2000 Interior School Dust
Data Summary Report

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SECTION 1.0 INTRODUCTION

In response to a court order from the Fourth Judicial District Court of the State of Idaho concerning Idaho Schools for Equal Educational Opportunity, et al. v. The State of Idaho, and in response to public concerns over potential childhood exposures to lead in school dust, Bunker Hill Superfund Site (BHSS) schools and schools in communities east of the BHSS (Silverton, Wallace, Mullan, and Osburn) were sampled in November of 2000 by the State of Idaho. This document reports the results of this sampling survey and reviews dust exposure issues associated with the BHSS and the Coeur d'Alene Basin.

1.1 Overview

Childhood lead poisoning and excessive exposure to lead in environmental media have long been noted in Idaho's Silver Valley. Public health intervention programs and remedial cleanup efforts have been ongoing for decades. The State of Idaho, Department of Health and Welfare, Bureau of Environmental Health and Safety, Department of Environmental Quality (DEQ) and the Panhandle Health District (PHD) have monitored children's blood lead levels and conducted a health intervention program in the Silver Valley for more than twenty years. The Lead Health Intervention Program (LHIP) has been successful in identifying children with lead poisoning and intervening with parents and families to reduce blood lead levels. This program is funded by federal health agencies and is overseen and critiqued annually by the Agency for Toxic Substance and Disease Registry (ATSDR) and the U.S. Environmental Protection Agency (USEPA).

Young children are the population of greatest concern for lead exposure. Blood lead levels tend to peak in children as they become more mobile and begin to orally explore their surroundings. Blood lead levels normally peak at approximately 30 months of age at a neuro-developmental stage when children are especially vulnerable to neuro-behavioral deficits (Rodier 1995, Goldstein 1990). Because lead health risks are based on cumulative lead exposures that manifest in blood lead levels, all exposure data fit into a larger picture that includes residences, schools, and the greater community. Exposures to children from schools or day cares must be combined with exposures at home. It is protective to limit exposures at schools to lead levels permissible in the home (i.e., to no more than the house dust Remedial Action Objectives (RAOs) established at the BHSS). Lead exposures to children are complex and include multiple direct and indirect sources which often manifest themselves as lead in dust (which may originate from soil, paint, or airborne sources). Unless a child is eating paint chips containing high levels of lead, exposure to lead paint occurs through inadvertent ingestion of lead in dust.

Each year, the LHIP solicits blood lead samples door-to-door from children in the BHSS. The Site includes the cities of Kellogg, Wardner, Page, Smelterville, and Pinehurst and is located in Public School District 391. Participation rates have consistently been more than 50% of the total childhood population for more than a decade. Each child with a blood lead level of 10 micrograms per deciliter (µg/dl) or greater is provided with follow-up testing and environmental investigation services designed to assist the family in reducing the child's blood lead burden. These services exceed the United States Centers for Disease Control and Prevention's (CDC) recommendation that follow-up environmental investigation be conducted if blood lead levels greater than 15 µg/dl persist for more than three months (CDC 1997).

Over the past 12 years, BHSS children's blood lead levels have decreased more than 60%. The incidence of high blood lead levels in these communities has been reduced from near 60% to 5% of children today. The RAO for the Site is that no more than 5% of children in each community will have a blood lead level of 10 µg/dl or higher based on national health criteria. Most of the high blood lead levels observed in recent years are among children less than three years of age. In 2000, only one of 79 children (< 3 years old) tested, had a blood lead level exceeding the U.S. Surgeon General's 15 µg/dl individual intervention level. The incidence of blood lead levels greater than 10 µg/dl is about 10% among 1 and 2 year old children, and less than 8% among 3 and 4 year old children. Among school aged children (5 to 9 years old), the percent that exceed 10 µg/dl is now less than 3%, or 5 individual children of 189 tested in the year 2000.

The LHIP conducts public and parental education programs in the BHSS to inform parents, teachers, and community members about the mechanisms of lead poisoning and those safeguards and actions that can be taken to minimize exposure. The LHIP works closely with the schools in implementing these efforts. Each spring, these education efforts include annual visits and puppet shows in all kindergarten through third grade classrooms in both public and private schools.

In the course of conducting follow-up investigations of children with high blood lead levels, LHIP personnel develop exposure profiles for each individual case. Those profiles identify the suspect sources of lead poisoning and provide advice and assistance in reducing those pathways of lead to children.

In more than twenty years of follow-up investigations with several hundred individuals, interior dust in public schools has never been noted as a source or contributor to excess lead absorption. Some problems were noted with school yard soils that were subsequently remediated (Table 1). Samples of soils in school yards and interior dusts in schools were collected in the 1970s and in the 1989-90 remedial investigations, that indicated difficulties in finding enough dust to collect for laboratory analysis in areas of public schools accessible to children. The bulk of dust collected was from entryways, and lead levels were indicative of community-wide soil lead concentrations. Table 1 shows that soils at all schools in the BHSS (School District #391) have been remediated or will be remediated in the next year. Schools outside of the BHSS (School Districts #392, #393) have also been sampled and remediated. Soil remediation has been the key component to the BHSS cleanup, and as soil remediation nears completion, house dust lead levels are also expected to continue to decline. A similar strategy of reducing exterior soil lead levels to reduce interior dust lead levels is also being proposed for the Coeur d'Alene Basin (discussed in Section 1.2) cleanup plan to be finalized by the end of 2001.

The pattern of interior dust lead levels reflecting overall community soil lead levels, as noted in the 1989 school sampling, has been observed throughout the cleanup activities in residential areas at the BHSS since 1989. Health officials suspect that interior dust lead concentrations in

BHSS schools continue to reflect community levels. However, no additional interior dust sampling in schools has been conducted in recent years nor outside the BHSS.

1.2 Site Location and Background

The Coeur d'Alene Basin (CDAB) in northern Idaho has been impacted by historical mining and smelting activity. Public health investigations in the 1970s to 1980s resulted in the designation of the 21 square mile area called the Bunker Hill Superfund Site, or "the Box," surrounding the former ore refining complex near Kellogg. Recently, the USEPA and Idaho's DEQ have extended a Remedial Investigation and Feasibility Study (RI/FS) to include the larger area of contaminant release in the CDAB. The CDAB includes the areas east of Harrison upstream from the mouth of the Coeur d'Alene River to Mullan, near the Idaho/Montana border (Figure 1). In response to studies initiated in 1996, the RI/FS process began to investigate and respond to risks to children and the environment in locations beyond the boundaries of the BHSS.

1.2.1 Bunker Hill Superfund Site

The BHSS is located in Shoshone County in northern Idaho, approximately 40 miles east of Coeur d'Alene, Idaho. The site encompasses approximately 21 square miles in the Silver Valley of the South Fork of the Coeur d'Alene River (SFCDR) and included the 365-acre abandoned industrial complex of the former Bunker Hill Company lead/zinc mine and smelter in Kellogg, Idaho. The site is home to more than 7000 people in five residential areas or communities, including the cities of Kellogg, Wardner, Smelterville, Pinehurst, and the unincorporated communities of Page, Ross Ranch, Elizabeth Park, and part of Montgomery Gulch. Most of the residential neighborhoods and the former smelter complex are located on the valley floor, side gulches, or adjacent bench areas (Figure 1). A century of discharges and emissions from mining and smelting activities has left several thousand acres contaminated with heavy metals. The most significant contaminants are antimony, arsenic, cadmium, copper, lead, mercury, and zinc.

The Bunker Hill Company mining and smelting complex closed in 1981. The site was added to the National Priorities List (NPL) in 1983, and remedial activities were initiated in 1986 and continue today. These actions have markedly reduced blood lead levels in the area's population. Up to 75 percent of the preschool children tested (throughout the 1970s and early 1980s) had elevated blood lead levels ($\geq$10 μg/dl) (JEG 1988). As observed in Figure 2, blood lead levels of BHSS children in the early 1980s averaged around 15 μg/dl, while today, the average blood lead level of children is near 4 μg/dl, with about 5% greater than or equal to 10 μg/dl (TerraGraphics 2000a).

BHSS RAOs are defined in the Records of Decision (RODs) (USEPA 1991, USEPA 1992). The blood lead RAOs seek to reduce the incidence of lead poisoning in each community to the following levels:

- less than 5% of children with blood lead levels of 10 micrograms per deciliter (μg/dl) or greater; and
- no individual child exceeding 15 μg/dl (nominally, <1% of population).

These objectives are to be achieved by a strategy that includes:

- remediation of all yards, commercial properties, and rights-of-way (ROWs) that have lead concentrations greater than 1000 mg/kg;
- achieving a geometric mean yard soil lead concentration of less than 350 mg/kg for each community in the site;
- controlling fugitive dust and stabilizing and covering contaminated soils throughout the site; and
- achieving geometric mean interior house dust lead levels for each community of 500 mg/kg or less, with no individual house dust lead level exceeding 1000 mg/kg.

The cleanup strategy adopted in the Populated Areas ROD (USEPA 1991) was based on partial removal of contaminated surface soils and capping of sub-surface contaminants and waste piles throughout the 21-square mile site. Establishing barriers over contaminated sources served the dual purpose of preventing direct contact by the population and containing contaminants in place. An integral element in this strategy was that house dust lead levels would progressively decline to acceptable concentrations as the soil and waste pile sources were eliminated or contained.

1.2.2 House Dust Lead Activities in the BHSS

House dusts have been monitored at the site as part of the LHIP offered by PHD since 1974. House dust lead concentrations have been determined for homes with young children in each community by collecting a sample from the homeowner's vacuum cleaner bag during the annual blood lead census in July/August. Average dust lead concentrations on the site have been reduced by 95%. In the mid 1970s, dust lead exposures averaged 10,000 mg/kg, but currently average around 500 mg/kg (Figure 3). Since 1996, house dust lead concentrations have also been sampled by a dust mat sampling technique. This procedure also determines an index of dust and lead loading rates at entryways into the homes (mass/area/time).

The ROD also required that, following completion of soil remediation in a community (based upon achievement of the RAOs for exterior soils as defined by the 1991 ROD for the Populated Areas), any home with house dust concentrations at or above 1000 mg/kg would be considered for interior remediation. The rationale for this decision was derived from a 1990 pilot cleaning study in which several homes at the site received comprehensive interior cleaning, yet carpets in the home became recontaminated within one year as observed in follow-up sampling. As a result, it was determined that home interiors could not be permanently remediated until exterior contamination sources were addressed. It was recognized that success of the remedial strategy depended on house dust lead concentrations decreasing to community mean concentrations similar to post-remedial soil lead concentrations.

Currently, a residential House Dust Pilot Project is underway in Smelterville (where soil remediation is complete) to determine the effectiveness of professional house cleaning activities as a remedial technique in achieving long-term reductions in dust and lead loading in area homes.

1.2.3 Coeur d'Alene Basin Investigation Activities

The CDAB is a vast hydrologic drainage network of over 3700 square miles located in Shoshone and Kootenai Counties in northern Idaho (Figure 1). The Coeur d'Alene (CDA) River flows west through the Basin for approximately 53 miles from the Idaho/Montana state border to Lake Coeur d'Alene which then drains to the Spokane River. It is estimated that as many as 10,000 people live in over 20 incorporated and unincorporated communities in the CDAB area (excluding the Bunker Hill Superfund Site and the city of Coeur d'Alene). Most of the communities included in the CDAB have developed at or near old mine portals and ore milling sites, or are adjacent to large mine waste (tailings) or contaminated alluvial deposits.

The same soil and dust exposure pathways identified at the BHSS potentially exist for individuals throughout the CDAB. Soil lead values near the river downstream of the BHSS typically range from 2000 mg/kg to 12,000 mg/kg while those in the upper Basin range from 500 mg/kg to 25,000 mg/kg. Generally, soil samples average 2500 mg/kg to 2800 mg/kg lead throughout the CDA River Valley (Neufeld 1987, Haness 1991, Lustig 1991).

In 1991, the CDC's blood lead intervention level for children of 25 μg/dl was revised downward to 10 μg/dl. In response, the geographic area of human health concern surrounding the BHSS has continued to expand. Minimal testing of residents upstream and downstream from the site for lead and other heavy metals was done prior to 1996. Children tested in the early 1970s, living outside the boundaries of the BHSS, often exhibited blood lead levels of 40 μg/dl to 50 μg/dl. No organized screening occurred beyond the site boundaries from 1975 until 1996.

In 1996, the State of Idaho, PHD, and ATSDR began consideration of the entire CDA River Basin for health-related concerns similar to those of the BHSS. The reason for this concern was based on known historical mining practices in the BHSS, the CDC's blood lead action level, and the Health Consultation accomplished by ATSDR. Additionally, fate and transport studies at the BHSS indicated that metals contamination had spread from the site along the Coeur d'Alene River, into the chain lakes area, into Lake Coeur d'Alene, and possibly into the Spokane River (SAIC 1990). A large-scale, multimedia sampling survey within the Basin was performed in 1996 by the State of Idaho, USEPA, and ATSDR (IDHW 1999). To better define the nature and extent of the contamination in the Basin, USEPA Region X began additional RI/FS data collection activities that are currently ongoing. In 1999, data gap sampling was performed by the State of Idaho. Additionally, the USEPA requested ATSDR to conduct an independent review of the environmental sampling data from 47 Common Use Areas (CUAs) and 80 residential properties in the Coeur d'Alene Basin in the Spring of 2000. Blood lead monitoring also began in 1996 and is ongoing throughout the Basin. Figure 4 presents observed blood lead levels for the 1996 to 2000 blood lead data. Observed dust and soil lead concentrations from participating households in 1996 through 1999 (2000 data unavailable) are shown in Figure 5.

1.3 Background Issues on House Dust

1.3.1 Sources of Lead in House Dust

There are numerous sources of lead in the environment that contribute directly or indirectly to house dust. At the BHSS and the CDAB, lead has been released to the environment principally by historic mining, milling, smelting activities, and product usage (i.e., paint and gasoline additives). These contaminants have settled in soil and dust repositories in or near residential areas and continue to contribute to house dust. The primary residual contamination sources include area soils and dust, and interior and exterior paint found at homes.

Investigators generally agree that exterior sources, such as soil and street dust, become entrained in house dust via airborne routes or tracking of these exterior media into the home. Interior lead based paint contributes directly to house dust inside the home through chalking and chipping of the paint. Recent studies have been undertaken to apportion exterior and interior lead-containing media as sources of house dust lead. Adgate et al. (1998) confirmed findings from other studies showing that outdoor lead-containing media (i.e., soils and street dust) are large sources of lead in house dust. Using a chemical mass balance method, their findings suggest soil and street dust contribute approximately two thirds of lead mass in house dust, while lead based paints largely account for the other third. Using scanning electron microscopy, results from a study by Hunt et al. (1992) suggest that paint, street dust, and garden soil are the major sources of lead in house dust. Other research performed in Christchurch, New Zealand, apportioned lead in house dust to paints (45%), soil (3%-5%), street dust (15%-20%), and settled aerosols (15%-25%) (Fergusson and Schroeder 1985). The Cincinnati Lead Study explained fifty-two percent of the variation in surface house dust lead concentrations by interior lead in paint and exterior surface dust lead (Bornschein et al. 1986). Structural equation modeling used on the ten-year database of the BHSS reported 20% of the variation in dust lead concentrations can be explained by yard soil, city soil, and neighborhood soil (within a radius of 200 feet of the house). Of the 20% explained by the model, it was determined that approximately 20% of yard soil, 60% of city soil, and 20% of neighborhood soil contributed to the house dust lead level (TerraGraphics 2000a). Most recently, a linear regression model of the data used in the Coeur d'Alene River Basin human health risk assessment showed yard soil, interior paint condition, and community soil concentrations explaining nearly 50% of the variation in floor mat dust lead concentrations (TerraGraphics 2000c).

1.3.2 House Dust Sampling Methods

There is no clear consensus on the most appropriate methodology for sampling house dust. Lead concentration in house dust has been the most common measurement. Current efforts are focusing more on measurement of lead loading (e.g., mg/m^2) or loading rates (e.g., $mg/m^2/day$). Collecting loading versus concentration measurements greatly affects sampling methodology. To determine concentrations, only a sufficient quantity of dust must be collected. However, to determine loading, dust must be collected from a specific area and/or time period. No universally accepted house dust sampling technique has been developed to assess dusts inside the home. There is a general consensus, however, that the interior of the house, especially soft surfaces (i.e., carpets and furniture), serves as a reservoir for lead, and that these media are most difficult to sample (CH2M Hill 1991, Adgate et al. 1995).

Historically, BHSS interior house dust has been sampled by collecting the homeowners' vacuum cleaner bag whenever the vacuum had not been used outside the home. This method has been used since 1974 as part of the LHIP performed by PHD. This method provides a general measurement of lead concentration inside the home. Since 1996, house dust lead concentrations have been sampled, in conjunction with vacuum bag samples, using a dust mat sampling technique. This procedure determines lead concentration as well as dust and lead loading rates entering the homes (mass/area/time).

1.3.3 Sampling Location

A standard protocol for sampling interior dust predictive of childhood blood lead levels has not yet been promulgated, although the USEPA Technical Review Workgroup for Lead has identified this as a risk assessment priority. Some researchers have investigated different sampling areas inside the home, but have yet to agree on a standard house dust sampling location. Lanphear et al. (1995) suggests non-carpeted floors and interior window sills or window wells as standardized sampling locations (using the Baltimore Repair and Maintenance (BRM) or wipe methods). Others have suggested that carpeted floors better represent exposures inside the home. Kim and Fergusson (1993) claim that carpeted floors make better sampling surfaces than hard surfaces because the dust on hard surfaces can move around easier, creating areas that may be unrepresentative of the dust lead in the house. According to a recent analysis of twelve epidemiological studies, floor dust lead loading was determined to be the best environmental predictor of children's blood lead levels (Lanphear et al. 1998). These studies illustrate how important floor surfaces are to the sampling of house dust. Floor surfaces representing the area of the house where a child spends most of his/her time, or a composite of those areas (Farfel and Rohde 1995) will likely be the most useful for risk assessment purposes.

1.3.4 Standards for House Dusts

The USEPA has recently promulgated the U.S. Housing and Urban Development's (HUD) clearance standards as interim guidance levels for residential interior lead dust. These standards appear in the January 5, 2001 Federal Register. HUD has set post-abatement clearance standards for lead in house dust at 40 $\mu g/ft^2$ for floors and 250 $\mu g/ft^2$ for interior window sills (based on the wipe dust collection method only) (USEPA 2001). RAOs as defined in the BHSS's ROD state that geometric mean interior house dust lead levels for each community must reach 500 mg/kg or less, with no individual house dust lead concentration exceeding 1000 mg/kg.

1.4 Previous School Dust Surveys

Two previous surveys conducted in October 1989 and in June 2000 have performed dust sampling at BHSS and upper Basin schools using different sampling techniques.

1.4.1 CH2M Hill Survey

In October 1989, CH2M Hill collected interior dust from four schools within the BHSS to obtain information regarding the level of contaminant concentrations in interior dust. Samples were collected from high traffic areas, including classrooms, using a special vacuum cleaner equipped with a fiberglass filter. The 1989 interior dust survey of schools included Kellogg High School, Sunnyside Elementary, Kellogg Middle School, and Pinehurst Elementary. A total of eight dust samples were collected. The lead concentrations ranged from a minimum of 319 mg/kg at Pinehurst Elementary to a maximum of 2160 mg/kg at Sunnyside Elementary in Kellogg (See Table 2). The geometric mean site-wide for all four schools was 898 mg/kg. Analytical and summary results for this survey are found in the *Phase II Remedial Investigation Data Summary Report for the Bunker Hill CERCLA Site Populated Areas RI/FS* (CH2M Hill 1990).

