Centre for Energy and Environmental Sustainability
NAIT Productivity and Innovation Centre
10210 Princess Elizabeth Avenue NW
Edmonton, AB, T5G 0Y2
https://www.nait.ca/applied-research/about/centres/technology-access-centre-for-energy-and-environmen

APPLIED RESEARCH | NAIT

Defining Naphthenic Acids Workshop Discussion Summary and Notes

Date: April 29, 2026

Contents

1. Workshop Objective

This was a free workshop open to public with the objective of receiving feedback from industry, government, and community representatives regarding the various definitions that exist for naphthenic acids. This session was intended solely for information-gathering and sharing, without obligation for participants or organizations to adopt the definitions that may emerge from the discussion.

2. Event Notes

The event was structured with activities to capture input periodically and allow for varying levels of discourse through a few approaches (outlined in Table 1).

Table 1 – Workshop activity outline

Activity	Approx. Length	Purpose	Participant Input
Presentation	20 minutes	Quick overview of common terms and definitions that are presented in literature	-
Menti 1	5 minutes	Capture initial definition preferences	Multiple choice, Sliding scales
Team Breakout Rooms	20 minutes in room, followed by 20 minutes of team presentations	Divide into smaller teams of ~10 people to discuss targeted prompts	Team discussions documented by scribe
Free discussion	40 minutes	Open a free discussion with broader group	Free discussion documented by scribe
Menti 2	10 minutes	Assess if definition preferences have moved due to the discussion and gather where we have landed	Multiple choice, Sliding scales
Menti 3 (Survey)	2 minutes	Capture feedback and what attendees would want to see in future sessions, if they desire more workshops	Multiple choice, free text input

2.1 Initial Definition Preferences – Menti Responses

Initially, attendees reviewed 5 common definitions (cf. Table A1 in Appendix A) and were asked to select up to 3 definitions for “Naphthenic Acids” (and/or related compounds) that made the most sense to them in the context of oil sands regulations. 33 attendees provided answers to the question. We observed that Naphthenic Acid Fraction Compounds (NAFCs), Petroleum-Derived

Naphthenic Acids, and Acid Extractable Organics (AEOs) were selected the most, as seen in Figure 1. Attendees were also asked to rate select groups of compounds from being not very important to very important in the context of routine monitoring. 34 attendees responded to this question and the results are shown in Figure 2. The "All petroleum derived organic acids" option was rated with the highest average importance.

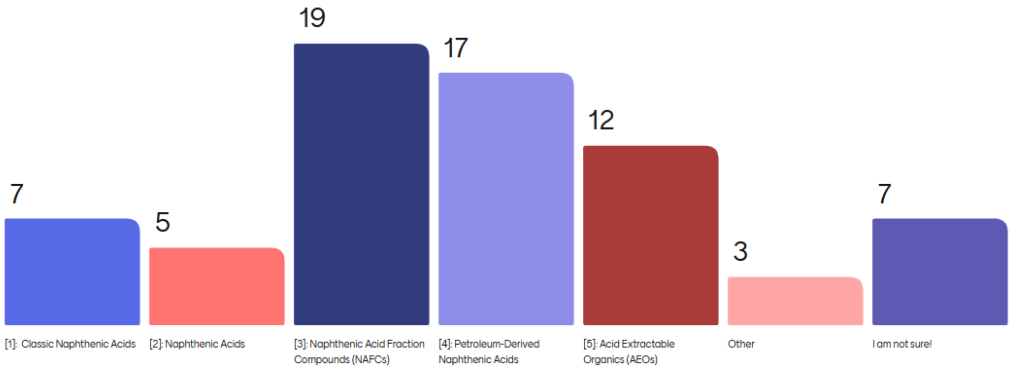

Figure 1 - Definitions selected by workshop attendees prior to break-out room discussions

