9	0.8500
NO.40	0.0	99.9	0.4250
NO.50	0.6	97.2	0.3000
NO.100	1.0	95.9	0.1500
NO.200	1.3	94.5	0.0750

Air Dry Weight(gm)= 67.40 Corrected Weight(gm)= 23.02

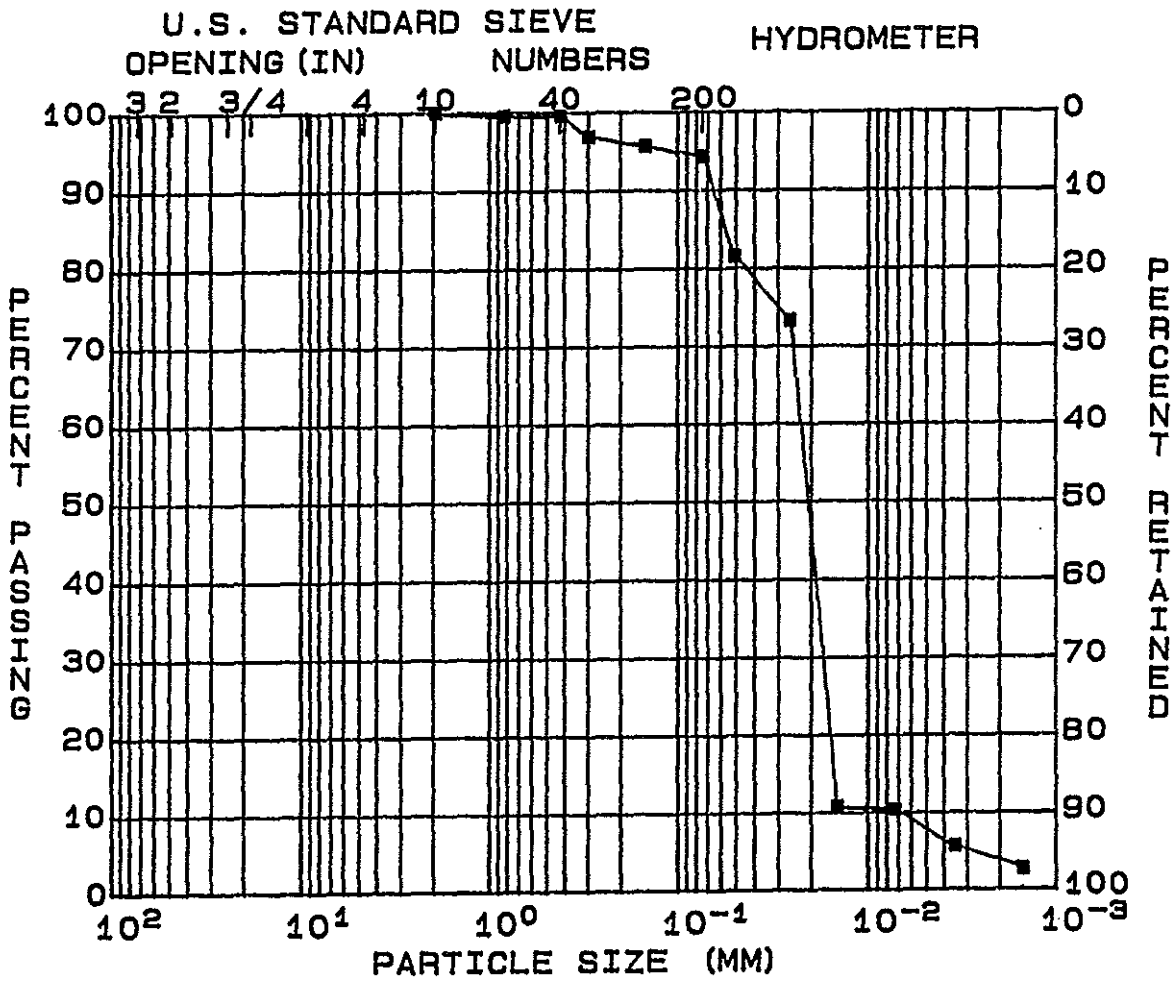
Time	Temp.	Hyd.Rdg	Corr	% Pass	Size(mm)
1 min.	17.0	18.8	0.0	81.7	0.0511
4 min.	17.0	16.9	0.0	73.4	0.0259
15 min.	17.0	2.5	0.0	10.9	0.0145
1 hour	17.0	2.4	0.0	10.4	0.0073
4 hours	21.0	1.3	0.0	5.6	0.0035
24 hour	18.0	0.7	0.0	3.0	0.0016

Gravel(%)= 0 Sand(%)= 6 Silt(%)= 86 Clay(%)= 8

SINGLETON LABORATORIES
PARTICLE SIZE ANALYSIS

PROJECT: OpTech
FEATURE: SIOU
STATION:
RANGE :
PART :

BORING:
EL. :
SAMPLE: 13CP1PS01
DATE : 06-20-96



GRAVEL (%)	= 0	D10 (MM)	= --
SAND (%)	= 6	D30 (MM)	= --
SILT (%)	= 86	D60 (MM)	= --
CLAY (%)	= 8	COEF UNIF	= --

SOIL SYMBOL=	L.L. (%) = 0	DENSITY (pcf) = --
MOISTURE (%) = --	P.I. (%) = 0	SATURATION (%) = --
SP. GR. = 2.45		VOID RATIO = --

REMARKS:

Singleton Laboratories
General Classification Tests

Project: OpTech
Feature: SIOU Eng. Support Study
Station:
Range :
Boring :

El. :
Sample: 13CP1PS02
Part :

FILE : 851
TESTED BY : REG
Computed By:TRB
Checked By :
Report Date:06-20-96

Specific Gravity =2.450(Assumed)

Moisture Determination
Dry Wt.+Tare(gm)= 0.00 Tare Wt(gm) = 0.00
Hygroscopic Moisture
Wet Wt.+Tare(gm)= 10.25 Dry Wt.+Tare(gm)= 5.42
Tare Wt(gm) = 1.90 Moisture(%) = 137.22
Sieve and Hydrometer Analysis
Total Dry Weight(gm) = 0

Sieve	Wt.Ret.	% Pass.	Size(mm)
3 in.	0.0	100.0	76.2000
2 in.	0.0	100.0	50.8000
1.5 in.	0.0	100.0	38.1000
1 in.	0.0	100.0	25.4000
3/4 in.	0.0	100.0	19.0500
3/8 in.	0.0	100.0	9.5300
NO.4	0.0	100.0	4.7500
NO.10	0.0	100.0	2.0000
NO.20	0.0	99.9	0.8500
NO.40	0.0	99.9	0.4250
NO.50	0.7	96.5	0.3000
NO.100	1.0	95.2	0.1500
NO.200	1.3	93.6	0.0750

Air Dry Weight(gm)= 47.60 Corrected Weight(gm)= 20.07

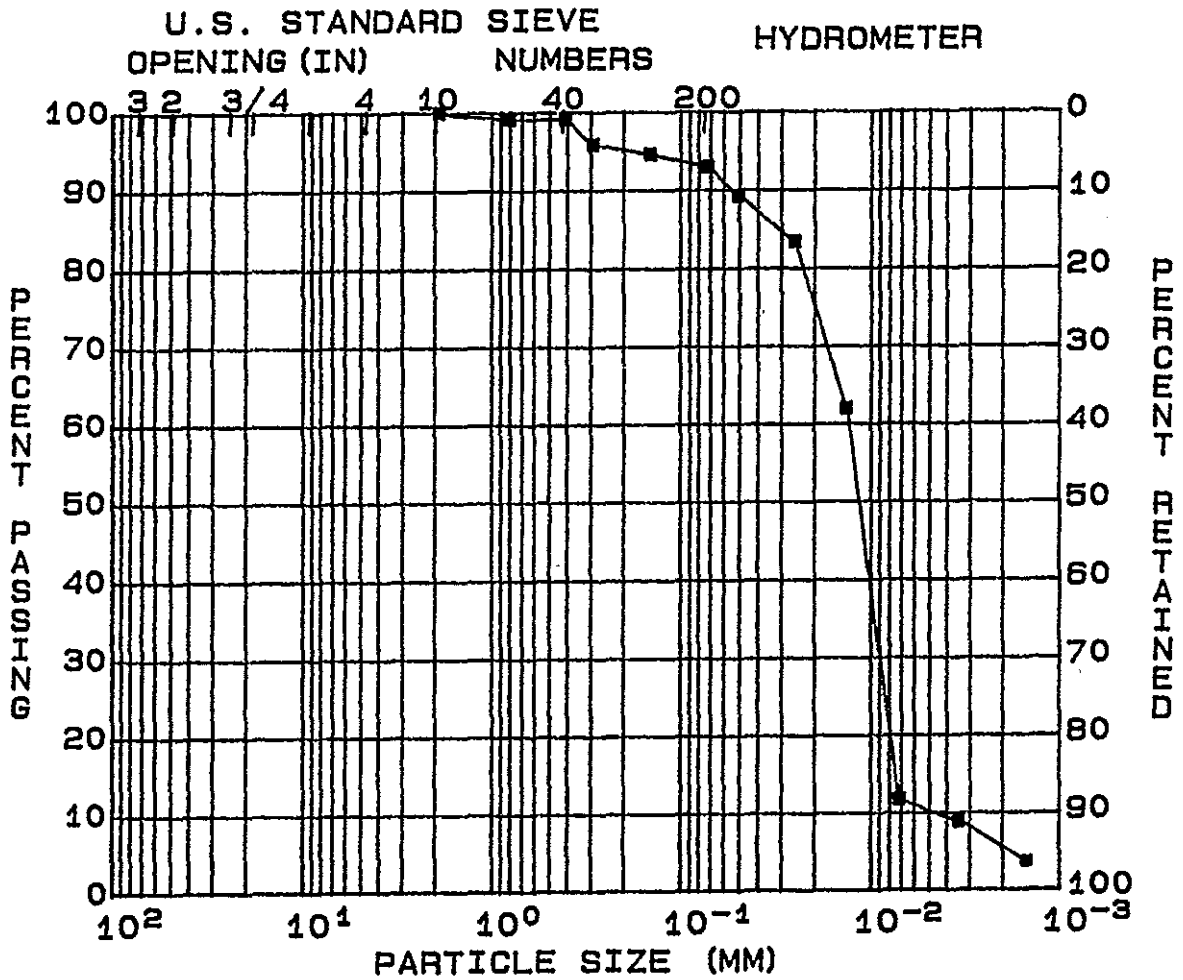
Time	Temp.	Hyd.Rdg	Corr	% Pass	Size(mm)
1 min.	17.0	18.0	0.0	89.7	0.0514
4 min.	17.0	16.8	0.0	83.7	0.0259
15 min.	17.0	12.5	0.0	62.3	0.0137
1 hour	17.0	2.4	0.0	12.0	0.0073
4 hours	21.0	1.8	0.0	9.0	0.0035
24 hour	18.0	0.7	0.0	3.5	0.0016

Gravel(%)= 0 Sand(%)= 6 Silt(%)= 83 Clay(%)= 11

SINGLETON LABORATORIES
PARTICLE SIZE ANALYSIS

PROJECT: OpTech
FEATURE: SIOU
STATION:
RANGE :
PART :

BORING:
EL. :
SAMPLE: 13CP1PS02
DATE : 06-20-96



GRAVEL (%)	= 0	D10 (MM)	= --
SAND (%)	= 6	D30 (MM)	= --
SILT (%)	= 83	D60 (MM)	= --
CLAY (%)	= 11	COEF UNIF	= --

SOIL SYMBOL=	L.L. (%) = 0	DENSITY (pcf) = --
MOISTURE (%) = --	P.I. (%) = 0	SATURATION (%) = --
SP. GR. = 2.45		VOID RATIO = --

REMARKS:

Singleton Laboratories
General Classification Tests

Project: OpTech
Feature: SIOU Engineering Support Study
Station:
Range :
Boring :

El. :
Sample: 24CP1PS01
Part :

FILE : 853
TESTED BY : REG
Computed By:TRB
Checked By :
Report Date:06-25-96

Specific Gravity =2.450(Assumed)

Moisture Determination
Dry Wt.+Tare(gm)= 0.00 Tare Wt(gm) = 0.00
Hygroscopic Moisture
Wet Wt.+Tare(gm)= 24.47 Dry Wt.+Tare(gm)= 10.91
Tare Wt(gm) = 1.91 Moisture(%) = 150.67
Sieve and Hydrometer Analysis
Total Dry Weight(gm) = 0

Sieve	Wt.Ret.	% Pass.	Size(mm)
3 in.	0.0	100.0	76.2000
2 in.	0.0	100.0	50.8000
1.5 in.	0.0	100.0	38.1000
1 in.	0.0	100.0	25.4000
3/4 in.	0.0	100.0	19.0500
3/8 in.	0.0	100.0	9.5300
NO.4	0.0	100.0	4.7500
NO.10	0.0	100.0	2.0000
NO.20	0.1	99.7	0.8500
NO.40	0.1	99.7	0.4250
NO.50	0.3	99.0	0.3000
NO.100	0.8	97.5	0.1500
NO.200	1.8	94.3	0.0750

Air Dry Weight(gm)= 78.85 Corrected Weight(gm)= 31.46

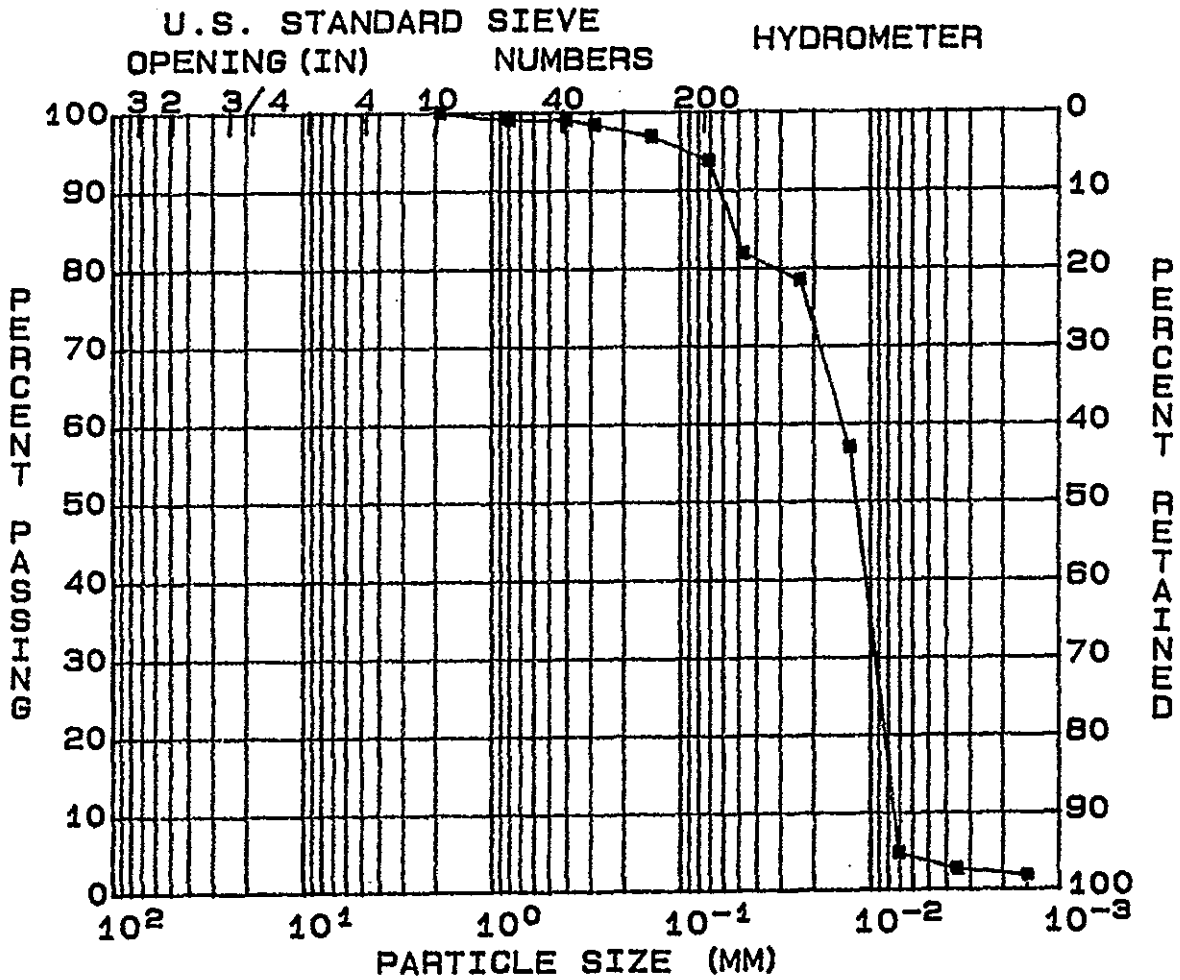
Time	Temp.	Hyd.Rdg	Corr	% Pass	Size(mm)
1 min.	17.6	25.9	0.0	82.3	0.0484
4 min.	17.6	24.8	0.0	78.8	0.0244
15 min.	17.6	18.0	0.0	57.2	0.0132
1 hour	17.6	1.6	0.0	5.1	0.0072
4 hours	19.4	0.9	0.0	2.9	0.0035
24 hour	19.0	0.6	0.0	1.9	0.0016

Gravel(%)= 0 Sand(%)= 6 Silt(%)= 90 Clay(%)= 4

SINGLETON LABORATORIES
PARTICLE SIZE ANALYSIS

PROJECT: OpTech
FEATURE: siou
STATION:
RANGE :
PART :

BORING:
EL. :
SAMPLE: 24CP1PS01
DATE : 06-25-96



GRAVEL (%)	= 0	D10 (MM)	= --
SAND (%)	= 6	D30 (MM)	= --
SILT (%)	= 90	D60 (MM)	= --
CLAY (%)	= 4	COEF UNIF	= --

SOIL SYMBOL=	L.L. (%) = 0	DENSITY (pcf) = --
MOISTURE (%) = --	P.I. (%) = 0	SATURATION (%) = --
SP. GR. = 2.45		VOID RATIO = --

REMARKS:

Singleton Laboratories
General Classification Tests

Project: OpTech
Feature: SIOU Engineering Support Study
Station:
Range :
Boring :

El. :
Sample: 24CP1PS02
Part :

FILE : 852
TESTED BY : REG
Computed By:TRB
Checked By :
Report Date:06-25-96

Specific Gravity =2.450 (Assumed)

Moisture Determination
Dry Wt.+Tare(gm) = 0.00 Tare Wt(gm) = 0.00
Hygroscopic Moisture
Wet Wt.+Tare(gm) = 25.22 Dry Wt.+Tare(gm) = 10.88
Tare Wt(gm) = 1.93 Moisture(%) = 160.22
Sieve and Hydrometer Analysis
Total Dry Weight(gm) = 0

Sieve	Wt.Ret.	% Pass.	Size(mm)
3 in.	0.0	100.0	76.2000
2 in.	0.0	100.0	50.8000
1.5 in.	0.0	100.0	38.1000
1 in.	0.0	100.0	25.4000
3/4 in.	0.0	100.0	19.0500
3/8 in.	0.0	100.0	9.5300
NO.4	0.0	100.0	4.7500
NO.10	0.0	100.0	2.0000
NO.20	0.1	99.7	0.8500
NO.40	0.1	99.7	0.4250
NO.50	0.3	99.0	0.3000
NO.100	0.8	97.4	0.1500
NO.200	2.0	93.4	0.0750

Air Dry Weight(gm) = 79.13 Corrected Weight(gm) = 30.41

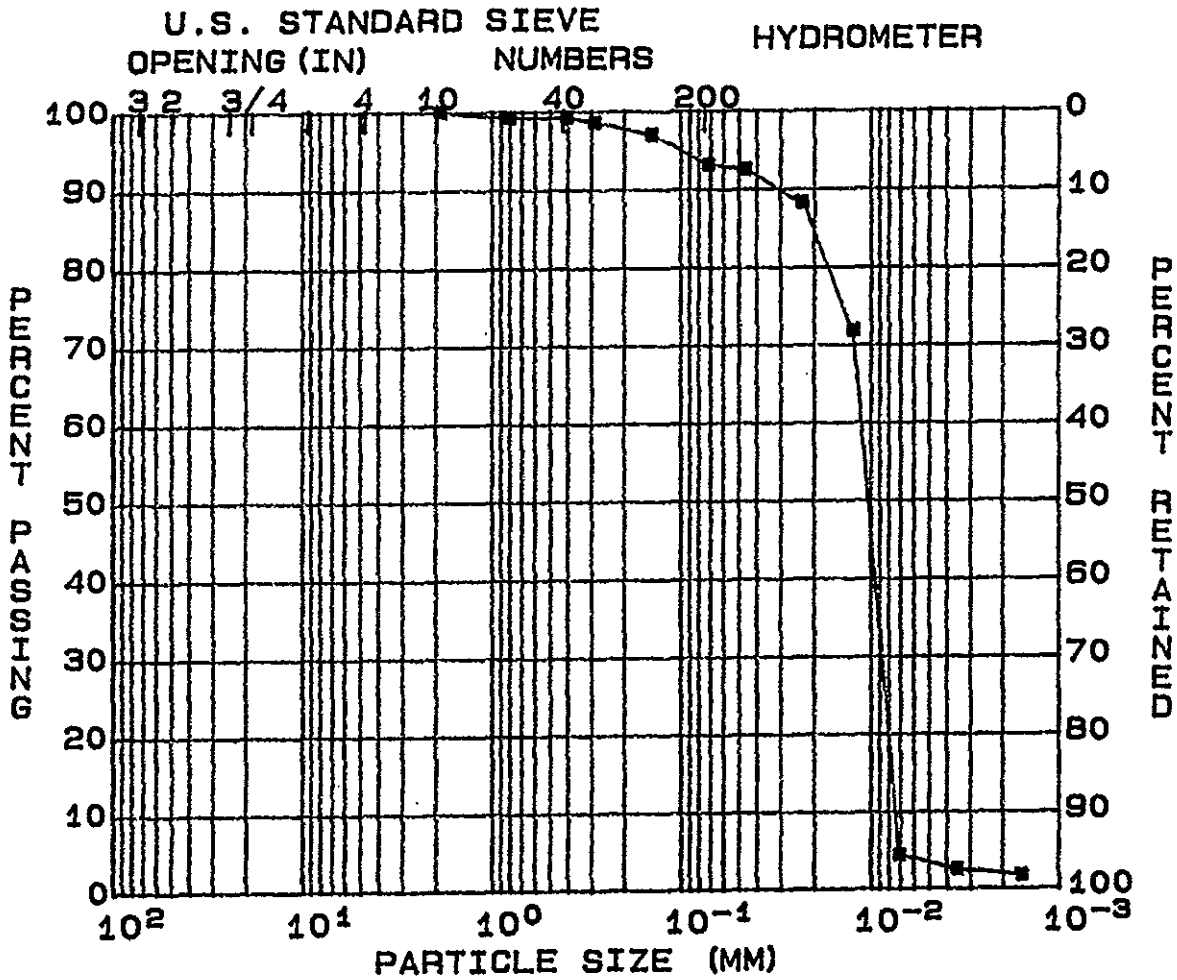
Time	Temp.	Hyd.Rdg	Corr	% Pass	Size(mm)
1 min.	17.6	28.2	0.0	92.7	0.0477
4 min.	17.6	26.9	0.0	88.5	0.0240
15 min.	17.6	21.9	0.0	72.0	0.0128
1 hour	17.6	1.4	0.0	4.6	0.0072
4 hours	19.4	0.8	0.0	2.6	0.0035
24 hour	19.0	0.6	0.0	2.0	0.0016

Gravel(%) = 0 Sand(%) = 7 Silt(%) = 90 Clay(%) = 3

SINGLETON LABORATORIES
PARTICLE SIZE ANALYSIS

PROJECT: OpTech
FEATURE: SIOU
STATION:
RANGE :
PART :

BORING:
EL. :
SAMPLE: 24CP1PS02
DATE : 06-25-96

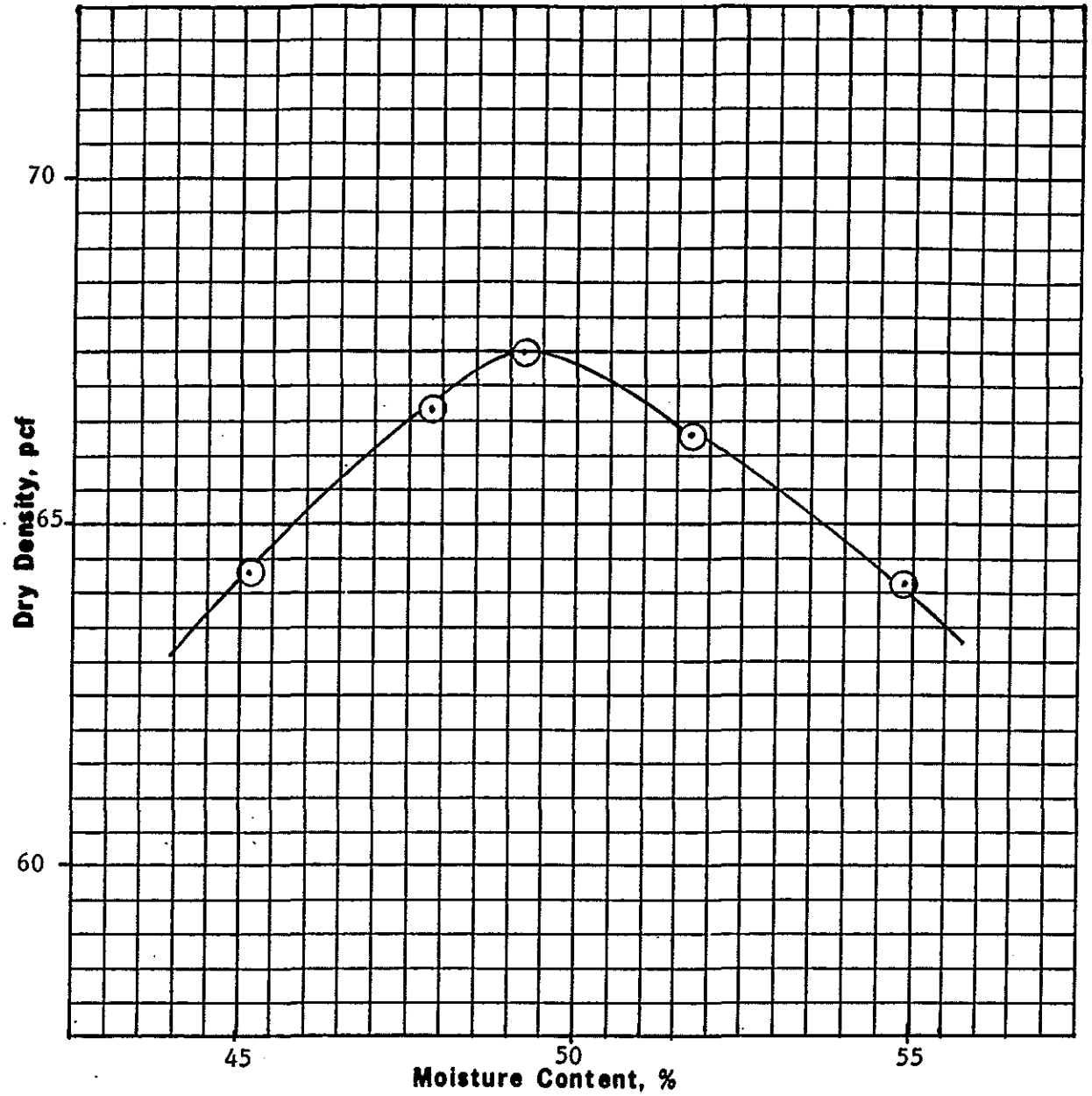


GRAVEL (%)	= 0	D10 (MM)	= ---
SAND (%)	= 7	D30 (MM)	= ---
SILT (%)	= 90	D60 (MM)	= ---
CLAY (%)	= 3	COEF UNIF	= ---

SOIL SYMBOL=	L.L. (%) = 0	DENSITY (pcf) = ---
MOISTURE (%) = ---	P.I. (%) = 0	SATURATION (%) = ---
SP. GR. = 2.45		VOID RATIO = ---

REMARKS:

SINGLETON LABORATORIES



Soil Class	Gravel %	Sand %	Silt %	Clay %	Specific Gravity	LL %	PI %	Optimum Moisture, %	Maximum Density, pcf
								49.2	67.5

Plus No. 4 Specific Gravity, S S D	
Plus No. 4 Absorption, %	

Remarks:

Project OpTECH - SIOU Engineering Support Study

Feature HARVARD MINIATURE COMPACTION

Sample No. CPCPHM01

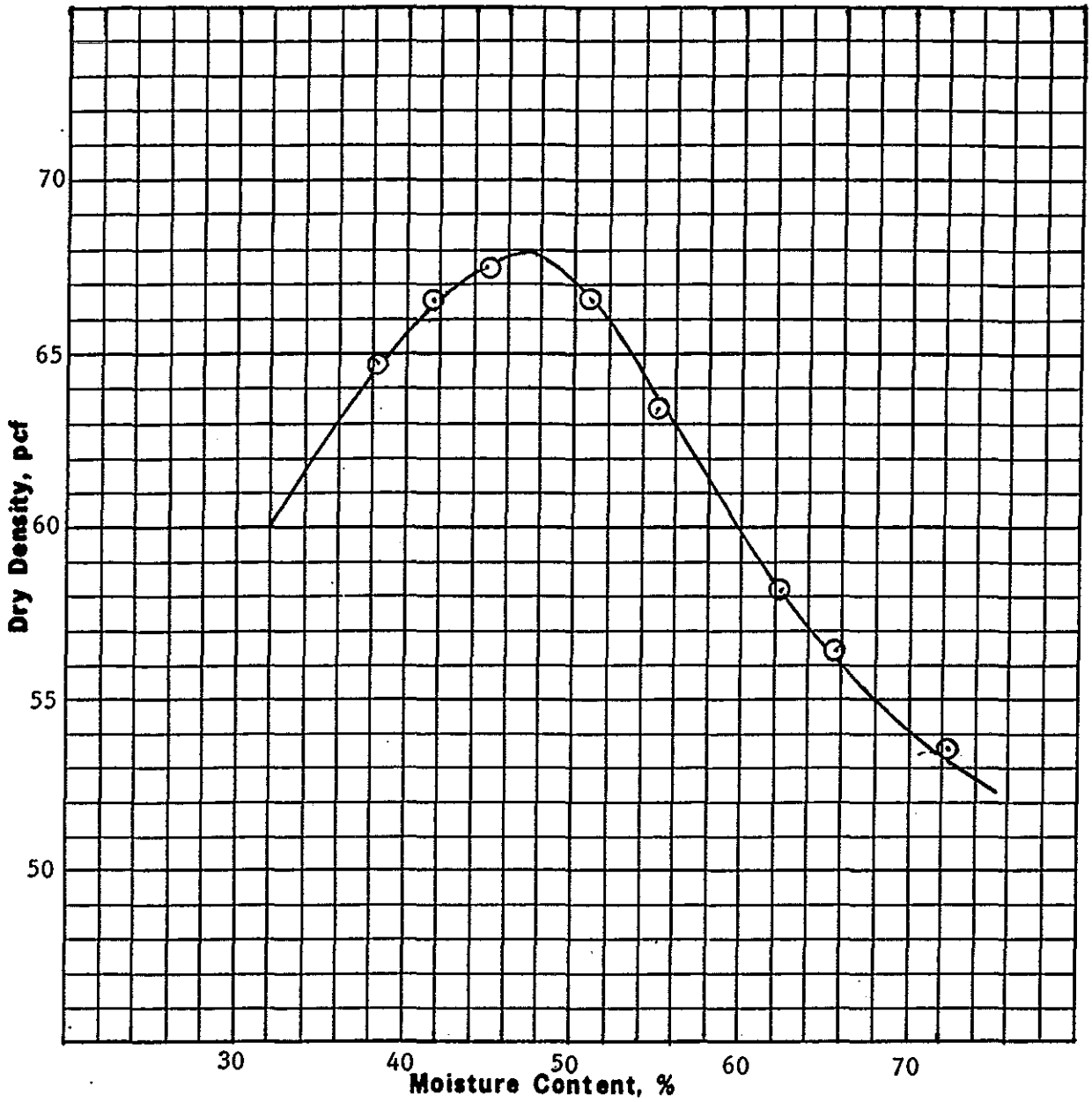
Date Tested 06/19/96

COMPACTION TEST (FAMILY OF CURVES)

E-39

Tested by: RGS Reviewed by: [illegible]

SINGLETON LABORATORIES



Soil Class	Gravel %	Sand %	Silt %	Clay %	Specific Gravity	LL %	PI %	Optimum Moisture, %	Maximum Density, pcf
								47.3	67.9

Plus No. 4 Specific Gravity, S S D	
Plus No. 4 Absorption, %	

Remarks:

Project OpTECH - SIOU Engineering Support Study

Feature HARVARD MINIATURE COMPACTION

Sample No. CPCPHM02

Date Tested 07/08/96

COMPACTION TEST (FAMILY OF CURVES)

Tested by: EG Reviewed by: [illegible]

OpTech - WAG 1 SIOU - ORNL Engineering Support Study

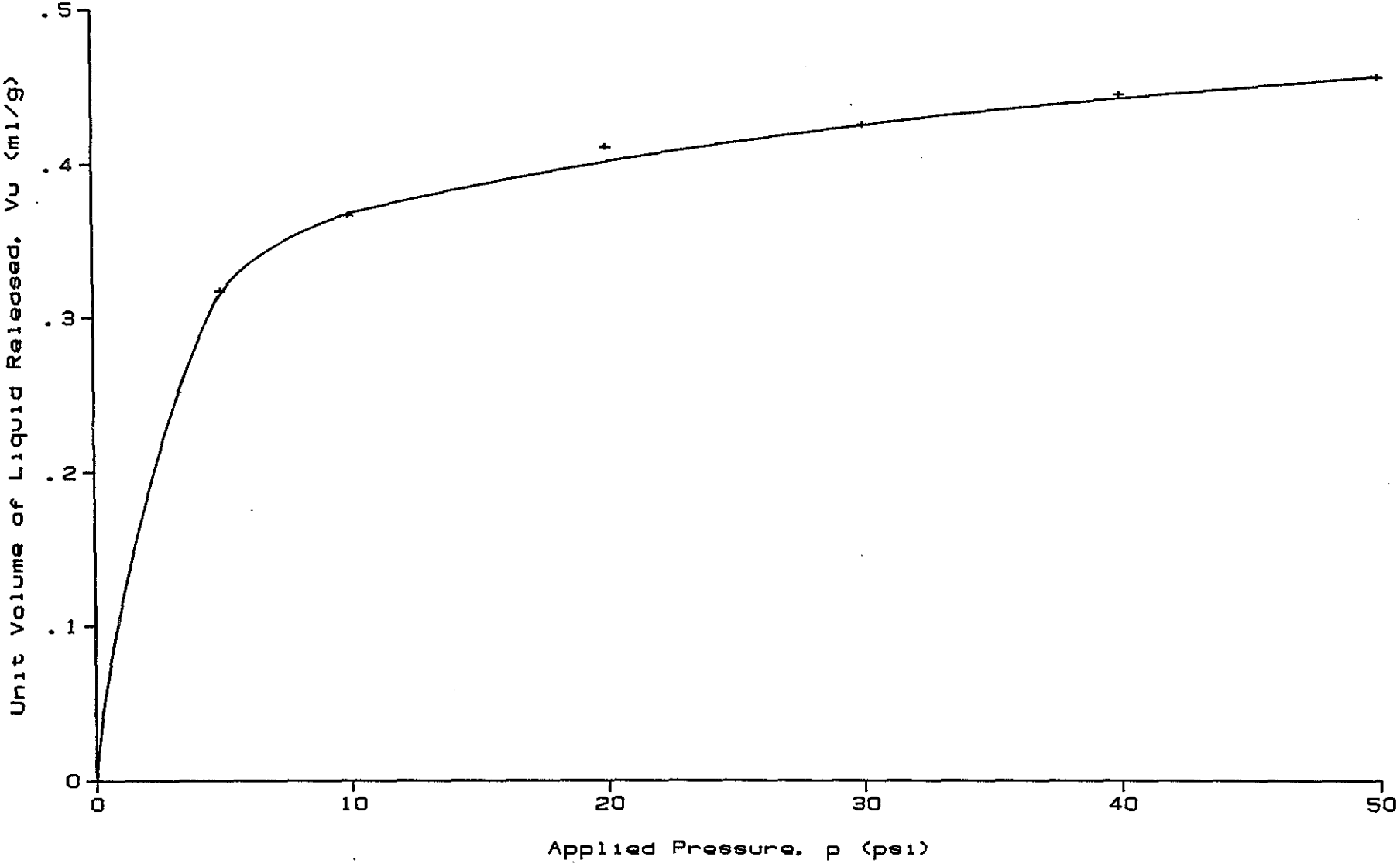
Subcontract No. 8053-511-S001

Modified Liquid Release Test

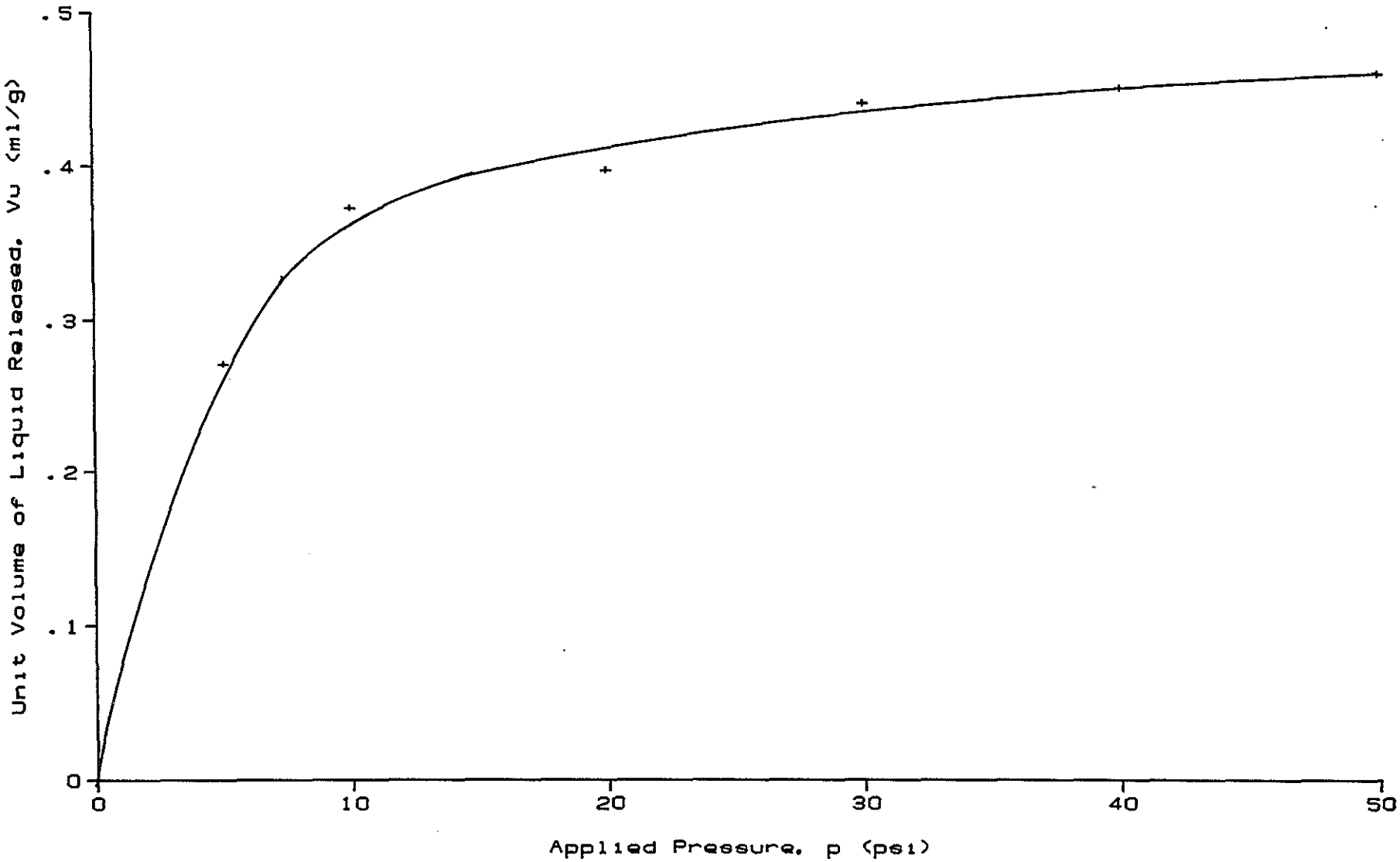
Sample No.	Pressure P, (psi)	Volume of Liquid Released, V (ml)	Cumulative Volume f Liquid Released, Vcum (ml	Unit Liquid Volume Released Vu = Vcum/W (ml/g)
CPCPLR01	0	0	0	.0000
	5	159.2	159.2	.2709
	10	59.6	218.8	.3724
	20	14.6	233.4	.3972
	30	25.3	258.7	.4403
	40	5.7	264.4	.4500
	50	5.1	269.5	.4589
Initial Weight (W) = 587.6 g Initial Moisture Content = 210.8% Final Moisture Content = 67.4%				
CPCPLR02	0	0	0	0
	5	89.1	89.1	.3173
	10	13.8	102.9	.3665
	20	12.6	115.5	.4113
	30	4.0	119.5	.4256
	40	5.4	124.9	.4448
	50	3.0	127.9	.4555
Initial Weight (W) = 280.8 g Initial Moisture Content = 200.6% Final Moisture Content = 64.2%				

