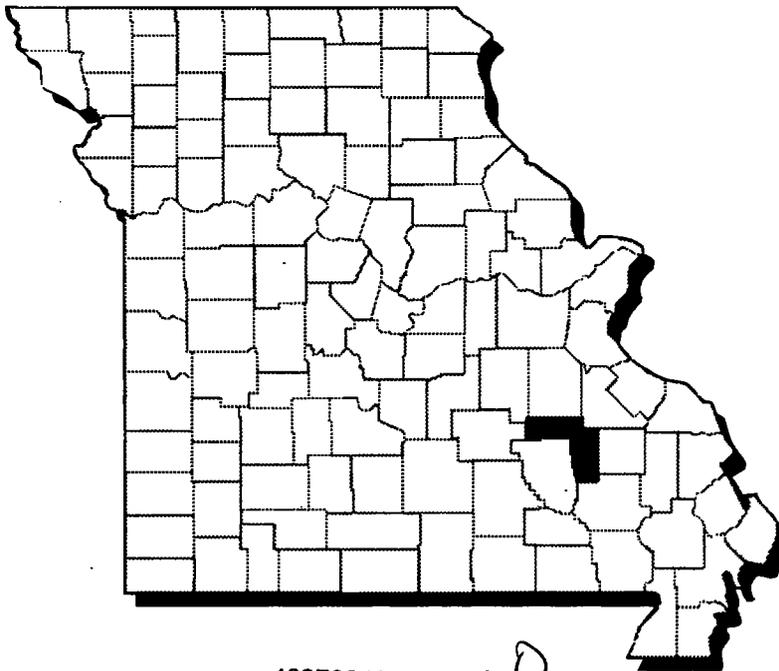


PRE-CERCLIS SITE SCREENING REPORT

St. Joseph Trailer Court Site Iron County, Missouri

June 30, 2000

Site	St. Joseph Trailer
ID #	
Area	1.5
Date	6-30-2000



1.0



Missouri Department of Natural Resources
Division of Environmental Quality
Hazardous Waste Program

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I. SITE SCREENING NARRATIVE REPORT

ST. JOSEPH TRAILER COURT SITE

Site Screening Narrative Report

A. Introduction

The Missouri Department of Natural Resources (DNR), through a Cooperative Agreement (CA V997381-99-0) with the U.S. Environmental Protection Agency (EPA), conducted a Pre-CERCLIS (Comprehensive Environmental Response, Compensation and Liability Information System) Site Screening (SS) at the St. Joseph Trailer Court site in Iron County, Missouri. The purpose of this investigation was to determine whether the site is eligible for entry onto CERCLIS, EPA's inventory of potential hazardous substance sites that are evaluated under the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA).

The St. Joseph Trailer Court site consists of 38 trailer lots that are suspected of containing gravel material in their driveways with elevated lead levels. The site was referred to the DNR from the Missouri Department of Health after a child at one privately owned trailer lot was found to have an elevated blood lead level. An environmental screening at the home, which included collecting soil and gravel samples from the yard, documented extremely elevated lead levels. DNR and DOH were concerned there may be other trailer lots with high lead levels that could potentially contribute to elevated blood levels in trailer occupants.

The SS was initiated on May 21, 1999. The scope of the investigation included review of file information, soil sampling, and collecting additional non-sampling information. A site visit was conducted on May 24, 1999, and SS sampling occurred on January 6, 2000.

B. Site Description

The St. Joseph Trailer Court is located on Court Street, which is on the west side of Highway Y on the northwest side of the city of Viburnum, Missouri. Figure 1 in Section II is a city map showing the site location. The site is in the South Half (S 1/2) of the Northeast Quarter (NE 1/4) of Section 27, Township 35 North, Range 2 West in Iron County, MO (Reference 1). Geographic coordinates for the St. Joseph Trailer Court site, as measured with the Garmin 12XL Global Positioning System unit from the middle of Court Street between lots 6 and 40, are 37°43'12.2" N latitude and 91°08'01.0" W longitude. Figure 2 in Section II is a Topographic Site Location Map. Directions to the site are as follows: from the middle of Viburnum on Highway 49, travel north on 49 to Highway Y; turn right (northeast) onto Hwy Y. The turnoff for the trailer court is on the right of Hwy Y, approximately 0.15 of a mile from Hwy 49.

The St. Joseph Trailer Court as a whole, consists of 42 lots divided on both sides of Court Street (Photos 9 - 15). Figure 3 in Section II is a detailed map of the trailer court property, however, at the time Figure 3 was made there were 45 lots in the trailer court. Since that time, three of the lots on the south side of Court Street were combined. There are now

only 20 lots on the south side of the street and 22 lots on the north side, for a total of 42. The first five lots on each side of Court Street are privately owned; the remaining lots are owned by Mr. Larry Ragsdale and leased to the occupants. This Site Screening investigation focused only on the 32 lots owned by Mr. Ragsdale. Investigation of the 10 private lots will be handled separately.

Figure 3 shows dimensions for each lot. The majority of the lots are less than 1/5 of an acre in size. The lots are mostly grassy areas with gravel driveways (Photo 11). At the time of SS sampling in January 2000, 12 of the 32 lots owned by Mr. Ragsdale were vacant (Photos 10, 11). The site sketch/sampling map in Section III identifies the vacant lots.

C. Site History/Ownership Information

The St. Joseph Trailer Court was originally built in the 1970's by the St. Joseph Lead Company (now known as the Doe Run Company), several of whose lead mines are located just east of the trailer court, north of the city of Viburnum. Figure 3 in Section II is a subdivision survey map that was provided by the Doe Run Company. Although there is no date on the figure, it was obviously produced near the time when the lot was first built. As stated previously, since that time, three of the lots on the south side of Court Street have been combined, leaving only 20 lots on the south side, and a total of 42 lots in the court. Mr. Ragsdale reports that he bought the trailer court in 1993 from Doe Run; he purchased all the lots except 1-5 and 41-45, which are privately owned (Reference 3).

This site was referred to the DNR from the Missouri Department of Health after a child at one privately owned trailer lot was found to have an elevated blood lead level in April 1999. When a child is found to have an elevated blood lead level, the County Health Department performs an environmental assessment of the home to try and determine the exposure pathways for the lead. The environmental assessment includes collecting samples of paint from the home, soil in the yard, dust samples from window sills, samples from mini blinds and any other potential sources of lead. Apparently samples of the gravel from the driveway and shed showed extremely high levels of lead, indicating this material was likely a source of lead that significantly contributed to the child's elevated blood lead level. Nevertheless, there were other exposure pathways in the home area, besides the gravel, that could have been contributing to the elevated blood lead level (e.g. lead based paint, leaded mini blinds, etc.) (Reference 4).

After interviewing the residents of the trailer, it was discovered that the gravel material lining the driveway and shed supposedly came from the Doe Run mine several years ago. In May 1999, the child no longer lived at the residence. However, Doe Run was still willing to discuss removing the gravel material from the private lot due to the possibility that the material may have come from their mines. DOH and Doe Run continued to communicate throughout the summer regarding a plan to remove the gravel material (Reference 4).

In light of the situation at the private trailer lot, DOH was concerned there may be other trailer lots with high lead levels that could potentially contribute to elevated blood levels in trailer occupants. Most of the other lots in the trailer court had similar looking gravel

material in their driveways. In the fall of 1999, DOH contacted DNR and requested assistance in investigating the potential lead problem at the trailer court. DNR agreed to initiate a Pre-CERCLIS site screening investigation to conduct sampling and determine whether other trailer lots contained material with elevated levels of lead.

In November 1999, DNR sent a notification letter to all the residents of the trailer court that rented from Mr. Ragsdale, informing them of the investigation. The plan was to collect and analyze samples of gravel and soil from all lots in the trailer court owned by Mr. Ragsdale. The sampling was scheduled for early January 2000 (Reference 5). In the meantime, unbeknown to DNR, Mr. Ragsdale contacted Mr. Denis Murphy in Environmental Planning at the Doe Run Company offices in Viburnum. Mr. Ragsdale was concerned about DNR involvement and what effects the investigation might have on his property and business (Reference 4).

After discussing the situation with Mr. Ragsdale, Doe Run decided to address the issue of the potentially elevated levels of lead in the gravel material that supposedly came from their mines years ago. Doe Run chose to voluntarily proceed with removal of the "old" gravel in the driveways of the trailer court, recover that rock as feed for their Viburnum mill, and place new gravel in the driveways from a local commercial rock quarry. Doe Run decided to conduct the work because they believed it would be beneficial to the property owner and residents of the trailer court. They received permission from Mr. Ragsdale to replace all of the driveways on the lots he owns, and they sent letters to all of the other property owners of the privately owned lots requesting authorization to enter their property and proceed with the project. The work plan involved removing all old gravel in the driveway along with 8 to 12 inches of soil around the driveway, and replacing the material with clean 1" minus rock from K & D Quarry on KK Highway. At that time, there was no sampling of the gravel material to verify whether all the lots actually contained material high in lead. Sampling of the old rock and new rock didn't occur until January 2000. Although DNR was not notified of the plans for the removal action, Doe Run did inform the residents of the trailer court that the DNR investigation, planned for January 2000, would go on as scheduled (Reference 4).

The work commenced sometime in early December. On December 13, 1999 DNR was notified by a resident of the trailer court that there were currently contractors removing and replacing the gravel in the driveways of all the trailer lots. On December 15, 1999, DNR personnel were able to get in touch with Mr. Murphy of Doe Run and Mr. Ragsdale and learned the details of the removal action. Photos 1 through 8 were taken by a DNR representative in the Southeast Regional Office who was able to visit the site during the removal action. Work on the removal action took over one month to complete. In addition to all of the 32 lots owned Mr. Ragsdale, the driveways from 8 of the 10 private lots were also replaced. All private lot owners (lots 1-5 and 41-45) gave Doe Run authorization to replace the driveway rock. Lots #4 and #45 have concrete driveways and were the only two that weren't replaced (Reference 6).

In light of the removal action, the plan for the SS investigation was then modified. Originally the plan was to collect and analyze samples of the gravel material, fines from the gravel, and soil from each lot. With all the gravel material being removed and replaced,

it would not be necessary to sample the gravel. However, soil from the yards, downgradient from the driveways, still needed to be sampled to determine whether any gravel fines had washed out from the driveways and contaminated the soil. The SS sampling event is discussed in the following section.

D. Site Reconnaissance/Sampling (Reference 7)

SS sampling was conducted on January 6, 2000. Mr. Ragsdale and Mr. Murphy of Doe Run were present for the event to collect split samples from each lot. One surface (0 - 4 inch depth) soil grab sample was collected from each of the 32 lots owned by Mr. Ragsdale. The samples were collected from soil downgradient of the driveways. If there were children's' play toys or a swingset downgradient and nearby, the sample was collected from this area. All the samples were brought back to the laboratory where they were screened for lead using the TN Spectrace 9000® portable x-ray fluorescence spectrometer (XRF). The sampling data table in Section IV presents information on each sample including XRF readings.

General XRF Information

The Spectrace 9000 contains three radioisotope excitation sources; Iron-55, Cadmium-109 and Americium-241. These sources provide a broad range of excitation allowing 25 elements to be quantitatively analyzed simultaneously. The following table lists the factory installed elements that the XRF is capable of analyzing, according to their excitation source.

Iron-55	Cadmium-109	Americium-241
K, Ca, Ti, Cr	Cr, Mn, Fe, Co, Ni, Cu, Zn, As, Se, Sr, Zr, Mo, Hg, Pb, Rb, Th, U	Ag, Cd, Sn Sb, Ba

The detection limits for each metal vary based on analysis run time set for each excitation source. The main contaminants of concern at this site were lead and cadmium, which are analyzed by the Cadmium-109 source and the Americium-241 source respectively. For this site, run times for the XRF were varied depending on the comparison of results to the standard deviation (discussed in the next paragraph), but generally the run time for the Cadmium-109 source was set at 200 seconds in order to achieve the minimum detection limit for lead of 14 ppm, according to the manufacturer's specifications. With the Americium-241 source run time set at 200 seconds, the minimum detection limit for cadmium is 86 ppm. This is well above the Superfund Chemical Data Matrix (SCDM) reference dose screening concentration (a health-based benchmark level for a noncarcinogenic substance) for cadmium in soil (39 ppm) and the MO Any-Use Soil Level (ASL) (28 ppm). Therefore, laboratory analysis was generally relied upon to evaluate the presence of cadmium.

According to the manufacturer, when reviewing results reported by the XRF, it is imperative to compare the results value to the standard deviation (SD) for each sample. If the result is greater than 10 times the SD, the element is definitely present in the sample and the

result can be accepted as a quantitative measurement of its concentration. If the result is less than 3 times the SD, the result is, by definition, below the detection limit (which varies according to the run time). If the result is between 3 and 10 times the SD, the manufacturer recommends increasing the run time by a factor of 4 if possible to attempt to lower the detection limit.

The results that fell between 3 and 10 times the SD are flagged in the table with an asterisk, followed by a number that signifies how many times greater the number is than the SD. These results are qualitative, indicating the element is present but cannot be definitively quantified. If the sample results were not 10 times greater than the SD, the majority of the samples were screened again. Several of the samples were screened numerous times with the XRF in order to get an average result.

As part of the sampling event, a soil sample was collected at a nearby ball park field in order to document a background level of lead in soil for that area. That background lead level was measured with the XRF at 285 ppm. Background levels of lead in soils throughout the state vary widely. Lead is a naturally occurring metal found in the earth's crust. Naturally occurring levels of lead in the state can range from approximately 10 ppm to 250 ppm or higher. Pollution in the area can account for slightly higher background levels of lead. In the cities, levels are higher, in part due to pollution from leaded gasoline for example.

Concentrations of lead at 12 of the 32 lots sampled exceed the MO ASL for lead (240 ppm). Lead levels at 5 of those 12 lots (lots number 9, 11, 20, 33 and 35) exceed the EPA residential screening level of 400 ppm.

The samples from lots 9, 20, 32, 33, and 35 were submitted to the DNR laboratory for chemical analysis of total lead and cadmium. The sample from lot 32 was chosen for lab analysis as a check of one of the lowest levels of lead detected with the XRF. The remaining samples were chosen for lab analysis as a check to verify some of the higher levels of lead that were detected with the XRF. If a sample's total analyte result was twenty times 80% of the Toxicity Characteristic Leaching Procedure (TCLP) regulatory limit, TCLP analysis was to be performed on that sample. The sampling data table in Section IV presents the lead results reported by DNR's laboratory.

The laboratory sampling results for cadmium for the five samples analyzed by DNR ranged from 1.85 ppm to 36.9 ppm. Sample number 0001904 from lot 33 was reported at 36.9 ppm cadmium. This is the only cadmium result to exceed the MO ASL (28 ppm); it does not, however exceed the SCDM reference dose (39 ppm). All of the other cadmium results were below both the MO ASL and the SCDM reference dose.

Only the split samples collected by Doe Run from lots 9, 11, 20, 33, 35 and 32 were chemically analyzed by a laboratory for lead and cadmium. The results for lead are presented in the last column of the sampling data table in Section IV. The results for cadmium were all below the SCDM reference dose for cadmium in soil (39 ppm) and the MO ASL (28 ppm). The levels of cadmium in the five Doe Run samples ranged from 1.1 ppm to 25 ppm (Reference 6).

During the January sampling event, Doe Run also had TCLP for lead and cadmium performed on total composite samples of the (1) yard soil collected, (2) the old gravel material from the driveways, and (3) the new gravel material placed in the driveways. The regulatory limit for lead analyzed via TCLP is 5.0 ppm; the limit for cadmium is 1.0 ppm. All three of the composite samples collected by Doe Run were below the regulatory limits for lead and cadmium (Reference 6).

E. Conclusions

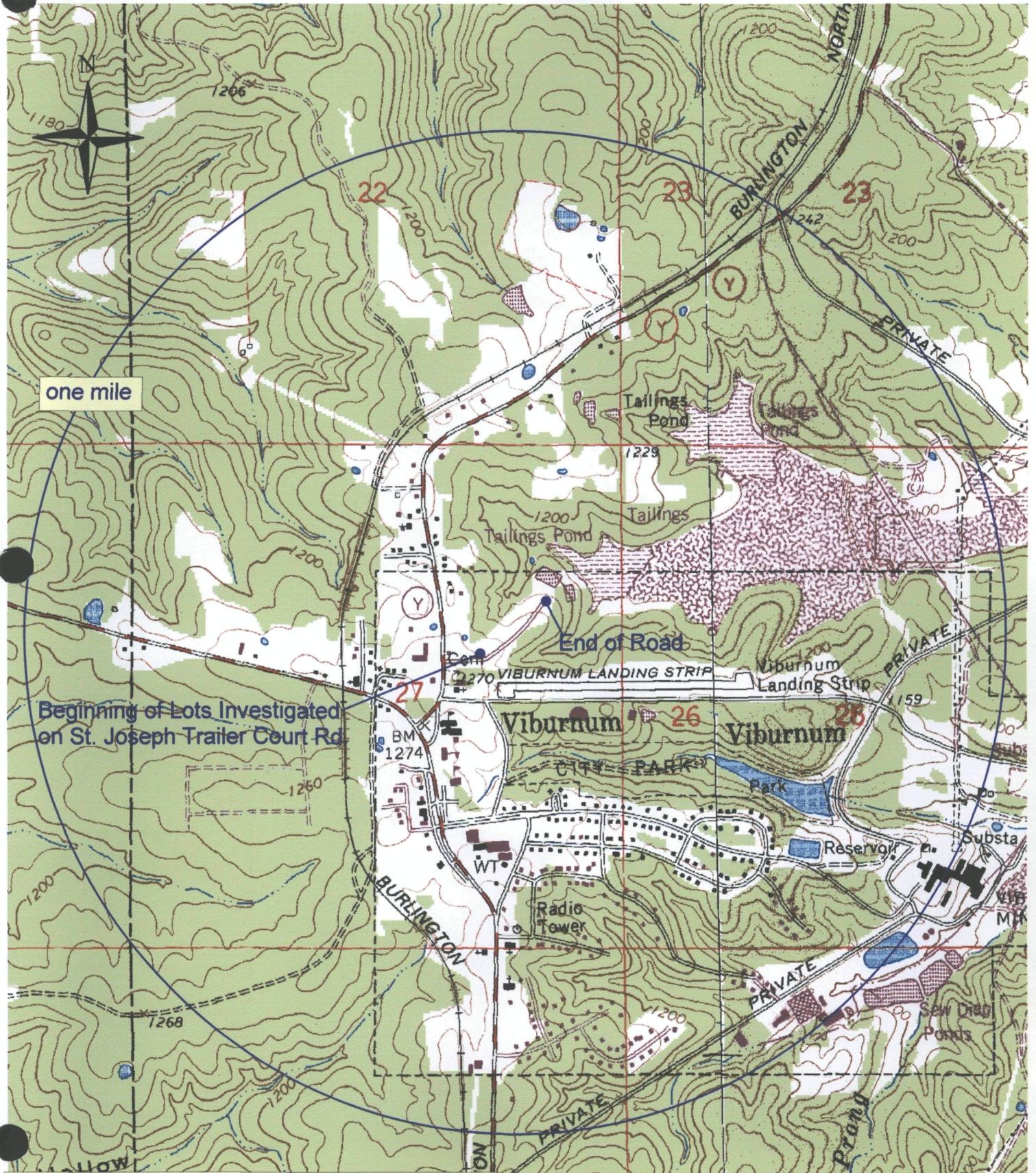
There are several health-based benchmarks and screening levels published for lead. The MO ASL for lead is 240 ppm. EPA has recommended 400 ppm as a residential screening level. SCDM does not have any soil screening levels for lead. For further comparison, site specific removal action levels have been established for lead at the Oronogo-Duenweg Mining Belt site (MOD980686281), more commonly referred to as the Jasper County Mining site. Currently in Jasper County, 800 ppm lead is the action level for excavation of soil in residential yards that were contaminated due to lead smelter fallout. In lieu of excavation, remedial action and institutional controls are required at residences with contamination between 500 ppm and 800 ppm lead. These actions include health education and providing HEPA vacuums to the residents, as well as institutional controls related to sale of property (yet to be determined). The time critical removal action level is 2500 ppm. Any yards with a lead level exceeding 2,500 ppm are worked on immediately. Also, any homes where children have elevated blood lead levels (above 15 ug/dl) and soil lead levels above 500 ppm, are addressed as time critical.

Concentrations of lead at 12 of the 32 lots sampled exceed the MO ASL. Lead levels at 5 of those 12 lots (lots number 9, 11, 20, 33 and 35) exceed the EPA residential screening level of 400 ppm. Currently lot 9 is vacant. Lead levels from lots 20 and 35 exceed 2500 ppm, the time critical removal action level set for the Jasper County site. The lead levels at the 5 lots that exceed the EPA screening level warrant further investigation. Additional soil sampling should be conducted at those lots, with priority given to lots 20 and 35.

There is evidence of a release of hazardous substances at 5 of the 32 trailer lots in the St. Joseph Trailer Court. This site is eligible for entry onto CERCLIS, however at this time, the Doe Run Company has expressed an interest in negotiating with the state to address the contamination at the five lots. If further investigation and cleanup is conducted under state authority, CERCLIS entry will be deferred. If negotiations are unsuccessful, CERCLIS entry may be warranted.