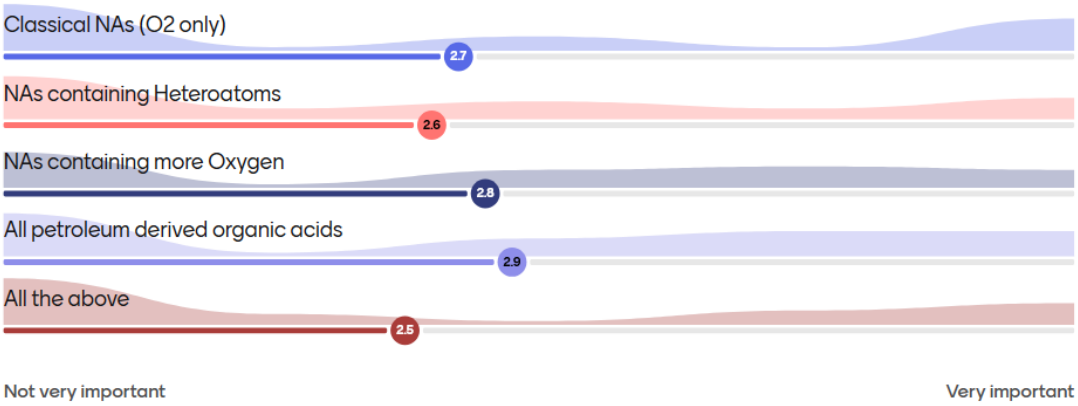

Figure 2 - Attendee perception of the importance of selected compounds as they relate to routine monitoring (taken before breakout discussions)

2.2 Breakout Room Activity

Attendees were split into smaller groups of ~10 people to discuss the following prompts:

1. In your opinion, which of the 5 definitions (or another) should be used going forward when monitoring?
    - Why?
2. What are the definition criteria that must be explicitly specified in the definition you would wish used?

- Why?
- What would you include / specify?

3. Given your selection, do you see any risks or challenges if adopting that definition going forward?
    - If so, what are they?
    - Any ideas on mitigations?

Table 2 below summarizes the prompt responses of each team. No group fully endorsed a single definition. Instead, each team tied their answer to purpose, measurement feasibility, and toxicity relevance. There was a strong convergence towards hybrid approaches intended to combine chemical measurement with toxicity measurement. This incorporated a shift towards toxicity-centered thinking where most groups felt toxicity testing should play a key role. As a result, mapping toxicologically relevant indicators and defining clear selection criteria for what NAFCs are in scope for monitoring are next steps that need to be explored and understood.

Table 2 – Summary of team responses to breakout room prompts

#	1. Preferred Definition	2. Required Definition Criteria	3. Risks / Challenges & Mitigations
1	• No single definition preferred outright: Rather, some wanted to reframe to a goal-dependent approach focused on toxicity • Lean away from broad definitions (too much non-toxic signal) • Focusing only on O_2-containing acids is limiting since they are inseparable from many other related compound classes in complex mixtures (practically challenging) • Suggest: petroleum-derived naphthenic acids or targeted NAs paired with toxicity testing	• Must be defined based on the monitoring objective (toxicity vs. NAs) • Must consider technical capability (FTIR vs. LC/GC-MS) • Need clear speciation targets if narrowing definition • Methods must be easy, cheap, and defensible	**Risks:** • Broad definition can dilute meaning (non-toxic fraction dominates) and more narrow definitions can miss cumulative effects of other toxic compounds • Misalignment among stakeholders and rights holders • Poor comparability across studies **Mitigations:** • Pair chemical monitoring with toxicity testing • Use tiered methods (FTIR → more advanced methods) • Align on clearly defined goals before defining

#	1. Preferred Definition	2. Required Definition Criteria	3. Risks / Challenges & Mitigations
2	• No strict preference; emphasizes practical measurability (some felt) • Classical definition is preferred for regulatory clarity (other perspective) • NA can serve as a proxy for toxicity, but it is not perfect • Suggested separating NAs into labile vs. refractory fractions	• Definitions should align with available analytical methods • Must acknowledge mixture complexity • Must consider time dependent toxicity • Need recognition of method limitations (FTIR, MS biases)	**Risks:** • Analytical methods are unreliable or biased • Some felt there are inconsistent NA to toxicity correlations but others felt these links are established • Complexity prevents full characterization **Mitigations:** • Accept analytical limitations • Use toxicity-based approaches alongside chemistry • Treat NAs as indicators, not absolutes
3	• Leaned towards classical NAs and NAFC because of perceived toxicity link • Some support for AEOs (historical toxicity link) • Strong emphasis on what is actionable for industry	• Must define what is toxic and extractable • Must ensure ease of analysis and interpretation • Need clarity between NA vs. NAFC • Sampling method must be explicitly defined in the definition chosen	**Risks:** • There was some debate on whether acidifying samples may/may not reflect environmental conditions • Measuring broad groups carries practical challenges for industry • Lack of evidence on which subsets (e.g. heteroatomic NAFCs) are toxic **Mitigations:** • Focus on practical, routine monitoring approaches • Document the processing/sampling methods when using acid-extractable fraction
4	• Lean toward definition 2 (A complex mixture of aliphatic and alicyclic carboxylic acids with $C_nH_{2n+z}O_x$; where x = 2 – 7)	• Must explicitly define analytical methods • Extraction procedures • Sample preparation conditions	**Risks:** • FTIR lacks specificity (broad signal) • NA focused monitoring can miss other toxic compounds

