HETA 96-209
Cass Lake Indian Health Service Hospital
Cass Lake, Minnesota

Max Kiefer, CIH
Clint Morley

PREFACE

The Hazard Evaluations and Technical Assistance Branch of NIOSH conducts field investigations of possible health hazards in the workplace. These investigations are conducted under the authority of Section 20(a)(6) of the Occupational Safety and Health Act of 1970, 29 U.S.C. 669(a)(6) which authorizes the Secretary of Health and Human Services, following a written request from any employer or authorized representative of employees, to determine whether any substance normally found in the place of employment has potentially toxic effects in such concentrations as used or found.

The Hazard Evaluations and Technical Assistance Branch also provides, upon request, technical and consultative assistance to Federal, State, and local agencies; labor; industry; and other groups or individuals to control occupational health hazards and to prevent related trauma and disease. Mention of company names or products does not constitute endorsement by the National Institute for Occupational Safety and Health.

ACKNOWLEDGMENTS AND AVAILABILITY OF REPORT

This report was prepared by Max Kiefer, of the Hazard Evaluations and Technical Assistance Branch, Division of Surveillance, Hazard Evaluations and Field Studies (DSHEFS), and Clint Morely, of the Engineering and Control Technology Branch, Division of Physical Science and Engineering.

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Health Hazard Evaluation Report 96-209
Cass Lake Indian Health Service Hospital
Cass Lake, Minnesota
September 4, 1996

Max Kiefer, CIH
Clint Morley

SUMMARY

On June 24, 1996, the National Institute for Occupational Safety and Health (NIOSH) received a request from the Bemidji Area Indian Health Service, Office of Environmental Health & Engineering, for a lead-based paint (LBP) inspection at the Cass Lake Indian Hospital in Cass Lake, Minnesota. The requestors asked NIOSH to assess the lead content on various interior components designated for removal or remodeling in an upcoming building renovation and asbestos abatement project. Additionally, recommendations concerning safe work practices contractors should follow when removing lead-containing components, and the appropriate waste disposal category for lead-containing waste were requested.

On July 9-12, a site visit was conducted at the Cass lake Indian Hospital. During this site visit, 32 paint chip samples were collected from various interior surfaces. Eighty-seven measurements were conducted with a direct-reading X-Ray Fluorescence (XRF) detector.

Lead was detected by the XRF in 28 of the 87 surfaces sampled; 13 of which exceeded the Department of Housing and Urban Development (HUD) definition of LBP (>1.0 milligrams per square centimeter [mg/cm^2]). None of the components (walls, sills, doors) with measurable lead had deteriorating paint. Lead was detected in 23 of the 32 paint chip samples. Five of the samples exceeded the HUD criteria for LBP (0.5% by weight), as determined by the paint chip method. For two samples, the paint chip analysis resulted in reclassifying the component from negative (as determined by XRF) to positive, based on HUD criteria.

Lead-based paint (LBP) was detected in various interior components of the Cass Lake Indian Hospital. Interior paint was in good condition; no deteriorating LBP was identified. Although the presence of lead on painted components in this facility is not considered a hazard to occupants, remodeling and renovation activities at this facility must take into account those components identified as containing LBP. Recommendations regarding the precautions necessary when handling these materials are provided in this report.

Keywords: 8062 (General Medical and Surgical Hospitals). Lead, Lead-Based Paint, HUD, X-Ray Fluorescence.

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INTRODUCTION

On July 9-12, 1996, NIOSH investigators conducted a site visit to the Cass Lake Indian Hospital in Cass Lake, Minnesota. During this visit the lead content of coatings on various interior surfaces was measured using both direct reading instrumentation and by collecting paint chip samples for subsequent laboratory analysis. An interim report describing NIOSH activities during this visit, and containing preliminary findings and recommendations was issued on August 13, 1996.

