Comments: Issues/Topics of Concern—Five Year Review

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The focus of this paper is on the Five Year Review as it applies to Butte Priority Soils OU.

Given that the EPA's remedy for Priority Soils calls for a "cleanup" that relies heavily on leaving capped waste-in-place and institutional controls, rather than aggressive treatment and/or removal of wastes, the Five Year Review is particularly important. A poorly functioning or implemented remedy will expose citizens to the very threats from toxics of concern that Superfund was supposed to remediate. The threat remains at Priority Soils, but it is EPA's contention that that threat can be managed so as not to affect human health and the environment. Unless the waste-in-place is "managed" properly, the remedy will not protect human health and the environment.

The protectiveness of the Remedy as currently being implemented also depends on the adequacy of the data upon which the health risk assessments were based and the adequacy of the data upon which the action levels were based. As will be shown, **new studies and new data** since the Record of Decision was released show that the original data used for the health risk assessments and the determination of the action levels was inaccurate, inadequate, incomplete and mischaracterized the health threats and risks at the Priority Soils site. **New studies and new data** call into question the protectiveness of the Remedy currently being implemented at the Priority Soils OU. Assumptions were made without justification. If the data is problematic, all conclusions based on that data are suspect and warrant change and redoing.

Given the high concentration of low-income citizens within the BPSOU, particular attention must also be given to issues related to environmental justice.

The question to be answered by the Five Year Review is: Whether or not the Butte Priority Soils Remedy as currently being implemented is protective of human health and the environment. The question to be answered by this Five Year Review is whether or not environmental justice is being promoted by the implementation of the Priority Soils Record of Decision. **The answer in both cases is a resounding NO!!!!!!!**

As this paper will convincingly demonstrate, the Priority Soils ROD will have be modified in order to successfully address the concerns that I discuss.

Five-Year Reviews—What they are supposed to do.

Despite past EPA practice in Montana, Five-Year Reviews are not supposed to be perfunctory exercises. Let us consider the main guidances found in the EPA's *Comprehensive Five-Year Review Guidance*—EPA 540-R-01-007—OSWER No. 9355.7-03B-P, June 2001. (This is **THE** Guidance document covering Five-Year Reviews. Unless otherwise noted, all page references refer to this document.)

A. Five-Year Reviews need to be conducted when waste is left in place
B. The purpose of a Five-Year Review is: "to evaluate the implementation and performance of a remedy in order to determine if the remedy is or will be protective of human health and the environment. Evaluation of the remedy and the determination of protectiveness should be based on and sufficiently supported by data and observations." (Page1-1) See also: *CERCLA*, Section 121 (c) and 40 *CFR*, Section 300.430(f)(4)(ii).
C. Community Involvement is a significant part of the Five-Year Review process. (See pages 3-2 and 3-3.)
D. The Five Year Review envisions the necessity of supplemental data collection, sampling and evaluation activities. (Page 3-3)
E. Neutral, objective parties "without bias or preconceived views or conclusions about the remedy and the site" should perform the Five-Year Review. (Page 3-5)
F. The Five-Year Review should address certain topics which include:
    a. "Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy still valid?" (Page 3-7)
    b. "Has any other information come to light that could call into question the protectiveness of the remedy?" (Page 3-7)
    c. "A determination of whether (new) issues affect current or future protectiveness." (Page 3-7)
    d. "List of any recommendations, including follow-up actions to ensure protectiveness." (Page 3-7)
G. The Five-Year Review process is supposed to identify whether or not "there are problems with the remedy that could ultimately lead to the remedy not being protective or suggest protectiveness is at risk." (Page 4-1)
H. The Five-Year Review should consider whether "other actions (e.g. removals) are necessary to ensure that there are no exposure pathways that could result in unacceptable risks." (Page 4-1)
I. The Five-Year Review should consider: "whether new human health or ecological exposure pathways or receptors have been identified." (Page 4-2)
J. ***Very importantly***, the Five-Year Review should consider whether "new contaminants or contaminants sources have been identified." (Page 4-2)
K. The implementation status of institutional controls needs to be considered. (Page 4-3) This includes whether or not institutional controls are incomplete, inadequate or unworkable. (Page 4-10)
L. If necessary, new risk assessments should be conducted. "In some cases, it may be necessary to revise or expand the previous risk assessment as part of your five-year review." (Page 4-7)

M. The Priority Soils remedy uses site-specific cleanup levels. "If the remedy is intended to meet site specific. . . cleanup levels, you should check to see whether toxicity or other contaminant characteristics used to determine the original cleanup level have changed. If there have been changes in the understanding or in our knowledge of these physical/chemical characteristics, you may need to recalculate risk. . . ." (Page 4-7) It is clear that cleanup is not a frozen process but changes to meet new conditions. (Page 4-80)
N. RAOs (Remedial Action Objectives) may be modified as a result of the Five-Year Review process. (Page 4-8)
O. RAOs need to be evaluated as to whether or not they are "sufficiently comprehensive to cover new or changed conditions at a site." (Page 4-9)
P. Five-Year Reviews need to consider whether or not risks have been sufficiently addressed at the site. (Page 4-9)
Q. If needed, the agency should be open to conducting "additional studies or investigations" in order to optimize the remedy. (Page 4-12)
R. Remedies need to be modified if they are not protective, based on incomplete or inadequate data and/or unworkable. (Pages 4-13 and 4-14)

Another document of significance is:
EPA, *Five Year Reviews, Frequently Asked Question (FAOs) and Answers*, OSWER 9355.7-21.

In this document we find additional information as to what is involved in a Five-Year Review and that Five-Year Reviews are supposed to be a proactive processes.

1. *Remedy optimization opportunities typically identify modifications to the operating remedy which may improve remedy performance. . . .* (Page 8)
2. *In Question B of the Technical Assessment section of the five-*year *review report, the toxicity data evaluation done in the risk assessment should be reviewed to ensure that any assumptions made at the time of the original risk assessment continue to be protective. In addition to reviewing the toxicity information form the original risk assessment, Regions generally should evaluate new toxicity information for other chemicals identified at the site. New toxicity information my result in the determination that the additional contaminants sources poses a risk to human health or the environment. The review of both the original risk assessment and any new site contaminant information is intended to ensure that the implemented remedy continues to be protective both currently and in the future. (Page 9)*
3. *When conducting the five-year review, it is appropriate to evaluate whether any new information comes to light that could call into question the protectiveness of the remedy. (Page 10)*
4. *The goal of the recommendation, and associated follow-up actions, generally is to ensure both current protectiveness and long-term protectiveness of the implemented remedy. (Page 11)*

The overall question the Five Year Review is supposed to answer is: Does the remedy protect human health and the environment?

If the Montana Office is going to be true to their own agency requirements in conducting a Five-Year Review, it is clear that that review will need to be more than a perfunctory process. If the Remedy for Priority Soils is not meeting the above requirements, if new information has come to light, if the remedy is based on incomplete, inaccurate or inadequate characterization of the toxics of concern, if the remedy is not protective of human health and the environment, it should be modified so as to be fully protective of human health and the environment. Remedy evaluations are supposed to fix Remedy implementation problems that compromise the remedy now and in the future. As I will show, there is strong warrant for significant modifications of the Priority Soils Record of Decision.

Also, by extrapolation, environmental justice issues must permeate the Five-Year Review process given that the Office of Solid Waste and Emergency Response [OSWER] in their *Integration of Environmental Justice into OSWER Policy, Guidance, and Regulatory Development* mandates that "Environmental Justice issues should be considered at all stages of policy guidance and regulation development, beginning with preliminary efforts" and that environmental justice should be integrated into all agency actions. (OSWER Directive 9200.3-18FS, EPA540/F-95/023) EPA Administrators have consistently defined environmental justice as "the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, ***implementation, and enforcement*** of environmental laws, regulations, and policies."

The following are issues/topics of concern regarding the BPSOU Remedy as currently being implemented.

Significant Toxics of Concern, which EPA admits are present at the BPSOU site, have not been adequately characterized or evaluated. Due to this inadequacy, the Remedy as currently being implemented can provide no assurances that the public health or the environment will be protected.

a. Metals/elements of health and environmental risk such as aluminum, cadmium, copper, iron, silver, zinc, boron, lithium, manganese, molybdenum and selenium, while present, according to the EPA, at the BPSOU site, are not considered under the Remedy, nor have these contaminants of concern ever been assessed by EPA as to the threat to human health that they pose. Yet, these metals **do pose**, according to the EPA, a risk to human health and the environment that mandates that they be assessed and remediated. EPA admits there is a threat in place but does not remediate that threat to human health and the environment under the Remedy as currently being implemented. In short the Remedy as currently being implemented is based on an incomplete, inadequate assessment and consideration of all the potential metals/elements/contaminants of health and environmental risk. In terms of the BPSOU, no comprehensive health risk assessments have been

conducted pertaining to the metals/elements of health and environmental risk that are identified in the above part of this section—aluminum, mercury, cadmium, copper, iron, silver, zinc, boron, lithium, manganese, molybdenum and selenium. Exposure data pertaining to the metals/elements of health and environmental risk (aluminum, mercury, cadmium, copper, iron, silver, zinc, boron, lithium, manganese, molybdenum and selenium) is insufficient. Pathways of exposure regarding these above-mentioned metals/elements of health and environmental risk have not been identified. Given that the adequacy of this Remedy as currently being implemented must be judged in terms of whether or not it will help achieve the goals of Superfund, which are to protect human health and the environment, a reasonable person could conclude that that this Remedy as currently being implemented is based on, at best, incomplete/inadequate data and ignores significant areas of threat to human health and the environment. Therefore, this Remedy as currently being implemented is inadequate in protecting human health and the environment from known contaminants of concern.

b. The Remedy as currently being implemented rests on the unproven assumption that if you remediate lead and arsenic you will automatically remediate the above listed contaminant/metals/elements of health and environmental risk. For example, can we assume that if lead levels drop, exposure to other heavy metals will also drop in a similar way? Does remediating mercury assure that cadmium levels will also drop? The EPA provides no information warranting such a conclusion. While the EPA says that its decisions are based in "good science," how good is their science when it is based on missing, incomplete and inadequate data? If the data is faulty, what flows from that data is also faulty. *The relationship between lead and other metals concentrations in outdoor soil is not evaluated in any detail.* (Steve Ackerlund—Draft Memorandum to CTEC Membership, September 15, 2009)
c. The Remedy as currently being implemented fails to consider the <u>synergistic affects</u> of the contaminants/metals/elements of health and environmental risk on human health. It is known that synergistic interaction does occur but this synergistic interaction was never evaluated.
d. The Remedy as currently being implemented fails to deal with <u>bioaccumulation</u> of the metals/elements of risk and toxics of concern.
e. The Remedy as currently being implemented fails to deal with the <u>cumulative effects</u> of exposure to these contaminants/toxics of concern.
f. The Remedy as currently being implemented fails to consider the chronic effects of exposure to arsenic, mercury and all of the other toxics of concern. Consider:
    1. *Blood and urine samples indicate acute arsenic exposure while tests of hair and fingernails indicate chronic arsenic exposure.*
    2. *Epidemiological assessments have identified high cancer prevalence in the Butte area for arsenic related types of cancer, implicating exposure to arsenic and other constituents in mine waste as a cause.*
    3. *Prior bioavailability work, which strongly influenced cleanup levels, failed to consider relative bioavailability for the diverse types of sources such s attic dust, house dust, or sufficient numbers and varieties of soil*

types in the Butte area. Relying upon soil cleanup level for lead and arsenic and lead biomonitoring only will not ensure protection from excessive exposure to arsenic and other metals.