II. SITE LOCATION MAPS

St. Joseph Trailer Court Site
Viburnum, Missouri
Figure 2: Site Location Map

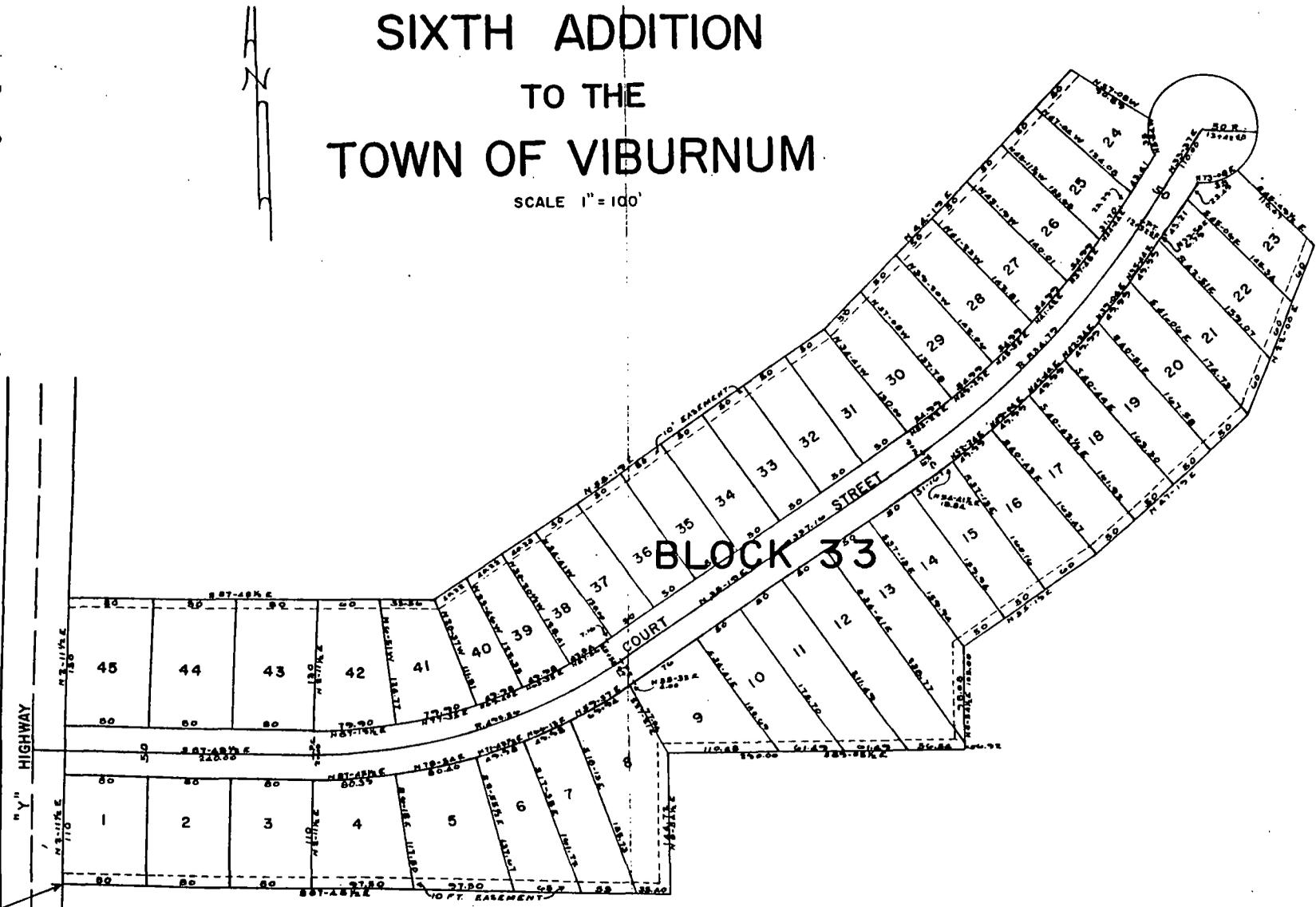


U.S.G.S. Topographic Map - 7.5 Minute Series
Viburnum East Quadrangle 1967

U.S.G.S. Topographic Map - 7.5 Minute Series
Viburnum East Quadrangle 1967

FIGURE 3
**SIXTH ADDITION
 TO THE
 TOWN OF VIBURNUM**

SCALE 1" = 100'



and sanitary culverts,
 and all lines of utility,
 and connections,
 and connections, and
 lines on and along
 same. The plat is
 made under power, after
 view and measurement,
 and connections,
 sections, in and along
 same and reserves
 here all minerals,
 lying said street and
 it together with the
 or other valuable sub-
 tal or mining operation,
 in traffic over said

its successors and
 the heirs, their suc-
 in common with each
 the connections thereto,
 drainage ways or
 lines, and other
 and across the various
 on the occupying

has caused these
 to corporate seal
 1973.

CORPORATE,
B. Hall

STATE OF MISSOURI }
 COUNTY OF ST. FRANCIS } ss.

SURVEYOR'S CERTIFICATE

I, Harold L. Koen, Registered Land Surveyor, do hereby certify that the foregoing plat of the Sixth Addition to the Town of Viburnum, which was prepared under my authority and direction, embraces part of the SE $\frac{1}{4}$ of the NE $\frac{1}{4}$ of Section 27, Township 35 North, Range 2 West, Iron County, Missouri, and correctly shows all the lots and tracts of land numbered thereon and shows the position of said lands relatively to the remainder of said section and the quarter section and



III. SITE SKETCH/SAMPLING MAP

Site Map: St. Joseph's Trailer Court

Key: Not To Scale

1-20 = Lot Numbers for South Side of Trailer Court

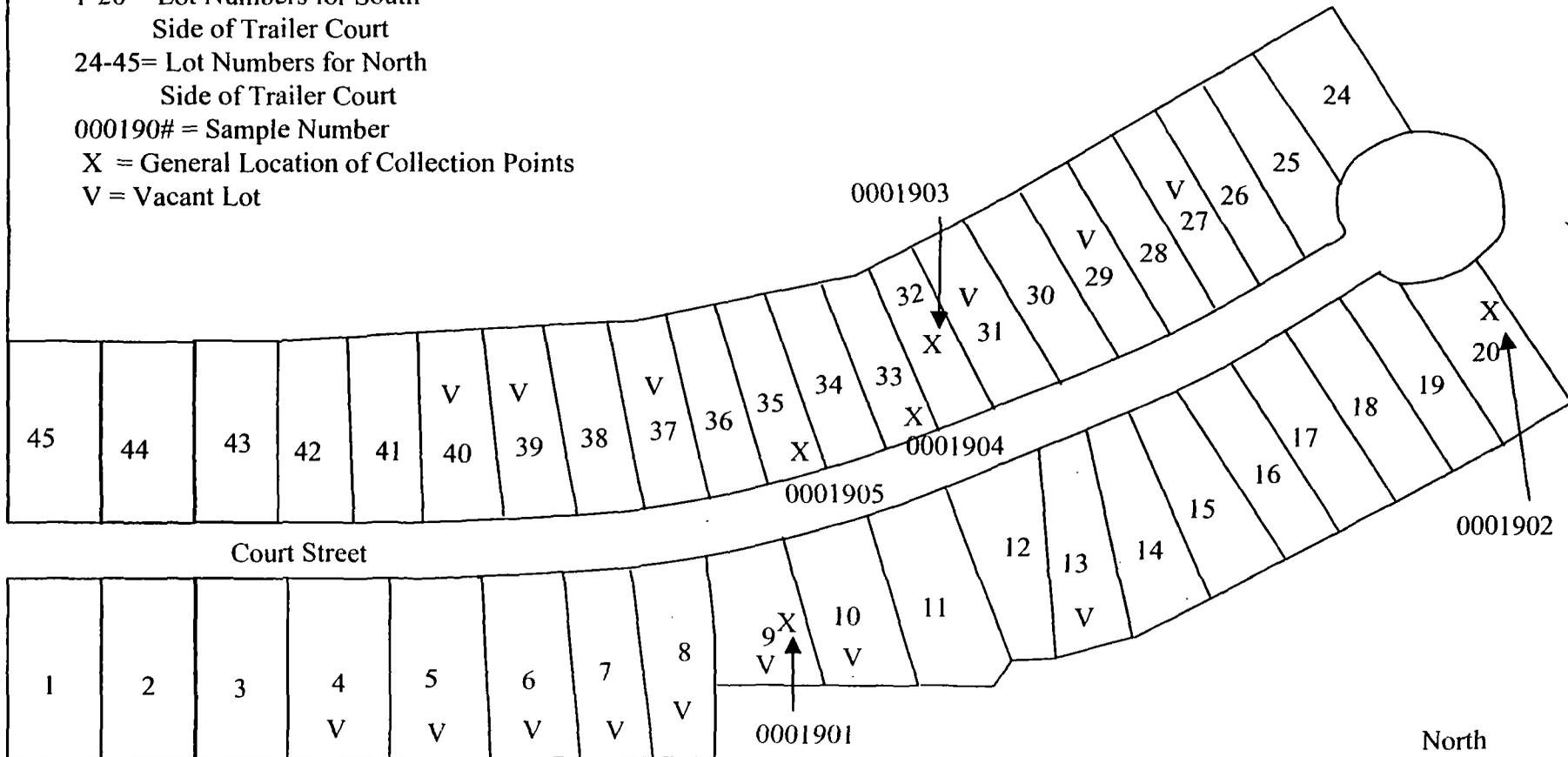
24-45 = Lot Numbers for North Side of Trailer Court

000190# = Sample Number

X = General Location of Collection Points

V = Vacant Lot

Route Y



IV. ANALYTICAL DATA TABLE

Soil Sampling Results from DNR Sampling at St. Joseph Trailer Court on January 6, 2000

* Indicates the XRF result fell between 3 and 10 times the Standard Deviation (SD) - followed by a number that signifies how many times greater the number is than the SD.

Indicates the XRF result is not valid NA - not analyzed

Lot #	XRF or Lab Sample ID	Date Analyzed	XRF Run Time Cd 109/Fe 55/ Am 241 (sec)	SD	XRF Lead Result	XRF Average/ Final Result	DNR Lab Result	Doe Run Lab Result
6	06	01/07/00	100/30/30	10.8	81.2* (>7x SD)		NA	NA
	06	01/12/00	150/30/150	8.7	72.1* (>8x SD)			
	06.200	01/12/00	200/30/200	10.3	169.0	169.0		
7	07	01/07/00	100/30/30	12.9	131.3	131.3	NA	NA
8	08	01/07/00	100/30/30	8.7	46.3* (>5x SD)		NA	NA
	08.150	01/12/00	150/30/150	11.1	130.5	121.9		
	08.200	01/12/00	200/30/200	9.1	113.3			
9	09	01/07/00	100/30/30	20.4	494.9	537.6	749 TCLP0.31	
	09.150	01/12/00	150/30/150	18.4	571.1			
	09.200	01/12/00	200/30/200	15.7	546.7			
	0001901	01/19/00 01/27/00						
	9							
10	10	01/07/00	100/30/30	18.9	378.7	378.7	NA	NA
11	11	01/07/00	100/30/30	23.6	706.3	1065.1	NA	1508
	11.200	01/12/00	200/30/200	23.7	1317.1			
	11.200	01/12/00	200/30/200	22.2	1172.0			
	11							
12	12	01/07/00	100/30/30	16.0	278.5	278.5	NA	NA
13	13	01/07/00	100/30/30	5.8	25.7* (>4x SD)		NA	NA
	13.200	01/12/00	200/30/200	12.4	372.9	372.9		
14	14	01/07/00	100/30/30	11.6	132.5	132.5	NA	NA
15	15	01/07/00	100/30/30	11.8	113.8* (>9x SD)	113.8	NA	NA
16	16	01/07/00	100/30/30	11.8	107.1* (>9x SD)		NA	NA
	16.200	01/12/00	200/30/200	8.4	119.0	119.0		
	16.300	01/12/00	300/30/300	21.4	120.5* (>5x SD)			
17	17	01/07/00	100/30/30	10.6	90.4* (>8x SD)		NA	NA
	17.200	01/12/00	200/30/200	7.8	96.0	96.0		
18	18	01/07/00	100/30/30	12.8	132.7	132.7	NA	NA
19	19	01/07/00	100/30/30	11.8	79.7* (>6x SD)		NA	NA
	19.200	01/12/00	200/30/200	8.7	85.1* (>9x SD)	85.1		
20	20	01/07/00	100/30/30	39.3	2042.2	1451.0	3321 TCLP 7.1	5349
	20.200	01/12/00	200/30/200	17.7	829.7			
	20.200	01/12/00	200/30/200	23.6	1481.0			
	0001902	01/19/00 01/27/00						
	20							
24	24	01/07/00	100/30/30	15.2	243.2	243.2	NA	NA
25	25	01/07/00	100/30/30	14.7	239.1	239.1	NA	NA
26	26	01/07/00	100/30/30	10.4	49.8* (>4x SD)		NA	NA
	26.200	01/12/00	200/30/200	8.2	80.5* (>9x SD)	80.5		
	26.200	01/12/00	200/30/200	6.5	42.4* (>6x SD)			
27	27	01/07/00	100/30/30	3.0	-10.8†		NA	NA
	27.200	01/13/00	200/30/200	8.9	138.3	138.3		
28	28	01/07/00	100/30/30	10.5	96.8* (>9x SD)		NA	NA
	28.200	01/12/00	200/30/200	8.0	108.4	108.4		

V. PHOTOGRAPHS



PHOTOS 1 & 2

St. Joseph Trailer Court Site
Viburnum, Missouri, Iron County
Photos taken by Jim Burris, MDNR,
SERO, on December 15, 1999
during PRP voluntary removal
action. Photo 1 and 2 are pictures
of two driveways before the old
gravel was removed. The old gravel
was suspected to contain high
levels of lead because the material
may have come from a lead mine in
Viburnum.



PHOTO 3

St. Joseph Trailer Court Site
Viburnum, Missouri, Iron County
Photos taken by Jim Burris, MDNR,
SERO, on December 15, 1999
during PRP voluntary removal
action. Photo shows the placement
of new gravel in a trailer driveway
after the old gravel had been
removed. The old gravel was
suspected to contain high levels of
lead because the material may have
come from a lead mine in Viburnum.
The new gravel came from a rock
quarry outside of Viburnum.





PHOTOS 4, 5, 6

St. Joseph Trailer Court Site
Viburnum, Missouri, Iron County
Photos taken by Jim Burris, MDNR,
SERO, on December 15, 1999
during PRP voluntary removal
action. Photos 4, 5, 6 show the
placement of new gravel in trailer
driveways after the old gravel had
been removed. The old gravel was
suspected to contain high levels of
lead because the material may have
come from a lead mine in Viburnum.
The new gravel came from a rock
quarry outside of Viburnum.



PHOTO 7

St. Joseph Trailer Court Site
Viburnum, Missouri, Iron County
Photos taken by Jim Burris, MDNR,
SERO, on December 15, 1999
during PRP voluntary removal
action. Photo shows the placement
of new gravel in a trailer driveway
after the old gravel had been
removed. The old gravel was
suspected to contain high levels of
lead because the material may have
come from a lead mine in Viburnum.
The new gravel came from a rock
quarry outside of Viburnum.



PHOTO 8

St. Joseph Trailer Court Site
Viburnum, Missouri, Iron County
Photos taken by Jim Burris, MDNR,
SERO, on December 15, 1999 during
PRP voluntary removal action. Photo
shows a driveway after the removal
and replacement of gravel is
completed.



PHOTO 9

St. Joseph Trailer Court Site
Viburnum, Missouri, Iron County
Photo taken by Valerie Wilder, MDNR,
Superfund on January 6, 2000.
Photo taken from the middle of Court
Street between lots 40 and 6 looking
northeast down the street. The first
trailer in the left of the photo is on lot
38.



PHOTO 10

St. Joseph Trailer Court Site
Viburnum, Missouri, Iron County
Photo taken by Valerie Wilder, MDNR,
Superfund on January 6, 2000.
Photo taken from the middle of Court
Street between lots 40 and 6 looking
east at the vacant lots 7-10. The trailer
on the left-hand side of the photo is on
lot 11.



PHOTO 11

St. Joseph Trailer Court Site
Viburnum, Missouri, Iron County
Photo taken by Valerie Wilder, MDNR,
Superfund on January 6, 2000.
Photo of vacant lot number 40. The
gravel in the driveway is new. The
removal action, in which the old gravel
material suspected of containing
elevated lead levels was removed, took
place in December 1999.



PHOTO 12

St. Joseph Trailer Court Site
Viburnum, Missouri, Iron County
Photo taken by Valerie Wilder, MDNR,
Superfund on January 6, 2000.
Photo taken from the bottom circle
drive of Court Street looking southwest.
The edge of the trailer on lot 20 is
visible in the far left-hand side of the
photo.



PHOTO 13

St. Joseph Trailer Court Site
Viburnum, Missouri, Iron County
Photo taken by Valerie Wilder, MDNR,
Superfund on January 6, 2000.
Photo taken from the bottom circle
drive of Court Street looking southeast
at the trailer on lot 20.



PHOTO 14

St. Joseph Trailer Court Site
Viburnum, Missouri, Iron County
Photo taken by Valerie Wilder, MDNR,
Superfund on January 6, 2000.
Photo taken from the bottom circle
drive of Court Street looking west-
southwest at the trailers (from right to
left of photo) on lots 24, 25, 26, and 28
(lot 27 was vacant).



PHOTO 15

St. Joseph Trailer Court Site
Viburnum, Missouri, Iron County
Photo taken by Valerie Wilder, MDNR,
Superfund on January 6, 2000.
Photo taken from the bottom circle
drive of Court Street looking north at
the trailer on lot 24.



PHOTO 16

St. Joseph Trailer Court Site
Viburnum, Missouri, Iron County
Photo taken by Valerie Wilder, MDNR,
Superfund on January 6, 2000.
Photo taken from the bottom circle
drive of Court Street looking east at the
tailings pond from the Viburnum mines.

VI. PRE-CERCLIS SCREENING FORM

MISSOURI SUPERFUND PRE-CERCLIS SITE SCREENING FORM

I. SITE NAME AND LOCATION

NAME: St. Joseph Trailer Court

ALIAS: Viburnum Driveways

ADDRESS OR OTHER LOCATION IDENTIFIER: Court Street

CITY: Viburnum

COUNTY: Iron

STATE: MO

ZIP: 65566

DIRECTIONS TO SITE: To reach the site from the middle of Viburnum on Highway 49, travel north on 49 to Highway Y; turn right (northeast) onto Hwy Y. The turnoff for the trailer court is on the right of Hwy Y, approximately 0.15 of a mile from Hwy 49

MAP ATTACHED: _____

II. SITE REFERRAL INFORMATION

REFERRED BY: Missouri Department of Health - Brittney Wallace

DATE OF REFERRAL: 5/99

REASON FOR REFERRAL (if applicable): elevated levels of lead were documented in soil and gravel from residential trailer lot

MAILING ADDRESS: Southeastern District Office 2875 James Boulevard

CITY: Poplar Bluff

STATE: MO

ZIP: 63901

TELEPHONE: (573) 840-9720

FAX: 573-840-9727

III. SITE INFORMATION

TYPE OF FACILITY: residential trailer court

TYPE OF OWNERSHIP: private

OWNER NAME, MAILING ADDRESS: Larry Ragsdale P.O. Box 248

CITY: Viburnum

STATE: MO

ZIP: 65566

TELEPHONE: (573) 244-5401

FAX:

OPERATOR NAME (if different from owner),
MAILING ADDRESS:

CITY:

STATE:

ZIP:

TELEPHONE:

FAX:

CURRENT SITE STATUS: active

YEARS OF OPERATION: trailer court built in 1970's

OPERATIONAL HISTORY:

The St. Joseph Trailer Court was originally built in the 1970's by the St. Joseph Lead Company (now known as the Doe Run Company), several of whose lead mines are located just east of the trailer court, north of the city of Viburnum. Apparently, the gravel material that was used to line the majority of the driveways in the trailer lots was mining material from the Doe Run mines that contained elevated levels of lead.

MISSOURI SUPERFUND PRE-CERCLIS SITE SCREENING FORM

IV. CERCLA APPLICABILITY

1. IS THERE A RELEASE AS DEFINED BY THE NCP

YES X NO

EXPLAIN: Analytical results of soil samples from 5 of 32 lots documented elevated levels of lead above background and Missouri Department of Health Any-Use Soil Level and EPA's residential soil screening level for lead.

(A RELEASE is defined as any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment (including the abandonment of barrels, containers, and other closed receptacles containing any hazardous substances or pollutant or contaminant), but excludes: workplace exposures; engine exhaust emissions; nuclear releases otherwise regulated; and the normal application of fertilizer. For purposes of the NCP, release also means threat of release. [40 CFR 300.410(d)])

2. IS THE SOURCE A FACILITY OR VESSEL AS DEFINED BY THE NCP?

YES X NO

EXPLAIN: The site consists of 5 residential trailer court lots.

(A FACILITY is defined as any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or POTW), well, pit, pond, lagoon, impoundment, ditch, landfill, storage container, motor vehicle, rolling stock, or aircraft or any site or area, where a hazardous substance has been deposited, stored, disposed of, or placed, or otherwise come to be located; but does not include any consumer product in consumer use or any vessel. A VESSEL is defined as any description of watercraft or other artificial contrivance used, or capable of being used, as a means of transportation on water other than a public vessel. [40 CFR 300.410(e)])

3. DOES THE RELEASE INVOLVE EITHER A HAZARDOUS SUBSTANCE, POLLUTANT OR CONTAMINANT AS DEFINED BY THE NCP?

YES X NO

EXPLAIN: Analytical results document elevated levels of lead. EPA classifies lead as a hazardous substance.

(A HAZARDOUS SUBSTANCE means any substance, element, compound, mixture, solution, hazardous waste, toxic pollutant, hazardous air pollutant, or imminently hazardous chemical substance or mixture designated pursuant to the CWA, CERCLA, SDWA, CAA or TSCA. The term does not include petroleum products, natural gas, natural gas liquids, liquefied natural gas, synthetic gas or mixtures of natural and synthetic gas. The definition of POLLUTANT or CONTAMINANT includes, but is not limited to, any element, substance, compound, or mixture, including disease-causing agents, which after release into the environment and upon exposure, ingestion, inhalation, or assimilation into any organism, either directly from the environment or indirectly by ingestion through food chains, will or may reasonably be anticipated to cause death, disease, behavioral abnormalities, cancer, genetic mutation, physiological malfunctions or physical deformations, in such organisms or their offspring. The term does not include petroleum products, natural gas, natural gas liquids, liquefied natural gas, synthetic gas or mixtures of natural and synthetic gas.) [40 CFR 300.410(e)]

4. IS THE RELEASE SUBJECT TO THE LIMITATIONS ON RESPONSE?

YES NO X

EXPLAIN:

(The LIMITATIONS ON RESPONSE provisions of the NCP (40 CFR 300.400(B)) states that removal shall not be undertaken in response to a release: of a naturally occurring substance in its unaltered or natural form; from products that are a part of the structure of, and result in exposure within, residential buildings or business or community structures; or into public or private drinking water supplies due to deterioration of the system through ordinary use.) [40 CFR 300.410(e)]

MISSOURI SUPERFUND PRE-CERCLIS SITE SCREENING FORM

IV. CERCLA APPLICABILITY (continued)

5. IS THERE A POTENTIAL FOR OTHER FEDERAL OR STATE RESPONSE MECHANISMS? YES NO

IF SO, IDENTIFY THE APPROPRIATE PROGRAM:

RCRA NRC FIFRA UST OTHER FEDERAL ()
 OTHER STATE DEFERRAL STATE VCP

EXPLAIN: The PRP, Doe Run Company has expressed an interest in addressing the site under the state's Cooperative Program. Negotiations are underway.

