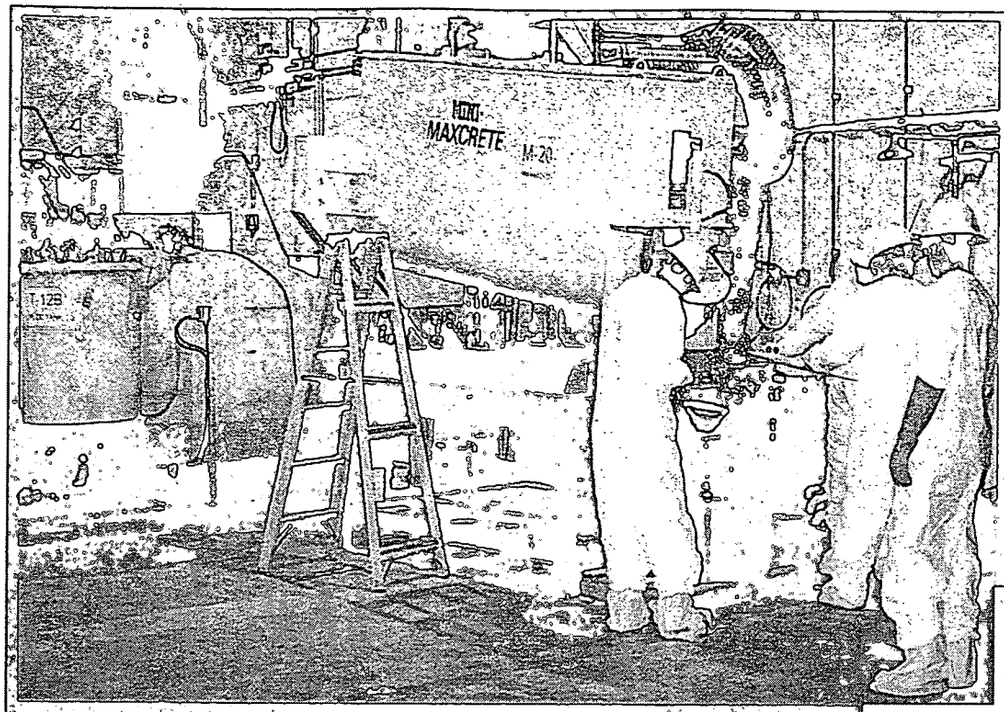
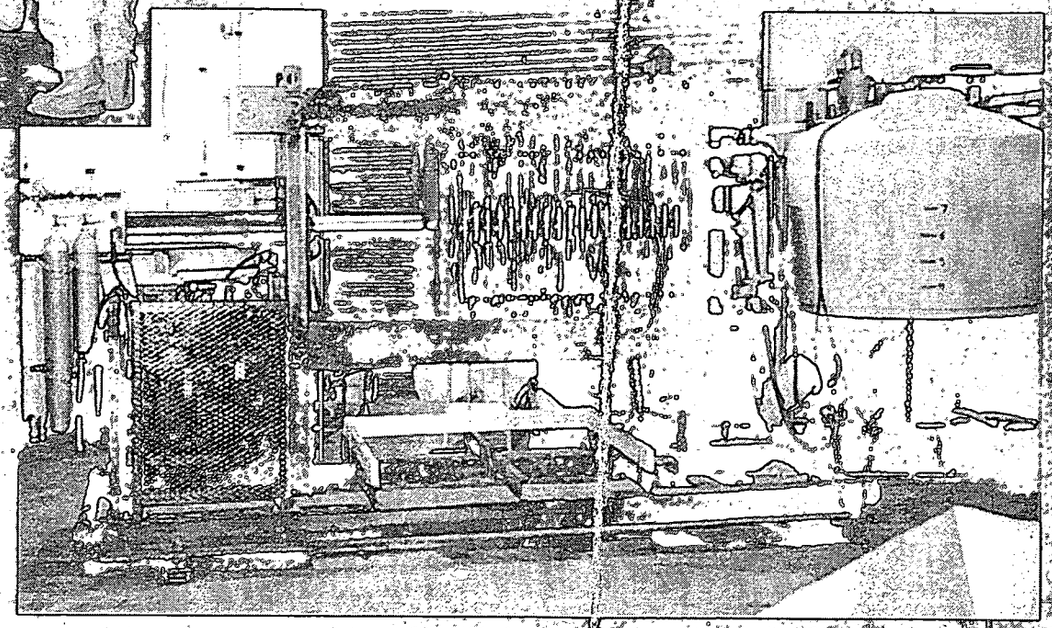


Appendix A through D



Fernald Operable Unit 4, Silos 1 and 2 Proof of Principle Demonstration Final Report

May 14, 1999

IT CORPORATION
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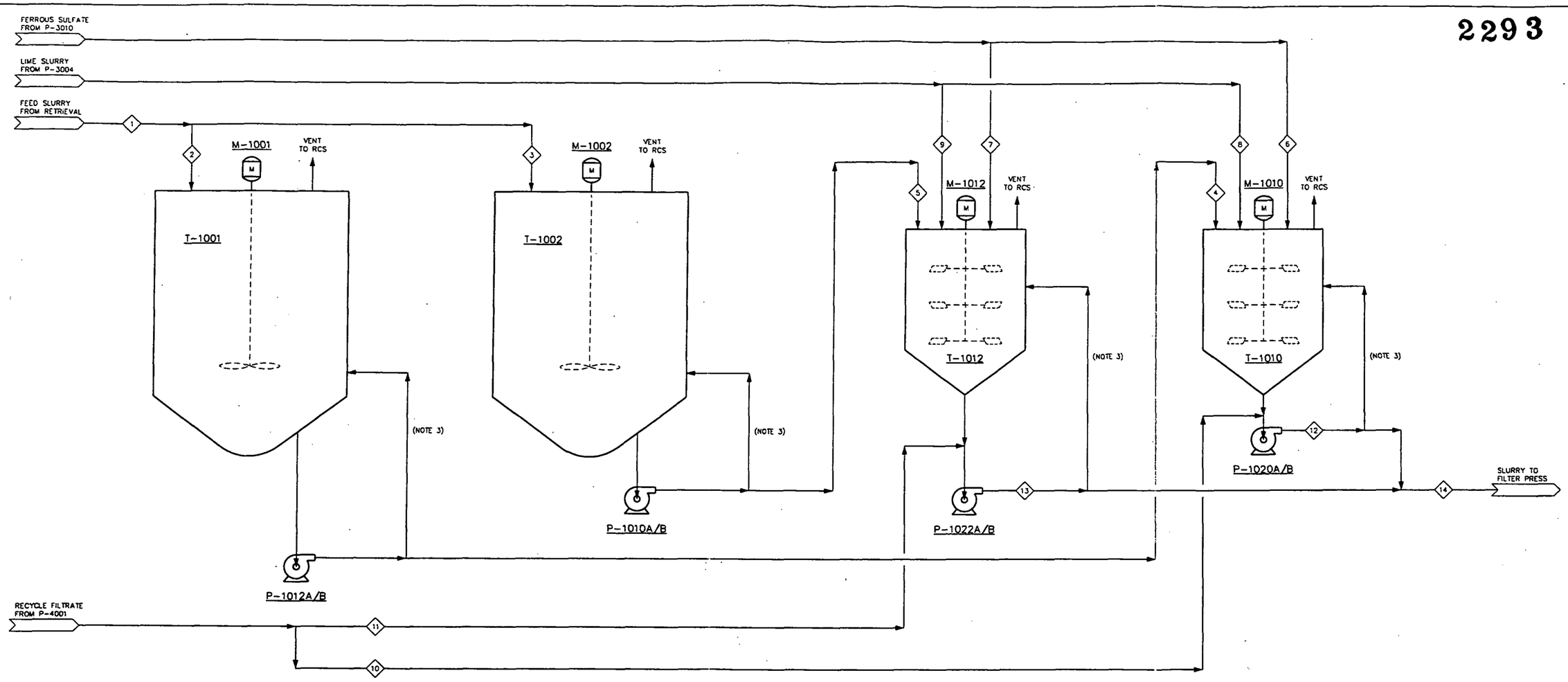
APPENDIX A
DESIGN DRAWINGS

DRAWING NUMBER D-00-10-001

2293



000003

	T-1001 SLURRY FEED TANK	M-1001 SLURRY FEED TANK MIXER	P-1012A/B SLURRY FEED PUMPS	T-1002 SLURRY FEED TANK	M-1002 SLURRY FEED TANK MIXER	P-1010A/B SLURRY FEED PUMPS	T-1012 BATCH TREATMENT TANK	M-1012 BATCH TANK MIXER	P-1022A/B FILTER FEED PUMPS	T-1010 BATCH TREATMENT TANK	M-1010 BATCH TANK MIXER	P-1020A/B FILTER FEED PUMPS
STREAM NO. / COMPONENT	1	2	3	4	5	6	7	8	9	10	11	12
	FEED SLURRY (LB/DAY)	FEED SLURRY (LB/DAY)	FEED SLURRY (LB/DAY)	SLURRY (LB/BATCH)	SLURRY (LB/BATCH)	FERROUS SULFATE (LB/BATCH)	FERROUS SULFATE (LB/BATCH)	LIME SLURRY (LB/BATCH)	LIME SLURRY (LB/BATCH)	RECYCLE FILTRATE (LB/BATCH)	RECYCLE FILTRATE (LB/BATCH)	COND. SLURRY (LB/BATCH)
K-65 SOLIDS	37,086	18,543	18,543	1,854	1,854							1,898
BENTO-GROUT	838	419	419	42	42							42
LIME, HYDRATED HIGH CALCIUM								70	70			
FERROUS SULFATE HEPTAHYDRATE						33	33					
TRIPLE SUPER PHOSPHATE (TSP)												
PORTLAND CEMENT												
DISSOLVED SALTS										1	1	32
WATER	341,316	170,658	170,658	17,066	17,066	78	78	621	621	418	418	18,212
TOTAL MASS	379,240	189,620	189,620	18,962	18,962	112	112	691	691	419	419	20,184
VOLUME (GAL)	42,657	21,329	21,329	2,133	2,133	11	11	77	77	50	50	2,270
VOLUME (GPM)												
BULK DENSITY (LB/FT^3)	66.5	66.5	66.5	66.5	66.5	73.6	73.6	66.7	66.7	62.7	62.7	66.5
TEMPERATURE (° F)	70	70	70	70	70	70	70	70	70	70	70	70

	T-1010 BATCH TREATMENT TANK	M-1010 BATCH TANK MIXER	P-1020A/B FILTER FEED PUMPS
STREAM NO. / COMPONENT	13	14	14
	COND. SLURRY (LB/BATCH)	FILTER FEED (LB/BATCH)	FILTER FEED (LB/DAY)
K-65 SOLIDS	1,898	3,796	37,962
BENTO-GROUT	42	84	838
LIME, HYDRATED HIGH CALCIUM			
FERROUS SULFATE HEPTAHYDRATE			
TRIPLE SUPER PHOSPHATE (TSP)			
PORTLAND CEMENT			
DISSOLVED SALTS	32	63	633
WATER	18,212	36,424	364,244
TOTAL MASS	20,184	40,368	403,677
VOLUME (GAL)	2,270	4,541	45,406
VOLUME (GPM)			
BULK DENSITY (LB/FT^3)	66.5	66.5	66.5
TEMPERATURE (° F)	70	70	70

1. DESIGN IS BASED ON 10 BATCHES PER DAY IN EACH BATCH TREATMENT TANK.
2. SYSTEM OPERATES FOR 105 WEEKS, 5 DAYS/WEEK, 2 SHIFTS/DAY.
3. RECIRCLATION LOOPS ARE PROVIDED FOR ALL SLURRY PUMPS.

REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION
0	5/14/99	JWH	SES		FINAL REPORT
B	5/5/99	JWH	SES		DRAFT FINAL
A	3/17/99	JWH	SES		DRAFT REPORT

FLUOR DANIEL FERNALD

PROJECT NAME: FEMP OU-4 SILO 1 & 2 POP DEMONSTRATION

TITLE: PROCESS FLOW DIAGRAM SLURRY PRE-TREATMENT

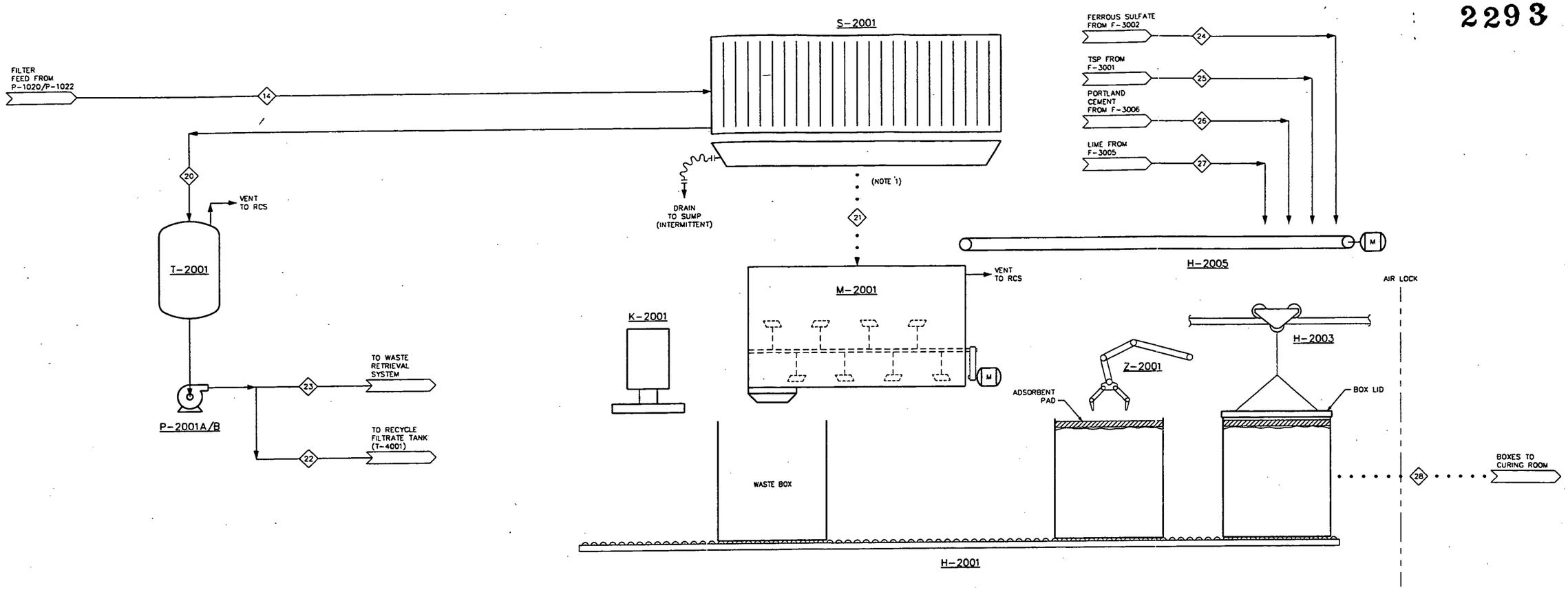
IT CORPORATION
A Member of The IT Group

DESIGNED BY	SES	CHECKED BY	MH	REVISION
DRAWN BY	JWH	APPROVED BY		0
DATE	3/17/99	DWG. SCALE	NONE	
IT PROJECT NO.	775743	DRAWING NO.	D-00-10-001	

775743D1 5/17/99 3:16pm JHubbard

DRAWING NUMBER D-00-10-002

2293



000004

	T-2001 FILTRATE RECEIVER	P-2001 FILTRATE TRANSFER PUMP	K-2001 HYDRAULIC COMPACTOR	S-2001 FILTER PRESS	M-2001 STABILIZATION MIXER	H-2001 WASTE BOX CONVEYOR	H-2005 ADDITIVE CONVEYOR	Z-2001 MANIPULATOR ARM	H-2003 OVERHEAD CRANE

STREAM NO. / COMPONENT	14 FILTER FEED (LB/BATCH)	20 FILTRATE (LB/BATCH)	21 WET CAKE (LB/BATCH)	22 RECYCLE FILTRATE (LB/BATCH)	23 RETURN FILTRATE (LB/BATCH)	24 FERROUS SULFATE (LB/BATCH)	25 TSP (LB/BATCH)	26 PORTLAND CEMENT (LB/BATCH)	27 LIME (LB/BATCH)	28 GROUT (LB/BATCH)
SOLIDS	3,796		3,796							3,796
BENTO-GROUT	84		84							84
LIME, HYDRATED HIGH CALCIUM									388	388
FERROUS SULFATE HEPTAHYDRATE						78				78
TRIPLE SUPER PHOSPHATE (TSP)							155			155
PORTLAND CEMENT								776		776
DISSOLVED SALTS	63	57	7	2	55					7
WATER	36,424	32,551	3,874	728	31,823					3,874
TOTAL MASS	40,368	32,607	7,761	730	31,878	78	155	776	388	9,157
VOLUME (FT^3)			90.2			1.0	2.0	8.5	11.1	98.4
VOLUME (GAL)	4,541	3,890		87						
BULK DENSITY (LB/FT^3)	66.5	62.7	86.0	62.7	62.7	78	80	90	35	93.1
TEMPERATURE (°F)	70	70	70	70	70	70	70	70	70	82

STREAM NO. / COMPONENT	14 FILTER FEED (LB/DAY)	20 FILTRATE (LB/DAY)	21 WET CAKE (LB/DAY)	22 RECYCLE FILTRATE (LB/DAY)	23 RETURN FILTRATE (LB/DAY)	24 FERROUS SULFATE (LB/DAY)	25 TSP (LB/DAY)	26 PORTLAND CEMENT (LB/DAY)	27 LIME (LB/DAY)	28 GROUT (LB/DAY)
SOLIDS	37,952		37,952							37,952
BENTO-GROUT	838		838							838
LIME, HYDRATED HIGH CALCIUM									3,880	3,880
FERROUS SULFATE HEPTAHYDRATE						776				776
TRIPLE SUPER PHOSPHATE (TSP)							1,552			1,552
PORTLAND CEMENT								7,761		7,761
DISSOLVED SALTS	633	566	67	20	546					67
WATER	364,244	325,505	38,739	7,280	318,225					38,739
TOTAL MASS	403,677	326,071	77,606	7,300	318,771	776	1,552	7,761	3,880	91,575
VOLUME (FT^3)			902.4			9.9	19.4	86.2	110.9	983.6
VOLUME (GAL)	45,406	38,900		871	38,029					
BULK DENSITY (LB/FT^3)	66.5	62.7	86.0	62.7	62.7	28	80	90	35	93.1
TEMPERATURE (°F)	70	70	70	70	70	70	70	70	70	82

1. THE FILTER PRESS IS MOUNTED ABOVE THE MIXER AND THE FILTER CAKE WILL DROP THROUGH A CHUTE INTO THE MIXER.
2. DESIGN IS BASED ON 10 BATCHES PER DAY.

REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION
0	5/14/99	JWH	SES		FINAL REPORT
B	5/5/99	JWH	SES		DRAFT FINAL
A	3/17/99	JWH	SES		DRAFT REPORT

FLUOR DANIEL FERNALD

PROJECT NAME: FEMP OU-4 SILO 1 & 2 POP DEMONSTRATION

TITLE: PROCESS FLOW DIAGRAM DEWATERING & STABILIZATION

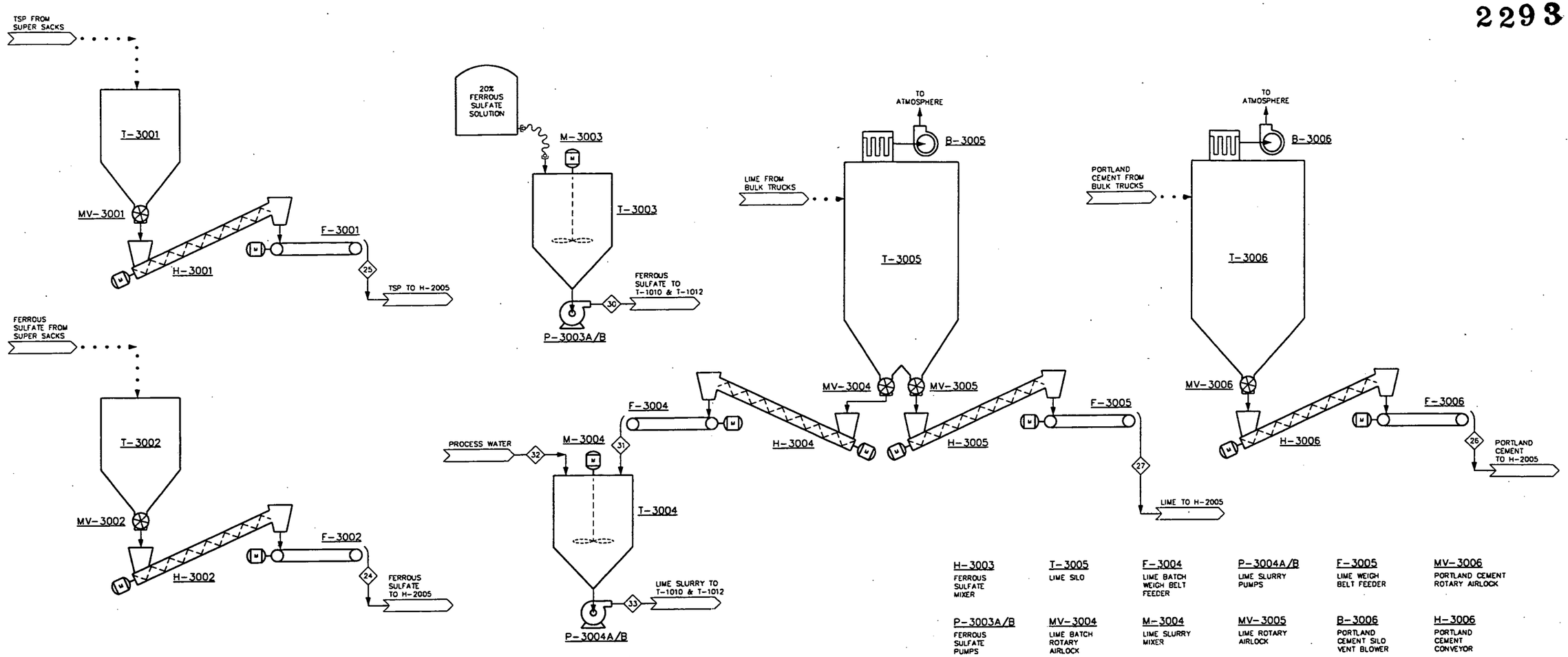
IT CORPORATION
A Member of The IT Group

DESIGNED BY	SES	CHECKED BY	MH	REVISION
DRAWN BY	JWH	APPROVED BY		0
DATE	3/17/99	DWG. SCALE	NONE	
IT PROJECT NO.	775743	DRAWING NO.	D-00-10-002	

775743.002 5/12/99 3:18pm JHubbard

DRAWING NUMBER D-00-10-003

2293



T-3001 TSP HOPPER	MV-3001 TSP ROTARY AIRLOCK	H-3001 TSP CONVEYOR	F-3001 TSP WEIGHT BELT CONVEYOR	T-3002 FERROUS SULFATE HOPPER	MV-3002 FERROUS SULFATE ROTARY AIRLOCK	H-3002 FERROUS SULFATE CONVEYOR	F-3002 FERROUS SULFATE WEIGH BELT CONVEYOR	T-3003 FERROUS SULFATE TANK	B-3005 LIME SILO VENT BLOWER	H-3004 LIME BATCH CONVEYOR	T-3004 LIME SLURRY TANK	H-3005 LIME CONVEYOR	T-3006 PORTLAND CEMENT SILO	F-3006 PORTLAND CEMENT WEIGH BELT FEEDER	H-3003 FERROUS SULFATE MIXER	T-3005 LIME SILO	F-3004 LIME BATCH WEIGH BELT FEEDER	P-3004A/B LIME SLURRY PUMPS	F-3005 LIME WEIGH BELT FEEDER	MV-3006 PORTLAND CEMENT ROTARY AIRLOCK	P-3003A/B FERROUS SULFATE PUMPS	MV-3004 LIME BATCH ROTARY AIRLOCK	M-3004 LIME SLURRY MIXER	MV-3005 LIME ROTARY AIRLOCK	B-3006 PORTLAND CEMENT SILO VENT BLOWER	H-3006 PORTLAND CEMENT CONVEYOR

STREAM NO. / COMPONENT	24 FERROUS SULFATE (LB/BATCH)	25 TSP (LB/BATCH)	26 PORTLAND CEMENT (LB/BATCH)	27 LIME (LB/BATCH)	30 FER. SULFATE SOL. (LB/BATCH)	33 LIME SLURRY (LB/BATCH)	24 FERROUS SULFATE (LB/DAY)	25 TSP (LB/DAY)	26 PORTLAND CEMENT (LB/DAY)	27 LIME (LB/DAY)	30 FER. SULFATE SOL. (LB/DAY)	31 LIME (LB/DAY)	32 PROCESS WATER (LB/DAY)	33 LIME SLURRY (LB/DAY)
SOLIDS														
BENTO-GROUT														
LIME, HYDRATED HIGH CALCIUM				388		140				3,880		1,402		1,402
FERROUS SULFATE HEPTAHYDRATE	78				67		776				670			
TRIPLE SUPER PHOSPHATE (TSP)		155						1,552						
PORTLAND CEMENT			776						7,761					
DISSOLVED SALTS														
WATER					156	1,241					1,563		12,414	12,414
TOTAL MASS	78	155	776	388	223	1,381	776	1,552	7,761	3,880	2,232	1,402	12,414	13,818
VOLUME (FT^3)	1.0	1.9	8.6	11.1			9.9	19.4	86.2	110.9		40		
VOLUME (GAL)					23	155					227		1,488	1,550
BULK DENSITY (LB/FT^3)	78	80	90	35	73.6	66.7	78	80	90	35	73.6	35	62.4	66.7
TEMPERATURE (° F)	70	70	70	70	70	70	70	70	70	70	70	70	70	70

REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION
C	5/14/99	JWH	SES		FINAL REPORT
B	5/5/99	JWH	SES		DRAFT FINAL
A	3/17/99	JWH	SES		DRAFT REPORT

FLUOR DANIEL FERNALD

PROJECT NAME: FEMP OU-4 SILO 1 & 2 POP DEMONSTRATION

TITLE: PROCESS FLOW DIAGRAM REAGENT ADDITION SYSTEMS

IT CORPORATION
A Member of The IT Group

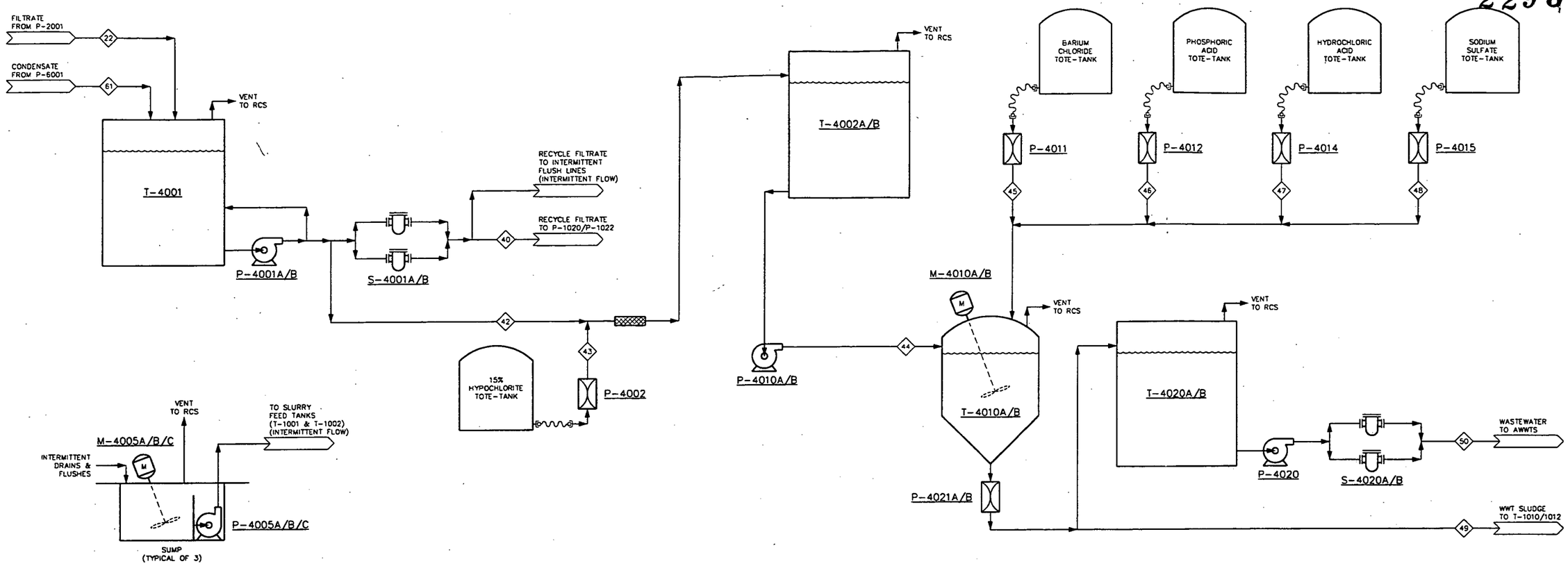
000005

DESIGNED BY	SES	CHECKED BY	MH	REVISION
DRAWN BY	JWH	APPROVED BY		0
DATE	3/17/99	DWG. SCALE	NONE	
IT PROJECT NO.	775743	DRAWING NO.	D-00-10-003	

775743D5 5/12/99 3:16pm JWH

DRAWING NUMBER D-00-10-004

2293



T-4001 RECYCLE FILTRATE TANK	S-4001A/B FILTERS	P-4005A/B/C SUMP PUMPS	T-4002A/B OXIDATION TANKS	P-4011 BARIUM CHLORIDE ADDITION PUMP	P-4014 HYDROCHLORIC ACID ADDITION PUMP	M-4010A/B WASTEWATER TREATMENT TANK MIXER	P-4021A/B WASTEWATER TREATMENT SLUDGE PUMPS	P-4020 EFFLUENT PUMP			
P-4001A/B RECYCLE FILTRATE PUMPS	MP-4005A/B/C SUMP MIXERS	P-4002 HYPOCHLORITE ADDITION PUMP	P-4010A/B TRANSFER PUMPS	P-4012 PHOSPHORIC ACID PUMP	P-4015 SODIUM SULFATE ADDITION PUMP	T-4010A/B WASTEWATER TREATMENT TANKS	T-4020A/B EFFLUENT TANKS	S-4020A/B EFFLUENT FILTERS			

STREAM NO. / COMPONENT	22 FILTRATE (LB/DAY)	40 RECYCLE FILTRATE (LB/DAY)	42 WASTEWATER (LB/DAY)	43 HYPOCHLORITE (LB/DAY)	44 WASTEWATER (LB/DAY)	45 BARIUM CHLORIDE (LB/DAY)	46 PHOSPHORIC ACID (LB/DAY)	47 HYDROCHLORIC ACID (LB/DAY)	48 SODIUM SULFATE (LB/DAY)	49 WASTEWATER TMENT SLUDGE (LB/DAY)	50 WASTEWATER TO AWWTS (LB/DAY	61 CONDENSATE (LB/DAY)
SOLIDS			6		6					326		
SODIUM SULFATE									42			
SODIUM HYPOCHLORITE				189								
BARIUM CHLORIDE						569						
PHOSPHORIC ACID							38					
HYDROCHLORIC ACID								124				
DISSOLVED SALTS	20	20	300		489					47	895	
WATER	7,280	8,360	125,429	1,068	126,497	2,276	89	415	168	6,162	123,283	1,080
TOTAL MASS	7,300	8,380	125,735	1,257	126,992	2,845	127	539	210	6,535	124,178	1,080
VOLUME (GAL)	871	1,000	15,000	138	15,126	284				757	14,744	129
VOLUME (GPM)												
BULK DENSITY (LB/FT^3)	62.7	62.7	62.7	68.1	62.8	74.9				64.6	63.0	62.4
TEMPERATURE (° F)	70	70	70	70	70	70	70	70	70	70	70	50

1. THE WASTEWATER TREATMENT SYSTEM WILL BE RUN AS NEEDED TO MAINTAIN WATER BALANCE. THE STABILIZATION SYSTEM IS EXPECTED TO BE IN WATER BALANCE WITH RESPECT TO THE RETRIEVAL SYSTEM. THEREFORE WASTEWATER TREATMENT MAY NOT BE REQUIRED UNTIL THE END OF THIS PROJECT. WASTEWATER TREATMENT BALANCE IS FOR 15,000 GALLON PER DAY WATER TREATMENT.

REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION
0	5/14/99	JWH	SES		FINAL REPORT
B	5/5/99	JWH	SES		DRAFT FINAL
A	3/17/99	JWH	SES		DRAFT REPORT

FLUOR DANIEL FERNALD

PROJECT NAME: FEMP OU-4 SILO 1 & 2 POP DEMONSTRATION

TITLE: PROCESS FLOW DIAGRAM FILTRATE & WATER TREATMENT

IT CORPORATION — A Member of The IT Group

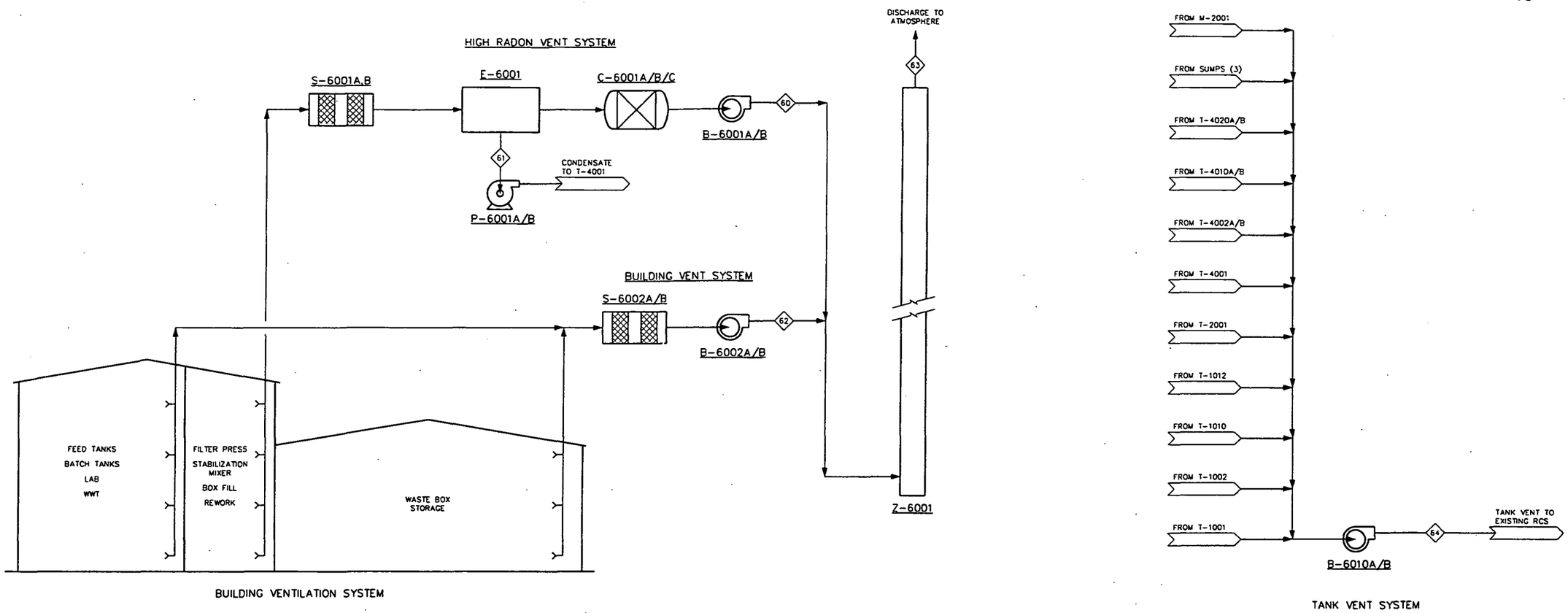
000006

DESIGNED BY	SES	CHECKED BY	MH	REVISION
DRAWN BY	JWH	APPROVED BY		0
DATE	3/17/99	DWG. SCALE	NONE	
IT PROJECT NO.	775743	DRAWING NO.	D-00-10-004	

775743.DN 5/14/99 8:50am JWH

DRAWING NUMBER D-00-10-005

2293



S-6001A/B	E-6001	B-6001A/B	C-6001A/B/C	P-6001A/B	S-6002A/B
HEPA FILTERS	DEHUMIDIFICATION PACKAGE UNIT	HIGH RADON VENT SYSTEM BLOWERS	CARBON ADSORBERS	CONDENSATE PUMPS	BUILDING VENT HEPA FILTERS

B-6002A/B	Z-6001	B-6010A/B
BUILDING VENTILATION BLOWER	STACK	TANK VENT BOOSTER BLOWERS

STREAM NO. / COMPONENT	60 HIGH RADON VENT (LB/HR)	61 CONDENSATE (LB/HR)	62 BUILDING VENT (LB/HR)	63 STACK DISCHARGE (LB/HR)	64 TANK VENTS (LB/HR)
AIR	8,955		45,000	53,955	2,250
WATER		45			
TOTAL MASS	8,955	45	45,000	53,955	2,250
VOLUME (SCFM)	2,000		10,000	11,990	500
VOLUME (GPM)		0.1			
BULK DENSITY (LB/FT^3)	0.075	62.4	0.075	0.075	0.075
TEMPERATURE (° F)	70	50	70	70	70

1. HIGH RADON VENT SYSTEM INCLUDES AIR FROM ROOM THAT HOUSES FILTER PRESS, STABILIZATION MIXER, WASTE BOX FILL AND REWORK EQUIPMENT.
2. CONTAINER STORAGE VENT SYSTEM INCLUDES AIR FROM PLANT AREAS WITH LOW POTENTIAL FOR RADON EMISSION. THIS INCLUDES ALL AREAS WITH SEALED TANKS AND WASTE BOXES.
3. ALL TANKS AND SUMPS WILL BE MAINTAINED AT 1-2 INCHES H_2O NEGATIVE PRESSURE. NORMAL AIR FLOW FROM ALL TANKS AND SUMPS IS SET AT 10-20 SCFM. VENT RATE DURING TANK FILLING WILL BE HIGHER (40 SCFM MAX). BALANCE AIR WILL BE PULLED FROM STABILIZATION MIXER.

REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION
0	5/14/99	JWH	SES		FINAL REPORT
B	5/5/99	JWH	SES		DRAFT FINAL
A	3/17/99	JWH	SES		DRAFT REPORT

FLUOR DANIEL FERNALD

PROJECT NAME: FEMP OU-4 SILO 1 & 2 POP DEMONSTRATION

TITLE: PROCESS FLOW DIAGRAM BUILDING VENTILATION & RADON CONTROL

IT CORPORATION
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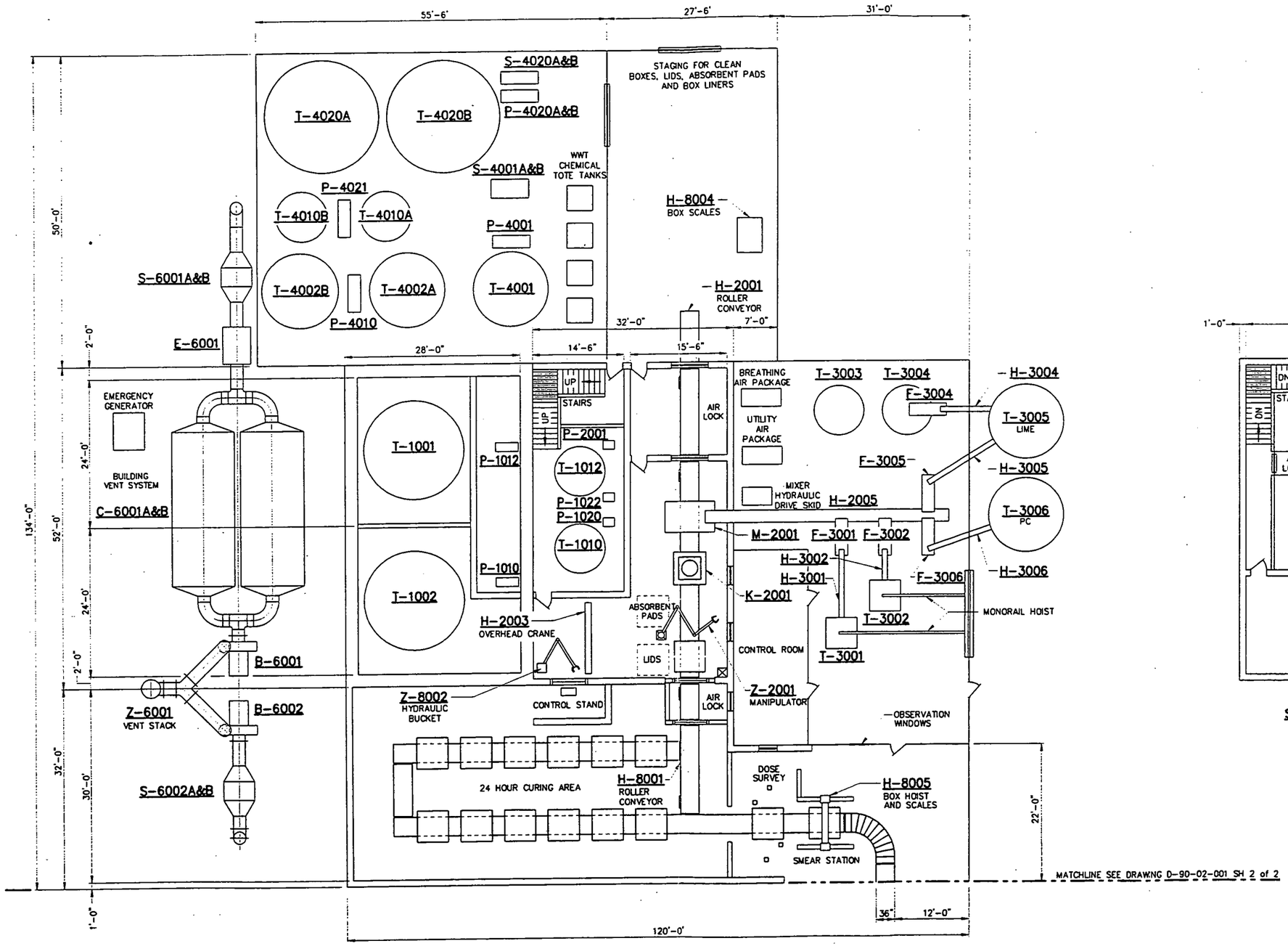
000007

DESIGNED BY	SES	CHECKED BY	MH	REVISION
DRAWN BY	JWH	APPROVED BY		0
DATE	3/17/99	DWG. SCALE	NONE	
IT PROJECT NO.	775743	DRAWING NO.	D-00-10-005	

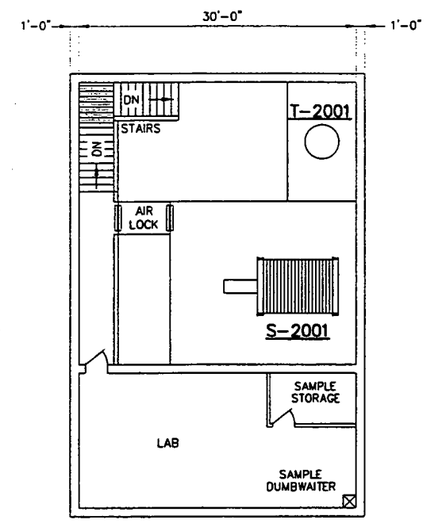
7757.303 5/12/99 1:04pm JWH

2293

DRAWING NUMBER D-90-02-001



GROUND LEVEL PLAN



SECOND LEVEL PLAN

REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION
0	5/14/99	STC	SES		FINAL REPORT
B	5/5/99	STC	SES		DRAFT FINAL
A	3/17/99	STC	SES		DRAFT REPORT

FLUOR DANIEL FERNALD

FEMP OU-4 SILO 1 & 3
PROPOSAL NO. 775743

PROJECT NAME: FEMP OU-4 SILO 1 & 2 POP DEMONSTRATION

TITLE: FACILITY ARRANGEMENT STABILIZATION BUILDING

IT CORPORATION
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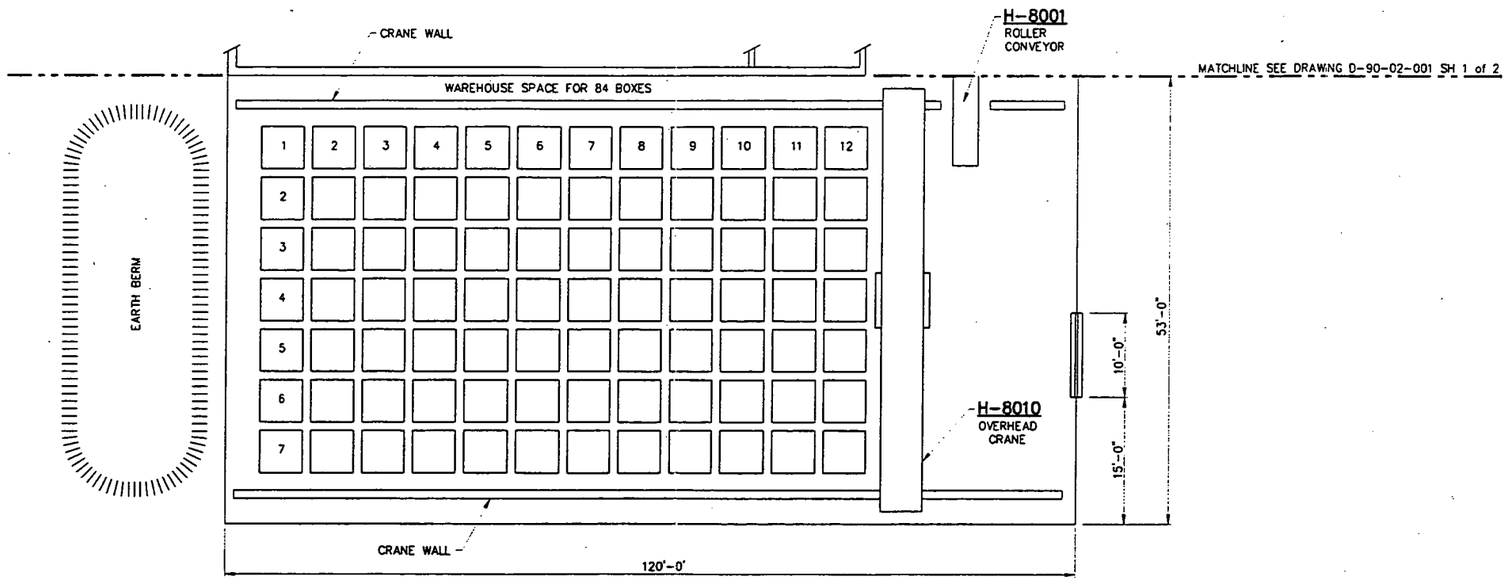
000008

DESIGNED BY	SES	CHECKED BY	MH		REVISION
DRAWN BY	STC	APPROVED BY			0
DATE	3/17/99	DWG. SCALE	1/8"=1'-0"		
IT PROJECT NO.	775743	DRAWING NO.	D-90-02-001		1 of 2

775743DB 05/12/99 1:05pm STC

DRAWING NUMBER D-90-02-001

2293



GROUND LEVEL PLAN

REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION
0	5/14/99	STC	SES		FINAL REPORT
B	5/3/99	STC	SES		DRAFT FINAL
A	3/17/99	STC	SES		DRAFT REPORT

FLUOR DANIEL FERNALD

FEMP OU-4 SILO 1 & 3
PROPOSAL NO. 775743

PROJECT NAME
FEMP OU-4 SILO 1 & 2
POP DEMONSTRATION

TITLE
FACILITY ARRANGEMENT
STABILIZATION BUILDING

IT CORPORATION
A Member of The IT Group

000009

DESIGNED BY	SES	CHECKED BY	MH	REVISION
DRAWN BY	STC	APPROVED BY		0
DATE	3/17/99	DWG. SCALE	1/8"=1'-0"	
IT PROJECT NO.	775743	DRAWING NO.	D-90-02-001	2 of 2

7757A307 05/11/99 11:10pm STC

APPENDIX B
TEST LOGS

NOTEBOOK NUMBER

1174

ISSUED TO: SILO 1 & 2 PROOF OF PRINCIPLE 775743

ON: 9-24-98

NOTEBOOK PURPOSE: RECORD LABORATORY AND DEMONSTRATION TESTING DATA AND OBSERVATIONS.

RETURNED:

Project Name PofP

Project Number 775743

2293
1174:001

% Moistures

Compound	Lot	Pan wt(g)	Pan + sample wt(g)	Dry wt of Pan + sample(g)
1) Aluminum Oxide	58594/0.0	1.001g	7.325g	7.324
2) Sodium Arsenite	61766/1.1	0.997g	10.028g	10.024
3) Barium Sulfate	61403/1.1	0.995	11.342g	11.329
4) Sodium Chromate (VI)	61106/1.1	0.992	10.057g	10.056
5) Magnesium Carbonate	61051/1.1	0.995g	4.340g	4.303
6) Sodium Carbonate	63711/0.0	0.994	5.550g	4.781
7) Nickel (II) Oxide	16710/1.2	0.996g	10.205g	10.200
8) Lead (II) Oxide	91666/1.1	0.999g	10.504g	10.497
9) Lead (II) Carbonate	62481/1.1	0.993g	11.162g	11.119
10) Lead (II) Sulfate	61359/1.1	1.575g	10.820g	10.819
11) Sodium Selenite	55595/1.1	1.552g	10.442g	10.440
12) Vanadium (V) Oxide	61436/1.1	0.993g	10.316g	10.316
13) Zinc Oxide	31912/1.1	0.993g	8.146g	8.146
14) U.S. Silica	50090398	0.994g	~~10~~ 11.035g	11.035
15) Sil-Co-Sil		0.997g	10.586g	10.586
16) Bentonite	NA*	0.994	10.856g	10.011
17) ~~Feldspar~~ Feldspar NC-4		0.992	10.533g	10.532

* NA = Not available

000012

Entries by JDC

Date 9-24-98

ject Name FDF PoP

ject Number 775743

2293
1174:002

% Moisture

1) Aluminum Oxide: 0.02%
2) Sodium Arsenite: 0.04%
3) Barium Sulfate: 0.13%
4) Sodium Chromate: 0.01%
5) Magnesium Carbonate: 1.11%
6) Sodium Carbonate: 16.88%
7) Nickel Oxide: ~~0.00%~~ 0.05% gfh 9/28/98
8) Lead (II) oxide: 0.07%
9) Lead (II) Carbonate: 0.42%
10) Lead (II) Sulfate: 0.01%
11) Sodium Selenite: 0.02%
12) Vanadium (V) oxide: 0%
13) Zinc Oxide: 0%
14) US Silica: 0%
15) Sil-co-Sil: 0 ~~0~~% silica
16) Bentonite: 8.57%
17) Feldspar NC-4: 0.01%

checked by gfh 9/28/98

000013

Entries by PRL Date 9-28-99

Project Name FDF PoP

Project Number 775743

2293
1174:003

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000014

Entries by Marilyn Hall

Date 3-2-99

ct Name FDF P&P

ct Number 775743

2293

1174:004

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000015

ries by Mary M. Kell Date 3-2-99

roject Name FDF PoP

roject Number 775743

2293

1174:005

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000016

Entries by Mary M. Wall

Date 3-2-99

ject Name FDF PoP

ject Number 775743

1174:006

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Entries by Mary Jane Hall Date 3-2-99

Project Name FDF PoP

Project Number 775743

2293

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MH

3-2-99

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Entries by Mary M Hall

Date 3-2-99

Project Name FDF PoP

Project Number 775743

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MH 3-2-99

000019

Entries by Mary McHall

Date 3-2-99

Project Name FDF PoP

Project Number 775743

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1174.009

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MJ 3-2-99

000020

Entries by Mary M Hall

Date 3-2-99

ect Name EDF PoP

ect Number 775743

2293

1174:010

30 WT % MOISTURE SILO 1 SURROGATE

1900

USING THE SHEET ON PG 11, WEIGHED OUT THE REAGENTS LISTED IN STEP 1. THE REAGENTS WERE PLACED INTO A 20 GALLON CONTAINER, NOT A 10 GALLON AS LISTED. THE WALK-IN HOOD IN LAB 3 WAS USED.

BLENDED WELL, USING A DUAL HELIX DRUM MIXER. PLACED A PLASTIC (CLEAR) BAG OVER TOP THE CONTAINER TO CONTAIN DUST EMISSIONS.

PAL 10/5/98

0705

CHECKED TO MAKE SURE REAGENTS WERE FINE.

1000

STARTED ADDING WATER TO REAGENTS AND MIXING. USED SAME MIXER AS ABOVE. ADDED WATER SLOWLY WHILE MIXING. TOOK ~15 MINUTES TO ADD WATER. CONTINUE MIXING FOR ANOTHER 15 MINUTES. ALLOWED TO SET.

1330

MIXED MATERIAL FOR 10 MINUTES PRIOR TO SAMPLING IN STEP 4. SAMPLE NUMBER FOR 1174-10-1. SAMPLES LABELLED A THRU D. SAMPLES TAKEN BY KEN FERGUSON AND PACKAGED BY MARY HALL.

PAL 10/6/98

1500

ADDED WATER AND BENTONITE (SEE PG ~~A~~ 21 PAL 10/6/98) TO A SECOND 20 GALLON CONTAINER. MIXED OVERNIGHT.

PAL 10/6/98

000021

ntries by [signature] Date 10/6/98

Project Name FDF PoP

Project Number: 775743

Preparation of the 70 wt % Solids Silo 1 Surrogate				
Compound	Dry Weight (g)	Moisture Content (%)	Mix Weight (g)	Actual Weight (g)
BaSO4	2,324.5	0.13	2,327.5	1723.3 + 504.2
Na2CrO4	18.0	0.01	18.0	18.06
Fe2O3	600.8	0.12	601.5	601.55
MgO	128.3	0.5	128.9	128.92
MgCO3	164.3	1.11	166.1	166.11
Mg3(PO4)2	380.3	0.2	381.1	381.15
NaNO3	112.5	0.01	112.5	112.51
NiO	103.5	0.05	103.6	103.64
PbO	1,125.0	0.07	1,125.8	1125.7
PbCO3	938.3	0.42	942.3	942.33
PbSO4	1,417.5	0.01	1,417.6	1417.6
Na2SeO3	29.3	0.02	29.3	29.38
Coarse SiO2	4,734.8	0	4,734.8	4734.80
Fine SiO2	4,339.4	0	4,339.4	4,339.5
Silica Fume	2,070.1	0.4	2,078.4	2,102.6
V2O5	20.3	0	20.3	20.32
ZnO	2.3	0	2.3	2.31
Diatomaceous Earth	330.8	0	330.8	330.78
Feldspar	3,660.8	0.01	3,661.2	3,661.2
Water			9,622.5	9,624.5

1. Weigh out the dry chemicals and place in a 10 gallon container
2. Blend well, breaking up any lumps
3. Add the water and mix thoroughly
4. Collect and weigh 4 1-L samples for validation testing and analysis

	Weight (g)
Sample 1	
Sample 2	SEE PG 16. PAL 10/6/98
Sample 3	
Sample 4	

Completed By: [signature]

Date: 10/6/98

ect Name FDF PoP

ect Number 775743

2293

1174:012

70 WT % SOLIDS SILO 2 SURROGATE

1500

USING THE SHEET ON PG 13, WEIGHED OUT THE REAGENTS LISTED IN STEP 1. THE REAGENTS WERE PLACED INTO A 20 GALLON CONTAINER, NOT A 10 GALLON AS LISTED. THE WALKIN HOOD IN LAB 3 WAS USED.

BLENDED THE DRY REAGENTS WELL, USING A DUAL HELIX DRUM MIXER. PLACED A PLASTIC BAG OVER THE TOP OF THE CONTAINER TO CONTROL DUSTING.

PAL 10/5/98

0710

ADDED TRI BUTYL PHOSPHATE AND KEROSENE TO DRY REAGENTS. MIXED WELL USING DRUM MIXER.

1100

STARTED ADDING WATER TO REAGENTS AND MIXING WITH DRUM MIXER. ADDED WATER SLOWLY WHILE MIXING. TOOK ~15 MINUTES TO ADD WATER & CONTINUED MIXING FOR ANOTHER 15 MINUTES.

1350

MIXED MATERIAL FOR ~10 MINUTES PRIOR TO SAMPLING IN STEP 5. SAMPLE NUMBER 1174-12-01. SAMPLES LABELLED A THRU D. SAMPLES TAKEN BY KEN FERGUSON AND PACKAGED BY MARY HALL.

1530

ADDED WATER AND BENTONITE (SEE P21) TO A SECOND 20 GALLON CONTAINER. MIXED OVERNIGHT.

PAL 10/6/98

000023

ries by [signature] Date 10/6/98

Project Name FDF P&P

Project Number 775743

Page No: 1174:013

10/10/98

Preparation of the 70 wt % Solids Silo 2 Surrogate

Compound	Dry Weight (g)	Moisture Content (%)	Mix Weight (g)	Actual Weight (g)
Al2O3	182.3	0.02	182.3	182.3
Na2HAsO4	78.8	0.04	78.8	78.8
BaSO4	1,530.0	0.13	1,532.0	1532.0
CaCO3	864.0	0.17	865.5	865.5
Na2CrO4	13.5	0.01	13.5	13.5
Fe2O3	1,401.8	0.12	1,403.4	1403.5
KNO3	81.0	0.1	81.1	81.1
MgCO3	587.3	1.11	593.9	593.9
Mg3(PO4)2	389.3	0.2	390.1	390.1
NaNO3	159.8	0.01	159.8	159.8
NiO	83.3	0.05	83.3	83.3
PbO	803.3	0.07	803.9	803.9
PbCO3	103.5	0.42	103.9	103.9
PbSO4	906.8	0.01	906.9	906.9
Na2SeO3	22.5	0.02	22.5	22.5
Coarse SiO2	4,753.8	0	4,753.8	4,753.8
Fine SiO2	4,127.0	0	4,127.0	4,127.0
Silica Fume	2,069.9	0.4	2,078.2	2103.8
V2O5	20.3	0	20.3	20.3
ZnO	2.3	0	2.3	2.35
Tributyl Phosphate	207.0	0.11	207.2	207.2
Kerosene	207.0	0	207.0	207.0
Diatomaceous Earth	996.8	0	996.8	996.8
Feldspar	2,988.0	0.01	2,988.3	2,988.5
Water			9,654.1	9657.0

1. Weigh out the dry chemicals and place in a 10 gallon container
2. Blend well, breaking up any lumps
3. Mix in tributyl phosphate and kerosene and mix well
4. Add the water and mix thoroughly
5. Collect and weigh 4 1-L samples for validation testing and analysis

	Weight (g)
Sample 1	
Sample 2	SEE PG 16. PAL 10/6/98
Sample 3	
Sample 4	

Completed By: [signature]

Date: 10/6/98

70 WT % SOLIDS DEMONSTRATION SURROGATE

1600

USING THE SHEET ON PG 15, WEIGHED OUT THE DRY REAGENTS LISTED IN STEP 1. REAGENTS WERE PLACED INTO A 20 GALLON CONTAINER (NOT 10 GALLON) IN WALK-IN HOOD IN LAB 3.

BLENDED THE DRY REAGENTS WELL, USING A OVAL HELIX DRUM MIXER. PLACED A PLASTIC BAG OVER THE TOP OF THE CONTAINER TO CONTROL DUST EMISSIONS.

PAL 10/5/98

0720

WEIGHED OUT & ADDED TRIBUTYL PHOSPHATE AND KEROSENE TO DRY REAGENTS. MIXED WELL WITH DRUM MIXER.

1030

STARTED ADDING WATER TO REAGENTS AND MIXING WITH DRUM MIXER. ADDED WATER SLOWLY WHILE MIXING. TOOK ~15 MINUTES TO ADD WATER AND CONTINUED MIXING FOR ANOTHER 15 MINUTES.

1340

MIXED MATERIALS FOR ~10 MINUTES PRIOR TO SAMPLING IN STEP 5. SAMPLE NUMBER 1174-14-01 SAMPLES LABELED A THRU D. SAMPLES TAKEN BY KEN FERGUSON & PACKAGED BY MARY HALL.

1600

ADDED WATER TO BENTONITE (SEE PG 21) IN A SECOND 20 GALLON CONTAINER. MIXED OVERNIGHT.

PAL 10/6/98

ies by [signature] Date 10/6/98

Project Name FDFPoP
Project No: 775743

2293

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MH 10/10/98

Preparation of the 70 wt % Solids Demonstration Surrogate				
Compound	Dry Weight (g)	Moisture Content (%)	Mix Weight (g)	Actual Weight (g)
Na2HAsO4	38.3	0.04	38.3	38.38
BaSO4	1,840.5	0.13	1,842.9	1,842.86
Na2CrO4	60.8	0.01	60.8	60.78
Fe2O3	567.0	0.12	567.7	567.15
Mg3(PO4)2	528.8	0.02	528.9	528.88
NaNO3	238.5	0.01	238.5	238.41
NiO	96.8	0.05	96.8	96.76
PbO	1,275.8	0.07	1,276.7	1,276.7
PbCO3	1,485.0	0.42	1,491.3	1,491.75
PbSO4	596.3	0.01	596.4	596.36
Na2SeO3	33.8	0.02	33.8	33.85
Coarse SiO2	4,482.0	0	4,482.0	4,482.0
Fine SiO2	4,252.5	0	4,252.5	4,252.7
Silica Fume	2,052.0	0.4	2,060.2	2043.3
V2O5	20.3	0	20.3	20.32
ZnO	2.3	0	2.3	2.29
Tributyl Phosphate	207.0	0.11	207.2	207.2
Kerosene	207.0	0	207.0	207.0
Diatomaceous Earth	411.8	0	411.8	411.63
Feldspar	4,122.0	0.01	4,122.4	4,122.6
Water			9,631.4	9632.0

1. Weigh out the dry chemicals and place in a 10 gallon container
2. Blend well, breaking up any lumps
3. Mix in tributyl phosphate and kerosene and mix well
4. Add the water and mix thoroughly
5. Collect and weigh 4 1-L samples for validation testing and analysis

Weight (g)

Sample 1
Sample 2 SEE PG 16. PAL 10/6/98
Sample 3
Sample 4

Completed By: [signature]

Date: 10/6/98

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10/10/98

10/6/98

SAMPLE WTS.

1174-10-1A	1001.64g
1174-10-1B	1000.53g
1174-10-1C	1000.38g
1174-10-1D	300.24g
1174-12-1A	1000.49g
1174-12-1B	1000.14g
1174-12-1C	1000.21g
1174-12-1D	301.71g
1174-14-1A	1000.38g
1174-14-1B	1000.40g
1174-14-1C	1000.44g
1174-14-1D	300.43g

Kenneth Ferguson 10/6/98

Project Name FDF PoP

Project Number 775743

2293
1174.017

TESTING OF ~~30~~ 70 WT % SOLIDS SURROGATES PAL 10/6/98

1430

TOOK 700g SURROGATE MATERIAL FROM EACH OF THE 3 70 WT % SOLIDS SURROGATES (p10-15).

MOISTURE CONTENT - PLACED PORTION INTO A PREWEIGHED ALUMINUM WEIGH DISH & WEIGHED. PLACED IN OVEN (TEMPERATURE 106°C). PAL 10/6/98

	SILO 1	SILO 2	DEMONSTRATION
PAN (g)	0.9889	0.9830	0.9887
PAN + SAMPLE (g)	20.8736	11.6978	15.6752

PAL 10/6/98

REMOVED SAMPLES FROM OVEN. PLACED IN DESSICATOR TILL COOL AND WEIGHED

PAN + DRY SOLIDS (g)	15.0007	8.4186	11.1893

PAL 10/7/98

INSITU BULK DENSITY - CUT 1-L PLASTIC GRADUATED CYLINDER (WALL THICKNESS 40 mm) TO A HEIGHT OF 250 ML. TOOK A KNOWN AMOUNT OF 70 WT % SOLIDS SURROGATE MATERIAL AND COMPACTED USING BOLT UNTIL NO FURTHER COMPACTION SEEN.

	SILO 1	SILO 2	DEMONSTRATION
WEIGHT (g)	217.0	185.0	190.0
COMPACTED VOLUME (ML)	130	110	105

RETURNED COMPACTED MATERIAL TO THE REST OF THE 70 WT % SOLIDS SURROGATE MATERIAL.

PAL 10/6/98

000028 18

Entries by [signature]

Date 10/7/98

ject Name FDF PoP

ject Number 775743

17 AM ~~18~~ 10/6/98

TESTING OF 70 WT % SOLIDS SURROGATES

pH

TOOK 5.0 g OF 70 WT % SOLIDS SURROGATE MATERIAL IN A DISPOSABLE BEAKER AND ADDED 96.5 g OF DEIONIZED WATER. STIRRED FOR 5 MINUTES AND DETERMINED pH

1600 pH CALIBRATION WITH pH 7.0 AND 10.0 BUFFERS.
pH 7 CHECK STANDARD - 7.01

1605 ADDED WATER TO SAMPLES

1610 -1615 MEASURED pHs.

	SILO 1	SILO 2	DEMONSTRATION
SAMPLE WT (g)	5.0398	4.9923	5.0101
pH	~~8.95~~ 9.13 PRL 10/6/98	8.93	8.31

1620 REWEIGHED ADDITIONAL ALIQUOTS OF DEMONSTRATION SURROGATE. ADDED 96.5 g DEIONIZED WATER TO EACH ALIQUOT. STIRRED.

1628 MEASURED pHs

	~~SILO~~ DEMONSTRATION - B	SILO 2	~~SILO 3~~ DEMONSTRATION - C PRL
SAMPLE WT (g)	4.9689	4.9638	
pH	8.24	8.40	

PRL 10/6/98

000029

19

ntries by [signature] Date 10/6/98

Project Name FDF PoP

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18 PAL
20 10/6/98

2293
1174:019

PLASTICITY

REMOVED AN ADDITIONAL 10.0g OF 70.% SOLIDS DEMONSTRATION SURROGATE TO REPLACE ADDITIONAL PU SAMPLE MATERIAL

TOOK ~50 g OF 70 WT. % SOLIDS MATERIAL AND TRIED TO MAKE A CLAY RIBBON WITH EACH. NONE WORKED.

ADDED ADDITIONAL WATER TO EACH TO MAKE THE MATERIAL JUST PLASTIC. MIXED ADDITIONAL WATER IN BY HAND.

ONCE A JUST PLASTIC MATERIAL CREATED, MOISTURE CONTENT OF THE MATERIAL WAS DETERMINED BY PLACING PORTION IN PRE WEIGHED CONTAINER AND WEIGHING. PLACED IN OVEN (TEMPERATURE = 105°C).

	SILO 1	SILO 2	DEMONSTRATION
PAN (g)	0.9897	0.9867	0.9858
PAN + SAMPLE (g)	18.0433	16.2510	14.4936
			PAL 10/6/98
PAN + DRY SOLIDS (g)	~~9.71~~ 12.3222 PAL 10/7/98	10.6033	9.7989
			PAL 10/7/98

000030

Entries by [signature] Date 10/7/98

oject Name FDF PoP

oject Number 775743

2293
1174:020

DETERMINATION OF WATER AND BENTONITE ADDITION TO MAKE 30 WT % SOLIDS SLURRY

A TOTAL WEIGHT OF REAGENTS & WATER IN 70 WT % SOLIDS SURROGATE FROM PGS ~~10, 12, & 14~~ 11, 13 & 15 RLL 10/6/98 :

SILO 1 = 32,070.46 (g) SILO 2 = 32,284.75 g DEMONSTRATION = 32,158.47 g

B WEIGHT REMOVED FOR FDF AND TCLP pb SAMPLES: (PGS 11, 13, & 15)

SILO 1 = 3,302.79 g SILO 2 = 3,302.55 g DEMONSTRATION = 3,309.35 g

C WEIGHT REMOVED FOR pH, MOISTURE, PLASTICITY TESTING: (PGS 17 AND 19)

SILO 1 = 70.0 g SILO 2 = 70.0 g DEMONSTRATION = 80.0 g

TOTAL 70 WT % SOLIDS MATERIAL REMAINING: (A - B - C)

SILO 1 = 28,697.67 g SILO 2 = 28,912.20 g DEMONSTRATION = 28,777.12 g

E ASSUMING 70 WT % SOLIDS, REMAINING DRY SOLIDS: (D x 0.7)

SILO 1 = ~~17,4~~ 20,088.37 g RLL 10/6/98 SILO 2 = 20,238.54 g DEMONSTRATION = 20,143.98 g

F DRY BENTONITE ADDITION: (E x 0.087)

SILO 1 = 1,746.82 g SILO 2 = 1,759.87 g ~~SILO 3~~ DEMONSTRATION = 1,751.65 g RLL 10/6/98

G MOISTURE CONTENT OF BENTONITE IS 8.75 % (% OF TOTAL WEIGHT), AMOUNT OF MOIST BENTONITE TO ADD: (F x 100/(100 - 8.75))

SILO 1 = 1914.32 g SILO 2 = 1928.63 g DEMONSTRATION = 1919.62 g

TOTAL REMAINING SOLIDS + DRY BENTONITE: (E + F)

SILO 1 = 21,835.18 g SILO 2 = 21,998.41 g DEMONSTRATION = 21,895.63 g

000031 21

Entries by [signature] Date 10/6/98

Project Name FDF PoP

Project Number 775743

20

I TOTAL 30 WT % SOLIDS SLURRY : (H / 0.3)

SILO 1 = 72,283.95 g SILO 2 = 73,328.04 g DEMONSTRATION = 72,985.41 g

J ADDITIONAL WATER NEED TO MAKE 30% WT % SOLIDS SLURRY : (I - D - G)

SILO 1 = 42,171.96 g SILO 2 = 42,487.22 g DEMONSTRATION = 42,288.71 g

1400

WEIGHED OUT BENTONITE AND WATER TO MAKE 30 WT % SOLIDS SLURRIES FROM 70 WT % SOLIDS SURROGATES

	SILO 1	SILO 2	DEMONSTRATION
BENTONITE	1914.39 g	1928.55 g	1919.62 g
WATER	42.2 PRL 10/6/98 ~~44.2~~ kg	42.5 kg	42.4 kg

PRL 10/6/98

1445

SEE PGS 10, 12, AND 14 FOR ADDITION OF WATER AND BENTONITE.

PRL 10/6/98

000032

Entries by [signature] Date 10/6/98

ject Name FDF PoP

ject Number 775743

2293

1174:022

VERIFICATION TESTING RESULTS VS CRITERIA

MOISTURE CONTENT (WET WT BASIS) (SEE PG 17)

$$\frac{\text{PAN + SAMPLE} - \text{PAN + DRY SOLIDS}}{\text{PAN + SAMPLE} - \text{PAN}} \times 100$$

SILO 1	SILO 2	DEMONSTRATION	CRITERIA
29.53 %	30.68 %	30.54 %	30 ± 2 %

IN SITU DENSITY (SEE PG 17)

WEIGHT COMPACTED SAMPLE (g) / COMPACTED VOLUME (ML)

	RESULT	CRITERIA
SILO 1	1.67 g/cm³	
SILO 2	1.68 g/cm³	
DEMONSTRATION	1.81 g/cm³	

pH (SEE PG 18)

SILO 1	SILO 2	DEMONSTRATION	CRITERIA
9.13	8.93	8.31, 8.24, 8.40	9-10

NOTE: pH IS SLIGHTLY LOWER THAN CRITERIA

PLASTICITY (SEE PG 19)

MOISTURE CONTENT (DRY WT BASIS) AT PLASTIC LIMIT

$$\frac{\text{PAN + SAMPLE} - \text{PAN + DRY SOLIDS}}{\text{PAN + DRY SAMPLE} - \text{PAN}} \times 100$$

SILO 1	SILO 2	DEMONSTRATION	CRITERIA
50.48%	58.73 %	53.27%	45-55%

NOTE: SILO 2 HAS SLIGHTLY HIGHER PLASTICITY

000033

Entries by PRL

Date 10/7/98

Project Name FDF Pop

Project Number 775743

2293
1174.023

1600 ADDED 70 WT % SILO 1 SURROGATE TO ITS WATER AND BENTONITE SLURRY (SEE PG 10). MIXED OVERNIGHT

1630 ADD 70 WT % SOLIDS SILO 2 SURROGATE TO ITS WATER AND BENTONITE SLURRY (SEE PG 12). MIXED OVERNIGHT.

1700 ADDED 70 WT % SOLIDS DEMONSTRATION SURROGATE TO IT'S WATER AND BENTONITE SLURRY (SEE PG 14). MIXED OVERNIGHT.

THIS SHOULD PRODUCE THE 3 30 WT % SOLIDS SLURRIES FOR DEWATERING AND FORMULATION DEVELOPMENT TESTING.

PAL 10/2/98

000034

Entries by [signature]

Date 10/2/98

oject Name FDF PoP

oject Number 775743

2293

1174:024

TRACKING OF SAMPLES SENT TO FDF (SEE PGS 10, 12, & 14)

1730 GOT MESSAGE FROM ROD WESTLAND THAT JOHN ROBERTS WAS INCORRECT ABOUT SAMPLE RECEIPT. VERIFICATION SAMPLES OF ~~30~~ 70 WT % SOLIDS SURROGATES WERE NOT RECEIVED BY FDF. SINCE ALL OF THE 70 WT % SOLIDS MATERIAL HAS BEEN ADDED TO THE BENTONITE & ADDITIONAL WATER (p23), THESE SAMPLES MUST BE FOUND. PAL 10/7/98

0830 HAD MARY HALL START FED-EX TRACKING OF SHIPMENT. OTHER SAMPLES WERE RECEIVED BY RECRA LABS ACCORDING TO MARY. TOLD HER TO GET HOURLY UPDATES.

1330 SPOKE WITH MARILYN AT FED-EX. SHE SAYS THAT THEY ARE LOOKING FOR A 5-GALLON BUCKET PER INSTRUCTIONS OF MARY MORRIS (FDF). I TOLD HER IT WAS A BLUE & WHITE COOLER. I HAD MARY TALK TO HER CONTACT AT FED-EX & HAVE HER TALK TO MARILYN.

1800 STILL NO WORD ON THE PACKAGE

PAL 10/8/98

1000 MARY'S LAST UPDATE IS THAT THE SAMPLES ARE STILL AWOL.

1400 MARY SAYS THE SAMPLES ARE FOUND. I TOLD HER TO CONTACT ROD WESTLAND TO ARRANGE DELIVERY.

PAL 10/9/98

000035

ntries by [signature] Date 10/9/98

Project Name FDF PoP

Project Number 775743

2293
1174.025

DEWATERING TESTING OF 30 WT % SOLIDS SURROGATE SLURRIES

0830

USING A LADLE TO SCOOP SLURRY MATERIAL, WHILE IT WAS BEING VIGOROUSLY MIXED, FROM ~1/2 THE SLURRY DEPTH. REMOVED ~ 500ML OF EACH SURROGATE SLURRY MATERIAL FOR DEWATERING TESTS

1. TOOK 100ML OF SILO 1 SLURRY. ADDED 1.2g OF HYDRATED LIME (MARTIN MARIETTA, WOODVILLE, OH). STIRRED VIGOROUSLY TO MIX & THEN INTERMITTENTLY FOR ~5 MIN. PLACED ON BUCHNER FUNNEL W/ WHATMAN #11 FILTER PAPER. PULL VACUUM FOR 5 MINUTES. GOOD CRACKING OBSERVED

2. TOOK 100ML OF SILO 1 SLURRY. ADDED 0.6g OF HYDRATED LIME (0.05 #/GALLON). STIRRED VIGOROUSLY TO MIX & THEN INTERMITTENTLY FOR ~5 MIN. PLACED ON BUCHNER FUNNEL W/ WHATMAN #11 FILTER PAPER. PULLED VACUUM FOR 5 MINUTES. NO CRACKING OBSERVED.

3. TOOK 100ML OF SILO 1 SLURRY. ADDED 0.9g OF HYDRATED LIME (0.075 #/GALLON). STIRRED VIGOROUSLY TO MIX & THEN INTERMITTENTLY FOR ~5 MIN. PLACED ON BUCHNER FUNNEL W/ WHATMAN #11 FILTER PAPER. PULLED VACUUM FOR 5 MINUTES. FAIR CRACKING.

4. TOOK 100ML OF SILO 1 SLURRY. ADDED 1.2g OF HYDRATED LIME (0.1 #/GALLON, REPEAT OF #1). STIRRED VIGOROUSLY TO MIX, THEN INTERMITTENTLY FOR ~5 MIN. PLACED ON BUCHNER FUNNEL W/ WHATMAN #1 FILTER PAPER. PULLED VACUUM FOR 5 MINUTES. GOOD CRACKING OBSERVED.

JM 10/8/98

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1174.026

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0910

5. TOOK 100 ML OF DEMONSTRATION SLURRY. ADDED 1.2g OF HYDRATED LIME (0.1#/GALLON). STIRRED VIGOROUSLY TO MIX & THEN INTERMITTENTLY OF ~5 MINUTES. PLACED ON BUCHNER FUNNEL w/ WHATMAN #1 FILTER PAPER. PULLED VACUUM FOR 5 MINUTES. GOOD CRACKING OBSERVED.

6. TOOK 100 ML OF DEMONSTRATION SLURRY. ADDED 0.9g OF HYDRATED LIME (0.075#/GALLON). STIRRED VIGOROUSLY TO MIX & THEN INTERMITTENTLY FOR ~5 MINUTES. PLACED ON BUCHNER FUNNEL w/ WHATMAN #1 FILTER PAPER. PULLED VACUUM FOR 5 MINUTES. FAIR TO GOOD CRACKING OBSERVED.

7. TOOK 100 ML OF SILO 2 SLURRY. ADDED 0.9g OF HYDRATED LIME (0.075#/GALLON). STIRRED VIGOROUSLY FOR MIXING AND THEN INTERMITTENTLY FOR ~5 MINUTES. PLACED ON BUCHNER FUNNEL w/ WHATMAN #1 FILTER PAPER. PULLED VACUUM FOR 5 MINUTES. FAIR TO GOOD CRACKING OBSERVED.

8. TOOK 100 ML OF SILO 2 SLURRY. ADDED 1.2g OF HYDRATED LIME (0.1#/GALLON). STIRRED VIGOROUSLY TO MIX AND THEN INTERMITTENTLY FOR ~5 MIN. PLACED ON BUCHNER FUNNEL w/ WHATMAN #1 FILTER PAPER. PULLED VACUUM FOR 5 MINUTES. GOOD CRACKING OBSERVED.

WILL USE 0.1#/GALLON HYDRATED LIME FOR ALL DEWATERING OF THE 30 WT % SOLIDS SLURRIES.

PRL 10/8/98

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1174:027

CHARACTERIZATION OF 70 WT % MOISTURE (30 WT % SOLIDS) SURROGATE SLURRY MATERIAL (SEE PG 23)

1000

USING A LADLE TO SCOOP MATERIAL FROM ~ ½ THE SLURRY DEPTH, 100 ML OF SLURRY WAS TRANSFERRED TO A GRADUATE CYLINDER & PLACED ON A TARED BALANCE

	SILO 1	SILO 2	DEMONSTRATION
WEIGHT OF 100 ML	125.51 g	118.46 g	119.66 g
DENSITY g/ML	1.26	1.18	1.20

USING A LADLE TO SCOOP MATERIAL FROM ~ ½ THE SLURRY DEPTH, A PORTION OF THE SLURRY WAS PLACED INTO A PRE-WEIGHED WEIGHING PAN. THE PAN WITH THE SLURRY WAS WEIGHED AND PLACED INTO AN OVEN.

	SILO 1	SILO 2	DEMONSTRATION
PAN (g)	0.99	1.08	0.99
PAN + SLURRY (g)	27.83	37.43	33.49
PAC DEL 10/8/98			

OVEN TEMPERATURE WAS 105 °C PAC 10/8/98

PAN + DRY SOLIDS	9.25	11.69	10.81

OVEN TEMPERATURE WAS 106°C. SAMPLES COOLED IN DESSICATOR PRIOR TO WEIGHING.

SOLIDS CONTENT % $\frac{(\text{PAN+DRYSOLIDS} - \text{PAN})}{(\text{PAN+SLURRY} - \text{PAN})} \times 100$	38.77 %	29.34 %	29.94 %

PAC 10/9/98

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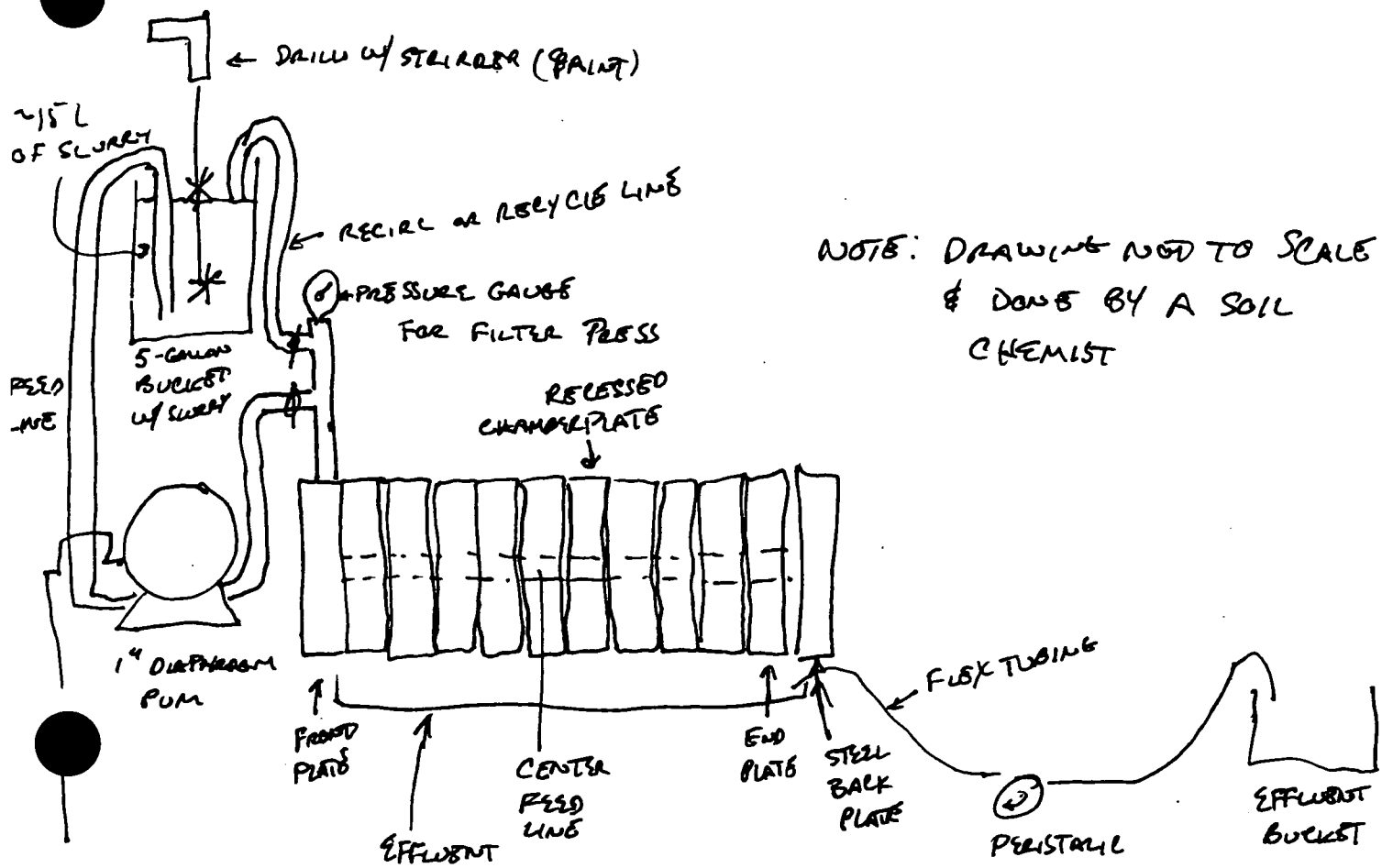
1174:028 2293

DEWATERING SETUP



NOTE: DRAWING NOT TO SCALE & DONE BY A SOIL CHEMIST

DIAPHRAM PUMP WILL FEED MATERIAL INTO THE PRESS. MATERIAL WILL BE FEED TO THE PRESS TO PRODUCE ~ 40 psi IN PRESS THEN PRESSURE WILL BE INCREASED IN PRESS BY INCREASING AIR PRESSURE SLOWLY. THIS WILL PUMP ADDITIONAL MATERIAL INTO PRESS. CYCLE TIME WILL BE DICTATED BY WHEN PRESS PRESSURE REACHES ~100 psi & WHEN EFFLUENT FLOW SLACKENS. ANTICIPATED PRESS TIME IS ~1 HOUR.

WHEN FILTER PRESS RUN COMPLETE, THE CAKE FORMED BETWEEN EACH PLATE WILL BE REMOVED AND WEIGHED. A PORTION OF THE MATERIAL IN THE CENTER FEED LINE WILL BE INCLUDED W/ EACH CAKE.

PAL 10/8/98

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1174:029

DEWATERING OF SILO 1 30 WT % SOLIDS SLURRY

1300 ~~1400~~ PRL 10/8/98

DIVIDED SLURRY MATERIAL INTO 3 15-L AND 1 13-L PORTIONS. TO THE 15-L PORTIONS, 180 g OF HYDRATED LIME WAS ADDED. TO THE 13-L PORTION, ~~15.6~~ 156 g PRL 10/8/98 OF HYDRATED LIME WAS ADDED. ALL LIME-AMENDED PORTIONS WERE WELL-MIXED USING A DRILL-MOUNTED PAINT STIRRER.

1400 - 1410

MATERIAL WAS INTRODUCED TO THE FILTER PRESS USING THE SAND PIPER 1" DIAPHRAM PUMP. APPROXIMATELY A 15-L PORTION OF LIME AMENDED SLURRY WAS NEED TO INITIALLY FILL THE PRESS. INITIAL PRESSURE ~40 psi

1410 - 1500 (RUN END)

AN ADDITIONAL ~7.5-L OF MATERIAL WAS TAKEN INTO THE PRESS AS THE PRESSURE WAS SLOWLY STEPPED TO ~100 psi. THE RECYCLE LINE WAS OPENED ~EVERY 5 MINS TO KEEP FEED LINE FROM PLUGGING, THOUGH NO SIGNS OF PLUGGING WERE ENCOUNTERED. TOOK AN INITIAL FILTER PRESS EFFLUENT SAMPLE (1174-29-01) AND A COMPOSITE EFFLUENT SAMPLE FOR THE FIRST FILTER PRESS RUN (1174-29-02). ~14 L OF EFFLUENT COLLECTED, SLIGHTLY YELLOW IN COLOR.

1600 - 1610

AFTER PRESS CLEANED & REASSEMBLED, MORE MATERIAL INTRODUCED TO FILTER PRESS ~15-L OF LIME-AMENDED MATERIAL NEEDED. INITIAL PRESSURE ~40 psi

1610 - 1700 (RUN END)

AN ADDITIONAL ~7.5-L OF MATERIAL WAS TAKEN WHILE PRESSURE INCREASED TO ~100 psi. TOOK COMPOSITE SAMPLE OF EFFLUENT FOR 2ND FILTER PRESS RUN (1174-29-03) ~ 12 L OF EFFLUENT COLLECTED. SLIGHT YELLOW COLOR. PRL 10/8/98

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29

1800 - 1810

TRY "SHORT-STACKING" THE PRESS WITH 5 PLATES INSTEAD OF 10 DUE TO LOWER SAMPLE VOLUME REMAINING (132). ~8L OF LIME-AMENDED MATERIAL NEED TO INITIALLY FEED PRESS. INITIAL PRESSURE ~ 40 psi.

1810 - 1825

ADDITIONAL MATERIAL WAS FEED TO THE PRESS AS PRESSURE WAS INCREASED. AT ~80 psi, MATERIAL BEGAN SPRAYING FROM END PLATE JOINT. RUN HAD TO BE TERMINATED! NO ADDITIONAL FILTER CAKE WAS SALVAGED. COMPOSITE FILTER PRESS EFFLUENT SAMPLE WAS

2000

PROBLEM SEEMS TO BE WITH SEAL ON END PLATE WHEN SHORT STACKING. NO SOLID STEEL BACK BEHIND END PLATE IN THE "SHORT STACK" CONFIGURATION, ONLY A REGULAR PLATE SINCE END PLATE WAS JUST PLACED IN PLACE OF 6TH PLATE. WITHOUT A SOLID STEEL BACKING PLATE, THIS PRESS CAN NOT BE SHORT-STACKED!!!

WEIGHT OF FILTER CAKES

	RUN 1		RUN 2
1	1711.7	1	1784.9
2	1710.0	2	1713.7
3	1677.7	3	1708.6
4	1648.7	4	1682.6
5	1697.5	5	1737.7
6	1788.9	6	1715.1
7	1689.4	7	1660.1
8	1735.2	8	1728.0
9	1711.1	9	1940.5
10	1790.9	10	1689.6

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es by [signature] Date 10/8/98

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1174:031

DEWATERING OF SILO 2 30 WT % SOLID SLURRY

1030

DIVIDED THE SLURRY INTO 3 15-L PORTIONS AND 1 17-L PORTION. ADDED 180g OF HYDRATED LIME TO THE 15-L PORTIONS AND 204 g TO THE 17-L PORTION. MIXED WELL WITH PAINT MIXER. WILL TRY 3 9 PLATE RUNS TO AVOID SHORT-STALK.

1100 – 1110

LIME-AMENDED MATERIAL PUMPED INTO FILTER PRESS. ~20-L OF MATERIAL USED TO INITIALLY FILL PRESS. INITIAL PRESSURE ~40 psi.

1110 – 1150 (RUN END)

AN ADDITIONAL ~40-L OF MATERIAL WAS INTRODUCED TO THE PRESS AS THE PRESSURE WAS SLOWLY INCREASED TO ~100 psi. RECYCLE LINE WAS USED ~EVERY 5-10 MINUTES. COLLECTED ~20-L OF EFFLUENT. COMPOSITE SAMPLE (1174-31-01) WAS TAKEN OF EFFLUENT. YELLOW COLOR NOTED.

1230-1240

LIME-AMENDED MATERIAL PUMPED INTO FILTER PRESS. ~20-L NEEDED TO INITIALLY FILL PRESS. INITIAL PRESSURE ~40 psi.

1240 – 1330 (RUN END)

ALL MATERIAL REMAINING WAS INTRODUCED TO THE PRESS AS THE PRESSURE WAS SLOWLY INCREASED TO 100 psi. RECYCLE LINE USED EVERY 5-10 MINUTES. COLLECTED ~20-L OF EFFLUENT. COMPOSITE SAMPLE (1174-31-02) WAS TAKEN OF EFFLUENT. YELLOW COLOR NOTED.

WEIGHTS OF FILTER CAKES

RUN 1				RUN 2			
1	1744.4 g	6	1777.8 g	1	1739.5 g	6	1805.2 g
2	1760.3 g	7	1778.0 g	2	1759.1 g	7	1824.3 g
3	1774.6 g	8	1794.8 g	3	1800.6 g	8	1845.4 g
4	1756.4 g	9	1911.7 g	4	1808.1 g	9	1975.7 g
5	1789.7 g			5	1837.5 g		

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Entries by PRL

Date 10/9/98

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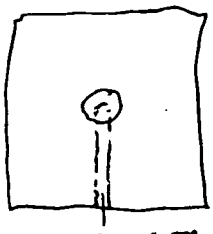
1174:032

SOLIDS PAL 10/9/98
~~MOISTURE~~ CONTENT OF FILTER CAKE MATERIAL
FROM THE DEWATERING OF SILO 1 & 2 SLURRIES

1600



SLICE TAKEN
FOR SOLIDS
CONTENT DETERMINATION

FILTER CAKE
SAMPLE

A SLICE OF FILTER CAKE MATERIAL FROM 3 RANDOM FILTER CAKES WAS OBTAINED FOR EACH OF THE SILO SURROGATES. THE SLICES WAS TAKEN USING 2 STAINLESS STEEL SPATULAS TO ENSURE THAT THE SOLIDS CONTENT REPRESENTED AN AVERAGE OF THE ENTIRE FILTER CAKE.

SILO 2 FILTER CAKE

	A	B	C
PAN	1.32 g	1.33 g	1.32 g
PAN + FILTER CAKE	15.41 g	17.38 g	15.12 g

OVEN TEMPERATURE WAS 165°C

PAL 10/9/98

PAN + DRY SOLIDS	9.93 ~~10.85~~ g PAL 10/10/98	11.06 ~~8.33~~ g PAL 10/10/98	9.40 ~~11.75~~ g PAL 10/10/98
% SOLIDS	61.11 %	60.62 %	58.55 PAL 10/10/98

1700

SILO 1 FILTER CAKE (SEE P 29)

	A	B	C
PAN	1.54 g	1.54 g	1.33 g
PAN + FILTER CAKE	19.07 g	24.75 g	19.66 g

PAL 10/9/98

PAN + DRY SOLIDS	10.85 g	8.33 g	11.75 g
% SOLIDS	53.64 %	52.13 %	56.85

$\frac{(\text{PAN + DRY SOLIDS} - \text{PAN})}{(\text{PAN + FILTER CAKE} - \text{PAN})} \times 100$

OVEN TEMPERATURE WAS 106°C

PAL 10/10/98

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Date 10/10/98

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2293
1174.033

BOILATERING OF DEMOSTRATION SURROGATE

0945 ~~1045~~ AM 10/12/98

DIVIDED THE SLURRY INTO 3 15-L PORTIONS AND 1 18-L PORTIONS. ADDED 180g OF HYDRATED LIME TO THE 15-L PORTIONS AND 216.0g OF HYDRATED LIME TO THE 18-L PORTION. MIXED WELL WITH PAINT MIXER WILL TAP 2 10 PLATE RUNS

1045 - 1100

LIME AMENDED MATERIAL INTRODUCED TO FILTER PRESS. ~ 20-L OF SLURRY USED TO FILL PRESS. INITIAL PRESSURE ~40 psi.

1100 - 1145

AN ADDITIONAL ~ 13-L OF LIME AMENDED SLURRY INTRODUCED AS PRESSURE SLOWLY INCREASED IN PRESS TO 100 psi. RECYCLE LINE USED ~ EVERY FIVE-TEN MINUTES. COLLECTED ~ 20 ml OF EFFLUENT. COMPOSITE SAMPLE (1174-33-01) TAKEN YELLOW COLOR NOTED.

1345 - 1355

LIME-AMENDED SLURRY INTRODUCED TO FILTER PRESS. ~20-L OF SLURRY USED TO FILL PRESS. INITIAL PRESSURE ~40 psi

1355 - 1410

~5L ADDITIONAL LIME SLURRY INTRODUCED TO PRESS AS PRESSURE INCREASED. PUMP TROUBLES CAUSED SHUT DOWN.

1410 - 1440

CLEANED UP CHECK VALVES & CLEARED PUMP LINES. LARGE AIR POCKET MAY BE CULPRIT OR IT COULD HAVE BEEN SANDY MATERIAL.

1440 - 1515

~5-L ADDITIONAL LIME SLURRY ADDED TO PRESS AS PRESSURE INCREASED. NEEDED TO ADD WATER FOR THE LAST 15 MINUTES TO FLUSH THE REMAINING SOLIDS. LEAK STARTED RIGHT AT ~1513. RUN TERMINATED AT 1515. COMPOSITE EFFLUENT SAMPLE (1174-33-02) TAKEN. YELLOW COLOR NOTED.

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1530

THE FILTER CAKE FROM THE SECOND RUN WAS STILL WET IN THE MIDDLE. SHOULD HAVE ONLY USED 9 PLATES FOR SECOND RUN. BECAUSE THE RUNS HAD DIFFERENT MOISTURE CONTENTS (BY VISUAL OBSERVATION), 2 SOLIDS CONTENT SAMPLE WERE TAKEN FROM FILTER CAKE MATERIAL FROM EACH RUN.

SEE PG 32 FOR HOW SAMPLES WERE COLLECTED.

RUN	1	1	2	2
	A	B	C	D
PAN (g)	1.32	1.32	1.33	1.34
PAN + FILTER CAKE (g)	16.64	18.21	15.55	19.33

OVEN TEMPERATURE WAS 106°C BY THERMOMETER

PRL 10/12/98

PAN + DRY SOLIDS (g)	9.74	10.60	8.75	10.68
% SOLID	54.96	54.94	52.32	51.82

$\frac{(\text{PAN + DRY SOLIDS} - \text{PAN})}{(\text{WET FILTER CAKE} - \text{PAN})} \times 100$

1700

THE FILTER CAKE MATERIAL FROM THE DEMONSTRATION SLURRY WAS HOMOGENIZED IN ORDER TO HAVE A HOMOGENEOUS MATERIAL FOR FORMULATION DEVELOPMENT TESTING

PRL 10/12/98

1800

pH ADJUSTED FILTRATE SAMPLES (SEE ABOVE) TO pH 2 WITH CONCENTRATED NITRIC ACID. CHECKED WITH pH STRIPS. ALSO pH ADJUSTED FILTRATE SAMPLES FROM THE DEWATERING OF SILO 1 & SILO 2 30 WT % SOLIDS SLURRY, IN THE SAME MANNER.

