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B06N49-TMA-240

0045411

TMA
Thermo Analytical Inc.

Skinner & Sherman Labs., Inc.
300 Second Avenue
Post Office Box 521
Waltham, MA 02254-0521
(617) 890-7200
FAX (617) 890-3883

September 22, 1992

TMA/NORCAL
2030 Wright Avenue
Richmond, CA 94804
Attention: Dan Stuermer

## Quality Control Narrative

### Scope

Fourteen (14) biota samples were submitted to TMA/Skinner & Sherman Laboratories, Inc. on July 27, 1992 from Westinghouse/ Hanford Company. The samples were analyzed for the USEPA CLP TAL metals. The analysis were performed under Skinner and Sherman work order S207214.

### Methodology

The samples were prepared, analyzed and reported in accordance with the USEPA Contract Laboratory Program Statement of Work (ILM02).

### Discussion

All quality control requirements were met for the samples with the following exceptions:

The arsenic and mercury digestion spike recovery exceeded the control limit requirements.

The chromium, iron, and zinc laboratory duplicates exceeded the control limits requirements.

Please feel free to call if there are any questions concerning this package.

Respectfully submitted,

TMA/SKINNER & SHERMAN LABORATORIES, INC.

David N. Peterson
Assistant Laboratory Manager

OCT 1996
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WESTINGHOUSE/HANFORD
1

SAMPLE NUMBER:

INORGANIC ANALYSIS DATA SHEET

B06N49

Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Code: SKINER Case No.: N2-07-086SAS No.: SDG No.: B06N49

rix (soil/water): SOIL Lab Sample ID: 07214-01S

el (low/med): LOW Date Received: 07/27/92

olids: 23.9

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

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 58.4 | B | | P |
| 7440-36-0 | Antimony | 13.8 | U | | P |
| 7440-38-2 | Arsenic | 3.3 | B | WN | F |
| 7440-39-3 | Barium | 17.5 | B | | P |
| 7440-41-7 | Beryllium | 0.59 | U | | P |
| 7440-43-9 | Cadmium | 1.3 | U | | P |
| 7440-70-2 | Calcium | 19700 | | | P |
| 7440-47-3 | Chromium | 4.1 | U | * | P |
| 7440-48-4 | Cobalt | 2.9 | U | | P |
| 7440-50-8 | Copper | 25.2 | | | P |
| 7439-89-6 | Iron | 206 | | * | P |
| 7439-92-1 | Lead | 3.0 | | | F |
| 7439-95-4 | Magnesium | 4590 | | | P |
| 7439-96-5 | Manganese | 34.3 | | | P |
| 7439-97-6 | Mercury | 0.71 | | N | CV |
| 7440-02-0 | Nickel | 5.0 | U | | P |
| 7440-09-7 | Potassium | 25900 | | | P |
| 7782-49-2 | Selenium | 4.7 | | | F |
| 7440-22-4 | Silver | 4.0 | U | | P |
| 7440-23-5 | Sodium | 320 | B | | P |
| 7440-28-0 | Thallium | 3.5 | U | W | F |
| 7440-62-2 | Vanadium | 2.8 | U | | P |
| 7440-66-6 | Zinc | 49.6 | | * | P |
| | Cyanide | | | | NR |

or Before: BROWN Clarity Before: Texture: FINE

or After: BROWN Clarity After: Artifacts: YES

ments:
LEAVES

002

9613491.2825

WESTINGHOUSE/HANFORD
1

# INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B06N50

Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Code: SKINER Case No.: N2-07-086SAS No.: SDG No.: B06N49

rix (soil/water): SOIL Lab Sample ID: 07214-02S

el (low/med): LOW Date Received: 07/27/92

olids: 39.3

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

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 45.6 | B | | P |
| 7440-36-0 | Antimony | 8.1 | U | | P |
| 7440-38-2 | Arsenic | 1.6 | B | WN | F |
| 7440-39-3 | Barium | 36.4 | B | | P |
| 7440-41-7 | Beryllium | 0.34 | U | | P |
| 7440-43-9 | Cadmium | 0.73 | U | | P |
| 7440-70-2 | Calcium | 24700 | | | P |
| 7440-47-3 | Chromium | 2.4 | U | * | P |
| 7440-48-4 | Cobalt | 1.7 | U | | P |
| 7440-50-8 | Copper | 9.2 | B | | P |
| 7439-89-6 | Iron | 120 | | * | P |
| 7439-92-1 | Lead | 2.7 | | | F |
| 7439-95-4 | Magnesium | 3710 | | | P |
| 7439-96-5 | Manganese | 17.5 | | | P |
| 7439-97-6 | Mercury | 0.32 | | N | CV |
| 7440-02-0 | Nickel | 2.9 | U | | P |
| 7440-09-7 | Potassium | 16000 | | | P |
| 7782-49-2 | Selenium | 2.7 | | + | F |
| 7440-22-4 | Silver | 2.3 | U | | P |
| 7440-23-5 | Sodium | 230 | B | | P |
| 7440-28-0 | Thallium | 2.2 | U | | F |
| 7440-62-2 | Vanadium | 1.6 | U | | P |
| 7440-66-6 | Zinc | 36.7 | | * | P |
| | Cyanide | | | | NR |

or Before: BROWN Clarity Before: Texture: FINE

or After: BROWN Clarity After: Artifacts: YES

ments:
LEAVES

003

WESTINGHOUSE/HANFORD
1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER:

B06N51

Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Code: SKINER Case No.: N2-07-086SAS No.: SDG No.: B06N49

rix (soil/water): SOIL Lab Sample ID: 07214-03S

el (low/med): LOW Date Received: 07/27/92

olids: 35.3

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

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 59.6 | B | | P |
| 7440-36-0 | Antimony | 9.2 | U | | P |
| 7440-38-2 | Arsenic | 1.7 | B | WN | F |
| 7440-39-3 | Barium | 38.4 | B | | P |
| 7440-41-7 | Beryllium | 0.39 | U | | P |
| 7440-43-9 | Cadmium | 0.83 | U | | P |
| 7440-70-2 | Calcium | 24400 | | | P |
| 7440-47-3 | Chromium | 2.7 | U | * | P |
| 7440-48-4 | Cobalt | 1.9 | U | | P |
| 7440-50-8 | Copper | 6.7 | B | | P |
| 7439-89-6 | Iron | 136 | | * | P |
| 7439-92-1 | Lead | 1.7 | | | F |
| 7439-95-4 | Magnesium | 3190 | | | P |
| 7439-96-5 | Manganese | 30.6 | | | P |
| 7439-97-6 | Mercury | 1.4 | | N | CV |
| 7440-02-0 | Nickel | 3.3 | U | | P |
| 7440-09-7 | Potassium | 16600 | | | P |
| 7782-49-2 | Selenium | 2.8 | | | F |
| 7440-22-4 | Silver | 2.7 | U | | P |
| 7440-23-5 | Sodium | 171 | B | | P |
| 7440-28-0 | Thallium | 2.4 | U | | F |
| 7440-62-2 | Vanadium | 1.8 | U | | P |
| 7440-66-6 | Zinc | 29.8 | | * | P |
| | Cyanide | | | | NR |

lor Before: BROWN Clarity Before: Texture: FINE

lor After: BROWN Clarity After: Artifacts: YES

mments:
LEAVES

004

WESTINGHOUSE/HANFORD
1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER:

B06N52

Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Code: SKINER Case No.: N2-07-086SAS No.: SDG No.: B06N49

rix (soil/water): SOIL Lab Sample ID: 07214-04S

el (low/med): LOW Date Received: 07/27/92

olids: 34.7

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

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 38.8 | B | | P |
| 7440-36-0 | Antimony | 9.3 | U | | P |
| 7440-38-2 | Arsenic | 2.1 | B | WN | F |
| 7440-39-3 | Barium | 39.0 | B | | P |
| 7440-41-7 | Beryllium | 0.40 | U | | P |
| 7440-43-9 | Cadmium | 0.85 | U | | P |
| 7440-70-2 | Calcium | 25100 | | | P |
| 7440-47-3 | Chromium | 2.8 | U | * | P |
| 7440-48-4 | Cobalt | 2.0 | U | | P |
| 7440-50-8 | Copper | 8.1 | B | | P |
| 7439-89-6 | Iron | 118 | | * | P |
| 7439-92-1 | Lead | 2.1 | | | F |
| 7439-95-4 | Magnesium | 3150 | | | P |
| 7439-96-5 | Manganese | 28.0 | | | P |
| 7439-97-6 | Mercury | 0.59 | | N | CV |
| 7440-02-0 | Nickel | 3.4 | U | | P |
| 7440-09-7 | Potassium | 16300 | | | P |
| 7782-49-2 | Selenium | 2.6 | B | | F |
| 7440-22-4 | Silver | 2.7 | U | | P |
| 7440-23-5 | Sodium | 199 | B | | P |
| 7440-28-0 | Thallium | 2.4 | U | | F |
| 7440-62-2 | Vanadium | 1.9 | U | | P |
| 7440-66-6 | Zinc | 23.7 | | * | P |
| | Cyanide | | | | NR |

or Before: BROWN Clarity Before: Texture: FINE

.or After: BROWN Clarity After: Artifacts: YES

ments:
LEAVES

005

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WESTINGHOUSE/HANFORD
1

SAMPLE NUMBER:

INORGANIC ANALYSIS DATA SHEET

B06N53

Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Code: SKINER Case No.: N2-07-086SAS No.: SDG No.: B06N49

rix (soil/water): SOIL Lab Sample ID: 07214-05S

el (low/med): LOW Date Received: 07/27/92

olids: 37.9

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

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 43.4 | B | | P |
| 7440-36-0 | Antimony | 8.7 | U | | P |
| 7440-38-2 | Arsenic | 1.9 | B | WN | F |
| 7440-39-3 | Barium | 32.3 | B | | P |
| 7440-41-7 | Beryllium | 0.37 | U | | P |
| 7440-43-9 | Cadmium | 0.79 | U | | P |
| 7440-70-2 | Calcium | 21500 | | | P |
| 7440-47-3 | Chromium | 2.6 | U | * | P |
| 7440-48-4 | Cobalt | 1.8 | U | | P |
| 7440-50-8 | Copper | 4.4 | B | | P |
| 7439-89-6 | Iron | 108 | | * | P |
| 7439-92-1 | Lead | 1.5 | B | | F |
| 7439-95-4 | Magnesium | 3260 | | | P |
| 7439-96-5 | Manganese | 19.3 | | | P |
| 7439-97-6 | Mercury | 0.58 | | N | CV |
| 7440-02-0 | Nickel | 3.2 | U | | P |
| 7440-09-7 | Potassium | 18000 | | | P |
| 7782-49-2 | Selenium | 2.4 | B | | F |
| 7440-22-4 | Silver | 2.5 | U | | P |
| 7440-23-5 | Sodium | 168 | B | | P |
| 7440-28-0 | Thallium | 2.3 | U | | F |
| 7440-62-2 | Vanadium | 1.7 | U | | P |
| 7440-66-6 | Zinc | 17.3 | | * | P |
| | Cyanide | | | | NR |

lor Before: BROWN Clarity Before: Texture: FINE

lor After: BROWN Clarity After: Artifacts: YES

mments:
LEAVES

008

WESTINGHOUSE/HANFORD
1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER:

B06N54

Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Code: SKINER Case No.: N2-07-086SAS No.: SDG No.: B06N49

rix (soil/water): SOIL Lab Sample ID: 07214-06S

el (low/med): LOW Date Received: 07/27/92

olids: 39.5

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

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 40.8 | B | | P |
| 7440-36-0 | Antimony | 8.4 | U | | P |
| 7440-38-2 | Arsenic | 2.1 | B | WN | F |
| 7440-39-3 | Barium | 26.4 | B | | P |
| 7440-41-7 | Beryllium | 0.35 | U | | P |
| 7440-43-9 | Cadmium | 0.76 | U | | P |
| 7440-70-2 | Calcium | 26200 | | | P |
| 7440-47-3 | Chromium | 2.5 | U | * | P |
| 7440-48-4 | Cobalt | 1.8 | U | | P |
| 7440-50-8 | Copper | 6.5 | B | | P |
| 7439-89-6 | Iron | 140 | | * | P |
| 7439-92-1 | Lead | 1.6 | | | F |
| 7439-95-4 | Magnesium | 5500 | | | P |
| 7439-96-5 | Manganese | 69.9 | | | P |
| 7439-97-6 | Mercury | 0.57 | | N | CV |
| 7440-02-0 | Nickel | 3.0 | U | | P |
| 7440-09-7 | Potassium | 10700 | | | P |
| 7782-49-2 | Selenium | 1.9 | B | W | F |
| 7440-22-4 | Silver | 2.4 | U | | P |
| 7440-23-5 | Sodium | 198 | B | | P |
| 7440-28-0 | Thallium | 2.1 | U | | F |
| 7440-62-2 | Vanadium | 1.7 | U | | P |
| 7440-66-6 | Zinc | 33.4 | | * | P |
| | Cyanide | | | | NR |

lor Before: GREEN Clarity Before: Texture: FINE

lor After: GREEN Clarity After: Artifacts: YES

nments:
LEAVES

007

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WESTINGHOUSE/HANFORD
1

SAMPLE NUMBER:

INORGANIC ANALYSIS DATA SHEET

B06N55

Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Code: SKINER Case No.: N2-07-086SAS No.: SDG No.: B06N49

rix (soil/water): SOIL Lab Sample ID: 07214-07S

el (low/med): LOW Date Received: 07/27/92

olids: 39.7

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

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 26.1 | B | | P |
| 7440-36-0 | Antimony | 8.3 | U | | P |
| 7440-38-2 | Arsenic | 1.3 | U | WN | F |
| 7440-39-3 | Barium | 24.3 | B | | P |
| 7440-41-7 | Beryllium | 0.35 | U | | P |
| 7440-43-9 | Cadmium | 0.76 | U | | P |
| 7440-70-2 | Calcium | 17500 | | | P |
| 7440-47-3 | Chromium | 2.5 | U | * | P |
| 7440-48-4 | Cobalt | 1.8 | U | | P |
| 7440-50-8 | Copper | 6.1 | B | | P |
| 7439-89-6 | Iron | 89.4 | | * | P |
| 7439-92-1 | Lead | 2.0 | | | F |
| 7439-95-4 | Magnesium | 4190 | | | P |
| 7439-96-5 | Manganese | 9.4 | | | P |
| 7439-97-6 | Mercury | 0.31 | | N | CV |
| 7440-02-0 | Nickel | 3.0 | U | | P |
| 7440-09-7 | Potassium | 14600 | | | P |
| 7782-49-2 | Selenium | 2.3 | B | | F |
| 7440-22-4 | Silver | 2.4 | U | | P |
| 7440-23-5 | Sodium | 185 | B | | P |
| 7440-28-0 | Thallium | 2.2 | U | | F |
| 7440-62-2 | Vanadium | 1.7 | U | | P |
| 7440-66-6 | Zinc | 26.0 | | * | P |
| | Cyanide | | | | NR |

or Before: BROWN Clarity Before: Texture: FINE

or After: BROWN Clarity After: Artifacts: YES

ments:
LEAVES

008

WESTINGHOUSE/HANFORD
1

SAMPLE NUMBER:

INORGANIC ANALYSIS DATA SHEET

B06N56

Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Code: SKINER Case No.: N2-07-086SAS No.: SDG No.: B06N49

rix (soil/water): SOIL Lab Sample ID: 07214-08S

el (low/med): LOW Date Received: 07/27/92

olids: 34.9

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

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 47.2 | B | | P |
| 7440-36-0 | Antimony | 9.5 | U | | P |
| 7440-38-2 | Arsenic | 1.6 | B | WN | F |
| 7440-39-3 | Barium | 26.9 | B | | P |
| 7440-41-7 | Beryllium | 0.40 | U | | P |
| 7440-43-9 | Cadmium | 0.86 | U | | P |
| 7440-70-2 | Calcium | 18600 | | | P |
| 7440-47-3 | Chromium | 3.9 | B | * | P |
| 7440-48-4 | Cobalt | 2.0 | U | | P |
| 7440-50-8 | Copper | 7.8 | B | | P |
| 7439-89-6 | Iron | 102 | | * | P |
| 7439-92-1 | Lead | 2.8 | | | F |
| 7439-95-4 | Magnesium | 1940 | B | | P |
| 7439-96-5 | Manganese | 22.3 | | | P |
| 7439-97-6 | Mercury | 0.67 | | N | CV |
| 7440-02-0 | Nickel | 5.1 | B | | P |
| 7440-09-7 | Potassium | 17500 | | | P |
| 7782-49-2 | Selenium | 2.2 | B | | F |
| 7440-22-4 | Silver | 2.8 | U | | P |
| 7440-23-5 | Sodium | 175 | B | | P |
| 7440-28-0 | Thallium | 2.4 | U | | F |
| 7440-62-2 | Vanadium | 1.9 | U | | P |
| 7440-66-6 | Zinc | 35.0 | | * | P |
| | Cyanide | | | | NR |

lor Before: BROWN Clarity Before: Texture: FINE

lor After: BROWN Clarity After: Artifacts: YES

mments:
LEAVES

009

WESTINGHOUSE/HANFORD
1

# INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B06N57

Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Code: SKINER Case No.: N2-07-086SAS No.: SDG No.: B06N49

rix (soil/water): SOIL Lab Sample ID: 07214-09S

el (low/med): LOW Date Received: 07/27/92

olids: 45.0

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

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 41.7 | B | | P |
| 7440-36-0 | Antimony | 7.1 | U | | P |
| 7440-38-2 | Arsenic | 1.4 | B | WN | F |
| 7440-39-3 | Barium | 36.8 | B | | P |
| 7440-41-7 | Beryllium | 0.30 | U | | P |
| 7440-43-9 | Cadmium | 0.64 | U | | P |
| 7440-70-2 | Calcium | 18800 | | | P |
| 7440-47-3 | Chromium | 3.2 | B | * | P |
| 7440-48-4 | Cobalt | 1.5 | U | | P |
| 7440-50-8 | Copper | 5.5 | B | | P |
| 7439-89-6 | Iron | 109 | | * | P |
| 7439-92-1 | Lead | 1.7 | | | F |
| 7439-95-4 | Magnesium | 4530 | | | P |
| 7439-96-5 | Manganese | 25.0 | | | P |
| 7439-97-6 | Mercury | 2.0 | | N | CV |
| 7440-02-0 | Nickel | 2.6 | U | | P |
| 7440-09-7 | Potassium | 13300 | | | P |
| 7782-49-2 | Selenium | 2.0 | B | | F |
| 7440-22-4 | Silver | 2.1 | U | | P |
| 7440-23-5 | Sodium | 191 | B | | P |
| 7440-28-0 | Thallium | 1.9 | U | | F |
| 7440-62-2 | Vanadium | 1.4 | U | | P |
| 7440-66-6 | Zinc | 28.5 | | * | P |
| | Cyanide | | | | NR |

lor Before: BROWN Clarity Before: Texture: FINE

lor After: BROWN Clarity After: Artifacts: YES

mments:
LEAVES

WESTINGHOUSE/HANFORD
1

SAMPLE NUMBER:

INORGANIC ANALYSIS DATA SHEET

B06N58

Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Code: SKINER Case No.: N2-07-086SAS No.: SDG No.: B06N49

rix (soil/water): SOIL Lab Sample ID: 07214-10S

el (low/med): LOW Date Received: 07/27/92

olids: 38.9

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

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 105 | | | P |
| 7440-36-0 | Antimony | 8.5 | U | | P |
| 7440-38-2 | Arsenic | 2.1 | B | WN | F |
| 7440-39-3 | Barium | 14.1 | B | | P |
| 7440-41-7 | Beryllium | 0.36 | U | | P |
| 7440-43-9 | Cadmium | 0.77 | U | | P |
| 7440-70-2 | Calcium | 21700 | | | P |
| 7440-47-3 | Chromium | 4.1 | B | * | P |
| 7440-48-4 | Cobalt | 1.8 | U | | P |
| 7440-50-8 | Copper | 8.1 | B | | P |
| 7439-89-6 | Iron | 203 | | * | P |
| 7439-92-1 | Lead | 1.6 | | | F |
| 7439-95-4 | Magnesium | 3180 | | | P |
| 7439-96-5 | Manganese | 32.7 | | | P |
| 7439-97-6 | Mercury | 1.4 | | N | CV |
| 7440-02-0 | Nickel | 3.1 | U | | P |
| 7440-09-7 | Potassium | 15900 | | | P |
| 7782-49-2 | Selenium | 1.9 | U | W | F |
| 7440-22-4 | Silver | 2.5 | U | | P |
| 7440-23-5 | Sodium | 156 | B | | P |
| 7440-28-0 | Thallium | 2.2 | U | | F |
| 7440-62-2 | Vanadium | 1.7 | U | | P |
| 7440-66-6 | Zinc | 18.8 | | * | P |
| | Cyanide | | | | NR |

lor Before: BROWN Clarity Before: Texture: FINE

lor After: BROWN Clarity After: Artifacts: YES

nments:
LEAVES

011

9615491.2839

WESTINGHOUSE/HANFORD
1

# INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B06N59

Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Code: SKINER Case No.: N2-07-086SAS No.: SDG No.: B06N49

rix (soil/water): SOIL Lab Sample ID: 07214-11S

el (low/med): LOW Date Received: 07/27/92

olids: 36.5

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

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 35.5 | B | | P |
| 7440-36-0 | Antimony | 9.0 | U | | P |
| 7440-38-2 | Arsenic | 2.4 | B | WN | F |
| 7440-39-3 | Barium | 64.3 | B | | P |
| 7440-41-7 | Beryllium | 0.38 | U | | P |
| 7440-43-9 | Cadmium | 0.82 | U | | P |
| 7440-70-2 | Calcium | 35700 | | | P |
| 7440-47-3 | Chromium | 3.4 | B | * | P |
| 7440-48-4 | Cobalt | 1.9 | U | | P |
| 7440-50-8 | Copper | 5.8 | B | | P |
| 7439-89-6 | Iron | 148 | | * | P |
| 7439-92-1 | Lead | 1.5 | B | | F |
| 7439-95-4 | Magnesium | 3190 | | | P |
| 7439-96-5 | Manganese | 24.0 | | | P |
| 7439-97-6 | Mercury | 1.4 | | N | CV |
| 7440-02-0 | Nickel | 3.3 | U | | P |
| 7440-09-7 | Potassium | 15800 | | | P |
| 7782-49-2 | Selenium | 1.9 | U | W | F |
| 7440-22-4 | Silver | 2.6 | U | | P |
| 7440-23-5 | Sodium | 167 | B | | P |
| 7440-28-0 | Thallium | 2.3 | U | | F |
| 7440-62-2 | Vanadium | 1.8 | U | | P |
| 7440-66-6 | Zinc | 19.5 | | * | P |
| | Cyanide | | | | NR |

.or Before: BROWN Clarity Before: Texture: FINE

.or After: BROWN Clarity After: Artifacts:

nments:
LEAVES

012

9613491.2835

WESTINGHOUSE/HANFORD
1

SAMPLE NUMBER:

INORGANIC ANALYSIS DATA SHEET

B06N60

Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Code: SKINER Case No.: N2-07-086SAS No.: SDG No.: B06N49

rix (soil/water): SOIL Lab Sample ID: 07214-12S

el (low/med): LOW Date Received: 07/27/92

olids: 36.2

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

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 67.0 | B | | P |
| 7440-36-0 | Antimony | 8.9 | U | | P |
| 7440-38-2 | Arsenic | 1.4 | U | WN | F |
| 7440-39-3 | Barium | 35.3 | B | | P |
| 7440-41-7 | Beryllium | 0.38 | U | | P |
| 7440-43-9 | Cadmium | 0.81 | U | | P |
| 7440-70-2 | Calcium | 25100 | | | P |
| 7440-47-3 | Chromium | 2.7 | U | * | P |
| 7440-48-4 | Cobalt | 1.9 | U | | P |
| 7440-50-8 | Copper | 4.5 | B | | P |
| 7439-89-6 | Iron | 138 | | * | P |
| 7439-92-1 | Lead | 1.4 | B | | F |
| 7439-95-4 | Magnesium | 1830 | B | | P |
| 7439-96-5 | Manganese | 23.6 | | | P |
| 7439-97-6 | Mercury | 2.7 | | N | CV |
| 7440-02-0 | Nickel | 3.2 | U | | P |
| 7440-09-7 | Potassium | 18400 | | | P |
| 7782-49-2 | Selenium | 2.5 | B | S | F |
| 7440-22-4 | Silver | 2.6 | U | | P |
| 7440-23-5 | Sodium | 220 | B | | P |
| 7440-28-0 | Thallium | 2.3 | U | | F |
| 7440-62-2 | Vanadium | 1.8 | U | | P |
| 7440-66-6 | Zinc | 22.2 | | * | P |
| | Cyanide | | | | NR |

.or Before: BROWN Clarity Before: Texture: FINE

.or After: BROWN Clarity After: Artifacts: YES

nments:
LEAVES

013

WESTINGHOUSE/HANFORD
1

# INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER:

B06N61

Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Code: SKINER Case No.: N2-07-086SAS No.: SDG No.: B06N49

rix (soil/water): SOIL Lab Sample ID: 07214-13S

el (low/med): LOW Date Received: 07/27/92

olids: 39.1

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

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 49.9 | B | | P |
| 7440-36-0 | Antimony | 8.4 | U | | P |
| 7440-38-2 | Arsenic | 1.7 | B | WN | F |
| 7440-39-3 | Barium | 40.7 | B | | P |
| 7440-41-7 | Beryllium | 0.36 | U | | P |
| 7440-43-9 | Cadmium | 0.77 | U | | P |
| 7440-70-2 | Calcium | 28900 | | | P |
| 7440-47-3 | Chromium | 2.5 | U | * | P |
| 7440-48-4 | Cobalt | 1.8 | U | | P |
| 7440-50-8 | Copper | 6.6 | B | | P |
| 7439-89-6 | Iron | 147 | | * | P |
| 7439-92-1 | Lead | 1.8 | | | F |
| 7439-95-4 | Magnesium | 4690 | | | P |
| 7439-96-5 | Manganese | 36.5 | | | P |
| 7439-97-6 | Mercury | 0.38 | | N | CV |
| 7440-02-0 | Nickel | 3.1 | U | | P |
| 7440-09-7 | Potassium | 14400 | | | P |
| 7782-49-2 | Selenium | 1.9 | U | W | F |
| 7440-22-4 | Silver | 2.5 | U | | P |
| 7440-23-5 | Sodium | 155 | B | | P |
| 7440-28-0 | Thallium | 2.2 | U | | F |
| 7440-62-2 | Vanadium | 1.7 | U | | P |
| 7440-66-6 | Zinc | 20.8 | | * | P |
| | Cyanide | | | | NR |

.or Before: BROWN Clarity Before: Texture: FINE

.or After: BROWN Clarity After: Artifacts: YES

nments:
LEAVES

014

9613491.2837

WESTINGHOUSE/HANFORD
1

# INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER:

B06N62

Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Code: SKINER Case No.: N2-07-086SAS No.: SDG No.: B06N49

rix (soil/water): SOIL Lab Sample ID: 07214-14S

el (low/med): LOW Date Received: 07/27/92

olids: 35.6

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

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 161 | | | P |
| 7440-36-0 | Antimony | 9.3 | U | | P |
| 7440-38-2 | Arsenic | 1.6 | B | WN | F |
| 7440-39-3 | Barium | 31.5 | B | | P |
| 7440-41-7 | Beryllium | 0.39 | U | | P |
| 7440-43-9 | Cadmium | 0.84 | U | | P |
| 7440-70-2 | Calcium | 22500 | | | P |
| 7440-47-3 | Chromium | 4.2 | B | * | P |
| 7440-48-4 | Cobalt | 2.0 | U | | P |
| 7440-50-8 | Copper | 6.8 | B | | P |
| 7439-89-6 | Iron | 321 | | * | P |
| 7439-92-1 | Lead | 3.1 | | | F |
| 7439-95-4 | Magnesium | 3030 | | | P |
| 7439-96-5 | Manganese | 20.4 | | | P |
| 7439-97-6 | Mercury | 0.98 | | N | CV |
| 7440-02-0 | Nickel | 3.4 | U | | P |
| 7440-09-7 | Potassium | 17800 | | | P |
| 7782-49-2 | Selenium | 2.3 | B | | F |
| 7440-22-4 | Silver | 2.7 | U | | P |
| 7440-23-5 | Sodium | 182 | B | | P |
| 7440-28-0 | Thallium | 2.4 | U | | F |
| 7440-62-2 | Vanadium | 1.9 | U | | P |
| 7440-66-6 | Zinc | 19.4 | | * | P |
| | Cyanide | | | | NR |

lor Before: BROWN Clarity Before: Texture: FINE

lor After: BROWN Clarity After: Artifacts: YES

mments:
LEAVES

015

9613491.2169

FEDERAL EXPRESS

QUESTIONS? CALL 800-238-5355 TOLL FREE.

AIRBILL
PACKAGE
TRACKING NUMBER 2521035086

21 2PM 2521035086

Date 7/25/92

RECIPIENT'S COPY

From (Your Name) Please Print: SAMPLE CONTROL

Your Phone Number (Very Important): (617) 237-2633

Company: T M A /NORCAL

Department/Floor No.

Street Address: 2030 WRIGHT AVE

City: RICHMOND State: CA ZIP Required: 94804

2 To (Recipient's Name) Please Print: SAMPLE CONTROL

Recipient's Phone Number (Very Important): (617) 890-7200

Company: T M A / SKINNER & SHERMAN

Department/Floor No.

Exact Street Address (We Cannot Deliver to P.O. Boxes or P.O. Zip Codes.): 300 SECOND AVENUE

City: WALTHAM State: MA ZIP Required: 02254

YOUR INTERNAL BILLING REFERENCE INFORMATION (optional) (First 24 characters will appear on invoice.): 2320-6406

H IF HOLD FOR PICK-UP, Print FEDEX Address Here

Street Address

City State ZIP Required

PAYMENT 1 [X] Bill Sender 2 [ ] Bill Recipient's FedEx Acct. No. 3 [ ] Bill 3rd Party FedEx Acct. No. 4 [ ] Bill Credit Card 5 [ ] Cash/Check

3 SERVICES (Check only one box)

Priority Overnight (Delivery by next business morning†)
- 11 [X] YOUR PACKAGING
- 16 [ ] FEDEX LETTER *
- 12 [ ] FEDEX PAK *
- 13 [ ] FEDEX BOX
- 14 [ ] FEDEX TUBE

Standard Overnight (Delivery by next business afternoon†)
- 51 [ ] YOUR PACKAGING
- 56 [ ] FEDEX LETTER *
- 52 [ ] FEDEX PAK *
- 53 [ ] FEDEX BOX
- 54 [ ] FEDEX TUBE

Economy Two-Day (Delivery by second business day†)
- 30 [ ] ECONOMY

Government Overnight (Restricted for authorized users only)
- 46 [ ] GOVT LETTER
- 41 [ ] GOVT PACKAGE

Freight Service (for Extra Large or any package over 150 lbs.)
- 70 [ ] OVERNIGHT FREIGHT ** (Contract expiration required)
- 80 [ ] TWO-DAY FREIGHT **

†Every commitment day for most areas. *Declared Value Limit $100. **Call for delivery schedule

5 DELIVERY AND SPECIAL HANDLING (Check services required)

1 [ ] HOLD FOR PICK-UP (Fill in Box H)
2 [A] DELIVER WEEKDAY
3 DELIVER SATURDAY (Extra charge) (Not available to all locations) [ ]
4 [ ] DANGEROUS GOODS (Extra charge)
5 [ ]
6 [ ] DRY ICE Lbs
7 [ ] OTHER SPECIAL SERVICE
8 [ ]
9 [X] SATURDAY PICK-UP (Extra charge)
10 [ ]
11 [ ]
12 [ ] HOLIDAY DELIVERY (If offered) (Extra charge)

6 PACKAGES | WEIGHT in Pounds Only | YOUR DECLARED VALUE

1

Total | Total | Total

DIM SHIPMENT (Chargeable Weight)

[ ] _____ lbs.

L x W x H =

Received At

1 [ ] Regular Stop 3 [ ] Drop Box 4 [ ] B.S.C. 2 [ ] On-Call Stop 5 [ ] Station

Emp. No. Date

[ ] Cash Received
[ ] Return Shipment
[ ] Third Party [ ] Chg. To Del [ ] Chg. To Hold

Street Address

City State Zip

Received By X

Date/Time Received 7/27/92 9:13c FedEx Employee Number

7 Release Signature:

FedEx Emp. No Date/Time

Federal Express Use
- Base Charges
- Declared Value Charge
- Other 1
- Other 2
- Total Charges

REVISION DATE 6/91
PART #137204 FXEM 4/92
FORMAT #099

099

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TMA/Skinner & Sherman Labs SAMPLE LOG-IN

WORKORDER S207214 CLIENT HANFORD NOR No. SAMPLES:

PROTCL CLP TURNARND 33 Day 14 (Soil) ____ (Water) ____ (Specify Other)

COOLER TEMP: 4 oC, or NA

CUSTODIAN A. Benney SDG/BATCH N/A

CUSTODY SEAL: PRESENT/ABSENT/INTACT/NOT CLIENT CASE N207086

SHIPER & # Fed Ex # 2521035086 PO/CONTRACT# N207086

TAGS: PRESENT/ABSENT/NA/SEE COC CONTACT D. Sanchez

CHAIN OF CUSTODY: PRESENT/ABSENT/NA, # N/A COMMENTS: N/A

SAMPLE CONTAINERS-INTACT/BROKEN COMMENTS

CLIENT COMMENT? YES/NO

SAMPLE LABELS AGREE WITH CHAIN OF CUSTODY INFO? YES/NO (COMMENT)

CLIENT PAPERWORK AGREES WITH SAMPLES & COC? YES /NO (COMMENT)

SHIPMENT DATES 7/27/92

LIST ANY DATE WITH PAPERWORK/SHIPMENT PROBLEMS & SPECIFY THE PROBLEM:

N/A

| | CLIENT ID | MATRIX | RECEIVED | PH* | TEST(S) & QC | HOLD TIME UP |
|---|---|---|---|---|---|---|
| 1 | B06N49 | Soil | 7/27/92 | N/A | Tm | Hg Due |
| 2 | B06N50 | ↓ | ↓ | ↓ | ↓ | 7/28/92 |
| 3 | B06N51 | | | | | |
| 4 | B06N52 | | | | | |
| 5 | B06N53 | | | | | |
| 6 | B06N54 | | | | | |
| 7 | B06N55 | | | | | |
| 8 | B06N56 | | | | | |
| 9 | B06N57 | | | | | |
| 10 | B06N58 | | | | | |
| 11 | B06N59 | | | | | |
| 12 | B06N60 | | | | | |
| 13 | B06N61 | | | | | |
| 14 | B06N62 | ↓ | ↓ | ↓ | D.S ↓ | |
| 15 | | | | | | |
| 16 | | | | | | |
| 17 | | | | | | |
| 18 | | | | | | |
| 19 | | | | | | |
| 20 | | | | | | |
| 21 | | | | | | |
| 22 | | | | | | |
| 23 | | | | | | |
| 24 | | | | | | |
| 25 | | | | | | |
| 26 | | | | | | |
| 27 | | | | | | |

Samples are from site known to have Rad-Contamination: YES ✓ NO ____

Samples have detectable amounts of Radioactive Material: YES ____ NO ✓

SUBCONTRACT: YES/NO, TO: ____ DATE: ____

REVIEWED ____ complete 7/27/92

* EPA/CLP required Rev 1.6 PAGE: 242 BP

9613391.2096

| Westinghouse Hanford Company | CHAIN OF CUSTODY | S&S |
|---|---|---|

ustody Form Initiator: Von Lucas

ompany Contact: Dan Landeen — Telephone: 376-1038

roject Designation/Sampling Locations: 100 A Biota Sampling — Collection Date: 7/1 & 7/13/92

Tree Leaves

e Chest No.: RM #105 — Field Logbook No.: WHC-N-444-1

ill of Lading/Airbill No.: 2509869120 — Offsite Property No.: W92-0-0436 #31

lethod of Shipment: DOE Vehicle

hipped to: TMA Norcal

ossible Sample Hazards/Remarks: N/A

Sample Identification

B06N49
B06N50
B06N51
B06N52
B06N53
B06N54
B06N55
B06N56

| Field Transfer of Custody | CHAIN OF POSSESSION | (Sign and Print Names) |
|---|---|---|
| linquished by: Jonathan G. Lucas | Received by: Kermit Blum | Date/Time: 7-20-92 0800 * |
| linquished by: Kermit Blum 7-24-92 | Received by: [illegible] | Date/Time: 7/27/92 9:30 |
| linquished by: | Received by: | Date/Time: |
| linquished by: | Received by: | Date/Time: |

Final Sample Disposition

| sposal Method: | Disposed by: | Date/Time: 250 |
|---|---|---|

omments: * Opened 7-20-92; Received @ TMA/NORCAL 7-18-92 . KB

A-6000-407 (12/90)

9613191.3391

| Westinghouse Hanford Company | CHAIN OF CUSTODY | S & S |
|---|---|---|

ustody Form Initiator Jon Lucas

ompany Contact Dan Landeen Telephone 376-1038

roject Designation/Sampling Locations 100 A Biota Sampling Collection Date 7/1 & 7/13/92

Tree Leaves

e Chest No. RM # 82 Field Logbook No. WHC-N-444-1

ill of Lading/Airbill No. 2509869120 Offsite Property No. W92-0-0436 #31

lethod of Shipment ODE Vehicle

hipped to TMA Norcal

ossible Sample Hazards/Remarks N/A

Sample Identification

B06N57
B06N58
B06N59
B06N60
B06N61
B06N62

| ] Field Transfer of Custody | CHAIN OF POSSESSION | (Sign and Print Names) |
|---|---|---|
| elinquished by: Jonathan G. Lucas | Received by: Kermit Blum | Date/Time: 7-20-92 0800 * |
| elinquished by: Kermit Blum 7-24-92 | Received by: | Date/Time: 7/27/92 9:30 |
| elinquished by: | Received by: | Date/Time: |
| elinquished by: | Received by: | Date/Time: |

Final Sample Disposition

| Disposal Method: | Disposed by: | Date/Time: 25i |
|---|---|---|

Comments: * Received @ TMA/Norcal 7-18-92 ; opened 7-20-92 · KB

A-6000-407 (12/90

9613491.2842

Westinghouse Hanford Company

# SAMPLE ANALYSIS REQUEST

## PART I: FIELD SECTION

Collector V.G. Lucas, C.E. Herden, Dan Landeen Date Sampled 7-14/7-13-92 Time — hours

Company Contact Dan Landeen Telephone (509) 376-1038

| Sample Number | Number and Type of Sample Containers | Type of Sample* | Analysis Requested |
|---|---|---|---|
| B06N49 | Ziplock bag — | Tree Leaves | TAL Metals (including Mercury) — |
| B06N50 | (1) per sample | | CLP |
| B06N51 | number | | |
| B06N52 | | | ~~Total Gamma — Lab SOP~~ |
| B06N53 | | | ~~Sr-90 — Lab SOP~~ |
| B06N54 | | | ~~Tritium — Lab SOP~~ |
| B06N55 | | | |
| B06N56 | | | |
| B06N57 | | | |
| B06N58 | | | |
| B06N59 | | | |
| B06N60 | | | |
| B06N61 | | | |
| B06N62 | | | |

Field Information** N/A

Special Handling and/or Storage 4°C

Possible Sample Hazards N/A

## PART II: LABORATORY SECTION

Received by Kermit Blum Title Sample Control Supervisor Date 7-20-92

Analysis Required

*Indicate whether sample is soil, sludge, water, etc.

**Use back of page for additional information relative to sample location.

252 A-6000-406 (05/90)

9613491.2843

**TMA**
**Thermo Analytical Inc.**

**TMA/Norcal**
2030 Wright Avenue
P. O. Box 4040
Richmond, CA 94804-0040
(510) 235-2633 Fax No (510) 235-0438

RECORD COPY

OCT 1992
RECEIVED
OSM DMO

October 2, 1992

SENT BY FEDERAL EXPRESS

Ref. TMA/Norcal N2-07-098-7069

Mr. John Bourgeault
Westinghouse Hanford Company
2355 Stevens Drive
Richland, WA 99352

Dear Mr. Bourgeault:

Enclosed on the Summary Data Section, are the $^{3}H$, $^{90}Sr$, and gamma scan results for the tree leaves from 100A Location, we received 20 July 1992. The QA/QC results are also given in the Summary Data Section. The Summary Data Including QC's section is numbered pages 1 to 44, and the appendices are numbered pages 1 to 271.

Please call if you have any questions concerning this data.

Sincerely,

D.P. Kharkar

Dinkar P. Kharkar, Ph.D.
Manager, Nuclear Programs

DPK/jv

Enclosures: Sections 1 and 2
Appendices

| | |
|---|---|
| SDG 7069 | Client Westinghouse Hanford |
| Contact Dinkar P. Kharkar | Contract MBH-SVV-069262 |

# CASE NARRATIVE

## 1.0 GENERAL

The result of tree leaf samples from Location 100A (TMA/Norcal Group 7069) are reported herein. TMA/Norcal Group 7069 is comprised of the fourteen samples listed on the Chain-of-Custody documents and is identified as Sample 1 through 14.

## 1.1 CHAINS-OF-CUSTODY

This report includes data from samples delivered under Chain-of-Custody documents Field Logbook No. WHC-N-441-1.

## 1.2 SAMPLE VOLUME

Ziplock bags containing the samples were received for the analyses.

## 1.3 MISSING SAMPLES

All samples were accounted for in an undamaged condition.

## 1.4 HOLDING TIMES

The collections were made between 7/1/92 and 7/13/92 and the sample processing was initiated within 180 days of collection.

## 2.0 QUALITY CONTROL

The internal quality control consisted of one sample each of a laboratory control, a blank, and a replicate. All original analyses were performed with QC samples 7069-15, 16, and 17.

The QC samples were prepared and labelled by the quality control officer. Copies of The QC notebook pages are included in the data package.

## 2.1 LABORATORY CONTROL SAMPLES

LCS recoveries for all nuclides were good. The MDA's for $^{3}H$ and $^{90}Sr$ meet the RDL requirements. The MDA's for gamma nuclides were higher than the RDL because only small aliquots (5.0 g to 160.0 g) were available for gamma analysis instead of 750.0 g required by MDA calculations.

## 2.2 BLANKS

MDA's for $^{3}H$ and $^{90}Sr$ meet the RDL requirements, except for the gamma nuclides. Sample aliquots smaller than the aliquot required by MDA calculations were used for gamma analysis.

| | |
|---|---|
| SDG 7069 | Client Westinghouse Hanford |
| Contact Dinkar P. Kharkar | Contract MBH-SVV-069262 |

## CASE NARRATIVE

### 2.3 REPLICATES

Results were satisfactory for $^{3}H$, $^{90}Sr$, and gamma nuclides. The $2\sigma$ error on 90Sr is underlined because the counting error is bigger than both the MDA and the result implying that the MDA may not be a good estimate of the real minimum detectable activity. Again, the MDA's for gamma nuclides were higher due to small aliquots availabe for gamma analysis.

### 3.0 ANALYTICAL NOTES

3.1 Hydrogen-3 Analyses: The average MDA was 0.16 ± 0.043 pCi/g. Samples 7069-8, 10, 12, and 13 have $^{3}H$ concentrations above RDL. The $^{3}H$ concentrations for the remaining samples were below RDL. The $^{3}H$ concentrations are calculated on the received sample weight.

3.2 Strontium-90 Analyses: The average yield for seventeen analysis (72 ± 11%). The lowest yield was 61% and the highest was 79%. The average MDA was 0.82 ± 0.28 pCi/g. Positive $^{90}Sr$ concentration was found in samples 7069-5, 10, and 12. The concentrations for the remaining samples were below RDL. The $^{90}Sr$ concentrations are calculated on the basis of dry sample.

3.3 Gamma Scan Analyses: Gamma scan analysis did not find positive concentration of gamma nuclides. The concentration of gamma nuclides was below RDL. The concentration is based on dry sample.