V. PATHWAY EVALUATION

1. SOURCE AND WASTE CHARACTERISTICS (known or suspected)

SOURCE TYPES AND LOCATIONS: contaminated soil

SIZE OF SOURCES: unknown at this time

WASTE TYPES AND QUANTITIES:

HAZARDOUS SUBSTANCES PRESENT: lead

GROUNDWATER USE AND CHARACTERISTICS WITHIN FOUR MILES Not applicable - contamination is present in ~~and~~ soils

GENERAL HYDROLOGY:

ARE KARST FEATURES PRESENT ON OR NEAR SITE:

DEPTH TO SHALLOWEST GROUNDWATER:

GROUNDWATER WELLS WITHIN 4 MILES:

PRIVATE WELLS _____
MUNICIPAL WELLS _____
INDUSTRIAL/AGRICULTURAL WELLS _____

LOCATIONS AND POPULATIONS SERVED (if known):

DISTANCE TO NEAREST DRINKING WATER WELL:

3. SURFACE WATER USE AND CHARACTERISTICS Not applicable - nearest surface water body is sewage lagoon and potential for runoff of surface soil contamination to lagoon is low

IS SITE IN A FLOOD PLAIN: IF YES: 10 YEAR _____ 100 YEAR _____ 500 YEAR _____

DISTANCE TO NEAREST SURFACE WATER; IF WITHIN TWO MILES, FILL OUT SURFACE WATER PATHWAY

LIST SURFACE WATER BODIES WITHIN 15 DOWNSTREAM MILES:

MISSOURI SUPERFUND PRE-CERCLIS SITE SCREENING FORM

DRINKING WATER INTAKES PRESENT WITHIN 15 DOWNSTREAM MILES: YES ___ NO ___
IF YES, LIST LOCATIONS AND POPULATIONS SERVED (if known):

ARE FISHERIES, SENSITIVE ENVIRONMENTS OR WETLANDS PRESENT WITHIN 15 DOWNSTREAM MILES: YES ___ NO ___
(List significant features, if known or applicable):

4. SOIL AND AIR EXPOSURE CHARACTERISTICS

NUMBER OF PEOPLE LIVING WITHIN 200 FEET OF SITE: 4 of the 5 lots are occupied with residents living within 200 feet of location of soil contamination

SCHOOLS OR DAYCARES WITHIN 200 FEET OF SITE: none

GENERAL POPULATION WITHIN 4 MILES (rural, small city, heavy urban area, etc.): small city

NUMBER OF WORKERS ON-SITE: none

ARE ANY TERRESTRIAL SENSITIVE ENVIRONMENTS AND/OR WETLANDS PRESENT ON-SITE: YES ___ NO X

IS SITE ACCESS RESTRICTED: YES ___ NO X

VI. SUPERFUND SITE SCREENING CRITERIA

1. DOES THE QUANTITY OR CONCENTRATION OF HAZARDOUS SUBSTANCES WARRANT RESPONSE? YES X NO ___

EXPLAIN: The levels of lead exceed the Missouri Department of Health's Any-Use Soil Level for lead and the EPA's residential soil screening level for lead.

[40 CFR 300.410(e)]

2. HAS A PRP BEEN IDENTIFIED? YES X NO ___

EXPLAIN: The original gravel material in the driveway that was documented at one trailer lot contained extremely elevated levels of lead that was alleged to have come from the Doe Run mines. It is thought this material was used at the majority of the other lots in the trailer court. Doe Run stepped forward to remove the gravel material from all the lots and replace it with clean gravel, however, it is believed during the time the gravel was in place, fines from the material washed into the soil, causing the contamination at the 5 lots.

[40 CFR 300.410(e)]

3. IS THERE AN ACTUAL OR POTENTIAL EXPOSURE TO HAZARDOUS SUBSTANCES POLLUTANTS, OR CONTAMINANTS? YES X NO ___

EXPLAIN: There are residents in 4 of the 5 trailer lots.

MISSOURI SUPERFUND PRE-CERCLIS SITE SCREENING FORM

4. IS THERE AN ACTUAL OR A POTENTIAL THREAT FOR CONTAMINATION OF DRINKING WATER SUPPLIES?

YES _____ NO X

EXPLAIN:

5. ARE THERE HAZARDOUS SUBSTANCES, POLLUTANTS, OR CONTAMINANTS IN DRUMS, BARRELS, OR BULK STORAGE CONTAINERS?

YES _____ NO X

EXPLAIN:

6. ARE THERE HIGH LEVELS OF HAZARDOUS SUBSTANCES, POLLUTANTS, OR CONTAMINANTS IN SURFACE SOILS?

YES _____ NO X

EXPLAIN:

("High levels" may be determined by streamlined risk assessments, health consultations, state or federal soil screening criteria, and/or Superfund program policies or directives)

7. ARE THERE CONDITIONS ON SITE WHICH MAY BE SUSCEPTIBLE TO IMPACT FROM ADVERSE WEATHER CONDITIONS?

YES _____ NO X

EXPLAIN:

8. IS THERE A THREAT OF FIRE OR EXPLOSION?

YES _____ NO X

EXPLAIN:

MISSOURI SUPERFUND PRE-CERCLIS SITE SCREENING FORM

9. ARE THERE OTHER SITUATIONS OR FACTORS WHICH WARRANT FURTHER SUPERFUND RESPONSE?

YES _____ NO X

EXPLAIN:

VII. SUPERFUND SITE SCREENING FINDINGS AND RECOMMENDATIONS

X	NO FURTHER SUPERFUND RESPONSE ACTION REQUIRED - SUPERFUND CERCLIS ENTRY NOT WARRANTED
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Cite the appropriate criteria below as the basis for the above determination.

			NO RELEASE OR THREAT OF RELEASE		NO AIR PATHWAY THREAT
			NOT A FACILITY OR VESSEL		NO THREAT OF FIRE OR EXPLOSION
			NO ACTUAL OR POTENTIAL EXPOSURE THREATS		DRUMS, BARRELS OR BULK CONTAINERS NOT PRESENT
			NO GROUNDWATER PATHWAY THREAT		SITE NOT SUSCEPTIBLE TO ADVERSE WEATHER CONDITIONS
			NO SURFACE WATER PATHWAY THREAT		SITE SUBJECT TO RESPONSE LIMITATIONS
		X	NO DIRECT SOIL EXPOSURE PATHWAY THREAT		WILLING/CAPABLE PRP RESPONSE
			NO HIGH LEVELS OF CONTAMINANTS IN SURFACE SOILS		REFERRED TO ANOTHER PROGRAM

COMMENTS: At this time, Doe Run Company has expressed an interest in negotiating with the state to address the site in the state's Cooperative Program. Negotiations are underway. If negotiations fail, the site will be recommended for entry onto CERCLIS.

MISSOURI SUPERFUND PRE-CERCLIS SITE SCREENING FORM

VII. SUPERFUND SITE SCREENING FINDINGS AND RECOMMENDATIONS (continued)

REMOVAL ACTION RECOMMENDED: EMERGENCY TIME-CRITICAL NON-TIME-CRITICAL

Cite one or more of the conditions or factors below as a basis for recommending that a removal action be conducted.

EXPOSURE TO HAZARDOUS SUBSTANCES OR POLLUTANTS OR CONTAMINANTS

ADVERSE WEATHER IMPACTS

CONTAMINATED DRINKING WATER

FIRE/EXPLOSION THREAT

CONTAMINATED SOIL

NO OTHER RESPONSE MECHANISM

DRUMS, BARRELS OR CONTAINERS

OTHER FACTORS

COMMENTS:

(Complete Removal Evaluation Form for sites recommended for a Removal Action.)

ADDITIONAL INTEGRATED ASSESSMENT RECOMMENDED

Cite the appropriate criteria below as a basis for recommending that additional site evaluation be performed.

THERE HAS BEEN A RELEASE OF HAZARDOUS SUBSTANCES, POLLUTANTS OR CONTAMINANTS

DRUMS, BARRELS OR CONTAINERS ARE, OR MAY BE, PRESENT

THERE IS A GROUNDWATER PATHWAY THREAT

CONTAMINANTS MAY BE PRESENT IN SUFFICIENT QUANTITY AND/OR CONCENTRATION

THERE IS A SURFACE WATER PATHWAY THREAT

THERE IS AN ACTUAL OR POTENTIAL EXPOSURE THREAT

THERE IS A DIRECT SOIL EXPOSURE PATHWAY THREAT

THERE IS, OR MAY BE, A THREAT OF FIRE OR EXPLOSION

THERE ARE, OR MAY BE, HIGH LEVELS OF CONTAMINANTS IN SURFACE SOILS

THE SITE IS SUSCEPTIBLE TO ADVERSE WEATHER CONDITIONS

THERE IS AN AIR PATHWAY THREAT

THERE ARE NO WILLING/CAPABLE PRPs WILLING TO RESPOND AT THIS TIME

THERE ARE ENDANGERED SPECIES, WETLANDS, OR OTHER SENSITIVE ENVIRONMENTS WHICH MAY BE IMPACTED BY THE SITE

CERCLA "LIMITATIONS ON RESPONSE" PROVISIONS DO NOT APPLY

MISSOURI SUPERFUND PRE-CERCLIS SITE SCREENING FORM

ADDITIONAL INTEGRATED ASSESSMENT RECOMMENDED (continued)

THERE ARE NO OTHER FEDERAL, STATE, OR OTHER RESPONSE MECHANISMS AVAILABLE TO INVESTIGATE THE SITE

OTHER (DESCRIBE):

VIII. ADDITIONAL INFORMATION OR COMMENTS

PREPARED BY:

NAME Valerie Wilder

SIGNATURE: *Valerie H. Wilder*

DATE: 6-29-00

REVIEWED BY:

NAME Julieann Warren

SIGNATURE: *Julieann Warren*

DATE: 6-30-00

APPROVED BY:

NAME Gary Behrns

SIGNATURE: *Gary Behrns*

DATE: 6-30-00

VII. ORIGINAL ANALYTICAL SAMPLE RESULTS

A. XRF RESULTS

Application:SOILS with U,Th,Ag Q101 07-08-1992

Meas Time: 7-JAN-2000 08:52:52

ID: <FE1-7-00>

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	Value	Std. dev.	
CrHI	111.744	50.0876	ppm
K	-277.556	185.314	ppm
Ca	-605.075	85.9482	ppm
Ti	-193.039	93.6764	ppm
CrLO	-768.905	159.457	ppm
Mn	5047.30	1453.07	ppm
Fe	1.63559e+06	6327.17	ppm
Co	3175.08	1700.69	ppm
Ni	-3616.77	857.706	ppm
Cu	374.114	200.410	ppm
Zn	-146.300	114.256	ppm
As	-37.8316	126.250	ppm
Se	-77.3007	47.8232	ppm
Sr	-1.20841	19.9317	ppm
Zr	15.0902	12.9240	ppm
Mo	-23.9566	13.5777	ppm
Hg	-7.25655	137.886	ppm
Pb	75.1178	114.564	ppm
Rb	-44.2021	48.2040	ppm
Cd	1622.90	425.208	ppm
Sn	156.793	227.635	ppm
Sb	281.608	156.973	ppm
Ba	64.6675	36.8829	ppm
Ag	200.204	245.682	ppm
U	4.16483	3.45844	ppm
Th	-3.29803	3.03611	ppm

Application:SOILS with U,Th,Ag Q101 07-08-1992

Meas Time: 7-JAN-2000 09:01:22

ID: <05>

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	Value	Std. dev.	
CrHI	583.242	159.154	ppm
K	8457.66	395.870	ppm
Ca	2380.02	164.018	ppm
Ti	2877.73	181.223	ppm
CrLO	-112.780	113.895	ppm
Mn	-23.0650	138.325	ppm
Fe	8935.28	237.178	ppm
Co	-1.15401	84.7889	ppm
Ni	68.5247	35.5147	ppm
Cu	25.4836	19.9318	ppm
Zn	65.1913	18.9204	ppm
As	-80.4770	20.8983	ppm
Se	6.33553	7.84634	ppm
Sr	47.8832	4.02539	ppm
Zr	311.799	5.54141	ppm
Mo	-2.22351	2.28419	ppm
Hg	-0.0967641	17.1188	ppm
Pb	284.577	16.7925	ppm
Rb	27.4504	5.99284	ppm
Cd	169.059	70.5867	ppm
Sn	479.144	44.2515	ppm
Sb	91.1465	27.3063	ppm
Ba	433.631	16.4083	ppm
Ag	-153.983	39.7161	ppm
U	15.7449	5.85157	ppm

Th 20.6428 5.01191 ppm

Application:SOILS with U,Th,Ag Q101 07-08-1992

Meas Time: 7-JAN-2000 09:09:53

ID: <06>

() ()

	Value	Std. dev.
CrHI	256.913	135.458 ppm
K	3813.60	279.553 ppm
Ca	5300.25	213.150 ppm
Ti	1122.96	122.258 ppm
CrLO	81.3723	97.2714 ppm
Mn	-38.2277	124.833 ppm
Fe	6523.61	201.110 ppm
Co	65.4851	77.5735 ppm
Ni	22.7155	32.8867 ppm
Cu	26.3634	20.0083 ppm
Zn	-23.9631	16.1352 ppm
As	-22.0265	14.8237 ppm
Se	20.4419	8.20106 ppm
Sr	22.2837	3.07663 ppm
Zr	172.660	4.05585 ppm
Mo	-1.62688	1.88425 ppm
Hg	10.9975	17.2558 ppm
Pb	81.2221	10.8062 ppm
Rb	18.0184	5.08754 ppm
Cd	25.7660	6.33468 ppm
Sn	-23.1719	3.97011 ppm
Sb	3.23545	3.08881 ppm
Ba	3.80883	1.42163 ppm
Ag	18.4975	4.00451 ppm
U	2.67311	5.00785 ppm
Th	1.08377	3.88004 ppm

Application:SOILS with U,Th,Ag Q101 07-08-1992

Meas Time: 7-JAN-2000 09:14:48

ID: <07>

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	Value	Std. dev.
CrHI	478.326	151.441 ppm
K	5173.75	311.626 ppm
Ca	3762.95	182.418 ppm
Ti	1326.72	130.327 ppm
CrLO	115.611	95.1372 ppm
Mn	269.434	148.074 ppm
Fe	8138.02	224.894 ppm
Co	86.3067	84.7644 ppm
Ni	-17.0289	32.2719 ppm
Cu	20.1716	20.3648 ppm
Zn	37.8801	19.0664 ppm
As	-43.5680	16.7646 ppm
Se	9.27825	8.10787 ppm
Sr	36.2886	3.64541 ppm
Zr	265.747	5.07027 ppm
Mo	3.40674	2.28666 ppm
Hg	27.8845	18.3998 ppm
Pb	131.294	12.8525 ppm
Rb	37.0557	6.03726 ppm
Cd	46.8929	59.2109 ppm
Sn	235.177	35.9792 ppm
Sb	89.5241	23.3685 ppm
Ba	291.582	13.2866 ppm

Ag	-150.844	32.9990 ppm
U	1.86802	5.75861 ppm
Th	20.8866	4.67132 ppm

Application:SOILS with U,Th,Ag Q101 07-08-1992

Meas Time: 7-JAN-2000 09:19:46

ID: <08>

() ()

	Value	Std. dev.
CrHI	539.033	137.047 ppm
K	941.978	103.706 ppm
Ca	884.157	49.0410 ppm
Ti	22.1044	47.2112 ppm
CrLO	232.804	40.1628 ppm
Mn	80.2960	115.636 ppm
Fe	2476.79	125.350 ppm
Co	-34.7438	52.4755 ppm
Ni	27.9731	27.8952 ppm
Cu	16.9483	16.1436 ppm
Zn	-37.4786	11.5025 ppm
As	-20.6820	11.5347 ppm
Se	6.15240	6.62958 ppm
Sr	15.4588	2.62243 ppm
Zr	142.801	3.57721 ppm
Mo	-0.786550	1.63694 ppm
Hg	43.2838	16.1883 ppm
Pb	46.3057	8.66347 ppm
Rb	9.15768	4.24922 ppm
Cd	6.02330	3.09036 ppm
Sn	-24.5236	2.98798 ppm
Sb	2.89490	2.26811 ppm
Ba	2.33186	1.10421 ppm
Ag	11.2309	2.07143 ppm
U	7.04586	4.72041 ppm
Th	7.45805	3.67292 ppm

Application:SOILS with U,Th,Ag Q101 07-08-1992

Meas Time: 7-JAN-2000 09:24:18

ID: <09>

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	Value	Std. dev.
CrHI	528.525	152.861 ppm
K	3069.44	260.748 ppm
Ca	5441.42	216.431 ppm
Ti	980.554	113.336 ppm
CrLO	-8.19345	97.9046 ppm
Mn	90.1249	133.708 ppm
Fe	6664.20	204.289 ppm
Co	107.836	80.6544 ppm
Ni	-13.1753	32.8419 ppm
Cu	89.7197	24.0594 ppm
Zn	178.497	23.9075 ppm
As	-44.6424	26.7465 ppm
Se	19.7425	8.73592 ppm
Sr	30.6318	3.45632 ppm
Zr	121.785	3.59605 ppm
Mo	-1.08094	1.91183 ppm
Hg	-28.9908	17.2849 ppm
Pb	494.937	20.3923 ppm
Rb	22.1784	5.45346 ppm
Cd	72.0613	63.4927 ppm
Sn	298.336	38.7199 ppm

Sb	86.5457	24.7378 ppm
Ba	168.913	10.9733 ppm
Ag	-179.120	35.2602 ppm
U	2.53909	5.39444 ppm
Th	2.66658	4.90976 ppm

Application:SOILS with U,Th,Ag Q101 07-08-1992

Meas Time: 7-JAN-2000 09:28:58

ID: <10>

() ()

	Value	Std. dev.	
CrHI	209.407	142.096	ppm
K	5882.71	343.797	ppm
Ca	7711.67	260.353	ppm
Ti	1223.18	134.271	ppm
CrLO	118.139	108.361	ppm
Mn	1209.15	186.662	ppm
Fe	11555.0	269.032	ppm
Co	138.455	98.2637	ppm
Ni	18.6271	35.6566	ppm
Cu	69.3994	23.2890	ppm
Zn	27.9780	19.2196	ppm
As	-34.7035	24.7792	ppm
Se	8.09536	8.43577	ppm
Sr	24.4778	3.35926	ppm
Zr	171.452	4.27179	ppm
Mo	-3.59565	2.05702	ppm
Hg	2.58391	18.6789	ppm
Pb	378.709	18.9220	ppm
Rb	28.1836	6.12263	ppm
Cd	179.727	65.7508	ppm
Sn	221.678	38.6311	ppm
Sb	75.2513	25.2929	ppm
Ba	307.884	14.0017	ppm
Ag	-102.794	37.2990	ppm
U	13.9016	5.63486	ppm
Th	6.48863	4.71430	ppm

Application:SOILS with U,Th,Ag Q101 07-08-1992

Meas Time: 7-JAN-2000 09:33:29

ID: <11>

() ()

	Value	Std. dev.	
CrHI	288.700	135.121	ppm
K	1678.71	172.758	ppm
Ca	3173.14	151.109	ppm
Ti	258.609	68.4998	ppm
CrLO	148.805	52.6906	ppm
Mn	14.6160	124.744	ppm
Fe	5844.21	189.714	ppm
Co	19.7209	73.0177	ppm
Ni	3.63653	31.2722	ppm
Cu	42.9632	20.6216	ppm
Zn	96.4679	20.0963	ppm
As	-189.993	28.8251	ppm
Se	16.3745	8.24850	ppm
Sr	24.8287	3.21902	ppm
Zr	145.869	3.82252	ppm
Mo	-2.00232	1.85801	ppm
Hg	16.4962	17.9457	ppm
Pb	706.320	23.5710	ppm
Rb	19.7884	5.30131	ppm

Cd	10.7312	59.9717 ppm
Sn	238.640	36.6659 ppm
Sb	109.780	23.9890 ppm
Ba	291.353	13.2353 ppm
Ag	-113.909	34.4899 ppm
U	3.90235	5.31979 ppm
Th	1.74728	5.28857 ppm

Application:SOILS with U,Th,Ag Q101 07-08-1992

Meas Time: 7-JAN-2000 09:38:03

ID: <12>

() ()

	Value	Std. dev.
CrHI	367.928	139.987 ppm
K	1327.57	164.909 ppm
Ca	4391.55	181.761 ppm
Ti	327.169	73.4334 ppm
CrLO	199.124	63.7132 ppm
Mn	98.5562	131.375 ppm
Fe	7489.43	213.654 ppm
Co	43.0171	79.9249 ppm
Ni	69.6788	34.9638 ppm
Cu	1.80864	18.7756 ppm
Zn	-11.2490	16.4912 ppm
As	-93.8525	19.9983 ppm
Se	18.7517	8.25100 ppm
Sr	25.7428	3.21952 ppm
Zr	99.2250	3.26604 ppm
Mo	-2.03496	1.74497 ppm
Hg	32.9703	18.1984 ppm
Pb	278.530	15.9676 ppm
Rb	17.9590	5.00291 ppm
Cd	159.577	65.3474 ppm
Sn	294.879	39.3521 ppm
Sb	108.661	25.7129 ppm
Ba	185.394	11.3607 ppm
Ag	-108.521	37.2684 ppm
U	1.81482	5.08026 ppm
Th	8.71097	4.44783 ppm

Application:SOILS with U,Th,Ag Q101 07-08-1992

Meas Time: 7-JAN-2000 09:43:41

ID: <13>

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	Value	Std. dev.
CrHI	138.855	81.7639 ppm
K	679.081	69.2453 ppm
Ca	759.953	26.3716 ppm
Ti	-80.7974	22.7475 ppm
CrLO	262.677	26.7696 ppm
Mn	-429.949	50.5520 ppm
Fe	206.674	33.1777 ppm
Co	-99.2666	19.6607 ppm
Ni	-29.4031	13.2136 ppm
Cu	24.9748	8.84878 ppm
Zn	43.9448	6.01708 ppm
As	-5.02418	6.84596 ppm
Se	-11.6758	3.27495 ppm
Sr	-4.90105	1.07652 ppm
Zr	3.24448	0.939146 ppm
Mo	1.27565	0.554302 ppm
Hg	-52.1571	5.95772 ppm

