Montana-Dakota Utilities
A Division of MDU Resources Group, Inc.

Bismarck, North Dakota

ENSR

Technical Work Plan of the PCB Management Program

ENSR Consulting and Engineering

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TECHNICAL WORK PLAN OF THE PCB MANAGEMENT PROGRAM

Prepared for

MONTANA-DAKOTA UTILITIES
A DIVISION OF MDU
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Bismarck, North Dakota

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1.0 INTRODUCTION

Montana-Dakota Utilities Co. (MDU), a Division of MDU Resources Group Inc., is a local distribution company which provides retail natural gas and electric service to 251 communities in Montana, North Dakota, South Dakota and Wyoming. The company's numerous gas distribution systems serve 175,000 customers with a peak natural gas load of approximately 304,488 Mcf per day. MDU's natural gas supplies are either purchased from or transported through Williston Basin Interstate Pipeline Company (WBI), a wholly-owned subsidiary of MDU Resources Group Inc.

As a result of national attention regarding existing or potential PCB problems within the gas industry, WBI developed an ongoing PCB testing program to insure that its systems were continuing to operate free of PCBs. This routine monitoring program indicated the presence of PCB concentrations, predominantly Arochlor 1268, above 50 parts per million in liquids collected from one segment of the WBI pipeline facilities. Because WBI and MDU are part of the same corporate family and were not segregated into different operating entities until 1985, MDU was notified. Since notification, MDU and WBI have undertaken an extensive sampling program to further define the nature and extent of the PCB presence.

MDU and WBI determined that certain valves purchased from Rockwell International, were likely delivered from the factory containing a sealant which contained PCBs as Arochlor 1268. The use and presence of Arochlor 1268 is relatively uncommon as compared to species used in the paper and electrical industries. After further investigation, it was also determined that some of the maintenance sealant purchased from Rockwell was of the same formulation.

The sealant is a semi-solid petroleum based lubricant. Lubrication is essential for proper operation of Rockwell plug valves, and sealant must be replaced when depleted from valve surfaces due to conditions of temperature, pressure and frequency of operation. Rockwell sealants designated as Lubricant 860 and 991 contain high levels of Arochlor 1268.

Under normal distribution system operating conditions, PCBs will not migrate from the sealant to areas beyond the valves. However, when a valve is exposed to natural gas condensates, the dissolution of the sealant may occur allowing the PCBs to migrate with the condensate. MDU has determined that discrete portions of some of its systems exhibit the presence of PCBs as a result of this process.

MDU has initiated a program to assess the extent of PCBs in its distribution systems for the purpose of preparing and implementing a remediation program. This technical work plan outlines MDU's approach to management of the PCBs.

1.1 Purpose

The purpose of this work plan is to provide a description of the methods and procedures to be followed in conducting PCB management activities for the MDU facilities. This work plan includes:

- a summary of available data;
- a description of the condensate handling program;
- a description of the equipment handling program; and
- an approach to evaluate distribution systems.

This work plan also delineates the necessary supporting documents to assure the quality of information to be obtained, along with the health and safety requirements of those implementing this work plan.

1.2 Goal

It is the goal of MDU to contain, reduce or eliminate PCBs from all MDU distribution systems in a technically sound and cost effective manner while complying with applicable laws and regulations.

1.3 Current Status

MDU has established a program to assure the orderly progress to meet the above goal, and activities are currently underway to prevent PCB exposure to workers, the public and the environment.

1.3.1 Health and Environment

The safety of the public and the distribution systems employees is important to MDU. MDU has evaluated the potential risks of PCB exposure to the public, the distribution systems employees, and the environment. The evaluation included internal operational and sampling information, as well as data from a U.S. Environmental Protection Agency (EPA) study of pipeline contamination in the northeastern United States (EPA 1984). Based on this evaluation, a risk assessment is not necessary. This evaluation is attached in Appendix A.

MDU has had an active PCB management program for its electric operations since the 1970's. This program has provided for the systematic removal of PCBs from electric system equipment, and includes worker training, proper storage procedures, inspections, and reporting. Because of this program, MDU has considerable experience regarding the appropriate handling and disposal of PCBs. After the discovery of PCBs in the gas distribution systems, information on handling PCBs in gas line liquids was added to the company's Hazard Communication Program. MDU has conducted worker safety training programs for gas personnel who may be exposed to PCBs in handling condensate, meters, removed pipe, or valve grease. This program is designed to ensure that personal protective equipment is utilized when potential PCB exposure exists.

Additionally, MDU has provided specific written guidance to employees on the procedures to be followed in situations where PCB exposure is possible. This guidance provides basic information on the nature and characteristics of PCBs along with procedures for controlling potential migration routes from distribution system facilities.

1.3.2 Regulatory Evaluation

MDU has conducted an evaluation of all relevant regulatory requirements related to the use and handling of PCB containing fluid, equipment, and materials. This work plan complies with pertinent requirements for:

- cleaning,
- disposal,
- labeling,
- transportation, and
- storage.

1.3.3 PCB Sampling Program

In establishing a database for work plan development, MDU has collected and analyzed samples of materials for PCBs. This database includes samples of condensate and grease from all natural gas distribution operating divisions. Natural gas samples were collected from one division where PCBs had been identified in condensate. A summary of this information is provided in Section 2.0.

1.3.4 Condensate Collection and Handling Program

Since PCBs are generally only mobile when contained in natural gas condensates, MDU has instituted a program to ensure the proper collection, handling, and/or disposal of such condensates.

1.3.5 Equipment Remediation

As an alternative to disposal, MDU is investigating a program to remove PCBs from affected distribution systems equipment taken out of service. MDU is currently evaluating the most efficient and cost effective techniques for the removal of PCBs from valves, meters, pipes, and fittings. This approach will assure that reuse of such equipment will not reintroduce PCBs into distribution system facilities.

1.3.6 Quality Assurance Project Plan

The QAPP will be applied throughout the entire sampling and analysis program and will include the following QA/QC procedures: 1) sample collection, handling, and preservation; 2) laboratory analyses; 3) data validation, management, and interpretation.

Specific activities will include: data quality objectives, glassware preparation, sampling equipment preparation, surface soil, valve grease sampling, condensate sampling, field documentation, PCB analytical procedures, and applicable QA/QC procedures (i.e., surrogate compounds, precision, accuracy, completeness and documentation).

Standard operating procedures (SOPs) are currently in place for many of the sampling and analysis procedures used by MDU and WBI. Procedures and methods not having a specific SOP will be identified, and SOPs will be prepared accordingly.

2.0 SUMMARY OF AVAILABLE DATA

MDU has analyzed samples for the presence of PCBs from various locations throughout the MDU distribution systems. The following subsections provide a description of the sample and source characteristics, the analytical results, analytical methods, and data evaluation.

2.1 Sample and Source Characteristics

The samples have been categorized into three sample types. A description of the sample types and respective sources is provided below:

- Grease. This is a semi-solid petroleum lubricant/sealant used in lubricated plug valves in the natural gas distribution systems. Samples of grease have been collected from two primary sources: 1) grease from in-service valves located at regulator stations, meter settings, and various points in the distribution systems; and 2) grease guns used to service the valves.

- Condensate. This is the hydrocarbon liquid product which separates from natural gas as a result of temperature and pressure changes within the distribution pipelines. This may also include oily liquids, water, glycol, and alcohol in varying amounts. Condensate samples have been collected from meters, gas/condensate separation equipment (e.g., drips, scrubbers, knockouts), and from condensate storage equipment.

- Gas. This is the natural gas transported as product throughout the MDU systems. Natural gas consists primarily of methane with minor amounts of ethane, propane, butane, and higher hydrocarbons. Gas samples were collected from utilization points.

2.2 Analytical Results by Sample Type

A summary of the analytical results are presented by sample type in Table 2-1. A complete printout of the analytical database is presented in Appendix B. The analytical results of each sample type are discussed below.

2.2.1 Grease Gun Analytical Results

A total of 41 samples of grease were collected from hydraulic grease guns and analyzed for the presence of PCBs. Of these, 30 grease samples contained less than 2 ppm PCBs. An

TABLE 2-1

MDU Results for All Sample Types Analyzed for PCBs

Sample Type	Total Number of Samples Analyzed	Number of Samples			
		Samples <DL (ppm)[1]	≥DL and <50 (ppm)	50-499 (ppm)	≥500 (ppm)
Grease					
Grease Guns	41	30	5	3	3
In-Service Valves	87	54	22	5	6
Condensate	25	12	8	5	0
Gas (Orbo Tube)	2	2	0	0	0
TOTAL	155	98	35	13	9

[1]DL - Detection Limit.

additional five grease samples contained between 2 and 50 ppm PCBs. Three grease gun samples contained concentrations between 50 and 499 ppm PCBs, and three samples contained concentrations greater than 500 ppm PCBs. The predominant species of PCBs has been identified as Arochlor 1268. Minor amounts of Arochlors 1242, 1254, and 1260 are also present.

