Pollution Incident Investigation Report for NSWMA Retirement Disposal Site Fire 19-20 March 2013

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Introduction

On the 20 October 2013 the National Solid Waste Management Authority (NSWMA) reported by Email that the Retirement Waste Disposal Site located at Retirement, St. James was set on fire on the 19 March 2013 at 8:00pm. It was further reported by the landfill manager that two cells were suspected to be maliciously set a blaze by residence stemming from a dispute over the NSWMA's effort to remove persons living on the disposal site. The cells reported on fire were the cell containing combustible materials located to the northern section of the site and the cell containing waste tyres located to the east of the site. The Agency immediately responded and enabled its Pollution Incident response Protocol. Residents from the Bogue Community also complained of heavy smoke nuisance on the morning of the 20 March 2013. A small team was dispatched to the site to investigate on the 20 March 2013.

Site Investigation

On the 20 March 2013 the Enforcement team arrived at approximately 12:00noon and observed sections of the site still on fire. They confirmed the reports that two cells were on fire, the tyre cell and the combustible cell. At the time of the visit a Jamaica Fire Brigade fire truck was on site. NSWMA was also using marl as cover material to aid in controlling the fire.

A team from the Air Quality Management Unit and the Enforcement Branch visited the Retirement site again at approximately 3:30pm. Two sections of the site which held the waste tyres and combustible material was observed to be still on fire with heavy smoke emissions being released from both sections.

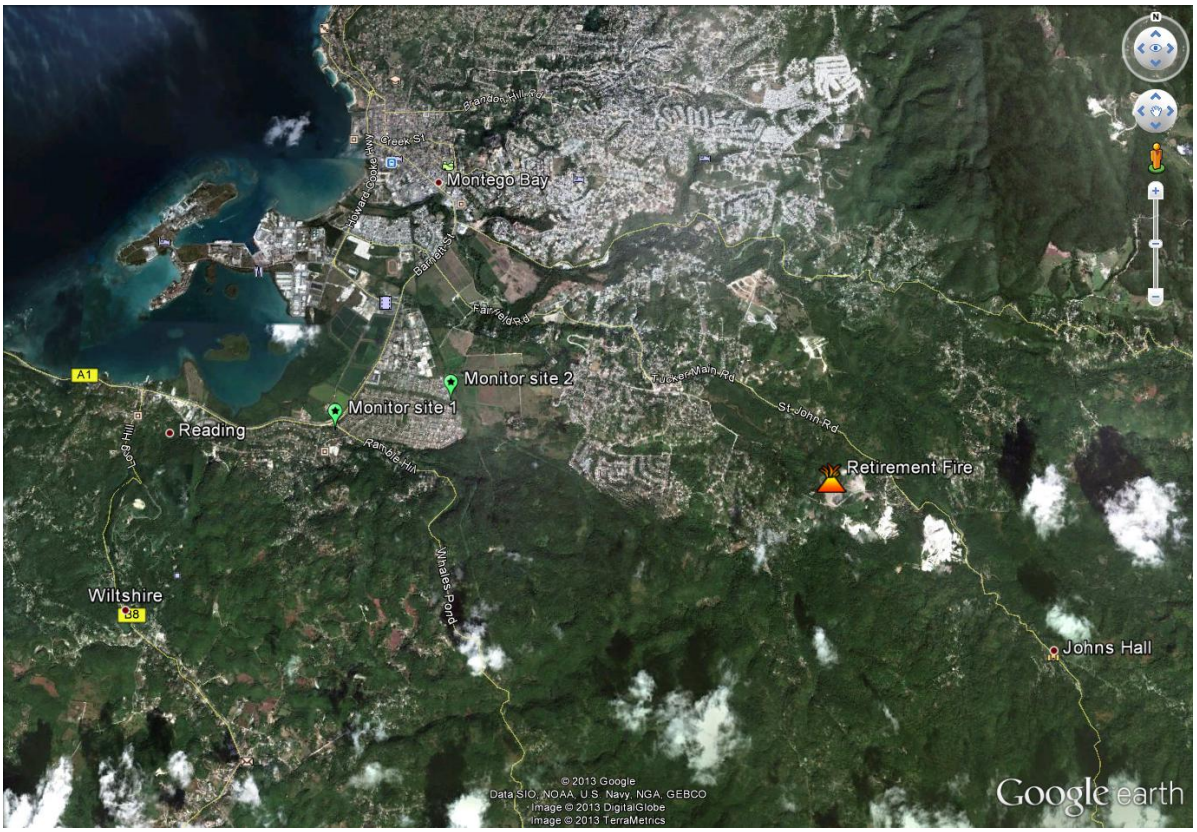
The NSWMA management team onsite reported that the fire at the cell with the combustible material (household waste) began at approximately 10:00pm on Monday the 18 March 2013. The tyre cell was set ablaze on 19 March 2013 at 8:00pm. The NSWMA notified the fire brigade whom responded to both calls. The NSWMA also responded by trucking and dumping marl on to the blaze to smother it. Six trucks were observed dumping marl to the tyre cell that was ablaze. The NSWMA reported that the combustible cell was put out earlier at about 2:00pm by the combination of the fire brigade and the application of the marl. The combustible section was now being cut and pushed by the front end loader equipment for final smothering by marl. Smoke emissions were still observed from this section but no blaze was evident, the enforcement team which had visited earlier indicated that the emissions from this section were reduced.

