

David W [redacted]

From: David W [redacted]
Sent: Tuesday, 23 May 2023 10:55 AM
To: U [redacted] s.73 - Irrelevant information
Subject: FW: FYI - A/ADG APPROVED | SPR230890 | CABINET IN CONFIDENCE - URGENT - DG BRIEF - HEC - Request for e-cigarette analysis DUE 25 MAY
Attachments: DG Brief - HEC request e-cigarette analysis.DOCX; Attachment 1 - DG Letter - HEC e-cigarette analysis.DOCX; Attachment 2 - Assessment of e-liquid composition Final.DOCX; Attachment 1 - DG Letter - HEC e-cigarette analysis - ADG Tracked Changes.pdf

FYI – they updated Attachment 2

From: PSB_Corro <[redacted]@health.qld.gov.au>
Sent: Tuesday, 23 May 2023 10:47 AM
To: Colleen [redacted] s.73 - Irrelevant information @health.qld.gov.au>; Rebecca [redacted] s.73 - Irrelevant information @health.qld.gov.au>; David W [redacted] s.73 - Irrelevant information health.qld.gov.au>
Subject: FW: FYI - A/ADG APPROVED | SPR230890 | CABINET IN CONFIDENCE - URGENT - DG BRIEF - HEC - Request for e-cigarette analysis DUE 25 MAY

Dear all,

Hope you are all well. Just keeping you in the loop, A/ADG approved and has been progressed to CLLO.

Thanks
Manda



Amanda [redacted] s.73 - Irrelevant information
 Executive Support Officer to Executive Director, Mark [redacted] s.73 - Irrelevant information
 Prevention Strategy Branch, Strategy, Policy and Reform Division | Queensland Health
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DOH DISCLOSURE LOG


From: SPRcorro <[REDACTED]@health.qld.gov.au>
Sent: Tuesday, 23 May 2023 10:27 AM
To: PSB_Corro <[REDACTED]@health.qld.gov.au>
Subject: FYI - A/ADG APPROVED | SPR230890 | CABINET IN CONFIDENCE - URGENT - DG BRIEF - HEC - Request for e-cigarette analysis DUE 25 MAY

Hi Amanda

This has now been approved by A/ADG SPRD David <[REDACTED]> and progressed to CLLO as per below.

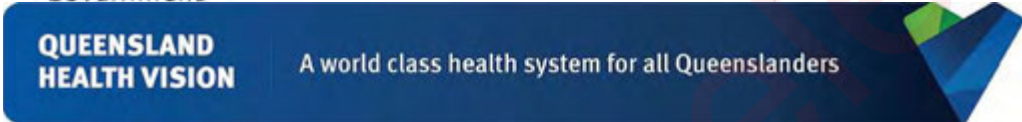
I have also attached for your reference a copy of the changes made to the letter by David (in blue, mine in red) – I thought this may be of use for your team to see David’s preferences for writing. No changes were made to the brief by David.

Thanks
 Nicole




Nicole <[REDACTED]>
Senior Correspondence Officer
 Office of the Associate Director-General,
 Strategy, Policy and Reform
 Division | Queensland Health

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From: SPRcorro
Sent: Tuesday, 23 May 2023 10:25 AM
To: CLLO <[REDACTED]@health.qld.gov.au>
Subject: A/ADG APPROVED | SPR230890 | CABINET IN CONFIDENCE - URGENT - DG BRIEF - HEC - Request for e-cigarette analysis DUE 25 MAY

Hi Stephen and team

Please find attached **Cab in Confident DG Brief for the Health and Environment Committee’s request for e-cigarette analysis**, for progression.

This was approved by the A/ADG SPRD David Sinclair on 22 May 2023.

This has a requested DG approval date of 25 May 2023, as the Health and Environment Committee (the Committee) has requested the analysis of e-cigarettes by this date, as per our discussion below.

Thanks
 Nicole

DOH DISCLOSURE LOG



Nicole

s.73 - Irrelevant information

Senior Correspondence Officer

Office of the Associate Director-General,
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Division | Queensland Health

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From: CLLO s.73 - Irrelevant information@health.qld.gov.au>

Sent: Monday, 22 May 2023 1:24 PM

To: SPRcorro <s.73 - Irrelevant information@health.qld.gov.au>; CLLO s.73 - Irrelevant information@health.qld.gov.au>

Subject: RE: REQUEST FOR EXTENSION | SPR230890 | CABINET IN CONFIDENCE - URGENT - DG BRIEF - HEC - Request for e-cigarette analysis DUE 23 MAY

Hi Nicole,

The Secretariat has advised that if they can receive it on Thursday (25 May) or before they are OK.

Thanks,

Stephen

From: SPRcorro s.73 - Irrelevant information@health.qld.gov.au>

Sent: Monday, 22 May 2023 11:23 AM

To: CLLO s.73 - Irrelevant information@health.qld.gov.au>

Subject: REQUEST FOR EXTENSION | SPR230890 | CABINET IN CONFIDENCE - URGENT - DG BRIEF - HEC - Request for e-cigarette analysis DUE 23 MAY

Importance: High

Hi Stephen

Thanks for the chat just now – as discussed, we have an urgent DG Brief to submit with a critical date of 23 May, to provide the analysis of vapes to the Health and Environment Committee by 23 May 2023, as per HEC's request.

I have attached the brief for reference (att 2 removed) – please note this has not been reviewed or cleared by the A/ADG and should not be progressed at this time.

Would it be possible for CLLO to seek an extension from HEC to 25 May to allow appropriate DG review time?

Thanks so much for your help
Nicole

DOH DISCLOSURE LOG



Nicole s.73 - Irrelevant information
Senior Correspondence Officer
Office of the Associate Director-General,
Strategy, Policy and Reform
Division | Queensland Health

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DOH DISCLOSURE LOG

SUBJECT: Request from the Chair of the Health and Environment Committee for analysis of e-cigarettes to inform current inquiry into reducing e-cigarette use in Queensland

<input type="checkbox"/> Approved	Signed..... Shaun Drummond, Director-General, Queensland Health Comments:
<input type="checkbox"/> Not approved	
<input type="checkbox"/> Noted	
<input type="checkbox"/> Further information required (see comments)	
	Date...../...../.....

ACTION REQUIRED BY - 25 May 2023, as the Health and Environment Committee (the Committee) has requested the analysis of e-cigarettes by this date.

RECOMMENDATION

It is recommended the Director-General:

- **Sign** the attached letter to Mr Aaron Harper MP, Chair of the Committee, regarding the requested analysis of e-cigarettes (Attachment 1); and
- **Approve** the report of e-cigarettes analysis (Attachment 2).