BACKGROUND

The Cass Lake Hospital was constructed in 1937 and encompasses approximately 28,000 square feet on the first floor and basement. Two outpatient clinic additions were constructed in 1961 and 1983, and a radiology area has been recently added. The hospital has the capacity to house 13 patients. Treatment and surgical rooms, patient rooms, and all clinic functions are on the first floor; The basement consists of maintenance and engineering offices, and all mechanical and storage space. Interior walls are a combination of clay tile with plaster and metal studs with gypsum board. Most walls are painted. A few of the doors are painted-metal although most are varnished-wood. The door casings/frames are painted-metal. In most areas the original ceiling is plaster with an asbestos-board sheath. Conduit, ventilation ductwork, and other piping are suspended below the original ceiling and above a false ceiling made of acoustical lay-in tile.

A major renovation project is planned to modernize the hospital and remove the asbestos-board from the ceiling. The ventilation system will be replaced as will the steam radiators. Approximately 40 rooms and corridors will be affected.

METHODS

On July 9, 1996, NIOSH investigators held an opening conference at the Cass Lake Hospital with Indian Health Service [IHS] and Cass Lake Indian Hospital representatives. During this meeting the scope of this project was discussed and information about NIOSH and LBP was provided. Following this meeting a walkthrough inspection of the hospital was conducted, and areas targeted for renovation were identified. Issues concerning access to patient rooms were discussed with the Director of Nursing.

On July 10, 32 paint chip samples were collected from various interior surfaces identified for renovation. Samples were collected from: walls (21), door casings/frames (7), doors (2), and radiators (2). On July 11, 87 direct-reading measurements using an X-ray Fluorescence (XRF) monitor were collected from interior components at the hospital. Surfaces sampled were: ceilings (6), walls (24), door casings/frames (25), doors (10), window frames and other components (18), radiators (2), an electrical panel (1), and a fire extinguisher cabinet (1). Preliminary findings and recommendations were discussed at a closing meeting with Indian Health Service and Cass Lake Indian Hospital representatives.

XRF

Direct-reading measurements to determine the lead content of coated surfaces were obtained with a portable Niton XL XRF spectrum analyzer. This analyzer contains a 10 millicurie ^{109}cadmium isotope as a radiation source. During the measurement mode, the instrument exposes the painted surface to radiation from the ^{109}cadmium source. This interaction of high energy photons from the radiation source with lead atoms in the paint results in the ejection of electrons from the K- or L-shells of the lead atoms. During this "excitation" process, electrons from less stable shells fill the vacancies, and energy in the form of X-rays is released. This energy emission is called fluorescence. The specific energy released is characteristic of the K- or L-shell of the lead atom. The intensity of the release is measured by the XRF detector and is used to quantify the amount of lead present in the paint. The Niton XL is capable of measuring both K- and L-shell emissions and uses this information to confirm findings as well as provide an indication of the relative depth of the lead. Results are reported in milligrams of lead per square centimeter (mg/cm^2), and are displayed on the unit screen during the measurement. The results are also stored for future downloading to a database. All necessary arrangements were made with the Radiation Control Section of the Minnesota Department of Health prior to shipping the unit to Minnesota.

Paint Chip Samples

Thirty-two paint chip samples were collected from interior components to confirm the XRF findings via an alternative method and resolve any inconclusive XRF results. For each sample, approximately one gram of paint sample was collected by removing all layers down to the substrate using a razor-knife tool to scrape the paint. Care was taken not to remove any substrate with the paint sample. The chip samples were sealed in rigid plastic vials and shipped to the NIOSH laboratory for analysis. Analysis for lead content was via a modification of NIOSH method 7300 using inductively coupled plasma-atomic emission spectroscopy (ICP-AES). The limit of quantitation for this sample set was 0.006 percent. Because the dimensions of the surface area sampled could not be accurately measured, the results are reported in micrograms per gram (µg/gm), or percent by weight, and not in mg/cm^2.

EVALUATION CRITERIA

Regulatory Evaluation Criteria

Lead is a bluish-gray heavy metal with no characteristic taste or smell. Although lead is a naturally occurring element, most exposures to lead occur from human activities.[1] Lead was a major ingredient in house paint for years prior to 1950, at which time other pigment materials became more popular, although LBP was still used.[2] In 1973, the Consumer Product Safety Commission (CPSC) established a maximum lead content in paint of 0.5% by weight for household paint, and further lowered the allowable level to 0.06% in 1978. The U.S Department of Housing and Urban Development (HUD) has established comprehensive guidelines for the evaluation and control of LBP in housing primarily because of the harmful effects of lead exposure on children.[3, 7] LBP is a concern both as a source of direct exposure (ingestion of paint chips), and as a contributor to lead in interior dust and exterior soil. The HUD definition of LBP is currently **0.5% by weight, or 1.0 milligram per square centimeter** (mg/cm^2), and it is estimated that some 42 million homes contain LBP.[2] Note that you cannot convert results reported in percent by weight or parts per million (ppm) to area concentrations as measured by the XRF unless the exact surface area and weight of the paint chip is determined.