9613491.2846

N207098-01

# TMA NORCAL
REPORTING GROUP 7069

# DATA SHEET

B06N49

SDG 7069
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N207098-01
Dept sample id 7069-001
Received 07/20/92

Client sample id B06N49
Matrix BIOTA
Collected 07/01/92
Chain of custody id WHC-N-444-1

| PARAMETER | CAS NO | RESULT pCi/G | 2σ ERR (COUNT) | MDA pCi/G | RDL pCi/G | QUALI-FIERS | TEST |
|---|---|---|---|---|---|---|---|
| Strontium 90 | 10098-97-2 | -0.007 | 1.2 | 1.2 | 2.0 | U | Y |
| Tritium | 10028-17-8 | -0.046 | 0.13 | 0.22 | 0.50 | U | H |
| GAMMA SCAN ANALYTES | | | | | | | |
| Potassium 40 | 13966-00-2 | 8.9 | 8.8 | | | | GAM |
| Iron 59 | | U | | 4.3 | 0.050 | U | GAM |
| Chromium 51 | 14392-02-0 | U | | 20 | | U | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.53 | 0.050 | U | GAM |
| Zinc 65 | 17982-39-3 | U | | 1.7 | | U | GAM |
| Ruthenium 106 | 13967-48-1 | U | | 5.1 | | U | GAM |
| Cesium 134 | 17967-70-9 | U | | 0.62 | | U | GAM |
| Cesium 137 | 10045-97-3 | U | | 0.53 | 0.050 | U | GAM |
| Europium 152 | 14683-23-9 | U | | 0.76 | 0.10 | U | GAM |
| Europium 154 | 15585-10-1 | U | | 0.50 | 0.10 | U | GAM |
| Radium 226 | 13982-67-7 | U | | 1.0 | 0.10 | U | GAM |
| Thorium 228 | 14274-82-9 | U | | 0.71 | | U | GAM |
| Thorium 232 | 7440-29-1 | U | | 2.2 | | U | GAM |



Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.17
Report date 10/01/92

9613491.2847

N207098-02

# TMA NORCAL
REPORTING GROUP 7069

# DATA SHEET

B06N50

SDG 7069
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N207098-02
Dept sample id 7069-002
Received 07/20/92

Client sample id B06N50
Matrix BIOTA
Collected 07/01/92
Chain of custody id WHC-N-444-1

| PARAMETER | CAS NO | RESULT pCi/G | 2σ ERR (COUNT) | MDA pCi/G | RDL pCi/G | QUALI-FIERS | TEST |
|---|---|---|---|---|---|---|---|
| Strontium 90 | 10098-97-2 | 0.34 | 0.32 | 1.0 | 2.0 | U | Y |
| Tritium | 10028-17-8 | 0.071 | 0.098 | 0.16 | 0.50 | U | H |
| GAMMA SCAN ANALYTES | | | | | | | |
| Potassium 40 | 13966-00-2 | 13 | 3.0 | | | | GAM |
| Iron 59 | | U | | 1.5 | 0.050 | U | GAM |
| Chromium 51 | 14392-02-0 | U | | 5.6 | | U | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.19 | 0.050 | U | GAM |
| Zinc 65 | 17982-39-3 | U | | 0.64 | | U | GAM |
| Ruthenium 106 | 13967-48-1 | U | | 1.5 | | U | GAM |
| Cesium 134 | 17967-70-9 | U | | 0.24 | | U | GAM |
| Cesium 137 | 10045-97-3 | U | | 0.19 | 0.050 | U | GAM |
| Europium 152 | 14683-23-9 | U | | 0.29 | 0.10 | U | GAM |
| Europium 154 | 15585-10-1 | U | | 0.19 | 0.10 | U | GAM |
| Radium 226 | 13982-67-7 | U | | 0.34 | 0.10 | U | GAM |
| Thorium 228 | 14274-82-9 | U | | 0.27 | | U | GAM |
| Thorium 232 | 7440-29-1 | 0.66 | 0.53 | | | | GAM |
| Beryllium 7 | | 4.3 | 2.3 | | | | GAM |



Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.17
Report date 10/01/92

9613491.2818

N207098-03

# TMA NORCAL
REPORTING GROUP 7069

# DATA SHEET

B06N51

SDG 7069
Contact Dinkar Kharkar
Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N207098-03
Dept sample id 7069-003
Received 07/20/92
Client sample id B06N51
Matrix BIOTA
Collected 07/01/92
Chain of custody id WHC-N-444-1

| PARAMETER | CAS NO | RESULT pCi/G | 2σ ERR (COUNT) | MDA pCi/G | RDL pCi/G | QUALI-FIERS | TEST |
|---|---|---|---|---|---|---|---|
| Strontium 90 | 10098-97-2 | 0.33 | 0.24 | 0.70 | 2.0 | U | Y |
| Tritium | 10028-17-8 | -0.005 | 0.090 | 0.15 | 0.50 | U | H |
| GAMMA SCAN ANALYTES | | | | | | | |
| Potassium 40 | 13966-00-2 | 13 | 2.9 | | | | GAM |
| Iron 59 | | U | | 1.6 | 0.050 | U | GAM |
| Chromium 51 | 14392-02-0 | U | | 5.4 | | U | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.14 | 0.050 | U | GAM |
| Zinc 65 | 17982-39-3 | U | | 0.44 | | U | GAM |
| Ruthenium 106 | 13967-48-1 | U | | 1.3 | | U | GAM |
| Cesium 134 | 17967-70-9 | U | | 0.17 | | U | GAM |
| Cesium 137 | 10045-97-3 | U | | 0.20 | 0.050 | U | GAM |
| Europium 152 | 14683-23-9 | U | | 0.26 | 0.10 | U | GAM |
| Europium 154 | 15585-10-1 | U | | 0.17 | 0.10 | U | GAM |
| Radium 226 | 13982-67-7 | U | | 0.30 | 0.10 | U | GAM |
| Thorium 228 | 14274-82-9 | U | | 0.25 | | U | GAM |
| Thorium 232 | 7440-29-1 | U | | 0.63 | | U | GAM |
| Beryllium 7 | | 4.3 | 2.4 | | | | GAM |

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.17
Report date 10/01/92

9613491.2849

# TMA NORCAL

REPORTING GROUP 7069

N207098-04

## DATA SHEET

B06N52

SDG 7069
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N207098-04
Dept sample id 7069-004
Received 07/20/92

Client sample id B06N52
Matrix BIOTA
Collected 07/01/92
Chain of custody id WHC-N-444-1

| PARAMETER | CAS NO | RESULT pCi/G | 2σ ERR (COUNT) | MDA pCi/G | RDL pCi/G | QUALI-FIERS | TEST |
|---|---|---|---|---|---|---|---|
| Strontium 90 | 10098-97-2 | 0.001 | 0.29 | 1.0 | 2.0 | U | Y |
| Tritium | 10028-17-8 | -0.038 | 0.092 | 0.15 | 0.50 | U | H |
| GAMMA SCAN ANALYTES | | | | | | | |
| Potassium 40 | 13966-00-2 | 15 | 3.2 | | | | GAM |
| Iron 59 | | U | | 1.0 | 0.050 | U | GAM |
| Chromium 51 | 14392-02-0 | U | | 6.5 | | U | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.17 | 0.050 | U | GAM |
| Zinc 65 | 17982-39-3 | U | | 0.37 | | U | GAM |
| Ruthenium 106 | 13967-48-1 | U | | 1.5 | | U | GAM |
| Cesium 134 | 17967-70-9 | U | | 0.16 | | U | GAM |
| Cesium 137 | 10045-97-3 | U | | 0.16 | 0.050 | U | GAM |
| Europium 152 | 14683-23-9 | U | | 0.27 | 0.10 | U | GAM |
| Europium 154 | 15585-10-1 | U | | 0.17 | 0.10 | U | GAM |
| Radium 226 | 13982-67-7 | U | | 0.27 | 0.10 | U | GAM |
| Thorium 228 | 14274-82-9 | U | | 0.22 | | U | GAM |
| Thorium 232 | 7440-29-1 | U | | 0.65 | | U | GAM |
| Beryllium 7 | | 5.5 | 2.5 | | | | GAM |

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.17
Report date 10/01/92

9613491.2850

N207098-05

# TMA NORCAL
REPORTING GROUP 7069

# DATA SHEET

B06N53

SDG 7069
Contact Dinkar Kharkar
Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N207098-05
Dept sample id 7069-005
Received 07/20/92
Client sample id B06N53
Matrix BIOTA
Collected 07/01/92
Chain of custody id WHC-N-444-1

| PARAMETER | CAS NO | RESULT pCi/G | 2σ ERR (COUNT) | MDA pCi/G | RDL pCi/G | QUALI-FIERS | TEST |
|---|---|---|---|---|---|---|---|
| Strontium 90 | 10098-97-2 | 2.6 | 0.45 | 0.84 | 2.0 | | Y |
| Tritium | 10028-17-8 | -0.038 | 0.088 | 0.15 | 0.50 | U | H |
| GAMMA SCAN ANALYTES | | | | | | | |
| Potassium 40 | 13966-00-2 | 15 | 2.6 | | | | GAM |
| Iron 59 | | U | | 1.5 | 0.050 | U | GAM |
| Chromium 51 | 14392-02-0 | U | | 6.4 | | U | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.15 | 0.050 | U | GAM |
| Zinc 65 | 17982-39-3 | U | | 0.39 | | U | GAM |
| Ruthenium 106 | 13967-48-1 | U | | 1.2 | | U | GAM |
| Cesium 134 | 17967-70-9 | U | | 0.16 | | U | GAM |
| Cesium 137 | 10045-97-3 | U | | 0.14 | 0.050 | U | GAM |
| Europium 152 | 14683-23-9 | U | | 0.20 | 0.10 | U | GAM |
| Europium 154 | 15585-10-1 | U | | 0.13 | 0.10 | U | GAM |
| Radium 226 | 13982-67-7 | U | | 0.38 | 0.10 | U | GAM |
| Thorium 228 | 14274-82-9 | U | | 0.21 | | U | GAM |
| Thorium 232 | 7440-29-1 | U | | 0.59 | | U | GAM |
| Beryllium 7 | | 3.2 | 2.1 | | | | GAM |

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.17
Report date 10/01/92

9613491.2851

N207098-06

# TMA NORCAL
REPORTING GROUP 7069

# DATA SHEET

B06N54

SDG 7069
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N207098-06
Dept sample id 7069-006
Received 07/20/92

Client sample id B06N54
Matrix BIOTA
Collected 07/01/92
Chain of custody id WHC-N-444-1

| PARAMETER | CAS NO | RESULT pCi/G | 2σ ERR (COUNT) | MDA pCi/G | RDL pCi/G | QUALI-FIERS | TEST |
|---|---|---|---|---|---|---|---|
| Strontium 90 | 10098-97-2 | -0.39 | 0.98 | 0.80 | 2.0 | U | Y |
| Tritium | 10028-17-8 | 0.32 | 0.11 | 0.15 | 0.50 | J | H |
| GAMMA SCAN ANALYTES | | | | | | | |
| Potassium 40 | 13966-00-2 | 11 | 2.6 | | | | GAM |
| Iron 59 | | U | | 1.1 | 0.050 | U | GAM |
| Chromium 51 | 14392-02-0 | U | | 5.9 | | U | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.15 | 0.050 | U | GAM |
| Zinc 65 | 17982-39-3 | U | | 0.43 | | U | GAM |
| Ruthenium 106 | 13967-48-1 | U | | 1.5 | | U | GAM |
| Cesium 134 | 17967-70-9 | U | | 0.15 | | U | GAM |
| Cesium 137 | 10045-97-3 | U | | 0.17 | 0.050 | U | GAM |
| Europium 152 | 14683-23-9 | U | | 0.27 | 0.10 | U | GAM |
| Europium 154 | 15585-10-1 | U | | 0.16 | 0.10 | U | GAM |
| Radium 226 | 13982-67-7 | U | | 0.32 | 0.10 | U | GAM |
| Thorium 228 | 14274-82-9 | U | | 0.23 | | U | GAM |
| Thorium 232 | 7440-29-1 | U | | 0.66 | | U | GAM |
| Beryllium 7 | | 3.0 | 2.5 | | | | GAM |



Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.17
Report date 10/01/92

9613491.2852

N207098-07

# TMA NORCAL
REPORTING GROUP 7069

# DATA SHEET

B06N55

SDG 7069
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N207098-07
Dept sample id 7069-007
Received 07/20/92

Client sample id B06N55
Matrix BIOTA
Collected 07/01/92
Chain of custody id WHC-N-444-1

| PARAMETER | CAS NO | RESULT pCi/G | 2σ ERR (COUNT) | MDA pCi/G | RDL pCi/G | QUALI-FIERS | TEST |
|---|---|---|---|---|---|---|---|
| Strontium 90 | 10098-97-2 | 0.23 | 2.7 | 0.88 | 2.0 | U | Y |
| Tritium | 10028-17-8 | -0.063 | 0.084 | 0.14 | 0.50 | U | H |
| GAMMA SCAN ANALYTES | | | | | | | |
| Potassium 40 | 13966-00-2 | 11 | 2.0 | | | | GAM |
| Iron 59 | | U | | 0.99 | 0.050 | U | GAM |
| Chromium 51 | 14392-02-0 | U | | 4.7 | | U | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.12 | 0.050 | U | GAM |
| Zinc 65 | 17982-39-3 | U | | 0.39 | | U | GAM |
| Ruthenium 106 | 13967-48-1 | U | | 1.1 | | U | GAM |
| Cesium 134 | 17967-70-9 | U | | 0.13 | | U | GAM |
| Cesium 137 | 10045-97-3 | U | | 0.11 | 0.050 | U | GAM |
| Europium 152 | 14683-23-9 | U | | 0.18 | 0.10 | U | GAM |
| Europium 154 | 15585-10-1 | U | | 0.12 | 0.10 | U | GAM |
| Radium 226 | 13982-67-7 | U | | 0.32 | 0.10 | U | GAM |
| Thorium 228 | 14274-82-9 | U | | 0.17 | | U | GAM |
| Thorium 232 | 7440-29-1 | U | | 0.43 | | U | GAM |
| Beryllium 7 | | 3.7 | 2.7 | | | | GAM |



Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.17
Report date 10/01/92

N207098-08

# TMA NORCAL
REPORTING GROUP 7069

# DATA SHEET

B06N56

SDG 7069
Contact Dinkar Kharkar
Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N207098-08
Dept sample id 7069-008
Received 07/20/92
Client sample id B06N56
Matrix BIOTA
Collected 07/01/92
Chain of custody id WHC-N-444-1

| PARAMETER | CAS NO | RESULT pCi/G | 2σ ERR (COUNT) | MDA pCi/G | RDL pCi/G | QUALI-FIERS | TEST |
|---|---|---|---|---|---|---|---|
| Strontium 90 | 10098-97-2 | 0.26 | 0.25 | 0.79 | 2.0 | U | Y |
| Tritium | 10028-17-8 | 0.64 | 0.14 | 0.17 | 0.50 | | H |
| GAMMA SCAN ANALYTES | | | | | | | |
| Potassium 40 | 13966-00-2 | 13 | 2.9 | | | | GAM |
| Iron 59 | | U | | 1.1 | 0.050 | U | GAM |
| Chromium 51 | 14392-02-0 | U | | 6.0 | | U | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.17 | 0.050 | U | GAM |
| Zinc 65 | 17982-39-3 | U | | 0.47 | | U | GAM |
| Ruthenium 106 | 13967-48-1 | U | | 1.4 | | U | GAM |
| Cesium 134 | 17967-70-9 | U | | 0.15 | | U | GAM |
| Cesium 137 | 10045-97-3 | U | | 0.16 | 0.050 | U | GAM |
| Europium 152 | 14683-23-9 | U | | 0.20 | 0.10 | U | GAM |
| Europium 154 | 15585-10-1 | U | | 0.14 | 0.10 | U | GAM |
| Radium 226 | 13982-67-7 | U | | 0.28 | 0.10 | U | GAM |
| Thorium 228 | 14274-82-9 | U | | 0.20 | | U | GAM |
| Thorium 232 | 7440-29-1 | U | | 0.69 | | U | GAM |
| Beryllium 7 | | 3.0 | 2.3 | | | | GAM |



Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.17
Report date 10/01/92

N207098-09

# TMA NORCAL
REPORTING GROUP 7069

# DATA SHEET

B06N57

SDG 7069
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N207098-09
Dept sample id 7069-009
Received 07/20/92

Client sample id B06N57
Matrix BIOTA
Collected 07/01/92
Chain of custody id WHC-N-444-1

| PARAMETER | CAS NO | RESULT pCi/G | 2σ ERR (COUNT) | MDA pCi/G | RDL pCi/G | QUALI-FIERS | TEST |
|---|---|---|---|---|---|---|---|
| Strontium 90 | 10098-97-2 | 0.27 | 0.26 | 0.80 | 2.0 | U | Y |
| Tritium | 10028-17-8 | -0.018 | 0.082 | 0.14 | 0.50 | U | H |
| GAMMA SCAN ANALYTES | | | | | | | |
| Potassium 40 | 13966-00-2 | 9.5 | 2.1 | | | | GAM |
| Iron 59 | | U | | 0.91 | 0.050 | U | GAM |
| Chromium 51 | 14392-02-0 | U | | 4.5 | | U | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.10 | 0.050 | U | GAM |
| Zinc 65 | 17982-39-3 | U | | 0.31 | | U | GAM |
| Ruthenium 106 | 13967-48-1 | U | | 1.1 | | U | GAM |
| Cesium 134 | 17967-70-9 | U | | 0.14 | | U | GAM |
| Cesium 137 | 10045-97-3 | U | | 0.12 | 0.050 | U | GAM |
| Europium 152 | 14683-23-9 | U | | 0.17 | 0.10 | U | GAM |
| Europium 154 | 15585-10-1 | U | | 0.11 | 0.10 | U | GAM |
| Radium 226 | 13982-67-7 | U | | 0.22 | 0.10 | U | GAM |
| Thorium 228 | 14274-82-9 | 0.13 | 0.074 | | | | GAM |
| Thorium 232 | 7440-29-1 | U | | 0.48 | | U | GAM |
| Beryllium 7 | | 2.9 | 2.0 | | | | GAM |



Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
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Version 2.17
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9613491.2855

# TMA NORCAL

REPORTING GROUP 7069

N207098-10

## DATA SHEET

B06N58

SDG 7069
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N207098-10
Dept sample id 7069-010
Received 07/20/92

Client sample id B06N58
Matrix BIOTA
Collected 07/01/92
Chain of custody id WHC-N-444-1

| PARAMETER | CAS NO | RESULT pCi/G | 2σ ERR (COUNT) | MDA pCi/G | RDL pCi/G | QUALI-FIERS | TEST |
|---|---|---|---|---|---|---|---|
| Strontium 90 | 10098-97-2 | 35 | 4.5 | 0.79 | 2.0 | | Y |
| Tritium | 10028-17-8 | 0.73 | 0.13 | 0.15 | 0.50 | | H |
| GAMMA SCAN ANALYTES | | | | | | | |
| Potassium 40 | 13966-00-2 | 14 | 3.2 | | | | GAM |
| Iron 59 | | U | | 2.0 | 0.050 | U | GAM |
| Chromium 51 | 14392-02-0 | U | | 8.6 | | U | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.23 | 0.050 | U | GAM |
| Zinc 65 | 17982-39-3 | U | | 0.64 | | U | GAM |
| Ruthenium 106 | 13967-48-1 | U | | 2.0 | | U | GAM |
| Cesium 134 | 17967-70-9 | U | | 0.24 | | U | GAM |
| Cesium 137 | 10045-97-3 | U | | 0.25 | 0.050 | U | GAM |
| Europium 152 | 14683-23-9 | U | | 0.42 | 0.10 | U | GAM |
| Europium 154 | 15585-10-1 | U | | 0.24 | 0.10 | U | GAM |
| Radium 226 | 13982-67-7 | U | | 0.34 | 0.10 | U | GAM |
| Thorium 228 | 14274-82-9 | U | | 0.27 | | U | GAM |
| Thorium 232 | 7440-29-1 | U | | 0.89 | | U | GAM |
| Beryllium 7 | | 5.2 | 3.5 | | | | GAM |



Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.17
Report date 10/01/92

9613491.2856

N207098-11

# TMA NORCAL
REPORTING GROUP 7069

# DATA SHEET

B06N59

SDG 7069
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N207098-11
Dept sample id 7069-011
Received 07/20/92

Client sample id B06N59
Matrix BIOTA
Collected 07/13/92
Chain of custody id WHC-N-444-1

| PARAMETER | CAS NO | RESULT pCi/G | 2σ ERR (COUNT) | MDA pCi/G | RDL pCi/G | QUALI-FIERS | TEST |
|---|---|---|---|---|---|---|---|
| Strontium 90 | 10098-97-2 | -0.33 | 2.0 | 0.81 | 2.0 | U | Y |
| Tritium | 10028-17-8 | 0.005 | 0.096 | 0.16 | 0.50 | U | H |
| GAMMA SCAN ANALYTES | | | | | | | |
| Potassium 40 | 13966-00-2 | 13 | 2.3 | | | | GAM |
| Iron 59 | | U | | 0.65 | 0.050 | U | GAM |
| Chromium 51 | 14392-02-0 | U | | 2.9 | | U | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.14 | 0.050 | U | GAM |
| Zinc 65 | 17982-39-3 | U | | 0.31 | | U | GAM |
| Ruthenium 106 | 13967-48-1 | U | | 0.90 | | U | GAM |
| Cesium 134 | 17967-70-9 | U | | 0.10 | | U | GAM |
| Cesium 137 | 10045-97-3 | U | | 0.10 | 0.050 | U | GAM |
| Europium 152 | 14683-23-9 | U | | 0.18 | 0.10 | U | GAM |
| Europium 154 | 15585-10-1 | U | | 0.11 | 0.10 | U | GAM |
| Radium 226 | 13982-67-7 | U | | 0.19 | 0.10 | U | GAM |
| Thorium 228 | 14274-82-9 | U | | 0.19 | | U | GAM |
| Thorium 232 | 7440-29-1 | U | | 0.38 | | U | GAM |
| Beryllium 7 | | 3.2 | 1.4 | | | | GAM |



Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.17
Report date 10/01/92

9613491.2857

N207098-12

# TMA NORCAL
REPORTING GROUP 7069

# DATA SHEET

B06N60

SDG 7069
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N207098-12
Dept sample id 7069-012
Received 07/20/92

Client sample id B06N60
Matrix BIOTA
Collected 07/13/92
Chain of custody id WHC-N-444-1

| PARAMETER | CAS NO | RESULT pCi/G | 2σ ERR (COUNT) | MDA pCi/G | RDL pCi/G | QUALI-FIERS | TEST |
|---|---|---|---|---|---|---|---|
| Strontium 90 | 10098-97-2 | 6.8 | 0.68 | 0.78 | 2.0 | | Y |
| Tritium | 10028-17-8 | 3.6 | 0.21 | 0.15 | 0.50 | | H |
| GAMMA SCAN ANALYTES | | | | | | | |
| Potassium 40 | 13966-00-2 | 18 | 2.8 | | | | GAM |
| Iron 59 | | U | | 0.96 | 0.050 | U | GAM |
| Chromium 51 | 14392-02-0 | U | | 4.2 | | U | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.16 | 0.050 | U | GAM |
| Zinc 65 | 17982-39-3 | U | | 0.35 | | U | GAM |
| Ruthenium 106 | 13967-48-1 | U | | 1.2 | | U | GAM |
| Cesium 134 | 17967-70-9 | U | | 0.15 | | U | GAM |
| Cesium 137 | 10045-97-3 | U | | 0.14 | 0.050 | U | GAM |
| Europium 152 | 14683-23-9 | U | | 0.21 | 0.10 | U | GAM |
| Europium 154 | 15585-10-1 | U | | 0.15 | 0.10 | U | GAM |
| Radium 226 | 13982-67-7 | U | | 0.25 | 0.10 | U | GAM |
| Thorium 228 | 14274-82-9 | U | | 0.19 | | U | GAM |
| Thorium 232 | 7440-29-1 | U | | 0.51 | | U | GAM |
| Beryllium 7 | | 4.3 | 2.3 | | | | GAM |



Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.17
Report date 10/01/92

N207098-13

# TMA NORCAL
REPORTING GROUP 7069

# DATA SHEET

B06N61

SDG 7069
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N207098-13
Dept sample id 7069-013
Received 07/20/92

Client sample id B06N61
Matrix BIOTA
Collected 07/13/92
Chain of custody id WHC-N-444-1

| PARAMETER | CAS NO | RESULT pCi/G | 2σ ERR (COUNT) | MDA pCi/G | RDL pCi/G | QUALI-FIERS | TEST |
|---|---|---|---|---|---|---|---|
| Strontium 90 | 10098-97-2 | 0.18 | 1.4 | 0.79 | 2.0 | U | Y |
| Tritium | 10028-17-8 | 2.1 | 0.17 | 0.14 | 0.50 | | H |
| GAMMA SCAN ANALYTES | | | | | | | |
| Potassium 40 | 13966-00-2 | 16 | 3.8 | | | | GAM |
| Iron 59 | | U | | 1.8 | 0.050 | U | GAM |
| Chromium 51 | 14392-02-0 | U | | 5.6 | | U | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.27 | 0.050 | U | GAM |
| Zinc 65 | 17982-39-3 | U | | 0.61 | | U | GAM |
| Ruthenium 106 | 13967-48-1 | U | | 1.8 | | U | GAM |
| Cesium 134 | 17967-70-9 | U | | 0.24 | | U | GAM |
| Cesium 137 | 10045-97-3 | U | | 0.16 | 0.050 | U | GAM |
| Europium 152 | 14683-23-9 | U | | 0.37 | 0.10 | U | GAM |
| Europium 154 | 15585-10-1 | U | | 0.23 | 0.10 | U | GAM |
| Radium 226 | 13982-67-7 | U | | 0.31 | 0.10 | U | GAM |
| Thorium 228 | 14274-82-9 | U | | 0.27 | | U | GAM |
| Thorium 232 | 7440-29-1 | U | | 0.73 | | U | GAM |
| Beryllium 7 | | 3.8 | 2.4 | | | | GAM |



Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.17
Report date 10/01/92

9613491.2859

N207098-14

# TMA NORCAL
REPORTING GROUP 7069

# DATA SHEET

B06N62

SDG 7069
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N207098-14
Dept sample id 7069-014
Received 07/20/92

Client sample id B06N62
Matrix BIOTA
Collected 07/13/92
Chain of custody id WHC-N-444-1

| PARAMETER | CAS NO | RESULT pCi/G | 2σ ERR (COUNT) | MDA pCi/G | RDL pCi/G | QUALI-FIERS | TEST |
|---|---|---|---|---|---|---|---|
| Strontium 90 | 10098-97-2 | 0.15 | 1.2 | 0.65 | 2.0 | U | Y |
| Tritium | 10028-17-8 | 0.014 | 0.090 | 0.15 | 0.50 | U | H |
| GAMMA SCAN ANALYTES | | | | | | | |
| Potassium 40 | 13966-00-2 | 16 | 3.0 | | | | GAM |
| Iron 59 | | U | | 1.6 | 0.050 | U | GAM |
| Chromium 51 | 14392-02-0 | U | | 7.0 | | U | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.18 | 0.050 | U | GAM |
| Zinc 65 | 17982-39-3 | U | | 0.66 | | U | GAM |
| Ruthenium 106 | 13967-48-1 | U | | 1.3 | | U | GAM |
| Cesium 134 | 17967-70-9 | U | | 0.16 | | U | GAM |
| Cesium 137 | 10045-97-3 | U | | 0.16 | 0.050 | U | GAM |
| Europium 152 | 14683-23-9 | U | | 0.28 | 0.10 | U | GAM |
| Europium 154 | 15585-10-1 | U | | 0.18 | 0.10 | U | GAM |
| Radium 226 | 13982-67-7 | U | | 0.28 | 0.10 | U | GAM |
| Thorium 228 | 14274-82-9 | U | | 0.28 | | U | GAM |
| Thorium 232 | 7440-29-1 | U | | 0.79 | | U | GAM |
| Beryllium 7 | | 9.7 | 3.9 | | | | GAM |



Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.17
Report date 10/01/92

9613491.2860

**FORM OF PAYMENT**

GBL ☐ FCCOD ☐

Bill to Consignee ☐ Third Party Billing ☐

Shipper's Account Number: 50281585

**EMERY WORLDWIDE**

A CF Company

**SERVICES**

UNITED STATES / CANADA: Same Day ☐ AM ☐ Second Day ☐ PM ☐ Saturday Delivery XX

INTERNATIONAL: Express ☐ Preferred ☐ Standard ☐ Business Document ☐ Customs Clearance ☐ Delivery ☐

Date: 07-17-92 | Origin: PSC | Shipment Number: 250986912

To:

TINGHOUSE SHIPPING DEPT (509) 376-6665
XEMERXXXXXX US DEPT OF ENERGY C/O
INGHOUSE HANFORD
BLDG 1163
STEVENS DRIVE
LAND WA

Canada ☐

d TMA/NORCAL ROBERT FOX
TMA NORCAL
#######
2030 WRIGHT AVE
RICHMOND CA

Hold for Pick Up ☐ Canada ☐

Tariff Dest. | Gate

Check to Shipper $

EMERY WORLDWI will accept Consign check with all risk being assumed by Shipper, including but not limited to non-payment, frau and misrepresenta

Customer's Reference Numbers: 220 PH18C W92-0-0436#31 | 99352

E Consignee's Account Number: 94804

| Description | Pcs. | L | W | H | Total Pieces | Total Weight (in Lbs.) |
|---|---|---|---|---|---|---|
| : CHESTS SAMPLES .05 46#; RM#82 41 #2 )-0436#31 | X | | | | 2 | 87 |

FOR INFORMATION OR RATES CALL 1-800 44 EMERY (1-800-443-6379)

Declared Value $

250986912 0

Remarks: RDAY DELIVERY ATURE SECURITY SERVIC

**Zip Ship** ☐

For shipments within the 50 United States Shipper has the option to check this box and, by checking, agrees that the Zip Ship conditions, described in the area to the right, apply.

Mark if Emery Packaging is used

Urgent Letter 9X12 ☒ Urgent Pack 12X15 ☒

International Shipments: Commodity Code le ☐

Third Party Account Number mandatory for Third Party Billing. E Third Party Account Number

International Customs Value | International Insurance

rge

Total Transportation Charges | Other Charges/Advance at Origin ☐ OC/AO- $

1-OAK-SA

Terms and Conditions on Back

9613491.2861

| Westinghouse Hanford Company | CHAIN OF CUSTODY |
|---|---|

Custody Form Initiator: Von Lucas

Company Contact: Dan Landeen — Telephone: 376-1038

Project Designation/Sampling Locations: 100 A Biota Sampling Tree Leaves — Collection Date: 7/1 & 7/13/92

Ice Chest No.: RM #105 — Field Logbook No.: WHC-N-444-1

Bill of Lading/Airbill No.: 2509869120 — Offsite Property No.: W92-0-0436 #31

Method of Shipment: DOE Vehicle

Shipped to: TMA Norcal

Possible Sample Hazards/Remarks: N/A

Sample Identification

B06N49
B06N50
B06N51
B06N52
B06N53
B06N54
B06N55
B06N56

| Field Transfer of Custody | CHAIN OF POSSESSION | (Sign and Print Names) |
|---|---|---|
| Relinquished by: Jonathan G. Lucas [signature] | Received by: Kermit Blum | Date/Time: 7-20-92 0800 * |
| Relinquished by: | Received by: | Date/Time: |
| Relinquished by: | Received by: | Date/Time: |
| Relinquished by: | Received by: | Date/Time: |

Final Sample Disposition

| Disposal Method: | Disposed by: | Date/Time: |
|---|---|---|
| | | |

001

Comments: * Opened 7-20-92; Received @ TMA/NORCAL 7-18-92 . KB

A-6000-407 (12/90)

9613491.2062

| Westinghouse Hanford Company | CHAIN OF CUSTODY |
|---|---|

Custody Form Initiator: Jon Lucas

Company Contact: Dan Landeen — Telephone: 376-1038

Project Designation/Sampling Locations: 100 A Biota Sampling — Collection Date: 7/1 & 7/13/92

Tree Leaves

Ice Chest No.: RM # 82 — Field Logbook No.: WHC-N-444-1

Bill of Lading/Airbill No.: 2509869120 — Offsite Property No.: W92-0-0436 #31

Method of Shipment: ODE Vehicle

Shipped to: TMA Norcal

Possible Sample Hazards/Remarks: N/A

Sample Identification

B06N57
B06N58
B06N59
B06N60
B06N61
B06N62

| Field Transfer of Custody | CHAIN OF POSSESSION | (Sign and Print Names) |
|---|---|---|
| Relinquished by: Jonathan G. Lucas | Received by: Kermit Blum | Date/Time: 7-20-92 0800 * |
| Relinquished by: | Received by: | Date/Time: |
| Relinquished by: | Received by: | Date/Time: |
| Relinquished by: | Received by: | Date/Time: 002 |

Final Sample Disposition

| Disposal Method: | Disposed by: | Date/Time: |
|---|---|---|

Comments: * Received @ TMA/Norcal 7-18-92; opened 7-20-92. KB

A-6000-407 (12/90)

9613191.2063

Westinghouse Hanford Company

# SAMPLE ANALYSIS REQUEST

## PART I: FIELD SECTION

Collector V.G. Lucas, C.E. Herden, Dan Landeen Date Sampled 7-14/7-13-92 Time — hours

Company Contact Dan Landeen Telephone (509) 376-1038

| Sample Number | Number and Type of Sample Containers | Type of Sample* | Analysis Requested |
|---|---|---|---|
| B06N49 | Ziplock bag — | Tree Leaves | TAL Metals (including Mercury) — |
| B06N50 | (1) per sample | | CLP |
| B06N51 | number | | |
| B06N52 | | | Total Gamma - Lab SOP |
| B06N53 | | | Sr-90 — Lab SOP |
| B06N54 | | | Tritium — Lab SOP |
| B06N55 | | | |
| B06N56 | | | |
| B06N57 | | | |
| B06N58 | | | |
| B06N59 | | | |
| B06N60 | | | |
| B06N61 | | | |
| B06N62 | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

Field Information** N/A

Special Handling and/or Storage 4°C

Possible Sample Hazards N/A

003

## PART II: LABORATORY SECTION

Received by Kermit Blum Title Sample Control Supervisor Date 7-20-92

Analysis Required

*Indicate whether sample is soil, sludge, water, etc.

**Use back of page for additional information relative to sample location.

A-6000-406 (05/90)

9613491.2864

| Westinghouse Hanford Company | CHAIN OF CUSTODY S&S |
|---|---|

Custody Form Initiator: Von Lucas

Company Contact: Dan Landeen — Telephone: 376-1038

Project Designation/Sampling Locations: 100 A Biota Sampling Tree Leaves — Collection Date: 7/1 & 7/13/92

Ice Chest No.: RM #105 — Field Logbook No.: WHC-N-444-1

Bill of Lading/Airbill No.: 2509869120 — Offsite Property No.: W92-0-0436 #31

Method of Shipment: DOE Vehicle

Shipped to: TMA Norcal

Possible Sample Hazards/Remarks: N/A

Sample Identification

B06N49
B06N50
B06N51
B06N52
B06N53
B06N54
B06N55
B06N56

☐ Field Transfer of Custody — CHAIN OF POSSESSION (Sign and Print Names)

| Relinquished by: | Received by: | Date/Time: |
|---|---|---|
| Jonathan G. Lucas | Kermit Blum | 7-20-92 0800 * |
| Kermit Blum 7-24-92 | [illegible] | 7/27/92 9:30 |
| | | |
| | | |

Final Sample Disposition

| Disposal Method: | Disposed by: | Date/Time: |
|---|---|---|
| | | 250 |

Comments: * Opened 7-20-92; Received @ TMA/NORCAL 7-18-92 - KB

A-6000-407 (12/90)

9615491.2965

| Westinghouse Hanford Company | CHAIN OF CUSTODY | S & S |
|---|---|---|

Custody Form Initiator: Jon Lucas

Company Contact: Dan Landeen — Telephone: 376-1038

Project Designation/Sampling Locations: 100 A Biota Sampling — Collection Date: 7/1 & 7/13/92

Tree Leaves

Ice Chest No.: RM # 82 — Field Logbook No.: WHC-N-444-1

Bill of Lading/Airbill No.: 2509869120 — Offsite Property No.: W92-0-0436 #31

Method of Shipment: DOE Vehicle

Shipped to: TMA Norcal

Possible Sample Hazards/Remarks: N/A

Sample Identification

B06N57
B06N58
B06N59
B06N60
B06N61
B06N62

☐ Field Transfer of Custody — CHAIN OF POSSESSION — (Sign and Print Names)

| Relinquished by: | Received by: | Date/Time: |
|---|---|---|
| Jonathan G. Lucas | Kermit Blum | 7-20-92 0800 * |
| Kermit Blum 7-24-92 | [illegible] | 7/27/92 9:30 |
| | | |
| | | |

Final Sample Disposition

| Disposal Method: | Disposed by: | Date/Time: |
|---|---|---|
| | | 251 |

Comments: * Received @ TMA/NORCAL 7-18-92; opened 7-20-92. KB

A-6000-407 (12/90)

9613491.2866

Westinghouse Hanford Company

# SAMPLE ANALYSIS REQUEST

## PART I: FIELD SECTION

Collector V.G. Lucas, C.E. Hayden, Dan Landeen Date Sampled 7-14/7-13-92 Time — hours

Company Contact Dan Landeen Telephone (509) 376-1038

| Sample Number | Number and Type of Sample Containers | Type of Sample* | Analysis Requested |
|---|---|---|---|
| B06N49 | ziplock bag — | Tree Leaves | TAL Metals (including Mercury) — |
| B06N50 | (1) per sample | | CLP |
| B06N51 | number | | |
| B06N52 | | | ~~Total Gamma — Lab SOP~~ |
| B06N53 | | | ~~Sr-90 — Lab SOP~~ |
| B06N54 | | | ~~Tritium — Lab SOP~~ |
| B06N55 | | | |
| B06N56 | | | |
| B06N57 | | | |
| B06N58 | | | |
| B06N59 | | | |
| B06N60 | | | |
| B06N61 | | | |
| B06N62 | | | |

CAM # 105

CAM # 82

Field Information** N/A

Special Handling and/or Storage 4°C

Possible Sample Hazards N/A

## PART II: LABORATORY SECTION

Received by Kermit Blum Title Sample Control Supervisor Date 7-20-92

Analysis Required

*Indicate whether sample is soil, sludge, water, etc.

**Use back of page for additional information relative to sample location.

 A-6000-406 (05/90)

9613491.2867

# Validation Narrative - SDG: B06N49

## 1. INTRODUCTION

This report presents the results of inorganic data validation on the following sample delivery group and sample numbers which were analyzed by the Thermo Analytical, Inc. - Richmond, CA laboratory. The HEIS sample numbers associated with this group by SDG are listed below:

| Data Package ID | HEIS Sample Numbers | | Matrix |
|---|---|---|---|
| SDG: B06N49 | B06N49 | B06N56 | Soil |
| | B06N50 | B06N57 | Soil |
| | B06N51 | B06N58 | Soil |
| | B06N52 | B06N59 | Soil |
| | B06N53 | B06N60 | Soil |
| | B06N54 | B06N61 | Soil |
| | B06N55 | B06N62 | Soil |

Sample identifications, dates received, and analyte concentrations are provided in the enclosed analysis data sheets. Data validation was conducted in accordance with the Westinghouse Hanford Company statement of work (WHC 1991) and validation procedures (WHC 1992). The data validation procedure is a review of laboratory performance and implementation of applicable protocols. Subsequent technical data evaluation by project lead personnel should include a determination of the appropriateness of results from a standpoint of past history and present knowledge of the sample site.

## 2. DATA QUALITY OBJECTIVES

Completeness

The data package was complete for all requested analyses and met the data quality objectives of the work plan. Data quality objectives for the project specified the use of CLP methods for the TAL metals analytes.

Data Qualification

The data is acceptable and useable given the attached qualifiers.

## 3. QUALIFIED DATA

This section presents a summary of the qualifications required based on validation of the subject data package (See Data Qualification Summary - Form B - 8).

### 3.1 Major Deficiencies

No major deficiencies were noted in the data.

### 3.2 Minor Deficiencies

The following qualifications were required as a result of the validation.

- Beryllium, cadmium, calcium, lead, magnesium, and sodium were detected in the laboratory and/or preparation blanks above their IDLs. Contaminants were detected in various samples at concentrations less than five times the highest concentrations found in the blanks and these have been qualified as non-detects (U).

- Matrix spike recoveries for arsenic and mercury exceeded control limits. Qualify affected results as estimated (<IDL - UJ; >IDL - J).

- Duplicates for chromium, iron, and zinc were outside limits. All samples were qualified as estimated (J).

- Analytical spike recovery of arsenic, selenium, and thallium was outside control limits, therefore the results have been qualified as estimated (UJ for non-detects).

## 4. CONCLUSION

The results contained in this report are acceptable for use.

# INORGANIC ANALYSIS DATA VALIDATION CHECKLIST - FORM A-6

| | | |
|---|---|---|
| PROJECT: 100 AREA BIOTA | REVIEWER: RCS | DATE: 12/15/92 |
| LABORATORY: TMA | CASE: N2-07-086 | SDG: B06N49 |
| SAMPLES/MATRIX: B06N49, B06N50, B06N51, B06N52, B06N53, B06N54, B06N55, B06N56, B06N57, B06N58, B06N59, B06N60, B06N61, B06N62, ALL SOIL TREE LEAVES | | |

## 1. COMPLETENESS AND CONTRACT COMPLIANCE

Review the data package for completeness and check off the items below. If any data review elements are missing contact the laboratory for submittal of the omitted data.

| Data Package Item | Present?: Yes | No | N/A |
|---|---|---|---|
| Case Narrative | ✓ | | |
| Cover Page | ✓ | | |
| Traffic Reports | ✓ | | |
| Sample Data | | | |
| Inorganic Analysis Data Sheets | ✓ | | |
| Standards Data | | | |
| Initial and Continuing Calibration Verification | ✓ | | |
| CRDL Standard for AA and ICP | ✓ | | |
| QC Summary | | | |
| Blanks | ✓ | | |
| ICP Interference Check Summary | ✓ | | |
| Spike Sample Recovery | ✓ | | |
| Post-Digestion Spike Sample Recovery | RCS 12/15/92 ✓ | ✓ | ✓ |
| Duplicate | ✓ | | |
| Laboratory Control Sample | ✓ | | |
| Standard Addition Results | ✓ | | |
| ICP Serial Dilutions | ✓ | | |
| Instrument Detection Limits | ✓ | | |
| ICP Interelement Correction Factors | ✓ | | |
| ICP Linear Ranges | ✓ | | |
| Preparation Log | ✓ | | |
| Analysis Run Log | ✓ | | |
| Raw Data | | | |
| ICP Raw Data | ✓ | | |
| Furnace AA Raw Data | ✓ | | |
| Mercury Raw Data | ✓ | | |
| Cyanide Raw Data | | | ✓ |
| Additional Data | | | |
| Internal laboratory chain-of-custody | ✓ | | |
| Laboratory Sample Preparation Records | ✓ | | |

6. LABORATORY BLANKS

Are target analytes present in the laboratory blanks? Yes No N/A

ACTION: Qualify all associated sample results for any analyte <5 times the amount in any laboratory blank as nondetected (U). If analyte concentrations in the blank are >CRDL or below the negative CRDL, verify the laboratory has redigested and reanalyzed associated samples with analyte concentrations <10 times the blank concentration. If the laboratory has not redigested and reanalyzed the samples, note in the validation narrative.

7. FIELD BLANKS

RCS 12/20/92

Are target analytes present in the field blanks? ~~Yes~~ No N/A

ACTION: Qualify all sample results for any analyte <5 times the amount in any valid field blank as nondetected (U).

* No field blanks identified in the sample delivery group.

8. MATRIX SPIKE SAMPLE ANALYSIS

Are spike recoveries within the control limits? Yes No N/A

ACTION: Qualify the affected sample data according to the following requirements:

If spike recovery is >125% and sample results are <IDL no qualification is required. If spike recovery is >125% or <75% qualify all positive results as estimated (J). If spike recovery is 30% to 74% qualify all nondetects as estimated (UJ). If spike recovery is <30%, reject all nondetects (R). If the field blank has been used for spike analysis, note in the validation narrative.

9. LABORATORY CONTROL SAMPLE

Are percent recoveries within the acceptance limits? Yes No N/A

Are there calculation errors? Yes No N/A

ACTION: Qualify the sample data according to the following requirements:

AQUEOUS LCS - Qualify as estimated (J), all sample results >IDL, for which the LCS %R falls within the range 50-79% or >120%. Qualify as estimated (UJ), all sample results <IDL, for which the LCS falls within the range of 50-79%. Qualify as unusable (R) all sample results, for which the LCS %R <50%.

SOLID LCS - Qualify as estimated (J), all sample results >IDL for which the LCS result is outside the established control limits. Qualify as estimated (UJ), all sample results <IDL for which the LCS %R are lower than the established control limits.

| | | | |
|---|---|---|---|
| If no, were MSA analyses performed when required? | Yes | No | N/A |
| Are MSA correlation coefficients $\geq$0.995? | Yes | No | N/A |
| If no, was a second MSA analysis performed? | Yes | No | N/A |

ACTION: If duplicate injections are outside the acceptance limits and the sample has not been reanalyzed or the reanalysis is outside the acceptance limits, qualify the associated data as estimated (J for detects and UJ for nondetects). If the analytical spike recovery is <40% qualify detects as estimated (J). If the analytical spike recovery is $\geq$10% but <40%, qualify all nondetects as estimated (UJ) and if the analytical spike recovery is <10%, reject all nondetects (R). If the sample absorbance is <50% of the analytical spike absorbance and the analytical spike recovery is <85% or >115%, qualify all results as estimated (J for detects and UJ for nondetects). If method of standard additions (MSA) was required but was not performed, the MSA samples were spiked incorrectly, or the MSA correllation coefficient was <0.995, qualify the associated detected results as estimated (J).

## 17. ANALYTE QUANTITATION AND DETECTION LIMITS

| | | | |
|---|---|---|---|
| Have results been reported and calculated correctly? | ~~Yes~~ RCS 12/10/92 | No | N/A |
| Are results within the calibrated range of the instruments and within the linear range of the ICP? | ~~Yes~~ | No | N/A |
| Are all detection limits below the CRQL? | Yes | No | N/A |

Action: If analyte quantitation is in error, contact the laboratory for explanation. If errors or deficiencies can not be resolved with the laboratory, qualify associated data as unusable (R).

## 18. OVERALL ASSESSMENT AND SUMMARY

| | | | |
|---|---|---|---|
| Has the laboratory conducted the analysis in accordance with the analytical SOW? | Yes | No | N/A |
| Were project specific data quality objectives met for this analysis? | Yes | No | N/A |

ACTION: Summarize all the data qualifications and complete the data validation narrative as specified in Section 10.0 of the data validation requirements.

HOLDING TIME SUMMARY - FORM B-1

| SDG: B06N49 | REVIEWER: RC SMITH | | | DATE: 12/15/92 | | PAGE 1 OF 1 | |
|---|---|---|---|---|---|---|---|
| FIELD SAMPLE IDENT. | ANALYSIS TYPE | DATE SAMPLED | DATE PREPARED | DATE ANALYZED | PREP. HOLDING TIME, DAYS | ANALYSIS HOLDING TIME, DAYS | QUALIFIER |
| ALL | COLD VAPOR/MERCURY | 7/1 & 7/13/92 | 7/27/92 | 7/27/92 | 26 | 26 | NONE |
| ALL | AA METALS | 7/1 & 7/13/92 | ~~7/18/26~~ 8/26/92 | 9/14,20,21/92 | 56 | 82 | NONE |
| ALL | ICP METALS | 7/1 & 7/13/92 | ~~9/18/92~~ 8/26/92 | 8/27 & 9/18/92 | 56 | 79 | NONE |
| | | | | | | | |
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| | | | | | | | |

COMMENTS: RECOMMENDED HOLDING TIMES WERE NOT EXCEEDED.

ACTION: No ACTION NECESSARY.