ISSUES

1. The Committee requested assistance with the analysis of e-cigarettes and **s.73 - Irrelevant information**
 - 1.1. On 4 April 2023, the Chair of the Committee wrote to the Director-General of Queensland Health, seeking advice on whether the Department's Forensic and Scientific Services (FSS) can assist with analysis of disposable e-cigarettes and **s.73 - Irrelevant information**
 - 1.2. **s.73 - Irrelevant information**
 - 1.3. The e-cigarette report should be provided to the Committee by 25 May 2023, following a short extension for Queensland Health granted by the Committee.
 - 1.4. The Committee provided seven e-cigarette samples for analysis. Another 10 came from goods seized in state-wide compliance activities (Queensland Health and Queensland Police Service).
2. The e-cigarette samples contain nicotine, other prohibited and dangerous substances
 - 2.1. The samples were analysed by FFS and a brief report of the results is provided (Attachment 2).
 - 2.2. All 17 samples of e-liquid products analysed contained nicotine.
 - 2.3. All 17 samples contained various volatile organic compounds, typically used and produced in the manufacture of paints, pharmaceuticals, and refrigerants.
 - 2.4. All samples contained between five to 15 heavy metals. A number of these heavy metals are considered toxic when inhaled including arsenic and zinc, these were detected in all samples.
 - 2.5. Initially, standard testing did not detect ingredients prohibited by the Therapeutic Goods Administration under their Standard for Nicotine Vaping Products TGO 110.
 - 2.6. Testing with a different analysis method identified benzaldehyde which is prohibited under TGO 110 in two of the samples.
 - 2.7. Further testing would be required to ascertain if samples contain prohibited ingredients above the detection limit set under TGO 110. This was not viable in the timeframe.
3. A covering letter has been prepared from the Director-General to the Committee Chair (Attachment 1).

BACKGROUND

4. On 14 March 2023 the Legislative Assembly agreed to a motion to inquire into: 1) **s.73 - Irrelevant information** and 2) reducing rates of e-cigarette use in Queensland. The Committee is due to table a report on reducing e-cigarette use by 31 August 2023.
5. Public hearings on the Bill were conducted on 12 April 2023 in Townsville and 14 April 2023 in Brisbane.
6. At these public hearings the Committee heard evidence and views from stakeholders on reducing e-cigarette use in Queensland.
7. On 3 May 2023, the Departmental representatives appeared with the Chief Health Officer at a public briefing at the request of the Committee to provide evidence on health impacts of e-cigarette use and information on current measures to monitor and reduce use.

RESULTS OF CONSULTATION

8. Hospital and Health Services provided samples of e-cigarettes that had been seized by Public Health Units.

RESOURCE/FINANCIAL IMPLICATIONS

9. There are no resource or financial implications associated with this brief.

HUMAN RIGHTS

10. Human rights are not engaged in providing analysis of the e-cigarette samples.

SENSITIVITIES/RISKS

11. There are no sensitivities or risks associated with this brief.

ATTACHMENTS

- 12. Attachment 1. Letter from the Director-General to the Chair of the Committee
- Attachment 2. Report - Assessment of e-liquid composition

Author Name: Rebecca [redacted] Position: Advanced Health Promotion Officer Unit: Prevention Strategy Tel No: s.73 - Irrelevant information Date Drafted: 18 May 2023	Cleared by (Dir/Snr Dir) Name: Mark [redacted] Position: Executive Director Branch: Prevention Strategy Branch Tel No: s.73 - Irrelevant information Date Cleared: 18 May 2023 <i>*Note clearance contact is also key contact for brief queries*</i>	Content verified by (DDG/CE) Name: David Sinclair Position: A/Associate Director-General Division: Strategy, Policy and Reform Tel No: s.73 - Irrelevant information Date Received: 22 May 2023 Date Verified: 22 May 2023
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RTI Release

DOH DISCLOSURE LOG

Assessment of e-liquid composition

For the Queensland Parliament - Health & Environment Committee

1. Purpose

To assess the chemical composition of e-liquids that are currently in vaping products available in Queensland.

2. Scope

To analyse the chemical composition of seventeen (17) e-liquid samples currently available in the Queensland vape market.

Seven (7) e-liquid samples were sourced from Health & Environment Committee (the Committee) and ten (10) samples were sourced from state-wide compliance activities from government departments (Queensland Health and Queensland Police Service).

3. Background

E-cigarette products marketed and sold in Queensland are not assessed in relation to their quality or safety.

Public health concerns have been raised by the community and by health practitioners regarding the risks of vaping products and their aerosols. In addition to nicotine, liquids used in electronic cigarettes also contain other chemical additives which have the potential to pose serious health risks to users. E-liquids are reported to contain other chemical additives such as flavours, solvents, preservatives, and contaminants that may be harmful to health when inhaled as part of vaping.

4. Laboratory Analysis

The 17 e-liquid samples were analysed by Queensland Health Forensic and Scientific Services (QH FSS) using the available laboratory methods. Qualitative or quantitative analyses were undertaken for nicotine, prohibited substances under the Therapeutic Goods Administration's - Therapeutic Goods (Standard for Nicotine Vaping Products) (TGO 110) Order 2021 (TGO 110), and other substances of concern such as carbonyl compounds, volatile organic compounds (VOCs), pesticides/fungicides/herbicides, and heavy metals.

The detection limit for the analytes was determined by QHFSS based on its current analytical capability. This may vary from the compliance limits established for the substances.

5. Results and Discussion

The 17 samples were analyzed for nicotine and other substances of concern such as carbonyl compounds, VOCs, pesticides, and heavy metals, and eight substances that are prohibited ingredients in vapes under the TGO 110.

E-liquids are also known to contain other chemical additives (flavourings and preservatives) and contaminants that have the potential to pose a serious health risk to vape users. These chemical additives and contaminants typically include various carbonyl compounds, VOCs, and heavy metals.

The results of the 17 samples are discussed below.

5.1 Nicotine

Nicotine was found in all e-liquid samples, as shown in Table 1. The nicotine content ranged from trace levels (<200 mg/kg) to 47,000 mg/kg.

Under Queensland's *Medicines and Poisons Act 2019*, vaping devices containing nicotine may only be obtained at a pharmacy under the prescription of a medical practitioner. Such devices may contain up to 100 mg/ml (100,000 mg/kg) of nicotine. Vaping products which contain nicotine and are sourced from other retailers are illegal under the *Medicines and Poisons Act 2019*. As these samples were NOT obtained through a pharmacy via a prescription, **nicotine should not have been present in any samples.**

The capacity of e-cigarettes to deliver nicotine and other harmful chemicals into the body varies widely, ranging from very low to levels like that of cigarettes, depending on product characteristics, user inhalation behaviour, and nicotine solution concentration.

The health risks of nicotine include neurological, cardiovascular, respiratory (impaired lung function), renal, and reproductive health effects. In some cases, high levels of exposure can lead to death. Young children, adolescents, pregnant and breastfeeding mothers, and the elderly are considered the most vulnerable to nicotine exposure. According to the World Health Organisation, nicotine itself is not a carcinogen, however, it may function as a "tumor promoter". Nicotine seems involved in fundamental aspects of the biology of malignant diseases, and neurodegeneration.

