Department of Energy
Oak Ridge Operations
Weldon Spring Site
Remedial Action Project Office
Route 2, Highway 94 South
St. Charles, Missouri 63303

September 03, 1987

Ms. Katherine Biggs
United States Environmental
Protection Agency, Region VII
726 Minnesota Avenue
Kansas City, Kansas 66101

Dear Ms. Biggs:

Enclosed is the information regarding the removal of overhead yard piping and asbestos insulation from the Weldon Spring Site, which we agreed upon in our telephone conference on July 24, 1987.

The site contains insulated overhead piping in the yard areas. The insulation is deteriorating and falling to the ground. The material is subject to blowing about and presents a potential hazard to exposed personnel. We propose to remove the material.

Radiologically contaminated material will be retained on site in a secure condition. Non-radiologcally contaminated materials will be disposed of offsite in approved landfills.

The entire task involves removing about 33,000 linear feet of pipe, 13,00 of which is asbestos insulated, and 500 pipe supports. The work will be accomplished by a subcontractor to MK-Ferguson Company, our Project Management Contractor.

The enclosed index lists five (5) attachments including sampling data and plans and specifications for the work. If you have any questions, please contact Jim Coyne of PEER Consultants, our support services contractor at (314) 441-8472.

Sincerely,

R. R. Nelson
Project Manager
Weldon Spring Site
Remedial Action Project

Enclosure:
As stated

cc: Dave Bedan, MDNR

FILE NUMBER: _____

INTERIM MEASURE

OVERHEAD PIPING/ASBESTOS REMOVAL

SUMMARY

This task consists of removing all abandoned outside overhead yard piping and associated insulation and pipe supports at the Weldon Spring Site. Approximately 33,000 lf of pipe are involved, 13,000 lf of which is asbestos insulated pipe. About 500 structural steel pipe support columns and a number of bridging structures are also included in this task.

The asbestos containing material (ACM) is deteriorating and falling to the ground. It is accessible to the elements and subject to blowing about the site. Its presence and state of deterioration constitute a significant threat to the health and safety of on-site workers and could under dry, high wind conditions pose a threat to off-site personnel.

We propose this work to place the ACM under control and mitigate worker and public exposure to the hazard posed by the deteriorating pipe insulation.

The plan calls for removal, survey, segregation, and protection of materials in on-site staging areas. Radiologically contaminated ACM will be retained on-site. Non-radiologically contaminated materials will be released for disposal off-site in approved asbestos landfills. We expect much of the utility pipe, structural supports, and asbestos to be releasable for disposal off-site.

3589-SC-WP017

TECHNICAL SPECIFICATIONS

WSSRAP OVERHEAD PIPING REMOVAL

LIST OF TECHNICAL SPECIFICATIONS
3589-SC-WP017

Specification Section No.	Title
1) Section 02051	Demolition Of Overhead Piping And Supports
2) Section 02080	Asbestos Removal On Overhead Piping

WSSRA PROJECT REVIEWS AND APPROVALS

Subject: WSSRA PROJECT - CP
Specification Section 02051
Demolition of Overhead Piping
and Supports

5121-C:SP-S-01-0192-02
(DOCUMENT NO.)

	Signature	Date
Prepared:	[signature]	5-19-87
Reviewed:	[signature]	5-19-87

Approved, MKE:

	Signature	Date
- Site Design Engineer	[signature]	5-19-87
- Engineering & Design Manager	[signature]	5-19-87
- Chief Engineer, ESC Division	[signature]	22 May 87

QA Compliance [signature] 5-22-87

- PMC Engineering Manager [signature] 6-17-87

Q.A. REVIEW
ENTRY NO. N/A
INIT. [signature] DATE 6/18/87

SECTION 02051

DEMOLITION OF OVERHEAD PIPING AND SUP

PART 1 - GENERAL

1.1 SCOPE

A. This Specification Section describes the the demolition and placing into storage o facilities:

1. All outdoor above ground piping, pip pipe bridges at a uranium feed mate plant, including steel piping (insul sulated), steel support structures and extending up to building lines. Also moval of some piping which is polyvinyl pipe and some timber pole, pipe suppor ping of asbestos contaminated soil. was primarily for supplying plant uti natural gas, plant air, steam, ethyle water. Piping to raffinate pits and st generally insulated with asbestos contai

2. Asbestos containing insulation on thre haust flue ducts to chimney stacks on steam plant, Building No. 401. Re contaminated soil to 5 feet horizontal of flue duct.

3. Asbestos-insulated pipe section with st frame support (approximately 50 feet lo ground beside road east of Building No topsoil within 5 feet of each end of pipe

4. Sections of asbestos insulated piping ground about 60 feet north of Raffinate proximately 79 joints at 30 ft. long equ Strip topsoil within 5 feet of stacked pip

B. Locations of demolition and material stag shown on project drawings.

C. Refer to Special Conditions, Articles SC-9 a restrictions applicable to working in areas w radiation hazards.

D. Refer to Section 02080 for requirements applicable to removal, handling, and clean-up of asbestos-containing materials.

1.2 WORK NOT INCLUDED

Foundations and underground structures are excluded.

1.3 SUBMITTALS

A. Dismantling and Asbestos Containment Plan:

The Subcontractor shall submit a detailed plan of the work schedule and procedures to be used in dismantling the overhead piping and supports. The plan shall include details concerning sequencing, method for asbestos containment during pipe cutting, and removal methods for support removal, air monitoring, transportation and storage. The Subcontractor shall meet with the Contractor prior to beginning work to discuss and obtain acceptance of the plan. 2

PART 2 - PRODUCTS

(Not Used)

PART 3 - EXECUTION

3.1 DEMOLITION

A. Pollution Controls:

1. Water sprinkling and temporary enclosures shall be used to limit the amount of airborne dust and dirt to the lowest practical level. Other methods of limiting the amount of airborne dust and dirt must be approved by Contractor.

2. Water shall not be used if it is likely to create hazardous or objectionable conditions such as ice, flooding, or pollution. An approved water-based biodegradable wetting agent (surfactant) may be used to reduce the quantity of water required.

B. Cutting and Capping:

1. Pipes shall be cut as close as practicable to the ground level and the faces of buildings.

2. Pipe supports shall be disconnected from their concrete footings where possible; otherwise they shall be cut off as close to the footing as possible. Footings shall be left in place.

C. Holes due to removal of timber poles shall be backfilled.

D. Areas disturbed by demolition operations, including backfilling and soil stripping, shall be seeded as specified in Section 02930.

3.2 DISPOSAL OF DEMOLITION DEBRIS

A. All materials shall be transported to and stacked at the on-site material staging area.

B. Within the staging area, materials shall be stacked in separate areas as directed by the Contractor. Materials shall be segregated into stacks of similar shapes.

C. Before placement in the material staging area, all materials shall be cut or broken up in sizes not greater than 10 feet in any dimension and not greater than 27 cubic feet in volume.

D. Unless otherwise approved by the Contractor, the demolition debris shall be stored in layers or piles not to exceed 10 feet in height.

E. All piping is considered empty except for short runs which may contain small amounts of liquids. For piping known to have contained ethylene glycol or piping suspected to contain 'unknown' liquids, Subcontractor shall provide drum containers for collecting liquids without liquids contacting ground surface.

END OF SECTION 02051

WSSRA PROJECT REVIEWS AND APPROVALS

Subject: WSSRA PROJECT - CP
Specification Section 02080
Asbestos Removal on Overhead
Piping

5121-C:SP-S-01-0122-03
(DOCUMENT NO.)

	Signature	Date
Prepared:	J Evans	5-29-87
Reviewed:	D. Reppond	5-29-87
Approved, MKE:		
- Site Design Engineer	D. Reppond	5-29-87
- Engineering & Design Manager	Philip R. Spencer	5-29-87
- Chief Engineer, ESC Division	E. E. Smith	29. V. 87

QA Compliance PDC 5-29-87

- PMC Engineering Manager — D R Lewis 6/17/87

Q.A. REVIEW
ENTRY NO. N/A
INIT. DATE 7/27/87

SECTION 02080

ASBESTOS REMOVAL ON OVERHEAD PIPING

PART 1 - GENERAL

1.1 SCOPE

A. This Specification Section describes the requirements for removal and disposal of asbestos-containing material on outdoor aboveground utility and process piping and valves between buildings at the Chemical Plant Site. All steam pipe insulation contains asbestos. Ethylene glycol piping insulation contains asbestos at bends only. Pipe is to be removed with insulation intact where possible. Clean-up of some asbestos contaminated soil is included.

B. The Subcontractor shall furnish all labor, supervision, materials, services, insurance, and equipment necessary to carry out the removal operation in accordance with the EPA and OSHA regulations and the State of Missouri Department of Natural Resources.

C. The Subcontractor shall be responsible for disposal of all asbestos containing materials at a designated location shown on the Subcontract Drawings.

D. The requirements specified in this Section are supplemental to the requirements specified in General Provisions, General Conditions and Special Conditions.

1.2 CODES AND REGULATIONS

A. All work on this Subcontract shall comply with applicable codes and regulations including, but not limited to, the following:

1. U.S. Department of Labor, Occupational Safety and Health Administration ("OSHA"): 29CFR1926.58

2. Environmental Protection Agency ("EPA"):

   National Emmissions Standard for Hazardous Air Pollutants (NESHAPS) 40CFR61, Subparts A and M

B. Posting Regulations: Copies of applicable OSHA and EPA regulations shall be obtained by the Subcontractor. One copy of each shall be posted at the job site. The EPA notification of asbestos removal, including the "Plan of procedures to be employed for compliance with EPA regulations" shall also be posted at the job site.

1.3 DEFINITIONS

A. Asbestos Controlled Area: The asbestos contaminated work area or any other area with either an airborne asbestos level equal to or above 0.01 fiber/cc air or visible uncontained deposits of asbestos-contaminated material.

B. Asbestos-Containing Material: Materials either containing more than 1% by weight of asbestos, excluding substrate materials, or contaminated with asbestos to a degree that handling the materials may reasonably be expected to give rise to exposure to airborne asbestos fibers.

C. Contaminated Materials: Materials having radioactive contamination levels greater than specified in the applicable US Environmental Protection Agency Standards. These standards are presented in the Federal Register, January 5, 1983, Section 192.12: "Standards for Remedial Actions at Inactive Uranium Processing Sites". The contamination levels will be determined by the Contractor.

D. HEPA Filter: A High Efficiency Particulate Absolute filter capable of trapping and retaining 99.97% of particles with aerodynamic equivalent diameters greater than or equal to 0.3 micrometer.

E. Clearance Air Samples: Air samples taken following asbestos removal and visual inspection by the Contractor or his authorized representative to verify completion of work specified under this Subcontract.

F. Amended Water: Water to which a surfactant has been added.

G. Encapsulant: A liquid material which can be applied to asbestos material which controls the possible release of asbestos fibers from the material by penetrating into the material and by binding its components together.

1.4 NOTIFICATION REQUIREMENTS

At least 20 days prior to beginning work on the asbestos-containing materials and 20 days prior to completion of Work on this Subcontract, the Subcontractor shall submit written notifications to the State of Missouri Department of Natural Resources. The specific information shall be provided as detailed in 40CFR61.146, Subpart M. The notice shall be sent to: 3

Department of Natural Resources
Division of Environmental Quality
P. O. Box 176
Jefferson City, Missouri 65102

Attn: Bob Craig (314-751-8328)

1.5 EXPOSURE MONITORING

A. The airborne asbestos exposure limit outside of asbestos controlled areas is 0.01 fiber/cc air. Where control of airborne asbestos levels to below 0.01 fiber/cc air is impractical, temporary asbestos control areas shall be established. Asbestos removal work areas with higher concentrations, or where concentrations might reasonably be expected to exceed the allowable limit, must be separated from other work areas by air-tight barriers. Airtight barriers for piping shall generally consist of glove bag or glove box.

B. All air monitoring shall be performed under the supervision of the Subcontractor's industrial hygienist, who must be certified by the American Board of Industrial Hygiene.

C. Documentation of each air sample shall be as specified by the Contractor and shall include at least the date and time, sample number, exact sampling location, name of individual performing sampling, sampling rate, sampling volume, analytical method,analytical results and limits of quantification and detection per National Institute of Occupational Safety and Health (NIOSH) analytical methods.

D. Analysis of air samples shall be as specified in 29 CFR 1926.58 Appendix A or equivalent. Samples shall be analyzed onsite. Test results of samples taken outside of asbestos control areas and one sample per work shift from each asbestos control area shall be reported to the Contractor within 4 hours of collection. Samples exceeding the asbestos exposure limit shall be reported to the Con-

tractor immediately following the analysis. The analysis quality assurance program shall include recounting of a portion of the samples by a laboratory accredited by the American Industrial Hygiene Association (AIHA) for asbestos analysis and currently judged proficient in asbestos counting by successful particpation in the NIOSH Proficiency Analytical Testing (PAT) program. The portion of samples recounted shall include the following: (1) all clearance air samples, (2) all samples taken outside asbestos control areas exceeding the exposure limit, and (3) 10% of the remaining samples taken from both inside and outside asbestos control areas not exceeding the exposure limit. All quality assurance sample results shall be reported to the Contractor within two weeks of collection.

E. Preliminary air sampling shall be sufficient to establish the perimeters of asbestos control areas to the satisfaction of the Contractor.

F. Air samples shall be taken in the breathing zones of workers removing asbestos in sufficient numbers to permit selection of appropriate respirators and Time Weighted Average (TWA) Exposures. At a minimum, for TWA exposures, one personal sample on the worker with the highest probable exposure is required in each asbestos control area, per work shift.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Wetting Materials: For wetting asbestos-containing materials prior to disturbance, amended water or a removal encapsulant shall be used. Wetting materials shall be tested at the job site on the material to be removed to ensure that the use of the material will result in the thorough wetting of the asbestos containing material and retardation of fiber release during disturbance of the material. Testing of wetting materials shall be done to the satisfaction of the Contractor.

B. Polyethylene Sheet: A single polyethylene film in the largest sheet size possible to minimize seams, 6.0 mils thick, clear or opaque.

C. Polyethylene Tubing: Seamless tubing of a single polyethylene film, 6 mil (minimum) thickness, and of a diameter sufficient to enclose one or more insulated pipes.

D. Disposal Bags: Six mil (minimum) thickess leak-tight polyethylene bags shall be provided by the Subcontractor. Bags shall be labeled in accordance with EPA and OSHA regulations.