#	1. Preferred Definition	2. Required Definition Criteria	3. Risks / Challenges & Mitigations
	• Concerned that current methods misrepresent reality • Therefore, strong shift towards toxicity-focused approach rather than NA only • important to clearly define what is being measured and how, including extraction conditions and analytical approach, to avoid misinterpretation and improve consistency.	• Must account for method sensitivity and variability	• Results vary widely depending on method **Mitigations:** • Incorporate toxicity testing more directly • Standardize methods • Move beyond single-metric NA frameworks
5	• Mixed: considered multiple options • NAFC seen as promising due to stronger toxicity linkage • Also considered classical • Suggested indicator-compound approach like seen with PAHs/PFAS	• Must specify analytical method clearly • Must account for regional variability • Need criteria for selecting key representative compounds if proxies are to be used • Must balance breadth vs. relevance	**Risks:** • Hard to identify the most relevant compounds • Monitoring too broad vs. too narrow carry risks • Lack of standardization and regional comparability **Mitigations:** • Standardize methods across studies • Focus on toxicologically relevant indicators • Develop clear selection criteria for NAFC/indications

2.3 Free Discussion

After the breakout room session, each team presented their responses to the broader group. We then opened the floor to a free discussion. Key themes and associated takeaways are mapped in Table 3 below.

Table 3 – Key themes, takeaways, and related comments from the free discussion

Theme	Takeaways

Inaction to action (ending circular debates)	• A circular debate persists, where definitions tend to be based on what is easiest to measure, while measurement approaches rely on unclear or inconsistent definitions. Some members proposed shifting to an impacts-first approach: first defining what must be measured to ensure river health and protect downstream rights holders and then developing the technical methods to support that definition.
Selecting a feasible approach	• Consider adopting approaches already used for other toxic compounds and in other industries. • Classify the NA fraction using methodologies aligned with US EPA methods (e.g., HPLC, double/quadruple MS) and large-scale commercial monitoring techniques, rather than relying on specialized laboratories. • Continuing to use historical methods and definitions enables comparison between current and past results. If definitions are updated, they should be renamed to avoid misleading comparisons.
Mapping molecules to real-world consequences	• A large-scale study examining tailings ponds, surface water, and groundwater could help identify which NAs are present across different contexts and how they relate to toxicity. • There may be merit in establishing a proxy indicator; however, a key limitation is that proxies may not capture the cumulative effects of complex mixtures. • Toxicity screening (such as whole effluent toxicity (WET)) may be a more effective regulatory approach and could be used alongside NA measurements. While toxicity alone may not serve as the primary indicator, a larger study could help strengthen the linkage between NA measurements and toxicity.
Democratizing knowledge and rights holder engagement	• Understanding the needs and knowledge of rights holders has been missing from some of our discussions. Consultancies that translate the scientific and regulatory landscape to be better understood by community members also play an important role and should be considered. The Government of Alberta has plans for engagement on this topic in the coming months.

2.4 Post-exercise Definition Preferences – Menti Results

After discussions, participants repeated the Section 2.1 Menti questions, added their own definitions, and then voted on all entries. Figure 3 shows that classical Naphthenic Acids and NAFCs were the top two selections made by attendees after the discussions, where 25 attendees responded to this question. Figure 4 shows that attendees favored monitoring classical NAs as more important after the breakout discussion. 25 attendees responded to this question.

