Appendix K
ANL-W Site Specific Arsenic and Silver Concentrations

APPENDIX K

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APPENDIX K

1.0 ANL-W DEVIATION FROM INEEL TRACK 2 BACKGROUND FOR ARSENIC AND SILVER

The INEEL agreed upon background concentrations used for screening purposes in the WAG 9 RI/FS is the *INEEL Background Dose Equivalent Rates and Surficial Soil Metal and Radionuclide Concentrations for the INEEL*. A review of this document shows that the levels of inorganics vary throughout the INEEL depending on types of soils and origin of these soils. The document also shows that none of the data was collected near the ANL-W facility. In addition, arsenic and silver were detected slightly above the INEEL background values in sites that had not received discharges of arsenic and silver. This prompted a review of the arsenic concentrations at the ANL-W facility. Prior background samples for ANL-W soils were in 1988 and 1994. The history behind these two sampling events are described in sections 1.1 and 1.2. The actual CLP data result sheets (form 1's) for these studies are found in the attachment to this appendix. Section 1.2 summarizes the results of the ANL-W site specific background concentrations for arsenic and silver.

1.1 Sampling Events

A review of the ANL-W Administrative Record identified that two sampling events to obtain background analytical data were conducted in 1988 and 1994. The combination of these two background sampling events provide data used in this study of arsenic and silver deviations to the INEEL background concentrations.

1.1.1 Soil Sampling 1988

In the summer of 1988, Chen Northern, Inc. under contract with ANL-W characterized background soil conditions in the ANL-W administrative area at the INEEL. Four boreholes were completed at the ANL-W facility from which four soil samples were collected. These soil samples were collected at two sites identified as STF (Sodium Test Facility) and NWC (Northwest corner of administrative area) as shown on Figure 1. At each of the two soil sampling locations, two boreholes were drilled using a hollow-stem auger and a stainless steel split-spoon sampler with mylar liners. Soil samples were collected at predetermined intervals from ground surface to bedrock. In all cases, bedrock was encountered at depths less than 11 feet. Four soil samples were prepared from the same vertical interval from the four boreholes and are identified as BG-S-1, BG-S-2, BG-S-3, BG-S-4. Sample BG-S-1 is a sample from the four samples collected from 0-1.5 feet, BG-S-2 is from 1.5 to 3 feet, BG-S-3 is from 3.0 4.5 feet and BG-S-4 is from 4.5 - 7 feet. The samples were submitted for analysis using the 1987 Contract Laboratory Program (CLP) inorganic methods. Both the arsenic and silver were analyzed using furnace AA method which has lower detection limits than the standard inductively coupled plasma method. The data quality for these samples is EPA level IV data and the 1988 data package has undergone

data validation procedures. Table K1 shows the Lab ID, Sample ID Analytical Methods, and sample results for the 1988 samples.

1.1.2 Soil Sampling 1994

Figure 1 shows two background areas that were chosen for collection of undisturbed background samples. One of these areas was approximately one-half mile directly south of the ANL-W facility, the other was one-quarter mile northwest of the northwest corner of the ANL-W security fence. There were three boreholes in each of these two areas. Borehole 1, 2, and 3 were collected at the southern background area and borehole 4, 5, and 6 were collected of the northwest location. Boreholes were approximately 25 feet apart. Samples were collected at various depth intervals until basalt was encountered. The samples were submitted for analysis using the 1987 Contract Laboratory Program (CLP) inorganic methods. The arsenic was analyzed using furnace AA method which has lower detection limits than the standard inductively coupled plasma method. While the silver was analyzed using the inductively coupled plasma method. Eight of the fourteen silver samples were qualified with the N meaning the spike sample recovery was outside of the established control limits. The spike sample recovery for these eight samples in the same sample data group was 26.9%. This poor recovery dictates that the data has to be qualified with either the J or R (estimated or rejected) depending on whether or not the reported result was greater than or less than the instrument detection limit. Based on the INEEL Inorganic Data Validation Procedures, Three of the eight samples were qualified as rejected (R) and the other five were estimated (J) as shown in Table K2 . The data quality for these samples is EPA level IV data and the 1988 data package has undergone data validation procedures. Table K2 shows the Lab ID, Sample ID, Depth, Date collected analysis method and sample results.

1.2 Data Quality Parameters

A review data and the laboratory duplicate samples indicated that the data relative percent deviation between these samples was less than 13% for the four duplicate samples for arsenic. Data is within acceptable range if the relative percent deviation is less than 15%. For silver, two duplicates had 0% while the third had 158% relative percent deviation. The third duplicate was in the same sample data group that was qualified as being out of control limits (N). The comparison of the sample results and the duplicates is found in Table K-3 of this report.

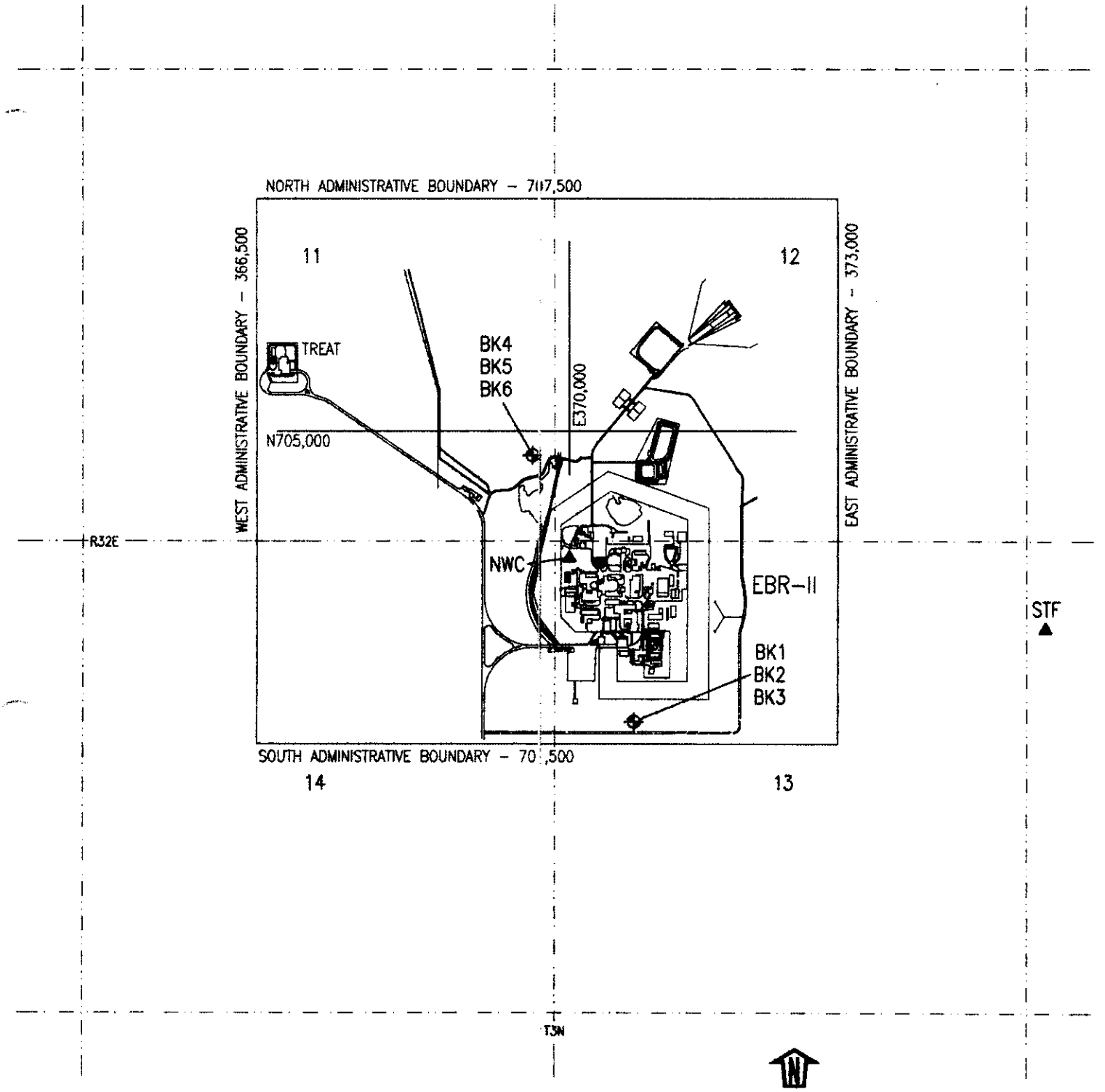
1.3 Calculation of the Upper Confidence Limit

The two ANL-W background sampling events were combined into one data set of 18 samples, four of which were from 1988, and 14 from the 1994 sampling events. Table K-4 and K-5 shows the results of the combined data set for arsenic and silver, respectively and the average, standard deviation, h-statistic, and calculated 95% one-tailed upper confidence limit. The 95% Upper Confidence Limit (UCL) for arsenic and silver are 11.16 and 6.22 mg/kg, respectively. The UCL values were calculated using the log-normally distributed data set.

1.4 ANL-W Arsenic and Silver Background Summary

The background samples collected for arsenic indicates that the localized concentration of arsenic is slightly higher than the rest of the INEEL. Based on the sample results and the calculated UCL, the background concentration for Arsenic at the ANL-W site is 11.16 mg/kg as compared to the 7.4 mg/kg in the INEEL background document. This incremental increase in the arsenic may appear to be insignificant; however, as mentioned in Section 1.0 four ditches which have not received arsenic from processes at ANL-W exceed the INEEL background but are slightly less than the localized background.

The ANL-W site specific concentration for silver was calculated using the 18 samples that were collected from 1988 and 1994. During review of the 1994 sample results, eight samples were qualified by the laboratory as having spike sample recoveries out of the specified range and were qualified with an "N". These eight samples were validated using the INEEL data validation procedures and three sample results were rejected and five samples were qualified as estimated. The log-normal one-tailed 95% UCL of the mean was calculated using one-half the instrument detection level for the samples that were undetected (U) qualified. The calculated UCL for the silver is 6.22 mg/kg as compared to the INEEL background concentration of non detected. This increase in the silver background concentration from non detected to 6.22 mg/kg for soils near the ANL-W facility is significant since small concentrations of silver have been detected in some of the WAG 9 sites that have not received discharges of silver. However, the release sites that have received silver from photographic operations are still retained because the concentrations are still above the ANL-W site specific background concentration for silver of 6.22 mg/kg.



