

21 May 2010
Project No. 42173607

Tasman District Council
189 Queen Street
Richmond

Attention: Jenny Easton
Resource Scientist - Contaminants

Dear Jenny

Subject: Former Fruit Growers Chemical Company Site (FCC) Mapua Ammonia Gas Survey Investigation- Part 2

1 Introduction

URS New Zealand Limited (URS) was engaged by Tasman District Council (TDC) to conduct a second Ammonia Gas Survey at the former Fruitgrowers Chemical Company Site (FCC), located at 11 Tahi Street, Mapua. The investigation has been undertaken in general accordance with the scope of works summarised in the email dated 06 April 2010 and comprised an ammonia gas survey event of all existing soil vapour points. Refer to enclosure one (Figure 3-1 from URS February 2010 report) for the location of the existing soil vapour points.

2 Soil Gas Survey

The ammonia gas survey was undertaken on 13 April 2010, using an aeroqual handheld gas monitor with an attached ammonia sensor head. Initially, an ambient survey for ammonia was undertaken across the site in the vicinity of each soil vapour point. Following this, two sets of measurements were recorded at each soil vapour point, these included the following;

- The first measurement involved removing the top cap and then placing the ammonia sensor head in the top of the vapour point and taking a reading.
- The second measurement involved purging. Initially a plug (attached to a pressure gauge and pump) was inserted into the top of the piezometer. The pump was used to draw air from within the column and was applied for approximately two minutes. Immediately after pumping, the plug was removed and the ammonia sensor head was placed in the top of the vapour point.
- All readings were recorded over a period of five minutes.

Works were scheduled during a dropping barometric pressure. Barometric pressure on 13 April as measured at the NIWA Meteorological station (Nelson Aero) was 1014 Hpa, (Enclosure 2).

Tables 1-3 (Enclosure 3) shows the ammonia soil gas results collected on 29 January and 13 April 2010.

The ambient survey of ammonia gas around the site recorded concentrations of ammonia at 0.0 ppm (Table 1). A tannin like odour was also noted at soil vapour points, six, and eight.

Results of the first set of measurements (without purging) initially recorded values of 0.1 ppm (soil point six) and 2.3 ppm (soil point eight). Over the five minute testing period these values decreased to 0.0 ppm and 1.2 ppm, respectively. Remaining soil vapour points recorded values of 0.0 ppm for the entire five minute period (Table 1).

Results of the second set of measurements (with purging) recorded values of 0.1 ppm at soil vapour point eight and 0.0 ppm at all remaining soil vapour points (Table 2).

Soil vapour point six (located in subgrade SG3) and eight (located in subgrade seven) were then re-tested. This involved re-purging at both soil vapour points, and testing for a period of five minutes. Soil vapour point six remained at 0.0 ppm for the entire five minute testing period. At soil vapour point eight, the initial value was at 0.1 ppm, which decreased to a value of 0.0 ppm (Table 3).

3 Comparison with Relevant Guidelines

Please refer to the initial report dated 18 February 2010 on guideline selection.

The short term ESL value for ammonia is 250 ppb (assuming this value is sustained for a period of one hour exposure), and equates to 0.25 ppm.

Measurements of ammonia concentrations immediately after removing the cap at soil vapour points six and eight initially recorded values of 0.1 ppm and 2.3 respectively. However over a period of five minutes; these values reduced to 0.0 ppm (soil vapour point six) and 1.2 ppm (soil vapour point eight). In comparing this data to the applicable guidelines, the value for ammonia does not exceed the short term ESL value for soil vapour point six. Soil vapour point eight does exceed the short term ESL value at 1.2 ppm.

Following purging, soil vapour point eight recorded a value of 0.1 ppm and all remaining soil vapour points recorded concentrations of 0.0 ppm. In comparing the purged data to the applicable guidelines, the value for ammonia does not exceed the short term ESL value for all soil vapour points.

Results of the re-testing at soil vapour points six and eight also do not exceed the short term ESL value.