Pb	25.7112	5.84869 ppm
Rb	-4.63245	1.69455 ppm
Cd	358.917	21.6252 ppm
Sn	17.5336	14.8401 ppm
Sb	-36.9717	5.34593 ppm
Ba	10.8948	2.27736 ppm
Ag	816.773	31.2205 ppm
U	-6.69737	1.84109 ppm
Th	-6.00736	1.61408 ppm

Application:SOILS with U,Th,Ag Q101 07-08-1992

Meas Time: 7-JAN-2000 09:48:08

ID: <14>

() ()

	Value	Std. dev.
CrHI	317.511	124.613 ppm
K	1928.63	182.600 ppm
Ca	2209.84	124.180 ppm
Ti	447.676	78.5755 ppm
CrLO	147.551	58.6812 ppm
Mn	132.142	118.630 ppm
Fe	3610.01	149.524 ppm
Co	48.9433	61.5299 ppm
Ni	-11.1537	26.1488 ppm
Cu	22.8911	16.4213 ppm
Zn	43.1579	15.0193 ppm
As	-30.1808	14.9927 ppm
Se	2.62997	6.50850 ppm
Sr	12.8282	2.52114 ppm
Zr	86.7531	2.91844 ppm
Mo	-2.47856	1.48267 ppm
Hg	-5.58201	14.3259 ppm
Pb	132.504	11.5556 ppm
Rb	12.4694	4.35192 ppm
Cd	125.675	63.3327 ppm
Sn	388.375	39.5291 ppm
Sb	128.557	25.3858 ppm
Ba	247.723	12.4543 ppm
Ag	-136.542	35.7515 ppm
U	7.72985	4.61484 ppm
Th	0.0464719	3.58106 ppm

Application:SOILS with U,Th,Ag Q101 07-08-1992

Meas Time: 7-JAN-2000 09:54:04

ID: <15>

() ()

	Value	Std. dev.
CrHI	292.020	137.406 ppm
K	845.322	96.3860 ppm
Ca	947.607	53.6443 ppm
Ti	-60.5604	37.7362 ppm
CrLO	206.857	36.7416 ppm
Mn	303.340	133.204 ppm
Fe	3353.66	148.235 ppm
Co	13.2208	64.5382 ppm
Ni	60.0190	35.0607 ppm
Cu	-7.29415	19.7239 ppm
Zn	-68.4563	16.2164 ppm
As	-59.5071	15.5964 ppm
Se	22.4630	8.50731 ppm
Sr	23.0408	3.04971 ppm
Zr	145.848	3.71377 ppm

Mo	-6.56574	1.81942 ppm
Hg	-4.01820	17.1568 ppm
Pb	113.834	11.7715 ppm
Rb	6.86136	4.70662 ppm
Cd	146.568	63.2001 ppm
Sn	408.242	39.3849 ppm
Sb	72.6425	24.3608 ppm
Ba	218.121	11.8123 ppm
Ag	-179.908	34.8525 ppm
U	7.07470	5.21233 ppm
Th	6.22468	4.29331 ppm

Application:SOILS with U,Th,Ag Q101 07-08-1992

Meas Time: 7-JAN-2000 10:00:37

ID: <16>

() ()

	Value	Std. dev.
CrHI	727.184	160.791 ppm
K	5343.61	317.240 ppm
Ca	1773.40	135.739 ppm
Ti	2061.53	157.151 ppm
CrLO	-174.479	99.2883 ppm
Mn	152.694	139.740 ppm
Fe	5916.40	192.699 ppm
Co	14.2426	74.1343 ppm
Ni	33.0535	33.5219 ppm
Cu	38.5890	20.7874 ppm
Zn	-16.8101	16.5737 ppm
As	-21.0620	15.9934 ppm
Se	20.9649	8.29691 ppm
Sr	31.3494	3.41494 ppm
Zr	283.796	5.12223 ppm
Mo	1.03721	2.18321 ppm
Hg	4.82454	17.1517 ppm
Pb	107.097	11.7927 ppm
Rb	19.0972	5.44005 ppm
Cd	20.3872	5.63982 ppm
Sn	-24.7474	3.92388 ppm
Sb	1.36707	2.61838 ppm
Ba	3.84307	1.42561 ppm
Ag	26.8018	5.05920 ppm
U	10.6214	5.56478 ppm
Th	10.3473	4.47451 ppm

Application:SOILS with U,Th,Ag Q101 07-08-1992

Meas Time: 7-JAN-2000 10:05:04

ID: <17>

() ()

	Value	Std. dev.
CrHI	404.607	132.549 ppm
K	1092.34	113.942 ppm
Ca	1022.92	58.6180 ppm
Ti	9.17359	42.8423 ppm
CrLO	179.514	26.2841 ppm
Mn	77.9810	118.828 ppm
Fe	3210.01	141.580 ppm
Co	-31.0136	57.4035 ppm
Ni	87.5041	32.2018 ppm
Cu	66.0975	19.6217 ppm
Zn	-21.2272	13.3900 ppm
As	-33.3105	13.7222 ppm
Se	8.25934	6.95103 ppm

Sr	25.5228	3.02338 ppm
Zr	172.996	3.94877 ppm
Mo	-1.80105	1.73306 ppm
Hg	-1.99003	14.9417 ppm
Pb	90.3845	10.6387 ppm
Rb	16.6871	4.77231 ppm
Cd	22.4864	5.83489 ppm
Sn	-13.5466	4.58958 ppm
Sb	3.32566	2.94227 ppm
Ba	5.02204	1.57562 ppm
Ag	10.5285	2.43275 ppm
U	6.07388	4.95038 ppm
Th	12.2578	4.05782 ppm

Application:SOILS with U,Th,Ag Q101 07-08-1992

Meas Time: 7-JAN-2000 10:10:05

ID: <18>

() ()

	Value	Std. dev.
CrHI	433.977	148.899 ppm
K	5432.48	317.129 ppm
Ca	2913.19	163.180 ppm
Ti	1425.73	136.728 ppm
CrLO	-82.3124	89.1301 ppm
Mn	34.7571	138.516 ppm
Fe	7050.62	209.802 ppm
Co	-19.9155	77.9748 ppm
Ni	22.4569	33.9334 ppm
Cu	34.2377	21.2020 ppm
Zn	-9.45333	17.5249 ppm
As	-33.0938	17.0225 ppm
Se	9.14914	8.08781 ppm
Sr	50.4189	4.03542 ppm
Zr	343.107	5.67939 ppm
Mo	2.77799	2.38172 ppm
Hg	-7.93779	17.0969 ppm
Pb	132.726	12.7997 ppm
Rb	35.2185	6.04656 ppm
Cd	286.927	64.7419 ppm
Sn	220.706	37.4363 ppm
Sb	43.0772	24.3244 ppm
Ba	320.880	13.9706 ppm
Ag	-105.271	36.1101 ppm
U	5.29342	5.91074 ppm
Th	13.8988	4.76740 ppm

Application:SOILS with U,Th,Ag Q101 07-08-1992

Meas Time: 7-JAN-2000 10:17:27

ID: <19>

() ()

	Value	Std. dev.
CrHI	500.815	161.947 ppm
K	9503.08	428.747 ppm
Ca	3478.14	200.414 ppm
Ti	3395.41	197.179 ppm
CrLO	-54.1764	141.215 ppm
Mn	746.576	179.678 ppm
Fe	12234.1	278.559 ppm
Co	156.036	102.088 ppm
Ni	-3.34055	36.6574 ppm
Cu	26.0212	22.6259 ppm
Zn	6.63580	19.9274 ppm

As	-38.3699	15.9611 ppm
Se	17.7996	9.03903 ppm
Sr	48.5764	4.17324 ppm
Zr	322.951	5.73210 ppm
Mo	5.05223	2.56134 ppm
Hg	-6.03665	18.5480 ppm
Pb	79.6597	11.8232 ppm
Rb	42.9079	6.66411 ppm
Cd	184.327	68.2784 ppm
Sn	191.322	39.5441 ppm
Sb	31.3304	25.3554 ppm
Ba	266.768	13.3819 ppm
Ag	-78.5966	39.3418 ppm
U	6.56710	6.06952 ppm
Th	11.3205	4.57042 ppm

Application:SOILS with U,Th,Ag Q101 07-08-1992

Meas Time: 7-JAN-2000 10:22:16

ID: <20>

() ()

	Value	Std. dev.
CrHI	270.718	135.824 ppm
K	1979.86	205.019 ppm
Ca	6483.65	226.068 ppm
Ti	251.939	73.4095 ppm
CrLO	89.6246	57.6621 ppm
Mn	208.569	134.215 ppm
Fe	5072.05	178.853 ppm
Co	-0.871134	69.8760 ppm
Ni	136.926	37.8241 ppm
Cu	151.270	25.8882 ppm
Zn	678.807	33.9738 ppm
As	-508.277	47.0126 ppm
Se	10.0416	8.69687 ppm
Sr	29.6441	3.60963 ppm
Zr	150.997	4.09564 ppm
Mo	-2.31610	1.88402 ppm
Hg	22.8027	19.7137 ppm
Pb	2042.17	39.3196 ppm
Rb	28.2813	5.93816 ppm
Cd	141.018	66.4062 ppm
Sn	335.731	40.4805 ppm
Sb	111.895	26.2121 ppm
Ba	185.946	11.5920 ppm
Ag	-174.464	36.7780 ppm
U	-1.64621	5.71131 ppm
Th	3.57153	7.42527 ppm

Application:SOILS with U,Th,Ag Q101 07-08-1992

Meas Time: 7-JAN-2000 10:27:07

ID: <24>

() ()

	Value	Std. dev.
CrHI	413.474	140.702 ppm
K	3294.82	243.350 ppm
Ca	2541.90	141.585 ppm
Ti	889.377	103.273 ppm
CrLO	296.754	81.7353 ppm
Mn	203.208	134.151 ppm
Fe	5485.32	184.642 ppm
Co	48.4881	72.0663 ppm
Ni	45.2195	32.6025 ppm

Cu	59.3127	20.5739 ppm
Zn	20.8974	16.5887 ppm
As	-75.1033	19.0120 ppm
Se	11.9890	7.69288 ppm
Sr	30.9998	3.36322 ppm
Zr	194.636	4.32238 ppm
Mo	2.34806	1.99471 ppm
Hg	27.3080	17.4486 ppm
Pb	243.203	15.2313 ppm
Rb	29.9652	5.58743 ppm
Cd	171.647	67.9254 ppm
Sn	440.083	42.2837 ppm
Sb	118.840	26.7899 ppm
Ba	273.521	13.2777 ppm
Ag	-140.671	38.3819 ppm
U	5.58738	5.51094 ppm
Th	19.7512	4.73430 ppm

Application:SOILS with U,Th,Ag Q101 07-08-1992

Meas Time: 7-JAN-2000 10:38:49

ID: <25>

() ()

	Value	Std. dev.
CrHI	460.868	139.359 ppm
K	822.689	90.6621 ppm
Ca	1076.34	59.7426 ppm
Ti	-60.3799	33.8013 ppm
CrLO	246.336	31.8068 ppm
Mn	229.132	131.163 ppm
Fe	5242.55	178.822 ppm
Co	-86.2688	65.5254 ppm
Ni	8.07793	29.7764 ppm
Cu	34.0653	20.3157 ppm
Zn	1189.84	41.9063 ppm
As	-55.5428	18.8945 ppm
Se	11.2809	7.49975 ppm
Sr	16.8077	2.80716 ppm
Zr	127.295	3.53126 ppm
Mo	-6.71148	1.57082 ppm
Hg	-9.68603	15.8926 ppm
Pb	239.072	14.7403 ppm
Rb	17.2354	4.75336 ppm
Cd	240.778	65.1809 ppm
Sn	331.885	39.1357 ppm
Sb	104.901	25.5797 ppm
Ba	266.159	12.9162 ppm
Ag	-178.488	35.5251 ppm
U	1.74512	4.75662 ppm
Th	5.75752	4.21165 ppm

Application:SOILS with U,Th,Ag Q101 07-08-1992

Meas Time: 7-JAN-2000 10:45:18

ID: <26>

() ()

	Value	Std. dev.
CrHI	543.259	153.133 ppm
K	2291.35	195.037 ppm
Ca	1282.97	89.9951 ppm
Ti	588.579	90.8688 ppm
CrLO	125.977	61.2893 ppm
Mn	151.357	144.840 ppm
Fe	11107.7	258.575 ppm

Co	275.383	97.6317 ppm
Ni	53.7442	36.0431 ppm
Cu	21.6378	19.8641 ppm
Zn	-29.9614	15.7328 ppm
As	-17.1609	14.0420 ppm
Se	17.7328	8.20529 ppm
Sr	31.0342	3.43590 ppm
Zr	194.587	4.41085 ppm
Mo	1.21044	2.05868 ppm
Hg	14.0758	17.6323 ppm
Pb	49.8367	10.4424 ppm
Rb	22.0581	5.56473 ppm
Cd	184.326	69.9100 ppm
Sn	322.913	41.8648 ppm
Sb	114.225	27.3592 ppm
Ba	240.938	12.8095 ppm
Ag	-143.327	39.4968 ppm
U	5.77038	5.27652 ppm
Th	23.3009	4.32069 ppm

Application:SOILS with U,Th,Ag Q101 07-08-1992

Meas Time: 7-JAN-2000 10:49:54

ID: <27>

() ()

	Value	Std. dev.
CrHI	-48.0829	59.6525 ppm
K	462.358	33.6725 ppm
Ca	776.127	25.9708 ppm
Ti	-88.6892	19.0137 ppm
CrLO	233.222	20.2276 ppm
Mn	-406.057	48.5115 ppm
Fe	138.692	25.0538 ppm
Co	-117.264	14.8507 ppm
Ni	-8.34341	14.5493 ppm
Cu	17.1814	7.41931 ppm
Zn	45.7460	5.27634 ppm
As	13.9032	3.90309 ppm
Se	-14.6681	2.78629 ppm
Sr	-5.80248	0.951525 ppm
Zr	0.999369	0.813178 ppm
Mo	1.33184	0.490189 ppm
Hg	-44.7638	6.15977 ppm
Pb	-10.8149	3.01029 ppm
Rb	-5.62735	1.33387 ppm
Cd	201.862	16.3837 ppm
Sn	26.6852	12.2477 ppm
Sb	-14.4822	4.77586 ppm
Ba	10.3265	2.20813 ppm
Ag	444.067	22.9370 ppm
U	-7.10822	1.62797 ppm
Th	-4.91614	1.31636 ppm

Application:SOILS with U,Th,Ag Q101 07-08-1992

Meas Time: 7-JAN-2000 10:54:03

ID: <28>

() ()

	Value	Std. dev.
CrHI	69.3189	108.483 ppm
K	545.174	55.8106 ppm
Ca	828.783	36.8119 ppm
Ti	-68.1281	29.9835 ppm
CrLO	197.076	23.2376 ppm

Mn	180.548	118.173 ppm
Fe	3577.84	147.876 ppm
Co	30.3052	60.4442 ppm
Ni	62.8083	30.2216 ppm
Cu	0.429649	15.4506 ppm
Zn	47.9455	15.4319 ppm
As	-33.9094	13.5362 ppm
Se	14.1014	6.99166 ppm
Sr	12.1185	2.47295 ppm
Zr	87.2447	2.91856 ppm
Mo	-1.85957	1.46539 ppm
Hg	16.4175	15.2536 ppm
Pb	96.8083	10.5226 ppm
Rb	12.0194	4.26404 ppm
Cd	6.66759	3.11000 ppm
Sn	-27.0416	2.54062 ppm
Sb	1.72041	2.04223 ppm
Ba	0.278746	0.539576 ppm
Ag	11.4491	2.08251 ppm
U	3.05436	4.50720 ppm
Th	7.82026	3.69737 ppm

Application:SOILS with U,Th,Ag Q101 07-08-1992

Meas Time: 7-JAN-2000 10:58:18

ID: <29>

() ()

	Value	Std. dev.
CrHI	426.017	139.268 ppm
K	827.625	105.258 ppm
Ca	1793.67	100.343 ppm
Ti	25.6790	50.4198 ppm
CrLO	209.173	43.6918 ppm
Mn	332.666	135.184 ppm
Fe	3953.85	157.500 ppm
Co	11.4443	64.3814 ppm
Ni	41.3956	31.9949 ppm
Cu	26.1441	19.1853 ppm
Zn	-17.0926	15.5148 ppm
As	-54.5995	18.2221 ppm
Se	8.10851	7.50000 ppm
Sr	30.2249	3.26309 ppm
Zr	183.593	4.11540 ppm
Mo	-2.94825	1.86467 ppm
Hg	-12.9624	15.6734 ppm
Pb	211.294	14.1417 ppm
Rb	23.0481	5.12557 ppm
Cd	27.4668	6.43692 ppm
Sn	-19.9256	3.94036 ppm
Sb	0.883570	2.74121 ppm
Ba	6.06701	1.72935 ppm
Ag	10.1795	2.46651 ppm
U	4.87517	5.36857 ppm
Th	12.4099	4.57259 ppm

Application:SOILS with U,Th,Ag Q101 07-08-1992

Meas Time: 7-JAN-2000 11:03:43

ID: <30>

() ()

	Value	Std. dev.
CrHI	223.992	140.060 ppm
K	4881.87	314.037 ppm
Ca	5929.87	228.369 ppm

Ti	1338.32	134.870 ppm
CrLO	57.9480	104.599 ppm
Mn	133.789	149.180 ppm
Fe	12831.3	280.579 ppm
Co	188.898	101.990 ppm
Ni	-7.05882	34.3255 ppm
Cu	17.4856	20.5586 ppm
Zn	52.9598	19.7964 ppm
As	-18.8972	16.6243 ppm
Se	4.52752	8.05155 ppm
Sr	32.7111	3.58190 ppm
Zr	193.004	4.46165 ppm
Mo	0.576333	2.08013 ppm
Hg	-6.95324	17.5560 ppm
Pb	107.239	12.2262 ppm
Rb	36.1999	6.01778 ppm
Cd	135.697	64.3396 ppm
Sn	211.463	37.9211 ppm
Sb	124.117	25.7102 ppm
Ba	194.618	11.6614 ppm
Ag	-135.668	36.0762 ppm
U	-1.31468	5.29857 ppm
Th	10.9144	4.20384 ppm

Application:SOILS with U,Th,Ag Q101 07-08-1992

Meas Time: 7-JAN-2000 11:08:08

ID: <31>

() ()

	Value	Std. dev.
CrHI	373.871	159.847 ppm
K	6940.40	439.138 ppm
Ca	43805.7	604.202 ppm
Ti	2306.82	170.528 ppm
CrLO	35.5564	133.856 ppm
Mn	401.021	171.147 ppm
Fe	12708.1	294.415 ppm
Co	179.350	107.960 ppm
Ni	55.9401	40.6881 ppm
Cu	78.3331	25.7007 ppm
Zn	157.055	25.1293 ppm
As	-76.4117	25.2605 ppm
Se	20.8591	9.68007 ppm
Sr	45.2287	4.30202 ppm
Zr	176.085	4.60472 ppm
Mo	-3.26701	2.20354 ppm
Hg	0.873823	20.1946 ppm
Pb	366.596	19.8202 ppm
Rb	36.4872	6.50390 ppm
Cd	254.381	77.0596 ppm
Sn	260.467	44.5552 ppm
Sb	41.9410	28.5585 ppm
Ba	164.208	11.9091 ppm
Ag	-159.453	43.0869 ppm
U	-0.942807	5.32730 ppm
Th	10.9153	4.67157 ppm

Application:SOILS with U,Th,Ag Q101 07-08-1992

Meas Time: 7-JAN-2000 11:12:23

ID: <32>

() ()

	Value	Std. dev.
CrHI	336.735	111.408 ppm

K	725.935	77.0383 ppm
Ca	867.320	40.8436 ppm
Ti	-81.5935	26.8583 ppm
CrLO	280.178	32.2549 ppm
Mn	-456.509	75.3014 ppm
Fe	3672.73	146.045 ppm
Co	8.74292	55.7899 ppm
Ni	56.6118	25.6066 ppm
Cu	25.0042	12.6758 ppm
Zn	26.1227	9.34367 ppm
As	17.9690	7.99390 ppm
Se	-9.21438	4.60829 ppm
Sr	4.33107	1.91046 ppm
Zr	32.8822	1.91149 ppm
Mo	0.742105	1.04700 ppm
Hg	-39.2874	9.74915 ppm
Pb	1.26675	5.39107 ppm
Rb	1.31389	3.08945 ppm
Cd	1102.91	38.2904 ppm
Sn	-61.7692	22.3156 ppm
Sb	-131.473	8.25230 ppm
Ba	14.7571	2.72253 ppm
Ag	2388.30	54.6149 ppm
U	1.61690	3.34775 ppm
Th	0.307385	2.45911 ppm

Application:SOILS with U,Th,Ag Q101 07-08-1992

Meas Time: 7-JAN-2000 11:16:38

ID: <33>

() ()

	Value	Std. dev.
CrHI	421.929	157.542 ppm
K	3359.22	283.915 ppm
Ca	8630.24	272.798 ppm
Ti	794.221	107.558 ppm
CrLO	41.3346	108.658 ppm
Mn	736.868	164.214 ppm
Fe	6287.96	202.501 ppm
Co	-11.4836	79.9173 ppm
Ni	4.43002	37.6469 ppm
Cu	25.4613	25.5237 ppm
Zn	1056.71	43.5421 ppm
As	-216.161	32.9392 ppm
Se	17.7857	9.82323 ppm
Sr	42.9993	4.01283 ppm
Zr	111.120	3.64024 ppm
Mo	-4.21232	2.12635 ppm
Hg	-13.5097	20.3037 ppm
Pb	849.464	26.4501 ppm
Rb	20.9229	5.75035 ppm
Cd	186.366	62.6653 ppm
Sn	229.647	37.0265 ppm
Sb	36.9587	23.4814 ppm
Ba	190.191	11.3936 ppm
Ag	-97.3996	35.4120 ppm
U	-0.363188	5.89686 ppm
Th	7.15147	5.91289 ppm

Application:SOILS with U,Th,Ag Q101 07-08-1992

Meas Time: 7-JAN-2000 11:20:54

ID: <34>

() ()