4. *Prior bioavialability work also does not consider the effect of exposure to multiple chemicals, as is the case in Butte.* (Steve Ackerlund, CTEC Position on Butte Area Soils Cleanup Program, Draft, June 25, 2009)

g. The site-specific bioavailability data that the Remedy as currently being implemented was extrapolated from the Anaconda Smelter Superfund site. No justification for doing this has ever been provided. Specific bio-availability of indoor dust and attic dust have never been adequately addressed. (See: Summary of Risk Assessment Reviews—Steve Ackerlund—Draft—June 3, 2009) *In particular, the applicability of these 'site-specific' values to indoor dust and attic dust has not been evaluated.* (Steve Ackerlund—Draft Memorandum to CTEC Membership, September 15, 2009) For example, the characteristics of attic dust may well mean that it is very bioavailable. Yet, the EPA failed to evaluate this. *Regarding bioavailability, the generalized estimates made for the entire BPSOU may not apply to specific locations, and the potential for error is larger when the 'site-specific' bioavailablity factor used is very much to the low end of typically values. In particular, the applicability of these 'site-specific' values to indoor dust and attic dust have not been evaluated.* (Steve Ackerlund—Draft Memorandum to CTEC Membership, September 24, 2009)

h. The EPA provides no justification for assuming that using lead level data can accurately lead to protective arsenic and mercury exposure action levels.

i. There are elevated cancer rates in Butte of the type of cancers related to exposure to mine waste. Such a finding is ignored by the EPA. If the current Remedy was working, these cancers would be decreasing.

j. By only considering only arsenic, lead and cadmium, the Priority Soils remedy as currently being implemented fails to sufficiently protect public health because it neglects other metals/contaminants of concern.

k. The Remedy as currently being implemented fails to consider the fact that children are particularly at risk from all the pollutants found in Butte Priority Soils, not just lead, mercury and arsenic. Action levels that may be protective for adults are not necessarily protective of children. Of course, the EPA has conducted no investigations of the effects of aluminum, cadmium, copper, iron, silver, zinc, boron, lithium, manganese, molybdenum and selenium on children within the BPSOU. Are BPSOU children somehow mysteriously immune to the health effects of aluminum, cadmium, copper, iron, silver, zinc, boron, lithium, manganese, molybdenum and selenium?

l. The tests used to detect arsenic contamination rely on urine studies that do not show the long-term, chronic affects of exposure to arsenic. Hair and fingernail studies give a much more comprehensive view of long term, chronic exposure to arsenic. Relying on urine sample fails to give a comprehensive picture of the degree of long-term exposure to arsenic that residents of the BPSOU have had to endure. Studies of the chronic effects of exposure to arsenic tend to show a much more significant problem. (*For example, Dr. Holly Peterson and Stacie Barry, MTech, completed an EPA-funded biomonitoring project that evaluated arsenic*

exposure in domestic pets and other sentinel species. This project went through a rigorous quality assurance, peer review, and publication process by the MTech Mine Waste Technology Program, the MSE Mine Waste Department, and the EPA. The study result indicate an increased risk of exposure to several mining related contaminants, including arsenic, and it suggests that exposure to humans may also be occurring. The results of this study are potentially conflicting with an exposure investigation conducted by ATSDR in 2000, which showed non-detectable arsenic exposure in Walkerville. However, the Walkerville study had a small sample size, was conducted during the winter when all exposure pathways are not well represented, and did not show exposure to elevated blood-lead such that no relationship of exposure between the two metals can be determined. While definitive studies on elevated arsenic exposure to Butte area residents are lacking, an ATSDR Health Consultation conducted in 2001 does show higher rates of cancer in Butte area residents compared to Montana overall. [Steve Ackerlund—Draft Letter to John Wardell and Richard Opper—August 4, 2009]

m. The Remedy's assessment of mercury was based on an early study of Walkerville that had significant uncertainties.
n. The Remedy as currently being implemented fails to give special consideration to the differential health effects of heavy metals exposure and other contaminants of concern—mercury, arsenic, lead, aluminum, cadmium, copper, iron, silver, zinc, boron, lithium, manganese, molybdenum and selenium—on low income populations, thus ignoring the EPA's environmental justice mandate. Given that low income citizens tend have poorer health than the non-poor, the EPA should have, but did not, investigated the differential effects of exposure to contaminants of concern on the low-income population of the BPSOU.
o. The Remedy as currently being implemented is based on an inadequate health risk assessment process in that many elements/contaminants of concern were never subjected to a health risk assessment and the three drivers—lead, mercury, and arsenic—never underwent a comprehensive health risk assessment. Mercury was particularly neglected in this concern. Arsenic was extrapolated from the Anaconda site and little unique work was done in Butte. Action levels were arbitrarily set with different action levels at different sites for the same contaminant. Are we to assume that somehow the toxicology and epidemiology related to toxic elements differs from one adjacent area to another? Is arsenic in Anaconda different than arsenic in Butte? Does Butte have a special kind of lead or mercury? Are the people of Anaconda somehow biologically different than the people of Butte or Missoula or East Helena?

The Remedy as currently being implemented fails to recognize that the arsenic in attic dust did come from smelting operations in the Butte/Anaconda area. Because the attic dust did come from mining related activities, it is directly under the purview of Superfund.

The public involvement plan pursuant to the remedy as currently being implemented needs some benchmarks by means of which success of public outreach is evaluated. At present, there is no way to determine whether or not the community

involvement component which is critical for the success of the Remedy as currently being implemented has been successful. What would be considered a successful public involvement/educational plan? We have no way of knowing what constitutes success or failure. Overall, the Remedy, as currently being implemented, presents a very sketchy community involvement plan. Yet, the success of the Remedy as currently being implemented depends on effective community outreach.

It is problematic as to whether the education/community involvement program mandated under the remedy as currently being implemented will reach populations of concern, particularly low-income citizens. Given the Montana EPA track record regarding community involvement in the BPSOU, which has been limited to the traditional/formalistic/ineffective format of formal agency conducted public hearings and informational meetings along with some agency produced written materials, there is little to suggest that target populations, particularly low-income citizens, will be reached and/or motivated to participate in the program. This is contrary to the EPA's Community Involvement policies, rules, regulations and guidance documents. For example, EPA has an environmental justice mandate to be pro-active in attempting to involve low-income citizens in their programs.

The BPSOU Remedy as currently being implemented fails to recognize and accommodate the unique health problems of low-income citizens thus failing to meet EPA's environmental justice mandate. Furthermore, the Plan fails to take into consideration the substandard housing, poor diet and other environmental factors affecting the poor in relation to toxic metal exposure.

There is no assurance that the majority of problematic properties will be identified. There are problems related to absentee landlords, property owners, etc. There are problems in that, if there is no application for a building permit prior to renovation, that kind of property may be ignored.

Given the voluntary nature of participation in the medical monitoring program, what assurances are there that the vast majority of the affected population will be identified and screened?

The Remedy as currently being implemented still mistakenly puts the onus on the property owner or renter or resident to initiate remediation. Such an onus is particularly burdensome to low-income residents. Past experience amply demonstrates that such an approach is not efficacious.

It is not clear and actually very problematic that that there will be enough money to accomplish a comprehensive remedy.

The Remedy as currently being implemented still relies on a non-protective pathways of exposure argument regarding the abatement of attic dust.

DISCUSSION

The plan still insists that attic dust will not be remediated unless a pathway of exposure is present.

The contaminated dust found in many BPSOU attics poses a direct threat to human health if people were to be exposed to these contaminants.

The dust obviously entered the attics. What enters can leave, if disturbed. Saying that no pathways of contamination currently exist does not provide any permanent remediation of the threat of toxic attic dust. New and expanded Pathways of exposure can be created by:

a. Remodeling and Painting
b. Use of the attics for storage
c. Weatherization
d. Deterioration of ceilings.
e. Damage or deterioration of roofs.
f. Modifying the attic through such measures as adding electrical wires, skylights, ceiling fans, electric lights or working on the roof.
g. Fires
h. Subsidence and cracking
i. Cleaning
j. Wind, rain, hail and or water from storm events.

2. The pathway argument rests on the failed premise that remediation should attempt to keep people from contaminants rather than remove the contaminants from people.
3. The pathway argument directly contradicts the Superfund requirement for permanent solutions in that human behavior patterns, residential use patterns, and general land use patterns change over time.
4. There exists no current law, rules, or regulations that would prohibit the owner of a home or the renter of a home from using or disturbing the home's attic.
5. The pathways argument is contrary to the principles of environmental justice in that this approach means that low-income citizens will continue to bear a disproportionate toxic burden.
6. The pathways approach is contrary to the principles of the Superfund Redevelopment Initiative and the Superfund Land Revitalization Action Agenda in that it limits or precludes future productive land uses and redevelopment of sites contaminated with toxic attic dust.
7. The pathways argument is directly contrary to the Principles of Pollution Prevention and the Precautionary Principle, which are embraced by EPA policy, rules and regulations, as well as Montana State Law.
8. The Libby Cleanup Precedent would warrant addressing contaminated attic dust in Butte.

The Remedy as currently being implemented does not adequately address many metals and mining related toxics of concern and potential risk to the public.

By the EPA's own account (BPSOU ROD), in addition to lead, arsenic and mercury, copper, aluminum, cadmium, iron, silver and zinc are also toxics of concern presently found within the BPSOU. Other studies have found boron, lithium, manganese, molybdenum and selenium to be metals/elements/toxics of risk present at the BPSOU site. (Holly Peterson, 2007. *Domestic Pets as Biosamplers of Mining Related Contaminants*, EPA Mine Waste Technology Program, Butte, Montana.)

The Remedy as currently being implemented fails to address these other toxics of concern and risk. I suppose that the assumption is made that if we remediate arsenic, lead and mercury, we will "get" all of these others also. <u>However, there is no substantiation for this claim, the EPA just assumes it</u>. Nor is there any consideration of the synergistic effects of these toxics of concern on human health. Nor is there any consideration of the bioaccumulation of these toxics of concern. Nor is there any consideration of the cumulative effects of chronic exposure by humans to these toxics of concern. (For example, given the reliance on urine sampling to measure arsenic exposure, the EPA probably never would be able to assess the cumulative effects of chronic exposure to arsenic.) Nor has there been an adequate health risk assessment of mercury exposure within the BPSOU. The harmful health effects of the above listed toxics of concern are amply discussed and demonstrated in Stacie Barry's *Toxicology of the Chemical of Concern in Butte, Montana*: Submitted to the Butte-Silver Bow Health Department, June 5, 2008.

In short, the current proposed the Remedy Plan as currently being implemented fails to consider all the potential threats to human health and the environment within the Butte Priority Soils OU in that it neglects many elements with are risky for human health and the environment. Faulty and incomplete data and conclusions based on unsubstantiated assumptions can only compromise the effectiveness of any plan based on such data.

Arsenic found in BPSOU and areas adjacent to the BPSOU <u>is</u> from smelter activities in Butte and Anaconda and, therefore, is directly under the Superfund purview.

Direct Evidence of Causal Link to Mining and Smelting

There is strong evidence that a significant amount of the trivalent arsenic present in attics in the homes in the BPSOU as well as adjacent to the BPSOU came, in large part, from the Anaconda Smelter. The geomorphology and chemical composition of the arsenic contaminated attic dust from the Anaconda Smelter and the geomorphology and chemical composition of the arsenic contaminated attic dust found in homes both within and adjacent to the BPSOU are the same. The arsenic attic dust is smelter arsenic dust. The EPA must stipulate that the arsenic attic dust is smelter arsenic dust.

The prevailing wind patters in Southwestern Montana clearly indicate that the prevailing winds flow from the Anaconda Smelter to Butte—hence a plume of trivalent arsenic contamination could have reached the Butte Hill. According to the National Oceanic and Atmospheric Administration—National Climatic Data Center, the prevailing winds are generally from Anaconda to the Butte area along the I-90 Corridor and are sufficiently strong enough of the time to carry contaminated smelter dust to Butte. A weather chart from the National Weather Service in 1920 shows essentially the same wind directions as today from Anaconda to Butte.