4 Summary and Conclusions

This investigation has been undertaken to assess if there is any ammonia gas inhalation risk to human and plant health or potential for ammonia gas penetration into future buildings at the FCC site at Mapua. The purpose of this second phase of works was to confirm the ammonia gas concentrations in the soil vapour points during dropping barometric conditions, and measuring the concentration of ammonia, prior to purging and after purging.

The second ambient and soil gas survey for ammonia was undertaken on each of the twelve installed points on 13 April 2010. With the exception of soil vapour points six and eight, (located on subgrade 3 and 7) all soil vapour points recorded an ammonia concentration of 0.0 ppm, over a testing period of five minutes.

In comparing the readings from soil vapour points six and eight to the TCEQ ESL guideline for ammonia, (based on one hour exposure), exceedences were limited to the concentrations sampled prior to purging in vapour point eight (2.3 ppm dropping to 1.2 ppm after 5 minutes).

Ammonia concentrations collected during this investigation suggest that the ammonia gas generation in the eastern region of the site in identified subgrades, SG3, SG7 and SG14 is limited and is therefore unlikely to pose any risk to human and plant health via inhalation or gas penetration into future buildings.

Yours sincerely
URS New Zealand Limited



Stacey O'Driscoll
Geologist



Ian Fraser
Principal

Enclosures

Enclosure 1 – Location of existing soil vapour points

Enclosure 2 - Barometric Pressure

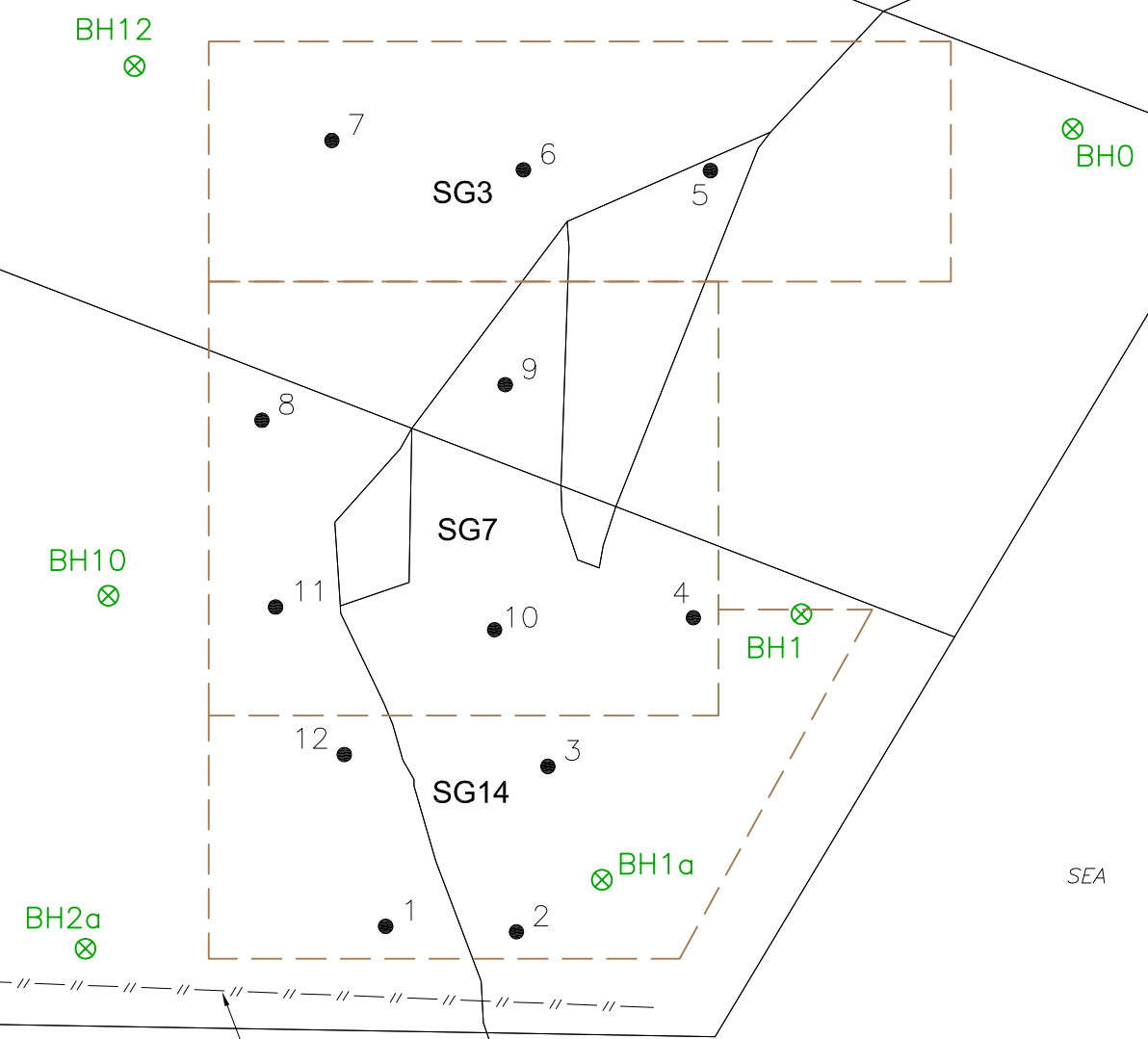
Enclosure 3 – Table of Results

Tahi Street

Aranui Road

SEA

FENCE



LEGEND:

	BH	EXISTING BORE HOLES
	1	SOIL VAPOUR POINTS
	SG3, SG7, SG14	SUBGRADES ON FCC EAST

**TASMAN DISTRICT COUNCIL
FCC MAPUA AMMONIA GAS SURVEY
