**Frontier Analysis, Ltd**

**In collaboration with**

# TECHNICAL SERVICE RESPONSE NO.: UT063

**Subject**: Analysis of Soil Samples from a Purported UFO Landing Site in an Agricultural Field (Putnam County, Indiana - Event Occurred Circa mid-March, 2009)

**Date**: May 26, 2009

**Requested By**: Chuck Modlin
MUFON Star Team

Glen Means
Indiana MUFON FI

**Reported By**: P. A. Budinger
Analytical Scientist
Frontier Analysis, Ltd.

Nick A. Reiter
The Avalon Foundation

## Background/Objective:

The background of this event as reported in MUFON case file C16168 follows:

> "Saturday March 21st,at about 4:30 to 4:35 P.M. decided to try to retrieve golf balls that I knew I had sliced off into the field in question the balls had been there since last fall but are hard to find due to the fact our field in this county (are no till) after finding four golf balls and knowing there were more I ventured some where 110 feet further back into the field came across a 12 foot in diameter circle.
> I returned home grabbed my Sony handy cam and returned to the location of the circle photographed and took video of the said circle I returned to the area around 5:00 P.M. after inspecting it to be sure I wasn't just seeing what I wanted

to see or that it might be something explainable I returned home showed the photo's to my mother, she then proceeds to tell me she could swear she saw something strange in the sky to the north west of our home in the sky I can not on the other hand confirm this myself(in other word I did not see this object).
After reviewing the photo's and video clips I called a close friend told him I had found something I wanted to get his opinion at about seven thirty we left my home headed to the site I waited to discus the situation with him until we arrived we took more video measured the area and took soil samples while taking video for evidence one sample within the circular pattern and one soil sample from just outside.
The circular pattern was completely dry while outside of it was damp or moist this is visible in one of my photo's that I will attach to this report it looked as if someone lay a round pattern on the ground and dried the inner part with a hair drier making a perfect dry pattern in the end.
There is a pile of dead corn stalks and bean stalks inside the circle that seem to show evidence of a swirl pattern (not well defined but seems to be a slight swirl) to the outer part of the circle the story is different there's an inch or more of plant matter that has been moved in what looks to be an evident swirl pattern around said area, there is more but I'm out of room here, we returned on the 22nd with metal detector compass and a stud finder to test for anything abnormal we got nothing with the metal detector or compass the stud finder on the other hand acted strange which I did not expect and this means nothing to me it was just an idea and these items were all we had to investigate with.
If there is anything that you may want to know further you are welcome to contact me though I do not want to be hounded by outside sources other than MUFON, and or MUFON investigators in short what I'm saying here is that I don't desire having government officials pulling into my drive way thinking their going to take my camera because I stumbled into something that I may have not been meant to see, so I'm opting the circle below to not have any other person other than a MUFON rep or investigator to have my contact info and would be glad to answer any questions just look at the pictures below and tell me is this normal?"

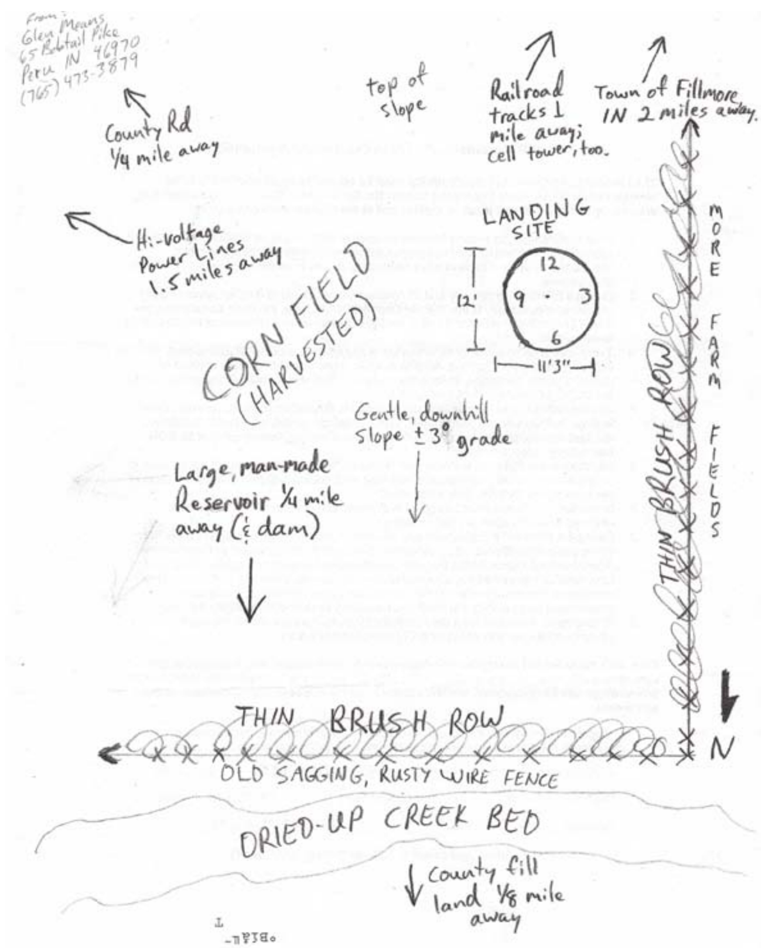
The object is to determine if there are any anomalies in the "landing zone" soil. Following are photographs of the site (courtesy of Glen Means).


The entire site looking north.


The center of the site.

The site looking north
(taken from the center).

Following is a plot of the area by Glen Means:




## **Conclusions:**

•No significant compositional differences are noted between the landing zone soils and the control soils. They are composed primarily of clay (montmorillinite-type) and sand (mostly quartz-type, $SiO_2$), which is a typical soil mineral mix. Small amounts of other typical sand-type components are detected such as calcite, limestone and feldspar grains. The grains have a natural weathered appearance that indicate that they are probably native, as opposed to some commercial or high purity form of sand ($SiO_2$). No <u>significant</u> amounts of other materials are detected. This shows that nothing has been deposited.

•The crystalline material in the LZ soils is identified as quartz ($SiO_2$), i.e. sand derived. It is also present in the control soils.

•The soils have not been exposed to heat. There is no evidence for glass, nor did the old vegetation (corn stalks from the previous year) appear to be burned.

•No radiation or <u>significant</u> amounts fluorescing materials are detected. A trace amount of natural ferromagnetic material is attracted to a magnet.

•Three tiny (micron sizes) fluorescing particles were observed. They were nothing unusual. One was identified as a combination of sodium poly(acrylic acid/acrylamide) copolymer and a refined carbohydrate. This is speculated to be an agricultural chemical. The other is a protein from animal origin, i.e. dried animal tissue. The last particle was a leaf fragment.

**<u>Speculations:</u>**

One possible model for the formation of the large grained sandy soil ring areas that deserves to be offered is as follows:

A small diameter natural air vortex or dust devil over the field may have applied enough tangential wind force at the ground level to literally “whisk” or sweep up smaller grained dust or clay particles from the soil surface. The soil surface remaining would present larger, heavier sand grains, and likely appear lighter in hue. Electrostatic force from the mechanical separation might remain for some time if no rain falls and humidity is low. Thus, we could have a ring shaped annular zone of light grained sandy soil, swirled organic matter, AND residual electrostatic charge. This is only a crude hypothesis, but could potentially be tested in the same or similar field, under similar weather conditions, with a gas powered leaf blower.

We also cannot rule out the idea that an air vortex from an unusual aerial craft may not produce a similar effect.

## Procedure:

All samples were submitted by Glen Means in Ziploc bags with the following information:

**(Surface Soil Samples Received by Phyllis Budinger on April 1, 2009)**

- Glass/crystal frags. taken inside LZ (Landing Zone) circle (9 & 12 o'clock) 2/23/09.
- Soil from 3 o'clock position inside LZ circle 3/23/09.
- Soil from 6 o'clock position inside LZ circle 3/23/09.
- Soil from 9 o'clock position inside LZ circle (Note: high amount of glass and warm temps in this zone) 3/23/09.
- Soil from 12 o'clock position inside of LZ circle 3/23/09.
- Soil sample from center point inside LZ circle 3/23/09.

- Control sample (taken 10' outside LZ to east) 3/23/09.
- Control sample (taken 10' outside LZ to south) 3/23/09.
- Control sample (taken 10' outside LZ to west) 3/23/09.
- Control sample (taken 10' outside LZ to north) 2/23/09.

Infrared spectra were obtained from all samples. The spectra were taken on the Thermo Electron Avatar 360 spectrometer using the Smart Herrick diamond sampling accessory. These samples were sent to Nick Reiter for EDS/SEM analysis. He did this analysis on select soil samples from: 6 o'clock; 9 o'clock; center; control north; control west.

**(Fluorescing Particulates Received by Phyllis Budinger, via Nick Reiter, on April 18, 2009. They were initially observed and isolated by Nick Reiter from the above samples.)**

- Grain 1 from glass/crystal frags. taken inside LZ circle (9 & 12 o'clock) 2/23/09.
- Grain 2 from 6 o'clock position inside LZ circle 3/23/09.

Both infrared analysis and SEM/EDS analyses were done on these samples.

**(Bulk and Core Soil Samples Received by Nick Reiter on April 10, 2009. They were received by Phyllis Budinger, via Nick Reiter, on April 27, 2009.)**

- Bulk LZ Soil (Inside Circle)
- Bulk Control Soil – 30' West of Circle
- Core Soil Inside Circle 0 – 6" Deep
- Core Soil Inside Circle 6 – 12" Deep

Infrared analysis was done on the four samples. They were sent to Brookside Laboratories, Inc. for a soil audit. Additionally, the samples were tested for radiation, UV fluorescing material, and any material attracted to a magnet by both Nick Reiter and Phyllis Budinger.