	Value	Std. dev.
CrHI	328.795	136.534 ppm
K	2830.55	247.447 ppm
Ca	7031.92	240.002 ppm
Ti	711.780	103.629 ppm
CrLO	155.684	86.4042 ppm
Mn	67.7309	128.127 ppm
Fe	6592.71	201.675 ppm
Co	64.6451	77.3074 ppm
Ni	-23.5010	29.9127 ppm
Cu	41.8247	20.3049 ppm
Zn	60.5013	18.7413 ppm
As	-72.4435	20.8469 ppm
Se	3.69733	7.58950 ppm
Sr	21.5646	3.05342 ppm
Zr	97.4972	3.21510 ppm
Mo	1.01823	1.74162 ppm
Hg	-0.422074	16.8015 ppm
Pb	300.915	16.2831 ppm
Rb	17.7103	4.80955 ppm
Cd	6.59410	3.41452 ppm
Sn	-20.5860	3.89350 ppm
Sb	1.16846	2.05521 ppm
Ba	1.02001	0.823323 ppm
Ag	10.4786	1.80504 ppm
U	-4.23947	4.81438 ppm
Th	3.76018	4.31324 ppm

Application:SOILS with U,Th,Ag Q101 07-08-1992

Meas Time: 7-JAN-2000 11:24:47

ID: <35>

() ()

	Value	Std. dev.
CrHI	158.908	111.450 ppm
K	862.859	92.5091 ppm
Ca	998.103	53.5258 ppm
Ti	-104.359	37.6171 ppm
CrLO	353.267	45.1318 ppm
Mn	-95.1308	101.449 ppm
Fe	2809.34	132.099 ppm
Co	-161.450	48.0110 ppm
Ni	23.1029	26.8489 ppm
Cu	33.9216	17.0234 ppm
Zn	160.462	19.0759 ppm
As	-99.2104	23.3454 ppm
Se	8.48693	6.85799 ppm
Sr	8.50883	2.34167 ppm
Zr	41.9252	2.25118 ppm
Mo	-0.259227	1.31080 ppm
Hg	-17.0721	14.1703 ppm
Pb	457.986	18.7542 ppm
Rb	7.91239	3.85488 ppm
Cd	2456.66	57.3981 ppm
Sn	-282.063	30.4964 ppm
Sb	-346.184	10.0350 ppm
Ba	24.0738	3.52133 ppm
Ag	5290.81	82.2182 ppm
U	-6.59459	4.02858 ppm
Th	2.58253	4.34742 ppm

Application:SOILS with U,Th,Ag Q101 07-08-1992

Meas Time: 7-JAN-2000 11:28:58

ID: <36>

() ()

	Value	Std. dev.
CrHI	190.332	111.945 ppm
K	1159.12	115.798 ppm
Ca	892.778	47.1558 ppm
Ti	-55.4511	33.3065 ppm
CrLO	317.497	38.8058 ppm
Mn	-57.5542	104.146 ppm
Fe	2730.79	129.532 ppm
Co	32.2399	55.4620 ppm
Ni	-0.419144	25.5235 ppm
Cu	34.9189	16.2750 ppm
Zn	0.203478	12.2167 ppm
As	-18.2560	12.0514 ppm
Se	-2.68637	5.94391 ppm
Sr	9.26651	2.30611 ppm
Zr	101.146	3.04096 ppm
Mo	0.00975007	1.46992 ppm
Hg	-8.53444	13.4835 ppm
Pb	66.2019	9.11119 ppm
Rb	8.89420	4.03848 ppm
Cd	24.7915	6.05563 ppm
Sn	-17.9108	4.14905 ppm
Sb	7.95745	3.57832 ppm
Ba	6.30680	1.74400 ppm
Ag	11.4490	2.69034 ppm
U	3.18571	4.27911 ppm
Th	0.671714	3.27513 ppm

Application:SOILS with U,Th,Ag Q101 07-08-1992

Meas Time: 7-JAN-2000 11:33:03

ID: <37>

() ()

	Value	Std. dev.
CrHI	623.104	159.405 ppm
K	3597.68	273.011 ppm
Ca	3451.84	176.669 ppm
Ti	1004.36	120.892 ppm
CrLO	-282.105	91.5211 ppm
Mn	624.955	160.100 ppm
Fe	7778.27	220.435 ppm
Co	80.9376	84.2766 ppm
Ni	102.441	38.6908 ppm
Cu	58.4059	23.1036 ppm
Zn	-19.9137	18.0805 ppm
As	-102.331	19.4539 ppm
Se	36.8265	9.29947 ppm
Sr	26.8230	3.34171 ppm
Zr	172.534	4.17196 ppm
Mo	-4.57928	2.05203 ppm
Hg	12.5109	18.3752 ppm
Pb	237.458	15.6262 ppm
Rb	27.9311	5.89972 ppm
Cd	208.664	68.7751 ppm
Sn	385.298	41.6433 ppm
Sb	39.9450	25.7186 ppm
Ba	265.948	13.2050 ppm
Ag	-223.274	37.2928 ppm
U	15.1055	5.88027 ppm
Th	12.3874	4.74625 ppm

Application:SOILS with U,Th,Ag Q101 07-08-1992

Meas Time: 7-JAN-2000 11:40:34

ID: <38>

() ()

	Value	Std. dev.	
CrHI	287.290	119.906	ppm
K	876.064	93.6512	ppm
Ca	963.453	51.1315	ppm
Ti	-123.771	32.1145	ppm
CrLO	277.530	36.3354	ppm
Mn	-113.059	114.247	ppm
Fe	7758.47	213.173	ppm
Co	-55.0184	73.0722	ppm
Ni	29.6698	27.1071	ppm
Cu	58.4171	16.9583	ppm
Zn	81.2918	14.7563	ppm
As	-10.1548	14.8918	ppm
Se	0.552921	5.98965	ppm
Sr	10.3026	2.40164	ppm
Zr	77.2103	2.81081	ppm
Mo	0.413303	1.37099	ppm
Hg	-16.0374	13.1010	ppm
Pb	128.898	11.4830	ppm
Rb	9.29149	4.15121	ppm
Cd	1704.54	48.4675	ppm
Sn	-140.852	25.3191	ppm
Sb	-224.325	9.32299	ppm
Ba	13.4730	2.68362	ppm
Ag	3267.72	65.5209	ppm
U	3.32900	4.04703	ppm
Th	6.01224	3.39733	ppm

Application:SOILS with U,Th,Ag Q101 07-08-1992

Meas Time: 7-JAN-2000 11:45:02

ID: <39>

() ()

	Value	Std. dev.	
CrHI	515.393	160.901	ppm
K	6756.07	368.095	ppm
Ca	4955.18	220.035	ppm
Ti	2017.57	160.296	ppm
CrLO	-292.396	115.991	ppm
Mn	864.637	177.688	ppm
Fe	9857.00	249.916	ppm
Co	42.3211	91.9160	ppm
Ni	59.5300	38.7762	ppm
Cu	40.3574	23.5652	ppm
Zn	3.30643	20.2338	ppm
As	3.40470	19.9627	ppm
Se	38.4806	9.78527	ppm
Sr	46.9950	4.09069	ppm
Zr	271.682	5.23571	ppm
Mo	-3.48676	2.31558	ppm
Hg	23.2832	19.9848	ppm
Pb	166.295	14.3054	ppm
Rb	36.2108	6.39319	ppm
Cd	247.325	70.7598	ppm
Sn	257.882	41.2742	ppm
Sb	91.6916	27.2931	ppm
Ba	350.760	14.9499	ppm
Ag	-138.993	39.6733	ppm
U	7.53873	5.94013	ppm

Th 10.1310 4.70034 ppm

Application:SOILS with U,Th,Ag Q101 07-08-1992

Meas Time: 7-JAN-2000 11:49:39

ID: <40>

() ()

	Value	Std. dev.	
CrHI	212.820	140.210	ppm
K	7515.72	377.822	ppm
Ca	3887.32	196.514	ppm
Ti	2021.82	161.445	ppm
CrLO	-69.3120	114.013	ppm
Mn	808.340	171.580	ppm
Fe	9927.39	249.426	ppm
Co	112.855	92.3373	ppm
Ni	-31.5738	32.5526	ppm
Cu	-13.0135	19.1558	ppm
Zn	-2.66736	18.0958	ppm
As	-18.3771	16.7774	ppm
Se	8.71290	8.27845	ppm
Sr	32.6639	3.59928	ppm
Zr	229.897	4.78929	ppm
Mo	-1.17041	2.20571	ppm
Hg	32.8644	19.0995	ppm
Pb	109.034	12.2773	ppm
Rb	38.8643	6.25419	ppm
Cd	148.248	64.8606	ppm
Sn	216.660	38.2255	ppm
Sb	50.7156	24.5388	ppm
Ba	311.134	13.9466	ppm
Ag	-95.6134	37.0894	ppm
U	9.03588	5.82549	ppm
Th	10.4696	4.36977	ppm

Application:SOILS with U,Th,Ag Q101 07-08-1992

Meas Time: 12-JAN-2000 10:49:40

ID: <FE>

() ()

	Value	Std. dev.	
CrHI	164.528	74.7073	ppm
Mn	2994.13	2013.94	ppm
Fe	1.61577e+06	8674.32	ppm
Co	4914.37	2394.19	ppm
Cu	551.817	311.809	ppm
Zr	45.4594	20.9285	ppm
Cd	1023.67	315.000	ppm
Sn	327.360	176.111	ppm
Sb	254.125	116.375	ppm

Application:SOILS with U,Th,Ag Q101 07-08-1992

Meas Time: 12-JAN-2000 11:07:42

ID: <TEFLON>

() ()

	Value	Std. dev.	
CrHI	289.202	119.605	ppm
Ca	128.002	38.3836	ppm
CrLO	132.970	62.2214	ppm
Ni	89.4601	32.8351	ppm
Sr	3.40362	1.84121	ppm
Zr	2.24459	1.24280	ppm
Mo	2.19123	1.64310	ppm
Cd	66.0089	24.1293	ppm

U 9.97821 4.66536 ppm

Application:SOILS with U,Th,Ag Q101 07-08-1992

Meas Time: 12-JAN-2000 11:44:53

ID: <06>

() ()

	Value	Std. dev.
CrHI	169.599	106.620 ppm
K	3685.66	279.136 ppm
Ca	5478.43	217.923 ppm
Ti	1000.63	112.647 ppm
CrLO	244.420	106.552 ppm
Mn	67.7061	107.006 ppm
Fe	7907.91	180.818 ppm
Co	42.8936	67.0577 ppm
Ni	41.8441	27.8421 ppm
Cu	63.2864	17.8501 ppm
Zn	-11.4509	13.6342 ppm
As	-4.95163	12.2382 ppm
Se	31.7367	7.10400 ppm
Sr	15.1615	2.30711 ppm
Zr	105.815	2.72416 ppm
Mo	-5.05740	1.40498 ppm
Hg	21.7029	14.5627 ppm
Pb	72.0618	8.65860 ppm
Rb	19.4011	4.08315 ppm
Cd	109.634	29.1193 ppm
Sn	280.379	17.5596 ppm
Sb	112.988	11.5070 ppm
Ba	131.169	4.54670 ppm
Ag	-130.803	16.5492 ppm
U	3.71785	4.10437 ppm
Th	7.35294	3.21358 ppm

Application:SOILS with U,Th,Ag Q101 07-08-1992

Meas Time: 12-JAN-2000 11:57:09

ID: <06.200>

() ()

	Value	Std. dev.
CrHI	104.047	99.6696 ppm
K	8539.77	415.039 ppm
Ca	7668.52	271.413 ppm
Ti	2570.27	175.805 ppm
CrLO	70.9529	137.634 ppm
Mn	504.342	120.530 ppm
Fe	13701.2	209.052 ppm
Co	85.8781	73.9788 ppm
Ni	1.34635	25.9979 ppm
Cu	55.8922	16.9700 ppm
Zn	94.1328	16.0969 ppm
As	-6.46973	14.0896 ppm
Se	2.61246	6.05324 ppm
Sr	34.8668	2.68092 ppm
Zr	251.243	3.64506 ppm
Mo	0.290727	1.65409 ppm
Hg	5.08299	13.6324 ppm
Pb	169.034	10.2579 ppm
Rb	34.7225	4.51239 ppm
Cd	45.0640	23.2444 ppm
Sn	100.680	13.4202 ppm
Sb	6.90413	8.48656 ppm
Ba	153.368	4.09872 ppm

Ag	-70.2873	13.5455 ppm
U	3.90214	3.99510 ppm
Th	11.2210	3.21142 ppm

Application:SOILS with U,Th,Ag Q101 07-08-1992

Meas Time: 12-JAN-2000 12:14:10

ID: <08.150>

() ()

	Value	Std. dev.
CrHI	275.769	121.879 ppm
K	7750.99	389.983 ppm
Ca	3813.84	200.788 ppm
Ti	2467.37	176.366 ppm
CrLO	35.1218	134.189 ppm
Mn	790.626	145.569 ppm
Fe	11657.8	221.942 ppm
Co	49.1701	79.4359 ppm
Ni	44.7070	30.8595 ppm
Cu	13.1289	17.6660 ppm
Zn	7.94573	15.8981 ppm
As	-41.1887	14.5090 ppm
Se	18.1829	7.31216 ppm
Sr	52.6232	3.49533 ppm
Zr	323.210	4.69456 ppm
Mo	-0.423203	2.01222 ppm
Hg	4.32168	15.3349 ppm
Pb	130.538	11.0627 ppm
Rb	46.5243	5.65583 ppm
Cd	165.788	30.3703 ppm
Sn	256.851	18.0185 ppm
Sb	65.0854	11.5704 ppm
Ba	354.191	6.71199 ppm
Ag	-105.014	17.3347 ppm
U	13.3427	5.11854 ppm
Th	22.2037	4.02185 ppm

Application:SOILS with U,Th,Ag Q101 07-08-1992

Meas Time: 12-JAN-2000 12:26:57

ID: <08.200>

() ()

	Value	Std. dev.
CrHI	286.021	104.868 ppm
K	7767.20	387.790 ppm
Ca	3418.79	190.966 ppm
Ti	2325.89	169.806 ppm
CrLO	-91.1210	124.310 ppm
Mn	871.148	126.832 ppm
Fe	10762.6	184.903 ppm
Co	77.2470	67.2464 ppm
Ni	49.7183	26.6903 ppm
Cu	50.8171	16.3680 ppm
Zn	1.85386	13.4993 ppm
As	-44.2710	11.9279 ppm
Se	16.2027	6.20388 ppm
Sr	46.2441	2.88239 ppm
Zr	323.204	4.03474 ppm
Mo	0.000985977	1.73897 ppm
Hg	30.3626	13.7907 ppm
Pb	113.338	9.09250 ppm
Rb	40.2580	4.67090 ppm
Cd	239.050	26.4963 ppm
Sn	234.155	15.4326 ppm

Sb	39.7620	9.90051 ppm
Ba	362.744	5.85811 ppm
Ag	-102.997	15.0013 ppm
U	13.0552	4.33934 ppm
Th	11.6369	3.28994 ppm

Application:SOILS with U,Th,Ag Q101 07-08-1992

Meas Time: 12-JAN-2000 12:52:09

ID: <09.150>

() ()

	Value	Std. dev.
CrHI	184.650	118.283 ppm
K	4934.09	338.137 ppm
Ca	9407.62	291.111 ppm
Ti	1403.45	135.667 ppm
CrLO	214.792	135.730 ppm
Mn	327.667	126.849 ppm
Fe	9747.29	203.421 ppm
Co	232.751	79.2141 ppm
Ni	-9.08029	30.2148 ppm
Cu	45.7194	20.0374 ppm
Zn	276.197	23.2368 ppm
As	-107.805	23.5186 ppm
Se	7.96787	7.46324 ppm
Sr	40.3484	3.22668 ppm
Zr	195.465	3.74252 ppm
Mo	-2.63879	1.82175 ppm
Hg	5.65719	16.4137 ppm
Pb	571.098	18.4379 ppm
Rb	27.5691	4.95622 ppm
Cd	109.037	28.0024 ppm
Sn	161.544	16.3481 ppm
Sb	29.9544	10.4288 ppm
Ba	145.621	4.66845 ppm
Ag	-66.9852	16.2666 ppm
U	1.55241	4.72868 ppm
Th	11.9427	4.44809 ppm

Application:SOILS with U,Th,Ag Q101 07-08-1992

Meas Time: 12-JAN-2000 13:03:41

ID: <09.200>

() ()

	Value	Std. dev.
CrHI	201.159	102.944 ppm
K	4725.77	334.115 ppm
Ca	9774.85	296.113 ppm
Ti	1364.34	139.895 ppm
CrLO	-30.9974	129.855 ppm
Mn	278.798	108.715 ppm
Fe	9990.84	178.322 ppm
Co	127.578	67.1850 ppm
Ni	-33.5864	25.1758 ppm
Cu	109.647	19.0995 ppm
Zn	245.805	19.6397 ppm
As	-79.7432	20.2712 ppm
Se	9.90689	6.49412 ppm
Sr	43.5424	2.85856 ppm
Zr	184.102	3.15644 ppm
Mo	-2.16589	1.57747 ppm
Hg	-10.1982	13.9012 ppm
Pb	546.712	15.6909 ppm
Rb	22.7889	4.30440 ppm

Cd	110.358	24.2728 ppm
Sn	167.903	14.1752 ppm
Sb	34.8318	9.07712 ppm
Ba	147.409	4.06381 ppm
Ag	-92.4106	13.9163 ppm
U	7.62907	4.11225 ppm
Th	6.84676	3.73289 ppm

Application:SOILS with U,Th,Ag Q101 07-08-1992

Meas Time: 12-JAN-2000 13:15:41

ID: <11.200>

() ()

	Value	Std. dev.
CrHI	152.680	103.276 ppm
K	4969.40	347.886 ppm
Ca	13896.0	348.878 ppm
Ti	1842.25	152.463 ppm
CrLO	-23.2632	127.348 ppm
Mn	436.706	116.844 ppm
Fe	11470.0	192.176 ppm
Co	71.4354	69.8784 ppm
Ni	-1.38659	26.5232 ppm
Cu	99.5523	19.0410 ppm
Zn	344.999	21.3667 ppm
As	-196.315	29.5903 ppm
Se	15.6159	6.97493 ppm
Sr	34.1924	2.78713 ppm
Zr	216.340	3.50224 ppm
Mo	-1.00789	1.67145 ppm
Hg	-6.59642	14.8573 ppm
Pb	1317.03	23.7490 ppm
Rb	42.1752	4.84522 ppm
Cd	81.9798	23.6477 ppm
Sn	152.132	13.8294 ppm
Sb	22.5856	8.76445 ppm
Ba	229.151	4.81607 ppm
Ag	-113.703	13.3547 ppm
U	-2.18352	4.28373 ppm
Th	12.9389	4.65497 ppm

Application:SOILS with U,Th,Ag Q101 07-08-1992

Meas Time: 12-JAN-2000 13:27:31

ID: <11.200>

() ()

	Value	Std. dev.
CrHI	151.179	100.395 ppm
K	4278.46	325.545 ppm
Ca	13869.0	345.503 ppm
Ti	1093.21	135.155 ppm
CrLO	-4.48339	118.921 ppm
Mn	546.604	116.109 ppm
Fe	9891.13	178.145 ppm
Co	-1.67817	64.4015 ppm
Ni	-33.3418	24.1821 ppm
Cu	99.8777	18.3254 ppm
Zn	152.735	17.3682 ppm
As	-188.614	27.6702 ppm
Se	23.2247	6.90813 ppm
Sr	32.5223	2.68240 ppm
Zr	187.169	3.24545 ppm
Mo	-2.34146	1.56249 ppm
Hg	-4.35512	14.3381 ppm

Pb	1172.03	22.2161 ppm
Rb	31.2490	4.52522 ppm
Cd	81.0133	24.1619 ppm
Sn	215.179	14.4671 ppm
Sb	45.3804	9.13470 ppm
Ba	260.013	5.06123 ppm
Ag	-103.614	13.7963 ppm
U	3.35519	4.18829 ppm
Th	14.4179	4.51745 ppm

Application:SOILS with U,Th,Ag Q101 07-08-1992

Meas Time: 12-JAN-2000 13:38:58

ID: <13.200>

() ()

	Value	Std. dev.
CrHI	424.063	95.1630 ppm
K	1055.62	135.590 ppm
Ca	2521.17	130.722 ppm
Ti	148.687	55.7307 ppm
CrLO	30.8669	39.4809 ppm
Mn	215.822	89.0934 ppm
Fe	4345.52	115.896 ppm
Co	42.0834	46.3293 ppm
Ni	55.6856	22.0288 ppm
Cu	51.3274	13.4300 ppm
Zn	52.3257	11.5936 ppm
As	-38.6698	16.0159 ppm
Se	8.12237	5.08616 ppm
Sr	16.5293	1.95579 ppm
Zr	73.9228	2.00391 ppm
Mo	-0.136346	1.11546 ppm
Hg	14.7829	11.5698 ppm
Pb	372.881	12.3908 ppm
Rb	17.3050	3.39802 ppm
Cd	11.4432	1.65174 ppm
Sn	-26.8059	1.17542 ppm
Sb	1.97908	0.914175 ppm
Ba	3.19677	0.499769 ppm
Ag	15.5428	1.24317 ppm
U	5.87436	3.50722 ppm
Th	9.30589	3.18819 ppm

Application:SOILS with U,Th,Ag Q101 07-08-1992

Meas Time: 12-JAN-2000 13:51:12

ID: <16.200>

() ()

	Value	Std. dev.
CrHI	281.304	93.6146 ppm
K	1911.10	174.904 ppm
Ca	1056.37	75.3976 ppm
Ti	409.247	79.0510 ppm
CrLO	82.3939	51.4422 ppm
Mn	267.338	94.6452 ppm
Fe	3766.46	109.595 ppm
Co	36.3360	45.7563 ppm
Ni	-1.24227	21.1658 ppm
Cu	34.9635	13.7465 ppm
Zn	-17.3066	10.8787 ppm
As	-24.4910	11.1551 ppm
Se	10.1110	5.33569 ppm
Sr	29.2195	2.30714 ppm
Zr	246.055	3.33559 ppm

Mo	-1.09721	1.42631 ppm
Hg	32.3218	12.3285 ppm
Pb	119.045	8.36933 ppm
Rb	13.6491	3.58171 ppm
Cd	160.439	24.2891 ppm
Sn	336.096	14.9004 ppm
Sb	106.930	9.60443 ppm
Ba	276.598	5.02073 ppm
Ag	-113.335	13.7595 ppm
U	13.9123	3.87774 ppm
Th	11.9486	3.15437 ppm

Application:SOILS with U,Th,Ag Q101 07-08-1992

Meas Time: 12-JAN-2000 13:59:47

ID: <16.300>

() ()

