

Frontier Analysis, Ltd

TECHNICAL SERVICE RESPONSE NO.: UT060

Subject: Addendum to Technical Service Response No.: UT050: Analysis of a Metal Chunk Purportedly from a UFO (1995)

Date: January 22, 2009

Requested By: Nick Reiter
The Avalon Foundation

Reported By: P. A. Budinger
Analytical Scientist

Background/Objective: The background of the event as presented in T.S.R. No.: 50 follows.¹

In 1995 a chunk of metal fell from an unknown "craft" flying overhead. The bizarre event as described by the chief investigator, Joe Stets, follows.²

"The event happened in the summer of 1995 about 40 miles east of Columbus in Hopewell, Ohio. The witness was going out to get the mail when he heard what sounded like metal grinding on metal. He looked around but didn't see anything. Still hearing the sounds he looked up and sighted "a craft". This craft was "primitive looking". Very squarish and silent. He estimated it to be 300' long with a "wing of 100'. It had a canard wing in front with a span of 50'. It was slightly South of his position. The "wing " being the closest to him.

It was traveling East to West at an altitude "so low I could have hit it with a rock". There were no structures on the surface. No aerodynamic shape. A very box like shape. No windows or other indication of viewing areas.

As he watched he heard something hit the ground near him. He didn't see anything released from "the craft". He didn't see any trace of smoke or trouble with the craft. He didn't see the object hit the ground. He was standing on the South side of a ridge of hills on a driveway leading to the family home. Hidden Spring Road is on the North side of the ridge and runs West to East. This is in the same area as Flint Ridge State Park. The driveway runs from the road due South over the top of the ridge turning South South East to the home.

The witness stated he had to look around the area to find the specimen. It was sitting off the road in a dirt area that was very moist. The sample was misplaced until recently."

The analysis of this piece of metal as reported in the conclusions in T.S.R. No.: 50 follows:

¹ Refer to The Avalon Foundation website for details: www.theavalonfoundation.org/docs/metal.html

² Joe Stets, Personal Communication, Email, 24 May 2006.

- The analysis shows the sample is an aluminum alloy with a density of ca. 2.8 ± 0.5 g/cc. This value falls into the range for aluminum alloys (2.7 g/cc).³ It is a high purity alloy with only silicon detected. The aluminum is covered with environmental debris, such as mineral silicates and carbonates, which are common components found in dirt. Oxidation of the aluminum on the outer surface is suggested.

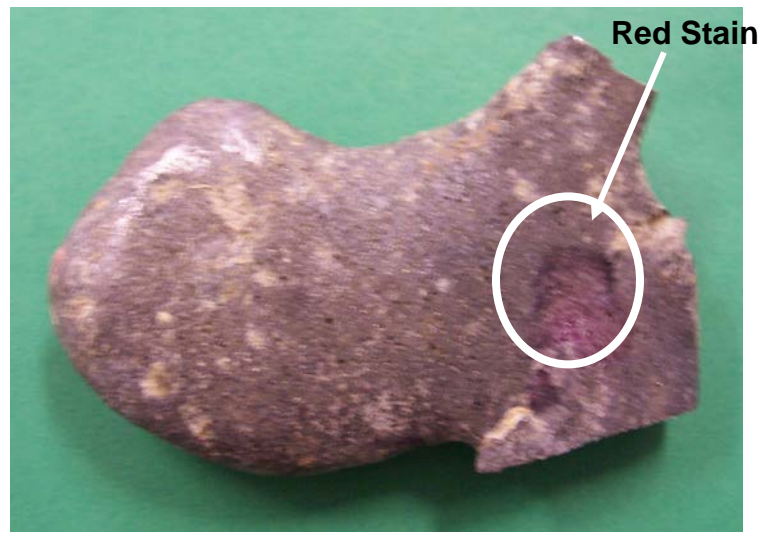
- The high purity of the aluminum alloy shows it is not an industrial grade. It should also be added that this is not an unknown alloy. The metal can be categorized as a wrought 4000 type alloy because silicon is the only other element detected.^{4,5} The grades in the 4000 series are commonly used for welding wire and as cladding alloys for brazing sheet.⁶

- The alloy could possibly have resulted from a broken weld in a conventional aircraft suffering a mechanical problem. Wrought alloys of a 4000 type are used for welding in the aircraft industry.⁷ If not, its source remains unknown.