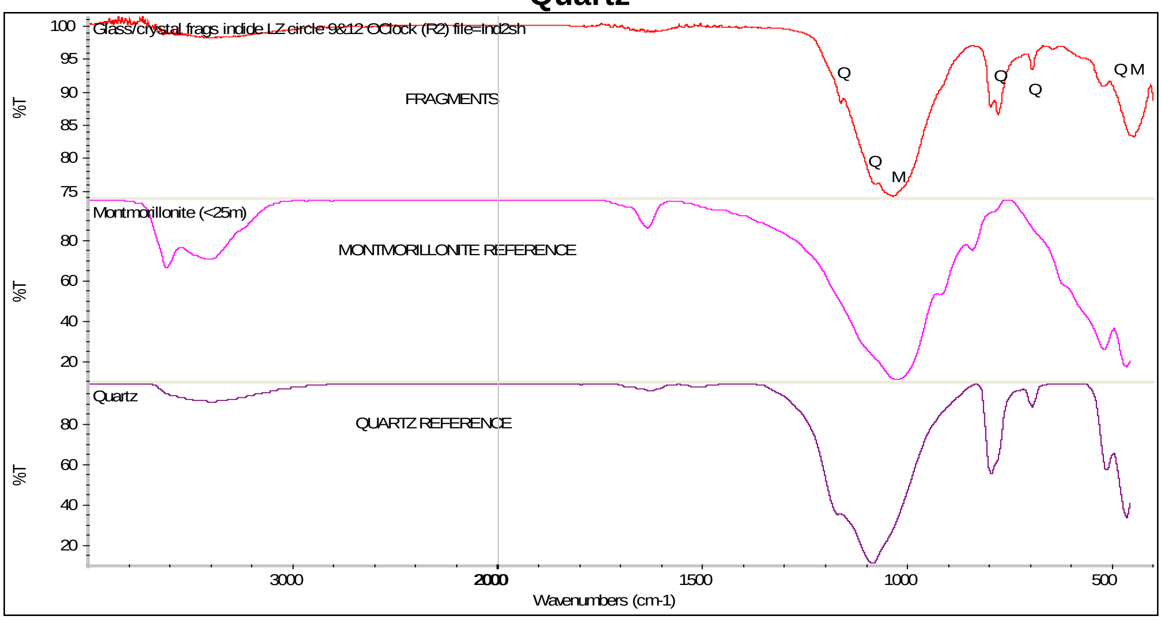
## **Results**:

The results of the individual tests done on the soils follow. These results are summarized in the conclusions section on pages three and four of this report. The original report, as written by Nick Reiter, on the SEM and elemental analyses can be found in the appendix. Parts of his report are interspersed with the other tests, where appropriate, in this results section.

## Analysis of Crystal Fragments Isolated from 9 and 12 o'clock Soils

**Infrared Analysis:**[1] Initial spectra show a combination of a clay-type mineral and sand (quartz). The clay mineral displays absorption bands comparable to a montmorillonite-type (hydrated sodium calcium aluminum magnesium silicate hydroxide). Following are spectra of the fragments, along with references of montmorillonite and quartz for comparison.

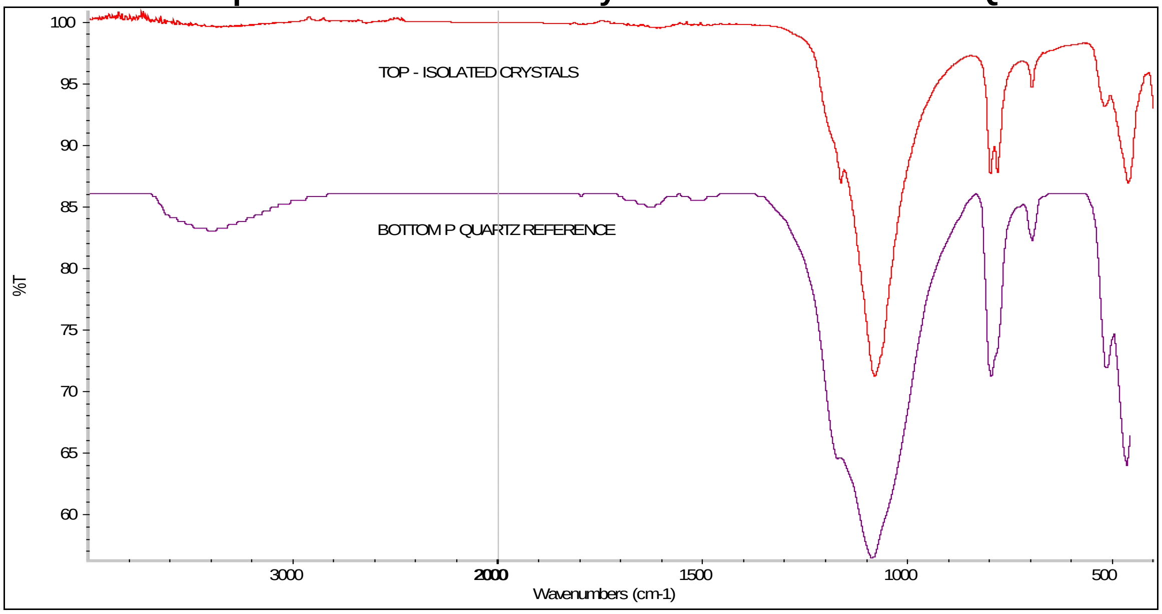
**Infrared Spectra of Fragments and References of Montmorillonite Clay and Quartz**




[1] **FT-IR (Fourier Transform Infrared Spectroscopy):** Infrared spectroscopy is used for the molecular structure identification and quantification of solids, liquids, and gases. An infrared spectrum is the result of light (in the 2 to 25 micron wavelength range) interacting with the vibrations of molecules. The particular set of vibrations of a molecule gives rise to specific spectral absorption bands, often referred to as the "fingerprint" spectrum.

The crystalline species were isolated further from the clay in this sample by carefully washing with distilled water. Infrared spectra of the shiny crystals identify them as quartz. No glassy-type material is present. Following are spectra of an isolated crystal and a reference of quartz for comparison.

**Infrared Spectra of the Isolated Crystal and a Reference of Quartz**




**SEM/EDS Analysis:**[2] SEM/EDS analysis was also done on a crystal appearing particle from the 9 and 12 o'clock samples. The SEM photograph of a glass-like particle is typical in appearance to quartz (sand). The EDS elemental analysis of this particle shows it is composed of only silicon and oxygen. That is, it is $SiO_2$

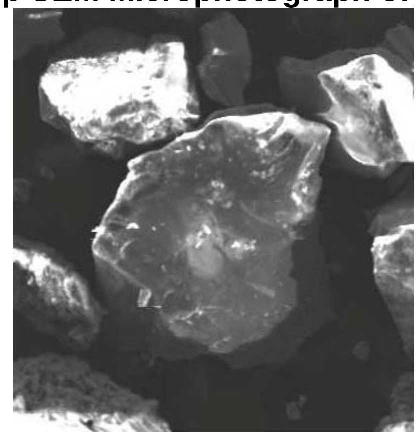
[2] **SEM (Scanning Electron Microscopy):** Scanning Electron Microscopy (SEM) is a method for characterizing the topography and texture of rough or polished materials over a large magnification range (25 to 100,000x) while maintaining substantial depth of focus. A beam of electrons is systematically scanned in raster fashion across a sample. The result is a variety of electron-induced signals that provide a great deal of morphological, physical, and chemical information about a sample. These signals include secondary electrons, backscattered electrons, and characteristic X-rays. Secondary electrons form the signal primarily used to produce SEM images of the sample.

**EDS (Energy Dispersive X-ray Spectroscopy):** XRF identifies elements and their semi-quantitative amounts. Samples are stimulated with X-rays which causes them to emit X-ray fluorescence radiation. This emitted radiation is resolved into a spectrum characteristic of each element.

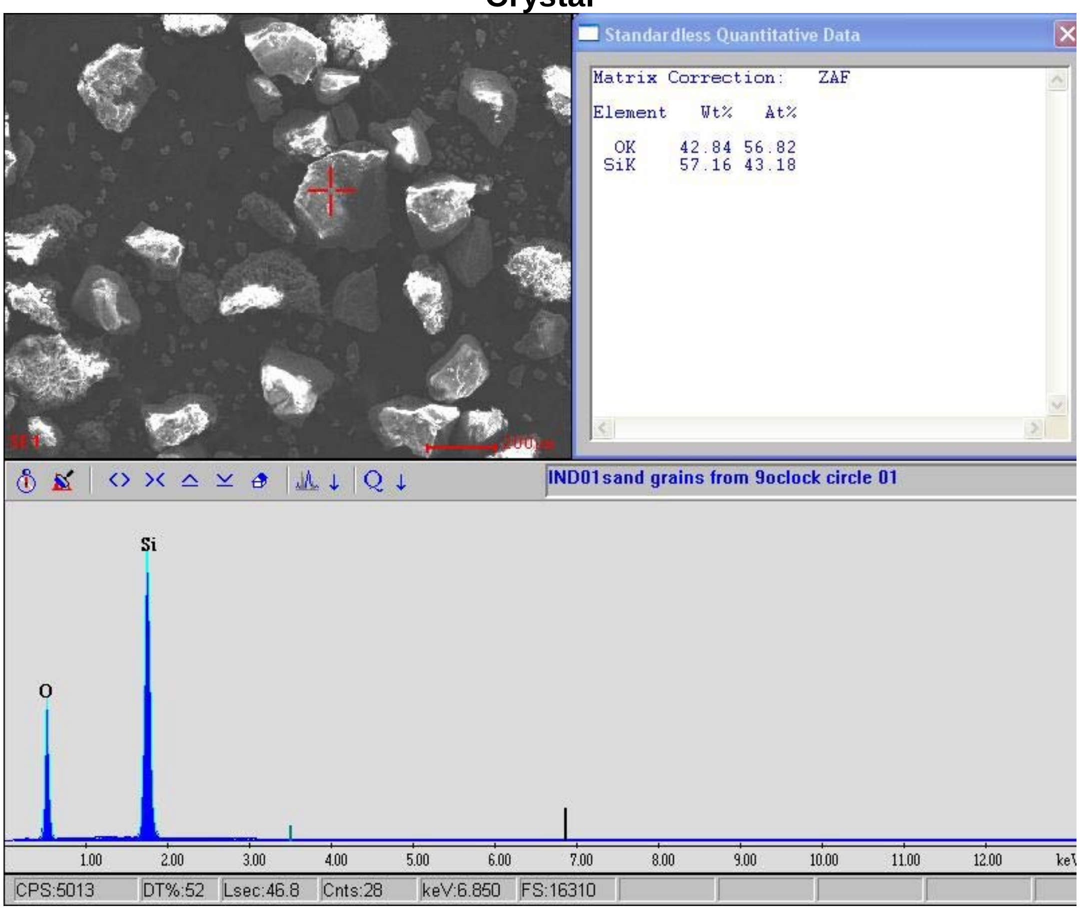
**SEM/EDX (Scanning Electron Microscopy/Energy Dispersive X-ray Spectroscopy):** This is an elemental identification using an energy dispersive X-ray (see EDX definition) system interfaced to a scanning electron microscope (see SEM definition).

which is the quartz composition. This supports the above infrared identification of quartz. Following is the SEM microphotograph of the quartz, along with the EDS elemental spectrum.