The tyre section which was separated from the combustible cell by a road, was approximately 200m in length and contained tyres which were still ablaze during the visit. Trucks with marl were being used to smother the blaze. NSWMA reported that the fire brigade had ceased their efforts to put out this blaze with water and had left as the effort was futile. They also indicated that this was a first for the site and they had never experienced a fire in this section of the site before, hence the reason it is separated from the rest of the site to prevent fires. The Agency representatives inquired to the cause of the blaze. NSWMA representatives on site reported that they suspect malicious activity as there was no other way this type of blaze which engulfed the entire 200m could have started. During the visit six trucks were used to constantly apply marl to the tyre blaze. It appeared that the effort was being hampered due to the nature of the blaze, as tyres were re-igniting even as marl was being applied. The Agency representatives suggested the use of foam to which the NSWMA responded they had no indication from the fire department why foam was not applied and they did not store foam on site.

On the 21 March 2013 at approximately 2:00pm the Agency's team returned to the site and observed that the fire was brought under control in both sections and only small puffs of smoke remained from the smothering efforts. This visit confirmed what was reported by the NSWMA in the media earlier in the day. There was no further complaint received from the communities that were impacted on the 20 March 2013 and the pollution incident was considered to be over.

Air Quality monitoring

On the 20 March 2013 Particulate Matter Less than 10 Microns (PM_{10}) and Volatile Organic Compounds (VOC) monitors were deployed at two of the reported affected sites in Reading and Bogue communities. At the time of the deployment the wind was blowing to the South west away from these communities. However the normal wind pattern is that it blows towards the communities during the morning and mid day hours. Samples were set for 24 hours. PM 10 samples will be analyzed by NEPA lab and the VOC will be analyzed using the overseas laboratory.



Sampling Procedure

Two Airmetrics Mini Volume samplers were used to sample for Particulate Matter (PM_{10}), these were placed on the roof of two buildings in the general wind direction from the Retirement site. The mini volume samplers offer the best response monitoring opportunity because of there portability, durability, size, built in auto timer and battery reliability. The height of each sampling inlet was approximately 15ft above the ground and samples were collected for 24 hours at a flow rate of 5.5 L/min. The samplers were placed and set to auto start and end from 3:00pm to 3:00pm the following day. Filter paper used in the sampling exercises was pre prepared by weighing and placed in filter hold for deployment to the field. Samples were returned in filter holders to the lab where post drying was allowed for 24 hours and then post weighing was completed.

Two 3M Passive Diffusion Monitors were set. These monitors are in the form of badges which have a charcoal filter with a diffusion membrane. The samplers were pinned on poles and protected from rain fall using the roofing of each building. These were set for 23 hours at one site and 25 hours at the other location. The Passive Badges were set at the site along with field blanks to ensure sampling protocol was observed. The samplers and blanks were removed; samples were covered with the sample cap and secured in the Canisters. These were then shipped overseas to be analyzed using Gas Chromatography/Mass Spectrometry (GC/MS).

