

Message from the Chair

The Fort Air Partnership (FAP) is all about monitoring the air we breathe in the Airshed, and 2022 felt like a bit of fresh air. Although Airshed air quality was consistent over the last few years, the COVID-19 pandemic hampered how we worked and collaborated to bring you air quality data.

The energy of people starting to gather again in person to discuss and make decisions on how best to monitor the air we all breathe has been inspiring and motivational. Of course, we have all come a long way in how we meet and collaborate online since the first quarter of 2020, but the energy and camaraderie created by gathering with driven and intelligent people are infectious.

I thank all Fort Air Partnership team members, including all volunteers, for their hard work in delivering objective, arms-length air monitoring data to the citizens of our Airshed.



We are proud of our team for their constant assessment of how best to monitor the air we breathe in our Airshed.

Air quality

We felt fortunate in 2022 that we did not have to endure the wildfire smoke in the summer months that we experienced in 2021. You will remember that several regions in British Columbia were devastated by wildfires in 2021, and winds brought wildfire smoke to our Airshed for several weeks.

Network Uptime

Our network for collecting and reporting on air quality data was up 99.2% of the time in 2022. An excellent achievement by our team ensuring the system is stable.

Maximizing the best use of our stations and PurpleAir monitors

We are proud of our team for their constant assessment of how best to monitor the air we breathe in our Airshed.

We wrapped up our portable monitoring station study in the Town of Lamont, leading to the decision to move the Lamont County Station to the Town of Lamont. Our assessment of air monitoring coverage led us to plan on moving the previous Town of Lamont portable station to the northeast corner of our Airshed, near the Hamlet of Newbrook. This portable monitoring station will be operational again in the first quarter of 2023.

In conjunction with Parks Canada, a PurpleAir monitor was installed at the Flk Island National Park's Astotin Lake campground registration office, resulting in a study completed in the last quarter of 2022.

Collaborating province-wide on air monitoring

Our Executive Director continues to play a lead role in the Alberta Airshed community as an Alberta Airsheds Council (AAC) Board and Executive Member. Our Communications team played a more significant role in 2022, with the AAC helping all Airsheds with enhanced social media strategies.

Responding to citizen feedback

We completed a random citizen telephone survey in the fall of 2022 with the Life in the Heartland and Northeast Region Community Awareness Emergency Response organizations. We are pleased that most citizens were satisfied with Fort Air Partnership's work. We also heard some valuable feedback on how we can adjust our communications to be more relevant and understandable. We will make adjustments in 2023 to do just that.

I look forward to 2023 and rest well knowing the fantastic people we have on our team are working hard to deliver top-of-class air quality data to our Airshed residents.

Allan Wesley

Chair, Fort Air Partnership

2022 Highlights

Air Monitoring Network

In 2022, Fort Air Partnership (FAP) operated 10 continuous ambient air quality monitoring stations, including one portable station. Our portable monitoring station operated in the Town of Lamont throughout the year.

In addition to the continuous monitoring network, FAP operated a 16-site passive monitoring network that provided monthly averages of sulphur dioxide (SO₂) and hydrogen sulphide (H₂S) and included five PurpleAir sensors.



Lamont County Air Monitoring Station Relocated to the Town of Lamont

Fort Air Partnership (FAP) relocated its
Lamont County continuous air monitoring
station into the Town of Lamont in November 2022. The
decision followed a one-year-long monitoring project in the
Town that collected data from a portable air monitoring station
between August 2021 and August 2022.

The data analysis showed that substance measurements between the two sites were comparable. The new Town location will also better enable FAP to meet its monitoring objectives. It will provide air quality information for the Town of Lamont, the largest population centre in the FAP Airshed without a continuous monitoring station until now. The new site is also nearer to the eastern border of the Airshed and better situated to provide information on air quality leaving the Airshed when winds blow in from the western quadrants.