- No radiation above background was detected from the metal.

On October 4, 2008, a second section of the metal piece was delivered to this laboratory by Nick Reiter. This piece had a red-appearing stain on the surface. The objective is to analyze the stain using infrared spectroscopy.

A photograph of the metal piece with the red stain follows.



Conclusions:

³ MatWeb, The online Materials Database, Aluminum Alloys, General, <http://www.matweb.com/search/SpecificMaterialPrint.asp?bassnum=MA0001>.

⁴ Erik Oberg et al., 26th Edition Machinery's Handbook, Industrial Press Inc. New York, 2000.

⁵ MetalForming Magazine, Pressworking Aluminum alloys, Metalforming OnLine <http://archive.metalformingmagazine.com/1995/10/alumin/aluminum.htm>.

⁶ Aluminum Alloys and Welding Data, Online at [http://www.welrealty.com/aluminum alloys.htm](http://www.welrealty.com/aluminum%20alloys.htm).

⁷ Ron Alexander & Scott Hetzer, EAA Sport Aviation, Nuts and Bolts Aircraft Building – Welding Aluminum, September 2004, Pg 98.

- Infrared spectroscopy indicates the stain area contains one or more metal oxides of which aluminum oxide predominates. There are also soil mineral-type components such as calcium carbonate (calcite and/or dolomite) and silicate. Water of hydration is apparent. There is no organic material. The stain surface is contaminated with dust-like components such as protein, skin cells and silicate (dirt). Some contamination is probably due to handling.

- It is unknown what causes the reddish color. There are no iron oxides or organic dyes. It is speculated that it may be due to trace/undetectable amounts of another materials, perhaps a chromium derivative. Many trace materials are capable of producing significant color.

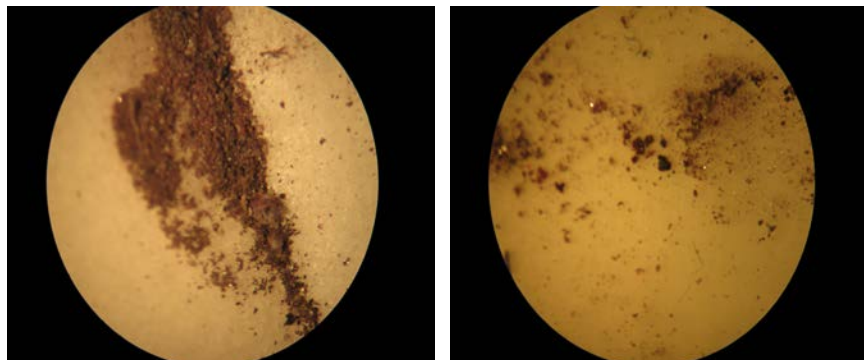
- XRD analysis is recommended on the stain for further characterization.⁸

Procedure:

Two infrared spectra were taken of scrapings from the red stain area using the diamond Harrick SplitPea™ accessory on the Nicolet Avatar 360 spectrometer. Additionally, microscope photographs were obtained. Nick Reiter provided this laboratory with EDS elemental analysis of the stain area. He took two spectra.

Results:

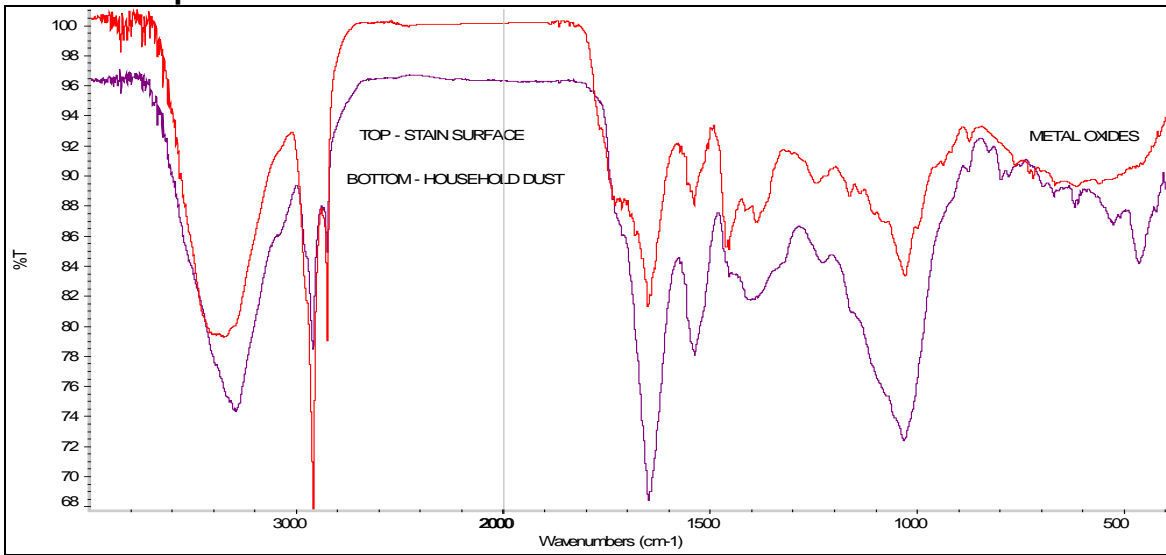
Microscope photographs of material scraped from the red stain show a granular reddish material. Two photographs follow.



The first infrared spectrum of the stain surface shows mostly contamination from handling and dust. Also, there is evidence of metal oxides. The spectrum is typical of dust that typically contains protein amide (skin cells) and silicate (dirt). The spectrum compares to a reference of household dust. Following are spectra of the surface stain and a reference of dust for comparison.

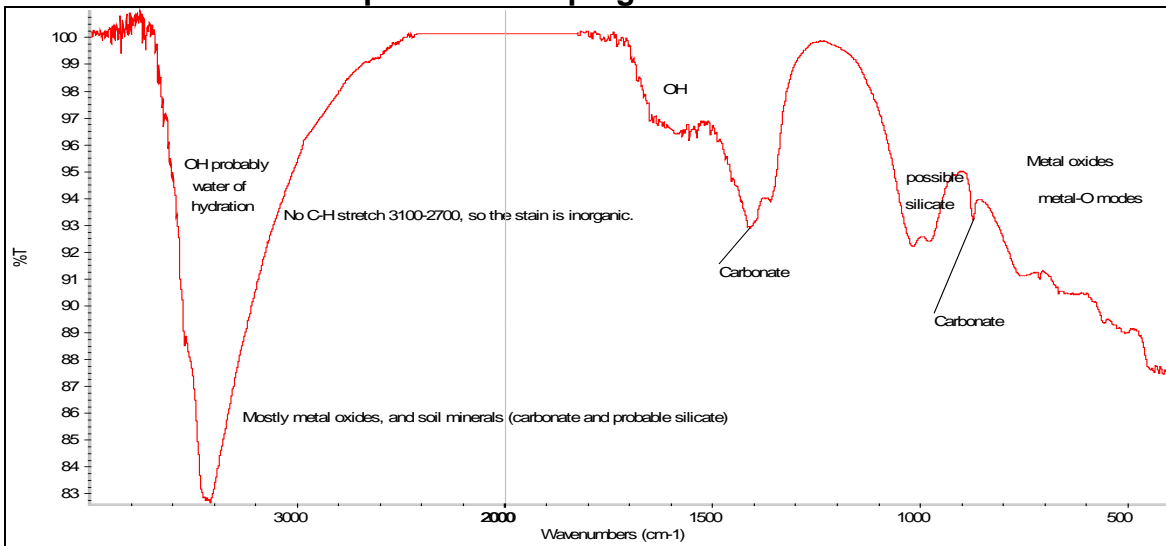
⁸Sample limitation may be a problem.

