Appendix F
MWM Brampton Facility, Autoclave Commissioning Test Data

MEDICAL WASTE MANAGEMENT INC.
95 Deerhurst Drive, Unit 3-4, Brampton, ON L6T 5R7 • Telephone: (905) 789-6660 • Facsimile: (905) 789-6661

Tuesday, March 09, 1999.

Mr. Robert Adcock
Senior Environmental Officer
ONTARIO MINISTRY OF ENVIRONMENT
1182 North Shore Blvd. East
Burlington, ON L7R 3Z9

REFERENCE: Certificate of Approval No. A860324 - Commissioning Testing.

Dear Mr. Adcock;

As you are aware, Medical Waste Management Inc. (MWM) has recently undertaken a series of commissioning tests to confirm the level of sterilization effectiveness of our medical waste autoclave system. The following is a summary of these test results.

The waste material used for all tests was primarily laboratory waste, which was received from Canadian Medical Laboratories. Although there were a small number of typical cardboard boxes containing medical waste, the majority of waste tested was representative of bulk specimen containers (glass and plastic) which contained blood, urine faeces, cultures and other body fluids. This waste is known to be the densest and the most difficult to sterilize.

Ontario MOE District Office Staff were on hand to witness the first three (3) test loads. They observed the loading of waste, the placement of the biological indicators, the sterilization cycles, extraction of the biological indicators as well as the incubation of it. No concerns were raised with respect to the methodologies of the testing procedures.

Through the C. of A. application process, MWM proposed to use the '3-M Attest' biological indicator and incubation system as this is the same system used by the Ontario Ministry of Health. These indicators were used exclusively through the first eight (8) test loads however, the 'Steri-Amp' biological indicators were introduced for the final five (5) test loads because of the following.

The 3-M Attest product is a plastic vial containing an inoculated spore strip of bacillus stearothermophilus (6 log), as well as a small glass ampoule containing the growth media and an enzyme to detect an early fluorescent detection (3 hours).

The plastic vial is fitted with a plastic lid, which has small vent holes on either side. This is used to allow air to escape during the vacuum segment of the process cycle and steam to enter during the sterilization segment of the process cycle. The problem with this product is that if the vents are blocked or the lid is accidentally closed before or during the process cycle, the biological indicator cannot operate as designed and false readings will result.

Medical waste is considered an extremely harsh environment for any biological indicator, especially the 3-M Attest product, which was designed for sanitary and protected hospital environments. On analysis of its application at MWM, 3-M representatives confirmed that their product cannot be relied on for our intended use.

The Steri-Amp product uses a single glass ampoule, which contains both the spores (6 log) of bacillus stearthermophilus as well as the media. There is no provision for early fluorescent detection and as such, a 24-hour incubation period is required to confirm results. These biological indicators are however more suited to our harsh operating environment and cannot be interfered with by the waste load.

Both the District Office of the Ontario MOE, as well as Mr. Michael Brodsky of the Ontario Ministry of Health were continuously consulted throughout testing to ensure that any and all changes made were pre-approved prior to moving forward.

Commissioning Test No. 1 - February 01, 1999.

Test was witnessed by Martin McConnochie of the MOE. A total weight of 2821 pounds was loaded into 7 carts for sterilization. 3-M Attest biological indicators were inserted into the bottom, middle and top of each cart. The waste was processed for 30 minutes at 275 deg.F to achieve sterilization. All carts were then removed the biological indicators retrieved and the carts reloaded into the autoclave for a second and third sterilization cycle, before shredding.

The biological indicators were then incubated per manufacturer instructions and the results read at 1, 2 and 3 hours respectively. A total of 7 biological indicators out of 21 failed - indicating non-sterilization. On consultation with the MOE, it was agreed that the next test cycle would be extended to 45 minutes at the same 275 deg.F temperature.

This load only was exposed to a total of three sterilization cycles in order to accommodate the pre-scheduled autoclave condenser vent emission testing. The associated independent consultant report and results of this testing has been included as an attachment. All other test loads were subjected to two sterilization cycles as an added precaution, prior to shredding and compacting for disposal at municipal landfill.

Commissioning Test No. 2 - February 03, 1999.

Test was witnessed be Mr. Denis Guimond of the MOE. A total weight of 2321 pounds was loaded into 5 carts for sterilization. Identical procedures were followed for this test load however, the sterilization cycle extended to 45 minutes at 275 def.F. The biological indicator test results showed that a total of 5 out of 15 failed - again indicating non-sterilization. On consultation with the MOE, it was agreed that the next test cycle would remain at 45 minutes however, the temperature would be increased to 300 deg.F.

Commissioning Test No. 3 - February 05, 1999.

Mr. Robert Adcock of the MOE witnessed this test. A total weight of 2376 pounds was loaded into 6 carts for sterilization. Identical procedures were followed for this test load however, the sterilization cycle was set at 300 deg.F for 45 minutes. This cycle showed that only 1 biological indicator out of 18 failed but again indicated non-sterilization.

Through the analysis of the second and third test results, it was noted that the biological indicators, which failed, were originally placed in positions, which were unlikely to fail. That is, in either the top or middle of the waste load. Additionally, it was noted that several biological indicators were becoming damaged during the sterilization cycle, or interfered with through the accidental closure or blockage of the vented lids. This led to serious questions concerning the effectiveness of the test results.

On consultation with the manufacturer, 3-M Canada, two separate process inspections were undertaken to evaluate the product application and significant technical inquiries were made within 3-M, in an attempt to resolve our concerns. As this evaluation continued, testing resumed without any changes to the operating parameters.

Commissioning Test No. 4 - February 09, 1999.

MWM was authorized to continue testing without on site representation of the MOE. A total weight of 3038 pounds was loaded into 7 carts for sterilization. Identical procedures were followed for this test load. One of 21 biological indicators failed again in an area unlikely to fail and one was lost in the waste load. Another non-sterilized load was recorded for this test, subject to the response from 3-M.

Commissioning Test No. 5 - February 12, 1999.

A total weight of 2821 pounds was loaded into 7 carts for sterilization. Identical procedures were followed for this test load. One of 21 biological indicators failed and two were lost in the waste load. Another non-sterilized load was recorded for this test, again subject to the response from 3-M.

Commissioning Test No. 6 - February 15, 1999.

A total weight of 2811 pounds was loaded into 7 carts for sterilization. Identical procedures were followed for this test load. Two of 21 biological indicators failed one on the bottom and one in the middle.

Prior to this test, MWM received a response from 3-M Canada, confirming our concerns relating to the interference of the biological indicator performance and related results as well as false readings. For this load and for ones to follow, it was decided to continue with the early indicator fluorescent reading capabilities of this product however, continue to incubate for a minimum of 24 hours to confirm the test results by the chemical colour change indicator capabilities. It was explained that the patented enzymes included in this product, facilitates the early fluorescent detection capabilities however, if the biological indicators are interfered with, the enzymes may still indicate an early positive reading but the spores may have sustained substantial damage to prevent growth. This is confirmed through the 24 - 48 hour chemical colour change indicator.

The biological indicators for this test load were incubated for 24 hours and only the control turned from purple to yellow - indicating a complete pass. Incubation continued for another 24 hours, with no change.

Commissioning Test No. 7 - February 17, 1999.

A total weight of 2857 pounds was loaded into 7 carts for sterilization. Identical procedures were followed for this test load. Early reading results detected one failure and one biological indicator that passed when inserted, then failed when turned 180 degrees and inserted again? The results for the chemical colour change indicator at 24 and 48 hours showed that only the control changed from purple to yellow.

Commissioning Test No. 8 - February 19, 1999.

A total weight of 2586 pounds was loaded into 7 carts for sterilization. Identical procedures were followed for this test load. Early reading results detected one failure. The results for the chemical colours change indicator at 24 and 48 hours showed that only the control changed from purple to yellow.

At this point it became obvious that the equipment was operating as designed and that total sterilization was being achieved however, if reliance of the 3-M Attest product test results were continued, the effect of obvious performance interference could always be questioned.

MWM proposed to both the MOE as well as Mr. Michael Brodsky of the MOH, that we introduce the Steri-Amp glass ampoule for subsequent tests, in the bottom of each waste load where sterilization is the most difficult to achieve. Additionally, we would run the 3-M Attest product concurrently in the middle and top of each waste load. Results would be monitored simultaneously. Both the MOE and MOH agreed to this procedure and as such, testing continued.

Commissioning Test No. 9 - February 23, 1999.

A total weight of 2646 pounds was loaded into 7 carts for sterilization. The Steri-Amp biological indicators were inserted into the bottom of each waste load and the 3-M Attest biological indicators were inserted in the middle and top of each waste load. Identical operating parameters were maintained for this test load. Both the early detection readings and the chemical colour change readings of the 3-M Attest product proved negative for all biological indicators. The Steri-Amp biological indicators were observed at 24 and 48 hours and only the control changed from purple to yellow.

The results were conclusive - a complete pass.

At this point, the information received to date, including test results were shared with Michael Brodsky of the MOH, for his expert analysis of the testing to date. A copy of the letter issued to him as well as his response is included herein. In Mr. Brodsky's opinion, a total of 4 loads at 300 deg.F for 45 minutes had been passed to date. Regardless, a final test with identical parameters was already scheduled and was proceeded with accordingly.

Commissioning Test No. 10 - February 26, 1999.

A total weight of 3026 pounds was loaded into 7 carts for sterilization. The identical operating parameters of the previous load were followed for this test load. Both the early detection reading and the chemical colour indicator reading resulted in complete sterilization. One of the Steri-Amp ampoules exploded during the cycle however, the remaining biological indicators indicated no colour change after 24 and 48 hours of incubation.

At the conclusion of this test load, the MOE was again consulted and advised that a final three test loads would be undertaken with new operating parameters of 300 deg.F for 30 minutes. For these test loads, only the Steri-Amp biological indicators would be used. This new test parameter was proposed to Mr. Michael Brodsky of the MOH, to which he confirmed agreement, prior to consultation with the MOE.

Commissioning Test No. 11 - March 01, 1999.

A total weight of 3035 pounds was loaded into 7 carts for sterilization. The Steri-Amp ampoules were placed in the bottom of each waste load before the carts were loaded into the autoclave. Waste materials were sterilized at 300 deg.F for 30 minutes. At the conclusion of the process cycle, the carts were removed, the biological indicators collected and the waste was placed back into the autoclave for a second sterilization cycle prior to shredding. The ampoules were placed into the Steri-Amp incubator and inspected at both 24 and 48 hours. In both cases, only the control changed from purple to yellow, confirming a successful test.

Commissioning Test No. 12 - March 03, 1999.

A total weight of 3049 pounds was loaded into 7 carts for sterilization. Identical operating and testing parameters as the previous load were followed for this test load. On reading the incubated Steri-Amp ampoules at 24 and 48 hours, only the control changed from purple to yellow, confirming a second successful test.

Commissioning Test No. 13 - March 05, 1999.

A total of 2043 pounds was loaded into 5 carts for sterilization. Identical operating and testing parameters as the previous two loads were followed for this test load. On reading the incubated Steri-Amp ampoules at 24 and 48 hours, only the control changed from purple to yellow, confirming a third consecutive successful test.
On the conclusion of this test, the MOE was contacted and advised of the commissioning testing results. This report is written confirmation of the commissioning testing results, as required in accordance with Certificate of Approval No. A 680324, Section B, Items 14, 15(a) through (g) and 15.

All commissioning testing results were witnessed by a qualified and independent healthcare professional. Mr. David R. Chalmers is a professional representative of The Steven Company Limited, a company who supplies and markets physicians and hospital supplies. The 3-M Attest product, incubator and log book were provided through this company, an approved distributor for 3-M healthcare products.

As confirmation of the qualified and independent commissioning testing result verification, Mr. Chalmers has endorsed this report accordingly.

Ongoing Monitoring Programs.

Finally and as agreed, Medical Waste Management Inc. commits to undertake regular validation testing on one typical waste load, every sixth (6th) processing day. The operating and testing parameters will be identical to those during the last three commissioning test loads. Any discrepancies in the test results, regardless of how minor, will be immediately reported to the District Office of the MOE, with the required remedial measures outlined in our C. of A., immediately initiated.

I trust this is the information required as related to the MWM commissioning testing program. If you have any questions or require additional information, please do not hesitate to contact me accordingly.

Yours very truly.
MEDICAL WASTE MANAGEMENT INC.

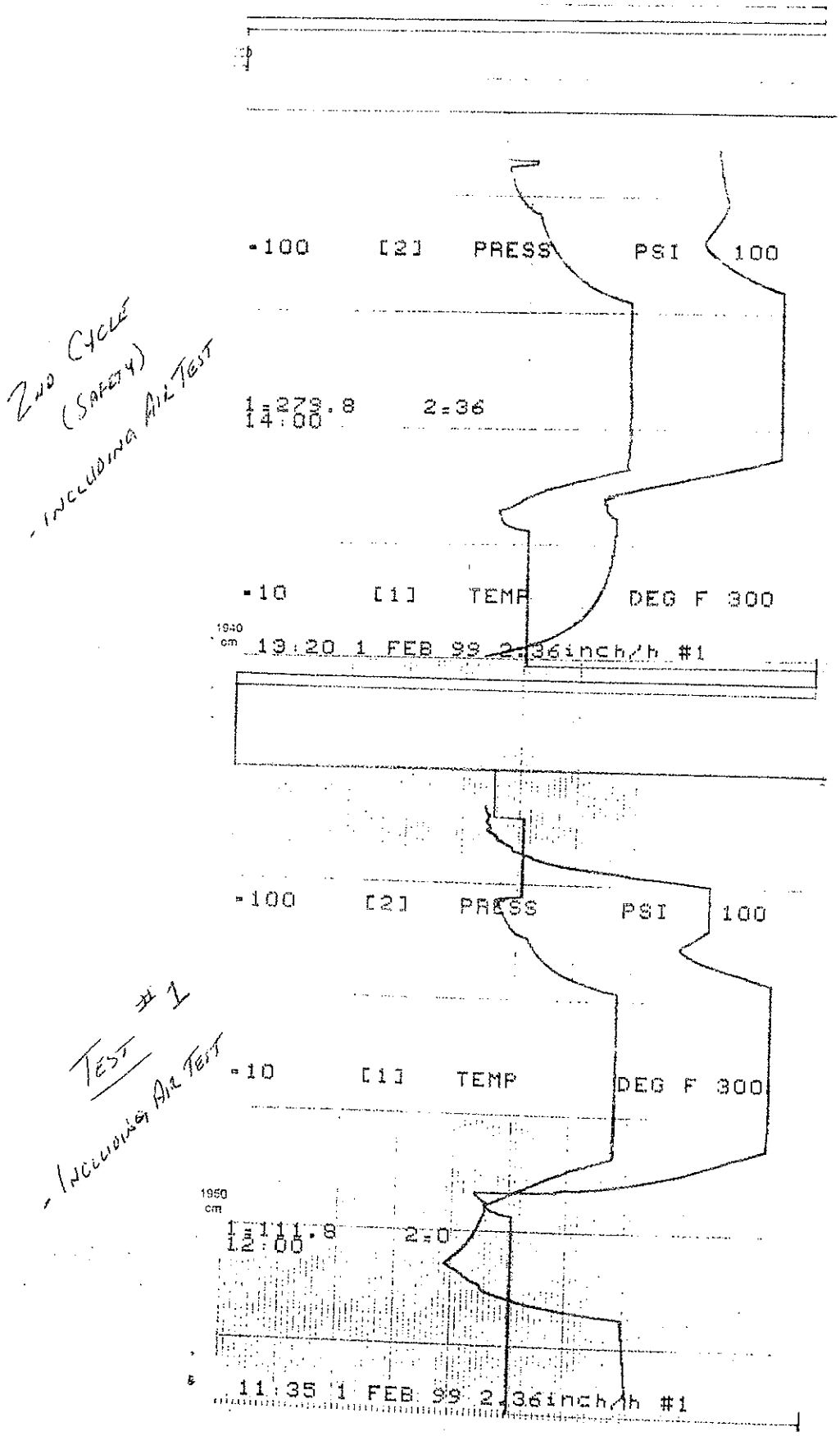
Daniel Kennedy
President.

Paul Carpino
Plant Manager.

I, David R. Chalmers, a professional representative with The Stevens Company Limited, a supplier to the Ontario healthcare industry, do hereby confirm that my company supplied the 3-M Attest biological indicators, incubator and log book, to Medical Waste Management Inc., for the purpose of their facility commissioning testing.

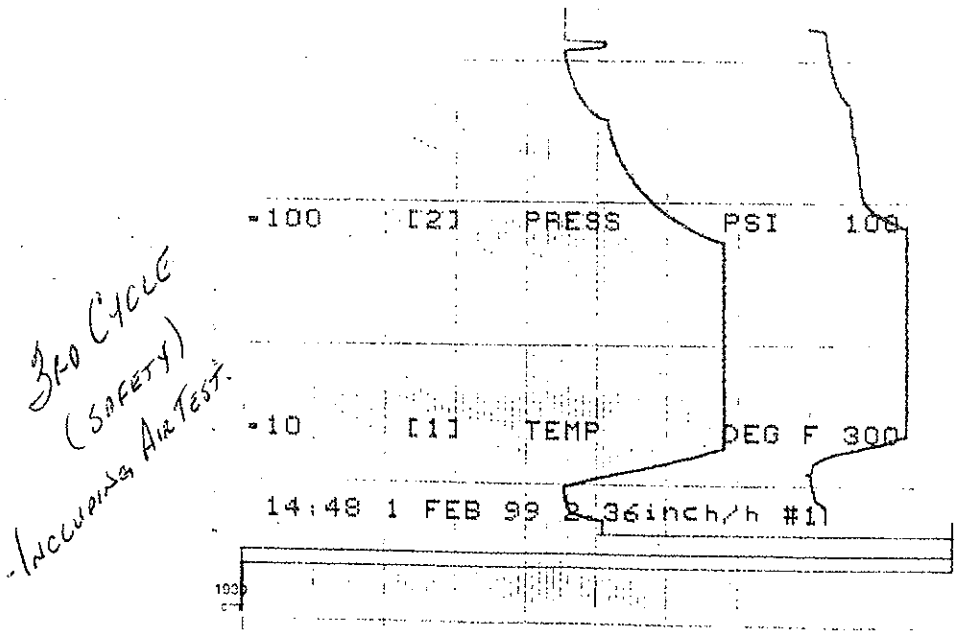
I further confirm that I personally witnessed the required components of the tests, including the biological indicator incubation results and confirm that the information contained in this report is both accurate and true.

David R. Chalmers
The Stevens Company Limited
200 Walker Drive
Bramalea, ON L6T 4H1
Tel: (905) 791-8600

