



Park West Two  
Cliff Mine Road  
Pittsburgh, PA 15275  
412-788-1080

C-34-9-4-156

200183  
3.2.26

September 13, 1984

Mr. Edward L. Taylor  
U.S. Environmental Protection Agency  
Region I  
Environmental Services Division  
60 Westview Street  
Lexington, Massachusetts 01273

*HYPO?*  
*5*

Subject: Cannon Engineering, Bridgewater Inorganic Data Validation for  
Samples: MA-0091; MA-0092; MA-079; MA-0093;

Dear Mr. Taylor:

Inorganic results for soil samples MA-0091; MA-0092; MA-0093; from the Cannon Engineering, Bridgewater Site, as submitted by, Chemtech were reviewed to insure the validity of the data. This evaluation was based on level one analysis and considered the following:

- Data Completeness
- Holding Times
- Laboratory blank analysis
- Matrix spike results
- Laboratory Duplicate Results
- Calibration Verification
- Interference QC results
- Detection Limits

The laboratory submitted data package contained the pertinent information requested to assess the accuracy and precision of the soil samples sent for analysis.

Values of all elements should be accepted since all validation criteria were met, except for zinc.

Zinc values should be approximated (J'd), because the RPD value for the duplicates was 50%. This RPD is significant since the zinc concentration in the duplicates were more than an order of magnitude higher (195 and

00293

NOTICE: If the film image is less clear than this notice, it is due to the quality of the document being filmed.

CANNON ENGINEERING (BRIDGEWATER)  
ADMINISTRATIVE RECORD

CAN 001

0439

F

C-34-9-4-156

Mr. Edward L. Taylor  
U.S. Environmental Protection Agency  
September 13, 1984 - Page Two

325 mg/l) than the laboratory detection limit for this element (10 mg/l). The values should, however, not be rejected because the zinc values in these three soil samples were relatively low (32.5, 37 and 9.8 mg/kg) and considering that the drinking water criteria (based on taste and odor quality of ambient water) is 5,000 mg/l.

Very truly yours,

*Haia Roffman*  
Haia Roffman, Ph.D.

HKR/dmr

Attachments

I hereby acknowledge receipt and approval of the NUS/REMPO Level I data validation for Cannon Engineering Bridgewater inorganic samples MA-0091; MA-0092; MA-0093; Chemtech.

\_\_\_\_\_  
Deputy Project Officer

00294

NOTICE: If the film image is less clear than this notice, it is due to the quality of the document being filmed.

CANNON ENGINEERING (BRIDGEWATER)  
ADMINISTRATIVE RECORD

CAN 001

0440

NOTICE: If the film image is less clear than this notice, it is due to the quality of the document being filmed.

CANON ENGINEERING (BRIDGEWATER)  
ADMINISTRATIVE RECORD

CAN 001

0441

Project Name \_\_\_\_\_  
TDD NO. \_\_\_\_\_

Quality Assurance Review  
of  
Inorganic Analysis Lab Data Package

SMO Case No. 1023 SHS No. \_\_\_\_\_  
Contract Lab 1011-1012 Contract No. 937064  
Reviewer John H. [unclear] Review Date Sept 7 1984

Low Level ✓ Med Level \_\_\_\_\_ High Level \_\_\_\_\_ Soil/Sed \_\_\_\_\_  
Water \_\_\_\_\_ Waste \_\_\_\_\_

Applicable Sample No: \_\_\_\_\_

The inorganic analytical data for this case has been reviewed. The quality assurance evaluation is summarized in the following table:

	Task I	Task II	Task III	CN <sup>+</sup>	NH <sub>3</sub>	S <sup>-2</sup>
Data completeness	A	A				
Lab Blank Analysis	A	A				
Blind Blank Analysis						
Matrix Spike Results	A	A				
Blind Spike Results						
Lab Duplicate Results	A <sup>x</sup>	A				
Split Sample Results						
Holding Times	A	I-				
Std. Addition Results						
Calibration Verification	A	I-				
Interference QC Results	A <sup>+</sup>					
Detection Limit Results	A	I-				
Instrument Sensitivity Results						

A = Acceptable  
P = Provisional  
U = Unacceptable

Comments: \* Zinc values around 100000005  
was 54% of the way through sample 105030  
4th time at detection limit (10,000) - 100000005  
\* 1st previous det. at 100000005

**PRIORITY POLLUTANT  
INORGANIC ELEMENTS**

002206

--	--	--	--	--	--	--	--	--	--

**(TASK 1)**

Aluminum  
Chromium  
Barium  
Beryllium  
Cobalt  
Copper  
Iron  
Nickel  
Manganese  
Zinc  
Boron  
Vanadium  
Silver