1.4.2 Huntley Survey

In June 2000, IHI Environmental conducted an indoor lead investigation of five schools and one day care located within the BHSS and upper Coeur d'Alene Basin for Robert C. Huntley, Attorney, Boise, Idaho. The five schools and one day care were Kellogg High School, Kellogg Middle School, Silver Valley High Building, Silver Hills Middle School, John Mullan Elementary, and Huggie Bear Day Care. The Silver Valley High Building contains the Early Learning Center (pre-school, kindergarten, day care) and the Silver Valley Alternative High School. The purpose of this survey was to determine whether lead in interior dust was present on various surfaces within the school and the extent to which lead in dust is impacting these schools. Four sampling methods, wipe, micro-vacuum, paint chip, and bulk sampling, were used in this survey. Wipe samples were collected from hard surfaces such as floors and window sills. Micro-vacuum samples were collected from carpeted surfaces. Paint chip samples were collected from window sills. Bulk dust samples were collected from heating, ventilating, and air conditioning (HVAC) air filters. Out of the 103 samples that were collected, eight exceeded HUD clearance standards for lead. These samples were from five window sills, two carpeted surfaces, and one hard floor surface. Analytical and summary results for June 2000 schools interior dust are found in the *Indoor Lead Survey, Silver Valley Schools, June 19-22, 2000* (IHI Environmental 2000, Appendix A). Results are also included in Tables 3, 4a, 4b, 5b, 5c, 5d, and 5e where the State's November 2000 survey sample locations were the same.

1.5 Purpose and Objectives

The purpose of the November 2000 school sampling survey was to evaluate lead concentrations from interior dust in BHSS and upper Basin schools (School Districts #391-393). The dust was to be sampled when school is in session to be more representative of exposure. This document reports the data collected during the November 2000 survey while incorporating and comparing data collected from previous school and house dust surveys. The specific objectives of the November 2000 sampling survey were:

- to collect samples in a similar manner and at the same locations as CH2M Hill sampled in the October 1989 survey of BHSS area schools;
- to collect a representative number of samples in a similar manner and at the same locations as the Huntley survey in June 2000 of BHSS and upper Basin area schools;
- to collect samples for the first time at Osburn Elementary and at the new Sunnyside Elementary in high-traffic areas and classrooms used daily;
- to collect vacuum and mat dust samples at each school in order to compare data with historical and year 2000 community-wide house dust vacuum and mat dust lead concentrations and daily dust and lead loading; and
- to collect drinking water fountain samples from each school to determine if drinking water is a potential source of lead exposure.

SECTION 2.0 METHODS

In November 2000, dust, indoor air, and fountain drinking water were sampled for lead from eight schools and one day care throughout the BHSS and the upper Basin: Kellogg High School, Kellogg Middle School, Sunnyside Elementary, Pinehurst Elementary, Silver Hills Middle School, Silver Valley High Building, John Mullan Elementary, Osburn Elementary, and Huggie Bear Day Care. The four sampling methods used to collect dust were vacuum bag, dust mat, BRM, and wipe. Fountain drinking water was collected using cubi-tainers and air was tested using personal air monitors. A full description of sampling protocols can be found in the *2000 FINAL Field Work Plan for Interior Dust Sampling* (TerraGraphics 2000b).

For comparison purposes, Kellogg High School, Kellogg Middle School, and Pinehurst Elementary were sampled in a similar manner and at the same locations as CH2M Hill sampled in the October 1989 survey. The BRM method was used in the present survey instead of the special vacuum cleaner equipped with a fiberglass filter used in the 1989 survey. In response to concerns regarding data usefulness, both concentrations and loadings were determined for the BRM.

Kellogg Middle School, Kellogg High School, Silver Hills Middle School, Silver Valley High Building, John Mullan Elementary, and Huggie Bear Day Care were sampled as part of the Huntley survey on June 19-22, 2000. During the November 2000 survey, BRM and wipe samples were collected from areas where elevated lead concentrations were detected in June and from a representative set of non-detect sample areas. Representative non-detect samples were collected to determine if a variance exists between dust lead levels during the summer, when no students are present, and during the academic year. Representative non-detect samples were selected from high-traffic areas throughout each school. Wipe samples were collected in the same manner as the Huntley survey. The November 2000 survey deviated from the Huntley protocol for carpet samples by using the BRM sampler instead of the micro-vacuum. During the Huntley survey, the Mullan School District conducted air monitoring in John Mullan Elementary to determine if lead in dust becomes air-borne. For comparative purposes, air samples from two separate high-traffic areas within John Mullan Elementary were collected from approximately 8:00 am to 3:30 pm, while school was in session.

Vacuum cleaner bag samples have been used as a primary measurement in the evaluation of lead in dust in homes on the BHSS since 1974, and in the Coeur d'Alene Basin since 1996. Vacuum bag samples were collected at each school for comparisons to historical and 2000 community-wide house dust data. Dust mats have also been used to determine house dust lead concentrations entering homes on the site and in the Basin since 1996. Dust mats not only measure dust lead concentrations but provide additional data on dust and lead loading rates. Dust mats were placed inside main entry ways at each school.

Because Osburn Elementary and the new Sunnyside Elementary building had not previously been sampled for interior lead dust concentrations, these were included in the November 2000 survey. These two schools comprised the remainder of the elementary schools that currently operate in the BHSS and upper Basin. Dust samples were collected using the BRM, dust mat, vacuum bag, and wipe methods in high traffic areas in both these schools. Water samples were also collected from drinking fountains from all schools sampled in the November survey.

2.1 Sample Collection Methods from Previous Surveys

2.1.1 CH2M Hill Sample Collection Methods

Fiberglass Filter Vacuum Sampling: Samples were collected from high traffic areas including classrooms frequented daily using a special vacuum cleaner equipped with a fiberglass filter capable of collecting dust particles as small as 0.01 micron in size. The filter is enclosed in a disposable plastic assembly attached to the intake hose of the vacuum cleaner. The work plan for interior dust sample collection procedures stated that a one-square meter area was to be vacuumed for one minute (CH2M Hill 1989). However, results were reported only as concentrations and not as mass per area.

2.1.2 Huntley Sample Collection Methods

For the June 2000 Huntley survey, four sample methods were used, wipe sampling, micro-vacuum sampling, paint chip sampling, and Bulk HVAC filter sampling. Only the wipe, micro-vacuum, and paint chip sampling techniques are discussed below, because only sample results from these methods can be compared with data results from the November 2000 survey.

Micro-vacuum Sampler: Samples were collected from carpet using a micro-vacuum method similar to a method developed by Que Hee and Bornschein, at the University of Cincinnati (Que Hee et al. 1985, Bornschein et al. 1985). Dust was collected through a 1 mm x 9 mm sample nozzle and through a 37 mm MCE filter cassette. The nozzle and filter cassette were attached to a personal air monitor pump with a flow rate of 2.5 liters per minute. A 6 inch x 12 inch carpet area was sampled by passing the nozzle in one direction and then passing the nozzle in the direction perpendicular to the first.

Wipe Sampling: Wipe samples were collected in a manner consistent with procedures outlined in the U.S. Housing and Urban Development's *Guidelines for the Evaluation and Control of Lead-*

Based Paint Hazards in Housing, Appendix 13.1 (HUD 1995). Hard, non-porous surfaces were sampled using unscented "Little Ones Baby Wipes®" available at K-Mart® department stores. Hard floors, window sills, window troughs, book shelves, cabinet tops, and surfaces associated with HVAC systems were sampled using the wipe method. Floor surface areas were marked with a 12 inch by 12 inch template and sampled. Other sample areas were measured and marked with masking tape.

Paint Chip Sampling: Three paint chip samples were collected from window sills where wipe samples had been collected. Two paint chip samples were collected from sills where paint was deteriorated, and one paint chip sample was collected from a metal window sill by scraping paint from a 1 inch by 2 inch area. Paint chip samples were collected and placed into 50 ml centrifuge tubes.

2.2 November 2000 Sample Collection Methods

Dust, fountain drinking water, and air samples were collected during the period of November 13-30, 2000. School was in session for this survey as opposed to the Huntley survey conducted two weeks after the 1999-2000 school year. By previous agreement, the sampling was conducted as a surprise survey. The school district superintendents were notified by telephone four hours prior to the start of sampling. A full description of sampling protocol is found in the *2000 FINAL Field Work Plan for Interior Dust Sampling* (TerraGraphics 2000b) and the in the *Addendum to School Sampling Plan - Revised* (TerraGraphics 2000d).

Vacuum Bag Sampling: Vacuum cleaner dust samples were collected from one or more vacuums from each school. To establish a unilateral time frame for vacuum dust collection, schools were asked to replace their vacuum bags on or around November 1, 2000. Vacuum types included canister vacuums, upright vacuums, and large industrial hall vacuum cleaners. The dust samples were collected from school vacuums by removing the bag and placing it into a large zip-lock® bag. If the vacuum bag was too large to fit into a zip-lock®, the bag was cut open, dust gently removed from the bottom of the bag (where fine materials had settled), and placed into the zip-lock® bag.

Dust Mat Sampling: Dust mats used for sampling are the "Floorsentry" model by Arko® and measure 17"x29". Two to six (an average of four) dust mats were placed directly inside high-traffic entry ways to each school. Where feasible, carpet tape was used to temporarily secure the mats in place. The mats were collected 5 to 14 days (an average of 9 days) after placement. Upon collection each mat was placed into an envelope made from white butcher paper, which was sealed with clear packaging tape to prevent dust from escaping. The mats were then placed into a sealed cardboard box. During collection, transport, handling, and storage, the mats were kept with the fiber side facing up so that the sample volume was not compromised. The mats were transported to the University of Idaho mat dust extraction laboratory for processing.

The dust was extracted from the mats with a Eureka Mighty-Might® vacuum cleaner and an adapted 1 inch wide tygon tube/sample nozzle. For each dust mat sample, a decontaminated tygon tube was attached to the vacuum cleaner and a new Eureka MM® vacuum bag was placed inside the vacuum to collect dust. The interior vacuum housing and port were decontaminated with disposable wipes between each sample. The collection envelope was cut open and each mat was vacuumed with direct contact of nozzle, making nozzle-width passes from right to left over the length of the entire mat and rubber edges (approximately 1 minute for full coverage) and then across the width of the mat from top to bottom; this procedure was repeated once more, but only right to left. The mat was then turned over and the back of the mat was struck five times with a wooden rod provided for this purpose (this causes dust remaining in the mat to fall onto the surface of the envelope). The inside of the envelope was vacuumed to remove any visible dirt or dust. Once extraction was complete for a mat, the Eureka MM® vacuum bag was removed from the vacuum and carefully folded and placed into a quart size zip-lock®bag. A pre- and post-weight was recorded from the vacuum bag to determine mass of dust collected.

Wipe Sampling: Wipe samples were collected in a manner consistent with procedures outlined in the U.S. Housing and Urban Development's *Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing, Appendix 13.1* (HUD 1995). Unscented "Little Ones Baby Wipes®" available at K-Mart® department stores were used to collect wipe samples from hard floor surfaces and window sills. The area of each sample was recorded in the log book. Window sill areas were generally measured and marked with masking tape, floors were sampled using a 12" x 12" template or square tiles were measured and used as a templates.

BRM Sampling: An average of two BRM dust samples were collected from high traffic carpeted areas such as entry ways and highly used classrooms. The BRM is a modified high-volume cyclone sampling method developed for the Baltimore Repair and Maintenance Study (Farfel et al. 1994, Lanphear et al. 1995). The cyclone device is attached to a hand-held Dirt Devil® vacuum, which moves air through the system. An 8 oz Nalgene® bottle is attached to the cylclone for the purpose of catching and collecting the sample and a tygon tube/sample nozzle is attached to the cyclone device.

Three 1-square foot templates were lined up in each area to be sampled. In one case, five 1-square foot templates were used in order to obtain enough sample, and in another case, a carpeted boot ledge was sampled, where a 1 foot x 2½ foot area was measured and marked with tape. Between each sample, the BRM was disassembled and each cyclone piece and the templates were decontaminated. After decontamination, a new, clean, pre-weighed Nalgene® catch bottle was securely attached to the bottom of the cyclone. A clean hose was used for each sample, with decontamination occurring between each school. A fresh filter bag was installed in the Dirt Devil® vacuum between sampling each school. After the template was placed and secured at the sample location, the cyclone was held vertical and the carpet surface was vacuumed with direct contact of nozzle in a vertical motion, making nozzle-width passes from right to left over the 1-square foot carpet; repeated horizontally from top to bottom; three times in each direction. After the sample was collected, the Dirt Devil® vacuum was allowed to run for an additional 10 seconds in order for all the dust in the cyclone to fall into the sample bottle. The catch bottle was removed and capped, and the final weight of the bottle was measured. The difference in weight before and after vacuuming is the total dust weight.

Air Monitoring: Air monitoring was performed at John Mullan Elementary School only. Gilliam GilAir 5® personal monitors were used to collect indoor air samples from two separate high-traffic areas within the school. A Gilliam Gilibrator® air flow calibrator system was used to calibrate the personal air monitors to a flow rate of 1.4 liters for both samples. The practical quantitation limit (PQL) for lead on each filter is 5 µg. Both air monitors were positioned so that samples could be collected from the children's breathing zone, approximately 4 feet above the ground. The first air monitor was set up in the hallway on the first floor outside of the second grade classroom, and the second air monitor was set up in the hallway on the second floor outside of the library. The air monitors ran from approximately 8:00 am to 3:30 pm.

Fountain Water Sampling: Twenty-two drinking water fountains, three classroom sink faucets, and one kitchen faucet were sampled from the nine schools. An average of three first draw drinking water samples were collected from each school. First draw water samples were collected immediately after turning on the tap for the first time in the morning. The water sample was collected into a plastic cubi-tainer or polyethylene bottle and preserved with nitric acid.

2.3 Data Quality Assurance/Quality Control Summary

A data Quality Assurance/Quality Control (QA/QC) review was completed to evaluate the precision, accuracy, completeness, and representativeness of the data obtained from both the field and the laboratory. A complete QA/QC review of school dust data collected during the November 2000 sampling survey is found in Appendix B. Laboratory data sheets are found in Appendix C. A total of 164 samples (including QA/QC) were collected from the nine BHSS and upper Basin schools using six distinct sample collection methods. Mat dust, vacuum dust, BRM dust, wipe dust, air monitoring, and first draw drinking water fountain samples were collected and submitted for lead analysis to Northern Analytical Laboratories, Inc. in Billings, Montana.

Field QA/QC samples consisted of five field duplicates, six rinsate blanks, twelve field blanks, and eight National Institute of Standards and Technology (NIST) soil standards. Three wipe dust duplicates and corresponding originals were all below the instrument detection limit for lead. The calculated relative percent difference (RPD) was 16.7% for the vacuum dust duplicate. The BRM dust duplicate had a calculated RPD of 53.9%; this high RPD is most likely an indication of high dust variability. Five of six rinsate blanks were below instrument detection for lead. One rinsate blank had a detected lead concentration of 0.017 mg/l. This rinsate blank was collected from BRM sampling equipment and the lowest lead concentration detected from BRM samples was 250 mg/kg. This concentration is significantly higher than 10 times the rinsate concentration; therefore, it was determined that decontamination procedures were adequate for the project.

External laboratory QA/QC was evaluated using field blanks and NIST soil standards submitted blind to Northern Analytical. All field blanks were below instrument detection limits for lead. One NIST standard was submitted with the BRM dust samples and the percent recovery for this standard was 90%. Three wipe dust standards were collected and percent recoveries ranged from 98% to 103%. One vacuum dust standard was collected and the percent recovery was 71%. This percent recovery for the vacuum dust standard did not meet data quality objectives as outlined in the work plan (80-120%), therefore all vacuum dust sample results batched with this standard were qualified as estimates for lead. The average standard percent recovery for the three mat dust standards was 66% and ranged from 60% to 67%. The percent recovery results for mat dust standards are consistent with previous BHSS residential mat dust surveys. The reduced percent recoveries are likely attributable to mat fiber dilution of vacuumed dust mat samples or a portion of the standard sticking to the vinyl backing of the mat.

Internal laboratory QA/QC precision was assessed using laboratory control samples (LCS), matrix spike/matrix spike duplicate samples (MS/MSD), and prep blank analysis. All laboratory QA/QC results were within the acceptable control limits. Based on a complete review of field duplicates, rinsate blanks, field blanks, standards, prep blanks, LCS, and MS/MSD analysis, the final completeness for this survey was assessed at 100%.

SECTION 3.0 RESULTS AND DISCUSSION

3.1 Results of CH2M Hill Survey

Table 2 displays the results for samples collected in the CH2M Hill survey from October 1989 and the results of duplicated sample locations and other dust lead concentration data obtained in the November 2000 survey. The Sunnyside Elementary building sampled in the 1989 survey is no longer used. Sunnyside Elementary has since moved to a new school built at a different location in town and given the same name. The lead concentrations from the 1989 survey ranged from a minimum of 319 mg/kg at Pinehurst Elementary to a maximum of 2160 mg/kg at Sunnyside Elementary in Kellogg. The two samples from Pinehurst Elementary had lower concentrations than the Kellogg schools. In 1989, Kellogg schools and residential mean community vacuum dust lead levels exceeded 1000 mg/kg, with geometric means of 1162 mg/kg and 1652 mg/kg, respectively (TerraGraphics 2000a). Analytical and summary results for 1989 schools interior dust are found in the *Phase II Remedial Investigation Data Summary Report for the Bunker Hill CERCLA Site Populated Areas RI/FS* (CH2M Hill 1990).

All the sites in 1989 were sampled using a special vacuum cleaner equipped with a fiberglass filter. This sampling technique was not repeated in 2000 due to unavailability of equipment and evolving sampling methodolgies. In November 2000, three of these sites were carpeted and sampled using the BRM method and three were hard floor surfaces sampled using the wipe method. Although the results are not directly comparable, the same surface and media was sampled. Two BRM lead concentrations in November 2000 were below those detected in 1989 in Pinehurst Elementary and Kellogg High School. One carpet sample in the Library of Kellogg Middle School was 1640 mg/kg in November 2000 and 961 mg/kg in 1989. Two of the wipe samples collected in November 2000 were below instrument detection for lead and the one detected at Kellogg High School was 27 $\mu g/ft^2$. This loading is below the 40 $\mu g/ft^2$ HUD clearance standard for floors. Further discussion of these school results from the November 2000 survey are in Section 3.3.1.

3.2 Results of Huntley Survey

Results from the Huntley survey, as reported by IHI Environmental, showed that of 103 samples collected, eight exceeded HUD clearance standards for lead. These samples were from five window sills, two carpeted surfaces, and one hard floor surface. A complete summary of results for this survey are found in the *Indoor Lead Survey, Silver Valley Schools, June 19-22, 2000* (IHI Environmental 2000, Appendix A).

Table 3 shows the eight exceedances reported from the Huntley June 2000 survey (and the corresponding November 2000 survey results) and any other sample results exceeding applicable lead standards in the November 2000 survey. The paint chip sample which corresponds to the wipe sample from a window sill in room 103 at Kellogg Middle School is also presented in Table 3. The observed lead concentration in the paint chip sample was 11,300 mg/kg (or 1% lead) and the corresponding wipe sample was 708 µg/ft^2. This window sill was re-sampled in November 2000 and a lead value of 377 µg/ft^2 was detected. The wipe samples from both surveys are above the HUD clearance standard of 250 µg/ft^2, and the high paint chip sample indicates that these results are due to lead based paint. At Kellogg High School, an elevated window sill sample of 436 µg/ft^2 and an elevated floor wipe sample of 94 µg/ft^2 were observed in the Huntley survey. Both samples exceeded the HUD clearance standards for lead. These two surfaces were sampled again in November 2000 using the same wipe sampling method. These results showed <60 µg/ft^2 and 50 µg/ft^2, respectively.