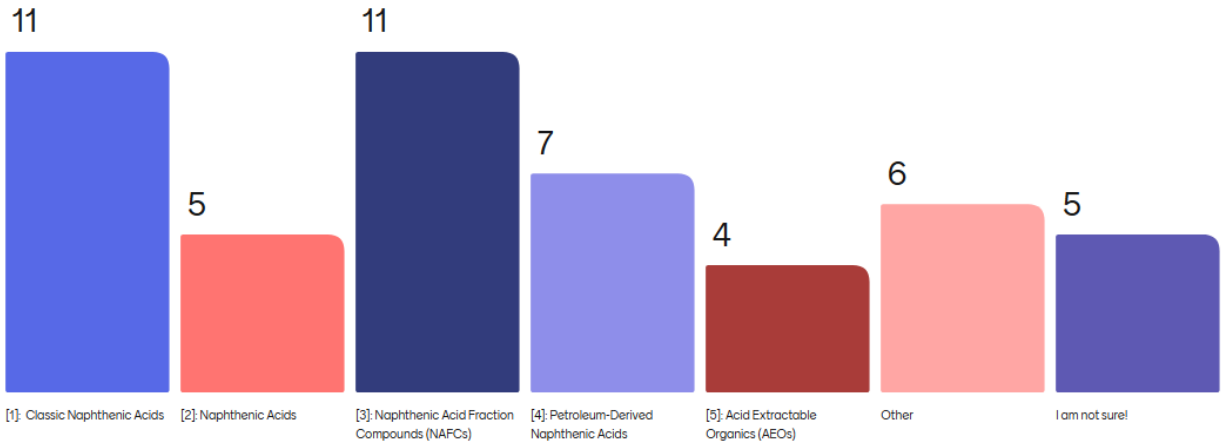

Figure 3 - Definitions selected by workshop attendees after break-out room discussions

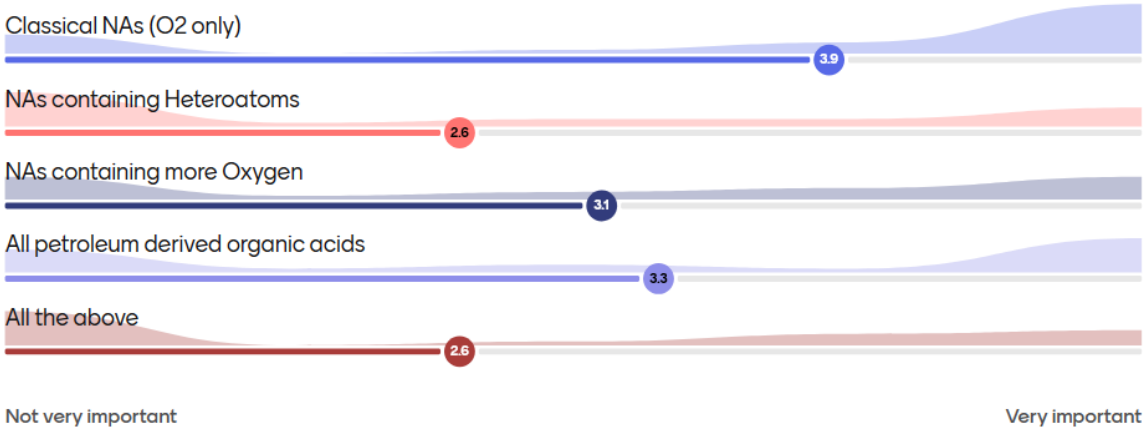

Figure 4 - Attendee perception of the importance of selected compounds as they relate to routine monitoring (taken after breakout discussions)

Figure 5 shows the results from an exercise where participants were asked to propose their own definitions and then vote on them. The most popular options all included a reference to toxicity, reinforcing that they desire an impacts-first approach to defining naphthenic acids and related compounds. A possible next step for the team would be to host a workshop looking to define and articulate what is known (and still unknown) about the linkages of toxicity to naphthenic acids and related compounds.