Infrared Spectra of Stain Surface Material and Household Dust Reference



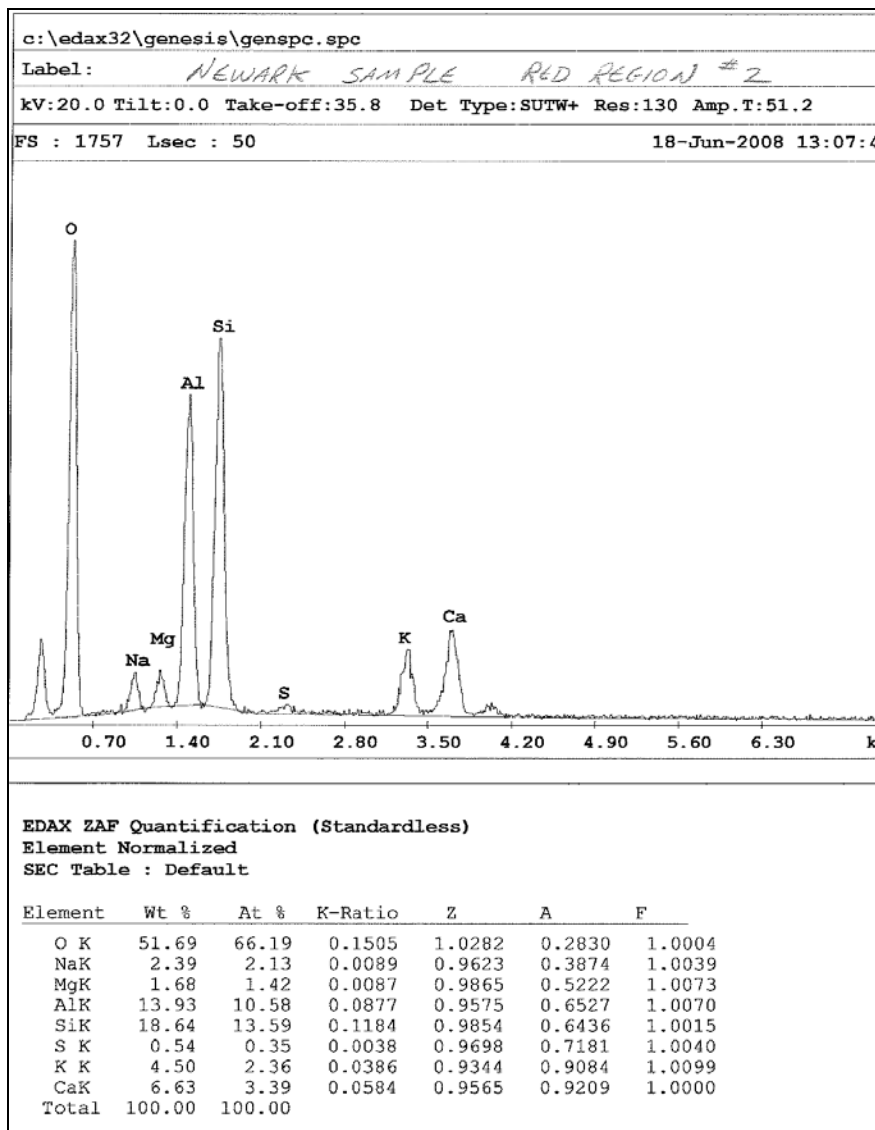
Infrared analysis of the material under the surface contamination shows it to be more representative of the stain material. The spectra display one or more metal oxides, of which aluminum oxide probably predominates. (Based on the EDS results (below) iron oxide is not present, and therefore, not responsible for the red color.) There are also soil mineral-type components such as calcium carbonate (calcite and/or dolomite) and silicate. Water of hydration is apparent. No organic materials are detected, i.e. there are no organic C-H stretching modes between $3100-2700\text{ cm}^{-1}$. The following is the best representative spectrum of the red material with pertinent peaks labeled.