	Value	Std. dev.
CrHI	351.047	251.543 ppm
K	1880.20	173.821 ppm
Ca	1049.48	75.2997 ppm
Ti	337.851	78.0275 ppm
CrLO	151.759	59.0927 ppm
Mn	532.632	267.375 ppm
Fe	4212.47	298.571 ppm
Co	-74.2508	114.906 ppm
Ni	118.354	65.2442 ppm
Cu	-29.7035	30.1885 ppm
Zn	-30.9625	27.5470 ppm
As	-66.8565	27.0807 ppm
Se	8.73887	13.8663 ppm
Sr	32.2252	6.21044 ppm
Zr	238.664	8.51514 ppm
Mo	4.43348	3.81716 ppm
Hg	87.6329	35.5215 ppm
Pb	120.524	21.3962 ppm
Rb	29.4781	9.98706 ppm
Cd	129.900	19.8109 ppm
Sn	324.270	12.1736 ppm
Sb	117.462	7.89993 ppm
Ba	266.695	4.09248 ppm
Ag	-134.121	11.1656 ppm
U	2.20577	10.1599 ppm
Th	7.64266	7.92331 ppm

Application:SOILS with U,Th,Ag Q101 07-08-1992

Meas Time: 12-JAN-2000 14:16:35

ID: <17.200>

() ()

	Value	Std. dev.
CrHI	323.066	93.6721 ppm
K	1727.46	171.170 ppm
Ca	2409.55	128.724 ppm
Ti	265.998	74.5959 ppm
CrLO	148.311	54.9266 ppm
Mn	130.321	89.9942 ppm
Fe	4079.85	113.255 ppm
Co	5.05354	45.4550 ppm
Ni	7.54615	20.9753 ppm
Cu	25.2034	13.0351 ppm
Zn	-27.5742	10.0752 ppm
As	-46.4828	9.95985 ppm
Se	16.4937	5.38524 ppm

Sr	32.4179	2.36985 ppm
Zr	220.023	3.16319 ppm
Mo	0.255145	1.37383 ppm
Hg	28.9772	11.9493 ppm
Pb	95.9647	7.76055 ppm
Rb	20.0493	3.51592 ppm
Cd	164.905	24.5549 ppm
Sn	336.652	15.0074 ppm
Sb	101.360	9.65651 ppm
Ba	302.258	5.21826 ppm
Ag	-133.777	13.7852 ppm
U	2.76419	3.65008 ppm
Th	5.69212	2.89481 ppm

Application:SOILS with U,Th,Ag Q101 07-08-1992

Meas Time: 12-JAN-2000 14:31:44

ID: <19.200>

() ()

	Value	Std. dev.
CrHI	200.385	104.997 ppm
K	8610.31	415.973 ppm
Ca	4562.96	222.417 ppm
Ti	3028.07	194.377 ppm
CrLO	-45.1642	148.319 ppm
Mn	785.343	126.944 ppm
Fe	11160.4	189.369 ppm
Co	59.1720	68.8005 ppm
Ni	55.2933	28.0162 ppm
Cu	21.2553	16.4178 ppm
Zn	12.9389	14.8060 ppm
As	-12.3747	12.1829 ppm
Se	12.7104	6.40276 ppm
Sr	43.2934	2.85153 ppm
Zr	355.156	4.25362 ppm
Mo	-0.749535	1.81433 ppm
Hg	-22.3225	13.0370 ppm
Pb	85.0942	8.71736 ppm
Rb	40.7573	4.79947 ppm
Cd	176.649	27.1280 ppm
Sn	159.120	15.5525 ppm
Sb	32.3251	10.0692 ppm
Ba	311.680	5.55012 ppm
Ag	-51.7045	15.8743 ppm
U	11.2603	4.40722 ppm
Th	19.4993	3.45710 ppm

Application:SOILS with U,Th,Ag Q101 07-08-1992

Meas Time: 12-JAN-2000 14:46:20

ID: <20.200>

() ()

	Value	Std. dev.
CrHI	219.344	87.7132 ppm
K	965.450	126.593 ppm
Ca	2958.46	141.570 ppm
Ti	-0.861806	42.7653 ppm
CrLO	226.144	46.7059 ppm
Mn	72.8665	84.1865 ppm
Fe	3630.01	106.676 ppm
Co	22.9720	43.9113 ppm
Ni	43.2857	21.8160 ppm
Cu	74.2194	14.5942 ppm
Zn	296.892	17.1420 ppm

As	-190.507	21.6694 ppm
Se	1.11761	5.12536 ppm
Sr	23.8302	2.20460 ppm
Zr	134.827	2.61040 ppm
Mo	-2.12529	1.21608 ppm
Hg	7.68355	11.7746 ppm
Pb	829.749	17.6838 ppm
Rb	15.2197	3.49407 ppm
Cd	12.4455	1.71388 ppm
Sn	-23.6332	1.36111 ppm
Sb	2.74939	0.985555 ppm
Ba	3.28194	0.507885 ppm
Ag	13.7101	1.10045 ppm
U	6.64255	3.74961 ppm
Th	17.1657	4.07876 ppm

Application:SOILS with U,Th,Ag Q101 07-08-1992

Meas Time: 12-JAN-2000 15:09:00

ID: <20.200>

() ()

	Value	Std. dev.
CrHI	425.266	98.9339 ppm
K	1870.15	205.864 ppm
Ca	5844.08	216.804 ppm
Ti	263.735	77.9398 ppm
CrLO	73.3493	74.2581 ppm
Mn	-5.43898	84.7473 ppm
Fe	3832.91	110.583 ppm
Co	75.4571	46.8310 ppm
Ni	32.4163	22.4217 ppm
Cu	94.2725	15.9006 ppm
Zn	515.289	21.2119 ppm
As	-319.841	28.6772 ppm
Se	4.94044	5.66558 ppm
Sr	24.9879	2.34798 ppm
Zr	135.990	2.71946 ppm
Mo	-2.24123	1.26700 ppm
Hg	23.9549	13.2008 ppm
Pb	1480.99	23.6005 ppm
Rb	24.3312	3.88387 ppm
Cd	14.9803	1.92089 ppm
Sn	-25.8826	1.35385 ppm
Sb	3.92559	1.11845 ppm
Ba	4.26636	0.581936 ppm
Ag	14.5107	1.19534 ppm
U	-1.05769	3.90349 ppm
Th	19.3580	4.85470 ppm

Application:SOILS with U,Th,Ag Q101 07-08-1992

Meas Time: 12-JAN-2000 15:21:35

ID: <26.200>

() ()

	Value	Std. dev.
CrHI	172.039	96.8313 ppm
K	5434.26	324.196 ppm
Ca	2737.91	164.411 ppm
Ti	2130.97	164.940 ppm
CrLO	-173.209	106.359 ppm
Mn	360.293	110.544 ppm
Fe	12110.1	193.854 ppm
Co	126.740	69.6792 ppm
Ni	75.6332	26.5306 ppm

Cu	14.0811	14.1932 ppm
Zn	-12.1858	11.9700 ppm
As	-11.2010	11.1256 ppm
Se	18.6316	5.98950 ppm
Sr	32.2253	2.51936 ppm
Zr	195.388	3.17532 ppm
Mo	-2.84566	1.45585 ppm
Hg	19.6045	13.0133 ppm
Pb	80.5024	8.16534 ppm
Rb	23.8947	4.09399 ppm
Cd	231.788	27.9923 ppm
Sn	390.799	16.9781 ppm
Sb	127.101	11.0042 ppm
Ba	259.122	5.20293 ppm
Ag	-128.837	15.8584 ppm
U	10.7237	3.83257 ppm
Th	14.9413	2.99737 ppm

Application:SOILS with U,Th,Ag Q101 07-08-1992

Meas Time: 12-JAN-2000 15:34:08

ID: <26.200>

() ()

	Value	Std. dev.
CrHI	330.716	94.4936 ppm
K	1937.77	176.275 ppm
Ca	1221.78	83.4881 ppm
Ti	452.515	76.6731 ppm
CrLO	225.354	59.1060 ppm
Mn	84.5636	91.3390 ppm
Fe	7107.04	146.875 ppm
Co	59.8038	54.8953 ppm
Ni	74.2402	23.6910 ppm
Cu	48.2244	13.7731 ppm
Zn	-8.42460	10.3373 ppm
As	-22.0307	8.70651 ppm
Se	16.6489	5.36597 ppm
Sr	19.5382	2.05705 ppm
Zr	154.062	2.72628 ppm
Mo	-2.01930	1.27003 ppm
Hg	18.2008	11.6127 ppm
Pb	42.4853	6.51866 ppm
Rb	21.9624	3.57333 ppm
Cd	220.825	26.4184 ppm
Sn	426.851	16.2536 ppm
Sb	126.017	10.4469 ppm
Ba	235.036	4.85497 ppm
Ag	-172.233	14.6462 ppm
U	7.47127	3.63602 ppm
Th	11.8850	2.77957 ppm

Application:SOILS with U,Th,Ag Q101 07-08-1992

Meas Time: 12-JAN-2000 15:47:55

ID: <28.200>

() ()

	Value	Std. dev.
CrHI	364.606	96.5806 ppm
K	1294.07	143.441 ppm
Ca	1859.44	107.374 ppm
Ti	257.090	66.1646 ppm
CrLO	251.609	56.9794 ppm
Mn	124.552	91.7005 ppm
Fe	6069.67	136.409 ppm

Co	74.0897	53.0226 ppm
Ni	4.21848	21.7302 ppm
Cu	37.8906	13.9587 ppm
Zn	87.5534	13.6023 ppm
As	-49.8152	10.3845 ppm
Se	6.13409	5.22435 ppm
Sr	23.0255	2.15199 ppm
Zr	145.230	2.64423 ppm
Mo	-0.563728	1.29000 ppm
Hg	-1.97353	11.3597 ppm
Pb	108.401	8.01447 ppm
Rb	18.4773	3.45658 ppm
Cd	145.984	24.4629 ppm
Sn	321.026	14.9278 ppm
Sb	100.439	9.61942 ppm
Ba	254.086	4.88248 ppm
Ag	-134.459	13.7490 ppm
U	2.86523	3.56533 ppm
Th	3.28298	2.78142 ppm

Application:SOILS with U,Th,Ag Q101 07-08-1992

Meas Time: 12-JAN-2000 15:59:03

ID: <30.200>

() ()

	Value	Std. dev.
CrHI	140.669	93.2197 ppm
K	2562.19	212.542 ppm
Ca	2255.53	129.112 ppm
Ti	743.172	94.3677 ppm
CrLO	156.283	65.7393 ppm
Mn	-114.225	91.6694 ppm
Fe	9469.59	169.829 ppm
Co	48.5942	62.0532 ppm
Ni	-0.844054	23.5619 ppm
Cu	-17.0464	13.3520 ppm
Zn	-1.49517	12.8176 ppm
As	-15.4271	10.7044 ppm
Se	0.757734	5.53392 ppm
Sr	34.2314	2.51338 ppm
Zr	187.993	3.04389 ppm
Mo	-2.37569	1.44240 ppm
Hg	13.7092	12.7937 ppm
Pb	71.3948	7.61890 ppm
Rb	29.9326	4.11441 ppm
Cd	144.389	23.7199 ppm
Sn	243.234	14.1392 ppm
Sb	51.7500	9.01361 ppm
Ba	164.025	4.13586 ppm
Ag	-149.485	13.1132 ppm
U	8.08316	3.97918 ppm
Th	7.86026	2.97145 ppm

Application:SOILS with U,Th,Ag Q101 07-08-1992

Meas Time: 12-JAN-2000 16:12:36

ID: <30.300>

() ()

	Value	Std. dev.
CrHI	-11.9349	70.6216 ppm
K	2189.27	195.883 ppm
Ca	2312.76	129.041 ppm
Ti	544.083	90.6231 ppm
CrLO	143.653	64.1061 ppm

Mn	192.521	81.1473	ppm
Fe	9071.61	135.811	ppm
Co	54.4712	49.9413	ppm
Ni	26.5705	19.8786	ppm
Cu	10.7385	11.6455	ppm
Zn	23.8225	10.8711	ppm
As	-22.1857	8.67899	ppm
Se	15.8376	4.79673	ppm
Sr	32.6905	2.00432	ppm
Zr	177.648	2.42429	ppm
Mo	-2.19329	1.14369	ppm
Hg	-20.1822	9.57706	ppm
Pb	73.4926	6.30898	ppm
Rb	27.3637	3.24755	ppm
Cd	88.9763	60.5006	ppm
Sn	178.738	35.7087	ppm
Sb	71.7794	23.4005	ppm
Ba	158.903	10.5045	ppm
Ag	-86.7190	34.8766	ppm
U	4.45949	3.13753	ppm
Th	12.4591	2.47048	ppm

Application:SOILS with U,Th,Ag Q101 07-08-1992

Meas Time: 12-JAN-2000 16:23:02

ID: <32.200>

() ()

	Value	Std. dev.	
CrHI	356.268	112.784	ppm
K	9183.27	434.968	ppm
Ca	9372.36	300.044	ppm
Ti	2538.64	188.742	ppm
CrLO	-109.042	147.981	ppm
Mn	51.2521	119.053	ppm
Fe	19981.9	253.604	ppm
Co	175.252	87.5195	ppm
Ni	-0.122610	27.8031	ppm
Cu	47.7180	17.3426	ppm
Zn	81.3365	16.3894	ppm
As	10.7552	11.6021	ppm
Se	15.7504	6.61462	ppm
Sr	44.5039	2.98541	ppm
Zr	271.101	3.88749	ppm
Mo	-2.87645	1.74844	ppm
Hg	-9.23942	13.7543	ppm
Pb	42.3087	7.94277	ppm
Rb	50.4602	5.13680	ppm
Cd	107.351	26.5857	ppm
Sn	129.193	15.2409	ppm
Sb	4.65285	9.64547	ppm
Ba	199.245	4.73555	ppm
Ag	-55.4492	15.6090	ppm
U	11.2687	4.26544	ppm
Th	12.5550	3.09180	ppm

Application:SOILS with U,Th,Ag Q101 07-08-1992

Meas Time: 12-JAN-2000 16:38:06

ID: <32.300>

() ()

	Value	Std. dev.	
CrHI	223.955	88.3898	ppm
K	8178.77	414.819	ppm
Ca	9338.77	297.741	ppm

Ti	2839.89	186.352 ppm
CrLO	-59.4185	144.748 ppm
Mn	245.760	100.371 ppm
Fe	19601.1	205.785 ppm
Co	244.502	71.7063 ppm
Ni	-28.5171	21.9848 ppm
Cu	53.1224	14.2174 ppm
Zn	57.7051	12.8954 ppm
As	-1.86631	9.72739 ppm
Se	13.3246	5.33394 ppm
Sr	50.4320	2.53545 ppm
Zr	271.918	3.18498 ppm
Mo	-0.352680	1.45617 ppm
Hg	-17.2007	11.0043 ppm
Pb	62.4217	6.85997 ppm
Rb	50.5659	4.23564 ppm
Cd	111.918	68.4493 ppm
Sn	168.540	39.7100 ppm
Sb	20.9398	25.1733 ppm
Ba	207.360	12.3511 ppm
Ag	-85.0783	39.6279 ppm
U	12.4965	3.52425 ppm
Th	11.0722	2.52129 ppm

Application:SOILS with U,Th,Ag Q101 07-08-1992

Meas Time: 12-JAN-2000 16:45:22

ID: <33.200>

() ()

	Value	Std. dev.
CrHI	-71.3928	43.6886 ppm
K	526.521	47.7397 ppm
Ca	805.075	30.9338 ppm
Ti	-105.655	19.5640 ppm
CrLO	236.986	22.2594 ppm
Mn	-465.713	30.7625 ppm
Fe	164.934	21.6767 ppm
Co	-107.414	13.8880 ppm
Ni	-36.4714	9.42540 ppm
Cu	12.8828	5.95370 ppm
Zn	42.7100	4.98214 ppm
As	4.99577	4.30935 ppm
Se	-18.1736	2.10418 ppm
Sr	-4.78169	0.788441 ppm
Zr	1.18141	0.616993 ppm
Mo	0.611416	0.413738 ppm
Hg	-48.7844	4.80831 ppm
Pb	7.44779	3.31851 ppm
Rb	-4.89390	1.19524 ppm
Cd	632.923	10.9938 ppm
Sn	-38.9392	5.67422 ppm
Sb	-81.3782	2.23846 ppm
Ba	7.79617	0.757933 ppm
Ag	1032.02	13.6703 ppm
U	-6.09357	1.44896 ppm
Th	-5.99419	1.16710 ppm

Application:SOILS with U,Th,Ag Q101 07-08-1992

Meas Time: 13-JAN-2000 07:24:52

ID: <FE>

() ()

	Value	Std. dev.
CrHI	137.343	69.6190 ppm

Fe	1.63624e+06	8773.76 ppm
Sr	32.8171	32.0049 ppm
Cd	1676.82	329.393 ppm
Sn	217.406	176.752 ppm
Sb	286.017	121.685 ppm

Application:SOILS with U,Th,Ag Q101 07-08-1992

Meas Time: 13-JAN-2000 07:30:50

ID: <PB>

() ()

	Value	Std. dev.
CrHI	1004.44	786.179 ppm
K	4048.81	399.268 ppm
Ca	263.687	159.334 ppm
Mn	2201.13	635.012 ppm
Cu	150.393	117.207 ppm
Zn	148.344	94.8896 ppm
As	1986.66	1098.87 ppm
Se	326.081	137.356 ppm
Sr	151.764	77.4708 ppm
Zr	426.719	82.0615 ppm
Hg	468.682	284.724 ppm
Pb	270625	2216.33 ppm
Cd	825.343	119.578 ppm
Sn	362.266	79.4921 ppm
Sb	368.701	59.8231 ppm
Ba	206.689	23.6119 ppm
Ag	112.724	60.9641 ppm
U	92.5897	25.6591 ppm

Application:SOILS with U,Th,Ag Q101 07-08-1992

Meas Time: 13-JAN-2000 07:39:17

ID: <33.200>

() ()

	Value	Std. dev.
CrHI	150.719	113.527 ppm
K	4606.90	362.109 ppm
Ca	19478.6	412.976 ppm
Ti	1514.21	145.479 ppm
CrLO	251.228	156.834 ppm
Mn	1178.44	137.877 ppm
Fe	11048.3	192.084 ppm
Co	160.906	73.8936 ppm
Ni	68.9879	32.6596 ppm
Cu	115.466	23.1565 ppm
Zn	2107.64	43.0751 ppm
Se	24.3704	8.13720 ppm
Sr	65.9936	3.57896 ppm
Zr	160.211	3.24823 ppm
Pb	1573.48	26.5178 ppm
Rb	37.8521	5.28932 ppm
Cd	114.456	25.8769 ppm
Sn	162.531	14.9996 ppm
Sb	22.4411	9.53984 ppm
Ba	199.139	4.70546 ppm
Th	7.98151	4.93165 ppm

Application:SOILS with U,Th,Ag Q101 07-08-1992

Meas Time: 13-JAN-2000 07:59:58

ID: <33.200>

() ()

	Value	Std. dev.
--	-------	-----------

K	738.495	77.4685 ppm
Ca	843.288	37.5324 ppm
CrLO	248.475	26.1207 ppm
Fe	641.364	47.7174 ppm
Cu	17.2446	9.78497 ppm
Zn	96.2717	10.5471 ppm
Sr	1.97655	1.29862 ppm
Zr	20.4541	1.16833 ppm
Pb	105.182	7.06071 ppm
Cd	3745.80	27.1608 ppm
Ba	19.6071	1.25296 ppm
Ag	6749.53	35.8470 ppm

Application:SOILS with U,Th,Ag Q101 07-08-1992

Meas Time: 13-JAN-2000 08:12:04

ID: <33.200>

() ()

	Value	Std. dev.
CrHI	153.341	97.7864 ppm
K	778.719	98.4943 ppm
Ca	1408.66	83.2262 ppm
CrLO	173.064	39.8413 ppm
Mn	329.942	97.1361 ppm
Fe	3618.22	110.319 ppm
Cu	49.8501	17.7658 ppm
Zn	799.974	27.0534 ppm
Se	24.0856	6.78603 ppm
Sr	39.2900	2.67931 ppm
Zr	98.4902	2.39545 ppm
Hg	26.9565	14.5710 ppm
Pb	889.773	18.6105 ppm
Rb	24.2571	4.02630 ppm
Cd	158.376	24.1583 ppm
Sn	322.180	14.7627 ppm
Sb	81.2021	9.38648 ppm
Ba	210.037	4.53024 ppm
Th	10.4420	4.33509 ppm

Application:SOILS with U,Th,Ag Q101 07-08-1992

Meas Time: 13-JAN-2000 08:23:06

ID: <33.200>

() ()

	Value	Std. dev.
CrHI	120.638	95.8712 ppm
K	807.376	100.451 ppm
Ca	1430.49	84.1178 ppm
CrLO	172.850	38.7804 ppm
Mn	260.476	95.1808 ppm
Fe	3783.04	112.226 ppm
Co	67.3562	50.2884 ppm
Ni	28.1191	26.0536 ppm
Cu	21.2561	16.9738 ppm
Zn	783.110	26.8199 ppm
Se	18.7514	6.64058 ppm
Sr	34.2698	2.56514 ppm
Zr	99.4454	2.38254 ppm
Pb	891.774	18.5840 ppm
Rb	25.6847	3.97008 ppm
Cd	166.780	24.1921 ppm
Sn	292.559	14.6187 ppm
Sb	104.318	9.55671 ppm
Ba	209.846	4.52970 ppm

Application:SOILS with U,Th,Ag Q101 07-08-1992

Meas Time: 13-JAN-2000 08:34:40

ID: <35.200>

() ()

	Value	Std. dev.
CrHI	212.027	106.469 ppm
K	5695.18	376.351 ppm
Ca	18983.3	405.986 ppm
Ti	1589.65	147.672 ppm
Mn	762.307	125.241 ppm
Fe	11182.8	191.744 ppm
Co	126.942	71.0815 ppm
Cu	84.3876	18.8857 ppm
Zn	344.926	21.6379 ppm
Se	21.8094	7.18368 ppm
Sr	38.0780	2.88366 ppm
Zr	148.802	3.01806 ppm
Pb	1214.73	23.0520 ppm
Rb	31.1896	4.61513 ppm
Cd	108.711	25.7111 ppm
Sn	227.468	15.3212 ppm
Sb	61.6585	9.79940 ppm
Ba	356.012	5.89604 ppm
Th	6.79085	4.42009 ppm

