

Marlborough District Council



METHYL BROMIDE MONITORING REPORT DECEMBER 2010

Issue

January 2011

Marlborough District Council

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Executive Summary

Source Testing New Zealand Limited (STNZ) was commissioned by Marlborough District Council (MDC) to undertake methyl bromide monitoring at two locations in Picton. The purpose of the monitoring was to determine if methyl bromide emitted from the fumigation of export logs at the Port Marlborough NZ Ltd, Waimahara Wharf could be detected within the Picton community.

On 5 December 2010 logs for export were fumigated under gas tight tarpaulins and ship holds using methyl bromide at Port Marlborough NZ Ltd Waimahara Wharf. The ambient concentration of methyl bromide just before, during, and after the release following the fumigation period was assessed at two sites in the Picton community (Waitohi Wharf and Picton Jetty) using MiniRAE PID analysers and GASTEC detection tubes.

The MiniRAE Photo Ionisation Detector analysers measure the concentration of total VOC's and do not specifically respond to methyl bromide. The GASTEC detection tubes were used to identify if methyl bromide was a significant contributor to any measured VOC's. The GASTEC detection tubes only provide short term averaged data (approximately 30 seconds) and are therefore too cumbersome and not sufficiently sensitive to be used for the determination of 1-hour averaged data.

The meteorological conditions were fine with temperatures in the mid twenties and light to moderate northerly winds.

Given the northerly wind direction it is very unlikely that any methyl bromide from the fumigation site would have been transported to the Picton community. The ambient concentration of VOC's at both sites was shown to be at or below the detection limit of the analysers, which is approximately 0.1 ppmv.

1. Introduction

Source Testing New Zealand Limited (STNZ) was commissioned by Marlborough District Council (MDC) to undertake methyl bromide monitoring at two locations in Picton. The purpose of the monitoring was to determine if methyl bromide emitted from the fumigation of export logs at the Port Marlborough NZ Ltd, Waimahara Wharf could be detected within the Picton community.

Port Marlborough NZ Ltd commissioned Sinclair Knight Merz Ltd (SKM) to assess methyl bromide concentrations at the site boundary during the fumigation of whole logs for export. This monitoring was undertaken in accordance with the SKM Methyl Bromide – Ambient Air Monitoring Protocol – Standard Protocol for Ambient Air Monitoring of Methyl Bromide at Fumigation Sites in New Zealand.

The SKM Methyl Bromide Ambient Air Monitoring Protocol outlines a number of methods for determining the ambient concentration of methyl bromide and recommends the use of Photo Ionization Detectors (PID) for the continuous determination of total volatile organic compounds (VOC's) with GASTEC methyl bromide specific gas detection tubes used to confirm the presence/absence of methyl bromide in the event more than minimal VOC's are detected. At the request of MDC this approach was applied by STNZ for the current monitoring in Picton. For the duration of the monitoring meteorological conditions and field observations were also recorded on a routine basis.

Matthew Newby, Air Quality Scientist with STNZ performed the methyl bromide monitoring on 5 December 2010. Matthew has over 14 year's air quality monitoring experience and is designated as a Key Technical Person under STNZ's IANZ accreditation.

This report presents the results of the ambient air quality monitoring and a summary of meteorological conditions over the fumigation period.

2. Methyl Bromide – Ambient Air Monitoring Protocol

2.1 Summary

The SKM Methyl Bromide Ambient Air Monitoring Protocol outlines a number of methods for determining the ambient concentration of methyl bromide and recommends the use of PIDs for the continuous determination of total VOC's with GASTEC gas detection tubes used to confirm the presence/absence of methyl bromide. Provided below is a brief summary of these two sampling methods. A brief summary of the approach employed for the current round of monitoring is presented below. For further detail the reader is directed to the protocol which is available from MDC.

2.2 Photo-ionisation Detectors (PID)

Photo-ionisation Detectors (PID's) are used to measure the concentration of total volatile organic compounds (VOC's). The units use an ultra-violet lamp producing high energy photons to break down gas molecules into positively charged ions. The electrical current produced in the reaction becomes the signal output for the unit. Once set up, the detectors continually record total VOC concentration and are not specific to methyl bromide.

The MiniRAE 2000 and 3000 PID's used are currently the most readily available cost effective option for short term ambient air monitoring. The analysers were checked using zero and span gases (100 ppmv isobutanol) before and after the sampling event. Calibrations were carried out where required. Hydrocarbon-free air generated through the use of a carbon scrubber was employed to zero the analysers.

2.3 GASTEC Gas Detection Tubes

GASTEC gas detector tubes are thin glass tubes with concentration scales printed on them to enable direct reading of concentrations of the substance being measured. Each tube contains a particulate matrix (e.g. silica gel, alumina) which binds with carefully selected and highly stable detection reagents that are especially sensitive to the target substance in order to produce a distinct layer of colour change. The tubes are hermetically sealed at both ends. After snapping off the sealed ends, sample air is aspirated (drawn) into the detector tube manually by pulling the handle of a sampling 'pump' that the detector tube is attached to. The number of pump strokes required for various concentration ranges is stated on the tube box or instruction sheet.

When GASTEC tubes are used to confirm PID readings, only comparison with the PID recordings over the time taken to sample with GASTEC 'pump' are valid with an averaging period of approximately 30 seconds.

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The simplicity of this method makes it easy to use and does not require a highly trained operator. The easy-to-check readings reduce potential operator error and can give quick and reasonably accurate results. Detection ranges can be easily adjusted by selecting different tube types and by altering air volumes drawn through the tube, hence the flexible nature of the method. The tubes are pre-calibrated and do not require complicated calibration procedures required in other methods. Methyl bromide specific GASTEC tubes have an accuracy of 10% for measurements of 1 to 6 parts per million (ppm).

2.4 Sampling Location

MDC selected two sampling locations within the Picton community. The first site was located at the seaward end of Waitohi Wharf with the second site located at the opening of the Picton Jetty (See Figure 1). Figure 1 depicts where the fumigation was being carried out at the time the MDC-commissioned monitoring was being performed. The Waitohi Wharf site was selected due to its relatively close location to Port Marlborough fumigation facility at Shakespeare Bay while the Picton Jetty was selected to assess if methyl bromide could be transported to eastern Picton. Both sites were also secure so to avoid any tampering with the monitoring unit by the general public.