2.2.2 In-Service Valve Grease Analytical Results

A total of 87 samples of grease were collected from in-service valves and analyzed for the presence of PCBs. Fifty-four of these samples contained concentrations of less than 2 ppm PCBs, and an additional 22 valve samples contained concentrations between 2 and 50 ppm. Five samples contained PCB concentrations between 50 and 499 ppm, and six samples contained concentrations above 500 ppm. The predominant species of PCBs has been identified as Arochlor 1268. Minor amounts of Arochlor 1242, 1254, and 1260 are also present.

2.2.3 Condensate Analytical Results

A total of 25 samples of natural gas condensate were collected and analyzed for the presence of PCBs. Twelve of these 25 samples contained concentrations of PCBs less than 2 ppm PCBs. Eight samples contained between 2 and 50 ppm PCBs, and five samples contained concentrations between 50 and 499 ppm. No condensate samples contained concentrations above 500 ppm PCBs. Again, the predominant species of PCBs has been identified as Arochlor 1268. Minor amounts of Arochlor 1242, 1254, and 1260 are also present.

2.2.4 Gas Analytical Results

A total of two gas samples were collected and analyzed for the presence of PCBs. Neither of these samples contained quantifiable amounts of PCBs. Gas samples are identified as "Orbo-Tube" in the analytical database.

2.3 Analytical Results by Operating Division

The MDU gas distribution systems are divided into seven operating divisions. These divisions include the Billings, Black Hills (Rapid City), Glendive, Williston, Minot, Dickinson, and Bismarck divisions and are depicted on the division map provided in Appendix C. An eighth division, Mobridge, is also shown on the map. This division is excluded from the following discussion because operations are limited to electrical utilities.

A summary of analytical results by operating division is provided in Table 2-2. The following subsections provide details for samples that have been analyzed.

TABLE 2-2

Analytical Results for All Sample Types by Operating Division

Division	Total Number of Samples Analyzed	Number of Samples			
		<DL (ppm)[1]	≥DL and <50 (ppm)	50-499 (ppm)	≥500 (ppm)
Grease Guns					
Billings	4	4	0	0	0
Bismarck	5	1	0	2	2
Black Hills	16	14	2	0	0
Dickinson	4	2	1	1	0
Glendive	2	1	1[2]	0	0
Minot	4	3	1[2]	0	0
Williston	6	5	0	0	1
Total	41	30	5	3	3
Valve Grease					
Billings	14	8	4	0	2
Bismarck	18	13	3[2]	1	1
Black Hills	6	4	1	1	0
Dickinson	11	8	2	0	1
Glendive	12	8	1	2	1
Minot	17	9	7	0	1
Williston	9	5	3	1	0
Total	87	55	21	5	6

TABLE 2-2 (CONTINUED)

Division	Total Number of Samples Analyzed	Number of Samples			
		<DL (ppm)[1]	≥DL and <50 (ppm)	50-499 (ppm)	≥500 (ppm)
Condensate					
Billings	2	2	0	0	0
Bismarck	10	4	3	3	0
Black Hills	4	3	1	0	0
Dickinson	3	1	1	1	0
Glendive	2	1	0	1	0
Minot	4	1	3	0	0
Total	25	12	8	5	0
Gas					
Bismarck	2	2	0	0	0
Total	2	2	0	0	0

[1]DL = Detection Limit

[2]Samples exhibited <2 ppm PCBs.

2.3.1 Grease Gun Distribution

Grease guns sampled as part of this program consisted of guns located at the time of sampling in each of MDU's seven operating divisions. A total of 41 grease samples collected and analyzed from grease guns are included in this Work Plan. Duplicate samples were collected from each grease gun and only the highest value for each is included in the database. All of MDU's grease guns have been sampled.

Analytical results of grease samples taken from four grease guns in the Billings division indicated PCB concentrations of less than 2 ppm.

A total of five grease guns were sampled from the Bismarck division. Two of these samples contained PCBs in excess of 500 ppm. Two other samples contained PCBs in concentrations between 50 and 499 ppm. The remaining sample contained less than 2 ppm PCBs.

Analytical results of grease samples taken from 16 grease guns in the Black Hills division indicate that all of the samples contained PCBs below 50 ppm. Fourteen of these samples contained less than 2 ppm PCBs.

One of the four grease samples collected from grease guns in the Dickinson division contained PCBs between 50 and 499 ppm. One sample contained 11 ppm PCBs, while the remaining two samples contained less than 2 ppm PCBs.

Two grease guns were sampled in the Glendive division. Both samples contained less than 2 ppm PCBs.

Grease samples from four grease guns in the Minot division were collected and analyzed for the presence of PCBs. All four samples contained less than 2 ppm PCBs.

A total of six grease guns from the Williston division were sampled and analyzed for the presence of PCBs. Analytical results indicate the PCB concentration of one sample was in excess of 500 ppm. The remaining five samples contained less than 2 ppm PCBs.

2.3.2 In-Service Valve Grease Distribution

Valve grease was analyzed from 87 in-service valves located at various points throughout the distribution systems. Samples were collected from each of the seven operating divisions.

Of the 14 valve grease samples taken from the Billings division, two samples contained PCBs in concentrations above 500 ppm. Twelve samples exhibited PCB levels less than 50 ppm, with eight of these samples containing less than 2 ppm PCBs.

A total of 18 grease samples were collected from in-service valves in the Bismarck division. One sample exhibited PCBs in excess of 500 ppm, and one other sample exhibited PCBs between 50 and 499 ppm. The remaining sixteen samples contained less than 50 ppm, with 13 samples containing less than 2 ppm PCBs.

Six samples were collected from the Black Hills division. One of these samples contained between 50 and 499 ppm PCBs, and one other sample contained 9.9 ppm. The remaining four samples contained less than 2 ppm PCBs.

Analytical results of grease samples taken from 11 in-service valves in the Dickinson division indicate that one of the samples contained PCBs in excess of 500 ppm. The remaining 10 samples contained less than 50 ppm PCBs, with eight of these containing less than 2 ppm PCBs.

One of the 12 grease samples collected from in-service valves in the Glendive division contained PCBs in excess of 500 ppm. Two of these 12 samples contained between 50 and 499 ppm PCBs, while the remaining nine samples contained less than 50 ppm, with eight of these containing less than 2 ppm.

Grease samples from 17 in-service valves were collected from the Minot division. One sample contained a PCB concentration greater than 500 ppm. The remaining 16 samples contained PCBs in concentrations less than 50 ppm, with nine of these samples containing less than 2 ppm.

A total of nine in-service grease samples were collected from the Williston division. One sample exhibited a PCB concentration between 50 and 499 ppm. The remaining eight samples contained less than 50 ppm PCBs, with five of these samples containing less than 2 ppm.

2.3.3 Condensate Sample Distribution

A total of 25 natural gas condensate samples were collected and analyzed for the presence of PCBs. Condensate samples were collected from all natural gas operating divisions with the exception of the Williston division where condensate was not available for sampling.

Two condensate samples were collected in the Billings division. Both samples contained less than 2 ppm PCBs.

A total of 10 samples were collected from the Bismarck division. Analytical results indicate that three samples contained between 50 and 499 ppm PCBs. The remaining seven samples contained less than 50 ppm, with four of these samples containing less than 2 ppm.

Four condensate samples were collected from the Black Hills division. One sample contained 19 ppm PCBs, while the remaining three samples contained less than 2 ppm PCBs.

One of the three condensate samples collected from the Dickinson division contained PCBs between 50 and 499 ppm. One sample contained 24 ppm PCBs and the other sample contained less than 2 ppm.

Two condensate samples were obtained from the Glendive division. One sample exhibited PCBs between 50 and 499 ppm, and the other sample contained less than 2 ppm PCBs.

Analytical results of the four condensate samples taken from the Minot division indicated PCB concentrations below 30 ppm, with one of these samples containing less than 2 ppm.

2.3.4 Gas Sample Distribution

The two natural gas samples analyzed for the presence of PCBs were collected from delivery points within the Bismarck division. PCBs were not identified in either of the gas samples.

2.4 Analytical QA/QC Summary

The majority of analytical work has been performed in WBI's laboratory. In order to ensure the proper performance of all analytical work and the development of representative data, a QA/QC program was implemented. The major aspects of this program are discussed below.

2.4.1 Sampling QA/QC

Sampling QA/QC includes the preparation of written SOPs for use by field personnel in the collection of samples from the various media. It also includes chain of custody (COC) procedures and the use of a field data sheet. The quality and integrity of each sample has been further assured through the use of field sampling kits which are prepared by WBI's analytical laboratory located in Glendive, Montana. Each kit contains a 40-50 ml wide mouth bottle with a foil lined cap, latex gloves, sample labels, COC forms, ziploc bags, field data forms, and a copy of the sampling SOP.