Application:SOILS with U,Th,Ag Q101 07-08-1992

Meas Time: 13-JAN-2000 08:46:40

ID: <35.200>

() ()

	Value	Std. dev.
CrHI	184.285	109.419 ppm
K	4817.60	366.666 ppm
Ca	24911.3	460.259 ppm
Ti	1100.48	138.962 ppm
CrLO	140.328	134.964 ppm
Mn	852.968	128.917 ppm
Fe	11029.6	192.024 ppm
Co	96.7572	71.5928 ppm
Ni	38.8961	29.5972 ppm
Cu	98.9788	20.4140 ppm
Zn	411.891	23.6525 ppm
Se	18.2048	7.52538 ppm
Sr	35.7918	2.91295 ppm
Zr	133.402	2.95184 ppm
Pb	1479.05	25.4971 ppm
Rb	39.9065	5.04807 ppm
Cd	75.6406	26.3170 ppm
Sn	194.952	15.5448 ppm
Sb	57.2690	9.97587 ppm
Ba	371.995	6.05750 ppm
Th	7.24544	4.73931 ppm

Application:SOILS with U,Th,Ag Q101 07-08-1992

Meas Time: 13-JAN-2000 08:57:41

ID: <36.200>

() ()

	Value	Std. dev.
CrHI	260.807	103.302 ppm
K	5777.58	342.490 ppm
Ca	4669.22	211.370 ppm
Ti	1867.72	152.810 ppm

Mn	402.537	111.345 ppm
Fe	8970.65	168.833 ppm
Co	90.6023	63.6975 ppm
Se	20.5622	6.44992 ppm
Sr	34.6206	2.60524 ppm
Zr	254.789	3.57039 ppm
Pb	232.744	11.1677 ppm
Rb	28.4173	4.40439 ppm
Cd	164.542	25.6702 ppm
Sn	237.251	15.1577 ppm
Sb	67.4609	9.81193 ppm
Ba	289.837	5.28301 ppm
U	15.0036	4.27110 ppm
Th	8.79131	3.40789 ppm

Application:SOILS with U,Th,Ag Q101 07-08-1992

Meas Time: 13-JAN-2000 09:09:45

ID: <38.200>

() ()

	Value	Std. dev.
CrHI	334.313	111.907 ppm
K	5684.18	372.709 ppm
Ca	13719.5	351.311 ppm
Ti	1926.05	175.125 ppm
Mn	308.276	118.226 ppm
Fe	14316.4	214.793 ppm
Co	299.472	79.6917 ppm
Ni	98.5691	30.9706 ppm
Cu	179.518	21.4332 ppm
Zn	159.835	18.4295 ppm
Se	33.9342	7.27410 ppm
Sr	37.4440	2.83321 ppm
Zr	241.887	3.67616 ppm
Pb	557.041	16.3899 ppm
Rb	39.7905	4.98081 ppm
Cd	233.618	28.6618 ppm
Sn	207.570	16.4677 ppm
Sb	35.7285	10.6106 ppm
Ba	170.135	4.55542 ppm
U	10.3461	4.35901 ppm
Th	15.6601	3.85316 ppm

Application:SOILS with U,Th,Ag Q101 07-08-1992

Meas Time: 13-JAN-2000 09:21:42

ID: <38.200>

() ()

	Value	Std. dev.
K	631.820	63.0948 ppm
Ca	762.923	26.0421 ppm
CrLO	236.083	20.2105 ppm
Fe	124.516	16.3063 ppm
Cu	18.5479	5.06526 ppm
Zn	40.3697	2.98787 ppm
As	13.2504	2.82224 ppm
Mo	1.53386	0.313343 ppm
Cd	199.073	6.28924 ppm
Sn	7.48233	4.14708 ppm
Ba	6.41918	0.686521 ppm
Ag	357.020	7.98459 ppm

Application:SOILS with U,Th,Ag Q101 07-08-1992

Meas Time: 13-JAN-2000 09:32:59

ID: <40.200>

() ()

	Value	Std. dev.
CrHI	186.561	94.4548 ppm
K	4426.48	286.035 ppm
Ca	2492.72	147.950 ppm
Ti	810.334	121.271 ppm
CrLO	-27.8479	87.5184 ppm
Mn	404.991	105.594 ppm
Fe	7676.82	154.669 ppm
Co	97.3488	58.9627 ppm
Ni	13.9213	23.6036 ppm
Cu	11.8961	13.9858 ppm
Zn	-13.6476	12.0110 ppm
As	-29.5936	10.9636 ppm
Se	16.2271	5.83084 ppm
Sr	31.0541	2.42947 ppm
Zr	213.840	3.22040 ppm
Mo	-4.56823	1.41519 ppm
Hg	1.77582	12.1755 ppm
Pb	95.7720	8.11314 ppm
Rb	24.8089	3.90623 ppm
Cd	167.069	24.3060 ppm
Sn	288.340	14.6894 ppm
Sb	81.6745	9.44254 ppm
Ba	287.484	5.15858 ppm
Ag	-116.004	13.6850 ppm
U	7.09897	3.86079 ppm
Th	9.36493	3.02684 ppm

Application:SOILS with U,Th,Ag Q101 07-08-1992

Meas Time: 13-JAN-2000 09:47:07

ID: <27.200>

() ()

	Value	Std. dev.
CrHI	254.673	93.1636 ppm
K	2636.57	222.389 ppm
Ca	3367.30	162.487 ppm
Ti	654.255	102.473 ppm
CrLO	170.804	77.2908 ppm
Mn	180.188	94.9182 ppm
Fe	6275.21	139.372 ppm
Co	65.8352	53.6310 ppm
Ni	-4.57436	21.4927 ppm
Cu	34.4288	13.8391 ppm
Zn	101.702	13.9270 ppm
As	-42.3553	11.4786 ppm
Se	2.45131	5.18550 ppm
Sr	29.1610	2.34457 ppm
Zr	184.087	2.98481 ppm
Mo	0.284704	1.35633 ppm
Hg	32.5422	12.4534 ppm
Pb	138.295	8.89328 ppm
Rb	17.7873	3.60348 ppm
Cd	121.866	24.3436 ppm
Sn	275.080	14.7076 ppm
Sb	115.689	9.68924 ppm
Ba	232.971	4.73591 ppm
Ag	-131.242	13.7322 ppm
U	2.79043	3.59951 ppm
Th	17.2267	3.08154 ppm

B. DNR LABORATORY RESULTS

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES

Mel Carnahan, Governor • Stephen M. Mahfood, Director

DIVISION OF ENVIRONMENTAL QUALITY

P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

RECEIVED

RESULTS OF SAMPLE ANALYSES

FEB 08 2000

Sample Number: 0001901
 Lab Number: 00-D86

MISSOURI ENVIRONMENTAL SERVICES PROGRAM
 MISSOURI DEPARTMENT OF
 NATURAL RESOURCES

Reported To: KEN HANNON
 Affiliation: ESP
 Project Code: 4071/9144

Report Date: 1/31/00
 Date Collected: 1/ 6/00
 Date Received: 1/18/00

Sample Collected by: KEN HANNON, ESP
 Sampling Location: ST. JOSEPH TRAILER COURT SITE
 Sample Description: VIBURNUM, MO, SOIL GRAB FROM LOT 9
 LOCATED S OF DRIVE 1/2 THE DISTANCE
 TO END OF LOT FROM ST, 0-4" DEPTH

Analysis Performed	Results	Analyzed	Method
Cadmium, Total	4,260 ug/kg	1/19/00	200.7
Lead, Total	749,000 ug/kg	1/19/00	239.2
Lead, TCLP	0.31 ppm	1/27/00	239.2

Metals results are reported on a dry weight basis

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency.

[Signature]
 James H. Long, Director
 Environmental Services Program
 Division of Environmental Quality

c: VALERIE WILDER, HWP

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES

Mel Carnahan, Governor • Stephen M. Mahéssal, Director

DIVISION OF ENVIRONMENTAL QUALITY

P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

RESULTS OF SAMPLE ANALYSES

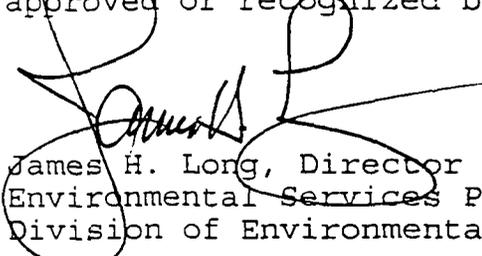
Sample Number: 0001902
 Lab Number: 00-D87

Reported To: KEN HANNON	Report Date: 1/31/00
Affiliation: ESP	Date Collected: 1/ 6/00
Project Code: 4071/9144	Date Received: 1/18/00
Sample Collected by: KEN HANNON, ESP	
Sampling Location: ST. JOSEPH TRAILER COURT SITE	
Sample Description: VIBURNUM, MO, SOIL GRAB FROM LOT 20 LOCATED EAST OF DRIVEWAY DOWN- GRADIENT NEAR WINDMILL, 0-4" DEPTH	

Analysis Performed	Results	Analyzed	Method
Cadmium, Total	24,700 ug/kg	1/19/00	200.7
Lead, Total	3,320,000 ug/kg	1/19/00	239.2
Cadmium, TCLP	0.14 ppm	1/27/00	200.7
Lead, TCLP	7.10 ppm	1/27/00	239.2

Metals results are reported on a dry weight basis

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency.


 James H. Long, Director
 Environmental Services Program
 Division of Environmental Quality

c: VALERIE WILDER, HWP

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES

Mal Carnahan, Governor • Stephen M. Mahfood, Director

DIVISION OF ENVIRONMENTAL QUALITY

P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

RESULTS OF SAMPLE ANALYSES

Sample Number: 0001903
Lab Number: 00-D88

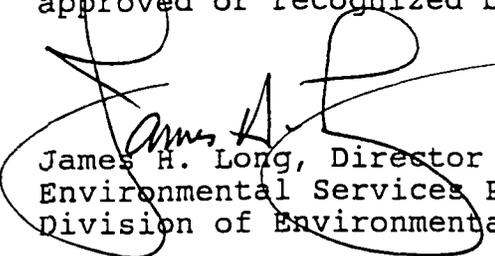
Reported To: KEN HANNON
Affiliation: ESP
Project Code: 4071/9144
Report Date: 1/21/00
Date Collected: 1/ 6/00
Date Received: 1/18/00

Sample Collected by: KEN HANNON, ESP
Sampling Location: ST. JOSEPH TRAILER COURT SITE
Sample Description: VIBURNUM, MO, SOIL GRAB FROM LOT 32
LOCATED NORTH OF GRAVEL DRIVEWAY
RIGHT BELOW SWINGSET, 0-4" DEPTH

Analysis Performed	Results	Analyzed	Method
Cadmium, Total	1,850	ug/kg	1/19/00 200.7
Lead, Total	61,900	ug/kg	1/19/00 239.2

Metals results are reported on a dry weight basis

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency.


James H. Long, Director
Environmental Services Program
Division of Environmental Quality

c: VALERIE WILDER, HWP

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES

McJannet, Governor • Stephen M. Mahfood, Director

DIVISION OF ENVIRONMENTAL QUALITY

P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

RESULTS OF SAMPLE ANALYSES

Sample Number: 0001904
 Lab Number: 00-D89

Reported To: KEN HANNON
 Affiliation: ESP
 Project Code: 4071/9144
 Report Date: 1/31/00
 Date Collected: 1/ 6/00
 Date Received: 1/18/00

Sample Collected by: KEN HANNON, ESP
 Sampling Location: ST. JOSEPH TRAILER COURT SITE
 Sample Description: VIBURNUM, MO, SOIL GRAB FROM LOT 33
 LOCATED SOUTH OF TRAILER, EAST OF
 DRIVEWAY, NEAR STREET, 0-4" DEPTH

Analysis Performed	Results	Analyzed	Method
Cadmium, Total	36,900	ug/kg	1/19/00 200.7
Lead, Total	1,050,000	ug/kg	1/19/00 239.2
Cadmium, TCLP	0.15	ppm	1/27/00 200.7
Lead, TCLP	0.41	ppm	1/27/00 239.2

Metals results are reported on a dry weight basis

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency.

James H. Long
 James H. Long, Director
 Environmental Services Program
 Division of Environmental Quality

c: VALERIE WILDER, HWP

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES

Mel Carnahan, Governor • Stephen M. Mahood, Director

DIVISION OF ENVIRONMENTAL QUALITY

P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

RESULTS OF SAMPLE ANALYSES

Sample Number: 0001905
Lab Number: 00-D90

Reported To: KEN HANNON
Affiliation: ESP
Project Code: 4071/9144

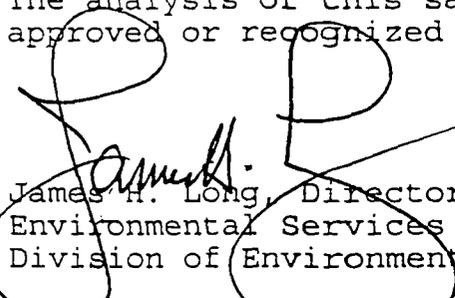
Report Date: 1/31/00
Date Collected: 1/ 6/00
Date Received: 1/18/00

Sample Collected by: KEN HANNON, ESP
Sampling Location: ST. JOSEPH TRAILER COURT SITE
Sample Description: VIBURNUM, MO, SOIL GRAB FROM LOT 35
LOCATED SOUTH OF TRAILER, EAST OF
DRIVEWAY, NEAR STREET, 0-4" DEPTH

Analysis Performed	Results	Method	Analyzed
Cadmium, Total	14,100 ug/kg	200.7	1/19/00
Lead, Total	1,760,000 ug/kg	239.2	1/19/00
Lead, TCLP	0.98 ppm	239.2	1/27/00

Metals results are reported on a dry weight basis

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency.


James H. Long, Director
Environmental Services Program
Division of Environmental Quality

c: VALERIE WILDER, HWP

C. DOE RUN LABORATORY RESULTS

THE DOE RUN COMPANY - SEMO

P.O. Box 500 #2 Airport Road
 Viburnum, MO USA 65566-0500

F A X C O V E R S H E E T

DATE: February 11, 2000 TIME: 9:30 AM
 TO: Valerie Wilder PHONE:
 DNR/Haz. Waste FAX: (573) 751-7869
 FROM: DENIS MURPHY *DM* PHONE: 573/244-8104
 FAX: 573/244-8426
 RE: St. Joe Trailer Court (Viburnum) Sample Results
 CC:

Number of pages including cover sheet: 4

MESSAGE

Sorry I missed you on the telephone. I'll be out of the office most of next week, so I am faxing my results on the yard samples.

Sample #	DNR/XRF Pb	Amer. Env. Consultants		
		Pb	Cd	
9	537	864	5.5	all ppm
11	1065	1508	4.9	
20	1451	5349	15.	
33	862	673	25.	
35	917	2824	14.	
32	62	87	1.1	

I also had TCLP performed on total composite samples of the (1) yard soil collected, (2) the "old" rock taken from the driveways, and (3) the "new" rock placed in the driveways. Those results are attached.

All private lot owners in the trailer park gave Doe Run authorization to replace the driveway rock. Lots #4 & #45 have concrete driveways and are the only two that weren't replaced.

I hope this provides useful information. Please call if you have any further questions.

CONFIDENTIALITY NOTICE

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Ozark Environmental Laboratories, Inc.

1511 WATTS DRIVE • ROLLA, MISSOURI 65401
P.O. BOX 806 • 573-364-3301

FAX/MESSAGE
573-341-2040



CERTIFICATE OF ANALYSIS

January 20, 2000

REPORT FOR:

OEL 315
Doe Run
Attn: Dennis Murphy
P.O. Box 500
Viburnum , MO 65566

SAMPLE OF:

TCLP PROJECT
1) Soil Sample

DATE RECEIVED:

January 18, 2000

METHOD USED:

Modified EPA 1311

RESULTS

<u>ANALYSIS</u>	<u>#1</u>	<u>UNITS</u>
Lead	0.32	mg/l
Cadmium	0.03	mg/l
pH upon arrival	7.35	s.u.
pH after HCL	1.96	s.u.
Extraction fluid pH	4.96	s.u.
pH after 18 hours	5.15	s.u.

**Ozark Environmental Laboratories, Inc.**

1511 WATTS DRIVE • ROLLA, MISSOURI 65401

P.O. BOX 806 • 573-364-3301

FAX/MESSAGE

573-341-2040

CERTIFICATE OF ANALYSIS

January 20, 2000

REPORT FOR:

OEL 315
Doe Run
Attn: Dennis Murphy
P.O. Box 500
Viburnum, MO 65566

SAMPLE OF:

TCLP PROJECT
1) Old Rock

DATE RECEIVED:

January 18, 2000

METHOD USED:

Modified EPA 1311

RESULTS

<u>ANALYSIS</u>	<u>#1</u>	<u>UNITS</u>
Lead	3.12	mg/l
Cadmium	0.01	mg/l
pH upon arrival	6.25	s.u.
pH after HCL	1.87	s.u.
Extraction fluid pH	4.95	s.u.
pH after 18 hours	5.28	s.u.



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P.O. BOX 806 • 573-364-3301

FAX/MESSAGE
573-341-2040

CERTIFICATE OF ANALYSIS
January 20, 2000

REPORT FOR: OEL 315
Doe Run
Attn: Dennis Murphy
P.O. Box 500
Viburnum , MO 65566

SAMPLE OF: TCLP PROJECT
1) New Rock

DATE RECEIVED: January 18, 2000

METHOD USED: Modified EPA 1311

RESULTS

<u>ANALYSIS</u>	<u>#1</u>	<u>UNITS</u>
Lead	0.22	mg/l
Cadmium	0.01	mg/l
pH upon arrival	8.04	s.u.
pH after HCL	2.11	s.u.
Extraction fluid pH	4.95	s.u.
pH after 18 hours	5.96	s.u.

VIII. REFERENCES

REFERENCES

1. U.S. Geological Survey, 7.5-Minute Series. Topographic Maps. Viburnum East, 1967; Viburnum West, 1967 Quadrangles.
2. Missouri Department of Natural Resources, DEQ, Appendix A. Locational Data Collection Sheet. January 6, 2000. 2 pages.
3. Wilder, Valerie H., Environmental Specialist, HWP, DEQ, DNR to St. Joseph Trailer Court Superfund Technical File. Telephone Record. Elevated lead levels in yards of trailers at St. Joe Trailer Court. October 18, 1999.
4. Murphy, Denis, Environmental Planning, Doe Run Company to Valerie Wilder, Hazardous Waste Program, MDNR. Letter. Viburnum Trailer Court. December 21, 1999. 2 pages.
5. Wilder, Valerie, Environmental Specialist, DEQ, DNR to Residents of St. Joseph Trailer Court. 19 Letters. November 30, 1999. 1 page.
6. Murphy, Denis, Doe Run Company - SEMO to Valerie Wilder, Hazardous Waste Program, MDNR. Fax. St. Joe Trailer Court (Viburnum) Sample Results. February 11, 2000. 4 pages.
7. Hannon, Kenneth, Environmental Specialist, Superfund/RCRA Unit, Environmental Services Program, DNR. Site Screening Assessment, St. Joseph Trailer Court Site, Viburnum, MO. February 10, 2000. 7 pages.

DEPARTMENT OF NATURAL RESOURCES
Division of Environmental Quality

TELEPHONE OR CONFERENCE RECORD

FILE: Viburnum Driveways

DATE: October 18, 1999

TELEPHONE:

CONFERENCE:

Incoming ()
Outgoing (X)

Field ()
Office ()

SUBJECT: Elevated lead levels in yards of trailers at St. Joe Trailer Park

PERSONS INVOLVED:

NAME

Larry Ragsdale

REPRESENTING

Owner of St. Joseph Trailer
Park in Viburnum, MO
(W) 573 244-5202
(H) 573 244-5401

Valerie Wilder

Missouri DNR

SUMMARY OF CONVERSATION:

I had called Mr. Ragsdale to verify that he was the owner of the St. Joseph Trailer Park in Viburnum, MO. He said he bought the trailer park in 1993 from Doe Run. It was apparently originally built sometime in the 1970's and owned by St. Joseph Lead Company. I explained to him the current situation identified by the Missouri Department of Health at the one trailer lot in the park with elevated lead levels in the soil near the driveway and in the shed. There was a child living there recently with an elevated blood lead level, but the child has since been removed from the home. I explained that sampling indicated the gravel material in the driveway and in the shed contained very high levels of lead, greater than 30,000 parts per million (ppm), and that the DOH had been told the material came from the lead mines in the area.

Mr. Ragsdale said that since 1993 when he bought the trailer park, the only gravel material he has used to line driveways has come from the quarry on Highway KK, but that when he bought the trailer park in 1993 there was already quite a lot of gravel material that most likely came from the mines, especially since the trailer park was built by St. Joseph Lead Company.

I explained the concern the DOH and DNR have regarding all the other lots in the trailer park that may have similar material with elevated lead levels that could be affecting small children. I let him know we would like to initiate a sampling event for the remaining trailer lots in the park, focusing first on those where children reside. Mr.

Ragsdale has no problem with the sampling; he gave us permission to sample but wanted to know who would ultimately be responsible for cleaning up any hazardous material. I told him we would be talking with Doe Run, notifying them of the investigation and trying to determine if the material actually came from the St. Joe/Doe Run mines.

Mr. Ragsdale said the first five trailers on each side of the road as you enter the park are privately owned, but the remaining lots are owned by him and leased to the occupants. He will send me a copy of the list of occupants with their addresses. He also said there are about five or six vacant lots that we can sample any time we would like.

ACTION TAKEN:

I subsequently talked with Brittney Wallace to discuss how we would proceed. We discussed sending a form letter to the trailer park residents explaining the investigation and letting them know we would be sampling on a particular date and offering them the opportunity to have their children's blood lead level screened if they would like. We also need to have a meeting, conference call or write a letter to Doe Run to notify them and discuss the investigation.

10/18/99
Date of Signature

John H. Wilde
Environmental Specialist

THE
DOE RUN
COMPANY

SOUTHEAST MISSOURI
MINING AND MILLING DIVISION
DEPARTMENT OF NATURAL RESOURCES
JEFFERSON CITY, MISSOURI 65102-0176

RECEIVED

DEC 23 1999

HAZARDOUS WASTE PROGRAM
MISSOURI DEPARTMENT OF
NATURAL RESOURCES

December 21, 1999

Valerie Wilder
Hazardous Waste Program
Missouri Department of Natural Resources
P.O. Box 176
Jefferson City, MO 65102-0176

Re: Viburnum Trailer Court

Dear Ms. Wilder:

This letter will provide some background information on Doe Run's involvement with cleanup activities at the Viburnum Trailer Court.

I received a telephone call on April 30, 1999, from Robert Royle of St. Francois County Health Department concerning a site in Viburnum that had high lead levels in the driveway. He inquired as to whether or not Doe Run would be willing to discuss removing this rock and replacing with "new" rock from a local quarry. He advised me that the rock had been placed in the driveway sometime before 1988. I advised him that we would be receptive to such a discussion, pending release of information from the property owner and additional information from the health department.

Robert Royle called on May 11, 1999, to advise me that the child with elevated blood lead no longer lived at the residence in question.

On May 18, 1999, Robert Royle called to inquire if Doe Run would be willing to remove the rock even though the child had moved. I replied by fax that we would be willing to discuss going ahead with a driveway cleanup, pending some further information on the residence, including whether or not there were exposure pathways other than the driveway rock.

Robert called on June 1, 1999 to inform me that the property owner had ignored certified letters requesting release of information. He did inform me that there were exposure pathways other than the rock.

Valerie Wilder
MDNR/Hazardous Waste
December 21, 1999
Page 2

On July 6, 1999, I received a copy of a letter from Robert Royle to Mrs. Sue Brines dated June 29, acknowledging release of information. He supplied my name, affiliation, and telephone number with Doe Run and suggested she contact me regarding cleaning up the driveway. I never received a call from Mrs. Brines requesting assistance with the driveway.

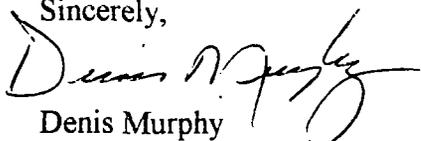
We didn't hear anything further until October, when you made a call to Mr. Larry Ragsdale, who owns most of the lots in the trailer court. Mr. Ragsdale contacted me, with concerns about DNR involvement and what that might mean to his property and business.

In keeping with our earlier commitment to assist with the driveway cleanup or replacement, Doe Run's decision was to proceed with removal of the "old" rock in the driveways of the trailer court, recover that rock as feed for our Viburnum mill, and place "new" rock in the driveways from a local commercial rock quarry.

You and I talked on December 15, 1999 at which time I explained that our effort was to remove and replace the driveway rock in the trailer park. We are conducting this work because we believe it is beneficial to the property owners and residents of the trailer court. We have received permission from Mr. Ragsdale to replace all of the driveways on lots he owns, and have sent letters to the other property owners requesting authorization to enter their property and proceed with the project. I have enclosed a copy of the letter sent to the property owners for your information. Please note we have pointed out that our effort is not intended to deter the department from their assignment and the DNR investigation will go on as planned.

I hope this provides sufficient information. Please call if you have any further questions, I can be reached at (573)244-8104.

Sincerely,


Denis Murphy
Environmental Planning

Cc: Mr. James Burris, MDNR, Poplar Bluff Regional Office

THE
DOE RUN

December 17, 1999

Ken Thomlinson
C/o Darrell Pryor
P.O. Box 162
Viburnum, MO 65566

Copy

Property Owner: Lot #42, St. Joe Trailer Court, Viburnum, MO

Dear Mr. Thomlinson:

The Doe Run Company is currently removing old driveway rock and replacing it with clean rock from a local quarry on lots #6 through #40 of St. Joe Trailer Court owned by Mr. and Mrs. Ragsdale. Doe Run believes this is a prudent step to benefit the community, especially the property owners of the trailer court, and is doing this work through a local contractor at no cost to the property owners or residents.

You may have recently received a letter from Missouri Department of Natural Resources regarding an upcoming environmental investigation in the trailer court. Missouri DNR is aware of our efforts to assist the property owners with the driveway rock replacement. Our efforts to replace this rock is not intended to deter the Department of Natural Resources from conducting their investigation, and their work will go on as planned.

For us to proceed, we need your permission authorizing our contractor to enter your property and perform the work. Doe Run hopes you agree that the driveway project is beneficial for all involved, especially the residents of the trailer park, and that you will grant us permission to proceed on your property with the project. Again, this work will be completed at no cost to you. The work plan is to remove all old rock in the driveway along with 8 to 12 inches of soil around the driveway, and replace with clean 7" minus rock from a commercial quarry.

We are asking you to please sign the authorization on the next page and return to us. We have provided a stamped, self-addressed envelope for your convenience. In return, by the signature below, The Doe Run Company pledges to perform the work as described in a workman-like manner, and will be responsible to you for any damages that may occur for failing to do so.

We would appreciate your prompt response as we would like to continue the work already in progress. If you have any questions, please call me at (573)244-8104.

The Doe Run Company

By: Denis Murphy
Denis Murphy, Environmental Planning

Date: Dec. 17, 1999

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES

Mel Carnahan, Governor • Stephen M. Mahood, Director

DIVISION OF ENVIRONMENTAL QUALITY

P.O. Box 176 Jefferson City, MO 65102-0176

November 30, 1999

Mr. and Mrs. Kris Kight
St. Joseph Trailer Court, Lot 11
Viburnum, MO 65566

Dear Mr. and Mrs. Kris Kight:

This letter is being sent as notification that the Missouri Department of Natural Resources (DNR) and the Missouri Department of Health (DOH) are conducting an environmental investigation at the St. Joseph Trailer Court. DOH recently became aware of a privately owned lot at the St. Joseph Trailer Court that contained very high levels of lead in the gravel and soil around the trailer. At the time, there was also a young child living in the trailer that had an elevated blood lead level. DNR and DOH are concerned there may be other trailer lots with high lead levels that could potentially contribute to elevated blood levels in trailer occupants, especially any children under the age of six.

DNR has obtained permission from Mr. Larry Ragsdale, the trailer park owner, to collect and test samples of gravel and soil from all of the trailer lots. We will be collecting samples sometime in early January 2000. You will be provided with copies of the results and an explanation of the information.

If there are children (especially those under six years old) living at your residence, or any expectant mothers, the DOH would recommend having their blood lead level tested. To schedule a free screening, you can contact Margarite Gillam or Judy Davis of the Iron County Health Department at (573) 546-7121 or toll free at 1-888-476-7121. The County Health Department will screen anyone's blood for lead, regardless of age.

The investigation is being conducted under authority of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), through a cooperative agreement with the U.S. Environmental Protection Agency (EPA). If you have any questions regarding the investigation, please contact me at (573) 751-8629 or 1-800 334-6946. Be sure to ask for Valerie Wilder in the Hazardous Waste Program when using the 800 number. If you have any health-related questions regarding lead exposure, please contact Margarite Gillam or Judy Davis at the numbers listed above.

Sincerely,

HAZARDOUS WASTE PROGRAM



Valerie Wilder
Environmental Specialist

VW: cj

cc: Ms. Brittney Wallace, DOH
Mr. Scott Clardy, DOH
Ms. Judy Davis, Iron County Health Department
Ms. Margarite Gillam, Iron County Health Department
Mr. Larry Ragsdale, St. Joe Trailer Park

Ozark Environmental Laboratories, Inc.
1511 WATTS DRIVE • ROLLA, MISSOURI 65401
P.O. BOX 806 • 573-364-3301

FAX/MESSAGE
573-341-2040



CERTIFICATE OF ANALYSIS

January 20, 2000

REPORT FOR:

OEL 315
Doe Run
Attn: Dennis Murphy
P.O. Box 500
Viburnum, MO 65566

SAMPLE OF:

TCLP PROJECT
1) Soil Sample

DATE RECEIVED:

January 18, 2000

METHOD USED:

Modified EPA 1311

RESULTS

<u>ANALYSIS</u>	<u>#1</u>	<u>UNITS</u>
Lead	0.32	mg/l
Cadmium	0.03	mg/l
pH upon arrival	7.35	s.u.
pH after HCL	1.96	s.u.
Extraction fluid pH	4.96	s.u.
pH after 18 hours	5.15	s.u.

**Ozark Environmental Laboratories, Inc.**

1511 WATTS DRIVE • ROLLA, MISSOURI 65401

P.O. BOX 806 • 573-364-3301

FAX/MESSAGE

573-341-2040

CERTIFICATE OF ANALYSIS

January 20, 2000

REPORT FOR:

OEL 315
Doe Run
Attn: Dennis Murphy
P.O. Box 500
Viburnum, MO 65566

SAMPLE OF:

TCLP PROJECT
1) Old Rock

DATE RECEIVED:

January 18, 2000

METHOD USED:

Modified EPA 1311

RESULTS

<u>ANALYSIS</u>	<u>#1</u>	<u>UNITS</u>
Lead	3.12	mg/l
Cadmium	0.01	mg/l
pH upon arrival	6.25	s.u.
pH after HCL	1.87	s.u.
Extraction fluid pH	4.95	s.u.
pH after 18 hours	5.28	s.u.



Ozark Environmental Laboratories, Inc.
1511 WATTS DRIVE • ROLLA, MISSOURI 65401
P.O. BOX 806 • 573-364-3301

FAX/MESSAGE
573-341-2040

CERTIFICATE OF ANALYSIS
January 20, 2000

REPORT FOR:

OEL 315
Doe Run
Attn: Dennis Murphy
P.O. Box 500
Viburnum, MO 65566

SAMPLE OF:

TCLP PROJECT
1) New Rock

DATE RECEIVED:

January 18, 2000

METHOD USED:

Modified EPA 1311

RESULTS

<u>ANALYSIS</u>	<u>#1</u>	<u>UNITS</u>
Lead	0.22	mg/l
Cadmium	0.01	mg/l
pH upon arrival	8.04	s.u.
pH after HCL	2.11	s.u.
Extraction fluid pH	4.95	s.u.
pH after 18 hours	5.96	s.u.

RECEIVED

FEB 10 2000

HAZARDOUS WASTE PROGRAM
MISSOURI DEPARTMENT OF
NATURAL RESOURCES

Site Screening Assessment
St. Joseph Trailer Court Site
Viburnum, MO

Site Information:

Project Code: 4071 ESP Staff: Kenneth Hannon

Site Code: 9144

Investigation Date: 1/6/00

Sampling Protocol:

HWP requested that ESP personnel conduct sampling as part of a site screening assessment. ESP personnel utilized sampling and investigation protocols as outlined in the MDNR, ESP, Field Services Section, Standard Operating Procedures Manual.

Site Observations:

ESP personnel Kenneth Hannon along with HWP employee Valerie Wilder arrived in Viburnum at 0930 hours to conduct sampling. DNR personnel met with Larry Ragsdale, the property owner and Denis Murphy from Doe Run and performed an initial site walk through to locate potential sampling points. Split samples were collected by the Doe Run Company on behalf of the site owner for all locations sampled. One surface (0.0 to 4.0 inch depth) soil sample was collected from each trailer court lot on-site (32 lots total). For detailed descriptions of our sampling locations please refer to the attached sampling data section and site maps.

Samples were collected through the use of a stainless steel spoon or a clean trowel. The top layer of vegetation (if present) was removed and the exposed soil was transferred to aluminum foil pans, homogenized, and transferred to sample containers. Samples were returned to the lab where they were pre-screened for lead and cadmium with the TN Spectrace 9000[®] portable x-ray fluorescence spectrometer (XRF). The Spectrace 9000 contains three radioisotope excitation sources: Iron-55, Cadmium-109 and Americium-241. These sources provide a broad range of excitation allowing 25 elements to be quantitatively analyzed simultaneously. The following table lists the factory installed elements that the XRF is capable of analyzing, according to their excitation source.

Iron-55	Cadmium-109	Americium-241
K, Ca, Ti, Cr	Cr, Mn, Fe, Co, Ni, Cu, Zn, As, Se, Sr, Zr, Mo, Hg, Pb, Rb, Th, U	Ag, Cd, Sn Sb, Ba

The detection limits for each metal vary based on analysis run time set for each excitation source. The main contaminants of concern at this site were lead and cadmium, which are analyzed by the Cadmium-109 source and the Americium-241 source respectively. For this site, run times for the XRF were varied depending on the comparison of results to the standard deviation (discussed in the next paragraph), but generally the run time for the Cadmium-109 source was set at 200 seconds in order to achieve the minimum detection limit for lead of 14 ppm, according to the manufacturer's specifications. With the Americium-241 source run time set at 200 seconds, the minimum detection limit for cadmium is 86 ppm. This is well above the Superfund Chemical Data Matrix (SCDM) health-based benchmark level set for cadmium in soil (39 ppm) and the MO Any-Use Soil Level (ASL) (28 ppm). Therefore, laboratory analysis was generally relied upon to evaluate the presence of cadmium. For detailed results on the XRF data please refer to the table titled: XRF Data.

According to the manufacturer, when reviewing results reported by the XRF, it is imperative to compare the results value to the standard deviation (SD) for each sample. If the result is greater than 10 times the SD, the element is definitely present in the sample and the result can be accepted as a quantitative measurement of its concentration. If the result is less than 3 times the SD, the result is, by definition, below the detection limit (which varies according to the run time). If the result is between 3 and 10 times the SD, the manufacturer recommends increasing the run time by a factor of 4 if possible to attempt to lower the detection limit.

The results that fell between 3 and 10 times the SD are flagged in the table with an asterisk, followed by a number that signifies how many times greater the number is than the SD. These results are qualitative, indicating the element is present but cannot be definitively quantified.

Five samples were selected for laboratory analysis based upon XRF data. These samples were submitted for total metals (Pb and Cd) with instructions relayed to analytical personnel that if a sample's total analyte results were 80% of twenty times the Toxicity Characteristic Leaching Procedure (TCLP) regulatory limit, TCLP analysis would be performed on that sample.

Sampling Data:

Sample#	Sample Information
0001901	Soil sample from lot 9 located south of the driveway, middle of the lot. The sample was taken from the 0.0 to 4.0 inch depth. Loose brown topsoil with some roots. Many pebbles and rock fragments. Collected at 1021 hrs.
0001902	Soil sample from lot 20 located east of the driveway, downgradient, near windmill. The sample was taken from the 0.0 to 4.0 inch depth. Dark brown loose topsoil with some rock fragments and pebbles. Many roots present. Collected at 1254 hrs.
0001903	Soil sample from lot 32 located north of gravel driveway right below swingset. The sample was taken from the 0.0 to 4.0 inch depth. Reddish-brown clayey topsoil with a few pebbles and rock fragments. Collected at 1127 hrs.
0001904	Soil sample from lot 33 located south of the trailer, east of the driveway, near the street. The sample was taken from the 0.0 to 4.0 inch depth. Dark brown loamy topsoil with some rock fragments and pebbles. Collected at 1055 hrs.
0001905	Soil sample from lot 35 located south of the trailer, east of driveway, near the street. The sample was taken from the 0.0 to 4.0 inch depth. Loose brown, loamy topsoil with a few roots. Collected at 1040 hrs.

Sample Location Points

Lot #	Sample Point Location
6	Vacant lot east of driveway near street.
7	Vacant lot east of driveway near street.
8	Vacant lot east of driveway near street, half the distance to the end of the lot from the street.
9	Vacant lot south of driveway half the distance to the end of the lot from the street.
10	Vacant lot east of driveway 5 feet from the street.
11	East of driveway and trailer, 3 feet from the street.
12	East of driveway and trailer, 4 feet from the street.
13	Vacant lot north of driveway 3 feet from the street.

Lot #	Sample Point Location
14	North of driveway 3 feet from the street.
15	East of driveway and trailer 8 feet from the street, near the lamppost.
16	South of driveway, under swingset.
17	South of driveway, 20 feet from driveway.
18	West of driveway.
19	West of driveway, upgradient.
20	East of driveway, downgradient near windmill.
24	East of trailer in play area.
25	West of trailer, just south of door entrance.
26	West of trailer, right below swingset.
27	Vacant lot north of gravel drive.
28	South of trailer and east of gravel drive, near the street.
29	Vacant lot south of where trailer would be, east of driveway.
30	West of trailer, north of gravel driveway, in the play area.
31	Vacant lot northeast of gravel driveway near abandoned toys.
32	North of gravel driveway right below swingset.
33	South of trailer, east of the driveway near street.
34	South of trailer, east of the driveway near street.
35	South of trailer, east of the driveway, near flowerbed, near the street.
36	South of trailer, east of the driveway, near door entrance, near street.
37	Vacant lot east of driveway near street.
38	South of trailer, east of driveway near street.
39	Vacant lot east of driveway near street.
40	Vacant lot east of driveway near street.

GPS Data:

Lot Number	Northing	Easting
24	4176592.527	664667.150
25	4176592.527	664667.150
26	4176562.047	664684.904
27	4176540.520	664687.783
28	4176518.895	664685.765
29	4176384.068	664419.026
30	"	"
31	"	"
32	"	"
33	"	"
34	4176436.020	664550.256
35	4176420.267	664533.425
36	4176413.712	664513.960
37	4176407.157	664494.496
38	4176413.224	664489.477
39	4176413.077	664482.132
40	4176416.257	664486.967
6	4176410.239	664494.435
7	4176438.224	664506.124
8	4176438.370	664513.469
9	4176445.316	664552.520
10	4176464.289	664576.635
11	4176479.904	664586.121
12	4176486.216	664593.343
13	4176495.560	664598.055
14	4176507.743	664590.464
15	4176523.691	664617.088
16	4176502.897	664656.693
17	4176543.260	664670.583
18	4176555.882	664685.027
19	4176546.782	664692.557
20	4176596.440	664708.710

XRF Data

Soil Sampling Results from DNR Sampling at St. Joseph Trailer Court on January 6, 2000						
* Indicates the XRF result fell between 3 and 10 times the standard deviation (SD) followed by a number that signifies how many times greater the number is than the SD.						
† Indicates the XRF result is not valid						
Lot #	XRF Sample ID	Date Analyzed	XRF Run Time Cd 109/Fe 55 /Am 241 (sec)	Standard Deviation	XRF Lead Result	XRF Average/ Final Result
6	06	01/07/00	100/30/30	10.8	81.2* (>7x SD)	
	06	01/12/00	150/30/150	8.7	72.1* (>8x SD)	
	06.200	01/12/00	200/30/200	10.3	169.0	169.0
7	07	01/07/00	100/30/30	12.9	131.3	131.3
8	08	01/07/00	100/30/30	8.7	46.3* (>5x SD)	
	08.150	01/12/00	150/30/150	11.1	130.5	121.9
	08.200	01/12/00	200/30/200	9.1	113.3	
9	09	01/07/00	100/30/30	20.4	494.9	537.6
	09.150	01/12/00	150/30/150	18.4	571.1	
	09.200	01/12/00	200/30/200	15.7	546.7	
10	10	01/07/00	100/30/30	18.9	378.7	378.7
11	11	01/07/00	100/30/30	23.6	706.3	1065.1
	11.200	01/12/00	200/30/200	23.7	1317.1	
	11.200	01/12/00	200/30/200	22.2	1172.0	
12	12	01/07/00	100/30/30	16.0	278.5	278.5
13	13	01/07/00	100/30/30	5.8	25.7* (>4x SD)	
	13.200	01/12/00	200/30/200	12.4	372.9	372.9
14	14	01/07/00	100/30/30	11.6	132.5	132.5
15	15	01/07/00	100/30/30	11.8	113.8* (>9x SD)	113.8
16	16	01/07/00	100/30/30	11.8	107.1* (>9x SD)	
	16.200	01/12/00	200/30/200	8.4	119.0	119.0
	16.300	01/12/00	300/30/300	21.4	120.5* (>5x SD)	
17	17	01/07/00	100/30/30	10.6	90.4* (>8x SD)	
	17.200	01/12/00	200/30/200	7.8	96.0	96.0
18	18	01/07/00	100/30/30	12.8	132.7	132.7
19	19	01/07/00	100/30/30	11.8	79.7* (>6x SD)	
	19.200	01/12/00	200/30/200	8.7	85.1* (>9x SD)	85.1
20	20	01/07/00	100/30/30	39.3	2042.2	1451.0
	20.200	01/12/00	200/30/200	17.7	829.7	
	20.200	01/12/00	200/30/200	23.6	1481.0	
24	24	01/07/00	100/30/30	15.2	243.2	243.2
25	25	01/07/00	100/30/30	14.7	239.1	239.1
26	26	01/07/00	100/30/30	10.4	49.8* (>4x SD)	
	26.200	01/12/00	200/30/200	8.2	80.5* (>9x SD)	80.5
	26.200	01/12/00	200/30/200	6.5	42.4* (>6x SD)	
27	27	01/07/00	100/30/30	3.0	-10.8†	
	27.200	01/13/00	200/30/200	8.9	138.3	138.3
28	28	01/07/00	100/30/30	10.5	96.8* (>9x SD)	
	28.200	01/12/00	200/30/200	8.0	108.4	108.4
29	29	01/07/00	100/30/30	14.1	211.3	211.3
30	30	01/07/00	100/30/30	12.2	107.2* (>8x SD)	
	30.200	01/12/00	200/30/200	7.6	71.4* (>9x SD)	
	30.300	01/12/00	300/30/300	6.3	73.4	73.4

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31	31	01/07/00	100/30/30	19.8	366.6	366.6
32	32	01/07/00	100/30/30	5.4	1.3 [†]	
	32.200	01/12/00	200/30/200	7.9	42.3* (>5x SD)	
	32.300	01/12/00	300/30/300	6.9	62.4* (>9x SD)	62.4
33	33.200	01/12/00	200/30/200	3.3	7.4	
	33	01/07/00	100/30/30	26.5	849.5	
	33.200	01/13/00	200/30/200	26.5	1573.5	
	33.200	01/13/00	200/30/200	7.1	105.2	862.0
	33.200	01/13/00	200/30/200	18.6	889.8	
34	34	01/07/00	100/30/30	16.3	301.0	301.0
	35	01/07/00	100/30/30	18.8	458.0	
35	35.200	01/13/00	200/30/200	23.1	1214.7	917.3
	35.200	01/13/00	200/30/200	25.5	1479.1	
36	36	01/07/00	100/30/30	9.1	66.2* (>7x SD)	
	36.200	01/13/00	200/30/200	11.2	232.8	232.8
37	37	01/07/00	100/30/30	15.6	237.5	237.5
38	38	01/07/00	100/30/30	11.5	128.9	
	38.200	01/13/00	200/30/200	16.4	557.0	343.0
	38.200	01/13/00	200/30/200	2.2	-8.5 [†]	
39	39	01/07/00	100/30/30	14.3	166.3	166.3
40	40	01/07/00	100/30/30	12.3	109.0* (>8x SD)	
	40.200	01/13/00	200/30/200	8.1	95.8	95.8

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