S:\EXCEL\TRACIE\FORMS\MODLIQ.XLS

TREATABILITY STUDIES AT WAG 1 - SIOU AT ORNL
MODIFIED LIQUID RELEASE TEST, SAMPLE NO. CPCPLR02
UNIT VOLUME OF LIQUID RELEASED VERSUS APPLIED PRESSURE



TREATABILITY STUDIES AT WAG 1 - SIOU AT ORNL
MODIFIED LIQUID RELEASE TEST, SAMPLE NO. CPCPLR01
UNIT VOLUME OF LIQUID RELEASED VERSUS APPLIED PRESSURE



Attachment B

Laboratory Test Data Sheets
Consolidation

Singleton Laboratories
Consolidation Test

Project: OpTech
Feature: SIOU Engineering Support Study
Station:
Range :
Boring :

El. :
Sample: CPCP1D01
Part :

File : 40
Tested By : REG
Computed By: TRB
Checked By :
Report Date: 06-27-96

Moisture Content	Trimming	Initial	Final
Wet Wt. and Tare (gm)=	55.9	94.0	105.7
Dry Wt. and Tare (gm)=	19.3	28.9	89.6
Wt. of Tare (gm) =	2.0	0.0	60.8
Moisture (%) =	210.8	225.8	55.5

Sample Data:
Sample Volume (cc) =79.068
Sample Height (in.)= 0.980

Specific Gravity=2.43
Ring No. =SO/TR-50

	Initial	Final
Moisture (%)	%225.8	55.5
Density (pcf)	22.8	56.7
Void Ratio	5.657	1.674
Saturation (%)	97.0	80.6

Load (tsf)	Dial Reading	Correction	Void Ratio
0.0625	0.28130	0.00030	3.7486
0.1250	0.33150	0.00050	3.4089
0.2500	0.39410	0.00070	2.9850
0.5000	0.45440	0.00120	2.5787
1.0000	0.50000	0.00170	2.2724
2.0000	0.54760	0.00270	1.9558
4.0000	0.59070	0.00430	1.6739

Singleton Laboratories
Consolidation Test

Project: OpTech
Feature: SIOU Engineering Support Study
Station:
Range :
Boring :

El. :
Sample: CPCP1D01
Part :

File : 40
Tested By : REG
Computed By: TRB
Checked By :
Report Date: 06-27-96

Load= 0.0625 (tsf) Time Started=0

Time	Dial Reading	Correction
0 sec	0.00000	0.00030
6 sec	0.01000	0.00030
15 sec	0.02400	0.00030
30 sec	0.04100	0.00030
1 min	0.05670	0.00030
2 min	0.06320	0.00030
4 min	0.08800	0.00030
8 min	0.12300	0.00030
15 min	0.16660	0.00030
30 min	0.22210	0.00030
1 hr	0.25090	0.00030
2 hrs	0.26130	0.00030
4 hrs	0.26770	0.00030
6 hrs	0.27090	0.00030
24 hrs	0.28130	0.00030

Remarks:

Load= 0.1250 (tsf) Time Started=

Time	Dial Reading	Correction
0 sec	0.28130	0.00030
6 sec	0.28370	0.00050
15 sec	0.28460	0.00050
30 sec	0.28600	0.00050
1 min	0.28780	0.00050
2 min	0.29080	0.00050
4 min	0.29450	0.00050
8 min	0.29940	0.00050
15 min	0.30480	0.00050
30 min	0.31070	0.00050
1 hr	0.31590	0.00050
2 hrs	0.32020	0.00050
4 hrs	0.32480	0.00050
6 hrs	0.32750	0.00050
24 hrs	0.33150	0.00050

Remarks:

Load= 0.2500 (tsf) Time Started=

Time	Dial Reading	Correction
0 sec	0.33150	0.00050
6 sec	0.33880	0.00070
15 sec	0.34000	0.00070
30 sec	0.34140	0.00070
1 min	0.34380	0.00070
2 min	0.34750	0.00070
4 min	0.35260	0.00070
8 min	0.35950	0.00070
15 min	0.36580	0.00070
30 min	0.37230	0.00070
1 hr	0.37760	0.00070
2 hrs	0.38200	0.00070
4 hrs	0.38610	0.00070
6 hrs	0.38850	0.00070
24 hrs	0.39410	0.00070

Remarks:

Load= 0.5000 (tsf) Time Started=

Time	Dial Reading	Correction
0 sec	0.39410	0.00070
6 sec	0.39750	0.00120
15 sec	0.39910	0.00120
30 sec	0.40090	0.00120
1 min	0.40400	0.00120
2 min	0.40880	0.00120
4 min	0.41380	0.00120
8 min	0.42070	0.00120
15 min	0.42670	0.00120
30 min	0.43290	0.00120
1 hr	0.43670	0.00120
2 hrs	0.44030	0.00120
4 hrs	0.44390	0.00120
6 hrs	0.44600	0.00120
72 hrs	0.45440	0.00120

Remarks:

Singleton Laboratories
Consolidation Test

Project: OpTech
Feature: SIOU Engineering Support Study
Station:
Range :
Boring :

El. :
Sample: CPCP1D01
Part :

File : 40
Tested By : REG
Computed By: TRB
Checked By :
Report Date: 06-27-96

Load= 1.0000 (tsf) Time Started=

Time	Dial Reading	Correction
0 sec	0.45440	0.00120
6 sec	0.45700	0.00170
15 sec	0.45890	0.00170
30 sec	0.46070	0.00170
1 min	0.46330	0.00170
2 min	0.46690	0.00170
4 min	0.47140	0.00170
8 min	0.47630	0.00170
15 min	0.48090	0.00170
30 min	0.48480	0.00170
1 hr	0.48870	0.00170
2 hrs	0.49150	0.00170
4 hrs	0.49450	0.00170
6 hrs	0.49610	0.00170
24 hrs	0.50000	0.00170

Remarks:

Load= 2.0000 (tsf) Time Started=

Time	Dial Reading	Correction
0 sec	0.50000	0.00170
6 sec	0.50420	0.00270
15 sec	0.50610	0.00270
30 sec	0.50860	0.00270
1 min	0.51180	0.00270
2 min	0.51590	0.00270
4 min	0.52200	0.00270
8 min	0.52750	0.00270
15 min	0.53160	0.00270
30 min	0.53500	0.00270
1 hr	0.53780	0.00270
2 hrs	0.54060	0.00270
4 hrs	0.54300	0.00270
6 hrs	0.54480	0.00270
24 hrs	0.54760	0.00270

Remarks:

Load= 4.0000 (tsf) Time Started=

Time	Dial Reading	Correction
0 sec	0.54760	0.00270
6 sec	0.55200	0.00430
15 sec	0.55370	0.00430
30 sec	0.55580	0.00430
1 min	0.55910	0.00430
2 min	0.56350	0.00430
4 min	0.56840	0.00430
8 min	0.57280	0.00430
15 min	0.57580	0.00430
30 min	0.57830	0.00430
1 hr	0.58370	0.00430
2 hrs	0.58590	0.00430
4 hrs	0.58770	0.00430
6 hrs	0.58870	0.00430
24 hrs	0.59070	0.00430

Remarks:

Load= 0.0000 (tsf) Time Started=

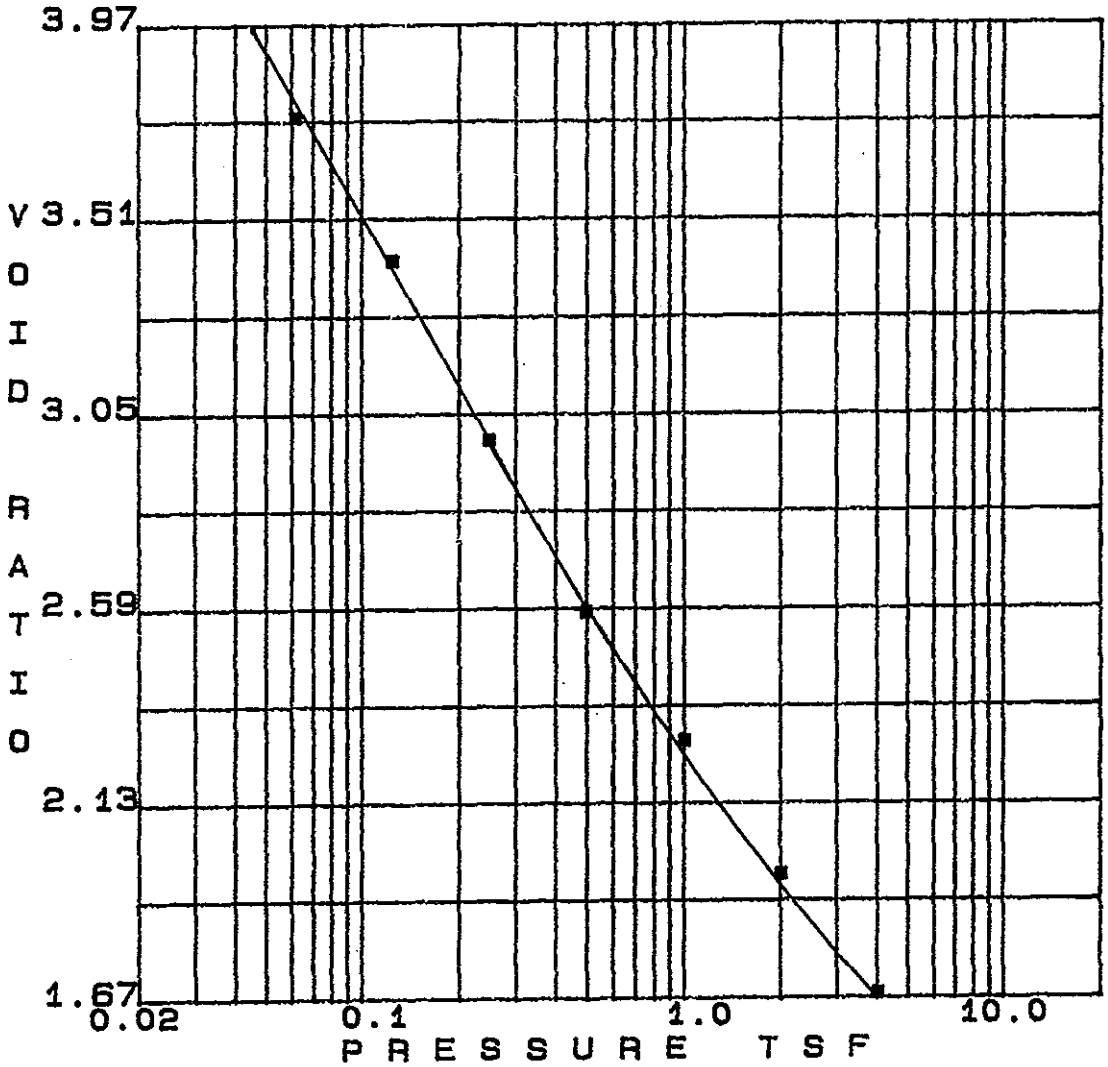
Time	Dial Reading	Correction
0 sec	0.00000	0.00000
6 sec	0.00000	0.00000
15 sec	0.00000	0.00000
30 sec	0.00000	0.00000
1 min	0.00000	0.00000
2 min	0.00000	0.00000
4 min	0.00000	0.00000
8 min	0.00000	0.00000
15 min	0.00000	0.00000
30 min	0.00000	0.00000
1 hr	0.00000	0.00000
2 hrs	0.00000	0.00000
4 hrs	0.00000	0.00000
6 hrs	0.00000	0.00000
hrs	0.00000	0.00000

Remarks:

SINGLETON LABORATORIES
CONSOLIDATION TEST

PROJECT: OpTech
FEATURE: SIOU
STATION:
RANGE :

BORING:
EL. :
SAMPLE: CPCP1D01
DATE : 06-27-96



SOIL SYMBOL=
SP GRAVITY =2.43 L.L. (%) = 0
D10 (mm) =0.0000 P.I. (%) = 0

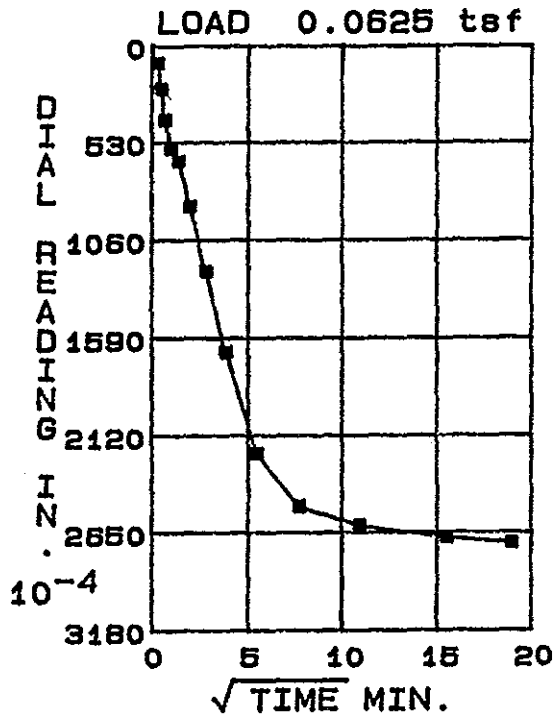
	INITIAL	FINAL
MOISTURE (%)	%225.8	55.5
DRY DENSITY (pcf)	22.8	56.7
VOID RATIO	5.657	1.674
SATURATION (%)	97.0	80.6

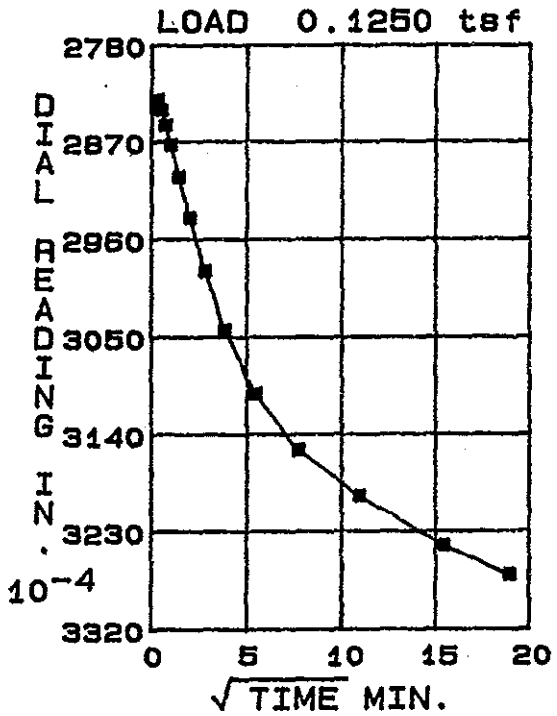
REMARKS:

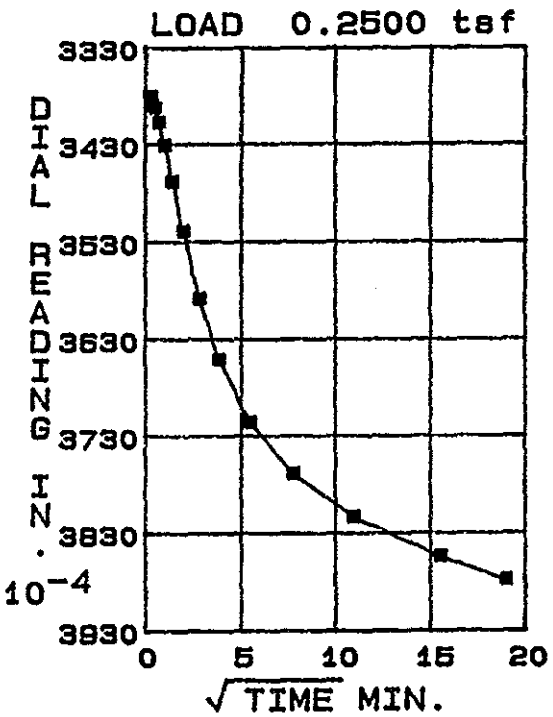
SINGLETON LABORATORIES
CONSOLIDATION TEST

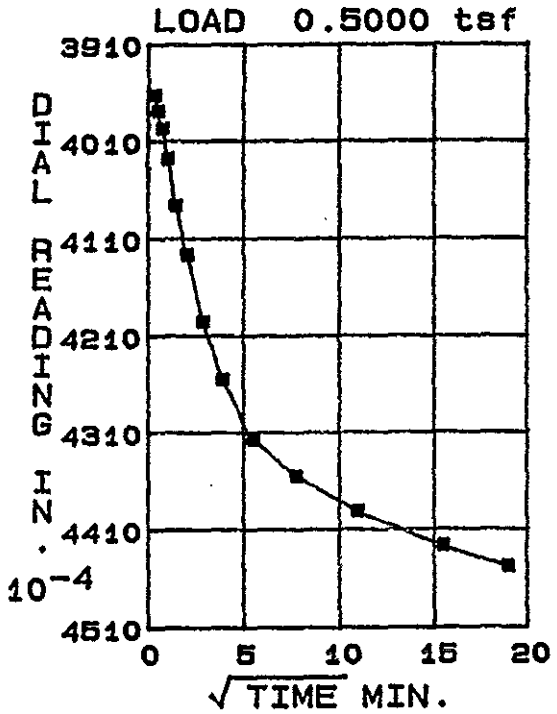
PROJECT: OpTech
FEATURE: SIOU
STATION:
RANGE :

BORING:
EL. :
SAMPLE: CPCP1D01
DATE : 06-27-96







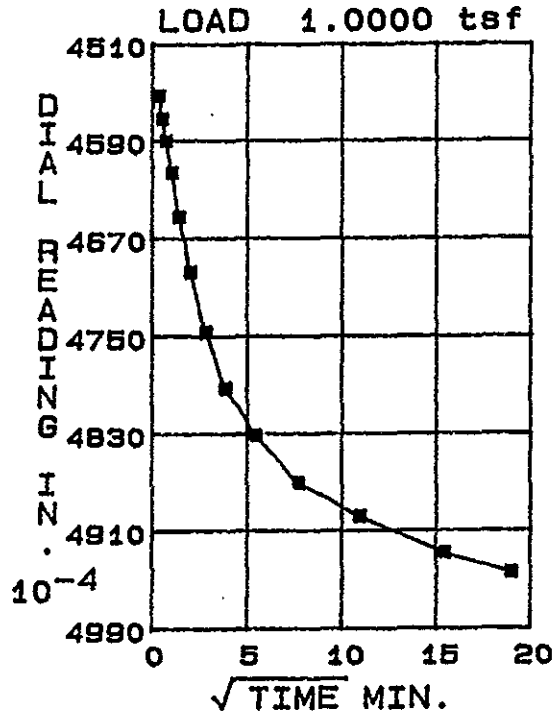


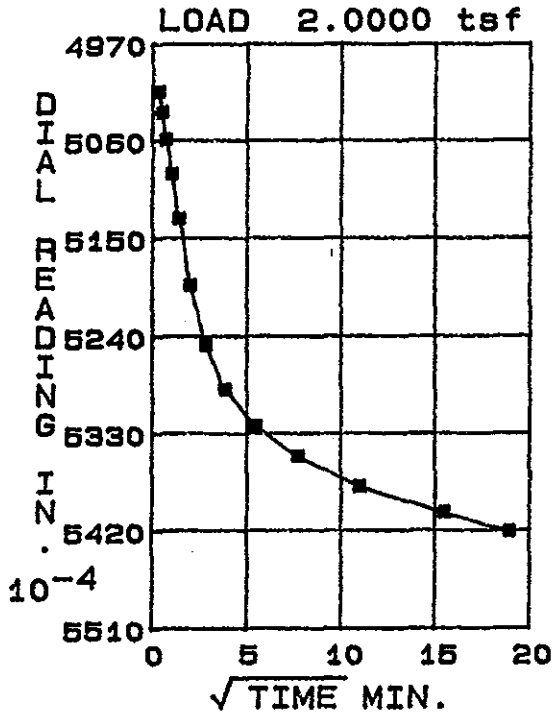
REMARKS:

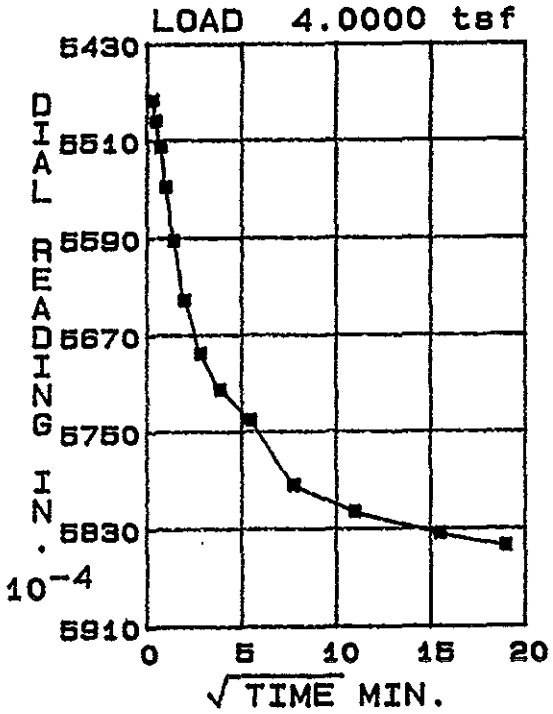
SINGLETON LABORATORIES
CONSOLIDATION TEST

PROJECT: OpTech
FEATURE: SIOU
STATION:
RANGE :

BORING:
EL. :
SAMPLE: CPCP1D01
DATE : 06-27-96







REMARKS:

Singleton Laboratories
Consolidation Test

Project: OpTech
Feature: SIOU Engineering Support Study
Station:
Range :
Boring :

El. :
Sample: CPCP1D02
Part :

File : 41
Tested By : REG
Computed By: TRB
Checked By :
Report Date: 07-10-96

Moisture Content	Trimming	Initial	Final
Wet Wt. and Tare (gm) =	35.3	89.3	104.4
Dry Wt. and Tare (gm) =	13.0	28.6	89.4
Wt. of Tare (gm) =	2.0	0.0	60.8
Moisture (%) =	203.8	211.8	52.6

Sample Data:
Sample Volume (cc) =79.068
Sample Height (in.)= 0.980
Specific Gravity=2.44
Ring No. =SO/TR-50

	Initial	Final
Moisture (%)	%211.8	52.6
Density (pcf)	22.6	63.1
Void Ratio	5.739	1.414
Saturation (%)	90.1	90.8

Load (tsf)	Dial Reading	Correction	Void Ratio
0.0625	0.29640	0.00030	3.7026
0.1250	0.36210	0.00050	3.2522
0.2500	0.41860	0.00070	2.8651
0.5000	0.48480	0.00120	2.4133
1.0000	0.53880	0.00170	2.0454
2.0000	0.58860	0.00270	1.7099
4.0000	0.63320	0.00430	1.4142

Singleton Laboratories
Consolidation Test

Project: OpTech
Feature: SIOU Engineering Support Study
Station:
Range :
Boring :

El. :
Sample: CPCP1D02
Part :

File : 41
Tested By : REG
Computed By: TRB
Checked By :
Report Date: 07-10-96

Load= 0.0625 (tsf) Time Started=

Time	Dial Reading	Correction
0 sec	0.00000	0.00030
6 sec	0.04190	0.00030
15 sec	0.05450	0.00030
30 sec	0.06650	0.00030
1 min	0.07700	0.00030
2 min	0.09580	0.00030
4 min	0.12200	0.00030
8 min	0.16200	0.00030
15 min	0.19720	0.00030
30 min	0.23940	0.00030
1 hr	0.26530	0.00030
2 hrs	0.27600	0.00030
4 hrs	0.28280	0.00030
6 hrs	0.28600	0.00030
24 hrs	0.29640	0.00030

Remarks:

Load= 0.1250 (tsf) Time Started=

Time	Dial Reading	Correction
0 sec	0.29640	0.00030
6 sec	0.30050	0.00050
15 sec	0.30180	0.00050
30 sec	0.30300	0.00050
1 min	0.30560	0.00050
2 min	0.30770	0.00050
4 min	0.31130	0.00050
8 min	0.31600	0.00050
15 min	0.32130	0.00050
30 min	0.32730	0.00050
1 hr	0.33280	0.00050
2 hrs	0.33780	0.00050
4 hrs	0.34270	0.00050
6 hrs	0.34530	0.00050
72 hrs	0.36210	0.00050

Remarks:

Load= 0.2500 (tsf) Time Started=

Time	Dial Reading	Correction
0 sec	0.36210	0.00050
6 sec	0.36740	0.00070
15 sec	0.36870	0.00070
30 sec	0.37030	0.00070
1 min	0.37250	0.00070
2 min	0.37560	0.00070
4 min	0.37980	0.00070
8 min	0.38510	0.00070
15 min	0.39000	0.00070
30 min	0.39560	0.00070
1 hr	0.40020	0.00070
2 hrs	0.40430	0.00070
4 hrs	0.40860	0.00070
6 hrs	0.41120	0.00070
24 hrs	0.41860	0.00070

Remarks:

Load= 0.5000 (tsf) Time Started=

Time	Dial Reading	Correction
0 sec	0.41860	0.00070
6 sec	0.42570	0.00120
15 sec	0.42800	0.00120
30 sec	0.43040	0.00120
1 min	0.43370	0.00120
2 min	0.43860	0.00120
4 min	0.44500	0.00120
8 min	0.45230	0.00120
15 min	0.45840	0.00120
30 min	0.46460	0.00120
1 hr	0.46900	0.00120
2 hrs	0.47260	0.00120
4 hrs	0.47600	0.00120
6 hrs	0.47820	0.00120
24 hrs	0.48480	0.00120

Remarks:

Singleton Laboratories
Consolidation Test

Project: OpTech
Feature: SIOU Engineering Support Study
Station:
Range :
Boring :

El. :
Sample: CPCP1D02
Part :

File : 41
Tested By : REG
Computed By: TRB
Checked By :
Report Date: 07-10-96

Load= 1.0000 (tsf) Time Started=

Time	Dial Reading	Correction
0 sec	0.48480	0.00120
6 sec	0.49000	0.00170
15 sec	0.49220	0.00170
30 sec	0.49420	0.00170
1 min	0.49880	0.00170
2 min	0.50240	0.00170
4 min	0.50810	0.00170
8 min	0.51380	0.00170
15 min	0.51890	0.00170
30 min	0.52320	0.00170
1 hr	0.52690	0.00170
2 hrs	0.53010	0.00170
4 hrs	0.53280	0.00170
6 hrs	0.53500	0.00170
24 hrs	0.53880	0.00170

Remarks:

Load= 2.0000 (tsf) Time Started=

Time	Dial Reading	Correction
0 sec	0.53880	0.00170
6 sec	0.54550	0.00270
15 sec	0.54770	0.00270
30 sec	0.55010	0.00270
1 min	0.55320	0.00270
2 min	0.55810	0.00270
4 min	0.56360	0.00270
8 min	0.56870	0.00270
15 min	0.57230	0.00270
30 min	0.57580	0.00270
1 hr	0.57900	0.00270
2 hrs	0.58130	0.00270
4 hrs	0.58410	0.00270
6 hrs	0.58560	0.00270
24 hrs	0.58860	0.00270

Remarks:

Load= 4.0000 (tsf) Time Started=

Time	Dial Reading	Correction
0 sec	0.58860	0.00270
6 sec	0.59360	0.00430
15 sec	0.59600	0.00430
30 sec	0.59850	0.00430
1 min	0.60220	0.00430
2 min	0.60670	0.00430
4 min	0.61150	0.00430
8 min	0.61480	0.00430
15 min	0.61880	0.00430
30 min	0.62180	0.00430
1 hr	0.62420	0.00430
2 hrs	0.62640	0.00430
4 hrs	0.62840	0.00430
6 hrs	0.62940	0.00430
72 hrs	0.63320	0.00430

Remarks:

Load= 0.0000 (tsf) Time Started=

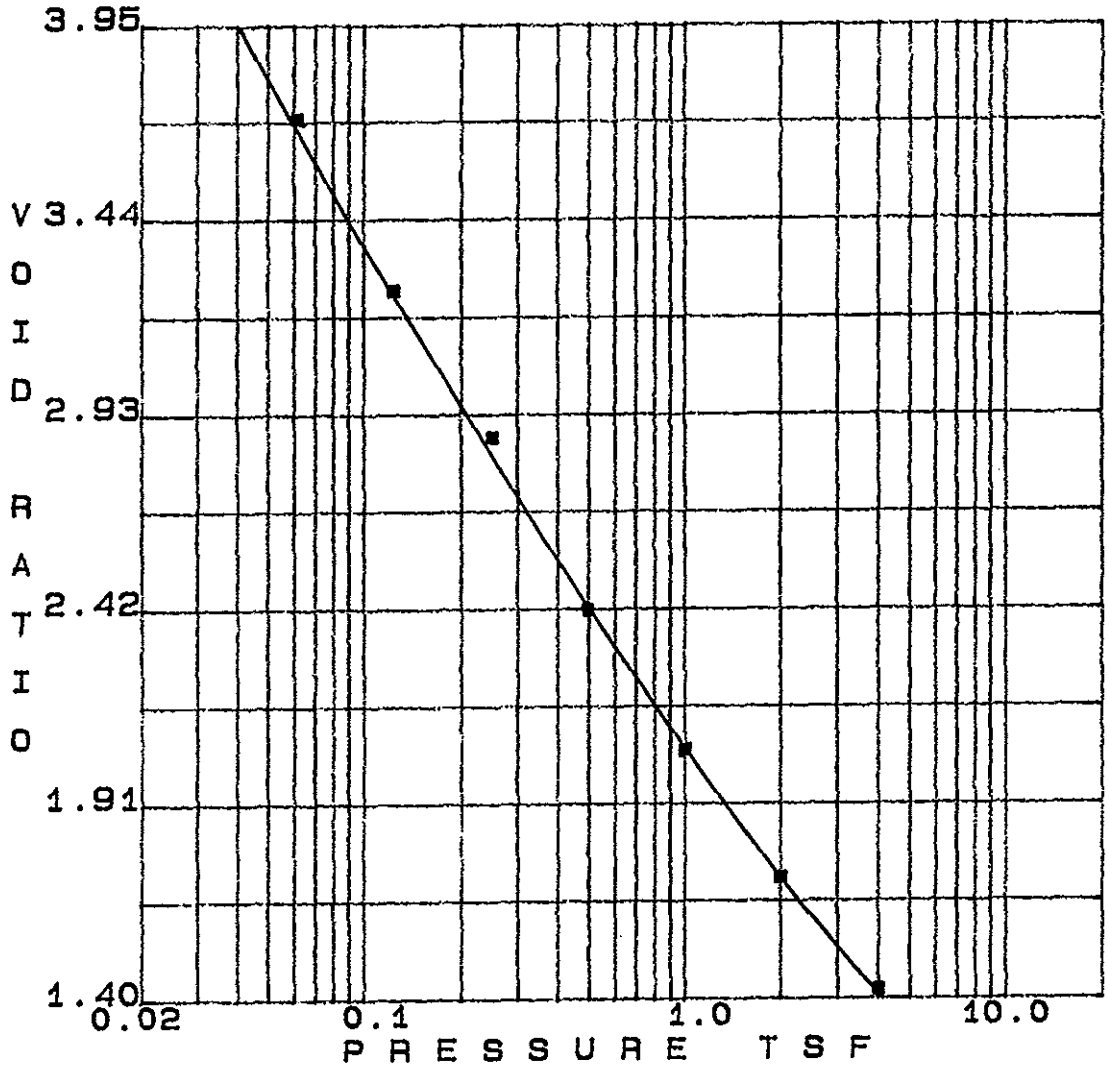
Time	Dial Reading	Correction
0 sec	0.00000	0.00000
6 sec	0.00000	0.00000
15 sec	0.00000	0.00000
30 sec	0.00000	0.00000
1 min	0.00000	0.00000
2 min	0.00000	0.00000
4 min	0.00000	0.00000
8 min	0.00000	0.00000
15 min	0.00000	0.00000
30 min	0.00000	0.00000
1 hr	0.00000	0.00000
2 hrs	0.00000	0.00000
4 hrs	0.00000	0.00000
6 hrs	0.00000	0.00000
hrs	0.00000	0.00000

Remarks:

SINGLETON LABORATORIES
CONSOLIDATION TEST

PROJECT: OpTech
FEATURE: SIOU Engineering
STATION:
RANGE :

BORING:
EL. :
SAMPLE: CPCP1D02
DATE : 07-10-96



SOIL SYMBOL=
SP GRAVITY =2.44 L.L. (%) = 0
D10 (mm) =0.0000 P.I. (%) = 0

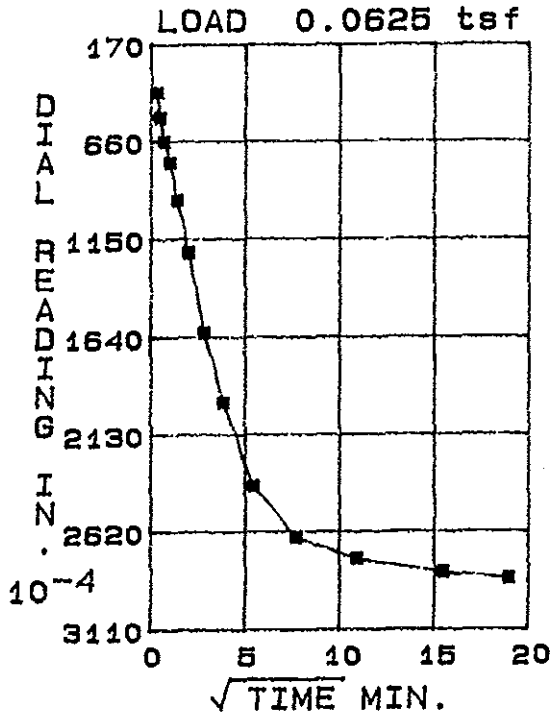
	INITIAL	FINAL
MOISTURE (%)	%211.8	52.6
DRY DENSITY (pcf)	22.6	63.1
VOID RATIO	5.739	1.414
SATURATION (%)	90.1	90.8

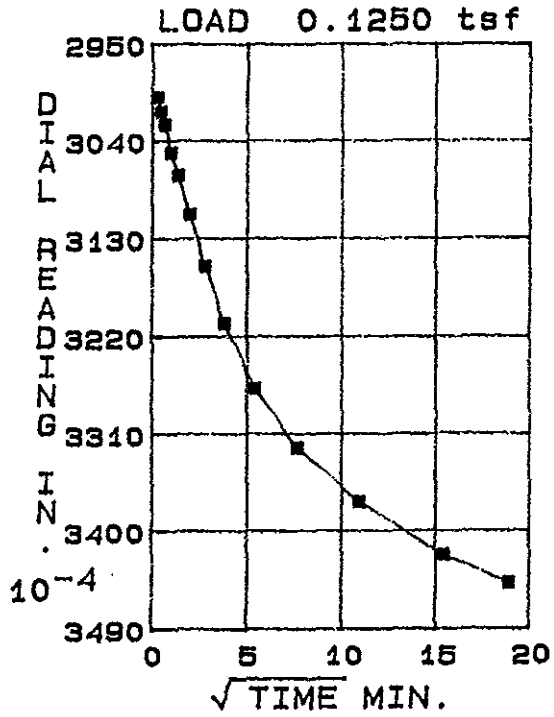
REMARKS:

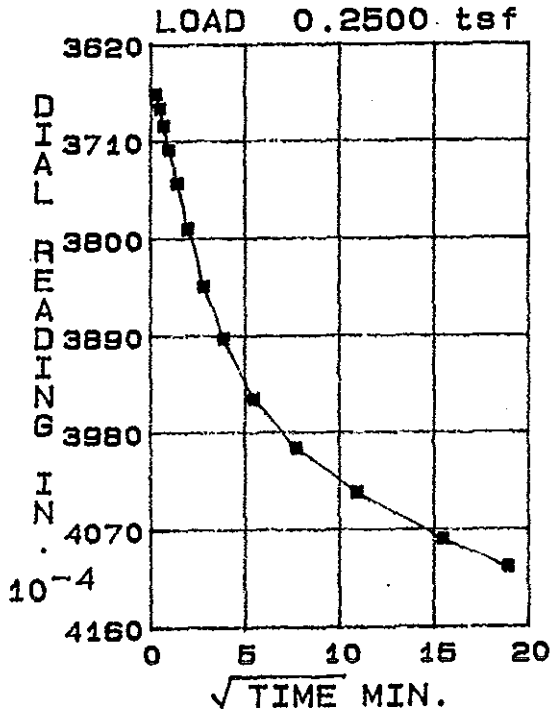
SINGLETON LABORATORIES
CONSOLIDATION TEST

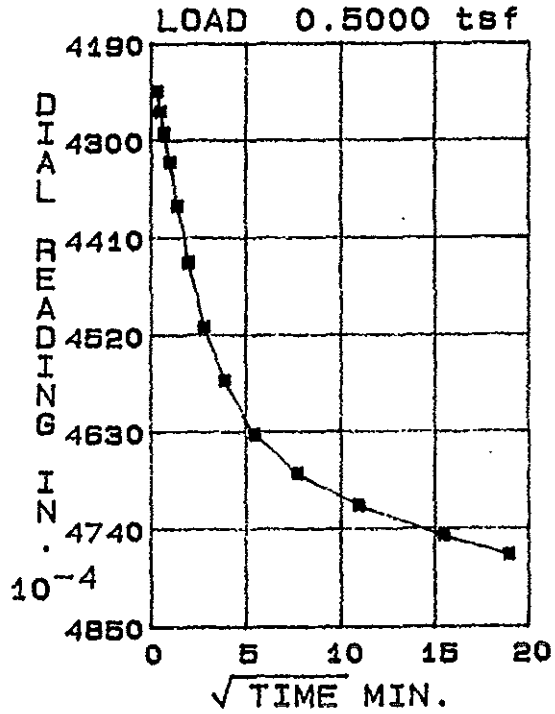
PROJECT: OpTech
FEATURE: SIOU Engineering
STATION:
RANGE :

BORING:
EL. :
SAMPLE: CPCP1D02
DATE : 07-10-96







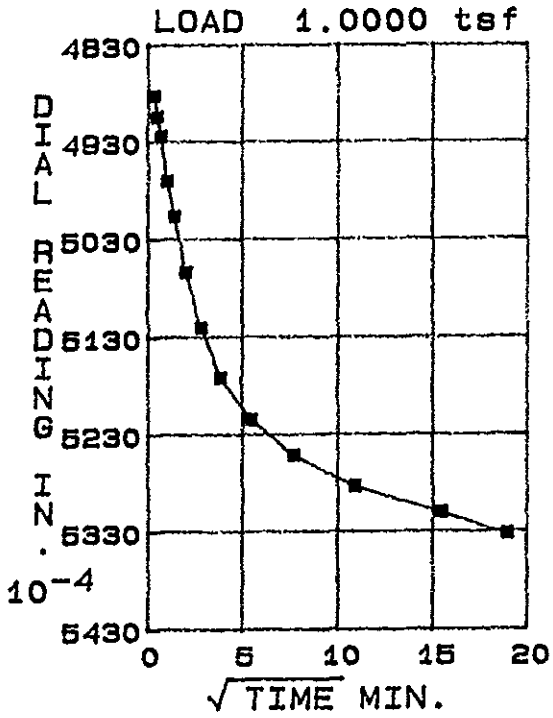


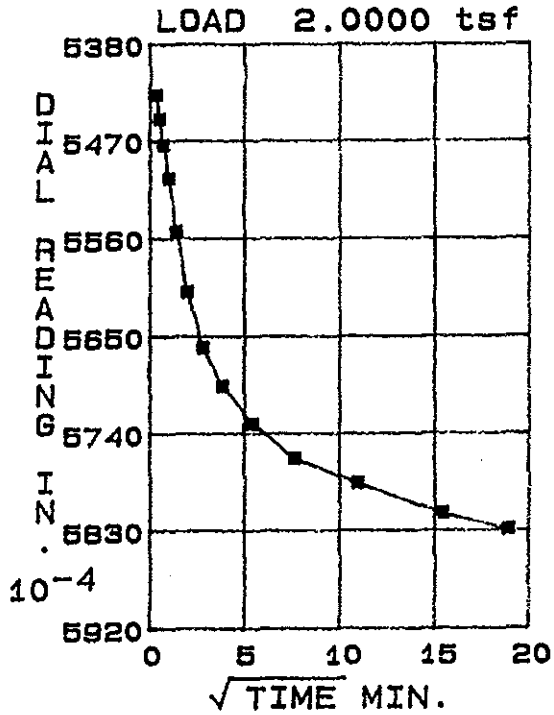
REMARKS:

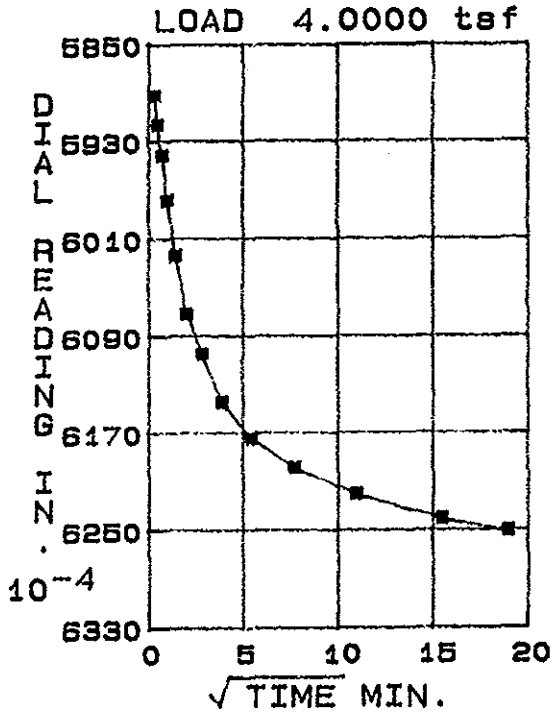
SINGLETON LABORATORIES
CONSOLIDATION TEST

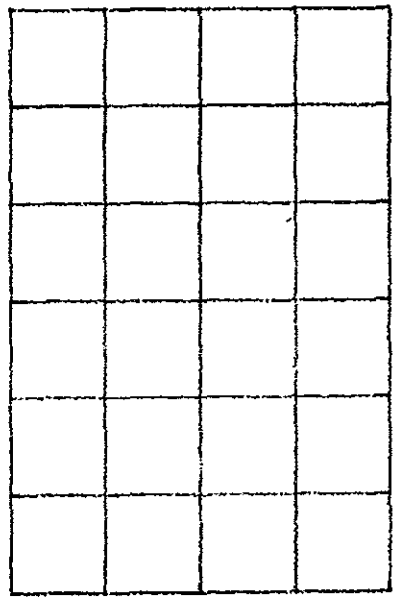
PROJECT: OpTech
FEATURE: SIOU Engineering
STATION:
RANGE :

BORING:
EL. :
SAMPLE: CPCP1D02
DATE : 07-10-96









REMARKS:

Singleton Laboratories
Consolidation Test

Project: SIOU Engineering Support Study
Feature: 50% Mix
Station:
Range :
Boring :

El. :
Sample: 3-day
Part :

File : 43
Tested By : REG
Computed By: TRB
Checked By :
Report Date: 08-14-96

Moisture Content	Trimming	Initial	Final
Wet Wt. and Tare (gm)=	854.6	181.1	170.0
Dry Wt. and Tare (gm)=	458.2	130.7	120.9
Wt. of Tare (gm) =	0.0	71.5	61.7
Moisture (%) =	86.5	85.0	82.8

Sample Data:
Sample Volume (cc) =79.068
Sample Height (in.)= 0.980

Specific Gravity=2.44
Ring No. =S/CN-6

	Initial	Final
Moisture (%)	85.0	82.8
Density (pcf)	46.8	50.3
Void Ratio	2.256	2.029
Saturation (%)	92.0	99.5

Load (tsf)	Dial Reading	Correction	Void Ratio
0.0625	0.00190	0.00030	2.2508
0.1250	0.00300	0.00050	2.2478
0.2500	0.00720	0.00050	2.2339
0.5000	0.01380	0.00120	2.2143
1.0000	0.02380	0.00170	2.1827
2.0000	0.03420	0.00270	2.1515
4.0000	0.07260	0.00430	2.0292

Remarks: 50% Portland Cement/Fly Ash mix
Test begun at 3-day curing time

Singleton Laboratories
Consolidation Test

Project: SIOU Engineering Support Study
Feature: 50% Mix
Station:
Range :
Boring :

El. :
Sample: 3-day
Part :

File : 43
Tested By : REG
Computed By: TRB
Checked By :
Report Date: 08-14-96

Load= 0.0625 (tsf) Time Started=8:30

Time	Dial Reading	Correction
0 sec	0.00000	0.00030
6 sec	0.00120	0.00030
15 sec	0.00130	0.00030
30 sec	0.00140	0.00030
1 min	0.00140	0.00030
2 min	0.00150	0.00030
4 min	0.00150	0.00030
8 min	0.00160	0.00030
15 min	0.00160	0.00030
30 min	0.00160	0.00030
1 hr	0.00170	0.00030
2 hrs	0.00170	0.00030
4 hrs	0.00180	0.00030
6 hrs	0.00180	0.00030
24 hrs	0.00190	0.00030

Remarks:

Load= 0.1250 (tsf) Time Started=8:30

Time	Dial Reading	Correction
0 sec	0.00190	0.00030
6 sec	0.00230	0.00050
15 sec	0.00230	0.00050
30 sec	0.00230	0.00050
1 min	0.00240	0.00050
2 min	0.00240	0.00050
4 min	0.00240	0.00050
8 min	0.00250	0.00050
15 min	0.00250	0.00050
30 min	0.00250	0.00050
1 hr	0.00260	0.00050
2 hrs	0.00260	0.00050
4 hrs	0.00280	0.00050
6 hrs	0.00290	0.00050
24 hrs	0.00300	0.00050

Remarks:

Load= 0.2500 (tsf) Time Started=8:30

Time	Dial Reading	Correction
0 sec	0.00300	0.00050
6 sec	0.00420	0.00070
15 sec	0.00450	0.00070
30 sec	0.00490	0.00070
1 min	0.00520	0.00070
2 min	0.00550	0.00070
4 min	0.00580	0.00070
8 min	0.00600	0.00070
15 min	0.00620	0.00070
30 min	0.00630	0.00070
1 hr	0.00650	0.00070
2 hrs	0.00670	0.00050
4 hrs	0.00690	0.00050
6 hrs	0.00700	0.00050
24 hrs	0.00720	0.00050

Remarks:

Load= 0.5000 (tsf) Time Started=8:30

Time	Dial Reading	Correction
0 sec	0.00720	0.00070
6 sec	0.01100	0.00120
15 sec	0.01150	0.00120
30 sec	0.01170	0.00120
1 min	0.01190	0.00120
2 min	0.01210	0.00120
4 min	0.01220	0.00120
8 min	0.01230	0.00120
15 min	0.01240	0.00120
30 min	0.01260	0.00120
1 hr	0.01270	0.00120
2 hrs	0.01290	0.00120
4 hrs	0.01320	0.00120
6 hrs	0.01360	0.00120
24 hrs	0.01380	0.00120

Remarks:

Singleton Laboratories
Consolidation Test

Project: SIOU Engineering Support Study
Feature: 50% Mix
Station:
Range :
Boring :

El. :
Sample: 3-day
Part :

File : 43
Tested By : REG
Computed By: TRB
Checked By :
Report Date: 08-14-96

Load= 1.0000 Time Started=
(tsf)

Time	Dial Reading	Correction
0 sec	0.01380	0.00120
6 sec	0.01920	0.00170
15 sec	0.01980	0.00170
30 sec	0.02010	0.00170
1 min	0.02040	0.00170
2 min	0.02080	0.00170
4 min	0.02100	0.00170
8 min	0.02130	0.00170
15 min	0.02160	0.00170
30 min	0.02190	0.00170
1 hr	0.02210	0.00170
2 hrs	0.02240	0.00170
4 hrs	0.02280	0.00170
6 hrs	0.02320	0.00170
72 hrs	0.02380	0.00170

Remarks:

Load= 2.0000 Time Started=
(tsf)

Time	Dial Reading	Correction
0 sec	0.02380	0.00170
6 sec	0.02910	0.00270
15 sec	0.03000	0.00270
30 sec	0.03050	0.00270
1 min	0.03090	0.00270
2 min	0.03130	0.00270
4 min	0.03170	0.00270
8 min	0.03210	0.00270
15 min	0.03240	0.00270
30 min	0.03270	0.00270
1 hr	0.03300	0.00270
2 hrs	0.03330	0.00270
4 hrs	0.03380	0.00270
6 hrs	0.03400	0.00270
24 hrs	0.03420	0.00270

Remarks:

Load= 4.0000 Time Started=
(tsf)

Time	Dial Reading	Correction
0 sec	0.03420	0.00270
6 sec	0.04800	0.00430
15 sec	0.05480	0.00430
30 sec	0.05850	0.00430
1 min	0.06140	0.00430
2 min	0.06380	0.00430
4 min	0.06560	0.00430
8 min	0.06710	0.00430
15 min	0.06830	0.00430
30 min	0.06930	0.00430
1 hr	0.07020	0.00430
2 hrs	0.07100	0.00430
4 hrs	0.07160	0.00430
6 hrs	0.07200	0.00430
24 hrs	0.07260	0.00430

Remarks:

Load= 0.0000 Time Started=
(tsf)

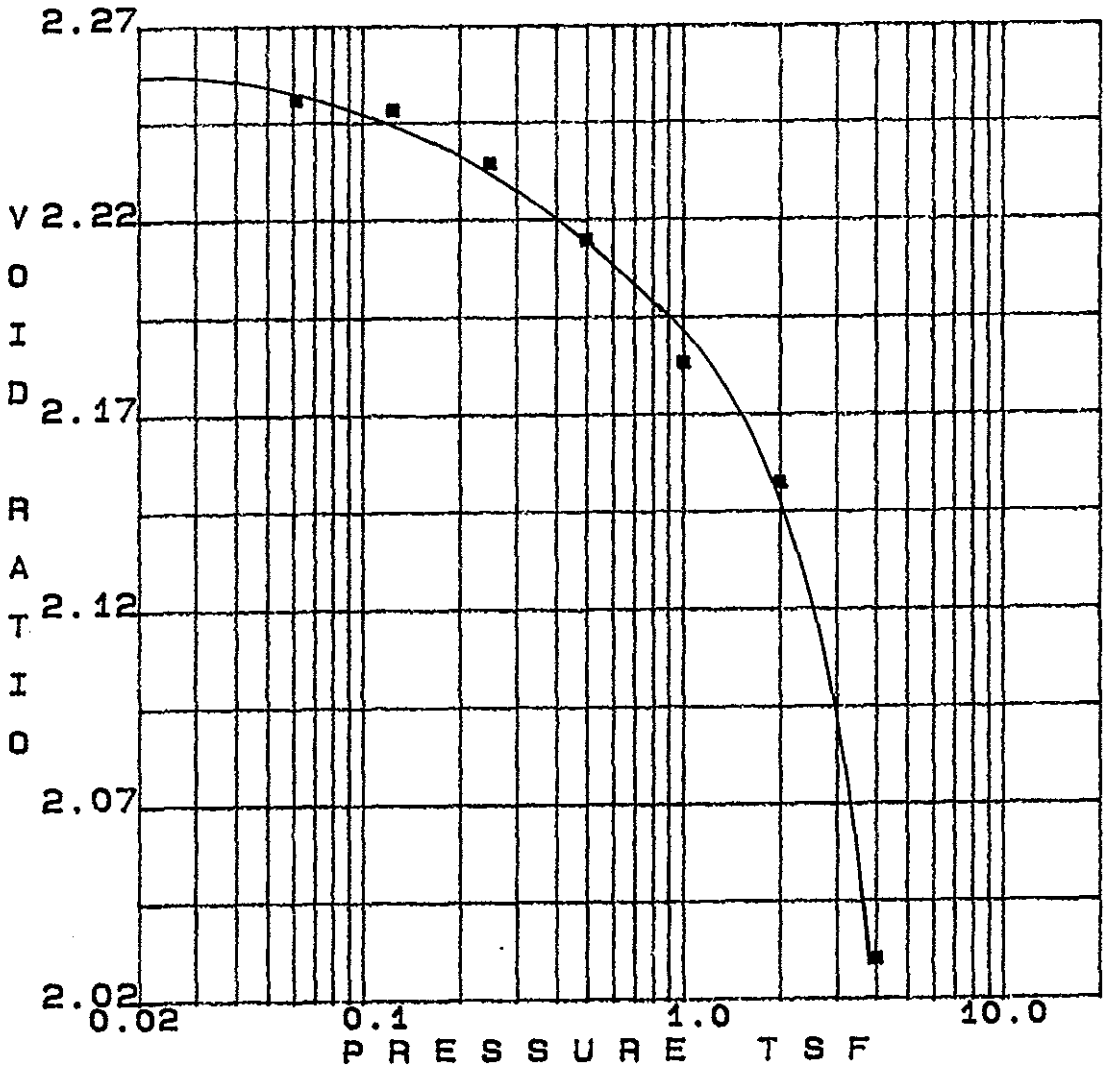
Time	Dial Reading	Correction
0 sec	0.00000	0.00000
6 sec	0.00000	0.00000
15 sec	0.00000	0.00000
30 sec	0.00000	0.00000
1 min	0.00000	0.00000
2 min	0.00000	0.00000
4 min	0.00000	0.00000
8 min	0.00000	0.00000
15 min	0.00000	0.00000
30 min	0.00000	0.00000
1 hr	0.00000	0.00000
2 hrs	0.00000	0.00000
4 hrs	0.00000	0.00000
6 hrs	0.00000	0.00000
hrs	0.00000	0.00000

Remarks:

SINGLETON LABORATORIES
CONSOLIDATION TEST

PROJECT: SIOU Engg.
FEATURE: 50% Mix
STATION:
RANGE :

BORING:
EL. :
SAMPLE: 3-day
DATE : 08-14-96



SOIL SYMBOL=N/A
SP GRAVITY =2.44 L.L. (%) = 0
D10 (mm) =0.0000 P.I. (%) = 0

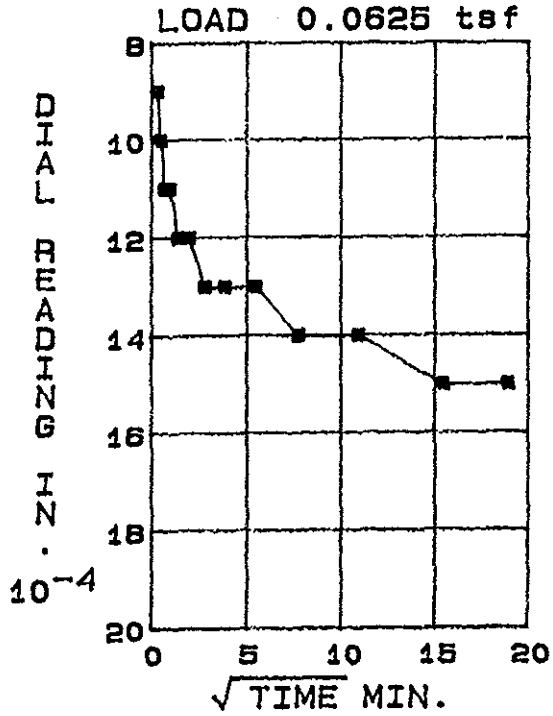
	INITIAL	FINAL
MOISTURE (%)	85.0	82.8
DRY DENSITY (pcf)	46.8	50.3
VOID RATIO	2.256	2.029
SATURATION (%)	92.0	99.5

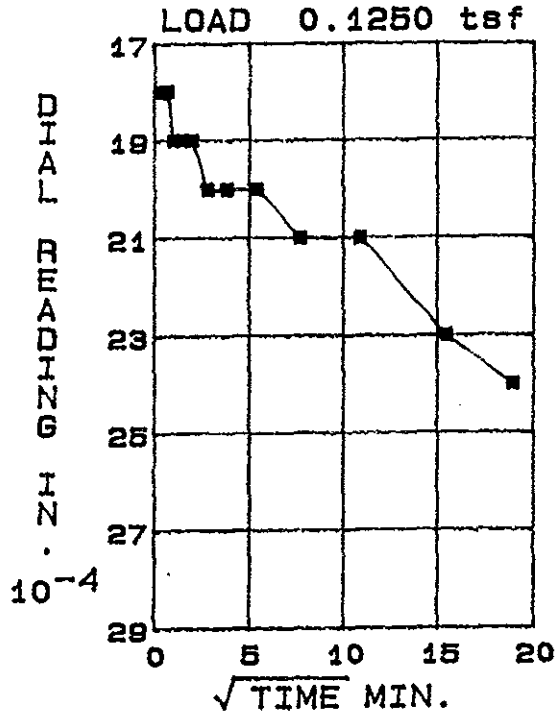
REMARKS: 50% Portland Cement/Fly Ash mix
Test begun at 3-day curing time

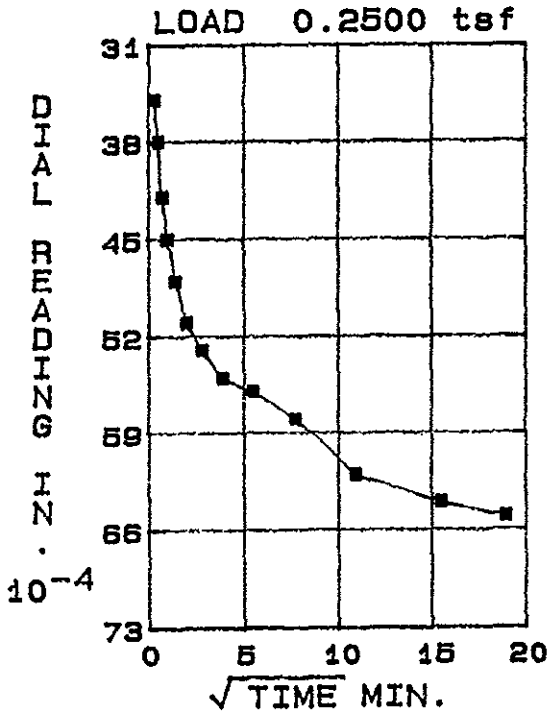
SINGLETON LABORATORIES
CONSOLIDATION TEST

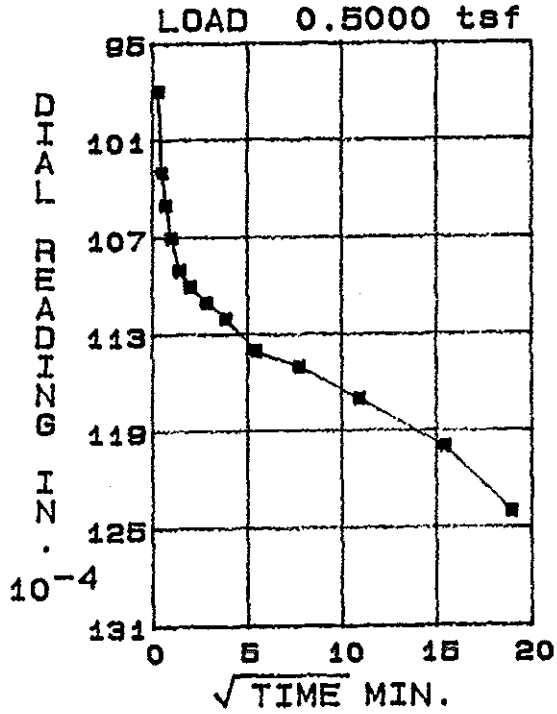
PROJECT: SIOU Engg.
FEATURE: 50% Mix
STATION:
RANGE :

BORING:
EL. :
SAMPLE: 3-day
DATE : 08-14-96







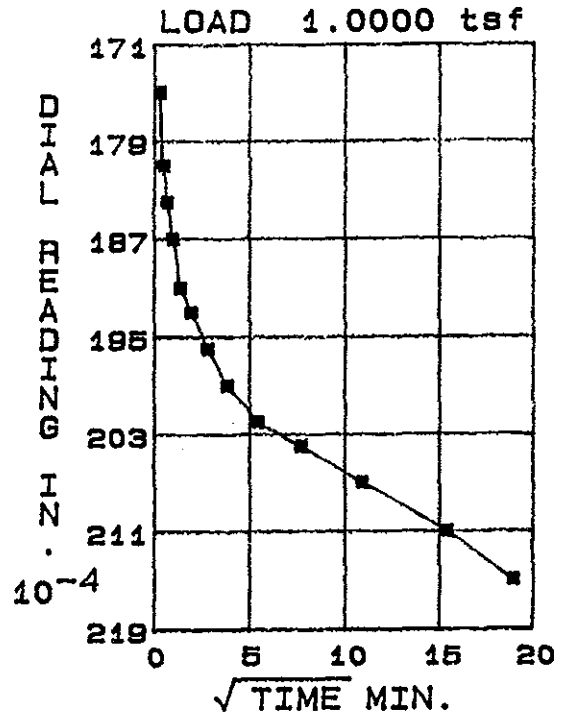


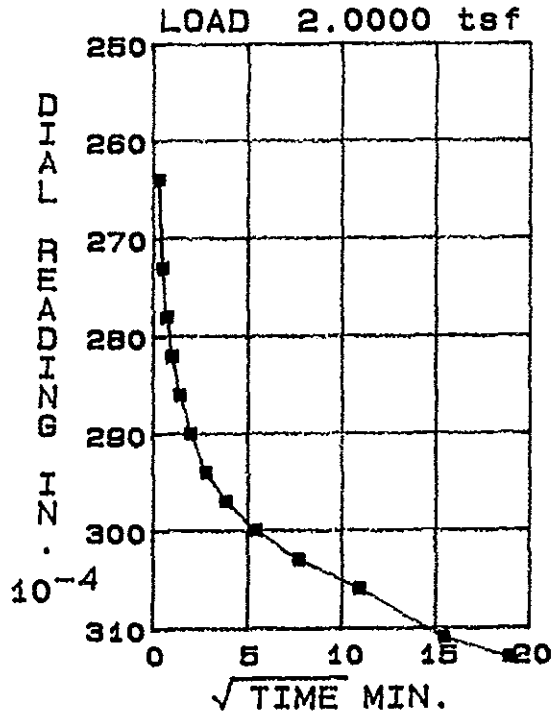
REMARKS:

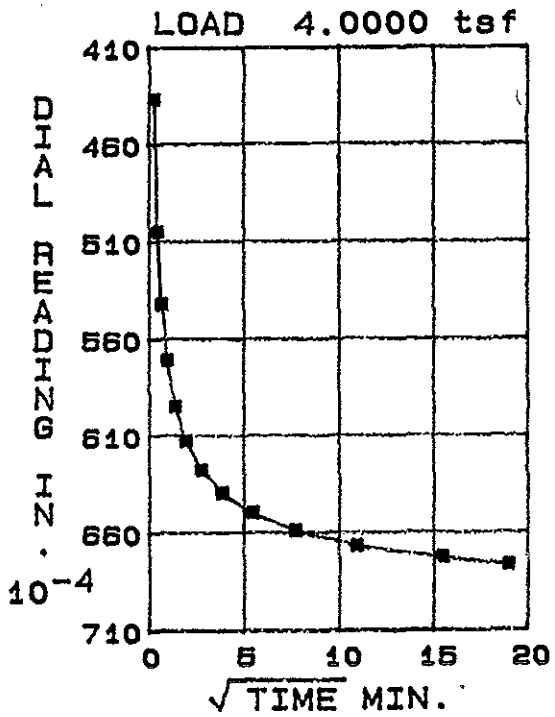
SINGLETON LABORATORIES
CONSOLIDATION TEST

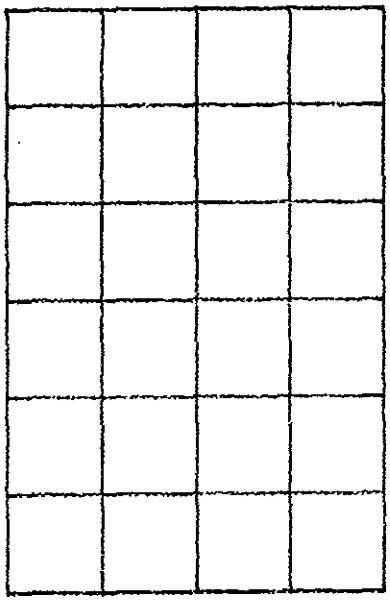
PROJECT: SIOU Engg.
FEATURE: 50% Mix
STATION:
RANGE :

BORING:
EL. :
SAMPLE: 3-day
DATE : 08-14-96









REMARKS:

Attachment C

Laboratory Test Data Sheets
Unconfined Compressive Strength

Singleton Laboratories
Unconfined Compression (UC) Test

Project: SIOU - Engineering Support Study		File : 178
Feature: CPCPDS03B		Tested By : REG
Station:	El. :	Computed By: TRB
Range :	Sample: 40%	Checked By :
Boring :	Part : 3 day	Report Date: 08-07-96

Soil Symbol=	L.L.(%)=	P.I.(%) =
Sp. Gr. = 2.44	D10(mm)=	

Specimen Number	1	2	3	4
Initial:				
Moisture Content(%)	103.3	0.0	0.0	0.0
Dry Density(pcf)	41.4	0.0	0.0	0.0
Void Ratio	2.682	0.000	0.000	0.000
Saturation(%)	94.0	0.0	0.0	0.0
Before Shearing:				
Moisture(%) (after satur.)	--	--	--	--
Saturation(%)	--	--	--	--
Moisture(%) (after cons.)	--	--	--	--
Void Ratio (after cons.)	--	--	--	--
Final Moisture Content(%)	103.3	0.0	0.0	0.0
Minor Principal Stress (tsf)	--	--	--	--
Major Principal Stress (tsf)	--	--	--	--
Eff. Minor Prin Stress (tsf)	--	--	--	--
Eff. Major Prin Stress (tsf)	--	--	--	--
Time to Failure(min)	3	0	0	0
Rate of Strain(%/min)	0.96	0.00	0.00	0.00
Specimen Height(in.)	5.39	0.00	0.00	0.00
Specimen Dia (in.)	3.00	0.00	0.00	0.00

	Max Deviator Stress		Max Eff Stress Ratio
Apparent	--	--	
Effective	--	--	

NOTE: Figures in parenthesis are based on the failure criteria of Maximum Effective Principal Stress Ratio.

Remark:

Singleton Laboratories
Unconfined Compression (UC) Test

Project: SIOU - Engineering Support Study
Feature: CPCPDS03B
Station:
Range :
Boring :

El. :
Sample: 40%
Part : 3 day

File :
Tested By : REG
Computed By: TRB
Checked By :
Report Date: 08-07-96

Moisture Content	Initial	Final
Wet Wt. and Tare(gm) =	840.6	840.6
Dry wt. and tare(gm) =	413.5	413.5
Wt. of tare(gm) =	0.0	0.0
Moisture(%) =	103.3	103.3

Test Conditions and Constants:

Proving Ring No. = 2223
Proving Ring Constant:
Slope Const. = 1
Intercept = 0
Confining Pres.(psi) = 0
Initial Pore Pre(psi) = 0

Tube No. =
Sample Volume (cc) = 623.909
Sample Height(in.) = 5.389
Specific Gravity = 2.44
Consolidation(in.) = 0
Initial P.R. Rdg = 0

Time (Min)	Deflection (ins.)	Pro.Ring Reading	Strain (%)	±1 - ±3 (tsf)
0.5	0.029	13.7	0.54	0.14
1.0	0.052	25.6	0.96	0.26
1.5	0.076	42.6	1.41	0.43
2.0	0.104	49.3	1.93	0.49
2.5	0.130	51.4	2.41	0.51
3.0	0.157	51.4	2.91	0.51
3.5	0.190	51.4	3.53	0.51
4.0	0.228	39.5	4.23	0.39
4.5	0.254	19.8	4.71	0.19

Initial:
Moisture(%) =103.3
Density(pcf) = 41.4

Void Ratio =2.682
Saturation(%) = 94.0

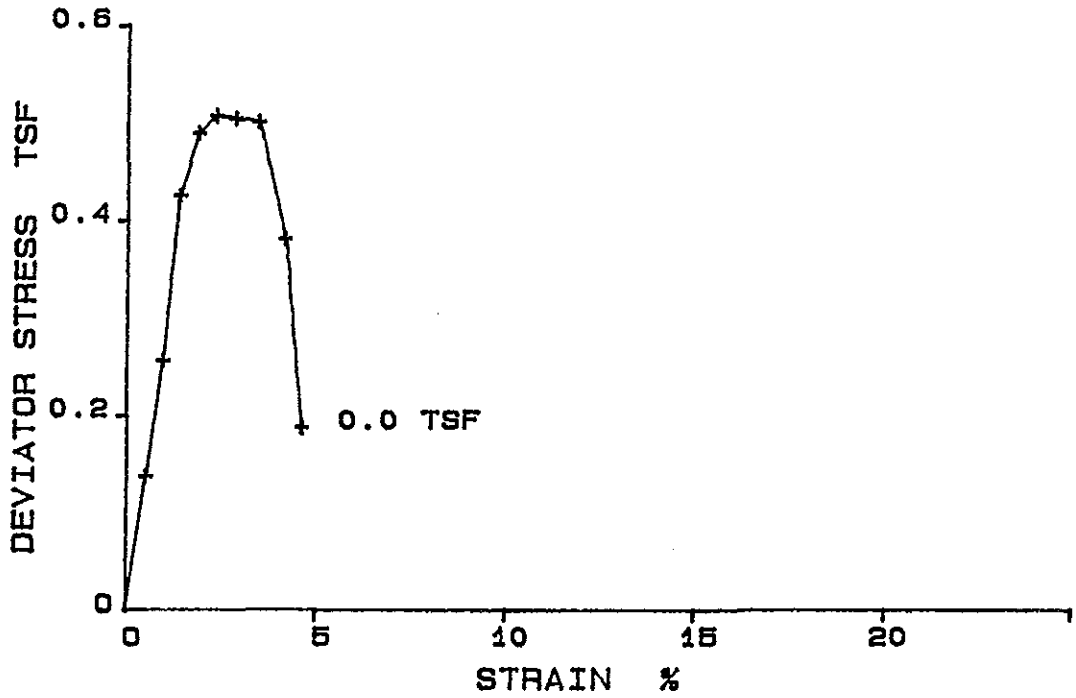
Minor Prin. Stress(tsf) =0.00

Major Prin. Stress(tsf) = 0.51

NOTE: Figures in parenthesis are based on the failure criteria of Maximum Effective Principal Stress Ratio.

SINGLETON LABORATORIES
UNCONFINED COMPRESSION (UC) TEST

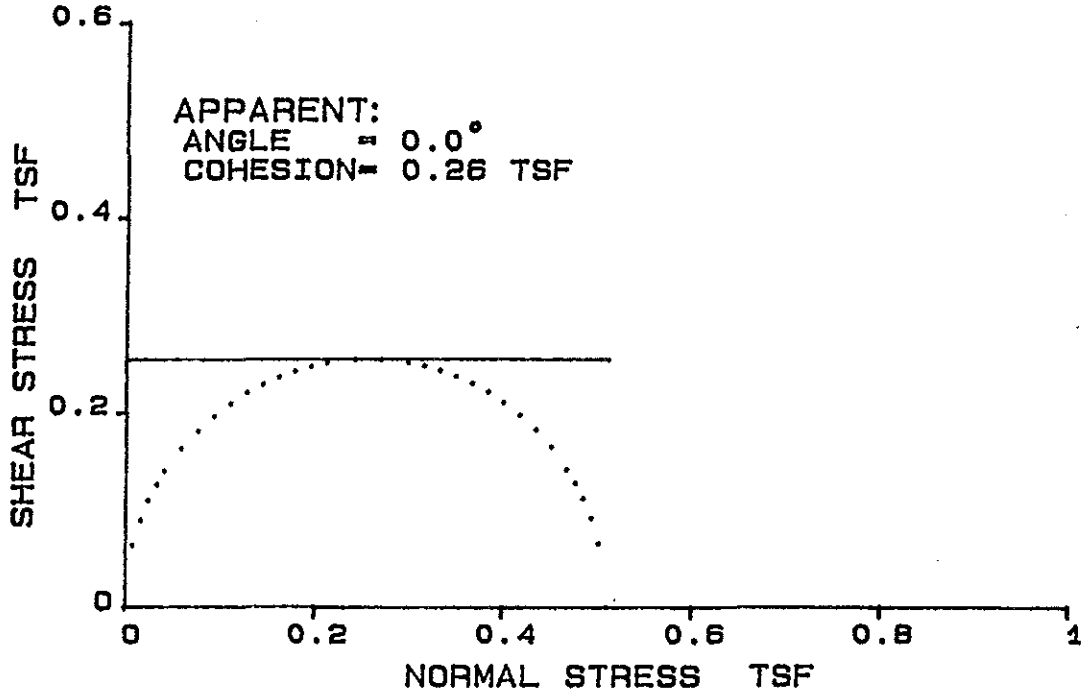
PROJECT:	SIOU	EL.	:
FEATURE:	CPCPDS03B	SAMPLE	: 40%
STATION:		PART	: 3 day
RANGE :		SOIL SYM:	
BORING :		DATE	: 08-07-96



REMARKS:

SINGLETON LABORATORIES
UNCONFINED COMPRESSION (UC) TEST

PROJECT:	SIOU	EL.	:
FEATURE:	CPCPDS03B	SAMPLE	: 40%
STATION:		PART	: 3 day
RANGE :		SOIL SYM:	
BORING :		DATE	: 08-07-96



Singleton Laboratories
Unconfined Compression (UC) Test

Project: SIOU Engineering Support Study		File : 177
Feature: CPCPDS03B		Tested By : REG
Station:	El. :	Computed By: TRB
Range :	Sample: 40%	Checked By :
Boring :	Part : 3 day	Report Date: 08-06-96

Soil Symbol=	L.L.(%)=	P.I.(%) =
Sp. Gr. = 2.44	D10(mm)=	

Specimen Number	1	2	3	4
Initial:				
Moisture Content(%)	106.7	0.0	0.0	0.0
Dry Density(pcf)	40.6	0.0	0.0	0.0
Void Ratio	2.753	0.000	0.000	0.000
Saturation(%)	94.6	0.0	0.0	0.0
Before Shearing:				
Moisture(%) (after satur.)	--	--	--	--
Saturation(%)	--	--	--	--
Moisture(%) (after cons.)	--	--	--	--
Void Ratio (after cons.)	--	--	--	--
Final Moisture Content(%)	106.7	0.0	0.0	0.0
Minor Principal Stress (tsf)	--	--	--	--
Major Principal Stress (tsf)	--	--	--	--
Eff. Minor Prin Stress (tsf)	--	--	--	--
Eff. Major Prin Stress (tsf)	--	--	--	--
Time to Failure(min)	5	0	0	0
Rate of Strain(%/min)	0.90	0.00	0.00	0.00
Specimen Height(in.)	5.26	0.00	0.00	0.00
Specimen Dia (in.)	3.00	0.00	0.00	0.00

	Max Deviator Stress		Max Eff Stress Ratio
Apparent	--	--	
Effective	--	--	

NOTE: Figures in parenthesis are based on the failure criteria of Maximum Effective Principal Stress Ratio.

