

**REMOVAL PROGRAM
PRELIMINARY ASSESSMENT/
SITE INVESTIGATION REPORT
FOR THE
HILTON CHROME SITE
LAWRENCE, ESSEX COUNTY, MASSACHUSETTS
25 AND 26 JANUARY 2012**

Prepared For:

U.S. Environmental Protection Agency
Region I
Emergency Planning and Response Branch
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NARRATIVE CHRONOLOGY

Introduction

The Hilton Chrome site (the site) is located at 75 Holly Street in Lawrence, Essex County, Massachusetts (MA) (see Appendix A, Figure 1) [1]. The geographic coordinates of the approximate center of the property are latitude 42° 42' 51" north and longitude 71° 10' 28" west. The site is located in a mixed residential and industrial area. It is bordered to the south and west by Holly Street and commercial and residential buildings, and to the north and east by industrial/commercial properties and the Spicket River (see Appendix A, Figure 2) [2].

At the request of the Massachusetts Department of Environmental Protection (MassDEP), the U.S. Environmental Protection Agency (EPA) and Weston Solutions, Inc. (WESTON®) Superfund Technical Assessment and Response Team III (START) personnel mobilized to the site to conduct field activities to identify unknown materials and to determine if further actions, including removal activities, may be warranted at the site. Activities included conducting air monitoring; compiling a container inventory; and collecting drum and vat samples for field screening and laboratory analysis.

Site Description

The Hilton Chrome site is a metal plating facility that ceased operations in 2011, by order of the City of Lawrence due to fire code violations. Electricity to the building was shut off by the utility company due to the fire code violations [3].

The site is a 0.25-acre industrial property, located adjacent to the Spicket River. The building on site is a one- and two-story structure with a partial basement, and is divided into three wings (South, East, and West). The second floor of the western end of the building was destroyed by a fire that purportedly occurred in 1968. The building directly abuts the sidewalk on Holly Street, and a paved parking area is located between the street and the south wing. There is a paved driveway located on the northern adjacent property that was used by Hilton Chrome personnel to access the rear of the building. There are bay doors located on the west side of the South Wing, and at the northeastern corner of the East Wing. The area between the South and East Wings is overgrown with vegetation and brush. Debris, empty vats, vehicle parts, and a dumpster are located in the rear yard, at the east end of the building.

Site History and Background

On 1 December 2011, representatives from the MassDEP conducted a site visit with personnel from the Lawrence Police Department and the Occupational Safety and Health Administration (OSHA), and the property owner [3].

An unknown number of drums were observed throughout the building interior and exterior. The property owner was unsure of the number of containers and drums on the property, but listed some container contents as hydrochloric, sulfuric, and nitric acids; sodium and potassium hydroxide; copper and sodium cyanide; and copper and acid solutions, used in the plating process. Vats and open containers in the processing room contained plating and rinsing solutions, and waste liquids. At the time of the December 2011 visit, the property owner was unsure as to

whether the building would be renovated to correct the building violations, or if the business would be permanently closed [3].

Site Activities

On 25 January 2012, EPA On-Scene Coordinator (OSC) Mike Barry, START Site Leader (SL) Chris Dupree, Project Leader (PL) Eric Ackerman, Chemist Bill Mahany, and START members Andrew Danikas and Colin Cardin mobilized to the site to conduct a drum/container inventory and sampling activities. City of Lawrence Fire Inspector Frank Skusevich, property owner Richard Hilton, City of Lawrence Fire Department Lieutenant Paul Maccarone, and MassDEP engineer Victor Fonkem were also on site to discuss the site history and building contents.

START SL Dupree conducted a tailgate Health and Safety meeting. Topics included low lighting, trip hazards, chemical hazards, and overhead hazards. Personnel signed the Health and Safety Plan (HASP) and tailgate meeting sign-in sheet. The site HASP has been prepared as a separate document, entitled *Site Health and Safety Plan for the Hilton Chrome Preliminary Assessment/Site Investigation, Lawrence, Massachusetts*.

START personnel prepared air monitoring equipment, including a MultiRAE Plus [with carbon monoxide (CO), hydrogen sulfide (H₂S), volatile organic compound (VOC), oxygen (O₂), and lower explosive level (LEL) sensors], a Dräger X-am [with LEL, O₂, hydrogen cyanide (HCN), and phosgene (PH₃) sensors], a Dräger Accuro 2000 auto-pump with a sulfuric acid Dräger tube, two Dräger hand pumps with hydrochloric acid and nitric acid Dräger tubes, and a Ludlum 19A Radiation meter (MicroR) [4-7]. Background levels were recorded as follows: LEL = 0%; O₂ = 20.9%; CO = 0 parts per million (ppm); H₂S = 0 ppm; HCN = 0.0 ppm; and MicroR = 10-15 microRoentgens per hour (µR/hr). No readings above background were observed in ambient air [4-6].

START members Ackerman, Cardin, Danikas, and Mahany donned Level B personal protective equipment (PPE) and entered the building through the South Wing. START personnel monitored ambient air throughout the first floor, near drums, and in the walkways between the open vats in the processing lines. The sulfuric acid Dräger tube was placed near a vat labeled “10% Sulfuric Acid”. No readings above background were observed on any of the air monitoring instruments.

All other personnel conducted a site walk around the exterior of the building, observing entrances, a pile of fire extinguishers, and empty vats at the rear of the building.

START members Dupree, Ackerman, and Cardin, EPA OSC Barry, City of Lawrence and MassDEP personnel, and the property owner conducted a walk-through of the building to observe conditions and document containers, including processing vats, tanks, and drums. Per the HASP, non-intrusive activities could be conducted in Modified Level D PPE (hardhat, safety glasses, gloves, tyvek as needed, and booties) based on the air monitoring results.

Personnel conducted photodocumentation of the building and containers during the walk-through (see Appendix C, Photodocumentation Log).

There were three process lines of open vats and containers in the East Wing, where plating activities were conducted by submersing items in each vat along the process line. The North Vat Line consisted of a raised platform with 16 vats, and there were several drums located along the vat line and at the eastern end. The North Vat Line covered most of the length of the north wall.

Two vat lines, immediately adjacent to each other, were located on the south side of the East Wing (South Vat Lines 1 and 2). Each South Vat Line had approximately eight vats. A cluster of drums was located near the east end of the vat lines, and a large vat labeled “Acid Copper” was against the east wall.

A wastewater treatment line was located in the southwestern corner of the East Wing, with a vat labeled “pH Adjust” located on a wooden loft in the northwest corner. Several drums with Hazardous Waste labels (Cyanide Waste) were staged in the northwest corner of the room, at the west end of the North Vat Line.

A Storage Area was located at the east end of the East Wing. Several empty vats and a large number of small empty containers were observed in the Storage Area.

The West Wing contained a large batch treatment tank in the southeast corner, with several small vats nearby. The batch treatment tank contained Acid Copper solution that the owner pumped from the large leaking vat in the East Wing.

Personnel also observed several empty vats and drums in the middle and southwest corner of the West Wing. Four drums, labeled “unknown” by the owner, were noted near the middle of the room. Several drums with hand-written or manufacturer’s labels were located throughout the room.

Personnel proceeded to the second floor, via the stairs on the south side of the West Wing. The second floor shares a footprint with the West Wing, but only the western portion of the second floor was accessible. The western edge of the second floor was visibly damaged from fire, and the ceiling beams had been covered with thin plywood material. A single drum was observed in the northeast corner of the room, and was assumed to contain sulfuric acid, based on the legible portion of the label. The east room on the second floor contained no drums or vats. Personnel exited the building when the walk-through was completed.

START personnel Ackerman, Cardin, and Danikas entered the building in Level B PPE to collect samples from the four drums labeled “unknown” in the West Wing. START members Dupree and Mahany entered in Modified Level D PPE (Saranex, hardhat, booties) to conduct an inventory of the vats and containers in the East Wing.

Drum sampling personnel opened each drum, monitored the headspace with air monitoring instruments, and recorded the pH. Each “unknown” drum was assigned a number (D-1 through D-4). An 8-ounce (oz) jar of material was collected from each drum, using a glass drum thief, for laboratory analysis for metals and cyanide [7]. An aliquot of each sample would be removed for field screening with the Ahura FirstDefender® (FD) Raman Spectrometry instrument (Ahura). Sampling activities were performed in accordance with the site Sampling and Analysis Plan (SAP), which has been prepared by START as a separate document, entitled *Removal Program*

Site Sampling and Analysis Plan for the Hilton Chrome Preliminary Assessment/Site Investigation, Lawrence, Massachusetts.

Drum sampling personnel also opened the two drums labeled “rainwater” in the northwest corner of the West Wing, designated as D-5 and D-6. Headspace air monitoring results and pH were recorded. Drum D-5 had a pH of 14; based on the apparent discrepancy between the labeled contents and recorded pH, personnel collected an 8-oz jar for laboratory analysis and field screening.

Inventory personnel designated each vat and container in the East Wing with a number (example: V1). Personnel recorded the hand-written label, described the contents, and collected a pH reading for each container. Two open drums in the process lines were also assigned “V” numbers. Personnel began with the southernmost vat line, then proceeded north, then to the wastewater treatment line (see Appendix A, Figure 3). Inventory personnel also documented vats and open process-line drums in the West Wing. A total of 46 containers (V1 through V46) were labeled during the inventory (see Appendix B, Table 1).

START Chemist Mahany conducted field screening of the collected samples using the Ahura. Samples D-2, D-4, and D-5 could not be analyzed due to high fluorescence and/or weak molecular signal (see Appendix B, Table 2).

OSC Barry and SL Dupree conducted a second walk-through of the building to determine which containers samples would be collected from. A total of 22 containers were selected for sampling, including four of the nine drums labeled “Good Acid Copper Solution” in the West Wing.

On 26 January 2012, START members Dupree, Danikas, and Mahany, OSC Barry, and OSC Dan Burgo mobilized to the site to conduct sampling of the containers selected the previous day. A Tailgate Health and Safety meeting was conducted. Topics included low lighting, structural stability, and chemical safety.

START personnel entered the building in Level C PPE to collect samples for Ahura field screening from four of the “Good Acid Copper Solution” drums, and from rainwater drum D-6. Based on air monitoring readings from 25 January, it was determined that Level C was appropriate, since the drums were labeled. Personnel also used pH paper, and recorded the pH of each drum. Personnel labeled the “Good Acid Copper Solution” drums as D-7 through D-15, and collected Ahura samples from odd-number drums D-7 through D-13. An 8-oz jar was also collected from “Good Acid Copper Solution” drum D-11 for laboratory analysis (see Appendix D, Chain-of-Custody Record).

START members Dupree and Danikas collected aliquots from 17 vats and containers for Ahura field screening. START Chemist Mahany analyzed the samples using the Ahura (see Appendix B, Table 2). OSC Barry selected several containers for laboratory analysis, including materials which the Ahura could not match to any item in its library, or that could not be analyzed by the Ahura due to high fluorescence and/or low molecular signal. Ahura reports can be found in Appendix E.

A total of 11 samples were prepared for laboratory analysis for metals and cyanide. The samples were relinquished to OSC Barry for hand delivery to the EPA Office of Environmental Measurement and Evaluation (OEME) in North Chelmsford, MA (see Appendix D).

Analytical Data Summary

On 15 February 2012, START received analytical results from OEME. Four metals (barium, chromium, lead, and silver) were detected in the samples submitted for analysis [8]. Cyanide was detected in 10 of the 11 samples, with a maximum concentration of 81,000 milligrams per kilogram (mg/Kg) [9]. A summary of laboratory results can be found in Appendix B, Table 3. Laboratory reports can be found in Appendix F.

REFERENCES

- [1] U.S. Geological Survey (USGS). 1987. Lawrence, Massachusetts. (7.5-minute series topographic map).
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- [8] U.S. Environmental Protection Agency. 8 February 2012. Office of Environmental Measurement and Evaluation. Laboratory Report. Project No. 12010029. [Hilton Chrome- Lawrence, MA – Metals by XRF].
- [9] U.S. Environmental Protection Agency. 13 February 2012. Office of Environmental Measurement and Evaluation. Laboratory Report. Project No. 12010029. [Hilton Chrome- Lawrence, MA – Total Cyanide in Product].