Figure 2 presents the Port Marlborough fumigation facility at Shakespeare Bay.



■ **Figure 1: Picton MDC Methyl Bromide Monitoring Sites**

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■ **Figure 2: Port Marlborough Fumigation Facility**

3. Fumigation Practices

3.1 Methyl Bromide Fumigation at Shakespeare Bay

Fumigation using methyl bromide is generally carried out as follows:

- In shipping containers: fumigation of a variety of merchandise within closed shipping containers;
- Under tarpaulin enclosures: fumigation of logs and timber enclosed within gas tight tarpaulins or covers, sealed to the hard ground surface; and
- In ships holds: fumigation of products of any type including logs and timber within closed holds of ships.

These three types of fumigation differ from one another in size, in terms of mass of product and fumigant used. Total fumigant quantity per container is generally less than 10 kg, while within a tarpaulin enclosure it may exceed 100 kg, and a ship's hold may require a tonne. These quantities vary not only with the volume of the enclosure, but also with bio-security standards of the importing country, and the nature of the product being treated.

At the end of the fumigation period (generally around 24-hours after fumigation commences), the release of methyl bromide is staggered to reduce the likely hood of exceedances at the site boundary.

3.2 Fumigation Conditions

On 5 December 2010 both enclosed tarpaulins and ship holds containing whole logs for export were fumigated. The fumigation was performed by South Fume Ltd who are approved by Ministry of Agriculture & Forestry (ISPM15 No. 260).

For the ship holds a total of 1,534 kg of methyl bromide was used with the release commencing at 14:48 hours and the final hold opened at 15:25 hours on 5 December 2010.

A total of 10 log stacks were enclosed in tarpaulins and fumigated using 1,025 kg of methyl bromide. The release of the first tarpaulin occurred at approximately 16:30 hours on 5 December 2010. The final tarpaulin was removed at 01:42 hours on 6 December 2010.

4. Methyl Bromide Monitoring Results

4.1 Field Observations

The fumigation release was initially scheduled to commence at 13:30. The PID analysers were deployed approximately 30 minutes prior to the scheduled release to give some back ground data. A single analyser was deployed at each site with a third unit remaining with the field technician to confirm PID readings and to be used as a back up if one of the site PID's was to experience a problem.

Throughout the monitoring period the two sites were routinely checked and data recorded on the instrument readout, wind speed, wind direction, ambient temperature, along with the activity of any potential sources of VOC's such as boats or vehicular traffic. Tables 1 and 2 present the field observations recorded for Waitohi Wharf and Picton Jetty respectively.

The wind speed was recorded using the Beaufort Scale, which for the purposes of this assessment is:

Beaufort Scale 2: Light Breeze which is approximate to 1.5 to 3.3 m/s;

Beaufort Scale 3: Gentle Breeze which is approximate to 3.3 to 5.5 m/s; and

Beaufort Scale 4: Moderate Breeze which is approximate to 5.5 to 8.0 m/s

4.1.1 Waitohi Wharf Field Observations

The Waitohi Wharf PID analyser was deployed at the seaward end of the wharf (See Figure 3). Waitohi Wharf serves as the ferry terminal and over the duration of the monitoring there were a number of arrivals and departures of the both the Inter-Islander and Bluebridge ferries. Vehicle traffic on the wharf was limited to the field technician and ferry staff during the arrival and departure of the Inter-Islander. However, this traffic was at least 50 meters to the south of the analyser. The northerly wind direction meant these sources would not be detected by the instruments.

While there were a number of power boats within the harbour they are required to stay clear of the ferry terminals. Hence up wind of the PID was the open harbour with no significant sources of VOC's.



■ **Figure 3: Waitohi Wharf PID Monitoring Site**

■ **Table 1: Waitohi Wharf Field Observations, 5 December 2010**

Time (hours)	Comments	PID Conc. ¹ (ppmv)	PID Peak² (ppmv)	Wind Speed³	Wind Direction (from)	Temp. (°C)
12:45	Commenced monitoring. Blue Bridge departs	0.0	0.0	4	N	22
12:47	0.5 ppm peak after vessel departs	0.0	0.5	4	N	22
13:00	Inter Islander departs					
13:18	Instrument observation	0.0	0.0	4	N	22
13:35	Instrument observation	0.0	0.0	4	N	21
14:05	Instrument observation	0.0	0.0	4	N	22
14:22	Instrument observation	0.0	0.0	4	N	22
14:46	Instrument observation	0.0	0.0	4	N	23
15:06	Instrument observation	0.0	0.0	4	N	23
15:55	Instrument observation	0.0	0.0	4	N	23
16:15	Instrument observation	0.0	0.0	4	N	23
17:05	Inter Islander arrives	0.0	0.0	4	N	23
17:25	Instrument observation	0.0	0.0	4	N	23
18:05	Inter Islander departs	0.0	0.0	4	N	20
18:27	Instrument observation	0.0	0.0	4	N	21
19:26	PID pump fault. Re-set instrument and pump seemed OK.	0.0	0.0	4	N	20
19:36	Instrument observation	0.0	0.0	4	N	20
20:18	Instrument observation	0.0	0.0	3	N	18
20:38	Instrument observation	0.0	0.0	4	N	21
20:58	Blue Bridge arrives 21:00	0.0	0.0	3	N	19
21:49	Final Instrument observation. STNZ's health and safety policy only allows staff to work a maximum of 14 hours in any given day. Delays at the port resulted in the fumigation release taking longer than STNZ staff was able to work. The analyser was collected by SKM at the end of the fumigation.	0.0	0.0	3	N	18

1. Actual PID concentration reading
2. Peak PID concentration reading over the logged period
3. Beaufort Scale

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4.1.2 Picton Jetty Field Observations

The Picton Jetty PID was deployed at the opening to the Picton Marina (see Figure 3). Access to this portion of the marina was restricted owners of the berthed vessels. Vessels at the entrance to the marina were a potential source of VOC's. On a single occasion a concentration of 0.5 ppmv was observed as an older boat entered the marina. No other vessels appeared to register on the PID. A public car park was located on shore approximately 25 m to the east of the analyser. However, the northerly wind direction resulted in the up wind environment being Picton harbour. While there were a number of vessels operating within Picton harbour, it is unlikely that these would emit significant VOC particularly given the speed restrictions with the harbour limits and their distance from the analyser.

