

APPENDIX F

REPORT

of

TEST NO. 762-6 & 7

**Supplemental Mercury Re-Evaluation for the Northwestern Lake Sediment
Characterization Condit Dam Removal Project (FERC No.2342)**

**White Salmon, Washington
Kleinfelder Project No. 58336 / 4**

Submitted to

**Squier | Kleinfelder
15050 SW Koll Parkway, Suite L
Beaverton, Oregon 97006**

Submitted by

**NORTHWESTERN AQUATIC SCIENCES
3814 YAQUINA BAY ROAD
P.O. BOX 1437
NEWPORT, OR 97365**

October 10, 2007

EXECUTIVE SUMMARY OF SEDIMENT BIOASSAYS

Two freshwater sediment bioassays, a 10-day *Hyalella azteca* survival test and a 10-day *Chironomus dilutus* (formerly *C. tentans*) growth and survival test, were conducted for Squier Kleinfelder as part of the Supplemental Mercury Re-Evaluation for the Northwestern Lake Sediment Characterization Condit Dam Removal Project (FERC No.2342), White Salmon, Washington, Kleinfelder Project No. 58336 / 4. One composite test sediment was compared to a reference sediment to assess sediment toxicity and to interpret organism response under the one-hit/two-hit rules described in *Northwest Regional Sediment Evaluation Framework –Interim Final - September 2006* (U.S. Army Corps of Engineers, Seattle District, Portland District, Walla Walla District, and Northwestern Division; U.S. Environmental Protection Agency, Region 10, Washington Department of Natural Resources, Washington Department of Ecology, Oregon Department of Environmental Ecology, Idaho Department of Environmental Quality, National Marine Fisheries Service, and U.S. Fish and Wildlife Service) The test and reference sediments tested are listed in Table 1.

TEST, REFERENCE, AND CONTROL SEDIMENT INFORMATION

The test and reference sediments were provided to Northwestern Aquatic Sciences by Squier Kleinfelder personnel. The negative control sediment was collected by NAS personnel from an area adjacent to the Highway 101 bridge at Beaver Creek, approximately 8 miles south of Newport, Oregon. All sediments were stored at 4°C in the dark until used. Sample identification and collection information is as follows:

Table 1. Sample identification and collection dates.				
Sample description	Kleinfelder Sample Identification	NAS Sample Identification	Collection Date	Receipt Date
Beaver Creek Control	Control	1142G	8-15-07	8-15-07
Test sediment	NW1-071807	1101G	7-18-07	7-20-07
Reference sediment*	NW7-071807	1107G	7-18-07	7-20-07

*Reference used for data interpretation.

BIOASSAY INTERPRETATION CRITERIA

Biological test interpretation as presented in the “Evaluation Framework” relies upon two levels of observed response in the test organism. These are known as “one-hit” and “two-hit” criteria failures. The bioassay-specific guidelines for each of these response categories are listed below. In general, a one-hit failure is a marked response in comparison to the level of response from a reference in any one biological test. A two-hit failure exhibits a lower intensity response that must be present in two or more biological tests.

One-Hit Criteria

When any one of the biological tests shows a test sediment response that exceeds the bioassay-specific response guidelines (presented below), and that response is “statistically different” from the reference, the test sediment is judged to have failed the bioassay. A “statistically different” response is defined in the “Evaluation Framework” as having a response that is greater than 20% difference from that of the control, and is statistically different ($\alpha=0.05$) from that of the reference sediment.

In accordance with the “Evaluation Framework”, the bioassay-specific response guidelines for evaluating the “one hit criteria” are as follows:

Amphipod Bioassay. Mean test mortality is greater than 15 percent over the mean reference response, and statistically different from the reference ($\alpha = 0.05$).

Midge Bioassay. Mean mortality in the test sediment is 20 percent over the reference mortality and statistically different from reference ($\alpha = 0.05$). For the growth test, a mean biomass that is less than 60 percent of the reference sediment response and statistically different from reference ($\alpha = 0.05$).

Two-Hit Criteria

When any two of the biological tests show test sediment responses that are less than the bioassay specific guidelines noted above for a one-hit failure, but are significantly different statistically from the reference sediment, the test sediment is judged to have failed bioassay testing (unacceptable risk to ecological receptors or unsuitable for unconfined aquatic disposal).

RESULTS OF AMPHIPOD, *HYALELLA AZTECA* 10-DAY SURVIVAL TEST (762-6)

All water quality observations were within the protocol specified ranges (Table 1, Section A). The test met all other applicable acceptability criteria including positive control performance (Section A).

The control and reference sediments exhibited mean mortalities of 1.3% and 0.0%, respectively (Table 2). Mortality of the test sediment was 6.3%. The test sediment mortality did not meet the criteria for failure under the one hit rule.

RESULTS OF MIDGE, *CHIRONOMUS DILUTUS*, 10-DAY SURVIVAL AND GROWTH TEST (762-7)

All water quality observations were within the protocol specified ranges (Table 1, Section B). The test met all other applicable acceptability criteria including positive control performance (Section B).

The mortality in the control and the reference sediments in the *Chironomid* test was 1.3% and 5.0%, respectively (Table 2). Mortality for the NW1-071807 test sediment was 3.8%. The control average individual ash-free weight was 0.74 mg. The average individual ash-free weight for the reference and test sediments was 0.76 mg and 0.62 mg, respectively. The test sediment did not meet the criteria for failure under the one hit rule for either mortality or biomass.

SUMMARY OF SEDIMENT BIOASSAY RESULTS

For a test sample to fail the "Evaluation Framework" Interpretive Criteria, the sample must be shown to exceed the "single-hit" criteria or that of the "two-hit" criteria to determine whether the sample passed or failed bioassay testing. The NW1-071807 test sediment (NAS# 1101G) did not meet the criteria for test failure under the "one hit" or "two-hit" rules (Table 2).

STUDY APPROVAL


Laboratory Director Date


Project Manager Date

Table 2. Data summary and interpretation.								
Sample Description	<i>Hyalella</i> % Mortality (Mean $\pm$ SD)	Failure under the one-hit rule?	Midge % Mortality (Mean $\pm$ SD)	Failure under the one-hit rule?	Average ind. ash-free wt/midge ¹ (mg)	Failure under the one-hit rule?	Failure under the two-hit rule?	Overall Result
Control (NAS# 1142G)	1.3 $\pm$ 3.5	---	1.3 $\pm$ 3.5	---	0.74 $\pm$ 0.05	---	---	---
NW1-071807 (NAS# 1101G)	6.3 $\pm$ 7.4*	No	3.8 $\pm$ 5.2	No	0.62 $\pm$ 0.05*	No	No	Pass
NW7-071807 ² (NAS# 1107G)	0.0 $\pm$ 0.0	---	5.0 $\pm$ 5.3	---	0.76 $\pm$ 0.05	---	---	---

¹ Pupae were not included in the sample to estimate dry weight (as per EPA/600/R-99/064, p. 59, section 12.3.8.2)

² Reference sediment used for data interpretation.

*Statistically significantly different from the reference

SECTION A

Amphipod (*Hyaella azteca*) sediment bioassay 762-6 data report

TOXICITY TEST REPORT**TEST IDENTIFICATION**

Test No.: 762-6

Title: Toxicity of freshwater sediments using a 10-day amphipod, *Hyalella azteca*, sediment bioassay as part of the Supplemental Mercury Re-Evaluation for the Northwestern Lake Sediment Characterization Condit Dam Removal Project (FERC No.2342), White Salmon, Washington, Kleinfelder Project No. 58336 / 4.
Protocol No.: NAS-XXX-HA4b, April 7, 1998 (Revision 1, 10-27-03). Based on ASTM 2001 (Standard test methods for measuring the toxicity of sediment-associated contaminants with fresh water invertebrates, E1706-00), Am. Soc. Test. Mat. Phila., PA, and EPA Method 100.1 (Methods for measuring the toxicity and bioaccumulation of sediment-associated contaminants with freshwater invertebrates, EPA/600/R-99/064).

STUDY MANAGEMENT

Study Sponsor: Squier | Kleinfelder, 15050 SW Koll Parkway, Suite L, Beaverton, OR 97006-6028

Sponsor's Study Monitor: Mr. David King

Testing Laboratory: Northwestern Aquatic Sciences, P.O. Box 1437, Newport, OR 97365

Test Location: Newport laboratory

Laboratory's Study Personnel: G.J. Irissarri, B.S., Proj. Man./Study Dir.; L.K. Nemeth, B.A., M.B.A., QA Officer; M.S. Redmond, M.S., Aq. Toxicologist; G.A. Buhler, B.S., Aq. Toxicologist; Tech.; S.J. Gage, B.A., Sr. Tech.; G. Hutchinson, B.S., Tech; L.P. Sandoval, B.S., Tech.

Study Schedule:

Test Beginning: 8-31-07, 1000 hrs.

Test Ending: 9-10-07, 0900 hrs.

Disposition of Study Records: All specimens, raw data, reports and other study records are stored according to Good Laboratory Practice regulations at Northwestern Aquatic Sciences, 3814 Yaquina Bay Rd., Newport, OR 97365.

Good Laboratory Practices: The test was conducted following the principles of Good Laboratory Practices (GLP) as defined in the EPA/TSCA Good Laboratory Practice regulations revised August 17, 1989 (40 CFR Part 792).

Statement of Quality Assurance: The test data were reviewed by the Quality Assurance Unit to assure that the study was performed in accordance with the protocol and standard operating procedures. This report is an accurate reflection of the raw data.

TEST MATERIAL

Test Sediments: Freshwater test sediments collected as part the Supplemental Mercury Re-Evaluation for the Northwestern Lake Sediment Characterization Condit Dam Removal Project (FERC No.2342), White Salmon, Washington, Kleinfelder Project No. 58336 / 4. Details are as follows:

NAS Sample No.	1101G	1107G
Description	NW1-071807	NW7-071807
Collection Date	7/18/07	7/18/07
Receipt Date	7/20/07	7/20/07

Reference Sediment: The reference sediment used for comparative analysis was NW7-071807 (1107G).

Control Sediment: The negative control sediment (NAS#1142G) was collected on 8-15-07 from an area approximately one mile east of the Hwy. 101 bridge at Beaver Creek, approx. 8 miles south of Newport, OR.

Treatments: Homogenized at test set up by mixing using stainless steel implements.

Storage: All test, reference, and control sediments were stored at 4°C in the dark in sealed containers until used.

TEST WATER

Source: Dechlorinated municipal tap water, which is also used as culture water.

Dates of Preparation: 8-27-07, 8-31-07

Water Quality:

pH: 7.0 (n=2)
 conductivity: 143 (n=2) $\mu\text{mhos/cm}$
 hardness: 43 (n=2) mg/L as CaCO_3
 alkalinity: 40 (n=2) mg/L as CaCO_3 .
 total chlorine: <0.02 (n=2) mg/L

Pretreatment: Dechlorinated and aerated ≥ 24 hr.

TEST ORGANISMS

Species: *Hyalella azteca*, amphipod.

Age/Size: 7-8 days old

Source: Chesapeake Cultures, Hayes, VA; received 8-29-07

Acclimation: Holding conditions prior to testing averaged: Temperature, 22.3 ± 0.2 °C; dissolved oxygen, 10.6 ± 3.8 mg/L; pH, 7.8 ± 0.4 ; conductivity, 313 ± 72 $\mu\text{mhos/cm}$; hardness, 103 ± 9 mg/L as CaCO_3 ; and alkalinity, 150 ± 56 mg/L as CaCO_3 . Photoperiod, 16:8, L:D. Half of the water was replaced daily with dechlorinated municipal tap water during holding. Animals were fed YTC daily during holding.

TEST PROCEDURES AND CONDITIONS

The following is an abbreviated statement of the test procedures and a statement of the test conditions actually employed. See the test protocol (Appendix I) for a more detailed description of the test procedures used in this study.

Test Chambers: 300 ml high-form glass beakers

Test Volumes: 100 ml sediment layer; 175 ml test water.

Replicates/Treatment: 8

Organisms/Treatment: 80

Water Volume Changes: 2 water volumes per day

Aeration: None.

Feeding: Animals are fed 1.0 ml of YTC suspension per beaker daily.

Effects Criterion: Survival after 10 days. Death is defined as no visible movement or response to tactile stimulation. Missing organisms were considered to be dead.

Water Quality and Other Test Conditions: The temperature, dissolved oxygen, conductivity, pH, hardness, alkalinity and ammonia-nitrogen were measured in the overlying water of one replicate test container per treatment on days 0 and 10 of the test. Temperature and dissolved oxygen were measured daily in the overlying water of one replicate test container per treatment. Hardness and alkalinity were measured with titrimetric methods. Ammonia-N was measured using Hach reagents based on the salicylate (Clin. Chim. Acta 14:403, 1996) colorimetric method; samples were not distilled prior to analysis. The photoperiod was 16:8, L:D.

DATA ANALYSIS METHODS

Survival and mortality were calculated for each replicate as follows:

$$\text{percent survival} = 100 \times (\text{number surviving}/\text{initial number tested})$$

$$\text{percent mortality} = 100 \times (\text{number dead}/\text{initial number tested})$$

Means and standard deviations for the biological endpoints described above, and for water quality data, were computed using Microsoft Excel 2000. The value for mortality for each test sediment was statistically compared to the reference sediment. Where appropriate, an arcsine square root transformation was performed on proportional mortality data before analysis. Following determination of normality and homogeneity of variances, a one-tailed Student T-test, Mann-Whitney or Approximate T test was conducted at the 0.05 level of significance. The statistical software used was BioStat (Beta v.4.1 (EXCEL)) bioassay software developed by the U.S. Army Corps of Engineers, Seattle District.

PROTOCOL DEVIATIONS

None

REFERENCE TOXICANT TEST

The reference toxicant test is a multi-concentration toxicity test using potassium chloride, to evaluate the performance of the test organisms used in the sediment toxicity test. The performance is evaluated by comparing the results of this test with historical results obtained at the laboratory. A summary of the reference toxicant test result is given below. The reference toxicant test raw data are found in Appendix III.

Test No.: 999-2320

Reference Toxicant and Source: Potassium Chloride (KCl), Fisher Lot #045768.

Test Date: 8-31-07.

Dilution Water Used: Moderately hard synthetic water prepared from Milli-Q® deionized water.

Result: 96-hr LC50, 0.36 g/L. This result is within the laboratory's control chart warning limits (0.27 – 0.53 g/L).

TEST RESULTS

Observations of water quality in the overlying water throughout the test are summarized in Table 1. A detailed tabulation of the water quality results by sample and test day can be found in Appendix II. The means and standard deviations of percent mortality of *Hyalella* exposed for 10 days to sediments are summarized in Table 2. Detailed data organized by sample and replicate, and summary statistics for these observations, are given in Appendix II.

All water quality observations of overlying water temperature and dissolved oxygen were within the protocol specified ranges. Ammonia-N in the overlying water ranged between 0.1 and 0.3 mg/L for all day 0 and day 10 measurements.

The test met the acceptability criteria specified in the *Northwest Regional Sediment Evaluation Framework – Interim Final - September 2006* with 1.3 % mean control mortality ($\leq 20\%$ required) and 0.0 % reference sediment survival ($\leq 25\%$ required). The reference toxicant (positive control) EC50 result was within the laboratory's control chart limits (0.36 g/L; control chart mean ± 2 S.D. = 0.40 ± 0.13).

Data interpretation was conducted as described in *Northwest Regional Sediment Evaluation Framework – Interim Final - September 2006* (U.S. Army Corps of Engineers, Seattle District, Portland District, Walla Walla District, and Northwestern Division; U.S. Environmental Protection Agency, Region 10, Washington Department of Natural Resources, Washington Department of Ecology, Oregon Department of Environmental Ecology, Idaho Department of Environmental Quality, National Marine Fisheries Service, and U.S. Fish and Wildlife Service). For a test sediment to fail under the single hit rule, the mean test mortality must be greater than 15 percentage points over the reference sediment response and “statistically different” ($\alpha = 0.05$) from the reference sediment. A “statistically different” response is defined in the “Evaluation Framework” as having a mortality response that is greater than 20% difference from that of the control, and is statistically different ($\alpha = 0.05$) from that of the reference sediment. Following these guidelines, the NW1-071807 (NAS#1101G) test sediment mortality of 6.3% did not result in a failure under the one-hit rule.

STUDY APPROVAL

Muhammad Ihsani 9-26-07
Project Manager/Study Director Date

Linda K. Nemeth 9/24/07
Quality Assurance Unit Date

Linda K. Nemeth 9/24/07
Laboratory Director Date
FOR R.S. CALDWELL

Table 1. Summary of water quality conditions during tests of the amphipod, *Hyaella azteca*, exposed to freshwater sediments.

Water Quality Parameter	Mean $\pm$ S.D.	Minimum	Maximum	N
Temperature ($^{\circ}$ C)	22.6 $\pm$ 0.4	22.0	23.3	33
Dissolved oxygen (mg/L)	6.9 $\pm$ 0.5	5.6	7.4	33
Conductivity (μ mh/cm)	165 $\pm$ 6	155	170	6
pH	6.6 $\pm$ 0.4	6.2	7.0	6
Hardness (mg/L as CaCO ₃)	51 $\pm$ 0	51	51	6
Alkalinity (mg/L as CaCO ₃)	43 $\pm$ 5	40	50	6
Total ammonia (mg/L)	0.2 $\pm$ 0.1	0.1	0.3	6

Table 2. Mortality results of *Hyaella* 10-day toxicity test and data interpretation using guidelines from the "Northwest Regional Sediment Evaluation Framework –Interim Final", September 2006. For a test sediment to fail under the single hit rule, the mean test mortality must be >15% over the reference sediment response, and "statistically different" ($\alpha = 0.05$) from the reference sediment. A "statistically different" response is defined in the "Evaluation Framework" as having a response that is greater than 20% difference from that of the control, and is statistically different ($\alpha = 0.05$) from that of the reference sediment.

Sample description	Percent mortality (Mean $\pm$ SD)	Statistically significantly different than that of the reference?	Difference from negative control sediment	Difference from reference sediment	Failure under 1-hit rule?
Control (NAS# 1142G)	1.3 $\pm$ 3.5	---	---	---	---
NW1-071807	6.3 $\pm$ 7.4	Yes	5.0	6.3	No
NW7-071807*	0.0 $\pm$ 0.0	---	---	---	---

*Reference sediment

APPENDIX I

PROTOCOL

TEST PROTOCOL

**FRESHWATER AMPHIPOD, *HYALELLA AZTECA*,
10-DAY SEDIMENT TOXICITY TEST**

1. INTRODUCTION

1.1 Purpose of Study: The purpose of this study is to characterize the toxicity of freshwater sediments based on survival and, optionally, growth using the amphipod, *Hyaella azteca*.

1.2 Referenced Method: This protocol is based on EPA Method 100.1 (EPA/600/R-99/064) and ASTM Method E 1706-00 (ASTM 2001).

1.3 Summary of Method: A summary of test conditions for the amphipod 10-day sediment toxicity test is tabulated below. The 10-day sediment toxicity test with *Hyaella azteca* is conducted at $23 \pm 1^\circ\text{C}$ with a 16L:8D photoperiod at an illuminance of about 100 to 1000 lux. Test chambers are 300-mL high-form lipless beakers containing 100 mL of sediment and 175 mL of overlying water. Ten 7-14 day old amphipods (1 to 2 day range in age) are used in each replicate. The number of replicates/treatment depends on the objective of the test. Eight replicates are recommended for routine testing. Amphipods in each test chamber are fed 1.0 mL of a YCT food daily. Each chamber receives two volume additions per day of overlying water. Overlying water can be culture water, well water, surface water, site water, or reconstituted water. Test endpoints include survival and/or growth.

2. STUDY MANAGEMENT

2.1 Sponsor's Name and Address:

2.2 Sponsor's Study Monitor:

2.3 Name of Testing Laboratory:

Northwestern Aquatic Sciences
3814 Yaquina Bay Road, P.O. Box 1437
Newport, OR 97365.

2.4 Test Location: _____

2.5 Laboratory's Personnel to be Assigned to the Study:

Study Director: _____
Quality Assurance Unit: _____
Aquatic Toxicologist: _____
Aquatic Toxicologist: _____

2.6 Proposed Testing Schedule: Tests are to begin within 14 days of sample collection unless otherwise specified. Reference toxicant test to be run concurrently.

2.7 Good Laboratory Practices: The test is conducted following the principles of Good Laboratory Practices (GLP) as defined in the EPA/TSCA Good Laboratory Practice regulations revised August 17, 1989 (40 CFR Part 792).

3. TEST MATERIAL

The test materials are freshwater sediments. The control, reference, and test sediments are placed in solvent cleaned 1 L glass jars fitted with PTFE-lined screw caps. At the laboratory the samples are stored at 4°C in the dark. The original sealed containers may be stored for up to 14 days prior to testing. If jars are not full when received or if sediment is removed for testing, headspaces should be filled with nitrogen to retard deterioration. A negative control sediment is collected from a clean site. In addition, a reference sediment, a clean sediment with physical characteristics similar to the test sediments, may be employed as a comparison station.

4. TEST WATER

Test water (overlying water) at NAS is normally moderately hard synthetic water at a hardness of 80-100 mg/L as CaCO₃ and alkalinity of 60-70 mg/L as CaCO₃. Dilution water is prepared from Milli-Q reagent grade water and reagent grade chemicals. Test water may also be well water, surface water or site water, depending on the study design.

5. TEST ORGANISMS

5.1 Species: amphipod, *Hyalella azteca*.

5.2 Source: Cultured at NAS or purchased from a reputable commercial supplier.

5.3 Age: 7-14 days old at start of test; with 1 to 2 day range in age.

5.4 Acclimation and Pretest Observation: Test organisms must be cultured and tested at 23°C. Ideally they should be cultured in the same water that will be the test water. However, acclimation to test water is not required. Isolated young should be held similarly to mass cultures for at least two days (eliminate the feeding instructions) before starting the test to eliminate animals injured during handling.

6. DESCRIPTION OF TEST SYSTEM

6.1 Test Chambers and Environmental Control: Test chambers used in the toxicity test are 300-mL high-form lipless glass beakers. Test chambers are maintained at constant temperature by partial immersion in a temperature-controlled water bath or by placement in a temperature-controlled room. Aeration is not employed unless dissolved oxygen drops below 2.5 mg/L. The test is conducted under an illuminance of 100 to 1000 lx with a 16L:8D photoperiod.

6.2 Cleaning: All laboratory glassware, including test chambers, is cleaned as described in EPA/600/4-90/027F. New glassware and test systems are soaked 15 minutes in tap water and scrubbed with detergent (or cleaned in automatic dishwasher); rinsed twice with tap water; carefully rinsed once with fresh, dilute (10%, V:V) hydrochloric or nitric acid to remove scale, metals, and bases; rinsed twice with deionized water; rinsed once with acetone to remove organic compounds (using a fume hood or canopy); and rinsed three times with deionized water. Test systems and chambers are rinsed again with dilution water just before use.

7. EXPERIMENTAL DESIGN AND TEST PROCEDURES

7.1 Experimental Design: The test involves exposure of amphipods to test, control, and reference sediments. The sediments are placed on the bottom of the test containers and are overlain with test water. The test exposure is for 10 days. The renewal of overlying water consists of two volume additions per day, either continuous or

intermittent. Each treatment consists of eight replicate test containers, each containing 10 organisms. Test chamber positions are completely randomized. Test organisms are randomly distributed to the test chambers. Blind testing is normally used.

7.2 Setup of Test Containers: Sediments are homogenized and placed in test chambers on the day before addition of test organisms. Sediment (100 ml) is placed into each of eight replicate beakers. After addition of the sediment, 175 ml of test water is gently added to each beaker in a manner to prevent resuspension. The overlying water is replaced twice daily. The test begins when amphipods are introduced to the test chambers. Initial water quality measurements are taken prior to the addition of test organisms.

7.3 Effect Criterion: The effect criterion used in the amphipod bioassay is mortality, defined as the lack of movement of body or appendages on response to tactile stimulation. The optional sublethal effect criterion is growth which is determined by using dry weight measurements or body length measurements.

7.4 Test Conditions: No aeration is employed unless dissolved oxygen falls below 2.5 mg/L. The test temperature employed is $23 \pm 1^{\circ}\text{C}$. A 16:8, L:D photoperiod is used. Illumination is supplied by daylight fluorescent lamps at 100 to 1000 lux. The overlying water is replaced twice daily.

7.5 Beginning the Test: On the day the test begins, amphipods are impartially counted into small containers of test water (10/container). The test is begun by rinsing test organisms into the equilibrated test containers. If the optional growth endpoint is to be used. Twenty organisms are archived for length determination or 80 organisms for dry weight.

7.6 Feeding: Amphipods are fed 1.0 mL of YCT daily per test chamber. A feeding may be skipped if there is a build up of excess food. However, all beakers must be treated similarly.

7.7 Test Duration, Type and Frequency of Observations, and Methods: The duration of the acute toxicity test is 10 days. The type and frequency of observations to be made are summarized as follows:

TYPE OF OBSERVATION	TIMES OF OBSERVATION
<i>BIOLOGICAL DATA</i>	
Survival, growth	Day 10
<i>PHYSICAL AND CHEMICAL DATA</i>	
Hardness, alkalinity, ammonia-N, conductivity, pH, dissolved oxygen, and temperature	Beginning and end of test in overlying water of one replicate beaker from each treatment.
Dissolved oxygen, temperature	Daily in overlying water of one replicate beaker from each treatment.

Dissolved oxygen is measured using a polarographic oxygen probe calibrated according to the manufacturer's recommendations. The pH is measured using a pH probe and a properly calibrated meter with scale divisions of 0.1 pH units. Temperature is measured with a calibrated mercury thermometer or telethermometer. Conductivity is measured with a conductivity meter. Hardness and alkalinity are measured using titrimetric methods. Ammonia-nitrogen is measured using the salicylate colorimetric method (Clin. Chim. Acta 14:403, 1996).

Overlying water should be sampled just before water renewal from about 1 to 2 cm above the sediment surface using a pipet. It may be necessary to pool water samples from individual replicates. The pipet should be checked to make sure no organisms are removed during sampling of overlying water.

7.8 Growth Measurement: Growth is measured as average dry weight of animals in a test replicate at the end of the test on day 10 or average total length of preserved animals. Pooled animals from each test replicate are rinsed with deionized water and placed into tared aluminum weigh pans. The pans are dried at 60-90°C to constant weight. The dried amphipods are placed into a dessicator and weighed as soon as possible to the nearest 0.01 mg (desirable

to use 0.001 mg). The total weight of the dried amphipods in each pan is divided by the number of amphipods weighed to obtain an average dry weight per surviving amphipod per replicate.

If the length growth endpoint is to be used, either in place of or along with the weight endpoint, amphipods from each replicate are pooled and preserved in vials. Later, the preserved amphipods from one vial are carefully stretched out on a glass microscope slide and quickly measured using a dissecting microscope fitted with a calibrated ocular micrometer. Then, if weight is to be determined, the animals are quickly transferred to tared aluminum foil cups. Fine-tipped forceps or fine brushes are required for these handling operations.

If both measurements are to be used, total length measurements are taken first, then the animals are transferred to tared aluminum foil cups for weighing.

8. CRITERIA OF TEST ACCEPTANCE

The test results are acceptable if the minimum survival of organisms in the control treatment at the end of the test is at least 80%. For the growth endpoint, the test results are acceptable if there is measureable growth of test organisms in the control sediment.

9. DATA ANALYSIS

The endpoints of the toxicity test are survival and growth (optional). Survival is obtained as a direct count of living organisms in each test container at the end of the test. Average amphipod dry weight, also measured at the end of the test, may be used to compare growth between treatment sediments and the control or reference sediment. Body length may be used instead of dry weight. Ordinarily the following data analysis is performed. Due to special requirements, alternative methods may be used. The means and standard deviations are calculated for each treatment level. Identification of toxic sediments is established by statistical comparison of test endpoints between test and control or reference sediments. Between treatment comparisons may be made using a Student's t-test or Wilcoxon's Two-Sample test, where each treatment is compared to the control or the reference sediment. An arcsine-square root transformation of proportional data, and tests for normality and heterogeneity of variances, are performed prior to statistical comparisons.

10. REPORTING

The final report of the test results must include all of the following standard information at a minimum: name and identification of the test; the investigator and laboratory; date and time of test beginning and end; information on the test material; information on the source and quality of the overlying/test water; detailed information about the test organisms including acclimation conditions; a description of the experimental design and test chambers and other test conditions including feeding, if any, and water quality; definition of the effect criteria and other observations; responses, if any, in the control treatment; tabulation and statistical analysis of measured responses and a summary table of endpoints; a description of the statistical methods used; any unusual information about the test or deviations from procedures; reference toxicant testing information.

11. STUDY DESIGN ALTERATION

Amendments made to the protocol must be approved by the sponsor and study director and should include a description of the change, the reason for the change, the date the change took effect and the dated signatures of the study director and sponsor. Any deviations in the protocol must be described and recorded in the study raw data.

12. REFERENCE TOXICANT

The reference toxicant test is a standard multi-concentration toxicity test using a specified chemical toxicant to evaluate the performance of test organisms used in the study. Reference toxicant tests are 96-hour, water only exposures, not 10-day sediment exposures. The reference toxicant test is run concurrently. Performance is evaluated by comparing the results of the reference toxicant test with historical results (e.g., control charts) obtained at the laboratory.

13. REFERENCED GUIDELINES

ASTM. 2001. Standard Test Methods for Measuring the Toxicity of Sediment-Associated Contaminants with Fresh Water Invertebrates. ASTM Standard Method No. E 1706-00. Am. Soc. Test. Mat., Philadelphia, PA.

U.S. EPA. 2000. Section 11, Test Method 100.1, *Hyalella azteca* 10-d Survival and Growth Test for Sediments, pp. 47-54 In: Methods for Measuring the Toxicity and Bioaccumulation of Sediment-associated Contaminants with Freshwater Invertebrates (Second Edition). EPA/600/R-99/064.

Weber, C.I. (Ed.) 1993. Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms (Fourth Edition). EPA/600/4-90/027F.

14. APPROVALS

Name Date for _____

Name Date for Northwestern Aquatic Sciences

Appendix A
Test Conditions Summary

1. Test type	whole sediment toxicity test with renewal of overlying water
2. Test duration	10 days
3. Temperature	23 ± 1°C
4. Light quality	daylight fluorescent light
5. Illuminance	100 - 1000 lux
6. Photoperiod	16L:8D
7. Test chamber size	300-mL high-form lipless beakers, (Pyrex® 1040 or equivalent)
8. Sediment volume	100 mL
9. Overlying water volume	175 mL
10. Renewal overlying water	2 volume additions/day (continuous or intermittent)
11. Age of test organisms	7-14 days old at test initiation (1 to 2 day range in age)
12. Organisms per test chamber	10
13. Replicates per treatment	8 recommended for routine testing (depends on design)
14. Organisms per treatment	80
15. Feeding regime	YCT food, fed 1.0 mL daily/chamber
16. Cleaning	if screens are used, clean as needed
17. Aeration	None, unless DO falls below 2.5 mg/L
18. Overlying (test) water	Culture water, well water, surface water, site water or reconstituted water
19. Water quality	Hardness, alkalinity, conductivity, pH, ammonia-N beginning and end; temperature and dissolved oxygen daily
20. Endpoints	Survival (optional, growth by dry weight or length)
21. Test acceptability criteria	Minimum control survival of 80%
22. Sample holding	14 days at 4°C in the dark
23. Sample volume required	1L (800 mL per sediment)
24. Reference toxicant	Concurrent testing required

APPENDIX II

RAW DATA

**TEST DESCRIPTION, MONITORING, AND RESULTS
BENCHSHEETS**

Test No. 762-6 Client Squier Kleinfelder

Investigator

REVIEWED
PAGE 1-18
-632**STUDY MANAGEMENT**Client: Squier | Kleinfelder, 15050 SW Koll Parkway, Suite L, Beaverton, OR 97006Client's Study Monitor: Mr. David KingTesting Laboratory: Northwestern Aquatic SciencesTest Location: Newport Laboratory

Laboratory's Study Personnel:

Proj. Man./Study Dir. G.J. Irissari ⁶³²QA Officer L.K. Nemeth1. GA Biven ^{WS}3. Greg Hutchinson ^{GH}5. Susan Goff ^{SG}7. 2. M.S. Redmond ^{MR}4. Lidia P. Sandoval ^{LP}6. 8.

Study Schedule:

Test Beginning: 8-31-07 1000Test Ending: 9-10-07 0900**TEST MATERIAL**General description (see sample logbook/chain-of-custody for details):

NAS Sample No.:	1142G	1101G	^{1107 632 ①} 0042G ⁸⁻³¹⁻⁰⁷		
Description:	Control	NW1-071807	NW7-071807		
Collection Date:	8/15/07	7/18/07	7/18/07		
Receipt Date:	8/15/07	7/20/07 ^②	7/20/07 ^③		
			^{632 9-19-07}		
NAS Sample No.:					
Description:					
Collection Date:					
Receipt Date:					
NAS Sample No.:					
Description:					
Collection Date:					
Receipt Date:					
NAS Sample No.:					
Description:					
Collection Date:					
Receipt Date:					
NAS Sample No.:					
Description:					
Collection Date:					
Receipt Date:					

Test No. 762-6 Client Squier Kleinfelder Investigator _____

SEDIMENT DESCRIPTIONS -- SUPPLEMENTAL NOTES

[illegible]

HYALELLA AZTECA 10-DAY SOLID PHASE SEDIMENT TEST

Test No. 762-6 Client Squier Kleinfelder Investigator

TEST WATER

Source: Dechlorinated municipal tap water

Date of Collection: 8-31-07, 8-27-07

pH 7.1, 6.8 $\bar{x} = 7.0$

Cond (umhos/cm2) 145, 140 $\bar{x} = 143$

Hardness (mg/La0) 43, 43 $\bar{x} = 43$

Alkalinity (mg/L) 40, 40 $\bar{x} = 40$

Total Chlorine (mg/L) <0.02, <0.02

Treatments: Dechlorinated, aerated

TEST ORGANISMS

Species: Hyalella azteca

Age: 5-6 DAYS AT RECEIPT

Source: Chesapeake Cultures, Hayes, VA

Date received: 8-29-07

Acclimation Data:

Date	Temp. (deg.C)	DO (mg/L)	pH	Cond. umhos/cm	Hardness (mg/L)	Alkalinity (mg/L)	Feeding amount	Feeding description	Water changes
8-29-07	22.1	>15.0	7.4	395	111	210	10 mL	YTC	YES
8-30-07	22.5	8.5	8.1	295	103	140	10 mL	YTC	YES
8-31-07	22.7	8.7	7.8	260	94	100	-	-	-
Mean	22.3	10.6	7.8	313	103	150			
S.D.	0.2	3.8	0.4	72	9	56			
(N)	3	3	3	3	3	3			

Photoperiod during acclimation: 16:8, L:D

TEST PROCEDURES AND CONDITIONS

Test chambers: 300 ml glass beakers

Test volumes: 100 ml of test sediment; 275 ml total volume

Replicates/treatment: (8) 8 Organisms/treatment: (80) 80 (10/REP)

Test water changes: Twice daily

Aeration: only if DO falls below 2.5 mg/L

Beaker placement: Total randomization

Feeding: everyday beginning with day zero

Photoperiod: 16:8, L:D

Test temperature (°C): 23 ± 1

Control Sediment:

Source: From an area approximately one mile east of the Hwy. 101 bridge at Beaver Creek,
approx. 8 miles south of Newport, OR.

Date collected: 08/15/07

Sieved through 0.5 -mm screen

Storage: darkness at 4°C, in sealed containers

NAS# 1142G

MISCELLANEOUS NOTES

Light intensity:

Date	Location	Measurement	Initials
8-31-07	BEAKER #13	84 FT-CANDLES	6JL

Test No. 762-6 Client Squier Kleinfelder Investigator _____

Test conducted in (circle one): room 1 room 2 trailer water bath other: _____

Randomization chart:

TOP SHELF

5	10	15	20						
4	9	14	19	24					
3	8	13	18	23					
2	7	12	17	22					
1	6	11	16	21					

Randomization chart:

Randomization chart:

Randomization chart:

Test No. 762-6 Client

Squier Kleinfelder

Investigator

DAILY RECORD SHEET

Day 0 (8 / 31 / 07)

[illegible]

*Water quality measurements to be taken.

Day 1 (9/7/09)

[illegible]

*Water quality measurements to be taken.

Test No. 762-6 Client Squier Kleinfelder Investigator _____

DAILY RECORD SHEET

Day 2 (9 / 2 07) 651

[illegible]

*Water quality measurements to be taken.

Day 3 (9 /3 07) WJ

[illegible]

*Water quality measurements to be taken.

Test No. 762-6 Client Squier Kleinfelder Investigator _____

DAILY RECORD SHEET

Day 4 (9/4/07) GB

[illegible]

*Water quality measurements to be taken.

Day 5 (9/5/07) LPS

[illegible]

*Water quality measurements to be taken.

Test No. 762-6 Client Squier Kleinfelder Investigator _____

DAILY RECORD SHEET

Day 6 (9/6/07) W LPS

[illegible]

*Water quality measurements to be taken.

Day 7 (9 / 7 / 07) 451

[illegible]

*Water quality measurements to be taken.

Test No. 762-6 Client Squier Kleinfelder Investigator _____

DAILY RECORD SHEET

Day 8 (9/8/07) af

[illegible]

*Water quality measurements to be taken.

Day 9 (9/9/07) 105

[illegible]

*Water quality measurements to be taken.

Test No. 762-6 Client Squier Kleinfelder Investigator _____

DAILY RECORD SHEET

Day 10 (9 / 10 / 07) 655

[illegible]

*Water quality measurements to be taken.

Day _____ (/ /)

[illegible]

*Water quality measurements to be taken.

HYALELLA AZTECA 10-DAY SOLID PHASE SEDIMENT TEST

Test No. 762-6 Client Squier Kleinfelder Investigator

DAY 10 TEST TERMINATION SHEET

Beaker No.	Number of survivors	Initials
1	10	GAB
2	10	GAB
3	10	GAB
4	10	GAB
5	9	GAB
6	10	GAB
7	9	GAB
8	9	GAB
9	8	GAB
10	10	GAB
11	10	GAB
12	10	GAB
13	10	GAB
14	10	GAB
15	10	GAB
16	10	GAB
17	10	GAB
18	10	GAB
19	10	GAB
20	10	GAB
21	10	GAB
22	10	GAB
23	9	GAB
24	10	GAB
25		
26		
27		
28		
29		
30		
31		
32		
33		
34		
35		
36		
37		
38		
39		
40		
41		
42		
43		
44		
45		

Beaker No.	Number of survivors	Initials
46		
47		
48		
49		
50		
51		
52		
53		
54		
55		
56		
57		
58		
59		
60		
61		
62		
63		
64		
65		
66		
67		
68		
69		
70		
71		
72		
73		
74		
75		
76		
77		
78		
79		
80		
81		
82		
83		
84		
85		
86		
87		
88		
89		
90		

Chesapeake Cultures

P.O. Box 507 Hayes, VA 23072 (804)693-4046 (804)694-4704 fax

www.c-cultures.com

growfish@c-cultures.com

NAS Shipment Information

Species Hyaulia azteca

Date 8/28/07

Size/
Age 4-5 d; ~1.5 mm

P.O. No. verbal

Quantity 470+

Invoice No. 5853

Temperature 24°C Salinity — pH 7.96

Notes Thank you!

Biologist Ernst Mullins

* Please inspect shipment and report any problem immediately *

Rec'd 8-29-07 sf

TEST DATA ANALYSIS RECORDS

Endpoints Data Entry and Calculations File

Endpoint Data Entry and Calculations File														
BKR=beaker number														
INIT=initial number														
SURV=number survivors														
MORT=number dead=INIT-SURV														
PSURV=%survival=100(SURV/INIT)														
PMORT=%mortality=100(MORT/INIT)														

Project Name: P765-6 Hyalella 10-day; % Mortality

Sample: x1
 Samp ID: NW1-071807
 Alias: NAS#1101G - X1
 Replicates: 8
 Mean: 6.25
 SD: 7.44
 Tr Mean: 10.234
 Trans SD: 11.259

Ref Samp: x2
 Ref ID: NW7-071807
 Alias: NAS#1107G - X2
 Replicates: 8
 Mean: 0
 SD: 0
 Tr Mean: 0
 Trans SD: 0

Shapiro-Wilk Results:	Levene's Results:	Test Results:
Residual Mean: 0 Residual SD: 0 SS: 0 K: 0 b: 0 Alpha Level: N/A Calculated Value: N/A Critical Value: N/A Normally Distributed: N/A Override Option: N/A	Test Residual Mean: 0 Test Residual SD: 0 Ref. Residual Mean: 0 Ref. Residual SD: 0 Deg. of Freedom: N/A Alpha Level: N/A Calculated Value: N/A Critical Value: N/A Variances Homogeneous: N/A	Statistic: 1-Sample t-Test Balanced Design: Yes Transformation: ArcSin Experimental Hypothesis Null: $x_1 \leq x_2$ Alternate: $x_1 > x_2$ Degrees of Freedom: 7 Experimental Alpha Level: 0.05 Calculated Value: 2.5708 Critical Value: ≥ 1.895 Accept Null Hypothesis: No Power: Min. Difference for Power:

Replicate Number	Test Data	Trans. Test Data	Reference Data	Trans. Reference Data	Levene's Test Residuals	Levene's Reference Residuals	Mann-Whitney Ranks	Rankits	Shapiro-Wilk Residuals
1	20	26.565	0	0					
2	10	18.435	0	0					
3	10	18.435	0	0					
4	0	0	0	0					
5	0	0	0	0					
6	0	0	0	0					
7	10	18.435	0	0					
8	0	0	0	0					
9									
10									
11	THE % MORTALITY OF NW1-071807 (NAS#1101G) WAS SIGNIFICANTLY GREATER THAN THAT OF THE REFERENCE (NW7-071807) AT $\alpha = 0.05$. -631								
12									
13									
14									
15									
16									

Water Quality Data											
NAS		CLIENT		Overlying water							
BKR	SMPL	DESCRIP	REPL	DAY	TEMP	DO	COND	pH	NH3	HARD	ALK
6	1101G	NW1-071807	8	0	22.8	7.2	160	6.2	0.3	51	40
15	1142G	Control	8	0	23.0	7.4	170	6.3	0.3	51	50
16	1107G	NW7-071809	8	0	22.9	7.4	155	6.3	0.3	51	50
6	1101G	NW1-071807	8	1	22.6	7.1					
15	1142G	Control	8	1	22.4	7.2					
16	1107G	NW7-071809	8	1	22.5	7.2					
6	1101G	NW1-071807	8	2	22.9	7.1					
15	1142G	Control	8	2	23.0	7.2					
16	1107G	NW7-071809	8	2	22.8	7.2					
6	1101G	NW1-071807	8	3	23.0	7.2					
15	1142G	Control	8	3	23.1	7.2					
16	1107G	NW7-071809	8	3	22.9	7.0					
6	1101G	NW1-071807	8	4	23.2	7.1					
15	1142G	Control	8	4	23.3	7.0					
16	1107G	NW7-071809	8	4	23.1	7.1					
6	1101G	NW1-071807	8	5	22.8	7.1					
15	1142G	Control	8	5	23.0	7.2					
16	1107G	NW7-071809	8	5	22.7	6.7					
6	1101G	NW1-071807	8	6	22.7	6.4					
15	1142G	Control	8	6	22.9	6.7					
16	1107G	NW7-071809	8	6	22.7	6.1					
6	1101G	NW1-071807	8	7	22.3	7.1					
15	1142G	Control	8	7	22.5	6.8					
16	1107G	NW7-071809	8	7	22.4	6.6					
6	1101G	NW1-071807	8	8	22.2	6.5					
15	1142G	Control	8	8	22.3	6.8					
16	1107G	NW7-071809	8	8	22.2	6.1					
6	1101G	NW1-071807	8	9	22.2	6.2					
15	1142G	Control	8	9	22.4	5.6					
16	1107G	NW7-071809	8	9	22.2	5.6					
6	1101G	NW1-071807	8	10	22.1	7.3	165	7.0	0.2	51	40
15	1142G	Control	8	10	22.2	7.2	170	7.0	0.2	51	40
16	1107G	NW7-071809	8	10	22.0	7.2	170	7.0	0.1	51	40
Mean					22.6	6.9	165	6.6	0.2	51	43
SD					0.4	0.5	6	0.4	0.1	0	5
n					33	33	6	6	6	6	6
Min					22.0	5.6	155	6.2	0.1	51	40
Max					23.3	7.4	170	7.0	0.3	51	50

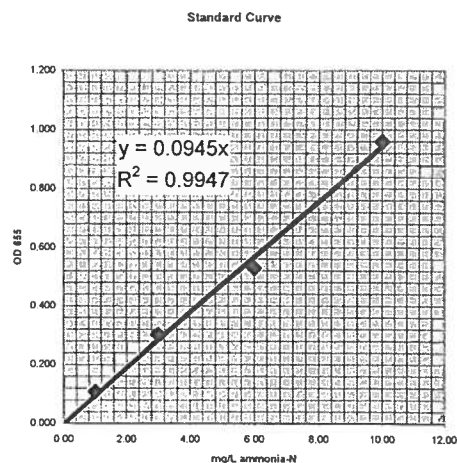
AMMONIA EXPOSURE BENCHSHEETS AND ANALYSIS

Total Ammonia-N in Water: Computation Worksheet

Salicylate Method (SOP #5492)

Result

Sample description	Dilution factor	OD ₆₅₅	NH ₃ -N (mg/L)
Blank	----	----	----
1.0 mg/L NH ₃ -N Std.	----	0.108	1.00
3.0 mg/L NH ₃ -N Std.	----	0.302	3.00
6.0 mg/L NH ₃ -N Std.	----	0.530	6.00
10.0 mg/L NH ₃ -N Std.	----	0.960	10.00
3.0 mg/L spike	----	0.285	3.01
3.0 mg/L spike dupl.	----	0.312	3.30
5.0 mg/L 2nd source	----	0.420	4.44



1.	Day 0 (8/31/07)			
2.	6	1	0.026	0.27
3.	15	1	0.025	0.26
4.	16	1	0.028	0.30

6.	Day 10 (9/10/07)			
7.	6	1	0.015	0.16
8.	15	1	0.015	0.16
9.	16	1	0.013	0.14

Reporting limit (mg/L) = 0.1

Recovery (%) = 105.1

Precision (RPD) = -9.05

2nd source (%) = 88.8

Sample volume (ml): 0.50

Dilution factor 1

Sample Set Description:

Test No.: 762-6

Test Day: 0 & 10

Species: *Hyalella azteca*

Proj. No.: P762

Overlying water

Analyst: MSR

Date analysed: 9/17/07

Total Ammonia-N in Water: Computation Worksheet				
Salicylate Method (SOP #5492)				
Result				
Sample description	Dilution factor	OD ₆₅₅	NH ₃ -N (mg/L)	
Blank	-----	-----	-----	
1.0 mg/L NH ₃ -N Std.	-----	0.108	1.00	
3.0 mg/L NH ₃ -N Std.	-----	0.302	3.00	
6.0 mg/L NH ₃ -N Std.	-----	0.153	6.00	
10.0 mg/L NH ₃ -N Std.	-----	0.96	10.00	
3.0 mg/L spike	-----	0.285		
3.0 mg/L spike dupl.	-----	0.312		
5.0 mg/L 2nd source	-----	0.420		
1. Day 0 (8-31-07)				
2. 6	1	0.026		
3. 15	1	0.025		
4. 16	1	0.028		
5. Day 10 (9-10-07)				
6. 6	1	0.015		
7. 15	1	0.015		
8. 16	1	0.013		
9.				
10.				
11.				
12.				
13.				
14.				
15.				
16.				
17.				
18.				
19.				
20.				
21.				
22.				
23.				
24.				
25.				
26.				
27.				
28.				
29.				
30.				
31.				
32.				
33.				
34.				
35.				
36.				

Standard Curve

Reporting limit (mg/L) =	0.1
Recovery (%) =	#VALUE!
Precision (RPD) =	#VALUE!
2nd source (%) =	#VALUE!
Sample volume (ml):	0.50
Dilution factor	1
Sample Set Description:	
Test No.:	762-6
Test Day:	0 & 10
Species:	<i>Hyaella azteca</i>
Proj. No.:	P762
Overlying water	
Analyst:	MLR
Date analysed:	9-17-07

CHAIN-OF-CUSTODY RECORDS

CHAIN OF CUSTODY RECORD

Northwestern Aquatic Sciences

3814 Yaquina Bay Rd., P.O. Box 1437, Newport, OR 97365
Tel: 541-265-7225, Fax: 541-265-2799 www.nwaquatic.com



Client Name David E King Kleinfelder, Inc		Project No. 53886		Shipping Information		Testing Required			
Address 19250 SW Kai Pkwy		Phone No. 503-644-9447		Carrier: Airbill No.					
City, State, Zip code Beaverton, OR 97050		Report Attention Dave King							
Lab Sample No.	Date Sampled	Time Sampled	Sampled by Scott Shoemaker / Crijan King	Sample Description	Number of Containers	BioAssay chambers	BioAssay chambers	IC Chest Interval	Comments
10996	7/14/07	1400		LWS-071907 (REF SEDIMENT)	3	+		18.0	5 gallon Buckets
11006	7/18/07	1500		Northwestern Lake	3	+		18.0	↓
11016		1000		NW1-071807	3			5.0	32oz Jar
11026		1120		NW2-071807	3				
11036		1230		NW3-071807	3				
11046		1300		NW4-071807	3				
11056		1340		NW5-071807	3			4.0	
11066		1420		NW6-071807	3				
11076	↓	1500		NW7-071807	3				↓
									H = hold until further notice
Signature Scott Shoemaker		Print Name Scott Shoemaker		Company Kleinfelder, Inc.		Date 7/20/07		Time 1055	
Relinquished by Scott Shoemaker								Cooler Custody Seal Present / Not Present Intact / Not Intact.	
Received by									
Relinquished by								Internal Cooler Temperature Upon Lab Receipt (°C)	
Received by									
Relinquished by									
Received by laboratory Shalala Manani		GERALD RISSARI		NORTHWESTERN AQUATIC SCIENCES		7/20/07		1055	

APPENDIX III

RAW DATA – REFERENCE TOXICANT TEST

REVIEWED
PAGES 1-7
-631

ACUTE TOXICITY TEST (ALL SPECIES)

Test No. 999-2320 Client _____ QC Test _____ Investigator _____

TEST ORGANISMS

Species: *Hyalella azteca*Age: 5-6 DAYS Size: _____Source: Chesapeake Cultures, Hayes, VADate received: 8-29-07

Acclimation Data:

Date	Temp. (deg.C)	DO (mg/L)	pH	Cond. umhos/cm	Hardness (mg/L)	Alkalinity (mg/L)	Feeding		Water changes
							Amount	description	
8-29-07	22.1	>15.0	7.4	395	111	210	10 mL	YTC	YES
8-30-07	22.5	8.5	8.1	285	103	140	10 mL	YTC	YES
8-31-07	22.4	8.4	7.8	260	94	100	-	-	-
Mean	22.3	10.6	7.8	313	103	150			
S.D.	0.2	3.8	0.7	72	9	56			
(N)	3	3	3	3	3	3			

Photoperiod during acclimation: 16:8, L:D

TEST PROCEDURES AND CONDITIONS

Test concentrations (50% series recommended): 1, 0.5, 0.25, 0.125, 0.063 0 g/LTest chamber: 250 ml glass beakersTest volume: 100 mlReplicates/treatment: 2Organisms/treatment: 20 (10/rep)Test water changes: NoneAeration during test: NoneFeeding: 0.5 ml YTC suspension per beaker on days 0 and 2Duration: 24-hr, 48-hr, 96-hrTest temperature (deg.C): 23 ± 1 or 20 ± 1

Beaker placement: Stratified randomization

Photoperiod: 16:8, L:D

MISCELLANEOUS NOTES

Test solution preparation:

Working stock: Dissolve 0.5g KCl crystals in dilution water and dilute to 500 mL.

Final conc.: 1.0 g/L.

	Test concentration (g/L)	KCl working stock (ml/200ml)	Dilution water
8-31-07 631	1	200	Brought up to
	0.5	100	final volume of
	0.25	50	200 ml with
	0.125	25	dilution water
	0.063	12.5	and distributed
	0	0	evenly between
			two replicates

NORTHWESTERN AQUATIC SCIENCES
ACUTE TOXICITY TEST (ALL SPECIES)

PROTOCOL NO. NAS-_____

Test No. 999-2320 Client _____

QC Test

DAILY RECORD SHEET

Day 0 (8/31/07) 643

Conc. (g/L)	Temp. (deg.C)	DO (ppm)	Cond. (umhos/cm)	pH	Hardness (mg/L)	Alkalinity (mg/L)	Survivors	
							A	B
1. 1	23.1	8.5	1735	7.8	94	80	10	10
2. 0.5	23.0	8.7	1035	7.8			10	10
3. 0.25	23.0	8.9	660	7.8			10	10
4. 0.125	23.1	8.6	475	7.8			10	10
5. 0.063	23.0	8.7	375	7.8			10	10
6. 0	23.1	8.6	280	7.8	94	80	10	10

All animals fed 0.5 ml YTC suspension. Initials: 643

Day 1 (9/1/07) 643

Conc. (g/L)	Temp. (deg.C)	DO (ppm)	Cond. (umhos/cm)	pH	Hardness (mg/L)	Alkalinity (mg/L)	Survivors	
							A	B
1. 1	22.3	8.6	1680	7.7			9(60)	5(50)
2. 0.5	22.2	8.7	1010	7.7			8(20)	10
3. 0.25	22.3	8.6	660	7.7			10	10
4. 0.125	22.3	8.4	480	7.6			10	10
5. 0.063	22.3	8.7	380	7.6			10	10
6. 0	22.2	8.5	285	7.6			10	10

Day 2 (9/2/07) 651

Conc. (g/L)	Temp. (deg.C)	DO (ppm)	Cond. (umhos/cm)	pH	Hardness (mg/L)	Alkalinity (mg/L)	Survivors	
							A	B
1. 1	23.1	7.6	1830	7.6			2(20)	0(50)
2. 0.5	23.1	7.6	1065	7.5			4(40)	6(40)
3. 0.25	23.1	7.7	710	7.5			10	9(M)
4. 0.125	23.1	7.7	510	7.4			10	10
5. 0.063	23.1	7.8	410	7.4			10	10
6. 0	23.1	7.8	295	7.3			10	10

All animals fed 0.5 ml YTC suspension. Initials: 651

Day 3 (9/3/07) 651

Conc. (g/L)	Temp. (deg.C)	DO (ppm)	Cond. (umhos/cm)	pH	Hardness (mg/L)	Alkalinity (mg/L)	Survivors	
							A	B
1. 1	23.3	7.7	1870	7.8			0(20)	0
2. 0.5	23.4	7.6	1075	7.7			2(20)	5(10)
3. 0.25	23.3	7.7	725	7.6			9(1M)	9
4. 0.125	23.3	7.8	515	7.6			10	10
5. 0.063	23.2	7.8	430	7.6			10	10
6. 0	23.3	7.6	315	7.5			10	10

Day 4 (9/4/07) 651

Conc. (g/L)	Temp. (deg.C)	DO (ppm)	Cond. (umhos/cm)	pH	Hardness (mg/L)	Alkalinity (mg/L)	Survivors	
							A	B
1. 1	—	—	—	—	—	—	0	0
2. 0.5	23.5	7.5	1090	7.7			0(20)	2(30)
3. 0.25	23.5	7.6	730	7.6			9	9
4. 0.125	23.4	7.8	520	7.6			10	10
5. 0.063	23.4	7.7	425	7.5			10	10
6. 0	23.4	7.7	310	7.6	86	80	10	9(1M)

Mean 23.0 8.1 — 7.6 91 80
SD 0.4 0.5 — 0.1 5 0
n 29 29 — 29 3 3

Chesapeake Cultures

P.O. Box 507 Hayes, VA 23072 (804)693-4046 (804)694-4704 fax

www.c-cultures.com

growfish@c-cultures.com

NAS Shipment Information

Species Hyaulia azteca

Date 8/28/07

Size/
Age 4-5 d; ~1.5 mm

P.O. No. verbal

Quantity 470+

Invoice No. 5853

Temperature 24°C Salinity — pH 7.96

Notes Thank you!

Biologist Ernst Mullins

* Please inspect shipment and report any problem immediately *

Rec'd 8-29-07 sf

Acute 96-hr Toxicity Test-96 Hr Survival

Start Date: 8/31/2007 09:15 Test ID: 999-2320 Sample ID: REF-Ref Toxicant
End Date: 9/4/2007 10:50 Lab ID: ORNAS-Northwestern Aquati Sample Type: KCL-Potassium chloride
Sample Date: Protocol: EPAA 91-EPA Acute Test Species: HA-Hyaella azteca
Comments:

Conc-gm/L	1	2
D-Control	1.0000	0.9000
0.063	1.0000	1.0000
0.125	1.0000	1.0000
0.25	0.9000	0.9000
0.5	0.0000	0.2000
1	0.0000	0.0000

Conc-gm/L	Mean	N-Mean	Transform: Arcsin Square Root					N	Number Resp	Total Number
			Mean	Min	Max	CV%				
D-Control	0.9500	1.0000	1.3305	1.2490	1.4120	8.661	2		1	20
0.063	1.0000	1.0526	1.4120	1.4120	1.4120	0.000	2		0	20
0.125	1.0000	1.0526	1.4120	1.4120	1.4120	0.000	2		0	20
0.25	0.9000	0.9474	1.2490	1.2490	1.2490	0.000	2		2	20
0.5	0.1000	0.1053	0.3112	0.1588	0.4636	69.269	2		18	20
1	0.0000	0.0000	0.1588	0.1588	0.1588	0.000	2		20	20

Auxiliary Tests

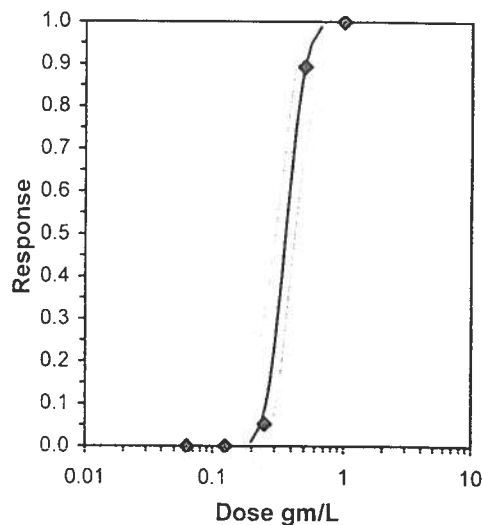
Normality of the data set cannot be confirmed
Equality of variance cannot be confirmed

Statistic Critical Skew Kurt

Maximum Likelihood-Probit

Parameter	Value	SE	95% Fiducial Limits		Control	Chi-Sq	Critical	P-value	Mu	Sigma	Iter
Slope	8.79953	1.95227	4.97309	12.626	0.05	0.67994	7.81472	0.88	-0.4457	0.11364	3
Intercept	8.92229	0.89093	7.17605	10.6685							
TSCR	0.01668	0.01655	-0.0158	0.04912							

Point	Probits	gm/L	95% Fiducial Limits	
EC01	2.674	0.19493	0.11369	0.24665
EC05	3.355	0.23299	0.15399	0.2827
EC10	3.718	0.25623	0.18041	0.30507
EC15	3.964	0.2732	0.20031	0.32185
EC20	4.158	0.28749	0.2173	0.33642
EC25	4.326	0.30034	0.23266	0.35001
EC40	4.747	0.33533	0.27391	0.39015
EC50	5.000	0.35831	0.29974	0.41985
EC60	5.253	0.38287	0.32564	0.45511
EC75	5.674	0.42748	0.36776	0.52885
EC80	5.842	0.44659	0.38409	0.56402
EC85	6.036	0.46994	0.40297	0.60964
EC90	6.282	0.50107	0.42663	0.67451
EC95	6.645	0.55104	0.46203	0.7874
EC99	7.326	0.65862	0.53154	1.06255



Test: AT-Acute 96-hr Toxicity Test

Test ID: 999-2320

Species: HA-Hyalella azteca

Protocol: EPAA 91-EPA Acute

Sample ID: REF-Ref Toxicant

Sample Type: KCL-Potassium chloride

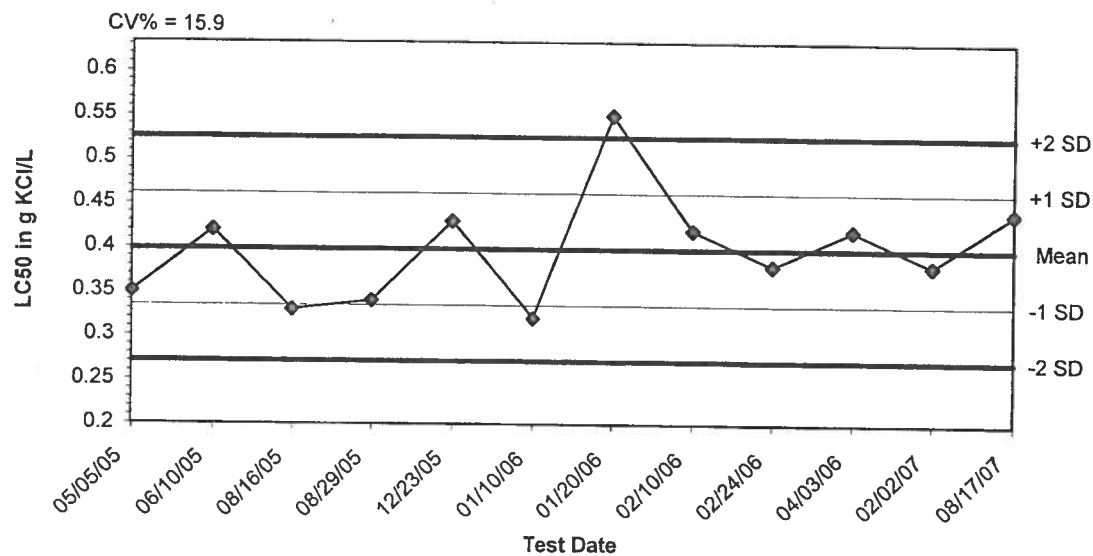
Start Date: 8/31/2007 09:15

End Date: 9/4/2007 10:50 Lab ID: ORNAS-Northwestern Aquatic Sciences

Pos	ID	Rep	Group	Start	24 Hr	48 Hr	72 Hr	96 Hr	Notes
	1	1	D-Control	10	10	10	10	10	
	2	2	D-Control	10	10	10	10	9	
	3	1	0.063	10	10	10	10	10	
	4	2	0.063	10	10	10	10	10	
	5	1	0.125	10	10	10	10	10	
	6	2	0.125	10	10	10	10	10	
	7	1	0.250	10	10	10	9	9	
	8	2	0.250	10	10	9	9	9	
	9	1	0.500	10	8	4	2	0	
	10	2	0.500	10	10	6	5	2	
	11	1	1.000	10	4	2	0	0	
	12	2	1.000	10	5	0	0	0	

Comments:

Amphipod, *Hyalella azteca*, acute reference toxicant test - all points



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
05/05/05	0.3500	0.3983	0.3348	0.2713	0.4618	0.5254
06/10/05	0.4200	0.3983	0.3348	0.2713	0.4618	0.5254
08/16/05	0.3300	0.3983	0.3348	0.2713	0.4618	0.5254
08/29/05	0.3400	0.3983	0.3348	0.2713	0.4618	0.5254
12/23/05	0.4300	0.3983	0.3348	0.2713	0.4618	0.5254
01/10/06	0.3200	0.3983	0.3348	0.2713	0.4618	0.5254
01/20/06	0.5500	0.3983	0.3348	0.2713	0.4618	0.5254
02/10/06	0.4200	0.3983	0.3348	0.2713	0.4618	0.5254
02/24/06	0.3800	0.3983	0.3348	0.2713	0.4618	0.5254
04/03/06	0.4200	0.3983	0.3348	0.2713	0.4618	0.5254
02/02/07	0.3800	0.3983	0.3348	0.2713	0.4618	0.5254
08/17/07	0.4400	0.3983	0.3348	0.2713	0.4618	0.5254

msk
9-18-07

SECTION B

Midge (*Chironomus dilutus*) sediment bioassay 762-7 data report

TOXICITY TEST REPORT**TEST IDENTIFICATION**

Test No.: 762-7

Title: Toxicity of freshwater sediments using a 10-day midge, *Chironomus dilutus* (formerly *C. tentans*), sediment bioassay as part of the Supplemental Mercury Re-Evaluation for the Northwestern Lake Sediment Characterization Condit Dam Removal Project (FERC No.2342), White Salmon, Washington, Kleinfelder Project No. 58336 / 4.

Protocol No.: NAS-XXX-CT4b, April 7, 1998. Revision 1 (10-28-03). Based on ASTM 2001 (Standard test methods for measuring the toxicity of sediment-associated contaminants with fresh water invertebrates, E1706-00), Am. Soc. Test. Mat., Phila., PA, and EPA Method 100.2 (Methods for measuring the toxicity and bioaccumulation of sediment-associated contaminants with freshwater invertebrates, EPA/600/R-99/064).

STUDY MANAGEMENT

Study Sponsor: Squier | Kleinfelder, 15050 SW Koll Parkway, Suite L, Beaverton, OR 97006-6028

Sponsor's Study Monitor: Mr. David King

Testing Laboratory: Northwestern Aquatic Sciences, P.O. Box 1437, Newport, OR 97365

Test Location: Newport laboratory

Laboratory's Study Personnel: G.J. Irissarri, B.S., Proj. Man./Study Dir.; L.K. Nemeth, B.A., M.B.A., QA Officer; M.S. Redmond, M.S., Aq. Toxicologist; S.J. Gage, B.A., Sr. Tech.; G. Hutchinson, B.S., Tech. L.P. Sandoval, B.S., Tech.

Study Schedule:

Test Beginning: 8-31-07, 1015 hrs.

Test Ending: 9-10-07, 1010 hrs.

Disposition of Study Records: All specimens, raw data, reports and other study records are stored according to Good Laboratory Practice regulations at Northwestern Aquatic Sciences, 3814 Yaquina Bay Rd., Newport, OR 97365.

Good Laboratory Practices: The test was conducted following the principles of Good Laboratory Practices (GLP) as defined in the EPA/TSCA Good Laboratory Practice regulations revised August 17, 1989 (40 CFR Part 792).

Statement of Quality Assurance: The test data were reviewed by the Quality Assurance Unit to assure that the study was performed in accordance with the protocol and standard operating procedures. This report is an accurate reflection of the raw data.

TEST MATERIAL

Test Sediments: Freshwater test sediments collected as part the Supplemental Mercury Re-Evaluation for the Northwestern Lake Sediment Characterization Condit Dam Removal Project (FERC No.2342), White Salmon, Washington, Kleinfelder Project No. 58336 / 4. Details are as follows:

NAS Sample No.	1101G	1107G
Description	NW1-071807	NW7-071807
Collection Date	7/18/07	7/18/07
Receipt Date	7/20/07	7/20/07

Reference Sediment: The reference sediment used for comparative analysis was NW7-071807 (1107G).

Control Sediment: The negative control sediment (NAS#1142G) was collected on 8-15-07 from an area approximately one mile east of the Hwy. 101 bridge at Beaver Creek, approx. 8 miles south of Newport, OR.

Treatments: Homogenized at test set up by mixing using stainless steel implements.

Storage: All test, reference, and control sediments were stored at 4°C in the dark in sealed containers until used.

TEST WATER

Source: Dechlorinated municipal tap water, which is also used as culture water.

Dates of Preparation: 8-27-07, 8-31-07

Water Quality:

pH: 7.0 (n=2)
 conductivity: 143 (n=2) $\mu\text{mhos/cm}$
 hardness: 43 (n=2) mg/L as CaCO_3
 alkalinity: 40 (n=2) mg/L as CaCO_3 .
 total chlorine: <0.02 (n=2) mg/L

Pretreatment: Dechlorinated and aerated ≥ 24 hr.

TEST ORGANISMS

Species: *Chironomus dilutus* (formerly *C. tentans*), midge.

Size: 3rd instar, mean initial wt: 0.20 ± 0.02 mg

Source: NAS cultures, originally obtained from EPA, Duluth, MN.

Acclimation: Holding conditions prior to testing averaged: Temperature, $23.4 \pm 0.9^\circ\text{C}$; dissolved oxygen, 7.8 ± 0.3 mg/L; pH, 7.5 ± 0.3 ; conductivity, 178 ± 7 $\mu\text{mhos/cm}$; hardness, 51 mg/L as CaCO_3 ; and alkalinity, 50 mg/L as CaCO_3 . Photoperiod was 16:8, L:D. Half of the water in culture tanks was replaced twice weekly with dechlorinated municipal tap water during holding. Animals were fed Tetra Fin suspension and *Selenastrum*.

TEST PROCEDURES AND CONDITIONS

The following is an abbreviated statement of the test procedures and a statement of the test conditions actually employed. See the test protocol (Appendix I) for a more detailed description of the test procedures used in this study.

Test Chambers: 300 ml high-form glass beakers

Test Volumes: 100 ml sediment layer; 175 ml test water.

Replicates/Treatment: 8

Organisms/Treatment: 80

Water Volume Changes: 2 water volumes per day

Aeration: None.

Feeding: Animals were fed 1.5 ml of Tetra Fin suspension (1.5 ml contains 6 mg dry solids) per beaker daily.

Effects Criteria: 1) survival after 10 days, and 2) average individual biomass (based on ash-free dry weight) after 10 days. Death is defined as no visible movement or response to tactile stimulation. Missing organisms were considered to be dead.

Water Quality and Other Test Conditions: The temperature, dissolved oxygen, conductivity, pH, hardness, alkalinity and ammonia-nitrogen were measured in the overlying water of one replicate test container per treatment on days 0 and 10 of the test. Temperature and dissolved oxygen were measured daily in the overlying water of one replicate test container per treatment. Hardness and alkalinity were measured with titrimetric methods. Ammonia-N was measured using Hach reagents based on the salicylate (Clin. Chim. Acta 14:403, 1996) colorimetric method; samples were not distilled prior to analysis. The photoperiod was 16:8, L:D.

DATA ANALYSIS METHODS

Survival and individual biomass were calculated for each replicate as follows:

percent survival = $100 \times (\text{number surviving} / \text{initial number tested})$

average individual ash-free dry wt. = $(\text{ash-free dry wt.}) / \text{number weighed}$,

where:

ash-free dry wt. = dry weight of organisms recovered on day 10 – ashed dry weight, in mg

Means and standard deviations for the biological endpoints described above, and for water quality data, were computed using Microsoft Excel 2000. The values for mortality and individual ash-free dry wt for each test sediment were statistically compared against the reference sediment. Where appropriate, an arcsine square root transformation was performed on proportional mortality data before analysis. Following determination of normality and homogeneity of variances, a one-tailed Student T-test, Mann-Whitney or Approximate T test was

conducted at the 0.05 level of significance. The statistical software used was BioStat (Beta v.4.1 (EXCEL)) bioassay software developed by the U.S. Army Corps of Engineers, Seattle District.

PROTOCOL DEVIATIONS

None

REFERENCE TOXICANT TEST

The reference toxicant test is a multi-concentration toxicity test using potassium chloride, to evaluate the performance of the test organisms used in the sediment toxicity test. The performance is evaluated by comparing the results of this test with historical results obtained at the laboratory. A summary of the reference toxicant test result is given below. The reference toxicant test raw data are found in Appendix III.

Test No.: 999-2321

Reference Toxicant and Source: Potassium chloride (KCl), Fisher, Lot No. 045768.

Test Date: 8-31-07

Dilution Water Used: Moderately hard synthetic water prepared from Milli-Q® deionized water.

Result: 96-hr LC50, 6.60 g/L. This result is within the laboratory's control chart warning limits (3.89 to 7.44 g/L).

TEST RESULTS

Observations of water quality in the overlying water throughout the test are summarized in Table 1. A detailed tabulation of the water quality results by sample and test day can be found in Appendix II. The means and standard deviations of percent mortality and growth (ash-free dry wt.) of midges exposed for 10 days to sediments are summarized in Tables 2 and 3. Detailed data organized by sample and replicate, and summary statistics for these observations, are given in Appendix II.

All water quality observations of overlying water temperature and dissolved oxygen were within the protocol specified ranges. Ammonia-N in the overlying water ranged between 0.2 and 0.5 mg/L for all day 0 and day 10 measurements.

The test met the acceptability criteria specified in the *Northwest Regional Sediment Evaluation Framework – Interim Final* - September 2006 with 1.3% mean control mortality ($\leq 30\%$ required) and 5.0% reference sediment mean mortality ($\leq 30\%$ required) and a control mean ash-free dry weight of 0.74 mg per larvae (≥ 0.48 mg required) and reference mean ash-free dry weight of 0.76 mg per larvae ($\geq 80\%$ of the negative control, i.e. ≥ 0.59 mg, required). The reference toxicant (positive control) EC50 result was within the laboratory's control chart limits (6.60 g/L; control chart mean ± 2 S.D. = 5.67 ± 1.78).

Data interpretation was conducted as described in *Northwest Regional Sediment Evaluation Framework – Interim Final* - September 2006 (U.S. Army Corps of Engineers, Seattle District, Portland District, Walla Walla District, and Northwestern Division; U.S. Environmental Protection Agency, Region 10, Washington Department of Natural Resources, Washington Department of Ecology, Oregon Department of Environmental Ecology, Idaho Department of Environmental Quality, National Marine Fisheries Service, and U.S. Fish and Wildlife Service). For a test sediment to fail under the single hit rule, the mean test mortality must be greater than 20 percentage points over the reference sediment response and “statistically different” from the reference sediment. Alternatively, if the reduction in the mean individual biomass is greater than 40% than that of the mean reference weight and is statistically different from the reference then the one hit rule also applies. A “statistically different” response is defined in the “Evaluation Framework” as having a mortality or growth response that is greater than 20% difference from that of the control, and is statistically different ($\alpha = 0.05$) from that of the reference sediment. If either or both endpoints fail the guideline, the test is considered a hit.

The NW1-071807 (NAS#1101G) test sediment did not produce mortality or growth endpoint results that met the above Evaluation Framework requirements for failure under the one hit rule.

STUDY APPROVAL

Mald Lusiani 9-26-07
Project Manager/Study Director Date

Linda K. Demuth 9/24/07
Quality Assurance Unit Date

Linda K. Demuth 9/24/07
Laboratory Director Date
FOR R.S. CALDWELL

Table 1. Summary of water quality conditions during tests of the midge, *Chironomus dilutus*, exposed to freshwater sediments.

Water Quality Parameter	Mean $\pm$ S.D.	Minimum	Maximum	N
Temperature ($^{\circ}$ C)	22.5 $\pm$ 0.3	22.1	23.1	33
Dissolved oxygen (mg/L)	6.1 $\pm$ 1.0	3.4	7.4	33
Conductivity (μ mhos/cm)	164 $\pm$ 6	155	170	6
pH	6.5 $\pm$ 0.2	6.2	6.7	6
Hardness (mg/L as CaCO ₃)	51 $\pm$ 0	51	51	6
Alkalinity (mg/L as CaCO ₃)	42 $\pm$ 4	40	50	6
Total ammonia (mg/L)	0.3 $\pm$ 0.1	0.2	0.5	6

Table 2. Mortality results of *Chironomus* toxicity test and data interpretation using guidelines from the “Northwest Regional Sediment Evaluation Framework –Interim Final,” September 2006. For a test sediment to fail under the single hit rule using the mortality endpoint, the mean test mortality must be >20 percentage points over the reference sediment response, and “statistically different” from the reference sediment. A “statistically different” response is defined in the “Evaluation Framework” as having a response that is greater than 20% difference from that of the control, and is statistically different ($\alpha = 0.05$) from that of the reference sediment.