III. Appendices

Appendix A

Figures

Figure 1 – Site Location Map

Figure 2 – Site Map

Figure 3 – Building Diagram and Inventory Map

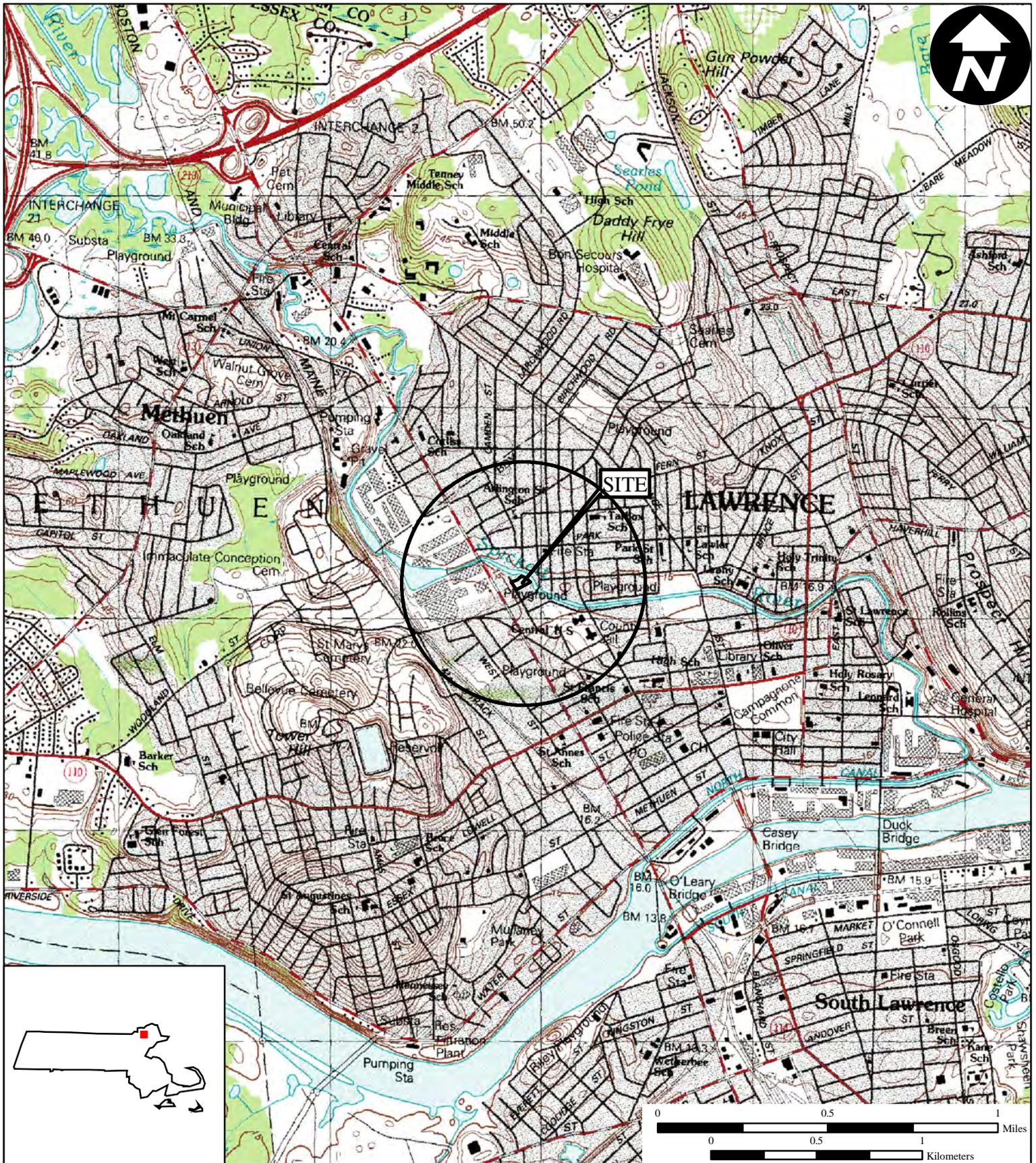


Figure 1

Site Location Map

Hilton Chrome
75 Holly Street
Lawrence, Massachusetts

EPA Region I
Superfund Technical Assessment and
Response Team (START) III
Contract No. EP-W-05-042

TDD Number: 12-01-0001
Created by: C. Dupree
Created on: 23 January 2012
Modified by: C. Dupree
Modified on: 23 January 2012

Data Sources:

Topos: MicroPath/USGS Quadrangle Name(s):
 Lawrence, MA
 All other data: START





Figure 2

Site Map

**Hilton Chrome
75 Holly Street
Lawrence, Massachusetts**

**EPA Region I
Superfund Technical Assessment and
Response Team (START) III
Contract No. EP-W-05-042**

TDD Number: 12-01-0001
Created by: C. Dupree
Created on: 23 January 2012
Modified by: C. Dupree
Modified on: 23 January 2012

LEGEND

 Site Boundary



0 25 50 100 150
Feet

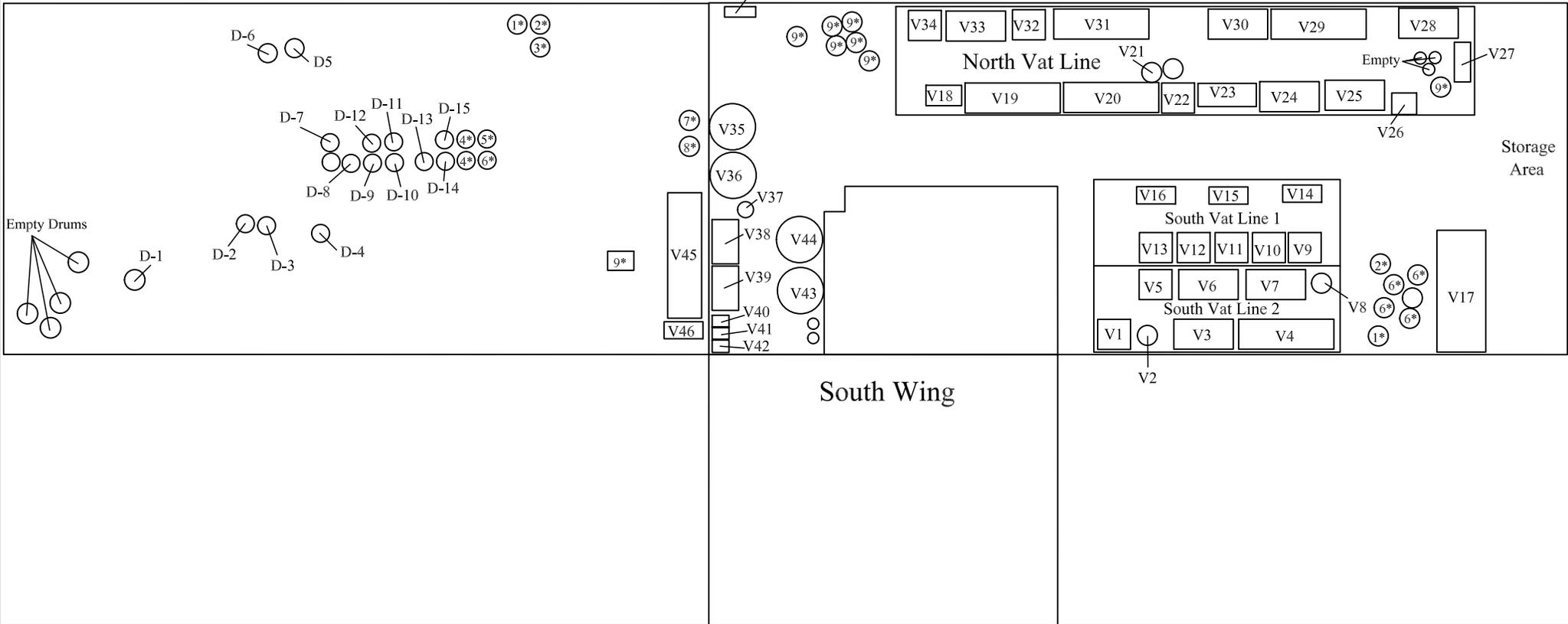
Data Sources:

Imagery: Bing Maps
Tops: None
All other data: START



West Wing

East Wing



LEGEND

FIGURE NOT TO SCALE

○ or □ Drum or Vat

- 1* = Sodium Hydroxide
- 2* = Aquaease
- 3* = Sodium Hyperchlorite
- 4* = Sulfuric Acid
- 5* = Nitric Acid
- 6* = Hydrochloric/Muriatic Acid
- 7* = Polymer
- 8* = Sodium Bisulfate
- 9* = Cyanide Waste



Figure 3

Building Diagram and Inventory Map

**Hilton Chrome
75 Holly Street
Lawrence, Massachusetts**

**EPA Region I
Superfund Technical Assessment
and Response Team (START) III
Contract No. EP-W-05-042**

TDD Number: 12-01-0001
Created By: C. Dupree
Created On: 31 January 2012
Modified By: C. Dupree
Modified On: 22 February 2012

Data Sources:
All data: START



Appendix B

Tables

Table 1	Container Inventory
Table 2	Ahura FirstDefender® Results
Table 3	Metals and Cyanide Results Summary

Table 1

**Container Inventory
Hilton Chrome
Lawrence, Massachusetts**

Container No.	Container Type	Contents¹	Size^{2,3}	Location	pH⁴	Ahura Sample⁵ (Scan No.)	Lab Sample⁶ (Sample No.)
D-1	Drum	Unknown	55 gal Poly	W room, SW corner	1	Y (006)	Y (0001)
D-2	Drum	Unknown	55 gal Poly	W room, south center	7	Y	Y (0002)
D-3	Drum	Unknown	55 gal Poly	W room, south center	1	Y (007)	Y (0003)
D-4	Drum	Unknown sludge	55 gal Poly	W room, south center	--	Y	Y (0004)
D-5	Drum	Rainwater	55 gal Poly	W room, NW corner	14	Y	Y (0005)
D-6	Drum	Rainwater	55 gal Poly	W room, NW corner	7	Y	
D-7	Drum	Good Acid Copper Solution	55 gal Poly	W room, center pallets	0-1	Y	
D-8	Drum	Good Acid Copper Solution	55 gal Poly	W room, center pallets	0-1		
D-9	Drum	Good Acid Copper Solution	55 gal Poly	W room, center pallets	0-1	Y	
D-10	Drum	Good Acid Copper Solution	55 gal Poly	W room, center pallets	0-1		
D-11	Drum	Good Acid Copper Solution	55 gal Poly	W room, center pallets	0-1	Y	Y (0006)
D-12	Drum	Good Acid Copper Solution	55 gal Poly	W room, center pallets	0-1		
D-13	Drum	Good Acid Copper Solution	55 gal Poly	W room, center pallets	0-1	Y (009)	
D-14	Drum	Good Acid Copper Solution	55 gal Poly	W room, center pallets	0-1		
D-15	Drum	Good Acid Copper Solution	55 gal Poly	W room, center pallets	0-1		
V8	Drum	Aluminum Zincate	½ 55 gal Poly	E room, S Vat Line 2	13	Y	Y (0007)
V21	Drum	1% Hydrochloric Acid	55 gal Poly	E room, N Vat Line	2	Y	
V37	Drum	Sludge Tank	< 55 gal (55 gal Poly)	Wastewater Treatment	7		
--	Drum	Nitric Acid	55 gal Steel	W room, center pallets	--		
--	Drum	Muriatic Acid	55 gal Poly	W room, center pallets	--		
--	Drum	Sulfuric Acid	55 gal Poly	W room, center pallets	--		
--	Drum	Sulfuric Acid	55 gal Poly	W room, center pallets	--		
--	Drum	Sulfuric Acid- Electrostrip	55 gal Poly	W room, center pallets	--		
--	Drum	Sodium Hydroxide	55 gal Poly	W room, NE corner	--		
--	Drum	Aquaease	55 gal Poly	W room, NE corner	--		

Table 1

**Container Inventory
Hilton Chrome
Lawrence, Massachusetts**

Container No.	Container Type	Contents ¹	Size ^{2,3}	Location	pH ⁴	Ahura Sample ⁵ (Scan No.)	Lab Sample ⁶ (Sample No.)
--	Drum	Sodium Hypochlorite	55 gal Poly	W room, NE corner	--		
--	Drum	Polymer	55 gal Poly	W room, E wall	5		
--	Drum	Sodium Bisulfate (dried/crystallized)	55 gal Poly	W room, E wall	--		
--	Drum	Sulfuric Acid	55 gal Poly	2nd floor, W room	--		
--	Drum	Sodium Hydroxide 10%	15 gal Poly	Wastewater Treatment	14		
--	Drum	Sulfuric Acid 10%	15 gal Poly	Wastewater Treatment	0		
--	Drum	Muriatic Acid 20%	55 gal Poly	E room, SE corner	--		
--	Drum	Muriatic Acid 20%	55 gal Poly	E room, SE corner	--		
--	Drum	Muriatic Acid 20%	55 gal Poly	E room, SE corner	--		
--	Drum	Muriatic Acid 20%	55 gal Poly	E room, SE corner	--		
--	Drum	Aquaease	55 gal Poly	E room, SE corner	--		
--	Drum	Caustic Soda Liquid 50%	55 gal Poly	E room, SE corner	--		
--	Drum	Hazardous Waste- Cyanide Waste (Green liquid and crystals)	< 10 gal (55 gal Poly)	E room, N Vat Line	11		
--	Drum	Nickel Anode Bags (debris in container)	(55 gal)	E room, N Vat Line	--		
--	Drum	Copper Cyanide (empty)	(10 gal)	E room, N Vat Line	--		
--	Drum	Sodium Cyanide (empty)	(15 gal)	E room, N Vat Line	--		
V1	Vat	Nickel Strike	< 135 gal	E room, S Vat Line 2	5		
V2	Vat	Nitric Acid Rack Strip (covered)	< 35 gal	E room, S Vat Line 2	1		
V3	Vat	Nitric Acid Rack Strip	< 400 gal	E room, S Vat Line 2	0	Y	
V4	Vat	10% Sulfuric Acid	< 535 gal	E room, S Vat Line 2	1	Y (012)	
V5	Vat	Acid Dragout	< 135 gal	E room, S Vat Line 2	1		
V6	Vat	Nitric Acid Rack Strip Drag	< 400 gal split ⁷	E room, S Vat Line 2	1	Y	
V7	Vat	Nitric Acid Rack Strip	< 400 gal	E room, S Vat Line 2	0	Y (013)	
V9	Vat	Aluminum Soap (dried/crystallized)	< 1/2 full	E room, S Vat Line 1	--		
V10	Vat	Aluminum Soap Drag	< 1/2 full	E room, S Vat Line 1	4		
V11	Vat	Aluminum Etch GHF (crystallized/frozen)	< 1/2 full	E room, S Vat Line 1	--		