4.2 Prohibited ingredients

There are eight chemical compounds listed as prohibited ingredients under the TGO 110. These include 2,3-pentanedione, acetoin, benzaldehyde, cinnamaldehyde, diacetyl, diethylene glycol, dl-alpha-tocopheryl acetate (Vit E), and ethylene glycol. The compliance limit set under the TGO 110 is less than 10 parts per million (ppm).

The laboratory analysis in **Table 2** revealed that none of the seventeen (17) samples contained prohibited ingredients above the laboratory limit of reporting (LoR) or limit of detection of 2000ppm. This limit is significantly higher (x200) than the compliance limit set under the TGO 110.

Further analysis would need to be undertaken to ascertain that the samples do not contain prohibited ingredients above the detection limit set under TGO 110.

It should be noted that using a different analytical method, which is used to assess carbonyls, benzaldehyde (carbonyl) was detected in two of the samples, at 28ppm and 66ppm (note 1 mg/kg = 1ppm). Benzaldehyde is a prohibited ingredient under TGO 110 with a compliance limit of <10 ppm, set by TGO 110.

There are known health risks associated with inhaling these prohibited ingredients identified in the TGO 110. These include irreversible lung damage; respiratory failure; toxicity of the brain, heart, and kidneys; and impairment of the immune cell function.

DOH DISCLOSURE LOG

Assessment of e-liquid composition – Queensland Health

Page 3

Prepared by: Environmental Hazards Unit, Health Protection Branch

Division Name: Qld Public Health & Scientific Services

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Table 1 - Nicotine

Lab Analysis (Limit of Reporting: 200 mg/kg)	IGET Bar Strawberry Watermelon Ice	Vorteke Melon	IGET Bar Strawberry Lemon Ice	IGET Legend Passionfruit Watermelon Ice	IGET Bar Grape Ice	IGET Bar Kiwi Pineapple Ice	IGET Legend Blueberry Blackberry Ice	HQD Cuvie Plus - Strawberry Watermelon	HQD Cuvie Plus - Passionfruit
Nicotine	Present	Present	Present	Present	Present	Present	Present	Present	Present
Concentration (mg/kg)	43,000	<200	45,000	47,000	47,000	45,000	44,000	38,000	44,000

Lab Analysis (Limit of Reporting: 200 mg/kg)	IGET Bar - Peach Ice - 3500 puffs	IGET Bar - Blackberry Ice - 3500 puffs	IGET XXL - Lush Ice - 1800 puffs	IGET Goat - Cherry Ice - 5000 puffs	Gunnpod Meta - Grape Ice - 4500 puffs	Gunnpod Wave - Summer Breeze - 3500 puffs	IGET Mega - Strawberry Banana Ice - 3000 puffs	Waka Smash - Apple surge - 6000 puffs
Nicotine	Present	Present	Present	Present	Present	Present	Present	Present
Concentration (mg/kg)	37,000	33,000	<200	28,000	30,000	12,000	35,000	30,000

Table 2 – Prohibited substances under TGO 110

Vaping liquid Samples tested (Limit of Reporting 2000mg/kg except for Vitamin E acetate 50 mg/kg))	TGO110 - Prohibited Substances							
	2,4-Butadione	2,3-Pentadione	Acetoin	Benzaldehyde	Cinnamaldehyde	Vitamin E acetate	Ethylene glycol	Diethylene glycol
IGET Bar Strawberry Watermelon Ice	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR
Vorteke Melon	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR
IGET Bar Strawberry Lemon Ice	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR
IGET Legend Passionfruit Watermelon Ice	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR
IGET Bar Grape Ice	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR
IGET Bar Kiwi Pineapple Ice	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR
IGET Legend Blueberry Blackberry Ice	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR
HQD Cuvie Plus - Strawberry Watermelon	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR
HQD Cuvie Plus – Passionfruit	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR
IGET Bar - Peach Ice - 3500 puffs	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR
IGET Bar - Blackberry Ice - 3500 puffs	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR
IGET XXL - Lush Ice - 1800 puffs	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR
IGET Goat - Cherry Ice - 5000 puffs	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR
Gunnpod Meta - Grape Ice - 4500 puffs	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR
Gunnpod Wave - Summer Breeze - 3500 puffs	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR
IGET Mega - Strawberry Banana Ice - 3000 puffs	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR
Waka Smash - Apple surge - 6000 puffs	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR

5.3 Other Chemicals of Concern

5.3.1 Carbonyl compounds

All 17 samples of e-liquids were found to contain carbonyl compounds. All samples contained at least two carbonyl compounds (formaldehyde and acetaldehyde) and 16 samples contained acrolein.

Carbonyl compounds are considered irritants of the mucosal tissue of the lungs. Some of these compounds are potentially harmful to health. For example, formaldehyde is classified as a Group 1 human carcinogen by the International Agency for Research on Cancer, and acetaldehyde is classified as possibly carcinogenic to humans (Group 2B); while acrolein causes irritation of the nasal cavity and damages the lining of the lungs.

5.3.2 Volatile Organic Compounds

VOCs are a class of organic compound chemicals (usually found in gaseous form) that are typically used and produced in the manufacture of paints, pharmaceuticals, and refrigerants.

All 17 samples contained various VOCs. Five VOCs are common to all 17 samples: propylene glycol, glycerin, 2-isopropyl-N,2,3-trimethylbutanamide, benzoic acid, and 3-hexene-1-ol.

Propylene glycol and glycerin are the main components of e-liquids. They are known to be hazardous when inhaled. Heating propylene glycol and glycerin in e-cigarettes produces lung disease hazards and inhaling these compounds makes the lungs vulnerable to infections. Breathing aerosolised propylene glycol can affect the risk of asthma development.

While some of the VOCs detected are not known to pose health risks, many of these have been flagged for critical health concerns. For example, methyl anthranilate (found in three products) and ethyl propanoate (found in one product) are suspected carcinogens and either a mutagen, skin sensitiser or toxic to reproduction. Further, neomenthol (found in 7 products) and ethyl lactate have also been suspected to be toxic to reproduction.

5.3.3 Heavy Metals

All samples contained between five to fifteen heavy metals. Arsenic and zinc were detected in all samples. Other toxic heavy metals identified include lead, mercury, nickel, chromium, antimony, aluminium, iron, nickel, barium, manganese, copper, strontium, and vanadium.

A number of these heavy metals are known to be carcinogenic, mutagenic, toxic to reproduction and development, and cause neurological anomalies. Arsenic and nickel are carcinogens, while chromium and nickel are linked to respiratory diseases. Manganese, lead, and mercury are known to cause neurological and developmental defects. Barium may cause kidney problems, while vanadium may be toxic to the respiratory system.

6. Summary of Results

Several chemical compounds detected in e-liquids tested as part of this analysis have been reported to pose serious health risks to vape users. The analysis identified that:

- All 17 samples of e-liquid products analysed contained nicotine. The nicotine content ranged from trace levels (<200 mg/kg) to 47,000 mg/kg.