PRL 10/12/98

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tries by [signature] Date 10/12/98

FERNALD K65 PROOF OF PRINCIPLE

BENCH-SCALE

Sample Number 1174-35-01 A/B Date 10/12/98 10/12/98

Name ARIE GROEN Source (S1, S2, D) S1

FORMULATION

	K65 SURROGATE	PC	TSP	FeSO4	WATER
PLANNED (g)	2000	200	0	20	TBD
ACTUAL (g)					A = 300 B = 450

Mixer Speed 1

Time of Mixing 90sec T60sec

Room Temperature 19.3 Temperature Rise (c) + 3.1°C

Final Grout Temperature 22.4

All Weights in grams

Tare 2 x 4 inch Mold A 21.17 B 21.17 Density (g/cc) A 1.37 B 1.37

Wt Compacted Sample in Mold net. 304.33 303.43 NOTE: VOLUME OF 2"x4" MOLD IS 206 ML

Tare 2 x 4 inch Mold A/ 21.17 B/21.17 Density (g/cc) A 1.34 B 1.37 AL 10/13/98

Wt Compacted Sample in Mold 297.40 302.63

Pocket Penetrometer Sample A B PP1 (tsf) PP2 (tsf) PP3 (tsf)

Vol Compacted Smp in S. Cup (cc) 80ml 160 A

Mod. ANS 55.1 A B 0 0@48h B

Vol. Smp. in Cylinder 230 228 24h 0@72h

Vol. Liquid @ 24 hr. 0 ml 0 ml 0@96h

0@7 days

10/15/98

Proj. Name: FDF PoP

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JAH 10/22/98

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FERNALD K65 PROOF OF PRINCIPLE

BENCH-SCALE

Sample Number	1174-36-01	Date 10/12/98 10/12/98	
Name	ARIE GROEN	Source (S1, S2, D)	S1

FORMULATION

	K65 SURROGATE	PC	TSP	FeSO4	WATER
PLANNED (g)	2000	200	40	20	TBD
ACTUAL (g)	2000	200	40	20	450

Mixer Speed: 1

Time of Mixing: 90 sec + 60 sec

Room Temperature: 19.3

Final Grout Temperature: 22.5

Temperature Rise (c): + 3.2°C

All Weights in grams

Tare 2 x 4 inch Mold: 21.17

Wt Compacted Sample in Mold: 325.90

Density (g/cc): 1.48 g/cm³

Tare 2 x 4 inch Mold: 21.17

Wt Compacted Sample in Mold: 326.06

Density (g/cc): 1.48 g/cm³

PAL 10/15/98

Pocket Penetrometer Sample

Vol Compacted Smp in S. Cup (cc): 290 ml

PP1 (tsf)	PP2 (tsf)	PP3 (tsf)
8		
24h	0@48h	
	0@72hr	
	0.1@96hr	
	<0.25@7days	

Mod. ANS 55.1

Vol. Smp. in Cylinder: 212 ml

Vol. Liquid @ 24 hr.: 0 ml

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AM 10/12/98

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Project Name: FDF PoP
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FERNALD K65 PROOF OF PRINCIPLE

BENCH-SCALE

Sample Number	1174-37-01	Date	10/12/98
Name	ARIE GROEN	Source (S1, S2, D)	S1

FORMULATION

	K65 SURROGATE	PC	TSP	FeSO4	WATER
PLANNED (g)	2000	400	0	20	TBD
ACTUAL (g)	2000	400	-	20	450

Mixer Speed	1		
Time of Mixing	150 sec		
Room Temperature	10.9	Temperature Rise (c)	+ 4.9°C
Final Grout Temperature	23.8°C		
All Weights in grams			
Tare 2 x 4 inch Mold	21.17	Density (g/cc)	1.43 g/cm³
Wt Compacted Sample in Mold	315.32		
Tare 2 x 4 inch Mold	21.17	Density (g/cc)	1.43 g/cm³
Wt Compacted Sample in Mold	315.28		
Pocket Penetrometer Sample			
Vol Compacted Smp in S. Cup (cc)	240 ml		
Mod. ANS 55.1			
Vol. Smp. in Cylinder	1 Dme		
Vol. Liquid @ 24 hr.	0 ml		

PP1 (tsf)	PP2 (tsf)	PP3 (tsf)
0		
24hr	0@48h	
	0.25@72hr	
	0.5@96h	
	4.5@7 days	

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10/15/98

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TM 10/22/98

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FERNALD K65 PROOF OF PRINCIPLE

BENCH-SCALE

Sample Number	1174-38-01	Date	10/12/98
Name	ARIE GROEN	Source (S1, S2, D)	~~S2~~ S1

FORMULATION

	K65 SURROGATE	PC	TSP	FeSO4	WATER
PLANNED (g)	2000	400	40	20	TBD
ACTUAL (g)	2000	400	40	20	450

Mixer Speed	1		
Time of Mixing	90 + 60 sec		
Room Temperature	19.0	Temperature Rise (c)	6.6°C
Final Grout Temperature	25.6		
All Weights in grams			
Tare 2 x 4 inch Mold	21.15	Density (g/cc)	1.43 g/cm³
Wt Compacted Sample in Mold	316.17		
Tare 2 x 4 inch Mold	21.17	Density (g/cc)	1.43 g/cm³
Wt Compacted Sample in Mold	315.99		
Pocket Penetrometer Sample			
Vol Compacted Smp in S. Cup (cc)	260 ml		
Mod. ANS 55.1			
Vol. Smp. in Cylinder	220 ml		
Vol. Liquid @ 24 hr.	0 ml		

PP1 (tsf)	PP2 (tsf)	PP3 (tsf)
0		
24h	0@48 h	
	a1@72h	
	1.05@96h	
	4.4@7days	

PJL 10/15/98

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Arie Groen 10/15/98

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FERNALD K65 PROOF OF PRINCIPLE

BENCH-SCALE

Sample Number	1174-39-01	Date	10/12/98
Name	ARIE GROEN	Source (S1, S2, D)	S1

FORMULATION

	K65 SURROGATE	PC	TSP	FeSO4	WATER
PLANNED (g)	2000	800	0	20	TBD
ACTUAL (g)	2000	800	0	20	450

Mixer Speed: 1

Time of Mixing:

Room Temperature: 19.8

Final Grout Temperature: 24.7

Temperature Rise (c): 4.9°C

All Weights in grams

Tare 2 x 4 inch Mold: 21.17

Wt Compacted Sample in Mold: 337.76

Density (g/cc): 1.54 g/cm³

Tare 2 x 4 inch Mold: 21.17

Wt Compacted Sample in Mold: 335.30

Density (g/cc): 1.52 g/cm³

PAR 10/15/98

Pocket Penetrometer Sample

Vol Compacted Smp in S. Cup (cc): 260 ml

PP1 (tsf)	PP2 (tsf)	PP3 (tsf)
0		
24h	0@48h	
	>4.5@72 hr	
	>5@ 96hr	

Mod. ANS 55.1

Vol. Smp. in Cylinder: 210 ml

Vol. Liquid @ 24 hr.: 0 ml

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MM 10/22/98

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FERNALD K65 PROOF OF PRINCIPLE

BENCH-SCALE

Sample Number	1174-40-01	Date	10/12/98
Name	ARIE GROEN	Source (S1, S2, D)	S1

FORMULATION

	K65 SURROGATE	PC	TSP	FeSO4	WATER
PLANNED (g)	2000	800	40	20	TBD
ACTUAL (g)	2000	800	40	20	450

Mixer Speed: 1

Time of Mixing: 90 + 60 sec

Room Temperature: 19.8

Final Grout Temperature: 26.8

Temperature Rise (c): 7.0 °C

All Weights in grams

Tare 2 x 4 inch Mold: 21.17

Wt Compacted Sample in Mold: 333.26

Density (g/cc): 1.52 g/cm³ 10/15/98

Tare 2 x 4 inch Mold: 21.17

Wt Compacted Sample in Mold: 332.85

Density (g/cc): 1.51 g/cm³ 10/15/98

Pocket Penetrometer Sample

Vol Compacted Smp in S. Cup (cc): 150 ml

PP1 (tsf)	PP2 (tsf)	PP3 (tsf)
0		
24hr	0.38 4hr	
	3.5@72hr	
	>5@96hr	

Mod. ANS 55.1

Vol. Smp. in Cylinder: 222 ml

Vol. Liquid @ 24 hr.: 0 ml

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Project Name FDF 044 POP

Project Number 775734

FERNALD K65 PROOF OF PRINCIPLE

BENCH-SCALE

Sample Number	1174-41-01	Date	~~10/12/98~~ 10/13/98
Name	ARIE GROEN	Source (S1, S2, D)	S2

FORMULATION

	K65 SURROGATE	PC	TSP	FeSO4	WATER
PLANNED (g)	2000	200	0	20	TBD
ACTUAL (g)	2000	200	0	20	0

Mixer Speed	1		
Time of Mixing	120 sec		
Room Temperature	19.6	Temperature Rise (c)	3.3 °C
Final Grout Temperature	22.9		
All Weights in grams			
Tare 2 x 4 inch Mold	21.17	Density (g/cc)	1.33 g/cm³
Wt Compacted Sample in Mold	295.06		
Tare 2 x 4 inch Mold	21.17	Density (g/cc)	1.33 g/cm³
Wt Compacted Sample in Mold	294.19		

		PP1 (tsf)	PP2 (tsf)	PP3 (tsf)
Pocket Penetrometer Sample		4.5		
Vol Compacted Smp in S. Cup (cc)	120/70			

t=0 75@24h

Mod. ANS 55.1	
Vol. Smp. in Cylinder	234
Vol. Liquid @ 24 hr.	0 ml

pm 10/15/98

MPL 10/13/98

Entries by [signature]

Date 10/15/98

000052

2293

1174.041

Project Name EDF 044 POD

Project Number 775743

FERNALD K65 PROOF OF PRINCIPLE

BENCH-SCALE

Sample Number	1174-42-01	Date	~~10/12/98~~ 10/13/98
Name	ARIE GROEN	Source (S1, S2, D)	S1 S2 A4 12/13

FORMULATION

	K65 SURROGATE	PC	TSP	FeSO4	WATER
PLANNED (g)	2000	200	40	20	TBD
ACTUAL (g)	2000	200	40	20	0

Mixer Speed: 1

Time of Mixing: 120

Room Temperature: 19

Final Grout Temperature: 26.3

Temperature Rise (c): 7.3°C

All Weights in grams

Tare 2 x 4 inch Mold: 21.17

Wt Compacted Sample in Mold: 311.26

Density (g/cc): 1.41 g/cm³

Tare 2 x 4 inch Mold: 21.17

Wt Compacted Sample in Mold: 301.36

Density (g/cc): 1.36 g/cm³

gre 10/15/98

Pocket Penetrometer Sample

Vol Compacted Smp in S. Cup (cc): 280/200

PP1 (tsf)	PP2 (tsf)	PP3 (tsf)
4.6		

t=0 > 5@24hr

Mod. ANS 55.1

Vol. Smp. in Cylinder: 210

Vol. Liquid @ 24 hr.: 0 ml

Entries by [signature]

Date 10/13/98

10/13/98

000053

2293

1174.042

Project Name FDF044 POP

Project Number 775743

FERNALD K65 PROOF OF PRINCIPLE

BENCH-SCALE

Sample Number	1174-43-01	Date	~~10/12/98~~ 10/13/98
Name	ARIE GROEN	Source (S1, S2, D)	~~S1~~ S2

FORMULATION

	K65 SURROGATE	PC	TSP	FeSO4	WATER
PLANNED (g)	2000	400	0	20	TBD
ACTUAL (g)	2000	400	0	20	0

Mixer Speed: 1

Time of Mixing: 120 sec

Room Temperature: 19.8

Final Grout Temperature: 25.2

Temperature Rise (c): 5.4 °C

All Weights in grams

Tare 2 x 4 inch Mold: 21.17

Wt Compacted Sample in Mold: 313.71

Density (g/cc): 1.42 g/cm³

Tare 2 x 4 inch Mold: ~~217.~~ 21.17

Wt Compacted Sample in Mold: 316.11

Density (g/cc): 1.43 g/cm³

Pocket Penetrometer Sample

Vol Compacted Smp in S. Cup (cc): 280/230

PP1 (tsf)	PP2 (tsf)	PP3 (tsf)
4.6		

two >5@24hr

Mod. ANS 55.1

Vol. Smp. in Cylinder: 230

Vol. Liquid @ 24 hr.: 0 ml

10/13/98

Entries by

Date 10/15/98

000054

2293

1174:043

Project Name EDF 0044 POP

Project Number 775743

FERNALD K65 PROOF OF PRINCIPLE

BENCH-SCALE

Sample Number	1174-44-01	Date	~~10/12/98~~ 10/13/98
Name	ARIE GROEN	Source (S1, S2, D)	~~S1~~ S2 AC 10/13

FORMULATION

	K65 SURROGATE 2000	PC 400	TSP 40	FeSO4 20	WATER TBD
PLANNED (g)					
ACTUAL (g)	2000	400	40	20	0

Mixer Speed	1		
Time of Mixing	120 sec		
Room Temperature	19.6	Temperature Rise (c)	7.3°C
Final Grout Temperature	26.9		
All Weights in grams			
Tare 2 x 4 inch Mold	21.17	Density (g/cc)	1.38 g/cm³
Wt Compacted Sample in Mold	306.07		
Tare 2 x 4 inch Mold	21.17	Density (g/cc)	1.43 g/cm³
Wt Compacted Sample in Mold	316.43		
Pocket Penetrometer Sample		PP1 (tsf)	PP2 (tsf) / PP3 (tsf)
Vol Compacted Smp in S. Cup (cc)	280/210	4.6	
		ctrl 7.5@24h	
Mod. ANS 55.1			
Vol. Smp. in Cylinder	228		
Vol. Liquid @ 24 hr.	None		

AC 10/15/98

AC 10/13/98

Entries by [signature]

Date 10/15/98

000055

1174.044 2293

Project Name FDF OU4 POP

Project Number 775743

FERNALD K65 PROOF OF PRINCIPLE

BENCH-SCALE

Sample Number	1174-45-01	Date	~~10/12/98~~ 10/13/98
Name	ARIE GROEN	Source (S1, S2, D)	~~S1~~ S2

AG 10/13

FORMULATION

	K65 SURROGATE	PC	TSP	FeSO4	WATER
PLANNED (g)	2000	800	0	20	TBD
ACTUAL (g)	2000	800	0	20	150

Mixer Speed	1		
Time of Mixing	120 sec		
Room Temperature	19.4	Temperature Rise (c)	7.2°C
Final Grout Temperature	26.6		
All Weights in grams			
Tare 2 x 4 inch Mold	21.17	Density (g/cc)	1.62 g/cm³
Wt Compacted Sample in Mold	354.87		
Tare 2 x 4 inch Mold	21.17	Density (g/cc)	1.60 g/cm³
Wt Compacted Sample in Mold	350.92		
Pocket Penetrometer Sample		PP1 (tsf)	PP2 (tsf) / PP3 (tsf)
Vol Compacted Smp in S. Cup (cc)	280/190	3.75	
Mod. ANS 55.1		too > 5 @ 24 hr	
Vol. Smp. in Cylinder	220		
Vol. Liquid @ 24 hr.	0 ml		

GAC 10/15/98

MK 10/13/98

Entries by [signature]

Date 10/12/98

000056

2293

1174.045

Project Name FDF 044 POP

Project Number 775743

FERNALD K65 PROOF OF PRINCIPLE

BENCH-SCALE

Sample Number	1174-46-01	Date	~~10/12/98~~ 10/13/98
Name	ARIE GROEN	Source (S1, S2, D)	S2

FORMULATION

	K65 SURROGATE	PC	TSP	FeSO4	WATER
PLANNED (g)	2000	800	40	20	TBD
ACTUAL (g)	2000	800	40	20	150

Mixer Speed	1		
Time of Mixing	120 sec		
Room Temperature	19.6	Temperature Rise (c)	7.9°C
Final Grout Temperature	27.5		
All Weights in grams			
Tare 2 x 4 inch Mold	21.17	Density (g/cc)	1.58 g/cm³
Wt Compacted Sample in Mold	346.67		
Tare 2 x 4 inch Mold	21.17	Density (g/cc)	1.59 g/cm³
Wt Compacted Sample in Mold	345.8		

		PP1 (tsf)	PP2 (tsf)	PP3 (tsf)
Pocket Penetrometer Sample		4.6		
Vol Compacted Smp in S. Cup (cc)	280/190			

t=0 75@24h

Mod. ANS 55.1	
Vol. Smp. in Cylinder	236
Vol. Liquid @ 24 hr.	0 ml

Bar 10/15/98

10/13/98

Entries by

Date 10/15/98

000052

2293

1174.046

Project Name EDF004POP

Project Number 775743

FERNALD K65 PROOF OF PRINCIPLE

BENCH-SCALE

Sample Number	1174-47-01	Date	~~10/13/98~~ 10/14/98
Name	ARIE GROEN	Source (S1, S2, D)	D

FORMULATION

	K65 SURROGATE	PC	TSP	FeSO4	WATER
PLANNED (g)	2000	200	0	20	TBD
ACTUAL (g)	2000	200	0	20	0

Mixer Speed	1		
Time of Mixing	110 sec		
Room Temperature	18.3	Temperature Rise (c)	4.2 °C
Final Grout Temperature	22.5		
All Weights in grams			
Tare 2 x 4 inch Mold	21.17	Density (g/cc)	1.40 g/cm³
Wt Compacted Sample in Mold	309.44		
Tare 2 x 4 inch Mold	21.17	Density (g/cc)	1.41 g/cm³
Wt Compacted Sample in Mold	310.96		
Pocket Penetrometer Sample		PP1 (tsf)	PP2 (tsf) / PP3 (tsf)
Vol Compacted Smp in S. Cup (cc)	240/140	0.25	
Mod. ANS 55.1		@ time	1.3 @ 24 hr.
Vol. Smp. in Cylinder	208		2.0 @ 48 hr
Vol. Liquid @ 24 hr.	0 ml		

ARG 10/15/98

ARG 10/15/98

10/14/98

Entries by [signature]

Date 10/15/98

000058

2293
1174.047

Project Name EDF 044 POP

Project Number 77,5,3743 10/13/98

FERNALD K65 PROOF OF PRINCIPLE

BENCH-SCALE

Sample Number	1174-48-01	Date	~~10/13/98~~ 10/14/98
Name	ARIE GROEN	Source (S1, S2, D)	D

FORMULATION

	K65 SURROGATE	PC	TSP	FeSO4	WATER
PLANNED (g)	2000	200	40	20	TBD
ACTUAL (g)					

Mixer Speed	1		
Time of Mixing	120		
Room Temperature	22.5	Temperature Rise (c)	4.8 °C
Final Grout Temperature	27.3		

All Weights in grams

Tare 2 x 4 inch Mold	21.17	Density (g/cc)	1.48 g/cm³
Wt Compacted Sample in Mold	326.00		
Tare 2 x 4 inch Mold	21.17	Density (g/cc)	1.49 g/cm³
Wt Compacted Sample in Mold	323.28		

BAL 10/15/98

		PP1 (tsf)	PP2 (tsf)	PP3 (tsf)
Pocket Penetrometer Sample		0.5		
Vol Compacted Smp in S. Cup (cc)	280/160	t=0	2.5@24hr	
			3.0@48hr	

Mod. ANS 55.1	
Vol. Smp. in Cylinder	226
Vol. Liquid @ 24 hr.	0 mL

BAL 10/15/98

10/14/98

1174:048

2293

Entries by

Date 10/15/98

000059

Project Name FDF POP 044

Project Number 775743

FERNALD K65 PROOF OF PRINCIPLE

BENCH-SCALE

Sample Number	1174-49-01	Date	~~10/13/98~~ 10/14/98
Name	ARIE GROEN	Source (S1, S2, D)	D

FORMULATION

	K65 SURROGATE	PC	TSP	FeSO4	WATER
PLANNED (g)	2000	400	0	20	TBD
ACTUAL (g)					

Mixer Speed	1		
Time of Mixing	120 sec		
Room Temperature	19.1	Temperature Rise (c)	6.0°C
Final Grout Temperature	25.1		
All Weights in grams			
Tare 2 x 4 inch Mold	21.17	Density (g/cc)	1.55 g/cm³
Wt Compacted Sample in Mold	340.18		
Tare 2 x 4 inch Mold	21.17	Density (g/cc)	1.51 g/cm³
Wt Compacted Sample in Mold	332.82		
Pocket Penetrometer Sample		PP1 (tsf)	PP2 (tsf) / PP3 (tsf)
Vol Compacted Smp in S. Cup (cc)	250/170	0.5	
Mod. ANS 55.1		t=0	2.3@24hr
Vol. Smp. in Cylinder	210		2.7@48hr
Vol. Liquid @ 24 hr.	0 mL		

PAL 10/15/98

PAL 10/15/98

10/14/98

Entries by

Date 10/15/98

000060

2293
1174.049

Project Name FDF044 POP

Project Number 775743

FERNALD K65 PROOF OF PRINCIPLE

BENCH-SCALE

Sample Number 1174-50-01 Date ~~10/13/98~~ 10/14/98

Name ARIE GROEN Source (S1, S2, D) D

FORMULATION

	K65 SURROGATE	PC	TSP	FeSO4	WATER
PLANNED (g)	2000	400	40	20	TBD
ACTUAL (g)	1				

Mixer Speed 120

Time of Mixing

Room Temperature 19.4 Temperature Rise (c) 7.9°C

Final Grout Temperature 27.3

All Weights in grams

Tare 2 x 4 inch Mold 21.17 Density (g/cc) 1.55 g/cm³

Wt Compacted Sample in Mold 391.25

Tare 2 x 4 inch Mold 21.17 Density (g/cc) 1.55 g/cm³

Wt Compacted Sample in Mold 340.40

	PP1 (tsf)	PP2 (tsf)	PP3 (tsf)
Pocket Penetrometer Sample	0.5		
Vol Compacted Smp in S. Cup (cc) 280/180	t=0	3.0 @ 24hr	3.25 @ 48hr

Mod. ANS 55.1

Vol. Smp. in Cylinder 210

Vol. Liquid @ 24 hr. ONL 10/15/98

10/15/98

10/14/98

Entries by

Date 10/15/98

000061

2293

1174.050

Project Name EDF 044 POP

Project Number 775743

FERNALD K65 PROOF OF PRINCIPLE

BENCH-SCALE

ample Number 1174-51-01 Date ~~10/13/98~~ 10/14/98

lame ARIE GROEN Source (S1, S2, D) D

ORMULATION

	K65 SURROGATE	PC	TSP	FeSO4	WATER
PLANNED (g)	2000	800	0	20	TBD
ACTUAL (g)					

Mixer Speed 1

Time of Mixing 120

Room Temperature 19.3 Temperature Rise (c) 7.7°C

Final Grout Temperature 27.0

All Weights in grams

Tare 2 x 4 inch Mold 21.17 Density (g/cc) 1.64 g/cm³

Wt Compacted Sample in Mold 358.52

Tare 2 x 4 inch Mold 21.17 Density (g/cc) 1.65 g/cm³

Wt Compacted Sample in Mold 360.67

Pocket Penetrometer Sample

Vol Compacted Smp in S. Cup (cc) 280/160

PP1 (tsf)	PP2 (tsf)	PP3 (tsf)
0.5.	2.5@24hr	
to	3.3@48hr	

Mod. ANS 55.1

Vol. Smp. in Cylinder 230

Vol. Liquid @ 24 hr. 0 ML

PAL 10/15/98

PAL 10/15/98

10/14/98

Entries by

Date 10/15/98

000062

2293

1174.051

Project Name FDF OU4 POP

Project Number 775743

FERNALD K65 PROOF OF PRINCIPLE

BENCH-SCALE

Sample Number	1174-52-01	Date	~~10/13/98~~ 10/14/98
Name	ARIE GROEN	Source (S1, S2, D)	D

FORMULATION

	K65 SURROGATE	PC	TSP	FeSO4	WATER
PLANNED (g)	2000	800	40	20	TBD
ACTUAL (g)	2000	800	40	20	0

Mixer Speed	1		
Time of Mixing	120 min		
Room Temperature	19.4	Temperature Rise (c)	9.2°C
Final Grout Temperature	28.6		
All Weights in grams			
Tare 2 x 4 inch Mold	21.17	Density (g/cc)	1.68 g/cm³
Wt Compacted Sample in Mold	366.65		
Tare 2 x 4 inch Mold	21.17	Density (g/cc)	1.68 g/cm³
Wt Compacted Sample in Mold	368.00		
Pocket Penetrometer Sample		PP1 (tsf)	PP2 (tsf) / PP3 (tsf)
Vol Compacted Smp in S. Cup (cc)	280/160	1.0	45@24hr
Mod. ANS 55.1		tw	75@48hr
Vol. Smp. in Cylinder	216		
Vol. Liquid @ 24 hr.	0 ml		

PAE 10/15/98

PAE 10/15/98

MA 10/14/98

Entries by [signature]

Date 10/13/98

000053

2293

1174:052

Project Name FDF PoP

Project Number 775743

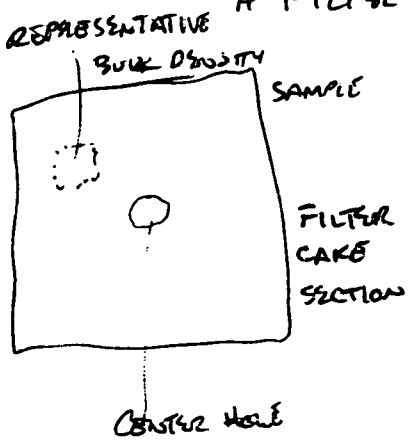
2293
1174:053

1300

BULK DENSITIES OF FILTER CAKE MATERIAL

PIECES OF THE FILTERCAKE MATERIAL PRODUCED DURING EACH RUN OF THE FILTER PRESS DEWATERING OF THE 30 WT % SOLIDS SLURRIES (SEE PG 29-34) WERE USED TO DETERMINE THE DENSITY OF THE FILTERCAKE.

LENGTH, WIDTH & HEIGHT MEASUREMENTS WERE MADE ON EACH PIECE, CARVED OUT OF THE INTERIOR SECTION OF A FILTER CAKE SECTION. THE PIECE OF FILTER CAKE WAS THEN WEIGHED TO DETERMINE IT'S MASS.



$$\text{BULK DENSITY} = \frac{\text{WEIGHT (g)}}{\text{VOLUME (cm}^3)}$$

$$\text{VOLUME (cm}^3) = \text{LENGTH (cm)} \times \text{HEIGHT (cm)} \times \text{WIDTH (c}$$

SLURRY	RUN	LENGTH (CM)	WIDTH (CM)	HEIGHT (CM)	VOLUME (CM^3)	WEIGHT (g)	BULK DENSITY (g/cm^3)
SILO 1	1	3.6	4.4	3.1	49.10	80.78	1.64
	2	3.5	3.9	3.1	42.32 ~~42.32~~ ~~69.47~~	69.47	1.64
SILO 2	1	3.7	5.0	3.1	57.35	88.97	1.55
	2	3.6	3.6	3.1	40.18	61.25	1.52
DEMONSTRATION	1	2.5	4.0	3.1	31.00	53.09	1.71
	2	1.8	5.0	3.1	27.90	43.82	1.57

000064

Entries by [signature] Date 10/14/98

Project Name FDF PoP

Project Number 775743

2293

1174:054

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MH 3-2-99

000065

Entries by Marylin Hall

Date 3-2-99

Project Name FDF PoP

Project Number 775743

2293
1174:055

INTERNATIONAL TECHNOLOGY CORPORATION

By AC Date 10/19/96 Subject Total Suspended Solid Sheet No. 1 of 1

Chkd. By ___ Date ___ FDF - Filtrates 1hr 2hr Proj. No. 775743

Filtration fp tan -m @ 1528 hrs 10/11 g/l

TSS #1 0.1270 } 0.2519 0.2512 ✓ net solids = 0 - ∅
SILO 1 + 1270

250 ml.

#2 0.1277 0.1249 0.1250 ✓ net 0. - ∅

#3 0.1255 0.1253 0.1254 ✓ net .0003 - 0.001

Str. 0.1258 ~~0.1226~~ AC 0.0116 0.1479 0.1481 ✓ ✓ net = 0.0226 = 0.09

SILO 2 #1 0.1247 0.1419 0.1408 ✓ net = 0.0170 = 0.0

#2 0.1254 (296 ml) 0.1355 ~~0.1349~~ AC 0.0116 0.1351 ✓ 0.0103 = 0.04

BLK 0.1254 0.1250

250 DEMO #1 0.1263 0.1390 0.1388 ✓ net 0.013 = 0.05
#2 0.1268 0.1338 0.1335 ✓ net = 0.0073 = 0.0

dech #1 = 2.2761 + SILO 1-S .. 24.1501
2.9126

Summary.

		TSS mg/l.
Silo 1	Run 1	∅
	Run 2	∅
	Run 3	1.2
	Straight	9.04
Silo 2	Run 1	68
	Run 2	~~40~~ 41.9 AC 10/9
Demo	Run 1	52
	Run 2	29.2

AC 10/21

000066

108-10-85

Entries by [signature] Date 10/21/96

Project Name FDF PoP

Project Number 775743

2293

1174:056

INTERNATIONAL TECHNOLOGY CORPORATION

By AG Date 10/19/96 Subject FDF POP TDS/TSS Sheet No. 1 of 1

Chkd. By ___ Date ___ Proj. No. ___

SPLEID	TARE	+ sple	dried			tray #
Silo 1 Run 1	2.6639	35.5154	3.2017	2.8717	2.8702 2.8697	1
2	2.6541	33.0618	2.8457	2.8430	2.8414 2.8410	2
3	2.6533	30.2188	2.8291	2.8269	2.8255 2.8243	
3	2.6591	31.7635	2.8456	2.8437	2.8428 2.8418 2.8428 2.8418	3D
Straight	2.6491	33.7502	2.8492	2.8461	2.8444 2.8434	4
Silo 2 Run 1	2.6463	33.7414	2.8741	2.8750	2.8740	5
2	2.6631	32.3151	2.8770	2.8777	2.8763 2.8764	6
Demo Run 1	2.6079	31.9427	2.8169 AG 10/19	2.8139	2.8117 2.8109	7
1	2.6276	31.8708	2.8308	2.8311		7D
2	2.6659	33.1048	2.8845	2.8846	AG 10/20	8

mc 1535 10/19

	initial net	final net	%	TS - TDS / net TDS
#1	32.8515	0.2058	0.6264	6264
#2	30.4077	0.1669	0.6146	6146
#3	27.5655	0.1716	AG 10/20 0.6225	AG 10/20 ~~6224~~ 622
#3D	29.1044	0.1829	~~0.6350~~ 0.6254	~~66~~ 6253
#4	31.1011	0.1946	0.6237	6248
#5	31.0951	0.2277	0.7323	~~6~~7255
#6	29.6520	.2133	0.7193	7151
#7	29.3191	0.203	0.6924	6872
#7D	29.2432	~~0.2056~~ 0.2035	0.6959	6907
#8	30.4389	0.2184	0.7175	7146

~~10/19/96~~

2.6079
2.8117
2.8110

2.8249
2.6533
.1716

Rec 10/21/96

000067

Entries by [signature] Date 10/21/96

2293

1174:057

Project Name FDF PoP

Project Number 775743

INTERNATIONAL TECHNOLOGY CORPORATION

FDF Filtrate's POP

By AC Date 10/20/98 Subject TDS / TSS. Sheet No. 1 of 1

Chkd. By ____ Date ____ Proj. No. 775743

Sample ID		mg/l TSS b/o 250ml.	mg/kg TDS b/o ~30g
Silo 1.	Run 1	Θ	6264
	Run 2	Θ	6146
	Run 3	1.2	6224/6283.
	Straight	9.0	6248
Silo 2	Run 1	68	6255
	Run 2	42	7151
Demo	Run 1	52	6672/6907
	Run 2	29	7146

P.M.
10/21/98

000068

108A-1-1996

Entries by [signature] Date 10/21/98

Project Name FDF PoP

Project Number 775743

2293
1174:058

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MJ 3-2-99

000069

Entries by Mary M Hall Date 3-2-99

Project Name FDF P.P

Project Number 775743

2293
1174:059

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MH 3-2-99

000070

Entries by Mary M. Hall

Date 3-2-99

Project Name FDF PoP

Project Number 775743

2293
1174:060

SUBMISSION OF LEAD SPECIES TO FDF

1445

TRANSFERRED ~20g OF PbO TO SCINTILLATION VIAL. LABELED AS 1174-60-1.

TRANSFERRED ~20g OF $PbSO_4$ TO SCINTILLATION VIAL. LABELED AS 1174-60-2

TRANSFERRED ~20g OF $PbCO_3$ TO SCINTILLATION VIAL. LABELED AS 1174-60-3 PRL 10/19/98

1455 GAVE VIALS TO MARY HALL FOR FEDERAL EXPRESS SHIPPING

PRL 10/19/98

1500 HAD MARY HALL PLACE 100g OF $MgPO_4$ AND 100g OF TRIBUTYL PHOSPHATE IN CONTAINERS FOR SHIPMENT TO FDF BY FEDERAL EXPRESS

1174-60-4 $MgPO_4$
1174-60-5 TRIBUTYL PHOSPHATE

PRL 10/23/98

1520 VERIFIED THE REAGENTS WOULD BE SENT TODAY
PRL 10/23/98

000071

Entries by [signature] Date 10/23/98

Project Name FDF Pop

Project Number 775743

2293
1174.061

MAGNESIUM PHOSPHATE SOLUBILITY

MADE TCLP #1 EXTRACTION FLUID USING ~~22.0~~ 11.4 mL ml 11/6/98 OF GLACIAL ACETIC ACID AND 128.6 mL 1.0 N NaOH DILUTED TO 2 L WITH DEIONIZED WATER.

CALIBRATED pH METER (pH 7.0 BUFFER = 6.994). pH OF TCLP #1 EXTRACTION FLUID = 4.948

	1174-061-1	1174-061-2	1174-061-3	1174-061-4
$Mg_3(PO_4)_2$	ORIGINAL	ORIGINAL	60952	
WEIGHT $Mg_3(PO_4)_2$	0.2341 g	0.2431 g	0.2339 g	0.2387 g
VOLUME TCLP #1	200.0 mL	200.0 mL	200.0 mL	200.0 mL
pH AT 5 MIN	4.914	4.975	4.973	4.958
pH AT 60 MIN	5.027	4.990	4.963	4.960

FILTERED SOLUTIONS THROUGH A 0.8 µm FILTER & DETERMINED PHOSPHOROUS BY ICP

pre 11/6/98

000072

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Entries by [signature] Date 11/6/98

Project Name FDF PoP

Project Number 775743

2293
1174:062

MAGNESIUM PHOSPHATE SOLUBILITY (CONT.)

MADE ALKALINE SOLUTIONS USING 1.0 N NaOH IN 1L DEIONIZED WATER.

TCLP Fluid Test - CALIBRATION pH METER USING pH 7.0 & pH 10.0 BUFFERS.
pH 7 BUFFER = 7.00
pH OF ALKALINE SOLUTION 10.25

Alkaline Leachate Tests - Calibrate pH meter using pH 7.0 & 10.0 Buffers:
pH 7 Buffer = 7.00, pH 10 Buffer 10.0, pH 7 Recheck = 7.05

$Mg_3(PO_4)_2$	1174-062-1 INITIAL	1174-062-2 INITIAL	1174-062-3 60452	1174-062-4 60952
WEIGHT $Mg_3(PO_4)_2$	0.2302	0.2213	0.2318	0.2250
VOLUME OF SOLN	200.0	200.0	200.0	200.0
pH AT 5 MIN	10.10	10.04	10.04	10.04
pH AT 1 HR	10.21	10.15	10.22	10.25

FILTER ~ 20 ml THROUGH A 0.8 μm FILTER & DETERMINED PHOSPHOROUS BY ICP

Sample	Mg3(PO4)2 Added (g)	Extraction Fluid	Total Volume (L)	pH at 5 min.	pH at 1 hr	Soluble P (mg/L)	Dissolved P (mg)	Dissolved Mg3(PO4)2 (mg)	Soluble Mg3(PO4)2 (%)
1174-061-1	0.2341	TCLP #1	0.2	4.91	5.03	266.6	53.32	226.30	96.67
1174-061-2	0.2431	TCLP #1	0.2	4.98	4.99	278.8	55.76	236.65	97.35
1174-061-3	0.2339	TCLP #1	0.2	4.97	4.96	270.5	54.1	229.61	98.16
1174-061-4	0.2387	TCLP #1	0.2	4.96	4.96	277.8	55.56	235.80	98.79

PM 11/6/98

Sample	Mg3(PO4)2 Added (g)	Extraction Fluid	Total Volume (L)	pH at 5 min.	pH at 1 hr	Soluble P (mg/L)	Dissolved P (mg)	Dissolved Mg3(PO4)2 (mg)	Soluble Mg3(PO4)2 (%)
1174-062-1	0.2302	pH 10 water	0.2	10.10	10.21	3.630	0.726	3.08	1.34
174-062-2	0.2213	pH 10 water	0.2	10.04	10.15	3.932	0.7864	3.34	1.51
[illegible]062-3	0.2318	pH 10 water	0.2	10.04	10.22	4.023	0.8046	3.41	1.47
[illegible]062-4	0.2250	pH 10 water	0.2	10.04	10.25	3.706	0.7412	3.15	1.40

ies by [signature] Date 11/6/98

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Project Name FDF PoP

Project Number 775743

2293
1174:063

DETERMINATION OF $Mg_3(PO_4)_2$ ADDITION RATE

0830 SILO 1 SURROGATE SAMPLES WERE MADE, WITH VARYING $Mg_3(PO_4)_2$ LEVELS, TO DETERMINE THE EFFECT ON TCLP LEAD LEVELS.

Silo 1 Surrogate

Compound	1174-63-01 S1-1 Mix Weight (g)	1174-63-02 S1-2 Mix Weight (g)	1174-63-03 S1-3 Mix Weight (g)	1174-63-04 S1-4 Mix Weight (g)
BaSO4	10.34	10.34	10.34	10.34
Na2CrO4	0.08	0.08	0.08	0.08
Fe2O3	2.67	2.67	2.67	2.67
MgO	0.57	0.57	0.57	0.57
MgCO3	0.74	0.74	0.74	0.74
Mg3(PO4)2	1.35	1.18	1.01	0.84
NaNO3	0.50	0.50	0.50	0.50
NiO	0.46	0.46	0.46	0.46
PbO	5.00	5.00	5.00	5.00
PbCO3	4.19	4.19	4.19	4.19
PbSO4	6.30	6.30	6.30	6.30
Na2SeO3	0.13	0.13	0.13	0.13
Coarse SiO2	21.38	21.55	21.72	21.89
Fine SiO2	19.29	19.29	19.29	19.29
Silica Fume	9.24	9.24	9.24	9.24
V2O5	0.09	0.09	0.09	0.09
ZnO	0.01	0.01	0.01	0.01
Diatomaceous Earth	1.47	1.47	1.47	1.47
Feldspar	16.27	16.27	16.27	16.27
Water	42.77	42.77	42.77	42.77

PRL 11/11/98

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Entries by [signature] Date 11/11/98

Project Name FDF PoP

Project Number 775743

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1174:064

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1100 SILO 2 SURROGATES, WITH VARYING $Mg_3(PO_4)_2$ LEVELS, WERE MADE

Silo 2 Surrogate

Compound	1174-64-01 S2-1 Mix Weight (g)	1174-64-02 S2-2 Mix Weight (g)	1174-64-03 S2-3 Mix Weight (g)	1174-64-04 S2-4 Mix Weight (g)
Al2O3	0.81	0.81	0.81	0.81
Na2HAsO4	0.21	0.21	0.21	0.21
BaSO4	6.81	6.81	6.81	6.81
CaCO3	3.85	3.85	3.85	3.85
Na2CrO4	0.06	0.06	0.06	0.06
Fe2O3	6.24	6.24	6.24	6.24
KNO3	0.36	0.36	0.36	0.36
MgCO3	2.43	2.43	2.43	2.43
Mg3(PO4)2	1.38	1.21	1.04	0.86
NaNO3	0.71	0.71	0.71	0.71
NiO	0.37	0.37	0.37	0.37
PbO	3.57	3.57	3.57	3.57
PbCO3	0.46	0.46	0.46	0.46
PbSO4	4.03	4.03	4.03	4.03
Na2SeO3	0.10	0.10	0.10	0.10
Coarse SiO2	21.48	21.65	21.82	22.00
Fine SiO2	18.34	18.34	18.34	18.34
Silica Fume	9.24	9.24	9.24	9.24
V2O5	0.09	0.09	0.09	0.09
ZnO	0.01	0.01	0.01	0.01
Tributyl Phosphate	0.92	0.92	0.92	0.92
Kerosene	0.92	0.92	0.92	0.92
Diatomaceous Earth	4.43	4.43	4.43	4.43
Feldspar	13.28	13.28	13.28	13.28
Water	42.76	42.76	42.76	42.76

PRL 11/11/98

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Entries by [signature] Date 11/11/98

Project Name FDF PoP

Project Number 775743

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1174:065

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1400 DEMONSTRATION SURROGATES, ALSO WITH VARYING $Mg_3(PO_4)_2$ LEVELS, WERE MADE

Demonstration Surrogate

Compound	DS-1 (1174-65-01) Mix Weight (g)	DS-2 (1174-65-02) Mix Weight (g)	DS-3 (1174-65-03) Mix Weight (g)	DS-4 (1174-65-04) Mix Weight (g)
Na2HAsO4	0.17	0.17	0.17	0.17
BaSO4	8.19	8.19	8.19	8.19
Na2CrO4	0.27	0.27	0.27	0.27
Fe2O3	2.52	2.52	2.52	2.52
Mg3(PO4)2	1.88	1.64	1.41	1.17
NaNO3	1.03	1.03	1.03	1.03
NiO	0.43	0.43	0.43	0.43
PbO	5.67	5.67	5.67	5.67
PbCO3	6.63	6.63	6.63	6.63
PbSO4	2.65	2.65	2.65	2.65
Na2SeO3	0.10	0.10	0.10	0.10
Coarse SiO2	20.39	20.63	20.86	21.10
Fine SiO2	18.90	18.90	18.90	18.90
Silica Fume	9.16	9.16	9.16	9.16
V2O5	0.09	0.09	0.09	0.09
ZnO	0.01	0.01	0.01	0.01
Tributyl Phosphate	0.92	0.92	0.92	0.92
Kerosene	0.92	0.92	0.92	0.92
Diatomaceous Earth	1.83	1.83	1.83	1.83
Feldspar	18.32	18.32	18.32	18.32
Water	42.77	42.77	42.77	42.77

BAL 11/11/98

000076

Entries by Mary Jane Hall Date 11/11/98

Project Name FDF POP

Project Number 775743 11/12/98 EMC

2293

1174:066

TCLP Extraction

Fluid #1 71.54 g HOAC + 61.8 g 50% NAOH TO 12 liter w/ DI H_2O pH = ~~4.85~~ 4.90 EMC 11/12/98

pH meter calib w/ 4, 7 buffer LOT# 9806272 (4) 9806172 (7)

Slope 100% Reading 4.00 = 4.01 11/12/98 11/13/98 4.00

7.00 = 7.00 7.02

45 g sample / 900 mls Fluid #1

on Shaker @ 3:30 pm 11/12/98

OFF Tumbler 9:30 AM 11/13/98

Sample		pH Filt	pH unFilt
1174 63-01	S1-1	5.64	5.65
-02	S1-2	5.64	5.65
-03	S1-3	5.59	5.60
-04	S1-4	5.62	5.63
64-01	S2-1	5.58	5.58
02	S2-2	5.54	5.55
03	S2-3	5.57	5.55
04	S24	6.14	6.07
65-01	D-1	5.28	5.30
02	D-2	5.32	5.34
03	D-3	5.36	5.37
04	D-4	5.36	5.39
Blank Fl #1		4.87	4.86

4.00 Buffer 4.01

7.00 Buffer 7.01

000077

Entries by Ellen Lacy Date 11/13/98

Project Name FDF POP

Project Number 775743

2293

1174:067

Additional Formulations

11/12/98

Additional Formulations for FDF Silo 1 & 2 POP
IT project 775743 00045000

1. Using 500 g portions of the Silo 1 or Demonstration filter cake material, make the 0 following formualtions:

Portland Cement Mix Ratio (g)	Calcium Hydroxide Mix Ratio (g)	Class F Fly Ash Mix Ratio (g)	Triple Superphosphate Mix Ratio (g)	Ferrous Sulfate Mix Ratio (g)
0.10 (100)	--	0.10 (100)	0.02 (20)	0.02 (20)
0.10	0.10	--	0.02	0.02
0.20 (200)	0.10	--	0.02	0.02
--	0.20 (200)	--	0.02	0.02
--	0.10	0.10	0.02	0.02

Samples Assigned Numbers 111298 S1 – 111298 S5 For Silo mixes and 111298 D1 – 111298 D5 For Demo mixes
All the Silo 1 Formulations had 100 ml of water Added to the Formulation.

Ferrous Sulfate Reagent was hepta hydrated

Calcium Hydroxide was Lab grade Mallinkrodt A.

Flyash was From Miami

PC – Dixie

all Silo 1 mixes still soft after overnight Cure.

@ 1 Day Demostration mixes pp (TSF)

MY 11/17/98
D1 - >4.5
D2 - >4.5
D3 - >4.5
D4 - >4.5
D5 - 4

Silo 1 mixes 11/16/98

MD 11/16/98
S1 - <0.25
S2 - 1.25
S3 - >4.5
S4 - 0.75
S5 - 0.5

11/13/98

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Entries by [signature] Date 11/13/98

Project Name FDF PoP

Project Number 775743

2293
1174:068

Work Plan FDF Silo 1 & 2 Pop. more Formulations

11/13/98

Work Plan for Fernald Silo 1 & 2 POP
IT Project 775743 00045000

1. Using 1.0 kg of the dewatered Silo 1 or Demonstration surrogate, make the following formulations:

Portland Cement Mix Ratio	Calcium Sulfate Mix Ratio	Class F Fly Ash Mix Ratio	Triple Superphosphate Mix Ratio	Ferrous Sulfate Mix Ratio
0.10	0.10	—	0.02	0.02
—	0.10	0.10	0.02	0.02
—	0.20	—	0.02	0.02

Compact treated material into two 2"x4" molds and two 8 oz cups.

Silo 1 mixes had 100 ml H_2O added to the formulations

Calcium Sulfate was Patching Plaster

Formulation #1 was reprepared using Silo 1 material without additional H_2O

Sample Assigned Sample #

111398 S1 – 111398 S4 Silo #1 mixes
111398 D1 – 111398 D3 Demo mixes

Penetration Resistance TSF 11/16/98

D1 – >4.5
D2 – 1.25
D3 – 1.5

S1 – 1.0
S2 – <0.25
S3 – <0.25
S4 – >4.5

11/13/98

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Entries by [signature] Date 11/13/98

Project Name FDF PoP

Project Number 775743

2293
1174.069

ADDITION SURROGATES TO DETERMINE COMPOSITION

Silo 1 Surrogate	1174-69-01 S1-5	1174-69-02 S1-6	1174-69-03 S1-7	1174-69-04 S1-8
Compound	Mix Weight (g)	Mix Weight (g)	Mix Weight (g)	Mix Weight (g)
BaSO4	10.34	10.34	10.34	10.34
Na2CrO4	0.08	0.08	0.08	0.08
Fe2O3	2.67	2.67	2.67	2.67
MgO	0.57	0.57	0.57	0.57
MgCO3	0.74	0.74	0.74	0.74
Mg3(PO4)2	0.84	0.68	0.51	0.34
NaNO3	0.50	0.50	0.50	0.50
NiO	0.46	0.46	0.46	0.46
PbO	5.00	5.00	5.00	5.00
PbCO3	4.19	4.19	4.19	4.19
PbSO4	6.30	6.30	6.30	6.30
Na2SeO3	0.13	0.13	0.13	0.13
Coarse SiO2	21.89	22.05	22.22	23.92
Fine SiO2	19.29	19.29	19.29	19.29
Silica Fume	9.24	9.24	9.24	9.24
V2O5	0.09	0.09	0.09	0.09
ZnO	0.01	0.01	0.01	0.01
Diatomaceous Earth	1.47	1.47	1.47	1.47
Feldspar	16.27	16.27	16.27	16.27
Water	42.77	42.77	42.77	43.42

PRL 11/16/98

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Entries by [signature]

Date 11/16/98

Project Name ~~775743~~ FDF PoP

Project Number 775743

2293

1174:070

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ADDITIONAL SURROGATES TO DETERMINE COMPOSITION

Silo 2 Surrogate

Compound	1174-70-01 S2-5 Mix Weight (g)	1174-70-02 S2-6 Mix Weight (g)	1174-70-03 S2-7 Mix Weight (g)	1174-70-4 S2-8 Mix Weight (g)
Al2O3	0.81	0.81	0.81	0.81
Na2HAsO4	0.21	0.21	0.21	0.21
BaSO4	6.81	6.81	6.81	6.81
CaCO3	3.85	3.85	3.85	3.85
Na2CrO4	0.06	0.06	0.06	0.06
Fe2O3	6.24	6.24	6.24	6.24
KNO3	0.36	0.36	0.36	0.36
MgCO3	2.43	2.43	2.43	2.43
Mg3(PO4)2	0.00	0.34	0.68	1.02
NaNO3	0.71	0.71	0.71	0.71
NiO	0.37	0.37	0.37	0.37
PbO	3.57	3.57	3.57	3.57
PbCO3	0.46	0.46	0.46	0.46
PbSO4	4.03	4.03	4.03	4.03
Na2SeO3	0.10	0.10	0.10	0.10
Coarse SiO2	22.86	22.52	22.18	21.84
Fine SiO2	18.34	18.34	18.34	18.34
Silica Fume	9.24	9.24	9.24	9.24
V2O5	0.09	0.09	0.09	0.09
ZnO	0.01	0.01	0.01	0.01
Tributyl Phosphate	0.92	0.92	0.92	0.92
Kerosene	0.92	0.92	0.92	0.92
Diatomaceous Earth	4.43	4.43	4.43	4.43
Feldspar	13.28	13.28	13.28	13.28
Water	42.76	42.76	42.76	42.76

PM 11/16/98

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Entries by [signature] Date 11/16/98

Project Name FDF PoP

Project Number 775743

2293
1174:071

ADDITIONAL SURROGATES TO DETERMINE COMPOSITION

Demonstration Surrogate	1174-71-01 DS-5	1174-71-02 DS-6	1174-71-03 DS-7	1174-71-04 DS-8
Compound	Mix Weight (g)	Mix Weight (g)	Mix Weight (g)	Mix Weight (g)
Na2HAsO4	0.17	0.17	0.17	0.17
BaSO4	8.19	8.19	8.19	8.19
Na2CrO4	0.27	0.27	0.27	0.27
Fe2O3	2.52	2.52	2.52	2.52
Mg3(PO4)2	2.00	1.88	1.76	1.64
NaNO3	1.03	1.03	1.03	1.03
NiO	0.43	0.43	0.43	0.43
PbO	5.67	5.67	5.67	5.67
PbCO3	6.63	6.63	6.63	6.63
PbSO4	2.65	2.65	2.65	2.65
Na2SeO3	0.10	0.10	0.10	0.10
Coarse SiO2	20.27	20.39	20.51	20.63
Fine SiO2	18.90	18.90	18.90	18.90
Silica Fume	9.16	9.16	9.16	9.16
V2O5	0.09	0.09	0.09	0.09
ZnO	0.01	0.01	0.01	0.01
Tributyl Phosphate	0.92	0.92	0.92	0.92
Kerosene	0.92	0.92	0.92	0.92
Diatomaceous Earth	1.83	1.83	1.83	1.83
Feldspar	18.32	18.32	18.32	18.32
Water	42.77	42.77	42.77	42.77

DRL 11/16/98

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Entries by [signature] Date 11/16/98

Project Name FDF PoP

Project Number 775743

2293

1174:072

11/16/98

TCLP extraction Fluid #1 prepared by Diluting 77.51g HOAc + 66.96g 10 N-NaOH to 13 l w/ D.I H_2O.
The pH meter ~~cal~~ was calibrated with pH buffers 4 & 7 slope = 101 Cal chk. 4 = 4.00, 7 = 7.00
pH of the TCLP extraction Fluid - 4.84
45 ± 0.02 g of each sample on pages 69, 70, 71 were placed into 1l bottles 900 ml of extraction Fluid was added. Tumble extraction Started @ 1655. Extraction Stopped 0900.

11/17/98
pH meter cal w/ 4 & 10 buffers slope = 98.5%
Cal chk w/ buffers 7 → 7.01, 10 → 10.00, 4 → 3.88 out of cal Low Range.
Recal w/ 4 & 7 buffers slope = 101
Cal chk 4 → 3.99, 7 → 7.01

Sample	pH before Filtration	pH after Filt.
11746901 S1-5	5.57	Not Determined
11746902 S1-6	5.59	
11746903 S1-7	5.58	
11746904 S1-8	5.55	
11747001 S2-5	6.09	
11747002 S2-6	6.32	
11747003 S2-7	5.58	
11747004 S2-8	5.57	
11747101 DS-5	5.38	
11747102 DS-6	5.38	
11747103 DS-7	5.37	
11747104 DS-8	5.36	
Blank Fluid 1	4.91	

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Entries by Mary M Hall Date 11-17-98

Project Name FDF PoP

Project Number 775743

2293
1174.073

STILL MORE SURROGATE COMPOSITION SAMPLES

Silo 2 Surrogate

Compound	1174-73-01 S2-9 Mix Weight (g)	1174-73-02 S2-10 Mix Weight (g)	1174-73-03 S2-11 Mix Weight (g)	1174-73-04 S2-12 Mix Weight (g)	1174-73-05 S2-13 Mix Weight (g)
Al2O3	0.81	0.81	0.81	0.81	0.81
Na2HAsO4	0.21	0.21	0.21	0.21	0.21
BaSO4	6.81	6.81	6.81	6.81	6.81
CaCO3	0.00	3.85	0.00	0.00	0.00
Na2CrO4	0.06	0.06	0.06	0.06	0.06
Fe2O3	6.24	6.24	6.24	6.24	6.24
KNO3	0.36	0.36	0.36	0.36	0.36
MgCO3	2.43	0.00	0.00	0.75	0.00
Mg3(PO4)2	0.00	0.00	0.00	0.17	1.17
NaNO3	0.71	0.71	0.71	0.71	0.71
NiO	0.37	0.37	0.37	0.37	0.37
PbO	3.57	3.57	3.57	3.57	3.57
PbCO3	0.46	0.46	0.46	0.46	0.46
PbSO4	4.03	4.03	4.03	4.03	4.03
Na2SeO3	0.10	0.10	0.10	0.10	0.10
Coarse SiO2	26.70	25.26	29.10	28.19	27.93
Fine SiO2	18.34	18.34	18.34	18.34	18.34
Silica Fume	9.24	9.24	9.24	9.24	9.24
V2O5	0.09	0.09	0.09	0.09	0.09
ZnO	0.01	0.01	0.01	0.01	0.01
Tributyl Phosphate	0.92	0.92	0.92	0.92	0.92
Kerosene	0.92	0.92	0.92	0.92	0.92
Diatomaceous Earth	4.43	4.43	4.43	4.43	4.43
Feldspar	13.28	13.28	13.28	13.28	13.28
Water	42.77	42.79	42.80	42.79	42.79

PAL 11/18/98

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Entries by [signature] Date 11/18/98

Project Name FDF PoP

Project Number 775743

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MAKE SURROGATE COMPOSITIONS

Silo 1 Surrogate

Compound	S1-9 (1174-74-01) Mix Weight (g)	S1-10 (1174-74-02) Mix Weight (g)
BaSO4	10.34	10.34
Na2CrO4	0.08	0.08
Fe2O3	2.67	2.67
MgO	0.57	0.57
MgCO3	0.74	0.74
Mg3(PO4)2	0.17	0.00
NaNO3	0.50	0.50
NiO	0.46	0.46
PbO	5.00	5.00
PbCO3	4.19	4.19
PbSO4	6.30	6.30
Na2SeO3	0.13	0.13
Coarse SiO2	22.56	22.73
Fine SiO2	19.29	19.29
Silica Fume	9.24	9.24
V2O5	0.09	0.09
ZnO	0.01	0.01
Diatomaceous Earth	1.47	1.47
Feldspar	16.27	16.27
Water	42.77	42.77

PL 11/18/98

Demonstration Surrogate

Compound	DS-9 (1174-74-03) Mix Weight (g)	DS-10 (1174-74-04) Mix Weight (g)
Na2HAsO4	0.17	0.17
BaSO4	8.19	8.19
Na2CrO4	0.27	0.27
Fe2O3	2.52	2.52
Mg3(PO4)2	1.17	1.41
NaNO3	1.03	1.03
NiO	0.43	0.43
PbO	5.67	5.67
PbCO3	6.63	6.63
PbSO4	2.65	2.65
Na2SeO3	0.10	0.10
Coarse SiO2	21.10	20.86
Fine SiO2	18.90	18.90
Silica Fume	9.16	9.16
V2O5	0.09	0.09
ZnO	0.01	0.01
Tributyl Phosphate	0.92	0.92
Kerosene	0.92	0.92
Diatomaceous Earth	1.83	1.83
Feldspar	18.32	18.32
Water	42.77	42.77

PL 11/18/98

Entries by [signature] Date 11/18/98

Project Name FDF PoP

Project Number 775743

2293
1174:075

74

TCLP Extraction Fluid #1 = 83.44 g HOAC + 72.1 g NAOH to 14 liter final vol in DI H_2O

pH meter calib	Buffer	reading	slope
	7.00	7.00	99.5
	4.00	4.01	

Fluid #1 pH = 4.88

11/18/98

Prepared 13 TCLP samples + Blk Fd #1 45g SURR / 900 mls Fd #1

on Extraction @ 3:35 pm 11/18/98
Stopped extraction @ 0825 11/19/98

11/19/98
pH meter cal w/ 4 & 7 buffers slope = 100
cal CHK 4 → 4.00 7 → 7.00

Sample	unFiltered TCLP pH
1174 6304 R	5.50
1174 6501 R	5.28
1174 6504 R	5.32
1174 7104 R	5.28
1174 7301	5.36
1174 7302	5.66
1174 7303	5.08
1174 7304	5.21
1174 7305	5.13
1174 7401	5.55
1174 7402	5.51
1174 7403	5.28
1174 7404	5.31
Blank	4.90

000086

Samples + BLK I0216 were filtered thru a 0.8 u filter and prepared for ICP analysis by adding 22.5 mls sample + 2.5 mls conc HNO_3 acid. (Centrifuged at 3000 RPM for 20 min prior to ~~filtering~~)
MS + MSD = added 500 uls of 10,000 mg/l Pb STD + 22.5 mls sample + 2 mls conc HNO_3 acid = 222 mg/l Spike

Entries by Ellen Lang Date 11/19/98

Project Name FDF PoP

Project Number 775743

2293

1174:076

11/19/98

7 Day Cure Penetration Resistance

Sample	TSF
111298 D1	>4.5
111298 D2	>4.5
111298 D3	>4.5
111298 D4	>4.5
111298 D5	4.5
111298 S1	0.25
111298 S2	3.5
111298 S3	>4.5
111298 S4	0.75
111298 S5	0.5
111398 D1	>4.5 ~~4.5~~
111398 D2	1.25
111398 D3	1.50
111398 S1	1.25
111398 S2	<0.25
111398 S3	>4.5
111398 S4	>4.5

TCLP Characterization

Cal buffer chk. 7 → 7.01, 10 → 9.95, 4 → 4.02

Sample	pH @ Stirr 5min w/ 5g → 96.5ml H_2O	pH @ 3.5ml 1N HCL 50°C
111298 D-1	10.48	8.84
111298 D-2	11.46	11.70
D-3	11.45	11.55
D-4	11.58	11.92
D-5	11.55	11.58
S-3	11.61	11.80
111398 D1	10.38	8.66
D2	7.20	2.92
D3	7.17	2.73
S1	10.70	9.27
S4	10.75	9.12

000087

Entries by [signature]

Date 11/19/98

Project Name FDF PoP

Project Number 775743

1174:077

76

45g of each sample (crushed < 3/8 inch) was placed into a 1l plastic bottle 900 ml of Extraction Fluid was added to each. Fluid #1 added to samples w/ Final pH ~~>~~ < 5, AND Fluid #2 added to samples w/ Final pH > 5.

TCLP Fluid #1 was prepare by diluting 47.65g HOAc + 41.21g 10 N NaOH To 8 l with the D.I. H_2O pH 4.93

TCLP Fluid #2 was prepared by Diluting 59.82g HOAc To 10 l w/ D.I. H_2O.
pH ~ 2.93

Extraction Started @ 4:45 pm
Extraction Stopped @ 0945

11/20/98
pH meter calibrated w/ 4 & 7 & 10 buffers.
4 → 3.96 7 → 7.00 10 → 9.96

Sample		unFiltered pH	Fluid
111298 D-1		5.52	2
111298 D-2		11.52	2
111298 D-3		11.67	2
111298 D-4		11.96	2
111298 D-5		7.45	2
111298 ~~D~~-5-3		11.56	2
111398 D1		5.61	2
D2		5.35	1
D3		5.35	1
S1		5.52	2
S4		5.57	2
1174 740 45	DS-10 slurry	5.12	1
BLK F1		4.92	1
BLK F2		2.93	2

000088

Entries by [signature] Date 11/20/98

Project Name EDF PoP

Project Number 775743

2293

1174:078

11/20/98

Formulations were prepared using 1000g of Silo 1 surrogate (Dewatered) The same reagents were used as in the Formulations Found on pages 117467 and 68. The sample were assigned Sample Numbers 112098 S1 – S8. Two 2x4" Cylinder molds and 2-8oz plastic cups were Filled For each Formulation. The mix Ratios are as Follows (Percent w/w):

Percent Loading

	A	B	C	D	E
1	PC	CaOH	CaSO4	FA	TSP
2	0.2	0.05	-	-	0.02
3	0.2	-	0.05	-	0.02
4	0.2	-	0.1	-	0.02
5	0.15	-	0.05	-	0.02
6	0.15	0.05		-	0.02
7	0.15	-	0.1	-	0.02
8	0.15	-		0.1	0.02
9	0.15	-		0.05	0.02
10	0.1	0.05	0.1	-	0.02

Water 100 ml

11/20/98

Pocket Penetrometer on 11/23 (TSF)

112098	S1	>4.5	112098 S6	>4.5
	S2	>4.5	S7	1.75
	S3	>4.5	S8	2.25
	S4	4.5	S9	2.25
	S5	2.5		

000089

Entries by R Gregg

Date 11/20/98

Project Name FDF PoP

Project Number 775743

2293
1174:079

78 TCLP Fluid Characterization for formulations on 1174:078

Cal Buffer CHK 7 → 7.01 10 → 9.96 4 → 4.01 Slope - 99

Sample ID#	pH @ 95.5g H_2O 5g Sample	pH after 3.5ml 1N HCL & 50°C	Fluid # Extr. pH
112098 S-1	11.28	11.28	11.40
S-2	11.37	10.90	10.20
S-3	11.41	10.81	9.84
S-4	11.33	10.41	8.39
S-5	11.66	11.64	11.00
S-6	11.43	10.48	8.17
S-7	11.33	10.41	7.94
S-8	11.42	10.66	8.29
S-9	11.88	11.37	9.02 ~~8.90~~ mt 11/30/98

TCLP Fl#1 = 71.55g HOAC + 61.81g con NaOH → 12 liter DI H_2O
pH = 4.90

TCLP Fl #2 = 95.40g HOAC → 16 liter DI H_2O pH = 2.93

Buffer 4 → 4.01 2 → 2.01 7 → 7.05 slope 98

		Extraction pH in Fluid #1
11748101	A	5.35
	B	5.30
	C	5.35
	D	5.40
Fluid #1		4.92
Fluid #2		2.93

S1-S9 Extractions Started at 14:40
11748101 Extractions started at 17:00
all Stopped @ 0910

all Samples 45g solid + 900 ml Fluid

000090

Entries by Ellen Jay Date 11/30/98

Project Name FDEPoP

Project Number 775743

2293

1174:080

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MN 3-2-99

000091

Entries by Mary Jo Hall

Date 3-2-99

Project Name FDF PoP

Project Number 775 743

2293
1174.081

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MH 3-2-99

000032

Entries by Mary Jo Hall

Date 3-2-99

Project Name FDF PoP

Project Number 775743

2293

1174:082

Buffer Reading 4 4.01 7 7.00 10 9.96

19 TCLP Extractions

Fluid #1 = 47.70 g HOAC + 41.21 g 50% NAOH Diluted to 8 l with DI H_2O. pH = 4.90

45 g sample / 900 mls extraction fluid #1

1174 8101 E
F
G
H

ON Tumbler
11/30/98 @ 14:00
OFF
12/1/98 @ 08:30

Buffer 4 - 4.01
7 - 7.00

Sample ID		pH
1174 8101	E	5.25
	F	5.26
	G	5.29
	H	5.60
Bulk Fluid #1		4.88

12/2/98

VERIFICATION TESTING OF DEMONSTRATION SURROGATE

pH = 9.21

PLASTICITY

P = 0.28 g
P+SHW = 22.75 g
P+S = ~~16.81~~ 16.22 g AM 12/2/98

42.8% MOISTURE DWB AM 12/3/98

NOTE: MATERIAL APPEARED TO BE AT PLASTIC LIMIT

MOISTURE CONTENT - ABOVE DATA, RECALCULATED AS WET% MOISTURE
30.0% MOISTURE AM 12/3/98

WET PLACE DENSITY - WEIGHT (g) - 216.62
COMPACTED VOLUME (mL) - 120
1.81 g/cm³

AM 12/2/98

000093

Entries by Mary McGall

Date 12/2/98

Project Name EDF PoP

Project Number 775743

2293
1174.083

84

1730 ADDED 30% WT MOISTURE MATERIAL TO WATER & BENTONITE NEEDED

WEIGHT OF DEMONSTRATION SURROGATE = 48,254 g

WEIGHT SOLIDS (70%) IN SURROGATE = 33,778 g (48,254 × 0.7)

AMOUNT REMOVED FOR VERIFICATION = 5,000 g PRL 12/30/98

AMOUNT OF DEMONSTRATION SURROGATE REMAINING 43,254 g (48,254 - 5,000

AMOUNT OF DRY REAGENTS REMAINING = 30,278 g (43,254 × 0.7)

DRY BENTONITE REQUIRED = 2,633 g (30,278 × (2.4/27.

BENTONITE MOISTURE CONTENT = 8.6%

BENTONITE REQUIRED = 2,880 g 2,633 × (100/(100-8.

TOTAL WEIGHT 30 WT % SLURRY NEEDED = 109,702 g (30,278 + 2,633

WATER REQUIRED = 63,568 g (109,702 - 43,254 - 2,880

WEIGHT BENTONITE 2,879.6 g
WEIGHT WATER 63,568.3 g

PRL 12/30/98

1800

ADDED 70 WT % SOLIDS TO WATER/BENTONITE SLURRY FOLLOWING RECEIPT OF CELS DATA ON TCLP Pb.

PRL 12/4/98

000094

Entries by Mary Mitchell Date 12/4/98

Project Name FDF PoP

Project Number 775743

2293

1174:084

83

0945

MOISTURE & DENSITY OF 30 WT% DEMONSTRATION SURROGATE

	ALIQUOT 1	2	3	
P	1.00	0.99	1.00	
P+S+W	35.38	36.96	31.88	
P+S	11.41	11.85	10.24	AND 12/8/98 PLL
SOLIDS CONTENT (%)	29.92	30.19	29.92	ADDED 12/8/98 PLL
WEIGHT OF 100ML ALIQUOT (g)	120.62	119.54	119.77	

1000 PREPARED FOR DEWATERING OF 30 WT% SOLIDS SLURRY

1100 TOOK 2 15-L ALIQUOTS AND AMENDED EACH WITH 90g FERRIC SULFATE (TECHNICAL GRADE). ALLOWED IT TO REACT W/ INTERMITTENT STIRRING. AFTER ~15 MINUTES, 180g OF LIME WAS ADDED TO EACH. 5 L OF H_2O WAS ADDED TO EACH TO IMPROVE PUMPABILITY.

1120 STARTED DEWATERING. ~20-L MATERIAL USED TO FILL PRESS INITIAL PRESSURE ~40 psi

1130 - 1200 THE REMAINING ~20-L MATERIAL FEED INTO PRESS AS PRESSURE SLOWLY STEPPED TO ~100 PSI. RECYCLE OPENED EVERY ~5 MINUTES TO PREVENT PLUGGING. TOOK FILTER PRESS EFFLUENT SAMPLE AT 1130 (1174-84-01)

1205 - 1220 PRESS CLEANED & RE ASSEMBLED. TWO ADDITIONAL 15-L ALIQUOTS AMENDED W/ 45 g OF FERROUS SULFATE EACH, FOLLOWED BY 180 g OF HYDRATED LIME. 5-L OF WATER ADDED TO EACH TO IMPROVE PUMPABILITY.

1220 - 1300 STARTED DEWATERING. ~20-L MATERIAL USED TO FILL PRESS. INITIAL PRESS ~40 psi. PRESSURE SLOWLY STEPPED TO ~100psi, EFFLUENT SAMPLE (1174-84-02) TAKEN AT 1230. ~20 L OF ADDITIONAL MATERIAL FEED INTO PRESS

000095

85

Entries by [signature]

Date 12/7/98

Project Name FDF PoP

Project Number 775743

84 gal
85

2293
1174:085

1305 - 1320 PRESS CLEANED & ASSEMBLED. 2 ADDITIONAL 15-L ALIQUOTS AMENDED WITH 27 g FERROUS SULFATE, EACH; FOLLOWED BY 180 g OF HYDRATED LIME. 5-L OF WATER ADDED TO EACH TO IMPROVE PUMPABILITY.

1320 - 1400 STARTED DEWATERING. ~20L MATERIAL ADDED TO FILL PRESS. INITIAL PRESSURE ~40 psi. PRESSURE SLOWLY STEPPED TO ~100 psi. EFFLUENT WAS SLIGHTLY YELLOW IN COLOR. NO EFFLUENT SAMPLE TAKEN. ~20-L OF ADDITIONAL MATERIAL TAKEN INTO PRESS.

1500 SINCE THE FILTRATE FROM THE 3RD RUN WAS NOT ACCEPTABLE, ONLY MATERIAL FROM THE FIRST 2-RUNS WOULD BE USED FOR FORMULATION DEVELOPMENT.

[illegible] 12/7/98

12/9/98 % Solids of Demo Filter cake #2 (105°C)

#1	Tare	2.26	DENSITY	#1	WEIGHT (g)	46.41	
	Tare + wet	32.12			HEIGHT (cm)	3.1	
	Tare + Dry	18.12			LENGTH (cm)	3.3	1.74 g/c
	% Moist.	46.89			WIDTH (cm)	2.6	
#2	Tare	2.28		#2	WEIGHT (g)	42.52	
	Tare + wet	29.77			HEIGHT (cm)	3.1	1.70 g/
	Tare + Dry	16.78			LENGTH (cm)	3.1	
	% Moist	47.25			WIDTH (cm)	2.6	

12/16/98 % Solids of Demo Filter Cake #2 (60°C)

#1	Tare	1.00	
	Tare + wet	28.52	% moist. 46.96
	Tare + Dry	15.59	
#2	Tare	1.00	% moist - 47.41
	Tare + wet	26.65	
	Tare + Dry	14.49	

000096

Entries by Mary M Hall Date 12/16/98

Project Name FDF PoP

Project Number 775743

12/17/98 Total Suspended AND Dissolved Solids.
Filtrate

TSS @ 105°C

Sample	Filter tare	mls Filtered	Dry Filter
BLK	0.1501	140	0.1498
8402	0.1515	150	0.1551
8401	0.1503	150	0.1538

TDS @ 180°C

Sample	beaker tare	ml Filtered	Dry Beaker
BLK	68.9834	MD 12/17/98 ~~150~~ 140	68.96.05
8402	71.3919	150	72.9176
8401	63.6881	150	65.0009

12/18/98
pH meter cal w/ 7 & 10 buffers Slope = 98
7 → 7.02 10 → 9.99

MD 12/18/98	Filtrate	pH
	~~8040~~ 8401	11.81
	8402	11.93

$$TSS = \frac{Dry - tare}{ml\ Filtered} \times 1000000 = \frac{mg}{l}$$

8402 – 24 mg/l

8401 – 23.3 mg/l

$$TDS = \frac{Dry - tare}{ml} \times 1000000 = mg/l$$

8402 – 10171 mg/l

8401 – 8752 mg/l

000097

117486 – Demonstration Formulation on page 92

Entries by Mary M Hall Date 12/18/98

Project Name FDF PoP

Project Number 775743

2293

1174.087

Fernald K65 POP
Revised Bench-Scale
Demostration Surrogate Form 2

FERNALD K65 PROOF OF PRINCIPLE
REVISED BENCH-SCALE

Sample Number	1174-87-01	Date	12/8/98
Name	Greg Bennett	Source	Demonstration

FORMULATION

	K65 SURROGATE FILTER CAKE	PC	Ca(OH)2	CaSO4*0.5H2	FeSO4*6H2O	FLY ASH	TSP	WATER (TBD)
PLANNED (% w/w)	N/A	15%	0%	5%	1%	0%	2%	10%
PLANNED (g)	2000	300	0	100	20	0	40	~~200~~
ACTUAL (g)	2000.00	300.00	0	100.00	20.00	0	40.00	0

JV 12-8-98

Mixer Speed #1 ~~2 min~~ JV 12-8-98
Time of Mixing 2 min

Room Temperature (C) 21°
Final Grout Temperature (C) 25°

Temperature Rise (C) 4°

WEIGHTS FOR ALIQUOTS (g)

Tare 2 x 4 inch mold 21.32
Wt Compacted Sample in mold 353.83
Density (g/cc) 1.61

Tare 2 x 4 inch mold 21.33
Wt Compacted Sample in mold 354.20
Density (g/cc) 1.62

Tare 2 x 4 inch mold 21.33
Wt Compacted Sample in mold 355.18
Density (g/cc) 1.62

Pocket Penetrometer sample
Vol. Compacted in S. Cup (cc) 200

Mod. ANS 55.1
Vol Smp in Container 200
Vol. Liquid @ 24 hr 0

PP @ Overnight	Cure (tsf)	1.25
PP @ 2 Day	Cure (tsf)	2.5
PP @ 3 Day	Cure (tsf)	2.75
PP @ 10 Days	Cure (tsf)	>4.5
PP @	Cure (tsf)	
PP @	Cure (tsf)	

MB 2/15/99

MB 2/15/99

000098

Entries by [signature] Date 2/15/99

Project Name FDF PoP

Project Number 775743

1174:088 22931

Fernald K65 PoP
Demonstration Surrogate
Form # 3

FERNALD K65 PROOF OF PRINCIPLE

REVISED BENCH-SCALE

Sample Number	1174-88-01	Date	12/8/98
Name	Greg Bennett	Source	Demonstration

FORMULATION

	K65 SURROGATE FILTER CAKE	PC	Ca(OH)2	CaSO4*0.5H2	FeSO4*6H2O	FLY ASH	TSP	WATER (TBD)
PLANNED (% w/w)	N/A	15%	5%	0%	1%	0%	2%	10%
PLANNED (g)	2000	300	100	0	20	0	40	~~200~~
ACTUAL (g)	2000.00	300.00	100.00	0	20.00	0	40.00	0

JY 12-8-98

Mixer Speed 1
Time of Mixing 3 min

Room Temperature (C) 21°
Final Grout Temperature (C) 26°

Temperature Rise (C) 5°

WEIGHTS FOR ALIQUOTS (g)

Tare 2 x 4 inch mold 21.32
Wt Compacted Sample in mold 354.74
Density (g/cc) 1.62

Tare 2 x 4 inch mold 21.37
Wt Compacted Sample in mold 344.06
Density (g/cc) 1.57

Tare 2 x 4 inch mold 21.34
Wt Compacted Sample in mold 324.45
Density (g/cc) 1.52

Pocket Penetrometer sample
Vol. Compacted in S. Cup (cc) 200

Mod. ANS 55.1
Vol Smp in Container 200
Vol. Liquid @ 24 hr 0

PP @ 0.42 hr	Cure (tsf)	1.5
PP @ 2 day	Cure (tsf)	2.5
PP @ 3 Day	Cure (tsf)	2.5
PP @ 6 Day	Cure (tsf)	4.5
PP @	Cure (tsf)	
PP @	Cure (tsf)	

MB 2/15/99

MB 2/15/99

000099

Entries by [signature] Date 2/15/99

Project Name EDF PoP

Project Number 775743

2293
1174:089

Fernald K65 POP
Demonstration Surrogate
Form #4

FERNALD K65 PROOF OF PRINCIPLE

REVISED BENCH-SCALE

Sample Number	1174-89-01	Date	12/8/98
Name	Greg Bennett	Source	Demonstration

FORMULATION

	K65 SURROGATE FILTER CAKE	PC	Ca(OH)2	CaSO4*0.5H2	FeSO4*6H2O	FLY ASH	TSP	WATER (TBD)
PLANNED (% w/w)	N/A	15%	0%	0%	1%	10%	2%	10%
PLANNED (g)	2000	300	0	0	20	200	40	~~200~~ 0 12-8-98
ACTUAL (g)	2000.00	300.00	0	0	20.00	200.00	40.00	

Mixer Speed 1
Time of Mixing 5 min

Room Temperature (C) 21°
Final Grout Temperature (C) 28°

Temperature Rise (C) 7°

WEIGHTS FOR ALIQUOTS (g)

Tare 2 x 4 inch mold 21.33
Wt Compacted Sample in mold 358.49
Density (g/cc) 1.64

Tare 2 x 4 inch mold 21.35
Wt Compacted Sample in mold 354.61
Density (g/cc) 1.62

Tare 2 x 4 inch mold 21.34
Wt Compacted Sample in mold 339.79
Density (g/cc) 1.55

Pocket Penetrometer sample
Vol. Compacted in S. Cup (cc) 205

Mod. ANS 55.1
Vol Smp in Container 205
Vol. Liquid @ 24 hr 0

PP @ overnight	Cure (tsf)	1.5
PP @ 2 Day	Cure (tsf)	3.0
PP @ 3 Day	Cure (tsf)	3.0
PP @ 6 Day	Cure (tsf)	3.0
PP @	Cure (tsf)	
PP @	Cure (tsf)	

2/15/99

2/15/99

000100

Entries by [signature] Date 2/15/99

Project Name FDF PoP

Project Number 775743

2293

1174:090

Fernald K-65 POP
Demonstration Surrogate Form #5

FERNALD K65 PROOF OF PRINCIPLE

REVISED BENCH-SCALE

Sample Number	1174-90-01	Date	12/8/98
Name	Greg Bennett	Source	Demonstration

FORMULATION

	K65 SURROGATE FILTER CAKE	PC	Ca(OH)2	CaSO4*0.5H2	FeSO4*6H2O	FLY ASH	TSP	WATER (TBD)
PLANNED (% w/w)	N/A	15%	0%	0%	1%	5%	2%	10%
PLANNED (g)	2000	300	0	0	20	100	40	~~200~~ 0 JT 12/8/98
ACTUAL (g)	2000.00	300.00	0	0	20.00	100.00	40.00	

Mixer Speed #1
Time of Mixing 3 min

Room Temperature (C) 21°
Final Grout Temperature (C) ~~26~~ 26° JT 12/8/98

Temperature Rise (C) 5°

WEIGHTS FOR ALIQUOTS (g)

Tare 2 x 4 inch mold 21.33
Wt Compacted Sample in mold 349.99
Density (g/cc) 1.60

Tare 2 x 4 inch mold 21.32
Wt Compacted Sample in mold 347.63
Density (g/cc) 1.58

Tare 2 x 4 inch mold 21.32
Wt Compacted Sample in mold 350.79
Density (g/cc) 1.60

Pocket Penetrometer sample
Vol. Compacted in S. Cup (cc) 220

Mod. ANS 55.1
Vol Smp in Container 220
Vol. Liquid @ 24 hr 0

PP @ Overnight	Cure (tsf)	1.5
PP @ 2 day	Cure (tsf)	2.5
PP @ 3 day	Cure (tsf)	2.5
PP @ 6 Days	Cure (tsf)	3.0
PP @	Cure (tsf)	
PP @	Cure (tsf)	

MB 2/15/99

MB 2/15/99

000101

Entries by Gregory Bennett Date 2/15/99

Project Name FDF PoP

Project Number 775743

2293
1174:091

Fernald K-65 PoP
Demonstration Surrogate
Form #6

FERNALD K65 PROOF OF PRINCIPLE

REVISED BENCH-SCALE

Sample Number	1174-91-01	Date	12/8/98
Name	Greg Bennett	Source	Demonstration

FORMULATION

	K65 SURROGATE FILTER CAKE	PC	Ca(OH)2	CaSO4*0.5H2	FeSO4*6H2O	FLY ASH	TSP	WATER (TBD)
PLANNED (% w/w)	N/A	10%	5%	0%	1%	0%	2%	10%
PLANNED (g)	2000	200	100	0	20	0	40	~~200~~ 0
ACTUAL (g)	2000.00	200.00	100.00	0	20.00	0	40.00	2.298

Mixer Speed #1
Time of Mixing 2.5 MIN

Room Temperature (C) 21°
Final Grout Temperature (C) 25°

Temperature Rise (C) 4°

WEIGHTS FOR ALIQUOTS (g)

Tare 2 x 4 inch mold 21.33
Wt Compacted Sample in mold 346.85
Density (g/cc) 1.58

Tare 2 x 4 inch mold 21.31
Wt Compacted Sample in mold 344.19
Density (g/cc) 1.57

Tare 2 x 4 inch mold 21.35
Wt Compacted Sample in mold 342.43
Density (g/cc) 1.56

Pocket Penetrometer sample
Vol. Compacted in S. Cup (cc) 220

Mod. ANS 55.1
Vol Smp in Container 220
Vol. Liquid @ 24 hr 0

PP @ Overnight	Cure (tsf)	1.5
PP @ 2 Day	Cure (tsf)	3.5
PP @ 3 Day	Cure (tsf)	3.5
PP @ 10 Day	Cure (tsf)	3.5
PP @	Cure (tsf)	
PP @	Cure (tsf)	

HM 2/15/99

HM 2/15/99

000102

Entries by [signature] Date 2/15/99

Project Name FDF P.P

Project Number 775743

2293
1174:092

FERNALD K65 PROOF OF PRINCIPLE

REVISED BENCH-SCALE

Sample Number	1174-86-01	Date	12/8/98
Name	Greg Bennett	Source	Demonstration

FORMULATION

	K65 SURROGATE FILTER CAKE	PC	Ca(OH)2	CaSO4*0.5H2	FeSO4*6H2O	FLY ASH	TSP	WATER (TBD)
PLANNED (% w/w)	N/A	20%	0%	5%	1%	0%	2%	10%
PLANNED (g)	2000	400	0	100	20	0	40	~~200~~ JY
ACTUAL (g)	2000.0	400.00	0	100.00	20.00	0	40.00	0 12-9-98

Mixer Speed 1

Time of Mixing 3 min.

Room Temperature (C) 21°

Final Grout Temperature (C) 27°

Temperature Rise (C) 6°

WEIGHTS FOR ALIQUOTS (g)

Tare 2 x 4 inch mold 21.32 g

Wt Compacted Sample in mold 364.38

Density (g/cc) 1.66

Tare 2 x 4 inch mold 21.33

Wt Compacted Sample in mold 362.73

Density (g/cc) 1.66

Tare 2 x 4 inch mold 21.30

Wt Compacted Sample in mold 363.41

Density (g/cc) 1.66

Pocket Penetrometer sample

Vol. Compacted in S. Cup (cc) 210

Mod. ANS 55.1

Vol Smp in Container 210

Vol. Liquid @ 24 hr 0

PP @ Overnight	Cure (tsf)	1.5
PP @ 2 Day	Cure (tsf)	3.25
PP @ 3 Day	Cure (tsf)	3.75
PP @ 6 Day	Cure (tsf)	24.5
PP @ 0	Cure (tsf)	
PP @	Cure (tsf)	

MB 2/15/99

MB 2/15/99

000103

Entries by R Gregory Bennett

Date 2/15/99

NOTEBOOK NUMBER

1179

ISSUED TO: Paul Lear

ON: 1-7-99

NOTEBOOK PURPOSE: FDF POP 775743

Lab Note Book #2

RETURNED:

Project Name FDF POP

Project Number 775743

2293

1179:002

Weight Log
Batch 1 - Tank A
Fernald POP Surrogate Slurry

12/21/98

Mary Hall 1/11/99

✓ **Silica Fume** – Use 19 bags, approx half bag to silica fume per bag of dry blend, put 5 bags of full SF on scale, record weight, MT into dry blend bags, weigh MT SF bags.

Actual weight(bags 1-5): full 25.03 kg MT 2.2 kg net 22.83 kg
Actual weight(bags 6-10): full 25.20 kg MT 2.2 kg net 23.00 kg
Actual weight(bags 11-15): full 24.90 kg MT 2.4 kg net 22.50 kg
Actual weight(bags 16-19): full 20.10 kg MT 1.7 kg net 18.40 kg
Total 86.73 kg
85.78 kg ADJUSTED
0.95 kg REMARKS 1.0 kg
per
VERIFY TOTAL
85.73 kg
per

By 12/21/98 date per

✓ **Sodium Arsenate** – Weigh out 1560 grams, split between all 38 bags at ~42 gr/bag

Actual weight: tare 0.0 g gross 1,560 g net 1,560 g

By 12/21/98 date per

✓ **Sodium Chromate** – Weigh out 2480 gr, split between all 38 bags, ~ 66 gr/bag

Actual weight: tare 0 g gross 2,480 g net 2,480 g

By 12/21/98 date per

✓ **Nickel Oxide** – Weigh out 3950 gr, split between all 38 bags at ~106 gr/bag

Actual weight: tare 0 g gross 3,950 g net 3,950 g

By per date 12/21/98

✓ **Sodium Selenate** – Weigh out 920 gr, split between all 38 bags at ~25 gr/bag

Actual weight: tare 0 g gross 920 g net 920 g

By per date 12/21/98

✓ **Vanadium Pentoxide** – Weigh out 830 gr, split into all bags at ~22 gr/bag

Actual weight: tare 0 g gross 830 g net 830 g

By per date 12/21/98

 per 12/21/98

000105

Entries by Mary Hall Date 1/11/98 1/11/99

Project Name FDF POP

Project Number 775743

✓ **Zinc oxide** – weigh out 90 gr, sprinkle into as many bags as possible

Actual weight: tare 0 g gross 90 g net 90 g

By PRL date 12/21/98

✓ **Sodium nitrate** – Weigh out 9740 gr, split into 38 bags at ~260 gr/bag

Actual weight: tare 0 g gross 9740 g net 9740 g

By PRL date 12/21/98

✓ **Magnesium Phosphate** – weigh out 13,380 gr, split into 38 bags at 360 gr/bag

Actual weight: tare 0 g gross 13,380 g net 13,380 g

By PRL date 12/21/98

✓ **Diatomaceous earth** – weigh out 2 batches of 8405 gr, split into 19 bags at 453 gr/bag

~~Actual weight: tare 0 g gross 5910 g net 5910 g~~
Actual weight: tare 0 g gross 5400 g net 5400 g
Actual weight: tare 0 g gross 5500 g net 5500 g
~~Actual weight: tare 0 PRL gross PRL total PRL net PRL~~

By PRL date 12/21/98 TOTAL: 16810 g

✓ **Iron oxide** – Weigh out 2 batches of 11,585 gr, split into 19 bags at ~624 gr/bag

Actual weight: tare 0 g gross 11,585 g net 11,585 g
Actual weight: tare 0 g gross 11,585 g net 11,585 g
total 23,120 g

By PRL date 12/21/98

Lead sulfate – weigh out 2 batches of 12,170 gr, split into 19 bags at ~656 gr bag
IN HOOD

Actual weight: tare 0 kg gross 24.30 kg net 24.30 kg
Actual weight: tare gross net
total

By PRL date 12/21/98

Mary Hall 1/11/99

 PRL 12/21/98

Entries by Mary Hall Date 1/6/99

Project Name FDF POP

Project Number 775743

Lead Oxide – weigh out 4 batches of 13,028 gr, split into 9 bags, ~1405 gr/bag, with a half share in the 10th bag - IN HOOD

Actual weight:	tare 0 kg	gross	26.0 kg	net	26.0 kg
Actual weight:	tare 0 kg	gross	26.1 kg	net	26.1 kg
Actual weight:	tare	gross		net	
Actual weight:	tare	gross		net	
				total	52.1 kg

By PAL date 12/21/98

Mary Hall 1/11/99

Lead Carbonate – weigh out 4 batches of 15,218 gr, split into 9 bags, ~1641 gr/bag, with a half share in the 10th bag - In Hood

Actual weight:	tare 0 kg	gross	20.3 kg	net	20.3 kg
Actual weight:	tare 0 kg	gross	20.3 kg	net	20.3 kg
Actual weight:	tare 0 kg	gross	20.3 kg	net	20.3 kg
Actual weight:	tare	gross		net	
				total	60.9 kg

By PAL date 12/21/98

Barium Sulfate – weigh out 5 batches of 15,044 gr, split into 7 bags, ~4500 gr/bag, with a half share in the 8th bag

ACTUAL WEIGHT:	TARE 0 g	GROSS	15,044 g	NET	15,044 g
Actual weight:	tare 0 g	gross	15,044 g	net	15,044 g
Actual weight:	tare 0 g	gross	15,044 g	net	15,044 g
Actual weight:	tare 0 g	gross	15,044 g	net	15,044 g
Actual weight:	tare 0 g	gross	15,044 g	net	15,044 g
				total	75220 g

By PAL date 12/21/98

✓ **Feldspar** –Get gross weight on 7 bags (50 lbs ea) of Feldspar, split each bag into 5 bags of dry blend, ~10 lb/bag, get tare weight mt bags, total weights from bags and weigh out an additional amount to total 168.3 kg, split this into the remaining 3 bags– In Hood (crystalline silica)

Actual weight:	tare 0 kg	gross	23.0 kg	net
Actual weight:	tare 0 kg	gross	22.8 kg	net
Actual weight:	tare 0 kg	gross	23.1 kg	net
Actual weight:	tare 0 kg	gross	22.8 kg	net
Actual weight:	tare 0 kg	gross	24.0 kg	net
Actual weight:	tare 0 kg	gross	22.1 kg	net
Actual weight:	tare 0 kg	gross	22.9 kg	net
			161.7 kg	Total
Actual weight:	tare	gross	-1.3 kg Tare	net
			160.4 kg	Total
	0		7.9 kg	
By PAL		date 12/21/98	168.3 kg	

 PAL 12/21/98

Entries by Mary Hall Date 1/11/99

Project Name FDF POP

Project Number 775743

2293
1179.005

Coarse Silica, (Sand) - Get gross weight on 8 bags (50 lbs ea) of sand, split each bag into 4 bags of dry blend, ~12.5 lb/bag, get tare weight on mt bags, total weights from bags and weigh out an additional amount to total 191.1 kg, split this into the remaining 6 bags– In Hood (crystalline silica)

Mary Hall 1/11/99

Actual weight:	tare	gross	44.20 kg	net	44.20 kg
Actual weight:	tare	gross	43.60 kg	net	43.60 kg
Actual weight:	tare	gross	44.50 kg	net	44.50 kg
Actual weight:	tare	gross	42.40 kg	net	42.40 kg
Actual weight:	tare	gross	18.30 kg	net	18.30 kg
Actual weight:	tare	gross		net	
Actual weight:	tare	gross		net	
Actual weight:	tare 1.9 kg	gross		net	-1.9 kg
				Total	191.1 kg
Actual weight:	tare	gross		net	
				Total	

By PM date 12/21/98

Tributyl Phosphate – Weigh out 8450 gr, hold to mix with fine silica

Actual weight: tare 0 gross 8.5 kg net 8.5 kg

By pm date 12/23/98

Kerosene – Weigh out 8450 gr, hold to mix with fine silica

Actual weight: tare 0 gross 8.5 kg net 8.5 kg

By pm date 12/23/98

Fine Silica – Get gross weight on 7 bags (50 lbs ea) of fine silica, put into open head drum, get tare weight mt bags, total weights from bags and weigh out an additional amount to total 171.9 kg, split this into the remaining 3 bags– In Hood (crystalline silica)

Actual weight:	tare	gross	45.3 kg	net	45.3 kg
Actual weight:	tare	gross	45.6 kg	net	45.6 kg
Actual weight:	tare	gross	45.4 kg	net	45.4 kg
Actual weight:	tare	gross	23.0 kg	net	23.0 kg
Actual weight:	tare 1.6 kg	gross	14.2 kg	net	12.6 kg
Actual weight:	tare	gross		net	
Actual weight:	tare	gross		net	
				Total	171.9 kg
Actual weight:	tare	gross		net	
				Total	

By date

Page 4 of 5 PM 12/21/98

000108

Entries by Mary Hall Date 1/11/99

roject Name FDF POP

roject Number 775743

Mix kerosene and TBP, add organics mix to fine silica in drum and mix with helical mixer.

Bentogrout – Weigh out 3 sacks of 29.1kg, hold to mix with water in tank

Actual weight:	tare	gross 68.1 kg	net 68.1 kg		
Actual weight:	tare 6.6 kg	gross 19.8 kg	net 19.2 kg		
Actual weight:	tare	gross	net		
			87.3 kg		

By PRL date 12/23/98

Mary Hall 1/11/99

Water
Add 5117 lbs of water to tank through neptune meter.

Meter calibration

Lb	419.8	422.2	459.0	START	683290.0
Gal	50	50	55	END	683898.5

Apparent lb of water per gallon on neptune meter 8.394#/Gal

$2,321.65 \text{ kg} \times \frac{2.2 \text{ lb}}{1 \text{ kg}} \times \frac{\text{Gal}}{8.394\#} = 608.5 \text{ Gal}$

PRL 12/22/98

NOTE: ADDED 12 GALLONS OF WATER WHILE ADDING DRY CONTENTS
PRL 12/28/98

Entries by Mary Hall Date 1/11/99

Project Name FDF POP

Project Number 775743

2293
1179.007

Weight Log
Batch 2 - Tank B
Fernald POP Surrogate Slurry

Silica Fume – Use 19 bags, approx half bag to silica fume per bag of dry blend, put 5 bags of full SF on scale, record weight, MT into dry blend bags, weigh MT SF bags.

Actual weight(bags 1-5): full 25.2 kg MT net 25.2 kg
Actual weight(bags 6-10): full 25.1 kg MT net 25.1 kg
Actual weight(bags 11-15): full 24.8 kg MT net 24.8 kg
Actual weight(bags 16-19): full 20.1 kg MT 8.9 kg net 11.2 kg
Total 86.3 kg
-1.0 kg
85.3 kg

By PAL date 12/22/98

Mary Hall 1/11/99

Sodium Arsenate – Weigh out 1560 grams, split between all 38 bags at ~42 gr/bag

Actual weight: tare 0 g gross 1,560 g net 1,560 g

By PAL date 12/22/98

Sodium Chromate – Weigh out 2480 gr, split between all 38 bags, ~ 66 gr/bag

Actual weight: tare 0 g gross 2,480 g net 2,480 g

By PAL date 12/22/98

Nickel Oxide – Weigh out 3950 gr, split between all 38 bags at ~106 gr/bag

Actual weight: tare 0 g gross 3,950 g net 3,950 g

By PAL date 12/22/98

Sodium Selenate – Weigh out 920 gr, split between all 38 bags at ~25 gr/bag

Actual weight: tare 0 g gross 920 g net 920 g

By PAL date 12/22/98

Vanadium Pentoxide – Weigh out 830 gr, split into all bags at ~22 gr/bag

Actual weight: tare 0 g gross 830 g net 830 g

By PAL date 12/22/98

000110

Entries by Mary Hall Date 1/11/99

Project Name FDF POP

Project Number 775743

Zinc oxide – weigh out 90 gr, sprinkle into as many bags as possible

Actual weight: tare 0 g gross 90 g net 90 g

By PLL date 12/22/98

Sodium nitrate – Weigh out 9740 gr, split into 38 bags at ~260 gr/bag

Actual weight: tare 0 g gross 9,740 net 9,740

By PLL date 12/22/98

Magnesium Phosphate – weigh out 13,380 gr, split into 38 bags at 360 gr/bag

Actual weight: tare 0 g gross 8,000 g net 8,000 g
tare 0 g gross 5,380 g net 5,380 g
By PLL date 12/22/98 TOTAL 13,380 g

Diatomaceous earth – weigh out 2 batches of 8405 gr, split into 19 bags at 453 gr/bag

Actual weight: tare 0 g gross 5,603 g net 5,603 g
Actual weight: tare 0 g gross 5,603 g net 5,603 g
0 g 5,603 g ~~total~~ net 5,603 g
By PLL date 12/22/98 total 16,809 g

Iron oxide – Weigh out 2 batches of 11,585 gr, split into 19 bags at ~624 gr/bag

Actual weight: tare 0 g gross 11,585 g net 11,585 g
Actual weight: tare 0 g gross 11,585 g net 11,585 g
total 23,170 g
By PLL date 12/22/98

Lead sulfate – weigh out 2 batches of 12,170 gr, split into 19 bags at ~656 gr bag
IN HOOD

Actual weight: tare 0 g gross 12,170 g net 12,170 g
Actual weight: tare 0 g gross 12,170 g net 12,170 g
total 24,340 g
By PLL date 12/22/98

Entries by Mary Hall Date 1/11/99

Project Name FDF POP

Project Number 775743

1179:009
2293

Mary Hall 1/11/99

Coarse Silica, (Sand) - Get gross weight on 8 bags (50 lbs ea) of sand, split each bag into 4 bags of dry blend, ~12.5 lb/bag, get tare weight on mt bags, total weights from bags and weigh out an additional amount to total 191.1 kg, split this into the remaining 6 bags– In Hood (crystalline silica)

Actual weight:	tare		gross	45.3 kg	net	45.3 kg
Actual weight:	tare		gross	45.5 kg	net	45.5 kg
Actual weight:	tare		gross	45.2 kg	net	45.2 kg
Actual weight:	tare	0.9 kg	gross	45.3 kg	net	44.4 kg
Actual weight:	tare	1	gross	0.9 kg	net	0.9 kg
Actual weight:	tare	all	gross	9.8 kg	net	9.8 kg
Actual weight:	tare	bags wt.	gross		net	
Actual weight:	tare	all	gross		net	
					Total	191.10 kg
Actual weight:	tare		gross		net	
					Total	

By PM date 12/28/98

Tributyl Phosphate – Weigh out 8450 gr, hold to mix with fine silica

Actual weight: tare 0 gross 8.5 kg net 8.5 kg

By PM date 12/23/98

Kerosene – Weigh out 8450 gr, hold to mix with fine silica

Actual weight: tare 0 gross 8.5 kg net 8.5 kg

By PM date 12/23/98

Fine Silica – Get gross weight on 7 bags (50 lbs ea) of fine silica, put into open head drum, get tare weight mt bags, total weights from bags and weigh out an additional amount to total 171.9 kg, split this into the remaining 3 bags– In Hood (crystalline silica)

Actual weight:	tare		gross	45.4 kg	net	45.4 kg
Actual weight:	tare		gross	45.5 kg	net	45.5 kg
Actual weight:	tare		gross	45.3 kg	net	45.3 kg
Actual weight:	tare		gross	22.5 kg	net	22.5 kg
Actual weight:	tare	1.5 kg	gross	17.0 kg	net	15.5 kg
Actual weight:	tare		gross		net	
Actual weight:	tare		gross		net	
					Total	171.9 kg
Actual weight:	tare		gross		net	
					Total	

000112

Entries by Mary Hall Date 1/11/99

oject Name FDF POP

oject Number 775743

1179:010
2293

Lead Oxide – weigh out 4 batches of 13,028 gr, split into 9 bags, ~1405 gr/bag, with a half share in the 10th bag - IN HOOD

Actual weight: tare 0 g gross 13,028 g net 13,028 g
Actual weight: tare 0 g gross 13,028 g net 13,028 g
Actual weight: tare 0 g gross 13,028 g net 13,028 g
Actual weight: tare 0 g gross 13,028 g net 13,028 g
total 52,112 g

By PRL date 12/22/98

Mary Hall 1/11/99

Lead Carbonate – weigh out 4 batches of 15,218 gr, split into 9 bags, ~1641 gr/bag, with a half share in the 10th bag - In Hood

Actual weight: tare ~~0 g~~ gross ~~20,000~~ per net
Actual weight: tare 0 g gross 20,872 g net 20,872 g
Actual weight: tare 0 g gross 20,000 g net 20,000 g
Actual weight: tare 0 g gross 20,000 g net 20,000 g
total 60,872 g

By PRL date 12/22/98

Barium Sulfate – weigh out 5 batches of 15,044 gr, split into 7 bags, ~4500 gr/bag, with a half share in the 8th bag

Actual weight: tare 0 g gross 25,073 g net 25,073 g
Actual weight: tare 0 g gross 25,073 g net 25,073 g
Actual weight: tare 0 g gross 25,073 g net 25,073 g
Actual weight: tare gross net
Actual weight: tare gross net
Actual weight: tare gross net
total 75,219 g

By PRL date 12/22/98

Feldspar –Get gross weight on 7 bags (50 lbs ea) of Feldspar, split each bag into 5 bags of dry blend, ~10 lb/bag, get tare weight mt bags, total weights from bags and weigh out an additional amount to total 168.3 kg, split this into the remaining 3 bags– In Hood (crystalline silica)

Actual weight: tare 0 kg gross 22.5 kg net 22.5 kg
Actual weight: tare 0 kg gross 23.1 kg net 23.1 kg
Actual weight: tare 0 kg gross 23.0 kg net 23.0 kg
Actual weight: tare 0 kg gross 23.0 kg net 23.0 kg
Actual weight: tare 0 kg gross 18.7 kg net 18.7 kg
Actual weight: tare 0 kg gross 23.0 kg net 23.0 kg
Actual weight: tare 1.4 kg gross 22.9 kg net 21.5 kg
Total
Actual weight: per gross wt. tare tare 0 kg gross 13.5 kg net 13.5 kg
Total 168.3 kg

By PRL date 12/22/98

000113

Entries by Mary Hall Date 1/11/99

Project Name FDF POP

Project Number 775743

1179:011
2293

By date

Mix kerosene and TBP, add organics mix to fine silica in drum and mix with helical mixer.