SOIL VAPOUR POINT LOCATION PLAN**

FIGURE 3-1

Barometric Pressure_13.4.10.txt

Station information:

Name Agent Number Network Number Latitude (dec.deg) Longitude
 (dec.deg) Height (m) Posn_Precision Observing Authority
 Nelson Aero 4241 G13222 -41.299 173.226 2 G N/A

"Note: Position precision types are: ""W"" = based on whole minutes, ""T"" = estimated to tenth minute,"

"G = derived from gridref, ""E"" = error cases derived from gridref,"

"H = based on GPS readings (NZGD49), ""D"" = by definition i.e. grid points."

Pressure: 9am only

Station	Date(NZST)	Time(NZST)	Pmsl(hPa)	Pstn(hPa)	tend
Nelson Aero	20100401	800	1030.1	-	-
Nelson Aero	20100402	800	1025.3	-	-
Nelson Aero	20100403	800	1019.8	-	-
Nelson Aero	20100404	900	1010.6	-	-
Nelson Aero	20100405	900	1013.6	-	-
Nelson Aero	20100406	900	1009.6	-	-
Nelson Aero	20100407	900	1023.7	-	-
Nelson Aero	20100408	900	1029.6	-	-
Nelson Aero	20100409	900	1025.6	-	-
Nelson Aero	20100410	900	1025.9	-	-
Nelson Aero	20100411	900	1024.9	-	-
Nelson Aero	20100412	900	1023.5	-	-
Nelson Aero	20100413	900	1014	-	-
Nelson Aero	20100414	900	1002.1	-	-
Nelson Aero	20100415	900	1006.8	-	-
Nelson Aero	20100416	900	1015.8	-	-
Nelson Aero	20100417	900	1021.6	-	-
Nelson Aero	20100418	900	1023.3	-	-
Nelson Aero	20100419	900	1013.4	-	-
Nelson Aero	20100420	900	1014.1	-	-
Nelson Aero	20100421	900	1017.1	-	-
Nelson Aero	20100422	900	1017.8	-	-
Nelson Aero	20100423	900	1016.5	-	-
Nelson Aero	20100424	900	1016.1	-	-
Nelson Aero	20100425	900	1021.6	-	-
Nelson Aero	20100426	900	1022.7	-	-
Nelson Aero	20100427	900	1017.7	-	-
Nelson Aero	20100428	900	1020.2	-	-
Nelson Aero	20100429	900	1018.6	-	-

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Table 1: Ammonia Soil Gas Survey Results (Ambient and Unpurged Concentrations) for 13.04.10