**Close Up SEM Microphotograph of 'Crystal'**



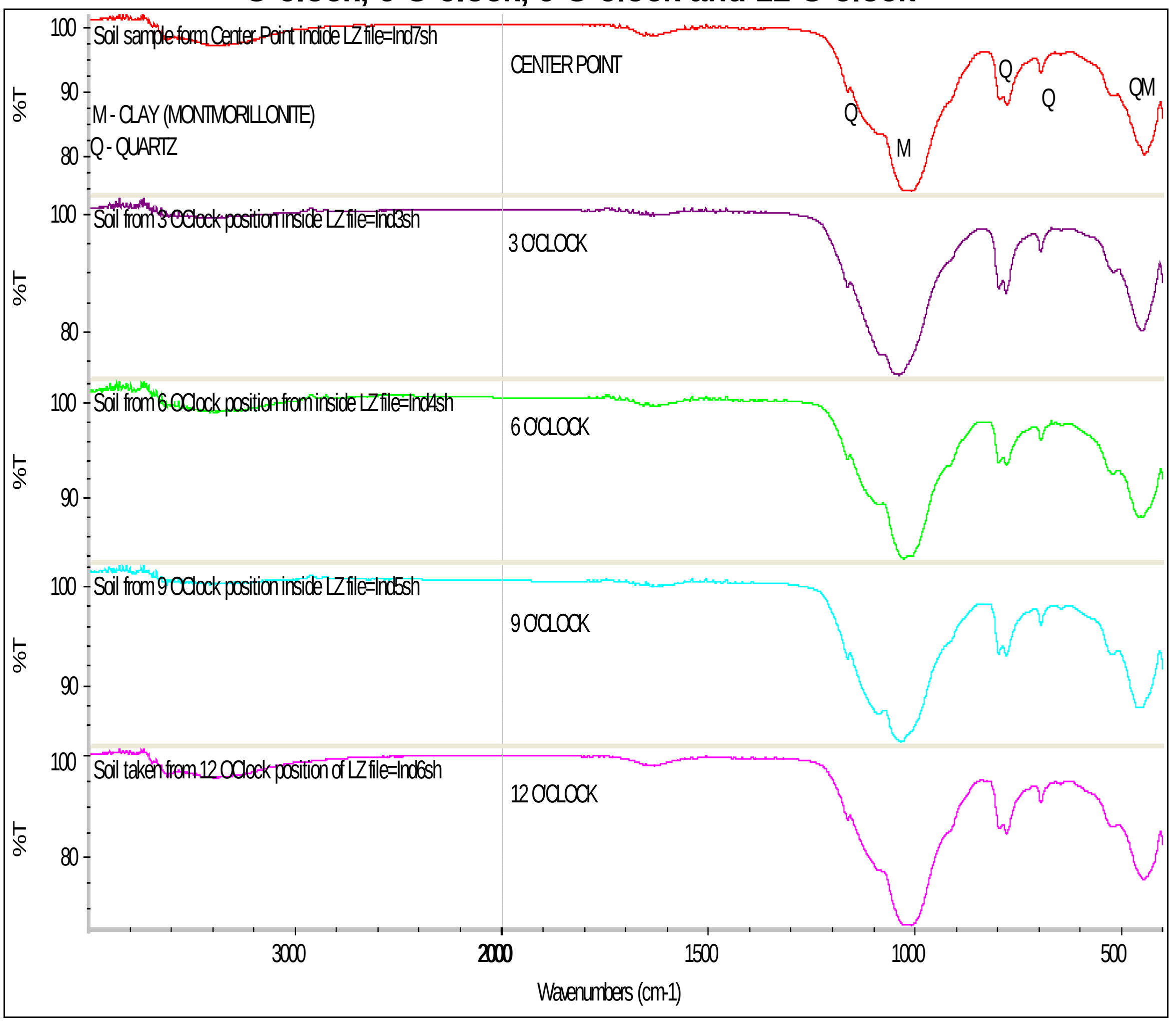
**SEM Microphotograph (Lower Mag) and EDS Elemental Spectrum of "Crystal"**



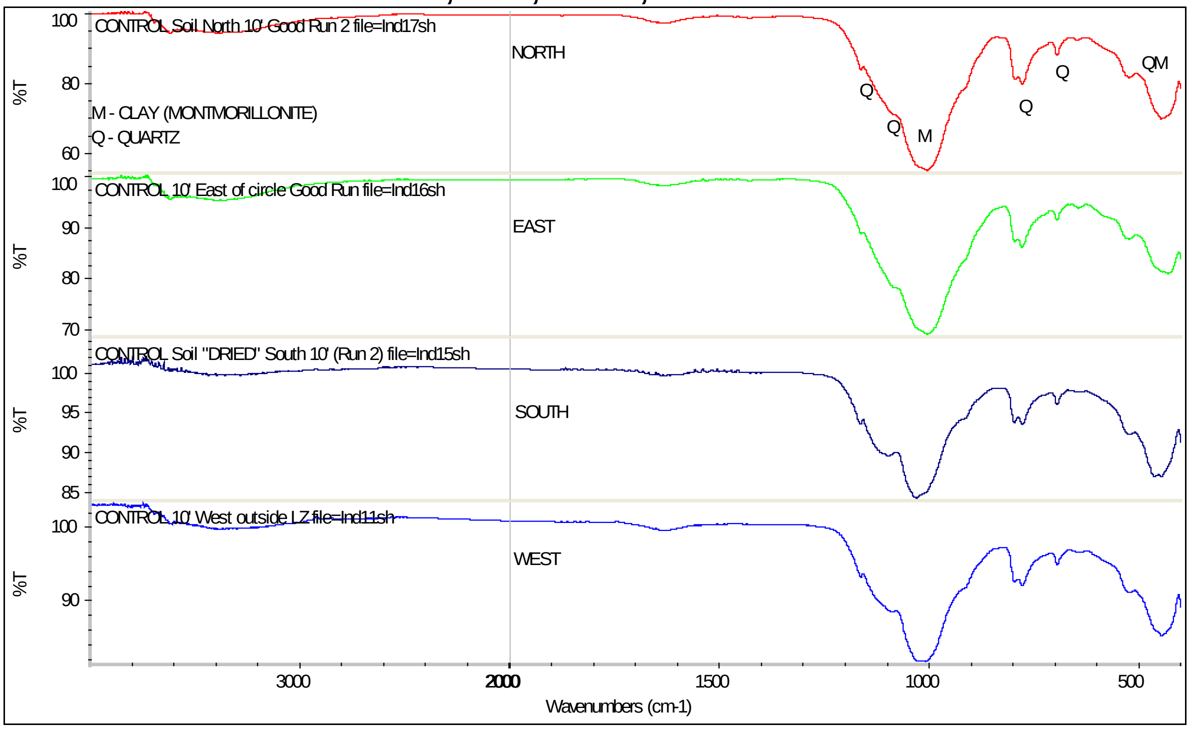
## Analysis of Assorted Ring Soils (3 O'clock, 6 O'clock, 9 O'clock and 12 O'clock) and Comparison to Control Soils (10' Outside LZ: East, South, West and North)

**Infrared Analysis:** The analysis of both the landing zone soils and control soils display no significant differences between them. They appear virtually the same. The spectra show only clay (montmorillonite type) and quartz. There seems to be subtle variances in the amounts of these two minerals, though that could be due to the sampling. Following are the spectra of the landing soils followed by the control soils taken 10' north, east, south and west of the landing zone.

**Infrared Spectra of Landing Zone Soils Taken from: The Center Point, 3 O'clock, 6 O'clock, 9 O'clock and 12 O'clock**



**Infrared Spectra of the Control Soils Taken 10' from the Landing Zone: North, East, South, and West**




**SEM/EDS Analysis:** EDS spectra and SEM microphotographs, located in the appendix, represent our findings for five selected soils, i.e. three ring samples (6 o'clock, 9 o'clock, ring center) and two control samples (north, west). To compare basic soil properties in a semi-quantitative way by EDS, we selected from each sample portion a grain of clay, and examined these at meaningful magnifications and similar spot sizes. The EDS plots were then examined for relative peak heights of the typical elements found – C, O, Na, Mg, Al, Si, K, Ti, and Fe. Following is a table of the results.

**Comparative signal amplitude for several primary elements in the clay fraction of soils from IND01 - all values are in at%**

| | 6 o'clock Ring | 9 o'clock Ring | Ring center zone | North Control | West Control |
|---|---|---|---|---|---|
| C | 15.45 | 12.47 | 20.27 | 13.88 | 15.99 |
| O | 46.05 | 44.17 | 42.94 | 42.17 | 44.14 |
| Na | 0.78 | 0.57 | 0.46 | 0.47 | 0.49 |
| Mg | 0.36 | 0.36 | 0.32 | 0.29 | 0.35 |
| Al | 3.84 | 4.12 | 3.9 | 3.75 | 4.23 |
| Si | 27.55 | 31.45 | 25.8 | 30.67 | 28.52 |
| K | 1.87 | 2.26 | 2.18 | 2.41 | 1.9 |
| Ti | 0.51 | 0.65 | 0.56 | 0.91 | 0.44 |
| Fe | 3.02 | 3.96 | 3.57 | 5.46 | 3.94 |

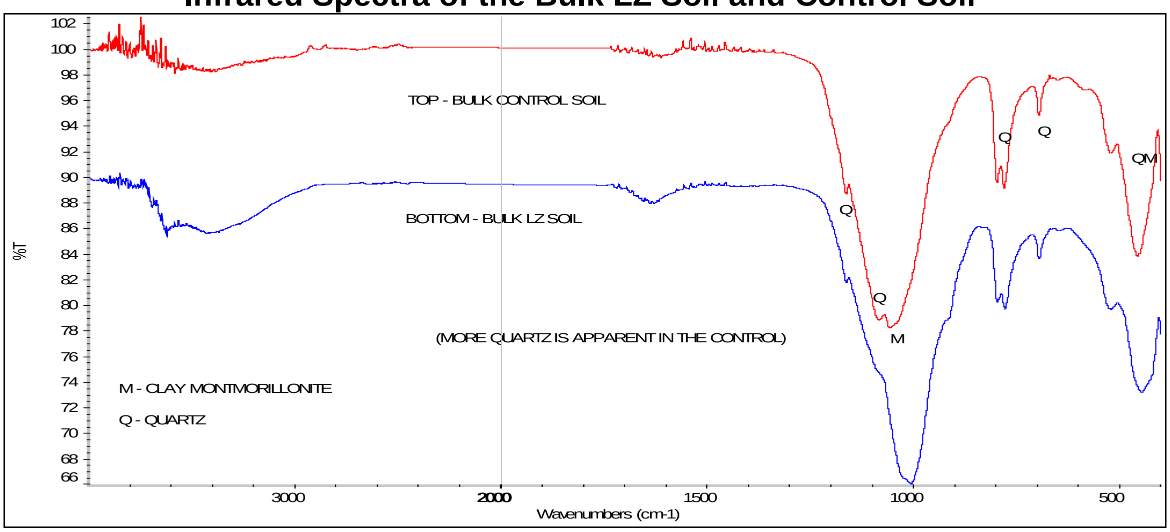
EDS of these “clay fractions” from both control and ring soil shows good consistency in the primary soil components. While no firm guideline for determining significance can be formally derived, because of the comparatively small sample size and small sampling area, it is doubtful from previous experience that there are significant or meaningful deviations in the clay fraction samples, nor were any surprising elemental traces found. Essentially, the soil samples from this perspective were very similar – nothing conclusive could be seen that would denote a distinguishing of the ring area from control.