The new station will monitor and collect data for the same parameters as the previous Lamont County station: sulphur

dioxide, nitric oxide, nitrogen dioxide, oxides of nitrogen, hydrogen sulphide, total hydrocarbons, non-methane hydrocarbons, methane, ozone, and particulate matter, plus weather information. It will also continue to provide the data required to calculate a daily Air Quality Health

Index (AQHI) and forecast.

The previous Lamont County station was located approximately six kilometres west of the Town of Lamont on a farmland site. The site was initially selected in 2003 in response to modelling results indicating that this area of the Airshed may experience higher measurements of sulphur dioxide (SO₂). However, the Lamont County data assessment showed no exceedances of the SO₂ Alberta Ambient Air Quality Objectives (AAAQOs) since the station was established in 2003. The highest one-hour average measured in 20 years was approximately 40% of the AAAQO.

The Provincial Government, as a member of the Fort Air Partnership, approved the relocation.



In late 2022, Fort Air Partnership (FAP) began implementing plans to move its portable <u>continuous air monitoring station</u> to a site near the Hamlet of Newbrook. The portable station was located in the Town of Lamont in 2022.

The portable station is being moved to Newbrook in early 2023 to fill a gap of no continuous air monitoring being done historically in the northern region of the FAP Airshed. The nearest continuous air quality monitoring station is in Redwater, 42 kilometres

The Newbrook portable station will be on the northern border of FAP. The station is located six kilometres south of Newbrook. See the

FAP Airshed map.

away.

The portable station will collect and report data on nine different substances: sulphur dioxide, hydrogen sulphide, nitric oxide, nitrogen dioxide, oxides of nitrogen, ozone, nonmethane hydrocarbons, methane and particulate matter. This data will enable a daily and forecast Air Quality Health Index (AQHI) calculation for the local area. Data analysis at the portable station will include comparisons to data generated by FAP's other continuous stations. It will also provide weather information.

In addition to FAP's <u>live data feed</u>, portable station data will be shared via weekly AQHI reporting and quarterly and annual air quality monitoring reports.



Special Projects

Lamont Portable Station Monitoring Project

Fort Air Partnership (FAP) collected air quality measurements from a portable air monitoring station in the Town of Lamont from August 1, 2021 to August 31, 2022. Data collected during the 13-month Town of Lamont project was used to calculate an Air Quality Health Index (AQHI), as is done at other continuous stations within FAP.

Results

The results indicate that the air quality the Town of Lamont residents experience is of low risk 98.4% of the time. This is a slightly higher percentage than the four other FAP community stations used for comparison in the report.

Less than 1.5% of the time, AQHI was recorded in the moderate risk category.

There were six hours of high-risk AQHI recorded due to smoke from wildfires outside of FAP, and no instances of very high-risk AQHI were recorded.

Regional events such as wildfires and wintertime temperature inversions affected air quality in the Town of Lamont, similarly to other communities throughout the FAP region. Five such events occurred during the reporting period, all due to wildfire smoke. The small number of air quality events monitored during the project was not enough to definitively compare the influence of regional events on the Town of Lamont relative to other communities in FAP.

Read the full report.

Fine Particulate Matter Speciation Study

A three-year research study that examined sources of fine particulate matter in the Fort Saskatchewan area provided valuable information on sources contributing to $PM_{2.5}$ generation in the Fort Air Partnership (FAP) region. The study was conducted in response to a recommendation from a network assessment completed in 2012 to better understand sources contributing to $PM_{2.5}$ in the FAP region.

Environment and Protected Areas (EPA) contributed significant technical expertise and support to this project. EPA will also use the data collected during this project in particulate matter speciation work they are conducting in the Red Deer-North Saskatchewan Region and evaluate the performance of photochemical modelling in support of the Designated Industrial Zone Pilot Project.

PM_{2.5} refers to "fine particulate matter," which are particles that are 2.5 microns or smaller. For reference, the average cross-section of a human hair is 50 microns.