- None of the 17 samples analysed recorded prohibited ingredients above the laboratory detection limit of 2000 ppm. The detection limit employed by QHFSS is significantly higher (x 200) than the compliance limit set under the TGO 110 which is less than 10 ppm.
- Using a different analysis method, benzaldehyde, which is a prohibited ingredient under TGO 110, was detected in two of the samples, at 28ppm and 66ppm which is above the limit set by TGO 110 (<10 ppm).
- All 17 samples contained various VOCs. Five (5) VOCs are common to all 17 samples.
- All samples contained between five 5 to 15 heavy metals. A number of these heavy metals are considered toxic when inhaled including arsenic and zinc, which were detected in all samples.

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DOH DISCLOSURE LOG

Assessment of e-liquid composition – Queensland Health

Page 6

Prepared by: Environmental Hazards Unit, Health Protection Branch

Division Name: Qld Public Health & Scientific Services

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Queensland Health

Enquiries to: Mark [REDACTED]
Executive Director
Prevention Strategy Branch

Telephone: s.73 - Irrelevant information
Our ref: CAPSXXX

Mr Aaron Harper
Chair
Health and Environment Committee
Parliament House
George Street
BRISBANE QLD 4000

Email: [REDACTED]@parliament.qld.gov.au

Dear Mr Harper

Thank you for your letter dated 4 April 2023 seeking advice on whether the Department's Forensic and Scientific Services (FSS) can assist with the analysis of electronic cigarettes tobacco (chop-chop). We previously provided a report on the analysis of illegal tobacco. Thank you for the acknowledgement of this report.

We have received the seven e-cigarette samples sourced by the Committee. These samples have been analysed along with ten further samples sourced from state-wide compliance activities undertaken by government departments (Queensland Health and Queensland Police Service).

The samples have been analysed to test for nicotine and prohibited substances under the Therapeutic Goods Administration's Standard for Nicotine Vaping Products TGO 110. Tests were also included for other substances of concern such as carbonyl compounds, volatile organic compounds, and heavy metals.

This analysis is provided in the enclosed report.

Thank you again for the opportunity to assist the Committee with its inquiry. I look forward to the Committee's report and recommendations on reducing rates of e-cigarette use in Queensland.

Yours sincerely

Shaun Drummond
Director-General

Prepared by: Rebecca [redacted]
Advanced Health Promotion Officer
Prevention Strategy Branch
s.73 - Irrelevant information
[redacted]
18 May 2023

Submitted through: Mark [redacted]
Executive Director
Prevention Strategy Branch
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[redacted]
18 May 2023

Cleared by: David Sinclair
A/Associate Director-General
Strategy, Policy and Reform
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[redacted]
Received: 22 May 2023
Cleared: 22 May 2023

Document Name: CAPSXXXX

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Queensland Health

Enquiries to: Mark [REDACTED]
 Executive Director
 Prevention Strategy Branch
 Telephone: s.73 - Irrelevant
 Our ref: CAPSXXX-ECTF-Number
 Your ref: [REDACTED]

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Mr Aaron Harper
 Chair
 Health and Environment Committee
 Parliament House
 George Street
 BRISBANE QLD 4000

Email s.73-ir@parliament.qld.gov.au

Formatted: Underline

Dear Mr Harper

Thank you for your letter dated 4 April 2023 seeking advice on whether the Department's Forensic and Scientific Services (FSS) can assist with the analysis of electronic cigarettes: ~~s.73 - Irrelevant information~~). ~~s.73 - Irrelevant information~~

We have received the seven e-cigarette samples sourced by the Committee, ~~thank you~~. These samples have been analysed along with ten further samples sourced from state-wide compliance activities undertaken by ~~from~~ government departments (Queensland Health and Queensland Police Service).

The samples have been analysed using qualitative or quantitative analyses to test for nicotine and prohibited substances under the Therapeutic Goods Administration's Standard for Nicotine Vaping Products TGO 110. Tests were also included for other substances of concern such as carbonyl compounds, volatile organic compounds, and heavy metals.

This analysis is provided in the enclosed report ~~at Attachment 1~~.

Thank you again for the opportunity to assist the Committee with its inquiry. I look forward to the Committee's report and recommendations on reducing rates of e-cigarette use in Queensland.

Yours sincerely

Shaun Drummond
Director-General

Level 37
 1 William St Brisbane
 GPO Box 48 Brisbane
 Queensland 4000 Australia

Website health.qld.gov.au
 Email s.73-irrelevantinformation@health.qld.gov.au
 ABN 66 329 169 412

Prepared by: Rebecca [redacted]
Advanced Health Promotion Officer
[redacted] Strategy Branch
s.73 - Irrelevant information
18 May 2023

Submitted through: Mark [redacted]
Executive Director
s.73 - Irrelevant information Strategy Branch
18 May 2023

Cleared by: David Sinclair ~~Jasmina Joldić~~ PSM
A/Associate Director-General
Strategy, Policy and Reform
s.73 - Irrelevant information
Received: 22 May 2023
Cleared: XX May 2023

Document Name: CAPS-ECTF-XXXXX

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RTI Release

Assessment of e-liquid composition

For the Queensland Parliament - Health & Environment Committee

1. Purpose

To assess the chemical composition of e-liquids that are currently in vaping products available in Queensland.

2. Scope

To analyse the chemical composition of seventeen (17) e-liquid samples currently available in the Queensland vape market.

Seven (7) e-liquid samples were sourced from Health & Environment Committee (the Committee) and ten (10) samples were sourced from state-wide compliance activities from government departments (Queensland Health and Queensland Police Service).

3. Background

E-cigarette products marketed and sold in Queensland are not assessed in relation to their quality or safety.

Public health concerns have been raised by the community and by health practitioners regarding the risks of vaping products and their aerosols. In addition to nicotine, liquids used in electronic cigarettes also contain other chemical additives which have the potential to pose serious health risks to users. E-liquids are reported to contain other chemical additives such as flavours, solvents, preservatives, and contaminants that may be harmful to health when inhaled as part of vaping.

4. Laboratory Analysis

The 17 e-liquid samples were analysed by Queensland Health Forensic and Scientific Services (QH FSS) using the available laboratory methods. Qualitative or quantitative analyses were undertaken for nicotine, prohibited substances under the Therapeutic Goods Administration's - Therapeutic Goods (Standard for Nicotine Vaping Products) (TGO 110) Order 2021 (TGO 110), and other substances of concern such as carbonyl compounds, volatile organic compounds (VOCs), pesticides/fungicides/herbicides, and heavy metals.

The detection limit for the analytes was determined by QHFSS based on its current analytical capability. This may vary from the compliance limits established for the substances.

5. Results and Discussion

The 17 samples were analyzed for nicotine and other substances of concern such as carbonyl compounds, VOCs, pesticides, and heavy metals, and eight substances that are prohibited ingredients in vapes under the TGO 110.

E-liquids are also known to contain other chemical additives (flavourings and preservatives) and contaminants that have the potential to pose a serious health risk to vape users. These chemical additives and contaminants typically include various carbonyl compounds, VOCs, and heavy metals.