LEGEND

◆ 1994 SOIL SAMPLE LOCATIONS

▲ 1988 SOIL SAMPLE LOCATIONS

0' 2000'

SCALE IN FEET

SOIL SAMPLING LOCATIONS, AUGUST, 1988
ARGONNE NATIONAL LABORATORY–WEST, IDAHO

MAY 29, 1997/ESWM
SITE–168.DWG (SITE–44)

Table K - 1 Soil Sample Results for Arsenic and Silver - 1988

Location	Sample ID	Lab ID	Depth (ft)	Date Collected	Arsenic and Silver Analytical Method - CLP Level IV SW 846	Arsenic Sample Results (mg/kg)	Data Qualifiers	Silver Sample Results (mg/kg)	Data Qualifiers
STF/NWC	BG-S-1	88009118	0-1.5	08/17/88	Furnace-AA	13		0.5	U
STF/NWC	BG-S-2	88009119	1.5-3	08/17/88	Furnace-AA	16		0.6	U
STF/NWC	BG-S-3	88009116	3.0-4.5	08/17/88	Furnace-AA	18		0.6	U
STF/NWC	BG-S-4	88009117	4.5-7.0	08/17/88	Furnace-AA	15		0.6	U

Table K - 2. Soil Sample Results for Arsenic and Silver- 1994

Location	Sample ID	Lab ID	Depth (ft)	Date Collected	Arsenic Analytical Method - CLP Level IV SW 846	Arsenic Sample Results (mg/kg)	Qualifiers	Silver Sample Results (mg/kg)	Qualifiers
BK-1	99-02	94329706	0-0.5	10/25/94	Furnace-AA	6.8		1.3	U
BK-1	99-02A	94329707	0.7-1.2	10/25/94	Furnace-AA	7.7		1.4	U
BK-2	99-03	94329708	0-0.5	10/25/94	Furnace-AA	7.0		1.3	U
BK-2	99-03A	94329709	1.6-2.2	10/25/94	Furnace-AA	7.1		1.3	U
BK-3	99-04	94329710	0-0.5	10/25/94	Furnace-AA	6.0		1.3	U
BK-3	99-04A	94329711	2-2.5	10/25/94	Furnace-AA	9.7		1.3	U
BK-3	99-05	94329712	0-0.5	10/25/94	Furnace-AA	5.8		1.3	U
BK-3	99-05A	94329713	2-2.5	10/25/94	Furnace-AA	9.5		1.4	U
BK-4	99-07	94325601	0-0.5	10/25/94	Furnace-AA	6.4		13.1	N, J
BK-4	99-07B	94325602	3.5-4	10/25/94	Furnace-AA	12.9		1.3	U, N, R
BK-4	99-07F	94325603	7-7.5	10/25/94	Furnace-AA	8.8		3.2	B, N, J
BK-5	99-08	94325604	0-0.5	10/25/94	Furnace-AA	6.4		1.4	B, N, J
BK-5	99-08B	94325605	3.5-4	10/25/94	Furnace-AA	8.8		12.5	N, J
BK-5	99-08F	94325606	7-7.5	10/25/94	Furnace-AA	6.4		1.4	U, N, R
BK-6	99-09	94325607	0-0.5	10/25/94	Furnace-AA	6.6		1.7	B, N, J
BK-6	99-09B	94325608	3.5-4	10/25/94	Furnace-AA	7.4		1.3	U, N, R

Table K - 3. Relative Percent Difference (RPD) for Arsenic and Silver

Location	Sample ID	Lab ID	Depth (ft)	Date Collected	Arsenic Sample Results (mg/kg)	Arsenic RPD	Silver Sample Results (mg/kg)	Silver RPD
STF/NWC	BG-S-1	88009118	0-1.5	08/17/88	13		0.5	
STF/NWC	BG-S-1	Laboratory Duplicate	0-1.5	08/17/88	13	0 %	0.5	0 %
BK-3	99-04	94329710	0-0.5	10/25/94	6.0		1.3	
BK-3	99-05	94329712	0-0.5	10/25/94	5.8	3.4 %	1.3	0 %
BK-3	99-04A	94329711	2-2.5	10/25/94	9.7		1.4	
BK-3	99-05A	94329713	2-2.5	10/25/94	9.5	2.1 %	1.4	0 %
BK-4	99-07	94325601	0-0.5	10/25/94	6.4		13.1	
BK-4	99-07	Laboratory Duplicate	0-0.5	10/25/94	5.6	13.0%	1.5	158.5%

Table K - 4. WAG 9 Upper Confidence Level Calculation for Arsenic

Type Location	Sample No.	Compound	Concentration	Units	Q Flags	Concentration	ln
STF	BG-S-1	Arsenic	13	mg/kg		13	2.564949
STF	BG-S-2	Arsenic	16	mg/kg		16	2.772589
NWC	BG-S-3	Arsenic	18	mg/kg		18	2.890372
NWC	BG-S-4	Arsenic	15	mg/kg		15	2.70805
BK1	99-02	Arsenic	6.8	mg/kg		6.8	1.916923
BK1	99-02A	Arsenic	7.7	mg/kg		7.7	2.04122
BK2	99-03	Arsenic	7	mg/kg		7.5	2.014903
BK2	99-03A	Arsenic	7.1	mg/kg		7.1	1.960095
BK3	99-04	Arsenic	6	mg/kg		6	1.791759
BK3	99-04A	Arsenic	9.7	mg/kg		9.7	2.272126
BK4	99-07	Arsenic	6.4	mg/kg		6.4	1.856298
BK4	99-07B	Arsenic	12.9	mg/kg		12.9	2.557227
BK4	99-07F	Arsenic	8.8	mg/kg		8.8	2.174752
BK5	99-08	Arsenic	6.4	mg/kg		6.4	1.856298
BK5	99-08B	Arsenic	8.8	mg/kg		8.8	2.174752
BK5	99-08F	Arsenic	6.4	mg/kg		6.4	1.856298
BK6	99-09	Arsenic	6.6	mg/kg		6.6	1.88707
BK6	99-09B	Arsenic	7.4	mg/kg		7.4	2.00148
					ncount		18
					ave		2.183176
					sdev		0.358125
					hstat		1.903419
					UPPER CONFIDENCE LIMIT		**11.16328**

Table K - 5. WAG 9 Upper Confidence Level Calculation for Silver

Type Location	Sample No.	Compound	Concentration	Units	Q Flags	½ U Concentration	ln
STF	BG-S-1	Silver	0.5	mg/kg	U	0.25	-1.38629436112
STF	BG-S-2	Silver	0.6	mg/kg	U	0.3	-1.20397280433
NWC	BG-S-3	Silver	0.6	mg/kg	U	0.3	-1.20397280433
NWC	BG-S-4	Silver	0.6	mg/kg	U	0.3	-1.20397280433
BK1	99-02	Silver	1.3	mg/kg	U	0.65	-0.43078291609
BK1	99-02A	Silver	1.4	mg/kg	U	0.7	-0.35667494394
BK2	99-03	Silver	1.3	mg/kg	U	0.65	-0.43078291609
BK2	99-03A	Silver	1.3	mg/kg	U	0.65	-0.43078291609
BK3	99-04	Silver	1.3	mg/kg	U	0.65	-0.43078291609
BK3	99-04A	Silver	1.4	mg/kg	U	0.7	-0.35667494394
BK4	99-07	Silver	13.1	mg/kg	N, J	6.55	1.87946504965
BK4	99-07B	Silver	1.3	mg/kg	U, N, R		
BK4	99-07F	Silver	3.2	mg/kg	B, N, J	1.6	0.47000362925
BK5	99-08	Silver	1.4	mg/kg	B, N, J	0.7	-0.35667494394
BK5	99-08B	Silver	12.5	mg/kg	N, J	6.25	1.83258146375
BK5	99-08F	Silver	1.4	mg/kg	U, N, R		
BK6	99-09	Silver	1.7	mg/kg	B, N, J	0.85	-0.1625189295
BK6	99-09B	Silver	1.3	mg/kg	U, N, R		
					ncount		15
					ave		-0.0204
					sdev		1.2537
					hstat		3.169
					UPPER CONFIDENCE LIMIT		6.219

ATTACHMENT TO APPENDIX K

U.S. EPA - CLP

1
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

BG-S-2

Lab Name: Envirodyne Engineers Contract: 3290

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: PW-1

Matrix (soil/water): SOIL Lab Sample ID: 88009119

Level (low/med): low Date Received: 8/20/88

% Solids: 89.3

Concentration Units (ug/L or mg/kg dry weight): mg/kg

CAS No.	Analyte	Concentration	C	M	Q
7429-90-5	Aluminum	13000		P	
7440-36-0	Antimony	1.1	U	F	N
7440-38-2	Arsenic	16		F	
7440-39-3	Barium	237		P	
7440-41-7	Beryllium	3.6		P	
7440-43-9	Cadmium	2.7		P	
7440-70-2	Calcium	77066		P	
7440-47-3	Chromium	22		P	
7440-48-4	Cobalt				
7440-50-8	Copper	29		P	
7439-89-6	Iron	14300		P	
7439-92-1	Lead	14		F	
7439-95-4	Magnesium				
7439-96-5	Manganese				
7439-97-6	Mercury	0.1	U	CV	N
7440-02-0	Nickel	29		P	
7440-09-7	Potassium	3630		A	
7782-49-2	Selenium	0.6	U	F	N
7440-22-4	Silver	0.6	U	F	
7440-23-5	Sodium	1700		P	
7440-28-0	Thallium	0.7	U	F	
7440-62-2	Vanadium	38		P	
7440-66-6	Zinc	60		P	
	Cyanide	1.4	U	335.2	
	Tin				
	Strontium	76		P	

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

As & Pb - dilution factor 5
Ca & Al + Fe - dilution factor 10

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1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

BG-S-1

Lab Name: Envirodyne Engineers Contract: 3290

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: PW-1

Matrix (soil/water): SOIL Lab Sample ID: 88009118

Level (low/med): low Date Received: 8/20/88

% Solids: 94.6

Concentration Units (ug/L or mg/kg dry weight): mg/kg

CAS No.	Analyte	Concentration	C	M	Q
7429-90-5	Aluminum	13300		P	
7440-36-0	Antimony	1.1	U	F	N
7440-38-2	Arsenic	13		F	
7440-39-3	Barium	191		P	
7440-41-7	Beryllium	3.1		P	
7440-43-9	Cadmium	2.0		P	
7440-70-2	Calcium	15606		P	
7440-47-3	Chromium	20		P	
7440-48-4	Cobalt				
7440-50-8	Copper	22		P	
7439-89-6	Iron	15900		P	
7439-92-1	Lead	14		F	
7439-95-4	Magnesium				
7439-96-5	Manganese				
7439-97-6	Mercury	0.1	U	CV	N
7440-02-0	Nickel	26		P	
7440-09-7	Potassium	4630		P	
7782-49-2	Selenium	0.5	U	F	N
7440-22-4	Silver	0.5	U	F	
7440-23-5	Sodium	511	B	P	
7440-28-0	Thallium	0.6	U	F	
7440-62-2	Vanadium	28		P	
7440-66-6	Zinc	67		P	
	Cyanide	1.3	U	335.2	
	Tin				
	Strontium	49		P	

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

Ca, As & Pb - dilution factor 5

Al + Fe - dilution factor 10

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1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

BG-S-4

Lab Name: Envirodyne Engineers Contract: 3290

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: PW-1

Matrix (soil/water): SOIL Lab Sample ID: 88009117

Level (low/med): low Date Received: 8/20/88

% Solids: 90.9

Concentration Units (ug/L or mg/kg dry weight): mg/Kg

CAS No.	Analyte	Concentration	C	M	Q
7429-90-5	Aluminum	12100		P	
7440-36-0	Antimony	1.1	U	F	N
7440-38-2	Arsenic	15		F	
7440-39-3	Barium	174		P	
7440-41-7	Beryllium	3.1		P	
7440-43-9	Cadmium	2.4		P	
7440-70-2	Calcium	61730		P	
7440-47-3	Chromium	21		P	
7440-48-4	Cobalt				
7440-50-8	Copper	24		P	
7439-89-6	Iron	13100		P	
7439-92-1	Lead	13		F	
7439-95-4	Magnesium				
7439-96-5	Manganese				
7439-97-6	Mercury	0.1	U	CV	N
7440-02-0	Nickel	27		P	
7440-09-7	Potassium	2790		P	
7782-49-2	Selenium	0.6	U	F	N
7440-22-4	Silver	0.6	U	F	
7440-23-5	Sodium	1560		P	
7440-28-0	Thallium	0.7	U	F	
7440-62-2	Vanadium	34		P	
7440-66-6	Zinc	52		P	
	Cyanide	1.4	U	335.2	
	Tin				
	Strontium	91		P	

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

As & Pb - dilution factor 5

Ca + Fe - dilution factor 10

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1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

BG-S-3

Lab Name: Envirodyne Engineers Contract: 3290

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: PW-1

Matrix (soil/water): SOIL Lab Sample ID: 88009116

Level (low/med): low Date Received: 8/20/88

% Solids: 90.3

Concentration Units (ug/L or mg/kg dry weight): mg/Kg

CAS No.	Analyte	Concentration	C	M	Q
7429-90-5	Aluminum	13900		P	
7440-36-0	Antimony	1.1	U	F	N
7440-38-2	Arsenic	18		F	
7440-39-3	Barium	210		P	
7440-41-7	Beryllium	3.5		P	
7440-43-9	Cadmium	2.4		P	
7440-70-2	Calcium	53842		P	
7440-47-3	Chromium	19		P	
7440-48-4	Cobalt				
7440-50-8	Copper	24		P	
7439-89-6	Iron	14800		P	
7439-92-1	Lead	13		F	
7439-95-4	Magnesium				
7439-96-5	Manganese				
7439-97-6	Mercury	0.1	U	CV	N
7440-02-0	Nickel	28		P	
7440-09-7	Potassium	3410		P	
7782-49-2	Selenium	0.6	U	F	N
7440-22-4	Silver	0.6	U	F	
7440-23-5	Sodium	1350		P	
7440-28-0	Thallium	0.7	U	F	
7440-62-2	Vanadium	32		P	
7440-66-6	Zinc	64		P	
	Cyanide	1.4	U	335.2	
	Tin				
	Strontium	109		P	

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

As & Pb - dilution factor 5

Ca+Al + Fe - dilution factor 10

6
DUPLICATES

EPA SAMPLE NO.