Sample description	Percent mortality (Mean $\pm$ SD)	Statistically significantly different than that of the reference?	Difference from negative control sediment	Difference from reference sediment	Failure under 1-hit rule?
Control (NAS# 1142G)	1.3 $\pm$ 3.5	---	---	---	---
NW1-071087 (NAS# 1101G)	3.8 $\pm$ 5.2	No	2.5%	-1.2%	No
NW7-071087 (NAS# 1107G) *	5.0 $\pm$ 5.3	---	---	---	---

*Reference sediment

Table 3. Growth results of *Chironomus* toxicity test and data interpretation using guidelines from the “Northwest Regional Sediment Evaluation Framework –Interim Final,” September 2006. For a test sediment to fail under the single hit rule using the growth endpoint, the mean test biomass must be reduced by >40% from the reference sediment response, and “statistically different” ($\alpha = 0.05$) from the reference sediment. A “statistically different” response is defined in the “Evaluation Framework” as having a response that is greater than 20% difference from that of the control, and is statistically different ($\alpha = 0.05$) from that of the reference sediment.

Sample description	Average ash-free dry wt/midge (mg) ¹ (Mean $\pm$ SD)	Statistically significantly different that that of the reference?	Greater than 20% difference (i.e. <0.59 mg) from that of the control?	Greater than 40% difference (i.e. <0.46 mg) from that of the reference?	Failure under 1-hit rule?
Control (NAS# 1142G)	0.74 $\pm$ 0.05	---	---	---	---
NW1-071087 (NAS# 1101G)	0.62 $\pm$ 0.05	Yes	No	No	No
NW7-071087 (NAS# 1107G) *	0.76 $\pm$ 0.05	---	---	---	---

¹ Pupae were not included in the sample to estimate ash-free dry weight (as per EPA/600/R-99/064, p. 59, section 12.3.8.2)

*Reference sediment

APPENDIX I
PROTOCOL

TEST PROTOCOL

**FRESHWATER MIDGE, CHIRONOMUS TENTANS,
10-DAY SEDIMENT TOXICITY TEST**

1. INTRODUCTION

1.1 Purpose of Study: The purpose of this study is to characterize the toxicity of freshwater sediments based on midge survival and growth using the midge, *Chironomus tentans*.

1.2 Referenced Method: This protocol is based on EPA Method 100.2 (EPA/600/R-99/064) and ASTM Method E 1706-00 (ASTM 2001).

1.3 Summary of Method: A summary of test conditions for the midge 10-day sediment toxicity test is tabulated below. The 10-day sediment toxicity test with *Chironomus tentans* is conducted at 23°C with a 16L:8D photoperiod at an illuminance of about 100-1000 lux. Test chambers are 300-mL high-form lipless beakers containing 100 mL of sediment and 175 mL of overlying water. Ten second to third-instar midges are used in each replicate (all organisms must be third instar or younger and at least 50% of the larvae must be third instar). The number of replicates/treatment depends on the objective of the test. Eight replicates are recommended for routine testing. Midges in each test chamber are fed 1.5 mL of a 4 g/L fish food flakes suspension daily. Each chamber receives two volume additions per day of overlying water. Overlying water can be culture water, well water, surface water, site water, or reconstituted water. Test endpoints include survival and/or growth.

2. STUDY MANAGEMENT

2.1 Sponsor's Name and Address:

2.2 Sponsor's Study Monitor:

2.3 Name of Testing Laboratory:

Northwestern Aquatic Sciences
3814 Yaquina Bay Road, P.O. Box 1437
Newport, OR 97365.

2.4 Test Location: _____

2.5 Laboratory's Personnel to be Assigned to the Study:

Study Director: _____
Quality Assurance Unit: _____
Aquatic Toxicologist: _____
Aquatic Toxicologist: _____

2.6 Proposed Testing Schedule: Tests are to begin within 14 days of sample collection. Eight week holding times may apply in some circumstances. Reference toxicant test to be run concurrently.

2.7 Good Laboratory Practices: The test is conducted following the principles of Good Laboratory Practices (GLP) as defined in the EPA/TSCA Good Laboratory Practice regulations revised August 17, 1989 (40 CFR Part 792).

3. TEST MATERIAL

The test materials are freshwater sediments. The control, reference, and test sediments are placed in solvent cleaned 1 L glass jars fitted with PTFE-lined screw caps. At the laboratory the samples are stored at 4°C in the dark. The original sealed containers may be stored for up to 14 days prior to testing. Eight week holding times may apply in some circumstances. If jars are not full when received or if sediment is removed for testing, headspaces should be filled with nitrogen to retard deterioration. A negative control sediment is collected from a clean site. In addition, a reference sediment, a clean sediment with physical characteristics similar to the test sediments, may be employed as a comparison station.

4. TEST WATER

Test water (overlying water) at NAS is normally *C. tentans* culture water, which is moderately hard synthetic water at a hardness of 80-100 mg/L as CaCO₃ and alkalinity of 60-70 mg/L as CaCO₃. Dilution water is prepared from Milli-Q reagent grade water and reagent grade chemicals. Test water may also be well water, surface water or site water depending on the study design.

5. TEST ORGANISMS

5.1 Species: midge, *Chironomus tentans*.

5.2 Source: Cultured at NAS (Originally obtained from U.S. EPA Environmental Research Lab, Duluth, MN) or purchased from a reputable commercial supplier.

5.3 Age: Third instar or younger larvae (at least 50% of the larvae must be in the third instar at the start of the test). Third instar is normally 9 to 11 days after hatching; head capsule widths range from 0.33 to 0.45 mm; or length ranges from 4-6 mm; or dry weight ranges 0.08 to 0.23 mg/individual.

5.4 Acclimation and Pretest Observation: Cultures are maintained at 23 ± 1°C under a 16:8 L:D photoperiod. The culture water is moderately hard synthetic water. Midge are fed finely ground Tetrafin flakes in suspension (10g Tetrafin in 100 mL Milli-Q water). Mortality during the 48-hr prior to testing should not be excessive.

6. DESCRIPTION OF TEST SYSTEM

6.1 Test Chambers and Environmental Control: Test chambers used in the toxicity test are 300-mL high-form lipless glass beakers (Pyrex® 1040 or equivalent). Test chambers are maintained at constant temperature by partial immersion in a temperature-controlled water bath or by placement in a temperature-controlled room. Aeration is not employed unless dissolved oxygen drops below 2.5 mg/L. The test is conducted under an illuminance of 100 to 1000 lux with a 16L:8D photoperiod.

6.2 Cleaning: All laboratory glassware, including test chambers, is cleaned as described in EPA/600/4-90/027F. New glassware and test systems are soaked 15 minutes in tap water and scrubbed with detergent (or cleaned in automatic dishwasher); rinsed twice with tap water; carefully rinsed once with fresh, dilute (10%, V:V) hydrochloric or nitric acid to remove scale, metals, and bases; rinsed twice with deionized water; rinsed once with acetone to remove organic compounds (using a fume hood or canopy); and rinsed three times with deionized water. Test systems and chambers are rinsed again with dilution water just before use.

7. EXPERIMENTAL DESIGN AND TEST PROCEDURES

7.1 Experimental Design: The test involves exposure of midge larvae to test, control, and reference sediments. The sediments are placed on the bottom of the test containers and are overlain with test water. The test exposure is

for 10 days. The renewal of overlying water consists of two volume additions per day, either continuous or intermittent. Each treatment consists of eight replicate test containers, each containing 10 organisms. Test chamber positions are completely randomized. Test organisms are randomly distributed to the test chambers. Blind testing is normally used.

7.2 Setup of Test Containers: Sediments are homogenized and placed in test chambers on the day before addition of test organisms. Sediment (100 ml) is placed into each of eight replicate beakers. After addition of the sediment, 175 ml of test water is gently added to each beaker in a manner to prevent resuspension. The overlying water is replaced twice daily. The test begins when midges are introduced to the test chambers. Initial water quality measurements are taken prior to the addition of test organisms.

7.3 Effect Criterion: The acute effect criterion used in the midge bioassay is mortality, defined as the lack of movement of body or appendages on response to tactile stimulation. The optional chronic effect criterion is growth which is determined by using dry weight measurements.

7.4 Test Conditions: No aeration is employed unless dissolved oxygen falls below 2.5 mg/L. The test temperature employed is 23°C (range of $\pm 1^\circ\text{C}$). A 16:8, L:D photoperiod is used. Illumination is supplied by daylight fluorescent lamps at 100-1000 lux. The overlying water is replaced twice daily.

7.5 Beginning the Test: The test is begun by adding the organisms to the equilibrated test containers as previously described. Three extra replicates of midge larvae should be counted out and randomly selected for drying to determine initial average weight and instar data.

7.6 Feeding: Midge larvae are fed 1.5 mL daily per test chamber (1.5 mL contains 6.0 mg of dry solids). A feeding may be skipped if there is a build up of excess food. However, all beakers must be treated similarly.

7.7 Test Duration, Type and Frequency of Observations, and Methods: The duration of the acute toxicity test is 10 days. The type and frequency of observations to be made are summarized as follows:

Type Of Observation	Times Of Observation
Biological Data	
Survival, growth	Day 10
Physical And Chemical Data	
Hardness, alkalinity, ammonia-N, conductivity, pH, dissolved oxygen, and temperature	Beginning and end of test in overlying water of one replicate beaker from each treatment.
Dissolved oxygen, temperature	Daily in overlying water of one replicate beaker from each treatment.

Dissolved oxygen is measured using a polarographic oxygen probe calibrated according to the manufacturer's recommendations. The pH is measured using a pH probe and a properly calibrated meter with scale divisions of 0.1 pH units. Temperature is measured with a calibrated mercury thermometer or telethermometer. Conductivity is measured with a conductivity meter. Hardness and alkalinity are measured using titrimetric methods. Ammonia-nitrogen is measured using the salicylate colorimetric method (Clin. Chim. Acta 14:403, 1996).

7.8 Growth Measurement: Growth is measured as ash-free dry weight (AFDW) of animals in a test replicate at the end of the test on day 10. Pooled animals from each test replicate are rinsed with deionized water, gently blotted and placed into tared aluminum weigh pans. The pans are dried at 60-90°C to constant weight. The dried organisms are placed into a dessicator and weighed as soon as possible to the nearest 0.01 mg (desirable to use 0.001 mg). The total weight of the dried midge in each pan is divided by the number of midge weighed to obtain an average dry weight per midge. The dried larvae in the pan are then ashed at 550°C for two hours. The pan with the ashed larvae is then reweighed and the tissue mass of the larvae is determined as the difference between the weight

of the dried larvae plus pan and the weight of the ashed larvae plus pan. Pupae or adult organisms are not included in the sample to estimate AFDW.

8. CRITERIA OF TEST ACCEPTANCE:

The test results are acceptable if the minimum survival of organisms in the control treatment at the end of the test is at least 70% and the average ash-free dry weight of *C. tentans* in the surviving controls is at least 0.48 mg.

9. DATA ANALYSIS

The endpoints of the toxicity test are survival and growth. Survival is obtained as a direct count of living organisms in each test container at the end of the test. Average midge ash-free dry weight, also measured at the end of the test, may be used to compare growth between treatment sediments and the control or reference sediment. Ordinarily the following data analysis is performed. Due to special requirements, alternative methods may be used. The means and standard deviations are calculated for each treatment level. Identification of toxic sediments is established by statistical comparison of test endpoints between test and control or reference sediments. Between treatment comparisons may be made using a Student's t-test or Wilcoxon's Two-Sample test, where each treatment is compared to the control or the reference sediment. An arcsine-square root transformation of proportional data, and tests for normality and heterogeneity of variances, are performed prior to statistical comparisons.

10. REPORTING

The final report of the test results must include all of the following standard information at a minimum: name and identification of the test; the investigator and laboratory; date and time of test beginning and end; information on the test material; information on the source and quality of the overlying/test water; detailed information about the test organisms including acclimation conditions; a description of the experimental design and test chambers and other test conditions including feeding, if any, and water quality; definition of the effect criteria and other observations; responses, if any, in the control treatment; tabulation and statistical analysis of measured responses and a summary table of endpoints; a description of the statistical methods used; any unusual information about the test or deviations from procedures; reference toxicant testing information.

11. STUDY DESIGN ALTERATION

Amendments made to the protocol must be approved by the sponsor and study director and should include a description of the change, the reason for the change, the date the change took effect and the dated signatures of the study director and sponsor. Any deviations in the protocol must be described and recorded in the study raw data.

12. REFERENCE TOXICANT

The reference toxicant test is a standard multi-concentration toxicity test using a specified chemical toxicant to evaluate the performance of test organisms used in the study. Reference toxicant tests are 96-hour, water only exposures, not 10-day sediment exposures. The reference toxicant test is run concurrently. Performance is evaluated by comparing the results of the reference toxicant test with historical results (e.g., control charts) obtained at the laboratory.

13. REFERENCED GUIDELINES

ASTM. 2001. Standard Test Methods for Measuring the Toxicity of Sediment-associated Contaminants with Fresh water Invertebrates. ASTM Standard Method No. E 1706-00. Am. Soc. Test. Mat., Philadelphia, PA.

U.S. EPA. 2000. Section 12, Test Method 100.2, *Chironomus tentans* 10-d Survival and Growth Test for Sediments, pp. 55-62. In: Methods for Measuring the Toxicity and Bioaccumulation of Sediment-associated Contaminants with Freshwater Invertebrates (Second Edition). EPA/600/R-99/064.

Weber, C.I. (Ed.) 1993. Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms (Fourth Edition). EPA/600/4-90/027F.

14. APPROVALS

Name Date for _____

Name Date for Northwestern Aquatic Sciences

Appendix A
Test Conditions Summary

1. Test type	whole sediment toxicity test with renewal of overlying water
2. Test duration	10 days
3. Temperature	23 ± 1°C
4. Light quality	daylight fluorescent light
5. Illuminance	100-1000 lux
6. Photoperiod	16L:8D
7. Test chamber size	300-mL high-form lipless beakers (Pyrex® 1040 or equivalent)
8. Sediment volume	100 mL
9. Overlying water volume	175 mL
10. Renewal overlying water	2 volume additions/day (continuous or intermittent)
11. Age of test organisms	2nd to 3rd instar or younger larvae (≥ 50% of organisms must be 3rd instar)
12. Organisms per test chamber	10
13. Replicates per treatment	8 recommended for routine (depends on design)
14. Organisms per treatment	80
15. Feeding regime	Fish food flakes, fed 1.5 mL chamber (1.5 mL contains 6.0 mg of dry solids) daily on days 0 - 9.
16. Aeration	None, unless DO falls below 2.5 mg/L.
17. Overlying (test) water	Culture water , well water, surface water, site water or reconstituted water
18. Water quality	Hardness, alkalinity, conductivity, pH, ammonia-N beginning and end; temperature and DO daily
19. Endpoints	Survival and growth (dry weight)
20. Test acceptability criteria	Minimum control survival of 70%; mean weight of surviving control organisms 0.48 mg AFDW
21. Sample holding	≤14 days at 4°C in the dark Longer under certain conditions
22. Sample volume required	1L (800 mL per sediment)
23. Reference toxicant	Concurrent testing required

APPENDIX II

RAW DATA

**TEST DESCRIPTION, MONITORING, AND RESULTS
BENCHSHEETS**

Test No. 762-7 Client Squier Kleinfelder

Investigator

REVIEWED
PAGE 1-20
-631**STUDY MANAGEMENT**Client: Squier | Kleinfelder, 15050 SW Koll Parkway, Suite L, Beaverton, OR 97006Client's Study Monitor: Mr. David KingTesting Laboratory: Northwestern Aquatic SciencesTest Location: Newport Laboratory

Laboratory's Study Personnel:

Proj. Man./Study Dir. G.J. Irissari ⁶³¹QA Officer L.K. Nemeth1. GA Buhler ^{um}3. Greg Hethison ^{GH}5. Susan Gape ^{sf}2. Mrs. Redmond MSL4. Lidia P. Jandova ^{LPS}

6.

8.

Study Schedule:

Test Beginning: 8-31-07 1015Test Ending: 9-10-07 1010**TEST MATERIAL**General description (see sample logbook/chain-of-custody for details):

NAS Sample No.:	1142G	1101G	1107G ⁶³¹		
Description:	Control	NW1-071807	0042G ⁶³¹	NW7-071807	
Collection Date:	8/15/07	7/18/07		7/18/07	
Receipt Date:	8/15/07	7/20/07 ⁶³¹		7/20/07 ⁶³¹	
NAS Sample No.:					
Description:					
Collection Date:					
Receipt Date:					
NAS Sample No.:					
Description:					
Collection Date:					
Receipt Date:					
NAS Sample No.:					
Description:					
Collection Date:					
Receipt Date:					
NAS Sample No.:					
Description:					
Collection Date:					
Receipt Date:					

Error codes: 1) correction of handwriting error

2) written in wrong location; entry deleted

3) wrong date deleted, replaced with correct date

4) error found in measurement; measurement repeated

Test No. 762-7 Client Squier Kleinfelder Investigator _____

SEDIMENT DESCRIPTIONS -- SUPPLEMENTAL NOTES

[illegible]

CHIRONOMUS TENTANS. 10-DAY SOLID PHASE SEDIMENT TEST

Test No. 762-7 Client Squier Kleinfelder Investigator

TEST WATER

Source: Dechlorinated municipal tap waterDate of Collection: 8-27-07, 8-31-07pH 6.8, 7.1 $\bar{x} = 7.0$ Cond (umhos/cm²) 140, 145 $\bar{x} = 143$ Hardness (mg/L) 43, 43 $\bar{x} = 43$ Alkalinity (mg/L) 40, 40 $\bar{x} = 40$ Total Chlorine (mg/L) ALL < 0.02Treatments: Dechlorinated, aerated

TEST ORGANISMS

Species: Chironomus tentansAge: 3rd instarSource: NAS culturesDate received: n/a

Acclimation Data:

Date	Temp. (deg.C)	DO (mg/L)	pH	Cond. umhos/cm	Hardness (mg/L)	Alkalinity (mg/L)	Feeding	Water changes
8-17-07	23.4	8.0	7.6	180	-	-	Animals fed Tetra Fin	YES
8-20-07	24.5	7.8	7.6	175	-	-	and Selenastrum	YES
8-24-07	23.9	7.2	7.2	190	51	50	Details recorded on	YES
8-27-07	21.8	7.9	7.9	180	-	-	Chironomid culture	YES
8-29-07	23.5	7.9	7.4	170	51	50	data sheets	-
8-31-07	23.0	7.9	7.2	175	-	-		YES
Mean	23.4	7.8	7.5	178	51	50		
S.D.	0.9	0.3	0.3	7	-	-		
(N)	6	6	6	6	2	2		

Photoperiod during acclimation: 16:8, L:D

TEST PROCEDURES AND CONDITIONS

Test chambers: 300 ml glass beakers

Test volumes: 100 ml of test sediment; 275 ml total volume

Replicates/treatment: (8) 8 Organisms/treatment: (80) 80 (10/REP)

Test water changes: Twice daily

Aeration: only if DO falls below 2.5 mg/L

Beaker placement: Total randomization

Feeding: everyday beginning with day zero

Photoperiod: 16:8, L:D

Test temperature (°C): 23 ± 1

Control Sediment:

Source: From an area approximately one mile east of the Hwy. 101 bridge at Beaver Creek,
approx. 8 miles south of Newport, OR.Date collected: 8/15/07Sieved through 0.5 -mm screenStorage: darkness at 4°C, in sealed container NAS# 1142G

MISCELLANEOUS NOTES

Light intensity:

Date	Location	Measurement	Initials
8-31-07	BEAKER #8	81 FT. CANDLES	6j2

Test No. 762-7

Client

Squier Kleinfelder

Investigator

Test conducted in (circle one): room 1 room 2 trailer water bath other: _____

Randomization chart:

TOP SHELF

5	10	15	20						
4	9	14	19	24					
3	8	13	18	23					
2	7	12	17	22					
1	6	11	16	21					

Randomization chart:

Randomization chart:

Randomization chart:

Test No. 762-7 Client Squier Kleinfelder Investigator _____

DAILY RECORD SHEET

Day 0 (8 / 31 / 0703)

[illegible]

*Water quality measurements to be taken.

Day 1 (9/1/07) WS

[illegible]

*Water quality measurements to be taken.

Test No. 762-7 Client

Squier Kleinfelder

Investigator

DAILY RECORD SHEET

Day 2 (9 / 2 / 67) 651

[illegible]

*Water quality measurements to be taken.

Day 3 (9 / 3 / 07) 651

[illegible]

*Water quality measurements to be taken.

Test No. 762-7 Client Squier Kleinfelder Investigator _____

DAILY RECORD SHEET

Day 4 (9 / 4 / 07)

[illegible]

*Water quality measurements to be taken.

Day 5 (9/5/07) 425

[illegible]

*Water quality measurements to be taken.

Test No. 762-7 Client Squier Kleinfelder Investigator _____

DAILY RECORD SHEET

Day 6 (9/8 107+CM) LPS

[illegible]

*Water quality measurements to be taken.

Day 7 (9 17 07) 611

[illegible]

*Water quality measurements to be taken.

Squier Kleinfelder

Investigator

DAILY RECORD SHEET

Day 8 (9/8/07) sf

[illegible]

*Water quality measurements to be taken.

Day 9 (9/9/07) LPS

[illegible]

*Water quality measurements to be taken.

Test No. 762-7 Client Squier Kleinfelder Investigator _____

DAILY RECORD SHEET

Day 10 (9 / 10 / 07) bsi

[illegible]

*Water quality measurements to be taken.

Day _____ (/ /)

[illegible]

*Water quality measurements to be taken.

CHIRONOMUS TENTANS 10-DAY SOLID PHASE SEDIMENT TEST

Test No. 762-7 Client Squier Kleinfelder Investigator

DAY 10 TEST TERMINATION SHEET

Beaker No.	Number of survivors	Initials
1	9	6JL
2	10	6JL
3	9	6JL
4	10	6JL
5	10	6JL
6	9	6JL
7	10	6JL
8	10	6JL
9	9	6JL
10	10	6JL
11	10	6JL
12	10	6JL
13	10	6JL
14	9	6JL
15	10	6JL
16	10	6JL
17	9	6JL
18	10	6JL
19	9	6JL
20	10	6JL
21	10	6JL
22	9	6JL
23	10	6JL
24	10	6JL
25		
26		
27		
28		
29		
30		
31		
32		
33		
34		
35		
36		
37		
38		
39		
40		
41		
42		
43		
44		
45		

Beaker No.	Number of survivors	Initials
46		
47		
48		
49		
50		
51		
52		
53		
54		
55		
56		
57		
58		
59		
60		
61		
62		
63		
64		
65		
66		
67		
68		
69		
70		
71		
72		
73		
74		
75		
76		
77		
78		
79		
80		
81		
82		
83		
84		
85		
86		
87		
88		
89		
90		

CHIRONOMUS TENTANS 10-DAY SOLID PHASE SEDIMENT TEST

Test No. 762-7

Client

Squier Kleinfelder

Investigator

WEIGHING DATA SHEET

Tare: Date 9-7-07 Oven temp (C.) 550 Drying time (hr.) 2 Initials 631
 Standard Weights: 10 mg: 10.003 100mg: 100.017

Final #1: Date 9-11-07 Oven temp (C.) 62 Drying time (hr.) 24 Initials 632
 Standard Weights: 10 mg: 10.005 100mg: 100.019

Final #2: Date 9-12-07 Oven temp (C.) 62 Drying time (hr.) 26 Initials 631
 Standard Weights: 10 mg: 10.005 100mg: 100.018

Final #3: Date 9-14-07 Oven temp (C.) 550 Drying time (hr.) 2 Initials 632
 Standard Weights: 10 mg: 10.002 100mg: 100.015

Equip. used: Oven BLUE M #1, FISHER ISOTEMP MUFFLE FURNACE Balance SARTORIUS MSP
 (Dry overnight at 60-90 degrees C) (Final ashing is at 550 degrees C for 2 hours)

Bkr. #	Pan #	Tare wt. (mg)	Dry total wt. (mg)		no. weighed	put into pans-initials	Ash weight (mg)	Comments
			1	2				
1	1	81.56	91.07	90.95	9	AF	84.98	
2	2	84.62	93.64	93.50	10	AF	86.32	
3	3	83.01	94.05	93.92	9	AF	87.32	
4	4	85.40	95.33	95.21	10	AF	87.57	
5	5	84.41	93.89	93.77	10	AF	86.52	
6	6	83.17	93.94	93.82	9	AF	87.13	
7	7	76.04	86.03	85.93	10	AF	78.07	
8	8	83.72	96.83	96.69	10	AF	88.67	
9	9	80.53	89.60	89.50	9	AF	84.04	
10	10	80.69	89.61	89.51	10	AF	84.15	
11	11	86.95	98.45	98.34	10	AF	91.56	
12	12	78.89	87.51	87.41	10	AF	80.76	
13	13	91.30	102.05	101.94	10	AF	95.41	
14	14	84.33	94.09	93.98	9	AF	86.51	
15	15	85.94	98.21	98.09	10	AF	90.65	
16	16	81.41	91.42	91.32	10	AF	85.33	
17	17	79.53	91.90	91.78	9	AF	84.72	
18	18	82.52	92.15	92.05	10	AF	84.88	
19	19	85.45	98.32	98.21	9	AF	90.74	
20	20	87.53	100.58	100.46	10	AF	92.98	
21	21	78.08	87.01	86.91	10	AF	80.10	
22	22	81.69	90.31	90.23	9	AF	84.82	
23	23	80.27	92.18	92.06	10	AF	85.23	
24	24	75.57	85.95	85.85	10	AF	79.64	
25	25							
26	26							
27	27							
28	28							
29	29							
30	30							
31	31							
32	32							
33	33							

CHIRONOMUS TENTANS 10-DAY SOLID PHASE SEDIMENT TEST

Test No. 762-7 Client Squier Kleinfelder Investigator _____

Tare: Date 8-30-87 Oven temp (C.) 64 Drying time (hr.) 36 Initials GSJ
 Standard Weights: 10 mg: 10.006 100mg: 100.013

Final Date 9-4-87 Oven temp (C.) 62 Drying time (hr.) 24 Initials GSJ
 #1 Standard Weights: 10 mg: 10.004 100mg: 100.016

Final Date 9-6-87 Oven temp (C.) 62 Drying time (hr.) 24 Initials GSJ
 #2 Standard Weights: 10 mg: 10.004 100mg: 100.021

Equip. used: Oven: BLUE M #1 Balance: SARTORIUS M3P

(Dry overnight at 60-90 degrees C)

Pan #	Tare wt. (mg)	Total wt. (mg)		#weighed	
		1	2		
1	86.59	88.54	88.54	10	
2	81.65	83.88	83.87	10	
3	83.58	85.43	85.43	10	

TEST DATA ANALYSIS RECORDS

Endpoints Data Entry and Calculations File

pan #	INITIAL WEIGHT			wt count	avg wt/ organism
	tare wt (mg)	final wt (mg)	wt		
1	86.59	88.54	10	0.20	
2	81.65	83.87	10	0.22	
3	83.58	85.43	10	0.19	

Project Name: P765-7 Chironomus 10-day; % Mortality

Sample: x1
 Samp ID: NW1-071807
 Alias: NAS#1101G - X1
 Replicates: 8
 Mean: 3.75
 SD: 5.175
 Tr Mean: 6.913
 Trans SD: 9.541

Ref Samp: x2
 Ref ID: NW7-071807
 Alias: NAS#1107G - X2
 Replicates: 8
 Mean: 5
 SD: 5.345
 Tr Mean: 9.217
 Trans SD: 9.854

Shapiro-Wilk Results:	Levene's Results:	Test Results:
Residual Mean: 0 Residual SD: 8.325 SS: 1316.902 K: 8 b: 31.024 Alpha Level: 0.05 Calculated Value: 0.7309 Critical Value: ≤ 0.887 Normally Distributed: No Override Option: Not Invoked	Test Residual Mean: 8.641 Test Residual SD: 2.385 Ref. Residual Mean: 9.217 Ref. Residual SD: 0 Deg. of Freedom: 14 Alpha Level: 0.1 Calculated Value: 0.6831 Critical Value: ≥ 1.761 Variances Homogeneous: Yes	Statistic: Mann-Whitney Balanced Design: Yes Transformation: rank-order Experimental Hypothesis Null: $x1 \leq x2$ Alternate: $x1 > x2$ Mann-Whitney N1: 8 Mann-Whitney N2: 8 Degrees of Freedom: Experimental Alpha Level: 0.05 Calculated Value: 28 Critical Value: ≥ 49.0 Accept Null Hypothesis: Yes Power: Min. Difference for Power:

Replicate Number	Test Data	Trans. Test Data	Reference Data	Trans. Reference Data	Levene's Test Residuals	Levene's Reference Residuals	Mann-Whitney Ranks	Shapiro-Wilk Residuals
1	0	5	10	13	6.913	9.217	0	-9.217
2	10	13	10	13	11.522	9.217	0	-9.217
3	0	5	0	5	6.913	9.217	0	-9.217
4	0	5	0	5	6.913	9.217	0	-9.217
5	0	5	10	13	6.913	9.217	0	-6.913
6	10	13	0	5	11.522	9.217	0	-6.913
7	0	5	0	5	6.913	9.217	0	-6.913
8	10	13	10	13	11.522	9.217	0	-6.913
9							0	-6.913
10							0	-6.913
11							18.435	9.217
12							18.435	9.217
13							18.435	9.217
14							18.435	9.217
15							18.435	11.522
16							18.435	11.522

THE % MORTALITY OF NW1-071807 (NAS#1101G) WAS NOT SIGNIFICANTLY GREATER THAN THAT OF THE REFERENCE (NW7-071807) AT $\alpha = 0.05$.
 -652

Project Name: P765-7 Midge 10-d; ind.biomass (ash-free dry wt)

Sample: x1
 Samp ID: NW1-071807
 Alias: NAS#1101G - X1
 Replicates: 8
 Mean: 0.62
 SD: 0.044
 Tr Mean: 0.62
 Trans SD: 0.044

Ref Samp: x2
 Ref ID: NW7-071807
 Alias: NAS#1107G - X2
 Replicates: 8
 Mean: 0.756
 SD: 0.046
 Tr Mean: 0.756
 Trans SD: 0.046

Shapiro-Wilk Results:	Levene's Results:	Test Results:
Residual Mean: 0 Residual SD: 0.039 SS: 0.028 K: 8 b: 0.164 Alpha Level: 0.05 Calculated Value: 0.949 Critical Value: ≤ 0.887 Normally Distributed: Yes Override Option: N/A	Test Residual Mean: 0.033 Test Residual SD: 0.027 Ref. Residual Mean: 0.035 Ref. Residual SD: 0.027 Deg. of Freedom: 14 Alpha Level: 0.1 Calculated Value: 0.2109 Critical Value: ≥ 1.761 Variances Homogeneous: Yes	Statistic: Student's t Balanced Design: Yes Transformation: No Transformation Experimental Hypothesis Null: $x1 \geq x2$ Alternate: $x1 < x2$ Degrees of Freedom: 14 Experimental Alpha Level: 0.05 Calculated Value: 6.0516 Critical Value: ≥ 1.761 Accept Null Hypothesis: No Power: Min. Difference for Power:

Replicate Number	Test Data	Trans. Test Data	Reference Data	Trans. Reference Data	Levene's Test Residuals	Levene's Reference Residuals	Mann-Whitney Ranks	Rankits	Shapiro-Wilk Residuals
1	0.54	0.54	0.74	0.74	0.08	0.016			-0.08
2	0.6	0.6	0.73	0.73	0.02	0.026			-0.076
3	0.62	0.62	0.74	0.74	0	0.016			-0.026
4	0.65	0.65	0.8	0.8	0.03	0.044			-0.02
5	0.68	0.68	0.83	0.83	0.06	0.074			-0.02
6	0.61	0.61	0.68	0.68	0.01	0.076			-0.016
7	0.6	0.6	0.75	0.75	0.02	0.006			-0.016
8	0.66	0.66	0.78	0.78	0.04	0.024			-0.01
9									-0.006
10									0
11									0.024
12									0.03
13									0.04
14									0.044
15									0.06
16									0.074

THE MEAN INDIVIDUAL ASH-FREE DRY WT OF NW1-071807 (NAS# 1101G) WAS SIGNIFICANTLY LESS THAN THAT OF THE REFERENCE (NW7-071807) AT $\alpha = 0.05$

-61

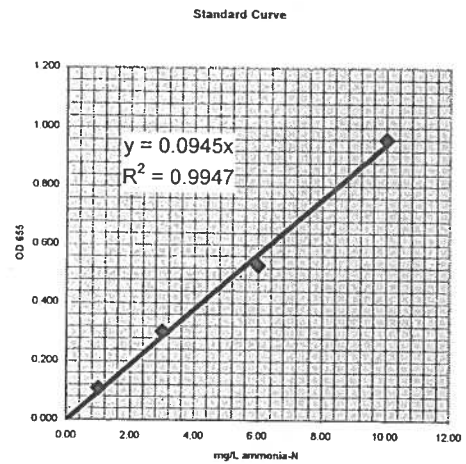
Water Quality Data											
NAS		CLIENT		Overlying water							
BKR	SMPL	DESCRIP	REPL	DAY	TEMP	DO	COND	pH	NH3	HARD	ALK
1	1101G	NW1-071807	8	0	22.8	7.3	160	6.2	0.2	51	40
17	1107G	NW7-071808	8	0	22.8	7.2	155	6.3	0.2	51	40
18	1142G	Control	8	0	22.9	7.4	170	6.5	0.5	51	50
1	1101G	NW1-071807	8	1	22.2	7.1					
17	1107G	NW7-071808	8	1	22.4	7.2					
18	1142G	Control	8	1	22.4	7.3					
1	1101G	NW1-071807	8	2	22.7	6.9					
17	1107G	NW7-071808	8	2	22.7	6.8					
18	1142G	Control	8	2	22.7	6.8					
1	1101G	NW1-071807	8	3	22.9	6.8					
17	1107G	NW7-071808	8	3	22.9	6.8					
18	1142G	Control	8	3	22.9	6.6					
1	1101G	NW1-071807	8	4	23.1	6.7					
17	1107G	NW7-071808	8	4	23.0	6.6					
18	1142G	Control	8	4	23.1	6.8					
1	1101G	NW1-071807	8	5	22.7	5.6					
17	1107G	NW7-071808	8	5	22.7	5.0					
18	1142G	Control	8	5	22.7	5.2					
1	1101G	NW1-071807	8	6	22.6	4.8					
17	1107G	NW7-071808	8	6	22.5	4.9					
18	1142G	Control	8	6	22.5	5.2					
1	1101G	NW1-071807	8	7	22.4	5.6					
17	1107G	NW7-071808	8	7	22.4	5.4					
18	1142G	Control	8	7	22.4	5.6					
1	1101G	NW1-071807	8	8	22.2	5.4					
17	1107G	NW7-071808	8	8	22.1	5.6					
18	1142G	Control	8	8	22.2	5.3					
1	1101G	NW1-071807	8	9	22.2	5.1					
17	1107G	NW7-071808	8	9	22.2	5.0					
18	1142G	Control	8	9	22.2	3.4					
1	1101G	NW1-071807	8	10	22.1	6.3	165	6.7	0.3	51	40
17	1107G	NW7-071808	8	10	22.1	6.1	170	6.7	0.3	51	40
18	1142G	Control	8	10	22.1	5.9	165	6.5	0.3	51	40
Mean					22.5	6.1	164	6.5	0.3	51	42
SD					0.3	1.0	6	0.2	0.1	0	4
n					33	33	6	6	6	6	6
Min					22.1	3.4	155	6.2	0.2	51	40
Max					23.1	7.4	170	6.7	0.5	51	50

AMMONIA EXPOSURE BENCHSHEETS AND ANALYSIS

Total Ammonia-N in Water: Computation Worksheet Salicylate Method (SOP #5492)

Result

Sample description	Dilution factor	OD ₆₅₅	NH ₃ -N (mg/L)
Blank	----	----	----
1.0 mg/L NH ₃ -N Std.	----	0.108	1.00
3.0 mg/L NH ₃ -N Std.	----	0.302	3.00
6.0 mg/L NH ₃ -N Std.	----	0.530	6.00
10.0 mg/L NH ₃ -N Std.	----	0.960	10.00
3.0 mg/L spike	----	0.285	3.01
3.0 mg/L spike dupl.	----	0.312	3.30
5.0 mg/L 2nd source	----	0.420	4.44



1.	Day 0 (8-31-07)			
2.	1	1	0.022	0.23
3.	17	1	0.020	0.21
4.	18	1	0.045	0.48
5.	Day 10 (9-10-07)			
6.	1	1	0.026	0.27
7.	17	1	0.030	0.32
8.	18	1	0.032	0.34

Reporting limit (mg/L) = 0.1

Recovery (%) = 105.1

Precision (RPD) = -9.05

2nd source (%) = 88.8

Sample volume (ml): 0.50

Dilution factor 1

Sample Set Description:

Test No.: 762-7

Test Day: 0 & 10

Species: *Chironomus dilutus*

Proj. No.: P762

Overlying water

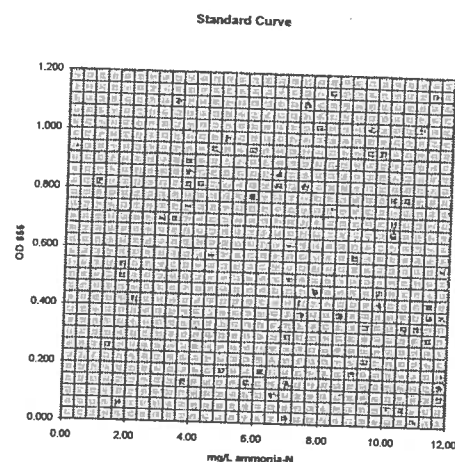
Analyst: MSR

Date analysed: 9/17/05

Total Ammonia-N in Water: Computation Worksheet **Salicylate Method (SOP #5492)**

Result

Sample description	Dilution factor	OD655	NH ₃ -N (mg/L)
Blank	-----	-----	-----
1.0 mg/L NH ₃ -N Std.	-----	0.108	1.00
3.0 mg/L NH ₃ -N Std.	-----	0.302	3.00
6.0 mg/L NH ₃ -N Std.	-----	0.53	6.00
10.0 mg/L NH ₃ -N Std.	-----	0.96	10.00
3.0 mg/L spike	-----	0.285	
3.0 mg/L spike dupl.	-----	0.312	
5.0 mg/L 2nd source	-----	0.420	



1.	Day 0 (8-31-07)		
2.	1	1	0.022
3.	17	1	0.020
4.	18	1	0.045
5.	Day 10 (9-10-07)		
6.	1	1	0.026
7.	17	1	0.030
8.	18	1	0.032

Reporting limit (mg/L) = 0.1

Recovery (%) = #VALUE!

Precision (RPD) = #VALUE!

2nd source (%) = #VALUE!

Sample volume (ml): 0.50

Dilution factor 1

Sample Set Description:

Test No.: 762-7

Test Day: 0 & 10

Species: *Chironomus dilutus*

Proj. No.: P762

Overlying water

Analyst:

Date analysed:

MLR

9-17-07

CHAIN-OF-CUSTODY RECORDS

Northwestern Aquatic Sciences



PAGE 20 OF 20

APPENDIX III

RAW DATA – REFERENCE TOXICANT TEST

Test No. 999-2321 Client: QC Test

Investigator

Test Type (range-finding/definitive)

Test Length (hr)

96

Species *Chironomus dilutus*REVIEWED
PAGE 1-7
-632

STUDY MANAGEMENT

Client: QC test

Client's Study Monitor: QC test

Testing Laboratory: Northwestern Aquatic Sciences

Test Location: Newport Laboratory

Laboratory's Study Personnel:

Proj. Man./Study Dir. G.J. Irissarri 632

QA Officer L. K. Nemeth

1. GABUNGA 43

2. M.S. Redmond MUR

3.

4.

Study Schedule:

Test Beginning: 8-31-07 0950

Test Ending: 9-4-07 1110

TEST MATERIAL

FISHER

Description: Potassium Chloride Crystals - Lot No.: 045768

NAS Sample No.

Date of Collection:

Date of Receipt:

Temperature (deg C):

Dissolved oxygen (mg/L):

pH:

Conductivity (umhos/cm):

Hardness (mg/L):

Alkalinity (mg/L):

Salinity (ppt):

Total chlorine (mg/L):

Total ammonia-N (mg/L):

DILUTION WATER

Description: Moderately hard synthetic water

Date of Preparation/Collection: 8-24-07

Water Quality: Cond. (umhos/cm): 260

Salinity (ppt) - pH 7.9

Hardness (mg/L as CaCO₃): 86Alkalinity (mg/L as CaCO₃): 70

Treatments: Aerated ≥ 24 hrs

TEST LOCATION

Test conducted in (circle one): room 1 room 2 trailer water bath other:

Randomization chart:

Error codes: 1) Correction of handwriting error

2) Written in wrong location; entry deleted

3) Wrong date deleted; replaced with correct date

4) Error found in measurement; measurement repeated

Test No. 999-2321 Client _____ QC Test _____ Investigator _____

TEST ORGANISMSSpecies: Chironomus dilutusAge: 3rd instarSource: NAS cultures

Date received: _____

Acclimation Data:

Date	Temp. (deg.C)	DO (mg/L)	pH	Cond. umhos/cm	Hardness (mg/L)	Alkalinity (mg/L)	Feeding	Water changes
8-17-07	23.4	8.0	7.6	180	-	-	Animals fed Tetra Fin	YES
8-20-07	24.5	7.8	7.6	175	-	-	and Selenastrum	YES
8-24-07	23.9	7.2	7.2	190	51	50	Details recorded on	YES
8-27-07	21.8	7.9	7.9	180	-	-	Chironomid culture	YES
8-29-07	23.5	7.9	7.4	170	51	50	data sheets	-
8-31-07	23.0	7.9	7.2	175	-	-		YES
Mean	23.4	7.8	7.5	178	51	50		
S.D.	0.9	0.3	0.3	7	0	0		
(N)	6	6	6	6	2	2		

Photoperiod during acclimation: 16:8, L:D**TEST PROCEDURES AND CONDITIONS**Test concentrations (50% series recommended): 20, 10, 5, 2.5, 1.25, 0 g/LTest chamber: 30 ml plastic cupsTest volume: 20 mlReplicates/treatment: 10Organisms/treatment: 10 (1/rep)Test water changes: NoneAeration during test: NoneFeeding: 0.25 ml Prime Tropical Flakes (4g/L) suspension per cup on days 0 and 2

Duration: 24-hr, 48-hr, 96-hr

Test temperature (deg.C): 23 ± 1Beaker placement: Stratified randomizationPhotoperiod: 16:8, L:D**MISCELLANEOUS NOTES**

Test solution preparation:

Working stock: Dissolve 10g KCl crystals in dilution water and dilute to 500 mL.

Final conc.: 20 g/L.

	Test concentration (g/L)	KCl working stock (ml/200ml)	ml of dilution water per 200 ml
8-31-07 bst	20	200	0
	10	100	100
	5	50	150
	2.5	25	175
	1.25	12.5	187.5
	0	0	0

NORTHWESTERN AQUATIC SCIENCES
ACUTE TOXICITY TEST (ALL SPECIES)

PROTOCOL NO. NAS-_____

Test No. 999-2321 Client _____

QC Test

DAILY RECORD SHEET

Day 0 (8/31/07) U3

Temp Beaker (°C): 23.3

Conc. (g/L)	Temp. (deg.C)	DO (ppm)	Cond. (umhos/cm)	pH	Hardness (mg/L)	Alkalinity (mg/L)	Comments
1. 20	23.6	8.4	14180	7.9	94	90	
2. 10	23.6	8.6	10450	7.9			
3. 5	23.6	8.5	6070	7.9			
4. 2.5	23.6	8.7	3470	7.9			
5. 1.25	23.6	8.6	1970	7.8			
6. 0	23.7	8.5	285	7.7	94	80	
All animals fed 0.25 ml Tetra Fin suspension. Initials: <u>U3</u>							

Day 1 (9/1/07) U3

Temp Beaker (°C): 22.1

Conc. (g/L)	Temp. (deg.C)	DO (ppm)	Cond. (umhos/cm)	pH	Hardness (mg/L)	Alkalinity (mg/L)	Comments
1. 20							
2. 10							
3. 5							
4. 2.5							
5. 1.25							
6. 0							

Day 2 (9/2/07) U3

Temp Beaker (°C): 23.1

Conc. (g/L)	Temp. (deg.C)	DO (ppm)	Cond. (umhos/cm)	pH	Hardness (mg/L)	Alkalinity (mg/L)	Comments
1. 20							
2. 10							
3. 5							
4. 2.5							
5. 1.25							
6. 0							
All animals fed 0.25 ml Tetra Fin suspension. Initials:							

Day 3 (9/3/07) U3

Temp Beaker (°C): 23.3

Conc. (g/L)	Temp. (deg.C)	DO (ppm)	Cond. (umhos/cm)	pH	Hardness (mg/L)	Alkalinity (mg/L)	Comments
1. 20							
2. 10							
3. 5							
4. 2.5							
5. 1.25							
6. 0							

Day 4 (9/4/07) U3

Temp Beaker (°C): 23.3

Conc. (g/L)	Temp. (deg.C)	DO (ppm)	Cond. (umhos/cm)	pH	Hardness (mg/L)	Alkalinity (mg/L)	Comments
1. 20	—	—	—	—	—	—	
2. 10	—	—	—	—	—	—	
3. 5	23.4	7.2	6180	7.6			
4. 2.5	23.4	7.2	3460	7.6			
5. 1.25	23.5	7.1	1960	7.5			
6. 0	23.5	7.1	330	7.4	111	90	

Mean 23.6 8.0 — 7.7 100 87
SD 0.1 0.7 — 0.2 10 6
n 10 10 — 10 3 3

ACUTE TOXICITY TEST (ALL SPECIES)

Test No. 999-2321 Client _____

QC Test _____

Investigator _____

DAILY RECORD SHEET - Survivors

Day 0 (8/31/07) 631

Conc. (g/L)	Survivors in Replicate:										Total
	1	2	3	4	5	6	7	8	9	10	
1. 20											10
2. 10											10
3. 5											10
4. 2.5											10
5. 1.25											10
6. 0											10

Day 1 (9/1/07) 02

Conc. (g/L)	Survivors in Replicate:										Total
	1	2	3	4	5	6	7	8	9	10	
1. 20											10
2. 10											10
3. 5											10
4. 2.5											10
5. 1.25											10
6. 0											10

Day 2 (9/2/07) 631

Conc. (g/L)	Survivors in Replicate:										Total
	1	2	3	4	5	6	7	8	9	10	
1. 20	X	X	X	X	X	X	X	X	X	X	0 (100)
2. 10	X	X	X	X	X	X	X	X	X	X	0 (100)
3. 5											10
4. 2.5											10
5. 1.25											10
6. 0											10

Day 3 (9/3/07) 631

Conc. (g/L)	Survivors in Replicate:										Total
	1	2	3	4	5	6	7	8	9	10	
1. 20	X	X	X	X	X	X	X	X	X	X	0
2. 10	X	X	X	X	X	X	X	X	X	X	0
3. 5											10
4. 2.5											10
5. 1.25											10
6. 0											10

Day 4 (9/4/07) 631

Conc. (g/L)	Survivors in Replicate:										Total
	1	2	3	4	5	6	7	8	9	10	
1. 20	X	X	X	X	X	X	X	X	X	X	0
2. 10	X	X	X	X	X	X	X	X	X	X	0
3. 5	X										9 (90)
4. 2.5											10
5. 1.25											10
6. 0											10

Acute 96-hr Toxicity Test-96 Hr Survival

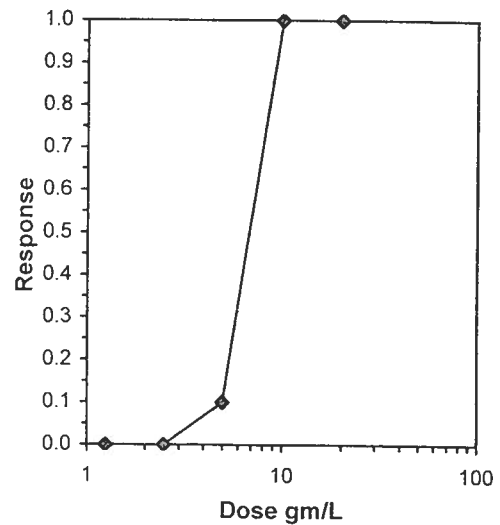
Start Date: 8/31/2007 09:50 Test ID: 999-2321 Sample ID: REF-Ref Toxicant
 End Date: 9/4/2007 11:10 Lab ID: ORNAS-Northwestern Aquatic Sample Type: KCL-Potassium chloride
 Sample Date: Protocol: EPAF 91-EPA Freshwater Test Species: CT-Chironomus tentans
 Comments:

Conc-gm/L	1
D-Control	1.0000
1.25	1.0000
2.5	1.0000
5	0.9000
10	0.0000
20	0.0000

Conc-gm/L	Mean	N-Mean	Resp	Not Resp	Total	N	Fisher's Exact P	1-Tailed Critical	Number Resp	Total Number
D-Control	1.0000	1.0000	0	10	10	1			0	10
1.25	1.0000	1.0000	0	10	10	1	1.0000	0.0500	0	10
2.5	1.0000	1.0000	0	10	10	1	1.0000	0.0500	0	10
5	0.9000	0.9000	1	9	10	1	0.5000	0.0500	1	10
*10	0.0000	0.0000	10	0	10	1	0.0000	0.0500	10	10
*20	0.0000	0.0000	10	0	10	1	0.0000	0.0500	10	10

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Fisher's Exact Test	5	10	7.07107	

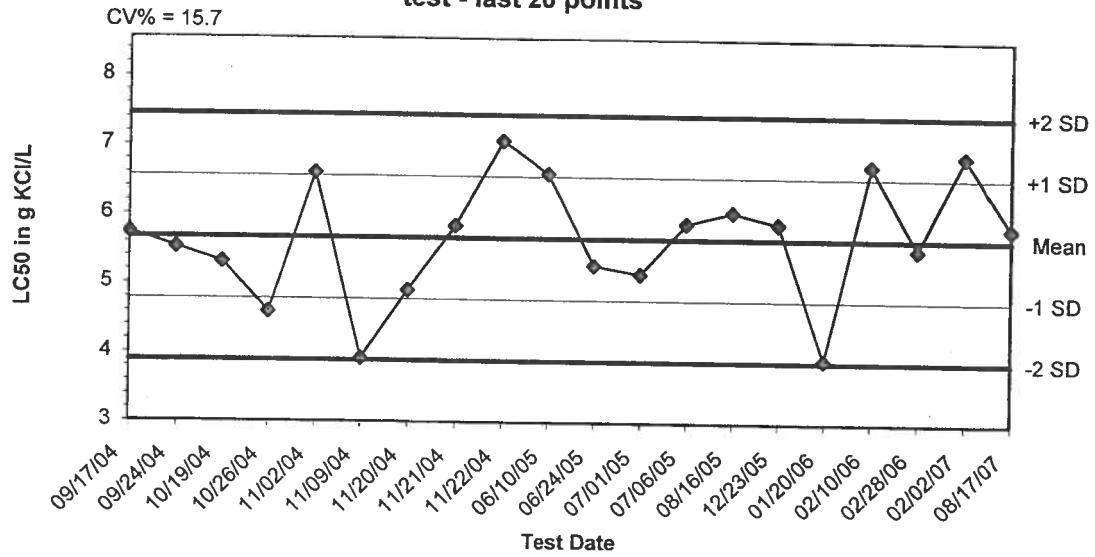
Trim Level	EC50	95% CL
0.0%	6.5975	5.7845 7.5249
5.0%	6.7460	5.7246 7.9495
10.0%	6.8040	6.2734 7.3794
20.0%	6.8040	6.2734 7.3794
Auto-0.0%	6.5975	5.7845 7.5249



Test: AT-Acute 96-hr Toxicity Test					Test ID: 999-2321				
Species: CT-Chironomus tentans					Protocol: EPAF 91-EPA Freshwater				
Sample ID: REF-Ref Toxicant					Sample Type: KCL-Potassium chloride				
Start Date: 8/31/2007 09:50					End Date: 9/4/2007 11:10 Lab ID: ORNAS-Northwestern Aquatic Sciences				
Pos	ID	Rep	Group	Start	24 Hr	48 Hr	72 Hr	96 Hr	Notes
	1	1	D-Control	10	10	10	10	10	
	2	1	1.250	10	10	10	10	10	
	3	1	2.500	10	10	10	10	10	
	4	1	5.000	10	10	10	10	9	
	5	1	10.000	10	10	0	0	0	
	6	1	20.000	10	10	0	0	0	

Comments:

Third instar larval midge, Chironomus dilutus, acute reference toxicant
test - last 20 points



Dates	Values	Mean	-1 SD	-2 SD	+1 SD	+2 SD
09/17/04	5.7400	5.6650	4.7757	3.8863	6.5543	7.4437
09/24/04	5.5200	5.6650	4.7757	3.8863	6.5543	7.4437
10/19/04	5.3100	5.6650	4.7757	3.8863	6.5543	7.4437
10/26/04	4.5900	5.6650	4.7757	3.8863	6.5543	7.4437
11/02/04	6.6000	5.6650	4.7757	3.8863	6.5543	7.4437
11/09/04	3.9200	5.6650	4.7757	3.8863	6.5543	7.4437
11/20/04	4.9100	5.6650	4.7757	3.8863	6.5543	7.4437
11/21/04	5.8400	5.6650	4.7757	3.8863	6.5543	7.4437
11/22/04	7.0700	5.6650	4.7757	3.8863	6.5543	7.4437
06/10/05	6.6000	5.6650	4.7757	3.8863	6.5543	7.4437
06/24/05	5.2800	5.6650	4.7757	3.8863	6.5543	7.4437
07/01/05	5.1600	5.6650	4.7757	3.8863	6.5543	7.4437
07/06/05	5.8900	5.6650	4.7757	3.8863	6.5543	7.4437
08/16/05	6.0600	5.6650	4.7757	3.8863	6.5543	7.4437
12/23/05	5.8900	5.6650	4.7757	3.8863	6.5543	7.4437
01/20/06	3.9300	5.6650	4.7757	3.8863	6.5543	7.4437
02/10/06	6.7400	5.6650	4.7757	3.8863	6.5543	7.4437
02/28/06	5.5300	5.6650	4.7757	3.8863	6.5543	7.4437
02/02/07	6.8800	5.6650	4.7757	3.8863	6.5543	7.4437
08/17/07	5.8400	5.6650	4.7757	3.8863	6.5543	7.4437

YMR
9-18-07



Total Mercury Analysis of Fish Tissue Samples

Project Name/Purchase Order: CONDIT 53886/5

For Samples Received: June 6, 2007

Report Date:

June 19, 2007

Prepared for:

Mr. David Earl King
Kleinfelder
15050 SW Koll Parkway
Suite L
Beaverton, OR 97006

Brooks Rand

Project #: KLE001

Report #: 07BR0799

Brooks Rand Labs

Table of Contents

Client Project ID: CONDIT 53886/5

Purchase Order No.: 53886/5

BRL Tracking #: 07BR0799

BRL Project: KLE001

Report Cover	1
Table of Contents	2
Case Narrative.....	3-4
Summary of Results	5-6
Data Qualifiers and their Definitions	7
 Total Mercury Data - Batch 07-0633.....	 8-37
QA Report	8
Sample and QA Data Spreadsheet.....	9-10
Prep Notes	11-12
Lab Bench Sheet	13-17
Instrument Printouts	18-37
 Sample Receiving Documentation - Tracking #07BR0799.....	 38-41
Sample Receiving Log	38-39
COC	40
FedEx Airbill	41

Brooks Rand Labs Case Narrative

Total Mercury Analysis of Fish Tissue

Client Project ID: CONDIT 53886/5

Purchase Order No.: 53886/5

BRL Tracking #: 07BR0799

BRL Project: KLE001

All samples were received, stored, prepared, and analyzed according to Brooks Rand Labs (BRL) standard operating procedures (SOPs) and EPA Methodology. BRL certifies that the reported test results for mercury by EPA Method 1631E meet all requirements of NELAC. BRL is a NELAC accredited laboratory (OR ELAP ID WA200006).

Shipping and Receiving

Three composite fish samples were received at 10:00 AM on 6/6/07. The samples arrived in a cooler with ice at a temperature less than 0 °C. The requested analysis for the samples was total mercury (THg). All samples were stored in a sample storage freezer at -10°C until further processing.

Holding Time, Preservation and Storage

All method holding time, preservation and storage requirements were satisfied.

Homogenization

Once thawed, the fish fillet samples were homogenized with the skin on using precleaned commercial grade homogenization equipment. A homogenization blank was collected after cleaning the equipment and prior to homogenization of the samples. The blank was digested as a fish tissue sample and analyzed along with the associated homogenates. The result for the homogenization blank was less than 10 times the lowest sample result, indicating that no significant contamination occurred during homogenization.

Total Mercury, Appendix to EPA Method 1631 (BRL SOP BR-0002)

All samples are prepared and analyzed in accordance with the Appendix to EPA Method 1631. Biota samples are digested with nitric acid/sulfuric acid ($\text{HNO}_3/\text{H}_2\text{SO}_4$) and heat, and further oxidized with bromine monochloride (BrCl). All samples are analyzed with stannous chloride (SnCl_2) reduction, single gold amalgamation and cold vapor atomic fluorescence spectroscopy (CVAFS) detection using a BRL Model III CVAFS Mercury Analyzer.

Batch # 07-0633

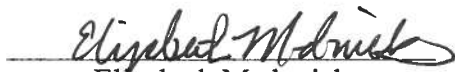
Preparation: The samples were digested on June 13, 2007.

Analysis: The samples were analyzed on June 15, 2007.

Quality Assurance: Sample results may have been evaluated using detection limits that were adjusted to account for sample aliquot size; please refer to the Quality Assurance Summary for a list of the sample specific method detection limits (MDLs)/practical quantitation limits (PQLs) and QA details. All QA criteria were met and no qualification of the data was required.

Blank correction: All sample results for low-level mercury analysis are blank corrected as described in EPA Method 1631 Revision E.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. In addition, I certify that to the best of my knowledge and belief, the data as reported are true and accurate. The Laboratory Director or her designee, as verified by the following signature has authorized release of the data contained in this data package.


Elizabeth Madonick
Project Manager

Reported by**Brooks Rand LLC****Contact:** Elizabeth Madonick3958 6th Avenue NW
Seattle, WA 98107

Tel: 206-632-6206 Fax: 206-632-6017

Summary of Results for**Kleinfelder****Contact:** Dave King15050 SW Koll Parkway
Beaverton OR 97006
Tel: 503-644-9447**Lab Project #** KLE001**Lab Tracking #** 07BR0799**Client Project****Purchase Order**

CONDIT 53886/5

53886/5

Sample/Sampling/Receiving Info

Kleinfelder**BRL****Sample****Identification**Northwest Lake Fish #1
Northwest Lake Fish #2
Northwest Lake Fish #3
HB-07-0606-Hg**Sampling Date**6/5/2007
6/5/2007
6/5/2007
6/8/2007**Matrix**Biota
Biota
Biota
Biota**Submatrix**Fish
Fish
Fish
Homog. Blank**Sample Number**07BR0799 - 01
07BR0799 - 02
07BR0799 - 03
07BR0799 - 04**Receiving Date**6/6/2007
6/6/2007
6/6/2007
6/6/2007

Tuesday, June 19, 2007


Project Manager

Reported by**Brooks Rand LLC****Contact:** Elizabeth Madonick3958 6th Avenue NW
Seattle, WA 98107

Tel: 206-632-6206 Fax: 206-632-6017

Summary of Results for**Kleinfelder****Contact:** Dave King15050 SW Koll Parkway
Beaverton OR 97006

Tel: 503-644-9447

Lab Project # KLE001**Lab Tracking #** 07BR0799**Client Project****Purchase Order**

CONDIT 53886/5

53886/5

Hg

Sample Identification	BRL Number	Total or Dissolved	Preparation date	Analysis date	Batch #	Result	Units	Qualifier (Q)
Northwest Lake Fish #1	07BR0799 - 01	T	6/13/2007	6/15/2007	07-0633	297.000	ng/g	
Northwest Lake Fish #2	07BR0799 - 02	T	6/13/2007	6/15/2007	07-0633	308.000	ng/g	
Northwest Lake Fish #3	07BR0799 - 03	T	6/13/2007	6/15/2007	07-0633	185.000	ng/g	
HB-07-0606-Hg	07BR0799 - 04	T	6/13/2007	6/15/2007	07-0633	0.070	ng/g	B

Tuesday, June 19, 2007


Project Manager

BROOKS RAND LABS

DATA QUALIFIERS and their DEFINITIONS

(Effective 6/23/06)

- B** - Detected by the instrument, above MDL but less than or equal to the PQL (ML).
Measured result is reported and considered an estimate.
- E** - An estimated value due to the presence of interferences. A full explanation will be presented in the case narrative.
- H** - Holding time and/or preservation requirements not met. Results are estimated.
- J** - Estimated value.
- M** - Duplicate precision (RPD) was not within acceptance criteria.
- N** - Spike recovery was not within acceptance criteria.
- R** - Rejected, unusable value. A full explanation will be presented in the QA Report.
- U** - Result below or equal to the method detection limit (MDL) and therefore analyte was not detected. Results reported at the MDL.

These qualifiers are based on those previously utilized by Brooks Rand, LLC, those found in the EPA SOW ILM03.0, Exhibit B, Section III, pg. B-18 and the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review; USEPA; July 2002. These supercede all previous qualifiers ever employed by BRL.

QUALITY ASSURANCE SUMMARY Brooks Rand Report #07BR0799



BROOKSRAND
TRACE METALS ANALYSIS & PRODUCTS

3958 6th Avenue NW
Seattle, WA 98107
Voice: 206-632-6206
Fax: 206-632-6017

Batch #: 07-0633

Method #: BR-0002

Analyte: Hg

Matrix: Biota

BIAS Criterion: Recovery = 77-123% Continuing Calibration Verification (CCV)			
QCS ID	Certified Value ng/L	Measured Value ng/L	Recovery %
CCV1	5.00	5.25	105%
CCV2	5.00	5.05	101%
CCV3	5.00	5.07	101%
CCV4	5.00	4.54	91%
CCV5	5.00	5.11	102%

BIAS Criterion: Recovery = 85-115% Independent Calibration Verification (ICV)			
QCS ID	Certified Value ng/L	Measured Value ng/L	Recovery %
ICV*	16.01	15.67	98%

* Preparation of the CRM NIST 1641d.

BIAS Criterion: Recovery = 75-125% Certified Reference Material (CRM)			
CRM ID	Certified Value ng/g	Measured Value ng/g	Recovery %
TORT-2	270	300	111%
DORM-2	4640	4342	94%

BIAS Criteria: Recovery = 70-130%, RPD ≤ 30% Matrix Spikes/Matrix Spike Duplicates (MS/MSD)								
Sample ID	Sample Value ng/g AR	Matrix Spike			Matrix Spike Duplicate			Duplicate RPD
		Spiked Value ng/g AR	Measured Value ng/g AR	MS Recovery %	Spiked Value ng/g AR	Measured Value ng/g AR	MSD Recovery %	
07BR0789-66	96.1	548.6	681.1	107%	530.9	632.6	101%	7%
07BR0799-01	297	1150	1442	100%	1211	1577	106%	9%
07BR0805-02	23.7	479.8	506.7	101%	N/A	N/A	N/A	N/A

PRECISION Criteria: RPD ≤ 30% if average result > 5x MDL Method Duplicate Analysis (MD)				
Sample ID	Sample Value ng/g AR	Duplicate Value ng/g AR	Average Value ng/g AR	Duplicate RPD
07BR0789-66	96.1	100.0	98.1	4%
07BR0799-01	297	300	299	1%
07BR0805-01	7.7	8.6	8.2	12%

Method Blanks (MB) Criteria: Avg. < 2x MDL, Std Dev < 2/3 MDL or sample results > 10x highest MB					
MB1 ng/g	MB2 ng/g	MB3 ng/g	MB4 ng/g	Average ng/g	StDev ng/g
0.03	0.05	0.04	0.03	0.04	0.01

Method Detection Limits	
MDL ng/g	PQL ng/g
0.04	0.10

Sample Specific Reporting Limits		
Sample ID	MDL ng/g	PQL ng/g
07BR0765-70	0.8	1.9
07BR0765-71	1.0	2.5
07BR0765-72	1.0	2.4
07BR0765-73	0.8	2.0
07BR0765-74	0.8	1.9
07BR0765-75	1.0	2.5
07BR0789-06	1.5	3.9
07BR0789-07	1.6	4.1
07BR0789-15	1.8	4.5
07BR0789-16	0.17	0.42
07BR0789-61	1.5	3.8

Sample Specific Reporting Limits		
Sample ID	MDL ng/g	PQL ng/g
07BR0789-62	0.17	0.43
07BR0789-66	1.9	4.8
07BR0789-68	1.7	4.3
07BR0789-69	1.8	4.4
07BR0799-01	5	12
07BR0799-02	4	10
07BR0799-03	4	10
07BR0805-01	0.9	2.3
07BR0805-02	0.9	2.2
07BR0805-03	1.6	3.9
07BR0805-04	2	6

Nicole C. Mead
Quality Assurance Officer
Elizabeth M. Mead
Project Manager

Batch: 07-0633 Analyst: AM		Analyte: THg Matrix: Biota		Date: 06/15/07 Instrument ID: BR-10		MDL: PQL:		0.04 ng/g 0.10 ng/g		Nitric/Sulfuric Prep				
Run No.	Run Type	Tracking #	Sample ID	Sample Wt mg	Dilution Vol. mL	Analyzed Vol. mL	PA	Hg pg	Hg ng/g	TV/ Spike	Recovery	MDL	PQL	Comments
1	CB						91	7.48				74.75		= avg PA of CB
2	CB						77	6.33				12.45		= std dev PA CB
3	CB						62	5.10				6.14		= avg pg of CB
4	CB						69	5.67				1.02		= std dev pg CB
5	CS						373			25	98%			
6	CS						1276			100	99%			
7	CS						6256			500	102%			
8	CS						30619			2500	100%	0.0822		= avg cal coeff
9	CS						123383			10000	101%	2%		= RSD cal coeff
10	ICV						19141	1567		1601	98%	1.0000		= R value
11	CCV						6466	525.2		500	105%			
88	CCV						6223	505.3		500	101%			
89	MB			1000	40.00	10.00	163	7.25	0.03			36.49		= average total pg
90	MB			1000	40.00	10.00	229	12.68	0.05			0.04		= avg MB ng/g
91	MB			1000	40.00	10.00	193	9.72	0.04			0.01		= std dev MB ng/g
92	MB			1000	40.00	10.00	158	6.84	0.03					
93	LFB	PQL Spike		1000	40.00	10.00	6377	517.9	2.04	0.10	2035%			R&D only
94	QCS	CRM-1	TORT-2	192.0	40.00	1.000	17632	1443	300	270	111%			
95	QCS	CRM-2	DORM-2	185.8	40.00	0.100	24620	2017	4342	4640	94%			
96	S	07BR0789	66	416.5	40.00	0.500	6167	500.7	96.1			1.9	4.8	
97	S	07BR0789	06	517.9	40.00	0.500	536	37.91	5.8			1.5	3.9	
98	S	07BR0789	07	493.2	40.00	0.500	43974	3608	585.1			1.6	4.1	
99	S	07BR0789	15	448.7	40.00	0.500	4147	334.7	59.6			1.8	4.5	
100	S	07BR0789	16	473.6	40.00	0.500	426	28.87	4.8			1.7	4.2	Near PQL - reanalyzed.
101	S	07BR0789	61	528.6	40.00	0.500	9996	815.3	123.3			1.5	3.8	
102	S	07BR0789	62	465.5	40.00	0.500	434	29.52	5.0			1.7	4.3	Near PQL - reanalyzed.
103	S	07BR0789	68	468.1	40.00	0.500	3699	297.8	50.8			1.7	4.3	
104	S	07BR0789	69	454.0	40.00	0.500	22003	1802	317.5			1.8	4.4	
105	S	07BR0805	01	888.1	40.00	0.500	1117	85.65	7.7			0.9	2.3	
106	MR	07BR0789	66MD	474.5	40.00	0.500	7297	593.5	100.0			4%	1.7	4.2
107	MS	07BR0789	66MS	455.7	40.00	0.500	47287	3880	681.1	548.6	107%	1.8	4.4	= MD RPD
108	MSD	07BR0789	66MSD	470.9	40.00	0.500	45392	3724	632.6	530.9	101%	1.7	4.2	= MS/MSD RPD
109	CCV						6245	507.1		500	101%			
110	S	07BR0805	02*	461.2	20.00	0.500	3406	273.8	23.7			0.9	2.2	
111	S	07BR0805	03*	254.5	20.00	0.500	10993	897.3	140.9			1.6	3.9	
112	S	07BR0805	04*	172.6	20.00	0.500	916	69.13	16			2	6	
113	S	07BR0765	70	1043.6	40.00	0.500	4472	361.4	27.7			0.8	1.9	
114	S	07BR0765	71	801.0	40.00	0.500	2241	178.0	17.7			1.0	2.5	
115	S	07BR0765	72*	410.7	20.00	0.500	2397	190.8	18.5			1.0	2.4	
116	S	07BR0765	73	980.5	40.00	0.500	3898	314.2	25.6			0.8	2.0	
117	S	07BR0765	74	1052.8	40.00	0.500	2341	186.2	14.1			0.8	1.9	
118	S	07BR0765	75	814.6	40.00	0.500	4372	353.2	34.6			1.0	2.5	
119	S	07BR0765	80	1001.5	40.00	10.00	170	7.83	-0.01	U		0.04	0.10	Homogenization blank

Batch: 07-0633 Analyst: AM		Analyte: THg Matrix: Biota		Instrument ID: BR-10		Date: 06/15/07		MDL: 0.04 ng/g PQL: 0.10 ng/g		Nitric/Sulfuric Prep				
Run No.	Run Type	Tracking #	Sample ID	Sample Wt mg	Dilution Vol. mL	Analyzed Vol. mL	PA	Hg pg	Hg ng/g	TV/ Spike	Recovery	MDL	PQL	Comments
120	MR	07BR0805	01MD*	534.6	20.00	0.500	1491	116.4	8.6			12%	0.7	1.9 = MD RPD
121	MS	07BR0805	02MS*	521.1	20.00	0.500	80413	6602	506.7	479.8	101%		0.8	1.9
123	CCV						5598	453.9		500	91%			
124	S	07BR0799	01	818.0	40.00	0.100	7454	606.4	297				5	12
125	S	07BR0799	02	994.0	40.00	0.100	9388	765.4	308				4	10
126	S	07BR0799	03	965.3	40.00	0.100	5507	446.4	185				4	10
127	S	07BR0799	04	1005.0	40.00	10.00	386	25.58	0.07	B			0.04	0.10
128	S	07BR0789	16R	473.6	40.00	5.000	3434	276.1	4.59				0.17	0.42
128	S	07BR0789	62R	465.5	40.00	5.000	3969	320.0	5.42				0.17	0.43
129	MR	07BR0799	01MD	862.1	40.00	0.100	7950	647.2	300			1%	5	12 = MD RPD
130	MS	07BR0799	01MS	869.8	40.00	0.100	38220	3135	1442	1150	100%		5	11
131	MSD	07BR0799	01MSD	825.9	40.00	0.100	39694	3256	1577	1211	106%	9%	5	12 = MS/MSD RPD
132	CCV						6298	511.4		500	102%			
* Prepped using smaller vial and 1/2 volume of acid due to limited sample mass.														

* Prepped using smaller vial and 1/2 volume of acid due to limited sample mass.