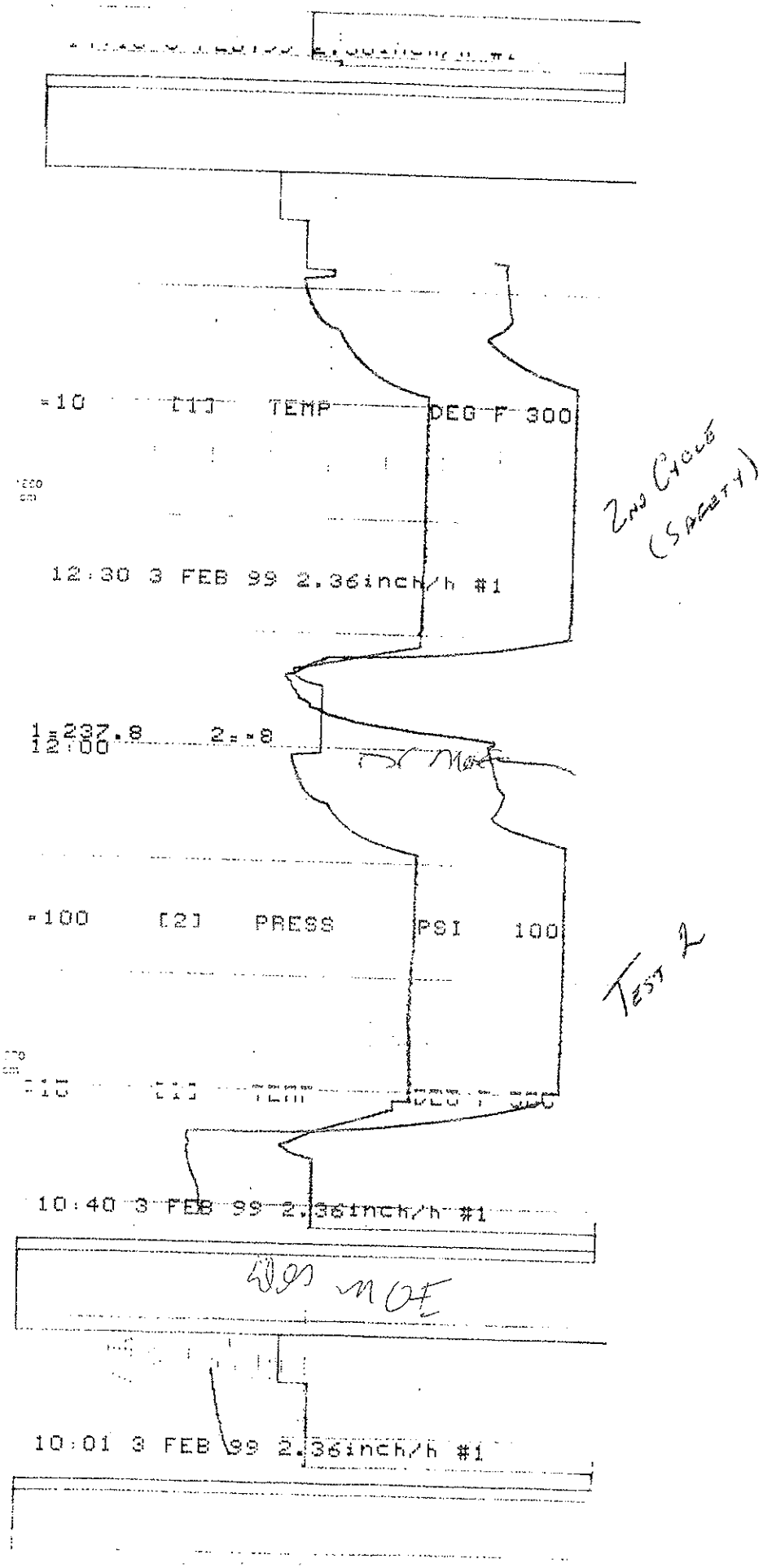


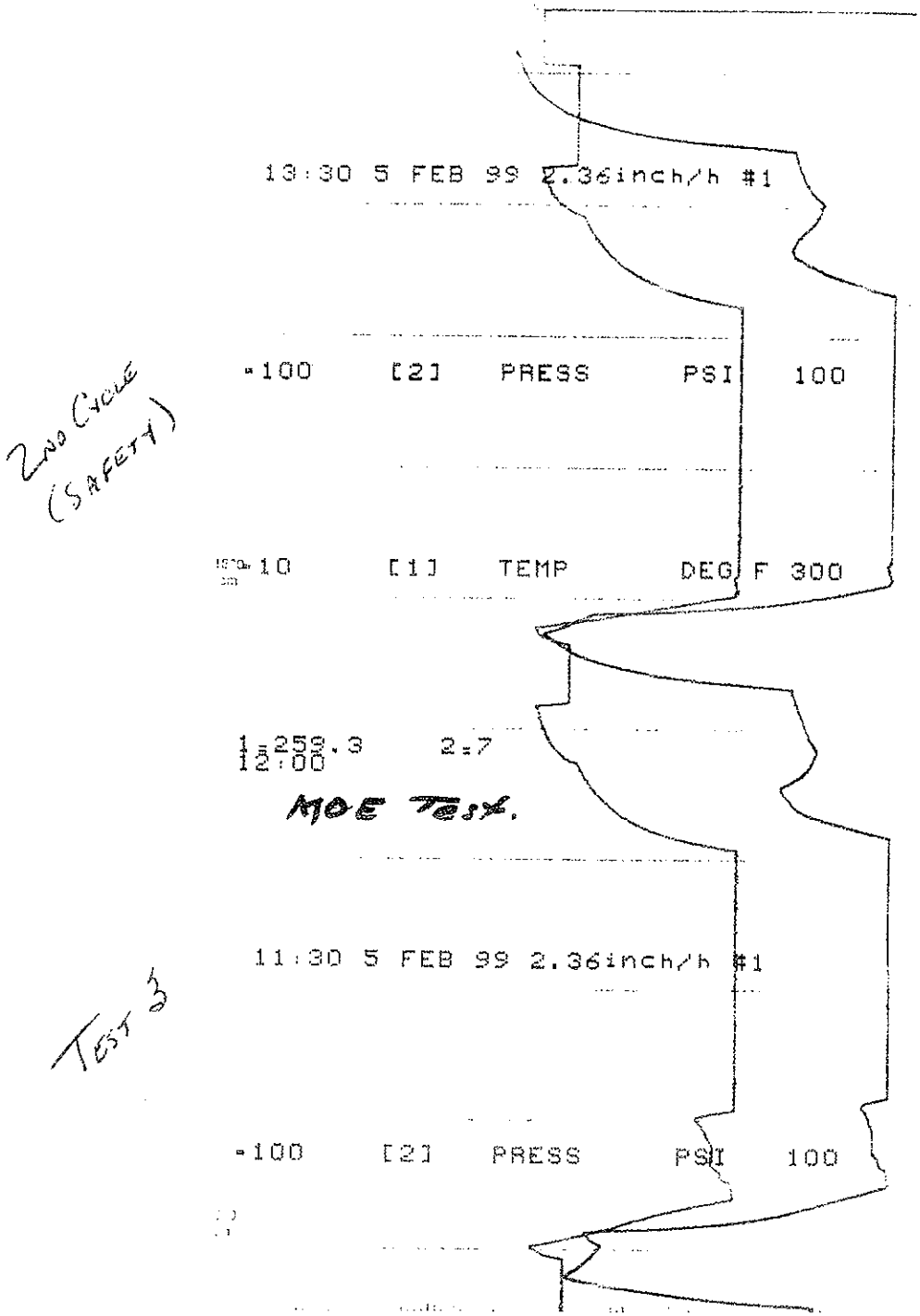
2nd Cycle (Safety) - Including Air Test

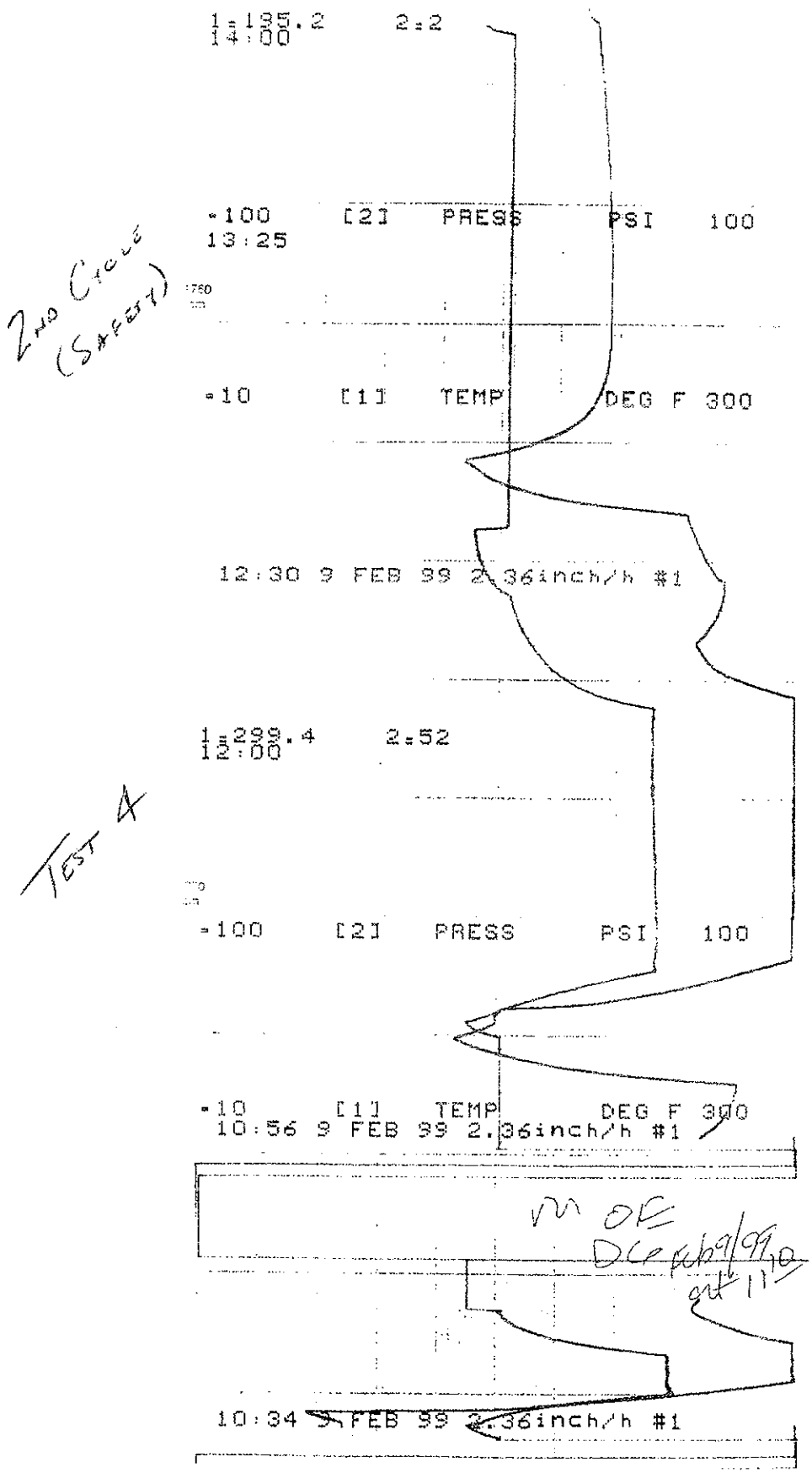
Test #1 - Including Air Test

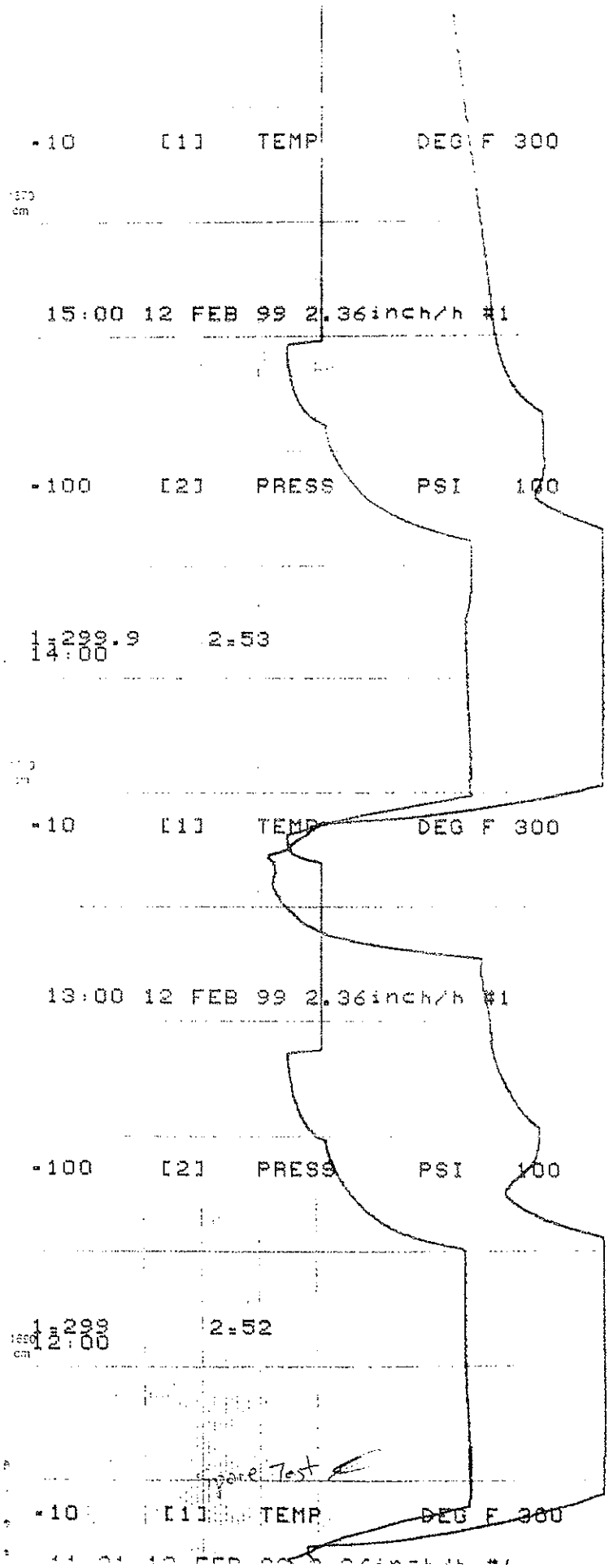


3rd Cycle
(Safety)
- Including Air Test.


=10 [1] TEMP DEG F 300
12:30 3 FEB 99 2.36inch/h #1
1=237.8 2=.8
12:00
=100 [2] PRESS PSI 100
10:40 3 FEB 99 2.36inch/h #1
10:01 3 FEB 99 2.36inch/h #1

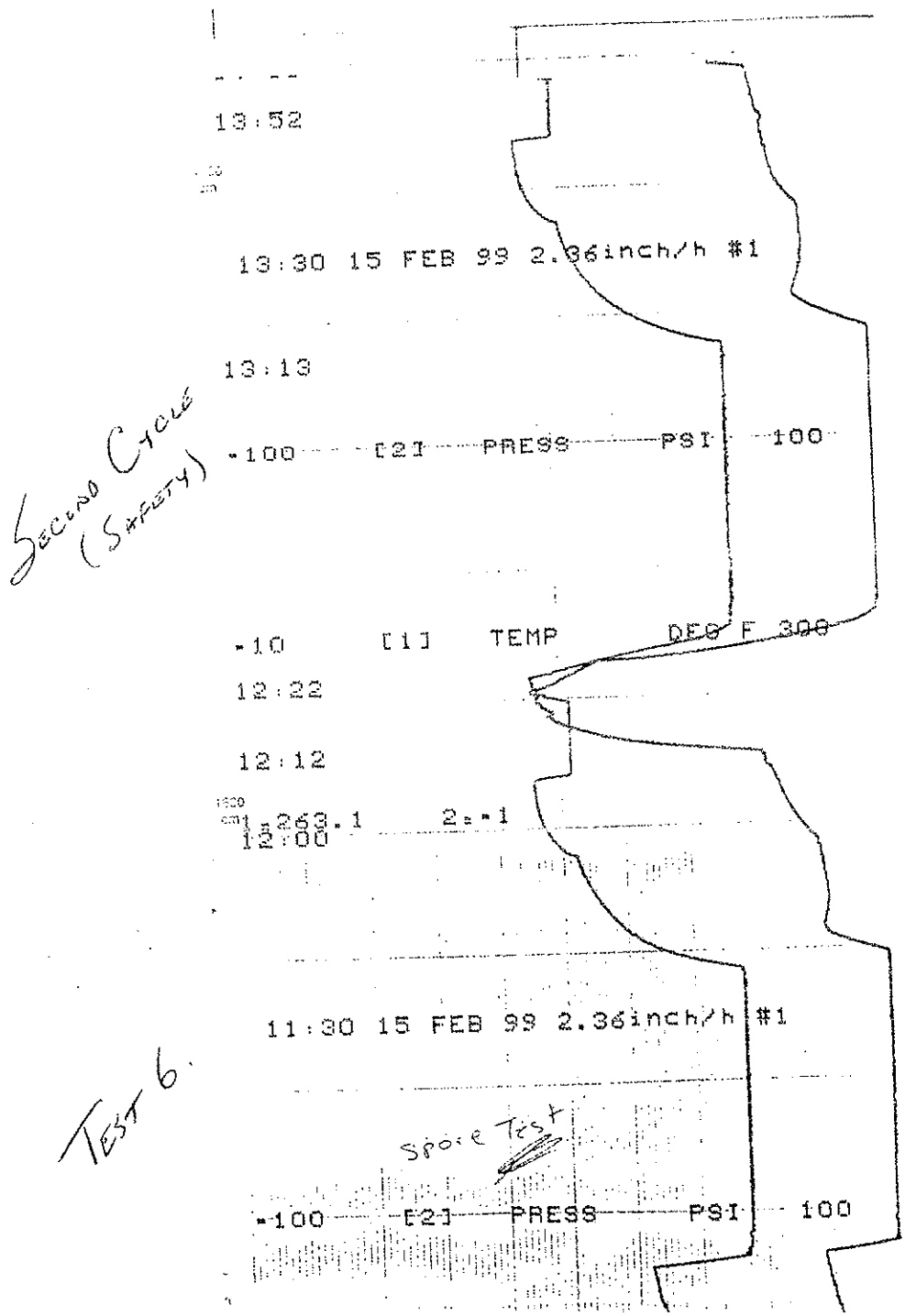

13:30 5 FEB 99 2.36inch/h #1
-100 [2] PRESS PSI 100
2nd Cycle (SAFETY)
10 [1] TEMP DEG F 300
1:259.3 2.7
12:00
MOE Test.
11:30 5 FEB 99 2.36inch/h #1
Test 3
-100 [2] PRESS PSI 100


1:135.2 2:2
14:00
100 [2] PRESS PSI 100
13:25
2ND CYCLE (SAFETY)
10 [1] TEMP DEG F 300
12:30 9 FEB 99 2.36inch/h #1
1:299.4 2:52
12:00
TEST A
100 [2] PRESS PSI 100
10 [1] TEMP DEG F 300
10:56 9 FEB 99 2.36inch/h #1
END OF Dcreb9/99.10 at 11
10:34 9 FEB 99 2.36inch/h #1



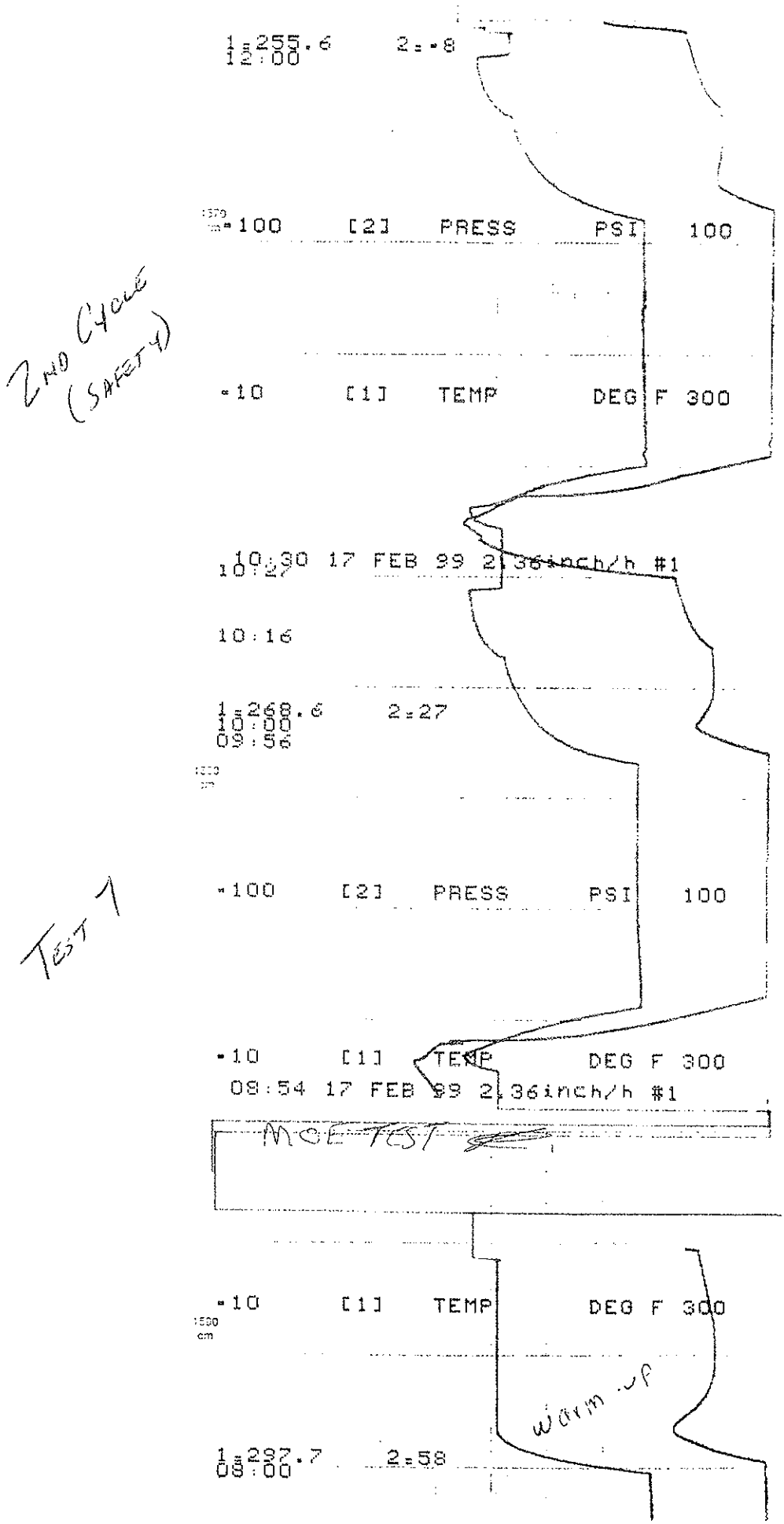
2nd Cycle (Safety)

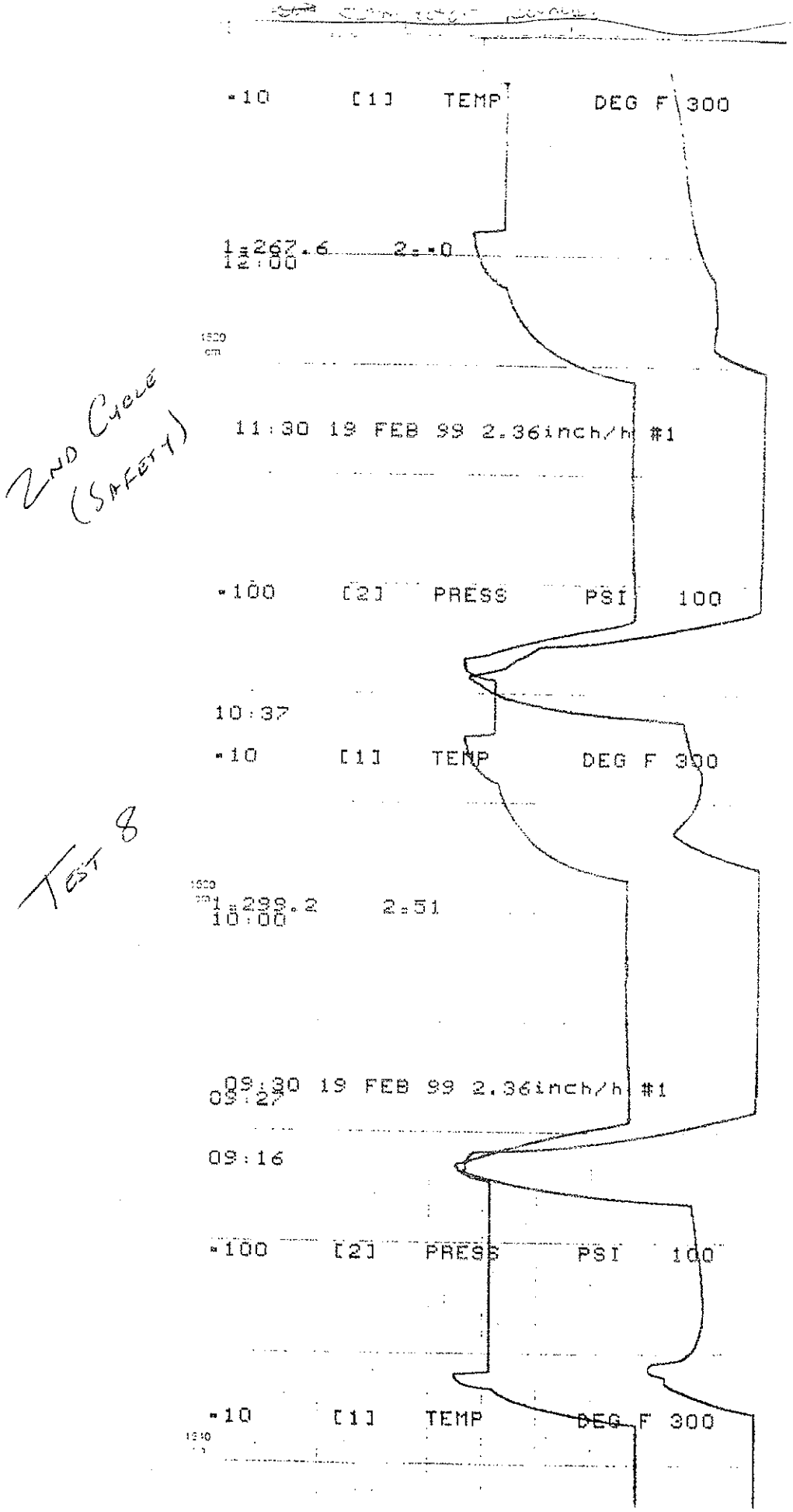
Test 5



Second Cycle (Safety)