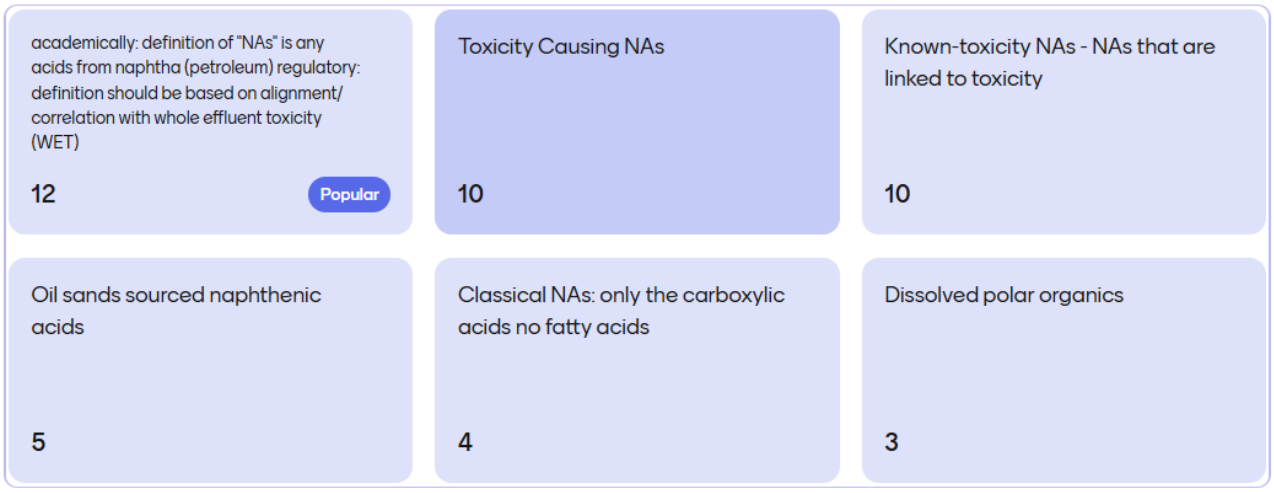

Figure 5 - Results of definition voting exercise

3. Key Takeaways and Next Actions

The ultimate goal of the workshop was to facilitate alignment between attendees from diverse backgrounds on what definition we should use for naphthenic acids and related compounds in the context of routine regulatory monitoring.

By the end of the workshop there were two prevalent viewpoints emerging. The first being that the use of classical naphthenic acids as a proxy indicator for routine monitoring could be useful when coupled with regular toxicity screening to serve as a periodic validation of ecological effects. The second being that toxicity is a key definition parameter that needs to be included in any definition put forward in a regulatory context. Therefore, if we can identify the toxic compounds and create a list, we can focus on measuring those known toxic compounds during routine monitoring.

Potential next actions:

- Ask the technical community to contribute to a shared worksheet so we can begin populating a list of toxic NA compounds, and
- Host a workshop to review and articulate the known linkages of toxicity to naphthenic acids with the goal of establishing selection criteria to define what naphthenic acid-related compounds should be in scope for routine monitoring.

Centre for Energy and Environmental Sustainability
NAIT Productivity and Innovation Centre
10210 Princess Elizabeth Avenue NW
Edmonton, AB, T5G 0Y2
https://www.nait.ca/applied-research/about/centres/technology-access-centre-for-energy-and-environmen

Appendix A – 5 Definition Archetypes Found in Literature

Table A1 – 5 common definition archetypes found in the literature for naphthenic acids and related compounds

#	Term	Definition	Formula	Definition Criteria									Petroleum derived?
				Carbon Chain Structure			Carboxylic Acids		Heteroatoms		# of Oxygen		
				aliphatic	alicyclic	aromatic	mono	poly	N	S	=2	> 2	
1	**Naphthenic Acids (Classic)**	A complex mixture of **aliphatic** and **alicyclic monocarboxylic acids**	$C_nH_{2n+Z}O_2$; Where z = negative integer	**Y**	**Y**	N	**Y**	N	N	N	**Y**	N	N
2	**Naphthenic Acids**	A complex mixture of **aliphatic** and **alicyclic carboxylic acids**	$C_nH_{2n+Z}O_x$; where x = 2 – 7	**Y**	**Y**	N	**Y**	**Y**	N	N	**Y**	**Y**	N
3	**Naphthenic acid fraction compounds (NAFCs)**	includes **classic NAs** and **related Ox-NAFCs** (where x /= 2), and a broader suite of **N- and/or S-containing acidic organic species**	$C_nH_{2n+Z}O_ON_NS_s$	**Y**	**Y**	N	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	N
4	**Petroleum-Derived Naphthenic Acids**	All **petroleum-derived** organic acids	Not specified	**Y**	**Y**	**Y**	**Y**	**Y**	**?Y?**	**Y**	**Y**	**Y**	**Y**
5	**Acid-Extractable Organics (AEO)**	Organic compounds extractable after acidification	Not specified	**?Y?**	**?Y?**	**?Y?**	**?Y?**	**?Y?**	**?Y?**	**?Y?**	**?Y?**	**?Y?**	**?Y?**