Additional support comes from the U.S. Forest Service, which in their various Forest Fire Suppression Documents and Reports, notes that the typical wind direction is from west to east as can be readily seen by the extent of smoke and particulate matter in the Butte area from fires occurring west of Butte. Ash from forest fires is denser and heavier than airborne particulate matter from the Anaconda smelter. The EPA Superfund ROD for the Anaconda Smelter (09/30/1996) also notes that the prevailing wind pattern is from west to east with most arsenic and heavy metal contamination found east of the Smelter stack.

The Final Risk Assessment-BPSOU Baseline Human Health Risk Assessment for Arsenic, April 29, 1997 notes: "Aerial emissions from the mills and smelters, **as well as the Anaconda Smelter**, also contributed to the BPSOU." (p. 1-2, emphasis supplied.)

It is important to note that inorganic, trivalent arsenic contamination releases result from the ore smelting process. (See: Paul F. Holt, *Inhaled Dust and Disease*, (New York: John Wiley and Sons, 1987. See also: *Arsenic* (ATSDR)"While arsenic is released to the environment from natural sources such as wind-blown dirt and volcanoes, releases from anthropogenic sources far exceed those from natural sources." (ATSDR) Mining and smelting are major causes. "The soil receives arsenic from a variety of anthropogenic sources, including. . . smelting operations, mining wastes. Mine tailing and smelter slag was estimated to add an additional, 200-11000 and 4,500 –9000 metric tons respectively. . . .abandoned mine tailings add still more."

Indirect Evidence of Causal Link to Mining and Smelting

There is no other possible source of the contaminated attic dust in Butte than the Anaconda Smelter.
Turn of the century and early 20th Century smelters in Butte are not the source of present day attic dust contamination in that contamination is found in homes both within and adjacent to the BPSOU that were built long after these early Butte smelters closed.
Coal burning is not the source of the present day attic dust contamination, as some allege, in that many homes with contaminated attic dust were built long after coal burning had ceased in Butte.
Contamination is not found in attics of homes that were built **after** the Anaconda Smelter closed in 1980.

To the extent that trivalent arsenic is found in the attics of homes constructed after smelter operations ceased on the Butte Hill, the 1920s, there would exist the strong presumption that such arsenic emanated from Anaconda. By the EPA's own

assumptions, trivalent arsenic was not characteristic of the arsenic found in Butte soils but is characteristic of the arsenic found in Anaconda.

Conclusion: The Anaconda Smelter would seem to be the only practical source for this trivalent arsenic found in Butte attic dust. What other major source exists? Thus, the presence of arsenic in BPSOU attics is a direct result of mining activity which contamination is covered by Superfund.

The BPSOU Remedy as currently being implemented fails to recognize and accommodate the unique health problems of low-income citizens thus failing to meet EPA's environmental justice mandate. The public involvement plan also fails to recognize and accommodate the unique problems of reaching low-income citizens thus failing to meet EPA's environmental justice mandate.

I make the following arguments that lead to the clear conclusion that the EPA needs to be more aggressive in attacking the BPSOU toxic attic dust problem. It is a human health issue and an environmental (social) justice issue:

A. **A significant number of homes in the BPSOU are substandard and deteriorating.**
B. **A disparate concentration of poor is found living in this substandard BPSOU housing.**
C. **Many, if not most, of these substandard BPSOU homes are contaminated with toxic attic dust which constitutes a severe threat to human health, particularly the health of children**
D. **This contaminated and toxic attic dust is found in BPSOU homes as the direct result of mining related activities. Hence, such toxic attic dust is clearly within Superfund's purview.**
E. **There is a great risk of exposure to toxic attic dust in substandard homes, particularly as compared to homes of good quality.**
F. **Superfund was designed to remediate these human health threats.**
G. **Superfund, in remediating human health threats, must also address environmental justice concerns.**
H. **The concentration of toxic attic dust in the BPSOU raises an environmental (social) justice issue.**
I. **The EPA's current approach to remediating toxic attic dust in the BPSOU is inadequate in that it will only address the toxic attic dust issue if there is a clear and present pathway of contamination within a home which leads to exposure of inhabitants to the toxic dust.**
J. **The EPA's current approach to remediating toxic attic dust in the BPSOU violates EPA environmental justice mandate in that it perpetuates a disparate toxics burden on the poor in the BPSOU.**
K. **Even though the Record of Decision for Priority Soils has been issued, EPA still has the regulatory flexibility and authority to change its approach to remediating toxic attic dust.**

L. EPA should change its approach, in the ways suggested in this paper, to more aggressively monitor and remediate toxic attic dust. Failure to undertake these changes would be contrary to the Superfund mandate to clean up sites, to protect human health and the environment and to make sites free of toxics in a permanent manner and would be contrary to EPA's environmental justice mandate.

The quality of the housing stock in the BPSOU is poor, the housing stock has a disproportionate number of low income citizens living in this housing, this housing stock is contaminated with toxic attic dust, and due to its substandard nature, it is likely that exposure of residents to this toxic attic dust will continue to occur:

1. According to a study commissioned by the Butte/Silver Bow Planning Board, ". . . much of the housing stock in the older town site is in a state of decay. Decay of the housing stock in much of Census Tracts 1 and 2, which encompass the area north of Front Street to Walkerville and the upper and lower west sides of the urban cluster are contributing to a significant aesthetic crisis and have created an economic development barrier for the community. Retail activity in the central business district is inherently impacted by a loss of people, by vacant and blighted structures and by high poverty in these areas." (*Butte-Silver Bow County Community Development Block Grant Application: Housing and Neighborhood Renewal*, December 8, 2006, p. 2-5)
2. According to the Center for Applied Economic Research for the Montana Department of Commerce, about 73% of the substandard housing units found in Butte are within the confines of the BPSOU. According to the report, this amounts to 2600 housing units. (Quoted in *Butte-Silver Bow County Community Development Block Grant Application: Housing and Neighborhood Renewal*, December 8, 2006, p. 2-5)
3. According to the Planning Board sponsored report: "The County's poor population is being isolated in the most blighted areas of the community. The older town site (Census Tracts 1 and 2), which contains an approximated 73 percent of the community's substandard housing units, (2600) units, is also home to 52 percent of people living below the federal poverty line. Living below the federal poverty line indicates people do not have enough resources to purchase the most basic goods and services for survival. Lower income families and individuals are segregated in blighted areas of Butte-Silver Bow; many are living in substandard conditions while paying more than 30% of their monthly incomes for housing costs. Disabled people, many of whom have extremely low incomes, are a subset of the impacted group." (*Butte-Silver Bow County Community Development Block Grant Application: Housing and Neighborhood Renewal*, December 8, 2006, pp. 2-3 and 4) Note: Butte Census Tracts 1 and 2 are in the BPSOU.
4. Substandard housing disparately affects the poor who live in Butte more than the non-poor.
5. The housing problems in the BPSOU are part of the overall poverty problem in Butte. According to the 2000 Census, 10.7% of Butte families live in poverty,

compared to 10.5% across the state. About 15% of the Butte population lives below the poverty line. Also, according to the 2000 Census, close to 25% of Butte families with children under the age of five years have incomes below the official poverty line. Fifty-eight percent of the homes without fathers have incomes below the official poverty line. According to the Montana Department of Public Health and Human Services, in 2002, about 2.4% of Butte's citizens were receiving Temporary Assistance for Needy Families compared to the state average of 1.89%. Over 10% of the Butte population was receiving food stamps compared to 7.56% statewide.

6. Low-Income Renters are a major component of the BPSOU housing occupants. (The percentage of households with incomes less than $25,000 is 42% in Silver Bow County compared with 28% for the nation and 38% for Montana. Further, 41% of families are considered low-income; seventy percent of renters have incomes less than $25,000 and 81% of them are concentrated in Census Tracts 1 and 2 (BPSOU) where there are an estimated 2600 substandard units. Thirty percent of households occupying rental units are experiencing a cost burden by contributing more than 30% of their income to housing costs." *Butte-Silver Bow County Community Development Block Grant Application: Housing and Neighborhood Renewal*, December 8, 2006, p. 2-2) 32% of renters in the age range 25-34 have annual income below the poverty level. (*Butte-Silver Bow County Community Development Block Grant Application: Housing and Neighborhood Renewal*, December 8, 2006, p. 2-1)
7. 30% of children in Butte live in high poverty neighborhoods in the BPSOU. "Silver Bow County ranked first (highest) in Montana in the poverty rate for population under 18 years of age; the percentage of children living in high-poverty neighborhoods (coterminous with the BPSOU); and the average number of food stamp recipients per month." *(Butte-Silver Bow County Community Development Block Grant Application: Housing and Neighborhood Renewal*, December 8, 2006, p. 1-40)
8. Deep poverty persists within the BPSOU. 59% of the high poverty block groups in Silver Bow County are found within the BPSOU. The BPSOU area "contains 52% of the county's poor while only comprising 29% of the total population. Of particular note are Bock Groups 4 and 5 in Tract 1 where poverty rates were 47% and 61% respectively in 2000." (*Butte-Silver Bow County Community Development Block Grant Application: Housing and Neighborhood Renewal*, December 8, 2006, p. 1-28)
9. Resident flight from the BPSOU is continuing and contributing to the decline and deterioration of the area. (*Butte-Silver Bow County Community Development Block Grant Application: Housing and Neighborhood Renewal*, December 8, 2006, p. 1-8)
10. Studies also indicate that the vast majority of the poor live in the area encompassed by Butte Priority Soils. For example, of the 1200 houses in Butte that have had a high risk of lead, the vast majority are in the Butte Priority Soils site. The risk of exposure to contaminated arsenic in attics is much higher in the BPSOU than anywhere else in Butte. The housing stock in the BPSOU is more deteriorated and dilapidated than anywhere else in Butte and is overwhelmingly

substandard. Compared to Butte as a whole, the low-income citizens living in the area encompassed by the Butte Priority Soils Operable Unit bear a disproportionate burden of exposure to toxics compared to the rest of the community. Comparing income levels to quantity of toxics present clearly demonstrates that low-income citizens in Butte bear a disproportionate toxics burden. The poor in Butte have a greater risk of cancer from exposure to heavy metals than do the non-poor. Given weakened immune systems which weaknesses are greater in the poor than the non-poor, given inadequate diets which are more prevalent in the poor than the non-poor, given lack of access to adequate medical treatment which is more prevalent in the poor than the non-poor, given the detrimental health effects of living in substandard housing which is more prevalent for the poor than the non-poor, the poor in Butte are more threatened by the release of toxic, heavy metals associated with mining than the non-poor. (See: Environmental Defense Fund, *Summary Report: Silver Bow County*, 11/24/03.)

11. The poor residents of central Butte lack the financial ability to either (1) move into better housing within the district or (2) move out of the BPSOU area into better housing. (*Butte-Silver Bow County Community Development Block Grant Application: Housing and Neighborhood Renewal*, December 8, 2006)
12. Many of these homes have attics that are contaminated with toxic arsenic dust.
13. "The age of the house and the design, construction, and condition of the house structure largely determine the entry of ceiling dust to the living areas of a dwelling. Dwellings in good condition rarely show evidence of ceiling dust entering the living areas of the house. Older dwellings and those in need of repair tend to show more signs of ceiling dust encroachment through cracks and vents." (Jeffrey J. Davis and Brian L Gulson, "Ceiling (attic) dust: A 'museum' of contamination and potential hazard," *Environmental Research*, Volume 99, Issue 2. October 2005, Pages 177-194) These findings are particularly relevant given the generally poor condition of housing stock within the BPSOU.