The sand grains found on the ring soil surface represent several species – $SiO_2$, and apparently some calcite, limestone, and feldspar grains. No grains had anything other than a natural weathered appearance, which indicated the sand was probably native – as opposed to some commercial or high purity form of $SiO_2$ deposited onto the soil.

## Analysis of the Bulk Soil

**Infrared Analysis:** Like the assorted LZ samples discussed on pages 8 and 9, the spectrum of the LZ bulk soil shows clay (montmorillinite-type) and quartz. No differences or other components are obvious. Following are the spectra.

**Infrared Spectra of the Bulk LZ Soil and Control Soil**



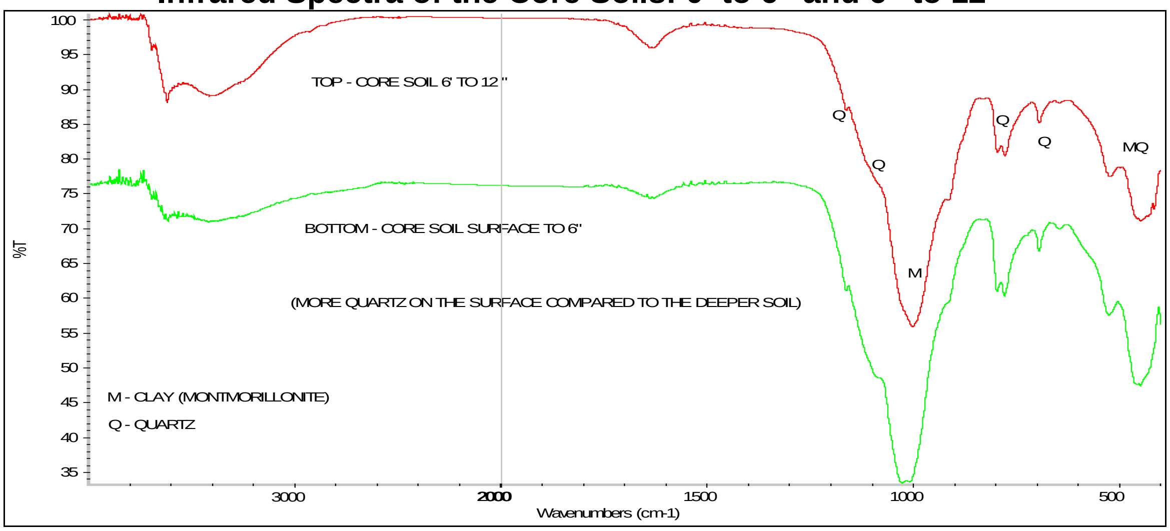

**Brookside Laboratories Soil Audit Analysis:** A number of soil related tests were done by Brookside. The complete set of data can be found in the appendix. The only <u>potentially</u> significant differences noted between the LZ soil and the bulk control soil are the amounts of cationic calcium, magnesium and potassium between the two samples. There is more calcium and magnesium in the LZ soil, while there is less potassium. We are unable to explain these differences. They are subtle, and it is unknown if they are relevant. Following is a table showing the data.

| Exchangeable Cation Elements | Control West (ppm) | LZ (ppm) |
|---|---|---|
| Calcium | 777 | 1230 |
| Magnesium | 119 | 200 |
| Potassium | 204 | 183 |

## Analysis of the Core Soils

**Infrared Analysis:** Spectra of the 0" to 6" and the 6" to 12" core soils expectedly show only clay (montmorillinite-type) and quartz. No significant differences are displayed. Following are the infrared spectra of both core samples.

**Infrared Spectra of the Core Soils: 0' to 6" and 6" to 12"**




**Brookside Laboratories Soil Audit Analysis:** The complete set of soil related tests done by Brookside can be found in the appendix. Potentially significant, though subtle, are differences noted between cationic calcium, magnesium and potassium in the 0 – 6" depth soil and 6-12" depth soil. There is more calcium and magnesium in the shallow sample and less potassium. Like the above bulk samples, we have no explanation for this, nor do we know if it is relevant. Following is a table showing these results.

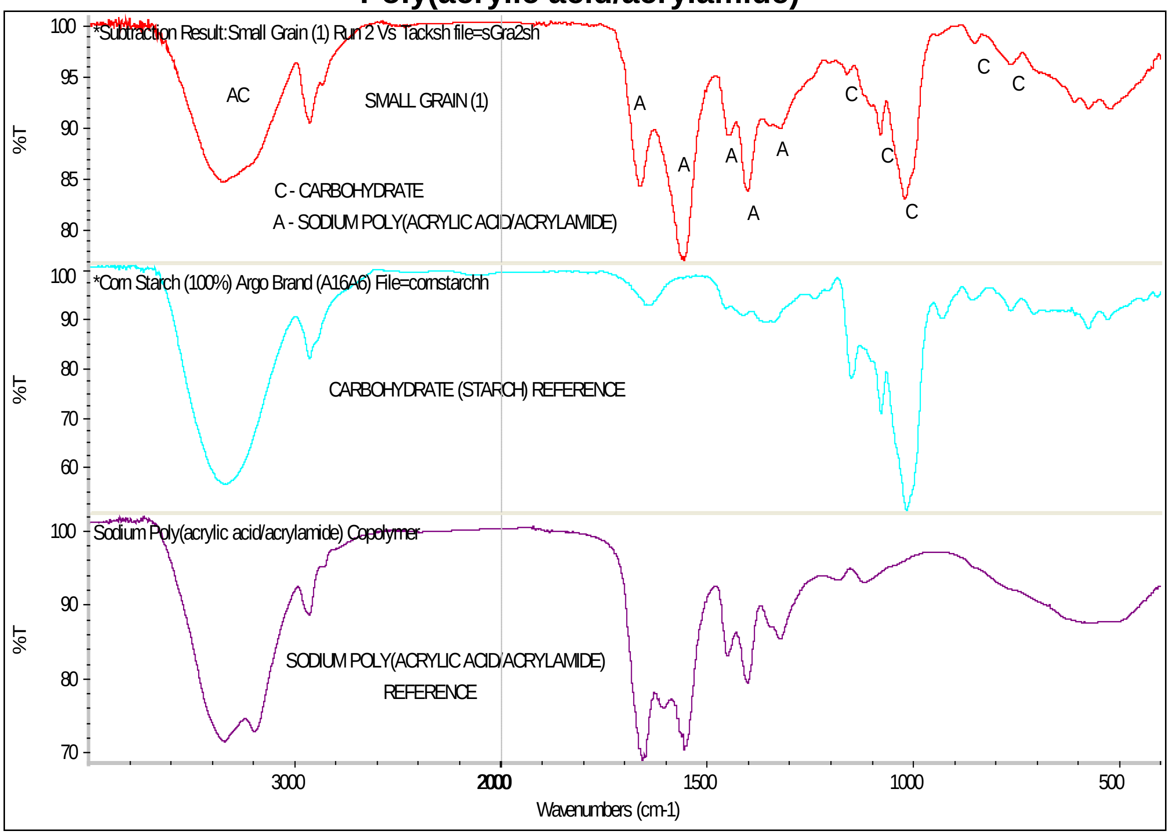
| Exchangeable Cation Elements | 0 – 6 Inches Depth (ppm) | 6 – 12 Inches Depth (ppm) |
|---|---|---|
| Calcium | 1586 | 1956 |
| Magnesium | 216 | 279 |
| Potassium | 118 | 87 |

# Analysis of Fluorescing Grains from the Landing Zone Soil

## (Grain 1 from Glass/crystal Frags. Sample Taken Inside LZ Circle (9 & 12 O'clock) 2/23/09)

**Infrared analysis:** A spectrum of a small grain (roughly 300 μ) from the 9 & 12 o'clock crystal composite shows it is composed of both sodium poly(acrylic acid/acrylamide) copolymer, and a refined carbohydrate similar to starch or flour. Both are not unusual, and probably related to an agricultural chemical. Following is the spectrum along with references of starch (a carbohydrate) and sodium poly(acrylic acid/acrylamide) for comparison.