BG-S-1

Lab Name: Envirodyne Engineers Contract: 3290

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: PW-1

Matrix (soil/water): SOIL Level (low/med): low

% Solids for Sample: 94.6 % Solids for Duplicate: 94.6

Concentration Units (ug/L or mg/kg dry weight): mg/Kg

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	M
Aluminum								
Antimony								
Arsenic	±10	13		13		0		F
Barium								
Beryllium								
Cadmium								
Calcium								
Chromium								
Cobalt								
Copper								
Iron								
Lead	±20%	14		15		6.9		F
Magnesium								
Manganese								
Mercury								
Nickel								
Potassium								
Selenium		0.5	U	0.5	U	NC		F
Silver		0.5	U	0.5	U	NC		F
Sodium								
Thallium		0.6	U	0.6	U	NC		F
Vanadium								
Zinc								
Cyanide		1.3	U	1.3	U	NC		335.2
Tin								

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

99-02

Lab Name: BARRINGER_LABORATORIES___ Contract: ETAS_CORP_

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: 943297

Matrix (soil/water): SOIL_ Lab Sample ID: 94329706

Level (low/med): LOW__ Date Received: 11/02/94

% Solids: _89.1

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum_	13500			P
7440-36-0	Antimony_	13.5	U	N	P
7440-38-2	Arsenic__	6.8			F
7440-39-3	Barium___	216			P
7440-41-7	Beryllium	0.98			F
7440-43-9	Cadmium__	1.2		*	P
7440-70-2	Calcium__	11000			P
7440-47-3	Chromium_	21.0		N	P
7440-48-4	Cobalt___	12.1			P
7440-50-8	Copper___	20.4			P
7439-89-6	Iron____	23000			P
7439-92-1	Lead____	18.9		*	F
7439-95-4	Magnesium	9680			P
7439-96-5	Manganese	699			P
7439-97-6	Mercury__	0.11	U		CV
7440-02-0	Nickel___	26.9			P
7440-09-7	Potassium	3580			P
7782-49-2	Selenium_	0.45	U		F
7440-22-4	Silver___	1.3	U		P
7440-23-5	Sodium___	213	B		P
7440-28-0	Thallium_	1.3	U		F
7440-62-2	Vanadium_	29.5			P
7440-66-6	Zinc____	86.8			P
	Cyanide__	0.39	U		CA

Color Before: TAN\BROWN Clarity Before: _____ Texture: MEDIUM

Color After: _____ Clarity After: _____ Artifacts: YES___

Comments:

U.S. EPA - CLP

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

99-02A

Lab Name: BARRINGER_LABORATORIES___ Contract: ETAS_CORP_

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: 943297

Matrix (soil/water): SOIL_ Lab Sample ID: 94329707

Level (low/med): LOW__ Date Received: 11/02/94

% Solids: _88.3

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum_	13900			P
7440-36-0	Antimony_	13.6	U	N	P
7440-38-2	Arsenic__	7.7			F
7440-39-3	Barium___	224			P
7440-41-7	Beryllium	1.1			F
7440-43-9	Cadmium__	1.4		*	P
7440-70-2	Calcium__	36400			P
7440-47-3	Chromium_	20.0		N	P
7440-48-4	Cobalt___	11.3	B		P
7440-50-8	Copper___	21.8			P
7439-89-6	Iron_____	18900			P
7439-92-1	Lead_____	17.4		*	F
7439-95-4	Magnesium	9310			P
7439-96-5	Manganese	576			P
7439-97-6	Mercury__	0.11	U		CV
7440-02-0	Nickel___	26.3			P
7440-09-7	Potassium	2810			P
7782-49-2	Selenium_	0.45	U		F
7440-22-4	Silver___	1.4	U		P
7440-23-5	Sodium___	304	B		P
7440-28-0	Thallium_	1.4	U		F
7440-62-2	Vanadium_	28.6			P
7440-66-6	Zinc_____	76.4			P
_____	Cyanide__	0.40	U		CA

Color Before: TAN\BROWN Clarity Before: _____ Texture: MEDIUM

Color After: _____ Clarity After: _____ Artifacts: YES___

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

99-03

Lab Name: BARRINGER_LABORATORIES___ Contract: ETAS_CORP_

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: 943297

Matrix (soil/water): SOIL_ Lab Sample ID: 94329708

Level (low/med): LOW__ Date Received: 11/02/94

% Solids: _89.6

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum_	15200			P
7440-36-0	Antimony_	13.4	U	N	P
7440-38-2	Arsenic__	7.0			F
7440-39-3	Barium___	262			P
7440-41-7	Beryllium	1.1			F
7440-43-9	Cadmium__	0.89	U	*	P
7440-70-2	Calcium__	42300			P
7440-47-3	Chromium_	22.6		N	P
7440-48-4	Cobalt___	11.7			P
7440-50-8	Copper___	25.0			P
7439-89-6	Iron_____	20300			P
7439-92-1	Lead_____	16.0		*	F
7439-95-4	Magnesium	11100			P
7439-96-5	Manganese	722			P
7439-97-6	Mercury__	0.11	U		CV
7440-02-0	Nickel___	26.2			P
7440-09-7	Potassium	3320			P
7782-49-2	Selenium_	0.45	U	W	F
7440-22-4	Silver___	1.3	U		P
7440-23-5	Sodium___	279	B		P
7440-28-0	Thallium_	1.3	U	W	F
7440-62-2	Vanadium_	29.7			P
7440-66-6	Zinc_____	87.5			P
	Cyanide__	0.39	U		CA

Color Before: TAN\BROWN Clarity Before: _____ Texture: MEDIUM

Color After: _____ Clarity After: _____ Artifacts: YES___

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

99-03A

Lab Name: BARRINGER_LABORATORIES___ Contract: ETAS_CORP_

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: 943297

Matrix (soil/water): SOIL_ Lab Sample ID: 94329709

Level (low/med): LOW__ Date Received: 11/02/94

% Solids: _91.9

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum_	9510			P
7440-36-0	Antimony_	13.1	U	N	P
7440-38-2	Arsenic__	7.1			F
7440-39-3	Barium___	161			P
7440-41-7	Beryllium	0.66			F
7440-43-9	Cadmium__	1.1		*	P
7440-70-2	Calcium__	86400			P
7440-47-3	Chromium_	16.5		N	P
7440-48-4	Cobalt___	8.9	B		P
7440-50-8	Copper___	15.5			P
7439-89-6	Iron_____	14700			P
7439-92-1	Lead_____	12.1		*	F
7439-95-4	Magnesium	11800			P
7439-96-5	Manganese	403			P
7439-97-6	Mercury__	0.11	U		CV
7440-02-0	Nickel___	23.3			P
7440-09-7	Potassium	1210			P
7782-49-2	Selenium_	0.44	U		F
7440-22-4	Silver___	1.3	U		P
7440-23-5	Sodium___	1090	B		P
7440-28-0	Thallium_	1.3	U		F
7440-62-2	Vanadium_	25.0			P
7440-66-6	Zinc_____	56.1			P
_____	Cyanide__	0.38	U		CA

Color Before: TAN\BROWN Clarity Before: _____ Texture: COARSE

Color After: _____ Clarity After: _____ Artifacts: YES___

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

99-04

Lab Name: BARRINGER_LABORATORIES___ Contract: ETAS_CORP_

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: 943297

Matrix (soil/water): SOIL_ Lab Sample ID: 94329710

Level (low/med): LOW__ Date Received: 11/02/94

% Solids: _90.3

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	14500			P
7440-36-0	Antimony	13.3	U	N	P
7440-38-2	Arsenic	6.0			F
7440-39-3	Barium	180			P
7440-41-7	Beryllium	0.99			F
7440-43-9	Cadmium	1.5		*	P
7440-70-2	Calcium	19500			P
7440-47-3	Chromium	23.2		N	P
7440-48-4	Cobalt	17.4			P
7440-50-8	Copper	19.9			P
7439-89-6	Iron	28300			P
7439-92-1	Lead	14.4		*	F
7439-95-4	Magnesium	14100			P
7439-96-5	Manganese	708			P
7439-97-6	Mercury	0.11	U		CV
7440-02-0	Nickel	32.1			P
7440-09-7	Potassium	3670			P
7782-49-2	Selenium	0.44	U	W	F
7440-22-4	Silver	1.3	U		P
7440-23-5	Sodium	1730			P
7440-28-0	Thallium	1.3	U		F
7440-62-2	Vanadium	33.8			P
7440-66-6	Zinc	92.7			P
	Cyanide	0.72			CA

Color Before: TAN\BROWN Clarity Before: _____ Texture: COARSE

Color After: _____ Clarity After: _____ Artifacts: YES___

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

99-04A

Lab Name: BARRINGER_LABORATORIES___ Contract: ETAS_CORP_

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: 943297

Matrix (soil/water): SOIL_ Lab Sample ID: 94329711

Level (low/med): LOW__ Date Received: 11/02/94

% Solids: _87.8

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	9450			P
7440-36-0	Antimony	13.7	U	N	P
7440-38-2	Arsenic	9.7			F
7440-39-3	Barium	239			P
7440-41-7	Beryllium	0.62			F
7440-43-9	Cadmium	0.91	U	*	P
7440-70-2	Calcium	103000			P
7440-47-3	Chromium	15.8		N	P
7440-48-4	Cobalt	7.4	B		P
7440-50-8	Copper	16.0			P
7439-89-6	Iron	14300			P
7439-92-1	Lead	9.3		*	F
7439-95-4	Magnesium	15500			P
7439-96-5	Manganese	312			P
7439-97-6	Mercury	0.11	U		CV
7440-02-0	Nickel	19.4			P
7440-09-7	Potassium	1130	B		P
7782-49-2	Selenium	0.46	U		F
7440-22-4	Silver	1.4	U		P
7440-23-5	Sodium	3020			P
7440-28-0	Thallium	1.4	U		F
7440-62-2	Vanadium	28.6			P
7440-66-6	Zinc	55.6			P
	Cyanide	0.40	U		CA

Color Before: TAN_____ Clarity Before: _____ Texture: COARSE

Color After: _____ Clarity After: _____ Artifacts: YES___

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

99-05

Lab Name: BARRINGER_LABORATORIES___ Contract: ETAS_CORP_

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: 943297

Matrix (soil/water): SOIL_ Lab Sample ID: 94329712

Level (low/med): LOW__ Date Received: 11/02/94

% Solids: _90.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum_	14500			P
7440-36-0	Antimony_	13.3	U	N	P
7440-38-2	Arsenic__	5.8			F
7440-39-3	Barium___	216			P
7440-41-7	Beryllium	0.99			F
7440-43-9	Cadmium__	0.96	B	*	P
7440-70-2	Calcium__	28700			P
7440-47-3	Chromium_	21.8		N	P
7440-48-4	Cobalt___	14.7			P
7440-50-8	Copper___	22.2			P
7439-89-6	Iron____	22000			P
7439-92-1	Lead____	12.9		*	F
7439-95-4	Magnesium	12300			P
7439-96-5	Manganese	736			P
7439-97-6	Mercury__	0.11	U		CV
7440-02-0	Nickel___	30.2			P
7440-09-7	Potassium	3900			P
7782-49-2	Selenium_	0.44	U		F
7440-22-4	Silver___	1.3	U		P
7440-23-5	Sodium___	1990			P
7440-28-0	Thallium_	1.3	U		F
7440-62-2	Vanadium_	30.1			P
7440-66-6	Zinc____	89.0			P
	Cyanide__	0.39	U		CA