Remark:

Singleton Laboratories
Unconfined Compression (UC) Test

Project: SIOU Engineering Support Study
Feature: CPCPDS03B
Station:
Range :
Boring :

El. :
Sample: 40%
Part : 3 day

File :
Tested By : REG
Computed By: TRB
Checked By :
Report Date: 08-06-96

Moisture Content	Initial	Final
Wet Wt. and Tare(gm) =	818.4	818.4
Dry wt. and tare(gm) =	395.9	395.9
Wt. of tare(gm) =	0.0	0.0
Moisture(%) =	106.7	106.7

Test Conditions and Constants:

Proving Ring No. = 2223
Proving Ring Constant:
Slope Const. = 1
Intercept = 0
Confining Pres.(psi) = 0
Initial Pore Pre(psi) = 0

Tube No. =
Sample Volume (cc) = 608.974
Sample Height(in.) = 5.26
Specific Gravity = 2.44
Consolidation(in.) = 0
Initial P.R. Rdg = 0

Time (Min)	Deflection (ins.)	Pro.Ring Reading	Strain (%)	±1 - ±3 (tsf)
0.5	0.023	0.9	0.44	0.01
1.0	0.043	0.9	0.82	0.01
1.5	0.069	0.9	1.31	0.01
2.0	0.095	13.1	1.81	0.13
2.5	0.122	26.5	2.32	0.26
3.0	0.145	37.4	2.76	0.37
3.5	0.167	42.9	3.17	0.42
4.0	0.188	45.6	3.57	0.45
4.5	0.213	46.2	4.05	0.45
5.0	0.238	46.5	4.52	0.45
5.5	0.258	46.5	4.90	0.45
6.0	0.282	46.5	5.36	0.45
6.5	0.305	41.0	5.80	0.39
7.0	0.333	33.4	6.33	0.32

Initial:
Moisture(%) =106.7
Density(pcf) = 40.6

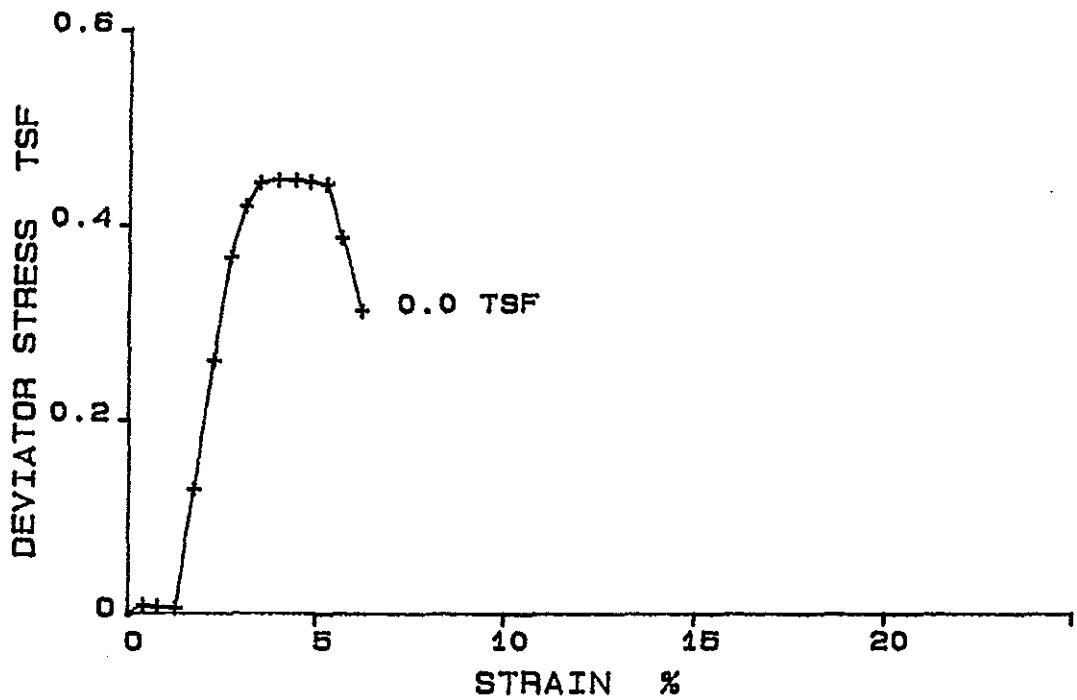
Void Ratio =2.753
Saturation(%) = 94.6

Minor Prin. Stress(tsf) =0.00 Major Prin. Stress(tsf) = 0.45

NOTE: Figures in parenthesis are based on the failure criteria of Maximum Effective Principal Stress Ratio.

SINGLETON LABORATORIES
UNCONFINED COMPRESSION (UC) TEST

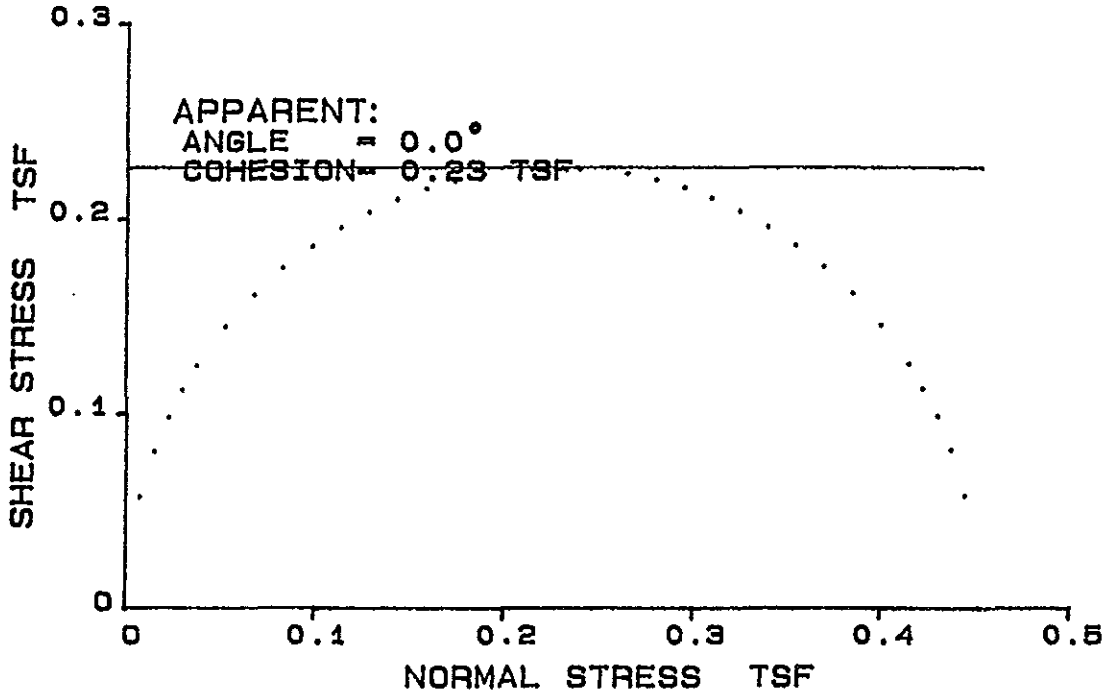
PROJECT:	SIOU Engineering	EL.	:
FEATURE:	CPCPDS03B	SAMPLE	: 40%
STATION:		PART	: 3 day
RANGE :		SOIL SYM:	
BORING :		DATE	: 08-06-96



REMARKS:

SINGLETON LABORATORIES
UNCONFINED COMPRESSION (UC) TEST

PROJECT:	SIOU Engineering	EL.	:
FEATURE:	CPCPDS03B	SAMPLE	: 40%
STATION:		PART	: 3 day
RANGE :		SOIL SYM:	
BORING :		DATE	: 08-06-96



Singleton Laboratories
UNCONFINED COMPRESSION (UC) TEST

Project: SIOU Engineering Support Study		File : 186
Feature: CPCPDS03B		Tested By : REG
Station:	El. :	Computed By: TRB
Range :	Sample: 40%	Checked By :
Boring :	Part : 7 day	Report Date: 08-07-96

Soil Symbol=	L.L.(%)=	P.I.(%) =
Sp. Gr. = 2.44	D10(mm)=	

Specimen Number	1	2	3	4
Initial:				
Moisture Content(%)	98.4	0.0	0.0	0.0
Dry Density(pcf)	42.0	0.0	0.0	0.0
Void Ratio	2.624	0.000	0.000	0.000
Saturation(%)	91.5	0.0	0.0	0.0
Before Shearing:				
Moisture(%) (after satur.)	--	--	--	--
Saturation(%)	--	--	--	--
Moisture(%) (after cons.)	--	--	--	--
Void Ratio (after cons.)	--	--	--	--
Final Moisture Content(%)	98.4	0.0	0.0	0.0
Minor Principal Stress (tsf)	--	--	--	--
Major Principal Stress (tsf)	--	--	--	--
Eff. Minor Prin Stress (tsf)	--	--	--	--
Eff. Major Prin Stress (tsf)	--	--	--	--
Time to Failure(min)	3	0	0	0
Rate of Strain(%/min)	0.92	0.00	0.00	0.00
Specimen Height(in.)	5.43	0.00	0.00	0.00
Specimen Dia (in.)	3.00	0.00	0.00	0.00

	Max Deviator Stress		Max Eff Stress Ratio
Apparent	--	--	
Effective	--	--	

NOTE: Figures in parenthesis are based on the failure criteria of Maximum Effective Principal Stress Ratio.

Remark:

Singleton Laboratories
UNCONFINED COMPRESSION (UC) TEST

Project: SIOU Engineering Support Study
Feature: CPCPDS03B
Station:
Range :
Boring :

El. :
Sample: 40%
Part : 7 day

File : 185
Tested By : REG
Computed By: TRB
Checked By :
Report Date: 08-07-96

Moisture Content	Initial	Final
Wet Wt. and Tare(gm)=	839.0	839.0
Dry wt. and tare(gm)=	422.9	422.9
Wt. of tare(gm) =	0.0	0.0
Moisture(%) =	98.4	98.4

Test Conditions and Constants:

Proving Ring No. = 2223
Proving Ring Constant:
Slope Const. = 1
Intercept = 0
Confining Pres.(psi) = 0
Initial Pore Pre(psi)= 0

Tube No. = 0
Sample Volume (cc) = 628.193
Sample Height(in.) = 5.426
Specific Gravity = 2.44
Consolidation(in.) = 0
Initial P.R. Rdg = 0

Time (Min)	Deflection (ins.)	Pro.Ring Reading	Strain (%)	±1 - ±3 (tsf)
0.5	0.030	7.6	0.55	0.08
1.0	0.057	38.6	1.05	0.39
1.5	0.075	60.8	1.38	0.61
2.0	0.094	83.0	1.73	0.83
2.5	0.122	97.3	2.25	0.97
3.0	0.150	97.9	2.76	0.97
3.5	0.187	91.2	3.45	0.90
4.0	0.220	51.7	4.05	0.51

Initial:
Moisture(%) = 98.4
Density(pcf)= 42.0

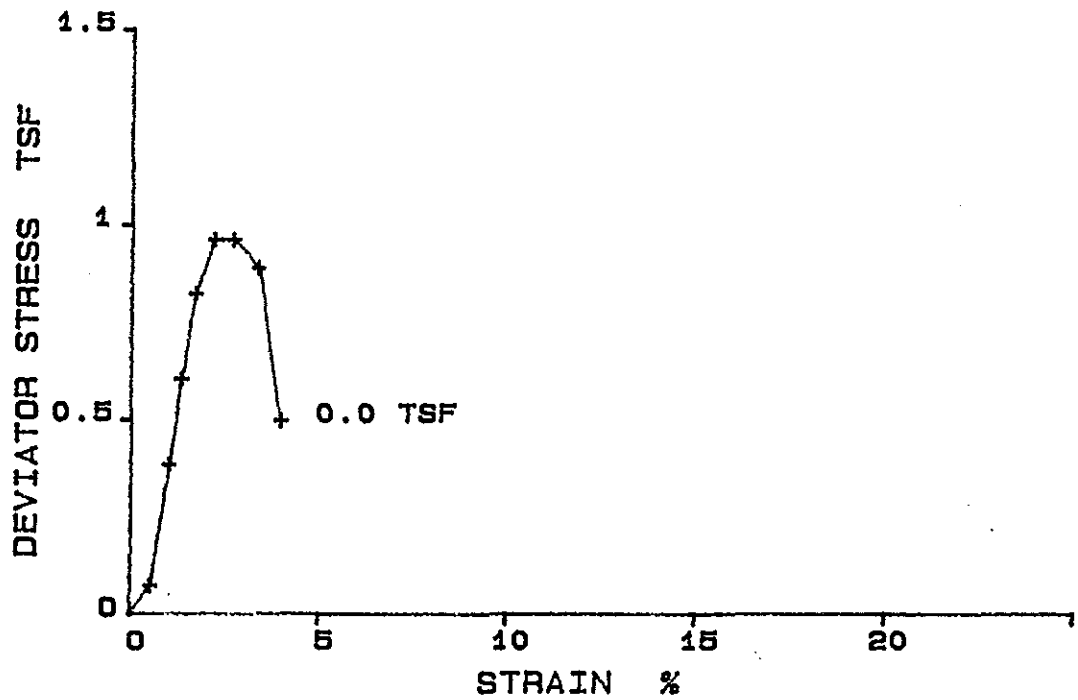
Void Ratio =2.624
Saturation(%)= 91.5

Minor Prin. Stress(tsf) =0.00
Major Prin. Stress(tsf) = 0.97

NOTE: Figures in parenthesis are based on the failure criteria of Maximum Effective Principal Stress Ratio.

SINGLETON LABORATORIES
UNCONFINED COMPRESSION (UC) TEST

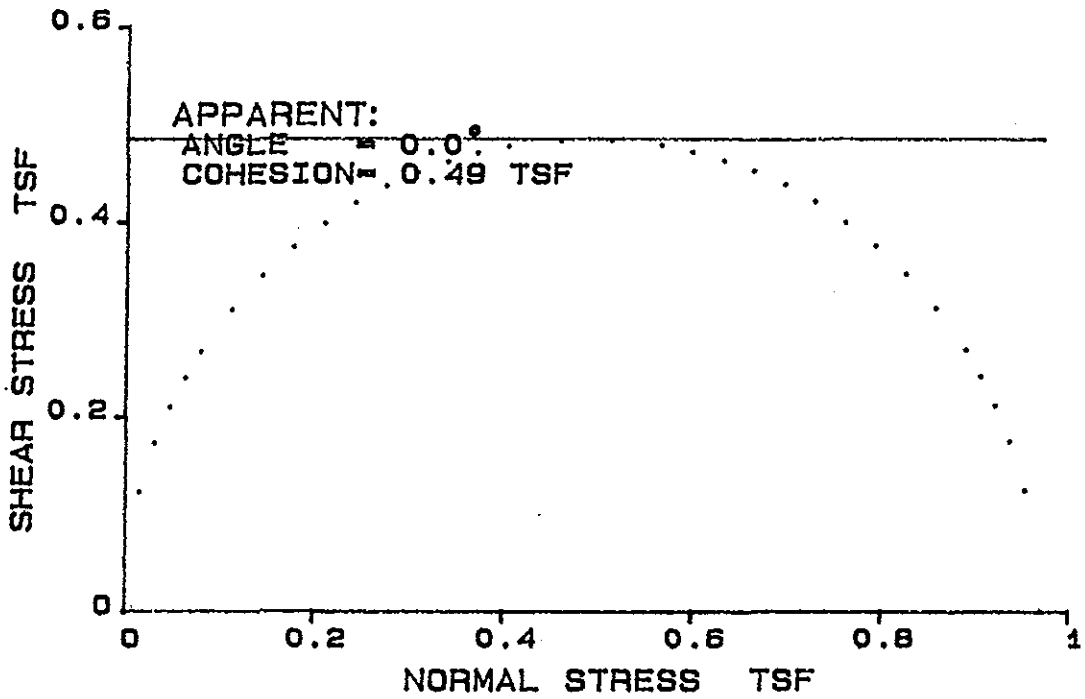
PROJECT:	SIOU	EL.	:
FEATURE:	CPCPDS03B	SAMPLE	: 40%
STATION:		PART	: 7 day
RANGE :		SOIL SYM:	
BORING :		DATE	: 08-07-96



REMARKS:

SINGLETON LABORATORIES
UNCONFINED COMPRESSION (UC) TEST

PROJECT:	SIOU	EL.	:
FEATURE:	CPCPDS03B	SAMPLE	: 40%
STATION:		PART	: 7 day
RANGE :		SOIL SYM:	
BORING :		DATE	: 08-07-96



Singleton Laboratories
UNCONFINED COMPRESSION (UC) TEST

Project: SIOU Engineering Support Study		File : 185
Feature: CPCPDS03B		Tested By : REG
Station:	El. :	Computed By: TRB
Range :	Sample: 40%	Checked By :
Boring :	Part : 7 day	Report Date: 08-07-96

Soil Symbol=	L.L.(%)=	P.I.(%) =
Sp. Gr. = 2.44	D10(mm)=	

Specimen Number	1	2	3	4
Initial:				
Moisture Content(%)	99.8	0.0	0.0	0.0
Dry Density(pcf)	42.2	0.0	0.0	0.0
Void Ratio	2.611	0.000	0.000	0.000
Saturation(%)	93.2	0.0	0.0	0.0
Before Shearing:				
Moisture(%) (after satur.)	--	--	--	--
Saturation(%)	--	--	--	--
Moisture(%) (after cons.)	--	--	--	--
Void Ratio (after cons.)	--	--	--	--
Final Moisture Content(%)	99.8	0.0	0.0	0.0
Minor Principal Stress (tsf)	--	--	--	--
Major Principal Stress (tsf)	--	--	--	--
Eff. Minor Prin Stress (tsf)	--	--	--	--
Eff. Major Prin Stress (tsf)	--	--	--	--
Time to Failure(min)	3	0	0	0
Rate of Strain(%/min)	1.13	0.00	0.00	0.00
Specimen Height(in.)	5.13	0.00	0.00	0.00
Specimen Dia (in.)	3.00	0.00	0.00	0.00

	Max Deviator Stress		Max Eff Stress Ratio
Apparent	--	--	
Effective	--	--	

NOTE: Figures in parenthesis are based on the failure criteria of Maximum Effective Principal Stress Ratio.

Remark:

Singleton Laboratories
UNCONFINED COMPRESSION (UC) TEST

Project: SIOU Engineering Support Study
Feature: CPCPDS03B
Station:
Range :
Boring :

El. :
Sample: 40%
Part : 7 day

File : 184
Tested By : REG
Computed By: TRB
Checked By :
Report Date: 08-07-96

Moisture Content	Initial	Final
Wet Wt. and Tare(gm) =	800.9	800.9
Dry wt. and tare(gm) =	400.9	400.9
Wt. of tare(gm) =	0.0	0.0
Moisture(%) =	99.8	99.8

Test Conditions and Constants:

Proving Ring No. = 2223
Proving Ring Constant:
Slope Const. = 1
Intercept = 0
Confining Pres.(psi) = 0
Initial Pore Pre(psi) = 0

Tube No. = 0
Sample Volume (cc) = 593.345
Sample Height(in.) = 5.125
Specific Gravity = 2.44
Consolidation(in.) = 0
Initial P.R. Rdg = 0

Time (Min)	Deflection (ins.)	Pro.Ring Reading	Strain (%)	±1 - ±3 (tsf)
0.5	0.030	9.1	0.59	0.09
1.0	0.070	48.0	1.37	0.48
1.5	0.095	67.8	1.85	0.68
2.0	0.120	82.1	2.34	0.82
2.5	0.143	87.6	2.79	0.87
3.0	0.174	88.2	3.40	0.87
3.5	0.209	59.3	4.08	0.58

Initial:
Moisture(%) = 99.8
Density(pcf) = 42.2

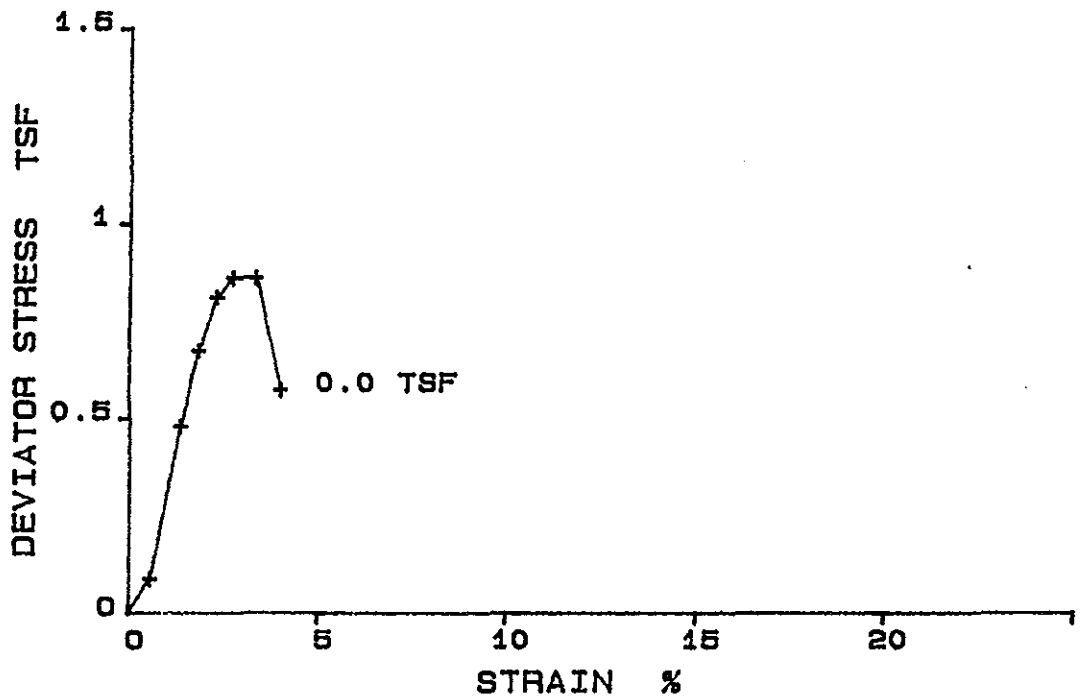
Void Ratio =2.611
Saturation(%) = 93.2

Minor Prin. Stress(tsf) =0.00
Major Prin. Stress(tsf) = 0.87

NOTE: Figures in parenthesis are based on the failure criteria of Maximum Effective Principal Stress Ratio.

SINGLETON LABORATORIES
UNCONFINED COMPRESSION (UC) TEST

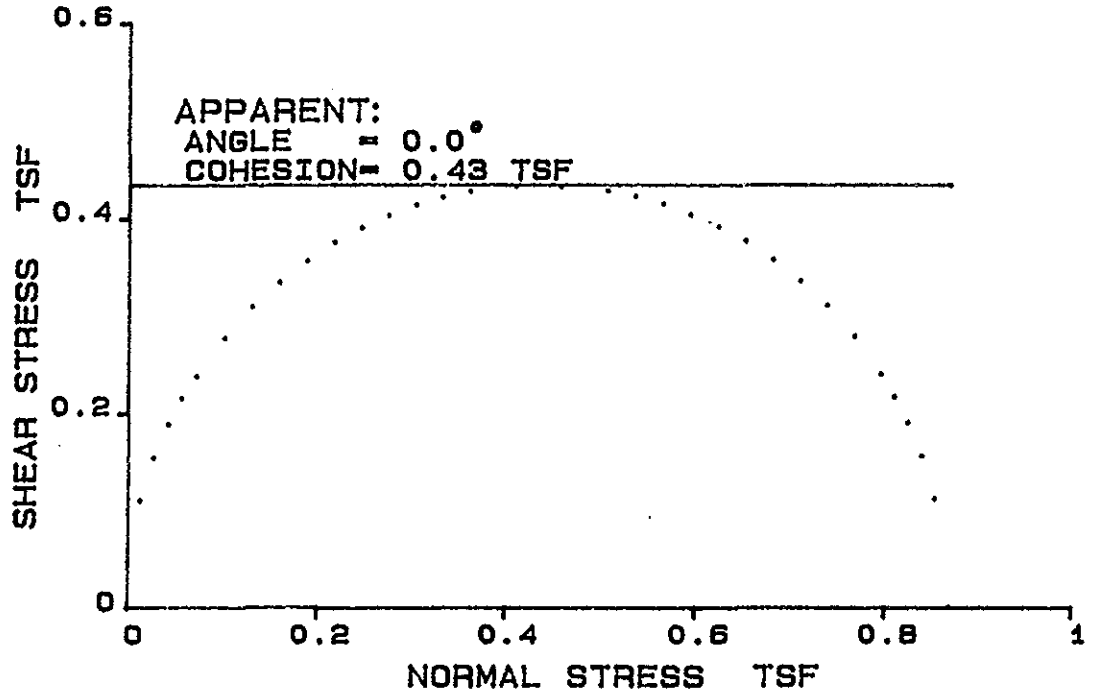
PROJECT:	SIOU	EL.	:
FEATURE:	CPCPDS03B	SAMPLE	: 40%
STATION:		PART	: 7 day
RANGE :		SOIL SYM:	
BORING :		DATE	: 08-07-96



REMARKS:

SINGLETON LABORATORIES
UNCONFINED COMPRESSION (UC) TEST

PROJECT:	SIOU	EL.	:
FEATURE:	CPCPDS03B	SAMPLE	: 40%
STATION:		PART	: 7 day
RANGE :		SOIL SYM:	
BORING :		DATE	: 08-07-96



Singleton Laboratories
Unconfined Compression (UC) Test

Project: SIOU Engineering Support Study		File : 179
Feature: CPCPDS03B		Tested By : REG
Station:	El. :	Computed By: TRB
Range :	Sample: 50%	Checked By :
Boring :	Part : 3 day	Report Date: 08-15-96

Soil Symbol=	L.L.(%)=	P.I.(%) =
Sp. Gr. = 2.44	D10(mm)=	

Specimen Number	1	2	3	4
Initial:				
Moisture Content(%)	85.8	0.0	0.0	0.0
Dry Density(pcf)	46.7	0.0	0.0	0.0
Void Ratio	2.260	0.000	0.000	0.000
Saturation(%)	92.7	0.0	0.0	0.0
Before Shearing:				
Moisture(%) (after satur.)	--	--	--	--
Saturation(%)	--	--	--	--
Moisture(%) (after cons.)	--	--	--	--
Void Ratio (after cons.)	--	--	--	--
Final Moisture Content(%)	85.8	0.0	0.0	0.0
Minor Principal Stress (tsf)	--	--	--	--
Major Principal Stress (tsf)	--	--	--	--
Eff. Minor Prin Stress (tsf)	--	--	--	--
Eff. Major Prin Stress (tsf)	--	--	--	--
Time to Failure(min)	4	0	0	0
Rate of Strain(%/min)	0.85	0.00	0.00	0.00
Specimen Height(in.)	5.33	0.00	0.00	0.00
Specimen Dia (in.)	3.00	0.00	0.00	0.00

	Max Deviator Stress		Max Eff Stress Ratio
Apparent	--	--	
Effective	--	--	

NOTE: Figures in parenthesis are based on the failure criteria of Maximum Effective Principal Stress Ratio.

Remark:

Singleton Laboratories
Unconfined Compression (UC) Test

Project: SIOU Engineering Support Study
Feature: CPCPDS03B
Station:
Range :
Boring :

El. :
Sample: 50%
Part : 3 day

File : 179
Tested By : REG
Computed By: TRB
Checked By :
Report Date: 08-15-96

Moisture Content	Initial	Final
Wet Wt. and Tare(gm) =	858.1	858.1
Dry wt. and tare(gm) =	461.8	461.8
Wt. of tare(gm) =	0.0	0.0
Moisture(%) =	85.8	85.8

Test Conditions and Constants:

Proving Ring No. = 2223
Proving Ring Constant:
Slope Const. = 1
Intercept = 0
Confining Pres.(psi) = 0
Initial Pore Pre(psi) = 0

Tube No. =
Sample Volume (cc) = 616.963
Sample Height(in.) = 5.329
Specific Gravity = 2.44
Consolidation(in.) = 0
Initial P.R. Rdg = 0

Time (Min)	Deflection (ins.)	Pro.Ring Reading	Strain (%)	±1 - ±3 (tsf)
0.5	0.031	25.8	0.58	0.26
1.0	0.057	48.3	1.07	0.49
1.5	0.074	72.1	1.39	0.72
2.0	0.092	92.7	1.73	0.93
2.5	0.115	118.6	2.16	1.18
3.0	0.140	132.6	2.63	1.32
3.5	0.159	136.2	2.98	1.35
4.0	0.184	134.1	3.45	1.32
4.5	0.226	57.8	4.24	0.56

Initial:
Moisture(%) = 85.8
Density(pcf) = 46.7

Void Ratio =2.260
Saturation(%) = 92.7

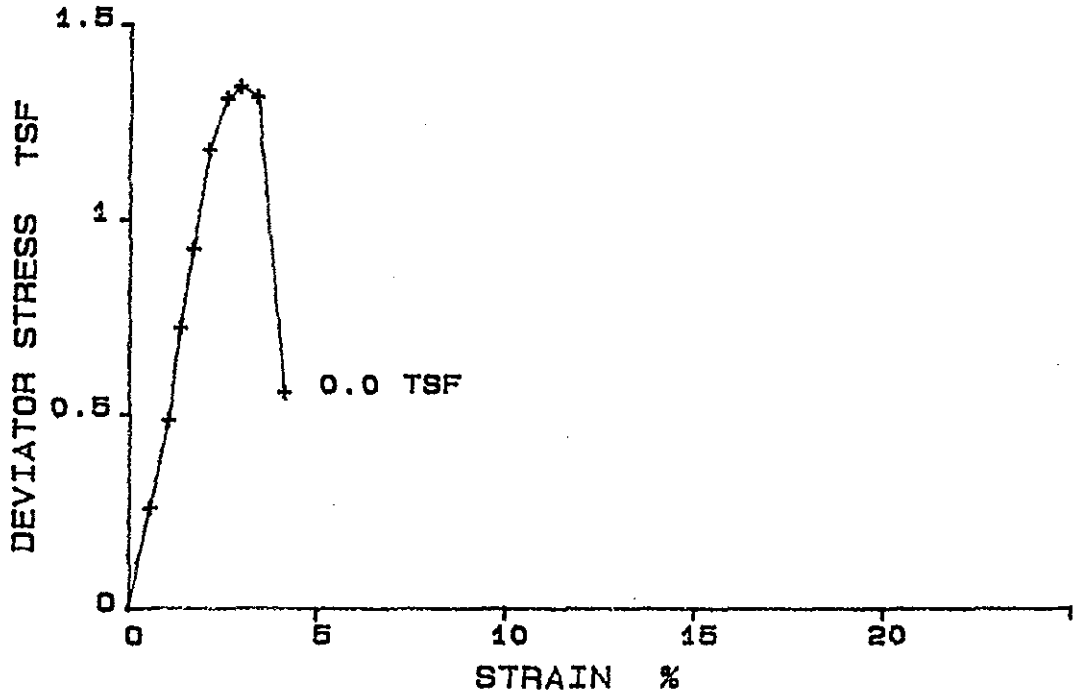
Minor Prin. Stress(tsf) =0.00

Major Prin. Stress(tsf) = 1.35

NOTE: Figures in parenthesis are based on the failure criteria of Maximum Effective Principal Stress Ratio.

SINGLETON LABORATORIES
UNCONFINED COMPRESSION (UC) TEST

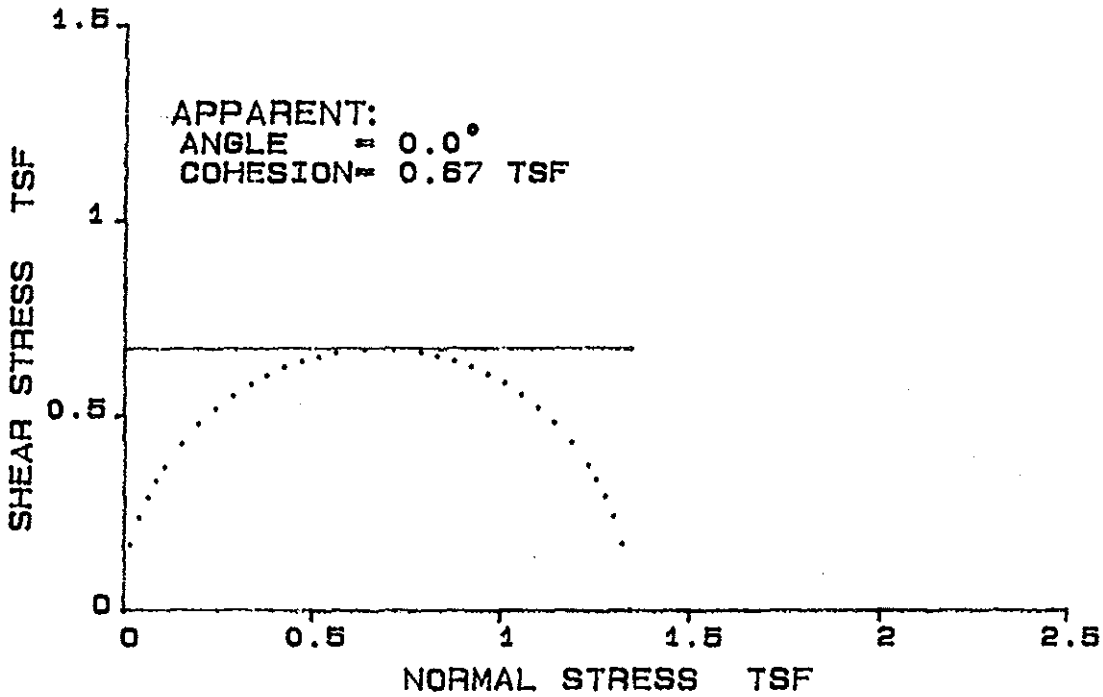
PROJECT:	SIOU	EL.	:
FEATURE:	CPCPDS03B	SAMPLE	: 50%
STATION:		PART	: 3 day
RANGE :		SOIL SYM:	
BORING :		DATE	: 08-15-96



REMARKS:

SINGLETON LABORATORIES
UNCONFINED COMPRESSION (UC) TEST

PROJECT:	SIOU	EL.	:
FEATURE:	CPCPDS03B	SAMPLE	: 50%
STATION:		PART	: 3 day
RANGE :		SOIL SYM:	
BORING :		DATE	: 08-15-96



Singleton Laboratories
Unconfined Compression (UC) Test

Project: SIOU Engineering Support Study		File : 180
Feature: CPCPDS03B		Tested By : REG
Station:	El. :	Computed By: TRB
Range :	Sample: 50%	Checked By :
Boring :	Part : 3 day	Report Date: 08-15-96

Soil Symbol=	L.L.(%)=	P.I.(%) =
Sp. Gr. = 2.44	D10(mm)=	

Specimen Number	1	2	3	4
Initial:				
Moisture Content(%)	86.5	0.0	0.0	0.0
Dry Density(pcf)	46.4	0.0	0.0	0.0
Void Ratio	2.285	0.000	0.000	0.000
Saturation(%)	92.4	0.0	0.0	0.0
Before Shearing:				
Moisture(%) (after satur.)	--	--	--	--
Saturation(%)	--	--	--	--
Moisture(%) (after cons.)	--	--	--	--
Void Ratio (after cons.)	--	--	--	--
Final Moisture Content(%)	86.5	0.0	0.0	0.0
Minor Principal Stress (tsf)	--	--	--	--
Major Principal Stress (tsf)	--	--	--	--
Eff. Minor Prin Stress (tsf)	--	--	--	--
Eff. Major Prin Stress (tsf)	--	--	--	--
Time to Failure(min)	4	0	0	0
Rate of Strain(%/min)	0.90	0.00	0.00	0.00
Specimen Height(in.)	5.33	0.00	0.00	0.00
Specimen Dia (in.)	3.00	0.00	0.00	0.00

	Max Deviator Stress		Max Eff Stress Ratio
Apparent	--	--	
Effective	--	--	

NOTE: Figures in parenthesis are based on the failure criteria of Maximum Effective Principal Stress Ratio.

Remark:

Singleton Laboratories
Unconfined Compression (UC) Test

Project: SIOU Engineering Support Study
Feature: CPCPDS03B
Station:
Range :
Boring :

El. :
Sample: 50%
Part : 3 day

File : 180
Tested By : REG
Computed By: TRB
Checked By :
Report Date: 08-15-96

Moisture Content	Initial	Final
Wet Wt. and Tare(gm) =	854.6	854.6
Dry wt. and tare(gm) =	458.2	458.2
Wt. of tare(gm) =	0.0	0.0
Moisture(%) =	86.5	86.5

Test Conditions and Constants:

Proving Ring No. = 2223
Proving Ring Constant:
Slope Const. = 1
Intercept = 0
Confining Pres.(psi) = 0
Initial Pore Pre(psi) = 0

Tube No. =
Sample Volume (cc) = 616.963
Sample Height(in.) = 5.329
Specific Gravity = 2.44
Consolidation(in.) = 0
Initial P.R. Rdg = 0

Time (Min)	Deflection (ins.)	Pro.Ring Reading	Strain (%)	±1 - ±3 (tsf)
0.5	0.029	11.9	0.54	0.12
1.0	0.053	27.1	0.99	0.27
1.5	0.069	47.4	1.29	0.48
2.0	0.094	79.4	1.76	0.79
2.5	0.118	106.4	2.21	1.06
3.0	0.144	124.7	2.70	1.24
3.5	0.168	129.8	3.15	1.28
4.0	0.196	107.9	3.68	1.06
4.5	0.243	78.1	4.56	0.76

Initial:
Moisture(%) = 86.5
Density(pcf) = 46.4

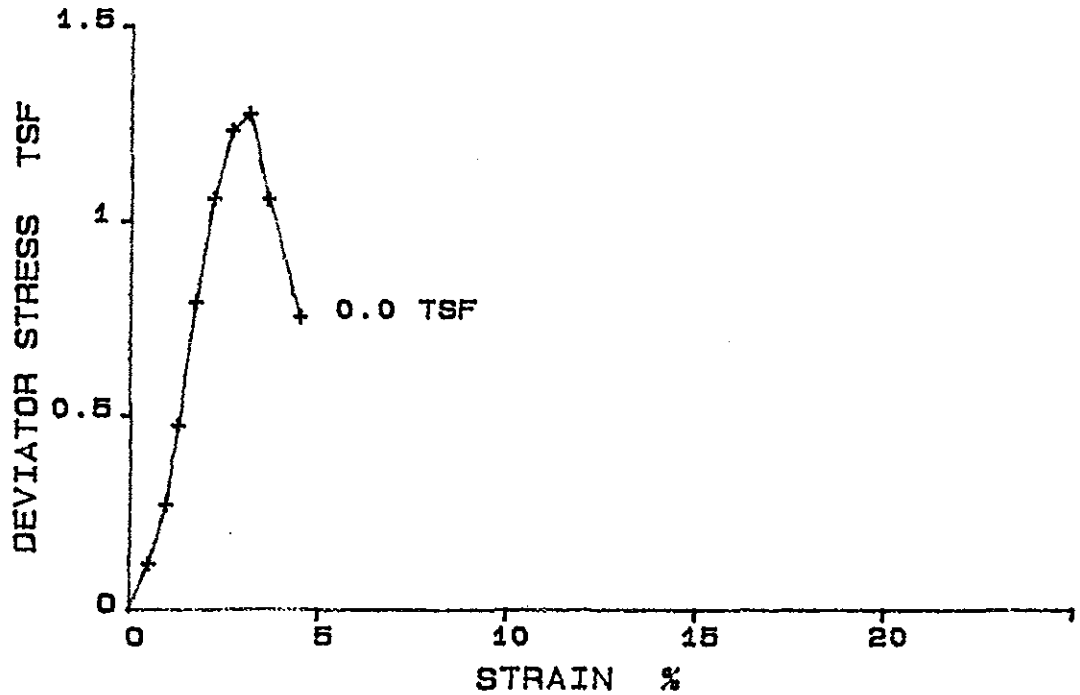
Void Ratio =2.285
Saturation(%) = 92.4

Minor Prin. Stress(tsf) =0.00
Major Prin. Stress(tsf) = 1.28

NOTE: Figures in parenthesis are based on the failure criteria of Maximum Effective Principal Stress Ratio.