Hg Prep Log for Solids (CVAFS) T-Hg / Other

Page 1 of 2

Revision #: 009

Batch: 07-0633

Matrix: Biota / Insect / Fish

Technician: AM

Date: 6/13/07

Sample I.D.	Aliquot (mg)	Sample I.D.	Aliquot (mg)
MB-1	—	07BR0789	1454.0
MB-2	—	* 07BR0805-01	888.1
MB-3	—	* -02	461.7
MB-4	—	* 02MS-02MD	521.1
PQL LFB	—	* 02MS-03	254.5
CRM-1	192.0 AM	* -04	172.6
07BR0789-06	47.6 517.9	* 07BR0765-70	1045.6
-07	443.2	* -71	801.0
-15	448.7	* -72	410.7
-16	477.6	* -73	480.5
-61	528.6	* -74	1052.8
-62	465.5	* -75	814.6
-66	416.5	* -80	1001.5
-66MD	474.5	07BR0749-01	818.0
-66MS	455.7	-02	944.0
-66MSD	470.9	-03	965.3
-68	466.1	-04	1005.0

AM
6/133:20 L
Vial
↓

20mL hi

Matrix Spike/Matrix Spike Duplicate

Sample I.D.	Hg Standard I.D.	Hg Standard Conc. (ng/mL)	Hg Standard Vol. used (mL)	Matrix Spike Conc. (ng/g)
07BR0789-66MSMD	07-0633-02	1000 ng/mL	0.25mL	548.6, 530.9
07BR0805-02MS	↓	↓	↓	530.9, 479.8
07BR0749-01MS	↓	↓	1.00mL	150 AM 6/13
↓ -01MSD	↓	↓	↓	1211
		mm blank		

Certified Reference Material (CRM)

CRM I.D.	CRM Source	CRM Conc. (ng/g) / (mg/kg)	CRM Mass used (mg)
CRM-1	TCR-2	0.270-8 152mg/kg	192.0
CRM-2	DO RM-2	464-5 4mg	185.8
PQL	1ng/mL	1.0ng/mL	0.100mL

Spike Witness
Initials/Date

JTB-13-07

HNO₃ Reagent I.D. #: 07-162-01

BrCl I.D. #: 07-154-02

HCl / H₂SO₄ Reagent I.D. #: 06361-05

Final Dil. Volume: 40mL

Target Temp. 1 (if required): 70 °C Measured Temp.: 75 °C Digestion Time: 1hr

Target Temp. 2 (if required): 90 °C Measured Temp.: 90 °C Digestion Time: 3hr

Comments: In some samples, low sample amount dictated that 20mL vials be used to retain PQL. 1/2 amount of acids were added except to 07BR0805-03

Revision #: ~~009~~

Date: 6/13/07

in
20m
Vial

See
page
one

CRM)

CRM) 6/16/07

Spike Witness
Initials/Date

BrCl I.D. #: _____

Final Dil. Volume: _____

Measured Temp.: _____ °C

Measured Temp.: _____ °C

Comments:

all no
12
from

Hg Analysis Sheet: T-Hg Other: _____

Batch: 07-0610, 07-0612 Matrix: Biofo Analyst: TL Date: 6/15/07

Mod. III ID#: BR10 Cal. Blank X: 74.75 PA CI X: 0.0222 pg/PA
 NH₄OH/HCl #: 07-159-05 10 ng Hg/mL std. #: 07-145-04 RSD: 2 %
 SnCl₂ #: 07-159-02 1.0 ng Hg/mL std. #: 07-145-05 low std. Rec.: 98 %

Run #	Split Bottle	Trap	Bubb.	Brooks Rand Sample ID	Analy. Vol. (mL)	PA	Comments
1	1	T1	1	CB-1	—	91	
2	2	T2	2	CB-2	—	77	
3	3	T3	3	CB-3	—	62	
4	4	T4	4	CB-4	—	69	
5	1	T5	1	25pg	0.025	373	10 ⁹ /mL
6	2	T6	2	100pg	0.100	1276	↓
7	3	T7	3	500pg	0.050	6256	10 ⁹ /mL
8	4	T8	4	2500pg	0.250	36619	↓
9	1	T9	1	10000pg	1.00	123382	↓
10	2	T10	2	FCV 1000pg	1.00	19141	N's 104/d
11	3	T11	3	FCV	0.050	6466	10 ⁹ /mL
12	4	T1	4	MB-1	10.00	218	
13	1	T2	1	CCB	—	115	
14	2	T3	2	MB-2	10.00	224	
15	3	T4	3	MB-3	10.00	309	
16	4	T5	4	MB-4	10.00	245	
17	1	T6	1	CRM	1.00	20135	
18	2	T7	2	ROLLED	10.00	2442	
19	3	T8	3	07BR0799-41	5.00	8253	
20	4	T9	4	-42	5.00	21874	
21	1	T10	1	-43	5.00	10879	
22	2	T11	2	-44	1.00	2573	
23	3	T1	3	-44MD	1.00	2774	
24	4	T2	4	-44MS	1.00	81677	

Comments: _____

Check standard: 07-145-04Verification standard: 07-145-05

2 5

07-0612, 07-0612

07-0612

JH

6/15/07

25	1	T3	1	07BR0797-44MSD	1.00	83454	
26	2	T4	2		-45	5.00	11076
27	3	T5	3		-46	5.00	20345
28	4	T6	4		-47	5.00	11745
29		T7	1		-48	5.00	8402
30	2	T8	2		-49	5.00	20401
31	3	T7	3		-50	5.00	5455
32	4	T10	4	CCV	0.050	6305	1079/mL
33	1	T11	1	07BR0797-51	5.00	13740	
34	2	T1	2		-52	5.00	13918
35	3	T2	3		-53	5.00	11632
36	4	T3	4		-54	5.00	4908
37	1	T4	1		-55	5.00	4504
38	2	T5	2		-56	1.00	5422
39	3	T6	3		-56RD	1.00	5078
40	4	T7	4		-56MS	1.00	573 84000 TH 0115
41		T8	1		-56MSD	1.00	81354
42	2	T9	2		-57	5.00	
43	3	T10	3		-58	5.00	
44	4	T11	4		-59	5.00	
45	1	T1	1		-60	5.00	
46	2	T2	2	CCV	0.050	5883	1079/mL
47	3	T3	3	MB-1	10.00		07-0612
48	4	T4	4	MB-2			
47	1	T1	1	MB-1	10.00	186	07-0612
48	2	T2	2			213	
49	3	T3	3			224	
50	4	T4	4			171	
51	1	T7	1	PULIFB		1803	
52	2	T8	2	CRM-2	1.00	4590	
53	3	T9	3	07BR0798.01		300	
54	4	T10	4		-04	1242	

AM analyst

Hg Analysis Sheet: (1-Hg) Gilbert

Page 3 5

Date: 07-06-07

Lab: Biotn

AM

Date: 6/15/07

55	1	T11	1	07DR0789-05	1.00	377
56	2	T1	2	-08		6296
57	3	T2	3	-09	10	2278
58	4	T3	4	-10	11	8852
59	1	T4	1	-11	12	5004632
60	2	T5	2	-12	13	38435
61	3	T6	3	-13	14	26167
62	4	T7	4	-14	15	17958
63	1	T8	1	-01R		945
64	2	T9	2	-05R		1256
65	3	T10	3	-04MD	1.00	776
66	4	T11	4	-10MD		9448
67	1	T1	1	-04ms		1941
68	2	T2	2	-04msD		1955
71	3	T3	3	CCV	0.050	5450
72	4	T4	4	07DR0789-67	2.50	26600
67	1	T5	1	07DR0789-04	5.00	27321
70	2	T6	2	-04MD		857
73	3	T7	3	-35	2.50	27321
74	4	T8	4	-36		857
75	1	T9	1	-37		1951
76	2	T10	2	-38		21461
77	3	T11	3	-39		6487
78	4	T1	4	-40		19623
79	1	T3	1	-39R		6234
80	2	T7	2	-63		14003
81	3	T4	3	-64		65578
82	4	T5	4	-65		1233
83	1	T6	1	-35MD		30623
84	2	T7	2	-67MD		40889
85	3	T8	3	-67ms		39688
86	4	T9	4	-67MD		42024

AM 6/15

AM 6/15

Abnormal peak shape - % recovery passes

5814PA

2883PA

AM 6/15

single spilled ester. only

Hy Analysis Sheet 7-112

4.5

07-0633

Ditch

AM

6/15/07

Line	Qty	Item	Unit	Description	Cost	Value	Notes
88	1	T10	1	CCV	0.050	6220	
89	2	T11	2	MD-1	10.00	160	
90	3	T1	3	MD-2		229	
91	4	T2	4	MD-3		193	
1	1		1	MD-4			
2	2		2	PQL LFB	10.00		
3	3		3	CRM-1	1.00		
4	4		4	CRM-2	0.100		
87	1	T3	1	07BR0789-67PPS	2.50	16497	+ 5000PS
92	2	T4	2	MD-4	1000	158	
93	3	T5	3	PQL LFB		6077	
94	4	T6	4	CRM-1	1.00	17632	
95	1	T7	1	CRM-2	0.100	24620	
96	2	T8	2	0784-66	0.500	6167	
97	3	T9	3	-06		506	
98	4	T3	4	-07		40974	
99	1	T10	1	-15		4147	
100	2	T11	2	-16		426	
101	3	T1	3	-61		4946	
102	4	T2	4	-62		434	
103	1	T5	1	-68		7649	
104	2	T6	2	-69		2200	
105	3	T7	3	07BR0805-01		1117	
106	4	T8	4	07BR0789-67MD		7297	-66MD
107	1	T9	1	-66MS		47287	
108	2	T10	2	-66MS		45092	
109	3	T11	3	CCV	0.050	6245	
110	4	T1	4	07BR0805-02	0.500	3406	
111	1	T1	1	-03		10993	
112	2	T2	2	-04		916	
113	3	T3	3	07BR0765-70		4472	
114	4	T4	4	-71		2241	

07-0633

AM 6/15

AM 6/15

AM 6/15

Fig analysis sheet: T-112

5 5

07-0633

Biot.

AM

6/15/07

115	1	T5	1	07DR0765-73	0.500	2397
116	2	T6	2	↓ -73	↓	3828
117	3	T7	3	↓ -74	↓	2341
118	4	T8	4	↓ -75	↓	4372
119	1	T9	1	↓ -80	10.00	170
120	2	T10	2	07DR0805-01MD	0.500	1491
121	3	T11	3	↓ -02MS	↓	80413
122	4	T1	4	CCV	0.050	5598
123	1	T2	1	07DR0792-01	0.100	7454
124	2	T3	2	↓ -03	↓	9388
125	3	T4	3	↓ -03	↓	5507
126	4	T5	4	↓ -04-04	10.00	386
127	1	T6	1	07DR0784-16	5.00	3434
128	2	T7	2	↓ -62	↓	3969
129	3	T8	3	07DR0799-01MD	0.100	7450
130	4	T9	4	↓ -01MS	↓	38220
131	1	T10	1	↓ -01MSD	0.100	39644
132	2	T11	2	CCV	0.050	6298

AM 6/15

AM 6/15

Peak Report

Brooks Rand Report #07BR0799

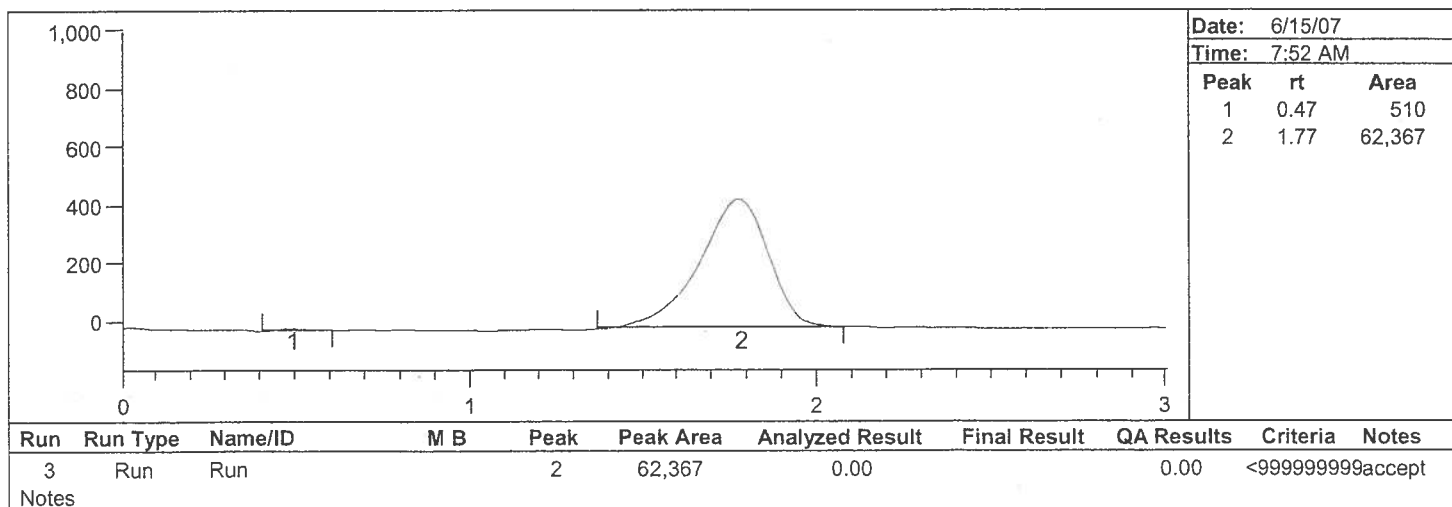
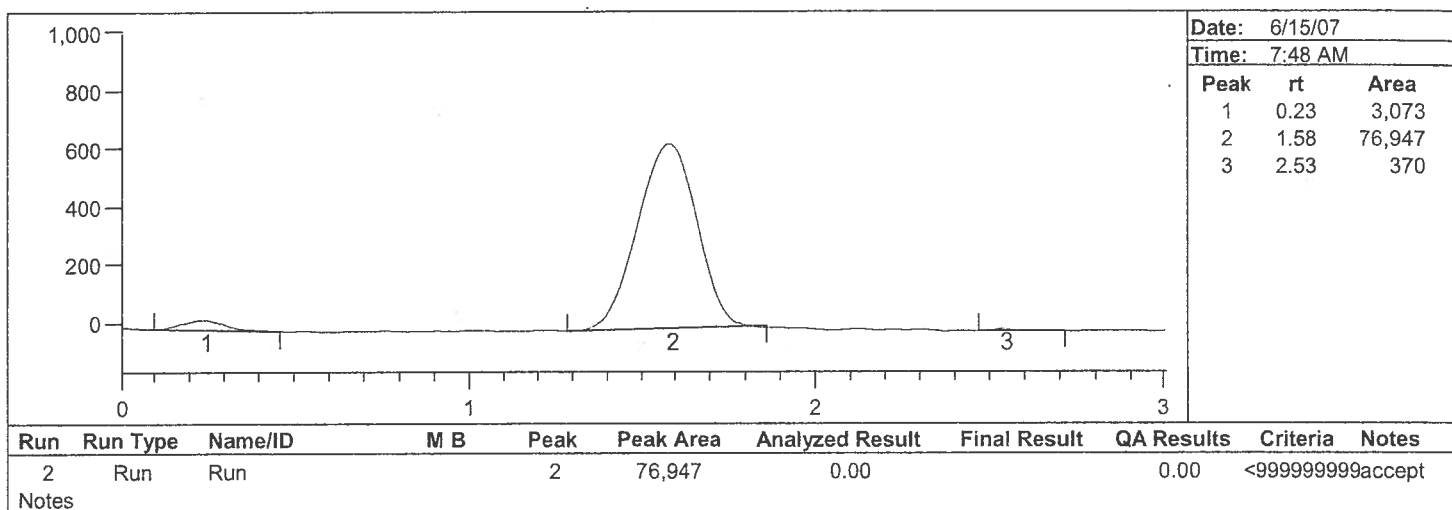
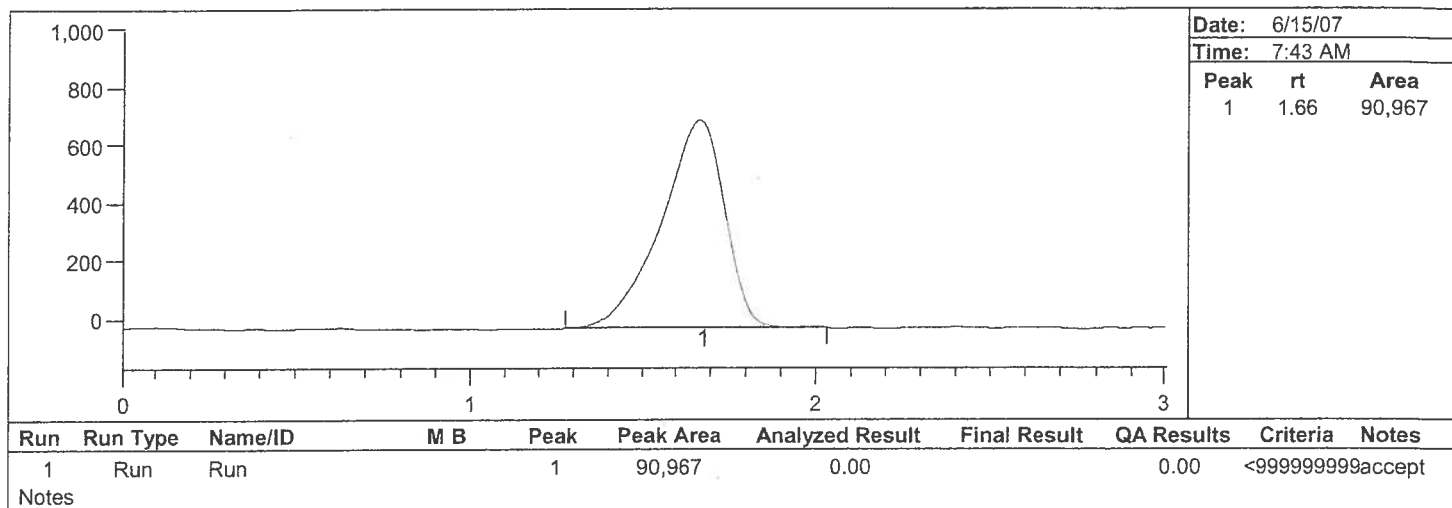
Batch Number: 07-0633

Method Number: THg

Project Number(s):

Instrument ID: br-10

Date Analyzed: 6/15/07
7:14/06 am
Analyst Name: am



Peak Report

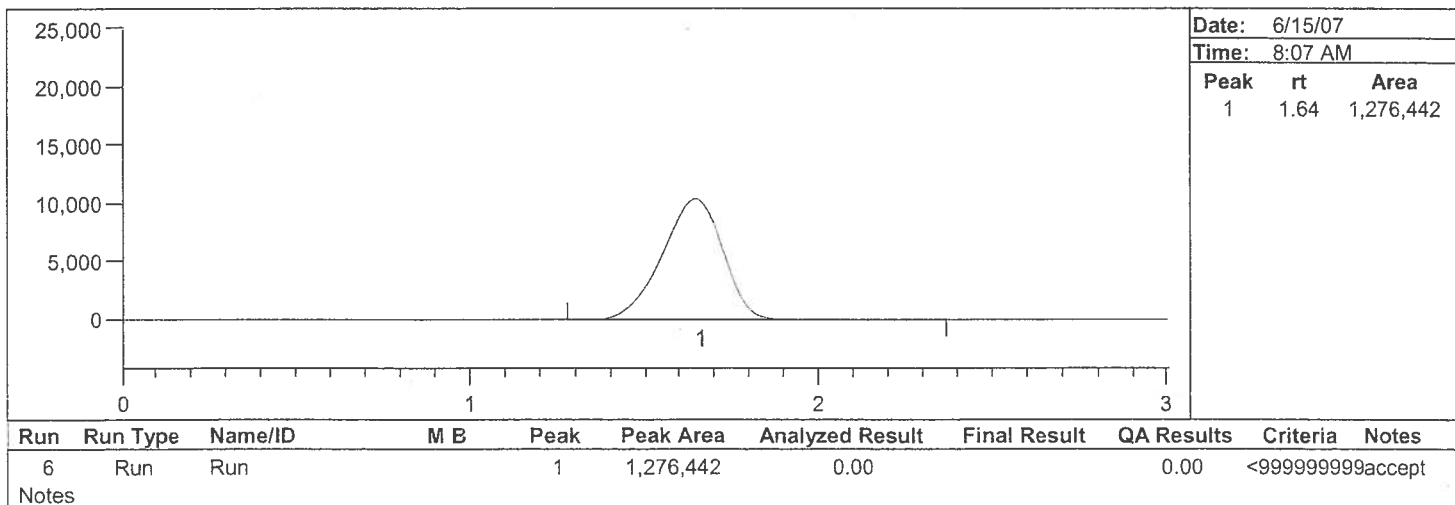
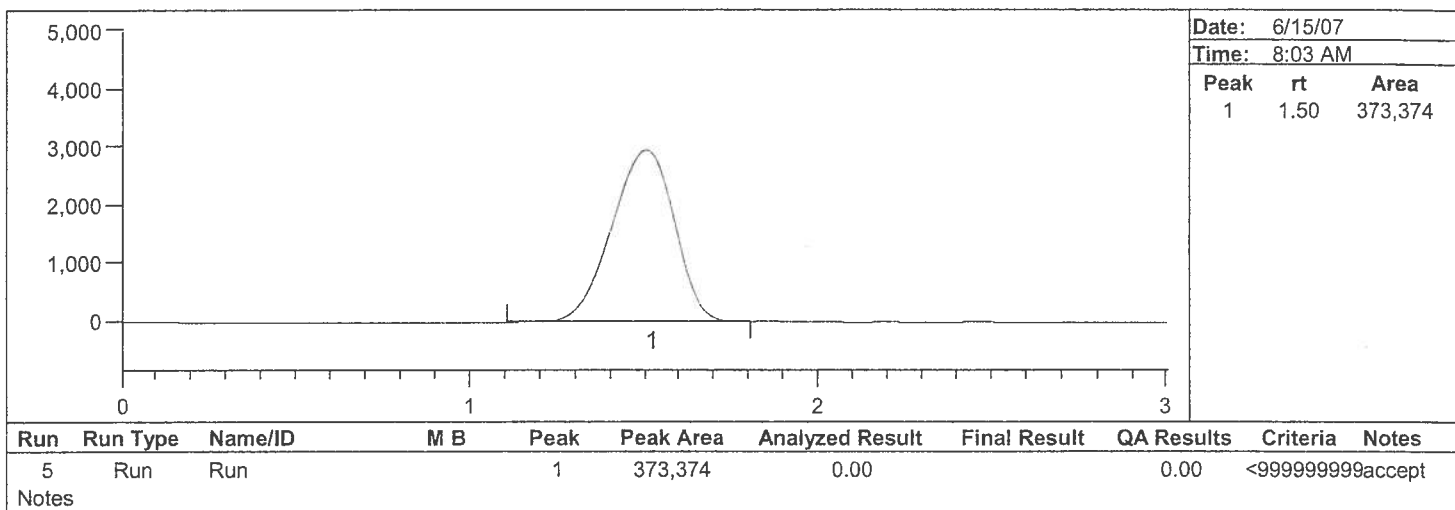
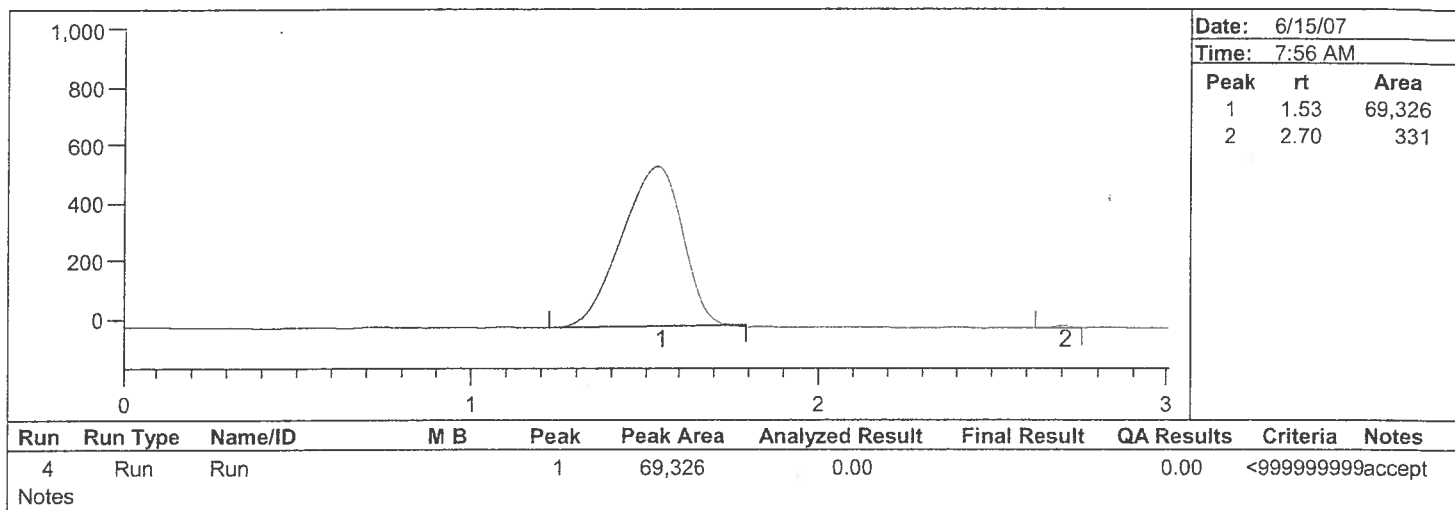
Brooks Rand Report #07BR0799

Batch Number: 07-0633

Method Number: THg

Project Number(s):
Instrument ID: br-10

Date Analyzed: 6/15/07
7/14/06 nm
Analyst Name: am



Peak Report

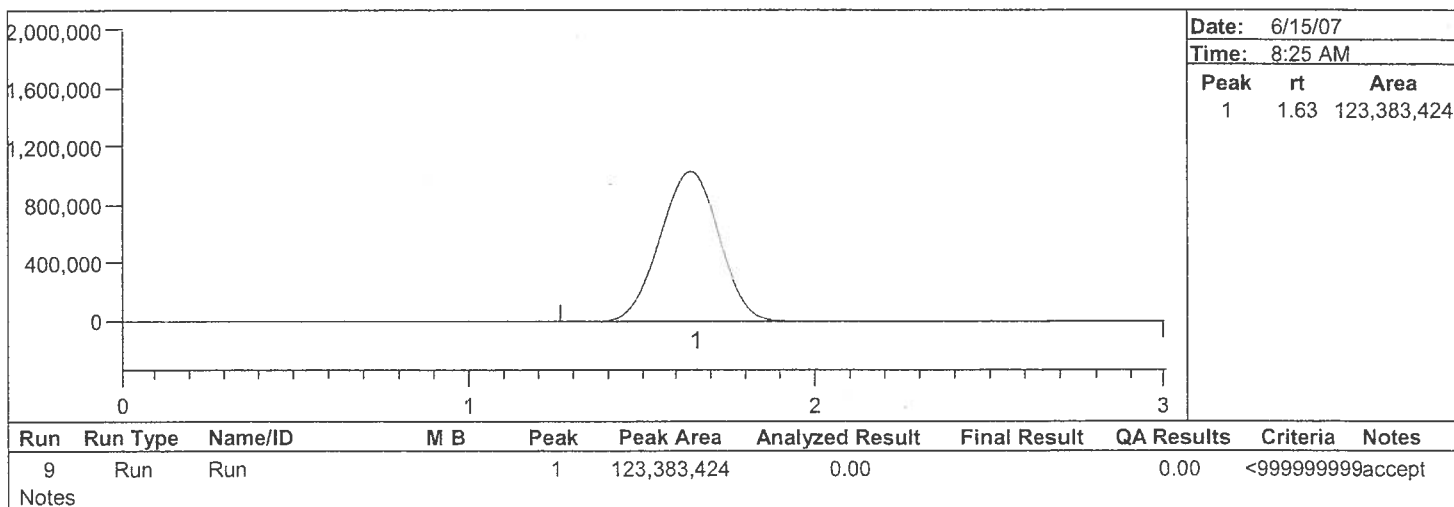
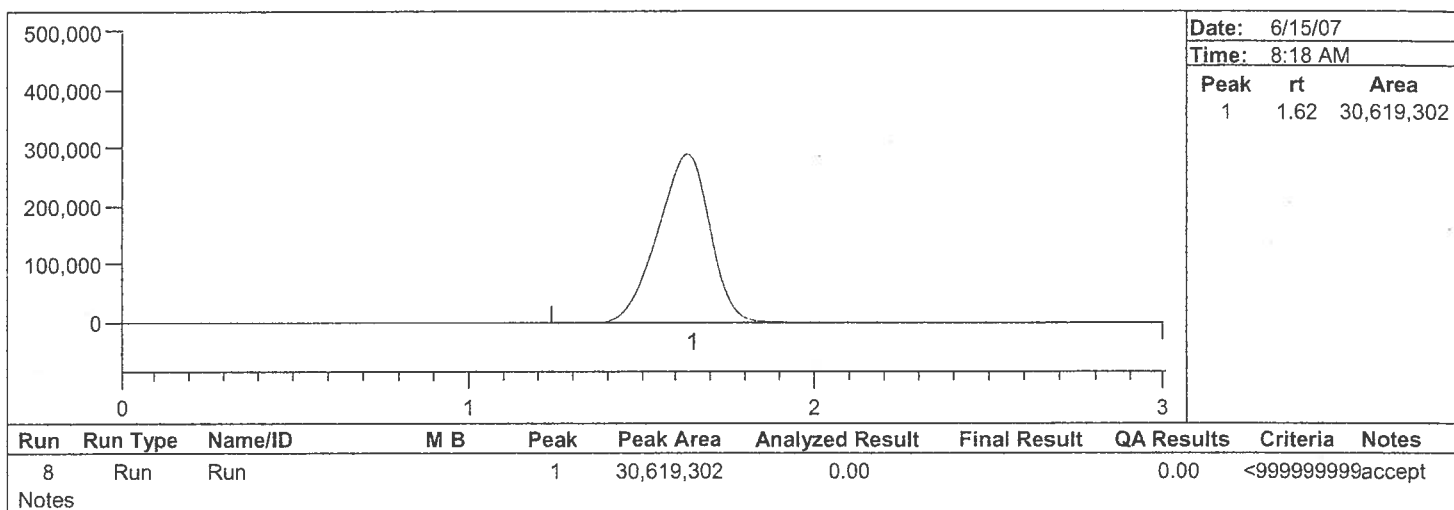
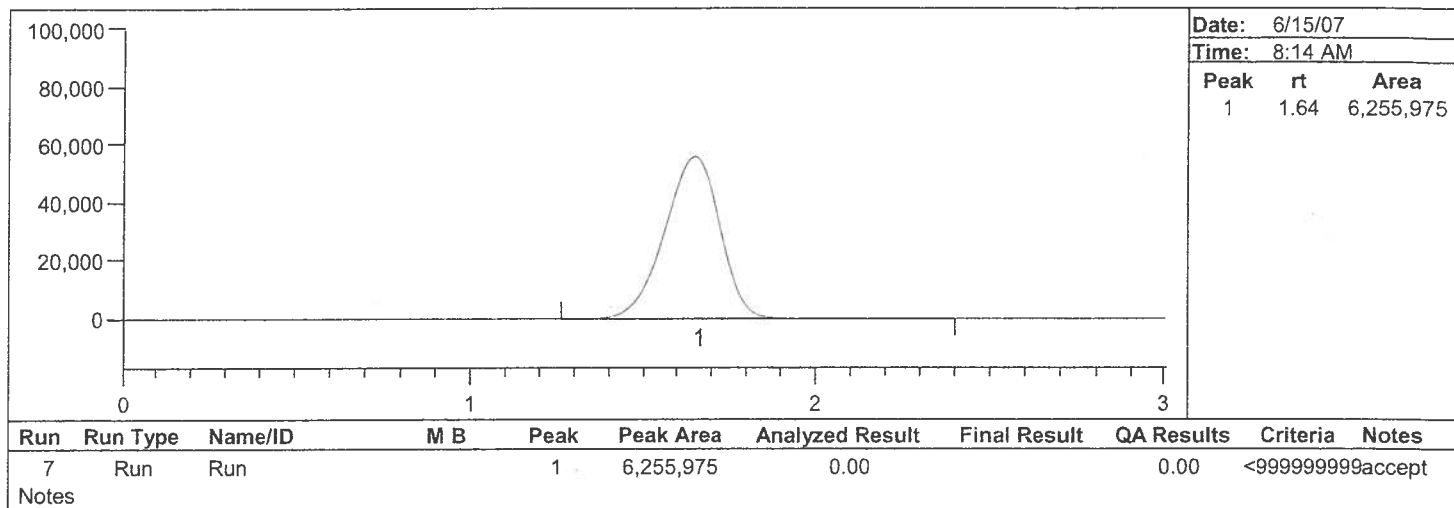
Brooks Rand Report #07BR0799

Batch Number: 07-0633

Method Number: THg

Project Number(s):
Instrument ID: br-10

Date Analyzed: ^{6/15/07}~~7/14/08~~ nm
Analyst Name: am



The spectra from runs 12-31, 33-45, 47-70, 72-87 were not part of batch # 07-0633 and were not included in this report, *eam 6/19/07*
Peak Report Brooks Rand Report #07BR0799

Batch Number: 07-0633

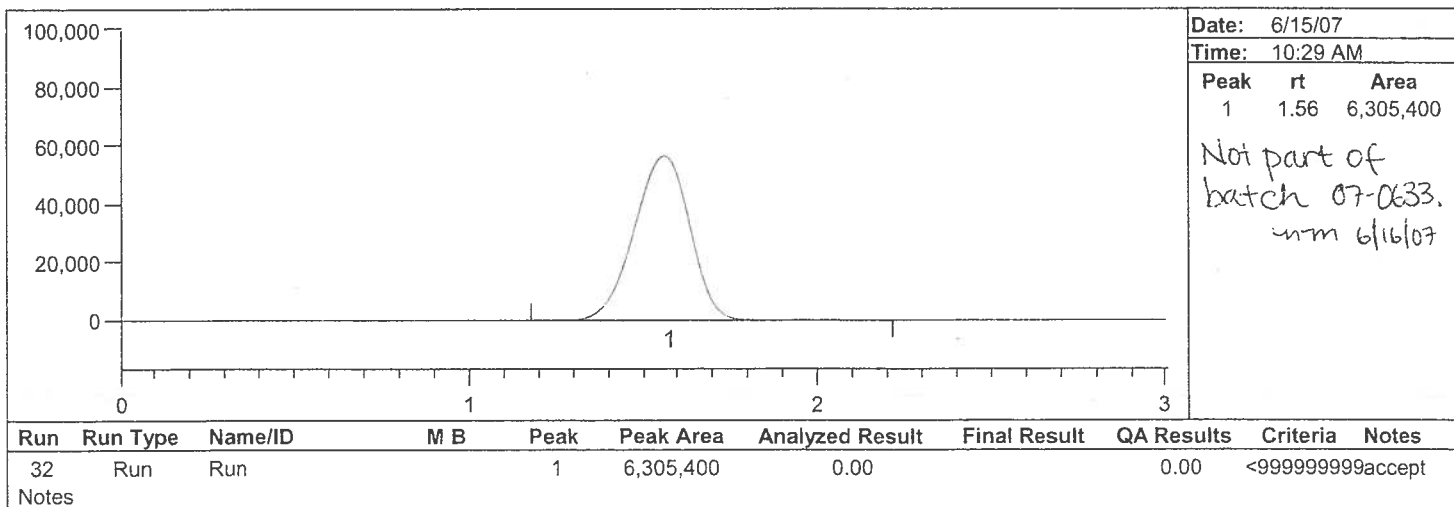
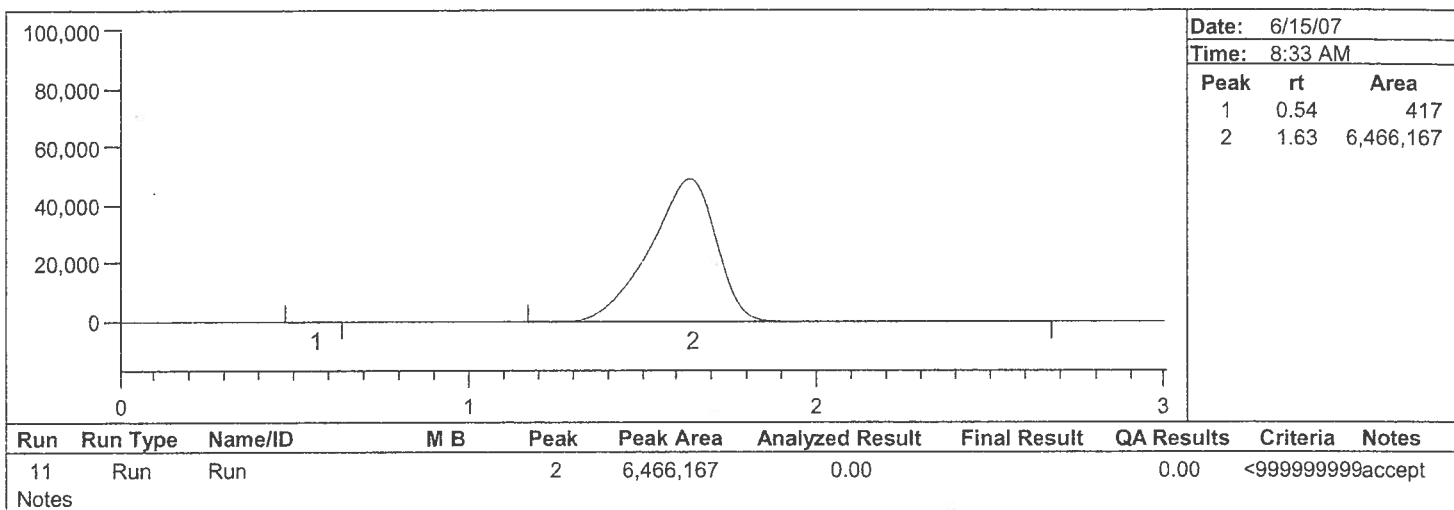
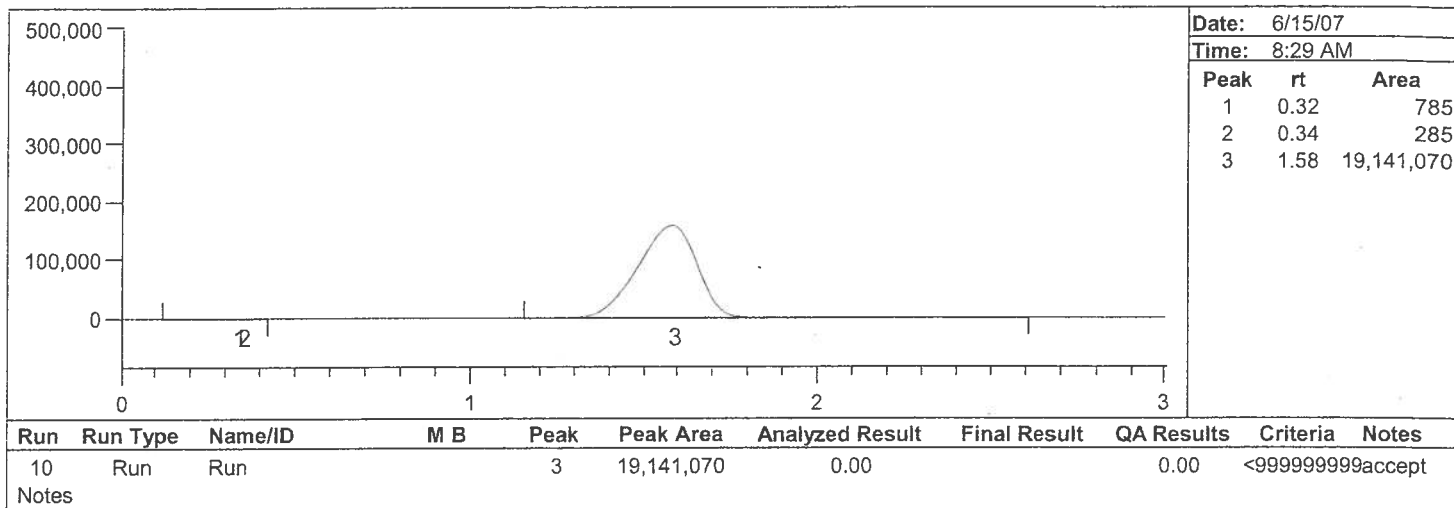
Method Number: THg

Project Number(s):

Instrument ID: br-10

Date Analyzed: *6/15/07* ~~7/14/06~~ *nm*

Analyst Name: am



Not part of batch 07-0633. nm 6/16/07

Peak Report

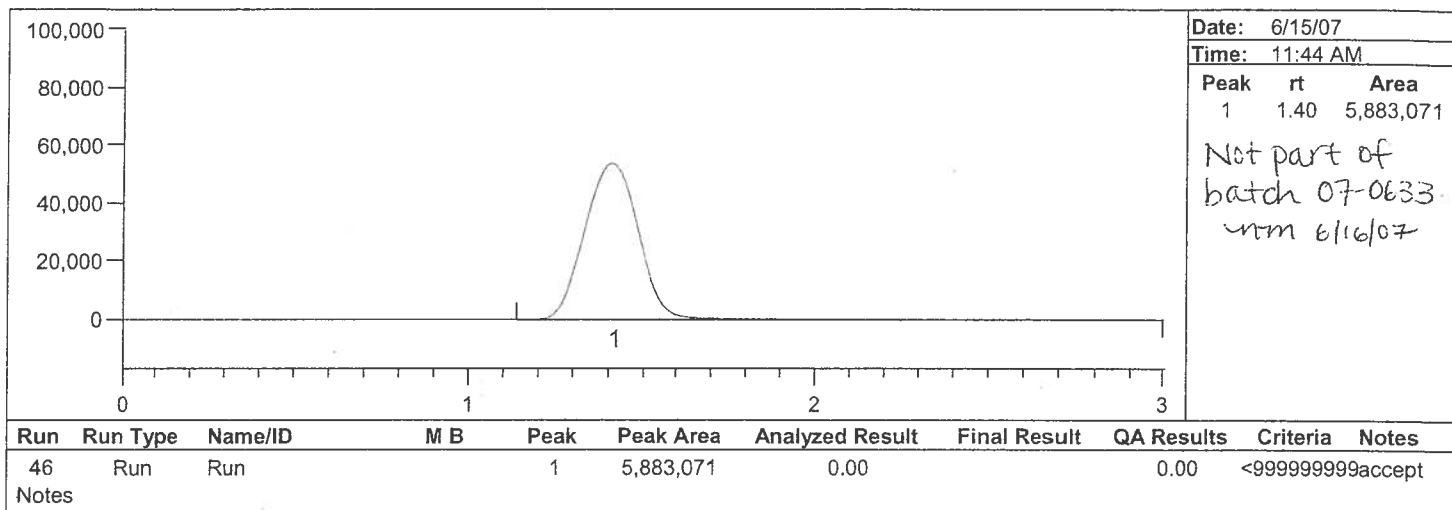
Brooks Rand Report #07BR0799

Batch Number: 07-0633

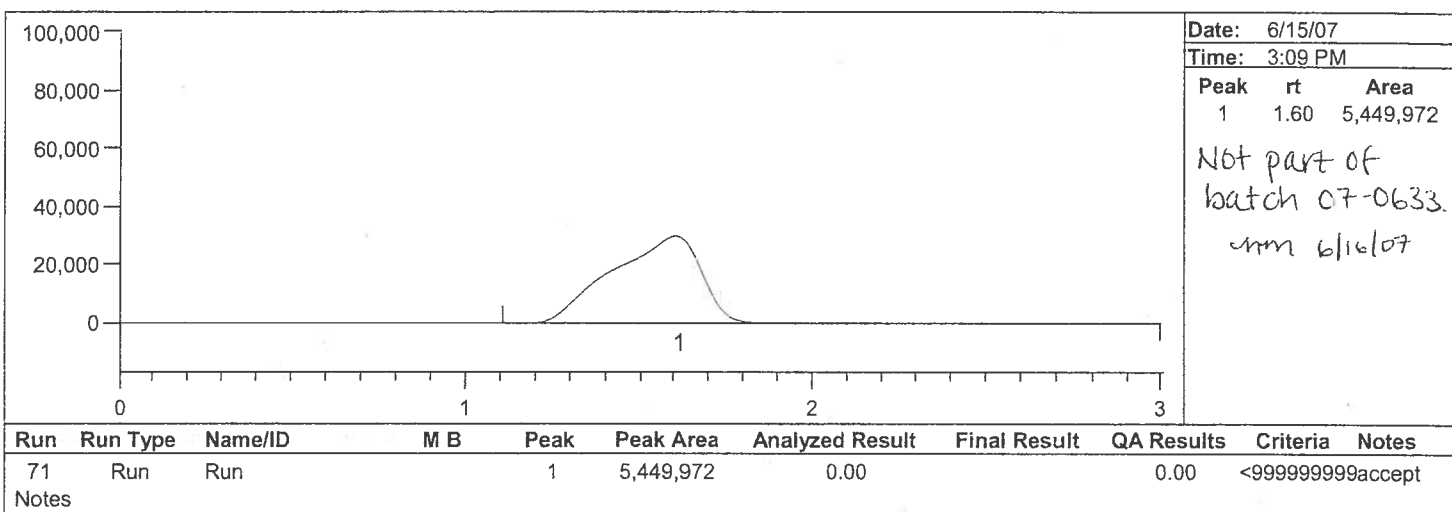
Method Number: THg

Project Number(s):
Instrument ID: br-10

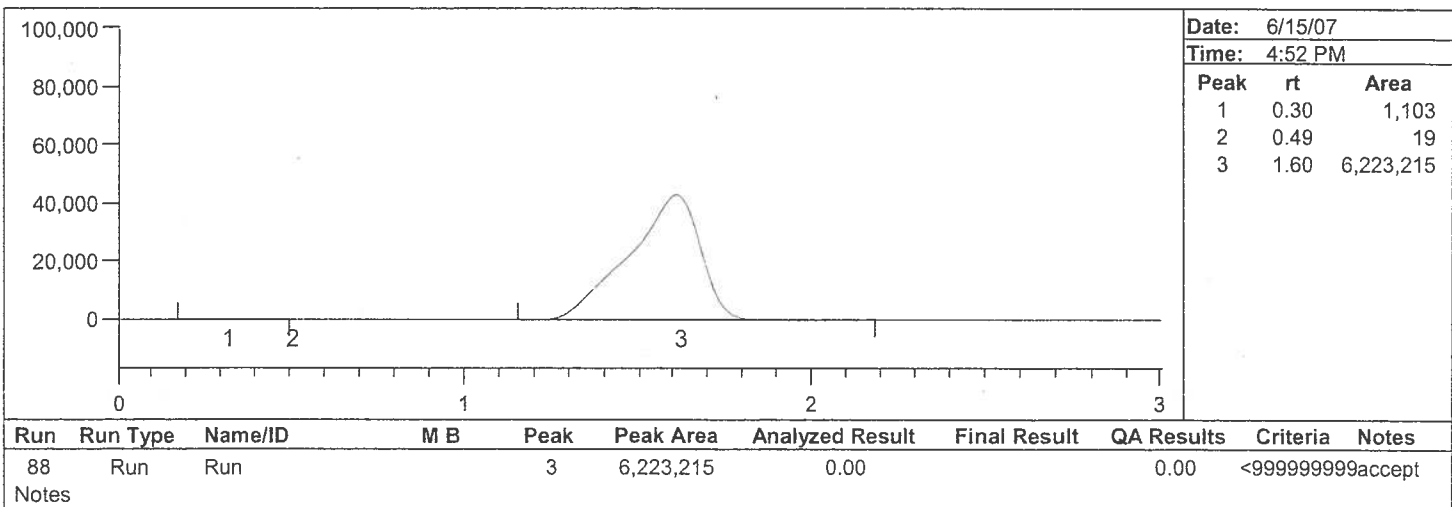
Date Analyzed: ^{6/15/07}~~7/14/06~~ nm
Analyst Name: am



Date: 6/15/07
Time: 11:44 AM
Peak rt Area
1 1.40 5,883,071
Not part of
batch 07-0633
nm 6/16/07



Date: 6/15/07
Time: 3:09 PM
Peak rt Area
1 1.60 5,449,972
Not part of
batch 07-0633
nm 6/16/07



Date: 6/15/07
Time: 4:52 PM
Peak rt Area
1 0.30 1,103
2 0.49 19
3 1.60 6,223,215

Peak Report

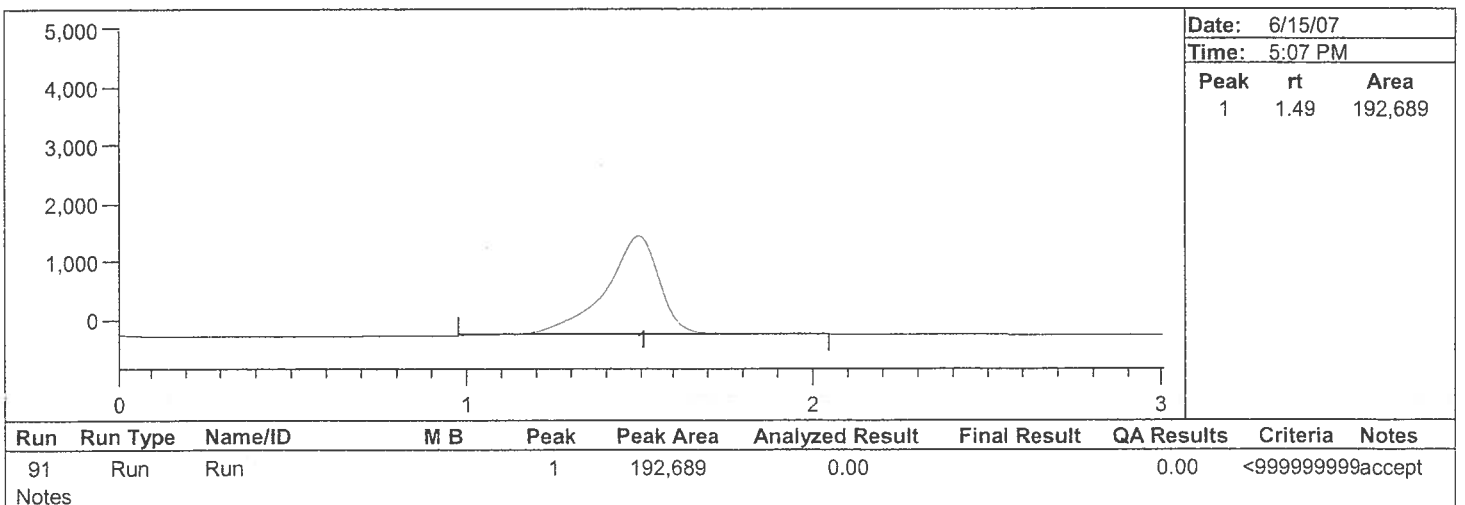
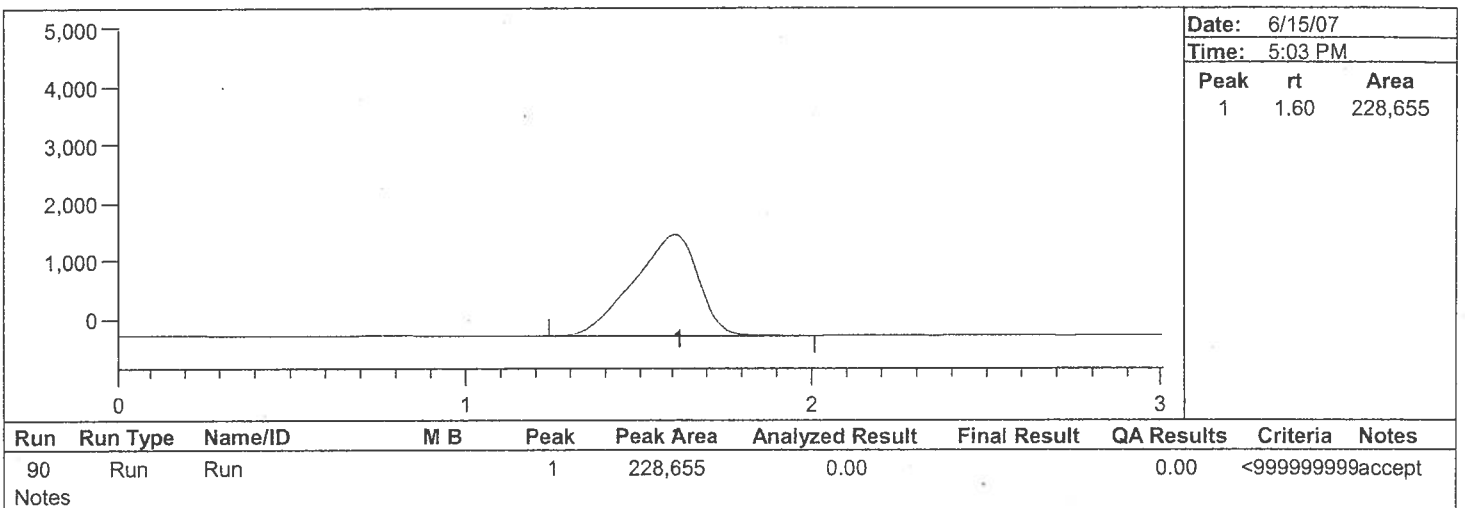
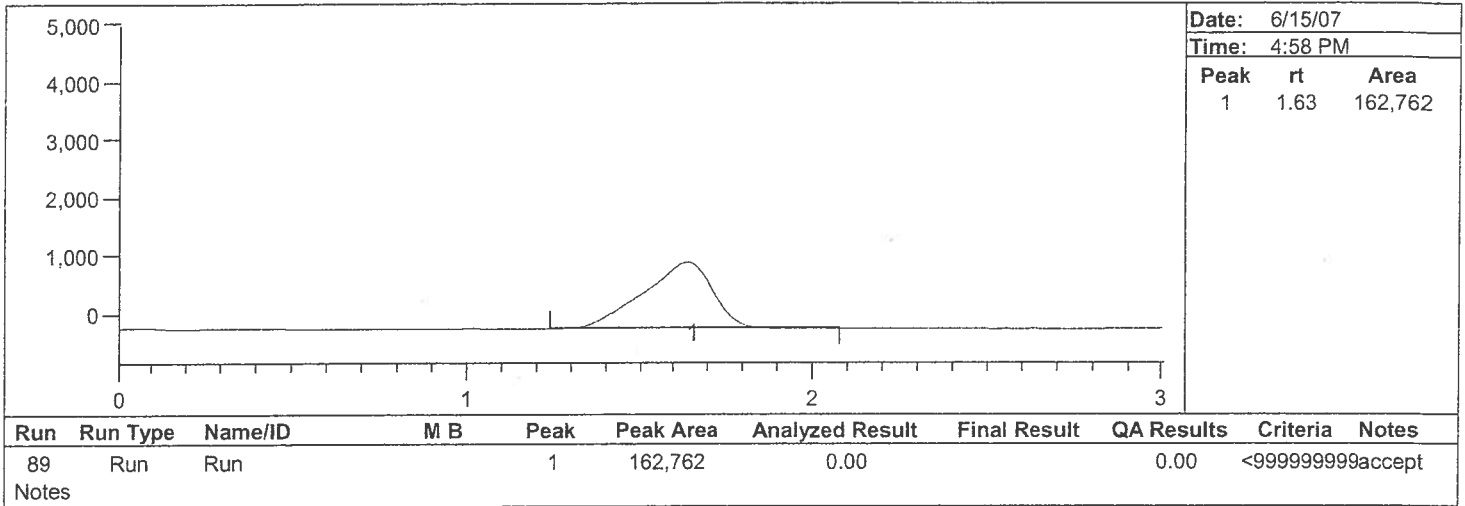
Brooks Rand Report #07BR0799

Batch Number: 07-0633

Method Number: THg

Project Number(s):
Instrument ID: br-10

Date Analyzed: 6/15/07
7/14/06 nm
Analyst Name: am



Peak Report

Brooks Rand Report #07BR0799

Batch Number: 07-0633

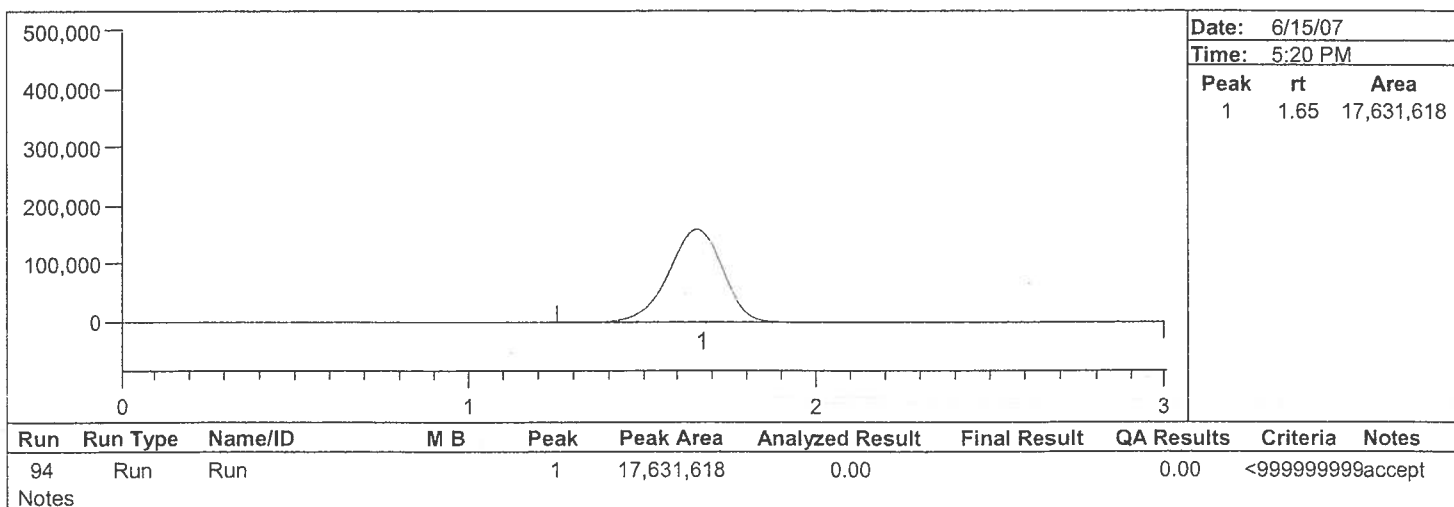
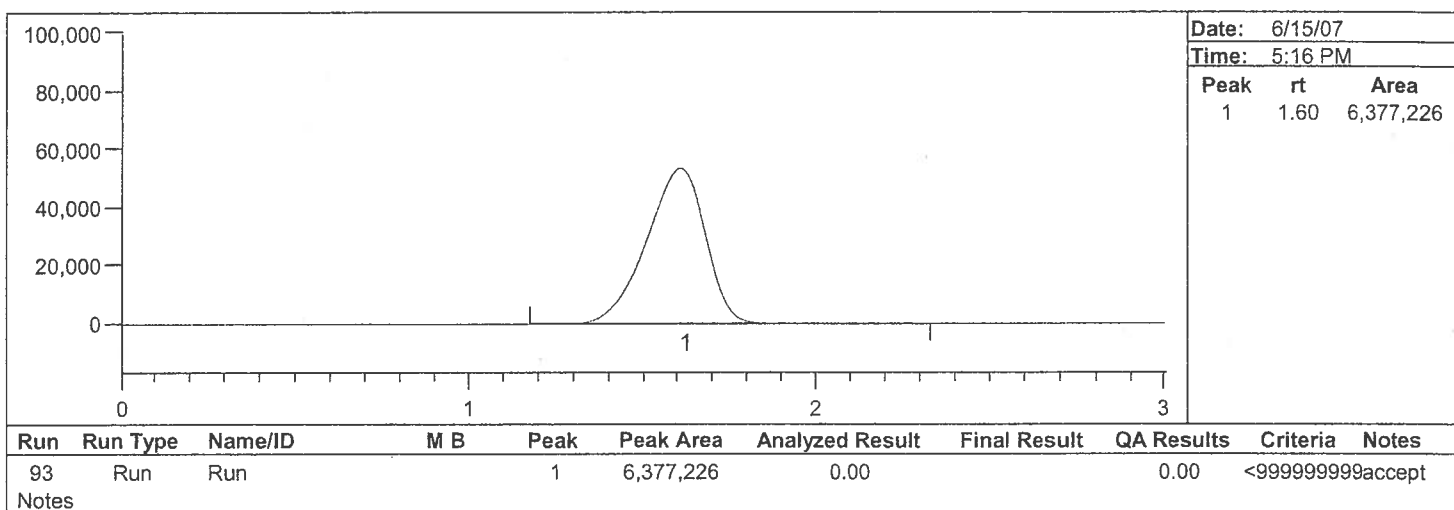
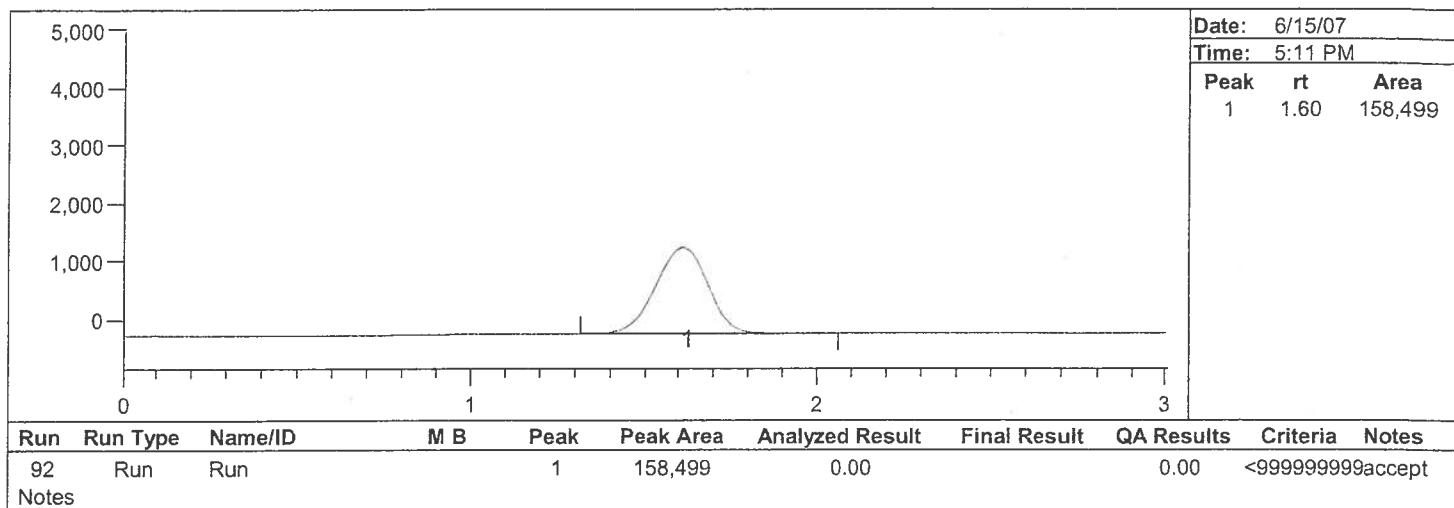
Method Number: THg

Project Number(s):

Instrument ID: br-10

Date Analyzed: 6/15/07 7:14:06 mm

Analyst Name: am



Peak Report

Brooks Rand Report #07BR0799

Batch Number: 07-0633

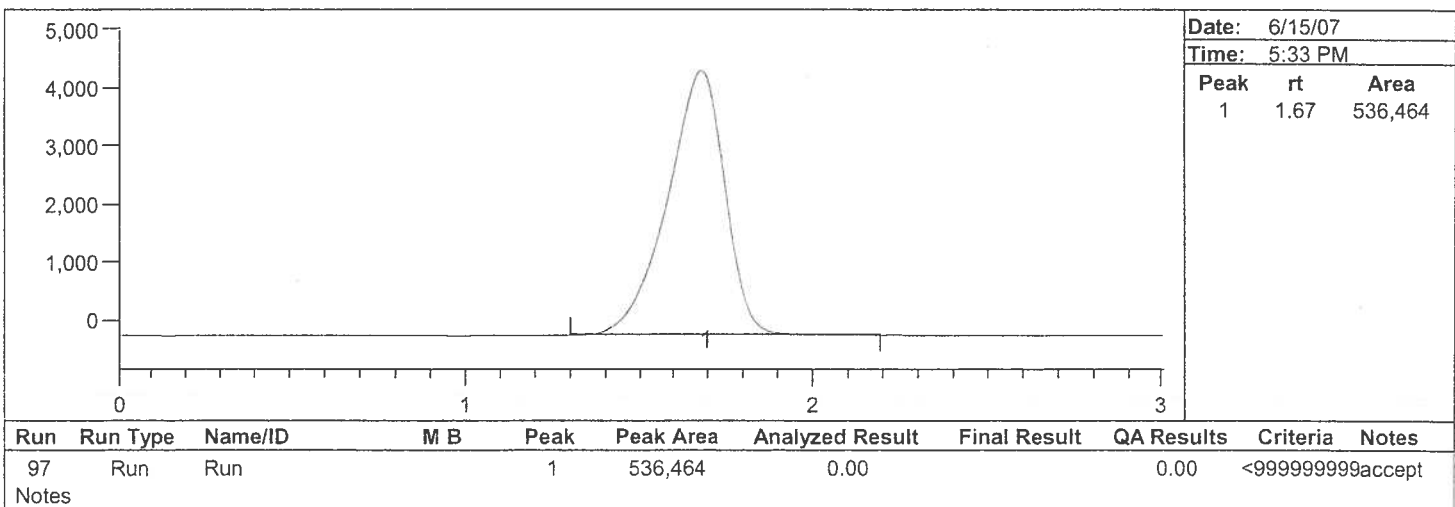
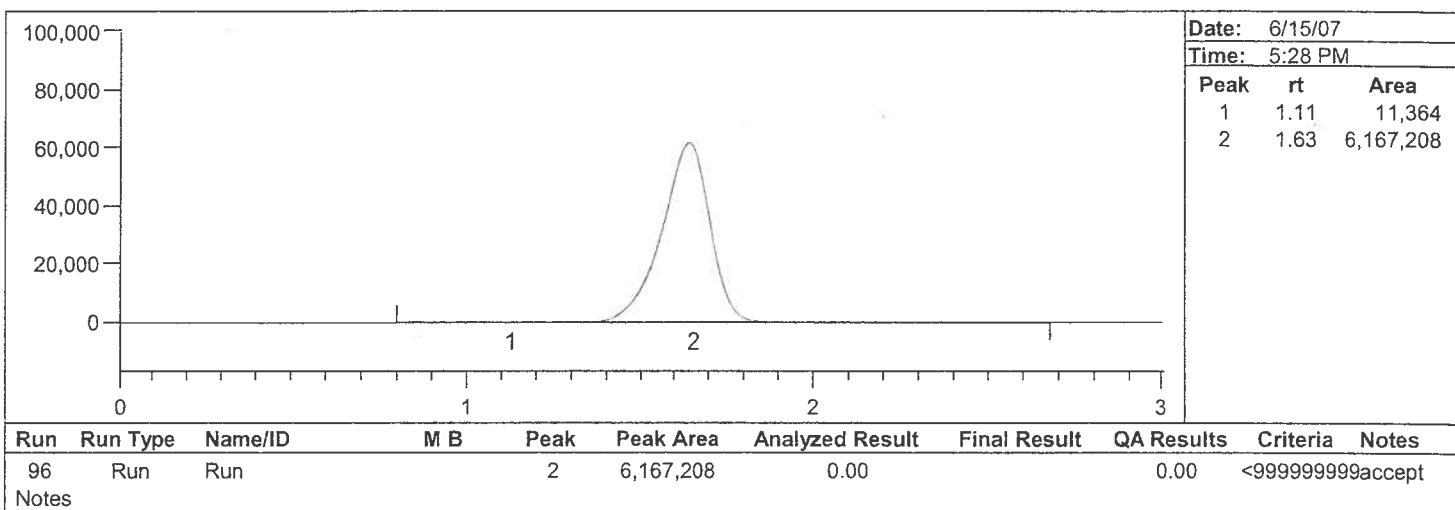
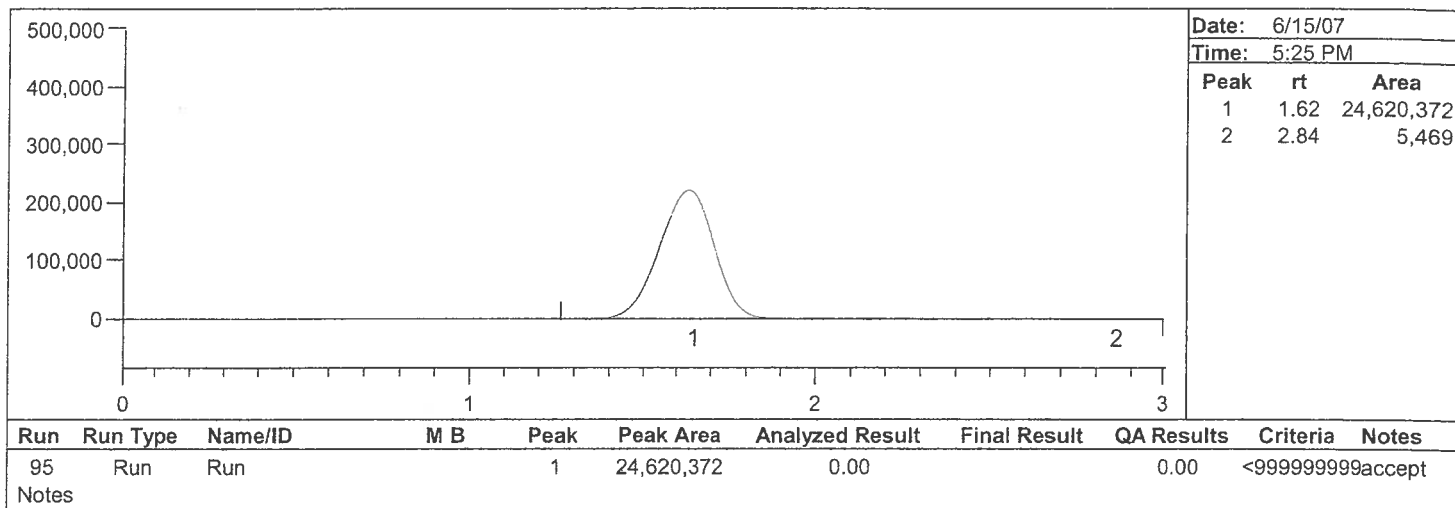
Method Number: THg

Project Number(s):

Instrument ID: br-10

Date Analyzed: ^{6/15/07}~~7/14/06~~ mm

Analyst Name: am



Peak Report

Brooks Rand Report #07BR0799

Batch Number: 07-0633

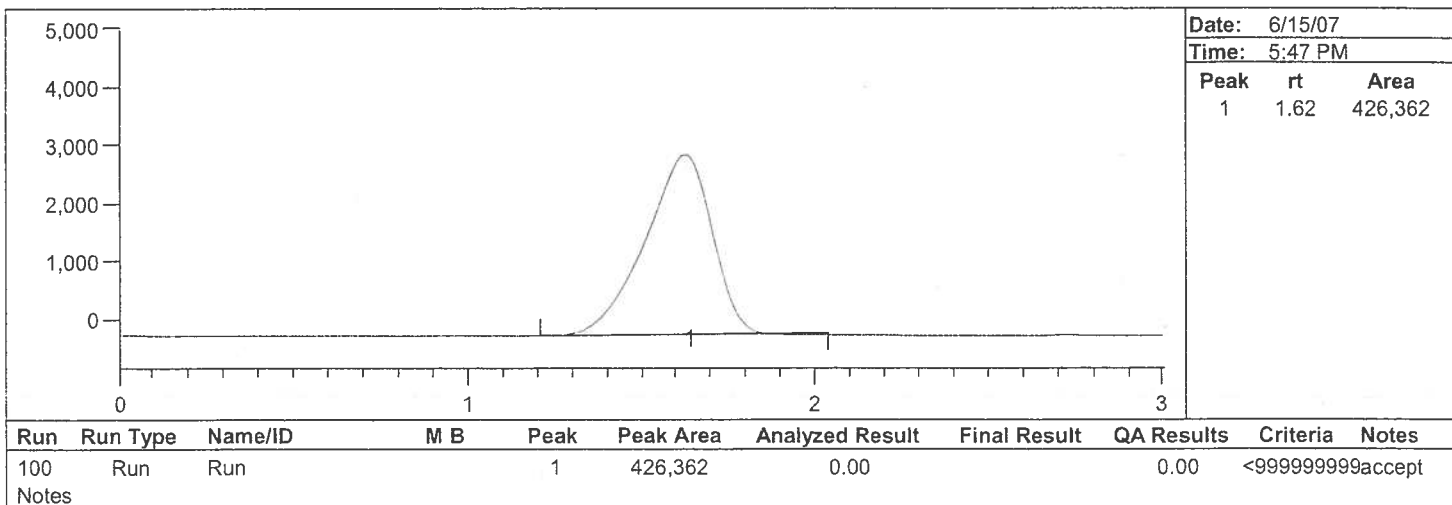
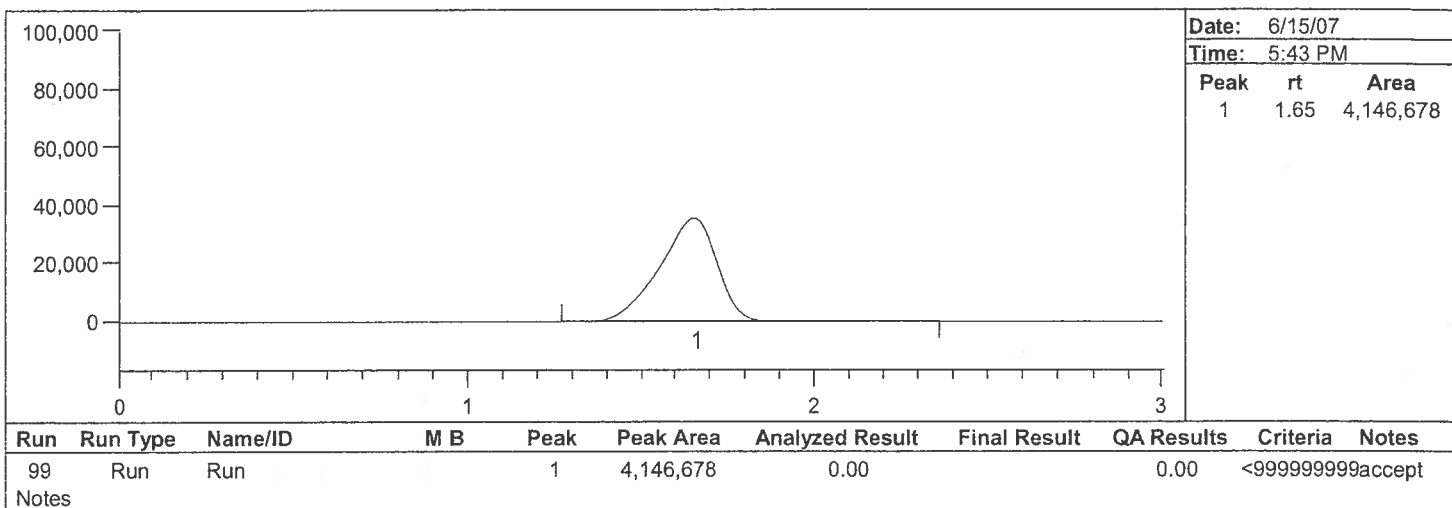
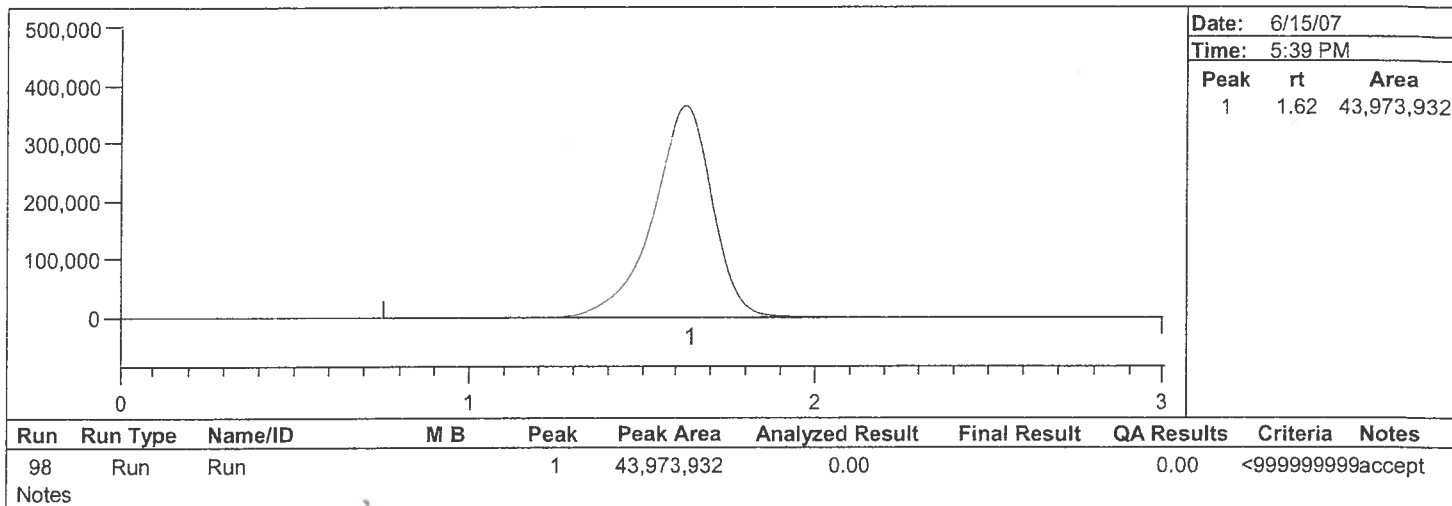
Method Number: THg

Project Number(s):