	29.6	1555							
	2.7	26.1	2.1						
			16.7						
			56.25						
			2.2						
			3.2						
			12.75						
			2.5						
			54.7						
			4.0						
			<10						
			51.5						

**(TASK 2)**

Arsenic  
Antimony  
Selenium  
Thallium  
Mercury  
Tin  
Cadmium  
Lead

		1.1							
		0.1	2.6						
			5.1						
			2.1						
			1.6						
			1.5						
			4.7						

**(TASK 3)**

Ammonia  
Cyanide  
Sulfide


002206

0442

CAN 001

CANNON ENGINEERING (BRIDGEWATER)  
ADMINISTRATIVE RECORD

NOTICE: If the film image  
is less clear than this  
notice, it is due to the  
quality of the document  
being filmed

Q. C. Report No. 268

## BLANKS

LAB NAME CHEMTECH  
DATE 7/27/54 D.H.CASE NO. 2983  
UNITS mg/l

Preparation Compound	Initial Calibration Blank Value	Continuing Calibration <sup>1</sup> Blank Value				Preparation Blank	
		1	2	3	4	1	2
<b>Metals:</b>							
1. Aluminum	<100		NR			<100	<100
2. Antimony	<20		"			<20	<20
3. Arsenic	<10		"			<10	<10
4. Barium	<100		"			<100	<100
5. Beryllium	<5		"			<5	<5
6. Cadmium	<1		"			<1	<1
7. Calcium	NR		"				
8. Chromium	<10		"			<10	<10
9. Cobalt	<50		"			<50	<50
10. Copper	<50		"			<50	<50
11. Iron	<50		"			<50	<50
12. Lead	<5		"			<5	<5
13. Magnesium	NR		"				
14. Manganese	<10		"			<10	<10
15. Mercury	<0.2		"			<0.2	<0.2
16. Nickel	<40		"			<40	<40
17. Potassium	NR		"				
18. Selenium	<2		"			<2	<2
19. Silver	<10		"			<10	<10
20. Sodium	NR		"				
21. Thallium	<10		"			<10	<10
22. Tin	<20		"			<20	<20
23. Vanadium	<200		"			<200	<200
24. Zinc	<10		"			<10	<10
<b>Other:</b>							
Cyanide	NR		"				

1 Not required at this time

00297

NOTICE: If the film image is less clear than this notice, it is due to the quality of the document being filmed.

CANON ENGINEERING (ENDOWMERS)  
ADMINISTRATIVE RECORD

CAN 001

0443

Q. C. Report No. 268

page 10 of 16

## SPIKE SAMPLE RECOVERY

NAME CHEMTECH  
DATE 7/27/84 D.H.CASE NO. 2983  
EPA Sample No. MA 0093  
Lab Sample ID No. 268-03  
Units ug/LMatrix L.S.

Compound	Control Limit	Spiked Sample Result (SSR)	Sample Result (SR)	Spiked Added (SA)	%R
Metals:					
1. Aluminum	80-120	75100	26700	50,000	96.8
2. Antimony	75-125	154	<20	150	102.6
3. Arsenic	75-125	130	22	100	108.0
4. Barium	80-120	665	214	500	90.2
5. Beryllium	80-120	57	<5 (<2)	25 <sup>SA</sup> 50	114.0
6. Cadmium	75-125	6.6	2.5 (1.9)	4.0	102.5
7. Calcium	NR				
8. Chromium	80-120	114	62	50	104.0
9. Cobalt	80-120	300	<50 (<20)	250	120.0
10. Copper	80-120	296	76	250	88.0
11. Iron	80-120	86000	38000	50,000	96.0
12. Lead	75-125	47	9.5 (1.2)	50	75.0
13. Magnesium	NR				
14. Manganese	80-120	1200	693	500	101.4
15. Mercury	75-125	2.0	<0.2	2.0	100.0
16. Nickel	80-120	330	49	250	112.4
17. Potassium	NR				
18. Selenium	75-125	18	<2	20	90.0
19. Silver	80-120	41	<10 (<5)	50	82.0
20. Sodium	NR				
21. Thallium	75-125	60	<10	75	80.0
22. Tin	75-125	154	<20	150	106.0
23. Vanadium	80-120	1080	<200 (<100)	1000	108.0
24. Zinc	80-120	240	195	50	90.0

Other:  
Cyanide N.R. 80-120

1 %R = [(SSR - SR)/SA] x 100

Comments: ▲ DUPLICATE SAMPLE WAS SPIKED.

00298

Form V

NOTICE: If the film image is less clear than this notice it is due to the quality of the document being filmed.

CANON ENGINEERING (SEIDENMAYER)  
ADMINISTRATIVE RECORD

CAN 001

0444

Q. C. Report No. 2983

## DUPLICATES

LAB NAME CHEMTECH  
DATE 7/27/84 D.H.CASE No. 2983  
EPA Sample No. MA-0092  
Lab Sample ID No. 268-02  
Units ug/lMatrix L.S.