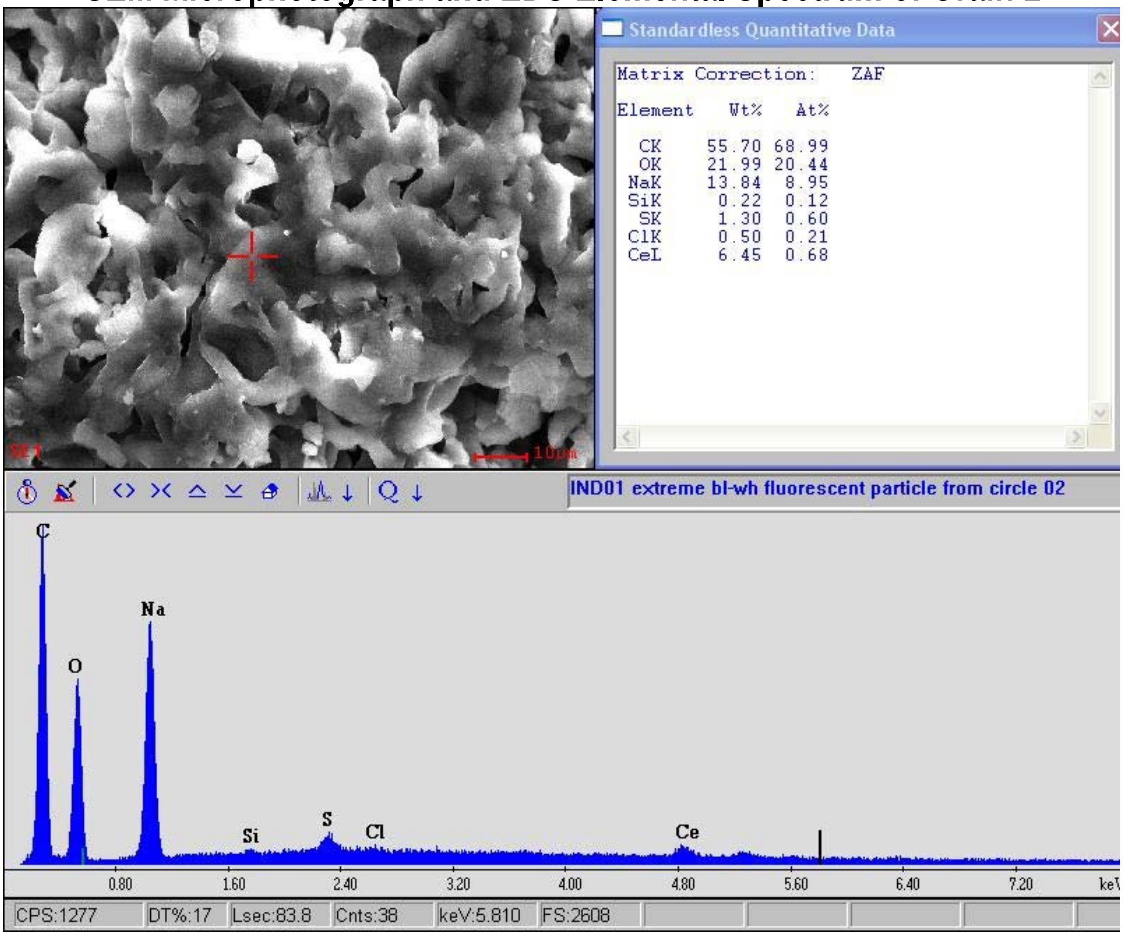
**Infrared Spectra of Grain 1 and References of a Carbohydrate and Sodium Poly(acrylic acid/acrylamide)**




**SEM/ EDS Analysis:** The EDS elemental analysis supports the infrared identification of sodium poly(acrylic acid/acrylamide) copolymer, and a refined carbohydrate. These data show the material is organic by the high carbon and oxygen content. Moreover, it shows high sodium. Nitrogen, which is indicated to be present by the poly(acrylamide) portion of the copolymer, is not detected by EDS because it is masked by the carbon and oxygen peaks. (All three elements produce peaks very close to each other and often nitrogen, when present, cannot be seen.) There are very small amounts of silicon, sulfur, chlorine, and cerium.

The silicon and possibly sulfur (may be in sulfate form), are from dirt contamination. It is unknown why cerium is present. Following are the SEM microphotograph and EDS elemental results.

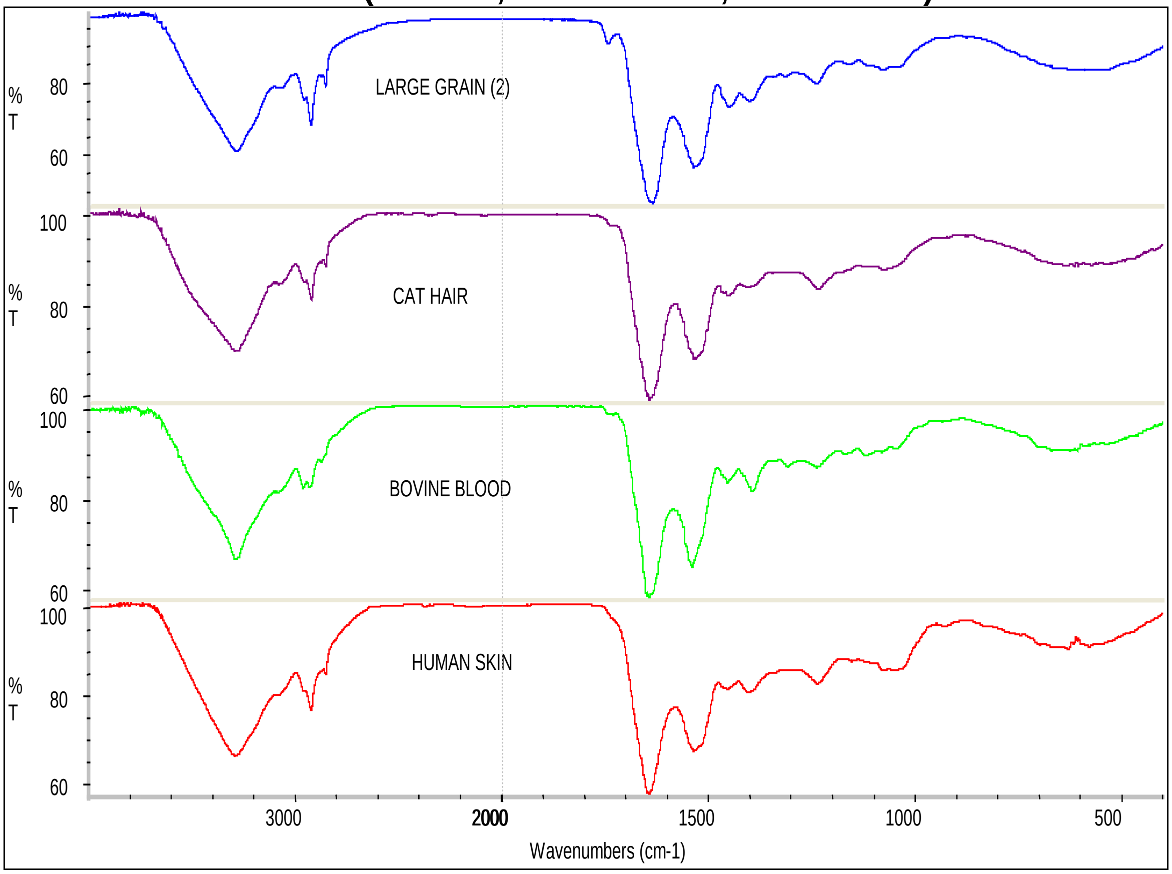
**SEM Microphotograph and EDS Elemental Spectrum of Grain 1**




**(Grain 2 from 6 o'clock position sample inside LZ circle 3/23/09)**

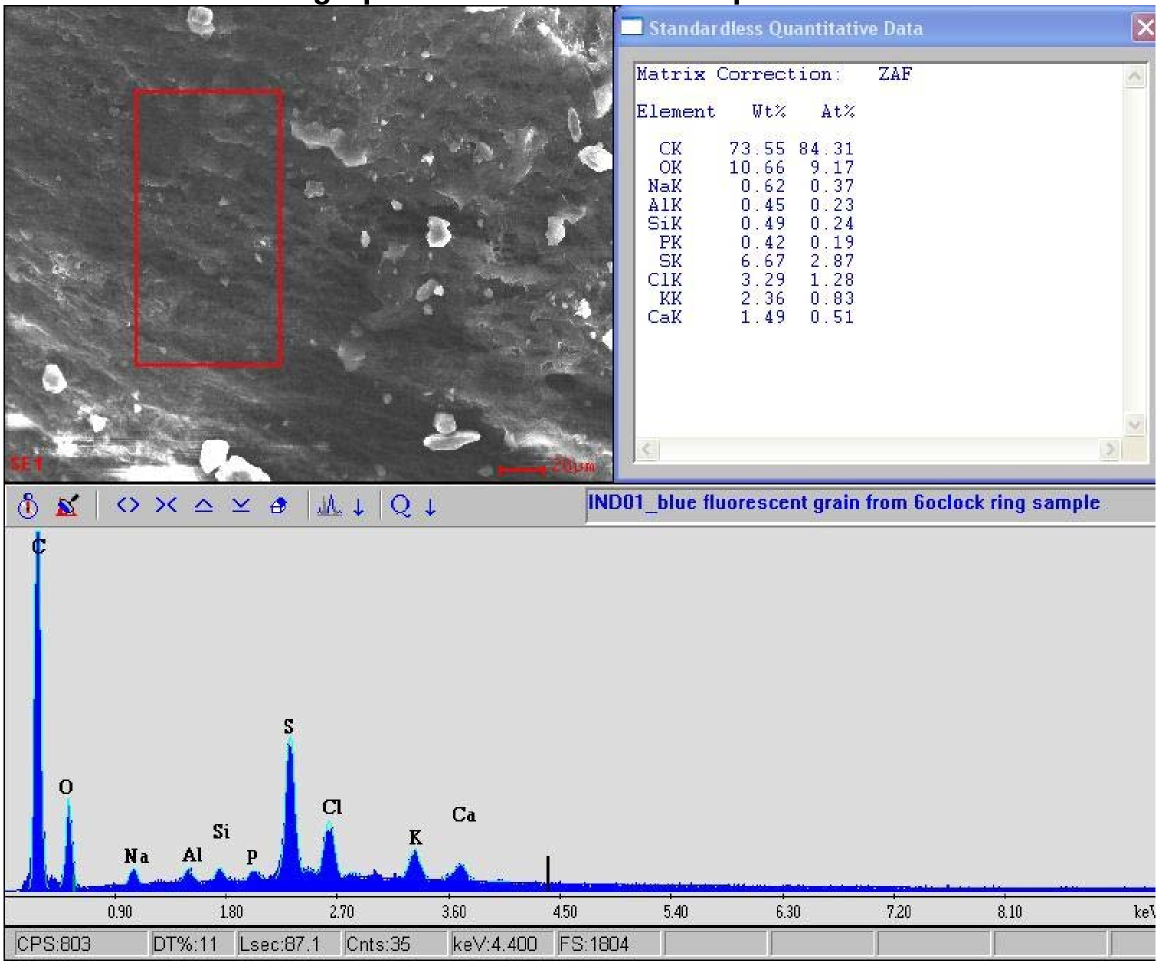
**Infrared Analysis:** The infrared spectrum of the second grain identifies it as a protein from an animal origin. A small amount of natural ester is also present. Following is the spectrum along with various protein sources from animals for comparison.

**Infrared Spectra of Grain 2 and References of Typical Animal Derived Proteins (Cat Hair, Bovine Blood, Human Skin)**




**SEM/EDS Analysis:** This analysis supports the infrared analysis by indicating it is organic. The data show high carbon and oxygen content. Infrared analysis additionally shows nitrogen present as identified by the protein structure. It is not detected by EDS because it is masked by the carbon and oxygen peaks (see above grain 1 discussion). Small amounts of residual dirt on the grain are indicated by the presence of aluminum, silicon, calcium and possibly sulfur. Trace agricultural chemicals could be indicated by the presence of phosphorus and potassium. The SEM microphotograph and EDS elemental results follow.