Color Before: TAN_____ Clarity Before: _____ Texture: COARSE

Color After: _____ Clarity After: _____ Artifacts: YES___

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

99-05A

Lab Name: BARRINGER_LABORATORIES___ Contract: ETAS_CORP_

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: 943297

Matrix (soil/water): SOIL_ Lab Sample ID: 94329713

Level (low/med): LOW__ Date Received: 11/02/94

% Solids: _87.8

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum_	10800	_		P_
7440-36-0	Antimony_	13.7	U	N	P_
7440-38-2	Arsenic__	9.5	_		F_
7440-39-3	Barium___	269	_		P_
7440-41-7	Beryllium	0.61	_		F_
7440-43-9	Cadmium__	1.1	B	*	P_
7440-70-2	Calcium__	116000	_		P_
7440-47-3	Chromium_	17.2	_	N	P_
7440-48-4	Cobalt___	8.4	B		P_
7440-50-8	Copper___	18.5	_		P_
7439-89-6	Iron_____	14200	_		P_
7439-92-1	Lead_____	13.6	_	S*	F_
7439-95-4	Magnesium	16200	_		P_
7439-96-5	Manganese	364	_		P_
7439-97-6	Mercury__	0.11	U		CV
7440-02-0	Nickel___	19.4	_		P_
7440-09-7	Potassium	1510	_		P_
7782-49-2	Selenium_	0.59	B		F_
7440-22-4	Silver___	1.4	U		P_
7440-23-5	Sodium___	3460	_		P_
7440-28-0	Thallium_	1.4	U		F_
7440-62-2	Vanadium_	29.9	_		P_
7440-66-6	Zinc_____	56.4	_		P_
_____	Cyanide__	0.44	B		CA
_____	_____	_____	_	_____	__

Color Before: TAN_____ Clarity Before: _____ Texture: MEDIUM

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

99-07

Lab Name: BARRINGER_LABORATORIES___ Contract: ETAS_CORP_

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: 943256

Matrix (soil/water): SOIL_ Lab Sample ID: 94325601

Level (low/med): LOW__ Date Received: 10/28/94

% Solids: _89.9

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum_	16500			P
7440-36-0	Antimony_	13.3	U	N	P
7440-38-2	Arsenic__	6.4		S	F
7440-39-3	Barium___	221			P
7440-41-7	Beryllium	1.1		S	F
7440-43-9	Cadmium__	0.94	B		P
7440-70-2	Calcium__	11400			P
7440-47-3	Chromium_	21.0			P
7440-48-4	Cobalt___	12.2			P
7440-50-8	Copper___	25.3			P
7439-89-6	Iron_____	19800			P
7439-92-1	Lead_____	17.3		N	F
7439-95-4	Magnesium	9150			P
7439-96-5	Manganese	570			P
7439-97-6	Mercury__	0.11	U		CV
7440-02-0	Nickel___	26.5			P
7440-09-7	Potassium	5170			P
7782-49-2	Selenium_	0.44	U	WN	F
7440-22-4	Silver___	13.1		N*	P
7440-23-5	Sodium___	163	B		P
7440-28-0	Thallium_	1.3	U		F
7440-62-2	Vanadium_	26.3			P
7440-66-6	Zinc_____	95.7		E	P
	Cyanide__	0.39	U		CA

Color Before: BROWN____ Clarity Before: _____ Texture: MEDIUM

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

U.S. EPA - CLP

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

99-07B

Lab Name: BARRINGER_LABORATORIES___ Contract: ETAS_CORP_

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: 943256

Matrix (soil/water): SOIL_ Lab Sample ID: 94325602

Level (low/med): LOW__ Date Received: 10/28/94

% Solids: _91.8

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum_	10200			P
7440-36-0	Antimony_	13.1	U	N	P
7440-38-2	Arsenic__	12.9			F
7440-39-3	Barium___	303			P
7440-41-7	Beryllium	0.73		S	F
7440-43-9	Cadmium__	1.0	B		P
7440-70-2	Calcium__	51000			P
7440-47-3	Chromium_	19.2			P
7440-48-4	Cobalt___	17.7			P
7440-50-8	Copper___	17.7			P
7439-89-6	Iron____	17400			P
7439-92-1	Lead____	16.1		N	F
7439-95-4	Magnesium	13900			P
7439-96-5	Manganese	1190			P
7439-97-6	Mercury__	0.11	U		CV
7440-02-0	Nickel___	30.4			P
7440-09-7	Potassium	1350			P
7782-49-2	Selenium_	0.46	B	WN	F
7440-22-4	Silver___	1.3	U	N*	P
7440-23-5	Sodium___	2090			P
7440-28-0	Thallium_	1.3	U		F
7440-62-2	Vanadium_	37.4			P
7440-66-6	Zinc____	66.4		E	P
	Cyanide__	0.38	U		CA

Color Before: BROWN____ Clarity Before: _____ Texture: MEDIUM

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

99-07F

Lab Name: BARRINGER_LABORATORIES___ Contract: ETAS_CORP_

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: 943256

Matrix (soil/water): SOIL_ Lab Sample ID: 94325603

Level (low/med): LOW__ Date Received: 10/28/94

% Solids: _84.9

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum_	21900			P
7440-36-0	Antimony_	14.1	U	N	P
7440-38-2	Arsenic__	8.8			F
7440-39-3	Barium___	377			P
7440-41-7	Beryllium	1.2		S	F
7440-43-9	Cadmium__	1.3			P
7440-70-2	Calcium__	29000			P
7440-47-3	Chromium_	32.2			P
7440-48-4	Cobalt___	30.5			P
7440-50-8	Copper___	23.7			P
7439-89-6	Iron_____	41900			P
7439-92-1	Lead_____	16.3		N	F
7439-95-4	Magnesium	15900			P
7439-96-5	Manganese	1180			P
7439-97-6	Mercury__	0.12	U		CV
7440-02-0	Nickel___	43.5			P
7440-09-7	Potassium	1510			P
7782-49-2	Selenium_	0.47	U	WN	F
7440-22-4	Silver___	3.2	B	N*	P
7440-23-5	Sodium___	3720			P
7440-28-0	Thallium_	1.4	U		F
7440-62-2	Vanadium_	72.8			P
7440-66-6	Zinc_____	82.3		E	P
	Cyanide__	0.41	U		CA

Color Before: BROWN____ Clarity Before: _____ Texture: MEDIUM

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

99-08

Lab Name: BARRINGER_LABORATORIES___ Contract: ETAS_CORP_

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: 943256

Matrix (soil/water): SOIL_ Lab Sample ID: 94325604

Level (low/med): LOW__ Date Received: 10/28/94

% Solids: _87.7

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum_	15600			P
7440-36-0	Antimony_	13.7	U	N	P
7440-38-2	Arsenic__	6.4			F
7440-39-3	Barium___	210			P
7440-41-7	Beryllium	0.84		S	F
7440-43-9	Cadmium__	1.1	B		P
7440-70-2	Calcium__	38400			P
7440-47-3	Chromium_	20.6			P
7440-48-4	Cobalt___	10.9	B		P
7440-50-8	Copper___	23.6			P
7439-89-6	Iron____	18400			P
7439-92-1	Lead____	15.1		N	F
7439-95-4	Magnesium	10200			P
7439-96-5	Manganese	514			P
7439-97-6	Mercury__	0.11	U		CV
7440-02-0	Nickel___	26.5			P
7440-09-7	Potassium	4450			P
7782-49-2	Selenium_	0.46	U	WN	F
7440-22-4	Silver___	1.4	B	N*	P
7440-23-5	Sodium___	184	B		P
7440-28-0	Thallium_	1.4	U		F
7440-62-2	Vanadium_	26.4			P
7440-66-6	Zinc____	82.7		E	P
	Cyanide__	0.40	U		CA

Color Before: BROWN____ Clarity Before: _____ Texture: MEDIUM

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

99-08B

Lab Name: BARRINGER_LABORATORIES___ Contract: ETAS_CORP_

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: 943256

Matrix (soil/water): SOIL_ Lab Sample ID: 94325605

Level (low/med): LOW__ Date Received: 10/28/94

% Solids: _90.7

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum_	10800			P_
7440-36-0	Antimony_	13.2	U	N	P_
7440-38-2	Arsenic__	8.8			F_
7440-39-3	Barium___	204			P_
7440-41-7	Beryllium	0.58		S	F_
7440-43-9	Cadmium__	1.0	B		P_
7440-70-2	Calcium__	91700			P_
7440-47-3	Chromium_	19.1			P_
7440-48-4	Cobalt___	9.1	B		P_
7440-50-8	Copper___	13.6			P_
7439-89-6	Iron_____	13600			P_
7439-92-1	Lead_____	11.8		N	F_
7439-95-4	Magnesium	16900			P_
7439-96-5	Manganese	353			P_
7439-97-6	Mercury__	0.11	U		CV
7440-02-0	Nickel___	23.6			P_
7440-09-7	Potassium	1650			P_
7782-49-2	Selenium_	0.49	B	WN	F_
7440-22-4	Silver___	12.5		N*	P_
7440-23-5	Sodium___	2220			P_
7440-28-0	Thallium_	1.3	U		F_
7440-62-2	Vanadium_	32.8			P_
7440-66-6	Zinc_____	82.0		E	P_
_____	Cyanide__	0.39	U		CA

Color Before: BROWN____ Clarity Before: _____ Texture: MEDIUM

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

99-08F

Lab Name: BARRINGER_LABORATORIES___ Contract: ETAS_CORP_

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: 943256

Matrix (soil/water): SOIL_ Lab Sample ID: 94325606

Level (low/med): LOW__ Date Received: 10/28/94

% Solids: _88.7

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum_	13400			P
7440-36-0	Antimony_	13.5	U	N	P
7440-38-2	Arsenic__	6.4			F
7440-39-3	Barium___	222			P
7440-41-7	Beryllium	0.60		S	F
7440-43-9	Cadmium__	0.90	U		P
7440-70-2	Calcium__	83800			P
7440-47-3	Chromium_	21.7			P
7440-48-4	Cobalt___	9.3	B		P
7440-50-8	Copper___	19.1			P
7439-89-6	Iron_____	17100			P
7439-92-1	Lead_____	11.2		N	F
7439-95-4	Magnesium	17700			P
7439-96-5	Manganese	444			P
7439-97-6	Mercury__	0.11	U		CV
7440-02-0	Nickel___	25.9			P
7440-09-7	Potassium	2040			P
7782-49-2	Selenium_	0.45	U	WN	F
7440-22-4	Silver___	1.4	U	N*	P
7440-23-5	Sodium___	3050			P
7440-28-0	Thallium_	1.4	U		F
7440-62-2	Vanadium_	34.7			P
7440-66-6	Zinc_____	73.0		E	P
	Cyanide__	0.39	U		CA

Color Before: BROWN____ Clarity Before: _____ Texture: MEDIUM

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

99-09

Lab Name: BARRINGER_LABORATORIES___ Contract: ETAS_CORP_

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: 943256

Matrix (soil/water): SOIL_ Lab Sample ID: 94325607

Level (low/med): LOW__ Date Received: 10/28/94

% Solids: _87.4

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum_	18600			P_
7440-36-0	Antimony_	13.7	U	N	P_
7440-38-2	Arsenic__	6.6			F_
7440-39-3	Barium___	230			P_
7440-41-7	Beryllium	0.85		S	F_
7440-43-9	Cadmium__	1.1	B		P_
7440-70-2	Calcium__	5830			P_
7440-47-3	Chromium_	23.9			P_
7440-48-4	Cobalt___	11.5			P_
7440-50-8	Copper___	26.9			P_
7439-89-6	Iron____	22600			P_
7439-92-1	Lead____	16.0		N	F_
7439-95-4	Magnesium	7090			P_
7439-96-5	Manganese	693			P_
7439-97-6	Mercury__	0.11	U		CV
7440-02-0	Nickel___	25.9			P_
7440-09-7	Potassium	6360			P_
7782-49-2	Selenium_	0.46	U	WN	F_
7440-22-4	Silver___	1.7	B	N*	P_
7440-23-5	Sodium___	194	B		P_
7440-28-0	Thallium_	1.4	U		F_
7440-62-2	Vanadium_	29.3			P_
7440-66-6	Zinc____	111		E	P_
	Cyanide__	0.40	U		CA