E. Glove Bags: Six mil (minimum) thickness polyethylene glove bags.

PART 3 - EXECUTION

3.1 ESTIMATED AMOUNTS OF ASBESTOS-CONTAINING MATERIALS TO BE REMOVED

The estimated amount of friable asbestos is approximately one hundred eighty-five (185) cubic yards on 11600 feet of pipe and 6 cubic yards on flue ducts. This asbestos is in piping insulation material located from ground level to a height of approximately 50 feet on various exterior pipe racks between the various structures, to the limits of the building faces, including vertical risers.

3.2 REMOVAL METHOD OPTIONS AND EXECUTION

A. Removal of Asbestos-Contaminated Soil:

1. Soil shall be saturated with amended water or removal encapsulant. The surface of the soil shall be kept continuously wet throughout its removal and decontamination. Areas designated on plan drawings, where asbestos insulation has fallen to ground, shall have the top soil stripped.

2. The limits of stripping under piperacks and pipeways shall include that area directly under the pipeway bounded by the outermost dimensions of the included pipe support plus 5 feet beyond. The top 3 inches of soils shall be removed and placed in disposal bags along with any visible asbestos. The limits of stripping for other designated items is the area immediately below and within 5 feet horizontally.

3. Personnel protective equipment shall be worn during initial soil decontamination activities. Traffic shall not be permitted onto the fresh soil surface. After the entire first layer of soil is removed, coveralls and boot covers shall be completely changed. Decontaminate excavation equipment by washing with water. Collect all water and filter as specified in 3.2.G. The remaining asbestos removal and decontamination work shall be carried out as specified.

B. Piping shall be removed in units or sections with insulation in place. The maximum allowable unit size is ten (10) linear feet.

C. Completely seal straight runs of piping between supporting columns with polyethylene sheeting or tubing. Duct tape shall be used to seal edges and spiral stripe wrap surface as reinforcement. Areas where asbestos is to be removed from the piping prior to dismantling and cutting, or areas where insulation and pipe are to be cut simultaneously, shall be enclosed in a glove bag or glove box. Glove boxes, if designed for multiple use, shall be decontaminated prior to being moved.

D. Isolation of Work Area: Areas where asbestos-containing material is to be removed, disengaged from pipe racks, or disturbed in any way shall be isolated and enclosed with glove bags or glove boxes. If glove boxes are to be used, construction details of the temporary enclosures shall be submitted as part of the Asbestos Removal Plan. The glove box shall be maintained under minimum negative operating pressure of at least 0.02 inch of water.

E. When glove boxes are inadequate, areas where asbestos-containing material is to be removed, in any way, shall be isolated and enclosed in temporary enclosures maintained under a minimum negative pressure of 0.02 inch of water. The minimum enclosure shall have a solid floor; walls shall be framed with wood or metal. The interior surface of the walls, ceiling and floor shall be covered with two layers of polyethylene sheeting such that the inner layer can be removed without disturbing the integrity of the outer layer. The sequence of applying polyethylene sheeting to the inner surfaces, overlaps, sealing procedure and decontamination facilities shall be as described in 29 CFR 1926.58 Appendix F. Decontamination facilities shall be of adequate number and size to allow effective decontamination of both workers and equipment.

F. Maintenance of the Enclosure System: Damage and defects in the enclosure system shall be repaired immediately upon discovery. If at any time during the project after removal work has started, visible debris or elevated levels of asbestos in air are observed outside the enclosure or if damage occurs to barriers, work shall immediately stop, the Contractor shall be notified, and repairs shall be made to the enclosure and debris cleaned up as specified in Paragraph A above.

G. Wastewater Collection: All wastewater shall be collected and filtered through a dual filtration system. Provide a first filter that removes all fibers 20 microns or longer and a second filter that removes all fibers 5 microns or longer. The filtered wastewater shall be collected, transported, and discharged at a location near Raffinate Pit No. 4 where directed by Contractor.

H. Where piping is cut at building lines, the exposed cut ends of asbestos containing insulation which will remain shall be sealed in polethylene secured by duct tape.

3.3 COMMENCEMENT OF REMOVAL WORK

A. Removal work shall not commence until:

1. After first enclosure system (glove bag and glove box), which shall be typical for all subsequent work, has been constructed (with glove box, also, brought under negative pressure), Subcontractor shall notify Contractor that the enclosure is available for inspection. Subcontractor shall receive written approval from Contractor to proceed with asbestos removal for glove bag and, separately, for glove box.

2. All submissions, notifications, postings and permits have been provided and approved by the Contractor.

3. All equipment is on hand.

4. All worker training and certification is completed.

3.4 TRANSPORT AND STORAGE

A. All materials removed shall be transported to and placed in the on-site Material Staging Area shown on the Subcontract Drawings. The area shall be distinguished by installing flags, or by boundary markers approved by the

Contractor, to prevent disturbance of the area by other subcontractors. The flags or markers shall be installed at each corner of the area and at a spacing not exceeding 40 feet.

B. The Subcontractor shall comply with EPA air emissions regulations, 40CFR61.152 and 40CFR61.153 during all transport and handling operations.

C. All bags containing asbestos shall be labeled in accordance with EPA and OSHA regulations.

D. All bags shall be placed in "fiberdrums" and covered with polyethylene film at material staging area.

3.5 CLEANING WORK AREAS AFTER ASBESTOS REMOVAL

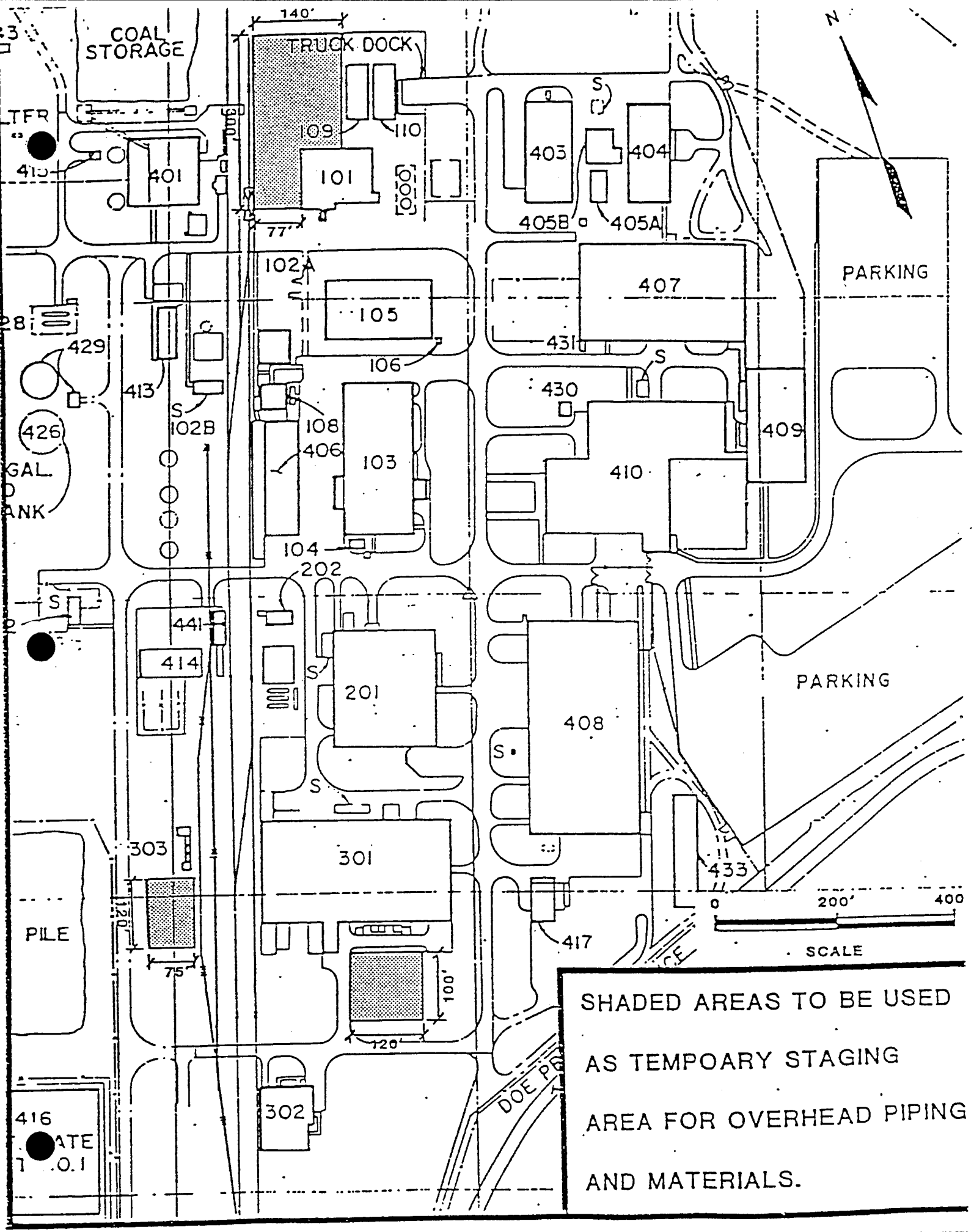
A. Prior to removal of enclosures, work areas shall be cleaned to assure there are no asbestos fibers which could become airborne.

B. Construction equipment shall be cleaned and free of asbestos fibers before removal from site-controlled work areas.

C. The Subcontractor shall notify the Contractor when work is complete for a final visual inspection.

D. After Contractor's final visual inspection, the enclosure shall be removed and all asbestos containing waste disposed of per the above.

END OF SECTION 02080



Drawing WP017-A

Weldon Spring Site Remedial Action Project (WSSRAP)
Route 2, Highway 94 South, St. Charles, Missouri 63303
Phone (314) 441-8086 Telecopy (314) 447-0803

FINAL

Asbestos Content of Pipe Insulation On Outdoor Overhead Utilities At The WSCP

Prepared for:

U.S. Department of Energy
Weldon Spring, Missouri

Prepared by:

Weldon Spring Site Remedial Action Project
MK-Ferguson Company -- Project Management Contractor
Weldon Spring, Missouri

ES&H
Kirk Meyer
February 3, 1987

MKF Project No. 3589

TABLE OF CONTENTS

Section	Contents	Page
1.0	INTRODUCTION	3
2.0	DESCRIPTION OF OVERHEAD PIPING & SAMPLING LOCATIONS	4
3.0	SAMPLING & ANALYSIS METHODS	6
4.0	TEST RESULTS	9

Appendix

A	Laboratory Report on the Asbestos Content of Pipe Insulation at the WSCP	
B	Field Data Sheets for Bulk Material Sampling for Asbestos Content of Pipe Insulation at the WSCP	
C	Radiological Contamination of Samples Collected to Measure Asbestos Content of Pipe Insulation at the WSCP	

Figure

2-1	Insulation Sampling Locations for Determining Asbestos Content of Pipe Insulation on Overhead Utilities at the WSCP, November 1986.	5

Table

3-1	Insulation Sampling Locations for Determining Asbestos Content of Pipe Insulation on Overhead Utilities at the WSCP, November 1986.	7
4-1	Asbestos Content of Insulation on Overhead Utilities Pipes at the WSCP, November 1986.	10

1.0 INTRODUCTION

This report presents the results of a survey to determine the type of insulation on overhead utilities at the Weldon Spring Chemical Plant (WSCP). In particular, this survey determined which pipes were insulated with asbestos containing material as defined by the EPA (greater than 1 percent asbestos by volume). Results of this survey are intended to be used in the preparation of an engineering plan for removal of the overhead utilities from the site. This report does not include a determination of the actual quantity of asbestos insulation, rather only the types of pipes which have asbestos insulation are presented. Asbestos quantities can be calculated by applying the information contained herein in conjunction with the piping inventory.

Sampling for this survey was conducted by the PMC during November 1986. Samples were analyzed by Particle Data Laboratories of Elmhurst, Illinois. A total of 42 samples were collected from six different types of insulation.

Section 2.0 of this report describes the overhead piping and its insulation. Section 3.0 presents the sampling methods. Test results are presented in Section 4.0. The laboratory report is presented in Appendix A. Copies of the field data sheets are in Appendix B. Results of the radiological analysis of these samples are in Appendix C.

2.0 DESCRIPTION OF OVERHEAD PIPING AND SAMPLING LOCATIONS

Overhead utilities pipelines are positioned between buildings at the WSCP as shown in Figure 2-1. Insulated and non-insulated process pipelines present had the following contents or functions:

Insulated Pipes

- Steam
- Ethylene Glycol
- Raffinate
- Miscellaneous Process Lines (near Building 403)

Non-Insulated Pipes

- Fuel Gas
- Plant Air
- Instrument Air

Locations of overhead utilities, pipes and supports can be found on construction drawings numbered 7500-5 to 7500-28 prepared by Blaw-Knox Company in 1955 and 1956. Bechtel National Incorporated drawings 201-SK22-C-01, 201-SK22-C-02 and 201-SK22-P-01 also show locations of insulated pipes by type of pipe.

The nearest support numbers and construction drawing numbers reported for each sampling location in Appendix B refers to the Blaw-Knox Drawings.