Bentogrout – Weigh out 3 sacks of 29.1kg, hold to mix with water in tank

Actual weight: tare 0 kg gross 68.1 kg net 68.1 kg
Actual weight: tare 0.6 kg gross 19.8 kg net 19.2 kg
Actual weight: tare 1 kg gross net
87.3 kg

Mary Hall 1/11/99

By PM date 12/23/98

Water
Add 5117 lbs of water to tank through neptune meter.

Meter calibration

Lb	419.8	422.2	459.0
Gal	50	50	55

START 683890.0
END 684498.5

Apparent lb of water per gallon on neptune meter 8.394#/GAL

2,321.65 kg × 2.2 lb / 1 kg × GAL / 8.394# = 608.5 GAL

PM 12/22/98

NOTE: ADDED 15 GALLONS OF WATER WHILE ADDING DRY REAGENTS

PM 12/28/98

000114

Entries by Mary Hall Date 1/11/99

roject Name FDF POP

roject Number 775743

1179:012
2293

Weight Log
Batch 3 - Tank C
Fernald POP Surrogate Slurry

Silica Fume – Use 19 bags, approx half bag to silica fume per bag of dry blend, put 5 bags of full SF on scale, record weight, MT into dry blend bags, weigh MT SF bags.

Actual weight(bags 1-5): full	24.9 kg MT		net	24.9 kg
Actual weight(bags 6-10): full	25.1 kg MT		net	25.1 kg
Actual weight(bags 11-15): full	25.1 kg MT	ALL Bags	net	25.1 kg
Actual weight(bags 16-19): full	19.8 kg MT	8.3	net	11.5 kg
		Total		-1.2 kg
				85.4 kg

By [illegible] date 12/22/98

Mary Hall 1/11/99

Sodium Arsenate – Weigh out 1560 grams, split between all 38 bags at ~42 gr/bag

Actual weight: tare 0 g gross 1,560 g net 1,560 g

By [illegible] date 12/28/98

Sodium Chromate – Weigh out 2480 gr, split between all 38 bags, ~ 66 gr/bag

Actual weight: tare 0 g gross 2,480 g net 2,480 g

By [illegible] date 12/22/98

Nickel Oxide – Weigh out 3950 gr, split between all 38 bags at ~106 gr/bag

Actual weight: tare 0 g gross 3,950 g net 3,950 g

By [illegible] date 12/22/98

Sodium Selenate – Weigh out 920 gr, split between all 38 bags at ~25 gr/bag

Actual weight: tare 0 g gross 920 g net 920 g

By [illegible] date 12/22/98

Vanadium Pentoxide – Weigh out 830 gr, split into all bags at ~22 gr/bag

Actual weight: tare 0 g gross 830 g net 830 g

By [illegible] date 12/22/98

000115

Entries by Mary Hall Date 1/11/99

Project Name FDF POP

Project Number 775743

1179:013
2293

Zinc oxide – weigh out 90 gr, sprinkle into as many bags as possible

Actual weight: tare 0 g gross 90 g net 90 g

By PM date 12/22/98

Mary Hall 1/11/99

Sodium nitrate – Weigh out 9740 gr, split into 38 bags at ~260 gr/bag

Actual weight: tare 0 g gross 9,740 g net 9,740 g

By PM date 12/22/98

Magnesium Phosphate – weigh out 13,380 gr, split into 38 bags at 360 gr/bag

Actual weight: tare 0 g gross 8380 g net 8380 g
tare 0 g gross 5,000 g net 5,000 g
13,300 g

By PM date 12/22/98

Diatomaceous earth – weigh out 2 batches of 8405 gr, split into 19 bags at 453 gr/bag

Actual weight: tare 0 g gross 5303 g net 5303 g
Actual weight: tare 0 g gross 5904 g net 5904 g
0 g gross 5603 g net total 5603 g

By PM date 12/22/98 total 16,810 g

Iron oxide – Weigh out 2 batches of 11,585 gr, split into 19 bags at ~624 gr/bag

Actual weight: tare 0 g gross 11,585 g net 11,585 g
Actual weight: tare 0 g gross 11,585 g net 11,585 g
total 23,170 g

By PM date 12/22/98

Lead sulfate – weigh out 2 batches of 12,170 gr, split into 19 bags at ~656 gr bag
IN HOOD

Actual weight: tare 0 g gross 24,340 g net 24,340 g
Actual weight: tare gross net
total 24,340 g

By PM date 12/22/98

000116

Entries by Mary Hall Date 1/11/99

Project Name EDF POP

Project Number 775743

1179:014

2293

Lead Oxide – weigh out 4 batches of 13,028 gr, split into 9 bags, ~1405 gr/bag, with a half share in the 10th bag - IN HOOD

Actual weight:	tare 0 g	gross	26,056 g	net	26,056 g
Actual weight:	tare 0 g	gross	26,057 g	net	26,057 g
Actual weight:	tare	gross		net	
Actual weight:	tare	gross		net	
				total	52,113 g

By PM date 12/22/98

Mary Hall 1/11/99

Lead Carbonate – weigh out 4 batches of 15,218 gr, split into 9 bags, ~1641 gr/bag, with a half share in the 10th bag - In Hood

Actual weight:	tare 0 g	gross	20,872 g	net	20,872 g
Actual weight:	tare 0 g	gross	20,000 g	net	20,000 g
Actual weight:	tare 0 g	gross	20,000 g	net	20,000 g
Actual weight:	tare	gross		net	
				total	60,872 g

By PM date 12/22/98

Barium Sulfate – weigh out 5 batches of 15,044 gr, split into 7 bags, ~4500 gr/bag, with a half share in the 8th bag

Actual weight:	tare 0 g	gross	25,075 g	net	25,075 g
Actual weight:	tare 0 g	gross	25,075 g	net	25,075 g
Actual weight:	tare 0 g	gross	25,070 g	net	25,070 g
Actual weight:	tare	gross		net	
				total	75,220 g

By PM date 12/22/98

Feldspar –Get gross weight on 7 bags (50 lbs ea) of Feldspar, split each bag into 5 bags of dry blend, ~10 lb/bag, get tare weight mt bags, total weights from bags and weigh out an additional amount to total 168.3 kg, split this into the remaining 3 bags– In Hood (crystalline silica)

Actual weight:	tare 0 kg	gross	22.8 kg	net	22.8 kg
Actual weight:	tare 0 kg	gross	22.8 kg	net	22.8 kg
Actual weight:	tare 0 kg	gross	22.8 kg	net	22.8 kg
Actual weight:	tare 0 kg	gross	22.8 kg	net	22.8 kg
Actual weight:	tare 0 kg	gross	22.7 kg	net	22.7 kg
Actual weight:	tare 0 kg	gross	23.1 kg	net	23.1 kg
Actual weight:	tare 1.2 kg	gross	22.9 kg	net	21.7 kg
				Total	
Actual weight:	tare 0 kg	gross	9.4 kg	net	9.4 kg
				Total	168.3 kg

By PM date 12/23/98

000117

Entries by Mary Hall Date 1/11/99

Project Name FDF POP

Project Number 775 743

1179:015
2293

Coarse Silica, (Sand) - Get gross weight on 8 bags (50 lbs ea) of sand, split each bag into 4 bags of dry blend, ~12.5 lb/bag, get tare weight on mt bags, total weights from bags and weigh out an additional amount to total 191.1 kg, split this into the remaining 6 bags– In Hood (crystalline silica)

Mary Hall 12/11/99

Actual weight:	tare 0 kg	gross 45.4 kg	net	45.4 kg	
Actual weight:	tare 0 kg	gross 45.4 kg	net	45.4 kg	
Actual weight:	tare 0 kg	gross 45.3 kg	net	45.3 kg	
Actual weight:	tare 0 kg	gross 45.4 kg	net	45.4 kg	
Actual weight:	tare 10 kg	gross 10.6 kg	net	9.6 kg	
Actual weight:	tare 1	gross	net		
Actual weight:	tare all bags	gross	net		
Actual weight:	tare	gross	net		
			Total	191.1 kg	
Actual weight:	tare	gross	net		
			Total		

By PRL date 12/23/98

Tributyl Phosphate – Weigh out 8450 gr, hold to mix with fine silica

Actual weight: tare 0 kg gross 8.5 kg net 8.5 kg

By PRL date 12/23/98

Kerosene – Weigh out 8450 gr, hold to mix with fine silica

Actual weight: tare 0 gross 8.5 kg net 8.5 kg

By PRL date 12/23/98

Fine Silica – Get gross weight on 7 bags (50 lbs ea) of fine silica, put into open head drum, get tare weight mt bags, total weights from bags and weigh out an additional amount to total 171.9 kg, split this into the remaining 3 bags– In Hood (crystalline silica)

Actual weight:	tare	gross 45.8 kg	net	45.8 kg	
Actual weight:	tare	gross 45.5 kg	net	45.5 kg	
Actual weight:	tare	gross 45.6 kg	net	45.6 kg	
Actual weight:	tare	gross 22.9 kg	net	22.9 kg	
Actual weight:	tare 1.6 kg	gross 13.7 kg	net	12.1 kg	
Actual weight:	tare	gross	net		
Actual weight:	tare	gross	net		
			Total	171.90 kg	
Actual weight:	tare	gross	net		
			Total		

By date

000118

Entries by Mary Hall Date 1/11/99

oject Name FDF POP

oject Number 775743

1179:016

2293

Mix kerosene and TBP, add organics mix to fine silica in drum and mix with helical mixer.

Bentogrout – Weigh out 3 sacks of 29.1kg, hold to mix with water in tank

Actual weight: tare 0 kg gross 67.9 kg net 67.9 kg
Actual weight: tare 0.6 kg gross 20.0 kg net 20.0-0.6 kg
Actual weight: tare gross net 87.3 kg

By PW date 12/23/98

Water
Add 5117 lbs of water to tank through neptune meter.

Meter calibration
Lb 419.8 422.2 459.0
Gal 50 50 55

START 664500.0
685108.5

Apparent lb of water per gallon on neptune meter 8.394#/GAL

$2{,}321.65\ kg \times \frac{2.2\ lb}{kg} \times \frac{GAL}{8.394\ lb} = 608.5\ GAL$ PW 12/22/98

Mary Hall 1/11/99

Page 5 of 5

NOTE: ADDED 13 GALLONS OF WATER WHILE ADDING DRY REAGENTS.

PW 12/20/98

000119

Entries by Mary Hall Date 1/11/99

Project Name FDF POP

Project Number 775743

2293

1179.017

This page reserved for Batch 01 samples.

Sample #*	Description	Matrix	Bottle	# of Bottles	Analyses (# of bottles for that analysis)
1179017-01-001	Filtrate	liq.	1L plastic	2 1-13-99 ~~pH~~	TDS, TSS, metals, nitrate pH
1179017-01-002	Stabilized	solid	1L plastic	5	Appearance, TCLP metals, Archive (3)
1179017-01-003	Stabilized	solid	2"x4" molds	3	14day UCS, 28 day UCS, Archive
1179017-01-004	stabilized	solid	2"x2" molds	36	Archive (36)
1179017-01-005	Original Slurry	slurry	2L plastic	1	Archive
1179017-01-006	Filter Cake	solid	8oz. plastic cup, 1qt. baggie	1 1	Moisture bulk density
1179017-01-007	Stabilized	solid	250 grad. Cylinder	1	Free liquid

* Sample # definition: xxxxxxx-xx-xxx
The first 4 digits are the lab book number, the next three digits are the page number, the next 2 digits are the batch number, the last 3 digits are the sample number on the page.

000120

Entries by Margaret Wall Date 1-12-99

Project Name FDF POP

Project Number 775743

1179:018 2293

This page reserved for Batch 02 samples

Mary McKell 1-20-99

Project: FDF PoP Demonstration Sample List for Batch 02
(for reference only)
Project Number: 775743

Sample #[1]	Description	Matrix	Bottle	# of Bottles	Analyses (# of bottles for that analysis)
1179018-02-001	Filtrate	liquid	1 L plastic	2	TDS, TSS, metals, nitrate, pH
1179018-02-002	Stabilized	solid	1 L plastic	5	Appearance, TCLP metals, Archive (3)
1179018-02-003	Stabilized	solid	2" x 4" molds	3	14 day UCS, 28 day UCS, Archive
1179018-02-004	Stabilized	solid	2" x 2" molds	36	Archive (36)
1179018-02-005	Original Slurry	slurry	2 L plastic	1	Archive
1179018-02-006	Filter Cake	solid	8 oz. plastic cup, 1 qt. baggie	1 1	Moisture bulk density
1179018-02-007	Stabilized	solid	250 grad. cylinder	1	Free liquid

[1] Sample # definition: XXXXXXX-XX-XXX
The first 4 digits are the book number; the next three digits are the page number; the next 2 digits are the batch number, the last three digits are the sample number on the page.

000121

Entries by Mary McKell Date 1-20-99

Project Name FDF PoP

Project Number 775743

2293

1179.019

This page reserved for Batch 03 samples

Project: FDF PoP Demonstration Sample List for Batch 03
(for reference only)
Project Number: 775743

Mary Hall 1-20-99

Sample #[1]	Description	Matrix	Bottle	# of Bottles	Analyses (# of bottles for that analysis)
1179019-03-001	Filtrate	liquid	1 L plastic	2	TDS, TSS, metals, nitrate, pH
1179019-03-002	Stabilized	solid	1 L plastic	5	Appearance, TCLP metals, Archive (3)
1179019-03-003	Stabilized	solid	2" x 4" molds	3	14 day UCS, 28 day UCS, Archive
1179019-03-004	Stabilized	solid	2" x 2" molds	36	Archive (36)
1179019-03-005	Original Slurry	slurry	2 L plastic	1	Archive
1179019-03-006	Filter Cake	solid	8 oz. plastic cup, 1 qt. baggie	1 1	Moisture bulk density
1179019-03-007	Stabilized	solid	250 grad. cylinder	1	Free liquid

[1] Sample # definition: XXXXXXX-XX-XXX
The first 4 digits are the book number; the next three digits are the page number; the next 2 digits are the batch number, the last three digits are the sample number on the page.

000122

Entries by Mary Hall Date 1-20-99

Project Name FDF PoP

Project Number 775743

2293

1179:020

This page reserved for Batch 04 samples.

Project: FDF PoP Demonstration Sample List for Batch 04
(for reference only)
Project Number: 775743

Mary Hall 1-20-99

Sample #*	Description	Matrix	Bottle	# of Bottles	Analyses (# of bottles for that analysis)
1 1 79020-04-001	Filtrate	liquid	1 L plastic	2	TDS, TSS, metals, nitrate, pH
1 1 79020-04-002	Stabilized	solid	1 L plastic	5	Appearance, TCLP metals, Archive (3)
1 1 79020-04-003	Stabilized	solid	2" x 4" molds	3	14 day UCS, 28 day UCS, Archive
1 1 79020-04-004	Stabilized	solid	2" x 2" molds	36	Archive (36)
1 1 79020-04-005	Original Slurry	slurry	2 L plastic	1	Archive
1 1 79020-04-006	Filter Cake	solid	8 oz. plastic cup, 1 qt. baggie	1 1	Moisture bulk density
1 1 79020-04-007	Stabilized	solid	250 grad. cylinder	1	Free liquid

* Sample # definition: XXXXXXX-XX-XXX
The first 4 digits are the book number; the next three digits are the page number; the next 2 digits are the batch number, the last three digits are the sample number on the page.

000123

Entries by Mary Hall Date 1-20-99

Project Name FDF POP

Project Number 775743

2293
1179:021

This page reserved for Batch 05 samples

Project: FDF PoP Demonstration Sample List for Batch 05
(for reference only)
Project Number: 775743

Mary Hall 1-20-99

Sample #[1]	Description	Matrix	Bottle	# of Bottles	Analyses (# of bottles for that analysis)
1179021-05-001	Filtrate	liquid	1 L plastic	2	TDS, TSS, metals, nitrate, pH
1179021-05-002	Stabilized	solid	1 L plastic	5	Appearance, TCLP metals, Archive (3)
1179021-05-003	Stabilized	solid	2" x 4" molds	3	14 day UCS, 28 day UCS, Archive
1179021-05-004	Stabilized	solid	2" x 2" molds	36	Archive (36)
1179021-05-005	Original Slurry	slurry	2 L plastic	1	Archive
1179021-05-006	Filter Cake	solid	8 oz. plastic cup, 1 qt. baggie	1 1	Moisture bulk density
1179021-05-007	Stabilized	solid	250 grad. cylinder	1	Free liquid

2 extra moistures

[1] Sample # definition: XXXXXXX-XX-XXX
The first 4 digits are the book number; the next three digits are the page number; the next 2 digits are the batch number, the last three digits are the sample number on the page.

000124

Entries by Mary M. Hall Date 1-20-99

oject Name FDF POP

oject Number 775743

1179:022 229

This page reserved for Batch 06 samples.

Project: FDF PoP Demonstration Sample List for Batch 06
(for reference only)
Project Number: 775743

Mary Hall 1-20-99

Sample #[1]	Description	Matrix	Bottle	# of Bottles	Analyses (# of bottles for that analysis)
1179022-06-001	Filtrate	liquid	1 L plastic	2	TDS, TSS, metals, nitrate, pH
1179022-06-002	Stabilized	solid	1 L plastic	5	Appearance, TCLP metals, Archive (3)
1179022-06-003	Stabilized	solid	2" x 4" molds	3	14 day UCS, 28 day UCS, Archive
1179022-06-004	Stabilized	solid	2" x 2" molds	36	Archive (36)
1179022-06-005	Original Slurry	slurry	2 L plastic	1	Archive
1179022-06-006	Filter Cake	solid	8 oz. plastic cup, 1 qt. baggie	1 1	Moisture bulk density
1179022-06-007	Stabilized	solid	250 grad. cylinder	1	Free liquid

[1] Sample # definition: XXXXXXX-XX-XXX
The first 4 digits are the book number; the next three digits are the page number; the next 2 digits are the batch number, the last three digits are the sample number on the page.

000125

Entries by Mary M Hall Date 1-20-99

Project Name FDF PoP

Project Number 775743

2293
1179:023

This page reserved for Batch 07 samples.

Project: FDF PoP Demonstration Sample List for Batch 07
(for reference only)
Project Number: 775743

Sample #[1]	Description	Matrix	Bottle	# of Bottles	Analyses (# of bottles for that analysis)
1179023-07-001	Filtrate	liquid	1 L plastic	2	TDS, TSS, metals, nitrate, pH
1179023-07-002	Stabilized	solid	1 L plastic	5	Appearance, TCLP metals, Archive (3)
1179023-07-003	Stabilized	solid	2" x 4" molds	3	14 day UCS, 28 day UCS, Archive
1179023-07-004	Stabilized	solid	2" x 2" molds	36	Archive (36)
1179023-07-005	Original Slurry	slurry	2 L plastic	1	Archive
1179023-07-006	Filter Cake	solid	8 oz. plastic cup, 1 qt. baggie	1 1	Moisture bulk density
1179023-07-007	Stabilized	solid	250 grad. cylinder	1	Free liquid

[1] Sample # definition: XXXXXXX-XX-XXX
The first 4 digits are the book number; the next three digits are the page number; the next 2 digits are the batch number, the last three digits are the sample number on the page.

000126

Entries by Mary McHall Date 1-20-99

Project Name FDF PoP

Project Number 775743

This page reserved for Batch 08 samples

Project: FDF PoP Demonstration Sample List for Batch 08
(for reference only)
Project Number: 775743

Mary Hall 1-20-99

Sample #[1]	Description	Matrix	Bottle	# of Bottles	Analyses (# of bottles for that analysis)
1179024-08-001	Filtrate	liquid	1 L plastic	2	TDS, TSS, metals, nitrate, pH
1179024-08-002	Stabilized	solid	1 L plastic	5	Appearance, TCLP metals, Archive (3)
1179024-08-003	Stabilized	solid	2" x 4" molds	3	14 day UCS, 28 day UCS, Archive
1179024-08-004	Stabilized	solid	2" x 2" molds	36	Archive (36)
1179024-08-005	Original Slurry	slurry	2 L plastic	1	Archive
1179024-08-006	Filter Cake	solid	8 oz. plastic cup, 1 qt. baggie	1 1	Moisture bulk density
1179024-08-007	Stabilized	solid	250 grad. cylinder	1	Free liquid

[1] Sample # definition: XXXXXXX-XX-XXX
The first 4 digits are the book number; the next three digits are the page number; the next 2 digits are the batch number, the last three digits are the sample number on the page.

Entries by Mary M Hall Date 1-20-99

Project Name FDF PoP

Project Number 775743

2293
1179.025

This page reserved for Batch 09 samples.

Mary Hall
1-20-99

Project: FDF PoP Demonstration Sample List for Batch 09
(for reference only)
Project Number: 775743

Sample #[1]	Description	Matrix	Bottle	# of Bottles	Analyses (# of bottles for that analysis)
1179025-09-001	Filtrate	liquid	1 L plastic	2	TDS, TSS, metals, nitrate, pH
1179025-09-002	Stabilized	solid	1 L plastic	5	Appearance, TCLP metals, Archive (3)
1179025-09-003	Stabilized	solid	2" x 4" molds	3	14 day UCS, 28 day UCS, Archive
1179021-09-004	Stabilized	solid	2" x 2" molds	36	Archive (36)
1179025-09-005	Original Slurry	slurry	2 L plastic	1	Archive
1179025-09-006	Filter Cake	solid	8 oz. plastic cup, 1 qt. baggie	1 1	Moisture bulk density
1179025-09-007	Stabilized	solid	250 grad. cylinder	1	Free liquid

[1] Sample # definition: XXXXXXX-XX-XXX
The first 4 digits are the book number; the next three digits are the page number; the next 2 digits are the batch number, the last three digits are the sample number on the page.

000128

Entries by Mary M Hall Date 1-20-99

Project Name FDF POP

Project Number 775743

2293

1179:026

This page reserved for Batch 10 samples.

01-14-1998 @ 01:35 Graduated Cylinders

BATCH #	FREE LIQUID OBSV.
1	NONE
2	NONE
3	NONE
4	NONE
5	NONE.
6	NONE
7	NONE
8	NONE
9	NONE
10	NONE
11	NONE

Project: FDF PoP Demonstration Sample List for Batch 10
(for reference only)
Project Number: 775743

Mary Hall 1-20-99

Sample #[1]	Description	Matrix	Bottle	# of Bottles	Analyses (# of bottles for that analysis)
1179026-10-001	Filtrate	liquid	1 L plastic	2	TDS, TSS, metals, nitrate, pH
1179026-10-002	Stabilized	solid	1 L plastic	5	Appearance, TCLP metals, Archive (3)
1179026-10-003	Stabilized	solid	2" x 4" molds	3	14 day UCS, 28 day UCS, Archive
1179026-10-004	Stabilized	solid	2" x 2" molds	36	Archive (36)
1179021-10-005 4 mL 1.5 gal	Original Slurry	slurry	2 L plastic	1	Archive
1179026-10-006	Filter Cake	solid	8 oz. plastic cup, 1 qt. baggie	1 1	Moisture bulk density
1179026-10-007	Stabilized	solid	250 grad. cylinder	1	Free liquid

[1] Sample # definition: XXXXXXX-XX-XXX
The first 4 digits are the book number; the next three digits are the [illegible]

000129

Entries by Mary M Hall Date 1-20-99

Project Name FDF P&P

Project Number 275743

2293

1179.027

This page reserved

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000130

Entries by Mary M Hall

Date 1-20-99

ject Name FDF PoP

ject Number 775743

1179:028

This page reserved for Batch 11 samples

Project: FDF PoP Demonstration Sample List for Batch 11
(for reference only)
Project Number: 775743

Sample #[1]	Description	Matrix	Bottle	# of Bottles	Analyses (# of bottles for that analysis)
1179018-03-001 28 11 1-20-99	Filtrate	liquid	1 L plastic	2	TDS, TSS, metals, nitrate, pH
1179018-03-002 28 11 1-20-99	Stabilized	solid	1 L plastic	5	Appearance, TCLP metals, Archive (3)
1179018-03-003 28 11 1-20-99	Stabilized	solid	2" x 4" molds	3	14 day UCS, 28 day UCS, Archive
1179018-03-004 28 11 1-20-99	Stabilized	solid	2" x 2" molds	36	Archive (36)
1179018-03-005 28 11 1-20-99	Original Slurry	slurry	2 L plastic	1	Archive
1179018-03-006 28 11 1-20-99	Filter Cake	solid	8 oz. plastic cup, 1 qt. baggie	1 1	Moisture bulk density
1179018-03-007 28 11	Stabilized	solid	250 grad. cylinder	1	Free liquid

[1] Sample # definition: XXXXXXX-XX-XXX
The first 4 digits are the book number; the next three digits are the page number; the next 2 digits are the batch number, the last three digits are the sample number on the page.

000131

Entries by Mary M Hall Date 1-20-99

Project Name FDF PoP

Project Number 775743

2293
1179:029

Silo 1 & 2 POP Demo
Filter Cake % Moistures

INTERNATIONAL TECHNOLOGY CORPORATION

By RGB Date 1/18/99 Subject Fernald Silo 1 & 2 POP % Moistures Filter Cakes Sheet No. ___ of ___
Chkd. By ___ Date ___ Proj. No. ___

Sample	Tare	Tare + wet	Tare + Dry
11790170 1	0.97	34.72	17.26
1802	0.99	35.76	16.72
1903	0.97	36.78	19.81
2004	0.99	32.06	17.33
2105	0.99	34.78	16.92
2206	0.99	33.20	16.89
2307	1.00	30.49	15.91
2408	0.99	31.61	16.50
2509	0.99	34.66	18.21
2610	0.99	32.51	17.77
2809	0.98	36.61	18.84
B05T (batch 05 treated)	0.98	28.94	16.58

000132

1/29/99

Entries by R Bleggy Date 1/29/99

Project Name FDF HOT

Project Number 775743

2293

1179:030

Silo 1 & 2 POP Demo
Filter Cake Bulk Density
page 1 of 2

INTERNATIONAL TECHNOLOGY CORPORATION

By _____ Date 1/19/99 Subject Bulk Density Filter Cakes Sheet No. ___ of ___

Chkd. By ___ Date _____ Proj. No. _____

Dimensions (Length, width, Height, in mm)

1179023-07 42.40g

25.92	30.49	25.86	HT
28.14	29.43	25.46	59.65
25.43	27.64	29.28	57.70

$A^2 + b^2 = c^2$

$b^2 = c^2 - A^2$

1179024-08 70.15g

38.58	40.84	29.89
36.86	40.04	34.53
35.30	43.98	34.04

1179025-09 64.40g

37.35	39.01	28.48
40.5	43.82	28.96
40.5	43.75	28.35

1179026-10 90.34g

36.28	45.51	37.98
37.73	46.18	38.15
39.28	45.37	38.54

1179028-9(a) 84.32g

37.17	46.59	34.91
38.67	38.90	34.89
40.53	40.19	34.34

1179023-07 102.56

41.98	41.57	38.35
45.45	43.63	38.82
45.38	44.84	38.55

1/29/99

000133

Entries by [signature] Date 1/29/99

Project Name FDF PoP

Project Number 775743

2293
1179.031

Silo 1 & 2 PoP Demo
Filter Cake Bulk Density
Page 2 of 2

INTERNATIONAL TECHNOLOGY CORPORATION

By _____ Date 1/19/99 Subject Bulk Density Sheet No. ___ of ___
Chkd. By ___ Date _____ PoP Filter Cakes Proj. No. _____

Sample 1179017-01
Mass - 74.38g

Length	Width	Depth
46.43	49.22	22.69
46.25	48.47	22.33
47.68	48.85	23.62

Sample 1179018-02

Mass 22.65

25.46	27.15	20.10
27.67	29.38	21.95
28.19	29.52	20.80

1179019-03 mass - 27.77

32.05	26.03	22.37
31.37	28.27	24.09
30.59	29.31	23.06

1179020-04 mass 76.73

42.20	40.65	30.35
45.28	41.79	30.06
45.41	37.90	30.89

1179021-05 24.66

33.41	28.05	18.37
35.68	29.23	19.45
36.86	29.69	18.84

1179022-06 60.62

51.53	39.32	24.23
49.84	40.64	20.65
49.68	40.37	20.32

1/29/99

000134

Entries by R Leggy Date 1/29/99

Project Name FDF PoP

Project Number 775743

2293
1179:032

Silo 1 & 2 POP
6-8 DAY Demo TCLP

INTERNATIONAL TECHNOLOGY CORPORATION

By _____ Date 1/20/99 Subject POP Silos 1 & 2 Sheet No. ___ of ___
Chkd. By ___ Date _____ TCLP Pilot treatments Proj. No. _____

Characterized Sample From pilot batches 2, 4, 10
(1179017-02, 20-04, 26-10)
5g + 95.5ml water stirred for 5 min
each sample

pH meter cal w/ 4 & 7 slope = 100
4 → 3.97, 7 → 6.98 10 → 9.94

Sample	5 + 95.5 pH	35ml 1N HCL 50° pH
1179017-02	11.64	11.03
20-04	11.42	11.02
26-10	11.47	11.12

Fluid #2 prepared by diluting 71.55g HOAC To 12l
With D.I. H_2O pH 2.93

900mls added to 45 ± 0.05g Sample

Extraction Started @ 1613
Extraction Stopped @ 0820
pH meter cal w/ 4 & 7 buffers slopper 99%
4 → 3.95, 7 → 7.02, 10 → 9.95

Equilibrium pH

Sample	pH
1179017-01	10.78
1179018-02	10.97
1179019-03	10.75
1179020-04	10.43
1179021-05	11.45
1179022-06	10.75
1179023-07	10.48
1179024-08	11.25
1179025-09	10.95
1179026-10	10.87
1179028-01 (11)	10.60

Sample	pH
BLK	2.93

MB

000135

1/29/99

Entries by [signature] Date 1/29/99

Project Name FDF PoP

Project Number 775743

2293
1179.033

Silo 1 & 2 PoP
Demo Filtrate TDS

INTERNATIONAL TECHNOLOGY CORPORATION

By _____ Date 1/29/99 Subject PoP Silos 1 & 2 TDS Sheet No. ___ of ___
Chkd. By ___ Date _____ Proj. No. _____

Sample	Tare	Tare + Dry	mlo
117901-01	104.1002	105.7451	200
18-02	109.3546	111.0344	
19-03	100.5370	102.2916	
20-04	110.8331	112.7546	
21-05	108.2430	110.1790	
22-06	98.7357	100.4611	
23-07	107.8605	109.8602	
24-08	104.7792	106.8654	
25-09	108.3563	110.2802	
26-10	108.8740	HP 1/29/99 ~~110.2802~~ 110.9492	
28-09(11)	110.2079	HP 1/29/99 ~~112.2819~~ 112.2819	
BLK	111.0511	111.0487	

HP

000136

1/29/99

Entries by R Gregg Orth Date 1/29/99

2293

1179:034

Project Name FDF PoP

Project Number 775743

Silo 1 & 2 POP
Demo Filtrate TSS

INTERNATIONAL TECHNOLOGY CORPORATION

By _____ Date 1/29/99 Subject Fernald Silo 1 & 2 POP TSS Sheet No. ____ of ____

Chkd. By ____ Date _____ Proj. No. _____

Sample	Tare wt	mls	Tare + Dry
1179017-01	1.14187	200	1.14282
18-02	1.1413	↓	1.1415
19-03	1.1412		1.1411
20-04	1.1415		1.1456
21-05	1.1426		1.1489
22-06	1.1441		1.1454
23-07	1.1436		1.1515
24-08	1.1431		1.1435
25-09	1.1446		1.1444
26-10	1.1475		1.1498
28-09 (11)	1.1487		1.1527
BLK	1.1465		1.1458

MB

000137

1/29/99

Entries by [signature] Date 1/29/99

Project Name FDF PoP

Project Number 775743

1179.035 2293

Silo 1 & 2 POP
Demo Raw Slurry Densities
AND pH

INTERNATIONAL TECHNOLOGY CORPORATION

By _____ Date 1/25/99 Subject Raw Slurry Density Sheet No. ___ of ___
Chkd. By ___ Date _____ pH Proj. No. _____

Sample	Vol (ml)	mass (g)	pH
1179017-01	1740	2034.05	8.52
18-02	1880	2286.52	8.51
19-03	2000	2344.34	MB 1/25/99 ~~8.52~~ 8.52
20-04	1920	2243.37	MB 1/25/99 ~~8.52~~ 8.52
21-05	1860	2167.24	8.52
22-06	1760	2037.56	8.52
23-07	1940	2293.06	8.529 MB 1/25/99
24-08	1900	2255.06	8.58
25-09	1920	2284.41	8.66
26-10	1880	2214.20	8.58

pH meter cal w/ 4, 7, 10 Slope = 98%
4 → 3.96, 7 → 7.05, 10 = 10.00

MB

1/29/99 000138

Entries by [signature] Date 1/29/99

Project Name FDF PoP

Project Number 775743

2293

1179:036

Silo 1 & 2 PoP
Demo Filtrate pH

INTERNATIONAL TECHNOLOGY CORPORATION

By RGH Date 1/27/99 Subject Filtrate pH Sheet No. 1 of 1

Chkd. By ___ Date 10-1-2-99 Fernald Silo 1 & 2 PoP Proj. No. ___

Sample	pH	Sample	pH
1179017-01	12.30	1179025-09	12.31
18-02	12.30	1179026-10	12.15
19-03	12.22	1179028-9(11)	12.09
20-04	12.28		
21-05	12.25		
22-06	12.17		
23-07	12.25		
24-08	12.31		

pH meter cal w/ 4&7 & 10 buffers slope = 98%
4 → 3.99, 7 → 7.04, 10 → 9.97

1/29/99

000139

Entries by R Gregory Hall Date 1/29/99

Project Name FDF POP

Project Number 775743

1179.037 2293

Silo 1&2 POP
Demo RAW Slurry
ALKALINITY

INTERNATIONAL TECHNOLOGY CORPORATION

By RLA Date ~~12/28/99~~ 01/27 Subject Fernald Silo 1&2 POP Sheet No. 1 of 1

Chkd. By ___ Date ___ Slurry Alkalinity Proj. No. ___

Sample	mass (g)	1 N HCL Vol (ml)	Start + Vol 0.05 NaOH (ml)	Finish Vol 0.05 NaOH (ml)	Start pH	Stop pH
1179017-01	10.20	2.0	5.50	12.80	2.49	4.51
1179018-02	10.45	2.0	12.80	19.15	2.53	4.53
1179019-03	10.50	2.0	19.15	23.60	2.70	4.50
1179020-04	10.84	2.0	23.60	27.50	2.80	4.54
1179021-05	9.51	2.0	27.50	32.00	2.78	4.53
1179022-06	10.02	2.0	32.00	37.15	2.75	4.50
1179023-07	10.99	~~2.0~~ 2.5	7.60	18.55	2.46	4.50
1179024-08	10.24	2.0	18.55	21.40	2.89	4.53
1179025-09	10.12	2.0	21.40	23.50	3.02	4.50
1179026-10	10.35	~~2.0~~ 2.5	23.60	35.35	2.40	4.52
Std.	0	1.0	14.10	34.42	2.34	7.33

Acid HCL - 1.01 N
Base NaOH 0.996 N. 50.0 ml. Diluted to 1 l w/ D.I.

pH meter cal. heated w/ 4, 7, 10 buffers slope = 98%
4 → 3.97, 7 → 7.04, 10 → 10.02

Samples were shaken overnight w/ 10 mls H_2O + 1.5 mls 1.01 N HCL. 0.5 ml HCL was added after taking the pH of the 1st sample.

000110

1/29/99

Entries by R Gregory Date 1/29/99

Project Name FDF PoP

Project Number 775743

1179:038

Silo 18.2 POP
Demo 14 Day UCS
Page 1 of 6

INTERNATIONAL TECHNOLOGY CORPORATION

By _____ Date 1/27/99 Subject Fernald Silo 1 & 2 Sheet No. ____ of ____
Chkd. By ____ Date _____ UCS 14 Days Proj. No. _____

Sample 1179017-01
mass 310.49 g HT 10.2cm

LOAD (LbS)	DEF
0	0
10	1
30	4
50	8
70	12
90	16
110	19
130	23
150	27
170	32
AB 1/27/99 ~~180~~ 177	42

Sample 1179018-02
MASS: 306.39 (g) HT 10.1cm

LOAD	DEF
0	0
10	3
30	7
50	11
70	14
90	17
110	20
130	23
150	26
170	31
190	35
210	41
211	43

1/29/99

000111

Entries by [signature] Date 1/29/99

Project Name FDF POP

Project Number 775 743

2293
1179.039

Silo 1 & 2 POP
Demo 14 Day UCS
Page 2 of 6

INTERNATIONAL TECHNOLOGY CORPORATION

By _____ Date 1/27/99 Subject POP UCS 14 DAY Sheet No. ___ of ___
Chkd. By ___ Date _____ Proj. No. _____

Sample 1179019-03
Mass 308.22 HT. 10.1 cm

LOAD	DEF
0	0
10	2
30	7
50	13
70	18
90	22
110	26
130	31
150	38
170	44
190	52
200	62
201	66

Sample 1179020-04
Mass 312.50 HT 10.2 cm

LOAD	DEF
0	0
10	5
20	10
30	18
42	38

Sample 1179021-05
Mass 308.82 HT 10.2 cm

LOAD	DEF
0	0
10	3
20	6
30	8
40	6
50	8
60	9

LOAD	DEF
100	10
~~140~~ 120	11
140	11
150	12
~~160~~ 170	13
~~180~~ 195	14
210	16
220	18

1/29/99

000112

Entries by _____ Date 1/29/99

Project Name FDF PoP

Project Number 775743

1179:040 2293

Silo 1 & 2 POP
Demo 14 Day UCS
Page 3 of 6

INTERNATIONAL TECHNOLOGY CORPORATION

By _____ Date 1/27/99 Subject POP UCS 14 Day Sheet No. ___ of ___

Chkd. By ___ Date _____ Proj. No. 1179021-05

LOAD	DEF
235	21
250	24
270	26
290	28
300	32
310	35
320	38
330	44

HB

000113

Entries by [signature] 1/29/99 Date 1/29/99

Project Name FDF PoP

Project Number 775743

2293
1179:041

Silo 1 & 2 PoP
Demo 14 Day UCS
Page 4 of 6

INTERNATIONAL TECHNOLOGY CORPORATION

By _____ Date 1/29/99 Subject Fernald Silo 1 & 2 UCS 14 Days Sheet No. ___ of ___
Chkd. By ___ Date _____ Proj. No. _____

1179022-06
mass - 305.65 HT. 10.1cm

LOAD (psi) Pounds	DEFORMATION
0 MB 1/28/99	0
10	2
30	4
50	8
70	14
90	23
100	28
MB 1/28/99 ~~120~~ 109	37

1179023-07 MASS 301.77 HT 10.1cm

0	0
10	6
~~30 20 28.~~ 29.2 MB 1/28/99	35

Large voids in ~~mold~~ Cylinder Due to Sticking to mold MB 1/28/99

1179024-08 mass 312.95 HT 10.1cm

LOAD	DEF
0	0
10	6
30	7
50	9
70	11
90	14
110	16
130	18
150	21
170	24
190	28
MB 1/28/99 ~~200~~ 195	33

MB

1/29/99

000114

Entries by _____ Date 1/29/99

oject Name FDF PoP

oject Number 775743

2293

1179:042

Silo 1 & 2 POP
~~Silo 1~~ Demo 14 Day UCS
MM 1/29/99 page 5 of 6

INTERNATIONAL TECHNOLOGY CORPORATION

POP

By _____ Date 1/29/99 Subject UCS Cont. Sheet No. ___ of ___

Chkd. By ___ Date _____ 14 Days Proj. No. _____

1179025-09 MASS 322.04 HT 10.1cm

LOAD	DEF
0	0
10	1
30	4
50	8
70	12
90	15
110	19
130	24
150	29
170	39
MM 1/29/99 ~~190~~ 171	43

1179026-10 MASS 320.84 HT 10.2cm

LOAD	DEF
0	0
10	1
30	1
50	2
70	4
90	7
110	10
130	16
150	30
151	39

MM

000145

Entries by [signature] 1/29/99 Date 1/29/99

Project Name FDF PoP

Project Number 775743

2293
1179.043

Silo 1 & 2 POP
Demo 14 Day UCS
Page 6 of 6

INTERNATIONAL TECHNOLOGY CORPORATION

By _____ Date 1/29/99 Subject POP UCS Cont. Sheet No. ___ of ___
Chkd. By ___ Date _____ 14 Days Proj. No. _____

1179028-9(11) MASS 308.85 HT 10.1cm

0	0
10	5
30	15
MD 1/28/99 ~~50~~ 40	26
MD 1/29/99 ~~50~~ 41.8	34

1/29/99

000116

Entries by P Leegy Date 1/29/99

roject Name FDF PoP

roject Number 775743

2293
1179.044

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MM
3/2/99

000147

Entries by Mary McFall

Date 3-2-99

Project Name FDF PoP

Project Number 775743

2293

1179:045

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000148

Entries by Mary M Hall

Date 3-2-99

Project Name FDF PoP

Project Number 775743

1179:046

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000149

Entries by Mary Jo Hale

Date 3-2-99

Project Name FDF PoP

Project Number 775743

2293
1179.047

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MT 3-2-99

000150

Entries by Mary M. Hall

Date 3-2-99

Project Name FDF PoP

Project Number 775743

2293
1179.048

1/28/99

0950 MADE WATER/BENTONITE SLURRIES FOR SILO 1 & 2 SURROGATES

	SILO 1	SILO 2
BENTONITE	1,739.12 g	1746.23 g
WATER	50,724.5 g	50,931.3 g

POURED BENTONITE INTO WATER DURING RAPID MIXING. ALLOWED TO MIX OVERNIGHT

PM 1/28/99

1/29/99

0930 ADDED SILO 1 & SILO 2 DRY REAGENTS, SUPPLIED BY FDF, TO APPROPRIATE BENTONITE/WATER SLURRY. CONTINUED MIXING.

PM 1/29/99

2/1/99

0835 DENSITY & MOISTURE OF SILO 2 SLURRY

DENSITY 388.36 g / 325 mL

P	9.50 g	
P+SILO	99.60 g	
P+S	36.33 g	29.78% SOLIDS

0840 DENSITY & MOISTURE OF SILO 1 SLURR

DENSITY 759.68 g

P = 6.99 g
P+SILO = 68.66 g
P+S = 18.71 29.70% SOLIDS

000151

Entries by Mary McKell Date 2-1-99

Project Name FDF PoP

Project Number 775763

2293
1179.049

SILO 2 SURROGATE DEWATERING

0820 TOOK THREE 10-L ALIQUOTS OF SILO #2 SURROGATE SLURRY. ADDED 5-L OF TAP WATER TO EACH & MIXED WELL

0840 AMENDED ALL DILUTED SLURRY SAMPLES WITH 60g EACH OF FERROUS SULFATE (TECHNICAL GRADE).

0845 AMENDED ALL DILUTED SLURRY SAMPLES WITH 120g EACH HYDRATED LIME

0850 STARTED DEWATERING

0910 TOOK FILTRATE SAMPLE 1179-049-01

0940 STOPPED FILTER PRESS RUN. BROKE DOWN PRESS & REMOVED CAKE

0945 TOOK 3 10-L ALIQUOTS OF SILO #2 SURROGATE SLURRY. ADDED 5-L OF FILTRATE TO EACH & MIXED.

1010 AMENDED ALL DILUTED SLURRY SAMPLES WITH 60g EACH OF FERROUS SULFATE (TECHNICAL GRADE)

1015 AMENDED ALL DILUTED SLURRY SAMPLES WITH 120g EACH OF HYDRATED LIME - 1020 STARTED DEWATERING

1030 TOOK Filtrate Sample 1179 049-02

1110 STOPPED DEWATERING. BROKE DOWN PRESS & REMOVED FILTER CAKE.

Per 2/1/99

000132

Entries by Mary Mitchell Date 2-1-99

Project Name FDF P&P

Project Number 775743

2293

1179:050

SILO 1 SURROGATE DEWATERING.

1230 TOOK 3 10-L ALIQUOTS OF SILO 1 SURROGATE SLURRY. ADDED 5-L OF FILTRATE TO EACH AND MIXED WELL

1300 ADDED 60 g OF FERROUS SULFATE TO EACH OF THE DILUTED SLURRY SAMPLES

1305 ADD 120 g OF HYDRATED LIME TO EACH OF THE DILUTED SLURRY SAMPLES

1315 STARTED DEWATERING

1325 TOOK FILTRATE SAMPLE 1179-50-01

1400 STOPPED DEWATERING. BROKE DOWN PRESS & REMOVED FILTER CAKE

1405 TOOK 3 10-L ALIQUOTS OF SILO 1 SURROGATE SLURRY. ADDED 5-L OF FILTRATE TO EACH & MIXED WELL.

1420 ADDED 60 g FERROUS SULFATE TO EACH DILUTED SLURRY

1425 ADDED 120 g HYDRATED LIME TO EACH DILUTED SLURRY

1430 STARTED DEWATERING

1435 Took Filtrate Sample 1179-50-02

1510 STOPPED DEWATERING. BROKE DOWN PRESS & REMOVED FILTER CAKE

PRC 2/1/99

000153

Entries by Mary Jo Hall Date 2-1-99

Project Name FDF PoP

Project Number 775743

2293

1179.051

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000154

Entries by Mary McNall

Date 3-2-99

oject Name FDF PoP

oject Number 775743

2293

1179:052

Fernald K65 POP
Silo 1 Surrogate Form 1

FERNALD K65 PROOF OF PRINCIPLE

REVISED BENCH-SCALE USING FDF SUPPLIED SURROGATE

Sample Number	1179-52-01	Date	2/3/99
Name	Greg Bennett	Source	Silo 1

FORMULATION

	K65 SURROGATE FILTER CAKE	PC	Ca(OH)2	CaSO4*0.5H2	FeSO4*6H2O	FLY ASH	TSP	WATER (TBD)
PLANNED (% w/w)	N/A	10%	5%	0%	1%	0%	2%	10%
PLANNED (g)	2000	200	100	0	20	0	40	200
ACTUAL (g)	2000.00	200.00	100.00	0	20.00	0	40.00	0

Mixer Speed: 1
Time of Mixing: 2 min

Room Temperature (C): 20°
Final Grout Temperature (C): 20°

Temperature Rise (C): 0°

WEIGHTS FOR ALIQUOTS (g)

Tare 2 x 4 inch mold: 21.31
Wt Compacted Sample in mold: 343.31
Density (g/cc): 1.56

Tare 2 x 4 inch mold: 21.34
Wt Compacted Sample in mold: 341.75
Density (g/cc): 1.56

Tare 2 x 4 inch mold: 21.31
Wt Compacted Sample in mold: 345.18
Density (g/cc): 1.57

Tare 2 x 4 inch mold: 21.30
Wt Compacted Sample in mold: 343.42
Density (g/cc): 1.56

Pocket Penetrometer sample
Vol. Compacted in S. Cup (cc): 2500 ml MB 2/3/99

Mod. ANS 55.1
Vol Smp in Container: 2500 ml MB 2/3/99
Vol. Liquid @ 24 hr: 0

PP @ 24 hr	Cure (tsf)	1.5
PP @ 48 hr	Cure (tsf)	2.0
PP @ 3 days	Cure (tsf)	3.25
PP @ 8 days	Cure (tsf)	4.0
PP @	Cure (tsf)	
PP @	Cure (tsf)	

MB 2/15/99

MB 2/15/99

000155

ntries by R Gregory Bennett Date 2/15/99

Project Name FDF PoP

Project Number 775743

2293
1179:053

Fernald K65 POP
Silo 1 Surrogate Form 2

FERNALD K65 PROOF OF PRINCIPLE
REVISED BENCH-SCALE USING FDF SUPPLIED SURROGATE

Sample Number	1179-53-01	Date	2/3/99
Name	Greg Bennett	Source	Silo 1

FORMULATION

	K65 SURROGATE FILTER CAKE	PC	Ca(OH)2	CaSO4*0.5H2	FeSO4*6H2O	FLY ASH	TSP	WATER (TBD)
PLANNED (% w/w)	N/A	10%	0%	0%	1%	0%	2%	10%
PLANNED (g)	2000	200	0	0	20	0	40	200
ACTUAL (g)	2000.00	200.00	0	0	20.00	0	40.00	0

Mixer Speed #1
Time of Mixing 2 min

Room Temperature (C) 19°
Final Grout Temperature (C) ~~22°~~

Temperature Rise (C) 3°

WEIGHTS FOR ALIQUOTS (g)

Tare 2 x 4 inch mold 21.29
Wt Compacted Sample in mold 337.86
Density (g/cc) 1.54

Tare 2 x 4 inch mold 21.31
Wt Compacted Sample in mold ~~338.85~~
Density (g/cc) 1.54

Tare 2 x 4 inch mold 21.29
Wt Compacted Sample in mold 339.24
Density (g/cc) 1.54

Tare 2 x 4 inch mold 21.29
Wt Compacted Sample in mold ~~341.67~~ 339.71 MB 2/4/99
Density (g/cc) 1.55

Pocket Penetrometer sample
Vol. Compacted in S. Cup (cc) 200

Mod. ANS 55.1
Vol Smp in Container 200
Vol. Liquid @ 24 hr 0

PP @ 24 hr Cure (tsf) 1.0
PP @ 48 hr Cure (tsf) 1.25
PP @ 6 days Cure (tsf) 1.5
PP @ 8 Days Cure (tsf) 2.0
PP @ Cure (tsf)
PP @ Cure (tsf)

MB 2/15/99

MB 2/15/99

Entries by [signature] Date 2/15/99

000156

ject Name FDF PoP

ject Number 775743

2293

1179:054

Fernald K65 POP
Silo 1 Surrogate Form 3

FERNALD K65 PROOF OF PRINCIPLE

REVISED BENCH-SCALE USING FDF SUPPLIED SURROGATE

Sample Number	1179-54-01	Date	2/3/99
Name	Greg Bennett	Source	Silo 1

FORMULATION

	K65 SURROGATE FILTER CAKE	PC	Ca(OH)2	CaSO4*0.5H2	FeSO4*6H2O	FLY ASH	TSP	WATER (TBD)
PLANNED (% w/w)	N/A	10%	0%	0%	1%	5%	2%	10%
PLANNED (g)	2000	200	0	0	20	100	40	200
ACTUAL (g)	2000.00	200.00	0	0	20.00	100.00	40.00	200.00

Mixer Speed #1
Time of Mixing 2 min

Room Temperature (C) 21°
Final Grout Temperature (C) 23°

Temperature Rise (C) 2°

WEIGHTS FOR ALIQUOTS (g)

Tare 2 x 4 inch mold 21.29
Wt Compacted Sample in mold 341.59
MB 2/4/99
Density (g/cc) 1.56

Tare 2 x 4 inch mold 21.31
Wt Compacted Sample in mold 340.81
Density (g/cc) 1.55

Tare 2 x 4 inch mold 21.31
Wt Compacted Sample in mold 341.22
Density (g/cc) 1.55

Tare 2 x 4 inch mold 21.31
Wt Compacted Sample in mold 340.66
Density (g/cc) 1.55

Pocket Penetrometer sample
Vol. Compacted in S. Cup (cc) 2300
MB 2/4/99

Mod. ANS 55.1
Vol Smp in Container 2300
Vol. Liquid @ 24 hr 0
MB 2/4/99

PP @ 24 hr	Cure (tsf)	1.5
PP @ 48 hr	Cure (tsf)	1.75
PP @ 5 day	Cure (tsf)	2.25
PP @ 8 day	Cure (tsf)	2.5
PP @	Cure (tsf)	
PP @	Cure (tsf)	

MB 2/15/99

MB 2/15/99

000157

ntries by Gregory Bennett Date 2/15/99

Project Name FDF PoP

Project Number 775743

2293
1179.055

Fernald K-65 POP
Silo 1 Surrogate Form 4

FERNALD K65 PROOF OF PRINCIPLE

REVISED BENCH-SCALE USING FDF SUPPLIED SURROGATE

Sample Number	1179-55-01	Date	2/3/99
Name	Greg Bennett	Source	Silo 1

FORMULATION

	K65 SURROGATE FILTER CAKE	PC	Ca(OH)2	CaSO4*0.5H2	FeSO4*6H2O	FLY ASH	TSP	WATER (TBD)
PLANNED (% w/w)	N/A	10%	0%	0%	1%	10%	2%	10%
PLANNED (g)	2000	200	0	0	20	200	40	200
ACTUAL (g)	2000.00	200.00	0	0	20.00	200.00	40.00	0

Mixer Speed #1
Time of Mixing 2 min

Room Temperature (C) 20°
Final Grout Temperature (C) 22°

Temperature Rise (C) 2°

WEIGHTS FOR ALIQUOTS (g)

Tare 2 x 4 inch mold 21.30
Wt Compacted Sample in mold 344.05
Density (g/cc) 1.57

Tare 2 x 4 inch mold 21.32
Wt Compacted Sample in mold 345.33
Density (g/cc) 1.57

Tare 2 x 4 inch mold 21.32
Wt Compacted Sample in mold 346.53
Density (g/cc) 1.58

Tare 2 x 4 inch mold 21.34
Wt Compacted Sample in mold 343.28
Density (g/cc) 1.56

Pocket Penetrometer sample
Vol. Compacted in S. Cup (cc) 2300 MB 2/4/99

Mod. ANS 55.1
Vol Smp in Container 2300 MB 2/4/99
Vol. Liquid @ 24 hr 0

PP @ 24 hr Cure (tsf) 1.25
PP @ 48 hr Cure (tsf) 1.5
PP @ 5 days Cure (tsf) 2.5
PP @ 7 days Cure (tsf) 2.5
PP @ Cure (tsf)
PP @ Cure (tsf)

MB 2/15/99

MB 2/15/99

000158

Entries by [signature] Date 2/15/99

ject Name FDFPoP

ject Number 775743

1179:056 2293

Fernald K-65 POP
Silo 1 Surrogate Form 5

FERNALD K65 PROOF OF PRINCIPLE

REVISED BENCH-SCALE USING FDF SUPPLIED SURROGATE

Sample Number 1179-56-01 Date 2/3/99

Name Greg Bennett Source Silo 1

FORMULATION

	K65 SURROGATE FILTER CAKE	PC	Ca(OH)2	CaSO4*0.5H2	FeSO4*6H2O	FLY ASH	TSP	WATER (TBD)
PLANNED (% w/w)	N/A	10%	0%	5%	1%	0%	2%	10%
PLANNED (g)	2000	200	0	100	20	0	40	200
ACTUAL (g)	2000.00	200.00	0	100.00	20.00	0	40.00	0

Mixer Speed

Time of Mixing

Room Temperature (C) 21°

Final Grout Temperature (C) 23°

Temperature Rise (C) 2°

WEIGHTS FOR ALIQUOTS (g)

Tare 2 x 4 inch mold 21.384 MB 2/4/99
Wt Compacted Sample in mold 342.91
Density (g/cc) 1.56

Tare 2 x 4 inch mold 21.31
Wt Compacted Sample in mold 341.18
Density (g/cc) 1.55

Tare 2 x 4 inch mold 21.28
Wt Compacted Sample in mold 342.38
Density (g/cc) 1.56

Tare 2 x 4 inch mold 21.35
Wt Compacted Sample in mold 342.17
Density (g/cc) 1.56

Pocket Penetrometer sample
Vol. Compacted in S. Cup (cc) 2800 MB 2/4/99

Mod. ANS 55.1
Vol Smp in Container 2800 MB 2/9/99
Vol. Liquid @ 24 hr 0

PP @ 24hr Cure (tsf) 2.0
PP @ 48hr Cure (tsf) 2.0
PP @ 5 days Cure (tsf) 3.0
PP @ 8 days Cure (tsf) 3.0
PP @ Cure (tsf)
PP @ Cure (tsf)

MB 2/15/99

MB 2/15/99

000159

ntries by Gregory Bennett Date 2/15/99

Project Name FDF PoP

Project Number 775743

2293
1179:057

Fernald K-65 PoP
Silo 1 Surrogate Form 6

FERNALD K65 PROOF OF PRINCIPLE

REVISED BENCH-SCALE USING FDF SUPPLIED SURROGATE

Sample Number	1179-57-01	Date	2/3/99
Name	Greg Bennett	Source	Silo 1

FORMULATION

	K65 SURROGATE FILTER CAKE	PC	Ca(OH)2	CaSO4*0.5H2	FeSO4*6H2O	FLY ASH	TSP	WATER (TBD)
PLANNED (% w/w)	N/A	12.5%	0%	0%	1%	0%	2%	10%
PLANNED (g)	2000	250	0	0	20	0	40	200
ACTUAL (g)	2000.00	250.00	0	0	20.00	0	40.00	0

Mixer Speed
Time of Mixing

Room Temperature (C) 21°
Final Grout Temperature (C) 23°

Temperature Rise (C) 2°

WEIGHTS FOR ALIQUOTS (g)

Tare 2 x 4 inch mold	21.26	Density (g/cc)	1.55
Wt Compacted Sample in mold	339.82		
Tare 2 x 4 inch mold	21.30	Density (g/cc)	1.55
Wt Compacted Sample in mold	340.42		
Tare 2 x 4 inch mold	21.31	Density (g/cc)	1.54
Wt Compacted Sample in mold	339.21		
Tare 2 x 4 inch mold	21.32	Density (g/cc)	1.55
Wt Compacted Sample in mold	339.62		

Pocket Penetrometer sample
Vol. Compacted in S. Cup (cc) 200

Mod. ANS 55.1
Vol Smp in Container 200
Vol. Liquid @ 24 hr 0

PP @ 24 hr	Cure (tsf)	1.25
PP @ 48 hr	Cure (tsf)	1.5
PP @ 3 days	Cure (tsf)	2.5
PP @ 8 Days	Cure (tsf)	3.25
PP @	Cure (tsf)	
PP @	Cure (tsf)	

MM 2/15/99

MM 2/15/99

000180

Entries by R Gregory Bennett Date 2/15/99

ject Name FDF PoP

ject Number 775743

1179:058 2293

Fernald K-65 POP
Silo 1 Surrogate Form 7

FERNALD K65 PROOF OF PRINCIPLE

REVISED BENCH-SCALE USING FDF SUPPLIED SURROGATE

Sample Number	1179-58-01	Date	2/3/99
Name	Greg Bennett	Source	Silo 1

FORMULATION

	K65 SURROGATE FILTER CAKE	PC	Ca(OH)2	CaSO4*0.5H2	FeSO4*6H2O	FLY ASH	TSP	WATER (TBD)
PLANNED (% w/w)	N/A	12.5%	5%	0%	1%	0%	2%	10%
PLANNED (g)	2000	250	100	0	20	0	40	200
ACTUAL (g)	2000.00	250.00	100.00	0	20.00	0	40.00	0

Mixer Speed #1
Time of Mixing 5 min

Room Temperature (C) 19
Final Grout Temperature (C) 22

Temperature Rise (C) 3°

WEIGHTS FOR ALIQUOTS (g)

Tare 2 x 4 inch mold 21.32
Wt Compacted Sample in mold 343.90
Density (g/cc) 1.57

Tare 2 x 4 inch mold 21.30
Wt Compacted Sample in mold 343.08
Density (g/cc) 1.56

Tare 2 x 4 inch mold 21.33
Wt Compacted Sample in mold 342.22
Density (g/cc) 1.56

Tare 2 x 4 inch mold 21.30
Wt Compacted Sample in mold 342.74

Density = 1.56 (g/cc)

Pocket Penetrometer sample
Vol. Compacted in S. Cup (cc) 200

Mod. ANS 55.1
Vol Smp in Container 200
Vol. Liquid @ 24 hr

PP @ 24hr	Cure (tsf)	1.00 ~~1.25~~
PP @ 48hr	Cure (tsf)	1.5
PP @ 5 days	Cure (tsf)	4.0
PP @ 28 days	Cure (tsf)	24.5
PP @	Cure (tsf)	
PP @	Cure (tsf)	

MB 2/4/99

MB 2/15/99

MB 2/15/99

000161

ntries by R Gregory Bennett Date 2/15/99

Project Name FDF PoP

Project Number 775743

2293

1179:059

Fernald K-65 POP
Silo 2 Surrogate Form 1

FERNALD K65 PROOF OF PRINCIPLE

REVISED BENCH-SCALE USING FDF SUPPLIED SURROGATE

Sample Number	1179-59-01	Date	2/4/99
Name	Greg Bennett	Source	Silo 2

FORMULATION

	K65 SURROGATE FILTER CAKE	PC	Ca(OH)2	CaSO4*0.5H2	FeSO4*6H2O	FLY ASH	TSP	WATER (TBD)
PLANNED (% w/w)	N/A	10%	5%	0%	1%	0%	2%	10%
PLANNED (g)	2000	200	100	0	20	0	40	200
ACTUAL (g)	2000.00	200.00	100.00	0	20.00	0	40.00	0

Mixer Speed #1
Time of Mixing 4 min

Room Temperature (C) 22°
Final Grout Temperature (C) 25°

Temperature Rise (C) 3°

WEIGHTS FOR ALIQUOTS (g)

Tare 2 x 4 inch mold 21.28
Wt Compacted Sample in mold ~~308.48~~ 340.36 MB 2/4/99
Density (g/cc) 1.55

Tare 2 x 4 inch mold 21.30
Wt Compacted Sample in mold 339.81
Density (g/cc) 1.55

Tare 2 x 4 inch mold 21.31
Wt Compacted Sample in mold 344.04
Density (g/cc) 1.57

Tare 2 x 4 inch mold 21.30
Wt Compacted Sample in mold 342.37
Density (g/cc) 1.56

Pocket Penetrometer sample
Vol. Compacted in S. Cup (cc) 200

Mod. ANS 55.1
Vol Smp in Container 200
Vol. Liquid @ 24 hr 0

PP @ 24 hr Cure (tsf) 1.75
PP @ 4 days Cure (tsf) 74.5
PP @ Cure (tsf)
PP @ Cure (tsf)
PP @ Cure (tsf)
PP @ Cure (tsf)

MB 2/15/99

MB 2/15/99

000162

Entries by R Gregory Bennett Date 2/15/99

oject Name FDF PoP

oject Number 775743

2293

1179:060

Fernald K65 - POP
Silo 2 Surrogate Form 2

FERNALD K65 PROOF OF PRINCIPLE

REVISED BENCH-SCALE USING FDF SUPPLIED SURROGATE

Sample Number	1179-60-01	Date	2/4/99
Name	Greg Bennett	Source	Silo 2

FORMULATION

	K65 SURROGATE FILTER CAKE	PC	Ca(OH)2	CaSO4*0.5H2	FeSO4*6H2O	FLY ASH	TSP	WATER (TBD)
PLANNED (% w/w)	N/A	10%	0%	0%	1%	0%	2%	10%
PLANNED (g)	2000	200	0	0	20	0	40	200
ACTUAL (g)	2000.00	20.00	0	0	20.00	0	40.00	0

Mixer Speed #1
Time of Mixing 4 min

Room Temperature (C) 22°
Final Grout Temperature (C) 25

Temperature Rise (C) 3°

WEIGHTS FOR ALIQUOTS (g)

Tare 2 x 4 inch mold 21.32 ~~336.22~~ MB 2/4/99
Wt Compacted Sample in mold 336.22
Density (g/cc) 1.53

Tare 2 x 4 inch mold 21.28 ~~334.73~~ MB 2/4/99
Wt Compacted Sample in mold 334.73
Density (g/cc) 1.52

Tare 2 x 4 inch mold 21.34 ~~336.00~~ MB 2/4/99
Wt Compacted Sample in mold 336.00
Density (g/cc) 1.53

Tare 2 x 4 inch mold 21.30
Wt Compacted Sample in mold 332.25
Density (g/cc) 1.51

Pocket Penetrometer sample
Vol. Compacted in S. Cup (cc) 200

Mod. ANS 55.1
Vol Smp in Container 200
Vol. Liquid @ 24 hr 0

PP @ 24 hr Cure (tsf) 1.75
PP @ 4 days Cure (tsf) 3.25
PP @ 7 Days Cure (tsf) 4.5
PP @ Cure (tsf)
PP @ Cure (tsf)
PP @ Cure (tsf)

MB 2/15/99

MB 2/15/99

000163

Entries by [signature] Date 2/15/99

Project Name FDF PoP

Project Number 775743

2293
1179.061

Fernald K-65 POP
Silo 2 Surrogate Form 3

FERNALD K65 PROOF OF PRINCIPLE

REVISED BENCH-SCALE USING FDF SUPPLIED SURROGATE

Sample Number	1179-61-01	Date	2/4/99
Name	Greg Bennett	Source	Silo 2

FORMULATION

	K65 SURROGATE FILTER CAKE	PC	Ca(OH)2	CaSO4*0.5H2	FeSO4*6H2O	FLY ASH	TSP	WATER (TBD)
PLANNED (% w/w)	N/A	10%	0%	0%	1%	5%	2%	10%
PLANNED (g)	2000	200	0	0	20	100	40	200
ACTUAL (g)	2000.00	200.00	0	0	20.00	100.00	40.00	20

UMB 2/4/99

Mixer Speed #1
Time of Mixing 4 min

Room Temperature (C) 22°
Final Grout Temperature (C) 26.5

Temperature Rise (C) 4.5

WEIGHTS FOR ALIQUOTS (g)

Tare 2 x 4 inch mold 21.29
Wt Compacted Sample in mold 340.57
Density (g/cc) 1.55

Tare 2 x 4 inch mold 21.31
Wt Compacted Sample in mold 341.40
Density (g/cc) 1.55

Tare 2 x 4 inch mold 21.35
Wt Compacted Sample in mold 341.38
Density (g/cc) 1.55

Tare 2 x 4 inch mold 21.26
Wt Compacted Sample in mold 340.78
Density (g/cc) 1.55

Pocket Penetrometer sample
Vol. Compacted in S. Cup (cc) 200

Mod. ANS 55.1
Vol Smp in Container 200
Vol. Liquid @ 24 hr 0

PP @ 24 hr Cure (tsf) 1.75
PP @ 4 days Cure (tsf) 4.25
PP @ 7 days Cure (tsf) 24.5
PP @ Cure (tsf)
PP @ Cure (tsf)
PP @ Cure (tsf)

UMB 2/15/99

UMB 2/15/99

000164

Entries by R Gregory Bennett Date 2/15/99

ject Name FDF PoP

ject Number 775743

2293

1179:062

Fernald K65 - POP
Silo 2 Surrogate Form 4

FERNALD K65 PROOF OF PRINCIPLE

REVISED BENCH-SCALE USING FDF SUPPLIED SURROGATE

Sample Number	1179-62-01	Date	2/4/99
Name	Greg Bennett	Source	Silo 2

FORMULATION

	K65 SURROGATE FILTER CAKE	PC	Ca(OH)2	CaSO4*0.5H2	FeSO4*6H2O	FLY ASH	TSP	WATER (TBD)
PLANNED (% w/w)	N/A	10%	0%	0%	1%	10%	2%	10%
PLANNED (g)	2000	200	0	0	20	200	40	200
ACTUAL (g)	2000.00	200.00	0	0	20.00	200.00	40.00	0

Mixer Speed #1
Time of Mixing 4 min

Room Temperature (C) 22
Final Grout Temperature (C) 26

Temperature Rise (C) 4°

WEIGHTS FOR ALIQUOTS (g)

Tare 2 x 4 inch mold ~~35~~ 21.32 NB 2/4/99
Wt Compacted Sample in mold 340.46
Density (g/cc) 1.55

Tare 2 x 4 inch mold 21.31
Wt Compacted Sample in mold 341.40
Density (g/cc) 1.55

Tare 2 x 4 inch mold 21.29
Wt Compacted Sample in mold 339.95
Density (g/cc) 1.55

Tare 2 x 4 inch mold 21.32
Wt Compacted Sample in mold 341.94
Density (g/cc) 1.56

Pocket Penetrometer sample
Vol. Compacted in S. Cup (cc) 200

Mod. ANS 55.1
Vol Smp in Container 200
Vol. Liquid @ 24 hr 0

PP @ 24 hr	Cure (tsf)	2.0
PP @ 4 day	Cure (tsf)	4.0
PP @ 10 day	Cure (tsf)	24.5
PP @	Cure (tsf)	
PP @	Cure (tsf)	
PP @	Cure (tsf)	

MB 2/15/99

MB 2/15/99

000165

Entries by R Gregory Bennett Date 2/15/99

Project Name FDF PoP

Project Number 775743

2293

1179:063

Fernald K65 POP
Silo 2 Surrogate Form 5

FERNALD K65 PROOF OF PRINCIPLE

REVISED BENCH-SCALE USING FDF SUPPLIED SURROGATE

Sample Number	1179-63-01	Date	2/4/99
Name	Greg Bennett	Source	Silo 2

FORMULATION

	K65 SURROGATE FILTER CAKE	PC	Ca(OH)2	CaSO4*0.5H2	FeSO4*6H2O	FLY ASH	TSP	WATER (TBD)
PLANNED (% w/w)	N/A	10%	0%	5%	1%	0%	2%	10%
PLANNED (g)	2000	200	0	100	20	0	40	200
ACTUAL (g)	2000.00	200.00	0	100.00	20.00	0	40.00	0.00

Mixer Speed #1
Time of Mixing 4 min

Room Temperature (C) 22°
Final Grout Temperature (C) 26

Temperature Rise (C) 4°

WEIGHTS FOR ALIQUOTS (g)

Tare 2 x 4 inch mold 21.33
Wt Compacted Sample in mold 340.76
Density (g/cc) 1.55

Tare 2 x 4 inch mold 21.33
Wt Compacted Sample in mold 340.88
Density (g/cc) 1.55

Tare 2 x 4 inch mold 21.28
Wt Compacted Sample in mold 340.64
Density (g/cc) 1.55

Tare 2 x 4 inch mold 21.34
Wt Compacted Sample in mold 340.19
Density (g/cc) 1.55

Pocket Penetrometer sample
Vol. Compacted in S. Cup (cc) 200

Mod. ANS 55.1
Vol Smp in Container 200
Vol. Liquid @ 24 hr 0

PP @ 24 hr Cure (tsf) 2.0
PP @ 4 Days Cure (tsf) 3.75
PP @ 7 Days Cure (tsf) 24.5
PP @ Cure (tsf)
PP @ Cure (tsf)
PP @ Cure (tsf)

2/15/99

2/15/99

000166

Entries by [signature] Date 2/15/99

oject Name FDF PoP

oject Number 775743

2293

1179.064

Fernald K-65 POP
Silo 2 Surrogate
Form 6

FERNALD K65 PROOF OF PRINCIPLE

REVISED BENCH-SCALE USING FDF SUPPLIED SURROGATE

Sample Number	1179-64-01	Date	2/4/99
Name	Greg Bennett	Source	Silo 2

FORMULATION

	K65 SURROGATE FILTER CAKE	PC	Ca(OH)2	CaSO4*0.5H2	FeSO4*6H2O	FLY ASH	TSP	WATER (TBD)
PLANNED (% w/w)	N/A	12.5%	0%	0%	1%	0%	2%	10%
PLANNED (g)	2000	250	0	0	20	0	40	200
ACTUAL (g)	2000.00	250.00	0	0	20.00	0	40.00	0

Mixer Speed #1
Time of Mixing 4 min

Room Temperature (C) 22°
Final Grout Temperature (C) 26

Temperature Rise (C) 4°

WEIGHTS FOR ALIQUOTS (g)

Tare 2 x 4 inch mold 21.29
Wt Compacted Sample in mold 338.04
Density (g/cc) 1.54

Tare 2 x 4 inch mold 21.32
Wt Compacted Sample in mold 338.21
Density (g/cc) 1.54

Tare 2 x 4 inch mold 21.36
Wt Compacted Sample in mold 337.20
Density (g/cc) 1.53

Tare 2 x 4 inch mold 21.33
Wt Compacted Sample in mold 338.45
Density (g/cc) 1.54

Pocket Penetrometer sample
Vol. Compacted in S. Cup (cc) 200

Mod. ANS 55.1
Vol Smp in Container 200
Vol. Liquid @ 24 hr 0

PP @ 24 hr Cure (tsf) ~~1.75~~ 2.0 MD 2/5/99
PP @ 4 day Cure (tsf) 74.5
PP @ Cure (tsf)
PP @ Cure (tsf)
PP @ Cure (tsf)
PP @ Cure (tsf)

WM 2/15/99

WM 2/15/99

000167

Entries by Gregory Bennett Date 2/15/99

Project Name FDF PoP

Project Number 775743

1179.065 2293

Fernald K-65 POP
Silo 2 Surrogate
Form 7

FERNALD K65 PROOF OF PRINCIPLE

REVISED BENCH-SCALE USING FDF SUPPLIED SURROGATE

Sample Number	1179-65-01	Date	2/4/99
Name	Greg Bennett	Source	Silo 2

FORMULATION

	K65 SURROGATE FILTER CAKE	PC	Ca(OH)2	CaSO4*0.5H2	FeSO4*6H2O	FLY ASH	TSP	WATER (TBD)
PLANNED (% w/w)	N/A	12.5%	5%	0%	1%	0%	2%	10%
PLANNED (g)	2000	250	100	0	20	0	40	200
ACTUAL (g)	2000.00	250.00	100.00	0	20.00	0	40.00	0

Mixer Speed #1
Time of Mixing 4 min

Room Temperature (C) 21°
Final Grout Temperature (C) 25°

Temperature Rise (C) 4°

WEIGHTS FOR ALIQUOTS (g)

Tare 2 x 4 inch mold 21.34
Wt Compacted Sample in mold 343.32
Density (g/cc) 1.56

Tare 2 x 4 inch mold 21.29
Wt Compacted Sample in mold 342.81
Density (g/cc) 1.56

Tare 2 x 4 inch mold 21.31
Wt Compacted Sample in mold 342.76
Density (g/cc) 1.56

Tare 2 x 4 inch mold 21.31
Wt Compacted Sample in mold 341.81

Density = 1.56 (g/cc)

PP @ 24 hr	Cure (tsf)	~~1.75~~ 1.50 MB 2/5/99
PP @ 4 days	Cure (tsf)	>4.5
PP @	Cure (tsf)	
PP @	Cure (tsf)	
PP @	Cure (tsf)	
PP @	Cure (tsf)	

MB 2/15/99

Pocket Penetrometer sample
Vol. Compacted in S. Cup (cc) 200

Mod. ANS 55.1
Vol Smp in Container 200
Vol. Liquid @ 24 hr 0

MB 2/15/99

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Entries by [signature] Date 2/15/99

ect Name FDF PoP

ect Number 775743

1179:066 2293

Fernald K-65 PoP
Silo 1 & 2 Filtrate TSS, TDS, % Solids

INTERNATIONAL TECHNOLOGY CORPORATION

By _____ Date 2/3/99 Subject POP Silo 1 & 2 Sheet No. ___ of ___
Chkd. By ___ Date _____ TDS & TSS, % Solids Proj. No. _____

Sample	Beaker Tare	Filter Tare	ml Sample	Final Beaker	Final Filter
11794901	104.3910	1.1444	200	105.9181	1.1491
11794902	103.0575	1.1448	200	105.0291	1.1516
11795001	107.3223	1.1417	200	109.3649	1.1424
11795002	101.0758	1.1450	200	102.7712	1.1496
Blank	111.0517	1.1420	200	111.0483	1.1416

Filter Cake % Solids

Sample	Tare	Tare + wet solid	Tare + Dry solid	% water
11794901	9.00	173.79	104.45	42.08
11795001	8.88	126.70	66.61	51.00
11794902	8.89	185.44	100.99	47.83
11795002	8.92	167.87	90.30	48.80

2/5/99

pH meter cal w/ 7 & 10 pH buffers slope = 98%
7 → 7.00 10 → 9.97

Sample	pH
11794901	12.03
4902	11.95
5001	11.81
5002	11.63

000169

108-10-85

Entries by [signature] Date 2/15/99

Project Name FDF P&P

Project Number 775743

2293

1179.067

Fernald K65-P&P
Silo 1 & 2 Filter Cake Densities

INTERNATIONAL TECHNOLOGY CORPORATION

By RCB Date 2/8/99 Subject P&P Silo 1 & 2 Sheet No. ___ of ___
Chkd. By ___ Date ___ Filter Cake Densities Proj. No. ___

Silo 1 F1 (1179050-01) MASS - 90.54 g

Dimensions (mm)		
52.32	38.02	31.81
53.18	36.93	31.00
53.21	34.67	30.91

Silo 2 F1 (1179050 ~~-02~~ 49-01) MASS 72.21

38.17	39.05	31.76
39.91	42.12	31.68
41.27	41.09	31.03

Silo 1 F2 (1179050-02) MASS 145.93

53.45	61.54	31.57
51.62	60.45	31.94
47.85	58.64	31.30

Silo 2 F2 (1179049-02) MASS 106.62

49.70	47.35	31.82
49.46	46.63	32.08
48.33	43.43	32.00

MB 2/15/99

000170

Entries by [signature] Date 2/15/99

Project Name FDF PoP

Project Number 775743

2293

1179.068

Fernald K-65 POP S,lo 1 & 2
Formulation TCLP

INTERNATIONAL TECHNOLOGY CORPORATION

By KGB Date 2/8/99 Subject S,lo 1 & 2 TCLP. Sheet No. ___ of ___

Chkd. By ___ Date ___ Proj. No. ___

pH meter cal w/ 4, 7, 10 slope = 98%
4 → 3.96 7 → 7.02 10 → 10.00

5g each sample + 96.5g D.I H_2O
Stirred 5 min

Sample	pH	After 3.5ml HCL 50° → 10 min	Retaken* pH
1179 5206	11.85	10.87	11.17
54	11.43	9.74	10.33
56	11.32	9.70	10.34
58	11.38	9.43	10.24
60	11.38	9.70	10.40
62	11.50	~~10.70~~ 10.08	10.56
64	11.76	11.43	11.54

* Samples still warm when 1st 50° 10 min pH taken so sat for 16 hrs and retaken.
TCLP Fluid #2 prepared by Diluting 95.36 g HoAc to 16 l w/ D.I H_2O

900 mls was added to each 45 ± 0.05g sample

Extraction Started 12:15
08:10

pH meter calibrated w/ 4, 7, 10 buffers slope = 98%
4 → 3.95, 7 → 7.03, 10 → 10.03
Equilibrium pH.

Sample	pH	Sample	pH
1179 52	10.36	1179 5906	10.14
53	6.27	60 06	6.43
54	5.78	61 06	6.20
55	5.59	62 06	6.00
56	5.66	63 06	6.39
57	8.49	64 06	8.04
58	10.89	6506	10.37
		BLK	2.88

KGB 2/15/99

100-10-85

170A

Entries by [signature] Date 2/15/99

Project Name EDF PoP

Project Number 775743

2293
1179.069

Fernald K65 POP Demo 28 Day UCS

INTERNATIONAL TECHNOLOGY CORPORATION

By RGB Date 2/10-11 Subject Fernald POP Sheet No. ___ of ___

Chkd. By ___ Date ___ Demonstration 28 Day UCS Proj. No. ___

Sample 1179017-01 28 Days MASS 291.89

HT 10.1 cm

Stress	Strain
0	0
80	2
120	3
150	4
180	4
220	5
250	5
280	6
310	6
330	6
360	7
400	7
450	8
500	8
550	9
590	9
630	10
660	10
720	11
750	12
780	12
800	13
830	13
860	14
900	15
950	16
1000	17

Sample 1179017-01

000171

108-10-85

Entries by [illegible] Date 2/15/99

Object Name FDF PoP

Object Number 775743

1179:070 2293

Fernald K-65 POP Demo 28 Day UCS

INTERNATIONAL TECHNOLOGY CORPORATION

By Rob Date 2/10/99 Subject Fernald Silo 1 & 2 Sheet No. ___ of ___

Chkd. By ___ Date ___ Demo 28 Day UCS Proj. No. ___

Sample 1179018-02 28 Day MASS 306.75

HT. 10.1 cm

Stress	Strain
0	0
20	2
50	5
80	10
110	15
130	18
160	23
190	28
220	35
250	39
280	42
310	44
340	46
370	48
400	51
430	53
460	55
490	56
520	58
550	59
570	60
600	62
630	63
660	65
700	66
750	69
780	70
810	72
850	73
880	75
900	76
950	79
1000	83

Sample # 1179018-02

000172

108-10-85

Entries by 2/15/99 Date 2/15/99

Project Name FDF PoP

Project Number 775743

2293

1179:071

Fernald PoP Demo 28 Day UCS

INTERNATIONAL TECHNOLOGY CORPORATION

By RBH Date 2/10/99 Subject Fernald PoP Demo 28 Day UCS Sheet No. ___ of ___

Chkd. By ___ Date ___ Proj. No. ___

Sample 1179019-03 28 Day MASS 312.37

HT 10.1 cm

Stress	Strain
0	0
10	1
30	4
70	6
100	8
130	9
170	10
200	11
230	11
270	12
300	12
350	13
400	14
450	14
500	15
550	15
600	16
650	17
700	17
750	18
800	18
900	19
1000	21

Sample 1179019-03

000173

108-10-85

Entries by [signature] Date 2/15/99

2/15/99

oject Name FDF PoP

oject Number 775743

2293
1179:072

Fernald POP Demo 28 Day UCS

INTERNATIONAL TECHNOLOGY CORPORATION

By RBB Date 2/10/99 Subject Fernald POP Demo 28 Day UCS Sheet No. ___ of ___

Chkd. By ___ Date ___ Proj. No. ___

Sample 1179020-04 28 Day MASS 310.00

HT 10.1cm

Stress	Strain
0	0
10	1
30	5
70	11
100	14
130	17
170	22
200	26
230	31
RBB 2/10/99 ~~270~~	
238	35

1179020-04

Sample

000174

108-10-85

Entries by RBB 2/15/99 Date 2/15/99

Project Name FDF PoP

Project Number 775743

2293
1179.073

Fernald POP Demo 28 Day UCS

INTERNATIONAL TECHNOLOGY CORPORATION

By RDB Date 2/10/99 Subject Fernald POP Demo 28 Day UCS Sheet No. ___ of ___

Chkd. By ___ Date ___ Proj. No. ___

Sample 1179021-05 28 Day MASS 304.25

HT 10.1 cm

(Stress) PSI	(Strain)
0	0
10	2
40	5
70	7
100	9
150	11
180	13
210	14
260	16
300	18
350	19
400	21
450	23
500	24
550	26
600	28
650	29
700	30
750	31
800	32
850	33
900	34
950	36
1000	38

Sample 1179021-05

2/15/99

000175 108-10-85

Entries by [signature] Date 2/15/99

Project Name FDF PoP

Project Number 775743

2293
1179:074

Fernald POP Demo 28 Day UCS

INTERNATIONAL TECHNOLOGY CORPORATION

By RLB Date 2/11/99 Subject Fernald Silo 1 & 2 PoP Sheet No. ___ of ___
Chkd. By ___ Date ___ Demo 28 Day UCS Proj. No. ___

Sample 1179022-06 28 Day mass 289.42
HT. 10.1cm

Stress	Strain
0	0
30	1
70	2
100	4
130	7
170	9
210	12
260	15
MB 2/11/99 ~~300~~ 281	18

Sample 1179023-07 28 Day MASS - 305.90
HT 10.2 cm

0	0
20	1
70	4
110	8
160	12
MB 2/11/99 ~~200~~ 192	21

Sample 1179024-08 28 Day MASS - 312.45
HT. 10.1 cm

Stress	Strain	Stress	Strain
0	0	440	10
MB 2/11/99 ~~20~~ 30	1	480	14
60	2	550	16
90	3	600	18
120	4	640	18
160	5	680	19
190	6	730	19
230	7	770	20
280	8	800	20
320	8	850	21
360	9	900	21
400	9	1000	23

MB 2/15/99

108-10-85

000176

Entries by R Gregory Gill Date 2/15/99

Samples 1179-22-24-06

Project Name FDF PoP

Project Number 775743

2293
1179.075

Fernald POP Demo 28 Day UCS

INTERNATIONAL TECHNOLOGY CORPORATION

By RWB Date 2/4/99 Subject Fernald POP 28 Day UCS Demo. Sheet No. ___ of ___

Chkd. By ___ Date ___ Proj. No. ___

sample 1179~~09026~~ 0925-09 MB 2/11/99 mass 322.97

HT	10.1cm
0	0
10	1
30	2
60	3
100	3
130	3
170	3
210	4
250	5
290	6
330	6
370	7
410	8
460	9
510	10
570	11
610	11
670	12
720	13
780	14
830	15
890	16
950	19
1000	21

Sample 117909 25-09

MB 2/15/99

108-10-85

000177

Entries by K Gregory Bott Date 2/15/99

roject Name FDF PoP

roject Number 775743

2293

1179:076

Fernald POP Demo 28 Day UCS

INTERNATIONAL TECHNOLOGY CORPORATION

By RGB Date 2/4/99 Subject Fernald POP Demo 28 Day UCS Sheet No. ___ of ___

Chkd. By ___ Date ___ Proj. No. ___

28 Days

sample 1179026-10 mass 322.40

HT. 10.1 cm

stress	strain
0	0
30	1
70	1
100	2
130	3
160	3
190	4
220	4
260	5
300	5
330	6
360	6
390	7
420	7
480	8
530	9
590	10
640	11
700	12
740	14
780	15
830	16
880	17
930	18
980	19
1000	20

Sample 1179026-10

108-10-85

000178

Entries by RBG 2/15/99 Date 2/15/99

Project Name FDF PoP

Project Number 775743

2293
1179.077

Fernald POP Demo 28 Day UCS

INTERNATIONAL TECHNOLOGY CORPORATION

By RGB Date 2/11/99 Subject Fernald POP Sheet No. ___ of ___

Chkd. By ___ Date ___ Demo 28 Day UCS Proj. No. ___

1179028-09 (11) 28 Day Mass 313.94
HT. 10.1 cm

0	0
10	1
40	4
80	8
110	10
130	12
160	15
190	19
220	28
225	32

Samp 1179028-09

108-10-85

000179

Entries by [illegible] Date 2/15/99

2/15/99

oject Name FDF PoP

oject Number 775743

2293
1179:078

Fernald K-65 POP
Demostration Slurry
% Solids

INTERNATIONAL TECHNOLOGY CORPORATION

By [illegible] Date 2/11/99 Subject Fernald Silo 1&2 POP Sheet No. ___ of ___
Chkd. By ___ Date ___ Demostration Slurry % Solids Proj. No. ___

Sample	Tare	Tare + wet	Tare + Dry
1179017-01	9.05	180.13	53.96
1179018-02	9.02	207.41	61.35
1179019-03	9.03	313.00 MM 2/11/99	89.76
20-04	8.90	261.~~45~~ 49	78.52
21-05	8.91	264.64	78.88
22-06	8.94	229.99	67.43
23-07	8.99	233.99	72.45
24-08	8.97	236.59	73.92
25-09	8.94	254.19	78.22
26-10	8.99	280.98	85.56

MM 2/15/99

000180

Entries by R Gregory Pitt Date 2/15/99

Project Name FDF PoP

Project Number 775743

2293
1179:079

Analyses performed by EML on 2/18/99
for TCLP Reruns on Demo material Stabilized

Batch #	2	5	6	11
pH + 96.5 mls H_2O –	10.91	11.12	10.98	11.07
pH + 3.5 mls 1N HCl –	4.49	5.23	8.80	3.98
final on 2/18	6.04	10.03	8.72	7.21
Stir + let settle on 2/19	9.94	10.74	9.86	10.21

use TCLP fluid #2 : 71.54 g HOAC to 12 liters final vol in DI water.

pH Meter Calibration

Buffer	7.00	4.00	10.00
Reading	7.02	4.00	10.01
Reading	7.02	4.02	—

Final pH on Demo Run Material Stabilized on 2/19/99 by EML.

Batch #	pH
Blk Fluid #2	2.91
01	7.67
02	7.99
03	7.57
04	8.99
05	8.95
06	7.84
07	9.47
08	8.28
09	7.62
10	7.98
11	8.04

pH Meter Calibration

Buffer	4.00	7.00	10.00
Reading	3.96	7.01	9.98

000181

Entries by Mary M Hall

Date 2/20/99

Project Name FDF PoP

Project Number 775743

2293
1179:080

Silo 1 14 day UCS

Sample: 11795201

HT 10.2 cm mass 320.63

HT (lbs)	deformation (in)
0	0
10	1
30	2
60	4
90	6
110	7
130	9
160	11
190	14
210	16
230	20
250	26
254	32

Sample 11795301

Ht 10.2 cm Mass 314.58

load lbs	deformation (in)
0	0
10	6
20	10
30	16
40	24
49	40

Sample 11795401

Ht = 10.2 cm mass 318.60

load (lbs)	deformation (in)
0	0
10	7
20	13
30	20
40	30
50	43
51	50

Sample 11795501

Ht. = 10.2 cm mass = 320.88

load (lbs)	deformation (in)
0	0
10	4
20	8
30	10
40	13
50	17
60	21
70	27
80	36
86	50

Sample 11795601

Ht. = 10.2 cm Mass = 319.87

load (lbs)	deformation (in)
0	0
10	3
20	7
40	15
60	23
70	30
80	42
85	54

Sample 11795701 Ht 10.2 cm mass = 316.04

load (lbs)	deformation (in)	load (lbs) cont.	deformation (in) cont.
0	0	120	12
10	5	140	13
30	9	160	18
50	9	167	24
70	10		
100 (cont.)	11 (cont.)		

000182

Entries by Mary Jo Hall Date 2/20/99

Project Name FDF PoP

Project Number 775743

2293
1179.081

Silo 1 14 day UCS (cont.)

Sample 11795801

H+ 10.2 cm mass 320.69

load (lbs)	deformation (in)
0	0
10	2
30	4
60	6
90	7
110	9
130	10
150	11
170	12
200	14
230	15
260	17
290	18
320	20
350	21
390	24
420	25
450	27
480	30
520	35
528	40

Silo 2 14 day UCS

Sample 11795901

H+ 10.2 cm mass 318.28

0	0
10	1
30	2
70	2
110	3
150	4
180	4
230	5
270	6
310	7
360	8
410	8
480	9
540	10
600	11
650	12
700	12
750	13
800	14
850	15
900	16
950	17
1000	18

Silo 2 14 day UCS

sample 11796001

H+. = 10.2cm mass = 314.03

load (lbs)	deformation (in)
0	0
10	2
30	7
60	10
80	12
100	14
130	16

load (lbs) (cont)	deformation (in)
160	18
190	21
220	24
250	27
270	29
290	32
310	38
318	45

000183

Entries by Mary M. Hall

Date 2-20-99

roject Name FDF PoP

roject Number 775743

1179:082 293

Silo 2 14 Day UCS cont.

Sample 11796101

HT=10.2cm mass=317.78

load(lb)	deformation(in)
0	0
10	2
30	6
60	10
90	14
120	18
140	20
170	23
200	25
230	28
260	33
290	41
[illegible]	49

Sample 11796201

H+=10.2cm mass=317.79

load(lbs)	deformation(in)
0	0
10	1
30	2
60	4
90	5
120	7
150	9
180	10
210	13
240	16
270	21
300	27
320	34
325	40

Sample 11796301

H+=10.3cm mass=318.47

load(lbs)	deformation(in)
0	0
10	2
30	5
60	7
90	9
120	11
150	13
180	15
210	17
240	19
270	23
300	26
330	29
360	35
374	42

Sample 11796401

H+ 10.2cm mass 315.76

load(lbs)	deformation(in)
0	0
20	2
50	5
80	8
110	10
140	12
170	15
200	17
230	18
260	21
290	23
[illegible]	24
340	26
370	28
400	29

Cont.

load(lbs)	deformation(in)
430	31
460	34
490	38
498	43

Sample 11796501

H+=10.2cm mass=320.65

load(lbs)	deform.(in)
0	0
10	1
40	3
70	4
100	6
130	6
160	7
200	8
250	9
300	10
350	11
400	12
450	12
500	13
600	14

Cont

load(lb)	deform.(in)
700	15
800	16
900	18
1000	19

000184

Entries by Mary M. Hall

Date 2-20-99

Project Name FDF PoP

Project Number 775743

2293
1179:083

Silo 1+2 28 Day UCS

Sample 11795302
Ht = 10.1cm mass = 314.68

load(lb)	deform(in)
0	0
10	4
20	7
30	11
40	14
50	18
60	22
70	27
80	34
84	43

Sample 11795402
Ht. = 10.1 cm mass 317.24

load(lb)	deform.(in)
0	0
10	3
30	8
50	14
70	19
90	27
100	34
105	42

Sample 11795502
Ht = 10.2cm Mass 322.36

load(lb)	deform.(in)
0	0
10	3
30	9
50	17
60	22
70	26
80	30
90	36
100	46
102	53

Sample 11795602
Ht. 10.1cm mass 318.00

load(lb)	deform.(in)
0	0
10	1
20	4
30	7
40	9
50	10
60	12
70	15
80	17
90	20
100	23
110	26
120	32
126	41

Sample 11795702
Ht. 10.2cm mass 317.58

load(lb)	deform(in)
0	0
10	2
30	5
60	7
90	9
120	10
150	12
180	14
210	15
240	17
270	19
300	22
330	26
338	31

000185

Entries by Mary M Wall

Date 2-8-99

Project Name R&R POP

Project Number 775743

2293

1179:084

MADE TREATED MATERIAL FROM THE DEWATERED SILO 1, SILO 2 AND DEMONSTRATION SURROGATE MATERIALS FROM FINAL FORMULATION DEVELOPMENT.

SAMPLE #	SURROGATE	FORMULATION	# 2"x2" MOLDS
1179-084-01	SILO 1	S1-T	36
1179-084-02	SILO 1	S1-U	36
1179-084-03	SILO 2	S2-T	36
1179-084-04	SILO 2	S2-U	36
1179-084-05	DEMONSTRATION	S0-D	36
1179-084-06	DEMONSTRATION	S0-U	36

PAL 3/24/99

000186

Entries by [signature]

Date 3/24/99

Project Name FOF POP

Project Number 775743 4/23/99

2293
1179.085

Samples From Drums of Treated Material

EMC 4/23/99

POP pH READINGS
1:1 DI H_2O 8/10 8/10

sample #	pH	
4 Buffer	4.00	Slope 100
7	7.01	
10	9.93	
POP Sample # #1	11.41	
2	11.~~40~~ 27 EMC	
3	11.34	
4	11.43	
5	11.69	
5A	11.57	
6	11.40	
7	11.22	
8	11.34	
9	11.14	
10	11.21	
11	11.25	
12	11.30	
13	11.34	
14	11.34	
15	11.41	
16	11.26	
17	7.91	
18	11.06	
10 Buffer	9.97	

Ellen Lay 4/23/99

EMC 4/23/99

000187

Entries by Ellen Lay Date 4/23/99

Project Name

Project Number

2293

1179:086

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A Green 6/1/99

000188

Entries by

Date

Project Name POP- Filtrate Treatment

Project Number 775743.00065000

2293

1179:087

- A summary of treatments and results pp-

Preliminary testing was begun on ~4/20/99 using samples of untreated filtrate from ETDC and a sample of pH treated (H_3PO_4) to pH ~7. The treatment to pH 7 reduced the lead to below detectable levels. The untreated liquid (pH ~12) had lead ~200 ppm and Se ~12 ppm as primary heavy metals of concern. Treatment criterion was to get selenium to <5 ppm and treatment required to obtain ~~free~~ selenium below or near detection level

- The pH treated liquid had lead not detected and Se @ ~6 ppm

Initial treatments tested included $KMnO_4$ (0.6%), Alumina, anion exchange resin, bleach (~0.1% active) plus iron powder,

No treatment appeared to be effective at reducing Se to below 4-5 ppm. The most promising samples appeared to be the bleach treated and permanganate treated, these two treatment samples were divided into 2 fractions and then 1 fraction was treated with 2% alumina (80/100 mesh) or 2% anion exchange resin. The treatments were put on a shaker overnight. - Except where noted, all treatments involved shaking overnight prior to analysis.

The post treated samples were analysed as samples POPAWT T7, T8, T9 and T10 for the bleach treatment followed by 2% resin (T8) 2% alumina (T7) and the permanganate followed by 2% alumina (T9) or 2% resin T10. The permanganate sample + resin was clear, indicating take up of manganese. None of these treatments reduced Se to below 3.5 ppm.