At approximately 18:10 hours the PID (Picton A PID) analyser initially deployed began to register total VOC concentrations above background levels. The back up PID with the field technician displayed a concentration of 0.0 ppmv. At this time there was no boat traffic and there were no apparent other sources of VOC's. A GASTEC detector tube was used which indicated the methyl bromide concentration was less than 1 ppmv. While there were no apparent sources of VOC's, the PID concentration continued to increase. The back up unit display 0.0 ppmv. The back up unit was subsequently deployed at the Picton Jetty (Picton B PID).



■ **Figure 4: Picton Jetty PID Monitoring Site**

■ **Table 2: Picton Jetty Field Observations, 5 December 2010**

Time (hours)	Comments	PID Conc. ¹ (ppmv)	PID Peak² (ppmv)	Wind Speed³	Wind Direction (from)	Temp. (°C)
13:00	Commence monitoring. Moderate boat traffic at entrance to marina.	0.0	0.0	2	N	25
13:50	Instrument observation	0.0	0.5	2	N	27
14:33	Instrument observation.	0.0	0.5	2	N	27
15:20	Instrument observation.	0.0	0.5	2	N	28
15:38	Instrument observation	0.0	0.5	2	N	29
16:30	Instrument observation	0.0	0.5	2	N	29
16:55	Instrument observation	0.0	0.5	2	N	30
17:40	Instrument observation	0.0	0.5	2	N	27
18:10	Back up PID reading 0.0 ppmv, GASTEC tube sample = 0 ppm	1.0	2.7	2	N	24
18:36	Instrument appears to be drifting significantly indicating a fault with the unit. Deployed PID MINNZ4 (PID B). GASTEC tube sample = 0 ppm	2.0	3.2	2	N	23
19:11	PID A PID B	2.2 0.0	4.0 0.0	2	N	23
20:07	PID A PID B	7.3 0.1	10.2 0.0	2	N	21
21:07	PID A PID B	14.9 2.0	21.4	2	N	18
21:36	PID A PID B GASTEC tube sample = 0 ppm Final instrument observation. STNZ's health and safety policy only allows staff to work a maximum of 14 hours in any given day. Delays at the port resulted in the fumigation release taking longer than STNZ staff was able to work. The analyser was collected by SKM at the end of the fumigation.	17.1 2.0	21.4	2	NNW	18

1. Actual PID concentration reading

2. Peak PID concentration reading over the logged period

3. Beaufort Scale

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4.2 Meteorological Data

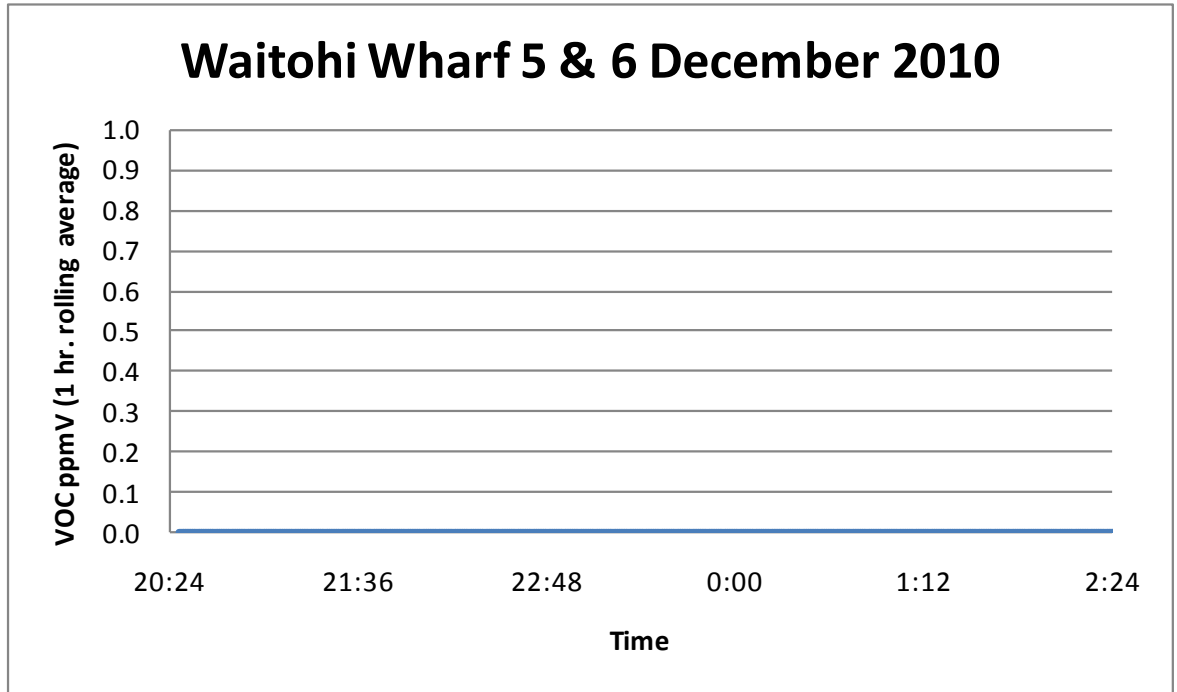
Meteorological conditions measured at Waitohi Wharf for the monitoring period are presented in Appendix A with a summary presented in Table 3. The wind direction was predominantly northerly with a slight swing to the west around 21:30 hours.