Collected samples are packaged to prevent breakage and sent to the WBI laboratory. Copies of the COC's and field data sheets are maintained.

2.4.2 Analytical QA/QC

Analytical QA/QC includes the use of written SOPs for the extraction and analysis of the samples of various matrices by gas chromatography (GC). The SOP for analysis by GC follows ASTM standard procedures D3304-83 and D4059-86. The GC instrument is a Hewlett-Packard Model 5713A. Sample information is controlled both by a manual entry laboratory log book and a computerized system. Results of PCB concentrations and curves for each PCB Arochlor are computer generated. The concentration data are recorded in the master log book and entered into the computer. The computer generates a spreadsheet which includes sample number, location, collector, and collection date.

The GC instrument is calibrated using three different standards and a blank. Working standards are prepared from primary standards supplied by EPA. A calibration curve is generated for each batch of samples (typically there are 20 to 40 samples per batch). Duplicate samples are analyzed at a rate of 10 percent or one per batch of less than 10 samples.

Other QA/QC activities include the calibration and maintenance of the analytical balance (Mettler Model HL52), use of high grade solvent (iso-octane etc.), routine maintenance of the GC, and use of EPA approved glassware cleaning procedures. Original data reports are filed in the analytical laboratory.

2.5 Discussion of Analytical Results

A total of four Arochlor species were detected in samples collected from the MDU systems. Of these four species, three (Arochlors 1242, 1254, and 1260) were found at relatively low concentrations in a limited number of samples.

The predominant species of PCBs detected in the various grease samples has been identified as Arochlor 1268. Based on WBI analytical results obtained to date, the source of this contaminant is believed to be certain sealants manufactured by Rockwell International. WBI samples of Rockwell 860 and Rockwell 991 sealants exhibited Arochlor 1268 concentrations in excess of 50 ppm. A limited number of grease samples collected from MDU grease guns and in-service valves also exhibited Arochlor 1242, 1254, and 1260 levels above 50 ppm.

The presence of Arochlors 1242, 1254, and 1260 at low levels in a small number of samples may indicate:

- limited transport of PCBs from other sources at interconnect locations,
- aging of Arochlors from 1268 to less saturated species, or
- masking of GC fingerprints by the presence of carboxylicacids in a grease matrix.

Gas samples have been collected from the Bismarck division. The analysis of the gas samples indicates that PCBs are not present in the gas transported in the MDU distribution systems. For this reason, the transport of PCBs in the gas stream appears to be highly unlikely. This finding is consistent with other studies relating to PCBs in natural gas (EPA 1984).

PCBs have not been identified above 500 ppm in natural gas condensates in any of MDU's operating divisions. PCBs have been detected between 50 and 499 ppm in natural gas condensate from three operating divisions, specifically, the Bismarck, Dickinson, and Glendive divisions.

3.0 CONDENSATE HANDLING PROGRAM

3.1 Condensate Collection Program

As discussed in Section 1.0 the primary route for the potential migration of PCBs from the grease matrix to workers, the public, and the environment is the dissolution of the grease by distribution system condensates. Therefore, MDU has supplemented their existing condensate management program to provide an even more aggressive and comprehensive approach to ensure the appropriate containment and disposal of condensates. This program is designed to provide assurance that condensate which occurs in the distribution systems is collected, contained, and disposed in an environmentally sound manner.

MDU collects condensate where it occurs in the distribution systems, however, very little condensate is present in MDU distribution systems. A collection program has been in place since condensates interfere with the efficient distribution of natural gas. MDU has provided training for field personnel on the proper handling of liquids which have the potential to contain PCBs. At those locations of the distribution systems where detectable levels of PCBs have been identified in pipeline liquids, MDU personnel will collect and store all liquids in accordance with requirements of 40 CFR 761. At those locations where PCBs have not been identified, the condensate collected will not be handled as PCBs until they arrive at a storage facility. However, in order to protect employees and the environment, all condensate and oily liquids will be collected, stored, and disposed as per the requirements of 40 CFR 761.

MDU will utilize existing storage facilities or construct new facilities as necessary to provide proper storage of all condensate potentially containing PCBs. MDU has seven PCB storage areas that meet the requirements of 40 CFR Part 761.65. MDU currently has in place a PCB Spill Prevention Control and Countermeasure (SPCC) Plan for all storage areas.

Specific steps to be followed by MDU personnel are as follows:

1. All condensate from areas tested where regulated levels of PCBs have been found, are considered to be PCB containing and may be mixed for storage and disposal, based on the requirements for the highest level of PCBs assumed to be present prior to mixing fluids.

2. When several condensate collection points are located at one site, all condensate will be accumulated in one container and one sample collected.

3. Condensate from untested locations within individual MDU distribution systems may be mixed in a common container, but the resultant mixture will be handled as if it contains a concentration of 50 ppm PCBs.

4. If any condensate with a PCB content of 500 ppm or greater is added to a bulk container, the contents of the entire container must be considered to have a content of 500 ppm or greater PCBs.

5. Condensate from tested locations will be assumed to be of the concentration of the initial test, unless and until MDU resamples the location, or has reason to believe the nature of the liquid has changed.

6. Condensate from areas tested and found to contain less than regulated levels of PCBs will be retested at intervals to verify that they remain unregulated.

7. Condensate will be collected in appropriate drums, until full, and then transported to the nearest PCB storage facility. If temporary storage is necessary, the storage area will have a SPCC plan developed prior to any storage of PCB containing materials. The material will be removed to a permanent storage area within 30 days.

Condensate from gas operations will be segregated from electric operations PCB wastes until such time as they are characterized and proper disposal procedures are selected. Any spilled condensate suspected of containing PCBs will be handled in accordance with the spill cleanup requirements of 40 CFR Part 761.120.

3.1.1 Compliance Monitoring

MDU will implement a condensate collection compliance monitoring program to periodically inspect all distribution system facilities which store or collect condensate and all system locations where liquids may potentially exit the distribution systems. The monitoring program will provide the information necessary to ensure all collection procedures are effective and are properly implemented by MDU field personnel. The program will be conducted by MDU division supervisors under the coordination of the MDU environmental staff.

MDU has sampled condensate where it occurs throughout the distribution systems (see Section 2.0). One additional sample will be collected in areas where no regulated level of PCBs has been identified in condensate. If the additional test confirms there are no PCBs present above regulated levels, monitoring will be discontinued for those systems. Condensate from

areas initially found to contain regulated levels of PCBs will be managed as containing PCBs at the level of the most recent test, until and unless MDU determines that the area contains PCBs below regulated levels.

3.1.2 Recordkeeping

MDU will prepare records of the condensate volumes collected at each collection point. These volume records will be used to monitor condensate quantities within the MDU systems. MDU will maintain all records for the storage of PCBs as required by 40 CFR Part 761.65.

4.0 EQUIPMENT MANAGEMENT

The equipment management program provides the procedures and controls to safely handle, store, remove, transport, clean, and return to service or dispose of distribution systems equipment which may contain PCBs. The following subsections discuss these procedures.

4.1 Equipment Handling and Storage Plan

The equipment handling and storage plan addresses two categories of equipment:

- equipment currently stored in MDU warehouses; and
- equipment currently in service.

Distribution equipment currently in service will remain in service until removed as part of MDU's routine maintenance or replacement programs. Equipment removed from service will be drained of all free liquids, which will be collected and stored in accordance with procedures described in Section 3.0. The equipment will then be handled as potentially PCB-containing equipment and tested for PCBs. Based on results of the testing, the equipment will be returned to service, cleaned or disposed of in accordance with 40 CFR Part 761.

All valves potentially lubricated with PCB-containing Rockwell sealant currently stored in MDU warehouses will either be disposed in accordance with 40 CFR Part 761 or sampled according to section 4.2 to determine the level of PCB content.

MDU will use existing PCB storage facilities or construct a new structure(s), if necessary. The PCB storage facilities will meet the following criteria:

- adequate roof and walls to eliminate rain water;
- impervious floor with continuous curbing having a containment volume at least two times the internal volume of the largest PCB container or 25 percent of the total volume of all PCB containers, whichever is greater;
- no drain valves, floor drains, expansion joints, sewer lines, or other openings within the curbed area; and
- site location above the 100-year flood water elevation.

4.2 Equipment Classification

4.2.1 Valves

4.2.1.1 Used Lubricated Plug Valves

All lubricated plug valves suspected of containing PCBs will be classified as salvageable or not salvageable. Equipment which MDU intends to reuse will be sampled either individually, or by combining equal amounts of sealant from up to five valves. If the results of the composite samples indicate that any one of the sampled valves contain PCB concentrations above 50 ppm, all the sampled valves will be classified as PCB equipment. For example, if five valves are sampled, and the composite sealant contains above 10 ppm PCBs, all five valves will be classified as PCB equipment.