In the Huntley survey, three window sill wipe samples exceeded HUD clearance standards for lead at the Silver Valley High Building with loadings of 780 µg/ft^2 (3rd floor auditorium), 479 µg/ft^2 (1st floor gym) and 374 µg/ft^2 (room 106) (Table 3). In November 2000, wipe samples were collected at these same locations and results of 143 µg/ft^2, 184 µg/ft^2, and 116 µg/ft^2, respectively were below HUD clearance standards. Possible explanations for these differences may be due to temporal variation and seasonal conditions (summer versus fall), or the samples may have been collected at different time intervals following janitorial cleaning. Because dust on hard surfaces can easily migrate, greater variability exists between samples from hard surfaces (Kim and Fergusson 1993).

Two of three carpet samples collected from John Mullan Elementary using a micro-vacuum were reported in the Huntley survey as exceeding HUD clearance standards (Table 3). Although standards for wipes do not apply to this particular sampling method, these results were compared to the HUD 40 µg/ft^2 clearance standard in the Huntley survey (IHI Environmental 2000, Appendix A). The first sample, from a boot ledge in the first floor hallway, was observed at 85 µg/ft^2. The second sample, collected from the fourth grade classroom on the second floor, had a lead value of 40 µg/ft^2. These locations were resampled using the BRM method in the November 2000 survey, and results were 1496 µg/ft^2 for the boot ledge and 3632 µg/ft^2 for the fourth grade classroom sample. The results from these different sampling protocols are not directly comparable and there is no recognized standard that applies to either of these methodologies.

3.3 Results of the November 2000 Survey

3.3.1 BHSS Area Schools

Kellogg High School, Kellogg Middle School, Sunnyside Elementary, and Pinehurst Elementary were sampled in the BHSS. Tables 4a, 4b, 4c, and 4d show all results for dust and drinking water. No drinking water samples from the four schools exceeded MCL standards for lead in drinking water. Two water samples were above instrument detection limits but below USEPA's maximum contaminant level (MCL) of 0.015μg/l in Kellogg High School and Kellogg Middle School at 0.007 and 0.005 mg/l, respectively. All seven vacuum bag dust samples collected had lead concentrations below 700 mg/kg, ranging from a minimum of 332 mg/kg in Sunnyside Elementary (Table 4c) to 674 mg/kg at Kellogg High School (Table 4a). For comparison, geometric mean vacuum bag lead concentrations from Kellogg and Pinehurst homes were similar for the year 2000 at 464 mg/kg and 397 mg/kg, respectively.

Mat dust lead concentrations in the schools were generally lower than, or similar to, those observed in residential homes in the year 2000. Geometric mean mat dust lead concentrations were 700 mg/kg in Kellogg schools versus 854 mg/kg in homes, and 553 mg/kg and 405 mg/kg, respectively, in Pinehurst schools and residences. One mat dust lead concentrations at Kellogg Middle School (Table 4b), Sunnyside Elementary, and Pinehurst Elementary (Table 4d) exceeded 1000 mg/kg, with concentrations of 1030 mg/kg, 1080 mg/kg, and 1050 mg/kg, respectively. The daily mat dust loading rate ranged from a minimum of 1069 mg/m^2/day in both Kellogg High School and Sunnyside Elementary to a maximum of 6343 mg/m^2/day in Kellogg Middle School. These loadings are substantially higher than the year 2000 geometric mean dust loading rates for mats from homes in Kellogg and Pinehurst with respective values of 539 mg/m^2/day and 607 mg/m^2/day. Because traffic volume is much greater in schools than in residential homes, higher loading rates are expected in schools than in homes. Lead loading rates were also substantially higher in the schools, ranging from 0.49 mg/m^2/day in Kellogg High School to 4.19 mg/m^2/day in Kellogg Middle School. Geometric mean lead loading rates for mats from homes in Kellogg and Pinehurst were 0.46 mg/m^2/day and 0.24 mg/m^2/day, respectively.

BRM lead concentrations ranged from 328 mg/kg in Pinehurst Elementary to 1640 mg/kg at Kellogg Middle School. BRM lead loadings ranged from a minimum of 1.20 mg/m^2 to a maximum of 65.2 mg/m^2, both at Kellogg Middle School. Of 17 wipe dust samples collected from BHSS area schools, only three had detectable lead loadings of 377 µg/ft^2 in Kellogg Middle School, and 50 µg/ft^2 and 27 µg/ft^2 at Kellogg High School. The one wipe sample exceeding HUD clearance standards in Kellogg Middle School was from a window sill that has known lead paint based on the Huntley survey as discussed in Section 3.2.

3.3.2 Coeur d'Alene Basin Area Schools

Located in the upper Basin, Osburn Elementary, Silver Hills Middle School, Silver Valley High Building, John Mullan Elementary, and Huggie Bear Day Care were also sampled during the November 2000 survey and results are presented in Tables 5a-5e. Drinking water lead concentrations ranged from below detection at Silver Hills Middle School (Table 5b) to 0.018 mg/l at Osburn Elementary (Table 5a). The drinking water MCL for lead is 0.015 mg/l. The fountain sampled on the first floor of Osburn Elementary had a lead concentration of 0.018 mg/l and the sample from a fountain on the second floor exhibited a concentration of 0.015 mg/l. Upon receiving and reviewing the drinking water sample results, the school was notified and corrective actions were taken. Vacuum bag dust lead concentrations were below 700 mg/kg, ranging from a minimum of 352 mg/kg at Huggie Bear Day Care (Table 5e) to a maximum of 644 mg/kg at Osburn Elementary. Osburn Elementary and Silver Hills Middle School were the only two schools with observed vacuum dust lead concentrations greater than 500 mg/kg in the upper Basin. Wallace, Mullan, and Silverton schools had substantially lower concentrations compared to vacuum bags collected from homes in the same area (1004 mg/kg, 985 mg/kg, 557 mg/kg, respectively) (TerraGraphics 2000c).

Mat dust lead concentrations ranged from 310 mg/kg at Osburn Elementary to 1440 mg/kg at Silver Hills Middle School. With the exception of two individual mats from Silver Hills Middle School exceeding 1000 mg/kg (1440 mg/kg and 1050 mg/kg), mat lead concentrations from schools were lower than residential mat lead concentrations. Geometric mean residential mat lead concentrations were 882 mg/kg in Osburn, 1774 mg/kg in Wallace, 1242 mg/kg in Mullan, and 863 mg/kg in Silverton (TerraGraphics 2000c). Mat dust lead loading rates ranged from 0.11 mg/m^2/day at John Mullan Elementary (Table 5d) to 17.6 mg/m^2/day at Silver Hills Middle School. As expected because of higher traffic volume in schools, mat dust and lead loading rates were higher in schools compared to residential geometric mean lead loadings, except for the Silver Valley High Building (Table 5c) and John Mullan Elementary. Geometric mean lead and dust loading rates in the Silver Valley High Building were 0.38 mg lead/m^2/day and 412 mg dust/m^2/day, compared to residential means of 2.43 mg/m^2/day and 1371 mg/m^2/day, respectively. The John Mullan Elementary mean lead and dust loading rates were 0.50 mg lead/m^2/day and 822 mg dust/m^2/day, compared to the residential community means of 1.56 mg/m^2/day and 1260 mg/m^2/day, respectively.

BRM lead concentrations ranged from 250 mg/kg at Huggie Bear Day Care to 1060 mg/kg at both Silver Hills Middle School and John Mullan Elementary. BRM lead loadings ranged from 0.61 mg/m^2 at Huggie Bear Day Care to 64.1 mg/m^2 at Silver Hills Middle School. Wipe dust loadings were detected at four out of 19 sample locations. Of the four detected wipes, lead loadings ranged from 112 $\mu g/ft^2$ at Osburn Elementary to 184 $\mu g/ft^2$ at the Silver Valley High Building, below the HUD window sill clearance standard of 250 $\mu g/ft^2$.

Two air monitoring samples were collected at John Mullan Elementary and results are shown in Table 5d. The air monitors ran from approximately 8:00 am to 3:30 pm, while school was in session. The average flow throughout the day was 1.4 liters per minute. Both sample concentrations observed were below detection (<9 $\mu g/m^3$). If air monitoring is to be performed in the future, it is recommended that high volume (20 liters per minute) pumps be used.

SECTION 4.0 SUMMARY AND CONCLUSIONS

A survey of dust and dust lead levels in Silver Valley area schools was conducted during the period of November 13-30, 2000 by contractors for the State of Idaho, DEQ. A total of 164 samples (including QA/QC) were collected from eight area schools and one day care. Those schools included Kellogg High School, Kellogg Middle School, Sunnyside Elementary, Pinehurst Elementary, Silver Hills Middle School, Silver Valley High Building, John Mullan Elementary, Osburn Elementary, and Huggie Bear Day Care.

Six types of samples were collected for lead analysis while schools were in session for the November 2000 survey. By previous agreement from the school's Superintendents, school officials were notified four hours prior to the sampling survey so that cleaning procedures and schedules did not deviate from those typically practiced by the school. Four types of dust samples were collected. Those methods included a vacuum bag sample from each school's vacuum cleaner, dust mats placed at the main entryways, the BRM special vacuum used to sample carpets, and wipe samples from hard surfaces and window sills. Fountain drinking water and air samples were also collected during the sampling survey. Two drinking fountains were found to have lead levels exceeding federal health criteria and corrective actions were taken. Air was sampled at only one school by personal air monitors and no significant concentrations were noted.

Two types of lead measurements are obtained by the dust mat, vacuum bag, BRM, and wipe dust sampling methodologies. Those measurements are concentration and loading. Concentration is the mass of lead per mass of dust, reported in milligrams of lead per kilogram of dust (mg/kg). These units are equivalent to parts per million (ppm). Dust loading and lead loading are reported as mass per unit area. The vacuum bag methodology measures only concentration (mg/kg) in the dust collected by the school vacuum. The wipe method measures only lead loading ($\mu g/ft^2$) on floors and window sills. The BRM technique measures concentration (mg/kg), dust loading (g dust/m^2), and lead loading (mg Pb/m^2) in carpets. The dust mat method measures lead concentration (mg/kg) and both dust (mg/m^2/day) and lead loading rate (mg/m^2/day), or the amount of dust and lead that accumulates on the mats per day.

Dust lead concentration has been measured at the BHSS for decades and is recognized as an important indicator of exposure to lead, especially for young children. As a result, assessment of the risk to children and comparisons of historical and current levels can be made from the school samples collected in the November 2000 survey.

Dust lead concentrations were measured by three techniques in the November survey; however, many different protocols have been used in the past surveys, making direct concentration comparisons difficult. All three sampling techniques used in the November survey showed similar concentrations, with the BRM showing somewhat higher concentrations in two of the Kellogg schools. Dust lead concentrations in the Kellogg and Pinehurst schools were similar to mean residential area house dust levels. Vacuum bag and BRM dust lead concentrations in Kellogg schools ranged from 332 mg/kg to 1640 mg/kg, with a geometric mean of 700 mg/kg in dust mats (Tables 4a-4c). This compares to an 854 mg/kg mean dust mat lead concentration in Kellogg homes. Although vacuum samples from Kellogg Middle School and Kellogg High School were higher than the community residential mean (655 mg/kg, 674 mg/kg, and 650 mg/kg, respectively vs. 464 mg/kg community mean), additional risks to the dust in these schools are minimal as these are older children (older than 11 years) and not expected to ingest as much dust as younger children. Vacuum dust concentrations in the Sunnyside Elementary school were lower than the community mean (332 mg/kg and 335 mg/kg vs. 464 mg/kg, respectively). In Pinehurst Elementary, six of seven dust samples ranged from 328 mg/kg to 460 mg/kg; one dust mat sample showed 1050 mg/kg lead (Table 4d). The Pinehurst geometric mean residential dust concentration in 2000 was 405 mg/kg in dust mats and 397 mg/kg in vacuums.

In the upper Basin communities, school vacuum bag dust lead concentrations were lower than those found in residences, with the exception of vacuum bag dusts in Osburn Elementary and Silver Hills Middle Schools (644 mg/kg and 632 mg/kg vs. 493 mg/kg community mean, respectively) (Tables 5a-5b). School vacuum bag concentration comparisons to community residential geometric means for the other schools were 451 mg/kg vs. 1004 mg/kg in Wallace, 387 mg/kg vs. 985 mg/kg in Mullan, and 352 mg/kg vs. 557 mg/kg in the Silverton daycare (Tables 5c-5e). Mean dust mat comparisons of schools to residences were 514 mg/kg and 778 mg/kg vs. 882 mg/kg for the Osburn schools, 923 mg/kg vs. 1774 mg/kg for the Wallace school, 604 mg/kg vs. 1242 mg/kg for the Mullan school, and 425 mg/kg vs. 863 mg/kg for the Silverton daycare. As these lead levels are lower than residential means, additional risk from lead exposures at these schools would not significantly contribute to higher blood lead levels.

With respect to the concentration of lead in dust, school levels are reflective of, and in the upper Basin lower than, those observed in the general community. This was the same result observed in the RI/FS for the BHSS in 1989. At that time, Kellogg schools special vacuum and mean community vacuum bag dust lead levels both exceeded 1000 mg/kg, with geometric means of 1162 mg/kg and 1652 mg/kg, respectively. Since that time, concentrations in the community have been reduced to 464 mg/kg (72% decrease), and 675 mg/kg in schools (42% decrease) (Table 2) through remedial efforts on the site. Direct comparisons for the school lead concentrations from 1989 are difficult as the same sampling protocols used in the 1989 survey are no longer used as a dust sampling technique. Although the Kellogg school mean of 675 mg/kg is higher than 464 mg/kg vacuum bag community mean, that concentration includes all sampling techniques that provide a concentration measure.

Direct comparisons for residential means, however, are applicable because the same sampling techniques are used on the BHSS today. A direct comparison of Kellogg schools to the community mean for recent data can be made by examining the dust mat and vacuum bag sampling techniques. In this case, vacuum bag concentrations from Kellogg schools are slightly higher than the community mean, but floor mat lead concentrations are generally lower in schools than the community mean. The RAO, or goal for the cleanup, for residential dust lead levels on the BHSS is a mean of less than 500 mg/kg with individual levels less than 1000 mg/kg (assuming the vacuum bag methodology). Schools throughout the valley are at or near that goal, as is the BHSS. As a result, any potential incremental increases in blood lead levels from exposure at schools are limited because school dust lead levels are similar to or less than those observed in the residential communities.

Lead loading measured by the wipe is the only technique that can be compared to an applicable standard. A total of 36 wipe samples were collected in the November 2000 survey. Two of those samples exceeded the applicable criteria (Table 3). One floor sample from the main stairwell in Kellogg High School measured 50 µg/ft^2 compared to the 40 µg/ft^2 criteria. This same location was sampled in June by a consultant for a private attorney (Huntley survey) and a value of 94 µg/ft^2 was noted. The oldest part of Kellogg High School was built in 1957.

Five window sills were noted in the Huntley survey as exceeding the 250 µg/ft^2 window criteria. These sites were re-sampled in November and one sill in Kellogg Middle School continued to exceed the criteria with a value of 377 µg/ft^2 (Table 3). In the Huntley survey a paint chip sample was collected from this particular window sill, showing a lead level exceeding 1% in paint. It was noted in the Huntley survey that the paint condition of this window sill was not chipping or peeling, although the paint may have been chalking. However, a considerable effort was put forth to obtain the paint chip sample from this window sill. The other four window sills with excessive wipe loadings in June showed less than the HUD standard of 250 µg/ft^2 in November (Table 3). It is likely the sills were cleaned in the interim. No other floors or window sills exceeded the criteria in either survey.

These results indicate that window sills might act as a reservoir for lead dust, especially those that have been painted with lead based paint. A pre-school, kindergarten, and day care exists in the Silver Valley High Building where 3 window sill wipe samples were observed to exceed the HUD standard of 250 µg/ft^2 in the June survey. This survey was completed after school was out of session, and in the November survey, samples were again collected from these same locations while school was in session and showed that lead loadings were below the HUD standard. The other high window results from the June survey were found in middle and high schools. Children in these schools are not as at-risk to exposure from window sills as younger and, particularly, pre-school aged children. Periodic cleaning would likely mitigate the hazard presented by these window sills.

The levels observed in the Silver Valley schools are comparable to reports from other schools in the U.S. In a school survey conducted in Philadelphia, wipe samples were collected from accessible and inaccessible hard surfaces from 5 schools with confirmed presence of lead-based paint. Although the schools had a known possible source of lead, the wipe results in accessible areas (desks, windowsills, etc.) were low. Of the ten rooms sampled, one room had an observed mean lead loading on accessible surfaces of 66 µg/ft^2, while the other 9 rooms had mean lead loadings for accessible surfaces ranging from 5 µg/ft^2 to 10 µg/ft^2 (Shorten and Hooven 2000).

Dust and lead loading rate is measured by the entryway dust mat technique. This methodology is believed to measure the amount of dust and lead entering the home or school from outdoor and, possibly, interior entryway sources. The results for Kellogg Middle School show that 1330 mg/m^2/day to 6343 mg/m^2/day of dust enters the school at the different entrances. This compares to 539 mg/m^2/day mean for residential homes in Kellogg, or about 3-12 times as much dust for the school entryways. With respect to lead in that dust, from 1.05 mg/m^2/day to 4.19 mg/m^2/day of lead comes in at the same entrances. This compares to 0.46 mg lead/m^2/day mean for residential homes in Kellogg. This suggests that about 2-9 times as much lead enters a school entrance as does in a typical home. It is expected that school dust and lead loading rates are higher than residential mean loading rates because the number of children/people entering and using that building per day is substantially greater than the number of children/people entering a home per day. In Kellogg High School and Sunnyside Elementary, the same patterns of higher dust and lead loadings into the schools were observed compared to the community-wide residential means for Kellogg.

In Pinehurst Elementary, dust entering the school ranged from 1936 mg/m^2/day to 5563 mg/m^2/day compared to the community-wide residential mean of 607 mg/m^2/day. Again, about 4-10 times as much dust is observed entering the school compared to the residential homes. A similar result is observed for lead loading. The mass of lead entering the school ranged from 0.91 mg/m^2/day to 2.56 mg/m^2/day compared to the community-wide geometric mean of 0.24 mg lead/m^2/day.

Similar to the BHSS and because of higher traffic volume, upper Basin schools of Osburn Elementary, Silver Hills Middle School, and the Huggie Bear Day Care, show dust and lead loadings into the schools are also higher than that observed in homes. Silver Hills Middle School had one mat with an extremely high dust (12,197 mg/m^2/day) and lead (17.56 mg/m^2/day) loading rate, increasing the maximum amount of dust and lead entering that school to 14 and 23 times as much as observed in the community residential homes of 884 mg dust/m^2/day and 0.78 mg lead/m^2/day (geometric mean), respectively. This mat was at the main entryway to the school used more frequently than the other three entryways where mats were placed.

However, two upper Basin schools, the Silver Valley High Building and John Mullan Elementary, displayed opposite results to the other schools. Lower dust and lead loadings are observed in both schools compared to community-wide residential means. In Wallace, residential dust loadings were 1371 mg/m^2/day with lead loadings of 2.43 mg/m^2/day. Dust loadings observed in the Silver Valley High Building ranged from 151 mg/m^2/day to 1004 mg/m^2/day, or about 1.5-9 times less than the residential geometric mean. Lead loadings ranged from 0.12 mg/m^2/day to 0.96 mg/m^2/day, or about 2.5-20 times *less* than the residential geometric mean. This building is no longer used as a high school, but contains the Early Learning Center (a pre-school, kindergarten, and day care) and the Silver Valley Alternative High School. Also, paved streets and concrete sidewalks surround the building. The one entryway where the dust loading was 1004 mg/m^2/day was observed to be the main entry of use. These loadings are more similar to the residential means.

