UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION V

DATE: 8-20-86

SUBJECT: Precision and Accuracy of Analyses for Data Set SF 3413
Site: AMERICAN CHEMICAL SERVICE

FROM: Steve Parker,
CRL QC Coordinator

TO: Data User: _____

The Region V Central Regional Laboratory has completed its analyses of 14 (number) WATER (matrix type) samples for the parameters listed on the attached sheet. The discrete values reported on the result forms should be considered to be of the precision and accuracy levels listed.

PRECISION is a measure of reproducibility or the closeness with which individual measurements of the same property, under similar conditions agree with each other. It is expressed as the relative percent difference (RPD) or the absolute concentration difference (R') between duplicate analyses. The limit acceptable at the time of analysis is stated. QC data within these limits indicate that the analysis was in control for that set of data.

ACCURACY is a measure of the closeness of an individual measurement to the expected value. It can be expressed as percent recovery of a known spike or standard concentration, or as percent bias which is the deviation from the true value. The limits applicable at the time of analysis are stated. A 95% confidence interval means that 95% of the time, percent recovery will fall between those limts.

Attachment

TRANSMITTED BY
AUG 20 1986
U.S. EPA CENTRAL
REGIONAL LAB

PRECISION AND ACCURACY STATEMENT

Data Set: SF 3413 Matrix: WATER

Site Name: AMERICAN CHEMICAL SERVICE

| | PRECISION | | | ACCURACY | | |
|---|---|---|---|---|---|---|
| Parameter | RPD R' | Limit | Method of Quality Control | % Recovery % Bias | Limit | Method of Quality Control |
| CN | 1.4 µg/L | ≤5 µg/L | DUPLICATE CONTROL | 113 – 120% | 75-125% | CONTROL STANDARDS |
| Hg | 0.05 µg/L | <0.1 µg/L | " | 113% | 85-115% | SPIKED SAMPLE |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

COMMENT:

QC FLAGS:

American Chemical Service IND-016-360-165

American Chemical Service
IND-016-360-165
all to Pam - PP 8/20/86

8/18/86

SUPERFUND

ACTIVITY# C41100

**ENVIRONMENTAL PROTECTION AGENCY**
**FOR THE TEAM: MINERALS - NUTRIENTS**

DIVISION/BRANCH WMD: SHE-12 SAMPLE DATE 8/5/86 LAB ARRIVAL DATE 8/6/86 DUE DATE 8/27/86

DU NUMBER Y306 DATA SET NUMBER 3413 STUDY _____ PRIORITY N CONTRACTOR N

| CRL LOG NUMBER | SAMPLE DESCRIPTION | WATER PHENOLICS UG PHENOL/L MIN 74818 | WATER CYANIDE UG CN/L MIN 74919 | WATER GROSS ALPHA P CI/L MIN 75020 | WATER $CR^{+6}$ UG $CR^{+6}$/L MIN 74816 | WATER MERCURY UG HG/L MIN 74717 |
|---|---|---|---|---|---|---|
| 865501561 | 5-61561 | | ✓ K 5 * | | | |
| 865501D01 | 5-61581 | | ✓ K 5 * | | | |
| 865501R01 | 5-61585 | | ✓ K 5 * | | | |
| 865501S02 | 5-61553 | | ✓ K 5 * | | | |
| 865501S03 | 5-61609 | | ✓ K 5 * | | | |
| 865501S04 | 5-61597 | | ✓ K 5 * | | | |
| 865501S05 | 5-61601 | | ✓ K 5 * | | | |
| 865501S01 | 5-61560 | | | | | ✓ K0.1 |
| 865501D01 | 5-61580 | | * SCREENED | USING AUTO UV | | ✓ K0.1 |
| 865501R01 | 5-61584 | | METHOD # | 335.3 | | ✓ K0.1 |
| 865501S02 | 5-61551 | | R.G. Pano | | | ✓ K0.1 |
| 865501S03 | 5-61608 | | 8-7-86 | | | ✓ K0.1 |
| 865501S04 | 5-61596 | | | | | ✓ K0.1 |
| 865501S05 | 5-61600 | | | | | ✓ K0.1 |
| | | | | | | PP - ice 8/14/86 |
| | | | | | | |
| | | | | | | |
| | | | | | | |

Sample to SAL

American Chemical Service IND-016-360-165

American Chemical Service
IND-016-360-165

8/18/86

8/20/86

ACTIVITY# C41100
all ice PC - PC

SUPERFUND

**ENVIRONMENTAL PROTECTION AGENCY**
**FOR THE TEAM: MINERALS - NUTRIENTS**

DIVISION/BRANCH WMD: SHE-12 SAMPLE DATE 8/5/86 LAB ARRIVAL DATE 8/6/86 DUE DATE 8/27/86

DU NUMBER Y306 DATA SET NUMBER 3413 STUDY _____ PRIORITY N CONTRACTOR N

| CRL LOG NUMBER | SAMPLE DESCRIPTION | WATER PHENOLICS UG PHENOL/L MIN 74818 | WATER CYANIDE UG CN/L MIN 74919 | WATER GROSS ALPHA P CI/L MIN 75020 | WATER $CR^{+6}$ UG $CR^{+6}$/L MIN 74616 | WATER MERCURY UG HG/L MIN 74717 |
|---|---|---|---|---|---|---|
| 865501501 | 5-61561 | | ✓ K 5 * | | | |
| 865501D01 | 5-61581 | | ✓ K 5 * | | | |
| 865501R01 | 5-61585 | | ✓ K 5 * | | | |
| 865501S02 | 5-61553 | | ✓ K 5 * | | | |
| 865501S03 | 5-61609 | | ✓ K 5 * | | | |
| 865501S04 | 5-61597 | | ✓ K 5 * | | | |
| 865501S05 | 5-61601 | | ✓ K 5 * | | | |
| 865501S01 | 5-61560 | | | | | ✓ K0.1 |
| 865501D01 | 5-61580 | | * SCREENED | USING AUTO-UV | | ✓ K0.1 |
| 865501R01 | 5-61584 | | METHOD # | 335.3 | | ✓ K0.1 |
| 865501S02 | 5-61551 | | R.G. Pierce | | | ✓ K0.1 |
| 865501S03 | 5-61608 | | 8-7-86 | | | ✓ K0.1 |
| 865501S04 | 5-61596 | | | | | ✓ K0.1 |
| 865501S05 | 5-61600 | | | | | ✓ K0.1 |
| | | | | | | PP - ice 8/14/86 |
| | | | | | | |
| | | | | | | |
| | | | | | | |

for Samples to CRL

* REGRESSION ANALYSIS * CSC VERSION 2.00 *

NAME OF ANALYST ---: RAP
PARAMETER NAME ----: CN
DATE OF ANALYSIS --: 08-07-1986

DATA SET NUMBER ---: 3413/3314
DU NUMBER ---------: Y306/Y905

AUTO-UV SCREENING

DEGREE OF FIT : 1

EQUATION : CONCENTRATION = -3.41927E-01
+5.62636E-01 * SIGNAL

COEFFICIENT OF DETERMINATION : .9996276

T-A-B-L-E O-F S-T-A-N-D-A-R-D-S

| STANDARD | SIGNAL | CONCENTRATION | CALCULATED |
|---|---|---|---|
| 1 | +0.000 | +0.000 | -0.342 |
| 2 | +9.500 | +5.000 | +5.003 |
| 3 | +19.500 | +10.000 | +10.629 |
| 4 | +44.500 | +25.000 | +24.695 |
| 5 | +89.500 | +50.000 | +50.013 |

T-A-B-L-E O-F S-A-M-P-L-E-S

| SAMPLE I.D. | SIGNAL | CONCENTRATION | |
|---|---|---|---|
| BL | +0.000 | -0.342 | limit = ≤5 |
| AQC [TV=20.0] | +43.500 | +24.132 | limit = 20±5 |
| 86S501S01 | +0.000 | -0.342 | |
| S02 | +0.000 | -0.342 | |
| S03 | +0.000 | -0.342 | |
| S04 | +0.000 | -0.342 | |
| S05 | +0.000 | -0.342 | |
| D01 | +0.000 | -0.342 | |
| R01 | +0.000 | -0.342 | |
| 86FB08S91 | +0.000 | -0.342 | |
| R13 | +0.000 | -0.342 | |
| DUP S501S01 | +0.000 | -0.342 | |
| SPK S501S02 (+20) | +39.000 | +21.600 | 20±5 |
| BL | +0.000 | -0.342 | |
| AQC [TV=20.0] | +41.000 | +22.726 | |

* REGRESSION ANALYSIS * CSC VERSION 2.00 *

NAME OF ANALYST ---: PF
PARAMETER NAME ----: HG
DATE OF ANALYSIS --: 08-13-1986

DATA SET NUMBER ---: ED03424 / RCRA 3371 / WSB 3398 / SF 3407 / SF 3413
DU NUMBER ---------:

DEGREE OF FIT : 1

EQUATION : CONCENTRATION = -4.52654E-02
+5.09986E-02 * SIGNAL

COEFFICIENT OF DETERMINATION : .9993744

T-A-B-L-E 0-F S-T-A-N-D-A-R-D-S

| STANDARD | SIGNAL | CONCENTRATION | CALCULATED |
|---|---|---|---|
| 1 | +0.500 | +0.000 | -0.020 |
| 2 | +11.000 | +0.500 | +0.515 |
| 3 | +21.000 | +1.000 | +1.025 |
| 4 | +30.000 | +1.500 | +1.484 |
| 5 | +40.000 | +2.000 | +1.994 |

T-A-B-L-E 0-F S-A-M-P-L-E-S

| SAMPLE I.D. | SIGNAL | CONCENTRATION | |
|---|---|---|---|
| BLK | +0.500 | -0.020 | Limit = ≤0.1 |
| CS1 | +30.000 | +1.484 | Limit 1.5±0.2 |
| CS2 | +30.000 | +1.484 | " 1.5±0.2 |
| EPBLK | +0.500 | -0.020 | |
| S08 86EF10S08 | +1.000 | +0.005 | |
| S10 " | +9.000 | +0.413 | ED03424 (Primary I) |
| S11 " | +9.000 | +0.413 | |
| S12 " | +2.000 | +0.056 | |
| RCRABL | +11.000 | +0.515 | |
| " | +11.000 | +0.515 | DS + RCRA 3371 |
| " | +9.000 | +0.413 | |
| " | +11.000 | +0.515 | |
| CS1 | +31.000 | +1.535 | |
| CS2 | +29.000 | +1.433 | |
| S10 DUP correction | +10.000 | +0.464 | d ≤0.1 |
| S10SPK (+10) | +32.000 % rec: 112 | +1.586 | Limit 100±15% |
| B6PG01S20 | +0.000 | -0.046 | |
| S21 | +0.000 | -0.046 | |
| S22 | +0.000 | -0.046 | WSB 3398 |
| S23 | +1.000 | +0.005 | |
| S24 | +0.500 | -0.020 | |
| S25 | +3.000 | +0.107 | |
| S26 | +0.000 | -0.046 | |
| S27 | +0.000 | -0.046 | |
| B6SB4101S01 | +0.000 | -0.046 | |
| S02 | +0.000 | -0.046 | SF 3407 |
| S03 | +0.000 | -0.046 | |
| S04 | +0.000 | -0.046 | |
| D04 | +0.000 | -0.046 | |
| B6PG01S20DUP | +0.000 | -0.046 | Δ ≤0.1 |
| B6SS01S01 | +0.000 | -0.046 | |
| S02 | +0.000 | -0.046 | |
| S03 | +0.000 | -0.046 | SF 3413 |
| S04 | +0.000 | -0.046 | |
| S05 | +0.000 | -0.046 | |
| D01 | +0.000 | -0.046 | |
| R01 | +0.000 | -0.046 | |
| S5D1S01DUP | +0.000 | -0.046 | |
| S5D1S01SPK | +23.000 | +1.127 | = 11370 rec. |
| CS1 | +30.000 | +1.484 | |
| CS2 | +30.000 | +1.484 | |

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION V

DATE: 9-9-86

SUBJECT: Precision and Accuracy of Analyses for Data Set SF 3413
Site: AMERICAN CHEMICAL SERVICE

FROM: Steve Parker,
CRL QC Coordinator

TO: Data User: _____

The Region V Central Regional Laboratory has completed its analyses of 7 (number) WATER (matrix type) samples for the parameters listed on the attached sheet. The discrete values reported on the result forms should be considered to be of the precision and accuracy levels listed.

PRECISION is a measure of reproducibility or the closeness with which individual measurements of the same property, under similar conditions agree with each other. It is expressed as the relative percent difference (RPD) or the absolute concentration difference (R') between duplicate analyses. The limit acceptable at the time of analysis is stated. QC data within these limits indicate that the analysis was in control for that set of data.

ACCURACY is a measure of the closeness of an individual measurement to the expected value. It can be expressed as percent recovery of a known spike or standard concentration, or as percent bias which is the deviation from the true value. The limits applicable at the time of analysis are stated. A 95% confidence interval means that 95% of the time, percent recovery will fall between those limts.