The conclusions reached by points 1-13 above are:

1. Butte has a high rate of poverty compared to the rest of the nation and Montana.
2. These poor live overwhelmingly within the BPSOU. The "poor-poor," which is a subset of the poor, also live overwhelmingly within the BPSOU.
3. A major subcategory of the poor and "poor-poor" living within the BPSOU are children, the elderly and the disabled.
4. These poor live in substandard housing within the BPSOU.
5. The poor living in the BPSOU area have a greater level of exposure to contaminated and toxic attic dust than the non-poor.

<u>Next, let us consider the degree of toxic attic dust contamination found in these substandard homes within the BPSOU and the health effects of this contamination.</u>

Regarding the health effects of toxic attic dust found in housing units in the BPSOU, we know the following:

1. Inorganic arsenic, found in attics in the BPSOU, even at low levels of exposure, poses a serious threat to human health. Arsenic has been designated a human carcinogen. Arsenic can cause cancer of the lungs, liver and skin. Long-term exposure to arsenic can cause alterations in mental functions and depression. (*Staying Healthy in a Risky Environment*, New York University Medical Center, p. 365 and 428) Arsenic exposure at low doses can cause nerve damage, cardiovascular problems, skin problems and constitutional complaints such as nausea, diarrhea, gastrointestinal upset, etc. (Johnson and DeRosa, ASTDR, "The Toxicologic Hazard of Superfund Hazardous Waste Sites") [See also: Paul F. Holt, Department of Chemistry, University of Reading, UK, *Inhaled Dust and Disease*, p. 245. which discusses the causative effect of arsenic on heart disease.] Arsenic targets most of the body's organs and is particularly harmful to the gastrointestinal tract and to the skin. Outdoor play is a common arsenic exposure route for children. Attics in the Butte Priority Soils area are contaminated with a host of toxics, in addition to inorganic arsenic, related to past mining/smelting activities.
2. More specifically, the trivalent arsenic found in BPSOU attics is a proven human carcinogen. One form of human cancer directly linked to trivalent arsenic is skin cancer that has above average levels in Butte. (NIOSH, Tenth Report on Carcinogens, *Arsenic Compounds, Inorganic*. See also: International Agency for Research on Cancer, *IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man*, Vols. 2 and 23 and Supplements 4 and 7, USEPA, Integrated Risk Information System, *Arsenic, inorganic* (CASRN 7440-38-2) and Dennis M. Opresko, Ph.D., Chemical Hazard Evaluation and Communication Group, Biomedical and Environmental Information Analysis Section, Health and Safety Research Division, Oak Ridge Reservation Environmental Restoration Program, Risk Assessment Information System, 1997) Not only is trivalent arsenic carcinogenic, even at low doses, [Arsenic exposure at low doses can cause nerve damage, cardiovascular problems, skin problems and constitutional complaints such as nausea, diarrhea, gastrointestinal upset, etc. (Johnson and DeRosa, ASTDR, *The Toxicologic Hazard of Superfund Hazardous Waste Sites*)] but it is also genotoxic. (Mass et al.,*Chem. Res. Toxicol.* 14:355-36, April 16, 2001) The EPA has specifically endorsed this genotoxic conclusion. (April 2001) "Inorganic arsenic is readily absorbed through ingestion and is widely distributed in the human body. It does not need metabolic activation to exert its effect." (Chiou, et. al., *Incidence of transition cell carcinoma and arsenic*, American Journal of Epidemiology 153 (5): 411-418, 2001)
3. Moreover, there are no known safe levels of exposure to inorganic arsenic. Trivalent arsenic bioaccumulates in tissue and is excreted very slowly. (Dr. Ronald Brecher, *Arsenic*, EBI, Canada and Aapo Saask, *The Arsenic Challenge*, Scarab Development AB, Stockholm, Sweden) Finally, trivalent arsenic causes a host of other serious medical problems. (Holt, *Inhaled Dust and Disease*, *op. cit.*; Norman Trieff, *Environment and Health*, Ann Arbor Science Publishers Inc.; Graber and Upton,

Staying Healthy in a Risky Environment: The New York University Medical Center Family Guide; ATSDR; OSHA; NIOSH; and USEPA.)

4. Trivalent Arsenic is one of the major contaminants of attic dust on the Butte Hill. The gross geologic morphology of the attic arsenic dust would lead to that conclusion.
5. There is strong evidence that a significant amount of the trivalent arsenic present in attics came from the Anaconda Smelter.
6. To the extent that trivalent arsenic is found in the attics of homes constructed after smelter operations ceased on the Butte Hill, the 1920s, there would exist the strong presumption that such arsenic emanated from Anaconda. By the EPA's own assumptions, trivalent arsenic was not characteristic of the arsenic found in Butte soils but is characteristic of the arsenic found in Anaconda.
7. The prevailing wind patters in Southwestern Montana clearly indicate that the prevailing winds flow from the Anaconda Smelter to Butte—hence a plume of trivalent arsenic contamination could have reached the Butte Hill.
8. The Final Risk Assessment-BPSOU Baseline Human Health Risk Assessment for Arsenic, April 29, 1997 notes: "Aerial emissions from the mills and smelters, **as well as the Anaconda Smelter**, also contributed to the BPSOU." (p. 1-2, emphasis supplied.)
9. Inorganic arsenic contamination releases result from the ore smelting process such as occurred very early in Butte, ending in the 1920s, and most prominently and recently in Anaconda. (See: Paul F. Holt, *Inhaled Dust and Disease*, (New York: John Wiley and Sons, 1987. See also: *Arsenic* (ATSDR)"While arsenic is released to the environment from natural sources such as wind-blown dirt and volcanoes, releases from anthropogenic sources far exceed those from natural sources." (ATSDR) Mining and smelting are major causes. "The soil receives arsenic from a variety of anthropogenic sources, including. . . smelting operations, mining wastes. Mine tailing and smelter slag was estimated to add an additional, 200-11000 and 4,500 –9000 metric tons respectively. . . .abandoned mine tailings add still more."
10. **Conclusion**: The Anaconda Smelter would seem to be the only practical source for this trivalent arsenic found in Butte attic dust. What other major source exists? Thus, the presence of arsenic in BPSOU attics is a direct result of mining activity which contamination is covered by Superfund.
11. <u>The 1997 Health Risk Assessment for arsenic and subsequent health studies for Butte Priority Soils do not specifically and directly consider trivalent arsenic found in Butte attics</u>. The 1997 Health Risk Assessment for arsenic and subsequent studies only consider the levels of trivalent arsenic found in soil as a potential source of the dust home contamination problem. This is deceptive in that arsenic is water soluble and would have been washed away to a large extent given rain, snow melt, wind, etc. However, the fine trivalent arsenic dust found in attics would not have been washed away by rain and snowmelt. Wind would not have blown away the trivalent arsenic found in attics. It is totally plausible that there would be low level of trivalent arsenic in the soil while having high levels of trivalent arsenic in attics. Arsenic does not lose it toxicity over time.

The contaminated dust found in many BPSOU attics poses a direct threat to human health if people were to be exposed to these contaminants. The EPA needs to be more pro-active in reaching out to low-income residents who are disproportionately concentrated in the Butte Priority Soils Site. Yet, no provisions occur in the proposed Multi-Pathway Residential Metals Abatement Program Plan for reaching out to, including, and involving low-income citizens in the Multi-Pathway Residential Metals Abatement Program.

Given the concentration of the poor in the substandard housing units of the BPSOU, which are contaminated in a disparate manner with toxic attic dust, the poor bear a disproportionate toxics burden. ***Consider:*** On February 11, 1994, through Executive Order 12898, President Clinton declared that: "each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States." According to the EPA, the President's concern was that: "minority and low-income populations bear a disproportionate amount of adverse health and environmental effects." Today, the EPA further defines environmental justice as "the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, ***implementation, and enforcement*** of environmental laws, regulations, and policies. Fair treatment means that no group of people, including a racial, ethnic, or a socioeconomic group, should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal and commercial operations ***or the execution of federal, state, local, and tribal programs and policies***." (Emphasis supplied.) EPA administrator Whitman in August 2001 stated that environmental justice would be an integral part of all EPA programs, policies, and activities. According to Whitman, the goal of the EPA's Environmental Justice program is that no segment of the population, including low-income citizens, suffers disproportionately from the EPA's policies, programs and activities. Furthermore, EPA has a mandate to provide for the equitable distribution of the burden of cleaning up sites. (The Office of Solid Waste and Emergency Response [OSWER] in their *Integration of Environmental Justice into OSWER Policy, Guidance, and Regulatory Development* mandates that "Environmental Justice issues should be considered at all stages of policy guidance and regulation development, beginning with preliminary efforts" and that environmental justice should be integrated into all agency actions. (OSWER Directive 9200.3-18FS, EPA540/F-95/023)

This above OSWER Directive also mandates that the economic/regulatory impacts of EPA decisions be considered in terms of environmental justice issues. Part of the EPA's environmental justice strategy is to promote a "sustainable economy" in areas affected by EPA rules, policies and programs. For example, OSWER Directive No. 9200.3-17 entitled *Integration of Environmental Justice into OSWER Policy, Guidance, and Regulatory Development* states: "Where environmental justice concerns or the potential for concerns are identified, staff should conduct an appropriate analysis of the issues(s). To the extent practicable, staff should evaluate the ecological, human health (taking into account subsistence patterns and sensitive populations) and socio-economic impacts of the proposed decision document on minority and low-income communities. Examples

include how a policy on future land use would impact minority or low-income communities versus non-minority, affluent communities. The analysis should be documented and retained for public availability." (**This has not been done by the Montana Office of EPA for Priority Soils**.) The point is that the Montana Office of EPA has a mandate to consider how its enforcement/abatement actions will disproportionately and adversely economically affect low-income areas and has a mandate to mitigate disproportionate adverse economic impacts on low-income citizens. (See: *Incorporating Environmental Justice Principles into the CERCLA Process*, May 1998.) Low-income citizens should not bear a disproportionate or undue regulatory burden when it comes to the development of cleanup activities. (EPA, Region 8, *Environmental Justice Action Plan*, April 2003)

The Region 8 of EPA also equates environmental justice with the legal concept of equal protection under the law. In April of 2003, Region 8 issued its *Environmental Justice Action Plan* which mandates that the agency will work with stakeholders to "correct and prevent inequitable environmental and public health impacts to any groups." In short, environmental justice mandates a particular concern with populations, such as low-income populations, that bear a disproportionate burden of environmental degradation and environmental regulations. "Fair treatment means that no group of people, including a racial, ethnic, or social economic group should bear a disproportionate share of the negative . . .consequences resulting from . . .the execution of federal, state, local and tribal programs and policies." (Headquarters Press Release, EPA, *Administrator Whitman Reaffirms Commitment to Environmental Justice*, August 21, 2003)

In meeting its obligation to remove in a permanent manner threats to human health and in meeting its obligation to promote environmental justice, the EPA choose to leave toxic attic dust in place and only remediate after dust was found to be contaminating living areas.

Superfund was designed not only to deal with actual harms to human health and the environment but also with threatened harms and potential threats. CERCLA specifically deals not only with release of hazardous substances but also with the "threat of" release "into the environment of a hazardous substance or pollutant or contaminant. CERCLA defines each of these terms quite broadly." (*Environmental Law Handbook*, p. 76.) Also, Superfund places an emphasis on treatment rather than containment for hazardous waste. [EPA, "Rules of Thumb for Superfund Remedy Selection," 40 CFR 300.430 (a)(1)(iii)(A)] Yet, in the Record of Decision for the BPSOU, the EPA determined that a one time evaluation of the living spaces of homes in order to determine whether or not toxic attic dust was present was sufficient to meet it burden of protecting human health and promoting environmental justice. It is hard to fathom how EPA could argue that a one-time evaluation of homes was sufficient in order to achieve this purpose.