Appendix B – References Used in Presentation / Definition Table Construction

Barros, E. V., Filgueiras, P. R., Lacerda, V., Rodgers, R. P., & Romão, W. (2022). Characterization of naphthenic acids in crude oil samples – A literature review. *Fuel*, *319*, 123775. https://doi.org/10.1016/j.fuel.2022.123775

Facanali, R., Porto, N. de A., Crucello, J., Carvalho, R. M., Vaz, B. G., & Hantao, L. W. (2021). Naphthenic Acids: Formation, Role in Emulsion Stability, and Recent Advances in Mass Spectrometry-Based Analytical Methods. *Journal of Analytical Methods in Chemistry*, *2021*, 1–15. https://doi.org/10.1155/2021/6078084

Grewer, D. M., Young, R. F., Whittal, R. M., & Fedorak, P. M. (2010). Naphthenic acids and other acid-extractables in water samples from Alberta: What is being measured? *Science of The Total Environment*, *408*(23), 5997–6010. https://doi.org/10.1016/j.scitotenv.2010.08.013

Hadwin, A. K. M., Del Rio, L. F., Pinto, L. J., Painter, M., Routledge, R., & Moore, M. M. (2006). Microbial communities in wetlands of the Athabasca oil sands: genetic and metabolic characterization. *FEMS Microbiology Ecology*, *55*(1), 68–78. https://doi.org/10.1111/j.1574-6941.2005.00009.x

Headley, J. V., Peru, K. M., Fahlman, B., Colodey, A., & McMartin, D. W. (2013). Selective solvent extraction and characterization of the acid extractable fraction of Athabasca oils sands process waters by Orbitrap mass spectrometry. *International Journal of Mass Spectrometry*, *345–347*, 104–108. https://doi.org/10.1016/j.ijms.2012.08.023

Holowenko, F. (2002). Characterization of naphthenic acids in oil sands wastewaters by gas chromatography-mass spectrometry. *Water Research*, *36*(11), 2843–2855. https://doi.org/10.1016/S0043-1354(01)00492-4

Kovalchik, K. A., MacLennan, M. S., Peru, K. M., Headley, J. V., & Chen, D. D. Y. (2017). Standard method design considerations for semi-quantification of total naphthenic acids in oil sands process affected water by mass spectrometry: A review. *Frontiers of Chemical Science and Engineering*, *11*(3), 497–507. https://doi.org/10.1007/s11705-017-1652-0

Leshuk, T., Krishnakumar, H., De Oliveira Livera, D., & Gu, F. (2018). Floating Photocatalysts for Passive Solar Degradation of Naphthenic Acids in Oil Sands Process-Affected Water. *Water*, *10*(2), 202. https://doi.org/10.3390/w10020202

McNaught, A. D. ., & Wilkinson, Andrew. (1997). *Compendium of chemical terminology : IUPAC recommendations*. Blackwell Science.

McQueen, A. D., Hendrikse, M., Gaspari, D. P., Kinley, C. M., Rodgers, J. H., & Castle, J. W. (2017). Performance of a hybrid pilot-scale constructed wetland system for treating oil sands process-affected

water from the Athabasca oil sands. *Ecological Engineering*, *102*, 152–165. https://doi.org/10.1016/j.ecoleng.2017.01.024

McQueen, A. D., Kinley, C. M., Hendrikse, M., Gaspari, D. P., Calomeni, A. J., Iwinski, K. J., Castle, J. W., Haakensen, M. C., Peru, K. M., Headley, J. V., & Rodgers, J. H. (2017). A risk-based approach for identifying constituents of concern in oil sands process-affected water from the Athabasca Oil Sands region. *Chemosphere*, *173*, 340–350. https://doi.org/10.1016/j.chemosphere.2017.01.072