Infrared Spectrum Scrapings from the Red Stain

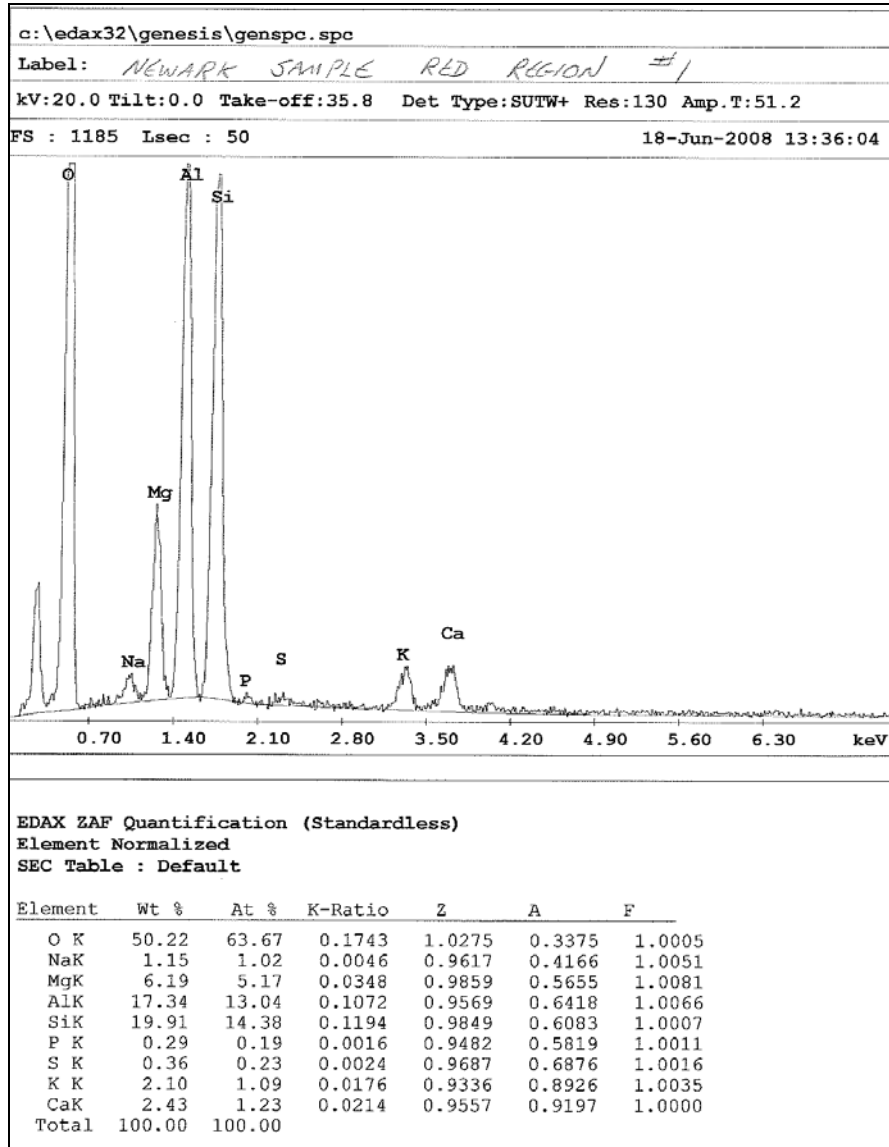


EDS analysis provided by The Avalon Foundation would support the infrared analysis. The spectra show major elements of Al, Si, O and minors of Ca, K, S, Mg, Na. Nick Reiter offered the following.⁹

“...(The spectra seem) to be to be a grab bag of metal oxides - possibly a region where trace metallic elements in the overall alloy segregated at the surface like slag or dross. I'm wondering if the red hue and pink fluorescence might actually imply ruby, due to some very slight amount of Cr. If so, that would be equally curious, as it would imply at some point a temperature way beyond just enough to melt an Al-Si alloy (650 - 700C). Artificial ruby needs to have Cr diffusion at something like 1400C I think. I could experiment with that actually.” Following are the spectra.



⁹ Email communication on November 19, 2008.



File: UT060

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