Based on what we know regarding toxic attic dust within the BPSOU and what we know concerning housing within the BPSOU, the following conclusions are warranted regarding evaluation of homes in the BPSOU for toxic attic dust exposure:

1. Toxic attic dust poses a threat to the health of residents of BPSOU.
2. Given the deteriorated and substandard condition of most of the housing units within the BPSOU and given the ease of creating new and/or expanded pathways of contamination, eventually, contaminated attic dust will seep into living areas and expose residents to toxic contamination.
3. This toxic burden falls disproportionately on the poor living with the BPSOU area and is not only a human health issue but also an environmental justice issue.
4. Given the deteriorated housing stock in the BPSOU, the EPA needs to be much more aggressive in attacking the problem of contaminated attic dust both in terms of more frequent inspections and evaluations of property (one-time inspections are clearly not enough) and more rigorous measures to prevent pathways of exposure to contaminated attic dust from opening up.
5. It is contrary to the EPA environmental justice mandate to place the burden on the poor to monitor and report possible contamination exposure. The poor may well lack: knowledge of the contamination's presence, the dangers such contamination poses and how to report possible exposure and whom to report it to. Low-income citizens may be fearful of reporting potential exposure to a government entity, may be fearful of incurring personal liability by reporting or getting into trouble by reporting, if renters, residents may be fearful of getting "in trouble" with the owner, and residents may have a lack of knowledge of how the bureaucratic Superfund process works (after all, it is pretty Byzantine).
6. The EPA has the regulatory authority to modify institutional controls within the BPSOU in order to more fully assure that attic dust contamination is not entering into living areas within the homes of BPSOU.

It is problematic as to whether the Remedy as currently being implemented will reach populations of concern, particularly low-income citizens.

The citizen education/community involvement approach articulated in the Remedy is inadequate. Yet, this educational/community involvement component is critical for the success of the Abatement Plan. The Plan's approach places the burden of avoiding exposure to toxic wastes on the residents of Butte Priority Soils. Effective resolution of liability obligations is shifted from the PRPs to the non-liable citizens. This is a total convolution of the Superfund process that calls for cleaning up an area in order to protect human health and the environment. **Superfund is not an education program but a cleanup program**. Superfund places the liability for cleanup on those legally responsible for the pollution, not the victims of pollution.

The EPA mandate for meaningful public participation is particularly pronounced when it comes to providing opportunities for meaningful participation by low-income citizens. On August 9, 2001, EPA administrator Christine Todd Williams issued a memorandum entitled "EPA's Commitment to Environmental Justice" which in part stated: "The agency defines environmental justice to mean the fair treatment of people of all races, cultures, and incomes with respect to the development, implementation, and enforcement of environmental laws and policies, and their meaningful involvement in the

decision making processes of the government." She goes on to state that environmental justice means that everyone has "equal access to the decision-making process to have a healthy environment in which to live, learn, and work." The *Region 8 Action Plan* for environmental justice issued in April 2003 mandates a pro-active approach to include, among others, low-income citizens.

Although the institutionalized mechanisms and forums of participation have been provided with regard to Butte Priority Soils, contrary to EPA policy, there have been no pro-active attempts to specifically include or encourage low-income citizens to participate in the decision-making process. On August 21, 2001, the EPA stated that: "Fair treatment means that no group of people, including a racial, ethnic, or social economic group should bear a disproportionate share of the negative environmental consequences resulting from. . .the execution of federal, state, local and tribal programs and policies." Meaningful participation as defined by EPA is that "the decision makers seek out and facilitate involvement of those potentially affected." In April 1995 the EPA issued "The Environmental Protection Agency's Environmental Justice Strategy" which mandates that the EPA needs to reach out to, among others, low-income residents and needs to afford them particular consideration in the development and execution of EPA policies, rules, regulations and guidelines. Sylvia F. Liu, Attorney, Environment and Natural Resources Division of the U.S. Department of Justice, in an article entitled: "Environmental Justice: An Overview of Legal Issues," states that agencies should: "Consider conducting outreach to the affected communities to promote participation in agency decision-making process concerning remedies." (February 2000) So far, no specific outreach has been directed to the low-income citizens within Butte Priority Soils. So far, the EPA has not reached out specifically to the low-income citizens who live within the Priority Soils area.

There have been developed no outreach programs that specifically target low-income residents of Butte. There has been extended no particular consideration of the effects of a waste-in-place solution on the low-income residents of Butte. The above lack of special attention to the low-income residents of Butte is at variance with the principles of environmental justice mandated under EPA rules, regulations, and policies. The proposed education program makes no special accommodation for reaching low-income citizens.

Public/stakeholder input is supposed to impact and shape EPA decisions. Public/stakeholder input is supposed to inform and be taken into consideration as EPA formulates a remedy. It is hard to see how low-income citizens can impact EPA decisions regarding Priority Soils if they are not specifically represented in the decision making process.

Summary--Public Participation and Environmental Justice:
It is a basic tenet of democratic decision making that: "on all matters where social action is substituted for individual action, liberty exists only through participation either in decision making or in control of leaders who make the decisions." (Emmette Redford-*Democracy in the Administrative State*.) It is not just the ethics of democracy that

mandates citizen participation, but the quality of public decisions is enhanced by public participation. The more people who are substantively involved in making a decision, the more information and the more perspectives that are brought to that decision. Public participation means that more alternative solutions are considered and the resulting decision will have greater credibility and legitimacy. Meaningful public participation promotes public civic education and increases trust in government institutions. Efficiency is also enhanced by public participation in that public acceptance of an agency decision decreases the likelihood of prolonged challenges to that decision. The law also mandates that most public agencies take into account public comments in rendering their decisions. EPA policies, procedures, rules, and guidance documents certainly mandate significant and consequential public involvement.

Agency personnel should not view the provision for meaningful public involvement as simply a procedural hurdle that need only be formally addressed. There are valuable contributions that the public can make to the Superfund decision-making process.

1. Citizens know best how a decision will affect their interests.
2. Citizens know the local area.
3. Because it is concerned with the making and enforcing of government policy decisions, Superfund decision-making is as much, if not more, a political process than it is a scientific process. Cleanup decisions cannot be determined with the certitude of a mathematic or scientific theorem. Although there are those who would seek to avoid conflict by an appeal to the certainty of science (after all you can't argue with science), an appeal to "good science" cannot eliminate conflict. Correct environmental decisions lie in the realm of the probable and contingent not the certain and absolute. As an inherently political process, the public must not only be involved but also allowed to be effective in their participation by decision makers. For example, consider Superfund's nine criteria for remedial alternatives evaluation. These criteria do not have scientific or technological certainty or precision. How they apply to perspective decisions, what they mandate and what they do not mandate, how they relate to each other, what they mean, and their significance are the result of political processes, bargaining and decision making. If one takes cost, for instance, how do you determine with scientific and technical certainty whether or not an alternative costs too much? The very standards such as contaminant action levels and the risk assessment process are infused with politics. Often action levels are the result of political bargaining and represent the lowest common denominator of what is acceptable to the various groups fighting about where the levels should be placed. The notion of value neutral decisions in Superfund is unobtainable.
4. Even decisions that are based in science and technology **have to be open to public scrutiny and comment.** The expert must offer his or her expert opinion to the public in the public realm. The expert's opinion must be tested, analyzed and evaluated in the public realm. We do not, even in environmental decision-making, have a government of experts. To this end, it is important to remember that not all expertise resides in government or the PRPs. Members of the general public often have extensive knowledge, experience, and expertise in the areas

> under consideration in Superfund. The wanton corporate hubris displayed at a recent meeting on Priority Soils where public input was characterized as the articulation of "feelings" is a disservice and mischaracterization of the value of the public participation process. Unfortunately, some Montana EPA officials buy into this characterization of the nature and value of public input.

For reasons already articulated, the public has a right to participate in Superfund decision-making. The low-income citizens living in the Butte Priority Soils area have a special right to participating in decision-making regarding the site. For reasons already articulated, EPA rules, policies, procedures, and guidance documents mandate efficacious and meaningful public involvement, particularly on the part of environmentally disadvantaged groups such as low-income citizens. For reasons already articulated, public participation produces sound environmental decisions. The specifics of my complaint address the issue of whether or not the Montana EPA really values public input into the decision making process regarding Butte Priority Soils. Does the Montana EPA allow public input to really impact a decision? Does the Montana EPA see public involvement, particularly involvement by low-income citizens as meaningful and efficacious? Does the Montana EPA afford meaningful opportunities, not just formal venues, for participation by low-income citizens? Given recent comments by Montana EPA decision makers, unfortunately, in terms of deeds, the answer is no. While the forms of public participation are present, the substance of efficacious public participation is missing. It will be the low-income citizens of the Butte Priority Soils area who will continue to bear a disparate toxics burden as a result of the failure to provide for meaningful public participation in the decision making process surrounding Priority Soils.

To me this is a significant test case regarding the efficacy of public involvement in Superfund decision-making. Does the Montana EPA really assign any weight to public involvement? Are we just going through the motions? If issues are effectively off the table of efficacious public discussion, if the primary elements of a remedy have already been determined regarding the "soils" element of Priority Soils while we are still in the RI/FS process, if the purview and purpose of citizen input can be limited to what the agency would like, if major emergency actions already taken are beyond public scrutiny and if significant elements of the remedy can be instituted by a PRP prior to the completion of the RI/FS and public comment, public participation in the Priority Soils decision has no substance. Some of the venues of public participation are there but the reality is absent, particularly for low-income citizens. What we have is "environmental theatre" where the script is already written, the outcome is already determined and the actors are simply playing pre-assigned parts and reading predetermined dialogue. Public participation in Superfund decision-making should be considered by the Montana EPA to be more than histrionics.

It is clear EPA policy that special effort needs to be made to ensure the maximum level of participation by low-income citizens. So far no special efforts have been made to ensure meaningful participation on the part of low-income citizens who live within the Priority Soils area.

Caps are not Permanently Protective of Human Health and the Environment.

Yet, the BPSOU Remedy as currently being implemented makes extensive use of capping toxic waste left in place.

Problems with caps:

1. Metals can be remobilized through bio-irrigation. (Dueri, Sibylle, et. al., University of Laval, Quebec, "Modeling the Transport of Heavy Metals through a Capping-Layer: The case Study of the Flood Sediments Deposited in the Saguenay Fjord, Quebec.")
2. The long term efficacy of caps can be compromised by advection "related to consolidation, diffusion, chemical reactions, and the effect of . . . burrowing activity." (*Ibid.*)
3. Desiccation can cause cracking of the cap cover. (David Daniel, Professor of Civil Engineering, University of Texas, *Geotechnical Practice for Waste Disposal*)
4. The freeze-thaw cycle can produce changes in the structure and fabric of the cover and a way that increases hydraulic conductivity. (*Ibid.*)
5. Caps are difficult to construct correctly. (*Ibid.*)
6. Caps are difficult to maintain and repair. (*Ibid.*)
7. Erosion is a serious problem. (Jack Caldwell, U.S. Department of Energy, *Principles and Practice of Waste Encapsulation.*)
8. Biointrusion can compromise the effectiveness of the cap. (*Ibid.*)
9. Differential settlement of the cap can cause cracking. (Oweis and Khera, New Jersey Institute of Technology, *Geotechnology of Waste Management.)*
10. Caps require regular and often expensive repair. (*Ibid.*)
11. Stabilization of the cap is a problem. (*Ibid.*)
12. Caps present long-term subsidence and settlement issues. (*Ibid.*)
13. Because of their susceptibility to "weathering, cracking and subsidence" caps have limited long term utility. "Wind, rain, and generalized erosion over time can severely damage even a well-designed . . . cover." (U.S. Department of Energy, Office of Environmental Management, "Remediation Technology Descriptions: Containment.") See also: Merritt, Frederick (ed.) *Standard Handbook for Civil Engineers*, McGraw-Hill, New York.