96341.2872

# CALIBRATION DATA SUMMARY - FORM B-2

| SDG: B06N49 | REVIEWER: RCS | DATE: 12/16/92 | PAGE 1 OF 1 |
|---|---|---|---|

INSTRUMENT:

| CALIB. TYPE | CALIB. DATE | ANALYTE/COMPOUND | RF | RSD/%D/%R | SAMPLE(S) AFFECTED | QUALIFIER |
|---|---|---|---|---|---|---|
| | | | | | | |

COMMENTS: Instruments were calibrated as required. The necessary blanks and standards were run. All percent recoveries were within control limits.

ACTION: No action required.

96 1017 0073

BLANK AND SAMPLE DATA SUMMARY - FORM B-3

SDG: B06N49 | REVIEWER: RCS | DATE: 12/16/92 | PAGE 1 OF 2

| CALIB. TYPE/SAMPLE IDENT. | ANALYTE/COMPOUND | RESULT | Q | RT | UNITS | 5X RESULT | 10X RESULT | SAMPLE(S) AFFECTED | QUALIFIER |
|---|---|---|---|---|---|---|---|---|---|
| CCB1 | BERYLLIUM | .16 | B | N/A | MG/KG | 0.8 | N/A | NONE | NONE |
| CCB1 | CADMIUM | .58 | | | | 2.9 | | | |
| PREP BLANK | CALCIUM | 9.15 | | | | 45.75 | | | |
| PREP BLANK | LEAD | .542 | | | | 2.71 | | B06N53 | u |
| | | | | | | | | B06N59 | |
| | | | | | | | | B06N60 | |
| PREP BLANK | MAGNESIUM | 8.364 | | | | 41.82 | | NONE | NONE |
| | SODIUM | 44.796 | | | | 223.98 | | B06N51 | u |
| | | | | | | | | B06N52 | |
| | | | | | | | | B06N53 | |
| | | | | | | | | B06N54 | |
| | | | | | | | | B06N55 | |
| | | | | | | | | B06N56 | |
| | | | | | | | | B06N57 | |
| | | | | | | | | B06N58 | |
| | | | | | | | | B06N59 | |
| | | | | | | | | B06N60 | |

COMMENTS:

ACTION:

96134671.2874

BLANK AND SAMPLE DATA SUMMARY - FORM B-3

| SDG: B06N49 | REVIEWER: RCl | DATE: 12/16/92 | PAGE 7 OF 2 |
|---|---|---|---|

| CALIB. TYPE/SAMPLE IDENT. | ANALYTE/COMPOUND | RESULT | Q | RT | UNITS | 5X RESULT | 10X RESULT | SAMPLE(S) AFFECTED | QUALIFIER |
|---|---|---|---|---|---|---|---|---|---|
| PREP BLANK | SODIUM | 44.796 | B | N/A | MG/KG | 223.98 | N/A | B06N61 | U |
| ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | B06N62 | ↓ |

COMMENTS: Contaminants detected in blanks above their IDL: beryllium, cadmium, calcium, lead, magnesium, & sodium.

ACTION: Qualify all the above analytes > their IDL but less than 5 times the largest concentration in any blank as undetected

96139169.2875

# ACCURACY DATA SUMMARY - FORM B-4
## MATRIX SPIKE RECOVERY AND LCS RECOVERY

| SDG: B06N49 | REVIEWER: RCS | DATE: 12/16/92 | PAGE 1 OF 1 | |
|---|---|---|---|---|
| **SAMPLE IDENT.** | **ANALYTE/COMPOUND** | **% RECOVERY** | **SAMPLE(S) AFFECTED** | **QUALIFIER** |
| MATRIX SPIKE | ARSENIC | 66.8 | B06N49 | J |
| | | | B06N50 | |
| | | | B06N51 | |
| | | | B06N52 | |
| | | | B06N53 | |
| | | | B06N54 | |
| | | | B06N55 | UJ |
| | | | B06N56 | J |
| | | | B06N57 | |
| | | | B06N58 | |
| | | | B06N59 | |
| | | | B06N60 | UJ |
| | | | B06N61 | J |
| | | | B06N62 | |
| | MERCURY | 38.9 | ALL | J |
| | | | | |
| | | | | |

**COMMENTS:** The matrix spike recovery for arsenic and mercury exceeded control limits.

**ACTION:** Qualify all results > 30% and < 75% and < IDL as UJ and > IDL as J.

9207.0136

ACCURACY DATA SUMMARY - FORM B-4
MATRIX SPIKE RECOVERY AND LCS RECOVERY

| SDG: B06N49 | REVIEWER: RCS | DATE: 12/16/92 | PAGE 1 OF 1 | |
|---|---|---|---|---|
| SAMPLE IDENT. | ANALYTE/COMPOUND | % RECOVERY | SAMPLE(S) AFFECTED | QUALIFIER |
| LCS | | | | |

COMMENTS: All LCS results fall within the published control limits.

ACTION: No action necessary.

96134977

PRECISION DATA SUMMARY - FORM B-5

| SDG: B06N49 | REVIEWER: RCJ | DATE: 12/16/92 | | PAGE 1 OF 1 | |
|---|---|---|---|---|---|
| ANALYTE/COMPOUND | SAMPLE IDENT. | SAMPLE IDENT. | RPD | SAMPLE(S) AFFECTED | QUALIFIER |
| IRON | DUPLICATES | | 96.2 | ALL | J |
| ZINC | | | 62.9 | ALL | J |

COMMENTS: Duplicate analytes for ~~chromium~~ RCJ 12/16/92, iron + zinc were out of limits.

ACTION: Qualify all samples > IDL as estimated (J).

9013916 2878

# PRECISION AND ACCURACY DATA SUMMARY - FORM B-6
## GFAA ANALYTICAL SPIKE RECOVERY

| SDG: B06N49 | REVIEWER: RCS | DATE: 12/16/92 | PAGE 1 OF 1 | |
|---|---|---|---|---|
| **SAMPLE IDENT.** | **ANALYTE/COMPOUND** | **% RECOVERY** | **SAMPLE(S) AFFECTED** | **QUALIFIER** |
| ANALYTICAL SPIKE | ARSENIC | 71.2 | B06N49 | J |
| | | 62.4 | B06N50 | J |
| | | 62.4 | B06N51 | J |
| | | 58.3 | B06N52 | J |
| | | 64.0 | B06N53 | J |
| | | 53.4 | B06N54 | J |
| | | 84.3 | B06N55 | UJ |
| | | 70.9 | B06N56 | J |
| | | 61.7 | B06N57 | J |
| | | 69.0 | B06N58 | J |
| | | 56.3 | B06N59 | J |
| | | 83.6 | B06N60 | UJ |
| | | 61.8 | B06N61 | J |
| | | 62.4 | B06N62 | J |
| | SELENIUM | 120.5 140.4 | B06N59 B06N58 | UJ UJ |
| | | 82.2 | B06N50 B06N54 | J J |
| | SELENIUM | 120.9 | B06N61 | UJ |
| | THALLIUM | 84.3 | B06N49 | UJ |

MS.A

COMMENTS: Percent recoveries for arsenic, selenium, & thallium were outside limits.

ACTION: All results <85% or >115% and >IDL qualified as J. All results <85% or >115% and <IDL qualified as UJ.

6287.61396

9613491.2880

# CALCULATION SUMMARY - FORM B-7

| SDG: 006 N49 | REVIEWER: RCS | DATE: 12/16/92 | PAGE 1 OF 6 |
|---|---|---|---|

COMMENTS:

ACTION:

# DATA QUALIFICATION SUMMARY - FORM B-8

| SDG: B06N49 | REVIEWER: RCJ | DATE: 12/16/92 | PAGE 1 OF 3 |
|---|---|---|---|
| | | | |
| ANALYTE/ COMPOUND | QUALIFIER | SAMPLES AFFECTED | REASON |
| ARSENIC | J | B06N49 | MATRIX SPIKE EXCEEDED LIMITS |
| | | B06N50 | |
| | | B06N51 | |
| | | B06N52 | |
| | | B06N53 | |
| | | B06N54 | |
| | UJ | B06N55 | |
| | J | B06N56 | |
| | | B06N57 | |
| | | B06N58 | |
| | | B06N59 | |
| | UJ | B06N60 | |
| | J | B06N61 | |
| | J | B06N62 | |
| MERCURY | J | ALL | |
| LEAD | U | B06N53 | CONTAMINANTS IN BLANKS |
| | | B06N59 | |
| | | B06N60 | |
| SODIUM | U | B06N51 | |
| | | B06N52 | |
| | | B06N53 | |
| | | B06N54 | |
| | | B06N55 | |
| | | B06N56 | |
| | | B06N57 | |
| | | B06N58 | |
| | | B06N59 | |

9613491.0802

# DATA QUALIFICATION SUMMARY - FORM B-8

| SDG: B06N49 | REVIEWER: RCS | DATE: 12/14/92 | PAGE 2 OF 3 |
|---|---|---|---|
| | | | |
| **ANALYTE/ COMPOUND** | **QUALIFIER** | **SAMPLES AFFECTED** | **REASON** |
| SODIUM | U | B06N60 | CONTAMINANTS IN BLANKS |
| | | B06N61 | |
| | | B06N62 | |
| ~~CHROMIUM~~ ~~ARSENIC~~ | ~~J~~ | ~~B06N56~~ | DUPLICATES WERE OUT OF LIMITS |
| | | ~~B06N57~~ | |
| RCS 12/16/92 | | ~~B06N58~~ | |
| | | ~~B06N59~~ | |
| | | ~~B06N62~~ | |
| IRON | J | ALL | |
| ZINC | J | ALL | |
| ARSENIC | J | B06N49 | ANALYTICAL SPIKE IS OUT OF LIMITS |
| | | B06N50 | |
| | | B06N51 | |
| | | B06N52 | |
| | | B06N53 | |
| | | B06N54 | |
| | UJ | B06N55 | |
| | J | B06N56 | |
| | | B06N57 | |
| | | B06N58 | |
| | | B06N59 | |
| | UJ | B06N60 | |
| | J | B06N61 | |
| | | B06N62 | |
| SELENIUM | UJ | B06N58 | |
| | ~~UJ~~ J | ~~B06N59~~ B06N50 | |
| | RCS 12/16/92 ~~UJ~~ J | RCS B06N~~54~~ | |
| | UJ | B06N61 | |

9613491.2883

# DATA QUALIFICATION SUMMARY - FORM B-8

| SDG: B06N49 | REVIEWER: RCJ | DATE: 12/16/92 | PAGE 3 OF 3 |
|---|---|---|---|
| | | | |
| ANALYTE/ COMPOUND | QUALIFIER | SAMPLES AFFECTED | REASON |
| THALLIUM | UJ | B06N49 | ANALYTICAL SPIKE OUT OF LIMIT |

9613491.2884

WESTINGHOUSE/HANFORD
1

SAMPLE NUMBER:

INORGANIC ANALYSIS DATA SHEET

B06N49

Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Code: SKINER Case No.: N2-07-086SAS No.: SDG No.: B06N49

rix (soil/water): SOIL Lab Sample ID: 07214-01S

el (low/med): LOW Date Received: 07/27/92

olids: 23.9

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

| CAS No. | Analyte | Concentration | C | Q | M | |
|---|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 58.4 | B | | P | |
| 7440-36-0 | Antimony | 13.8 | U | | P | |
| 7440-38-2 | Arsenic | 3.3 | ~~B~~ | WN | F | J |
| 7440-39-3 | Barium | 17.5 | B | | P | |
| 7440-41-7 | Beryllium | 0.59 | U | | P | |
| 7440-43-9 | Cadmium | 1.3 | U | | P | |
| 7440-70-2 | Calcium | 19700 | | | P | |
| 7440-47-3 | Chromium | 4.1 | U | * | P | |
| 7440-48-4 | Cobalt | 2.9 | U | | P | |
| 7440-50-8 | Copper | 25.2 | | | P | |
| 7439-89-6 | Iron | 206 | | * | P | J |
| 7439-92-1 | Lead | 3.0 | | | F | |
| 7439-95-4 | Magnesium | 4590 | | | P | |
| 7439-96-5 | Manganese | 34.3 | | | P | |
| 7439-97-6 | Mercury | 0.71 | | N | CV | J |
| 7440-02-0 | Nickel | 5.0 | U | | P | |
| 7440-09-7 | Potassium | 25900 | | | P | |
| 7782-49-2 | Selenium | 4.7 | | | F | ~~UJ~~ RLS 12/16/92 |
| 7440-22-4 | Silver | 4.0 | U | | P | |
| 7440-23-5 | Sodium | 320 | B | | P | |
| 7440-28-0 | Thallium | 3.5 | U | W | F | UJ |
| 7440-62-2 | Vanadium | 2.8 | U | | P | |
| 7440-66-6 | Zinc | 49.6 | | * | P | J |
| | Cyanide | | | | NR | |

lor Before: BROWN Clarity Before: Texture: FINE

lor After: BROWN Clarity After: Artifacts: YES

mments:
LEAVES

002

9613491.2885

WESTINGHOUSE/HANFORD
1

SAMPLE NUMBER:

INORGANIC ANALYSIS DATA SHEET

B06N50

b Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

b Code: SKINER Case No.: N2-07-086SAS No.: SDG No.: B06N49

trix (soil/water): SOIL Lab Sample ID: 07214-02S

vel (low/med): LOW Date Received: 07/27/92

Solids: 39.3

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

| CAS No. | Analyte | Concentration | C | Q | M | |
|---|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 45.6 | B | | P | |
| 7440-36-0 | Antimony | 8.1 | U | | P | |
| 7440-38-2 | Arsenic | 1.6 | ~~B~~ | WN | F | J |
| 7440-39-3 | Barium | 36.4 | B | | P | |
| 7440-41-7 | Beryllium | 0.34 | U | | P | |
| 7440-43-9 | Cadmium | 0.73 | U | | P | |
| 7440-70-2 | Calcium | 24700 | | | P | |
| 7440-47-3 | Chromium | 2.4 | U | * | P | |
| 7440-48-4 | Cobalt | 1.7 | U | | P | |
| 7440-50-8 | Copper | 9.2 | B | | P | |
| 7439-89-6 | Iron | 120 | | * | P | J |
| 7439-92-1 | Lead | 2.7 | | | F | |
| 7439-95-4 | Magnesium | 3710 | | | P | |
| 7439-96-5 | Manganese | 17.5 | | | P | |
| 7439-97-6 | Mercury | 0.32 | | N | CV | J |
| 7440-02-0 | Nickel | 2.9 | U | | P | |
| 7440-09-7 | Potassium | 16000 | | | P | |
| 7782-49-2 | Selenium | 2.7 | | + | F | J |
| 7440-22-4 | Silver | 2.3 | U | | P | |
| 7440-23-5 | Sodium | 230 | B | | P | |
| 7440-28-0 | Thallium | 2.2 | U | | F | |
| 7440-62-2 | Vanadium | 1.6 | U | | P | |
| 7440-66-6 | Zinc | 36.7 | | * | P | J |
| | Cyanide | | | | NR | |

lor Before: BROWN Clarity Before: Texture: FINE

lor After: BROWN Clarity After: Artifacts: YES

mments:
LEAVES

003

9613491.2886

WESTINGHOUSE/HANFORD
1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER:

B06N51

Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Code: SKINER Case No.: N2-07-086SAS No.: SDG No.: B06N49

trix (soil/water): SOIL Lab Sample ID: 07214-03S

vel (low/med): LOW Date Received: 07/27/92

Solids: 35.3

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

| CAS No. | Analyte | Concentration | C | Q | M | |
|---|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 59.6 | B | | P | |
| 7440-36-0 | Antimony | 9.2 | U | | P | |
| 7440-38-2 | Arsenic | 1.7 | ~~B~~ | WN | F | J |
| 7440-39-3 | Barium | 38.4 | B | | P | |
| 7440-41-7 | Beryllium | 0.39 | U | | P | |
| 7440-43-9 | Cadmium | 0.83 | U | | P | |
| 7440-70-2 | Calcium | 24400 | | | P | |
| 7440-47-3 | Chromium | 2.7 | U | * | P | |
| 7440-48-4 | Cobalt | 1.9 | U | | P | |
| 7440-50-8 | Copper | 6.7 | B | | P | |
| 7439-89-6 | Iron | 136 | | * | P | J |
| 7439-92-1 | Lead | 1.7 | | | F | |
| 7439-95-4 | Magnesium | 3190 | | | P | |
| 7439-96-5 | Manganese | 30.6 | | | P | |
| 7439-97-6 | Mercury | 1.4 | | N | CV | J |
| 7440-02-0 | Nickel | 3.3 | U | | P | |
| 7440-09-7 | Potassium | 16600 | | | P | |
| 7782-49-2 | Selenium | 2.8 | | | F | |
| 7440-22-4 | Silver | 2.7 | U | | P | |
| 7440-23-5 | Sodium | 171 | ~~B~~ | | P | u |
| 7440-28-0 | Thallium | 2.4 | U | | F | |
| 7440-62-2 | Vanadium | 1.8 | U | | P | |
| 7440-66-6 | Zinc | 29.8 | | * | P | J |
| | Cyanide | | | | NR | |

lor Before: BROWN Clarity Before: Texture: FINE

lor After: BROWN Clarity After: Artifacts: YES

mments:
LEAVES

004

FORM I - IN ILM02.1

9613491.2887

WESTINGHOUSE/HANFORD
1

# INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B06N52

Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Code: SKINER Case No.: N2-07-086SAS No.: SDG No.: B06N49

rix (soil/water): SOIL Lab Sample ID: 07214-04S

el (low/med): LOW Date Received: 07/27/92

olids: 34.7

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

| CAS No. | Analyte | Concentration | C | Q | M | |
|---|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 38.8 | B | | P | |
| 7440-36-0 | Antimony | 9.3 | U | | P | |
| 7440-38-2 | Arsenic | 2.1 | ~~B~~ | WN | F | J |
| 7440-39-3 | Barium | 39.0 | B | | P | |
| 7440-41-7 | Beryllium | 0.40 | U | | P | |
| 7440-43-9 | Cadmium | 0.85 | U | | P | |
| 7440-70-2 | Calcium | 25100 | | | P | |
| 7440-47-3 | Chromium | 2.8 | U | * | P | |
| 7440-48-4 | Cobalt | 2.0 | U | | P | |
| 7440-50-8 | Copper | 8.1 | B | | P | |
| 7439-89-6 | Iron | 118 | | * | P | J |
| 7439-92-1 | Lead | 2.1 | | | F | |
| 7439-95-4 | Magnesium | 3150 | | | P | |
| 7439-96-5 | Manganese | 28.0 | | | P | |
| 7439-97-6 | Mercury | 0.59 | | N | CV | J |
| 7440-02-0 | Nickel | 3.4 | U | | P | |
| 7440-09-7 | Potassium | 16300 | | | P | |
| 7782-49-2 | Selenium | 2.6 | B | | F | |
| 7440-22-4 | Silver | 2.7 | U | | P | |
| 7440-23-5 | Sodium | 199 | ~~B~~ | | P | u |
| 7440-28-0 | Thallium | 2.4 | U | | F | |
| 7440-62-2 | Vanadium | 1.9 | U | | P | |
| 7440-66-6 | Zinc | 23.7 | | * | P | J |
| | Cyanide | | | | NR | |

or Before: BROWN Clarity Before: Texture: FINE

or After: BROWN Clarity After: Artifacts: YES

ments:
LEAVES

005

9613491.2888

WESTINGHOUSE/HANFORD
1

# INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B06N53

› Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

› Code: SKINER Case No.: N2-07-086SAS No.: SDG No.: B06N49

:rix (soil/water): SOIL Lab Sample ID: 07214-05S

'el (low/med): LOW Date Received: 07/27/92

:olids: 37.9

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

| CAS No. | Analyte | Concentration | C | Q | M | |
|---|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 43.4 | B | | P | |
| 7440-36-0 | Antimony | 8.7 | U | | P | |
| 7440-38-2 | Arsenic | 1.9 | ~~B~~ | WN | F | J |
| 7440-39-3 | Barium | 32.3 | B | | P | |
| 7440-41-7 | Beryllium | 0.37 | U | | P | |
| 7440-43-9 | Cadmium | 0.79 | U | | P | |
| 7440-70-2 | Calcium | 21500 | | | P | |
| 7440-47-3 | Chromium | 2.6 | U | * | P | |
| 7440-48-4 | Cobalt | 1.8 | U | | P | |
| 7440-50-8 | Copper | 4.4 | B | | P | |
| 7439-89-6 | Iron | 108 | | * | P | J |
| 7439-92-1 | Lead | 1.5 | ~~B~~ | | F | u |
| 7439-95-4 | Magnesium | 3260 | | | P | |
| 7439-96-5 | Manganese | 19.3 | | | P | |
| 7439-97-6 | Mercury | 0.58 | | N | CV | J |
| 7440-02-0 | Nickel | 3.2 | U | | P | |
| 7440-09-7 | Potassium | 18000 | | | P | |
| 7782-49-2 | Selenium | 2.4 | B | | F | |
| 7440-22-4 | Silver | 2.5 | U | | P | |
| 7440-23-5 | Sodium | 168 | ~~B~~ | | P | u |
| 7440-28-0 | Thallium | 2.3 | U | | F | |
| 7440-62-2 | Vanadium | 1.7 | U | | P | |
| 7440-66-6 | Zinc | 17.3 | | * | P | J |
| | Cyanide | | | | NR | |

or Before: BROWN Clarity Before: Texture: FINE

or After: BROWN Clarity After: Artifacts: YES

ments:
LEAVES

008

9613491.2889

WESTINGHOUSE/HANFORD
1

# INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B06N54

Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Code: SKINER Case No.: N2-07-086SAS No.: SDG No.: B06N49

rix (soil/water): SOIL Lab Sample ID: 07214-06S

el (low/med): LOW Date Received: 07/27/92

olids: 39.5

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

| CAS No. | Analyte | Concentration | C | Q | M | |
|---|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 40.8 | B | | P | |
| 7440-36-0 | Antimony | 8.4 | U | | P | |
| 7440-38-2 | Arsenic | 2.1 | ~~B~~ | WN | F | J |
| 7440-39-3 | Barium | 26.4 | B | | P | |
| 7440-41-7 | Beryllium | 0.35 | U | | P | |
| 7440-43-9 | Cadmium | 0.76 | U | | P | |
| 7440-70-2 | Calcium | 26200 | | | P | |
| 7440-47-3 | Chromium | 2.5 | U | * | P | |
| 7440-48-4 | Cobalt | 1.8 | U | | P | |
| 7440-50-8 | Copper | 6.5 | B | | P | |
| 7439-89-6 | Iron | 140 | | * | P | J |
| 7439-92-1 | Lead | 1.6 | | | F | |
| 7439-95-4 | Magnesium | 5500 | | | P | |
| 7439-96-5 | Manganese | 69.9 | | | P | |
| 7439-97-6 | Mercury | 0.57 | | N | CV | J |
| 7440-02-0 | Nickel | 3.0 | U | | P | |
| 7440-09-7 | Potassium | 10700 | | | P | |
| 7782-49-2 | Selenium | 1.9 | ~~B~~ | W | F | J |
| 7440-22-4 | Silver | 2.4 | U | | P | |
| 7440-23-5 | Sodium | 198 | ~~B~~ | | P | w |
| 7440-28-0 | Thallium | 2.1 | U | | F | |
| 7440-62-2 | Vanadium | 1.7 | U | | P | |
| 7440-66-6 | Zinc | 33.4 | | * | P | J |
| | Cyanide | | | | NR | |

or Before: GREEN Clarity Before: Texture: FINE

or After: GREEN Clarity After: Artifacts: YES

ments:
LEAVES

007

9613491.2890

WESTINGHOUSE/HANFORD

1

# INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B06N55

Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Code: SKINER Case No.: N2-07-086SAS No.: SDG No.: B06N49

rix (soil/water): SOIL Lab Sample ID: 07214-07S

el (low/med): LOW Date Received: 07/27/92

olids: 39.7

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

| CAS No. | Analyte | Concentration | C | Q | M | |
|---|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 26.1 | B | | P | |
| 7440-36-0 | Antimony | 8.3 | U | | P | |
| 7440-38-2 | Arsenic | 1.3 | ~~U~~ | WN | F | uJ |
| 7440-39-3 | Barium | 24.3 | B | | P | |
| 7440-41-7 | Beryllium | 0.35 | U | | P | |
| 7440-43-9 | Cadmium | 0.76 | U | | P | |
| 7440-70-2 | Calcium | 17500 | | | P | |
| 7440-47-3 | Chromium | 2.5 | U | * | P | |
| 7440-48-4 | Cobalt | 1.8 | U | | P | |
| 7440-50-8 | Copper | 6.1 | B | | P | |
| 7439-89-6 | Iron | 89.4 | | * | P | J |
| 7439-92-1 | Lead | 2.0 | | | F | |
| 7439-95-4 | Magnesium | 4190 | | | P | |
| 7439-96-5 | Manganese | 9.4 | | | P | |
| 7439-97-6 | Mercury | 0.31 | | N | CV | J |
| 7440-02-0 | Nickel | 3.0 | U | | P | |
| 7440-09-7 | Potassium | 14600 | | | P | |
| 7782-49-2 | Selenium | 2.3 | B | | F | |
| 7440-22-4 | Silver | 2.4 | U | | P | |
| 7440-23-5 | Sodium | 185 | ~~B~~ | | P | u |
| 7440-28-0 | Thallium | 2.2 | U | | F | |
| 7440-62-2 | Vanadium | 1.7 | U | | P | |
| 7440-66-6 | Zinc | 26.0 | | * | P | J |
| | Cyanide | | | | NR | |

or Before: BROWN Clarity Before: Texture: FINE

or After: BROWN Clarity After: Artifacts: YES

ments:
LEAVES

008

9613491.2891

WESTINGHOUSE/HANFORD
1

SAMPLE NUMBER:

INORGANIC ANALYSIS DATA SHEET

B06N56

Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Code: SKINER Case No.: N2-07-086SAS No.: SDG No.: B06N49

-ix (soil/water): SOIL Lab Sample ID: 07214-08S

el (low/med): LOW Date Received: 07/27/92

olids: 34.9

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

| CAS No. | Analyte | Concentration | C | Q | M | |
|---|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 47.2 | B | | P | |
| 7440-36-0 | Antimony | 9.5 | U | | P | |
| 7440-38-2 | Arsenic | 1.6 | ~~B~~ | WN | F | J |
| 7440-39-3 | Barium | 26.9 | B | | P | |
| 7440-41-7 | Beryllium | 0.40 | U | | P | |
| 7440-43-9 | Cadmium | 0.86 | U | | P | |
| 7440-70-2 | Calcium | 18600 | | | P | ~~J~~ RCS 12/16/92 |
| 7440-47-3 | Chromium | 3.9 | ~~B~~ | * | P | ~~J~~ RCS 12/16/92 |
| 7440-48-4 | Cobalt | 2.0 | U | | P | |
| 7440-50-8 | Copper | 7.8 | B | | P | |
| 7439-89-6 | Iron | 102 | | * | P | J |
| 7439-92-1 | Lead | 2.8 | | | F | |
| 7439-95-4 | Magnesium | 1940 | B | | P | |
| 7439-96-5 | Manganese | 22.3 | | | P | |
| 7439-97-6 | Mercury | 0.67 | | N | CV | J |
| 7440-02-0 | Nickel | 5.1 | B | | P | |
| 7440-09-7 | Potassium | 17500 | | | P | |
| 7782-49-2 | Selenium | 2.2 | B | | F | |
| 7440-22-4 | Silver | 2.8 | U | | P | |
| 7440-23-5 | Sodium | 175 | ~~B~~ | | P | u |
| 7440-28-0 | Thallium | 2.4 | U | | F | |
| 7440-62-2 | Vanadium | 1.9 | U | | P | |
| 7440-66-6 | Zinc | 35.0 | | * | P | J |
| | Cyanide | | | | NR | |

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts: YES

Comments:
LEAVES

009

FORM I - IN ILM02.1

9613491.2892

WESTINGHOUSE/HANFORD

1

# INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B06N57

Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Code: SKINER Case No.: N2-07-086SAS No.: SDG No.: B06N49

rix (soil/water): SOIL Lab Sample ID: 07214-09S

el (low/med): LOW Date Received: 07/27/92

olids: 45.0

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

| CAS No. | Analyte | Concentration | C | Q | M | |
|---|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 41.7 | B | | P | |
| 7440-36-0 | Antimony | 7.1 | U | | P | |
| 7440-38-2 | Arsenic | 1.4 | ~~B~~ | WN | F | J |
| 7440-39-3 | Barium | 36.8 | B | | P | |
| 7440-41-7 | Beryllium | 0.30 | U | | P | |
| 7440-43-9 | Cadmium | 0.64 | U | | P | |
| 7440-70-2 | Calcium | 18800 | | | P | |
| 7440-47-3 | Chromium | 3.2 | ~~B~~ | * | P | J |
| 7440-48-4 | Cobalt | 1.5 | U | | P | |
| 7440-50-8 | Copper | 5.5 | B | | P | |
| 7439-89-6 | Iron | 109 | | * | P | J |
| 7439-92-1 | Lead | 1.7 | | | F | |
| 7439-95-4 | Magnesium | 4530 | | | P | |
| 7439-96-5 | Manganese | 25.0 | | | P | |
| 7439-97-6 | Mercury | 2.0 | | N | CV | J |
| 7440-02-0 | Nickel | 2.6 | U | | P | |
| 7440-09-7 | Potassium | 13300 | | | P | |
| 7782-49-2 | Selenium | 2.0 | B | | F | |
| 7440-22-4 | Silver | 2.1 | U | | P | |
| 7440-23-5 | Sodium | 191 | ~~B~~ | | P | u |
| 7440-28-0 | Thallium | 1.9 | U | | F | |
| 7440-62-2 | Vanadium | 1.4 | U | | P | |
| 7440-66-6 | Zinc | 28.5 | | * | P | J |
| | Cyanide | | | | NR | |

or Before: BROWN Clarity Before: Texture: FINE

or After: BROWN Clarity After: Artifacts: YES

ments:
LEAVES

010

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WESTINGHOUSE/HANFORD
1

SAMPLE NUMBER:

INORGANIC ANALYSIS DATA SHEET

B06N58

Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Code: SKINER Case No.: N2-07-086SAS No.: SDG No.: B06N49

rix (soil/water): SOIL Lab Sample ID: 07214-10S

el (low/med): LOW Date Received: 07/27/92

olids: 38.9

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

| CAS No. | Analyte | Concentration | C | Q | M | |
|---|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 105 | | | P | |
| 7440-36-0 | Antimony | 8.5 | U | | P | |
| 7440-38-2 | Arsenic | 2.1 | ~~B~~ | WN | F | J |
| 7440-39-3 | Barium | 14.1 | B | | P | |
| 7440-41-7 | Beryllium | 0.36 | U | | P | |
| 7440-43-9 | Cadmium | 0.77 | U | | P | |
| 7440-70-2 | Calcium | 21700 | | | P | |
| 7440-47-3 | Chromium | 4.1 | ~~B~~ | * | P | ~~J~~ rej 12/14/92 |
| 7440-48-4 | Cobalt | 1.8 | U | | P | |
| 7440-50-8 | Copper | 8.1 | B | | P | |
| 7439-89-6 | Iron | 203 | | * | P | J |
| 7439-92-1 | Lead | 1.6 | | | F | |
| 7439-95-4 | Magnesium | 3180 | | | P | |
| 7439-96-5 | Manganese | 32.7 | | | P | |
| 7439-97-6 | Mercury | 1.4 | | N | CV | J |
| 7440-02-0 | Nickel | 3.1 | U | | P | |
| 7440-09-7 | Potassium | 15900 | | | P | |
| 7782-49-2 | Selenium | 1.9 | ~~U~~ | W | F | UJ |
| 7440-22-4 | Silver | 2.5 | U | | P | |
| 7440-23-5 | Sodium | 156 | ~~B~~ | | P | U |
| 7440-28-0 | Thallium | 2.2 | U | | F | |
| 7440-62-2 | Vanadium | 1.7 | U | | P | |
| 7440-66-6 | Zinc | 18.8 | | * | P | J |
| | Cyanide | | | | NR | |

or Before: BROWN Clarity Before: Texture: FINE

or After: BROWN Clarity After: Artifacts: YES

ments:
LEAVES

011

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WESTINGHOUSE/HANFORD

1

# INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER:

B06N59

Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Code: SKINER Case No.: N2-07-086SAS No.: SDG No.: B06N49

Matrix (soil/water): SOIL Lab Sample ID: 07214-11S

Level (low/med): LOW Date Received: 07/27/92

% Solids: 36.5

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

| CAS No. | Analyte | Concentration | C | Q | M | |
|---|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 35.5 | B | | P | |
| 7440-36-0 | Antimony | 9.0 | U | | P | |
| 7440-38-2 | Arsenic | 2.4 | ~~B~~ | WN | F | J |
| 7440-39-3 | Barium | 64.3 | B | | P | |
| 7440-41-7 | Beryllium | 0.38 | U | | P | |
| 7440-43-9 | Cadmium | 0.82 | U | | P | |
| 7440-70-2 | Calcium | 35700 | | | P | |
| 7440-47-3 | Chromium | 3.4 | ~~B~~ | * | P | ~~J~~ RCD 12/14/92 |
| 7440-48-4 | Cobalt | 1.9 | U | | P | |
| 7440-50-8 | Copper | 5.8 | B | | P | |
| 7439-89-6 | Iron | 148 | | * | P | J |
| 7439-92-1 | Lead | 1.5 | ~~B~~ | | F | u |
| 7439-95-4 | Magnesium | 3190 | | | P | |
| 7439-96-5 | Manganese | 24.0 | | | P | |
| 7439-97-6 | Mercury | 1.4 | | N | CV | J |
| 7440-02-0 | Nickel | 3.3 | U | | P | |
| 7440-09-7 | Potassium | 15800 | | | P | |
| 7782-49-2 | Selenium | 1.9 | ~~U~~ | W | F | uJ |
| 7440-22-4 | Silver | 2.6 | U | | P | |
| 7440-23-5 | Sodium | 167 | ~~B~~ | | P | u |
| 7440-28-0 | Thallium | 2.3 | U | | F | |
| 7440-62-2 | Vanadium | 1.8 | U | | P | |
| 7440-66-6 | Zinc | 19.5 | | * | P | J |
| | Cyanide | | | | NR | |

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts:

Comments:
LEAVES

012

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WESTINGHOUSE/HANFORD
1

# INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER: B06N60

Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Code: SKINER Case No.: N2-07-086SAS No.: SDG No.: B06N49

rix (soil/water): SOIL Lab Sample ID: 07214-12S

el (low/med): LOW Date Received: 07/27/92

Solids: 36.2

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

| CAS No. | Analyte | Concentration | C | Q | M | |
|---|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 67.0 | B | | P | |
| 7440-36-0 | Antimony | 8.9 | U | | P | |
| 7440-38-2 | Arsenic | 1.4 | ~~U~~ | WN | F | uJ |
| 7440-39-3 | Barium | 35.3 | B | | P | |
| 7440-41-7 | Beryllium | 0.38 | U | | P | |
| 7440-43-9 | Cadmium | 0.81 | U | | P | |
| 7440-70-2 | Calcium | 25100 | | | P | |
| 7440-47-3 | Chromium | 2.7 | U | * | P | |
| 7440-48-4 | Cobalt | 1.9 | U | | P | |
| 7440-50-8 | Copper | 4.5 | B | | P | |
| 7439-89-6 | Iron | 138 | | * | P | J |
| 7439-92-1 | Lead | 1.4 | ~~B~~ | | F | u |
| 7439-95-4 | Magnesium | 1830 | B | | P | |
| 7439-96-5 | Manganese | 23.6 | | | P | |
| 7439-97-6 | Mercury | 2.7 | | N | CV | J |
| 7440-02-0 | Nickel | 3.2 | U | | P | |
| 7440-09-7 | Potassium | 18400 | | | P | |
| 7782-49-2 | Selenium | 2.5 | B | S | F | |
| 7440-22-4 | Silver | 2.6 | U | | P | |
| 7440-23-5 | Sodium | 220 | ~~B~~ | | P | u |
| 7440-28-0 | Thallium | 2.3 | U | | F | |
| 7440-62-2 | Vanadium | 1.8 | U | | P | |
| 7440-66-6 | Zinc | 22.2 | | * | P | J |
| | Cyanide | | | | NR | |

lor Before: BROWN Clarity Before: Texture: FINE

lor After: BROWN Clarity After: Artifacts: YES

mments:
LEAVES

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9613491.2896

WESTINGHOUSE/HANFORD
1

# INORGANIC ANALYSIS DATA SHEET

SAMPLE NUMBER:

B06N61

Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Code: SKINER Case No.: N2-07-086SAS No.: SDG No.: B06N49

rix (soil/water): SOIL Lab Sample ID: 07214-13S

el (low/med): LOW Date Received: 07/27/92

olids: 39.1

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

| CAS No. | Analyte | Concentration | C | Q | M | |
|---|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 49.9 | B | | P | |
| 7440-36-0 | Antimony | 8.4 | U | | P | |
| 7440-38-2 | Arsenic | 1.7 | ~~B~~ | WN | F | J |
| 7440-39-3 | Barium | 40.7 | B | | P | |
| 7440-41-7 | Beryllium | 0.36 | U | | P | |
| 7440-43-9 | Cadmium | 0.77 | U | | P | |
| 7440-70-2 | Calcium | 28900 | | | P | |
| 7440-47-3 | Chromium | 2.5 | U | * | P | |
| 7440-48-4 | Cobalt | 1.8 | U | | P | |
| 7440-50-8 | Copper | 6.6 | B | | P | |
| 7439-89-6 | Iron | 147 | | * | P | J |
| 7439-92-1 | Lead | 1.8 | | | F | ~~UW~~ RCS 12/16/92 |
| 7439-95-4 | Magnesium | 4690 | | | P | |
| 7439-96-5 | Manganese | 36.5 | | | P | |
| 7439-97-6 | Mercury | 0.38 | | N | CV | J |
| 7440-02-0 | Nickel | 3.1 | U | | P | |
| 7440-09-7 | Potassium | 14400 | | | P | |
| 7782-49-2 | Selenium | 1.9 | ~~U~~ | W | F | UJ |
| 7440-22-4 | Silver | 2.5 | U | | P | |
| 7440-23-5 | Sodium | 155 | ~~B~~ | | P | U |
| 7440-28-0 | Thallium | 2.2 | U | | F | |
| 7440-62-2 | Vanadium | 1.7 | U | | P | |
| 7440-66-6 | Zinc | 20.8 | | * | P | J |
| | Cyanide | | | | NR | |

lor Before: BROWN Clarity Before: Texture: FINE

lor After: BROWN Clarity After: Artifacts: YES

mments:
LEAVES

014

WESTINGHOUSE/HANFORD
1

SAMPLE NUMBER:
B06N62

INORGANIC ANALYSIS DATA SHEET

b Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

b Code: SKINER Case No.: N2-07-086SAS No.: SDG No.: B06N49

trix (soil/water): SOIL Lab Sample ID: 07214-14S

vel (low/med): LOW Date Received: 07/27/92

Solids: 35.6

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

| CAS No. | Analyte | Concentration | C | Q | M | |
|---|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 161 | | | P | |
| 7440-36-0 | Antimony | 9.3 | U | | P | |
| 7440-38-2 | Arsenic | 1.6 | ~~B~~ | WN | F | J |
| 7440-39-3 | Barium | 31.5 | B | | P | |
| 7440-41-7 | Beryllium | 0.39 | U | | P | |
| 7440-43-9 | Cadmium | 0.84 | U | | P | |
| 7440-70-2 | Calcium | 22500 | | | P | |
| 7440-47-3 | Chromium | 4.2 | ~~B~~ | * | P | ~~J~~ RW 12/16/92 |
| 7440-48-4 | Cobalt | 2.0 | U | | P | |
| 7440-50-8 | Copper | 6.8 | B | | P | |
| 7439-89-6 | Iron | 321 | | * | P | J |
| 7439-92-1 | Lead | 3.1 | | | F | |
| 7439-95-4 | Magnesium | 3030 | | | P | |
| 7439-96-5 | Manganese | 20.4 | | | P | |
| 7439-97-6 | Mercury | 0.98 | | N | CV | J |
| 7440-02-0 | Nickel | 3.4 | U | | P | |
| 7440-09-7 | Potassium | 17800 | | | P | |
| 7782-49-2 | Selenium | 2.3 | B | | F | |
| 7440-22-4 | Silver | 2.7 | U | | P | |
| 7440-23-5 | Sodium | 182 | ~~B~~ | | P | u |
| 7440-28-0 | Thallium | 2.4 | U | | F | |
| 7440-62-2 | Vanadium | 1.9 | U | | P | |
| 7440-66-6 | Zinc | 19.4 | | * | P | J |
| | Cyanide | | | | NR | |

olor Before: BROWN Clarity Before: Texture: FINE

olor After: BROWN Clarity After: Artifacts: YES

omments:
LEAVES

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XNP
1/31/93

# 100 AREA BIOTA RADIOCHEMICAL DATA VALIDATION REPORT

## FOR SDG N2-07-098-7069 (Tree Leaves)

The 100 Area Biota Radiochemical Validation was performed to the requirements outlined in the draft procedure titled "Data Validation Procedure for Radiological Analysis, Rev. 0, June 18, 1991."

The SDG consisted of 14 samples. All samples were identified on the Chain of custody as being "Tree Leaves". All samples were analyzed at the Thermo Analytical Laboratory Norcal Laboratory. Radiological parameters of interest were: Gross Gamma Scan, Strontium - 90, and Tritium.

The radiological validation process, in part, is a detailed and in-depth technical review of the laboratory counting systems used, standards and quality control used in analyzing the samples. Review of chain of custody requirements, completeness of data reported and contract required detection limits are also part of the validation process. The technical review of the laboratory counting systems is documented on the attached appendices taken from the radiological data validation procedure. Sample analysis batch Quality Control (QC) and instrument performance are reviewed on an individual delivery group basis.

**Data limitations and explanation of qualifiers for SDG # N2-07-098-7069**

## STRONTIUM-90

**The processing group contains the following sample numbers: B06N49, B06N50, B06N51, B06N52, B06N53, B06N54, B06N55, B06N56, B06N57, B06N58, B06N59, B06N60, B06N61, and B06N62.**

Review of the detector system check source data found that detector #10 check source recovery exceeded the limits established by the laboratory. Sample #'s B06N49, B06N54, B06N56, and B06N60 were the only samples that had results reported from detector 10. Qualify sample B06N49, B06N54, B06N56, and B06N60 as "R" unusable.

All other QC samples and method specific requirements are within acceptable limits. NOTE: Activity was detected in the blank but the activity is below the MDA.

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100 AREA BIOTA RADIOCHEMICAL DATA VALIDATION REPORT

FOR SDG N2-07-098-7069 (Tree Leaves)

## GAMMA SCAN

The processing group contains the following sample numbers: B06N49, B06N50, B06N51, B06N52, B06N53, B06N54, B06N55, B06N56, B06N57, B06N58, B06N59, B06N60, B06N61, and B06N62.

All QC samples and method specific requirements are within acceptable limits. Do to the limited amount of sample mass that could be provided for these samples, the laboratory could not obtain required detection limits.

## TRITIUM

The processing group contains the following sample numbers: B06N49, B06N50, B06N51, B06N52, B06N53, B06N54, B06N55, B06N56, B06N57, B06N58, B06N59, B06N60, B06N61, and B06N62.

All QC samples and method specific requirements are within acceptable limits.