Where the salvage value of a valve is less than the cost of sampling, MDU may elect to classify certain valve groups as PCB equipment without any analysis. This PCB equipment will be properly disposed according to 40 CFR Part 761.

4.2.1.2 New Lubricated Plug Valves

MDU presently has lubricated valves in stock as inventory. Some of these valves were purchased new and have not yet been placed in service. Other in-stock valves have been retired from previous service and have been reclaimed for reuse. Except for those valves which were recently purchased and placed in stock it is difficult to determine the exact vintage of each inventoried valve in stock. Therefore it is not possible to determine by vintage which valves may have been lubricated with a sealant containing PCBs except for those recently purchased.

In the absence of simply testing actual sealant samples taken from every lubricated valve that MDU has in inventory (except for those unused valves which can be verified by records as being purchased after January 1, 1990) it is impossible to know with certainty which in-stock valves are not free of PCBs. It is expected, however, that the vast majority of MDU's on-the-shelf valves are free of PCBs. Until proven otherwise, MDU is taking the position that all inventoried valves which were purchased prior to January 1, 1990 are assumed to contain PCBs. New valves in stock which were purchased after January 1, 1990 will be considered to contain less than 50 ppm PCBs in the valve lubricant, and will be used as necessary in the distribution systems.

Valves in stock purchased prior to January 1, 1990, will be sampled on the same basis as used valves and treated accordingly, depending on analysis of the valve grease or lubricant.

Lubricated valves containing PCB concentrations greater than 50 ppm may be cleaned or disposed as PCB articles, depending on economic factors.

4.2.2 Meters and Regulators

Dry meters and regulators removed from service under normal maintenance schedules will be handled as PCB free and will be returned to service. When meters or regulators removed from service in the course of normal maintenance are found to contain liquids, the equipment will be contained and transported to the maintenance area for draining and sampling. The equipment and liquids will be handled as if they contained PCBs, pending analytical results.

Liquids from meters and regulators will be handled according to the procedures outlined in Section 3.0. Depending on the replacement cost of the meters, and the PCB concentration levels, if detected, one of the following options will be selected:

- clean in accordance with 40 CFR Part 761.79,
- dispose in accordance with 40 CFR Part 761.60,
- remediate according to an alternative approved technology, or
- return to service.

4.2.3 Hydraulic Grease Guns

MDU conducted a sampling program to evaluate PCB levels in all 41 hydraulic grease guns used to maintain valves in the distribution systems. Only six of these grease guns were found to contain PCB concentrations of greater than 50 ppm. MDU has handled all six guns in accordance with 40 CFR 761. They are currently being stored for cleaning and reuse in the distribution systems.

4.2.4 Pipe Classification

4.2.4.1 Removed Pipe in Existing Stockpiles

Presently, MDU has less than 3,000 feet of stockpiled pipe in six division pipe yards. This pipe is completely dry of any liquid, and will either be sold as scrap metal, or cut up and used by MDU for meter barriers and/or protective fences.

4.2.4.2 Pipe to be Removed or Abandoned in Place

It is the general practice in MDU's replacement projects to abandon distribution mains and services in place in the ground, after capping the pipe ends. Exceptions to this practice occur occasionally when the abandoned pipe interferes with the new gas distribution mains or with other utility or street grading projects. Economics and public inconvenience often supports leaving the abandoned pipe in place since, in most cases, replacement pipe is installed in a different location. In many replacement projects, new pipe is installed in alleys, whereas in the past, pipe was installed in streets.

For pipe which is to be abandoned in place the following procedures will be implemented:

- Open pipe ends, at tie-in points for replacement pipe, will be inspected for evidence of condensate or liquids. Where such tie-in points are more than one city block apart, an inspection will be made at intervals not to exceed one city block to determine the presence, if any, of condensate or liquids. If no condensate or liquids are found at pipe ends, or at one block interval inspection points, the pipe ends will be capped and sealed.

- If liquids are found at the open pipe ends or at the other inspection locations, the liquid will be drained and placed in approved containers. Prior to capping the ends of the pipe, an absorbent swab will be pulled through the pipe and any residual liquids collected. A sample of the liquids will be analyzed for PCBs. If analysis indicates that liquids contain PCB concentrations greater than 500 ppm, MDU will follow the requirements specified in 40 CFR 761.60 (b)(5) for disposal of the pipe. An approved alternative method of disposal, or cleaning may be considered. If the liquids contain less than 500 ppm PCBs, the pipe will be disposed in place.

For pipe which is to be removed from the ground (i.e., not abandoned in place), the following procedures will be implemented (see Figure 4-1):

- Pipe sections in which no liquids are found will be available for salvage or reuse.

- If liquids are found they will be drained prior to the removal of the pipe. The liquids will be placed in approved containers for disposition. A sample from each location where liquids are recovered will be analyzed for PCBs. If the liquids contain PCBs in excess of 50 ppm, they will be handled as outlined in Section 3.0.

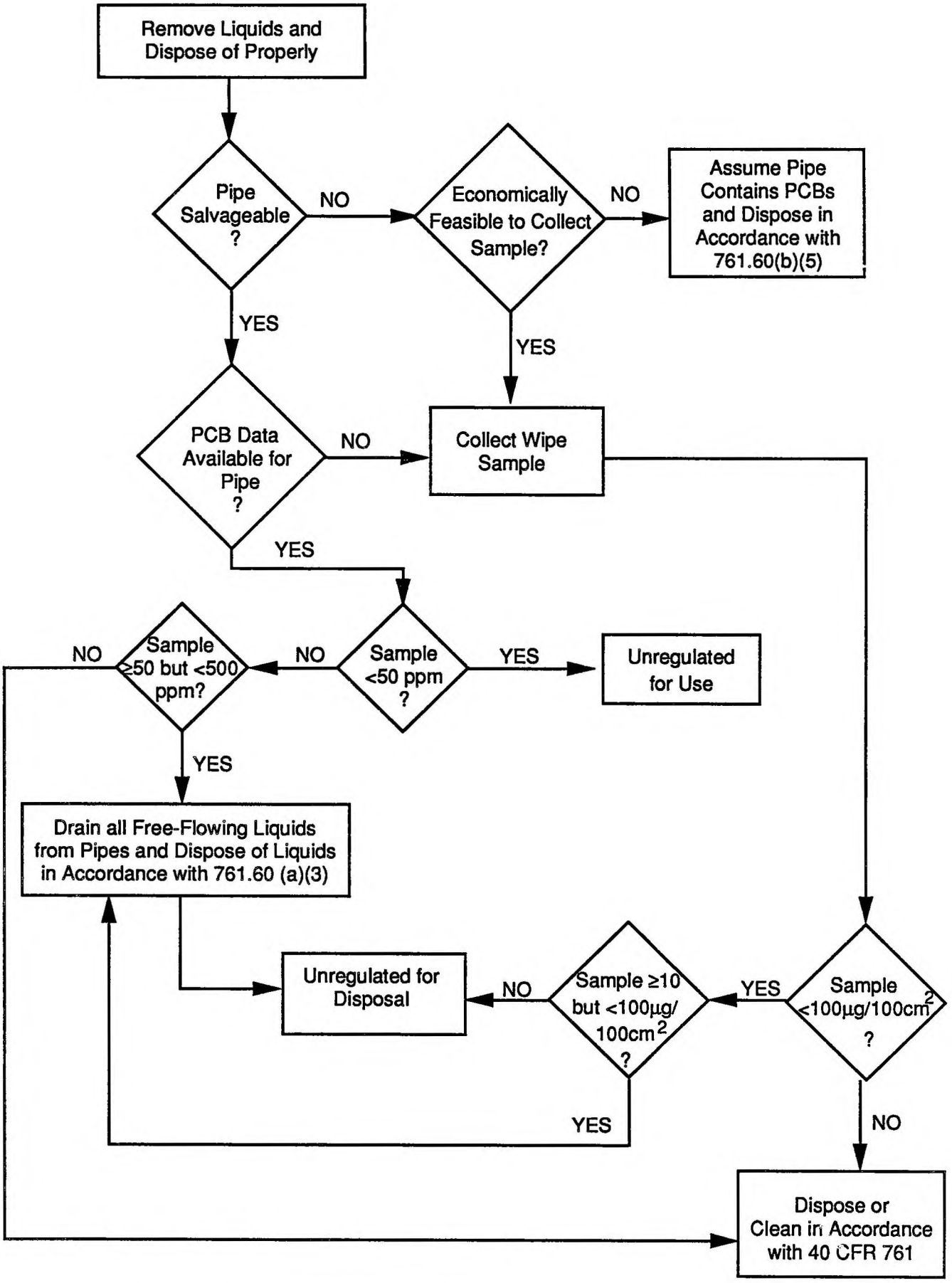

Figure 4-1. Pipe Handling Procedure

- Pipe sections from which liquids have been drained will be cut into joints approximately 40 feet in length. The open pipe ends will be temporarily capped and the pipe will be transported to the division pipe yard and stored to await analysis of the liquids.