The results of the 17 samples are discussed below.

5.1 Nicotine

Nicotine was found in all e-liquid samples, as shown in Table 1. The nicotine content ranged from trace levels (<200 mg/kg) to 47,000 mg/kg.

Under Queensland's *Medicines and Poisons Act 2019*, vaping devices containing nicotine may only be obtained at a pharmacy under the prescription of a medical practitioner. Such devices may contain up to 100 mg/ml (100,000 mg/kg) of nicotine. Vaping products which contain nicotine and are sourced from other retailers are illegal under the *Medicines and Poisons Act 2019*. As these samples were NOT obtained through a pharmacy via a prescription, **nicotine should not have been present in any samples.**

The capacity of e-cigarettes to deliver nicotine and other harmful chemicals into the body varies widely, ranging from very low to levels like that of cigarettes, depending on product characteristics, user inhalation behaviour, and nicotine solution concentration.

The health risks of nicotine include neurological, cardiovascular, respiratory (impaired lung function), renal, and reproductive health effects. In some cases, high levels of exposure can lead to death. Young children, adolescents, pregnant and breastfeeding mothers, and the elderly are considered the most vulnerable to nicotine exposure. According to the World Health Organisation, nicotine itself is not a carcinogen, however, it may function as a "tumor promoter". Nicotine seems involved in fundamental aspects of the biology of malignant diseases, and neurodegeneration.

4.2 Prohibited ingredients

There are eight chemical compounds listed as prohibited ingredients under the TGO 110. These include 2,3-pentanedione, acetoin, benzaldehyde, cinnamaldehyde, diacetyl, diethylene glycol, dl-alpha-tocopheryl acetate (Vit E), and ethylene glycol. The compliance limit set under the TGO 110 is less than 10 parts per million (ppm).

The laboratory analysis in **Table 2** revealed that none of the seventeen (17) samples contained prohibited ingredients above the laboratory limit of reporting (LoR) or limit of detection of 2000ppm. This limit is significantly higher (x200) than the compliance limit set under the TGO 110.

Further analysis would need to be undertaken to ascertain that the samples do not contain prohibited ingredients above the detection limit set under TGO 110.

It should be noted that using a different analytical method, which is used to assess carbonyls, benzaldehyde (carbonyl) was detected in two of the samples, at 28ppm and 66ppm (note 1 mg/kg = 1ppm). Benzaldehyde is a prohibited ingredient under TGO 110 with a compliance limit of <10 ppm, set by TGO 110.

There are known health risks associated with inhaling these prohibited ingredients identified in the TGO 110. These include irreversible lung damage; respiratory failure; toxicity of the brain, heart, and kidneys; and impairment of the immune cell function.

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Table 1 - Nicotine

Lab Analysis (Limit of Reporting: 200 mg/kg)	IGET Bar Strawberry Watermelon Ice	Vorteke Melon	IGET Bar Strawberry Lemon Ice	IGET Legend Passionfruit Watermelon Ice	IGET Bar Grape Ice	IGET Bar Kiwi Pineapple Ice	IGET Legend Blueberry Blackberry Ice	HQD Cuvie Plus - Strawberry Watermelon	HQD Cuvie Plus - Passionfruit
Nicotine	Present	Present	Present	Present	Present	Present	Present	Present	Present
Concentration (mg/kg)	43,000	<200	45,000	47,000	47,000	45,000	44,000	38,000	44,000

Lab Analysis	IGET Bar - Peach Ice - 3500 puffs	IGET Bar - Blackberry Ice - 3500 puffs	IGET XXL - Lush Ice - 1800 puffs	IGET Goat - Cherry Ice - 5000 puffs	Gunnpod Meta - Grape Ice - 4500 puffs	Gunnpod Wave - Summer Breeze - 3500 puffs	IGET Mega - Strawberry Banana Ice - 3000 puffs	Waka Smash - Apple surge - 6000 puffs
Nicotine	Present	Present	Present	Present	Present	Present	Present	Present
Concentration (mg/kg)	37,000	33,000	<200	28,000	30,000	12,000	35,000	30,000

Table 2 – Prohibited substances under TGO 110

Vaping liquid Samples tested (Limit of Reporting 2000mg/kg except for Vitamin E acetate 50 mg/kg))	TGO110 - Prohibited Substances							
	2,4-Butadione	2,3-Pentadione	Acetoin	Benzaldehyde	Cinnamaldehyde	Vitamin E acetate	Ethylene glycol	Diethylene glycol
IGET Bar Strawberry Watermelon Ice	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR
Vorteke Melon	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR
IGET Bar Strawberry Lemon Ice	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR
IGET Legend Passionfruit Watermelon Ice	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR
IGET Bar Grape Ice	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR
IGET Bar Kiwi Pineapple Ice	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR
IGET Legend Blueberry Blackberry Ice	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR
HQD Cuvie Plus - Strawberry Watermelon	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR
HQD Cuvie Plus – Passionfruit	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR
IGET Bar - Peach Ice - 3500 puffs	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR
IGET Bar - Blackberry Ice - 3500 puffs	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR
IGET XXL - Lush Ice - 1800 puffs	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR
IGET Goat - Cherry Ice - 5000 puffs	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR
Gunnpod Meta - Grape Ice - 4500 puffs	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR
Gunnpod Wave - Summer Breeze - 3500 puffs	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR
IGET Mega - Strawberry Banana Ice - 3000 puffs	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR
Waka Smash - Apple surge - 6000 puffs	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR	> LOR

5.3 Other Chemicals of Concern

5.3.1 Carbonyl compounds

All 17 samples of e-liquids were found to contain carbonyl compounds. All samples contained at least two carbonyl compounds (formaldehyde and acetaldehyde) and 16 samples contained acrolein.

Carbonyl compounds are considered irritants of the mucosal tissue of the lungs. Some of these compounds are potentially harmful to health. For example, formaldehyde is classified as a Group 1 human carcinogen by the International Agency for Research on Cancer, and acetaldehyde is classified as possibly carcinogenic to humans (Group 2B); while acrolein causes irritation of the nasal cavity and damages the lining of the lungs.

5.3.2 Volatile Organic Compounds

VOCs are a class of organic compound chemicals (usually found in gaseous form) that are typically used and produced in the manufacture of paints, pharmaceuticals, and refrigerants.

All 17 samples contained various VOCs. Five VOCs are common to all 17 samples: propylene glycol, glycerin, 2-isopropyl-N,2,3-trimethylbutanamide, benzoic acid, and 3-hexene-1-ol.

Propylene glycol and glycerin are the main components of e-liquids. They are known to be hazardous when inhaled. Heating propylene glycol and glycerin in e-cigarettes produces lung disease hazards and inhaling these compounds makes the lungs vulnerable to infections. Breathing aerosolised propylene glycol can affect the risk of asthma development.