9613191.2900

XnP 1/31/93

N207098-01

# TMA NORCAL
REPORTING GROUP 7069

# DATA SHEET

B06N49

SDG 7069
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N207098-01
Dept sample id 7069-001
Received 07/20/92

Client sample id B06N49
Matrix BIOTA
Collected 07/01/92
Chain of custody id WHC-N-444-1

| PARAMETER | CAS NO | RESULT pCi/G | 2σ ERR (COUNT) | MDA pCi/G | RDL pCi/G | QUALI-FIERS | TEST |
|---|---|---|---|---|---|---|---|
| Strontium 90 | 10098-97-2 | -0.007 R | 1.2 | 1.2 | 2.0 | U | Y |
| Tritium | 10028-17-8 | -0.046 | 0.13 | 0.22 | 0.50 | U | H |
| GAMMA SCAN ANALYTES | | | | | | | |
| Potassium 40 | 13966-00-2 | 8.9 | 8.8 | | | | GAM |
| Iron 59 | | U | | 4.3 | 0.050 | U | GAM |
| Chromium 51 | 14392-02-0 | U | | 20 | | U | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.53 | 0.050 | U | GAM |
| Zinc 65 | 17982-39-3 | U | | 1.7 | | U | GAM |
| Ruthenium 106 | 13967-48-1 | U | | 5.1 | | U | GAM |
| Cesium 134 | 17967-70-9 | U | | 0.62 | | U | GAM |
| Cesium 137 | 10045-97-3 | U | | 0.53 | 0.050 | U | GAM |
| Europium 152 | 14683-23-9 | U | | 0.76 | 0.10 | U | GAM |
| Europium 154 | 15585-10-1 | U | | 0.50 | 0.10 | U | GAM |
| Radium 226 | 13982-67-7 | U | | 1.0 | 0.10 | U | GAM |
| Thorium 228 | 14274-82-9 | U | | 0.71 | | U | GAM |
| Thorium 232 | 7440-29-1 | U | | 2.2 | | U | GAM |



Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.17
Report date 10/01/92

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XnP 1/31/93

N207098-02

# TMA NORCAL
REPORTING GROUP 7069

# DATA SHEET

B06N50

SDG 7069
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N207098-02
Dept sample id 7069-002
Received 07/20/92

Client sample id B06N50
Matrix BIOTA
Collected 07/01/92
Chain of custody id WHC-N-444-1

| PARAMETER | CAS NO | RESULT pCi/G | 2σ ERR (COUNT) | MDA pCi/G | RDL pCi/G | QUALI-FIERS | TEST |
|---|---|---|---|---|---|---|---|
| Strontium 90 | 10098-97-2 | 0.34 | 0.32 | 1.0 | 2.0 | U | Y |
| Tritium | 10028-17-8 | 0.071 | 0.098 | 0.16 | 0.50 | U | H |
| GAMMA SCAN ANALYTES | | | | | | | |
| Potassium 40 | 13966-00-2 | 13 | 3.0 | | | | GAM |
| Iron 59 | | U | | 1.5 | 0.050 | U | GAM |
| Chromium 51 | 14392-02-0 | U | | 5.6 | | U | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.19 | 0.050 | U | GAM |
| Zinc 65 | 17982-39-3 | U | | 0.64 | | U | GAM |
| Ruthenium 106 | 13967-48-1 | U | | 1.5 | | U | GAM |
| Cesium 134 | 17967-70-9 | U | | 0.24 | | U | GAM |
| Cesium 137 | 10045-97-3 | U | | 0.19 | 0.050 | U | GAM |
| Europium 152 | 14683-23-9 | U | | 0.29 | 0.10 | U | GAM |
| Europium 154 | 15585-10-1 | U | | 0.19 | 0.10 | U | GAM |
| Radium 226 | 13982-67-7 | U | | 0.34 | 0.10 | U | GAM |
| Thorium 228 | 14274-82-9 | U | | 0.27 | | U | GAM |
| Thorium 232 | 7440-29-1 | 0.66 | 0.53 | | | | GAM |
| Beryllium 7 | | 4.3 | 2.3 | | | | GAM |



Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.17
Report date 10/01/92

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XnP 1/31/93

N207098-03

# TMA NORCAL
REPORTING GROUP 7069

# DATA SHEET

B06N51

SDG 7069
Contact Dinkar Kharkar
Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N207098-03
Dept sample id 7069-003
Received 07/20/92
Client sample id B06N51
Matrix BIOTA
Collected 07/01/92
Chain of custody id WHC-N-444-1

| PARAMETER | CAS NO | RESULT pCi/G | 2σ ERR (COUNT) | MDA pCi/G | RDL pCi/G | QUALI-FIERS | TEST |
|---|---|---|---|---|---|---|---|
| Strontium 90 | 10098-97-2 | 0.33 | 0.24 | 0.70 | 2.0 | U | Y |
| Tritium | 10028-17-8 | -0.005 | 0.090 | 0.15 | 0.50 | U | H |
| GAMMA SCAN ANALYTES | | | | | | | |
| Potassium 40 | 13966-00-2 | 13 | 2.9 | | | | GAM |
| Iron 59 | | U | | 1.6 | 0.050 | U | GAM |
| Chromium 51 | 14392-02-0 | U | | 5.4 | | U | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.14 | 0.050 | U | GAM |
| Zinc 65 | 17982-39-3 | U | | 0.44 | | U | GAM |
| Ruthenium 106 | 13967-48-1 | U | | 1.3 | | U | GAM |
| Cesium 134 | 17967-70-9 | U | | 0.17 | | U | GAM |
| Cesium 137 | 10045-97-3 | U | | 0.20 | 0.050 | U | GAM |
| Europium 152 | 14683-23-9 | U | | 0.26 | 0.10 | U | GAM |
| Europium 154 | 15585-10-1 | U | | 0.17 | 0.10 | U | GAM |
| Radium 226 | 13982-67-7 | U | | 0.30 | 0.10 | U | GAM |
| Thorium 228 | 14274-82-9 | U | | 0.25 | | U | GAM |
| Thorium 232 | 7440-29-1 | U | | 0.63 | | U | GAM |
| Beryllium 7 | | 4.3 | 2.4 | | | | GAM |

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.17
Report date 10/01/92

9613491.2903

XnP 1/31/93

N207098-04

# TMA NORCAL
REPORTING GROUP 7069

# DATA SHEET

B06N52

SDG 7069
Contact Dinker Kharkar
Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N207098-04
Dept sample id 7069-004
Received 07/20/92
Client sample id B06N52
Matrix BIOTA
Collected 07/01/92
Chain of custody id WHC-N-444-1

| PARAMETER | CAS NO | RESULT pCi/G | 2σ ERR (COUNT) | MDA pCi/G | RDL pCi/G | QUALI-FIERS | TEST |
|---|---|---|---|---|---|---|---|
| Strontium 90 | 10098-97-2 | 0.001 | 0.29 | 1.0 | 2.0 | U | Y |
| Tritium | 10028-17-8 | -0.038 | 0.092 | 0.15 | 0.50 | U | H |
| GAMMA SCAN ANALYTES | | | | | | | |
| Potassium 40 | 13966-00-2 | 15 | 3.2 | | | | GAM |
| Iron 59 | | U | | 1.0 | 0.050 | U | GAM |
| Chromium 51 | 14392-02-0 | U | | 6.5 | | U | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.17 | 0.050 | U | GAM |
| Zinc 65 | 17982-39-3 | U | | 0.37 | | U | GAM |
| Ruthenium 106 | 13967-48-1 | U | | 1.5 | | U | GAM |
| Cesium 134 | 17967-70-9 | U | | 0.16 | | U | GAM |
| Cesium 137 | 10045-97-3 | U | | 0.16 | 0.050 | U | GAM |
| Europium 152 | 14683-23-9 | U | | 0.27 | 0.10 | U | GAM |
| Europium 154 | 15585-10-1 | U | | 0.17 | 0.10 | U | GAM |
| Radium 226 | 13982-67-7 | U | | 0.27 | 0.10 | U | GAM |
| Thorium 228 | 14274-82-9 | U | | 0.22 | | U | GAM |
| Thorium 232 | 7440-29-1 | U | | 0.65 | | U | GAM |
| Beryllium 7 | | 5.5 | 2.5 | | | | GAM |

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVO-DS
Version 2.17
Report date 10/01/92

9613491.2904

XNP 1/31/93

N207098-05

# TMA NORCAL
REPORTING GROUP 7069

# DATA SHEET

B06N53

SDG 7069
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N207098-05
Dept sample id 7069-005
Received 07/20/92

Client sample id B06N53
Matrix BIOTA
Collected 07/01/92
Chain of custody id WHC-N-444-1

| PARAMETER | CAS NO | RESULT pCi/G | 2σ ERR (COUNT) | MDA pCi/G | RDL pCi/G | QUALI-FIERS | TEST |
|---|---|---|---|---|---|---|---|
| Strontium 90 | 10098-97-2 | 2.6 | 0.45 | 0.84 | 2.0 | | Y |
| Tritium | 10028-17-8 | -0.038 | 0.088 | 0.15 | 0.50 | U | H |
| GAMMA SCAN ANALYTES | | | | | | | |
| Potassium 40 | 13966-00-2 | 15 | 2.6 | | | | GAM |
| Iron 59 | | U | | 1.5 | 0.050 | U | GAM |
| Chromium 51 | 14392-02-0 | U | | 6.4 | | U | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.15 | 0.050 | U | GAM |
| Zinc 65 | 17982-39-3 | U | | 0.39 | | U | GAM |
| Ruthenium 106 | 13967-48-1 | U | | 1.2 | | U | GAM |
| Cesium 134 | 17967-70-9 | U | | 0.16 | | U | GAM |
| Cesium 137 | 10045-97-3 | U | | 0.14 | 0.050 | U | GAM |
| Europium 152 | 14683-23-9 | U | | 0.20 | 0.10 | U | GAM |
| Europium 154 | 15585-10-1 | U | | 0.13 | 0.10 | U | GAM |
| Radium 226 | 13982-67-7 | U | | 0.38 | 0.10 | U | GAM |
| Thorium 228 | 14274-82-9 | U | | 0.21 | | U | GAM |
| Thorium 232 | 7440-29-1 | U | | 0.59 | | U | GAM |
| Beryllium 7 | | 3.2 | 2.1 | | | | GAM |



Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.17
Report date 10/01/92

9613491.2905

XnP 1/31/93

N207098-06

# TMA NORCAL
REPORTING GROUP 7069

# DATA SHEET

B06N54

SDG 7069
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N207098-06
Dept sample id 7069-006
Received 07/20/92

Client sample id B06N54
Matrix BIOTA
Collected 07/01/92
Chain of custody id WHC-N-444-1

| PARAMETER | CAS NO | RESULT pCi/G | 2σ ERR (COUNT) | MDA pCi/G | RDL pCi/G | QUALI-FIERS | TEST |
|---|---|---|---|---|---|---|---|
| Strontium 90 | 10098-97-2 | -0.39 R | 0.98 | 0.80 | 2.0 | U | Y |
| Tritium | 10028-17-8 | 0.32 | 0.11 | 0.15 | 0.50 | J | H |
| GAMMA SCAN ANALYTES | | | | | | | |
| Potassium 40 | 13966-00-2 | 11 | 2.6 | | | | GAM |
| Iron 59 | | U | | 1.1 | 0.050 | U | GAM |
| Chromium 51 | 14392-02-0 | U | | 5.9 | | U | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.15 | 0.050 | U | GAM |
| Zinc 65 | 17982-39-3 | U | | 0.43 | | U | GAM |
| Ruthenium 106 | 13967-48-1 | U | | 1.5 | | U | GAM |
| Cesium 134 | 17967-70-9 | U | | 0.15 | | U | GAM |
| Cesium 137 | 10045-97-3 | U | | 0.17 | 0.050 | U | GAM |
| Europium 152 | 14683-23-9 | U | | 0.27 | 0.10 | U | GAM |
| Europium 154 | 15585-10-1 | U | | 0.16 | 0.10 | U | GAM |
| Radium 226 | 13982-67-7 | U | | 0.32 | 0.10 | U | GAM |
| Thorium 228 | 14274-82-9 | U | | 0.23 | | U | GAM |
| Thorium 232 | 7440-29-1 | U | | 0.66 | | U | GAM |
| Beryllium 7 | | 3.0 | 2.5 | | | | GAM |

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.17
Report date 10/01/92

XNP 1/31/93

N207098-07

# TMA NORCAL
REPORTING GROUP 7069

# DATA SHEET

B06N55

SDG 7069
Contact Dinkar Kharkar
Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N207098-07
Dept sample id 7069-007
Received 07/20/92
Client sample id B06N55
Matrix BIOTA
Collected 07/01/92
Chain of custody id WHC-N-444-1

| PARAMETER | CAS NO | RESULT pCi/G | 2σ ERR (COUNT) | MDA pCi/G | RDL pCi/G | QUALI-FIERS | TEST |
|---|---|---|---|---|---|---|---|
| Strontium 90 | 10098-97-2 | 0.23 | 2.7 | 0.88 | 2.0 | U | Y |
| Tritium | 10028-17-8 | -0.063 | 0.084 | 0.14 | 0.50 | U | H |
| GAMMA SCAN ANALYTES | | | | | | | |
| Potassium 40 | 13966-00-2 | 11 | 2.0 | | | | GAM |
| Iron 59 | | U | | 0.99 | 0.050 | U | GAM |
| Chromium 51 | 14392-02-0 | U | | 4.7 | | U | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.12 | 0.050 | U | GAM |
| Zinc 65 | 17982-39-3 | U | | 0.39 | | U | GAM |
| Ruthenium 106 | 13967-48-1 | U | | 1.1 | | U | GAM |
| Cesium 134 | 17967-70-9 | U | | 0.13 | | U | GAM |
| Cesium 137 | 10045-97-3 | U | | 0.11 | 0.050 | U | GAM |
| Europium 152 | 14683-23-9 | U | | 0.18 | 0.10 | U | GAM |
| Europium 154 | 15585-10-1 | U | | 0.12 | 0.10 | U | GAM |
| Radium 226 | 13982-67-7 | U | | 0.32 | 0.10 | U | GAM |
| Thorium 228 | 14274-82-9 | U | | 0.17 | | U | GAM |
| Thorium 232 | 7440-29-1 | U | | 0.43 | | U | GAM |
| Beryllium 7 | | 3.7 | 2.7 | | | | GAM |

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.17
Report date 10/01/92

XnP 1/31/93

N207098-08

# TMA NORCAL
REPORTING GROUP 7069

# DATA SHEET

B06N56

SDG 7069
Contact Dinkar Kharkar
Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N207098-08
Dept sample id 7069-008
Received 07/20/92
Client sample id B06N56
Matrix BIOTA
Collected 07/01/92
Chain of custody id WHC-N-444-1

| PARAMETER | CAS NO | RESULT pCi/G | 2σ ERR (COUNT) | MDA pCi/G | RDL pCi/G | QUALI-FIERS | TEST |
|---|---|---|---|---|---|---|---|
| Strontium 90 | 10098-97-2 | 0.26 R | 0.25 | 0.79 | 2.0 | U | Y |
| Tritium | 10028-17-8 | 0.64 | 0.14 | 0.17 | 0.50 | | H |
| GAMMA SCAN ANALYTES | | | | | | | |
| Potassium 40 | 13966-00-2 | 13 | 2.9 | | | | GAM |
| Iron 59 | | U | | 1.1 | 0.050 | U | GAM |
| Chromium 51 | 14392-02-0 | U | | 6.0 | | U | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.17 | 0.050 | U | GAM |
| Zinc 65 | 17982-39-3 | U | | 0.47 | | U | GAM |
| Ruthenium 106 | 13967-48-1 | U | | 1.4 | | U | GAM |
| Cesium 134 | 17967-70-9 | U | | 0.15 | | U | GAM |
| Cesium 137 | 10045-97-3 | U | | 0.16 | 0.050 | U | GAM |
| Europium 152 | 14683-23-9 | U | | 0.20 | 0.10 | U | GAM |
| Europium 154 | 15585-10-1 | U | | 0.14 | 0.10 | U | GAM |
| Radium 226 | 13982-67-7 | U | | 0.28 | 0.10 | U | GAM |
| Thorium 228 | 14274-82-9 | U | | 0.20 | | U | GAM |
| Thorium 232 | 7440-29-1 | U | | 0.69 | | U | GAM |
| Beryllium 7 | | 3.0 | 2.3 | | | | GAM |

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.17
Report date 10/01/92

9613491.2908

XnP 1/31/93

N207098-09

# TMA NORCAL
REPORTING GROUP 7069

# DATA SHEET

B06N57

SDG 7069
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N207098-09
Dept sample id 7069-009
Received 07/20/92

Client sample id B06N57
Matrix BIOTA
Collected 07/01/92
Chain of custody id WHC-N-444-1

| PARAMETER | CAS NO | RESULT pCi/G | 2σ ERR (COUNT) | MDA pCi/G | RDL pCi/G | QUALI-FIERS | TEST |
|---|---|---|---|---|---|---|---|
| Strontium 90 | 10098-97-2 | 0.27 | 0.26 | 0.80 | 2.0 | U | Y |
| Tritium | 10028-17-8 | -0.018 | 0.082 | 0.14 | 0.50 | U | H |
| GAMMA SCAN ANALYTES | | | | | | | |
| Potassium 40 | 13966-00-2 | 9.5 | 2.1 | | | | GAM |
| Iron 59 | | U | | 0.91 | 0.050 | U | GAM |
| Chromium 51 | 14392-02-0 | U | | 4.5 | | U | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.10 | 0.050 | U | GAM |
| Zinc 65 | 17982-39-3 | U | | 0.31 | | U | GAM |
| Ruthenium 106 | 13967-48-1 | U | | 1.1 | | U | GAM |
| Cesium 134 | 17967-70-9 | U | | 0.14 | | U | GAM |
| Cesium 137 | 10045-97-3 | U | | 0.12 | 0.050 | U | GAM |
| Europium 152 | 14683-23-9 | U | | 0.17 | 0.10 | U | GAM |
| Europium 154 | 15585-10-1 | U | | 0.11 | 0.10 | U | GAM |
| Radium 226 | 13982-67-7 | U | | 0.22 | 0.10 | U | GAM |
| Thorium 228 | 14274-82-9 | 0.13 | 0.074 | | | | GAM |
| Thorium 232 | 7440-29-1 | U | | 0.48 | | U | GAM |
| Beryllium 7 | | 2.9 | 2.0 | | | | GAM |



Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.17
Report date 10/01/92

9613491.2909

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N207098-10

# TMA NORCAL
REPORTING GROUP 7069

# DATA SHEET

B06N58

SDG 7069
Contact Dinker Kherkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N207098-10
Dept sample id 7069-010
Received 07/20/92

Client sample id B06N58
Matrix BIOTA
Collected 07/01/92
Chain of custody id WHC-N-444-1

| PARAMETER | CAS NO | RESULT pCi/G | 2σ ERR (COUNT) | MDA pCi/G | RDL pCi/G | QUALI-FIERS | TEST |
|---|---|---|---|---|---|---|---|
| Strontium 90 | 10098-97-2 | 35 | 4.5 | 0.79 | 2.0 | | Y |
| Tritium | 10028-17-8 | 0.73 | 0.13 | 0.15 | 0.50 | | H |
| GAMMA SCAN ANALYTES | | | | | | | |
| Potassium 40 | 13966-00-2 | 14 | 3.2 | | | | GAM |
| Iron 59 | | U | | 2.0 | 0.050 | U | GAM |
| Chromium 51 | 14392-02-0 | U | | 8.6 | | U | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.23 | 0.050 | U | GAM |
| Zinc 65 | 17982-39-3 | U | | 0.64 | | U | GAM |
| Ruthenium 106 | 13967-48-1 | U | | 2.0 | | U | GAM |
| Cesium 134 | 17967-70-9 | U | | 0.24 | | U | GAM |
| Cesium 137 | 10045-97-3 | U | | 0.25 | 0.050 | U | GAM |
| Europium 152 | 14683-23-9 | U | | 0.42 | 0.10 | U | GAM |
| Europium 154 | 15585-10-1 | U | | 0.24 | 0.10 | U | GAM |
| Radium 226 | 13982-67-7 | U | | 0.34 | 0.10 | U | GAM |
| Thorium 228 | 14274-82-9 | U | | 0.27 | | U | GAM |
| Thorium 232 | 7440-29-1 | U | | 0.89 | | U | GAM |
| Beryllium 7 | | 5.2 | 3.5 | | | | GAM |



Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.17
Report date 10/01/92

9613491.2910

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N207098-11

# TMA NORCAL
REPORTING GROUP 7069

# DATA SHEET

B06N59

SDG 7069
Contact Dinker Kharkar
Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N207098-11
Dept sample id 7069-011
Received 07/20/92
Client sample id B06N59
Matrix BIOTA
Collected 07/13/92
Chain of custody id WHC-N-444-1

| PARAMETER | CAS NO | RESULT pCi/G | 2σ ERR (COUNT) | MDA pCi/G | RDL pCi/G | QUALI-FIERS | TEST |
|---|---|---|---|---|---|---|---|
| Strontium 90 | 10098-97-2 | -0.33 | 2.0 | 0.81 | 2.0 | U | Y |
| Tritium | 10028-17-8 | 0.005 | 0.096 | 0.16 | 0.50 | U | H |
| GAMMA SCAN ANALYTES | | | | | | | |
| Potassium 40 | 13966-00-2 | 13 | 2.3 | | | | GAM |
| Iron 59 | | U | | 0.65 | 0.050 | U | GAM |
| Chromium 51 | 14392-02-0 | U | | 2.9 | | U | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.14 | 0.050 | U | GAM |
| Zinc 65 | 17982-39-3 | U | | 0.31 | | U | GAM |
| Ruthenium 106 | 13967-48-1 | U | | 0.90 | | U | GAM |
| Cesium 134 | 17967-70-9 | U | | 0.10 | | U | GAM |
| Cesium 137 | 10045-97-3 | U | | 0.10 | 0.050 | U | GAM |
| Europium 152 | 14683-23-9 | U | | 0.18 | 0.10 | U | GAM |
| Europium 154 | 15585-10-1 | U | | 0.11 | 0.10 | U | GAM |
| Radium 226 | 13982-67-7 | U | | 0.19 | 0.10 | U | GAM |
| Thorium 228 | 14274-82-9 | U | | 0.19 | | U | GAM |
| Thorium 232 | 7440-29-1 | U | | 0.38 | | U | GAM |
| Beryllium 7 | | 3.2 | 1.4 | | | | GAM |

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.17
Report date 10/01/92

9613491.2911

XnP 1/31/93

N207098-12

# TMA NORCAL
REPORTING GROUP 7069

# DATA SHEET

B06N60

SDG 7069
Contact Dinkar Kherkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N207098-12
Dept sample id 7069-012
Received 07/20/92

Client sample id B06N60
Matrix BIOTA
Collected 07/13/92
Chain of custody id WHC-N-444-1

| PARAMETER | CAS NO | RESULT pCi/G | 2σ ERR (COUNT) | MDA pCi/G | RDL pCi/G | QUALI-FIERS | TEST |
|---|---|---|---|---|---|---|---|
| Strontium 90 | 10098-97-2 | 6.8 R | 0.68 | 0.78 | 2.0 | | Y |
| Tritium | 10028-17-8 | 3.6 | 0.21 | 0.15 | 0.50 | | H |
| GAMMA SCAN ANALYTES | | | | | | | |
| Potassium 40 | 13966-00-2 | 18 | 2.8 | | | | GAM |
| Iron 59 | | U | | 0.96 | 0.050 | U | GAM |
| Chromium 51 | 14392-02-0 | U | | 4.2 | | U | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.16 | 0.050 | U | GAM |
| Zinc 65 | 17982-39-3 | U | | 0.35 | | U | GAM |
| Ruthenium 106 | 13967-48-1 | U | | 1.2 | | U | GAM |
| Cesium 134 | 17967-70-9 | U | | 0.15 | | U | GAM |
| Cesium 137 | 10045-97-3 | U | | 0.14 | 0.050 | U | GAM |
| Europium 152 | 14683-23-9 | U | | 0.21 | 0.10 | U | GAM |
| Europium 154 | 15585-10-1 | U | | 0.15 | 0.10 | U | GAM |
| Radium 226 | 13982-67-7 | U | | 0.25 | 0.10 | U | GAM |
| Thorium 228 | 14274-82-9 | U | | 0.19 | | U | GAM |
| Thorium 232 | 7440-29-1 | U | | 0.51 | | U | GAM |
| Beryllium 7 | | 4.3 | 2.3 | | | | GAM |

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.17
Report date 10/01/92

9613491.2912

XnP 1/31/93

N207098-13

# TMA NORCAL
REPORTING GROUP 7069

# DATA SHEET

B06M61

SDG 7069
Contact Dinkar Kharkar
Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N207098-13
Dept sample id 7069-013
Received 07/20/92
Client sample id B06M61
Matrix BIOTA
Collected 07/13/92
Chain of custody id WHC-N-444-1

| PARAMETER | CAS NO | RESULT pCi/G | 2σ ERR (COUNT) | MDA pCi/G | RDL pCi/G | QUALI-FIERS | TEST |
|---|---|---|---|---|---|---|---|
| Strontium 90 | 10098-97-2 | 0.18 | 1.4 | 0.79 | 2.0 | U | Y |
| Tritium | 10028-17-8 | 2.1 | 0.17 | 0.14 | 0.50 | | H |
| GAMMA SCAN ANALYTES | | | | | | | |
| Potassium 40 | 13966-00-2 | 16 | 3.8 | | | | GAM |
| Iron 59 | | U | | 1.8 | 0.050 | U | GAM |
| Chromium 51 | 14392-02-0 | U | | 5.6 | | U | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.27 | 0.050 | U | GAM |
| Zinc 65 | 17982-39-3 | U | | 0.61 | | U | GAM |
| Ruthenium 106 | 13967-48-1 | U | | 1.8 | | U | GAM |
| Cesium 134 | 17967-70-9 | U | | 0.24 | | U | GAM |
| Cesium 137 | 10045-97-3 | U | | 0.16 | 0.050 | U | GAM |
| Europium 152 | 14683-23-9 | U | | 0.37 | 0.10 | U | GAM |
| Europium 154 | 15585-10-1 | U | | 0.23 | 0.10 | U | GAM |
| Radium 226 | 13982-67-7 | U | | 0.31 | 0.10 | U | GAM |
| Thorium 228 | 14274-82-9 | U | | 0.27 | | U | GAM |
| Thorium 232 | 7440-29-1 | U | | 0.73 | | U | GAM |
| Beryllium 7 | | 3.8 | 2.4 | | | | GAM |