Attachment

TRANSMITTED BY
SEP 10 1986
U.S. EPA CENTRAL REGIONAL LAB

PRECISION AND ACCURACY STATEMENT

Data Set: SF 3413 Matrix: WATER

Site Name: AMERICAN CHEMICAL SERVICE

| | PRECISION | | | ACCURACY | | |
|---|---|---|---|---|---|---|
| Parameter | RPD R' | Limit | Method of Quality Control | ~~% Recovery~~ % Bias | Limit | Method of Quality Control |
| As | 0.2 µg/L | ≤4µg/L | CONTROL STDs | 93-94% | 90-110% | CONTROL STD |
| Pb | 1.2 µg/L | ≤4µg/L | " | 98-108% | " | " |
| Sb | 1.6 µg/L | " | " | 98-104% | " | " |
| Se | 1.0 µg/L | ≤2µg/L | " | 91-100% | " | " |
| Cd | 0.00 µg/L | ≤0.2µg/L | " | 99-100% | " | " |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

COMMENT:

QC FLAGS:

~~6TG805WUU7~~
6TGB05WUU7

American Chemical Service
IND-016-360-165
ACTIVITY # ~~C41100~~ C411J7

9/4/86 AJ
JM 3Sept86
9/9/86

**ENVIRONMENTAL PROTECTION AGENCY**
**FOR THE TEAM: METALS**

SUPERFUND

DIVISION/BRANCH WMD: SHE-12 SAMPLE DATE 8/5/86 LAB ARRIVAL DATE 8/6/86 DUE DATE 8/27/86

DU NUMBER Y306 DATA SET NUMBER 3413 STUDY _____ PRIORITY N CONTRACTOR N

| CRL LOG NUMBER | SAMPLE DESCRIPTION | TOTAL METALS WATER TOTAL ICAP UG/L MET111 | TOTAL METALS WATER AS UG/L MET181 | TOTAL METALS WATER PB UG/L MET1181 | TOTAL METALS WATER SB UG/L MET1201 | TOTAL METALS WATER SE UG/L MET1211 | TOTAL METALS WATER TL UG/L MET1221 |
|---|---|---|---|---|---|---|---|
| 865[redacted]01S01 | 5-61559 | ✓ | ✓ <2 | ✓ <2 8/20/86 JM | ✓ <2 | ✓ <2 | |
| 865[redacted]01 D01 | 5-61579 | ✓ | ✓ <2 | ✓ <2 JM 8/26 | ✓ <2 | ✓ <2 | |
| 865[redacted]01 R01 | 5-61583 | ✓ | ✓ <2 | ✓ <2 JM 8/26 | ✓ <2 | ✓ <2 | |
| 865[redacted]01 S02 | 5-61552 | ✓ | ✓ <2 | ✓ <2 JM <2 HMR 8/28/86 | ✓ <2 | ✓ <2 | |
| 865[redacted]01 S03 | 5-61607 | ✓ | ✓ <2 | ✓ <2 JM 8/26 | ✓ <2 | ✓ <2 | |
| 865[redacted]01 S04 | 5-61595 | ✓ | ✓ <2 | ✓ <2 JM 8/26 | ✓ <2 | ✓ <2 | |
| 865[redacted]01 S05 | 5-61599 | ✓ | ✓ <2 | ✓ <2 JM 8/26 | ✓ <2 | ✓ <2 | |
| | | | PM 8-29-86 | | 8-19-86 P.M. | 8-26-86 PM | |
| | | | MS 8-29-86 | | | | |

For Samples to CRL

6TGB05WUJ7 · 9/4/86
C41NJ7

JVM 359+84 9/9/86

ENVIRONMENTAL PROTECTION AGENCY
FOR THE TEAM: METALS

DIVISION/BRANCH SF - Enforcement SAMPLING DATE 8/5/86 LAB ARRIVAL DATE 8/6/86 DUE DATE 8/27/86

DU NUMBER Y306 DATASET NUMBER 3413 STUDY American Chemical Service PRIORITY N CONTRACTOR N

| CRL LOG NUMBER | SAMPLE DESCRIPTION | TOTAL METALS IN WATER TOTAL ICAP UG/L MET111 | TOTAL METALS IN WATER AS UG/L MET161 | TOTAL METALS IN WATER CD UG/L MET181 | TOTAL METALS IN WATER CR UG/L MET1101 | TOTAL METALS IN WATER PB UG/L MET1191 |
|---|---|---|---|---|---|---|
| 86550150 1 | 5-61559 | | | ✓ <0.1 | | |
| 86550100 1 | 5-61579 | | | ✓ <0.1 | | |
| 86550100 1 | 5-61583 | | | ✓ <0.1 | | |
| 86550150 2 | 5-61552 | | | ✓ <0.1 | | |
| 86550150 3 | 5-61607 | | | ✓ <0.1 | | |
| 86550150 4 | 5-61595 | | | ✓ <0.1 | | |
| 86550150 5 | 5-61599 | | | ✓ <0.1 | | |
| | | | | I.L | | |
| | | | | 8.22.86. | | |

0.005
0.261
0.565 S02
0.769
0.012
0.288
0.554 S03
0.834
-0.000
0.219

S04

0.422
0.659
0.006
0.212
0.427 D4
0.675
0.652
0.946
1.219 QC
1.541
0.005 Blank
0.005
0.249
0.474 S01
0.713
0.001
0.230
0.465 D01
0.696
0.001
0.262
0.542 R01
0.820
0.005
0.231
0.462 S02
0.692
0.006
0.242
0.455 S03
0.706
0.008
0.238
0.468 S04
0.700
0.016
0.259
0.485 S05
0.728
0.633
0.915 QC
1.200
1.501

SF3413

JLM
3Sept86

JVM
3 Sep 86

---

* FLAMELESS * CSC VERSION 1.00 *

---

NAME OF ANALYST ---: M.S./P.M.
DATE OF ANALYSIS --: 08-29-1986
PARAMETER NAME ----: AS
DATA SET # --------: SF3413 American Chemical Service

---

| SAMPLE NO. | CONC. | R VALUE | SLOPE | |
|---|---|---|---|---|
| Q.C. Last wheel | 22.05781 | .9994 | 2.94 E-02 | -6.1% |
| S01 | .3363118 | .9998901 | .02349 | |
| D01 | 0 | .999989 | .0232 | |
| R01 | -.1571081 | .999874 | .02737 | |
| S02 | .1614343 | .9999889 | .02292 | |
| S03 | .2291418 | .9995473 | .02313 | |
| S04 | .3295793 | .9999979 | .02306 | |
| S05 | .7493628 | .9998962 | .02362 | |
| QC | 21.76877 | .9998814 | 2.889001E-02 | -7.4% |

---

S01

| SPIKE | MEASURED | CALC. | ERROR | PER CENT |
|---|---|---|---|---|
| 0 | .005 | 7.899963E-03 | 2.899964E-03 | 36.70857 % |
| 10 | .249 | .2428 | -6.200031E-03 | -2.553555 % |
| 20 | .474 | .4777 | 3.699958E-03 | .774536 % |
| 30 | .713 | .7126 | -4.000664E-04 | -.0561418 % |

D01

| SPIKE | MEASURED | CALC. | ERROR | PER CENT |
|---|---|---|---|---|
| 0 | .001 | 0 | -.001 | -1.701412E+38 % |
| 10 | .23 | .232 | 2.000019E-03 | .8620771 % |
| 20 | .465 | .4640001 | -9.999573E-04 | -.215508 % |
| 30 | .696 | .6960001 | 5.960465E-08 | 8.563885E-06 % |

R01

| SPIKE | MEASURED | CALC. | ERROR | PER CENT |
|---|---|---|---|---|
| 0 | .001 | -4.300049E-03 | -5.300049E-03 | 123.2556 % |
| 10 | .262 | .2694 | 7.399977E-03 | 2.746836 % |
| 20 | .542 | .5431 | 1.100004E-03 | .2025417 % |
| 30 | .82 | .8168 | -3.199995E-03 | -.3917721 % |

S02

| SPIKE | MEASURED | CALC. | ERROR | PER CENT |
|---|---|---|---|---|
| 0 | .005 | 3.700073E-03 | -1.299927E-03 | -35.13245 % |
| 10 | .231 | .2329 | 1.900017E-03 | .8158081 % |
| 20 | .462 | .4621 | 9.995699E-05 | 2.163103E-02 % |
| [illegible] | [illegible] | [illegible] | -7.000565E-04 | -.1012567 % |

JVM
3Sept86

S03

| SPIKE | MEASURED | CALC. | ERROR | PER CENT |
|---|---|---|---|---|
| 0 | .006 | 5.300049E-03 | -6.999513E-04 | -13.20651 % |
| 10 | .242 | .2366 | -5.399972E-03 | -2.282321 % |
| 20 | .455 | .4679 | .0129 | 2.756998 % |
| 30 | .706 | .6992 | -6.799996E-03 | -.9725395 % |

S04

| SPIKE | MEASURED | CALC. | ERROR | PER CENT |
|---|---|---|---|---|
| 0 | 8.000001E-03 | 7.600098E-03 | -3.999029E-04 | -5.261813 % |
| 10 | .238 | .2382001 | 2.000332E-04 | 8.397698E-02 % |
| 20 | .468 | .4688 | 7.999838E-04 | .170645 % |
| 30 | .7 | .6993999 | -6.000996E-04 | -8.580206E-02 % |

S05

| SPIKE | MEASURED | CALC. | ERROR | PER CENT |
|---|---|---|---|---|
| 0 | .016 | 1.769995E-02 | 1.699951E-03 | 9.604267 % |
| 10 | .259 | .2539 | -5.100042E-03 | -2.008682 % |
| 20 | .485 | .4901 | 5.099982E-03 | 1.0406 % |
| 30 | .728 | .7263 | -1.699984E-03 | -.2340609 % |

QC

| SPIKE | MEASURED | CALC. | ERROR | PER CENT |
|---|---|---|---|---|
| 0 | .633 | .6289 | -4.100084E-03 | -.6519455 % |
| 10 | .915 | .9178001 | 2.800048E-03 | .3050825 % |
| 20 | 1.2 | 1.2067 | 6.700158E-03 | .5552463 % |
| 30 | 1.501 | 1.4956 | -5.399704E-03 | -.3610392 % |

SF3381 Pac

0.302
0.587 FS08 RC3
0.898

0.003 Blank cup

0.097
0.359
0.616 S37
0.862

SF3406

0.024
0.285 S38
0.559
0.827

0.008
0.287 S39
0.570
0.844

Jvm
3Sept86

0.121
0.379
0.634 S40
0.899
0.123
0.374
0.634 D40
0.875
0.743
1.032
1.366 QC
1.656
-0.002 Blank cup
0.004 Blank
0.011
0.258 SF3407
0.495 S01
0.762
0.005
0.261 S02
0.505
0.769
0.012
0.288
0.554 S03
0.834
-0.000
0.219

S04

0.422
0.659
0.006
0.212 D4
0.427
0.675
0.652
0.946 QC
1.219
1.541
0.005 Blank
0.005

SF3413

BRABANT AUTO
4905 C48122
JRV 8/24/86

JVM
3 Sept 86

---

* FLAMELESS * CSC VERSION 1.00 *

---

NAME OF ANALYST ---: JRT
DATE OF ANALYSIS --: 08-27-1986
PARAMETER NAME ----: PB
DATA SET # --------: SF~~4313~~3413&SF3406

---

| SAMPLE NO. | CONC. | R VALUE | SLOPE |
|---|---|---|---|
| RBK | .6119603 | .998125 | .01438 <2 |
| AQC | 19.79544 (TV 18.3) | .9998716 | .01271 Δ 8.2 % |
| SF3413#S05 | 6.762364E-02 | .9998264 | .01183 |
| SF3406#R05 | .4133991 | .9999376 | .01403 |
| S35 | 1.557221 | .9953752 | 5.330001E-03 |
| ~~S36~~ | ~~1.234343~~ | ~~.9832548~~ | ~~.00559~~ |
| S36 | -1.506116E-02 | .9979153 | .00664 |
| S37 | -7.358241E-02 | .9924137 | 1.235454E-02 |
| S37 | 1.409952 | .996256 | 8.440001E-03 |
| S35DUP | .5714316 | .9991486 | 5.249999E-03 <2 |
| AQC | 19.16927 (TV=18.3) | .9964371 | .01276 Δ 5.0 % |

---

RBK

| SPIKE | MEASURED | CALC. | ERROR | PER CENT |
|---|---|---|---|---|
| 0 | 0 | 8.799988E-03 | 8.799988E-03 | 100 % |
| 10 | .169 | .1526 | -1.640002E-02 | -10.74707 % |
| 20 | .29 | .2964 | 6.399989E-03 | 2.159241 % |
| 30 | .439 | .4402 | 1.199961E-03 | .2725945 % |

AQC

| SPIKE | MEASURED | CALC. | ERROR | PER CENT |
|---|---|---|---|---|
| 0 | .252 | .2516 | -4.000366E-04 | -.1589971 % |
| 10 | .38 | .3787 | -1.300037E-03 | -.3432894 % |
| 20 | .502 | .5058 | 3.799975E-03 | .7512802 % |
| 30 | .635 | .6329 | -2.100051E-03 | -.331814 % |

SF3413#S05

| SPIKE | MEASURED | CALC. | ERROR | PER CENT |
|---|---|---|---|---|
| 0 | .003 | 7.999878E-04 | -2.200012E-03 | -275.0057 % |
| 10 | .115 | .1191 | 4.10001E-03 | 3.442493 % |
| 20 | .239 | .2374 | -1.599968E-03 | -.6739542 % |
| 30 | .356 | .3557001 | -2.999604E-04 | -8.432958E-02 % |

SF3406#R05

| SPIKE | MEASURED | CALC. | ERROR | PER CENT |
|---|---|---|---|---|
| 0 | .004 | 5.799988E-03 | 1.799988E-03 | 31.03433 % |

| | | | | |
|---|---|---|---|---|
| 10 | [illegible] | [illegible] | [illegible]034E-03 | -1.984966 % |
| 20 | .286 | .2863999 | 3.999174E-04 | .139636 % |
| 30 | .426 | .4267 | 6.999374E-04 | .164035 % |

S35

JVM 3Sept84

| SPIKE | MEASURED | CALC. | ERROR | PER CENT |
|---|---|---|---|---|
| 0 | .005 | 8.299988E-03 | 3.299988E-03 | 39.75895 % |
| 10 | .062 | .0616 | -4.000031E-04 | -.6493556 % |
| 20 | .124 | .1149 | -9.09999E-03 | -7.919922 % |
| 30 | .162 | .1682 | 6.200016E-03 | 3.686097 % |

S36

| SPIKE | MEASURED | CALC. | ERROR | PER CENT |
|---|---|---|---|---|
| 0 | .003 | 6.899979E-03 | 3.899979E-03 | 56.52161 % |
| 10 | .059 | 6.279998E-02 | 3.799975E-03 | 6.050918 % |
| 20 | .138 | .1187 | -1.930002E-02 | -16.2595 % |
| 30 | .163 | .1746 | 1.159999E-02 | 6.643751 % |

S36

| SPIKE | MEASURED | CALC. | ERROR | PER CENT |
|---|---|---|---|---|
| 0 | .003 | -1.000061E-04 | -3.100006E-03 | 3099.817 % |
| 10 | .059 | 6.629998E-02 | 7.299982E-03 | 11.01053 % |
| 20 | .138 | .1327 | -5.30003E-03 | -3.993995 % |
| 30 | .198 | .1991 | 1.099959E-03 | .5524658 % |

S37

| SPIKE | MEASURED | CALC. | ERROR | PER CENT |
|---|---|---|---|---|
| 0 | .005 | -9.09077E-04 | -5.909077E-03 | 650.0085 % |
| 10 | .101 | .1226364 | 2.163636E-02 | 17.6427 % |
| 20 | .257 | .2461818 | -.0108182 | -4.394394 % |
| 0 | .004 | -9.09077E-04 | -4.909077E-03 | 540.0068 % |

S37

| SPIKE | MEASURED | CALC. | ERROR | PER CENT |
|---|---|---|---|---|
| 0 | .004 | 1.189999E-02 | 7.899994E-03 | 66.38655 % |
| 10 | .11 | 9.630001E-02 | -1.369999E-02 | -14.22637 % |
| 20 | .177 | .1807 | 3.700018E-03 | 2.047602 % |
| 30 | .263 | .2651 | 2.100021E-03 | .7921616 % |

S35DUP

| SPIKE | MEASURED | CALC. | ERROR | PER CENT |
|---|---|---|---|---|
| 0 | .004 | 3.000015E-03 | -9.99985E-04 | -33.33267 % |
| 10 | .056 | 5.550001E-02 | -4.999973E-04 | -.9008959 % |
| 20 | .104 | .108 | 3.999993E-03 | 3.703698 % |
| 30 | .163 | .1605 | -2.500013E-03 | -1.55764 % |

AQC

| SPIKE | MEASURED | CALC. | ERROR | PER CENT |
|---|---|---|---|---|
| 0 | .25 | .2445999 | -5.400092E-03 | -2.207724 % |
| 10 | .374 | .3721999 | -1.80009E-03 | -.4836353 % |
| 20 | .48 | .4998 | 1.979995E-02 | 3.961575 % |
| 30 | .64 | .6274 | -1.260001E-02 | -2.008289 % |