Color Before: BROWN____ Clarity Before: _____ Texture: MEDIUM

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

99-09B

Lab Name: BARRINGER_LABORATORIES___ Contract: ETAS_CORP_

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: 943256

Matrix (soil/water): SOIL_ Lab Sample ID: 94325608

Level (low/med): LOW__ Date Received: 10/28/94

% Solids: _92.7

Concentration Units (ug/L cr mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum_	11300			P
7440-36-0	Antimony_	12.9	U	N	P
7440-38-2	Arsenic__	7.4			F
7440-39-3	Barium___	173			P
7440-41-7	Beryllium	0.59		S	F
7440-43-9	Cadmium__	0.86	U		P
7440-70-2	Calcium__	81500			P
7440-47-3	Chromium_	19.0			P
7440-48-4	Cobalt___	8.3	B		P
7440-50-8	Copper___	12.9			P
7439-89-6	Iron_____	14100			P
7439-92-1	Lead_____	11.6		N	F
7439-95-4	Magnesium	13500			P
7439-96-5	Manganese	307			P
7439-97-6	Mercury__	0.11	U		CV
7440-02-0	Nickel___	21.9			P
7440-09-7	Potassium	1560			P
7782-49-2	Selenium_	0.43	U	N	F
7440-22-4	Silver___	1.3	U	N*	P
7440-23-5	Sodium___	357	B		P
7440-28-0	Thallium_	1.3	U		F
7440-62-2	Vanadium_	27.6			P
7440-66-6	Zinc_____	61.7		E	P
	Cyanide__	0.38	U		CA

Color Before: BROWN____ Clarity Before: _____ Texture: MEDIUM

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

U.S. EPA - CLP

6
DUPLICATES

EPA SAMPLE NO.

99-07

Lab Name: BARRINGER_LABORATORIES___ Contract: ETAS_CORP_

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: 943256

Matrix (soil/water): SOIL_ Level (low/med): _LOW__

% Solids for Sample: _89.9 % Solids for Duplicate: __89.9

Concentration Units (ug/L or mg/kg dry weight): MG/KG

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	M
Aluminum		16515.5695		16611.6073		0.6		P
Antimony		13.3482	U	13.3482	U			P
Arsenic	2.2	6.3582		5.5840		13.0		F
Barium	44.5	220.6407		238.3911		7.7		P
Beryllium		1.0772		0.9188		15.9		F
Cadmium	1.1	0.9399	B	1.1515		20.2		P
Calcium		11400.0701		12433.6481		8.7		P
Chromium		21.0427		20.4129		3.0		P
Cobalt	11.1	12.2125		11.5377		5.7		P
Copper	5.6	25.2957		25.0883		0.8		P
Iron		19833.4260		20066.8320		1.2		P
Lead		17.3304		16.4850		5.0		F
Magnesium		9146.4930		9350.9998		2.2		P
Manganese		570.1980		604.9175		5.9		P
Mercury		0.1112	U	0.1112	U			CV
Nickel	8.9	26.4810		29.0812		9.4		P
Potassium	1112.3	5174.0699		5044.1984		2.5		P
Selenium		0.4449	U	0.4449	U			F
Silver	4.4	13.0592		1.5103	B	158.5	*	P
Sodium		162.5164	B	162.9168	B	0.2		P
Thallium		1.3348	U	1.3348	U			F
Vanadium	11.1	26.3468		27.1057		2.8		P
Zinc		95.7433		93.5615		2.3		P
Cyanide		0.3893	U	0.3893	U			CA

Chen-Northern, Inc.

GRAIN SIZE DISTRIBUTION CURVE

Project: ANL Baseline

Location: STF-1 & 2-S 0.0 - 1.5 feet

Classification _____

Moisture Content _____ %

Liquid Limit _____ %

Sample No. _____

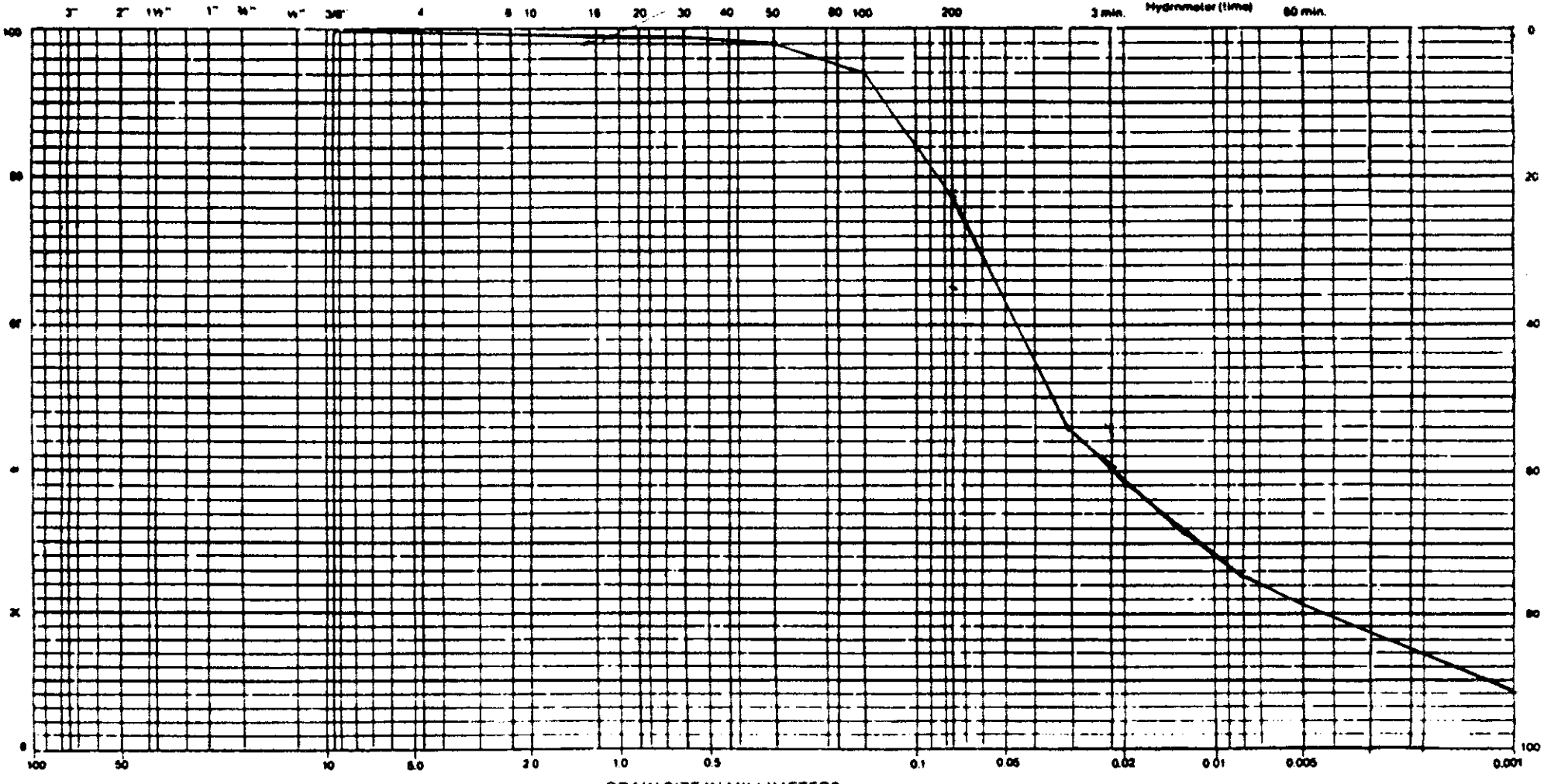
Job No. 188-1444

Date 10/6/88

Plasticity Index _____ %

Coefficient of Uniformity $= C_U = \frac{D_{60}}{D_{10}} =$ _____

Coefficient of Curvature $= C_Z = \frac{(D_{30})^2}{D_{10} \times D_{60}} =$ _____



Gravel		Sand			Fines	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay

NET-106

Chen-Northern, Inc.

GRAIN SIZE DISTRIBUTION CURVE

Project: ANL Baseline

Location: STF-1 & 2-S 1.5 - 3.0 feet

Classification _____

Sample No. _____

Job No. 188-1444

Date 10/6/88

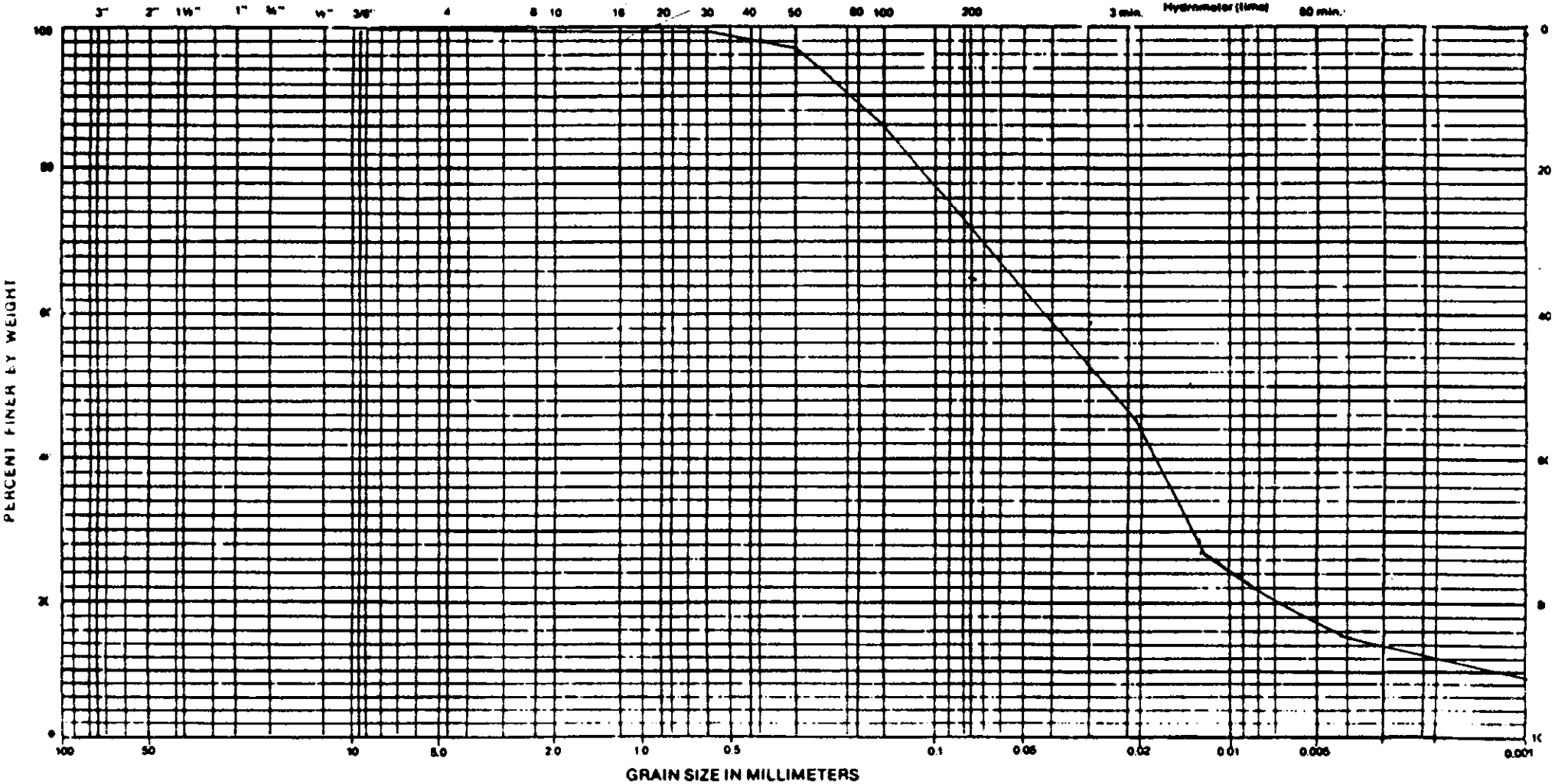
Moisture Content _____ %

Liquid Limit _____ %

Plasticity Index _____ %

Coefficient of Uniformity $= C_U = \frac{D_{60}}{D_{10}} =$ _____

Coefficient of Curvature $= C_Z = \frac{(D_{30})^2}{D_{10} \times D_{60}} =$ _____



Gravel		Sand			Fines	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay

Chen-Northern, Inc.