While some of the VOCs detected are not known to pose health risks, many of these have been flagged for critical health concerns. For example, methyl anthranilate (found in three products) and ethyl propanoate (found in one product) are suspected carcinogens and either a mutagen, skin sensitiser or toxic to reproduction. Further, neomenthol (found in 7 products) and ethyl lactate have also been suspected to be toxic to reproduction.

5.3.3 Heavy Metals

All samples contained between five to fifteen heavy metals. Arsenic and zinc were detected in all samples. Other toxic heavy metals identified include lead, mercury, nickel, chromium, antimony, aluminium, iron, nickel, barium, manganese, copper, strontium, and vanadium.

A number of these heavy metals are known to be carcinogenic, mutagenic, toxic to reproduction and development, and cause neurological anomalies. Arsenic and nickel are carcinogens, while chromium and nickel are linked to respiratory diseases. Manganese, lead, and mercury are known to cause neurological and developmental defects. Barium may cause kidney problems, while vanadium may be toxic to the respiratory system.

6. Summary of Results

Several chemical compounds detected in e-liquids tested as part of this analysis have been reported to pose serious health risks to vape users. The analysis identified that:

- All 17 samples of e-liquid products analysed contained nicotine. The nicotine content ranged from trace levels (<200 mg/kg) to 47,000 mg/kg.

- None of the 17 samples analysed recorded prohibited ingredients above the laboratory detection limit of 2000 ppm. The detection limit employed by QHFSS is significantly higher (x 200) than the compliance limit set under the TGO 110 which is less than 10 ppm.
- Using a different analysis method, benzaldehyde, which is a prohibited ingredient under TGO 110, was detected in two of the samples, at 28ppm and 66ppm which is above the limit set by TGO 110 (<10 ppm).
- All 17 samples contained various VOCs. Five (5) VOCs are common to all 17 samples.
- All samples contained between five 5 to 15 heavy metals. A number of these heavy metals are considered toxic when inhaled including arsenic and zinc, which were detected in all samples.

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Assessment of e-liquid composition – Queensland Health
Division Name: Qld Public Health & Scientific Services

Page 6

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David W [REDACTED]

From: R [REDACTED] s.73 - Irrelevant information
Sent: Wednesday, 24 May 2023 2:04 PM
To: Rebecca [REDACTED] s.73 - Irrelevant information
Cc: U [REDACTED] s.73 - Irrelevant information; David W [REDACTED]; Jim [REDACTED] s.73 - Irrelevant information
Subject: RE: URGENT: HEC request report on analysis of e-cigarette contents
Attachments: Attachment 2 - Assessment of e-liquid composition Final.docx

Importance: High

Good afternoon Rebecca,

This is to confirm that the first dot point on page 6 is correct. None of the 17 samples analysed recorded prohibited ingredients above the laboratory detection limit or limit of reporting (LOR) of 2000 mg/kg (or 2000 ppm) or 50 mg/kg or 50 ppm for vitamin E acetate.

A typological error has occurred during the transfer of data on Table 2. Please accept our apologies for the error. Table 2 has been rectified – please see attachment (Attachment 2 to the brief).

Please do not hesitate to contact us if you require more information.

Kind regards,

Ri [REDACTED] s.73 - Irrelevant information

From: Rebecca [REDACTED] s.73 - Irrelevant information; [REDACTED] s.73 - Irrelevant information <[REDACTED]@health.qld.gov.au>
Sent: Wednesday, 24 May 2023 10:17 AM
To: David W [REDACTED] s.73 - Irrelevant information; [REDACTED] s.73 - Irrelevant information; health.qld.gov.au>; Jim [REDACTED] s.73 - Irrelevant information; [REDACTED] s.73 - Irrelevant information; health.qld.gov.au>
Cc: Mark [REDACTED] s.73 - Irrelevant information; [REDACTED] s.73 - Irrelevant information; health.qld.gov.au>; U [REDACTED] s.73 - Irrelevant information; [REDACTED] s.73 - Irrelevant information; [REDACTED] s.73 - Irrelevant information; [REDACTED] s.73 - Irrelevant information; @health.qld.gov.au>; Ri [REDACTED] s.73 - Irrelevant information; [REDACTED] s.73 - Irrelevant information; health.qld.gov.au>
Subject: URGENT: HEC request report on analysis of e-cigarette contents
Importance: High

Hello David and Jim,

The HEC committee have a question about the report as follows:

- On page 4, table 2 the report indicates that for prohibited substances the Limit of Reporting 2000mg/kg except for Vitamin E acetate 50 mg/kg))
- The results in the table show all substances have >LOR (greater than) for all prohibited substances
- The first dot point on page 6 indicates that none of the 17 samples analysed recorded prohibited ingredients above the laboratory detection limit of 2000 ppm.

The Committee secretary are asking if this is correct – is there further detail that is required to assist with interpretation of these two figures?

They are happy with an email response. Can you please let me know when you can provide to clarify this.

Many thanks
Rebecca



Rebecca [Redacted]
Advanced Health Promotion Officer
Prevention Strategy Branch | Queensland Health
Working hours Monday to Friday

P [Redacted]
E [Redacted] [health.qld.gov.au](mailto:[Redacted]@health.qld.gov.au)
W health.qld.gov.au
A [15 Butterfield Street, Herston](https://www.health.qld.gov.au/locations/15-Butterfield-Street)

From: David W [Redacted] [health.qld.gov.au](mailto:[Redacted]@health.qld.gov.au)>
Sent: Thursday, 18 May 2023 2:05 PM
To: Rebecca [Redacted] [@health.qld.gov.au](mailto:[Redacted]@health.qld.gov.au)>
Cc: Mark [Redacted] [@health.qld.gov.au](mailto:[Redacted]@health.qld.gov.au)>; U [Redacted] [@health.qld.gov.au](mailto:[Redacted]@health.qld.gov.au)>
Subject: RE: URGENT: HEC request report on analysis of e-cigarette contents

Hi Rebecca,

Just tried calling and TEAMsing you. The Assessment of the e-liquid composition that was attached with the brief wasn't the 'final' cleared version (sent at 10:43 this morning)??

Happy to chat

Kind Regards



David W [Redacted]
Advanced Environmental Health Scientist
Environmental Hazards Unit
Health Protection Branch, Queensland Public Health
and Scientific Services | Queensland Health

E [Redacted] [@health.qld.gov.au](mailto:[Redacted]@health.qld.gov.au)
W health.qld.gov.au



Queensland Health acknowledges the Traditional Custodians of the land across Queensland, and pays respect to First Nations Elders past, present and future.

DOH DISCLOSURE LOG

From: Rebecca [redacted] <[redacted]@health.qld.gov.au>
Sent: Thursday, 18 May 2023 1:24 PM
To: Mark [redacted] <[redacted]@health.qld.gov.au>
Cc: Colleen [redacted] <[redacted]@health.qld.gov.au>; David W [redacted] <[redacted]@health.qld.gov.au>; U [redacted] <[redacted]@health.qld.gov.au>; Suzanne [redacted] <[redacted]@health.qld.gov.au>; Amanda [redacted] <[redacted]@health.qld.gov.au>

Subject: URGENT: HEC request report on analysis of e-cigarette contents
Importance: High

Hi Mark,

The Health and Environment Committee wrote to the DG in April for analysis and report on [redacted] and e-cigarettes.
 s.73 - Irrelevant information

We have now completed assessment and drafted a report on e-cigarette samples from Qld Health as well as samples obtained by the Committee. QH-FSS has conducted the analysis in liaison with Health Protection and Health Protection have drafted the attached report on e-liquid composition.