The
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Particulate matter is categorized by size because different-sized particles can have different health effects. PM₁₀ particles (particles less than 10 microns in size) can irritate your nose

and eyes. $PM_{2.5}$ particles, 75% smaller than PM_{10} particles, raise the possibility of moving deeper into the lungs. They consist of numerous chemicals and particles, both liquid and solid. This is why $PM_{2.5}$ is an essential component of the Air Quality Health Index (AQHI), a general measure of air quality concerning human health.

PM_{2.5} mass concentrations at the Ross Creek station in Fort Saskatchewan had the largest contributions from secondary particulate matter components consisting of organic carbon and metals, ammonium nitrate and ammonium sulphate. The substances that react to form these secondary particulate matter components observed during the study are emitted by urban and industrial activities both within and outside of Fort Air Partnership's boundaries and the broader Edmonton Metropolitan Area.

On the days when higher concentrations of $PM_{2.5}$ were measured, meteorological conditions were more conducive to pollution buildup, especially in the case of wintertime temperature inversions in the winter months and wildfire smoke episodes during the summer months.

Although a major contributing factor to elevated $PM_{2.5}$ levels in the FAP region is wildfire smoke that cannot be directly managed by entities in FAP or the Edmonton Metropolitan Area, there is still a significant contribution from other sources generating secondary particulate matter, including both urban and industrial. This contribution from other sources highlights the need for collective regional air quality stewardship.

Read the **full report**.





Communications, Education and Awareness

Increased social media communication

- In early 2022, FAP re-launched our Facebook platform to communicate more directly with Airshed residents.
 We concentrated on re-purposing our messaging through Facebook, hoping to attract more followers.
- We added Twitter to our communications toolbox through a pilot in late 2022.

Citizen random telephone survey



- FAP completed a random citizen telephone survey in the fall of 2022 with the Life in the Heartland and Northeast Region Community Awareness Emergency Response organizations.
- We received feedback that our communications can be more relevant and understandable and that the local print media remains a top channel for people to receive their news.

 We are adjusting our communications to improve understanding and working harder to get the right messages into local print media streams.

Re-starting our education program

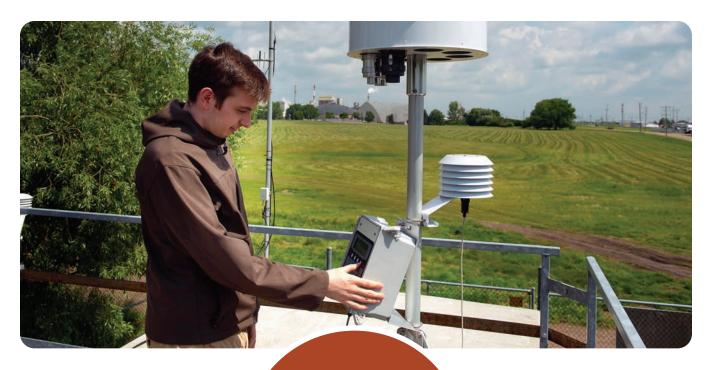


 Unfortunately, our work with Airshed schools on air quality education was interrupted by the COVID-19 pandemic in 2000 and 2021. In 2022, we started to ramp the program back up with our education partner and will be re-launching a school program in the fall of 2023.

Fresh Air Experience

- The 2022 Fresh Air Experience contest continued in 2022, ranking again as the number one way to attract new followers to our social media messaging.
- We congratulate the 2022 winners and hope more people can participate in 2023. (below)





Collaborating with other Alberta Airsheds

FAP continues to collaborate with other Airsheds provincially as part of the **Alberta Airsheds Council** to implement successful air monitoring, reporting and education within Alberta.

The multi-stakeholder oversight of monitoring, data and analysis through Alberta's Airshed organizations continues to be critical to ensuring a credible, science-based approach to understanding air quality in Alberta. Stakeholders include all levels of government, industry, non-governmental organizations and the public.

We actively participate in AAC policy and program development, with membership on AAC's Executive, Technical and Communications committees.