The BRM methodology used in the November survey indicates how much lead is present in carpeted surfaces in the schools. The results for the Kellogg Middle School, for example, indicate the main entry carpet has 96.3 grams of dust per square meter (g/m^2) and 65.2 mg of lead per square meter removable by the BRM technique. The library carpet, in contrast, contains about

0.73 g/m^2 dust and 1.20 mg/m^2 lead. The library result is important to note, as this sample showed the highest lead concentration of any dust sample (1640 mg/kg), but a relatively low lead loading (Table 4b). Comparing the results of the BRM to the dust mat measurement at the main entry way, indicates the equivalent of about 16 days of dust and lead accumulation was found in the entry carpet. Together these results indicate that substantial amounts of lead are collected at the entryway, but do not migrate into the school.

Relatively low levels of lead (less than 10 mg/m^2) were noted in the Kellogg and Osburn middle school libraries, the Sunnyside and Pinehurst elementary schools, the high school building in Wallace, and the daycare in Silverton. The highest lead loadings in carpets were the main entrance to the Kellogg and Osburn middle schools and one classroom in the Mullan elementary school. Intermediate levels were noted at the Kellogg High School and the Osburn and Mullan elementary schools.

Carpets were also sampled by a micro-vac methodology in the June survey. The BRM methodology collects significantly more sample than the micro-vac technique and the results are difficult to compare quantitatively. However, the June survey did indicate positive lead findings in carpets by the micro-vac method for the Kellogg Middle and High School and Osburn Middle School entrances, the pre-school carpet in the Silver Valley High Building and the classrooms in the Mullan Elementary School, where the November survey found high BRM loadings.

The health significance of these vacuum readings is difficult to assess. These results indicate that significant amounts of dust and lead are captured and retained on entryway carpets at particular schools. In general, interior carpets in these schools show relatively low levels of lead, indicating the effectiveness of the entryway carpeting in capturing dust lead entering the building. However, these carpets are a reservoir for the contaminants and should be cleaned regularly. Other schools show low levels of lead in the entryways and throughout the building. Intermediate levels noted at the Osburn Elementary and the Mullan Elementary School suggest that regular vacuuming and cleaning is advised.

In summary, these results collectively support earlier conclusions that the schools do not represent a significant risk of lead exposure to the children of the Silver Valley. Potential exposures to lead in the schools is relatively low compared to the home and residential area environment for most children. Lead poisoning, although prevalent throughout these communities in the 1970s and 1980s is relatively rare among school aged children (5-9 year olds) today. Follow-up investigations of school-aged children with lead poisoning, indicate exposures to contaminated soils and dusts are encountered in residential and recreational activities. None of these investigations has indicated a significant exposure occurring on school property in the last several years.

SECTION 5.0 REFERENCES

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Table 1 - School Remediation Status

School District	Exterior Sampled	Remediated	Interior Sampled
#391			
Canyon Elementary	Yes	No - tested below cleanup threshold	No
Pinehurst Elementary	Yes	Yes - 2000	Yes - CH2M Hill 1989; IDEQ 2000
Sunnyside Elementary (closed)	No	No exposed soil - closed	Yes - CH2M Hill 1989
Sunnyside Elementary (opened May 1999)	Yes	New School - Remediated during construction	Yes - IDEQ 2000
Kellogg Middle School	Yes	No - to be remediated in 2001-2002	Yes - CH2M Hill 1989; Huntley 2000; IDEQ 2000
Kellogg High School	Yes	Yes	Yes - CH2M Hill 1989; Huntley 2000; IDEQ 2000
Silver King Elementary	Yes	Closed - used as Bus garage	No
#392			
Mullan Elementary	Yes	Yes - 2000	Yes - Huntley 2000; IDEQ 2000
Mullan High School	Yes	Yes - 2000	No
Mullan Football Field	Yes	No - tested clean	--
#393			
Osburn Elementary	Yes	Yes - 1999	Yes - IDEQ 2000
Silver Hills Middle School	Yes	Yes - 1997-1999	Yes - Huntley 2000; IDEQ 2000
Silver Valley High Building (Old Wallace Elementary)	Yes	Yes - Shared play area with High School 1999	Yes - Huntley 2000; IDEQ 2000
Wallace High School	Yes	Yes - Shared play area with old Elementary 1999	No
Huggie Bear Day Care	Yes	Yes - Play Area South of Building 2000	Yes - Huntley 2000; IDEQ 2000

Table 2 - Comparison Between November 2000 and CH2M Hill 1989 School Dust Lead Concentration Data*

		State November 2000					CH2M Hill October 1989		
Location	**Surface**	**Sample Method**	**Lead Conc.**	**Units**	**Lead (1) Load**	**Units**	**Sample Method**	**Lead Conc.**	**Units**
Pinehurst Elementary									
Room 2	Floor Carpet	BRM Dust	328	mg/kg	--	--	Special vacuum cleaner	540	mg/kg
Room 7	Floor Tile	Wipe Dust	--	--	<14	ug/ft2	Special vacuum cleaner	319	mg/kg
Main entry, far left door going in	--	Mat Dust	430	mg/kg	--	--	--	--	--
Main entry, middle left door going in	--	Mat Dust	450	mg/kg	--	--	--	--	--
North entry, left door going in	--	Mat Dust	460	mg/kg	--	--	--	--	--
South entry, right door going in	--	Mat Dust	1050	mg/kg	--	--	--	--	--
Hallway vacuum	--	Vacuum Dust	416 J	mg/kg	--	--	--	--	--
Classroom vacuum	--	Vacuum Dust	406 J	mg/kg	--	--	--	--	--
Pinehurst Elementary - Geometric Mean Lead Concentration			**471**						
Kellogg High School									
Entry Hall	Floor Carpet	BRM Dust	1020	mg/kg	--	--	Special vacuum cleaner	1720	mg/kg
Room 309	Floor Tile	Wipe Dust	--	--	27	ug/ft2	Special vacuum cleaner	1040	mg/kg
Room 206	Floor Carpet	BRM Dust	1060	mg/kg	--	--	--	--	--
Main entry middle door	--	Mat Dust	640	mg/kg	--	--	--	--	--
Main entry north door or left door going in	--	Mat Dust	740	mg/kg	--	--	--	--	--
Main entry south door or right door going in	--	Mat Dust	740	mg/kg	--	--	--	--	--
Gym entry west double doors, right door going in	--	Mat Dust	450	mg/kg	--	--	--	--	--
Gym entry west double doors, left door going in	--	Mat Dust	460	mg/kg	--	--	--	--	--
Gym entry middle double doors, right door going in	--	Mat Dust	Insufficient volume		--	--	--	--	--
Upstairs vacuum bag	--	Vacuum Dust	674 J	mg/kg	--	--	--	--	--
Downstairs vacuum bag	--	Vacuum Dust	650 J	mg/kg	--	--	--	--	--
Kellogg High School - Geometric Mean Lead Concentration			**688**						
Kellogg Middle School									
Library	Floor Carpet	BRM Dust	1640	mg/kg	--	--	Special vacuum cleaner	961	mg/kg
Room 115	Floor Tile	Wipe Dust	--	--	<30	ug/ft2	Special vacuum cleaner	856	mg/kg
Main entry	Floor Carpet	BRM Dust	677	mg/kg	--	--	--	--	--
Main entry, the farthest right door going in	--	Mat Dust	660	mg/kg	--	--	--	--	--
Cafeteria entry, the farthest right door going in	--	Mat Dust	730	mg/kg	--	--	--	--	--
Cafeteria entry, middle right door going in	--	Mat Dust	1030	mg/kg	--	--	--	--	--
Cafeteria entry, middle left door going in	--	Mat Dust	790	mg/kg	--	--	--	--	--
Vacuum bag dust	--	Vacuum Dust	655 J	mg/kg	--	--	--	--	--
Kellogg Middle School - Geometric Mean Lead Concentration			**836**						
Old Sunnyside Elementary (2)									
Gym and cafeteria entry way	Unknown	--	--	--	--	--	Special vacuum cleaner	2160	mg/kg
Computer room	Unknown	--	--	--	--	--	Special vacuum cleaner	773	mg/kg
New Sunnyside Elementary (2)									
Main entry (west entry), right door going in	--	Mat Dust	750	mg/kg	--	--	--	--	--
NE corner of bldg, east entry, right door going in	--	Mat Dust	850	mg/kg	--	--	--	--	--
NE corner of bldg, east entry, left door going in	--	Mat Dust	1080	mg/kg	--	--	--	--	--
NE corner of bldg, north entry, right door going in	--	Mat Dust	640	mg/kg	--	--	--	--	--
SE corner of bldg, right door going in	--	Mat Dust	710	mg/kg	--	--	--	--	--
SW corner of bldg, right door going in	--	Mat Dust	530	mg/kg	--	--	--	--	--
Canister vacuum dust	--	Vacuum Dust	332 J	mg/kg	--	--	--	--	--
Industrial hall vac dust	--	Vacuum Dust	335 J	mg/kg	--	--	--	--	--
Room 107	Floor Carpet	BRM Dust	356	mg/kg	--	--	--	--	--
Hallway, near SW entry way	Floor Carpet	BRM Dust	566	mg/kg	--	--	--	--	--
Sunnyside Elementary - Geometric Mean Lead Concentration			**571**						
All Kellogg Schools - Geometric Mean Lead Concentration			**675**					**1162**	

< Concentration below instrument detection limit.

(1) HUD's interim clearance standard for floor wipe samples is 40 ug/ft2; lead loading is the only value obtained from a wipe sample, therefore, no concentration is comparable to the CH2M Hill survey for that specific location.

(2) Since the 1989 survey, Sunnyside Elementary moved to a new building at a different location; the new Sunnyside Elementary was sampled in November 2000 (See Table 4c).

* Only concentration is represented in this table and all data including lead loading rates for the November 2000 survey (Kellogg High School, Kellogg Middle School, Sunnyside Elementary, and Pinehurst Elementary) are presented in Tables 4a-4d.

Table 3 - 2000 School Dust Data Results Exceeding Action Levels

School	Location	Surface	State November 2000 Sample Method	State November 2000 Lead Value	State November 2000 Units	Huntley June 2000 Sample Method	Huntley June 2000 Lead Value	Huntley June 2000 Units	Applicable Standards Lead Value	Applicable Standards Units	
BHSS Schools											
Kellogg Middle School	Room 103	Window Sill	--	--	--	Paint Chip	11300	mg/kg	--	--	--
Kellogg Middle School	Room 103	Window Sill	Wipe Dust	377	ug/ft2	Wipe Dust	708	ug/ft2	250	ug/ft2	(HUD)
Kellogg High School	2nd floor corridor, south side	Window Sill	Wipe Dust	<60	ug/ft2	Wipe Dust	436	ug/ft2	250	ug/ft2	(HUD)
Kellogg High School	Main stair, near room 215	Floor Tile	Wipe Dust	50	ug/ft2	Wipe Dust	94	ug/ft2	40	ug/ft2	(HUD)
Upper Coeur d'Alene Basin Schools											
Osburn Elementary	1st floor fountain, west end, first draw	--	Fountain Water	0.018	mg/l	--	--	--	0.015	mg/l	(MCL)
Osburn Elementary	2nd floor fountain, east end, first draw	--	Fountain Water	0.015	mg/l	--	--	--	0.015	mg/l	(MCL)
Silver Valley High Building	3rd floor auditorium	Window Sill	Wipe Dust	143	ug/ft2	Wipe Dust	780	ug/ft2	250	ug/ft2	(HUD)
Silver Valley High Building	1st floor gym west wall	Window Sill	Wipe Dust	184	ug/ft2	Wipe Dust	479	ug/ft2	250	ug/ft2	(HUD)
Silver Valley High Building	Room 106, pre-school	Window Sill	Wipe Dust	116	ug/ft2	Wipe Dust	374	ug/ft2	250	ug/ft2	(HUD)
John Mullan Elementary	1st floor corridor, boot ledge	Boot Ledge Carpet	BRM Dust	16.10 mg/m2 (1496 ug/ft2)		Micro-vac	85	ug/ft2	(3)	--	--
John Mullan Elementary	2nd floor, 4th grade classroom	Floor Carpet	BRM Dust	39.10 mg/m2 (3632 ug/ft2)		Micro-vac	40	ug/ft2	(3)	--	--

< Concentration below instrument detection limit.

(MCL) Maximum Contaminant Level - The maximum permissible level of a contaminant in water which is delivered to any user of a public water system; EPA's current drinking water standard for lead.

(HUD) These Housing and Urban Development standards were updated in September, 2000. HUD's interim standard for floors is 40 ug/ft2 and 250 ug/ft2 for window sills. Public schools with students six years old or younger fall under these HUD guidelines. Levels above these standards are cause for concern.

(3) The Huntley survey compared Micro-vac floor sample results directly against the HUD interim lead standard of 40 ug/ft2 for floors (IHI Environmental 2000, Appendix A).

Table 4a - 2000 School Dust Data Results, Kellogg High School, Kellogg, Idaho

November 2000								Huntley June 2000				Community	
Sample Method	Lead Conc.	Units	Dust Load Rate	Units	Lead Load Rate	Units		Sample Method	Lead Load Rate	Units	Applicable Standard	House Dust Geometric Mean	Location
Fountain Water	<0.003	mg/l	--	--	--	--		--	--	--	0.015 mg/l (MCL)	--	1st floor fountain, first draw
Fountain Water	0.007	mg/l	--	--	--	--		--	--	--	0.015 mg/l (MCL)	--	2nd floor main hall fountain, first draw
Fountain Water	<0.003	mg/l	--	--	--	--		--	--	--	0.015 mg/l (MCL)	--	3rd floor fountain, first draw
Mat Dust	640	mg/kg	5900	mg/m2/day	3.78	mg/m2/day		--	--	--	(4)	854 mg/kg (A)	Main entry middle door
Mat Dust	740	mg/kg	1812	mg/m2/day	1.34	mg/m2/day		--	--	--	(4)	854 mg/kg (A)	Main entry north door or left door going in
Mat Dust	740	mg/kg	1875	mg/m2/day	1.39	mg/m2/day		--	--	--	(4)	854 mg/kg (A)	Main entry south door or right door going in
Mat Dust	450	mg/kg	1557	mg/m2/day	0.70	mg/m2/day		--	--	--	(4)	854 mg/kg (A)	Gym entry west double doors, right door going in
Mat Dust	460	mg/kg	1069	mg/m2/day	0.49	mg/m2/day		--	--	--	(4)	854 mg/kg (A)	Gym entry west double doors, left door going in
Mat Dust	--	insufficient volume for analysis				--		--	--	--	(4)	854 mg/kg (A)	Gym entry middle double doors, right door going in
Vacuum Dust	674 J	mg/kg	--	--	--	--		--	--	--	(4)	464 mg/kg (B)	Upstairs vacuum bag
Vacuum Dust	650 J	mg/kg	--	--	--	--		--	--	--	(4)	464 mg/kg (B)	Downstairs vacuum bag
BRM Dust	1020	mg/kg	18.59	g/m2	18.96	mg/m2	(1761 ug/ft2)	Micro-vac	37	ug/ft2	(5)	--	Entry hall, floor carpet
BRM Dust	1060	mg/kg	7.93	g/m2	8.41	mg/m2	(781 ug/ft2)	Micro-vac	<10	ug/ft2	(5)	--	Room 206, floor carpet
Wipe Dust	--	--	--	--	<30	ug/ft2		Wipe Dust	<10	ug/ft2	40 ug/ft2 (HUD)	--	1st floor north end of gymnastics room, floor tile
Wipe Dust	--	--	--	--	<30	ug/ft2		Wipe Dust	30	ug/ft2	40 ug/ft2 (HUD)	--	Stairs near 309, floor tile
Wipe Dust	**--**	**--**	--	--	**50**	**ug/ft2**		**Wipe Dust**	**94**	**ug/ft2**	**40 ug/ft2 (HUD)**	**--**	**Main stair, near room 215, floor tile**
Wipe Dust	--	--	--	--	<30	ug/ft2		Wipe Dust	29	ug/ft2	40 ug/ft2 (HUD)	--	Cafeteria, floor tile
Wipe Dust	--	--	--	--	27	ug/ft2		--	--	--	40 ug/ft2 (HUD)	--	Room 309, cement floor
Wipe Dust	--	--	--	--	<30	ug/ft2		Wipe Dust	14	ug/ft2	40 ug/ft2 (HUD)	--	Main entry, floor tile
Wipe Dust	**--**	**--**	--	--	**<60**	**ug/ft2**		**Wipe Dust**	**436**	**ug/ft2**	**250 ug/ft2 (HUD)**	**--**	**2nd floor corridor south side, window sill**

J Concentration qualified as an estimate; QA/QC criteria not met.

< Concentration below instrument detection limit.

(MCL) Maximum Contaminant Level - The maximum permissible level of a contaminant in water which is delivered to any user of a public water system; EPA's current drinking water standard for lead.

(HUD) These Housing and Urban Development standards were updated in September, 2000. HUD's interim standard for floors is 40 ug/ft2 and 250 ug/ft2 for window sills. Public schools with students six years old or younger fall under these HUD guidelines. Levels above these standards are cause for concern.

(4) No applicable standards exist for these sampling methods, see community house dust geometric means for comparison.

(5) No applicable standards or comparison data exist

(A) Kellogg residential mat dust; geometric mean dust loading rate = 539 mg/m2/day; geometric mean lead loading rate = 0.46 mg/m2/day (PHD 2000 dust data)

(B) Kellogg residential vacuum dust (PHD 2000 dust data)

Table 4b - 2000 School Dust Data Results, Kellogg Middle School, Kellogg, Idaho

November 2000								Huntley June 2000					
Sample Method	Lead Conc.	Units	Dust Load Rate	Units	Lead Load Rate	Units		Sample Method	Lead Load Rate	Units	Applicable Standard	Community House Dust Geometric Mean	Location
Fountain Water	0.005	mg/l	--	--	--	--		--	--	--	0.015 mg/l (MCL)	--	Entry hall, first draw
Fountain Water	<0.003	mg/l	--	--	--	--		--	--	--	0.015 mg/l (MCL)	--	Cafeteria, first draw
Fountain Water	<0.003	mg/l	--	--	--	--		--	--	--	0.015 mg/l (MCL)	--	North hall, west wing, first draw
Mat Dust	660	mg/kg	6343	mg/m2/day	4.19	mg/m2/day		--	--	--	(4)	854 mg/kg (A)	Main entry, the farthest right door going in
Mat Dust	730	mg/kg	2237	mg/m2/day	1.63	mg/m2/day		--	--	--	(4)	854 mg/kg (A)	Cafeteria entry, the farthest right door going in
Mat Dust	1030	mg/kg	2165	mg/m2/day	2.23	mg/m2/day		--	--	--	(4)	854 mg/kg (A)	Cafeteria entry, middle right door going in
Mat Dust	790	mg/kg	1330	mg/m2/day	1.05	mg/m2/day		--	--	--	(4)	854 mg/kg (A)	Cafeteria entry, middle left door going in
Vacuum Dust	655 J	mg/kg	--	--	--	--		--	--	--	(4)	464 mg/kg (B)	Vacuum dust
BRM Dust	677	mg/kg	96.30	g/m2	65.20	mg/m2	(6057 ug/ft2)	Micro-vac	29	ug/ft2	(5)	--	Main entry, floor carpet
BRM Dust	1640	mg/kg	0.73	g/m2	1.20	mg/m2	(112 ug/ft2)	--	--	--	(5)	--	Library, floor carpet
Wipe Dust	--	--	--	--	<30	ug/ft2		--	--	--	40 ug/ft2 (HUD)	--	Room 115, floor tile
Wipe Dust	--	--	--	--	<14	ug/ft2		Wipe Dust	<4	ug/ft2	40 ug/ft2 (HUD)	--	Cafeteria, floor tile
Wipe Dust	--	--	--	--	<14	ug/ft2		Wipe Dust	<10	ug/ft2	40 ug/ft2 (HUD)	--	Band room, #204, floor tile
Wipe Dust	--	--	--	--	<30	ug/ft2		Wipe Dust	36	ug/ft2	40 ug/ft2 (HUD)	--	Gym entry way, wood floor
Wipe Dust	--	--	--	--	<30	ug/ft2		Wipe Dust	<10	ug/ft2	40 ug/ft2 (HUD)	--	Room 125, floor tile
Wipe Dust	**--**	**--**	**--**	**--**	**377**	**ug/ft2**		**Wipe Dust**	**708**	**ug/ft2**	**250 ug/ft2 (HUD)**	**--**	**Room 103, window sill**

J Concentration qualified as an estimate; QA/QC criteria not met.