Our Branch have drafted the attached DG Brief and letter to the Committee.

Can you please review the package and progress for ADG clearance.

The report is due to the Committee 23 May 2023.

Best Regards
 Rebecca



Rebecca [redacted]
 Advanced Health Promotion Officer
 Prevention Strategy Branch | Queensland Health
 Working hours Monday to Friday

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A 15 Butterfield Street, Herston

QUIT HQ Find your way to quit quithq.initiatives.qld.gov.au

Queensland Health acknowledges the Traditional Owners of the land, and pays respect to Elders past, present and future.

DOH DISCLOSURE LOG

Assessment of e-liquid composition

For the Queensland Parliament - Health & Environment Committee

1. Purpose

To assess the chemical composition of e-liquids that are currently in vaping products available in Queensland.

2. Scope

To analyse the chemical composition of seventeen (17) e-liquid samples currently available in the Queensland vape market.

Seven (7) e-liquid samples were sourced from Health & Environment Committee (the Committee) and ten (10) samples were sourced from state-wide compliance activities from government departments (Queensland Health and Queensland Police Service).

3. Background

E-cigarette products marketed and sold in Queensland are not assessed in relation to their quality or safety.

Public health concerns have been raised by the community and by health practitioners regarding the risks of vaping products and their aerosols. In addition to nicotine, liquids used in electronic cigarettes also contain other chemical additives which have the potential to pose serious health risks to users. E-liquids are reported to contain other chemical additives such as flavours, solvents, preservatives, and contaminants that may be harmful to health when inhaled as part of vaping.

4. Laboratory Analysis

The 17 e-liquid samples were analysed by Queensland Health Forensic and Scientific Services (QH FSS) using the available laboratory methods. Qualitative or quantitative analyses were undertaken for nicotine, prohibited substances under the Therapeutic Goods Administration's - Therapeutic Goods (Standard for Nicotine Vaping Products) (TGO 110) Order 2021 (TGO 110), and other substances of concern such as carbonyl compounds, volatile organic compounds (VOCs), pesticides/fungicides/herbicides, and heavy metals.

The detection limit for the analytes was determined by QHFSS based on its current analytical capability. This may vary from the compliance limits established for the substances.

5. Results and Discussion

The 17 samples were analyzed for nicotine and other substances of concern such as carbonyl compounds, VOCs, pesticides, and heavy metals, and eight substances that are prohibited ingredients in vapes under the TGO 110.

E-liquids are also known to contain other chemical additives (flavourings and preservatives) and contaminants that have the potential to pose a serious health risk to vape users. These chemical additives and contaminants typically include various carbonyl compounds, VOCs, and heavy metals.

The results of the 17 samples are discussed below.

5.1 Nicotine

Nicotine was found in all e-liquid samples, as shown in Table 1. The nicotine content ranged from trace levels (<200 mg/kg) to 47,000 mg/kg.

Under Queensland's *Medicines and Poisons Act 2019*, vaping devices containing nicotine may only be obtained at a pharmacy under the prescription of a medical practitioner. Such devices may contain up to 100 mg/ml (100,000 mg/kg) of nicotine. Vaping products which contain nicotine and are sourced from other retailers are illegal under the *Medicines and Poisons Act 2019*. As these samples were NOT obtained through a pharmacy via a prescription, **nicotine should not have been present in any samples.**

The capacity of e-cigarettes to deliver nicotine and other harmful chemicals into the body varies widely, ranging from very low to levels like that of cigarettes, depending on product characteristics, user inhalation behaviour, and nicotine solution concentration.

The health risks of nicotine include neurological, cardiovascular, respiratory (impaired lung function), renal, and reproductive health effects. In some cases, high levels of exposure can lead to death. Young children, adolescents, pregnant and breastfeeding mothers, and the elderly are considered the most vulnerable to nicotine exposure. According to the World Health Organisation, nicotine itself is not a carcinogen, however, it may function as a "tumor promoter". Nicotine seems involved in fundamental aspects of the biology of malignant diseases, and neurodegeneration.

4.2 Prohibited ingredients

There are eight chemical compounds listed as prohibited ingredients under the TGO 110. These include 2,3-pentanedione, acetoin, benzaldehyde, cinnamaldehyde, diacetyl, diethylene glycol, dl-alpha-tocopheryl acetate (Vit E), and ethylene glycol. The compliance limit set under the TGO 110 is less than 10 parts per million (ppm).

The laboratory analysis in **Table 2** revealed that none of the seventeen (17) samples contained prohibited ingredients above the laboratory limit of reporting (LoR) or limit of detection of 2000ppm. This limit is significantly higher (x200) than the compliance limit set under the TGO 110.

Further analysis would need to be undertaken to ascertain that the samples do not contain prohibited ingredients above the detection limit set under TGO 110.

It should be noted that using a different analytical method, which is used to assess carbonyls, benzaldehyde (carbonyl) was detected in two of the samples, at 28ppm and 66ppm (note 1 mg/kg = 1ppm). Benzaldehyde is a prohibited ingredient under TGO 110 with a compliance limit of <10 ppm, set by TGO 110.

There are known health risks associated with inhaling these prohibited ingredients identified in the TGO 110. These include irreversible lung damage; respiratory failure; toxicity of the brain, heart, and kidneys; and impairment of the immune cell function.

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Assessment of e-liquid composition – Queensland Health

Page 3

Prepared by: Environmental Hazards Unit, Health Protection Branch

Division Name: Qld Public Health & Scientific Services

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Table 1 - Nicotine

Lab Analysis (Limit of Reporting: 200 mg/kg)	IGET Bar Strawberry Watermelon Ice	Vorteke Melon	IGET Bar Strawberry Lemon Ice	IGET Legend Passionfruit Watermelon Ice	IGET Bar Grape Ice	IGET Bar Kiwi Pineapple Ice	IGET Legend Blueberry Blackberry Ice	HQD Cuvie Plus - Strawberry Watermelon	HQD Cuvie Plus - Passionfruit
Nicotine	Present	Present	Present	Present	Present	Present	Present	Present	Present
Concentration (mg/kg)	43,000	<200	45,000	47,000	47,000	45,000	44,000	38,000	44,000