Activities involving abatement of LBP have been increasing in recent years, and have received regulatory attention. Guidelines have been established by HUD and the Environmental Protection Agency for assessing and removing LBP. More specific requirements, such as training of personnel in the lead-removal industry, have been or will be established by many states, and are likely to be promulgated at the federal level.[3, 7] By contrast, a LBP **hazard,** defined by the Residential Lead-Based Paint Hazard Reduction Act of 1992 (Public Law 102-550), is considered to be any condition that causes exposure to lead that would result in adverse human health effects. As such, intact LBP on most walls or ceilings would not be considered hazardous under normal conditions. However, if the LBP is damaged or altered, then a LBP hazard could be present even if the LBP concentration was below the HUD definition.

The Occupational Safety and Health Administration (OSHA) has established a comprehensive regulation for lead that applies to both general industry and, due to a recent amendment, to construction.[3,6] The standard establishes a permissible exposure limit (PEL) of 50 $\mu g/m^3$, and an action level of 30 $\mu g/m^3$. The action level is the level at which an employer must begin certain compliance activities. One of the most significant requirements is to provide medical surveillance that includes assessing blood lead levels in exposed employees. Full medical surveillance is required for employees with blood lead levels over 40 micrograms per deciliter. Exposure monitoring, training, housekeeping, personal protective equipment and other requirements are also specified in the regulations.

The OSHA lead in construction standard (29 CFR 1926.62) applies to all construction work where an employee may be occupationally exposed to lead. This comprehensive standard includes all construction activities that entail alteration, repair, demolition, renovation, removal, or salvage of structures or materials that contain lead. For the purposes of compliance with the OSHA construction regulation, if there is a *detectable level of lead in paint* the OSHA standard applies, even if it is below the HUD or CPSC criteria. In general, the OSHA regulations require conducting an initial exposure assessment (air sampling) to determine if employees are exposed to lead above the action level. Until the initial assessment is completed precautions must still be taken to safeguard employees. OSHA has addressed this issue by establishing three tiers of trigger tasks where employees conducting these activities are assumed to exceed the PEL and must be protected accordingly.[4]

The HUD guidelines contain specific information regarding inspection protocols, abatement methods, clearance testing, worker protection, and waste disposal.[3, 7] Recommended abatement methods as well as prohibited techniques (open flame torching, machine sanding/grinding without high efficiency particulate air [HEPA] filtration, abrasive blasting without HEPA, uncontained hydroblasting or high pressure washing) are described.

Lead-contaminated surface dust and soil represent potential sources of lead exposure, particularly for young children. This may occur either by direct hand-to-mouth contact, or indirectly from hand-to-mouth contact with contaminated clothing, cigarettes, or food. Previous studies have found a significant correlation between resident children's blood lead levels and house dust lead levels.[4] There is currently no federal standard which provides a permissible limit for lead contamination of surfaces in occupational (or any other) settings. As required by Section 403 of the Toxic Substances Control Act (TSCA), EPA is in the process of developing a rule to address hazards from lead-contaminated dust and soil in and around homes.

HUD and EPA currently recommend the following clearance levels for surface lead loading after residential lead abatement or interim control activities: uncarpeted floors, 100 micrograms per square foot ($\mu g/ft^2$); interior window sills, 500 $\mu g/ft^2$, and window wells, 800 $\mu g/ft^2$.[5] These levels have been established as achievable through lead abatement and interim control activities, and they are not based on projected health effects associated with specific surface dust levels. These clearance levels are intended to indicate whether a lead hazard exists for young children following hazard control efforts in public housing.