Table 1

**Container Inventory
Hilton Chrome
Lawrence, Massachusetts**

Container No.	Container Type	Contents ¹	Size ^{2,3}	Location	pH ⁴	Ahura Sample ⁵ (Scan No.)	Lab Sample ⁶ (Sample No.)
V12	Vat	Aluminum Etch Drag (frozen)	< 70 gal (½ full)	E room, S Vat Line 1	4		
V13	Vat	Aluminum... (illegible)	< 65 gal (⅓ full)	E room, S Vat Line 1	1	Y (014)	
V14	Vat	Acid Rinse	< 135 gal	E room, S Vat Line 1	2		
V15	Vat	(unlabeled) Dry/Empty		E room, S Vat Line 1	--		
V16	Vat	Hot Water (frozen)	< 135 gal	E room, S Vat Line 1	5		
V17	Vat	Acid Copper (blue, some crystallization)	(3500 gal)	E room, SE corner	1		
V18	Vat	Soak Cleaner, Aquaease 917L	< 135 gal	E room, N Vat Line	14		
V19	Vat	Aquaease 917L, Soak Cleaner	< 535 gal	E room, N Vat Line	13	Y (017)	Y (0008)
V20	Vat	Electrocleaner, Aquaease E-159	< 400 gal	E room, N Vat Line	13		
V22	Vat	Cleaner Rinse	< 400 gal	E room, N Vat Line	11		
V23	Vat	Hydrochloric Acid 20%	< 270 gal	E room, N Vat Line	0	Y	
V24	Vat	Acid Rinse (frozen)	< 400 gal	E room, N Vat Line	--		
V25	Vat	Hydrochloric Acid 30%	< 270 gal	E room, N Vat Line	0	Y	
V26	Vat	Hazardous Waste- Cyanide Waste (crystals, colors vary)	< 1/2 full	E room, N Vat Line	--	Y (011)	
V27	Vat	Cyanide Drag	< 180 gal	E room, N Vat Line	11		
V28	Vat	Cyanide Copper Strike	< 400 gal	E room, N Vat Line	10	Y (016)	Y (0009)
V29	Vat	Bright Acid Nickel	< 535 gal	E room, N Vat Line	5	Y (015)	Y (0010)
V30	Vat	Nickel Drag	< 400 gal	E room, N Vat Line	6		
V31	Vat	Chrome	< 400 gal	E room, N Vat Line	1	Y (010)	
V32	Vat	Chrome Drag	< 135 gal	E room, N Vat Line	1		
V33	Vat	Chrome Drag	< 400 gal split ⁷	E room, N Vat Line	2		
V34	Vat	Hot Water (frozen)	< 135 gal	E room, N Vat Line	5		
V35	Vat	Chrome Destruct I	< 375 gal	Wastewater Treatment	4	Y	
V36	Vat	Settling Tank (unreachable for sampling)	< 460 gal	Wastewater Treatment	8*		
V38	Vat	Cyanide I Destruct	< 540 gal	Wastewater Treatment	11		
V39	Vat	Cyanide 2 Destruct (frozen)	< 135 gal (<⅓ full)	Wastewater Treatment	--		

Table 1

**Container Inventory
Hilton Chrome
Lawrence, Massachusetts**

Container No.	Container Type	Contents ¹	Size ^{2,3}	Location	pH ⁴	Ahura Sample ⁵ (Scan No.)	Lab Sample ⁶ (Sample No.)
V40	Vat	Cyanide Rinse (inset into floor)		Wastewater Treatment	11	Y	
V41	Vat	Acid Alkaline Rinse Water Sump (inset into floor)		Wastewater Treatment	4		
V42	Vat	Final Treated Rinsewater (inset into floor)		Wastewater Treatment	5		
V43	Vat	Cyanide Rinse Water	< 15,000 gal	Wastewater Treatment	--		
V44	Vat	Acid Alkaline Holding Tank	< 15,000 gal	Wastewater Treatment	--		
V45	Vat	Batch Treatment Tank (Acid Copper from V17)	< 3,500 gal	W room, SE corner	1	Y	Y (0011)
V46	Vat	Acid Holding Tank	< 270 gal	W room, SE corner	4		
--	Vat	pH Adjust	< 375 gal	E room, NW loft	--		
--	Vat	Hazardous Waste- Chrome Tank Sludge	< 135 gal	W room, SE corner	--		

gal = gallon < = Less than No. = Number % = percent Poly = Polyethylene Y = Yes, i.e., sample analyzed
 N = North NE = Northeast NW = Northwest S = South SW = Southwest SE = Southeast E = East W = West

- 1: Most containers were labeled with a hand-written Right-to-Know sticker, applied by the business owner. A portion of drums (muriatic, sulfuric, and nitric acids) also had the original manufacturer's label.
- 2: For drums, the approximate volume of the drum is listed; drums known to be empty or partially full have the drum volume in parentheses.
- 3: For vats, the approximate volume of the vat was calculated from the exterior dimension, based on the observed depth or dimension of material in the vat. The '<' symbol indicates that the size or material volume was estimated.
- 4: pH values were collected using pH paper during the sampling and inventory.
- 5: An aliquot of material was collected for analysis on the Ahura FirstDefender® (FD) Raman Laser Spectrometer. [Value in parentheses is AhuraScan No., with the prefix Hilton Chrome- Scan(0##); absence of parenthesized value indicates that the Ahura could not analyze the sample.]
- 6: An 8-ounce jar of material was collected (at the discretion of the OSC) for laboratory analysis for metals and cyanide. [Value in parentheses is the assigned sample number, listed on the Chain of Custody, with the prefix R01-120125MB-(00##).]
- 7: The vat was a divided container, with a full or partial wall through the center of the vat, dividing the length.
- * pH was collected from the drip-pipe extending from V36 to V37 (drum).
- = The container was not assigned a number, or pH was not recorded.

Table 2

**Ahura FirstDefender Results
Hilton Chrome
Lawrence, Massachusetts**

Scan No.	Container No.	Results*	Description
006	D-1	96% Mixture ¹ : 73% Sulfuric Acid (10%2) 20% Cluster of: Epsom Salt and Magnesium sulfate heptahydrate 3% Lead(II) sulfate	Light blue liquid
--	D-2	--	Clear liquid
007	D-3	71% Mixture ¹ : 37% Cluster of: Nitric Acid (7%2); Lanthanum(III) nitrate hexahydrate; Gallium (III) nitrate; Manganese(II) nitrate solution; Beryllium nitrate solution; Ammonium nitrate (Sat. solution); Ammonium nitrate (50% sat. sol.); 23% Lead(II) fluoride 7% Glass, borosilicate 3% Bleach, regular 1% Nitric Acid	Clear liquid
--	D-4	--	Brown solid/sludge
--	D-5	--	Clear liquid
--	D-6	--	Clear liquid
--	D-7	--	Light green liquid
--	D-9	--	Light blue liquid
--	D-11	--	Light blue liquid
009	D-13	25% Ammonium nitrate 21% Nitric acid 12% Beryllium nitrate solution 11% Gallium (III) nitrate 8% Lead(II) nitrate 7% Manganese(II) nitrate solution 3% Cesium nitrate 3% Silver nitrate	Light green liquid

Table 2**Ahura FirstDefender Results
Hilton Chrome
Lawrence, Massachusetts**

Scan No.	Container No.	Results*	Description
010	V31	84% Mixture ¹ : 70% Ammonium dichromate 9% Pyrrolidine 3% Ethyl isocyanatoacetate 1% 2,2-Dichloropropane	Dark amber liquid
--	V35	--	Clear liquid with red precipitate
--	V45	--	Light blue liquid
011	V26	87% Mixture ¹ : 72% Strontium carbonate 16% Bismuth(III) carbonate basic	Light amber solid/crystals
--	V3	--	Green liquid
012	V4	Sulfuric acid (10% ²)	Light green liquid
--	V6	--	Light green liquid
013	V7	26% Ammonium nitrate 24% Nitric acid 12% Beryllium nitrate solution 11% Gallium (III) nitrate 7% Manganese(II) nitrate solution 6% Lead(II) nitrate 3% Cesium nitrate 3% Silver nitrate	Green liquid
014	V13	88% Mixture ¹ : 74% Sulfuric acid (10% ²) 8% Cluster of: Epsom salt and Magnesium sulfate heptahydrate 7% Nitric acid	Light yellow liquid

Table 2

**Ahura FirstDefender Results
Hilton Chrome
Lawrence, Massachusetts**

Scan No.	Container No.	Results*	Description
--	V21	--	Clear liquid
--	V23	--	Clear liquid
--	V25	--	Light yellow liquid
015	V29	No positive match ³	Green liquid
016	V28	No match found ⁴	Light yellow liquid
017	V19	No positive match ⁵	Cloudy light yellow liquid
--	V8	--	Amber liquid
--	V40	--	Amber liquid

All samples were analyzed in 4-milliliter vials, and analyzed with an Ahura FirstDefender® (FD) FD5654 Raman Laser spectrometer. The Ahura FD compared Spectrometric results with an internal library of compounds based on the molecular signal.

No. = Number.

-- = Sample not analyzed due to high fluorescence.

Sat. = Saturated.

D-# = Drum; number assigned during inventory and sampling.

Sol. = Solution.

V# = Vat; number assigned during inventory and sampling.

% = Percentage

*: If the percentage (%) is listed before a compound, the percentage is the probability of the compound being present, not the concentration of the compound.

1: The measured data could not be identified by a single library item. The components listed account for the approximate total percentage of identifiable compounds. Component percentages are based on the amount of molecular signal recorded by the instrument.

2: Percentage in parentheses is the concentration of the component (i.e. 50% of the sample is a 10% solution of nitric acid).

3: No positive match was found in the library (fluorescence interference). Item with similar features: Ammonium cobalt(II) sulfate hexahydrate.

4: No match was found in the instrument library.

5: No positive match was found in the library (low molecular signal). Items with similar features: Bismuth(III) carbonate basic; Lithium nitrate; Potassium carbonate.

Table 3
Metals and Cyanide Results Summary
Hilton Chrome
Lawrence, Massachusetts
mg/Kg

Container No.	Sample No.	Barium	Chromium	Lead	Silver	Cyanide
D-1	*0001	ND	100	ND	ND	0.07
D-2	*0002	ND	ND	ND	ND	0.15
D-3	*0003	ND	ND	ND	ND	0.89
D-4	*0004	53	76	45	47	21,000
D-5	*0005	ND	ND	ND	ND	1.8
D-11	*0006	ND	ND	ND	ND	0.45
V8	*0007	ND	ND	ND	ND	0.98
V19	*0008	ND	ND	82	ND	1.1
V28	*0009	ND	ND	ND	ND	81,000
V29	*0010	ND	ND	ND	ND	ND
V45	*0011	ND	ND	ND	ND	3.1

All Results were reported in milligrams per Kilogram (mg/Kg); equivalent to parts per million (ppm).

No. = Number

* Sample Numbers are prefixed by R01-120125MB- on the Chain-of-Custody Record.

All samples were analyzed by the EPA Office of Environmental Measurement and Evaluation Laboratory.

Metals were analyzed via X-Ray Fluorescence, EPA Method EIASOP-INGXRF2.

Cyanide was analyzed by the Lachat Method, EPA Method EIASOP-INGCN12.

ND = Non-Detect.

Appendix C

Photodocumentation Log

PHOTOGRAPHY LOG SHEET
Hilton Chrome • Lawrence, Massachusetts



SCENE: View of the sulfuric acid tank in the East Wing, sitting at an angle due to eroded tank supports.

DATE: 1 December 2011

TIME: 1141 hours

PHOTOGRAPHER: V. Fonkem

CAMERA: Canon A1100



SCENE: View of the wastewater processing line in the southwest corner of the East Wing.

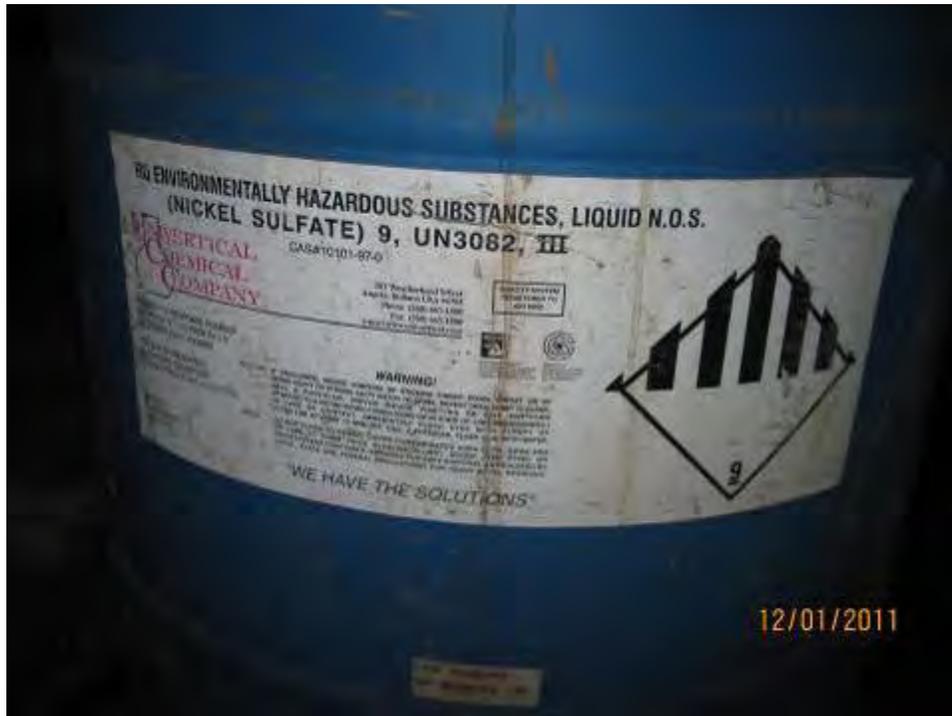
DATE: 1 December 2011

TIME: 1214 hours

PHOTOGRAPHER: V. Fonkem

CAMERA: Canon A1100

PHOTOGRAPHY LOG SHEET
Hilton Chrome • Lawrence, Massachusetts



SCENE: View of a drum with a manufacturer's label indicating nickel sulfate.