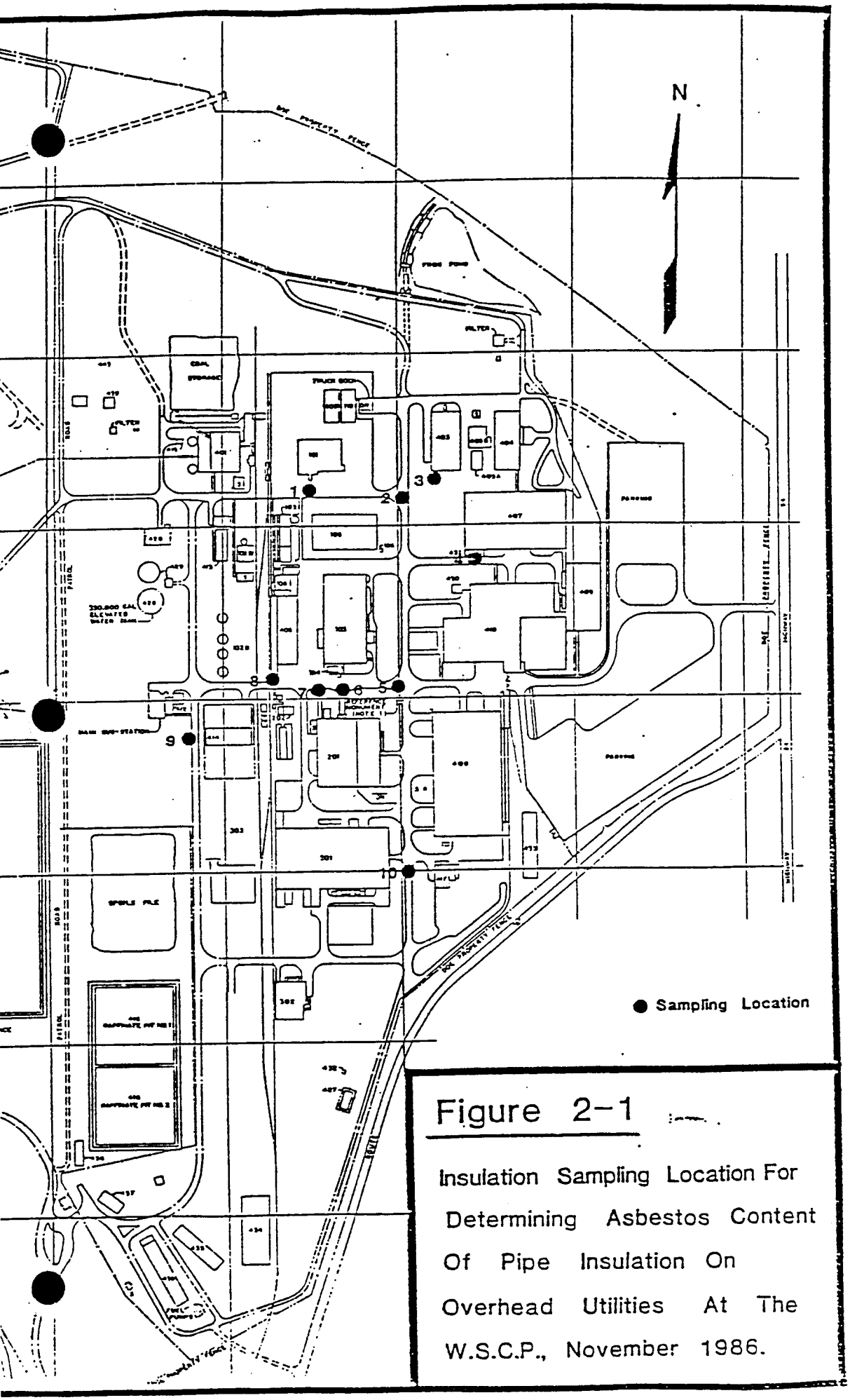


Figure 2-1

Insulation Sampling Location For Determining Asbestos Content Of Pipe Insulation On Overhead Utilities At The W.S.C.P., November 1986.

Figure 2-1 Insulation Sampling Locations for Determining Asbestos Content of Pipe Insulation on Overhead Utilities at the WSCP, November 1986.

3.0 SAMPLING AND ANALYSIS METHODS

Samples were collected from insulation on each type of insulated pipe and from each visibly different type of insulation. Samples were collected from the 42 locations listed in Table 3-1 and shown in Figure 2-1. The sampling locations were selected in such a way that insulation on all types of pipe (steam, raffinate, ethylene glycol and process) and all sizes of pipes of each type could be sampled. Ten sampling zones were chosen. All pipes accessible from a manlift in each of these zones were sampled.

Field data sheets are presented in Appendix B of this report. The pipe diameters shown on the field sheets are estimated for most locations. The thicknesses of insulation are actual measured values for all locations. Support and construction drawing numbers refers to drawings prepared by Blaw-Knox around 1956.

Those samples suspected of containing asbestos were submitted for analysis. One sample from each insulation type (fiberglass and cork) not suspected to contain asbestos was also analyzed.

Each sample was a complete cross-section of the pipe insulation including sheathing. These samples were collected with a hole saw operated with a battery-powered drill. Samples were also collected by hand when the insulation could be easily broken loose without tools. The hole saw and the sampling technicians' gloves were thoroughly decontaminated with a clean water spray between samples. The samples were transferred directly from the hole saw into a Zip-Lok plastic bag and placed in pre-labeled jars.

The samples were divided in half in the laboratory. A clean, dust-free table was used during this operation. Only one sample was open at any one time. The forceps, gloves, and the table top were cleaned with a clean water spray and were dried with clean paper towels between samples.

After all samples were split, planchettes were filled for a radiological survey of the insulation. These planchettes were analyzed for alpha radiation prior to shipping the samples off site. The radiological analysis data is presented in Appendix C.

The samples were analyzed for asbestos content by Particle Data Laboratories of Elmhurst, Illinois. This laboratory is a successful participant in the EPA laboratory evaluation program for asbestos sample analysis. The presence of asbestos in the samples was determined by a polarized light microscopy analytical method and the concentration of asbestos in the sample was determined by volume. Appendix A describes the analysis method in more detail.

Table 3-1 Insulation Sampling Locations for Determining Asbestos Content of Pipe Insulation on Overhead Utilities at the WSCP, November 1986.

SAMPLING ZONE NUMBER	NEAREST SUPPORT NUMBER	ZONE DESCRIPTION (DWG. NO.)	INSULATION SAMPLES COLLECTED SAMPLE NUMBER	PIPE TYPE	SHEATH	SIZE
1	508	NW Corner of Building 105 (7500-16)	1	Steam	Fiber	18"
			2	Ethylene Glycol	Fiber	2"
			3	Ethylene Glycol	Fiber	6"
			4	Ethylene Glycol	Fiber	6
			5	Elbow (E.G.)	Fiber	18"
			6	Ethylene Glycol	Fiber	6"
			7	Ethylene Glycol	Fiber	24"
2	522	NE Corner of Building 105 (7500-17)	8	Steam	Fiber	8"
			9	Process	Fiber	2"
			10	Process	Fiber	2"
			11	Process	Fiber	2"
			12	Process	Fiber	2"
			13	Process	Fiber	2"
			14	Ethylene Glycol	Fiber	12"
			15	Ethylene Glycol	Fiber	12"
3	71	NW Corner of Building 403 (7500-23)	16	Steam	Fiber	6"
			17	Ethylene Glycol	Fiber	2"
			18	Ethylene Glycol	Fiber	2"
			19	Process	Fiber	2"
			20	Process	Fiber	2"
			21	Process	Fiber	1.5"
			22	Process	Fiber	2"
4	731	From Building 407 to 410 (7500-28)	23	Ethylene Glycol	Fiber	4"
			24	Ethylene Glycol	Fiber	4"
			25	Process	Metal	2"
5	40	NE Corner of Building 201 (7500-19)	26	Raffinate	Fiber	3"
			27	Raffinate	Fiber	3"
			28	Steam	Fiber	18"
6	562	North Center Building 201 (7500-24)	29	Process	Fiber	4"
			30	Raffinate	Fiber	6"
			31	Raffinate	Metal	4"
			32	Steam	Fiber	4"
			33	Elbow (Steam)	Fiber	4"

SAMPLING ZONE NO.	NEAREST SUPPORT NUMBER	ZONE DESCRIPTION (DWG. NO.)	INSULATION SAMPLES TO BE COLLECTED QUANT.	PIPE TYPE	SHEATH	SIZE
7	564	NE Corner of Building 201 (7500-24)	34	Raffinate	Metal	3"
8	Ground	SW Corner of Building 406 (N.A.)	35	Steam	Fiber	1"
9	764	West of Building 406 (7500-25)	36	Raffinate	Fiber	3"
			37	Raffinate	Fiber	3"
			38	Raffinate	Fiber	3"
			39	Elbow (Raffinate)	Metal	3"
10	84	East Center Building 301 (7500-20)	40	Steam	Fiber	3"
			41	Steam	Fiber	3"
			42	Steam	Fiber	18"

Source: WSSRAP, 1987

4.0 TEST RESULTS

Asbestos concentrations greater than 1.0 percent were found in all insulation samples from steam and raffinate pipes. Asbestos was found on all of the new (non-original) process piping near Building 403. Asbestos was also found on all elbows and all repair sections on all insulated pipes including ethylene glycol pipes. Straight sections of ethylene glycol piping were found to not have asbestos insulation. Table 4-1 presents the test results for each location.

All insulation sampled during this survey was friable. Friable materials are defined by EPA to be asbestos containing when they are greater than 1.0 percent asbestos (40 CFR 61). 40 CFR 61 sets engineering controls for preventing the release of asbestos fibers into the air apply during demolition of any structure which contains friable asbestos.

Radiological contamination was found only in a sample from a location where the exterior sheathing was no longer intact (Appendix C).

Table 4-1 Asbestos Content of Insulation on Overhead Utilities Pipes at the WSCP, November 1986.

Pipe Type	Insulation Type	Friable Asbestos Containing Material
Steam	Plaster	Yes
Raffinate	Plaster	Yes
Elbows on All Insulated Pipes	Plaster over Fiberglass or Animal Hair	Yes
Repair Sections on All Insulated Pipes	Plaster over Fiberglass or Animal Hair	Yes
"New" Process Lines Near Building 403	Plaster or Foam	Yes
Ethylene Glycol	Fiberglass or Cork	No

Source: WSSRAP, 1987.

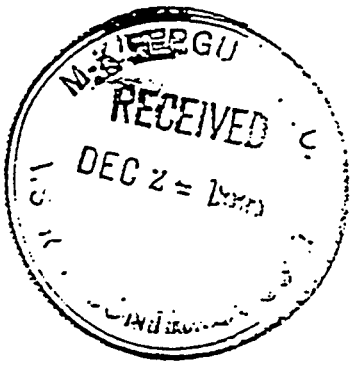
Appendix A

Laboratory Report on the Asbestos Content of Pipe Insulation at the WSCP

PARTICLE DATA LABORATORIES, LTD.

115 Hahn Street • Elmhurst, Illinois 60126 • (312) 832-5658

December 17, 1986



Mr. Ken Lee
MK Ferguson Company
Route 2, Highway 94 South
St. Charles, Missouri 63303

RE: Examination of Bulk Samples for Asbestos
P.O. 3589-1002-1256
File No. ES-19-03-01-01
PDL Project: I-11121
EPA Lab I.D. Number 5118

Dear Mr. Lee:

This report covers the asbestos identification by polarized light microscopy of the 32 samples received November 21, 1986.

The attached information tabulates the quantities of fibrous material found in each sample; the numbers will not necessarily add up to 100%, with the balance being filler and binder materials. When a sample is labeled as inhomogeneous, there is the possibility of significantly higher local concentrations than the averaged value reported. This could result in local high airborne asbestos fiber levels if the material is disturbed and appropriate safety precautions are indicated. Also, the symbol (-) indicates not detected.

Identification and quantifications were performed in accordance with Appendix A - Interim Method for the Determination of Asbestos in Bulk Insulation Samples of EPA Asbestos in Schools Regulations, Federal Register, Vol. 47, No. 103, Thursday, May 27, 1982. Analysis was initiated by a gross examination of the sample as received. Any obvious fractions were noted and samples of each fraction were mounted for polarized light microscopy in a 1.515 index liquid. When mounting samples any fiberous material is thoroughly separated for examination. Preliminary evaluation to determine the possible species of asbestos present is performed by morphology, birefringence and refractive index relative to the mounting fluid. Concurrently the relative abundance of any asbestos material, other fibers, fillers and binders is determined. Quantities are based on areal coverage and thickness of the various species present. The term trace means 0.1% or less. Identification of non-asbestos material is not as rigorous as these are not the species of interest.

PARTICLE DATA LABORATORIES, LTD.

When asbestos type fibers are seen morphologically, they are additionally characterized by immersion matching in refractive index liquid using both white light and sodium d-line. A numeric determination of birefringence is available based on the index measurments. A sample has to fit into the accepted ranges of indices, birefringence and morphological features to be classed as asbestos.

The features of the various forms of asbestos are as follows:

Amosite: Straight thin single fibers and bundles of such fibers usually with cleanly broken ends on individual fibers; refractive indices of 1.700 and 1.695, birefringence 0.020-0.033 and parallel extinctions.

Chrysotile: Thin fibers and fiber bundles with both straight and wavy sections. The ends of bundles tend to be frayed. Indices are 1.529-1.559 and 1.537-1.576, birefringence of 0.004-0.016 and the fibers exhibit parallel extinction.

Anthophylite: Similar in morphology to amosite but indices of 1.60-1.64, birefrigence of 0.013 -0.025 and extinction varying from parallel to 15 degrees oblique.

Crocidolite: Similar in morphology to amosite but is distinguished by blue to blue-green pleochroic coloration and indices of 1.680-1.698 and 1.685-1.706. It is commonly referred to as blue asbestos.

Tremolite-Actinolite Series: Transparent, elongated furrowed prisms, usually with uneven, jagged ends and smooth sides, with oblique extinction and positive elongation; indices are 1.559-1.612 and 1.625-1.637. The two minerals are very similar optically and grade into each other.

~~Attached are representative photomicrographs of each sample and~~ a compendium of the materials found. The micrographs are taken with crossed polars and a first order red compensator which results in the pink background and shows birefringence as bright colors other than the background and isotropic transparent material as the same color as the background.

Samples will be retained for six months unless otherwise instructed.

It has been a pleasure serving you, and we look forward to serving you again in the near future.

Respectfully submitted,

PARTICLE DATA LABORATORIES, LTD.