Lead - Health Effects

Lead is ubiquitous in U.S. urban environments due to the widespread use of lead compounds in industry, gasoline, and paints during the past century. Exposure to lead occurs via inhalation of dust and fume, and ingestion through contact with lead-contaminated hands, food, cigarettes, and clothing. Absorbed lead accumulates in the body in the soft tissues and bones. Lead is stored in bones for decades, and may cause health effects long after exposure as it is slowly released in the body.

Lead can enter the body by inhalation or ingestion and can adversely affect numerous body systems. Skin absorption does not occur except for certain organo-lead compounds such as tetraethyl lead. Inhalation is considered to be the most important occupational exposure route. Lead is a systemic poison that serves no useful function after absorption in the body, the health consequences of which can occur after periods of exposure as short as days or as long as several years.[6] Once absorbed, lead is excreted from the body very slowly. Absorbed lead can damage the kidneys, peripheral and central nervous systems, and the blood forming organs (bone marrow).[1,7,8] These effects may be felt as weakness, tiredness, irritability, digestive disturbances, high blood pressure, kidney damage, mental deficiency, or slowed reaction times. Damage to the central nervous system in general, and the brain (encephalopathy) in particular, is one of the most severe forms of lead poisoning.[8, 7,6] Chronic lead exposure is associated with infertility and with fetal damage in pregnant women.[8, 7,1] Although the hazards of lead have been known for some time, occupational exposure to lead is still a significant problem in some industries. In 1990, the U.S. Public Health Service established a national goal to eliminate worker exposures resulting in blood lead concentrations greater than 25 micrograms per deciliter (µg/dl).[9]

RESULTS

XRF

The results of the LBP sampling are presented in Table 1. Lead was detected by the XRF in 28 of the 87 surfaces sampled. Thirteen of the samples exceeded the HUD definition of LBP (>1.0 mg/cm^2). Of the 13 samples exceeding the HUD definition of LBP, 10 were from interior door casings. A variety of painting and construction histories were observed on the walls; however, except for the tile walls in the clinic area, and 3 interior walls in rooms 405/406, LBP was not detected by the XRF on the walls. Lead was not detected by the XRF on any of the doors or ceiling. The radiators were difficult to sample with the XRF; a very low level of lead was detected and paint chip samples were obtained to verify results. The window sashes inside the clinic area were lead-free. Other painted window components, however (exterior sill, frame), contained lead. Paint condition was mostly intact on all surfaces except for the South wall of room 300. None of the components with measurable lead had deteriorating coatings.

Paint Chip Samples

As shown in Table 1, lead was detected in 23 of the 32 paint chip samples. Five of the samples exceeded the HUD criteria for LBP (0.5%), as determined by the paint chip method. The lead concentration in 10 of the 23 positive samples were below the CPSC allowable level for lead in paint of 0.06%. For two samples (metal door casing, room 440; radiator in corridor 108), the paint chip sample resulted in reclassifying the component from negative (as determined by XRF) to positive, based on HUD criteria. Additional notable findings of the paint chip sampling were the detection of LBP exceeding HUD criteria on the door and casing from room 435, and the east wall of room 100. Lesser concentrations of LBP were also found on other walls (room 101- west wall, room 103, room 441- north wall, room 435- south wall).

DISCUSSION AND CONCLUSIONS

Lead-based paint was detected in various components throughout the Cass Lake Indian Hospital. Most of the interior door casings were found to contain LBP. The paint chip sampling identified additional areas where LBP was present, and resulted in the reclassification (based on HUD criteria) of two components, previously classified (based on XRF results) as negative.

Remodeling and renovation activities at this facility must take into account those components identified as containing LBP. Recommendations regarding the precautions necessary when handling these materials are provided in the following section.

RECOMMENDATIONS

1. Lead-based paint precautions should be taken during remodeling activities involving those materials identified as containing lead. Trained and certified lead-abatement contractors and workers should be used for these tasks. The contractors and workers should follow OSHA regulations and HUD guidelines. This includes developing an occupant protection plan (isolation of occupants from work areas, covering/removing furnishings, etc.) and conducting an initial worker exposure determination. Many of the controls required for asbestos abatement are applicable to lead. Efforts should be made to combine asbestos abatement activities with remodeling tasks involving the lead-containing material. Only recommended abatement techniques should be used. Other criteria specified in the HUD guidelines that should be included in the remodeling plan include dust removal (HEPA vacuum, wet washing) and clean-up, and development of a waste management plan. Based on our observations, building component replacement (e.g., removal of casings, etc.) may be the most effective method.