- If analysis of the liquid removed from the pipe indicates PCB concentrations at levels less than 50 ppm, the pipe will be handled and transported for salvage or reuse.

- If the analysis indicates PCB concentrations in excess of 50 ppm, the following procedures will be completed before disposing of or re-using the pipe:

    - Disposal will be in accordance with 40 CFR 761.60(b)(5)(i) or (ii), or pipes will be cleaned using a permitted process.

    - The capping method will be determined by the project supervisor to ensure that the pipe interior is not exposed during handling, transportation, and storage.

    - Each pipe end will be capped with a welded metal plate, insert, compression fitting or polyethylene plastic covering.

4.3 Equipment Cleaning Program

All equipment classified as PCB equipment and salvageable by MDU will be cleaned if feasible. Those items of equipment which have been in contact with PCB containing grease or condensate will be cleaned using effective procedures.

The cleaning process for equipment which has been in contact with condensate containing PCBs will be a triple solvent rinse, as described in 40 CFR Part 761.79, or an alternative approved technology.

4.4 Equipment Disposal Program

All equipment classified as non-salvageable and potentially containing PCBs will be properly stored prior to disposal. This equipment will be transported with a manifest to a licensed disposal facility within one year of placement in storage.

5.0 DISTRIBUTION SYSTEMS EVALUATION

MDU has initiated a condensate sampling program in all of its distribution systems where condensate collection facilities exist to collect the liquids and where condensate has historically been found. In addition, meters removed from service are checked for the presence of liquids which if found, are analyzed for PCBs. The location on the distribution systems from which the meter was removed is recorded.

All MDU grease guns used to lubricate plug valves have been evaluated and tested for the presence of PCBs and those guns exhibiting PCB concentrations in excess of 50 ppm have been removed from service. The location of PCB containing guns is being studied to determine the extent of past possible use by operating division and town. This data, when analysis is complete, will be used to evaluate individual distribution system contamination potential and possible migration of condensate from any exit points.

5.1 Work Plan Development

Based on evaluation of the data, MDU will prepare a Soil Sampling Plan, if warranted, to assess potential PCB exposure of the soil in the immediate area of distribution facilities where condensate has been collected and removed from the systems. The Plan will detail the soil sampling activities and provide an implementation schedule.

6.0 REFERENCES

U.S. Environmental Protection Agency. 1984. Final Report: Exposure Assessment for Incidentally Produced Polychlorinated Biphenyls.

HEALTH AND ENVIRONMENT

Introduction

Although PCB contamination was found in gas pipeline systems in the early 1980's, the primary source for PCBs has been oils used in compressor stations. Recently, however, polychlorinated biphenyls (PCBs) have been found in valve grease used in some areas of the WBI and MDU systems. This grease is a potential "source" of contamination.

The grease is not transported by natural gas, but may be partially dissolved and transported by hydrocarbon liquids sometimes found in a gas pipeline. Thus a secondary source has been identified as the contaminated condensate liquids found at various points in the systems.

Potential pathways for PCB exposure include the natural gas traveling through the pipeline, and any solid or liquid materials which can become contaminated, either inside or outside the pipeline. Potential receptors include the pipeline employees, the public, and the environment.

Risk To The Public

A public risk assessment need not be completed because a credible pathway for PCB exposure cannot be identified. For the public to be exposed through the air pathway, three conditions are required: 1) PCBs must be present; 2) they must be volatilized from condensate or grease; and 3) for contaminated gas to contaminate the actual breathing air, PCBs (if present in the gas) must survive combustion in a flame. Only small flames, such as pilots or stove burners are applicable in this case since gas furnaces provide heat through heat-exchangers and they provide no direct exposure to the combusted gas.

The first condition for the air pathway model is met because PCBs have been identified in the grease and condensate of some line segments. However, the second condition, volatilization, has not occurred. Sampling by MDU and WBI has identified no significant levels of PCBs in the gas stream.

This outcome is expected since volatilization of PCBs requires a high temperature, or a liquid solvent to carry PCB's in the gas stream. PCBs have a very low volatility, especially at pipeline temperatures (summer: 60°F, winter 28°F). This fact combined with the low exposure cross-section of grease to the gas stream, makes volatilization extremely unlikely.

Presently, there is no evidence that contaminated distribution systems can serve as a pathway to public receptors under normal circumstances. In fact, a study by the United States Environmental Protection Agency (EPA) in Long Island, New York found no public exposure through the gas distribution system containing PCBs (EPA 1984).

Solvent action is the most likely transport mechanism for the limited amount of PCBs found in pipeline condensate. Liquid-phase hydrocarbons in the gas stream may dissolve PCBs and transport them to points of collection in the line. However, an objective of all natural gas systems is to remove liquid hydrocarbons from the line to provide more efficient operation.

Thus, high concentrations of liquid hydrocarbons are not generally a constituent of the gas stream. Solvent action is therefore an intermittent or uncommon event.

The third link in the air pathway is that of the combusted gas-air interface. As mentioned above, small burners and pilots are the most likely interface.

To summarize, based upon MDU and WBI testing, EPA studies, and an evaluation of potential pathways, there is no rationale for performing a risk assessment for the public. The mere presence of PCBs in condensate or grease does not indicate exposure.

Risk to Employees

Historically, workers have handled PCBs for 60 years. Risks to employees working with PCBs are well characterized and documented, with worker exposure seldom proving to be of concern. Workplace procedures and protective equipment, together with limited airborne exposure, appear to offer adequate protective barriers for employees working with PCBs.

The difficulty of reaching hazardous levels in workplace air makes the PCB air pathway exposure model highly unlikely under normal circumstances. Again, the low volatility of PCBs at normal temperatures mitigates against airborne exposure. Intense heating, agitation or pressurization would be required to vaporize or aerosolize enough of the material to reach the exposure limit. In these cases, respiratory protection is available.

The other modes of potential exposure, dermal and oral, are easily controlled through the use of proper protective clothing including impervious gloves, aprons, and boots; and through proper workplace hygiene.

Based upon the adequate historical information available regarding workplace PCB exposures, a risk assessment for pipeline employees is unnecessary.

Risk To The Environment

The only significant potential pathway to the environment is contaminated condensate liquids. These liquids have routinely been collected at various points.

Conceivable pathways to environmental receptors include water run-off and contaminated soil. To date, these events have not been shown to have occurred in this case. Unless soil or water contamination is shown to exist, there is no need to perform an environmental or ecological risk assessment.

Summary

Based upon the above evaluation, the following can be concluded:

1. A thorough evaluation of risk to the public has been performed by EPA for contaminated pipeline systems in the northeast United States. These risks were found to be very low, with the gas-pathway identified as an ineffective transport mechanism for PCBs. Risk to the public is not of concern because break-down

products from PCBs in a flame did not occur in the EPA New York study. Dibenzofurans and dioxins are not formed in the high temperatures of natural gas flames (EPA 1984).

2. The workers, are protected from well identified risks by protective work procedures, exposure limits, and equipment. With adequate historical information available, it is unnecessary to re-assess the risk to employees handling PCBs.

3. Regarding the environment, a risk assessment is also unnecessary. No significant releases to the environment have been identified, and no other valid pathway to the environment has been established.