■ Table 3 Waitohi Wharf Meteorological Observations

	Temp. (°C)	Max. Temp. (°C)	Humidity (%)	Due Pt. (°C)	Wind Speed (m/s)	Wind Speed Max. (m/s)	Ambient Pressure (Bar)	Rain
Ave.	18.0	18.1	62.8	10.7	10.2	16.8	1009.3	0
Max.	20.4	20.5	76.0	11.4	16.5	26.1	1010.5	0
Min.	15.5	15.6	52.0	10.1	1.7	6.1	1008.2	0

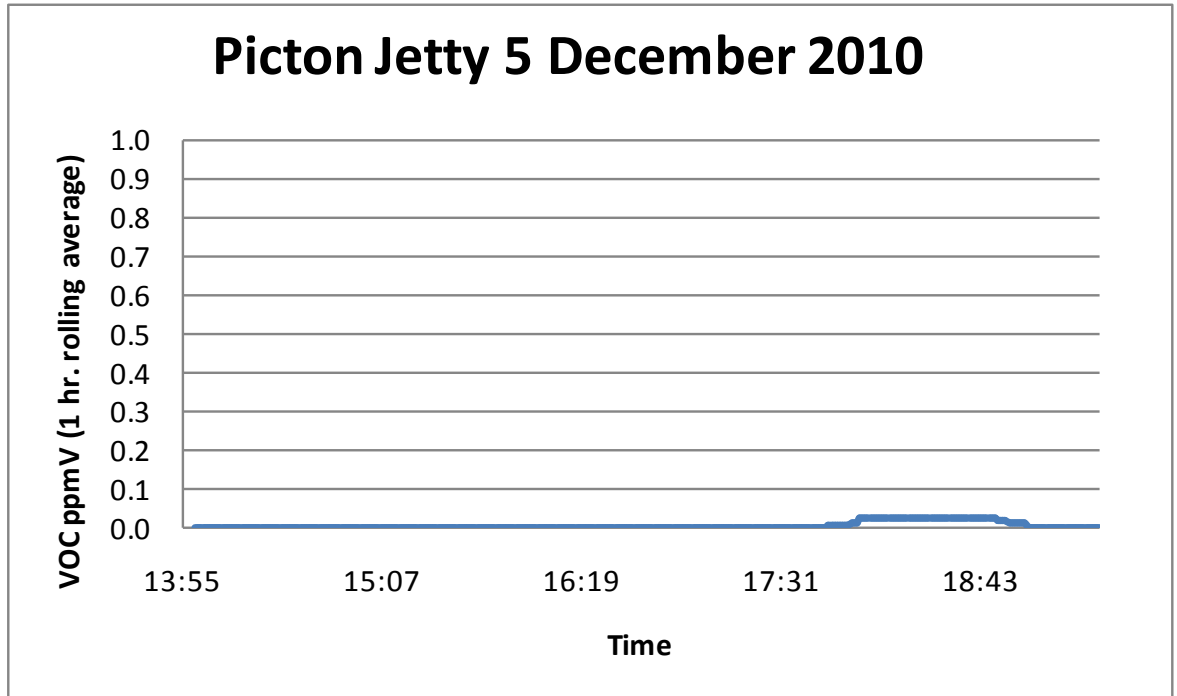
4.3 Methyl Bromide Monitoring Results

The following section presents the results of the ambient methyl bromide monitoring performed within the Picton community on 5 and 6 December 2010. Figures 5 and 6 present the 1-hour rolling average total VOC data from the PID analysers for Waitohi Wharf and Picton Jetty respectively. Appendix B presents the Ambient Air Monitoring Site Evaluation Form for the current fumigation. Included in the form is the calibration zero and span data for each of the analysers deployed. Appendix C presents the raw data from each of the instruments. Appendix D contains the calibration certificates from the instrument suppliers.



■ **Figure 5: Waitohi Wharf Methyl Bromide Data, 5 to 6 December 2010**

The results of the ambient total VOC monitoring performed at the Waitohi Wharf on 5 and 6 December 2010 indicate that the concentration was below detection limit of the analyser of 0.1 ppmv. Data from the Waitohi Wharf PID analyser was lost for the period 14:45 to 19:26 as the instrument was re-started due to a pump fault. However, the field observation (see Table 1) indicated no VOC's were detected over this period.



■ **Figure 6: Picton Jetty Methyl Bromide Data, 5 December 2010**

The results of the ambient VOC monitoring performed at the Picton Jetty on 5 December 2010 indicate that the concentration was at or below detection limit of the analyser. The PID analyser initially deployed at Picton Jetty (Picton A PID) began to drift from around 18:00 hours to register VOC concentrations over 52 ppmv by the end of the monitoring period (refer to Appendix C). GASTEC tubes were drawn at 18:10, 18:36 and 21:36 hours, all of which indicated that the concentration of any methyl bromide in the air was less than 1 ppmv. A second PID (Picton B PID) analyser was deployed at the Picton Jetty site at 18:36 hours. The data from the second PID was used for the period 18:36 to 19:26 when the battery failed.

Appendix 3 presents the raw data for the PID initially located at the Picton Jetty (Picton A PID) and the raw data for the second PID deployed at 18:36 (Picton B PID). The raw data from the Picton A PID for the period 14:00 to 18:36 was combined with the raw Picton B PID data for the period 18:36 to 19:26 hours to calculate the 1-hour rolling averaged data presented in Figure 6.

4.4 Discussion

On 5 December 2010 logs for export were fumigated under gas tight tarpaulins and ship holds using methyl bromide at Port Marlborough NZ Ltd Waimahara Wharf. The ambient concentration of methyl bromide just before, during and after the release following the fumigation period was assessed at two sites in the Picton community (Waitohi Wharf and Picton Jetty) using MiniRAE PID analysers and GASTEC detection tubes. The meteorological conditions were fine with temperatures in the mid twenties and light to moderate northerly winds.

The MiniRAE PID analysers measure the concentration of total VOC's and do not specifically measure methyl bromide. The GASTEC detection tubes were used to identify if methyl bromide was a significant contributor to any measured VOC's. The GASTEC tubes only provide short term averaged data (approximately 30 seconds) and are therefore too cumbersome and not sufficiently sensitive to be used for the determination of 1-hour averaged data.

The ambient concentration of VOC's at both sites was shown to be at or below the detection limit of the analysers, which is approximately 0.1 ppmv. The PID analyser located at the Picton Jetty started to measure VOC's around 18:00 hours. GASTEC tubes drawn at 18:10, 18:36 and 21:36 hours all indicate the methyl bromide concentration was less than 1 ppmv. Site observations at the time did not indicate any significant upwind sources of VOC's. Furthermore the back up PID analyser showed the concentration to be less than 0.1 ppmv. This suggests that the apparent increase in the VOC concentration was due to a fault in the instrument and the analyser was replaced.