Perez, R., Bhattacharya, S., & Acosta, E. (2023). *Interfacial behavior and partitioning of partially neutralized naphthenic acids: experiments versus HLD-NAC predictions*. https://doi.org/10.26434/chemrxiv-2023-8k7pf

Speight, J. G. (2014). Naphthenic Acids in Petroleum. In *High Acid Crudes* (pp. 1–29). Elsevier. https://doi.org/10.1016/B978-0-12-800630-6.00001-0

Vander Meulen, I. J., Headley, J. V., & McMartin, D. W. (2025a). Corrigendum to “On the occurrence, behaviour, and fate of naphthenic acid fraction compound in aquatic environments” [Sci. Total Environ. 960 (2025) 178383]. *Science of The Total Environment*, *963*, 178576. https://doi.org/10.1016/j.scitotenv.2025.178576

Vander Meulen, I. J., Headley, J. V., & McMartin, D. W. (2025b). On the occurrence, behaviour, and fate of naphthenic acid fraction compounds in aquatic environments. *Science of The Total Environment*, *960*, 178383. https://doi.org/10.1016/j.scitotenv.2025.178383

Wu, C., De Visscher, A., & Gates, I. D. (2019). On naphthenic acids removal from crude oil and oil sands process-affected water. *Fuel*, *253*, 1229–1246. https://doi.org/10.1016/j.fuel.2019.05.091

Appendix C – Responses to Registration Intake Form

In order to register, registrants had to answer the following questions:

1. What is your goal in attending the workshop?
2. What is the definition of naphthenic acids that you or your organization currently uses, if you use one?

Goals of workshop registrants:

- Get a sense for the current outlook and future directions for NAFCs.
- Consensus on the definitions of naphthenic acids.
- Getting a better understanding of the complexity of naphthenic acids, what they are, how to measure them, why we care about them.
- understand the perspective of different NA definition.
- Curiosity / Learning / Listening In (specified by multiple registrants).
- Contribute towards better understanding to what is naphthenic acids and how to consistently measure across different organizations and instruments.
- To become more informed about what industry, academia, and government are considering for the definition of naphthenic acids and what standardized methodology may be used for monitoring.
- To collect input on the varying definitions of naphthenic acids.
- To understand the direction the industry will take in regulating NAs.
- Learn more on potential ways to define NAs.
- To hear more from the oil sands/academic community about their definitions of NAs.
- Learn about others are doing in the lab. Is change possible or accept status quo?
- Understand views of industry, stakeholders, regulator as to definition of "naphthenic acids", proposed measurement methodologies (who decides, how, etc.), timelines associated with developing the above, and linkages to the meaning/measurement of NA to other considerations such as effluent toxicity.
- Get a sense of how industry and technical experts currently see the definition of OSMW Naphthenic Acids.
- Contribute; participant
- Understand how people perceive naphthenic acids and related extractable compounds.
- Understand more about how naphthenic acids could be defined.
- Better understand differing viewpoints and definition to assist in future works.
- understand the various opinions on how to define and measure naphthenic acids.
- Exchange with other scientists working within the NAs field.
- learn more about acceptable nomenclature and definitions of NA.

- Learn more about the subject to help formulate more practical and targeted research questions for this issue.
- To get more info about naphthenic acids for future projects.
- Gather feedback from the industry regarding naphthenic acids and determine if our lab can provide the services.
- To come to an agreed definition on exactly what types of compounds are included in the definition of NA/NAFC/AEOs so that a standardized method can be developed; we cannot standardize a method if target analytes are not defined.
- Representation from Government of Canada, from the PT and RM field of expertise.
- Learn what is known about N.A. and how to get rid of them.
- Understand NAIT and industry perspective on definition of NAs in light of OSMW Steering Committee recommendations; share perspective of water technology SME.
- Understand the current state of practice in regulatory permitting and discharge criteria. Understand the labile and refractory portion of the NA under various pH, hardness, and aerobic and anaerobic environments.
- To learn how different groups define Naphthenic acids.
- I have experience with characterizing NAs and would be happy to learn about advancements.
- Understanding measurement techniques for NAs.
- Interested to hear of proven treatment technologies.
- to learn perspectives from different groups.
- Learn research organizations and industrials experience on naphthenic acid study and definition.
- Take part in discussions.