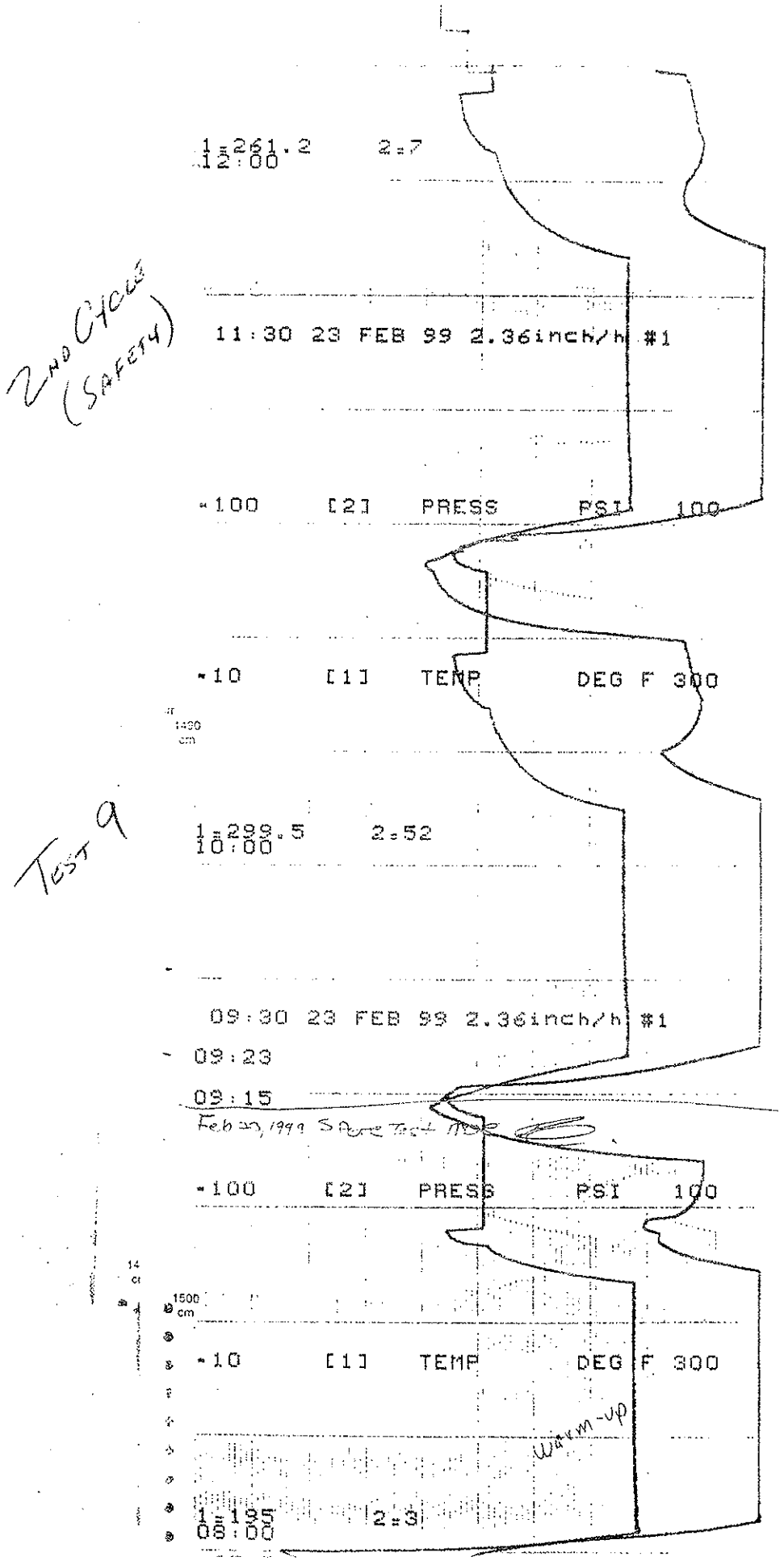
Test 6.


1=255.6
12:00
2=.8
100 [2] PRESS PSI 100
2ND Cycle (SAFETY)
10 [1] TEMP DEG F 300
10:30 17 FEB 99 2.36inch/h #1
10:27
10:16
1=268.6
10:00
09:56
2:27
100 [2] PRESS PSI 100
TEST 1
10 [1] TEMP DEG F 300
08:54 17 FEB 99 2.36inch/h #1
MOE TEST
10 [1] TEMP DEG F 300
warm up
1=287.7
08:00
2=58

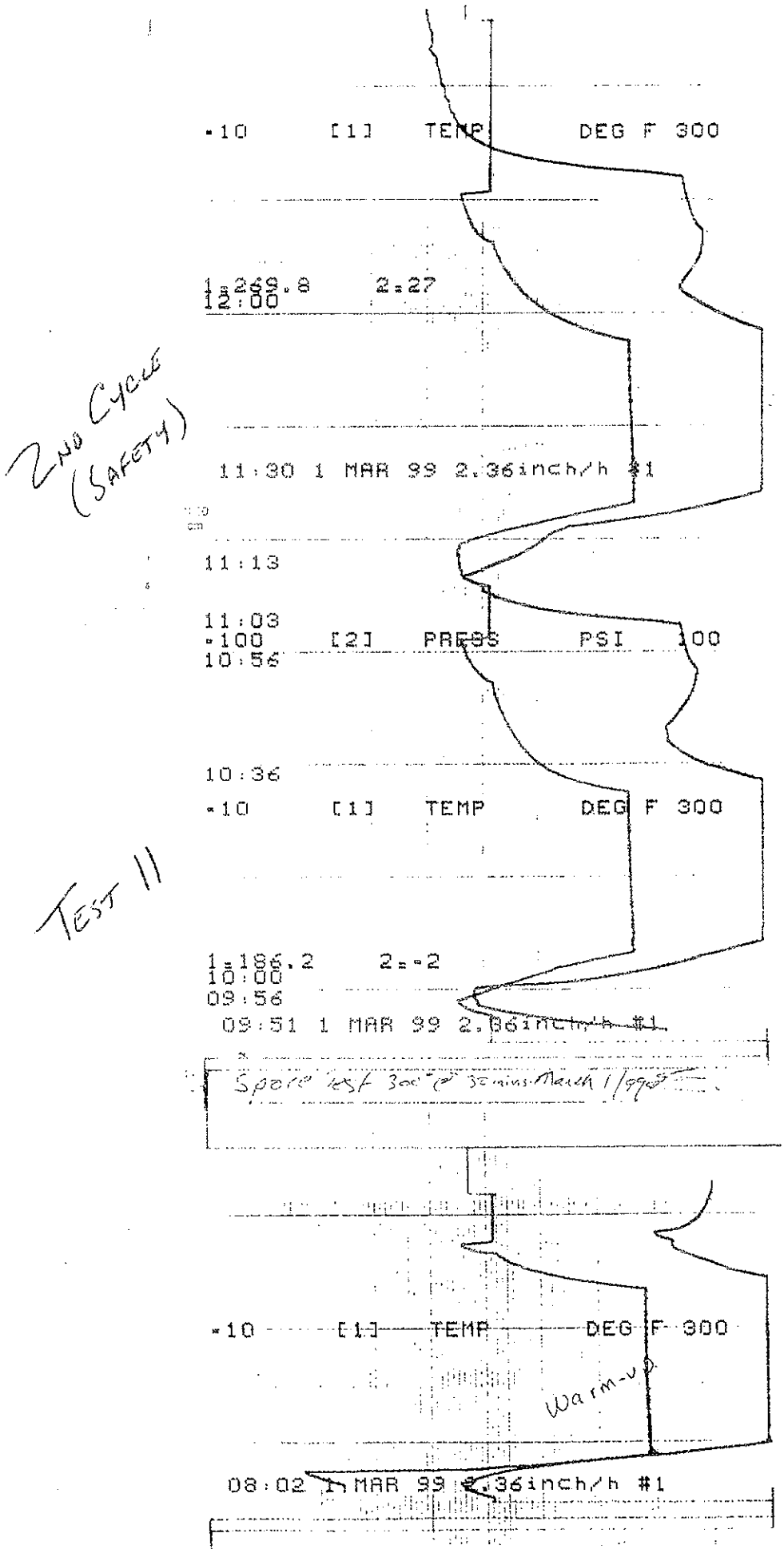


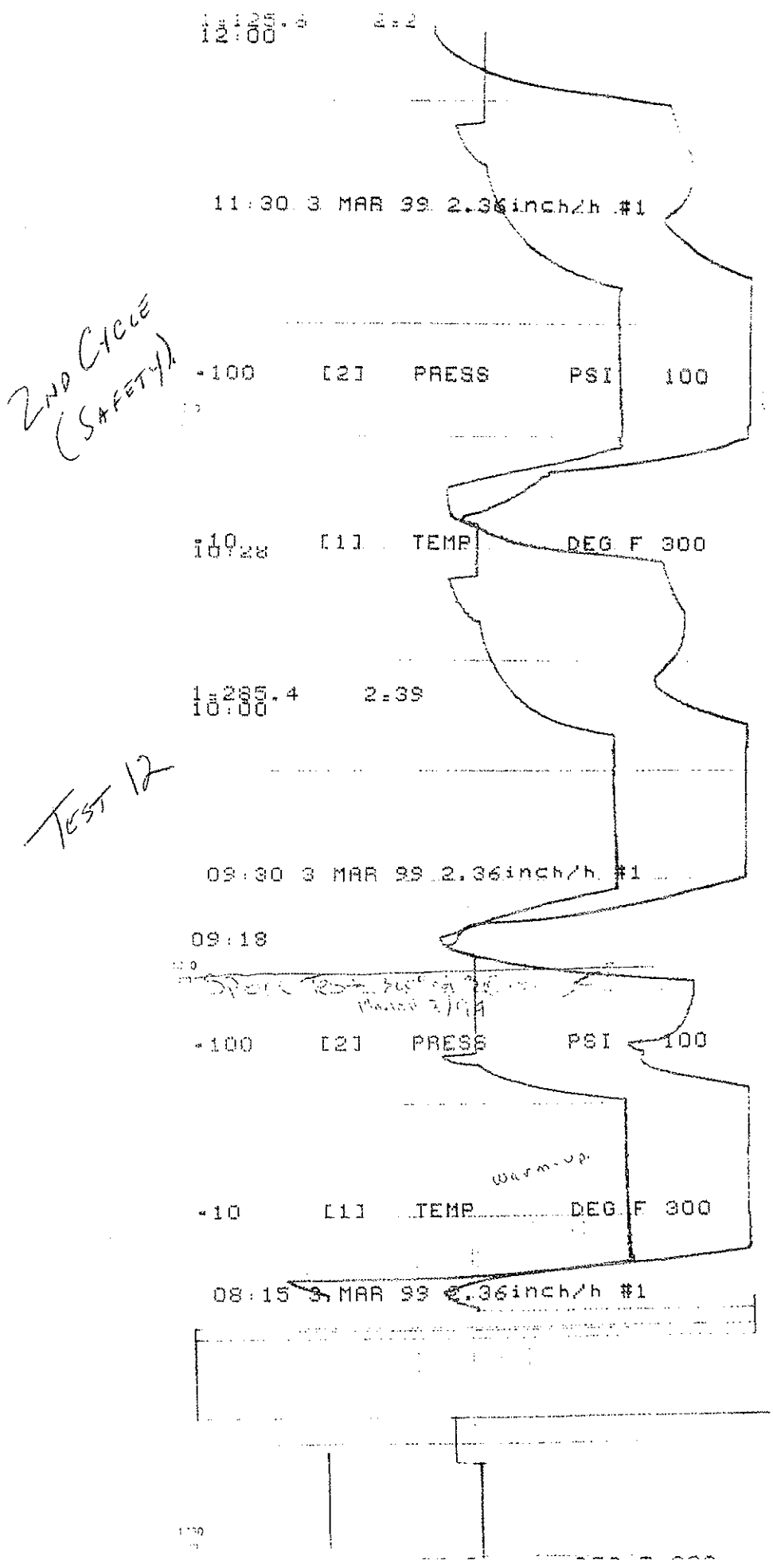
2ND Cycle (Safety)

Test 8


1=261.2
12:00
2=7
2ND CYCLE (SAFETY)
11:30 23 FEB 99 2.36inch/h #1
100
[2] PRESS PSI 100
10
[1] TEMP DEG F 300
1=299.5
10:00
2=52
TEST 9
09:30 23 FEB 99 2.36inch/h #1
09:23
09:15
Feb 23, 1999 Spare Test Mode
100
[2] PRESS PSI 100
10
[1] TEMP DEG F 300
WARM-UP
1=135
08:00
2=3

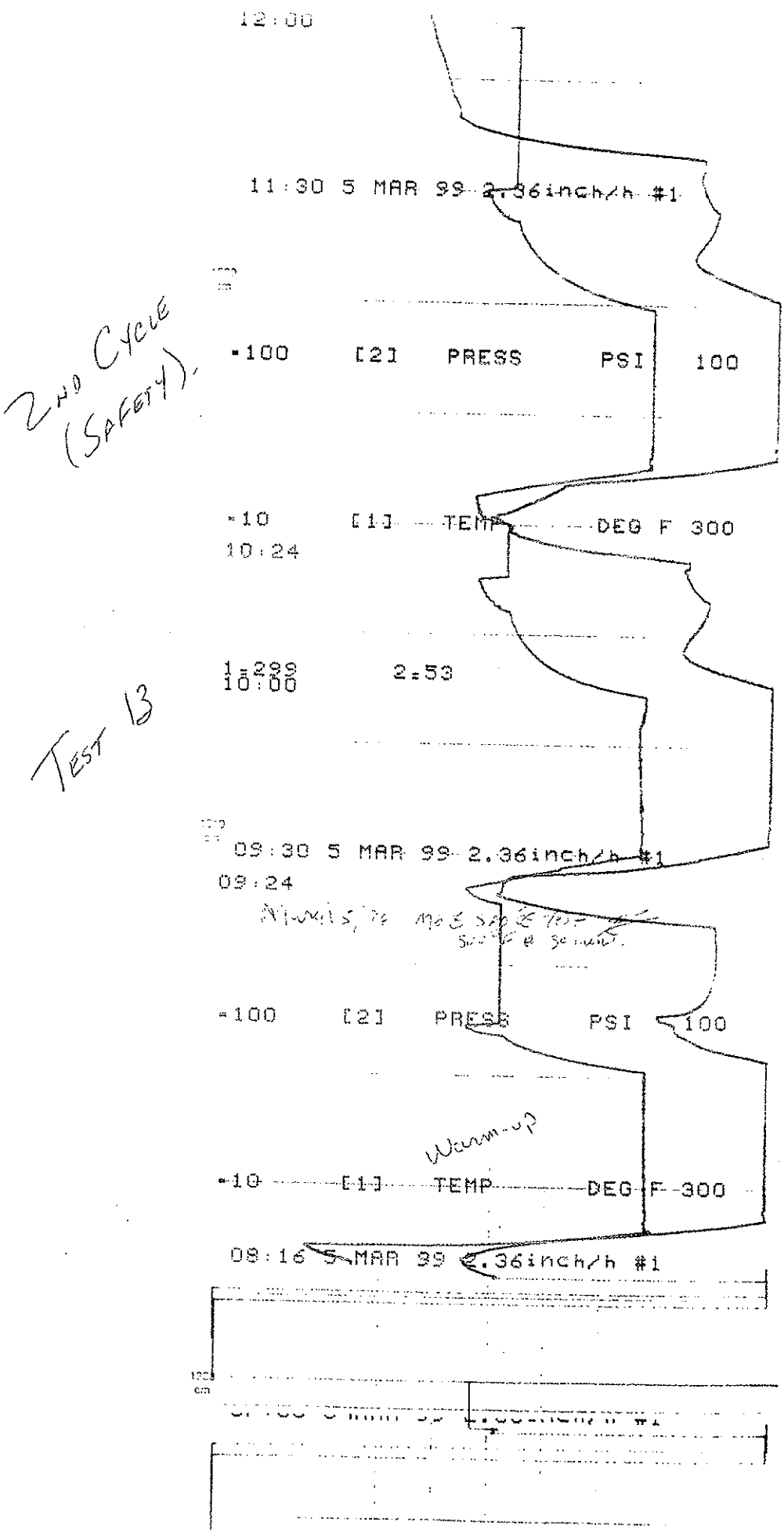
11:30 26 FEB 99 2.36inch/h #1
2ND CYCLE (SAFETY)
100 [2] PRESS PSI 100
10 [1] TEMP DEG F 300
DOUBLE TEST FEB. 26/99
10:09
1:260.5 2:-2
10:00
09:30 26 FEB 99 2.36inch/h #1
TEST 10
100 [2] PRESS PSI 100
08:44
10 [1] TEMP DEG F 300
1:237.5 2:57
08:00
WARM-UP
07:38 26 FEB 99 2.36inch/h #1


-10 [1] TEMP DEG F 300
1=269.8 2=27
12:00
2ND CYCLE (SAFETY)
11:30 1 MAR 99 2.36inch/h #1
11:13
11:03
-100 [2] PRESS PSI 100
10:56
10:36
-10 [1] TEMP DEG F 300
TEST 11
1=186.2 2=-2
10:00
09:56
09:51 1 MAR 99 2.36inch/h #1
Spare test 300°F 30 mins March 1/99
-10 [1] TEMP DEG F 300
Warm-up
08:02 1 MAR 99 2.36inch/h #1



2ND CICLE (SAFETY)

TEST 12


12:00
11:30 5 MAR 99 2.36inch/h #1
2ND CYCLE (SAFETY).
•100 [2] PRESS PSI 100
•10 [1] TEMP DEG F 300
10:24
1=299
10:00
2=53
TEST 13
09:30 5 MAR 99 2.36inch/h #1
09:24
•100 [2] PRESS PSI 100
WARM-UP?
•10 [1] TEMP DEG F 300
08:16 5 MAR 99 2.36inch/h #1

3M Canada Company
Compagnie 3M Canada

P.O. Box / C.P. 5757
London, Ontario N6A 4T1
519-451-2500 Telephone

February 15, 1999

Daniel Kennedy
Medical Waste Management Company
Fax Number: 905-789-6661

Dear Mr. Kennedy,

This letter is in response to your concerns as to the reasons for the two recent failures obtained in your decontamination cycle when using the 3M™ Attest™ 1292 Rapid Biological Indicator. There are two scenarios to consider. Firstly, the 1292 Attest biological indicator has holes located along the side of cap to allow for steam penetration into the vial and air removal from the vial. If these holes become occluded, the above processes will not occur and a failure will result. Therefore, it is important that the placement of the biological indicator in the load be such that the cap is in the upright or raised position and free of any obstruction or interference to air removal and steam penetration.
Secondly, the centre of the mass or load will not heat as quickly or as well as the bottom and top of the load. The centre of the load is the most challenging as in dense loads cold spots may be present and cause failure of the biological indicator. Therefore, the load should be loosely packed and placed to allow air removal and steam penetration and be exposed to the steam for the recommended length of time.

I hope you find the responses provided satisfactory. If you have any further questions, please do not hesitate in contacting myself or your 3M Sales Representative, Fran Kleinsteuber.

Sincerely,
3M Canada Company

Jackie Daley, Professional Services
Medical Products
800-563-2921

cc. Fran Kleinsteuber

MEDICAL WASTE MANAGEMENT INC.
95 Deerhurst Drive, Unit 3-4, Brampton, ON L6T 5R7 • Telephone: (905) 789-6660 • Facsimile: (905) 789-6661

Friday, February 26, 1999.

Mr. Michael H. Brodsky
Environmental Microbiologist
ONTARIO MINISTRY OF HEALTH
P.O. Box 9000, Terminal "A"
Toronto, ON M5W 1R5

Issued By Facsimile Number - (416) 235-5951.

REFERENCE: Medical Waste Management Inc. Commissioning testing.

Dear Mr. Brodsky;

As requested, this letter is in response to our detailed telephone conversation late yesterday afternoon.

Medical Waste Management Inc. (MWM) as you know is currently undertaking a series of commissioning tests on our medical waste sterilization system to determine the most effective parameters. The biological indicators (B.I.'s) we are using are the 3-M Attest product number 1292, which is almost identical to the 1291 B.I.'s used by your lab, the only difference being the vacuum component of our system.

These B.I.'s were designed for hospital and laboratory applications where expedient results provide a real value. As you know, there are two distinctly different ways to analyze the performance results of these B.I.'s. The first is the rapid readout period where a specific enzyme is produced when growing spores absorb the substrate contained in the B.I. This enzyme can be detected through the florescent reader in the incubation unit for a period of up to eight hours only. After that time, the B.I. is read like all others through a chemical colour change indicator, which changes from dark purple to bright yellow within 24 hours, if the contained spores were not killed off.