The activity of the resin and permanganate suggested further study with varying levels of oxidizing, or reducing media. Treatment set #2 involved the use of iron powder, zinc powder, copper ion, alumina, anion exchange resin and sulfide ion. These materials were tested for relative activity at different concentrations on both feed liquids. Also at this time larger aliquots of both feeds were prepared with bleach (calcium hypochlorite @ 0.5%, 1% and 0.25% active)

000189

Entries by [signature] Date 5/11/99

Project Name POP - FILTRATE TREATMENT -

Project Number 775743.0006 5000

2293
1179.088

for subsequent testing of oxidized feed, the following treatments were tested on pH adjusted liquid and untreated liquid

Treatment -		Low pH feed,	high pH feed.
2% alumina		x	x
2% anion exchange resin		x	x
1% anion exchange resin		x	x
iron powder	0.25%	x	x
iron powder	0.5%	x	x
iron powder	1%	x	x
$CuSO_4$	0.5% (Cu^{++})	x	
$CuSO_4$	1% (Cu^{++}	x	
Zn powder	1%	x	x
	2%	x	x
Na_2S	500 ppm $S^=$	x	x
Na_2S	1000 ppm $S^=$	x	x

each sample was prepared of ~30 ml of liquid feed

- Also prepared 50 ml quantities of 0.25%, 0.5%, 1% $Cu(OCl)_2$ for each feed liquid!

The treatments with Fe powder on the low pH liquid appeared to be the most effective, the solution were rust colored and lowered the Se concentration to ~2.5 for the highest Fe level. The higher alumina on the low pH liquid also appeared to be more effective with the Se conc @ ~2 ppm. The alumina treatment for the high pH liquid with Se at ~3.7 ppm - down from 12 ppm. The Na_2S also was about as effective. Na_2S was not considered to be a preferred treatment so further consideration was dropped.

The following sets of treatments used low level of bleach - 0.25% as a preliminary treatment followed by addition of reagents. treatment set # 5 used only short

000130

Entries by [signature] Date 5/11/99

Project Name POP - FILTRATE TREATMENT

Project Number 775743.00065000

2293
1179.089

term shaking by hand usually 40 minutes
- high levels of some reagents on high and low pH feeds.
set sets # popfw4-1 through 7, set 5-1 through 4
Treatments included - on bleached material (0.25%)

	low pH	high pH
5% alumina	X	
5% porocell	X	
$BaCl_2$ 2%	X	X
~~5% Fe powder~~		
500 ppm $S^=$		
0.1% Ba^{++}		X
Fe^{3+} @ 0.5%	X	
5% Fe powder	X	X
0.2% Ba^{++}		X

- and set popfw 6-1 through 5.
- These tests indicated that high levels of Ba^{++} reduced the Se level to non detectable
the next set of tests at varying levels of Ba^{++} confirmed that Ba^{++} > 0.4% but ≤ 0.5% was needed. @ 0.5% Ba^{++} there was ~ 100 ppm residual Ba^{++} in the liquid.
- Test samples ID # popfw 7-1 through 4. in summary.

With barium requirement partially defined the post treatment to reduce Ba^{++} to acceptable levels was necessary. Back titration with $SO_4^=$ to precipitate the residual Ba^{++} was tested.
- also tested in this series was the action of Fe^{3+} at lower pH
- also tested was the difference in residual Ba^{++} if order of Ba addition and pH adjustment was changed or the acid was changed from HCl to H_3PO_4. H_3PO_4 produces more precipitate but the order of addition appeared to be immaterial.
- A new resin (proprietary metal oxide mixture) was found and preliminary testing on this resin at high + low pH was checked.

190A

Entries by [signature] Date 5/11/99

Project Name POV FILTRATE TREATMENT

Project Number 775743.00065000

the effect of the initial pH on the activity of the anion exchange resin was also checked. Results indicated that the solmetex was effective at removing the selenium better at low pH than high pH

The test of back titration indicated that Ba^{++} could be reduced to reasonable levels by titration with Na_2SO_4 followed by filtration to remove precipitated $BaSO_4$

- Action of Ba^{++} suggested potential use of Ca^{++} in place of Ba to precipitate the selenium. This was tested as treatment set # 10 and Ca^{++} was found to be ineffective at removing selenium to the required level of <5 ppm or <1 ppm.

Treatment set #9 attempted to define the Ba^{++} requirement more closely and to test if the use of HCl vs H_3PO_4 to adjust the pH altered the Ba^{++} requirement. The effect of using HCl as the adjusting acid for both the anion exchange (Cl^- base) and the solmetex - both @ 1% levels were tested. The use of HCl had no apparent effect on the activity of the anion exchange and the solmetex was ineffective without the Ba^{++} treatment. varying the Ba^{++} levels testing was not conclusive.

Test set # 10 used the high pH feed liquid - not bleached.
- tried adjusting the pH with HCl followed by < stoichiometric Ba^{++} requirement - pH readjusted to <7 following addition of solmetex resin - Similar test on bleached liquid

- these tests indicated that bleaching followed by < stoichiometric Ba^{++} at high solmetex levels reduced to Se to below detection levels. - The test without bleach, left some detectable Se even at high solmetex (5%) level
- analysis of an untreated feed liquid sample indicated inhomogeneity in the feed liquid (high salt content + crystals)

Entries by [signature] Date 5/1/95

Project Name POP FILTRATE TREATMENT

Project Number 775-743.00065000

2293

1179.091

At this point, a column of solmeter was prepared and feed liquid was prepared initially as follows

- a 3-4 liter pail of high pH liquid feed was treated at ~0.2% bleach (liquid household bleach) and allowed to react for ~1-2 hours. An orange precipitate began to form (indicative of lead oxide). $BaCl_2$ was added at a level of 0.43-0.44% (slightly less than stoichiometric) and the pH was adjusted to ~7.5 with H_3PO_4. The precipitate formed had a slight pink tinge. Additional bleach was added in an effort to reduce the Se content to <1 ppm (was @ ~3.5 ppm). The additional bleach did not appear to help. The $BaCl_2$ was also increased to ~0.45-0.46% to get Se lower. This feed was set aside and a new feed was prepared as follows

- 3-4 l high pH feed liquid. add 0.2% active bleach
- allow to stir overnight - this time - the brown solids indicative of lead dioxide were present. the pH was adjusted c̄ HCl to ~pH 10 and H_3PO_4 was added to ~200 ppm - pH was adjusted back to pH 10.2 with 6% NaOH
- step 1 pH → 12.1 → 8.5 c̄ conc muriatic acid used (66.297-50.
  - pH 8.5 - 9.6 c̄ 6% NaOH (41.922-40.
  conc H_3PO_4 pH 9.6 → 7.9 (25.537-24.786)
  pH 7.9-10.2 c̄ 6% NaOH (40.779-34.955)
  Added 750 mg $BaCl_2$ to liquid after algae removed.
  - starting weight of liquid ≅ 2926 g (c̄ solids)

Weight of solids (solmeter) in the column = 16.50 g.
- Column began on 5/1/99 - feed rate ~0.47 ml/min
  - effluents tested for Se - not detected.
- liquid consumed. in feed bucket - residual sludge ~200 g
  - used feed liquid #1 described above. c̄ ~3.+ ppm Se
  - effluent sample weights on next page

000192

Entries by [signature] Date 5/11/99

Project Name POP FILTRATE TREATMENT

Project Number 775-743.00065000

1179:092
2293

- Column Study Effluents.
- feed liquid #2
  ~17ml passed @ higher flow rate (1.5 ml/min) then adjusted to 0.5ml/min)

① 552.8 - 55.7 = 497.1
2A 597.5 - 57.1 = 540.4
2B (overflow of 2A) 197.5 - 57.1 = 140.4
3 291.3 - 47.2 = 194.1
4 240.4 - 55.1 = 185.3
5 289.3 - 57.1 = 232.2
6 326.1 - 57.6 = 268.5
7 326.4 - 55.3 = 271.1

- new feed liquid (sample #1 previous page)

① 116.4 - 56.8 = 59.6
② 285.3 - 55.4 = 229.9
③ 292.2 - 57.3 = 234.9
④ 364.3 - 57.2 = 307.1
⑤ 220.8 - 56.8 = 164
⑥ 532.8 - 56.7 = 476.1
⑦ 479.8 - 53.2 = 426.6 (flow rate @ 2 ml/min)
8 529.3 - 57.0 = 472.3 (flow rate @ 2 ml/min)

total effluent = 4699.6 g ~285 bed volumes

- sample #2A above used as feed for testing secondary treatment to remove Ba residue from effluent
  - initial pH of liquid ~ 11.4 - requires ~60 ml of 6N HCl for 40 ml to get pH to 8.2

- looked at various treatments to reduce Ba to <1 ppm for treated liquid
  - reagents included - pH reduction w HCl to 7-8
  - then add resin IRC718, C100 (cation exchange resins) or clinoptilolite, natural
  the C100 resin appeared to be more effective than IRC718 Ba from ~7 - ~2-3 ppm - 2% alum appeared to be the most effective treatment - however this treatment requires reducing the pH prior to alum treatment

000193

Entries by [signature] Date 5/11/99

Project Name POP FILTRATE TREATMENT

Project Number 775743.0006.5000

2293

1179:093

Primary conclusions – to obtain treated liquid with Selenium @ <1 ppm to ND levels –

Step 1 – bleach @ ~0.15-0.2% @ high pH. allow to agitate overnight or at least until brown solids indicative of PbO_2 are formed. – oxidation of selenium also complete
– add slightly less than stoichiometric Ba^{++} requirement based on sulfur analysis of filtrate – adjust pH to ~6.5-7 with HCl and trace of H_3PO_4 (~200 ppm for residual Pb in solution to get ND on lead.

– Allow to agitate for several hours to obtain required equilibrium concentration of Ba in the liquid. – check for residual sulfur in the sample. Residual Sulfur as sulfate reduces the loading of Solmeter for selenate anion. Selenium remaining following Ba^{+1} at level to get <50 ppm S in the sample will be about 2-4 ppm. Ba should be <1 ppm

– filter or allow solids to settle before feeding column.
– Flow through solmeter column ~0.0008454 ft^2 cross sect
@ 2 ml/min = 0.0005284 gal/min
= 0.625 gpm/ft^2.
– much higher rates may be possible.

– the solmeter resin removes both sulfate and selenate anions well with selenate preferred slightly over sulfate. selenite anion also appears to be removed but not as selective
– the presence of high sulfate residual (low or no Ba usage) greatly increases the solmeter required to remove Selenium
– the solmeter requires a low to moderate pH feed 5.5-6 and generates a high pH effluent (11.4) especially at the low flow rates. Loadings of 15-20% are possible according to literature. high $SO_4^=$ content reduces the column effective for selenate anion. (produced by bleaching feed liquid)

000194

Entries by [signature] Date 5/11/89

Project Name POP FILTRATE TREATMENT

Project Number 775743.00065000

2293
1179.094

Treatment criterion # 2 - Selenium <5 ppm for discharge (100 x drinking water) and Ba <20 ppm.

- treat filtrate with bleach - overnight as before - adjust pH c̄ HCl & H_3PO_4 as before

- add Ba^{++} closer to stoichiometric based on Sulfur content.
- allow to agitate for at least 4-6 hours to equilibrate Ba^{++}. Recheck for levels of Ba^{++} & Se - Sulfur will be ~10-20 ppm & Ba around 10 with Se ~2 at the correct $BaCl_2$ dosage.

000195

Entries by [signature] Date 5/11/99

Project Name POP FILTRATE TREATMENT

Project Number 775743-00065000

Analysis Summary.

POP filtrate testing for selenium removal

First test series by cem included alumina, kmno4,resin,bleach

Two from this first set were retreated ,sample 3(bleach),and 6(kmno4)
The treatments were 2% of alumina or 2% resin on each sample after filtration

The next treatment set was labeled as series 2 and 3.
Series 2 used ph treated liquid from the garbage pail
Series 3 used untreated filtrate from the 5 gal pail.

Sample ID		treatment			Residual Se
test set 2					
1-Jan		1%resin		initial =5.5	3.83
2		2%resin			3.44
3		0.25%fe 0			2.769
4		0.5% fe 0			2.857
5		1% fe 0			2.426
6		500ppm s-			3.476
7		1000ppm s-			4.423
8		1%zn 0			4.094
9		2%zn 0			3.652
10		2% alumina			1.992
11		0.5% cu++			3.733
12		1% cu++			4.184
test set 3					
1		1%resin		initial =12	9.786
2		2%resin			7.43
3		0.25%fe 0			11.43
4		0.5%fe 0			7.986
5		1% fe 0			10.4
6		2% alumina			3.674
7		1% zn 0			8.204
8		2% zn 0			10.05
9		500 ppm s-			3.032
10		1000 ppm s-			2.916
test set 1a					
3a	3(bleach)	2% resin	follow ser 1		4.818
3b	3(bleach)	2% alumina	follow ser 1		3.909
6a	6(kmno4)	2% resin	follow ser 1		5.045
6b	6(kmno4)	2% alumina	follow ser 1		3.559

5/11/95

Entries by

Date 5/11/95

Project Name VOP FILTRATE TREATMENT

Project Number A5743.00065000

2293
1179.096

Analytical Summary

conclusions following these tests
bleaching of liquid prior to additional treatment seemed to be indicated since
there appeared to be a residual level of Se in all treatments (another form less amenable to treatment)

samples were made up using different levels of bleach 0.25, 0.5, and 1 %, only lowest level used in any follow up tests
Test series 4 looked at treatments folowing bleach @ 0.25% on low and high pH liquids.
also starting to look at Ba to precipitate sulfate and selenate ions from bleach treatments

Sample ID	treatment	Residual Se
poptw4-1	5% alumina to 0.25% bleach on high pH feed	0.0477
poptw4-2	5% alumina to 0.25% bleach on low pH feed	0.07
poptw4-3	5% porocel to 0.25% bleach on high pH feed	0.232
poptw4-4	5% porocel to 0.25% bleach on low pH feed	0.235
poptw4-5	2 % bacl2 on high pH feed with 0.25% bleach	0.237
poptw4-6	500 ppm s- on high ph feed with 0.25% bleach	0.121

test set 5 was a short time quick shake on high level reagents, ba at lower levels
test set 6 was a subset of set 5 with longer shake times and different reagents

Set 5	treatment	
1	5% alumina on low ph feed with 0.25% bleach	4.642
2	5 % porocel on low ph feed with 0.25% bleach	4.419
3	0.1% ba on high ph feed with 0.25% bleach	4.511
4	5% fe 0 on low pH feed with 0.25% bleach	3.94

set 6

poptw6 1	5% alumina on high ph feed with 0.25% bleach	3.962
poptw6 2	5% porocel on high ph feed with 0.25% bleach	4.379
poptw6 3	0.5% fe+++ on low ph feed with 0.25% bleach ph adj	3.833
poptw6 4	5% fe 0 on high ph feed with 0.25% bleach	3.852
poptw6 5	0.2% ba on high ph feed with 0.25% bleach	3.953

The results of these tests plus other quick tests by cem indicated ba requirement about 0.5%

poptwt7 2	0.1% ba	5.385
popwt7 5	0.4% ba	3.434
poptw7 6	0.5% ba	0.64
poptw7 6d	0.5% ba diluted 1/100	101ppmba

5/11/99

000197

Entries by [signature] Date 5/11/99

Project Name DOP FILTRATE TREATMENT

Project Number 775743 00065000

2293
1179:097

Analysis Summary

Test set 7 not defined quick shake tests by cem, also prepared 0.1% liocl bleach batch allowed to sit
Set 8 used this bleached sample as basis, attempt to define back titration of excess ba with na2so4
also try out new solmetex resin and try to define ph requirements of the anion resin, also test simple ph adjusting

Sample ID	Treatment		
test set 8			
1	50 ul 930ppm so4 +0.5% ba	ba sat	1.243
2	100 ul so4 + 0.5% ba	ba sat	1.261
3	250 ul so4 + 0.5% ba	ba =11.7	1.037
4	1000 ul so4 +0.5% ba(maybe only 500 ul)	ba =5.55	1.087
5	0.5% fe+++ adj ph to 7		4.345
6	0.5% ba adjust to ph 7 with hcl		0.073
7	adjust ph to 7 with hcl then +0.5% ba		-0.191
8	adjust ph to 7 with h3po4 then + 0.5% ba		0.165
9	0.5% ba then adjust ph to 7 with h3po4		0.195
10	add 0.5% solmetex at ph 12		6.42
11	add 2% solmetex at ph 12		4.53
12	add 5% solmetex at ph 12		0.731
13	add 2% solmetex at ph 7		2.668
14	add 2% anion resin at ph 12		5.582
15	add 2% aion resin at ph 7		3.655
16	add 1 % anion resin at ph 12		6.291
17	add 1 % anion resin at ph 7		4.41
18	adjust ph to 10.5		6.13
19	adjust ph to 8.5		5.912

test series 9 attempts to define ba requirement at high ph, also check if ba requirement
lower if hcl used to lower ph versus po4-, also recheck anion exchange resin action at ph 6 with hcl
also check loading of solmetex at ph 6 with hcl

test set 9	treatment using high ph liquid bleached with liocl	
1	high ph with 0.44% ba	0.457
2	high ph with 0.46% ba	2.2
3	high ph with 0.48% ba	0.378
4	ph to 7 with hcl + 0.25% ba	6.056
5	ph to 7 with hcl + 0.3% ba	6.433
6	ph to 7 with hcl + 0.4% ba	6.201
7	ph to 6 with hcl + 1% anion ex resin	6.644
8	ph to 6 with hcl + 1%solmetex	7.205

5/11/99

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Entries by [signature] Date 5/11/99

Project Name POP FILTRATE TREATMENT

Project Number 775743.00065000

2293
1179.098

Analysis Summary

Test set 10 used raw high ph liquid as feed , try to define loading of solmetex at lower ph and less then stoichiometric ba
also looked at using calcium instead of barium as precipitant ion

test set 10	treatment	
poptw10 1	low bleach +ph adjust +0.44%ba+2% anion ex	1.621
poptw10 2	same + 2% solmetex	0.118
poptw10 3	low bleach +ph adjust+calcium chloride@1%	5.408
poptw10 4	same with calcium @ 2%	4.818
poptw10 5	low caocl bleach + ph adjust + cacl2 @ 1%	3.321

test set 10a

	treatment on raw feed at high ph	
1	adjust ph t0 5.3 with hcl + 0.4% ba+2%solmetex adjust ph to 6.7 with hcl	2.959
2	same with 5% solmetex	0.734
3	add 0.2% liq bleach then 0.4%ba on ph adjusted feed ,+2% solmetex then adjust ph to6.6	4.208
4	same at 5% solmetex	-0.123
5	untreated filtrate diluted 2x with conc hcl+ h20 +dilute 2x with 5%hno3	0.039
6	bleached liquid feed for column study	8.742
7	bleached feed with 0.45% ba added	2.31
8	same with ba boosted to 0.5+%	0.652

continuation of set 10a
looking at activity of hydrated solmetex with additional ph adjustments after addition
also looking at activity of powdered solmetex

9	bleached column feed ,reduce ph to 6.6+ 0.5% powdered solmetex	6.701
10	same feed with 0.4%ba, ph to 6.7 then add 2% hydrated solmetex, adjust ph @ 1+hr	-0.008
11	same at 5% solmetex	0.096
12	same at 0.5% powdered solmetex	0.0289
13	same at 1% powdered solmetex	0.0435
14	ph adjusted only with 0.42%ba	0.543

5/11/99

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Entries by [signature] Date 5/11/99

APPENDIX C
IT TESTING REPORTS

INTERNATIONAL TECHNOLOGY CORPORATION

GEOTECHNICAL LABORATORY

CERTIFICATE OF ANALYSIS

Paul Lear
IT Corporation
304 Directors Drive
Knoxville TN 37923

November 3, 1998

This is the Certificate of Analysis for the following samples:

Project ID:	**Proof of Principle**
IT Project No.:	**775743**
Date Received by Lab:	October 26, 1998
Number of Samples:	Eighteen (18)
Sample Type:	Stabilized cylinders

I. Introduction/Case Narrative

Eighteen samples were received by the IT Geotechnical Laboratory on October 26, 1998. All samples were submitted for unconfined compressive strength testing in three groups at seven day cure times.

Please see Appendix A, Sample Number Cross Reference List; Appendix B, Analysis Results; Appendix C, Chain-of-Custody and Request-for-Analysis Records; and Appendix D, Nonconformance/Variance Reports.

Reviewed and Approved:

Ralph Cole
Laboratory Manager, Geotechnical Services

IT Environmental Technology Development Center
P.O. Box 4339 • 1570 Bear Creek Road • Oak Ridge, TN 37830 • 615-482-6497 • FAX: 615-482-1890

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LABORATORY
OAK RIDGE, TN
(423) 482-6497

II. Analytical Results/Methodology

REFERENCES: United States Army Corps of Engineers (USACE), Engineer Manual 1110-2-1906, *Laboratory Soils Testing*, appendix II, 1970; United States Environmental Protection Agency, SW846, *Test Methods for Examining Solid Waste, Physical/Chemical Methods*, 3rd ed., Nov 1986 (EPA SW-846). Annual Book of ASTM Standards, Section 4, Construction, Volume 04.08, *Soil and Rock (I)*, and Volume 04.09, *Soil and Rock (II)*, 1998.

Laboratory Determination of Water (Moisture) Content of Soil and Rock . . . . . **ASTM D 2216**
Unconfined Compressive Strength of Cohesive Soil . . . . . **ASTM D 2166**

III. Quality Control

Quality control checks such as duplicates and spikes (QC samples), are not normally applicable to geotechnical testing. This is due largely to the inability of obtaining samples with known characteristics, the heterogenous nature of the samples, and quality control procedures built-in to the analytical method.

QC measures to ensure accuracy and precision of test results include the following:

- 100% verification of all numerical results - raw data entries, transcriptions and calculations entered by lab technicians are checked, recalculated and verified. Most data calculations are performed by computer programs.

- Data validation through test reasonableness - summaries of all test results for individual reports are reviewed to determine the overall reasonableness of data and to determine the presence of any data that may be considered outliers.

- Quality control procedures are built into most standardized geotechnical procedures. For example, liquid limit and plastic limit analyses call for re-analyses and specify acceptance criteria.

- Routine instrument calibration - instruments, gauges and equipment used in testing are calibrated on a routine basis. All instrument calibration follows ASTM or manufacturer guidelines.

- Maintenance of all past calibration records - records and certification documents of all instruments, gauges and equipment are updated routinely and maintained in the Quality Control Coordinators Quality/Operations files.

- Certified and trained personnel - all technicians are certified by the National Institute for Certification of Engineering Technicians (NICET) in geotechnical soil testing, and are trained

in the application of standard laboratory procedures for geotechnical analyses as well as the quality assurance measures implemented by IT.

IV. Data Qualification

One unusual condition was noted during testing and this condition is documented in a nonconformance report included in Appendix D of this report. Sample numbers ETDC-7694, ETDC-7700, ETDC-7706, and ETDC-7707 (1174-039-01, 1174-045-01, 1174-051-01, and 1174-052-01, respectively) did not fail with in the load limits of the load cell used for the test. ETDC-7694 was reloaded twice using higher capacity load cells until failure of the sample was achieved. The other samples were not reloaded. It is our understanding that a minimum unconfined compressive strength was needed, and that the ultimate strength of the samples were not necessarily needed.

Appendix A

Sample Number Cross-Reference

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IT Corporation
November 3, 1998
IT Project ID: Proof of Principle
IT Project No.: 775743

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LABORATORY
OAK RIDGE, TN
(423) 482-6497

SAMPLE NUMBER CROSS-REFERENCE LIST

LAB SAMPLE NO.	CLIENT SAMPLE NO.	SAMPLE MATRIX
ETDC-7690	1174-035-01	Stabilized surrogate
ETDC-7691	1174-036-01	Stabilized surrogate
ETDC-7692	1174-037-01	Stabilized surrogate
ETDC-7693	1174-038-01	Stabilized surrogate
ETDC-7694	1174-039-01	Stabilized surrogate
ETDC-7695	1174-040-01	Stabilized surrogate
ETDC-7696	1174-041-01	Stabilized surrogate
ETDC-7697	1174-042-01	Stabilized surrogate
ETDC-7698	1174-043-01	Stabilized surrogate
ETDC-7699	1174-044-01	Stabilized surrogate
ETDC-7700	1174-045-01	Stabilized surrogate
ETDC-7701	1174-046-01	Stabilized surrogate
ETDC-7702	1174-047-01	Stabilized surrogate
ETDC-7703	1174-048-01	Stabilized surrogate
ETDC-7704	1174-049-01	Stabilized surrogate
ETDC-7705	1174-050-01	Stabilized surrogate
ETDC-7706	1174-051-01	Stabilized surrogate
ETDC-7707	1174-052-01	Stabilized surrogate

Appendix B

Analysis Results

Paul Lear
IT Corporation
November 3, 1998
IT Project ID: Proof of Principle
IT Project No.: 775743

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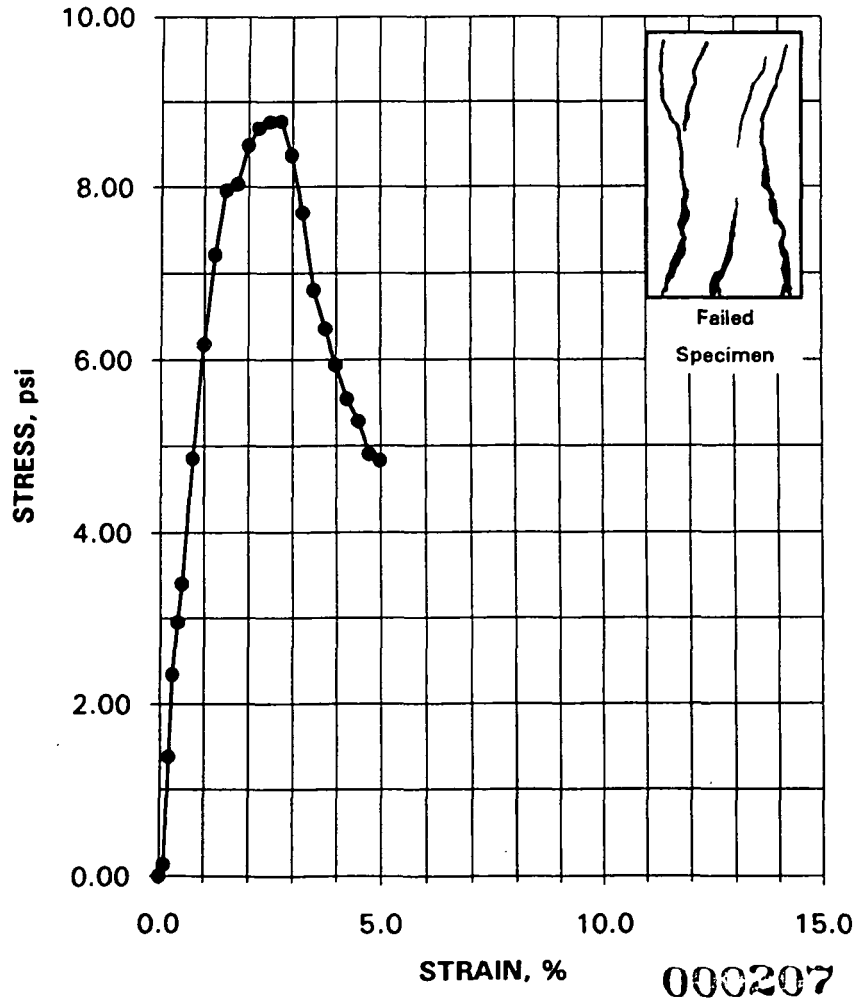
UNCONFINED COMPRESSIVE STRENGTH - ASTM D 2166
14-DAY CURE

Project Name	Proof of Principle	Client Sample No.	1174-035-01
Project No.	775743	IT Lab Specimen No.	ETDC-7690

Specimen Mold Date	10/12/98	Specimen Height, in.	3.9805
Specimen Test Date	10/26/98	Specimen Diameter, in.	1.9893
		Specimen Weight, g.	301.41
STRESS AT FAILURE, psi	**8.8**	Moisture Content, %	99.5
STRAIN AT FAILURE, %	**2.75**	Wet Unit Weight, pcf.	92.8
		Dry Unit Weight, pcf.	46.5
		Rate of Strain, in./min.	0.0240

AXIAL STRAIN, %	DEVIATOR STRESS, psi
0.00	0.00
0.10	0.13
0.20	1.38
0.30	2.34
0.40	2.95
0.50	3.39
0.75	4.85
1.00	6.18
1.25	7.21
1.50	7.95
1.75	8.03
2.00	8.48
2.25	8.68
2.50	8.75
2.75	8.76
3.00	8.36
3.25	7.69
3.50	6.80
3.75	6.35
4.00	5.93
4.25	5.55
4.50	5.28
4.75	4.90
5.00	4.83



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IT Corporation
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IT Project No.: 775743

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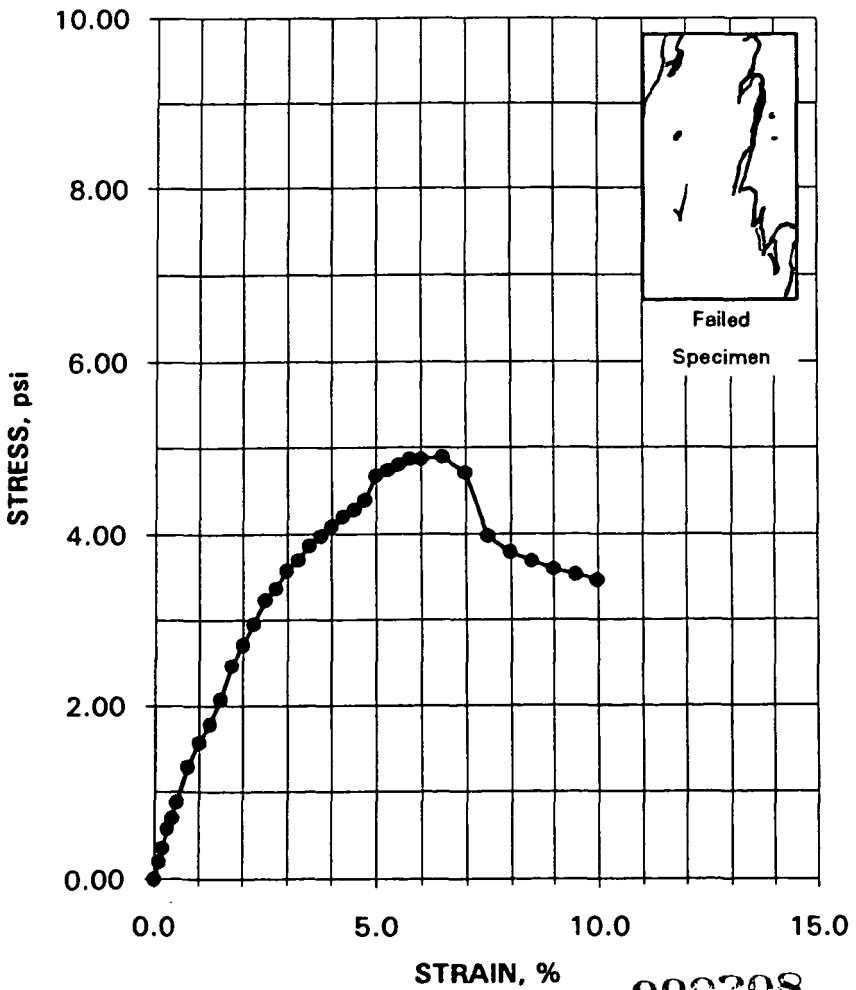
UNCONFINED COMPRESSIVE STRENGTH - ASTM D 2166
14-DAY CURE

Project Name	Proof of Principle	Client Sample No.	1174-036-01
Project No.	775743	IT Lab Specimen No.	ETDC-7691

Specimen Mold Date	10/12/98	Specimen Height, in.	3.9613
Specimen Test Date	10/26/98	Specimen Diameter, in.	2.0020
		Specimen Weight, g.	302.30
STRESS AT FAILURE, psi	**4.9**	Moisture Content, %	98.0
STRAIN AT FAILURE, %	**6.50**	Wet Unit Weight, pcf.	92.4
		Dry Unit Weight, pcf.	46.7
		Rate of Strain, in./min.	0.0240

AXIAL STRAIN, %	DEVIATOR STRESS, psi
0.00	0.00
0.10	0.19
0.20	0.35
0.30	0.57
0.40	0.70
0.50	0.89
0.75	1.29
1.00	1.57
1.25	1.79
1.50	2.07
2.00	2.71
2.50	3.22
3.00	3.57
3.50	3.86
4.00	4.09
4.50	4.28
5.00	4.67
5.50	4.80
6.00	4.86
6.50	4.89
7.00	4.70
7.50	3.97
8.00	3.78
8.50	3.69
9.00	3.59
9.50	3.53
10.00	3.46



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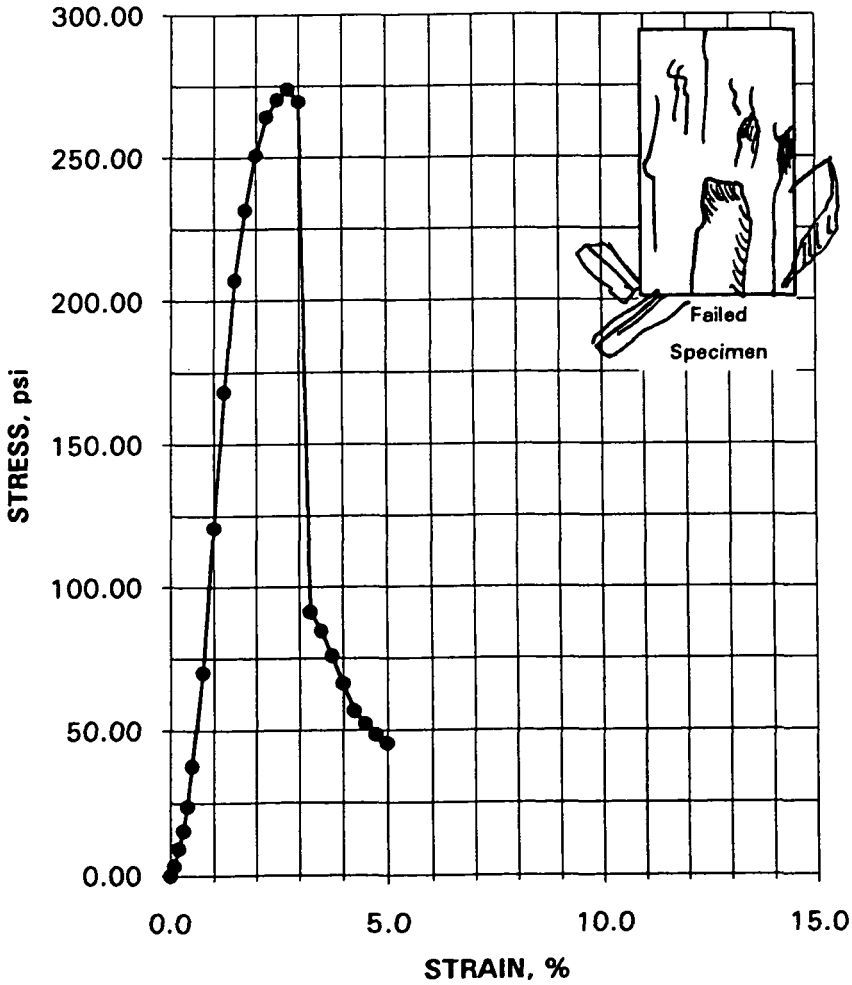
UNCONFINED COMPRESSIVE STRENGTH - ASTM D 2166
14-DAY CURE

Project Name	Proof of Principle	Client Sample No.	1174-037-01
Project No.	775743	IT Lab Specimen No.	ETDC-7692

Specimen Mold Date	10/12/98	Specimen Height, in.	3.9792
Specimen Test Date	10/26/98	Specimen Diameter, in.	1.9987
		Specimen Weight, g.	314.90
STRESS AT FAILURE, psi	**273.8**	Moisture Content, %	79.6
STRAIN AT FAILURE, %	**2.75**	Wet Unit Weight, pcf.	96.1
		Dry Unit Weight, pcf.	53.5
		Rate of Strain, in./min.	0.0240

AXIAL STRAIN, %	DEVIATOR STRESS, psi
0.00	0.00
0.10	3.18
0.20	9.10
0.30	15.35
0.40	23.62
0.50	37.58
0.75	70.13
1.00	120.89
1.25	168.30
1.50	207.02
1.75	231.49
2.00	250.51
2.25	263.90
2.50	269.81
2.75	273.77
3.00	269.41
3.25	91.00
3.50	84.58
3.75	75.90
4.00	66.00
4.25	56.77
4.50	52.17
4.75	48.36
5.00	45.58



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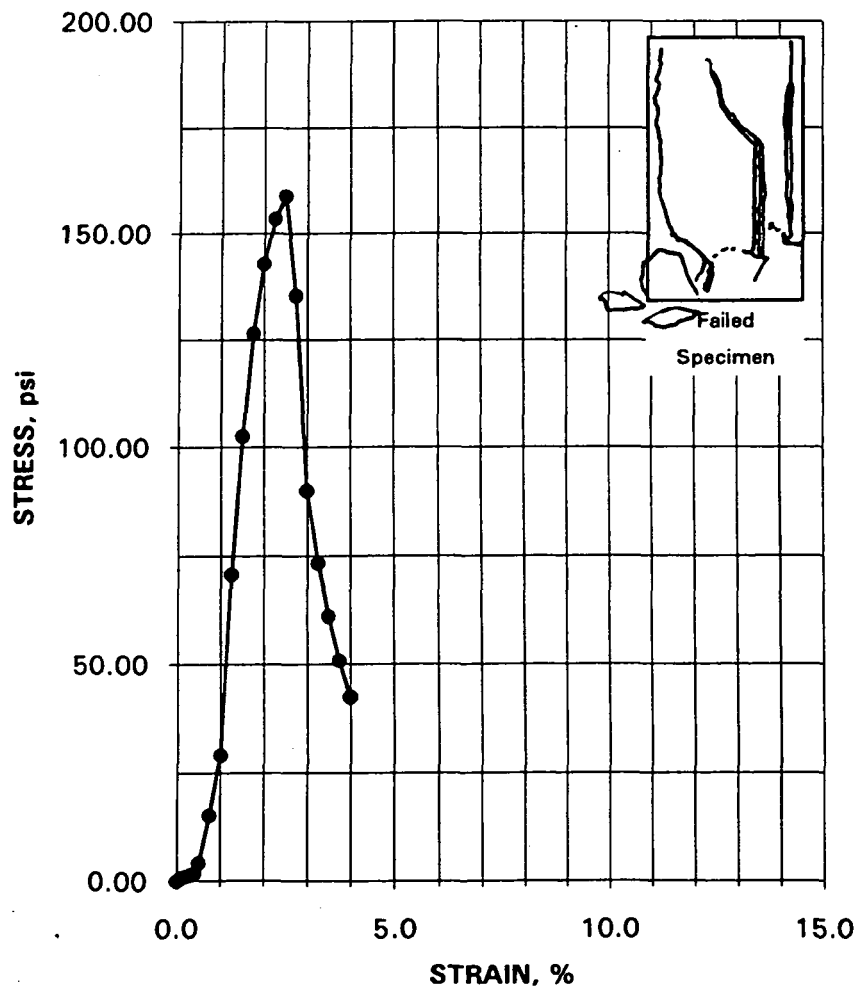
UNCONFINED COMPRESSIVE STRENGTH - ASTM D 2166
14-DAY CURE

Project Name	Proof of Principle	Client Sample No.	1174-038-01
Project No.	775743	IT Lab Specimen No.	ETDC-7693

Specimen Mold Date	10/12/98	Specimen Height, in.	4.0100
Specimen Test Date	10/26/98	Specimen Diameter, in.	1.9923
		Specimen Weight, g.	315.82
STRESS AT FAILURE, psi	**158.7**	Moisture Content, %	81.2
STRAIN AT FAILURE, %	**2.50**	Wet Unit Weight, pcf.	96.3
		Dry Unit Weight, pcf.	53.1
		Rate of Strain, in./min.	0.0240

AXIAL STRAIN, %	DEVIATOR STRESS, psi
0.00	0.00
0.10	0.45
0.20	0.83
0.30	1.31
0.40	1.60
0.50	4.05
0.75	15.06
1.00	28.93
1.25	70.64
1.50	102.40
1.75	126.47
2.00	142.59
2.25	153.42
2.50	158.75
2.75	135.23
3.00	89.92
3.25	73.27
3.50	61.01
3.75	50.76
4.00	42.43



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November 3, 1998
IT Project ID: Proof of Principle
IT Project No.: 775743

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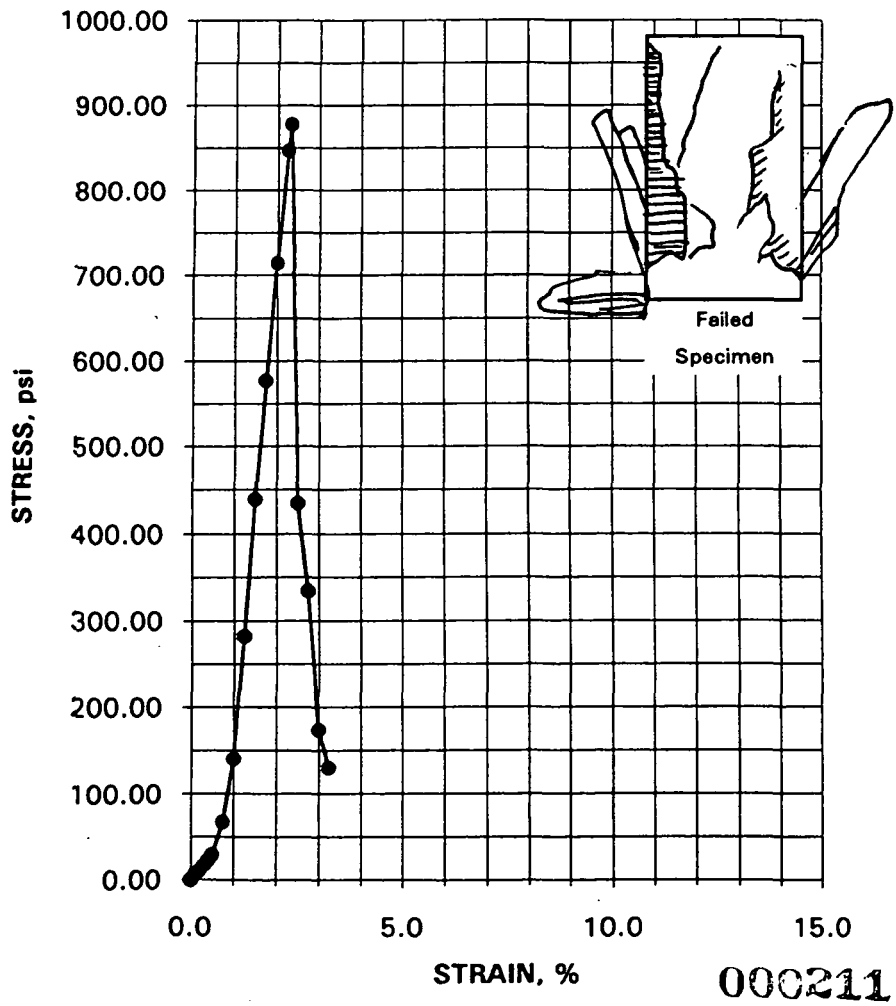
UNCONFINED COMPRESSIVE STRENGTH - ASTM D 2166
14-DAY CURE

Project Name	Proof of Principle	Client Sample No.	1174-039-01
Project No.	775743	IT Lab Specimen No.	ETDC-7694

Specimen Mold Date	10/12/98	Specimen Height, in.	3.9880
Specimen Test Date	10/26/98	Specimen Diameter, in.	1.9927
		Specimen Weight, g.	335.10
STRESS AT FAILURE, psi	**876.9**	Moisture Content, %	56.4
STRAIN AT FAILURE, %	**2.33**	Wet Unit Weight, pcf.	102.7
		Dry Unit Weight, pcf.	65.6
		Rate of Strain, in./min.	0.0240

AXIAL STRAIN, %	DEVIATOR STRESS, psi
0.00	0.00
0.10	6.41
0.20	9.60
0.30	15.98
0.40	22.36
0.50	28.72
0.75	66.83
1.00	139.68
1.25	281.81
1.50	439.03
1.75	576.53
2.00	713.33
2.25	846.30
2.33	876.90
2.50	434.57
2.75	333.67
3.00	174.18
3.25	130.30



Paul Lear
IT Corporation
November 3, 1998
IT Project ID: Proof of Principle
IT Project No.: 775743

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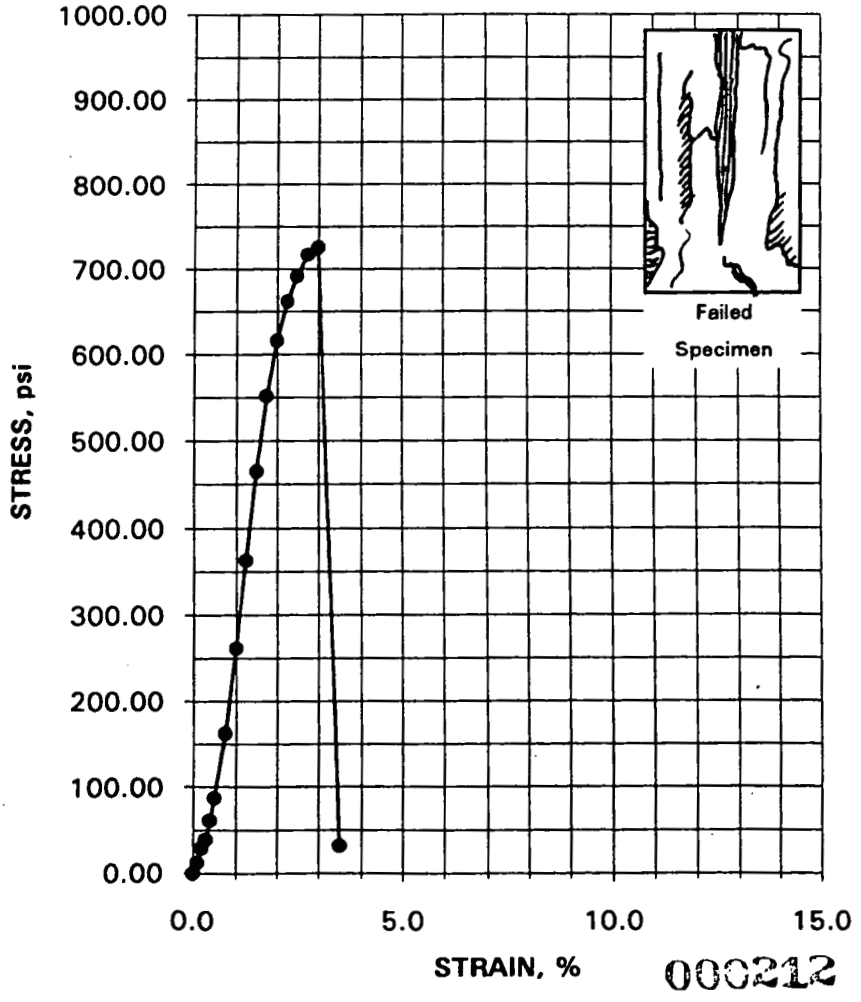
UNCONFINED COMPRESSIVE STRENGTH - ASTM D 2166
14-DAY CURE

Project Name	Proof of Principle	Client Sample No.	1174-040-01
Project No.	775743	IT Lab Specimen No.	ETDC-7695

Specimen Mold Date	10/12/98	Specimen Height, in.	4.0083
Specimen Test Date	10/26/98	Specimen Diameter, in.	1.9952
		Specimen Weight, g.	332.58
STRESS AT FAILURE, psi	**725.4**	Moisture Content, %	57.7
STRAIN AT FAILURE, %	**3.00**	Wet Unit Weight, pcf.	101.1
		Dry Unit Weight, pcf.	64.1
		Rate of Strain, in./min.	0.0240

AXIAL STRAIN, %	DEVIATOR STRESS, psi
0.00	0.00
0.10	11.82
0.20	28.41
0.30	38.27
0.40	61.17
0.50	86.57
0.75	162.22
1.00	261.56
1.25	362.60
1.50	465.03
1.75	551.21
2.00	615.31
2.25	661.89
2.50	691.08
2.75	716.37
3.00	725.37
3.50	31.48



Paul Lear
IT Corporation
November 3, 1998
IT Project ID: Proof of Principle
IT Project No.: 775743

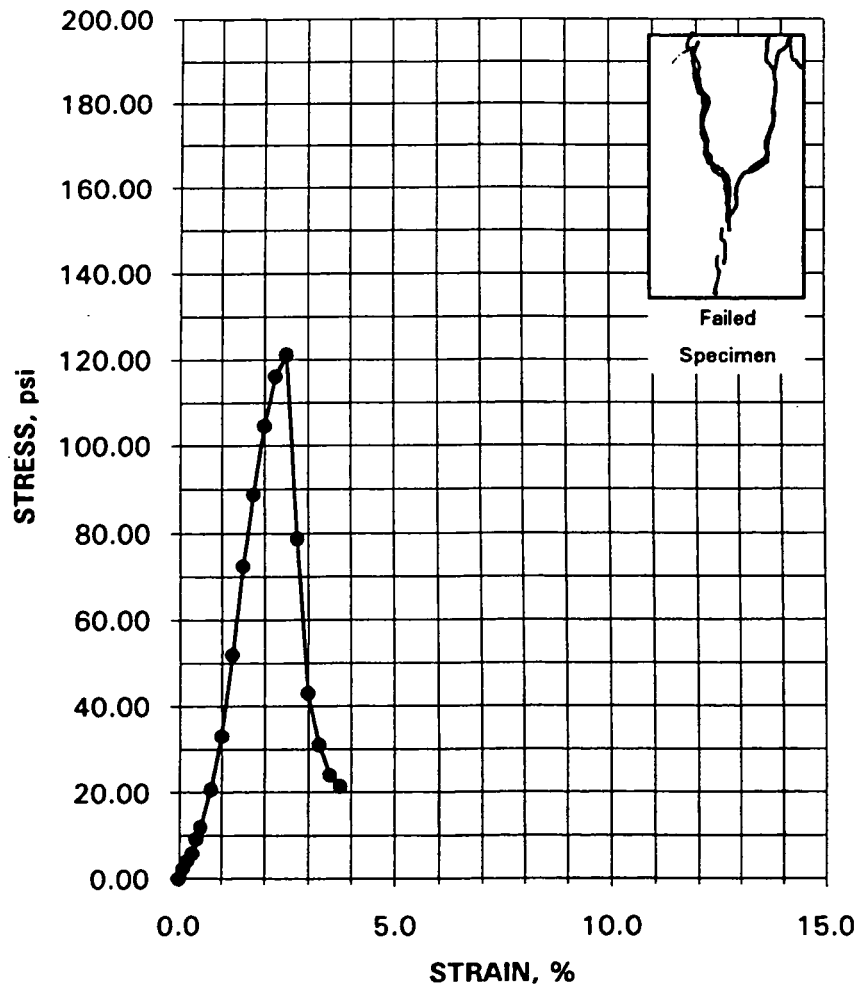
IT GEOTECHNICAL
LABORATORY
OAK RIDGE, TN
(423) 482-6497

UNCONFINED COMPRESSIVE STRENGTH - ASTM D 2166
14-DAY CURE

Project Name	Proof of Principle	Client Sample No.	1174-041-01
Project No.	775743	IT Lab Specimen No.	ETDC-7696

Specimen Mold Date	10/13/98	Specimen Height, in.	4.0125
Specimen Test Date	10/27/98	Specimen Diameter, in.	2.0052
		Specimen Weight, g.	293.80
STRESS AT FAILURE, psi	**121.0**	Moisture Content, %	53.6
STRAIN AT FAILURE, %	**2.50**	Wet Unit Weight, pcf.	88.3
		Dry Unit Weight, pcf.	57.5
		Rate of Strain, in./min.	0.0240

AXIAL STRAIN, %	DEVIATOR STRESS, psi
0.00	0.00
0.10	2.21
0.20	3.98
0.30	5.62
0.40	9.08
0.50	11.88
0.75	20.62
1.00	33.01
1.25	51.97
1.50	72.37
1.75	88.70
2.00	104.58
2.25	116.05
2.50	121.03
2.75	78.65
3.00	42.88
3.25	31.07
3.50	23.93
3.75	21.43



Paul Lear
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IT Project No.: 775743

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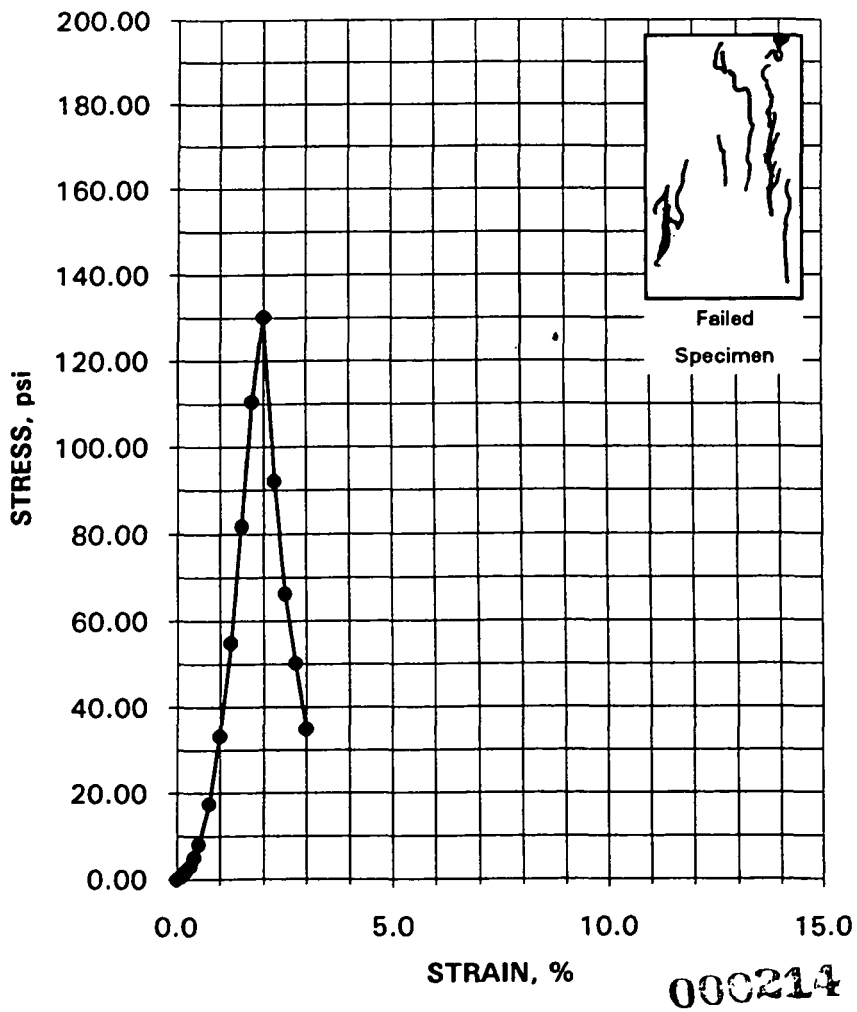
UNCONFINED COMPRESSIVE STRENGTH - ASTM D 2166
14-DAY CURE

Project Name	Proof of Principle	Client Sample No.	1174-042-01
Project No.	775743	IT Lab Specimen No.	ETDC-7697

Specimen Mold Date	10/13/98	Specimen Height, in.	4.0337
Specimen Test Date	10/27/98	Specimen Diameter, in.	1.9980
		Specimen Weight, g.	310.97
STRESS AT FAILURE, psi	**130.0**	Moisture Content, %	51.1
STRAIN AT FAILURE, %	**2.00**	Wet Unit Weight, pcf.	93.7
		Dry Unit Weight, pcf.	62.0
		Rate of Strain, in./min.	0.0240

AXIAL STRAIN, %	DEVIATOR STRESS, psi
0.00	0.00
0.10	0.51
0.20	1.53
0.30	2.86
0.40	4.89
0.50	7.81
0.75	17.41
1.00	33.38
1.25	54.77
1.50	81.71
1.75	110.46
2.00	130.00
2.25	92.19
2.50	66.24
2.75	50.16
3.00	34.96



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IT Project No.: 775743

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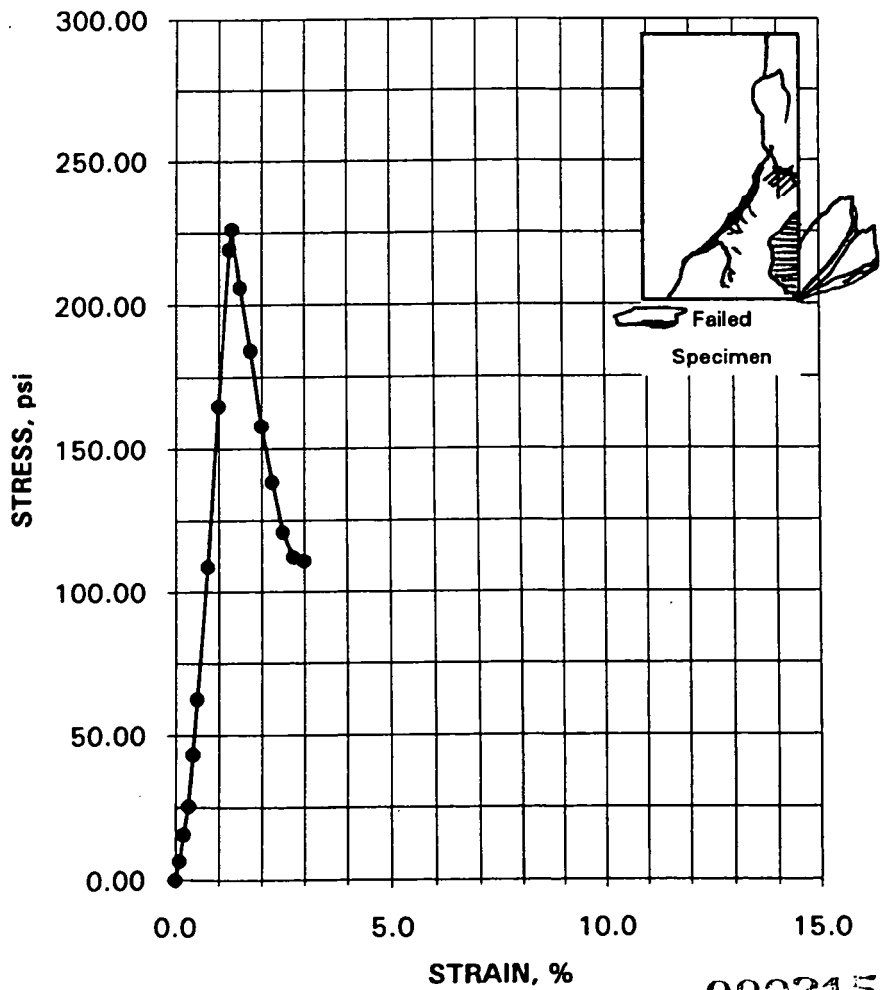
UNCONFINED COMPRESSIVE STRENGTH - ASTM D 2166
14-DAY CURE

Project Name	Proof of Principle	Client Sample No.	1174-043-01
Project No.	775743	IT Lab Specimen No.	ETDC-7698

Specimen Mold Date	10/13/98	Specimen Height, in.	4.0385
Specimen Test Date	10/27/98	Specimen Diameter, in.	1.9995
		Specimen Weight, g.	313.47
STRESS AT FAILURE, psi	**226.0**	Moisture Content, %	43.1
STRAIN AT FAILURE, %	**1.30**	Wet Unit Weight, pcf.	94.2
		Dry Unit Weight, pcf.	65.8
		Rate of Strain, in./min.	0.0240

AXIAL STRAIN, %	DEVIATOR STRESS, psi
0.00	0.00
0.10	6.36
0.20	15.64
0.30	25.40
0.40	43.26
0.50	62.46
0.75	108.79
1.00	165.05
1.25	218.98
1.30	226.00
1.50	205.87
1.75	184.29
2.00	157.98
2.25	138.53
2.50	120.85
2.75	112.21
3.00	110.84



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IT Project No.: 775743

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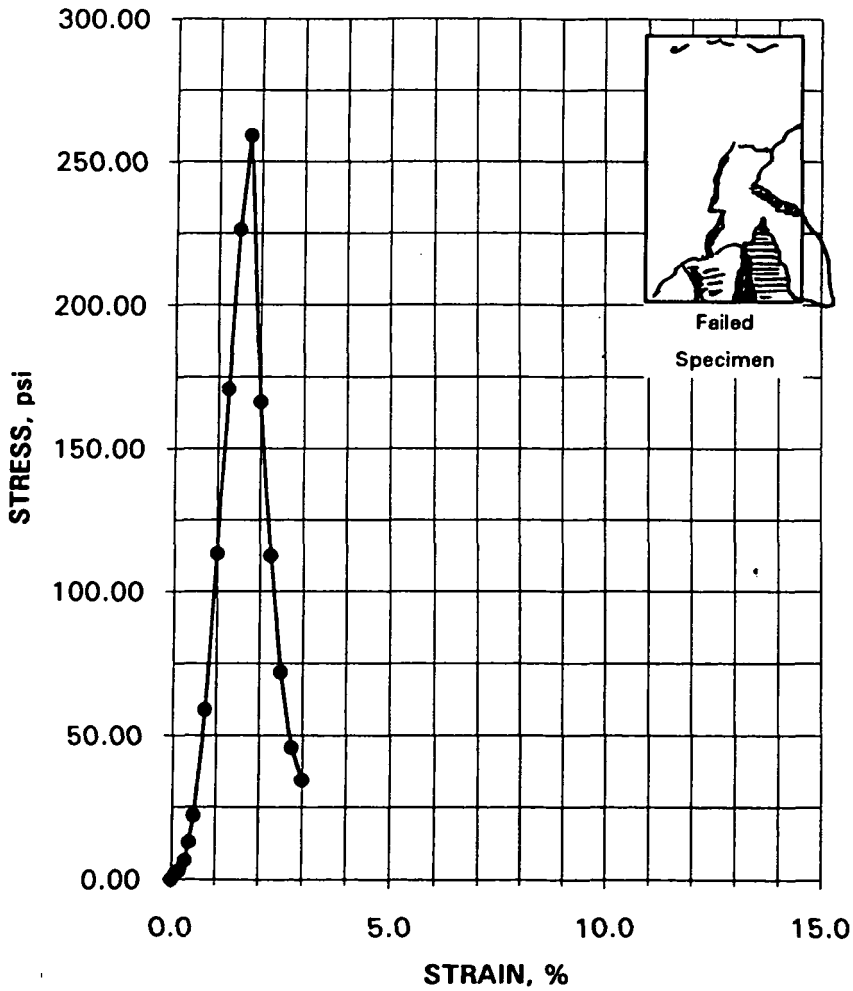
UNCONFINED COMPRESSIVE STRENGTH - ASTM D 2166
14-DAY CURE

Project Name	Proof of Principle	Client Sample No.	1174-044-01
Project No.	775743	IT Lab Specimen No.	ETDC-7699

Specimen Mold Date	10/13/98	Specimen Height, in.	4.0252
Specimen Test Date	10/27/98	Specimen Diameter, in.	2.0072
		Specimen Weight, g.	305.58
STRESS AT FAILURE, psi	**259.0**	Moisture Content, %	41.5
STRAIN AT FAILURE, %	**1.75**	Wet Unit Weight, pcf.	91.4
		Dry Unit Weight, pcf.	64.6
		Rate of Strain, in./min.	0.0240

AXIAL STRAIN, %	DEVIATOR STRESS, psi
0.00	0.00
0.10	1.89
0.20	3.15
0.30	6.30
0.40	12.59
0.50	22.01
0.75	58.97
1.00	113.26
1.25	170.71
1.50	226.00
1.75	258.97
2.00	166.32
2.25	112.45
2.50	71.80
2.75	45.80
3.00	34.33



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November 3, 1998
IT Project ID: Proof of Principle
IT Project No.: 775743

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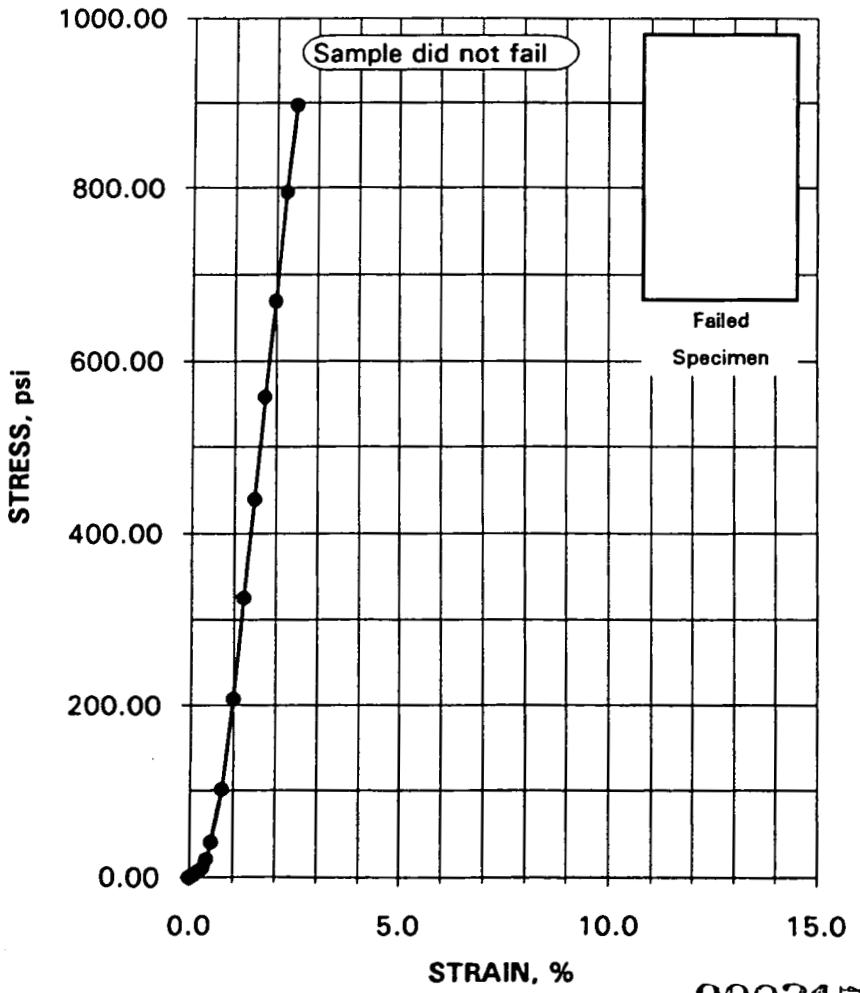
UNCONFINED COMPRESSIVE STRENGTH - ASTM D 2166
14-DAY CURE

Project Name	Proof of Principle	Client Sample No.	1174-045-01
Project No.	775743	IT Lab Specimen No.	ETDC-7700

Specimen Mold Date	10/13/98	Specimen Height, in.	4.0452
Specimen Test Date	10/27/98	Specimen Diameter, in.	2.0005
		Specimen Weight, g.	350.76
STRESS AT FAILURE, psi >	**897.4**	Moisture Content, %	35.7
STRAIN AT FAILURE, % >	**2.50**	Wet Unit Weight, pcf.	105.1
		Dry Unit Weight, pcf.	77.5
		Rate of Strain, in./min.	0.0240

AXIAL STRAIN, %	DEVIATOR STRESS, psi
0.00	0.00
0.10	2.54
0.20	6.67
0.30	10.47
0.40	20.28
0.50	39.57
0.75	101.36
1.00	207.56
1.25	324.22
1.50	438.73
1.75	557.96
2.00	668.47
2.25	794.59
2.50	897.41



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IT Project ID: Proof of Principle
IT Project No.: 775743

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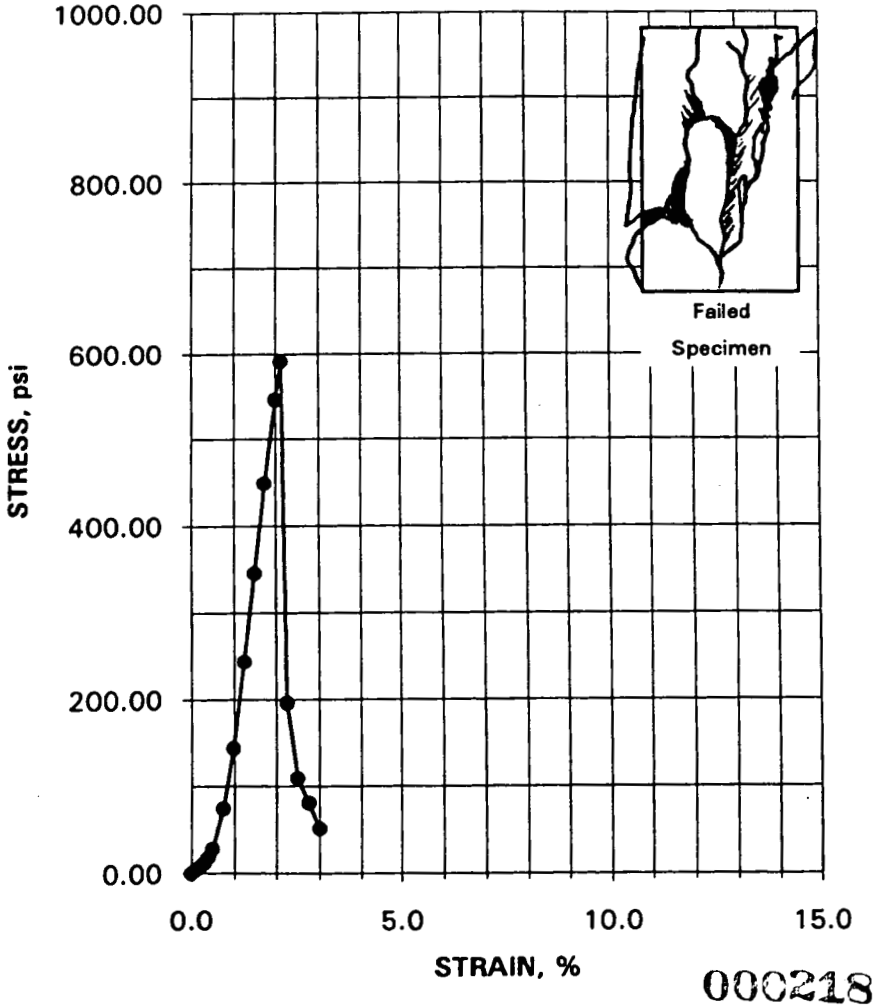
UNCONFINED COMPRESSIVE STRENGTH - ASTM D 2166
14-DAY CURE

Project Name	Proof of Principle	Client Sample No.	1174-046-01
Project No.	775743	IT Lab Specimen No.	ETDC-7701

Specimen Mold Date	10/13/98	Specimen Height, in.	4.0537
Specimen Test Date	10/27/98	Specimen Diameter, in.	2.0045
		Specimen Weight, g.	346.52
STRESS AT FAILURE, psi	**591.3**	Moisture Content, %	36.5
STRAIN AT FAILURE, %	**2.15**	Wet Unit Weight, pcf.	103.2
		Dry Unit Weight, pcf.	75.6
		Rate of Strain, in./min.	0.0240

AXIAL STRAIN, %	DEVIATOR STRESS, psi
0.00	0.00
0.10	2.53
0.20	6.01
0.30	11.06
0.40	17.04
0.50	27.43
0.75	74.22
1.00	143.68
1.25	243.45
1.50	344.59
1.75	448.02
2.00	545.93
2.15	591.33
2.25	196.38
2.50	109.37
2.75	80.74
3.00	50.72



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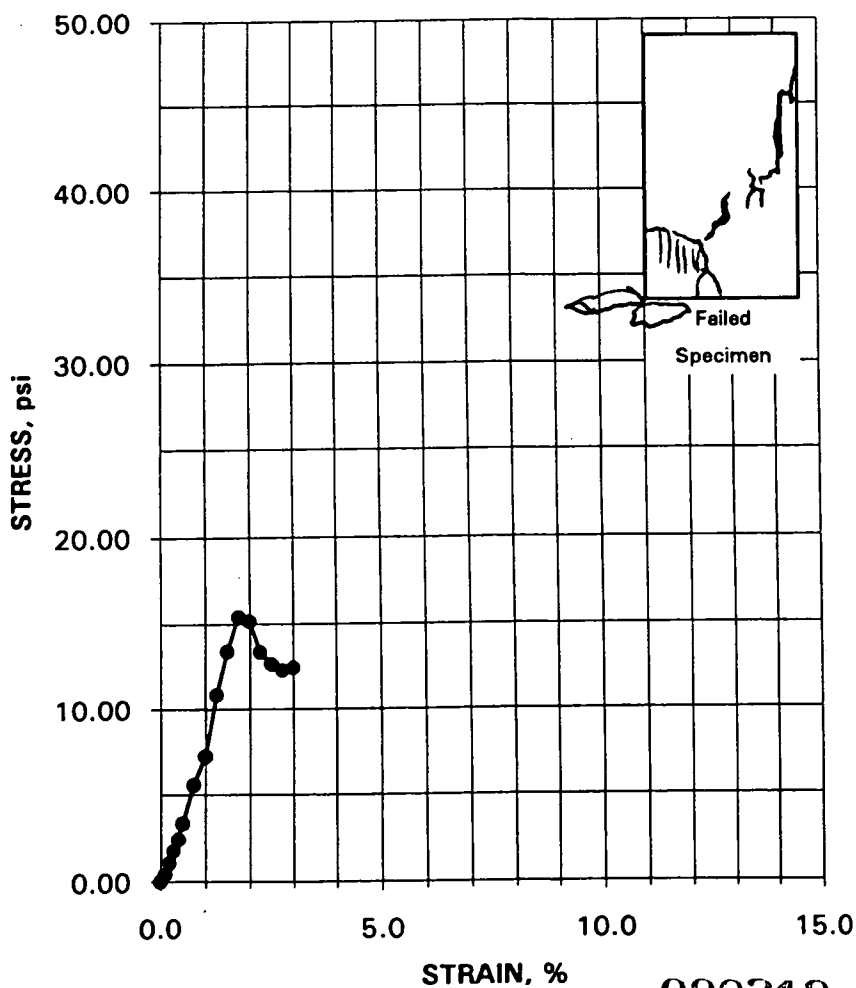
UNCONFINED COMPRESSIVE STRENGTH - ASTM D 2166
14-DAY CURE

Project Name	Proof of Principle	Client Sample No.	1174-047-01
Project No.	775743	IT Lab Specimen No.	ETDC-7702

Specimen Mold Date	10/14/98	Specimen Height, in.	3.8567
Specimen Test Date	10/28/98	Specimen Diameter, in.	1.9947
		Specimen Weight, g.	299.98
STRESS AT FAILURE, psi	**15.4**	Moisture Content, %	67.2
STRAIN AT FAILURE, %	**1.75**	Wet Unit Weight, pcf.	94.8
		Dry Unit Weight, pcf.	56.7
		Rate of Strain, in./min.	0.0240

AXIAL STRAIN, %	DEVIATOR STRESS, psi
0.00	0.00
0.10	0.42
0.20	1.05
0.30	1.75
0.40	2.42
0.50	3.34
0.75	5.56
1.00	7.25
1.25	10.81
1.50	13.40
1.75	15.41
2.00	15.15
2.25	13.36
2.50	12.64
2.75	12.29
3.00	12.42



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IT Project ID: Proof of Principle
IT Project No.: 775743

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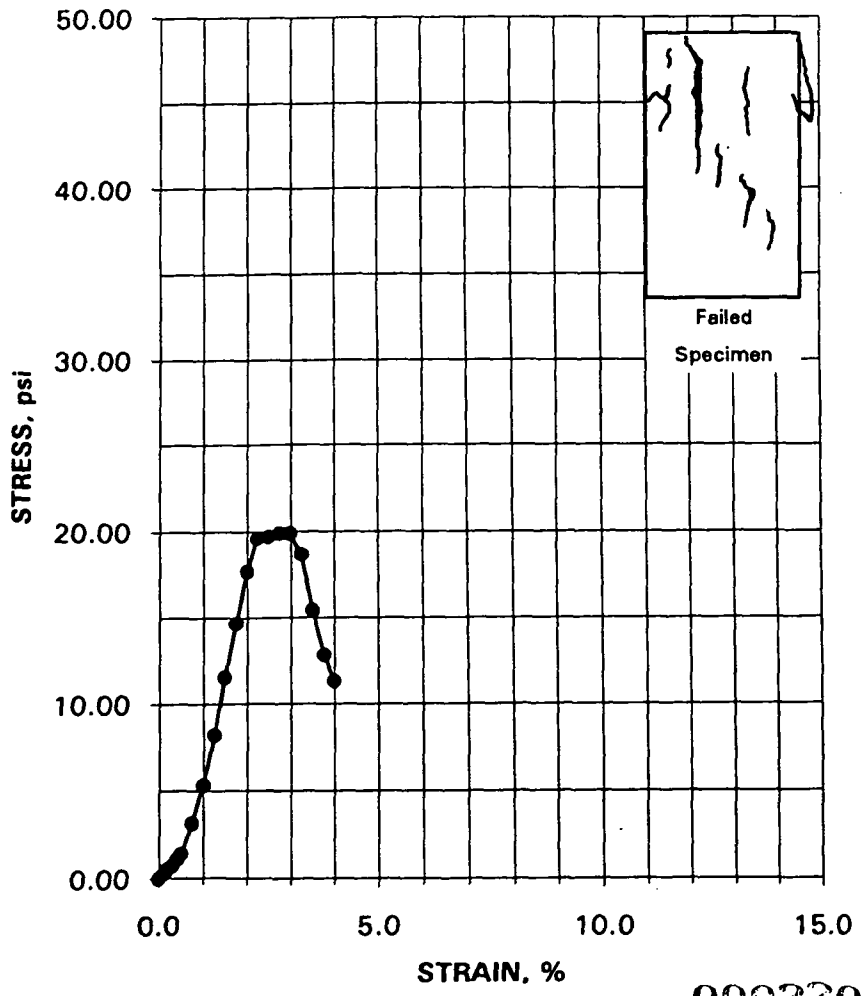
UNCONFINED COMPRESSIVE STRENGTH - ASTM D 2166
14-DAY CURE

Project Name	Proof of Principle	Client Sample No.	1174-048-01
Project No.	775743	IT Lab Specimen No.	ETDC-7703

Specimen Mold Date	10/14/98	Specimen Height, in.	4.0105
Specimen Test Date	10/28/98	Specimen Diameter, in.	1.9962
		Specimen Weight, g.	323.99
STRESS AT FAILURE, psi	**19.9**	Moisture Content, %	61.8
STRAIN AT FAILURE, %	**3.00**	Wet Unit Weight, pcf.	98.4
		Dry Unit Weight, pcf.	60.8
		Rate of Strain, in./min.	0.0240

AXIAL STRAIN, %	DEVIATOR STRESS, psi
0.00	0.00
0.10	0.22
0.20	0.48
0.30	0.70
0.40	1.05
0.50	1.37
0.75	3.08
1.00	5.31
1.25	8.20
1.50	11.52
1.75	14.63
2.00	17.66
2.25	19.58
2.50	19.69
2.75	19.86
3.00	19.87
3.25	18.64
3.50	15.39
3.75	12.82
4.00	11.32



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November 3, 1998
IT Project ID: *Proof of Principle*
IT Project No.: 775743

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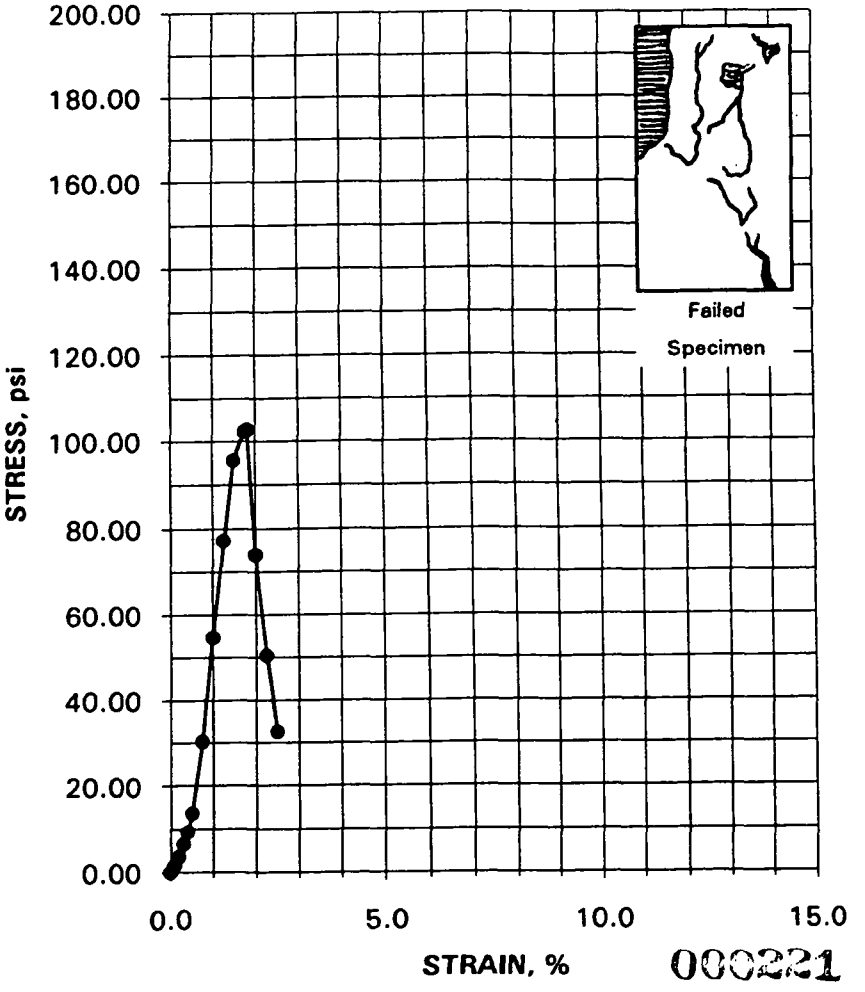
UNCONFINED COMPRESSIVE STRENGTH - ASTM D 2166
14-DAY CURE

Project Name	Proof of Principle	Client Sample No.	1174-049-01
Project No.	775743	IT Lab Specimen No.	ETDC-7704

Specimen Mold Date	10/14/98	Specimen Height, in.	4.0088
Specimen Test Date	10/28/98	Specimen Diameter, in.	2.0005
		Specimen Weight, g.	339.12
STRESS AT FAILURE, psi	**102.7**	Moisture Content, %	51.9
STRAIN AT FAILURE, %	**1.82**	Wet Unit Weight, pcf.	102.5
		Dry Unit Weight, pcf.	67.5
		Rate of Strain, in./min.	0.0240

AXIAL STRAIN, %	DEVIATOR STRESS, psi
0.00	0.00
0.10	1.43
0.20	3.46
0.30	6.34
0.40	9.19
0.50	13.55
0.75	30.28
1.00	54.65
1.25	77.13
1.50	95.52
1.75	102.28
1.82	102.67
2.00	73.80
2.25	50.29
2.50	32.57



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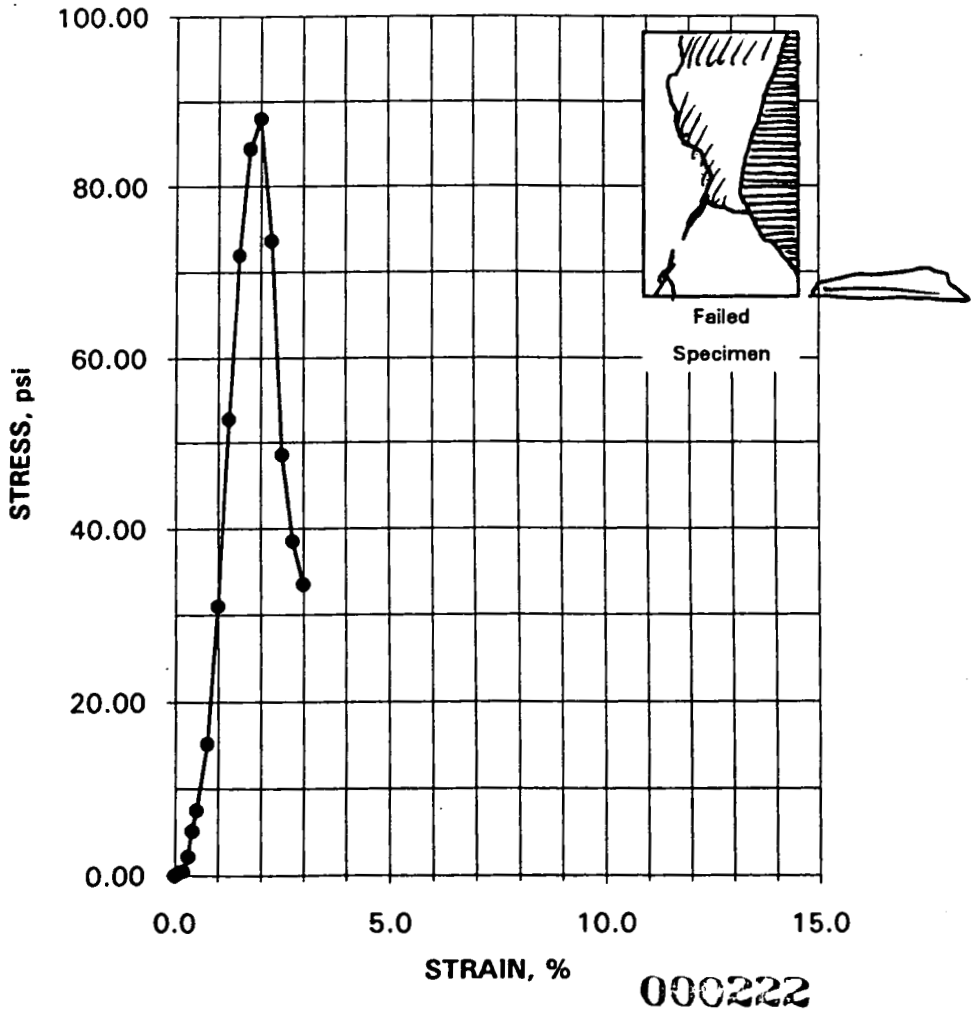
UNCONFINED COMPRESSIVE STRENGTH - ASTM D 2166
14-DAY CURE

Project Name	Proof of Principle	Client Sample No.	1174-050-01
Project No.	775743	IT Lab Specimen No.	ETDC-7705

Specimen Mold Date	10/14/98	Specimen Height, in.	3.9717
Specimen Test Date	10/28/98	Specimen Diameter, in.	1.9940
		Specimen Weight, g.	337.19
STRESS AT FAILURE, psi	**87.9**	Moisture Content, %	53.7
STRAIN AT FAILURE, %	**2.00**	Wet Unit Weight, pcf.	103.6
		Dry Unit Weight, pcf.	67.4
		Rate of Strain, in./min.	0.0240

AXIAL STRAIN, %	DEVIATOR STRESS, psi
0.00	0.00
0.10	0.22
0.20	0.45
0.30	2.17
0.40	5.10
0.50	7.52
0.75	15.26
1.00	30.94
1.25	52.75
1.50	71.95
1.75	84.32
2.00	87.90
2.25	73.62
2.50	48.55
2.75	38.46
3.00	33.48



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IT Project ID: Proof of Principle
IT Project No.: 775743

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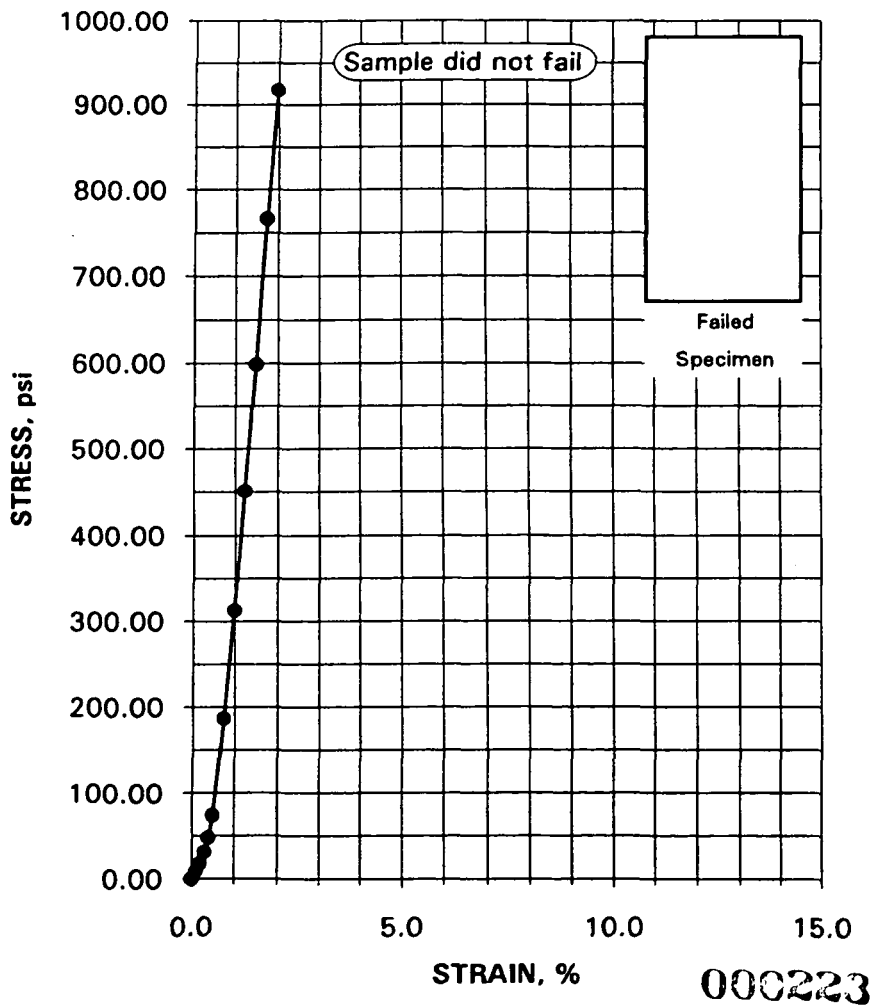
14-DAY CURE

Project Name	Proof of Principle	Client Sample No.	1174-051-01
Project No.	775743	IT Lab Specimen No.	ETDC-7706

Specimen Mold Date	10/14/98	Specimen Height, in.	3.9190
Specimen Test Date	10/28/98	Specimen Diameter, in.	1.9988
		Specimen Weight, g.	351.97
STRESS AT FAILURE, psi >	**917.2**	Moisture Content, %	38.0
STRAIN AT FAILURE, % >	**2.00**	Wet Unit Weight, pcf.	109.1
		Dry Unit Weight, pcf.	79.0
		Rate of Strain, in./min.	0.0240

AXIAL STRAIN, %	DEVIATOR STRESS, psi
0.00	0.00
0.10	8.28
0.20	16.86
0.30	30.50
0.40	47.29
0.50	73.56
0.75	186.93
1.00	312.65
1.25	450.96
1.50	597.98
1.75	765.54
2.00	917.24



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IT Project No.: 775743

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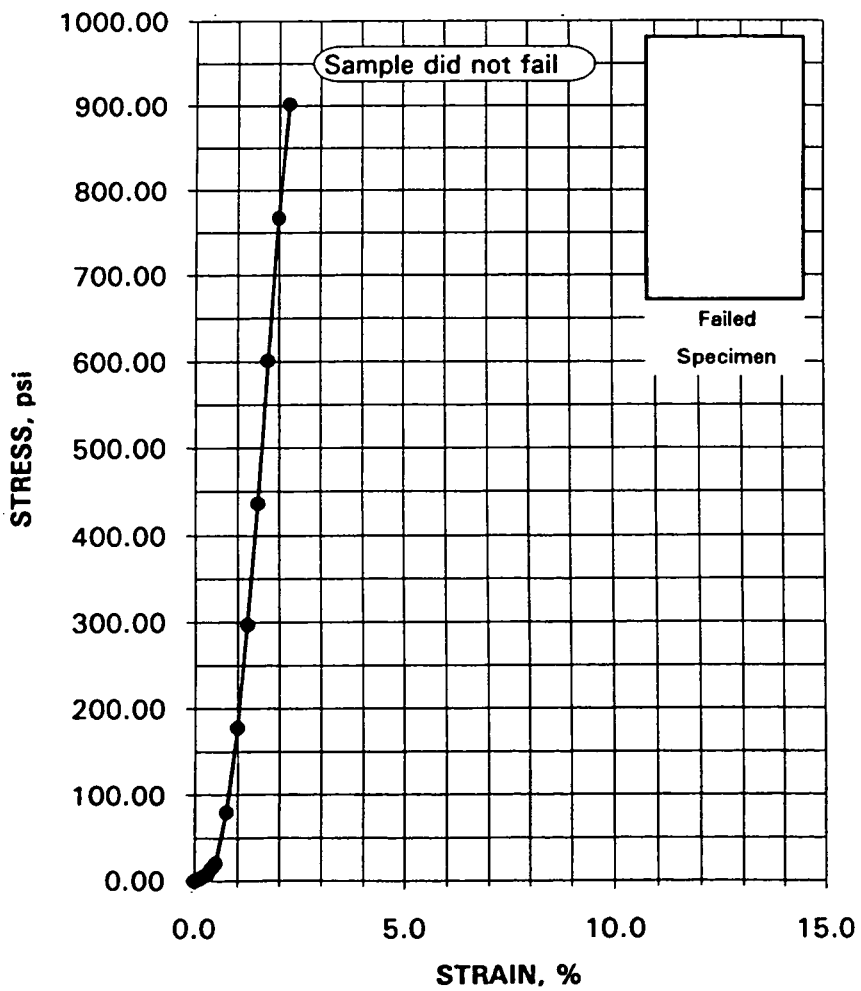
UNCONFINED COMPRESSIVE STRENGTH - ASTM D 2166
14-DAY CURE

Project Name	Proof of Principle	Client Sample No.	1174-052-01
Project No.	775743	IT Lab Specimen No.	ETDC-7707

Specimen Mold Date	10/14/98	Specimen Height, in.	3.9597
Specimen Test Date	10/28/98	Specimen Diameter, in.	2.0015
		Specimen Weight, g.	362.27
STRESS AT FAILURE, psi >	**901.9**	Moisture Content, %	37.1
STRAIN AT FAILURE, % >	**2.25**	Wet Unit Weight, pcf.	110.8
		Dry Unit Weight, pcf.	80.8
		Rate of Strain, in./min.	0.0240

AXIAL STRAIN, %	DEVIATOR STRESS, psi
0.00	0.00
0.10	1.27
0.20	4.12
0.30	6.97
0.40	13.61
0.50	20.24
0.75	79.49
1.00	177.15
1.25	297.23
1.50	436.10
1.75	600.50
2.00	766.85
2.25	901.91



Appendix C

Chain-of-Custody & Request-for-Analysis

2293

INTERNATIONAL TECHNOLOGY CORPORATION

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD*

Reference Document No. 426837
Page 1 of 2

Project Name/No. [1] FDF POP. 775743.
Sample Team Members [2] A Groen
Profit Center No. [3] 2370050
Project Manager [4] PAUL LEAR
Purchase Order No. [6] —
Required Report Date [11]

Samples Shipment Date [7] 10/26/98
Lab Destination [8] IT ETDC
Lab Contact [9] DON HUSKEY
Project Contact/Phone [12] ARIE GROEN
Carrier/Waybill No. [13]

Bill to: [5] IT CORP
Report to: [10] PAUL LEAR

000226

ONE CONTAINER PER LINE

Sample Number [14]	Sample Description/Type [15]	Date/Time Collected [16]	Container Type [17]	Sample Volume [18]	Preservative [19]	Requested Testing Program [20]	Condition on Receipt [21]	Disposal Record No. [22]
#1174-035-1	S1L01 MIX#1B	10/12/98	PLASTIC	2XX MCLD	—	14DAY UCS	ETDC 7690	
#1174-036-1	S1L01 MIX#2				—	10/26/98	ETDC 7691	
#1174-037-1	S1L01 MIX#3				—		ETDC 7692	
#1174-038-1	S1L01 MIX#4				—		ETDC 7693	
#1174-039-1	S1L01 MIX#5				—		ETDC 7694	
#1174-040-1	S1L01 MIX#6				—		ETDC 7695	
#1174-041-1	S1L02 MIX#7	10/12/98			—	14DAY UCS.	ETDC 7696	
#1174-042-1	S1L02 MIX#8				—	10/27/98	ETDC 7697	

Special Instructions: [23] BREAK #1-6 ON 10/26, 7-12 on 10/27, 13-18 on 10/28

Possible Hazard Identification: [24]
Non-hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐

Sample Disposal: [25]
Return to Client ☐ Disposal by Lab ☒ Archive _____ (mos.)

Turnaround Time Required: [26]
Normal ☐ Rush ☒

QC Level: [27]
I. ☒ II. ☐ III. ☐ Project Specific (specify):

1. Relinquished by [28] (Signature/Affiliation) Arie Groen ITTDL	Date: 10/26/98 Time: 1130	1. Received by [28] (Signature/Affiliation) Don Huskey IT/ETDC	Date: 10-26-98 Time: 1400
2. Relinquished by (Signature/Affiliation)	Date: Time:	2. Received by (Signature/Affiliation)	Date: Time:
3. Relinquished by (Signature/Affiliation)	Date: Time:	3. Received by (Signature/Affiliation)	Date: Time:

Comments: [29] NAD

White: To accompany samples
Yellow: Field copy
Pink: Upon receipt, IT Special instructions

MCA 3/15/91

2293

INTERNATIONAL TECHNOLOGY CORPORATION

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD (cont.)*

Reference Document No.[30] 426837

Page 2 of 2

Project Name FDF - POP

Project No. 775743

Samples Shipment Date 10/26/98

ONE CONTAINER PER LINE

Sample[14] Number	Sample[15] Description/Type	Date/Time[16] Collected	Container[17] Type	Sample[18] Volume	Pre-[19] servative	Requested Testing[20] Program	Condition on[21] Receipt	Disposal[22] Record No.
#1174-043-1	SILO 2 MIX 9	10/13/98	PLASTIC	7X4 HOLD	—	14DAY UCS	ETDC 7698	
#1174-044-1	SILO 2 MIX 10				—	10/27/98	ETDC 7699	AB ONLY
#1174-045-1	SILO 2 - MIX 11				—		ETDC 7700	
#1174-046-1	SILO 2 MIX 12				—		ETDC 7701	AB ONLY
#1174-047-1	DEMO - MIX 13	10/14/98			—	14DAY UCS	ETDC 7702	
#1174-048-1	DEMO - MIX 14				—	10/28/98	ETDC 7703	
#1174-049-1	DEMO - MIX 15				—		ETDC 7704	AB ONLY
#1174-050-1	DEMO MIX 16				—		ETDC 7705	
#1174-051-1	DEMO MIX 17				—		ETDC 7706	AB
#1174-052-1	DEMO MIX 18				—		ETDC 7707	

White: To accompany samples

Yellow: Field copy

*See back of form for special instructions.