DATE: 1 December 2011

TIME: 1517 hours

PHOTOGRAPHER: V. Fonkem

CAMERA: Canon A1100



SCENE: View of debris, automobile parts, and empty vats at the rear of the building. Photograph taken facing southeast.

DATE: 25 January 2012

TIME: 1025 hours

PHOTOGRAPHER: C. Dupree

CAMERA: Samsung SL605

PHOTOGRAPHY LOG SHEET
Hilton Chrome • Lawrence, Massachusetts



SCENE: View of the north side of the building, and the access path (owned by the northern adjacent property). Photograph taken facing northeast.

DATE: 25 January 2012

PHOTOGRAPHER: C. Dupree

TIME: 1026 hours

CAMERA: Samsung SL605



SCENE: View of empty containers and vats stored in the East Wing of the building.

DATE: 25 January 2012

PHOTOGRAPHER: C. Dupree

TIME: 1205 hours

CAMERA: Samsung SL605

PHOTOGRAPHY LOG SHEET
Hilton Chrome • Lawrence, Massachusetts



SCENE: View of empty containers and vats stored in the East Wing of the building.

DATE: 25 January 2012
PHOTOGRAPHER: C. Dupree

TIME: 1205 hours
CAMERA: Samsung SL605

TOP



SCENE: View of a vat labeled "Aquaese 917L", located at the western end of the North Vat Line.

DATE: 25 January 2012
PHOTOGRAPHER: C. Dupree

TIME: 1206 hours
CAMERA: Samsung SL605

PHOTOGRAPHY LOG SHEET
Hilton Chrome • Lawrence, Massachusetts



SCENE: View of the North Vat Line from the western end of the line.

DATE: 25 January 2012

PHOTOGRAPHER: C. Dupree

TIME: 1207 hours

CAMERA: Samsung SL605



SCENE: View of the wastewater treatment line, in the southwest corner of the East Wing.

DATE: 25 January 2012

PHOTOGRAPHER: C. Dupree

TIME: 1207 hours

CAMERA: Samsung SL605

PHOTOGRAPHY LOG SHEET
Hilton Chrome • Lawrence, Massachusetts



SCENE: View of two drums in the batch processing line, on the east wall of the West Wing. Containers are labeled as “Polymer” (left) and “Sodium Bisulfate” (right).

DATE: 25 January 2012

PHOTOGRAPHER: C. Dupree

TIME: 1208 hours

CAMERA: Samsung SL605



SCENE: View of staged drums in the West Wing.

DATE: 25 January 2012

PHOTOGRAPHER: C. Dupree

TIME: 1209 hours

CAMERA: Samsung SL605

PHOTOGRAPHY LOG SHEET
Hilton Chrome • Lawrence, Massachusetts



SCENE: View of the fire damage in the west end of the second floor.

DATE: 25 January 2012

PHOTOGRAPHER: C. Dupree

TIME: 1213 hours

CAMERA: Samsung SL605



SCENE: View of an unlabeled vat and partially labeled drum on the second floor.

DATE: 25 January 2012

PHOTOGRAPHER: C. Dupree

TIME: 1213 hours

CAMERA: Samsung SL605

PHOTOGRAPHY LOG SHEET
Hilton Chrome • Lawrence, Massachusetts

TOP



SCENE: View of an open drum labeled “1% Hydrochloric Acid” located toward the center of the North Vat Line, in the East Wing.

DATE: 25 January 2012

PHOTOGRAPHER: C. Dupree

TIME: 1227 hours

CAMERA: Samsung SL605



SCENE: View of containers staged at the east end of the North Vat Line; the blue drum on the right is labeled “Cyanide Waste”; the remainder contained debris or were empty.

DATE: 25 January 2012

PHOTOGRAPHER: C. Dupree

TIME: 1228 hours

CAMERA: Samsung SL605

PHOTOGRAPHY LOG SHEET
Hilton Chrome • Lawrence, Massachusetts



SCENE: View of South Vat Line 1, from the east end of the line.

DATE: 25 January 2012
PHOTOGRAPHER: C. Dupree

TIME: 1229 hours
CAMERA: Samsung SL605



SCENE: View of the South Vat Lines: South Vat Line 1 (foreground) and South Vat Line 2 (background).

DATE: 25 January 2012
PHOTOGRAPHER: C. Dupree

TIME: 1232 hours
CAMERA: Samsung SL605

PHOTOGRAPHY LOG SHEET
Hilton Chrome • Lawrence, Massachusetts



SCENE: View of South Vat Line 1, from the west end of the line.

DATE: 25 January 2012
PHOTOGRAPHER: C. Dupree

TIME: 1232 hours
CAMERA: Samsung SL605



SCENE: View of the drums located at the east end of the South Vat Lines.

DATE: 25 January 2012
PHOTOGRAPHER: C. Dupree

TIME: 1232 hours
CAMERA: Samsung SL605

PHOTOGRAPHY LOG SHEET
Hilton Chrome • Lawrence, Massachusetts



SCENE: View of the southernmost vat line (South Vat Line 2), with the tilted Sulfuric Acid vat on the right.

DATE: 25 January 2012

TIME: 1517 hours

PHOTOGRAPHER: C. Dupree

CAMERA: Samsung SL605



SCENE: View of the contents of V26, located at the east end of the North Vat Line, labeled "Cyanide Waste"

DATE: 25 January 2012

TIME: 1520 hours

PHOTOGRAPHER: C. Dupree

CAMERA: Samsung SL605

PHOTOGRAPHY LOG SHEET
Hilton Chrome • Lawrence, Massachusetts



SCENE: View of the North Vat Line, from the east end of the line.

DATE: 25 January 2012

PHOTOGRAPHER: C. Dupree

TIME: 1521 hours

CAMERA: Samsung SL605



SCENE: View of blue crystals forming in vat V29, labeled "Bright Acid Nickel".

DATE: 25 January 2012

PHOTOGRAPHER: C. Dupree

TIME: 1521 hours

CAMERA: Samsung SL605

PHOTOGRAPHY LOG SHEET
Hilton Chrome • Lawrence, Massachusetts



SCENE: View of two drums at the south end of the wastewater treatment line, labeled “10% Sodium Hydroxide” and “10% Sulfuric Acid”.

DATE: 25 January 2012

PHOTOGRAPHER: C. Dupree

TIME: 1522 hours

CAMERA: Samsung SL605



SCENE: View of drums in the northeast corner of the West Wing.

DATE: 25 January 2012

PHOTOGRAPHER: C. Dupree

TIME: 1523 hours

CAMERA: Samsung SL605

PHOTOGRAPHY LOG SHEET
Hilton Chrome • Lawrence, Massachusetts



SCENE: View of drums staged in the center of the West Wing.

DATE: 25 January 2012

PHOTOGRAPHER: C. Dupree

TIME: 1523 hours

CAMERA: Samsung SL605



SCENE: View of drums D-3 and D-4, located near the center of the West Wing.

DATE: 25 January 2012

PHOTOGRAPHER: C. Dupree

TIME: 1525 hours

CAMERA: Samsung SL605

PHOTOGRAPHY LOG SHEET
Hilton Chrome • Lawrence, Massachusetts



SCENE: View of drums D-5 and D-6, labeled “rainwater”, located in the northwest corner of the West Wing.

DATE: 25 January 2012

TIME: 1525 hours

PHOTOGRAPHER: C. Dupree

CAMERA: Samsung SL605



SCENE: View of drum D-2, located near the center of the West Wing.

DATE: 25 January 2012

TIME: 1525 hours

PHOTOGRAPHER: C. Dupree

CAMERA: Samsung SL605

PHOTOGRAPHY LOG SHEET
Hilton Chrome • Lawrence, Massachusetts



SCENE: View of drum D-1, located in the southwest corner of the West Wing.

DATE: 25 January 2012

TIME: 1525 hours

PHOTOGRAPHER: C. Dupree

CAMERA: Samsung SL605



SCENE: View of drum D-1 and other drums in the southwest corner of the West Wing.

DATE: 25 January 2012

TIME: 1526 hours

PHOTOGRAPHER: C. Dupree

CAMERA: Samsung SL605

PHOTOGRAPHY LOG SHEET
Hilton Chrome • Lawrence, Massachusetts



SCENE: View of drums staged in the center of the West Wing.

DATE: 25 January 2012

PHOTOGRAPHER: C. Dupree

TIME: 1526 hours

CAMERA: Samsung SL605

TOP



SCENE: View of the cyanide storage cabinet, located under the loft on the west end of the East Wing.

DATE: 25 January 2012

PHOTOGRAPHER: C. Dupree

TIME: 1527 hours

CAMERA: Samsung SL605

PHOTOGRAPHY LOG SHEET
Hilton Chrome • Lawrence, Massachusetts



SCENE: View of hazardous waste drums labeled "Cyanide Waste", staged at the west end of the North Vat Line, in the East Wing.

DATE: 25 January 2012

PHOTOGRAPHER: C. Dupree

TIME: 1527 hours

CAMERA: Samsung SL605



SCENE: View of the East Wing, including the North Vat Line (right) and the South Vat Lines (left).

DATE: 25 January 2012

PHOTOGRAPHER: C. Dupree

TIME: 1528 hours

CAMERA: Samsung SL605

PHOTOGRAPHY LOG SHEET
Hilton Chrome • Lawrence, Massachusetts

TOP



SCENE: View of yellow crystals forming on a support column in the West Wing.

DATE: 26 January 2012

PHOTOGRAPHER: C. Dupree

TIME: 0922 hours

CAMERA: Samsung SL605

Appendix D

Chain-of-Custody Record

Appendix E

Ahura Field Screening Reports

Mixture (96%)	
Sulfuric acid (10%)	73%
Cluster of 2 Items	20%
Epsom Salt	
Magnesium sulfate heptahydrate	
Lead(II) sulfate	3%

The measured data cannot be adequately described by a single library item, but a mixture of the items shown accounts for 96% of the data. Values shown are the amount of molecular signal that can be described by each item.

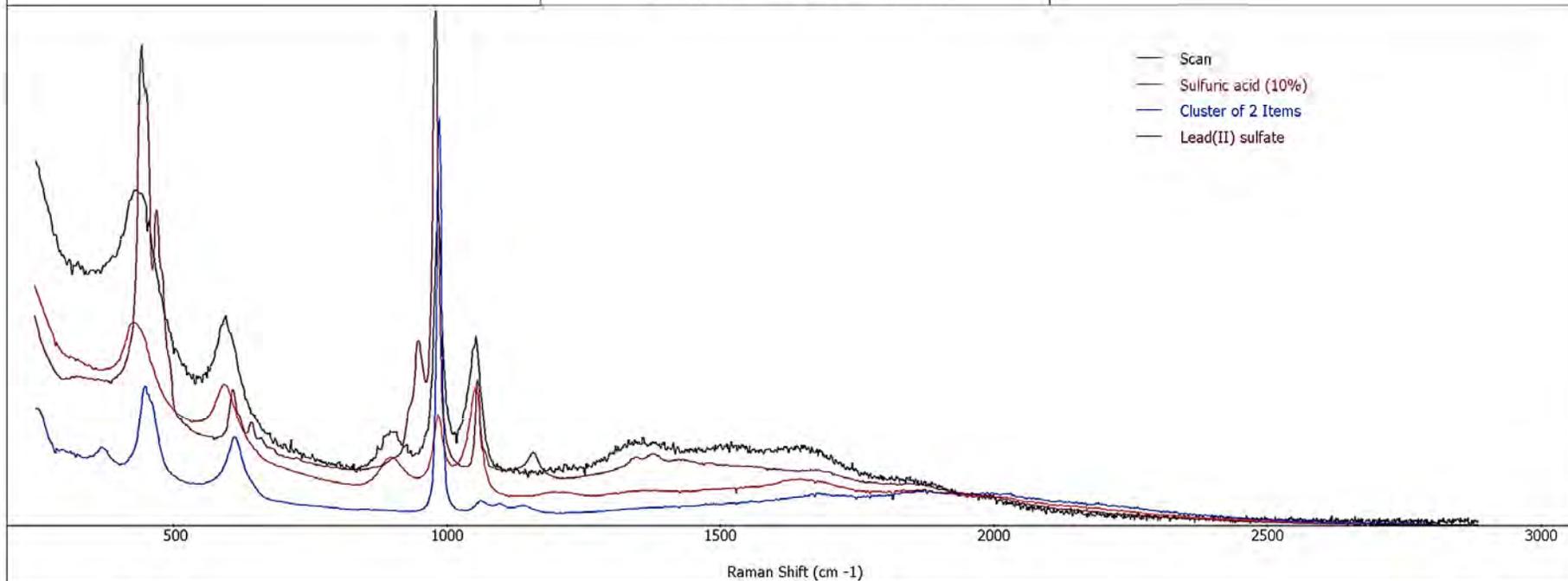
All results should be verified using other methods or techniques

Ahura Scientific



FirstDefender FD5654

Mode:	Auto, Vial Holder
Power Setting:	High
Laser Status:	Pass
CCD Status:	Pass
Calibration:	Pass
Last Checked:	1/25/2012 5:24 PM
Scan Warnings:	None



Mixture (71%)	
Cluster of 7 Items	37%
Nitric acid; 7%	
Lanthanum(III) nitrate hexahydrate	
Gallium (III) nitrate	
Manganese(II) nitrate solution	
Beryllium nitrate solution	
Ammonium nitrate, Sat. sol.	
Ammonium nitrate, 50% sat. sol.	
Lead(II) fluoride	23%
Glass, borosilicate	7%
Bleach, regular	3%
Nitric acid	1%

The measured data cannot be adequately described by a single library item, but a mixture of the items shown accounts for 71% of the data. Values shown are the amount of molecular signal that can be described by each item.