Results of Sampling

Table1: PM_{10} Sample results

PM_{10} Sample	Concentration Ug/m3
Monitor Site 1	37.01
Monitor Site 2	48.52

Table 2: VOC sample results

RESULTS	Unit :	µg/m³		
Sample I.D.	CAS #	Monitor Site 1	Monitor Site 1 (Repeat)	Monitor Site 2
Exposure time (min)		1355	1355	1500
Dichloromethane	75-09-2	< 0.2	< 0.2	< 0.2
Hexane	110-54-3	1.78	1.84	1.43
Chloroform	67663	< 0.2	< 0.2	< 0.2
1,2-Dichloroethane	107-06-2	< 0.2	< 0.2	< 0.2
Benzene	71432	4.46	4.30	9.64
Trichloroethylene	79-01-6	< 0.2	< 0.2	< 0.2
Toluene	108-88-3	21.7	21.4	12.6
Tetrachloroethylene	127184	< 0.2	< 0.2	< 0.2
Ethylbenzene	100414	3.36	3.25	2.90
(m+p)-Xylene	108383 / 106423	7.88	7.81	2.63
o-Xylene	95476	1.95	2.03	1.18
Styrene	100425	0.310	0.311	0.870
Cumene	98828	0.324	0.336	0.411
a-Pinene	80-56-8	0.365	0.360	0.322
1,1,2,2-Tetrchloroethane	79345	< 0.2	< 0.2	< 0.2
n-Decane	124-18-5	3.99	3.78	4.57
1,3,5-Trimethylbenzene	108-67-8	0.516	0.532	0.212
1,2,4-Trimethylbenzene	95-63-6	2.51	2.74	1.75
Pentachloroethane	76-01-7	< 0.2	< 0.2	< 0.2
d-Limonene	5989-27-5	1.95	2.08	1.78
p-Cymene	99876	0.307	0.333	0.792
1,3-Dichlorobenzene	541-73-1	< 0.2	< 0.2	< 0.2
1,4-Dichlorobenzene	106467	0.64	0.697	0.633
Hexachloroethane	67-72-1	< 0.2	< 0.2	< 0.2
1,2,4-Trichlorobenzene	120821	< 0.2	< 0.2	< 0.2
Naphthalene	91203	4.08	4.04	4.45
TVOC		56.1	55.8	46.1

Analysis of results

From the four sets of samples collected, both PM_{10} samples showed elevated PM10 levels at the two locations above the estimated background of 20ug/m^3. However the results showed no breaches of the 150ug/m^3 24 hour average Jamaica Ambient Air Quality Standards.

Volatile Organic Compounds which were present on the screen analysis done by the laboratory were all associated with various likely sources present in the area such as traffic and industry. No significant level of any VOC was detected based on the samples recovered and the method of analysis. VOC results present in Table 2 did not show any breach of any known international association/country standards or local standards.

Conclusions

The Fire at the Retirement Disposal Site in St. James on 19 March 2013 created a negative impact on the air quality especially in the communities to the West and North West of the facility. The PM10 sampling during the fire, conducted at sites approximately 4Km and 5Km in the general downwind direction from the site indicated impact on PM_{10} background concentrations. Although an impact was created in the communities of Bogue and Reading, no breach of the PM_{10} 24 Hour Average Jamaica Ambient Air Quality Standard was observed at the locations monitored. No significant levels of VOCs were observed from monitor sites sampled. Concentrations measured are comparable concentrations observed from routine measurements in ambient air in Kingston and other cities around the world.

The level of impact was not long term as the fire was brought under control within 48 to 72 hours. Smoke emissions were also significantly reduced within a 48 hour period as fire fighting at the disposal site was aided by the abundance of cover material.

Recommendations

The following are recommendations to be implemented based on the investigation

- NSWMA should develop and outline procedures to deal with fires on all Cells including the Tyre cell at the Retirement Site
- NSWMA with the help of the Fire Department should review the response to this fire event and the lessons learnt used to improve the response.
- NSWMA should have access to Foam for the fire fighting emergencies
- The Tyre Cell at the Retirement Disposal Site should be removed from its current position and placed in a secure location with adequate fire prevention protocols in place
- The Agency should invest in more emergency response monitoring equipment and officers form satellite offices should be trained in the deployment and collection of these devices
- Particulate Matter less than 2.5 microns ($PM_{2.5}$) analysis must be done to determine a more detailed level of impact of the air pollution incident