## SEM Photograph and EDS Elemental Spectrum of Grain 2




**<u>Acknowledgements:</u>** We would like to thank Indiana MUFON, the Star Team and <u>especially</u> Glen Means for their assistance in procuring any additional samples we asked for, and providing as much background as they had available on the event. They were a pleasure to work with. And, my personal (Phyllis Budinger) special thanks go to Nick Reiter for contributing his expertise in EDS/SEM analysis and knowledge of soil analysis. He is <u>always</u> a pleasure to work with!

File: UT063
CC:
CMS
James Carrion
Richard Lang

Phyllis A. Budinger

Nick A. Reiter

# APPENDIX

- Nick Reiter's Original Report
- SEM/EDS Data: Three LZ Soils (6 o'clock, 9 o'clock, center) and two control samples (north, west).
- Brookside Soil Audit and Inventory Report

## Final Report for Case IND01: Analysis of Soil and Soil Artifacts Taken from an Agricultural Field Anomaly Discovered in Fulton Co. Indiana, March 2009

N. A. Reiter, on behalf of The Avalon Foundation and Frontier Analysis

Submitted 25 May 2009

### Case Description:

On 21 March, 2009, a farmer and landowner in Fulton County, Indiana discovered an approximate 12 foot diameter ring or annulus of apparently altered soil in a field near his home. This feature was documented promptly by the farmer, and reported within a few days to local MUFON representatives. Another member of the farmer's family claimed upon the discovery of the circle that a few days previous, she had witnessed "something strange in the sky to the north west of our home."

Indiana MUFON was given case authority, and soil samples were taken in a diligent and meaningful fashion. An initial round of small volume samples were submitted to Phyllis Budinger of Frontier Analysis for IR spectroscopy. Frontier retained a small portion of each sample, and then in turn submitted the balance to us for SEM, EDS, and optical microscopy.

### Analysis Objective:

Our objective in this case was to carefully examine in a both a qualitative and semi-quantitative way the properties of soil and surface residue from both the circular feature and same-field controls. We also agreed to facilitate quantitative analysis at Brookside Laboratories, New Knoxville, Ohio – our usual agricultural analysis resource.

### Chronology:

Initial (small volume) samples were received from Phyllis Budinger on 10 April 2009. EDS and SEM work commenced on 13 April and extended through 20 April. On 16 April, I received directly from Glen Means of Indiana MUFON a larger volume set of soil samples (approx 200g each) from the event site. Four samples were received – one control, one from the ring region (position undefined at the time) and two vertical "core" samples also from the ring region. One core sample represented a 6" depth from the surface, the second was from the same core tube, but represented a depth from 6" to 12". These later samples were dried down, partially pulverized to obtain enough material for agricultural analysis, and partitioned. Soil was sent to Brookside for their S001 test protocol on 24 April, the balance of each sample was then sent on to Phyllis Budinger on 25 April.

## Physical observations:

All soil samples received, except for the small volume of sand or mineral grain material removed from the extreme ring area surface, appears to be a solid, heavy clay with a small sand and silt content. No samples were found to be radioactive, nor were any bulk or isolated anomalies found. Three very small minor particles that exhibited fluorescence were recovered. One of these was a leaf fragment, another appears to be dried animal tissue, and the third was a rounded grain about 300 microns across that Phyllis Budinger agreed to perform IR spectroscopy on. This object turned out to be an identifiable and not-unusual organic (polymer) compound, which PB will detail in her final report.

No bulk fluorescence or unusual textural characteristics were observed. A magnet was dragged in a plastic liner across some samples from both control and ring area. The amount of natural ferromagnetic residue was quite minimal, only a few isolated grains at most from any sample appeared to be influenced

## SEM and EDS results:

The attached EDS plots and SEM photos represent our findings. To compare basic soil properties in a semi-quantitative way by EDS, we selected from each sample portion a grain of clay, and examined these at meaningful magnifications and similar spot sizes. The EDS plots were then examined for relative peak heights of the typical elements found – C, O, Na, Mg, Al, Si, K, Ti, and Fe.

Comparative signal amplitude for several primary elements in the clay fraction of soils from IND01 - all values are in at%

| | 6 o'clock Ring | 9 o'clock Ring | Ring center zone | North Control | West Control |
|---|---|---|---|---|---|
| C | 15.45 | 12.47 | 20.27 | 13.88 | 15.99 |
| O | 46.05 | 44.17 | 42.94 | 42.17 | 44.14 |
| Na | 0.78 | 0.57 | 0.46 | 0.47 | 0.49 |
| Mg | 0.36 | 0.36 | 0.32 | 0.29 | 0.35 |
| Al | 3.84 | 4.12 | 3.9 | 3.75 | 4.23 |
| Si | 27.55 | 31.45 | 25.8 | 30.67 | 28.52 |
| K | 1.87 | 2.26 | 2.18 | 2.41 | 1.9 |
| Ti | 0.51 | 0.65 | 0.56 | 0.91 | 0.44 |
| Fe | 3.02 | 3.96 | 3.57 | 5.46 | 3.94 |

EDS of these "clay fractions" from both control and ring soil shows a good consistency in the primary soil components. While no firm guideline for determining significance can be formally derived, because of the comparatively small sample size and small sampling area, it is doubtful from previous experience that any significant or meaningful deviations was seen in the clay fraction samples, nor were any surprising elemental traces found. Essentially, the soil samples from this perspective were very similar – nothing firm could be seen that would denote a distinguishing of the ring area from control.

The sand grains found on the ring soil surface represent several species – $SiO_2$, and apparently some calcite, limestone, and feldspar grains. No grains had anything other than a natural weathered appearance that indicated the sand was probably native – as opposed to some commercial or high purity form of $SiO_2$ deposited onto the soil.

## **Brookside Laboratories Soil Analysis:**

The four dried and pulverized soil samples described before were sent to Brookside Labs. Turnaround time was approximately 1 week, and we received the full S001 analysis reports. These were scanned and are attached herewith.

As may be seen, some potentially significant differences may be seen between the samples, particularly in cationic K, Ca, and Mg. However, it remains difficult to interpret these differences in terms of the circle structure itself. Due to the difficulty in terminology of describing an annular area, we were mistaken in our understanding of where Mr. Means sampled the core and "extra" soil samples for ag analysis. Finally, we were able to ascertain that the samples of the ring region had not actually been taken in the physically altered region of the ring, but rather the interior space of the ring, where Mr. Means had observed a maximum magnetic anomaly level. As such, we have no sample for comparison to the annular altered soil zone itself. In light of this, it seems unlikely that we can declare any relationship of the altered soil ring to analyzed soil properties.

## **Summary:**

It would be our opinion that no significant alteration or anomalous properties exist in the soil of the ring area, compared to the outer control field area. While some deviation in EDS peak heights exists, up to about 30% from control to ring area, this cannot be said to represent a causal significance without additional samples. We also do not have enough soil samples for complete agricultural analysis to make a proper comparison either.

We must allow Indiana MUFON to incorporate these results in their own summary. Transient or unusual magnetic field distortions and EMI are of course interesting clues for the case, but are typically without baseline reference values.

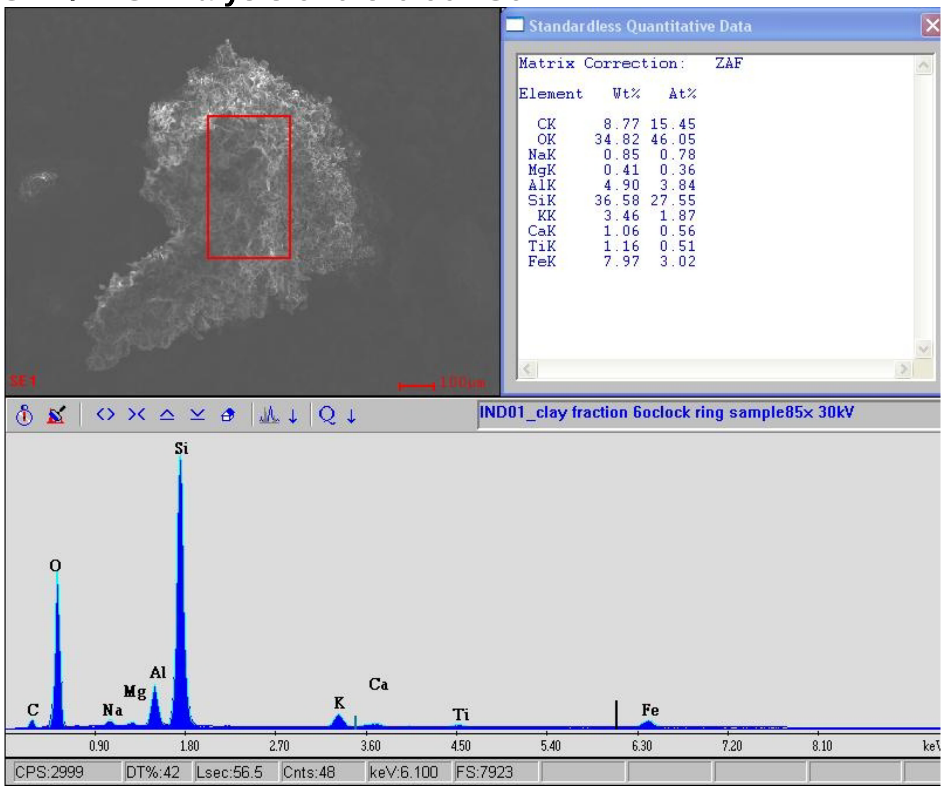
One possible model for the formation of the large grained sandy soil ring areas that deserves to be offered is as follows:

A small diameter natural air vortex or dust devil over the field may have applied enough tangential wind force at the ground level to literally “whisk” or sweep up smaller grained dust or clay particles from the soil surface.  The soil surface thus remaining would present larger heavier sand grains, and likely appear lighter in hue.  Electrostatic force from the mechanical separation might remain for some time if no rain falls and humidity is low.  Thus we could have a ring shaped annular zone of light grained sandy soil, swirled organic matter, AND residual electrostatic charge.  This is only a crude hypothesis, but could potentially be tested in the same or similar field, under similar weather conditions, with a gas powered leaf blower.