Sm
3Sept86

Pb 8/27/13
SF 3413 & SF 3406

| | |
|---|---|
| | 0.002 |
| | -0.000 |
| | 0.000 AZ |
| | 0.000 |
| RBK | 0.169 |
| | 0.290 |
| | 0.439 |
| | 0.252 |
| AQC | 0.380 |
| | 0.502 |
| | 0.635 |
| SF3413 | 0.003 |
| | 0.115 |
| S05 | 0.239 |
| | 0.356 |
| SF3406 | 0.004 |
| | 0.149 |
| R05 | 0.286 |
| | 0.426 |
| | 0.005 |
| | 0.052 |
| S35 | 0.124 |
| | 0.162 |
| | 0.003 |
| S36 | 0.059 |
| | 0.139 |
| | 0.163 |
| | 0.000 |
| | 0.006 |
| | 0.005 |
| | 0.001 |
| | 0.003 |
| | 0.002 |
| | 0.000 |
| | 0.000 |
| | 0.002 |
| | 0.003 |
| | 0.001 |
| | -0.000 |
| | 0.007 |
| | 0.193 |
| | 0.005 |
| S37 | 0.101 |
| | 0.291 |
| | 0.257 |
| | 0.004 |
| DUP35 | 0.096 |
| | 0.104 |
| | 0.163 |
| | 0.250 |
| AQC | 0.374 |
| | 0.480 |
| | 0.640 |
| | 0.004 |
| S37. | 0.110 |
| | 0.177 |
| | 0.253 |
| | 0.002 |

JVM
35 ppb

Pb blank
Pb spiked

American chem services
Y30 C41J7
6TBB 05WVJ7

JRT
3 Sept 86

---

* FLAMELESS * CSC VERSION 1.00 *

---

NAME OF ANALYST ---: JRT
DATE OF ANALYSIS --: 08-28-1986
PARAMETER NAME ----: PB
DATA SET # --------: SF3413

---

| SAMPLE NO. | CONC. | R VALUE | SLOPE |
|---|---|---|---|
| RBK | .0872795 | .9996612 | 8.020001E-03 <2 |
| S01 | .3345702 | .9971516 | .00269 |
| D01 | -.147602 | .9990889 | .00271 |
| R01 | 1.506649 | .9962619 | .00677 |
| S02 | -.1562476 | .9970831 | .00256 |
| S03 | 1.003458 | .9961076 | .00289 |
| ~~S04~~ | ~~.2027074~~ | ~~.9695803~~ | ~~.00148~~ JR |
| S04 | -.3741517 | .9962955 | .00294 |
| S02DUP | .3703762 | .9980851 | 2.699999E-03 |
| ~~AQC~~ | ~~22.83785~~ | ~~.994544~~ | ~~5.919998E-03~~ JR |
| AQC | 18.21823 (18.3) | .9967306 | .00724 Δ 0.5% |

---

RBK

| SPIKE | MEASURED | CALC. | ERROR | PER CENT |
|---|---|---|---|---|
| 0 | 0 | 6.999817E-04 | 6.999817E-04 | 100 % |
| 10 | .08 | .0809 | 9.000003E-04 | 1.112485 % |
| 20 | .165 | .1611 | -3.899992E-03 | -2.420851 % |
| 30 | .239 | .2413 | 2.300039E-03 | .9531863 % |

S01

| SPIKE | MEASURED | CALC. | ERROR | PER CENT |
|---|---|---|---|---|
| 0 | .003 | 8.999939E-04 | -2.100006E-03 | -233.3356 % |
| 10 | .026 | .0278 | 1.799995E-03 | 6.474803 % |
| 20 | .052 | .0547 | 2.699994E-03 | 4.936003 % |
| 30 | .084 | .0816 | -2.400003E-03 | -2.941181 % |

D01

| SPIKE | MEASURED | CALC. | ERROR | PER CENT |
|---|---|---|---|---|
| 0 | .001 | -4.000015E-04 | -1.400002E-03 | 349.9991 % |
| 10 | .025 | .0267 | 1.699999E-03 | 6.367038 % |
| 20 | .053 | .0538 | 7.999987E-04 | 1.486986 % |
| 30 | .082 | .0809 | -1.100004E-03 | -1.359708 % |

R01

| SPIKE | MEASURED | CALC. | ERROR | PER CENT |
|---|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| 0 | [illegible] | [illegible] | [illegible] | [illegible] % |
| 10 | .067 | 7.790001E-02 | 1.090001E-02 | 13.99231 % |
| 20 | .15 | .1456 | -4.400015E-03 | -3.021989 % |
| 30 | .214 | .2133 | -7.000119E-04 | -.3281819 % |

SO2

| SPIKE | MEASURED | CALC. | ERROR | PER CENT |
|---|---|---|---|---|
| 0 | .002 | -3.999939E-04 | -2.399994E-03 | 600.0077 % |
| 10 | .022 | 2.520001E-02 | 3.200006E-03 | 12.69843 % |
| 20 | .05 | 5.080001E-02 | 8.000024E-04 | 1.574808 % |
| 30 | .078 | .0764 | -1.600005E-03 | -2.094247 % |

JVM
3Sept86

SO3

| SPIKE | MEASURED | CALC. | ERROR | PER CENT |
|---|---|---|---|---|
| 0 | .006 | 2.899994E-03 | -3.100006E-03 | -106.897 % |
| 10 | .028 | .0318 | 3.799997E-03 | 11.94968 % |
| 20 | .059 | .0607 | 1.699999E-03 | 2.800657 % |
| 30 | .092 | 8.960001E-02 | -2.399996E-03 | -2.678567 % |

SO4

| SPIKE | MEASURED | CALC. | ERROR | PER CENT |
|---|---|---|---|---|
| 0 | .002 | 3.000069E-04 | -1.699993E-03 | -566.6515 % |
| 10 | .016 | .0151 | -8.999966E-04 | -5.960241 % |
| 20 | .023 | .0299 | 6.900002E-03 | 23.07693 % |
| 30 | .049 | .0447 | -4.300002E-03 | -9.619692 % |

SO4

| SPIKE | MEASURED | CALC. | ERROR | PER CENT |
|---|---|---|---|---|
| 0 | .002 | -1.100006E-03 | -3.100006E-03 | 281.8172 % |
| 10 | .024 | .0283 | 4.299995E-03 | 15.19433 % |
| 20 | .057 | .0577 | 6.999932E-04 | 1.21316 % |
| 30 | .089 | .0871 | -1.900002E-03 | -2.181404 % |

SO2DUP

| SPIKE | MEASURED | CALC. | ERROR | PER CENT |
|---|---|---|---|---|
| 0 | .003 | 1.000015E-03 | -1.999985E-03 | -199.9954 % |
| 10 | .025 | 2.800001E-02 | 3.000004E-03 | 10.7143 % |
| 20 | .055 | .055 | -3.72529E-09 | -6.773256E-06 % |
| 30 | .083 | 8.199999E-02 | -1.00001E-03 | -1.219524 % |

AQC

| SPIKE | MEASURED | CALC. | ERROR | PER CENT |
|---|---|---|---|---|
| 0 | .141 | .1352 | -5.799994E-03 | -4.289936 % |
| 10 | .183 | .1944 | 1.139998E-02 | 5.86419 % |
| 20 | .259 | .2536 | -5.400032E-03 | -2.12935 % |
| 30 | .313 | .3127999 | -2.00063E-04 | -6.395877E-02 % |

HUC

| SPIKE | MEASURED | CALC. | ERROR | PER CENT |
|---|---|---|---|---|
| 0 | .13 | .1319 | 1.899973E-03 | 1.440465 % |
| 10 | .212 | .2043 | -7.700041E-03 | -3.768988 % |
| 20 | .267 | .2767 | 9.699971E-03 | 3.505592 % |
| 30 | .353 | .3491 | -3.900021E-03 | -1.117165 % |

JVM
3Sept86

Pb SF 34/3 8/27

| | | |
|---|---|---|
| | 0.061 | |
| | 0.000 | A2 |
| | -0.006 | |
| FBX | 0.080 | |
| | 0.165 | |
| | 0.237 | |
| SF34/3 | 0.003 | |
| | 0.026 | |
| S01 | 0.052 | |
| | 0.084 | |
| | 0.001 | |
| | 0.025 | |
| D01 | 0.053 | |
| | 0.082 | |
| | 0.016 | |
| R01 | 0.46 | |
| | 0.150 | |
| | 0.214 | |
| | 0.002 | |
| | 0.022 | |
| S02 | 0.050 | |
| | 0.078 | |
| | 0.031 | |
| | 0.029 | |
| X S03 | 0.060 | |
| | 0.069 | |
| | 0.002 | |
| | 0.023 | |
| X S04 | 0.016 | |
| | 0.049 | |
| | -0.040 | |
| | 0.031 | |
| S02DUP | 0.052 | |
| | 0.073 | |
| | 0.098 | |
| AQC | 0.179 | |
| | 0.292 | |
| | 0.321 | |
| 21 | 0.006 | |
| 22 | 0.028 | |
| 23 S03 | 0.059 | |
| 24 | 0.092 | |
| 25 | 0.002 | |
| 26 | 0.024 | |
| 27 S04 | 0.057 | |
| 28 | 0.089 | |
| 29 | 0.029 | |
| 30 | 0.024 | |
| 31 | 0.012 | |
| 32 | 0.041 | |
| 33 | 0.115 | |
| 34 | 0.200 | |
| 35 | 0.238 | |
| 29 | 0.003 | |
| 30 DUP | 0.025 | |
| 31 | 0.055 | |
| 32 S02 | 0.083 | |
| 33 | 0.141 | |
| 34 | 0.182 | |
| 35 AQC | 0.318 | |
| 36 | 0.259 | |
| 37 | 0.130 | |
| 38 | 0.212 | |
| 39 | 0.267 | |
| 40 | 0.353 | |
| 33 | 0.140 | |
| 34 | 0.184 | |

JVM
3 Sept 86

λ = 217.0

JM 3Sept86

---

* FLAMELESS * CSC VERSION 1.00 *

---

NAME OF ANALYST ---: HNR
DATE OF ANALYSIS --: 08-~~21~~ 20-1986
PARAMETER NAME ----: PB
DATA SET # --------: 3413

---

| SAMPLE NO. | CONC. | R VALUE | SLOPE |
|---|---|---|---|
| R | .2755288 | .9999692 | .02468 <2 |
| NBS | 24.18373 | .9997906 | .02101 2.0 % dev |
| ✓ S01 | -.2928678 | .9999709 | .02356 |
| ✗ S02 | -2.094397 | .9999969 | .01017 |
| S03 | -2.487948 | .9995511 | .01037 |
| S04 | -2.784091 | .9996129 | .01056 |
| NBS | 25.35394 | .9998776 | .02006 6.8 % dev. |

Reanalyzed later AJ

---

R

| SPIKE | MEASURED | CALC. | ERROR | PER CENT |
|---|---|---|---|---|
| 0 | 8.999999E-03 | 6.800049E-03 | -2.199951E-03 | -32.35198 % |
| 10 | .25 | .2536 | 3.600001E-03 | 1.419559 % |
| 20 | .501 | .5004 | -6.0004E-04 | -.1199121 % |
| 30 | .748 | .7472 | -8.000732E-04 | -.1070762 % |

NBS

| SPIKE | MEASURED | CALC. | ERROR | PER CENT |
|---|---|---|---|---|
| 0 | .51 | .5081001 | -1.899898E-03 | -.373922 % |
| 10 | .712 | .7182 | 6.200016E-03 | .8632714 % |
| 20 | .935 | .9283 | -6.69998E-03 | -.7217472 % |
| 30 | 1.136 | 1.1384 | 2.399802E-03 | .2108049 % |

S01

| SPIKE | MEASURED | CALC. | ERROR | PER CENT |
|---|---|---|---|---|
| 0 | -.006 | -6.899963E-03 | -8.999631E-04 | 13.04301 % |
| 10 | .226 | .2287 | 2.700001E-03 | 1.180586 % |
| 20 | .467 | .4643 | -2.700031E-03 | -.5815273 % |
| 30 | .699 | .6999 | 8.999705E-04 | .1285856 % |

S02

| SPIKE | MEASURED | CALC. | ERROR | PER CENT |
|---|---|---|---|---|
| 0 | -.021 | -2.130002E-02 | -3.000181E-04 | 1.408535 % |
| 10 | .08 | 8.039999E-02 | 3.999919E-04 | .4975024 % |
| 20 | .182 | .1821 | 1.000017E-04 | 5.491581E-02 % |
| 30 | .284 | .2838 | -2.000034E-04 | -7.047336E-02 % |

S03

| SPIKE | MEASURED | CALC. | ERROR | PER CENT |
|---|---|---|---|---|
| 0 | -.024 | -2.580002E-02 | -1.800017E-03 | 6.976807 % |
| 10 | .078 | .0779 | -1.000091E-04 | -.1283815 % |
| 20 | .176 | .1816 | 5.600006E-03 | 3.083703 % |
| 30 | .289 | .2853 | -3.699988E-03 | -1.296876 % |

JVM
3Sept86

S04

| SPIKE | MEASURED | CALC. | ERROR | PER CENT |
|---|---|---|---|---|
| 0 | -.029 | -.0294 | -3.999956E-04 | 1.360529 % |
| 10 | .073 | .0762 | 3.199995E-03 | 4.199468 % |
| 20 | .187 | .1818 | -5.200014E-03 | -2.860294 % |
| 30 | .285 | .2874 | 2.399981E-03 | .8350666 % |

NBS

| SPIKE | MEASURED | CALC. | ERROR | PER CENT |
|---|---|---|---|---|
| 0 | .5120001 | .5085999 | -3.400147E-03 | -.6685308 % |
| 10 | .706 | .7091999 | 3.199875E-03 | .4511952 % |
| 20 | .906 | .9097998 | 3.799796E-03 | .4176519 % |
| 30 | 1.114 | 1.1104 | -3.60024E-03 | -.3242292 % |

::BEGIN DATA FILE: ~~3314~~ 3413.DF

JVM
3 Sept 86

```
Begin Element - PE
   0.000
   0.000 AE
   0.009
   0.250
   0.501 R
   0.748
   0.510
   0.712
   0.985 NBS
   1.136
  -0.006
   0.326
   0.487  S01
   0.695
  -0.021
   0.090
   0.192  S02
   0.334
  -0.024
   0.078
   0.175  S03
   0.285
  -0.028
   0.078
   0.187  S04
   0.355
   0.510
   0.715
   0.905  NBS
   1.114
```

Jvm
3Sept86

---

* FLAMELESS * CSC VERSION 1.00 *

---

NAME OF ANALYST ---: P.M.
DATE OF ANALYSIS --: 08-19-1986
PARAMETER NAME ----: SB
DATA SET # --------: AMERICAN CHEMICAL Service SF 3413

---

| SAMPLE NO. | CONC. | R VALUE | SLOPE | |
|---|---|---|---|---|
| QC LAST WHEEL | 21.57717 | .9987867 | .01192 | +4.4% |
| S01 | -.4743083 | .9989301 | .01265 | |
| D01 | -.5155474 | .9991051 | .01222 | |
| R01 | -.4651202 | .9984456 | .01247 | |
| S02 | -.3015055 | .9992069 | .01194 | |
| S03 | -.2253766 | .9994861 | .01198 | |
| S04 | -.3694344 | .9996712 | .01191 | |
| S05 | -.7462686 | .998134 | .0067 | |
| QC 20.3 | 19.98384 | .9985892 | .01237 | -2.0% |