Compound	Control Limit <sup>1</sup>	Sample(S)	Duplicate(D)	RPD <sup>2</sup>
Metals:				
1. Aluminum		26700	29000	- 8.3
2. Antimony		< 20	< 20	—
3. Arsenic		22	22	—
4. Barium		214	228	- 6.3
5. Beryllium		< 5	< 5	—
6. Cadmium		2.5	2.5	—
7. Calcium	NR			
8. Chromium		62	69	- 10.7
9. Cobalt		< 50	< 50	—
10. Copper		76	73	- 4.0
11. Iron		38000	43000	- 12.3
12. Lead		267	210	- 23.8
13. Magnesium	NR			
14. Manganese		673	783	+ 12.2
15. Mercury		< 0.2	< 0.2	—
16. Nickel		49	47	- 4.2
17. Potassium	NR			
18. Selenium		< 2	< 2	—
19. Silver		< 10	< 10	—
20. Sodium	NR			
21. Thallium		< 10	< 10	—
22. Tin		< 20	< 20	—
23. Vanadium		< 200	< 200	—
24. Zinc		195	325	(+ 50.0)

Other:  
Cyanide NR

\* Out of Control

1 To be added at a later date.

2 RPD =  $[(S - D) / ((S + D) / 2)] \times 100$ 

00299

Form VI

NOTICE: If the film image is less clear than this notice, it is due to the quality of the document being filmed.

CANON ENGINEERING (BRIDGEWATER)  
ADMINISTRATIVE RECORD

CAN 001

0445

Q. C. Report No. 268

EXHIBIT B  
Page 9 of 12

ICP INTERFERENCE CHECK SAMPLE

LAB NAME CHEMTECH  
DATE 7/27/84 D.H.

CASE NO. 2983  
Check Sample I.D. FC58  
Check Sample Source SYNTHETIC  
Units µg/L

Compound	Control Limits <sup>3</sup>		True <sup>2</sup>	Initial		Final	
	Mean <sup>1</sup>	2X Std. Dev.		Observed	SR	Observed	SR
Metals:							
1. Aluminum							
2. Antimony							
3. Arsenic							
4. Barium			500	440	88.0	441	88.2
5. Beryllium			500	483	96.6	490	98.0
6. Cadmium							
7. Calcium							
8. Chromium			500	430	86.0	446	89.2
9. Cobalt			500	395	79.0	409	81.8
10. Copper			500	640	128.0	656	131.2
11. Iron							
12. Lead							
13. Magnesium							
14. Manganese			500	412	82.4	452	90.4
15. Mercury							
16. Nickel			500	423	84.6	446	89.2
17. Potassium							
18. Selenium							
19. Silver			500	416	83.2	446	89.2
20. Sodium							
21. Thallium							
22. Tin							
23. Vanadium			500	424	84.8	457	90.2
24. Zinc			500	600	120.0	604	120.8

1 Mean value based on n = \_\_\_\_.

2 True value of EPA ICAP Quality Control Sample or contractor standard.

3 Not required at this time.

Form IV

00300

NOTICE: If the film image is less clear than this notice, it is due to the quality of the document being filmed.

CANON ENGINEERING (SHIMADZU)  
ADMINISTRATIVE RECORD

CAN 001

0446



C. Report No. 268

INITIAL AND CONTINUING CALIBRATION VERIFICATION

LAB NAME CHEMTECH

CASE NO. 2983

DATE 7/27/84 D.H.

UNITS μg/l

Compound Metals:	Control Limits		Initial Calib. <sup>1</sup>		Continuing Calibration <sup>2</sup>		
	ICP/AA	Furn.	True Value	SR	True Value	SR	SR
1. Aluminum	85-115		800	96.3	5000	144	101.8
2. Antimony		85-115	86.5	86.0	150	102.6	110.6
3. Arsenic		86-114	30	106.7	40	114.0	110.0
4. Barium	84-116		2000	99.6	5000	103.0	103.0
5. Beryllium		87-113	900	99.0	1000	105.0	105.0
6. Cadmium		80-120	5.0	114.0	3.75	109.3	104.0
7. Calcium	NR						
8. Chromium		88-112	250	100.4	5.000 <sup>104.2</sup>	104.2	104.2
9. Cobalt		78-122	600	103.8	1.000 <sup>103.0</sup>	103.0	103.0
10. Copper		83-117	350	102.8	10.000 <sup>101.2</sup>	101.2	101.2
11. Iron		88-112	900	96.8	5.000 <sup>106.2</sup>	106.2	106.2
12. Lead		78-122	48	87.5	75	93.3	89.3
13. Magnesium	NR						
14. Manganese		90-110	500	98.0	5000 <sup>106.0</sup>	106.0	106.0
15. Mercury		80-120	2.0	102.5	2.0	105.5	102.5
16. Nickel		89-111	300	98.6	10.000 <sup>103.0</sup>	103.0	103.0
17. Potassium	NR						
18. Selenium		85-115	20	100.0	20	100.0	100.0
19. Silver		80-120	49	98.0	1.000 <sup>103.0</sup>	103.0	103.0
20. Sodium	NR						
21. Thallium		88-112	50	112.0	1000 <sup>105.0</sup>	105.0	105.0
22. Tin		75-125	100	85.0	200	84.5	83.5
23. Vanadium		90-110	850	100.0	1.000 <sup>104.3</sup>	104.3	104.3
24. Zinc		75-125	400	102.0	10.000 <sup>101.5</sup>	101.5	101.5