2. Clearance testing (visual and dust sampling) of surfaces utilizing the HUD criteria and sampling protocol should be conducted after the remodeling activities are completed to ensure the building is lead-safe.

3. Minnesota has an established lead program that has specific requirements for LBP abatement projects. The Cass Lake Hospital project should be discussed with this group. The Minnesota lead program may be a good source of information regarding available contractors that could be utilized, as well as specific lead-abatement training or certifications that are required.

4. The Minnesota Pollution Control Agency prescribes the disposal pathways for lead-containing waste. Based on our discussion with the Minnesota lead program, the abatement method used will

significantly influence the waste category of the lead-containing materials (e.g., the use of chemical strippers as opposed to component removal). Specific waste management requirements should be obtained from this agency.

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Table 1
XRF Lead-Based Paint Test Results
Cass Lake Indian Hospital, Cass Lake, MN
HETA 96-209
July 11, 1996

Substrate	Component	Color	Test Locations	XRF Readings[1]	Paint Chip Results[2]	HUD Class[3]
Asbestos Bd	Ceiling	White	Corridor 427, North Side	<0.1		Neg
Asbestos Bd	Ceiling	White	Corridor 427, South Side	<0.1		Neg
Drywall	Wall	White	Room 426, adjacent main door		<0.006	Neg
Metal	Door	Pink	Room 426 from Corridor 416, composite sample		**0.04**	Neg
Plaster	Wall	White	Room 413, middle of west wall		**0.06**	Neg
Plaster	Wall	White	Room 432, Middle of South Wall	<0.1	**0.03**	Neg
Wood	Door	Varnish	Room 432, Corridor Side	<0.1		Neg
Metal	Door Casing	Pink	Room 432 Door, Left Side	<0.1		Neg
Metal	Door Casing	Brown	Room 433, Right Side	**3.5 ± 2.5**	**5.87**	Pos
Metal	Door Casing	Brown	Room 433, Right Side (Repeat Test)	**3.9 ± .6**	**5.87**	Pos
Metal	Door Casing	Brown	Room 433, Left Side	**4.7**		Pos
Metal	Door	White	Room 435 Room Side		**2.52**	Pos
Metal	Door Casing	White	Room 435, Right Side		**1.1**	Pos
Plaster	Wall	White	Room 435, South Wall		**0.43**	Neg
Plaster	Wall	White	Room 440, West Wall		0.05	Neg
Metal	Door Casing	Pink	Room 440, Left Side	**0.3 ± .1**	**0.69**	Pos
Metal	Door Casing	Pink	Room 440, Left Side (where paint was removed)	<0.1		Neg
Drywall	Wall	White	Room 441, North Wall		**0.17**	Neg
Plaster	Wall	White	East Side of Corridor 427, South of Room 430	<0.1		Neg
Metal	Door Casing	Pink	Room 430, Left Side	<0.1		Neg
Wood	Door	Varnish	Room 430	<0.1		Neg
Plaster	Wall	White	Room 430, South Wall	<0.1		Neg
Metal	Wall	White	Room 430, North Wall by Autoclave	<0.1		Neg