---

QC LAST WHEEL

| SPIKE | MEASURED | CALC. | ERROR | PER CENT |
|---|---|---|---|---|
| 0 | .258 | .2572 | -8.000434E-04 | -.3110589 % |
| 10 | .37 | .3764 | 6.39996E-03 | 1.700308 % |
| 20 | .506 | .4956 | -.0104 | -2.098466 % |
| 30 | .61 | .6148 | 4.799962E-03 | .7807356 % |

S01

| SPIKE | MEASURED | CALC. | ERROR | PER CENT |
|---|---|---|---|---|
| 0 | .001 | -.006 | -.007 | 116.6667 % |
| 10 | .11 | .1205 | .0105 | 8.713692 % |
| 20 | .247 | .247 | -1.490116E-08 | -6.03286E-06 % |
| 30 | .377 | .3735 | -3.500015E-03 | -.9370856 % |

D01

| SPIKE | MEASURED | CALC. | ERROR | PER CENT |
|---|---|---|---|---|
| 0 | 0 | -6.299988E-03 | -6.299988E-03 | 100 % |
| 10 | .107 | .1159 | 8.900002E-03 | 7.679035 % |
| 20 | .237 | .2381 | 1.099989E-03 | .4619861 % |
| 30 | .364 | .3603 | -3.700018E-03 | -1.026927 % |

R01

| | | | | |
|---|---|---|---|---|
| 0 | .001 | -5.800049E-03 | -6.800049E-03 | 117.2412 % |
| 10 | .106 | .1189 | 1.289997E-02 | 10.84943 % |
| 20 | .249 | .2436 | -5.400032E-03 | -2.216762 % |
| 30 | .369 | .3683 | -7.000268E-04 | -.1900697 % |

Jvm
3 Sept 86

S02

| SPIKE | MEASURED | CALC. | ERROR | PER CENT |
|---|---|---|---|---|
| 0 | .001 | -3.599976E-03 | -4.599976E-03 | 127.778 % |
| 10 | .107 | .1158 | 8.800008E-03 | 7.599315 % |
| 20 | .239 | .2352 | -3.800005E-03 | -1.615648 % |
| 30 | .355 | .3546 | -4.000068E-04 | -.1128051 % |

S03

| SPIKE | MEASURED | CALC. | ERROR | PER CENT |
|---|---|---|---|---|
| 0 | .001 | -2.700012E-03 | -3.700012E-03 | 137.0369 % |
| 10 | .11 | .1171 | 7.100001E-03 | 6.063195 % |
| 20 | .24 | .2369 | -3.099993E-03 | -1.308566 % |
| 30 | .357 | .3567 | -2.999604E-04 | -8.409317E-02 % |

S04

| SPIKE | MEASURED | CALC. | ERROR | PER CENT |
|---|---|---|---|---|
| 0 | -.001 | -4.399963E-03 | -3.399963E-03 | 77.27254 % |
| 10 | .109 | .1147 | 5.700037E-03 | 4.969517 % |
| 20 | .235 | .2338 | -1.199976E-03 | -.5132487 % |
| 30 | .354 | .3529 | -1.099974E-03 | -.3116956 % |

S05

| SPIKE | MEASURED | CALC. | ERROR | PER CENT |
|---|---|---|---|---|
| 0 | 0 | -.005 | -.005 | 100 % |
| 10 | .055 | 6.200001E-02 | 7.000003E-03 | 11.29033 % |
| 20 | .128 | .129 | 1.000002E-03 | .7751953 % |
| 30 | .199 | .196 | -3.000021E-03 | -1.530623 % |

QC 20.3

| SPIKE | MEASURED | CALC. | ERROR | PER CENT |
|---|---|---|---|---|
| 0 | .253 | .2472 | -5.799979E-03 | -2.34627 % |
| 10 | .359 | .3709 | 1.189998E-02 | 3.208406 % |
| 20 | .501 | .4945999 | -6.400079E-03 | -1.293991 % |
| 30 | .618 | .6182998 | 2.99871E-04 | 4.849928E-02 % |

Jun
35ept86

0.265
0.429
0.564 Q.C new
0.695
0.000 Blank up
0.002
0.110
0.257 R05
0.387
0.002
0.112
0.248 S35
0.366
0.001
0.109
0.248 S36
0.371
-0.001
0.104
0.237 S37
0.353
-0.001
0.105
0.230 S38
0.355
-0.000
0.103
0.236 S39
0.357
-0.001
0.104
0.233 S40
0.344
0.000
0.098
0.218 D40
0.339
0.289
0.444
0.483 Q.C.
0.722
0.301
0.449
0.484
0.489
0.258
0.370
0.506 Q.C.
0.610
-0.002
0.000 Blanks
0.001
0.110
0.247 S01
0.377
0.000
0.107
0.237 D01
0.364
0.001
0.106
0.249 R01
0.369

Brabante

American Chemical Services

Jvm
3Sept86

0.001
0.107 S02
0.239
0.355
0.001
0.110
0.240 S03
0.357
-0.001
0.109
0.235 S04
0.354
0.000
0.055
0.128 S05
0.199
0.253
0.359 Q.C.
0.501
0.618

0.003 Blank cup
0.002 FB08S91 Sunrise
0.127 SF 3414
0.280
0.429
0.000
0.119 R13
0.268
0.403
0.001
0.111 FL08R12 N.W. Berrien
0.257
0.376
0.003 SF 3421
0.112
0.243 S85
0.368
0.000
0.102 S86
0.236
0.351
0.001
0.103
0.235 D86
0.350
0.004
0.116
0.252 S87
0.370
0.263
0.373 Q.C.
0.516
0.641

* FLAMELESS * CSC VERSION 1.00 *

NAME OF ANALYST ---: P.M.
DATE OF ANALYSIS --: 08-26-1986
PARAMETER NAME ----: SE
DATA SET # -------: AMERICAN CHEMICAL SE 3413

| SAMPLE NO. | CONC. | R VALUE | SLOPE |
|---|---|---|---|
| STD | -.2123363 | .9997884 | 9.890001E-03 |
| NBS 9.7 | 8.788544 | .999942 | .00908 -9.4% |
| RO1 | -.3448246 | .9997914 | .01015 |
| DO1 | -.0212102 | .9997942 | 9.430001E-03 |
| SO1 | -.1252622 | .9999479 | 9.579999E-03 |
| SO2 | 4.282589E-02 | .99978 | 9.340002E-03 |
| SO3 | 9.216449E-02 | .9992204 | .00868 |
| SO4 | -.2990047 | .9998493 | .00903 |
| SO5 | -.1197605 | .9998064 | 8.350001E-03 |
| NBS | 9.765255 | .9997686 | 8.520001E-03 0% dif |

STD

| SPIKE | MEASURED | CALC. | ERROR | PER CENT |
|---|---|---|---|---|
| 0 | -.001 | -2.100006E-03 | -1.100006E-03 | 52.38109 % |
| 10 | .097 | 9.680001E-02 | -1.999959E-04 | -.2066074 % |
| 20 | .192 | .1957 | 3.700018E-03 | 1.890658 % |
| 30 | .297 | .2946 | -2.399981E-03 | -.8146575 % |

NBS 9.7

| SPIKE | MEASURED | CALC. | ERROR | PER CENT |
|---|---|---|---|---|
| 0 | .081 | 7.979999E-02 | -1.200013E-03 | -1.503776 % |
| 10 | .169 | .1706 | 1.599997E-03 | .9378648 % |
| 20 | .261 | .2614 | 3.99977E-04 | .1530134 % |
| 30 | .353 | .3522 | -7.999838E-04 | -.2271391 % |

RO1

| SPIKE | MEASURED | CALC. | ERROR | PER CENT |
|---|---|---|---|---|
| 0 | -.001 | -3.499969E-03 | -2.499969E-03 | 71.42831 % |
| 10 | .095 | 9.800002E-02 | 3.000029E-03 | 3.061253 % |
| 20 | .198 | .1995 | 1.500025E-03 | .7518923 % |
| 30 | .303 | .301 | -2.000004E-03 | -.6644531 % |

DO1

| SPIKE | MEASURED | CALC. | ERROR | PER CENT |
|---|---|---|---|---|
| 0 | .001 | -2.000122E-04 | -1.200012E-03 | 599.9696 % |
| 10 | .091 | 9.409999E-02 | 3.099993E-03 | 3.294361 % |
| 20 | .191 | .1884 | -2.600014E-03 | -1.38005 % |
| 30 | .282 | .2827 | 6.99997E-04 | .2476112 % |

S01

| SPIKE | MEASURED | CALC. | ERROR | PER CENT |
|---|---|---|---|---|
| 0 | 0 | -1.200012E-03 | -1.200012E-03 | 100 % |
| 10 | .093 | 9.459999E-02 | 1.599982E-03 | 1.691314 % |
| 20 | .19 | .1904 | 3.99977E-04 | .210072 % |
| 30 | .287 | .2862 | -8.000434E-04 | -.27954 % |

Jim Dyett

S02

| SPIKE | MEASURED | CALC. | ERROR | PER CENT |
|---|---|---|---|---|
| 0 | .002 | 3.999939E-04 | -1.600006E-03 | -400.0076 % |
| 10 | .093 | 9.380002E-02 | 8.000136E-04 | .8528928 % |
| 20 | .184 | .1872 | 3.200039E-03 | 1.709422 % |
| 30 | .283 | .2806001 | -2.399922E-03 | -.8552818 % |

S03

| SPIKE | MEASURED | CALC. | ERROR | PER CENT |
|---|---|---|---|---|
| 0 | .005 | 7.999878E-04 | -4.200012E-03 | -525.0095 % |
| 10 | .082 | 8.759999E-02 | 5.599991E-03 | 6.392684 % |
| 20 | .173 | .1744 | 1.399994E-03 | .8027489 % |
| 30 | .264 | .2612 | -2.800018E-03 | -1.071982 % |

S04

| SPIKE | MEASURED | CALC. | ERROR | PER CENT |
|---|---|---|---|---|
| 0 | -.002 | -2.700012E-03 | -7.000121E-04 | 25.92626 % |
| 10 | .088 | 8.759999E-02 | -4.000068E-04 | -.4566288 % |
| 20 | .175 | .1779 | 2.89999E-03 | 1.630124 % |
| 30 | .27 | .2682 | -1.800001E-03 | -.6711411 % |

S05

| SPIKE | MEASURED | CALC. | ERROR | PER CENT |
|---|---|---|---|---|
| 0 | -.001 | -9.999999E-04 | 1.164153E-10 | -1.164153E-05 % |
| 10 | .081 | 8.250001E-02 | 1.500003E-03 | 1.818186 % |
| 20 | .169 | .166 | -2.999991E-03 | -1.807224 % |
| 30 | .248 | .2495 | 1.500025E-03 | .6012125 % |

NBS

| SPIKE | MEASURED | CALC. | ERROR | PER CENT |
|---|---|---|---|---|
| 0 | .081 | 8.319998E-02 | 2.199978E-03 | 2.644205 % |
| 10 | .171 | .1684 | -2.600014E-03 | -1.543952 % |
| 20 | .255 | .2536 | -1.399994E-03 | -.5520481 % |
| 30 | .337 | .3388 | 1.799971E-03 | .5312783 % |

Begin Element - SE

hm
3 Sept 86

0.007

American Chemical
SF3413

0.000 AZ
-0.001
0.097
0.192 Std
0.297
0.081
0.169
0.261 QC.
0.353
-0.001
0.095
0.198 R01
0.303
0.001
0.091
0.191 D01
0.282
0.000
0.093
0.190 S01
0.287
0.002
0.093
0.184 S02
0.283
0.005
0.082
0.173 S03
0.264
-0.002
0.088
0.175 S04
0.270
-0.001
0.081
0.169 S05
0.248
0.081
0.171
0.255 Q.C.
~~0.350~~
0.337

---

* FLAMELESS * CSC VERSION 1.00 *

---

NAME OF ANALYST ---: I.L
DATE OF ANALYSIS --: 08-22-1986
PARAMETER NAME ----: CD
DATA SET # --------: SF3413

JVM 354+8k

---

| SAMPLE NO. | CONC. | R VALUE | SLOPE | |
|---|---|---|---|---|
| R.BLANK | 6.302567E-03 | .9996825 | .0476 | |
| NBS 1.0 | .9940996 | .9995911 | 6.780003E-02 | %Dev-0.6 |
| 86SS01S01 | -4.535089E-03 | .9992451 | 8.819999E-02 | |
| 86SS011D01 | 2.262414E-03 | .9985292 | 8.840001E-02 | |
| 86SS01R01 | 1.690843E-02 | .9971415 | .0414 | |
| 86SS01S02 | 0 | .9992776 | .088 | |
| 86SS01S03 | 2.717402E-02 | .9990091 | 9.199999E-02 | |
| 86SS01S04 | 1.834866E-02 | .9990963 | .0872 | |
| 86SS01S05 | 1.312907E-02 | .9993398 | .1828 | |
| NBS | .9971172 | .9994766 | 6.940003E-02 | %Dev-03 |

---

R.BLANK

| SPIKE | MEASURED | CALC. | ERROR | PER CENT |
|---|---|---|---|---|
| 0 | 0 | 3.000021E-04 | 3.000021E-04 | 100 % |
| .5 | .025 | .0241 | -9.000022E-04 | -3.734449 % |
| 1 | .047 | .0479 | 8.999966E-04 | 1.878908 % |
| 1.5 | .072 | .0717 | -3.000051E-04 | -.4184172 % |

NBS 1.0

| SPIKE | MEASURED | CALC. | ERROR | PER CENT |
|---|---|---|---|---|
| 0 | .067 | 6.739998E-02 | 3.99977E-04 | .5934378 % |
| .5 | .101 | .1013 | 2.999827E-04 | .2961331 % |
| 1 | .137 | .1352 | -1.800001E-03 | -1.331362 % |
| 1.5 | .168 | .1691 | 1.100019E-03 | .6505136 % |

86SS01S01

| SPIKE | MEASURED | CALC. | ERROR | PER CENT |
|---|---|---|---|---|
| 0 | -.001 | -3.999949E-04 | 6.000052E-04 | -150.0032 % |
| .5 | .043 | .0437 | 7.000007E-04 | 1.601832 % |
| 1 | .091 | 8.779999E-02 | -3.200002E-03 | -3.644649 % |
| 1.5 | .13 | .1319 | 1.900002E-03 | 1.440487 % |

86SS011D01

| SPIKE | MEASURED | CALC. | ERROR | PER CENT |
|---|---|---|---|---|
| 0 | -.001 | 1.999974E-04 | 1.199998E-03 | 600.0065 % |
| .5 | .044 | .0444 | 3.999993E-04 | .9008994 % |
| 1 | .093 | .0886 | -.0044 | -4.96614 % |
| 1.5 | .13 | .1328 | 2.800018E-03 | 2.108447 % |