00022

Appendix D

NONCONFORMANCE/VARIANCE REPORT

2293

NONCONFORMANCE or VARIANCE (circle one)	Project Name: Proof of Principle	Date: 10-28-98	Page 1 of 1
	Project No. 775743		Report No. ETDC-068-98N

Nonconformance/Variance Description (include requirement violated

SAMPLE NO. ETDC-7694, ETDC-7700, ETDC-7706, ETDC-7707 TESTED FOR UNCONFINED COMPRESSIVE STRENGTH BY ASTM D 2166

- SAMPLES DID NOT FAIL WITHIN LIMITS of 2000 lb. LOAD CELL
- RELOADED ETDC-7694 USING 20,000 lb. LOAD CELL TO FAILURE.

Identified by R. Cole

Root Cause

N/A

Corrective Action (include expected completion date)

N/A

Action completed by — Expected Completion Date

Action taken to preclude recurrence

N/A

To be performed by — Expected Completion Date

Client notified (include client name, how notified, and response)

PAUL LOAR, VERBAL, RESPONSE WAS TO NOT PROCEED WITH TESTING USING THE 20K LOAD CELL. TEST CRITERIA IS ≥ 50 PSI.

Notified by RALPH COLE — Date 10-28-98

Corrective action completed by — Date

Corrective action approved by

Laboratory Supervisor — Date 10-28-98

Project Manager — Date 11-3-98

QA Comments

000229

QAO Approval — Date 11-4-98

Use back of page for additional space. Attach additional pages if necessary.

INTERNATIONAL TECHNOLOGY CORPORATION

GEOTECHNICAL LABORATORY

CERTIFICATE OF ANALYSIS

Paul Lear
IT Corporation
304 Directors Drive
Knoxville TN 37923

October 26, 1998

This is the Certificate of Analysis for the following samples:

Project ID:	**Proof of Principle**
IT Project No.:	***775743***
Date Received by Lab:	October 19, 1998
Number of Samples:	Sixteen (16)
Sample Type:	Stabilized cylinders

I. Introduction/Case Narrative

Sixteen samples were received by the IT Geotechnical Laboratory on October 19, 1998. All samples were submitted for unconfined compressive strength testing in three groups at seven day cure times.

Please see Appendix A, Sample Number Cross Reference List; Appendix B, Analysis Results; Appendix C, Chain-of-Custody and Request-for-Analysis Records; and Appendix D, Nonconformance/Variance Reports.

Reviewed and Approved:

Ralph Cole
Laboratory Manager, Geotechnical Services

IT Environmental Technology Development Center
P.O. Box 4339 • 1570 Bear Creek Road • Oak Ridge, TN 37830 • 615-482-6497 • FAX: 615-482-1890

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II. Analytical Results/Methodology

REFERENCES: United States Army Corps of Engineers (USACE), Engineer Manual 1110-2-1906, *Laboratory Soils Testing*, appendix II, 1970; United States Environmental Protection Agency, SW846, *Test Methods for Examining Solid Waste, Physical/Chemical Methods*, 3rd ed., Nov 1986 (EPA SW-846). Annual Book of ASTM Standards, Section 4, Construction, Volume 04.08, *Soil and Rock (I)*, and Volume 04.09, *Soil and Rock (II)*, 1998.

Laboratory Determination of Water (Moisture) Content of Soil and Rock . . . . . **ASTM D 2216**
Unconfined Compressive Strength of Cohesive Soil . . . . . **ASTM D 2166**

III. Quality Control

Quality control checks such as duplicates and spikes (QC samples), are not normally applicable to geotechnical testing. This is due largely to the inability of obtaining samples with known characteristics, the heterogenous nature of the samples, and quality control procedures built-in to the analytical method.

QC measures to ensure accuracy and precision of test results include the following:

- 100% verification of all numerical results - raw data entries, transcriptions and calculations entered by lab technicians are checked, recalculated and verified. Most data calculations are performed by computer programs.

- Data validation through test reasonableness - summaries of all test results for individual reports are reviewed to determine the overall reasonableness of data and to determine the presence of any data that may be considered outliers.

- Quality control procedures are built into most standardized geotechnical procedures. For example, liquid limit and plastic limit analyses call for re-analyses and specify acceptance criteria.

- Routine instrument calibration - instruments, gauges and equipment used in testing are calibrated on a routine basis. All instrument calibration follows ASTM or manufacturer guidelines.

- Maintenance of all past calibration records - records and certification documents of all instruments, gauges and equipment are updated routinely and maintained in the Quality Control Coordinators Quality/Operations files.

- Certified and trained personnel - all technicians are certified by the National Institute for Certification of Engineering Technicians (NICET) in geotechnical soil testing, and are trained

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in the application of standard laboratory procedures for geotechnical analyses as well as the quality assurance measures implemented by IT.

IV. Data Qualification

Three unusual conditions were noted during testing the samples and these conditions are documented in nonconformance reports included in Appendix D of this report. The first condition was noted during testing of the first sample (ETDC-7674, 1174-037-01). The strain readings displayed by the linear displacement transducer (LDT) did not match the readings that were anticipated by the strain rate set on the load frame transmission. The actual strain rate was approximately 0.024 inches per minute. The readings given by the LDT were approximately half that rate. The test results for this sample show inaccurate strain measurements. The actual strain at failure was approximately 2%, instead of the 0.39% shown on the results sheet.

Sample numbers ETDC-7676 (1174-039-01) and ETDC-7688 (1147-051-01) were loaded using the 500-lb. load cell. The load cell reached its maximum capacity before the samples failed. The samples were unloaded and retested using a 2000-lb. load cell. A comparison of load readings between the first and second tests seems to indicate that the unconfined compressive strength of the samples were not compromised by the first loading.

The third condition involved a broken sample that could not be tested. The test sample (ETDC-7686, 1174-049-01) fell into three sections upon ejection from the plastic mold. This may have been caused by cracks in the sample before de-molding, or by rough handling by the operator. Density information for this sample is supplied based on an assumed sample height of 4.00 inches.

Appendix A

Sample Number Cross-Reference

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SAMPLE NUMBER CROSS-REFERENCE LIST

LAB SAMPLE NO.	CLIENT SAMPLE NO.	SAMPLE MATRIX
ETDC-7674	1174-037-01	Stabilized surrogate
ETDC-7675	1174-038-01	Stabilized surrogate
ETDC-7676	1174-039-01	Stabilized surrogate
ETDC-7677	1174-040-01	Stabilized surrogate
ETDC-7678	1174-041-01	Stabilized surrogate
ETDC-7679	1174-042-01	Stabilized surrogate
ETDC-7680	1174-043-01	Stabilized surrogate
ETDC-7681	1174-044-01	Stabilized surrogate
ETDC-7682	1174-045-01	Stabilized surrogate
ETDC-7683	1174-046-01	Stabilized surrogate
ETDC-7684	1174-047-01	Stabilized surrogate
ETDC-7685	1174-048-01	Stabilized surrogate
ETDC-7686	1174-049-01	Stabilized surrogate
ETDC-7687	1174-050-01	Stabilized surrogate
ETDC-7688	1174-051-01	Stabilized surrogate
ETDC-7689	1174-052-01	Stabilized surrogate

Appendix B

Analysis Results

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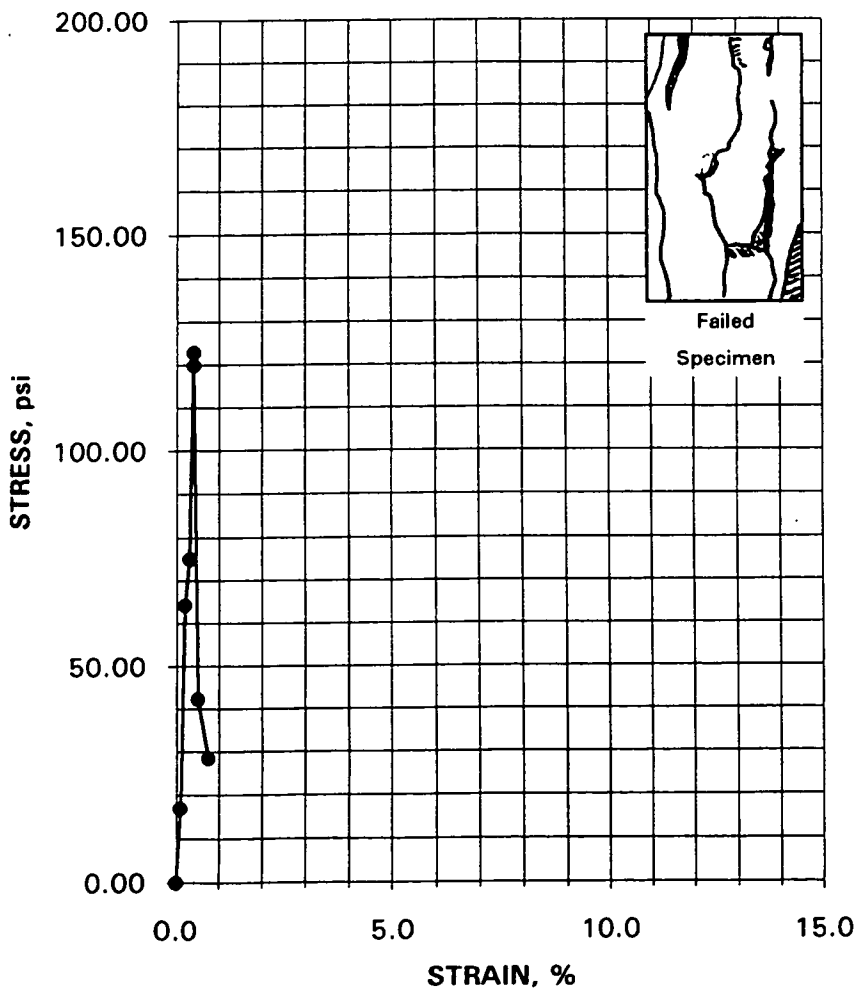
UNCONFINED COMPRESSIVE STRENGTH - ASTM D 2166
7-DAY CURE

Project Name	Proof of Principle	Client Sample No.	1174-037-01
Project No.	775743	IT Lab Specimen No.	ETDC-7674

Specimen Mold Date	10/12/98	Specimen Height, in.	3.9962
Specimen Test Date	10/19/98	Specimen Diameter, in.	1.9947
		Specimen Weight, g.	315.02
STRESS AT FAILURE, psi	**122.8**	Moisture Content, %	82.1
STRAIN AT FAILURE, %*	**0.39**	Wet Unit Weight, pcf.	96.1
		Dry Unit Weight, pcf.	52.8
		Rate of Strain, in./min.	0.0240

AXIAL STRAIN, %	DEVIATOR STRESS, psi
0.00	0.00
0.10	16.78
0.20	64.19
0.30	74.82
0.39	122.79
0.40	119.84
0.50	42.13
0.75	28.43



* Strain readings are lower than actual.
Strain at Failure was approx. 2%.

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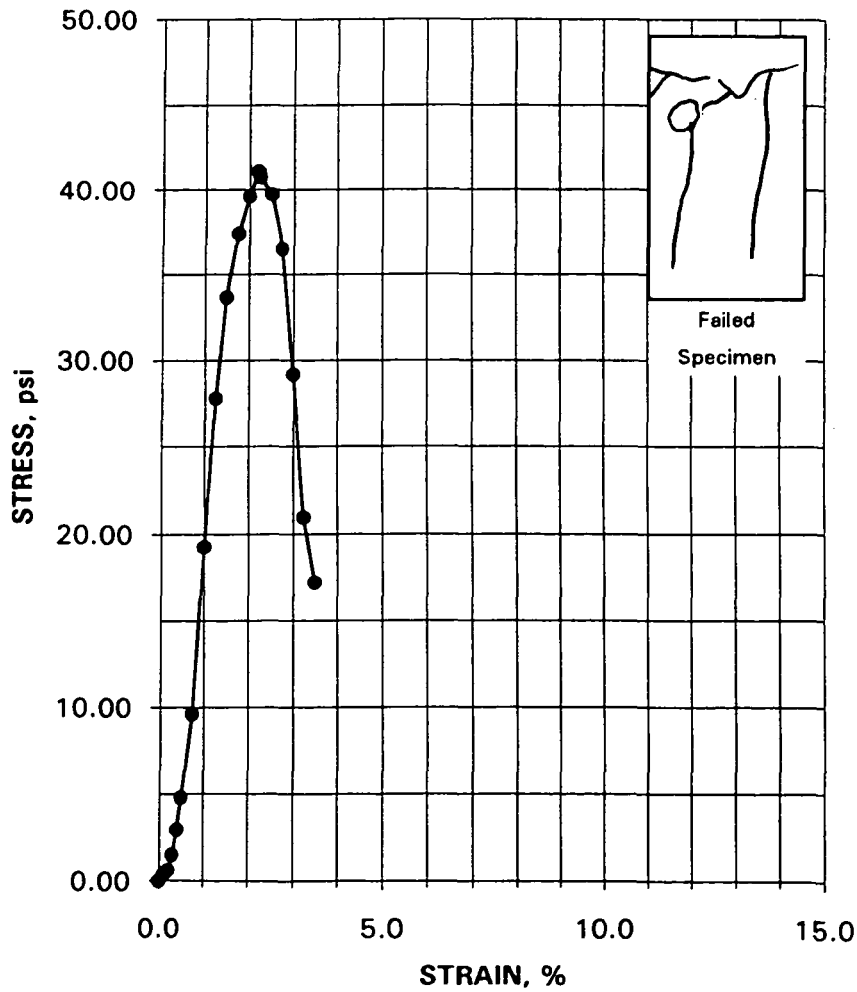
7-DAY CURE

Project Name	Proof of Principle	Client Sample No.	1174-038-01
Project No.	775743	IT Lab Specimen No.	ETDC-7675

Specimen Mold Date	10/12/98	Specimen Height, in.	3.9950
Specimen Test Date	10/19/98	Specimen Diameter, in.	1.9958
		Specimen Weight, g.	315.57
STRESS AT FAILURE, psi	**41.0**	Moisture Content, %	85.0
STRAIN AT FAILURE, %	**2.20**	Wet Unit Weight, pcf.	96.2
		Dry Unit Weight, pcf.	52.0
		Rate of Strain, in./min.	0.0240

AXIAL STRAIN, %	DEVIATOR STRESS, psi
0.00	0.00
0.10	0.35
0.20	0.57
0.30	1.47
0.40	2.90
0.50	4.80
0.75	9.61
1.00	19.24
1.25	27.78
1.50	33.66
1.75	37.37
2.00	39.56
2.20	41.04
2.25	40.74
2.50	39.74
2.75	36.49
3.00	29.18
3.25	20.91
3.50	17.15



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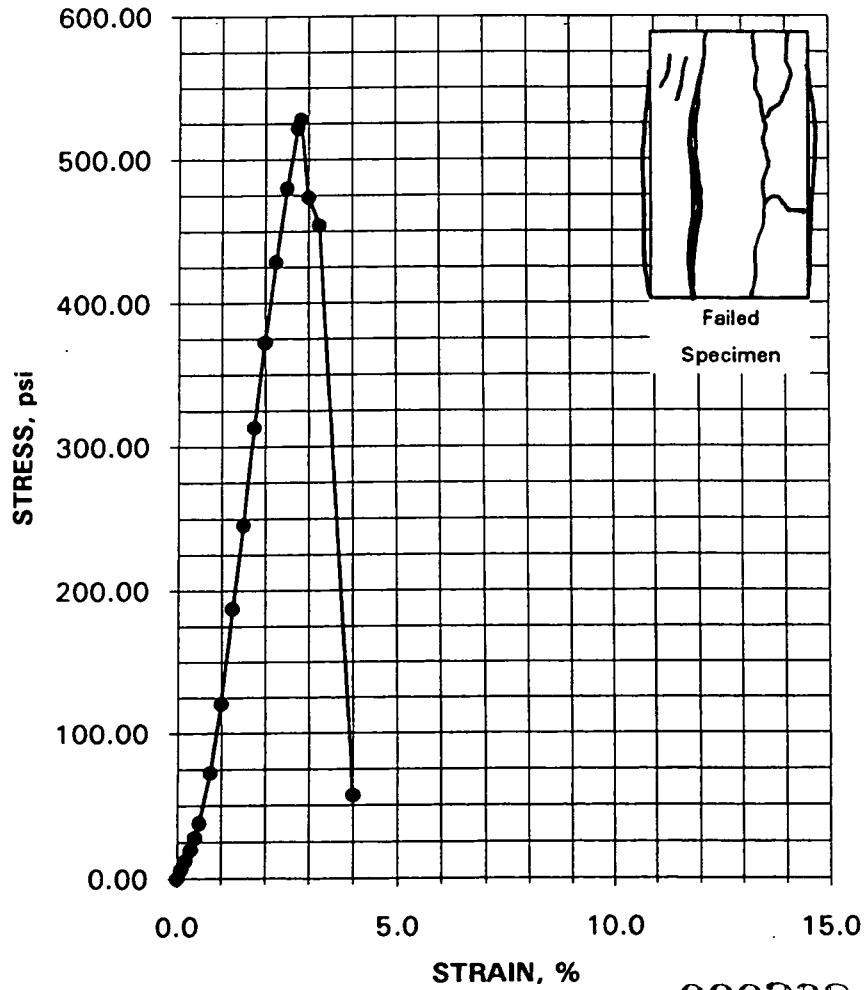
UNCONFINED COMPRESSIVE STRENGTH - ASTM D 2166
7-DAY CURE

Project Name	Proof of Principle	Client Sample No.	1174-039-01
Project No.	775743	IT Lab Specimen No.	ETDC-7676

Specimen Mold Date	10/12/98	Specimen Height, in.	3.9905
Specimen Test Date	10/19/98	Specimen Diameter, in.	1.9935
		Specimen Weight, g.	336.02
STRESS AT FAILURE, psi	**527.4**	Moisture Content, %	59.2
STRAIN AT FAILURE, %	**2.83**	Wet Unit Weight, pcf.	102.8
		Dry Unit Weight, pcf.	64.6
		Rate of Strain, in./min.	0.0240

AXIAL STRAIN, %	DEVIATOR STRESS, psi
0.00	0.00
0.10	5.76
0.20	12.15
0.30	19.17
0.40	27.76
0.50	37.62
0.75	72.50
1.00	120.53
1.25	187.61
1.50	245.52
1.75	312.90
2.00	372.38
2.25	428.12
2.50	479.19
2.75	521.28
2.83	527.37
3.00	473.63
3.25	453.80
4.00	56.59



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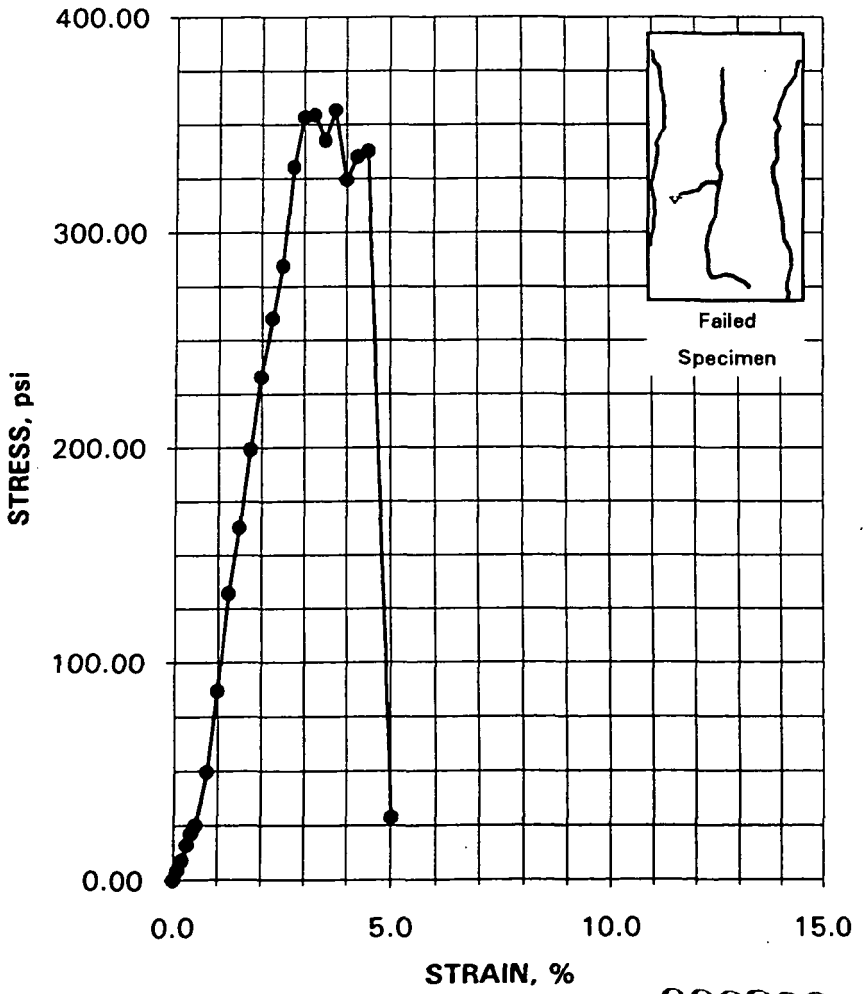
7-DAY CURE

Project Name	Proof of Principle	Client Sample No.	1174-040-01
Project No.	775743	IT Lab Specimen No.	ETDC-7677

Specimen Mold Date	10/12/98	Specimen Height, in.	3.9870
Specimen Test Date	10/19/98	Specimen Diameter, in.	1.9980
		Specimen Weight, g.	332.64
STRESS AT FAILURE, psi	**356.4**	Moisture Content, %	60.4
STRAIN AT FAILURE, %	**3.75**	Wet Unit Weight, pcf.	101.4
		Dry Unit Weight, pcf.	63.2
		Rate of Strain, in./min.	0.0240

AXIAL STRAIN, %	DEVIATOR STRESS, psi
0.00	0.00
0.10	4.14
0.20	8.91
0.30	15.90
0.40	20.97
0.50	24.75
0.75	49.38
1.00	86.52
1.25	131.97
1.50	162.74
1.75	198.99
2.00	232.87
2.25	260.33
2.50	284.23
2.75	330.34
3.00	353.31
3.25	354.25
3.50	342.57
3.75	356.41
4.00	323.95
4.25	335.02
4.50	337.80
5.00	28.48



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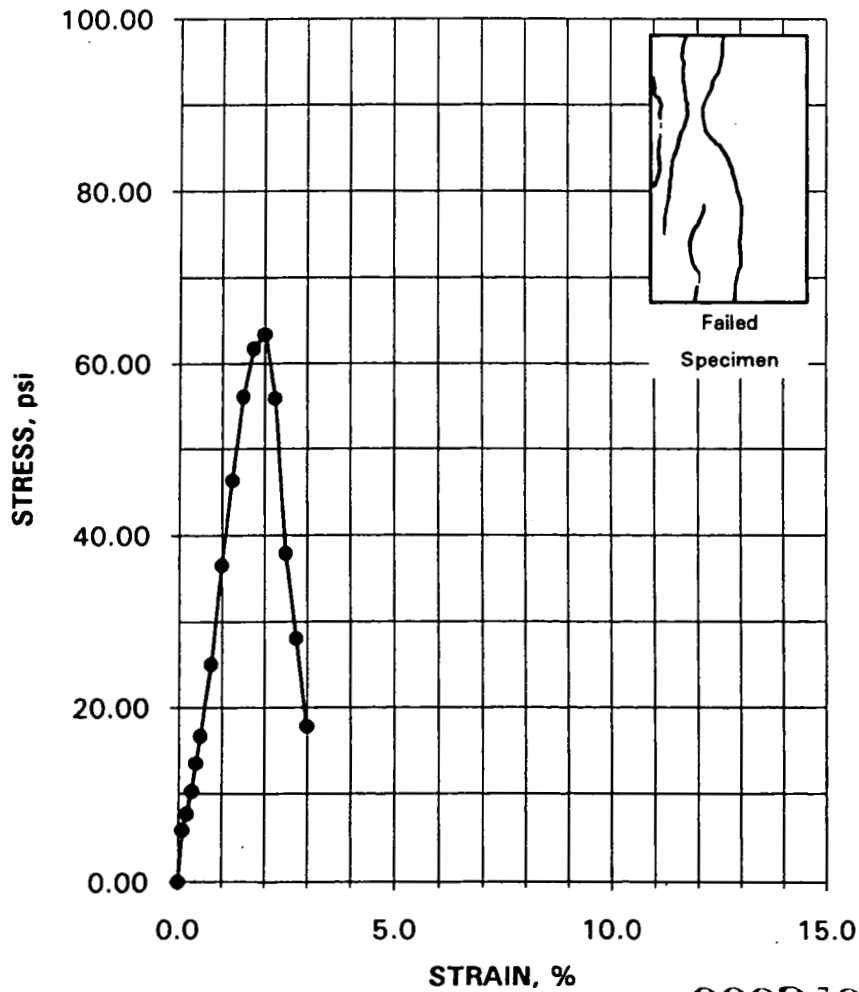
7-DAY CURE

Project Name	Proof of Principle	Client Sample No.	1174-041-01
Project No.	775743	IT Lab Specimen No.	ETDC-7678

Specimen Mold Date	10/13/98	Specimen Height, in.	4.0050
Specimen Test Date	10/20/98	Specimen Diameter, in.	1.9845
		Specimen Weight, g.	293.89
STRESS AT FAILURE, psi	**63.4**	Moisture Content, %	43.8
STRAIN AT FAILURE, %	**2.00**	Wet Unit Weight, pcf.	90.4
		Dry Unit Weight, pcf.	62.9
		Rate of Strain, in./min.	0.0240

AXIAL STRAIN, %	DEVIATOR STRESS, psi
0.00	0.00
0.10	5.81
0.20	7.74
0.30	10.31
0.40	13.52
0.50	16.73
0.75	25.03
1.00	36.49
1.25	46.29
1.50	56.05
1.75	61.62
2.00	63.37
2.03	63.35
2.25	55.94
2.50	37.83
2.75	27.98
3.00	17.88



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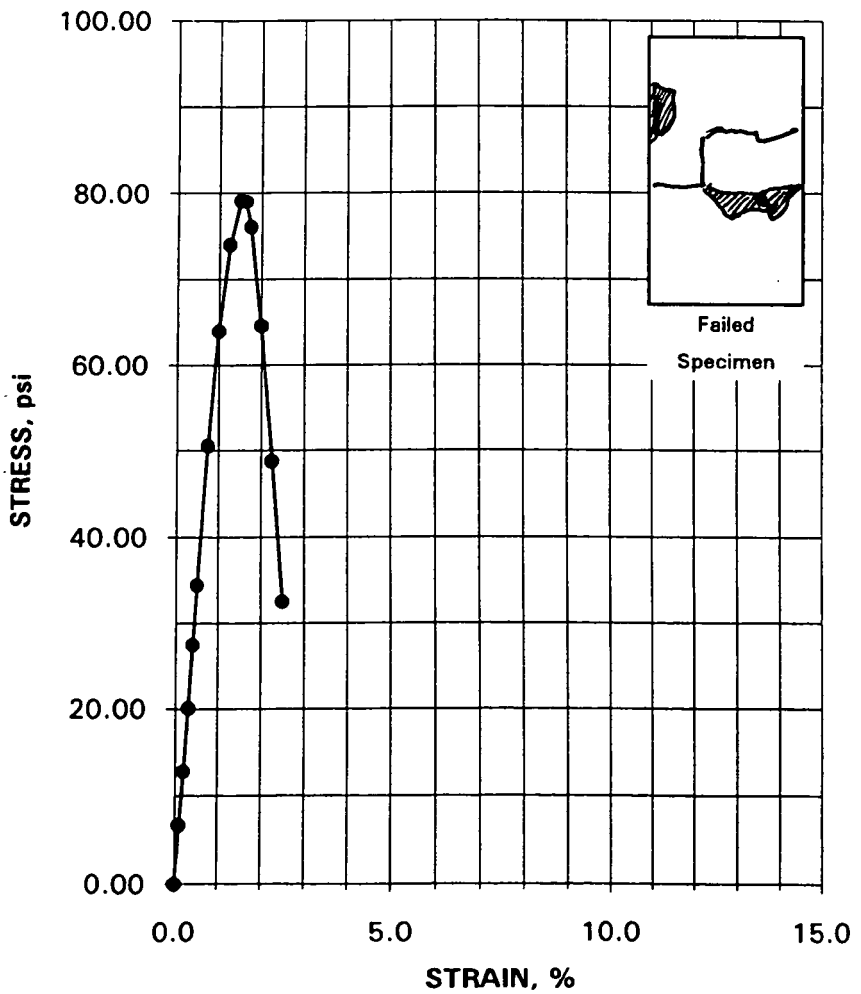
UNCONFINED COMPRESSIVE STRENGTH - ASTM D 2166
7-DAY CURE

Project Name	Proof of Principle	Client Sample No.	1174-042-01
Project No.	775743	IT Lab Specimen No.	ETDC-7679

Specimen Mold Date	10/13/98	Specimen Height, in.	3.9962
Specimen Test Date	10/20/98	Specimen Diameter, in.	1.9953
		Specimen Weight, g.	300.70
STRESS AT FAILURE, psi	**79.1**	Moisture Content, %	44.1
STRAIN AT FAILURE, %	**1.50**	Wet Unit Weight, pcf.	91.7
		Dry Unit Weight, pcf.	63.6
		Rate of Strain, in./min.	0.0240

AXIAL STRAIN, %	DEVIATOR STRESS, psi
0.00	0.00
0.10	6.71
0.20	12.77
0.30	20.09
0.40	27.39
0.50	34.37
0.75	50.47
1.00	63.95
1.25	73.90
1.50	79.06
1.62	78.97
1.75	76.04
2.00	64.56
2.25	48.77
2.50	32.43



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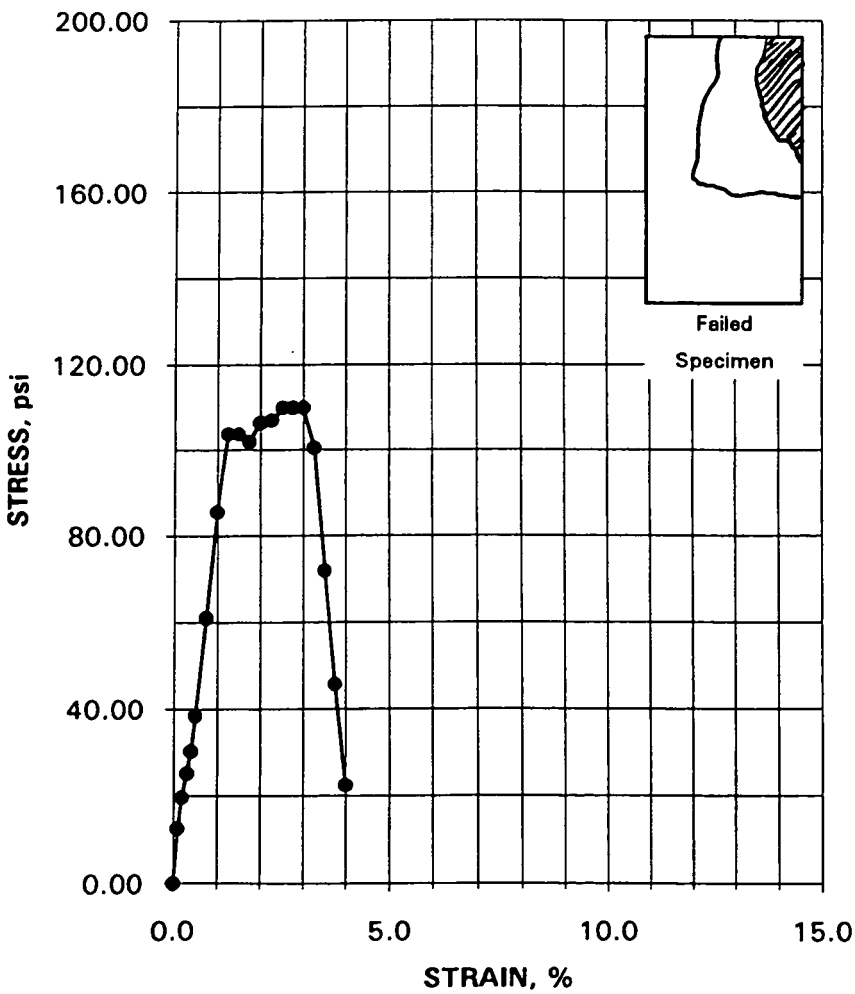
UNCONFINED COMPRESSIVE STRENGTH - ASTM D 2166
7-DAY CURE

Project Name	Proof of Principle	Client Sample No.	1174-043-01
Project No.	775743	IT Lab Specimen No.	ETDC-7680

Specimen Mold Date	10/13/98	Specimen Height, in.	4.0288
Specimen Test Date	10/20/98	Specimen Diameter, in.	2.0057
		Specimen Weight, g.	315.74
STRESS AT FAILURE, psi	**109.9**	Moisture Content, %	39.0
STRAIN AT FAILURE, %	**3.00**	Wet Unit Weight, pcf.	94.5
		Dry Unit Weight, pcf.	68.0
		Rate of Strain, in./min.	0.0240

AXIAL STRAIN, %	DEVIATOR STRESS, psi
0.00	0.00
0.10	12.33
0.20	19.58
0.30	25.25
0.40	30.26
0.50	38.42
0.75	60.94
1.00	85.23
1.25	103.77
1.50	103.82
1.75	102.00
2.00	106.40
2.25	107.05
2.50	109.86
2.75	109.89
3.00	109.91
3.25	100.44
3.50	71.78
3.75	45.70
4.00	22.49



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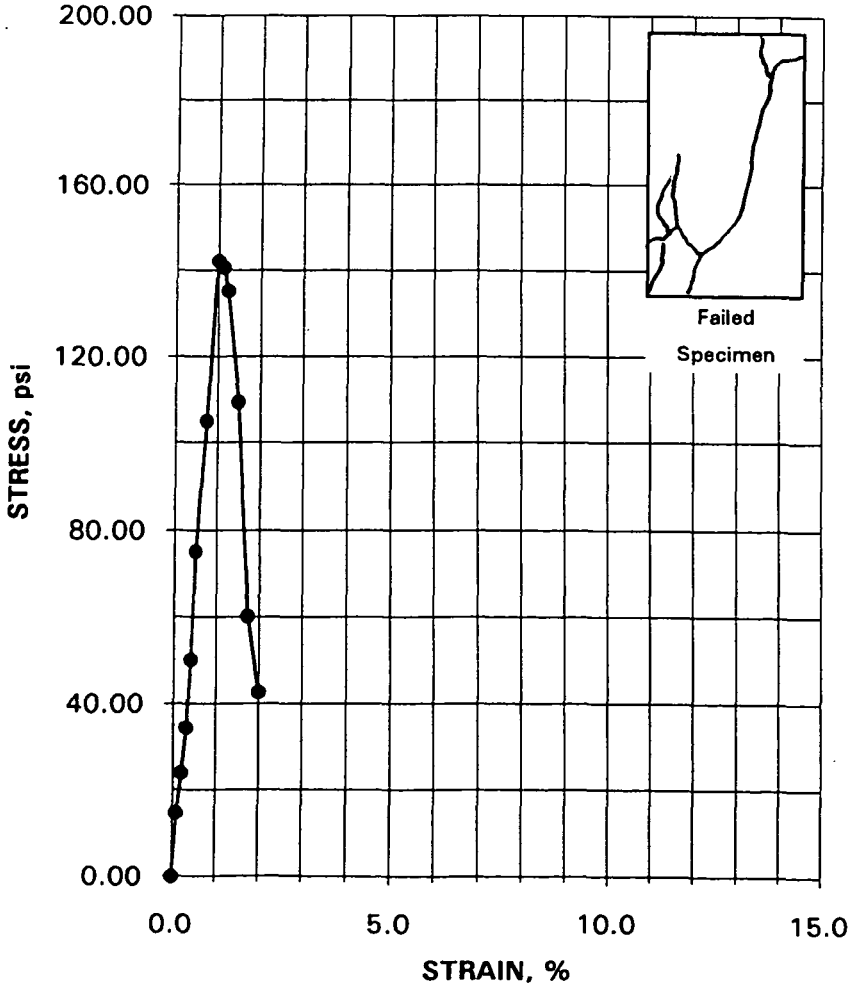
UNCONFINED COMPRESSIVE STRENGTH - ASTM D 2166
7-DAY CURE

Project Name	Proof of Principle	Client Sample No.	1174-044-01
Project No.	775743	IT Lab Specimen No.	ETDC-7681

Specimen Mold Date	10/13/98	Specimen Height, in.	4.0545
Specimen Test Date	10/20/98	Specimen Diameter, in.	1.9967
		Specimen Weight, g.	315.79
STRESS AT FAILURE, psi	**142.0**	Moisture Content, %	43.0
STRAIN AT FAILURE, %	**1.00**	Wet Unit Weight, pcf.	94.8
		Dry Unit Weight, pcf.	66.3
		Rate of Strain, in./min.	0.0240

AXIAL STRAIN, %	DEVIATOR STRESS, psi
0.00	0.00
0.10	14.68
0.20	23.91
0.30	34.39
0.40	49.94
0.50	75.00
0.75	104.92
1.00	141.97
1.14	140.50
1.25	134.99
1.50	109.48
1.75	59.93
2.00	42.57



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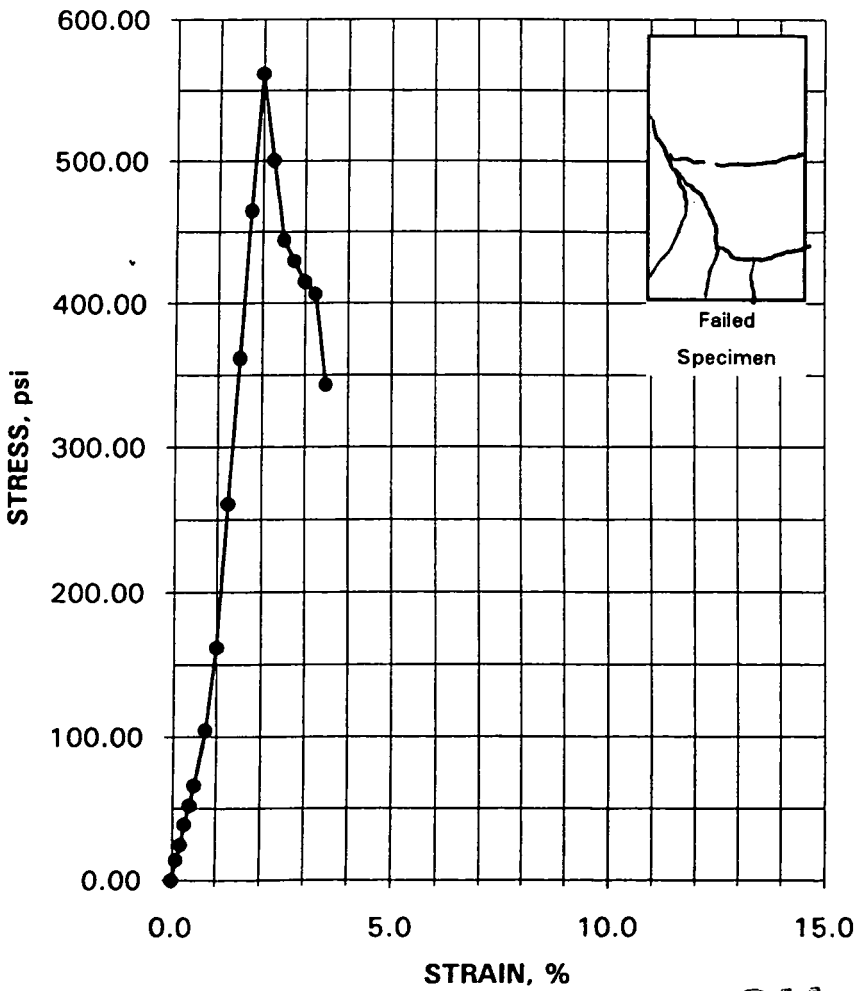
UNCONFINED COMPRESSIVE STRENGTH - ASTM D 2166
7-DAY CURE

Project Name	Proof of Principle	Client Sample No.	1174-045-01
Project No.	775743	IT Lab Specimen No.	ETDC-7682

Specimen Mold Date	10/13/98	Specimen Height, in.	4.0320
Specimen Test Date	10/20/98	Specimen Diameter, in.	2.0068
		Specimen Weight, g.	354.59
STRESS AT FAILURE, psi	**561.4**	Moisture Content, %	37.8
STRAIN AT FAILURE, %	**2.00**	Wet Unit Weight, pcf.	105.9
		Dry Unit Weight, pcf.	76.9
		Rate of Strain, in./min.	0.0240

AXIAL STRAIN, %	DEVIATOR STRESS, psi
0.00	0.00
0.10	13.90
0.20	24.29
0.30	38.14
0.40	51.64
0.50	65.43
0.75	104.17
1.00	161.50
1.24	260.40
1.50	361.86
1.75	464.68
2.00	561.40
2.25	500.33
2.50	443.87
2.75	429.21
3.00	414.61
3.25	406.51
3.50	343.22



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IT Project No.: 775743

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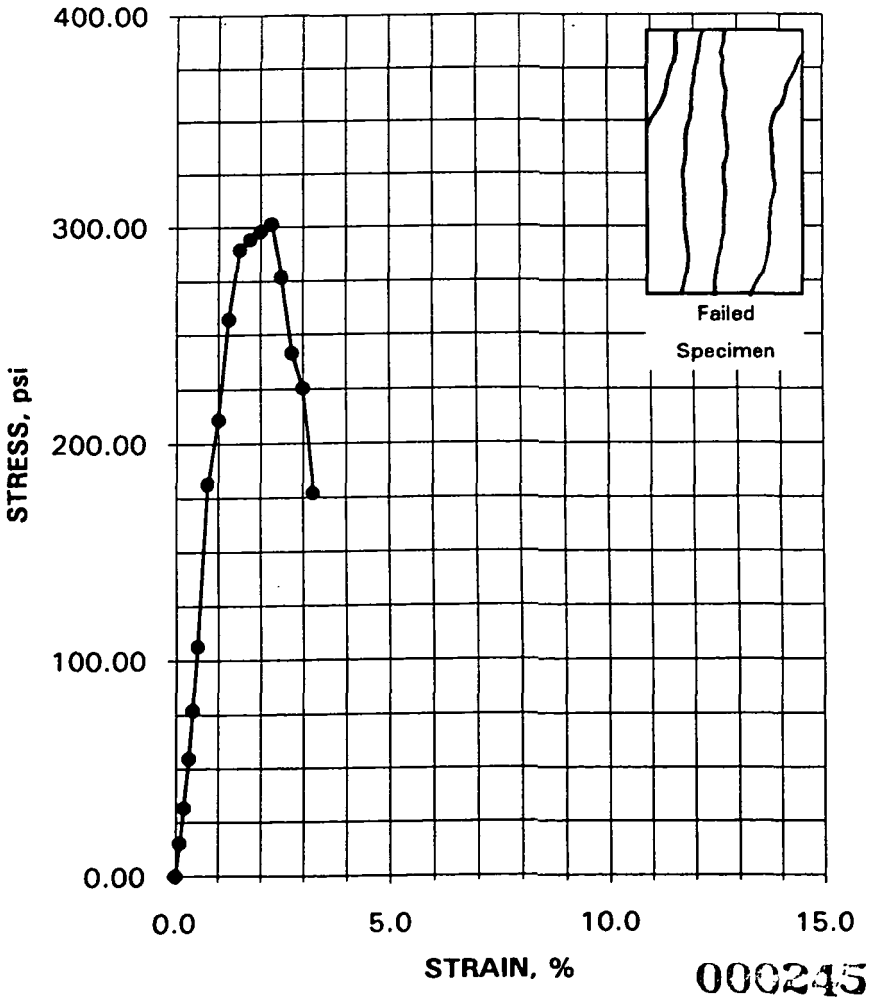
UNCONFINED COMPRESSIVE STRENGTH - ASTM D 2166
7-DAY CURE

Project Name	Proof of Principle	Client Sample No.	1174-046-01
Project No.	775743	IT Lab Specimen No.	ETDC-7683

Specimen Mold Date	10/13/98	Specimen Height, in.	4.0793
Specimen Test Date	10/20/98	Specimen Diameter, in.	1.9982
		Specimen Weight, g.	347.62
STRESS AT FAILURE, psi	**301.1**	Moisture Content, %	37.6
STRAIN AT FAILURE, %	**2.25**	Wet Unit Weight, pcf.	103.5
		Dry Unit Weight, pcf.	75.2
		Rate of Strain, in./min.	0.0240

AXIAL STRAIN, %	DEVIATOR STRESS, psi
0.00	0.00
0.10	14.97
0.20	31.51
0.30	54.37
0.40	76.86
0.50	106.30
0.75	181.67
1.00	211.21
1.25	256.97
1.50	288.99
1.75	293.89
2.00	297.83
2.25	301.12
2.27	301.07
2.50	276.72
2.75	241.59
3.00	225.50
3.25	177.10



000245

Paul Lear
IT Corporation
October 26 1998
IT Project ID: Proof of Principle
IT Project No.: 775743

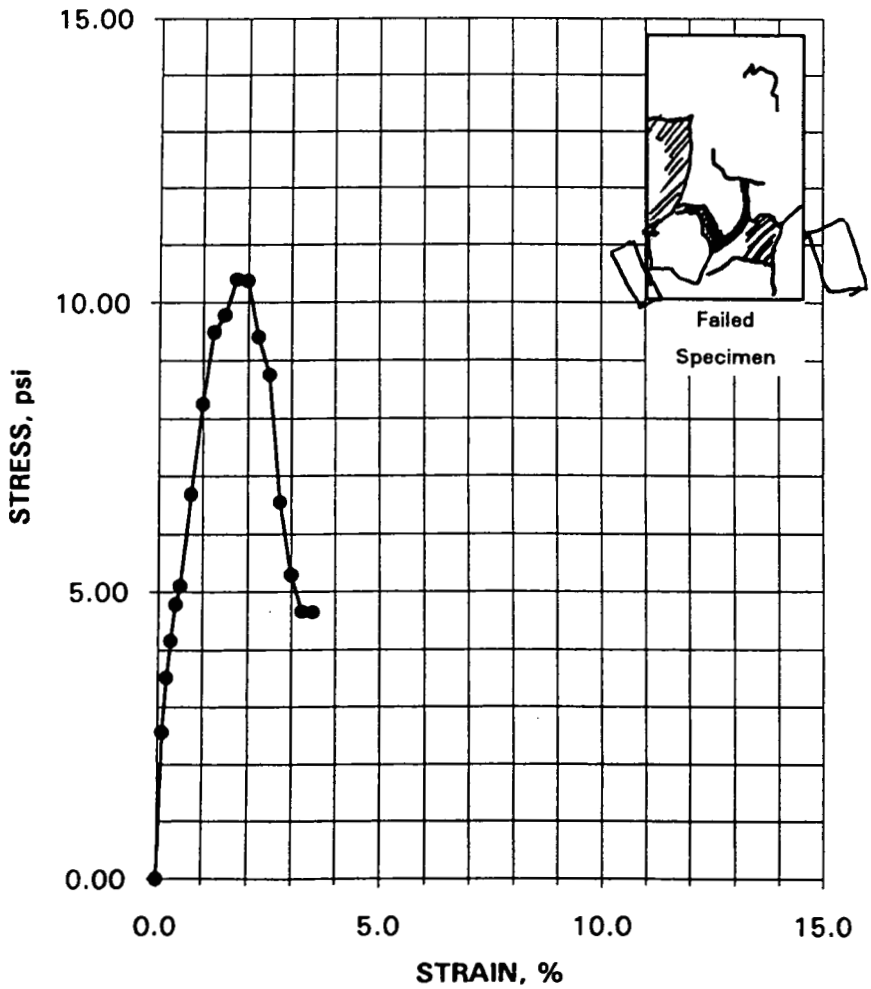
IT GEOTECHNICAL
LABORATORY
OAK RIDGE, TN
(423) 482-6497

UNCONFINED COMPRESSIVE STRENGTH - ASTM D 2166
7-DAY CURE

Project Name	Proof of Principle	Client Sample No.	1174-047-01
Project No.	775743	IT Lab Specimen No.	ETDC-7684

Specimen Mold Date	10/14/98	Specimen Height, in.	4.0067
Specimen Test Date	10/21/98	Specimen Diameter, in.	1.9932
		Specimen Weight, g.	309.15
STRESS AT FAILURE, psi	**10.4**	Moisture Content, %	68.8
STRAIN AT FAILURE, %	**1.75**	Wet Unit Weight, pcf.	94.2
		Dry Unit Weight, pcf.	55.8
		Rate of Strain, in./min.	0.0240

AXIAL STRAIN, %	DEVIATOR STRESS, psi
0.00	0.00
0.10	2.56
0.20	3.52
0.30	4.15
0.40	4.79
0.50	5.10
0.75	6.68
1.00	8.25
1.25	9.49
1.50	9.79
1.75	10.39
2.00	10.36
2.25	9.40
2.50	8.75
2.75	6.55
3.00	5.28
3.25	4.65
3.50	4.64



Paul Lear
IT Corporation
October 26 1998
IT Project ID: Proof of Principle
IT Project No.: 775743

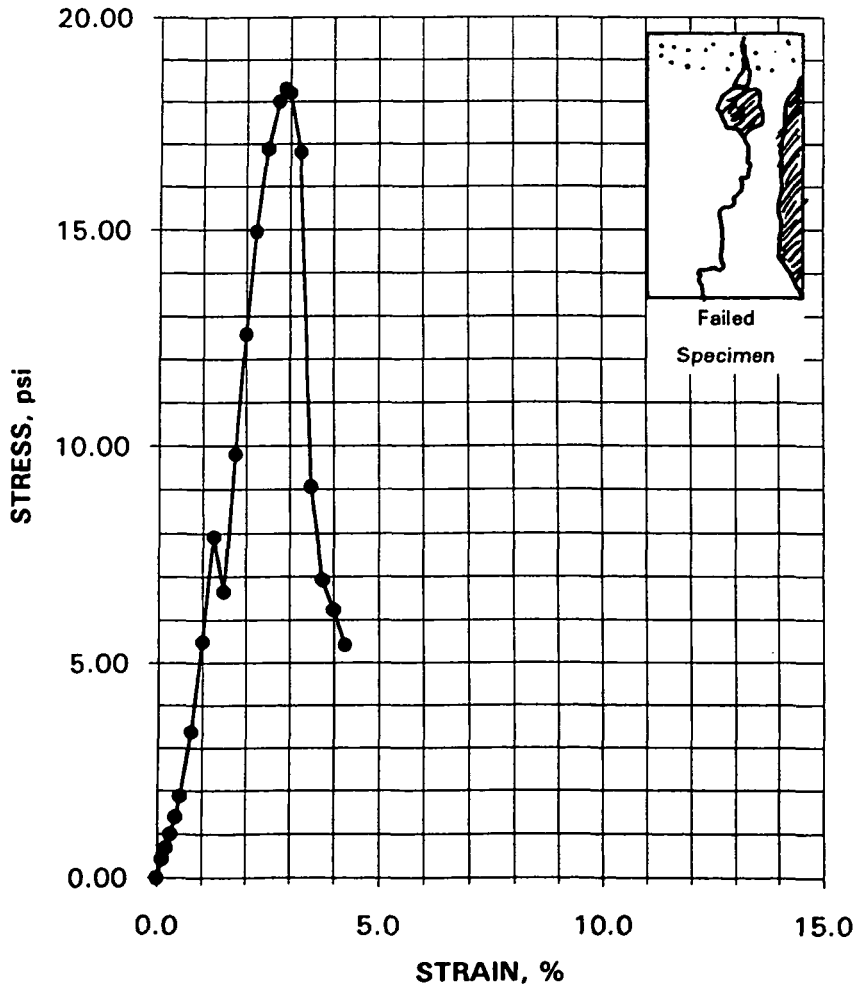
IT GEOTECHNICAL
LABORATORY
OAK RIDGE, TN
(423) 482-6497

UNCONFINED COMPRESSIVE STRENGTH - ASTM D 2166
7-DAY CURE

Project Name	Proof of Principle	Client Sample No.	1174-048-01
Project No.	775743	IT Lab Specimen No.	ETDC-7685

Specimen Mold Date	10/14/98	Specimen Height, in.	3.9918
Specimen Test Date	10/21/98	Specimen Diameter, in.	1.9822
		Specimen Weight, g.	322.48
STRESS AT FAILURE, psi	**18.3**	Moisture Content, %	62.5
STRAIN AT FAILURE, %	**2.91**	Wet Unit Weight, pcf.	99.7
		Dry Unit Weight, pcf.	61.4
		Rate of Strain, in./min.	0.0240

AXIAL STRAIN, %	DEVIATOR STRESS, psi
0.00	0.00
0.10	0.42
0.20	0.68
0.30	1.00
0.40	1.39
0.50	1.87
0.75	3.38
1.00	5.49
1.25	7.90
1.50	6.64
1.75	9.81
2.00	12.58
2.25	14.95
2.50	16.87
2.75	18.00
2.91	18.28
3.00	18.20
3.25	16.81
3.50	9.07
3.75	6.92
4.00	6.22
4.25	5.40



Paul Lear
IT Corporation
October 26 1998
IT Project ID: Proof of Principle
IT Project No.: 775743

IT GEOTECHNICAL
LABORATORY
OAK RIDGE, TN
(423) 482-6497

UNCONFINED COMPRESSIVE STRENGTH - ASTM D 2166
7-DAY CURE

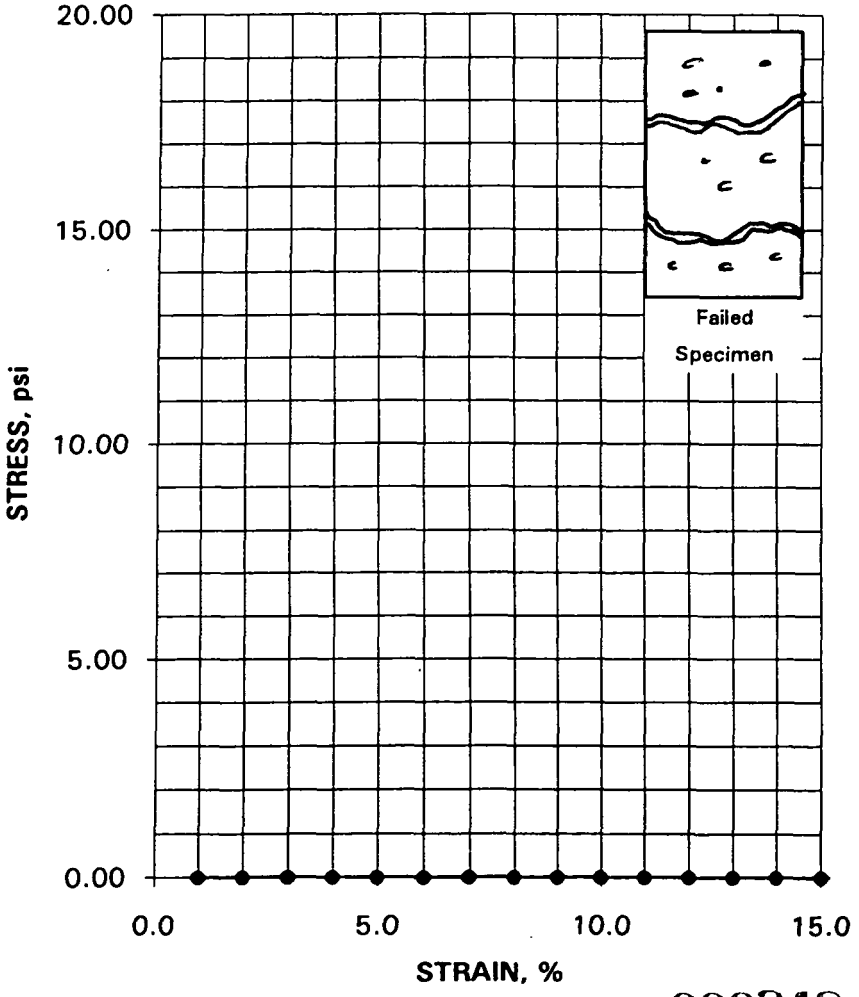
Project Name	Proof of Principle	Client Sample No.	1174-049-01
Project No.	775743	IT Lab Specimen No.	ETDC-7686

Specimen Mold Date	10/14/98	Specimen Height, in.	4.0000
Specimen Test Date	10/21/98	Specimen Diameter, in.	1.9960
		Specimen Weight, g.	326.00
STRESS AT FAILURE, psi		Moisture Content, %	56.2
STRAIN AT FAILURE, %		Wet Unit Weight, pcf.	99.2
		Dry Unit Weight, pcf.	63.5
		Rate of Strain, in./min.	

AXIAL STRAIN, %	DEVIATOR STRESS, psi

Sample fractured into three sections prior to loading.

Density info assumes sample length = 4-inches.



Paul Lear
IT Corporation
October 26 1998
IT Project ID: Proof of Principle
IT Project No.: 775743

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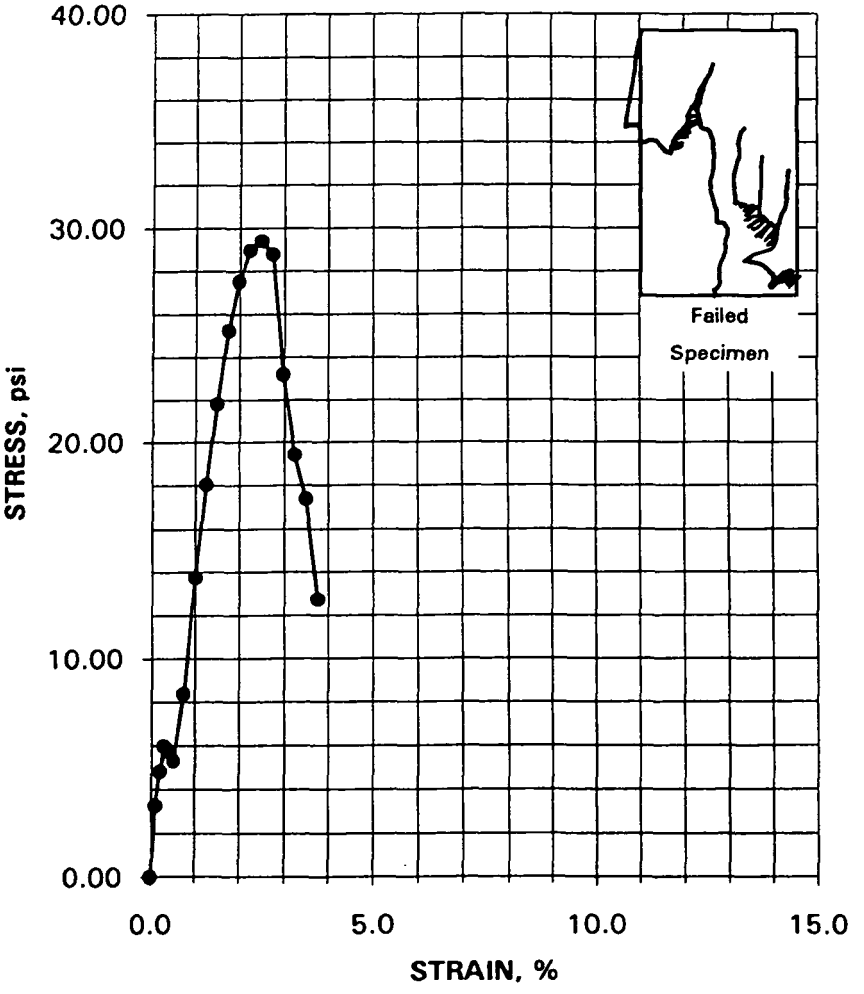
LABORATORY
OAK RIDGE, TN
(423) 482-6497

UNCONFINED COMPRESSIVE STRENGTH - ASTM D 2166
7-DAY CURE

Project Name	Proof of Principle	Client Sample No.	1174-050-01
Project No.	775743	IT Lab Specimen No.	ETDC-7687

Specimen Mold Date	10/14/98	Specimen Height, in.	4.0035
Specimen Test Date	10/21/98	Specimen Diameter, in.	1.9934
		Specimen Weight, g.	339.88
STRESS AT FAILURE, psi	**29.4**	Moisture Content, %	56.8
STRAIN AT FAILURE, %	**2.50**	Wet Unit Weight, pcf.	103.6
		Dry Unit Weight, pcf.	66.1
		Rate of Strain, in./min.	0.0240

AXIAL STRAIN, %	DEVIATOR STRESS, psi
0.00	0.00
0.10	3.27
0.20	4.83
0.30	5.97
0.40	5.74
0.50	5.29
0.75	8.36
1.00	13.74
1.25	18.04
1.50	21.81
1.75	25.22
2.00	27.48
2.25	28.94
2.50	29.40
2.75	28.76
3.00	23.19
3.25	19.41
3.50	17.35
3.75	12.71



Paul Lear
IT Corporation
October 26 1998
IT Project ID: Proof of Principle
IT Project No.: 775743

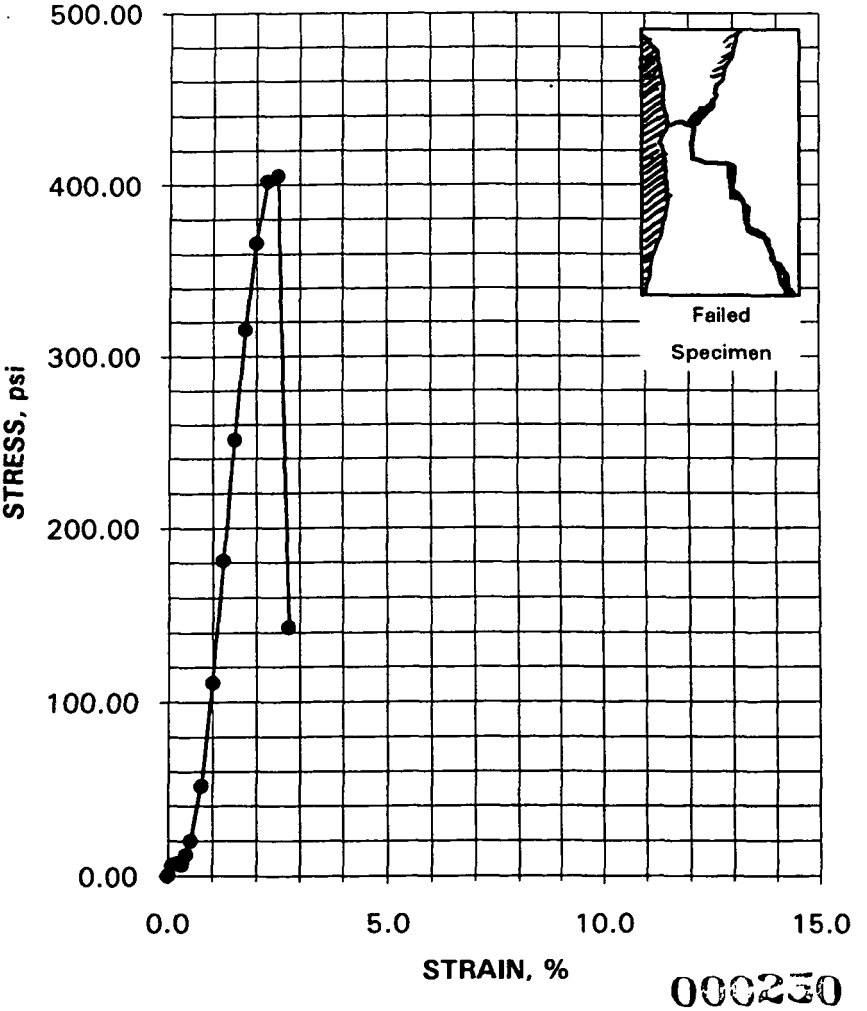
IT GEOTECHNICAL
LABORATORY
OAK RIDGE, TN
(423) 482-6497

UNCONFINED COMPRESSIVE STRENGTH - ASTM D 2166
7-DAY CURE

Project Name	Proof of Principle	Client Sample No.	1174-051-01
Project No.	775743	IT Lab Specimen No.	ETDC-7688

Specimen Mold Date	10/14/98	Specimen Height, in.	4.0132
Specimen Test Date	10/21/98	Specimen Diameter, in.	1.9973
		Specimen Weight, g.	360.37
STRESS AT FAILURE, psi	**404.9**	Moisture Content, %	40.0
STRAIN AT FAILURE, %	**2.50**	Wet Unit Weight, pcf.	109.2
		Dry Unit Weight, pcf.	78.0
		Rate of Strain, in./min.	0.0240

AXIAL STRAIN, %	DEVIATOR STRESS, psi
0.00	0.00
0.10	5.74
0.20	7.01
0.30	6.05
0.40	11.76
0.50	19.69
0.75	51.63
1.00	111.22
1.25	181.22
1.50	250.56
1.75	315.46
2.00	365.95
2.25	402.14
2.50	404.85
2.75	142.46



Paul Lear
IT Corporation
October 26 1998
IT Project ID: Proof of Principle
IT Project No.: 775743

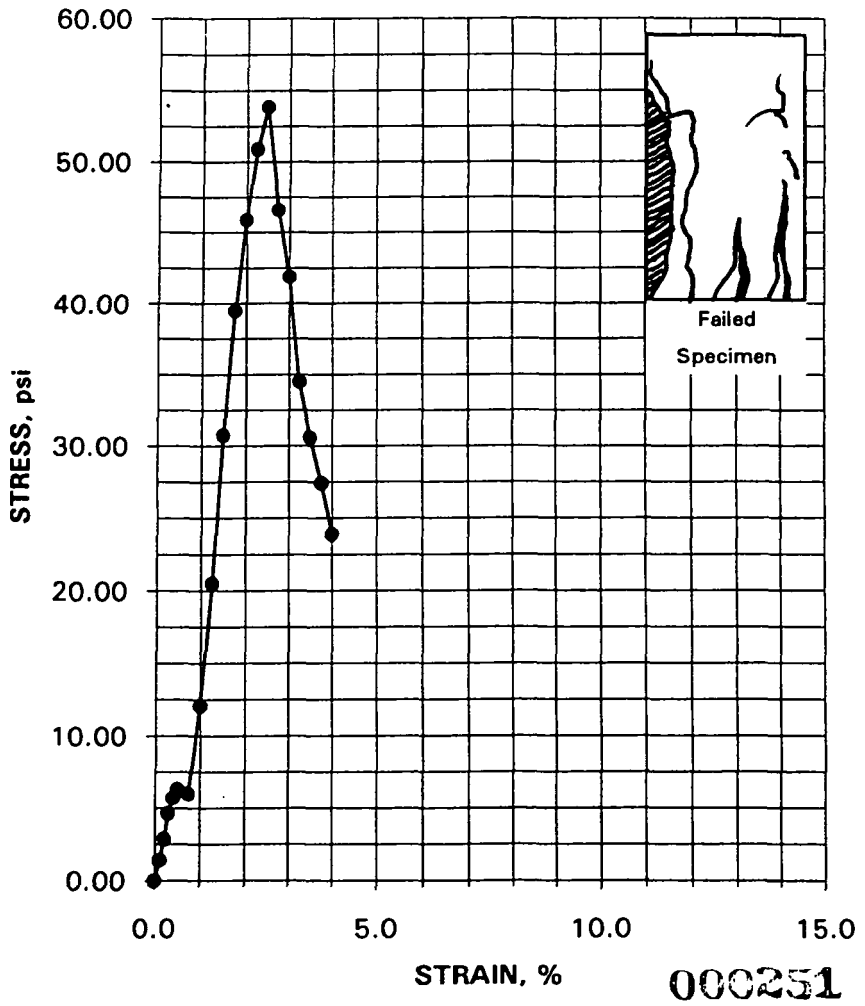
IT GEOTECHNICAL
LABORATORY
OAK RIDGE, TN
(423) 482-6497

UNCONFINED COMPRESSIVE STRENGTH - ASTM D 2166
7-DAY CURE

Project Name	Proof of Principle	Client Sample No.	1174-052-01
Project No.	775743	IT Lab Specimen No.	ETDC-7689

Specimen Mold Date	10/14/98	Specimen Height, in.	4.0365
Specimen Test Date	10/21/98	Specimen Diameter, in.	2.0052
		Specimen Weight, g.	367.59
STRESS AT FAILURE, psi	**53.8**	Moisture Content, %	42.4
STRAIN AT FAILURE, %	**2.50**	Wet Unit Weight, pcf.	109.9
		Dry Unit Weight, pcf.	77.2
		Rate of Strain, in./min.	0.0240

AXIAL STRAIN, %	DEVIATOR STRESS, psi
0.00	0.00
0.10	1.36
0.20	2.81
0.30	4.61
0.40	5.65
0.50	6.30
0.75	5.97
1.00	12.04
1.25	20.48
1.50	30.72
1.75	39.42
2.00	45.81
2.25	50.83
2.50	53.82
2.75	46.56
3.00	41.87
3.25	34.47
3.50	30.59
3.75	27.43
4.00	23.89



Appendix C

Chain-of-Custody & Request-for-Analysis

2293

INTERNATIONAL TECHNOLOGY CORPORATION

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD*

Reference Document No. 426829
Page 1 of 2

Project Name/No. [1] PROOF OF PRINCIPLE — Samples Shipment Date [7] 10/19/98 — Bill to: [5] IT CORP

Sample Team Members [2] A Lee — Lab Destination [8] IT-ETDC

Profit Center No. [3] 2370050 — Lab Contact [9] RALPH COLE

Project Manager [4] PAUL LEAR — Project Contact/Phone [12] PAUL LEAR — Report to: [10] PAUL LEAR, IT TDL.

Purchase Order No. [6] — Carrier/Waybill No. [13] —

Required Report Date [11]

White: To accompany samples

ONE CONTAINER PER LINE

Sample Number [14]	Sample Description/Type [15]	Date/Time Collected [16]	Container Type [17]	Sample Volume [18]	Preservative [19]	Requested Testing Program [20]	Condition on Receipt [21]	Disposal Record No. [22]
#1174-035-01	SILO1 - MIX1	10/12/98	PLASTIC MOLD	2x4"	—	7 DAY UCS	DELETE #1	ETDC 7672
#1174-036-01	SILO1-MIX2				—	SEE COMMENTS	HOLD FOR 28 DAY	ETDC 7673
#1174-037-01	SILO1-MIX3				—			ETDC 7674
#1174-038-01	SILO1-MIX 4				—			ETDC 7675
#1174-039-01	SILO-1 -MIX5				—			ETDC 7676
#1174-040-01	SILO1-MIX 6				—			ETDC 7677
#1174-041-01	SILO 2 MIX 7	10/13/98			—	7 DAY UCS		ETDC 7678
#1174-042-01	SILO 2-MIX 8				—			ETDC 7679

FOR LAB USE ONLY

Special Instructions: [23] ASTM METHOD D 2166 FOR UCS TESTING

Possible Hazard Identification: [24] Non-hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒* Unknown ☐

Sample Disposal: [25] Return to Client ☐ Disposal by Lab ☒ Archive _____ (mos.)

Turnaround Time Required: [26] Normal ☒ Rush ☐

QC Level: [27] I. ☒ II. ☐ III. ☐ Project Specific (specify):

1. Relinquished by [28] (Signature/Affiliation) IT TAC	Date: 10/19/98 Time: 940	1. Received by [28] (Signature/Affiliation) Don Hurley IT/ETDC	Date: 10-19-98 Time: 1100
2. Relinquished by (Signature/Affiliation)	Date: Time:	2. Received by (Signature/Affiliation)	Date: Time:
3. Relinquished by (Signature/Affiliation)	Date: Time:	3. Received by (Signature/Affiliation)	Date: Time:

Comments: [29]* LEAD CONTAMINATION

(2) SAMPLE NUMBERS 1174-035-0[illegible] (ETDC-7672) & 1174-036-01 (ETDC-7673) [illegible] RECEIVED

MCA 3/15/91

293

INTERNATIONAL TECHNOLOGY CORPORATION

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD (cont.)*

Reference Document No.[30] 426829

Page 2 of 2

Project Name SILO 1+2 POP

Project No. 77769363

Samples Shipment Date 10/19/98

ONE CONTAINER PER LINE

Sample[14] Number	Sample[15] Description/Type	Date/Time[16] Collected	Container[17] Type	Sample[18] Volume	Pre-[19] servative	Requested Testing[20] Program	Condition on[21] Receipt	Disposal[22] Record No.
#1174-043-01	SILO 2 MIX 9	10/13/98	PLASTIC MOLD	2x4"	—	7 Day UCS		ETDC 7680
#1174-044-01	SILO 2-MIX 10				—		FOR	ETDC 7681
#1174-045-01	SILO 2 MIX 11				—		USE	ETDC 7682
#1174-046-01	SILO 2-MIX 12				—			ETDC 7683
#1174-047-01	DEMO-MIX 13	10/14/98			—	7 DAY UCS	FOR	ETDC 7684
#1174-048-01	DEMO-MIX 14				—		USE	ETDC 7685
#1174-049-01	DEMO-MIX 15				—		FOR	ETDC 7686
#1174-050-01	DEMO-MIX 16				—		USE	ETDC 7687
#1174-051-01	DEMO-MIX 17				—			ETDC 7688
#1174-052-01	DEMO-MIX 18				—		FOR USE	ETDC 7689
							FOR LAB USE ONLY	
							FOR LAB USE ONLY	
							FOR LAB USE ONLY	

White: To accompany samples. Yellow: Field copy.

*See back of form for special instructions.

00025475

NONCONFORMANCE/VARIANCE REPORT

2293

NONCONFORMANCE or VARIANCE (circle one)	Project Name: Proof-of-Principle	Date: 10/19/98	Page 1 of 1
	Project No.: 775743		Report No.: ETDC-065-98N

Nonconformance/Variance Description (include requirement violated

SAMPLE NO. ETDC-7674
SUBMITTED FOR UNCONFINED COMPRESSIVE STRENGTH by ASTM D 2166
RATE of STRAIN CALCULATED FROM LDT READINGS VS. TIME DID NOT AGREE WITH STRAIN RATE SET ON LOAD FRAME. ACTUAL STRAIN RATE WAS APPROX. 0.0024 INCHES PER MINUTE, RATHER THAN THE 0.012 INCHES PER MINUTE GIVEN BY THE LINEAR DISPLACEMENT TRANSDUCER. SAMPLE ACTUALLY FAILED AT APPROX. 2% RATHER THAN 0.39 %.
RC 10/26/98

Identified by RALPH COLE

Root Cause

LDT NOT MATCHED WITH APPROPRIATE READOUT OR IN NEED OF FACTORY ADJUSTMENT

Corrective Action ... (include expected completion date)

PULL LDT (~~[illegible]~~ SERIAL NO. 0233) FROM SERVICE UNTIL VERIFIED
RC 10/26/98

... completed by R. Cole — Expected Completion Date 10/26/98

A... taken to preclude recurrence

NONE. THIS INSTRUMENT WAS IN CALIBRATION.

To be performed by — Expected Completion Date

Client notified (include client name, how notified, and response)

R. LEAR IT-TOL 10/26/98 VIA E-MAIL

Notified by RALPH COLE — Date 10/26/98

Corrective action completed by R. Cole — Date 10/26/98

Corrective action approved by

Laboratory Supervisor [signature] — Date 10/26/98

P... Manager [signature] — Date 10/26/98

QA Comments

000255

QAO Approval [signature] — Date 10-26-98

Use back of page for additional space. Attach additional pages if necessary.

NONCONFORMANCE/VARIANCE REPORT

2293

NONCONFORMANCE or VARIANCE (circle one)	Project Name: Proof-of-Principle	Date: 10/21/98	Page 1 of 1
	Project No. 775743		Report No. ETDC-064-98 N

Nonconformance/Variance Description (include requirement violated

SAMPLE No. ETDC-7686
SUBMITTED FOR UNCONFINED COMPRESSIVE STRENGTH by ASTM D 2166
- SAMPLE BROKE INTO 3 SEGMENTS of APPROXIMATELY EQUAL SIZE during EJECTION FROM MOLD.

Identified by RALPH COLE

Root Cause

SAMPLE FRACTURED INSIDE MOLD OR EJECTION PROCESS INAPPROPRIATE TO SAMPLE TYPE.

Corrective Action (include expected completion date)

EXERCISE GREATER CAUTION during de-molding PROCEDURE. IN FUTURE.

To be completed by R. Cole Expected Completion Date 10/21/99

Action taken to preclude recurrence

DISCUSS de-molding PROCEDURES w/ LAB STAFF.
URGE CAUTION IN de-molding.

To be performed by RALPH COLE Expected Completion Date 10/26/98

Client notified (include client name, how notified, and response)

P. LOHR IT-TDL VIA e-MAIL 10-26-98

Notified by RALPH COLE Date 10/26/98

Corrective action completed by RALPH COLE Date 10/26/98

Corrective action approved by

Laboratory Supervisor _____ Date _____

Project Manager [signature] Date 10/26/98

QA Comments

000256

QAO Approval Don Hurley Date 10-26-98

Use back of page for additional space. Attach additional pages if necessary.

P.o.P. UCS nonconformances
10/26/98 10:27:29 AM EST
From: ITGEOLAB
To: plear@itcrp.com

I am putting the UCS report together for P.o.P. and need to notify you of two conditions encountered during testing the samples. While testing the first sample (ETDC-7674, 1174-037-01), the strain readings on the LDT display did not appear to match the strain rate set on the load frame. This would affect only the strain measurements and not the reported loads. I removed the LDT and used an electronic dial gauge on the remainder of the samples.
The second condition was encountered during de-molding of Sample number ETDC-7686 (1174-049-01). The specimen was not coming free of the mold using the standard procedures, so I tapped the sample on the concrete floor to try to pop it loose. Once removed from the mold, the sample fell into three sections separated horizontally. I may have fractured the sample while trying to remove it from the mold, or it may have already contained cracks, but I feel that I should have used more caution in trying to free the sample from the mold. A UCS test could not be performed. Density information is available assuming a sample length of 4.00 inches.
Both of these conditions are documented in nonconformance reports that will be contained in the report.

NONCONFORMANCE/VARIANCE REPORT

NONCONFORMANCE or VARIANCE (circle one)	Project Name: PROOF OF PRINCIPLE	Date: 10/26/98	Page 1 of 1
	Project No. 769383		Report No. ETDC-066-98N

Nonconformance Description (include specific requirement violated):

SAMPLE NUMBERS ETDC-7676 AND ETDC-7688 SUBMITTED FOR UNCONFINED COMPRESSIVE STRENGTH

- SAMPLES DID NOT FAIL BEFORE MAXIMUM SAFE LOAD FOR LOAD CELL REACHED. SAMPLES WERE RELOADED USING A HIGHER CAPACITY LOAD CELL.

Identified by: RALPH COLE Date: 10-26-98

Root cause of Nonconformance:

INABILITY TO PREDICT FAILURE LOAD OF SAMPLE AND USE APPROPRIATELY RATED LOAD CELL.

Corrective action (include expected completion date):

NONE.

To be performed by: Anticipated Completion Date:

Action taken to preclude recurrence:

NONE.

To be performed by: Anticipated Completion Date:

Client notified (include client name, how notified, and response):

P. LOAR VIA E-MAIL 10/26/98 : NO RESPONSE

Notified by: Date:

Corrective action completed by: N/A Date:

Corrective action approved by:

Laboratory Supervisor: [signature] Date:

Project Manager: Date:

QAO Approval: [signature] Date: 11-3-98

P.o.P. UCS nonconfrmance
Date: 10/26/98 11:18:28 AM EST
From: ITGEOLAB
To: plear@itcrp.com

A third condition needs noting: Sample number ETDC-7676 (1174-039-01) did not fail within the load limits of the 500-lb. load cell. The sample was retested using a 2000-lb. load cell. The two series of load readings are comparable, indicating that there is was no damage to the sample's ultimate strength.

Unconfined Compressive Strength

ASTM D2166-85

Project: Fernald POP

Sample Description: 1174-86-01

Analyst: RGB Date: 12/23/98

Sample Weight (g): 341.78 Sample Height (cm): 10.2
Sample Diameter (cm): 5.0

Sample Volume (cm^3): 200.28 Bulk Density (g/cm^3): 1.71

Load (lb)	Strain (0.001 in)	Total Strain (in)	Unit Strain	Corrected Area (in^2)	Stress (psi)
0	0	0.000	0.000	3.043	0.00
10	3	0.003	0.000	3.044	3.28
20	5	0.005	0.000	3.045	6.57
40	8	0.008	0.001	3.046	13.13
60	9	0.009	0.001	3.046	19.70
110	10	0.010	0.001	3.046	36.11
150	11	0.011	0.001	3.047	49.23
180	11	0.011	0.001	3.047	59.08
240	12	0.012	0.001	3.047	78.77
300	13	0.013	0.001	3.047	98.45
350	14	0.014	0.001	3.048	114.84
380	15	0.015	0.001	3.048	124.68
450	16	0.016	0.002	3.048	147.63
500	17	0.017	0.002	3.049	164.01
590	18	0.018	0.002	3.049	193.52
670	19	0.019	0.002	3.049	219.74
720	19	0.019	0.002	3.049	236.13
800	20	0.020	0.002	3.049	262.35
900	20	0.020	0.002	3.049	295.14
1000	22	0.022	0.002	3.050	327.87

Unconfined Compressive Strength

ASTM D2166-85

Project: Fernald POP

Sample Description: 1174-87-01

Analyst: RGB Date: 12/23/98

Sample Weight (g): 331.65 Sample Height (cm): 10.2
Sample Diameter (cm): 5.0

Sample Volume (cm^3): 200.28 Bulk Density (g/cm^3): 1.66

Load (lb)	Strain (0.001 in)	Total Strain (in)	Unit Strain	Corrected Area (in^2)	Stress (psi)
0	0	0.000	0.000	3.043	0.00
10	1	0.001	0.000	3.044	3.29
30	2	0.002	0.000	3.044	9.86
60	4	0.004	0.000	3.045	19.71
90	6	0.006	0.001	3.045	29.55
120	8	0.008	0.001	3.046	39.40
150	9	0.009	0.001	3.046	49.24
180	11	0.011	0.001	3.047	59.08
210	12	0.012	0.001	3.047	68.92
240	13	0.013	0.001	3.047	78.76
270	15	0.015	0.001	3.048	88.59
300	15	0.015	0.001	3.048	98.43
330	17	0.017	0.002	3.049	108.25
360	19	0.019	0.002	3.049	118.07
390	21	0.021	0.002	3.050	127.88
420	22	0.022	0.002	3.050	137.70
450	24	0.024	0.002	3.051	147.51
480	26	0.026	0.003	3.051	157.31
510	28	0.028	0.003	3.052	167.11
540	32	0.032	0.003	3.053	176.87
570	34	0.034	0.003	3.054	186.66
599	44	0.044	0.004	3.057	195.97

Unconfined Compressive Strength

ASTM D2166-85

Project: Fernald POP

Sample Description: 1174-88-01

Analyst: RGB Date: 12/23/98

Sample Weight (g): 332.28 Sample Height (cm): 10.2
Sample Diameter (cm): 5.0

Sample Volume (cm^3): 200.28 Bulk Density (g/cm^3): 1.66

Load (lb)	Strain (0.001 in)	Total Strain (in)	Unit Strain	Corrected Area (in^2)	Stress (psi)
0	0	0.000	0.000	3.043	0.00
10	1	0.001	0.000	3.044	3.29
40	2	0.002	0.000	3.044	13.14
70	4	0.004	0.000	3.045	22.99
100	5	0.005	0.000	3.045	32.84
160	6	0.006	0.001	3.045	52.54
200	6	0.006	0.001	3.045	65.68
240	6	0.006	0.001	3.045	78.81
280	7	0.007	0.001	3.046	91.94
320	7	0.007	0.001	3.046	105.07
400	8	0.008	0.001	3.046	131.33
450	8	0.008	0.001	3.046	147.74
500	9	0.009	0.001	3.046	164.14
550	10	0.010	0.001	3.046	180.54
600	11	0.011	0.001	3.047	196.93
650	12	0.012	0.001	3.047	213.32
700	14	0.014	0.001	3.048	229.69
750	15	0.015	0.001	3.048	246.07
800	16	0.016	0.002	3.048	262.45
850	17	0.017	0.002	3.049	278.82
900	18	0.018	0.002	3.049	295.20
1000	20	0.02	0.002	3.049	327.93

Unconfined Compressive Strength

ASTM D2166-85

Project: Fernald POP

Sample Description: 1174-89-01

Analyst: RGB Date: 12/23/98

Sample Weight (g): 336.01 Sample Height (cm): 10.2
Sample Diameter (cm): 5.0

Sample Volume (cm^3): 200.28 Bulk Density (g/cm^3): 1.68

Load (lb)	Strain (0.001 in)	Total Strain (in)	Unit Strain	Corrected Area (in^2)	Stress (psi)
0	0	0.000	0.000	3.043	0.00
10	1	0.001	0.000	3.044	3.29
30	4	0.004	0.000	3.045	9.85
50	6	0.006	0.001	3.045	16.42
70	8	0.008	0.001	3.046	22.98
100	11	0.011	0.001	3.047	32.82
120	12	0.012	0.001	3.047	39.38
150	15	0.015	0.001	3.048	49.21
200	18	0.018	0.002	3.049	65.60
220	20	0.020	0.002	3.049	72.15
250	23	0.023	0.002	3.050	81.96
270	25	0.025	0.002	3.051	88.50
300	29	0.029	0.003	3.052	98.29
311	32	0.032	0.003	3.053	101.87

Unconfined Compressive Strength
ASTM D2166-85

Project: Fernald POP

Sample Description: 1174-90-01

Analyst: RGB Date: 12/23/98

Sample Weight (g): 327.76 Sample Height (cm): 10.2
Sample Diameter (cm): 5.0

Sample Volume (cm^3): 200.28 Bulk Density (g/cm^3): 1.64

Load (lb)	Strain (0.001 in)	Total Strain (in)	Unit Strain	Corrected Area (in^2)	Stress (psi)
0	0	0.000	0.000	3.043	0.00
20	1	0.001	0.000	3.044	6.57
30	3	0.003	0.000	3.044	9.85
50	5	0.005	0.000	3.045	16.42
80	8	0.008	0.001	3.046	26.27
100	10	0.010	0.001	3.046	32.83
120	12	0.012	0.001	3.047	39.38
140	14	0.014	0.001	3.048	45.94
160	16	0.016	0.002	3.048	52.49
180	17	0.017	0.002	3.049	59.05
200	19	0.019	0.002	3.049	65.59
220	20	0.020	0.002	3.049	72.15
240	22	0.022	0.002	3.050	78.69
260	23	0.023	0.002	3.050	85.24
280	25	0.025	0.002	3.051	91.78
300	26	0.026	0.003	3.051	98.32
320	28	0.028	0.003	3.052	104.86
350	33	0.033	0.003	3.053	114.63
370	36	0.036	0.004	3.054	121.14
380	39	0.039	0.004	3.055	124.38
400	43	0.043	0.004	3.056	130.88
426	54	0.054	0.005	3.060	139.23

Unconfined Compressive Strength

ASTM D2166-85

Project: Fernald POP

Sample Description: 1174-91-01

Analyst: RGB Date: 12/23/98

Sample Weight (g): 324.49 Sample Height (cm): 10.2
Sample Diameter (cm): 5.0

Sample Volume (cm^3): 200.28 Bulk Density (g/cm^3): 1.62

Load (lb)	Strain (0.001 in)	Total Strain (in)	Unit Strain	Corrected Area (in^2)	Stress (psi)
0	0	0.000	0.000	3.043	0.00
10	2	0.002	0.000	3.044	3.29
20	5	0.005	0.000	3.045	6.57
40	11	0.011	0.001	3.047	13.13
60	16	0.016	0.002	3.048	19.68
80	22	0.022	0.002	3.050	26.23
100	31	0.031	0.003	3.053	32.76
110	39	0.039	0.004	3.055	36.01
117	58	0.058	0.006	3.061	38.22

Unconfined Compressive Strength
ASTM D2166-85

Project: Fernald OU4 Silo 1 & 2 POP

Sample Description: 1174-91-02

Analyst: PRL Date: 12/30/98

Sample Weight (g): 321.42 Sample Height (cm): 10.0
Sample Diameter (cm): 5.0

Sample Volume (cm^3): 196.35 Bulk Density (g/cm^3): 1.64

Load (lb)	Strain (0.001 in)	Total Strain (in)	Unit Strain	Corrected Area (in^2)	Stress (psi)
0	0	0.000	0.000	3.043	0.00
20	3	0.003	0.000	3.044	6.57
40	6	0.006	0.001	3.045	13.14
60	9	0.009	0.001	3.046	19.70
80	13	0.013	0.001	3.047	26.25
100	16	0.016	0.002	3.048	32.81
120	19	0.019	0.002	3.049	39.35
140	24	0.024	0.002	3.051	45.89
150	27	0.027	0.003	3.052	49.15
160	32	0.032	0.003	3.053	52.40
170	36	0.036	0.004	3.054	55.66
175	41	0.041	0.004	3.056	57.27
175.4	43	0.043	0.004	3.057	57.38
174	46	0.046	0.005	3.057	56.91

Unconfined Compressive Strength
ASTM D2166-85

Project: Fernald Silos 1 and 2 POP

Sample Description: 11749103

Analyst: RGB Date: 1/5/99

Sample Weight (g): 319.35 Sample Height (cm): 10.2
Sample Diameter (cm): 5.0

Sample Volume (cm^3): 200.28 Bulk Density (g/cm^3): 1.59

Load (lb)	Strain (0.001 in)	Total Strain (in)	Unit Strain	Corrected Area (in^2)	Stress (psi)
0	0	0.000	0.000	3.043	0.00
10	0	0.000	0.000	3.043	3.29
20	0	0.000	0.000	3.043	6.57
60	1	0.001	0.000	3.044	19.71
100	6	0.006	0.001	3.045	32.84
120	9	0.009	0.001	3.046	39.39
140	13	0.013	0.001	3.047	45.94
160	17	0.017	0.002	3.049	52.48
180	23	0.023	0.002	3.050	59.01
195	32	0.032	0.003	3.053	63.87

Unconfined Compressive Strength
ASTM D2166-85

Project: Fernald Silos 1&2 POP

Sample Description: 1179017-01 14 Days

Analyst: RGB Date: 1/27/99

Sample Weight (g): 310.49 Sample Height (cm): 10.2
Sample Diameter (cm): 5.0

Sample Volume (cm^3): 200.28 Bulk Density (g/cm^3): 1.55

Load (lb)	Strain (0.001 in)	Total Strain (in)	Unit Strain	Corrected Area (in^2)	Stress (psi)
0	0	0.000	0.000	3.043	0.00
10	1	0.001	0.000	3.044	3.29
30	4	0.004	0.000	3.045	9.85
50	8	0.008	0.001	3.046	16.42
70	12	0.012	0.001	3.047	22.97
90	16	0.016	0.002	3.048	29.53
110	19	0.019	0.002	3.049	36.08
130	23	0.023	0.002	3.050	42.62
150	27	0.027	0.003	3.052	49.16
170	32	0.032	0.003	3.053	55.68
177	42	0.042	0.004	3.056	57.92

Unconfined Compressive Strength
ASTM D2166-85

Project: Fernald Silos 1&2 POP

Sample Description: 1179018-02 14 Days

Analyst: RGB Date: 1/27/99

Sample Weight (g): 306.39 Sample Height (cm): 10.1
Sample Diameter (cm): 5.0

Sample Volume (cm^3): 198.31 Bulk Density (g/cm^3): 1.54

Load (lb)	Strain (0.001 in)	Total Strain (in)	Unit Strain	Corrected Area (in^2)	Stress (psi)
0	0	0.000	0.000	3.043	0.00
10	3	0.003	0.000	3.044	3.28
30	7	0.007	0.001	3.046	9.85
50	11	0.011	0.001	3.047	16.41
70	14	0.014	0.001	3.048	22.97
90	17	0.017	0.002	3.049	29.52
110	20	0.020	0.002	3.049	36.07
130	23	0.023	0.002	3.050	42.62
150	26	0.026	0.003	3.051	49.16
170	31	0.031	0.003	3.053	55.69
190	35	0.035	0.003	3.054	62.21
210	41	0.041	0.004	3.056	68.72
211	43	0.043	0.004	3.056	69.03

Unconfined Compressive Strength
ASTM D2166-85

Project: Fernald Silos 1&2 POP

Sample Description: 1179019-03 14 Days

Analyst: RGB Date: 1/27/99

Sample Weight (g): 308.22 Sample Height (cm): 10.1
Sample Diameter (cm): 5.0

Sample Volume (cm^3): 198.31 Bulk Density (g/cm^3): 1.55

Load (lb)	Strain (0.001 in)	Total Strain (in)	Unit Strain	Corrected Area (in^2)	Stress (psi)
0	0	0.000	0.000	3.043	0.00
10	2	0.002	0.000	3.044	3.29
30	7	0.007	0.001	3.046	9.85
50	13	0.013	0.001	3.047	16.41
70	18	0.018	0.002	3.049	22.96
90	22	0.022	0.002	3.050	29.51
110	26	0.026	0.003	3.051	36.05
130	31	0.031	0.003	3.053	42.58
150	38	0.038	0.004	3.055	49.10
170	44	0.044	0.004	3.057	55.61
190	52	0.052	0.005	3.059	62.11
200	62	0.062	0.006	3.062	65.31
201	66	0.066	0.007	3.063	65.61

Unconfined Compressive Strength
ASTM D2166-85

Project: Fernald Silos 1&2 POP

Sample Description: 1179020-04 14 Days

Analyst: RGB Date: 1/27/99

Sample Weight (g): 312.5 Sample Height (cm): 10.2
Sample Diameter (cm): 5.0

Sample Volume (cm^3): 200.28 Bulk Density (g/cm^3): 1.56

Load (lb)	Strain (0.001 in)	Total Strain (in)	Unit Strain	Corrected Area (in^2)	Stress (psi)
0	0	0.000	0.000	3.043	0.00
10	5	0.005	0.000	3.045	3.28
20	10	0.010	0.001	3.046	6.57
30	18	0.018	0.002	3.049	9.84
42	38	0.038	0.004	3.055	13.75

Unconfined Compressive Strength

ASTM D2166-85

Project: Fernald Silos 1&2 POP

Sample Description: 1179021-05 14 Days

Analyst: RGB Date: 1/27/99

Sample Weight (g): 308.82 Sample Height (cm): 10.2
Sample Diameter (cm): 5.0

Sample Volume (cm^3): 200.28 Bulk Density (g/cm^3): 1.54

Load (lb)	Strain (0.001 in)	Total Strain (in)	Unit Strain	Corrected Area (in^2)	Stress (psi)
0	0	0.000	0.000	3.043	0.00
10	3	0.003	0.000	3.044	3.28
20	5	0.005	0.000	3.045	6.57
30	6	0.006	0.001	3.045	9.85
40	7	0.007	0.001	3.046	13.13
50	8	0.008	0.001	3.046	16.42
80	9	0.009	0.001	3.046	26.26
100	10	0.010	0.001	3.046	32.83
120	11	0.011	0.001	3.047	39.39
140	11	0.011	0.001	3.047	45.95
150	12	0.012	0.001	3.047	49.23
170	13	0.013	0.001	3.047	55.79
195	14	0.014	0.001	3.048	63.98
210	16	0.016	0.002	3.048	68.89
220	18	0.018	0.002	3.049	72.16
250	24	0.024	0.002	3.051	81.95
270	26	0.026	0.003	3.051	88.49
280	28	0.028	0.003	3.052	91.75
300	32	0.032	0.003	3.053	98.26
310	35	0.035	0.003	3.054	101.51
320	38	0.038	0.004	3.055	104.75
330	44	0.044	0.004	3.057	107.96

Unconfined Compressive Strength
ASTM D2166-85

Project: Fernald Silos 1&2 POP

Sample Description: 1179022-06 14 Days

Analyst: RGB Date: 1/28/99

Sample Weight (g): 305.65 Sample Height (cm): 10.1
Sample Diameter (cm): 5.0

Sample Volume (cm^3): 198.31 Bulk Density (g/cm^3): 1.54

Load (lb)	Strain (0.001 in)	Total Strain (in)	Unit Strain	Corrected Area (in^2)	Stress (psi)
0	0	0.000	0.000	3.043	0.00
10	2	0.002	0.000	3.044	3.29
30	4	0.004	0.000	3.045	9.85
50	8	0.008	0.001	3.046	16.42
70	14	0.014	0.001	3.048	22.97
90	23	0.023	0.002	3.050	29.50
100	28	0.028	0.003	3.052	32.77
109	37	0.037	0.004	3.055	35.68

Unconfined Compressive Strength
ASTM D2166-85

Project: Fernald Silos 1&2 POP

Sample Description: 1179023-07 14 Days

Analyst: RGB Date: 1/28/99

Sample Weight (g): 301.77 Sample Height (cm): 10.1
Sample Diameter (cm): 5.0

Sample Volume (cm^3): 198.31 Bulk Density (g/cm^3): 1.52

Load (lb)	Strain (0.001 in)	Total Strain (in)	Unit Strain	Corrected Area (in^2)	Stress (psi)
0	0	0.000	0.000	3.043	0.00
10	6	0.006	0.001	3.045	3.28
29	35	0.035	0.003	3.054	9.50

Unconfined Compressive Strength
ASTM D2166-85

Project: Fernald Silos 1&2 POP

Sample Description: 1179024-08 14 Days

Analyst: RGB Date: 1/28/99

Sample Weight (g): 312.95 Sample Height (cm): 10.1
Sample Diameter (cm): 5.0

Sample Volume (cm^3): 198.31 Bulk Density (g/cm^3): 1.58

Load (lb)	Strain (0.001 in)	Total Strain (in)	Unit Strain	Corrected Area (in^2)	Stress (psi)
0	0	0.000	0.000	3.043	0.00
10	6	0.006	0.001	3.045	3.28
30	7	0.007	0.001	3.046	9.85
50	9	0.009	0.001	3.046	16.41
70	11	0.011	0.001	3.047	22.98
90	14	0.014	0.001	3.048	29.53
110	16	0.016	0.002	3.048	36.09
130	18	0.018	0.002	3.049	42.64
150	21	0.021	0.002	3.050	49.18
170	24	0.024	0.002	3.051	55.73
190	28	0.028	0.003	3.052	62.26
195	33	0.033	0.003	3.053	63.86