GRAIN SIZE DISTRIBUTION CURVE

Project: ANL Baleline

Location: STF-1 & 2-S 3.0 - 4.5 feet

Classification _____

Sample No. _____

Job No. 188-1444

Date 10/6/88

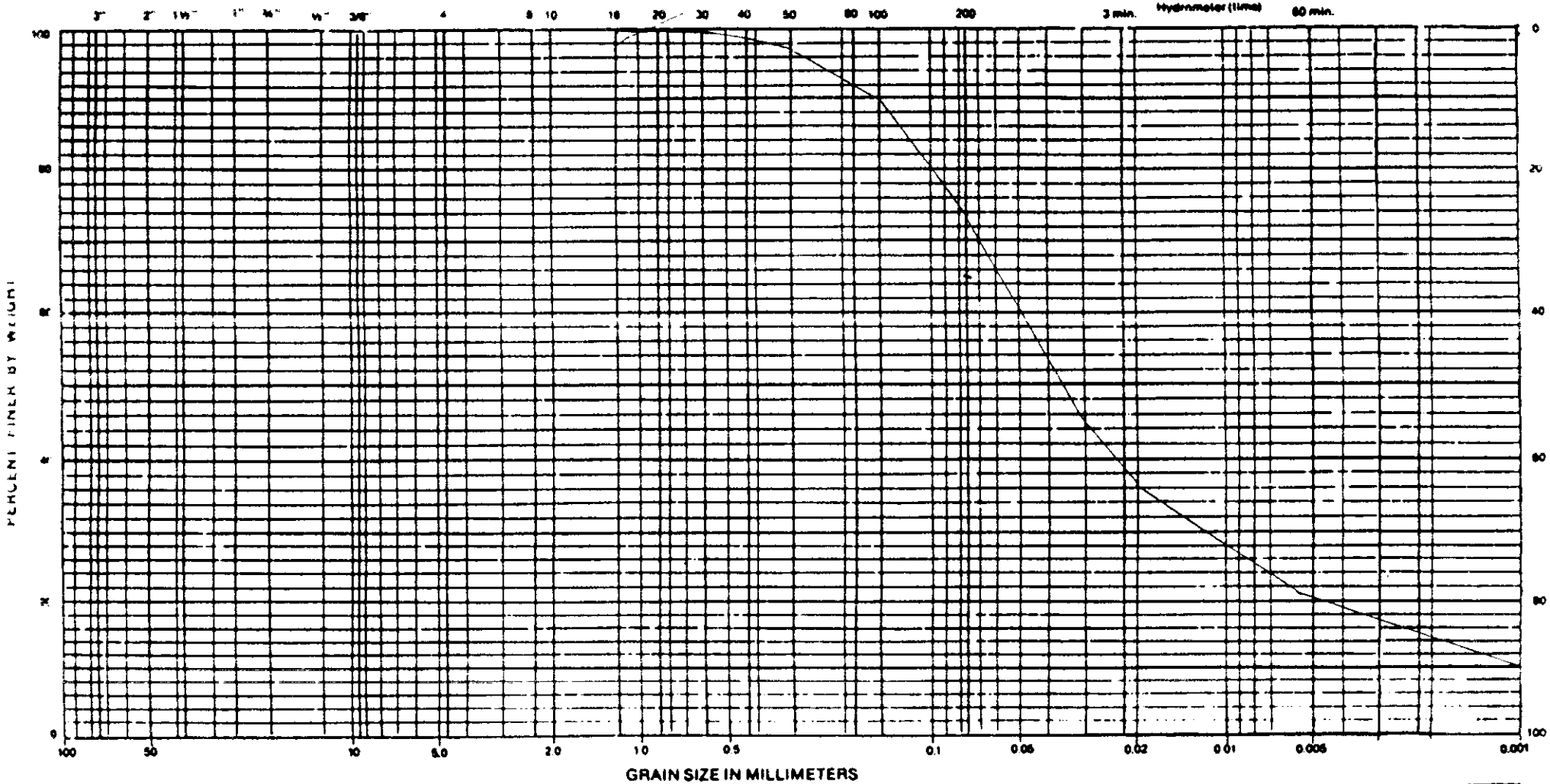
Moisture Content _____ %

Liquid Limit _____ %

Plasticity Index _____ %

Coefficient of Uniformity $= C_U = \frac{D_{60}}{D_{10}} =$ _____

Coefficient of Curvature $= C_Z = \frac{(D_{30})^2}{D_{10} \times D_{60}} =$ _____



Gravel		Sand			Fines	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay

NET-105

Chen-Northern, Inc.

GRAIN SIZE DISTRIBUTION CURVE

Project: ANL Baseline

Location: STF-1 & 2-S 4.5 - 6.0 feet

Classification _____

Sample No. _____

Job No. 188/1444

Date 10/7/88

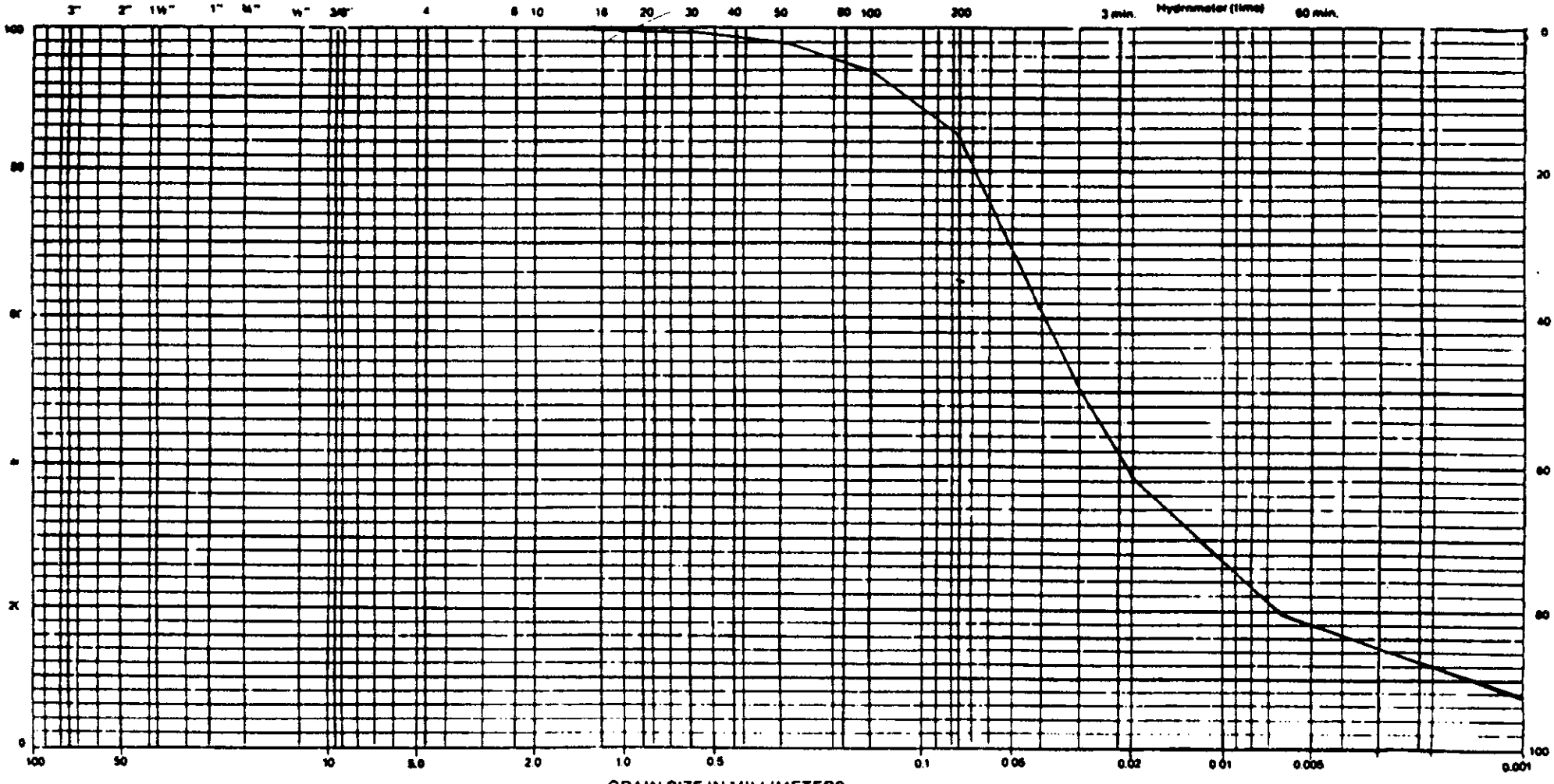
Moisture Content _____ %

Liquid Limit _____ %

Plasticity Index _____ %

Coefficient of Uniformity $= C_U = \frac{D_{60}}{D_{10}} =$ _____

Coefficient of Curvature $= C_Z = \frac{(D_{30})^2}{D_{10} \times D_{60}} =$ _____



Gravel		Sand			Fines	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay

NET-

Chen-Northern, Inc.