< Concentration below instrument detection limit.

(MCL) Maximum Contaminant Level - The maximum permissible level of a contaminant in water which is delivered to any user of a public water system; EPA's current drinking water standard for lead.

(HUD) These Housing and Urban Development standards were updated in September, 2000. HUD's interim standard for floors is 40 ug/ft2 and 250 ug/ft2 for window sills. Public schools with students six years old or younger fall under these HUD guidelines. Levels above these standards are cause for concern.

(4) No applicable standards exist for these sampling methods, see community house dust geometric means for comparison.

(5) No applicable standards or comparison data exist

(A) Kellogg residential mat dust; geometric mean dust loading rate = 539 mg/m2/day; geometric mean lead loading rate = 0.46 mg/m2/day (PHD 2000 dust data)

(B) Kellogg residential vacuum dust (PHD 2000 dust data)

Table 4c - 2000 School Dust Data Results, Sunnyside Elementary, Kellogg, Idaho

November 2000								Huntley June 2000					
Sample Method	**Lead Conc.**	**Units**	**Dust Load Rate**	**Units**	**Lead Load Rate**	**Units**		**Sample Method**	**Lead Load Rate**	**Units**	**Applicable Standard**	**Community House Dust Geometric Mean**	**Location**
Fountain Water	<0.003	mg/l	--	--	--	--		--	--	--	0.015 mg/l (MCL)	--	Room 103, classroom sink, first draw
Fountain Water	<0.003	mg/l	--	--	--	--		--	--	--	0.015 mg/l (MCL)	--	Room 207, classroom sink, first draw
Fountain Water	<0.003	mg/l	--	--	--	--		--	--	--	0.015 mg/l (MCL)	--	Cafeteria fountain, first draw
Mat Dust	750	mg/kg	2597	mg/m2/day	1.95	mg/m2/day		--	--	--	(4)	854 mg/kg (A)	Main entry (west entry), right door going in
Mat Dust	850	mg/kg	2151	mg/m2/day	1.83	mg/m2/day		--	--	--	(4)	854 mg/kg (A)	NE corner of bldg, east entry, right door going in
Mat Dust	1080	mg/kg	1522	mg/m2/day	1.64	mg/m2/day		--	--	--	(4)	854 mg/kg (A)	NE corner of bldg, east entry, left door going in
Mat Dust	640	mg/kg	1994	mg/m2/day	1.28	mg/m2/day		--	--	--	(4)	854 mg/kg (A)	NE corner of bldg, north entry, right door going in
Mat Dust	710	mg/kg	1277	mg/m2/day	0.91	mg/m2/day		--	--	--	(4)	854 mg/kg (A)	SE corner of bldg, right door going in
Mat Dust	530	mg/kg	1069	mg/m2/day	0.57	mg/m2/day		--	--	--	(4)	854 mg/kg (A)	SW corner of bldg, right door going in
Vacuum Dust	332 J	mg/kg	--	--	--	--		--	--	--	(4)	464 mg/kg (B)	Canister vacuum dust
Vacuum Dust	335 J	mg/kg	--	--	--	--		--	--	--	(4)	464 mg/kg (B)	Industrial hall vac dust
BRM Dust	356	mg/kg	8.47	g/m2	3.01	mg/m2	(280 ug/ft2)	--	--	--	(5)	--	Room 107, floor carpet
BRM Dust	566	mg/kg	3.05	g/m2	1.73	mg/m2	(160 ug/ft2)	--	--	--	(5)	--	Hallway, near SW entry way, floor carpet
Wipe Dust	--	--	--	--	<30	ug/ft2		--	--	--	40 ug/ft2 (HUD)	--	Kindergarten room, room 201, floor tile
Wipe Dust	--	--	--	--	<30	ug/ft2		--	--	--	40 ug/ft2 (HUD)	--	Room 103, floor tile
Wipe Dust	--	--	--	--	<30	ug/ft2		--	--	--	40 ug/ft2 (HUD)	--	Cafeteria, floor tile

J Concentration qualified as an estimate; QA/QC criteria not met.

< Concentration below instrument detection limit.

(MCL) Maximum Contaminant Level - The maximum permissible level of a contaminant in water which is delivered to any user of a public water system; EPA's current drinking water standard for lead.

(HUD) These Housing and Urban Development standards were updated in September, 2000.   HUD's interim standard for floors is 40 ug/ft2 and 250 ug/ft2 for window sills. Public schools with students six years old or younger fall under these HUD guidelines. Levels above these standards are cause for concern.

(4) No applicable standards exist for these sampling methods, see community house dust geometric means for comparison.

(5) No applicable standards or comparison data exist

(A) Kellogg residential mat dust; geometric mean dust loading rate = 539 mg/m2/day; geometric mean lead loading rate = 0.46 mg/m2/day (PHD 2000 dust data)

(B) Kellogg residential vacuum dust (PHD 2000 dust data)

Table 4d - 2000 School Dust Data Results, Pinehurst Elementary, Pinehurst, Idaho

November 2000								Huntley June 2000					
Sample Method	Lead Conc.	Units	Dust Load Rate	Units	Lead Load Rate	Units		Sample Method	Lead Load Rate	Units	Applicable Standard	Community House Dust Geometric Mean	Location
Fountain Water	<0.003	mg/l	--	--	--	--		--	--	--	0.015 mg/l (MCL)	--	Room #3 classroom sink, first draw
Fountain Water	<0.003	mg/l	--	--	--	--		--	--	--	0.015 mg/l (MCL)	--	Hall fountain - south, first draw
Fountain Water	<0.003	mg/l	--	--	--	--		--	--	--	0.015 mg/l (MCL)	--	Hall fountain - north, first draw
Mat Dust	430	mg/kg	2124	mg/m2/day	0.91	mg/m2/day		--	--	--	(4)	405 mg/kg (C)	Main entry, far left door going in
Mat Dust	450	mg/kg	2579	mg/m2/day	1.16	mg/m2/day		--	--	--	(4)	405 mg/kg (C)	Main entry, middle left door going in
Mat Dust	460	mg/kg	5563	mg/m2/day	2.56	mg/m2/day		--	--	--	(4)	405 mg/kg (C)	North entry, left door going in
Mat Dust	1050	mg/kg	1936	mg/m2/day	2.03	mg/m2/day		--	--	--	(4)	405 mg/kg (C)	South entry, right door going in
Vacuum Dust	416 J	mg/kg	--	--	--	--		--	--	--	(4)	397 mg/kg (D)	Hallway vacuum
Vacuum Dust	406 J	mg/kg	--	--	--	--		--	--	--	(4)	397 mg/kg (D)	Classroom vacuum
BRM Dust	328	mg/kg	26.80	g/m2	8.79	mg/m2	(817 ug/ft2)	--	--	--	(5)	--	Room 2 - floor carpet
Wipe Dust	--	--	--	--	<14	ug/ft2		--	--	--	40 ug/ft2 (HUD)	--	Room 7 - floor tile

J Concentration qualified as an estimate; QA/QC criteria not met.

< Concentration below instrument detection limit.

(MCL) Maximum Contaminant Level - The maximum permissible level of a contaminant in water which is delivered to any user of a public water system; EPA's current drinking water standard for lead.

(HUD) These Housing and Urban Development standards were updated in September, 2000. HUD's interim standard for floors is 40 ug/ft2 and 250 ug/ft2 for window sills. Public schools with students six years old or younger fall under these HUD guidelines. Levels above these standards are cause for concern.

(4) No applicable standards exist for these sampling methods, see community house dust geometric means for comparison.

(5) No applicable standards or comparison data exist

(C) Pinehurst residential mat dust; geometric mean dust loading rate = 607 mg/m2/day; geometric mean lead loading rate = 0.24 mg/m2/day (PHD 2000 dust data)

(D) Pinehurst residential vacuum dust (PHD 2000 dust data)

Table 5a - 2000 School Dust Data Results, Osburn Elementary, Osburn, Idaho

November 2000								Huntley June 2000					
Sample Method	**Lead Conc.**	**Units**	**Dust Load Rate**	**Units**	**Lead Load Rate**	**Units**		**Sample Method**	**Lead Load Rate**	**Units**	**Applicable Standard**	**Community House Dust Geometric Mean**	**Location**
Fountain Water	**0.018**	**mg/l**	**--**	**--**	**--**	**--**		**--**	**--**	**--**	**0.015 mg/l (MCL)**	**--**	**1st floor fountain west end, first draw**
Fountain Water	**0.015**	**mg/l**	**--**	**--**	**--**	**--**		**--**	**--**	**--**	**0.015 mg/l (MCL)**	**--**	**2nd floor fountain east end, first draw**
Mat Dust	340	mg/kg	3962	mg/m2/day	1.35	mg/m2/day		--	--	--	(4)	882 mg/kg (E)	South entry, right door going in
Mat Dust	670	mg/kg	7982	mg/m2/day	5.35	mg/m2/day		--	--	--	(4)	882 mg/kg (E)	North entry, left door going in
Mat Dust	790	mg/kg	1855	mg/m2/day	1.47	mg/m2/day		--	--	--	(4)	882 mg/kg (E)	Library entrance
Mat Dust	310	mg/kg	7411	mg/m2/day	2.30	mg/m2/day		--	--	--	(4)	882 mg/kg (E)	East entry, left door going in
Mat Dust	640	mg/kg	8113	mg/m2/day	5.19	mg/m2/day		--	--	--	(4)	882 mg/kg (E)	Cafeteria gym entry, right door going in
Vacuum Dust	644 J	mg/kg	--	--	--	--		--	--	--	(4)	493 mg/kg (F)	Vacuum dust
BRM Dust	469	mg/kg	50.48	g/m2	23.68	mg/m2	(2200 ug/ft2)	--	--	--	(5)	--	Room 104, carpet floor
BRM Dust	740	mg/kg	14.10	g/m2	10.43	mg/m2	(969 ug/ft2)	--	--	--	(5)	--	Room 202, computer lab, carpet floor
Wipe Dust	--	--	--	--	<30	ug/ft2		--	--	--	40 ug/ft2 (HUD)	--	West corridor, 1st floor, wood floor
Wipe Dust	--	--	--	--	<30	ug/ft2		--	--	--	40 ug/ft2 (HUD)	--	Gym/cafeteria, wood floor
Wipe Dust	--	--	--	--	112	ug/ft2		--	--	--	250 ug/ft2 (HUD)	--	Room 203, window sill

J Concentration qualified as an estimate; QA/QC criteria not met.

< Concentration below instrument detection limit.

(MCL) Maximum Contaminant Level - The maximum permissible level of a contaminant in water which is delivered to any user of a public water system; EPA's current drinking water standard for lead.

(HUD) These Housing and Urban Development standards were updated in September, 2000. HUD's interim standard for floors is 40 ug/ft2 and 250 ug/ft2 for window sills. Public schools with students six years old or younger fall under these HUD guidelines. Levels above these standards are cause for concern.

(4) No applicable standards exist for these sampling methods, see community house dust geometric means for comparison.

(5) No applicable standards or comparison data exist

(E) Osburn residential mat dust; geometric mean dust loading rate = 884 mg/m2/day; geometric mean lead loading rate = 0.78 mg/m2/day (TerraGraphics 2000c)

(F) Osburn residential vacuum dust geometric mean (TerraGraphics 2000c)

Table 5b - 2000 School Dust Data Results, Silver Hills Middle School, Osburn, Idaho

November 2000								Huntley June 2000					
Sample Method	Lead Conc.	Units	Dust Load Rate	Units	Lead Load Rate	Units		Sample Method	Lead Load Rate	Units	Applicable Standard	Community House Dust Geometric Mean	Location
Fountain Water	<0.003	mg/l	--	--	--	--		--	--	--	0.015 mg/l (MCL)	--	North hall fountain, first draw
Fountain Water	<0.003	mg/l	--	--	--	--		--	--	--	0.015 mg/l (MCL)	--	West hall fountain, first draw
Fountain Water	0.006	mg/l	--	--	--	--		--	--	--	0.015 mg/l (MCL)	--	East hall fountain, first draw
Mat Dust	1440	mg/kg	12,197	mg/m2/day	17.56	mg/m2/day		--	--	--	(4)	882 mg/kg (E)	South entry
Mat Dust	550	mg/kg	1721	mg/m2/day	0.95	mg/m2/day		--	--	--	(4)	882 mg/kg (E)	East entry
Mat Dust	440	mg/kg	1694	mg/m2/day	0.75	mg/m2/day		--	--	--	(4)	882 mg/kg (E)	North entry
Mat Dust	1050	mg/kg	4654	mg/m2/day	4.89	mg/m2/day		--	--	--	(4)	882 mg/kg (E)	West entry
Vacuum Dust	632 J	mg/kg	--	--	--	--		--	--	--	(4)	493 mg/kg (F)	Vacuum dust
BRM Dust	511	mg/kg	13.02	g/m2	6.66	mg/m2	(618 ug/ft2)	Micro-vac	<10	ug/ft2	(5)	--	Library, floor carpet
BRM Dust	1060	mg/kg	60.46	g/m2	64.09	mg/m2	(5954 ug/ft2)	Micro-vac	16	ug/ft2	(5)	--	Main entry, near doors, floor carpet
Wipe Dust	--	--	--	--	<30	ug/ft2		Wipe Dust	<10	ug/ft2	40 ug/ft2 (HUD)	--	Cafeteria, floor tile
Wipe Dust	--	--	--	--	<30	ug/ft2		Wipe Dust	<10	ug/ft2	40 ug/ft2 (HUD)	--	Room 110, floor tile
Wipe Dust	--	--	--	--	<30	ug/ft2		Wipe Dust	<10	ug/ft2	40 ug/ft2 (HUD)	--	North wing corridor, north entry, floor tile

J Concentration qualified as an estimate; QA/QC criteria not met.

< Concentration below instrument detection limit.

(MCL) Maximum Contaminant Level - The maximum permissible level of a contaminant in water which is delivered to any user of a public water system; EPA's current drinking water standard for lead.

(HUD) These Housing and Urban Development standards were updated in September, 2000. HUD's interim standard for floors is 40 ug/ft2 and 250 ug/ft2 for window sills. Public schools with students six years old or younger fall under these HUD guidelines. Levels above these standards are cause for concern.

(4) No applicable standards exist for these sampling methods, see community house dust geometric means for comparison.

(5) No applicable standards or comparison data exist

(E) Osburn residential mat dust; geometric mean dust loading rate = 884 mg/m2/day; geometric mean lead loading rate = 0.78 mg/m2/day (TerraGraphics 2000c)

(F) Osburn residential vacuum dust geometric mean (TerraGraphics 2000c)

Table 5c - 2000 School Dust Data Results, Silver Valley High Building, Wallace, Idaho**

November 2000								Huntley June 2000					
Sample Method	**Lead Conc.**	**Units**	**Dust Load Rate**	**Units**	**Lead Load Rate**	**Units**		**Sample Method**	**Lead Load Rate**	**Units**	**Applicable Standard**	**Community House Dust Geometric Mean**	**Location**
Fountain Water	0.007	mg/l	--	--	--	--		--	--	--	0.015 mg/l (MCL)	--	Room 107 drinking fountain, first draw
Fountain Water	0.005	mg/l	--	--	--	--		--	--	--	0.015 mg/l (MCL)	--	3rd floor drinking fountain, first draw
Fountain Water	0.007	mg/l	--	--	--	--		--	--	--	0.015 mg/l (MCL)	--	2nd floor drinking fountain, first draw
Mat Dust	820	mg/kg	151	mg/m2/day	0.12	mg/m2/day		--	--	--	(4)	1774 mg/kg (G)	East entry, right door going in
Mat Dust	960	mg/kg	1004	mg/m2/day	0.96	mg/m2/day		--	--	--	(4)	1774 mg/kg (G)	East entry, left door going in
Mat Dust	1000	mg/kg	460	mg/m2/day	0.46	mg/m2/day		--	--	--	(4)	1774 mg/kg (G)	North entry, left door going in
Vacuum Dust	451 J	mg/kg	--	--	--	--		--	--	--	(4)	1004 mg/kg (H)	Vacuum bag from preschool vac
BRM Dust	584	mg/kg	9.04	g/m2	5.28	mg/m2	(491 ug/ft2)	Micro-vac	14	ug/ft2	(5)	--	Room 106, pre-school, floor carpet
BRM Dust	700	mg/kg	1.65	g/m2	1.16	mg/m2	(107 ug/ft2)	Micro-vac	<10	ug/ft2	(5)	--	Room 204, library, floor carpet
Wipe Dust	--	--	--	--	<30	ug/ft2		Wipe Dust	<10	ug/ft2	40 ug/ft2 (HUD)	--	Room 304, wood floor
Wipe Dust	--	--	--	--	<30	ug/ft2		Wipe Dust	<10	ug/ft2	40 ug/ft2 (HUD)	--	Room 107, stage area, wood floor
Wipe Dust	--	--	--	--	<30	ug/ft2		Wipe Dust	<10	ug/ft2	40 ug/ft2 (HUD)	--	Room 101, wood floor
Wipe Dust	**--**	**--**	**--**	**--**	**143**	**ug/ft2**		**Wipe Dust**	**780**	**ug/ft2**	**250 ug/ft2 (HUD)**	**--**	**3rd floor auditorium, window sill**
Wipe Dust	**--**	**--**	**--**	**--**	**184**	**ug/ft2**		**Wipe Dust**	**479**	**ug/ft2**	**250 ug/ft2 (HUD)**	**--**	**1st floor gym west wall, window sill**
Wipe Dust	**--**	**--**	**--**	**--**	**116**	**ug/ft2**		**Wipe Dust**	**374**	**ug/ft2**	**250 ug/ft2 (HUD)**	**--**	**Room 106, pre-school, window sill**

J Concentration qualified as an estimate; QA/QC criteria not met.

< Concentration below instrument detection limit.

(MCL) Maximum Contaminant Level - The maximum permissible level of a contaminant in water which is delivered to any user of a public water system; EPA's current drinking water standard for lead.

(HUD) These Housing and Urban Development standards were updated in September, 2000. HUD's interim standard for floors is 40 ug/ft2 and 250 ug/ft2 for window sills. Public schools with students six years old or younger fall under these HUD guidelines. Levels above these standards are cause for concern.

(4) No applicable standards exist for these sampling methods, see community house dust geometric means for comparison.

(5) No applicable standards or comparison data exist

(G) Wallace residential mat dust; geometric mean dust loading rate = 1371 mg/m2/day; geometric mean lead loading rate = 2.43 mg/m2/day (TerraGraphics 2000c)

(H) Wallace residential vacuum dust geometric mean (TerraGraphics 2000c)

** The Silver Valley High Building contains the Early Learning Center (day care, pre-school, and kindergarden) and the Silver Valley Alternative High School.