The problem we have faced during each load is that at suspected suitable exposure times and temperatures, 1 or 2 of the B.I.'s indicated a positive reading. When examined in more detail and as confirmed by the manufacturer, we noticed that the B.I.'s were being interfered with during the test cycle, which has caused false positive readings.

Because of the adverse nature of our waste, the B.I.'s have to be attached to a heavy steel probe (angle iron) and driven into a cart full of waste which could weigh up to 500 lbs. and measure 4 feet deep. After the sterilization cycle, these probes are difficult to extract because the large quantities of plastic in the waste become molten and fuse around the probe, as well as the B.I.'s. These probes must then be bent back and forth until they come loose for extraction and recovery of the B.I.'s.

The physical configuration of these B.I.'s include a plastic lid which is to be closed after sterilization but not before or during. On two sides of this lid are a series of small holes (vents) which allow for the air in the B.I. to be evacuated during vacuum and the steam to be introduced during the 'soak' period.

If these holes are interfered with through the accidental closure of the lid during insertion, or if they are blocked by molten plastic during processing, they will not operate as designed and false positives will result. This was the case during our testing.

Once we understood what was happening, we continued to incubate the B.I.'s for periods of 24, 48 and 72 hours respectively to view the results of the colour grow out. In every case the control turned bright yellow after less than 12 hours and stayed that colour, where the sterilized B.I.'s remained dark purple. The last 4 loads were documented and independently witnessed accordingly.

For our last load, in addition the 3-M B.I.'s, we ran concurrently the older style of glass ampules, provided by S.G.M. / Pulse Scientific, that cannot be interfered with. After the mandatory 48 hour incubation period, the results remained 100% negative, confirming the previous false positives.

With this information in mind, please respond to the following two questions, based on operating test parameters of 300 deg.F., for 45 minutes.

1) Would you agree that the positive readings were in fact 'false' under the circumstances and given that there was no colour change after 24 & 48 hours?

2) Would you agree that after the final concurrent B.I. test load, in addition to three loads with no colour grow out of the 3-M B.I.'s, that we have successfully passes 4 loads in sequence?

3) Would you recommend continuing with the 3-M product even though our heavy commercial application may be far to adverse for their intended application -or- would you revert to the glass ampule style, which requires 48 hour incubation?

4) Would you expect these same negative results using proper B.I. if the operating temperature of 300 deg.F. was maintained but the time was reduced from 45 - 30 minutes? (Obviously conditional on 3 successful B.I. test cycles).

Your expert opinion and advise regarding this matter is very much appreciated and as you can appreciate, time is of the essence. As such, an early response would be very much appreciated.

Yours very truly,
MEDICAL WASTE MANAGEMENT INC.

Daniel Kennedy
President.

cc. Mr. Robert Adcock - Ontario MOE, Halton - Peel District Office.

ONTARIO MINISTRY OF HEALTH

Laboratory Services Branch
P.O. Box 9000, Terminal "A"
Toronto, Ontario M5W 1R5

Telephone: (416) 235-5717
Fax: (416) 235-5951

February 26, 1999

Mr. Daniel Kennedy, President
Medical Waste Management Inc.
95 Deerhurst Drive, Unit 3-4
Brampton, Ontario
L6Y 2C6

Dear Mr. Kennedy:

In response to your questions based on operating test parameters of 300 F for 45 minutes:

1. I believe that the scenario you described could result in "false positive" readings due to a chemical effect rather than microbial activity.

2. It would appear that you have successfully passed 4 loads in sequence.

3. The choice of spore suspension system is up to you. The 3M system allows for rapid readout, but has some inherent problems for your application. The spore suspension in the glass ampoules is more reliable in your system, but takes longer to validate. Perhaps a combination of the two systems may be appropriate.

4. Reducing the exposure time to 30 minutes, while maintaining the temperature at 300 F, should be adequate to achieve biological sterility; however, the effectiveness of such a change would have to be validated.

Sincerely,

M.H. Brodsky

Michael H. Brodsky
Environmental Microbiologist

A.J. Chandler Associates Ltd.

February 15, 1999

Medical Waste Management Inc.
95 Deerhurst Drive
Units 3 & 4
BRAMPTON ON L6F 5R7

Attn. Mr. Daniel Kennedy

Dear Mr. Kennedy,

Subject: Testing of Emission Points from Autoclave Operation

As you are aware, on Monday February 1st, 1999 testing was conducted on the air emissions from your autoclave operation. The writer was present along with 2 technicians to obtain samples from the stacks. This was completed under the direction of MOE staff using procedures discussed in our memorandum of December 2nd, 1998. As neither of us had perceived that the MOE might require multiple sources to be tested, the project, at least in terms of analysis and time on site became somewhat greater than we had originally anticipated. I authorized the laboratory to proceed with additional analyses to ensure that we had sufficient information to address any concerns that might arise from the MOE and thus the attached invoice is for an amount greater than the original estimate.

Overall the results, as you will see from the attached report, show low exhaust flow rates and the chemicals quantified in these emissions should not be of concern. The report includes a discussion of the results of the various tests, the calculations of the emission quantities, and the dispersion calculations that define the distance to the nearest receptor that would be critical should there be any concerns.

I trust this is self-explanatory, but should you require more information please call.

Yours truly,

A. John Chandler QEP
Principal

Environmental Management Consultants

12 Urbandale Avenue • Willowdale • Ontario • Canada • M2M 2H1 • Telephone 416-250-6570 • Facsimile 416-733-2588

A.J. Chandler & Associates Ltd.

AUTOCLAVE COMMISSIONING STACK TESTS

for

Medical Waste Management Inc.

95 Deerhurst Drive
Brampton, ON

Prepared by

A.J. Chandler & Associates Ltd.

per: A. John Chandler
February 1999

Environmental Management Consultants

12 Urbandale Avenue • Willowdale • Ontario • Canada • M2M 2H1 • Telephone 416-250-6570 • Facsimile 416-733-2588

INTRODUCTION

Medical Waste Management Inc. [MWM] operates a licensed biomedical waste treatment facility at 95 Deerhurst Drive in Brampton, ON. As part of their Certificate of Approval for this site, MWM were required to complete a number of commissioning tests to prove the acceptability of the process. These tests included:

- using biological indicators to prove the effectiveness of the sterilization process; and,
- measuring exhaust gas flows and quantifying organics emitted from the exhaust stacks during the purge cycles.

Commissioning testing commenced on February 1st, 1999 with 7 carts of biomedical waste being sterilized. On this day, A. J. Chandler & Associates Ltd. personnel were present on site for the purposes of observing operations, obtaining flow rate data and collecting samples for volatile organic compound [VOC] analyses. This work was observed by an MOE inspector and conducted according to an agreed upon Scope of Work submitted to the MOE in December 1998. The site inspector on the day of the testing required that additional VOC samples be taken from the holding tank vent stack and the results of the analysis of these samples are included in this report.

FACILITY DESCRIPTION

The process sterilizes the waste by heating it to high temperature using a steam autoclave. The autoclave is a long horizontal cylinder into which seven metal carts containing waste can be introduced. Each cart is weighed prior to introduction into the autoclave and the weight and source of the waste are logged into a computer data base. When all seven carts are loaded, the door to the autoclave is closed and a preliminary vacuum of minus 10 psi is drawn on the autoclave for 2 minutes. After this the heating cycle commences. When the autoclave reaches the desired operating temperature and pressure the heating cycle timer is activated and the cycle proceeds for the requisite time. At the end of the heating cycle the steam is released through a large condenser equipped with water sprays.

The condenser is approximately 75 cm in diameter and approximately 250 cm tall. It is equipped with 4 water spray heads which deluge the steam coming into the condenser. The water sprays are activated prior to the steam valve opening. The water and any condensate collected are routed to a holding tank and from this tank they are discharged to the sanitary sewer system. The system was designed to condense all the steam and discharge it to the sewer. In reality, this should mean that there is little to no flow in the vent stack fitted on the top of the condenser. If the water valves should fail to open, the condenser and the vent act to allow the escape of the steam to the atmosphere thereby protecting plant personnel.

The 20 cm diameter vent stack extends through the facility roof and terminates approximately 250 cm above the roof. For the purpose of testing, the vent pipe was equipped with a 25.4 mm diameter tapped hole approximately 125 cm above the roof.

After the steam pressure in the autoclave has been reduced, a process that takes approximately 4 minutes, a vacuum pump starts to draw a vacuum on the chamber. The vacuum pump operates until the chamber has been at minus 9 psi (or a full vacuum) for at least two minutes. The vacuum is then released and the autoclave door can be opened and the bins removed.

As a final step of the process, the waste that has been sterilized is dumped into a shear shredder for size reduction. The discharge of the shredder is placed into a self contained compactor container for transport to the landfill site.

TESTING PROGRAM METHODS

The emission point of interest was the condenser vent stack and measurements included the stack gas velocity and the concentration of volatile organic compounds [VOC]. The velocity is used to determine the volumetric flow rate. Combined with the concentration of VOC, the flow rate is used to determine emission rates for chemicals. The methods used are described in this section.

Flow Measurements

Velocity pressure measurements were taken using a standard pitot tube connected by Tygon tubing to a Magnelic gauge rated for 0.0 to 0.5 inches of water column. The pitot tube was inserted into the access port in the vent stack. Since the diameter of the stack was small, a traverse was not taken and the probe was located at the centre of the stack.

Volumetric flow rate calculations were performed using equations from Method 2 of the Ontario Ministry of Environment Source Testing Code (Version #2).

Stack Gas Temperature and Moisture Content

Temperatures (Dry Bulb and Wet Bulb) were taken using an Omega Model HH23 Microprocessor Thermometer with dual Type K thermocouple probes.

Gas Bag Samples

A "lung box" connected to a battery powered portable sampling pump (SKC intermediate model) served to create a vacuum around a Tedlar gas sample bag placed inside the box. The tedlar bag was attached to a sample fitting in the "lung box" and the box was sealed tightly. A Teflon sample line and sample probe were connected to

the exterior of the sample fitting thereby allowing the sample gas to enter the gas bag. The pump was attached to a purge fitting on the box and was used to evacuate the inside of the box thus forcing the bag to expand and fill with the sample from the stack. A ball valve was used to control the sample gas flow by adjusting the purge rate. Sample collection started when the steam valve was opened on the autoclave and continued until the gas bag was full.

VOC Tube Samples

VOC samples were also collected using sorbent tubes connected to an SKC pump. The sorbent tube measured 10 x 140 mm and was packed with Carbotrap C, Carbopack B, and Carbosieve III. The pump was calibrated to collect at a rate of 1.0 L/min. The pump was connected with Tygon tubing to the sorbent cartridge which in turn was connected to a teflon sampling probe inserted into the vent stack.

At the request of the MOE inspector the same sampling procedure was used to take samples from the holding tank vent stack. Sample volumes for the two sources differed with 1.0 liters being collected for the condenser vent stack and 2.0 liters being collected for the holding tank vent stack.

Analytical Procedures

Exposed field sampling sorbent tubes were returned to the OSB laboratory where they were processed for analysis. The tubes are desorbed and transferred onto C analytical tubes using a TDU system operating at 280°C. This process takes 20 minutes to complete. The analytical tubes have a 6 mm outer diameter and are packed by Envirochem with the same sorbents as used in the field tubes. This process allows the sample to be split using critical orifices and suitable connections.

Following analysis of the first gas bag, subsequent gas bag samples were concentrated on sorbent tubes to achieve better detection limits. Essentially the contents of the bag were extracted through a field sorbent tube and then these tubes were processed in the manner described above.

Analysis was carried out on the Analytical VOC System [AVS] which consists of an Envirochem 810A Concentrating Capillary Inletting System coupled to a Hewlett Packard HP 5890E Series II Plus Gas Chromatograph [GC] with an HP 5972A Mass Selective Detector [MSD] via a 260°C heated nickel steel transfer tube.

The analytical tubes were desorbed at 260°C on the Envirochem Unit through internal analytical traps operated at 280°C. The focusing trap then automatically injected, by means of thermal desorption, any VOCs into the GC via the transfer tube. The GC can employ a cryogenic oven control for superior VOC separation using a 60 m HP-624 capillary column. VOCs were detected by the MSD in Scan Mode. The MSD was

interfaced to an HP ChemStation Data System G1701AA-A.03.02 with a National Institute for Science and Technology (NIST/EPA/NIH) MS compound library, with NIST 98/HP-PB98 combination mass spectral search programs.

The above procedure is similar to EPA SW846 Method 8260B, NIOSH Method 2549 and equivalent to EPA compendium Method TO-17.

SAMPLES COLLECTED

The autoclave was cycled three times on the afternoon of February 1, 1999. Each time the condenser was operated the temperature, humidity and velocity pressure in the vent stack was measured.

A total of 6 VOC tube samples were collected:

MB126	condenser vent - start of first event
MB149	condenser vent - start of second event
MB122	plumbing stack - end of second event
MB114	condenser vent - start of third event
MB116	condenser vent - end of third event
MB110	condenser vent - third event vacuum cycle

A total of 5 sample bags were collected and the following volumes analyzed:

Bag #1	5 liters - condenser vent start of first event
Bag #3	5 liters - condenser vent start of second event
Bag #4	0.1 liters - condenser vent 2 minutes into second event
Bag #5	0.2 liters - condenser vent start of third event
Bag #5a	5 liters - condenser vent start of third event

The laboratory analytical results are presented in Appendix 1.

RESULTS and DISCUSSION

Observations

February 1st, 1999 was a crisp, cold overcast day that followed a night with significant quantities of hoar frost. As such the ambient relative humidity was high and there was very little wind.

Upon arrival at the site the technician set up the sampling equipment near the stack and prepared for the first tests. Inside the facility the bins were loaded with laboratory waste and weighed prior to having biological indicators inserted at various levels of the loads. Once the MOE inspector had witnessed the indicators being inserted into the loads, the bins were pushed into the autoclave and the cycle was initiated.

After 30 minutes operation the controls initiated the opening of the condenser water valves and the steam was released from the autoclave; sampling commenced and continued for approximately 4 minutes.

While the background sky conditions on the day of the testing were not that conducive to observing the exhaust from the condenser vent stack from the ground, it did not appear that there was much material emitted during the condenser operation. This observation was confirmed by the MOE inspector who was on the roof.

The cycle of the autoclave continued with the vacuum purge of the chamber and shutdown of the autoclave. The vacuum cycle appeared to take longer than staff had anticipated, and sensing that there might have been a controls "lockup" attempts were made to "free" the controls. This may have terminated the purge cycle early.

Upon opening the door of the autoclave some "smoke" was observed to leave the vessel and enter the plant. The material rose to the underside of the roof deck and remained forming a haze that was visible for some time after the autoclave was opened. This may have been material released from the surface coatings used on the bins and the inside of the autoclave.

The bins were removed from the autoclave and the biological indicators were removed from the loads. The bins were then reintroduced into the autoclave and a second cycle commenced. At the end of the second cycle testing was again conducted and the MOE requested sample from the holding tank plumbing vent stack was collected. The bins were not removed after the second cycle and the autoclave cycle was reinitiated for a third time. Again, testing was completed at the end of the third cycle.

During the third cycle careful attention was paid to the timing of all the cycles and the system was allowed to operate without operator intervention. It was observed that the condenser cycle continued longer than anticipated until the desired end state was

achieved and the vacuum purge took almost 10 minutes to reach the minus 9 psi desired vacuum. After this was reached the 2 minute cycle time at this condition passed quickly. Upon opening the autoclave at the end of the third run there was little visible haze escaping from the machine.

Flow Rate Calculations

Measurement data for the first run showed that over the 4 minute period the velocity pressure ranged from 0.046 to 0.061" H_2O and averaged 0.051" H_2O. On the second run there was no registered velocity pressure during the condenser operation. On the third run there was similarly virtually no velocity pressure registered. A value of 0.005" H_2O was used for both the second and third runs so that a calculation of emissions could be conducted. The various stack parameters are summarized in Table 1.

Table 1 Summary of Condenser Vent Flow Data

Parameter	Run Number		
	1	2	3
Barometric Pressure (" Hg)	30.276	30.276	30.24
Static Pressure (" H_2O)	0.0	0.0	0.0
Absolute Stack Pressure ("H_2O)	30.276	30.276	30.24
Stack Temperature (^oC)	14.6	16.2	10.7
Water Vapour (%)	1.0	1.1	1.1
Velocity Pressure ("H_2O)	0.051	0.005	0.005
Stack Gas Velocity (ft/s)	14.822	4.654	4.612

The vent stack is 8" Schedule 40 pipe with an inside diameter of 7.981" and an area of 50 square inches, or 0.0323 m^2. Since the velocity was measured in the center of the pipe, and the location was more than 10 diameters after the last disturbance, it is likely that the velocity pressure measured represented fairly well developed flow and the center line velocity likely over-estimates the average velocity by 10 to 15%. Regardless, the center line velocity was used for all calculations in this report.

The volumetric flow rate in the vent stack varied from 0.146 m^3/s on the first run to 0.046 m^3/s on the latter two runs.

The emissions from the holding tank plumbing vent occur as a very short duration puff

at two points during the cycle: at the start of condenser operation and at the start of vacuum pump operation. It is postulated that these reflect the initial introduction of fluids into the holding tank displacing any air above the tank, and during the vacuum pump cycle likely the initial surge from clearing the pipes to the holding tank. No flow measurement was attempted on this source as the duration of the puff was very short.

Volatile Organic Compound Concentrations

VOC data are summarized in tables in the Appendix. The concentration of the various chemicals identified in each of the samples is presented and the Point of Impingement value for the various compounds that have standards are included in the tables.

Following the tables are several pages of chromatograms which show the VOC data captured from the GC/MS. These are pictures of the chemicals present in the samples that relate to the time the chemicals are released during the analysis. Typically these chromatograms are used to provide a visual comparison of the nature of VOC samples.

A total of 11 samples were collected as noted above. A quick review of the data shows that the concentration of VOC in the holding tank vent emissions was significantly different from the rest of the data and it should be considered in isolation.

Condenser Vent Stack

Subjectively, the tube and bag data taken from the condenser vent stack are similar in concentration. Furthermore, as the chromatograms for tube samples MB114, MB126, MB149, MB116 and MB110 show, the patterns of the chemicals are very similar. Peaks in these chromatograms can also be seen in the chromatograms of the bag samples. Two differences are evident in the bag samples, more chemicals are found after 22 minutes in the bag samples, and much less resolution is available in most of the bag samples as evidenced by few peaks in the baseline trace. The large area under the curve after 22 minutes was attributed to chemicals related to the sampling bag materials, and not to the emission source. The reason for the second observations is that the concentrations for some chemicals were so low that only the tubes were capable of registering a detectable quantity of some chemicals. The concentration in the bag samples was too low to register.

A statistical evaluation of these data show all the tube and bag samples for the individual compounds to belong to the same distribution. That is to say, it appears that the range of concentrations measured in the samples represents what should be expected as a range from the operation. None of the data points for the individual compounds seemed to be a particular outlier when compared to the rest of the data.

Overall the quantity of VOCs in the samples were generally low. The total of the quantified VOC in the tubes ranged from 370 to 4200 ug/m^3 and a similar range was

found in the bag samples. Some of the difference in the bag samples could be attributed to limited sample volumes being processed and thus not having enough chemical in the sample to register in the analysis.

For chemicals with established point of impingement [POI] values, the concentration in any sample can be compared to the POI value. Since the POI value represents the level that must not be exceeded at the critical receptor, over what is assumed to be a half hour average, any chemical emitted at a concentration less than the POI value cannot by definition exceed the POI level. Furthermore, since the duration of the releases from the facility is on the order of 4 minutes, after which flow ceases, not enough chemicals are released to result in a 30 minute average.

Given the nature of the source the equation:

$$K = \frac{0.6 \times 10^6 \times Q}{L^2}$$

Where	K	=	concentration at the point of impingement (ug/m^3)
	Q	=	rate of emissions in grams per second
	L	=	straight line distance from emission point to receptor in meters

should be applied to determine the concentration at any rooftop fresh air inlets.

As an example of the use of this equation, a high chemical concentration and flow rate can be used to estimate POI values at any point greater than 1 meter from the stack. Since Q is in grams per second, the emission concentrations in ug/m^3 needs to be multiplied by the flow rate, say the 0.15 m^3/s and taking the highest concentration found in a tube sample, 940 ug/m^3 for ethanol on the second run, the emission rate would be 141 x 10^{-6} g/s and the K value would be $85/L^2$. Since L is greater than 1 the maximum POI value that would be calculated would be <85 ug/m^3. Clearly, the emissions are within the limits prescribed by the current regulations in the province of Ontario.

It should be noted that the lowest POI value in the list of chemicals is that for naphthalene at 38 ug/m^3. This chemical was not found in the tube samples but was found in three bag samples. The level of naphthalene reported ranged from 9 to 12.7 ug/m^3. This is an order of magnitude below the level used in the preceding example suggesting that the calculated POI number would be <10 ug/m^3 or roughly one quarter of the standard. This should still be considered satisfactory.

Holding Tank Vent

As noted above the Holding Tank vent sample taken during the second cycle produced very high levels of VOCs. Comparing both the concentration data and the chromatograms of any of the MB samples against the holding tank vent sample MB122, shows that there is little similarity between the samples. A considerable number of peaks are evident in the 15 to 21 minute range of MB122 and the highest peak now occurs at about 21 minutes. Clearly, the fumes released from the vent stack are not of the same nature as those released from the condenser vent.

A closer look at the MB122 results reveals the presence of many solvents. Some of these industrial chemicals can be found in low concentrations in some of the condenser vent samples, however those levels are typical of the concentrations of such materials found when homes or industrial areas of the city are tested using this technique. Indeed, anecdotal evidence was offered by the MOE inspector on site suggesting that solvents could be smelled on the roof of the facility before the autoclave shutdown procedure started.

One plausible explanation of the high levels of chemicals found in the sampled puff may be that the holding tank vent is releasing sewer gas when the flow of water from the tank to the sewer stops. With these chemicals not being found in high concentrations in the condenser vent, it seems unlikely that the process is the source. Indeed, some of the chemicals are only found in the holding tank vent.