APPENDIX B

MDU PCB ANALYTICAL DATABASE

Lab No.	No.1	No.2	Location	Detail Loc.	Article	Sampler	Sample Date	Analyze Date	Pcb ppm	Arochlor
1557			BISMARCK G.O.	BISMARCK SWEETHEART BAKERY	CONDENSATE	LEO LENO	10-Aug-82	22-Oct-82	187.3	
1557			BISMARCK G.O.	BISMARCK SWEETHEART BAKERY	CONDENSATE	LEO LENO	10-Aug-82	22-Oct-82	36	
17194	13	13	BISMARCK G.O.	BELLEFOURCHE METER 9686	CONDENSATE	A. STOMBERG	16-Aug-90	22-Aug-90	<1	
17195	13	14	BISMARCK G.O.	LEAD METER 12226	CONDENSATE	A. STOMBERG	16-Aug-90	22-Aug-90	<1	
17196	13	15	BISMARCK G.O.	AM COLLOID WEST COLONY	CONDENSATE	A. STOMBERG	16-Aug-90	22-Aug-90	19.0	1268
17381	12	8	BISMARCK G.O.	STAGE STOP	CONDENSATE	A. STOMBERG	23-Aug-90	01-Oct-90	14.1	1268
17382	12	9	BISMARCK G.O.	BISMARCK REGULATOR STATION	CONDENSATE	A. STOMBERG	23-Aug-90	02-Oct-90	20.9	1268
17383	12	14	BISMARCK G.O.	BISMARCK 12-3 TIP	GREASE	A. STOMBERG	10-Oct-90	24-Oct-90	232.2	1268
17386	12	12	BISMARCK G.O.	BISMARCK 12-2 END	GREASE	A. STOMBERG	10-Oct-90	24-Oct-90	16125.1	1268
17387	12	20	BISMARCK G.O.	JAMESTOWN PLUNGER	GREASE	A. STOMBERG	10-Oct-90	24-Oct-90	<1	
17389	12	10	BISMARCK G.O.	BISMARCK 12-1 END	GREASE	A. STOMBERG	10-Oct-90	24-Oct-90	464.2	1268
17394	24	1	BISMARCK G.O.	WOLFPOINT TGUN PLUNGER,VALVTEX	GREASE	A. STOMBERG	15-Oct-90	24-Oct-90	378.5	1268
17395	24	3	BISMARCK G.O.	WOLFPOINT GREEN TIP	GREASE	A. STOMBERG	15-Oct-90	24-Oct-90	<1	
17397	20	5	BISMARCK G.O.	MINOT 20-3 D.C. RESERVOIR	GREASE	A. STOMBERG	10-Oct-90	24-Oct-90	<1	
17399	24	10	BISMARCK G.O.	WILLISTON T PLUNGER	GREASE	A. STOMBERG	10-Oct-90	24-Oct-90	<1	
17401	24	13	BISMARCK G.O.	MINOT 20-1 RESERVOIR	GREASE	A. STOMBERG	10-Oct-90	24-Oct-90	<1	
17402	20	3	BISMARCK G.O.	MINOT 20-2 TIP	GREASE	A. STOMBERG	10-Oct-90	24-Oct-90	<1	
17403	24	6	BISMARCK G.O.	TIOGA TIP	GREASE	A. STOMBERG	15-Oct-90	23-Oct-90	<1	
17406	20	2	BISMARCK G.O.	MINOT 20-1 HOSE	GREASE	A. STOMBERG	10-Oct-90	23-Oct-90	1.6	1268
17407	20	7	BISMARCK G.O.	MINOT 20-4 END	GREASE	A. STOMBERG	10-Oct-90	23-Oct-90	<1	
17408	24	8	BISMARCK G.O.	WOLFPOINT RED PLUNGER,GLASGOW	GREASE	A. STOMBERG	10-Oct-90	23-Oct-90	<1	
17413	12	22	BISMARCK G.O.	LADDISH BORDER	CONDENSATE	A. STOMBERG	08-Oct-90	25-Oct-90	<1	
17414	15	1	BISMARCK G.O.	DICKINSON 15-1 HOSE END	GREASE	D. CONNELLY	16-Oct-90	29-Oct-90	381.2	1268
17416	15	3	BISMARCK G.O.	DICKINSON 15-2 HOSE END	GREASE	D. CONNELLY	16-Oct-90	31-Oct-90	10.9	1254,1268
17418	15	5	BISMARCK G.O.	DICKINSON 15-3 HOSE END	GREASE	D. CONNELLY	22-Oct-90	31-Oct-90	<1	
17420	13	28	BISMARCK G.O.	RC 13-1 SPARE HOSE	GREASE	D. CONNELLY	18-Oct-90	01-Nov-90	<1	
17423	13	31	BISMARCK G.O.	RC 13-2 SPARE HOSE END	GREASE	D. CONNELLY	18-Oct-90	31-Oct-90	7.5	1254
17424	13	32	BISMARCK G.O.	RC 13-3 HOSE END	GREASE	D. CONNELLY	18-Oct-90	31-Oct-90	<1	
17427	13	35	BISMARCK G.O.	RC 13-4 HOSE END	GREASE	D. CONNELLY	18-Oct-90	31-Oct-90	2.5	1254
17428	13	36	BISMARCK G.O.	RAPID CITY GREASE GUN 13-5	GREASE	D. CONNELLY	18-Oct-90	31-Oct-90	<1	
17430	13	38	BISMARCK G.O.	RAPID CITY GREASE GUN 13-6	GREASE	D. CONNELLY	18-Oct-90	31-Oct-90	<1	
17431	13	39	BISMARCK G.O.	RC 13-7 HOSE END	GREASE	D. CONNELLY	18-Oct-90	31-Oct-90	<1	
17434	13	42	BISMARCK G.O.	RC 13-8 CYLINDER	GREASE	D. CONNELLY	18-Oct-90	31-Oct-90	<1	
17436	13	44	BISMARCK G.O.	RC 13-9 HOSE END	GREASE	D. CONNELLY	18-Oct-90	31-Oct-90	<1	
17438	13	46	BISMARCK G.O.	RC 13-10 HOSE END	GREASE	D. CONNELLY	18-Oct-90	31-Oct-90	<1	
17440	13	48	BISMARCK G.O.	RC 13-11 CYLINDER	GREASE	D. CONNELLY	18-Oct-90	31-Oct-90	<1	
17441	13	49	BISMARCK G.O.	RC 13-12 CYLINDER	GREASE	D. CONNELLY	18-Oct-90	31-Oct-90	<1	
17444	13	52	BISMARCK G.O.	RC 13-13 CYLINDER	GREASE	D. CONNELLY	18-Oct-90	01-Nov-90	<1	
17445	13	53	BISMARCK G.O.	RC 13-14 CYLINDER	GREASE	D. CONNELLY	18-Oct-90	01-Nov-90	<1	
17448	13	56	BISMARCK G.O.	RC 13-15 CYLINDER	GREASE	D. CONNELLY	18-Oct-90	01-Nov-90	<1	
17450	13	58	BISMARCK G.O.	RC 13-16 CYLINDER	GREASE	D. CONNELLY	18-Oct-90	01-Nov-90	<1	
17456	16	1	BISMARCK G.O.	GLENDIVE,TIP	GREASE	A. STOMBERG	25-Oct-90	01-Nov-90	<1	
17457	16	6	BISMARCK G.O.	MILES CITY,TIP	GREASE	A. STOMBERG	25-Oct-90	01-Nov-90	1.9	1268
17460	16	4	BISMARCK G.O.	GLENDIVE,JACK'S OIL	OIL	A. STOMBERG	25-Oct-90	01-Nov-90	<1	