86SS01R01

| SPIKE | MEASURED | CALC. | ERROR | PER CENT |
|---|---|---|---|---|
| 0 | -.001 | 7.000089E-04 | 1.700009E-03 | 242.8554 % |
| .5 | .023 | 2.140001E-02 | -1.599994E-03 | -7.476603 % |
| 1 | .044 | 4.210001E-02 | -1.899995E-03 | -4.513052 % |
| 1.5 | .061 | 6.280001E-02 | 1.800004E-03 | 2.866249 % |

Jvm 35 spike

86SS01S02

| SPIKE | MEASURED | CALC. | ERROR | PER CENT |
|---|---|---|---|---|
| 0 | -.001 | 0 | .001 | 1.701412E+38 % |
| .5 | .044 | .044 | 0 | 0 % |
| 1 | .091 | .088 | -2.999999E-03 | -3.409089 % |
| 1.5 | .13 | .132 | 2.000004E-03 | 1.515155 % |

86SS01S03

| SPIKE | MEASURED | CALC. | ERROR | PER CENT |
|---|---|---|---|---|
| 0 | .003 | 2.50001E-03 | -4.999906E-04 | -19.99955 % |
| .5 | .046 | .0485 | 2.500001E-03 | 5.154642 % |
| 1 | .098 | .0945 | -.0035 | -3.703704 % |
| 1.5 | .139 | .1405 | 1.499996E-03 | 1.067613 % |

86SS01S04

| SPIKE | MEASURED | CALC. | ERROR | PER CENT |
|---|---|---|---|---|
| 0 | .002 | 1.600003E-03 | -3.999969E-04 | -24.99976 % |
| .5 | .043 | 4.520001E-02 | 2.200004E-03 | 4.867265 % |
| 1 | .092 | 8.880001E-02 | -3.199995E-03 | -3.603597 % |
| 1.5 | .131 | .1324 | 1.400009E-03 | 1.057409 % |

86SS01S05

| SPIKE | MEASURED | CALC. | ERROR | PER CENT |
|---|---|---|---|---|
| 0 | .003 | 2.399993E-03 | -6.000072E-04 | -25.00037 % |
| .5 | 9.000001E-02 | 9.379999E-02 | 3.799982E-03 | 4.051155 % |
| 1 | .191 | .1852 | -5.800024E-03 | -3.131763 % |
| 1.5 | .274 | .2766 | 2.599955E-03 | .9399693 % |

NBS

| SPIKE | MEASURED | CALC. | ERROR | PER CENT |
|---|---|---|---|---|
| 0 | .07 | 6.919996E-02 | -8.000359E-04 | -1.156122 % |
| .5 | .102 | .1039 | 1.89998E-03 | 1.828663 % |
| 1 | .14 | .1386 | -1.400009E-03 | -1.010107 % |
| 1.5 | .173 | .1733 | 3.000051E-04 | .1731131 % |

SF3413 Cal I.L.

| | | | |
|---|---|---|---|
| | | -0.001 | |
| | | 0.000 | AZ |
| | 1 | 0.010 | |
| | 2 | 0.024 | zeros |
| | 3 | 0.061 | |
| | 4 | 0.086 | Jim Bright |
| BL. | 1 | 0.000 | |
| | 2 | 0.025 | |
| | 3 | 0.047 | |
| | 4 | 0.072 | |
| NBS | 5 | 0.069 | zeros |
| | 6 | 0.100 | |
| | 7 | 0.133 | |
| | 8 | 0.151 | |
| | ~~5~~ | ~~0.071~~ | |
| NBS | 5 | 0.067 | |
| | 6 | 0.101 | |
| | 7 | 0.137 | |
| | 8 | 0.168 | |
| SO1 | 9 | -0.001 | |
| | 10 | 0.043 | |
| | 11 | 0.091 | |
| | 12 | 0.130 | |
| DO1 | 13 | -0.001 | |
| | 14 | 0.044 | |
| | 15 | 0.093 | |
| | 16 | 0.133 | |
| | 17 | -0.001 | zeros |
| | 18 | 0.026 | |
| | 19 | 0.045 | |
| | 20 | 0.105 | |
| | ~~20~~ | ~~0.058~~ | |
| | 21 | 0.000 | |
| | 22 | 0.044 | zeros |
| | 23 | 0.105 | |
| | 24 | 0.129 | |
| SO3 | 25 | 0.003 | |
| | 26 | 0.045 | |
| | 27 | 0.095 | |
| | 28 | 0.139 | |
| SO4 | 29 | 0.002 | |
| | 30 | 0.043 | |
| | 31 | 0.092 | |
| | 32 | 0.131 | |
| SO5 | 33 | 0.003 | |
| | 34 | 0.090 | |
| | 35 | 0.191 | |
| | 36 | 0.274 | |
| | 17 | -0.001 | zeros |
| | 18 | 0.026 | |
| | 19 | 0.041 | |
| | 20 | 0.161 | |
| SO2 | 21 | -0.001 | |
| | 22 | 0.044 | |
| | 23 | 0.091 | |
| | 24 | 0.130 | |
| PO | 17 | -0.000 | |
| | 18 | 0.023 | |
| | 19 | 0.044 | |
| | 20 | 0.061 | |
| NBS | 37 | 0.070 | |
| | 38 | 0.102 | |
| | 39 | 0.140 | |
| | 40 | 0.173 | |

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION V

DATE: 9-9-86

SUBJECT: Precision and Accuracy of Analyses for Data Set SF 3413
Site: AMERICAN CHEMICAL SERVICE

FROM: Steve Parker,
CRL QC Coordinator

TO: Data User: _____

The Region V Central Regional Laboratory has completed its analyses of 7 (number) WATER (matrix type) samples for the parameters listed on the attached sheet. The discrete values reported on the result forms should be considered to be of the precision and accuracy levels listed.

PRECISION is a measure of reproducibility or the closeness with which individual measurements of the same property, under similar conditions agree with each other. It is expressed as the relative percent difference (RPD) or the absolute concentration difference (R') between duplicate analyses. The limit acceptable at the time of analysis is stated. QC data within these limits indicate that the analysis was in control for that set of data.

ACCURACY is a measure of the closeness of an individual measurement to the expected value. It can be expressed as percent recovery of a known spike or standard concentration, or as percent bias which is the deviation from the true value. The limits applicable at the time of analysis are stated. A 95% confidence interval means that 95% of the time, percent recovery will fall between those limts.

Attachment

TRANSMITTED BY
Griffin
SEP 10 1986

U.S. EPA CENTRAL
REGIONAL LAB

PRECISION AND ACCURACY STATEMENT

Data Set: SF 3413 Matrix: WATER

Site Name: AMERICAN CHEMICAL SERVICE

| | PRECISION | | | ACCURACY | | |
|---|---|---|---|---|---|---|
| Parameter | ~~RPD~~ ~~SD~~ R' | Limit | Method of Quality Control | % Recovery % Bias | Limit | Method of Quality Control |
| NITRATE/NITRITE NITROGEN | 0.00 mg/L | ≤ 0.15 mg/L | DUPLICATE CONTROL | 95% | 92-108% | SPIKED SAMPLE |
| AMMONIA NITROGEN | 0.00 mg/L | ≤ 0.5 mg/L | " | 102% | 94-106% | " |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

COMMENT:

QC FLAGS:

American Chemical Service 9/8/86 AJ
IND-016-360-165
OK-BP 9/9/86

SUPERFUND

ENVIRONMENTAL PROTECTION AGENCY
FOR THE TEAM: MINERALS-NUTRIENTS

DIVISION/BRANCH WMD: SHE-12 SAMPLING DATE 8/5/86 LAB ARRIVAL DATE 8/6/86 DUE DATE 8/27/86

DU NUMBER Y306 DATASET NUMBER 3413 STUDY PRIORITY N CONTRACTOR

| CRL LOG NUMBER | SAMPLE DESCRIPTION | WATER NITRATE & NITRITE MG N/L MIN7284 | WATER AMMONIA MG N/L MIN7294 | WATER TOTAL KJELDAHL NITROGEN MG N/L MIN7384 | WATER TOTAL PHOSPHORUS MG P/L MIN7315 | WATER TOTAL DISSOLVED PHOSPHORUS MG P/L MIN7325 |
|---|---|---|---|---|---|---|
| 865501S01 | 5-61562 | ✓ <0.10 | ✓ 0.20 | | | |
| 865501D01 | 5-61582 | ✓ <0.10 | ✓ 0.20 | | | |
| 865501R01 | 5-61586 | ✓ <0.10 | ✓ ~~0.20~~ <0.05 | | | |
| 865501S02 | 5-61554 | ✓ <0.10 | ✓ ~~<0.05~~ 0.20 | | | |
| 865501S03 | 5-61610 | ✓ <0.10 | ✓ ~~0.20~~ 0.20 | | | |
| 865501S04 | 5-61598 | ✓ <0.10 | ✓ 0.30 | | | |
| 865501S05 | 5-61602 | ✓ <0.10 | ✓ 0.20 | | | |
| | | Fleda R. Roldan 8/25/86 | Fleda R. Roldan 8/25/86 | | | |

* REGRESSION ANALYSIS * CSC VERSION 2.00 *

NAME OF ANALYST ---: HNR
PARAMETER NAME ----: NO3
DATE OF ANALYSIS --: 08-26-1986

DATA SET NUMBER ---: 3398 , 3413
DU NUMBER ---------: C215 , Y306

DEGREE OF FIT : 1

EQUATION : CONCENTRATION = -2.30551E-02
+1.02181E-01 * SIGNAL

COEFFICIENT OF DETERMINATION : .9999807

T-A-B-L-E O-F S-T-A-N-D-A-R-D-S

| STANDARD | SIGNAL | CONCENTRATION | CALCULATED |
|---|---|---|---|
| 1 | +0.000 | +0.000 | -0.024 |
| 2 | +10.000 | +1.000 | +0.998 |
| 3 | +20.000 | +2.000 | +2.020 |
| 4 | +39.500 | +4.000 | +4.013 |
| 5 | +98.000 | +10.000 | +9.990 |

T-A-B-L-E O-F S-A-M-P-L-E-S

| SAMPLE I.D. | SIGNAL | CONCENTRATION | |
|---|---|---|---|
| BLK | +0.000 | -0.024 | RBlk ± 0.1 mg/l |
| BLK | +0.000 | -0.024 | |
| AQC | +19.550 | +1.974 | AQC limits = 2.0 ± 0.15 mg/l |
| BLK | +0.000 | -0.024 | |
| S20 | +0.000 | -0.024 | |
| S21 | +0.500 | +0.028 | |
| DUPS20 | +0.000 | -0.024 | |
| S22 | +0.000 | -0.024 | |
| S23 | +0.000 | -0.024 | |
| S24 | +0.000 | -0.024 | |
| S25 | +1.000 | +0.079 | |
| BLK | +0.000 | -0.024 | |
| S26 | +0.000 | -0.024 | |
| S27 | +11.500 | +1.152 | |
| AQC | +19.500 | +1.969 | |
| BLK | +0.000 | -0.024 | |
| R01 | +0.000 | -0.024 | |
| S01 | +0.000 | -0.024 | |
| D01 | +0.000 | -0.024 | |
| S02 | +0.000 | -0.024 | |
| S03 | +0.000 | -0.024 | |
| S04 | +0.000 | -0.024 | |
| S05 | +0.000 | -0.024 | |
| SPKS01 | +18.500 | +1.867 → | 1.867 + .024 = 1.921 94.6% rec. |
| BLK | +0.000 | -0.024 | |
| AQC | +19.500 | +1.969 | limits for spike: 2.0 ± 0.15 OK AS |

* REGRESSION ANALYSIS * CSC VERSION 2.00 *

NAME OF ANALYST ---: HNR
PARAMETER NAME -----: NH3
DATE OF ANALYSIS --: 08-26-1986

DATA SET NUMBER ---: 3398, 3413
DU NUMBER ----------: C215, Y306

DEGREE OF FIT : 1

EQUATION : CONCENTRATION = -7.43456E-02
+1.07899E-01 * SIGNAL

COEFFICIENT OF DETERMINATION : .9997734

T-A-B-L-E O-F S-T-A-N-D-A-R-D-S

| STANDARD | SIGNAL | CONCENTRATION | CALCULATED |
|---|---|---|---|
| 1 | +0.000 | +0.000 | -0.075 |
| 2 | +10.000 | +1.000 | +1.004 |
| 3 | +19.500 | +2.000 | +2.029 |
| 4 | +38.500 | +4.000 | +4.079 |
| 5 | +93.000 | +10.000 | +9.960 |

T-A-B-L-E O-F S-A-M-P-L-E-S

| SAMPLE I.D. | SIGNAL | CONCENTRATION | |
|---|---|---|---|
| BLK | +0.000 | -0.075 | Limit ±0.05 |
| BLK | +0.000 | -0.075 | |
| AQC | +76.000 | +8.125 | Limit = 8.0 ± 0.5 |
| BLK | +0.000 | -0.075 | |
| S20 | +1.000 | +0.033 | |
| S21 | +0.000 | -0.075 | |
| DUPS20 | +0.000 | -0.075 | a ≤ 0.1 |
| S22 | +1.000 | +0.033 | |
| S23 | +1.000 | +0.033 | |
| S24 | +1.000 | +0.033 | |
| S25 | +1.000 | +0.033 | |
| S26 | +1.500 | +0.087 | |
| BLK | +0.000 | -0.075 | |
| S27 | +0.500 | -0.021 | |
| AQC | +76.000 | +8.125 | |
| BLK | +0.000 | -0.075 | |
| R01 | +0.000 | -0.075 | |
| S01 | +2.500 | +0.195 | |
| D01 | +2.500 | +0.195 | |
| S02 | +2.500 | +0.195 | |
| S03 | +2.500 | +0.195 | |
| S04 | +3.500 | +0.303 | |
| S05 | +2.500 | +0.195 | |
| SPKS01 | +49.400 | +5.255 | 5.255 - .195 = 5.06 mg/L Limit = 5.0 ± 0.3 |
| BLK | +0.000 | -0.075 | |
| AQC | +76.000 | +8.125 | |

D/S 3398

D/S 3413

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY (METALS BY ICP)
REGION 5 CENTRAL REGIONAL LABORATORY (WATER)
536 SOUTH CLARK STREET (5SCRL)
CHICAGO, ILLINOIS 60605

DATE: 9/8/86 CRL DATA SET NUMBER: SF 3413

SUBJECT: QUALITY CONTROL SUMMARY STATEMENT FOR AMERICAN CHEMICAL SERVICE

FROM: STEVE PARKER, CRL QC COORDINATOR
(312 353 3805)

TO: DATA USER:

The Region V Central Regional Laboratory (CRL) has completed analysis of the samples submitted for metals analysis using inductively coupled plasma emission spectroscopy. The analysis was performed using the CRL's "Standard Operating Procedure for the Analysis of Metals in Water Using Inductively Coupled Plasma Emission Spectroscopy", Method 200.7 DNS (INDUCTIVELY COUPLED PLASMA, DIGESTED). The method is the CRL's implementation of USEPA method 200.7 and is approved for NPDES and SDWA samples.

Metals that have been indicated as being of primary interest, by the site investigators will be reported. Metals that are of secondary interest may be deleted from the report without comment. The routine controls designed into the run in which the samples were analyzed are listed below and were met unless noted otherwise.