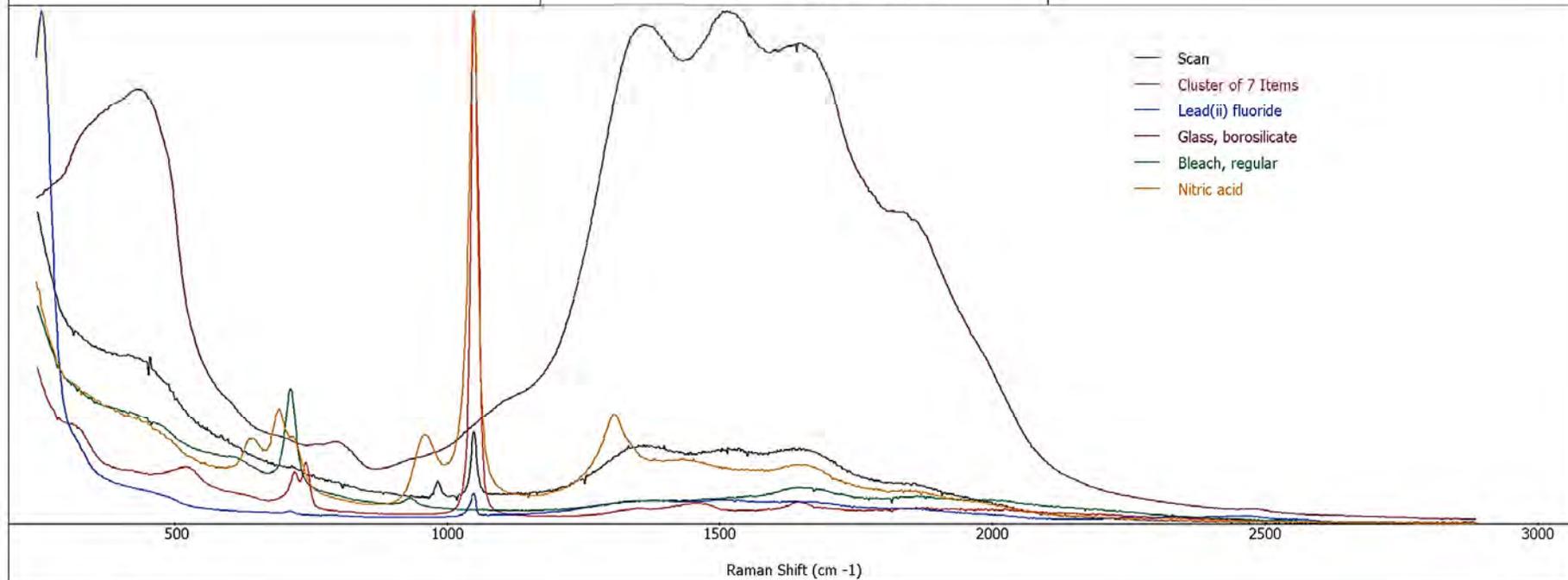
All results should be verified using other methods or techniques

Ahura Scientific



FirstDefender FD5654

Mode:	Auto, Vial Holder
Power Setting:	High
Laser Status:	Pass
CCD Status:	Pass
Calibration:	Pass
Last Checked:	1/25/2012 6:02 PM
Scan Warnings:	None



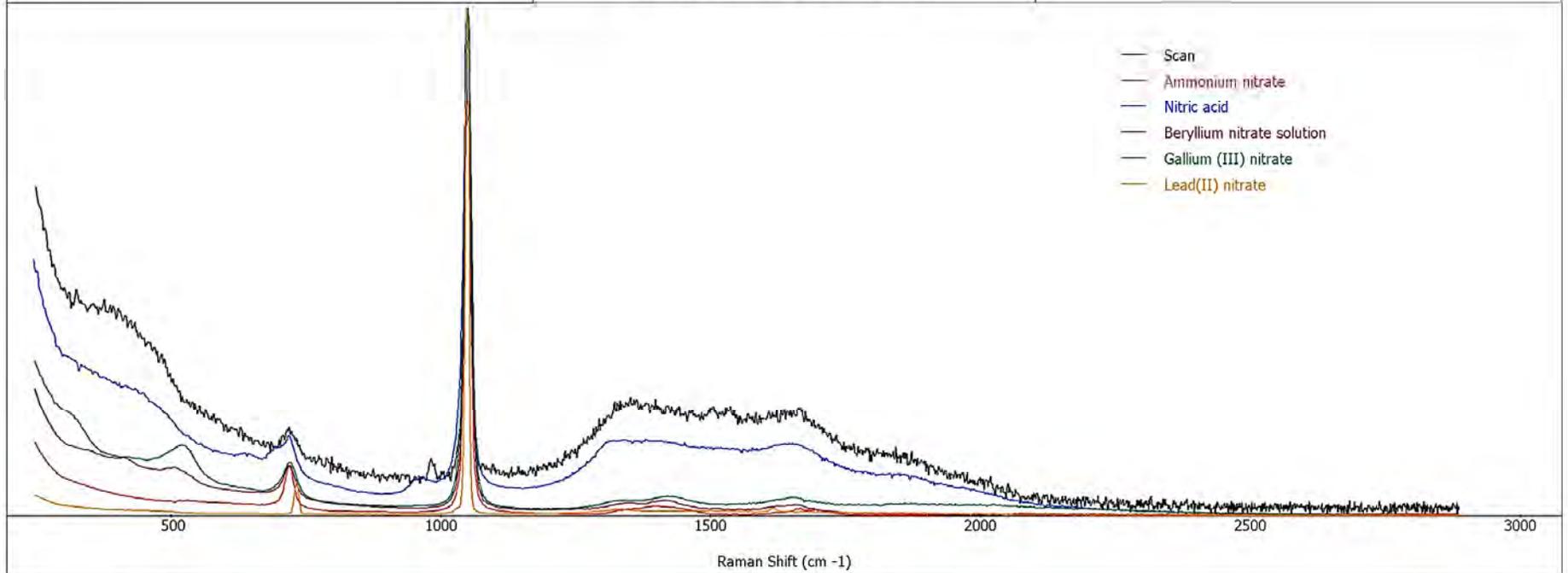


Mode: Auto, Vial Holder
 Power Setting: High
 Laser Status: Pass
 CCD Status: Pass
 Calibration: Pass
 Last Checked: 1/26/2012 12:02 PM
 Scan Warnings: None

Positive Matches	
Ammonium nitrate	25%
Nitric acid	21%
Beryllium nitrate solution	12%
Gallium (III) nitrate	11%
Lead(II) nitrate	8%
Manganese(II) nitrate solution	7%
Cesium nitrate	3%
Silver nitrate	3%

The measured data is consistent with ALL of the library items shown. The probabilities (%) indicate how much the measured data favors one item versus another. They are NOT concentrations.

All results should be verified using other methods or techniques



Mixture (84%)	
Ammonium dichromate	70%
Pyrrolidine	9%
Ethyl isocyanatoacetate	3%
2,2-Dichloropropane	1%

The measured data cannot be adequately described by a single library item, but a mixture of the items shown accounts for 84% of the data. Values shown are the amount of molecular signal that can be described by each item.

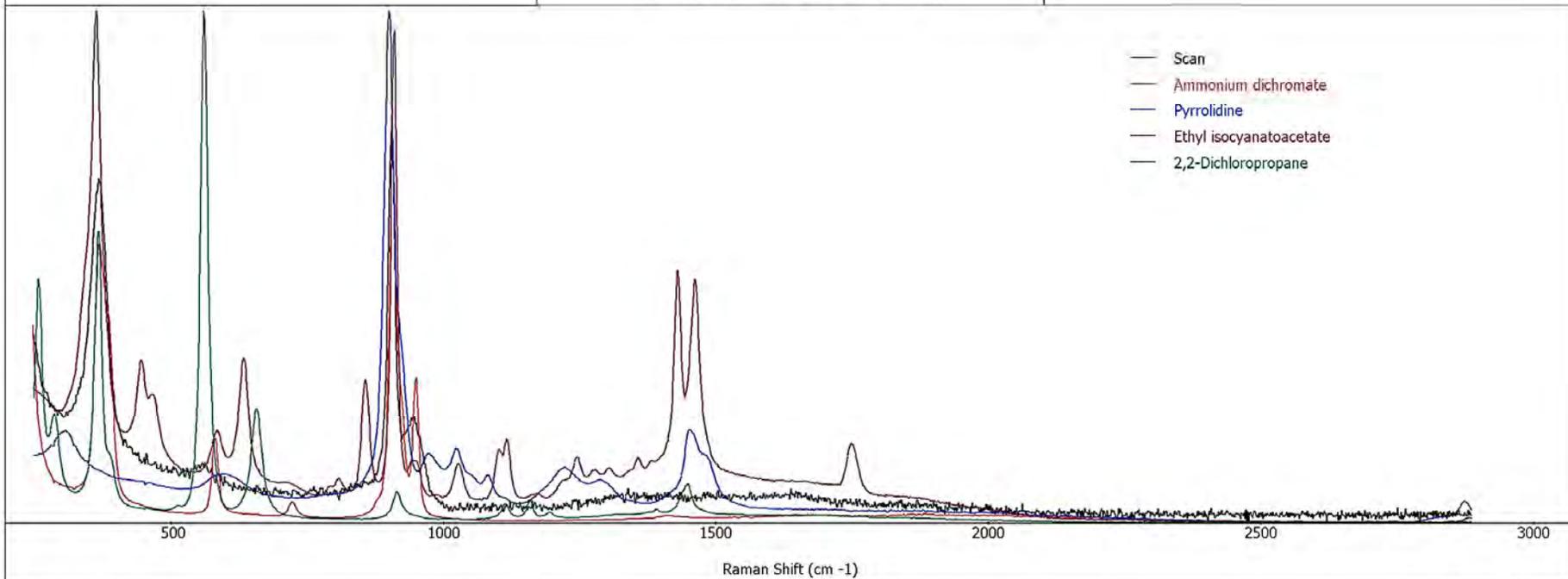
All results should be verified using other methods or techniques

Ahura Scientific



FirstDefender FD5654

Mode:	Auto, Vial Holder
Power Setting:	High
Laser Status:	Pass
CCD Status:	Pass
Calibration:	Pass
Last Checked:	1/26/2012 12:06 PM
Scan Warnings:	None



Mixture (87%)	
Strontium carbonate	72%
Bismuth(III) carbonate basic	16%

The measured data cannot be adequately described by a single library item, but a mixture of the items shown accounts for 87% of the data. Values shown are the amount of molecular signal that can be described by each item.

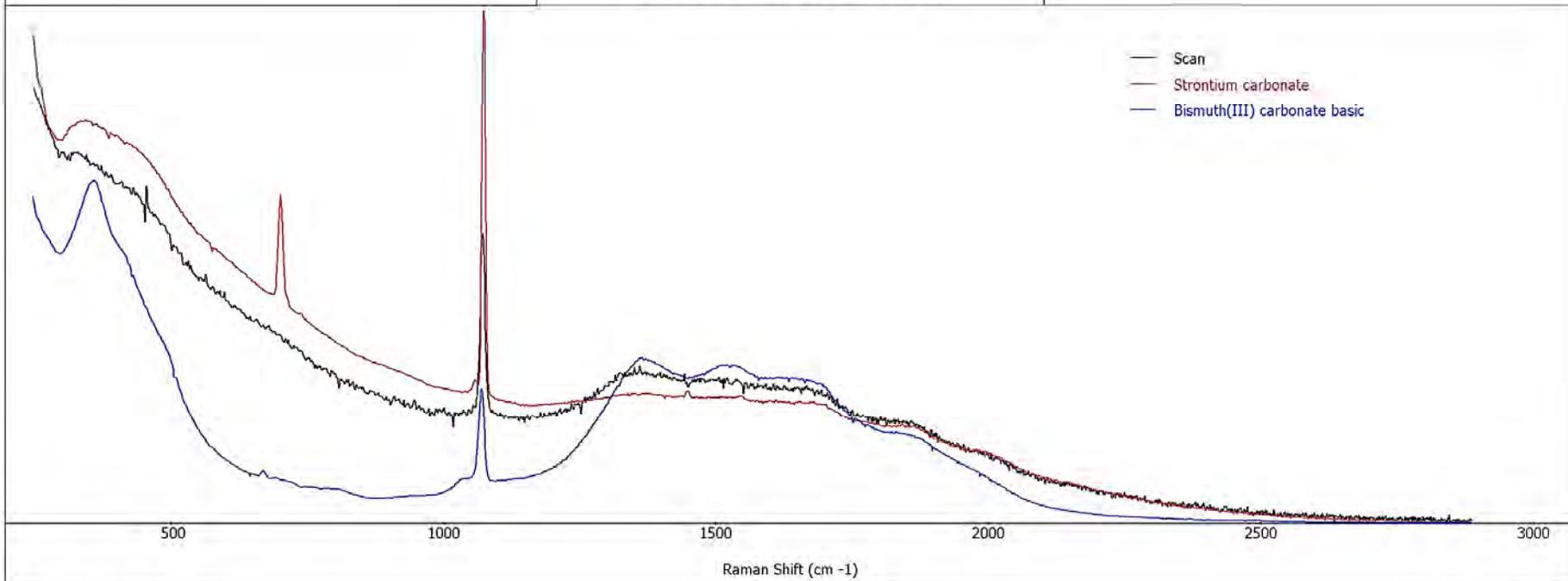
All results should be verified using other methods or techniques

Ahura Scientific



FirstDefender FD5654

Mode:	Auto, Vial Holder
Power Setting:	High
Laser Status:	Pass
CCD Status:	Pass
Calibration:	Pass
Last Checked:	1/26/2012 12:24 PM
Scan Warnings:	None



Positive Match

Sulfuric acid (10%)

The measured data is fully consistent with the library item for Sulfuric acid (10%).