In 2022, the Alberta Airsheds Council released a 2021 Alberta Airsheds Air Quality Report to summarize the air quality data monitored and collected in our province by Alberta's Airsheds. This report is available on fortair.org.

Designated Industrial Zone Pilot Project

In 2022, Environment and Protected Areas (EPA), Alberta's Industrial Heartland Association and the Northeast Capital Industrial Association finalized the first step in implementing

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a pilot Designated Industrial Zone (DIZ) in Alberta's Industrial Heartland.

The objective of the pilot project was to establish a Designated Industrial Zone for Alberta's Industrial Heartland. From the Government of Alberta: The Designated Industrial Zone (DIZ) in Alberta's Industrial Heartland will establish a best-in-class regulatory framework that will help attract new investment and create good jobs for Albertans while realizing environmental

jobs for Albertans while realizing environmen outcomes. Facilities in the DIZ will benefit from:

- consistent, coordinated regulatory approvals
- shared access to infrastructure and resources
- minimized cumulative environmental impacts through participative governance of the zone and a commitment to continuous improvement.

FAP continued to actively participate in the Air Working Group of the Designated Industrial Zone Pilot Project in 2022. As part of supporting the Air Working Group, FAP also began work on a long-term monitoring plan, assessing how the current network may need to be expanded or revised to accommodate new development over the next several years.

FAP developed its previous monitoring plan in 2015. All projects approved in that plan are complete.

2022 Air Monitoring Results

Air Quality Health Index Ratings

Seven of FAP's 10 continuous monitoring stations collect data to calculate an hourly and forecast Air Quality Health Index (AQHI) in and around Alberta's Industrial Heartland.

The number of hours of air monitoring in 2022 was 55,611 hours. Of these hours, 94.9% were low-risk AQHI, and 4.8% were moderate-risk AQHI.

Just over 0.2% of the hours monitored were high or very highrisk AQHI. Wildfire smoke most frequently contributed to high-risk and very high-risk Air Quality Health Index (AQHI) ratings measured at Fort Air Partnership's monitoring stations in 2022. Meteorological conditions leading to temperature inversions were the second largest contributor to high or very high-risk AQHI.

FAP • 202	2	AQHI Risk Level (% of time in each)						
Station Name	Hours Monitored	Low	Moderate	High	Very High			
Bruderheim	8,303	94.65%	5.25%	0.10%	0.00%			
Elk Island	8,513	96.99%	2.64%	0.24%	0.13%			
Fort Saskatchewan	8,189	91.45%	8.27%	0.28%	0.00%			
Gibbons	8,550	92.95%	6.48%	0.54%	0.03%			
Lamont County	6,933	97.00%	2.94%	0.06%	0.00%			
Redwater	8,215	95.87%	3.91%	0.22%	0.00%			
Town of Lamont*	6,908	95.87%	4.13%	0.00%	0.00%			
TOTALS HOURS	55,611	52,776	2,702	119	14			

^{*}Town of Lamont data includes the Town of Lamont Kieth Purves Portable (Jan-Aug) air monitoring station and the new Town of Lamont permanent continuous air monitoring station starting in November.

Hours with a High or Very High Risk AQHI Rating

														High	Risk	Very High Risk
			F	AP C	ontir	nuou	s Air	Qual	ity M	onit	oring	Stat	ion			
Event Dates	Brude	erheim	Elk Is	sland	Ft. S	ask.	Gibb	oons		nont inty	Redv	vater		n of ont*	Total Hours	Attributed Cause
August 20-22	-	-	5	-	4	-	4	-	1	-	2	-	-	-	16	Wildfire smoke
September 2-5		-	1	-	4	-	18	-	-	-	8	-	-	-	31	Wildfire smoke
September 10-11	3	-	10	-	15	-	23	3	1	-	-	-	-	-	55	Wildfire smoke
October 9	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1	Local campfire
October 19	1	-	2	11	-	-	-	-	2	-	7	-	-	-	23	Regional met conditions and controlled burn at Elk Island Park
November 11	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1	Wintertime inversion
December 31	4	-	2	-	-	-	-	-	-	-	-	-	-	-	6	Wintertime inversion
Total Hours	8	-	20	11	23	-	46	3	4	-	18	-	-	-	133	

^{*}Town of Lamont data includes the Town of Lamont Kieth Purves Portable (Jan-Aug) air monitoring station and the new Town of Lamont permanent continuous air monitoring station starting in November.