The following metals are primary or secondary drinking water parameters with maximum contaminant levels as indicated:

| Primary: | Maximum Contaminant Level (MCL) |
|---|---|
| Barium - Ba | 1 milligram per liter |
| Cadmium - Cd | 0.010 milligrams per liter |
| Chromium - Cr | 0.05 milligrams per liter |
| Lead - Pb | 0.05 milligrams per liter |
| Silver - Ag | 0.05 milligrams per liter |

| Secondary: | Maximum Contaminant Level (MCL) |
|---|---|
| Copper - Cu | 1 milligram per liter |
| Iron - Fe | 0.3 milligrams per liter |
| Manganese - Mn | 0.05 milligrams per liter |
| Zinc - Zn | 5 milligrams per liter |

SAMPLE HANDLING

The samples were properly preserved by acidification to a pH < 2 with concentrated nitric acid. The samples were shipped and stored at 4 C or room temperature in high density polyethylene containers. The analysis was completed within 6 months of the date of sampling

## METHOD DETECTION LIMIT

The Method Detection Limit (MDL) is defined as the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined in a given matrix containing the analyte. The CRL periodically monitors the analytical system by determining the MDL in deionized distilled water and has calculated them to be as indicated in the enclosed tables. The MDL for this site can only be determined by studying samples from the different matrixes at this site and is determined only upon request as outline in the site's project plan.

## METHOD BIAS

Bias is defined as the difference between the population mean and the true or reference value or as estimated from sample statistics, the difference between the sample average and the reference value. The CRL has not detected any significant method bias in deionized distilled water. To monitor for any systematic bias, the CRL analyzes a control sample at the beginning and end of the run. The expected value and the control values for each element are listed in an enclosed table. Indications of potential bias can be determined from spiked samples from this site. Samples to be spiked must be chosen based on information about the site and the investigation's objectives. Unless requested by the field, a spike will not necessarily be run with each data set.

## METHOD PRECISION

Precision is defined as the degree of mutual agreement among individual measurements made under prescribed conditions. The long term precision for the method can be inferred from the control limits for the control standard. The precision of the data for this site must be determined from the results of replicate or co located samples samples designed into the sampling plan. Unless requested by the field, replicate samples will not necessarily be run with each data set. When replicate samples are analyzed, they are evaluated in two ways depending upon whether they contain a large amount, when compared to the method detection limit, of the parameter being analyzed or whether the amount is relatively close to the method detection limit. In the case where there is a large amount of material, we typically find that the results are in agreement to 10% relative percent difference. At lower levels, we typically find the results to be within ± MDL of the average value or below the detection limit for the parameter.

## CONTAMINATION

Laboratory blanks are analyzed within each analytical run along with any field blanks that have been submitted. The laboratory blank is expected to be within ±MDL of zero.

Site: SF 3413
Data Set Number: AMERICAN CHEMICAL SERVICE

The following laboratory control samples were examined for precision and bias information:

✓ Undigested Blank(s).
✓ Digested Blank(s).
✓ Analytical Quality Control Sample(s).
✓ The blanks were within the method detection limit of zero for each element listed unless indicated otherwise.
✓ The Analytical Quality Control Sample (AQC) results were within the expected control limits unless indicated otherwise.

| ELEMENT | MDL | AQC SAMPLE EXPECTED | CONTROL LIMITS | |
|---|---|---|---|---|
| * SILVER - Ag | 6 ug/L | 168 ug/L | 150 - 185 | ug/L |
| ALUMINUM - Al | 80 ug/L | 4760 ug/L | 4280 - 5250 | ug/L |
| BARIUM - Ba | 6 ug/L | 1510 ug/L | 1360 - 1660 | ug/L |
| BERYLLIUM - Be | 1 ug/L | 728 ug/L | 655 - 800 | ug/L |
| ~~BORON - B~~ | ~~80 ug/L~~ | ~~1050 ug/L~~ | ~~945 - 1155~~ | ~~ug/L~~ |
| CADMIUM - Cd | 10 ug/L | 425 ug/L | 380 - 470 | ug/L |
| COBALT - Co | 6 ug/L | 972 ug/L | 875 - 1070 | ug/L |
| CHROMIUM - Cr | 8 ug/L | 1570 ug/L | 1410 - 1730 | ug/L |
| COPPER - Cu | 6 ug/L | 1160 ug/l | 1040 - 1280 | ug/L |
| IRON - Fe | 80 ug/L | 3820 ug/L | 3440 - 4200 | ug/L |
| LITHIUM - Li | 10 ug/L | 808 ug/L | 725 - 890 | ug/L |
| MANGANESE - Mn | 5 ug/L | 1330 ug/L | 1200 - 1460 | ug/L |
| MOLYBDENUM - Mo | 15 ug/L | 811 ug/L | 730 - 890 | ug/L |
| NICKEL - Ni | 15 ug/L | 1180 ug/L | 1060 - 1300 | ug/L |
| ~~LEAD - Pb~~ | ~~70 ug/L~~ | ~~2970 ug/L~~ | ~~2670 - 3270~~ | ~~ug/L~~ |
| TIN - Sn | 40 ug/L | 2430 ug/L | ~~1080~~ 2190 - ~~1320~~ 2670 | ug/L |
| STRONTIUM - Sr | 10 ug/L | 902 ug/L | 810 - 990 | ug/L |
| TITANIUM - Ti | 25 ug/L | 1200 ug/L | 1080 - 1320 | ug/L |
| VANADIUM - V | 5 ug/L | 744 ug/L | 670 - 820 | ug/L |
| YTTRIUM - Y | 5 ug/L | 784 ug/L | 700 - 860 | ug/L |
| ZINC - Zn | 40 ug/L | 2800 ug/L | 2500 - 3100 | ug/L |
| CALCIUM - Ca | 0.5 mg/L | 13.2 mg/L | 12.0 - 14.5 | mg/L |
| MAGNESIUM - Mg | 0.1 mg/L | 5.2 mg/L | 4.7 - 5.7 | mg/L |
| POTASSIUM - K | 2 mg/L | 96 | 86 - 106 | mg/L |
| SODIUM - Na | 1 mg/L | 18.5 mg/L | 16.6 - 20.4 | mg/L |

OBSERVATION/DEVIATIONS:
* SILVER INDICATED A HIGH BIAS, HOWEVER THE SAMPLES DID NOT INDICATE THE PRESENCE OF SILVER.

Site: SF 3413
Data Set Number: AMERICAN CHEMICAL SERVICE

The following samples were examined for precision and bias information:

Duplicate: S501 S02
Spike: S501 S02

✓ The spike recoveries were within the control limits for each element unless indicated otherwise.
✓ The duplicate results were acceptable.

| ELEMENT | MDL | SAMPLE SPIKE EXPECTED | CONTROL LIMITS |
|---|---|---|---|
| SILVER - Ag | 6 ug/L | 50 ug/L | 42 - 58 ug/L |
| ALUMINUM - Al | 80 ug/L | 800 ug/L | 680 - 920 ug/L |
| BARIUM - Ba | 6 ug/L | 200 ug/L | 170 - 230 ug/L |
| BERYLLIUM - Be | 1 ug/L | 10 ug/L | 8 - 12 ug/L |
| ~~BORON - B~~ | ~~80 ug/L~~ | ~~800 ug/L~~ | ~~680 - 920 ug/L~~ |
| ** CADMIUM - Cd | 10 ug/L | 25 ug/L | 21 - 29 ug/L |
| COBALT - Co | 6 ug/L | 100 ug/L | 85 - 115 ug/L |
| CHROMIUM - Cr | 8 ug/L | 100 ug/L | 85 - 115 ug/L |
| * COPPER - Cu | 6 ug/L | 50 ug/L | 42 - 58 ug/L |
| IRON - Fe | 80 ug/L | 800 ug/L | 680 - 920 ug/L |
| LITHIUM - Li | 10 ug/L | 54 ug/L | 46 - 62 ug/L |
| MANGANESE - Mn | 5 ug/L | 50 ug/L | 42 - 58 ug/L |
| MOLYBDENUM - Mo | 15 ug/L | 100 ug/L | 85 - 115 ug/L |
| NICKEL - Ni | 15 ug/L | 150 ug/L | 128 - 172 ug/L |
| ~~** LEAD - Pb~~ | ~~70 ug/L~~ | ~~800 ug/L~~ | ~~680 - 920 ug/L~~ |
| TIN - Sn | 40 ug/L | 400 ug/L | 340 - 460 ug/L |
| STRONTIUM - Sr | 10 ug/L | 1000 ug/L | 850 - 1150 ug/L |
| TITANIUM - Ti | 25 ug/L | 100 ug/L | 85 - 115 ug/L |
| VANADIUM - V | 5 ug/L | 50 ug/L | 42 - 58 ug/L |
| YTTRIUM - Y | 5 ug/L | 50 ug/L | 42 - 58 ug/L |
| ZINC - Zn | 40 ug/L | 400 ug/L | 340 - 460 ug/L |
| CALCIUM - Ca | 0.5 mg/L | 50 mg/L | 42 - 58 mg/L |
| MAGNESIUM - Mg | 0.1 mg/L | 25 mg/L | 21 - 29 mg/L |
| POTASSIUM - K | 2 mg/L | 20 mg/L | 17 - 23 mg/L |
| SODIUM - Na | 1 mg/L | 50 mg/L | 42 - 58 mg/L |

OBSERVATION/DEVIATIONS:

* COPPER SHOWED LOW RECOVERIES 37 ug/L (74%) THE REPORTED DL HAS BEEN RAISED FROM 6 TO 20 ug/L. ALL OF THE SAMPLES ARE WELL BELOW THE MCL OF 1 MILLIGRAM/LITER. THE AQC SAMPLE RESULTS WERE SATISFACTORY.

** Cd AND Pb WILL BE RUN BY GFAA AND REPORTED SEPERATELY.

9/4/86 AJ

9/9/86

SF 3413 American  Y905  C41137  AQ

DL1:[001,054]RUN539.BRN  20-AUG-86  07:53:03  PAGE 1

DATA SET : SF3413 American Chemical Service

| ELEMENT | S501S01 | S501D01 | S501S02 | S501S03 |
|---|---|---|---|---|
| AG µg/L | < 6.00 | < 6.00 | < 6.00 | < 6.00 |
| AL | < 80.0 | < 80.0 | < 80.0 | < 80.0 |
| BA | 107. | 106. | 114. | 131. |
| BE | < 1.00 | < 1.00 | < 1.00 | < 1.00 |
| ~~CD~~ | ~~< 10.0~~ | ~~< 10.0~~ | ~~< 10.0~~ | ~~< 10.0~~ |
| CO | < 6.00 | < 6.00 | < 6.00 | < 6.00 |
| CR | < 8.00 | < 8.00 | < 8.00 | < 8.00 |
| CU | <20 ~~8.4~~ | <20 ~~8.0~~ | <20 ~~11.6~~ | <20 ~~19.5~~ |
| FE | 2080. | 2060. | 2040. | 2840. |
| LI | 28.8 | 28.1 | 30.3 | 31.4 |
| MN | 40.4 | 39.8 | 48.6 | 75.1 |
| MO | < 15.0 | < 15.0 | < 15.0 | < 15.0 |
| NI | < 15.0 | < 15.0 | < 15.0 | < 15.0 |
| ~~PB~~ | ~~< 70.0~~ | ~~< 70.0~~ | ~~< 70.0~~ | ~~< 70.0~~ |
| SN | < 40.0 | < 40.0 | < 40.0 | < 40.0 |
| SR | 503. | 499. | 506. | 755. |
| TI | < 25.0 | < 25.0 | < 25.0 | < 25.0 |
| V | < 5.00 | < 5.00 | < 5.00 | < 5.00 |
| Y | < 5.00 | < 5.00 | < 5.00 | < 5.00 |
| ZN | 89. | 85. | 44. | 120. |
| ~~CA~~ | ~~103.~~ | ~~103.~~ | ~~103.~~ | ~~103.~~ |
| CA mg/L | 83.1 | 82.5 | 86.6 | 90.7 |
| MG | 36.7 | 36.6 | 38.1 | ~~44.6~~ 44.6 |
| NA | 16.3 | 16.1 | 16.2 | 17.4 |
| K | < 2.00 | < 2.00 | 2.18 | 2.57 |

Cd, Pb will be determined by AA

9/4/86
AJ
9/9/86

SF 3413 American  Y905  C411JZ

JVR
3 Sept

AG

DL1:[001,054]EUN539.BRN  20-AUG-86  07:56:03  PAGE

DATA SET : SF3413 American Chemical Service

| ELEMENT | | S501S04 | S501S05 | S501S06 | S501S07 |
|---|---|---|---|---|---|
| AG | µg/L | < 6.00 | < 6.00 | dil for Na only. | < 6.00 |
| AL | | 80.0 | 80.0 | | 80.0 |
| BA | | 118. | 85.70 | | 6.00 |
| BE | | 1.00 | 1.00 | | 1.00 |
| ~~CD~~ | | ~~10.0~~ | ~~10.0~~ | | ~~10.0~~ |
| CO | | 6.00 | 6.00 | | 6.00 |
| CR | | 8.00 | 8.00 | | 8.00 |
| CU | | <20 ~~11.5~~ | <20 ~~6.00~~ | | <20 ~~6.00~~ |
| FE | | 2200. | 131.0 | | 80.0 |
| LI | | 30.7 | 65.1 | | 10.0 |
| MN | | 27.4 | 12.90 | | 5.00 |
| MO | | 15.0 | 26.9 | | 15.0 |
| NI | | 15.0 | 15.0 | | 15.0 |
| ~~PB~~ | | ~~20.0~~ | ~~20.0~~ | | ~~5.00~~ |
| SN | | 40.0 | 40.0 | | 40.0 |
| SR | | 602. | 10.0 | | 10.0 |
| TI | | 25.0 | 43.4 | | 25.0 |
| V | | 5.00 | 13.00 | | 5.00 |
| Y | | 5.00 | 5.00 | | 5.00 |
| ZN | | 47.5 | 106.0 | | 40.0 |
| ~~LA~~ | | ~~103.000~~ | ~~0.500~~ | | ~~0.500~~ |
| CA | mg/L | 79.8 | 0.500 | | 0.500 |
| MG | | 38.4 | 0.100 | | 0.100 |
| NA | | 18.9 | ~~213.00~~ | 204. | 1.00 |
| K | | < 2.00 | < 2.00 | | < 2.12 |