SINGLETON LABORATORIES
UNCONFINED COMPRESSION (UC) TEST

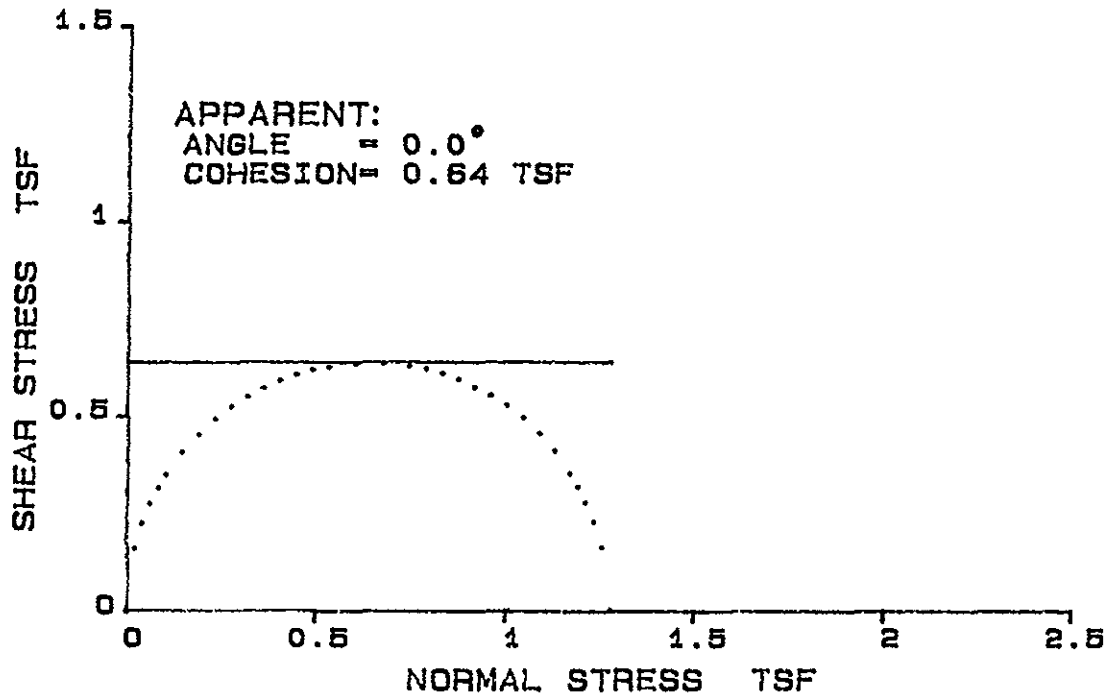
PROJECT:	SIOU	EL.	:
FEATURE:	CPCPDS03B	SAMPLE	: 50%
STATION:		PART	: 3 day
RANGE :		SOIL SYM:	
BORING :		DATE	: 08-15-96



REMARKS:

SINGLETON LABORATORIES
UNCONFINED COMPRESSION (UC) TEST

PROJECT:	SIOU	EL.	:
FEATURE:	CPCPDS03B	SAMPLE	: 50%
STATION:		PART	: 3 day
RANGE :		SOIL SYM:	
BORING :		DATE	: 08-15-96



Singleton Laboratories
UNCONFINED COMPRESSION (UC) TEST

Project: SIOU Engineering Support Study		File : 187
Feature: CPCPDS03B		Tested By : REG
Station:	El. :	Computed By: TRB
Range :	Sample: 50%	Checked By :
Boring :	Part : 7 day	Report Date: 08-07-96

Soil Symbol=	L.L.(%)=	P.I.(%) =
Sp. Gr. = 2.44	D10(mm)=	

Specimen Number	1	2	3	4
Initial:				
Moisture Content(%)	84.3	0.0	0.0	0.0
Dry Density(pcf)	47.0	0.0	0.0	0.0
Void Ratio	2.243	0.000	0.000	0.000
Saturation(%)	91.7	0.0	0.0	0.0
Before Shearing:				
Moisture(%) (after satur.)	--	--	--	--
Saturation(%)	--	--	--	--
Moisture(%) (after cons.)	--	--	--	--
Void Ratio (after cons.)	--	--	--	--
Final Moisture Content(%)	84.3	0.0	0.0	0.0
Minor Principal Stress (tsf)	--	--	--	--
Major Principal Stress (tsf)	--	--	--	--
Eff. Minor Prin Stress (tsf)	--	--	--	--
Eff. Major Prin Stress (tsf)	--	--	--	--
Time to Failure(min)	3	0	0	0
Rate of Strain(%/min)	0.94	0.00	0.00	0.00
Specimen Height(in.)	5.34	0.00	0.00	0.00
Specimen Dia (in.)	3.00	0.00	0.00	0.00

	Max Deviator Stress		Max Eff Stress Ratio
Apparent	--	--	
Effective	--	--	

NOTE: Figures in parenthesis are based on the failure criteria of Maximum Effective Principal Stress Ratio.

Remark:

Singleton Laboratories
UNCONFINED COMPRESSION (UC) TEST

Project: SIOU Engineering Support Study
Feature: CPCPDS03B
Station:
Range :
Boring :

El. :
Sample: 50%
Part : 7 day

File : 186
Tested By : REG
Computed By: TRB
Checked By :
Report Date: 08-07-96

Moisture Content	Initial	Final
Wet Wt. and Tare(gm) =	856.6	856.6
Dry wt. and tare(gm) =	464.8	464.8
Wt. of tare(gm) =	0.0	0.0
Moisture(%) =	84.3	84.3

Test Conditions and Constants:

Proving Ring No. = 2223
Proving Ring Constant:
Slope Const. = 1
Intercept = 0
Confining Pres.(psi) = 0
Initial Pore Pre(psi) = 0

Tube No. = 0
Sample Volume (cc) = 617.773
Sample Height(in.) = 5.336
Specific Gravity = 2.44
Consolidation(in.) = 0
Initial P.R. Rdg = 0

Time (Min)	Deflection (ins.)	Pro.Ring Reading	Strain (%)	±1 - ±3 (tsf)
0.5	0.025	38.0	0.47	0.39
1.0	0.051	72.1	0.96	0.73
1.5	0.075	115.5	1.41	1.16
2.0	0.100	153.5	1.87	1.54
2.5	0.128	185.5	2.40	1.85
3.0	0.151	194.0	2.83	1.92
3.5	0.178	194.0	3.34	1.91
4.0	0.230	173.3	4.31	1.69

Initial:
Moisture(%) = 84.3
Density(pcf) = 47.0

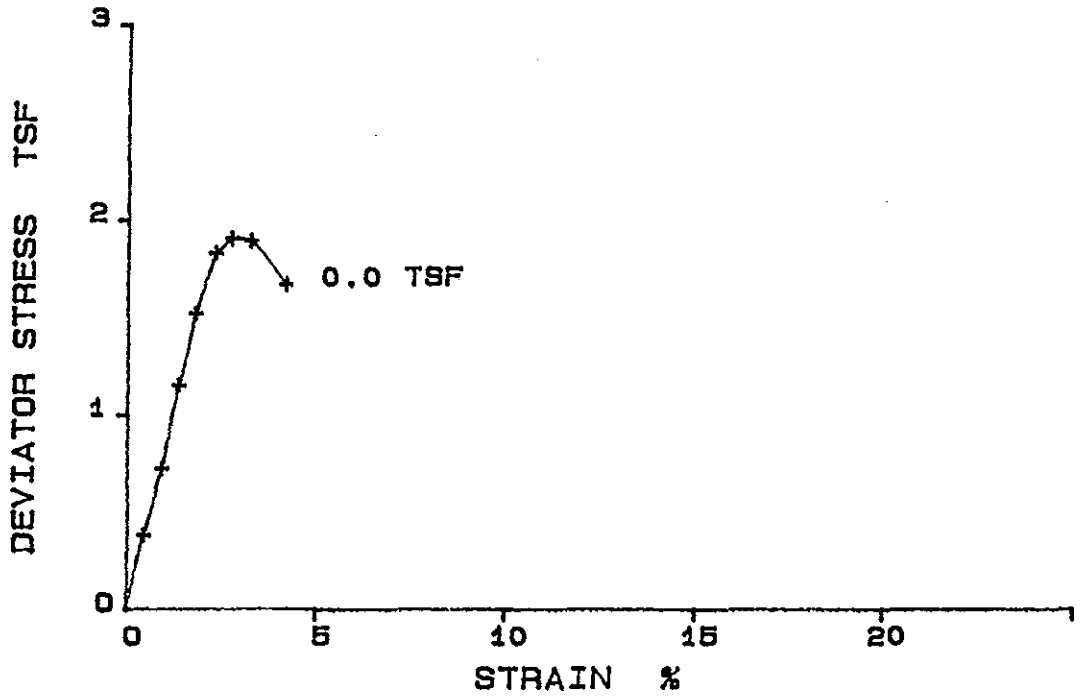
Void Ratio =2.243
Saturation(%) = 91.7

Minor Prin. Stress(tsf) =0.00
Major Prin. Stress(tsf) = 1.92

NOTE: Figures in parenthesis are based on the failure criteria of Maximum Effective Principal Stress Ratio.

SINGLETON LABORATORIES
UNCONFINED COMPRESSION (UC) TEST

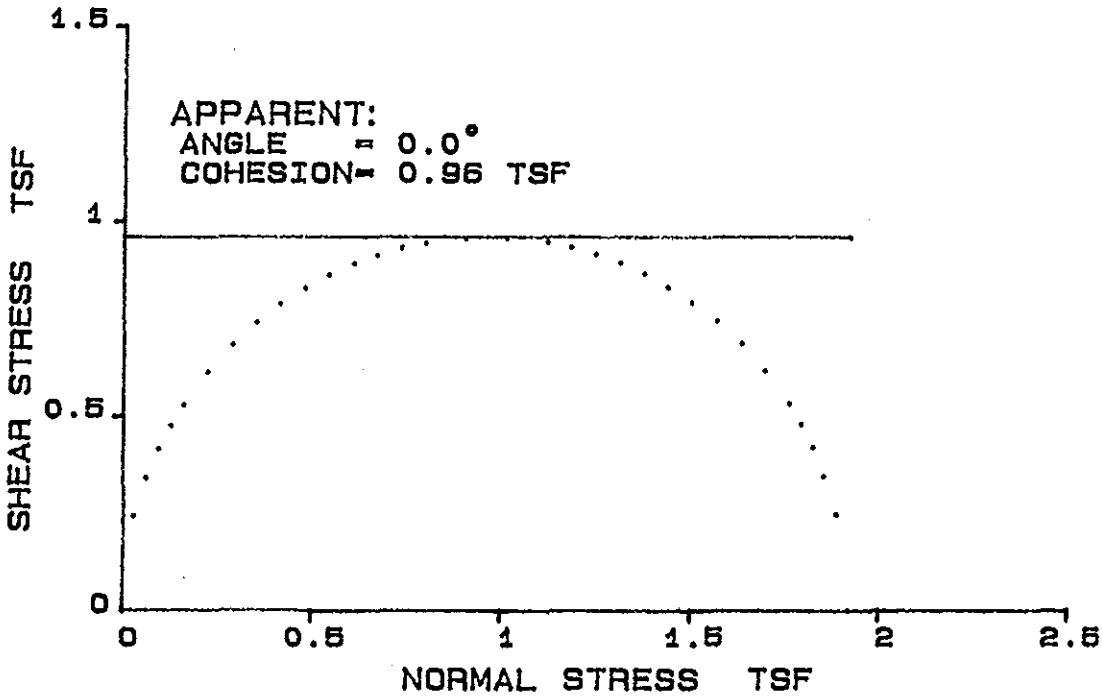
PROJECT:	SIOU	EL.	:
FEATURE:	CPCPDS03B	SAMPLE	: 50%
STATION:		PART	: 7 day
RANGE :		SOIL SYM:	
BORING :		DATE	: 08-07-96



REMARKS:

SINGLETON LABORATORIES
UNCONFINED COMPRESSION (UC) TEST

PROJECT:	SIOU	EL.	:
FEATURE:	CPCPDS03B	SAMPLE	: 50%
STATION:		PART	: 7 day
RANGE :		SOIL SYM:	
BORING :		DATE	: 08-07-96



Singleton Laboratories
UNCONFINED COMPRESSION (UC) TEST

Project: SIOU Engineering Support Study		File : 188
Feature: CPCPDS03B		Tested By : REG
Station:	El. :	Computed By: TRB
Range :	Sample: 50%	Checked By :
Boring :	Part : 7 day	Report Date: 08-07-96

Soil Symbol=	L.L.(%)=	P.I.(%) =
Sp. Gr. = 2.44	D10(mm)=	

Specimen Number	1	2	3	4
Initial:				
Moisture Content(%)	84.3	0.0	0.0	0.0
Dry Density(pcf)	47.5	0.0	0.0	0.0
Void Ratio	2.210	0.000	0.000	0.000
Saturation(%)	93.1	0.0	0.0	0.0
Before Shearing:				
Moisture(%) (after satur.)	--	--	--	--
Saturation(%)	--	--	--	--
Moisture(%) (after cons.)	--	--	--	--
Void Ratio (after cons.)	--	--	--	--
Final Moisture Content(%)	84.3	0.0	0.0	0.0
Minor Principal Stress (tsf)	--	--	--	--
Major Principal Stress (tsf)	--	--	--	--
Eff. Minor Prin Stress (tsf)	--	--	--	--
Eff. Major Prin Stress (tsf)	--	--	--	--
Time to Failure(min)	4	0	0	0
Rate of Strain(%/min)	0.97	0.00	0.00	0.00
Specimen Height(in.)	5.29	0.00	0.00	0.00
Specimen Dia (in.)	3.00	0.00	0.00	0.00

	Max Deviator Stress		Max Eff Stress Ratio
Apparent	--	--	
Effective	--	--	

NOTE: Figures in parenthesis are based on the failure criteria of Maximum Effective Principal Stress Ratio.

Remark:

Singleton Laboratories
UNCONFINED COMPRESSION (UC) TEST

Project: SIOU Engineering Support Study
Feature: CPCPDS03B
Station:
Range :
Boring :

El. :
Sample: 50%
Part : 7 day

File : 187
Tested By : REG
Computed By: TRB
Checked By :
Report Date: 08-07-96

Moisture Content	Initial	Final
Wet Wt. and Tare(gm)=	857.9	857.9
Dry wt. and tare(gm)=	465.5	465.5
Wt. of tare(gm) =	0.0	0.0
Moisture(%) =	84.3	84.3

Test Conditions and Constants:

Proving Ring No. = 2223
Proving Ring Constant:
Slope Const. = 1
Intercept = 0
Confining Pres.(psi) = 0
Initial Pore Pre(psi)= 0

Tube No. = 0
Sample Volume (cc) = 612.332
Sample Height(in.) = 5.289
Specific Gravity = 2.44
Consolidation(in.) = 0
Initial P.R. Rdg = 0

Time (Min)	Deflection (ins.)	Pro.Ring Reading	Strain (%)	±1 - ±3 (tsf)
0.5	0.031	34.1	0.59	0.35
1.0	0.057	69.9	1.08	0.70
1.5	0.080	109.8	1.51	1.10
2.0	0.105	142.9	1.99	1.43
2.5	0.127	164.2	2.40	1.63
3.0	0.151	184.9	2.85	1.83
3.5	0.179	194.9	3.38	1.92
4.0	0.210	176.3	3.97	1.73

Initial:

Moisture(%) = 84.3
Density(pcf)= 47.5

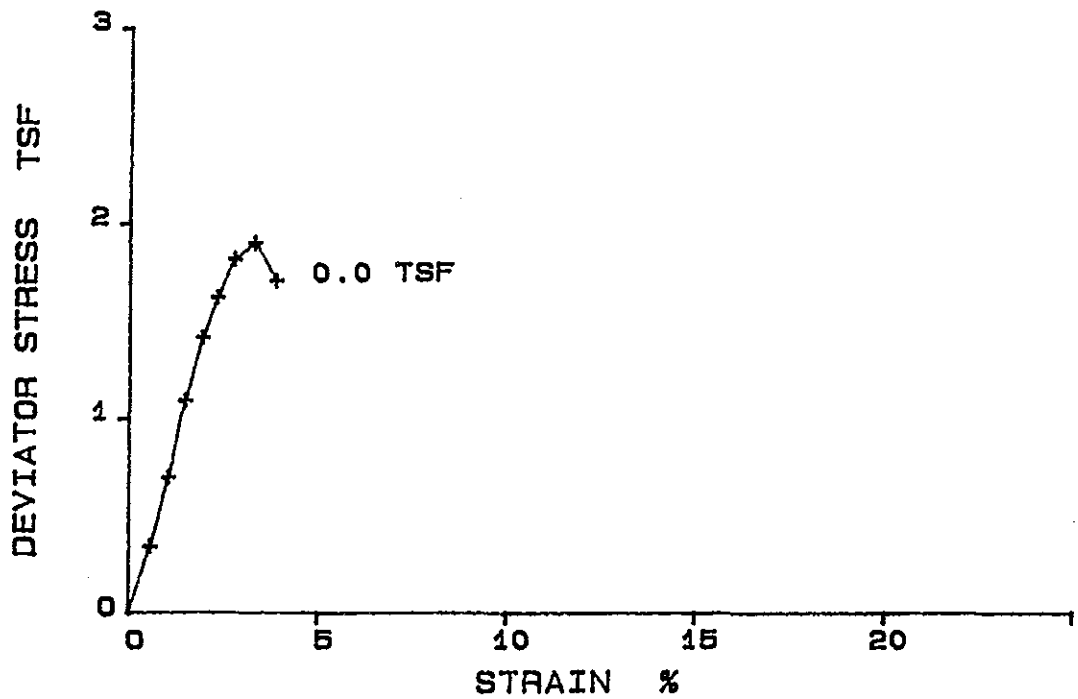
Void Ratio =2.210
Saturation(%)= 93.1

Minor Prin. Stress(tsf) =0.00
Major Prin. Stress(tsf) = 1.92

NOTE: Figures in parenthesis are based on the failure criteria of Maximum Effective Principal Stress Ratio.

SINGLETON LABORATORIES
UNCONFINED COMPRESSION (UC) TEST

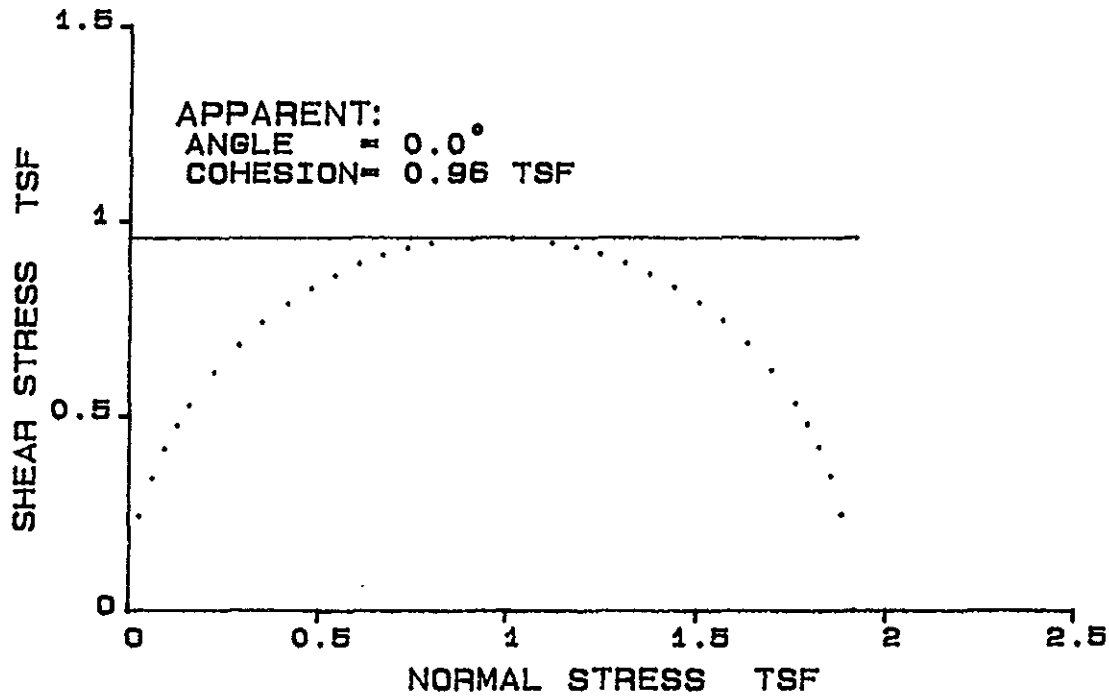
PROJECT:	SIOU	EL.	:
FEATURE:	CPCPDS03B	SAMPLE	: 50%
STATION:		PART	: 7 day
RANGE :		SOIL SYM:	
BORING :		DATE	: 08-07-96



REMARKS:

SINGLETON LABORATORIES
UNCONFINED COMPRESSION (UC) TEST

PROJECT:	SIOU	EL.	:
FEATURE:	CPCPDS03B	SAMPLE	: 50%
STATION:		PART	: 7 day
RANGE :		SOIL SYM:	
BORING :		DATE	: 08-07-96



Singleton Laboratories
UNCONFINED COMPRESSION (UC) TEST

Project: SIOU Engineering Support Study		File : 193
Feature: CPCPDS03B		Tested By : REG
Station:	El. :	Computed By: TRB
Range :	Sample: 75%	Checked By :
Boring :	Part : 3 day	Report Date: 08-08-96

Soil Symbol=	L.L.(%)=	P.I.(%) =
Sp. Gr. = 2.44	D10(mm)=	

Specimen Number	1	2	3	4
Initial:				
Moisture Content(%)	61.5	0.0	0.0	0.0
Dry Density(pcf)	57.8	0.0	0.0	0.0
Void Ratio	1.635	0.000	0.000	0.000
Saturation(%)	91.7	0.0	0.0	0.0
Before Shearing:				
Moisture(%) (after satur.)	--	--	--	--
Saturation(%)	--	--	--	--
Moisture(%) (after cons.)	--	--	--	--
Void Ratio (after cons.)	--	--	--	--
Final Moisture Content(%)	61.5	0.0	0.0	0.0
Minor Principal Stress (tsf)	--	--	--	--
Major Principal Stress (tsf)	--	--	--	--
Eff. Minor Prin Stress (tsf)	--	--	--	--
Eff. Major Prin Stress (tsf)	--	--	--	--
Time to Failure(min)	6	0	0	0
Rate of Strain(%/min)	0.42	0.00	0.00	0.00
Specimen Height(in.)	5.33	0.00	0.00	0.00
Specimen Dia (in.)	3.00	0.00	0.00	0.00

	Max Deviator Stress		Max Eff Stress Ratio
Apparent	--	--	
Effective	--	--	

NOTE: Figures in parenthesis are based on the failure criteria of Maximum Effective Principal Stress Ratio.

Remark:

Singleton Laboratories
UNCONFINED COMPRESSION (UC) TEST

Project: SIOU Engineering Support Study
Feature: CPCPDS03B
Station:
Range :
Boring :

El. :
Sample: 75%
Part : 3 day

File : 192
Tested By : REG
Computed By: TRB
Checked By :
Report Date: 08-08-96

Moisture Content	Initial	Final
Wet Wt. and Tare(gm)=	921.8	921.8
Dry wt. and tare(gm)=	570.8	570.8
Wt. of tare(gm) =	0.0	0.0
Moisture(%) =	61.5	61.5

Test Conditions and Constants:

Proving Ring No.	= 2223	Tube No.	= 0
Proving Ring Constant:		Sample Volume (cc)	= 616.5
Slope Const.	= 1	Sample Height(in.)	= 5.325
Intercept	= 0	Specific Gravity	= 2.44
Confining Pres.(psi)	= 0	Consolidation(in.)	= 0
Initial Pore Pre(psi)	= 0	Initial P.R. Rdg	= 0

Time (Min)	Deflection (ins.)	Pro.Ring Reading	Strain (%)	±1 - ±3 (tsf)
0.5	0.029	25.8	0.54	0.26
1.0	0.056	59.3	1.05	0.60
1.5	0.077	90.9	1.45	0.91
2.0	0.097	126.8	1.82	1.27
2.5	0.113	150.2	2.12	1.50
3.0	0.123	164.2	2.31	1.63
3.5	0.133	180.6	2.50	1.79
4.0	0.134	183.0	2.52	1.82
4.5	0.135	183.6	2.54	1.82
5.0	0.135	183.9	2.54	1.83
6.0	0.135	183.9	2.54	1.83
7.0	0.136	183.9	2.55	1.83

Initial:

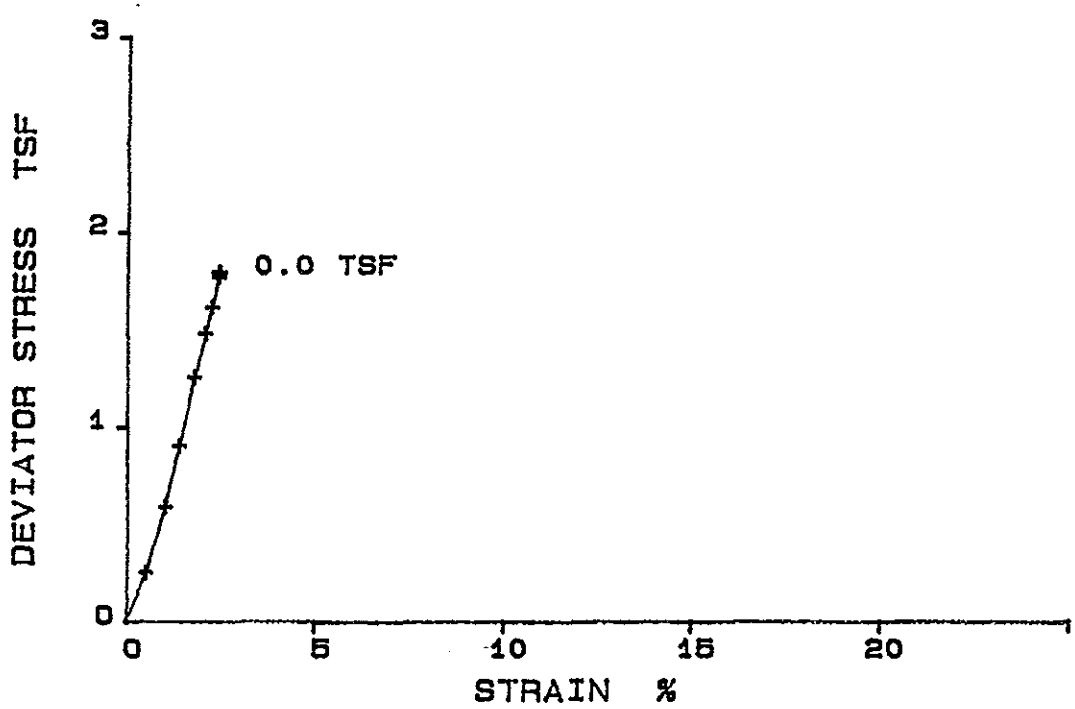
Moisture(%)	= 61.5	Void Ratio	=1.635
Density(pcf)	= 57.8	Saturation(%)	= 91.7

Minor Prin. Stress(tsf) =0.00 Major Prin. Stress(tsf) = 1.83

NOTE: Figures in parenthesis are based on the failure criteria of Maximum Effective Principal Stress Ratio.

SINGLETON LABORATORIES
UNCONFINED COMPRESSION (UC) TEST

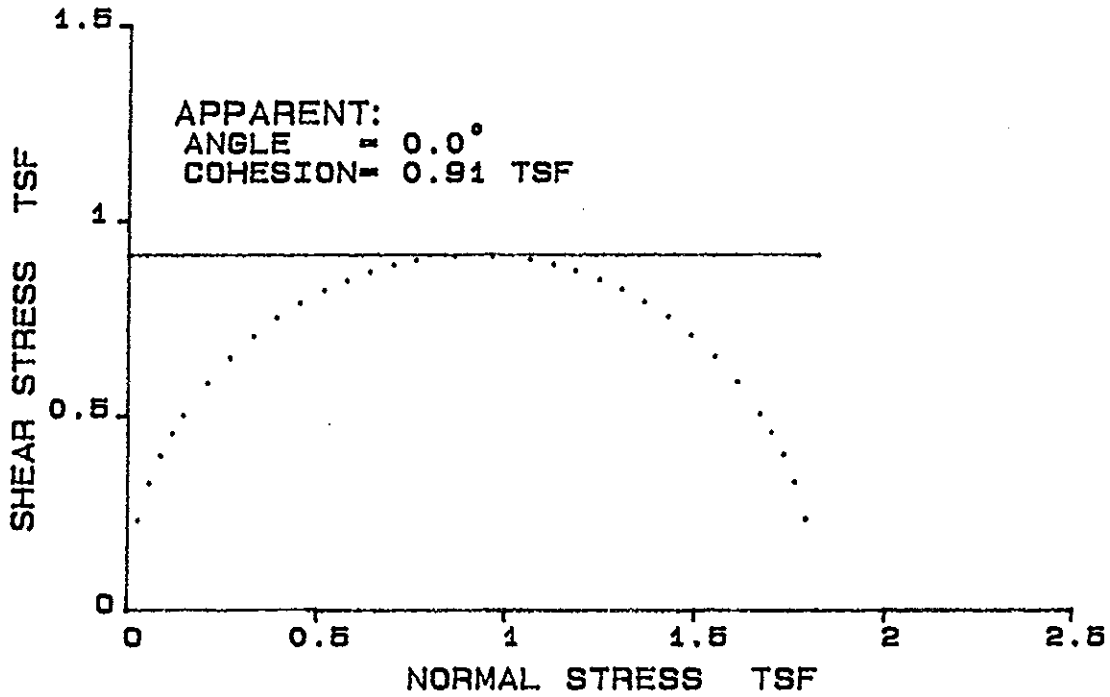
PROJECT:	SIOU	EL.	:
FEATURE:	CPCPDS03B	SAMPLE	: 75%
STATION:		PART	: 3 day
RANGE :		SOIL SYM:	
BORING :		DATE	: 08-08-96



REMARKS:

SINGLETON LABORATORIES
UNCONFINED COMPRESSION (UC) TEST

PROJECT:	SIOU	EL.	:
FEATURE:	CPCPDS03B	SAMPLE	: 75%
STATION:		PART	: 3 day
RANGE :		SOIL SYM:	
BORING :		DATE	: 08-08-96



Singleton Laboratories
Unconfined Compression (UC) Test

Project: SIOU Engineering Support Study		File : 192
Feature: CPCPDS03B		Tested By : REG
Station:	El. :	Computed By: TRB
Range :	Sample: 75%	Checked By :
Boring :	Part : 3 day	Report Date: 08-08-96

Soil Symbol=	L.L.(%)=	P.I.(%) =
Sp. Gr. = 2.44	D10(mm)=	

Specimen Number	1	2	3	4
Initial:				
Moisture Content(%)	58.8	0.0	0.0	0.0
Dry Density(pcf)	58.3	0.0	0.0	0.0
Void Ratio	1.612	0.000	0.000	0.000
Saturation(%)	89.0	0.0	0.0	0.0
Before Shearing:				
Moisture(%) (after satur.)	--	--	--	--
Saturation(%)	--	--	--	--
Moisture(%) (after cons.)	--	--	--	--
Void Ratio (after cons.)	--	--	--	--
Final Moisture Content(%)	58.8	0.0	0.0	0.0
Minor Principal Stress (tsf)	--	--	--	--
Major Principal Stress (tsf)	--	--	--	--
Eff. Minor Prin Stress (tsf)	--	--	--	--
Eff. Major Prin Stress (tsf)	--	--	--	--
Time to Failure(min)	5	0	0	0
Rate of Strain(%/min)	0.46	0.00	0.00	0.00
Specimen Height(in.)	5.40	0.00	0.00	0.00
Specimen Dia (in.)	3.00	0.00	0.00	0.00

	Max Deviator Stress		Max Eff	Stress Ratio
Apparent	--	--		
Effective	--	--		

NOTE: Figures in parenthesis are based on the failure criteria of Maximum Effective Principal Stress Ratio.

Remark:

Singleton Laboratories
Unconfined Compression (UC) Test

Project: SIOU Engineering Support Study
Feature: CPCPDS03B
Station:
Range :
Boring :

El. :
Sample: 75%
Part : 3 day

File :
Tested By : REG
Computed By: TRB
Checked By :
Report Date: 08-08-96

Moisture Content	Initial	Final
Wet Wt. and Tare(gm)=	927.7	927.7
Dry wt. and tare(gm)=	584.2	584.2
Wt. of tare(gm) =	0.0	0.0
Moisture(%) =	58.8	58.8

Test Conditions and Constants:

Proving Ring No. = 2223
Proving Ring Constant:
Slope Const. = 1
Intercept = 0
Confining Pres.(psi) = 0
Initial Pore Pre(psi)= 0

Tube No. = 0
Sample Volume (cc) = 625.299
Sample Height(in.) = 5.401
Specific Gravity = 2.44
Consolidation(in.) = 0
Initial P.R. Rdg = 0

Time (Min)	Deflection (ins.)	Pro.Ring Reading	Strain (%)	±1 - ±3 (tsf)
0.5	0.031	38.0	0.57	0.39
1.0	0.054	72.4	1.00	0.73
1.5	0.072	105.5	1.33	1.06
2.0	0.096	149.9	1.78	1.50
2.5	0.114	179.3	2.11	1.79
3.0	0.120	179.7	2.22	1.79
3.5	0.122	181.2	2.26	1.80
4.0	0.122	181.2	2.26	1.80
5.0	0.123	181.5	2.28	1.81
6.0	0.124	181.5	2.30	1.81
7.0	0.124	181.5	2.30	1.81

Initial:
Moisture(%) = 58.8
Density(pcf)= 58.3

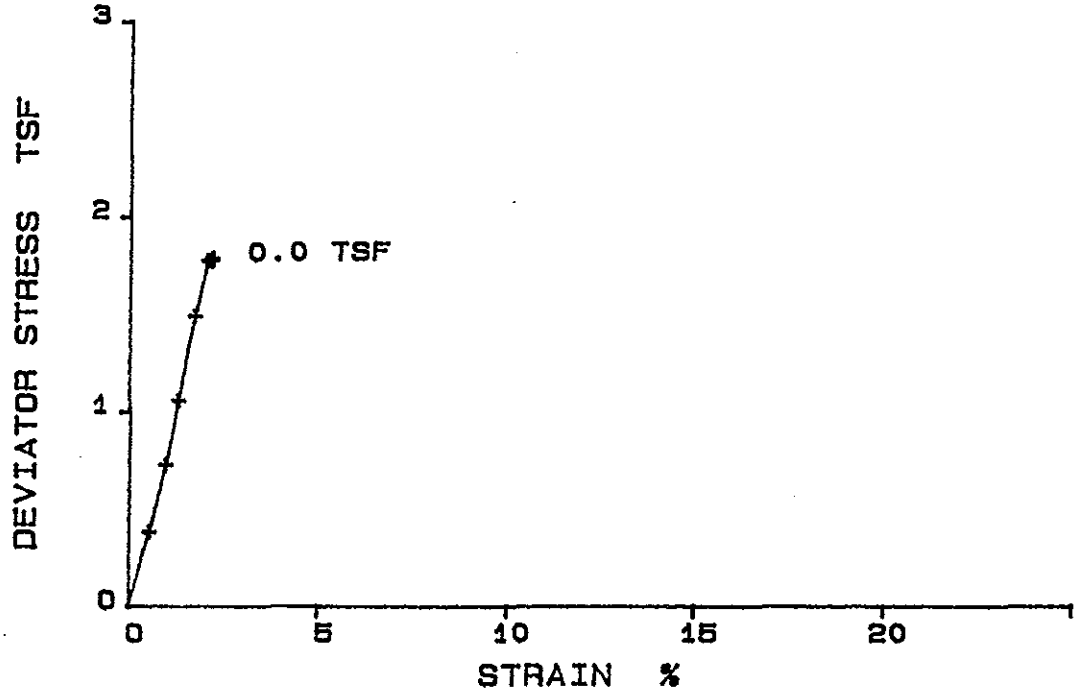
Void Ratio =1.612
Saturation(%)= 89.0

Minor Prin. Stress(tsf) =0.00
Major Prin. Stress(tsf) = 1.81

NOTE: Figures in parenthesis are based on the failure criteria of Maximum Effective Principal Stress Ratio.