Olga Kist

Olga Kist
Research Microscopist

BULK SAMPLE ANALYSIS FOR ASBESTOS CONTENT

CLIENT: MK-Ferguson Company

PDL PROJECT: 1- 11121

SAMPLE I.D.	HOMO-GENOUS	ASBESTOS FORMS				NON-ASBESTOS FIBERS		
		CHRYSOTILE	AMOSITE	CROCIDOLITE	OTHER	FIBERGLASS	PAPER	OTHER FIBERS
		(PERCENTS-BY-WEIGHT)				(PERCENTS-BY-WEIGHT)		
1. TN 2000-1	No	30	10-20	--	--	1-2	1-2	--
2. TN 2000-3	No	trace	--	--	--	60	3-5	--
3. TN 2000-5A (Light)	No	20-30	--	--	--	20	--	--
4. TN 2000-5B (Dark)	Yes	trace	--	--	--	1-2	trace	animal hair/90
5. TN 2006-6	No	5-10	--	--	--	80	--	--
6. TN 2006-8	No	5-10	40	--	--	trace	1-2	--
7. TN 2000-9	No	10	30	--	--	--	5	--
8. TN 2000-10	NO	20-30	trace-0.5	--	--	trace	trace	animal hair/1-2
9. TN 2000-12	Yes	--	30	--	--	--	--	--
10. TN 2000-16	No	5-10	30	--	--	--	1-2	--
11. TN 2000-18	No	1-2	--	--	--	70-80	10	animal hair/trace -0.5
12. TN 2000-19	No	20	20-30	--	--	--	1-2	cotton/5-10 animal hair/1-2
13. TN 2000-20	NO	10-20	--	--	--	--	1-2	animal hair/1-2
14. TN 2000-21	NO	1-2	--	--	--	3-5	trace	--
15. TN 2000-22	No	--	10-20	--	--	--	10-20	--

BULK SAMPLE ANALYSIS FOR ASBESTOS CONTENT

CLIENT: MK-Ferguson
Page 2

PDL PROJECT: 1- 11121

SAMPLE I.D.	HOMO-GENOUS	ASBESTOS FORMS (PERCENTS-BY-WEIGHT)				NON-ASBESTOS FIBERS (PERCENTS-BY-WEIGHT)		
		CHRYSOTILE	AMOSITE	CROCIDOLITE	OTHER	FIBERGLASS	PAPER	OTHER FIBERS
16. TN 2000-25	Yes	1-2	20-30	--	--	--	trace	--
17. TN 2000-26	No	5-10	20	1-2	--	--	5-10	cotton/10
18. TN 2000-27	No	10	10	--	--	--	3-5	--
19. TN 2000-28	NO	20-30	20-30	--	--	--	5	--
20. TN 2000-29	No	5-10	20	--	--	--	5-10	--
21. TN 2000-30	No	10-20	30-40	--	--	--	--	--
22. TN 2000-31	No	10	10-20	--	--	--	3-5	--
23. TN 2000-32	No	--	trace*	--	--	90	--	*synthetic/trace -0.5 Hair & Feathers/ 1-2
24. TN 2000-33	No	20-30	20-30	--	--	--	--	--
25. TN 2000-34	Yes	1-2	20-30	--	--	--	--	--
26. TN 2000-35	No	5-10	20	--	--	--	5	--
27. TN 2000-36	Yes	20	30-40	--	--	--	--	--
28. TN 2000-37	NO	1-2	20-30	--	--	--	1-2	--
29. TN 2000-38	No	10-20	20-30	--	--	10	trace	--
30. TN 2000-40	Yes	5	1-2	--	--	80	trace	--

BULK SAMPLE ANALYSIS FOR ASBESTOS CONTENT

CLIENT: MK-Ferguson
Page 3

PDL PROJECT: I - 11121

SAMPLE I.D.	HOMO-GENOUS	ASBESTOS FORMS				NON-ASBESTOS FIBERS		
		CHRYSOTILE	AMOSITE	CROCIDOLITE	OTHER	FIBERGLASS	PAPER	OTHER FIBERS
		(PERCENTS-BY-WEIGHT)				(PERCENTS-BY-WEIGHT)		
31. IN 2000-41	No	5-10	40	--	--	--	10	--
32. IN 2000-42	No	10-20	30	--	--	--	5-10	--

* = Sample IN 2000-32 has inhomogeneous portion (possible contamination) consisting of animal hair feathers and synthetic fibers. this material does burn, indicating it not to be asbestos material.

Appendix B

Field Data Sheets for Bulk Material Sampling for Asbestos Content of Pipe Insulation at the WSCP

WELDON SPRING SITE REMEDIAL ACTION PROJECT (WSSRAP)
Route 2, Highway 94, St. Charles, Missouri 63303
Phone (314) 441-8086 Telex (314) 447-0803

BULK MATERIAL SAMPLING FOR ASBESTOS - FIELD DATA

SAMPLE NUMBER: IN-2000-1 Date: NOVEMBER 17, 1986

SAMPLING LOCATION

Building Number: INTER-BUILDING OVERHEAD UTILITIES

~~Floor~~ NEAREST SUPPORT NO.: 508

~~Room~~ SAMPLING ZONE 1

Construction Drawing 7500-16

Other SOUTHERN-MOST PIPE ON TOP RACK

MATERIAL TYPE

X Pipe Insulation
Pipe Diameter: 18 inches
Pipe Type: X Steam, ___ Ethylene Glycol, ___ Raffinate,
___ Other ___

___ Ceiling
___ Floor
___ Wall
___ Boiler Insulation
___ Other ___

COVER OVER MATERIAL

Fiber, Metal, Plaster, None, Other Fiber ~~[illegible]~~ Tarpaper

DESCRIPTION OF MATERIAL

Color: WHITE

Hardness: X Fibrous (Friable), ___ Granular (Soft), or ___ Hard (Concrete-Like)

Thickness: 3 inches

COMMENTS ___

Radiation Level — 0.4 DPM

___ Background Only
___ Above Background ___ cpm Instrument: ___

Sample Collection Personnel: [illegible] Company: [illegible]

WELDON SPRING SITE REMEDIAL ACTION PROJECT (WSSRAP)
Route 2, Highway 94, St. Charles, Missouri 63303
Phone (314) 441-8086 Telex (314) 447-0803

BULK MATERIAL SAMPLING FOR ASBESTOS - FIELD DATA

SAMPLE NUMBER: IN-2000-2 Date: NOVEMBER 17, 1986

SAMPLING LOCATION

Building Number: INTER-BUILDING OVERHEAD UTILITIES
~~Floor~~ NEAREST SUPPORT NO.: 508
~~Room~~ SAMPLING ZONE 1
Construction Drawing 7500-16
Other 2nd Pipe from South on Top Rack

MATERIAL TYPE

X Pipe Insulation
Pipe Diameter: 2" inches
Pipe Type: ___ Steam, X Ethylene Glycol, ___ Raffinate,
___ Other ___
___ Ceiling
___ Floor
___ Wall
___ Boiler Insulation
___ Other ___

COVER OVER MATERIAL

(Fiber), Metal, Plaster, None, Other ~~Fiberglass~~ Tar Paper

DESCRIPTION OF MATERIAL

Color: ___
Hardness: X Fibrous (Friable), ___ Granular (Soft), or ___ Hard (Concrete-like)
Thickness: 3 inches

COMMENTS FIBERGLASS

Radiation Level

___ Background Only
___ Above Background ___ cpm Instrument: ___

Sample Collection Personnel: [illegible] Company: [illegible]

WELDON SPRING SITE REMEDIAL ACTION PROJECT (WSSRAP)
Route 2, Highway 94, St. Charles, Missouri 63303
Phone (314) 441-8086 Telex (314) 447-0803

BULK MATERIAL SAMPLING FOR ASBESTOS - FIELD DATA

SAMPLE NUMBER: IN-2000-3 Date: NOVEMBER 17, 1986

SAMPLING LOCATION

Building Number: INTER-BUILDING OVERHEAD UTILITIES

~~Floor~~ NEAREST SUPPORT NO.: 508

~~Room~~ SAMPLING ZONE 1

Construction Drawing 7500-16

Other 3rd from North on Top Rack

MATERIAL TYPE

X Pipe Insulation
Pipe Diameter: 6 inches
Pipe Type: ___ Steam, X Ethylene Glycol, ___ Raffinate,
___ Other ___

___ Ceiling
___ Floor
___ Wall
___ Boiler Insulation
___ Other ___

COVER OVER MATERIAL

Fiber, Metal, Plaster, None, Other (tar paper)

DESCRIPTION OF MATERIAL

Color: ___

Hardness: X Fibrous (Friable), ___ Granular (Soft), or ___ Hard (Concrete-Like)

Thickness: 3 inches

COMMENTS Fiberglass

Radiation Level

___ Background Only
___ Above Background ___ cpm Instrument: ___

Sample Collection Personnel: [signature] 11/17/86 Company: Jacobs Engineering

[signature] GORANI

WELDON SPRING SITE REMEDIAL ACTION PROJECT (WSSRAP)
Route 2, Highway 94, St. Charles, Missouri 63303
Phone (314) 441-8086 Telex (314) 447-0803

BULK MATERIAL SAMPLING FOR ASBESTOS - FIELD DATA

SAMPLE NUMBER: IN-2000-4 Date: NOVEMBER 17, 1986

SAMPLING LOCATION

Building Number: INTER-BUILDING OVERHEAD UTILITIES
~~Floor~~ NEAREST SUPPORT NO.: 508
~~Room~~ SAMPLING ZONE 1
Construction Drawing 7500-16
Other 2nd From North on Top Rack

MATERIAL TYPE

X Pipe Insulation
Pipe Diameter: 6 inches
Pipe Type: ___ Steam, X Ethylene Glycol, ___ Raffinate,
___ Other ___

___ Ceiling
___ Floor
___ Wall
___ Boiler Insulation
___ Other ___

COVER OVER MATERIAL

Fiber, Metal, Plaster, None, Other ~~Fiberglass~~ Tar Paper

DESCRIPTION OF MATERIAL

Color: ___
Hardness: X Fibrous (Friable), ___ Granular (Soft), or ___ Hard (Concrete-Like)
Thickness: 3 inches

COMMENTS Fiberglass

Radiation Level

___ Background Only
___ Above Background ___ cpm Instrument: ___

Sample Collection Personnel: [illegible] Company: [illegible]

WELDON SPRING SITE REMEDIAL ACTION PROJECT (WSSRAP)
Route 2, Highway 94, St. Charles, Missouri 63303
Phone (314) 441-8086 Telex (314) 447-0803

BULK MATERIAL SAMPLING FOR ASBESTOS - FIELD DATA

SAMPLE NUMBER: IN-2000-5 Date: NOVEMBER 17, 1986

SAMPLING LOCATION

Building Number: INTER-BUILDING OVERHEAD UTILITIES

~~Floor~~ NEAREST SUPPORT NO.: 508

~~Room~~ SAMPLING ZONE 1

Construction Drawing 7500-16

Other Elbow on top of 2 Pipe from North - New Construction

MATERIAL TYPE

X Pipe Insulation
Pipe Diameter: ≈ 2 ELBOW inches
Pipe Type: ___ Steam, X Ethylene Glycol, ___ Raffinate,
___ Other ___

___ Ceiling
___ Floor
___ Wall
___ Boiler Insulation
___ Other ___

COVER OVER MATERIAL

Fiber, Metal, Plaster, None, Other FIBER (BROWN)

DESCRIPTION OF MATERIAL

Color: White plaster / brown inner material

Hardness: X Fibrous (Friable), ___ Granular (Soft), or ___ Hard (Concrete-Like)

Thickness: 3 inches

COMMENTS T coming up on top of Ethylene Glycol line (Elbow)

Radiation Level 0.4 DPM

___ Background Only
___ Above Background ___ cpm Instrument: ___

Sample Collection Personnel: Kate Meyer Wiles Company: Jacobs Engineering

WELDON SPRING SITE REMEDIAL ACTION PROJECT (WSSRAP)
Route 2, Highway 94, St. Charles, Missouri 63303
Phone (314) 441-8086 Telex (314) 447-0803

BULK MATERIAL SAMPLING FOR ASBESTOS - FIELD DATA

SAMPLE NUMBER: IN-2000-6 Date: NOVEMBER 17, 1986

SAMPLING LOCATION

Building Number: INTER-BUILDING OVERHEAD UTILITIES

~~Floor~~ NEAREST SUPPORT NO.: 508

~~Room~~ SAMPLING ZONE 1

Construction Drawing 7500-16

Other Coming down from 2nd Pipe from North on top rack - Leads to "Tank" on lower level

MATERIAL TYPE

X Pipe Insulation
Pipe Diameter: ≈6 inches
Pipe Type: ___ Steam, X Ethylene Glycol, ___ Raffinate,
___ Other ___

___ Ceiling
___ Floor
___ Wall
___ Boiler Insulation
___ Other ___

COVER OVER MATERIAL

Fiber, Metal, Plaster, None, Other FIBER Tar Paper

DESCRIPTION OF MATERIAL

Color: BROWN

Hardness: X Fibrous (Friable), ___ Granular (Soft), or ___ Hard (Concrete-Like)

Thickness: 8 inches

COMMENTS Does not look like other fiber glass. Material unknown Straight-section coming down from V.E.G. line (from) sample CORK

Radiation Level 1.1 DPM

___ Background Only
___ Above Background ___ cpm Instrument: ___

Sample Collection Personnel: [illegible] Company: Jacobs Engineering

WELDON SPRING SITE REMEDIAL ACTION PROJECT (WSSRAP)
Route 2, Highway 94, St. Charles, Missouri 63303
Phone (314) 441-8086 Telex (314) 447-0803

BULK MATERIAL SAMPLING FOR ASBESTOS - FIELD DATA

SAMPLE NUMBER: IN-2000-7 Date: NOVEMBER 17, 1986

SAMPLING LOCATION

Building Number: INTER-BUILDING OVERHEAD UTILITIES
~~Floor~~ NEAREST SUPPORT NO.: 508
~~Room~~ SAMPLING ZONE 1
Construction Drawing 7500-16
Other "Tank" on lower Rack

MATERIAL TYPE

X Pipe Insulation ~24
Pipe Diameter: ____ inches
Pipe Type: ____ Steam, X Ethylene Glycol, ____ Raffinate,
____ Other ____
____ Ceiling
____ Floor
____ Wall
____ Boiler Insulation
____ Other ____

COVER OVER MATERIAL

Fiber, Metal, Plaster, None, Other Tarpaper

DESCRIPTION OF MATERIAL

Color: BROWN
Hardness: X Fibrous (Friable), ____ Granular (Soft), or ____ Hard (Concrete-Like)
Thickness: 3 inches

COMMENTS CORK INSULATION

Radiation Level

____ Background Only
____ Above Background ____ cpm Instrument: ____

Sample Collection Personnel: [illegible] Company: Jacobs Engineering

WELDON SPRING SITE REMEDIAL ACTION PROJECT (WSSRAP)
Route 2, Highway 94, St. Charles, Missouri 63303
Phone (314) 441-8086 Telex (314) 447-0803

BULK MATERIAL SAMPLING FOR ASBESTOS - FIELD DATA

SAMPLE NUMBER: IN-2000-8 Date: NOVEMBER 17, 1986

SAMPLING LOCATION

Building Number: INTER-BUILDING OVERHEAD UTILITIES
~~Floor~~ NEAREST SUPPORT NO.: 522
~~Room~~ SAMPLING ZONE 21
Construction Drawing 7500-17
Other Top Rack, Farthest South

MATERIAL TYPE

X Pipe Insulation
Pipe Diameter: ~10 inches
Pipe Type: X Steam, ___ Ethylene Glycol, ___ Raffinate,
___ Other ___

___ Ceiling
___ Floor
___ Wall
___ Boiler Insulation
___ Other ___

COVER OVER MATERIAL

(Fiber) Metal, Plaster, None, Other Tar Paper

DESCRIPTION OF MATERIAL

Color: White
Hardness: X Fibrous (Friable), ___ Granular (Soft), or ___ Hard (Concrete-Like)
Thickness: 2½ inches

COMMENTS ~~2" Diameter Insulation~~ ~14" O.D. w/ insulation

Radiation Level

___ Background Only
___ Above Background ___ cpm Instrument: ___

Sample Collection Personnel: Kathleen on 11/17/86 Company: Jacobs Engineering

WELDON SPRING SITE REMEDIAL ACTION PROJECT (WSSRAP)
Route 2, Highway 94, St. Charles, Missouri 63303
Phone (314) 441-8086 Telex (314) 447-0803

BULK MATERIAL SAMPLING FOR ASBESTOS - FIELD DATA

SAMPLE NUMBER: IN-2000-9 Date: NOVEMBER 17, 1986

SAMPLING LOCATION

Building Number: INTER-BUILDING OVERHEAD UTILITIES
~~Floor~~ NEAREST SUPPORT NO.: 502
~~Sector~~ SAMPLING ZONE 2
Construction Drawing 7500-17
Other 2nd level, Furthest South

MATERIAL TYPE

X Pipe Insulation
Pipe Diameter: 4" inches
Pipe Type: ___ Steam, ___ Ethylene Glycol, ___ Raffinate,
X Other Process ?