Unconfined Compressive Strength
ASTM D2166-85

Project: Fernald Silos 1&2 POP

Sample Description: 1179025-09 14 Days

Analyst: RGB Date: 1/28/99

Sample Weight (g): 322.04 Sample Height (cm): 10.1
Sample Diameter (cm): 5.0

Sample Volume (cm^3): 198.31 Bulk Density (g/cm^3): 1.62

Load (lb)	Strain (0.001 in)	Total Strain (in)	Unit Strain	Corrected Area (in^2)	Stress (psi)
0	0	0.000	0.000	3.043	0.00
10	1	0.001	0.000	3.044	3.29
30	4	0.004	0.000	3.045	9.85
50	8	0.008	0.001	3.046	16.42
70	12	0.012	0.001	3.047	22.97
90	15	0.015	0.001	3.048	29.53
110	19	0.019	0.002	3.049	36.08
130	24	0.024	0.002	3.051	42.61
150	29	0.029	0.003	3.052	49.14
170	39	0.039	0.004	3.055	55.64
171	43	0.043	0.004	3.056	55.95

Unconfined Compressive Strength

ASTM D2166-85

Project: Fernald Silos 1&2 POP

Sample Description: 1179026-10 14 Days

Analyst: RGB Date: 1/28/99

Sample Weight (g): 320.84 Sample Height (cm): 10.2
Sample Diameter (cm): 5.0

Sample Volume (cm^3): 200.28 Bulk Density (g/cm^3): 1.60

Load (lb)	Strain (0.001 in)	Total Strain (in)	Unit Strain	Corrected Area (in^2)	Stress (psi)
0	0	0.000	0.000	3.043	0.00
10	1	0.001	0.000	3.044	3.29
30	1	0.001	0.000	3.044	9.86
50	2	0.002	0.000	3.044	16.43
70	4	0.004	0.000	3.045	22.99
90	7	0.007	0.001	3.046	29.55
110	10	0.010	0.001	3.046	36.11
130	16	0.016	0.002	3.048	42.65
150	30	0.030	0.003	3.052	49.14
151	39	0.039	0.004	3.055	49.43

Unconfined Compressive Strength

ASTM D2166-85

Project: Fernald Silos 1&2 POP

Sample Description: 1179028-09 (11) 14 Days

Analyst: RGB Date: 1/28/99

Sample Weight (g): 308.85 Sample Height (cm): 10.1
Sample Diameter (cm): 5.0

Sample Volume (cm^3): 198.31 Bulk Density (g/cm^3): 1.56

Load (lb)	Strain (0.001 in)	Total Strain (in)	Unit Strain	Corrected Area (in^2)	Stress (psi)
0	0	0.000	0.000	3.043	0.00
10	5	0.005	0.000	3.045	3.28
30	15	0.015	0.001	3.048	9.84
40	26	0.026	0.003	3.051	13.11
42	34	0.034	0.003	3.054	13.75

Unconfined Compressive Strength
ASTM D2166-85

Project: Fernald Silos 1&2 POP

Sample Description: 1179017-01 28 Days

Analyst: RGB Date: 2/10/99

Sample Weight (g): 291.89 Sample Height (cm): 10.1
Sample Diameter (cm): 5.0

Sample Volume (cm^3): 198.31 Bulk Density (g/cm^3): 1.47

Load (lb)	Strain (0.001 in)	Total Strain (in)	Unit Strain	Corrected Area (in^2)	Stress (psi)
0	0	0.000	0.000	3.043	0.00
80	2	0.002	0.000	3.044	26.28
120	3	0.003	0.000	3.044	39.42
150	4	0.004	0.000	3.045	49.27
180	4	0.004	0.000	3.045	59.12
220	5	0.005	0.000	3.045	72.25
250	5	0.005	0.000	3.045	82.10
280	6	0.006	0.001	3.045	91.95
310	6	0.006	0.001	3.045	101.80
360	7	0.007	0.001	3.046	118.21
400	7	0.007	0.001	3.046	131.34
500	8	0.008	0.001	3.046	164.16
630	10	0.010	0.001	3.046	206.80
720	11	0.011	0.001	3.047	236.32
780	12	0.012	0.001	3.047	255.99
830	13	0.013	0.001	3.047	272.37
860	14	0.014	0.001	3.048	282.18
900	15	0.015	0.001	3.048	295.28
950	16	0.016	0.002	3.048	311.65
1000	17	0.017	0.002	3.049	328.02

Unconfined Compressive Strength
ASTM D2166-85

Project: Fernald Silos 1&2 POP

Sample Description: 1179018-02 28 Days

Analyst: RGB Date: 2/10/99

Sample Weight (g): 306.75 Sample Height (cm): 10.1
Sample Diameter (cm): 5.0

Sample Volume (cm^3): 198.31 Bulk Density (g/cm^3): 1.55

Load (lb)	Strain (0.001 in)	Total Strain (in)	Unit Strain	Corrected Area (in^2)	Stress (psi)
0	0	0.000	0.000	3.043	0.00
50	5	0.005	0.000	3.045	16.42
110	15	0.015	0.001	3.048	36.09
160	23	0.023	0.002	3.050	52.45
220	35	0.035	0.003	3.054	72.04
280	42	0.042	0.004	3.056	91.62
340	46	0.046	0.005	3.057	111.21
400	51	0.051	0.005	3.059	130.77
460	55	0.055	0.005	3.060	150.32
520	58	0.058	0.006	3.061	169.88
570	60	0.060	0.006	3.062	186.18
630	63	0.063	0.006	3.063	205.71
700	66	0.066	0.007	3.063	228.50
780	70	0.070	0.007	3.065	254.51
850	73	0.073	0.007	3.066	277.27
900	76	0.076	0.008	3.067	293.49
1000	83	0.083	0.008	3.069	325.88

Unconfined Compressive Strength
ASTM D2166-85

Project: Fernald Silos 1&2 POP

Sample Description: 1179019-03 28 Days

Analyst: RGB Date: 2/10/99

Sample Weight (g): 312.37 Sample Height (cm): 10.1
Sample Diameter (cm): 5.0

Sample Volume (cm^3): 198.31 Bulk Density (g/cm^3): 1.58

Load (lb)	Strain (0.001 in)	Total Strain (in)	Unit Strain	Corrected Area (in^2)	Stress (psi)
0	0	0.000	0.000	3.043	0.00
10	1	0.001	0.000	3.044	3.29
30	4	0.004	0.000	3.045	9.85
70	6	0.006	0.001	3.045	22.99
100	8	0.008	0.001	3.046	32.83
130	9	0.009	0.001	3.046	42.68
170	10	0.010	0.001	3.046	55.80
200	11	0.011	0.001	3.047	65.64
230	11	0.011	0.001	3.047	75.49
270	12	0.012	0.001	3.047	88.61
300	12	0.012	0.001	3.047	98.46
350	13	0.013	0.001	3.047	114.85
400	14	0.014	0.001	3.048	131.25
450	14	0.014	0.001	3.048	147.65
500	15	0.015	0.001	3.048	164.04
550	15	0.015	0.001	3.048	180.45
600	16	0.016	0.002	3.048	196.83
650	17	0.017	0.002	3.049	213.22
700	17	0.017	0.002	3.049	229.62
750	18	0.018	0.002	3.049	245.99
800	18	0.018	0.002	3.049	262.39
1000	21	0.021	0.002	3.050	327.89

Unconfined Compressive Strength
ASTM D2166-85

Project: Fernald Silos 1&2 POP

Sample Description: 1179020-04 28 Days

Analyst: RGB Date: 2/10/99

Sample Weight (g): 310.00 Sample Height (cm): 10.1
Sample Diameter (cm): 5.0

Sample Volume (cm^3): 198.31 Bulk Density (g/cm^3): 1.56

Load (lb)	Strain (0.001 in)	Total Strain (in)	Unit Strain	Corrected Area (in^2)	Stress (psi)
0	0	0.000	0.000	3.043	0.00
10	1	0.001	0.000	3.044	3.29
30	5	0.005	0.000	3.045	9.85
70	11	0.011	0.001	3.047	22.98
100	14	0.014	0.001	3.048	32.81
130	17	0.017	0.002	3.049	42.64
170	22	0.022	0.002	3.050	55.74
200	26	0.026	0.003	3.051	65.55
230	31	0.031	0.003	3.053	75.34
238	35	0.035	0.003	3.054	77.93

Unconfined Compressive Strength
ASTM D2166-85

Project: Fernald Silos 1&2 POP

Sample Description: 1179021-05 28 Days

Analyst: RGB Date: 2/10/99

Sample Weight (g): 304.25 Sample Height (cm): 10.1
Sample Diameter (cm): 5.0

Sample Volume (cm^3): 198.31 Bulk Density (g/cm^3): 1.53

Load (lb)	Strain (0.001 in)	Total Strain (in)	Unit Strain	Corrected Area (in^2)	Stress (psi)
0	0	0.000	0.000	3.043	0.00
10	2	0.002	0.000	3.044	3.29
40	5	0.005	0.000	3.045	13.14
70	7	0.007	0.001	3.046	22.98
100	9	0.009	0.001	3.046	32.83
150	11	0.011	0.001	3.047	49.23
180	13	0.013	0.001	3.047	59.07
210	14	0.014	0.001	3.048	68.91
260	16	0.016	0.002	3.048	85.29
300	18	0.018	0.002	3.049	98.40
350	19	0.019	0.002	3.049	114.79
400	21	0.021	0.002	3.050	131.16
450	23	0.023	0.002	3.050	147.52
500	24	0.024	0.002	3.051	163.90
550	26	0.026	0.003	3.051	180.25
600	28	0.028	0.003	3.052	196.60
650	29	0.029	0.003	3.052	212.96
700	30	0.030	0.003	3.052	229.32
750	31	0.031	0.003	3.053	245.68
800	32	0.032	0.003	3.053	262.03
900	34	0.034	0.003	3.054	294.72
1000	38	0.038	0.004	3.055	327.34

Unconfined Compressive Strength
ASTM D2166-85

Project: Fernald Silos 1&2 POP

Sample Description: 1179022-06 28 Days

Analyst: RGB Date: 2/11/99

Sample Weight (g): 289.42 Sample Height (cm): 10.1
Sample Diameter (cm): 5.0

Sample Volume (cm^3): 198.31 Bulk Density (g/cm^3): 1.46

Load (lb)	Strain (0.001 in)	Total Strain (in)	Unit Strain	Corrected Area (in^2)	Stress (psi)
0	0	0.000	0.000	3.043	0.00
30	2	0.002	0.000	3.044	9.86
70	5	0.005	0.000	3.045	22.99
100	7	0.007	0.001	3.046	32.83
130	9	0.009	0.001	3.046	42.68
170	11	0.011	0.001	3.047	55.80
210	13	0.013	0.001	3.047	68.91
260	14	0.014	0.001	3.048	85.31
281	16	0.016	0.002	3.048	92.18

Unconfined Compressive Strength
ASTM D2166-85

Project: Fernald Silos 1&2 POP

Sample Description: 1179023-07 28 Days

Analyst: RGB Date: 2/11/99

Sample Weight (g): 305.90 Sample Height (cm): 10.2
Sample Diameter (cm): 5.0

Sample Volume (cm^3): 200.28 Bulk Density (g/cm^3): 1.53

Load (lb)	Strain (0.001 in)	Total Strain (in)	Unit Strain	Corrected Area (in^2)	Stress (psi)
0	0	0.000	0.000	3.043	0.00
20	1	0.001	0.000	3.044	6.57
70	4	0.004	0.000	3.045	22.99
110	8	0.008	0.001	3.046	36.12
160	12	0.012	0.001	3.047	52.51
192	21	0.021	0.002	3.050	62.96

Unconfined Compressive Strength
ASTM D2166-85

Project: Fernald Silos 1&2 POP

Sample Description: 1179024-08 28 Days

Analyst: RGB Date: 2/11/99

Sample Weight (g): 312.45 Sample Height (cm): 10.1
Sample Diameter (cm): 5.0

Sample Volume (cm^3): 198.31 Bulk Density (g/cm^3): 1.58

Load (lb)	Strain (0.001 in)	Total Strain (in)	Unit Strain	Corrected Area (in^2)	Stress (psi)
0	0	0.000	0.000	3.043	0.00
30	1	0.001	0.000	3.044	9.86
60	2	0.002	0.000	3.044	19.71
90	3	0.003	0.000	3.044	29.56
120	4	0.004	0.000	3.045	39.41
160	5	0.005	0.000	3.045	52.55
190	6	0.006	0.001	3.045	62.39
230	7	0.007	0.001	3.046	75.52
280	8	0.008	0.001	3.046	91.93
320	8	0.008	0.001	3.046	105.06
360	9	0.009	0.001	3.046	118.18
440	10	0.010	0.001	3.046	144.43
480	14	0.014	0.001	3.048	157.50
550	16	0.016	0.002	3.048	180.43
600	18	0.018	0.002	3.049	196.79
680	19	0.019	0.002	3.049	223.01
770	20	0.020	0.002	3.049	252.50
850	21	0.021	0.002	3.050	278.71
1000	23	0.023	0.002	3.050	327.83

Unconfined Compressive Strength
ASTM D2166-85

Project: Fernald Silos 1&2 POP

Sample Description: 1179025-09 28 Days

Analyst: RGB Date: 2/11/99

Sample Weight (g): 322.97 Sample Height (cm): 10.1
Sample Diameter (cm): 5.0

Sample Volume (cm^3): 198.31 Bulk Density (g/cm^3): 1.63

Load (lb)	Strain (0.001 in)	Total Strain (in)	Unit Strain	Corrected Area (in^2)	Stress (psi)
0	0	0.000	0.000	3.043	0.00
10	1	0.001	0.000	3.044	3.29
30	2	0.002	0.000	3.044	9.86
60	3	0.003	0.000	3.044	19.71
130	3	0.003	0.000	3.044	42.70
210	4	0.004	0.000	3.045	68.97
250	5	0.005	0.000	3.045	82.10
290	6	0.006	0.001	3.045	95.23
330	6	0.006	0.001	3.045	108.37
370	7	0.007	0.001	3.046	121.49
410	8	0.008	0.001	3.046	134.61
460	9	0.009	0.001	3.046	151.01
510	10	0.010	0.001	3.046	167.41
570	11	0.011	0.001	3.047	187.08
610	11	0.011	0.001	3.047	200.21
670	12	0.012	0.001	3.047	219.88
720	13	0.013	0.001	3.047	236.27
780	14	0.014	0.001	3.048	255.93
830	15	0.015	0.001	3.048	272.31
890	16	0.016	0.002	3.048	291.97
950	19	0.019	0.002	3.049	311.56
1000	21	0.021	0.002	3.050	327.89

Unconfined Compressive Strength
ASTM D2166-85

Project: Fernald Silos 1&2 POP

Sample Description: 1179026-10 28 Days

Analyst: RGB Date: 2/11/99

Sample Weight (g): 322.40 Sample Height (cm): 10.1
Sample Diameter (cm): 5.0

Sample Volume (cm^3): 198.31 Bulk Density (g/cm^3): 1.63

Load (lb)	Strain (0.001 in)	Total Strain (in)	Unit Strain	Corrected Area (in^2)	Stress (psi)
0	0	0.000	0.000	3.043	0.00
30	1	0.001	0.000	3.044	9.86
70	1	0.001	0.000	3.044	23.00
100	2	0.002	0.000	3.044	32.85
130	3	0.003	0.000	3.044	42.70
190	4	0.004	0.000	3.045	62.40
260	5	0.005	0.000	3.045	85.39
330	6	0.006	0.001	3.045	108.37
390	7	0.007	0.001	3.046	128.06
480	8	0.008	0.001	3.046	157.59
530	9	0.009	0.001	3.046	173.99
590	10	0.010	0.001	3.046	193.67
640	11	0.011	0.001	3.047	210.06
700	12	0.012	0.001	3.047	229.73
740	14	0.014	0.001	3.048	242.81
780	15	0.015	0.001	3.048	255.91
830	16	0.016	0.002	3.048	272.29
880	17	0.017	0.002	3.049	288.66
930	18	0.018	0.002	3.049	305.03
980	19	0.019	0.002	3.049	321.40
1000	20	0.020	0.002	3.049	327.93

Unconfined Compressive Strength
ASTM D2166-85

Project: Fernald Silos 1&2 POP

Sample Description: 1179028-09 (11) 28 Days

Analyst: RGB Date: 2/11/99

Sample Weight (g): 313.94 Sample Height (cm): 10.1
Sample Diameter (cm): 5.0

Sample Volume (cm^3): 198.31 Bulk Density (g/cm^3): 1.58

Load (lb)	Strain (0.001 in)	Total Strain (in)	Unit Strain	Corrected Area (in^2)	Stress (psi)
0	0	0.000	0.000	3.043	0.00
10	1	0.001	0.000	3.044	3.29
40	4	0.004	0.000	3.045	13.14
80	8	0.008	0.001	3.046	26.27
110	10	0.010	0.001	3.046	36.11
130	12	0.012	0.001	3.047	42.66
160	15	0.015	0.001	3.048	52.49
190	19	0.019	0.002	3.049	62.31
220	28	0.028	0.003	3.052	72.09
225	32	0.032	0.003	3.053	73.70

Unconfined Compressive Strength
ASTM D2166-85

Project: Fernald Silos 1&2 POP

Sample Description: 117952-01 14 Days

Analyst: RGB Date: 2/17/99

Sample Weight (g): 320.63 Sample Height (cm): 10.2
Sample Diameter (cm): 5.0

Sample Volume (cm^3): 200.28 Bulk Density (g/cm^3): 1.60

Load (lb)	Strain (0.001 in)	Total Strain (in)	Unit Strain	Corrected Area (in^2)	Stress (psi)
0	0	0.000	0.000	3.043	0.00
10	1	0.001	0.000	3.044	3.29
30	2	0.002	0.000	3.044	9.86
60	4	0.004	0.000	3.045	19.71
90	6	0.006	0.001	3.045	29.55
110	7	0.007	0.001	3.046	36.12
130	9	0.009	0.001	3.046	42.68
160	11	0.011	0.001	3.047	52.52
190	14	0.014	0.001	3.048	62.34
210	16	0.016	0.002	3.048	68.89
230	20	0.020	0.002	3.049	75.42
250	26	0.026	0.003	3.051	81.93
254	32	0.032	0.003	3.053	83.20

Unconfined Compressive Strength
ASTM D2166-85

Project: Fernald Silos 1&2 POP

Sample Description: 117953-01 14 Days

Analyst: RGB Date: 2/17/99

Sample Weight (g): 314.58 Sample Height (cm): 10.2
Sample Diameter (cm): 5.0

Sample Volume (cm^3): 200.28 Bulk Density (g/cm^3): 1.57

Load (lb)	Strain (0.001 in)	Total Strain (in)	Unit Strain	Corrected Area (in^2)	Stress (psi)
0	0	0.000	0.000	3.043	0.00
10	6	0.006	0.001	3.045	3.28
20	10	0.010	0.001	3.046	6.57
30	16	0.016	0.002	3.048	9.84
40	24	0.024	0.002	3.051	13.11
49	40	0.040	0.004	3.055	16.04

Unconfined Compressive Strength
ASTM D2166-85

Project: Fernald Silos 1&2 POP

Sample Description: 117954-01 14 Days

Analyst: RGB Date: 2/17/99

Sample Weight (g): 318.60 Sample Height (cm): 10.2
Sample Diameter (cm): 5.0

Sample Volume (cm^3): 200.28 Bulk Density (g/cm^3): 1.59

Load (lb)	Strain (0.001 in)	Total Strain (in)	Unit Strain	Corrected Area (in^2)	Stress (psi)
0	0	0.000	0.000	3.043	0.00
10	7	0.007	0.001	3.046	3.28
20	13	0.013	0.001	3.047	6.56
30	20	0.020	0.002	3.049	9.84
40	30	0.030	0.003	3.052	13.10
50	43	0.043	0.004	3.056	16.36
51	50	0.050	0.005	3.058	16.68

Unconfined Compressive Strength
ASTM D2166-85

Project: Fernald Silos 1&2 POP

Sample Description: 117955-01 14 Days

Analyst: RGB Date: 2/17/99

Sample Weight (g): 320.88 Sample Height (cm): 10.2
Sample Diameter (cm): 5.0

Sample Volume (cm^3): 200.28 Bulk Density (g/cm^3): 1.60

Load (lb)	Strain (0.001 in)	Total Strain (in)	Unit Strain	Corrected Area (in^2)	Stress (psi)
0	0	0.000	0.000	3.043	0.00
10	4	0.004	0.000	3.045	3.28
20	8	0.008	0.001	3.046	6.57
30	10	0.010	0.001	3.046	9.85
40	13	0.013	0.001	3.047	13.13
50	17	0.017	0.002	3.049	16.40
60	21	0.021	0.002	3.050	19.67
70	27	0.027	0.003	3.052	22.94
80	36	0.036	0.004	3.054	26.19
86	50	0.050	0.005	3.058	28.12

Unconfined Compressive Strength
ASTM D2166-85

Project: Fernald Silos 1&2 POP

Sample Description: 117956-01 14 Days

Analyst: RGB Date: 2/17/99

Sample Weight (g): 319.87 Sample Height (cm): 10.2
Sample Diameter (cm): 5.0

Sample Volume (cm^3): 200.28 Bulk Density (g/cm^3): 1.60

Load (lb)	Strain (0.001 in)	Total Strain (in)	Unit Strain	Corrected Area (in^2)	Stress (psi)
0	0	0.000	0.000	3.043	0.00
10	3	0.003	0.000	3.044	3.28
20	7	0.007	0.001	3.046	6.57
40	15	0.015	0.001	3.048	13.12
60	23	0.023	0.002	3.050	19.67
70	30	0.030	0.003	3.052	22.93
80	42	0.042	0.004	3.056	26.18
85	54	0.054	0.005	3.060	27.78

Unconfined Compressive Strength
ASTM D2166-85

Project: Fernald Silos 1&2 POP

Sample Description: 117957-01 14 Days

Analyst: RGB Date: 2/17/99

Sample Weight (g): 316.04 Sample Height (cm): 10.2
Sample Diameter (cm): 5.0

Sample Volume (cm^3): 200.28 Bulk Density (g/cm^3): 1.58

Load (lb)	Strain (0.001 in)	Total Strain (in)	Unit Strain	Corrected Area (in^2)	Stress (psi)
0	0	0.000	0.000	3.043	0.00
10	5	0.005	0.000	3.045	3.28
30	9	0.009	0.001	3.046	9.85
50	9	0.009	0.001	3.046	16.41
70	10	0.010	0.001	3.046	22.98
100	11	0.011	0.001	3.047	32.82
120	12	0.012	0.001	3.047	39.38
140	13	0.013	0.001	3.047	45.94
160	18	0.018	0.002	3.049	52.48
167	24	0.024	0.002	3.051	54.74

Unconfined Compressive Strength
ASTM D2166-85

Project: Fernald Silos 1&2 POP

Sample Description: 117958-01 14 Days

Analyst: RGB Date: 2/17/99

Sample Weight (g): 320.69 Sample Height (cm): 10.2
Sample Diameter (cm): 5.0

Sample Volume (cm^3): 200.28 Bulk Density (g/cm^3): 1.60

Load (lb)	Strain (0.001 in)	Total Strain (in)	Unit Strain	Corrected Area (in^2)	Stress (psi)
0	0	0.000	0.000	3.043	0.00
10	2	0.002	0.000	3.044	3.29
30	4	0.004	0.000	3.045	9.85
60	6	0.006	0.001	3.045	19.70
90	7	0.007	0.001	3.046	29.55
110	9	0.009	0.001	3.046	36.11
130	10	0.010	0.001	3.046	42.67
150	11	0.011	0.001	3.047	49.23
170	12	0.012	0.001	3.047	55.79
200	14	0.014	0.001	3.048	65.63
230	15	0.015	0.001	3.048	75.46
260	17	0.017	0.002	3.049	85.29
290	18	0.018	0.002	3.049	95.12
320	20	0.020	0.002	3.049	104.94
350	21	0.021	0.002	3.050	114.77
390	24	0.024	0.002	3.051	127.84
420	25	0.025	0.002	3.051	137.66
450	27	0.027	0.003	3.052	147.47
480	30	0.030	0.003	3.052	157.25
520	35	0.035	0.003	3.054	170.27
528	40	0.040	0.004	3.055	172.81

Unconfined Compressive Strength
ASTM D2166-85

Project: Fernald Silos 1&2 POP

Sample Description: 117959-01 14 Days

Analyst: RGB Date: 2/17/99

Sample Weight (g): 318.28 Sample Height (cm): 10.1
Sample Diameter (cm): 5.0

Sample Volume (cm^3): 198.31 Bulk Density (g/cm^3): 1.60

Load (lb)	Strain (0.001 in)	Total Strain (in)	Unit Strain	Corrected Area (in^2)	Stress (psi)
0	0	0.000	0.000	3.043	0.00
10	1	0.001	0.000	3.044	3.29
30	2	0.002	0.000	3.044	9.86
70	2	0.002	0.000	3.044	23.00
110	3	0.003	0.000	3.044	36.13
150	4	0.004	0.000	3.045	49.27
180	4	0.004	0.000	3.045	59.12
230	5	0.005	0.000	3.045	75.54
270	6	0.006	0.001	3.045	88.66
310	7	0.007	0.001	3.046	101.79
360	8	0.008	0.001	3.046	118.19
410	8	0.008	0.001	3.046	134.61
480	9	0.009	0.001	3.046	157.58
540	10	0.010	0.001	3.046	177.26
600	11	0.011	0.001	3.047	196.93
700	12	0.012	0.001	3.047	229.73
750	13	0.013	0.001	3.047	246.12
800	14	0.014	0.001	3.048	262.50
850	15	0.015	0.001	3.048	278.88
900	16	0.016	0.002	3.048	295.25
950	17	0.017	0.002	3.049	311.62
1000	18	0.018	0.002	3.049	327.99

Unconfined Compressive Strength
ASTM D2166-85

Project: Fernald Silos 1&2 POP

Sample Description: 117960-01 14 Days

Analyst: RGB Date: 2/17/99

Sample Weight (g): 314.03 Sample Height (cm): 10.2
Sample Diameter (cm): 5.0

Sample Volume (cm^3): 200.28 Bulk Density (g/cm^3): 1.57

Load (lb)	Strain (0.001 in)	Total Strain (in)	Unit Strain	Corrected Area (in^2)	Stress (psi)
0	0	0.000	0.000	3.043	0.00
10	2	0.002	0.000	3.044	3.29
30	7	0.007	0.001	3.046	9.85
60	10	0.010	0.001	3.046	19.70
80	12	0.012	0.001	3.047	26.26
100	14	0.014	0.001	3.048	32.81
130	16	0.016	0.002	3.048	42.65
160	18	0.018	0.002	3.049	52.48
190	21	0.021	0.002	3.050	62.30
220	24	0.024	0.002	3.051	72.12
250	27	0.027	0.003	3.052	81.93
270	29	0.029	0.003	3.052	88.46
290	32	0.032	0.003	3.053	94.99
310	38	0.038	0.004	3.055	101.48
318	45	0.045	0.004	3.057	104.03

Unconfined Compressive Strength
ASTM D2166-85

Project: Fernald Silos 1&2 POP

Sample Description: 117961-01 14 Days

Analyst: RGB Date: 2/17/99

Sample Weight (g): 317.78 Sample Height (cm): 10.2
Sample Diameter (cm): 5.0

Sample Volume (cm^3): 200.28 Bulk Density (g/cm^3): 1.59

Load (lb)	Strain (0.001 in)	Total Strain (in)	Unit Strain	Corrected Area (in^2)	Stress (psi)
0	0	0.000	0.000	3.043	0.00
10	2	0.002	0.000	3.044	3.29
30	6	0.006	0.001	3.045	9.85
60	10	0.010	0.001	3.046	19.70
90	14	0.014	0.001	3.048	29.53
120	18	0.018	0.002	3.049	39.36
140	20	0.020	0.002	3.049	45.91
170	23	0.023	0.002	3.050	55.73
200	25	0.025	0.002	3.051	65.55
230	28	0.028	0.003	3.052	75.37
260	33	0.033	0.003	3.053	85.15
290	41	0.041	0.004	3.056	94.90
297	49	0.049	0.005	3.058	97.12

Unconfined Compressive Strength
ASTM D2166-85

Project: Fernald Silos 1&2 POP

Sample Description: 117962-01 14 Days

Analyst: RGB Date: 2/17/99

Sample Weight (g): 317.79 Sample Height (cm): 10.2
Sample Diameter (cm): 5.0

Sample Volume (cm^3): 200.28 Bulk Density (g/cm^3): 1.59

Load (lb)	Strain (0.001 in)	Total Strain (in)	Unit Strain	Corrected Area (in^2)	Stress (psi)
0	0	0.000	0.000	3.043	0.00
10	1	0.001	0.000	3.044	3.29
30	2	0.002	0.000	3.044	9.86
60	4	0.004	0.000	3.045	19.71
90	5	0.005	0.000	3.045	29.56
120	7	0.007	0.001	3.046	39.40
150	9	0.009	0.001	3.046	49.24
180	10	0.010	0.001	3.046	59.09
210	13	0.013	0.001	3.047	68.91
240	16	0.016	0.002	3.048	78.73
270	21	0.021	0.002	3.050	88.53
300	27	0.027	0.003	3.052	98.31
320	34	0.034	0.003	3.054	104.79
325	40	0.040	0.004	3.055	106.37

Unconfined Compressive Strength
ASTM D2166-85

Project: Fernald Silos 1&2 POP

Sample Description: 117963-01 14 Days

Analyst: RGB Date: 2/17/99

Sample Weight (g): 318.47 Sample Height (cm): 10.3
Sample Diameter (cm): 5.0

Sample Volume (cm^3): 202.24 Bulk Density (g/cm^3): 1.57

Load (lb)	Strain (0.001 in)	Total Strain (in)	Unit Strain	Corrected Area (in^2)	Stress (psi)
0	0	0.000	0.000	3.043	0.00
10	2	0.002	0.000	3.044	3.29
30	5	0.005	0.000	3.045	9.85
60	7	0.007	0.001	3.046	19.70
90	9	0.009	0.001	3.046	29.55
120	11	0.011	0.001	3.047	39.39
150	13	0.013	0.001	3.047	49.22
180	15	0.015	0.001	3.048	59.06
210	17	0.017	0.002	3.048	68.89
240	19	0.019	0.002	3.049	78.71
270	23	0.023	0.002	3.050	88.52
300	26	0.026	0.003	3.051	98.32
330	29	0.029	0.003	3.052	108.12
360	35	0.035	0.003	3.054	117.89
374	42	0.042	0.004	3.056	122.39

Unconfined Compressive Strength
ASTM D2166-85

Project: Fernald Silos 1&2 POP

Sample Description: 117964-01 14 Days

Analyst: RGB Date: 2/17/99

Sample Weight (g): 315.76 Sample Height (cm): 10.2
Sample Diameter (cm): 5.0

Sample Volume (cm^3): 200.28 Bulk Density (g/cm^3): 1.58

Load (lb)	Strain (0.001 in)	Total Strain (in)	Unit Strain	Corrected Area (in^2)	Stress (psi)
0	0	0.000	0.000	3.043	0.00
20	2	0.002	0.000	3.044	6.57
50	5	0.005	0.000	3.045	16.42
80	8	0.008	0.001	3.046	26.27
110	10	0.010	0.001	3.046	36.11
140	12	0.012	0.001	3.047	45.95
170	15	0.015	0.001	3.048	55.78
200	17	0.017	0.002	3.049	65.61
230	18	0.018	0.002	3.049	75.44
260	21	0.021	0.002	3.050	85.25
290	23	0.023	0.002	3.050	95.07
310	24	0.024	0.002	3.051	101.62
340	26	0.026	0.003	3.051	111.43
370	28	0.028	0.003	3.052	121.24
400	29	0.029	0.003	3.052	131.06
430	31	0.031	0.003	3.053	140.86
460	34	0.034	0.003	3.054	150.64
490	38	0.038	0.004	3.055	160.40
498	43	0.043	0.004	3.056	162.94

Unconfined Compressive Strength
ASTM D2166-85

Project: Fernald Silos 1&2 POP

Sample Description: 117965-01 14 Days

Analyst: RGB Date: 2/17/99

Sample Weight (g): 320.65 Sample Height (cm): 10.2
Sample Diameter (cm): 5.0

Sample Volume (cm^3): 200.28 Bulk Density (g/cm^3): 1.60

Load (lb)	Strain (0.001 in)	Total Strain (in)	Unit Strain	Corrected Area (in^2)	Stress (psi)
0	0	0.000	0.000	3.043	0.00
10	1	0.001	0.000	3.044	3.29
40	3	0.003	0.000	3.044	13.14
70	4	0.004	0.000	3.045	22.99
100	6	0.006	0.001	3.045	32.84
130	6	0.006	0.001	3.045	42.69
160	7	0.007	0.001	3.046	52.54
200	8	0.008	0.001	3.046	65.66
250	9	0.009	0.001	3.046	82.07
300	10	0.010	0.001	3.046	98.48
350	11	0.011	0.001	3.047	114.88
400	12	0.012	0.001	3.047	131.28
450	12	0.012	0.001	3.047	147.69
500	13	0.013	0.001	3.047	164.08
600	14	0.014	0.001	3.048	196.88
700	15	0.015	0.001	3.048	229.67
800	16	0.016	0.002	3.048	262.45
900	18	0.018	0.002	3.049	295.20
1000	19	0.019	0.002	3.049	327.96

Unconfined Compressive Strength
ASTM D2166-85

Project: Fernald Silos 1&2 POP

Sample Description: 117953-02 28 Days

Analyst: RGB Date: 3/3/99

Sample Weight (g): 314.68 Sample Height (cm): 10.1
Sample Diameter (cm): 5.0

Sample Volume (cm^3): 198.31 Bulk Density (g/cm^3): 1.59

Load (lb)	Strain (0.001 in)	Total Strain (in)	Unit Strain	Corrected Area (in^2)	Stress (psi)
0	0	0.000	0.000	3.043	0.00
10	4	0.004	0.000	3.045	3.28
20	7	0.007	0.001	3.046	6.57
30	11	0.011	0.001	3.047	9.85
40	14	0.014	0.001	3.048	13.12
50	18	0.018	0.002	3.049	16.40
60	22	0.022	0.002	3.050	19.67
70	27	0.027	0.003	3.052	22.94
80	34	0.034	0.003	3.054	26.20
84	43	0.043	0.004	3.056	27.48

Unconfined Compressive Strength
ASTM D2166-85

Project: Fernald Silos 1&2 POP

Sample Description: 117954-02 28 Days

Analyst: RGB Date: 3/3/99

Sample Weight (g): 317.24 Sample Height (cm): 10.1
Sample Diameter (cm): 5.0

Sample Volume (cm^3): 198.31 Bulk Density (g/cm^3): 1.60

Load (lb)	Strain (0.001 in)	Total Strain (in)	Unit Strain	Corrected Area (in^2)	Stress (psi)
0	0	0.000	0.000	3.043	0.00
10	3	0.003	0.000	3.044	3.28
30	8	0.008	0.001	3.046	9.85
50	14	0.014	0.001	3.048	16.41
70	19	0.019	0.002	3.049	22.96
90	27	0.027	0.003	3.052	29.49
100	34	0.034	0.003	3.054	32.75
105	42	0.042	0.004	3.056	34.36

Unconfined Compressive Strength
ASTM D2166-85

Project: Fernald Silos 1&2 POP

Sample Description: 117955-02 28 Days

Analyst: RGB Date: 3/3/99

Sample Weight (g): 322.36 Sample Height (cm): 10.2
Sample Diameter (cm): 5.0

Sample Volume (cm^3): 200.28 Bulk Density (g/cm^3): 1.61

Load (lb)	Strain (0.001 in)	Total Strain (in)	Unit Strain	Corrected Area (in^2)	Stress (psi)
0	0	0.000	0.000	3.043	0.00
10	3	0.003	0.000	3.044	3.28
30	9	0.009	0.001	3.046	9.85
50	17	0.017	0.002	3.049	16.40
60	22	0.022	0.002	3.050	19.67
70	26	0.026	0.003	3.051	22.94
80	30	0.030	0.003	3.052	26.21
90	36	0.036	0.004	3.054	29.47
100	46	0.046	0.005	3.057	32.71
102	53	0.053	0.005	3.059	33.34

Unconfined Compressive Strength
ASTM D2166-85

Project: Fernald Silos 1&2 POP

Sample Description: 117956-02 28 Days

Analyst: RGB Date: 3/3/99

Sample Weight (g): 318.00 Sample Height (cm): 10.1
Sample Diameter (cm): 5.0

Sample Volume (cm^3): 198.31 Bulk Density (g/cm^3): 1.60

Load (lb)	Strain (0.001 in)	Total Strain (in)	Unit Strain	Corrected Area (in^2)	Stress (psi)
0	0	0.000	0.000	3.043	0.00
10	1	0.001	0.000	3.044	3.29
20	4	0.004	0.000	3.045	6.57
30	7	0.007	0.001	3.046	9.85
40	9	0.009	0.001	3.046	13.13
50	10	0.010	0.001	3.046	16.41
60	12	0.012	0.001	3.047	19.69
70	15	0.015	0.001	3.048	22.97
80	17	0.017	0.002	3.049	26.24
90	20	0.020	0.002	3.049	29.51
100	23	0.023	0.002	3.050	32.78
110	26	0.026	0.003	3.051	36.05
120	32	0.032	0.003	3.053	39.30
126	41	0.041	0.004	3.056	41.23

Unconfined Compressive Strength
ASTM D2166-85

Project: Fernald Silos 1&2 POP

Sample Description: 117957-02 28 Days

Analyst: RGB Date: 3/3/99

Sample Weight (g): 317.58 Sample Height (cm): 10.2
Sample Diameter (cm): 5.0

Sample Volume (cm^3): 200.28 Bulk Density (g/cm^3): 1.59

Load (lb)	Strain (0.001 in)	Total Strain (in)	Unit Strain	Corrected Area (in^2)	Stress (psi)
0	0	0.000	0.000	3.043	0.00
10	2	0.002	0.000	3.044	3.29
30	5	0.005	0.000	3.045	9.85
60	7	0.007	0.001	3.046	19.70
90	9	0.009	0.001	3.046	29.55
120	10	0.010	0.001	3.046	39.39
150	12	0.012	0.001	3.047	49.23
180	14	0.014	0.001	3.048	59.06
210	15	0.015	0.001	3.048	68.90
240	17	0.017	0.002	3.049	78.73
270	19	0.019	0.002	3.049	88.55
300	22	0.022	0.002	3.050	98.36
330	26	0.026	0.003	3.051	108.15
338	31	0.031	0.003	3.053	110.72

#	Sample Name	File	Method	Date	Time	OpID	Type	Mode
1	9023 T8	17NOV98	FWF	11/18/98	17:56	CEM	S	CONC
2	9023 T9	17NOV98	FWF	11/18/98	18:02	CEM	S	CONC
3	CCV	17NOV98	FWF	11/18/98	18:19	EML	Q	CONC
4	CCB	17NOV98	FWF	11/18/98	18:25	EML	B	CONC
5	HI STD	17NOV98	FWF	11/17/98	18:30		S	CONC
6	ICV	17NOV98	FWF	11/17/98	18:34	EML	Q	CONC
7	ICB	17NOV98	FWF	11/17/98	18:38	EML	B	CONC
8	9023 40X	17NOV98	FWF	11/17/98	18:44	EML	S	CONC
9	GG9023 400X	17NOV98	FWF	11/17/98	18:48	EML	S	CONC
10	I0215 BLK 11/17/98	17NOV98	FWF	11/17/98	18:51	EML	S	CONC
11	I0215LCS 11/17/98	17NOV98	FWF	11/17/98	18:55	EML	S	CONC
12	FL2 EXT BLK 11/17/98	17NOV98	FWF	11/17/98	19:00	EML	S	CONC
13	1174 69 01 10X	17NOV98	FWF	11/17/98	19:04	EML	S	CONC
14	1174 69 02 10X	17NOV98	FWF	11/17/98	19:07	EML	S	CONC
15	1174 69 03 10X	17NOV98	FWF	11/17/98	19:11	EML	S	CONC
16	1174 69 03 DUP 10X	17NOV98	FWF	11/17/98	19:15	EML	S	CONC
17	1174 69 04 10X	17NOV98	FWF	11/17/98	19:18	EML	S	CONC
18	1174 70 01 10X	17NOV98	FWF	11/17/98	19:22	EML	S	CONC
19	1174 70 02 10X	17NOV98	FWF	11/17/98	19:26	EML	S	CONC
	1174 70 03 10X	17NOV98	FWF	11/17/98	19:29	EML	S	CONC
[illegible]	1174 70 04 10X	17NOV98	FWF	11/17/98	19:33	EML	S	CONC
[illegible]	CCV	17NOV98	FWF	11/17/98	19:37	EML	Q	CONC
23	CCB	17NOV98	FWF	11/17/98	19:40	EML	B	CONC
24	1174 71 01 10X	17NOV98	FWF	11/17/98	19:44	EML	S	CONC
25	1174 71 02 10X	17NOV98	FWF	11/17/98	19:48	EML	S	CONC
26	1174 71 03 10X	17NOV98	FWF	11/17/98	19:51	EML	S	CONC
27	1174 71 04 10X	17NOV98	FWF	11/17/98	19:55	EML	S	CONC
28	CCV	17NOV98	FWF	11/17/98	19:59	EML	Q	CONC
29	CCB	17NOV98	FWF	11/17/98	20:02	EML	B	CONC

A· lysis Report Averages Tue 03-09-99 05:25:48 PM page 2

#	Sample Name	Pb2203
1	9023 T8	D.7733
2	9023 T9	D-.3026
3	CCV	Q1.566
4	CCB	D.0193
5	HI STD	9.912
6	ICV	1.820
7	ICB	D-.0166
8	9023 40X	D12.96
9	GG9023 400X	D11.21
10	I0215 BLK 11/17/98	D-.0400
11	I0215LCS 11/17/98	186.1
12	FL2 EXT BLK 11/17/98	D.0322
13	1174 69 01 10X	475.1
14	1174 69 02 10X	558.7
15	1174 69 03 10X	621.4
16	1174 69 03 DUP 10X	633.4
17	1174 69 04 10X	681.1
18	1174 70 01 10X	D3.058
19	1174 70 02 10X	D2.040
[illegible]	1174 70 03 10X	d5.894
[illegible]	1174 70 04 10X	D4.426
2[illegible]	[illegible]CV	1.862
2[illegible]	[illegible]CB	D-.0412
24	1174 71 01 10X	419.1
25	1174 71 02 10X	512.9
26	1174 71 03 10X	555.8
27	1174 71 04 10X	565.9
28	CCV	1.891
29	CCB	D-.0359

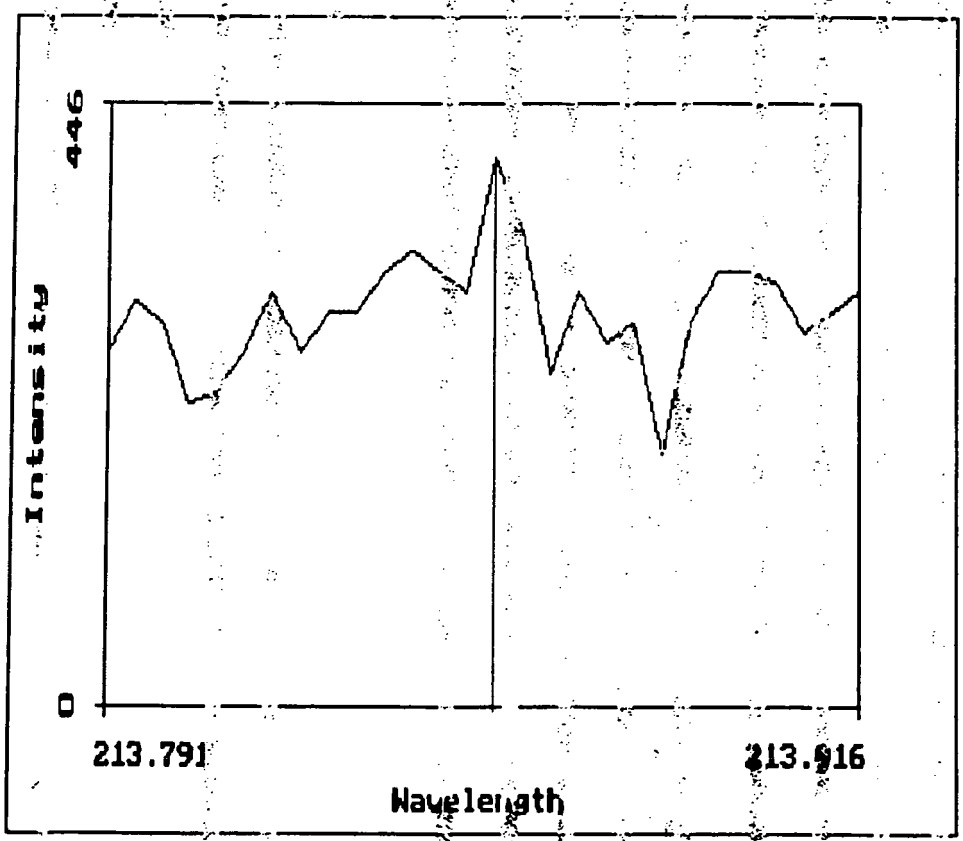
Standardization Rpt. Tue 11-17-98 06:15:52 PM page 1

Method: FWF Standard: STD1-Blank
Run Time: 11/17/98 18:13:39

Elem	Pb2203	Zn2138
Avge	D.0022	D.0107
SDev	.0046	.0040
%RSD	205.3	37.28
#1	D-.0026	D.0059
#2	D.0029	D.0148
#3	D.0064	D.0124

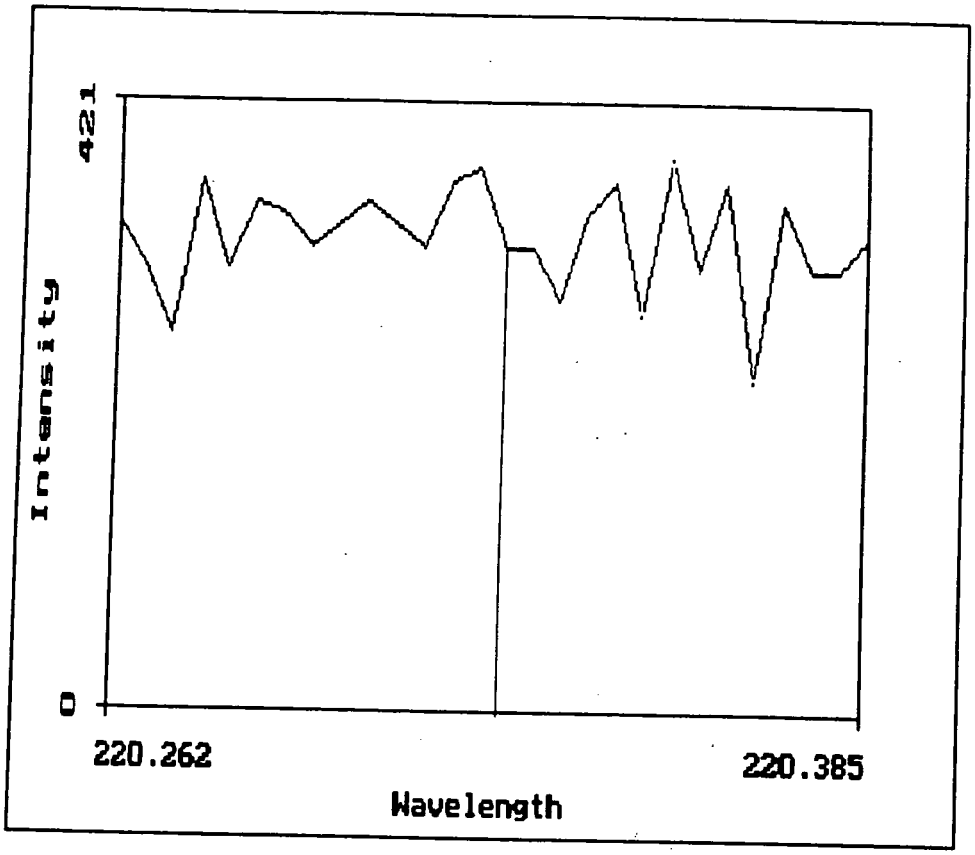
Analyte Scan

Element Name: Zn2138
Wavelength : 213.854



Analyte Scan

Element Name: Pb2203
Wavelength : 220.323

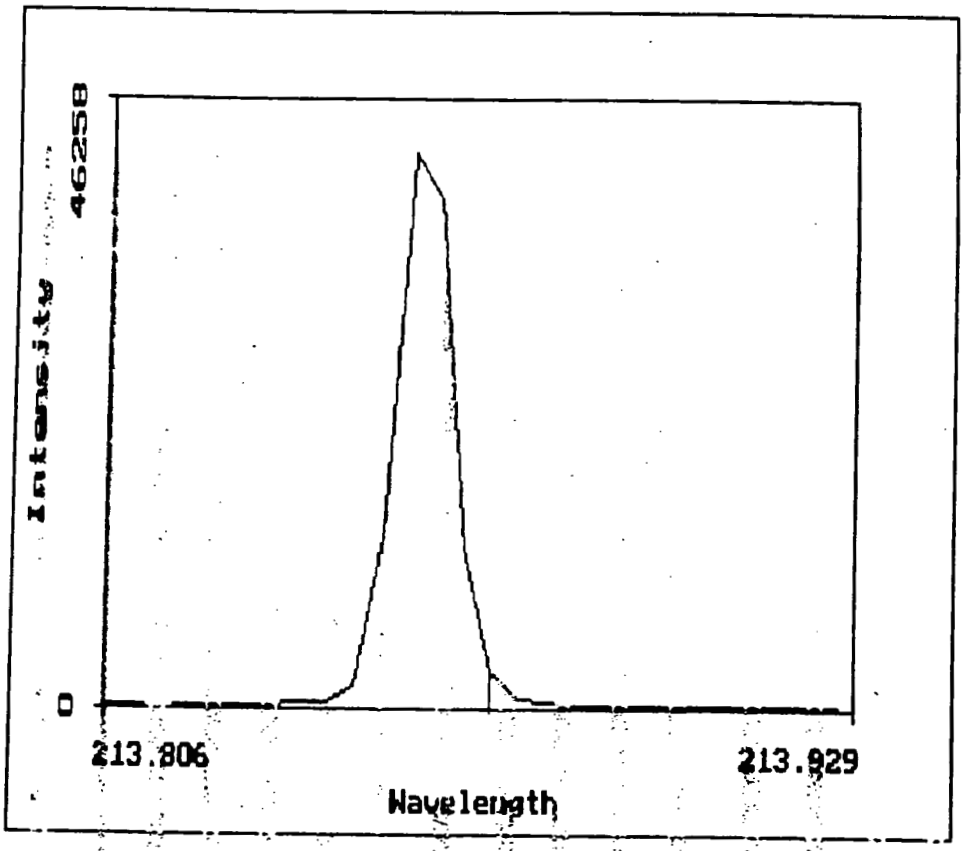


Method: FWF Standard: STD2
Run Time: 11/17/98 18:22:47

Elem	Pb2203	Zn2138
Avge	1.108	D.6243
SDev	.014	.0413
%RSD	1.246	6.623
#1	1.119	D.6707
#2	1.111	D.6111
#3	1.092	D.5912

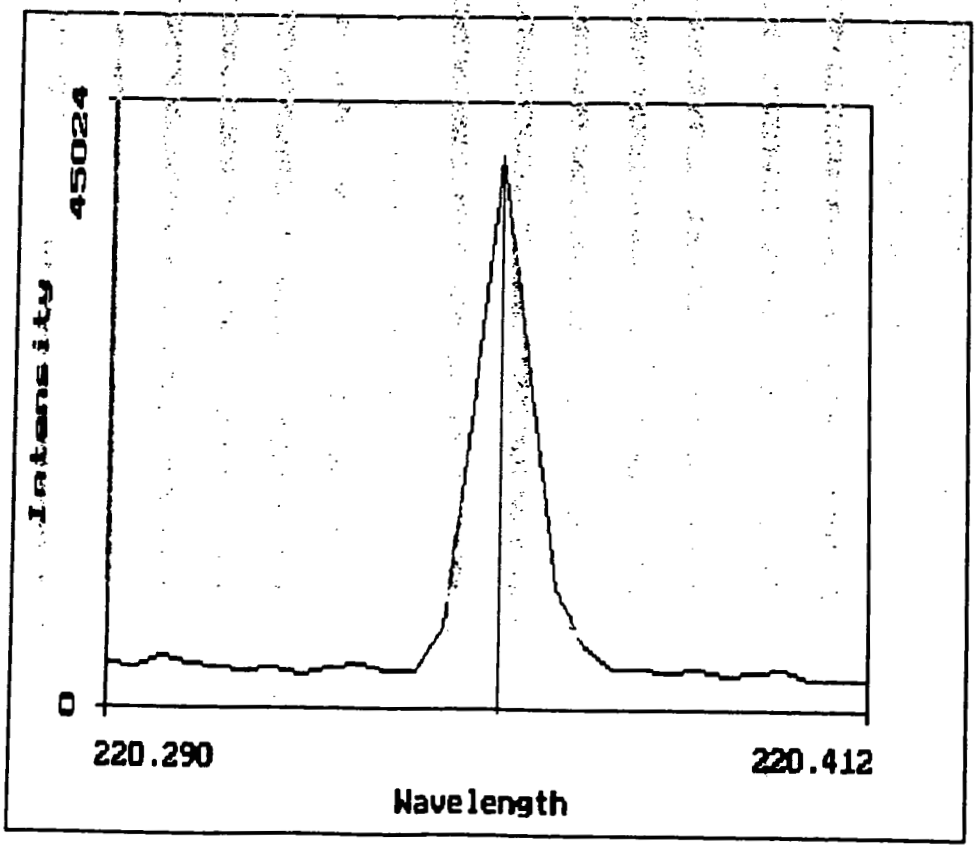
Analyte Scan

Element Name: Zn2138
Wavelength : 213.867



nalyte Scan

lement Name: Pt2203
avelength : 220.351



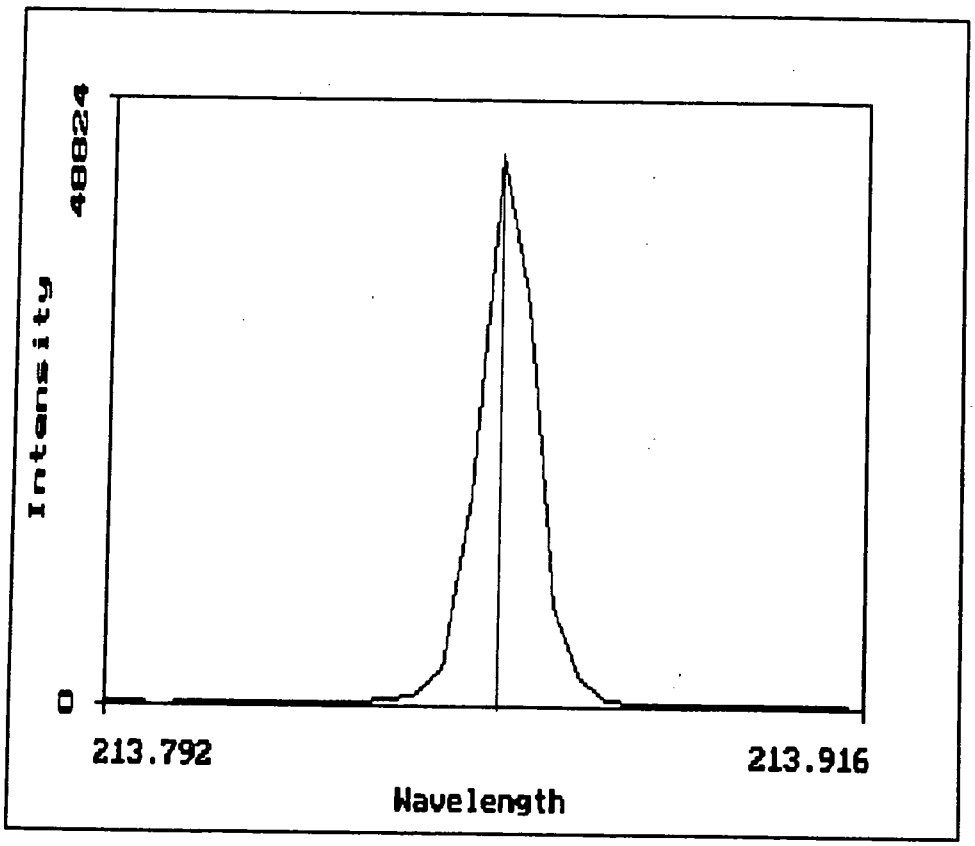
Standardization Rpt. Tue 11-17-98 06:30:29 PM page 1

Method: FWF Standard: STD2
Run Time: 11/17/98 18:28:17

Elem	Pb2203	Zn2138
Avge	1.103	11.62
SDev	.008	.07
%RSD	.7056	.6017
#1	1.095	11.70
#2	1.103	11.61
#3	1.111	11.56

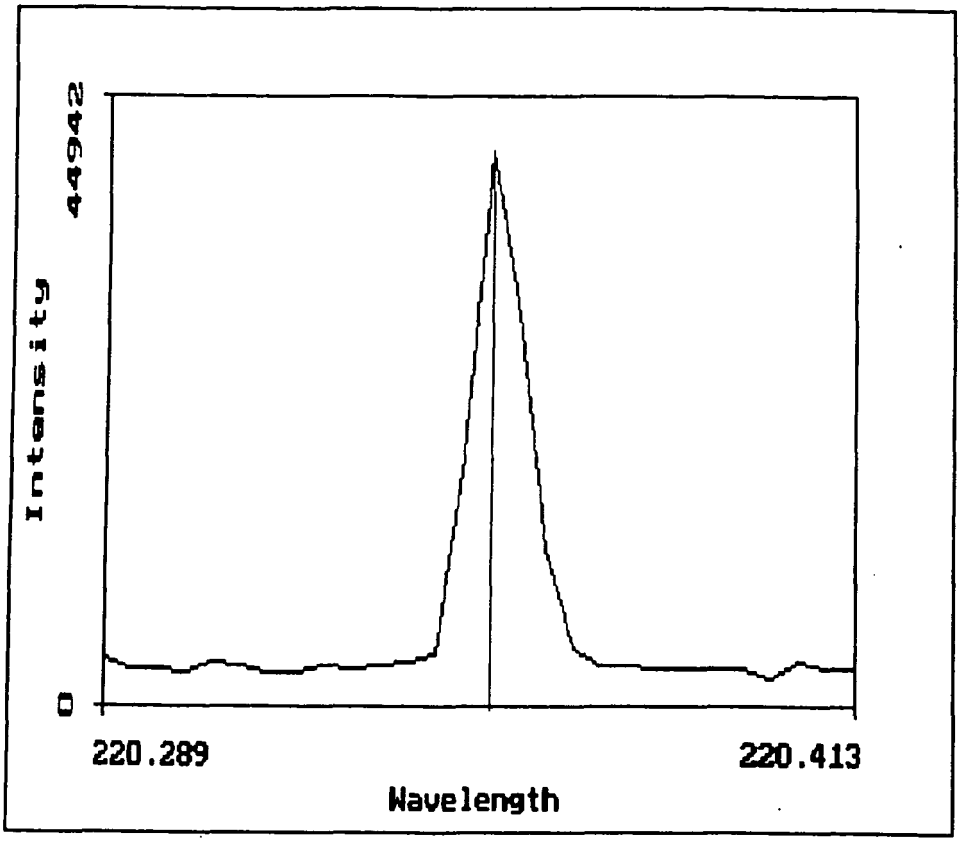
Analyte Scan

Element Name: Zn2138
Wavelength : 213.854



Analyte Scan

Element Name: Pb2203
Wavelength : 220.351

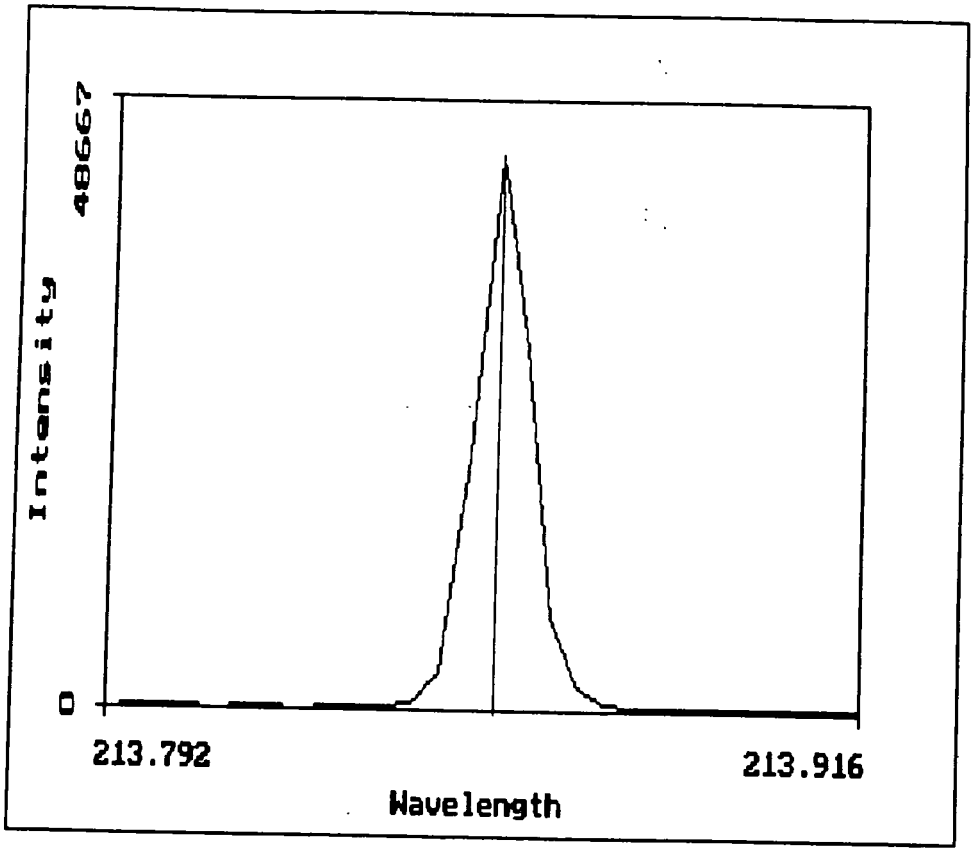


Method: FWF Sample Name: HI STD Operator:
Run Time: 11/17/98 18:30:59
Comment:
Mode: CONC Corr. Factor: 1

Elem	Pb2203	Zn2138
Units	mg/l	mg/l
Avge	9.912	3.959
SDev	.081	.015
%RSD	.8172	.3750
#1	9.931	3.954
#2	9.823	3.947
#3	9.982	3.976

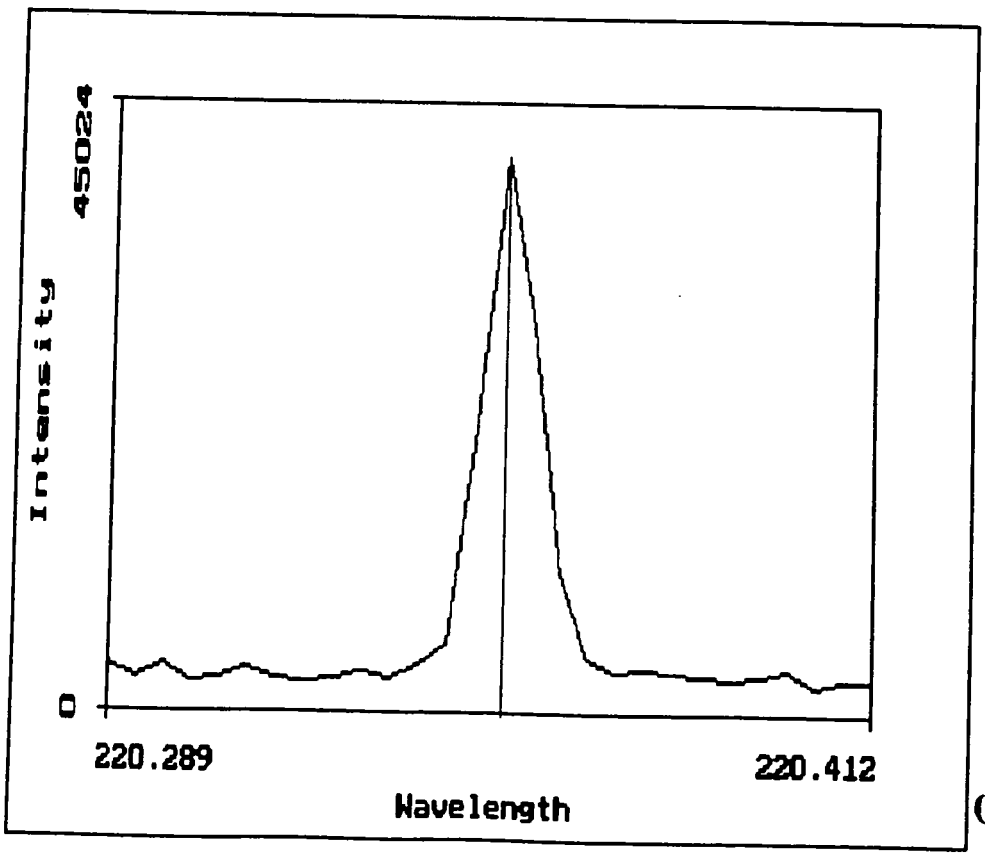
Analyte Scan

Element Name: Zn2138
Wavelength : 213.854



Analyte Scan

Element Name: Pb2203
Wavelength : 220.351



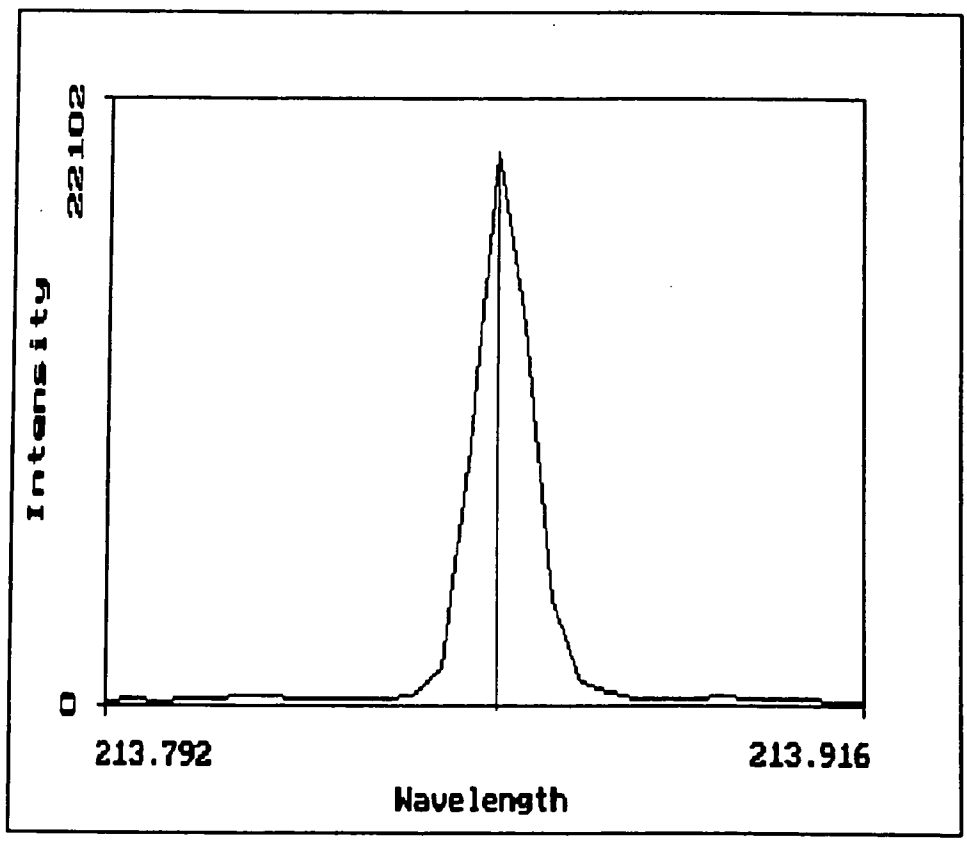
Analysis Report QC Standard Tue 11-17-98 06:38:20 PM page 1

Method: FWF Sample Name: ICV Operator: EML
Run Time: 11/17/98 18:34:24
Comment: TCLP EXTRACTS Pb
Mode: CONC Corr. Factor: 1

Elem	Pb2203	Zn2138
Units	mg/l	mg/l
Avge	1.820	1.818
SDev	.005	.005
%RSD	.2901	.2631
#1	1.816	1.819
#2	1.819	1.813
#3	1.826	1.822
Errors	QC Pass	QC Pass
Value	2.000	2.000
Range	10.00	10.00

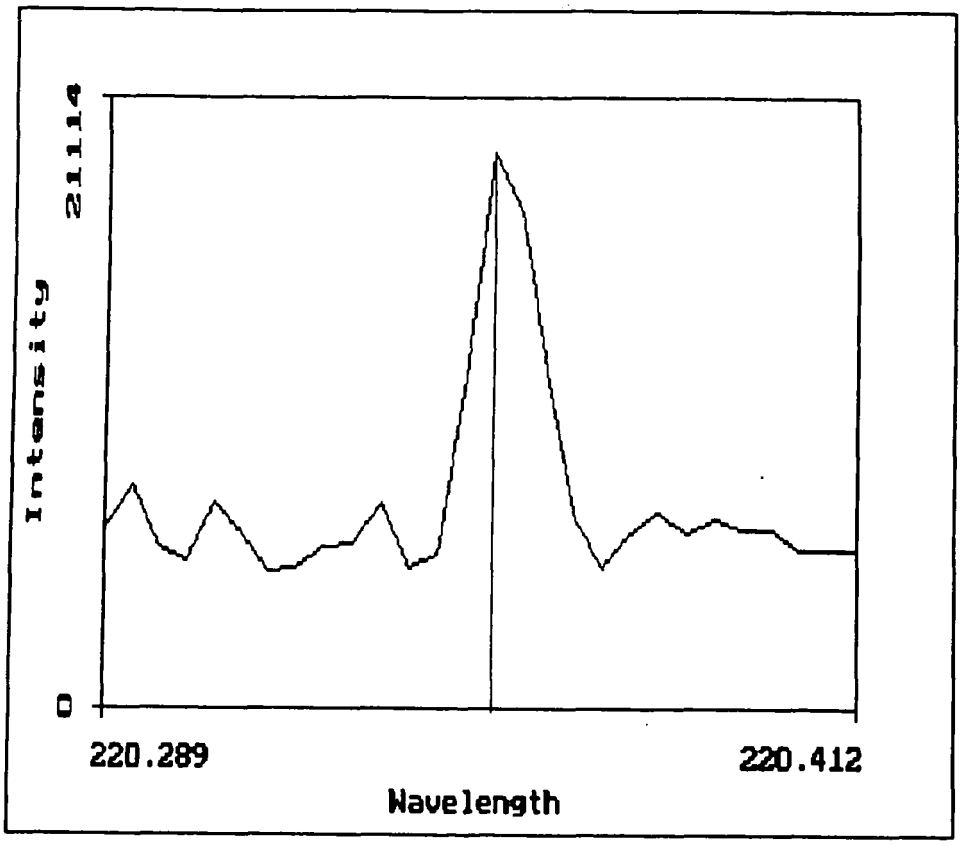
Analyte Scan

Element Name: Zn2138
Wavelength : 213.854



Analyte Scan

Element Name: Pb2203
Wavelength : 220.351

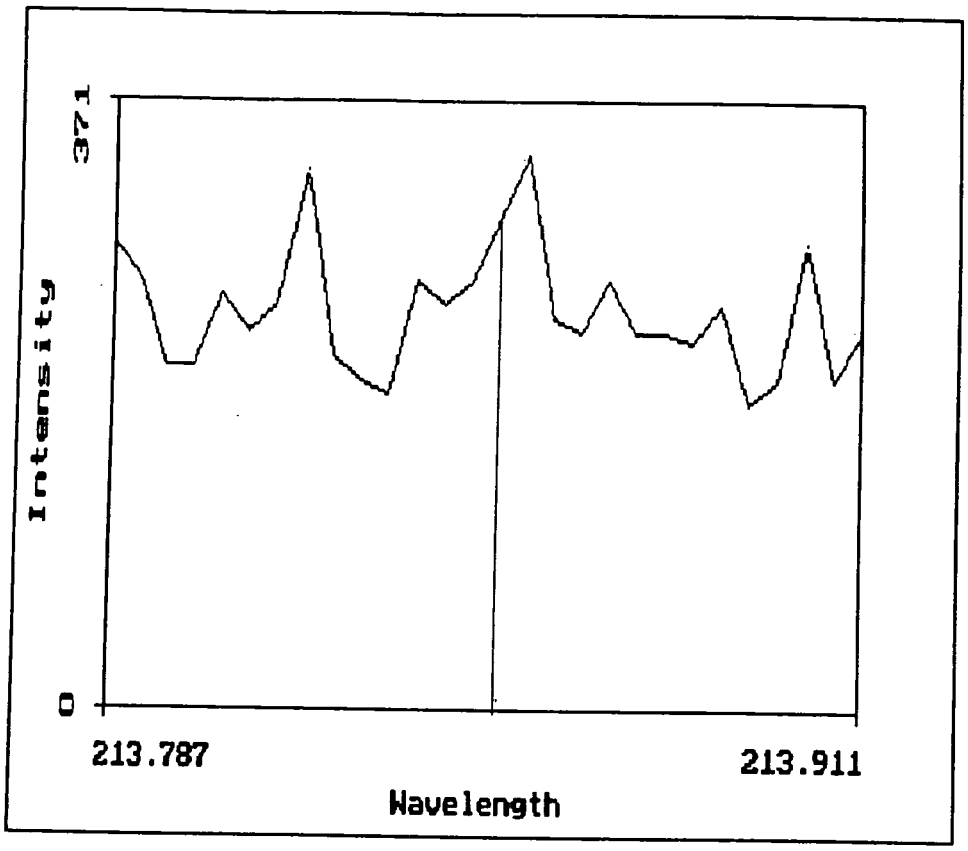


Method: FWF Sample Name: ICB Operator: EML
Run Time: 11/17/98 18:38:39
Comment:
Mode: CONC Corr. Factor: 1

Elem	Pb2203	Zn2138
Units	mg/l	mg/l
Avge	D-.0166	D.0016
SDev	.0373	.0013
%RSD	224.1	84.84
#1	D-.0161	D.0031
#2	D.0204	D.0010
#3	D-.0542	D.0006

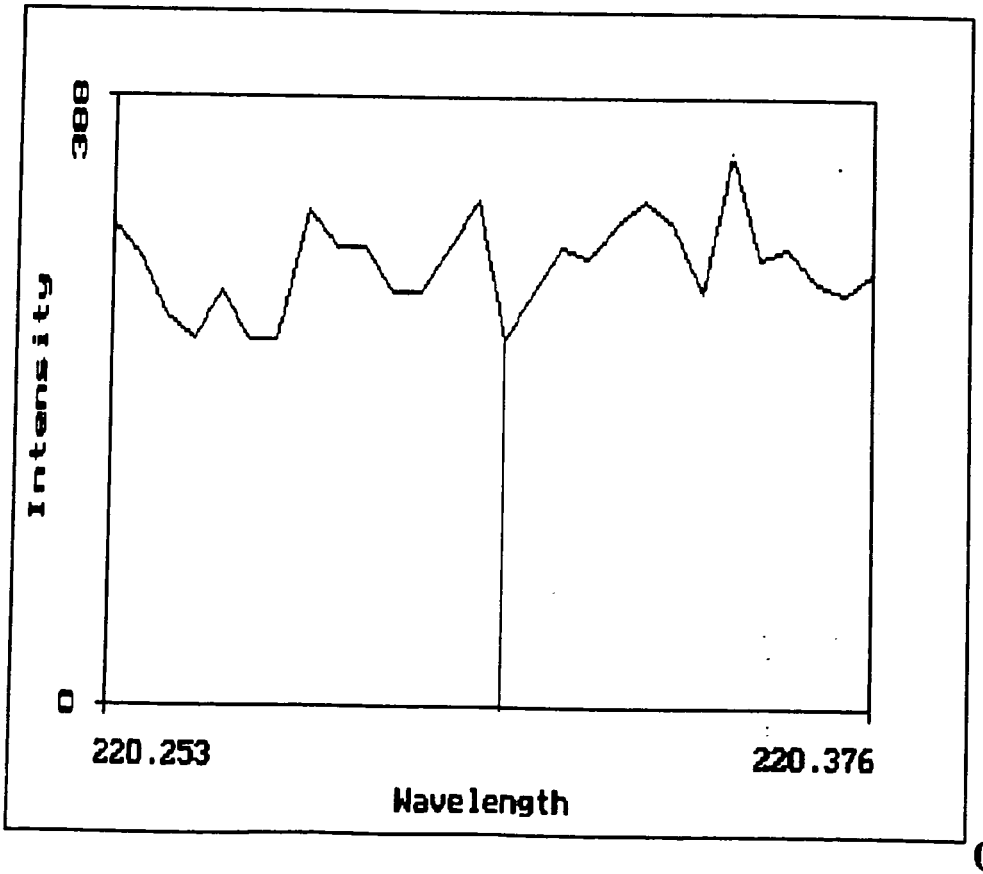
Analyte Scan

Element Name: Zn2138
Wavelength : 213.849



Analyte Scan

Element Name: Pb2203
Wavelength : 220.314



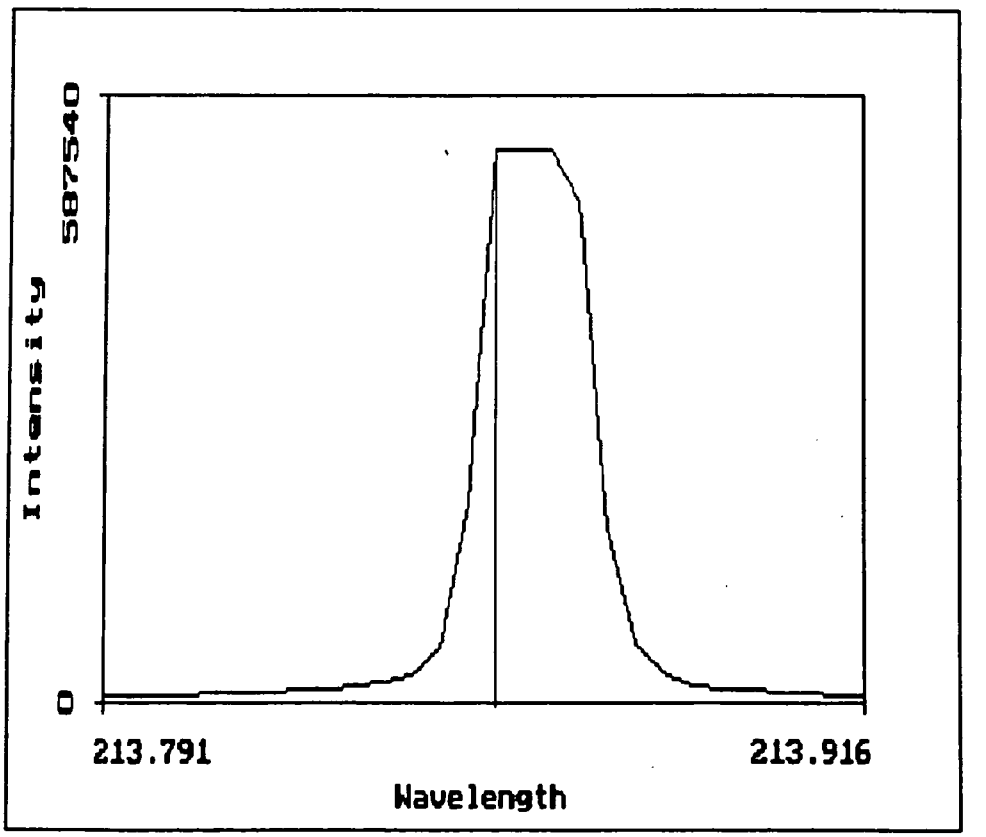
A· lysis Report Tue 11-17-98 06:46:15 PM page 1

Me d: FWF Sample Name: 9023 40X Operator: EML
Run Time: 11/17/98 18:44:02
Comment:
Mode: CONC Corr. Factor: 40

Elem	Pb2203	Zn2138
Units	mg/l	mg/l
Avge	D12.96	S1748.
SDev	2.81	1.
%RSD	21.71	.0433
#1	D9.712	S1749.
#2	D14.43	S1747.
#3	D14.72	S1747.
Errors	NOCHECK	NOCHECK
High		
Low		

Analyte Scan

El t Name: Zn2138
Wavelength : 213.854



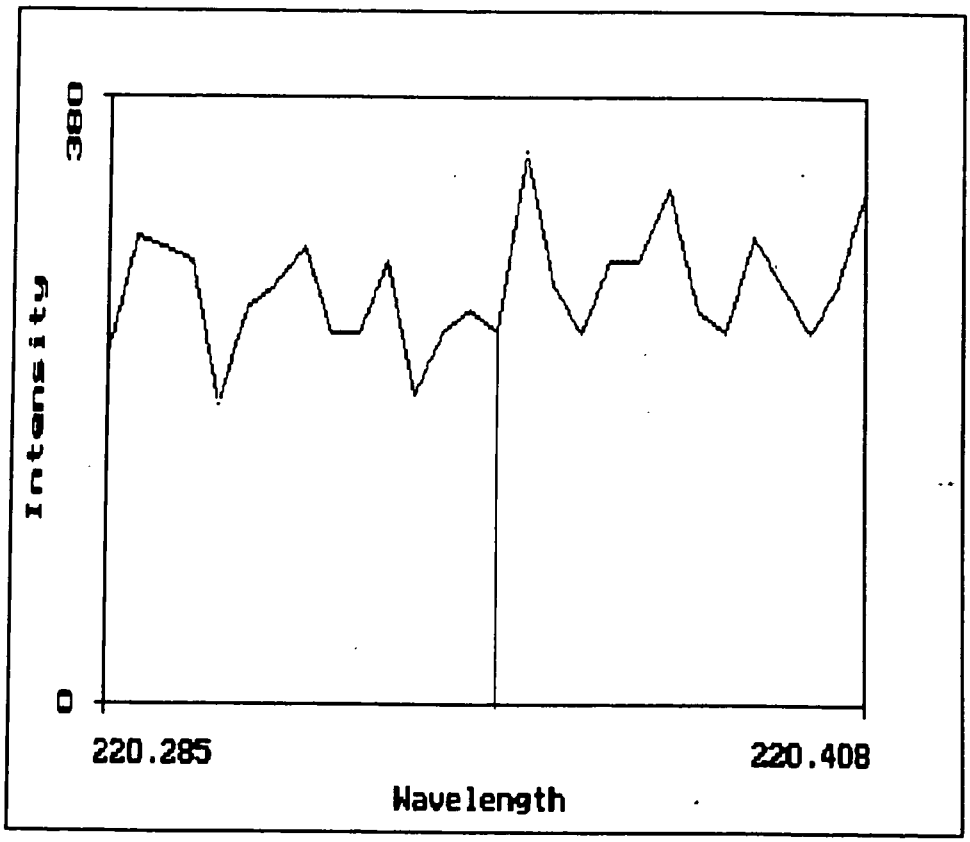
Analysis Report Tue 11-17-98 06:55:01 PM page 1

Method: FWF Sample Name: I0215 BLK 11/17/98 Operator: EML
Run Time: 11/17/98 18:51:36
Comment:
Mode: CONC Corr. Factor: 1.11

Elem	Pb2203
Units	mg/l
Avge	D-.0400
SDev	.0464
%RSD	116.1
#1	D-.0284
#2	D-.0004
#3	D-.0911
Errors	NOCHECK
High	
Low	

Analyte Scan

Element Name: Pb2203
Wavelength : 220.346



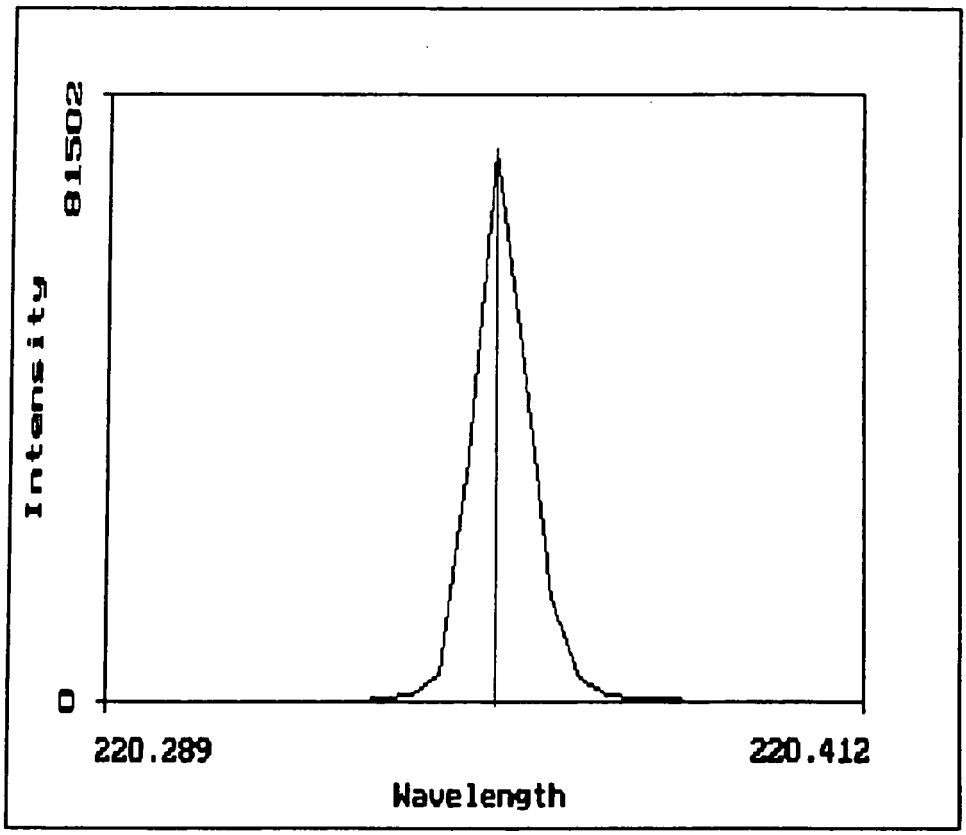
Method: FWF Sample Name: I0215LCS 11/17/98 Operator: EML
Run Time: 11/17/98 18:55:11
Comment:
Mode: CONC Corr. Factor: 1.11

Elem	Pb2203
Units	mg/l
Avge	186.1
SDev	.5

%	.2702
#1	185.6
#2	186.6
#3	186.3
Errors	NOCHECK
High	
Low	

Analyte Scan

Element Name: Pb2203
Wavelength : 220.351

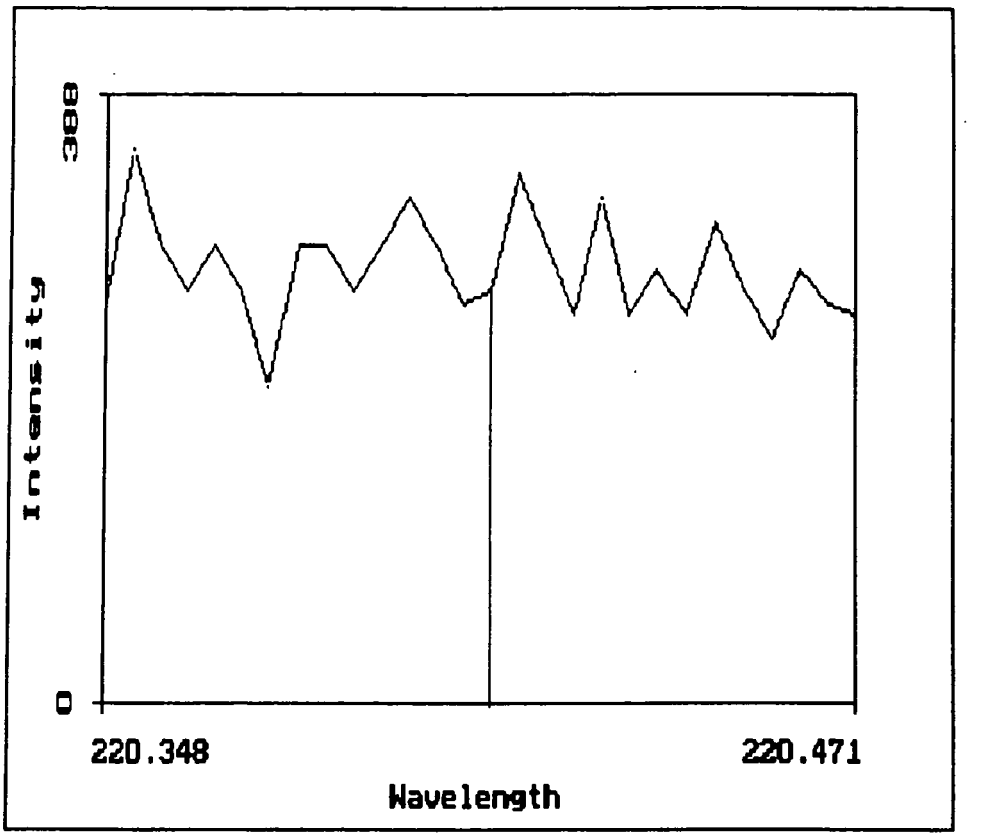


Method: FWF Sample Name: FL2 EXT BLK 11/17/98 Operator: EML
Run Time: 11/17/98 19:00:40
Comment:
Mode: CONC Corr. Factor: 1.11

Elem	Pb2203
Units	mg/l
Avge	D.0322
SDev	.0267
SD	82.96
#1	D.0584
#2	D.0050
#3	D.0332
Errors	NOCHECK
High	

Analyte Scan

Element Name: Pb2203
Wavelength : 220.410

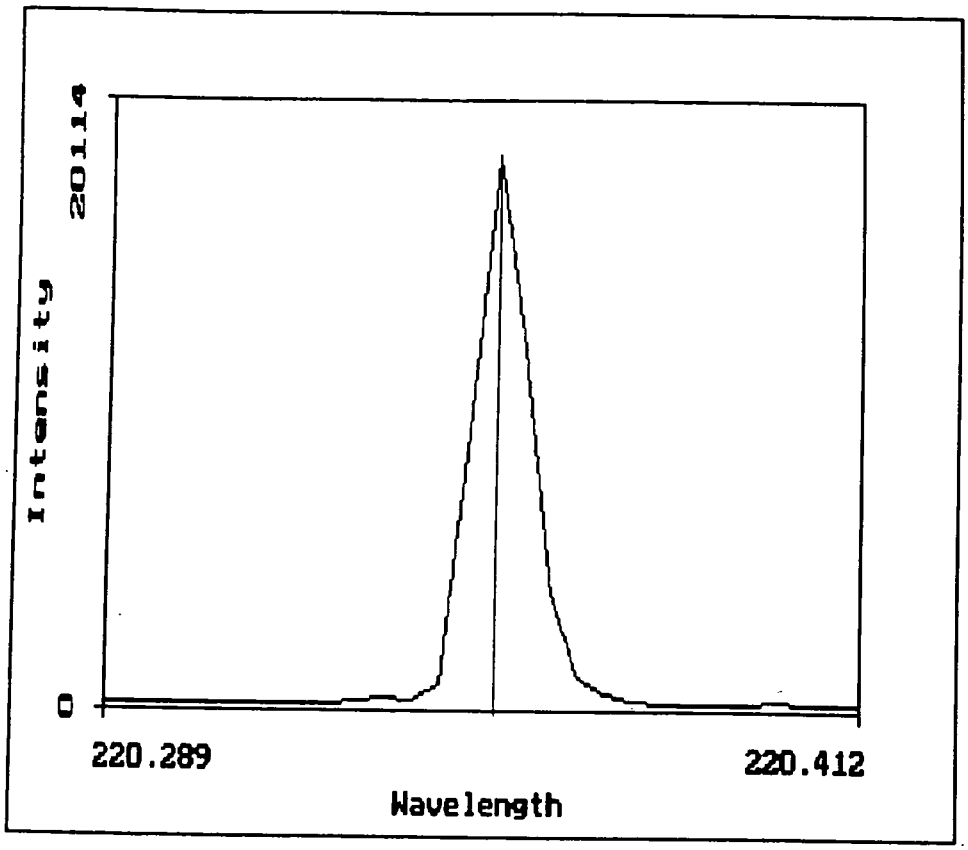


Method: FWF Sample Name: 1174 69 01 10X Operator: EML
Run Time: 11/17/98 19:04:13
Comment: TCLP EXTRACT Pb FDF POP
Mode: CONC Corr. Factor: 11.1

Elem	Pb2203
Units	mg/l
Avge	475.1
SDev	4.9
%RSD	1.035
#1	469.5
#2	478.6
#3	477.3
Errors	NOCHECK
High	
w	

Analyte Scan

Element Name: Pb2203
Wavelength : 220.351

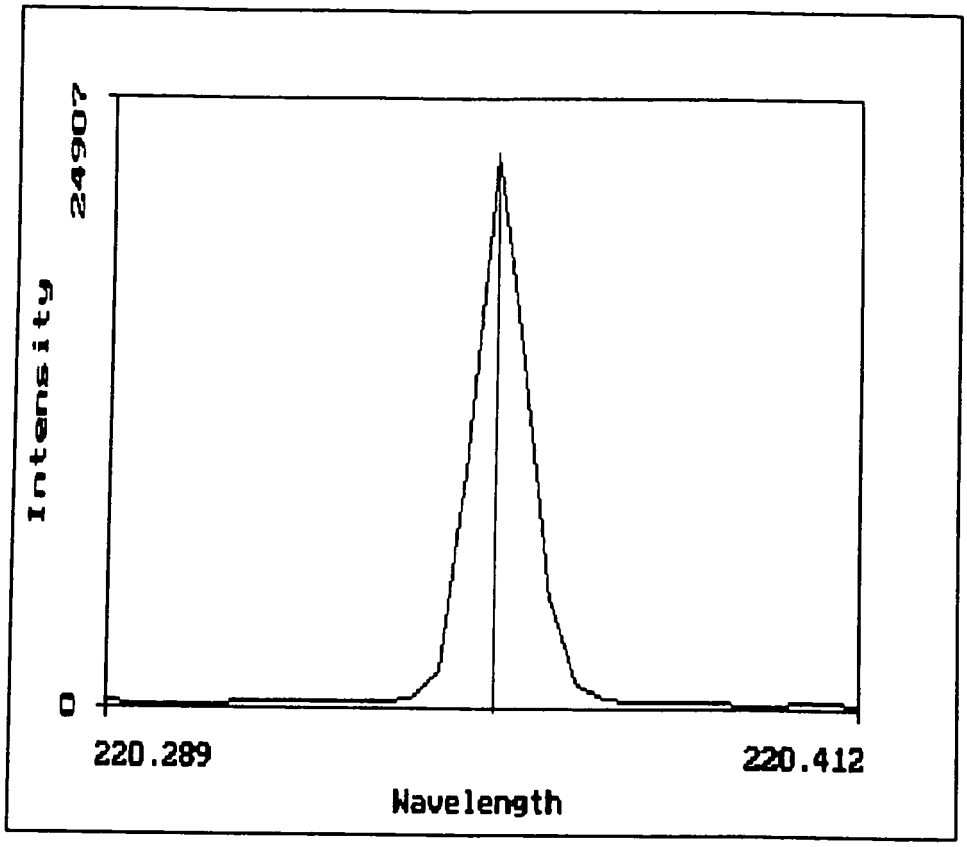


Method: FWF Sample Name: 1174 69 02 10X Operator: EML
Run Time: 11/17/98 19:07:48
Comment: TCLP EXTRACT Pb FDF POP
Mode: CONC Corr. Factor: 11.1

Elem	Pb2203
Units	mg/l
Avge	558.7
SDev	.7
%RSD	.1251
#1	558.1
#2	558.4
#3	559.5
Errors	NOCHECK
High	
Low	

Analyte Scan

Element Name: Pb2203
Wavelength : 220.351

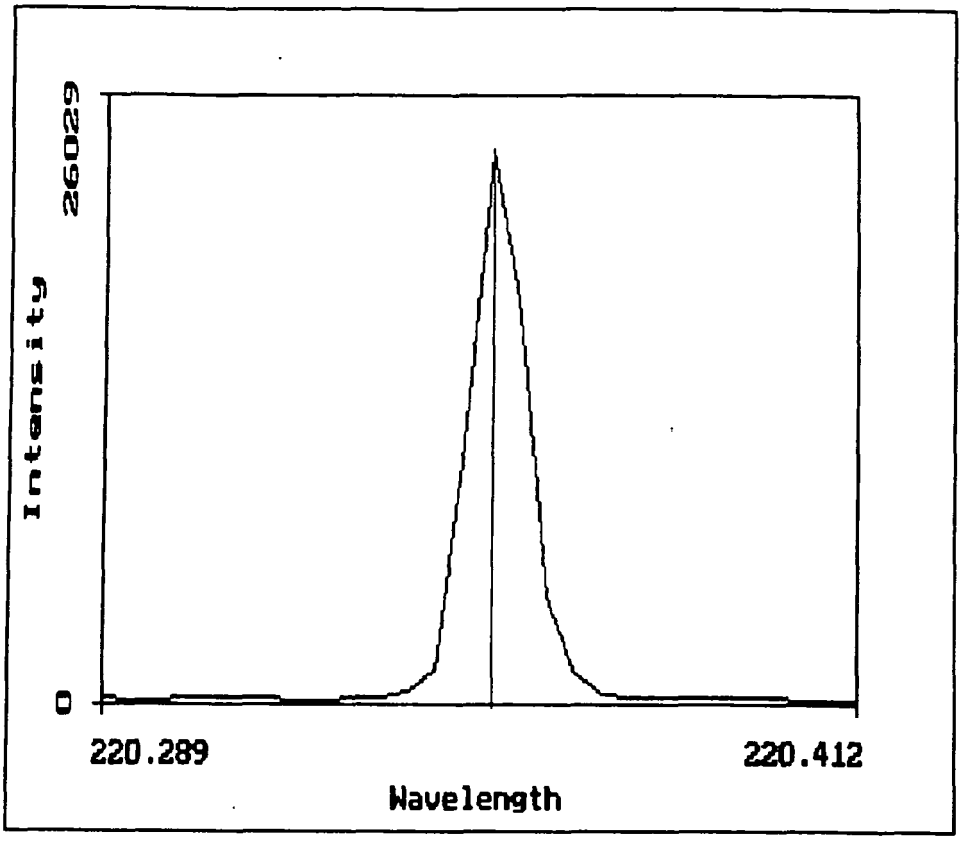


Method: FWF Sample Name: 1174 69 03 10X Operator: EML
Run Time: 11/17/98 19:11:28
Comment: TCLP EXTRACT Pb FDF POP
Mode: CONC Corr. Factor: 11.1

Elem	Pb2203
Units	mg/l
Avge	621.4
SDev	4.0
%RSD	.6469
#1	617.0
#2	622.1
#3	625.0
Errors	NOCHECK
High	
Low	