The dispersion equation above can be used, with the operating parameters, to estimate how much might be released and determine if this could be a concern. The puff only occurred for a few seconds at most and likely would not be of concern with respect to POI values but rather with odours that could be recognized. While noticeable, the puff was not released with a high velocity and even assuming it was a 4" diameter pipe flowing at the highest velocity pressure found for the condenser vent, the flow, based upon the area, would be approximately 25% of that from the condenser vent, or 0.0375 m^3/s. The highest emission concentration and lowest POI in the list relates to carbon disulphide and the release would be 0.004 g/s. The resulting K value using L equal to 1 would be 2200. Assuming that the nearest receptor was at the same elevation, if it was 3 m from the vent, the POI requirement would be satisfied, even if the release continued for 30 minutes, over 300 times longer than witnesses suggested that the puff was obvious.

While it does not appear that the holding tank vent emissions are directly related to the materials in the autoclave, or the process of sterilization, these releases should satisfy the Point of Impingement requirements provided that the receptor is located at least 3 meters from the vent stack.

SUMMARY

VOCs at trace concentrations were measured in the condenser vent stack during the blow down stage of autoclave operation immediately following the heating cycle. The stack gas flow rates during this phase were measured 3 times and ranged from virtually non-existent to approximately 0.15 m^3/s. At the concentrations measured the facility would satisfy the POI requirements of the Environmental Protection Act provide the nearest receptor was more than 1 m from the stack, a criteria that is satisfied.

Higher concentrations of industrial chemicals were found in the holding tank vent stack when it puffed for a few seconds during the initial operating cycles. It is not known where these chemicals originated, but evidence suggests that they did not come from the autoclave operation. Regardless, the quantity of these chemicals released is estimated to be so small that the POI requirements would be satisfied if the nearest receptor is more than 3 m from the vent. This criteria is also satisfied.

The autoclave system, complete with the condenser functioned as required during the test program and proved that the autoclave operation could occur without undue air emissions.

A.J. Chandler Associates Ltd.

AUTOCLAVE COMMISSIONING STACK TESTS

for

Medical Waste Management Inc.

95 Deerhurst Drive
Brampton, ON

APPENDIX 1

RESULTS AND FIGURES

Prepared by

A.J. Chandler & Associates Ltd.

per: A. John Chandler

February 1999

Environmental Management Consultants

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OSB Services
Environmental Air Quality Specialists

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Canada L6T 5B7

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Fax (905) 794-2338

REPORT OF ANALYSIS

CLIENT:	BAQC
CLIENT REF. NO.:	Medical Waste
DATE RECEIVED:	February 1, 1999
DATE OF ANALYSIS:	February 2-3, 1999
DATE OF REPORT:	February 4, 1999
OSB REF. NO.:	99009a

TYPE OF SAMPLE SUBMITTED:	MB Sorbent Tubes
TYPE OF ANALYSIS REQUESTED:	VOC Scan
METHOD:	Multisorbent Tubes ATD-GC-MSD

Client Reference Numbers:

Client Sample No.	Reference No.
MB114	9FEB0303
MB126	9FEB0304
MB149	9FEB0305
MB116	9FEB0306
MB110	9FEB0307
MB122	9FEB0308

ANALYZED BY: _____
Ferha Chaudary, CEET.

ANALYZED BY: _____
Richard S. Szawiola, B.Sc., C.Chem.

ASSOCIATION OF CHEMICAL PROFESSIONALS OF ONTARIO
CHARTERED
Richard Szawiola, B.Sc.
CHEMIST

REPORT OF ANALYSIS: Selected and Target Compounds in ug/m³

REPORT: 99009

CAS #	COMPOUND	Autoclave Stack First Run - Start	Autoclave Stack Second Run - Start	Settling Tank Stack Second Run End	Autoclave Stack Third Run - Start	Autoclave Stack Third Run - End of Blowdown	Autoclave Stack Third Run - Vacuum	POI (Ontario) (ug/m³)
	DESCRIPTION	9FEB0304	9FEB0305	9FEB0302	9FEB0303	9FEB0306	9FEB0307	
		MB126 SF=1.08 V=1.0L	MB149 SF=1.10 V=1.0L	MB122 SF=131.8 V=2.0L	MB114 SF=1.10 V=1.0L	MB116 SF=1.98 V=1.0L	MB110 SF=1.00 V=1.0L	
75-07-0	Acetaldehyde		78		10.5	42	33	-
67-56-1	Methanol	320	400					84000
78-78-4	2-Methyl Butane	62	22	930	15.2	24	16.1	-
109-66-0	Pentane	34		6200	7.8		7.0	-
78-79-5	Isoprene						3.4	-
64-17-5	Ethanol	76	940			31	36	19000
76-13-1	1,1,2-Trichloro-1,2,2-Trifluoroethane	18.4			3.2	15.5	13.9	2400000
67-64-1	Acetone	120	290	900	11.2	93	134	48000
75-15-0	Carbon Disulphide	17.2	17.5	98000	4.9	17.0	8.9	330
67-63-0	Isopropyl Alcohol	140	930			62	71	24000
107-83-5	2-Methyl Pentane	23	57	5400		8.2	3.9	-
75-09-2	Dichloromethane	59		1140	4.0	31	21	5300
96-14-0	3-Methyl Pentane	15.7	26	1430	3.5	5.7	2.3	-
763-29-1	2-Methyl-1-Pentene			5600				-
110-54-3	Hexane	38	69	57	8.6	14.1	6.3	35000
96-37-7	Methyl Cyclopentane		16.5	3100	1.9		1.9	-
78-93-3	MEK	60	72					31000
591-76-4	2-Methyl Hexane	14.2	35		10.5	5.5		-
110-82-7	Cyclohexane			2200				300000
589-34-4	3-Methyl Hexane	14.2	34	1450	8.1	5.0	3.2	-
71-43-2	Benzene	46	28	730	17.1	101	19.1	
142-82-5	Heptane	17.1	25	3400	6.9	8.8	2.9	-
79-01-6	Trichloroethylene				7.8			85000
108-87-2	Methyl Cyclohexane	12.4	9.7	3700	5.1	5.4	2.7	-
107-87-9	2-Pentanone	18.4						-
108-88-3	Toluene	230	580	34000	83	177	45	2000
111-65-9	Octane	17.9	14.1	16200	9.6	15.1	5.2	45400
541-05-9	Hexamethyl Cyclotrisiloxane		17.2		2.5	26	1.5	-
127-18-4	Tetrachloroethylene	6.8			6.6	6.4		10000
66-25-1	Hexanal	260						-
120-92-3	Cyclopentanone	32						-
100-41-4	Ethyl Benzene	17.5	15.2	3600	7.5	7.8	4.9	4000
108-38-3/106-42-3	m/p-Xylene	76	82	7000	34	36	24	2300*
95-47-6	o-Xylene	42		3000	12.2	9.7	6.4	2300*
100-42-5	Styrene		127	70000			10.0	400
1678-92-8	Propyl Cyclohexane					14.6		-
80-56-8	alpha-Pinene	21			2.3		1.6	-
98-82-8	Isopropyl Benzene(Cumene)			4100				100
556-67-2	Octamethyl Cyclotetrasiloxane	10.2	9.8		2.6	25	2.8	-
79-92-5	Camphene				2.6			-
103-65-1	Propyl Benzene	4.6	6.0	2100	2.0	10.3	1.4	-
620-14-4/622-96-8	m/p-Ethyl Toluene	20	11.3	1220	5.8	11.7	5.1	-
124-18-5	Decane	18.3	32	2600	11.7	21	4.1	-
108-67-8	1,3,5-Trimethyl Benzene	8.3	10.1	105			2.2	-
611-14-3	o-Ethyl Toluene	12.4		90	4.4	8.8	3.7	-
95-63-6	1,2,4-Trimethyl Benzene	24	19.6	260	9.1	14.6	4.8	500

REPORT OF ANALYSIS: Selected and Target Compounds in ug/m³

REPORT: 99009

CAS #	COMPOUND	Autoclave Stack First Run - Start DESCRIPTION 9FEB0304 MB128 SF=1.08 V=1.0L	Autoclave Stack Second Run - Start 9FEB0305 MB143 SF=1.10 V=1.0L	Settling Tank Stack Second Run End 9FEB0308 MB122 SF=131.8 V=2.0L	Autoclave Stack Third Run - Start 9FEB0303 MB114 SF=1.10 V=1.0L	Autoclave Stack Third Run - End of Blowdown 9FEB0306 MB116 SF=1.08 V=1.0L	Autoclave Stack Third Run - Vacuum 9FEB0307 MB110 SF=1.08 V=1.0L	POI (Ontario) (ug/m³)
138-86-3	Limonene	54	23	1170	9.3	10.7	4.1	-
541-73-1	1,3-Dichlorobenzene		12.8					-
526-73-8	1,2,3-Trimethyl Benzene	14.2	27	84	5.2	9.7	5.7	-
1120-21-4	Undecane	21	45		9.4	14.9	7.6	-
541-02-6	Decamethyl Cyclopentasiloxane	63	35			30	19.6	-
112-40-3	Dodecane	6.9	25	440		9.8	5.4	-
629-50-5	Tridecane		13.5		3.7	10.0	3.0	-
629-59-4	Tetradecane		9.7		1.9	13.4	3.8	-
-	C4 Benzenes	64	35	520	22	28	9.9	-
-	C8 Hydrocarbons			115000				-
-	C9 Hydrocarbons			169000				-
-	C10 Hydrocarbons			40000				-
-	C11 Hydrocarbons			16200				-
	TVOCs (Toluene)	1770	2900	635000	450	1130	490	
	TVOCs (Quantified)	2100	4200	621000	370	960	560	

POI = Half Hour Point of Impingement (Ontario Ministry of Environment and Energy)

Blank = Below integration threshold but presence or absence was not verified by manual search

* & ** = Sum of all isomers

SF = Split dilution factor

V = Volume of air sampled

OSB Services
Environmental Air Quality Specialists

OSB LAB
a division of OSB Services

14 Abacus Road
Brampton, Ontario
Canada L6T 5B7

Phone (905) 794-3672
Fax (905) 794-2338

REPORT OF ANALYSIS

CLIENT:	BAQC
CLIENT REF. NO.:	Medical Waste
DATE RECEIVED:	February 1, 1999
DATE OF ANALYSIS:	February 2-3, 1999
DATE OF REPORT:	February 4, 1999
OSB REF. NO.:	99009b

TYPE OF SAMPLE SUBMITTED:	Gas Bags
TYPE OF ANALYSIS REQUESTED:	VOC Scan
METHOD:	Multisorbent Tubes ATD-GC-MSD

Client Reference Numbers:

Client Sample No.	Reference No.
MB126 Bag #1	9FEB0403
MB149 Bag #3	9FEB0404
MB149 Bag #4	9FEB0207
MB114 Bag #5	9FEB0208/9FEB0406

ANALYZED BY: Ferha Chaudary
Ferha Chaudary, CEET.

ANALYZED BY: R. Szawiola
Richard S. Szawiola, B.Sc., C.Chem.

REPORT OF ANALYSIS: Selected and Target Compounds in ug/m³

REPORT: 99009b

CAS #	COMPOUND	Autoclave Stack First Run - Start 9FEB0403 BAG #1 V=5.0L	Autoclave Stack Second Run- Start 9FEB0404 BAG #3 V=5.0L	Autoclave Stack Second Run 2 minutes into Run 9FEB0207 BAG #4 V=0.1L	Autoclave Stack Third Run - Start 9FEB0208 BAG #5 V=0.2L	Autoclave Stack Third Run - Start 9FEB0406 BAG #5 SF=2.15 V=5.0L	POI (Ontario) (ug/m³)
75-07-0	Acetaldehyde	2.3	6.0	21			-
67-56-1	Methanol	230	470	186	48	128	84000
78-78-4	2-Methyl Butane	15.4	14.9	105	20	15.1	-
109-66-0	Pentane	16.9	9.0	27		8.2	-
64-17-5	Ethanol	79	810	51		114	19000
76-13-1	1,1,2-Trichloro-1,2,2-Trifluoroethane	10.1				6.5	2400000
67-64-1	Acetone	112	159	140	24	47	48000
67-63-0	Isopropyl Alcohol	140	670	410	51	109	24000
107-83-5	2-Methyl Pentane	25	33	25		19.5	-
75-09-2	Dichloromethane			220			5300
96-14-0	3-Methyl Pentane	9.3	15.2	23		4.6	-
110-54-3	Hexane	29	45	57	10.8	11.0	35000
96-37-7	Methyl Cyclopentane		13.2			2.9	-
78-93-3	MEK	119	70			16	31000
141-78-6	Ethyl Acetate					16.9	19000
591-76-4	2-Methyl Hexane	12.9	21	35		9.3	-
589-34-4	3-Methyl Hexane	11.4	21	23		6.7	-
71-43-2	Benzene	14.6	20	35	7.3	12.6	
142-82-5	Heptane	13.2	15.9	14.0		6.6	-
71-36-3	n-Butanol	100					2278
79-01-6	Trichloroethylene		9.7			9.8	85000
108-87-2	Methyl Cyclohexane		10.9	14.9		6.5	-
107-87-9	2-Pentanone	36					-
108-88-3	Toluene	171	220	320	119	74	2000
111-65-9	Octane	12.4	6.0			4.1	45400
541-05-9	Hexamethyl Cyclotrisiloxane	31	35		27	1.5	-
127-18-4	Tetrachloroethylene	7.9	11.7			6.4	10000
66-25-1	Hexanal	400					-
120-92-3	Cyclopentanone	11.5					-
100-41-4	Ethyl Benzene	15.5	13.6	17.8	6.5	12.7	4000
108-38-3/106-42-3	m/p-Xylene	55	54	70	26	41	2300*
95-47-6	o-Xylene			18.3	7.9	13.4	2300*
100-42-5	Styrene	44	67				400
80-56-8	alpha-Pinene	6.6	4.4			2.5	-
556-67-2	Octamethyl Cyclotetrasiloxane				7.1		-
103-65-1	Propyl Benzene	U	U			U	-
620-14-4/622-96-8	m/p-Ethyl Toluene	U	U			U	-
124-18-5	Decane	U	U	35		U	-
108-67-8	1,3,5-Trimethyl Benzene	U	U			U	-
95-63-6	1,2,4-Trimethyl Benzene		14.7	20	8.5	15.7	500
100-52-7	Benzaldehyde	220	41				-
138-86-3	Limonene		8.9	21	10.3	10.4	-

REPORT OF ANALYSIS: Selected and Target Compounds in ug/m³

REPORT: 99009b

CAS #	COMPOUND	Autoclave Stack First Run - Start DESCRIPTION 9FEB0403 BAG #1 V=5.0L	Autoclave Stack Second Run - Start 9FEB0404 BAG #3 V=5.0L	Autoclave Stack Second Run 2 minutes into Run 9FEB0207 BAG #4 V=0.1L	Autoclave Stack Third Run - Start 9FEB0208 BAG #5 V=0.2L	Autoclave Stack Third Run - Start 9FEB0406 BAG #5 SF=2.15 V=5.0L	POI (Ontario) (ug/m³)
526-73-8	1,2,3-Trimethyl Benzene		16.7			16.3	-
1120-21-4	Undecane	57	28			11.3	-
541-02-6	Decamethyl Cyclopentasiloxane				27		-
112-40-3	Dodecane	16.4	20		6.3	7.4	-
91-20-3	Naphthalene	12.7	10.3			9.0	36
629-50-5	Tridecane	5.1	4.8			1.4	-
629-59-4	Tetradecane		3.8			1.6	-
	TVOCs (Toluene)	2300	1870	1420	560	750	
	TVOCs (Quantified)	2000	3000	1890	410	780	

POI = Half Hour Point of Impingement (Ontario Ministry of Environment and Energy)

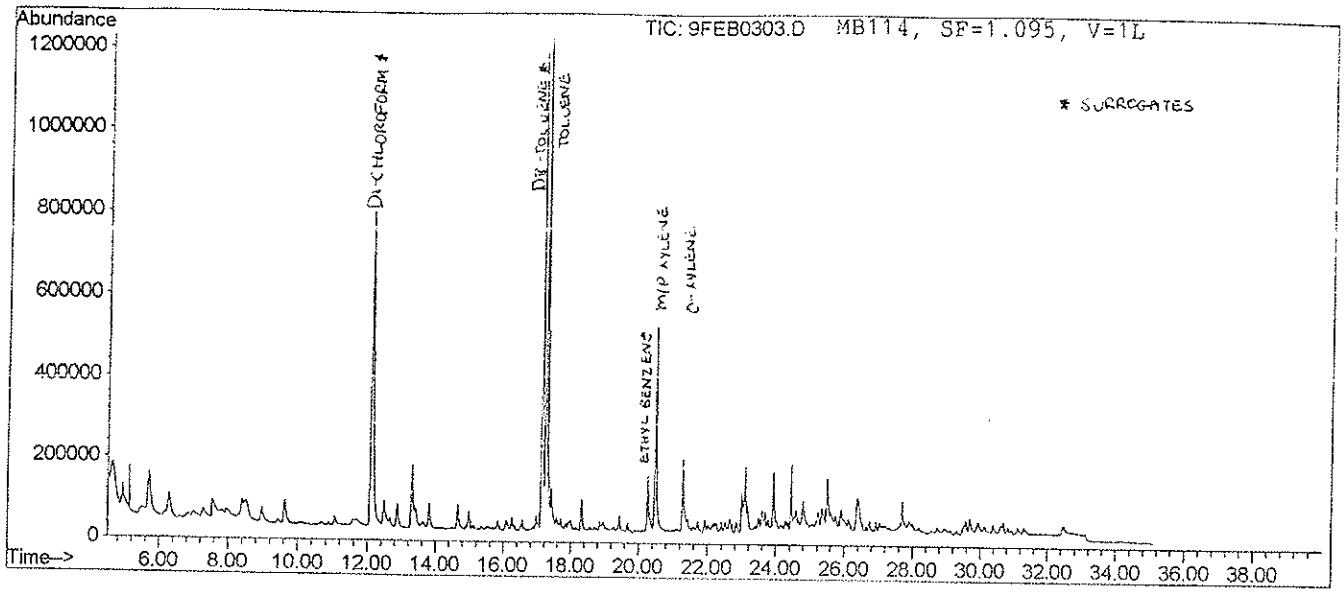
U = Unresolved due to co-elution

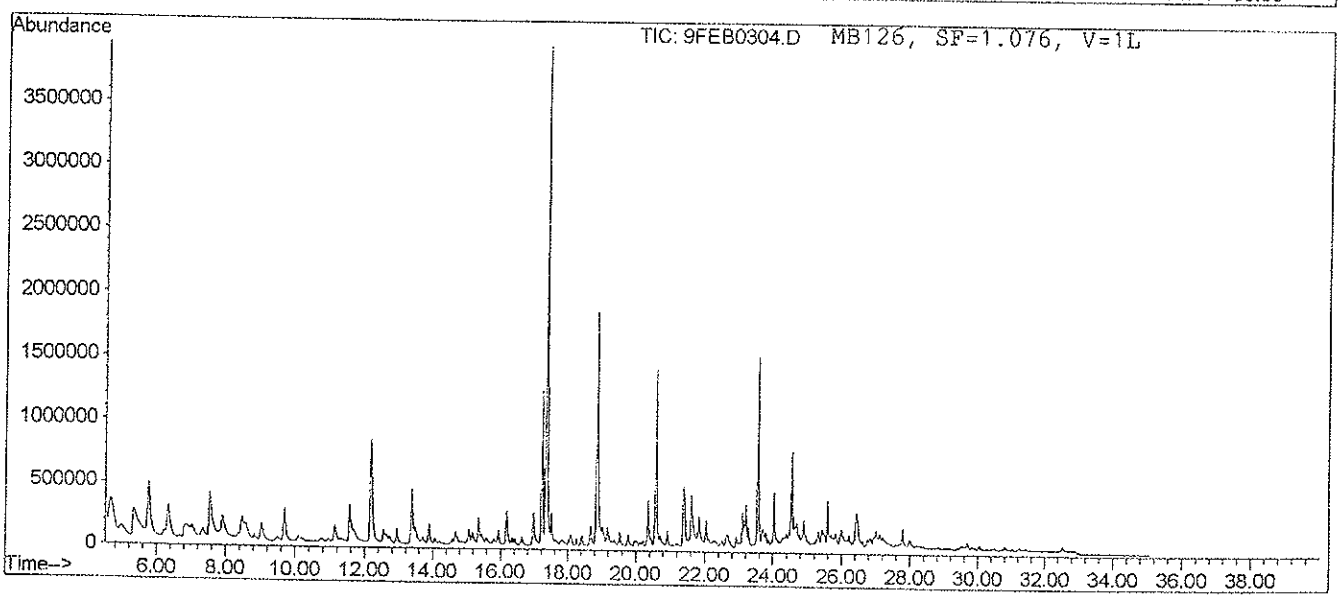
Blank = Below integration threshold but presence or absence was not verified by manual search