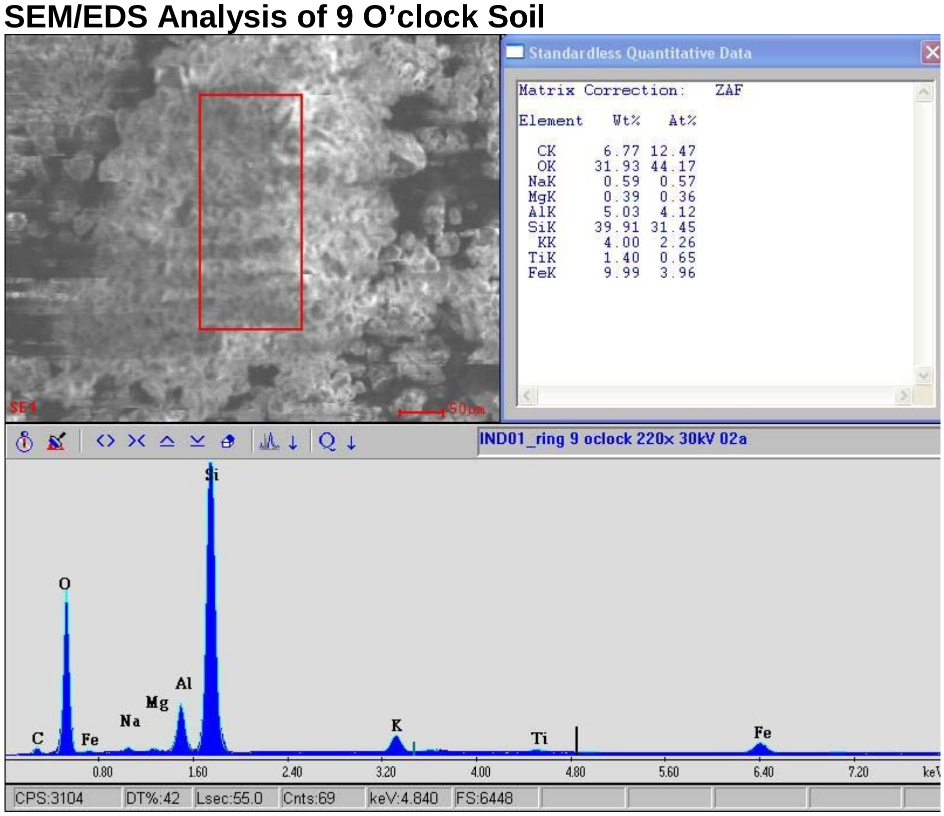
We also cannot rule out the idea that an air vortex from an unusual aerial craft may not produce a similar effect.

In closing, I would like to thank Glen Means, Phyllis Budinger, and Indiana MUFON for their assistance and services.

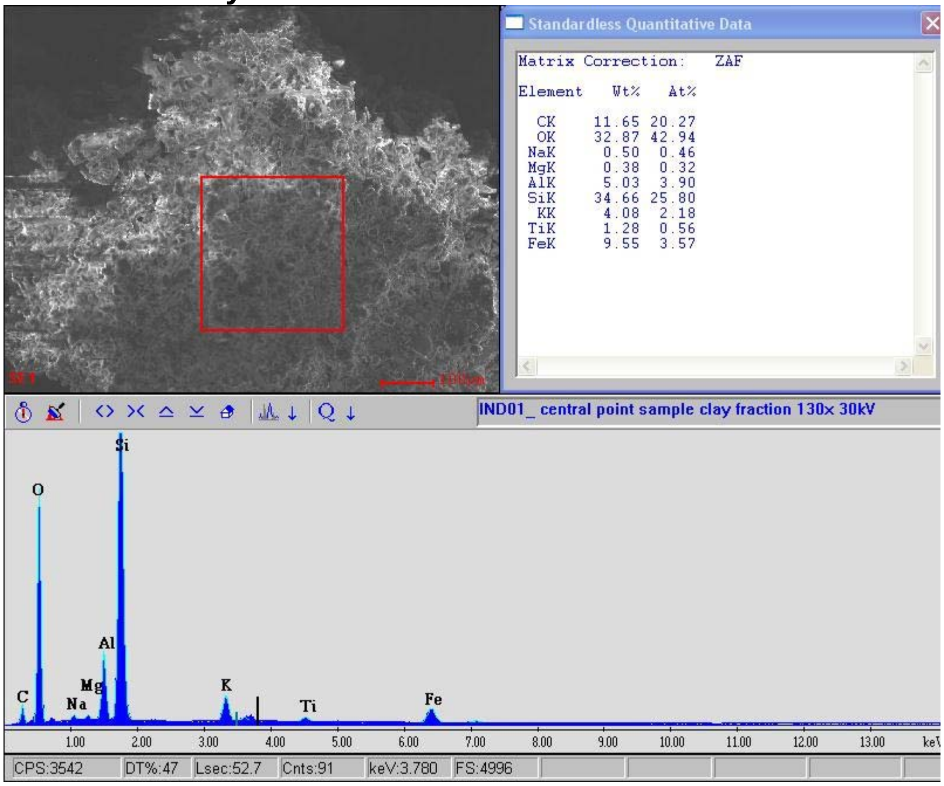
## SEM/EDS Analysis of 6 O'clock Soil




## SEM/EDS Analysis of 9 O'clock Soil

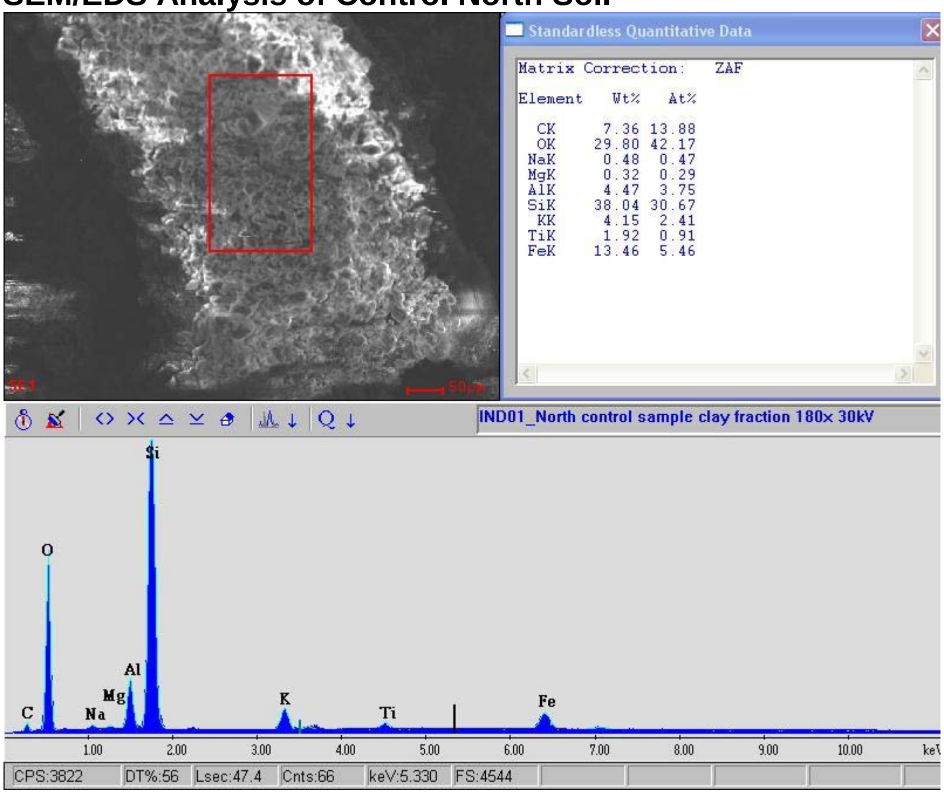


## SEM/EDS Analysis of Central LZ Soil



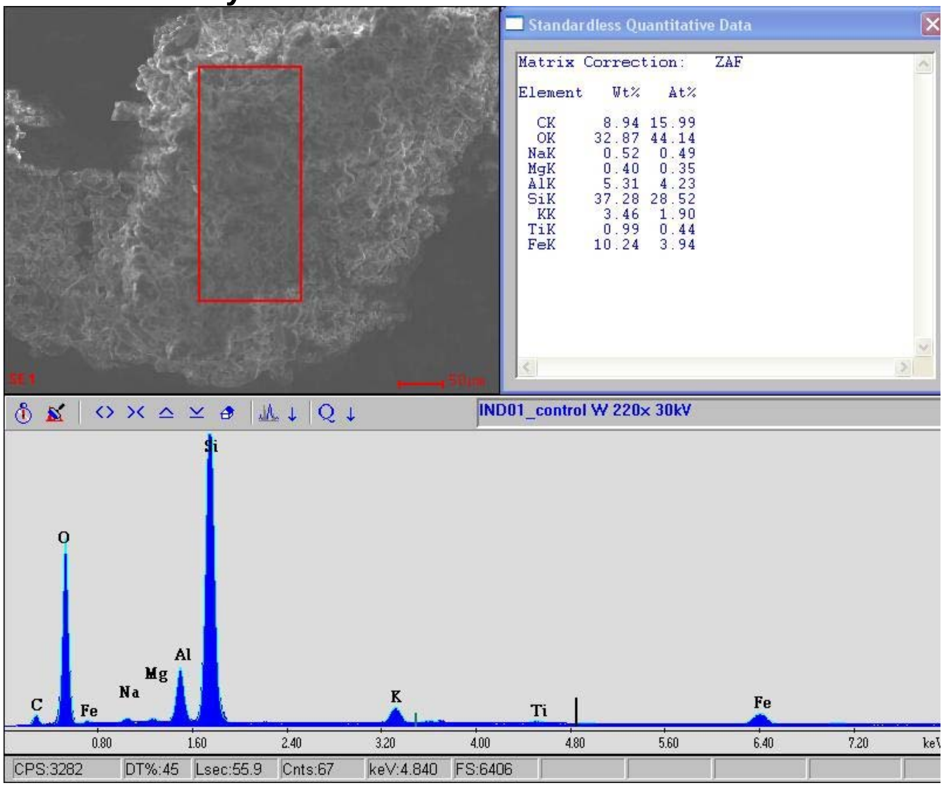

| Element | Wt% | At% |
|---|---|---|
| CK | 11.65 | 20.27 |
| OK | 32.87 | 42.94 |
| NaK | 0.50 | 0.46 |
| MgK | 0.38 | 0.32 |
| AlK | 5.03 | 3.90 |
| SiK | 34.66 | 25.80 |
| KK | 4.08 | 2.18 |
| TiK | 1.28 | 0.56 |
| FeK | 9.55 | 3.57 |

## SEM/EDS Analysis of Control North Soil




| Element | Wt% | At% |
|---|---|---|
| CK | 7.36 | 13.88 |
| OK | 29.80 | 42.17 |
| NaK | 0.48 | 0.47 |
| MgK | 0.32 | 0.29 |
| AlK | 4.47 | 3.75 |
| SiK | 38.04 | 30.67 |
| KK | 4.15 | 2.41 |
| TiK | 1.92 | 0.91 |
| FeK | 13.46 | 5.46 |