The extensive use of caps as a cleanup method for Butte Priority Soils would do nothing to reduce the toxicity and volume and mobility of contaminants. Caps do nothing to clean up a site. The extensive use of caps as a cleanup method for Butte Priority Soils would not provide a permanent remedy. The extensive use of caps as a cleanup method for BPSOU would violate the Superfund mandate for treatment over containment. In short, the extensive use of caps for the BPSOU would not be protective of human health and the environment.

Institutional Controls—The Public should be concerned about too great a Reliance on Institutional Controls for the Remedy as currently being implemented.

Institutional controls per se do nothing to reduce the mobility, toxicity, or volume of contaminants. Institutional controls do nothing to clean up a site. The institutional controls being considered in the EPA's RI/FS for Priority Soils would seriously limit productive land uses and greatly compromise the property rights of owners to use their land as they determine. The extensive reliance on institutional controls is also contrary to the Superfund mandate of preference for treatment over restricted land use. Institutional controls do nothing to treat a site. The EPA's own document "Rules of Thumb for Superfund Remedy Selection" states that the law mandates a clear preference for treatment over all other approaches. "EPA expects to use treatment to address the principal threats posed by a site. . . ." [40 CFR 300.430(a)(1)(iii)(A)]. The above document also notes: "Institutional controls. . .generally shall not substitute for more active measures. . . ." (pp. 12-13)

The EPA itself has found significant problems with institutional controls at its other sites. In an article entitled "EPA, Think Tank Studies Show Superfund Land-use Controls Flawed, December 10, 2001" which summarizes "Superfund Report via Inside EPA.com" by Resources for the Future, we find these conclusions, ***reached by the EPA itself***, which due to their significance, I will quote at length:

"EPA and environmental think tank studies have shown that the federal and state governments' land-use restrictions at Superfund sites, known as institutional controls (IC), are seriously flawed, with an agency study showing the controls are not reliably implemented and the think tank report finding the controls are dramatically under-funded."

"During a November 27 land use control summit, sponsored by the International City/County Management Association (ICMA), EPA officials and the Environmental Law Institute (ELI), outlined numerous shortcomings they have found with EPA's IC monitoring and enforcement efforts nationwide. While EPA released the results of a study showing EPA has failed to ensure Superfund ICs are reliably implemented, and ELI study indicates that EPA's ICs are dramatically under-funded."

"Bruce Means, of EPA's Federal Facilities Restoration and Reuse Office, told attendees that preliminary studies show that half of the ICs implemented under Superfund records of decisions (ROD) were mischaracterized. During a study of RODs conducted during 1999 and 2000, the agency found that half of the ICs established under RODs were not implemented as the agency had planned."

"And Jay Pendergrass of ELI outlined the preliminary findings of ELI's study of state's IC programs, which showed that the programs are severely under-funded."
"In a draft version of the report, Pendergrass found that state environmental programs are underfunded and as a result the sites allocate very little time on IC implementation. The

funding and staffing shortfall 'raises concerns about whether [ICs] are implemented as intended and [are] as protective as intended."

"An ICMA source agrees that EPA has serious problems with its IC program, saying that the agency has many RODs with vague or inconsistent references to such controls." (pages 1-2)

The greater the cleanup of the Butte Priority Soils Operable Unit, the more the site can be used productively. The less cleanup of the BPSOU, the less the site can be used for residences and recreational uses. Given the EPA's admission that institutional controls have failed it in the past, it is amazing that the remedies listed in the RI/FS for Priority Soils call for such extensive use of institutional controls.

Other Problems with Institutional Controls:

a. There is a tendency not to implement institutional controls as time passes. Frequently institutional control mandates are not carried to completion.
b. The effectiveness of institutional controls usually depends upon the ability, personnel and resources of the local government to implement. Often local governments do not have the personnel or resources to devote to the implementation and monitoring of institutional controls. Given the national administration's proposed cutbacks in Superfund allocations, resources will be increasingly unavailable on the national level to monitor implementation and effectiveness of institutional controls. Certainly the financial capacity of Butte's local government to implement and monitor institutional controls is greatly limited. Nowhere does the EPA's comprehensively address the above issue.
c. "Institutional controls rely heavily on humans to implement, oversee, and administer them. It is human nature to ignore tasks that no one else seems to care about or where the purpose is not readily apparent. Residual hazardous substances are a classic example of a problem that is not readily apparent." ("Protecting Public Health at Superfund Sites: Can Institutional Controls Meet the Challenge?" Environmental Law Institute, p. 2)
d. Although EPA must review the remedy every five years, the frequency of this review process may be insufficient to detect the failure of institutional controls.
e. The use of education as part of the institutional controls strategy is a substantial part of the EPA's approach to implementing institutional controls. Research of previous remedies under Superfund indicates that education programs fail to materialize.
f. "In addition to the direct costs of implementing institutional controls, their use can impose substantial indirect costs on communities, property owners, prospective purchasers and developers by limiting the ways a site may be used. The burden of the restrictions on use of the site falls on the property owner and the community, with the owner reaping potentially lower profits from use of the property and the community receiving lower social benefits from the allowed uses than would have been possible if no restrictions existed." (ELI, *Ibid.)*
g. Because the sites where institutional controls will be implemented will not be cleaned up and will present a continuing potential threat to human health, these

sites will be off limits to development in perpetuity. It is difficult to see how the use of institutional controls meshes with the goals of the EPA's Superfund Redevelopment Initiative.

h. It is impossible to determine future possible land uses for the site nor is it possible to predict unanticipated land uses. (See: "Linking Land Use and Superfund Cleanups: Uncharted Territory," by Probst, Hersh, Wernstedy and Mazurek, *Summary of Findings*, RFF, p. 1)

i. "Institutional controls have more problems than just risk miscalculation. Breeches in the site because of future construction, or even animals may cause the control to fail. The lack of a required contingency plan, would not account for new remedies, new information, or failed institutional controls negatively impacts the effectiveness of the treatment. Institutional memory loss was well is an important factor. This memory loss occurs when a party decides to breach the original institutional control without its own knowledge. In fact, in the ICMA (International City/County Management Association) study, the majority of respondents (63%) said that breaches in the institutional controls on a site were highly or somewhat likely. Following up on that question, 30% of the respondents reported that no formal inspection schedule was set up to evaluate the site as require by law." (Erwin Tam, Environmental Science and Economics, UC Berkeley, "Analysis of Institutional Controls at California Superfund Sites.")

j. "Concern has been expressed about the long-term viability of institutional controls as a remediation tool. For example, they may be forgotten; enforcement agencies may not effectively review properties or land users' actions; or land users simply may take their chances. Decision makers should weigh the full costs of such options, including capital costs, costs of long-term sampling and analysis, and costs of replacing equipment, as well as concerns about potential long-term risks associated with contaminants left in place, against the cost options that would remove the contaminants completely. Many local governments do not yet have the capacity and resources necessary to meet the challenges of long-term stewardship." ("Understanding the Role of Institutional Controls at Brownfields Sites: Major Concepts and Issues.")

k. Because institutional controls leave large amounts of contaminants in place, institutional controls will have to be perpetual. Who is to say what anticipated land uses come up for an institutionally controlled area? For example, fifty years after the record of decision for Butte Priority Soils is implemented, the contaminants will still be there threatening human health and the environment, but will the will be there to restrict land uses in order to prevent the release of contaminants. "Institutional controls 'work' only if they are complied with. And while this is true of any site remedy, institutional controls require monitoring and enforcement over long time periods." ("Linking Land Use and Superfund Cleanups: Unchartered Territory, Probst, et al., Resources for the Future Center for Risk Management.) Will the will to enforce institutional controls exist fifty to a hundred years in the future?

l. Legal, social and political pressures limit the effectiveness of institutional controls. (*Ibid.*)

m. The long-term effectiveness of institutional controls is unknown. "There has, however, been little investigation of what happens at sites on the National Priorities List (NPL) when land use plays a prominent role in the remedy selection process. There also has been little analysis of what institutions are involved in making land use decisions and maintaining land use restrictions over time. It is unclear what legal mechanisms are most effective, what institutions will be responsible for enforcing institutional controls, and who's going to pay for these additional responsibilities. We need to be able to answer these questions if land use-based remedies are to be protective over the long term." (*Ibid.*)

"Planners of long-term disposal systems have long recognized the difficulty of maintaining institutional control over property. . . ." (Jack A. Caldwell and Charles C. Reith, *Principles and Practice of Waste Encapsulation*, 1993, p. 35)

More on the inadequacy of Institutional Controls

Superfund's goal is to clean up hazardous waste sites that pose a threat to human health and the environment. Superfund cleanups should provide a permanent remedy that, in part, reduces the toxicity, mobility, and volume of contaminants. Because Superfund has a strong preference for treatment, the use of institutional controls should normally not be a substitute for "more active measures (e.g. treatment and/or containment of source materials) as the sole remedy. . . ." (40 CFR 300.430(a)(1)(iii)(D). OSWER Directive 9355.0-69, EPA 540-R-97-013 makes essentially this same point that the use of institutional controls should be a remedy of last resort.

To the extent that contamination at a site is really cleaned up, the necessity for institutional controls is minimized. To the extent that institutional controls are used at a site to put waste off-limits, the extent of contamination cleanup is minimized. It is important to remember that the impetus for Superfund in the first place was a failure of institutional controls to prevent the contamination problems and resultant health effects at Love Canal where the institutional controls were not followed. Risk is a function of both toxicity of the materials on site and the degree of exposure to the hazardous waste. (*Effects of Future Land Use Assumptions on Environmental Restoration Decision Making*, DOE, Office of Environmental Policy and Assistance, RCRA/CERCLA Information Brief, DOE/EH-413/9810, July 1998, p.1) Institutional controls depend on limiting exposure to toxic materials and do nothing to lessen the toxicity of these materials. After institutional controls are implemented, the toxic materials that originally triggered the Superfund cleanup are still on site to threaten human health and the environment.

Superfund should be concerned about treating hazardous wastes so that they are no longer toxic and, if treatment of the waste is technically impossible, removing the hazardous waste to a repository where the waste will no longer threaten human health and the environment. "Our obligation is to free subsequent generations of the responsibility for caretaking our hazardous residues, not to saddle them with housekeeping chores

which, if neglected, will result in the re-pollution of the environment that we worked so hard to clean." (Jack A. Caldwell and Charles C. Reith, *Principles and Practice of Waste Encapsulation*. Boca Raton: Lewis Publishing Co., 1993, p. 35.) Wastes that are institutionally controlled are still a permanent threat to human health and the environment.

The cleaner a site is after remediation, the greater the potential land uses for that site. The more contamination left after remediation, the less the potential land uses are for the site. "Citizens have pushed for the highest cleanup standards, arguing that an unrestricted use would allow a wider range of future development at the site." (Wernstedt, et. al., *Basing Superfund Cleanups on Future Land Uses: Promising Remedy or Dubious Nostrum?*, Resources for the Future, Discussion Paper 98-03, October 1997, p. 17) The institutional controls being considered in the EPA's RI/FS for Butte Priority Soils would seriously limit productive land uses and greatly compromise the property rights of owners. The extensive reliance on institutional controls is also contrary to the Superfund mandate of preference for treatment and cleanup over institutional controls that restrict land use in perpetuity. If the goal is to encourage productive land uses after Superfund cleanup, a clean site affords the most encouragement. If the goal is to protect human health and the environment, these toxic materials must be treated and/or removed.

The thesis of my comments is that the use of institutional controls for the Butte Priority Soils Operable Unit should be minimal. Instead of extensive use of institutional controls to deal with the BPSOU contaminants, the toxics in Butte Priority Soils should either be treated on site or, if that is not feasible, be removed to a safe repository and treated there using appropriate innovative technologies.