___ Ceiling
___ Floor
___ Wall
___ Boiler Insulation
___ Other

COVER OVER MATERIAL

(Fiber), Metal, Plaster, None, Other Tarpaper

DESCRIPTION OF MATERIAL

Color: WHITE
Hardness: X Fibrous (Friable), ___ Granular (Soft), or ___ Hard (Concrete-Like)
Thickness: 1/2" inches

COMMENTS 2" Stainless Steel Pipe

Radiation Level 0.4 DPM
___ Background Only
___ Above Background _____ cpm Instrument:

Sample Collection Personnel: [illegible] Company: Jacobs Engineering

WELDON SPRING SITE REMEDIAL ACTION PROJECT (WSSRAP)
Route 2, Highway 94, St. Charles, Missouri 63303
Phone (314) 441-8086 Telex (314) 447-0803

BULK MATERIAL SAMPLING FOR ASBESTOS - FIELD DATA

SAMPLE NUMBER: IN-2000-10 Date: NOVEMBER 17, 1986

SAMPLING LOCATION

Building Number: INTER-BUILDING OVERHEAD UTILITIES
~~Floor~~ NEAREST SUPPORT NO.: 32
~~Room~~ SAMPLING ZONE 2
Construction Drawing 7500-17
Other 3rd level down, Farthest South

MATERIAL TYPE

X Pipe Insulation
Pipe Diameter: 2" inches
Pipe Type: ___ Steam, ___ Ethylene Glycol, ___ Raffinate,
X Other ?, Process?

___ Ceiling
___ Floor
___ Wall
___ Boiler Insulation
___ Other

COVER OVER MATERIAL

Fiber, Metal, Plaster, None, Other Tar bubble Coat

DESCRIPTION OF MATERIAL

Color: white
Hardness: X Fibrous (Friable), ___ Granular (Soft), or ___ Hard (Concrete-Like)
Thickness: 2' 1/2" inches

COMMENTS 2" Stainless steel pipe

Radiation Level 0.0 DPM
___ Background Only
___ Above Background _____ cpm Instrument: _____

Sample Collection Personnel: [signature] 11-17-86 Company: Jacobs Engineering

WELDON SPRING SITE REMEDIAL ACTION PROJECT (WSSRAP)
Route 2, Highway 94, St. Charles, Missouri 63303
Phone (314) 441-8086 Telex (314) 447-0803

BULK MATERIAL SAMPLING FOR ASBESTOS - FIELD DATA

SAMPLE NUMBER: IN-2000-11 Date: NOVEMBER 17, 1986

SAMPLING LOCATION

Building Number: INTER-BUILDING OVERHEAD UTILITIES
~~Floor~~ NEAREST SUPPORT NO.: ~~522~~ 2
~~Sec~~ SAMPLING ZONE
Construction Drawing 7500-17
Other Lowest pipe at the Section

MATERIAL TYPE

X Pipe Insulation
Pipe Diameter: 2" inches
Pipe Type: ___ Steam, ___ Ethylene Glycol, ___ Raffinate,
X Other Process ?
___ Ceiling
___ Floor
___ Wall
___ Boiler Insulation
___ Other

COVER OVER MATERIAL

Fiber, Metal, Plaster, None, Other Tar Paper Cover

DESCRIPTION OF MATERIAL

Color: Yellow
Hardness: X Fibrous (Friable), ___ Granular (Soft), or ___ Hard (Concrete-Like)
Thickness: 2 inches

COMMENTS 2" dia Steel pipe
Fiber glass ~~Insulation~~ Insulation
Sheathing Torn at Sampling Location

Radiation Level

___ Background Only
___ Above Background ___ cpm Instrument:

7.2 DPM - do not ship offsite

Sample Collection Personnel: Kurt Haas on 11/17/86 Company: Jacobs Engineering

WELDON SPRING SITE REMEDIAL ACTION PROJECT (WSSRAP)
Route 2, Highway 94, St. Charles, Missouri 63303
Phone (314) 441-8086 Telex (314) 447-0803

BULK MATERIAL SAMPLING FOR ASBESTOS - FIELD DATA

SAMPLE NUMBER: IN-2000-12 Date: NOVEMBER 17, 1986

SAMPLING LOCATION

Building Number: INTER-BUILDING OVERHEAD UTILITIES
~~Floor~~ NEAREST SUPPORT NO.: 522
~~Sec.~~ SAMPLING ZONE 21
Construction Drawing 7500-17
Other Middle ~~pipe~~ 2nd level from the top

MATERIAL TYPE

X Pipe Insulation
Pipe Diameter: 2" inches
Pipe Type: ___ Steam, ___ Ethylene Glycol, ___ Raffinate,
X Other Process ?

___ Ceiling
___ Floor
___ Wall
___ Boiler Insulation
___ Other

COVER OVER MATERIAL

Fiber, Metal, Plaster, None, Other Tar 1025

DESCRIPTION OF MATERIAL

Color: White Light insulation
Hardness: X Fibrous (Friable), ___ Granular (Soft), or ___ Hard (Concrete-Like)
Thickness: 1 1/2" inches

COMMENTS Stainless Steel

Radiation Level

___ Background Only
___ Above Background _____ cpm Instrument:

Sample Collection Personnel: Kurt Olson 11-17-86 Company: Jacobs Engineering

WELDON SPRING SITE REMEDIAL ACTION PROJECT (WSSRAP)
Route 2, Highway 94, St. Charles, Missouri 63303
Phone (314) 441-8086 Telex (314) 447-0803

BULK MATERIAL SAMPLING FOR ASBESTOS - FIELD DATA

SAMPLE NUMBER: IN-2000-13 Date: NOVEMBER 17, 1986

SAMPLING LOCATION

Building Number: INTER-BUILDING OVERHEAD UTILITIES
~~Floor~~ NEAREST SUPPORT NO.: 502
~~Room~~ SAMPLING ZONE 2
Construction Drawing 7500-17
Other 2nd Level Down, Farthest North

MATERIAL TYPE

X Pipe Insulation
Pipe Diameter: 2 inches
Pipe Type: ___ Steam, ___ Ethylene Glycol, ___ Raffinate,
X Other Process ?
___ Ceiling
___ Floor
___ Wall
___ Boiler Insulation
___ Other

COVER OVER MATERIAL

Fiber, Metal, Plaster, None, Other = None, Nothing

DESCRIPTION OF MATERIAL

Color: Grey
Hardness: X Fibrous (Friable), ___ Granular (Soft), or ___ Hard (Concrete-Like)
Thickness: 1 1/2 inches

COMMENTS Like-Styrofoam (Grey)
Black covers
Stainless Steel construction size

Radiation Level 0.0 DPM
___ Background Only
___ Above Background ___ cpm Instrument:

Sample Collection Personnel: [illegible] Company: Tech Engineering

WELDON SPRING SITE REMEDIAL ACTION PROJECT (WSSRAP)
Route 2, Highway 94, St. Charles, Missouri 63303
Phone (314) 441-8086 Telex (314) 447-0803

BULK MATERIAL SAMPLING FOR ASBESTOS - FIELD DATA

SAMPLE NUMBER: IN-2000-14 Date: NOVEMBER 17, 1986

SAMPLING LOCATION

Building Number: INTER-BUILDING OVERHEAD UTILITIES

~~Floor~~ NEAREST SUPPORT NO.: 522

~~Room~~ SAMPLING ZONE 2

Construction Drawing 7500-17

Other Top Level, 3rd From North

MATERIAL TYPE

X Pipe Insulation

Pipe Diameter: ~~[illegible]~~ 12 ? inches

Pipe Type: ____ Steam, X Ethylene Glycol, ____ Raffinate, ____ Other ____

____ Ceiling

____ Floor

____ Wall

____ Boiler Insulation

____ Other ____

COVER OVER MATERIAL

Fiber, Metal, Plaster, None, Other (TAR Paper Sheet)

DESCRIPTION OF MATERIAL

Color: Yellow

Hardness: X Fibrous (Friable), ____ Granular (Soft), or ____ Hard (Concrete-Like)

Thickness: 2 inches

COMMENTS FIBER GLASS Insulation

Radiation Level

____ Background Only

____ Above Background ____ cpm Instrument: ____

Sample Collection Personnel: [illegible] 11/17/86 Company: Jacobs Engineering

WELDON SPRING SITE REMEDIAL ACTION PROJECT (WSSRAP)
Route 2, Highway 94, St. Charles, Missouri 63303
Phone (314) 441-8086 Telex (314) 447-0803

BULK MATERIAL SAMPLING FOR ASBESTOS - FIELD DATA

SAMPLE NUMBER: IN-2000-15 Date: NOVEMBER 17, 1986

SAMPLING LOCATION

Building Number: INTER-BUILDING OVERHEAD UTILITIES
~~Floor~~ NEAREST SUPPORT NO.: 522
~~Sector~~ SAMPLING ZONE 2
Construction Drawing 7500-17
Other Top Level, 2nd from North

MATERIAL TYPE

X Pipe Insulation
Pipe Diameter: ~~20~~ 12 ? inches
Pipe Type: ____ Steam, X Ethylene Glycol, ____ Raffinate,
____ Other ____
____ Ceiling
____ Floor
____ Wall
____ Boiler Insulation
____ Other ____

COVER OVER MATERIAL

Fiber, Metal, Plaster, None, Other TAR Paper, Sheet

DESCRIPTION OF MATERIAL

Color: Yellow
Hardness: X Fibrous (Friable), ____ Granular (Soft), or ____ Hard (Concrete-like)
Thickness: 2 inches

COMMENTS FIBER GLASS Insulation

Radiation Level

____ Background Only
____ Above Background ____ cpm Instrument: ____

Sample Collection Personnel: [signature] 11/17/86 Company: Jacobs Engineering

WELDON SPRING SITE REMEDIAL ACTION PROJECT (WSSRAP)
Route 2, Highway 94, St. Charles, Missouri 63303
Phone (314) 441-8086 Telex (314) 447-0803

BULK MATERIAL SAMPLING FOR ASBESTOS - FIELD DATA

SAMPLE NUMBER: IN-2000-16 Date: NOVEMBER 17, 1986

SAMPLING LOCATION

Building Number: INTER-BUILDING OVERHEAD UTILITIES
~~Floor~~ NEAREST SUPPORT NO.: 71
~~Room~~ SAMPLING ZONE 3
Construction Drawing 7500-a3
Other Top Level 3rd from East

MATERIAL TYPE

X Pipe Insulation
Pipe Diameter: 6 inches
Pipe Type: X Steam, ___ Ethylene Glycol, ___ Raffinate,
___ Other ___
___ Ceiling
___ Floor
___ Wall
___ Boiler Insulation
___ Other ___

COVER OVER MATERIAL

(Fiber), Metal, Plaster, None, Other Tar Impregnated Canvas

DESCRIPTION OF MATERIAL

Color: White ~~Light~~ Insulation
Hardness: X Fibrous (Friable), ___ Granular (Soft), or ___ Hard (Concrete-Like)
Thickness: 1 1/2" inches

COMMENTS ~~Example~~
One missing from the blue print

Radiation Level

___ Background Only
___ Above Background ___ cpm Instrument: ___

Sample Collection Personnel: [illegible] Company: Jacobs Engineering

WELDON SPRING SITE REMEDIAL ACTION PROJECT (WSSRAP)
Route 2, Highway 94, St. Charles, Missouri 63303
Phone (314) 441-8086 Telex (314) 447-0803

BULK MATERIAL SAMPLING FOR ASBESTOS - FIELD DATA

SAMPLE NUMBER: IN-2000-17 Date: NOVEMBER 17, 1986

SAMPLING LOCATION

Building Number: INTER-BUILDING OVERHEAD UTILITIES
~~Floor~~ NEAREST SUPPORT NO.: 71
~~Room~~ SAMPLING ZONE 3
Construction Drawing 7500-23
Other Top, 2nd from East

MATERIAL TYPE

X Pipe Insulation
Pipe Diameter: 2" inches
Pipe Type: ___ Steam, X Ethylene Glycol, ___ Raffinate,
___ Other ___

___ Ceiling
___ Floor
___ Wall
___ Boiler Insulation
___ Other ___

COVER OVER MATERIAL

Fiber, Metal, Plaster, None, Other Tar Paper cover

DESCRIPTION OF MATERIAL

Color: Yellow
Hardness: X Fibrous (Friable), ___ Granular (Soft), or ___ Hard (Concrete-Like)
Thickness: 3" inches