Given the northerly wind direction it is very unlikely that any methyl bromide from the fumigation site would have been transported to the Picton community. The monitoring performed using the PID's indicated that ambient concentration of total VOC's was less than 0.1 ppmv.

Appendix A Waitohi Meteorological Data

This Appendix contains 2 pages including cover.

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Date	Time	Temp Out	Hi Temp	Low Temp	Out Hum	Dew Pt.	Wind Speed	Wind Dir	Wind Run	Hi Speed	Hi Dir	Bar	Rain
5/12/2010	13:00	19.7	19.8	19.4	59	11.4	14.8	N	3.7	21.7	N	1010	0
5/12/2010	13:15	19.8	19.9	19.7	58	11.3	15.7	N	3.91	21.7	N	1009.8	0
5/12/2010	13:30	19.9	20.1	19.8	58	11.4	15.7	N	3.91	23.5	N	1009.6	0
5/12/2010	13:45	20.2	20.2	19.9	57	11.4	13.9	N	3.48	20.9	N	1009.5	0
5/12/2010	14:00	20.2	20.2	20.2	55	10.8	15.7	N	3.91	22.6	N	1009.2	0
5/12/2010	14:15	20.4	20.4	20.2	53	10.5	13.9	N	3.48	23.5	N	1009.1	0
5/12/2010	14:30	20.3	20.4	20.3	53	10.4	15.7	N	3.91	24.3	N	1009.1	0
5/12/2010	14:45	20.4	20.5	20.3	54	10.8	16.5	N	4.13	26.1	N	1008.9	0
5/12/2010	15:00	20.3	20.4	20.2	52	10.1	16.5	N	4.13	24.3	N	1008.8	0
5/12/2010	15:15	20.4	20.4	20.3	53	10.5	16.5	N	4.13	25.2	N	1008.7	0
5/12/2010	15:30	20.3	20.4	20.2	52	10.1	14.8	N	3.7	24.3	N	1008.7	0
5/12/2010	15:45	20.2	20.4	20.2	55	10.9	15.7	N	3.91	22.6	N	1008.6	0
5/12/2010	16:00	19.9	20.2	19.9	56	10.9	15.7	N	3.91	24.3	NNE	1008.6	0
5/12/2010	16:15	19.9	20.1	19.9	55	10.6	14.8	N	3.7	25.2	NNE	1008.4	0
5/12/2010	16:30	20.1	20.1	19.8	55	10.7	15.7	N	3.91	21.7	N	1008.3	0
5/12/2010	16:45	20.1	20.1	19.9	55	10.7	14.8	N	3.7	20	N	1008.2	0
5/12/2010	17:00	20.2	20.2	20.1	53	10.3	12.2	N	3.04	19.1	N	1008.3	0
5/12/2010	17:15	20.1	20.2	19.9	55	10.7	13	N	3.26	19.1	N	1008.3	0
5/12/2010	17:30	19.7	20.1	19.6	54	10.1	13.9	N	3.48	22.6	NNW	1008.2	0
5/12/2010	17:45	19.2	19.7	19.2	59	11	13.9	N	3.48	20.9	NNE	1008.2	0
5/12/2010	18:00	18.9	19.2	18.9	58	10.4	13	N	3.26	21.7	N	1008.2	0
5/12/2010	18:15	18.6	19.1	18.6	59	10.4	13.9	N	3.48	20.9	N	1008.2	0
5/12/2010	18:30	18.3	18.6	18.3	60	10.4	12.2	N	3.04	18.3	N	1008.4	0
5/12/2010	18:45	18.2	18.4	18.2	59	10.1	12.2	N	3.04	20.9	NNE	1008.6	0
5/12/2010	19:00	18.2	18.2	18.2	60	10.3	11.3	N	2.83	22.6	NNE	1008.7	0
5/12/2010	19:15	17.9	18.3	17.9	62	10.5	12.2	N	3.04	21.7	N	1008.7	0
5/12/2010	19:30	17.7	17.9	17.7	63	10.6	12.2	N	3.04	20	N	1008.9	0
5/12/2010	19:45	17.6	17.7	17.6	63	10.5	12.2	N	3.04	20	N	1009.1	0
5/12/2010	20:00	17.5	17.6	17.5	63	10.4	13.9	N	3.48	20.9	N	1009.3	0
5/12/2010	20:15	17.3	17.5	17.3	63	10.2	11.3	N	2.83	20.9	NNE	1009.4	0
5/12/2010	20:30	17.3	17.3	17.3	64	10.4	12.2	N	3.04	20.9	N	1009.6	0
5/12/2010	20:45	17.2	17.3	17.2	65	10.5	11.3	N	2.83	17.4	N	1009.7	0
5/12/2010	21:00	17	17.2	17	65	10.4	7.8	N	1.96	14.8	NNE	1009.7	0
5/12/2010	21:15	16.9	17	16.9	66	10.5	8.7	N	2.17	13	N	1009.8	0
5/12/2010	21:30	16.7	16.9	16.7	66	10.3	6.1	NW	1.52	13	N	1010.1	0
5/12/2010	21:45	16.7	16.7	16.7	67	10.5	3.5	N	0.87	7.8	NW	1010.1	0
5/12/2010	22:00	16.6	16.7	16.6	68	10.6	4.3	NW	1.09	8.7	NW	1010.3	0
5/12/2010	22:15	16.4	16.6	16.4	68	10.5	4.3	NNW	1.09	8.7	NNW	1010.4	0
5/12/2010	22:30	16.4	16.4	16.4	69	10.7	3.5	NNW	0.87	11.3	NW	1010.5	0
5/12/2010	22:45	16.3	16.4	16.3	70	10.8	6.1	NNW	1.52	11.3	N	1010.3	0
5/12/2010	23:00	16.2	16.3	16.2	70	10.7	4.3	NW	1.09	10.4	NW	1010.3	0
5/12/2010	23:15	16.2	16.3	16.2	70	10.7	1.7	NNW	0.43	7.8	NW	1010.3	0
5/12/2010	23:30	16.2	16.2	16.2	71	11	3.5	NW	0.87	8.7	NNW	1010.3	0
5/12/2010	23:45	16.1	16.2	16.1	71	10.8	2.6	N	0.65	6.1	NNE	1010.3	0
6/12/2010	0:00	16.1	16.2	16.1	71	10.8	2.6	N	0.65	6.1	N	1010.2	0
6/12/2010	0:15	16.1	16.1	16.1	72	11	3.5	NW	0.87	8.7	NW	1010.1	0
6/12/2010	0:30	16.1	16.1	15.9	72	11	3.5	N	0.87	7	NE	1010	0
6/12/2010	0:45	15.9	16.1	15.9	72	10.9	5.2	NW	1.3	8.7	N	1009.9	0
6/12/2010	1:00	15.9	15.9	15.8	73	11.1	4.3	NW	1.09	9.6	NW	1009.8	0
6/12/2010	1:15	15.8	15.9	15.8	73	10.9	3.5	NW	0.87	7	NW	1009.7	0
6/12/2010	1:30	15.8	15.8	15.8	74	11.2	6.1	NW	1.52	9.6	NW	1009.6	0
6/12/2010	1:45	15.7	15.8	15.7	74	11	5.2	NW	1.3	9.6	NW	1009.4	0
6/12/2010	2:00	15.6	15.7	15.6	75	11.2	4.3	NW	1.09	7.8	NW	1009.4	0
6/12/2010	2:15	15.5	15.6	15.5	76	11.3	7	WNW	1.74	12.2	NW	1009.3	0
	Ave	18.0	18.1	18.0	62.8	10.7	10.2		2.5	16.8		1009.3	0
	Max	20.4	20.5	20.3	76.0	11.4	16.5		4.1	26.1		1010.5	0
	Min	15.5	15.6	15.5	52.0	10.1	1.7		0.4	6.1		1008.2	0