Lab id TMAN
Protocol WHC-MEIS
Version Ver 1.0
Form DVD-DS
Version 2.17
Report date 10/01/92

9613491.2913

XnP 1/31/93

N207098-14

# TMA NORCAL
REPORTING GROUP 7069

# DATA SHEET

B06N62

SDG 7069
Contact Dinkar Kharkar
Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N207098-14
Dept sample id 7069-014
Received 07/20/92
Client sample id B06N62
Matrix BIOTA
Collected 07/13/92
Chain of custody id WHC-N-444-1

| PARAMETER | CAS NO | RESULT pCi/G | 2σ ERR (COUNT) | MDA pCi/G | RDL pCi/G | QUALI-FIERS | TEST |
|---|---|---|---|---|---|---|---|
| Strontium 90 | 10098-97-2 | 0.15 | 1.2 | 0.65 | 2.0 | U | Y |
| Tritium | 10028-17-8 | 0.014 | 0.090 | 0.15 | 0.50 | U | H |
| GAMMA SCAN ANALYTES | | | | | | | |
| Potassium 40 | 13966-00-2 | 16 | 3.0 | | | | GAM |
| Iron 59 | | U | | 1.6 | 0.050 | U | GAM |
| Chromium 51 | 14392-02-0 | U | | 7.0 | | U | GAM |
| Cobalt 60 | 10198-40-0 | U | | 0.18 | 0.050 | U | GAM |
| Zinc 65 | 17982-39-3 | U | | 0.66 | | U | GAM |
| Ruthenium 106 | 13967-48-1 | U | | 1.3 | | U | GAM |
| Cesium 134 | 17967-70-9 | U | | 0.16 | | U | GAM |
| Cesium 137 | 10045-97-3 | U | | 0.16 | 0.050 | U | GAM |
| Europium 152 | 14683-23-9 | U | | 0.28 | 0.10 | U | GAM |
| Europium 154 | 15585-10-1 | U | | 0.18 | 0.10 | U | GAM |
| Radium 226 | 13982-67-7 | U | | 0.28 | 0.10 | U | GAM |
| Thorium 228 | 14274-82-9 | U | | 0.28 | | U | GAM |
| Thorium 232 | 7440-29-1 | U | | 0.79 | | U | GAM |
| Beryllium 7 | | 9.7 | 3.9 | | | | GAM |

Lab id TMAN
Protocol WHC-NEIS
Version Ver 1.0
Form DVD-DS
Version 2.17
Report date 10/01/92

9613491.2914

N207098-15

# TMA NORCAL

REPORTING GROUP 7069

# LAB CONTROL SAMPLE

LAB CONTROL SAMPLE

SDG 7069
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N207098-15
Dept sample id 7069-015

Matrix BIOTA
Material

| PARAMETER | RESULT pCi/G | 2σ ERR (COUNT) | MDA pCi/G | RDL pCi/G | QUALI-FIERS | TEST | ADDED pCi/G | 2σ ERR pCi/G | REC % | 3σ LMTS (TOTAL) | PROTOCOL LIMITS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Strontium 90 | 9.2 | 2.5 | 0.67 | 2.0 | | Y | 11.9 | 0.48 | 77 | 66-134 | |
| Tritium | 4.9 | 0.32 | 0.24 | 0.50 | | H | 4.60 | 0.18 | 107 | 80-120 | |
| GAMMA SCAN ANALYTES | | | | | | | | | | | |
| Potassium 40 | U | | 30 | | U | GAM | | | | | |
| Iron 59 | U | | 8.3 | 0.050 | U | GAM | | | | | |
| Chromium 51 | U | | 18 | | U | GAM | | | | | |
| Cobalt 60 | 30 | 6.1 | | 0.050 | | GAM | 33.6 | 1.3 | 89 | 66-134 | |
| Zinc 65 | U | | 8.6 | | U | GAM | | | | | |
| Ruthenium 106 | U | | 27 | | U | GAM | | | | | |
| Cesium 134 | U | | 4.1 | | U | GAM | | | | | |
| Cesium 137 | 25 | 4.6 | | 0.050 | | GAM | 21.6 | 0.86 | 116 | 58-142 | |
| Europium 152 | U | | 5.6 | 0.10 | U | GAM | | | | | |
| Europium 154 | U | | 3.6 | 0.10 | U | GAM | | | | | |
| Radium 226 | U | | 6.5 | 0.10 | U | GAM | | | | | |
| Thorium 228 | U | | 4.3 | | U | GAM | | | | | |
| Thorium 232 | U | | 17 | | U | GAM | | | | | |

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-LCS
Version 2.17
Report date 10/01/92

9613491.2915

# TMA NORCAL
REPORTING GROUP 7069

N207098-16

# REAGENT BLANK

Reagent Blank

SDG 7069
Contact Dinkar Kharkar
Client Westinghouse Hanford
Contract MBH-SVV-069262

Lab sample id N207098-16
Dept sample id 7069-016
Matrix BIOTA
Material

| PARAMETER | CAS NO | RESULT pCi/G | 2σ ERR (COUNT) | MDA pCi/G | RDL pCi/G | QUALI-FIERS | TEST |
|---|---|---|---|---|---|---|---|
| Strontium 90 | 10098-97-2 | 0.19 | 0.23 | 0.67 | 2.0 | U | Y |
| Tritium | 10028-17-8 | -0.098 | 0.14 | 0.24 | 0.50 | U | H |
| GAMMA SCAN ANALYTES | | | | | | | |
| Potassium 40 | 13966-00-2 | U | | 29 | | U | GAM |
| Iron 59 | | U | | 7.4 | 0.050 | U | GAM |
| Chromium 51 | 14392-02-0 | U | | 16 | | U | GAM |
| Cobalt 60 | 10198-40-0 | U | | 2.8 | 0.050 | U | GAM |
| Zinc 65 | 17982-39-3 | U | | 4.2 | | U | GAM |
| Ruthenium 106 | 13967-48-1 | U | | 21 | | U | GAM |
| Cesium 134 | 17967-70-9 | U | | 2.8 | | U | GAM |
| Cesium 137 | 10045-97-3 | U | | 2.4 | 0.050 | U | GAM |
| Europium 152 | 14683-23-9 | U | | 4.2 | 0.10 | U | GAM |
| Europium 154 | 15585-10-1 | U | | 2.8 | 0.10 | U | GAM |
| Radium 226 | 13982-67-7 | U | | 4.7 | 0.10 | U | GAM |
| Thorium 228 | 14274-82-9 | U | | 4.1 | | U | GAM |
| Thorium 232 | 7440-29-1 | U | | 11 | | U | GAM |

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-DS
Version 2.17
Report date 10/01/92

9613491.2916

N207098-17

# TMA NORCAL

REPORTING GROUP 7069

## REPLICATE

B06N49

SDG 7069
Contact Dinkar Kharkar

Client Westinghouse Hanford
Contract MBH-SVV-069262

REPLICATE
Lab sample id N207098-17
Dept sample id 7069-017

ORIGINAL
Lab sample id N207098-01
Dept sample id 7069-001
Received 07/20/92

Client sample id B06N49
Matrix BIOTA
Collected 07/01/92
Chain of custody id WHC-N-444-1

| PARAMETER | REPLICATE pCi/G | 2σ ERR (COUNT) | MDA pCi/G | RDL pCi/G | QUALI-FIERS | TEST | ORIGINAL pCi/G | 2σ ERR (COUNT) | MDA pCi/G | QUALI-FIERS | RPD % | 3σ PROT TOT LIMIT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Strontium 90 | -0.034 | 0.98 | 0.73 | 2.0 | U | Y | -0.007 | 1.2 | 1.2 | U | - | |
| Tritium | 0.048 | 0.12 | 0.20 | 0.50 | U | H | -0.046 | 0.13 | 0.22 | U | - | |
| GAMMA SCAN ANALYTES | | | | | | | | | | | | |
| Potassium 40 | 21 | 6.5 | | | | GAM | 8.9 | 8.8 | | | 81 | 124 |
| Iron 59 | U | | 4.7 | 0.050 | U | GAM | U | | 4.3 | U | - | |
| Chromium 51 | U | | 23 | | U | GAM | U | | 20 | U | - | |
| Cobalt 60 | U | | 0.56 | 0.050 | U | GAM | U | | 0.53 | U | - | |
| Zinc 65 | U | | 1.5 | | U | GAM | U | | 1.7 | U | - | |
| Ruthenium 106 | U | | 5.1 | | U | GAM | U | | 5.1 | U | - | |
| Cesium 134 | U | | 0.53 | | U | GAM | U | | 0.62 | U | - | |
| Cesium 137 | U | | 0.46 | 0.050 | U | GAM | U | | 0.53 | U | - | |
| Europium 152 | U | | 0.66 | 0.10 | U | GAM | U | | 0.76 | U | - | |
| Europium 154 | U | | 0.42 | 0.10 | U | GAM | U | | 0.50 | U | - | |
| Radium 226 | U | | 0.94 | 0.10 | U | GAM | U | | 1.0 | U | - | |
| Thorium 228 | U | | 0.70 | | U | GAM | U | | 0.71 | U | - | |
| Thorium 232 | U | | 1.6 | | U | GAM | U | | 2.2 | U | - | |

Lab id TMAN
Protocol WHC-HEIS
Version Ver 1.0
Form DVD-REP
Version 2.17
Report date 10/01/92

TMA

| | |
|---|---|
| SDG 7069 | Client Westinghouse Hanford |
| Contact Dinkar P. Kharkar | Contract MBH-SVV-069262 |

# CASE NARRATIVE

## 1.0 GENERAL

The result of tree leaf samples from Location 100A (TMA/Norcal Group 7069) are reported herein. TMA/Norcal Group 7069 is comprised of the fourteen samples listed on the Chain-of-Custody documents and is identified as Sample 1 through 14.

## 1.1 CHAINS-OF-CUSTODY

This report includes data from samples delivered under Chain-of-Custody documents Field Logbook No. WHC-N-441-1.

## 1.2 SAMPLE VOLUME

Ziplock bags containing the samples were received for the analyses.

## 1.3 MISSING SAMPLES

All samples were accounted for in an undamaged condition.

## 1.4 HOLDING TIMES

The collections were made between 7/1/92 and 7/13/92 and the sample processing was initiated within 180 days of collection.

## 2.0 QUALITY CONTROL

The internal quality control consisted of one sample each of a laboratory control, a blank, and a replicate. All original analyses were performed with QC samples 7069-15, 16, and 17.

The QC samples were prepared and labelled by the quality control officer. Copies of The QC notebook pages are included in the data package.

## 2.1 LABORATORY CONTROL SAMPLES

LCS recoveries for all nuclides were good. The MDA's for $^{3}H$ and $^{90}Sr$ meet the RDL requirements. The MDA's for gamma nuclides were higher than the RDL because only small aliquots (5.0 g to 160.0 g) were available for gamma analysis instead of 750.0 g required by MDA calculations.

## 2.2 BLANKS

MDA's for $^{3}H$ and $^{90}Sr$ meet the RDL requirements, except for the gamma nuclides. Sample aliquots smaller than the aliquot required by MDA calculations were used for gamma analysis.

| | |
|---|---|
| SDG 7069 | Client Westinghouse Hanford |
| Contact Dinkar P. Kharkar | Contract MBH-SVV-069262 |

## CASE NARRATIVE

### 2.3 REPLICATES

Results were satisfactory for $^{3}H$, $^{90}Sr$, and gamma nuclides. The $2\sigma$ error on 90Sr is underlined because the counting error is bigger than both the MDA and the result implying that the MDA may not be a good estimate of the real minimum detectable activity. Again, the MDA's for gamma nuclides were higher due to small aliquots availabe for gamma analysis.

### 3.0 ANALYTICAL NOTES

3.1 Hydrogen-3 Analyses: The average MDA was 0.16 ± 0.043 pCi/g. Samples 7069-8, 10, 12, and 13 have $^{3}H$ concentrations above RDL. The $^{3}H$ concentrations for the remaining samples were below RDL. The $^{3}H$ concentrations are calculated on the received sample weight.

3.2 Strontium-90 Analyses: The average yield for seventeen analysis (72 ± 11%). The lowest yield was 61% and the highest was 79%. The average MDA was 0.82 ± 0.28 pCi/g. Positive $^{90}Sr$ concentration was found in samples 7069-5, 10, and 12. The concentrations for the remaining samples were below RDL. The $^{90}Sr$ concentrations are calculated on the basis of dry sample.

3.3 Gamma Scan Analyses: Gamma scan analysis did not find positive concentration of gamma nuclides. The concentration of gamma nuclides was below RDL. The concentration is based on dry sample.

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| Westinghouse Hanford Company | CHAIN OF CUSTODY |
|---|---|

Custody Form Initiator: Von Lucas

Company Contact: Dan Landeen — Telephone: 376-1038

Project Designation/Sampling Locations: 100 A Biota Sampling Tree Leaves — Collection Date: 7/1 & 7/13/92

Ice Chest No.: RM #105 — Field Logbook No.: WHC-N-444-1

Bill of Lading/Airbill No.: 2509869120 — Offsite Property No.: W92-0-0436 #31

Method of Shipment: DOE Vehicle

Shipped to: TMA Norcal

Possible Sample Hazards/Remarks: N/A

Sample Identification

B06N49
B06N50
B06N51
B06N52
B06N53
B06N54
B06N55
B06N56

☐ Field Transfer of Custody — CHAIN OF POSSESSION — (Sign and Print Names)

| Relinquished by: | Received by: | Date/Time: |
|---|---|---|
| Jonathan G. Lucas [signature] | Kermit Blum | 7-20-92 0800 * |
| Relinquished by: | Received by: | Date/Time: |
| Relinquished by: | Received by: | Date/Time: |
| Relinquished by: | Received by: | Date/Time: |

Final Sample Disposition

| Disposal Method: | Disposed by: | Date/Time: |
|---|---|---|

Comments: * [illegible] @ TMA [illegible]

001

9613491.2920

| Westinghouse Hanford Company | CHAIN OF CUSTODY |
|---|---|

Custody Form Initiator: Jon Lucas

Company Contact: Dan Landeen — Telephone: 376-1088

Project Designation/Sampling Locations: 100 A Biota Sampling — Collection Date: 7/1 & 7/13/92

Tree Leaves

Ice Chest No.: RM # 82 — Field Logbook No.: WHC-N-444-1

Bill of Lading/Airbill No.: 2509869120 — Offsite Property No.: W92-0-0436 #31

Method of Shipment: DOE Vehicle

Shipped to: TMA Norcal

Possible Sample Hazards/Remarks: N/A

Sample Identification

B06N57
B06N58
B06N59
B06N60
B06N61
B06N62

| ] Field Transfer of Custody | CHAIN OF POSSESSION | (Sign and Print Names) |
|---|---|---|
| Relinquished by: Jonathan G. Lucas | Received by: Kermit Blum | Date/Time: 7-20-92 0800 * |
| Relinquished by: | Received by: | Date/Time: |
| Relinquished by: | Received by: | Date/Time: |
| Relinquished by: | Received by: | Date/Time: 002 |

Final Sample Disposition

| Disposal Method: | Disposed by: | Date/Time: |
|---|---|---|

Comments: * Received @ TMA/Norcal 7-18-92; opened 7-20-92 · KB

A-6000-407 (12/90)

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Westinghouse Hanford Company

# SAMPLE ANALYSIS REQUEST

## PART I: FIELD SECTION

Collector V.G. Lucas, C.E. Hesden, Dan Landeen Date Sampled 7-12/7-13-92 Time — hours

Company Contact Dan Landeen Telephone (509) 376-1038

| Sample Number | Number and Type of Sample Containers | Type of Sample* | Analysis Requested |
|---|---|---|---|
| B06N49 | Ziplock bag — | Tree Leaves | TAL Metals (including Mercury) — |
| B06N50 | (1) per sample | | CLP |
| B06N51 | number | | |
| B06N52 | | | Total Gamma - Lab SOP |
| B06N53 | | | Sr-90 — Lab SOP |
| B06N54 | | | Tritium — Lab SOP |
| B06N55 | | | |
| B06N56 | | | |
| B06N57 | | | |
| B06N58 | | | |
| B06N59 | | | |
| B06N60 | | | |
| B06N61 | | | |
| B06N62 | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

Field Information** N/A

Special Handling and/or Storage 4°C

Possible Sample Hazards N/A

003

## PART II: LABORATORY SECTION

Received by Kermit Blum Title Sample Control Supervisor Date 7-20-92

Analysis Required

*Indicate whether sample is soil, sludge, water, etc.

**Use back of page for additional information relative to sample location.

A-6000-406 (05/90)

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N2-07-098-7069

JNP
11/31/93



# Supplemental Requirements for Analyses Using Gas Proportional Counters

## A.0 Completeness Checklist

### Analysis Results

- O Results Report for Sample Analyses and Reanalyses
- O Raw Data (Counting Logs, Printouts, Notebook Pages)
- O Calculation Sheets
- O Sample Identifications
- O Detector Identification
- O Analysis Date and Initials of Analyst
- O Amounts of Samples Prepared or Counted
- O Weights of Solids Counted

### Initial and Continuing Calibration

- O Detector Identification
- O Calibration Date(s) and Initials of Analyst
- O Identification of Calibration and Check Standards including Radionuclide, Certification, Expiration Date, and Activity
- O Amount of (Check) Standard Used
- O Raw Data including Counts and Count Duration for Standards
- O Weights of Preparations
- O Efficiencies
- O Weights of Carriers Added, If Applicable
- O Results of Statistical Tests Used to Evaluate Instrument Reliability and Efficiency Checks
- O Raw Data of Background Counts and Count Duration
- O Results of Statistical Test Used to Evaluate Instrument Background
- O Control Limits for Check Source and Background Counts

### Blanks

- O Detector Identification
- O Date of Analysis
- O MDA of Method
- O Amounts of Reagents Used in Blank

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1/31/93



## Supplemental Requirements for Analyses Using Gas Proportional Counters (Cont.)

### Radiometric and Gravimetric Yields

O Amounts (Volumes, Concentrations, Activity) of Spikes, Tracers, or Carriers Used
O Weights of Precipitates or Solids Counted
O Calculated Recoveries

### Duplicates

O Detector Identification
O Date of Analysis
O Aliquots of Samples
O Weights of Solids Counted
O Count Durations
O Sample Identifications
O Calculated Precision

### Laboratory Control Samples

O Detector Identification
O Date of Analysis
O Calculation of Recoveries
O Results of Analyses

9613491 2924 N2-07-098-7069

XMP
1/31/93

Supplemental Requirements for Analyses Using
Gamma Spectroscopy

C.0 Completeness Checklist

Analysis Results

O Results Report for Sample Analyses and Reanalyses
O Raw Data (Spectra, Printouts of Counts per Channel, Notebook Pages)
O Calculation Sheets
O Sample Identifications
O Detector Identification and Counting Position
O Analysis Date and Initials of Analyst
O Amounts of Samples Counted

Initial and Continuing Calibration

O Detector Identification
O Calibration Date(s) and Initials of Analyst
O Identification of Calibration and Check Standards including Radionuclides, Certification, Expiration Date, and Activity
O Amount of (Check) Standard Used
O Raw Data including Counts and Count Duration for Standards
O Efficiencies and/or Geometry and Matrix Factors
O Raw Data of Background Counts, Count Dates, and Duration of Counts
O Kev/Channel
O FWHM

Blanks

O Detector Identification
O Date of Analysis
O MDA of Method
O Amounts of Reagents Used in Blank
O Raw Data

9613491.2925 N2-07-098-7069

XnP 1/31/93



## Supplemental Requirements for Analyses Using Gamma Spectroscopy (Cont.)

### Duplicates

O Detector Identification
O Date of Analysis
O Amounts of Samples
O Count Durations
O Sample Identifications
O Results of Analyses and Calculated Precision
O Raw Data

### Radiometric and Gravimetric Yields

N/A Amounts (Volumes, Concentrations, Activity) of Spikes, Tracers, or Carriers Used
N/A Weights of Precipitates or Solids Counted
N/A Calculated Recoveries

### Laboratory Control Samples

O Detector Identification
O Date of Analysis
O Calculation of Recoveries
O Results of Analyses

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XNP 1/31/93



# Supplemental Requirements for the Analysis of Tritium Using Liquid Scintillation Counting

## F.0 Completeness Checklist

### Analysis Results

- O Results Report for Sample Analyses and Reanalyses
- O Raw Data (Gross Counts, Notebook Pages, etc.)
- O Calculation Sheets
- O Sample Identifications
- O Instrument Identification
- O Analysis Date and Analyst Initials
- O Amounts of Samples Counted
- O Background Counts Associated with Each Sample Result

### Initial and Continuing Instrument Calibration

- O Instrument Identification
- O Identification of Calibration Standards including Radionuclides, Certification, Expiration Date and Activity
- O Amount of Standard Used for Calibration
- O Raw Data (Gross Counts, Count Duration, Background Count, and Background Count Duration)
- O Counting Efficiency Determination Method and Results
- O Quench Correction Method

### Blanks

- O Instrument Identification
- O Date of Analysis
- O MDA of Method
- O Amounts of Reagents Used
- O Lot Numbers of Reagents Used
- O Raw Data
- O Tritium Levels in Background Water

### Duplicates

- O Instrument Identification
- O Date of Analysis
- O Amounts of Samples
- O Amount of Spike for Spiked Duplicates
- O Raw Data (Gross Counts, Count Duration, Background Counts, and Background Count Duration)

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N2-07-098-7069

XNP 1/31/93



Radiometric and Gravitimetric Yields

0 Amount of Tritium Standard Used for Radiometric Yield Determination
0 Radiometric Yield Calculations and Results

Laboratory Control Samples

0 Instrument Identification
0 Date of Analysis
0 Calculated Recoveries
0 Results of Analyses

## F.1 General

Scope

This Appendix provides supplemental information used for validating analytical data from the determination of tritium in water using liquid scintillation counting.

Applicability

The validation criteria in this appendix are intended to be applied in addition to those found in the body of the procedure. In cases where discrepancies exist between the requirements of the procedure and the appendix, the criteria in the appendix shall apply.

## F.2 Calibration

Liquid scintillation counting systems are calibrated using NIST traceable external or internal standards. The chemical and physical matrix of the standards should resemble the samples as closely as possible in order to match light emission (scintillation) and quenching properties.

- If the matrix of the sample is not representative of that for the samples, qualify all associated results as estimated, (J).

Most automated liquid scintillation systems are capable of processing many more samples than is normally contained in an SDG. As a minimum, one calibration standard should be included with every analytical run of samples. An analytical run can be comprised of more than one SDG.

- Qualify the results associated with runs lacking calibration standards as unusable, (R).