GRAIN SIZE DISTRIBUTION CURVE

Project: ANL Baseline

Location: STF-1 & 2-S 6.0 - 7.5 feet

Classification _____

Sample No. _____

Job No. 188-1444

Date 10/7/88

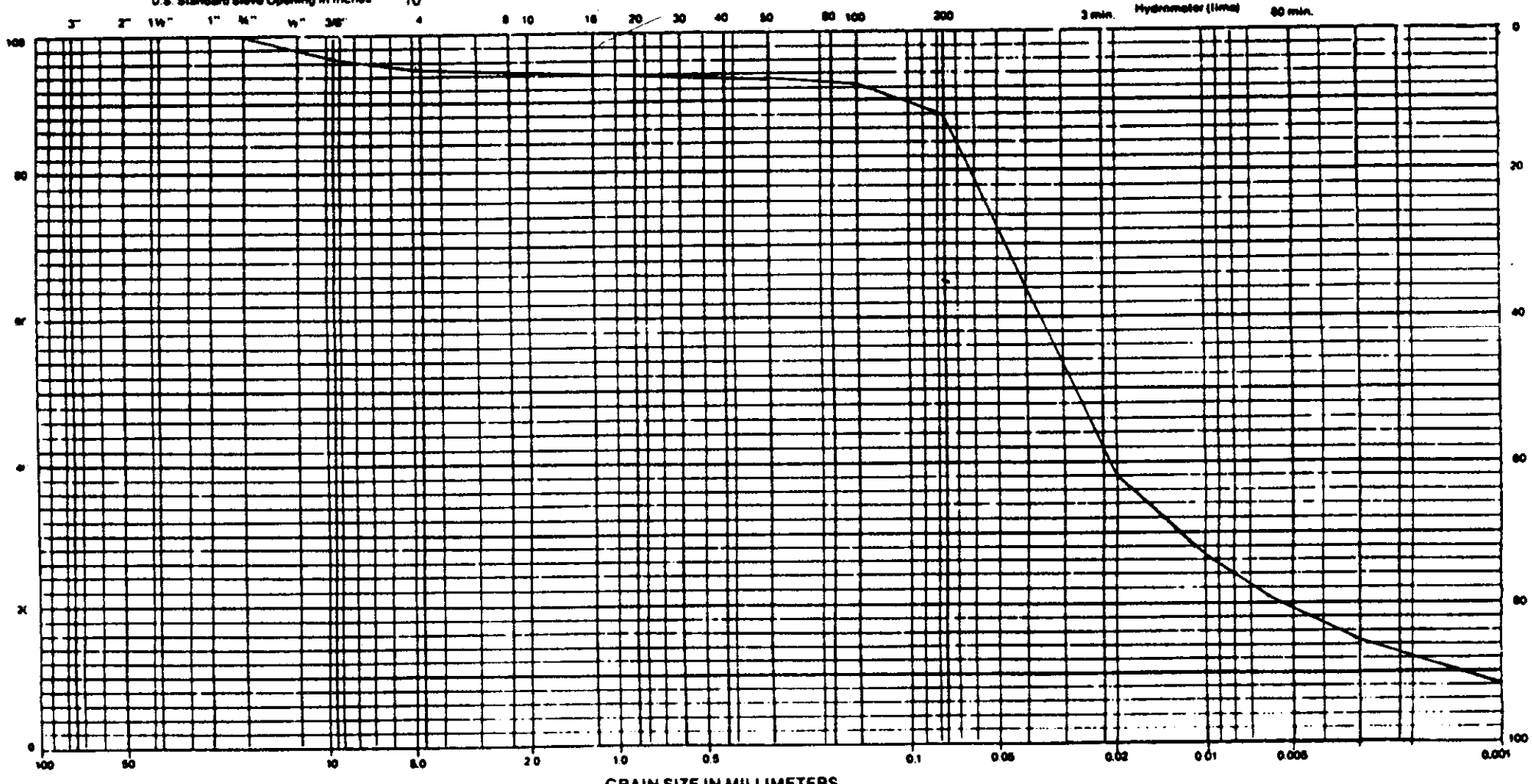
Moisture Content _____ %

Liquid Limit _____ %

Plasticity Index _____ %

Coefficient of Uniformity $= C_U = \frac{D_{60}}{D_{10}} =$ _____

Coefficient of Curvature $= C_Z = \frac{(D_{30})^2}{D_{10} \times D_{60}} =$ _____



Gravel		Sand			Fines	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay

NET-105

Chen-Northern, Inc.

GRAIN SIZE DISTRIBUTION CURVE

Project: ANL Baseline

Location: NWC-1 & 2-S 0.0 - 1.5 feet

Classification _____

Moisture Content _____ %

Liquid Limit _____ %

Sample No. _____

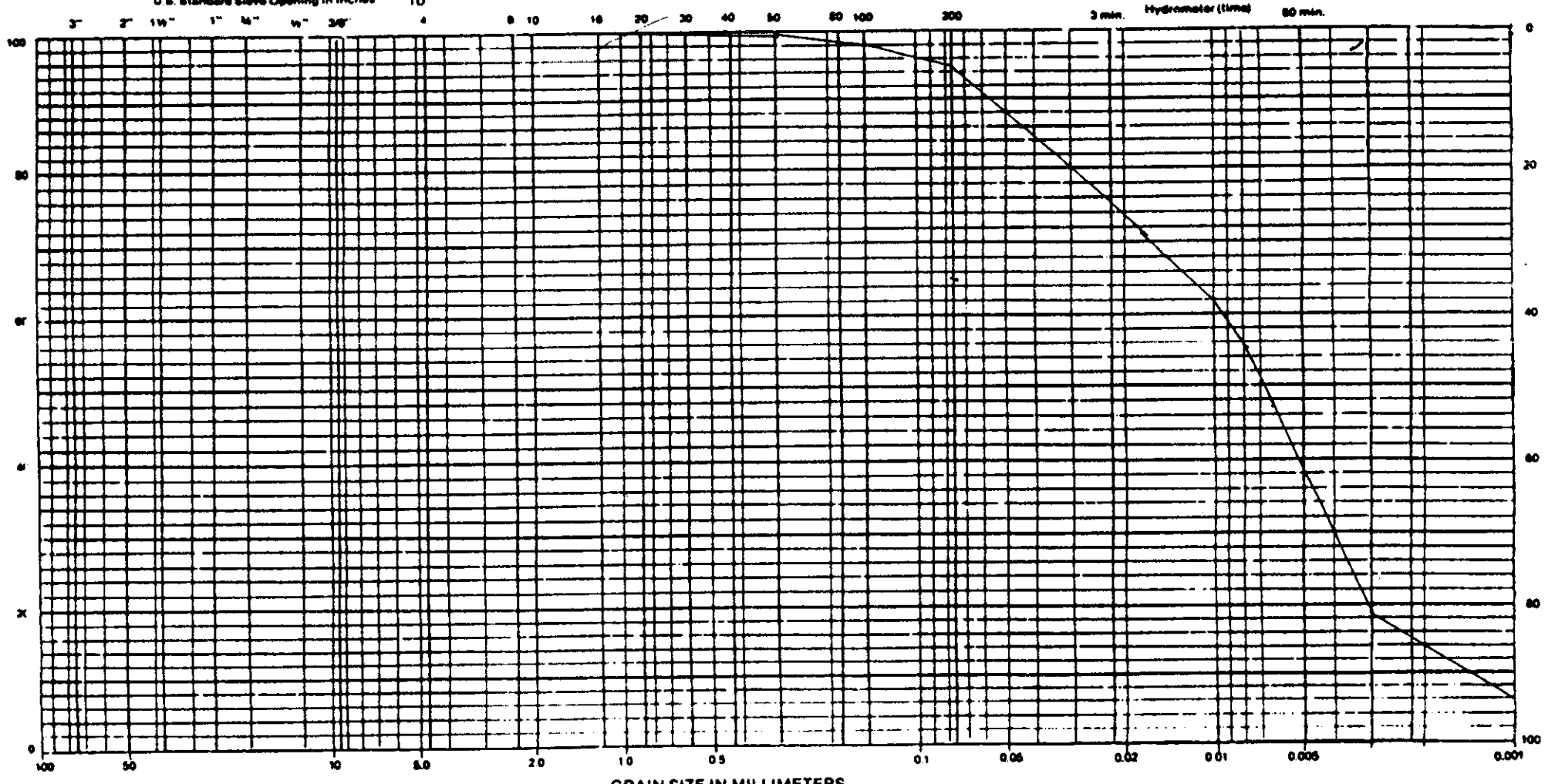
Job No. 188-1444

Date 10/7/88

Plasticity Index _____ %

Coefficient of Uniformity $= C_U = \frac{D_{60}}{D_{10}} =$ _____

Coefficient of Curvature $= C_Z = \frac{(D_{30})^2}{D_{10} \times D_{60}} =$ _____



Gravel		Sand			Fines	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay

NE

Chen-Northern, Inc.

GRAIN SIZE DISTRIBUTION CURVE

Project: ANL Baseline

Location: NWC-1 & 2-S 1.5 - 3.0 feet

Classification _____

Sample No. _____

Job No. 188-1444

Date 10/7/88

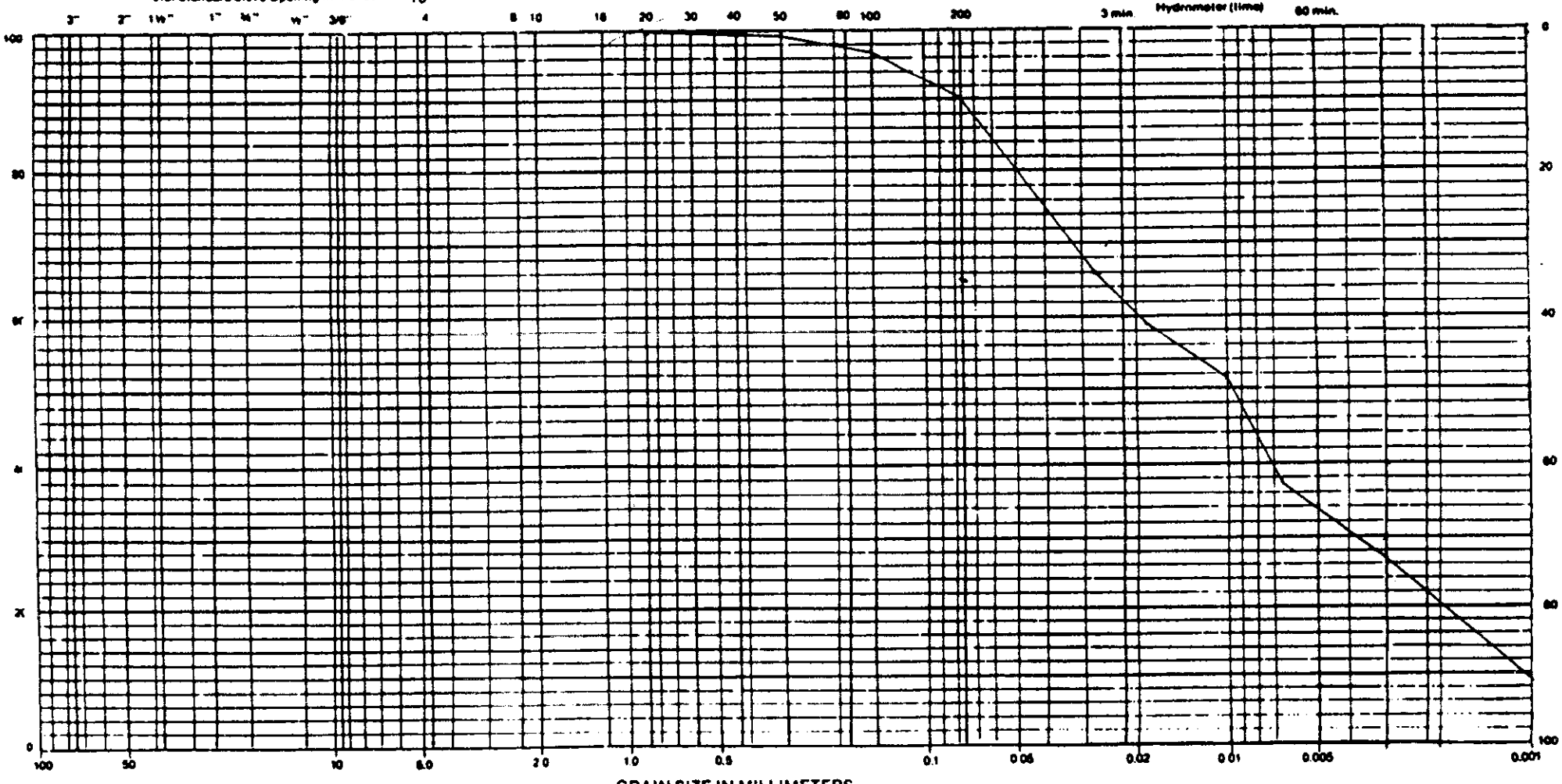
Moisture Content _____ %

Liquid Limit _____ %

Plasticity Index _____ %

Coefficient of Uniformity $= C_U = \frac{D_{60}}{D_{10}} =$ _____

Coefficient of Curvature $= C_Z = \frac{(D_{30})^2}{D_{10} \times D_{60}} =$ _____



Gravel		Sand			Fines	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay

NET-105

Chen-Northern, Inc.