SINGLETON LABORATORIES
UNCONFINED COMPRESSION (UC) TEST

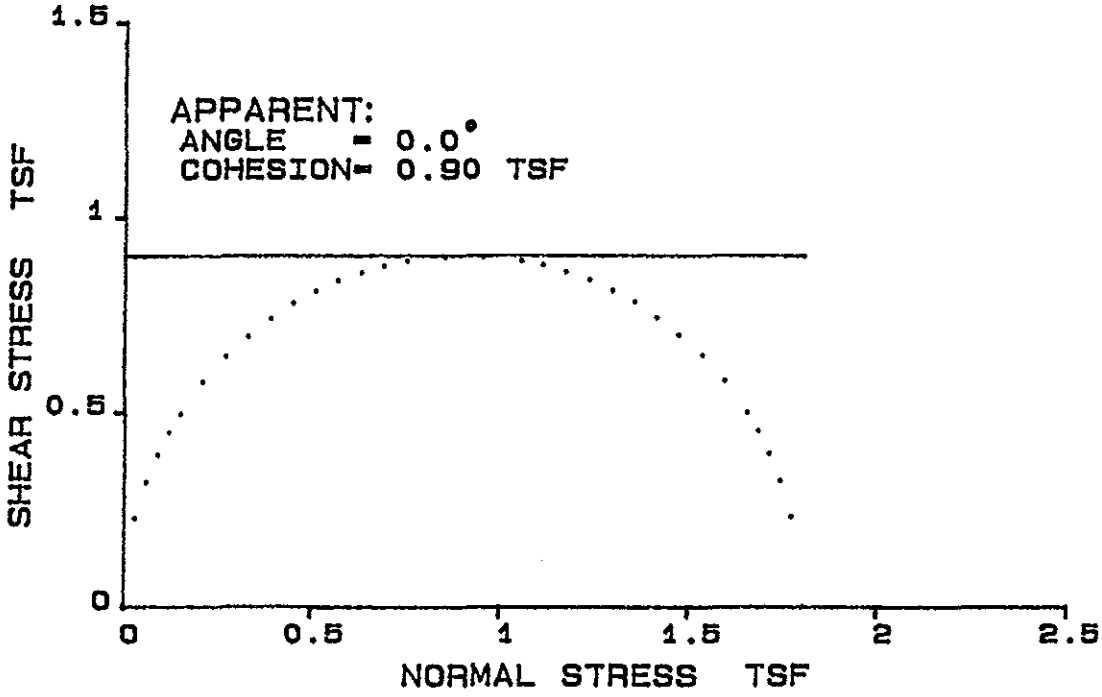
PROJECT:	SIOU	EL.	:
FEATURE:	CPCPDS03B	SAMPLE	: 75%
STATION:		PART	: 3 day
RANGE :		SOIL SYM:	
BORING :		DATE	: 08-08-96



REMARKS:

SINGLETON LABORATORIES
UNCONFINED COMPRESSION (UC) TEST

PROJECT:	SIOU	EL.	:
FEATURE:	CPCPDS03B	SAMPLE	: 75%
STATION:		PART	: 3 day
RANGE :		SOIL SYM:	
BORING :		DATE	: 08-08-96



Singleton Laboratories
UNCONFINED COMPRESSION (UC) TEST

Project: SIOU Engineering Support Study		File : 190
Feature: CPCPDS03B		Tested By : REG
Station:	El. :	Computed By: TRB
Range :	Sample: 75%	Checked By :
Boring :	Part : 7 day	Report Date: 08-07-96

Soil Symbol=	L.L.(%)=	P.I.(%) =
Sp. Gr. = 2.44	D10(mm)=	

Specimen Number	1	2	3	4
Initial:				
Moisture Content(%)	55.7	0.0	0.0	0.0
Dry Density(pcf)	60.0	0.0	0.0	0.0
Void Ratio	1.540	0.000	0.000	0.000
Saturation(%)	88.2	0.0	0.0	0.0
Before Shearing:				
Moisture(%) (after satur.)	--	--	--	--
Saturation(%)	--	--	--	--
Moisture(%) (after cons.)	--	--	--	--
Void Ratio (after cons.)	--	--	--	--
Final Moisture Content(%)	55.7	0.0	0.0	0.0
Minor Principal Stress (tsf)	--	--	--	--
Major Principal Stress (tsf)	--	--	--	--
Eff. Minor Prin Stress (tsf)	--	--	--	--
Eff. Major Prin Stress (tsf)	--	--	--	--
Time to Failure(min)	7	0	0	0
Rate of Strain(%/min)	0.74	0.00	0.00	0.00
Specimen Height(in.)	5.26	0.00	0.00	0.00
Specimen Dia (in.)	3.00	0.00	0.00	0.00

	Max Deviator Stress		Max Eff Stress Ratio
Apparent	--	--	
Effective	--	--	

NOTE: Figures in parenthesis are based on the failure criteria of Maximum Effective Principal Stress Ratio.

Remark:

Singleton Laboratories
UNCONFINED COMPRESSION (UC) TEST

Project: SIOU Engineering Support Study
Feature: CPCPDS03B
Station:
Range :
Boring :

El. :
Sample: 75%
Part : 7 day

File : 189
Tested By : REG
Computed By: TRB
Checked By :
Report Date: 08-07-96

Moisture Content	Initial	Final
Wet Wt. and Tare(gm) =	910.8	910.8
Dry wt. and tare(gm) =	585.0	585.0
Wt. of tare(gm) =	0.0	0.0
Moisture(%) =	55.7	55.7

Test Conditions and Constants:

Proving Ring No. = 2223
Proving Ring Constant:
Slope Const. = 1
Intercept = 0
Confining Pres.(psi) = 0
Initial Pore Pre(psi) = 0

Tube No. = 0
Sample Volume (cc) = 609.09
Sample Height(in.) = 5.261
Specific Gravity = 2.44
Consolidation(in.) = 0
Initial P.R. Rdg = 0

Time (Min)	Deflection (ins.)	Pro.Ring Reading	Strain (%)	±1 - ±3 (tsf)
0.5	0.025	36.5	0.48	0.37
1.0	0.047	56.2	0.89	0.57
1.5	0.063	82.1	1.20	0.83
2.0	0.085	121.6	1.62	1.22
2.5	0.115	158.1	2.19	1.58
3.0	0.140	191.5	2.66	1.90
3.5	0.163	226.5	3.10	2.24
4.0	0.185	264.5	3.52	2.60
4.5	0.210	307.1	3.99	3.00
5.0	0.230	346.6	4.37	3.38
5.5	0.243	370.9	4.62	3.61
6.0	0.257	402.9	4.89	3.91
6.5	0.265	425.7	5.04	4.12
7.0	0.272	431.7	5.17	4.17
8.0	0.275	431.7	5.23	4.17

Initial:

Moisture(%) = 55.7
Density(pcf) = 60.0

Void Ratio =1.540
Saturation(%) = 88.2

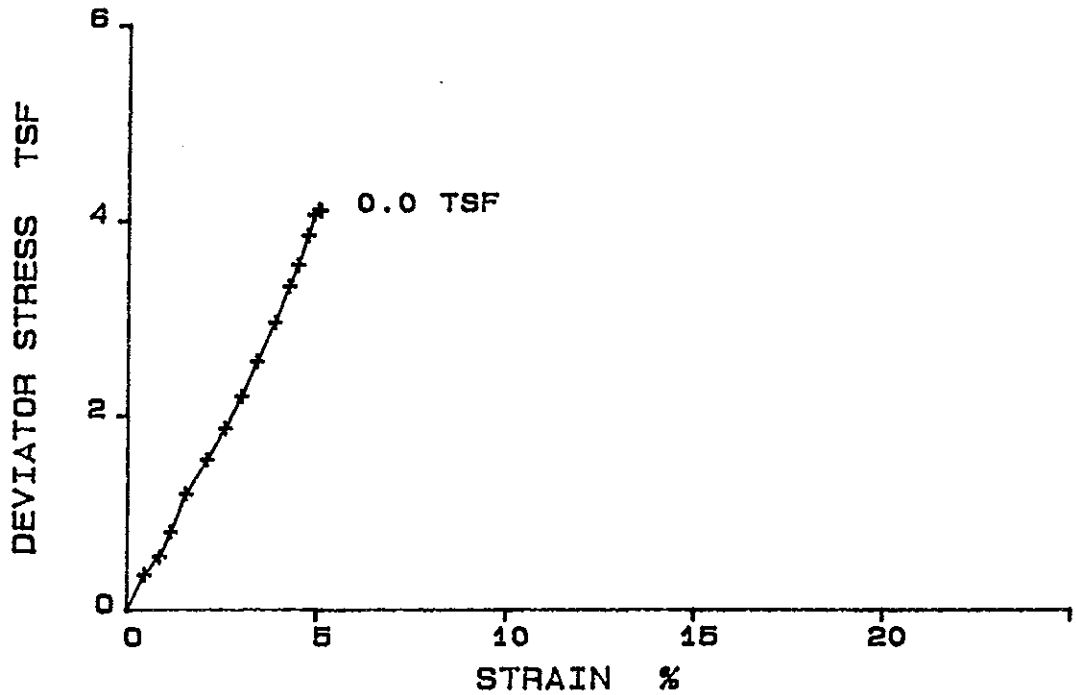
Minor Prin. Stress(tsf) =0.00

Major Prin. Stress(tsf) = 4.17

NOTE: Figures in parenthesis are based on the failure criteria of Maximum Effective Principal Stress Ratio.

SINGLETON LABORATORIES
UNCONFINED COMPRESSION (UC) TEST

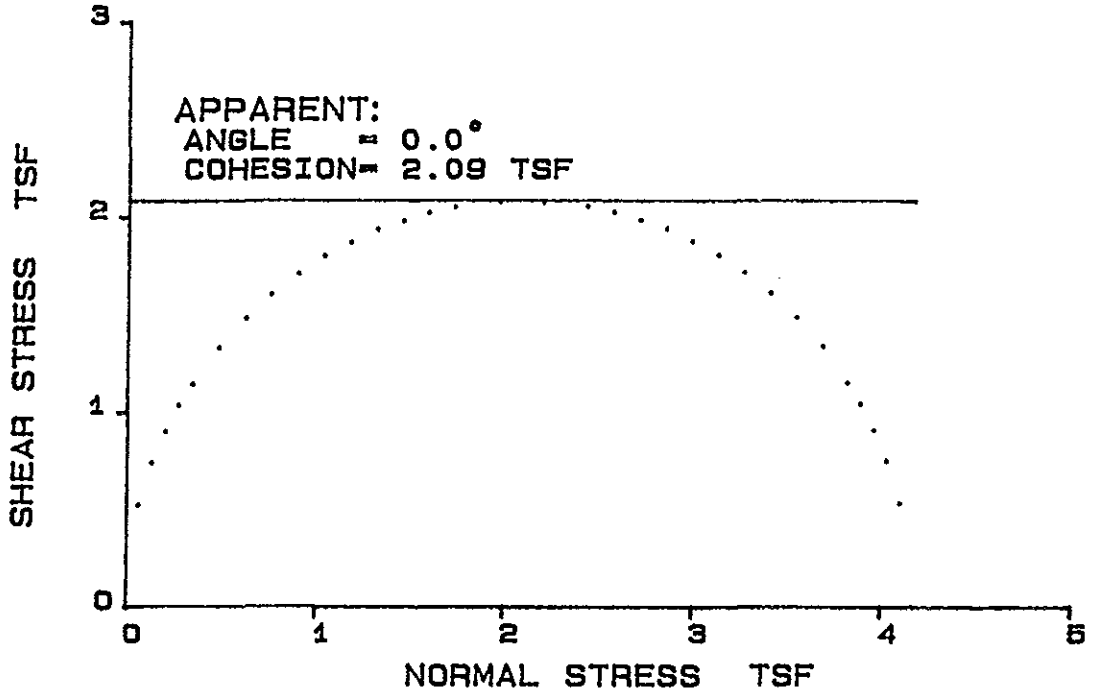
PROJECT:	SIOU	EL.	:
FEATURE:	CPCPDS03B	SAMPLE	: 75%
STATION:		PART	: 7 day
RANGE :		SOIL SYM:	
BORING :		DATE	: 08-07-96



REMARKS:

SINGLETON LABORATORIES
UNCONFINED COMPRESSION (UC) TEST

PROJECT:	SIOU	EL.	:
FEATURE:	CPCPDS03B	SAMPLE	: 75%
STATION:		PART	: 7 day
RANGE :		SOIL SYM:	
BORING :		DATE	: 08-07-96



Singleton Laboratories
UNCONFINED COMPRESSION (UC) TEST

Project: SIOU Engineering Support Study		File : 189
Feature: CPCPDS03B		Tested By : REG
Station:	El. :	Computed By: TRB
Range :	Sample: 75%	Checked By :
Boring :	Part : 7 day	Report Date: 08-07-96

Soil Symbol=	L.L.(%)=	P.I.(%) =
Sp. Gr. = 2.44	D10(mm)=	

Specimen Number	1	2	3	4
Initial:				
Moisture Content(%)	56.1	0.0	0.0	0.0
Dry Density(pcf)	58.5	0.0	0.0	0.0
Void Ratio	1.602	0.000	0.000	0.000
Saturation(%)	85.4	0.0	0.0	0.0
Before Shearing:				
Moisture(%) (after satur.)	--	--	--	--
Saturation(%)	--	--	--	--
Moisture(%) (after cons.)	--	--	--	--
Void Ratio (after cons.)	--	--	--	--
Final Moisture Content(%)	56.1	0.0	0.0	0.0
Minor Principal Stress (tsf)	--	--	--	--
Major Principal Stress (tsf)	--	--	--	--
Eff. Minor Prin Stress (tsf)	--	--	--	--
Eff. Major Prin Stress (tsf)	--	--	--	--
Time to Failure(min)	11	0	0	0
Rate of Strain(%/min)	0.47	0.00	0.00	0.00
Specimen Height(in.)	5.41	0.00	0.00	0.00
Specimen Dia (in.)	3.00	0.00	0.00	0.00

	Max Deviator Stress		Max Eff Stress Ratio
Apparent	--	--	
Effective	--	--	

NOTE: Figures in parenthesis are based on the failure criteria of Maximum Effective Principal Stress Ratio.

Remark:

Singleton Laboratories
UNCONFINED COMPRESSION (UC) TEST

Project: SIOU Engineering Support Study
Feature: CPCPDS03B
Station:
Range :
Boring :

El. :
Sample: 75%
Part : 7 day

File : 188
Tested By : REG
Computed By: TRB
Checked By :
Report Date: 08-07-96

Moisture Content	Initial	Final
Wet Wt. and Tare(gm) =	916.7	916.7
Dry wt. and tare(gm) =	587.3	587.3
Wt. of tare(gm) =	0.0	0.0
Moisture(%) =	56.1	56.1

Test Conditions and Constants:

Proving Ring No. = 2223
Proving Ring Constant:
Slope Const. = 1
Intercept = 0
Confining Pres.(psi) = 0
Initial Pore Pre(psi) = 0

Tube No. = 0
Sample Volume (cc) = 626.341
Sample Height(in.) = 5.41
Specific Gravity = 2.44
Consolidation(in.) = 0
Initial P.R. Rdg = 0

Time (Min)	Deflection (ins.)	Pro.Ring Reading	Strain (%)	±1 - ±3 (tsf)
0.5	0.028	22.5	0.52	0.23
1.0	0.048	42.6	0.89	0.43
1.5	0.075	77.5	1.39	0.78
2.0	0.100	121.6	1.85	1.22
2.5	0.128	149.0	2.37	1.48
3.0	0.145	174.8	2.68	1.73
3.5	0.165	208.3	3.05	2.06
4.0	0.183	243.2	3.38	2.39
4.5	0.202	278.2	3.73	2.73
5.0	0.218	302.5	4.03	2.96
5.5	0.228	325.3	4.21	3.18
6.0	0.240	346.0	4.44	3.37
6.5	0.248	360.3	4.58	3.50
7.0	0.253	370.9	4.68	3.60
8.0	0.258	384.6	4.77	3.73
9.0	0.260	384.6	4.81	3.73
10.0	0.270	410.5	4.99	3.97
11.0	0.281	433.3	5.19	4.19

Initial:

Moisture(%) = 56.1
Density(pcf) = 58.5

Void Ratio =1.602
Saturation(%) = 85.4

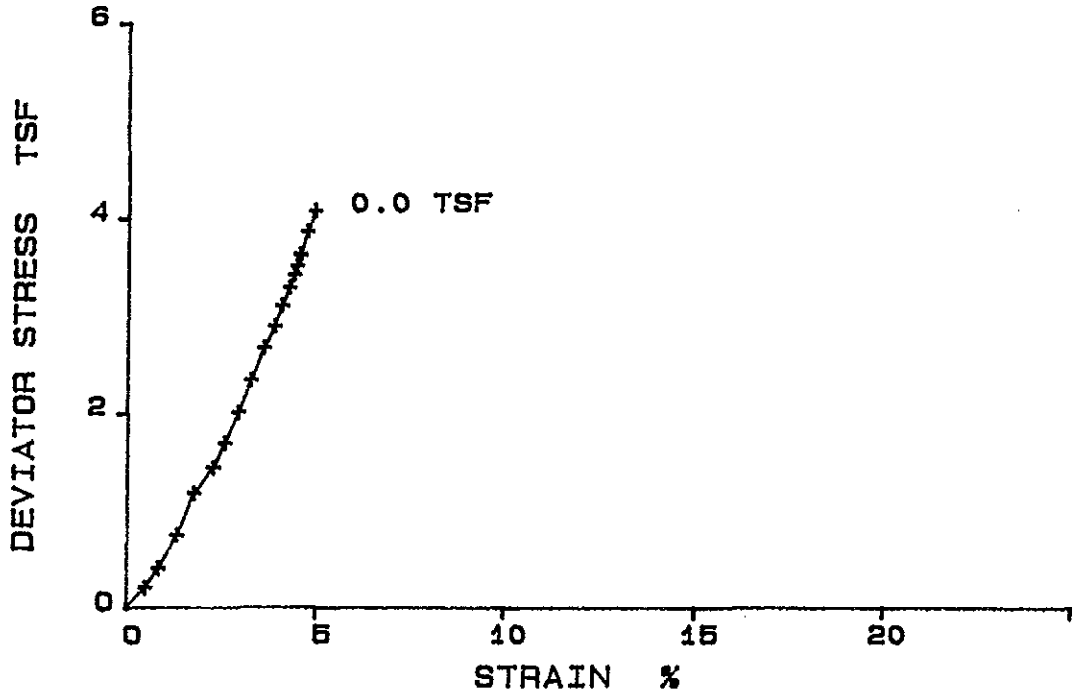
Minor Prin. Stress(tsf) =0.00

Major Prin. Stress(tsf) = 4.19

NOTE: Figures in parenthesis are based on the failure criteria of Maximum Effective Principal Stress Ratio.

SINGLETON LABORATORIES
UNCONFINED COMPRESSION (UC) TEST

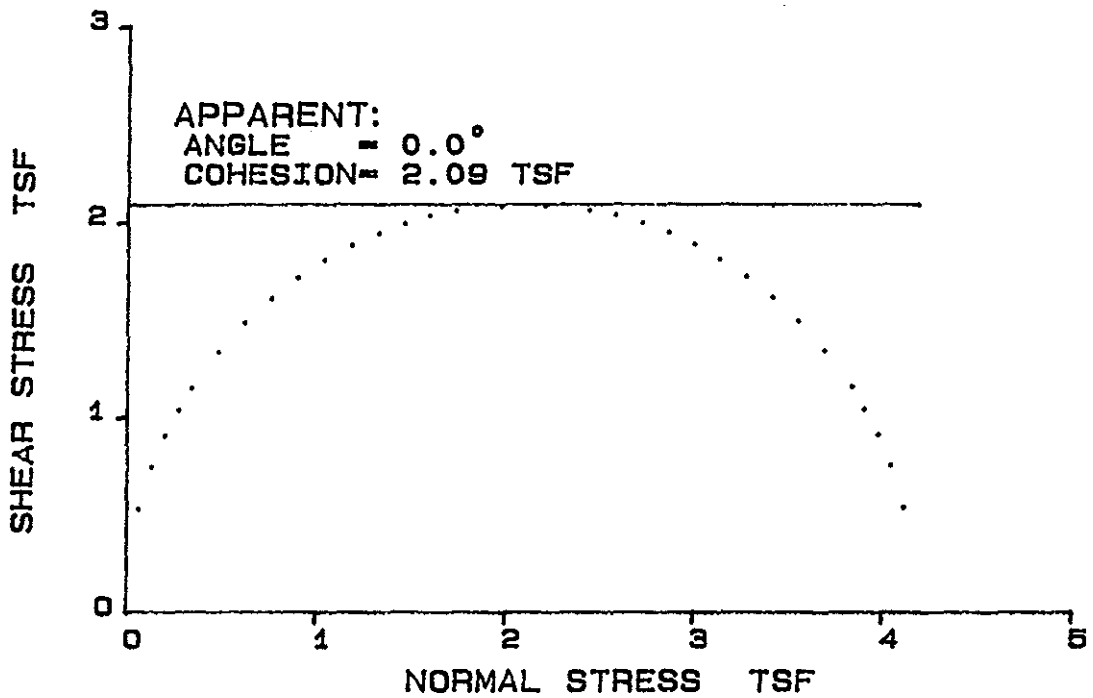
PROJECT:	SIOU	EL.	:
FEATURE:	CPCPDS03B	SAMPLE	: 75%
STATION:		PART	: 7 day
RANGE :		SOIL SYM:	
BORING :		DATE	: 08-07-96



REMARKS:

SINGLETON LABORATORIES
UNCONFINED COMPRESSION (UC) TEST

PROJECT:	SIOU	EL.	:
FEATURE:	CPCPDS03B	SAMPLE	: 75%
STATION:		PART	: 7 day
RANGE :		SOIL SYM:	
BORING :		DATE	: 08-07-96



Singleton Laboratories

UNCONFINED COMPRESSION (UC) TEST

Project: SIOU Engineering Support Study		File : 195
Feature: CPCPDS03B		Tested By : REG
Station:	El. :	Computed By: TRB
Range :	Sample: 100%	Checked By :
Boring :	Part : 3 day	Report Date: 08-08-96

Soil Symbol=	L.L.(%)=	P.I.(%) =
Sp. Gr. = 2.44	D10(mm)=	

Specimen Number	1	2	3	4
Initial:				
Moisture Content(%)	44.7	0.0	0.0	0.0
Dry Density(pcf)	66.3	0.0	0.0	0.0
Void Ratio	1.299	0.000	0.000	0.000
Saturation(%)	84.0	0.0	0.0	0.0
Before Shearing:				
Moisture(%) (after satur.)	--	--	--	--
Saturation(%)	--	--	--	--
Moisture(%) (after cons.)	--	--	--	--
Void Ratio (after cons.)	--	--	--	--
Final Moisture Content(%)	44.7	0.0	0.0	0.0
Minor Principal Stress (tsf)	--	--	--	--
Major Principal Stress (tsf)	--	--	--	--
Eff. Minor Prin Stress (tsf)	--	--	--	--
Eff. Major Prin Stress (tsf)	--	--	--	--
Time to Failure(min)	7	0	0	0
Rate of Strain(%/min)	0.31	0.00	0.00	0.00
Specimen Height(in.)	5.41	0.00	0.00	0.00
Specimen Dia (in.)	3.00	0.00	0.00	0.00

	Max Deviator Stress		Max Eff Stress Ratio
Apparent	--	--	
Effective	--	--	

NOTE: Figures in parenthesis are based on the failure criteria of Maximum Effective Principal Stress Ratio.

Remark:

Singleton Laboratories
UNCONFINED COMPRESSION (UC) TEST

Project: SIOU Engineering Support Study
Feature: CPCPDS03B
Station:
Range :
Boring :

El. :
Sample: 100%
Part : 3 day

File : 194
Tested By : REG
Computed By: TRB
Checked By : [illegible]
Report Date: 08-08-96

Moisture Content	Initial	Final
Wet Wt. and Tare(gm) =	962.6	962.6
Dry wt. and tare(gm) =	665.2	665.2
Wt. of tare(gm) =	0.0	0.0
Moisture(%) =	44.7	44.7

Test Conditions and Constants:

Proving Ring No. = 2223
Proving Ring Constant:
Slope Const. = 1
Intercept = 0
Confining Pres.(psi) = 0
Initial Pore Pre(psi) = 0

Tube No. = 0
Sample Volume (cc) = 626.688
Sample Height(in.) = 5.413
Specific Gravity = 2.44
Consolidation(in.) = 0
Initial P.R. Rdg = 0

Time (Min)	Deflection (ins.)	Pro.Ring Reading	Strain (%)	±1 - ±3 (tsf)
0.5	0.029	27.1	0.54	0.27
1.0	0.051	59.6	0.94	0.60
1.5	0.067	89.4	1.24	0.90
2.0	0.081	118.6	1.50	1.19
2.5	0.095	142.9	1.76	1.43
3.0	0.107	158.1	1.98	1.58
3.5	0.114	173.6	2.11	1.73
4.0	0.118	179.7	2.18	1.79
5.0	0.119	180.6	2.20	1.80
6.0	0.119	180.6	2.20	1.80
7.0	0.119	180.6	2.20	1.80

Initial:
Moisture(%) = 44.7
Density(pcf) = 66.3

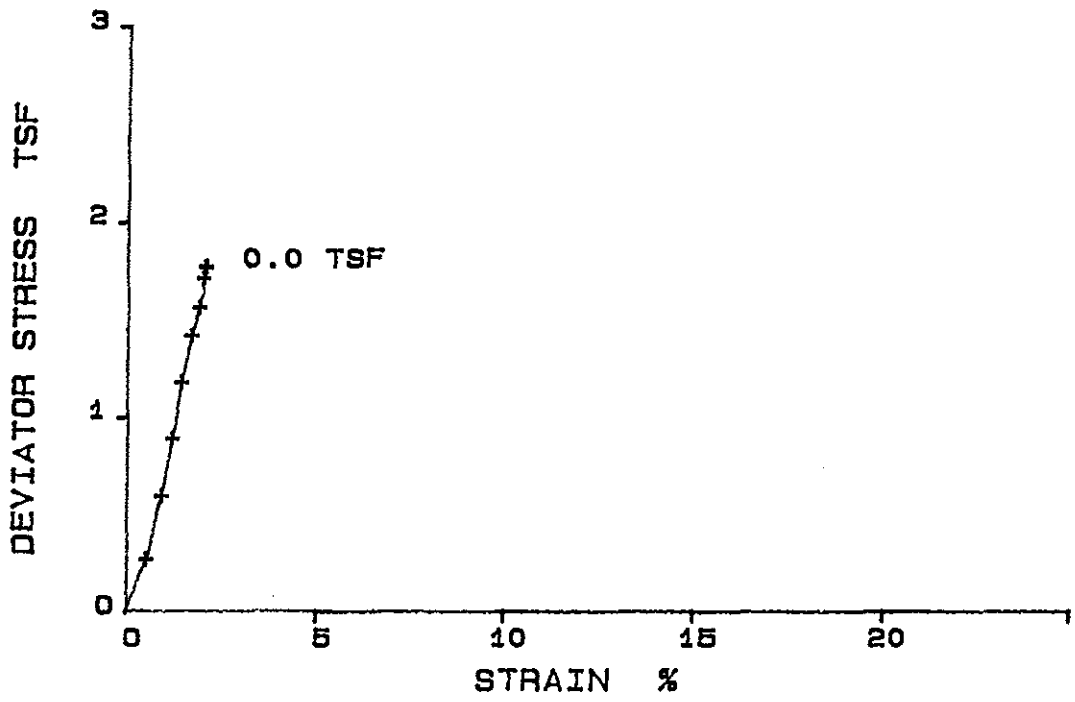
Void Ratio =1.299
Saturation(%) = 84.0

Minor Prin. Stress(tsf) =0.00
Major Prin. Stress(tsf) = 1.80

NOTE: Figures in parenthesis are based on the failure criteria of Maximum Effective Principal Stress Ratio.

SINGLETON LABORATORIES
UNCONFINED COMPRESSION (UC) TEST

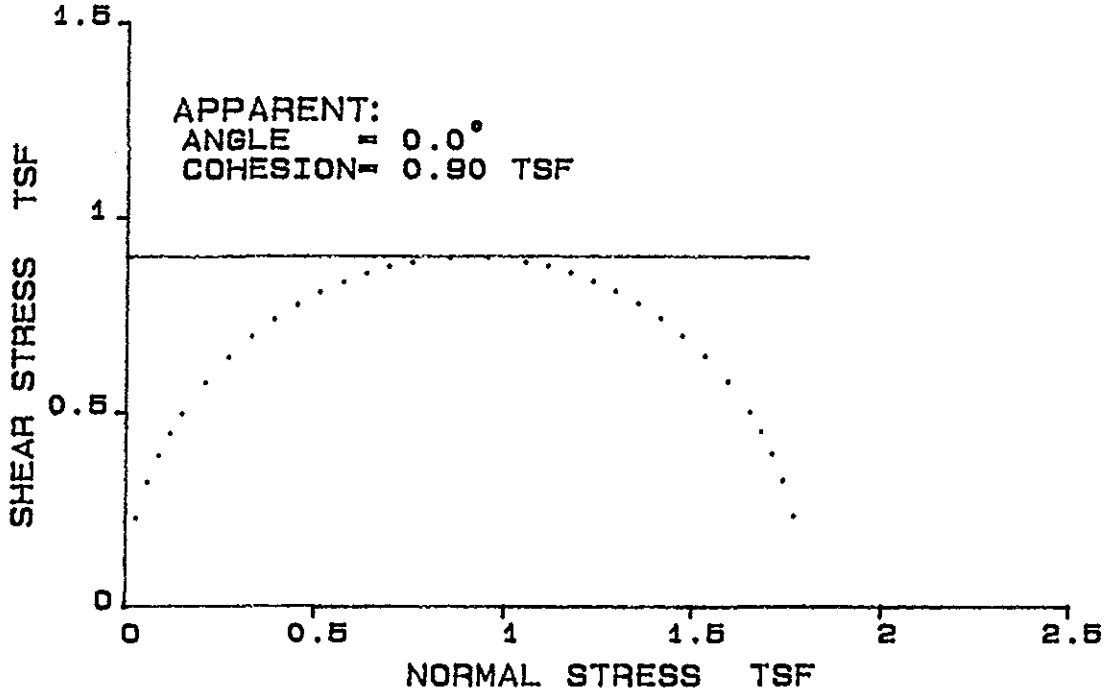
PROJECT:	SIOU	EL.	:
FEATURE:	CPCPDS03B	SAMPLE	: 100%
STATION:		PART	: 3 day
RANGE :		SOIL SYM:	
BORING :		DATE	: 08-08-96



REMARKS:

SINGLETON LABORATORIES
UNCONFINED COMPRESSION (UC) TEST

PROJECT:	SIOU	EL.	:
FEATURE:	CPCPDS03B	SAMPLE	: 100%
STATION:		PART	: 3 day
RANGE :		SOIL SYM:	
BORING :		DATE	: 08-08-96



Singleton Laboratories
UNCONFINED COMPRESSION (UC) TEST

Project: SIOU Engineering Support Study		File : 194
Feature: CPCPDS03B		Tested By : REG
Station:	El. :	Computed By: TRB
Range :	Sample: 100%	Checked By :
Boring :	Part : 3 day	Report Date: 08-08-96

Soil Symbol=	L.L.(%)=	P.I.(%) =
Sp. Gr. = 2.44	D10(mm)=	

Specimen Number	1	2	3	4
Initial:				
Moisture Content(%)	45.1	0.0	0.0	0.0
Dry Density(pcf)	66.7	0.0	0.0	0.0
Void Ratio	1.283	0.000	0.000	0.000
Saturation(%)	85.7	0.0	0.0	0.0
Before Shearing:				
Moisture(%) (after satur.)	--	--	--	--
Saturation(%)	--	--	--	--
Moisture(%) (after cons.)	--	--	--	--
Void Ratio (after cons.)	--	--	--	--
Final Moisture Content(%)	45.1	0.0	0.0	0.0
Minor Principal Stress (tsf)	--	--	--	--
Major Principal Stress (tsf)	--	--	--	--
Eff. Minor Prin Stress (tsf)	--	--	--	--
Eff. Major Prin Stress (tsf)	--	--	--	--
Time to Failure(min)	5	0	0	0
Rate of Strain(%/min)	0.57	0.00	0.00	0.00
Specimen Height(in.)	5.35	0.00	0.00	0.00
Specimen Dia (in.)	3.00	0.00	0.00	0.00

	Max Deviator Stress		Max Eff Stress Ratio
Apparent	--	--	
Effective	--	--	

NOTE: Figures in parenthesis are based on the failure criteria of Maximum Effective Principal Stress Ratio.

Remark:

Singleton Laboratories
UNCONFINED COMPRESSION (UC) TEST

Project: SIOU Engineering Support Study
Feature: CPCPDS03B
Station:
Range :
Boring :

El. :
Sample: 100%
Part : 3 day

File : 193
Tested By : REG
Computed By: TRB
Checked By :
Report Date: 08-08-96

Moisture Content	Initial	Final
Wet Wt. and Tare(gm)=	959.5	959.5
Dry wt. and tare(gm)=	661.3	661.3
Wt. of tare(gm) =	0.0	0.0
Moisture(%) =	45.1	45.1

Test Conditions and Constants:

Proving Ring No. = 2223
Proving Ring Constant:
Slope Const. = 1
Intercept = 0
Confining Pres.(psi) = 0
Initial Pore Pre(psi)= 0

Tube No. = 0
Sample Volume (cc) = 618.815
Sample Height(in.) = 5.345
Specific Gravity = 2.44
Consolidation(in.) = 0
Initial P.R. Rdg = 0

Time (Min)	Deflection (ins.)	Pro.Ring Reading	Strain (%)	±1 - ±3 (tsf)
0.5	0.024	28.3	0.45	0.29
1.0	0.054	55.6	1.01	0.56
1.5	0.078	90.0	1.46	0.90
2.0	0.096	118.0	1.80	1.18
2.5	0.113	141.1	2.11	1.41
3.0	0.125	155.4	2.34	1.55
3.5	0.135	170.3	2.53	1.69
4.0	0.138	173.3	2.58	1.72
4.5	0.138	174.2	2.58	1.73
5.0	0.139	173.9	2.60	1.73
6.0	0.139	173.9	2.60	1.73
7.0	0.139	173.9	2.60	1.73

Initial:
Moisture(%) = 45.1
Density(pcf)= 66.7

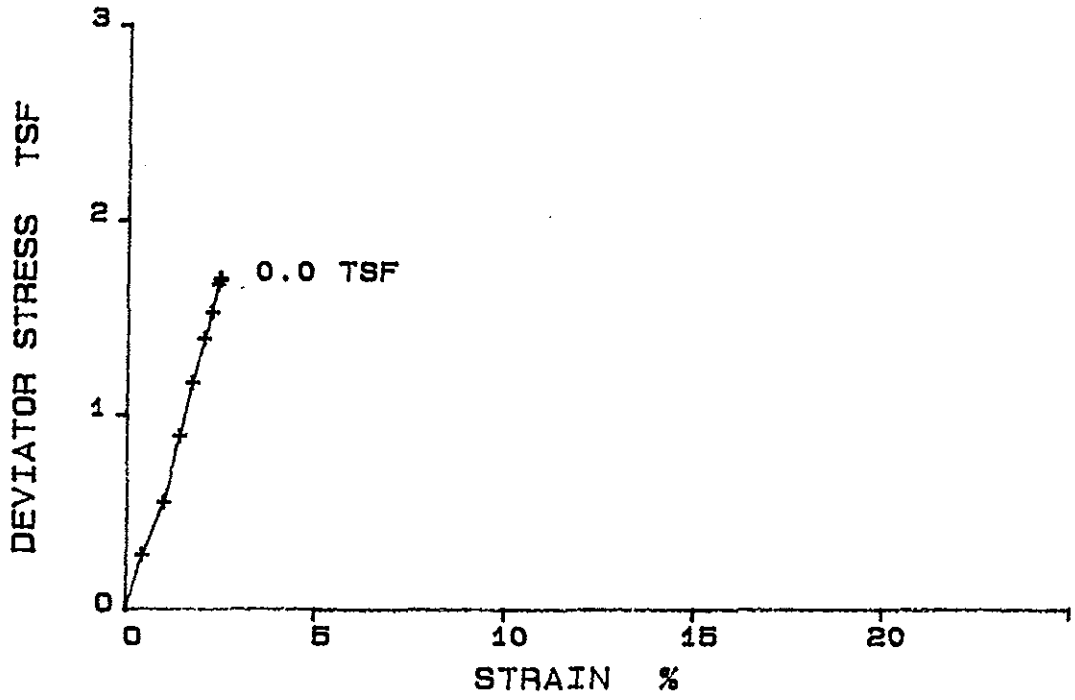
Void Ratio =1.283
Saturation(%)= 85.7

Minor Prin. Stress(tsf) =0.00
Major Prin. Stress(tsf) = 1.73

NOTE: Figures in parenthesis are based on the failure criteria of Maximum Effective Principal Stress Ratio.

SINGLETON LABORATORIES
UNCONFINED COMPRESSION (UC) TEST

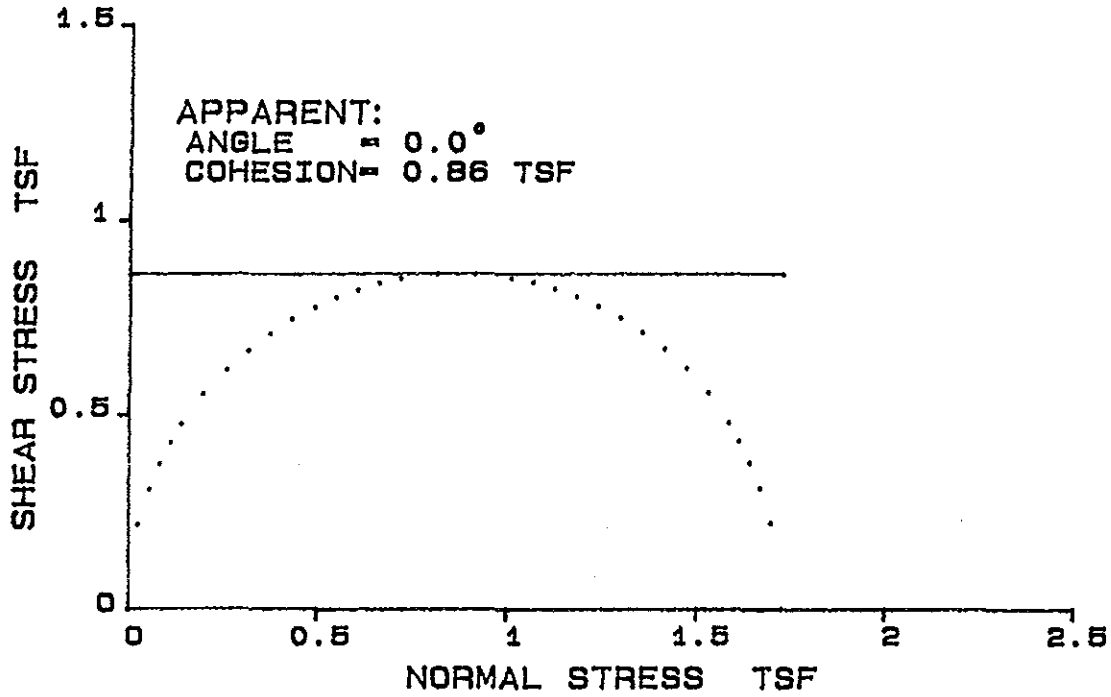
PROJECT:	SIOU	EL.	:
FEATURE:	CPCPDS03B	SAMPLE	: 100%
STATION:		PART	: 3 day
RANGE :		SOIL SYM:	
BORING :		DATE	: 08-08-96



REMARKS:

SINGLETON LABORATORIES
UNCONFINED COMPRESSION (UC) TEST

PROJECT:	SIOU	EL.	:
FEATURE:	CPCPDS03B	SAMPLE	: 100%
STATION:		PART	: 3 day
RANGE :		SOIL SYM:	
BORING :		DATE	: 08-08-96



Singleton Laboratories
UNCONFINED COMPRESSION (UC) TEST

Project: SIOU Engineering Support Study		File : 196
Feature: CPCPDS03B		Tested By : REG
Station:	El. :	Computed By: TRB
Range :	Sample: 100%	Checked By :
Boring :	Part : 7 day	Report Date: 08-08-96

Soil Symbol=	L.L.(%)=	P.I.(%) =
Sp. Gr. = 2.44	D10(mm)=	

Specimen Number	1	2	3	4
Initial:				
Moisture Content(%)	40.4	0.0	0.0	0.0
Dry Density(pcf)	68.8	0.0	0.0	0.0
Void Ratio	1.215	0.000	0.000	0.000
Saturation(%)	81.1	0.0	0.0	0.0
Before Shearing:				
Moisture(%) (after satur.)	--	--	--	--
Saturation(%)	--	--	--	--
Moisture(%) (after cons.)	--	--	--	--
Void Ratio (after cons.)	--	--	--	--
Final Moisture Content(%)	40.4	0.0	0.0	0.0
Minor Principal Stress (tsf)	--	--	--	--
Major Principal Stress (tsf)	--	--	--	--
Eff. Minor Prin Stress (tsf)	--	--	--	--
Eff. Major Prin Stress (tsf)	--	--	--	--
Time to Failure(min)	5	0	0	0
Rate of Strain(%/min)	0.85	0.00	0.00	0.00
Specimen Height(in.)	5.33	0.00	0.00	0.00
Specimen Dia (in.)	3.00	0.00	0.00	0.00

	Max Deviator Stress		Max Eff Stress Ratio
Apparent	--	--	
Effective	--	--	

NOTE: Figures in parenthesis are based on the failure criteria of Maximum Effective Principal Stress Ratio.