Instrument ID: br-10

Date Analyzed: ^{6/15/07}~~7/14/06~~ ^{irm}

Analyst Name: am



Peak Report

Brooks Rand Report #07BR0799

Batch Number: 07-0633

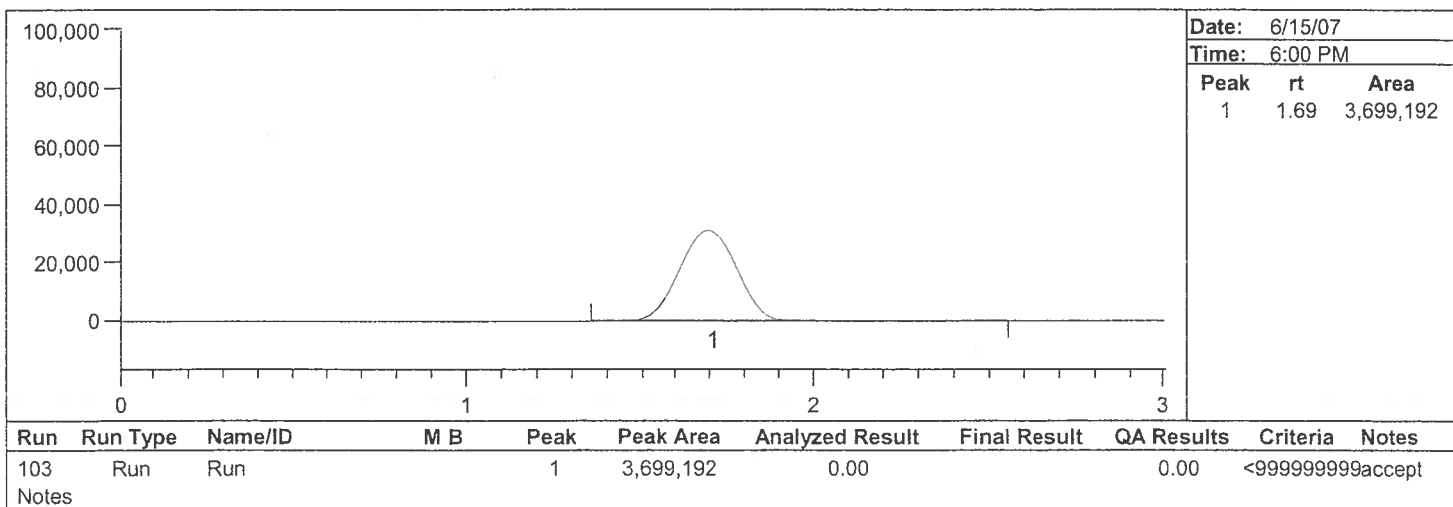
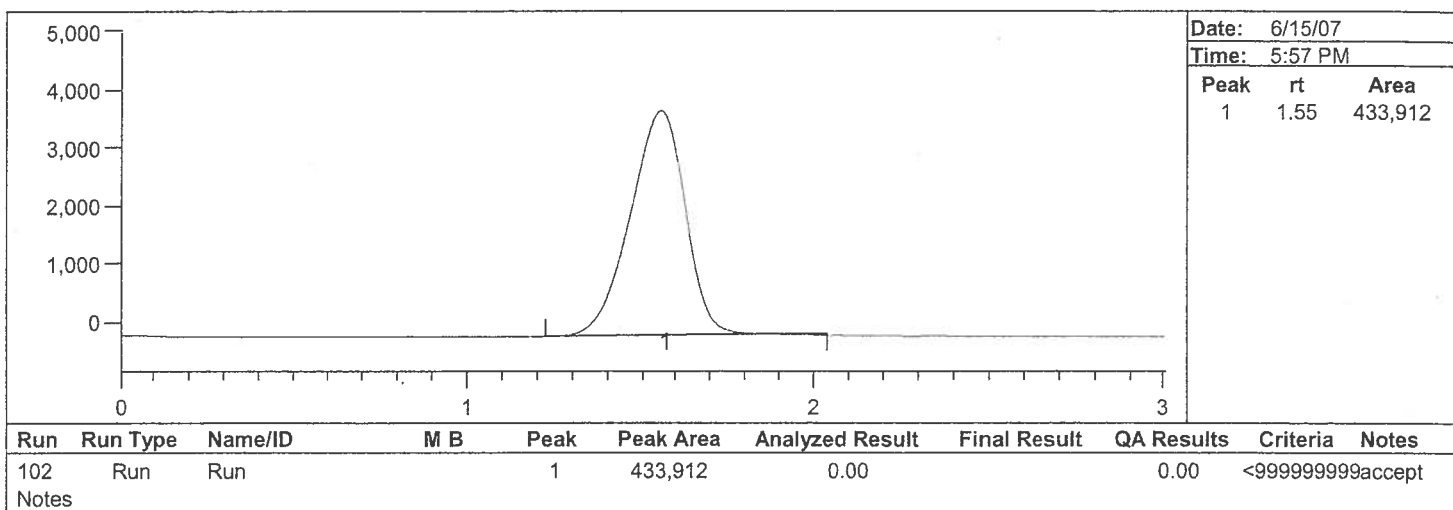
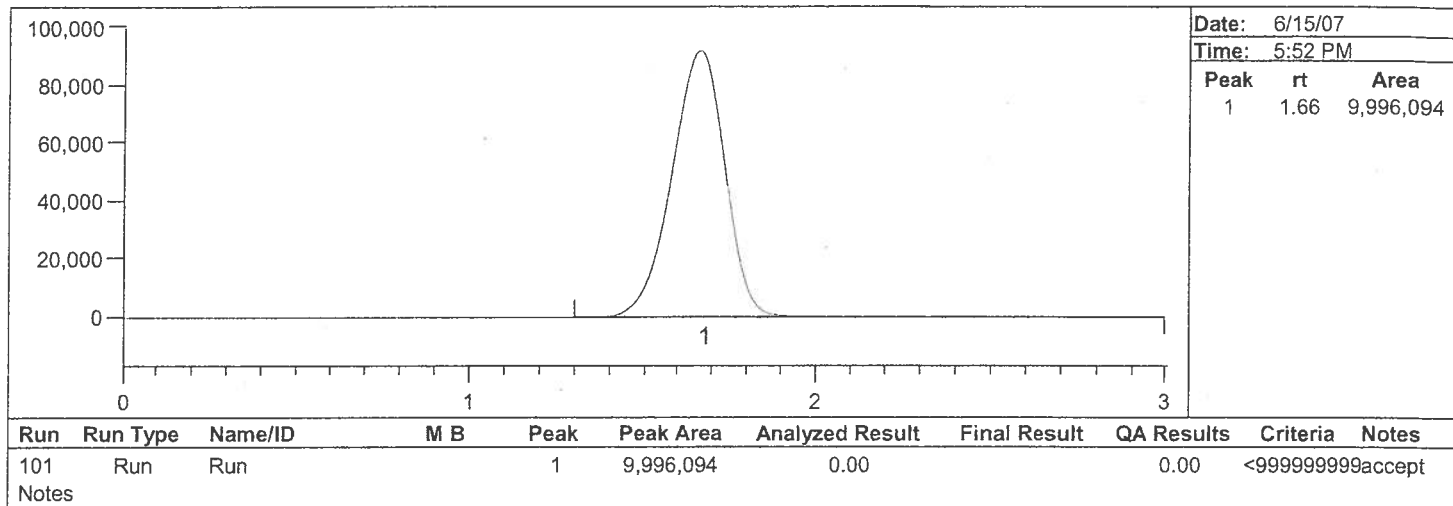
Method Number: THg

Project Number(s):

Instrument ID: br-10

Date Analyzed: ^{6/15/07}~~7/14/06~~ mm

Analyst Name: am



Peak Report

Brooks Rand Report #07BR0799

Batch Number: 07-0633

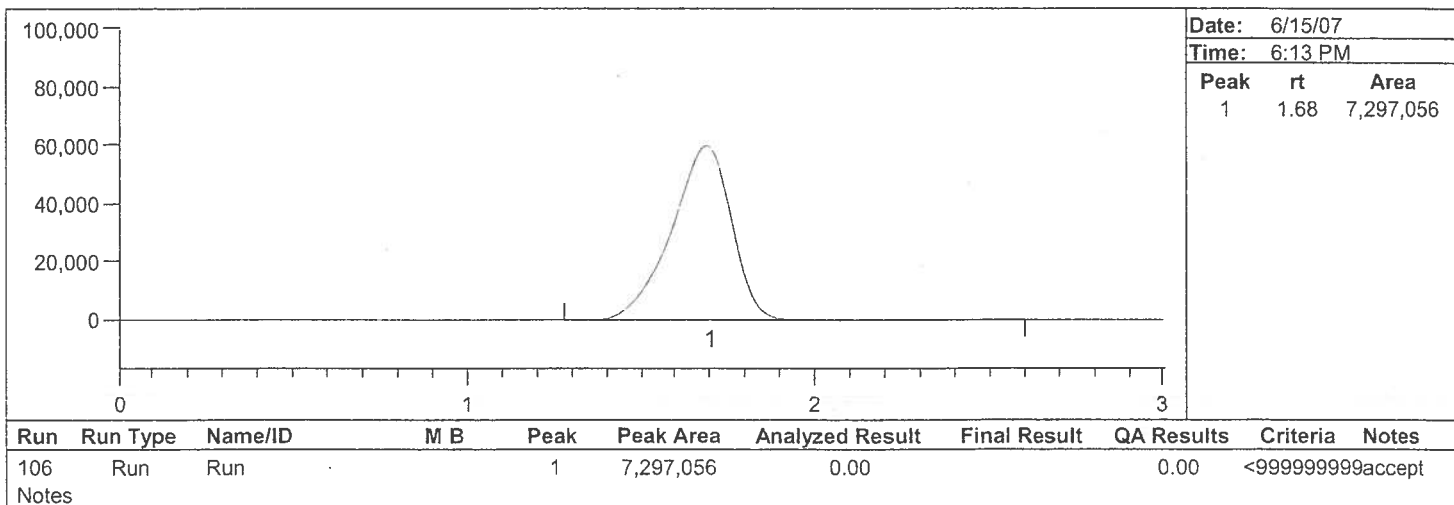
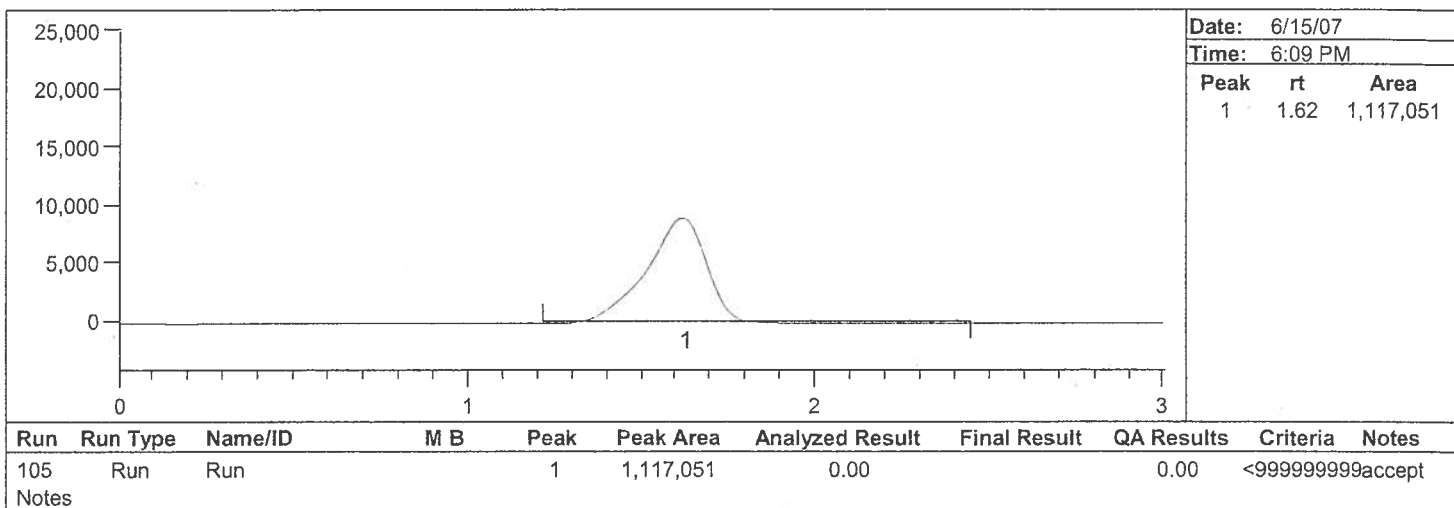
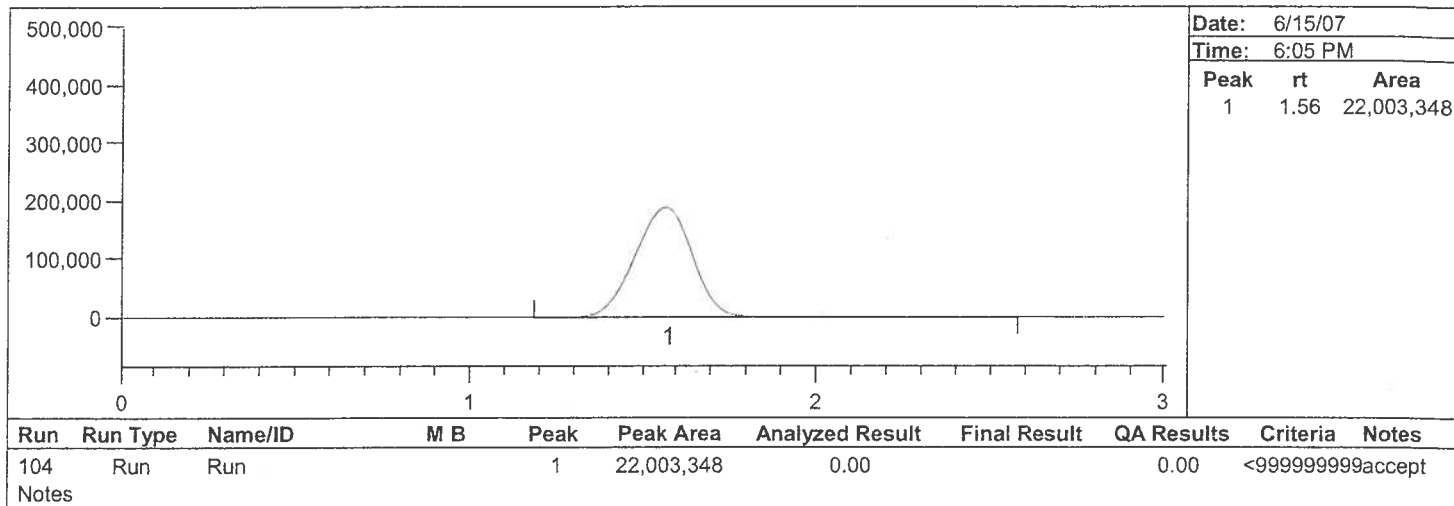
Method Number: THg

Project Number(s):

Instrument ID: br-10

Date Analyzed: 6/15/07 7:14/06 nm

Analyst Name: am



Peak Report

Brooks Rand Report #07BR0799

Batch Number: 07-0633

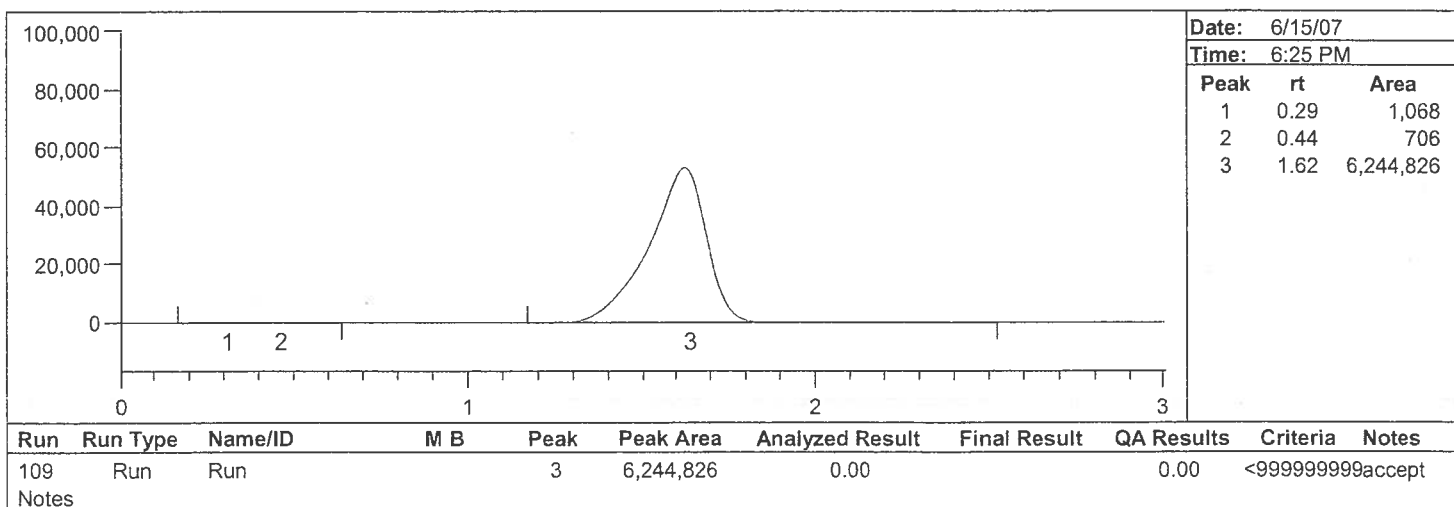
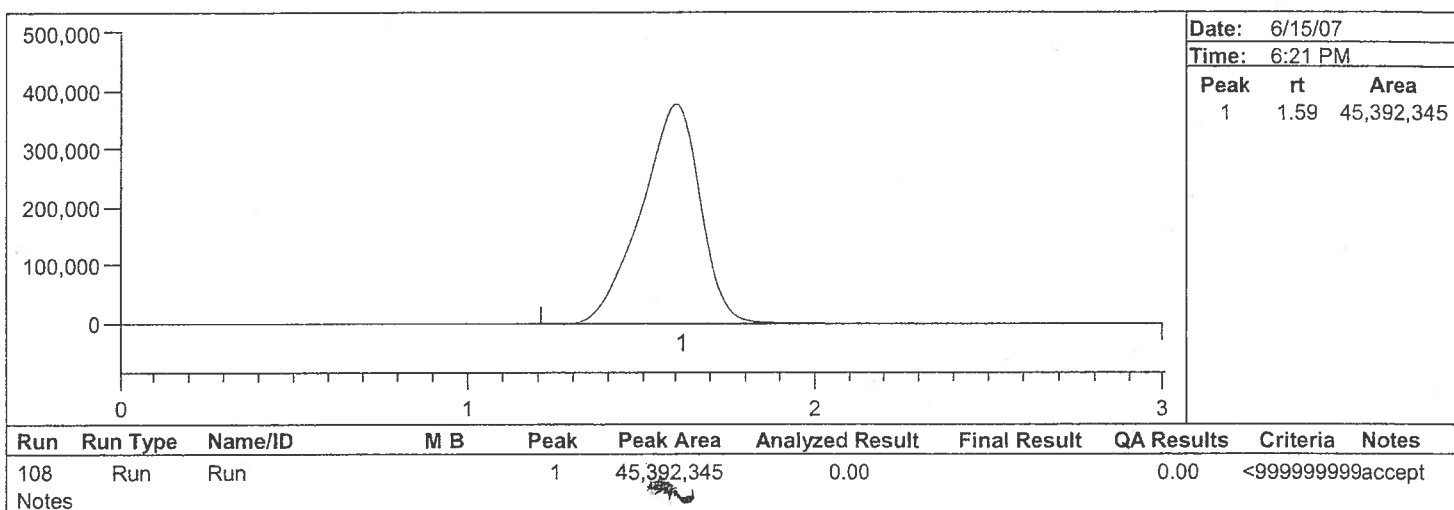
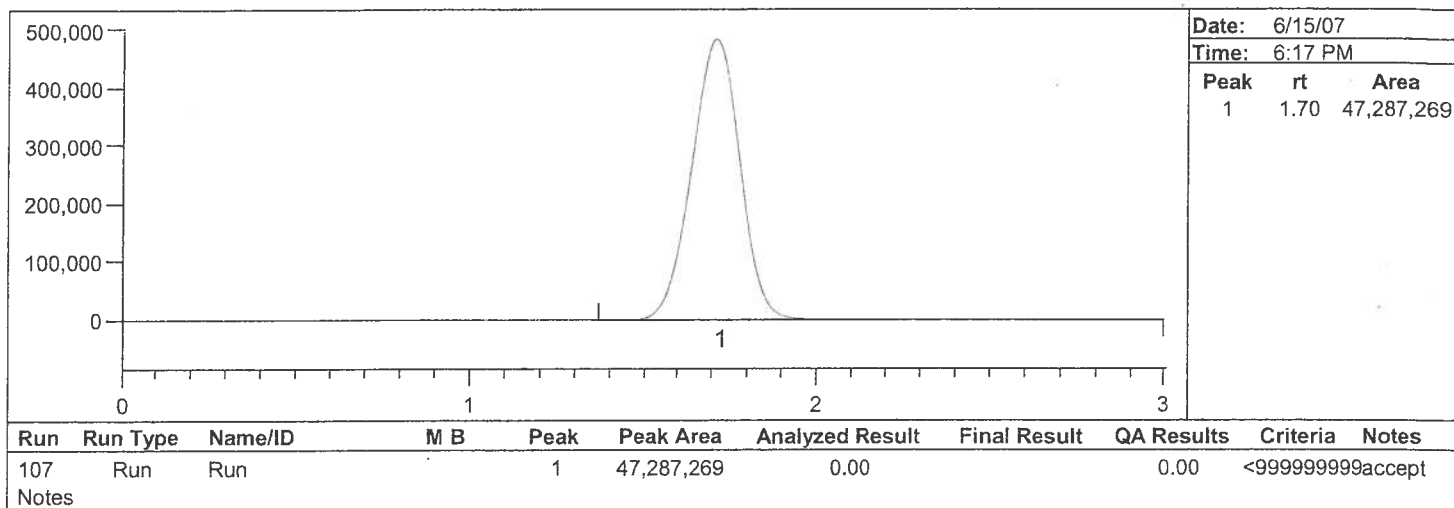
Method Number: THg

Project Number(s):

Instrument ID: br-10

Date Analyzed: 6/15/07 7:14 PM

Analyst Name: am



Peak Report

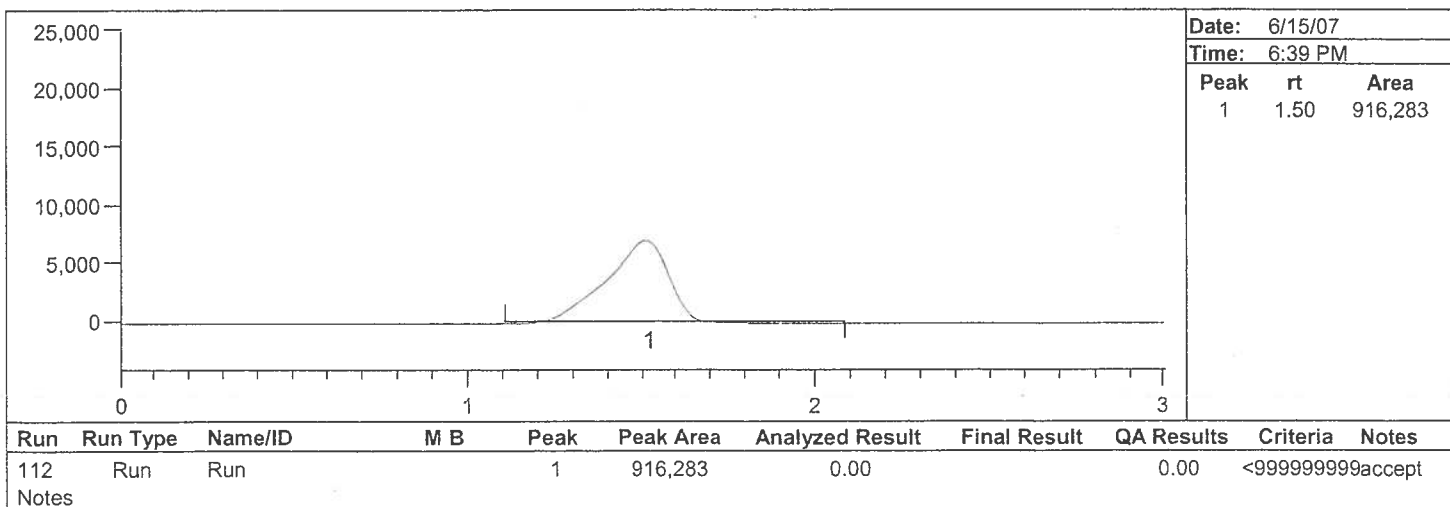
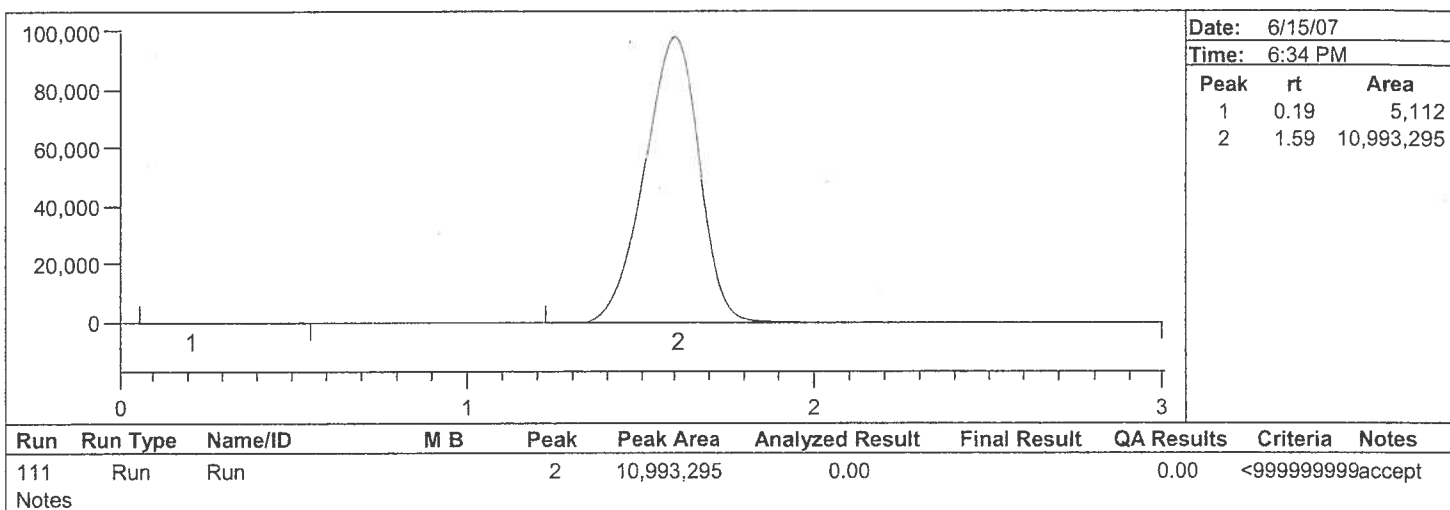
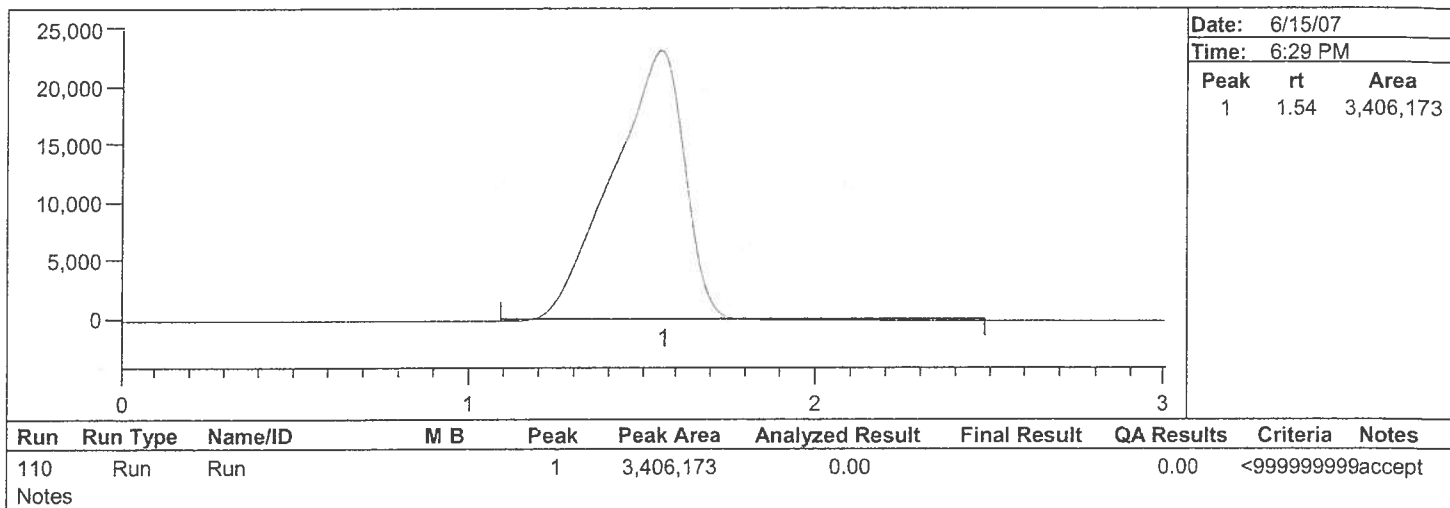
Brooks Rand Report #07BR0799

Batch Number: 07-0633

Method Number: THg

Project Number(s):
Instrument ID: br-10

Date Analyzed: ^{6/15/07}~~7/14/06~~ am
Analyst Name: am



Peak Report

Brooks Rand Report #07BR0799

Batch Number: 07-0633

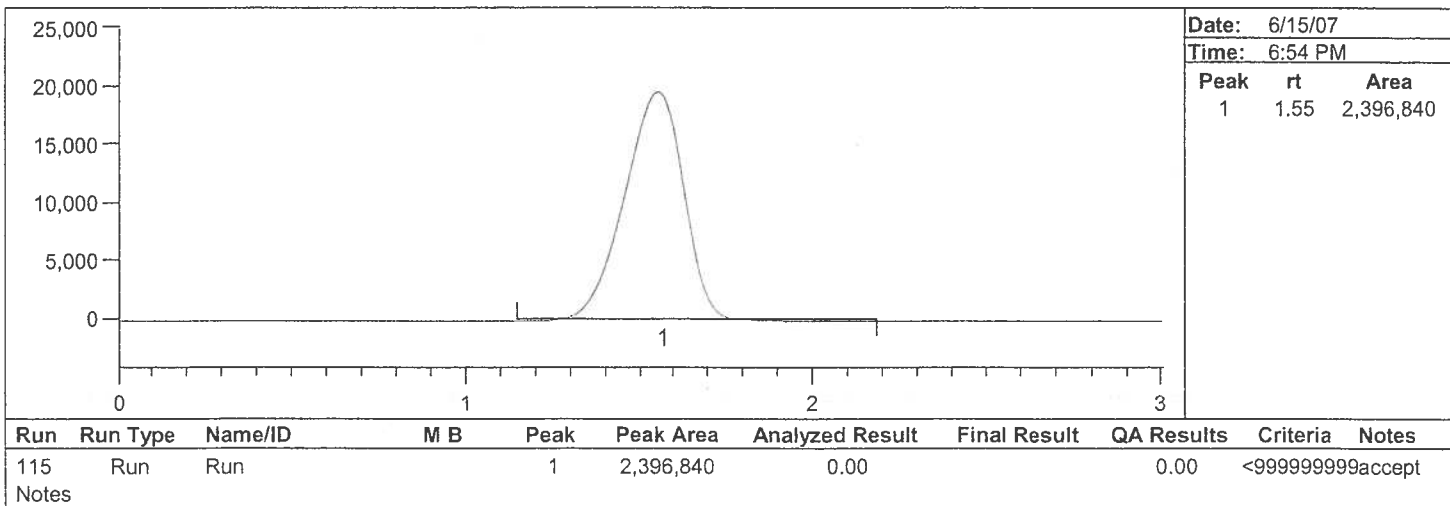
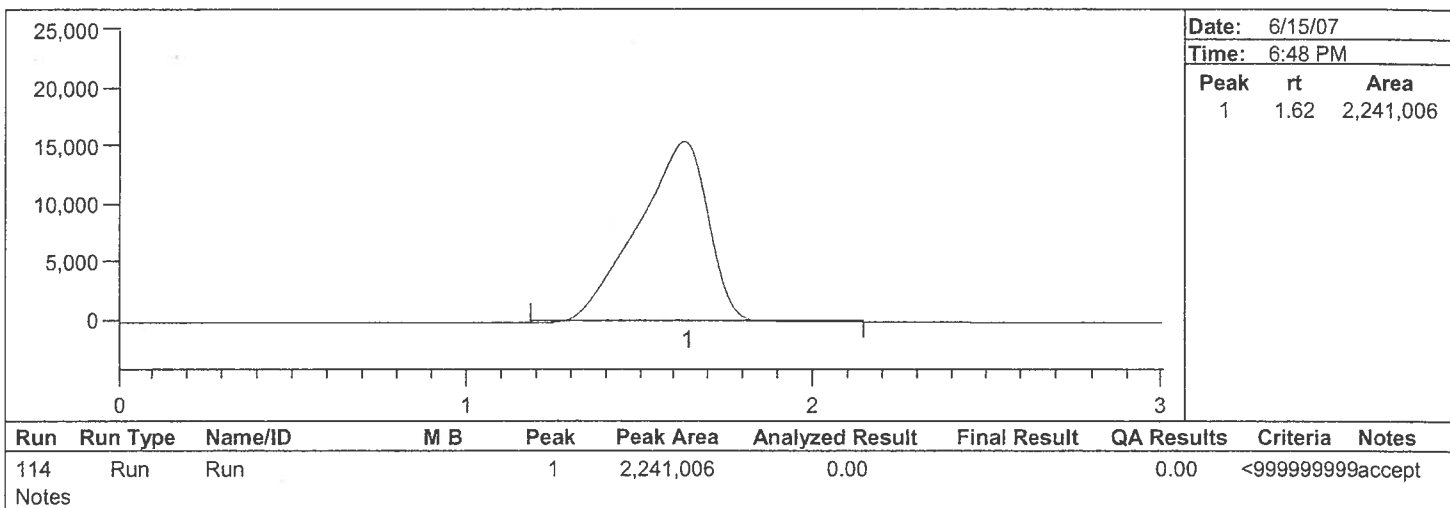
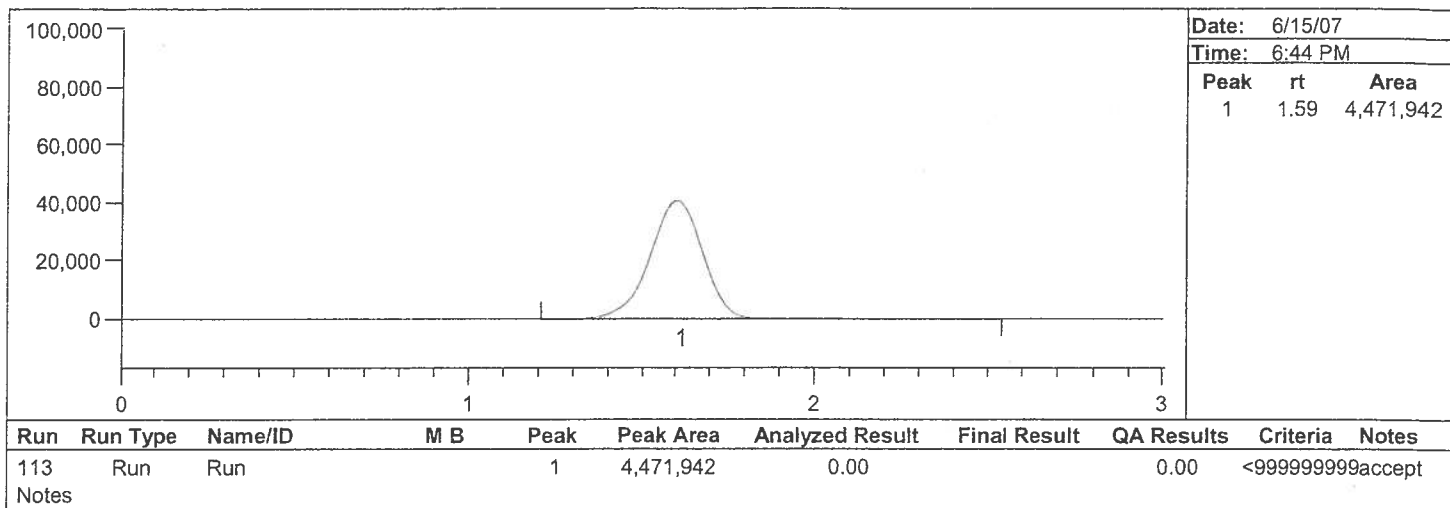
Method Number: THg

Project Number(s):

Instrument ID: br-10

Date Analyzed: 6/15/07 7:14 PM

Analyst Name: am



Peak Report

Brooks Rand Report #07BR0799

Batch Number: 07-0633

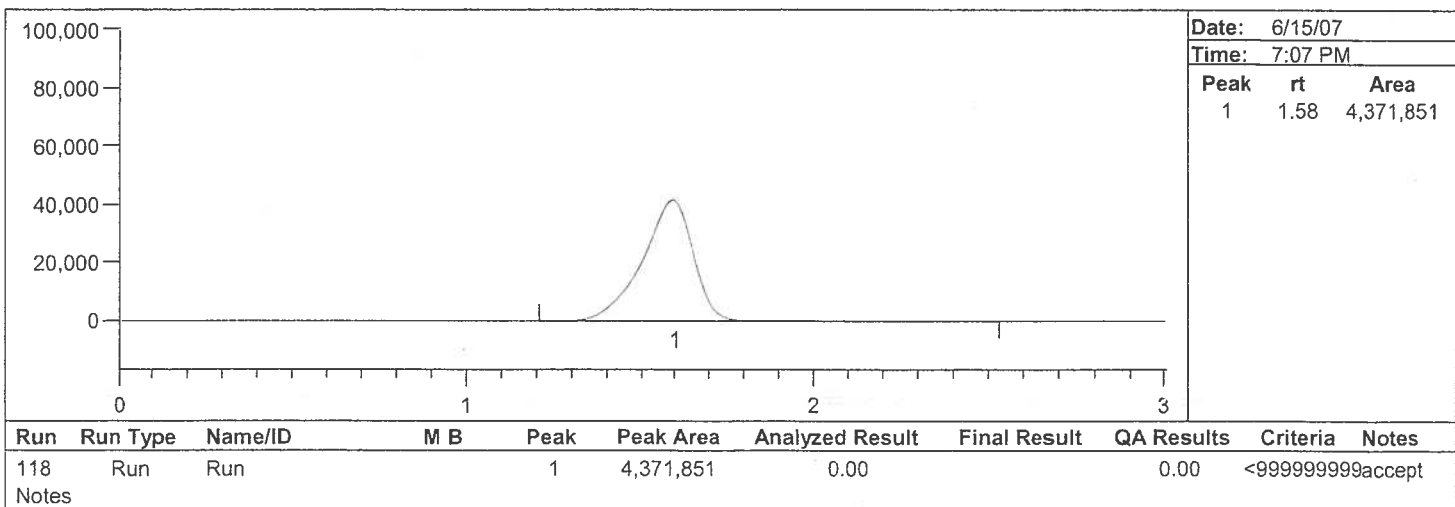
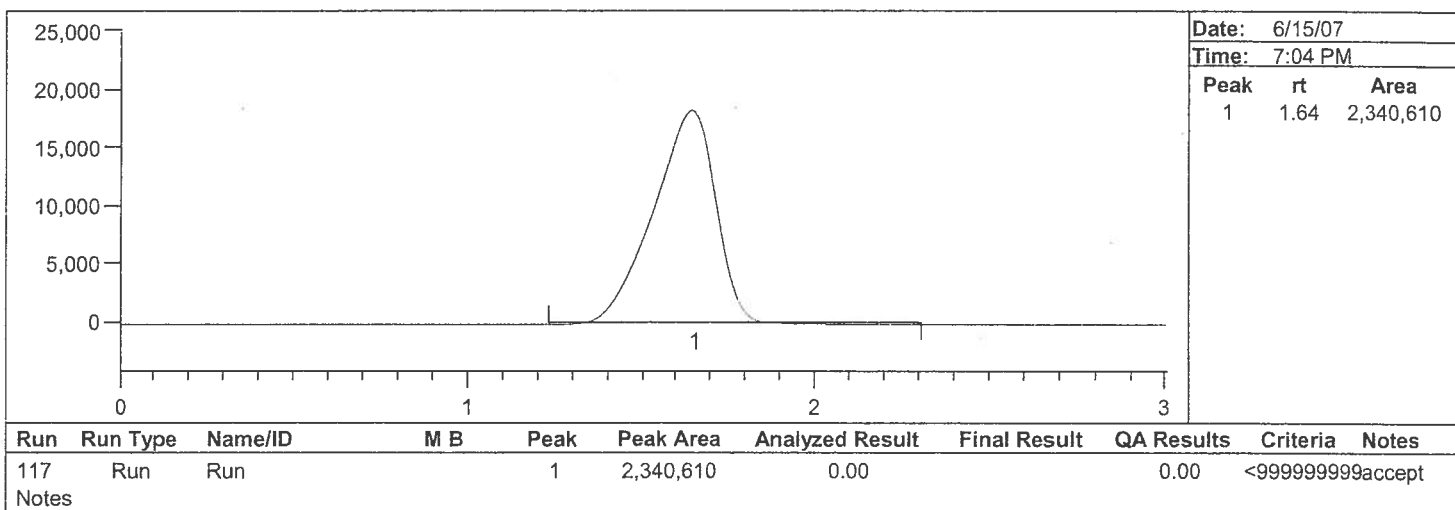
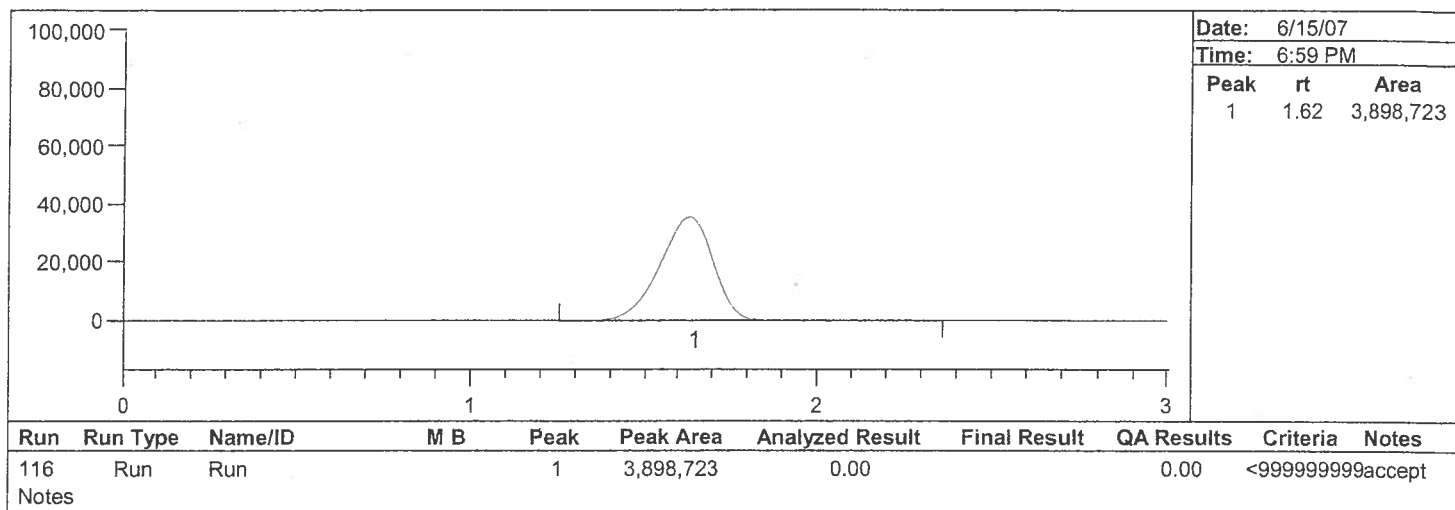
Method Number: THg

Project Number(s):

Instrument ID: br-10

Date Analyzed: 6/15/07 7:14/06 mm

Analyst Name: am



Peak Report

Brooks Rand Report #07BR0799

Batch Number: 07-0633

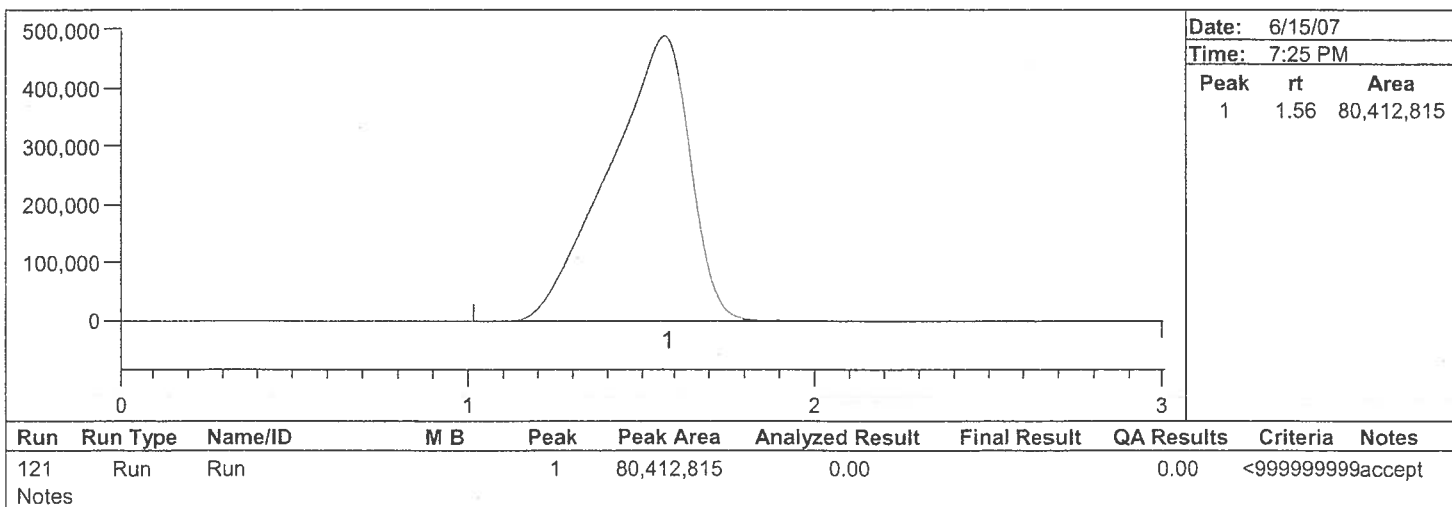
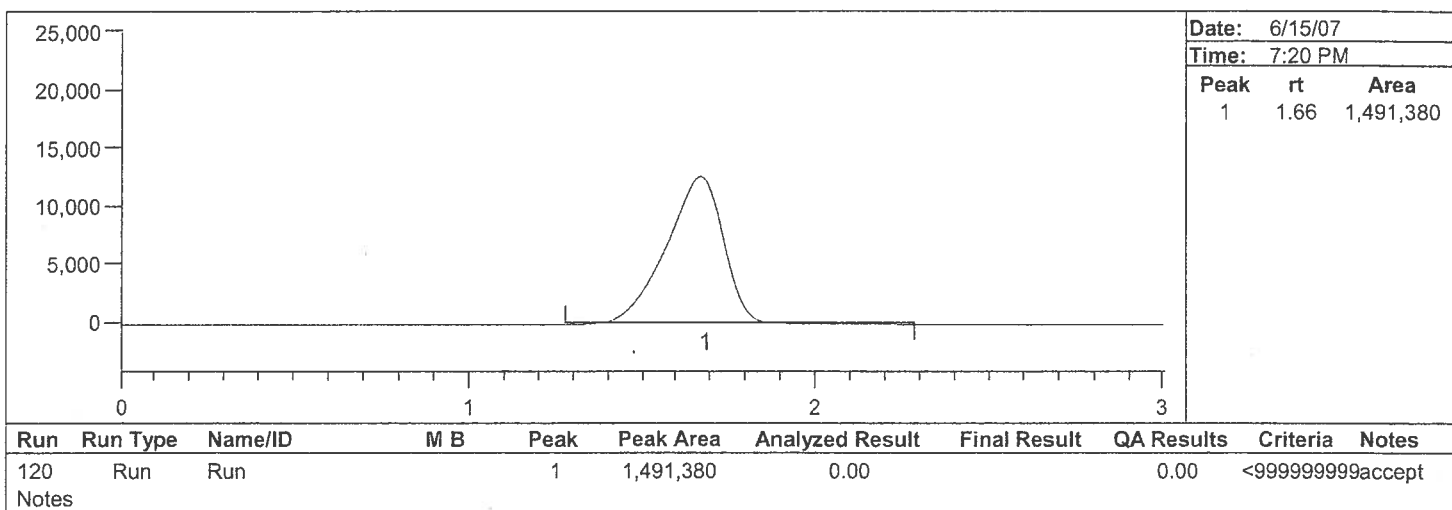
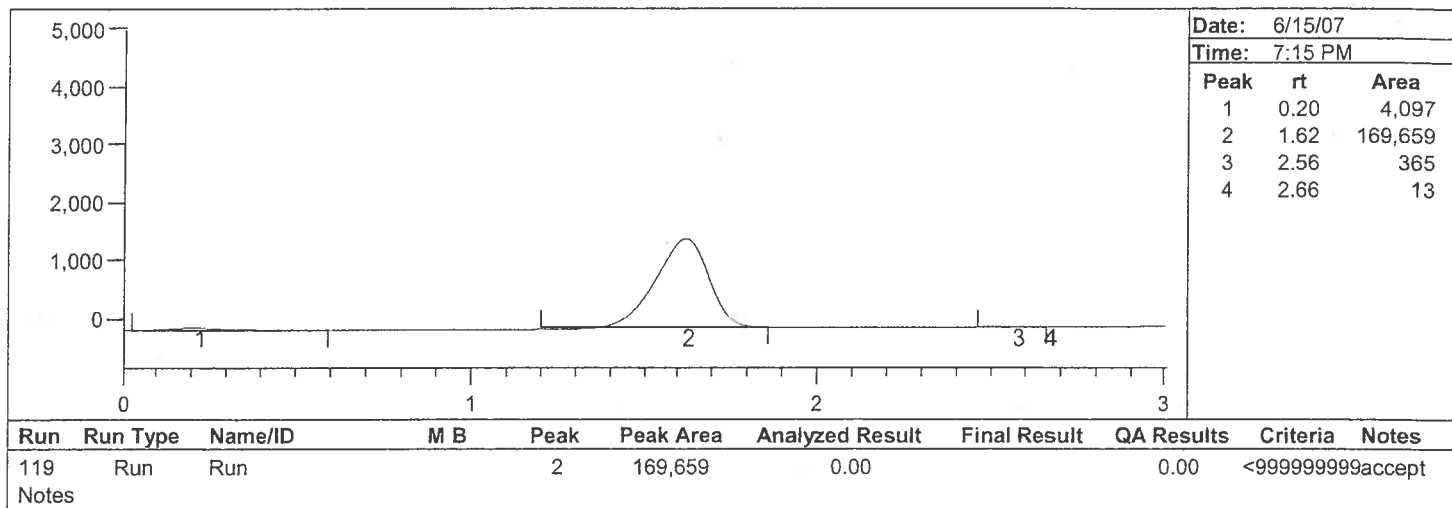
Method Number: THg

Project Number(s):

Instrument ID: br-10

Date Analyzed: ^{6/15/07}~~7/14/06~~ mm

Analyst Name: am



Peak Report

Brooks Rand Report #07BR0799

Batch Number: 07-0633

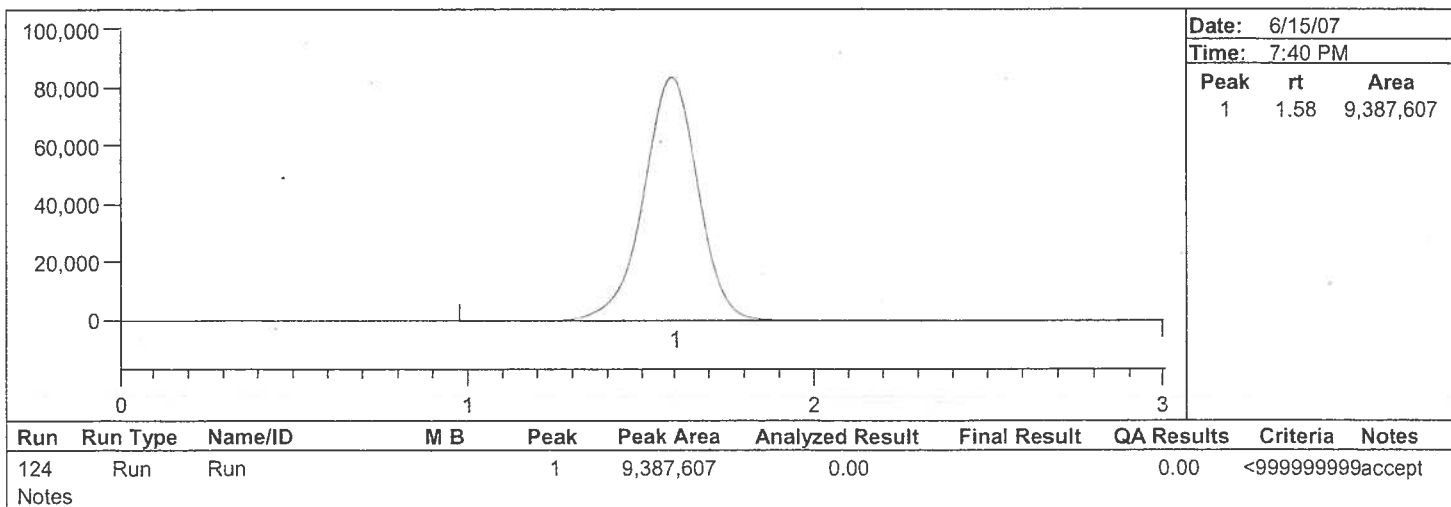
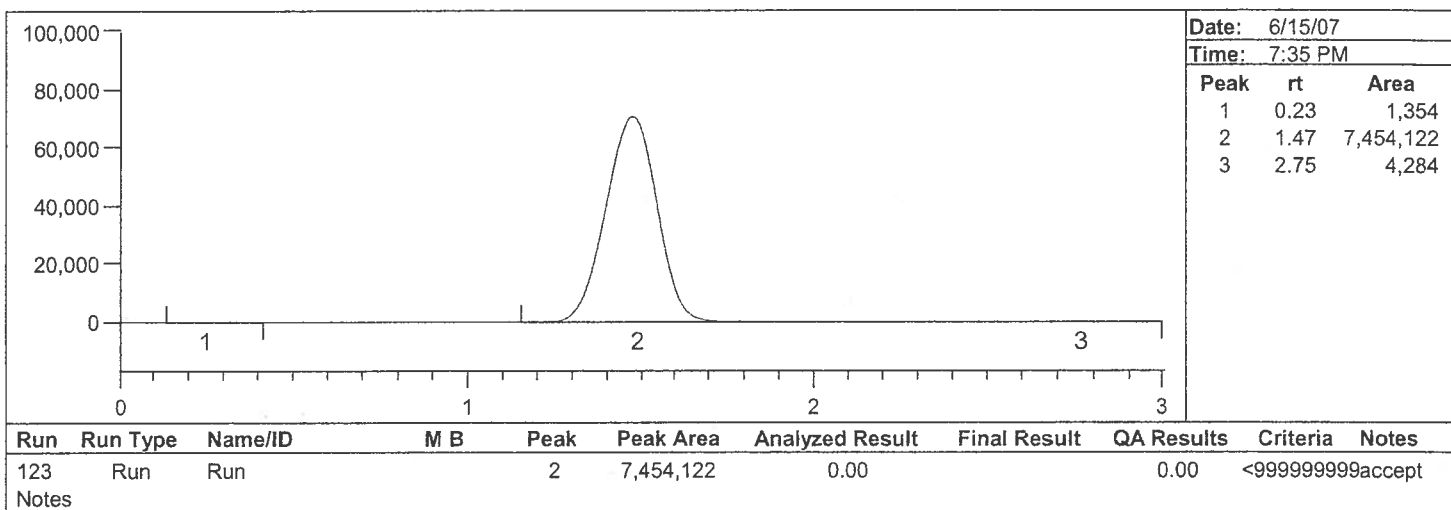
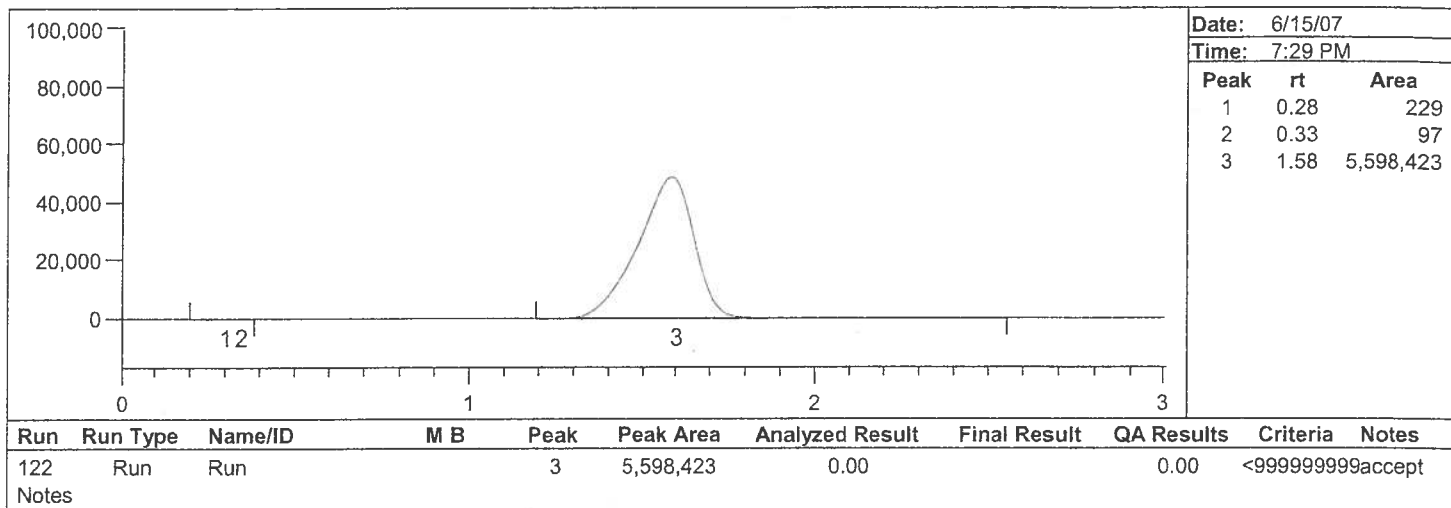
Method Number: THg

Project Number(s):

Instrument ID: br-10

Date Analyzed: 6/15/07 7:14:06 nm

Analyst Name: am



Peak Report

Brooks Rand Report #07BR0799

Batch Number: 07-0633

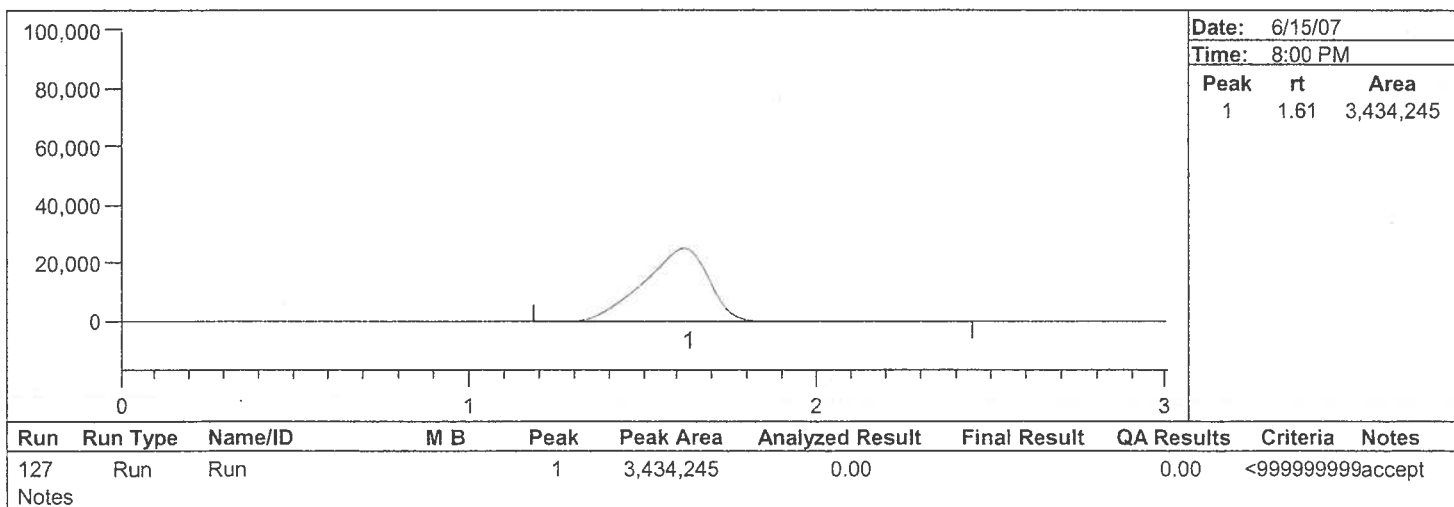
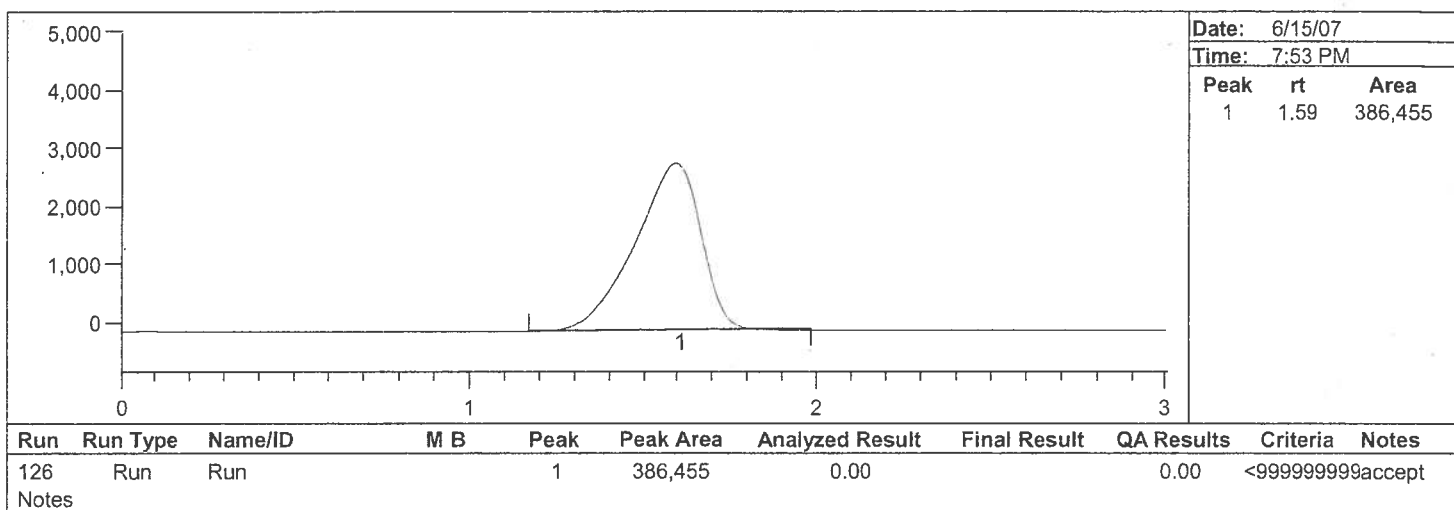
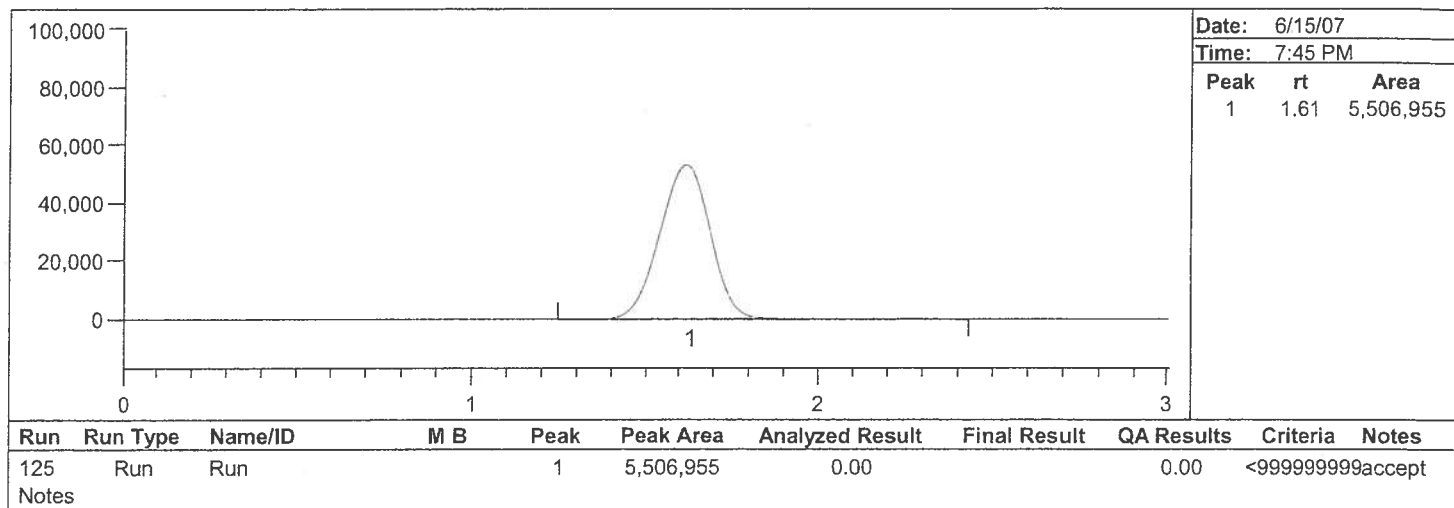
Method Number: THg

Project Number(s):

Instrument ID: br-10

Date Analyzed: ^{6/15/07} ~~7/14/06~~ nm

Analyst Name: am



Peak Report

Brooks Rand Report #07BR0799

Batch Number: 07-0633

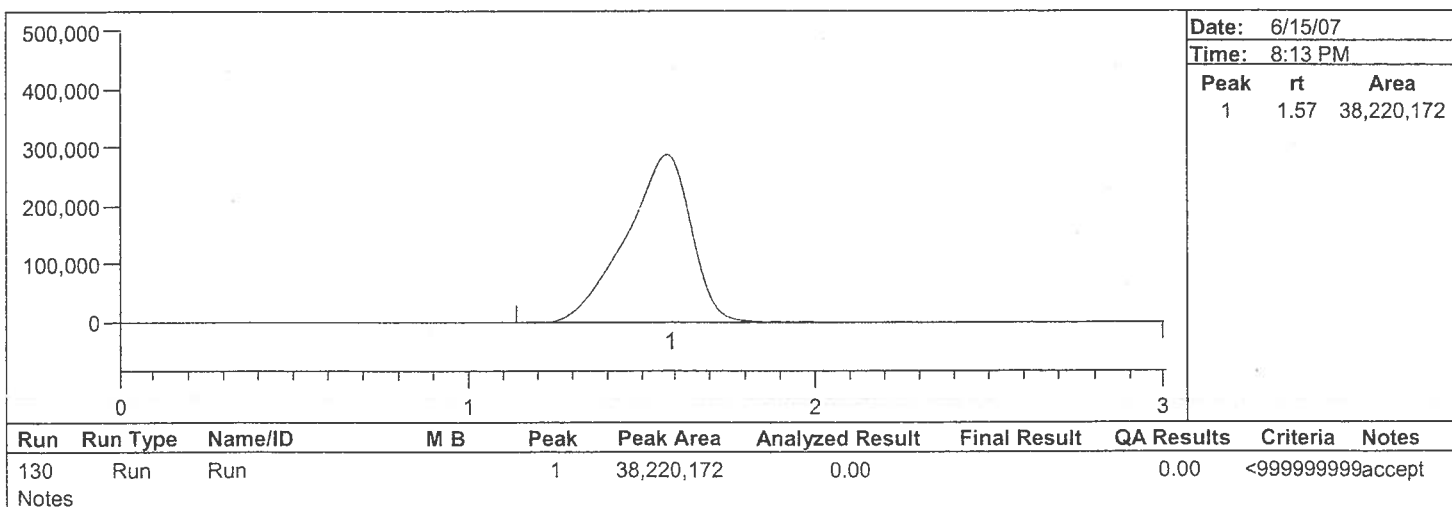
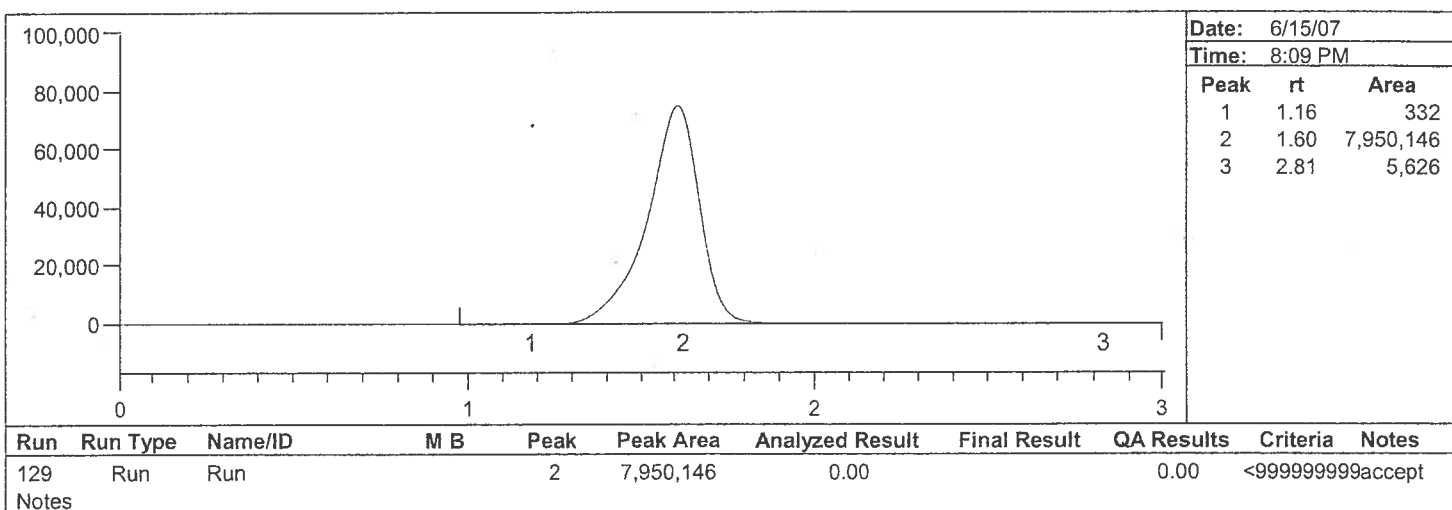
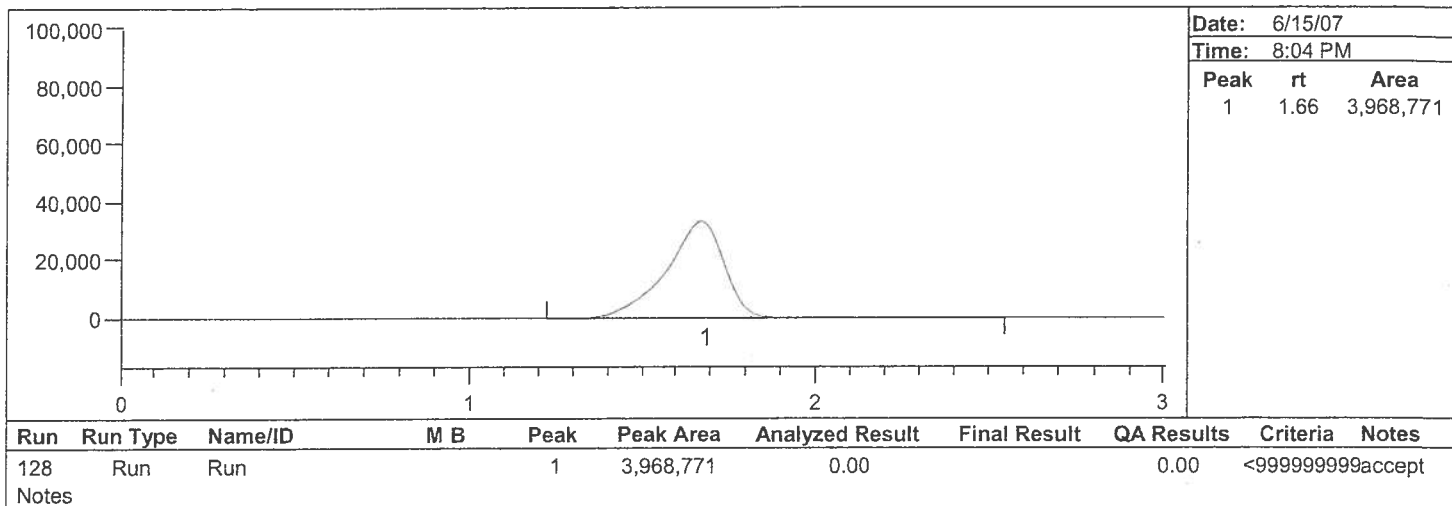
Method Number: THg

Project Number(s):

Instrument ID: br-10

Date Analyzed: 6/15/07 7:14:06 am

Analyst Name: am



Peak Report

Brooks Rand Report #07BR0799

Batch Number: 07-0633

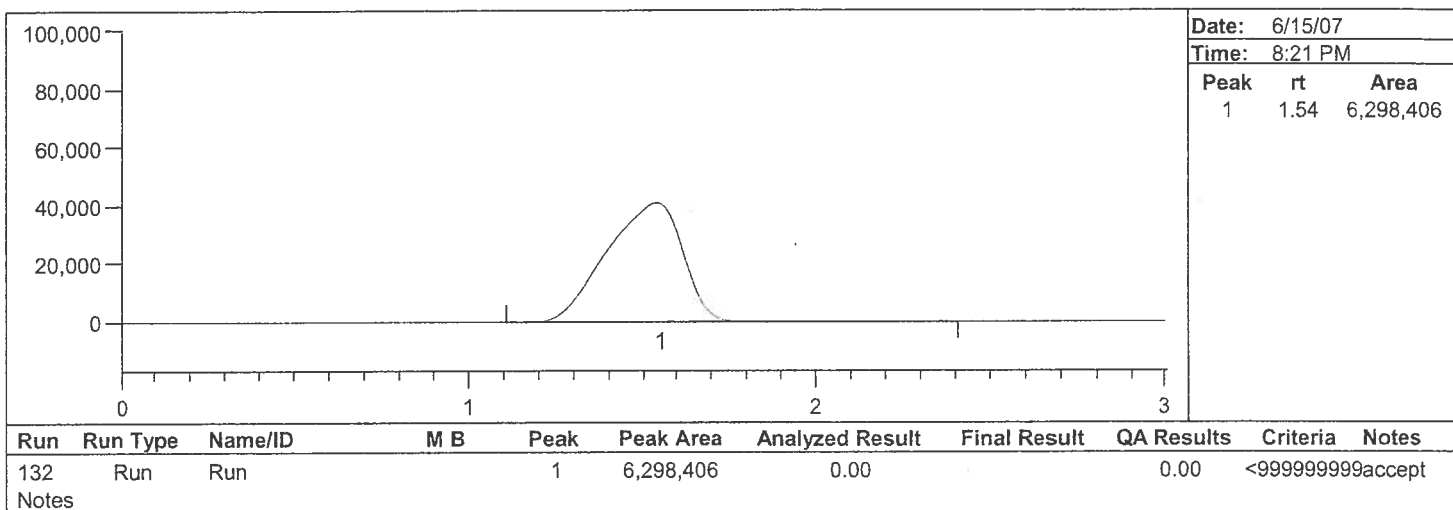
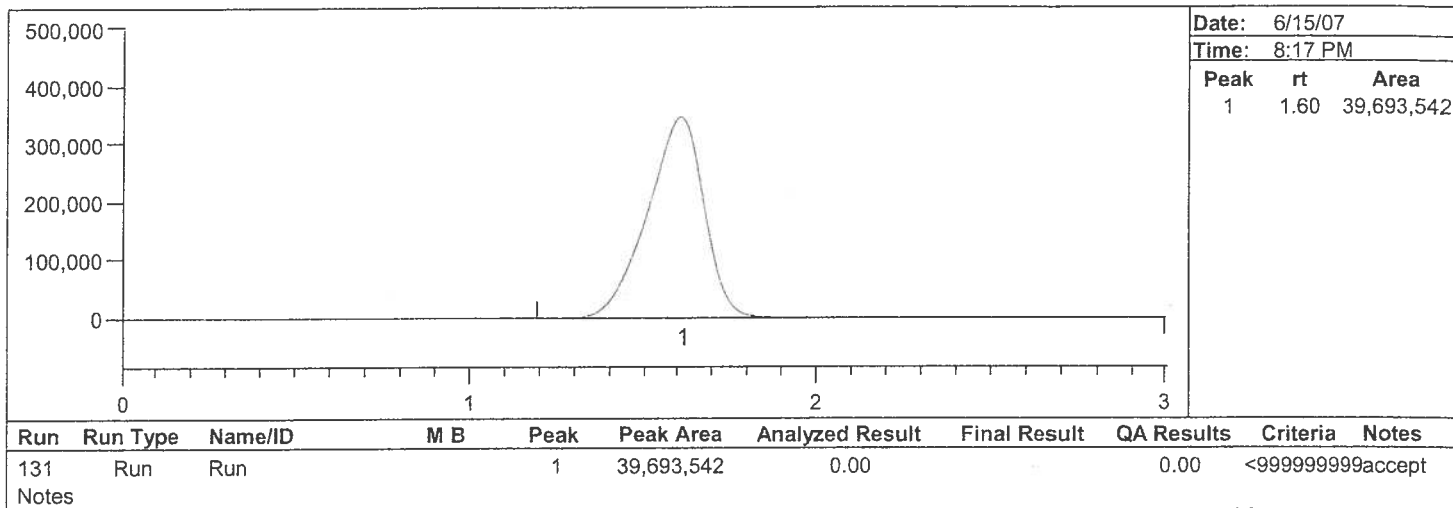
Method Number: THg

Project Number(s):

Instrument ID: br-10

Date Analyzed: ^{6/15/07}~~7/14/06~~ um

Analyst Name: am



3958 6th Avenue NW

Phone: 206-632-6206

Seattle, WA 98107

Fax: 206-632-6017

www.brooksrand.com

Email: brl@brooksrand.com

Sample Receiving LogTracking # **07BR0799**

Customer: Kleinfelder

Contact: Dave King

Project Ref. #: KLE001

BRL Project Manager: Elizabeth Madonick

Due Date: 6/20/2007

Receiving Date: 6/6/2007

Receiving Time: 10:00 AM

Logged-in by: Katie Jahanmir

Log-in Date: 6/6/2007

Log-in Time: 3:03 PM

Airbill present? Yes

Airbill # 1Z897E500195063817

Courier: UPS

QA Level Full

Sample Condition Intact

Shipping container intact? Yes

Shipping container type: Cooler

Shipping container temp: -20.0 C

Shipping container coolant: Dry ice

Sample Turnaround Time:

Contract Turnaround Time: 14 days

Custody seal present? No

Custody seal intact? No

COC Present? Yes

COC/Sample tag agree? Yes

COC Number: N/A

Comments:

Lab ID:

01

Sample Tag #: Northwest Lake Fish #1

Collection Date/Time: 6/5/2007,

ContainerType and Lot #: Plastic Bag,

Size:

Matrix/Sub-Matrix: Biota, Fish

Preservation: none

Acid Lot#: n/a

pH:

Filtered?: No

Sample Storage Location: Freezer #3

Comments:

Analysis / Method: Hg

EPA 1631, Appendix

Analysis / Method: Homogenization

BR-0103

02

Sample Tag #: Northwest Lake Fish #2

Collection Date/Time: 6/5/2007,

ContainerType and Lot #: Plastic Bag,

Size:

Matrix/Sub-Matrix: Biota, Fish

Preservation: none

Acid Lot#: n/a

pH:

Filtered?: No

Sample Storage Location: Freezer #3

Comments:

Analysis / Method: Hg

EPA 1631, Appendix

Analysis / Method: Homogenization

BR-0103

Lab ID:

Brooks Rand Report #07BR0799

03

Sample Tag #: Northwest Lake Fish #3

Collection Date/Time: 6/5/2007,

ContainerType and Lot #: Plastic Bag,
Size:

Matrix/Sub-Matrix: Biota, Fish

Preservation: none

Acid Lot#: n/a

pH:

Filtered?: No

Sample Storage Location: Freezer #3

Comments:

Analysis / Method: Hg

EPA 1631, Appendix

Analysis / Method: Homogenization

BR-0103

Sample Custodian signature

Date

Reviewed By signature

Date



SQUIER ASSOCIATES

4260 Galenwood
Post Office Box 1317
Lake Oswego, Oregon 97035
(503) 635-4419
Fax 635-1430

LABORATORY NUMBER: _____
LABORATORY NAME: _____

Chain of Custody

Brooks Rand Report #07BR0799

ANALYSIS REQUEST			
PETROLEUM HYDROCARBONS			
ORGANICS			
INORG.			
TCLP			
OTHER			
TPH-HCID State: ORWA	TPH-G State: ORWA	TPH-D State: ORWA	418.1M State: ORWA
EPA 418.1	8270 SIM	8020M-BETX only	8310 HPLC PAHs
7421 Lead	TCLP Cr, Cd, Pb	8010 Halogenated VOCs	8020 Aromatic VOCs
8040 Phenols	8240 GCMS Volatiles	8270 GCMS Semivolatiles	8080 OC Pesticides/PCBs
8080M PCBs only	Drinking Water (8)	Priority Pol. Metals (13)	ICP Metal Scan (22)
TCLP Metals (8)	TCLP Vol. 8240 ZH-EXT	TCLP Semivolatiles 8270	

LAB ID	SAMPLE ID	DATE	TIME	MATRIX
	NORTHWEST LAKE FISH #1	05/06/07		Full
	NORTHWEST LAKE FISH #2	05/06/07		Full
	NORTHWEST LAKE FISH #3	05/06/07		Full

TURN AROUND TIME
☐ 24 hr. ☐ 48 hr. ☐ 5 day ☐ 10 day

Project Manager: DAVID EARL KING
Project Name: COND IT
Project Number: 53806/4
Site Location: Northwestern Lake
Sampled By: FRANK SHIREN

Special Instructions: Note No. KLE001

Total Number of Containers: 3

RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: [Signature] Time: [Time] Company: [Company]	Signature: [Signature] Time: [Time] Company: [Company]	Signature: [Signature] Time: [Time] Company: [Company]
RECEIVED BY: 1.	RECEIVED BY: 2.	RECEIVED BY: 3.
Signature: [Signature] Time: [Time] Company: [Company]	Signature: [Signature] Time: [Time] Company: [Company]	Signature: [Signature] Time: [Time] Company: [Company]
Container: [Container]	Container: [Container]	Container: [Container]
Sealed: ☒ ☐ Iced: ☒ ☐	Sealed: ☒ ☐ Iced: ☒ ☐	Sealed: ☒ ☐ Iced: ☒ ☐

DISTRIBUTION: White, Canary = Analytical Laboratory; Pink = Squier Files

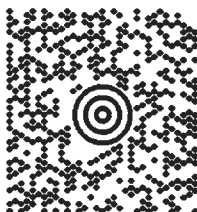
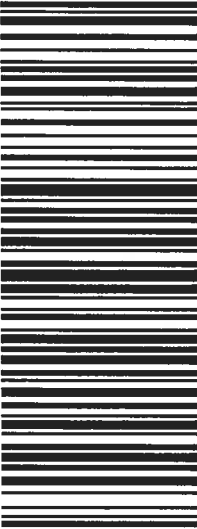
UPS Internet Shipping: View/Print Label

1. **Print the label(s):** Select the Print button on the print dialog box that appears. Note: If your browser does not support this function select Print from the File menu to print the label.
2. **Fold the printed label at the dotted line.** Place the label in a UPS Shipping Pouch. If you do not have a pouch, affix the folded label using clear plastic shipping tape over the entire label.
3. **GETTING YOUR SHIPMENT TO UPS**
Customers without a Daily Pickup
 - Schedule a same day or future day Pickup to have a UPS driver pickup all of your Internet Shipping packages.
 - Hand the package to any UPS driver in your area.
 - Take your package to a location of The UPS Store®, UPS Drop Box, UPS Customer Center or Authorized Shipping Outlet near you. Items sent via UPS Return Services (including Ground Returns) are accepted at any UPS Drop Box.
 - To find the location nearest you, please visit the 'Find Locations' Quick link at ups.com.