COMMENTS Fiberglass

Radiation Level

___ Background Only
___ Above Background ___ cpm Instrument: ___

Sample Collection Personnel: [illegible] Company: [illegible]

WELDON SPRING SITE REMEDIAL ACTION PROJECT (WSSRAP)
Route 2, Highway 94, St. Charles, Missouri 63303
Phone (314) 441-8086 Telex (314) 447-0803

BULK MATERIAL SAMPLING FOR ASBESTOS - FIELD DATA

SAMPLE NUMBER: IN-2000-18 Date: NOVEMBER 17, 1986

SAMPLING LOCATION

Building Number: INTER-BUILDING OVERHEAD UTILITIES

~~Floor~~ NEAREST SUPPORT NO.: 71

~~Room~~ SAMPLING ZONE 3

Construction Drawing 7500-23

Other Top, Farthest East

MATERIAL TYPE

X Pipe Insulation
Pipe Diameter: 2" ? inches
Pipe Type: ____ Steam, X Ethylene Glycol, ____ Raffinate,
____ Other ____

____ Ceiling
____ Floor
____ Wall
____ Boiler Insulation
____ Other ____

COVER OVER MATERIAL

Fiber, Metal, Plaster, None, Other TAR paper cover

DESCRIPTION OF MATERIAL

Color: Yellow

Hardness: X Fibrous (Friable), ____ Granular (Soft), or ____ Hard (Concrete-Like)

Thickness: 3" inches

COMMENTS FIBERGLASS

Radiation Level

____ Background Only
____ Above Background ____ cpm Instrument: ____

Sample Collection Personnel: [illegible] Company: [illegible]

WELDON SPRING SITE REMEDIAL ACTION PROJECT (WSSRAP)
Route 2, Highway 94, St. Charles, Missouri 63303
Phone (314) 441-8086 Telex (314) 447-0803

BULK MATERIAL SAMPLING FOR ASBESTOS - FIELD DATA

SAMPLE NUMBER: IN-2000-19 Date: NOVEMBER 17, 1986

SAMPLING LOCATION

Building Number: INTER-BUILDING OVERHEAD UTILITIES

~~Floor~~ NEAREST SUPPORT NO.: 71

~~Room~~ SAMPLING ZONE 2

Construction Drawing 7500-23

Other 2nd level from Tub farthest East

MATERIAL TYPE

X Pipe Insulation
Pipe Diameter: 2" inches
Pipe Type: ____ Steam, ____ Ethylene Glycol, ____ Raffinate,
____ Other ?

____ Ceiling
____ Floor
____ Wall
____ Boiler Insulation
____ Other ____

COVER OVER MATERIAL

Fiber, Metal, Plaster, None, Other TAR Paper Cover

DESCRIPTION OF MATERIAL

Color: White

Hardness: X Fibrous (Friable), ____ Granular (Soft), or ____ Hard (Concrete-Like)

Thickness: 2" inches

COMMENTS Stainless Steel Pipe

Radiation Level

____ Background Only
____ Above Background ____ cpm Instrument: ____

Sample Collection Personnel: [signature] 11/17/86 Company: Jacobs Engineering

WELDON SPRING SITE REMEDIAL ACTION PROJECT (WSSRAP)
Route 2, Highway 94, St. Charles, Missouri 63303
Phone (314) 441-8086 Telex (314) 447-0803

BULK MATERIAL SAMPLING FOR ASBESTOS - FIELD DATA

SAMPLE NUMBER: IN-2000-20 Date: NOVEMBER 17, 1986

SAMPLING LOCATION

Building Number: INTER-BUILDING OVERHEAD UTILITIES
~~Floor~~ NEAREST SUPPORT NO.: 71
~~Room~~ SAMPLING ZONE 3
Construction Drawing 7500-23
Other Bottom level farthest East

MATERIAL TYPE

X Pipe Insulation
Pipe Diameter: 3" inches
Pipe Type: ___ Steam, ___ Ethylene Glycol, ___ Raffinate,
X Other Process ?
___ Ceiling
___ Floor
___ Wall
___ Boiler Insulation
___ Other

COVER OVER MATERIAL

Fiber, Metal, Plaster, None, Other TAR Paper cover

DESCRIPTION OF MATERIAL

Color: White / Light Insulation
Hardness: X Fibrous (Friable), ___ Granular (Soft), or ___ Hard (Concrete-like)
Thickness: 2" inches

COMMENTS Stainless steel

Radiation Level

___ Background Only
___ Above Background _____ cpm Instrument:

Sample Collection Personnel: [illegible] Company: [illegible]

WELDON SPRING SITE REMEDIAL ACTION PROJECT (WSSRAP)
Route 2, Highway 94, St. Charles, Missouri 63303
Phone (314) 441-8086 Telex (314) 447-0803

BULK MATERIAL SAMPLING FOR ASBESTOS - FIELD DATA

SAMPLE NUMBER: IN-2000-21 Date: NOVEMBER 17, 1986

SAMPLING LOCATION

Building Number: INTER-BUILDING OVERHEAD UTILITIES
~~Floor~~ NEAREST SUPPORT NO.: 71
~~Room~~ SAMPLING ZONE 3
Construction Drawing 7500-22
Other 2nd level from Northeast West.

MATERIAL TYPE

X Pipe Insulation
Pipe Diameter: 1½ inches
Pipe Type: ___ Steam, ___ Ethylene Glycol, ___ Raffinate,
X Other Process ?
___ Ceiling
___ Floor
___ Wall
___ Boiler Insulation
___ Other

COVER OVER MATERIAL

Fiber, Metal, Plaster, (None) Other

DESCRIPTION OF MATERIAL

Color: GREY
Hardness: ___ Fibrous (Friable), ___ Granular (Soft), or ___ Hard (Concrete-Like)
Thickness: 1" inches

COMMENTS Styrofoam material (Black), Stainless Steel Pipe

Radiation Level
___ Background Only
___ Above Background _____ cpm Instrument:

Sample Collection Personnel: [illegible] Company: [illegible]

WELDON SPRING SITE REMEDIAL ACTION PROJECT (WSSRAP)
Route 2, Highway 94, St. Charles, Missouri 63303
Phone (314) 441-8086 Telex (314) 447-0803

BULK MATERIAL SAMPLING FOR ASBESTOS - FIELD DATA

SAMPLE NUMBER: IN-2000-22 Date: NOVEMBER 17, 1986

SAMPLING LOCATION

Building Number: INTER-BUILDING OVERHEAD UTILITIES
~~Floor~~ NEAREST SUPPORT NO.: 71
~~Room~~ SAMPLING ZONE 3
Construction Drawing 7500-23
Other Bottom level furthest west.

MATERIAL TYPE

X Pipe Insulation
Pipe Diameter: 2" inches
Pipe Type: ___ Steam, ___ Ethylene Glycol, ___ Raffinate,
X Other PROCESS ?
___ Ceiling
___ Floor
___ Wall
___ Boiler Insulation
___ Other

COVER OVER MATERIAL

Fiber, Metal, Plaster, None, Other ~~TAR~~ Rubber COVER

DESCRIPTION OF MATERIAL

Color: White
Hardness: X Fibrous (Friable), ___ Granular (Soft), or ___ Hard (Concrete-Like)
Thickness: 2" inches

COMMENTS Stainless Steel bips

Radiation Level

___ Background Only
___ Above Background _____ cpm Instrument: _____

Sample Collection Personnel: [signature] 11/17/86 Company: Jacobs Engineering

WELDON SPRING SITE REMEDIAL ACTION PROJECT (WSSRAP)
Route 2, Highway 94, St. Charles, Missouri 63303
Phone (314) 441-8086 Telex (314) 447-0803

BULK MATERIAL SAMPLING FOR ASBESTOS - FIELD DATA

SAMPLE NUMBER: IN-2000-23 Date: NOVEMBER 17, 1986

SAMPLING LOCATION

Building Number: INTER-BUILDING OVERHEAD UTILITIES
~~Floor~~ NEAREST SUPPORT NO.: 731
~~Room~~ SAMPLING ZONE 4
Construction Drawing 7500-28
Other Furthest west

MATERIAL TYPE

X Pipe Insulation
Pipe Diameter: 4 inches
Pipe Type: ___ Steam, X Ethylene Glycol, ___ Raffinate,
___ Other ___
___ Ceiling
___ Floor
___ Wall
___ Boiler Insulation
___ Other ___

COVER OVER MATERIAL

Fiber, Metal, Plaster, None, Other TAR base (cove)

DESCRIPTION OF MATERIAL

Color: Yellow
Hardness: X Fibrous (Friable), ___ Granular (Soft), or ___ Hard (Concrete-Like)
Thickness: 3" inches

COMMENTS Fiber Glass
(Sample label stuck to bottle bag)

Radiation Level
___ Background Only
___ Above Background ___ cpm Instrument: ___

Sample Collection Personnel: [signature] 11/17/86 Company: Jacobs Engineering

WELDON SPRING SITE REMEDIAL ACTION PROJECT (WSSRAP)
Route 2, Highway 94, St. Charles, Missouri 63303
Phone (314) 441-8086 Telex (314) 447-0803

BULK MATERIAL SAMPLING FOR ASBESTOS - FIELD DATA

SAMPLE NUMBER: IN-2000-24 Date: NOVEMBER 17, 1986

SAMPLING LOCATION

Building Number: INTER-BUILDING OVERHEAD UTILITIES
~~Floor~~ NEAREST SUPPORT NO.: 731
~~Room~~ SAMPLING ZONE 4
Construction Drawing 7500-38
Other EAST End.

MATERIAL TYPE

X Pipe Insulation
Pipe Diameter: 6 inches
Pipe Type: ___ Steam, X Ethylene Glycol, ___ Raffinate,
___ Other ___
___ Ceiling
___ Floor
___ Wall
___ Boiler Insulation
___ Other ___

COVER OVER MATERIAL

Fiber, Metal, Plaster, None, Other TAR paper cover

DESCRIPTION OF MATERIAL

Color: Yellow
Hardness: X Fibrous (Friable), ___ Granular (Soft), or ___ Hard (Concrete-Like)
Thickness: 3" inches

COMMENTS FIBER GLASS

Radiation Level

___ Background Only
___ Above Background ___ cpm Instrument: ___

Sample Collection Personnel: [illegible] Company: Jacobs Engineering

WELDON SPRING SITE REMEDIAL ACTION PROJECT (WSSRAP)
Route 2, Highway 94, St. Charles, Missouri 63303
Phone (314) 441-8086 Telex (314) 447-0803

BULK MATERIAL SAMPLING FOR ASBESTOS - FIELD DATA

SAMPLE NUMBER: IN-2000-26 Date: NOVEMBER 17, 1986

SAMPLING LOCATION

Building Number: INTER-BUILDING OVERHEAD UTILITIES
~~Floor~~ NEAREST SUPPORT NO.: 38
~~Room~~ SAMPLING ZONE 5
Construction Drawing 7500-19
Other Top level

MATERIAL TYPE

X Pipe Insulation
Pipe Diameter: ≈ 4 inches
Pipe Type: ___ Steam, ___ Ethylene Glycol, X Raffinate,
___ Other
___ Ceiling
___ Floor
___ Wall
___ Boiler Insulation
___ Other

COVER OVER MATERIAL

Fiber, Metal, Plaster, None, Other TAR BABY COVER

DESCRIPTION OF MATERIAL

Color: White
Hardness: X Fibrous (Friable), ___ Granular (Soft), or ___ Hard (Concrete-Like)
Thickness: 1 1/2" inches

COMMENTS Steam

Radiation Level
___ Background Only
___ Above Background _____ cpm Instrument: _____

Sample Collection Personnel: [signature] 11/17/86 Company: Tech Engineering

WELDON SPRING SITE REMEDIAL ACTION PROJECT (WSSRAP)
Route 2, Highway 94, St. Charles, Missouri 63303
Phone (314) 441-8086 Telex (314) 447-0803

BULK MATERIAL SAMPLING FOR ASBESTOS - FIELD DATA

SAMPLE NUMBER: IN-2000-27 Date: NOVEMBER 17, 1986

SAMPLING LOCATION

Building Number: INTER-BUILDING OVERHEAD UTILITIES

~~Floor~~ NEAREST SUPPORT NO.: 38

~~Room~~ SAMPLING ZONE 5

Construction Drawing 7500-19

Other 2nd Level Furthest West From Top

MATERIAL TYPE

X Pipe Insulation
Pipe Diameter: ≈ 4" inches
Pipe Type: ____ Steam, ____ Ethylene Glycol, X Raffinate,
____ Other ____

____ Ceiling
____ Floor
____ Wall
____ Boiler Insulation
____ Other ____

COVER OVER MATERIAL

Fiber, Metal, Plaster, None, Other Metal cover

DESCRIPTION OF MATERIAL

Color: White

Hardness: X Fibrous (Friable), ____ Granular (Soft), or ____ Hard (Concrete-Like)

Thickness: 2½" inches

COMMENTS Stainless Steel pipe

Radiation Level

____ Background Only
____ Above Background ____ cpm Instrument: ____

Sample Collection Personnel: Kirk Meyer 11/17/86 Company: Jacobs Engineering

WELDON SPRING SITE REMEDIAL ACTION PROJECT (WSSRAP)
Route 2, Highway 94, St. Charles, Missouri 63303
Phone (314) 441-8086 Telex (314) 447-0803

BULK MATERIAL SAMPLING FOR ASBESTOS - FIELD DATA

SAMPLE NUMBER: IN-2000-28 Date: NOVEMBER 17, 1986

SAMPLING LOCATION

Building Number: INTER-BUILDING OVERHEAD UTILITIES
~~Floor~~ NEAREST SUPPORT NO.: 38
~~Room~~ SAMPLING ZONE 5
Construction Drawing 7500-19
Other 2nd from west.