Remark:

Singleton Laboratories
UNCONFINED COMPRESSION (UC) TEST

Project: SIOU Engineering Support Study
Feature: CPCPDS03B
Station:
Range :
Boring :

El. :
Sample: 100%
Part : 7 day

File : 195
Tested By : REG
Computed By: TRB
Checked By :
Report Date: 08-08-96

Moisture Content	Initial	Final
Wet Wt. and Tare(gm) =	953.9	953.9
Dry wt. and tare(gm) =	679.4	679.4
Wt. of tare(gm) =	0.0	0.0
Moisture(%) =	40.4	40.4

Test Conditions and Constants:

Proving Ring No. = 2223
Proving Ring Constant:
Slope Const. = 1
Intercept = 0
Confining Pres.(psi) = 0
Initial Pore Pre(psi) = 0

Tube No. = 0
Sample Volume (cc) = 616.847
Sample Height(in.) = 5.328
Specific Gravity = 2.44
Consolidation(in.) = 0
Initial P.R. Rdg = 0

Time (Min)	Deflection (ins.)	Pro.Ring Reading	Strain (%)	±1 - ±3 (tsf)
0.5	0.030	54.7	0.56	0.55
1.0	0.065	114.0	1.22	1.15
1.5	0.093	156.6	1.75	1.57
2.0	0.123	199.1	2.31	1.98
2.5	0.150	252.4	2.82	2.50
3.0	0.185	331.4	3.47	3.26
3.5	0.200	377.0	3.75	3.70
4.0	0.217	415.0	4.07	4.06
4.5	0.225	425.7	4.22	4.16
5.0	0.227	433.3	4.26	4.23

Initial:
Moisture(%) = 40.4
Density(pcf) = 68.8

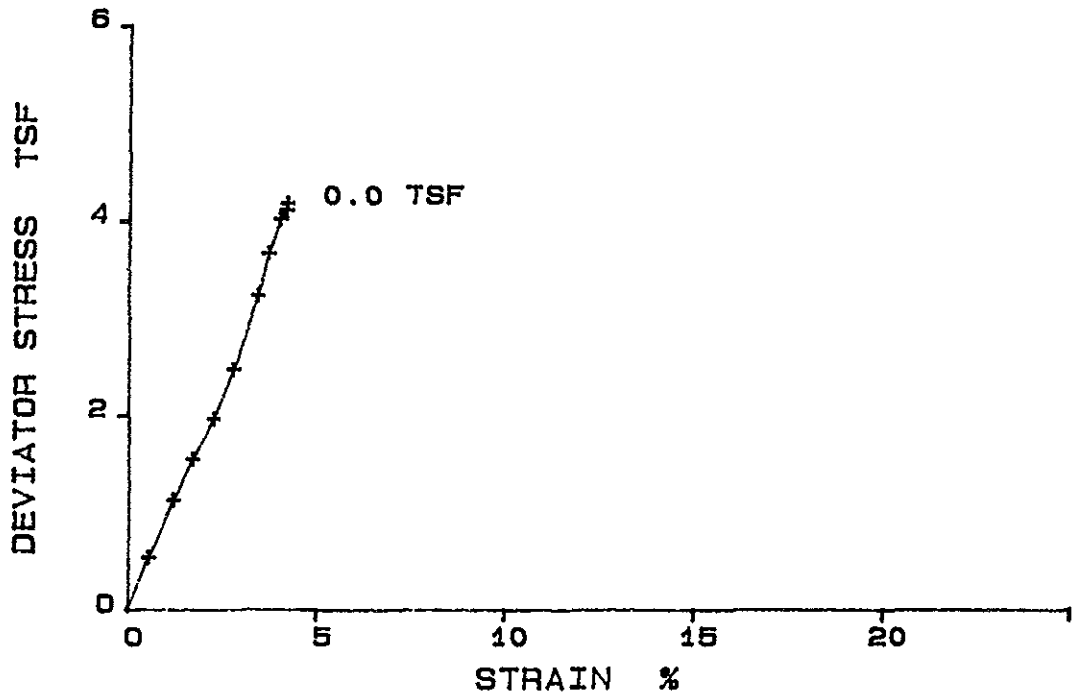
Void Ratio =1.215
Saturation(%) = 81.1

Minor Prin. Stress(tsf) =0.00
Major Prin. Stress(tsf) = 4.23

NOTE: Figures in parenthesis are based on the failure criteria of Maximum Effective Principal Stress Ratio.

SINGLETON LABORATORIES
UNCONFINED COMPRESSION (UC) TEST

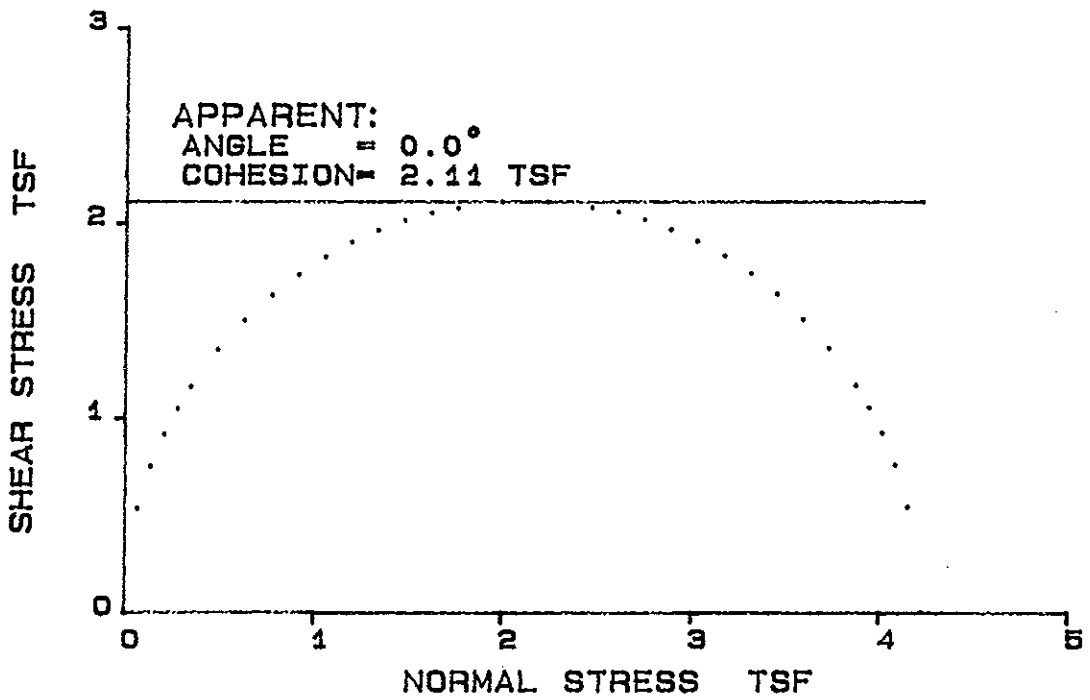
PROJECT:	SIOU	EL.	:
FEATURE:	CPCPDS03B	SAMPLE	: 100%
STATION:		PART	: 7 day
RANGE :		SOIL SYM:	
BORING :		DATE	: 08-08-96



REMARKS:

SINGLETON LABORATORIES
UNCONFINED COMPRESSION (UC) TEST

PROJECT:	SIOU	EL.	:
FEATURE:	CPCPDS03B	SAMPLE	: 100%
STATION:		PART	: 7 day
RANGE :		SOIL SYM:	
BORING :		DATE	: 08-08-96



Singleton Laboratories
UNCONFINED COMPRESSION (UC) TEST

Project: SIOU Engineering Support Study		File : 191
Feature: CPCPDS03B		Tested By : REG
Station:	El. :	Computed By: TRB
Range :	Sample: 100%	Checked By :
Boring :	Part : 7 day	Report Date: 08-07-96

Soil Symbol=	L.L.(%)=	P.I.(%) =
Sp. Gr. = 2.44	D10(mm)=	

Specimen Number	1	2	3	4
Initial:				
Moisture Content(%)	41.2	0.0	0.0	0.0
Dry Density(pcf)	68.9	0.0	0.0	0.0
Void Ratio	1.212	0.000	0.000	0.000
Saturation(%)	82.9	0.0	0.0	0.0
Before Shearing:				
Moisture(%) (after satur.)	--	--	--	--
Saturation(%)	--	--	--	--
Moisture(%) (after cons.)	--	--	--	--
Void Ratio (after cons.)	--	--	--	--
Final Moisture Content(%)	41.2	0.0	0.0	0.0
Minor Principal Stress (tsf)	--	--	--	--
Major Principal Stress (tsf)	--	--	--	--
Eff. Minor Prin Stress (tsf)	--	--	--	--
Eff. Major Prin Stress (tsf)	--	--	--	--
Time to Failure(min)	5	0	0	0
Rate of Strain(%/min)	0.87	0.00	0.00	0.00
Specimen Height(in.)	5.44	0.00	0.00	0.00
Specimen Dia (in.)	3.00	0.00	0.00	0.00

	Max Deviator Stress		Max Eff Stress Ratio
Apparent	--	--	
Effective	--	--	

NOTE: Figures in parenthesis are based on the failure criteria of Maximum Effective Principal Stress Ratio.

Remark:

Singleton Laboratories
UNCONFINED COMPRESSION (UC) TEST

Project: SIOU Engineering Support Study
Feature: CPCPDS03B
Station:
Range :
Boring :

El. :
Sample: 100%
Part : 7 day

File : 190
Tested By : REG
Computed By: TRB
Checked By :
Report Date: 08-07-96

Moisture Content	Trimming	Initial	Final
Wet Wt. and Tare(gm)=	0.0	980.8	980.8
Dry Wt. and Tare(gm)=	0.0	694.7	694.7
Wt. of Tare(gm) =	0.0	0.0	0.0
Moisture(%) =	% 1.701412E+38	41.2	41.2

Test Conditions and Constants:

Proving Ring No. = 2223
Proving Ring Constant:
Slope Const. = 1
Intercept = 0
Confining Pres.(psi) = 0
Initial Pore Pre(psi)= 0

Tube No. = 0
Sample Volume (cc) = 629.814
Sample Height(in.) = 5.44
Specific Gravity = 2.44
Consolidation(in.) = 0
Initial P.R. Rdg = 0

Time (Min)	Deflection (ins.)	Pro.Ring Reading	Strain (%)	±1 - ±3 (tsf)
0.5	0.050	91.2	0.92	0.92
1.0	0.085	164.2	1.56	1.65
1.5	0.125	237.2	2.30	2.36
2.0	0.155	298.0	2.85	2.95
2.5	0.175	349.7	3.22	3.45
3.0	0.194	395.3	3.57	3.88
3.5	0.208	431.7	3.82	4.23
4.0	0.211	437.8	3.88	4.29
4.5	0.212	440.9	3.90	4.32

Initial:

Moisture(%) = 41.2
Density(pcf)= 68.9

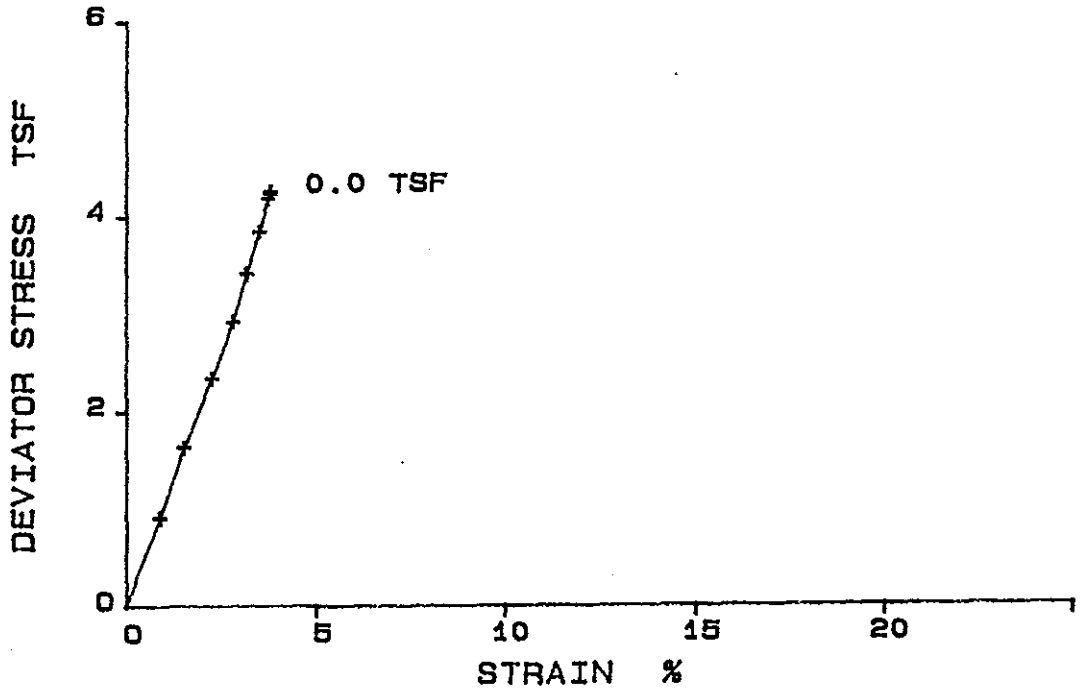
Void Ratio =1.212
Saturation(%)= 82.9

Minor Prin. Stress(tsf) =0.00 Major Prin. Stress(tsf) = 4.32

NOTE: Figures in parenthesis are based on the failure criteria of Maximum Effective Principal Stress Ratio.

SINGLETON LABORATORIES
UNCONFINED COMPRESSION (UC) TEST

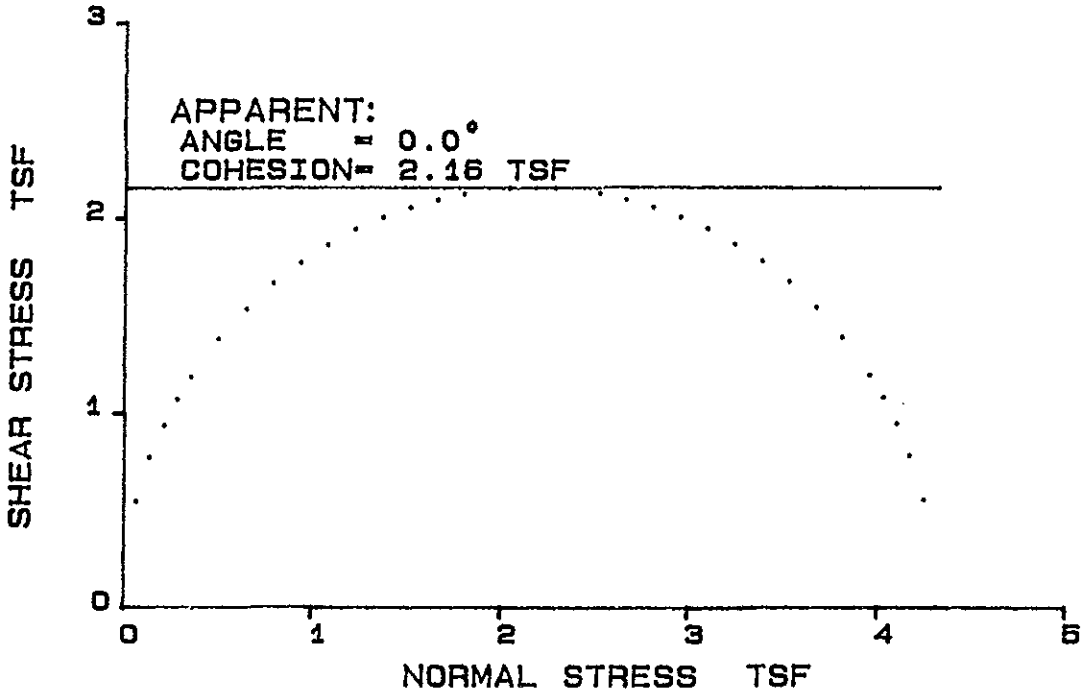
PROJECT: SIOU	EL. :
FEATURE: CPCPDS03B	SAMPLE : 100%
STATION:	PART : 7 day
RANGE :	SOIL SYM:
BORING :	DATE : 08-07-96



REMARKS:

SINGLETON LABORATORIES
UNCONFINED COMPRESSION (UC) TEST

PROJECT:	SIOU	EL.	:
FEATURE:	CPCPDS03B	SAMPLE	: 100%
STATION:		PART	: 7 day
RANGE :		SOIL SYM:	
BORING :		DATE	: 08-07-96



Appendix A

Equipment Usage Log

SINGLETON LABORATORIES

Equipment Usage Log

Report: 3101-96-033
Date : 08/26/96

Item	ID	Model No.	Accuracy
HYDROMETER, BULB	SO/HY-3	ASTM152H	+/-1G/LITER
SIEVE 20	2500	NO. 20	+/-0.0014IN
SIEVE 50	2091	NO.50	+/-0.00055IN
SIEVE 100	2161	NO.100	+/-0.0003 IN
SIEVE 200	2604	NO. 200	+/-0.0002IN
CONSOLIDATION RING	SO/CR-6	2.5IN DIA	+/-.001CM3
TRIMMING TUBE	SO/TR-500	2.5IN DIA	+/-.001CM3
EXTENSOMETER 0.4"	2281	4C204001	+/-0.0005 IN
CONSOLIDOMETER	SO/CO-6	C-220	+/-1% LOAD
EXTENSOMETER 1"	2267	LC-8	+/-0.001 IN
PROVING RING,500 LB	2223	NA	+/-0.002 IN
TRIMMING TUBE,HARVARD MOLD NO.2	SO/TT-9	1.3 IN DIA	+/-.001CM3
ZERO HEADSPACE EXTRACTOR	SO/ZHE-1	3.0IN DIA	NA

APPENDIX F

Constituent Results and Supporting Documentation

Analytical Services Organization @ K-25 Site
Oak Ridge, TN 37831
Sample Analyses Results

AnaLIS ID: 960723-010 Project: X104 CHAR Customer Sample ID: CPCPD-TCLP1

Customer: TELINDA MOORE
Date Sampled: 15-JUL-1996
Sampled By: TM/NW
Material Description: COMPOSITE SOIL/SEDIMENT
Program Manager: R SALLIE (# 19332)

Requisition Number:
Date Sample Received: 23-JUL-1996
Date Sample Completed: 2-AUG-1996
Date Sample Approved: 4-AUG-1996
[] : Result has been Corrected for Spike

Procedure No.	Analysis	Result	Q Qual	Units	Analyst	QA File Number	Date Completed
***** Inductively Coupled Plasma Laboratory *****							
EPA-6010 ACD-096010	Arsenic (TCLP)	< 0.25	d	mg/L	EC SCOTT	60726A	26-JUL-1996
EPA-6010 ACD-096010	Barium (TCLP)	1.5		mg/L	EC SCOTT	60726A	26-JUL-1996
EPA-6010 ACD-096010	Cadmium (TCLP)	< 0.015	d	mg/L	EC SCOTT	60726A	26-JUL-1996
EPA-6010 ACD-096010	Chromium (TCLP)	< 0.050	d	mg/L	EC SCOTT	60726A	26-JUL-1996
EPA-6010 ACD-096010	Lead (TCLP)	< 0.25	d	mg/L	EC SCOTT	60726A	26-JUL-1996
EPA-6010 ACD-096010	Nickel (TCLP)	0.29		mg/L	EC SCOTT	60726A	26-JUL-1996
EPA-6010 ACD-096010	Selenium (TCLP)	< 0.25	d	mg/L	EC SCOTT	60726A	26-JUL-1996
EPA-6010 ACD-096010	Silver (TCLP)	< 0.035	d	mg/L	EC SCOTT	60726A	26-JUL-1996

Q Qual:(d) Dilution required for accurate determination of all analytes; reporting limits raised accordingly.

***** Wet Instrumentation Laboratory *****							
EPA-1311	TCLP Metals Extraction	C			CA HUBBUCH	960724-TCLP	24-JUL-1996
***** Mercury Laboratory *****							
EPA-7470	Mercury (TCLP)	< 0.001		mg/L	DE HASTE	60725E	25-JUL-1996

Spike Recovery Data

Analysis	Unspike Result	Amount Spike	Spike Result	Units	Amount Recovered	Percent Recovered
***** Mercury Laboratory *****						
MERCURY (TCLP)	0.0	200.0	154.25	UG/L	154.25	77.1

***** Comments from the Wet Instrumentation Laboratory *****

TCLP extract total activity screen = 1710 dpm/ml 7-24-96 CA Hubbuch

***** Comments from the Mercury Laboratory *****

ercury Lab spike recovery was 81.3%. Spike duplicate recovery was 80.1%.
pike blank recovery was 80.3%. Spike blank duplicate recovery was 79.6%.

Analytical Services Organization @ K-25 Site
Oak Ridge, TN 37831
Sample Analyses Results

AnaLIS ID: 960723-010 Project: X104 CHAR Customer Sample ID: CPCPD-TCLP1

Laboratory:	Gas / Liquid Chromatography Laboratory	Customer:	TELINDA MOORE
File ID:	GC 3742	Sample Matrix:	SOIL
Instrument ID:		Requisition Number:	
Authorized By:	DS ZINGG	Date Sample Received:	23-JUL-1996

HERBICIDES (TCLP)

Date Extracted/Prepared:	26-JUL-1996	Date Analyzed:	1-AUG-1996
Regulatory Procedure Number:	EPA-8150	ACD Procedure Number:	ACD-1500
Percent Moisture:		Dilution Factor:	1.0
Percent Moisture (decanted):		Analyst:	EK JUSTICE
Associated Blank:		QA File Number:	GC 3742

[] : Result has been Corrected for Spike

CAS	Analysis	ug/L	Q Qual	CAS	Analysis	ug/L	Q Qual
94-75-7	2,4-D	20	U				
93-72-1	2,4,5-TP (Silvex)	20	U				

Q Qual: (U) Compound was analyzed for but not detected.
(B) Analyte found in blank as well as sample.
(J) Indicates an estimated value.
(N) Confirmed by second column, quantative results differed by >50% between columns.
(E) Concentrations exceed calibration range of the GC instrument .

Analytical Services Organization @ K-25 Site
Oak Ridge, TN 37831
Sample Analyses Results

AnaLIS ID: 960723-010 Project: X104 CHAR Customer Sample ID: CPCPD-TCLP1

Laboratory:	Gas / Liquid Chromatography Laboratory	Customer:	TELINDA MOORE
File ID:	GC 3734	Sample Matrix:	SOIL
Instrument ID:		Requisition Number:	
Authorized By:	DS ZINGG	Date Sample Received:	23-JUL-1996

Pesticides (TCLP)

Date Extracted/Prepared:	26-JUL-1996	Date Analyzed:	30-JUL-1996
Regulatory Procedure Number:	EPA-8080	ACD Procedure Number:	ACD-1540
Percent Moisture:		Dilution Factor:	1.0
Percent Moisture (decanted):		Analyst:	EK JUSTICE
Associated Blank:		QA File Number:	GC 3734

[] : Result has been Corrected for Spike

CAS	Analysis	ug/L	Q Qual	CAS	Analysis	ug/L	Q Qual
72-20-8	Endrin	0.80	U				
58-89-9	gamma-BHC(Lindane)	0.80	U				
72-43-5	Methoxychlor	0.80	U				
8001-35-2	Toxaphene	13	U				
57-74-9	Technical Chlordane	13	U				
76-44-8	Heptachlor	0.80	U				
1024-57-3	Heptachlor Epoxide	0.80	U				

Q Qual: (U) Compound was analyzed for but not detected.
(B) Analyte found in blank as well as sample.
(J) Indicates an estimated value.
(N) Confirmed by second column, quantative results differed by >50% between columns.
(E) Concentrations exceed calibration range of the GC instrument .

Analytical Services Organization @ K-25 Site
Oak Ridge, TN 37831
Sample Analyses Results

AnaLIS ID: 960723-010 Project: X104 CHAR Customer Sample ID: CPCPD-TCLP1

PESTICIDES (TCLP) ORGANICS ANALYSIS DATA SHEETS
SURROGATE SPIKE RECOVERY

AnaLIS ID: 960723-010
Laboratory: Gas / Liquid Chromatography Laboratory
Sample Matrix: SOIL
Level: (low/med): LOW
Dilution Factor: 1.0

Customer Sample ID: CPCPD-TCLP1
Customer: TELINDA MOORE
File ID: GC 3734
Date Received: 23-JUL-1996
Date Analyzed: 30-JUL-1996

Surrogate Compound	SPIKE ADDED (ug/L)	RESULT (ug/L)	% REC	#	QC LIMITS % REC
Decachlorobiphenyl	4.0	3.4	85.0		60 - 150

Column to be used to flag recovery values with an asterisk
* Values outside of QC limits

Spike Recovery: 0 out of 1 outside limits

COMMENTS:

Analytical Services Organization @ K-25 Site
Oak Ridge, TN 37831
Sample Analyses Results

AnaLIS ID: 960723-011 Project: X104 CHAR Customer Sample ID: CPCPD-TCLP2

Customer:	TELINDA MOORE	Requisition Number:	
Date Sampled:	15-JUL-1996	Date Sample Received:	23-JUL-1996
Sampled By:	TM/NW	Date Sample Completed:	2-AUG-1996
Material Description:	COMPOSITE SOIL/SEDIMENT	Date Sample Approved:	4-AUG-1996
Program Manager:	R SALLIE (# 19332)	[] : Result has been Corrected for Spike	

Procedure No.	Analysis	Result	Q Qual	Units	Analyst	QA File Number	Date Completed
***** Inductively Coupled Plasma Laboratory *****							
EPA-6010 ACD-096010	Arsenic (TCLP)	< 0.25	d	mg/L	EC SCOTT	60726A	26-JUL-1996
EPA-6010 ACD-096010	Barium (TCLP)	3.9		mg/L	EC SCOTT	60726A	26-JUL-1996
EPA-6010 ACD-096010	Cadmium (TCLP)	< 0.015	d	mg/L	EC SCOTT	60726A	26-JUL-1996
EPA-6010 ACD-096010	Chromium (TCLP)	< 0.050	d	mg/L	EC SCOTT	60726A	26-JUL-1996
EPA-6010 ACD-096010	Lead (TCLP)	< 0.25	d	mg/L	EC SCOTT	60726A	26-JUL-1996
EPA-6010 ACD-096010	Nickel (TCLP)	0.20		mg/L	EC SCOTT	60726A	26-JUL-1996
EPA-6010 ACD-096010	Selenium (TCLP)	< 0.25	d	mg/L	EC SCOTT	60726A	26-JUL-1996
EPA-6010 ACD-096010	Silver (TCLP)	< 0.035	d	mg/L	EC SCOTT	60726A	26-JUL-1996

Q Qual:(d) Dilution required for accurate determination of all analytes; reporting limits raised accordingly.

***** Wet Instrumentation Laboratory *****							
EPA-1311	TCLP Metals Extraction	C			CA HUBBUCH	960724-TCLP	24-JUL-1996
***** Mercury Laboratory *****							
EPA-7470	Mercury (TCLP)	< 0.001		mg/L	DE HASTE	60725E	25-JUL-1996

Spike Recovery Data

Analysis	Unspike Result	Amount Spike	Spike Result	Units	Amount Recovered	Percent Recovered
***** Inductively Coupled Plasma Laboratory *****						
ARSENIC (TCLP)	-0.0174	5.00	5.47	mg/L	5.49	109.7
BARIUM (TCLP)	3.87	5.00	11.1	mg/L	7.2	144.6
CADMIUM (TCLP)	-0.00610	5.00	4.31	mg/L	4.32	86.3
CHROMIUM (TCLP)	-0.0482	5.00	4.96	mg/L	5.01	100.2
LEAD (TCLP)	0.000500	5.00	4.60	mg/L	4.60	92.0
NICKEL (TCLP)	0.204	5.00	5.58	mg/L	5.38	107.5
SELENIUM (TCLP)	-0.0413	5.00	4.85	mg/L	4.89	97.8
SILVER (TCLP)	0.0114	5.00	4.36	mg/L	4.35	87.0

***** Comments from the Wet Instrumentation Laboratory *****

Analytical Services Organization @ K-25 Site
Oak Ridge, TN 37831
Sample Analyses Results

AnaLIS ID: 960723-011 Project: X104 CHAR Customer Sample ID: CPCPD-TCLP2

TCLP extract total activity = 1420 dpm/ml 7-24-96 CA Hubbuch

Analytical Services Organization @ K-25 Site
Oak Ridge, TN 37831
Sample Analyses Results

AnaLIS ID: 960723-011 Project: X104 CHAR Customer Sample ID: CPCPD-TCLP2

Laboratory:	Gas / Liquid Chromatography Laboratory	Customer:	TELINDA MOORE
File ID:	GC 3742	Sample Matrix:	SOIL
Instrument ID:		Requisition Number:	
Authorized By:	DS ZINGG	Date Sample Received:	23-JUL-1996

HERBICIDES (TCLP)

Date Extracted/Prepared:	26-JUL-1996	Date Analyzed:	2-AUG-1996
Regulatory Procedure Number:	EPA-8150	ACD Procedure Number:	ACD-1500
Percent Moisture:		Dilution Factor:	1.0
Percent Moisture (decanted):		Analyst:	EK JUSTICE
Associated Blank:		QA File Number:	GC 3742

[] : Result has been Corrected for Spike

CAS	Analysis	ug/L	Q Qual	CAS	Analysis	ug/L	Q Qual
94-75-7	2,4-D	20	U				
93-72-1	2,4,5-TP (Silvex)	20	U				

Q Qual: (U) Compound was analyzed for but not detected.
(B) Analyte found in blank as well as sample.
(J) Indicates an estimated value.
(N) Confirmed by second column, quantative results differed by >50% between columns.
(E) Concentrations exceed calibration range of the GC instrument .

Analytical Services Organization @ K-25 Site
Oak Ridge, TN 37831
Sample Analyses Results

AnaLIS ID: 960723-011 Project: X104 CHAR Customer Sample ID: CPCPD-TCLP2

Laboratory:	Gas / Liquid Chromatography Laboratory	Customer:	TELINDA MOORE
File ID:	GC 3734	Sample Matrix:	SOIL
Instrument ID:		Requisition Number:	
Authorized By:	DS ZINGG	Date Sample Received:	23-JUL-1996

Pesticides (TCLP)

Date Extracted/Prepared:	26-JUL-1996	Date Analyzed:	30-JUL-1996
Regulatory Procedure Number:	EPA-8080	ACD Procedure Number:	ACD-1540
Percent Moisture:		Dilution Factor:	1.0
Percent Moisture (decanted):		Analyst:	EK JUSTICE
Associated Blank:		QA File Number:	GC 3734

[] : Result has been Corrected for Spike

CAS	Analysis	ug/L	Q Qual	CAS	Analysis	ug/L	Q Qual
72-20-8	Endrin	0.80	U				
58-89-9	gamma-BHC(Lindane)	0.80	U				
72-43-5	Methoxychlor	0.80	U				
8001-35-2	Toxaphene	13	U				
57-74-9	Technical Chlordane	13	U				
76-44-8	Heptachlor	0.80	U				
1024-57-3	Heptachlor Epoxide	0.80	U				

Q Qual: (U) Compound was analyzed for but not detected.
(B) Analyte found in blank as well as sample.
(J) Indicates an estimated value.
(N) Confirmed by second column, quantative results differed by >50% between columns.
(E) Concentrations exceed calibration range of the GC instrument .

Analytical Services Organization @ K-25 Site
Oak Ridge, TN 37831
Sample Analyses Results

AnaLIS ID: 960723-011 Project: X104 CHAR Customer Sample ID: CPCPD-TCLP2

PESTICIDES (TCLP) ORGANICS ANALYSIS DATA SHEETS
SURROGATE SPIKE RECOVERY

AnaLIS ID: 960723-011
Laboratory: Gas / Liquid Chromatography Laboratory
Sample Matrix: SOIL
Level: (low/med): LOW
Dilution Factor: 1.0

Customer Sample ID: CPCPD-TCLP2
Customer: TELINDA MOORE
File ID: GC 3734
Date Received: 23-JUL-1996
Date Analyzed: 30-JUL-1996

Surrogate Compound	SPIKE ADDED (ug/L)	RESULT (ug/L)	% REC	#	QC LIMITS % REC
Decachlorobiphenyl	4.0	3.5	87.5		60 - 150

Column to be used to flag recovery values with an asterisk
* Values outside of QC limits

Spike Recovery: 0 out of 1 outside limits

COMMENTS:

Analytical Services Organization @ K-25 Site
Oak Ridge, TN 37831
Sample Analyses Results

AnaLIS ID: 960723-012 Project: X104 CHAR Customer Sample ID: CPCPD-PCB1

Customer:	TELINDA MOORE	Requisition Number:	
Date Sampled:	15-JUL-1996	Date Sample Received:	23-JUL-1996
Sampled By:	TM/NW	Date Sample Completed:	29-JUL-1996
Material Description:	COMPOSITE SOIL/SEDIMENT	Date Sample Approved:	29-JUL-1996
Program Manager:	R SALLIE (# 19332)	[] : Result has been Corrected for Spike	

Procedure No.	Analysis	Result	Q Qual	Units	Analyst	QA File Number	Date Completed

Analytical Services Organization @ K-25 Site
Oak Ridge, TN 37831
Sample Analyses Results

AnaLIS ID: 960723-012 Project: X104 CHAR Customer Sample ID: CPCPD-PCB1

Laboratory:	Gas / Liquid Chromatography Laboratory	Customer:	TELINDA MOORE
File ID:		Sample Matrix:	SOIL
Instrument ID:		Requisition Number:	
Authorized By:	JS MCCALL	Date Sample Received:	23-JUL-1996

PCB (TCL) SOIL

Date Extracted/Prepared:	24-JUL-1996	Date Analyzed:	28-JUL-1996
Regulatory Procedure Number:	EPA-8080	ACD Procedure Number:	ACD-1520
Percent Moisture:	79.5	Dilution Factor:	10
Percent Moisture (decanted):		Analyst:	LC FELLERS
Associated Blank:		QA File Number:	GC 3729

[] : Result has been Corrected for Spike

CAS	Analysis	ug/L	Q Qual	CAS	Analysis	ug/L	Q Qual
12674-11-2	Aroclor-1016	2400	U				
11104-28-2	Aroclor-1221	2400	U				
11141-16-5	Aroclor-1232	2400	U				
53469-21-9	Aroclor-1242	2400	U				
12672-29-6	Aroclor-1248	2400	U				
11097-69-1	Aroclor-1254	29000					
11096-82-5	Aroclor-1260	2400	U				

Q Qual: (U) Compound was analyzed for but not detected.
(B) Analyte found in blank as well as sample.
(J) Indicates an estimated value.
(N) Confirmed by second column, quantative results differed by >50% between columns.
(E) Concentrations exceed calibration range of the GC instrument .

Analytical Services Organization @ K-25 Site
Oak Ridge, TN 37831
Sample Analyses Results

AnaLIS ID: 960723-012 Project: X104 CHAR Customer Sample ID: CPCPD-PCB1

PCB (TCL) SOIL ORGANICS ANALYSIS DATA SHEETS
SURROGATE SPIKE RECOVERY

AnaLIS ID: 960723-012
Laboratory: Gas / Liquid Chromatography Laboratory
Sample Matrix: SOIL
Level: (low/med): LOW
Dilution Factor: 10

Customer Sample ID: CPCPD-PCB1
Customer: TELINDA MOORE
File ID:
Date Received: 23-JUL-1996
Date Analyzed: 28-JUL-1996

Surrogate Compound	SPIKE ADDED (ug/L)	RESULT (ug/L)	% REC	#	QC LIMITS % REC
Decachlorobiphenyl	97	85	87.6		60 - 150

Column to be used to flag recovery values with an asterisk
* Values outside of QC limits

Spike Recovery: 0 out of 1 outside limits

COMMENTS:

Analytical Services Organization @ K-25 Site
Oak Ridge, TN 37831
Sample Analyses Results

AnaLIS ID: 960723-013 Project: X104 CHAR Customer Sample ID: CPCPD-PCB2

Customer:	TELINDA MOORE	Requisition Number:	
Date Sampled:	15-JUL-1996	Date Sample Received:	23-JUL-1996
Sampled By:	TM/NW	Date Sample Completed:	29-JUL-1996
Material Description:	COMPOSITE SOIL/SEDIMENT	Date Sample Approved:	29-JUL-1996
Program Manager:	R SALLIE (# 19332)	[] : Result has been Corrected for Spike	

Procedure No.	Analysis	Result	Q Qual	Units	Analyst	QA File Number	Date Completed

Analytical Services Organization @ K-25 Site
Oak Ridge, TN 37831
Sample Analyses Results

AnaLIS ID: 960723-013 Project: X104 CHAR Customer Sample ID: CPCPD-PCB2

Laboratory:	Gas / Liquid Chromatography Laboratory	Customer:	TELINDA MOORE
File ID:		Sample Matrix:	SOIL
Instrument ID:		Requisition Number:	
Authorized By:	JS MCCALL	Date Sample Received:	23-JUL-1996

PCB (TCL) SOIL

Date Extracted/Prepared:	24-JUL-1996	Date Analyzed:	28-JUL-1996
Regulatory Procedure Number:	EPA-8080	ACD Procedure Number:	ACD-1520
Percent Moisture:	79.6	Dilution Factor:	10
Percent Moisture (decanted):		Analyst:	LC FELLERS
Associated Blank:		QA File Number:	GC 3729

[] : Result has been Corrected for Spike

CAS	Analysis	ug/L	Q Qual	CAS	Analysis	ug/L	Q Qual
12674-11-2	Aroclor-1016	2500	U				
11104-28-2	Aroclor-1221	2500	U				
11141-16-5	Aroclor-1232	2500	U				
53469-21-9	Aroclor-1242	2500	U				
12672-29-6	Aroclor-1248	2500	U				
11097-69-1	Aroclor-1254	35000					
11096-82-5	Aroclor-1260	2500	U				

Q Qual: (U) Compound was analyzed for but not detected.
(B) Analyte found in blank as well as sample.
(J) Indicates an estimated value.
(N) Confirmed by second column, quantative results differed by >50% between columns.
(E) Concentrations exceed calibration range of the GC instrument .