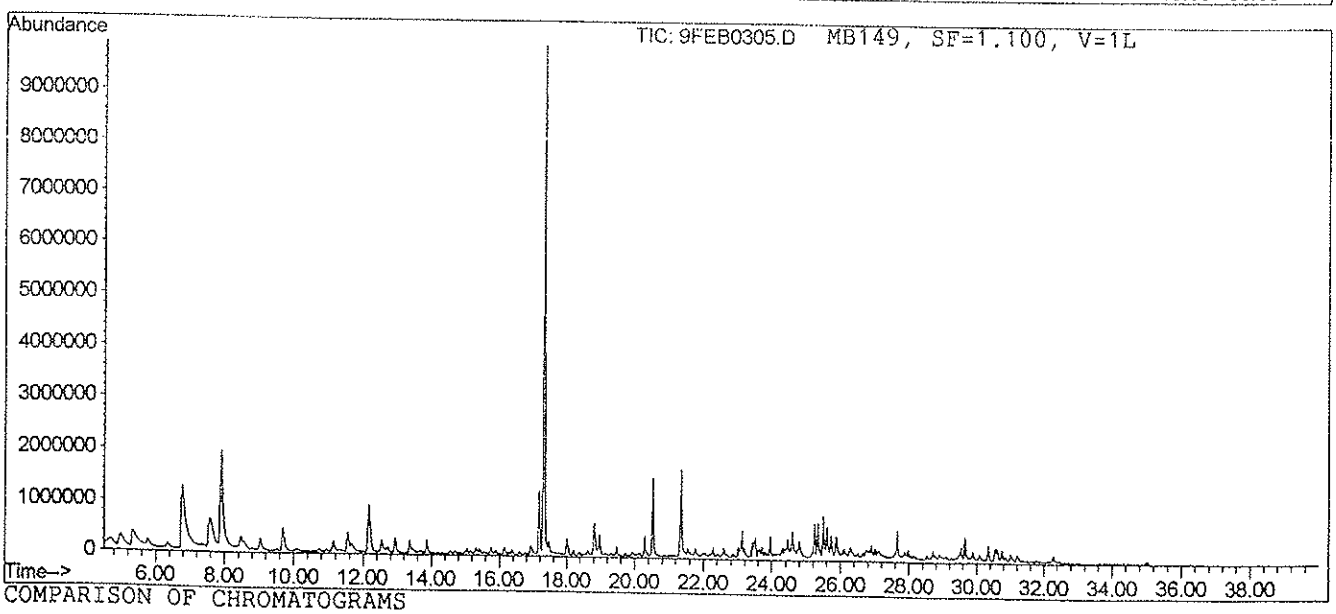
* & ** = Sum of all isomers

SF = Split dilution factor

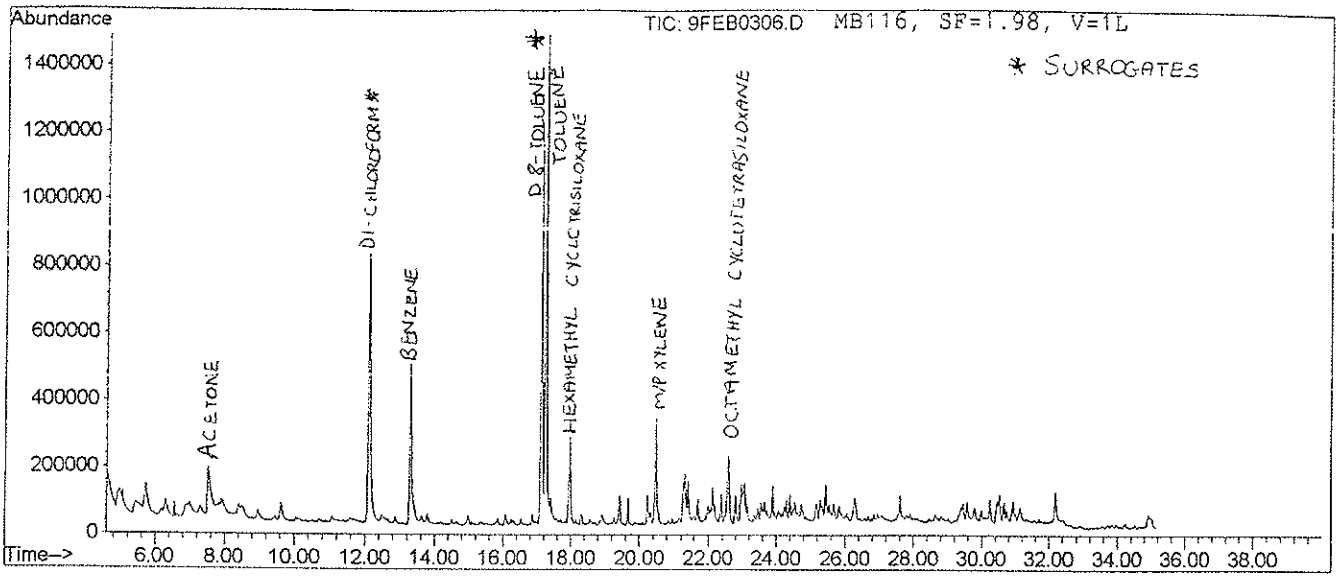
V = Volume of air analyzed

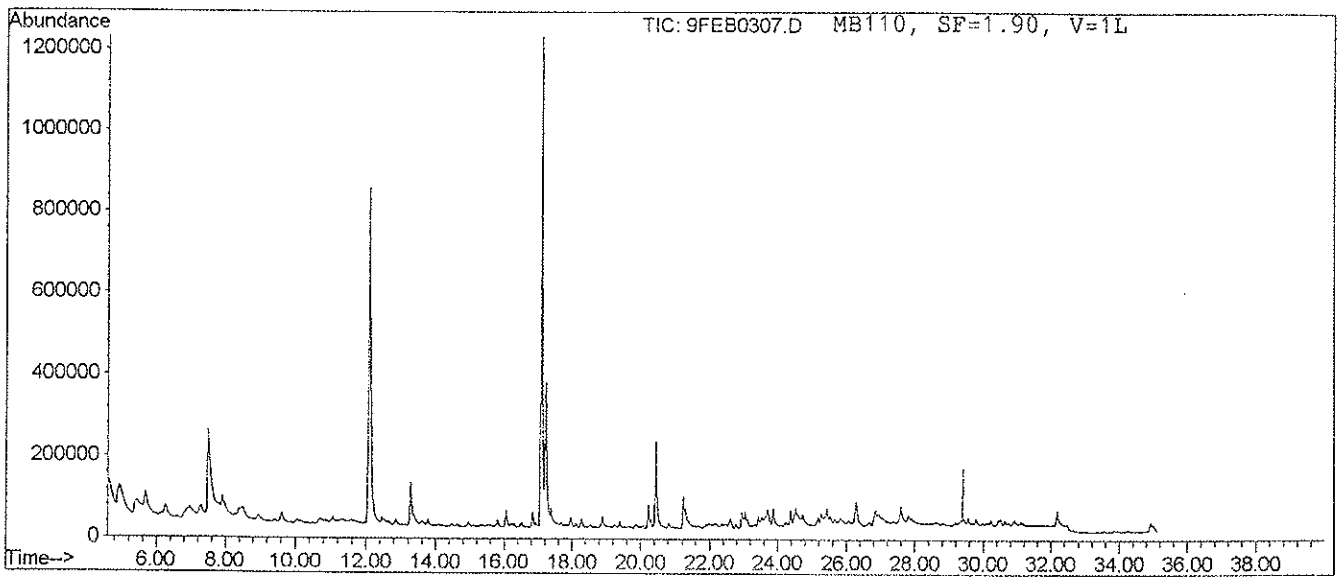


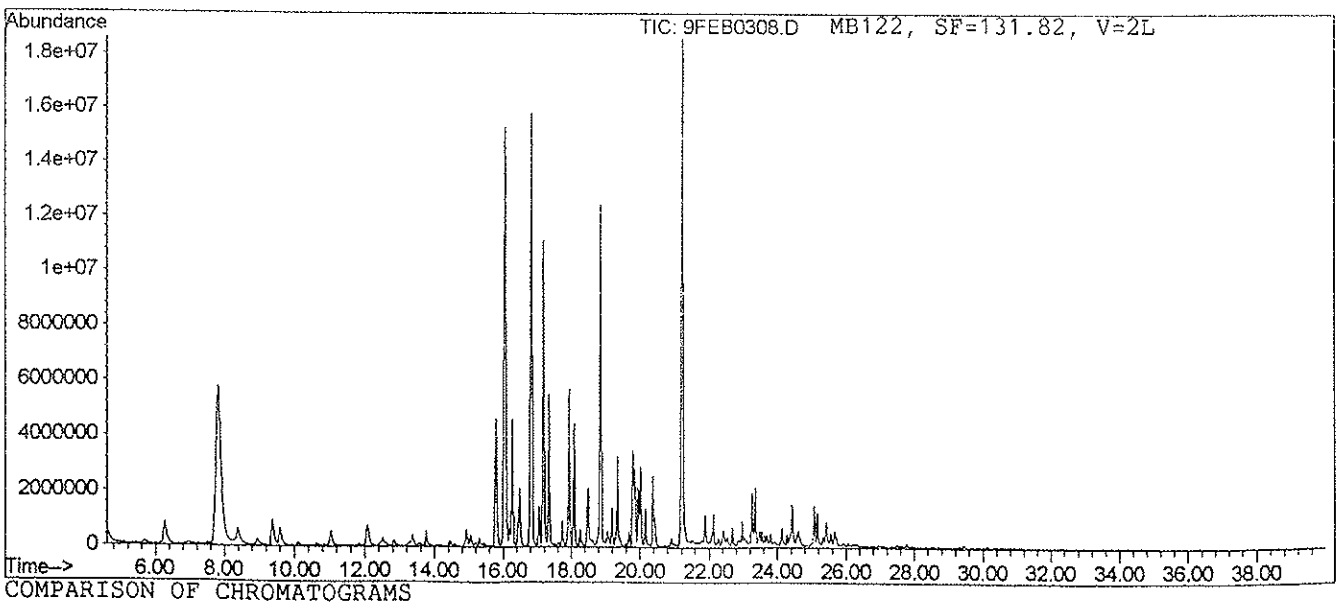




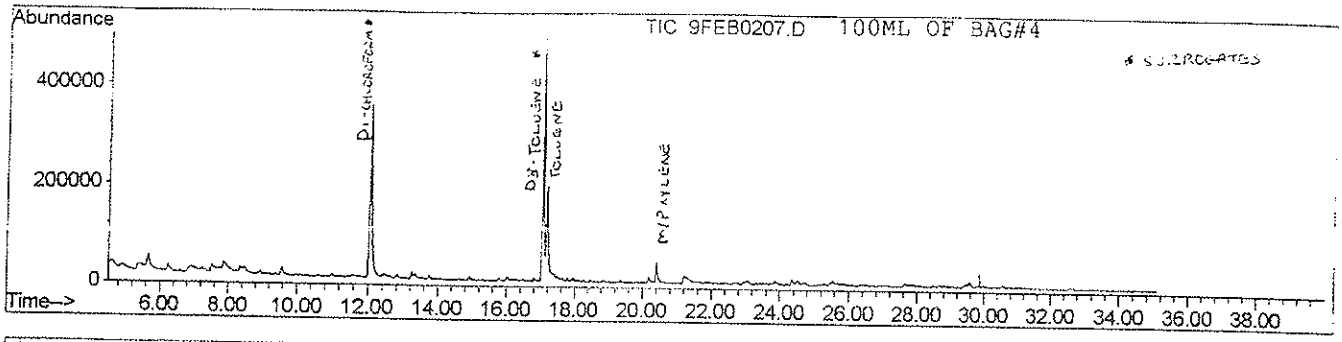
COMPARISON OF CHROMATOGRAMS

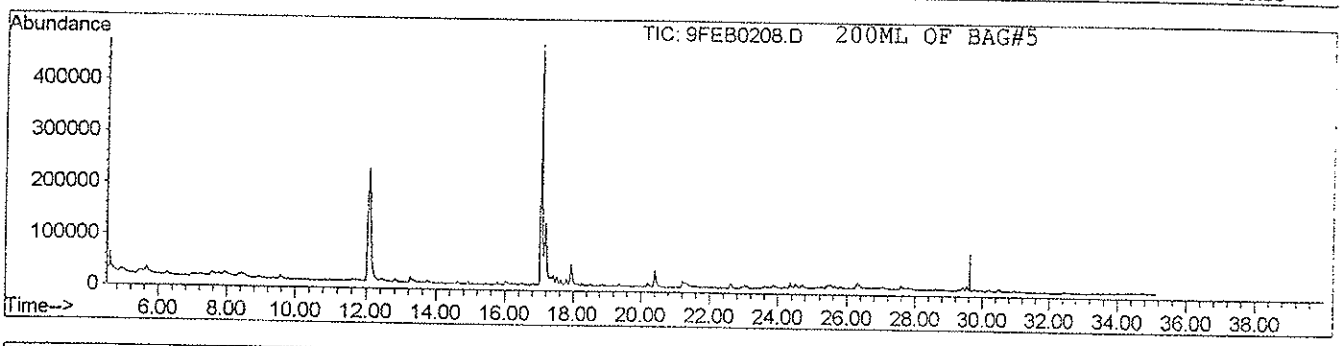


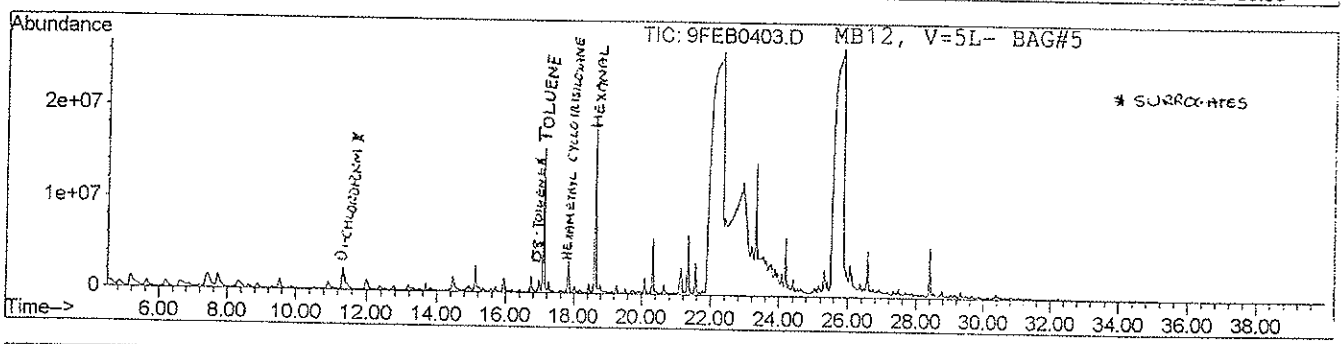


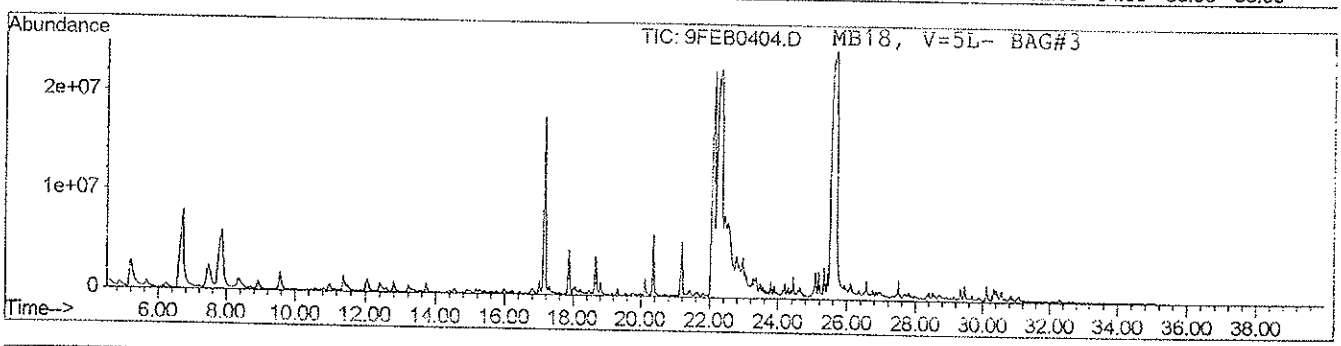


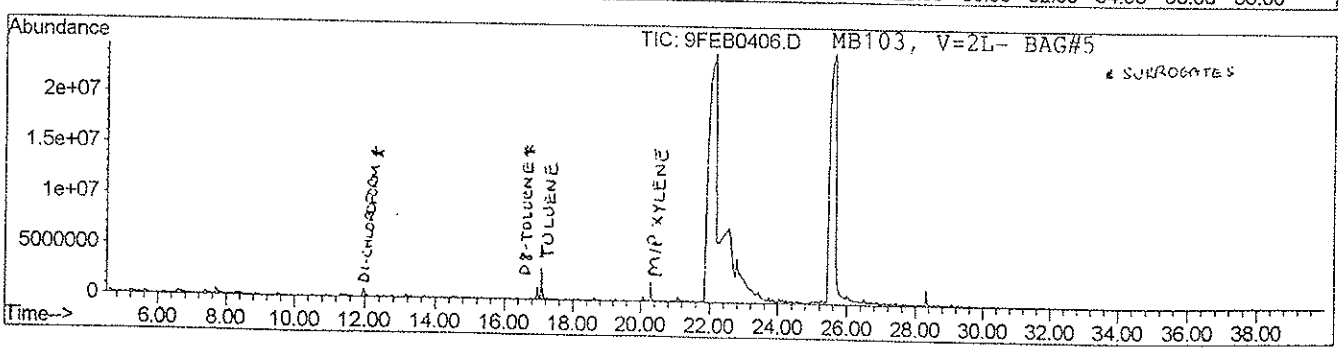
COMPARISON OF CHROMATOGRAMS











COMPARISON OF CHROMATOGRAMS

Appendix G
MWM Brampton Facility Operations Manual

Introduction

The operating manual should be used as a reference document which provides a broad understanding of Medical Waste Management's activities as well as detailed descriptions of all procedures in effect at the Brampton site.

The manual describes the company's policies and rules, regulations and certificates of approval governing it's operations. The procedures included in this manual include both waste handling and equipment operation aspects of the site. The manual also covers the health and safety rules and procedures related to the site and its activities.

The manual is meant to be used by all site personnel as a reference tool and is also the basis upon which all training activities are based. It will be a requirement of Medical Waste Management Inc. to have all employees study the manual, and to be familiar with all of the rules and regulations included in the manual. The manual is also used to assist in the due diligence process presented to Medical Waste Management by regulatory officials of corporate clients. Confidentiality is requested during and after the review of this document.

Section 1: Corporate Policy

This section provides a brief overview of the company, its activities as well as the various policies governing its operation. Finally, the section describes the Brampton site and its specific activities and role.

1.1 Medical Waste Management Inc.

Principal Values

- Environmental compliance
- Advancement of technology
- Commitment to healthcare
- Uncompromised service
- Honesty and integrity

1.2 Mission Statement

Medical Waste Management Inc. is committed to providing the highest standard of packaging, collection, transportation, destruction & disposal service to our Ontario health care customers. We are also firmly committed to managing and mitigating any potential health, safety and environmental risks to our employees, customers and the general public, including the environment in which we operate.

Medical Waste Management Inc. will conduct its business in an efficient, safe and responsible manner with full respect for the responsibilities of municipal, regional, provincial and federal governments to regulate our industry and protect the public.

Medical Waste Management Inc. has developed and will maintain a new standard for the packaging, transportation, destruction and disposal of Ontario biomedical and pharmaceutical waste, to which all other companies will be measured.

1.3 Environmental Policy

Medical Waste Management Inc. is an organization committed to providing environmental security and protection to our customers in both private and public sectors, to our employees, and to the community in which we operate.

We will work closely with regulatory agencies and industry associations to develop and comply with sound environmental policies. We at Medical Waste Management Inc. will maintain a standard that surpasses our legal responsibilities.

We will recycle, re-use and recover resources as an alternative wherever feasible.

We will routinely conduct internal environmental audits of our operation and will act promptly to respond to any deficiencies we may find. We will ensure total compliance with the Corporation's operating authorities and environmental legislation and regulations.

Our management will monitor each operating unit and will ensure that these principles are maintained. Any intentional breach by an employee of the terms and conditions of the corporation's operating authorities or environmental legislation or regulations will be grounds for immediate dismissal.

1.4 Health and Safety Policy

Medical Waste Management Inc. is totally committed to the prevention of all accidents both on site and on the road.

Medical Waste Management Inc. has committed to the highest safety standards designed to protect the health and safety of all employees, our customers and the community in which we work.

1. Medical Waste Management Inc. is responsible for informing employees of all known hazards and developing effective standards to protect their health and safety.

2. Each manager and supervisor is responsible for providing a healthy and safe work environment and for controlling hazards through the use of well designed process, equipment, and training programs.

3. Each employee is responsible for working and acting safely at all times, and reporting any deficiencies or related incidents to his/her supervisor.

Section 2: Operating Manual Maintenance

This section describes the manual's review and update procedures. Also, identifying the personnel responsible for maintaining, communicating and ensuring compliance with the manual.

2.1 Review and Update Procedure

The manual must be updated on a continual basis as new procedures are developed and old ones are changed. However, once a year, the manual will be reviewed in its entirety to ensure all procedures are still valid and in effect.

2.2 Responsibilities for Maintaining and Ensuring Compliance with the Manual

The manual maintenance activities should be performed by the plant supervisor and the transportation supervisor. It is their responsibility to ensure all appropriate procedures are in the manual and that any changes or updates are dealt with on a continual basis. Both the plant and transportation supervisor must communicate the procedures to all employees under their supervision.

MWM management maintains overall responsibility to ensure total compliance with all procedures and policies stated in this manual.

It is also the responsibility of both the plant and transportation supervisor to ensure that the employees under their supervision have the proper knowledge and experience to accomplish their day to day jobs according to the procedures set out in this manual. They must also provide the appropriate training required.

Section 3: Employee Training

This section outlines the company's training policies which are in effect for all plant staff as well as transportation staff. It describes the training to be given to any new employee as well as the on-going training requirements and schedule. Individuals will be trained in their specific area of responsibility, and wherever possible, we will hire a professional to perform training on or off site.

3.1 Training Policy

It is a priority with Medical Waste Management Inc. to have all employees properly trained and aware of all of the latest regulations associated with each individual job.

Medical Waste Management Inc. will provide the appropriate training to all new employees before they are assigned their tasks, MWM will also provide refresher training when required, and new training when required.

3.2 Employee Orientation

All New Medical Waste Management Inc. employees will be fully informed of the potential hazards involved in their work. In this specialty field of bio-medical and pharmaceutical waste disposal, there is a great deal of knowledge required in dealing properly and safely with this unique stream of waste.

Each new employee will be provided a full orientation and training to: learn about the company; learn how to do their job well and safely; and, learn why we do things a certain way.

The orientation program has two major parts: a general section applicable to all new employees; and a second section specific to the individual employee's job. The complete list is documented in the orientation list for new employees.

Those employees that will be in direct contact with both the handling and the transportation of bio-medical waste will receive special training and certification in all aspects of safe and correct methods and procedures outlined in the Transportation of Dangerous Goods Act (TDGA). The complete requirements for both plant staff and transportation staff are outlined in detail in section 3.2.1 and 3.2.2.