The reasons for this conclusion are:

1. Institutional controls do not meet the Superfund mandate of really cleaning up a site. To clean up means to make free of contamination.
2. Institutional controls are not permanent remedies. Rather, institutional controls permanently leave pollutants in place.
3. Institutional controls do nothing to reduce the toxicity of the hazardous materials. Lead, arsenic, mercury, and cadmium don't naturally attenuate over time, but keep their toxicity indefinitely.
4. Institutional controls are designed, implemented and monitored poorly.
5. Institutional controls have inherent enforcement problems.
6. Institutional controls have severe legal problems that work against effective reduction of the threats to human health and the environment posed by toxic materials.
7. Institutional controls are ineffective.
8. Institutional controls for a Superfund site are usually the result of a defective process that limits public participation and which leads to a haphazard development of institutional controls for a particular site.
9. Institutional controls are poorly understood and poorly defined.

Institutional Controls are not Effective

A. The EPA itself has found significant problems with the effectiveness of institutional controls. For example, in an article entitled "EPA, Think Tank Studies Show Superfund Land-use Controls Flawed, December 10, 2001" which summarizes "Superfund Report via Inside EPA.com" by Resources for the Future, we find the following conclusions:

1. Institutional Controls are not reliably implemented. The EPA study found that over half of the institutional controls implemented under EPA issued records of decision are mischaracterized and that half of the institutional controls were not implemented according to EPA plans.
2. Institutional Controls are dramatically underfunded.
3. Monitoring of institutional controls is poor. Another study of California Superfund sites entitled: "Analysis of Institutional Controls at California Superfund Sites" by Erwin Tam of the University of California—Berkley found that 30% of the sites had no inspection schedule as required by law and in 63% of the cases it was felt that compromise of the institutionally controlled site was likely.
4. Enforcement of institutional controls is poor.
5. ROD's tend to have "vague or inconsistent references" to institutional controls.

In a study done by English, et. al. of the University of Tennessee entitled *Institutional Controls at Superfund Sites*, (July 1997. Hereinafter cited as *Institutional Controls at Superfund Sites.*), which was funded in part by EPA; the EPA's remedial project managers admit the above listed problems (1-5) with institutional controls. The report concludes: "Perhaps most importantly, the results of this study point to a fairly strong sense of unease on the part of some RPMs with the efficacy of institutional controls. This finding is consistent with discussions in the literature on the efficacy of institutional controls." (p.67) No wonder noted engineers Jack A Caldwell and Charles C. Reith stated in their book *Principles and Practice of Waste Encapsulation*, that "Planners of long-term disposal systems have long recognized the difficulty of maintaining institutional control over property. . . ." (p. 35)

B. "To the extent that responsibility for selecting and maintaining the long-term effectiveness of the remedy will become contingent on the intent and actions of a more diffuse set of institutions—local government, private property laws, current and future property owners, land recordation offices, the courts—the ultimate effectiveness of a remedy to protect human health and the environment will become increasingly difficult to assess." (Hersh, et. al., *Linking Land Use and Superfund Cleanups: Uncharted Territory*, Center for Risk Management, 1997, p.49. Hereinafter cited as: *Linking Land Use.*) If institutional controls become a prime remedy for the Butte Priority Soils Operable Unit, the community will have to live with these controls, effective or not, in perpetuity.

C. The success of institutional controls will depend on changing the way people behave which is very difficult.

> Managing human behavior is an extraordinarily difficult task. None of the institutional controls in use, or under consideration for future use, is foolproof.

> None can reduce to zero the risk of human or environmental exposure to hazardous substances left in place at a site. Nor is there a universal, all-purpose institutional control appropriate for all sites. (Environmental Law Institute, *Protecting Public Health at Superfund Sites: Can Institutional Controls Meet the Challenge*, 1999, p. 13. Hereinafter cited as *Protecting Public Health*.)

The risk of human exposure is considerably less if the toxics are treated to make them non-toxic or if they are removed to a repository where the public cannot come in contact with them.

D. The relationship between land use and toxic exposure is not well understood and can have a great deal of variation.

Institutional Controls have Inherent Limitations

A. Institutional controls do nothing to reduce the toxicity or volume of contaminants. Institutional controls, per se, are not that effective in reducing mobility of toxics off-site. To be protective of human health and the environment, institutional controls would have to last as long as the toxics last. "Substances such as lead, mercury, arsenic, and cadmium will not degrade at all and will remain potentially hazardous unless removed or treated. In order to effectively protect against exposure to such long-lived risks, institutional controls would need to last essentially for as long as humans are expected to live on the planet." (*Protecting Public Health*, p. 13.) No institutional control has this needed level of permanence. If institutional controls are used instead of removal and/or treatment, these controls will have to work in perpetuity. Remember, toxic heavy metals such as those found at the BPSOU do not lose their toxicity over time. Yet, institutional controls are predicated on the designated land use of a sight existing in perpetuity—a flawed assumption. Land use changes are the most frequent changes in a locality.

B. Institutional controls also increase the likelihood that people will unknowingly be exposed to hazardous materials. Leaving contamination on site will always pose a threat of exposure if the institutional control fails. Predicting the long-term efficacy of an institutional control system is very problematic.

C. As we saw with regard to lead exposure, very often, as time passes, it is determined that the contamination in place is more dangerous to human health and/or the environment than originally thought. In such a situation, the in-place institutional controls may not be sufficiently protective of human health and the environment. "Questions then arise about who should be responsible for additional controls or remediation, and about whether residual contaminants should be allowed only if their risks and methods of containment are well understood." (*Institutional Controls at Superfund Sites*, p. 36.) It is critical that we get the most protective remedy the first time around.

D. Since the implementation of institutional controls depends on people, human error or neglect is a constant problem. After a remedy is selected, the degree of interest in the implementation of the remedy does not match the degree of interest shown during the

remedy selection process. "Residual hazardous substances are a classic example of a problem that is not readily apparent, and the tasks associated with implementing institutional controls are unlikely to be the focus of widespread public attention in many cases. Thus, decision makers should plan for a relatively high probability that the person charged with the responsibility to implement an institutional control will fail to do so because that task is not a high priority for that person or because it is a task without a specific deadline and can therefore be postponed indefinitely." (*Protecting Public Health*, p. 103) The efficacy of an institutional control depends on human judgment and "the judgment of any individual may be questionable in a specific situation and a poor judgment about implementing institutional controls could cause people to be exposed to hazardous substances." (*Protecting Public Health,* p. 105)

The Meaning and Understanding of Institutional Controls is Problematic.

A. What are the institutions that will be charged with controlling the toxics? How will these institutions coordinate their activities? Who will devise these institutional controls? Who will have enforcement responsibility? How will these controls be enforced? What is meant by controls? To what extent will the nature of these controls be the result of political processes rather then good protective environmental and scientific technology? Who will monitor the institutional controls? How often will the controls be monitored? How will they be monitored? All of these questions must be satisfactorily answered before the public can have any confidence in the protectiveness of the controls. Yet, in far too many cases where EPA has extensively utilized institutional controls, these questions have never been answered. Nor is there any consensus as to how they should be answered.

B. "When we admit societal values, power, political leverage, and notions of rights and duties into the picture, it becomes difficult to see 'controls' as anything but contested, and hence problematic. For institutional controls are not stagnant features of a remedy but are made and unmade in the course of experience by regulatory statutes, by the acuity of government oversight, by negotiations at planning board meetings, by the attitudes of bankers, developers, and others involved in real estate, by the limitations of scientific understanding of the health risks posed by toxic chemicals, by the vast and evolving corpus of real property law, by public trust in government or the lack thereof, and, in a broader sense by the constellation of rights and responsibilities that inform a societal ethic." (*Linking Land Use*, p. 52. See also: T. Beatley, *Ethical Land Use: Principles of Policy and Planning* (Baltimore, MD: Johns Hopkins Press, 1994 and R. Platt, *Land Use and Society: Geography, Law and Public Policy* (Washington, D.C.: Island Press, 1996) Even if there were some agreement on the nature and role of institutional controls, that agreement would be fleeting.

The Effectiveness of Institutional Controls is Compromised by a Dependency on Local Government.

A. It is impossible for local government to predict future land uses. Most land use planning is done in a very piecemeal, incremental fashion. One of the great faults of incremental decision-making is its inability to predict accurately or to plan for possible future events that differ from the present.

B. Often the development of institutional controls occurs after the record of decision has been determined. This later development limits public participation and limits local government input into the design and implementation of institutional controls. If institutional controls are imposed on local government after secret consent decree negotiations, local governments may well see no compelling reason to be pro-active in enforcing or monitoring these controls.

C. Often the development of specific institutional controls is more of a political process rather than a technical or scientific process. The essence of the political process is compromise which compromises may not be protective of human health and the environment. "When institutional controls are used to assure protection of human health and the environment, the technical adequacy of the remedy becomes dependent on a number of non-technical factors over which EPA has little influence. These include: the efficacy of local government administration; the consistent application of zoning ordinances; the ability of private property restrictions (such as easements and restrictive covenants) to bind both current and successive users of the sites; and prompt enforcement." (*Linking Land Use*, p. 7.) Land use planning on the local level is often not systematic but results from the compromises that are endemic to the political process. Often land use planning decisions represent the interests of developers, bankers, real estate agents, and etc. rather than the interests of the general public.

D. The lack of consistency in developing and applying land use controls on the local level means that institutional controls are not very dependable or reliable. "In no area of American law are there such frequent requests for amendments to the law (rezoning requests) or minor revisions to the law under the guise of an administrative actions (variance, special exemptions, and so forth." (*Linking Land Use,* p. 61) In fact changing zoning is the most common form of land use action which local government takes. (*Ibid.*, p. 62) E.D. Kelly in "Zoning" states this process is inherently "unpredictable and unfair." (Found in *The Practice of Local Government Planning*, 2nd ed., ed. F.S. So and J. Getzels (Washington, D.C.: ICMA Training Institute, 1988) Variances are also frequently given. B. Collingsworth in *The Political Culture of Planning* notes: "Various studies have convincingly shown that boards of adjustment (or appeal) commonly operate according to their own sense of what is right, with little regard to the law, or even their local planning department." (New York: Routledge, 1993, p. 7) English, *et. al.* conclude in *Institutional Controls at Superfund Sites* that: "local governments can repeal or modify any ordinance that they create. In no other area of American law are there such frequent requests for amendments to the law, and decisions about land use have been among the most controversial and contested issues in many communities. Furthermore, some

zoning ordinances place few locational constraints on residential construction, and, especially if a local government does not agree with the proposed Superfund remedy, it may be unwilling to cooperate by amending its zoning ordinance." (Energy, Environment, and Resources Center, University of Tennessee, July 1997. Hereinafter cited as: *Institutional Controls at Superfund Sites*.) For example, most restraints on local governments ability to change zoning regulations are procedural not substantive.

E. Local governments also face serious problems regarding the long term, permanent application of institutional controls. Enforcement of institutional controls by local government has been called "the weakest link of the chain." (Claudia Kerbawy, telephone interview with Robert Hersh, November 1995. Kerbawy is Chief of 307, Environmental Response Division, Michigan Department of Environmental Quality, Lansing, Michigan quoted in *Linking Land Use*, p. 65.) E.D. Kelly in *Enforcing Land Use Controls* calls local enforcement and monitoring of institutional controls "a planner's paradise but an enforcement nightmare." (Planning Advisory Service, Report Number 409 [Chicago: American Planning Association, 1988], p. 4)

F. The effective use of institutional controls demands coordination between and among several levels of government—a difficult, if not impossible, task. Several government agencies may be charged with selecting and implementing the institutional controls. The lack of coordination and cooperation between these agencies can doom institutional controls to failure. So often in the past, institutional controls have been selected on the federal level and the local government has been charged with implementation. Yet, often the local government does not have the authority, funding, interest in or commitment to the institutional controls imposed on it. Coordination and commitment problems can mean that the institutional controls will not be implemented as planned and will not be effective. "The entities responsible for implementation and operation of institutional controls must support the controls selected and have the authority, resources and commitment to enforce them. Because institutional controls may be essentially an unfunded mandate and can conflict with other interests of a locality or state, such as economic development, local acceptance is particularly important." (*Protecting Public Health*, p. 98)

G. The often-poor record keeping of the land use conditions that have been imposed on a Superfund site also compromise enforcement. Even conscientious developers may not be able to ascertain what restrictions have been placed on a piece of property they wish to develop.