Summary of Exceedances

During 2022, there were 195 occurrences across FAP's 10 monitoring stations where air quality measurements exceeded Alberta's Ambient Air Quality Objectives. This is compared to 472 exceedances in 2021 and 33 exceedances in 2020. Most exceedances in 2022 were due to increased levels of fine particulate matter from wildfire smoke.

Air quality measurements are continuously compared to <u>Alberta Ambient Air Quality Objectives</u> (AAAQO). Any exceedance of an AAAQO is reported to the Alberta Government, and the cause of the exceedance is investigated.

One Hour Exceedances - 2022									
Parameter	Exceedances	Date	Attributed Cause						
Fine Particulate Matter (PM _{2.5})	1	June 3	Undetermined						
	2	July 14, 18	Natural, due to wetlands						
	2	July 23	Industry responsible						
Hydrogen Sulphide (H ₂ S)	14	August 3, 16, 18, 22, 23, 24, 31 & September 18	Natural, due to wetlands						
	1	August 25	Undetermined						
Ozone (O ₂)	3	August 20	Summertime Smog						
Fine Particulate Matter (PM _{2.5})	14	August 22	Wildfire Smoke						
	1	September 1	Harvest dust						
	31	September 4, 5	Wildfire Smoke						
	45	September 10, 11	Wildfire Smoke						
Hydrogen Sulphide (H ₂ S)	1	October 3	Natural, due to wetlands						
	3	October 8, 18	Local fire pit						
	12	October 18, 19	Controlled Burn (Elk Island Park)						
Fine Particulate	3	October 19	Regional meteorological conditions						
Matter (PM _{2.5})	3	November 11	Winter inversion						
	1	December 15	Brush burning						
	4	December 30, 31	Winter inversion						
TOTAL	141								

7,	24-Hour	Exceedances - 2022	2		
Parameter	Exceedances	Date	Attributed Cause		
Fine Particulate Matter (PM _{2.5})	9	August 22, 23	Wildfire smoke		
Hydrogen Sulphide (H ₂ S)	1	August 23	Natural, due to wetlands		
	8	September 3, 4	Wildfire Smoke		
Fine Particulate	11	September 10, 11	Wildfire Smoke		
	1	October 18	Local fire pit		
	2	October 18, 19	Controlled Burn (Elk Island Park)		
Matter (PM _{2.5})	8	October 18, 19	Regional meteorological conditions		
	5	November 10, 11	Winter inversion		
	1	November 14	Undetermined		
	1	December 15	Brush burning		
	7	December 30, 31	Winter inversion		
TOTAL	54				

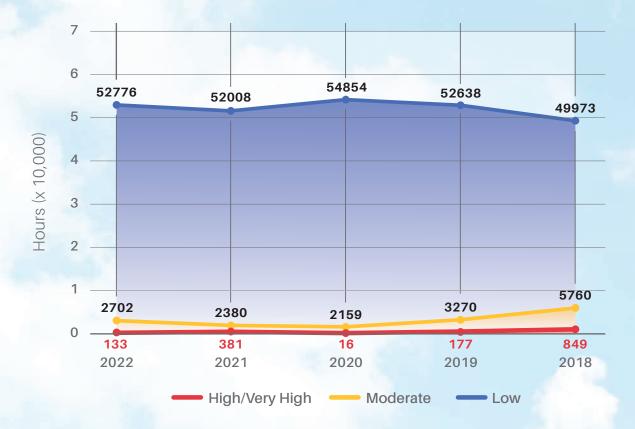
Summary of Exceedances: 2018-2022

The following table details the number of exceedances for substances measured by FAP across all stations in the past five years.