Analyte Scan

Element Name: Pb2203
Wavelength : 220.351

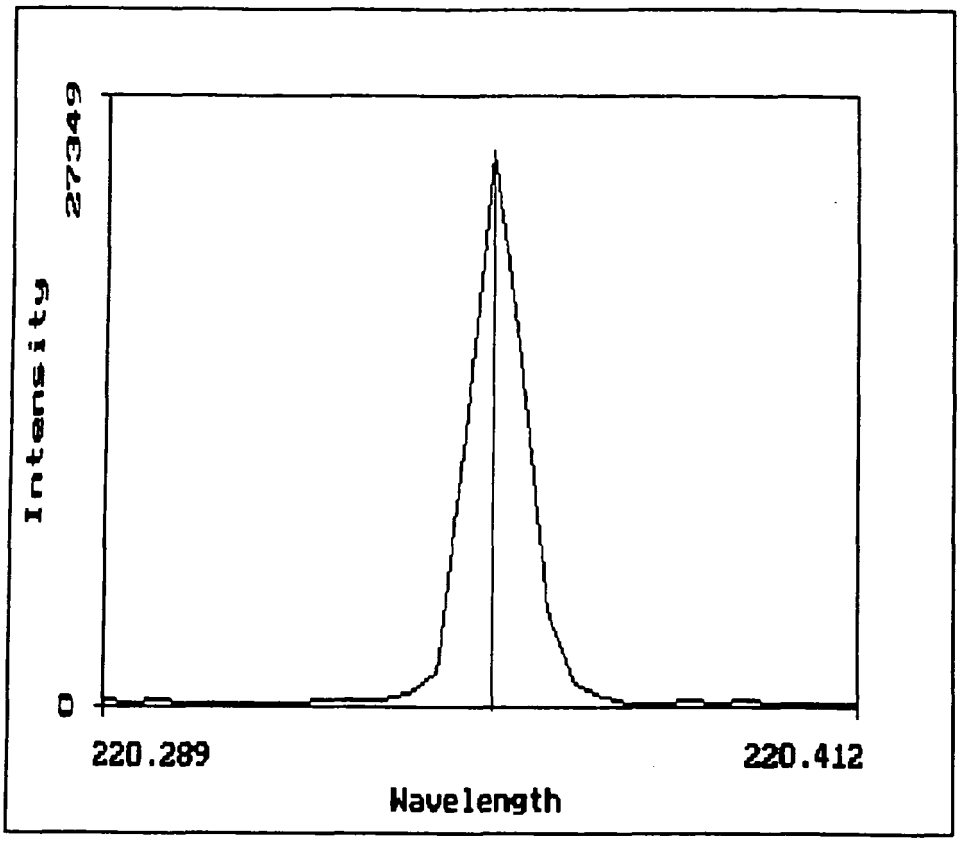


Method: FWF Sample Name: 1174 69 03 DUP 10X Operator: EML
Run Time: 11/17/98 19:15:01
Comment: TCLP EXTRACT Pb FDF POP
Mode: CONC Corr. Factor: 11.3

Elem	Pb2203
Units	mg/l
Avge	633.4
SDev	5.5
%RSD	.8670
#1	627.8
#2	633.5
#3	638.8
Errors	NOCHECK
High	
Low	

Analyte Scan

Element Name: Pb2203
Wavelength : 220.351

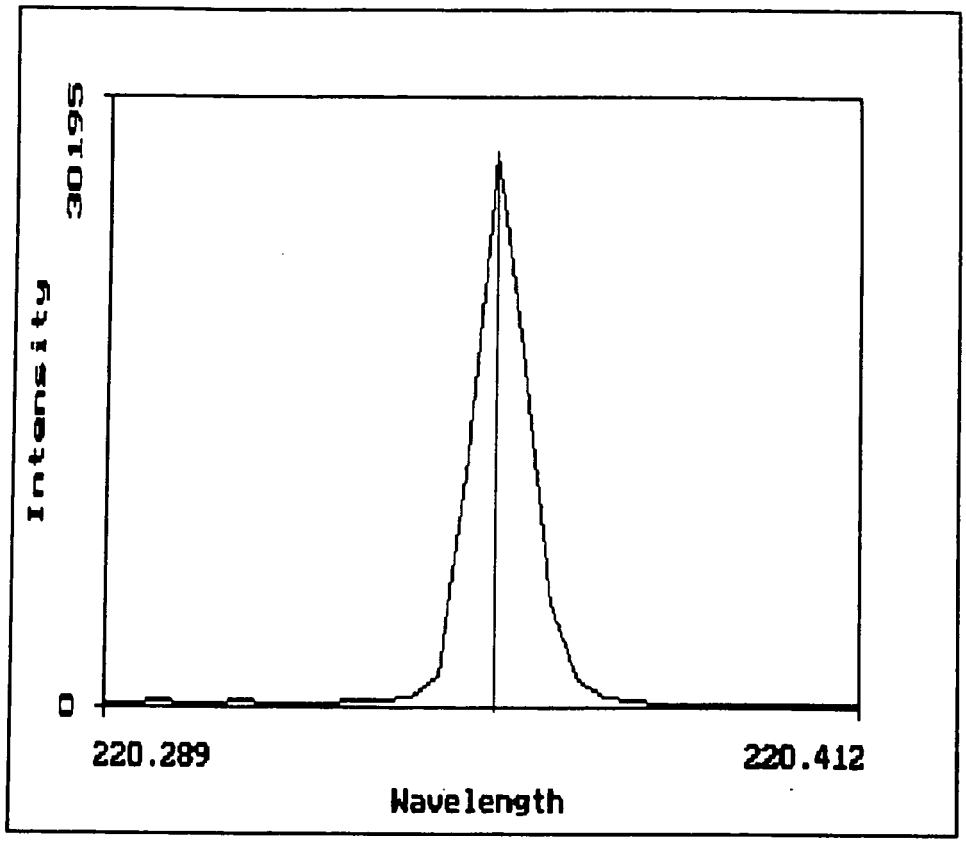


Method: FWF Sample Name: 1174 69 04 10X Operator: EML
Run Time: 11/17/98 19:18:44
Comment: TCLP EXTRACT Pb FDF POP
Mode: CONC Corr. Factor: 11.1

Elem	Pb2203
Units	mg/l
Avge	681.1
SDev	3.4
%RSD	.5059
#1	680.2
#2	684.9
#3	678.2
Errors	NOCHECK
High	
Low	

Analyte Scan

Element Name: Pb2203
Wavelength : 220.351

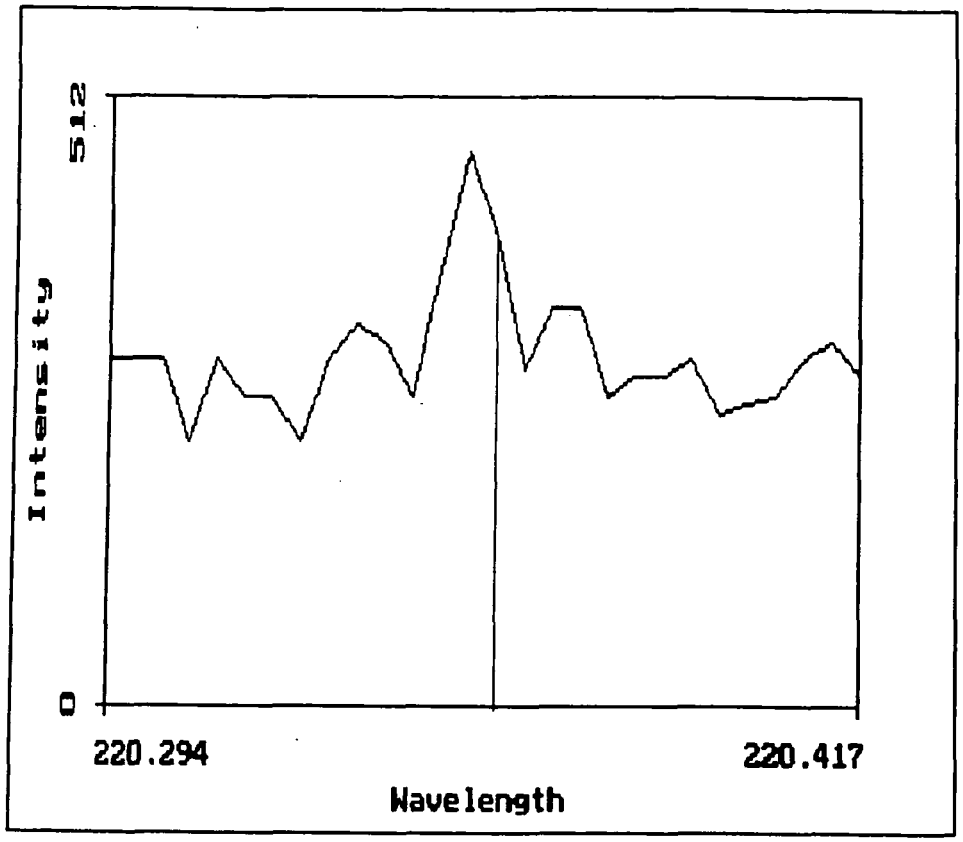


Method: FWF Sample Name: 1174 70 01 10X Operator: EML
Run Time: 11/17/98 19:22:25
Comment: TCLP EXTRACT Pb FDF POP
Mode: CONC Corr. Factor: 11.1

Elem	Pb2203
Units	mg/l
Avge	D3.058
SDev	.384
%RSD	12.56
#1	D3.344
#2	D2.621
#3	D3.207
Errors	NOCHECK
High	
Low	

Analyte Scan

Element Name: Pb2203
Wavelength : 220.355

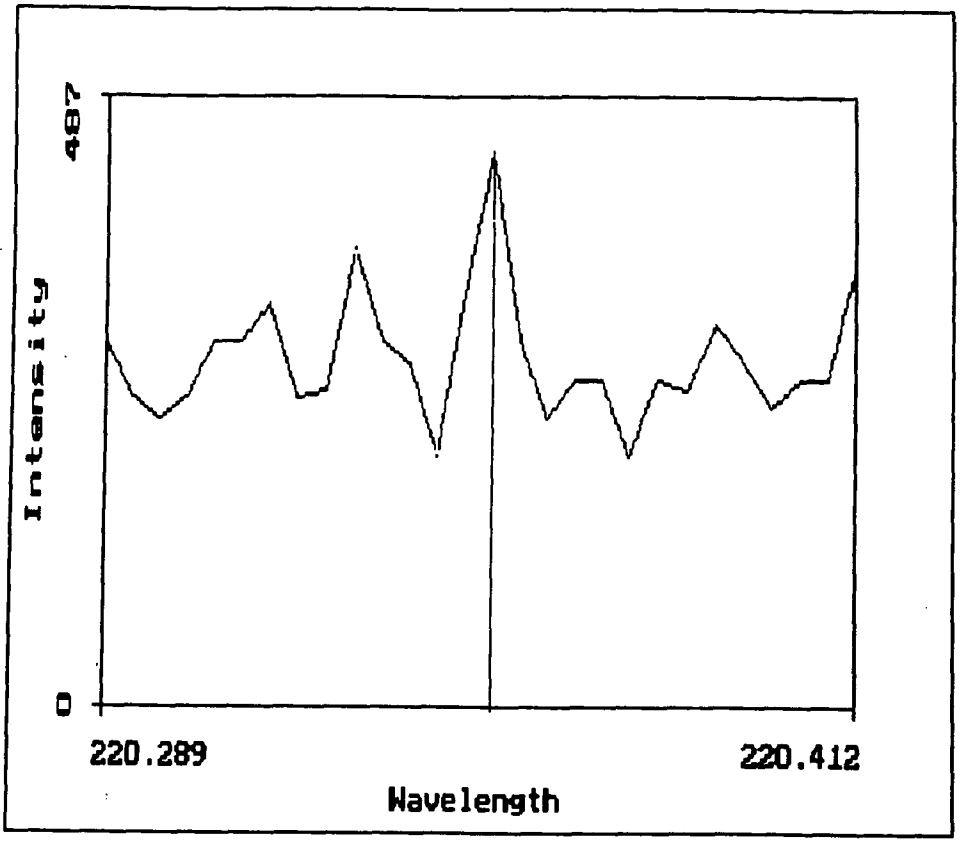


Method: FWF Sample Name: 1174 70 02 10X Operator: EML
Run Time: 11/17/98 19:26:07
Comment: TCLP EXTRACT Pb FDF POP
Mode: CONC Corr. Factor: 11.1

Elem	Pb2203
Units	mg/l
Avge	D2.040
SDev	.576
%RSD	28.24
#1	D1.402
#2	D2.195
#3	D2.523
Errors	NOCHECK
High	
Low	

Analyte Scan

Element Name: Pb2203
Wavelength : 220.351

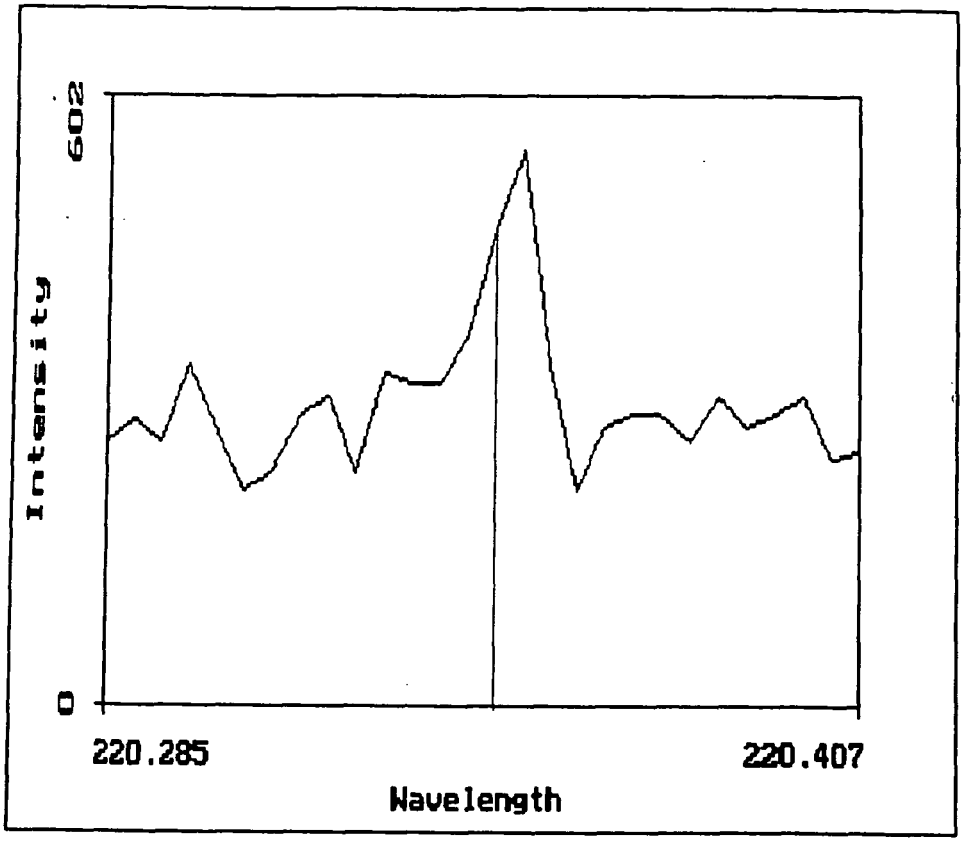


Method: FWF Sample Name: 1174 70 03 10X Operator: EML
Run Time: 11/17/98 19:29:49
Comment: TCLP EXTRACT Pb FDF POP
Mode: CONC Corr. Factor: 11.1

Elem	Pb2203
Units	mg/l
Avge	d5.894
SDev	.234
%RSD	3.970
#1	6.065
#2	d5.627
#3	5.989
Errors	NOCHECK
High	
Low	

Analyte Scan

Element Name: Pb2203
Wavelength : 220.346

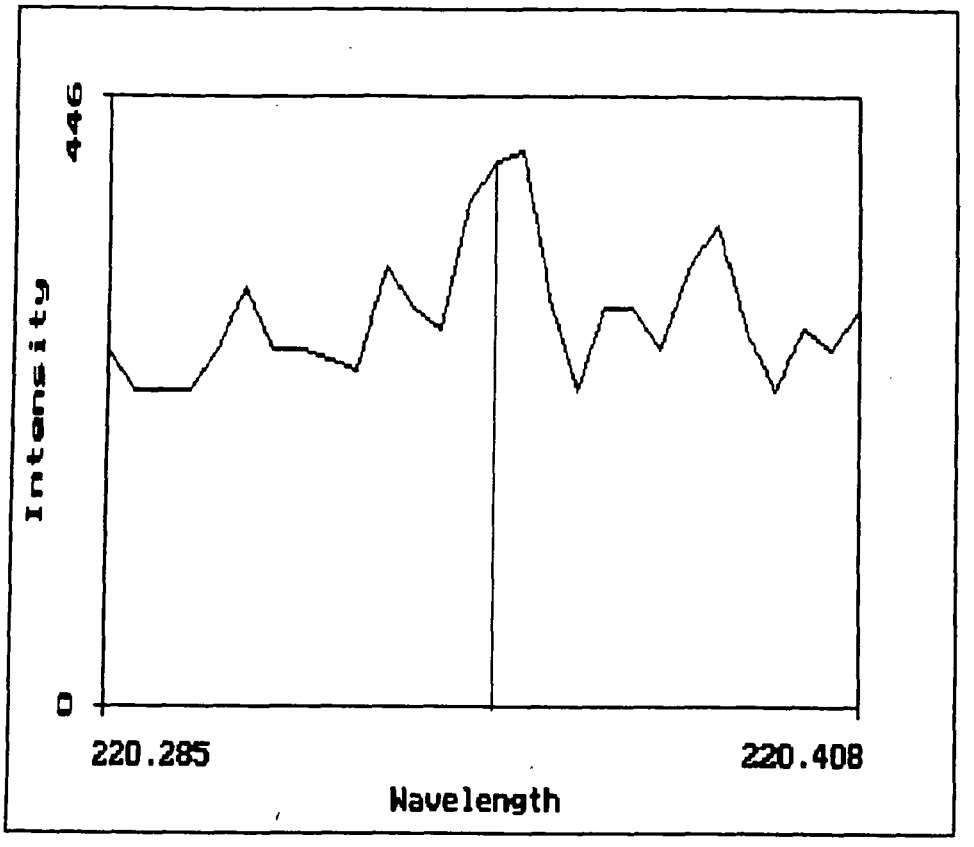


Method: FWF Sample Name: 1174 70 04 10X Operator: EML
Run Time: 11/17/98 19:33:25
Comment: TCLP EXTRACT Pb FDF POP
Mode: CONC Corr. Factor: 11.1

Elem	Pb2203
Units	mg/l
Avge	D4.426
SDev	.310
%RSD	6.999
#1	D4.213
#2	D4.782
#3	D4.285
Errors	NOCHECK
High	
Low	

Analyte Scan

Element Name: Pb2203
Wavelength : 220.346

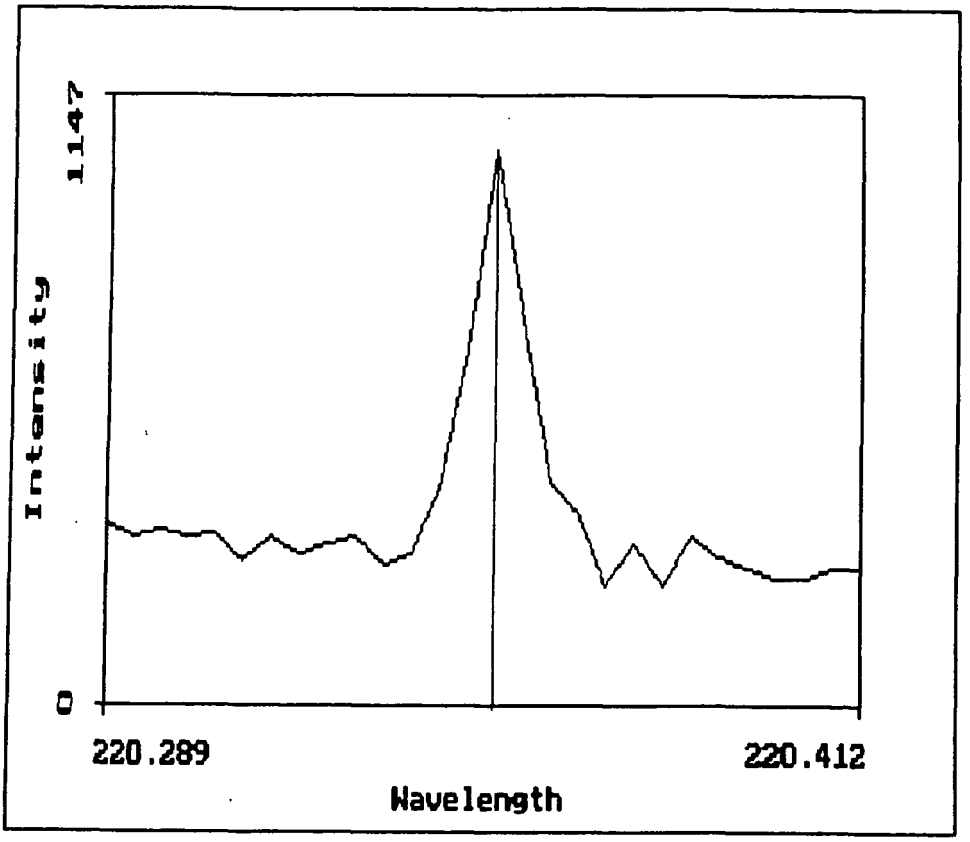


Method: FWF Sample Name: CCV Operator: EML
Run Time: 11/17/98 19:37:05
Comment: TCLP ANALYSIS
Mode: CONC Corr. Factor: 1

Elem	Pb2203
Units	mg/l
Avge	1.862
SDev	.040
%RSD	2.153
#1	1.906
#2	1.827
#3	1.855
Errors	QC Pass
Value	2.000
Range	10.00

Analyte Scan

Element Name: Pb2203
Wavelength : 220.351

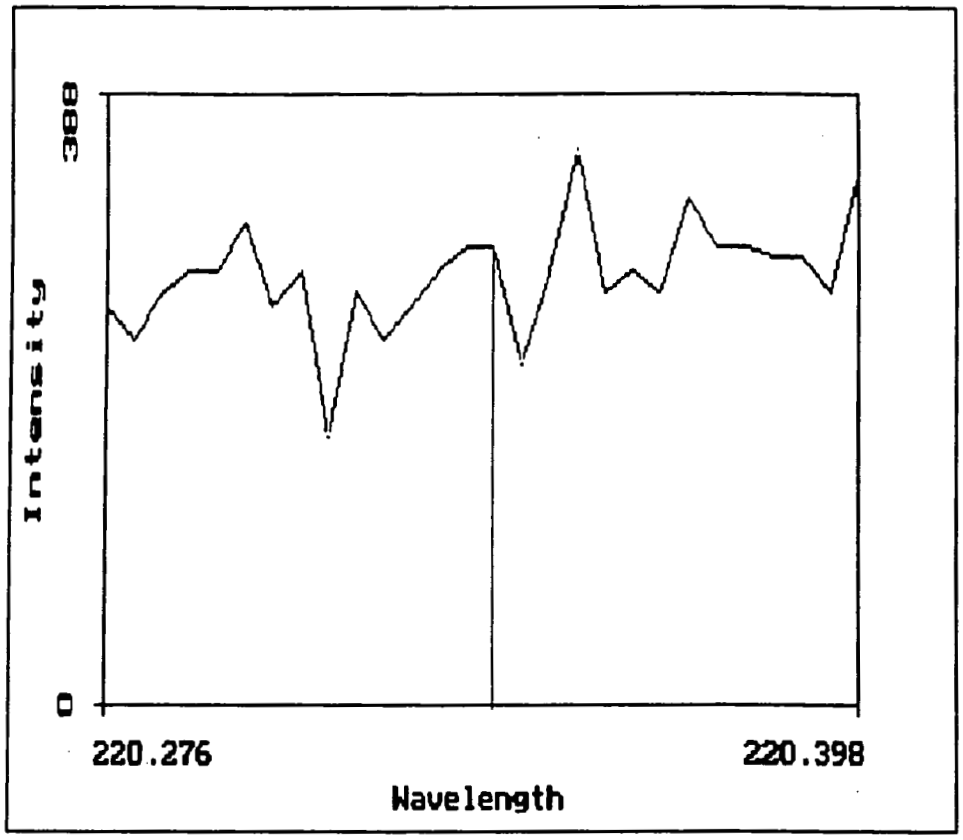


Method: FWF Sample Name: CCB Operator: EML
Run Time: 11/17/98 19:40:39
Comment: TCLP ANALYSIS
Mode: CONC Corr. Factor: 1

Elem	Pb2203
Units	mg/l
Avge	D-.0412
SDev	.0474
%RSD	115.1
#1	D.0114
#2	D-.0543
#3	D-.0807

Analyte Scan

Element Name: Pb2203
Wavelength : 220.337

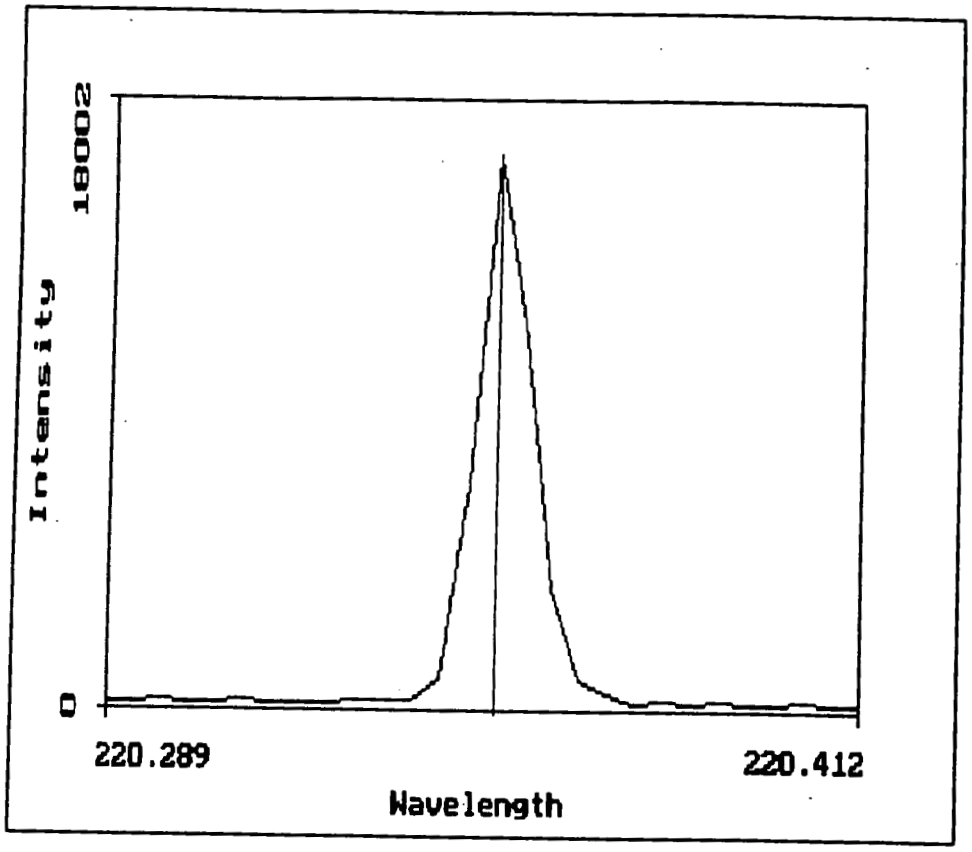


Method: FWF Sample Name: 1174 71 01 10X Operator: EML
Run Time: 11/17/98 19:44:33
Comment: TCLP EXTRACT Pb FDF POP
Mode: CONC Corr. Factor: 11.1

Elem	Pb2203
Units	mg/l
Avge	419.1
SDev	3.7
%RSD	.8803
#1	415.2
#2	419.4
#3	422.6
Errors	NOCHECK
High	
Low	

Analyte Scan

Element Name: Pb2203
Wavelength : 220.351



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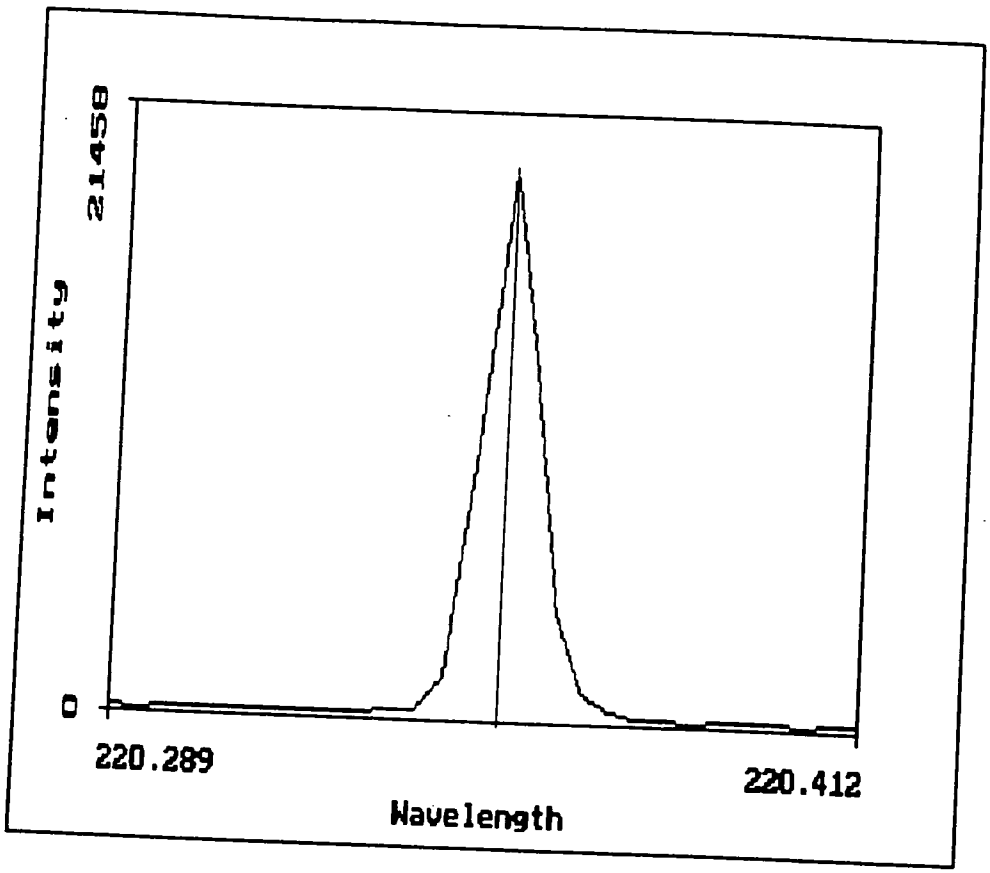
ethod: FWF Sample Name: 1174 71 02 10X Operator: EML
un Time: 11/17/98 19:48:06
omment: TCLP EXTRACT Pb FDF POP
ode: CONC Corr. Factor: 11.1

Elem	Pb2203
Units	mg/l
Avge	512.9
SDev	3.6
RSD	.7078
1	510.2
2	511.6
3	517.1
rrors	NOCHECK
igh	
ow	

Analyte Scan

Element Name: Pb2203
Wavelength : 220.351



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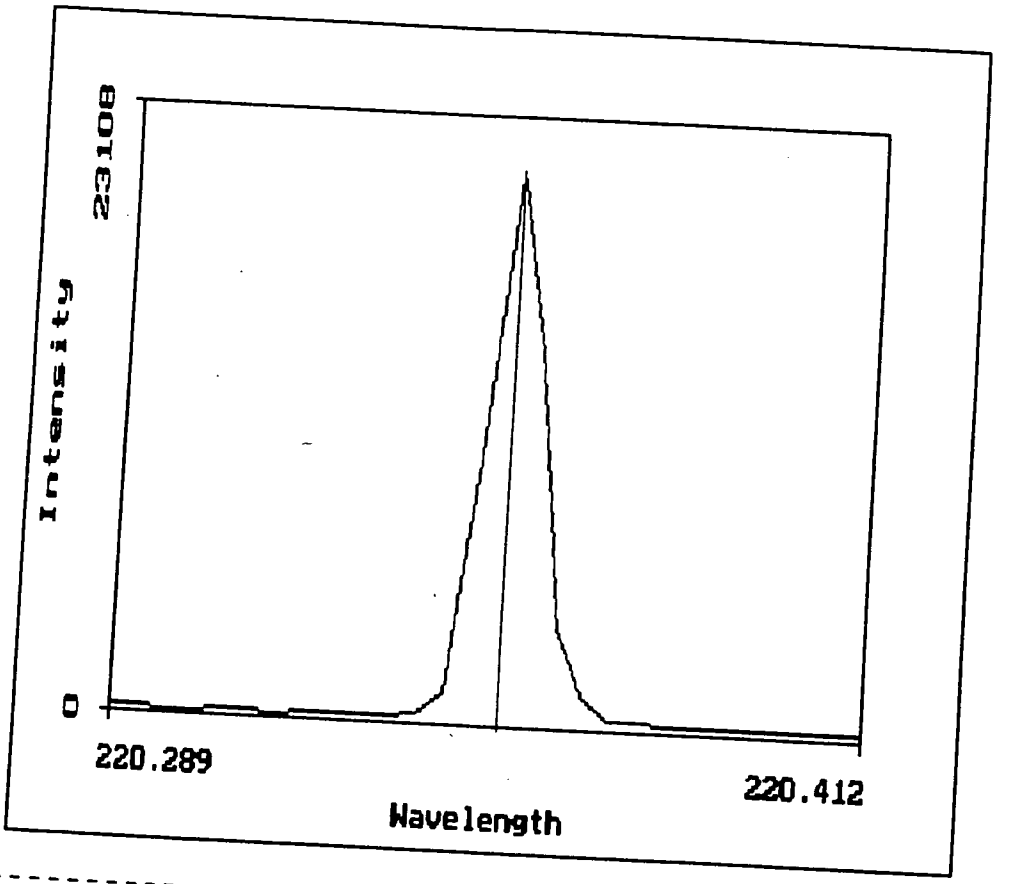
thod: FWF Sample Name: 1174 71 03 10X Operator: EML
n Time: 11/17/98 19:51:48
mment: TCLP EXTRACT Pb FDF POP
de: CONC Corr. Factor: 11.1

lem	Pb2203
nits	mg/l
vge	555.8
Dev	4.9
RSD	.8826
-	560.1
:	550.5
	557.0
rors	NOCHECK
gh	
w	

---

alyte Scan

ement Name: Pb2203
velength : 220.351



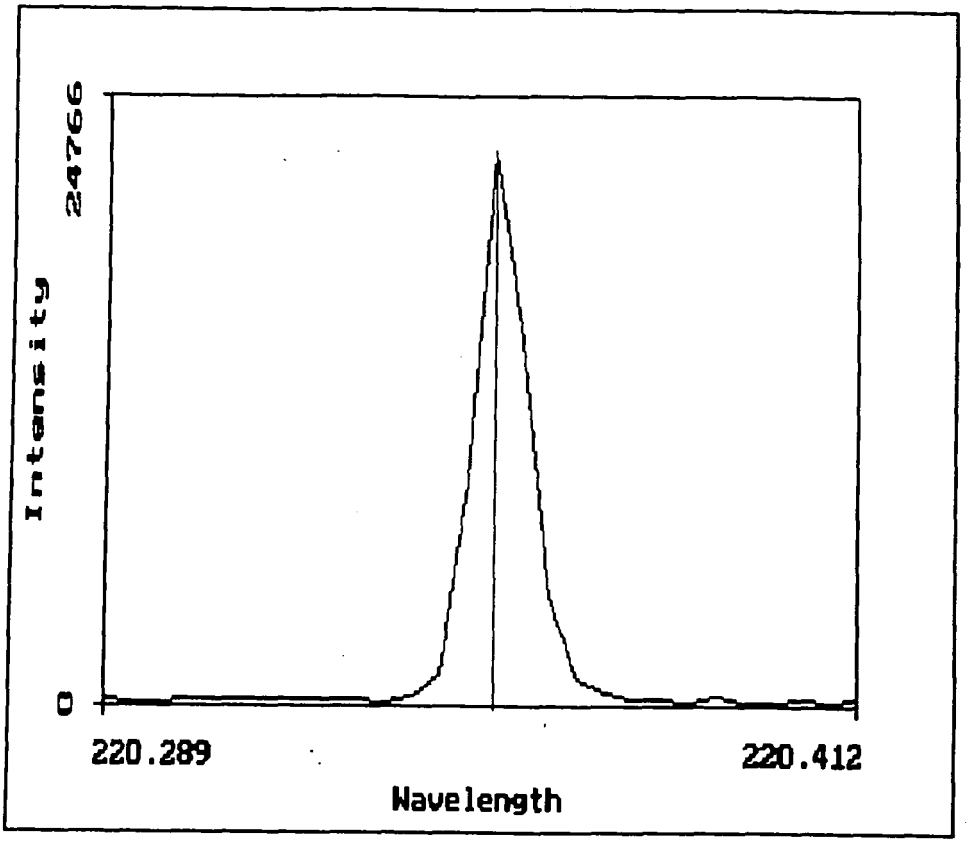
od: FWF Sample Name: 1174 71 04 10X
Time: 11/17/98 19:55:27 Operator: EML
ent: TCLP EXTRACT Pb FDF POP
: CONC Corr. Factor: 11.1

n	Pb2203
:s	mg/l
e	565.9
r	3.9
)	.6804
	566.1
	562.0
	569.7

rs NOCHECK

Analyte Scan

Element Name: Pb2203
Wavelength : 220.351

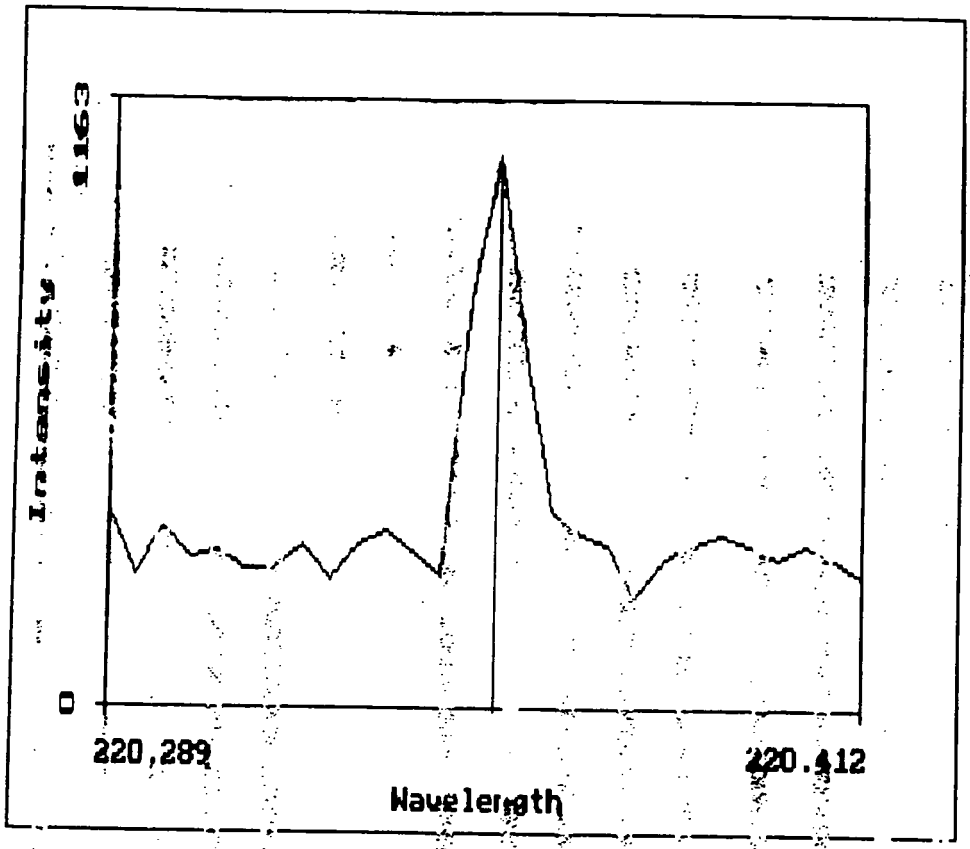


Method: FWF Sample Name: CCV Operator: EML
Run Time: 11/17/98 19:59:01
Comment: TCLP ANALYSIS
Mode: CONC Corr. Factor: 1

Elem	Pb2203
Units	mg/l
Avge	1.891
SDev	.027
%RSD	1.423
#1	1.905
#2	1.860
#3	1.909
Errors	QC Pass
Value	2.000
Range	10.00

Analyte Scan

Element Name: Pb2203
Wavelength : 220.351

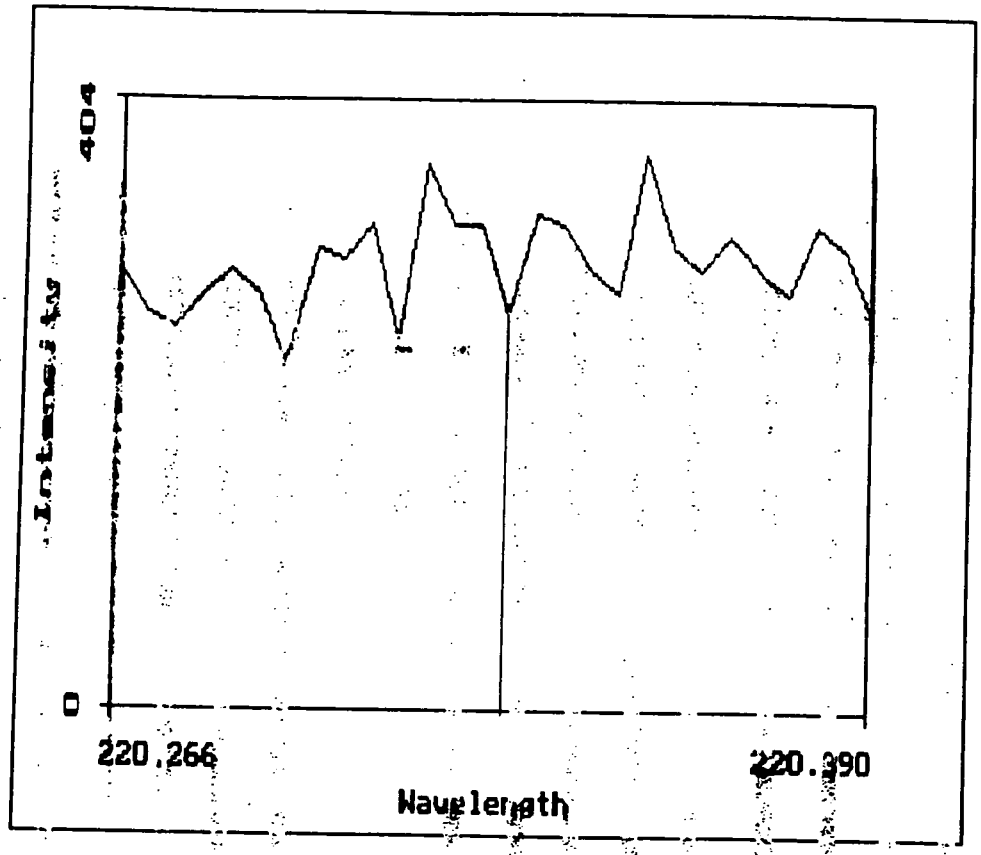


Method: FWF Sample Name: CCB Operator: EML
Run Time: 11/17/98 20:02:43
Comment: TCLP ANALYSIS
Mode: CONC Corr. Factor: 1

Elem	Pb2203
Units	mg/l
Avge	D-.0359
SDev	.0142
%RSD	39.41
#1	D-.0518
#2	D-.0313
#3	D-.0247

Analyte Scan

Element Name: Pb2203
Wavelength : 220.328



#	ample Name	File	Method	Date	Time	OpID	Type	Mode
1	ICV	19NOV98	FWF	11/19/98	15:38	EML	Q	CONC
2	ICB	19NOV98	FWF	11/19/98	15:42	EML	B	CONC
3	I0216 BLK 11/19/98	19NOV98	FWF	11/19/98	15:46	EML	S	CONC
4	FL1 EXT BLK 11/19/98	19NOV98	FWF	11/19/98	15:50	EML	S	CONC
5	1174 63 04R 10X	19NOV98	FWF	11/19/98	15:53	EML	S	CONC
6	1174 65 01R 10X	19NOV98	FWF	11/19/98	15:57	EML	S	CONC
7	1174 65 04R 10X	19NOV98	FWF	11/19/98	16:01	EML	S	CONC
8	1174 71 04R 10X	19NOV98	FWF	11/19/98	16:04	EML	S	CONC
9	1174 73 01 10X	19NOV98	FWF	11/19/98	16:08	EML	S	CONC
10	1174 73 02 10X	19NOV98	FWF	11/19/98	16:12	EML	S	CONC
11	1174 73 03 10X	19NOV98	FWF	11/19/98	16:16	EML	S	CONC
12	1174 73 04 10X	19NOV98	FWF	11/19/98	16:19	EML	S	CONC
13	1174 73 05 10X	19NOV98	FWF	11/19/98	16:23	EML	S	CONC
14	CCV	19NOV98	FWF	11/19/98	16:26	EML	Q	CONC
15	CCB	19NOV98	FWF	11/19/98	16:30	EML	B	CONC
16	1174 74 01 10X	19NOV98	FWF	11/19/98	16:34	EML	S	CONC
17	1174 74 02 10X	19NOV98	FWF	11/19/98	16:38	EML	S	CONC
18	1174 74 03 10X	19NOV98	FWF	11/19/98	16:41	EML	S	CONC
19	1174 74 04 10X	19NOV98	FWF	11/19/98	16:45	EML	S	CONC
[illegible]	1174 74 04 10X MS	19NOV98	FWF	11/19/98	16:49	EML	S	CONC
[illegible]	1174 74 04 10X MSD	19NOV98	FWF	11/19/98	16:53	EML	S	CONC
22	[illegible]CV	19NOV98	FWF	11/19/98	16:56	EML	Q	CONC
23	[illegible]B	19NOV98	FWF	11/19/98	17:00	EML	B	CONC
24	[illegible]00 PPM Pb LIN RNG	19NOV98	FWF	11/19/98	17:06	EML	S	CONC

Analysis Report Averages Thu 11-19-98 05:08:45 PM page 2

#	Sample Name	Pb2203
1	ICV	1.986
2	ICB	D-.0026
3	I0216 BLK 11/19/98	D.0213
4	FL1 EXT BLK 11/19/98	D.0321
5	1174 63 04R 10X	380.7
6	1174 65 01R 10X	857.3
7	1174 65 04R 10X	448.2
8	1174 71 04R 10X	571.7
9	1174 73 01 10X	219.2
10	1174 73 02 10X	24.48
11	1174 73 03 10X	877.1
12	1174 73 04 10X	793.8
13	1174 73 05 10X	206.1
14	CCV	2.072
15	CCB	D.0047
16	1174 74 01 10X	845.5
17	1174 74 02 10X	810.5
18	1174 74 03 10X	751.7
19	1174 74 04 10X	665.5
20	1174 74 04 10X MS	864.1
	1174 74 04 10X MSD	857.7
[illegible]	CCV	1.977
23	[illegible]CB	D.0071
24	[illegible]0 PPM Pb LIN RNG	385.5

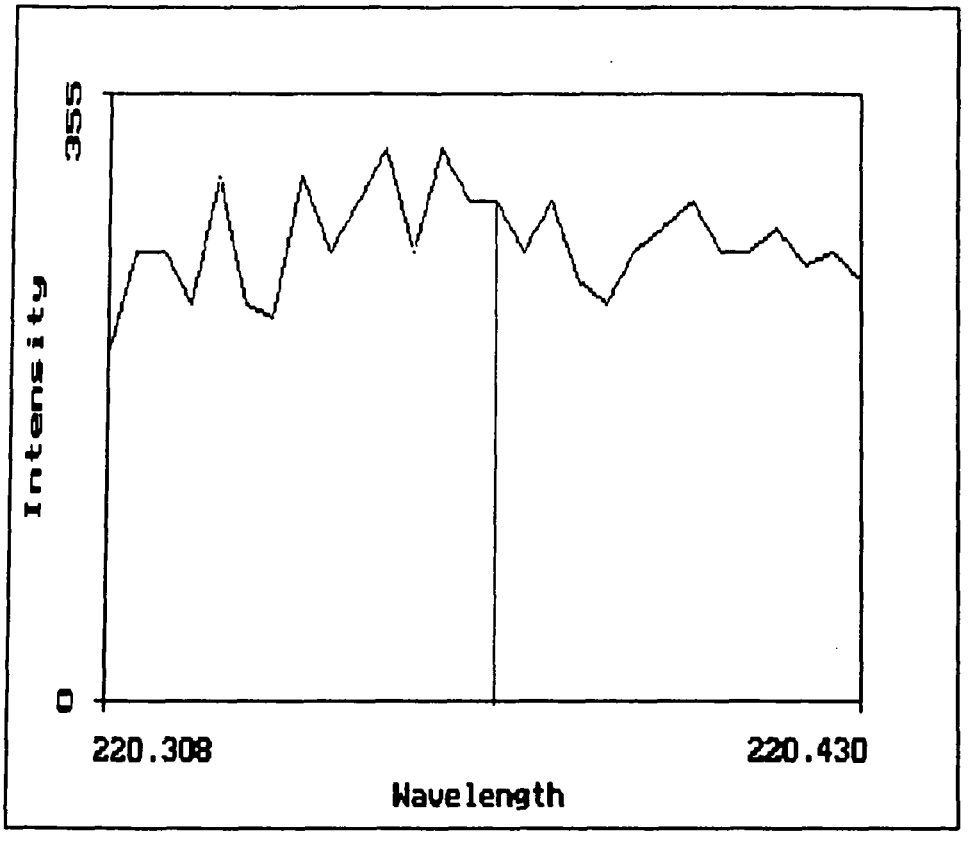
Standardization Rpt. Thu 11-19-98 03:33:51 PM page 1

Method: FWF Standard: STD1-Blank
Run Time: 11/19/98 15:32:08

Elem	Pb2203
Avge	D.0014
SDev	.0014
%RSD	97.54
#1	D.0027
#2	D-.0000
#3	D.0016

Analyte Scan

Element Name: Pb2203
Wavelength : 220.369

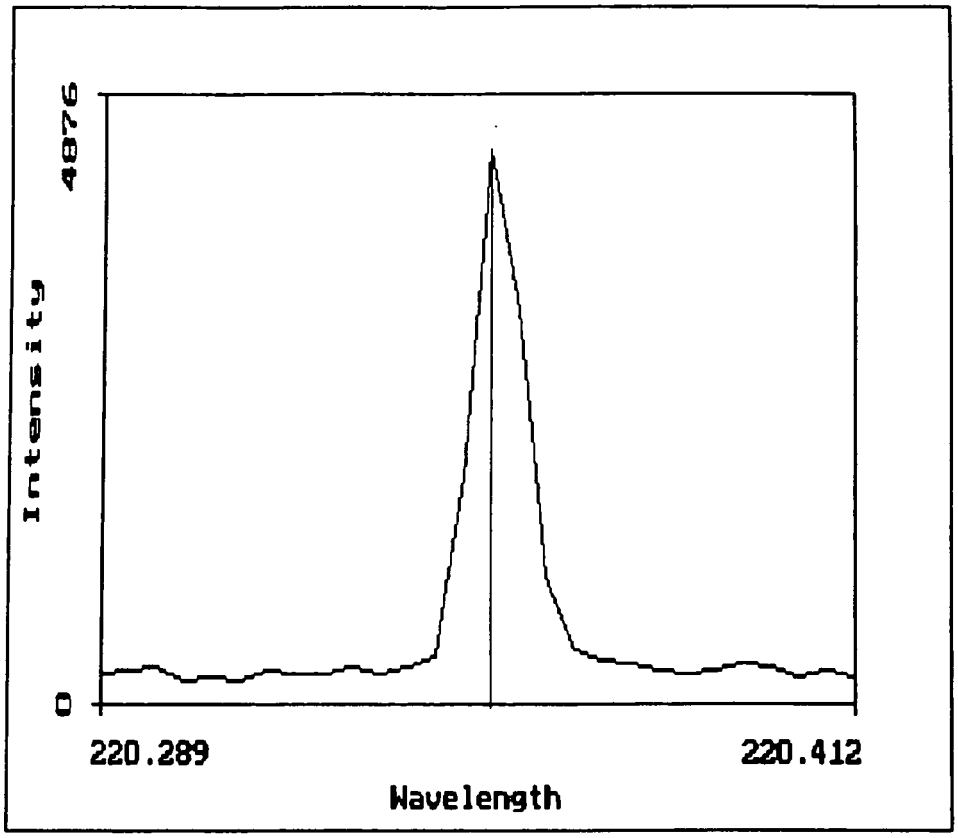


Method: FWF Standard: STD2
Run Time: 11/19/98 15:35:51

Elem	Pb2203
Avge	1.092
SDev	.006
%RSD	.5419
	1.098
#2	1.086
#3	1.091

Analyte Scan

Element Name: Pb2203
Wavelength : 220.351



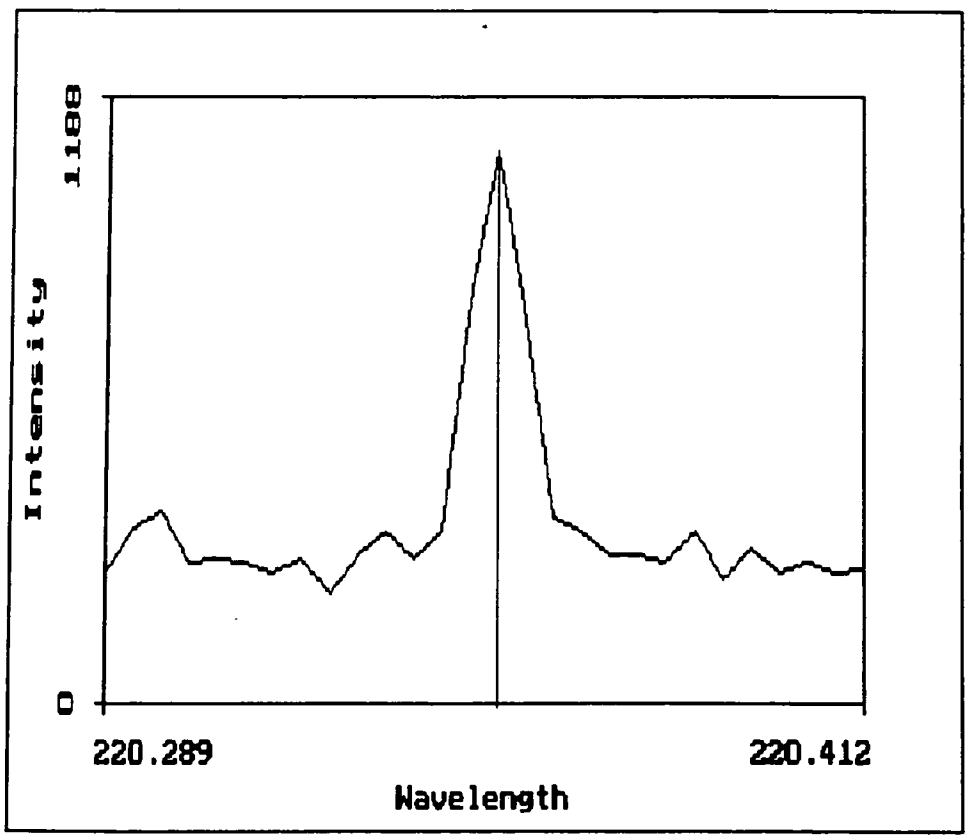
Analysis Report QC Standard Thu 11-19-98 03:42:22 PM page 1

Method: FWF Sample Name: ICV Operator: EML
Run Time: 11/19/98 15:38:56
Comment: TCLP EXTRACTS Pb
Mode: CONC Corr. Factor: 1

Elem	Pb2203
Units	mg/l
Avge	1.986
SDev	.032
%RSD	1.614
#1	1.998
#2	2.010
#3	1.949
Errors	QC Pass
Value	2.000
Range	10.00

Analyte Scan

Element Name: Pb2203
Wavelength : 220.351



Method: FWF Sample Name: ICB Operator: EML
Time: 11/19/98 15:42:40
Comment:
Mode: CONC Corr. Factor: 1

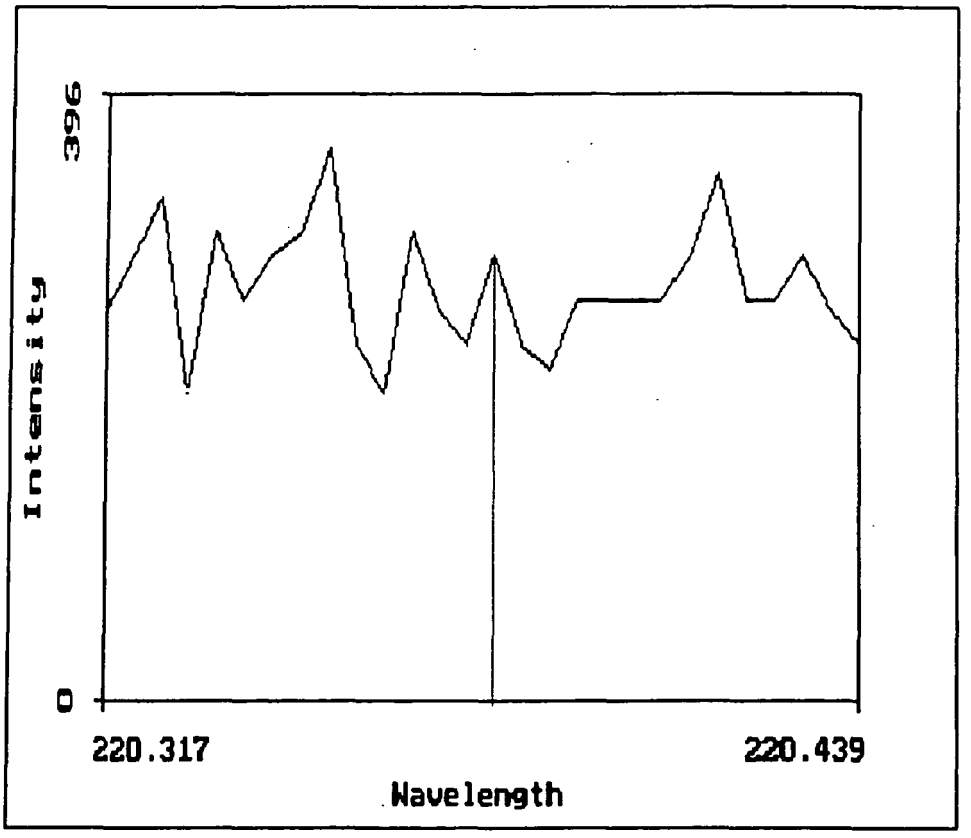
Elem	Pb2203
Units	mg/l
Avge	D-.0026
SDev	.0365

%[illegible] 1422.

#1 D-.0147
#2 D-.0314
#3 D.0385

Analyte Scan

Element Name: Pb2203
Wavelength : 220.378



Method: FWF Sample Name: I0216 BLK 11/19/98 Operator: EML
Run Time: 11/19/98 15:46:23
Comment:
Mode: CONC Corr. Factor: 1.11

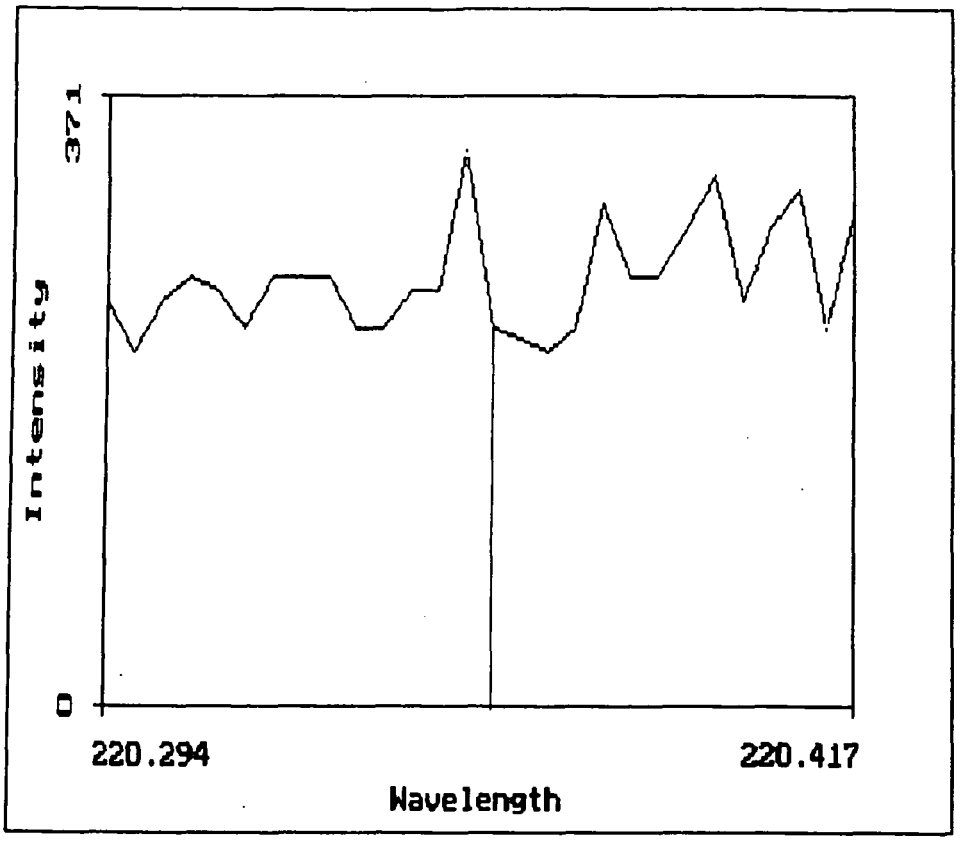
Elem Pb2203
Units mg/l
Avge D.0213
SDev .0261
%RSD 122.6

#1 D.0134
#2 D.0504
#3 D.0001

Errors NOCHECK
High
Low

Analyte Scan

Element Name: Pb2203
Wavelength : 220.355

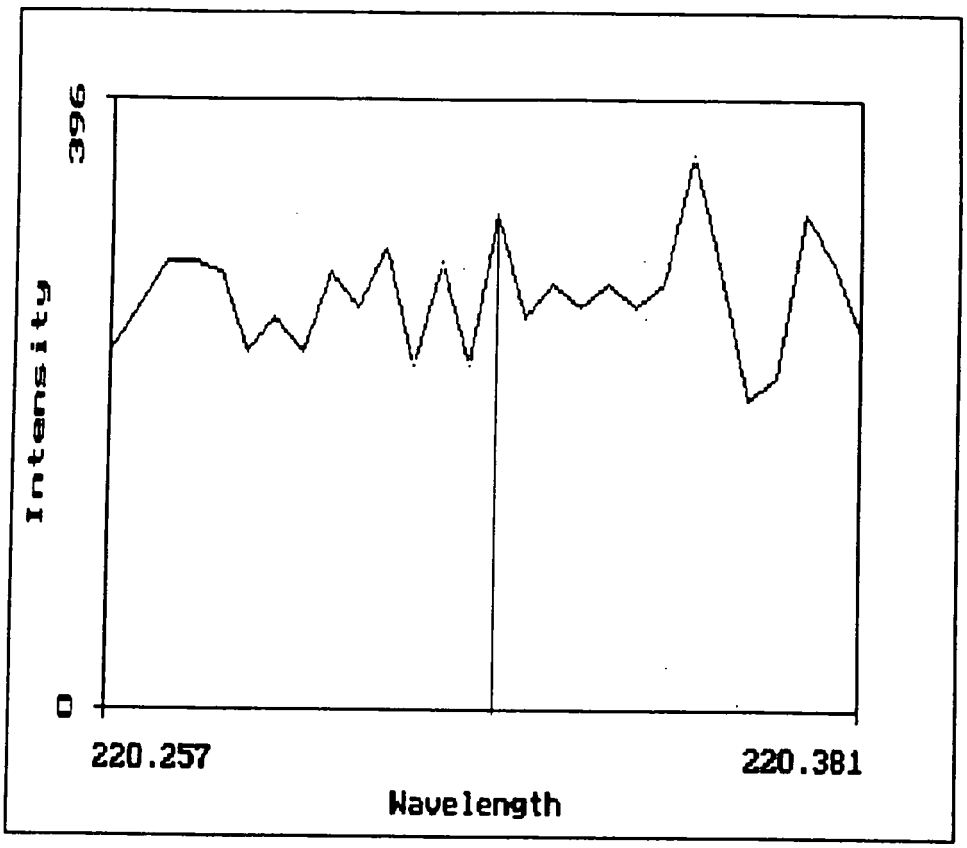


Method: FWF Sample Name: FL1 EXT BLK 11/19/98 Operator: EML
Run Time: 11/19/98 15:50:05
Comment:
Mode: CONC Corr. Factor: 1.11

Elem	Pb2203
Units	mg/l
Avge	D.0321
SDev	.0107
%RSD	33.38
#1	D.0220
#2	D.0309
#3	D.0433
Errors	NOCHECK
High	
Low	

Analyte Scan

Element Name: Pb2203
Wavelength : 220.319

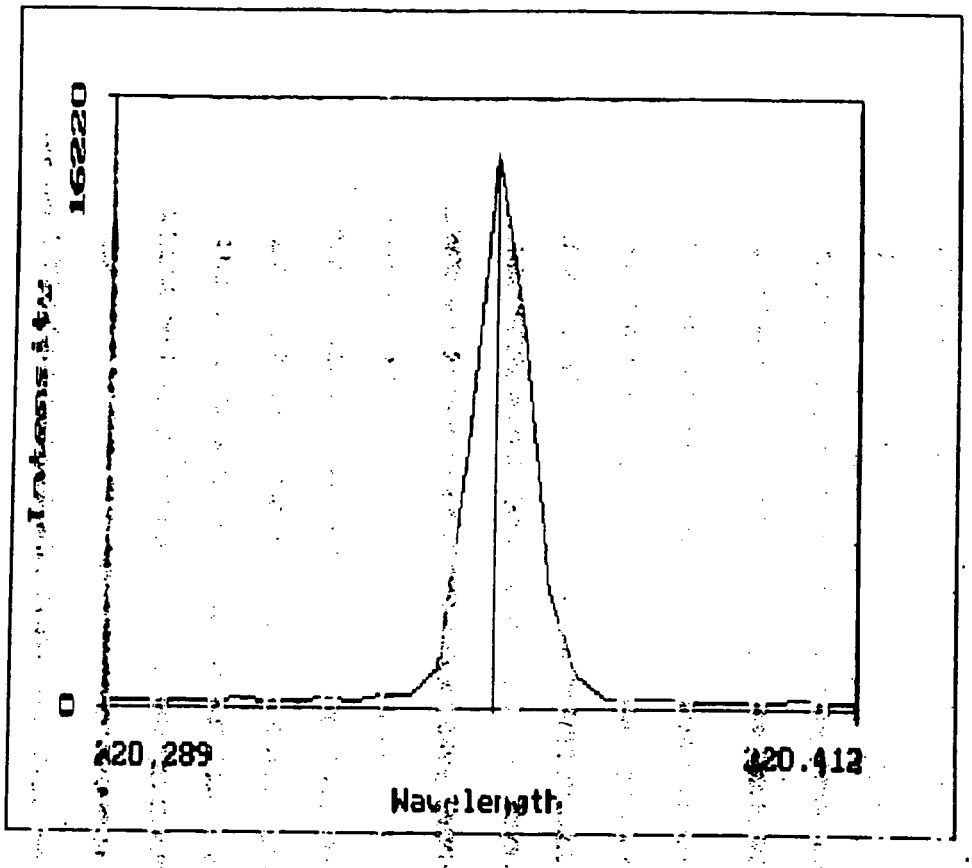


Method: FWF Sample Name: 1174 63 04R 10X Operator: EML
Run Time: 11/19/98 15:53:47
Comment: TCLP EXTRACT Pb FDF POP
Mode: CONC Corr. Factor: 11.1

Elem	Pb2203
Units	mg/l
Avge	380.7
SDev	1.5
%RSD	.3968
#1	379.3
#2	382.3
#3	380.5
Errors	NOCHECK
High	
Low	

Analyte Scan

Element Name: Pb2203
Wavelength : 220.351

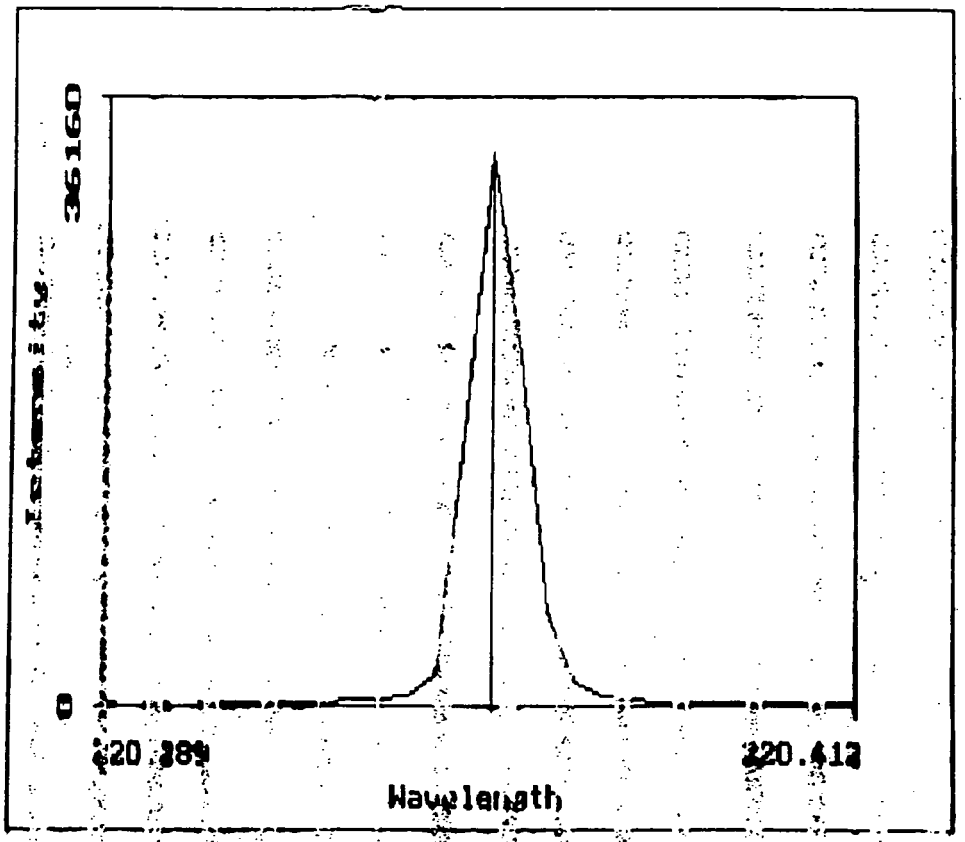


Method: FWF Sample Name: 1174 65 01R 10% Operator: ZML
Run Time: 11/19/98 15:57:28
Comment: TCLP EXTRACT Pb FDF POR
Mode: CONC Corr. Factor: 11.1

Elem	Pb2203
Units	mg/l
Avge	857.3
SDev	3.9
%RSD	.456
#1	854.2
#2	861.4
#3	855.6
Errors	NOCHECK
High	
Low	

Analyte Scan

Element Name: Pb2203
Wavelength : 220.351

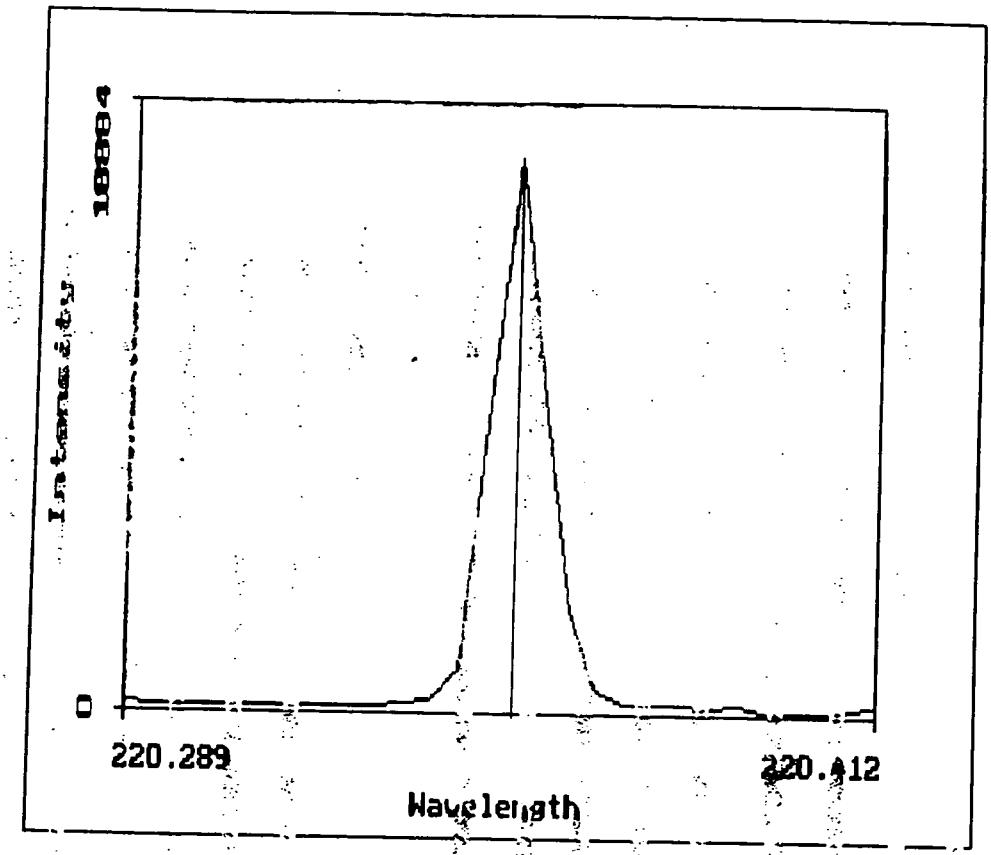


Method: FWS Sample Name: 1174 65 04R 10X Operator: EML
Run Time: 11/19/98 16:01:11
Comment: TCLP EXTRACT Pb SDF POR
Mode: CONC Cor. Factor: 11.1

Elem	Pb2203
Units	mg/l
Avge	418.6
SDev	4.5
%RSD	.995
#1	421.1
#2	410.1
#3	413.1
Errors	NO CHECK
High	
Low	

Analyte Scan

Element Name: Pb2203
Wavelength : 220.351



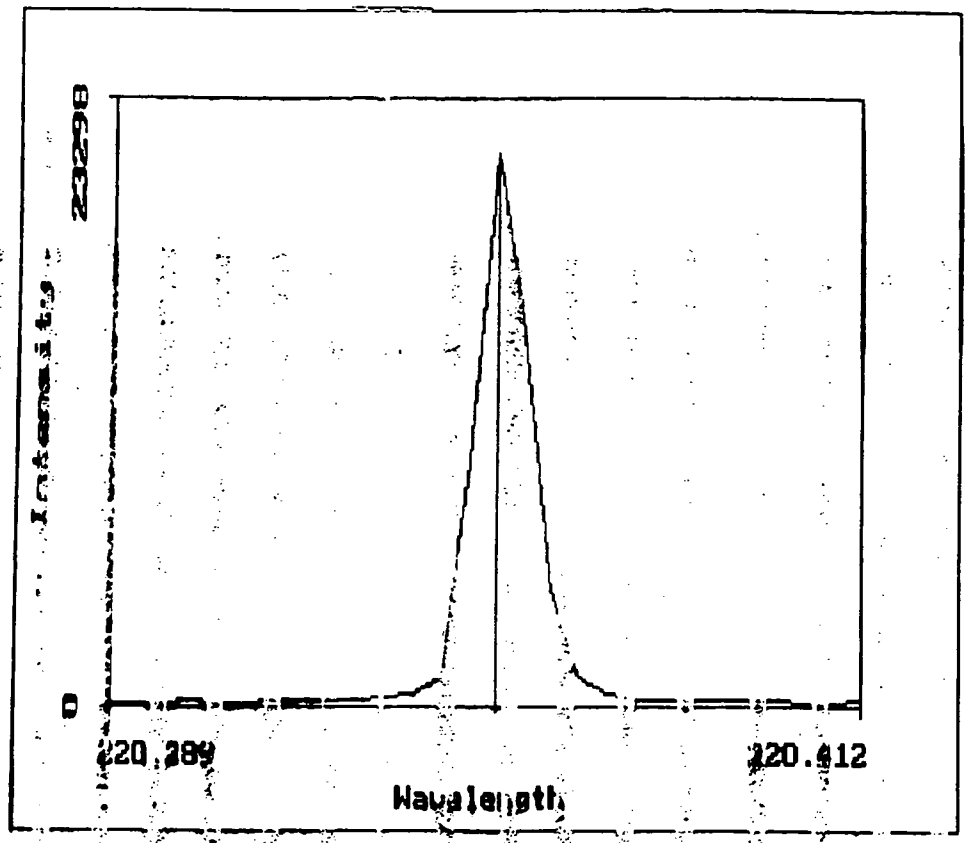
---

ethod: FWF Sample Name: 11 4 71 04R 10x Operator: EML
un Time: 11/19/98 16:04:52
omment: TCLP EXTRACT Pb FDF POR
ode: CONC Corr. Factor: 11.3

Elem	Pb2203
Units	mg/l
Avge	571.
SDev	.
%RSD	.150
#1	572.
#2	572.
#3	570.
Errors	NO CHECK
High	
Low	

Analyte Scan

Element Name: Pb2203
Wavelength : 220.351

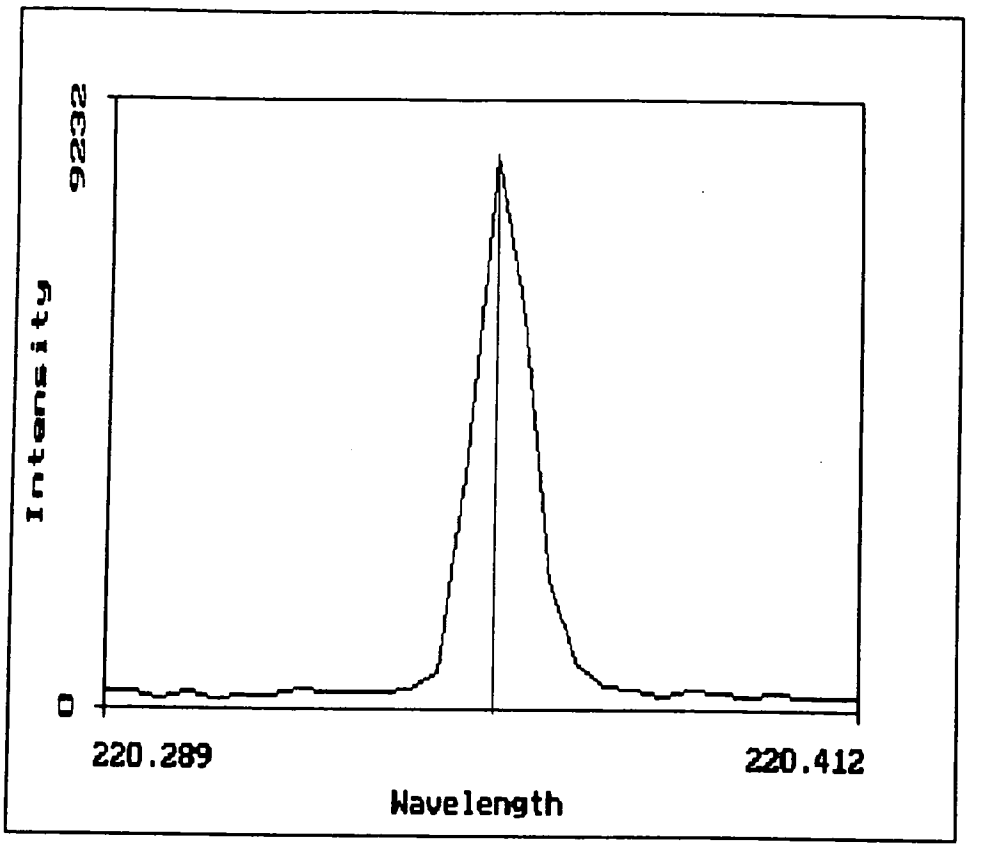


Method: FWS Sample Name: 1174 73 01 10X Operator: EML
Run Time: 11/19/98 16:08:14
Comment: TCLP EXTRACT Pb SDF POP
Mode: CONC Corr. Factor: 11.1

Elem	Pb2203
Units	mg/l
Avge	219.2
SDev	2.4
%RSD	.9936
#1	219.5
#2	216.6
#3	221.1
Errors	NOCHECK
High	
Low	

Analyte Scan

Element Name: Pb2203
Wavelength : 220.351

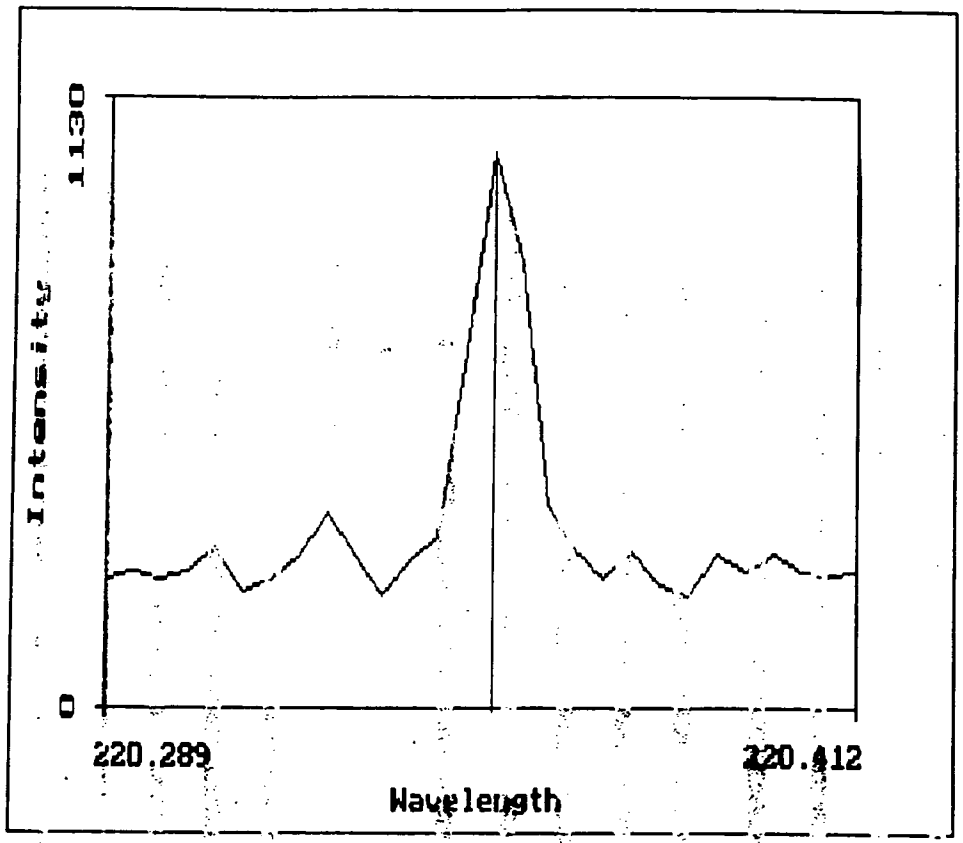


Method: FWF Sample Name: 1174 73 02 10X Operator: EML
Run Time: 11/19/98 16:12:16
Comment: TCLP EXTRACT Pb FDF POP
Mode: CONC Corr. Factor: 11.1

Elem	Pb2203
Units	mg/l
Avge	24.48
SDev	.47
%RSD	1.904
#1	24.65
#2	24.83
#3	23.95
Errors	NOCHECK
High	
Low	

Analyte Scan

Element Name: Pb2203
Wavelength : 220.351

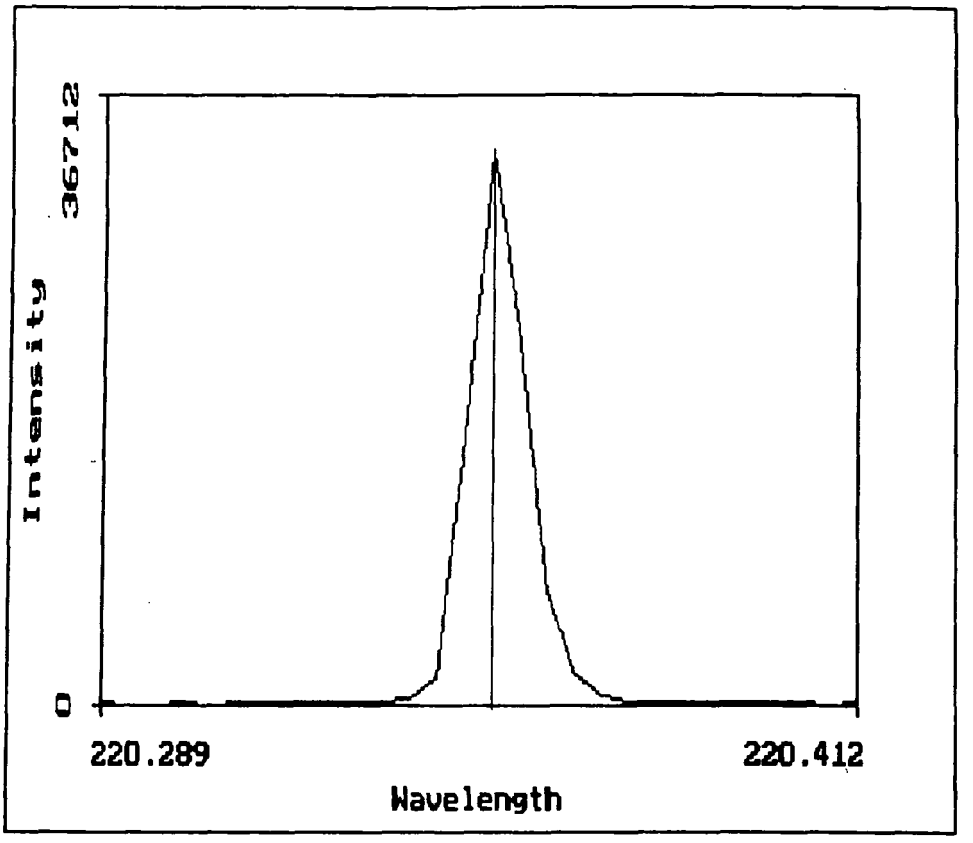


Method: FWP Sample Name: 1174 73 03 10X Operator: EML
Run Time: 11/19/98 16:16:00
Comment: TCLP EXTRACT Pb FDF POR
Mode: CONC Corr. Factor: 11.1

Elem	Pb2203
Units	mg/l
Avge	877.1
SDev	1.4
%RSD	.1811
#1	876.5
#2	875.9
#3	878.2
Errors	NO CHECK
High	
Low	

Analyte Scan

Element Name: Pb2203
Wavelength : 220.351



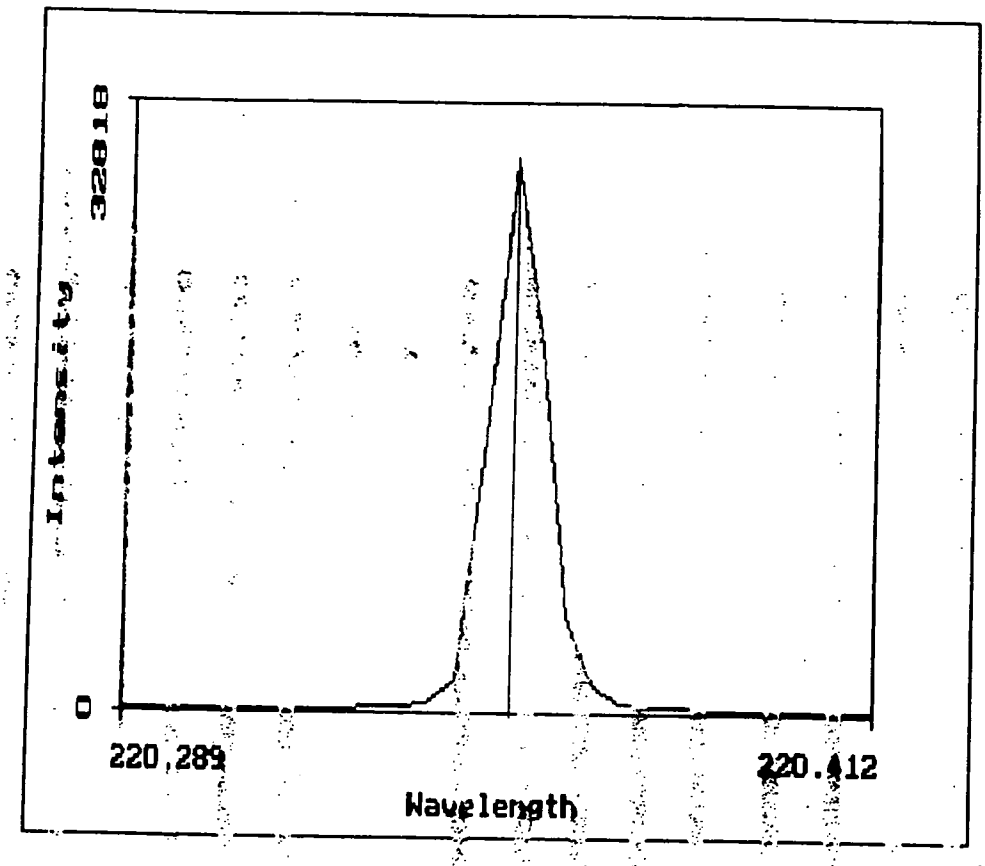
---

lethod: FWF Sample Name: 1174 73 04 10X Operator: EML
:un Time: 11/19/98 16:19:42
:omment: TCLP EXTRACT Pb FDF POP
lode: CONC Corr. Factor: 11.1

Elem	Pb2203
Units	mg/l
Avge	793.8
SDev	9.2
%RSD	1.165
#1	797.6
#2	783.2
#3	800.5
Errors	NOCHECK
High	
Low	

Analyte Scan

Element Name: Pb2203
Wavelength : 220.251

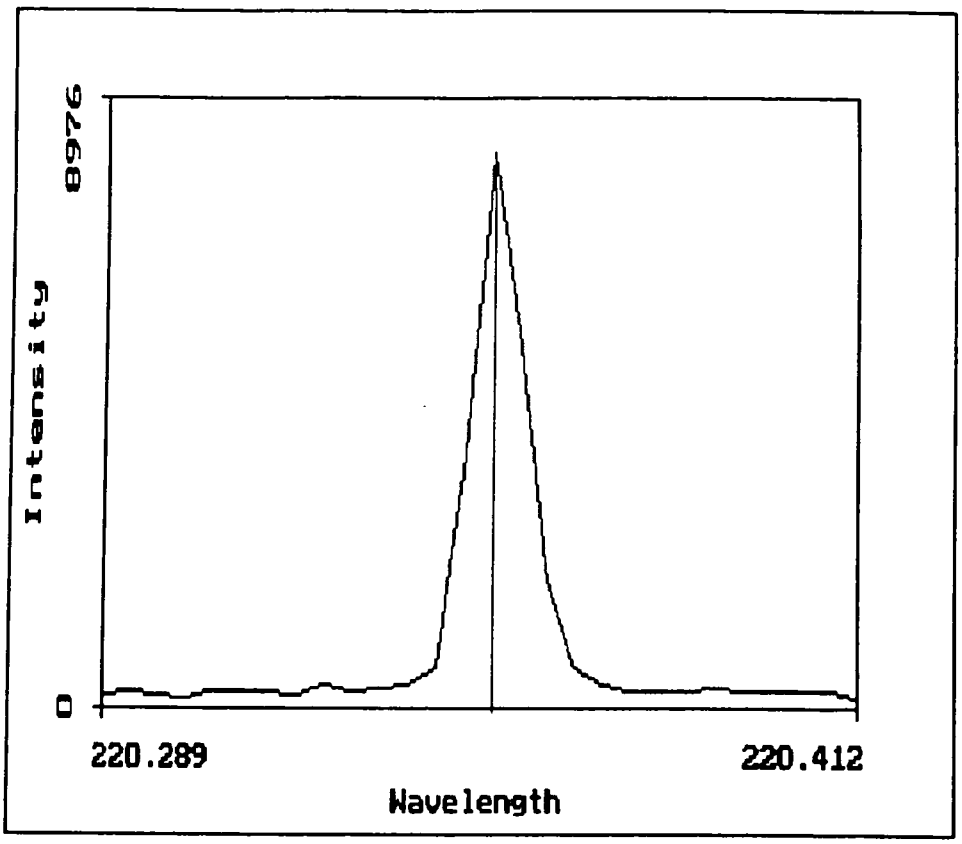


Method: FWE Sample Name: 1134 73 05 10X Operator: SML
Run Time: 11/19/98 16:23:24
Comment: TCLP EXTRACT Pb FDF PO
Mode: CONC Corr. Factor: 11.1

Elem	Pb2203
Units	mg/l
Avge	206.1
SDev	2.[illegible]
%RSD	1.10%
#1	205.[illegible]
#2	208.7
#3	204.6
Errors	NOCHECK
High	
Low	

Analyte Scan

Element Name: Pb2203
Wavelength : 220.351

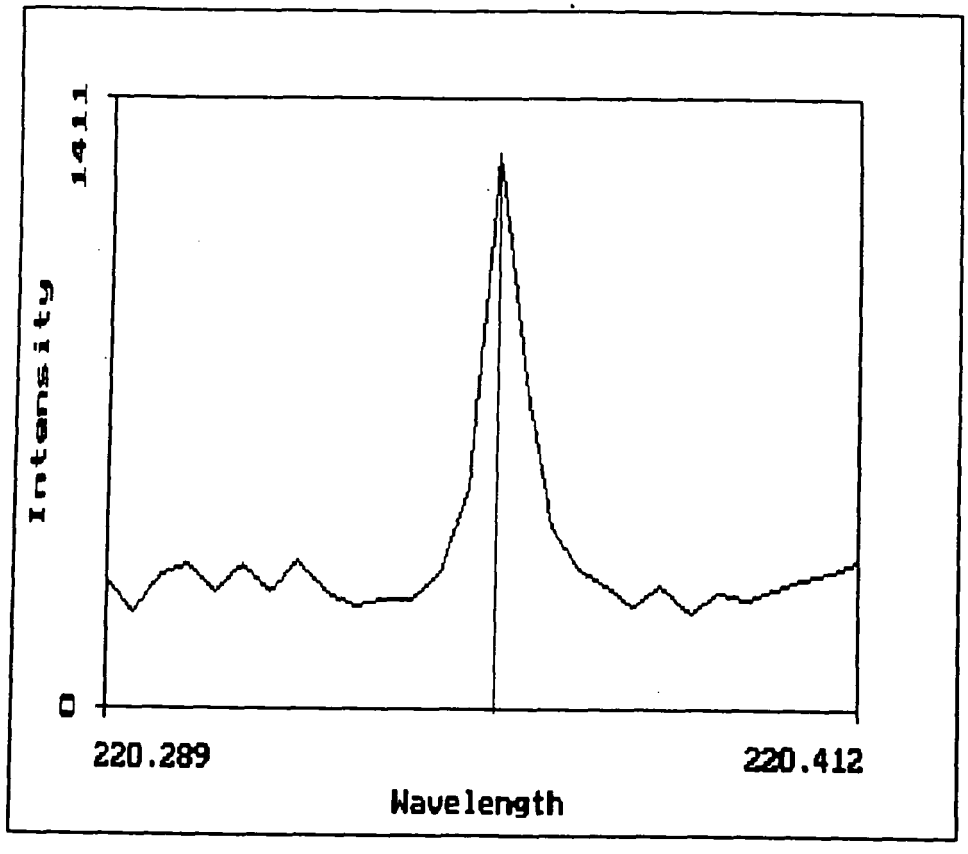


Method: FWF Sample Name: CCV Operator: EML
Run Time: 11/19/98 16:26:57
Comment: TCLP ANALYSIS
Mode: CONC Corr. Factor: 1

Elem	Pb2203
Units	mg/l
Avge	2.072
SDev	.029
%RSD	1.389
#1	2.103
#2	2.046
#3	2.068
Errors	QC Pass
Value	2.000
Range	10.00

Analyte Scan

Element Name: Pb2203
Wavelength : 220.351

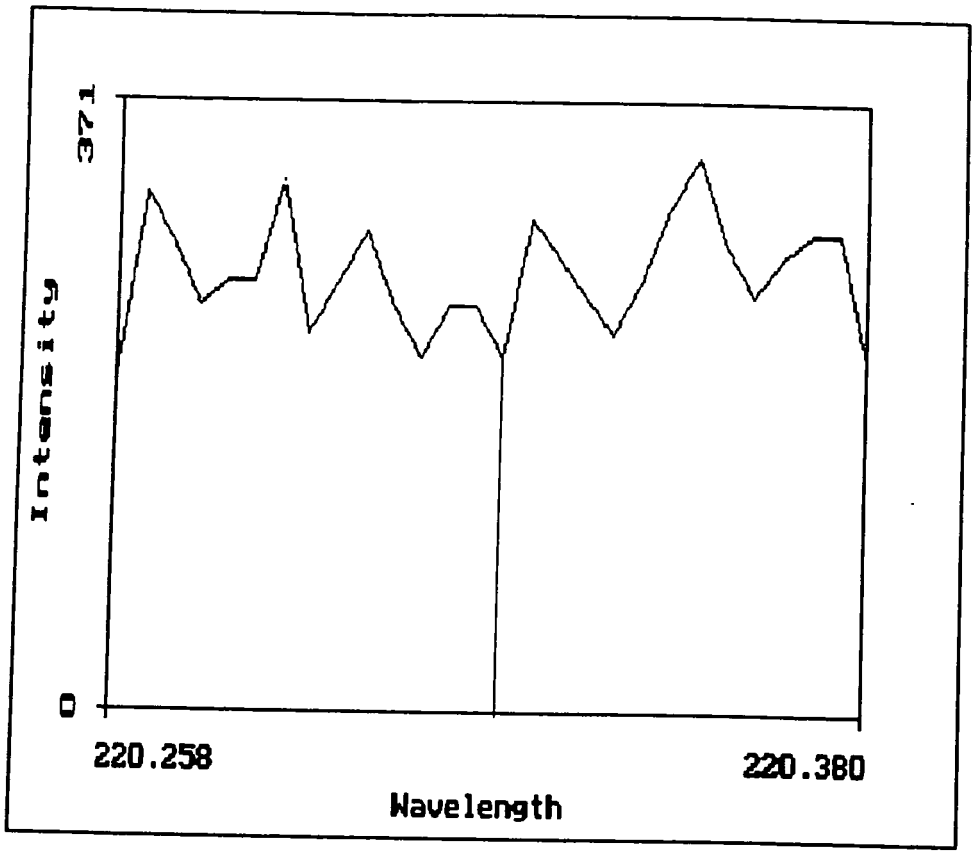


Method: FWF Sample Name: CCB Operator: EML
Run Time: 11/19/98 16:30:42
Comment: TCLP ANALYSIS
Mode: CONC Corr. Factor: 1