Table 1 (continued)
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Substrate	Component	Color	Test Locations	XRF Readings[1]	Paint Chip Results[2]	HUD Class[3]
Metal	Door Casing	Pink	Room 430, Right Side	<0.1		Neg
Plaster	Wall	White	Room 430, West Wall, South of Door	<0.1		Neg
Metal	Door Casing	Pink	Room 407, Right Side	**2.3 ± 1.2**		Pos
Metal	Door Casing	Pink	Room 407, Right Side (Repeat Test)	**2.5 ± .3**		Pos
Wood	Door	Varnish	Room 407	<0.1		Neg
Plaster	Wall	White	Room 406, North Wall	**0.6 ± .1**		Neg
Plaster	Wall	White	Room 406, South Wall	**0.7 ± .1**		Neg
Metal	Door Casing	Pink	Room 406, Right Side	**2.8 ± .4**		Pos
Plaster	Wall	White	Room 404, East Wall	<0.1		Neg
Metal	Door Casing	Brown	Room 405, Left Side	**3.4 ± .5**		Pos
Plaster	Wall	White	Room 405, North Wall	**0.8 ± .2**		Neg
Plaster	Wall	White	Room 405, North Wall (Repeat Test)	**0.7 ± .3**		Neg
Asbestos Bd	Ceiling	White	Corridor 408, Adjacent Room 412	<0.1		Neg
Asbestos Bd	Ceiling	White	Corridor 310, North Side	<0.1		Neg
Asbestos Bd	Ceiling	White	Corridor 200, Adjacent Room 101	<0.1		Neg
Metal	Door Casing	Brown	Room 213, Left Side	**4.3 ± .7**		Pos
Metal	Door Casing	Brown	Room 213, Left Side (Repeat Test)	**>5.0**		Pos
Metal	Door	Brown	Corridor 216, Main Door, South Side	<0.1		Neg
Asbestos Bd	Ceiling	White	Corridor 216, Adjacent Room 213	<0.1		Neg
Plaster	Wall	White	Corridor 216, East Side, North End		**0.007**	Neg
Drywall	Wall	White	Room 213, South Wall	<0.1	<0.006	Neg
Metal	Elec. Panel	gray	Square D Panel in 213	<0.1		Neg

Table 1 (continued)
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Substrate	Component	Color	Test Locations	XRF Readings[1]	Paint Chip Results[2]	HUD Class[3]
Plaster	Wall	White	Corridor 216, West Side, South of Rm 213	<0.1	**0.03**	Neg
Plaster	Wall	White	Corridor 216, West Side, North of Rm 201	<0.1	<0.006	Neg
Metal	Door	Yellow	Room 201	<0.1		Neg
Metal	Door Casing	Brown	Room 201, Left Side	<0.1		Neg
Drywall	Wall	White	Room 201, East Side	<0.1	<0.006	Neg
Wood	Sash	White	Room 118, Inside Window Sash	<0.1		Neg
Wood	Win. Frame	Varnish	Room 118, Inside Window Frame	<0.1		Neg
Wood	Win. Sill	Brown	Room 118, Exterior Sill	**0.5 ± .2**		Neg
Wood	Win. Sill	White	Room 118, Exterior Sill	**0.7 ± .1**		Neg
Brick	Wall	White	Corridor 108, North Side, Adjacent Rm. 118	<0.1		Neg
Tile	Wall	Teal	Corridor 108, North Side, Adjacent Rm. 116	**1.9 ± .2**		Pos
Wood	Sash	White	Room 109, West Side, Inside Window Sash	<0.1		Neg
Wood	Win. Frame	Varnish	Room 109, West Side, Inside Window Frame	<0.1		Neg
Wood	Win. Sill	Wte/Br	Room 109, West Side, Exterior Sill	**0.6 ± .1**		Neg
Wood	Sash	Brown	Room 109, West Side, Exterior (screen) Sash	**0.8 ± .1**		Neg
Wood	Sash	White	Room 106, Interior Window Sash	<0.1		Neg
Wood	Win. Frame	Varnish	Room 106, Inside Window Frame	<0.1		Neg
Wood	Win. Sill	Varnish	Room 106, Interior Sill	<0.1		Neg
Wood	Win. Sill	Br/Gr	Room 106, Exterior Sill	**0.8 ± .1**		Neg
Wood	Sash	Brown	Room 106, Exterior (screen) Sash	**0.8 ± .1**		Neg