Soil Vapour Point	Subgrade	Location		Ambient Ammonia Concentrations (ppm) 29.01.10 and 13.4.10	Duration of test 13.04.10		Ammonia Concentration Unpurged 13.4.10		Ammonia ESL* ppm
		GPS Coordinates			Minutes				
		E	N						
1	SG14	2518443	5994383	0.0	0	5	0.0	0.0	0.25
2		2518455	5994386	0.0	0	5	0.0	0.0	0.25
3		2518458	5994397	0.0	0	5	0.0	0.0	0.25
4	SG7	2518467	5994410	0.0	0	5	0.0	0.0	0.25
5		2518470	5994424	0.0	0	5	0.0	0.0	0.25
6	SG3	2518459	5994431	0.0	0	5	0.1	0.0	0.25
7		2518446	5994423	0.0	0	5	0.0	0.0	0.25
8		2518438	5994423	0.0	0	5	2.3	1.2	0.25
9		2518454	5994421	0.0	0	5	0.0	0.0	0.25
10	SG7	2518451	5994409	0.0	0	5	0.0	0.0	0.25
11		2518436	5994410	0.0	0	5	0.0	0.0	0.25
12	SG14	2518438	5994399	0.0	0	5	0.0	0.0	0.25

Notes:

No purge measurements of soil vapour points were collected during the first phase of works - 29.01.10.

* Texas Commission on Environmental Quality, Effects Screening Levels (ESL) October 2009.

Bold exceeds Ammonia ESL

Table 2: Ammonia Soil Gas Survey Results (Purged) for 29.01.10 and 13.04.10

Soil Vapour Point	Subgrade	Location		Duration of test Minutes		Ammonia Concentration Purged		Ammonia Concentration Purged		Ammonia ESL* ppm
		GPS Coordinates				29.01.10		13.4.10		
		E	N							
1	SG14	2518443	5994383	0	5	0.0	0.0	0.0	0.0	0.25
2		2518455	5994386	0	5	0.0	0.0	0.0	0.0	0.25
3		2518458	5994397	0	5	0.0	0.0	0.0	0.0	0.25
4	SG7	2518467	5994410	0	5	0.0	0.0	0.0	0.0	0.25
5		2518470	5994424	0	5	3.8	3.8	0.0	0.0	0.25
6	SG3	2518459	5994431	0	5	0.0	0.0	0.0	0.0	0.25
7		2518446	5994423	0	5	0.0	0.0	0.0	0.0	0.25
8		2518438	5994423	0	5	0.0	0.0	0.1	0.1	0.25
9		2518454	5994421	0	5	0.0	0.0	0.0	0.0	0.25
10	SG7	2518451	5994409	0	5	0.0	0.0	0.0	0.0	0.25
11		2518436	5994410	0	5	0.0	0.0	0.0	0.0	0.25
12	SG14	2518438	5994399	0	5	0.0	0.0	0.0	0.0	0.25

* Texas Commission on Environmental Quality, Effects Screening Levels (ESL) October 2009.

Bold exceeds Ammonia ESL

Table 3: Ammonia Soil Gas Survey Results (Repurged and Re-tested) for 29.01.10 and 13.04.10

Soil Vapour Point	Subgrade	Location		Duration of test Minutes		Ammonia Concentration Re-Purged		Ammonia Concentration Re-Purged		Ammonia ESL* ppm
		GPS Coordinates				29.01.10		13.4.10		
		E	N							
5	SG3	2518470	5994424	0	30	0.1	0.1	Not re-tested		0.25
6	SG3	2518459	5994431	0	5	Not re-tested		0.0	0.0	0.25
8	SG7	2518438	5994423	0	5	Not re-tested		0.1	0.0	0.25

Notes:

Soil Vapour Point Five - Re-tested 29.01.10 for 30 minutes

Soil Vapour Point Six and Eight - Re-tested 13.04.10 for 5 minutes

* Texas Commission on Environmental Quality, Effects Screening Levels (ESL) October 2009.

Bold exceeds Ammonia ESL