H. Problems with local funding also limit the enforcement of institutional controls.

> "The long term efficacy of institutional controls must be based on regular monitoring, PRP or site owner compliance, and prompt enforcement; yet funding for environmental monitoring and enforcement at the local level has been reduced, and noncompliance with property-based restrictions can be difficult to detect. With deep funding cuts for environment enforcement activities at both the federal and state levels, there is a strong possibility that noncompliance with institutional controls will go unnoticed. Institutional controls work only if they are

> complied with. While this is true of any site remedy, institutional controls require monitoring and enforcement over long time periods and are thus more problematic. If we define a right to exist only when there is a system to protect the holder of the right from action or claims of another, to what extent should we see the increased use of institutional controls as a process that reduces the rights of nearby residents or workers on remediated sites while privileging those of past polluters? " (*Linking Land Use*, p. 68)

I. Local and state governments experience great turnover of staff. Institutional knowledge about the institutional controls is lost when there is a constant turnover of knowledgeable personnel.

Legal Issues Limit the Effectiveness of Institutional Controls

A. Another problem complicating the use of institutional controls are the courts. The courts can potentially play a significant role on land use decisions and land use decisions can be very litigious.

> "Although the courts try not to make substantive zoning decisions, judicial attacks on local land use regulations are well documented in case law and in the planning literature and constitute yet another source of uncertainty to the effective working of institutional controls at Superfund sites. In view of the wide variation in the decisions of state and appellate courts concerning the limits of police power to regulate land use and the need for Constitutional protection for the individual, it is easy to envisage the possibility that an owner of a site that is encumbered with a use restriction may challenge and successfully invalidate an institutional control, such as a zoning restriction, on the grounds that the restriction will cause a severe burden and, as such, constitutes a taking of private property by the government." (*Linking Land Use*, p. 64)

B. The NCP does not clearly specify the legal authority for institutional controls. Because there are no detailed statutory specifications of institutional controls, institutional controls are often left to the end of the remedy selection process where public input is minimal. Leaving them to the end is problematic in that: "If you leave institutional controls to the last and you can't get them implemented, then you're stuck. You're at a dead end rather than the destination of the record of decision (ROD)." (Claudia Kerbawy, *op.cit.*, p. 53)

C. On a practical level, it is unclear who should monitor and enforce the institutional controls. RODs usually have little specificity regarding the implementation and monitoring of institutional controls. Often the specification of the nature and types of institutional controls is very general. Questions abound regarding what kind of monitoring will be performed, who will perform the monitoring, how and what type of enforcement will occur, what will be the frequency of the monitoring, and who is responsible for maintaining the protectiveness of the institutional control arrangements. The technical remedy is determined first and then institutional controls are developed to

protect the remedy. Yet, it is often difficult to get acceptance by property owners or PRPs after the ROD is issued

D. Given that issues related to institutional land use/property control are not based in federal law but are based in state property laws or the local police power, federal control of institutional controls on the local level is very limited. CERCLA provides EPA with oversight authority over institutional controls that are part of the ROD remedy but CERCLA provides no mechanisms to enforce that control. Every five years, EPA can amend a remedy when contaminants are left in place, but during that five-year period the supervision of institutional controls is with the local government. Much to compromise a remedy can happen in five years. Moreover, there are serious proposals in Congress to remove the five-year review process. Hence, federal supervision of institutional controls is very problematic and could disappear altogether.

E. It is very problematic whether an institutional control on a current owner of a particular property would bind subsequent owners of that property. "Can third parties (for example, community groups or the local government) enforce a restriction at a site if the property owner fails to comply with the control and the holder of the easement, for example, (EPA, a PRP, the state government, or a local government if signatory to the agreement) fails to act properly? (*Linking Land Use*, p. 57) In *Environmental Regulation of Real Property*, N. Robinson comments that institutional control covenants are very complicated and that "they often defeat the attempts of parties to write covenants which will be enforceable against successors." (pp. 6-16) For example, the form of future property ownership must be similar to the existing type of property ownership for an institutional control restriction to continue in force. Once a property is sold to a new owner, monitoring of what the new owner does on the property is diffuse if it exists at all. What happens in a commercial venture if the purchaser of the property goes bankrupt? Who is responsible for the institutional control restrictions on the property? Who will enforce these restrictions? State laws regulating the use property are Byzantine.

> "The common law tradition of different types of ownership could limit long-term effectiveness of (institutional controls') reliability if they fail to bind third parties to the agreements worked out in the consent decree, and the question of authority—who holds an easement and on what legal basis can the government or some other entity challenge noncompliance with the easement or deed restriction—is, again, open to interpretation. These issues suggest that proprietary controls, negotiated between PRP/site owners and government (federal, state, local) may be insufficient by themselves to effectively ensure the long-term safety of the public from residual contamination. Their reliability hinges on how carefully they are devised, the authority and willingness of the party holding the rights to use them, and the willingness of a property owner to comply." (*Linking Land Use*, p. 58)

F. Multiple owners or multiple use of a site also compromise the ability of government to police institutional controls.

G. The "touch and concern" doctrine can limit the efficacy of real covenants in the institutional control process. "Equitable servitudes" also are limited in their effectiveness by the "touch and concern" requirement.

H. Liability under institutional controls is problematic.

> "When institutional controls are created, it is important to determine who will be liable in the event they fail. Even if the EPA has entered into a consent decree at the time of the initial site remediation releasing PRPs from liability for residual contamination, questions remain about liability if the institutional controls are violated. For example: If the current property owners allow development that violates use restrictions, are they liable, are the original PRPs liable, or both? If people are harmed by such a violation, would they be able to sue the current property owners, the original PRPs or both?" (*Institutional Controls at Superfund Sites*, p. 34)

I. Another difficulty is that land use controls are "vulnerable to changing legal interpretations about the nature of property rights." (Wernstedt, et. al., *Basing Superfund Cleanups on Future Land Uses: Promising Remedy of Dubious Nostrum?*, Resources for the Future, Discussion Paper 98-03, October 1997, p. 16) For example, if the courts expand the scope of takings decisions to increase the extent to which government regulations are viewed as a "taking" then the efficacy of institutional controls will be diminished.

Summary

Based on the above one can, in summary fashion, conclude:

1. Because the data upon which the remedy was based is incomplete, inadequate or insufficient, additional investigation is mandated.
2. Because the assumptions upon which the remedy is based are unsupported, additional investigation is mandated.
3. Because toxics of concern were not recognized and evaluated in the original remedy selection process, new investigations should be conducted and, if needed, the remedy should be modified to remediate these new toxics of concern.
4. Because there are workability/implementation problems, the remedy must be changed.
5. Because the Community Involvement Program is inadequate, particularly in terms of environmental justice issues, the Community Involvement Program must be modified.
6. Because of inherent problems with Institutional Controls and the degree to which the Priority Soils Remedy's effectiveness depends on Institutional Controls, the implementation of Institutional Controls at the Priority Soils site warrants strict scrutiny.

7. Because of inherent problems associated with caps, the difficulties inherent in the use of capping hazardous waste must be addressed.
8. Because of new data, the Priority Soils Record of Decision must be significantly modified.

The BPSOU Remedy as currently being implemented must be modified in order to:

1. Remediate all attics containing toxic attic dust, both within the BPSOU and in areas adjacent to the BPSOU, regardless of whether or not a so call "pathway of exposure" to the toxic dust exists. If toxic attic dust in present, it should be remediated. The "pathways of exposure" approach to remediating attic dust will assure that the BPSOU remedy as currently being implemented will never be protective of human health and the environment.

2. Comprehensively examine/assess/remediate all toxics/metals/elements of risk to human health and the environment found within and adjacent to the BPSOU.

3. Correct the health risk assessment omissions and remediation inadequacies listed earlier in this paper.

4. Officially stipulate that the arsenic contamination found in attics within and adjacent to the BPSOU is smelter dust and thus within the remediation purview of the Superfund program.

5. Develop, as part of the Remedy implementation, a comprehensive/effective/innovative community involvement program for the BPSOU that targets, in particular, low-income citizens.

6. Address and resolve the environmental justice issues that are discussed in this paper.

7. Justify the argument that remediating three toxics—arsenic, lead and mercury—will lead, automatically, to the remediation of all toxics present within the BPSOU.

8. Place the burden of initiating remediation on the PRPs and not on citizens.

9. Be proactive in Remediation. The Remedy as currently being implemented places far too much emphasis on voluntary cleanup initiation and compliance by property owners, or renters or occupants. (The primary burden should be on owners.) **Given the inadequate community outreach program articulated in the Plan, this is particularly problematic. While the PRPS for BPSOU need to be primarily responsible for implementing the cleanup of attics, however, the EPA needs to be pro-active also**. For example, private property controls such as deed restrictions, restrictive covenants, or government controls such as notices and advisories of contamination existing on the property, permits and informational devices (for example, notices that would become part

of property deeds) could be used. **The EPA has no lack of statutory authority to enforce its cleanup decisions under CERCLA**. In developing these controls, I would reference:

1. "Draft Guidance "Institutional Controls: A Guide to Implementing Monitoring and Enforcing Institutional Controls at Superfund, Brownfields, Federal Facility, UST and RCRA Corrective Action Cleanups" February 19, 2003

2. The Uniform Environmental Covenants Act

3. All of the enforcement tools available to EPA under the general heading of Superfund (CERCLA) law, policies and regulations. EPA has broad authority to regulate private actions in order to protect the public's right to a clean and healthy natural environment. The contaminants found on private property within the BPSOU constitute a threat to the public health and welfare.

Certainly, EPA has the legal right to enter into such environmental covenants, controls and enforcement actions in order to protect human health and the environment from contamination now and in the future. If voluntary compliance fails, these, and similar, controls and enforcement actions can and should be used to gain access to contaminated properties in order to remediate them. (Perhaps, what could be done is to have some property owner/resident response level participation target or benchmark level and if that target or benchmark level is not met, mandatory compliance actions will be forthcoming. If participation levels are below benchmark targets, the EPA could use more aggressive measures. I am all for voluntary compliance as a first start but, if voluntary compliance does not work, more directive measures and procedures are needed. Hopefully, if coupled with a vigorous public outreach campaign, voluntary compliance will be successful.) In any event, the EPA needs to be more aggressive at identifying and remediating homes with attic dust contamination problems. Leaving attic dust in place is leaving a threat to human health in place, contrary to Superfund law. Not only is this contaminated attic dust a direct threat to human health, it also is a threat to the whole BPSOU remedy in that it leaves in place a potential source of recontamination of the BPSOU. In order to ensure a permanently protective remedy, it would seem that preventing attic dust contamination from migrating to other parts of the BPSOU would be required. This can only be done, with any level of assurance, if existing attic contamination is expeditiously remediated regardless of whether or not some "visible" pathway of contamination is observed. EPA must approach this remediation proactively, using the extensive legal rights it possess to compel, if voluntary measures fail, remediation under Superfund. Over reliance on voluntary measures does not guarantee that the threats posed by attic dust contamination will be successfully remediated. Voluntary compliance may be the place to start, but if voluntary compliance is ineffective, more aggressive measures are necessary.

10. Provide assurances that adequate monies will be available to implement the program.