Table 5d - 2000 School Dust Data Results, John Mullan Elementary, Mullan, Idaho

November 2000								Huntley June 2000					
Sample Method	**Lead Conc.**	**Units**	**Dust Load Rate**	**Units**	**Lead Load Rate**	**Units**		**Sample Method**	**Lead Load Rate**	**Units**	**Applicable Standard**	**Community House Dust Geometric Mean**	**Location**
Fountain Water	0.006	mg/l	--	--	--	--		--	--	--	0.015 mg/l (MCL)	--	1st floor north fountain, first draw
Fountain Water	0.006	mg/l	--	--	--	--		--	--	--	0.015 mg/l (MCL)	--	1st floor south fountain, first draw
Fountain Water	0.006	mg/l	--	--	--	--		--	--	--	0.015 mg/l (MCL)	--	2nd floor north fountain, first draw
Mat Dust	560	mg/kg	1570	mg/m2/day	0.88	mg/m2/day		--	--	--	(4)	1242 mg/kg (K)	Main entry (west entry), left door going in
Mat Dust	330	mg/kg	332	mg/m2/day	0.11	mg/m2/day		--	--	--	(4)	1242 mg/kg (K)	Main entry (west entry), right door going in
Mat Dust	880	mg/kg	1325	mg/m2/day	1.17	mg/m2/day		--	--	--	(4)	1242 mg/kg (K)	First floor east entry
Mat Dust	650	mg/kg	1087	mg/m2/day	0.71	mg/m2/day		--	--	--	(4)	1242 mg/kg (K)	2nd floor entry, right door going in
Mat Dust	760	mg/kg	499	mg/m2/day	0.38	mg/m2/day		--	--	--	(4)	1242 mg/kg (K)	2nd floor entry, left door going in
Vacuum Dust	387 J	mg/kg	--	--	--	--		--	--	--	(4)	985 mg/kg (L)	Vacuum dust
BRM Dust	**736**	**mg/kg**	**21.87**	**g/m2**	**16.10**	**mg/m2**	**(1496 ug/ft2)**	**Micro-vac**	**85**	**ug/ft2**	**(5)**	**--**	**1st floor corridor, boot ledge carpet**
BRM Dust	**1060**	**mg/kg**	**36.89**	**g/m2**	**39.10**	**mg/m2**	**(3632 ug/ft2)**	**Micro-vac**	**40**	**ug/ft2**	**(5)**	**--**	**2nd floor, 4th grade classroom, floor carpet**
BRM Dust	655	mg/kg	37.32	g/m2	24.44	mg/m2	(2271 ug/ft2)	Micro-vac	19	ug/ft2	(5)	--	2nd floor, 3th grade classroom, floor carpet
Wipe Dust	--	--	--	--	<30	ug/ft2		Wipe Dust	<10	ug/ft2	40 ug/ft2 (HUD)	--	Cafeteria/multi-purpose, floor tile
Wipe Dust	--	--	--	--	<30	ug/ft2		Wipe Dust	<10	ug/ft2	40 ug/ft2 (HUD)	--	Base of south stair well, floor tile
Wipe Dust	--	--	--	--	<30	ug/ft2		Wipe Dust	<10	ug/ft2	40 ug/ft2 (HUD)	--	2nd floor computer lab, linoleum floor
Wipe Dust	--	--	--	--	<29	ug/ft2		Wipe Dust	<12	ug/ft2	250 ug/ft2 (HUD)	--	Kindergarten room, window sill
Air Monitoring	--	--	--	--	<9	ug/m3		--	--	--	(6)	--	First floor, outside second grade classroom
Air Monitoring	--	--	--	--	<9	ug/m3		--	--	--	(6)	--	Second floor, outside the library

J Concentration qualified as an estimate; QA/QC criteria not met.

< Concentration below instrument detection limit.

(MCL) Maximum Contaminant Level - The maximum permissible level of a contaminant in water which is delivered to any user of a public water system; EPA's current drinking water standard for lead.

(HUD) These Housing and Urban Development standards were updated in September, 2000. HUD's interim standard for floors is 40 ug/ft2 and 250 ug/ft2 for window sills. Public schools with students six years old or younger fall under these HUD guidelines. Levels above these standards are cause for concern.

(4) No applicable standards exist for these sampling methods, see community house dust geometric means for comparison.

(5) No applicable standards or comparison data exist

(6) Air monitors ran from approximately 8:00 am to 3:30 pm (426 minutes); filter was at level of children's breathing zone; average flow throughout the day was 1.4 liters per minute.

(K) Mullan residential mat dust; geometric mean dust loading rate = 1260 mg/m2/day; geometric mean lead loading rate = 1.56 mg/m2/day (TerraGraphics 2000c)

(L) Mullan residential vacuum dust geometric mean (TerraGraphics 2000c)

Table 5e - 2000 School Dust Data Results, Huggie Bear Day Care, Silverton, Idaho

November 2000								Huntley June 2000					
Sample Method	Lead Conc.	Units	Dust Load Rate	Units	Lead Load Rate	Units		Sample Method	Lead Load Rate	Units	Applicable Standard	Community House Dust Geometric Mean	Location
Fountain Water	0.008	mg/l	--	--	--	--		--	--	--	0.015 mg/l (MCL)	--	Kitchen faucet, first draw
Fountain Water	0.005	mg/l	--	--	--	--		--	--	--	0.015 mg/l (MCL)	--	Hall fountain, first draw
Fountain Water	0.008	mg/l	--	--	--	--		--	--	--	0.015 mg/l (MCL)	--	Pre-school fountain, first draw
Mat Dust	440	mg/kg	6223	mg/m2/day	2.74	mg/m2/day		--	--	--	(4)	863 mg/kg (M)	Main entry, right door going in
Mat Dust	410	mg/kg	2114	mg/m2/day	0.87	mg/m2/day		--	--	--	(4)	863 mg/kg (M)	Main entry, left door going in
Vacuum Dust	352 J	mg/kg	--	--	--	--		--	--	--	(4)	557 mg/kg (N)	Vacuum bag dust
BRM Dust	315	mg/kg	8.00	g/m2	2.52	mg/m2	(234 ug/ft2)	Micro-vac	<5	ug/ft2	(5)	--	Baby toddler room, floor carpet
BRM Dust	250	mg/kg	2.44	g/m2	0.61	mg/m2	(57 ug/ft2)	Micro-vac	<5	ug/ft2	(5)	--	Big-kid room, floor carpet
Wipe Dust	--	--	--	--	<14	ug/ft2		Wipe Dust	<10	ug/ft2	40 ug/ft2 (HUD)	--	Baby toddler room near door, floor tile
Wipe Dust	--	--	--	--	<30	ug/ft2		Wipe Dust	<10	ug/ft2	40 ug/ft2 (HUD)	--	Kitchen floor, floor tile
Wipe Dust	--	--	--	--	<14	ug/ft2		Wipe Dust	<10	ug/ft2	40 ug/ft2 (HUD)	--	Sleep room, floor tile

J Concentration qualified as an estimate; QA/QC criteria not met.

< Concentration below instrument detection limit.

(MCL) Maximum Contaminant Level - The maximum permissible level of a contaminant in water which is delivered to any user of a public water system; EPA's current drinking water standard for lead.

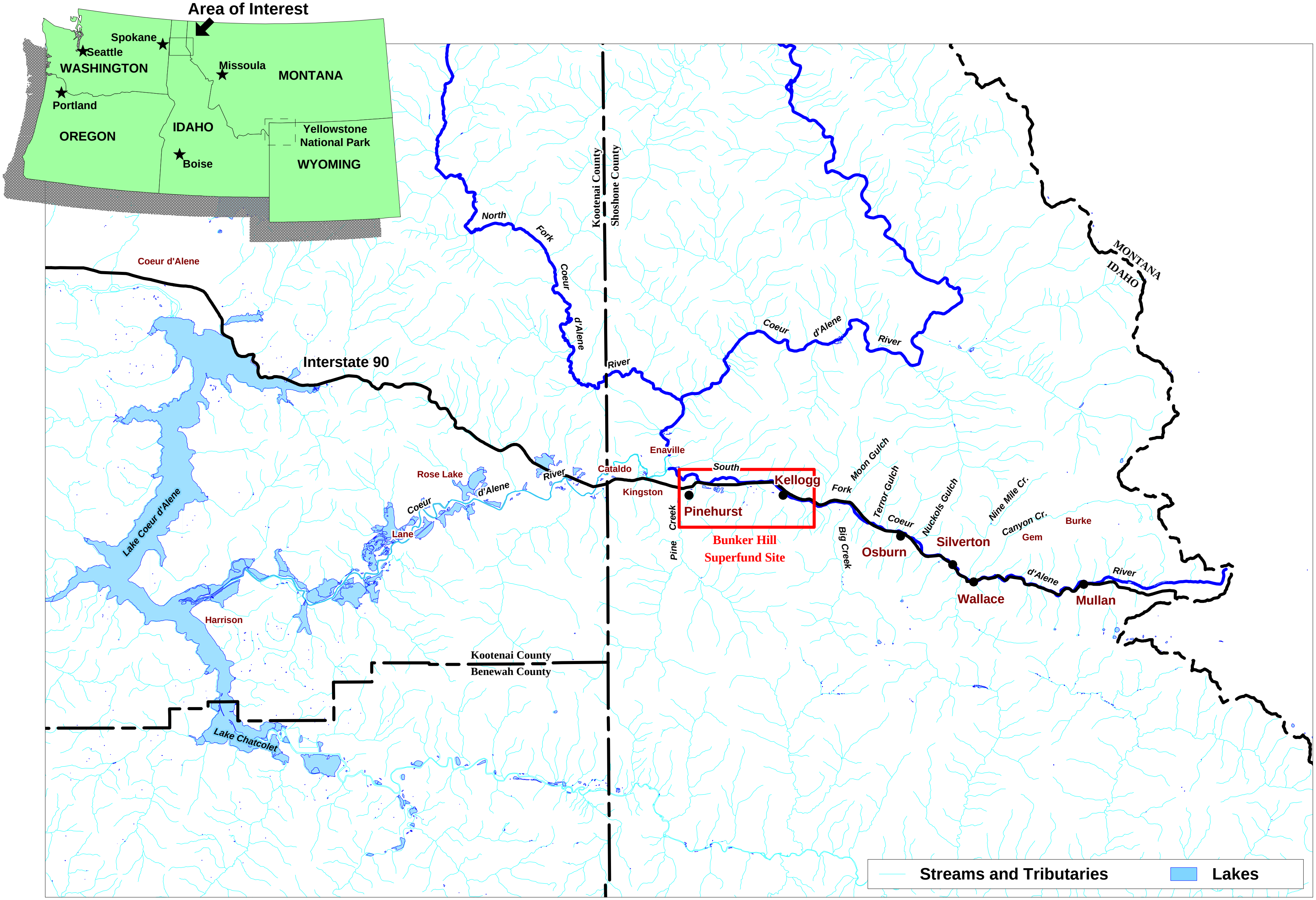
(HUD) These Housing and Urban Development standards were updated in September, 2000. HUD's interim standard for floors is 40 ug/ft2 and 250 ug/ft2 for window sills. Public schools with students six years old or younger fall under these HUD guidelines. Levels above these standards are cause for concern.

(4) No applicable standards exist for these sampling methods, see community house dust geometric means for comparison.

(5) No applicable standards or comparison data exist

(M) Silverton residential mat dust; geometric mean dust loading rate = 1084 mg/m2/day; geometric mean lead loading rate = 0.93 mg/m2/day (TerraGraphics 2000c)

(N) Silverton residential vacuum dust geometric mean (TerraGraphics 2000c)

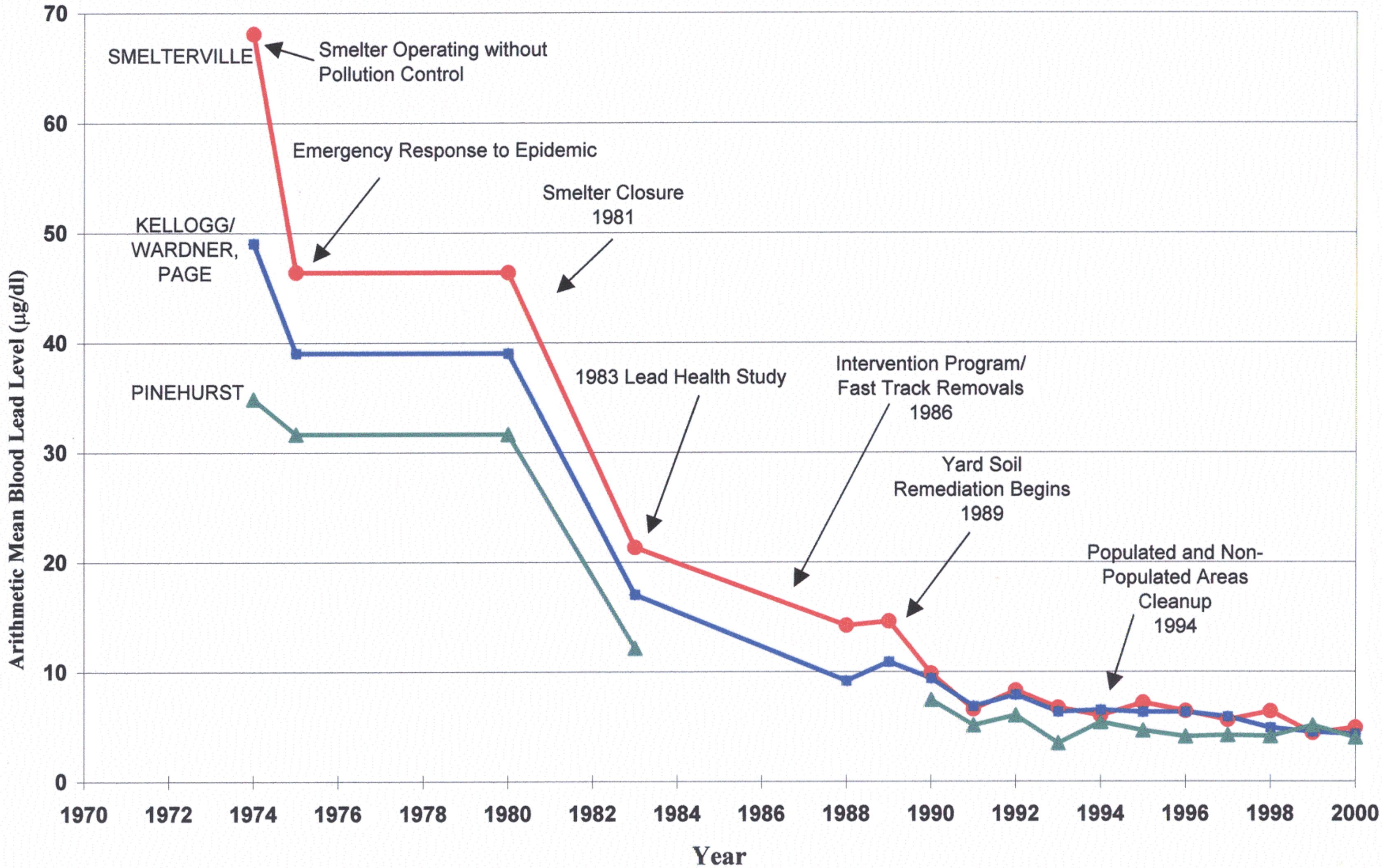


TerraGraphics Environmental Engineering, Inc.	File 2001-03-28 School Dust / basin Date 30MAR2001 Project No. 980290	Requestor S. LeVan Designer S. LeVan, B. Bailey Cartographer B. Bailey Approved S. LeVan	2000 Interior School Dust Data Summary Report

Figure 1

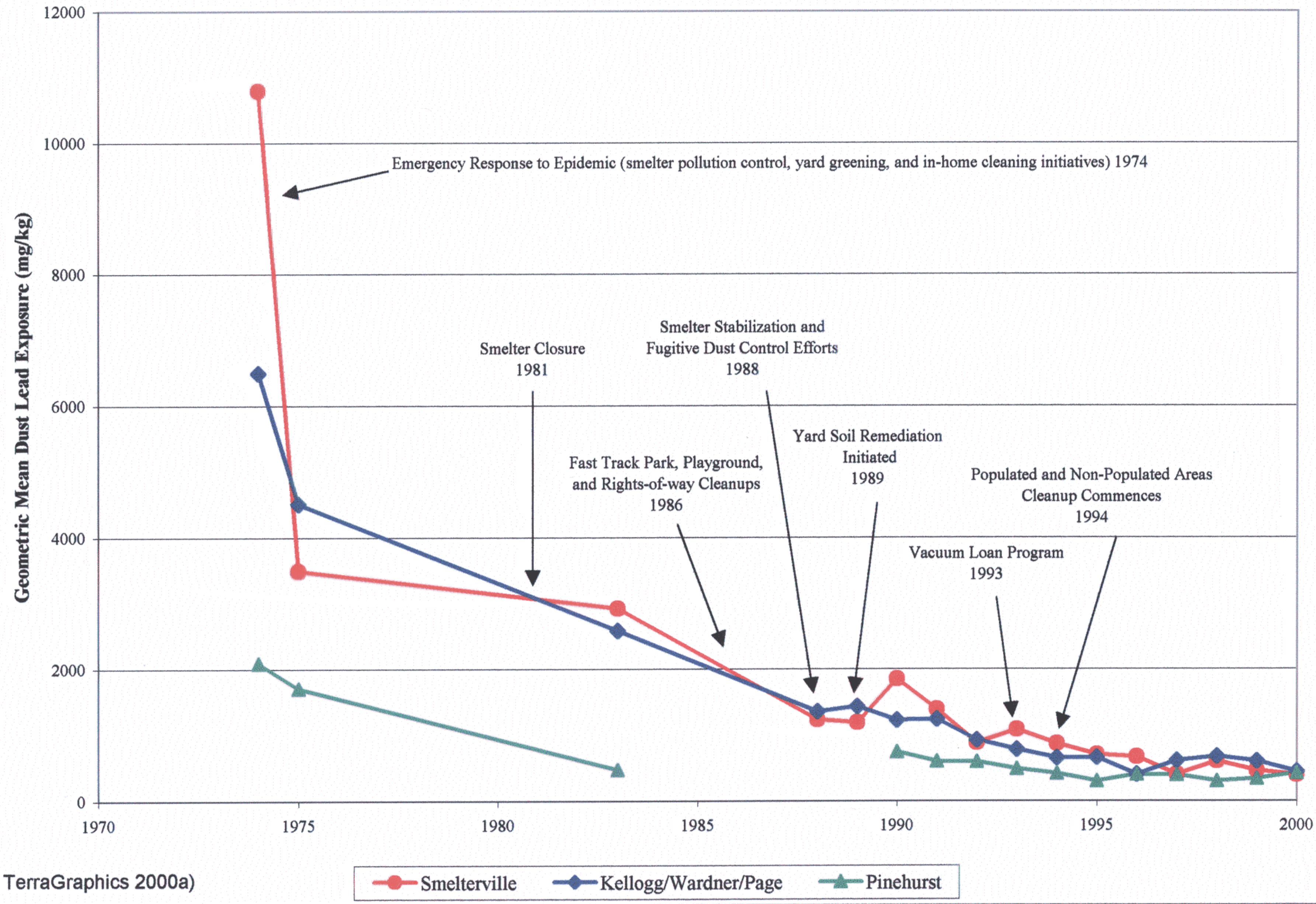
Coeur d'Alene Basin

Figure 2
BHSS Children's (0-9 years old) Blood Lead Levels by Year, 1974-2000



(Source: TerraGraphics 2000a)

Figure 3
BHSS House Dust Lead Exposure by Year, 1974-2000



(Source: TerraGraphics 2000a)