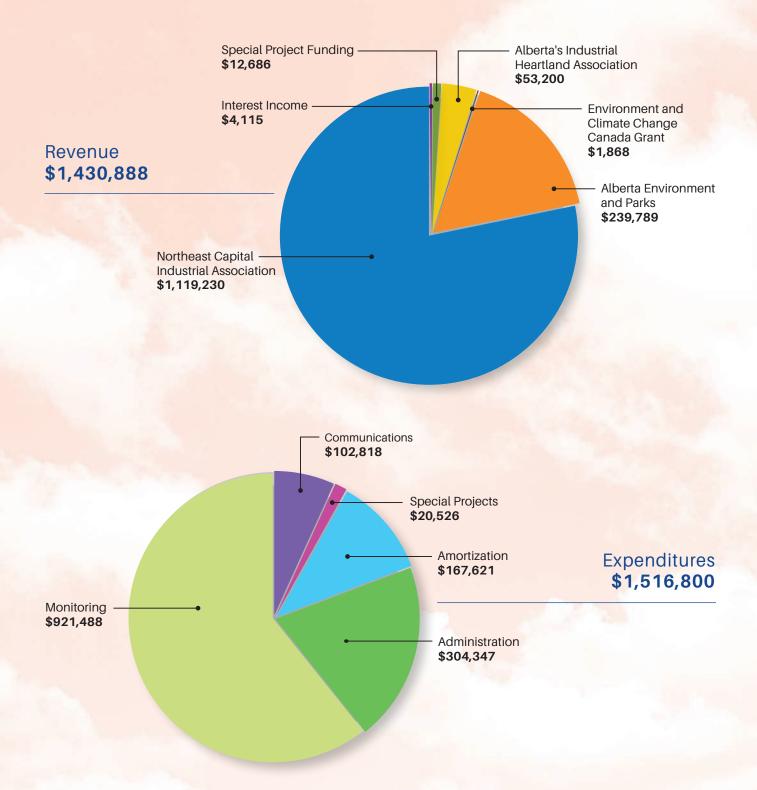
Parameter measured		2022	2021	2020	2019	2018
Ammonia (NH ₃)	1-hr	-	-	-	-	-
Benzene (C ₆ H ₆)	1-hr	-	-	-	-	-
Carbon Monoxide	1-hr	-	-		-	-
(CO)	8-hr	-	-	-	-	-
Ethyl Benzene (C ₆ H ₅ CH ₂ CH ₃)	1-hr	-	-	-	-	-
	1-hr	-	-	-	-	-
Ethylene (C ₂ H ₄)	3-day	-	-	-	-	-
	Annual	-	-	-	-	-
Fine Particulate	1-hr	118	393	6	119	810
Matter (PM _{2.5})	24-hr	53	60	19	37	117
Hydrogen Sulphide	1-hr	19	16	7	9	20
(H ₂ S)	24-hr	1	0	1	1	4
	1-hr	-	-	-	-	7 -
Nitrogen Dioxide (NO ₂)	24-hr	_	-	-	- 4	-
(· · · · · · · · · · · · · · · · · · ·	Annual	-	-	-	-	-
Ozone (O ₃)	1-hr	3	3	-	23	6
Styrene (C ₂ H ₄ CH=CH ₃)	1-hr	-	-	-	-	-
	1-hr	-	-		-	-
Sulphur Dioxide (SO ₂)	24-hr	-	-	-	-	-
	30-day		-	_	-	_
	Annual	-	-	-	-	-
Toluene (C ₆ H ₅ CH ₃)	1-hr	-	-			-
Xylenes (0-,m- and p-isomers)	1-hr	-	-	-		-
TOTAL		194	472	33	189	957

Air Quality Health Index Past Five Years (2018-2022)

As illustrated in the chart below, low-risk AQHI ratings in the FAP Airshed have remained relatively static since 2019. The uptick in high and very-high-risk AQHI in 2021 was mainly due to wildfire smoke.