Lab No.	No.1	No.2	Location	Detail Loc.	Article	Sampler	Sample Date	Analyze Date	Pcb ppm	Arochlor
17472	11	2	BISMARCK G.O.	BILLINGS SHOP GUN PLUNGER,11-2	GREASE	A. STOMBERG	30-Oct-90	02-Dec-90	<1	
17474	11	4	BISMARCK G.O.	POWELL T-GUN TIP,11-4	GREASE	A. STOMBERG	30-Oct-90	02-Dec-90	<1	
17476	11	6	BISMARCK G.O.	SHERIDAN TIP,11-6	GREASE	A. STOMBERG	31-Oct-90	02-Dec-90	<1	
17479	11	8	BISMARCK G.O.	BILLINGS KURTS PLUNGER,11-9	GREASE	A. STOMBERG	30-Oct-90	02-Dec-90	<1	
17481	11	11	BISMARCK G.O.	BNGS LOCKWD&OLD HARDIN RD,11-11	CONDENSATE	A. STOMBERG	25-Oct-90	02-Dec-90	<1	
17482	11	10	BISMARCK G.O.	CONOCO & S.ELK BSN 30585	CONDENSATE	A. STOMBERG	25-Oct-90	01-Dec-90	<1	
17504	12	25	BISMARCK G.O.	VALLEY CITY GUN TIP,12-25	GREASE	A. STOMBERG	09-Nov-90	03-Dec-90	39115.7	1268
17507	20	9	BISMARCK G.O.	SOUTH 3RD STREET,20-2	CONDENSATE	A. STOMBERG	07-Nov-90	01-Dec-90	<1	
17609	12	31	BISMARCK G.O.	ND STATE HOSP JAMESTOWN,645272	CONDENSATE	VERN HERMAN	08-Nov-90	01-Dec-90	<1	
17610	15	8	BISMARCK G.O.	DICKINSON DIST STAT #4,15-8	CONDENSATE	L. KUDRNA	08-Nov-90	04-Dec-90	302.2	1254,1268
17611	15	9	BISMARCK G.O.	DICKINSON DIST. STAT #21,15-9	CONDENSATE	L. KUDRNA	14-Nov-90	03-Dec-90	23.9	1254
17612	15	10	BISMARCK G.O.	DICKINSON GUN PARKS,15-10	GREASE	A. STOMBERG	15-Nov-90	03-Dec-90	<1	
17613	15	7	BISMARCK G.O.	SENTINEL BUTTE N SIDE RETIREMENT	CONDENSATE	L. CALLAHAN	07-Nov-90	01-Dec-90	<1	
17614	12	29	BISMARCK G.O.	SHEYENNE CARE CTER 314531,12-29	CONDENSATE	VERN HERMAN	14-Nov-90	01-Dec-90	<1	
17615	20	16	BISMARCK G.O.	DEVIL'S LAKE 6TH AVN & 8TH ST	CONDENSATE	R. ZAAHER	19-Nov-90	01-Dec-90	30.1	1268
17616	20	17	BISMARCK G.O.	DEVIL'S LAKE 7TH AVN & 8TH ST	CONDENSATE	R. ZAAHER	19-Nov-90	01-Dec-90	24.1	1268
17617	20	18	BISMARCK G.O.	DEVIL'S LAKE 12TH ST & 2ND AVN	CONDENSATE	R. ZAAHER	19-Nov-90	02-Dec-90	21.7	1268
17618	12	53	BISMARCK G.O.	NEW SALEM LP STA #1,12-524-1	GREASE	D. HILLMAN	21-Nov-90	03-Dec-90	<1	
17619	12	54	BISMARCK G.O.	NEW SALEM LP STA #2,12-524-2	GREASE	D. HILLMAN	21-Nov-90	03-Dec-90	5.3	1260
17624	12	55	BISMARCK G.O.	1304 E BROADWAY,12-1	OIL	NICK CAIN	13-Nov-90	02-Dec-90	89.1	1254,1268
17625	12	56	BISMARCK G.O.	BIS. REG & METER 218347,12-2	OIL	NICK CAIN	14-Nov-90	04-Dec-90	94.1	1254,1268
17626	13	27	BISMARCK G.O.	METER 762208,13-17	OIL	BOB BRAND	01-Nov-90	02-Dec-90	<1	
17643	24	18	BISMARCK G.O.	ARNEGARD LIBRARY VALVE,24-18	GREASE	R. NEHRING	23-Nov-90	03-Dec-90	13.1	1254
17644	24	19	BISMARCK G.O.	WATFORD CITY VALVE,24-19	GREASE	R. NEHRING	23-Nov-90	03-Dec-90	11.5	1242
17645	24	20	BISMARCK G.O.	TIOGA VALVE	GREASE	R. NEHRING	26-Nov-90	03-Dec-90	<1	
17646	24	21	BISMARCK G.O.	STANLEY HOSPITAL VALVE	GREASE	R. NEHRING	26-Nov-90	03-Dec-90	152.2	1254
17648	24	23	BISMARCK G.O.	WILLISTON DISTRIBUTION VALVE	GREASE	R. NEHRING	26-Nov-90	03-Dec-90	<1	
17686	16	7	BISMARCK G.O.	GLEND. SHOP, WOLF PNT 663692,16-7	CONDENSATE	A. STOMBERG	27-Nov-90	20-Dec-90	53.1	
17687	16	8	BISMARCK G.O.	SECTIONALIZING VLV #7,GLEND,16-8	GREASE	A. STOMBERG	27-Nov-90	04-Jan-91	157.5	1242
17688	16	9	BISMARCK G.O.	SECTIONALIZING VLV #6,BAKER,16-9	GREASE	A. STOMBERG	28-Nov-90	31-Dec-90	<1	
17689	16	10	BISMARCK G.O.	2" VLV @ OLD BDR,ISMAY MT,16-10	GREASE	S. STOMBERG	28-Nov-90	04-Jan-91	6856.5	1242,1254,1268
17690	16	11	BISMARCK G.O.	DIST. STATION #1,WIBAUX,16-11	GREASE	A. STOMBERG	28-Nov-90	02-Jan-91	201.6	1242
17691	16	12	BISMARCK G.O.	DIST. REG STA #2,SIDNEY,16-12	GREASE	A. STOMBERG	29-Nov-90	31-Dec-90	<1	
17692	16	13	BISMARCK G.O.	SECT.VLV #1,FAIRVIEW,16-13	GREASE	A. STOMBERG	29-Nov-90	31-Dec-90	<1	
17693	16	14	BISMARCK G.O.	DIST REG STATION #1,RICHEY,16-14	GREASE	A. STOMBERG	29-Nov-90	31-Dec-90	<1	
17694	16	15	BISMARCK G.O.	DIST.REG STATION #2,SAVAGE,16-15	GREASE	A. STOMBERG	29-Nov-90	31-Dec-90	<1	
17695	16	16	BISMARCK G.O.	SECT. VALVE #8,FORSYTH,16-16	GREASE	A. STOMBERG	29-Nov-90	31-Dec-90	<1	
17696	16	17	BISMARCK G.O.	DIST REG #2,TERRY,16-17	GREASE	A. STOMBERG	29-Nov-90	01-Jan-91	<1	
17697	16	18	BISMARCK G.O.	2" NORD. VLV,ROSEBUD H.S.,16-18	GREASE	A. STOMBERG	29-Nov-90	03-Jan-91	5.8	1242
17698	16	19	BISMARCK G.O.	SECT. VLV #11,MILES CITY,16-19	GREASE	A. STOMBERG	29-Nov-90	01-Jan-91	<1	
17706	15	11	BISMARCK G.O.	DICKINSON,VALVE 96B,15-11	GREASE	ALAN STIEG	28-Nov-90	01-Jan-91	<1	
17707	15	12	BISMARCK G.O.	TAYLOR,VALVE #2,15-12	GREASE	A. STIEG	28-Nov-90	03-Jan-91	8.0	1268
17708	15	13	BISMARCK G.O.	RICHARDTON H.S.,15-13	GREASE	A. STIEG	28-Nov-90	04-Jan-91	6447.3	1242,1268
17709	15	14	BISMARCK G.O.	MOTT VALVE M15,15-14	GREASE	A. STIEG	28-Nov-90	01-Jan-91	<1	