Analytical Services Organization @ K-25 Site
Oak Ridge, TN 37831
Sample Analyses Results

AnaLIS ID: 960723-013 Project: X104 CHAR Customer Sample ID: CPCPD-PCB2

PCB (TCL) SOIL ORGANICS ANALYSIS DATA SHEETS
SURROGATE SPIKE RECOVERY

AnaLIS ID: 960723-013
Laboratory: Gas / Liquid Chromatography Laboratory
Sample Matrix: SOIL
Level: (low/med): LOW
Dilution Factor: 10

Customer Sample ID: CPCPD-PCB2
Customer: TELINDA MOORE
File ID:
Date Received: 23-JUL-1996
Date Analyzed: 28-JUL-1996

Surrogate Compound	SPIKE ADDED (ug/L)	RESULT (ug/L)	% REC	#	QC LIMITS % REC
Decachlorobiphenyl	98	102	104.1		60 - 150

Column to be used to flag recovery values with an asterisk
* Values outside of QC limits

Spike Recovery: 0 out of 1 outside limits

COMMENTS:

OFFICIAL REPORT

08/16/96 16:34:57 Y-12 ANALYTICAL SERVICES ORGANIZATION

SUBMITTER	ADDRESS	CUSTOMER ID	REQ NO	SAMPLE NO	MTC	STATUS
TAYLOR, C. A.	BLDG 7078-D, MS 6402	040CPCPDS03		E962080039	E499	APPROVED

DATE SAMPLED: 07/23/96 09:00:00 DATE NEEDED: 08/12/96 LOCATION: CHARGE #: PX332P03
DATE RECEIVED: 07/26/96 DATE COMPLETED: 08/16/96 PROJECT CODE: CASE: SIOU
SAMPLER: SAMPLE DESCRIPTION: 040CPCPDS03 FINAL APPROVAL:

COMMENTS: 040CPCPDS03, SAMPLES ARE RADIOACTIVE-BE CAREFUL, FOR ICP-TCL, TCLHG, TCLSE, HERB

TEST: ICP_TCL ICP Analysis of TCLP Metals REPLICATE: 1 STATUS: CANCELLED
PREP MTH: PROC MTH: PHASE: TIME ANALYZED: APPROVER:
THIS TEST WAS CANCELLED BY D3A

TEST: PCB_UG PCB IN SOLID WASTE, PREP SW846 3540 REPLICATE: 1 STATUS: APPROVED
PREP MTH: PROC MTH: SW846 8080 PHASE: TIME ANALYZED: 08/09/96 07:08:00 APPROVER: E010186
COMMENTS: SAMPLE WAS REPORTED ON AS RECEIVED BASIS ONLY, INSUFFICIENT AMOUNT DID NOT ALLOW DRY BASIS REPORT.

CAS NUMBER	DETERMINATION	DT	RESULT	CONFIDENCE	UNIT
12674112	PCB1016		<2		ug/g
11104282	PCB1221		<2		ug/g
11141165	PCB1232		<2		ug/g
53469219	PCB1242		<2		ug/g
12672296	PCB1248		<2		ug/g
11097691	PCB1254		PRESENT		ug/g
11096825	PCB1260		<2		ug/g
LIMS001	Total PCB as received		4.6		ug/g
ELIMS002	Total PCB on the dry basis		NA		ug/g

TEST: TCLHER Gas Chromatography, Herbicides by TCLP REPLICATE: 1 STATUS: APPROVED
PREP MTH: PROC MTH: SW846 8150 PHASE: TIME ANALYZED: 08/15/96 23:50:00 APPROVER: E009834
COMMENTS: Herbicide Recoveries

Analyte	Spike	Result	% Recovery
2,4-D	7.5	6.1	81
Silvex	7.6	4.7	62

CAS NUMBER	DETERMINATION	DT	RESULT	CONFIDENCE	UNIT
93721	Silvex		0.0040 U		mg/L
94757	2,4-D		0.0040 U		mg/L
93765	2,4,5T		0.0040 U		mg/L

OFFICIAL REPORT

SAMPLE E962080039 | Y-12 ANALYTICAL SERVICES ORGANIZATION | PAGE 2 OF 2

TEST: TCLHG95 TCLP Mercury (Hg) by Cold Vapor AA EPA 7470 REPLICATE: 1 STATUS: CANCELLED
PREP MTH: PROC MTH: SW846 7470 PHASE: TIME ANALYZED: APPROVER:
THIS TEST WAS CANCELLED BY D3A

TEST: TCLPES Gas Chromatography, Pesticides by TCLP REPLICATE: 1 STATUS: APPROVED
PREP MTH: PROC MTH: SW846 8080 PHASE: TIME ANALYZED: 08/08/96 02:53:00 APPROVER: E022164

CAS NUMBER	DETERMINATION	DT	RESULT	CONFIDENCE	UNIT
57749	Chlordane		<0.013		mg/L
72208	Endrin		<0.0008		mg/L
58899	Lindane		<0.0008		mg/L
76448	Heptachlor		<0.0008		mg/L
1024573	Heptachlor epoxide		<0.0008		mg/L
72435	Methoxychlor		<0.0008		mg/L
8001352	Toxaphene		<0.013		mg/L

TEST: TCLSE95 TCLP Selinium by Graphite Furnace AA SW846 7740 REPLICATE: 1 STATUS: CANCELLED
PREP MTH: PROC MTH: SW846 7740 PHASE: TIME ANALYZED: APPROVER:
THIS TEST WAS CANCELLED BY D3A

TEST: TCL_HG TCLP Mercury (Hg) by Cold Vapor AA SW846 7470 REPLICATE: 1 STATUS: CANCELLED
PREP MTH: PROC MTH: SW846 7470 PHASE: TIME ANALYZED: APPROVER:
THIS TEST WAS CANCELLED BY D3A

TEST: TCL_SE TCLP Selenium by Graphite Furnace AA SW846 7740 REPLICATE: 1 STATUS: CANCELLED
PREP MTH: PROC MTH: SW846 7740 PHASE: TIME ANALYZED: APPROVER:
THIS TEST WAS CANCELLED BY D3A

*** LAST PAGE ***

Analytical Services Organization @ K-25 Site
Oak Ridge, TN 37831
Sample Analyses Results

AnaLIS ID: 960802-144 Project: SIOU WAG1 Customer Sample ID: 040CPCPDS03

Customer:	CHRIS TAYLOR	Requisition Number:	
Date Sampled:	23-JUL-1996	Date Sample Received:	1-AUG-1996
Sampled By:	TM	Date Sample Completed:	6-AUG-1996
Material Description:	SEDIMENTS IN CONCRETE/TCLP EXTRA	Date Sample Approved:	7-AUG-1996
Program Manager:	DD ALTOM (# 31265)	{} : Result has been Corrected for Spike	

Procedure No.	Analysis	Result	Q Qual	Units	Analyst	QA File Number	Date Completed
***** Inductively Coupled Plasma Laboratory *****							
EPA-6010 ACD-096010	Arsenic (TCLP)	< 0.25	P d	mg/L	EC SCOTT	60805X	5-AUG-1996
EPA-6010 ACD-096010	Barium (TCLP)	3.4	P	mg/L	EC SCOTT	60805X	5-AUG-1996
EPA-6010 ACD-096010	Cadmium (TCLP)	< 0.015	P d	mg/L	EC SCOTT	60805X	5-AUG-1996
EPA-6010 ACD-096010	Chromium (TCLP)	< 0.050	P d	mg/L	EC SCOTT	60805X	5-AUG-1996
EPA-6010 ACD-096010	Lead (TCLP)	< 0.25	P d	mg/L	EC SCOTT	60805X	5-AUG-1996
EPA-6010 ACD-096010	Nickel (TCLP)	< 0.12	P d	mg/L	EC SCOTT	60805X	5-AUG-1996
EPA-6010 ACD-096010	Selenium (TCLP)	< 0.25	P d	mg/L	EC SCOTT	60805X	5-AUG-1996
EPA-6010 ACD-096010	Silver (TCLP)	< 0.035	P d	mg/L	EC SCOTT	60805X	5-AUG-1996

Q Qual:(P) This sample was found to have a pH above 2.
(d) Dilution required for accurate determination of all analytes; reporting limits raised accordingly.

***** Mercury Laboratory *****							
EPA-7470	Mercury (TCLP)	< 0.001	p	mg/L	WW JOHNSON	60805A	6-AUG-1996

Q Qual:(p) Sample known to be unpreserved.

Spike Recovery Data

Analysis	Unspike Result	Amount Spike	Spike Result	Units	Amount Recovered	Percent Recovered
***** Inductively Coupled Plasma Laboratory *****						
ARSENIC (TCLP)	-0.126	5.00	4.98	mg/L	5.11	102.1
BARIUM (TCLP)	3.36	10.0	13.5	mg/L	10.1	101.4
CADMIUM (TCLP)	-0.00310	5.00	4.75	mg/L	4.75	95.1
CHROMIUM (TCLP)	0.0499	5.00	4.96	mg/L	4.91	98.2
LEAD (TCLP)	0.0290	5.00	4.96	mg/L	4.93	98.6
NICKEL (TCLP)	0.0904	5.00	5.00	mg/L	4.91	98.2
SELENIUM (TCLP)	0.0509	5.00	5.02	mg/L	4.97	99.4
SILVER (TCLP)	0.0314	10.0	9.70	mg/L	9.67	96.7
***** Mercury Laboratory *****						
MERCURY (TCLP)	0.0	1	0.9776	UG/L	0.9776	97.8

Analytical Services Organization @ K-25 Site
Oak Ridge, TN 37831
Sample Analyses Results

AnaLIS ID: 960802-144 Project: SIOU WAG1 Customer Sample ID: 040CPCPDS03

***** Comments from the Mercury Laboratory *****

Spike duplicate recovery was 93.9%. Spike blank recovery was 97.2%. Spike blank duplicate recovery was 95.8%.
This sample was NOT preserved, it had a pH of 11.

CORRECTION REPORT

08/16/96 16:35:06 Y-12 ANALYTICAL SERVICES ORGANIZATION

SUBMITTER	ADDRESS	CUSTOMER ID	REQ NO	SAMPLE NO	MTC	STATUS
TAYLOR, C. A.	BLDG 7078-D, MS 6402	050CPCPDS03		E962080040	E499	APPROVED

DATE SAMPLED: 07/23/96 09:00:00 DATE NEEDED: 08/12/96 LOCATION: CHARGE #: PX332P03
DATE RECEIVED: 07/26/96 DATE COMPLETED: 08/16/96 PROJECT CODE: CASE: SIOU
SAMPLER: SAMPLE DESCRIPTION: 040CPCPDS03 FINAL APPROVAL:

COMMENTS: 040CPCPDS03, SAMPLES ARE RADIOACTIVE-BE CAREFUL, FOR ICP-TCL, TCLHG, TCLSE, HERB

TEST: ICP_TCL ICP Analysis of TCLP Metals REPLICATE: 1 STATUS: CANCELLED
PREP MTH: PROC MTH: PHASE: TIME ANALYZED: APPROVER:
THIS TEST WAS CANCELLED BY D3A

TEST: PCB_UG PCB IN SOLID WASTE, PREP SW846 3540 REPLICATE: 1 STATUS: APPROVED
PREP MTH: PROC MTH: SW846 8080 PHASE: TIME ANALYZED: 08/09/96 07:49:00 APPROVER: E010186
COMMENTS:
SAMPLE WAS REPORTED ON AS RECEIVED BASIS ONLY, INSUFFICIENT AMOUNT DID NOT ALLOW DRY BASIS REPORT.

CAS NUMBER	DETERMINATION	DT	RESULT	CONFIDENCE	UNIT
12674112	PCB1016		<2		ug/g
11104282	PCB1221		<2		ug/g
11141165	PCB1232		<2		ug/g
53469219	PCB1242		<2		ug/g
12672296	PCB1248		<2		ug/g
11097691	PCB1254		PRESENT		ug/g
11096825	PCB1260		<2		ug/g
ELIMS001	Total PCB as received		5.4		ug/g
ELIMS002	Total PCB on the dry basis		NA		ug/g

TEST: TCLHER Gas Chromatography, Herbicides by TCLP REPLICATE: 1 STATUS: APPROVED
PREP MTH: PROC MTH: SW846 8150 PHASE: TIME ANALYZED: 08/16/96 00:43:00 APPROVER: E009834

CAS NUMBER	DETERMINATION	DT	RESULT	CONFIDENCE	UNIT
93721	Silvex		0.0040 U		mg/L
94757	2,4-D		0.0040 U		mg/L
93765	2,4,5T		0.0040 U		mg/L

TEST: TCLHG95 TCLP Mercury (Hg) by Cold Vapor AA EPA 7470 REPLICATE: 1 STATUS: CANCELLED
PREP MTH: PROC MTH: SW846 7470 PHASE: TIME ANALYZED: APPROVER:
THIS TEST WAS CANCELLED BY D3A

TEST: TCLPES Gas Chromatography, Pesticides by TCLP REPLICATE: 1 STATUS: APPROVED
PREP MTH: PROC MTH: SW846 8080 PHASE: TIME ANALYZED: 08/08/96 03:38:00 APPROVER: E022164

CORRECTION REPORT

SAMPLE E962080040 Y-12 ANALYTICAL SERVICES ORGANIZATION

CAS NUMBER	DETERMINATION	DT	RESULT	CONFIDENCE	UNIT
57749	Chlordane		<0.013		mg/L
72208	Endrin		<0.0008		mg/L
58899	Lindane		<0.0008		mg/L
76448	Heptachlor		<0.0008		mg/L
1024573	Heptachlor epoxide		<0.0008		mg/L
72435	Methoxychlor		<0.0008		mg/L
8001352	Toxaphene		<0.013		mg/L

TEST: TCLSE95 TCLP Selinium by Graphite Furnace AA SW846 7740 REPLICATE: 1 STATUS: CANCELLED
PREP MTH: PROC MTH: SW846 7740 PHASE: TIME ANALYZED: APPROVER:
THIS TEST WAS CANCELLED BY D3A

*** LAST PAGE ***

Analytical Services Organization @ K-25 Site
Oak Ridge, TN 37831
Sample Analyses Results

AnaLIS ID: 960802-145 Project: SIOU WAG1 Customer Sample ID: 050CPCPDS03

Customer:	CHRIS TAYLOR	Requisition Number:	
Date Sampled:	23-JUL-1996	Date Sample Received:	1-AUG-1996
Sampled By:	TM	Date Sample Completed:	6-AUG-1996
Material Description:	SEDIMENTS IN CONCRETE/TCLP EXTRA	Date Sample Approved:	7-AUG-1996
Program Manager:	DD ALTOM (# 31265)	[] : Result has been Corrected for Spike	

Procedure No.	Analysis	Result	Q Qual	Units	Analyst	QA File Number	Date Completed
***** Inductively Coupled Plasma Laboratory *****							
EPA-6010 ACD-096010	Arsenic (TCLP)	< 0.25	P d	mg/L	EC SCOTT	60805X	5-AUG-1996
EPA-6010 ACD-096010	Barium (TCLP)	5.0	P	mg/L	EC SCOTT	60805X	5-AUG-1996
EPA-6010 ACD-096010	Cadmium (TCLP)	< 0.015	P d	mg/L	EC SCOTT	60805X	5-AUG-1996
EPA-6010 ACD-096010	Chromium (TCLP)	< 0.050	P d	mg/L	EC SCOTT	60805X	5-AUG-1996
EPA-6010 ACD-096010	Lead (TCLP)	< 0.25	P d	mg/L	EC SCOTT	60805X	5-AUG-1996
EPA-6010 ACD-096010	Nickel (TCLP)	< 0.12	P d	mg/L	EC SCOTT	60805X	5-AUG-1996
EPA-6010 ACD-096010	Selenium (TCLP)	< 0.25	P d	mg/L	EC SCOTT	60805X	5-AUG-1996
EPA-6010 ACD-096010	Silver (TCLP)	< 0.035	P d	mg/L	EC SCOTT	60805X	5-AUG-1996

Q Qual: (P) This sample was found to have a pH above 2.
(d) Dilution required for accurate determination of all analytes; reporting limits raised accordingly.

***** Mercury Laboratory *****

EPA-7470	Mercury (TCLP)	< 0.001	p	mg/L	WW JOHNSON	60805A	6-AUG-1996

Q Qual: (p) Sample known to be unpreserved.

***** Comments from the Mercury Laboratory *****

This sample was NOT preserved, it has a pH of 12.

OFFICIAL REPORT

08/16/96 16:35:14 Y-12 ANALYTICAL SERVICES ORGANIZATION

SUBMITTER	ADDRESS	CUSTOMER ID	REQ NO	SAMPLE NO	MTC	STATUS
TAYLOR, C. A.	BLDG 7078-D, MS 6402	075CPCPDS03		E962080041	E499	APPROVED

DATE SAMPLED: 07/23/96 09:00:00 DATE NEEDED: 08/12/96 LOCATION: CHARGE #: PX332P03
DATE RECEIVED: 07/26/96 DATE COMPLETED: 08/16/96 PROJECT CODE: CASE: SIOU
SAMPLER: SAMPLE DESCRIPTION: 040CPCPDS03 FINAL APPROVAL:

COMMENTS: 040CPCPDS03, SAMPLES ARE RADIOACTIVE-BE CAREFUL, FOR ICP-TCL, TCLHG, TCLSE, HERB

TEST: ICP_TCL ICP Analysis of TCLP Metals REPLICATE: 1 STATUS: CANCELLED
PREP MTH: PROC MTH: PHASE: TIME ANALYZED: APPROVER:
THIS TEST WAS CANCELLED BY D3A

TEST: PCB_UG PCB IN SOLID WASTE, PREP SW846 3540 REPLICATE: 1 STATUS: APPROVED
PREP MTH: PROC MTH: SW846 8080 PHASE: TIME ANALYZED: 08/09/96 08:30:00 APPROVER: E010186
COMMENTS: SAMPLE WAS REPORTED ON AS RECEIVED BASIS ONLY, INSUFFICIENT AMOUNT DID NOT ALLOW DRY BASIS REPORT.

CAS NUMBER	DETERMINATION	DT	RESULT	CONFIDENCE	UNIT
12674112	PCB1016		<2		ug/g
11104282	PCB1221		<2		ug/g
11141165	PCB1232		<2		ug/g
53469219	PCB1242		<2		ug/g
12672296	PCB1248		<2		ug/g
11097691	PCB1254		PRESENT		ug/g
11096825	PCB1260		<2		ug/g
ELIMS001	Total PCB as received		3.8		ug/g
ELIMS002	Total PCB on the dry basis		NA		ug/g

TEST: TCLHER Gas Chromatography, Herbicides by TCLP REPLICATE: 1 STATUS: APPROVED
PREP MTH: PROC MTH: SW846 8150 PHASE: TIME ANALYZED: 08/16/96 01:36:00 APPROVER: E009834

CAS NUMBER	DETERMINATION	DT	RESULT	CONFIDENCE	UNIT
93721	Silvex		0.0040 U		mg/L
94757	2,4-D		0.0040 U		mg/L
93765	2,4,5T		0.0040 U		mg/L

TEST: TCLHG95 TCLP Mercury (Hg) by Cold Vapor AA EPA 7470 REPLICATE: 1 STATUS: CANCELLED
PREP MTH: PROC MTH: SW846 7470 PHASE: TIME ANALYZED: APPROVER:
THIS TEST WAS CANCELLED BY D3A

TEST: TCLPES Gas Chromatography, Pesticides by TCLP REPLICATE: 1 STATUS: APPROVED
PREP MTH: PROC MTH: SW846 8080 PHASE: TIME ANALYZED: 08/08/96 04:23:00 APPROVER: E022164

CAS NUMBER	DETERMINATION	DT	RESULT	CONFIDENCE	UNIT

OFFICIAL REPORT

SAMPLE E962080041 | Y-12 ANALYTICAL SERVICES ORGANIZATION | PAGE 2 OF 2

57749	Chlordane	<0.013	mg/L
72208	Endrin	<0.0008	mg/L
58899	Lindane	<0.0008	mg/L
76448	Heptachlor	<0.0008	mg/L
1024573	Heptachlor epoxide	<0.0008	mg/L
72435	Methoxychlor	<0.0008	mg/L
8001352	Toxaphene	<0.013	mg/L

TEST: TCLSE95 TCLP Selinium by Graphite Furnace AA SW846 7740 REPLICATE: 1 STATUS: CANCELLED
PREP MTH: PROC MTH: SW846 7740 PHASE: TIME ANALYZED: APPROVER:
THIS TEST WAS CANCELLED BY D3A

TEST: TCL_HG TCLP Mercury (Hg) by Cold Vapor AA SW846 7470 REPLICATE: 1 STATUS: CANCELLED
PREP MTH: PROC MTH: SW846 7470 PHASE: TIME ANALYZED: APPROVER:
THIS TEST WAS CANCELLED BY D3A

TEST: TCL_SE TCLP Selenium by Graphite Furnace AA SW846 7740 REPLICATE: 1 STATUS: CANCELLED
PREP MTH: PROC MTH: SW846 7740 PHASE: TIME ANALYZED: APPROVER:
THIS TEST WAS CANCELLED BY D3A

*** LAST PAGE ***

Analytical Services Organization @ K-25 Site
Oak Ridge, TN 37831
Sample Analyses Results

AnaLIS ID: 960802-146 Project: SIOU WAG1 Customer Sample ID: 075CPCPDS03

Customer: CHRIS TAYLOR
Date Sampled: 23-JUL-1996
Sampled By: TM
Material Description: SEDIMENTS IN CONCRETE/TCLP EXTRA
Program Manager: DD ALTOM (# 31265)

Requisition Number:
Date Sample Received: 1-AUG-1996
Date Sample Completed: 6-AUG-1996
Date Sample Approved: 7-AUG-1996
[] : Result has been Corrected for Spike

Procedure No.	Analysis	Result	Q Qual	Units	Analyst	QA File Number	Date Completed
***** Inductively Coupled Plasma Laboratory *****							
EPA-6010 ACD-096010	Arsenic (TCLP)	< 0.25	P d	mg/L	EC SCOTT	60805X	5-AUG-1996
EPA-6010 ACD-096010	Barium (TCLP)	4.9	P	mg/L	EC SCOTT	60805X	5-AUG-1996
EPA-6010 ACD-096010	Cadmium (TCLP)	< 0.015	P d	mg/L	EC SCOTT	60805X	5-AUG-1996
EPA-6010 ACD-096010	Chromium (TCLP)	< 0.050	P d	mg/L	EC SCOTT	60805X	5-AUG-1996
EPA-6010 ACD-096010	Lead (TCLP)	< 0.25	P d	mg/L	EC SCOTT	60805X	5-AUG-1996
EPA-6010 ACD-096010	Nickel (TCLP)	< 0.12	P d	mg/L	EC SCOTT	60805X	5-AUG-1996
EPA-6010 ACD-096010	Selenium (TCLP)	< 0.25	P d	mg/L	EC SCOTT	60805X	5-AUG-1996
EPA-6010 ACD-096010	Silver (TCLP)	0.037	P	mg/L	EC SCOTT	60805X	5-AUG-1996

Q Qual: (P) This sample was found to have a pH above 2.
(d) Dilution required for accurate determination of all analytes; reporting limits raised accordingly.

***** Mercury Laboratory *****

EPA-7470	Mercury (TCLP)	< 0.001	p	mg/L	WW JOHNSON	60805A	6-AUG-1996

Q Qual: (p) Sample known to be unpreserved.

***** Comments from the Mercury Laboratory *****

This sample was NOT preserved, it had a pH of 12.

OFFICIAL REPORT

08/16/96 16:35:21 Y-12 ANALYTICAL SERVICES ORGANIZATION

SUBMITTER	ADDRESS	CUSTOMER ID	REQ NO	SAMPLE NO	MTC	STATUS
TAYLOR, C. A.	BLDG 7078-D, MS 6402	100CPCPDS03		E962080042	E499	APPROVED

DATE SAMPLED: 07/23/96 09:00:00 DATE NEEDED: 08/12/96 LOCATION: CHARGE #: PX332P03
DATE RECEIVED: 07/26/96 DATE COMPLETED: 08/16/96 PROJECT CODE: CASE: SIOU
SAMPLER: SAMPLE DESCRIPTION: 040CPCPDS03 FINAL APPROVAL:

COMMENTS: 040CPCPDS03, SAMPLES ARE RADIOACTIVE-BE CAREFUL, FOR ICP-TCL, TCLHG, TCLSE, HERB

TEST: ICP_TCL ICP Analysis of TCLP Metals REPLICATE: 1 STATUS: CANCELLED
PREP MTH: PROC MTH: PHASE: TIME ANALYZED: APPROVER:
THIS TEST WAS CANCELLED BY D3A

TEST: PCB_UG PCB IN SOLID WASTE, PREP SW846 3540 REPLICATE: 1 STATUS: APPROVED
PREP MTH: PROC MTH: SW846 8080 PHASE: TIME ANALYZED: 08/09/96 09:10:00 APPROVER: E010186
COMMENTS: SAMPLE WAS REPORTED ON AS RECEIVED BASIS ONLY, INSUFFICIENT AMOUNT DID NOT ALLOW DRY BASIS REPORT.

CAS NUMBER	DETERMINATION	DT	RESULT	CONFIDENCE	UNIT
12674112	PCB1016		<2		ug/g
11104282	PCB1221		<2		ug/g
11141165	PCB1232		<2		ug/g
53469219	PCB1242		<2		ug/g
12672296	PCB1248		<2		ug/g
11097691	PCB1254		PRESENT		ug/g
11096825	PCB1260		<2		ug/g
IMS001	Total PCB as received		5.7		ug/g
IMS002	Total PCB on the dry basis		NA		ug/g

TEST: TCLHER Gas Chromatography, Herbicides by TCLP REPLICATE: 1 STATUS: APPROVED
PREP MTH: PROC MTH: SW846 8150 PHASE: TIME ANALYZED: 08/16/96 02:29:00 APPROVER: E009834

CAS NUMBER	DETERMINATION	DT	RESULT	CONFIDENCE	UNIT
93721	Silvex		0.0040 U		mg/L
94757	2,4-D		0.0040 U		mg/L
93765	2,4,5T		0.0040 U		mg/L

TEST: TCLHG95 TCLP Mercury (Hg) by Cold Vapor AA EPA 7470 REPLICATE: 1 STATUS: CANCELLED
PREP MTH: PROC MTH: SW846 7470 PHASE: TIME ANALYZED: APPROVER:
THIS TEST WAS CANCELLED BY D3A

TEST: TCLPES Gas Chromatography, Pesticides by TCLP REPLICATE: 1 STATUS: APPROVED
PREP MTH: PROC MTH: SW846 8080 PHASE: TIME ANALYZED: 08/08/96 05:08:00 APPROVER: E022164

CAS NUMBER	DETERMINATION	DT	RESULT	CONFIDENCE	UNIT

OFFICIAL REPORT

SAMPLE E962080042 Y-12 ANALYTICAL SERVICES ORGANIZATION

57749	Chlordane	<0.013	mg/L
72208	Endrin	<0.0008	mg/L
58899	Lindane	<0.0008	mg/L
76448	Heptachlor	<0.0008	mg/L
1024573	Heptachlor epoxide	<0.0008	mg/L
72435	Methoxychlor	<0.0008	mg/L
8001352	Toxaphene	<0.013	mg/L

TEST: TCLSE95 TCLP Selinium by Graphite Furnace AA SW846 7740 REPLICATE: 1 STATUS: CANCELLED
PREP MTH: PROC MTH: SW846 7740 PHASE: TIME ANALYZED: APPROVER:
THIS TEST WAS CANCELLED BY D3A

TEST: TCL_HG TCLP Mercury (Hg) by Cold Vapor AA SW846 7470 REPLICATE: 1 STATUS: CANCELLED
PREP MTH: PROC MTH: SW846 7470 PHASE: TIME ANALYZED: APPROVER:
THIS TEST WAS CANCELLED BY D3A

TEST: TCL_SE TCLP Selenium by Graphite Furnace AA SW846 7740 REPLICATE: 1 STATUS: CANCELLED
PREP MTH: PROC MTH: SW846 7740 PHASE: TIME ANALYZED: APPROVER:
THIS TEST WAS CANCELLED BY D3A

*** LAST PAGE ***

Analytical Services Organization @ K-25 Site
Oak Ridge, TN 37831
Sample Analyses Results

AnaLIS ID: 960802-147 Project: SIOU WAG1 Customer Sample ID: 100CPCPDS03

Customer: CHRIS TAYLOR
Date Sampled: 23-JUL-1996
Sampled By: TM
Material Description: SEDIMENTS IN CONCRETE/TCLP EXTRA
Program Manager: DD ALTOM (# 31265)

Requisition Number:
Date Sample Received: 1-AUG-1996
Date Sample Completed: 6-AUG-1996
Date Sample Approved: 7-AUG-1996
[] : Result has been Corrected for Spike

Procedure No.	Analysis	Result	Q Qual	Units	Analyst	QA File Number	Date Completed
***** Inductively Coupled Plasma Laboratory *****							
EPA-6010 ACD-096010	Arsenic (TCLP)	< 0.25	P d	mg/L	EC SCOTT	60805X	5-AUG-1996
EPA-6010 ACD-096010	Barium (TCLP)	7.9	P	mg/L	EC SCOTT	60805X	5-AUG-1996
EPA-6010 ACD-096010	Cadmium (TCLP)	< 0.015	P d	mg/L	EC SCOTT	60805X	5-AUG-1996
EPA-6010 ACD-096010	Chromium (TCLP)	< 0.050	P d	mg/L	EC SCOTT	60805X	5-AUG-1996
EPA-6010 ACD-096010	Lead (TCLP)	< 0.25	P d	mg/L	EC SCOTT	60805X	5-AUG-1996
EPA-6010 ACD-096010	Nickel (TCLP)	< 0.12	P d	mg/L	EC SCOTT	60805X	5-AUG-1996
EPA-6010 ACD-096010	Selenium (TCLP)	< 0.25	P d	mg/L	EC SCOTT	60805X	5-AUG-1996
EPA-6010 ACD-096010	Silver (TCLP)	0.040	P	mg/L	EC SCOTT	60805X	5-AUG-1996

Q Qual: (P) This sample was found to have a pH above 2.
(d) Dilution required for accurate determination of all analytes; reporting limits raised accordingly.

***** Mercury Laboratory *****

EPA-7470	Mercury (TCLP)	< 0.001	p	mg/L	WW JOHNSON	60805A	6-AUG-1996

Q Qual: (p) Sample known to be unpreserved.

***** Comments from the Mercury Laboratory *****

This sample was NOT peserved, it has a pH of 12.

OFFICIAL REPORT

09/10/96 08:52:44 Y-12 ANALYTICAL SERVICES ORGANIZATION

SUBMITTER	ADDRESS	CUSTOMER ID	REQ NO	SAMPLE NO	MTC	STATUS
Altom, Dianna Derreb	Building 9769 Room 213A M.S.8081	000CPCPD000		E962200011	E999	APPROVED

DATE SAMPLED: 08/01/96 11:00:00 DATE NEEDED: 08/27/96 LOCATION: CHARGE #: PX332P03
DATE RECEIVED: 08/07/96 DATE COMPLETED: 09/10/96 PROJECT CODE: CASE: S10U
SAMPLER: SAMPLE DESCRIPTION: COMP S10U FINAL APPROVAL:

COMMENTS: NEED ASAP, PLEASE RUSH, RAD ACTIVITY

TEST: ICP_TCL ICP Analysis of TCLP Metals REPLICATE: 1 STATUS: APPROVED
PREP MTH: 3010 PROC MTH: 6010mod PHASE: ALL TIME ANALYZED: 08/30/96 21:56:00 APPROVER: E029191
COMMENTS: Metals in TCLP extract by SW846 3010/6010.
Z= not included in pertinent EPA methodology/QC may not be in full compliance

CAS NUMBER	DETERMINATION	DT	RESULT	CONFIDENCE	UNIT
7440224	Silver	UDL	<0.20		mg/L
7440382	Arsenic	UDL	<0.50		mg/L
7440393	Barium	UDL	<5.0		mg/L
7440439	Cadmium	UDL	<0.10		mg/L
7440473	Chromium	UDL	<0.50		mg/L
7439921	Lead		0.23		mg/L

TEST: MOIS_ER .Determination of Percent Moisture on ER Samples REPLICATE: 1 STATUS: APPROVED
PREP MTH: PROC MTH: PHASE: TIME ANALYZED: 08/08/96 12:30:00 APPROVER: E011117

S NUMBER	DETERMINATION	DT	RESULT	CONFIDENCE	UNIT
7732185	Water		2.0		Weight %

TEST: PCB_UG PCB IN SOLID WASTE, PREP SW846 3540 REPLICATE: 1 STATUS: APPROVED
PREP MTH: PROC MTH: SW846 8080 PHASE: TIME ANALYZED: 08/15/96 20:37:00 APPROVER: E010186

CAS NUMBER	DETERMINATION	DT	RESULT	CONFIDENCE	UNIT
12674112	PCB1016		<20		ug/g
11104282	PCB1221		<20		ug/g
11141165	PCB1232		<20		ug/g
53469219	PCB1242		<20		ug/g
12672296	PCB1248		PRESENT		ug/g
11097691	PCB1254		PRESENT		ug/g
11096825	PCB1260		<20		ug/g
ELIMS001	Total PCB as received		55		ug/g
ELIMS002	Total PCB on the dry basis		55		ug/g

TEST: TCLHER Gas Chromatography, Herbicides by TCLP REPLICATE: 1 STATUS: APPROVED
PREP MTH: PROC MTH: SW846 8150 PHASE: TIME ANALYZED: 08/28/96 00:00:00 APPROVER: E009834

OFFICIAL REPORT

SAMPLE E962200011 Y-12 ANALYTICAL SERVICES ORGANIZATION

COMMENTS: Results are provisional due to an exceeded holding time

CAS NUMBER	DETERMINATION	DT	RESULT	CONFIDENCE	UNIT
93721	Silvex		<.020		mg/L
94757	2,4-D		<.020		mg/L
93765	2,4,5T		<.020		mg/L

TEST: TCLHG95 TCLP Mercury (Hg) by Cold Vapor AA EPA 7470 REPLICATE: 1 STATUS: APPROVED
PREP MTH: PROC MTH: SW846 7470 PHASE: TIME ANALYZED: 08/27/96 15:29:00 APPROVER: E019715

CAS NUMBER	DETERMINATION	DT	RESULT	CONFIDENCE	UNIT
7439976	Mercury		0.03		mg/L

TEST: TCLPES Gas Chromatography, Pesticides by TCLP REPLICATE: 1 STATUS: APPROVED
PREP MTH: PROC MTH: SW846 8080 PHASE: TIME ANALYZED: 08/30/96 00:00:00 APPROVER: E009834

CAS NUMBER	DETERMINATION	DT	RESULT	CONFIDENCE	UNIT
57749	Chlordane		0.013 U		mg/L
72208	Endrin		0.0008 U		mg/L
58899	Lindane		0.0008 U		mg/L
76448	Heptachlor		0.0008 U		mg/L
1024573	Heptachlor epoxide		0.0008 U		mg/L
72435	Methoxychlor		0.0008 U		mg/L
8001352	Toxaphene		0.013 U		mg/L

TEST: TCLSE95 TCLP Selinium by Graphite Furnace AA SW846 7740 REPLICATE: 1 STATUS: APPROVED
PREP MTH: PROC MTH: SW846 7740 PHASE: TIME ANALYZED: 08/27/96 07:28:56 APPROVER: E010186

CAS NUMBER	DETERMINATION	DT	RESULT	CONFIDENCE	UNIT
7782492	Selenium		<.020		mg/L

*** LAST PAGE ***

APPENDIX G

E-Mail Reference

Author: oe9@ew140.eng.ornl.gov (Robert Coe) at INTERNET
Date: 8/12/96 8:05 AM
Priority: Normal
TO: TMOORE at OpTech-OR
CC: oe9@ornl.gov at INTERNET
Subject: Re: Bentonite treatments reference
---------- Message Contents ----------

Received: by ccmail from ew140.eng.ornl.gov
From oe9@ew140.eng.ornl.gov
X-Envelope-From: oe9@ew140.eng.ornl.gov
Received: (from oe9@localhost) by ew140.eng.ornl.gov (8.6.10/8.6.10) id IAA16587; Mon, 12 Aug 1996 08:51:05 -0400
From: oe9@ew140.eng.ornl.gov (Robert Coe)
Message-Id: <9608120851.ZM16585@ew140.eng.ornl.gov>
Date: Mon, 12 Aug 1996 08:51:04 -0400
In-Reply-To: TMOORE_at_OpTech-OR@smtpgwy.otcorp.com
"Bentonite treatments reference" (Aug 9, 16:24)
References: <9607098396.AA839630290@smtpgwy.otcorp.com>
X-Mailer: Z-Mail (3.2.2 10apr95 MediaMail)
To: TMOORE_at_OpTech-OR@smtpgwy.otcorp.com
Subject: Re: Bentonite treatments reference
Cc: oe9@ornl.gov
Mime-Version: 1.0
Content-Type: text/plain; charset=us-ascii

On Aug 9, 16:24, TMOORE_at_OpTech-OR@smtpgwy.otcorp.com wrote:
> Subject: Bentonite treatments reference
> Rob,
>
> Do you have a handy reference we can site for historic bentonite
> treatments on the south bermed area of pond 3513?? Would greatly
> appreciate one. Thanks and I hope you have a superb weekend!
>
> Telena
>-- End of excerpt from TMOORE_at_OpTech-OR@smtpgwy.otcorp.com

Telena:

I know of no papers, other than various emails and my personal log, referencing Bentonite applications. You may use this communication as a reference. Prior to Nov. 94, no en masse bentonite was applied to 3513. The only bentonite applications were in small percentages mixed with clay. About 2000 lbs were sprinkled along the south 3513 berm between Nov 94 and Jan. 95. In Jan 95 (starting on the 10th) approximately 7 tons of bentonite were spread along the 3513 South berm at and below the normal waterline elevation range. In May of 1996 application of 15 tons of bentonite was made on the south berm also, but generally in at a higher elevation (from the waterline to just below the crest).

Rob Coe

--
Robert Harrison Castle Coe, III