Customers with a Daily Pickup

- Your driver will pickup your shipment(s) as usual.

FOLD HERE

DAVID EARL KING 503-644-9447 102 KLEINFELDER, INC. 15050 SW KOLL PARKWAY BEAVERTON OR 97006	SHIP TO: ELIZABETH MADONICK BROOKSRAND 3958 6TH AVENUE NW SEATTLE WA 98107-5058	16 LBS DWT:10,14,16	1 OF 1
		WA 981 9-02 	
UPS NEXT DAY AIR TRACKING #: 1Z 897 E50 01 9506 3817		1	
			
BILLING: P/P		 TM	
Reference #1: 53886 Reference #2: 4		US 9.0.20.0 WXPJES0 64 0A 02/2007	



Total Mercury Analysis of Biota Samples (Lumbriculus Variegatus and Corbicula Fluminea)

Project Name: Pacific Corp/Dam Investigation

Purchase Order: 53886/5

For Samples Received: September 11, 2007

Report Date:

September 26, 2007

Prepared for:

Mr. David Earl King
Kleinfelder
15050 SW Koll Parkway
Suite L
Beaverton, OR 97006

Brooks Rand

Project #: KLE001

Report #: 07BR1309

3958 6th Avenue NW
Seattle, WA 98107
www.brooksrand.com

Phone: 206-632-6206
Fax: 206-632-6017
Email: brl@brooksrand.com

Brooks Rand Labs Case Narrative

Total Mercury analysis of Lumbriculus Variegatus and Corbicula Fluminea Kleinfelder Pacific Corp/Dam Investigation

Purchase Order No.: 53886/5
BRL Tracking No.: 07BR1309

Client Project ID: P762
BRL Project Reference: KLE001

Report Cover	1
Table of Contents	2
Case Narrative	3-5
Summary of Results	6-8
Data Qualifiers and their Definitions	9
Total Mercury Data - Batch #07-1008.....	10-53
QA Report	10-11
Sample and QA Data Spreadsheet.....	12-13
Prep Notes & Physical Characteristics.....	14-17
Lab Bench Sheet	18-21
Instrument Printouts	22-53
Homogenization Notes	54-56
Sample Receiving Documentation - Tracking No.: 07BR1309	57-67
Sample Receiving Log	57-65
COC	66
Airbill	67

Brooks Rand Labs Case Narrative

Total Mercury analysis of *Lumbriculus Variegatus* and *Corbicula Fluminea*
Kleinfelder
Pacific Corp/Dam Investigation

Purchase Order No.: 53886/5
BRL Tracking No.: 07BR1309

Client Project ID: P762
BRL Project Reference: KLE001

Shipping and Receiving

Four clam and four worm samples (in five containers) were received at 2:52 PM on September 11, 2007. The samples arrived in two coolers with ice at temperatures of 0.2 °C and 4.0 °C. The requested analysis for the samples was total mercury (THg). The clam samples were stored in a refrigerator overnight in a locked storage room. The worm samples were stored in a storage freezer at less than -10°C until further processing.

Holding Time, Preservation and Storage

All method holding time, preservation and storage requirements were satisfied.

Homogenization

The clam samples were shucked the day after receipt and then frozen. Once thawed, the clam and worm samples were homogenized using precleaned commercial grade homogenization equipment. The contents of the five containers provided for each sample were composited and homogenized together. At the time of preparation, five replicate aliquots from each composite were prepared and analyzed.

The worm composites were received in their native environment. The worms could not be separated from the rest of the contents and the client instructed BRL to homogenize the total contents of each container. Also, some of the worm mass appeared to have congealed to the lids and to the sample container walls, even after having been thoroughly thawed.

A homogenization blank for each sample matrix was collected. The blanks were digested as tissue samples and analyzed along with the associated homogenates. The results for the homogenization blanks were non-detects, indicating that no significant contamination occurred during homogenization.

Total Mercury, Appendix to EPA Method 1631 (BRL SOP BR-0002)

Biota samples are digested with nitric acid/sulfuric acid ($\text{HNO}_3/\text{H}_2\text{SO}_4$) and heat, and further oxidized with bromine monochloride (BrCl). All samples are analyzed with stannous chloride (SnCl_2) reduction, single gold amalgamation and cold vapor atomic fluorescence spectroscopy (CVAFS) detection using a BRL Model III CVAFS Mercury Analyzer.

Batch # 07-01008

Preparation: The samples were digested on August 20, 2007.

Analysis: The samples were analyzed on August 24, 2007.

Quality Assurance: Sample results may have been evaluated using detection limits that were adjusted to account for sample aliquot size; please refer to the Quality Assurance Summary for a list of the sample specific method detection limits/practical quantitation limits (MDLs/PQLs) and QA results. Sample results less than or equal to the MDL have been qualified "U" as non-detects and have been reported at the MDL. All QA criteria were met and no additional qualification of the data was required.

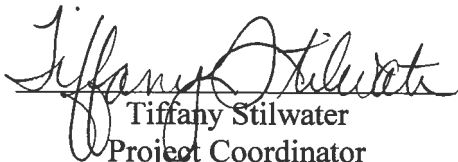
The matrix spike/matrix spike duplicate (MS/MSD) set prepared from sample "1173G (Post Exposure) 1" (07BR1309-16) was spiked at concentrations lower than the native value and was, therefore, not a valid indication of bias. The MS/MSD results were reported for the purpose of demonstrating duplicate precision only. A post preparation spike was analyzed at an appropriate concentration and produced a recovery within the control limits.

The average of the method blanks (MBs) was greater than two times the MDL and the standard deviation (SD) between the MBs was greater than two-thirds the MDL. An estimated MDL (EMDL) was calculated as three times the SD and the estimated PQL (EPQL) was calculated as three times the EMDL. All sample results were greater than the EPQL with the exception of the two homogenization blanks. Both blank results yielded peak areas less than that of the lowest standard indicating no significant contamination was introduced by the homogenization process.

Blank correction: All sample results for low-level mercury analysis are blank corrected as described in EPA Method 1631 Revision E.

We certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. In addition, I

certify that to the best of my knowledge and belief, the data as reported are true and accurate. The Laboratory Director or her designee, as verified by the following signature has authorized release of the data contained in this data package.


Tiffany Stilwater
Project Coordinator
tiffany@brookrand.com


Elizabeth Madonick
Project Manager
elizabeth@brookrand.com

Reported by

Brooks Rand LLC

Contact: Elizabeth Madonick

3958 6th Avenue NW

Seattle, WA 98107

Tel: 206-632-6206 Fax: 206-632-6017

Summary of Results for

Kleinfelder

Contact: Dave King

15050 SW Koll Parkway

Beaverton OR 97006

Tel: 503-644-9447

Brooks Rand Report #07BR1309

Lab Project # KLE001

Lab Tracking # 07BR1309

Client Project

Purchase Order

Pacific Corp/ Dam Investigation

53886/5

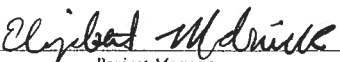
Sample/Sampling/Receiving Info

Kleinfelder

BRL

Sample Identification	Sampling Date	Matrix	Submatrix	Sample Number	Receiving Date
1138G (Pre exposure) 1	8/8/2007	Biota	Worms	07BR1309 - 01	9/11/2007
1138G (Pre exposure) 2	8/8/2007	Biota	Worms	07BR1309 - 02	9/11/2007
1138G (Pre exposure) 3	8/8/2007	Biota	Worms	07BR1309 - 03	9/11/2007
1138G (Pre exposure) 4	8/8/2007	Biota	Worms	07BR1309 - 04	9/11/2007
1138G (Pre exposure) 5	8/8/2007	Biota	Worms	07BR1309 - 05	9/11/2007
1139G (Pre exposure) 1	8/9/2007	Biota	Bivalve	07BR1309 - 06	9/11/2007
1139G (Pre exposure) 2	8/9/2007	Biota	Bivalve	07BR1309 - 07	9/11/2007
1139G (Pre exposure) 3	8/9/2007	Biota	Bivalve	07BR1309 - 08	9/11/2007
1139G (Pre exposure) 4	8/9/2007	Biota	Bivalve	07BR1309 - 09	9/11/2007
1139G (Pre exposure) 5	8/9/2007	Biota	Bivalve	07BR1309 - 10	9/11/2007
1172G (Post Exposure) 1	9/5/2007	Biota	Worms	07BR1309 - 11	9/11/2007
1172G (Post Exposure) 2	9/5/2007	Biota	Worms	07BR1309 - 12	9/11/2007
1172G (Post Exposure) 3	9/5/2007	Biota	Worms	07BR1309 - 13	9/11/2007
1172G (Post Exposure) 4	9/5/2007	Biota	Worms	07BR1309 - 14	9/11/2007
1172G (Post Exposure) 5	9/5/2007	Biota	Worms	07BR1309 - 15	9/11/2007
1173G (Post Exposure) 1	9/5/2007	Biota	Worms	07BR1309 - 16	9/11/2007
1173G (Post Exposure) 2	9/5/2007	Biota	Worms	07BR1309 - 17	9/11/2007
1173G (Post Exposure) 3	9/5/2007	Biota	Worms	07BR1309 - 18	9/11/2007
1173G (Post Exposure) 4	9/5/2007	Biota	Worms	07BR1309 - 19	9/11/2007
1173G (Post Exposure) 5	9/5/2007	Biota	Worms	07BR1309 - 20	9/11/2007
1174G (Post Exposure) 1	9/5/2007	Biota	Worms	07BR1309 - 21	9/11/2007
1174G (Post Exposure) 2	9/5/2007	Biota	Worms	07BR1309 - 22	9/11/2007
1174G (Post Exposure) 3	9/5/2007	Biota	Worms	07BR1309 - 23	9/11/2007
1174G (Post Exposure) 4	9/5/2007	Biota	Worms	07BR1309 - 24	9/11/2007
1174G (Post Exposure) 5	9/5/2007	Biota	Worms	07BR1309 - 25	9/11/2007
1175G (Post Exposure) 1	9/6/2007	Biota	Bivalve	07BR1309 - 26	9/11/2007
1175G (Post Exposure) 2	9/6/2007	Biota	Bivalve	07BR1309 - 27	9/11/2007
1175G (Post Exposure) 3	9/6/2007	Biota	Bivalve	07BR1309 - 28	9/11/2007
1175G (Post Exposure) 4	9/6/2007	Biota	Bivalve	07BR1309 - 29	9/11/2007
1175G (Post Exposure) 5	9/6/2007	Biota	Bivalve	07BR1309 - 30	9/11/2007
1176G (Post Exposure) 1	9/6/2007	Biota	Bivalve	07BR1309 - 31	9/11/2007
1176G (Post Exposure) 2	9/6/2007	Biota	Bivalve	07BR1309 - 32	9/11/2007
1176G (Post Exposure) 3	9/6/2007	Biota	Bivalve	07BR1309 - 33	9/11/2007
1176G (Post Exposure) 4	9/6/2007	Biota	Bivalve	07BR1309 - 34	9/11/2007
1176G (Post Exposure) 5	9/6/2007	Biota	Bivalve	07BR1309 - 35	9/11/2007
1177G (Post Exposure) 1	9/6/2007	Biota	Bivalve	07BR1309 - 36	9/11/2007
1177G (Post Exposure) 2	9/6/2007	Biota	Bivalve	07BR1309 - 37	9/11/2007
1177G (Post Exposure) 3	9/6/2007	Biota	Bivalve	07BR1309 - 38	9/11/2007
1177G (Post Exposure) 4	9/6/2007	Biota	Bivalve	07BR1309 - 39	9/11/2007

Tuesday, September 25, 2007


Project Manager

*Reported by***Brooks Rand LLC**

Contact: Elizabeth Madonick

3958 6th Avenue NW

Seattle, WA 98107

Tel: 206-632-6206

Fax: 206-632-6017

*Summary of Results for***Kleinfelder**

Contact: Dave King

15050 SW Koll Parkway

Beaverton

Tel: 503-644-9447

OR 97006

Lab Project # KLE001

Lab Tracking # 07BR1309

Client Project

Purchase Order

Pacific Corp/ Dam Investigation

53886/5

Sample/Sampling/Receiving Info continued...

*Kleinfelder**BRL*

Sample Identification	Sampling Date	Matrix	Submatrix	Sample Number	Receiving Date
1177G (Post Exposure) 5	9/6/2007	Biota	Bivalve	07BR1309 - 40	9/11/2007
HB-Hg-07-1022-1	9/13/2007	Biota	Blank	07BR1309 - 41	9/11/2007
HB-Hg-07-0992-1	9/14/2007	Biota	Blank	07BR1309 - 42	9/11/2007

Tuesday, September 25, 2007


Project Manager

Reported by

Brooks Rand LLC

Contact: Elizabeth Madonick

3958 6th Avenue NW
Seattle, WA 98107

Tel: 206-632-6206 Fax: 206-632-6017

Summary of Results for

Kleinfelder

Contact: Dave King

15050 SW Koll Parkway
Beaverton OR 97006
Tel: 503-644-9447

Brooks Rand Report #07BR1309

Lab Project # KLE001
Lab Tracking # 07BR1309

Client Project Pacific Corp/ Dam Investigation
Purchase Order 53886/5

Hg

Sample Identification	BRL Number	Total or Dissolved	Preparation date	Analysis date	Batch #	Result	Units	Qualifier (Q)
1138G (Pre exposure) 1	07BR1309- 01	T	9/20/2007	9/24/2007	07-1008	4.390	ng/g	
1138G (Pre exposure) 2	07BR1309- 02	T	9/20/2007	9/24/2007	07-1008	4.160	ng/g	
1138G (Pre exposure) 3	07BR1309- 03	T	9/20/2007	9/24/2007	07-1008	4.240	ng/g	
1138G (Pre exposure) 4	07BR1309- 04	T	9/20/2007	9/24/2007	07-1008	4.340	ng/g	
1138G (Pre exposure) 5	07BR1309- 05	T	9/20/2007	9/24/2007	07-1008	3.970	ng/g	
1139G (Pre exposure) 1	07BR1309- 06	T	9/20/2007	9/24/2007	07-1008	29.900	ng/g	
1139G (Pre exposure) 2	07BR1309- 07	T	9/20/2007	9/24/2007	07-1008	30.900	ng/g	
1139G (Pre exposure) 3	07BR1309- 08	T	9/20/2007	9/24/2007	07-1008	31.000	ng/g	
1139G (Pre exposure) 4	07BR1309- 09	T	9/20/2007	9/24/2007	07-1008	27.900	ng/g	
1139G (Pre exposure) 5	07BR1309- 10	T	9/20/2007	9/24/2007	07-1008	29.200	ng/g	
1172G (Post Exposure) 1	07BR1309- 11	T	9/20/2007	9/24/2007	07-1008	13.400	ng/g	
1172G (Post Exposure) 2	07BR1309- 12	T	9/20/2007	9/24/2007	07-1008	13.500	ng/g	
1172G (Post Exposure) 3	07BR1309- 13	T	9/20/2007	9/24/2007	07-1008	13.300	ng/g	
1172G (Post Exposure) 4	07BR1309- 14	T	9/20/2007	9/24/2007	07-1008	13.100	ng/g	
1172G (Post Exposure) 5	07BR1309- 15	T	9/20/2007	9/24/2007	07-1008	12.300	ng/g	
1173G (Post Exposure) 1	07BR1309- 16	T	9/20/2007	9/24/2007	07-1008	340.000	ng/g	
1173G (Post Exposure) 2	07BR1309- 17	T	9/20/2007	9/24/2007	07-1008	346.000	ng/g	
1173G (Post Exposure) 3	07BR1309- 18	T	9/20/2007	9/24/2007	07-1008	354.000	ng/g	
1173G (Post Exposure) 4	07BR1309- 19	T	9/20/2007	9/24/2007	07-1008	340.000	ng/g	
1173G (Post Exposure) 5	07BR1309- 20	T	9/20/2007	9/24/2007	07-1008	357.000	ng/g	
1174G (Post Exposure) 1	07BR1309- 21	T	9/20/2007	9/24/2007	07-1008	4.980	ng/g	
1174G (Post Exposure) 2	07BR1309- 22	T	9/20/2007	9/24/2007	07-1008	4.740	ng/g	
1174G (Post Exposure) 3	07BR1309- 23	T	9/20/2007	9/24/2007	07-1008	4.460	ng/g	
1174G (Post Exposure) 4	07BR1309- 24	T	9/20/2007	9/24/2007	07-1008	4.910	ng/g	
1174G (Post Exposure) 5	07BR1309- 25	T	9/20/2007	9/24/2007	07-1008	4.980	ng/g	
1175G (Post Exposure) 1	07BR1309- 26	T	9/20/2007	9/24/2007	07-1008	32.200	ng/g	
1175G (Post Exposure) 2	07BR1309- 27	T	9/20/2007	9/24/2007	07-1008	35.100	ng/g	
1175G (Post Exposure) 3	07BR1309- 28	T	9/20/2007	9/24/2007	07-1008	34.000	ng/g	
1175G (Post Exposure) 4	07BR1309- 29	T	9/20/2007	9/24/2007	07-1008	35.000	ng/g	
1175G (Post Exposure) 5	07BR1309- 30	T	9/20/2007	9/24/2007	07-1008	34.800	ng/g	
1176G (Post Exposure) 1	07BR1309- 31	T	9/20/2007	9/24/2007	07-1008	38.400	ng/g	
1176G (Post Exposure) 2	07BR1309- 32	T	9/20/2007	9/24/2007	07-1008	40.900	ng/g	
1176G (Post Exposure) 3	07BR1309- 33	T	9/20/2007	9/24/2007	07-1008	37.100	ng/g	
1176G (Post Exposure) 4	07BR1309- 34	T	9/20/2007	9/24/2007	07-1008	40.400	ng/g	
1176G (Post Exposure) 5	07BR1309- 35	T	9/20/2007	9/24/2007	07-1008	41.800	ng/g	
1177G (Post Exposure) 1	07BR1309- 36	T	9/20/2007	9/24/2007	07-1008	35.900	ng/g	
1177G (Post Exposure) 2	07BR1309- 37	T	9/20/2007	9/24/2007	07-1008	35.700	ng/g	
1177G (Post Exposure) 3	07BR1309- 38	T	9/20/2007	9/24/2007	07-1008	36.900	ng/g	
1177G (Post Exposure) 4	07BR1309- 39	T	9/20/2007	9/24/2007	07-1008	34.000	ng/g	
1177G (Post Exposure) 5	07BR1309- 40	T	9/20/2007	9/24/2007	07-1008	38.000	ng/g	
HB-Hg-07-1022-1	07BR1309- 41	T	9/20/2007	9/24/2007	07-1008	0.650	ng/g	U
HB-Hg-07-0992-1	07BR1309- 42	T	9/20/2007	9/24/2007	07-1008	0.650	ng/g	U

Tuesday, September 25, 2007

Elizabeth Madonick
Project Manager

BROOKS RAND LABS

DATA QUALIFIERS and their DEFINITIONS

(Effective 6/23/06)

- B** - Detected by the instrument, above MDL but less than or equal to the PQL (ML).
Measured result is reported and considered an estimate.
- E** - An estimated value due to the presence of interferences. A full explanation will be presented in the case narrative.
- H** - Holding time and/or preservation requirements not met. Results are estimated.
- J** - Estimated value.
- M** - Duplicate precision (RPD) was not within acceptance criteria.
- N** - Spike recovery was not within acceptance criteria.
- R** - Rejected, unusable value. A full explanation will be presented in the QA Report.
- U** - Result below or equal to the method detection limit (MDL) and therefore analyte was not detected. Results reported at the MDL.

These qualifiers are based on those previously utilized by Brooks Rand, LLC, those found in the EPA SOW ILM03.0, Exhibit B, Section III, pg. B-18 and the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review; USEPA; July 2002. These supercede all previous qualifiers ever employed by BRL.

QUALITY ASSURANCE SUMMARY Brooks Rand Report #07BR1309



BROOKSRAND
TRACE METALS ANALYSIS & PRODUCTS

3958 6th Avenue NW
Seattle, WA 98107
Voice: 206-632-6206
Fax: 206-632-6017

Batch #: 07-1008

Method #: BR-0002

Analyte: Hg

Matrix: Biota

BIAS Criterion: Recovery = 77-123%			
Continuing Calibration Verification (CCV)			
QCS ID	Certified Value ng/L	Measured Value ng/L	Recovery %
CCV1	5.00	5.30	106%
CCV2	5.00	5.00	100%
CCV3	5.00	5.27	105%
CCV4	5.00	5.26	105%
CCV5	5.00	4.93	99%
CCV6	5.00	5.04	101%

BIAS Criterion: Recovery = 85-115%			
Independent Calibration Verification (ICV)			
QCS ID	Certified Value ng/L	Measured Value ng/L	Recovery %
ICV*	16.01	16.05	100%

* Preparation of the CRM NIST 1641d.

BIAS Criterion: Recovery = 75-125%			
Certified Reference Material (CRM)			
CRM ID	Certified Value ng/g	Measured Value ng/g	Recovery %
DORM-2	4640	4764	103%
DORM-2	4640	4806	104%

BIAS Criteria: Recovery = 70-130%, RPD ≤ 30%								
Matrix Spikes/Matrix Spike Duplicates (MS/MSD)								
		Matrix Spike			Matrix Spike Duplicate			
Sample ID	Sample Value ng/g AR	Spiked Value ng/g AR	Measured Value ng/g AR	MS Recovery %	Spiked Value ng/g AR	Measured Value ng/g AR	MSD Recovery %	Duplicate RPD
07BR1309-01	4.39	189.8	216.9	112%	190.5	225.4	116%	4%
07BR1309-06	29.9	483	558	109%	459	486	99%	14%
07BR1309-16	340	185	532	*	191	518	*	3%
07BR1309-31	38.4	483	537	103%	422	503	110%	6%

* 07BR1309-16 MS/MSD underspiked, recovery criteria does not apply. PPS analyzed.

BIAS Criteria: Recovery 85-115%				
Post-Preparation Spike Analysis (PPS)				
Sample ID	Sample Value ng/g AR	Spiked Value ng/g AR	Measured Value ng/g AR	PPS Recovery %
07BR1309-01	4.39	9.93	15.19	109%
07BR1309-16	340	652	1028	105%

Quality Assurance Officer

Project Manager

QUALITY ASSURANCE SUMMARY

Brooks Rand Report #07BR1309

Batch #: 07-1008 cont.

Method #: BR-0002

Analyte: Hg

Matrix: Biota

PRECISION Criteria: $RPD \leq 30\%$ if average result $> 5x$ PQL
Method Duplicate Analysis (MD)

Sample ID	Sample Value ng/g AR	Duplicate Value ng/g AR	Average Value ng/g AR	Duplicate RPD
07BR1309-01	4.39	3.66	4.03	18%
07BR1309-06	29.9	31.4	30.7	5%
07BR1309-16	340	329	335	3%
07BR1309-31	38.4	39.1	38.8	2%

Method Detection Limits	
MDL ng/g	PQL ng/g
0.04	0.10

Method Blanks (MB) Criteria: Avg. $< 2x$ MDL, Std Dev $< 2/3$ MDL
or sample results $> 10x$ highest MB

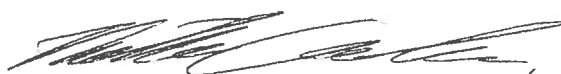
MB1 ng/g	MB2 ng/g	MB3 ng/g	MB4 ng/g	Average ng/g	StDev ng/g
0.31	0.53	0.08	0.06	0.25	0.22

Estimated Detection Limits	
EMDL ng/g	EPQL ng/g
0.65	1.96

High MB average and standard deviation, EMDL/EPQL calculated, see narrative.

Sample Specific Reporting Limits		
Sample ID	MDL ng/g	PQL ng/g
07BR1309-06	1.2	3.5
07BR1309-07	1.1	3.3
07BR1309-08	1.2	3.7
07BR1309-09	1.3	3.8
07BR1309-10	1.1	3.4
07BR1309-16	21	64
07BR1309-17	13	38
07BR1309-18	13	39
07BR1309-19	13	38
07BR1309-20	12	36
07BR1309-26	1.1	3.4
07BR1309-27	1.2	3.7
07BR1309-28	1.2	3.7

Sample Specific Reporting Limits		
Sample ID	MDL ng/g	PQL ng/g
07BR1309-29	1.3	3.8
07BR1309-30	1.2	3.6
07BR1309-31	1.2	3.5
07BR1309-32	1.3	3.9
07BR1309-33	1.2	3.7
07BR1309-34	1.2	3.6
07BR1309-35	1.3	3.8
07BR1309-36	1.2	3.5
07BR1309-37	1.3	3.8
07BR1309-38	1.3	3.8
07BR1309-39	1.1	3.4
07BR1309-40	1.2	3.6



Quality Assurance Officer



Project Manager

Batch: 07-1008 Analyst: JH		Analyte: THg Matrix: Biota		Date: 09/24/07 Instrument ID: BR10		MDL: PQL:		0.04 ng/g 0.10 ng/g		EMDL: EPQL:		0.65 ng/g 1.96 ng/g		Nitric/Sulfuric Prep	
Run No.	Run Type	Tracking #	Sample ID	Sample Wt mg	Dilution Vol. mL	Analyzed Vol. mL	PA	Hg pg	Hg ng/g	TV/ Spike	Recovery	MDL	PQL	Comments	
1	CB						61	5.92				80.50		= avg PA of CB	
2	CB						83	8.06				14.18		= std dev PA CB	
3	CB						95	9.22				7.82		= avg pg of CB	
4	CB						83	8.06				1.38		= std dev pg CB	
5	CS						328			25	96%				
6	CS						1093			100	98%				
7	CS						5222			500	100%				
8	CS						26496			2500	103%	0.0971		= avg cal coeff	
9	CS						106715			10000	104%	3%		= RSD cal coeff	
10	ICV						16609	1605		1601	100%	1.0000		= R value	
11	OCV						5536	530		500	106%				
12	MB		MB-1	1000	40.00	10.00	877	77	0.309			246.41		= average total pg used for blk corr	
13	CB						68	6.60							
14	MB		MB-2	1000	40.00	10.00	1440	131.99	0.528						
15	MB		MB-3	1000	40.00	10.00	298	21.12	0.084			0.25		= avg MB ng/g	
16	MB		MB-4	1000	40.00	10.00	245	15.97	0.064			0.22		= std dev MB ng/g	
17	QCS	Dorm-2	CRM-1	204	40.00	0.05	12596	1215	4764	4640	103%				
18	QCS	Dorm-2	CRM-2	205	40.00	0.05	12769	1232	4806	4640	104%				
19	LFB	PQL Spike		1000	40.00	10.00	602	51	-0.04	0.10	-44%				
20	S		41	1010	40.00	10.00	158	7.52	-0.21			0.65	1.94		
21	MB		MB-1R	1000	40.00	10.00	914	81	0.324					Confirmation only	
22	MB		MB-2R	1000	40.00	10.00	1449	132.87	0.531					Confirmation only	
23	S	07BR1309	42	1010	40.00	10.000	302	21.51	-0.16			0.65	1.94		
24	S	07BR1309	01	1007	40.00	0.500	620	52.38	3.92			13	39	<5X EPQL; reanalyzed	
25	S	07BR1309	06	1131	40.00	0.500	3806	361.70	25.4			12	35	<5X EPQL; reanalyzed	
26	S	07BR1309	11	1060	40.00	0.500	1823	169.18	12.5			12	37	<5X EPQL; reanalyzed	
27	S	07BR1309	16	1023	40.00	0.500	46114	4469.33	349			13	38		
28	S	07BR1309	21	1006	40.00	0.500	707	60.83	4.59			13	39	<5X EPQL; reanalyzed	
29	S	07BR1309	26	1161	40.00	5.000	48574	4708.17	32.2			1.1	3.4		
30	S	07BR1309	31	1123	40.00	5.000	55864	5415.94	38.4			1.2	3.5		
31	S	07BR1309	36	1111	40.00	5.000	51721	5013.70	35.9			1.2	3.5		
32	S	07BR1309	01R	1007	40.00	10.000	12089	1165.89	4.39			0.65	1.95		
33	S	07BR1309	06R	1131	40.00	5.000	43955	4259.71	29.9			1.2	3.5		
34	S	07BR1309	11R	1060	40.00	10.000	37356	3619.03	13.4			0.62	1.85		
35	S	07BR1309	21R	1006	40.00	10.000	13605	1313.08	4.98			0.65	1.95		
36	S	07BR1309	16R	1023	40.00	0.300	26986	2612.22	340			21	64		
37	MR	07BR1309	01MD	1039	40.00	10.000	10516	1013.17	3.66			18%	0.63	= MD RPD	
38	MS	07BR1309	01MS	1054	40.00	10.000	502026	48733.20	184.7	189.75	95%	0.62	1.86	Over calibration	
39	MS	07BR1309	01MS	1054	40.00	1.000	59023	5722.65	216.9	189.75	112%	6.2	19		
40	CB						93	9.03							
41	CB						105	10.19							
42	MSD	07BR1309	01MSD	1050	40.00	1.000	61075	5921.87	225.4	190.48	116%	4%	19	= MS/MSD RPD	
43	PPS	07BR1309	01PPS	1007	40.00	10.000	40096	3885.05	15.19	9.93	109%	0.65	1.95		
44	CCV						5229	500		500	100%				
45	MR	07BR1309	06MD	1165	40.00	5.000	47449	4598.94	31.4			5%	1.1	= MD RPD	
46	MS	07BR1309	06MS	1036	40.00	0.250	37296	3613.20	558	483	109%		25	76	
47	MSD	07BR1309	06MSD	1089	40.00	0.250	34165	3309.22	486	459	99%	14%	24	72	
48	S	07BR1309	02	1020	40.00	10.000	11640	1122.30	4.16			0.64	1.92		
49	S	07BR1309	03	1058	40.00	10.000	83823	8130.44	30.5			0.62	1.86	High result compared to split samples, reanalyzed.	
50	S	07BR1309	04	1066	40.00	10.000	12625	1217.93	4.34			0.61	1.84		
51	S	07BR1309	05	999	40.00	10.000	10936	1053.95	3.97			0.66	1.97		

Batch: 07-1008 Analyst: JH		Analyte: THg Matrix: Biota		Instrument ID: BR10		Date: 09/24/07		MDL: PQL:		0.04 ng/g 0.10 ng/g		EMDL: EPQL:		0.65 ng/g 1.96 ng/g		Nitric/Sulfuric Prep	
Run No.	Run Type	Tracking #	Sample ID	Sample Wt. mg	Dilution Vol. mL	Analyzed Vol. mL	PA	Hg pg	Hg ng/g	TV/ Spike	Recovery			MDL	PQL		Comments
52	S	07BR1309	07	1193	40.00	5.000	47876	4640.40	30.9					1.1	3.3		
53	S	07BR1309	08	1048	40.00	5.000	42169	4086.31	31.0					1.2	3.7		
54	S	07BR1309	09	1023	40.00	5.000	37131	3597.18	27.9					1.3	3.8		
55	S	07BR1309	10	1145	40.00	5.000	43454	4211.07	29.2					1.1	3.4		
56	S	07BR1309	12	1056	40.00	10.000	37358	3619.22	13.48					0.62	1.86		
57	S	07BR1309	03R	1058	40.00	10.000	12255	1182.01	4.24					0.62	1.86		
58	CCV						5507	527		500	105%						
59	MR	07BR1309	16MD	1123	40.00	0.300	28681	2776.78	329			6%		19	58		= MD RPD
60	MS	07BR1309	16MS	1082	40.00	0.300	44531	4315.64	532	185	104%			20	60		
61	MSD	07BR1309	16MSD	1046	40.00	0.300	41979	4067.87	518	191	93%	3%		21	63		= MS/MSD RPD
62	PPS	07BR1309	16PPS	1023	40.00	0.300	81312	7886.65	1028	652	105%			21	64		
63	MR	07BR1309	31MD	1040	40.00	5.000	52742	5112.83	39.1			2%		1.3	3.8		= MD RPD
64	MS	07BR1309	31MS	1035	40.00	0.250	35871	3474.85	537	483	103%			25	76		
65	MSD	07BR1309	31MSD	1185	40.00	0.250	38479	3728.06	503	422	110%	6%		22	66		= MS/MSD RPD
66	S	07BR1309	13	1069	40.00	10.000	37330	3616.50	13.3					0.61	1.84		
67	S	07BR1309	14	1038	40.00	10.000	35773	3465.34	13.1					0.63	1.89		
68	S	07BR1309	15	1069	40.00	10.000	34632	3354.56	12.3					0.61	1.84		
69	S	07BR1309	17	1041	40.00	0.500	46468	4503.70	346					13	38		
70	S	07BR1309	18	1016	40.00	0.500	46377	4494.86	354					13	39		
71	S	07BR1309	19	1033	40.00	0.500	45268	4387.19	340					13	38		
72	S	07BR1309	20	1089	40.00	0.500	50165	4862.64	357					12	36		
73	S	07BR1309	22	1030	40.00	10.000	13275	1281.04	4.74					0.64	1.91		
74	CCV						5499	526		500	105%						
75	S	07BR1309	23	1008	40.00	10.000	12289	1185.31	4.46					0.65	1.95		
76	S	07BR1309	24	1014	40.00	10.000	13546	1307.35	4.91					0.65	1.94		
77	S	07BR1309	25	1118	40.00	10.000	15048	1453.17	4.98					0.59	1.76		
78	S	07BR1309	27	1054	40.00	5.000	48054	4657.68	35.1					1.2	3.7		
79	S	07BR1309	28	1059	40.00	5.000	46742	4530.30	34.0					1.2	3.7		
80	S	07BR1309	29	1030	40.00	5.000	46872	4542.92	35.0					1.3	3.8		
81	S	07BR1309	30	1104	40.00	5.000	49839	4830.98	34.8					1.2	3.6		
82	S	07BR1309	32	1019	40.00	5.000	54119	5246.52	40.9					1.3	3.9		
83	S	07BR1309	33	1058	40.00	5.000	50882	4932.25	37.1					1.2	3.7		
84	S	07BR1309	34	1091	40.00	5.000	57181	5543.81	40.4					1.2	3.6		
85	CCV						5158	493		500	99%						
86	S	07BR1309	35	1031	40.00	5.000	55858	5415.36	41.8					1.3	3.8		
87	S	07BR1309	37	1039	40.00	5.000	48142	4666.22	35.7					1.3	3.8		
88	S	07BR1309	38	1031	40.00	5.000	49322	4780.79	36.9					1.3	3.8		
89	S	07BR1309	39	1148	40.00	5.000	50671	4911.76	34.0					1.1	3.4		
90	S	07BR1309	40	1089	40.00	5.000	53741	5209.82	38.0					1.2	3.6		
91	CCV						5268	504		500	101%						

Hg Prep Log for Solids (CVAFS) T-Hg / Other _____ Page 1 of 2
 Revision #: 009

Batch: 07-1008Matrix: BiOTATechnician: MUDate: 9/20/07

Sample I.D.	Aliquot (mg)	Sample I.D.	Aliquot (mg)
MB-1	—	07BR1309-06	1131
↓ -2	—	↓ -06MD	1165
↓ -3	—	↓ -06MS	1036
↓ -4	—	↓ -06MSD	1089
CRM-1	204	↓ -07	1193
↓ -2	205	↓ -08	1048
PQL LFB	—	↓ -09	1023
07BR1309-41	1010	↓ -10	1145
↓ -42	1010	↓ -11	1060
07BR1309-01	1007	↓ -12	1056
↓ -01MD	1039	↓ -13	1069
↓ -01MS	1054	↓ -14	1038
↓ -01MSD	1050	↓ -15	1069
↓ -02	1020	↓ -16	1023
↓ -03	1058	↓ -16MD	1123
↓ -04	1066	↓ -16MS	1082
↓ -05	999	↓ -16MSD	1046

Matrix Spike/Matrix Spike Duplicate

Sample I.D.	Hg Standard I.D.	Hg Standard Conc. (ng/mL)	Hg Standard Vol. used (mL)	Matrix Spike Conc. (ng/g)
07BR1309-01MS	0737037	1000ng/mL	0.200mL	see analytical spreadsheet
↓ -01MSD	↓	↓	↓	↓
↓ -06MS	↓	1000ng/mL	0.500mL	↓
↓ -06MSD	↓	↓	↓	↓
↓ -16MS	↓	↓	0.200mL	↓
↓ -16MSD	↓	↓	↓	↓

Certified Reference Material (CRM)

CRM I.D.	CRM Source	CRM Conc. (ng/g) / (mg/kg)	CRM Mass used (mg)	Spike Witness Initials/Date
CRM-1 & 2	CRM-2	4640	204, 205	
PQL LFB	0734055	1ng/mL	0.100mL	JH 9/20/07
			nm 9/25/07	

HNO₃ Reagent I.D. #: 07-162-1BrCl I.D. #: 073900GHCl / H₂SO₄ Reagent I.D. #: 07-179-03Final Dil. Volume: 40mLTarget Temp. 1 (if required): 70 °CMeasured Temp.: 72 °CDigestion Time: 1 HRSTarget Temp. 2 (if required): 90-110 °CMeasured Temp.: 95 °CDigestion Time: 3 HRS

Comments: _____

Hg Prep Log for Solids (CVAFS) T-Hg/ Other _____ Page 2 of 2
 Revision #: 009

Batch: 07-1008Matrix: BiotaTechnician: MUDate: 9/20/07

Sample I.D.	Aliquot (mg)	Sample I.D.	Aliquot (mg)
07BR1309-17	1041	07BR1309-31MSD	1185
-18	1016	-32	1019
-19	1033	-33	1058
-20	1089	-34	1091
-21	1006	-35	1031
-22	1030	-36	1111
-23	1008	-37	1039
-24	1014	-38	1031
-25	1118	-39	1148
-26	1161	-40	1089
-27	1054		
-28	1059		
-29	1030		
-30	1104		
-31	1123		
-31MSD	1040		
-31MS	1035		

Matrix Spike/Matrix Spike Duplicate

Sample I.D.	Hg Standard I.D.	Hg Standard Conc. (ng/mL)	Hg Standard Vol. used (mL)	Matrix Spike Conc. (ng/g)
07BR1309-31MS	0737037	1000ng/mL	0.50mL	see analytical spreadsheet
↓ -31MSD	↓	↓	↓	

Certified Reference Material (CRM)

CRM I.D.	CRM Source	CRM Conc. (ng/g) / (mg/kg)	CRM Mass used (mg)	Spike Witness Initials/Date

HNO₃ Reagent I.D. #: _____ BrCl I.D. #: _____HCl / H₂SO₄ Reagent I.D. #: _____ Final Dil. Volume: _____

Target Temp. 1 (if required): _____ °C Measured Temp.: _____ °C Digestion Time: _____

Target Temp. 2 (if required): _____ °C Measured Temp.: _____ °C Digestion Time: _____

Comments: _____

Sample Physical Characteristics Log

Page 1 of 2

Prep Technician: MMDate: 09/20/07Client ID(s): KLE001

Sample ID	Matrix/Submatrix	Physical Characteristics
07BR1309-01	Biota / Worm	BROWN, well homogenized, ^{mud/slop} watery/soupy, ^{mud/slop} smelly
-02	↓ ↓	↓ ↓ ↓
-03	↓ ↓	↓ ↓ ↓
-04	↓ ↓	↓ ↓ ↓
-05	↓ ↓	↓ ↓ ↓
-06	Biota / Bivalve	tan/light grey, pasty, well homogenized
-07	↓ ↓	↓ ↓ ↓
-08	↓ ↓	↓ ↓ ↓
-09	↓ ↓	↓ ↓ ↓
-10	↓ ↓	↓ ↓ ↓
-11	Biota / Bivalve ^{mud/slop} worm	dark brown, watery/soupy, well homogenized
-12	↓ ↓	↓ ↓ ↓
-13	↓ ↓	↓ ↓ ↓
-14	↓ ↓	↓ ↓ ↓
-15	↓ ↓	↓ ↓ ↓
-16	↓ ↓	dark brown, smelly, pasty, well homogenized
-17	↓ ↓	↓ ↓ ↓
-18	↓ ↓	↓ ↓ ↓
-19	↓ ↓	↓ ↓ ↓
-20	↓ ↓	↓ ↓ ↓

Additional Notes: _____

Sample Physical Characteristics Log

page 2 of 2

Prep Technician: MUDate: 09/20/07Client ID(s): KLE001

Sample ID	Matrix/Submatrix	Physical Characteristics
07BR1309-21	Biota / WORMS	dark brown, pasty, well homogenized
-22		
-23		
-24		
-25		
-26	/ Bivalve	tan/light grey, pasty, well homogenized
-27		
-28		
-29		
-30		
-31		
-32		
-33		
-34		
-35		
-36		
-37		
-38		
-39		
-40		

Additional Notes: _____

Hg Analysis Sheet: T-Hg / Other: _____

(form 1) Page 1 of 4

Batch: 07-1008Matrix: BiotaAnalyst: JHDate: 9/24/07Mod. III ID#: BR-10Cal. Blanks X: 80.50 PACF X: 0.0771 pg/PANH₂OH·HCl #: 073820310 ng Hg/mL std. #: 0734056RSD: 3 %SnCl₂ #: 07370351.0 ng Hg/mL std. #: 0734055low std. Rec.: 96 %

Run #	Split Bottle	Trap	Bubb.	Brooks Rand Sample ID	Analy. Vol. (mL)	PA	Comments
1	1	X 1	1	CB-1	-	61	
2	2	X 2	2	CB-2	-	83	
3	3	X 3	3	CB-3	-	95	
4	4	X 4	4	CB-4	-	83	
5	1	X 5	1	25pg	0.025	328	JH 9/24/07 1 ng/mL
6	2	X 6	2	100pg	0.100	1093	↓
7	3	X 7	3	500pg	0.050	5222	10 ng/mL
8	4	X 8	4	2500pg	0.250	26496	↓
9	1	X 9	1	10000pg	1.00	106715	↓
10	2	X 10	2	ICV 1601pg	1.00	16609	Nist 1641d
11	3	X 11	3	CCV	0.050	5536	10 ng/mL
12	4	X 12	4	MB-1	10.00	877	
13	1	X 1	1	CCB	-	68	
14	2	X 2	2	MB-2	10.00	1440	
15	3	X 3	3	MB-3	10.00	290	
16	4	X 4	4	MB-4	10.00	245	
17	1	X 5	1	CRM-1	0.050	12596	
18	2	X 6	2	CRM-2	0.050	12769	
19	3	X 7	3	PGLLFB	10.00	602	
20	4	X 8	4	07BR1309-41	10.00	158	
21	1	X 9	1	MB-1R	10.00	914	
22	2	X 10	2	MB-2R	10.00	1449	
23	3	X 11	3	07BR1309-41	10.00	302	
24	4	X 12	4	↓	0.500	620	

Comments: _____

Check standard: 0734056Verification standard: 0737030

Brooks Rand Report #07BR1309

Revision 004

Page 19 of 21

Hg Analysis Sheet: -Hg Other: _____(Form 2) Page 2 of 4Batch: 07-1008Matrix: BiotaAnalyst: JHDate: 9/24/07

Run #	Split Bottle	Trap	Bubb.	Brooks Rand Sample ID	Analy. Vol. (mL)	PA	Comments
25	1	X 1	1	07BR1309-06	0.500	3806	
26	2	X 2	2	-11	↓	1823	
27	3	X 3	3	-16	↓	46114	
28	4	X 4	4	-21	↓	707	
29	1	X 5	1	-26	5.00	48574	
30	2	X 6	2	-31	↓	55864	
31	3	X 7	3	-36	↓	51721	
32	4	X 8	4	-01R	10.00	12089	
33	1	X 9	1	-06R	5.00	43955	
34	2	X 10	2	-11R	10.00	3337356	JH 9/24
35	3	X 11	3	-21R	10.00	13605	
36	4	X 12	4	-16R	0.300	26986	
37	1	X 1	1	-01MD	10.00	10516	
38	2	X 2	2	-01MS	↓	1502026	
39	3	X 3	3	-01MSD	↓		
40	4	X 4	4	-01PS	↓		2500pg spike
				CCV	0.050		
				07BR1309-06MD			
39	1	X 5	1	07BR1309-01MS	1.00	59023	
40	2	X 6	2	CCB	-	93	
41	3	X 7	3	CCB	-	105	
42	4	X 8	4	07BR1309-01MSD	1.00	61075	
43	1	X 9	1	↓ -01PS	10.00	40096	2500pg spike
44	2	X 10	2	CCV	0.050	5229	10 ⁷ g/mL
45	3	X 11	3	07BR1309-06MD	5.00	47449	
46	4	X 12	4	-06MS	0.250	37296	
47	1	X 1	1	-06MSD	0.250	34165	
48	2	X 2	2	-02	10.00	11646	
49	3	X 3	3	-03	↓	83823	
50	4	X 4	4	↓ -04	↓	12625	

Comments: _____

Hg Analysis Sheet: T-Hg/ Other: _____

(form 2) Page 3 of 4

Batch: 07-1008

Matrix: Biotin

Analyst: JH

Date: 9/24/07

Run #	Split Bottle	Trap	Bubb.	Brooks Rand Sample ID	Analy. Vol. (mL)	PA	Comments
51	1	X 5	1	07BR1309-05	10.00	10936	
52	2	X 6	2	-07	5.00	47876	
53	3	X 7	3	-08	5.00	42169	
54	4	X 8	4	-09	5.00	37131	
55	1	X 9	1	-10	5.00	43454	
56	2	X 10	2	-12	10.00	37358	
57	3	X 11	3	-03R	10.00	12255	
58	4	X 12	4	CCV	0.050	5507	10 ⁻⁹ /mL
59	1	X 1	1	07BR1309-10MD	0.300	28091	
60	2	X 2	2	-10MS		44531	
61	3	X 3	3	-10MSD		41979	
62	4	X 4	4	-10PDS		81312	5000pg spike
63	1	X 5	1	-31MD	5.00	52742	
64	2	X 6	2	-31MS	0.250	35871	
65	3	X 7	3	-31MSD	0.250	38479	
66	4	X 8	4	-13	10.00	37330	
67	1	X 9	1	-14		35773	
68	2	X 10	2	-15		34632	
69	3	X 11	3	-17	0.500	46469	
70	4	X 12	4	-18		46377	
71	1	X 1	1	-19	0.500	45268	
72	2	X 2	2	-20		50165	
73	3	X 3	3	-22	10.00	13275	
74	4	X 4	4	CCV	0.050	5449	10 ⁻⁹ /mL
75	1	X 5	1	07BR1309-23	10.00	12289	
76	2	X 6	2	-24		13546	
77	3	X 7	3	-25		15048	
78	4	X 8	4	-27	5.00	48054	
79	1	X 9	1	-28		46742	
80	2	X 10	2	-29		46872	
81	3	X 11	3	-30		49839	
82	4	X 12	4	-32	5.00	54119	

Comments: _____

Brooks Rand Report #07BR1309

Revision 004

Page 19 of 21

Hg Analysis Sheet: T-Hg Other: _____

(Form 2) Page 4 of 4

Batch: 07-003

Matrix: Biotin

Analyst: JH

Date: 9/24/07

Run #	Split Bottle	Trap	Bubble	Brooks Rand Sample ID	Analy Vol. (mL)	PA	Comments
83	1	X 1	1	07BR1309-33	5.00	50882	
84	2	X 2	2	↓ -34	↓	57181	
85	3	X 3	3	CCV	6.500	5158	1.79/mL
86	4	X 4	4	07BR1309-35	5.00	55858	
87	1	X 5	1	↓ -37	↓	48142	
88	2	X 6	2	↓ -38	↓	44322	
89	3	X 7	3	↓ -39	↓	50071	
90	4	X 8	4	↓ -40	↓	53741	
91	1	X 9	1	CCV	0.050	5268	1.079/mL
mm 9/25/07							

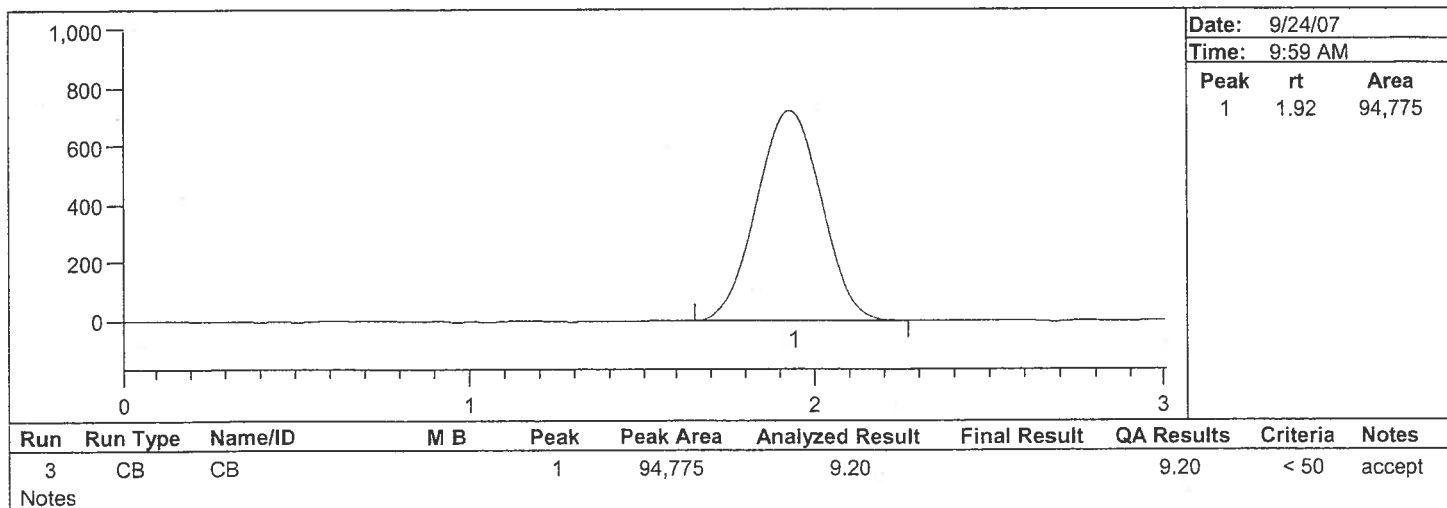
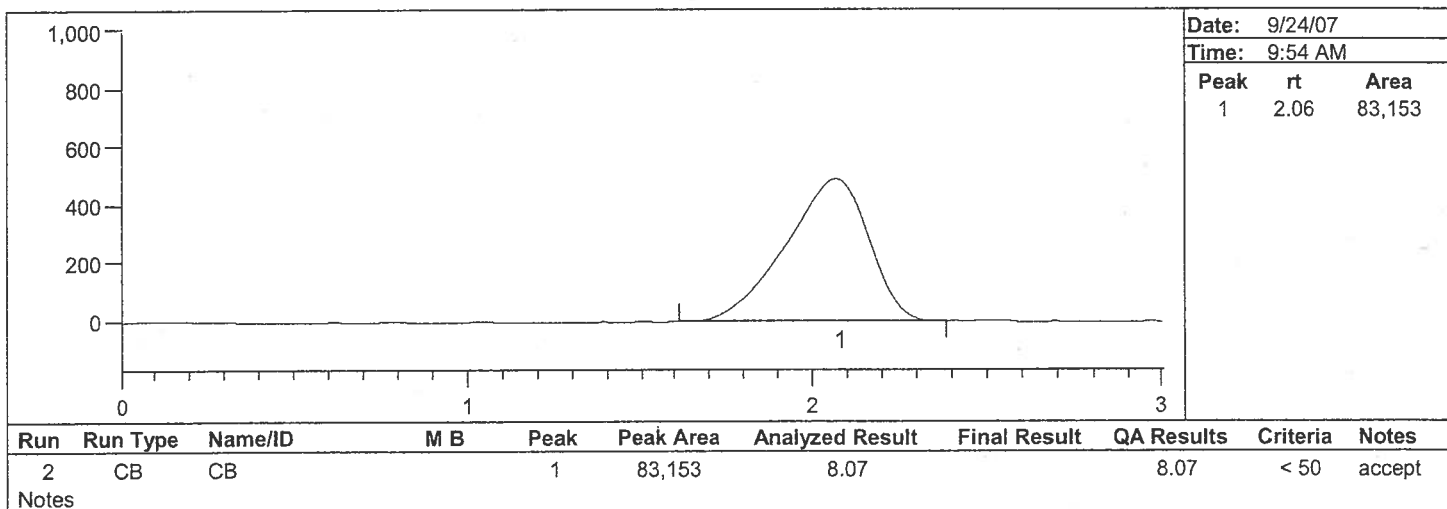
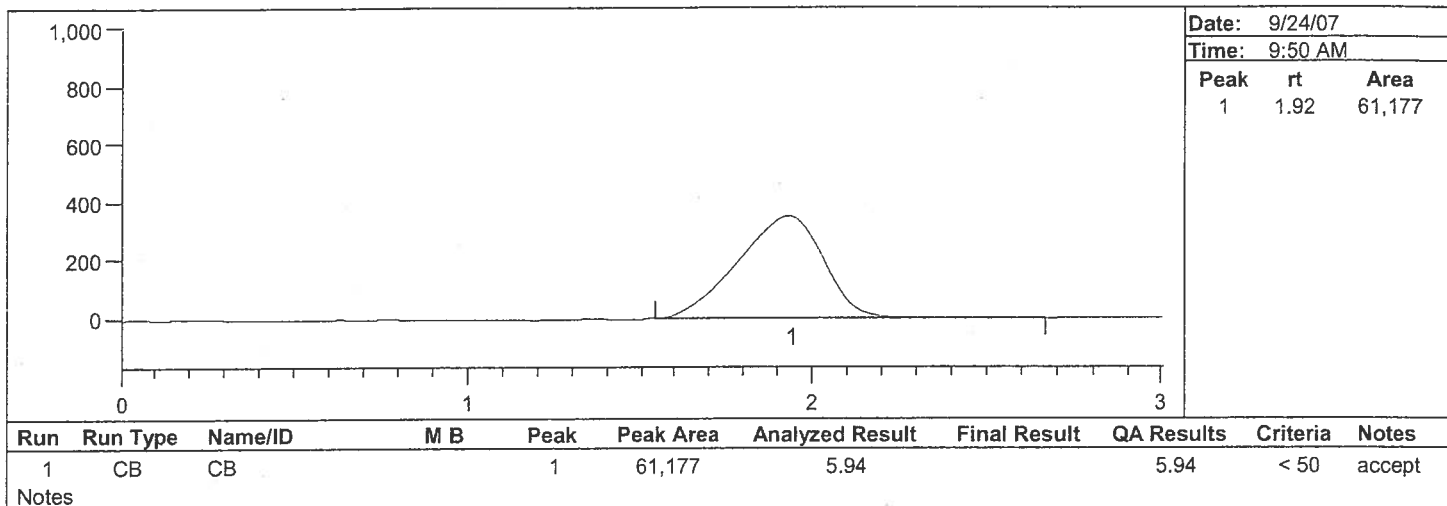
Peak Report

Brooks Rand Report #07BR1309

Batch Number:
Method Number: 1631 Mod.

Project Number(s):
Instrument ID:

Date Analyzed: 9/24/07
Analyst Name:



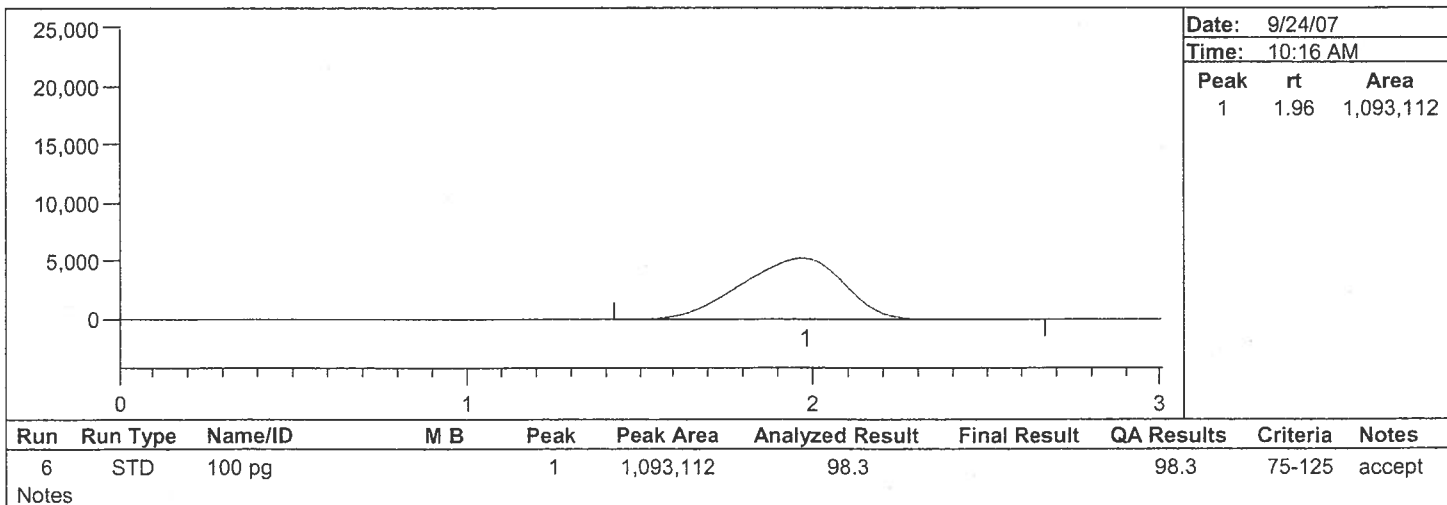
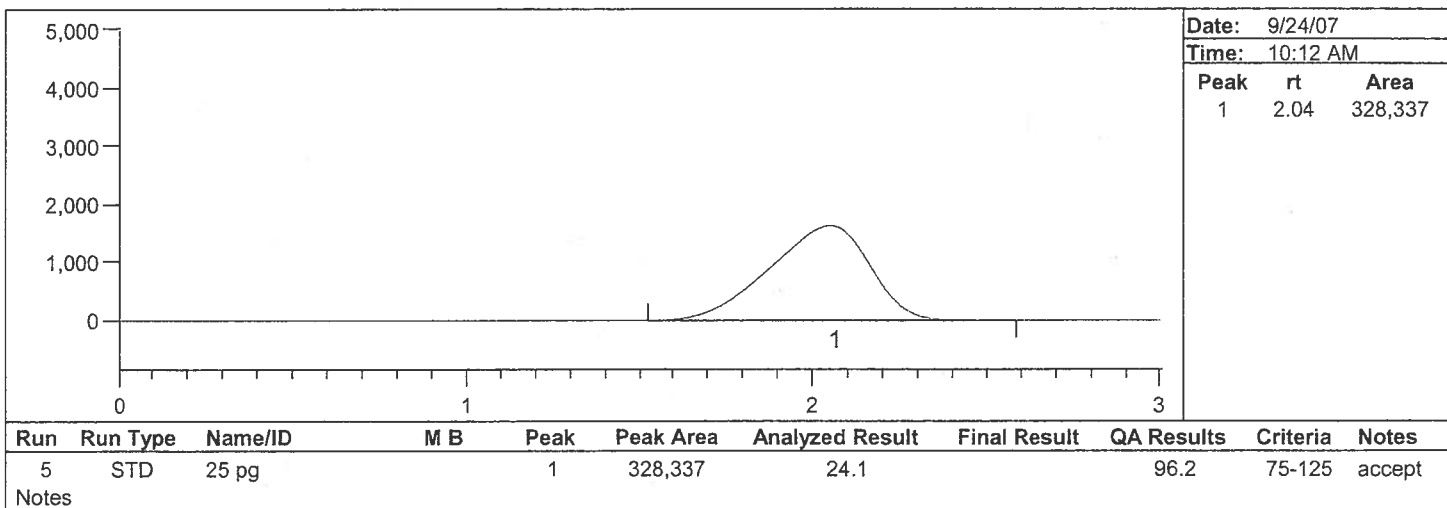
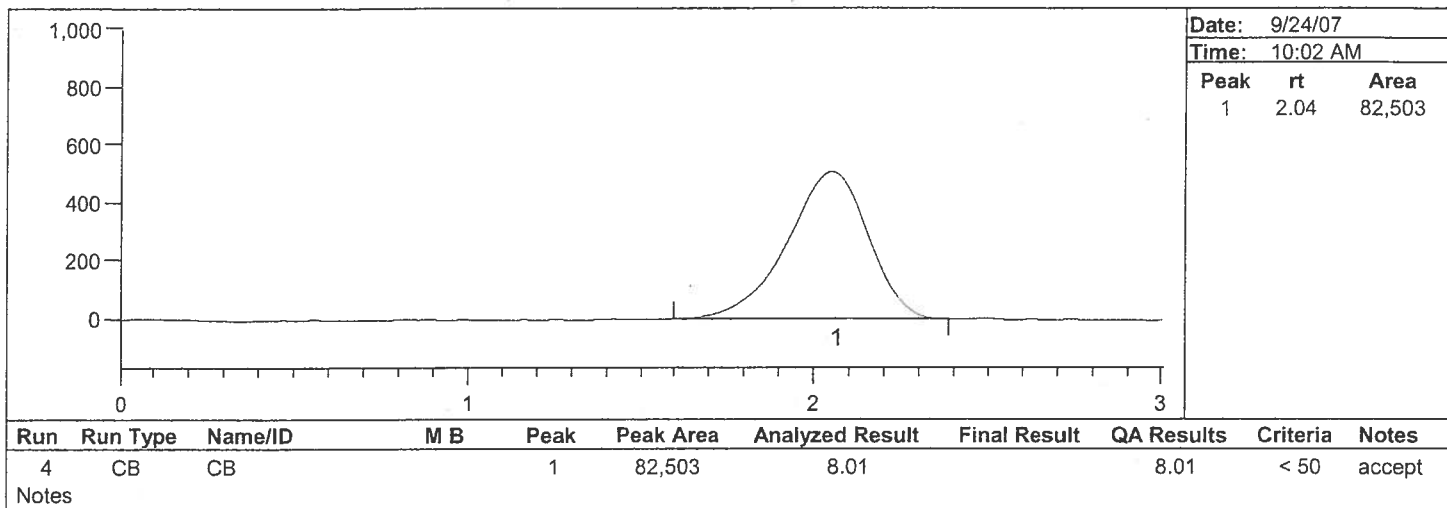
Peak Report

Brooks Rand Report #07BR1309

Batch Number:
Method Number: 1631 Mod.

Project Number(s):
Instrument ID:

Date Analyzed: 9/24/07
Analyst Name:



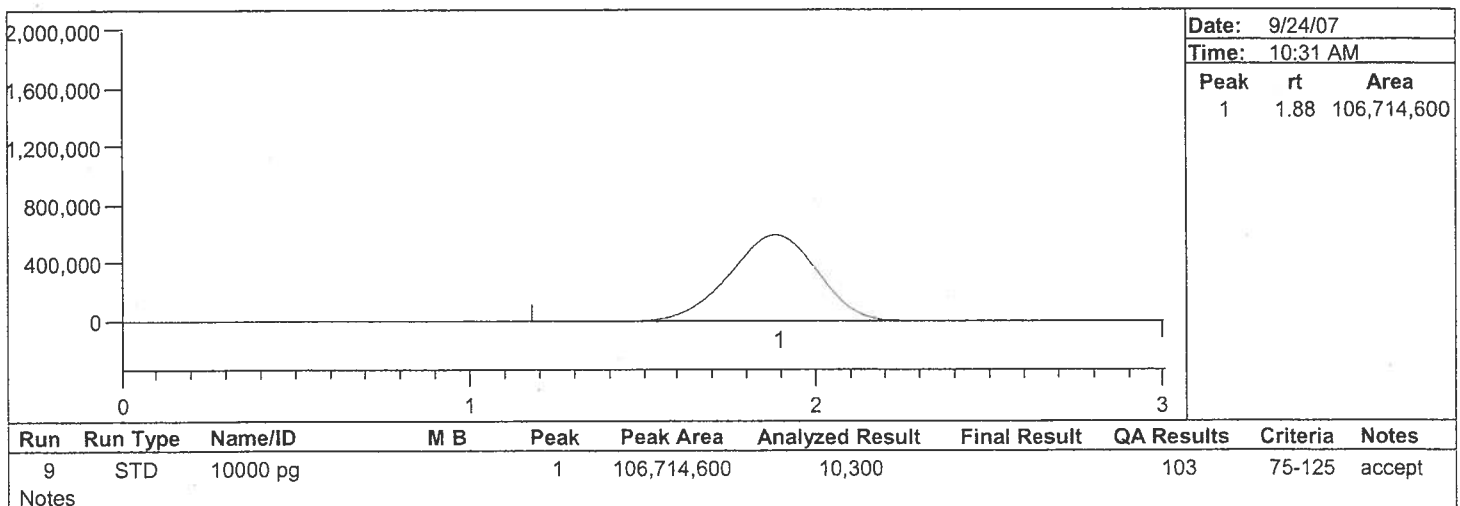
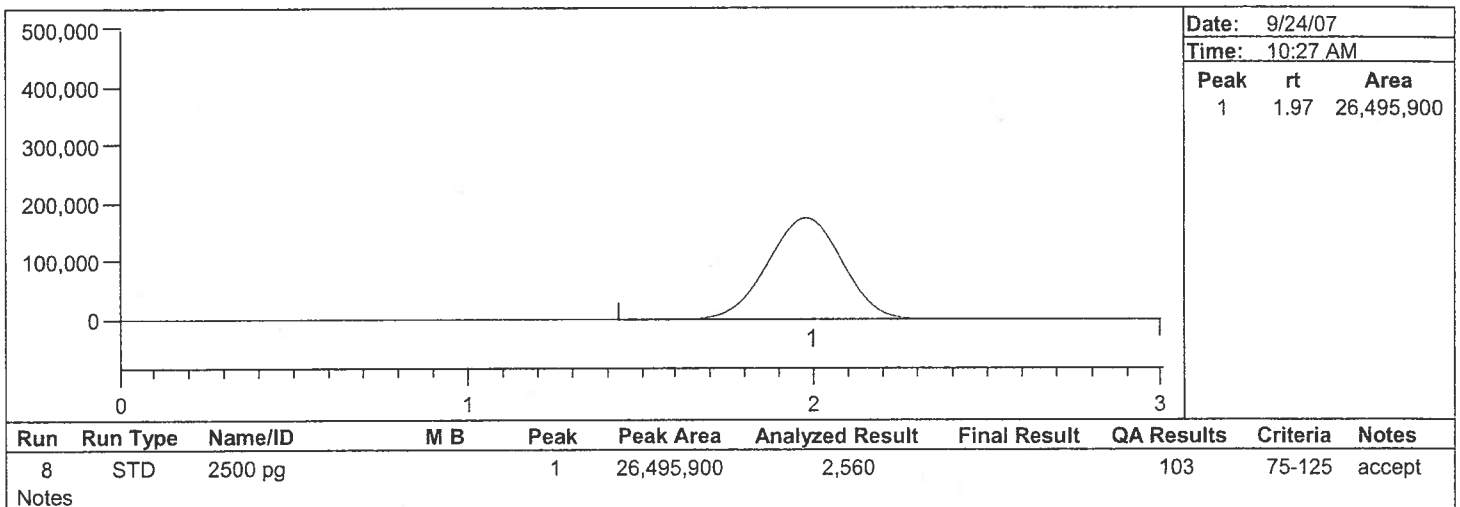
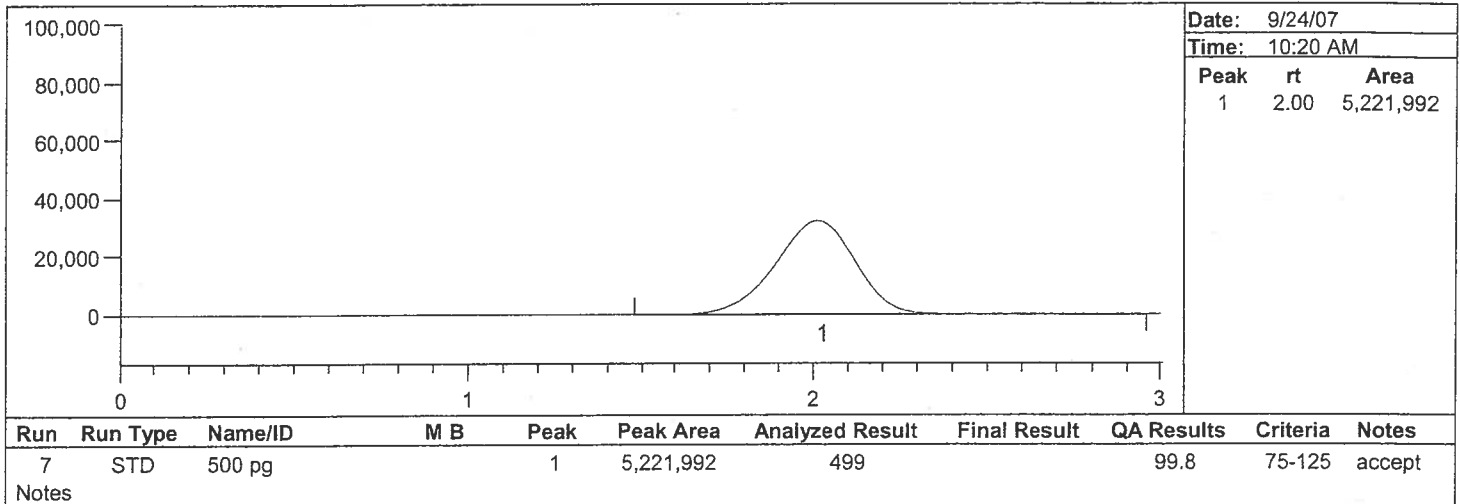
Peak Report

Brooks Rand Report #07BR1309

Batch Number:
Method Number: 1631 Mod.