The orientation program is conducted for all new employees in the following matter:

1 - One-on-one presentation and discussion of relative material with the new employee.
2 - A demonstration of specific procedures/materials by the supervisor.
3 - Reading and studying the operating manual, job description.
4 - Payroll and benefits
5 - Probationary period (3 months)
6 - Staff discipline
7 - Facilities
8 - Uniforms
9 - Introductions to staff

The orientation program is followed by the training program.

3.2.1 Plant Employee Training Program

The orientation and training program for plant employees is conducted over a three to ten day period depending on the job, and commences the first day of employment with MWM. The new employee will receive training specific to their job. The following schedule provides a general description and indication of the expected time frame for an average employee to complete the training program.

Step 1

- Orientation

Step 2

- Operating procedures for the job
- Equipment handling, and preventative maintenance
- Review of materials presented so far

Step 3

- Enrollment in a certified training program (if applicable)

Step 4

- Evaluation by plant supervisor

Step 5

- If necessary, review specific areas
- Work along with experienced employee
- Written and practical test (if applicable)
- Employee should now be ready to work on his/her own

Step 6

- At completion of probationary period, the employee will have review by his/her supervisor
- Annual evaluations
- Employee feedback (performance review)

3.2.2 Transportation (driver) Employee Training Program

The Medical Waste Management Inc. driver training program is designed to conform with the high standards set out by both the Ontario Ministry of Environment (MOE), Ministry of Transportation (MTO), Transport Canada and Environment Canada. The schedule of procedures are as follows:

Step 1

- Orientation

Step 2

- The new driver will begin by studying the specifications of all of our vehicles, including:
    - dimensions
    - maximum capacity
    - licensing requirements
    - proper preventative maintenance checks
- Each driver must have a good understanding of the operation of his/her vehicle; any additional information needed will be retrieved from the truck operation manual.
- The driver should also have a good understanding of the operation of the refrigeration unit; any additional information can be retrieved from the reefer operation manual.
- The transportation supervisor will review and demonstrate the proper operation of all equipment pertaining to the driving job.
- The new driver will also be responsible for learning the proper loading and unloading procedures of the trucks. These procedures are outlined in section 8.2 of the manual. The transportation supervisor will review and demonstrate these procedures with the new driver.
- The new driver must become familiar with the legislation that governs our operation. The driver must first study the relevant material, and then review the material with the transportation supervisor. The areas of review will be:
    - Transportation of Dangerous Goods Act
    - Occupational Health and Safety Act
    - Medical waste handling regulations
    - Certificates of approvals
- New drivers will be made aware of all environmental concerns with the type of waste we handle and with the potential environmental hazards involved. This information is outlined in greater detail in section 6.1 of this manual.
- The new driver will be made aware of what to do in the case of an accident; whether a personal injury, spill, or motor vehicle accident. The procedures are outlined in greater detail in section 5 of this manual.

Step 3

- Once the driver has mastered all of the above material, he/she will work along with an experienced driver for 5 days. The experienced driver will be reviewing all relevant information with the new driver on a daily basis.

Step 4

- After completing the 5 day training with the experienced driver, the new driver must demonstrate his/her understanding and ability by completing the following:
    - a road test (with transportation supervisor)
    - handling a mock spill
    - a written test

- driver should now be ready to work on his/her own

Section 4: Regulatory Requirements - Medical Waste Management Inc.

This section outlines the various regulatory requirements of Medical Waste Management Inc. The objective is to outline the various requirements imposed on the operation from the various certificate of approvals granted to Medical Waste Management Inc. All employees of Medical Waste Management Inc. will be required to become familiar with all certificates of approval.

4.1 Ontario Waste Generator: ON 2383800

The new Ontario biomedical waste regulations requires that generators of subject wastes be registered with the Waste Management branch. Medical Waste Management Inc. is registered as a generator of the following subject wastes:

- Pharmaceuticals (261A, 261B, 261I, 261L)
- Pathological wastes (312P)
- Waste compressed gases (331A)

Medical Waste Management Inc. can only generate these subject wastes. Any addition must be applied for.

The biomedical waste regulations require that all generators of subject waste use a federal manifest when shipping this waste for disposal and to indicate our generator number on the manifest. When we are picking up subject waste from customers, we must ensure that the customer has an Ontario Generator Number (unless exempt), and that number should appear on the manifest.

Note that only nursing homes, homes for the aged and rest homes, homes for special care, dentists and doctors are exempt from the registration requirements. There is no small quantity exemption for biomedical waste in Ontario.

4.2 Transportation Certificate of Approval: A 841667

In order for Medical Waste Management Inc. to transport biomedical waste (or any other subject waste) in Ontario, a System Certificate of Approval is required.

Medical Waste Management Inc. is authorized to transport this waste stream by Provisional Certificate of Approval No. A 841667. This section describes the main requirements of the certificate.

Waste types allowed:

- pharmaceutical waste (261)
- biomedical waste (312)
- non-biomedical waste generated by human health care and residential facilities
- solid non-hazardous waste from biomedical and pharmaceutical waste generators
- solid non-hazardous waste contracted for product destruction

Insurance:

Every vehicle must be insured under a vehicle liability insurance for a minimum of $1,000,000.

Driver Training:

All drivers must have received training in accordance with the requirements of the biomedical waste regulations and the Transportation of Dangerous Goods Act.

Driver Documents:

Each vehicle must have a copy of the Certificate of Approval and a copy of the liability insurance certificate on board, also on board is a copy of the Equivalent Level of Safety. The driver is responsible for carrying his/her own certificate for the transportation of Dangerous Goods.

Vehicle Waste Storage Compartment:

- must be insulated and refrigerated at 4 degrees Celsius or lower
- floor must be metal surfaced and the walls metal or glassboard surfaced
- floor must be sealed and include system capable of containing liquids
- no windows or ventilation openings shall exist
- shall have only one lockable door
- an interior light
- should be locked at all times (while parked or in transport)
- must be disinfected at the end of each operating day

Vehicles:

- any addition, deletion or changes to the fleet of vehicles must be reported to the Approvals branch of the MOE.
- shall be marked on both sides with the company name, C of A number and a biohazardous symbol.
- waste cannot be stored on a vehicle overnight when parked on site at MWM.

Waste Containers:

- Medical Waste Management Inc. will refuse to accept any waste which is not properly packaged (sealed leakproof containers with biohazardous label).

Medical Waste Management Inc. must comply with all applicable requirements of the TDGA and the permit for Equivalent Level of Safety SU 5514. Placards are required when transporting any infectious, potentially infectious waste, or hazardous pharmaceutical waste.

4.3 Processing Provisional Certificate of Approval No. A680324

In order for Medical Waste Management Inc. to treat biomedical waste or any other subject waste in Ontario, a System Certificate of Approval is required.

Medical Waste Management Inc. is authorized to treat this waste stream by Provisional Certificate of Approval No.A680324. This section describes the main requirements of the certificate.

Waste Categories:

The Certificate of Approval allows for the transfer and/or processing of Ontario waste classes 261 (pharmaceutical waste) and 312 (biomedical waste) and solid non-hazardous waste. Currently, MWM is required to store/transfer 261A, 261B, Cytotoxic, and Anatomical waste for incineration. All incoming waste will be inspected prior to being accepted at the site.

Site Operations:

- all activities associated with the loading/unloading, processing and storage of waste must be conducted all indoors.
- the amount of waste received on-site cannot exceed 25 tonnes per day.
- the amount of waste stored on site cannot exceed 50 tonnes at any given time.
- all biomedical waste (excluding cytotoxic waste) that is not processed within 72 hours of receipt at the site shall be stored in a secure, enclosed and refrigerated storage area.

Record Keeping:

Daily records both in a log book or in our computer system, shall be maintained and contain the following information:

- the source, type and amounts of materials received
- the type, amounts and destinations of materials shipped from the site
- the amounts stored at the site at the end of each operating day
- the number of processing cycles completed
- the temperature, pressure and duration of each processing cycle

Note that materials include: biomedical waste, pharmaceutical waste, solid non-hazardous waste, treated biomedical waste, shredded pharmaceutical and solid non-hazardous waste.

4.4 Air Certificate of Approval No.8-3443-98

Medical Waste Management Inc. has a Certificate of Approval for the air emissions of the gas-fired boiler, and the emissions from the autoclave condenser. Any modifications to this boiler system requires an amendment to the certificate.

Section 5: Environmental Management System

This section outlines the various procedures associated with the Environmental Management system in place at Medical Waste Management Inc. It describes how compliance is to be monitored as well as the procedures related to any incidents that could have an adverse effect on the environment if they are not handled properly.

5.1 Compliance Monitoring System

It will be the responsibility of management to monitor compliance with regards to all current regulations and with respect to our Certificates of Approvals. Management should be on top of all regulations and amendments to Certificates of Approvals. Any changes that should be made in order to stay within compliance should be made immediately. The compliance system will be an on going day to day process.

5.2 Odor Control Plan

To be developed

5.3 Emergency Response Plan

This section outlines how to respond to various accidents that could occur in our day to day operation.

There are five distinct categories of accidents that employees must be prepared for:

- Employee personal injury accident
- Environmental (spill) accident
- Motor vehicle accident
- Fire
- Equipment accident

Medical Waste Management Inc. has developed the following procedures to ensure that our staff take the correct action after an accident. The procedures outline all steps including first aid, spill containment, and reporting.

5.3.1 Employee personal injury accident

Even while working carefully, accidents may happen. If and when an accident occurs, it is important to report it to your supervisor, it doesn't matter how serious.

What to do in case of an accident:
First: first aid
Second: reporting

Detail Steps:

- for all needlestick injuries - mandatory doctor or emergency services

If you have been cut or scraped:
- wash hands thoroughly with soap and water
- wash and disinfect wound as soon as possible, use hydrogen peroxide from first aid kit
- cover wound using bandages from the first aid kit

If you have been splashed:

- wash thoroughly with soap and water (shower if needed)
- spit out anything that gets into your mouth immediately then rinse with water then spit again
- notify your supervisor immediately
- complete the accident report and submit to supervisor

5.3.2 Environmental (spill) accident

The process of dealing with a spill or leak involves the following:

- Containment - keeping the spill from spreading
- Decontamination - disinfecting the spilled/leaked material and the spill area
- Clean up
- Reporting

The detailed process is as follows:
- get all bystanders out of the spill area
- contact MWM as soon as the spill is under control
- put on protective clothing: rubber gloves, goggles, coveralls.
- place absorbent socks around the spill to stop the spill from spreading. Pour the absorb-all absorbent material on the spill to absorb any liquid from the spill.
- prepare a container complete with a liner.
- clean up the debris using the broom and dustpan, and put into the container.
- remove protective gear:
    - put dustpan and broom in plastic bag
    - put gloves and coveralls in the container for disposal
    - put goggles and respirator in another plastic bag
    - do not discard these bags when you return to the plant-save for decontamination
    - if the spill takes place at the generator site, notify the generator immediately of the incident, and the action taken

5.3.3 Motor Vehicle Accident

The priorities for dealing with a motor vehicle accident are quite similar to those for any accident:

First:	personal safety
Second:	first aid
Third:	spill containment
Fourth:	reporting
Fifth:	documentation (insurance)

In the event of a motor vehicle accident it is most important that you remember to fill out the accident report fully and completely with all details for our insurance company. Each vehicle is equipped with a binder including all documentation required for completely filling out the accident report (also in the binder).

Points to remember in case of a motor vehicle accident:

- offer assistance to those injured.
- call the appropriate law enforcement (police) and your supervisor immediately to report any accident.
- if the accident involves personal injury, or the vehicle is seriously damaged, do not attempt to move the vehicle until authorized to do so by the investigating officer.
- do not discuss or take any blame for the accident.
- fill in the accident report immediately, completing all details which can be obtained from the scene.

Medical Waste Management Inc.

Motor Vehicle Accident Report

Driver's name: _____
Vehicle number: _____
Date: _____

Information Regarding Other Vehicle:

Make: _____ Year: _____
License plate: _____ Year: _____ Province: _____
Trailer plate: _____ Year: _____ Province: _____
Driver name: _____ Gender: M____ F_____
Driver permit number: _____
Vehicle owner: _____
Address: _____
_____
_____

Insurance Company: _____
Agent: _____
Policy number: _____
Obvious damage:

_____
_____
_____

Passenger information - other vehicle
names, addresses, injuries (if any):

_____
_____
_____

Police Information:
Officer name: _____
Badge number: _____
Department: _____
Officer name: _____
Badge number: _____
Department: _____

Witnesses - Names and addresses:

_____
_____
_____

Medical Information - Doctor at scene (if any):
Name: _____
Address: _____
_____
_____

Diagram of Accident Scene:

Draw an accurate sketch of the accident scene, along with the events of accident on this page, including the direction of travel, point of impact and relation of traffic lanes, signals and signs.

5.3.4 Driver Discipline/Incentive Program

The purpose of the Driver Discipline/Incentive Program is to maintain driver awareness of the importance of driving safety and to prevent accidents.

A "preventable accident" is defined as:

Any incident or accident which results in property damage or injury to any property or any person resulting from an action of the employee in charge of the vehicle, or resulting from the lack of proper action which could have prevented the incident or accident by the employee.

The following guidelines will be the disciplinary action taken in the event of an accident. In addition to the following, any driver involved in an accident which is judged to be preventable, shall have his or her driving skills evaluated by the Transportation Supervisor prior to resuming normal driving duties.

Preventable Incident:

A preventable incident shall be deemed to be an accident in which damages do not exceed $1000.00. The amount of the damages will be determined by the transportation supervisor. A verbal warning, with a note to the employee's file, will follow the first preventable incident.

Minor Preventable Accident:

A minor preventable accident shall be deemed to be an accident in which total damages do not exceed $2000.00. The amount of the damages will be determined by the transportation supervisor. A minimum one-day suspension, maximum three-day suspension - without pay - shall follow the first minor preventable accident within a twelve month period. Two minor preventable accidents within a twelve month period will lead to the dismissal of the employee.

Major Preventable Accident:

A major preventable accident shall be deemed to be an accident in which total damages exceed $2000.00, or one in which a third party claim results. The amount of the damages will be determined by the transportation supervisor. A minimum three-day suspension, maximum five-day suspension - without pay - will follow any major preventable accident. Two major preventable accidents within a five-year period shall lead to the dismissal of the employee.

Driver Safety Incentive:

Medical Waste Management Inc. will develop a drivers safety incentive program which will result in an annual bonus to drivers. This will promote driver safety and awareness. This offer will not be available for those drivers with any convictions or accidents within the current year of evaluation.

Driver Discipline/Incentive Program Guidelines:

A driver who is charged and convicted of a moving traffic violation under any Federal or Provincial statute while operating a company vehicle shall be treated as having been involved in a minor preventable accident and liable to the penalties provided for in respect of a minor preventable accident exclusive of suspension. Failure of an employee to report a charge will be cause for dismissal. Any preventable accident, depending on the circumstances, could lead to the dismissal of the employee. A combination of any one minor preventable accident and any one

major preventable accident within a twelve month period will lead to the dismissal of the employee.

5.3.5 Fire Accident

It is important that management make all employees aware of the location of all fire exits and all fire extinguishers within the building.

Should you discover a fire, it is important that everybody be made aware of the situation and that all personnel be removed from the location/building. Extinguishing the fire is secondary to the safety of all the people.

Dealing with the fire will vary by location. For example, most office fires involve garbage or electricity and can be extinguished by Medical Waste Management personnel using the appropriate fire extinguisher. A fire associated with the boiler will involve natural gas which means that all Medical Waste Management personnel should be evacuated. The local fire department should be called immediately and should deal with the problem.

After the fire has been dealt with in the proper manner, please fill out an incident report accordingly.

5.4 Incident Reporting Procedure

All incidents which could have an effect on the environment or on the public health and safety must be reported to the Ontario Ministry of the Environment.

The following procedure identifies the nature of the incidents that should be reported and describes the procedure to be followed in each case. The procedures concern only the reporting requirements for the MOE. Refer to the entirety of this manual for complete procedures.

5.4.1 Personnel Exposed to Biomedical Waste

Personnel involved in the collection, transportation and processing of biomedical waste who are accidentally exposed to potentially infectious material via the percutaneous route, ingestion, or contamination of the mucous membranes shall:

- report the incident to their supervisor
- if the incident occurred outside an institutional building or outside the waste treatment facility (95 Deerhurst dr. unit 3-4), the supervisor will prepare a report for the president describing the circumstances of the incident and the actions taken to mitigate it and to prevent its reoccurrence. The supervisor will keep a copy of the incident on file.
- the president will then inform, in writing, the Halton-Peel District Manager of the incident

5.4.2 Biomedical Waste Spills

The reporting procedure can be divided into three different scenarios:

- minor spills outside the treatment site (during transportation - inside truck)
- major spills outside the treatment site (during transportation - outside truck)
- significant spills at the treatment site

Minor spills outside the treatment site: A minor spill is when any biomedical waste container leaks, cracks or otherwise causes a spill in or outside the vehicle or during loading or unloading, and can be contained, decontaminated and cleaned up easily by the driver without any outside help. The reporting procedure is then as follows:

- once back at the site, report the incident to your supervisor

- the supervisor will then complete the appropriate intercompany report including the details of the incident and clean-up

Major spills outside the treatment facility: A major spill is a spill in or outside the vehicle during loading or unloading that cannot be contained, decontaminated, and cleaned up easily by the driver. The reporting structure is as follows:

- the driver must immediately call his supervisor
- the OPP should also be contacted if the spill occurred on the road
- once the spill is under control, the driver and his supervisor will record the circumstances of the incident on the appropriate report
- the supervisor will inform the president of the completion of the cleanup who will then inform the MOE District Manager, in writing, within 24 hours of the incident

Significant spills at the treatment site: Significant spills or leakage of biomedical waste at the site have to be reported to the MOE. The reporting procedures are as follows:

- report the spill to your supervisor
- the supervisor will immediately report the spill to the ministry's spill action center and to the president
- the supervisor will record the spill in the appropriate report. The date and time of the spill, the name of the employee involved, the nature of the spill, the action taken for the clean-up and the measures taken to prevent future occurrences must be noted in the report
- the president will then inform the ministry's district manager, in writing, within 24 hours of the incident

5.4.3 Upsets at the Treatment Facility

Any significant upsets at the treatment facility that have or could potentially have an adverse effect on the environment, the neighbors, and/or the employees (e.g., malfunctioning of a steam trap opening of the autoclave relief valve, accidental autoclaving of non-acceptable waste, etc.) shall be reported to the MOE according to the following procedures:

- report the upset to your supervisor
- the supervisor will record the upset in the appropriate report. The date and the time of the upset, the name of the employee involved, the nature of the upset, the action taken for the clean-up and the measures taken to prevent future occurrences must be noted in the report
- if the neighbors report to us that the upset is affecting them in any way (e.g. odors, presence of a lot of steam,
  etc.), the supervisor will inform the neighbors of the nature of the upset and what corrective procedures are being implemented
- the president will then inform the ministry's district manager, in writing, within 24 hours of the incident

5.4.4 Equipment Failure

All equipment failures (e.g. autoclave, boiler, vacuum pump, shredder, compactor, etc.) that have or could have an adverse effect on our ability to process waste in a timely manner must be reported to the MOE. The reporting procedure is as follows:

- once the situation has been evaluated and all necessary steps have been taken to repair the equipment, the supervisor will record the equipment failure in the equipment utilization log. The equipment concerned, the date and the time of the failure as well as a description of the work to be done must be recorded
- the supervisor will make sure the contingency plan is implemented accordingly and will record all relevant information on the implementation
- the supervisor will inform the president of the implementation of the contingency plan, who will in turn inform the MOE district manager, in writing, within 24 hours of the incident

5.4.5 Important Contacts and Phone Numbers

Ministry of the Environment Spill Action Center	1-800-268-6060 416-325-3000
MOE District of Halton-Peel	1-905-637-4150 1-800-335-5906
MOE District of Metro Toronto	1-416-326-6700 1-800-810-8048
MOE District of York Durham	1-905-427-5600 1-800-376-4547
Emergency	911
CANUTEC	1-613-996-6666
Ontario Provincial Police	1-800-267-2677
Medical Waste Management Inc.	905-789-6660

5.5 Spill Kit Contents:

1 - 2 x 4' absorbent socks
25 x 17"x19" yellow pads
2 x disposable coveralls
1 x splash proof goggles
4 x nitrate gloves
2 x mist masks
6 x clean up bags (yellow and labels)
1 x chlorinated Bio-Gel
1 x whisk set

Please note.....the spill kits were designed and manufactured by International Spill Products Inc. The same spill kits are used by Team-1 Environmental Services Inc.

2 - In addition, binders in trucks include the following:
- copy of truck registration
- copy of insurance certificate
- copy of transportation certificate of approval
- copy of permit for equivalent level of safety

5.6 Contingency Plan

The contingency plan is to be implemented in the event that the allowable storable volume is potentially exceeded.

In the event that either the resumption of normal operations cannot be accurately determined, or it is expected to exceed a 24 hour continuous processing period, or that a shutdown may result in the accumulation of more than the allowable permitted waste storage volumes, the following plans must be implemented:

1 - Management to verify where the incoming waste can be diverted

2 - Waste already on-site will be loaded onto Medical Waste Management trucks (or other licensed biomedical waste haulers) and sent to one of the sites mentioned above

3 - Detailed record will be kept to account for the diverted waste

5.7 Site Security and Maintenance

The site has to be maintained in a secure manner, such that authorized personnel only may enter the site.

In order to achieve this high level of security, the site is equipped with a full security system and signs posted on all man doors entering the site. The alarm system covers all plant doors and is also equipped with motion detectors for the plant and offices. The signs which are posted on all man doors read, "authorized personnel only", and are also equipped with the biohazard label (sign and lettering). The following procedure must be followed to ensure proper security:

1- All doors entering the processing facility will be locked at all times
2- The alarm system will be armed when no employees are present in the processing facility

Any security codes or keys to either the office or the processing facility will be restricted to both management and appointed plant or transportation staff. When an employee leaves the company, codes will have to be changed.