Financial Summary



Statement of Financial Position

CURRENT		
Cash	\$	205,483
GIC (wind-up reserve)	\$	255,000
GIC (Special Projects)	\$	92,062
GST Recoverable	\$	17,116
Accounts Receivable	\$	33,632
Prepaid Expenses	\$	7,618
EQUIPMENT		
Air Monitoring and Computer Equipment	\$	725,379
Total Assets	\$1	,336,290
Total Assets	\$1	,336,290
Total Assets LIABILITIES	\$1	,336,290
	\$1	,336,290 139,318
LIABILITIES		
LIABILITIES Accounts Payable and Accrued Liabilities	\$	139,318
LIABILITIES Accounts Payable and Accrued Liabilities Deferred Contributions	\$	139,318 115,862

People of FAP (as at December 31, 2022)

Board of Directors

Allan Wesley, M.A., B.Com., B.Sc. (Chair) Public Member

Keith Purves, (Vice-chair)

Public Member

Carrie Trenholm, LPN (Treasurer)

Public Member

Paula Horn, Dip.Chem.Tech. (Secretary)

Public Member

Councillor Wayne Olechow

(Bruderheim) Public Member

Darcy Garchinski, MHA

Alberta Health Services

Ed McConaghy, B.Sc., C.Eng.

Public Member

Greg Poholka, P.Eng.

NCIA

Ehimai Ohiozebau, PhD.

Alberta Environment and Protected Areas

Kathleen Zellweger

Public Member

Laurie Danielson, Ph.D., P.Chem.

NCIA

Megan Wesley, P.Eng.

Public Member

Paul Smith

Public member

Deputy Reeve Roy Anaka

(Lamont County)

AIHA

Stephanie Kozey, B.Sc.

NCIA

Karlee Conway

AIHA

Staff

Nadine Blaney, B.Sc.

Executive Director

Harry Benders

Network Manager

Wade Wilson

Communications Director

Alison Thiessen

Business Administrator

Technical Working Group

FAP's Technical Working Group provides overall direction in the implementation and operation of FAP's regional air monitoring network. The committee is supported by representation from industry, government and the public, which allows for equal, in-kind technical

support. FAP Board members on the Technical Working Group include Allan Wesley and Keith Purves.

Harry Benders, (Chair) FAP Network Manager

Patrick Andersen, B.Sc. Andersen Science Consulting

Chris Nayet, Dip. CET

Environment and Climate Change

Canada

Graham Aitken

EHS&S Specialist

NCIA

Darcy Walberg

NCIA

Doug Hurl, CD, CRSP

NCIA

Laura Tabor

Alberta Environment and

Protected Areas

Gerry Mason, CRSP

NCIA

Gerry Zulyniak, P.Eng.

NCIA

Jeff Cooper, C.Tech.

WSP

Jocelyn Thrasher-Haug, M.Sc.,

P.Ag., P.Biol.

Strathcona County

Karlee Searle

NCIA

Marianne Quimpere, B.Sc., EP

NCIA

Nadine Blaney, B.Sc.

FAP Executive Director

Scott Hillier

NCIA

Stephen Raye, BET (Environmental)

NCIA

Cynthia Huppie

NCIA

Robert Annett

NCIA

Eric Isberg

NCIA

Matt McClelland, P.Ag.

NCIA

Jamie Peters, M.Sc. P.Ag.

NCIA

Keith Purves

Public Member

Marianne Quimpere, EP

NCIA

Michelle Renaud, P.Ag.

NCIA

Graham Tyler, P. Eng.

Alberta Environment and Protected Areas

Alan Wesley

Public Member

Note:

AIHA = Alberta Industrial Heartland Association.

NCIA = Northeast Capital

Industrial Association.

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