Project Number(s):
Instrument ID:

Date Analyzed: 9/24/07
Analyst Name:

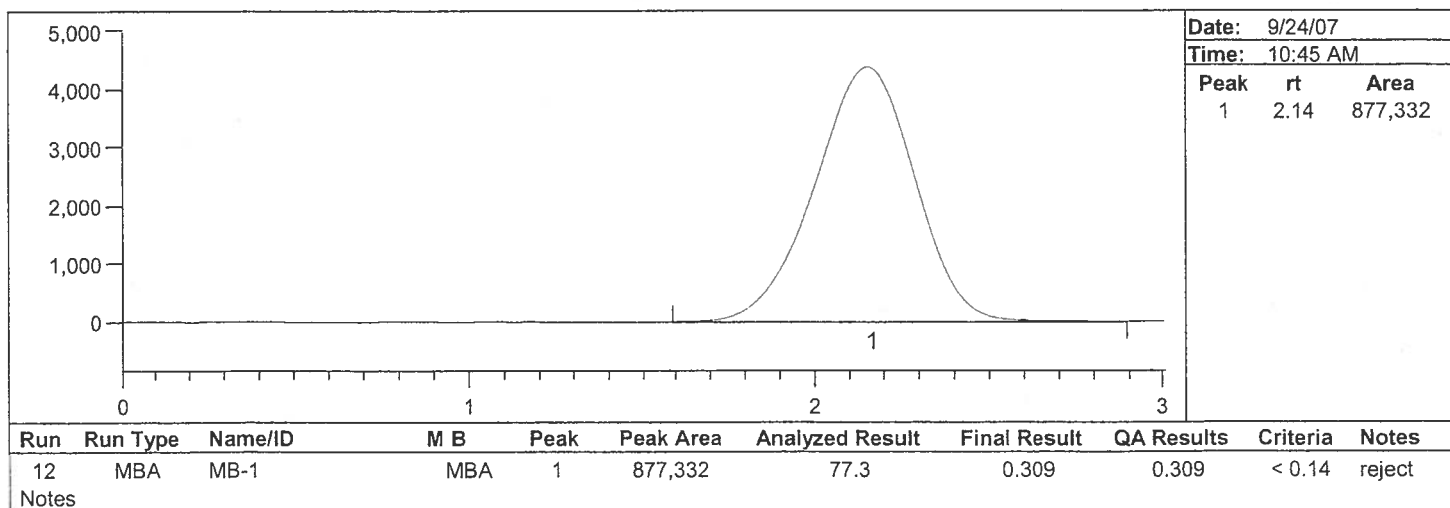
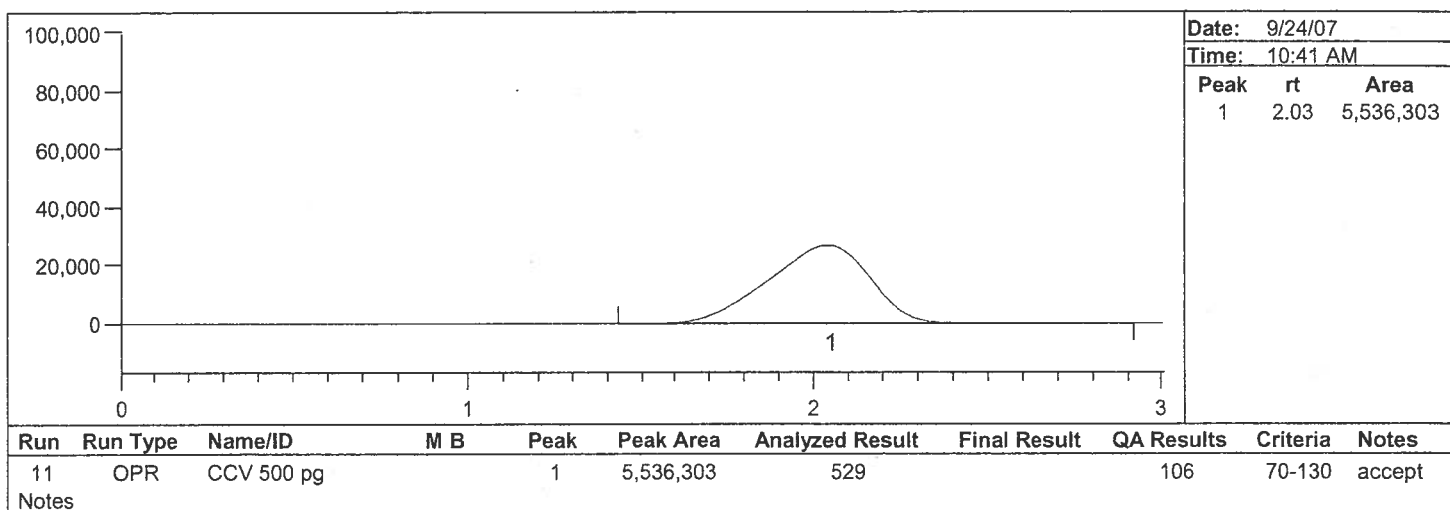
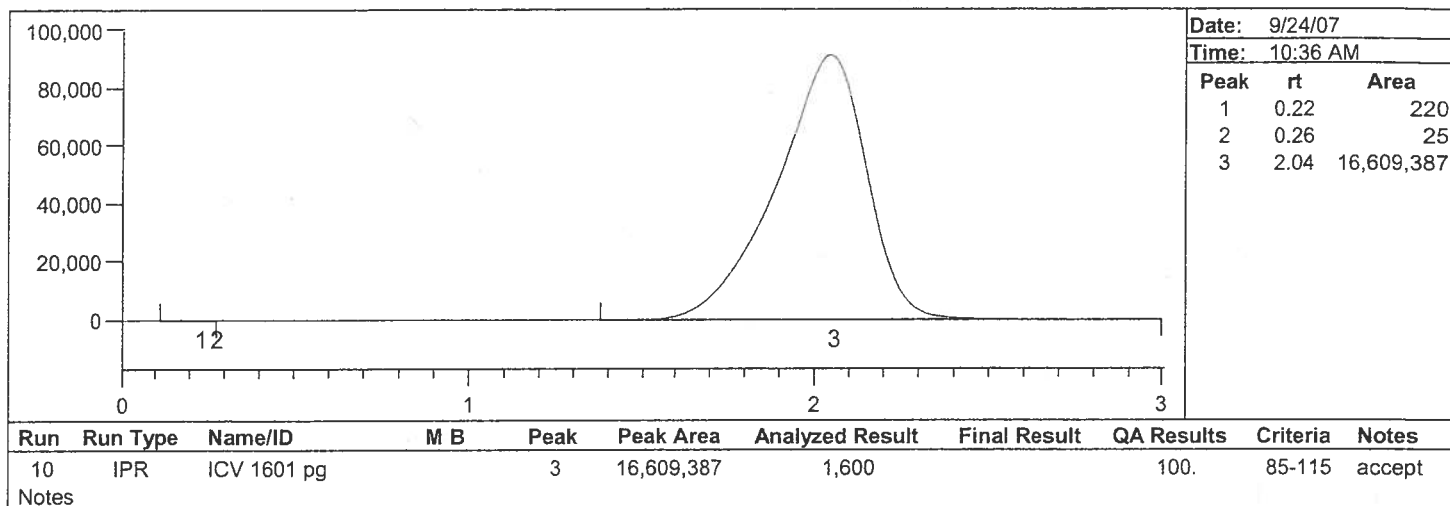


Peak Report

Batch Number:
Method Number: 1631 Mod.

Project Number(s):
Instrument ID:

Date Analyzed: 9/24/07
Analyst Name:

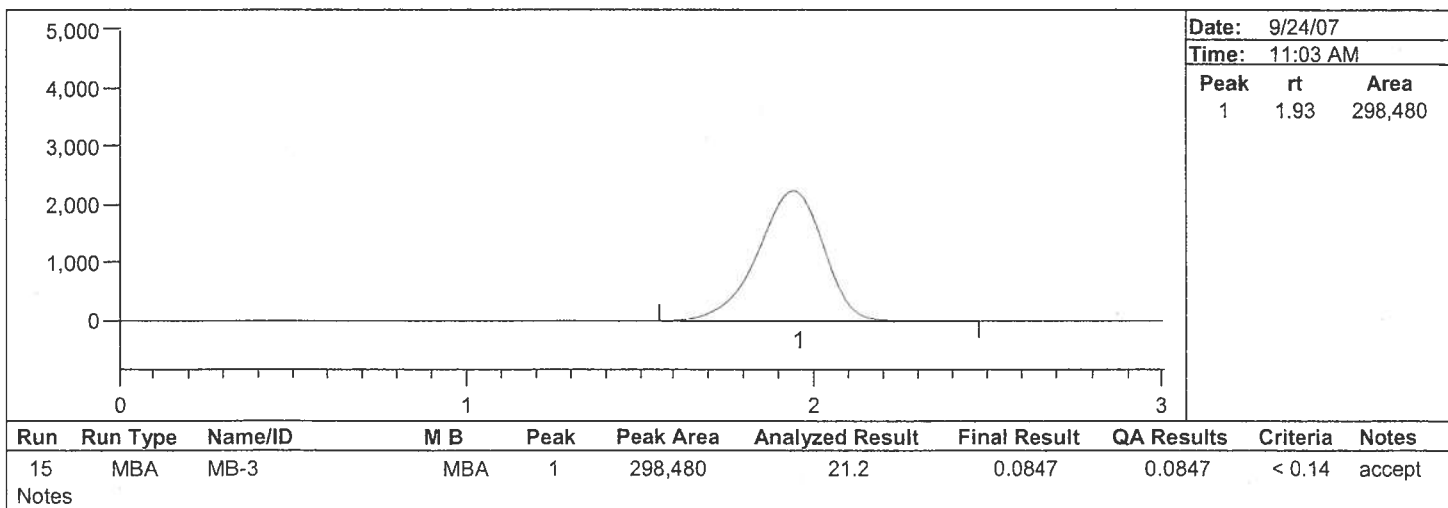
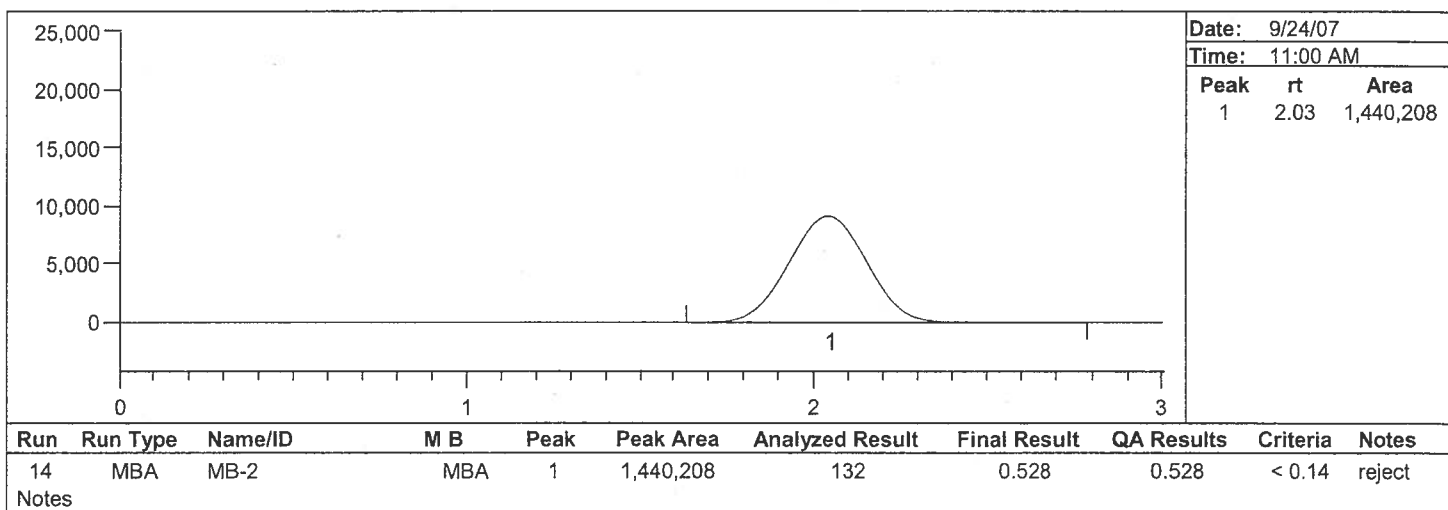
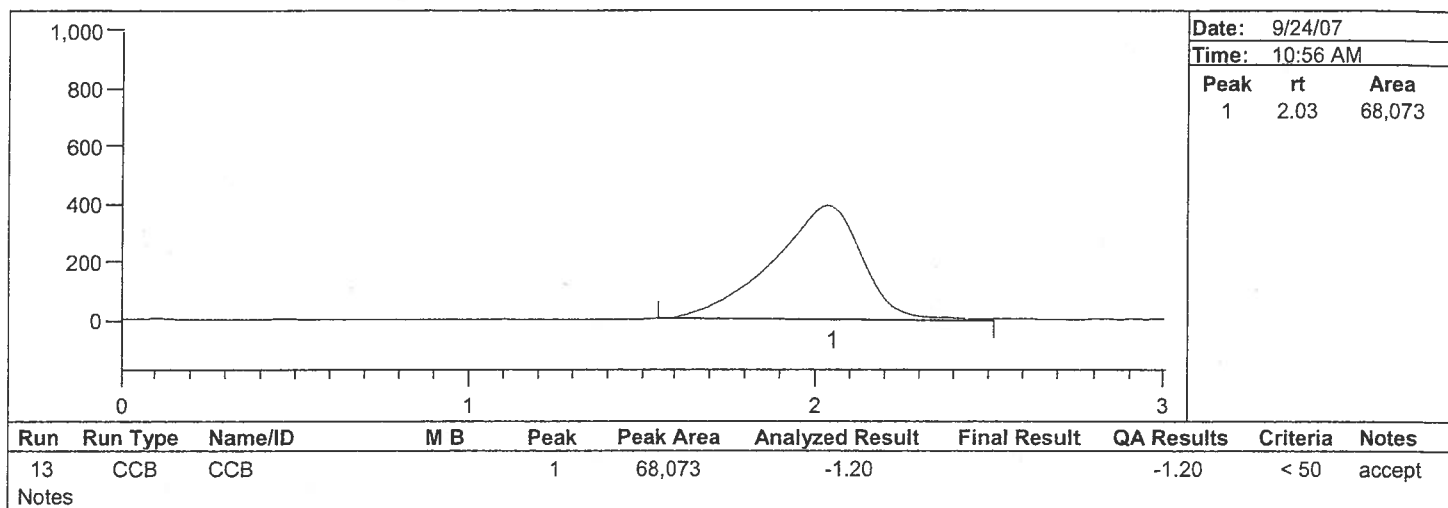


Peak Report

Batch Number:
Method Number: 1631 Mod.

Project Number(s):
Instrument ID:

Date Analyzed: 9/24/07
Analyst Name:



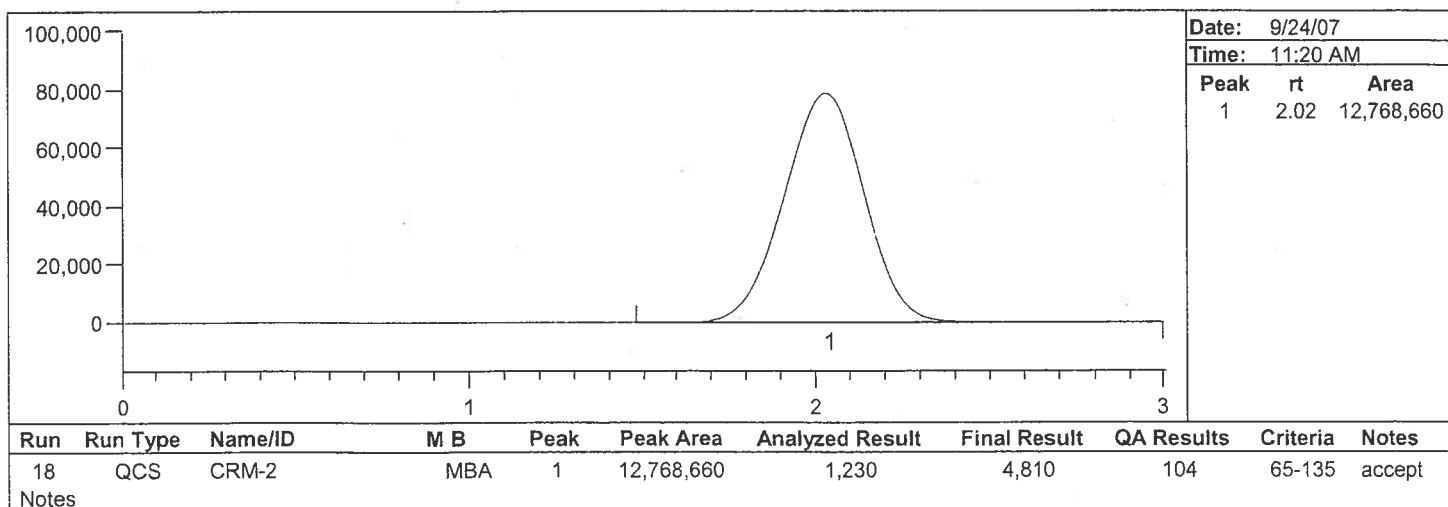
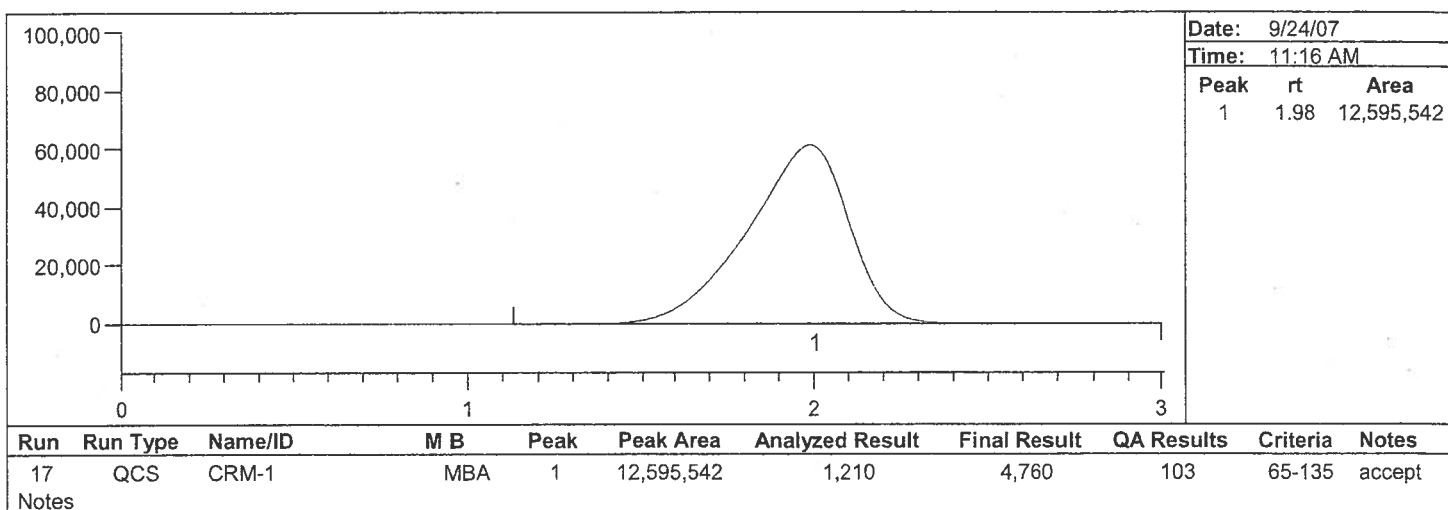
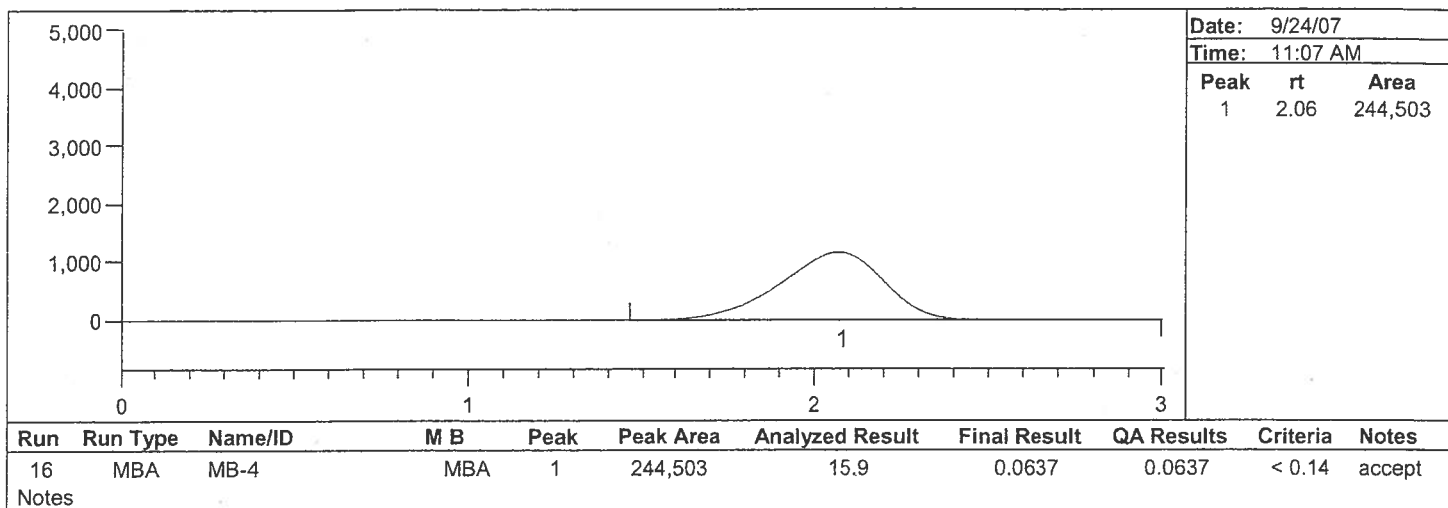
Peak Report

Brooks Rand Report #07BR1309

Batch Number:
Method Number: 1631 Mod.

Project Number(s):
Instrument ID:

Date Analyzed: 9/24/07
Analyst Name:



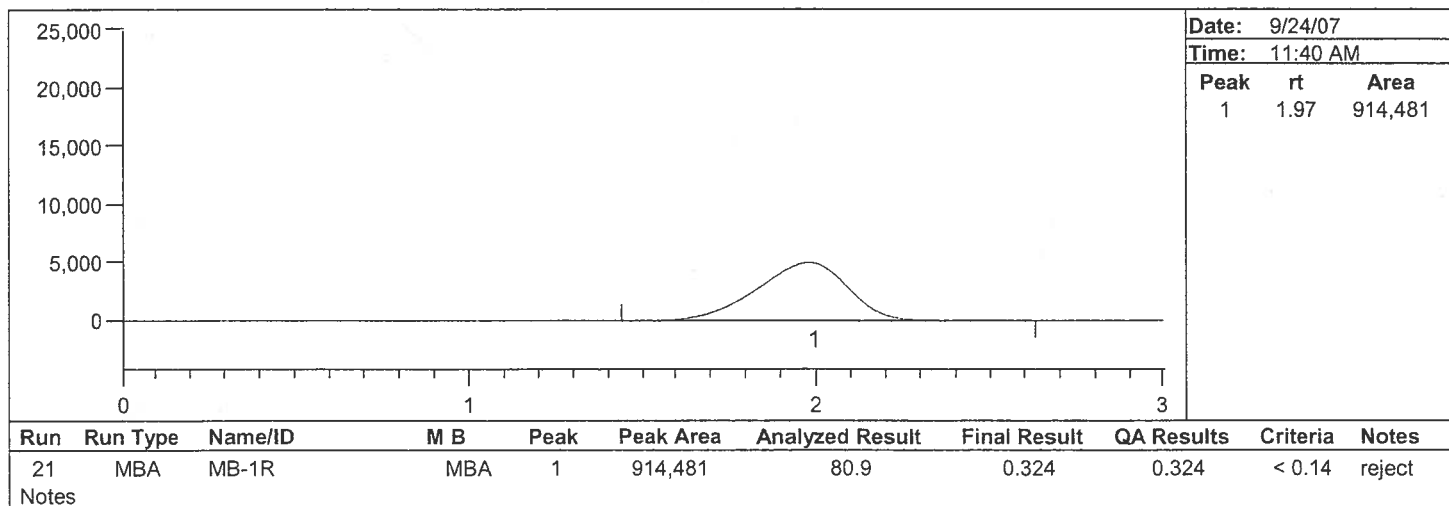
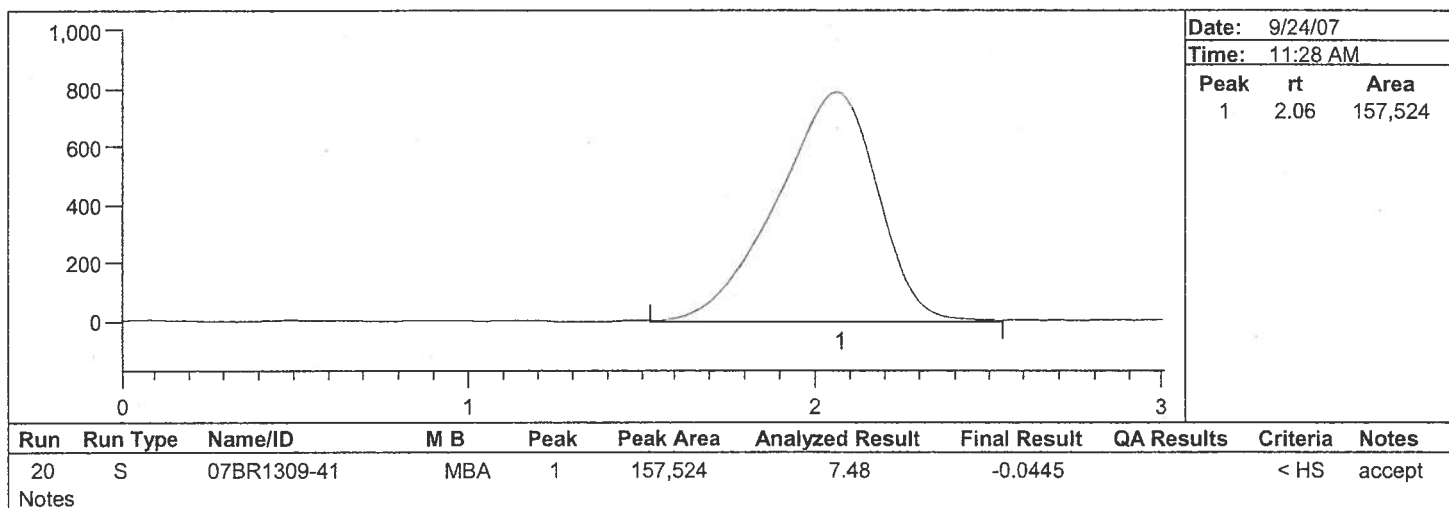
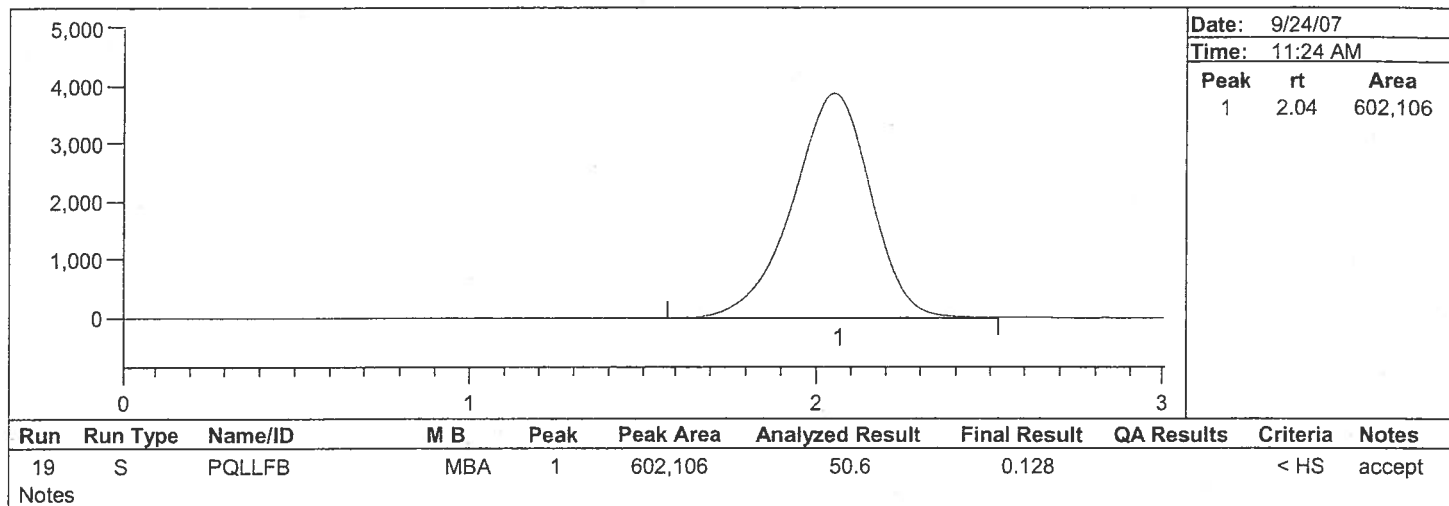
Peak Report

Brooks Rand Report #07BR1309

Batch Number:
Method Number: 1631 Mod.

Project Number(s):
Instrument ID:

Date Analyzed: 9/24/07
Analyst Name:



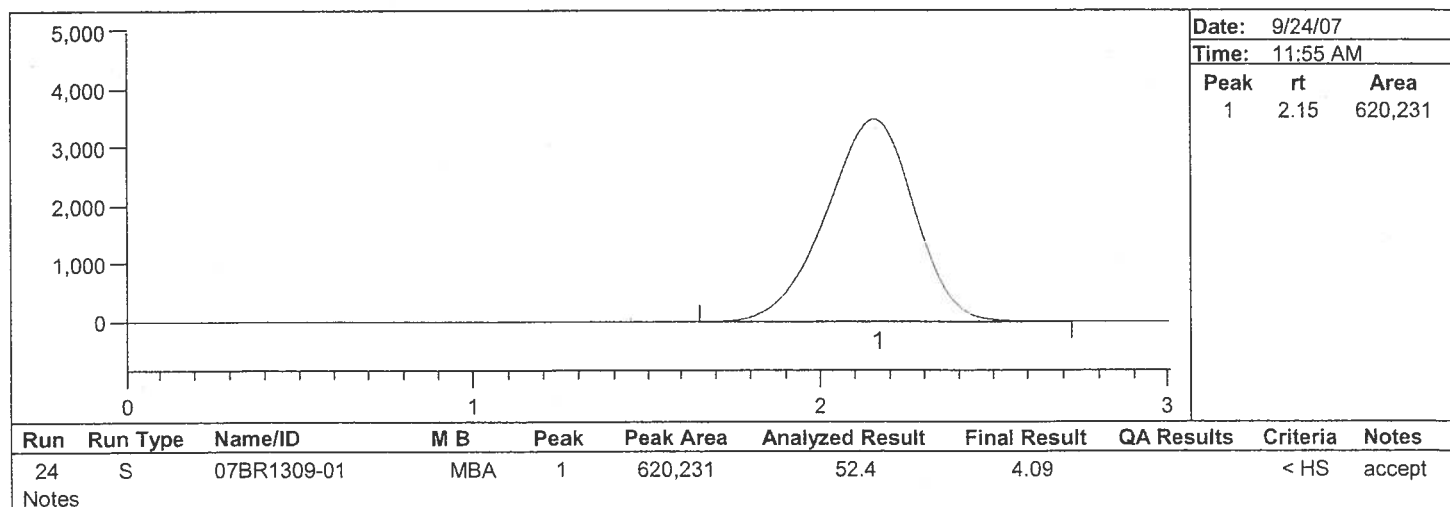
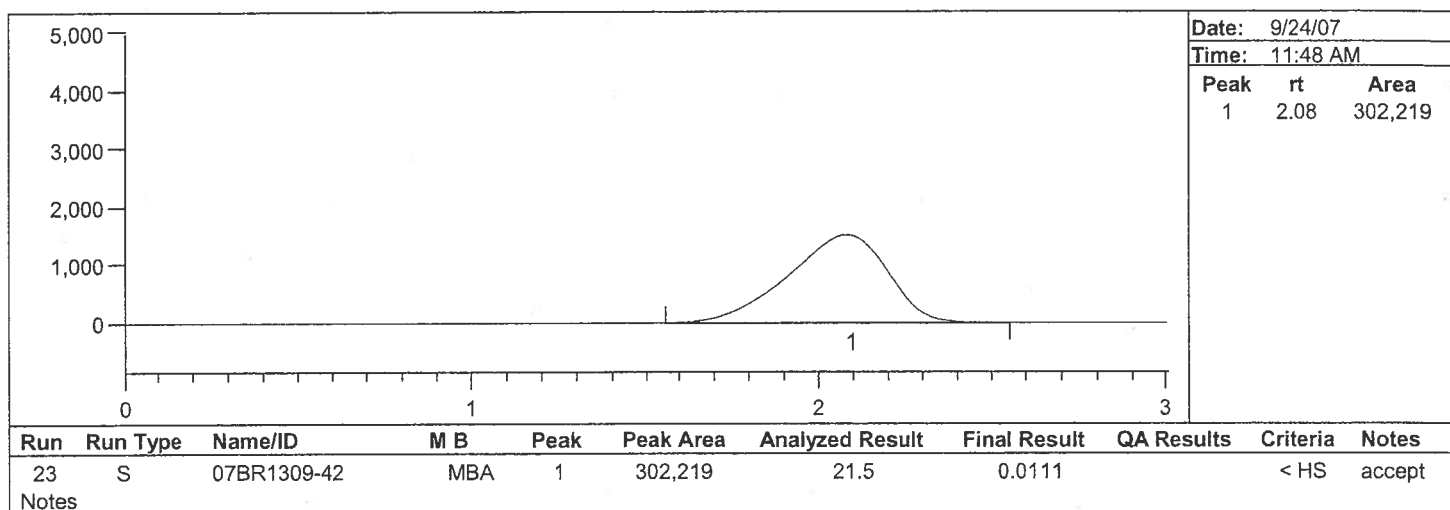
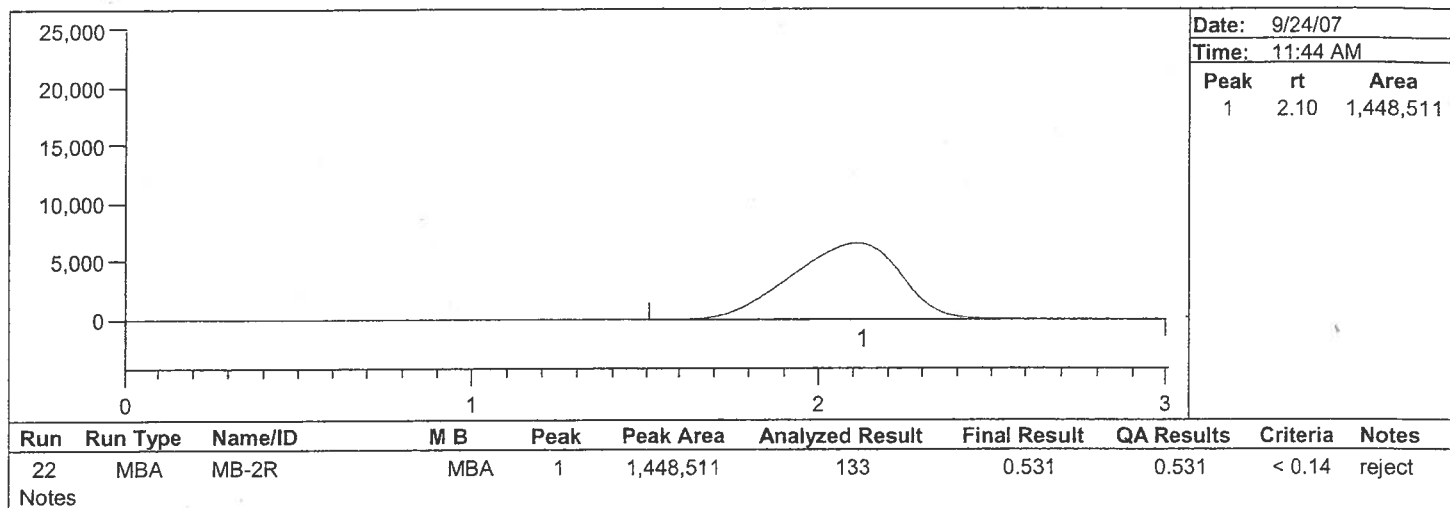
Peak Report

Brooks Rand Report #07BR1309

Batch Number:
Method Number: 1631 Mod.

Project Number(s):
Instrument ID:

Date Analyzed: 9/24/07
Analyst Name:



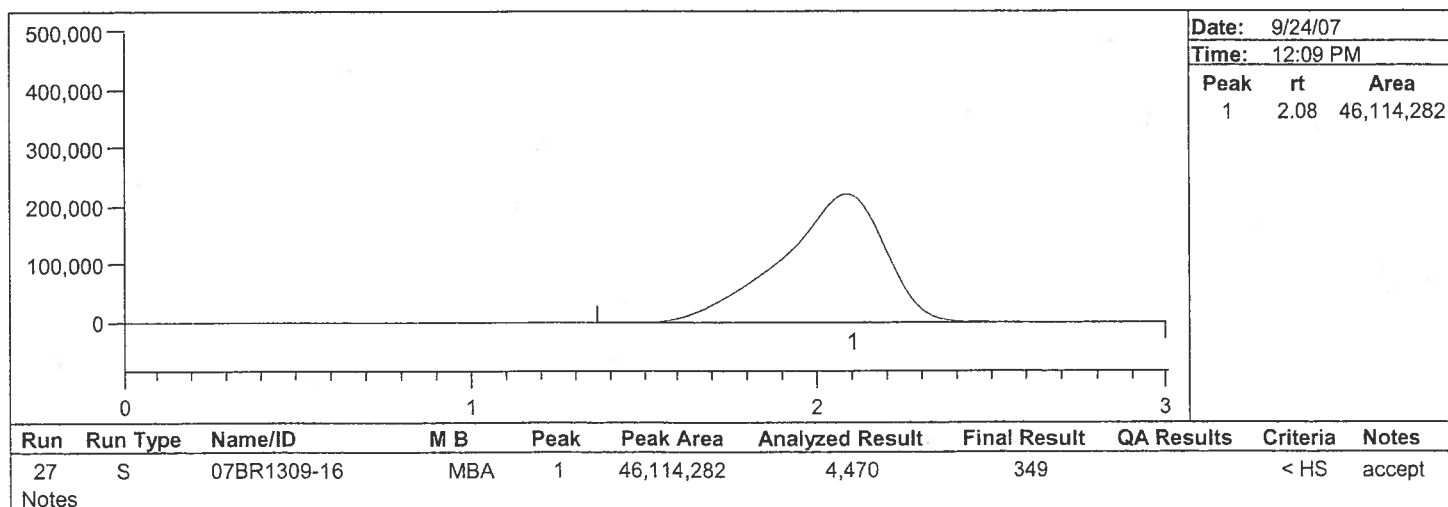
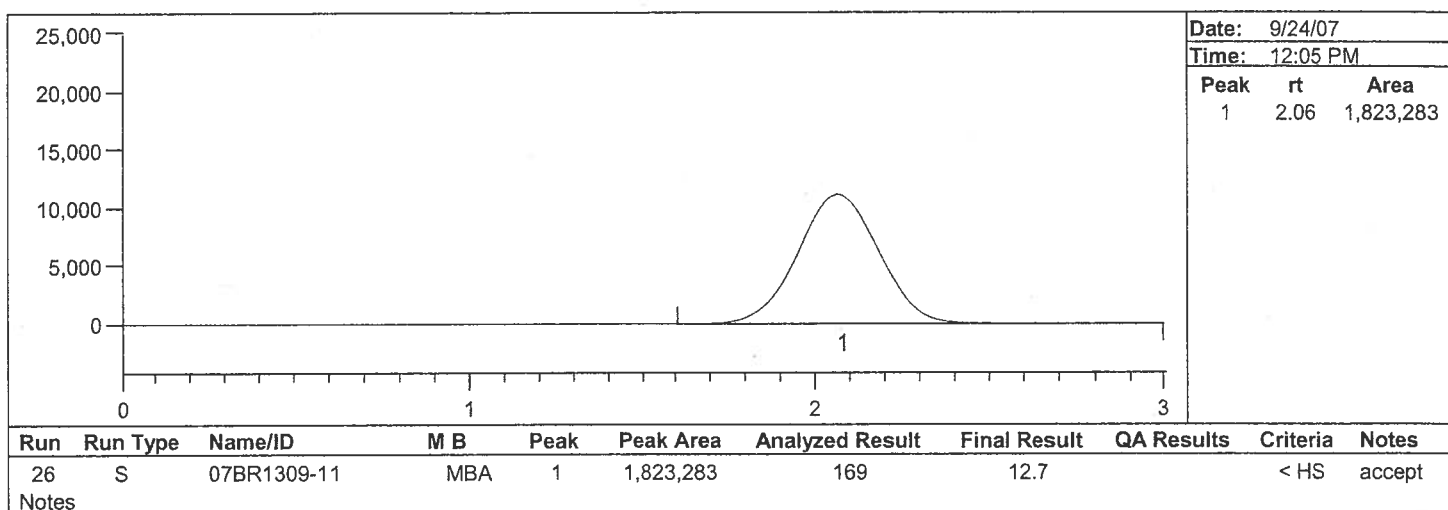
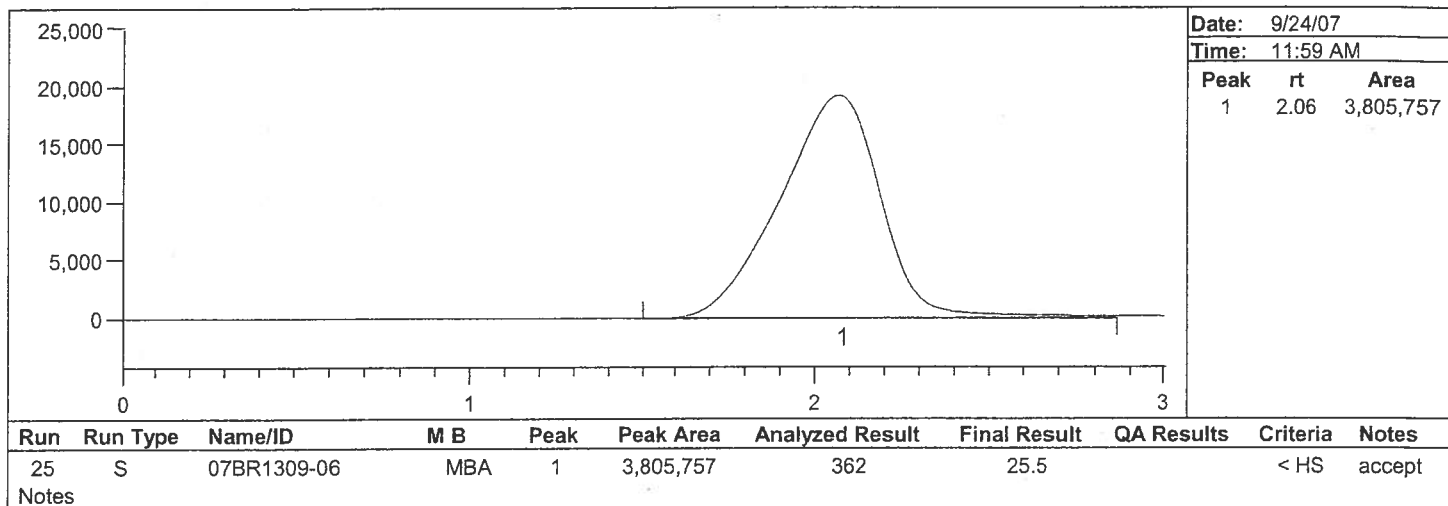
Peak Report

Brooks Rand Report #07BR1309

Batch Number:
Method Number: 1631 Mod.

Project Number(s):
Instrument ID:

Date Analyzed: 9/24/07
Analyst Name:

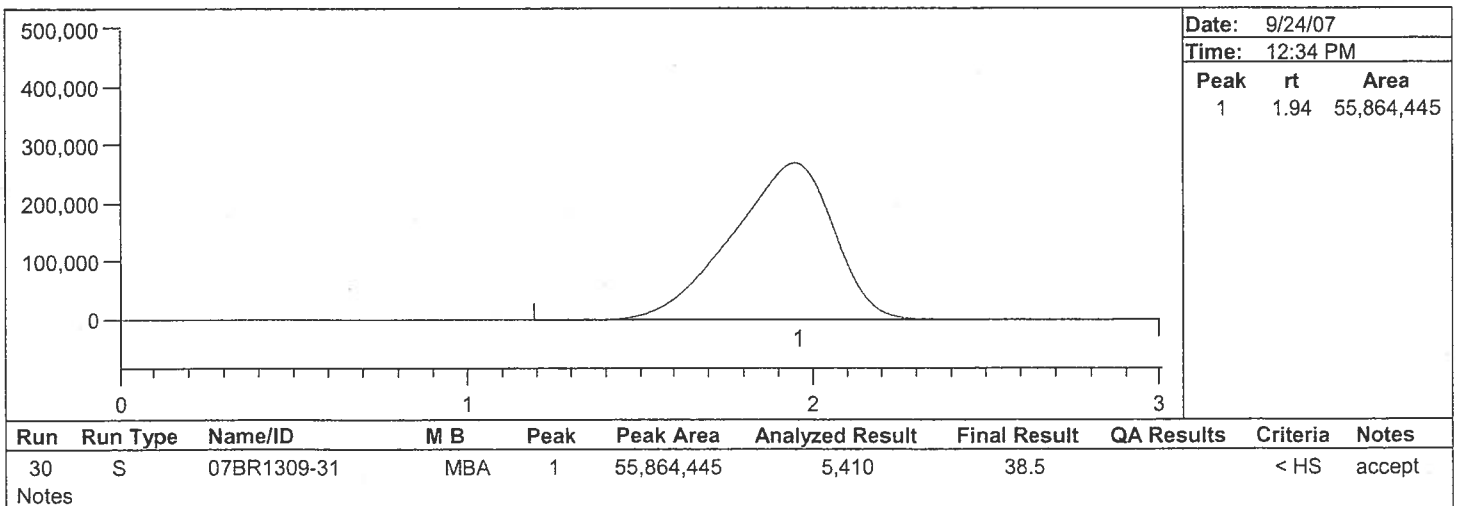
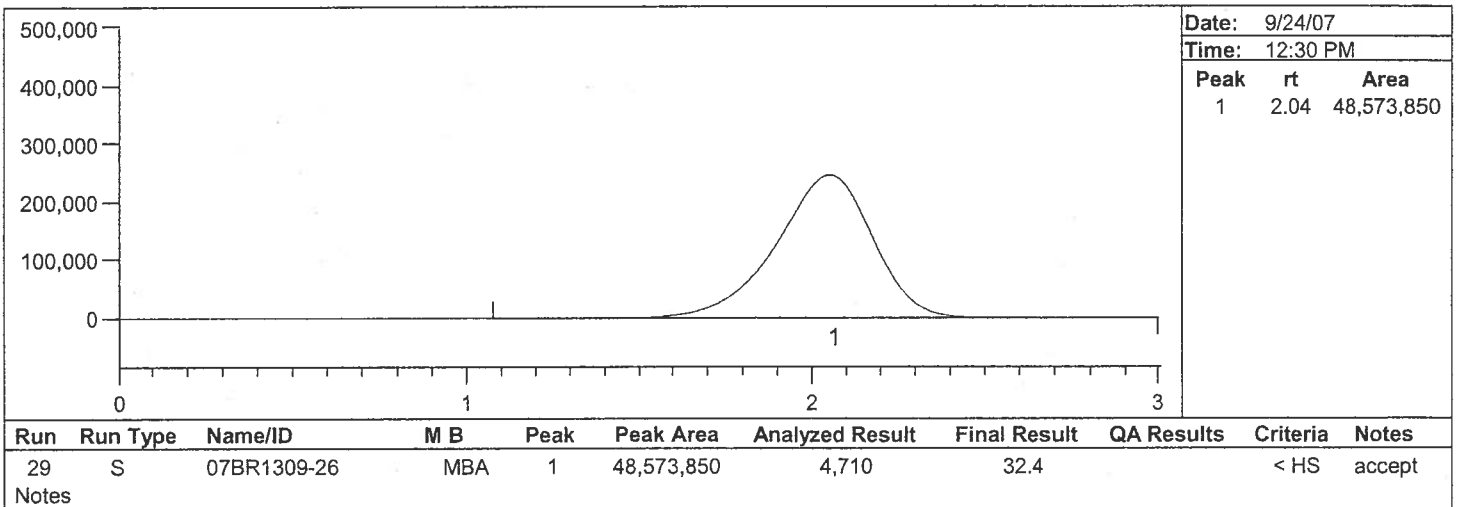
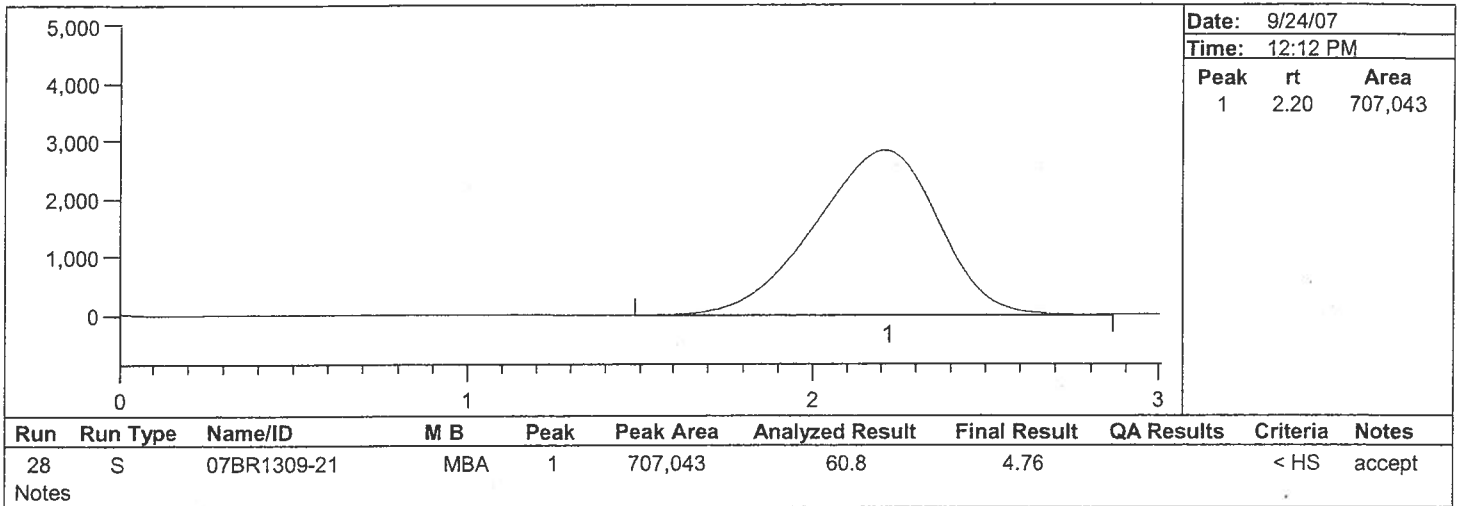


Peak Report

Batch Number:
Method Number: 1631 Mod.

Project Number(s):
Instrument ID:

Date Analyzed: 9/24/07
Analyst Name:

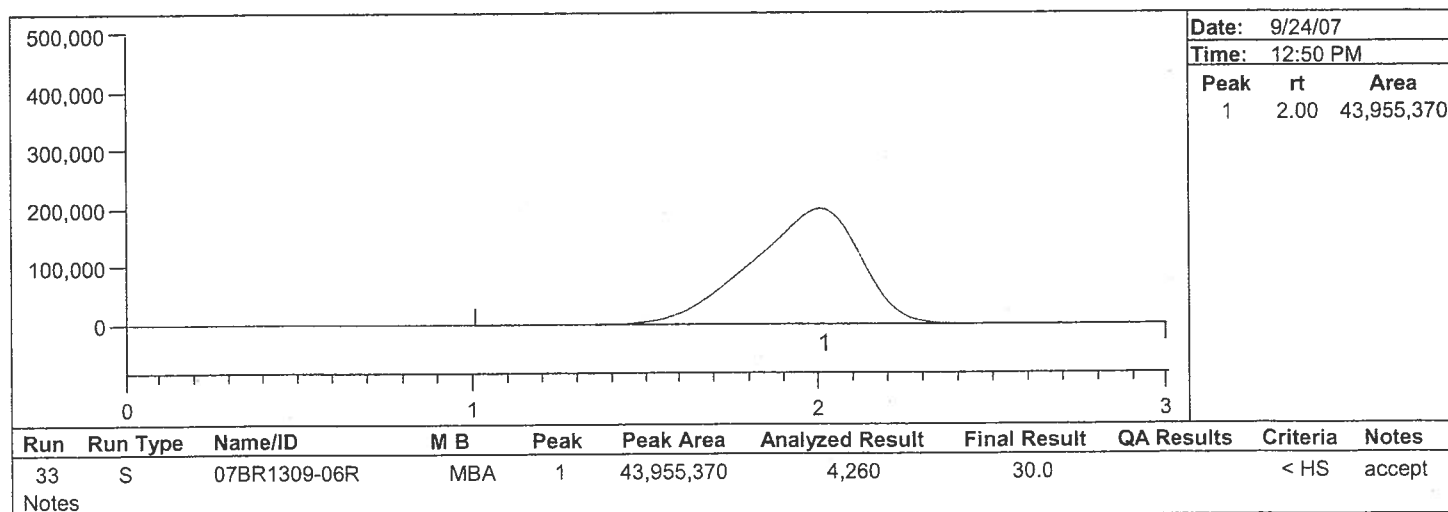
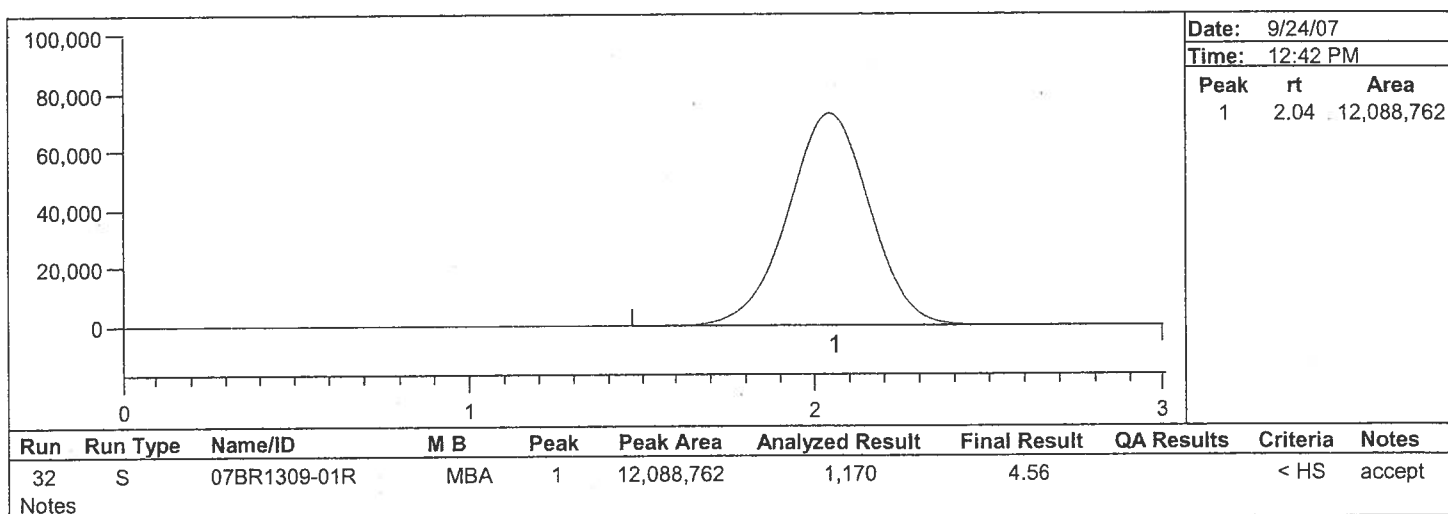
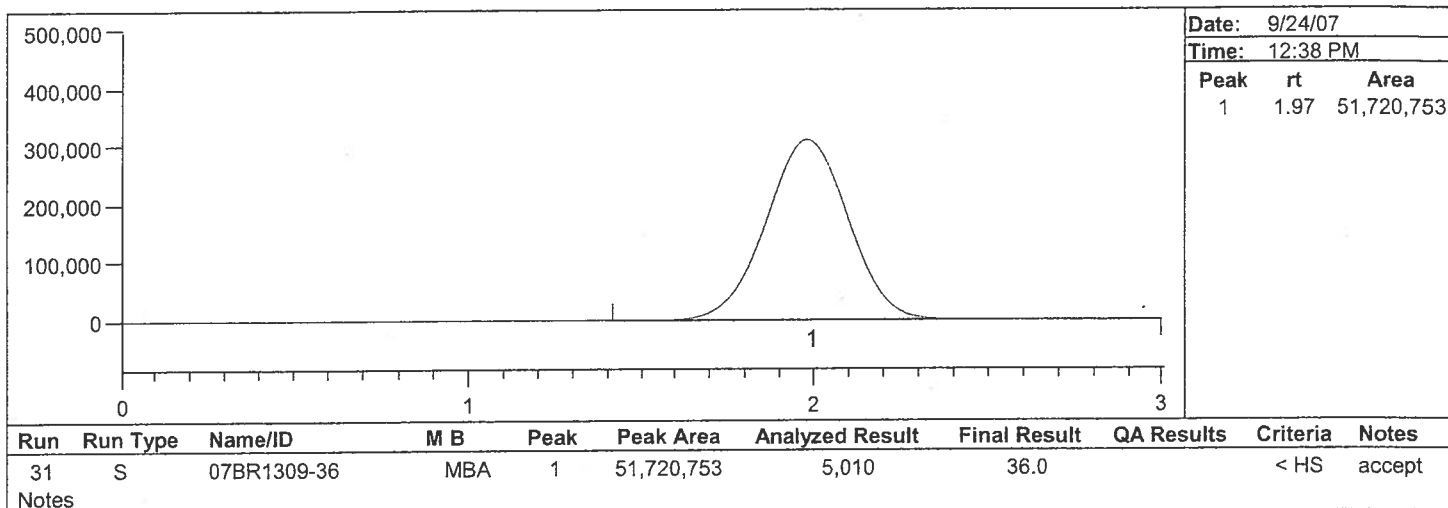


Peak Report

Batch Number:
Method Number: 1631 Mod.

Project Number(s):
Instrument ID:

Date Analyzed: 9/24/07
Analyst Name:



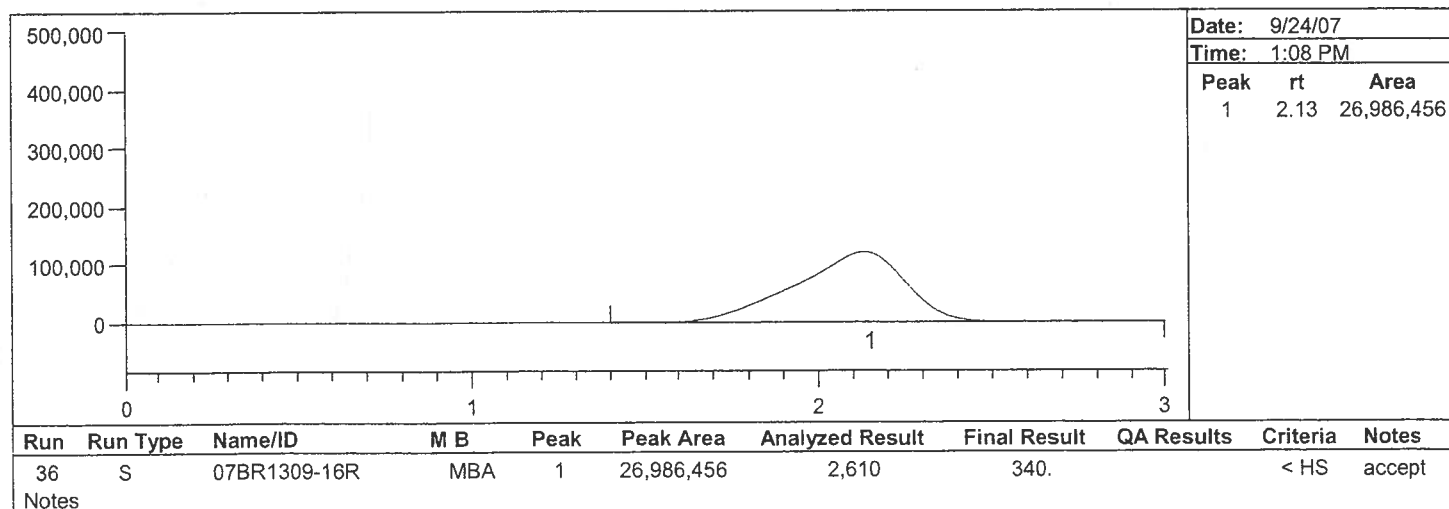
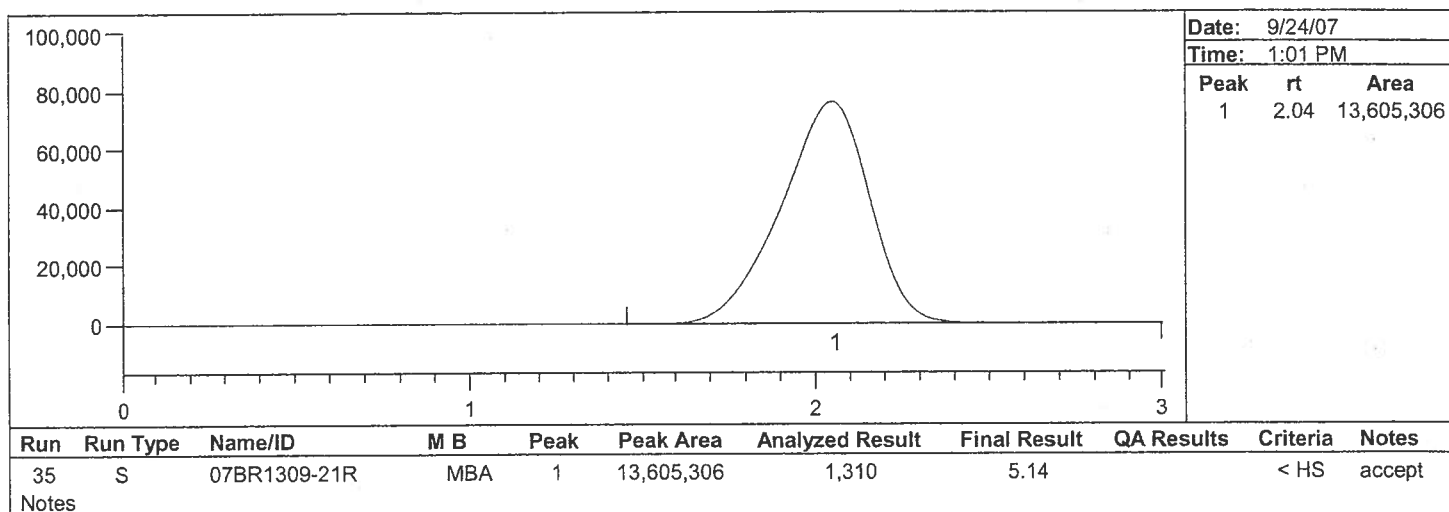
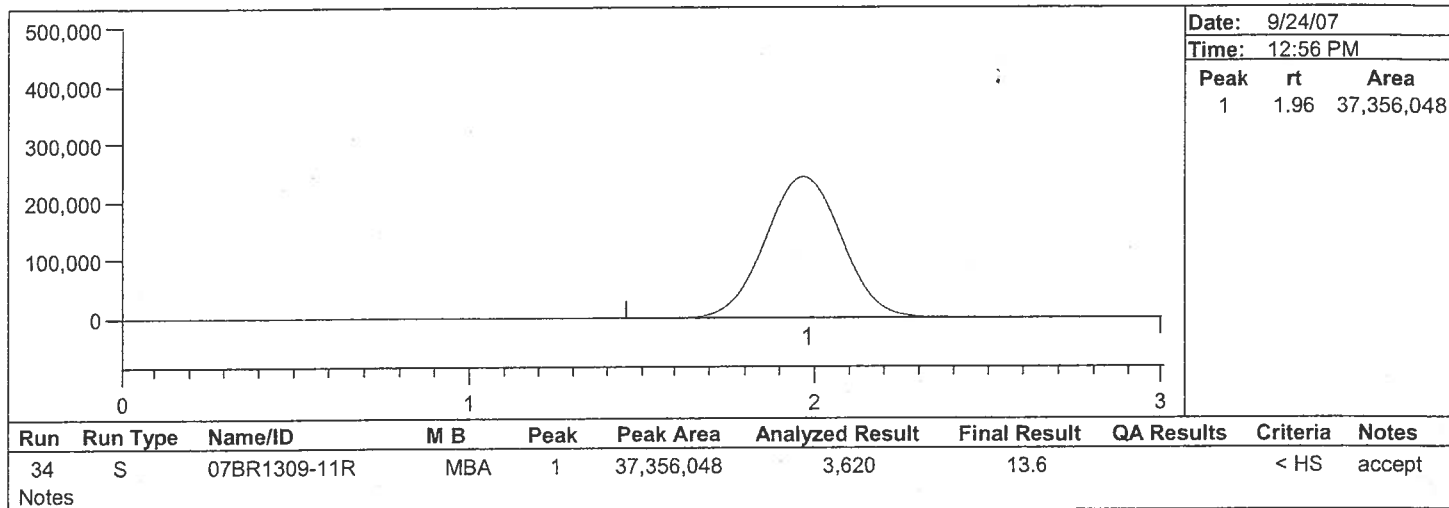
Peak Report

Brooks Rand Report #07BR1309

Batch Number:
Method Number: 1631 Mod.

Project Number(s):
Instrument ID:

Date Analyzed: 9/24/07
Analyst Name:



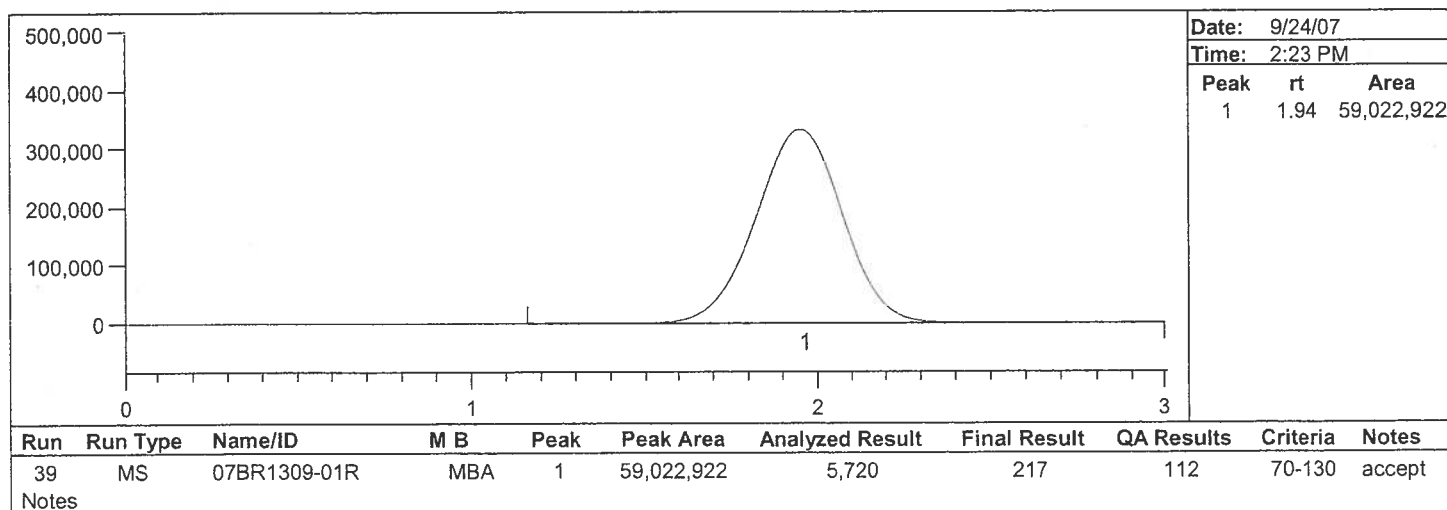
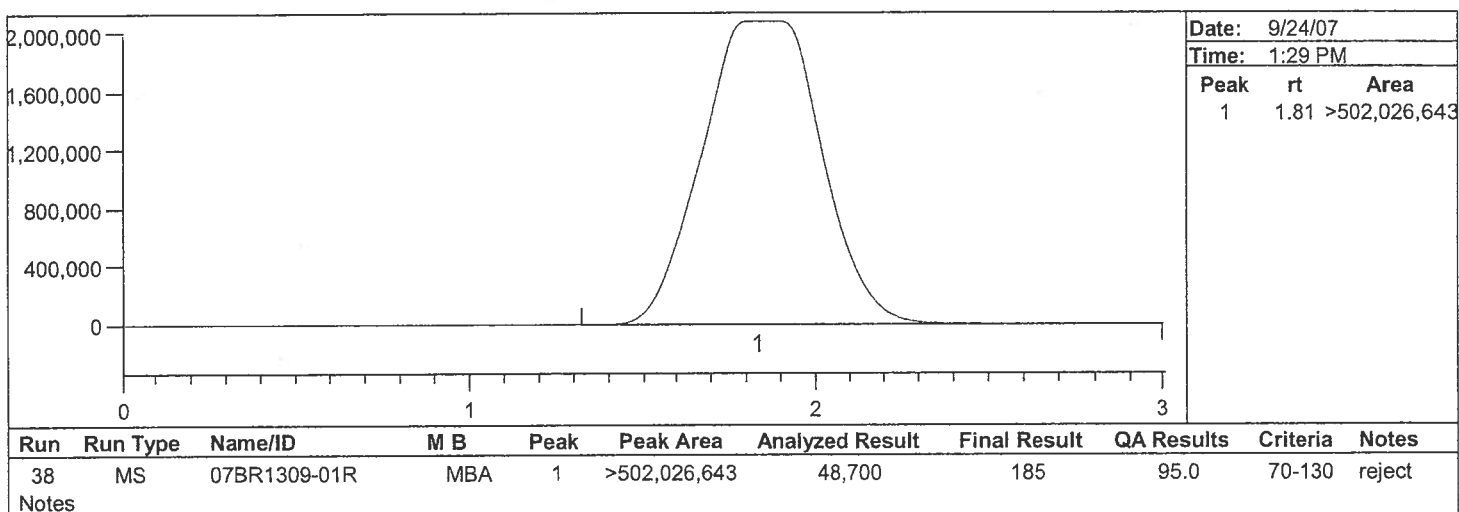
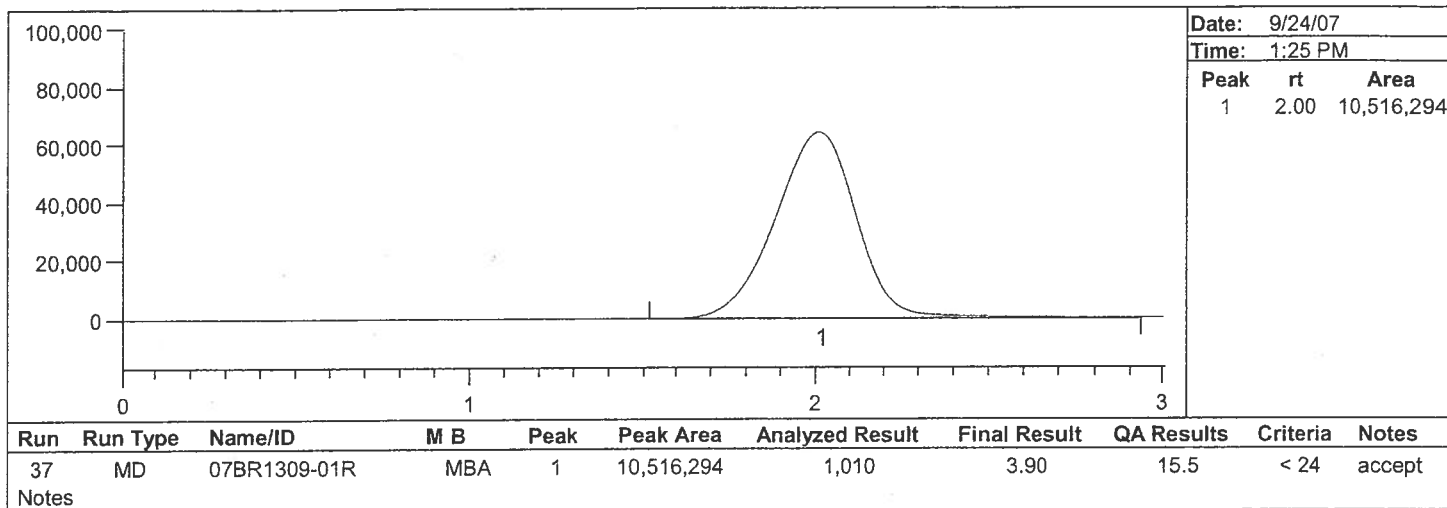
Peak Report

Brooks Rand Report #07BR1309

Batch Number:
Method Number: 1631 Mod.