GRAIN SIZE DISTRIBUTION CURVE

Project: ANL Baseline

Location: NWC-1 & 2-S 3.0 - 4.5 feet

Classification _____

Moisture Content _____ %

Liquid Limit _____ %

Sample No. _____

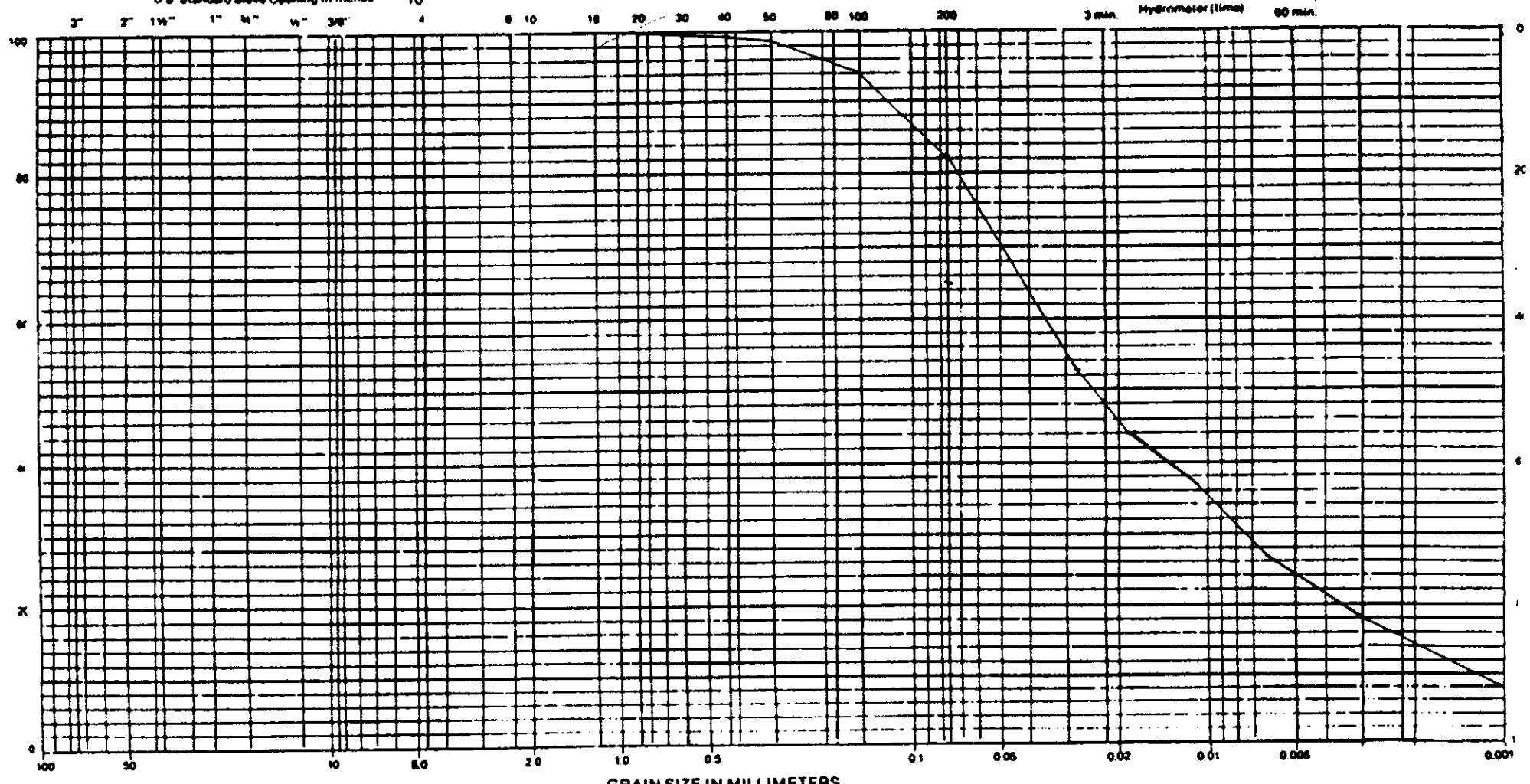
Job No. 188-1444

Date 10-7-88

Plasticity Index _____ %

Coefficient of Uniformity $= C_U = \frac{D_{60}}{D_{10}} =$ _____

Coefficient of Curvature $= C_Z = \frac{(D_{30})^2}{D_{10} \times D_{60}} =$ _____



Gravel		Sand			Fines	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay

Chen-Northern, Inc.

GRAIN SIZE DISTRIBUTION CURVE

Project: ANL Baseline

Location: NWC-1 & 2-S 4.5 - 6.0 feet

Classification

Sample No.

Job No. 188-1444

Date 10/7/88

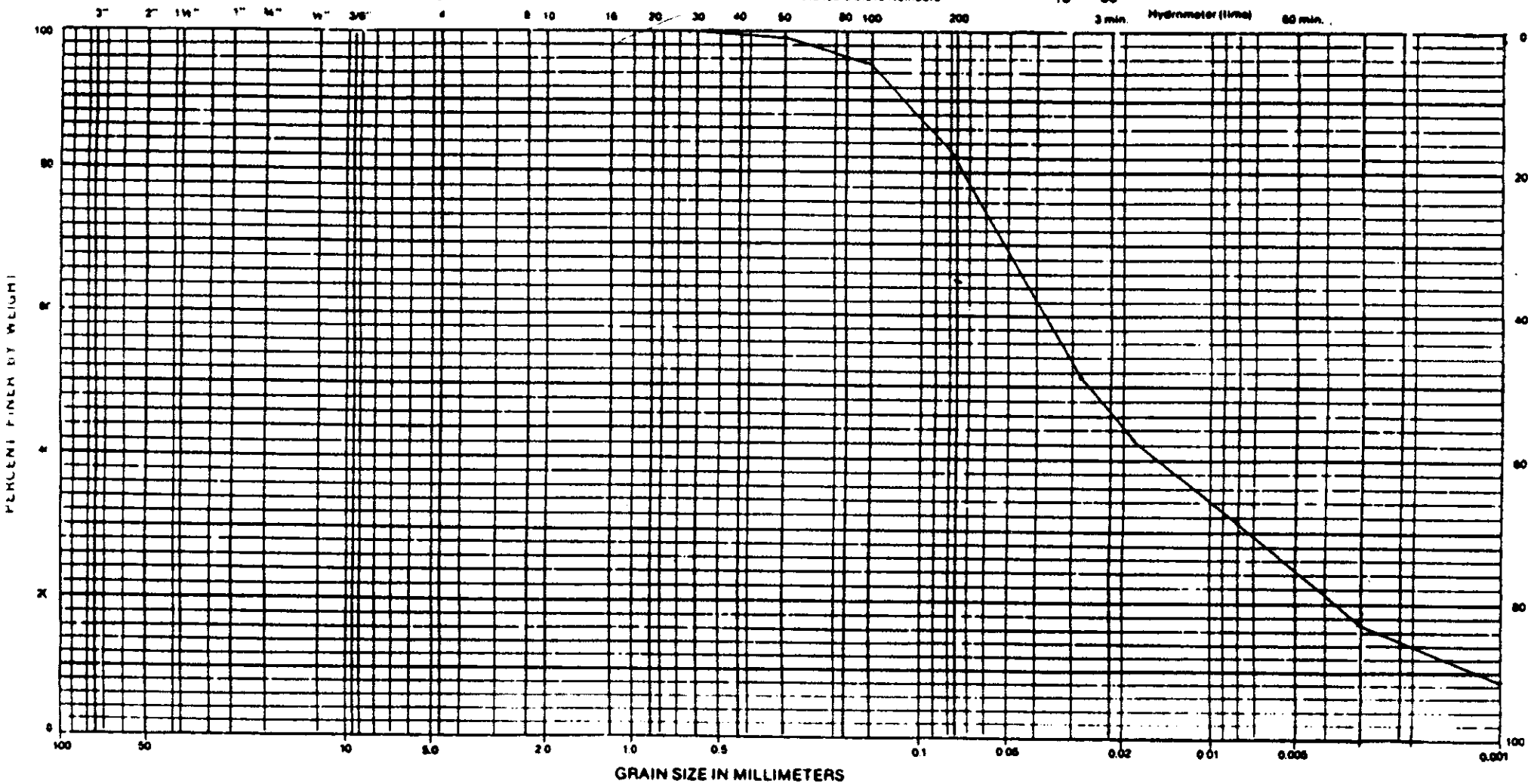
Moisture Content _____ %

Liquid Limit _____ %

Plasticity Index _____ %

Coefficient of Uniformity $= C_U = \frac{D_{60}}{D_{10}} =$ _____

Coefficient of Curvature $= C_Z = \frac{(D_{30})^2}{D_{10} \times D_{60}} =$ _____



Gravel		Sand			Fines	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay

NET-105

Chen-Northern, Inc.

GRAIN SIZE DISTRIBUTION CURVE

Project: ANL Baseline

Location: NWC-1 & 2-S 6.0 - 7.5

Classification

Sample No.

Job No. 188-1444

Date 10/7/88

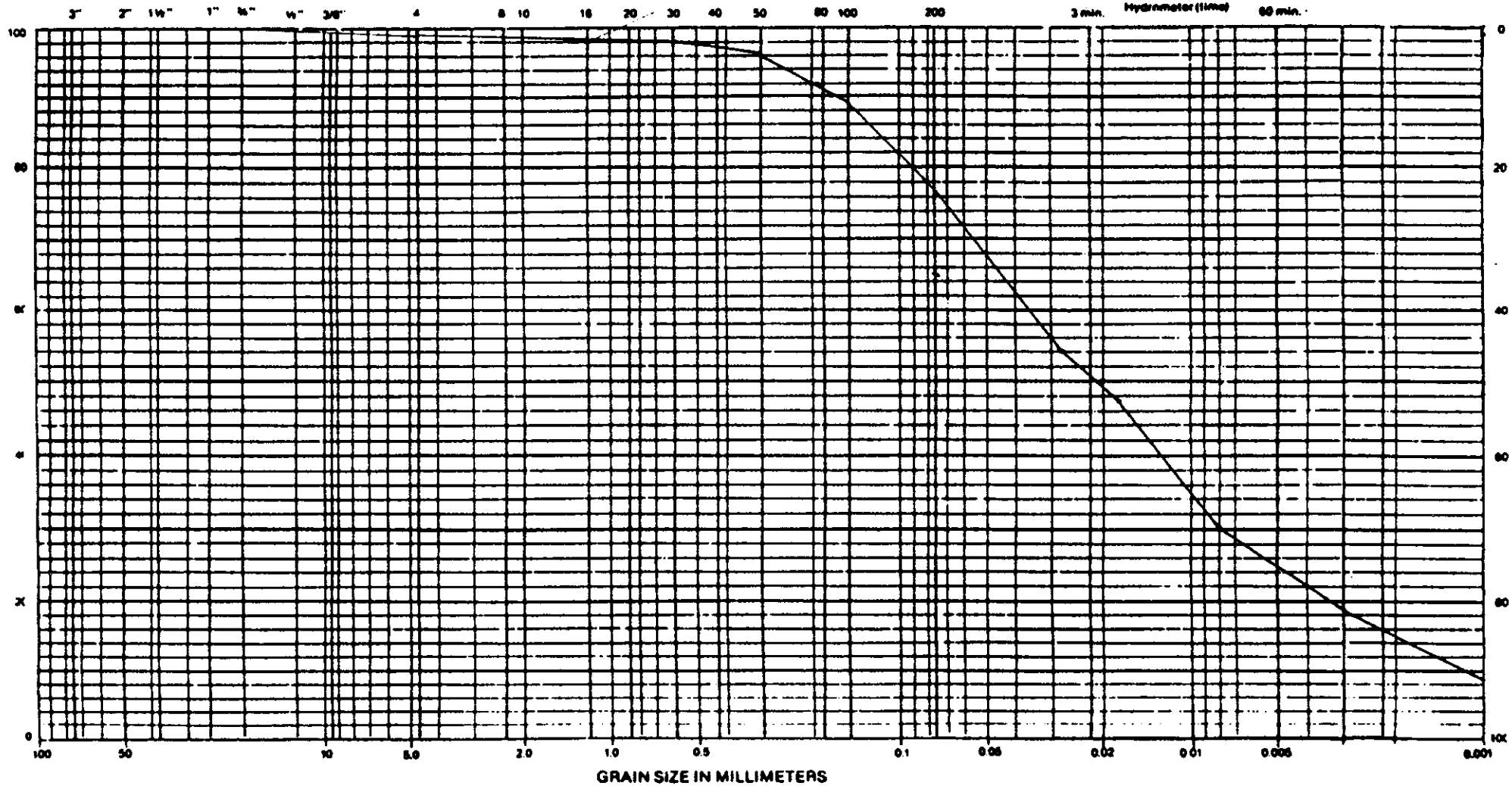
Moisture Content _____ %

Liquid Limit _____ %

Plasticity Index _____ %

Coefficient of Uniformity $= C_U = \frac{D_{60}}{D_{10}} =$ _____

Coefficient of Curvature $= C_Z = \frac{(D_{30})^2}{D_{10} \times D_{60}} =$ _____



Gravel		Sand			Fines	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay

MET-105