All results should be verified using other methods or techniques

Ahura Scientific

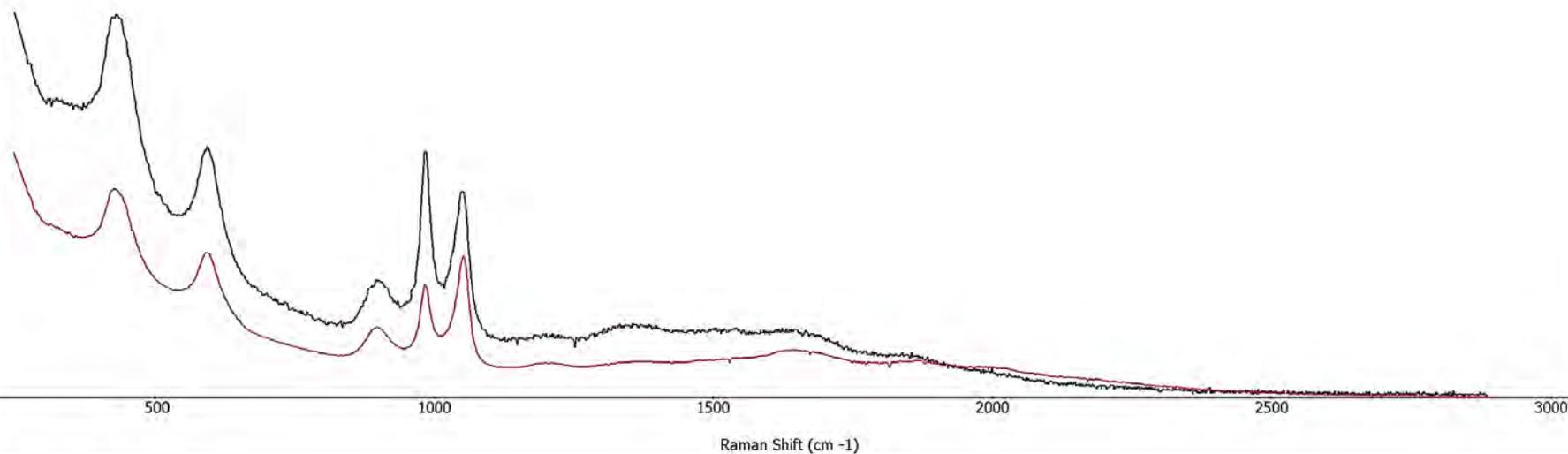


FirstDefender FD5654

Mode: Auto, Vial Holder
Power Setting: High

Laser Status: Pass
CCD Status: Pass
Calibration: Pass
Last Checked: 1/26/2012 12:34 PM
Scan Warnings: None

— Scan
— Sulfuric acid (10%)



Positive Matches	
Ammonium nitrate	26%
Nitric acid	24%
Beryllium nitrate solution	12%
Gallium (III) nitrate	11%
Manganese(II) nitrate solution	7%
Lead(II) nitrate	6%
Cesium nitrate	3%
Silver nitrate	3%

The measured data is consistent with ALL of the library items shown. The probabilities (%) indicate how much the measured data favors one item versus another. They are NOT concentrations.

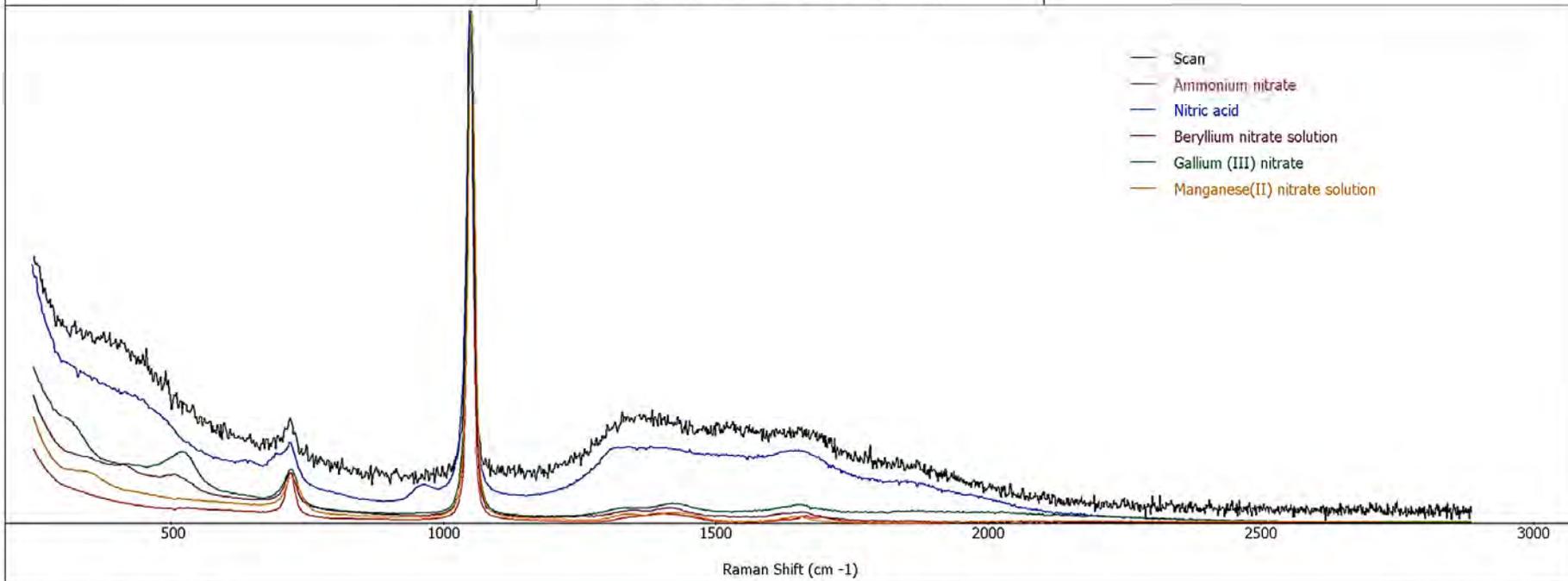
All results should be verified using other methods or techniques

Ahura Scientific



FirstDefender FD5654

Mode:	Auto, Vial Holder
Power Setting:	High
Laser Status:	Pass
CCD Status:	Pass
Calibration:	Pass
Last Checked:	1/26/2012 12:45 PM
Scan Warnings:	None



Mixture (88%)	
Sulfuric acid (10%)	74%
Cluster of 2 Items	8%
Epsom Salt	
Magnesium sulfate heptahydrate	
Nitric acid	7%

The measured data cannot be adequately described by a single library item, but a mixture of the items shown accounts for 88% of the data. Values shown are the amount of molecular signal that can be described by each item.

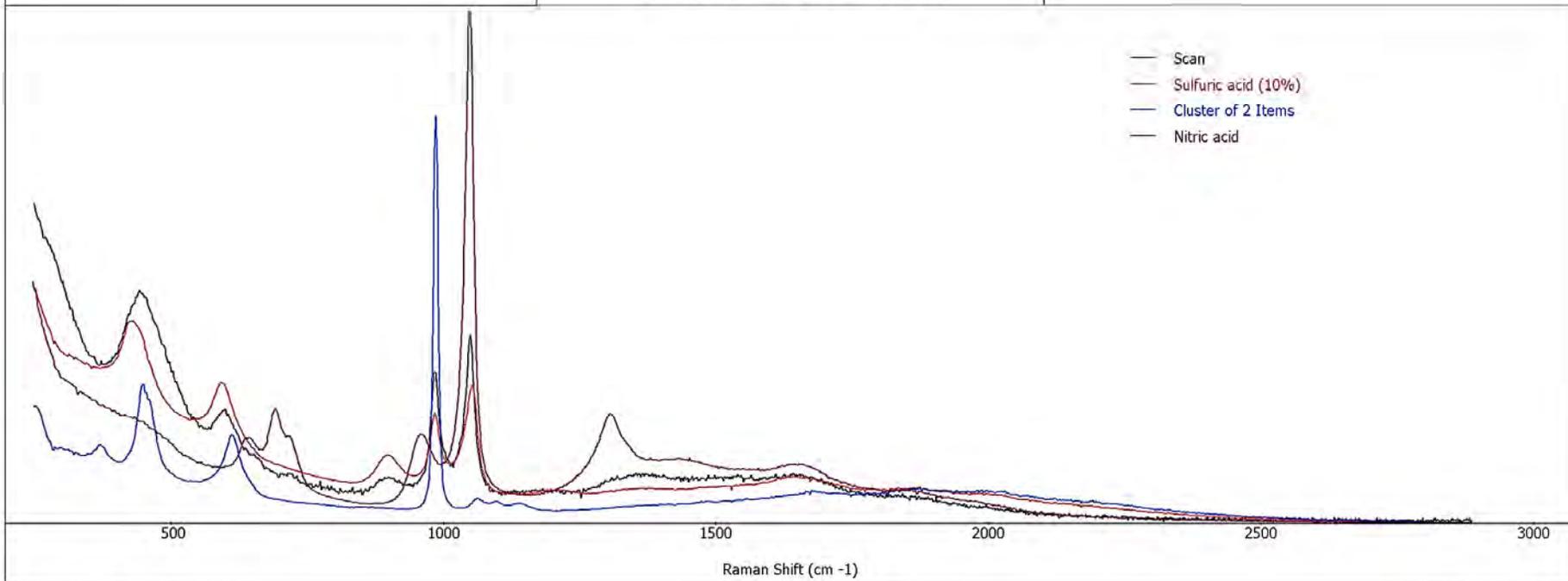
All results should be verified using other methods or techniques

Ahura Scientific



FirstDefender FD5654

Mode:	Auto, Vial Holder
Power Setting:	High
Laser Status:	Pass
CCD Status:	Pass
Calibration:	Pass
Last Checked:	1/26/2012 12:51 PM
Scan Warnings:	None



No Positive Match

Ammonium cobalt(II) sulfate hexahydrate

No match found in the library. Fluorescence may prevent reliable identification of this material. Items with some similar features are shown. Contact Ahura (800-374-1992) for spectral analysis assistance.

All results should be verified using other methods or techniques

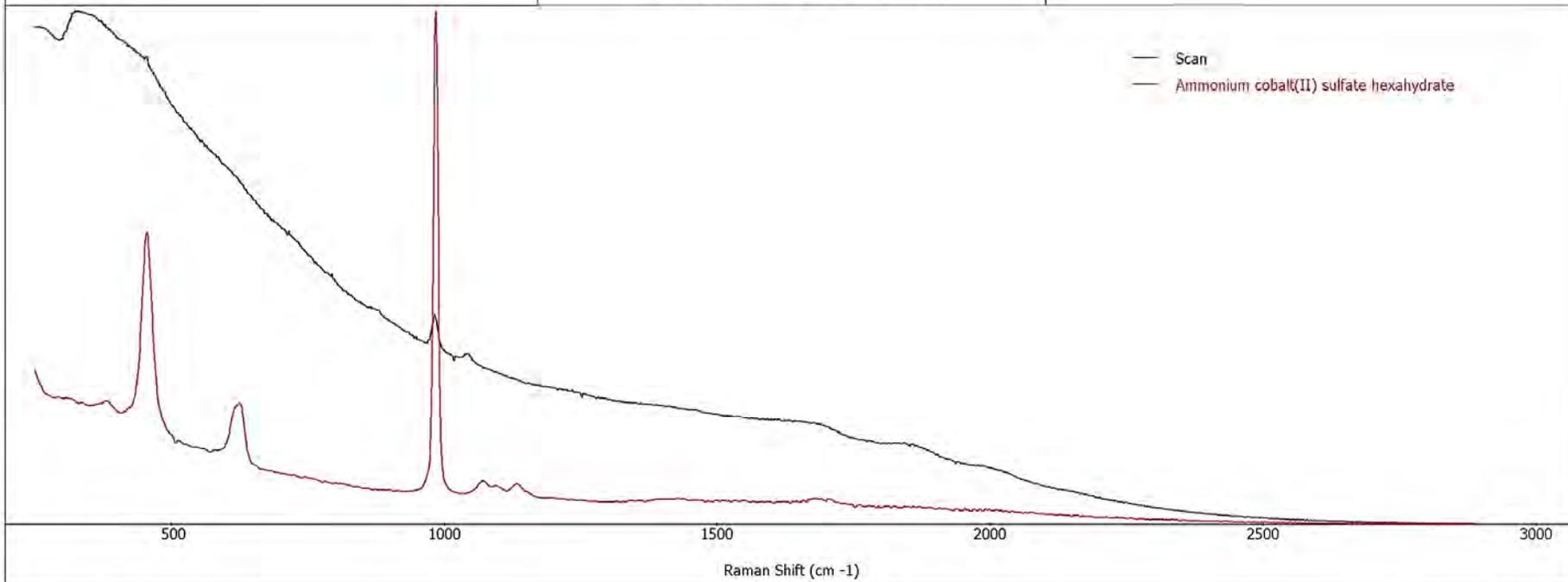
Ahura Scientific



FirstDefender FD5654

Mode: Auto, Vial Holder
Power Setting: High

Laser Status: Pass
CCD Status: Pass
Calibration: Pass
Last Checked: 1/26/2012 1:04 PM
Scan Warnings: None