Project Number(s):
Instrument ID:

Date Analyzed: 9/24/07
Analyst Name:



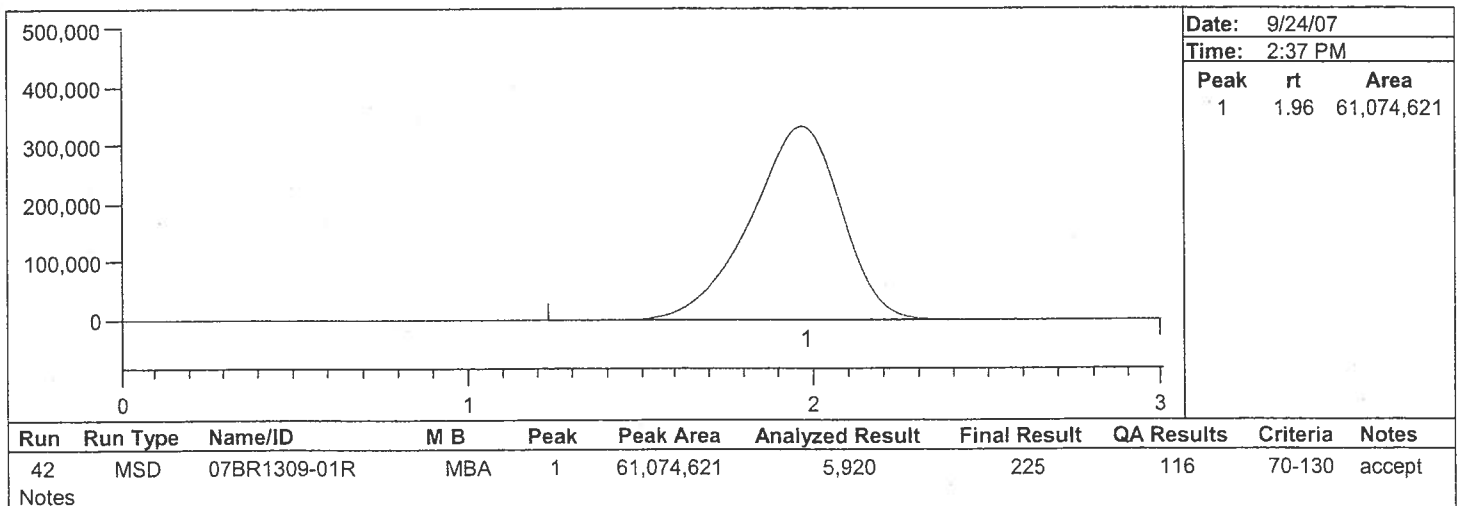
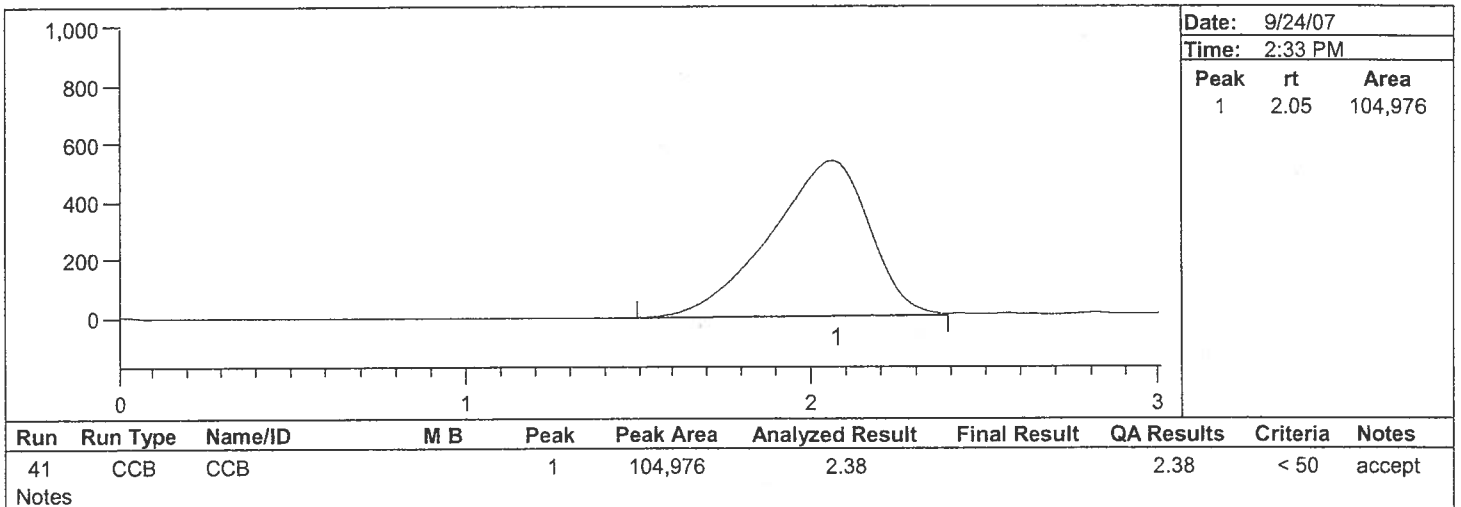
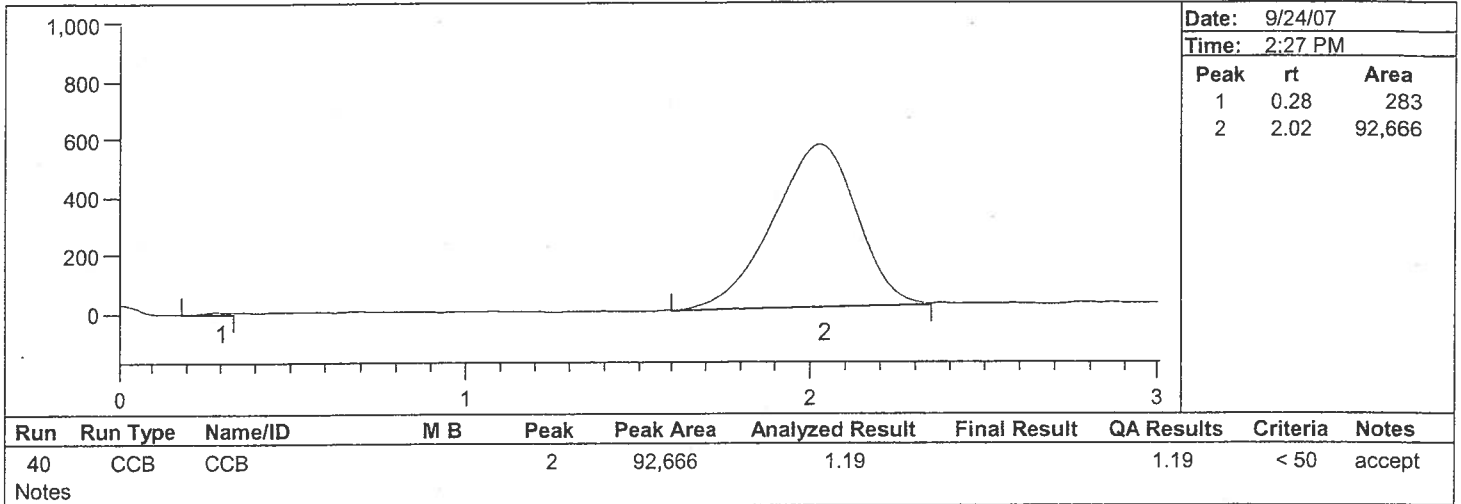
Peak Report

Brooks Rand Report #07BR1309

Batch Number:
Method Number: 1631 Mod.

Project Number(s):
Instrument ID:

Date Analyzed: 9/24/07
Analyst Name:

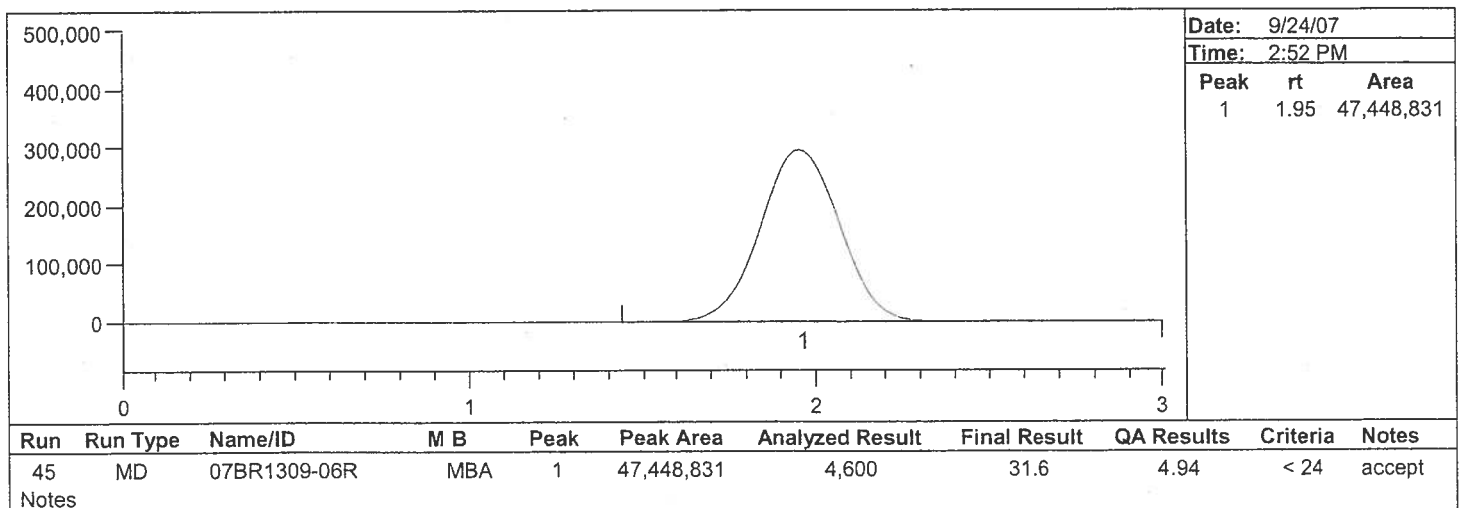
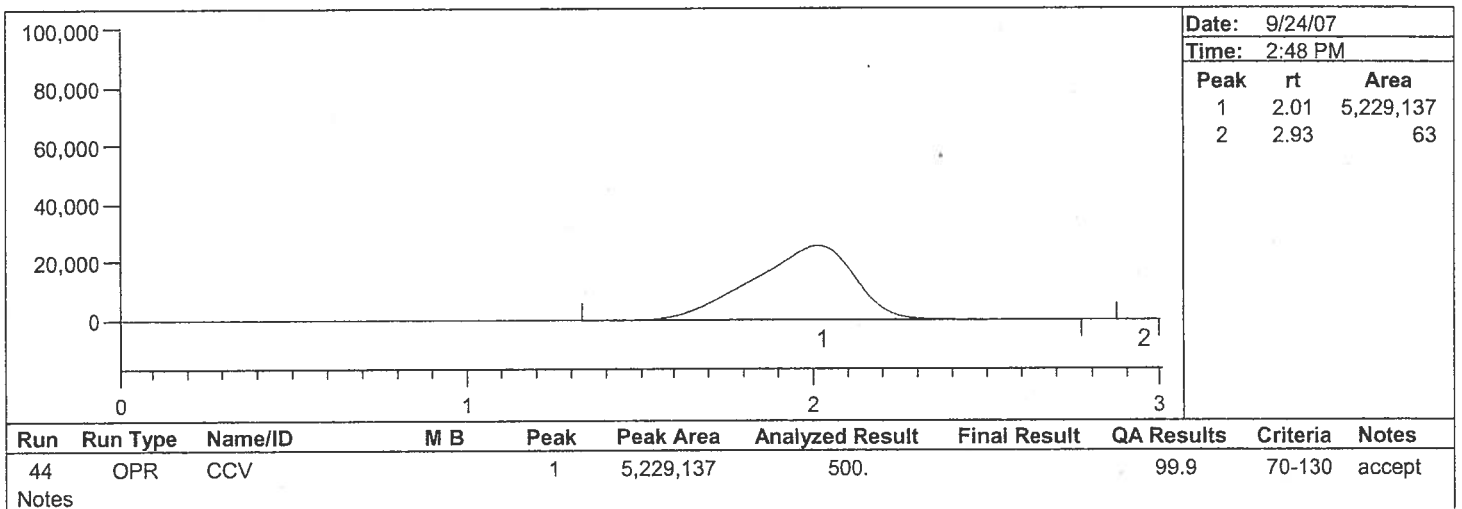
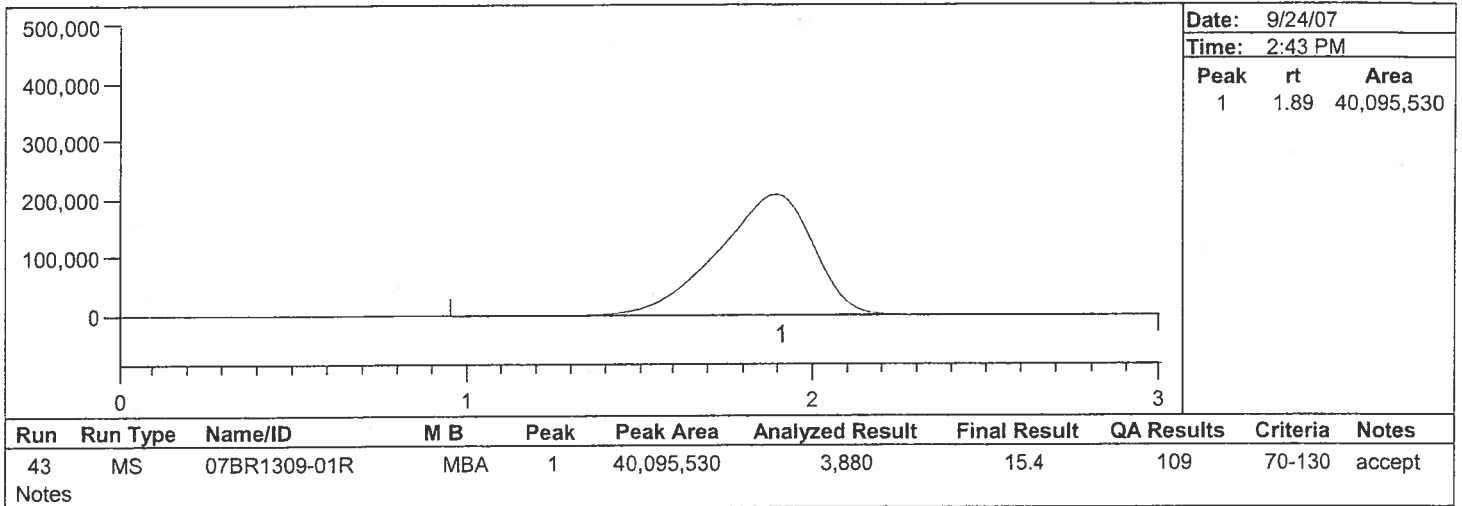


Peak Report

Batch Number:
Method Number: 1631 Mod.

Project Number(s):
Instrument ID:

Date Analyzed: 9/24/07
Analyst Name:



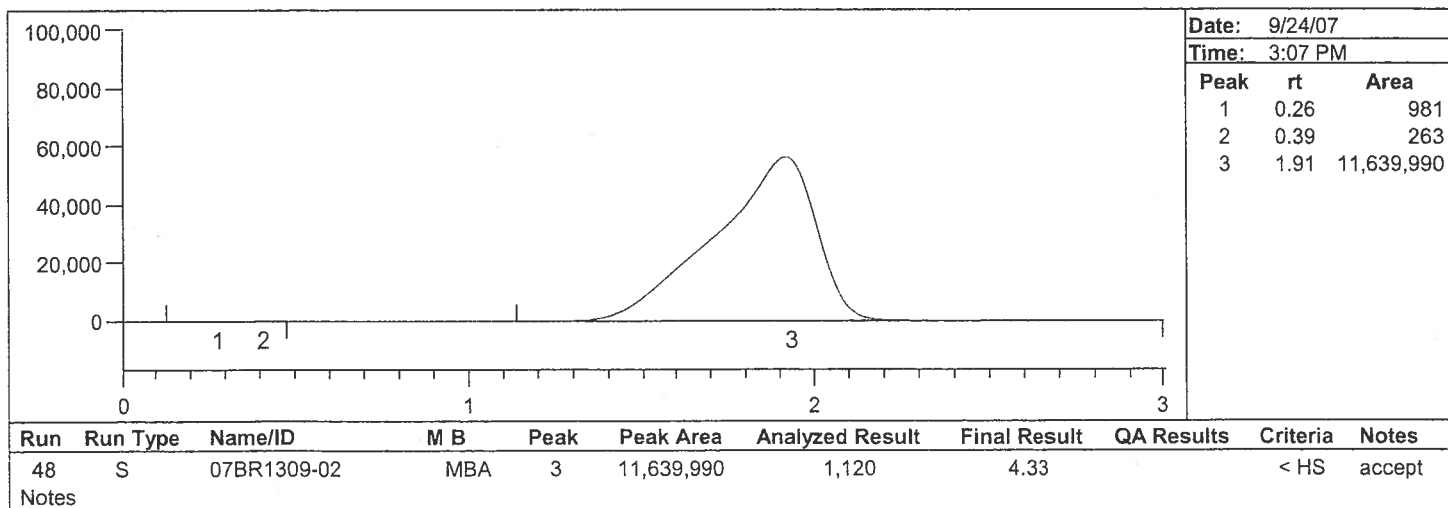
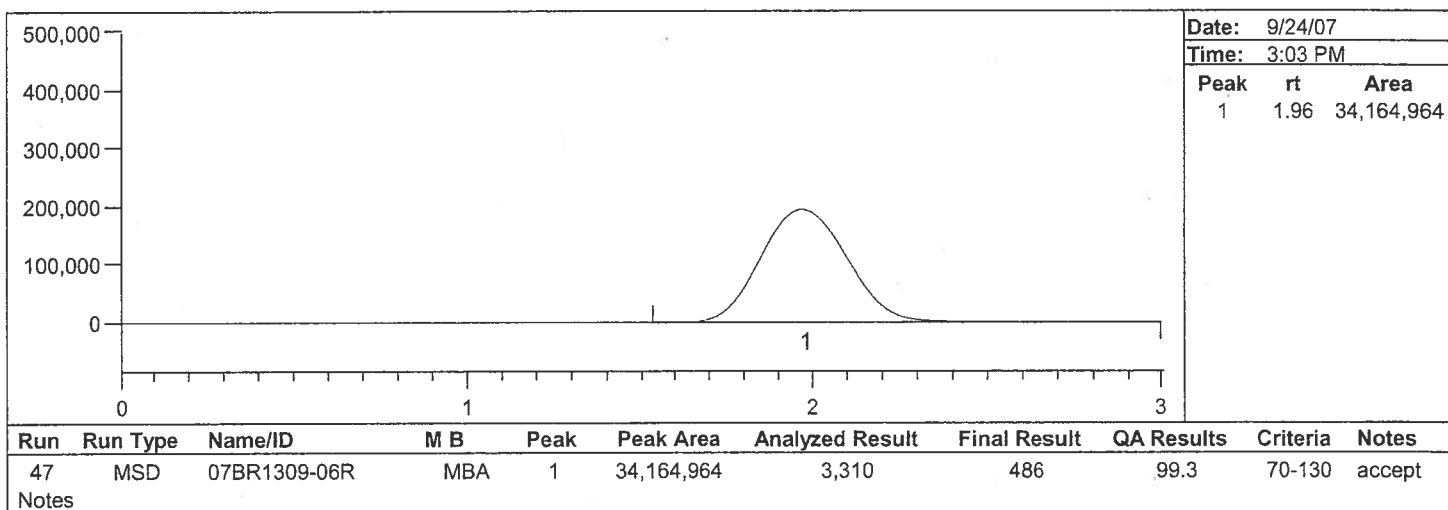
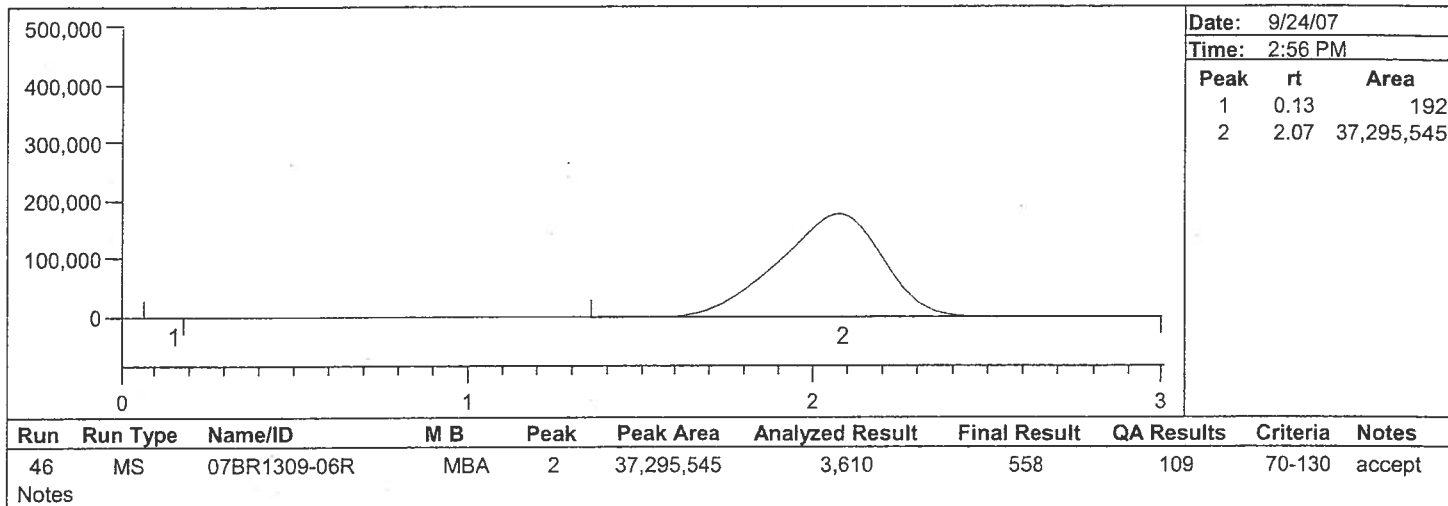
Peak Report

Brooks Rand Report #07BR1309

Batch Number:
Method Number: 1631 Mod.

Project Number(s):
Instrument ID:

Date Analyzed: 9/24/07
Analyst Name:



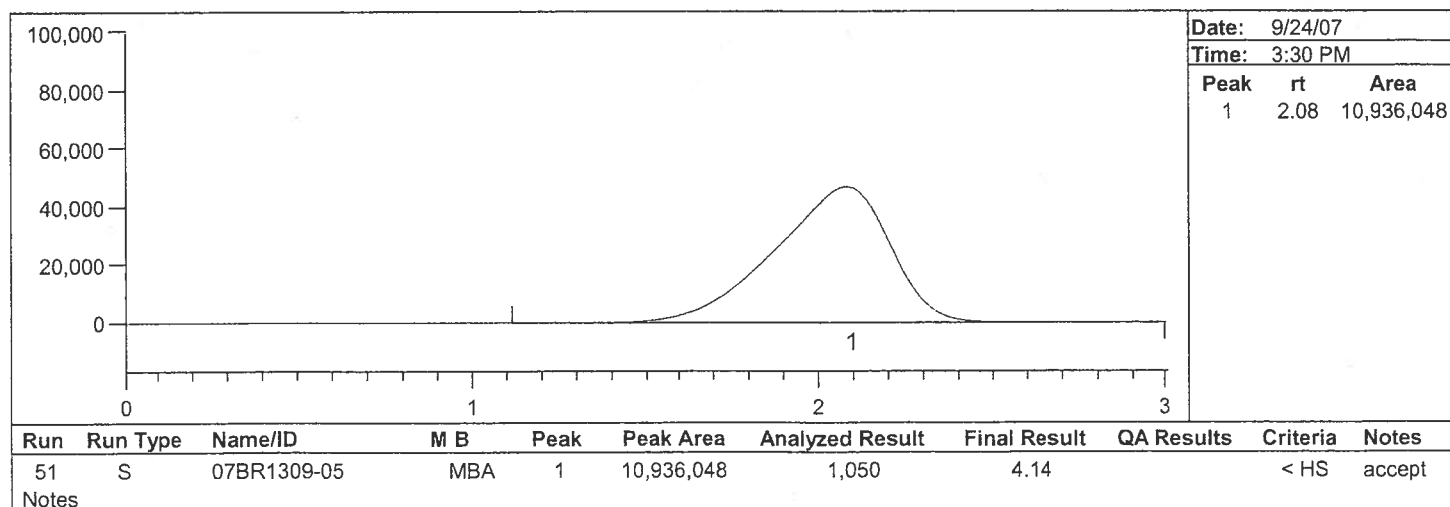
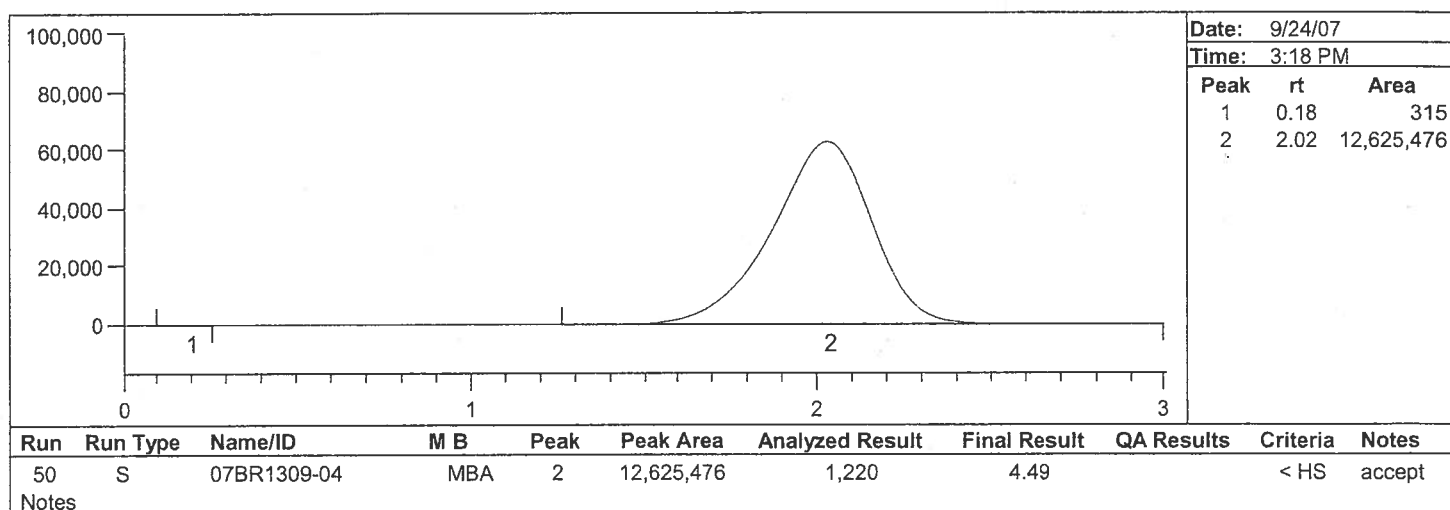
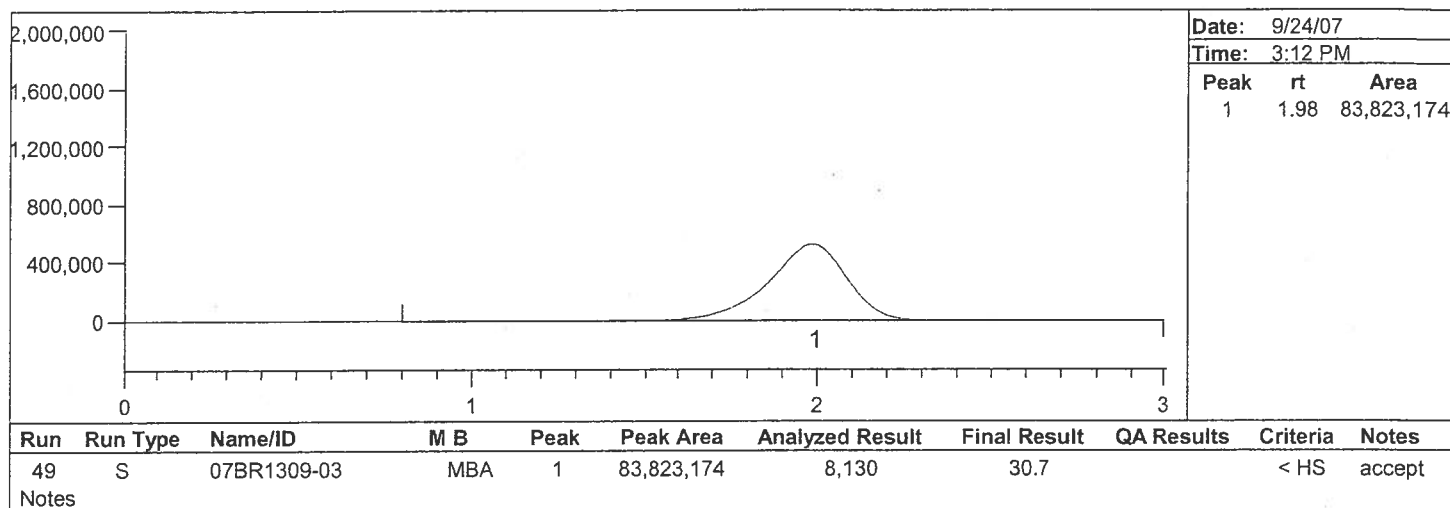
Peak Report

Brooks Rand Report #07BR1309

Batch Number:
Method Number: 1631 Mod.

Project Number(s):
Instrument ID:

Date Analyzed: 9/24/07
Analyst Name:

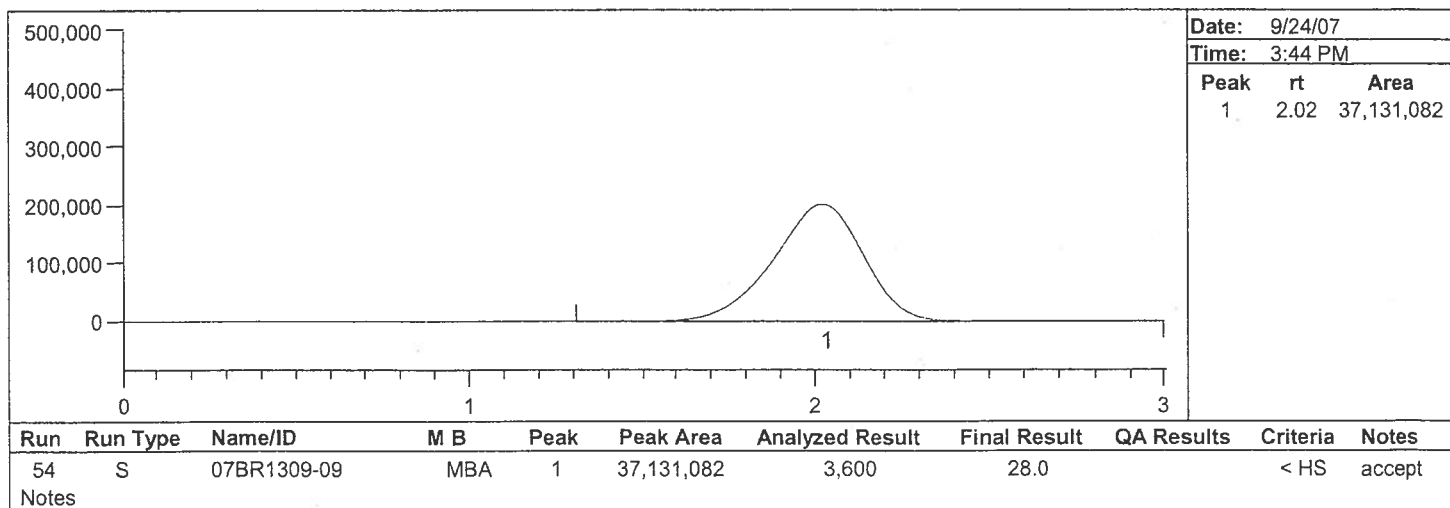
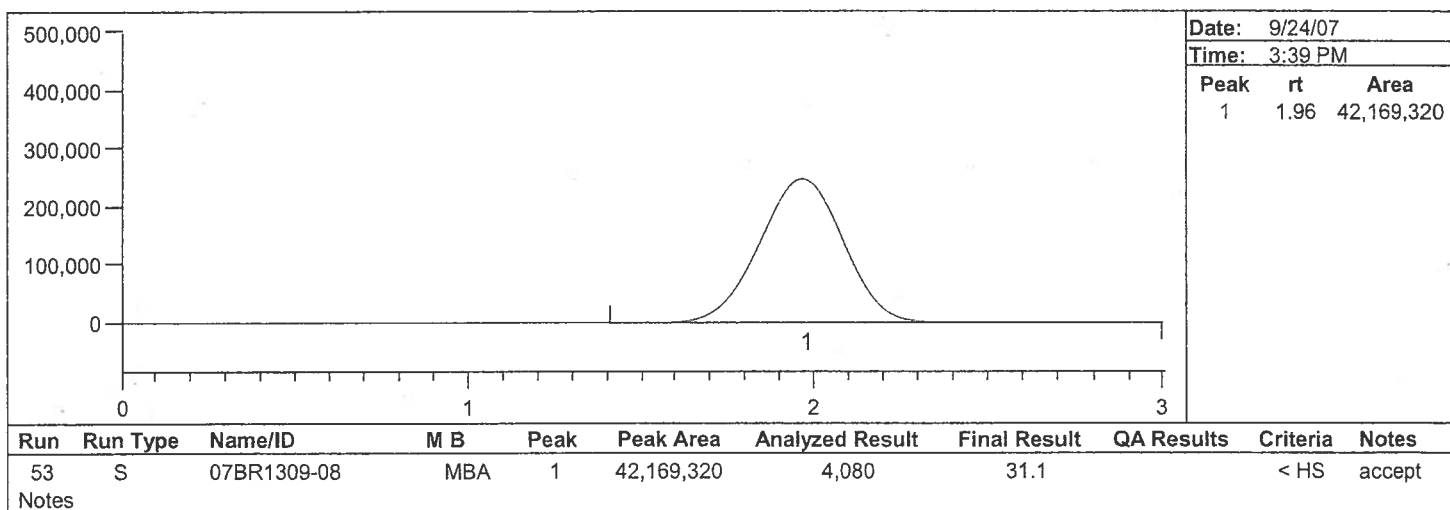
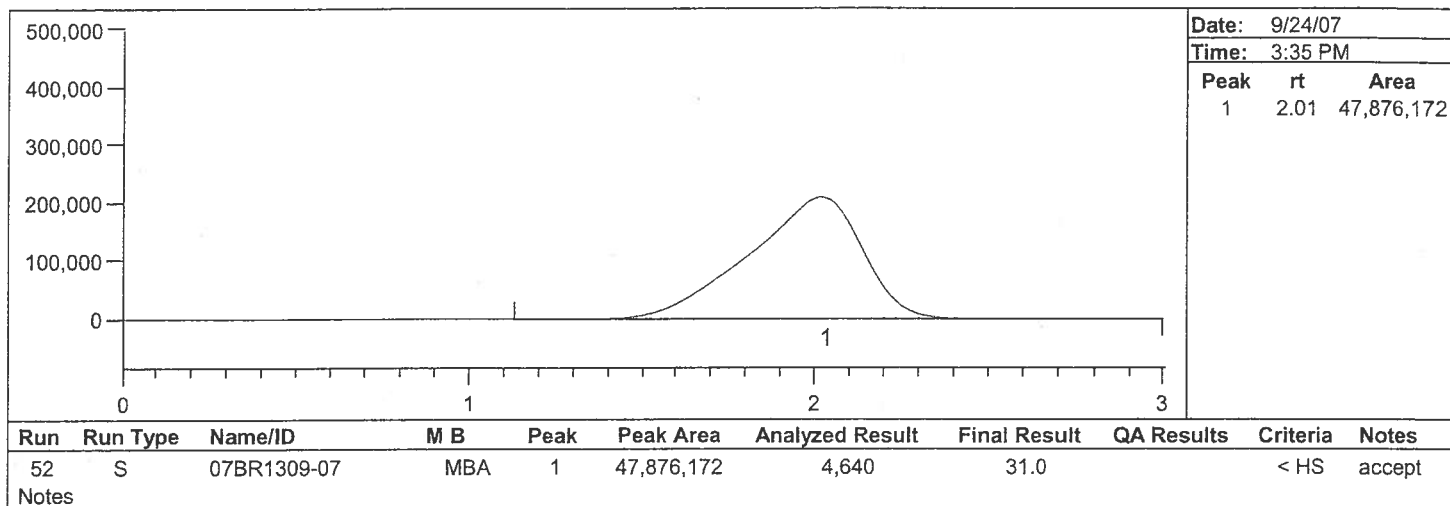


Peak Report

Batch Number:
Method Number: 1631 Mod.

Project Number(s):
Instrument ID:

Date Analyzed: 9/24/07
Analyst Name:



Peak Report

Batch Number:

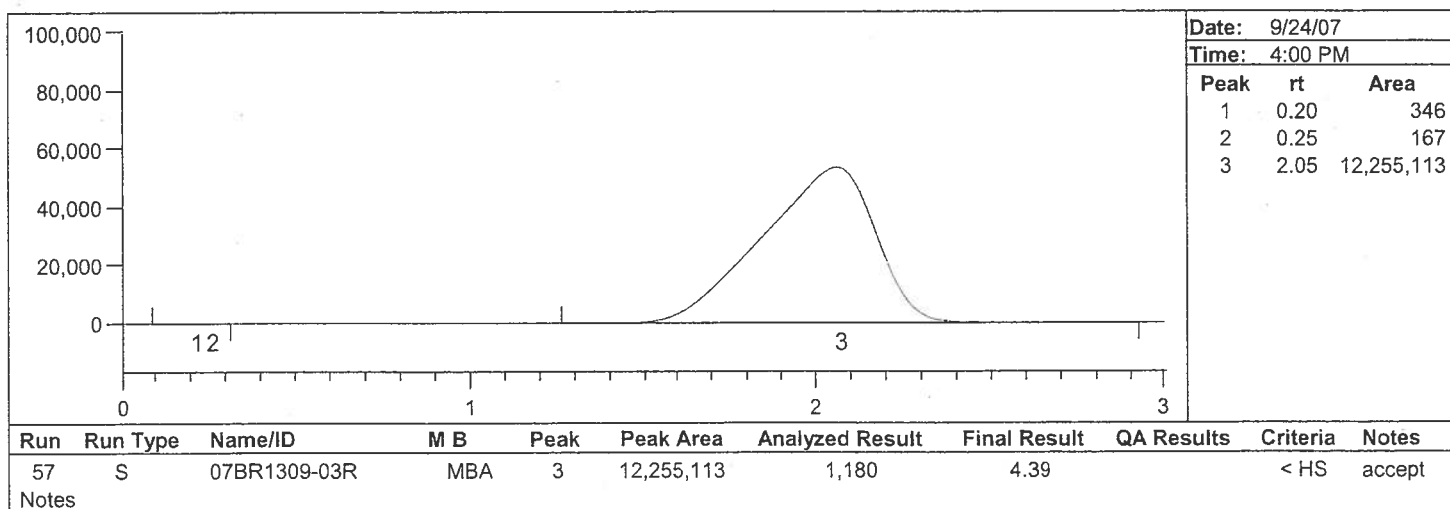
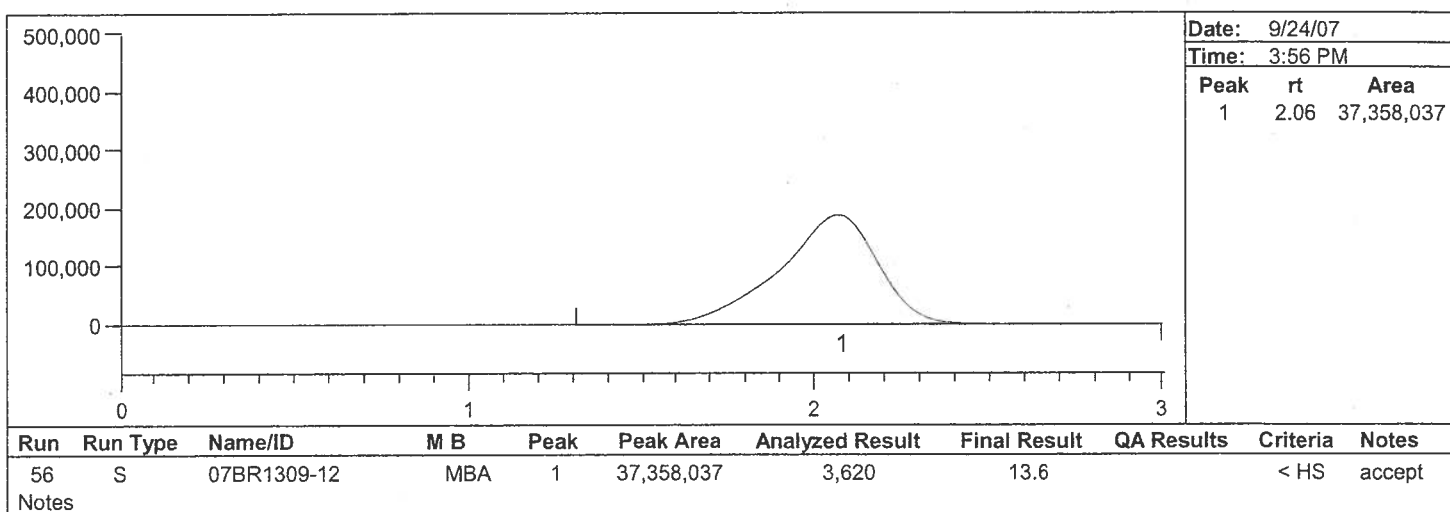
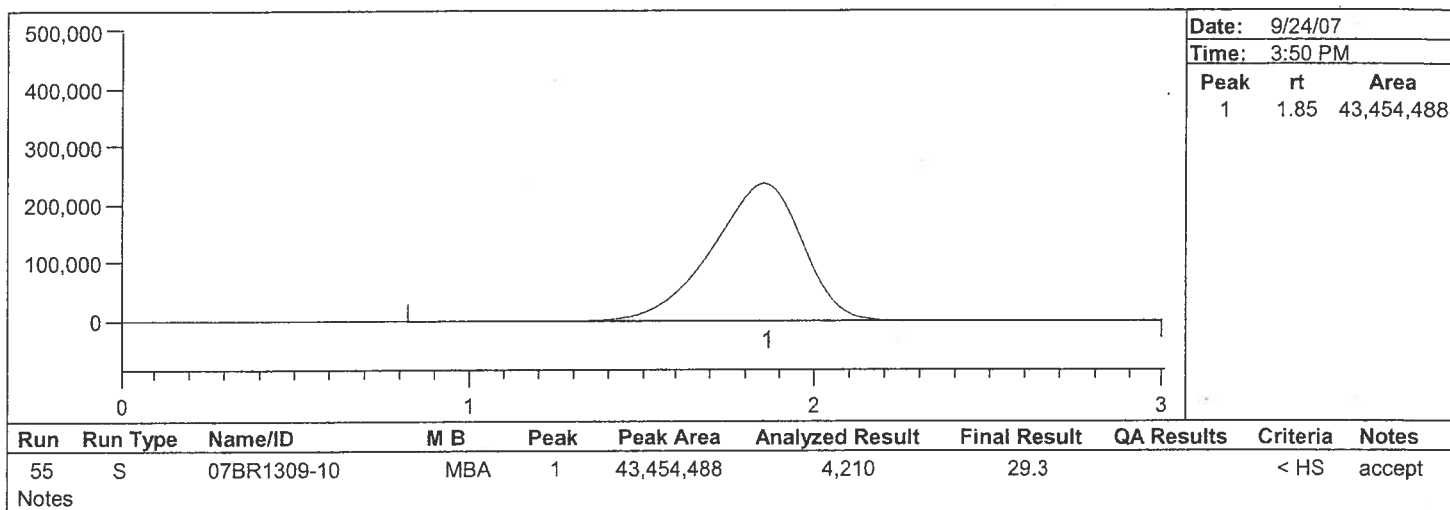
Method Number: 1631 Mod.

Project Number(s):

Instrument ID:

Date Analyzed: 9/24/07

Analyst Name:



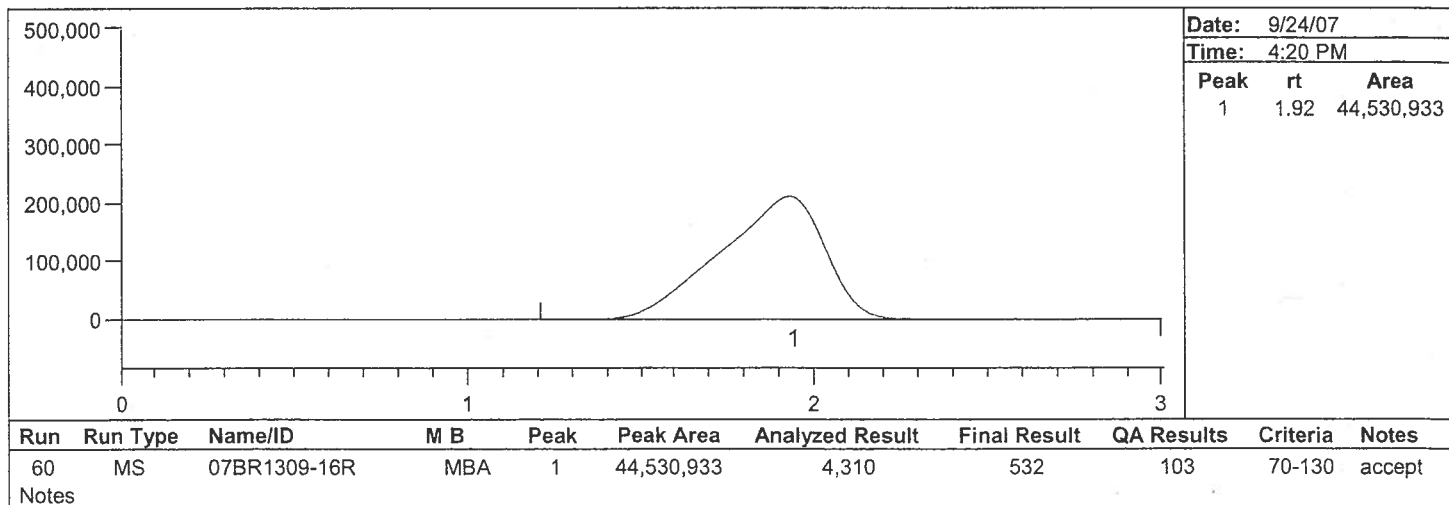
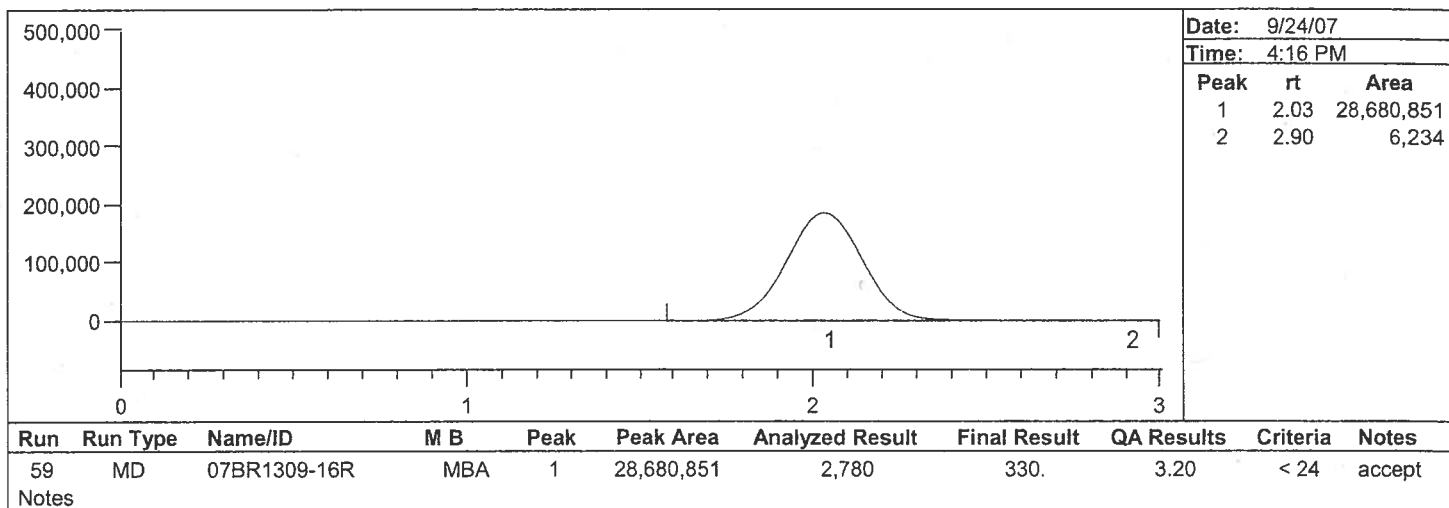
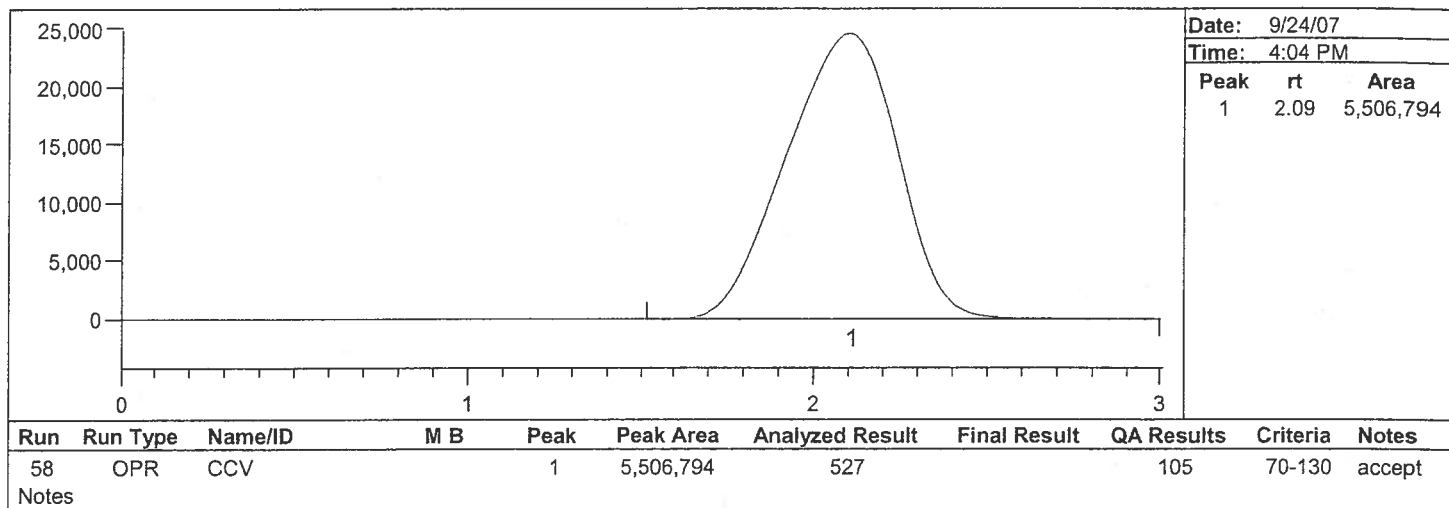
Peak Report

Brooks Rand Report #07BR1309

Batch Number:
Method Number: 1631 Mod.

Project Number(s):
Instrument ID:

Date Analyzed: 9/24/07
Analyst Name:



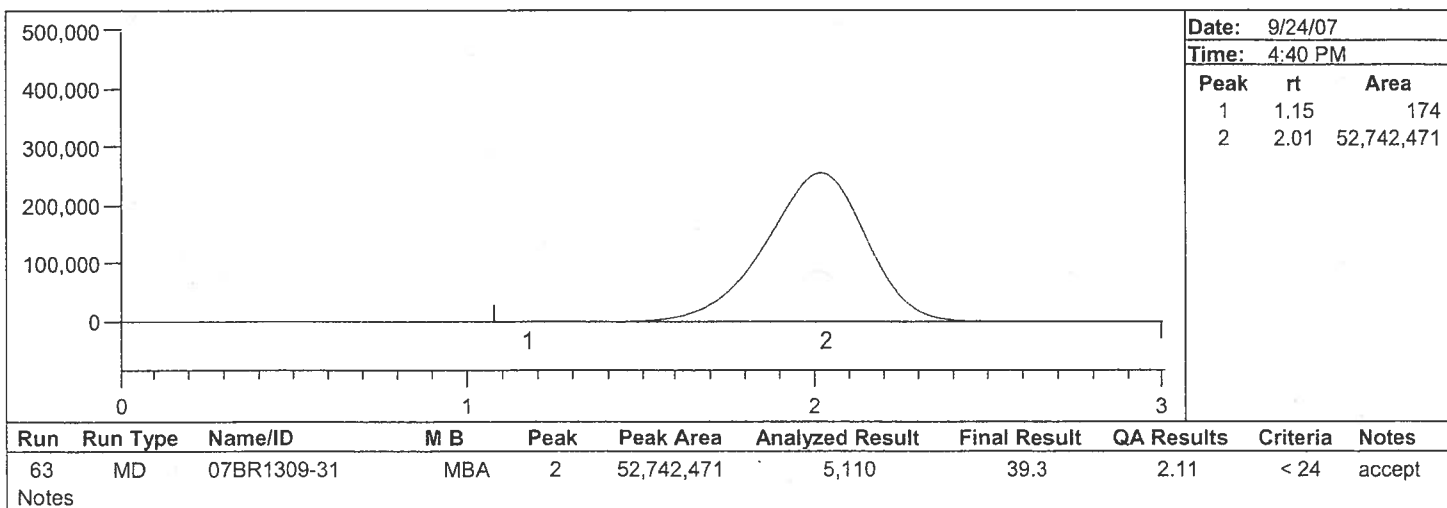
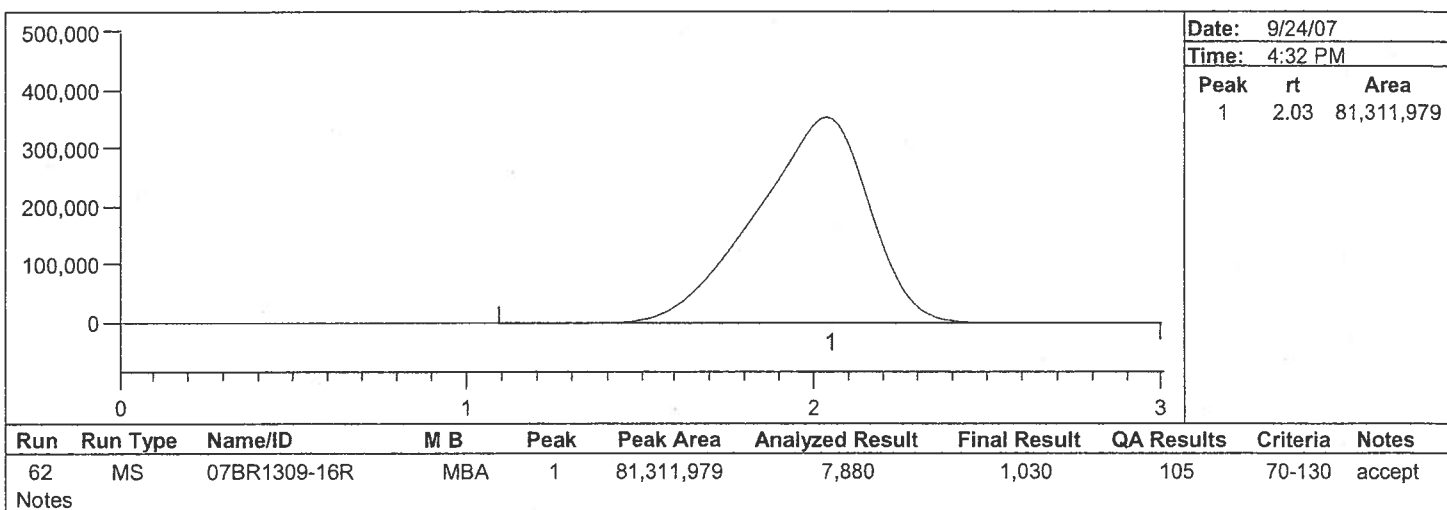
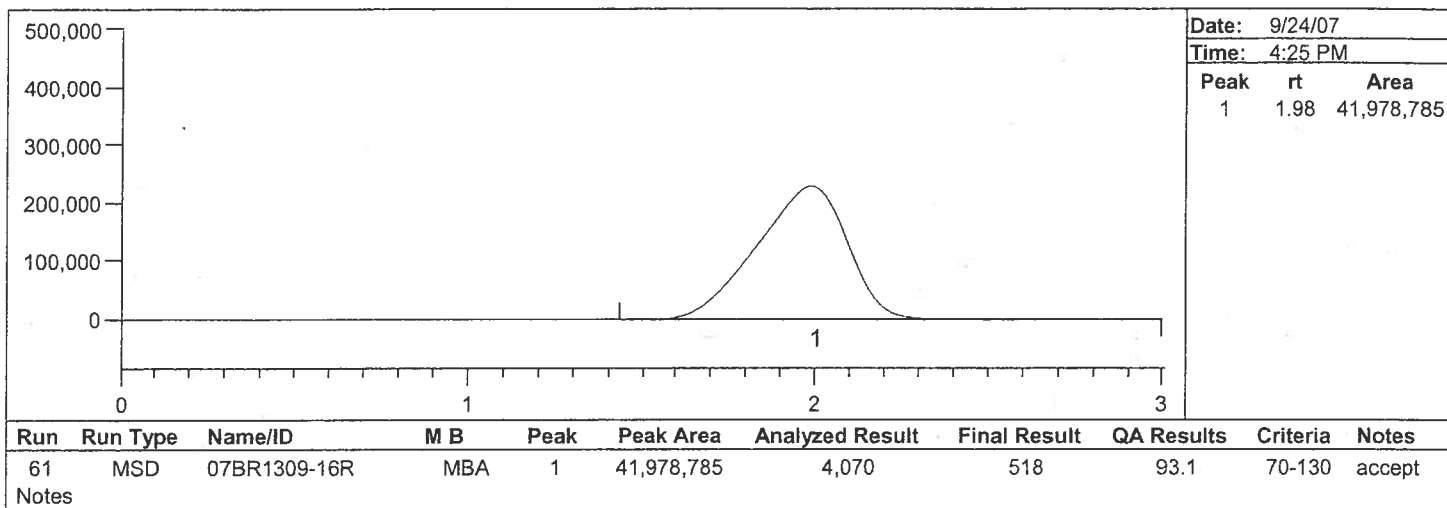
Peak Report

Brooks Rand Report #07BR1309

Batch Number:
Method Number: 1631 Mod.

Project Number(s):
Instrument ID:

Date Analyzed: 9/24/07
Analyst Name:



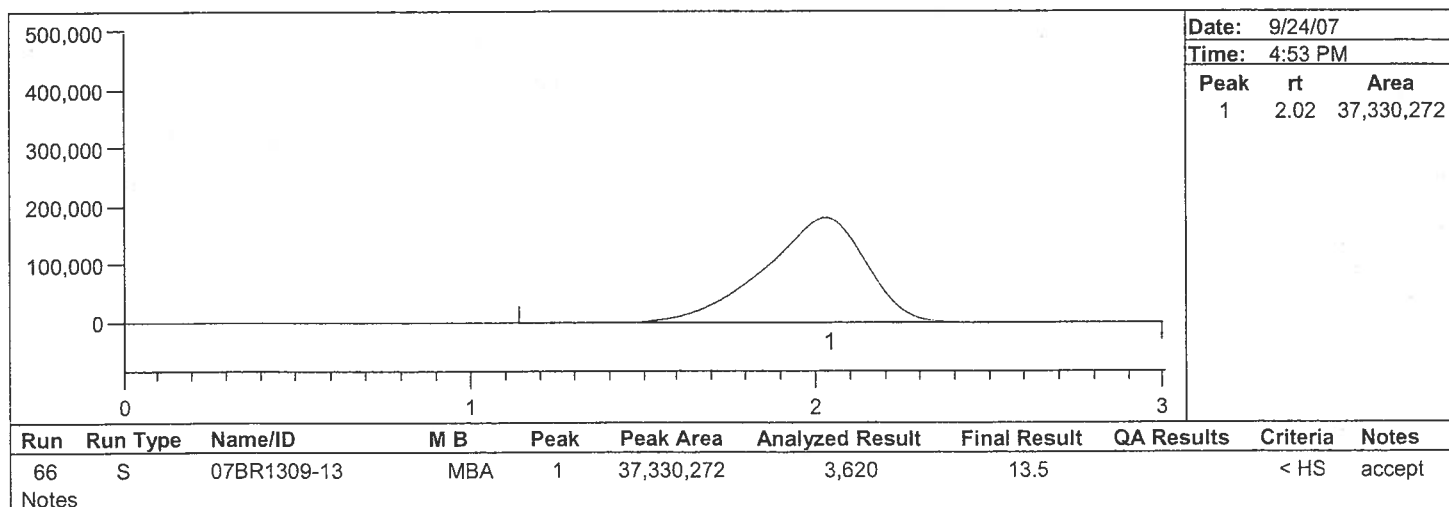
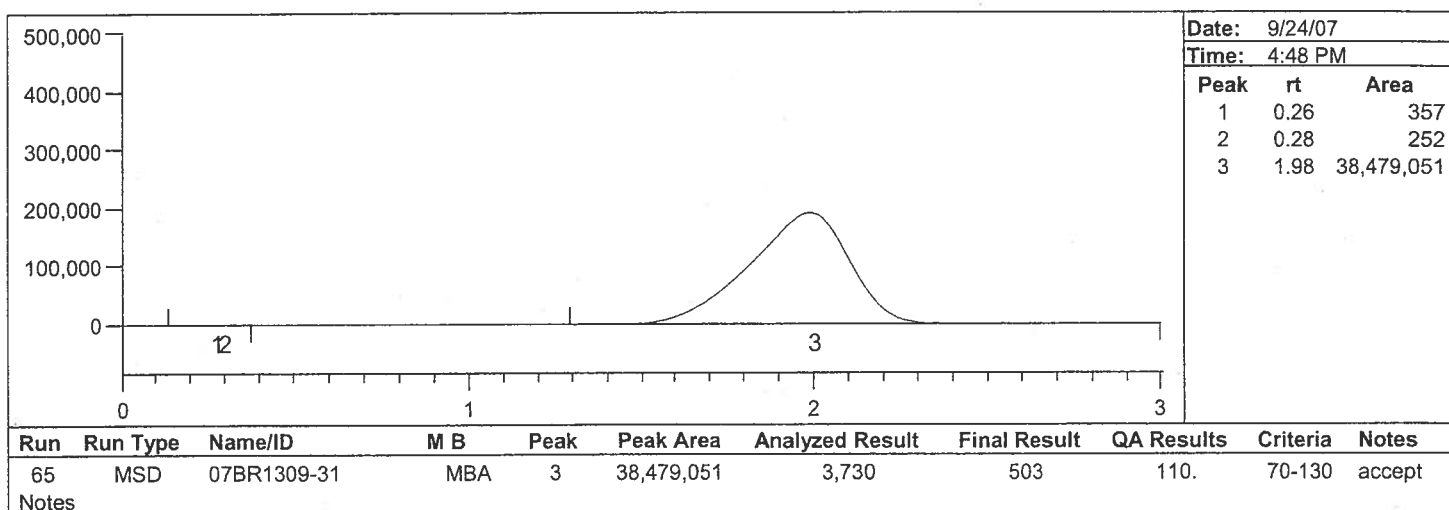
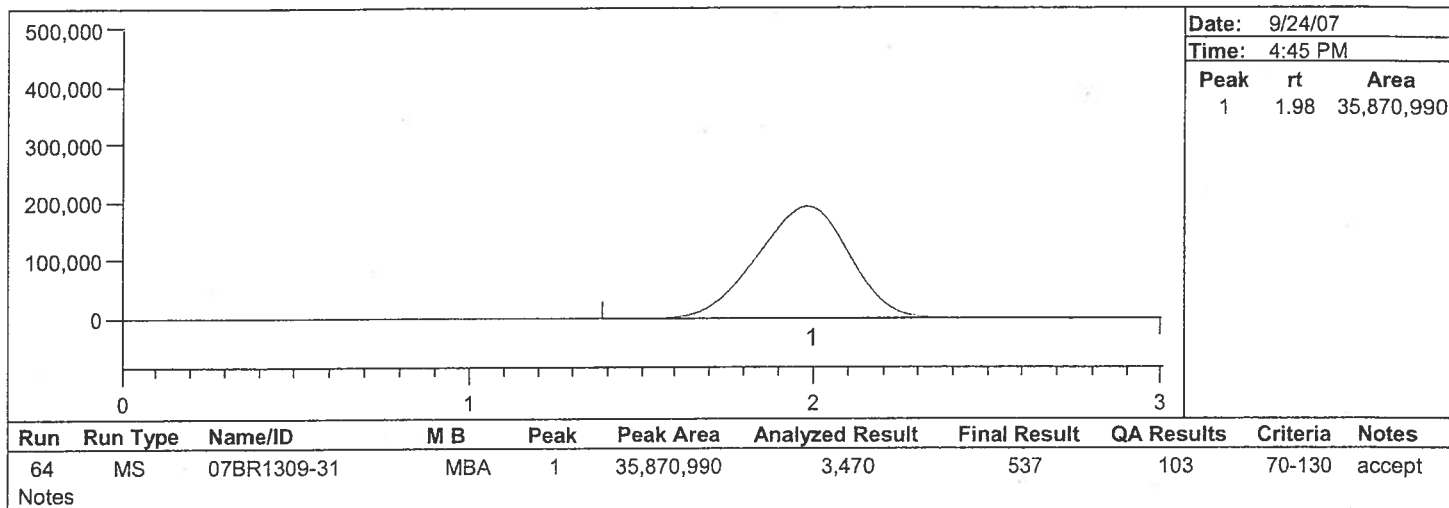
Peak Report

Brooks Rand Report #07BR1309

Batch Number:
Method Number: 1631 Mod.

Project Number(s):
Instrument ID:

Date Analyzed: 9/24/07
Analyst Name:



Peak Report

Batch Number:

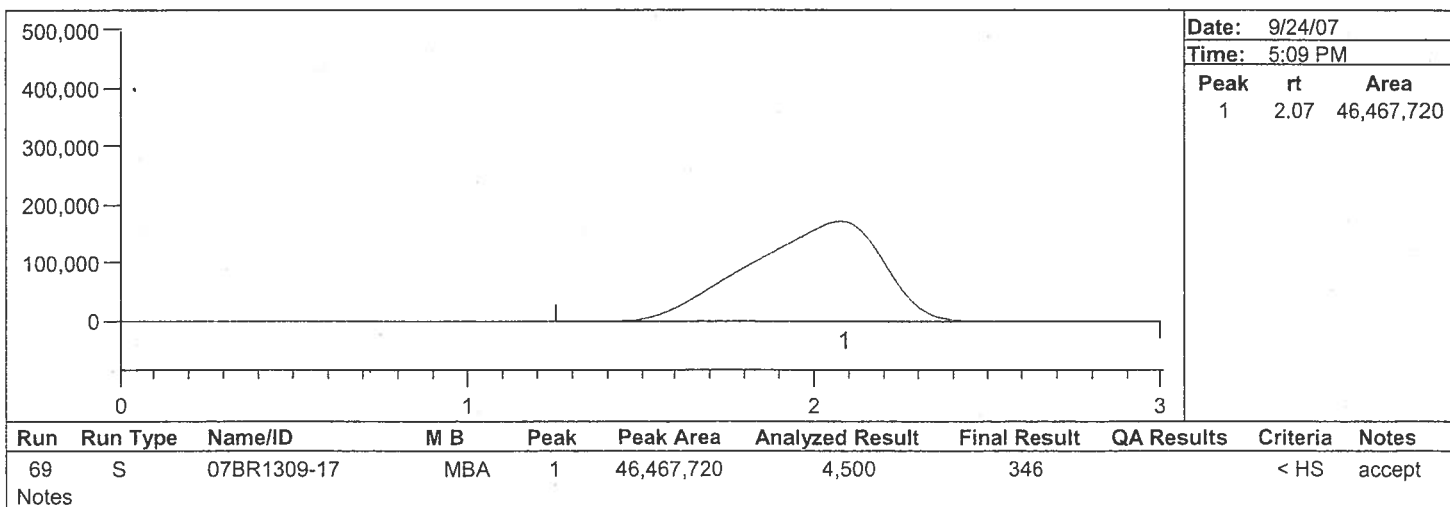
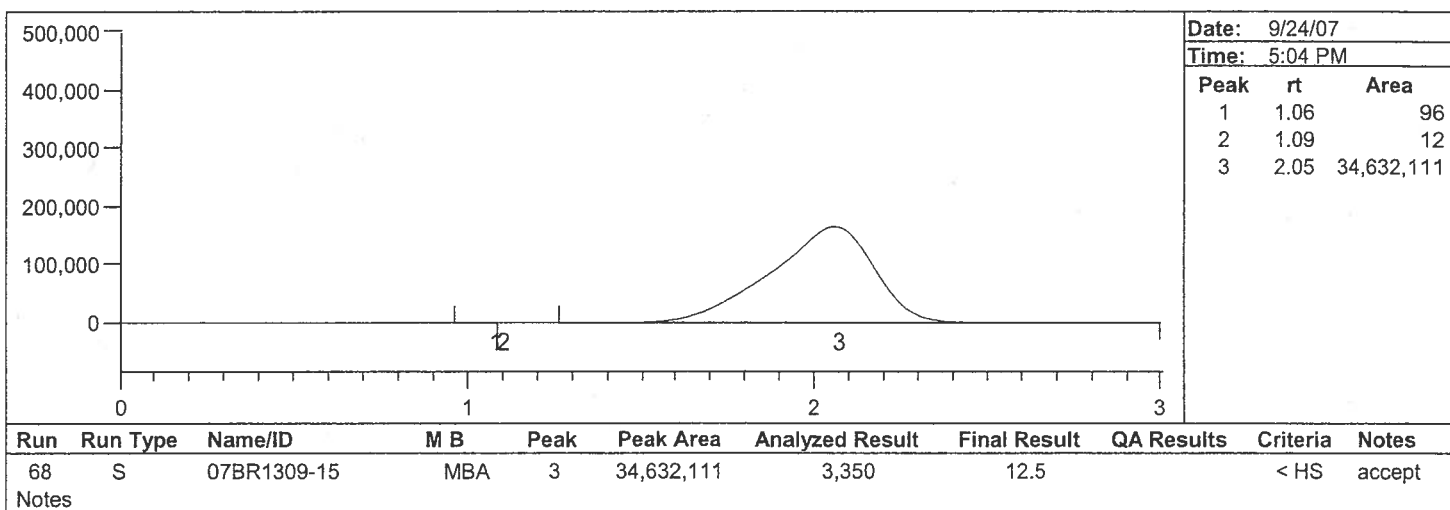
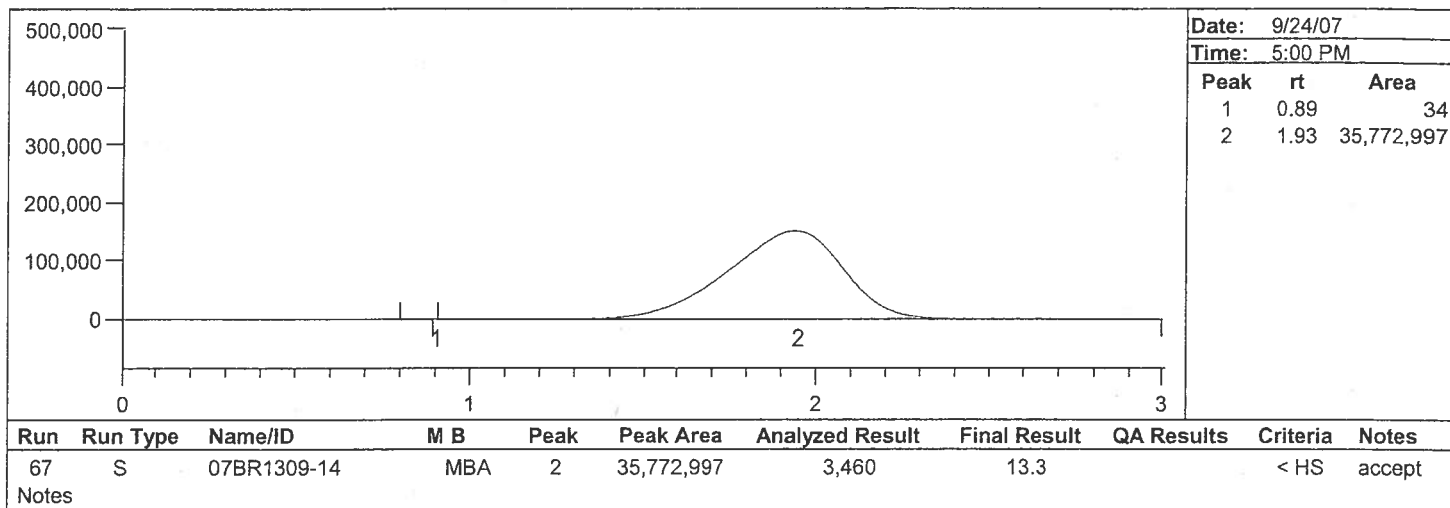
Method Number: 1631 Mod.