Other: Cyanide NR 80-120

- 1 Initial Calibration Source SEE ATTACHED SHEET (TABULATED DETECTION LIMITS)
- 2 Continuing Calibration Source A.A. STANDARD

Form II

00301

NOTICE: If the film image is less clear than this notice, it is due to the quality of the document being filmed.

CANNON ENGINEERING (BRIDGEWATER) ADMINISTRATIVE RECORD

CAN 001

0447

Regiment Office  
Alexandria, Virginia 22313  
TS 8-337-2490

LABORATORY DETECTION LIMITS  
INORGANICS ANALYSIS DATA SHEET

LABORATORY NAME CHEMTECH CASE NO. \_\_\_\_\_  
QC REPORT NO. \_\_\_\_\_  
SAMPLE ID. NO. \_\_\_\_\_

TASK 1 (Elements to be identified and measured)

	<u>ug/l</u> or mg/kg (circle one)	<u>ug/l</u> or mg/l (circle one)
Aluminum	10	10
Bromine	50	50
Barium	5	50
Beryllium	0.5	
Cadmium	20	
Cobalt	20	
Copper	20	
Iron	5	
Lead	20	
Nickel	20	

  

11. Manganese	10
12. Zinc	50
13. Boron	50
14. Vanadium	

  

15. Calcium	
16. Magnesium	
17. Sodium	

TASK 2 (Elements to be identified and measured)

	<u>ug/l</u> or mg/kg (circle one)	<u>ug/l</u> or mg/l (circle one)
Arsenic	2	0.2
Antimony	10	20
Selenium	2	5
Thallium	10	

  

5. Mercury	20
6. Tin	5
7. Silver	

TASK 3 (Elements to be identified and measured)

	<u>ug/l</u> or mg/l (circle one)
1. Ammonia	
2. Cyanide	
3. Sulfide	

LABORATORY

00302

12/8-  
AS

NOTICE: If the film image is less clear than this notice, it is due to the quality of the document being filmed.

CANNON ENGINEERING (BENDOWATER)  
ADMINISTRATIVE RECORD

CAN 001

044B



Detection Limits Results

Detection limits were reported for all samples analyzed:

Yes \_\_\_\_\_ No \_\_\_\_\_

Exceptions: None

Detection limits were less than or equal to the required detection limits listed in: Yes

Exceptions: None

sample no.(s)	parameter	reported detection limit	required detection limit	Comments
---------------	-----------	-----------------------------	-----------------------------	----------

_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

Instrument Sensitivity Reports

Instrument sensitivity reports were documented for all parameters:

Yes \_\_\_\_\_ No

Comments: None

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

00304

NOTICE: If the film image is less clear than this notice, it is due to the quality of the document being filmed.

CANNON ENGINEERING (BIDDING) RECORD ADMINISTRATIVE RECORD

CAN 001

0450

NOTICE: If the film image is less clear than this notice, it is due to the quality of the document being filmed.

CANNON ENGINEERING (ENGINEERERS)  
ADMINISTRATIVE RECORD

CAN 001

0451 L

Initial Calibration Verification and Continuing Calibration Verification

Documentation indicates calibrations were performed and checked every ten samples:

Yes \_\_\_\_\_ No \_\_\_\_\_

Exceptions:

None

Calibrations and verifications were all within the control limits specified in

\_\_\_\_\_ : Yes  No \_\_\_\_\_

Outliers are listed below:

See Table 5

Parameter	Acceptable Range (%)	Calibration Identifier	% of True Value	Comments
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

Interference QC Results

Documentation indicates interference QC samples were run before and after every ten samples:

Yes \_\_\_\_\_ No \_\_\_\_\_

Exceptions:

None

Interference QC results were all within the control limits specified in

\_\_\_\_\_ : Yes \_\_\_\_\_ No \_\_\_\_\_

Exceptions:

Parameter	Acceptable Range (%)	Calibration Identifier	% of True Value	Comments
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

00005