CD, Pb will be determined by AA

TRANSMITTED BY
SEP 10 1986
U.S. EPA CENTRAL REGIONAL LAB

9/4/86

SF 3413 American 4905 C41137 AQ

DL1:[001,054]RUN539.BRN 20-AUG-86 07:53:03 PAGE 1

DATA SET : SF3413

| ELEMENT | | S501S01 | | S501D01 | | S501S02 | | S501S03 |
|---|---|---|---|---|---|---|---|---|
| AG | µg/L | < 6.00 | < | 6.00 | < | 6.00 | < | 6.00 |
| AL | | < 80.0 | < | 80.0 | < | 80.0 | < | 80.0 |
| BA | | 107. | | 106. | | 114. | | 131. |
| BE | | < 1.00 | < | 1.00 | < | 1.00 | < | 1.00 |
| ~~CD~~ | | ~~< 10.0~~ | ~~<~~ | ~~10.0~~ | ~~<~~ | ~~10.0~~ | ~~<~~ | ~~10.0~~ |
| CO | | < 6.00 | < | 6.00 | < | 6.00 | < | 6.00 |
| CR | | < 8.00 | < | 8.00 | < | 8.00 | < | 8.00 |
| CU | | 8.4 | | 8.0 | | 11.6 | | 19.5 |
| FE | | 2080. | | 2060. | | 2040. | | 2840. |
| LI | | 28.8 | | 28.1 | | 30.3 | | 31.4 |
| MN | | 40.4 | | 39.8 | | 48.6 | | 75.1 |
| MO | | < 15.0 | < | 15.0 | < | 15.0 | < | 15.0 |
| NI | | < 15.0 | < | 15.0 | < | 15.0 | < | 15.0 |
| ~~PB~~ | | ~~< 70.0~~ | ~~<~~ | ~~70.0~~ | ~~<~~ | ~~70.0~~ | ~~<~~ | ~~70.0~~ |
| SN | | < 40.0 | < | 40.0 | < | 40.0 | < | 40.0 |
| SR | | 503. | | 499. | | 506. | | 755. |
| TI | | < 25.0 | < | 25.0 | < | 25.0 | < | 25.0 |
| V | | < 5.00 | < | 5.00 | < | 5.00 | < | 5.00 |
| Y | | < 5.00 | < | 5.00 | < | 5.00 | < | 5.00 |
| ZN | | 89. | | 85. | | 44. | | 120. |
| ~~CA~~ | | ~~103.~~ | | ~~103.~~ | | ~~103.~~ | | ~~103.~~ |
| CA | mg/L | 83.1 | | 82.5 | | 86.6 | | 90.7 |
| MG | | 36.7 | | 36.6 | | 38.1 | | 44.6 |
| NA | | 16.3 | | 16.1 | | 16.2 | | 17.4 |
| K | | < 2.00 | < | 2.00 | | 2.18 | | 2.57 |

Cd, Pb will be determined by AA

9/4/86
AS

SF 3413 American Y905 C411JZ

AG

DL1:[001,054]RUN539.BRN 20-AUG-86 07:52:03 PAGE

DATA SET : SF3413

| ELEMENT | | S501S04 | S501S05 | S501S06 | S501S07 |
|---|---|---|---|---|---|
| | Mg/L | | | | |
| AG | | < 6.00 | < 6.00 | < | < 6.00 |
| AL | | < 80.0 | < 80.0 | < | < 80.0 |
| BA | | 118.00 | 85.70 | < | < 6.00 |
| BE | | < 1.00 | < 1.00 | < | < 1.00 |
| ~~CH~~ | | ~~< 10.0~~ | ~~< 10.0~~ | | ~~< 10.0~~ |
| CD | | < 6.00 | < 6.00 | | < 6.00 |
| CR | | < 8.00 | < 8.00 | | < 8.00 |
| CU | | 11.50 | < 6.00 | | < 6.00 |
| FE | | 2200.0 | 131.0 | | < 80.0 |
| LI | | 30.7 | 65.1 | | < 10.0 |
| MN | | 27.40 | 12.90 | | < 5.00 |
| MO | | < 15.0 | 26.9 | | < 15.0 |
| NI | | < 15.0 | < 15.0 | | < 15.0 |
| ~~PB~~ | | ~~< 70.0~~ | ~~< 70.0~~ | | ~~< 40.0~~ |
| SN | | < 40.0 | < 40.0 | | < 40.0 |
| SR | | 602.0 | 10.0 | | < 10.0 |
| TI | | 25.0 | 43.4 | | < 25.0 |
| V | | < 5.00 | 13.00 | | < 5.00 |
| Y | | < 5.00 | < 5.00 | | < 5.00 |
| ZN | | 49.5 | 106.0 | | < 40.0 |
| ~~CA~~ | | ~~103.000~~ | ~~0.500~~ | | ~~< 0.500~~ |
| CA | Mg/L | 79.800 | 0.500 | | 0.500 |
| MG | | 38.400 | 0.100 | | 0.100 |
| NA | | 18.90 | 213.00 | 204.00 | 1.00 |
| K | | < 2.00 | < 2.00 | | < 2.12 |

dil for Na only

CD, Pb will be determined by AA

9/4/86
AS

SF 3413 American  Y 905  C411JZ

DL1:[001,054]RN539A.BRN  27-AUG-86  11:29:44  PAGE 1

DATA SET : SF3413

| ELEMENT | S501R01 | S501S01 | S501D01 | S501S02 |
|---|---|---|---|---|
| MG | < 0.1 | 37.3 | 36.1 | 37.7 |
| K | 2.12 | < 2.00 | < 2.00 | 2.18 |

SM
3Sept86

9/4/86 AJ

SF3413 American y905 C411JZ



DATA SET : SF3413

| ELEMENT | S501S03 | | S501S04 | | S501S05 |
|---|---|---|---|---|---|
| MG | 42.700 | | 36.800 | < | 0.100 |
| K | 2.57 | < | 2.00 | < | 2.00 |

JW 3Sept

9/4/86 AJ



DATA SET : SF3413 SAMPLE ID : S501S03 diluted for Mg reading only

| ELEMENT | Sample |
|---|---|
| MG | 44.60 |

Na 34ppb

SF 3413 American chemical Service

Run No. -539 -

Prep. by AQ Date 8-15-86 Anal. by Date

| Beaker No. | Data Set | Sample | Notes | Beaker No | Data Set | Sample | Notes |
|---|---|---|---|---|---|---|---|
| 1 | SF 3413 | S01 | 51 | 26 | | | |
| 2 | | S02 | 52 | 27 | | | |
| 3 | | S03 | 53 | 28 | | | |
| 4 | | S04 | 54 | 29 | | | |
| 5 | | S05 | 55 | 30 | | | |
| 6 | | ~~S6~~ D01 | 56 | 31 | | | |
| 7 | | R01 | 57 | 32 | | | |
| 8 | SF 3413 | S91 | 58 | 33 | | | |
| 9 | | R13 | 59 | 34 | | | |
| 10 | SF 3421 | S85 | 61 | 35 | | | |
| 11 | | S86 | 62 | 36 | | | |
| 12 | | S87 | 60 | 37 | | | |
| 13 | | D86 | 63 | 38 | | | |
| 14 | | R12 | 64 | 39 | | | |
| 15 | SF 3413 | S02 Dup | 65 | 40 | | | |
| 16 | | S02 Spk | 66 | 41 | | | |
| 17 | SF 3421 | S85 Dup | 67 | 42 | | | |
| 18 | | S85 Spk | 68 | 43 | | | |
| 19 | | | B | 44 | | | |
| 20 | | | B | 45 | | | |
| 21 | | | | 46 | | | |
| 22 | | | | 47 | | | |
| 23 | | | | 48 | | | |
| 24 | | | | 49 | | | |
| 25 | | | | 50 | | | |

SF 3413 American Y905 C41JZ
SF 3414 Sunrise = C481ZZ
SF 3421 N.W. Berrin = C481ZZ

AQ

DL1:[001,054]RUN539.BRN 20-AUG-86 07:42:50 PAGE 1

DATA SET : METALS1

| ELEMENT | DET LIM | BLANK01 | BLANK02 | BLANK01 Digestion |
|---|---|---|---|---|
| AG | 6.000 | 0.402 | 0.050 | -0.022 |
| AL | 80.00 | 1.93 | 0.97 | -2.72 |
| BA | 6.00 | 1.90 | 3.63 | 1.27 |
| BE | 1.000 | -0.157 | 0.047 | -0.110 |
| CD | 10.00 | 1.16 | 1.09 | 1.03 |
| CO | 6.00 | 1.23 | 1.74 | 2.94 |
| CR | 8.00 | -3.32 | 0.61 | -2.72 |
| CU | 6.00 | -0.52 | 0.09 | -1.95 |
| FE | 80.000 | 0.638 | 2.680 | 0.904 |
| LI | 10.00 | 1.97 | 2.54 | 1.01 |
| MN | 5.000 | 0.232 | 0.699 | 0.506 |
| MO | 15.000 | 0.561 | -3.450 | 0.953 |
| NI | 15.00 | -1.77 | -0.88 | -5.99 |
| PB | 70.00 | -9.77 | 4.78 | 8.80 |
| SN | 40.00 | -16.70 | 4.07 | -7.18 |
| SR | 10.000 | 0.183 | 0.491 | 0.290 |
| TI | 25.000 | 1.290 | 2.200 | 0.835 |
| V | 5.00 | 0.64 | -0.38 | -3.09 |
| Y | 5.000 | 0.318 | 0.159 | 0.318 |
| ZN | 40.000 | 0.181 | 1.460 | 0.944 |
| CA | 0.500 | -0.000 | 0.012 | 0.005 |
| CA | 0.500 | 0.010 | 0.031 | 0.009 |
| MG | 0.100 | -0.002 | 0.003 | -0.001 |
| NA | 1.000 | 0.010 | 0.023 | -0.007 |

ug/L

mg/L

All within detection limits

SF 3413 American y905 C.211TZ

SF 3414 Sunrise = C4817Z

SF3421 N.W.Berrin = =

JMM
J Sparks

AG

DL1:E001.054]RUN539.BRN 20-AUG-86 07:42:50 PAGE 2

DATA SET : METALS1

| ELEMENT | DET LIM | BLANK02 Digestion Blk |
|---|---|---|
| AG | 6.000 | 0.400 |
| AL | 80.00 | 4.23 |
| BA | 6.00 | 1.38 |
| BE | 1.000 | -0.216 |
| CD | 10.00 | 1.58 |
| CO | 6.00 | 1.45 |
| CR | 8.000 | 0.757 |
| CU | 6.000 | -0.443 |
| FE | 80.000 | 0.504 |
| LI | 10.00 | 1.39 |
| MN | 5.000 | 0.225 |
| MO | 15.00 | 2.15 |
| NI | 15.00 | -3.11 |
| PB | 70.00 | -9.69 |
| SN | 40.000 | 0.319 |
| SR | 10.000 | 0.095 |
| TI | 25.00 | 1.01 |
| V | 5.000 | -0.721 |
| Y | 5.000 | 0.079 |
| ZN | 40.000 | 0.696 |
| CA | 0.500 | 0.001 |
| CA | 0.500 | 0.009 |
| MG | 0.100 | -0.002 |
| NA | 1.000 | 0.001 |

mgl

mgl

All within ~~10% limit~~ DL

SF 3413 American Y905 C411JZ
SF 3414 Sunrise = C481ZZ
SF 3421 N.W. Berrin = =

Jm 3Sept86 A

DL1:[001,054]RUN539.BRN 20-AUG-86 07:45:24 PAGE 1

DATA SET : METALS1 SAMPLE ID : LAB.AQC

| ELEMENT | | TRUE | MEASURED | % DEV |
|---|---|---|---|---|
| * AG | Mg/L | 168. | 203. | 20.8 |
| AL | | 4760.00 | 4530.00 | -4.75 |
| BA | | 1510.00 | 1470.00 | -2.51 |
| BE | | 728.00 | 701.00 | -3.70 |
| CD | | 425.000 | 423.000 | -0.478 |
| CO | | 972.00 | 940.00 | -3.28 |
| CR | | 1570.00 | 1500.00 | -4.61 |
| CU | | 1160.00 | 1110.00 | -4.10 |
| FE | | 3820.00 | 3700.00 | -2.95 |
| LI | | 808.00 | 790.00 | -2.23 |
| MN | | 1330.00 | 1270.00 | -4.91 |
| MO | | 811.00 | 766.00 | -5.46 |
| NI | | 1180.00 | 1110.00 | -6.13 |
| PB | | 2970.000 | 3000.000 | 0.931 |
| SN | | 2430.00 | 2340.00 | -3.78 |
| SR | | 902.00 | 850.00 | -5.74 |
| TI | | 1200.00 | 1150.00 | -4.42 |
| V | | 744.00 | 708.00 | -4.82 |
| Y | | 784.00 | 744.00 | -5.16 |
| ZN | | 2800.00 | 2690.00 | -4.04 |
| CA | | 12.40 | 12.60 | 1.62 |
| CA | mg/L | 13.20 | 13.90 | 4.85 |
| MG | | 5.21 | 4.98 | -4.37 |
| NA | | 18.50 | 18.00 | -2.50 |

All within 10% limits except *
However, samples were free of Ag.

Ag Norm on WB378

SF 3413 American y 905 C411JZ
SF 34M Sunrise = C481ZZ
SF 3421 N.W. Bering = =



DATA SET : METALS1 SAMPLE ID : LAB.AQC

Jun 25 yrs

| ELEMENT | | TRUE | MEASURED | % DEV |
|---|---|---|---|---|
| * AG | ug/L | 168. | 206. | 22.61 |
| AL | | 4760.00 | 4580.00 | -3.76 |
| BA | | 1510.00 | 1490.00 | -1.33 |
| BE | | 728.00 | 705.00 | -3.11 |
| CD | | 425.000 | 423.000 | -0.526 |
| CO | | 972.00 | 950.00 | -2.27 |
| CR | | 1570.00 | 1520.00 | -3.00 |
| CU | | 1160.00 | 1120.00 | -2.99 |
| FE | | 3820.00 | 3740.00 | -2.11 |
| LI | | 808.000 | 801.000 | -0.911 |
| MN | | 1330.00 | 1280.00 | -4.15 |
| MO | | 811.00 | 778.00 | -4.02 |
| NI | | 1180.00 | 1130.00 | -4.47 |
| PB | | 2970.000 | 2990.000 | 0.388 |
| SN | | 2430.00 | 2380.00 | -2.04 |
| SR | | 902.00 | 862.00 | -4.43 |
| TI | | 1200.00 | 1160.00 | -3.38 |
| V | | 744.00 | 715.00 | -3.89 |
| Y | | 784.00 | 754.00 | -3.86 |
| ZN | | 2800.00 | 2700.00 | -3.56 |
| CA | | 12.40 | 12.80 | 3.09 |
| CA | mg/L | 13.20 | 13.90 | 5.47 |
| MG | | 5.21 | 5.02 | -3.61 |
| NA | | 18.50 | 18.20 | -1.44 |

All within 10% limits except the Hi Ag Bias.
However non of the samples had Ag > detection lim

SF 3413 American Y 905 C41JZ
SF 3414 Sunrise = C48JZZ
SF 3421 N.W. Berrin = =

A

[redacted]001,054]RUN539.BRN 20-AUG-86 07:47:38 PAGE 3

[redacted]ET : METALS1 SAMPLE ID : LAB.ACC [redacted]

JM
3 Sept 86

| ELEMENT | | TRUE | MEASURED | % DEV |
|---|---|---|---|---|
| * AG | ug/L | 168. | 198. | 17.8% |
| AL | | 4760.00 | 4430.00 | -6.97 |
| BA | | 1510.00 | 1430.00 | -5.44 |
| BE | | 728.00 | 686.00 | -5.84 |
| CD | | 425.00 | 412.00 | -3.20 |
| CO | | 972.00 | 917.00 | -5.62 |
| CR | | 1570.00 | 1440.00 | -8.14 |
| CU | | 1160.00 | 1080.00 | -7.00 |
| FE | | 3820.00 | 3590.00 | -5.98 |
| LI | | 808.00 | 768.00 | -4.97 |
| MN | | 1330.00 | 1240.00 | -7.36 |
| MO | | 811.00 | 749.00 | -7.59 |
| NI | | 1180.00 | 1090.00 | -7.66 |
| PB | | 2970.00 | 2880.00 | -3.05 |
| SN | | 2430.00 | 2250.00 | -7.31 |
| SR | | 902.00 | 823.00 | -8.78 |
| TI | | 1200.00 | 1110.00 | -7.20 |
| V | | 744.00 | 687.00 | -7.62 |
| Y | | 784.00 | 722.00 | -7.98 |
| ZN | | 2800.00 | 2630.00 | -6.13 |
| CA | | 12.40 | 12.20 | -1.66 |
| CA | mg/L | 13.20 | 13.50 | 2.36 |
| MG | | 5.21 | 4.88 | -6.32 |
| NA | | 18.50 | 17.60 | -4.80 |

All within 10% limits except *
However there were no Ag [redacted] samples.