## SEM/EDS Analysis of Control West Soil



lb/A 42281-4

# BROOKSIDE LABORATORIES, INC.

## SOIL AUDIT AND INVENTORY REPORT

Name Nick Reiter City Gibsonburg State OH

Independent Consultant Brookside Consultants of Ohio, Inc. Date 04/28/2009

| | | | | | | |
|---|---|---|---|---|---|---|
| Sample Location ~~OTR(OLF)W~~ CONTROL (WEST) | | - | | | | |
| Sample Identification | | | | | | |
| Lab Number | | 0433-1 | | | | |
| Total Exchange Capacity (ME/100 g) | | 13.51 | | | | |
| pH ($H_2O$ 1:1) | | 4.7 | | | | |
| Organic Matter (humus) % | | 2.46 | | | | |
| Estimated Nitrogen Release | lb/A | 70 | | | | |
| ANIONS — SOLUBLE SULFUR* | ppm | 11 | | | | |
| PHOSPHORUS — MEHLICH III | lb/A P as $P_2O_5$ | 97 | | | | |
| | ppm of P | 20 | | | | |
| PHOSPHORUS — BRAY II | lb/A P as $P_2O_5$ | 119 | | | | |
| | ppm of P | 26 | | | | |
| PHOSPHORUS — OLSEN | lb/A P as $P_2O_5$ | | | | | |
| | ppm of P | | | | | |
| EXCHANGEABLE CATIONS — CALCIUM* | lb/A | 1554 | | | | |
| | ppm | 777 | | | | |
| MAGNESIUM* | lb/A | 238 | | | | |
| | ppm | 119 | | | | |
| POTASSIUM* | lb/A | 408 | | | | |
| | ppm | 204 | | | | |
| SODIUM* | lb/A | 64 | | | | |
| | ppm | 32 | | | | |
| **BASE SATURATION PERCENT** | | | | | | |
| Calcium | % | 28.76 | | | | |
| Magnesium | % | 7.34 | | | | |
| Potassium | % | 3.87 | | | | |
| Sodium | % | 1.03 | | | | |
| Other Bases | % | 8.00 | | | | |
| Hydrogen | % | 51.00 | | | | |
| **EXTRACTABLE MINORS** | | | | | | |
| Boron* (ppm) | | < 0.20 | | | | |
| Iron* (ppm) | | 179 | | | | |
| Manganese* (ppm) | | 74 | | | | |
| Copper* (ppm) | | 1.12 | | | | |
| Zinc* (ppm) | | 1.92 | | | | |
| Aluminum* (ppm) | | 735 | | | | |
| | | | | | | |
| OTHER TESTS — Soluble Salts (mmhos/cm) | | | | | | |
| Chlorides (ppm) | | | | | | |
| | | | | | | |

* Mehlich III Extractable

1b/A

# BROOKSIDE LABORATORIES, INC.

42291-4

## SOIL AUDIT AND INVENTORY REPORT

Name Nick Reiter City Gibsonburg State OH

Independent Consultant Brookside Consultants of Ohio, Inc. Date 04/28/2009

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Sample Location CIRCLE 6L | | | - | | | | |
| Sample Identification | | | | | | | |
| Lab Number | | | 0434-1 | | | | |
| Total Exchange Capacity (ME/100 g) | | | 16.31 | | | | |
| pH ($H_2O$ 1:1) | | | 5.9 | | | | |
| Organic Matter (humus) % | | | 1.47 | | | | |
| Estimated Nitrogen Release | | lb/A | 49 | | | | |
| ANIONS | SOLUBLE SULFUR* | ppm | 7 | | | | |
| PHOSPHORUS | MEHLICH III | lb/A P as $P_2O_5$ | 23 | | | | |
| | | ppm of P | 5 | | | | |
| | BRAY II | lb/A P as $P_2O_5$ | 27 | | | | |
| | | ppm of P | 6 | | | | |
| | OLSEN | lb/A P as $P_2O_5$ | | | | | |
| | | ppm of P | | | | | |
| EXCHANGEABLE CATIONS | CALCIUM* | lb/A | 3912 | | | | |
| | | ppm | 1956 | | | | |
| | MAGNESIUM* | lb/A | 558 | | | | |
| | | ppm | 279 | | | | |
| | POTASSIUM* | lb/A | 174 | | | | |
| | | ppm | 87 | | | | |
| | SODIUM* | lb/A | 60 | | | | |
| | | ppm | 30 | | | | |
| **BASE SATURATION PERCENT** | | | | | | | |
| Calcium | | % | 59.96 | | | | |
| Magnesium | | % | 14.26 | | | | |
| Potassium | | % | 1.37 | | | | |
| Sodium | | % | 0.80 | | | | |
| Other Bases | | % | 5.60 | | | | |
| Hydrogen | | % | 18.00 | | | | |
| **EXTRACTABLE MINORS** | | | | | | | |
| Boron* (ppm) | | | < 0.20 | | | | |
| Iron* (ppm) | | | 126 | | | | |
| Manganese* (ppm) | | | 64 | | | | |
| Copper* (ppm) | | | 1.45 | | | | |
| Zinc* (ppm) | | | 1.01 | | | | |
| Aluminum* (ppm) | | | 905 | | | | |
| | | | | | | | |
| OTHER TESTS | Soluble Salts (mmhos/cm) | | | | | | |
| | Chlorides (ppm) | | | | | | |
| | | | | | | | |

* Mehlich III Extractable

lb/A 43291-4

# BROOKSIDE LABORATORIES, INC.

## SOIL AUDIT AND INVENTORY REPORT

Name: Nick Reiter City: Gibsonburg State: OH

Independent Consultant: Brookside Consultants of Ohio, Inc. Date: 04/28/2009

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Sample Location | | CIRCLE 6E | - | | | | |
| Sample Identification | | | | | | | |
| Lab Number | | | 0435-1 | | | | |
| Total Exchange Capacity (ME/100 g) | | | 23.50 | | | | |
| pH ($H_2O$ 1:1) | | | 4.8 | | | | |
| Organic Matter (humus) % | | | 2.24 | | | | |
| Estimated Nitrogen Release | | lb/A | 65 | | | | |
| ANIONS | SOLUBLE SULFUR* | ppm | 12 | | | | |
| PHOSPHORUS | MEHLICH III | lb/A P as $P_2O_5$ | 266 | | | | |
| | | ppm of P | 58 | | | | |
| | BRAY II | lb/A P as $P_2O_5$ | 417 | | | | |
| | | ppm of P | 91 | | | | |
| | OLSEN | lb/A P as $P_2O_5$ | | | | | |
| | | ppm of P | | | | | |
| EXCHANGEABLE CATIONS | CALCIUM* | lb/A | 3172 | | | | |
| | | ppm | 1586 | | | | |
| | MAGNESIUM* | lb/A | 432 | | | | |
| | | ppm | 216 | | | | |
| | POTASSIUM* | lb/A | 236 | | | | |
| | | ppm | 118 | | | | |
| | SODIUM* | lb/A | 54 | | | | |
| | | ppm | 27 | | | | |
| BASE SATURATION PERCENT | | | | | | | |
| | Calcium | % | 33.74 | | | | |
| | Magnesium | % | 7.66 | | | | |
| | Potassium | % | 1.29 | | | | |
| | Sodium | % | 0.50 | | | | |
| | Other Bases | % | 7.80 | | | | |
| | Hydrogen | % | 49.00 | | | | |
| EXTRACTABLE MINORS | | | | | | | |
| | Boron* (ppm) | | < 0.20 | | | | |
| | Iron* (ppm) | | 225 | | | | |
| | Manganese* (ppm) | | 54 | | | | |
| | Copper* (ppm) | | 1.39 | | | | |
| | Zinc* (ppm) | | 2.32 | | | | |
| | Aluminum* (ppm) | | 950 | | | | |
| OTHER TESTS | Soluble Salts (mmhos/cm) | | | | | | |
| | Chlorides (ppm) | | | | | | |

* Mehlich III Extractable

lb/A 43381-4

# BROOKSIDE LABORATORIES, INC.

## SOIL AUDIT AND INVENTORY REPORT

Name: Rick Reiter City: Gibsonburg State: OH

Independent Consultant: Brookside Consultants of Ohio, Inc. Date: 04/28/2005

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Sample Location | | CIRCLE A | | | | | |
| Sample Identification | | | | | | | |
| Lab Number | | 0422-1 | | | | | |
| Total Exchange Capacity (ME/100 g) | | 18.52 | | | | | |
| pH ($H_2O$ 1:1) | | 4.3 | | | | | |
| Organic Matter (humus) % | | 3.13 | | | | | |
| Estimated Nitrogen Release | lb/A | 81 | | | | | |
| ANIONS: SOLUBLE SULFUR* | ppm | 11 | | | | | |
| PHOSPHORUS: MEHLICH III | lb/A P as $P_2O_5$ | 78 | | | | | |
| | ppm of P | 17 | | | | | |
| PHOSPHORUS: BRAY II | lb/A P as $P_2O_5$ | 105 | | | | | |
| | ppm of P | 23 | | | | | |
| PHOSPHORUS: OLSEN | lb/A P as $P_2O_5$ | | | | | | |
| | ppm of P | | | | | | |
| EXCHANGEABLE CATIONS: CALCIUM* | lb/A | 2460 | | | | | |
| | ppm | 1230 | | | | | |
| MAGNESIUM* | lb/A | 400 | | | | | |
| | ppm | 200 | | | | | |
| POTASSIUM* | lb/A | 366 | | | | | |
| | ppm | 183 | | | | | |
| SODIUM* | lb/A | 56 | | | | | |
| | ppm | 28 | | | | | |
| **BASE SATURATION PERCENT** | | | | | | | |
| Calcium | % | 33.21 | | | | | |
| Magnesium | % | 9.00 | | | | | |
| Potassium | % | 2.53 | | | | | |
| Sodium | % | 0.66 | | | | | |
| Other Bases | % | 7.60 | | | | | |
| Hydrogen | % | 47.00 | | | | | |
| **EXTRACTABLE MINORS** | | | | | | | |
| Boron* (ppm) | | < 0.20 | | | | | |
| Iron* (ppm) | | 182 | | | | | |
| Manganese* (ppm) | | 65 | | | | | |
| Copper* (ppm) | | 1.29 | | | | | |
| Zinc* (ppm) | | 2.06 | | | | | |
| Aluminum* (ppm) | | 814 | | | | | |
| OTHER TESTS: Soluble Salts (mmhos/cm) | | | | | | | |
| Chlorides (ppm) | | | | | | | |

* Mehlich III Extractable