Lab No.	No.1	No.2	Location	Detail Loc.	Article	Sampler	Sample Date	Analyze Date	Pcb ppm	Arochlor
17710	15	15	BISMARCK G.O.	NEW ENGLAND,VLV NE9,15-15	GREASE	A. STIEG	28-Nov-90	01-Jan-91	<1	
17711	15	16	BISMARCK G.O.	SOUTH HEART SCHOOL,15-16	GREASE	A.STIEG	29-Nov-90	01-Jan-91	<1	
17712	15	17	BISMARCK G.O.	BELFIELD H.S. RISER,15-17	GREASE	A. STIEG	29-Nov-90	01-Jan-91	<1	
17713	15	18	BISMARCK G.O.	DIST STATION #2 VLV #2,15-18	GREASE	A. STIEG	29-Nov-90	01-Jan-91	<1	
17714	15	19	BISMARCK G.O.	GLADSTONE VALVE #1,15-19	GREASE	A. STIEG	29-Nov-90	02-Jan-91	<1	
17715	15	20	BISMARCK G.O.	HEBRON BRICK INLET,15-20	GREASE	A. STIEG	30-Nov-90	02-Jan-91	10.8	1254
17716	11	13	BISMARCK G.O.	KAYCEE SCHOOL,11-13	GREASE	H. MEYER	29-Nov-90	02-Jan-91	<1	
17717	11	14	BISMARCK G.O.	BUFFALO HESSE STATION,11-14	GREASE	H. MEYERS	29-Nov-90	04-Jan-91	837.9	1260,1254
17718	11	15	BISMARCK G.O.	SHERIDAN STATION #4,11-15	GREASE	H. MEYERS	29-Nov-90	02-Jan-91	<1	
17719	11	16	BISMARCK G.O.	CROW AGENCY HOSPITAL,11-16	GREASE	H. MEYERS	29-Nov-90	02-Jan-91	<1	
17720	11	17	BISMARCK G.O.	HARDIN DIST. STATION,11-17	GREASE	H. MEYERS	29-Nov-90	04-Jan-91	121326	1268
17721	11	18	BISMARCK G.O.	BILLINGS VLV 5TH & MONTANA,11-18	GREASE	H. MEYERS	28-Nov-90	02-Jan-91	25.0	1268
17722	11	19	BISMARCK G.O.	LAUREL DUTCH TOWN,11-19	GREASE	H. MEYERS	30-Nov-90	02-Jan-91	<1	
17723	11	20	BISMARCK G.O.	PARK CITY DIST. STATION,11-20	GREASE	H. MEYERS	30-Nov-90	02-Jan-91	<1	
17724	11	21	BISMARCK G.O.	EDGAR DIST. STATION,11-21	GREASE	H. MEYERS	30-Nov-90	02-Jan-91	8.6	1242
17725	11	22	BISMARCK G.O.	FROMBERG SCHOOL,11-22	GREASE	H. MEYERS	30-Nov-90	02-Jan-91	<1	
17726	11	23	BISMARCK G.O.	BRIDGER SCHOOL,11-23	GREASE	H. MEYERS	30-Nov-90	02-Jan-91	9.0	1242
17727	11	24	BISMARCK G.O.	BELFRY SCHOOL,11-24	GREASE	H. MEYERS	30-Nov-90	02-Jan-91	<1	
17728	11	25	BISMARCK G.O.	POWELL L.P. STA.,11-25	GREASE	H. MEYERS	30-Nov-90	02-Jan-91	12.8	1242
17729	11	26	BISMARCK G.O.	LOVELL DIST. STA.,11-26	GREASE	H. MEYERS	30-Nov-90	03-Jan-91	<1	
17730	12	57	BISMARCK G.O.	BISMARCK SERVICE CENTER	ORBO TUBE	G. ANFINSON	06-Dec-90	11-Dec-90	<1	
17731	13	60	BISMARCK G.O.	BELLEFOURCHE DIST. STA #5,13-60	GREASE	G. HIGLIN	28-Nov-90	03-Jan-91	9.9	1242
17732	13	61	BISMARCK G.O.	SPEARFISH DISTRICT STA. #2,13-61	GREASE	G. HIGLIN	28-Nov-90	03-Jan-91	<1	
17733	13	62	BISMARCK G.O.	DEADWOOD DISTRICT STA.,13-62	GREASE	G. HIGLIN	28-Nov-90	03-Jan-91	<1	
17734	13	63	BISMARCK G.O.	LEAD DISTRICT STA. #9,13-63	GREASE	G. HIGLIN	28-Nov-90	03-Jan-91	<1	
17735	13	64	BISMARCK G.O.	STURGIS DISTRICT STA. #2,13-64	GREASE	G. HIGLIN	28-Nov-90	03-Jan-91	<1	
17736	13	65	BISMARCK G.O.	RAPID CITY DIST.STA. #19,13-65	GREASE	G. HIGLIN	28-Nov-90	03-Jan-91	52.2	1254
17737	12	32	BISMARCK G.O.	STEEL SCHOOL,12-32	GREASE	G. OLSON	27-Nov-90	03-Jan-91	<1	
17738	12	33	BISMARCK G.O.	DAWSON BORDER,12-33	GREASE	G. OLSON	27-Nov-90	03-Jan-91	1.5	1268
17739	12	34	BISMARCK G.O.	TAPPEN BORDER,12-34	GREASE	G. OLSON	27-Nov-90	03-Jan-91	<1	
17740	12	35	BISMARCK G.O.	GLEN ULLIN MP #3	GREASE	D. HILLMAN	28-Nov-90	03-Jan-91	<1	
17741	12	37	BISMARCK G.O.	HAY CREEK STATION,12-37	CONDENSATE	D. HILLMAN	30-Nov-90	11-Dec-90	<1	
17742	12	38	BISMARCK G.O.	WILTON H.S.,12-38	GREASE	H.A. JOB	29-Nov-90	03-Jan-91	11.4	1268
17743	12	39	BISMARCK G.O.	WASHBURN H.S.,12-39	GREASE	H.A. JOB	29-Nov-90	22-Dec-90	172.2	1268
17744	12	40	BISMARCK G.O.	WASHBURN VALVE W. OF BORDER	GREASE	H.A. JOB	29-Nov-90	04-Jan-91	148089	1268
17745	24	27	BISMARCK G.O.	POPLAR DIST. #2,VALVE#1,24-27	GREASE	T. WILKINSON	27-Nov-90	03-Jan-91	2.9	1254
17746	24	26	BISMARCK G.O.	WOLFPOINT DIST.STA #2VLV#1,24-26	GREASE	T. WILKINSON	26-Nov-90	03-Jan-91	<1	
17747	24	25	BISMARCK G.O.	GLASGOW EMERGENCY VLV,24-25	GREASE	G. BOYEFF	28-Nov-90	03-Jan-91	<1	
17748	24	24	BISMARCK G.O.	MALTA STATION #3,VLV #9	GREASE	G. BOYEFF	28-Nov-90	03-Jan-91	<1	
17749	20	19	BISMARCK G.O.	MINOT STA #10,20-16	GREASE	VERN REITER	28-Nov-90	03-Jan-91	<1	
17750	20	20	BISMARCK G.O.	BERTHOLD RISER VLV @SCHOOL,20-17	GREASE	VERN REITER	29-Nov-90	03-Jan-91	11.0	1268
17751	20	21	BISMARCK G.O.	DESLACS OUTLET VLV,20-18	GREASE	VERN REITER	29-Nov-90	03-Jan-91	18.8	1242,1254
17752	20	22	BISMARCK G.O.	BURLINGTON DIST. STA,20-19	GREASE	VERN REITER	29-Nov-90	04-Jan-91	1195.5	1268
17753	20	23	BISMARCK G.O.	TURTLE LAKE HOSPITAL VLV,20-20	GREASE	VERN REITER	29-Nov-90	03-Jan-91	3.2	1254

Lab No.	No.1	No.2	Location	Detail Loc.	Article	Sampler	Sample Date	Analyze Date	Pcb ppm	Arochlor
17754	20	24	BISMARCK G.O.	UNDERWOOD VLV @ NURSE.HOME,20-21	GREASE	VERN REITER	29-Nov-90	03-Jan-91	41.4	1254
17755	20	25	BISMARCK G.O.	RIVERDALE SCHOOL VLE,20-22	GREASE	VERN REITER	29-Nov-90	03-Jan-91	<1	
17756	20	26	BISMARCK G.O.	GARRISON HOSPITAL VLV,20-23	GREASE	VERN REITER	29-Nov-90	03-Jan-91	6.3	1254
17757	20	27	BISMARCK G.O.	MAX SCHOOL VLV,20-24	GREASE	VERN REITER	29-Nov-90	03-Jan-91	<1	
17758	20	28	BISMARCK G.O.	SURREY DIST STA #14 VLV A,20-25	GREASE	VERN REITER	28-Nov-90	03-Jan-91	<1	
17759	20	29	BISMARCK G.O.	GRAFTON REG STA B,20-29	GREASE	R. BEZARSON	03-Dec-90	03-Jan-91	5.2	1242
17760	20	30	BISMARCK G.O.	WALHALLA SCHOOL,20-30	GREASE	R. BEZARSON	03-Dec-90	03-Jan-91	2.9	1268
17761	20	31	BISMARCK G.O.	LANGDON HOSPITAL,20-31	GREASE	R. BEZARSON	03-Dec-90	03-Jan-91	<1	
17762	20	32	BISMARCK G.O.	CAVALIER SCHOOL,20-32	GREASE	R. BEZARSON	03-Dec-90	03-Jan-91	<1	
17763	20	33	BISMARCK G.O.	PARK RIVER SCHOOL,20-33	GREASE	R. BEZARSON	04-Dec-90	03-Jan-91	<1	
17764	20	34	BISMARCK G.O.	SIOUX MFG. CO.,20-34	GREASE	R. BEZARSON	04-Dec-90	03-Jan-91	<1	
17765	20	35	BISMARCK G.O.	DEVILS LAKE REG STA A,20-35	GREASE	R. BEZARSON	04-Dec-90	03-Jan-91	3.6	1268
17766	15	21	BISMARCK G.O.	BOWMAN VALVE #112,15-21	GREASE	M. BAGLEY	29-Nov-90	04-Jan-91	1781.4	1242,1254,1268
17768	12	42	BISMARCK G.O.	MEDINA CN 706966,12-42	GREASE	V. HERMAN	30-Nov-90	03-Jan-91	<1	
17769	12	43	BISMARCK G.O.	VALLEY CITY VLV NAT.GUARD,12-43	GREASE	V. HERMAN	30-Nov-90	04-Jan-91	<1	
17770	12	44	BISMARCK G.O.	CLEVELAND CN 216167,12-44	GREASE	VERN HERMAN	30-Nov-90	04-Jan-91	<1	
17771	12	45	BISMARCK G.O.	SHEYENNE SCHOOL CN 643372,12-45	GREASE	VERN HERMAN	28-Nov-90	04-Jan-91	<1	
17772	12	46	BISMARCK G.O.	VALLEY CITY ISO.S I94,12-46	GREASE	VERN HERMAN	30-Nov-90	04-Jan-91	<1	
17773	12	47	BISMARCK G.O.	FOSTER CITY CN 643367,12-47	GREASE	VERN HERMAN	28-Nov-90	04-Jan-91	<1	
17774	12	48	BISMARCK G.O.	NEW ROCKFORD CN 643501,12-48	GREASE	VERN HERMAN	28-Nov-90	04-Jan-91	<1	
17775	12	49	BISMARCK G.O.	JAMESTOWN WLAMART,12-49	GREASE	VERN HERMAN	27-Nov-90	04-Jan-91	2.8	1268
17776	12	50	BISMARCK G.O.	NE DIST STA JAMESTOWN,12-50	GREASE	VERN HERMAN	27-Nov-90	04-Jan-91	<1	
17782	12	58	BISMARCK G.O.	BISMARCK SERVICE CENTER,12-58	ORBO TUBE	A. STOMBERG	11-Dec-90	17-Dec-90	<1	

APPENDIX C

DIVISION MAP