Project Number(s):

Instrument ID:

Date Analyzed: 9/24/07

Analyst Name:



Peak Report

Batch Number:

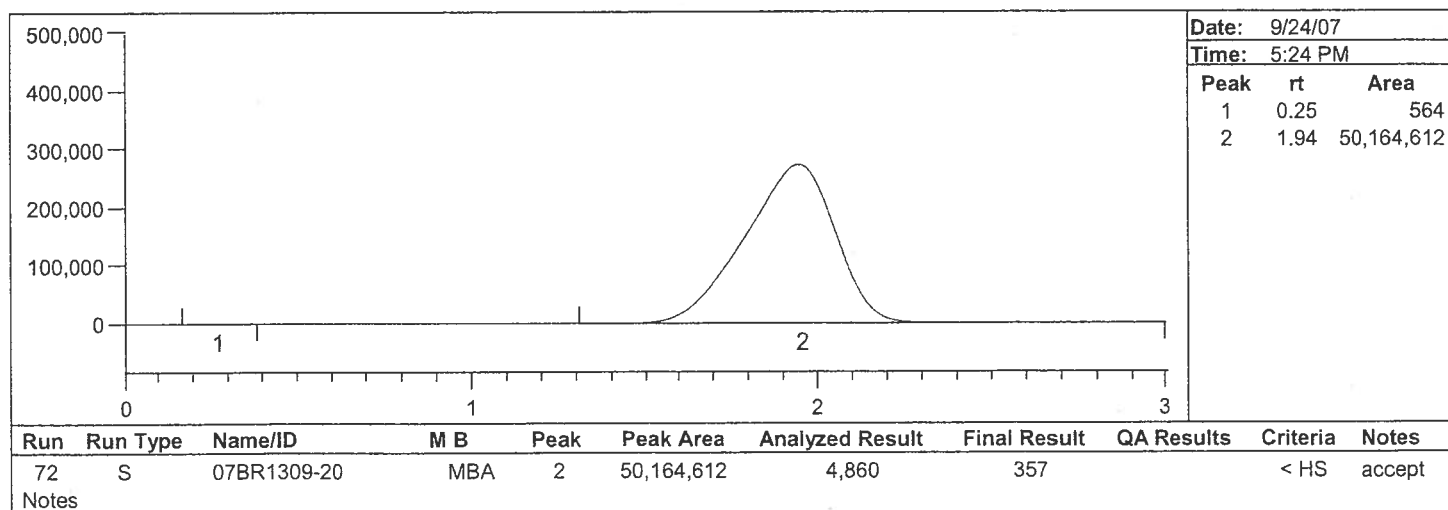
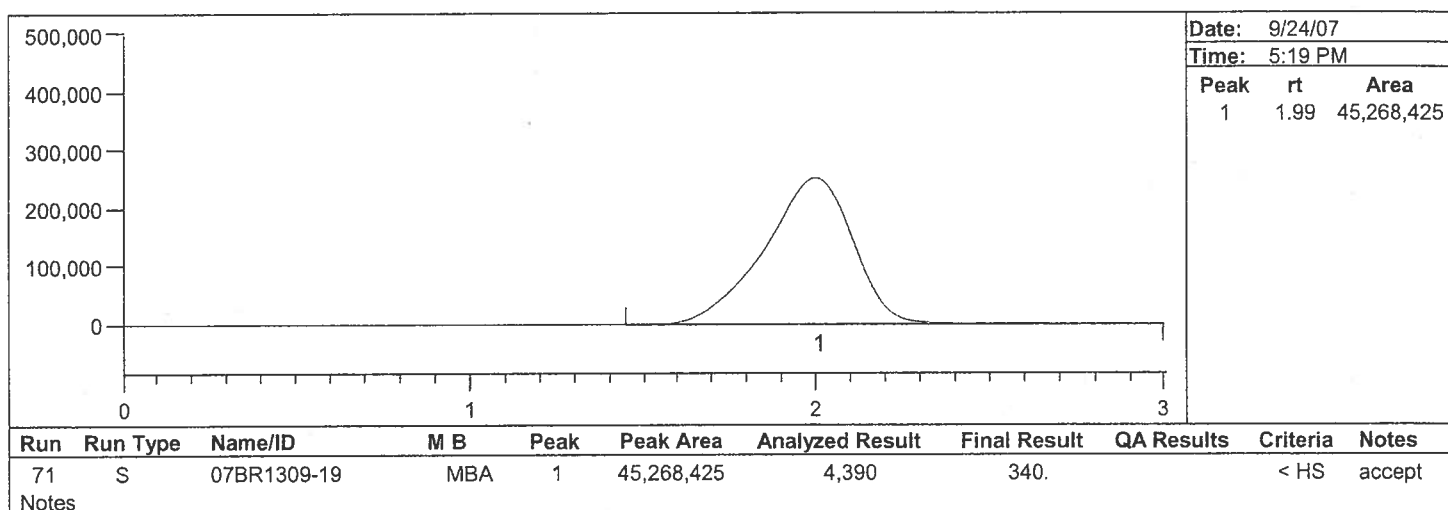
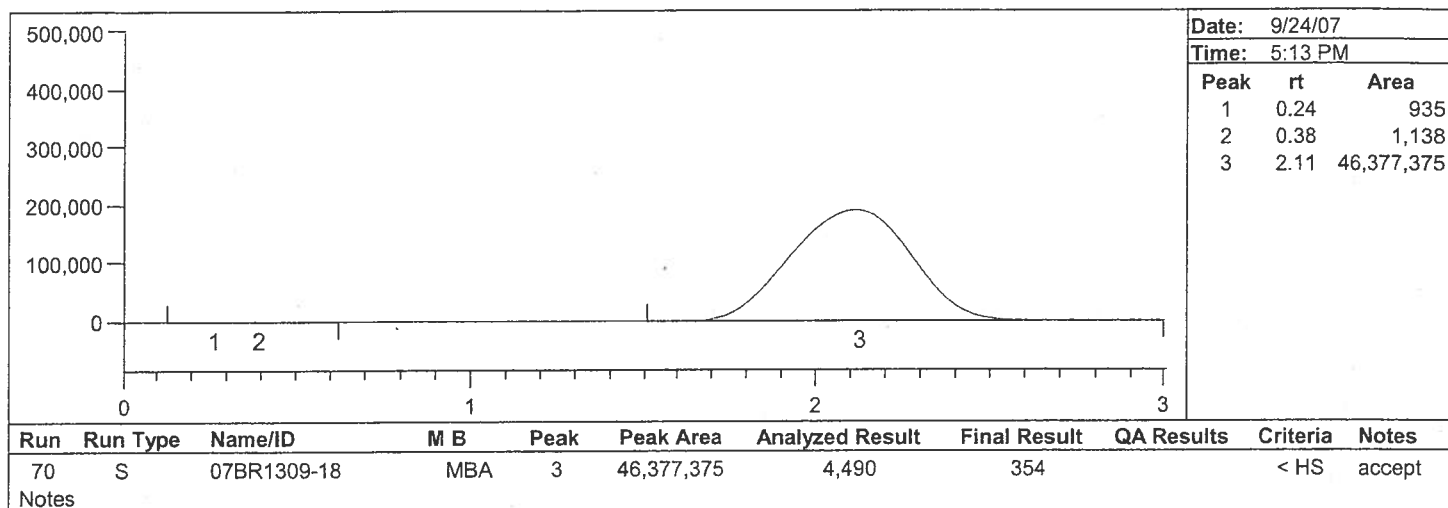
Method Number: 1631 Mod.

Project Number(s):

Instrument ID:

Date Analyzed: 9/24/07

Analyst Name:



Peak Report

Batch Number:

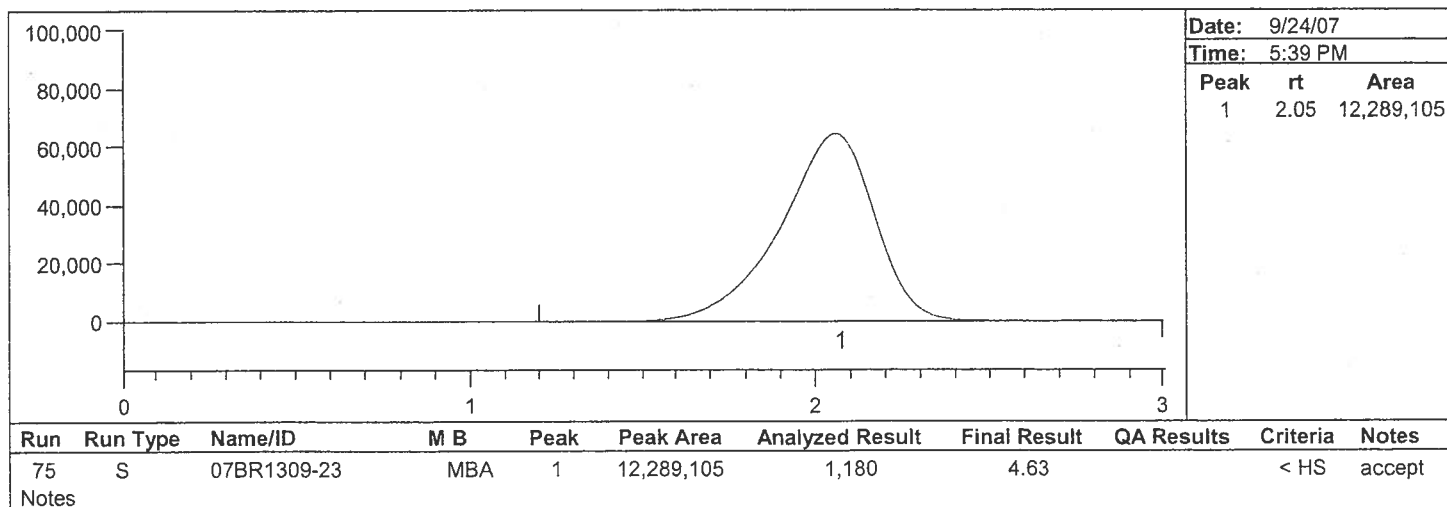
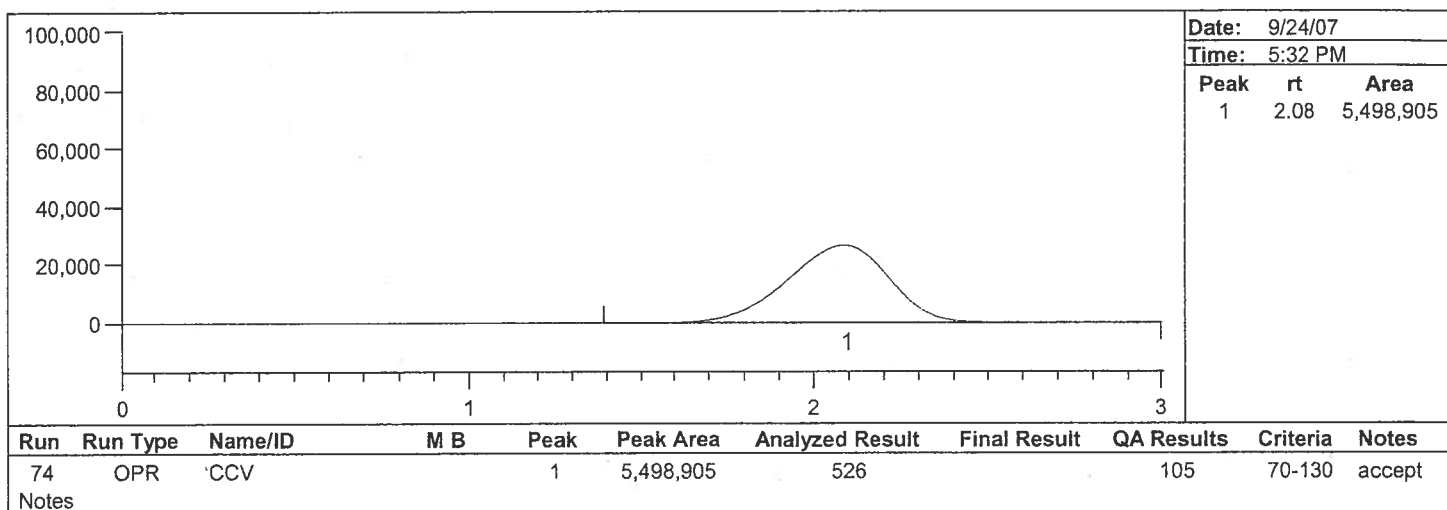
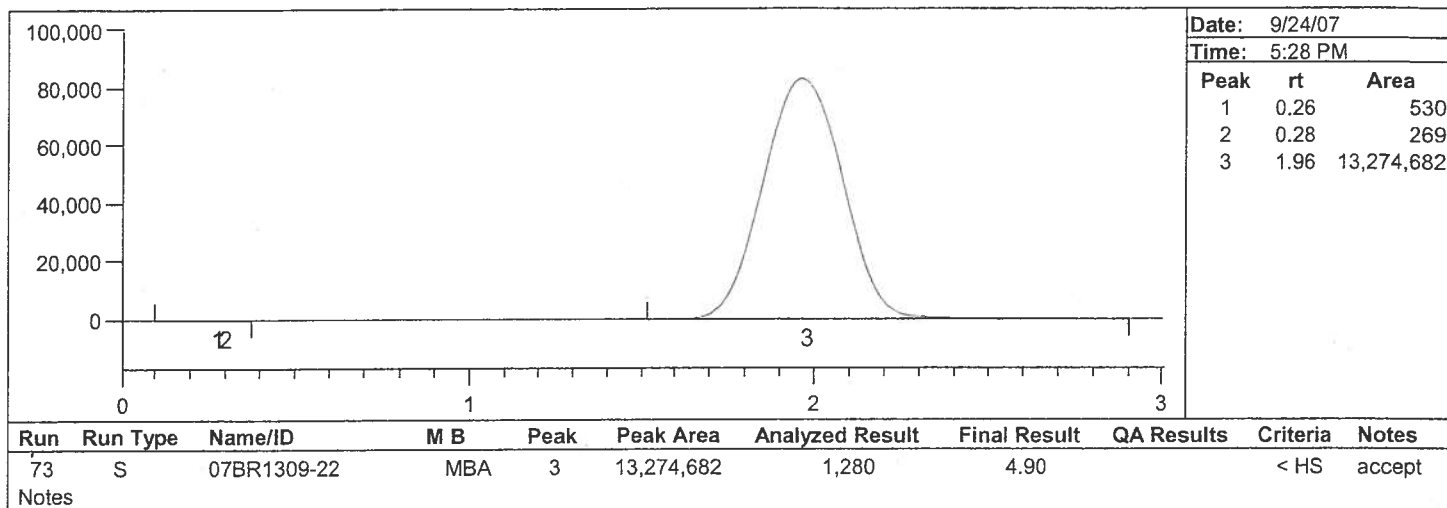
Method Number: 1631 Mod.

Project Number(s):

Instrument ID:

Date Analyzed: 9/24/07

Analyst Name:



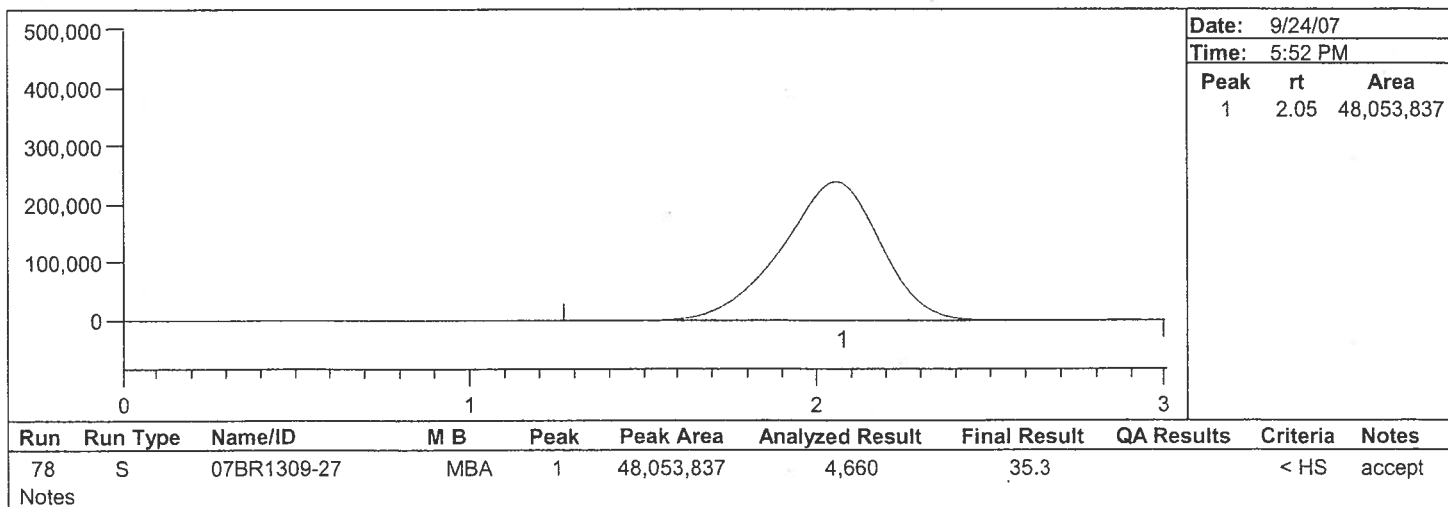
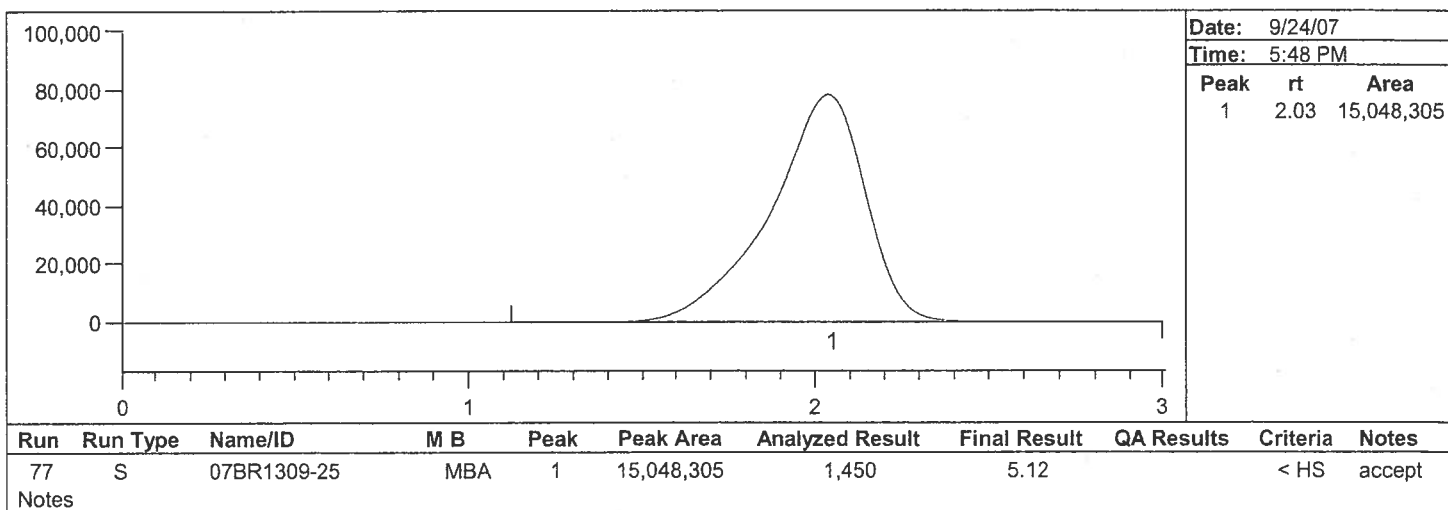
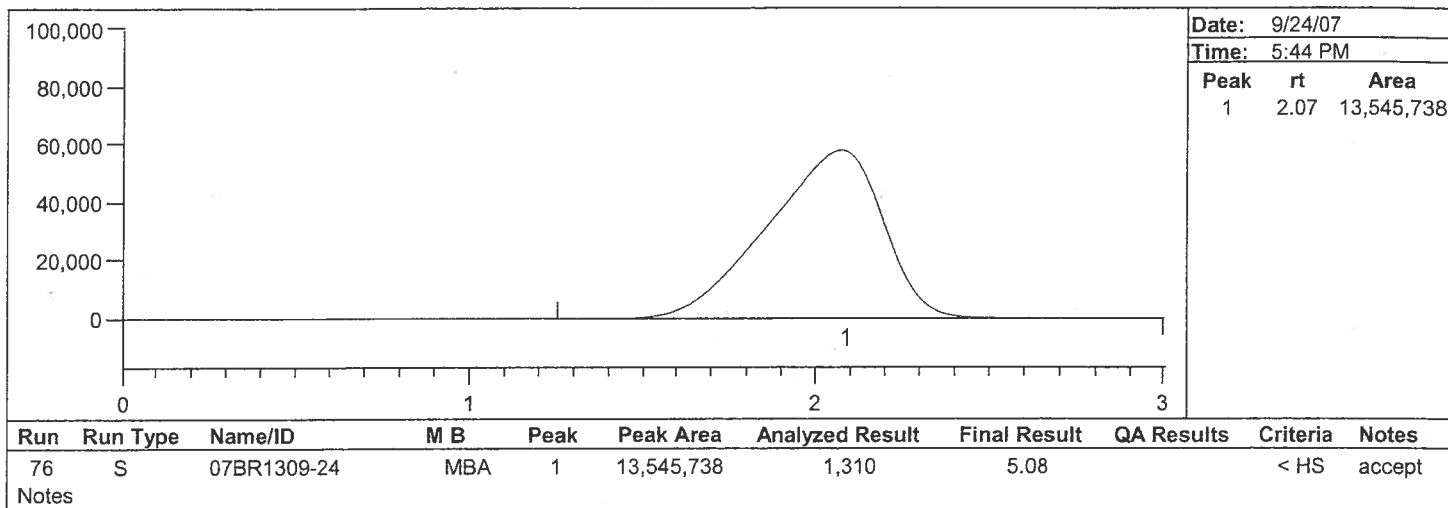
Peak Report

Brooks Rand Report #07BR1309

Batch Number:
Method Number: 1631 Mod.

Project Number(s):
Instrument ID:

Date Analyzed: 9/24/07
Analyst Name:



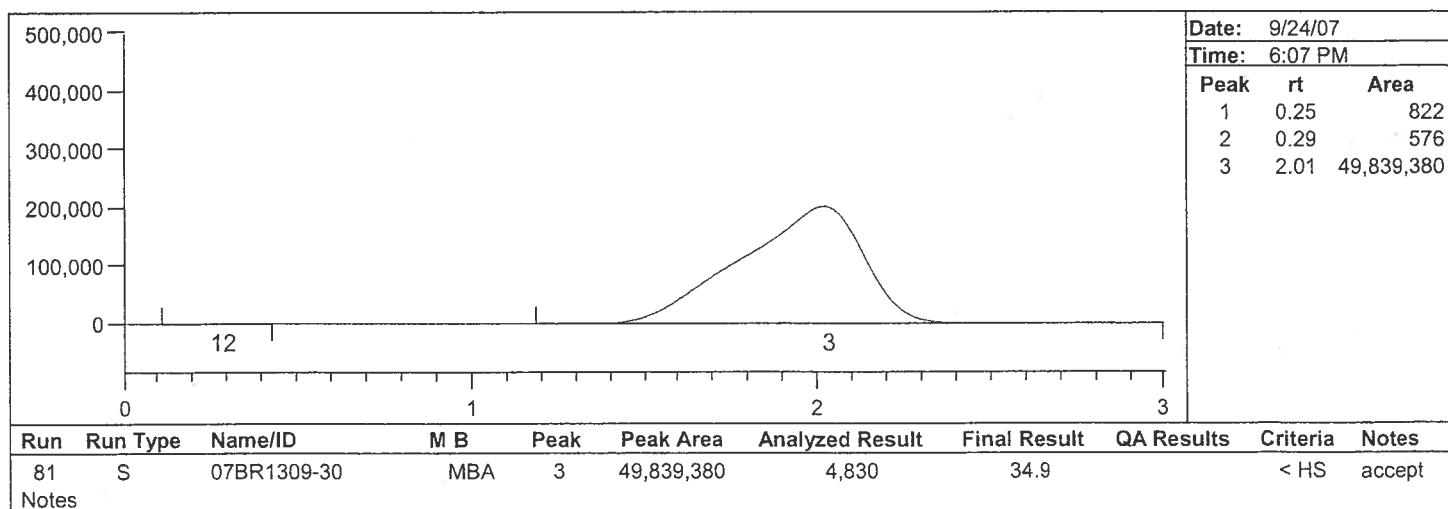
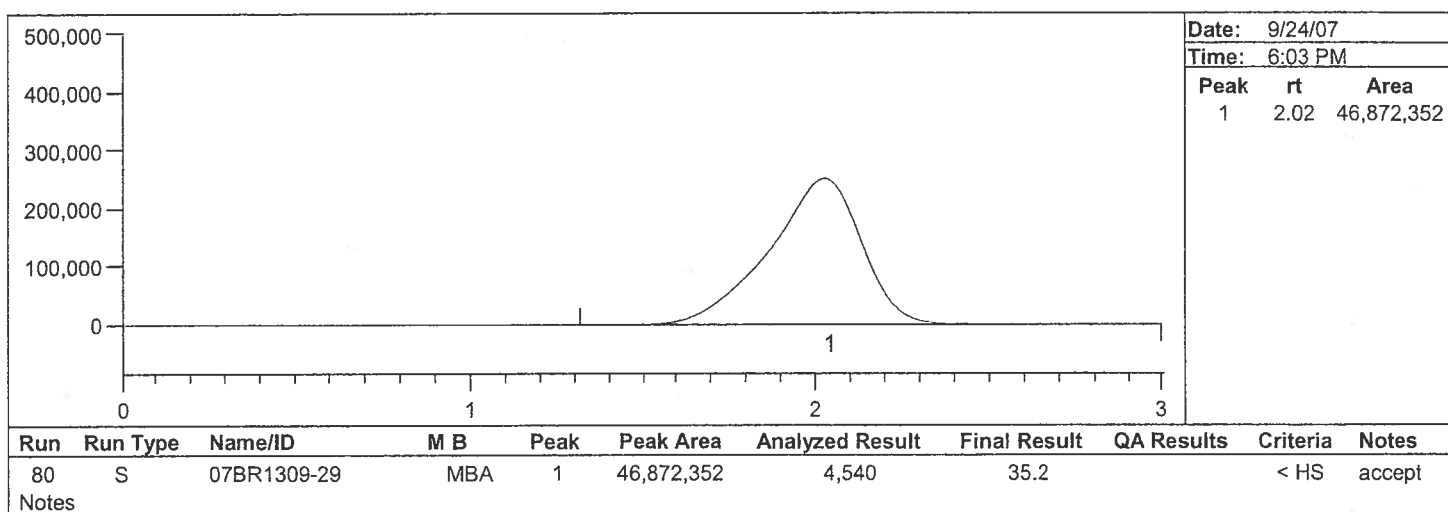
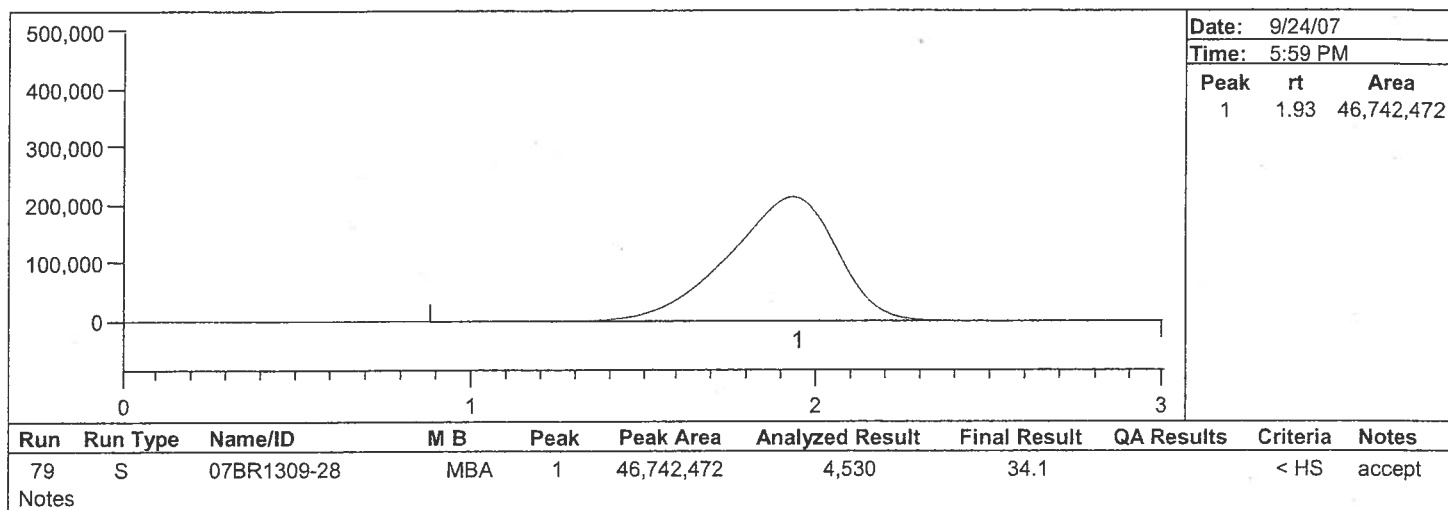
Peak Report

Brooks Rand Report #07BR1309

Batch Number:
Method Number: 1631 Mod.

Project Number(s):
Instrument ID:

Date Analyzed: 9/24/07
Analyst Name:



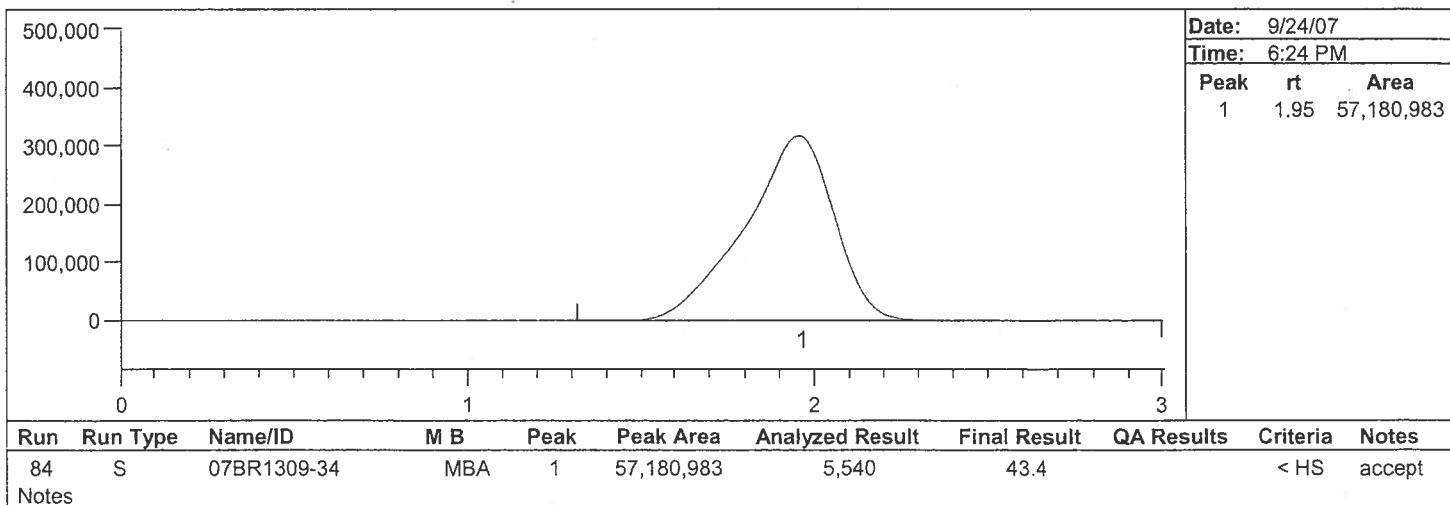
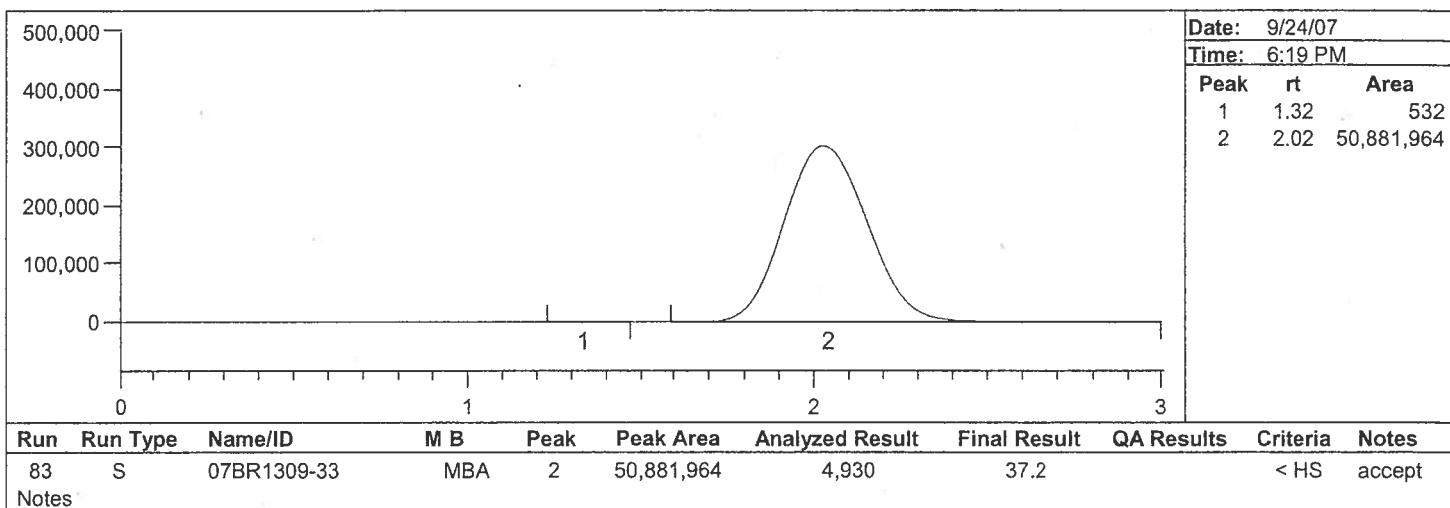
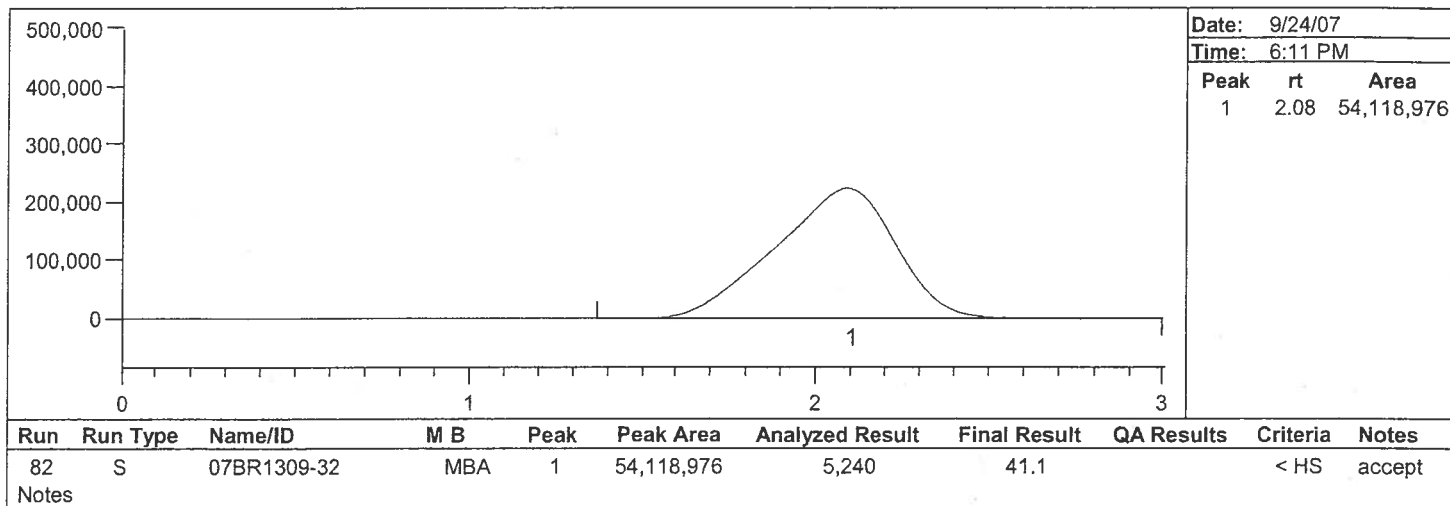
Peak Report

Brooks Rand Report #07BR1309

Batch Number:
Method Number: 1631 Mod.

Project Number(s):
Instrument ID:

Date Analyzed: 9/24/07
Analyst Name:



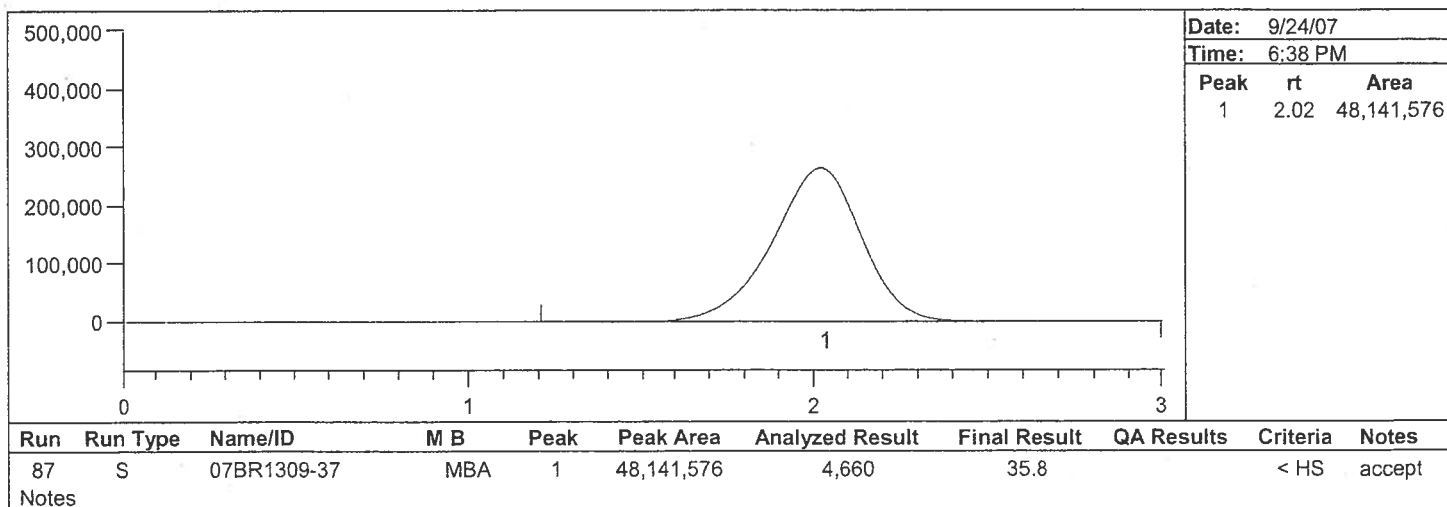
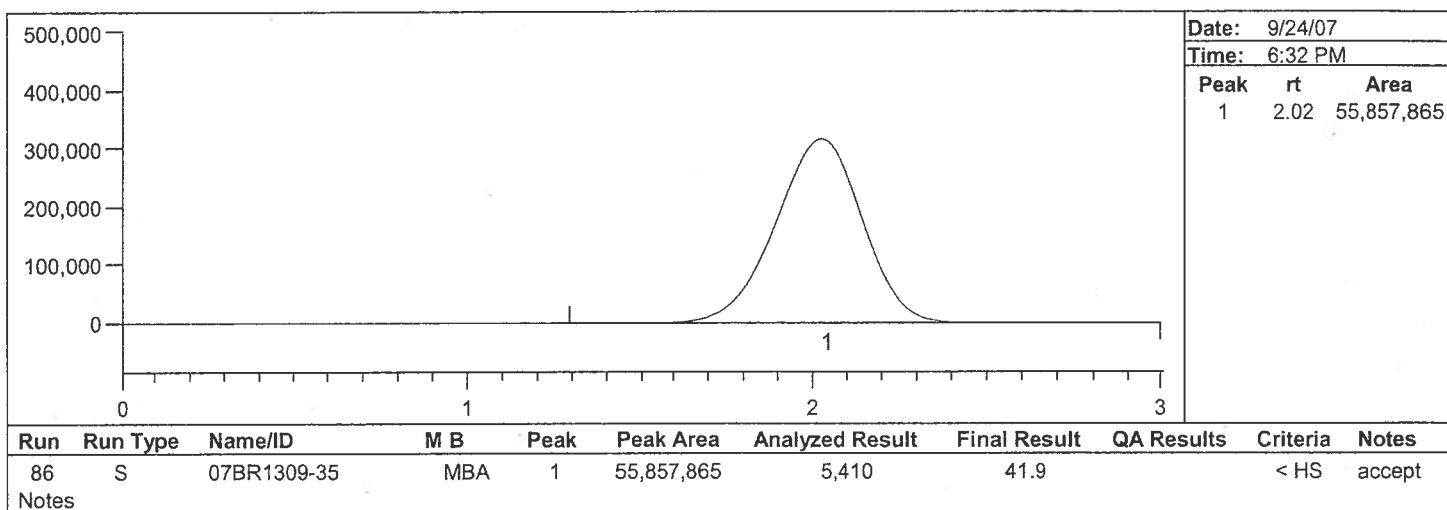
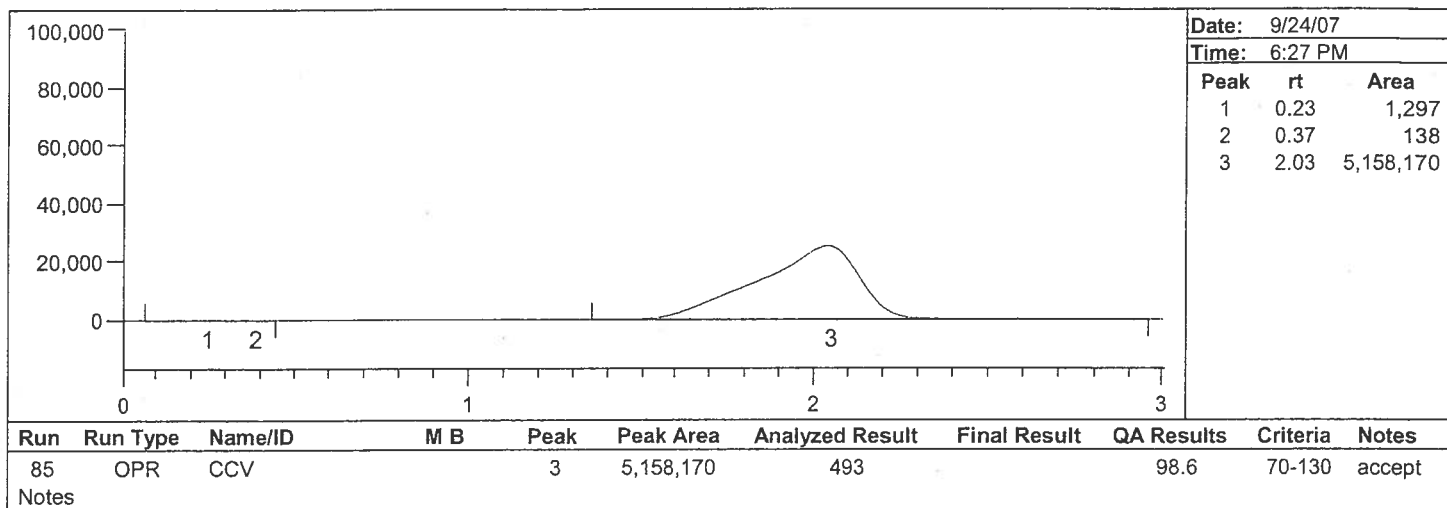
Peak Report

Brooks Rand Report #07BR1309

Batch Number:
Method Number: 1631 Mod.

Project Number(s):
Instrument ID:

Date Analyzed: 9/24/07
Analyst Name:



Peak Report

Brooks Rand Report #07BR1309

Batch Number:

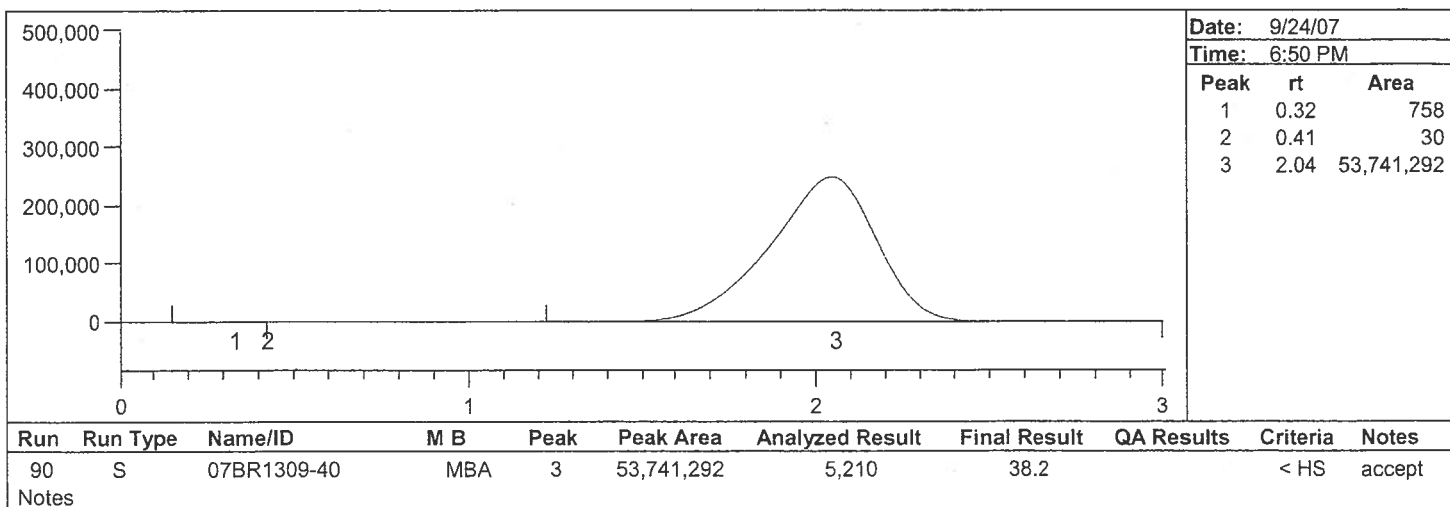
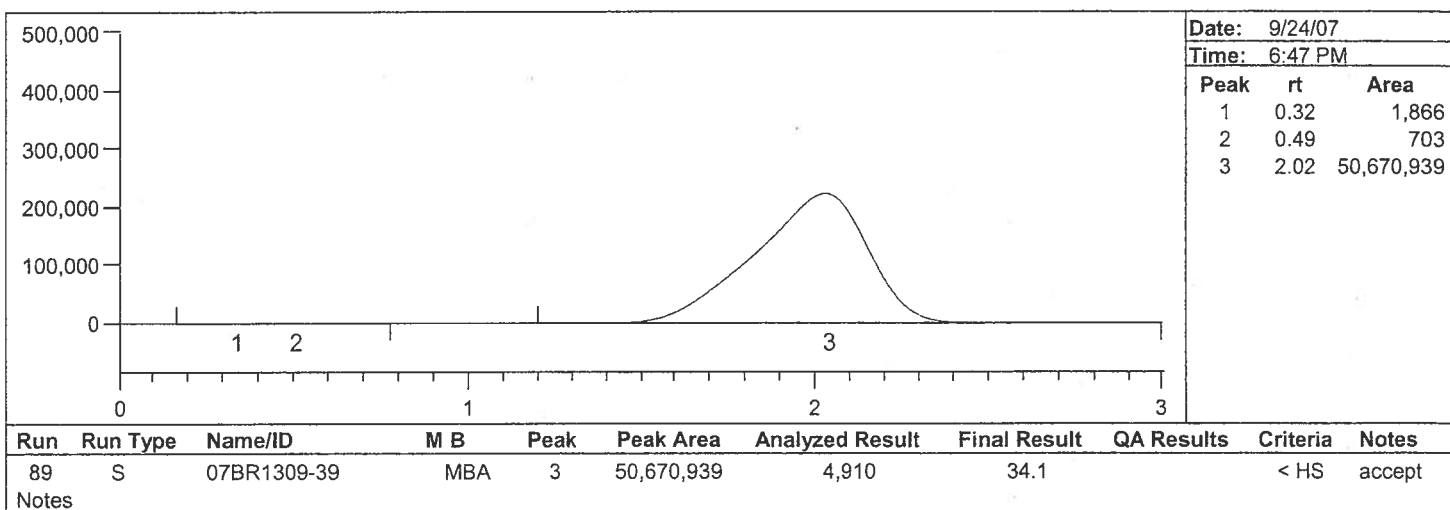
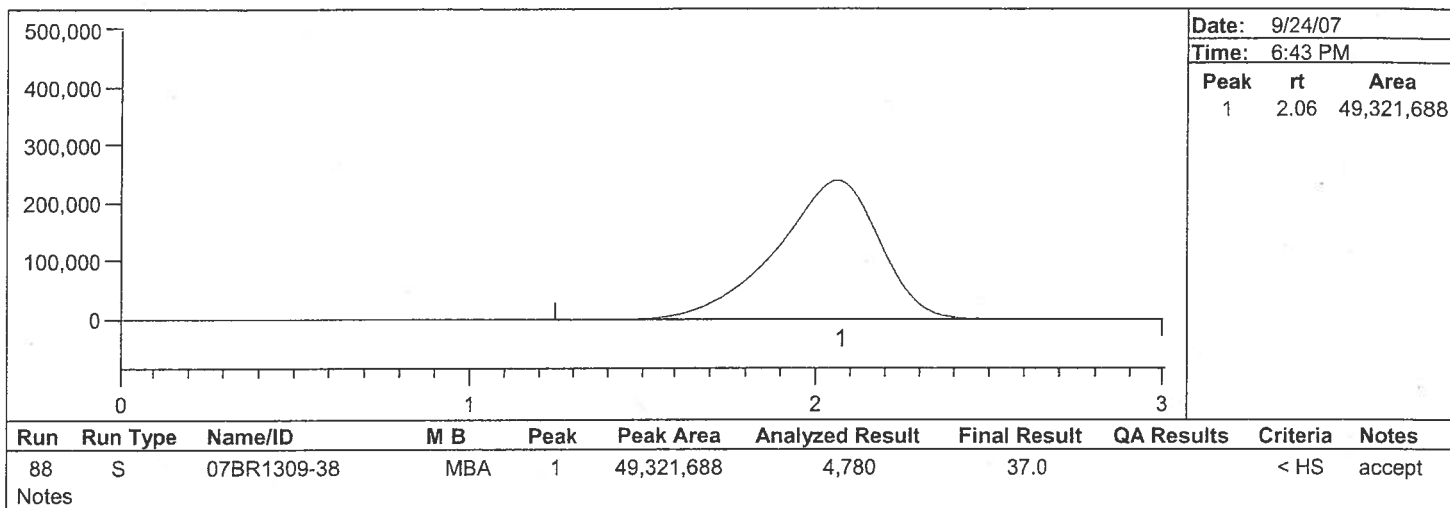
Method Number: 1631 Mod.

Project Number(s):

Instrument ID:

Date Analyzed: 9/24/07

Analyst Name:



Peak Report

Brooks Rand Report #07BR1309

Batch Number:

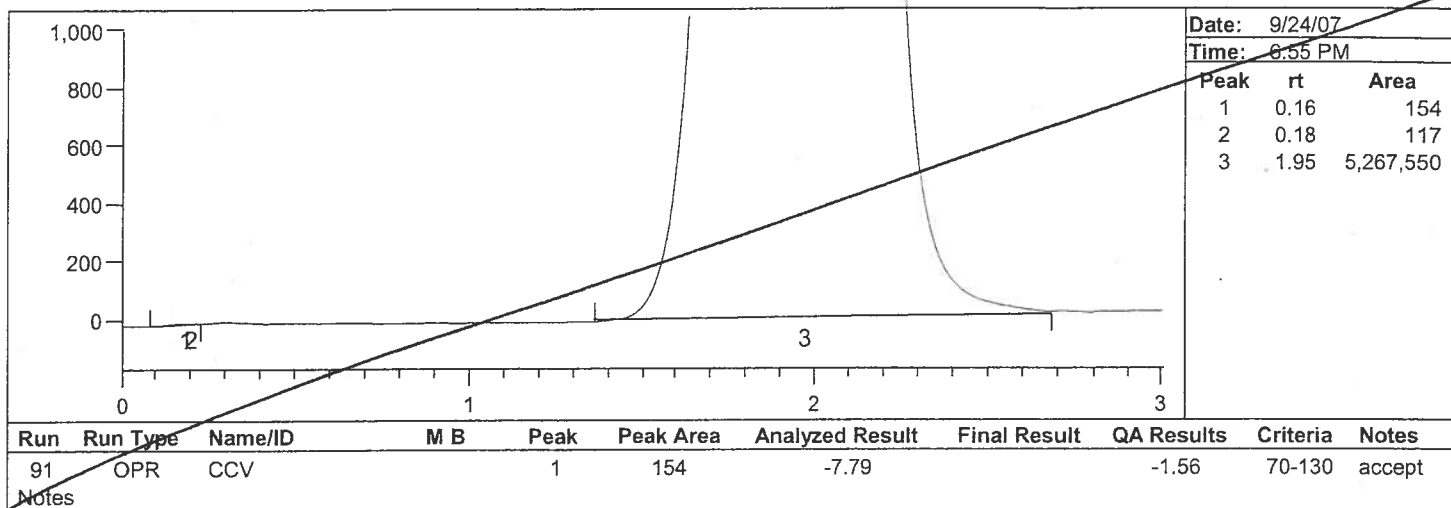
Method Number: 1631 Mod.

Project Number(s):

Instrument ID:

Date Analyzed: 9/24/07

Analyst Name:



Guru error, see next page.
NLA 9/25/07.

Peak Report

Brooks Rand Report #07BR1309

Batch Number:

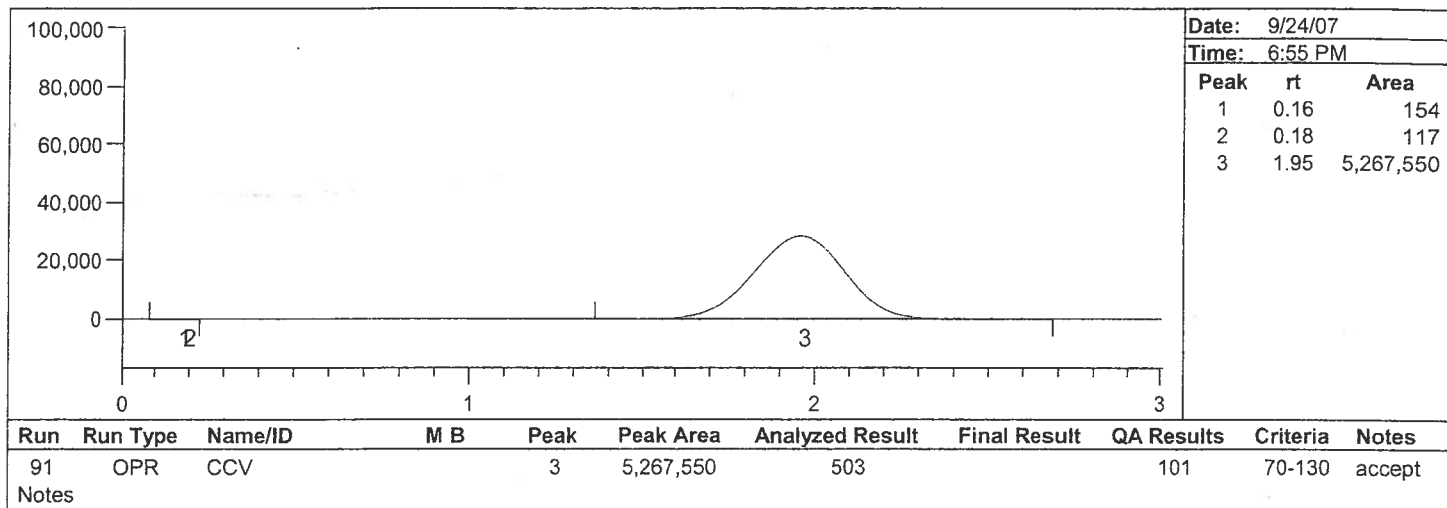
Method Number: 1631 Mod.

Project Number(s):

Instrument ID:

Date Analyzed: 9/24/07

Analyst Name:



Sample Homogenization

Date: 9/14/07

Technician: JR

Objectives:

- 1) Start time of homogenizing (comments section)
- 2) List of samples homogenized
- 3) Time homogenizer blank is taken (which homogenizer blanked – comments section)
- 4) List of samples homogenized after blank
- 5) End time of homogenizing (comments section)

	Date <i>Time</i>	Sample ID	Equip. #	Comments (i.e. start/stop time, consistency of sample, sample vs. homogenization blank; if a blank then how preserved, what analytes to be tested for, etc.)
1	9:45	07BR1309-05		Some of the worms were on the
2	10:10	-01		sides and I scraped off as much
3	10:49	-04		as I could. Not all got in.
4	11:29	-10		blank
5	11:31	▼ -03		
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				

Date: 9/13/07

[illegible]

Additional Notes: Blank done between -03 and -06

Sample Homogenization

Date: 9/13/07

Technician: JB

Objectives:

- 1) Start time of homogenizing (comments section)
- 2) List of samples homogenized
- 3) Time homogenizer blank is taken (which homogenizer blanked – comments section)
- 4) List of samples homogenized after blank
- 5) End time of homogenizing (comments section)

	Date Time	Sample ID	Equip. #	Comments (i.e. start/stop time, consistency of sample, sample vs. homogenization blank; if a blank then how preserved, what analytes to be tested for, etc.)
1	2:23	07BR1309-02		66g
2	2:32	↓ -08		56g
3	2:40	↓ -07		54g
4	2:49	↓ -06		56g
5	2:38	↓ -09		blank
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				

3958 6th Avenue NW

Phone: 206-632-6206

Seattle, WA 98107

Fax: 206-632-6017

www.brooksrand.com

Email: brl@brooksrand.com

Sample Receiving Log

Tracking # 07BR1309

Customer: Kleinfelder

Contact: Dave King

Project Ref. #: KLE001

BRL Project Manager: Elizabeth Madonick

Due Date: 9/25/2007

Receiving Date: 9/11/2007

Receiving Time: 9:15 AM

Logged-in by: Katie Jahanmir

Log-in Date: 9/11/2007

Log-in Time: 2:52 PM

Airbill present? Yes

Airbill # See Comments

Courier: UPS

Custody seal present? Yes

Custody seal intact? Yes

COC Present? Yes

COC/Sample tag agree? Yes

COC Number: N/A

QA Level Full

Sample Condition Intact

Shipping container intact? Yes

Shipping container type: Cooler

Shipping container temp: See Comments

Shipping container coolant: Ice

Sample Turnaround Time:

Contract Turnaround Time: 14 days

Comments: Cooler 1: 1Z8491690110033098, 0.2 C Cooler 2: 1Z8491690110033105, 4.0 C

Lab ID:

01 Sample Tag #: 1138G (Pre exposure) 1 Collection Date/Time: 8/8/2007, ContainerType and Lot #: Glass jar, Size: 4 oz.	Matrix/Sub-Matrix: Biota, Worms Preservation: none Acid Lot#: n/a pH: Sample Storage Location: Freezer #4	Filtered?: No
--	---	---------------

Comments: Sample consists of 5 separate jars. All 5 sample containers homogenized together.

Analysis / Method: Hg EPA 1631, Appendix

Analysis / Method: Homogenization BR-0103

02 Sample Tag #: 1138G (Pre exposure) 2 Collection Date/Time: 8/8/2007, ContainerType and Lot #: Glass jar, Size: 4 oz.	Matrix/Sub-Matrix: Biota, Worms Preservation: none Acid Lot#: n/a pH: Sample Storage Location: Freezer #4	Filtered?: No
--	---	---------------

Comments: Sample split from BRL sample 07BR1309-01.

Analysis / Method: Hg EPA 1631, Appendix

Analysis / Method: Homogenization BR-0103

Lab ID:

03	Sample Tag #: 1138G (Pre exposure) 3	Matrix/Sub-Matrix: Biota, Worms
Collection Date/Time: 8/8/2007,	Preservation: none	
ContainerType and Lot #: Glass jar,	Acid Lot#: n/a	
Size: 4 oz.	pH:	Filtered?: No
	Sample Storage Location: Freezer #4	
<u>Comments: Sample split from BRL sample 07BR1309-01.</u>		
Analysis / Method: Hg	EPA 1631, Appendix	
Analysis / Method: Homogenization	BR-0103	
04	Sample Tag #: 1138G (Pre exposure) 4	Matrix/Sub-Matrix: Biota, Worms
Collection Date/Time: 8/8/2007,	Preservation: none	
ContainerType and Lot #: Glass jar,	Acid Lot#: n/a	
Size: 4 oz.	pH:	Filtered?: No
	Sample Storage Location: Freezer #4	
<u>Comments: Sample split from BRL sample 07BR1309-01.</u>		
Analysis / Method: Hg	EPA 1631, Appendix	
Analysis / Method: Homogenization	BR-0103	
05	Sample Tag #: 1138G (Pre exposure) 5	Matrix/Sub-Matrix: Biota, Worms
Collection Date/Time: 8/8/2007,	Preservation: none	
ContainerType and Lot #: Glass jar,	Acid Lot#: n/a	
Size: 4 oz.	pH:	Filtered?: No
	Sample Storage Location: Freezer #4	
<u>Comments: Sample split from BRL sample 07BR1309-01.</u>		
Analysis / Method: Hg	EPA 1631, Appendix	
Analysis / Method: Homogenization	BR-0103	
06	Sample Tag #: 1139G (Pre exposure) 1	Matrix/Sub-Matrix: Biota, Bivalve
Collection Date/Time: 8/9/2007,	Preservation: none	
ContainerType and Lot #: Glass jar,	Acid Lot#: n/a	
Size: 8 oz.	pH:	Filtered?: No
	Sample Storage Location: Freezer #4	
<u>Comments: Sample consists of 5 separate jars, aproximately 100 clams. All 5 sample containers homogenized together.</u>		
Analysis / Method: Hg	EPA 1631, Appendix	
Analysis / Method: Homogenization	BR-0103	
Analysis / Method: Shucking	In-house	
07	Sample Tag #: 1139G (Pre exposure) 2	Matrix/Sub-Matrix: Biota, Bivalve
Collection Date/Time: 8/9/2007,	Preservation: none	
ContainerType and Lot #: Glass jar,	Acid Lot#: n/a	
Size: 8 oz.	pH:	Filtered?: No
	Sample Storage Location: Freezer #4	
<u>Comments: Sample split from BRL sample 07BR1309-06.</u>		
Analysis / Method: Hg	EPA 1631, Appendix	
Analysis / Method: Homogenization	BR-0103	
Analysis / Method: Shucking	In-house	

Lab ID:

08	Sample Tag #: 1139G (Pre exposure) 3	Matrix/Sub-Matrix: Biota, Bivalve
Collection Date/Time: 8/9/2007,	Preservation: none	
ContainerType and Lot #: Glass jar,	Acid Lot#: n/a	
Size: 8 oz.	pH:	Filtered?: No
	Sample Storage Location: Freezer #4	
<u>Comments: Sample split from BRL sample 07BR1309-06.</u>		
Analysis / Method: Hg	EPA 1631, Appendix	
Analysis / Method: Homogenization	BR-0103	
Analysis / Method: Shucking	In-house	
09	Sample Tag #: 1139G (Pre exposure) 4	Matrix/Sub-Matrix: Biota, Bivalve
Collection Date/Time: 8/9/2007,	Preservation: none	
ContainerType and Lot #: Glass jar,	Acid Lot#: n/a	
Size: 8 oz.	pH:	Filtered?: No
	Sample Storage Location: Freezer #4	
<u>Comments: Sample split from BRL sample 07BR1309-06.</u>		
Analysis / Method: Hg	EPA 1631, Appendix	
Analysis / Method: Homogenization	BR-0103	
Analysis / Method: Shucking	In-house	
10	Sample Tag #: 1139G (Pre exposure) 5	Matrix/Sub-Matrix: Biota, Bivalve
Collection Date/Time: 8/9/2007,	Preservation: none	
ContainerType and Lot #: Glass jar,	Acid Lot#: n/a	
Size: 8 oz.	pH:	Filtered?: No
	Sample Storage Location: Freezer #4	
<u>Comments: Sample split from BRL sample 07BR1309-06.</u>		
Analysis / Method: Hg	EPA 1631, Appendix	
Analysis / Method: Homogenization	BR-0103	
Analysis / Method: Shucking	In-house	
11	Sample Tag #: 1172G (Post Exposure) 1	Matrix/Sub-Matrix: Biota, Worms
Collection Date/Time: 9/5/2007,	Preservation: none	
ContainerType and Lot #: HDPE jar,	Acid Lot#: n/a	
Size: 8 oz.	pH:	Filtered?: No
	Sample Storage Location: Freezer #4	
<u>Comments: Sample consists of 5 separate jars. All 5 sample containers homogenized together.</u>		
Analysis / Method: Hg	EPA 1631, Appendix	
Analysis / Method: Homogenization	BR-0103	
12	Sample Tag #: 1172G (Post Exposure) 2	Matrix/Sub-Matrix: Biota, Worms
Collection Date/Time: 9/5/2007,	Preservation: none	
ContainerType and Lot #: HDPE jar,	Acid Lot#: n/a	
Size: 8 oz.	pH:	Filtered?: No
	Sample Storage Location: Freezer #4	
<u>Comments: Sample split from BRL sample 07BR1309-11.</u>		
Analysis / Method: Hg	EPA 1631, Appendix	
Analysis / Method: Homogenization	BR-0103	

Lab ID:

Analysis / Method: Hg EPA 1631, Appendix
 Analysis / Method: Homogenization BR-0103

19 Matrix/Sub-Matrix: Biota, Worms
 Sample Tag #: 1173G (Post Exposure) 4 Preservation: none
 Collection Date/Time: 9/5/2007, Acid Lot#: n/a
 ContainerType and Lot #: HDPE jar, pH: Filtered?: No
 Size: 8 oz. Sample Storage Location: Freezer #4

Comments: Sample split from BRL sample 07BR1309-16.

Analysis / Method: Hg EPA 1631, Appendix
 Analysis / Method: Homogenization BR-0103

20 Matrix/Sub-Matrix: Biota, Worms
 Sample Tag #: 1173G (Post Exposure) 5 Preservation: none
 Collection Date/Time: 9/5/2007, Acid Lot#: n/a
 ContainerType and Lot #: HDPE jar, pH: Filtered?: No
 Size: 8 oz. Sample Storage Location: Freezer #4

Comments: Sample split from BRL sample 07BR1309-16.

Analysis / Method: Hg EPA 1631, Appendix
 Analysis / Method: Homogenization BR-0103

21 Matrix/Sub-Matrix: Biota, Worms
 Sample Tag #: 1174G (Post Exposure) 1 Preservation: none
 Collection Date/Time: 9/5/2007, Acid Lot#: n/a
 ContainerType and Lot #: HDPE jar, pH: Filtered?: No
 Size: 8 oz. Sample Storage Location: Freezer #4

Comments: Sample consists of 5 separate jars. All 5 sample containers homogenized together.

Analysis / Method: Hg EPA 1631, Appendix
 Analysis / Method: Homogenization BR-0103

22 Matrix/Sub-Matrix: Biota, Worms
 Sample Tag #: 1174G (Post Exposure) 2 Preservation: none
 Collection Date/Time: 9/5/2007, Acid Lot#: n/a
 ContainerType and Lot #: HDPE jar, pH: Filtered?: No
 Size: 8 oz. Sample Storage Location: Freezer #4

Comments: Sample split from BRL sample 07BR1309-21.

Analysis / Method: Hg EPA 1631, Appendix
 Analysis / Method: Homogenization BR-0103

23 Matrix/Sub-Matrix: Biota, Worms
 Sample Tag #: 1174G (Post Exposure) 3 Preservation: none
 Collection Date/Time: 9/5/2007, Acid Lot#: n/a
 ContainerType and Lot #: HDPE jar, pH: Filtered?: No
 Size: 8 oz. Sample Storage Location: Freezer #4

Comments: Sample split from BRL sample 07BR1309-21.

Analysis / Method: Hg EPA 1631, Appendix
 Analysis / Method: Homogenization BR-0103

Lab ID:

24	Sample Tag #: 1174G (Post Exposure) 4 Collection Date/Time: 9/5/2007, ContainerType and Lot #: HDPE jar, Size: 8 oz.	Matrix/Sub-Matrix: Biota, Worms Preservation: none Acid Lot#: n/a pH: Sample Storage Location: Freezer #4	Filtered?: No
	<u>Comments: Sample split from BRL sample 07BR1309-21.</u>		
	Analysis / Method: Hg Analysis / Method: Homogenization	EPA 1631, Appendix BR-0103	
25	Sample Tag #: 1174G (Post Exposure) 5 Collection Date/Time: 9/5/2007, ContainerType and Lot #: HDPE jar, Size: 8 oz.	Matrix/Sub-Matrix: Biota, Worms Preservation: none Acid Lot#: n/a pH: Sample Storage Location: Freezer #4	Filtered?: No
	<u>Comments: Sample split from BRL sample 07BR1309-21.</u>		
	Analysis / Method: Hg Analysis / Method: Homogenization	EPA 1631, Appendix BR-0103	
26	Sample Tag #: 1175G (Post Exposure) 1 Collection Date/Time: 9/6/2007, ContainerType and Lot #: Ziploc Bag, Size:	Matrix/Sub-Matrix: Biota, Bivalve Preservation: none Acid Lot#: n/a pH: Sample Storage Location: Freezer #4	Filtered?: No
	<u>Comments: Sample consists of 5 separate bags, approximately 100 clams. All 5 sample containers homogenized together.</u>		
	Analysis / Method: Hg Analysis / Method: Homogenization Analysis / Method: Shucking	EPA 1631, Appendix BR-0103 In-house	
27	Sample Tag #: 1175G (Post Exposure) 2 Collection Date/Time: 9/6/2007, ContainerType and Lot #: Ziplock Bag, Size:	Matrix/Sub-Matrix: Biota, Bivalve Preservation: none Acid Lot#: n/a pH: Sample Storage Location: Freezer #4	Filtered?: No
	<u>Comments: Sample split from BRL sample 07BR1309-26.</u>		
	Analysis / Method: Hg Analysis / Method: Homogenization Analysis / Method: Shucking	EPA 1631, Appendix BR-0103 In-house	
28	Sample Tag #: 1175G (Post Exposure) 3 Collection Date/Time: 9/6/2007, ContainerType and Lot #: Ziplock Bag, Size:	Matrix/Sub-Matrix: Biota, Bivalve Preservation: none Acid Lot#: n/a pH: Sample Storage Location: Freezer #4	Filtered?: No
	<u>Comments: Sample split from BRL sample 07BR1309-26.</u>		
	Analysis / Method: Hg Analysis / Method: Homogenization Analysis / Method: Shucking	EPA 1631, Appendix BR-0103 In-house	

Comments: Sample split from BRL sample 07BR1309-26.

Comments: Sample split from BRL sample 07BR1309-26.

Comments: Sample consists of 5 separate bags, aproximately 100 clams. All 5 sample containers homogenized together.

Comments: Sample split from BRL sample 07BR1309-31.

Comments: Sample split from BRL sample 07BR1309-31.

Analysis / Method:	Hg	EPA 1631, Appendix
Analysis / Method:	Homogenization	BR-0103
Analysis / Method:	Shucking	In-house

Lab ID:

34

Sample Tag #: 1176G (Post Exposure) 4
 Collection Date/Time: 9/6/2007,
 ContainerType and Lot #: Ziplock Bag,
 Size:

Matrix/Sub-Matrix: Biota, Bivalve
 Preservation: none
 Acid Lot#: n/a
 pH:
 Sample Storage Location: Freezer #4

Filtered?: No

Comments: Sample split from BRL sample 07BR1309-31.

Analysis / Method: Hg EPA 1631, Appendix
 Analysis / Method: Homogenization BR-0103
 Analysis / Method: Shucking In-house

35

Sample Tag #: 1176G (Post Exposure) 5
 Collection Date/Time: 9/6/2007,
 ContainerType and Lot #: Ziplock Bag,
 Size:

Matrix/Sub-Matrix: Biota, Bivalve
 Preservation: none
 Acid Lot#: n/a
 pH:
 Sample Storage Location: Freezer #4

Filtered?: No

Comments: Sample split from BRL sample 07BR1309-31.

Analysis / Method: Hg EPA 1631, Appendix
 Analysis / Method: Homogenization BR-0103
 Analysis / Method: Shucking In-house

36

Sample Tag #: 1177G (Post Exposure) 1
 Collection Date/Time: 9/6/2007,
 ContainerType and Lot #: Ziploc Bag,
 Size:

Matrix/Sub-Matrix: Biota, Bivalve
 Preservation: none
 Acid Lot#: n/a
 pH:
 Sample Storage Location: Freezer #4

Filtered?: No

Comments: Sample consists of 5 separate bags. aproximately 100 clams. All 5 sample containers homogenized together.

Analysis / Method: Hg EPA 1631, Appendix
 Analysis / Method: Homogenization BR-0103
 Analysis / Method: Shucking In-house

37

Sample Tag #: 1177G (Post Exposure) 2
 Collection Date/Time: 9/6/2007,
 ContainerType and Lot #: Ziplock Bag,
 Size:

Matrix/Sub-Matrix: Biota, Bivalve
 Preservation: none
 Acid Lot#: n/a
 pH:
 Sample Storage Location: Freezer #4

Filtered?: No

Comments: Sample split from BRL sample 07BR1309-36.

Analysis / Method: Hg EPA 1631, Appendix
 Analysis / Method: Homogenization BR-0103
 Analysis / Method: Shucking In-house

38

Sample Tag #: 1177G (Post Exposure) 3
 Collection Date/Time: 9/6/2007,
 ContainerType and Lot #: Ziplock Bag,
 Size:

Matrix/Sub-Matrix: Biota, Bivalve
 Preservation: none
 Acid Lot#: n/a
 pH:
 Sample Storage Location: Freezer #4

Filtered?: No

Comments: Sample split from BRL sample 07BR1309-36.

Analysis / Method: Hg EPA 1631, Appendix
 Analysis / Method: Homogenization BR-0103
 Analysis / Method: Shucking In-house

Lab ID:

39

Sample Tag #: 1177G (Post Exposure) 4
 Collection Date/Time: 9/6/2007,
 ContainerType and Lot #: Ziplock Bag,
 Size:

Matrix/Sub-Matrix: Biota, Bivalve

Preservation: none

Acid Lot#: n/a

pH:

Filtered?: No

Sample Storage Location: Freezer #4

Comments: Sample split from BRL sample 07BR1309-36.

Analysis / Method: Hg EPA 1631, Appendix
 Analysis / Method: Homogenization BR-0103
 Analysis / Method: Shucking In-house

40

Sample Tag #: 1177G (Post Exposure) 5
 Collection Date/Time: 9/6/2007,
 ContainerType and Lot #: Ziplock Bag,
 Size:

Matrix/Sub-Matrix: Biota, Bivalve

Preservation: none

Acid Lot#: n/a

pH:

Filtered?: No

Sample Storage Location: Freezer #4

Comments: Sample split from BRL sample 07BR1309-36.

Analysis / Method: Hg EPA 1631, Appendix
 Analysis / Method: Homogenization BR-0103
 Analysis / Method: Shucking In-house

41

Sample Tag #: HB-Hg-07-1022-1
 Collection Date/Time: 9/13/2007, 2:38:00 PM
 ContainerType and Lot #: FLPE bottle, 07-199
 Size: 250-mL

Matrix/Sub-Matrix: Biota, Blank

Preservation: none

Acid Lot#: n/a

pH:

Filtered?: No

Sample Storage Location: Cabinet #5

Comments: This homog blank is applicable to the clam samples.

Analysis / Method: Hg EPA 1631, Appendix Do Not Spike

42

Sample Tag #: HB-Hg-07-0992-1
 Collection Date/Time: 9/14/2007, 9:45:00 AM
 ContainerType and Lot #: FLPE bottle, 07-199
 Size: 250-mL

Matrix/Sub-Matrix: Biota, Blank

Preservation: 0.4% HCl

Acid Lot#: 07-234-06

pH: <2

Filtered?: No

Sample Storage Location: Cabinet #5

Comments: This homog blank is applicable to the worms samples.

Analysis / Method: Hg EPA 1631, Appendix Do Not Spike

Sample Custodian signature

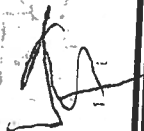
Date

Reviewed By signature

Date

 **UPS Next Day Air[®]**
EXTREMELY URGENT

1





28

UPS
Louisville, KY

12 849 169 01 1003 309 8

TRACKING NUMBER

10/97 M

 **UPS Next Day Air[®]**
EXTREMELY URGENT

1



12

30

UPS
Louisville, KY

12 849 169 01 1003 310 5

TRACKING NUMBER

10/97 M

Summary: DATA VALID ? YES NO

Analytical Laboratory Data Validation Check Sheet

Job Name: CONDIT

Job Number: 53886/5

Date of Review: 12/06/07

Lab Name: Brooks Rm

Lab Batch Id #: KLE001/07BR1309

Chain of Custody

1.) Correct containers used ?

yes no

2.) Correct preservative (if any) used ?

-NONE REQ'D

yes no

3.) Signature blocks complete and ending with lab ?

yes no

4.) Analyses requested matches analyses reported ?

yes no

5.) Sample identification number matches with lab report ?

yes no

6.) Trip Blank Submitted ?

yes no

7.) Field Blank Submitted ?

CONTROL SAMPLES
REFERENCE INCLUDED

yes no

Timing

8.) Samples extracted within holding time ?

yes no

9.) Analysis performed within holding time ?

yes no

Quality Assurance/Quality Control

10.) Lab Blank Completed ?

yes no

11.) Lab, Field, or Trip Blank(s) reports contaminants ?

yes no

If yes, indicate blank type, chemical(s) and concentration(s):

12.) Are Reporting Limits raised ? (If yes, explain @ "Comments")

yes no

Accuracy

13.) Surrogate Recovery within limits (Default 70-130 %)?

NA yes no

14.) Matrix Spike (MS) Recovery within limits (Default 70-130 %)?

103-112 yes no

15.) Matrix Spike Duplicate (MSD) Recovery within limits (Default 70-130 %)?

99-116 yes no

If no, list exceptions:

Precision

16.) Rel. % Diff. (RPD) within limits (Default 25%) ?

3-14 yes no

17.) RPD calculation for Field Duplicates within limits (Default 25%) ?

yes no

Comments:

NA

Initial Review By: DEK

Final Review By: _____