No Match

Ahura Scientific



FirstDefender FD5654

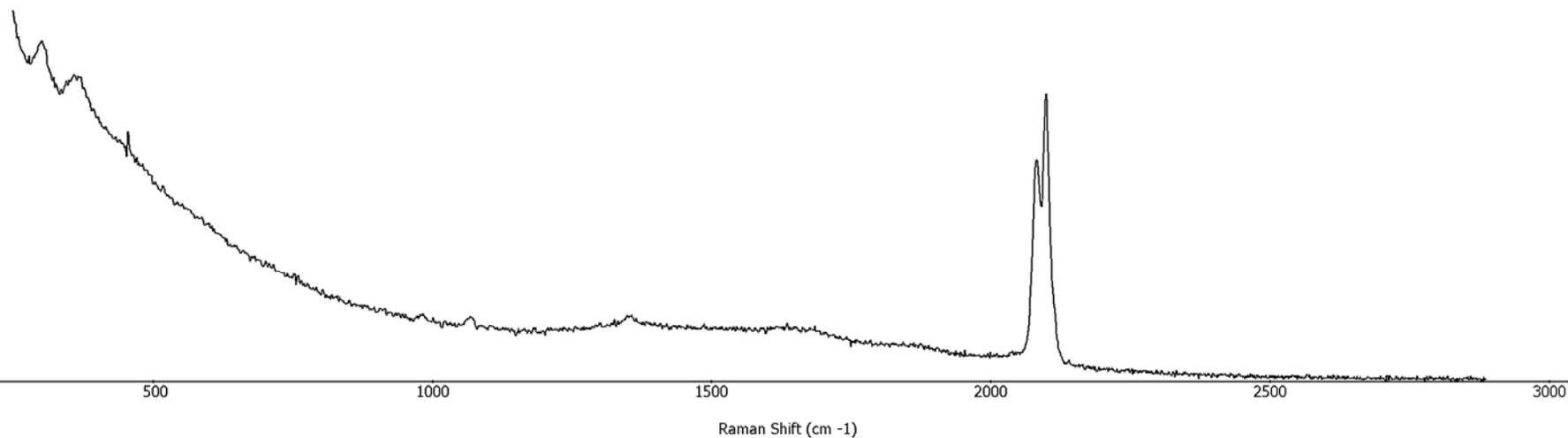
Mode: Auto, Vial Holder
Power Setting: High

Laser Status: Pass
CCD Status: Pass
Calibration: Pass
Last Checked: 1/26/2012 1:07 PM
Scan Warnings: None

No match found in the library. Contact Ahura (800-374-1992) for spectral analysis assistance.

All results should be verified using other methods or techniques

— Scan



No Positive Match

Bismuth(III) carbonate basic
Lithium nitrate
Potassium carbonate

No match found in the library. The molecular signal is too low to reliably identify this material. Items with some similar features are shown. Contact Ahura (800-374-1992) for spectral analysis assistance.

All results should be verified using other methods or techniques

Ahura Scientific

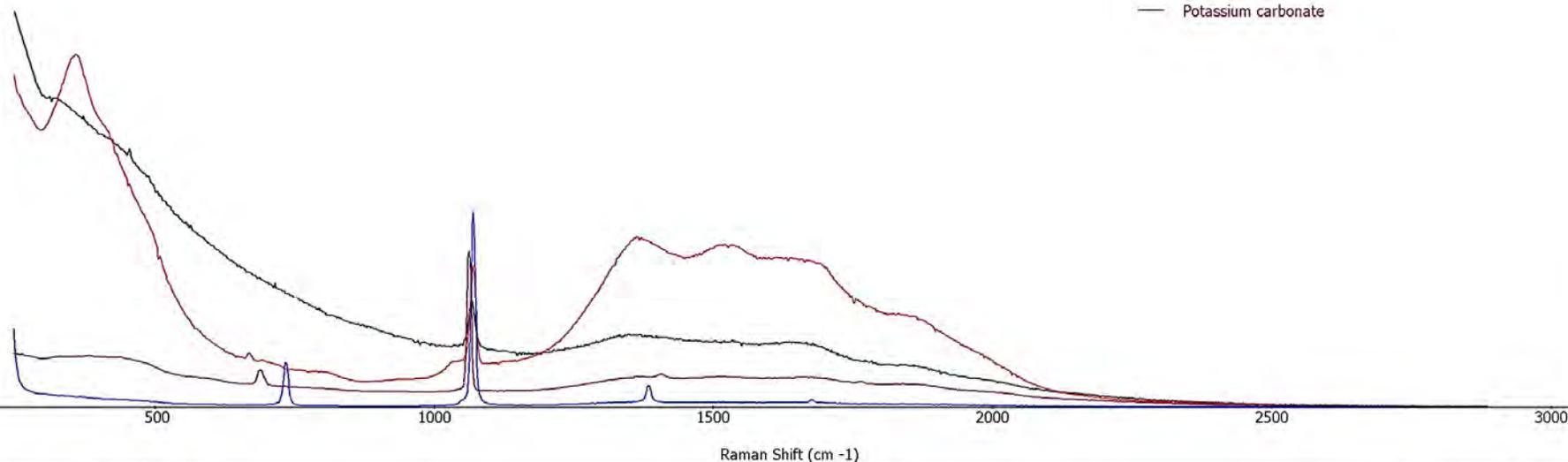


FirstDefender FD5654

Mode: Auto, Vial Holder
Power Setting: High

Laser Status: Pass
CCD Status: Pass
Calibration: Pass
Last Checked: 1/26/2012 1:22 PM
Scan Warnings: None

- Scan
- Bismuth(III) carbonate basic
- Lithium nitrate
- Potassium carbonate



Appendix F

Laboratory Analytical Data



United States Environmental Protection Agency
Office of Environmental Measurement & Evaluation
11 Technology Drive
North Chelmsford, MA 01863-2431

Laboratory Report

February 08, 2012

Mike Barry - Mail Code OSRR02-2
US EPA New England R1

Project Number: 12010029
Project: Hilton Chrome - Lawrence, MA
Analysis: Metals by XRF
Analyst: Janet Paquin

JP 2/8/12

Analytical Procedure:

All samples were received and logged in by the laboratory according to the USEPA New England SOP for Sample Log-in.

Sample preparation and analysis was done following the EPA Region I SOP, EIASOP-INGXRF0.

Samples were screened using a PANalytical Epsilon 5 energy dispersive x-ray fluorescence (XRF) spectrometer.

Date Samples Received by the Laboratory: 01/26/2012

Data were reviewed in accordance with the internal verification procedures described in the EPA New England OEME Chemistry QA Plan.

Results relate only to the items tested or to the samples as received by the Laboratory. This analytical report shall not be reproduced except in full, without written approval of the laboratory.

Report may contain multiple sections and each section will be numbered independently.

If you have any questions please call me at 617-918-8340 .

Sincerely,


Daniel N. Boudreau
Chemistry Team Leader

Qualifiers:

RL	Reporting limit
ND	Not Detected above reporting limit
NA	Not Applicable
NC	Not calculated since analyte concentration is ND
J	Estimated value. The result is estimated because a double layer of prolene film was used in the XRF cup to keep the sample from leaking. The instrument software only corrects for a single layer of film. Therefore, the sample results may be affected.
J1	Estimated value due to MS recovery outside acceptance criteria
J3	Estimated value due to RPD result outside acceptance criteria
J4	Estimated value due to standard reference material result outside acceptance criteria
RPD	Relative Percent Difference

All samples were run as received except sample AB27002. That sample was dried at 60 degrees Celsius for 24 hours and sieved through a number 10 standard (2mm) sieve prior to analysis.

A solid standard reference material containing selenium was not available.

This report contains results for the eight RCRA metals. Other metals are present in the samples that are not included here.

US ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND LABORATORY

Hilton Chrome - Lawrence, MA

Metals by XRF

Client Sample ID: R01-120125MB-0001

Lab Sample ID: AB26999

Date of Collection: 1/25/2012

Matrix Product

Date of Analysis: 1/27/12

CAS Number	Compound	Concentration mg/Kg	RL mg/Kg	Qualifier
7440-38-2	Arsenic	ND	10	J, J4
7440-39-3	Barium	ND	50	J, J4
7440-43-9	Cadmium	ND	10	J
7440-47-3	Chromium	100	40	J
7439-92-1	Lead	ND	5	J
7439-97-6	Mercury	ND	20	J
7782-49-2	Selenium	ND	10	J
7440-22-4	Silver	ND	10	J

Comments:

US ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND LABORATORY

Hilton Chrome - Lawrence, MA

Metals by XRF

Client Sample ID: R01-120125MB-0002

Lab Sample ID: AB27000

Date of Collection: 1/25/2012

Matrix Product

Date of Analysis: 1/27/12

CAS Number	Compound	Concentration mg/Kg	RL mg/Kg	Qualifier
7440-38-2	Arsenic	ND	10	J, J4
7440-39-3	Barium	ND	50	J, J4
7440-43-9	Cadmium	ND	10	J
7440-47-3	Chromium	ND	40	J
7439-92-1	Lead	ND	5	J
7439-97-6	Mercury	ND	20	J
7782-49-2	Selenium	ND	10	J
7440-22-4	Silver	ND	10	J

Comments:

US ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND LABORATORY

Hilton Chrome - Lawrence, MA

Metals by XRF

Client Sample ID: R01-120125MB-0003

Lab Sample ID: AB27001

Date of Collection: 1/25/2012

Matrix Product

Date of Analysis: 1/27/12

<u>CAS Number</u>	<u>Compound</u>	<u>Concentration mg/Kg</u>	<u>RL mg/Kg</u>	<u>Qualifier</u>
7440-38-2	Arsenic	ND	10	J, J4
7440-39-3	Barium	ND	50	J, J4
7440-43-9	Cadmium	ND	10	J
7440-47-3	Chromium	ND	40	J
7439-92-1	Lead	ND	5	J
7439-97-6	Mercury	ND	20	J
7782-49-2	Selenium	ND	10	J
7440-22-4	Silver	ND	10	J

Comments:

US ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND LABORATORY

Hilton Chrome - Lawrence, MA

Metals by XRF

Client Sample ID: R01-120125MB-0004

Lab Sample ID: AB27002

Date of Collection: 1/25/2012

Matrix Product

Date of Analysis: 1/31/12

<u>CAS Number</u>	<u>Compound</u>	<u>Concentration mg/Kg</u>	<u>RL mg/Kg</u>	<u>Qualifier</u>
7440-38-2	Arsenic	ND	10	
7440-39-3	Barium	53	50	
7440-43-9	Cadmium	ND	10	
7440-47-3	Chromium	76	40	J4
7439-92-1	Lead	45	5	
7439-97-6	Mercury	ND	20	
7782-49-2	Selenium	ND	10	
7440-22-4	Silver	47	10	

Comments: Sample AB27002 was inhomogeneous.

US ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND LABORATORY

Hilton Chrome - Lawrence, MA

Metals by XRF

Client Sample ID: R01-120125MB-0005

Lab Sample ID: AB27003

Date of Collection: 1/25/2012

Matrix Product

Date of Analysis: 1/27/12

<u>CAS Number</u>	<u>Compound</u>	<u>Concentration mg/Kg</u>	<u>RL mg/Kg</u>	<u>Qualifier</u>
7440-38-2	Arsenic	ND	10	J, J4
7440-39-3	Barium	ND	50	J, J4
7440-43-9	Cadmium	ND	10	J
7440-47-3	Chromium	ND	40	J
7439-92-1	Lead	ND	5	J
7439-97-6	Mercury	ND	20	J
7782-49-2	Selenium	ND	10	J
7440-22-4	Silver	ND	10	J

Comments:

US ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND LABORATORY

Hilton Chrome - Lawrence, MA

Metals by XRF

Client Sample ID: R01-120125MB-0006

Lab Sample ID: AB27004

Date of Collection: 1/26/2012

Matrix Product

Date of Analysis: 1/27/12

<u>CAS Number</u>	<u>Compound</u>	<u>Concentration mg/Kg</u>	<u>RL mg/Kg</u>	<u>Qualifier</u>
7440-38-2	Arsenic	ND	10	J, J4
7440-39-3	Barium	ND	50	J, J4
7440-43-9	Cadmium	ND	10	J
7440-47-3	Chromium	ND	40	J
7439-92-1	Lead	ND	5	J
7439-97-6	Mercury	ND	20	J
7782-49-2	Selenium	ND	10	J
7440-22-4	Silver	ND	10	J

Comments:

US ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND LABORATORY

Hilton Chrome - Lawrence, MA

Metals by XRF

Client Sample ID: R01-120125MB-0007

Lab Sample ID: AB27005

Date of Collection: 1/26/2012

Matrix Product

Date of Analysis: 2/7/12

CAS Number	Compound	Concentration mg/Kg	RL mg/Kg	Qualifier
7440-38-2	Arsenic	ND	10	J
7440-39-3	Barium	ND	50	J
7440-43-9	Cadmium	ND	10	J
7440-47-3	Chromium	ND	40	J
7439-92-1	Lead	ND	5	J
7439-97-6	Mercury	ND	20	J
7782-49-2	Selenium	ND	10	J
7440-22-4	Silver	ND	10	J

