Field Report

April 29-May 2, 2013

Phase 3 EPA Staff X-Ray Fluorescence Sampling Event

<u>Iron King – Humboldt Smelter Superfund Site, Humboldt, Arizona</u>

May 8, 2013

On April 29 – May 3, 2013, Jeff Dhont, Zizi Searles, John Hillenbrand, Peter Husby, and Greg Nagle of EPA Region 9 conducted a sampling of soils, tailings, and dross over a wide area at the Iron King Mine – Humboldt Smelter Superfund Site (IKHS), with samples to be analyzed by X-Ray Fluorescence spectrometer (XRF) and confirmed by laboratory analysis/correlation. A limited number of additional soil and tailings samples were collected for in-vitro characterization for bioaccessibility. This report is to document field samples, techniques, and observations. However, it will be supplemented by a separate report by the EPA Region 9 laboratory which present the actual chemical results and correlative analyses for the data collected. In addition, this report shows only the original plan for data collection; the actual locations sampled in the field differ somewhat from those shown here and those will be documented in the Amended RI Report for the IKHS Site.

This effort supplemented previous similar efforts conducted in January, 2012, by Monika O'Sullivan, Jeff Dhont, John Hillenbrand, and Peter Husby, of EPA Region 9, and in April 2012 by Jeff Dhont and Greg Nagle of EPA Region 9. The results of those efforts, as well as laboratory samples collected previously in RI efforts by EPA's former contractor EA were used to inform sample locations and approach during this field effort.

Jeff Dhont is the lead remedial project manager (RPM), and Zizi Searles the co-RPM assigned to the IKHS site. John Hillenbrand is another RPM and regional mines expert who assisted in this effort. The work was executed in the field based on planning conducted in advance by the project management team. This included deciding on sampling locations, types, matrices, etc. in the field, as well as navigation to sampling locations. Peter Husby and Greg Nagle are on staff of the Field Services Team at the U.S. EPA Region 9 Laboratory. Mr. Husby and Mr. Nagle operated the XRF device in the field, and also back at the EPA Region 9 laboratory, where samples not analyzed in the field were shipped for analysis after the field event. These staff conducted calibration and quality control procedures for the XRF device. They arranged for the transport of the XRF device and all sampling field gear to and from the site. Global Positioning System (GPS) readings were taken for all sample points in the field. Large, high-resolution maps were also retained by all field teams and locations and numbers of sample points were logged on the maps in case of GPS problems or failure. The XRF and GPS devices maintained electronic records of all samples and GPS locations for direct processing back at the laboratory.

All sample locations in this report should be considered preliminary pending the more formal results posted by the EPA Region IX laboratory. Sample locations shown in this report are posted on aerial photos based on direct knowledge of the effort, not GPS. As mentioned above, actual chemical XRF results are posted in a separate report being issued by the EPA Region 9 staff; actual sample locations based on GPS will be posted to the site database and will be plotted on maps for this effort shown in the Amended RI Report.

Background and Context

The IKHS site contains two major sources – the former Iron King Mine (IKM) which contains a tailings pile with as much as 4 million cubic yards of material; and the former Humboldt Smelter. The operations at both facilities ceased at least 40 years ago and the smelter was operational as early as 1880. The IKM main tailings pile is located on the edge of the town of Humboldt. The smelter is somewhat of a centerpiece near the center of town. Primary metals being mined include zinc and copper, and possibly limited lead and gold. The primary contaminants of concern from a risk standpoint are arsenic and lead. Even when not a health concern, with proper scientific scrutiny zinc and copper levels have been found to be a useful consideration when evaluating influences from the sites on surrounding soils.

A major drainage known as the Chaparral Gulch traverses the mountains to the west and runs by the north edge of the IKM main tailings pile. Particularly during high storm events, extremely high volumes of water and sediment flow down what is otherwise a highly ephemeral channel. Flows carrying high sediment loads create scour and at times, bank overflow, creating a highly dynamic environment over the decades in which deposition is overlain by more deposition, mixed, scoured, and moved. Chaparral Gulch crosses Highway 69 from the IKM Mine Area into the Humboldt main town area (between Main Street and Third Street) and then passes by the former smelter, which sits above the Gulch. Tailings from the IKM main tailings pile have entered this drainage. There are also tailings located on the smelter property, which have mixed into the same drainage farther downstream. The Gulch ultimately drains into the Agua Fria River. The smelter property also contains may piles of aluminum dross which was brought in by a later operator many years after the smelter stopped operating, with the intention of reprocessing to recover aluminum. The smelter also contains black slag material which was dumped over a cliff overlooking the Agua Fria River.

The Agua Fria River flows from the north through the center of town, passing on the east side of the smelter property. The town is nestled in unconsolidated sediments in the river valley, between mountain ranges on the east and west. The rock geology in these ranges varies significantly, including quaternary, tertiary, and pre-tertiary deposits of sedimentary and igneous rock layers interspersed with subsequent lava upflows, raised at a significant dip angle. The geology in the east and west ranges appears to differ. The geology south of town also appears to differ from that in the town and north of the town. An agricultural region sits north of the town and just west of the River, extending northward to Arizona Highway 169. Tightlyspaced residential parcels are located due north of the smelter "in-town;" residential parcels east of the River, and west of Highway 69, are much larger and more dispersed.

Aerial Disperson and Background. Aerial dispersion of contaminated dusts may have occurred both in the past during site operations, and/or more recently. Possible sources include 1) tailings at the former mine tailings pile; 2) tailings at the smelter or areas downstream of the smelter, 3) aluminum dross material at the smelter brought in by a later operator, and 4) smelter stack emissions at the time the smelter was actually operating (up until 1937). Up until 2011, significant numbers of samples have been collected in residential areas close to the main tailings pile and the smelter, primarily to the north of both the smelter and the IKM main tailings pile as well as in-between these two locations. However, prior to 2012 sampling efforts, insufficient data had been collected at locations farther out to evaluate the physical area which contains the influence of historical aerial dispersion from either source, nor what should be considered a "background" level for various metals. Air-depositional traces of the former operations that may remain have been altered by up to 100 years of human activity in the area, including industry, construction, soil cut-and-fill, landscaping, etc. There is some evidence that foreign material, possibly from quarries some distance from the sites (a few have been sampled), as well as tailings themselves, may have been brought into yards by landowners or developers as fill or landscaping material.

Two subsequent XRF sampling efforts by EPA in 2012 (Phases 1 and 2) greatly expanded the background investigation, examining soils at surface and at 1 foot out to distances of as much as 2.5 – 3.0 miles from the smelter and mine in the north-northeast direction, encompassing virtually all residential areas near the site. Evaluating background concentrations is presently the topic of a draft report by EPA Contractor CH2M Hill. It is intended that data from this effort will be used to supplement that report before it is final.

After these two previous 2012 XRF efforts, there remained a few locations where lateral coverage was potentially insufficient: 1) west of the Iron King Mine, 2) South of the Iron King Mine, 3) certain areas north of the Iron King Mine and on either sides of ridges north of the mine to better refine the areas of impact from the mine, 4) a neighborhood over a mountain due south of the smelter that was never sampled; and 5) due east of the smelter directly across the Agua Fria River.

Gulches and Tailings Transport. Prior to this 2013 sampling event, insufficient data had been collected in the Chaparral Gulch to determine extent and depth of the contamination, making completion of a feasibility study for such materials untenable. In 1964 the main tailings pile at the Iron King Mine sustained a blowout, and tailings and water presumably flowed down a pathway crossing what is now an expanded Highway 69, and followed a gulch along 3rd Street to its overcrossing/confluence with the Chaparral Gulch. It is likely that the Chaparral Gulch proper also received contaminated alluvium and/or tailings during normal mine operations over decades prior to the blowout. At the Third Street overcrossing, it has been presumed that the main flow of Chaparral Gulch north of the overcrossing mixed with tailings from the Third

Street Gulch. From there, flow and alluvium moved downstream toward the smelter. At the smelter, there was also a blowout of the main tailings swale, allowing huge quantities of tailings to flow into the Chaparral Gulch. While these tailings had been sampled and the chemical composition reasonably well-known, the extent of tailings and tailings impact was not as well-characterized, and a general understanding of layering and mixture was lacking. The level of metals at the fringes of the smelter property had not been characterized, nor had the Chaparral Gulch just upstream of the smelter, in the zone where the Gulch and tailings form the smelter begin to merge. More information was therefore needed about overall extent of contamination in the Gulch, the nature of tailings in the Third Street Gulch (tributary carrying sediment/tailings from the IKM tailings pile blowout in 1964), the presence of overbank flow out of the Gulch south of 3rd Street; the merger zone between the Gulch and the smelter area; the layering, mixing with alluvium, characteristics of the smelter tailings blowout; and aspects of the tailings up to the tailings dam downstream of the smelter.

Rear Tailngs Pile and "Elbow" of the Chaparral Gulch.

The Chaparral Gulch below the tailings dam eventually makes a sharp turn to the left (north) and then immediately to the east again, emptying into the Agua Fria River. The River in this area is making a C-shaped curve and receives the flow from the Chaparral Gulch (which is ephemeral) at about the center of the "C". During previous investigation in early 2013, a pile of material was observed tucked deep into the Canyon directly on the banks of the Agua Fria River just after the confluence of the Chaparral Gulch with the Agua Frida. At least some of the material was yellowish and appeared to be tailings. This pile was perhaps 30 feet or more high at its highest, and lesser heights of it were present along the banks wrapping northward upriver.

This pile had never been previously investigated. The main Humboldt Smelter operated from the first years of the 1900s until about 1022, and then sporadically until 1937. However, at least two operations preceeded the Humboldt smelter on the site: the Agua Fria stamp mill, and the Val Verde Smelter. The exact location of these operations is not clear, but from photos it appears they were not up on the main plateau occupied by the Humboldt Smelter, but closer to the water. It has been assumed that this rear tailings pile could have come from these predecessor operations, and therefore may have different chemical or physical properties than tailings elsewhere at the smelter.

Before the confluence, where the Chaparral Gulch makes an abrupt left turn, there is another, smaller but significant tailings collection in the canyon that has been highly eroded by high energy water flow on the right side of the channel. No information was available about his pile.

It is considered likely that there were previously dams, spillways, and other similar structures associated with smelting and ore processing in this area. If these existed, they are no longer present but evidence may exist suggesting their previous existence. This was considered in this report.

Objectives of Sampling

This effort was performed to contribute data and analysis directly to the remedial investigation. This effort was not intended to address all RI data gaps for the site. Rather, a set of data of priority was identified which EPA staff could obtain in the time allotted, acknowledging that additional field effort would likely follow in the summer, to be performed by contractor staff. Most of the samples collected were XRF analyses of soils and tailings, collected from surface soils and co-located samples at about 1 foot in depth.

The objectives for this effort included:

1. Obtain additional data and spatial coverage in characterization for soils south, west and north of the Iron King Mine that would allow for refining the area potentially impacted by the site, including examination of the ratio concentrations in surface to deeper soils in those locations. These efforts are designed to enhance evaluations of background concentrations and physical area impacted by the sites presently ongoing, and increase the data available from the Phase 1 and Phase 2 EPA sampling efforts in 2012.

2. Obtain both visual and chemical characterization data for the Third Street Gulch (tributary to Chaparral Gulch that received blowout material from the Iron King Mine in 1964), including spatial extent of affected area, extent and presence of tailings, extent of concentrations, depths of material, and layering of material from depositional events.

3. Obtain more spatial coverage to evaluate extent of contamination in the Chaparral Gulch upstream of the 3rd Street overcrossing, especially in localized ponding areas on the north side of the Gulch near 3rd Street; and enhance previous surface data with surface and 1 foot sampling data.

4. Obtain more spatial coverage in characterization and visually evaluate sediment and/or tailings deposition in the Chaparral Gulch downstream of the Third Street overcrossing and between the Third Street overcrossing and the Humboldt smelter. Also evaluate the possibility of bank overflow of contaminated material, and traces of the blowout material that flowed down the Third Street Gulch into the main gulch.

5. Evaluate layering of alluvium and tailings and extent of contamination in the open flood plain below the smelter blowout, and assess contaminant concentrations in tailings as well as in overlying alluvial layers (layers which may have covered but also mixed with tailings over decades of flows); assess metals concentrations in varying layers;

6. Evaluate layering at the point of the smelter tailings blowout; obtain samples to characterize the chemical composition of the smelter dross and the tailings that appear to be salts which are known at other sites to be highly concentrated in metals;

7. Obtain soils characterization on the western boundary of the smelter where it abuts residential property, and from the zone where the Chaparral Gulch transitions into full impact from the smelter.

8. Obtain surface and 1 ft soil samples from the private, gated neighborhood behind the mountainous prominence and plateau which lies due south of the smelter and Chaparral Gulch.

9. Obtain surface and 1 ft. soil characterization due east directly across the Agua Fria River from the smelter slag.

10. Obtain soil samples to be analyzed for bioaccessibility by laboratory in-vitro method, which can be used through regression to get an estimate of arsenic and lead bioavailability for use in the risk assessment. These samples mostly targeted source materials in this effort.

Field Procedures and Approach

The portable X-ray fluorescence spectrometer was calibrated at the beginning of each working day, using standards provided by the manufacturer of the instrument for such.

Sample locations were based on previous in-office planning considering all previous data, as well as observations once in the field. Large maps of every quadrant around the sources were utilized by Mr. Dhont to locate the sampling team and choose sampling locations. Both U.S.G.S. geologic maps and photobase maps with overlaid roads and parcel boundaries were utilized. All sampling locations were penned onto the photobase maps, with corresponding sample ID.

In choosing sample locations, pointed consideration was given to finding locations that appeared to have undisturbed soils. In particular, any material that could be road bedding or have been subject to road grading was carefully avoided, as was soil that might have been subject to off-road vehicle traffic. Field notation was taken as to the terrain and depositional environment. In particular, samples taken from active drainage channels were noted as opposed to soils on hillsides or open flat areas. Drainage channels can serve to “average” the metals levels from points upstream of the sample, making them of special advantage in many cases for background considerations. Careful effort was made to collect a balance of channel and other terrain (bluff, hillside/sloped, flat, ridge) samples and the conditions were logged.

Most samples were collected to the side of public roadways, as long as a location could be found that was clearly not influenced by road construction and appeared undisturbed. The team ventured farther from the road where EPA had direct access agreements for properties (such as state lands or BLM lands). Sampling locations were kept outside property fence lines. The team did not sample past private gates, or into driveways or yards.

At virtually all locations, a photograph was taken of the sample number(s) written on a white board followed by a photograph of the area the sample was taken from. Samples were collected into plastic zip lock bags for analysis by XRF, generally conducted at the back of a 4WD vehicle. Prior to sample collection to the bag, the sample ID was written on the bag in indelible ink.

Surface soils were collected using a white plastic scoop designed and sold specifically for sampling operations which arrived at the site clean in thick, sealed plastic bags. Scoops were reused in areas with similar characteristics and soil levels. If high levels were observed, scoops were changed out (there were few of these on this effort). Soil and dust was wiped from the scoop to a visibly clean state between samples. It was not desired to use water for cleaning between samples as moisture content can affect XRF readings and, given the very large sample size compared to any residual low-level dust on the scoop, the effect of reuse was considered negligible.

Deeper samples, where collected, were obtained in one of two ways. Most commonly, a long-handle spade was used to advance a hole to as close to 1 foot depth as possible. In several cases, this depth could not be achieved due to either 1) caliche or cobbles at a shallower depth, or 2) bedrock at a shallower depth. In such cases, soil was collected from the greatest depth that could be reached and the depth noted in field charts. In only a few situations, depths of 15 inches (more than 1 foot) were achieved.

The second manner that deep samples were collected was the "road cut" method. In some locations, the road was cut out by carving into a hill and leaving a nearly vertical face, with a native flat bluff or hillside immediately above. In these cases, the surface sample was collected from on top of the bluff (above the cut) and the deep sample from one foot below in the cut face. In general, the outer layer of soil in the vertical face, 1 foot down, was brushed away, and then the sample was collected from a few inches horizontally into the face.

When deeper samples were collected by spade, soil was scooped out of the hole as much as possible in only one direction. When the hole had reached target depth, infalling soil from the surface was edged against the same side of the hole. The spade was then used to cut a clean, vertical face of a few inches on the <u>*opposite*</u> side of the hole near the bottom. The shaved off material was then placed *behind and under* the shovel, with the shovel wedged in the bottom of the hole at an angle so that only the cleanly exposed edge was exposed. This was done to segregate the deeper soils from soils that may have fallen into the hole from nearer the surface. With care not to push more surface soils into the hole, a scoop was used to pull soil out of the clean face at the bottom of the hole. Soil that fell out of the face fell on the metal blade of the shovel and could be retrieved off the shovel. Any holes were backfilled with the original soil material. Zip lock bags were sealed and brought back to the sampling vehicle.

Prior to analysis with XRF, each bag was "massaged" with the fingers to break up any colloids as much as possible. The bag was inverted several times to mix the contents well. With clay and moist soils, extra time was spent squeezing the clay flakes to spread them out, push them together again, and then spread them out in repetition. The bag was then inverted and mixed several times. The objective in each case was to provide as much mixing and as uniform a particle size distribution as possible.

XRF runs were made through the face of each ziplock bag, with the device's sampling port window pressed firmly into the bag material and the face perpendicular to the axis of the spectrometer.

Every sample was analyzed by XRF twice, with further mixing of the bag between duplicate samples. These were designated as **[Sample No.] A** and **[Sample No.] B**. Values for both duplicates were recorded in memory electronically *and* logged into field charts manually.

All samples were retained, double wrapped, and were shipped back to the EPA Region 9 laboratory in Richmond, California by next-day freight.

Interpretations for the following charts and figures

In the sample numbering scheme, **odd-numbered samples were always surface samples; even-numbered samples were always deep (usually 1 ft) samples.** In cases where no deep sample was taken at a location, the even numbered sample number was skipped and numbering resumed with the next odd number.

Data that show up in yellow, orange, or red are pre-flagged as appearing to be either higher than usual for the area, or to have a significant difference between the surface and the deeper sample, or both.

On the photo-based figures showing sample locations and results, the metals results are shown in the following order: **Arsenic, Lead, Zinc, Copper.**

When metals were not detected, the applicable detection limit is shown after a "less than" sign, e.g. "<8" means not detected with a detection limit of 8.

All units are in milligrams per kilogram of soil.

Iron King Humboldt Smelter Site: 2nd Phase X-Ray Fluorescence Sampling, April 16 – 19, 2012 *Jeff Dhont Field Recording*								
Sample	**A/B**	**Depth**	**As**	**Pb**	**Zn**	**Cu**	**Terrain/Deposition**	**Location and Observations**
SECTION: 201-212: SOUTH / SOUTHWEST OF IK MAIN TAILINGS PILE; SECTION: 213+ SOUTH/SOUTHWEST OF SMELTER								
201	A	Top	32	28	142	82	Flat, low point	Iron King Road near Iron King Mine. Road comes west from Hwy 69 to back of main tailings pile. Sample point is shortly after road turns sharply to the right. ***Sample is taken in a low point --likely drainage.*** Refusal to shovel was encountered at 9 inches. Hard clay layer. Levels of lead observed are higher than most at the site.
201	B	Top	32	19	119	82		
202	A	9 inches	27	17	124	80	Flat	
202	B	9 inches	29	<8	141	78		
203	A	Top	26	18	130	70	Small slope	Further south on Iron King Road. Refusal of shovel encountered at 8 inches due to caliche and/or rock.
203	B	Top	62	43	179	105		
204	A	8 inches	25	<9	121	79	Small slope	
204	B	8 inches	22	12	118	89		
205	A	Top	74	34	154	103	Hillside channel	Well off road, east side of Iron King Road, farther south. Placed in meandering channel through sloped hill with evidence of water flow.
205	B	Top	52	41	124	102		
206	A	8 inches	27	19	90	74	Hillside channel	
206	B	8 inches	37	11	96	76		
207	A	Top	15	10	100	68	Active Channel	In the gas right of way, north of intersection with Iron King Road, in active channel. Natural gulley bottom.
207	B	Top	22	<8	120	68		
208	A	8 inches	20	<8	109	88	Active Channel	
208	B	8 inches	22	<9	106	62		
209	A	Top	16	17	92	54	Hillside	Natural gas right of way, well up on hillside, below tall peak. Near the point that ROW enters private property and road is fenced off. Sample point was bout 40 feet off road on west side. On deep sample, met refusal due to cobbles at 10 inches.
209	B	Top	15	17	78	50		
210	A	10 inches	12	13	69	40	Hillside	
210	B	10 inches	13	<8	65	46		
211	A	Top	87	21	113	118	Gentle slope	Natural gas right of way, well on hillside, 30 feet off road on open ground. Cobbles and caliche resulted in refusal at 8 inches for the deep sample.
211	B	Top	87	22	117	94		
212	A	8 inches	75	14	110	120	Gentle slope	
212	B	8 inches	71	10	106	140		
213	A	Top	22	33	118	86	Flat, open	Agua Fria Road, southeast of smelter. Deeper sample has a darker, loamy and loose character that is deeper than soils on the west side of the highway nearer to the mine. Some moisture in deep sample.
213	B	Top	25	26	116	73		
214	A	1 ft	<8	21	136	59	Flat, open	
214	B	1 ft	15	20	79	59		
215	A	Top	11	26	87	63	Top of anticline	Agua Fria Road, farther east than last sample. 30 feet off road, south of road. Deep sample was same as last location – loamy and fairly dark. Loose, little resistance to 1 ft. Some moisture.
215	B	Top	10	22	100	53		
216	A	1 ft	10	15	75	70	Top of anticline	
216	B	1 ft	<9	29	85	72		

Iron King Humboldt Smelter Site: 2nd Phase X-Ray Fluorescence Sampling, April 16 – 19, 2012 *Jeff Dhont Field Recording*								
Sample	**A/B**	**Depth**	**As**	**Pb**	**Zn**	**Cu**	**Terrain/Deposition**	**Location and Observations**
SECTION: SOUTH/SOUTHEAST OF SMELTER								
217	A	Top	<11	38	98	73	Active Channel	Active Channel sediments off Agua Fria Road south of smelter – drainage.
217	B	Top	12	31	96	70		
218	-	-	-	-	-	-	*-No Sample -*	
218	-	-	-	-	-	-		
219	A	Top	20	37	124	121	Bluff	Agua Fria Road near but *not* at the bottom of hill, near southwest corner of smelter property, before road splits. There is a steep eroded crescent here, perhaps 15 feet high, on side of road. Deep sample used roadside cut to obtain 16 inch depth. Scooped an inch into side of road cut to get sample. Shallow sample was collected from top of crescent after climbing up the side.
219	B	Top	22	32	114	80		
220	A	Cut 16"	11	23	88	65	Eroded Crescent	
220	B	Cut 16"	<8	21	73	96		
221	A	Top	<10	41	111	80	Hillside steep upslope	After split from Agua Fria Road onto uphill road unnamed that goes along south end of smelter, but at higher elevation. Deeper sample was collected from side of cut for road. Reddish horizon visible in lower soils in cut.
221	B	Top	11	35	108	92		
222	A	Cut 1 ft	15	22	90	86	Road cut	
222	B	Cut 1 ft	<8	24	99	77		
223	A	Top	51	107	289	468	Gentle Slope	At the top of the rise of the north road extending off of Agua Fria Road. Just before the descent on east side of hill. More directly south of the smelter property with the Chaparral Gulch in-between. This location is much higher elevation than the smelter property.
223	B	Top	65	125	334	500		
224	A	1 ft	33	52	175	215	Gentle Slope	
224	B	1 ft	35	38	143	153		
225	A	Top	100	158	396	704	Slope	North road off of Agua Fria Road, on downslope to bottom a little ways from end of road. About 1 foot down in road cut there was firm clay. Sample was taken in clay.
225	B	Top	111	179	451	752		
226	A	Cut 1 ft	<8	19	78	94	Slope	
226	B	Cut 1 ft	<8	13	63	92		
227	A	Top	72	180	482	745	Slope	North road off Agua Fria Road, same road near the bottom near end of road. Hard clay at 1 ft – sample taken from there. Possible change of geology.
227	B	Top	68	179	457	702		
228	A	Cut 1 ft	100	10	52	81	Slope	
228	B	Cut 1 ft	107	16	61	74		
229	A	Top	88	211	273	355	Bluff	Sample taken from loop at bottom of the road. This location sits perhaps 30 feet off the floor of Chaparral Gulch as it empties into the Agua Fria. Tailings are visible far below in Gulch. Cobbly/rocky soil and possible bedrock with refusal at 6 inches. *It is questionable whether this is truly a "deep sample" - it was fairly shallow and underlain by rock.
229	B	Top	97	180	263	342		
230*	A	6 inches	187	361	329	616	Bluff	
230*	B	6 inches	210	341	406	654		
231	A	Top	30	20	85	59	Bluff	Location is collected on bluff off dirt road leading out of the loop to the SOUTH and eventually into private property. Sits above Agua Fria Canyon, around corner from Smelter. Possible geology change. Soil is very loose, fine, and deep. Few cobbles compared to last samples. White, shiny quartz chunks and outcrops observed near road.
231	B	Top	47	21	101	59		
232	A	15 inches	16	19	64	42	Bluff	
232	B	15 inches	20	17	61	42		

Iron King Humboldt Smelter Site: 2nd Phase X-Ray Fluorescence Sampling, April 16 – 19, 2012 *Jeff Dhont Field Recording*

Sample	A/B	Depth	As	Pb	Zn	Cu	Terrain/Deposition	Location and Observations
SECTION: 201-212: SOUTH / SOUTHWEST OF IK MAIN TAILINGS PILE; SECTION: 213+ SOUTH/SOUTHWEST OF SMELTER								

Iron King Humboldt Smelter Site: 2nd Phase X-Ray Fluorescence Sampling, April 16 – 19, 2012 *Jeff Dhont Field Recording*

Sample	A/B	Depth	As	Pb	Zn	Cu	Terrain/Deposition	Location and Observations
SECTION: EAST of SMELTER – EAST OF AGUA FRIA								
233	**A**	**Top**	**35**	**64**	**206**	**216**	**Gentle Slope**	Agua Fria Ranch Road, heading south. Deeper sample taken from side of road cut. Cutting into the cut, hit caliche almost immediately, so cut sample is outermost soils from 1 ft down from top of cut.
233	**B**	**Top**	**45**	**60**	**255**	**196**		
234	**A**	**Cut 1 ft**	**<9**	**21**	**105**	**175**	**Gentle Slope**	
234	**B**	**Cut 1 ft**	**<8**	**21**	**97**	**77**		
235	**A**	**Top**	**119**	**77**	**217**	**257**	**Steep slope**	At the hairpin turn, well south on Agua Fria Ranch Road, headed toward Agua Fria Ranch Estates. Took from top of hill flat above the road.
235	**B**	**Top**	**112**	**83**	**208**	**306**		
236	**-**	**-**	**-**	**-**	**-**	**-**	**Sample not Possible**	
236	**-**	**-**	**-**	**-**	**-**	**-**		
237	**A**	**Top**	**19**	**28**	**125**	**130**	**Flat**	Back at "Y" where Agua Fria Ranch Road splits from Road that goes Taken north of the "Y" in flat cattle field. (outside fence) 50 feet north of roadway. Deeper sample is dark brown and loamy. This is near the southeast corner of the smelter property, but across the Chaparral Gulch and at somewhat higher elevation.
237	**A**	**Top**	**16**	**35**	**142**	**115**		
238	**B**	**15 inches**	**9**	**19**	**79**	**81**	**Flat**	
238	**B**	**15 inches**	**<7**	**20**	**77**	**80**		
239	**A**	**Top**	**44**	**19**	**88**	**52**	**Flat**	Start of Day 2 – Mingus Road south of Lazy River Drive
239	**B**	**Top**	**46**	**11**	**75**	**61**		
240	**A**	**1 ft**	**42**	**14**	**74**	**58**	**Flat**	
240	**B**	**1 ft**	**46**	**10**	**91**	**57**		
241	**A**	**Top**	**53**	**20**	**109**	**99**	**Slope**	Mingus Road farther south, just past visible driveway, on upslope as move south toward Agua Fria Lane.
241	**B**	**Top**	**48**	**34**	**99**	**91**		
242	**A**	**10 inches**	**52**	**13**	**88**	**90**	**Slope**	
242	**B**	**10 inches**	**54**	**18**	**86**	**68**		
243	**A**	**Top**	**73**	**9**	**110**	**69**	**Active Channel**	Just around 145 degree turn in Rattlesnake Trail, which comes off Rancho Road. Down slope in active channel. Drainage comes down from higher elevations. Culvert under road.
243	**B**	**Top**	**51**	**13**	**83**	**80**		
244	**A**	**1 ft**	**44**	**16**	**80**	**68**	**Active Channel**	
244	**B**	**1 ft**	**58**	**12**	**83**	**61**		
245	**A**	**Top**	**25**	**15**	**105**	**173**	**Gentle slope into channel**	Rattlesnake trail, to side of small drainage channel coming down from hills behind toward Agua Fria. Deep sample refusal – cobbles and rock at 8 inches.
245	**B**	**Top**	**21**	**<8**	**107**	**158**		
246	**A**	**8 inches**	**18**	**9**	**69**	**152**		
246	**B**	**8 inches**	**27**	**<7**	**69**	**158**		

Iron King Humboldt Smelter Site: 2nd Phase X-Ray Fluorescence Sampling, April 16 – 19, 2012 *Jeff Dhont Field Recording*								
Sample	**A/B**	**Depth**	**As**	**Pb**	**Zn**	**Cu**	**Terrain/Deposition**	**Location and Observations**
SECTION: 201-212: SOUTH / SOUTHWEST OF IK MAIN TAILINGS PILE; SECTION: 213+ SOUTH/SOUTHWEST OF SMELTER								
247	**A**	**Top**	**54**	**<8**	**110**	**71**	**Active Channel**	Ending hairpin, to south, on Rattlesnake Trail, in active channel from high above.
247	**B**	**Top**	**49**	**12**	**105**	**107**		
248	**A**	**1 ft**	**44**	**<8**	**97**	**122**	**Active Channel**	
248	**B**	**1 ft**	**37**	**10**	**98**	**63**		
Iron King Humboldt Smelter Site: 2nd Phase X-Ray Fluorescence Sampling, April 16 – 19, 2012 *Jeff Dhont Field Recording*								
Sample	**A/B**	**Depth**	**As**	**Pb**	**Zn**	**Cu**	**Terrain/Deposition**	**Location and Observations**
Section: East of Smelter / East of Agua Fria, continued								
249	**A**	**Top**	**29**	**14**	**53**	**63**	**Flat and Open**	On Agua Fria Lane east of Sleepy Acre
249	**B**	**Top**	**40**	**<8**	**72**	**61**		
250	**A**	**6 inches**	**38**	**15**	**83**	**79**	**Flat and Open**	
250	**B**	**6 inches**	**38**	**14**	**83**	**83**		
251	**A**	**Top**	**55**	**18**	**76**	**80**	**Slight slope**	Between Agua Fria Lane and Lazy River Drive on Sleepy Acre. There is a clear westward view of the smelter stack from this location.
251	**B**	**Top**	**45**	**14**	**72**	**57**		
252	**A**	**1 ft**	**74**	**11**	**84**	**56**	**Slight slope**	Deeper sample has *higher* levels As – may indicate a background location here.
252	**B**	**1 ft**	**85**	**14**	**83**	**61**		
253	**A**	**Top**	**73**	**30**	**114**	**134**	**Slight slope**	Green Valley Road south of Lazy River Drive, ½ of the way to where Agua Fria Lane would be if extended. Side of road samples. Native material. Deep sample was moist
253	**B**	**Top**	**53**	**29**	**112**	**117**		
254	**A**	**1 ft**	**44**	**10**	**74**	**80**	**Slight slope**	
254	**B**	**1 ft**	**59**	**<7**	**87**	**64**		
255	**A**	**Top**	**46**	**68**	**142**	**168**	**Flat**	Open field near corner of Agua Fria Lane and Holiday Drive – across river from smelter.
255	**B**	**Top**	**37**	**56**	**140**	**170**		
256	**A**	**10 inches**	**32**	**31**	**99**	**99**	**Flat**	
256	**B**	**10 inches**	**25**	**18**	**83**	**96**		
257	**A**	**Top**	**83**	**36**	**134**	**99**	**Gentle Slope**	Green Valley Road, south of where Beverly Hills Drive splits off to the east. Taken on top of flat by side of the road.
257	**B**	**Top**	**65**	**36**	**135**	**104**		
258	**A**	**1 ft**	**63**	**26**	**111**	**98**	**Gentle Slope**	
258	**B**	**1 ft**	**60**	**24**	**109**	**71**		
259	**A**	**Top**	**44**	**52**	**115**	**97**	**Active Channel Bottom**	Very active channel bottom sediment; Green Valley Road south of previous location.
259	**B**	**Top**	**75**	**35**	**127**	**87**		
260	**-**	**-**	**-**	**-**	**-**	**-**	**No Sample**	

Iron King Humboldt Smelter Site: 2nd Phase X-Ray Fluorescence Sampling, April 16 – 19, 2012 *Jeff Dhont Field Recording*								
Sample	**A/B**	**Depth**	**As**	**Pb**	**Zn**	**Cu**	**Terrain/Deposition**	**Location and Observations**
SECTION: 201-212: SOUTH / SOUTHWEST OF IK MAIN TAILINGS PILE; SECTION: 213+ SOUTH/SOUTHWEST OF SMELTER								
260	-	-	-	-	-	-		
261	A	Top	85	64	203	137	Slope	Green Valley Road farther south, at last point before road turns private.
261	B	Top	67	46	180	141		
262	A	10 inches	58	18	133	140	Slope	
262	B	10 inches	66	15	133	140		

Iron King Humboldt Smelter Site: 2nd Phase X-Ray Fluorescence Sampling, April 16 – 19, 2012 *Jeff Dhont Field Recording*								
Sample	**A/B**	**Depth**	**As**	**Pb**	**Zn**	**Cu**	**Terrain/Deposition**	**Location and Observations**
Section: Humboldt Smelter Property								
263	A	Top	54	187	764	1153	Flat	On smelter near brick building just off entrance road from Main Street, about 100 yards from the stack.
263	B	Top	98	260	911	1259		
264	A	8 inches	72	294	651	848	Flat	
264	B	8 inches	59	210	701	959		
265	A	Top	25	280	5550	10200	ASH SAMPLE	**ASH Sample –** near stack, and about due west of it. Quite low in arsenic.
265	B	Top	33	344	6332	9957		
266	-	-	-	-	-	-	No Deep Sample	
266	-	-	-	-	-	-		
267	A	Top	69	425	4545	4185		Soil sample taken just adjacent to smelter and stack. Could not dig to depth – rock.
267	B	Top	107	487	4451	4734		
268	-	-	-	-	-	-	No Deep Sample	
268	-	-	-	-	-	-		
269	A	Top	54	480	3950	5290	Flat – Soil near ash	West side of smelter stack, 50 years from Agua Fria and slag at edge of canyon.
269	B	Top	36	377	3286	4276		
270	A	8 inches	18	20	169	239	Flat – Soil near ash	
270	B	8 inches	9	23	167	221		
271	A	Top	<19	302	2518	6314	Ash Sample	Ash pile east of smelter. Pure ash. Surprisingly low in arsenic.
271	B	Top	<19	307	2797	6483		

Iron King Humboldt Smelter Site: 2nd Phase X-Ray Fluorescence Sampling, April 16 – 19, 2012 *Jeff Dhont Field Recording*								
Sample	**A/B**	**Depth**	**As**	**Pb**	**Zn**	**Cu**	**Terrain/Deposition**	**Location and Observations**
SECTION: 201-212: SOUTH / SOUTHWEST OF IK MAIN TAILINGS PILE; SECTION: 213+ SOUTH/SOUTHWEST OF SMELTER								
272	-	-	-	-	-	-	No Deep Sample	
272	-	-	-	-	-	-		
273	A	Top	139	109	288	416	Soil -Flat	Southern portion of property. Thick, deep and loose soils. Darker than near smelter stack. Soft loam, deeper sample is damp and has some clay. Possible that deeper sample has been affected by historical activity, even though this is not evident. 100 years of history at this location. Piles of debris sporadically around.
273	B	Top	156	139	428	443		
274	A	1 ft	51	75	213	282	Soil-Flat	
274	B	1 ft	66	67	225	276		
275	A	Top	127	56	196	313	Soil – Flat	Same note.
275	B	Top	128	66	215	306		
276	A	1 ft	70	32	124	131	Soil – Flat	
276	B	1 ft	90	39	138	143		
277	A	Top	109	212	558	930	Soil – Flat	Same note.
277	B	Top	123	192	629	923		
278	A	1 ft	90	82	177	254	Soil – Flat	
278	B	1 ft	68	57	189	275		

Iron King Humboldt Smelter Site: 2nd Phase X-Ray Fluorescence Sampling, April 16 – 19, 2012 *Jeff Dhont Field Recording*								
Sample	**A/B**	**Depth**	**As**	**Pb**	**Zn**	**Cu**	**Terrain/Deposition**	Location and Observations
Section: Humboldt Smelter Property, continued								
279	A	Top	215	1251	995	2093	Flat	Smelter property, near south end, but still on the flat, south of a tiny tailings or ash pile but far from it. No apparent reason for the high readings, particularly of lead. Loose, loamy soil with little resistance.
279	B	Top	228	1118	912	1821		
280	A	1 ft	35	65	252	234	Flat	
280	B	1 ft	30	70	168	223		
281	A	Top	121	340	207	1355	Sloped	South end of smelter, over the edge of the plateau and on the slope leading into the Chaparral Gulch. **Refusal at 6 inches – more cobbles and rocks**. Different entirely than deep, loose soils up on the plateau in southern edge of property. *Deep sample is quite shallow – may not be representative of old soil; cross-contamination from surface is likely, also.
281	B	Top	102	235	542	1085		
282*	A	6 inches	123	370	749	1914	Sloped	
282*	B	6 inches	131	305	649	1629		
283	A	Top	79	206	365	763	Flat	On flat open area, loamy, loose and dark like previous samples before last sample; south end of property, SW side, North of Chaparral Gulch, east of Smelter Tailings.
283	B	Top	70	232	446	883		
284	A	1 ft	57	146	254	403	Flat	
284	B	1 ft	53	204	251	438		
285	A	Top	64	105	312	592	Flat	SW side of property, western edge of higher plateau. Farther from tailings and ash

Iron King Humboldt Smelter Site: 2nd Phase X-Ray Fluorescence Sampling, April 16 – 19, 2012 *Jeff Dhont Field Recording*								
Sample	**A/B**	**Depth**	**As**	**Pb**	**Zn**	**Cu**	**Terrain/Deposition**	**Location and Observations**
SECTION: 201-212: SOUTH / SOUTHWEST OF IK MAIN TAILINGS PILE; SECTION: 213+ SOUTH/SOUTHWEST OF SMELTER								
285	**B**	**Top**	**54**	**99**	**307**	**582**		piles.
286	**A**	**1 ft**	**47**	**102**	**276**	**582**	**Flat**	
286	**B**	**1 ft**	**45**	**74**	**240**	**415**		
287	**A**	**Top**	**93**	**221**	**913**	**1660**	**Gentle Slope**	On lower elevation, very close to but not in tailings that are at the smelter – on the western edge of the property in tailings area.
287	**B**	**Top**	**96**	**212**	**867**	**1530**		
288	**A**	**1 ft**	**24**	**40**	**175**	**191**	**Gentle Slope**	
288	**B**	**1 ft**	**22**	**36**	**159**	**241**		
289	**A**	**Top**	**100**	**182**	**1042**	**1045**	**Pure Deep Tailings**	Tailings- dark orange with crust (cut through to get sample).
289	**B**	**Top**	**103**	**200**	**1046**	**1021**		
290	**-**	**-**	**-**	**-**	**-**	**-**	**– No Deep Sample-**	
290	**-**	**-**	**-**	**-**	**-**	**-**		
291	**A**	**Top**	**153**	**216**	**506**	**901**	**Pure Deep Tailings**	Tailings – lighter yellow, finer, and no crust
291	**B**	**Top**	**173**	**215**	**641**	**1005**		
292	**-**	**-**	**-**	**-**	**-**	**-**	**– No Deep Sample-**	
292	**-**	**-**	**-**	**-**	**-**	**-**		
293	**A**	**Top**	**190**	**200**	**417**	**820**	**Pure Deep Tailings**	Tailings – lighter yellow, finer, and no crust
293	**B**	**Top**	**167**	**210**	**577**	**706**		
294	**-**	**-**	**-**	**-**	**-**	**-**	**– No Deep Sample-**	
294	**-**	**-**	**-**	**--**	**-**	**-**		

Iron King Humboldt Smelter Site: 2nd Phase X-Ray Fluorescence Sampling, April 16 – 19, 2012 *Jeff Dhont Field Recording*								
Sample	**A/B**	**Depth**	**As**	**Pb**	**Zn**	**Cu**	**Terrain/Deposition**	**Location and Observations**
Section: North Central								
295	**A**	**Top**	**24**	**38**	**140**	**117**	**Flat**	**Start of Day 3**: North side of Green Gulch Road, farmland, not in crop zone but out of roadway base.
295	**B**	**Top**	**20**	**43**	**143**	**144**		
296	**A**	**8 inches**	**19**	**38**	**124**	**102**	**Flat**	
296	**B**	**8 inches**	**23**	**30**	**134**	**92**		
297	**A**	**Top**	**29**	**46**	**135**	**79**		Pale Moon Drive, north side of the gulch, open spot on south side of street, not far in (west) from the Old Black Canyon Hwy.
297	**B**	**Top**	**20**	**38**	**119**	**66**		
298	**-**	**-**	**-**	**-**	**-**	**-**	**No Sample**	Refusal encountered due to cobbles at 3 inches.
298	**-**	**-**	**-**	**-**	**-**	**-**		

Iron King Humboldt Smelter Site: 2nd Phase X-Ray Fluorescence Sampling, April 16 – 19, 2012 *Jeff Dhont Field Recording*								
Sample	**A/B**	**Depth**	**As**	**Pb**	**Zn**	**Cu**	**Terrain/Deposition**	**Location and Observations**
SECTION: 201-212: SOUTH / SOUTHWEST OF IK MAIN TAILINGS PILE; SECTION: 213+ SOUTH/SOUTHWEST OF SMELTER								
299	**A**	**Top**	**11**	**12**	**58**	**35**	**Flat**	At the side of a slope off Old Black Canyon Highway, leading into irrigation ditch – but not in the ditch bottom. Not on crop land.
299	**B**	**Top**	**14**	**13**	**62**	**35**		
300	**A**	**10 inches**	**13**	**16**	**74**	**38**	**Flat**	
300	**B**	**10 inches**	**19**	**14**	**72**	**49**		
301	**A**	**Top**	**15**	**30**	**87**	**60**	**Flat**	From the north side of Highway 169, about 1 ½ blocks east of Hwy 69 intersection. Open field edge. Vegetation. Soft soil – good dig to 1 ft.
301	**B**	**Top**	**17**	**26**	**94**	**66**		
302	**A**	**1 ft**	**17**	**30**	**84**	**41**	**Flat**	
302	**B**	**1 ft**	**17**	**39**	**77**	**40**		
303	**A**	**Top**	**20**	**46**	**135**	**67**	**Flat**	Latilla Lane, off end of Coldwater drive. Light industry in area. Lot appears to have trash on it, but not be disturbed. Light vegetation.
303	**B**	**Top**	**26**	**38**	**142**	**71**		
304	**A**	**1 ft**	**16**	**37**	**91**	**55**	**Flat**	
304	**B**	**1 ft**	**12**	**45**	**107**	**45**		
305	**A**	**Top**	**38**	**19**	**82**	**67**	**Flat**	Far out on Outback Road, as far as the small housing block. Open field, east side of road. Cow manure observed.
305	**B**	**Top**	**39**	**23**	**69**	**53**		
306	**A**	**1 ft**	**34**	**17**	**68**	**40**	**Flat**	
306	**B**	**1 ft**	**35**	**15**	**69**	**51**		

Iron King Humboldt Smelter Site: 2nd Phase X-Ray Fluorescence Sampling, April 16 – 19, 2012 *Jeff Dhont Field Recording*								
Sample	**A/B**	**Depth**	**As**	**Pb**	**Zn**	**Cu**	**Terrain/Deposition**	**Location and Observations**
Section: Northwest of Iron King Mine Main Tailings Pile								
307	**A**	**Top**	**21**	**18**	**86**	**42**	**Flat**	Prescott Dells Ranch Road, just south of the end of Misty Dells Road which meets Prescott Dells about 3 blocks east of Hwy 69. Very, very hard to dig. Cobbles and rock.
307	**B**	**Top**	**19**	**20**	**86**	**43**		
308	**A**	**10 inches**	**11**	**8**	**57**	**29**	**Flat**	

Sample	A/B	Depth	As	Pb	Zn	Cu	Terrain/Deposition	Location and Observations
SECTION: 201-212: SOUTH / SOUTHWEST OF IK MAIN TAILINGS PILE; SECTION: 213+ SOUTH/SOUTHWEST OF SMELTER								
308	B	10 inches	15	12	76	42		
309	A	Top	47	40	151	54	Gentle slope	Cody Ridge Road
309	B	Top	46	40	140	45		Caliche interfered with deep sample going deeper.
310	A	8 inches	25	16	82	45	Gentle Slope	
310	B	8 inches	19	20	91	50		
311	A	Top	85	60	252	89	Steep slope	Cody Ridge Road, near end on south
311	B	Top	96	69	247	60		Hard clay prevented deeper sample.
312	A	8 inches	22	14	68	43	Steep Slope	
312	B	8 inches	21	12	93	60		
313	A	Top	69	49	200	56	Steep Slope	Cody Ridge Road
313	B	Top	67	74	265	85		Caliche and hard clay right there on deep sample
314	A	Cut 1 ft	17	14	86	56	Steep Slope	
314	B	Cut 1 ft	18	<7	63	40		
315	A	Top	20	19	88	30	Flat	Cody Ridge Road. Top flat over cut to side of roadway.
315	B	Top	29	29	87	45		Clay prevented deeper sample.
316	A	10 inches	14	14	60	44	Flat	
316	B	10 inches	15	15	73	54		
317	A	Top	32	38	135	34	Flat	Cody Ridge Road near intersection with Prescott Dells Ranch Road.
317	B	Top	47	35	165	51		Caliche in deep sample at 10 inches.
318	A	10 inches	24	16	72	40	Flat	
318	B	10 inches	13	12	60	34		
319	A	Top	13	9	56	12	Gentle Slope	Prescott Dells Ranch Road where it makes a "leg" to the right and then back left again toward west if heading outward. Right side of road in native soils.
319	B	Top	17	13	66	68		
320	A	1 ft	17	14	52	41	Gentle Slope	
320	B	1 ft	14	15	80	36		
321	A	Top	7	<7	80	<21	Active Channel	Natural gas right of way, just south of intersection with Prescott Dells Ranch Road, below culvert with well cut-out banks to sides. Active Channel here. 1 foot sample also collected in this case.
321	B	Top	28	9	52	<21		
322	A	1 ft	9	14	47	24	Active Channel	
322	B	1 ft	12	13	61	41		

Sample	A/B	Depth	As	Pb	Zn	Cu	Terrain/Deposition	Location and Observations
Section: Northwest of Iron King Mine Main Tailings Pile, continued								
323	A	Top	51	10	91	45	Hilltop	Natural gas right of way farther south. High terrain north of the gulch pass.
323	B	Top	71	13	94	31		
324	A	1 ft	107	<7	82	<21	Hilltop	The arsenic at this location appears isolated and at depth primarily, and given this location, natural.
324	B	1 ft	121	<8	85	<22		
325	A	Top	25	15	91	36	Ridge Top	High above Chaparral Gulch at the mountain pass where water can drain in from the back (west) watershed toward the mine.
325	B	Top	30	27	102	57		
326	A	1 ft	22	10	58	32	Ridge Top	
326	B	1 ft	22	13	73	51		
327	A	Top	73	14	79	26	Active Channel	BOTTOM OF CHAPARRAL GULCH BELOW MOUNTAIN PASS Active channel sediments, draining from back side of mountain as well as multiple gullies on mountainside to this location. High erosion/water velocities/scour. Dry at time of sample.
327	B	Top	83	21	88	47		
328	-	-	-	-	-	-	No deep sample	
328	-	-	-	-	-	-		
329	A	Top	70	20	100	41	Active Channel	BOTTOM OF CHAPARRAL GULCH BELOW MOUNTAIN PASS Active channel sediments, draining from back side of mountain as well as multiple gullies on mountainside to this location. High erosion/water velocities/scour. Dry at time of sample.
329	B	Top	110	24	118	53		
330	-	-	-	-	-	-	No deep sample	
330	-	-	-	-	-	-		
331	A	Top	52	32	152	45	Soil Bar Raised in Active Channel	BOTTOM OF CHAPARRAL GULCH BELOW MOUNTAIN PASS Active channel sediments, draining from back side of mountain as well as multiple gullies on mountainside to this location. Some trees growing here, indicating lower water velocities. Dry at time of sample.
331	B	Top	65	34	158	41		
332	-	-	-	-	-	-	No deep sample	
332	-	-	-	-	-	-		
333	A	Top	196	12	117	122	Steep Slope	BOTTOM OF CHAPARRAL GULCH BELOW MOUNTAIN PASS From side of hill above the Gulch and banks of Gulch.
333	B	Top	165	11	94	111		
334	-	-	-	-	-	-	No deep sample	
334	-	-	-	-	-	-		
335	A	Top	63	22	110	68	Steep Slope	BOTTOM OF CHAPARRAL GULCH BELOW MOUNTAIN PASS From side of hill above the Gulch and banks of Gulch.
335	B	Top	63	31	101	81		
336	-	-	-	-	-	-	No deep sample	
336	-	-	-	-	-	-		

Iron King Humboldt Smelter Site: 2nd Phase X-Ray Fluorescence Sampling, April 16 – 19, 2012 *Jeff Dhont Field Recording*								
Sample	**A/B**	**Depth**	**As**	**Pb**	**Zn**	**Cu**	**Terrain/Deposition**	**Location and Observations**
Section: Northwest of Iron King Mine Main Tailings Pile, continued								
337	**A**	**Top**	**16**	**12**	**86**	**61**	**High and gentle slope**	On unnamed road extending north off of Prescott Dells Ranch Road, just after the natural gas r.o.w. Sample was taken from the point at the end before the road becomes impassable and a fence blocks off private property. Caliche and/or cobbles were encountered in the deep sample. The elevation of this point is relatively high.
337	**B**	**Top**	**14**	**15**	**69**	**50**		
338	**A**	**1 ft**	**12**	**<7**	**65**	**52**	**High and gentle slope**	
338	**B**	**1 ft**	**9**	**<7**	**43**	**53**		
339	**A**	**Top**	**9**	**9**	**39**	**<18**	**Active Channel**	Far out on Prescott Dells Ranch Road, behind the mountain. This sample was taken in an active channel draining out of the mountains the next ridge back.
339	**B**	**Top**	**10**	**14**	**35**	**<16**		
340	**-**	**-**	**-**	**-**	**-**	**-**	**No Sample**	
340	**-**	**-**	**-**	**-**	**-**	**-**		
341	**A**	**Top**	**19**	**65**	**72**	**29**	**Active Channel**	Far out on Prescott Dells Ranch Road, behind the mountain. This sample was taken in an active channel draining out of the mountains the next ridge back.
341	**B**	**Top**	**19**	**45**	**78**	**36**		
342	**-**	**-**	**-**	**-**	**-**	**-**	**No Sample**	
342	**-**	**-**	**-**	**-**	**-**	**-**		