Elem	Pb2203
Units	mg/l
Avge	D.0047
SDev	.0231
%RSD	486.3
#1	D.0156
#2	D-.0218
#3	D.0204

Analyte Scan

Element Name: Pb2203
Wavelength : 220.319

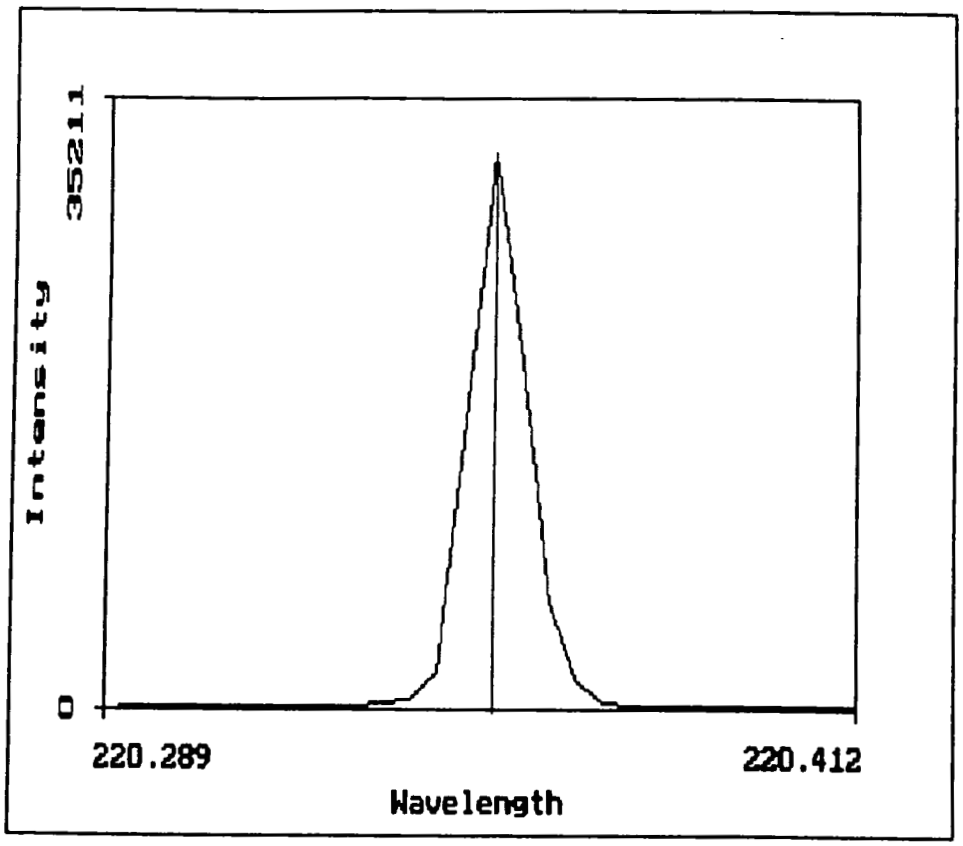


Method: FWF Sample Name: 1174 74 01 10X Operator: EML
Run Time: 11/19/98 16:34:35
Comment: TCLP EXTRACT Pb FDF POP
Mode: CONC Corr. Factor: 11.1

Elem	Pb2203
Units	mg/l
Avge	845.5
SDev	8.0
%RSD	.9455
#1	836.6
#2	848.1
#3	851.9
Errors	NOCHECK
High	
Low	

Analyte Scan

Element Name: Pb2203
Wavelength : 220.351

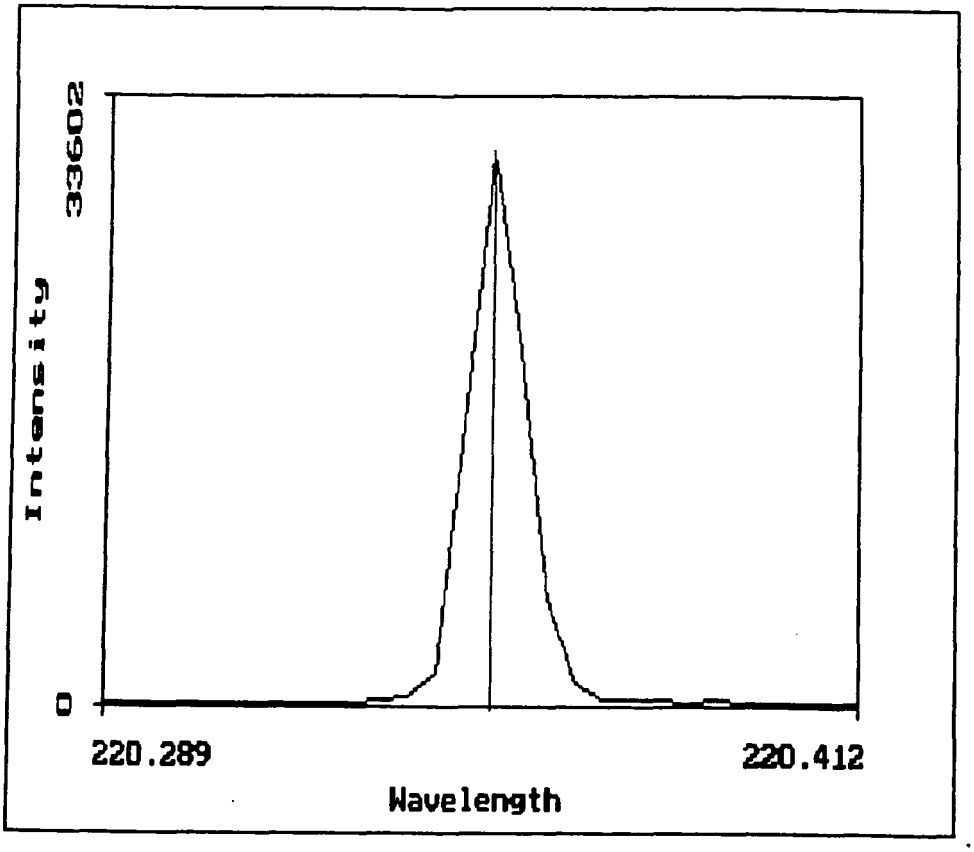


Method: FWF Sample Name: 1174 74 02 10X Operator: EML
Run Time: 11/19/98 16:38:16
Comment: TCLP EXTRACT Pb FDF POP
Mode: CONC Corr. Factor: 11.1

Elem	Pb2203
Units	mg/l
Avge	810.5
SDev	3.4
%RSD	.4174
#1	807.1
#2	810.5
#3	813.9
Errors	NOCHECK
High	
Low	

Analyte Scan

Element Name: Pb2203
Wavelength : 220.351



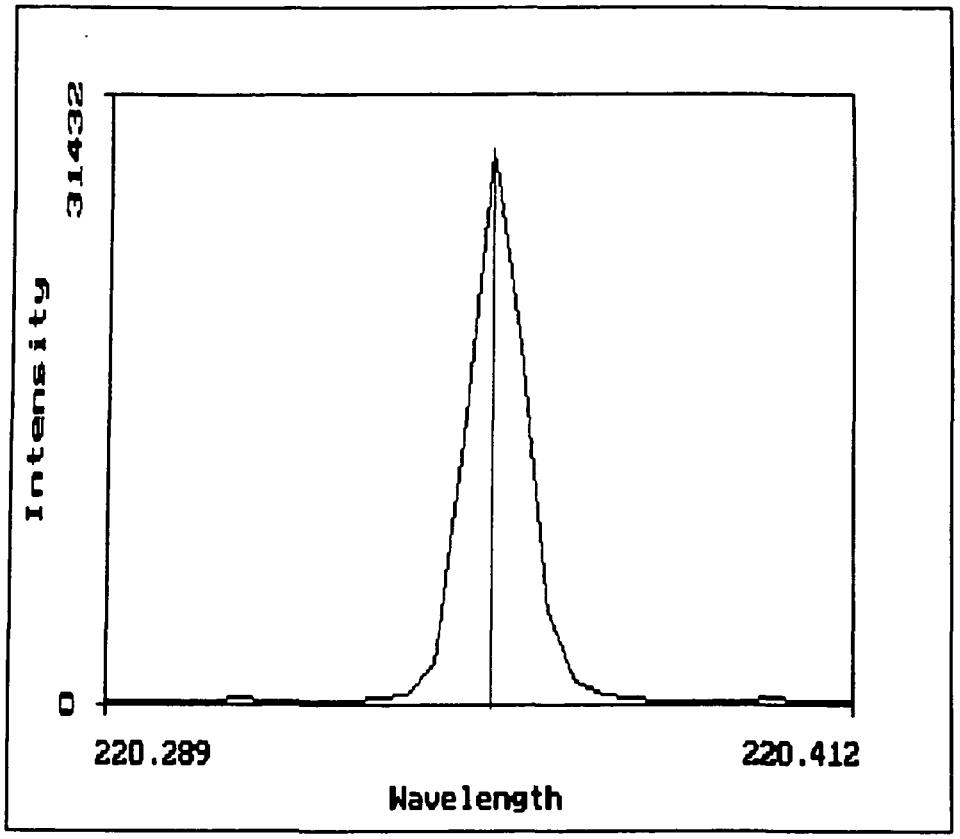
Method: FWF Sample Name: 1174 74 03 10X Operator: EML
Run Time: 11/19/98 16:41:56
Comment: TCLP EXTRACT Pb FDF POP
Mode: CONC Corr. Factor: 11.1

Elem	Pb2203
Units	mg/l
Avge	751.7
SDev	3.4
%RSD	.4466
#1	752.4
#2	754.7
#3	748.1
Errors	NOCHECK
High	
Low	

---

malyte Scan

Element Name: Pb2203
Wavelength : 220.351

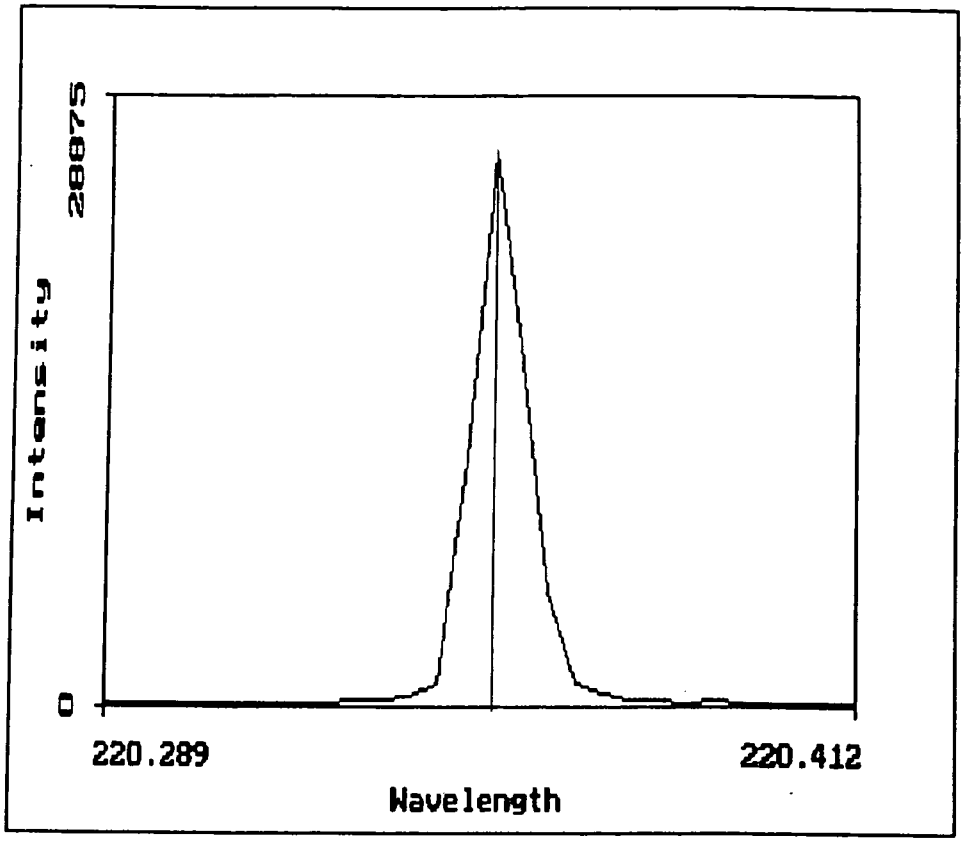


Method: FWF Sample Name: 1174 74 04 10X Operator: EML
Run Time: 11/19/98 16:45:38
Comment: TCLP EXTRACT Pb FDF POP
Mode: CONC Corr. Factor: 11.1

Elem	Pb2203
Units	mg/l
Avge	665.5
SDev	2.8
%RSD	.4234
#1	662.6
#2	668.3
#3	665.6
Errors	NOCHECK
High	
Low	

Analyte Scan

Element Name: Pb2203
Wavelength : 220.351



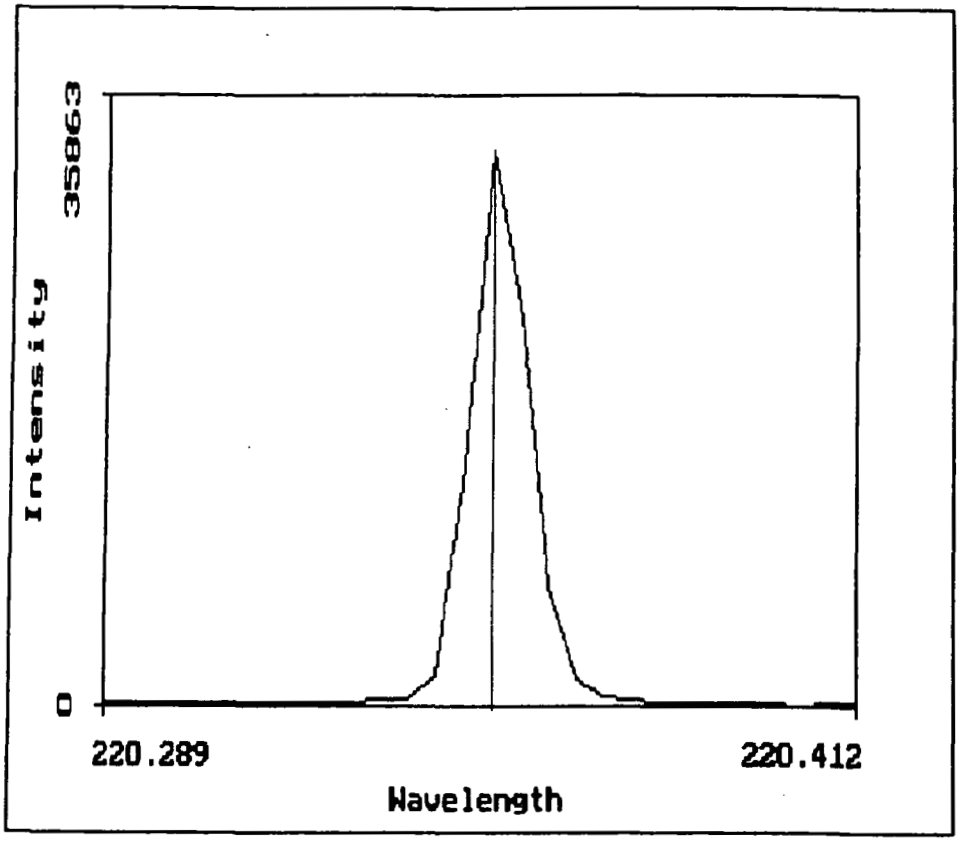
Method: FWF Sample Name: 1174 74 04 10X MS Operator: EML
Run Time: 11/19/98 16:49:20
Comment: TCLP ANALYSIS
Mode: CONC Corr. Factor: 11.1

Elem	Pb2203
Units	mg/l
Avge	864.1
SDev	2.5
%RSD	.2877
#1	866.2
#2	861.3
#3	864.8
Errors	NOCHECK
High	
Low	

---

nalyte Scan

lement Name: Pb2203
avelength : 220.351



---

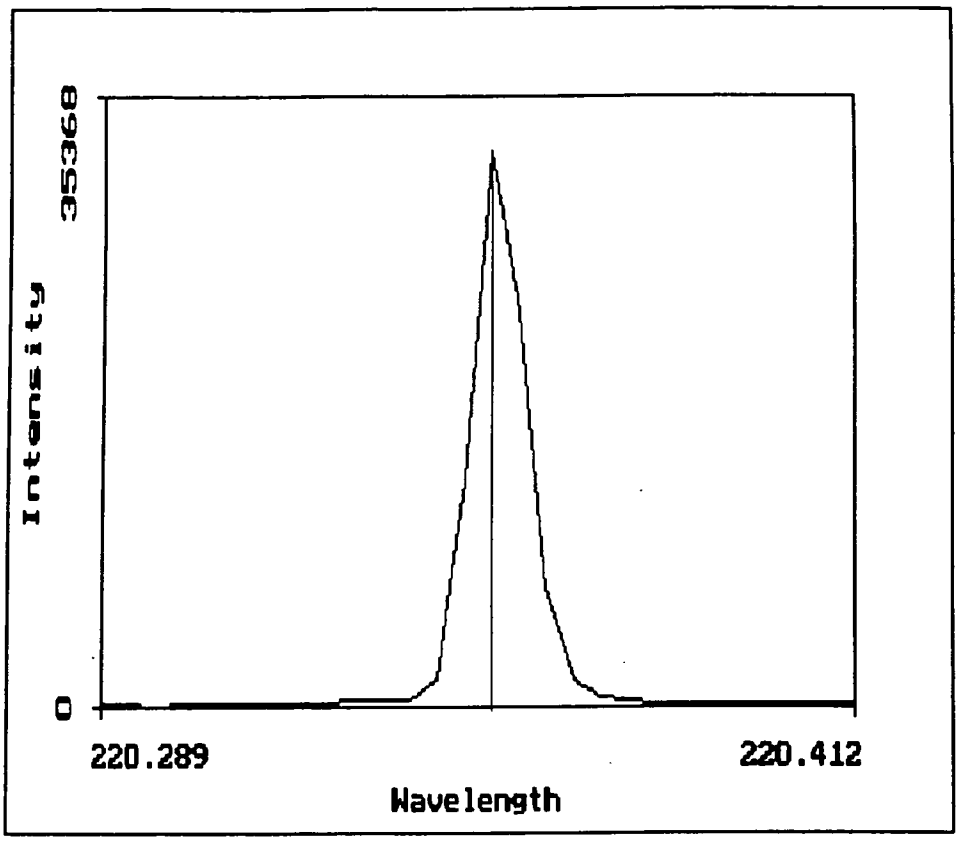
ethod: FWF Sample Name: 1174 74 04 10X MSD Operator: EML
in Time: 11/19/98 16:53:03
omment: TCLP ANALYSIS
ode: CONC Corr. Factor: 11.1

Elem	Pb2203
Units	mg/l
Avge	857.7
SDev	7.2
%RSD	.8344
1	863.5
2	859.9
3	849.7
Errors	NOCHECK
High	
Low	

---

nalyte Scan

lement Name: Pb2203
avelength : 220.351



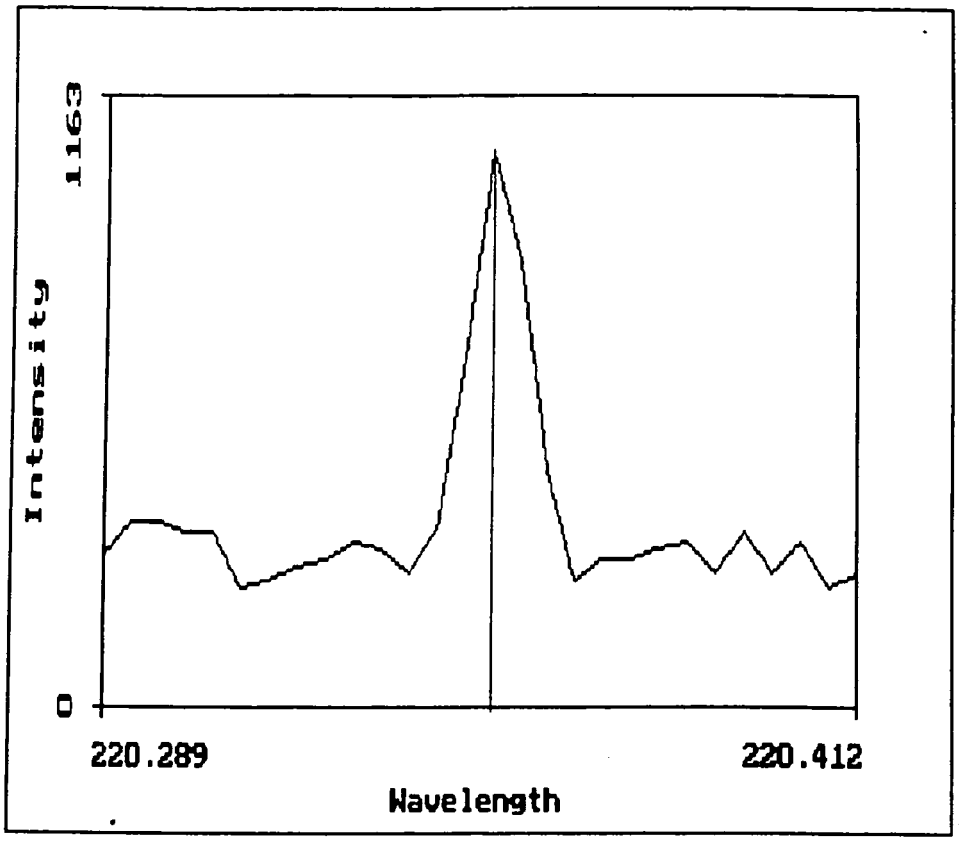
---

lethod: FWF Sample Name: CCV Operator: EML
un Time: 11/19/98 16:56:45
omment: TCLP ANALYSIS
lode: CONC Corr. Factor: 1

Elem	Pb2203
Units	mg/l
Avge	1.977
SDev	.060
%RSD	3.011
#1	2.045
#2	1.944
#3	1.941
Errors	QC Pass
Value	2.000
Range	10.00

Analyte Scan

Element Name: Pb2203
Wavelength : 220.351



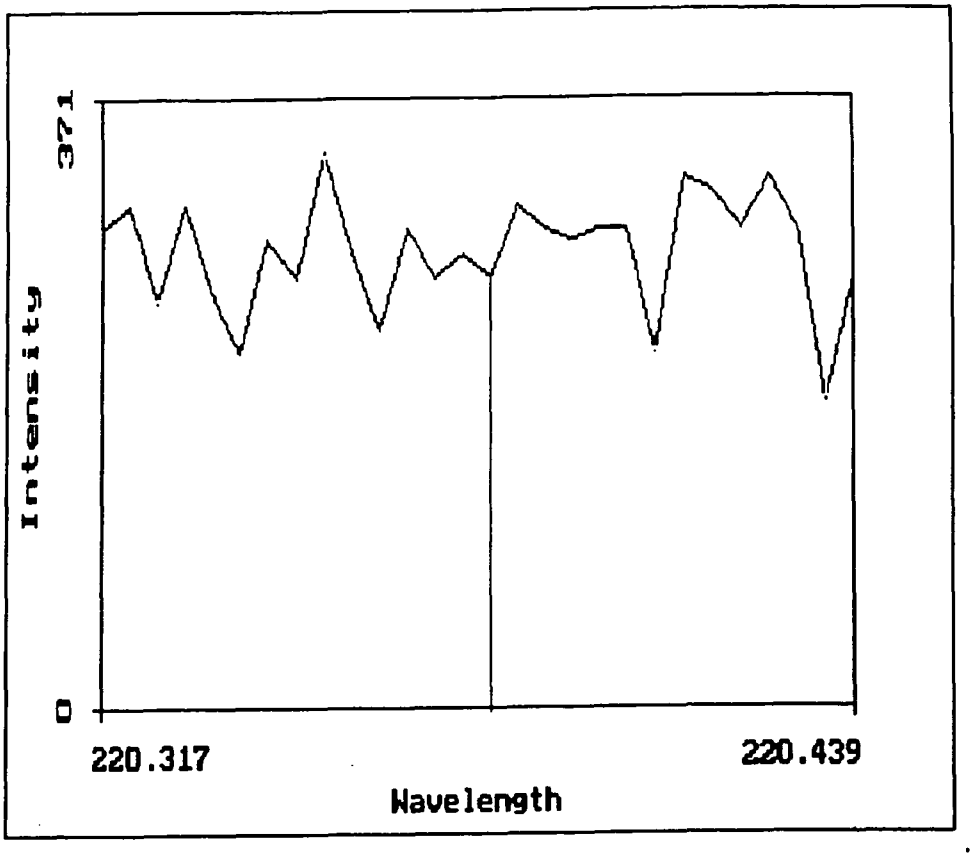
Method: FWF Sample Name: CCB Operator: EML
Run Time: 11/19/98 17:00:31
Comment: TCLP ANALYSIS
Mode: CONC Corr. Factor: 1

Elem	Pb2203
Units	mg/l
Avge	D.0071
SDev	.0509
%RSD	720.3
#1	D-.0350
#2	D.0637
#3	D-.0075

---

malyte Scan

Element Name: Pb2203
Wavelength : 220.378



PROJECT :Fernald POP DEMO
PROJECT NO. : 775743.00065000
DATE ANALYZED: 2/5//99
SUBJECT : ANALYTICAL RESULTS - NITRATE by Ion Chromatography

SAMPLE NO	Nitrate Concentration (mg/L)	
Det Lim Method based on 50X dil. Fact. (mg/L)	25	
		QC
117917-01	1810	
117918-02	1862	
117919-03	1658	
117920-04	1822	
117921-05	1911	
117922-06	1935	
117923-07	1887	
117924-08	2254	
117925-09	2054	
117926-10	2155	
117928-11	2166	
0b	860	
15	1879	
117949-01	1301	
117949-02	1938	
117950-01	1396	
117950-02	1363	
t10b dup	878	pass
t10b ms	2759	pass
t10b msd	2771	pass
Spike Concentration (mg/L)	2000	

QUALIFIERS:
U= ANALYTE NOT FOUND . VALUE GIVEN IS METHOD DETECTION LIMIT.
UJ= ESTIMATED VALUE AT OR NEAR THE DETECTION LIMIT. ANALYTE IS PRESENT BUT MAY HAVE INTERFERENCE
J= ESTIMATED VALUE DUE TO MATRIX INTERFERENCE.
METHOD: ANALYSIS BASED ON EPA METHOD 300.0 Anions by IC

000369

APPENDIX D
SAMPLE CHAIN OF CUSTODY FORMS

FERMCO

P.O. BOX 538704
CINCINNATI, OH 45253-8704

CHAIN OF CUSTODY / REQUEST FOR ANALYSIS RECORD

ORIGINAL MEF NO.: NA

REFERENCE DOCUMENT NO.: SPL-99-0051

CORRESPONDING REFERENCE DOCUMENT NO.:

PAGE 1 OF 1

RELEASE NO.: 1000018383	PROJECT NO.: N/A	FOR SAMPLE RELATED PROBLEMS, ACS CONTACT / PHONE: Nat Politi 4921	CONTRACT PURCHASE ORDER / TASK ORDER NO.: N/A
PROJECT NAME: SIOS Project POP		REQUIRED REPORT DATE / LAB TAT: 14 DAYS	SAMPLE SHIPMENT DATE: 1-27-99
PROJECT CONTACT / PHONE: NAT Politi 4921		RECEIVING LAB NAME: International Technology Corp.	SAMPLE SHIPPER (Print): K. Helfferich
CHARGE NO.: 5111	LOT MARKING NO.: NA	RECEIVING LAB ADDRESS: Knoxville, TN 37923	OFF-SITE LAB CONTACT: Paul Lear
SAMPLING TEAM (Print) & GROUP NAME / PHONE: Nat Politi, SIOS 4921			
SAMPLING TEAM (Signature & Badge No.): Nat Politi 76778			

ITEM NO.	SAMPLE NUMBER FACTS ID	SAMPLE NUMBER CUSTOMER ID / SAMPLE POINT	SAMPLE MATRIX	COMP	GRAB	FILTERED	COLLECTION DATE	COLLECTION TIME	CONTAINER TYPE	CONTAINER VOL.	NO. CONTRS	PRESERVATION	ASL	ANALYSES REQUESTED (If more space is required, use the SPECIAL INSTRUCTIONS block.)	SAMPLE OKAY? (Y/N)* FERMCO	SAMPLE OKAY? (Y/N)* OFF-SITE
1	200346731	DS-47-S2	S Solid	X		No	1/26/99	1102	steel drum	55 gal	1	NONE	B	*	Y	
2																
3		nothing follows (NP) 1/26/99														
4																
5																
6																
7																
8																
9																
10																

SPECIAL INSTRUCTIONS: *Please ship to Mr. Paul Lear International Technology Corporation
304 Directors Drive
Knoxville, TN 37923

RELINQUISHED

ITEM / REASON	RELINQUISHED BY (Signature) / AFFILIATION	BADGE NO.	DATE	TIME
1 - ~~Shipper to offsite~~ To SPL SDC 1/26/99	Nat Politi SDC	76778	1/26/99	1103
1 - to ship	Karen Helfferich / SPL	27706	1-27-99	1300
		3		
		4		
		5		

RECEIVED

RECEIVED BY (Signature) / AFFILIATION	BADGE NO.	DATE	TIME
Scott Cogle SPL	76717	1/26/99	1103
	2		
	3		
	4		
	5		

DISTRIBUTION OF COPIES: WHITE ON-SITE - RELEASE FILE / OFF-SITE ANALYTICAL LAB - RETURN TO FEMP; YELLOW ON-SITE - DISTRIBUTE AS NEEDED / OFF-SITE ANALYTICAL LAB - RETURN TO FEMP; BLUE SAMPLING TECH / PROJECT FILE

FS-F-3361 (09-21-95)

SHADED AREAS ARE TO BE COMPLETED BY THE SAMPLE RECEIVING GROUP.

* IF "N", THEN COMPLETE APPLICABLE NON-CONFORMANCE PROCEDURE.

1 copy

000371

2293

INTERNATIONAL TECHNOLOGY CORPORATION

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD*

Reference Document No. 426833
Page 1 of 1

775743.00035000

Project Name/No. [1] FDF POP
Sample Team Members [2] PL/MH/KF
Profit Center No. [3] 6585001
Project Manager [4] Paul Lear
Purchase Order No. [6] 775743
Required Report Date [11]

Samples Shipment Date [7] 10/6/98 (10/6/98)
Lab Destination [8] Fernald OHIO
Lab Contact [9] John Roberts (513)
Project Contact/Phone [12] Paul Lear 694-7316
Carrier/Waybill No. [13] FedX 7916 2650 9078

Bill to: [5] NA
Report to: [10] NA

White: To accompany samples
Yellow: Field copy

ONE CONTAINER PER LINE

Sample Number [14]	Sample Description/Type [15]	Date/Time Collected [16]	Container Type [17]	Sample Volume [18]	Preservative [19]	Requested Testing Program [20]	Condition on Receipt [21]	Disposal Record No. [22]
1174-10-1A,B,C	Silo 1 Surrogate	10/6/98	3-1L Plastic	3-1L	None			
1174-12-1A,B,C	Silo 2 Surrogate	10/6/98	3-1L Plastic	3-1L				
1174-14-1A,B,C	Demo Surrogate	10/6/98	3-1L Plastic	3-1				

FOR LAB USE ONLY

FOR LAB USE ONLY

COPY

Special Instructions: [23]

Possible Hazard Identification: [24]
Non-hazard ☑ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐

Sample Disposal: [25] Disposal by FDF
Return to Client ☐ Disposal by Lab ☐ Archive _____ (mos.)

Turnaround Time Required: [26]
Normal ☐ Rush ☐

QC Level: [27]
I. ☐ II. ☐ III. ☑ Project Specific (specify): Project Specific

1. Relinquished by [28] (Signature/Affiliation) Mary Hall	Date: 10/6/98 Time: 14:30pm	1. Received by [28] (Signature/Affiliation)	Date: Time:
2. Relinquished by (Signature/Affiliation)	Date: Time:	2. Received by (Signature/Affiliation)	Date: Time:
3. Relinquished by (Signature/Affiliation)	Date: Time:	3. Received by (Signature/Affiliation)	Date: Time:

Comments: [29]

000372

2293

*See back of form for special instructions.

MCA 3/15/91

INTERNATIONAL TECHNOLOGY CORPORATION

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD*

Reference Document No. 26834
Page 1 of ___

Project Name/No.[1] FDF POP 775713.00035000
Sample Team Members[2] PL/MH/KF
Profit Center No.[3] 6585001
Project Manager[4] Paul Lear
Purchase Order No.[6] 775713
Required Report Date[11] 10/21/98

Samples Shipment Date[7] 10/6/98
Lab Destination[8] Recra Labnet Philadelphia (610) 280-3000
Lab Contact[9] Gail Ruzzo 423 694-7361
Project Contact/Phone[12] Paul Lear
Carrier/Waybill No.[13] Fed Ex 7916265089978 7916265090178 MA 10/6/98

Bill to:[5] IT Corp. 312 Directors Dr Knoxville, TN 37923
Report to:[10] Paul Lear IT Corp. 304 Directors Dr Knoxville, TN 37923

White: To accompany samples
Yellow: Field copy

ONE CONTAINER PER LINE

Sample Number[14]	Sample Description/Type[15]	Date/Time Collected[16]	Container Type[17]	Sample Volume[18]	Preservative[19]	Requested Testing Program[20]	Condition on Receipt[21]	Disposal Record No.[22]
1174-10-1D	Solid S1101 Surrogate	10/6/98	1L Plastic	300.24g ~300g	None	TCLP Pb	FOR LAB USE ONLY	
1174-12-1D	Solid S1102 Surrogate	10/6/98	1L Plastic	301.71g ~300g		TCLP Pb		
1174-14-1D	Solid Demo Surrogate	10/6/98	1L Plastic	~300g		TCLP Pb	FOR LAB USE ONLY	

COPY

Special Instructions:[23]

Possible Hazard Identification:[24] Non-hazard ☑ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐

Sample Disposal:[25] Return to Client ☐ Disposal by Lab ☐ Archive ____ (mos.)

Turnaround Time Required:[26] Normal ☐ Rush ☑ 14 days

QC Level:[27] I. ☐ II. ☐ III. ☑ Project Specific (specify): QC results on project sample

1. Relinquished by[28] (Signature/Affiliation) Mary Hall	Date: 11/16/98 Time: 14:27	1. Received by[28] (Signature/Affiliation)	Date: Time:
2. Relinquished by (Signature/Affiliation)	Date: Time:	2. Received by (Signature/Affiliation)	Date: Time:
3. Relinquished by (Signature/Affiliation)	Date: Time:	3. Received by (Signature/Affiliation)	Date: Time:

Comments:[29]

000323

*See back of form for special instructions.

MCA 3/15/91

229.3

INTERNATIONAL TECHNOLOGY CORPORATION

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD*

Reference Document No. 26835
Page 1 of 2

Project Name/No. [1] FDF044 PGP
Sample Team Members [2] AG
Profit Center No. [3] 6585001
Project Manager [4] Paul Lear
Purchase Order No. [6] 775743
Required Report Date [11] 10/28/98

Samples Shipment Date [7] 10/14/98
Lab Destination [8] RCRA Labnet
Lab Contact [9] Gail DeRuzzo
Project Contact/Phone [12] Paul Lear 694-7346 423
Carrier/Waybill No. [13] 79015071 1045 7916 2945 3703

Bill to: [5] IT Corp
312 Directors Dr
Knoxville, Tn 37923

Report to: [10] Paul Lear
304 Directors Dr
Knoxville Tn 37923

White: To accompany samples
Yellow: Field copy

ONE CONTAINER PER LINE

Sample Number [14]	Sample Description/Type [15]	Date/Time Collected [16]	Container Type [17]	Sample Volume [18]	Preservative [19]	Requested Testing Program [20]	Condition on Receipt [21]	Disposal Record No. [22]
1174-35-01B	Silo1 Surrogate Mix #1	10/12/98	32oz Glass	32oz	None	TCLP/UTS metals SW-846 Methods 1311, 6010A		
1174-36-01	Silo1 Surrogate Mix #2	10/12/98	Glass	32oz			FOR LAB USE ONLY	
1174-37-01	Silo1 Surrogate Mix #3	10/12/98	Glass	32oz				
1174-38-01	Silo1 Surrogate Mix #4	10/12/98	Glass	32oz				
1174-39-01	Silo1 Surrogate Mix #5	10/12/98	Glass	32oz				
1174-40-01	Silo1 Surrogate Mix #6	10/12/98	Glass	32oz			FOR LAB USE ONLY	
1174-41-01	Silo2 Surrogate Mix #7	10/13/98	Glass	32oz				
1174-42-01	Silo2 Surrogate Mix #8	10/13/98	Glass	32oz				

← Cooler 1

COPY

Special Instructions: [23]

Possible Hazard Identification: [24] Lead
Non-hazard ☑ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐

Sample Disposal: [25]
Return to Client ☐ Disposal by Lab ☑ Archive _____ (mos.)

Turnaround Time Required: [26]
Normal ☐ Rush ☑ 14 Days

QC Level: [27]
I. ☐ II. ☐ III. ☑ Project Specific (specify): QC project specific

1. Relinquished by [28] (Signature/Affiliation) Date: Time:	1. Received by [28] (Signature/Affiliation) Date: Time:
2. Relinquished by (Signature/Affiliation) Date: Time:	2. Received by (Signature/Affiliation) Date: Time:
3. Relinquished by (Signature/Affiliation) Date: Time:	3. Received by (Signature/Affiliation) Date: Time:

Comments: [29]

000372

*See back of form for special instructions.

2293

MCA 3/15/91

INTERNATIONAL TECHNOLOGY CORPORATION

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD (cont.)*

Reference Document No. 26835
Page 2 of ____

Project Name FDF OU 4 POP

Project No. 775743

Samples Shipment Date 10/14/98

ONE CONTAINER PER LINE

Sample Number 14	Sample Description/Type 15	Date/Time Collected 16	Container Type 17	Sample Volume 18	Pre-servative 19	Requested Testing Program 20	Condition on Receipt 21	Disposal Record No. 22
1174-43-01	Silo 2 Surrogate Mix # 9	10/13/98	Glass	32oz	None	TCLP/LTS metals SW-846 1311+6010A		
1174-44-01	Silo 2 Surrogate Mix # 10	10/13/98					FOR LAB USE ONLY	
1174-45-01	Silo 2 Surrogate Mix # 11	10/13/98						
1174-46-01	Silo 2 Surrogate Mix # 12	10/13/98					FOR LAB USE ONLY	
1174-47-01	Demo Surrogate Mix # 13	10/14/98	Glass	32oz	None	TCLP/LTS metals SW-846 1311+6010A		
1174-48-01	Demo Surrogate Mix # 14	10/14/98					FOR LAB USE ONLY	
1174-49-01	Demo Surrogate Mix # 15	10/14/98						
1174-50-01	Demo Surrogate Mix # 16	10/14/98					FOR LAB USE ONLY	
1174-51-01	Demo Surrogate Mix # 17	10/14/98						
1174-52-01	Demo Surrogate Mix # 18	10/14/98					FOR LAB USE ONLY	
							FOR LAB USE ONLY	
							FOR LAB USE ONLY	
							FOR LAB USE ONLY	

Cooler 1 ↑
Cooler 2 → Cooler

COPY

000375

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Yellow: Field copy
*See back of form for special instructions.

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MCA 3/15/91

INTERNATIONAL TECHNOLOGY CORPORATION 775743

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD*

Reference Document No. 6841
Page 1 of 1

Project Name/No. [1] FDF 044 POP
Sample Team Members [2] PL / MH
Profit Center No. [3] 6585001
Project Manager [4] Paul Lear
Purchase Order No. [6]
Required Report Date [11]

Samples Shipment Date [7] 10/19/98
Lab Destination [8] FDF Fernald
Lab Contact [9] John Roberts
Project Contact/Phone [12] Paul Lear (423)690-3211
Carrier/Waybill No. [13] 8017629 34292

Bill to: [5]
Report to: [10]

White: To accompany samples
Yellow: Field copy

ONE CONTAINER PER LINE

Sample Number [14]	Sample Description/Type [15]	Date/Time Collected [16]	Container Type [17]	Sample Volume [18]	Pre-servative [19]	Requested Testing Program [20]	Condition on Receipt [21]	Disposal Record No. [22]
1174-60-1	PbO	10/19/98 2:15pm	Scintillation Vial	20ml	None		FOR LAB USE ONLY	
1174-60-2	PbSO4	10/19/98 2:25pm	↓	↓	↓			
							FOR LAB USE ONLY	

COPY

Special Instructions: [23]

Possible Hazard Identification: [24]
Non-hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐

Sample Disposal: [25]
Return to Client ☐ Disposal by Lab ☑ Archive _____ (mos.)

Turnaround Time Required: [26]
Normal ☐ Rush ☐

QC Level: [27]
I. ☐ II. ☐ III. ☐ Project Specific (specify): _____

1. Relinquished by [28] (Signature/Affiliation) Margaret Hall	Date: 10/19/98 Time: 3:30pm	1. Received by [28] (Signature/Affiliation)	Date: Time:
2. Relinquished by (Signature/Affiliation)	Date: Time:	2. Received by (Signature/Affiliation)	Date: Time:
3. Relinquished by (Signature/Affiliation)	Date: Time:	3. Received by (Signature/Affiliation)	Date: Time:

Comments: [29]

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*See back of form for special instructions.

2293

MCA 3/15/91

INTERNATIONAL TECHNOLOGY CORPORATION

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD*

Reference Document No. 26842
Page 1 of 1

Project Name/No.[1] 775713 FDFOUHPoP
Sample Team Members[2] PL / MH
Profit Center No.[3] 6585001
Project Manager[4] Paul Lear
Purchase Order No.[6]
Required Report Date[11]

Samples Shipment Date[7] 10/19/98
Lab Destination[8] FD Fernald
Lab Contact[9] John Roberts
Project Contact/Phone[12] Paul Lear / (513) 690-3211
Carrier/Waybill No.[13] 801762934307

Bill to:[5]
Report to:[10]

White: To accompany samples
Yellow: Field copy
*See back of form for special instructions.

ONE CONTAINER PER LINE

Sample Number[14]	Sample Description/Type[15]	Date/Time Collected[16]	Container Type[17]	Sample Volume[18]	Preservative[19]	Requested Testing Program[20]	Condition on Receipt[21]	Disposal Record No.[22]
1174-60-3	$PbCO_3$	10/19/98 2:45pm	Scintillation Vial	20ml	None		FOR LAB USE ONLY	
							FOR LAB USE ONLY	

COPY

Special Instructions:[23]

Possible Hazard Identification:[24] Non-hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐

Sample Disposal:[25] Return to Client ☐ Disposal by Lab ☑ Archive _____ (mos.)

Turnaround Time Required:[26] Normal ☐ Rush ☐

QC Level:[27] I. ☐ II. ☐ III. ☐ Project Specific (specify): _____

1. Relinquished by[28] (Signature/Affiliation) Mary Jo Kell / IT	Date: 10/19/98 Time: 3:30pm	1. Received by[28] (Signature/Affiliation)	Date: Time:
2. Relinquished by (Signature/Affiliation)	Date: Time:	2. Received by (Signature/Affiliation)	Date: Time:
3. Relinquished by (Signature/Affiliation)	Date: Time:	3. Received by (Signature/Affiliation)	Date: Time:

Comments:[29]

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MCA 3/15/91

INTERNATIONAL TECHNOLOGY CORPORATION

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD*

Reference Document No. 6829
Page 1 of 2

Project Name/No.: 1 PROOF OF PRINCIPLE
Sample Team Members: 2 A Gose
Profit Center No.: 3 2370050
Project Manager: 4 PAUL LEAR
Purchase Order No.: 6
Required Report Date: 11

Samples Shipment Date: 7 10/19/98 (1769383)
Lab Destination: 8 IT - ETDC
Lab Contact: 9 RALPH COLE
Project Contact/Phone: 12 PAUL LEAR
Carrier/Waybill No.: 13 —

Bill to: 5 IT CORP
Report to: 10 PAUL LEAR, IT TDL

ONE CONTAINER PER LINE

Sample Number 14	Sample Description/Type 15	Date/Time Collected 16	Container Type 17	Sample Volume 18	Preservative 19	Requested Testing Program 20	Condition on Receipt 21	Disposal Record No. 22
#1174-035-01	SILO1 - MIX1	10/12/98	PLASTIC MOLD	2x4"	—	7 DAY UCS (10/19/98)	DELETE #1	
#1174-036-01	SILO1 - MIX2				—	SEE COMMENTS	HOLD #2	
#1174-037-01	SILO1 - MIX3				—			
#1174-038-01	SILO1 - MIX4	9/8			—			
#1174-039-01	SILO1 - MIX5				—			
#1174-040-01	SILO1 - MIX6				—			
#1174-041-01	SILO2 MIX7	10/13/98			—	7 DAY UCS		
#1174-042-01	SILO2 - MIX8				—			

FOR LAB USE ONLY

FOR LAB USE ONLY

COPY

Special Instructions: 23 #ASTM METHOD D 2166 FOR UCS TESTING

Possible Hazard Identification: 24
Non-hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown ☐

Sample Disposal: 25
Return to Client ☐ Disposal by Lab ☒ Archive ____ (mos.)

Turnaround Time Required: 26
Normal ☒ Rush ☐

QC Level: 27
I. ☒ II. ☐ III. ☐ Project Specific (specify): ____

1. Relinquished by 28 (Signature/Affiliation) IT TAC — Date: 10/19/98 Time: 940	1. Received by 28 (Signature/Affiliation) Don Hunley IT/ETDC — Date: 10-19-98 Time: 1100
2. Relinquished by (Signature/Affiliation) — Date: Time:	2. Received by (Signature/Affiliation) — Date: Time:
3. Relinquished by (Signature/Affiliation) — Date: Time:	3. Received by (Signature/Affiliation) — Date: Time:

Comments: 29

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Yellow: Field copy
*See back of form for special instructions.

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INTERNATIONAL TECHNOLOGY CORPORATION

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD (cont.)*

Reference Document No.[30] 26829
Page 2 of 2

Project Name SILO 1 & 2 POP

Project No. 77 769363

Samples Shipment Date 10/19/98

ONE CONTAINER PER LINE

Sample[14] Number	Sample[15] Description/Type	Date/Time[16] Collected	Container[17] Type	Sample[18] Volume	Pre-[19] servative	Requested Testing[20] Program	Condition on[21] Receipt	Disposal[22] Record No.
#1174-043-01	SILO 2 MIX 9	10/13/98	PLASTIC MOLD	2x4"	—	7 Day UCS		
#1174-044-01	SILO 2 - MIX 10				—		FOR LAB USE ONLY	
#1174-045-01	SILO 2 MIX 11				—			
#1174-046-01	SILO 2 - MIX 12				—		FOR LAB USE ONLY	
#1174-047-01	DEMO - MIX 13	10/14/98			—	7 DAY UCS		
#1174-048-01	DEMO - MIX 14				—		FOR LAB USE ONLY	
#1174-049-01	DEMO MIX 15				—			
#1174-050-01	DEMO - MIX 16				—		FOR LAB USE ONLY	
#1174-051-01	DEMO - MIX 17				—			
#1174-052-01	DEMO - MIX 18				—		FOR LAB USE ONLY	
							FOR LAB USE ONLY	
							FOR LAB USE ONLY	
							FOR LAB USE ONLY	
							FOR LAB USE ONLY	

COPY

DELETE #1 & #2

White: To accompany samples
Yellow: Field copy

*See back of form for special instructions.

MCA 3/15/91

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INTERNATIONAL TECHNOLOGY CORPORATION

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD*

Reference Document No. 426843
Page 1 of 1

775743

Project Name/No. [1] FDF POP
Sample Team Members [2] KF /MH
Profit Center No. [3] 6585001
Project Manager [4] Paul Lucas
Purchase Order No. [6]
Required Report Date [11]

Samples Shipment Date [7] 10/23/98
Lab Destination [8] Furnald
Lab Contact [9] 513 648 5433 Jo Ann Roberts
Project Contact/Phone [12] Paul
Carrier/Waybill No. [13] Pickup 109

Bill to: [5]
Report to: [10]

ONE CONTAINER PER LINE

Sample Number [14]	Sample Description/Type [15]	Date/Time Collected [16]	Container Type [17]	Sample Volume [18]	Pre-servative [19]	Requested Testing Program [20]	Condition on Receipt [21]	Disposal Record No. [22]
1174-60-4	MgPO4	10/23/98 3:30	250ml plastic	100g ~~250ml~~	NA		FOR LAB USE ONLY	
1174-605	Tributyl Phosphate	10/23/98 3:40	100ml plastic	100g	NA			
							FOR LAB USE ONLY	

COPY

Special Instructions: [23]

Possible Hazard Identification: [24]
Non-hazard ☑ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐

Sample Disposal: [25]
Return to Client ☐ Disposal by Lab ☑ Archive _____ (mos.)

Turnaround Time Required: [26]
Normal ☐ Rush ☐

QC Level: [27]
I. ☐ II. ☐ III. ☐ Project Specific (specify): _____

1. Relinquished by [28] (Signature/Affiliation) Mary Hall	Date: 10/23/98 Time: 4:00	1. Received by [28] (Signature/Affiliation)	Date: Time:
2. Relinquished by (Signature/Affiliation)	Date: Time:	2. Received by (Signature/Affiliation)	Date: Time:
3. Relinquished by (Signature/Affiliation)	Date: Time:	3. Received by (Signature/Affiliation)	Date: Time:

Comments: [29]

000380

White: To accompany samples
Yellow: Field copy
*See back of form for special instructions.

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MCA 3/15/91

INTERNATIONAL TECHNOLOGY CORPORATION

ANALYSIS REPORT AND CHAIN OF CUSTODY RECORD*

Reference Document No. -26844
Page 1 of 1

Project Name/No. [1] FDF POP 775743
Sample Team Members [2] MH
Profit Center No. [3] 6585001
Project Manager [4] Paul Lacer
Purchase Order No. [6]
Required Report Date [11]

Samples Shipment Date [7] 10/26/98
Lab Destination [8] FDF
Lab Contact [9] John Roberts
Project Contact/Phone [12] Paul Lacer (423) 661-3211
Carrier/Waybill No. [13] 806992071330

Bill to: [5]
Report to: [10]

ONE CONTAINER PER LINE

Sample Number [14]	Sample Description/Type [15]	Date/Time Collected [16]	Container Type [17]	Sample Volume [18]	Pre-servative [19]	Requested Testing Program [20]	Condition on Receipt [21]	Disposal Record No. [22]
1174-60-6	Ba SO4	10/26/98 3:30	Plastic 250ml	100g	NA		FOR LAB USE ONLY	
							FOR LAB USE ONLY	

COPY

Special Instructions: [23]

Possible Hazard Identification: [24]
Non-hazard ☑ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐

Sample Disposal: [25]
Return to Client ☐ Disposal by Lab ☑ Archive _____ (mos.)

Turnaround Time Required: [26]
Normal ☐ Rush ☐

QC Level: [27]
I. ☐ II. ☐ III. ☐ Project Specific (specify): _____

1. Relinquished by [28] (Signature/Affiliation) Mark Nixdall	Date: 10/26/98 Time: 3:35 pm	1. Received by [28] (Signature/Affiliation)	Date: Time:
2. Relinquished by (Signature/Affiliation)	Date: Time:	2. Received by (Signature/Affiliation)	Date: Time:
3. Relinquished by (Signature/Affiliation)	Date: Time:	3. Received by (Signature/Affiliation)	Date: Time:

Comments: [29]

000381

White: To accompany samples
Yellow: Field copy
*See back of form for special instructions.

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MCA 3/15/91

INTERNATIONAL TECHNOLOGY CORPORATION

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD*

Reference Document No. 0000

Page 1 of ___

Project Name/No. [1] FDF PoP / 775143

Samples Shipment Date [7] 1-12-99

Bill to: [5]

Sample Team Members [2] PL

Lab Destination [8] Corning

Profit Center No. [3]

Lab Contact [9] Linda Adams

Project Manager [4] Paul Lear

Project Contact/Phone [12] Paul Lear 423-482-6477 Mary Hall

Purchase Order No. [6]

Report to: [10]

Carrier/Waybill No. [13] Fedx 8088609684 02

Required Report Date [11]

ONE CONTAINER PER LINE

Sample Number [14]	Sample Description/Type [15]	Date/Time Collected [16]	Container Type [17]	Sample Volume [18]	Pre-servative [19]	Requested Testing Program [20]	Condition on Receipt [21]	Disposal Record No. [22]
1179-027-001	Slurry	1-11-99 6:35pm	3-1L plastic	3-1L	None			

COPY

Special Instructions: [23]

Possible Hazard Identification: [24]
Non-hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐

Sample Disposal: [25]
Return to Client ☐ Disposal by Lab ☑ Archive _____ (mos.)

Turnaround Time Required: [26]
Normal ☐ Rush ☐

QC Level: [27]
I. ☐ II. ☐ III. ☐ Project Specific (specify): ☐

1. Relinquished by [28] (Signature/Affiliation) Mary Hall	Date: 1-12-99 Time: 9:48am	1. Received by [28] (Signature/Affiliation)	Date: Time:
2. Relinquished by (Signature/Affiliation)	Date: Time:	2. Received by (Signature/Affiliation)	Date: Time:
3. Relinquished by (Signature/Affiliation)	Date: Time:	3. Received by (Signature/Affiliation)	Date: Time:

Comments: [29]

000382

White: To accompany samples

Yellow: Field copy

*See back of form for special instructions.

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INTERNATIONAL TECHNOLOGY CORPORATION

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD*

Reference Document No. 26634
Page 1 of ____

Project Name/No. 1 FDF PoP/777571/3
Sample Team Members 2 PL/ES/SS/MH
Profit Center No. 3
Project Manager 4 Paul Xiao
Purchase Order No. 6
Required Report Date 11

Samples Shipment Date 7 1-19-99
Lab Destination 8 ETDC
Lab Contact 9 Joel Isham
Project Contact/Phone 12 Paul Kiao
Carrier/Waybill No. 13

Bill to: 5
Report to: 10

ONE CONTAINER PER LINE

Sample Number 14	Sample Description/Type 15	Date/Time Collected 16	Container Type 17	Sample Volume 18	Pre-servative 19	Requested Testing Program 20	Condition on Receipt 21	Disposal Record No. 22
117 9023-07-004	Stabilized/Vitrified	1-14-99 ~11:15pm	2"x2" mold (36)	36 x 5in	NA	Archive		
117 9024-08-004	↓	1-14-99 ~7:00pm	36-2x2" mold	↓	↓	↓	FOR LAB USE ONLY	
117 9022-06-004	↓	~03:15am 1-14-99	2"x2" 12 mold	5in	↓	↓		
							FOR LAB USE ONLY	

COPY

Special Instructions: 23

Possible Hazard Identification: 24 Lead
Non-hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐

Sample Disposal: 25
Return to Client ☐ Disposal by Lab ☐ Archive _____ (mos.)

Turnaround Time Required: 26
Normal ☐ Rush ☐

QC Level: 27
I. ☐ II. ☐ III. ☐ Project Specific (specify): _____

1. Relinquished by 28 (Signature/Affiliation) Date: Time:	1. Received by 28 (Signature/Affiliation) Date: Time:
2. Relinquished by (Signature/Affiliation) Date: Time:	2. Received by (Signature/Affiliation) Date: Time:
3. Relinquished by (Signature/Affiliation) Date: Time:	3. Received by (Signature/Affiliation) Date: Time:

Comments: 29

000383

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Yellow: Field copy
*See back of form for special instructions.

MCA 3/15/91

2293

IT INTERNATIONAL TECHNOLOGY CORPORATION

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD*

Reference Document No. 426655
Page 1 of 1

Project Name/No. 1 [illegible]
Sample Team Members 2 [illegible]
Profit Center No. 3
Project Manager 4 [illegible]
Purchase Order No. 6
Required Report Date 11

Samples Shipment Date 7 [illegible]
Lab Destination 8 [illegible]
Lab Contact 9 [illegible]
Project Contact/Phone 12 [illegible]
Carrier/Waybill No. 13

Bill to: 5
Report to: 10

White: to accompany samples
Yellow: field copy

ONE CONTAINER PER LINE

Sample Number 14	Sample Description/Type 15	Date/Time Collected 16	Container Type 17	Sample Volume 18	Pre-servative 19	Requested Testing Program 20	Condition on Receipt 21	Disposal Record No. 22
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	NA	[illegible]		
[illegible]	↓	[illegible]	[illegible]	[illegible]	↓	↓	FOR LAB USE ONLY	
[illegible]	↓	[illegible]	[illegible]	↓	↓	↓		
[illegible]	↓	[illegible]	[illegible]	↓	↓	↓		
[illegible]	↓	[illegible]	[illegible]	↓	↓	↓	FOR LAB USE ONLY	

COPY

Special Instructions: 23

Possible Hazard Identification: 24
Non-hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐

Sample Disposal: 25
Return to Client ☐ Disposal by Lab ☐ Archive _____ (mos.)

Turnaround Time Required: 26
Normal ☐ Rush ☐

QC Level: 27
I. ☐ II. ☐ III. ☐ Project Specific (specify): _____

1. Relinquished by 28 (Signature/Affiliation) Date: Time:	1. Received by 28 (Signature/Affiliation) Date: Time:
2. Relinquished by (Signature/Affiliation) Date: Time:	2. Received by (Signature/Affiliation) Date: Time:
3. Relinquished by (Signature/Affiliation) Date: Time:	3. Received by (Signature/Affiliation) Date: Time:

Comments: 29

000384

*See back of form for special instructions.

2293

MCA 3/15/91

INTERNATIONAL TECHNOLOGY CORPORATION

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD*

Reference Document No. 426636
Page 1 of ____

Project Name/No. 1 FDF RP/775 W3
Sample Team Members 2 [illegible]
Profit Center No. 3
Project Manager 4 [illegible]
Purchase Order No. 6
Required Report Date 11

Samples Shipment Date 7 1-14-99
Lab Destination 8 ETDC
Lab Contact 9 [illegible]
Project Contact/Phone 12 [illegible]
Carrier/Waybill No. 13

Bill to: 5
Report to: 10

ONE CONTAINER PER LINE

Sample Number 14	Sample Description/Type 15	Date/Time Collected 16	Container Type 17	Sample Volume 18	Pre-servative 19	Requested Testing Program 20	Condition on Receipt 21	Disposal Record No. 22
[illegible]	Sediment	1-13-99 ~12:30	9.2x2" Metal	9 x 8 in³	NA	[illegible]		
[illegible]	↓	1-12-99 ~2:10pm	36 ↓	36 ↓	↓	↓	FOR LAB USE ONLY	
[illegible]	↓	1-14-99 ~11:[illegible]	36 ↓	36 ↓	↓	↓		
							FOR LAB USE ONLY	

COPY

Special Instructions: 23

Possible Hazard Identification: 24 LEAD
Non-hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐

Sample Disposal: 25
Return to Client ☐ Disposal by Lab ☐ Archive _____ (mos.)

Turnaround Time Required: 26
Normal ☐ Rush ☐

QC Level: 27
I. ☐ II. ☐ III. ☐ Project Specific (specify): _____

1. Relinquished by 28 (Signature/Affiliation) Date: Time:	1. Received by 28 (Signature/Affiliation) Date: Time:
2. Relinquished by (Signature/Affiliation) Date: Time:	2. Received by (Signature/Affiliation) Date: Time:
3. Relinquished by (Signature/Affiliation) Date: Time:	3. Received by (Signature/Affiliation) Date: Time:

Comments: 29

000385

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MCA 3/15/99

WHITE: to accompany samples. YELLOW: lab copy. PINK: to project specialist upon receipt.
See back of form for special instructions.

INTERNATIONAL TECHNOLOGY CORPORATION

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD*

Reference Document No. 426637
Page 1 of 2

Project Name/No. 1 EDF P&P/77574
Sample Team Members 2 DL/ES/SC/MH
Profit Center No. 3
Project Manager 4 Paul Lorenz
Purchase Order No. 6
Required Report Date 11

Samples Shipment Date 7 1-19-99
Lab Destination 8 ETDC
Lab Contact 9 Jack Dolhman
Project Contact/Phone 12 Paul Lorenz
Carrier/Waybill No. 13

Bill to: 5
Report to: 10

ONE CONTAINER PER LINE

Sample Number 14	Sample Description/Type 15	Date/Time Collected 16	Container Type 17	Sample Volume 18	Preservative 19	Requested Testing Program 20	Condition on Receipt 21	Disposal Record No. 22
1179026-10-001	Stainless lined Filtered	1-15-99 04:00am	36 2x2" Molds	36 8m³	NA	Archive	FOR LAB USE ONLY	
1179027-11-004	↓	1-15-99 16:00am	36 ↓	36 ↓	↓	↓		
1179017-01-003		1-12-99 ~4:3[illegible]	2"x4" Mold		NA			
1179018-02-003		1-13-99 ~12:[illegible]am						
1179019-03-003		1-13 07:3[illegible]					FOR LAB USE ONLY	
1179020-04-003		1-13 14:20pm						
1179021-05-003		1-13 7:44 pm						
1179022-06-003	↓	1-14 03:21am	↓		↓	↓		

COPY

Special Instructions: 23

Possible Hazard Identification: 24
Non-hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐

Sample Disposal: 25
Return to Client ☐ Disposal by Lab ☐ Archive _____ (mos.)

Turnaround Time Required: 26
Normal ☐ Rush ☐

QC Level: 27
I. ☐ II. ☐ III. ☐ Project Specific (specify): _____

1. Relinquished by 28 (Signature/Affiliation) Date: Time:	1. Received by 28 (Signature/Affiliation) Date: Time:
2. Relinquished by (Signature/Affiliation) Date: Time:	2. Received by (Signature/Affiliation) Date: Time:
3. Relinquished by (Signature/Affiliation) Date: Time:	3. Received by (Signature/Affiliation) Date: Time:

Comments: 29

000385

White: To accompany samples
Yellow: Field copy
*See back of form for special instructions.

MCA 3/15/91

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INTERNATIONAL TECHNOLOGY CORPORATION

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD (cont.)*

Reference Document No.[30] 26637
Page 2 of 2

Project Name FDF POP

Project No. 775743

Samples Shipment Date 1-19-99

ONE CONTAINER PER LINE

Sample[14] Number	Sample[15] Description/Type	Date/Time[16] Collected	Container[17] Type	Sample[18] Volume	Pre-[19] servative	Requested Testing[20] Program	Condition on[21] Receipt	Disposal[22] Record No.
1179023-07-003	Stainless steel mixture	1-14-99 ~11:00am	2"x4" Mold-		NA	Archive		
1179024-08-003		1-14-99 ~7:01pm					FOR LAB USE ONLY	
1179025-09-003		1-14-99 11:20am						
1179026-10-003		1-15-99 ~7:10am					FOR LAB USE ONLY	
1179028-11-003		1-15-99 09:30am						
1179024-08-002		1-14-99 ~7:01pm	3-1L plastic	1L			FOR LAB USE ONLY	
1179023-07-002		1-14-99 ~11:45am						
1179023-06-002		1-14-99 ~03:00					FOR LAB USE ONLY	
							FOR LAB USE ONLY	
							FOR LAB USE ONLY	
							FOR LAB USE ONLY	
							FOR LAB USE ONLY	
							FOR LAB USE ONLY	

COPY

1-15-99

000387

White: To accompany samples
Yellow: Field copy

*See back of form for special instructions

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MCA 3/15/91

INTERNATIONAL TECHNOLOGY CORPORATION

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD*

Reference Document No. 20638
Page 1 of 1

Project Name/No. 1 FDF D.P/77570
Samples Shipment Date 7 1-19-99
Bill to: 5

Sample Team Members 2 PL/ES/SS/MH
Lab Destination 8 ETDL

Profit Center No. 3
Lab Contact 9 [illegible]

Project Manager 4 Paul Erne
Project Contact/Phone 12 Paul Erne
Report to: 10 Paul, Erne

Purchase Order No. 6
Carrier/Waybill No. 13

Required Report Date 11

ONE CONTAINER PER LINE

Sample Number 14	Sample Description/Type 15	Date/Time Collected 16	Container Type 17	Sample Volume 18	Pre-servative 19	Requested Testing Program 20	Condition on Receipt 21	Disposal Record No. 22
1179021-05-002	Specified material	1-13-99 ~7:50pm	1L plastic	3-1L	NA	Archive		
1179020-04-002		1-13-99 13:55pm		3			FOR LAB USE ONLY	
1179017-03-002		1-13-99 [illegible]		3				
1179018-02-002		1-13-99 12:[illegible]pm		3				
1179017-01-002		1-12-99 ~5:[illegible]pm		3				
1179025-09-002		1-14-99 11:20pm		3			FOR LAB USE ONLY	
1179023-07-002		1-15-99 04:00am		3				
1179028-11-002		1-15-99 07:15am		3				

COPY

Special Instructions: 23

Possible Hazard Identification: 24 Lead
Non-hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐

Sample Disposal: 25
Return to Client ☐ Disposal by Lab ☐ Archive _____ (mos.)

Turnaround Time Required: 26
Normal ☐ Rush ☐

QC Level: 27
I. ☐ II. ☐ III. ☐ Project Specific (specify): _____

1. Relinquished by 28 (Signature/Affiliation) Date: Time:	1. Received by 28 (Signature/Affiliation) Date: Time:
2. Relinquished by (Signature/Affiliation) Date: Time:	2. Received by (Signature/Affiliation) Date: Time:
3. Relinquished by (Signature/Affiliation) Date: Time:	3. Received by (Signature/Affiliation) Date: Time:

Comments: 29

000388

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Yellow: Field copy
*See back of form for special instructions.

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MCA 3/15/91

INTERNATIONAL TECHNOLOGY CORPORATION

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD*

Reference Document No. [illegible] 639
Page 1 of 1

Project Name/No. 1 EDF PIP/775743
Sample Team Members 2 PL/ES/SS/MH
Profit Center No. 3
Project Manager Paul Kaw
Purchase Order No. 6
Required Report Date 11

Samples Shipment Date 7 1-19-99
Lab Destination 8 ETDC
Lab Contact 9 [illegible]
Project Contact/Phone 12 Paul
Carrier/Waybill No. 13

Bill to: 5
Report to: 10

ONE CONTAINER PER LINE

Sample Number 14	Sample Description/Type 15	Date/Time Collected 16	Container Type 17	Sample Volume 18	Pre-servative 19	Requested Testing Program 20	Condition on Receipt 21	Disposal Record No. 22
179024-08-005	Liquid/Slurry	1-14-99 13:40pm	2L plastic	2L	NA	Volatile		
23-07		1-14-99 04:5[illegible]						
22-06		1-14-99 23:1[illegible]						
26-10		1-15-99 02:00am						
21-05		1-1[illegible]99 11:35[illegible]						
025-07		1-11-99 7:25pm						
20-04		1-13-97 05:40am						
19-03		1-13-99 03:00am						

FOR LAB USE ONLY

FOR LAB USE ONLY

COPY

Special Instructions: 23

Possible Hazard Identification: 24
Non-hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐

Sample Disposal: 25
Return to Client ☐ Disposal by Lab ☐ Archive _____ (mos.)

Turnaround Time Required: 26
Normal ☐ Rush ☐

QC Level: 27
I. ☐ II. ☐ III. ☐ Project Specific (specify): _____

1. Relinquished by 28 (Signature/Affiliation)	Date: Time:	1. Received by 28 (Signature/Affiliation)	Date: Time:
2. Relinquished by (Signature/Affiliation)	Date: Time:	2. Received by (Signature/Affiliation)	Date: Time:
3. Relinquished by (Signature/Affiliation)	Date: Time:	3. Received by (Signature/Affiliation)	Date: Time:

Comments: 29

000389

White: To accompany samples
Yellow: Field copy
*See back of form for special instructions.

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MCA 3/15/91

INTERNATIONAL TECHNOLOGY CORPORATION

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD*

Reference Document No. 26640
Page 1 of 1

Project Name/No. 1 FDE DD
Sample Team Members 2 DL ES SSMH
Profit Center No. 3
Project Manager 4 [illegible]
Purchase Order No. 6
Required Report Date 11

Samples Shipment Date 7 1-19-99
Lab Destination 8 FTDC
Lab Contact 9 [illegible]
Project Contact/Phone 12 [illegible]
Carrier/Waybill No. 13

Bill to: 5
Report to: 10

ONE CONTAINER PER LINE

Sample Number 14	Sample Description/Type 15	Date/Time Collected 16	Container Type 17	Sample Volume 18	Pre-servative 19	Requested Testing Program 20	Condition on Receipt 21	Disposal Record No. 22
1179-015-[illegible]	original [illegible]	1-12-99 7:35pm	2L [illegible]	2L	NA	Archive	FOR LAB USE ONLY	
1179-017-[illegible]		1-12-99 [illegible]						
1179-025-[illegible]		1-15-99 [illegible]						
							FOR LAB USE ONLY	

COPY

Special Instructions: 23

Possible Hazard Identification: 24 Local
Non-hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐

Sample Disposal: 25
Return to Client ☐ Disposal by Lab ☐ Archive _____ (mos.)

Turnaround Time Required: 26
Normal ☐ Rush ☐

QC Level: 27
I. ☐ II. ☐ III. ☐ Project Specific (specify): _____

1. Relinquished by 28 (Signature/Affiliation)	Date: Time:	1. Received by 28 (Signature/Affiliation)	Date: Time:
2. Relinquished by (Signature/Affiliation)	Date: Time:	2. Received by (Signature/Affiliation)	Date: Time:
3. Relinquished by (Signature/Affiliation)	Date: Time:	3. Received by (Signature/Affiliation)	Date: Time:

Comments: 29

000390

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Yellow: Field copy
*See back of form for special instructions.

MCA 3/15/91

2293

INTERNATIONAL TECHNOLOGY CORPORATION

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD*

Reference Document No. [illegible]-641
Page 1 of 3

Project Name/No. [1] FDF PoP
Sample Team Members [2] PL/ES/SS/MH
Profit Center No. [3]
Project Manager [4] Paul Lear
Purchase Order No. [6]
Required Report Date [11]

Samples Shipment Date [7] 1-18-99
Lab Destination [8] TDL
Lab Contact [9] Greg
Project Contact/Phone [12] Paul
Carrier/Waybill No. [13] truck

Bill to: [5]

Report to: [10] Paul
Eric
Stuart
Mary

White: To accompany samples
Yellow: Field copy

ONE CONTAINER PER LINE

Sample Number [14]	Sample Description/Type [15]	Date/Time Collected [16]	Container Type [17]	Sample Volume [18]	Pre-servative [19]	Requested Testing Program [20]	Condition on Receipt [21]	Disposal Record No. [22]
1179017-01-007	Stabilized	1-12-99 7:10pm	250 gradeglid	~200ml	NA	Fsec liquid	FOR LAB USE ONLY	
1179018-02-007		1-13-99 12:09am						
1179019-03-007		1-13-99 14:10						
1179020-04-007		1-13-99 14:10pm						
1179021-05-007		1-14-99 7:00pm					FOR LAB USE ONLY	
1179022-06-007		1-13-99 17:40pm						
1179023-07-007		1-14-99 03:20am						
		1-14-99 11:00am						

24-08

COPY

Special Instructions: [23]

Possible Hazard Identification: [24] Lead
Non-hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐

Sample Disposal: [25]
Return to Client ☐ Disposal by Lab ☐ Archive _____ (mos.)

Turnaround Time Required: [26]
Normal ☐ Rush ☐

QC Level: [27]
I. ☐ II. ☐ III. ☐ Project Specific (specify): _____

1. Relinquished by [28] (Signature/Affiliation)	Date: Time:	1. Received by [28] (Signature/Affiliation)	Date: Time:
2. Relinquished by (Signature/Affiliation)	Date: Time:	2. Received by (Signature/Affiliation)	Date: Time:
3. Relinquished by (Signature/Affiliation)	Date: Time:	3. Received by (Signature/Affiliation)	Date: Time:

Comments: [29]

000331

*See back of form for special instructions.

MCA 3/15/91

2299

INTERNATIONAL TECHNOLOGY CORPORATION

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD (cont.)*

Reference Document No.[3] 266641

Page 2 of 23 1-18-99

Project Name EDF PoP

Project No. 775743

Samples Shipment Date 1-18-99

ONE CONTAINER PER LINE

Sample[14] Number	Sample[15] Description/Type	Date/Time[16] Collected	Container[17] Type	Sample[18] Volume	Pre-[19] servative	Requested Testing[20] Program	Condition on[21] Receipt	Disposal[22] Record No.
1179025-09-007	Solidified	1-14-99 11:45am	250 gal cylinder	~200 ml	NA	Free Liquid	FOR LAB USE ONLY	
1179026-10-007		1-15-99 0400am						
1179028-11-007		1-15-99 0930am						
1179017-01-003		1-12-99 4:32pm	2"x4" molds		NA	14 day UCS	FOR LAB USE ONLY	
1179017-01-003		1-12-99 4:48pm				28		
1179018-02-003		1-13-99 12:17am				14	FOR LAB USE ONLY	
↓		1-13-99 12:20am				28		
1179028-11-003		1-15-99 0930				14		
↓		1-15-99 09:30				28		
1179025-09-003 1-15-99		1-14-99 11:20am				14	FOR LAB USE ONLY	
↓		1-14-99 11:20				28		
1179026-10-003		1-15-99 0400am				14	FOR LAB USE ONLY	
↓		1-15-99 0400am				28		
1179028-05-003		1-13-99 7:43pm				14	FOR LAB USE ONLY	
↓		1-13-99 7:44pm				28		
1179019-03-003		1-13-99 0750am				14	FOR LAB USE ONLY	
↓		1-13-98 0750am				28		
1179020-04-003		1-13-98 14:20pm				14		
↓		1-13-98 14:20pm				28		
1179023-07-003		1-14-99 11:00				14		

000392

COPY

White: To accompany samples Yellow: Field copy

*See back of form for special instructions.

2293

INTERNATIONAL TECHNOLOGY CORPORATION

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD (cont.)*

Reference Document No.[30] 6641
Page 3 of 3

Project Name FDF PcP

Project No. 775 743

Samples Shipment Date 1-15-99

ONE CONTAINER PER LINE

Sample[14] Number	Sample[15] Description/Type	Date/Time[16] Collected	Container[17] Type	Sample[18] Volume	Pre-[19] servative	Requested Testing[20] Program	Condition on[21] Receipt	Disposal[22] Record No.
1179023-07-003	Stabilized	1-14-99 11:00	2"x4" mold		NA	28 day UCS		
1179022-06-003		1-14-99 0320				14	FOR LAB USE ONLY	
						28		
1179025-09-003		1-14-99 7:01				14	FOR LAB USE ONLY	
						28		
							FOR LAB USE ONLY	
							FOR LAB USE ONLY	
							FOR LAB USE ONLY	
							FOR LAB USE ONLY	
							FOR LAB USE ONLY	
							FOR LAB USE ONLY	
							FOR LAB USE ONLY	
							FOR LAB USE ONLY	

COPY

000393

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*See back of form for special instructions.

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MCA 3/15/91

INTERNATIONAL TECHNOLOGY CORPORATION

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD*

Reference Document No. 26642
Page 1 of ___

Project Name/No. [1] EDF PoP
Sample Team Members [2] PL/ES/SS/MH
Profit Center No. [3]
Project Manager [4] Paul Lear
Purchase Order No. [6]
Required Report Date [11]

Samples Shipment Date [7] 1-19-99
Lab Destination [8] TDL
Lab Contact [9] Greg
Project Contact/Phone [12] Paul
Carrier/Waybill No. [13]

Bill to: [5]

Report to: [10] Paul
Ernie
Stuart
Mary

White: To accompany samples
Yellow: Field copy

ONE CONTAINER PER LINE

Sample Number [14]	Sample Description/Type [15]	Date/Time Collected [16]	Container Type [17]	Sample Volume [18]	Preservative [19]	Requested Testing Program [20]	Condition on Receipt [21]	Disposal Record No. [22]
1179017-01-001	Filtrate	1-12-99 ~10:15am	2-1L plastic	2L	NA	TDS, TSS, metals, nitrate, pH		
1179018-02-001		1-12-99 ~810pm					FOR LAB USE ONLY	
1179019-03-001		1-13-99 0255						
1179020-04-001		1-13-99 0900am						
1179021-05-001		1-13-99 4:30pm					FOR LAB USE ONLY	
1179022-06-001		1-14-99 11:07pm						
1179023-07-001								
1179024-08-001	Filtrate	11-14-99 13:30pm						

COPY

Special Instructions: [23] Preserve metals aliquot.

Possible Hazard Identification: [24] Lead
Non-hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐

Sample Disposal: [25]
Return to Client ☐ Disposal by Lab ☐ Archive _____ (mos.)

Turnaround Time Required: [26]
Normal ☐ Rush ☐

QC Level: [27]
I. ☐ II. ☐ III. ☐ Project Specific (specify): _____

1. Relinquished by [28] (Signature/Affiliation) Mary Hall	Date: 1-19-99 Time: 3:30pm	1. Received by [28] (Signature/Affiliation)	Date: Time:
2. Relinquished by (Signature/Affiliation)	Date: Time:	2. Received by (Signature/Affiliation)	Date: Time:
3. Relinquished by (Signature/Affiliation)	Date: Time:	3. Received by (Signature/Affiliation)	Date: Time:

Comments: [29]

*See back of form for special instructions.

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2293

MCA 3/15/91

INTERNATIONAL TECHNOLOGY CORPORATION

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD*

Reference Document No. 26851
Page 1 of ___

Project Name/No. [1] FDF PoP/775743
Sample Team Members [2] PL/ES/SS/M+I
Profit Center No. [3]
Project Manager [4] Paul Leaf
Purchase Order No. [6]
Required Report Date [11]

Samples Shipment Date [7] 1-19-99
Lab Destination [8] IT-TDL
Lab Contact [9] Greg Bennett
Project Contact/Phone [12] Paul Leaf / Mary Hall 7324
Carrier/Waybill No. [13] truck

Bill to: [5] 775743

Report to: [10] Paul, Ernie, Stuart, Mary

White: To accompany samples
Yellow: Field copy

ONE CONTAINER PER LINE

Sample Number [14]	Sample Description/Type [15]	Date/Time Collected [16]	Container Type [17]	Sample Volume [18]	Pre-servative [19]	Requested Testing Program [20]	Condition on Receipt [21]	Disposal Record No. [22]
1179017-01-006	Filter Cake	1-12-99 12:25 pm	1 gal baggie	1 gal	NA	Bulk Density		
1179018-02-006		1-12-99 7:50 pm					FOR LAB USE ONLY	
1179019-03-006		1-13-99 0430						
1179020-04-006		1-13-99 11:4[illegible] am						
1179021-05-006		1-13-99 7:0[illegible] pm					FOR LAB USE ONLY	
1179022-06-006		1-14-99 0115 am						
1179023-07-006		1-14-99 06:40 am						
1179024-08-006		1-14-99 15:20 pm	1 gal baggie					

COPY

Special Instructions: [23]

Possible Hazard Identification: [24] Lead
Non-hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐

Sample Disposal: [25]
Return to Client ☐ Disposal by Lab ☐ Archive _____ (mos.)

Turnaround Time Required: [26]
Normal ☑ Rush ☐

QC Level: [27]
I. ☐ II. ☐ III. ☐ Project Specific (specify): _____

1. Relinquished by [28] (Signature/Affiliation) Date: Time:	1. Received by [28] (Signature/Affiliation) Date: Time:
2. Relinquished by (Signature/Affiliation) Date: Time:	2. Received by (Signature/Affiliation) Date: Time:
3. Relinquished by (Signature/Affiliation) Date: Time:	3. Received by (Signature/Affiliation) Date: Time:

Comments: [29]

000385

*See back of form for special instructions.

2293

MCA 3/15/91

INTERNATIONAL TECHNOLOGY CORPORATION

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD (cont.)*

Reference Document No.[30] [redacted] 268S1
Page 2 of 2

Project Name FDF PoP/775743 Project No. 775743 Samples Shipment Date 1-19-99

ONE CONTAINER PER LINE

Sample[14] Number	Sample[15] Description/Type	Date/Time[16] Collected	Container[17] Type	Sample[18] Volume	Pre-[19] servative	Requested Testing[20] Program	Condition on[21] Receipt	Disposal[22] Record No.
1179025-09-006	Filter Cake	1-14-99 1105 pm	1 qt baggie	~1 qt	NA	Bulk Density	FOR LAB USE ONLY	
1179026-10-006	↓	1-15-99 0240	1 qt baggie		↓	↓	FOR LAB USE ONLY	
1179028-11-006	↓	1-15-99 0700 am	1 qt baggie	~1 qt	↓	↓	FOR LAB USE ONLY	
							FOR LAB USE ONLY	
							FOR LAB USE ONLY	
							FOR LAB USE ONLY	
							FOR LAB USE ONLY	
							FOR LAB USE ONLY	
							FOR LAB USE ONLY	
							FOR LAB USE ONLY	
							FOR LAB USE ONLY	
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							FOR LAB USE ONLY	
							FOR LAB USE ONLY	
							FOR LAB USE ONLY	
							FOR LAB USE ONLY	
							FOR LAB USE ONLY	

COPY

1-15-99

000396

White: To accompany samples Yellow: Field copy

*See back of form for special instructions.

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INTERNATIONAL TECHNOLOGY CORPORATION

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD*

Reference Document No. 4 852
Page 1 of 2

Project Name/No. 1 FOF DP/175743
Sample Team Members 2 PL/ES/SS/MH
Profit Center No. 3
Project Manager 4 Paul Lear
Purchase Order No. 6
Required Report Date 11

Samples Shipment Date 7 1-19-99
Lab Destination 8 IT-TDL
Lab Contact 9 Greg Bennett
Project Contact/Phone 12 Paul Lear / Mary HALL 7326
Carrier/Waybill No. 13 truck

Bill to: 5 175743
Report to: 10 Paul Lear
Ernie Stine
Grant Sheely
Mary Hall

ONE CONTAINER PER LINE

Sample Number 14	Sample Description/Type 15	Date/Time Collected 16	Container Type 17	Sample Volume 18	Preservative 19	Requested Testing Program 20	Condition on Receipt 21	Disposal Record No. 22
1179017-01-006	FilterCake	1-12-99 12:30 pm	8oz Plastic	~8oz	NA	Moisture		
1179018-02-006		1-12-99 7:50pm					FOR LAB USE ONLY	
1179019-03-006		1-13-99 04:30						
1179020-04-006		1-13-99 11:40 am						
1179021-05-006		1-13-99 7:00pm					FOR LAB USE ONLY	
1179021-05-006D		1-13-99 10:15pm	2-8oz plastic					
1179022-06-006		1-14-99 01:15am	8oz plastic					
1179023-07-006		1-14-99 06:40 am						

COPY

Special Instructions: 23

Possible Hazard Identification: 24 Lead
Non-hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐

Sample Disposal: 25
Return to Client ☐ Disposal by Lab ☐ Archive _____ (mos.)

Turnaround Time Required: 26
Normal ☑ Rush ☐

QC Level: 27
I. ☐ II. ☐ III. ☐ Project Specific (specify): _____

1. Relinquished by 28 (Signature/Affiliation)	Date: Time:	1. Received by 28 (Signature/Affiliation)	Date: Time:
2. Relinquished by (Signature/Affiliation)	Date: Time:	2. Received by (Signature/Affiliation)	Date: Time:
3. Relinquished by (Signature/Affiliation)	Date: Time:	3. Received by (Signature/Affiliation)	Date: Time:

Comments: 29

000037

White: To accompany samples
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*See back of form for special instructions.

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MCA 3/15/91

INTERNATIONAL TECHNOLOGY CORPORATION

ANALYSIS REQUESTED CHAIN OF CUSTODY RECORD (cont.)*

Reference Document No.[30] 4 of 12
Page 2 of 2

Project Name EDF PoP

Project No. 775743

Samples Shipment Date 1-19-99

ONE CONTAINER PER LINE

Sample[14] Number	Sample[15] Description/Type	Date/Time[16] Collected	Container[17] Type	Sample[18] Volume	Preservative[19]	Requested Testing Program[20]	Condition on Receipt[21]	Disposal[22] Record No.
1179024-08-00A	Filter Cake	1-14-99 05:20am	8oz. plastic	~8oz.	NA	Moisture		
1179025-09-00A		1-14-99 10:05pm					FOR LAB USE ONLY	
1179026-10-00A		1-15-99 02:40am						
1179028-11-00A		1-15-99 07:00am					FOR LAB USE ONLY	
							FOR LAB USE ONLY	
							FOR LAB USE ONLY	
							FOR LAB USE ONLY	
							FOR LAB USE ONLY	
							FOR LAB USE ONLY	
							FOR LAB USE ONLY	
							FOR LAB USE ONLY	
							FOR LAB USE ONLY	

COPY 1-15-99

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INTERNATIONAL TECHNOLOGY CORPORATION

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD*

Reference Document No. [illegible]643
Page 1 of 2

775743

Project Name/No. [1] FDF PoP
Sample Team Members [2] PL/ES/SS/MH
Profit Center No. [3]
Project Manager [4] Paul
Purchase Order No. [6]
Required Report Date [11]

Samples Shipment Date [7] 1-19-99
Lab Destination [8] TDL
Lab Contact [9] Greg
Project Contact/Phone [12] Paul
Carrier/Waybill No. [13]

Bill to: [5]

Report to: [10] Paul, Ernie, Stu, Mary

ONE CONTAINER PER LINE

Sample Number [14]	Sample Description/Type [15]	Date/Time Collected [16]	Container Type [17]	Sample Volume [18]	Pre-servative [19]	Requested Testing Program [20]	Condition on Receipt [21]	Disposal Record No. [22]
1179023-07-001	Filtrate	1-15-99 ~0520am	2-1L plastic	2/L	NA	TDS, TSS, metals, nitrate, pH	FOR LAB USE ONLY	
1179025-09-001		1-14-99 ~7:36pm						
1179026-10-001		1-15-99 0520						
1179028-11-001		1-15-99 0550am						
1179017-01-002	Stabilized	1-12-99 5:55pm	1L [illegible] plastic			Appearance	FOR LAB USE ONLY	
1179018-02-002		1-13-99 12:12am						
1179019-03-002		1-13-99 0750am						
1179020-04-002		1-13-99 14:00pm						

COPY

Special Instructions: [23]

Possible Hazard Identification: [24] Lead
Non-hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐

Sample Disposal: [25]
Return to Client ☐ Disposal by Lab ☐ Archive _____ (mos.)

Turnaround Time Required: [26]
Normal ☐ Rush ☐

QC Level: [27]
I. ☐ II. ☐ III. ☐ Project Specific (specify): _____

1. Relinquished by [28] (Signature/Affiliation)	Date: Time:	1. Received by [28] (Signature/Affiliation)	Date: Time:
2. Relinquished by (Signature/Affiliation)	Date: Time:	2. Received by (Signature/Affiliation)	Date: Time:
3. Relinquished by (Signature/Affiliation)	Date: Time:	3. Received by (Signature/Affiliation)	Date: Time:

Comments: [29]

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*See back of form for special instructions.

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MCA 3/15/91

IT INTERNATIONAL TECHNOLOGY CORPORATION

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD (cont.)*

Reference Document No.[3] 426643

Page 2 of 2

Project Name EDF PoP

Project No. 775743

Samples Shipment Date 1-19-99

ONE CONTAINER PER LINE

Sample[14] Number	Sample[15] Description/Type	Date/Time[16] Collected	Container[17] Type	Sample[18] Volume	Pre-[19] servative	Requested Testing[20] Program	Condition on[21] Receipt	Disposal[22] Record No.
1179-02-05-002	Stabilized	1-13-99 7:57pm	~~PE~~ 1L plastic	1L	NA	Appearance		
1179022-06-002		1-14-99 03:20am					FOR LAB USE ONLY	
1179023-07-002		1-14-99 10:45am						
1179024-08-002		1-14-99 702pm					FOR LAB USE ONLY	
1179025-09-002		1-14-99 11:20pm						
1179026-10-002		1-15-99 0400am					FOR LAB USE ONLY	
1179027-11-002		1-15-99 09:30am						
							FOR LAB USE ONLY	
							FOR LAB USE ONLY	
							FOR LAB USE ONLY	
							FOR LAB USE ONLY	
							FOR LAB USE ONLY	
							FOR LAB USE ONLY	

COPY

1-19-99

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*See back of form for special instructions.

MCA 3/15/91

INTERNATIONAL TECHNOLOGY CORPORATION

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD*

Reference Document No. 6846
Page 1 of 2

Project Name/No. [1] FDF PoP/775743
Sample Team Members [2] MAI
Profit Center No. [3]
Project Manager [4] Paul Lear
Purchase Order No. [6] 775743
Required Report Date [11] 2-19-99

Samples Shipment Date [7] 2-8-99
Lab Destination [8] Compu Chem
Lab Contact [9] Chuck Smith
Project Contact/Phone [12] Mary Hall 423-691-7326
Carrier/Waybill No. [13] FedX

Bill to: [5] IT Corp
312 Directors Dr
Knoxville Tn 37923

Report to: [10] Mary Hall
304 Directors Dr
Knoxville Tn 37923

White: To accompany samples
Yellow: Field copy

ONE CONTAINER PER LINE

Sample Number [14]	Sample Description/Type [15]	Date/Time Collected [16]	Container Type [17]	Sample Volume [18]	Pre-servative [19]	Requested Testing Program [20]	Condition on Receipt [21]	Disposal Record No. [22]
1179017-01-002	Solid	2-8-99 3:35pm	1L plastic	1L	NA	TCLP metals from UTS list Sb, Ba, Be, Cd, Cr, Pb, Hg, Ni, Ag, Tl, Se, Tl	FOR LAB USE ONLY	
1179018-02-002		2-8-99 3:37pm						
1179019-03-002		2-8-99 3:40pm						
1179020-04-002		2-8-99 3:4[illegible]pm						
1179021-05-002		2-8-99 3:43pm						
1179022-06-002		2-8-99 3:47pm						
1179023-07-002		2-8-99 3:49pm						
1179024-08-002		2-8-99 3:50pm						

COPY

Special Instructions: [23] *Please call with pH's 1 & 2 before continuing. Will call back in 1hr with decision. | Include pH's (all 3) in data pkg.

Possible Hazard Identification: [24] Lead
Non-hazard ☑ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐

Sample Disposal: [25]
Return to Client ☐ Disposal by Lab ☑ Archive _____ (mos.)

Turnaround Time Required: [26]
Normal ☐ Rush ☑

QC Level: [27]
I. ☐ II. ☐ III. ☑ Project Specific (specify):

1. Relinquished by [28] (Signature/Affiliation) Mary Hall Date: 2-8-99 Time: 3:45pm	1. Received by [28] (Signature/Affiliation) Date: Time:
2. Relinquished by (Signature/Affiliation) Date: Time:	2. Received by (Signature/Affiliation) Date: Time:
3. Relinquished by (Signature/Affiliation) Date: Time:	3. Received by (Signature/Affiliation) Date: Time:

Comments: [29]

000401

*See back of form for special instructions.

2293

MCA 3/15/91

INTERNATIONAL TECHNOLOGY CORPORATION

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD (cont.)*

Reference Document No.[30] 6846

Page 2 of 2

Project Name FDF PoP

Project No. 775743

Samples Shipment Date 2-8-99

ONE CONTAINER PER LINE

Sample[14] Number	Sample[15] Description/Type	Date/Time[16] Collected	Container[17] Type	Sample[18] Volume	Pre-[19] servative	Requested Testing[20] Program	Condition on[21] Receipt	Disposal[22] Record No.
1179025-09-002	Solid	2-8-99 3:51pm	1L plastic	1L	NA	TCLP metals from UTS list		
1179026-10-002	↓	2-8-99 3:53pm	↓	↓	↓	Sb, Be, Ba, Cd, Cr, Pb, Hg, Ni, Ag, Tl, Se ↓	FOR LAB USE ONLY	
1179028-11-002	↓	2-8-99 3:55pm	↓	↓	↓			
							FOR LAB USE ONLY	
							FOR LAB USE ONLY	
							FOR LAB USE ONLY	
							FOR LAB USE ONLY	
							FOR LAB USE ONLY	
							FOR LAB USE ONLY	
							FOR LAB USE ONLY	
							FOR LAB USE ONLY	
							FOR LAB USE ONLY	
							FOR LAB USE ONLY	

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INTERNATIONAL TECHNOLOGY CORPORATION

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD*

Reference Document No. 5875
Page 1 of 1

Project Name/No.[1] FDF/POP 775743
Sample Team Members[2] GB, JY
Profit Center No.[3] 6585001
Project Manager[4] Paul Lear
Purchase Order No.[6] 775743
Required Report Date[11] 14 day turn

Samples Shipment Date[7] 12/ /98
Lab Destination[8] CompuChem
Lab Contact[9] Marlene Swift
Project Contact/Phone[12] Mary Hall 423 694 7326
Carrier/Waybill No.[13]

Bill to:[5] IT Corp
312 Directors Dr
Knoxville, TN 37923

Report to:[10] Paul Lear / Mary Hall
304 Directors Dr
Knoxville, TN 37923
FAX 423 694 7573

ONE CONTAINER PER LINE

Sample Number[14]	Sample Description/Type[15]	Date/Time Collected[16]	Container Type[17]	Sample Volume[18]	Pre-servative[19]	Requested Testing Program[20]	Condition on Receipt[21]	Disposal Record No.[22]
1174-8605	POP Solidified Surrogate	12/8/98 4:00pm	160z GLASS	1118.64g	NONE	TCLP + UTS list Ba, Cd, Cr, Pb, Hg Ag, Sb, Be, Ni, Tl		
1174-8705		12/8/98 4:20pm		1042.97g			FOR LAB USE ONLY	
1174-8805		12/8/98 4:50		843.[illegible]				
1174-8905		12/8/98 5:30pm		1118.16g				
1174-9005		12/8/98 6:00pm		1079.8g				
1174-9105		12/8/98 6:40pm		996.28g			FOR LAB USE ONLY	

COPY

Special Instructions:[23] Please provide the 3 pH readings for the TCLP method add H_2O → pH; add HCl → pH; 18 hrs → pH

Possible Hazard Identification:[24] ~~Rch 12/8/98~~
Non-hazard ☑ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐

Sample Disposal:[25]
Return to Client ☐ Disposal by Lab ☑ Archive _____ (mos.)

Turnaround Time Required:[26]
Normal ☐ Rush ☑ 14 day

QC Level:[27]
I. ☐ II. ☐ III. ☑ Project Specific (specify):

1. Relinquished by[28] (Signature/Affiliation) Mary Jo Hall / ITCorp	Date: 12/9/98 Time: 4:30pm	1. Received by[28] (Signature/Affiliation)	Date: Time:
2. Relinquished by (Signature/Affiliation)	Date: Time:	2. Received by (Signature/Affiliation)	Date: Time:
3. Relinquished by (Signature/Affiliation)	Date: Time:	3. Received by (Signature/Affiliation)	Date: Time:

Comments:[29]

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*See back of form for special instructions.

MCA 3/15/91

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INTERNATIONAL TECHNOLOGY CORPORATION 775743

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD*

Reference Document No. 5 831
Page 1 of 2

Project Name/No. [1] Fernald Silos 1,2 POP
Sample Team Members [2] Bennett
Profit Center No. [3] 6585001
Project Manager [4] P. Leak
Purchase Order No. [6]
Required Report Date [11]

Samples Shipment Date [7] 2/15/99
Lab Destination [8] CompuChem
Lab Contact [9] Chuck Smith
Project Contact/Phone [12] Mary Hall
Carrier/Waybill No. [13] FedX

Bill to: [5] IT Corp
Accts Payable
312 Directors Dr
Knoxville, TN 37923

Report to: [10] Mary Hall
IT Corp
304 Directors Dr
Knoxville, TN 37923

ONE CONTAINER PER LINE

Sample Number [14]	Sample Description/Type [15]	Date/Time Collected [16]	Container Type [17]	Sample Volume [18]	Preservative [19]	Requested Testing Program [20]	Condition on Receipt [21]	Disposal Record No. [22]
11795206	Stabilized Silo 1	2/4/99	Glass	1 l	None	TCLP UTS metals Ba, Cd, Cr, Pb, Hg, Se, Ag, Sb, Be, Ni, Th	FOR LAB USE ONLY	
11795306								
11795406								
11795506								
11795606							FOR LAB USE ONLY	
11795706								
11795806								
11795906	Stabilized Silo 2	2/5/99						

COPY

Special Instructions: [23] See Attachment For Detection Limits Analyze on 2/17/99 Wed.

Possible Hazard Identification: [24] Non-hazard ☑ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐

Sample Disposal: [25] Return to Client ☐ Disposal by Lab ☑ Archive _____ (mos.)

Turnaround Time Required: [26] Normal ☐ Rush ☑ 7 working Days

QC Level: [27] I. ☐ II. ☐ III. ☐ Project Specific (specify):

1. Relinquished by [28] (Signature/Affiliation) Mary Hall	Date: 2-15-99 Time: 2:30pm	1. Received by [28] (Signature/Affiliation)	Date: Time:
2. Relinquished by (Signature/Affiliation)	Date: Time:	2. Received by (Signature/Affiliation)	Date: Time:
3. Relinquished by (Signature/Affiliation)	Date: Time:	3. Received by (Signature/Affiliation)	Date: Time:

Comments: [29] *Please include pH Data (9113) in Report.

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*See back of form for special instructions.

MCA 3/15/91

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INTERNATIONAL TECHNOLOGY CORPORATION

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD (cont.)*

Reference Document No.[30] [redacted]6831

Page 2 of 2

Project Name Fernald Silo 1&2

Project No. 775743

Samples Shipment Date 2/15/99

ONE CONTAINER PER LINE

Sample[14] Number	Sample[15] Description/Type	Date/Time[16] Collected	Container[17] Type	Sample[18] Volume	Pre-[19] servative	Requested Testing[20] Program	Condition on[21] Receipt	Disposal[22] Record No.
11796006	Stabilized SiO2	2/5/99	GLASS	1L	None	TCLP UTS metals Ba, Cd, Cr, Pb, Hg, Se, Ag Sb, Be, Ni, Th.		
11796106							FOR LAB USE ONLY	
11796206								
11796306							FOR LAB USE ONLY	
11796406								
11796506							FOR LAB USE ONLY	
							FOR LAB USE ONLY	
							FOR LAB USE ONLY	
							FOR LAB USE ONLY	
							FOR LAB USE ONLY	

COPY

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White: To accompany samples

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