SOURCE TESTING NZ

Appendix B Ambient Air Monitoring Site Evaluation Form

This Appendix contains 7 pages including cover.

Ambient Air Monitoring: Site Evaluation Form

Site details (name, location etc)	PORT MARLBOROUGH LTD DIAMOND MARBOUR.
Exporter details (name, contact person etc)	ZINDIA
Fumigator details (name, contact person etc)	SOUTHFUMC
Goods under fumigation (name, quantity etc) and location (stacks, holds, containers)	LOGS IN HULL AND UNDER TAIERS
Fumigant used. Date and time fumigant introduced and quantity	MeBr
Date and time fumigant released (fill in retrospectively)	5.12.10 ~ 14:00
Relevant ambient air quality guidelines (legislative body, limits etc)	
Security or Property boundary monitoring	
Closest sensitive receptor and distance from monitoring boundary and fumigated goods	
<i>Plan sketch/photograph/diagram of site including monitoring boundary</i>	

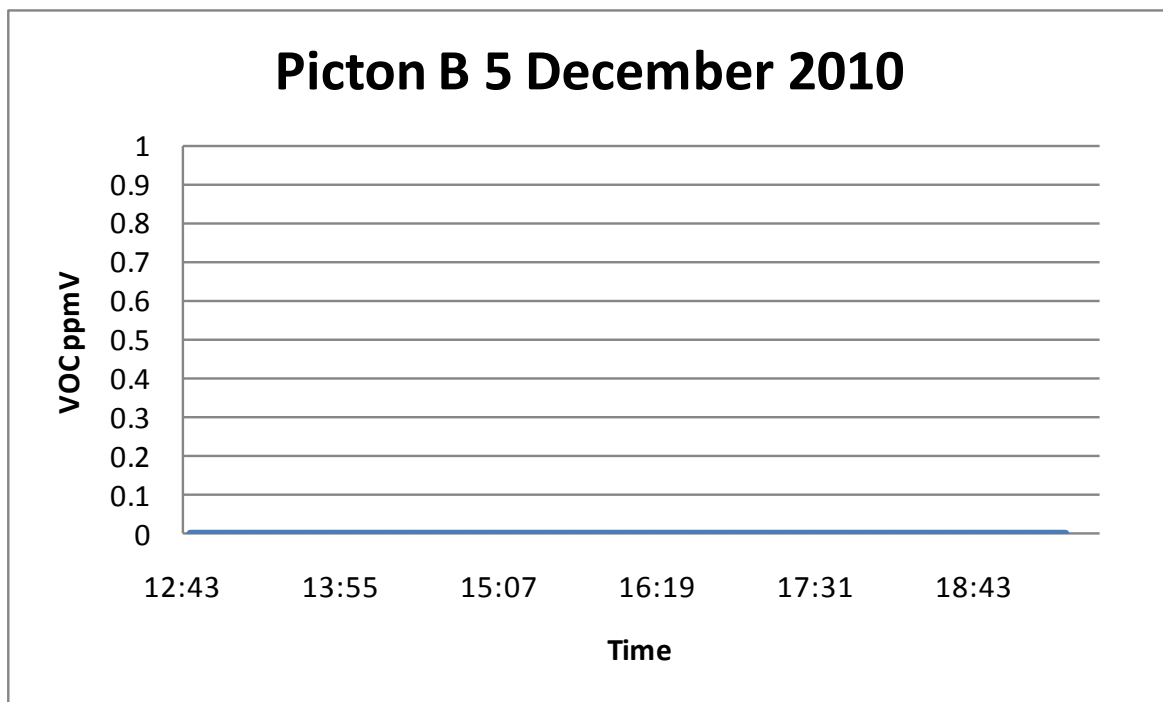
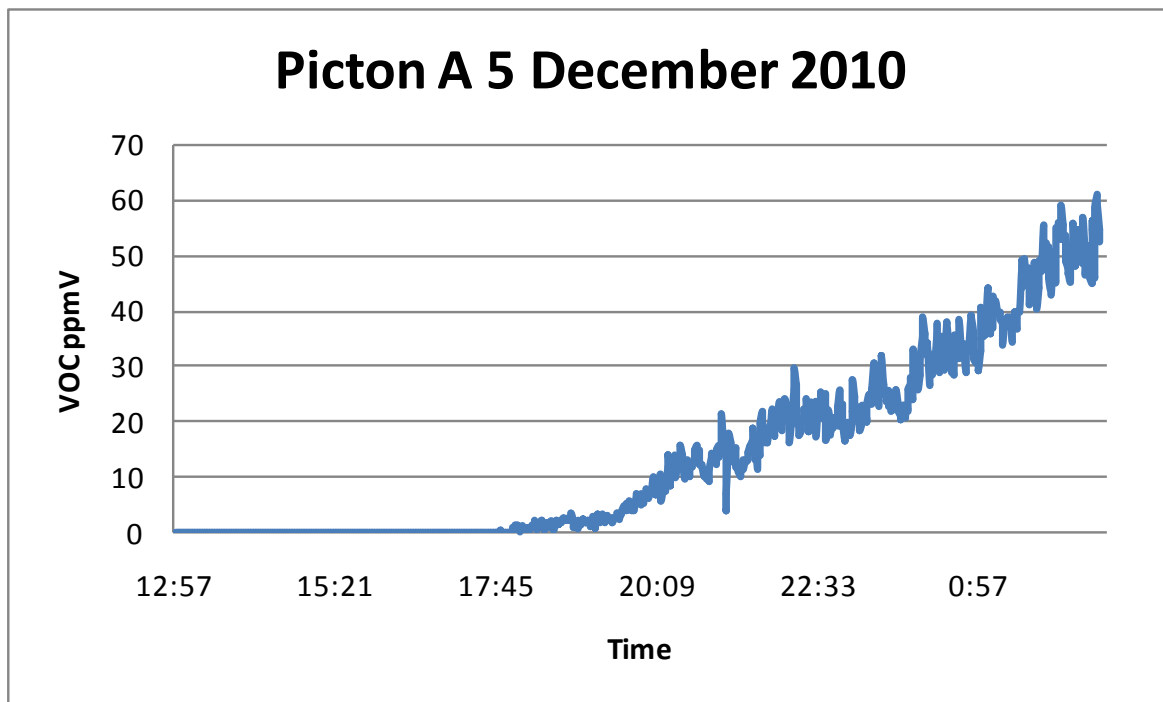
Relief sketch/photograph/diagram of site			
Forecasted Synoptic Weather Conditions (24 hours)			
Prevailing Wind direction (blowing from)	<i>NORTHWEST</i>	Cloud cover (> or <50%)	<i>< 50%</i>
Wind speed (m/s)	<i>15 → 20</i>	Ambient temperature (°C)	<i>20°C</i>
Local Weather Conditions 4 hours prior to fumigant release			
Prevailing wind direction (blowing from)	<i>NORTHWEST</i>	Cloud cover (> or <50%)	<i>< 50%</i>
Wind speed (m/s)	<i>LIGH</i>	Daytime insolation (strong, moderate, slight)	<i>STRONG</i>
Beaufort wind force scale (1-12)	<i>3</i>	Ambient temperature (°C)	<i>20°C</i>
		Pasquill stability class (A-F)	