SF 3413 American Y905 C411JZ
SF 3414 Sunrise = C481ZZ
SF 3421 N.W. Berlin = =

DL1:[001,054]RUN539.BRN 20-AUG-86 07:49:48 PAGE 1

Jun 3 Sept

DATA SET : SF3413 SAMPLE ID : S501S02

| ELEMENT | SAMPLE | DUPLICATE | AVERAGE | R P D |
|---|---|---|---|---|
| AG | -2. | -0. | -1. | -150. |
| AL | -45.90 | -42.40 | -44.10 | -7.84 |
| BA | 114.00 | 112.00 | 113.00 | 1.97 |
| BE | -0.4 | -0.5 | -0.5 | -28.4 |
| CD | 0.8 | 1.1 | 1.0 | 31.3 |
| CO | 0.7 | 2.1 | 1.4 | 98.8 |
| CR | 0. | 1. | 1. | 128. |
| CU | 11.6 | 4.9 | 8.2 | 81.8 cutt. [illegible] +10 |
| FE | 2040.000 | 2020.000 | 2030.000 | 0.881 |
| LI | 30.30 | 29.00 | 29.60 | 4.27 |
| MN | 48.60 | 47.80 | 48.20 | 1.75 |
| MO | 8.64 | 8.30 | 8.47 | 4.05 |
| NI | 8. | -4. | 2. | 519. |
| PB | 5.3 | 4.7 | 5.0 | 12.7 |
| SN | 1. | -1. | 0. | 1870. |
| SR | 506.000 | 509.000 | 507.000 | 0.457 |
| TI | 3.7 | 4.2 | 4.0 | 12.4 |
| V | 1.1 | 3.0 | 2.1 | 91.5 |
| Y | 0.2 | 0.4 | 0.3 | 75.1 |
| ZN | 43.7 | 31.4 | 37.6 | 32.6 |
| CA | 103.000 | 103.000 | 103.000 | 0.000 |
| CA | 86.600 | 86.000 | 86.300 | 0.682 |
| MG | 38.100 | 38.100 | 38.100 | 0.033 |
| NA | 16.200 | 16.300 | 16.300 | 0.895 |

dgIC

mgIC

All Duplicates were < detection limit or 10 %

SF 3413 American r905 C4UJZ AG
SF 3414 Sunrise " <481ZZ
SF 3421 W. Berlin " =

JVM 3 Sept 86



[redacted]TA SET : SF3421 SAMPLE ID : FL08885 [redacted]

| ELEMENT | SAMPLE | DUPLICATE | AVERAGE | R P D |
|---|---|---|---|---|
| AG | -1. | 0. | -0. | -388. |
| AL | 20.7 | 27.4 | 24.0 | 28.0 |
| BA | 23.00 | 22.30 | 22.70 | 3.21 |
| BE | -0.2 | -0.2 | -0.2 | -11.3 |
| CD | 1.75 | 1.77 | 1.76 | 1.53 |
| CO | -1. | -0. | -0. | -133. |
| CR | 1.8 | 1.5 | 1.7 | 18.1 |
| CU | 26.20 | 25.70 | 25.90 | 2.03 |
| FE | 121.00 | 115.00 | 118.00 | 5.39 |
| LI | 7.69 | 7.14 | 7.41 | 7.39 |
| MN | 6.73 | 6.57 | 6.65 | 2.44 |
| MO | 2.54 | 2.76 | 2.65 | 8.43 |
| NI | 1. | 4. | 3. | 104. |
| PB | -9.7 | -3.3 | -6.5 | -97.8 |
| SN | -0.6 | -1.7 | -1.1 | -95.5 |
| SR | 138.00 | 137.00 | 137.00 | 1.01 |
| TI | 4.21 | 4.08 | 4.15 | 2.98 |
| V | 1. | -1. | 0. | 582. |
| Y | -0. | 0. | 0. | 336. |
| ZN | 318.00 | 313.00 | 315.00 | 1.84 |
| CA | 28.20 | 27.70 | 27.90 | 1.48 |
| CA | 29.40 | 29.10 | 29.20 | 1.26 |
| MG | 6.62 | 6.51 | 6.56 | 1.73 |
| NA | 7.20 | 7.10 | 7.15 | 1.40 |

µg/L

mg/L

All duplicates < detection limits

[redacted] [redacted]

| | | | | |
|---|---|---|---|---|
| SF 3413 | American | Y 905 | C411JZ | |
| SF 3414 | Sunrise | Y905 | C481ZZ | Jm 3 Sept 86 |
| SF 3421 | N-W Berrin | = | = | |

DL1:[001,054]RUN539.BRN 20-AUG-86 08:05:40 PAGE 1

DATA SET : SF3413 SAMPLE ID : S501S02

| ELEMENT | SAMPLE | SPIKE | SPIKE ADDED | % RECOVERY |
|---|---|---|---|---|
| | ug/L | | | |
| AG | -2. | 54. | 50. | 111. |
| AL | -45.9 | 672.0 | 800.0 | 89.7 |
| BA | 114.0 | 301.0 | 200.0 | 93.4 |
| BE | -0.4 | 8.9 | 10.0 | 92.7 |
| CD | 0.8 | 23.8 | 25.0 | 91.9 |
| CO | 0.7 | 93.5 | 100.0 | 92.7 |
| CR | 0.2 | 94.1 | 100.0 | 93.9 |
| CU | 11.6 | 48.6 | 50.0 | 74.1 * |
| FE | 2040.0 | 2730.0 | 800.0 | 86.6 |
| LI | 30.3 | 82.6 | 54.0 | 96.9 |
| MN | 48.6 | 93.9 | 50.0 | 90.5 |
| MO | 8.6 | 103.0 | 100.0 | 94.1 |
| NI | 8.0 | 141.0 | 150.0 | 88.5 |
| PB | 5.3 | 789.0 | 800.0 | 97.9 |
| SN | 1. | 417. | 400. | 104. |
| SR | 506.0 | 1460.0 | 1000.0 | 95.7 |
| TI | 3.7 | 96.4 | 100.0 | 92.7 |
| V | 1.1 | 45.2 | 50.0 | 88.1 |
| Y | 0.2 | 47.0 | 50.0 | 93.6 |
| ZN | 43.7 | 404.0 | 400.0 | 90.2 |
| CA | 103.000 | 103.000 | 50.000 | 0.000 |
| | mg/L | | | |
| CA | 86.6 | 132.0 | 50.0 | 91.8 |
| MG | 38.1 | 58.8 | 25.0 | 83.0 |
| NA | 16.2 | 65.1 | 50.0 | 97.8 |

All spks within 15 % limits except *

Cu d.l. raised to 20

SF 3415 American Y90 C411JZ
SF 3414 Sunrise " C481ZZ
SF 3421 N.W. Berrin " "

AQ

DL1:[001,054]RUN539.BRN 20-AUG-86 08:10:55 PAGE 1

DATA SET : SF3421 SAMPLE ID : FL08S85

| ELEMENT | | SAMPLE | SPIKE | SPIKE ADDED | % RECOVERY | |
|---|---|---|---|---|---|---|
| | ug/L | | | | | |
| AG | | -1. | 53. | 50. | 107. | |
| AL | | 20.7 | 694.0 | 800.0 | 84.2 | * |
| BA | | 23.0 | 205.0 | 200.0 | 90.8 | |
| BE | | -0.2 | 8.7 | 10.0 | 89.2 | |
| ~~CD~~ | | ~~1.8~~ | ~~22.4~~ | ~~25.0~~ | ~~82.5~~ | ~~*~~ |
| CO | | -0.5 | 93.6 | 100.0 | 94.1 | |
| CR | | 1.8 | 91.4 | 100.0 | 89.6 | |
| CU | | 26.2 | 62.9 | 50.0 | 73.5 | * |
| FE | | 121.0 | 799.0 | 800.0 | 84.6 | |
| LI | | 7.7 | 59.3 | 54.0 | 95.5 | |
| MN | | 6.7 | 51.4 | 50.0 | 89.4 | |
| MO | | 2.5 | 96.1 | 100.0 | 93.5 | |
| NI | | 1.3 | 129.0 | 150.0 | 85.3 | |
| PB | | -9.7 | 757.0 | 800.0 | 95.8 | |
| SN | | -0.6 | 365.0 | 400.0 | 91.4 | |
| SR | | 138.0 | 1080.0 | 1000.0 | 93.8 | |
| TI | | 4.2 | 92.6 | 100.0 | 88.4 | |
| V | | 1.2 | 44.2 | 50.0 | 86.0 | |
| Y | | -0.0 | 45.5 | 50.0 | 91.2 | |
| ZN | | 318.0 | 667.0 | 400.0 | 87.0 | |
| CA | | 28. | 103. | 50. | 150. | |
| CA | mg/L | 29.4 | 77.1 | 50.0 | 95.4 | |
| MG | | 6.6 | 29.9 | 25.0 | 93.0 | |
| NA | | 7.2 | 54.3 | 50.0 | 94.2 | |

Cu d.l. raised here

All spks within 15% limits.

CD ~~* *~~ will be done by AA

Jm 3/5/86

DL1:[001,054]RN539A.BRN 27-AUG-86 11:20:10 PAGE 1

DATA SET : METALS1 SAMPLE ID : LAB.AQC

| ELEMENT | TRUE | MEASURED | % DEV |
|---|---|---|---|
| MG | 5.21 | 4.97 | -4.59 |
| K | 96.0 | 95.4 | -0.676 |

All Qc within limits

| | | | |
|---|---|---|---|
| SF 3413 | American | Y905 | C411JZ |
| SF 3414 | Sunrise | = | C481ZZ |
| SF 3421 | N.W. Berrin | = | = |

DL1:[001,054]RN539A.BRN 27-AUG-86 11:20:20 PAGE 2

DATA SET : METALS1 SAMPLE ID : LAB.AVG

| ELEMENT | TRUE | MEASURED | % DEV |
|---|---|---|---|
| MG | 5.21 | 4.99 | -4.25 |
| K | 96.0 | 95.9 | -0.146 |

Jun 3 Sept

All QC within limits.

| | | | | |
|---|---|---|---|---|
| SF | 3413 | American | Y 905 | C411JZ |
| SF | 3414 | Sunrise | = | C481ZZ |
| SF | 3421 | N.W. Berrin | = | = |

DATA SET : METALS1 SAMPLE ID : LAB.AQC

| ELEMENT | TRUE | MEASURED | % DEV |
|---|---|---|---|
| MG | 5.21 | 4.98 | -4.42 |
| K | 96.0 | 96.9 | 0.934 |

Jun 3 spot

All QC within limit.

| | | | | |
|---|---|---|---|---|
| SF | 3413 | American | Y 905 | C4115Z |
| SF | 3414 | Sunrise | = | C4817Z |
| SF | 3421 | N.W. Berrin | = | = |

SF 3413
SF 3414
SF 3421

American Sunrise
N.W. Berrin

Y905 C411JZ
5 C4817Z
2

DL1:[001,054]RN539A.BRN 27-AUG-86 11:42:21 PAGE 1

DATA SET : SF3421 SAMPLE ID : FL08S85

JVM 3 Sept

| ELEMENT | SAMPLE | SPIKE | SPIKE ADDED | % RECOVERY |
|---|---|---|---|---|
| MG | 6.7 | 31.3 | 25.0 | 98.3 |
| K | 4.2 | 22.4 | 20.0 | 90.7 |

All QC within 15 % limit

SF 3413 American 1905 C411JZ
SF 3414 Sunrise = C481ZZ
SF 3421 N.W. Berrin = =

Jun 3Sept86

DL1:[001,054]RN539A.BRN 27-AUG-86 11:37:25 PAGE 1

DATA SET : SF3413 SAMPLE ID : S501S02

| ELEMENT | SAMPLE | SPIKE | SPIKE ADDED | % RECOVERY |
|---|---|---|---|---|
| MG | 37.7 | 59.7 | 25.0 | 88.2 |
| K | 2.2 | 19.8 | 20.0 | 88.2 |

All QC within 15% limits

| | | | | |
|---|---|---|---|---|
| | | | Y905 | C 4 11 JZ |
| SF | 3413 | American | = | C4B1ZZ |
| SF | 3414 | Sunrise | | |
| SF | 3421 | N.W. Berrin | = | = |

JWM 3Sept86

DL1:E001.054JRN539A.BRN 27-AUG-86 11:18:11 PAGE 1

DATA SET : METALS1

| ELEMENT | DET LIM | BLANK01 | BLANK02 dig. | BLANK03 dig. |
|---|---|---|---|---|
| MG | 0.10 | -0.003 | 0.007 | 0.002 |
| K | 2.00 | 0.962 | 0.233 | 0.204 |

All QC within limits.

SF 3413 American 4905 C4 11JZ
SF 3414 Sunrise = C48178
SF 3421 N.W. Berrin = =

Jan
35 gal



DATA SET : METALS1

| ELEMENT | DET LIM | BLANK04 |
|---|---|---|
| MG | 0.10 | 0.003 |
| K | 2.00 | 1.83 |

DL1:[001,054]RN539A.BRN 27-AUG-86 11:21:12 PAGE 1

DATA SET : SF3413 SAMPLE ID : S501S02 dig

| ELEMENT | SAMPLE | DUPLICATE | AVERAGE | R P D |
|---|---|---|---|---|
| MG | 37.7 | 37.4 | 37.5 | 0.818 |
| K | 2.2 | 1.7 | 1.9 | 24.7 |

JVM
35 gt dk

Duplicates within dectection limit

SF 3413 American Y905 C411JZ

SF 3414 Sunrise = C481QZ

SF 3421 N.W. Berrin = =

DATA SET : SF3421 SAMPLE ID : FL08S85 dig.

| ELEMENT | SAMPLE | DUPLICATE | AVERAGE | R P D | |
|---|---|---|---|---|---|
| MG | 6.73 | 6.25 | 6.49 | 7.34 | |
| K | 4.2 | 1.7 | 3.0 | 84.8 | * |

duplicates within detection limits except *

± DL OF AV.

Jan 25 1988