MATERIAL TYPE

X Pipe Insulation
Pipe Diameter: 8 x 18 inches
Pipe Type: X Steam, ___ Ethylene Glycol, ___ Raffinate,
___ Other ___
___ Ceiling
___ Floor
___ Wall
___ Boiler Insulation
___ Other ___

COVER OVER MATERIAL

Fiber, Metal, Plaster, None, Other TAR Babal Cover

DESCRIPTION OF MATERIAL

Color: White
Hardness: X Fibrous (Friable), ___ Granular (Soft), or ___ Hard (Concrete-Like)
Thickness: 3" inches

COMMENTS ___

Radiation Level

___ Background Only
___ Above Background ___ cpm Instrument: ___

Sample Collection Personnel: [signature] 11/17/86 Company: Roy's Engineering

WELDON SPRING SITE REMEDIAL ACTION PROJECT (WSSRAP)
Route 2, Highway 94, St. Charles, Missouri 63303
Phone (314) 441-8086 Telex (314) 447-0803

BULK MATERIAL SAMPLING FOR ASBESTOS - FIELD DATA

SAMPLE NUMBER: IN-2000-29 Date: NOVEMBER 17, 1986

SAMPLING LOCATION

Building Number: INTER-BUILDING OVERHEAD UTILITIES
~~Floor~~ NEAREST SUPPORT NO.: 562
~~Sec.~~ SAMPLING ZONE 6
Construction Drawing 7500-24
Other Lowest one

MATERIAL TYPE

X Pipe Insulation
Pipe Diameter: ≈ 4" inches
Pipe Type: ___ Steam, ___ Ethylene Glycol, ___ Raffinate,
X Other Process ?

___ Ceiling
___ Floor
___ Wall
___ Boiler Insulation
___ Other

COVER OVER MATERIAL

Fiber, Metal, Plaster, None, Other TAR Paper Cover

DESCRIPTION OF MATERIAL

Color: White
Hardness: X Fibrous (Friable), ___ Granular (Soft), or ___ Hard (Concrete-Like)
Thickness: 1½ inches

COMMENTS

Radiation Level

___ Background Only
___ Above Background ___ cpm Instrument:

Sample Collection Personnel: [illegible] 11/17/86 Company: Jacobs Engineering

WELDON SPRING SITE REMEDIAL ACTION PROJECT (WSSRAP)
Route 2, Highway 94, St. Charles, Missouri 63303
Phone (314) 441-8086 Telex (314) 447-0803

BULK MATERIAL SAMPLING FOR ASBESTOS - FIELD DATA

SAMPLE NUMBER: IN-2000-30 Date: NOVEMBER 17, 1986

SAMPLING LOCATION

Building Number: INTER-BUILDING OVERHEAD UTILITIES
~~Floor~~ NEAREST SUPPORT NO.: 562
~~Sector~~ SAMPLING ZONE 6
Construction Drawing 7500-24
Other Right Above IN-2000-29 Headed South.

MATERIAL TYPE

X Pipe Insulation
Pipe Diameter: 6" inches
Pipe Type: ___ Steam, ___ Ethylene Glycol, X Raffinate,
___ Other [redacted]

___ Ceiling
___ Floor
___ Wall
___ Boiler Insulation
___ Other

COVER OVER MATERIAL

Fiber, Metal, Plaster, None, Other TAR Duct

DESCRIPTION OF MATERIAL

Color: White
Hardness: X Fibrous (Friable), ___ Granular (Soft), or ___ Hard (Concrete-Like)
Thickness: 2" inches

COMMENTS

Radiation Level 0.0 DPM
___ Background Only
___ Above Background ___ cpm Instrument:

Sample Collection Personnel: [signature] 11/17/86 Company: Tetra Engineering

WELDON SPRING SITE REMEDIAL ACTION PROJECT (WSSRAP)
Route 2, Highway 94, St. Charles, Missouri 63303
Phone (314) 441-8086 Telex (314) 447-0803

BULK MATERIAL SAMPLING FOR ASBESTOS - FIELD DATA

SAMPLE NUMBER: IN-2000-31 Date: NOVEMBER 17, 1986

SAMPLING LOCATION

Building Number: INTER-BUILDING OVERHEAD UTILITIES
~~Floor~~ NEAREST SUPPORT NO.: 562
~~Seam~~ SAMPLING ZONE 6.
Construction Drawing 7500-94
Other Top furthest north.

MATERIAL TYPE

X Pipe Insulation
Pipe Diameter: 4" inches
Pipe Type: ___ Steam, ___ Ethylene Glycol, X Raffinate,
___ Other ___
___ Ceiling
___ Floor
___ Wall
___ Boiler Insulation
___ Other ___

COVER OVER MATERIAL

Fiber, Metal, Plaster, None, Other metal cover

DESCRIPTION OF MATERIAL

Color: white
Hardness: X Fibrous (Friable), ___ Granular (Soft), or ___ Hard (Concrete-like)
Thickness: 2" inches

COMMENTS ___

Radiation Level
___ Background Only
___ Above Background ___ cpm Instrument: ___

Sample Collection Personnel: [signature] 11/17/86 Company: Jacobs Engineering

_ ACTION PROJECT (WSSRAP)
Charles, Missouri 63303
Telex (314) 447-0803

FOR ASBESTOS - FIELD DATA

Date: NOVEMBER 17, 1986

BUILDING OVERHEAD UTILITIES
562
E
500-24
Elbow 3rd from ~~SOUTH~~ EAST

W

___ inches
___ Ethylene Glycol, ___ Raffinate,

TAR batch Coat

___ Granular (Soft), or ___ Hard (Concrete-Like)

Instrument: _____

Company: Jacobs Engineering

WELDON SPRING SITE REMEDIAL ACTION PROJECT (WSSRAP)
Route 2, Highway 94, St. Charles, Missouri 63303
Phone (314) 441-8086 Telex (314) 447-0803

BULK MATERIAL SAMPLING FOR ASBESTOS - FIELD DATA

SAMPLE NUMBER: IN-2000-33 Date: NOVEMBER 17, 1986

SAMPLING LOCATION

Building Number: INTER-BUILDING OVERHEAD UTILITIES
~~Floor~~ NEAREST SUPPORT NO.: 56a
~~Room~~ SAMPLING ZONE C
Construction Drawing 7500-24
Other Elbow 1st from west

MATERIAL TYPE

X Pipe Insulation
Pipe Diameter: ≈4 inches ELBOW
Pipe Type: X Steam, ___ Ethylene Glycol, ___ Raffinate,
___ Other ___
___ Ceiling
___ Floor
___ Wall
___ Boiler Insulation
___ Other ___

COVER OVER MATERIAL

Fiber, Metal, Plaster, None, Other Tar type Coat.

DESCRIPTION OF MATERIAL

Color: Brown
Hardness: X Fibrous (Friable), ___ Granular (Soft), or ___ Hard (Concrete-Like)
Thickness: ≈2 inches

COMMENTS ___

Radiation Level
___ Background Only
___ Above Background ___ cpm Instrument: ___

Sample Collection Personnel: Kirk Nixon 11/17/86 Company: Jacobs Engineering

WELDON SPRING SITE REMEDIAL ACTION PROJECT (WSSRAP)
Route 2, Highway 94, St. Charles, Missouri 63303
Phone (314) 441-8086 Telex (314) 447-0803

BULK MATERIAL SAMPLING FOR ASBESTOS - FIELD DATA

SAMPLE NUMBER: IN-2000-34 Date: NOVEMBER 10, 1986

SAMPLING LOCATION

Building Number: INTER-BUILDING OVERHEAD UTILITIES
~~Floor~~ NEAREST SUPPORT NO.: 569
~~Sector~~ SAMPLING ZONE 7
Construction Drawing 7500-24
Other Top Level - Farthest North

MATERIAL TYPE

X Pipe Insulation
Pipe Diameter: ~ 4" inches
Pipe Type: ___ Steam, ___ Ethylene Glycol, X Raffinate,
___ Other

___ Ceiling
___ Floor
___ Wall
___ Boiler Insulation
___ Other

COVER OVER MATERIAL

Fiber, (Metal), Plaster, None, Other METAL JOINT

DESCRIPTION OF MATERIAL

Color: White
Hardness: X Fibrous (Friable), ___ Granular (Soft), or ___ Hard (Concrete-like)
Thickness: 2 3/4" inches

COMMENTS Stainless steel pipe

Radiation Level

___ Background Only
___ Above Background _____ cpm Instrument:

Sample Collection Personnel: [signature] 11/6/86 Company: Jacobs Engineering

WELDON SPRING SITE REMEDIAL ACTION PROJECT (WSSRAP)
Route 2, Highway 94, St. Charles, Missouri 63303
Phone (314) 441-8086 Telex: (314) 447-0803

BULK MATERIAL SAMPLING FOR ASBESTOS - FIELD DATA

SAMPLE NUMBER: IN-2000-35 Date: NOVEMBER 18, 1986

SAMPLING LOCATION

Building Number: INTER-BUILDING OVERHEAD UTILITIES
~~Floor~~ NEAREST SUPPORT NO.: GROUND (NEAR 406)
~~Room~~ SAMPLING ZONE 8
Construction Drawing ~~7560~~ N.A.
Other Vertical Pipe at SW corner of Rail Loading Dock at Building-406

MATERIAL TYPE

X Pipe Insulation
Pipe Diameter: 1 inches
Pipe Type: X Steam, ___ Ethylene Glycol, ___ Raffinate,
___ Other ___
___ Ceiling
___ Floor
___ Wall
___ Boiler Insulation
___ Other ___

COVER OVER MATERIAL

~~Fiber~~, Metal, Plaster, None, Other Tarpaper

DESCRIPTION OF MATERIAL

Color: White
Hardness: X Fibrous (Friable), ___ Granular (Soft), or ___ Hard (Concrete-Like)
Thickness: 1 ½ inches

COMMENTS ___

Radiation Level

___ Background Only
___ Above Background ___ cpm Instrument: ___

Sample Collection Personnel: [signature] 11/19/86 Company: Jacobs Engineering

WELDON SPRING SITE REMEDIAL ACTION PROJECT (WSSRAP)
Route 2, Highway 94, St. Charles, Missouri 63303
Phone (314) 441-8086 Telex (314) 447-0803

BULK MATERIAL SAMPLING FOR ASBESTOS - FIELD DATA

SAMPLE NUMBER: IN-2000-36 Date: NOVEMBER 18, 1986

SAMPLING LOCATION

Building Number: INTER-BUILDING OVERHEAD UTILITIES
~~Floor~~ NEAREST SUPPORT NO.: 74
~~Room~~ SAMPLING ZONE 9
Construction Drawing 7500-25
Other Top, Farthest East

MATERIAL TYPE

X Pipe Insulation
Pipe Diameter: ~4 inches
Pipe Type: ___ Steam, ___ Ethylene Glycol, X Raffinate,
___ Other

___ Ceiling
___ Floor
___ Wall
___ Boiler Insulation
___ Other

COVER OVER MATERIAL

Fiber, Metal, Plaster, None, Other TAR PAPER (WRAP)

DESCRIPTION OF MATERIAL

Color: White
Hardness: X Fibrous (Friable), ___ Granular (Soft), or ___ Hard (Concrete-Like)
Thickness: 2" inches

COMMENTS Steel pipe - Real Bad Condition

Radiation Level

___ Background Only
___ Above Background _____ cpm, Instrument: _____

Sample Collection Personnel: V. A. Mench 11/18/86 Company: Jacobs Engineering

WELDON SPRING SITE REMEDIAL ACTION PROJECT (WSSRAP)
Route 2, Highway 94, St. Charles, Missouri 63303
Phone (314) 441-8086 Telex (314) 447-0803

BULK MATERIAL SAMPLING FOR ASBESTOS - FIELD DATA

SAMPLE NUMBER: IN-2000-37 Date: NOVEMBER 18, 1986

SAMPLING LOCATION

Building Number: INTER-BUILDING OVERHEAD UTILITIES
~~Floor~~ NEAREST SUPPORT NO.: 754
~~Sector~~ SAMPLING ZONE 9
Construction Drawing 7500-25
Other Top-Level 2nd from east

MATERIAL TYPE

X Pipe Insulation
Pipe Diameter: ~4" inches
Pipe Type: ___ Steam, ___ Ethylene Glycol, X Raffinate,
___ Other
___ Ceiling
___ Floor
___ Wall
___ Boiler Insulation
___ Other

COVER OVER MATERIAL

Fiber, (Metal), Plaster, None, Other

DESCRIPTION OF MATERIAL

Color: White
Hardness: X Fibrous (Friable), ___ Granular (Soft), or ___ Hard (Concrete-Like)
Thickness: 3" inches

COMMENTS Stainless Steel pipe

Radiation Level
___ Background Only
___ Above Background ___ cpm Instrument:

Sample Collection Personnel: [signature] 11/18/86 Company: Jacobs Engineering

SPRING SITE REMEDIAL ACTION PROJECT (WSSRAP)
ute 2, Highway 94, St. Charles, Missouri 63303
Phone (314) 441-8086 Telex (314) 447-0803

ILK MATERIAL SAMPLING FOR ASBESTOS - FIELD DATA

IN-2000-38 Date: NOVEMBER 10, 1986

IN
ng Number: INTER-BUILDING OVERHEAD UTILITIES
NEAREST SUPPORT NO.: 764
SAMPLING ZONE 9
uction Drawing 7500-25
Elbow - Top level Northeast East

Insulation
ipe Diameter: ~ 4" inches
ipe Type: ____ Steam, ____ Ethylene Glycol, X Raffinate,
____ Other ____

ng

- Insulation

RIAL
, Plaster, None, Other TAR paper cover

MATERIAL
White
X Fibrous (Friable), ____ Granular (Soft), or ____ Hard (Concrete-Like)
3" inches

Steel pipe

0.0 DPM

ground Only
e Background ____ cpm Instrument: ____
el: [signature] 11/18/86 Company: Jacobs Engineering
[signature]

WELDON SPRING SITE REMEDIAL ACTION PROJECT (WSSRAP)
Route 2, Highway 94, St. Charles, Missouri 63303
Phone (314) 441-8086 Telex (314) 447-0803

BULK MATERIAL SAMPLING FOR ASBESTOS - FIELD DATA

SAMPLE NUMBER: IN-2000-39 Date: NOVEMBER 18, 1986

SAMPLING LOCATION

Building Number: INTER-BUILDING OVERHEAD UTILITIES
~~Floor~~ NEAREST SUPPORT NO.: 764
~~Room~~ SAMPLING ZONE 9
Construction Drawing 7500-25
Other Elbow - South Section of Run

MATERIAL TYPE

X Pipe Insulation
Pipe Diameter: N A 11 inches
Pipe Type: ~~Steam~~, ___ Ethylene Glycol, X Raffinate,
~~X~~ Other ___
___ Ceiling
___ Floor
___ Wall
___ Boiler Insulation
___ Other ___