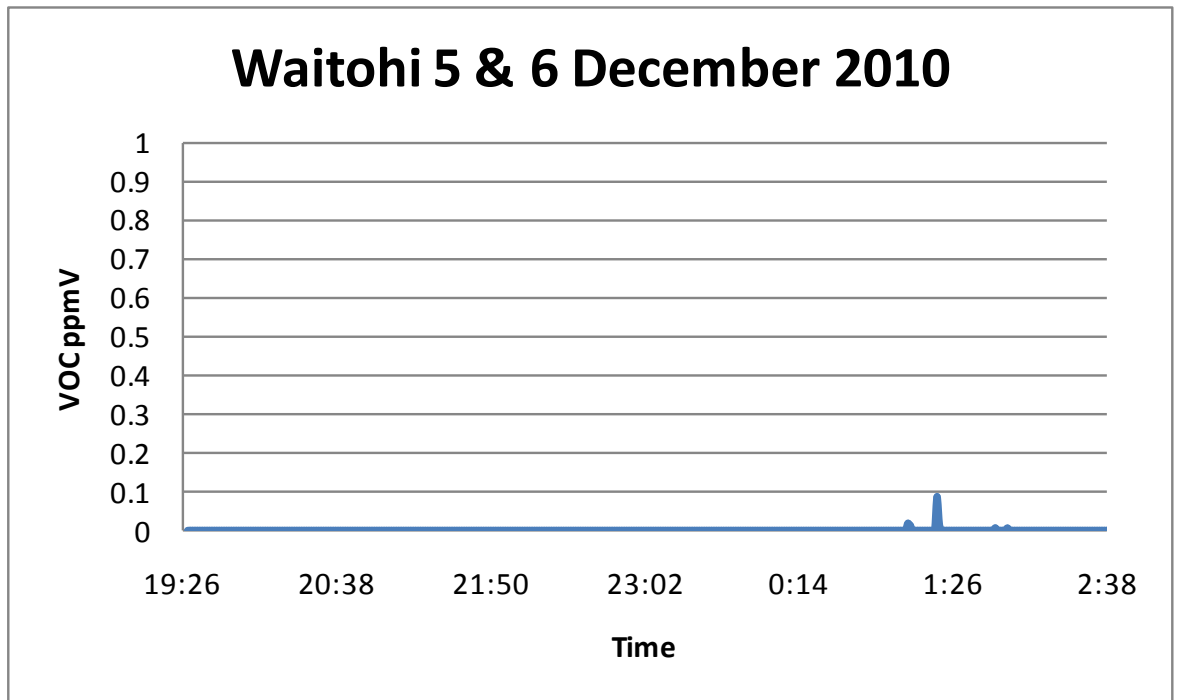
Marlborough District Council
Methyl Bromide Monitoring Report
December 2010

Detector Tubes					
Sample #	Location	Type of Tube	Date and Time Sampled	Result (ppm)	Notes
	PIC20N	GAS7EC	13:10	0	
	PIC20N	GAS7EC	14:36	0	
	PIC20N	GAS7EC	21:36	0	

Appendix C Raw PID VOC Data

This Appendix contains 3 pages including cover.





Appendix D Calibration Certificates

This Appendix contains 4 pages including cover.