Housekeeping Requirements

It is very important to maintain a clean working environment. In order to do so, the following procedure should be followed:

All office and other miscellaneous waste is to be gathered on a regular basis and shredded. Employees must maintain their work areas, and keep them neat, clean and tidy at all times.

All waste handling areas and equipment are to be cleaned on a regular basis with approved disinfectant. Surfaces to be included are:

- floor
- dollies
- handtrucks
- scales
- ladders
- ramps
- forktruck

Office areas, washrooms, and change facilities are to be cleaned on a regular basis. Surfaces to be included are:

- floor
- walls
- plumbing fixtures
- windows
- exterior of lockers
- mirrors

Section 6: Health and Safety Program

This section outlines the company's health and safety rules and regulations and explains the risks, for the employees, associated with the handling of biomedical waste. It is very important that each and every employee be aware of those risks and to know how to protect themselves properly.

6.1 Infection Control and Safety

The chances of our trained staff contracting a disease from the materials we handle are extremely remote. Because of the unique packaging system Medical Waste Management uses, our staff are handling rigid plastic reusable containers which are leak proof, with the waste safely sealed away inside. Nevertheless, it is very important to be aware of the possible danger of infection and use some common sense steps for protection.

Personal hygiene is extremely important. Our recommendations are included in section 6.3. It is important that these are followed at all times to ensure basic protection.

Accidents - especially cuts, scrapes, bruises - present greatly increased risks because a protective barrier (your skin) has been broken. In case of an accident it is important that you first, clean, disinfect and apply first aid. It is also important that you report the accident to your supervisor, so the appropriate medical follow up is arranged.

6.1.1 Staff Immunization Program

Medical Waste Management Inc. will provide an immunization program for all employees. It is company policy to have all new hires immunized before handling waste. Medical Waste Management will provide immunization against the following:

- Hepatitis B (series of three boosters over 6 month period)(booster every 5 years)
- Diphtheria, Tetanus, Polio (booster every 10 years)

Medical Waste Management Inc. will provide these immunizations at no cost to the employee, through special arrangement by the supervisor. Some employees may already have had all of the boosters required, and do not require any more. Medical Waste Management would suggest a blood test to see if immunity has been built up sufficiently. If the vaccination is required, it is administered inter muscularity in three doses: the second dose one month after the first, and the final dose five months later. Side effects of the vaccination are rare, but do occur.

6.2 General Health and Safety Rules

Safety policies and procedures are designed to assure the physical safety of all employees whenever and wherever they are working, as well as visitors, clients, or others nearby.

Management Responsibilities:

- to be consistent with enforcement of all safety rules and regulations
- to be alert for any unsafe practices, and to take immediate and appropriate action to correct any irregularities found
- to require all employees to report any injury or incident sustained by them or visitors promptly
- to see that prompt medical attention is administered to an injured party, and to complete the necessary documentation required by the company policy
- to provide the necessary job training, safety education, and supervision of all employees
- to see that employees, clients and others are constantly alert to accident hazards
- to comply with safety education and regulations outlined in this policy

Employee Responsibilities:

- to follow safe practices on the job and abide by all rules and regulations established by the company and the health and safety committee
- to be constantly alert for all hazards anywhere in our facility or facilities in which we visit, and to report them to his/her supervisor or a member of the health and safety committee
- to respect the safety rules and practices of our customers

Health and Safety Committee

A health and safety committee will be developed in conjunction with the requirements of the ministry of health. There will be one certified employee from the management and one from either the plant staff or the transportation staff. The committee will consist of a minimum of two members.

6.3 Personal Hygiene

All staff are required to handle waste carefully and follow basic personal hygiene rules to avoid any possible danger. The following procedures are required:

- always wash hands thoroughly before eating
- do not eat, drink or smoke while handling waste
- do not put any objects such as pencils, fingers, cigarettes, tools, etc., in your mouth, ears, eyes or nose
- do not bring food into the processing area, or the box of the truck. Meals should be restricted to either the cafeteria or the cab of the truck
- cover all cuts, open sores, and bruises on hands with waterproof tape or rubber gloves. Normal bandaging and clothing for other areas of the body is sufficient
- keep up to date with your immunization program

All employees should come to work in their own personal street clothing, and should change at work into the uniform that is provided to them. At the end of their shift, they should then take off their uniform and change back into their personal street clothing. Lockers will be provided to the employees, and should be kept neat and clean.

6.4 Uniforms

All plant and transportation staff members will be provided with a Medical Waste Management Inc. uniform. All personnel must wear their company uniform and approved safety shoes/boots (steel toe/shank) while on duty. Safety shoes and uniforms should be removed before leaving for home.

Drivers represent Medical Waste Management Inc. and must maintain a clean, professional appearance at all times:

- shirts must be buttoned and tucked in
- shoes must be tied
- clothing must be kept clean (full uniform service provided)
- personal cleanliness must be maintained (i.e., hair washed and combed)

Each employee is issued a pair of work gloves. Used or soiled gloves should be returned to the supervisor for replacement. All Medical Waste Management Inc. personnel must wear gloves when handling waste or product. All personnel must wear safety glasses when shredding, cleaning containers, and/or unloading the autoclave.

Section 7: General Record-Keeping Procedures

This section presents all procedures related to record-keeping. It describes when and how manifests should be used, the purpose of a bill of lading and all the other record-keeping activities that have to occur to keep track of our operations and to comply with our certificate of approval requirements.

7.1 Manifest Handling Procedure

As required in Ontario regulation 347, or equivalent regulations, subject waste generators are required to use a manifest as a tracking tool for their waste. This section goes into detail on how a manifest should be filled out and the various steps involved in the process (collection, reception, shipping), and how they must be distributed.

Waste Pickup:
Before a driver picks up waste at a generator, he/she must ensure that a manifest is available for this pickup (some generators are exempt from manifesting). At pickup time, the driver must ensure that:
Part A of Manifest:

- generator number, name and address section is complete (the driver cannot pickup the waste if the generator does not provide a generator number)
- intended consignee is Medical Waste Management Inc. - provincial ID number (A680324) and our address must be printed on the manifest
- the waste description of the manifest must be filled out correctly:
  - physical state: S=solid, L=liquid
  - shipping name of waste: waste infectious substances affecting humans
  - provincial number: 312P
  - TDGA/PIN: UN2814
  - quantity Shipped: write number of lbs. picked up
  - units: Lbs.
  - classification = 6.2
  - packaging group = n/a
  - packaging no.: write number of containers picked up
  - packaging codes: 01 for boxes or containers, 04 for drums

In the special handling/emergency box, the number of our permit for equivalent level of safety must appear: SU 5514

The driver must fill in the date and time of pick up as well as the scheduled arrival date.

The generator must then sign in the consignor certification box.

Part B of Manifest:

- The driver must also fill in the carrier information (if not already printed)
  - provincial ID. no. = A841667
  - write Medical Waste Management's name and address
  - enter vehicle information (plate number and province)
- The driver must then date and sign the carrier certification. The driver must also write his/her name and signature, and also fill in the company's telephone number.

Before leaving the generator's site, the driver must give copy 1 and copy 2 of the manifest to the generator and bring the remaining 4 copies with him/her back to Medical Waste Management.

Waste Delivery:
Upon arrival at Medical Waste Management Inc., the driver must ensure that all paperwork from his/her truck has been given to the plant personnel or placed in a designated area of the plant. The plant personnel, after inspecting and weighing all containers from one given manifest will fill part C of the manifest.

Part C of Manifest:

- Plant personnel will fill in part C as follows:
  - provincial ID. no. = A680324
  - consignee information = yes
  - fill in the date and time received (weighted and inspected)
  - fill in quantity received (in lbs.), any discrepancies
  - handling code = 02 for autoclave, 01 for storage
  - indicate if decontamination of containers and/or vehicle is done
  - if waste is to be transferred, write name, address and provincial ID. no.
- Plant personnel must then sign Part C.

Plant personnel must then give the 4 copies of each manifest to the invoicing personnel for distribution.

Distribution:

Copy 3: to be mailed to the MOE, monitoring and reporting branch, area M, 135 St.Clair Ave. W., Toronto, Ont. M4V 1P5. *Note that this copy must be sent to the MOE within 3 days of the waste received at the site.*
Copy 4: to be filed at Medical Waste Management Inc. (carrier copy)
Copy 5: to be filed at Medical Waste Management Inc. (consignee copy)
Copy 6: to be mailed to consignor (generator)

When shipping waste from the plant to another site, manifests must also be used. Follow the same procedure as described above. However, Medical Waste Management Inc. is now the generator (consignor) and the provincial ID number to use is: ON2383800. The carrier is still the same but the consignee will not be Medical Waste Management Inc. Talk to your supervisor to obtain the consignee information.

7.2 Bill of Lading Handling Procedure

The "Bill of Lading for Non-Hazardous Products" is to be completed for all non-hazardous pharmaceutical and product destruction shipments from Medical Waste Management customers. It is to be completed in the following manner.

Section A:
Should be completed with the customer information including, company name, and complete address of the head office and shipping location. Below the company information a materiel description is required. This must include the term "Non-Hazardous". The customer should also provide a weight under the column headed quantity, and the number of units being shipped under No. of Pieces. The section headed "special handling instructions" should be completed with the agreed upon treatment method (i.e. incineration only or shredding only).
The generator must then print sign his/her name and date the document.

Section B:
Should read as follows:

Medical Waste Management Inc.	CofA A841667
95 Deerhurst Drive #3-4	Brampton
Ontario	L6T 5R7
Truck License Number	Ont.
Driver's name	(905)789-6660
Driver's signature	Date Shipped

Section C:
Is to be completed upon arrival at Medical Waste Management. The receiver must fill in section C with Medical Waste Management as the receiver under our receiver permit number A680324. The receiver must count and weigh the shipment before signing the document as received.

Once the form has been completed in full, it is to be forwarded to the invoicing personnel where 2 copies will be filed and a completed copy will be mailed to the generator.

7.3 Record-Keeping Activities

All waste received at the site must be unloaded into waste staging area immediately upon receipt, and then recorded in the waste management system immediately after being unloaded from the vehicle in which it was transported.

The waste management system will record the following information:

- receiving date
- autoclave batch
- waste stream (bio, pharm, redbg)
- manifest/bill of lading number
- account name and address
- size code: i.e. sbx/redbg/cyto
- quantity of units received
- weight (of individual boxes / average for multiple)
- destination (if waste is to transferred)

This information will be recorded on a daily basis in the form of a receiving batch, and will all be available for review by printing any of the available reports.

Transferring Waste:

The procedure for the transfer of any waste is not yet known. Unfamiliar with the tracking system of the software.

Daily Reports:

These reports are designed to give the shift supervisor and the plant manager accurate information about the quantity of waste on site, and the amount of waste transferred from our site on a daily

basis. At the end of each day, the plant manager must ensure all relevant reports are generated and filed accordingly. These reports should be readily available for review by the Ministry of Environment.

Section 8: Waste Pickup and Delivery Procedures

This section presents all the procedures related to our fleet of trucks including the operation and routine maintenance of the vehicles, also outlines drivers responsibilities.

8.1 Truck Operation

- all vehicles, if left unattended, will be secured and locked
- the spill kit shall be maintained in each vehicle
- if there is an accident, the driver will cooperate with the local law enforcement, fire department and other agencies responding to the scene
- an accident and spill report shall be completed by the driver
- the driver is responsible for contacting all of the appropriate authorities
- there will be a phone list provided in the truck binder

Pre-trip Inspection:

The pre-trip inspection must be followed before each run to inspect the truck, and to make sure it is in safe working order for the run and all safety equipment and supplies are on board.

Engine Check:
- with engine off, open hood and check:
- radiator: fluid, leaks, cap, etc.
- power steering fluid
- windshield washer fluid
- engine oil level
- air cleaner
- wiring for cracks, loose connections
- belts for tension and condition
- all hoses for leaks or weak spots
- air brake lines

- check refrigeration unit fluid levels
- top up fluids as required
- start truck engine and refrigeration unit, turn on low beams and left turn signal
- check for oil and coolant leaks
- close hood

Walk Around:
- check front of truck:
  - bumper, plates, hood secure
  - license sticker valid
  - low beams, clearance lights
  - listen for air leaks

- windshield clean and free of cracks
- check left front of truck:
  - suspension - bent or broken pieces, shock absorber
  - wheel and wheel nuts tight
  - tire - tread, pressure
  - mirror - cracks, mount secure
  - door latches, step, trim secure
  - left turn signal

- check left side equipment:
  - battery
  - air tank (brakes) open valve momentarily
  - exhaust secure
  - clearance lights
- check left rear:
  - suspension - bent or broken pieces, shock absorbers
  - wheels and shell nuts tight
  - tires - tread, pressure, debris between tires
  - turn signal working, light bracket secure
  - clearance lights, reflectors OK
  - listen for air leaks
  - mud flap secure
- at the cab:
  - put right turn signal on
  - check high beams
  - check brake lights
- check box and contents:
  - walls, ceiling, floor
  - temperature
  - two load bars
- check rear:
  - door OK - close and lock
  - lift secure, no bent, loose or broken pieces
  - step, license plate, pull handles secure
  - clearance lights OK
- check right rear:
  - suspension - bent or broken pieces, shock absorbers
  - wheels and wheel nuts tight
  - tires - tread, pressure, debris between tires
  - turn signal working, light bracket secure
  - clearance lights, reflectors OK
  - listen for air leaks
  - mud flap secure
- check right side:
  - clearance lights
  - fuel tank - leaks, cap tight
  - listen for air leaks
- check right front:
  - suspension - bent or broken pieces, shock absorbers
  - wheel and shell nuts tight
  - tire - tread, pressure

- mirror, door, step, trim secure
- right turn signal

- cab check:
  - check cab equipment
  - horn
  - all gauges
  - switches
  - heater
  - emergency hazard lights
  - wipers
  - steering free play (1/4 turn)
  - signal arms
  - emergency brake: apply and try to move against
  - throttle
- cab supplies and paperwork:
  - fire extinguisher
  - spill kit (check contents)
  - first aid kit
  - road flares - should be three
  - binder including all documentation (ownership, insurance, CofA, etc.)
- air brake test:
  - fan the brake pedal to reduce air pressure to light the warning signal (should come on at 60-65 psi)
  - idle at 1500 RPM to build air pressure back to 90 psi
  - apply and hold foot brake
  - pressure should not drop below 75 psi after 45 seconds

8.2 Loading/Unloading Procedure

We must keep in mind two requirements when arranging the load on the truck:

- keep the waste separated from the supplies
- secure the load so that it does not shift during transit (each truck is equipped with at least two load bars for securing the load)

Trucks must be loaded according to the following guidelines:

- begin loading waste at the front of the truck
- keep products at the back of the truck, clean and dry
- small items such as tape may be carried in the cab
- stack loads properly: put heavier containers at the bottom, the lighter ones on top
- reposition the load bar after each stop, make sure that both the waste and the supplies are secure

The driver of the vehicle is responsible for the loading, off-loading and securing of all loads.

8.3 Truck Washing and Decontamination Procedure

Use the following procedure for washing and decontamination of the truck at the end of each day:

- after the truck has been off-loaded, move the truck to the designated truck washing area - trucks are to be washed only in the designated truck washing area
- make sure that the box is empty of all waste and all supplies - remove the load bars
- put on protective equipment (i.e., rubber gloves, glasses)
- sweep out any garbage too large to fall down drain holes
- spray interior of box with disinfectant - let stand at least 15 minutes
- while waiting for the disinfectant to work - clean the cab:
  - sweep out any dirt
  - wipe surfaces with disinfectant

- CAB MUST BE KEPT CLEAN AT ALL TIMES!

- wash and scrub the box interior thoroughly with a brush - and then rinse the box with water
- connect the pump up to the catch tank - and drain the tank fully
- also wipe down the load bars, handtruck, and exterior of truck
- return all equipment to box - close the rear door and lock it

Section 9: Waste Processing Procedures

This section outlines the procedures related to the handling of the waste, from the time it is received at our site until it leaves, whether treated or transferred to another site. It is most important that each and every employee fully understand these procedures. These procedures ensure that the waste we receive is treated properly and minimizes the potential of mishandling.

9.1 Waste Receiving Procedure

As trucks arrive at the site, it is necessary to unload them, inspect the waste and process it according to type. Our certificate of approval enables us to receive the following types of waste:

- non-anatomical biomedical waste
- cytotoxic biomedical waste
- anatomical biomedical waste
- animal carcasses
- pharmaceutical waste
- solid non-hazardous waste (product destruction)

Any other types of waste cannot be accepted at the site. See section 9.7 for a description of the steps to be followed in such cases.

Each of these types of waste require a specific treatment:

- non-anatomical biomedical waste =>autoclave and shred
- cytotoxic biomedical waste =>storage (non-refrigerated) and transfer
- anatomical biomedical waste =>storage (refrigerated) and transfer
- animal carcasses =>storage (refrigerated) and transfer
- pharmaceutical waste =>shredding and/or transfer
- product destruction =>shredding

It is extremely important that each waste stream we handle is treated as shown above. Note that biomedical waste generators have received a waste packaging, labeling and segregation information package to ensure that they package their waste properly. Please refer to section 9.8 for packaging and labeling information.

The following procedure describes each step that an employee must go through when receiving waste:

- when a truck arrives at the site, it is backed up to one of two loading docks
- truck is off loaded in waste receiving area with care to avoid spillage
- all paperwork (manifests, packing slips, rosters, bill of lading) are given to plant personnel
- the containers are first checked for radioactivity using a stationary Geiger counter, the containers are then weighed and the bar code on each container is scanned - if radioactivity is detected (> 1mR), then the container must be rejected - see section 9.7 for instructions
- once all containers from the same manifest have been weighed, inspected and segregated for either autoclaving or incineration the manifest and other records are filled out and signed off

- containers for incineration will be directed to their appropriate holding areas, until such time as they are transferred

9.2 Cytotoxic, Anatomical Waste and Animal Carcass Handling Procedure

Cytotoxic Waste:
Cytotoxic waste has to be stored in the dedicated area of the plant immediately. Note that this waste should not be stored in the refrigerator, but only in the dedicated area of the plant. It is very important that all cytotoxic waste be stored in this area immediately upon receipt to avoid any mishandling.

Anatomical Waste:
Anatomical waste must be refrigerated immediately upon receipt. Ensure that there are no leaks before moving these containers to the refrigeration unit. If a container is leaking, repackage and relabel the container and notify the supervisor.

Animal Carcasses:
Carcasses must also be refrigerated immediately upon receipt.

9.3 Non-Hazardous Pharmaceutical Waste and Product Destruction Handling Procedure

When receiving pharmaceutical waste and or product destruction waste, all waste should be coded with the appropriate bar code (applied by the generator) which will tell the operator what treatment is required. For example, hazardous pharmaceutical waste (261A and 261B) has to be stored and transferred off-site - we can not process this type of waste at this time.

9.4 Non-Anatomical Waste Handling Procedure

Non-Anatomical Waste is the most involved type of waste stream that we receive. This waste stream has to be autoclaved, shredded, compacted and finally shipped to a landfill site for final disposal. The following procedure must be followed to process this waste stream:

- Empty waste containers into the autoclave bins until full, taking special care to avoid spillage. Reusable bins are sent to the washing area to be disinfected.
- Once all bins are full and the autoclave is ready, push all bins into the autoclave, close and secure the door and start the sterilization cycle. During the cycle, monitor the autoclave to ensure the cycle is being completed as programmed. Note that the autoclave must maintain a temperature of 300 degrees for 30 minutes to sterilize the waste. If any problems are encountered, advise your supervisor immediately.
- While the cycle is engaged, shred the treated biomedical waste and refill the bins as described above.

Note that the waste has to be treated within 72 hours of receipt at the plant. If for any reason the waste cannot be treated within this time frame, then it must be refrigerated. If this happens, tell your supervisor immediately.

9.5 Reusable Containers Handling Procedure

Once empty, the reusable containers have to be cleaned and disinfected. Bring the containers into the washing area, each container can be put through the wash bay conveyer - ensure that each container comes out clean and that the old bar code label has been removed. The containers can now be stacked in the drying area before they are ready for storage and/or reuse.

9.6 Compactor Waste Disposal Procedure

Once the compactor is full, it is necessary to have it removed and replaced by an empty one. Let your supervisor know when the compactor is full. The supervisor will make arrangements to have it removed and replaced. While the compactor is being replaced, clean the area around the compactor and shredder.

9.7 Waste Rejection Procedure

Any waste that arrives on the site that does not fall into one of the categories outlined in section 9.1 must be isolated. When this occurs, notify your supervisor immediately.

Improper packaging:
Waste received in improper packaging can either be repackaged with a penalty to the generator or sent back to the generator.

Radioactive waste:
If any radioactive waste is received, the employee should put the container aside, identify it properly and notify the supervisor immediately. The supervisor will contact the generator to make arrangements to have a licensed transporter pick up the waste and have it returned to the generator.

9.8 Generator Waste Packaging and Labeling Instructions

This section outlines the appropriate practices to be followed when sending biomedical waste for disposal to Medical Waste Management Inc.. The procedure described below must be followed to ensure proper waste handling and segregation.

Packaging and labeling requirements:

Medical Waste Management Inc. has made available to all of its customers various packaging materials to ensure proper segregation, packaging and labeling of the different types of biomedical waste.

Anatomical waste:
Anatomical waste (including placentas) should be packaged in either a MWM supplied leak proof fiber drum or non-reusable pail. The drum must be sufficiently lined and securely sealed once it is full. The drum or pail must be labeled with both the proper bar code and a "anatomical waste" label. Please note that all anatomical waste must be incinerated.

Cytotoxic waste:
Cytotoxic waste can be packaged in either a MWM supplied cardboard box or a plastic pail. If a cardboard box is used, it must be lined with a plastic bag. Once the container is full, the generator must close it securely (including the bag) and properly identify the container with both the applicable bar code label and an "cytotoxic waste" label. Please note that all cytotoxic waste must be incinerated.

Non-anatomical waste

Non-anatomical waste should be packaged in a MWM supplied container or in a plastic pail. If the reusable container is used, it must be lined with a plastic bag. Note that all sharps must be placed into a proper sharp container prior to placing into the reusable container.