Figure 4. Basin Blood Lead Levels for Children 0-9 years old, 1996-2000

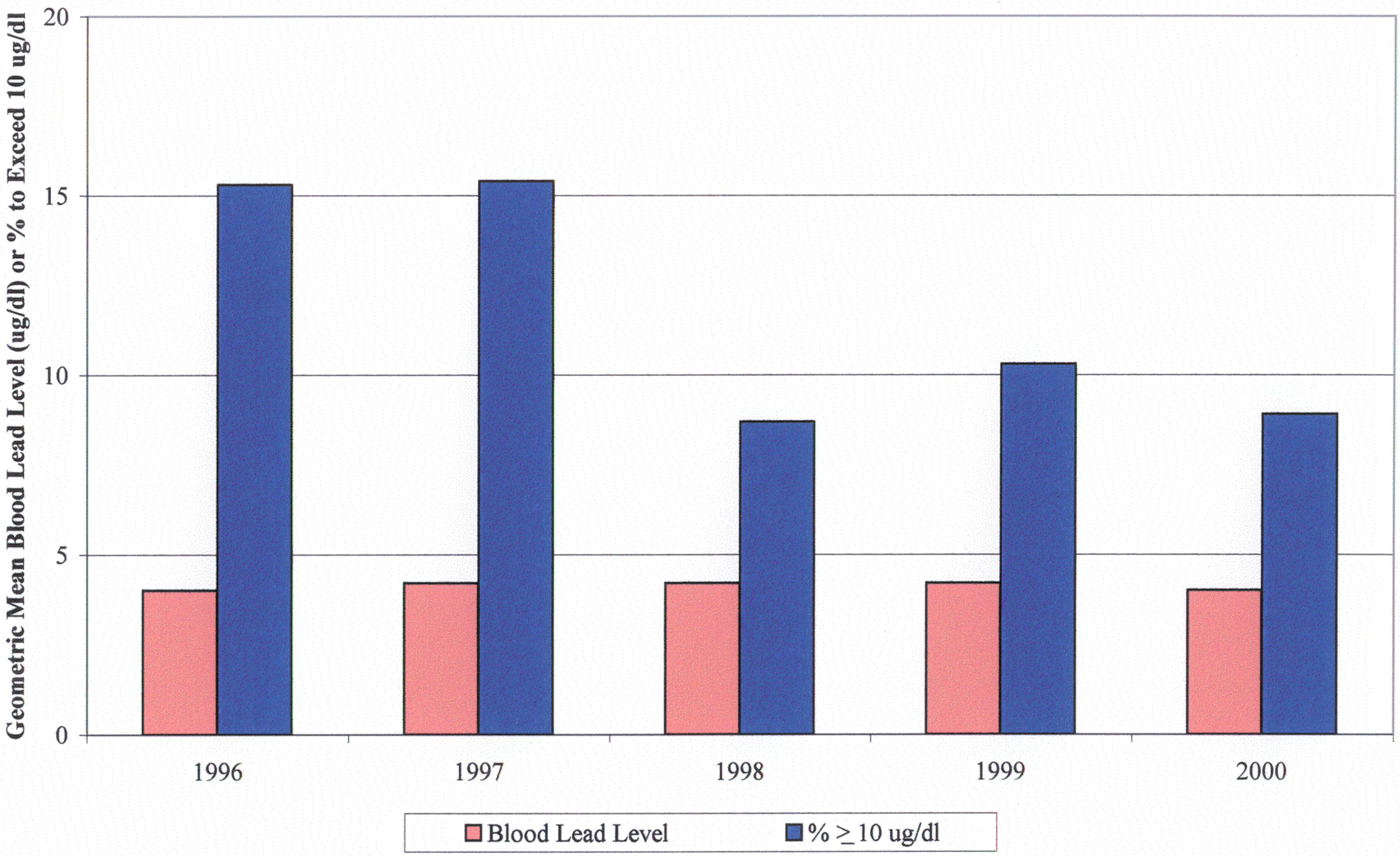
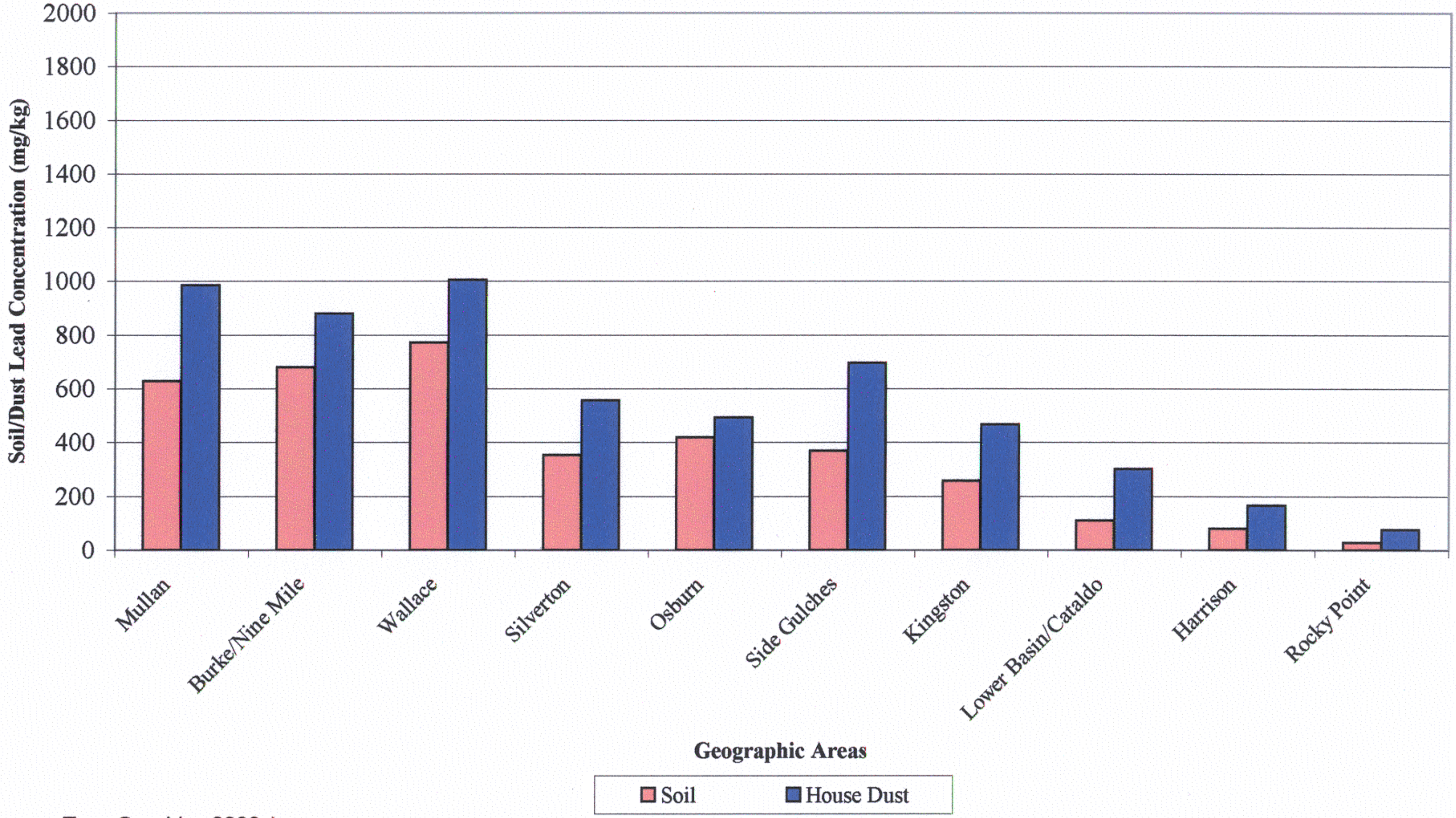


Figure 5
Basin Geometric Mean Soil and House Dust Lead Concentrations by Geographic Area (1996-1999 Combined)



(Source: TerraGraphics 2000c)

APPENDIX A

Indoor Lead Survey Silver Valley Schools, June 19-22, 2000, IHI Environmental

(AVAILABLE UPON REQUEST)

APPENDIX B

QA/QC Memoranda

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INTERNAL MEMORANDUM

To: Gerald B. Lee, TerraGraphics, Moscow

From: Shanda LeVan, TerraGraphics, Moscow

Date: February 20, 2001

Subject: QA/QC Review for the 2000 School Dust Sampling Event

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Introduction

The following memorandum provides a summary of the quality assurance/quality control (QA/QC) review for the 2000 School Dust Sampling Event. Nine schools within the Bunker Hill Superfund Site (BHSS) and Coeur d' Alene Basin (Basin) were sampled during November 2000. Pinehurst Elementary, Sunnyside Elementary, Kellogg Middle, Kellogg High, John Mullan Elementary, Silver Valley High, Osburn Elementary, Silver Hills Middle, and Huggie Bear Day Care were sampled using six distinct sample collection methods. Mat dust, vacuum dust, Baltimore Repair and Maintenance (BRM) dust, wipe dust, and drinking water fountain samples were collected from all nine schools. Air monitoring samples were collected from John Mullan Elementary only. Field samples and QA/QC samples were batched separately according to sample type and submitted to Northern Analytical Laboratories, Inc. for analysis. All samples arrived to the laboratory intact and custody seals were present and unbroken on all shipping containers.

General

A QA/QC review was completed to evaluate the precision, accuracy, completeness, and representativeness of the data obtained from both the field and laboratory. Definitions and QC objectives for these parameters are as described in the *2000 FINAL Field Work Plan for Interior Dust Sampling* (TerraGraphics 2000a) and the *Addendum to School Sampling Plan - Revised* (TerraGraphics 2000b). Procedures for sample labeling, handling, and analysis were as described in the Work Plan and Addendum. All laboratory data and master logs were entered into dBase 5.0 database files. Forms were checked and reviewed to ensure that samples were labeled and tracked correctly, including chain of custody and master log forms. This data validation review

indicated all samples were properly tracked during the project and all sample holding times were met. School dust data are displayed in Tables 1a, 1b, 1c, 1d, 1e, 1f.

The vacuum dust results were qualified as estimates based on a review of the standard percent recovery for this batch. The NIST standard included in this batch displayed a percent recovery of 71%. This percent recovery does not meet data quality objectives as outlined in the work plan (80 to 120%). After reviewing all other field and laboratory QA/QC data for this sampling event, no other qualifiers were placed on the data.

Field Sampling QA/QC Results

A total of 164 samples (including QA/QC) were collected from the nine BHSS and Basin schools during this event. Field QA/QC samples consisted of five field duplicates, twelve blanks, and six rinsate blanks. Eight NIST standards were also included in the sample train. All samples were banked and recorded on a master log, and chain of custody forms were completed and checked before samples were shipped to the lab. All dust samples were sieved to -80 mesh at Northern Analytical prior to analysis.

Duplicates

A total of five duplicate samples were collected in the field and submitted to the laboratory for analysis. Duplicate samples were used to examine variability in the field and in laboratory procedures. One BRM dust duplicate, one vacuum dust duplicate, and three wipe dust duplicates were sampled and analyzed. The BRM field duplicate was sampled in the same manner as the original; three square-foot templates were placed to the positions adjacent to the three original subsamples and composited in a separate container. The duplicate vacuum bag sample was collected in the same manner as the original, but placed in a separate container. The three duplicate wipe samples were collected in the same manner as the originals, and one foot away from the original. No dust mat, drinking water, or air monitoring duplicate samples were collected.

Results for the five duplicate analyses are presented in Table 2. The three wipe dust duplicates and corresponding originals were all below the instrument detection limit for lead. The calculated relative percent difference (RPD) was 16.7% for the vacuum dust duplicate and 53.9% for the BRM dust duplicate. The high RPD for the BRM dust duplicate is most likely an indication of high field variability. There is no required review criteria for field duplicates, therefore no samples were qualified as estimates based on the duplicate results.

Rinsate Blanks

Rinsate blanks were collected to ensure decontamination procedures were effective, and that cross-contamination was not significant during field sampling. Rinsate blanks consisted of commercially available distilled water poured over a representative batch of decontaminated sampling equipment. Rinsate blanks were collected into 500 ml plastic bottles and preserved with nitric acid. The bottles were supplied by Northern Analytical and were delivered to Northern Analytical for analysis.
Six rinsate blanks were collected during the sampling event. Rinsate blank results are presented in Table 3. Five of six rinsate blanks were below detection for lead. Rinsate blank with sample

identification number 00SD080 had a lead concentration of 0.017 mg/l. This rinsate blank was collected from BRM sampling equipment. The lowest lead concentration detected from the BRM samples was 250 mg/kg. This concentration is significantly higher than 10 times the rinsate concentration; therefore, it was determined that decontamination procedures were adequate for the project and no qualifiers were placed on the data.

Laboratory Analysis

A total of 133 samples (excluding QA/QC samples) were collected from BHSS and Basin schools during the project. Laboratory QA/QC was checked externally by the use of duplicate samples in the field and by submitting soil standards and blanks of distilled water blind to the laboratory for lead analysis. The NIST standards submitted to Northern Analytical contained 432 mg/kg lead. One field duplicate was collected and one standard was submitted for every batch of samples (approximately 1 in 20) submitted to the lab. Northern Analytical provided a copy of their internal QA/QC results for laboratory preparation blanks, laboratory control samples (LCS), and matrix spike/matrix spike duplicates (MS/MSD).

External QA/QC

Field Blanks

A total of 12 field blanks were collected and analyzed. Table 4 displays the field blank results. Nine wipe dust blanks, two fountain water blanks, and one air monitoring blank were collected. Wipe dust blanks consisted of a disposable non-contaminated wipe inserted into a plastic centrifuge tube supplied by Northern Analytical. One wipe blank was collected at each school. Fountain water blanks consisted of commercially available distilled water collected into 500 ml plastic bottles and preserved with nitric acid. The bottles were supplied by Northern Analytical. The air monitoring blank consisted of a sealed unused air monitoring cartridge supplied by Northern Analytical. All blanks were below instrument detection limits for lead.

Standards

Standards were used to evaluate the accuracy of Northern Analytical. Standard results are presented in Tables 5a, 5b, and 5c. One BRM, one vacuum, three wipe, and three mat dust standards were submitted blind to Northern Analytical; one standard was included in every batch of samples submitted to the lab (approximately 1 in 20). The BRM standard consisted of approximately 5 grams of soil standard placed in an 8 oz Nalgene® sample bottle. The vacuum dust standard consisted of approximately 5 grams of soil standard placed in a Zip-Loc® bag. The wipe dust standards consisted of exactly 0.27 grams of soil standard placed onto a disposable non-contaminated wipe; the standard was allowed to be absorbed and the wipe was placed into a plastic centrifuge tube. Percent recovery was 90% for the BRM dust standard and 71% for the vacuum dust standard. The standard percent recovery for the vacuum dust standard did not meet data quality objectives as outlined in the work plan (80 to 120%). Therefore, all vacuum dust sample results batched with this standard were qualified as estimates. The wipe dust standard percent recoveries for lead concentration ranged from 98% to 103%. No sample results were qualified based on BRM and wipe standard results.

Mat Dust Standards

A pre-loaded mat standard was inserted at the University of Idaho mat dust extraction laboratory for every batch of mat dust samples (approximately 1 in 20). A total of three standards were recovered from the mats and submitted blind to Northern Analytical. Pre-loaded mats had 10 g of a NIST standard containing 432 mg/kg lead. The dust mat standards were used to evaluate the dust recovery of the vacuum, as well as the accuracy of Northern Analytical. The average percent recovery of dust mass for the standards was 87%. The average percent recovery of lead concentration was 66% and the average percent recovery of lead mass was 57%.

Standard percent recoveries on dust mass, lead concentration, and lead mass were very similar to previous BHSS residential dust mat surveys. A NIST standard was used during this survey with less than half of the lead concentration used in all previous surveys, showing that the change in the standard's lead concentration did not affect percent recoveries. The sieved portion of many of the dust mat samples in previous projects contained significant amounts of fibers. Numerous mat fibers were clearly visible in 1997 and 1998 laboratory photographs of the sieved portion of the samples. Another possible explanation for the decreased percent recovery on concentration is preferential retention of the clays on the somewhat sticky vinyl surface, thereby reducing the total amount of lead available for vacuum sample removal. No qualifiers were placed on the data based on the mat dust standard results.

Internal QA/QC

Northern Analytical inserted one laboratory preparation blank per batch of samples to ensure no bias was introduced during sample preparation. Prep blank results are displayed in Table 6. All prep blanks were below the instrument detection limit for lead. No qualifiers were placed on the data based on the prep blank results.

Internal checks of Northern Analytical's accuracy were assessed by analyzing laboratory control samples (LCS). Results for aqueous LCS are presented in Table 7, results for soil LCS are presented in Table 8, and results for wipe dust and air monitoring LCS and their corresponding LCS duplicates are presented in Table 9. An aqueous LCS was analyzed for every batch of BRM dust, vacuum dust, mat dust, and fountain water samples. A soil LCS was analyzed for every batch of BRM dust, vacuum dust, and mat dust samples. Wipe dust and air monitoring LCS and LCS duplicates were analyzed for every batch of wipe dust and air monitoring samples, respectively. All LCS samples were within the acceptable percent recovery ranges specified by Northern Analytical. No qualifiers were placed on the data based on the LCS results.

Internal checks of laboratory precision at Northern Analytical were assessed using matrix spike/matrix spike duplicate (MS/MSD) analysis on one sample from each sample batch. No MS/MSD analysis occurred for the air monitoring or three wipe dust sample batches. Table 10 contains the MS/MSD analysis results. RPDs ranged from 0.2% to 14.5%, with an average of

5.6%. All spike percent recoveries were within the acceptable range specified by Northern Analytical, thus no qualifiers were placed on the data based on the laboratory MS/MSD results.

Conclusions

A check of field decontamination procedures was assessed using rinsate blanks. No significant concentrations of lead were found in the rinsate blanks. Field blank samples were submitted blind to the lab to check field techniques and lab accuracy. All field blanks were below detection for lead. No qualifiers were placed on the data based on both rinsate blank and field blank results.

Field duplicates were analyzed to assess field and laboratory variability. The BRM dust duplicate percent recovery indicated high field variability. No qualifiers were placed on the data based on duplicate results.

An external check of Northern Analytical laboratory accuracy was assessed using NIST soil standards. Percent recoveries were within the acceptable range and no qualifiers were placed on the data based on BRM dust and wipe dust standard results. The percent recovery for the vacuum dust standard did not meet data quality objectives as outlined in the work plan, thus all vacuum dust sample results batched with this standard were qualified as estimates. Percent recoveries were low for the three mat dust NIST standard results. Based on previous mat dust survey results, these low percent recoveries were likely a result of fiber dilution of vacuum samples or a portion of the standard sticking to the vinyl surface. No qualifiers were placed on the data based on mat dust standard results.

Northern Analytical inserted one laboratory preparation blank per batch of samples to ensure no bias was introduced during sample preparation. All prep blanks were below the instrument detection limit for lead, thus no qualifiers were placed on the data based on the prep blank results.

An internal check of Northern Analytical laboratory accuracy was assessed using LCS. All LCS results were within acceptable limits. Laboratory precision was assessed using MS/MSD analyses. All MS/MSDs displayed acceptable RPD values.

Based on a complete review of the rinsate blanks, field blanks, field duplicates, standards, prep blanks, LCS, and MS/MSD analyses, the final completeness for the study was assessed at 100%.