Equipment Report - MINIRAE 2000 PID

This PID has been performance checked / calibrated* as follows:

Calibration	Actual Value	Reading	Pass?
Zero – fresh air	0.0 ppm	0.0 ppm	<input checked="" type="checkbox"/>
Span – Isobutylene	100 ppm	101 ppm	<input checked="" type="checkbox"/>
Set Alarm limits to	High	ppm	Low ppm
Operations Check			
<input checked="" type="checkbox"/> Performance Check (pump, lamp, sensor & battery voltage check)			
<input checked="" type="checkbox"/> Battery Charged	<input checked="" type="checkbox"/> Filters Check	<input type="checkbox"/> Spare battery Voltage (5.5v minimum)	V
<input type="checkbox"/> Electrical Safety Tag attached (AS/NZS 3760)	Tag No:.....	Valid to:.....	
<input checked="" type="checkbox"/> Bump test / Date: 30/11/10			

* Calibration gas traceability information is available upon request.

This PID has been performance checked / calibrated* as follows:

Date: 30/11/10. Checked by: David.
Signed: [Signature]

Please check that the following items are received and that all items are cleaned and decontaminated before return. A minimum \$20 cleaning / service / repair charge may be applied to any unclean or damaged items. Items not returned will be billed for at the full replacement cost.

Sent	Returned	Item
<input checked="" type="checkbox"/>	<input type="checkbox"/>	MiniRae 2000 PID / Operational Check, plus Battery Voltage @ 5.5V
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Lamp Voltage @ 10.6 V Compound Set to: _____ C/factor: _____
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Protective yellow rubber boot
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Inlet probe (attached to PID)
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Spare water trap filter(s) Qty _____
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Charger 240V to 12V 500mA
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Instruction Manual behind foam on the lid of case "
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Quick Guide Sheet behind foam on the lid of case "
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Spare Alkaline Battery Compartment with batteries
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Inline Moisture trap Filter Guide Laminated
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Calibration regulator & tubing (optional)
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Carry Case
<input type="checkbox"/>	<input type="checkbox"/>	Check to confirm electrical safety (tag must be valid)

Processors Signature/ Initials [Signature]

EE Quote Reference	Condition on return
Customer Ref: Bliggitt	
Equipment ID: PID MINIRAE	
Equipment serial no.	
Return Date: / /	
Return Time	



CERTIFICATE OF CALIBRATION AND COMPLIANCE

Customer: Port Marlborough

Date: 01st December 2010

Instrument: MiniRAE 3000

Serial No: 592-904808

Envco certifies that the above instrument has been calibrated in accordance with the manufacturers' instructions. The instrument has been tested and assessed to ensure compliance with the approval documents and the relevant standards to which it is approved.

	Standard	Meter	
Zero Calibration	0.0ppm	0.0ppm	
Span Calibration	100.0ppm	100.0ppm	
Low Alarm	50ppm	High Alarm	100ppm

Battery Check Good

Calibration Gas: 100ppm Isobutylene Part# 37-001-A-103S

Please check that all items are received and all returned. Please clean equipment before returning. A charge may apply to any unclean items. Any damaged or lost items are the liability of the renter.

Sent		Returned
Yes	PID with Inlet	
Yes	Protective Yellow Boot	
Yes	Charger	
Yes	Filter	
Yes	Instruction Manual	
Yes	Pocket instruction guide	
Yes	Download cable	
Yes	Travel charger	
Yes	Spare battery pack	

Comments:

The Environmental Collective LTD, Unit 7 74 Upper Queen Street, Newton, Auckland 1010, New Zealand
tel: 0800 623336, 649 307 3285, fax: 649 307 3827
www.envco.co.nz, info@envco.co.nz



GEOTECHNICS

RENTALS

Equipment Report - MINIRAE 2000 PID

This PID has been performance checked / calibrated* as follows:

Calibration	Actual Value	Reading	Pass?	
Zero – fresh air	0.0 ppm	0.0 ppm	<input checked="" type="checkbox"/>	
Span – Isobutylene	100 ppm	100 ppm	<input checked="" type="checkbox"/>	
Set Alarm limits to	High	100 ppm	Low	50 ppm
Operations Check				
<input checked="" type="checkbox"/> Performance Check (pump, lamp, sensor & battery voltage check)				
<input checked="" type="checkbox"/> Battery Charged	<input checked="" type="checkbox"/> Filters Check	<input type="checkbox"/> Spare battery Voltage (5.5v minimum)	V	
<input type="checkbox"/> Electrical Safety Tag attached (AS/NZS 3760)	Tag No:		Valid to:	
<input checked="" type="checkbox"/> Bump test / Date: 30/11/10				

* Calibration gas traceability information is available upon request.

This PID has been performance checked / calibrated* as follows:

Date: 30/11/10 Checked by: Daniel
Signed: [Signature]

Please check that the following items are received and that all items are cleaned and decontaminated before return. A minimum \$20 cleaning / service / repair charge may be applied to any unclean or damaged items. Items not returned will be billed for at the full replacement cost.

Sent	Returned	Item
<input checked="" type="checkbox"/>	<input type="checkbox"/>	MiniRae 2000 PID / Operational Check, plus Battery Voltage @ 5.5 V
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Lamp Voltage @ 10.6 V Compound Set to: _____ C/factor: _____
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Protective yellow rubber boot
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Inlet probe (attached to PID)
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Spare water trap filter(s) Qty _____
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Charger 240V to 12V 500mA
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Instruction Manual behind foam on the lid of case
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Quick Guide Sheet behind foam on the lid of case
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Spare Alkaline Battery Compartment with batteries
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Inline Moisture trap Filter Guide Laminated
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Calibration regulator & tubing (optional)
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Carry Case
<input type="checkbox"/>	<input type="checkbox"/>	Check to confirm electrical safety (tag must be valid)

Processors Signature/ Initials [Signature]

EE Quote Reference	Condition on return
Customer Ref <u>Briggite</u>	
Equipment ID <u>PID MYN22</u>	
Equipment serial no.	
Return Date <u>1/1</u>	
Return Time	

GEOTECHNICS LTD 23 Morgan Street, Newmarket, Auckland 1023
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