Definitions that registrants or their respective organizations use currently:

- Classical NAs and NAFCs as defined by the Headley lab.
- Classical naphthenic acids: NA-O2s, CNAs; Naphthenic Acid Fractional Compounds (NAFCs): polar organic compounds from OSPW; Acid Extractable Compounds (AECs) = ? are they NAFCs?
- Naphthenic acids (NAs) are a complex mixture of alkyl-substituted acyclic and cycloaliphatic carboxylic acids naturally found in petroleum and oil sands bitumen. They are known for causing corrosion in oil refineries, behaving as surfactants that stabilize emulsions, and posing toxicity risks to aquatic life in tailing waters. NAs are commonly used in industrial applications as corrosion inhibitors, metal naphthenates (wood preservatives), and paint driers.
- We measure NA using an Orbitrap and define it based on the concentration of O2 compound classes.
- I don’t know / we don’t have one (from multiple respondents).

- Naphthenic acids are the primary contaminant of concern in OSPW, consisting of chemically diverse carboxylic acids with varying hydrophilicity, chemical complexity, heteroatom functionality, and aromaticity.
- Defined as acids, primarily monocarboxylic, derived from naphthenes that are commonly associated with oil sands processing. More colloquially, they are defined as group of petroleum acids that may be present in the by-products of oil sands processing.
- FTIR Method. However, no correlations to anything else.
- NAFC or AEO for compounds which includes various compounds such as fatty acids in addition to classical naphthenic acids. NA for classical naphthenic acids, typically measured with high-res methods. When making comparisons of any dataset to literature (be it for NAFC/AEO, NA, including if only O2 NAs or O3, O4, O5, etc.), or comparisons within literature data sets, extraction method (inc. sample prep, solvent if LLE, etc.) and analysis method/instrument are documented.
- Technical definition established by Brient et al., 2001 - i.e., aliphatic amphipathic carboxylic acids with/without aliphatic ring systems.
- The definition varies depending on which end user is requiring information. What we typically call NA is actually acid extractable organic compounds.
- unsure if we have one particular working definition. Currently asking industry to report total NA via Fourier Transform Infrared Spectroscopy with 3 step extraction with dichloromethane.
- Naphthenic acids are a group of cycloaliphatic and aliphatic carboxylic acids, commonly found in crude oil, refinery streams, and oil sands process water.
- I use the classical definition of NA cited in literature which I know is not encompassing.
- I am not sure about my organization but I understand naphthenic acids as a group of cycloaliphatic carboxylic acids commonly found in petroleum and oil sands process-affected water.
- Naphthenic Acids are a group of polar organics released from oil sands during aqueous extraction processes. They are aliphatic with varying numbers of ring structures. The common distinguishing feature of all naphthenic acids is the presence of the carboxylic acid functional group.
- Classic NAs are O2 compounds as per the CnH2n+zO2 formula that have a carboxyl group. NAFCs expand that definition to include compounds with N and S. AEOs are everything that is extracted from an aqueous matrix that adheres to the molecular formula but that may or may not include a carboxyl group.
- Naphthenic acids (NAs) are mixtures of several cyclopentyl and cyclohexyl carboxylic acids.
- Hard to degrade and toxic to the environment.
- Bad stuff under the GC curve!!!!
- NAs = C_c H_h O2 negative ions (ESI-); AEO = acid extractable organics (incl. NAs); NAFCs = rest of the dissolved organics in OSPW (incl. AEO, but also base or neutral extractables).

- Operationally, many oil sands studies define naphthenic acids as the organic acids extractable from OSPW with organic solvents (e.g., dichloromethane) and measurable by methods such as LC-MS, recognizing that this is an analytical, not purely structural, definition.
- We loosely define them as a very large and complex group of carboxylic acid compounds. Mono- or Polycyclic heteroatoms with oxygen content ranging from O2, O3, and O4 (and higher, though those are less abundant).
- Acid Extractable Organics is the main definition that we are using.
- We usually discuss total NAs as measured by FTIR.
- Naphthenic acids are extracted from petroleum distillates by extraction with aqueous base, and are described by the general formula CnH2n+zO2.
- Our sample was sent out and NA is based on their method which Oil sands company used (FTIR etc.).
- is often inconsistent and tied in with the default analytical method used by the major commercial labs in the Edmonton area.
- O2 component of the acid extractable fraction from bitumen-influenced waters.