Lab Analysis (Limit of Reporting: 200 mg/kg)	IGET Bar - Peach Ice - 3500 puffs	IGET Bar - Blackberry Ice - 3500 puffs	IGET XXL - Lush Ice - 1800 puffs	IGET Goat - Cherry Ice - 5000 puffs	Gunnpod Meta - Grape Ice - 4500 puffs	Gunnpod Wave - Summer Breeze - 3500 puffs	IGET Mega - Strawberry Banana Ice - 3000 puffs	Waka Smash - Apple surge - 6000 puffs
Nicotine	Present	Present	Present	Present	Present	Present	Present	Present
Concentration (mg/kg)	37,000	33,000	<200	28,000	30,000	12,000	35,000	30,000

Table 2 – Prohibited substances under TGO 110

Vaping liquid Samples tested (Limit of Reporting 2000mg/kg except for Vitamin E acetate 50 mg/kg)	TGO110 - Prohibited Substances							
	2,4-Butadione	2,3-Pentadione	Acetoin	Benzaldehyde	Cinnamaldehyde	Vitamin E acetate	Ethylene glycol	Diethylene glycol
IGET Bar Strawberry Watermelon Ice	< LOR	< LOR	< LOR	< LOR	< LOR	< LOR	< LOR	< LOR
Vorteke Melon	< LOR	< LOR	< LOR	< LOR	< LOR	< LOR	< LOR	< LOR
IGET Bar Strawberry Lemon Ice	< LOR	< LOR	< LOR	< LOR	< LOR	< LOR	< LOR	< LOR
IGET Legend Passionfruit Watermelon Ice	< LOR	< LOR	< LOR	< LOR	< LOR	< LOR	< LOR	< LOR
IGET Bar Grape Ice	< LOR	< LOR	< LOR	< LOR	< LOR	< LOR	< LOR	< LOR
IGET Bar Kiwi Pineapple Ice	< LOR	< LOR	< LOR	< LOR	< LOR	< LOR	< LOR	< LOR
IGET Legend Blueberry Blackberry Ice	< LOR	< LOR	< LOR	< LOR	< LOR	< LOR	< LOR	< LOR
HQD Cuvie Plus - Strawberry Watermelon	< LOR	< LOR	< LOR	< LOR	< LOR	< LOR	< LOR	< LOR
HQD Cuvie Plus – Passionfruit	< LOR	< LOR	< LOR	< LOR	< LOR	< LOR	< LOR	< LOR
IGET Bar - Peach Ice - 3500 puffs	< LOR	< LOR	< LOR	< LOR	< LOR	< LOR	< LOR	< LOR
IGET Bar - Blackberry Ice - 3500 puffs	< LOR	< LOR	< LOR	< LOR	< LOR	< LOR	< LOR	< LOR
IGET XXL - Lush Ice - 1800 puffs	< LOR	< LOR	< LOR	< LOR	< LOR	< LOR	< LOR	< LOR
IGET Goat - Cherry Ice - 5000 puffs	< LOR	< LOR	< LOR	< LOR	< LOR	< LOR	< LOR	< LOR
Gunnpod Meta - Grape Ice - 4500 puffs	< LOR	< LOR	< LOR	< LOR	< LOR	< LOR	< LOR	< LOR
Gunnpod Wave - Summer Breeze - 3500 puffs	< LOR	< LOR	< LOR	< LOR	< LOR	< LOR	< LOR	< LOR
IGET Mega - Strawberry Banana Ice - 3000 puffs	< LOR	< LOR	< LOR	< LOR	< LOR	< LOR	< LOR	< LOR
Waka Smash - Apple surge - 6000 puffs	< LOR	< LOR	< LOR	< LOR	< LOR	< LOR	< LOR	< LOR

Assessment of e-liquid composition – Queensland Health

5.3 Other Chemicals of Concern

5.3.1 Carbonyl compounds

All 17 samples of e-liquids were found to contain carbonyl compounds. All samples contained at least two carbonyl compounds (formaldehyde and acetaldehyde) and 16 samples contained acrolein.

Carbonyl compounds are considered irritants of the mucosal tissue of the lungs. Some of these compounds are potentially harmful to health. For example, formaldehyde is classified as a Group 1 human carcinogen by the International Agency for Research on Cancer, and acetaldehyde is classified as possibly carcinogenic to humans (Group 2B); while acrolein causes irritation of the nasal cavity and damages the lining of the lungs.

5.3.2 Volatile Organic Compounds

VOCs are a class of organic compound chemicals (usually found in gaseous form) that are typically used and produced in the manufacture of paints, pharmaceuticals, and refrigerants.

All 17 samples contained various VOCs. Five VOCs are common to all 17 samples: propylene glycol, glycerin, 2-isopropyl-N,2,3-trimethylbutanamide, benzoic acid, and 3-hexene-1-ol.

Propylene glycol and glycerin are the main components of e-liquids. They are known to be hazardous when inhaled. Heating propylene glycol and glycerin in e-cigarettes produces lung disease hazards and inhaling these compounds makes the lungs vulnerable to infections. Breathing aerosolised propylene glycol can affect the risk of asthma development.

While some of the VOCs detected are not known to pose health risks, many of these have been flagged for critical health concerns. For example, methyl anthranilate (found in three products) and ethyl propanoate (found in one product) are suspected carcinogens and either a mutagen, skin sensitiser or toxic to reproduction. Further, neomenthol (found in 7 products) and ethyl lactate have also been suspected to be toxic to reproduction.

5.3.3 Heavy Metals

All samples contained between five to fifteen heavy metals. Arsenic and zinc were detected in all samples. Other toxic heavy metals identified include lead, mercury, nickel, chromium, antimony, aluminium, iron, nickel, barium, manganese, copper, strontium, and vanadium.

A number of these heavy metals are known to be carcinogenic, mutagenic, toxic to reproduction and development, and cause neurological anomalies. Arsenic and nickel are carcinogens, while chromium and nickel are linked to respiratory diseases. Manganese, lead, and mercury are known to cause neurological and developmental defects. Barium may cause kidney problems, while vanadium may be toxic to the respiratory system.

6. Summary of Results

Several chemical compounds detected in e-liquids tested as part of this analysis have been reported to pose serious health risks to vape users. The analysis identified that:

- All 17 samples of e-liquid products analysed contained nicotine. The nicotine content ranged from trace levels (<200 mg/kg) to 47,000 mg/kg.

- None of the 17 samples analysed recorded prohibited ingredients above the laboratory detection limit of 2000 ppm (or 50 ppm for vitamin E acetate). The detection limit employed by QHFSS is significantly higher (x 200) than the compliance limit set under the TGO 110 which is less than 10 ppm.
- Using a different analysis method, benzaldehyde, which is a prohibited ingredient under TGO 110, was detected in two of the samples, at 28 ppm and 66 ppm which is above the limit set by TGO 110 (<10 ppm).
- All 17 samples contained various VOCs. Five (5) VOCs are common to all 17 samples.
- All samples contained between five 5 to 15 heavy metals. A number of these heavy metals are considered toxic when inhaled including arsenic and zinc, which were detected in all samples.

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Assessment of e-liquid composition – Queensland Health

Page 6

Prepared by: Environmental Hazards Unit, Health Protection Branch

Division Name: Qld Public Health & Scientific Services

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