Comments:

US ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND LABORATORY

Hilton Chrome - Lawrence, MA

Metals by XRF

Client Sample ID: R01-120125MB-0008

Lab Sample ID: AB27006

Date of Collection: 1/26/2012

Matrix Product

Date of Analysis: 2/7/12

CAS Number	Compound	Concentration mg/Kg	RL mg/Kg	Qualifier
7440-38-2	Arsenic	ND	10	J
7440-39-3	Barium	ND	50	J
7440-43-9	Cadmium	ND	10	J
7440-47-3	Chromium	ND	40	J
7439-92-1	Lead	82	5	J
7439-97-6	Mercury	ND	20	J
7782-49-2	Selenium	ND	10	J
7440-22-4	Silver	ND	10	J

Comments:

US ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND LABORATORY

Hilton Chrome - Lawrence, MA

Metals by XRF

Client Sample ID: R01-120125MB-0009

Lab Sample ID: AB27007

Date of Collection: 1/26/2012

Matrix Product

Date of Analysis: 2/7/12

CAS Number	Compound	Concentration mg/Kg	RL mg/Kg	Qualifier
7440-38-2	Arsenic	ND	10	J
7440-39-3	Barium	ND	50	J
7440-43-9	Cadmium	ND	10	J
7440-47-3	Chromium	ND	40	J
7439-92-1	Lead	ND	5	J
7439-97-6	Mercury	ND	20	J
7782-49-2	Selenium	ND	10	J
7440-22-4	Silver	ND	10	J

Comments:

US ENVIRONMENTAL PROTECTION AGENCY
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Hilton Chrome - Lawrence, MA

Metals by XRF

Client Sample ID: R01-120125MB-0010

Lab Sample ID: AB27008

Date of Collection: 1/26/2012

Matrix Product

Date of Analysis: 2/7/12

<u>CAS Number</u>	<u>Compound</u>	<u>Concentration mg/Kg</u>	<u>RL mg/Kg</u>	<u>Qualifier</u>
7440-38-2	Arsenic	ND	10	J
7440-39-3	Barium	ND	50	J
7440-43-9	Cadmium	ND	10	J
7440-47-3	Chromium	ND	40	J
7439-92-1	Lead	ND	5	J
7439-97-6	Mercury	ND	20	J
7782-49-2	Selenium	ND	10	J
7440-22-4	Silver	ND	10	J

Comments:

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NEW ENGLAND LABORATORY

Hilton Chrome - Lawrence, MA

Metals by XRF

Client Sample ID: R01-120125MB-0011

Lab Sample ID: AB27009

Date of Collection: 1/26/2012

Matrix Product

Date of Analysis: 2/7/12

CAS Number	Compound	Concentration mg/Kg	RL mg/Kg	Qualifier
7440-38-2	Arsenic	ND	10	J
7440-39-3	Barium	ND	50	J
7440-43-9	Cadmium	ND	10	J
7440-47-3	Chromium	ND	40	J
7439-92-1	Lead	ND	5	J
7439-97-6	Mercury	ND	20	J
7782-49-2	Selenium	ND	10	J
7440-22-4	Silver	ND	10	J

Comments: Sample AB27009 was inhomogenous. It was a liquid sample that contained solid particulates.

US ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND LABORATORY

Laboratory Duplicate Results

COMPOUND	SAMPLE RESULT mg/Kg	SAMPLE DUPLICATE RESULT mg/Kg	PRECISION RPD %	QC LIMITS
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Sample ID: AB26999

Arsenic	ND	ND	NC	35
Barium	ND	ND	NC	35
Cadmium	ND	ND	NC	35
Chromium	100	100	0	35
Lead	ND	ND	NC	35
Mercury	ND	ND	NC	35
Selenium	ND	ND	NC	35
Silver	ND	ND	NC	35

Sample ID: AB27002

Arsenic	ND	ND	NC	35
Barium	53	54	2	35
Cadmium	ND	ND	NC	35
Chromium	76	ND	NC	35
Lead	45	50	10	35
Mercury	ND	ND	NC	35
Selenium	ND	ND	NC	35
Silver	47	48	2	35

Sample ID: AB27005

Arsenic	ND	ND	NC	35
Barium	ND	ND	NC	35
Cadmium	ND	ND	NC	35
Chromium	ND	ND	NC	35
Lead	ND	ND	NC	35
Mercury	ND	ND	NC	35
Selenium	ND	ND	NC	35
Silver	ND	ND	NC	35

A duplicate RPD could not be calculated for Cr for AB27002 because one result was ND.

US ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND LABORATORY

XRF QC REPORT

Hilton Chrome - Lawrence, MA

Standard Reference Material 2709

COMPOUND	MEASURED CONCENTRATION mg/Kg	CERTIFIED VALUE mg/Kg	QC LIMITS mg/Kg
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Run Date: 01/31/2012

Arsenic	17	18	13 - 23
Barium	770	970	680 - 1260
Chromium	88	130	91 - 170
Lead	17	19	13 - 25

Comments:

US ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND LABORATORY

XRF QC REPORT

Hilton Chrome - Lawrence, MA

Standard Reference Material 2710

COMPOUND	MEASURED CONCENTRATION mg/Kg	CERTIFIED VALUE mg/Kg	QC LIMITS mg/Kg
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Run Date: 01/31/2012

Arsenic	550	630	440 - 820
Barium	720	710	497 - 920
Cadmium	17	22	15 - 29
Lead	4710	5530	3870 - 7190
Mercury	32	33	23 - 43
Silver	30	35	25 - 46

Comments:

Quality Control Check Sample Results for Liquids

Conostan S-21 Oil Standard (1/27/12 #1)

<u>Parameter</u>	<u>Found*</u>	<u>Certified Value*</u>	<u>% Recovery</u>
Ag	100	100	100
Ba	140	100	140**
Cd	100	100	100
Cr	110	100	110
Pb	98	100	98

Conostan S-21 Oil Standard (1/27/12 #2)

<u>Parameter</u>	<u>Found*</u>	<u>Certified Value*</u>	<u>% Recovery</u>
Ag	89	100	89
Ba	120	100	120
Cd	88	100	88
Cr	110	100	110
Pb	82	100	82

*Results are in mg/Kg

**Result is outside the acceptance range of $\pm 30\%$

Quality Control Check Sample Results for Liquids (cont.)

Conostan S-21 Oil Standard (2/7/12 #1)

<u>Parameter</u>	<u>Found*</u>	<u>Certified Value*</u>	<u>% Recovery</u>
Ag	92	100	92
Ba	120	100	120
Cd	91	100	91
Cr	120	100	120
Pb	87	100	87

Conostan S-21 Oil Standard (2/7/12 #2)

<u>Parameter</u>	<u>Found*</u>	<u>Certified Value*</u>	<u>% Recovery</u>
Ag	100	100	100
Ba	130	100	130
Cd	100	100	100
Cr	120	100	120
Pb	99	100	99

*Results are in mg/Kg

**Result is outside the acceptance range of $\pm 30\%$

Quality Control Check Sample Results for Liquids (cont.)

Conostan 100 ppm As Oil Standard (1/27/12)

<u>Parameter</u>	<u>Found*</u>	<u>Certified Value*</u>	<u>% Recovery</u>
As	140	100	140**

Conostan 100 ppm Hg Oil Standard (1/27/12)

<u>Parameter</u>	<u>Found*</u>	<u>Certified Value*</u>	<u>% Recovery</u>
Hg	80	100	80

Conostan 100 ppm Se Oil Standard (1/27/12)

<u>Parameter</u>	<u>Found*</u>	<u>Certified Value*</u>	<u>% Recovery</u>
Se	100	100	100

Conostan 100 ppm As Oil Standard (2/7/12)

<u>Parameter</u>	<u>Found*</u>	<u>Certified Value*</u>	<u>% Recovery</u>
As	130	100	130

Conostan 100 ppm Hg Oil Standard (2/7/12)

<u>Parameter</u>	<u>Found*</u>	<u>Certified Value*</u>	<u>% Recovery</u>
Hg	87	100	87

Conostan 100 ppm Se Oil Standard (2/7/12)

<u>Parameter</u>	<u>Found*</u>	<u>Certified Value*</u>	<u>% Recovery</u>
Se	110	100	110

*Results are in mg/Kg

**Result is outside the acceptance range of $\pm 30\%$



United States Environmental Protection Agency
Office of Environmental Measurement & Evaluation
11 Technology Drive
North Chelmsford, MA 01863-2431

Laboratory Results

February 13, 2012

Mike Barry - Mail Code OSRR02-2
US EPA New England R1

Project Number: 12010029

Project: Hilton Chrome - Lawrence, MA

Analysis: Total Cyanide in Product

Analyst: Inna Germansderfer *IG 2/13/12*

Analytical Procedure:

All samples were received and logged in by the laboratory according to the USEPA New England Laboratory SOP for Sample Log-in.

Sample preparation and analysis was done following the EPA Region I SOP, EIASOP-INGCN12.

The Cyanide SOP is Based on Lachat Method 10-204-00-1-X.

Analytical support was provided by ESAT contractors.

Date Samples Received by the Laboratory: 01/26/2012

Data were reviewed in accordance with the internal verification procedures described in the EPA New England OEME Chemistry QA Plan.

Results relate only to the items tested or to the samples as received by the Laboratory. This analytical report shall not be reproduced except in full, without written approval of the laboratory.

Report may contain multiple sections and each section will be numbered independently.

If you have any questions please call me at 617-918-8340 .

Sincerely,

Daniel N. Boudreau 2/13/12
Daniel N. Boudreau
Chemistry Team Leader

US ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND LABORATORY

Hilton Chrome - Lawrence, MA

Total Cyanide in Product

Matrix: Product

Sample Number	Lab ID	Collected	Extracted	Analysis	Concentration mg/Kg	RL mg/Kg	Qualifier
R01-120125MB-0001	AB26999	01/25/2012	01/31/2012	02/01/2012	0.07	0.059	
Comments:							
R01-120125MB-0002	AB27000	01/25/2012	01/31/2012	02/01/2012	0.15	0.056	
Comments:							
R01-120125MB-0003	AB27001	01/25/2012	01/31/2012	02/01/2012	0.89	0.057	
Comments:							
R01-120125MB-0004	AB27002	01/25/2012	01/31/2012	02/01/2012	21000	230	
Comments:							
R01-120125MB-0005	AB27003	01/25/2012	01/31/2012	02/01/2012	1.8	0.059	
Comments:							
R01-120125MB-0006	AB27004	01/26/2012	01/31/2012	02/01/2012	0.45	0.057	
Comments:							
R01-120125MB-0007	AB27005	01/26/2012	01/31/2012	02/01/2012	0.98	0.060	
Comments:							
R01-120125MB-0008	AB27006	01/26/2012	01/31/2012	02/01/2012	1.1	0.060	
Comments:							
R01-120125MB-0009	AB27007	01/26/2012	01/31/2012	02/01/2012	81000	540	
Comments:							
R01-120125MB-0010	AB27008	01/26/2012	01/31/2012	02/01/2012	ND	0.059	
Comments:							

US ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND LABORATORY

Hilton Chrome - Lawrence, MA

Total Cyanide in Product

Matrix: Product

Sample Number	Lab ID	Collected	Extracted	Analysis	Concentration mg/Kg	RL mg/Kg	Qualifier
R01-120125MB-0011	AB27009	01/26/2012	01/31/2012	02/01/2012	3.1	0.12	
Comments:							

Blank			01/31/2012	02/01/2012	ND	0.060	
Comments:							

US ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND LABORATORY

MATRIX SPIKE (MS) RESULTS

Hilton Chrome - Lawrence, MA

SAMPLE ID	PARAMETER	SPIKE ADDED mg/Kg	SAMPLE CONCENTRATION mg/Kg	MS CONCENTRATION mg/Kg	MS % REC	QC LIMITS (% REC)
AB27000	Total Cyanide in Product	2.20	0.15	2.24	95.0	54 - 132
AB27007	Total Cyanide in Product	2.08	81000	85000	R	54 - 132

Comments: R = No recovery was calculated since the analyte concentration is greater than four times the spike level.

US ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND LABORATORY

Laboratory Duplicate Results

Hilton Chrome - Lawrence, MA

SAMPLE ID	PARAMETER	SAMPLE RESULT mg/Kg	SAMPLE DUPLICATE RESULT mg/Kg	PRECISION RPD %	QC LIMITS (%RPD)
AB27003	Total Cyanide in Product	1.8	1.8	0	20
AB27005	Total Cyanide in Product	0.98	0.96	2.1	20

Comments:

US ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND LABORATORY

Low/High Laboratory Fortified Blank (LFB) Results

Hilton Chrome - Lawrence, MA

High Level

PARAMETER	LFB AMOUNT SPIKED mg/Kg	LFB RESULT mg/Kg	LFB RECOVERY %	QC LIMITS %
Total Cyanide in Product	4.40	4.01	91.1	90 - 110

Comments:

Low Level

PARAMETER	LFB AMOUNT SPIKED mg/Kg	LFB RESULT mg/Kg	LFB RECOVERY %	QC LIMITS %
Total Cyanide in Product	0.440	0.416	94.5	90 - 110

Comments:

US ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND LABORATORY

Solid Laboratory Control Sample (LCS) Results

Hilton Chrome - Lawrence, MA

PARAMETER	LCS RESULTS mg/Kg	CONTROL LIMITS mg/Kg
Total Cyanide in Product	41.2	21.3 - 72.3

Comments:

