

Citizens for a Clean Columbia

Our mission: to advocate for a clean Columbia River ecosystem
NEWSLETTER JANUARY 2020

Who are we?

Citizens for a Clean Columbia (CCC) is a volunteer organization focused on advocating for the health of the Upper Columbia River (UCR) and Lake Roosevelt. Visit us on our website <https://citizensforacleancolumbia.org> or on Facebook <https://www.facebook.com/groups/315230442457913/>.

News in Brief

Baseline Ecological Risk Assessment Update

- A brief summary of recent Phase 3 activities is provided. For a complete summary of BERA activities, see our January 2019 newsletter.

Tribal Consumption and Resource Use Survey

- As part of the Human Health Risk Assessment, a survey was conducted of recreational and traditional tribal activities of members of the Confederated Tribes of the Colville Reservation [CCT] living in the UCR area to assess exposures.
- 1583 people completed at least one dietary recall and 1174 completed the food questionnaire.
- The daily frequency of finfish consumption was approximately 8%; 69% of finfish consumed was local sourced, at a mean of 8.3 g/day (all ages).

CCT Wins Lawsuit

- In June 2019, the US Supreme Court denied an appeal that leaves the Ninth Circuit ruling in place, awarding more than \$8 million in costs to the CCT and holding Teck responsible for cleaning up the smelter contamination.

Human Health Risk Assessment (HHRA)

- The draft document of the HHRA is now under review. Preliminary findings include lead and non-lead risks for resident, worker, recreational visitor, and tribal populations.

Soil Amendment Technology Evaluation Study (SATES): Phase II Testing Underway

- In this portion of the SATES, 5 soil amendments and 7 amendment combinations are being tested

for their ability to reduce lead bioavailability and improve soil quality.

- This portion should be completed by August 2020.

Cleaning up Northport's Waterfront

- The Washington State Department of Ecology (DOE) completed a remedial investigation of the Northport waterfront area.
- Copper, lead and zinc are the most widespread detected metals at the site and will be the focus of a feasibility study to determine a remedy.

Removal Assessment: Northport Revisited

- Because of a change in the removal action level for lead in soil from 1000 mg/kg to 700 mg/kg, the Region 10 Removal Program conducted a removal site evaluation of properties within Northport city limits that were sampled in 2003/2004 and contained lead in soil at concentrations near or above the action level of 700 mg/kg, but at which no soil removal action was taken.
- Some properties were resampled, and EPA is evaluating the information and considering next steps.

Technical Advisor Update

- Joe focused on the toxicity identification evaluation (TIE) pilot memorandum, the background soil memorandum, the phase 3 sediment toxicity study, and the draft site-wide human health risk assessment (HHRA).

Baseline Ecological Risk Assessment

For the U.S. Environmental Protection Agency (EPA) Remedial Investigation and Feasibility Study, both a Baseline Ecological Risk Assessment (BERA) and Human Health Risk Assessment (HHRA) are conducted. The BERA is an appraisal of the actual or potential effects of a hazardous waste site on plants and animals other than people or domesticated species. For general information see EPA website: <https://www.epa.gov/sites/production/files/2015->

09/documents/v1no2.pdf. A review of the BERA Phase III activities can be found in our January 2019 newsletter located on the CCC website.

Phase III activities began in Spring 2019 to further evaluate UCR sediment and porewater to look primarily at metals concentrations and toxicity to benthic organisms. In addition, progress was made on establishing background information on soil metals levels and soil toxicity reference values to use for baseline comparisons. Information was also gathered on the distribution of rock attributes (facies mapping).

Areas that have been or will be investigated include Deadman's Eddy, China Bend, and Evans. Reference areas (to use for baseline comparison) include Arrow Lake, Birchbank and Genelle.

Mindy Smith, CCC secretary

[Tribal Consumption and Resource Use Survey results](#)

Background: As part of the HHRA, information was needed on possible exposures that could place people living and recreating at the UCR Site at risk from exposure to contaminants at the site. Two local Native American tribes (the Spokane Tribe of Indians [STI] and the Confederated Tribes of the Colville Reservation [CCT]) live in the area and engage in activities (e.g., hunting, fishing, and gathering) and traditional tribal activities (e.g., construction of shelters or other structures or large objects; sweat lodge construction and use; weaving, coloring and dyeing, carving; food preparation and preservation; and medicinal, spiritual, or traditional practices) that could place them at risk. Information had been gathered on potential risk to the area STI population (Harper et al., 2002; U.S. EPA, 2005a). However, available information was not adequate to establish exposure parameter values for the CCT population.

The Tribal Survey was completed and finalized in June, 2012 (<https://www.ucr-rifs.com/assets/Docs/06-29-12Tribal-Survey-FinalMTonel.pdf>) and the draft final data analysis report issued in March 2019. The Tribal Survey data will be used to derive age-specific central tendency exposure (CTE) and reasonable maximum exposure (RME) values for pathways of exposure and location of contact with environmental media. Four survey instruments were used – a household screening survey for demographic information, dietary recall (DR; performed at least twice), food questionnaire (FQ), and resource utilization and practices questionnaire.

Results: Population and response rate: 2645 individuals were selected for participation in the survey which focused on heavy consumers of local foods or those taking part in traditional Native American practices more than 3 times weekly; these individuals comprised 51% of enumerated individuals and 65% of the individuals selected for the survey.

Of 2645 initially recruited for the survey, 1583 completed at least one DR and 1174 completed the FQ. Fifty-one percent were women, 65% (vs. 51% of the total enumerated population) were heavy consumers, 15% were ages 0 to 6 years, and 30% were over age 55 years. Two or more DRs were completed by 1325 respondents.

Some highlights of the report include the following:

- Approximately 80% (906) of the participants who completed the survey reported eating fish on the FQ. The daily frequency of finfish consumption from the Local Area was approximately 8% (i.e., finfish sourced from the Local Area was consumed on average once every 13 days) and approximately 69% of all finfish consumed was sourced from the Local Area; mean 8.3 g/day (all ages)

- Participants who reported venison consumption on the FQ or on one or more AMPM (n = 916); mean 12 g/day
- Approximately 41% of the total fruits and vegetables consumed were sourced from the Local Area. Wild plant consumption was infrequent.
- Time (hours/person/year) spent in UCR water, on water and on land near the river, for all river reaches, was 67, 104, and 156, respectively.
- Of those living in the local area, 123 reported weaving or carving animal materials, 260 reported weaving plant materials, and 495 used sweat lodges. Types of materials and hours of use were recorded.
- About one-third of the 552 responding to this question reported avoiding eating local fish, plants, or other animals; using local resources; or hunting, swimming, fishing, or gathering plants in areas along the UCR or Lake Roosevelt.

Mindy Smith, CCC secretary

CCT Wins Lawsuit

In September 2018, the CCT won their case against Teck Cominco Metals Ltd. in a Ninth Circuit Court of Appeals ruling; the decision can be viewed at: (<http://cdn.ca9.uscourts.gov/datastore/opinions/2018/09/14/16-35742.pdf>). Teck was found to be responsible for release of harmful chemicals from the Trail, Canada lead and zinc smelter that entered the Columbia River in Canada and harmed waters and soils downstream in the tribes' historic territory.

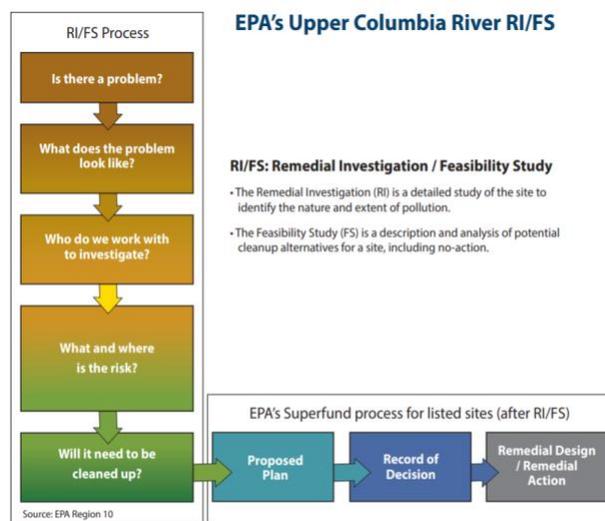
Teck appealed the decision to the US Supreme Court. The court denied the appeal which leaves the Ninth Circuit ruling in place and holds Teck responsible for cleaning up the damage. CCT was awarding over \$8 million in costs to the tribes.

Mindy Smith, CCC Secretary

Human Health Risk Assessment

The purpose of the HHRA is to calculate risk for hypothetical groups including resident, worker, recreational visitor, and tribal populations; evaluate exposure to chemicals from various sources (food; air; touching or accidental ingestion of soil, sediment and river water); estimate risks using measured concentrations of chemicals in soil, public beaches, and the river; and compare estimated risks to benchmarks to see if they are of concern.

Robert Tan from the EPA described the Remedial Investigation/Feasibility Study process at a public meeting in Northport in October 2019 using the following slide:



To understand site-specific exposures, 2 surveys were conducted – the Recreational Consumption and Resource Use Survey (2010-2011; discussed in our July 2019 newsletter) and the Tribal Consumption and Resource Use Survey (2009-2011; discussed above). To understand chemical exposures (metals and others), a number of studies were conducted, beginning in 2005. These were:

- Public beach sediment sampling: 2005, 2009-2011, 2013 (reanalysis), & 2015
- Surface water sampling: 2009-2010

- Upland Soil Sampling: 2014
- Residential Soil and Beach Reconnaissance and Sampling: 2014 & 2016
- Fish, mussels, crayfish, and plants sampling: 2005, 2009, 2016, & 2018

The primary risks appear related to lead and arsenic, although other chemicals may contribute. Lead risk is assessed based on estimates of exposure that result in blood lead concentrations associated with adverse health effects. The lead risk evaluation benchmarks used in the HHRA range from 3 µg/dL to 8 µg/dL; these benchmarks correspond to soil lead concentrations of 50 ppm to 400 ppm. EPA uses computer models to predict children and adult blood lead concentrations from contact with environmental media. Lead is widespread in the environment, so lead risk is based on exposure from all sources.

For chemicals other than lead, risk is assessed based on estimates of exposure concentrations or chemical intakes compared to chemical concentrations that have been found to be associated with cancer or non-cancer effects. Cancer benchmarks are based on an estimated increase in the likelihood of getting cancer of one in a million to one in ten thousand. Non-cancer benchmarks are based on concentrations that may produce adverse health effects. Exposure is summed across pathways, such as a recreational visitor who may be exposed to sediment, surface water, air, and fish added together.

Preliminary residential soil results for lead are summarized in the following Table.

	Number of decision units exceeding each benchmark		
Lead level	>50 ppm	>200 ppm	>400 ppm
Total sampling area	392 of 594 (66%)	88 of 594 (15%)	12 of 594 (2%)

River-associated results for lead showed that exposure of children to surface sediment at some residential beaches and exposure of child recreational visitors to surface sediment at Bossburg Flat beach were above lead-risk benchmarks while exposure of workers to public beach subsurface sediment, exposure of children to surface sediment at public beaches except Bossburg Flat beach, exposure of children to UCR surface water, and consumption of fish from the UCR were below lead-risk benchmarks.

Other findings will be highlighted once the report is finalized. The EPA is now reviewing comments on the HHRA draft provided by the participating parties - Washington Department of Ecology, Department of the Interior, National Park Service, CCT and STI) – and CCC. Next steps will include a public comment period this spring on the HHRA draft document with a final HHRA issued later in 2020.

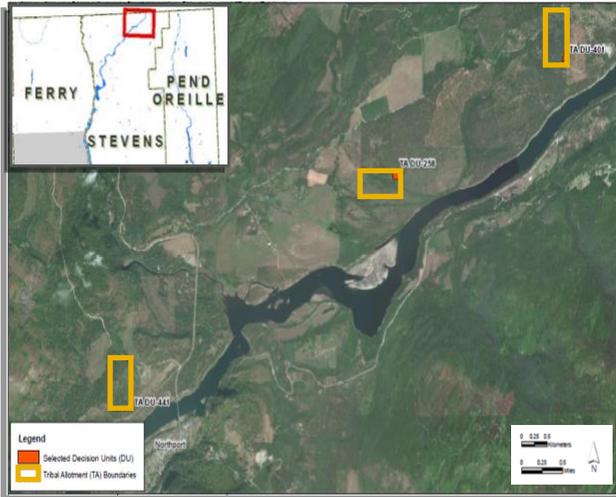
Mindy Smith, CCC secretary

SATES Phase II Testing Underway

The purpose of SATES is to test substances that can be added to soil (called soil amendments) to cause a change in soil chemistry and reduce human exposure to lead. A successful amendment will do one or more of the following: reduce lead bioavailability, increase vegetation, and/or improve soil quality. The study represents a collaboration between U.S. EPA, Teck American Incorporated (providing funds for field and laboratory work), CCT

(providing vegetation monitoring on test plots), University of Washington, Ohio State University, Arcadis, and Ramboll.

Three tribal allotments, shown in yellow below, with soil lead concentrations over action levels, will be used in Phase III for field-scale application.



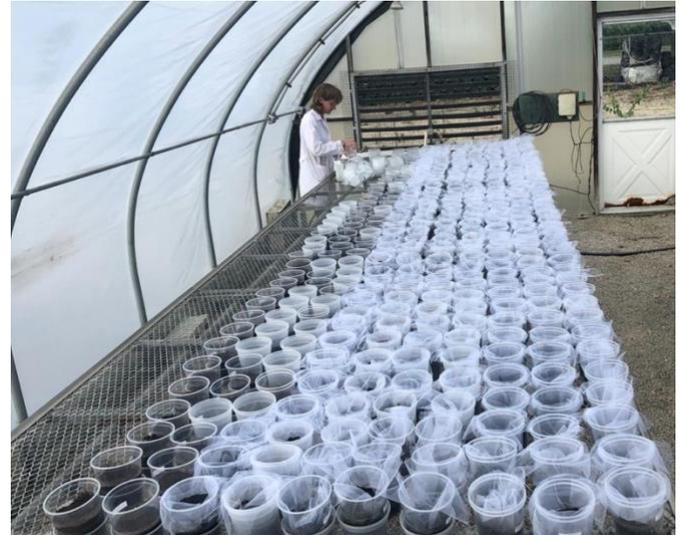
Map showing test plots

In Phase IA, completed in 2018, soil on these test plots were sampled and analyzed to characterize chemical, mineralogical, and physical properties and establish baseline conditions. Lead concentrations on these plots ranged from 419-1587 ppm (screening level is 250 ppm and critical action clean-up levels are 700 ppm and above).

In Phase IB, completed in 2019, initial screening of soil amendment technology options was conducted and amendments were selected for bench-scale testing based on site-specific conditions identified during test plot screening and characterization. These amendments are: soluble phosphate, biosolids, wood ash, biochar, and compost.

In Phase II, these 5 amendments and 7 amendment combinations are undergoing tested by adding them to pots containing samples of soil from the tribal allotments as shown below. The pots will be

incubated for 6 months and tested for bioaccessible lead and soil conditions at four time points (baseline, 1 month, 4 months, and 6 months). This portion of the study should be completed by August 2020.



SATES study lab containers of soil and ammendments

Mindy Smith, CCC secretary, based on the report given by Kira Lynch at the Northport public meeting October 2019

[Cleaning up Northport's Waterfront](#)

The Washington State Department of Ecology's (DOE) Toxics Cleanup Program completed a Remedial Investigation (RI) in October 2019 to define the extent of smelter-derived metals contamination along the Northport waterfront and boat launch area. The site is located within the Northport town limits and the area of investigation is adjacent to the town park and the former Le Roi copper and lead smelter on the south bank and nearshore areas of the river between Smelter Rock and the Highway 25 bridge.



Northport waterfront

During the study, the investigation team observed and documented sample collection from 26 test pits excavated to 4 feet below ground surface, 3 hand sample locations (hand excavated to 2 feet) and 109 surface (0 to 0.5 feet) grab locations. Test pits and shallow excavations were immediately backfilled using excavated materials and compacted the soil to match the surrounding grade. Surface samples were treated as a single interval, homogenized, and portions of each sample were placed into laboratory-prepared sample containers for laboratory analysis.

Another portion of each sample was screened on site for metals content using a hand-held x-ray fluorescence (XRF) instrument. XRF analyzers determine the chemistry of a sample by measuring the fluorescent (or secondary) X-ray emitted from a sample when it is excited by a primary X-ray source. The XRF provided screening results for 16 metals: antimony, arsenic, barium, calcium, chromium, cobalt, copper, iron, lead, manganese, mercury, nickel, potassium, selenium, silver and zinc.



Map showing surface copper concentration

In brief, slag was observed in 101 of the 138 locations sampled along the waterfront. XFR results are shown below. Based on the distribution and magnitude of copper, lead and zinc, the entire site should be evaluated in the feasibility study (FS) for cleanup options.

Metals	Preliminary Cleanup or Screening Level	No of Samples Exceeding Screening Level	Frequency of Exceedance (percent)
Copper	143 ppm	220/329	67
Lead	250 ppm	140/329	42
Zinc	3,200 ppm	109/329	33

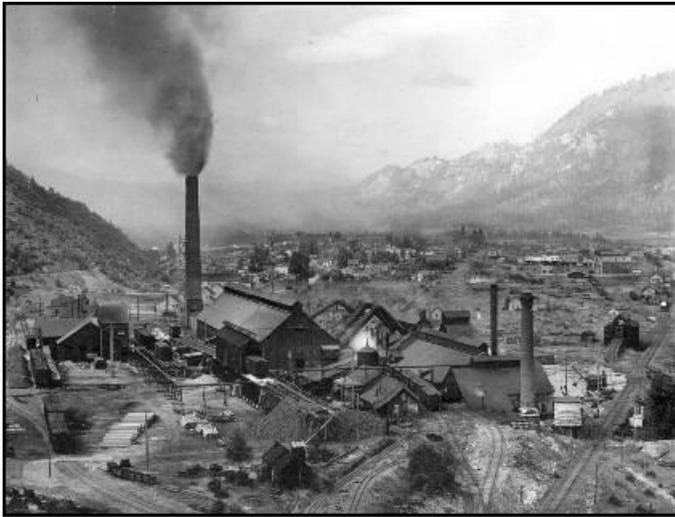
A preliminary report of their findings is available at <https://apps.ecology.wa.gov/gsp/Sitepage.aspx?csid=14874>. DOE will hold a comment period for this report when the draft Feasibility Study Report that lays out cleanup options is also ready (mid-to-late 2020). Beginning this month, DOE has been consulting with professionals at GeoEngineers in support of this effort.

Mindy Smith, CCC secretary

[Removal Assessment: Northport Revisited](#)

Background: The LeRoi/Northport Smelter operated from 1897-1906 and 1916-1921, smelting copper, gold, silver and lead. The site covers approximately

30 acres at the northeast end of Northport, Washington. Detailed information about the smelter and EPA cleanup can be found at: https://apps.ecology.wa.gov/gsp/Sitepage.aspx?c_sid=47 and <https://semspub.epa.gov/work/10/1196118.pdf>.



LeRoi smelter (from https://response.epa.gov/site/site_profile.aspx?site_id=WAD988507323)

In 2004, the U.S. EPA consolidated and recycled all scrap metal, consolidated and capped contaminated soil with a protective barrier, and disposed of hazardous materials off-site. A health assessment was also conducted by the U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry. In addition, the DOH, the Northeast Tri-County Health District, and the Northport Community Health Center collected blood samples from children for an exposure investigation. However, only 14 individuals came for testing; their lead levels were not elevated.

Also, in 2004, EPA collected soil samples from 148 residential and common-use areas in and near Northport. Soil at just over half of the properties contained lead and arsenic concentrations that were higher than the State of Washington Department of Ecology cleanup levels. From July through October 2004, EPA completed time-critical removal actions

at the former Le Roi Smelter property (as noted) and at 29 residential properties located in the town of Northport. In 2004, **the time-critical removal action level for lead in soil was 1,000 mg/kg.**

In 2015, time-critical soil removal actions were conducted by Teck American Incorporated (Teck) with EPA oversight at residential properties and a Tribal allotment located outside Northport city limits. In 2015, **the removal action level for lead in soil was 700 mg/kg.** EPA determined that 700 mg/kg was the action level for UCR time-critical removal above which lead contamination may present an imminent and substantial endangerment to public health or welfare or the environment based on recent and more protective guidance from EPA and Centers for Disease Control. In 2017 and 2018, additional removal actions were conducted by Teck with EPA oversight at residential properties located outside Northport city limits.

In October 2019, the Region 10 Removal Program conducted a removal site evaluation of properties within Northport city limits that were sampled in 2003/2004 which contained lead in soil at concentrations near or above the action level of 700 mg/kg, but at which no soil removal action was taken. During the removal site evaluation, EPA documented the condition and layout of each property designated for potential cleanup and interviewed each of the property owners regarding their use of the property and any changes to the property since the 2003/2004 soil sampling. At some of the properties, EPA either extended the size of some decision units (DUs), or added new DUs, based on additional observations of property use and interviews with the landowners that indicated areas of the property with a high likelihood of exposure to humans from contaminated soil. A DU is an identified area within a property that is

distinguishable from other areas by factors such as location or use; this includes areas within a property with a high likelihood of exposure to humans from contaminated soil. Examples of DUs are play areas, gardens, or lawns. EPA also collected and analyzed soil samples, as determined appropriate by the EPA On-Scene Coordinator to better delineate the horizontal extent of contamination.

EPA is evaluating the information gathered and potential next steps.

Mindy Smith, CCC secretary

Technical Advisor Report

My efforts over the past six months focused on the toxicity identification evaluation (TIE) pilot memorandum, the background soil memorandum, the phase 3 sediment toxicity study, and the draft site-wide human health risk assessment (HHRA).

I reviewed two drafts of the additional TIE pilot study testing memorandum. The major concern with the TIE pilot study was the lack of control organism survival using the ion-exchange resin specified for use by the EPA method document. Some discussion of test results using Amberlite XAD-4 and TP-214 resin was included in the second draft in response to CCC's comments on the first draft. To date, there has been no clarification of CCC's comment asking if any communication between the testing laboratory and authors of the 2007 EPA TIE ion-exchange method has occurred.

I reviewed the draft final background levels of metals in soil document and had no formal comments for CCC. Most of CCC's comments on the previous draft of the document had been incorporated in the final draft.

I observed porewater sampling for the phase 3 sediment toxicity study at Deadman's Eddy on October 9, 2019. In my opinion, the porewater samples collected using the Trident probe for this study are by far the best *in situ* porewater samples collected for the RI/FS. The Trident probe was equipped with lights and cameras to see how the probe contacted the sediment surface. Real-time monitoring of porewater sample temperature and conductivity and overlying water, and intermittent determination of pH, oxidation reduction potential, and total dissolved solids allowed porewater sample quality to be determined in real time. Samples indicating the incursion of overlying water were rejected during the sampling process.

I observed sediment sampling for the phase 3 sediment toxicity study at Deadman's Eddy on October 11, 2019. I observed sampling with the Hamon grab sampler, not the freeze-grab sampler. The sampler was equipped with a camera and lights to allow evaluation of the sampler placement and sediment surface characteristics prior to obtaining the sample and to observe the actual sampling scoop. This allowed a good estimation of sampling depth and eliminated sample attempts where conditions were unfavorable. In my opinion, the Hamon sampler was a significant improvement over the Van Veen sampler used in the 2013 study.

I reviewed the memorandum proposing sediment sample selection for bioassay toxicity testing for the phase 3 sediment study. The proposed samples well represent the range of excess simultaneously-extracted metals, estimated percent slag, mean probable effects quotients, percent total organic carbon and grain sizes at each area of interest. The three proposed batch compositions should allow evaluation of batch to batch assay variability.

I reviewed the draft site-wide HHRA. I had several main concerns with the draft:

- The draft HHRA stated that ground and well water was not being consumed by residents. However, almost everyone living in the site uses ground or well water as their primary water source. Gravity flow water systems were not evaluated in the 2017 memorandum referenced for the evaluation of drinking water sources at the site. Gravity flow water systems were to be evaluated in the HHRA, but were not mentioned in the draft.
- Canadian air quality data were cited to support reduced emissions from the Teck smelter, but the smelter upgrade in the mid-1990s included installation of a 5-micron bag house, making stack emissions at the smelter unlikely to fall out in Canada. The Canadian air quality data probably reflect fugitive dust rather than stack emissions.
- The HHRA used national data on outside exposure rates for residents, not data on people living in areas as rural as the site. This may underestimate outside exposure times for residents.
- The HHRA used beach visit data from the recreational use survey conducted at Lake Roosevelt National Recreation Area. I suggested that residents with beaches on their property and others living near the water may visit beaches more frequently than visitors. I also suggested that EPA may consider developing an approach for presenting an overall exposure risk for presentation at the next public meeting. The HHRA presents an evaluation of three separate risks: lead, non-lead cancer and non-lead non-cancer.

I also attended the November 2019 Lake Roosevelt Forum conference held in Spokane, Washington. Please see Mindy Smith's article on the conference.

Joe Wichmann, PhD; CCC Technical Advisor

Want to be More Involved?

CCC welcomes new members. Our next General Member Meeting will be in the fall. Please join us. We will post updated information on Facebook (<https://www.facebook.com/groups/315230442457913/>).

With questions for the EPA project managers, contact Robert Tan for information on human health studies at Tan.Robert@epa.gov and Kathryn Cerise for information on ecological studies at Cerise.Kathryn@epa.gov. Kira Lynch is responsible for the Soil Amendment Technology Evaluation Study (SATES) and can be reached at Kira.Lynch@epa.gov. Concerns may also be directed to the EPA assistant Region 10 Deputy Regional Administrator Michelle Pirzadeh (Pirzadeh.Michelle@epa.gov).

Mindy Smith, CCC secretary