Table 1a
2000 School Wipe Dust Data

Lab ID	Sample ID	Field ID	Lead Concentration	Units
2000110234 - 8	00SD003	SDHB-01-WD	<30	ug/wipe
2000110234 - 9	00SD004	SDHB-02-WD	<30	ug/wipe
2000110233 - 12	00SD005	SDHB-03-WD	<30	ug/wipe
2000110235 - 1	00SD070	SDJM-01-WD	<30	ug/wipe
2000110235 - 2	00SD071	SDJM-02-WD	<30	ug/wipe
2000110235 - 3	00SD072	SDJM-03-WD	<30	ug/wipe
2000110235 - 4	00SD073	SDJM-04-WD	<30	ug/wipe
2000110234 - 18	00SD025	SDKH-01-WD	60	ug/wipe
2000110234 - 17	00SD024	SDKH-02-WD	<30	ug/wipe
2000110234 - 19	00SD026	SDKH-03-WD	<30	ug/wipe
2000110234 - 16	00SD023	SDKH-04-WD	50	ug/wipe
2000110234 - 11	00SD018	SDKH-05-WD	<30	ug/wipe
2000110234 - 15	00SD022	SDKH-07-WD	<30	ug/wipe
2000110234 - 13	00SD020	SDKH-08-WD	<30	ug/wipe
2000110233 - 14	00SD048	SDKM-01-WD	<30	ug/wipe
2000110233 - 15	00SD049	SDKM-02-WD	<30	ug/wipe
2000110233 - 16	00SD050	SDKM-03-WD	<30	ug/wipe
2000110233 - 17	00SD051	SDKM-04-WD	<30	ug/wipe
2000110233 - 18	00SD052	SDKM-05-WD	<30	ug/wipe
2000110233 - 19	00SD053	SDKM-06-WD	220	ug/wipe
2000110233 - 8	00SD068	SDOE-01-WD	<30	ug/wipe
2000110233 - 7	00SD067	SDOE-02-WD	<30	ug/wipe
2000110233 - 9	00SD069	SDOE-04-WD	70	ug/wipe
2000110234 - 7	00SD009	SDPE-01-WD	<30	ug/wipe
2000110235 - 6	00SD086	SDSE-01-WD	<30	ug/wipe
2000110235 - 8	00SD088	SDSE-02-WD	<30	ug/wipe
2000110235 - 9	00SD089	SDSE-03-WD	<30	ug/wipe
2000110233 - 1	00SD055	SDSH-01-WD	<30	ug/wipe
2000110233 - 3	00SD057	SDSH-02-WD	<30	ug/wipe
2000110233 - 5	00SD059	SDSH-04-WD	<30	ug/wipe
2000110234 - 6	00SD037	SDSV-01-WD	170	ug/wipe
2000110234 - 2	00SD033	SDSV-02-WD	<30	ug/wipe
2000110234 - 5	00SD036	SDSV-04-WD	<30	ug/wipe
2000110234 - 1	00SD032	SDSV-05-WD	270	ug/wipe
2000110234 - 3	00SD034	SDSV-06-WD	210	ug/wipe
2000110234 - 20	00SD031	SDSV-07-WD	<30	ug/wipe

Table 1b
2000 School BRM Dust Data

Lab ID	Sample ID	Field ID	Lead Concentration	Units
2000110236 - 16	00SD001	SDHB-01-BD	315	mg/kg
2000110236 - 17	00SD002	SDHB-02-BD	250	mg/kg
2000110236 - 3	00SD075	SDJM-01-BD	736	mg/kg
2000110236 - 4	00SD076	SDJM-02-BD	1060	mg/kg
2000110236 - 5	00SD077	SDJM-03-BD	655	mg/kg
2000110236 - 11	00SD015	SDKH-01-BD	1020	mg/kg
2000110236 - 12	00SD017	SDKH-02-BD	1060	mg/kg
2000110236 - 19	00SD060	SDKM-01-BD	677	mg/kg
2000110236 - 20	00SD061	SDKM-02-BD	1640	mg/kg
2000110236 - 6	00SD078	SDOE-01-BD	469	mg/kg
2000110236 - 7	00SD079	SDOE-02-BD	740	mg/kg
2000110236 - 18	00SD008	SDPE-01-BD	328	mg/kg
2000110236 - 8	00SD081	SDSE-01-BD	356	mg/kg
2000110236 - 9	00SD082	SDSE-02-BD	566	mg/kg
2000110236 - 1	00SD062	SDSH-01-BD	511	mg/kg
2000110236 - 2	00SD063	SDSH-02-BD	1060	mg/kg
2000110236 - 13	00SD029	SDSV-01-BD	584	mg/kg
2000110236 - 14	00SD030	SDSV-02-BD	700	mg/kg

Table 1c
2000 School Vacuum Dust Data

Lab ID	Sample ID	Field ID	Lead Concentration	Units
2000110237 - 6	00SD007	SDHB-01-VD	352 J	mg/kg
2000110237 - 10	00SD065	SDJM-01-VD	387 J	mg/kg
2000110237 - 1	00SD027	SDKH-01-VD	674 J	mg/kg
2000110237 - 2	00SD028	SDKH-02-VD	650 J	mg/kg
2000110237 - 7	00SD042	SDKM-01-VD	655 J	mg/kg
2000110237 - 9	00SD064	SDOE-01-VD	644 J	mg/kg
2000110237 - 5	00SD011	SDPE-01-VD	416 J	mg/kg
2000110237 - 4	00SD012	SDPE-02-VD	406 J	mg/kg
2000110237 - 11	00SD083	SDSE-01-VD	332 J	mg/kg
2000110237 - 12	00SD084	SDSE-02-VD	335 J	mg/kg
2000110237 - 8	00SD043	SDSH-01-VD	632 J	mg/kg
2000110237 - 3	00SD038	SDSV-01-VD	451 J	mg/kg

J: Concentration qualified as an estimate; QA/QC criteria not met.

Table 1d
2000 School Mat Dust Data

Lab ID	Sample ID	Field ID	Lead Concentration	Units
2001010016 - 6	00M495	SDHB-01-MD	440	mg/kg
2001010016 - 5	00M494	SDHB-02-MD	410	mg/kg
2001010015 - 12	00M461	SDJM-01-MD	560	mg/kg
2001010015 - 9	00M458	SDJM-02-MD	330	mg/kg
2001010015 - 15	00M464	SDJM-03-MD	880	mg/kg
2001010015 - 14	00M463	SDJM-04-MD	650	mg/kg
2001010015 - 13	00M462	SDJM-05-MD	760	mg/kg
2001010016 - 16	00M505	SDKH-01-MD	640	mg/kg
2001010016 - 15	00M504	SDKH-02-MD	740	mg/kg
2001010016 - 14	00M503	SDKH-03-MD	740	mg/kg
2001010016 - 13	00M502	SDKH-04-MD	450	mg/kg
2001010016 - 12	00M501	SDKH-05-MD	460	mg/kg
2001010016 - 11	00M500	SDKH-06-MD	insufficient volume*	
2001010017 - 15	00M484	SDKM-01-MD	660	mg/kg
2001010017 - 14	00M483	SDKM-02-MD	730	mg/kg
2001010017 - 13	00M482	SDKM-03-MD	1030	mg/kg
2001010017 - 12	00M481	SDKM-04-MD	790	mg/kg
2001010016 - 3	00M492	SDOE-01-MD	340	mg/kg
2001010016 - 2	00M491	SDOE-02-MD	670	mg/kg
2001010016 - 4	00M493	SDOE-03-MD	790	mg/kg
2001010016 - 1	00M490	SDOE-04-MD	310	mg/kg
2001010017 - 20	00M489	SDOE-05-MD	640	mg/kg
2001010016 - 10	00M499	SDPE-01-MD	430	mg/kg
2001010016 - 9	00M498	SDPE-02-MD	450	mg/kg
2001010016 - 7	00M496	SDPE-03-MD	460	mg/kg
2001010016 - 8	00M497	SDPE-04-MD	1050	mg/kg
2001010017 - 2	00M471	SDSE-01-MD	750	mg/kg
2001010015 - 20	00M469	SDSE-02-MD	850	mg/kg
2001010015 - 19	00M468	SDSE-03-MD	1080	mg/kg
2001010015 - 18	00M467	SDSE-04-MD	640	mg/kg
2001010015 - 16	00M465	SDSE-05-MD	710	mg/kg
2001010015 - 17	00M466	SDSE-06-MD	530	mg/kg
2001010017 - 9	00M478	SDSH-01-MD	1440	mg/kg
2001010017 - 10	00M479	SDSH-02-MD	550	mg/kg
2001010017 - 11	00M480	SDSH-03-MD	440	mg/kg
2001010017 - 19	00M488	SDSH-04-MD	1050	mg/kg
2001010017 - 16	00M485	SDSV-01-MD	820	mg/kg
2001010017 - 17	00M486	SDSV-02-MD	960	mg/kg
2001010017 - 18	00M487	SDSV-04-MD	1000	mg/kg

* Insufficient sample volume was available for analysis.

Table 1e
2000 School Air Monitoring Dust Data

Lab ID	Sample ID	Field ID	Lead Concentration	Units
2000120064 - 1	00SD118	SDJM-01-AM	<5	ug/filter
2000120064 - 2	00SD119	SDJM-02-AM	<5	ug/filter

<: Concentration below instrument detection limit.

Table 1f
2000 School Drinking Water Fountain Data

Lab ID	Sample ID	Field ID	Lead Concentration	Units
2000110210 - 3	00SD040	SDHB-01-FW	0.005	mg/l
2000110210 - 2	00SD039	SDHB-02-FW	0.008	mg/l
2000110210 - 4	00SD041	SDHB-03-FW	0.008	mg/l
2000120065 - 3	00SD115	SDJM-01-FW	0.006	mg/l
2000120065 - 4	00SD116	SDJM-02-FW	0.006	mg/l
2000120065 - 5	00SD117	SDJM-03-FW	0.006	mg/l
2000110211 - 1	00SD091	SDKH-01-FW	<0.003	mg/l
2000110211 - 2	00SD092	SDKH-02-FW	0.007	mg/l
2000110211 - 3	00SD093	SDKH-03-FW	<0.003	mg/l
2000110211 - 7	00SD097	SDKM-01-FW	0.005	mg/l
2000110211 - 9	00SD099	SDKM-02-FW	<0.003	mg/l
2000110211 - 10	00SD100	SDKM-03-FW	<0.003	mg/l
2000120065 - 1	00SD113	SDOE-01-FW	0.018	mg/l
2000120065 - 2	00SD114	SDOE-02-FW	0.015	mg/l
2000110211 - 4	00SD094	SDPE-01-FW	<0.003	mg/l
2000110211 - 5	00SD095	SDPE-02-FW	<0.003	mg/l
2000110211 - 6	00SD096	SDPE-03-FW	<0.003	mg/l
2000110211 - 11	00SD101	SDSE-01-FW	<0.003	mg/l
2000110211 - 12	00SD102	SDSE-02-FW	<0.003	mg/l
2000110211 - 13	00SD103	SDSE-03-FW	<0.003	mg/l
2000110211 - 15	00SD105	SDSH-01-FW	<0.003	mg/l
2000110211 - 16	00SD106	SDSH-02-FW	<0.003	mg/l
2000110211 - 17	00SD107	SDSH-03-FW	0.006	mg/l
2000110210 - 6	00SD044	SDSV-01-FW	0.007	mg/l
2000110210 - 7	00SD045	SDSV-02-FW	0.005	mg/l
2000110210 - 8	00SD046	SDSV-03-FW	0.007	mg/l

Table 2 - Field Duplicates

Sample Type	Original Lab ID	Duplicate Lab ID	Original Sample ID	Duplicate Sample ID	Units	Original Lead Conc.	Duplicate Lead Conc.	RPD
BRM Dust	2000110236 - 11	2000110236 - 15	00SD015	00SD014	mg/kg	1020	587	53.9
Wipe Dust	2000110233 - 1	2000110233 - 2	00SD055	00SD056	ug/wipe	<30	<30	NA
Wipe Dust	2000110234 - 11	2000110234 - 12	00SD018	00SD019	ug/wipe	<30	<30	NA
Wipe Dust	2000110235 - 6	2000110235 - 7	00SD086	00SD087	ug/wipe	<30	<30	NA
Vacuum Dust	2000110237 - 12	2000110237 - 13	00SD084	00SD085	mg/kg	335	396	16.7
							Average	35.3

RPD = ABS(X1-X2)/((X1+X2)/2)

X1 = ORIGINAL SAMPLE

X2 = DUPLICATE SAMPLE

Table 3 - Rinsate Blanks

Sample Type	Lab ID	Sample ID	Lead Concentration	Units
BRM Dust	2000110210 - 10	00SD080	0.017	mg/l
BRM Dust	2000110210 - 1	00SD016	<0.003	mg/l
BRM Dust	2000110210 - 5	00SD013	<0.003	mg/l
BRM Dust	2000110210 - 9	00SD047	<0.003	mg/l
Mat Dust	2001010015 - 11	00M460	<0.003	mg/l
Mat Dust	2001010016 - 19	00M508	<0.003	mg/l

Table 4 - Field Blanks

Sample Type	Lab ID	Sample ID	Lead Concentration	Units
Wipe Dust	2000110233 - 13	00SD006	<30	ug/wipe
Wipe Dust	2000110233 - 11	00SD010	<30	ug/wipe
Wipe Dust	2000110234 - 14	00SD021	<30	ug/wipe
Wipe Dust	2000110234 - 4	00SD035	<30	ug/wipe
Wipe Dust	2000110233 - 20	00SD054	<30	ug/wipe
Wipe Dust	2000110233 - 4	00SD058	<30	ug/wipe
Wipe Dust	2000110233 - 6	00SD066	<30	ug/wipe
Wipe Dust	2000110235 - 5	00SD074	<30	ug/wipe
Wipe Dust	2000110235 - 10	00SD090	<30	ug/wipe
Fountain Water	2000110211 - 8	00SD098	<0.003	mg/l
Fountain Water	2000110211 - 14	00SD104	<0.003	mg/l
Air Monitoring Dust	2000120064 - 3	00SD120	<5	ug/filter

Table 5a - BRM and Vacuum Dust Standards

Sample Type	Lab ID	Sample ID	Analyte	Units	Measured Lead Value	True Lead Value	Percent Recovery
BRM Dust	2000110236 - 10	00SD108	Lead	mg/kg	389	432	90%
Vacuum Dust	2000110237 - 14	00SD109	Lead	mg/kg	305	432	71%
						Average	80%

Table 5b - Wipe Dust Standards

Sample Type	Lab ID	Sample ID	Pre-loading Sample Weight (g)	Sample Conc. (ug/g)	Amount Lead Applied to wipe (ug/wipe)	Recovered Sample Conc. (ug/wipe)	Percent Recovery Lead (conc.)
Wipe Dust	2000110234 - 10	00SD110	0.27	432	117	120	103%
Wipe Dust	2000110233 - 10	00SD111	0.27	432	117	120	103%
Wipe Dust	2000110235 - 11	00SD112	0.27	432	117	114	98%
						Average	101%

Table 5c - Mat Dust Standards

Sample Type	Lab ID	Sample ID	Pre-loading Sample Weight (g)	Sample Conc. (ug/g)	Amount Lead Applied to mat (ug)	Recovered Sample Weight (g)	Recovered Sample Conc. (ug/g)	Amount Lead in Sample (ug)	Percent Recovery Dust (mass)	Percent Recovery Lead (conc.)	Percent Recovery Lead (mass)
Mat Dust	2001010015 - 10	00M459	10	432	4320	8.66	290	2511	87%	67%	58%
Mat Dust	2001010017 - 1	00M470	10	432	4320	8.64	300	2592	86%	69%	60%
Mat Dust	2001010016 - 18	00M507	10	432	4320	8.79	260	2285	88%	60%	53%
								Average	87%	66%	57%

Percent Recovery = (Measured Conc.)/(True Conc.)* 100

Table 6 - Laboratory Preparation Blanks

Batched with Sample Type	Lab ID	Lead Concentration	Units
BRM Dust	2000110236 - 21	<0.05	mg/l
Wipe Dust	2000110233 - 21	<30	ug/wipe
Wipe Dust	2000110234 - 21	<30	ug/wipe
Wipe Dust	2000110235 - 12	<30	ug/wipe
Vacuum Dust	2000110237 - 15	<0.05	mg/l
Mat Dust	2001010015 - 21	<0.05	mg/l
Mat Dust	2001010017 - 21	<0.05	mg/l
Mat Dust	2001010016 - 20	<0.05	mg/l
Fountain Water	2000110210 - 11	<0.003	mg/l
Fountain Water	2000110211 - 18	<0.003	mg/l
Fountain Water	2000120065 - 6	<0.003	mg/l
Air Monitoring Dust	2000120064 - 4	<5	ug/filter

Table 7 - Aqueous LCS

Batched with Sample Type	Lab ID	Measured Lead Value (mg/l)	True Lead Value (mg/l)	Percent Recovery	Acceptable % Range*
BRM Dust	2000110236 - 22	5.38	5.00	108%	80-120
Vacuum Dust	2000110237 - 16	5.15	5.00	103%	80-120
Mat Dust	2001010015 - 22	5.14	5.00	103%	80-120
Mat Dust	2001010017 - 22	5.07	5.00	101%	80-120
Mat Dust	2001010016 - 21	4.90	5.00	98%	80-120
Fountain Water	2000110210 - 12	0.795	0.800	99%	85-115
Fountain Water	2000110211 - 19	0.416	0.400	104%	85-115
Fountain Water	2000120065 - 7	0.383	0.400	96%	85-115

Percent Recovery = (Measured Conc.)/(True Conc.)* 100
*Acceptable percent recovery range specifiec by Northern Analytical, Inc.

Table 8 - Soil LCS

Batched with Sample Type	Lab ID	Measured Lead Value (mg/kg)	True Lead Value (mg/kg)	Percent Recovery	Acceptable % Range*
BRM Dust	2000110236 - 23	377	372	101%	80-120
Vacuum Dust	2000110237 - 17	400	372	108%	80-120
Mat Dust	2001010015 - 23	413	372	111%	80-120
Mat Dust	2001010017 - 23	131	119	110%	76-124
Mat Dust	2001010016 - 22	138	138	100%	75-125

*Acceptable percent recovery range specifiec by Northern Analytical, Inc.

Percent Recovery = (Measured Conc.)/(True Conc.)* 100

RPD = ABS(X1-X2)/((X1+X2)/2)

X1 = ORIGINAL SAMPLE

X2 = DUPLICATE SAMPLE

Table 9 - Wipe Dust and Air Monitoring LCS

Batched with Sample Type	LCS Lab ID	LCS Duplicate Lab ID	Measured Lead Value (mg/kg)	Duplicate Lead Value (mg/kg)	RPD	True Lead Value (mg/kg)	Percent Recovery	Duplicate Percent Recovery	Acceptable % Range*
Wipe Dust	2000110233 - 23	2000110233 - 24	371.0	356.4	4	372.2	100%	96%	80-120
Wipe Dust	2000110234 - 23	2000110234 - 24	147.4	135.1	9	137.7	107%	98%	74-125
Wipe Dust	2000110235 - 14	2000110235 - 15	361.8	348.3	4	372.2	97%	94%	80-120
Air Monitoring Dust	2000120064 - 5	2000120064 - 6	44	46	4	50	88%	92%	81-117

*Acceptable percent recovery range specifiec by Northern Analytical, Inc.
Percent Recovery = (Measured Conc.)/(True Conc.)* 100
RPD = ABS(X1-X2)/((X1+X2)/2)
X1 = ORIGINAL SAMPLE
X2 = DUPLICATE SAMPLE

Table 10 - Laboratory Matrix Spike/Matrix Spike Duplicates

Batched with Sample Type	MS Lab ID	MS/D Lab ID	Units	MS Lead Conc.	MS/D Lead Conc.	RPD
BRM Dust	2000110236 - 24	2000110236 - 25	mg/kg	1078	1147	6.2
Vacuum Dust	2000110237 - 18	2000110237 - 19	mg/kg	1194	1033	14.5
Mat Dust	2001010015 - 24	2001010015 - 25	mg/kg	1340	1400	4.4
Mat Dust	2001010017 - 24	2001010017 - 25	mg/kg	1480	1510	2.0
Mat Dust	2001010016 - 23	2001010016 - 24	mg/kg	1180	1210	2.5
Fountain Water	2000110210 - 13	2000110210 - 14	mg/l	0.730	0.753	3.1
Fountain Water	2000110211 - 20	2000110211 - 21	mg/l	0.408	0.409	0.2
Fountain Water	2000120065 - 8	2000120065 - 9	mg/l	0.420	0.373	11.9
					Average RPD	5.6

RPD = ABS(X1-X2)/((X1+X2)/2)

X1 = ORIGINAL SAMPLE

X2 = DUPLICATE SAMPLE

APPENDIX C

Laboratory Data Sheets

(AVAILABLE UPON REQUEST)