COVER OVER MATERIAL

Fiber, Metal, Plaster, None, Other TAR PAPER COVER

DESCRIPTION OF MATERIAL

Color: Yellow
Hardness: X Fibrous (Friable), ___ Granular (Soft), or ___ Hard (Concrete-Like)
Thickness: ≈ 2 inches

COMMENTS FIBER GLASS

Radiation Level
___ Background Only
___ Above Background ___ cpm Instrument: ___

Sample Collection Personnel: K.C. Meyer 11/18/86 Company: Jacobs Engineering

WELDON SPRING SITE REMEDIAL ACTION PROJECT (WSSRAP)
Route 2, Highway 94, St. Charles, Missouri 63303
Phone (314) 441-8086 Telex (314) 447-0803

BULK MATERIAL SAMPLING FOR ASBESTOS - FIELD DATA

SAMPLE NUMBER: IN-2000-40 Date: NOVEMBER 18, 1986

SAMPLING LOCATION

Building Number: INTER-BUILDING OVERHEAD UTILITIES
~~Floor~~ NEAREST SUPPORT NO.: 84
~~Sector~~ SAMPLING ZONE 10
Construction Drawing 7500E20
Other Elbow - Top level

MATERIAL TYPE

X Pipe Insulation
Pipe Diameter: ~4" inches
Pipe Type: X Steam, ___ Ethylene Glycol, ___ Raffinate,
___ Other ___

___ Ceiling
___ Floor
___ Wall
___ Boiler Insulation
___ Other ___

COVER OVER MATERIAL

Fiber, Metal, Plaster, None, Other TAR & foil cover

DESCRIPTION OF MATERIAL

Color: White
Hardness: X Fibrous (Friable), ___ Granular (Soft), or ___ Hard (Concrete-Like)
Thickness: 3" inches

COMMENTS Steel pipe

Radiation Level

___ Background Only
___ Above Background ___ cpm Instrument: ___

Sample Collection Personnel: [signature] 11/18/86 Company: Jacobs Engineering

WELDON SPRING SITE REMEDIAL ACTION PROJECT (WSSRAP)
Route 2, Highway 94, St. Charles, Missouri 63303
Phone (314) 441-8086 Telex (314) 447-0803

BULK MATERIAL SAMPLING FOR ASBESTOS - FIELD DATA

SAMPLE NUMBER: IN-2000-41 Date: NOVEMBER 18, 1986

SAMPLING LOCATION

Building Number: INTER-BUILDING OVERHEAD UTILITIES

~~Floor~~ NEAREST SUPPORT NO.: SL

~~Room~~ SAMPLING ZONE

Construction Drawing 7500-20

Other ~~[illegible]~~ Straight Section of Small Pipe

MATERIAL TYPE

X Pipe Insulation
Pipe Diameter: ~ 4" inches
Pipe Type: X Steam, ___ Ethylene Glycol, ___ Raffinate,
___ Other ___

___ Ceiling
___ Floor
___ Wall
___ Boiler Insulation
___ Other ___

COVER OVER MATERIAL

Fiber, Metal, Plaster, None, Other Tar Paper

DESCRIPTION OF MATERIAL

Color: White Asbestos

Hardness: X Fibrous (Friable), ___ Granular (Soft), or ___ Hard (Concrete-Like)

Thickness: 2" inches

COMMENTS ___

Radiation Level

___ Background Only
___ Above Background ___ cpm Instrument: ___

Sample Collection Personnel: [signature] 11/18/86 Company: Jacobs Engineering

WELDON SPRING SITE REMEDIAL ACTION PROJECT (WSSRAP)
Route 2, Highway 94, St. Charles, Missouri 63303
Phone (314) 441-8086 Telex (314) 447-0803

BULK MATERIAL SAMPLING FOR ASBESTOS - FIELD DATA 18

SAMPLE NUMBER: IN-2000- 42 Date: NOVEMBER 18, 1986

SAMPLING LOCATION

Building Number: INTER-BUILDING OVERHEAD UTILITIES
~~Floor~~ NEAREST SUPPORT NO.: 84
~~Room~~ SAMPLING ZONE 10
Construction Drawing 7500- 20
Other ~~[illegible]~~
22 level - furthest west

MATERIAL TYPE

X Pipe Insulation
Pipe Diameter: 18 inches
Pipe Type: X Steam, ___ Ethylene Glycol, ___ Raffinate,
___ Other ___
___ Ceiling
___ Floor
___ Wall
___ Boiler Insulation
___ Other ___

COVER OVER MATERIAL

Fiber, Metal, Plaster, None, Other Tar paper

DESCRIPTION OF MATERIAL

Color: white
Hardness: X Fibrous (Friable), ___ Granular (Soft), or ___ Hard (Concrete-Like)
Thickness: 3" inches

COMMENTS ___

Radiation Level
___ Background Only
___ Above Background ___ cpm Instrument: ___

Sample Collection Personnel: Kip Mann 11/18/86 Company: Jacobs Engineering

Appendix C

Radiological Contamination of Samples Collected to Measure Asbestos Content of Pipe Insulation at the WSCP

2.06 VEHICLE/EQUIPMENT RELEASE FOR UNRESTRICTED USE CONTAMINATION SURVEY FORM

Property # NA Date 11/19/86 HP C.T. ALSTON

Survey Instrument: LUDLUM GM.C

Meter Model # _____ Probe Model # _____
Meter Serial # _____ Probe Serial # _____
Due for Calibration _____ Background _____ cpm

Detector Area _____ Scintillation Detec. YES NO

Correction Factor _____ Pancake Detec. YES NO

Release Criteria
o Fixed + Removable (By Direct Survey) : 5000 dpm/100cm^2

Counter: LUDLUM ALPHA SCINTILLATION

Scaler Model # 2000 Detector Model # 43-2
Scaler Serial # 35714 Detector Serial # 21449
Due for Calibration _____ Background 3760 (.05) cpm

Detector Efficiency (Eff) 17.2% Th^{230}

o Removable (By Smear) : 1000 dpm/100 cm^2

DIRECT SURVEY

ITEM SURVEYED	LOCATION SURVEYED	GROSS cpm	NET (GROSS-BKG)	TOTAL ACTIVITY dpm/100cm^2 (NET X CF / DETEC. AREA X 100)
ASBESTOS SAMPLE # IN-2000-1	PLANCHET	NA	NA	NA
#5	"			
#6	"			
#9	"			
#10	"			
#11	"			
#13	"			
#30	"			
#36	"			

SMEAR SURVEY

GROSS cpm	NET (GROSS-BKG)	TOTAL ACTIVITY DPM (NET/EFF)	RELEASE	DECON	REMARKS
0.10	0.05	0.4	✓		T_c = 10m.
0.10	0.05	0.4	✓		2σ BKG =
0.20	0.15	1.1	✓		0.06 cpm
0.10	0.05	0.4	✓		
0.00	0.00	0.0	✓		
1.00	0.95	7.2	X		
0.00	0.00	0.0	✓		
0.00	0.00	0.0	✓		
0.00	0.00	0.0	✓		

50 0 50 100

SCALE

MKE DOCUMENT NO. 5121-C-DW-D-01-0

U. S. DEPARTMENT OF ENE

OAK RIDGE, TENNES

DRAWN AMC

CHEMICAL PLAN

CONSTRUCTION

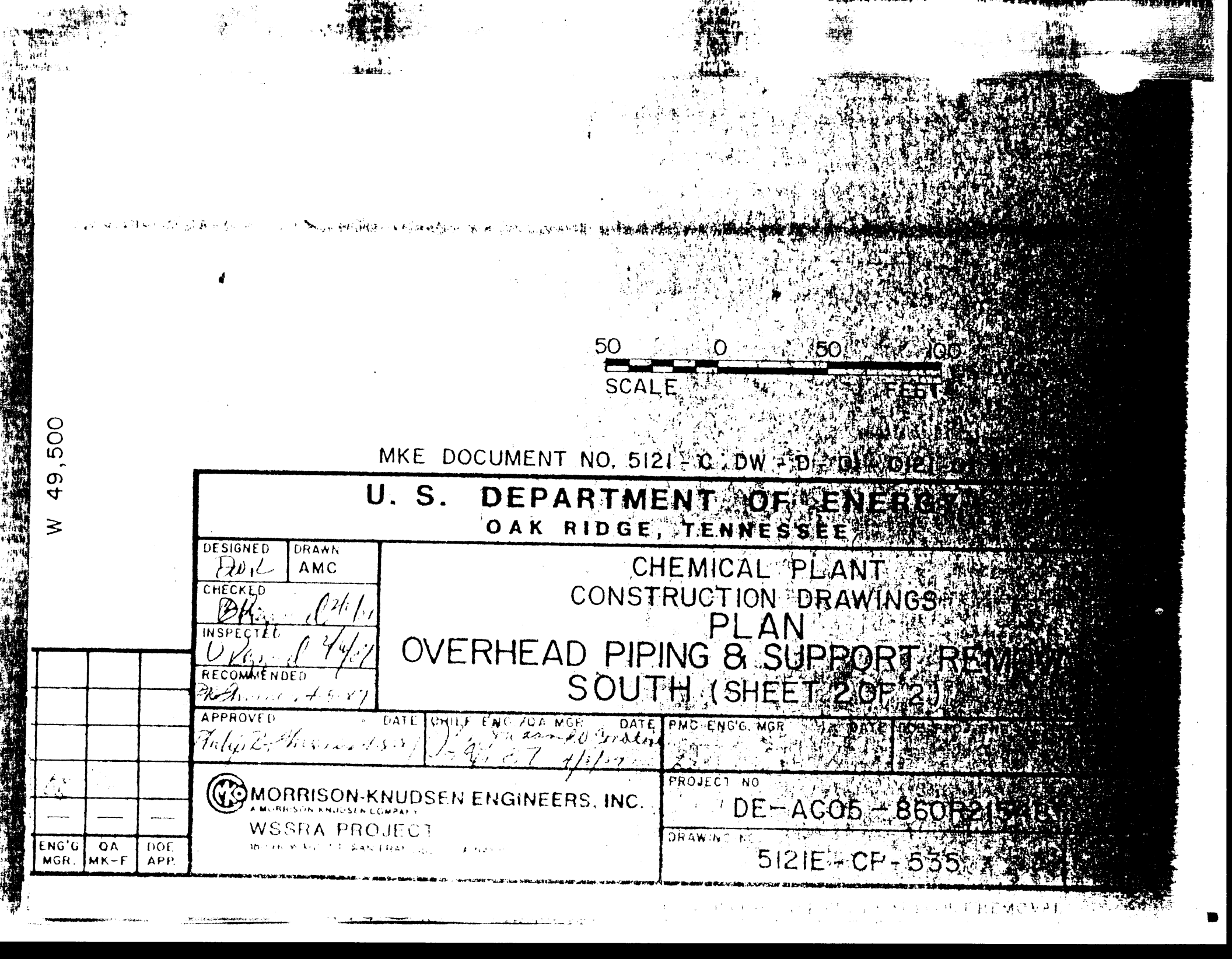
PLAN

OVERHEAD PIPING & SU

NORTH (SHE

DATE | ENGR. | DATE

RISON KNUDSEN ENGINEERS, INC.


50 0 50 100
SCALE FEET
W 49,500
MKE DOCUMENT NO. 5121-C-DW-D-D1-0121-S
U. S. DEPARTMENT OF ENERGY
OAK RIDGE, TENNESSEE
DESIGNED
DRAWN
AMC
CHECKED
INSPECTED
RECOMMENDED
CHEMICAL PLANT
CONSTRUCTION DRAWINGS
PLAN
OVERHEAD PIPING & SUPPORT REMOVAL
SOUTH (SHEET 2 OF 2)
APPROVED
DATE
CHIEF ENG./QA MGR.
DATE
PMC ENG'G. MGR.
DATE
DOE PROJ. ENG.
MORRISON-KNUDSEN ENGINEERS, INC.
A MORRISON KNUDSEN COMPANY
WSSRA PROJECT
PROJECT NO
DE-AC05-86OR21548
DRAWING NO.
5121E-CP-535
ENG'G MGR.
QA MK-F
DOE APP.

MKE DOCUMENT NO. 5121 - C : DW - D - 01 - 0119, -00

U. S. DEPARTMENT OF ENERGY

OAK RIDGE, TENNESSEE

DESIGNED	DRAWN
[illegible]	JMM

CHECKED [illegible] 2/10/87

INSPECTED [illegible] 2/10/87

RECOMMENDED [illegible] 4-8-87

CHEMICAL PLANT
CONSTRUCTION DRAWINGS

EXISTING SITE PLAN

APPROVED	DATE	CHIEF ENG./QA MGR.	DATE	PMC ENG'G. MGR.	DATE	DOE PROJ. ENG.	DATE
[illegible]	4-8-87	[illegible]	4 Apr 87				

MORRISON-KNUDSEN ENGINEERS, INC.
A MORRISON KNUDSEN COMPANY
WSSRA PROJECT
180 HOWARD ST. SAN FRANCISCO, CA 94105

PROJECT NO.
DE-AC05-86OR21548

DRAWING NO.
5121E-CP-533

REV.
0

QA IKE	ENG'G MGR.	QA MK-F	DOE APP.
—	—	—	—

CP - OVERHEAD PIPING & SUPPORT PLAN

MKE DOCUMENT NO. 5121 - C : DW - D - 01 - 0118 - 00

U. S. DEPARTMENT OF ENERGY
OAK RIDGE, TENNESSEE

DESIGNED	DRAWN
[illegible]	JMM/AMC
CHECKED	
INSPECTED	
RECOMMENDED	

CHEMICAL PLANT
CONSTRUCTION DRAWINGS

LOCATION MAP, VICINITY MAP & LIST OF DRAWINGS

APPROVED	DATE	CHIEF ENG./QA MGR	DATE	PMC ENG'G. MGR.	DATE	DOE PROJ. ENG.
[illegible]	[illegible]	[illegible]	[illegible]			

MORRISON-KNUDSEN ENGINEERS, INC.
A MORRISON-KNUDSEN COMPANY
WSSRA PROJECT
180 HOWARD ST. SAN FRANCISCO, CA 94105

PROJECT NO. DE-AC05-860R[illegible]

DRAWING NO. 5121E-CP-53[illegible]

F	QA MKE	ENG'G MGR	QA MK-F	DOE APP.

CP - OVERHEAD PIPING [illegible]