Table 1 (continued)
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Substrate	Component	Color	Test Locations	XRF Readings[1]	Paint Chip Results[2]	HUD Class[3]
Metal	Radiator	Brown	Corridor 108, Adjacent Rm. 100	**0.2 ± .1**	**0.8***	Pos
Metal	Radiator	Brown	Corridor 108, Adjacent Rm. 100 (repeat)	**0.3 ± .1**	**0.8***	Pos
Metal	Radiator	Brown	Corridor 427, Adjacent Room 435		**0.364**	Neg
Metal	Door	Pink	Entrance to room 426 from Corr. 416	<0.1		Neg
Plaster	Wall	White	Corridor 408, Adjacent Rm. 426	<0.1		Neg
Plaster	Wall	White	Room 402, West Wall	<0.1	**0.11**	Neg
Metal	Door Casing	Brown	Room 402, Interior Door Frame	<0.1	<0.06	Neg
Metal	Door	Brown	Room 402, Interior Door	<0.1		Neg
Wood	Door	Varnish	Room 402	<0.1		Neg
Metal	Door Casing	Pink	Room 400, Left Side	**1.3 ± .3**		Pos
Metal	Door Casing	Pink	Room 401	<0.1	**0.01**	Neg
Plaster	Wall	White	Room 401, East Wall	<0.1	<0.06	Neg
Metal	Door Casing	Pink	Room 202, Left Side	<0.1		Neg
Metal	Door Casing	Pink	Room 202, Right Side	<0.1	<0.006	Neg
Plaster	Wall	White	Room 300, South Wall, East Side		**0.007**	Neg
Plaster	Wall	White	Room 300, bottom of East Wall		<0.006	Neg
Metal	Door Casing	Pink	Corridor 216, North Entrance, Left Side	<0.1		Neg
Metal	Door Casing	Pink	Corridor 216, North Entrance, Right Side	<0.1	**0.01**	Neg
Metal	Extinguisher	Red	Adjacent Corridor 216	<0.1		Neg
Plaster	Wall	White	Room 100, East Wall		**0.57**	Pos
Drywall	Wall	White	Room 101, West Wall, North Side	<0.1	<0.006	Neg
Plaster	Wall	White	Room 101, West Wall	<0.1	**0.18**	Neg

Table 1 (continued)
XRF Lead-Based Paint Test Results
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Substrate	Component	Color	Test Locations	XRF Readings[1]	Paint Chip Results[2]	HUD Class[3]
Plaster	Wall	White	Room 103, composite of all sides		**0.015**	Neg
Tile	Wall	Teal	Room 116, West Wall	**1.4 ± .5**		Pos
Wood	Door	Varnish	Room 115	<0.1		Neg
Metal	Door Casing	Brown	Room 115, Left Side	<0.1		Neg
Metal	Door Casing	Brown	Room 115, Right Side	<0.1		Neg
Tile	Wall	Teal	Wall Between Rooms 115 & 114	**2.7 ± .5**		Pos
Wood	Door	Varnish	Room 114	<0.1		Neg
Wood	Door Casing	Brown	Room 116, Left Side	<0.1		Neg
Wood	Win. Frame	Varnish	Room 116, Interior Window Frame	<0.1		Neg
Wood	Sill	Varnish	Room 116, Interior Window Sill	<0.1		Neg
Wood	Sash	White	Room 116, Interior Sash	<0.1		Neg
Wood	Sill	Br/Wh	Room 116, Exterior Sill	**0.5 ± .1**		Neg
/Wood	Sash	Brown	Room 116, Exterior Sash	**0.4 ± .1**		Neg
Drywall	Wall	White	Room 211, West Wall		<0.006	Neg
Plaster	Wall	White	Room 203, East Wall	<0.1	**0.1**	Neg

Notes:

1. The XRF Results are reported in milligrams lead per square centimeter (mg/cm^2)

2. The paint chip results are reported in percentage of lead, by weight, in the sample submitted. These results are not directly comparable to results reported by the XRF measurement method.

3. Lead-based paint, defined by the U.S. Department of Housing and Urban Development, is any paint, varnish, stain, or other applied coating that has **1 mg/cm^2** or **0.5% by dry weight** or more of lead.

* = HUD Classification changed from negative to positive based on the paint chip sample results (change was from that reported on the Interim Report dated August 13, 1996). The direct-reading XRF measurements were obtained with a Niton XL XRF (serial # U495NA031). XRF calibration was verified before and after sampling using National Institute of Standards and Technology (NIST) traceable lead standards (deep and shallow lead). All calibrations were within the range required by the HUD/EPA Performance Characteristics Sheet.