

BLACK CARBON AND METHANE FROM THE OIL AND GAS SECTOR

ACAP WEBINAR

2021



ARCTIC CONTAMINANTS
ACTION PROGRAM

Black Carbon and Methane from the Oil and Gas Sector

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Oil drilling north of the Arctic Circle near Tuktoyaktuk, Northwest Territories, Canada. Credit: iStock / wildpix645

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SUMMARY AND KEY MESSAGES

On September 27-28, 2020, the Arctic Council's Arctic Contamination Action program (ACAP) Working Group held a webinar on Black Carbon and Methane from the Oil and Gas Sector, arranged in cooperation with the Ministry of Natural Resources and Environment of Russia, the Nordic Environment Finance Corporation (NEFCO) and Carbon Limits. Over two days the webinar brought together about 100 experts representing governments of the Arctic States, Arctic Council bodies and other international organization and initiatives, as well as the scientific community and oil and gas companies with operations in the Arctic. The objective was to share knowledge and perspectives and discuss ways to effectively address black carbon and methane emissions from the oil and gas sector.

In her opening remarks, the ACAP Chair Ms Inger Johanne Wiese highlighted the importance of black carbon and methane emissions reduction for the Arctic climate and for climate change mitigation in general. The oil and gas sector accounts for a significant part of methane and black carbon emissions are not yet on a downward trend for the Arctic as a whole. Nevertheless, there are reasons to be optimistic about future developments given the large potential that exists for measures which can be achieved with both economic and environmental gains. Further, Ms Wiese noted that this webinar with such a broad participation of experts would represent an excellent arena for exchange of knowledge and strengthening collaboration with the objective of speeding up the implementation of mitigation measures.

Mr Nuritdin Inamov, Director of the Department of International Cooperation of the Ministry of Natural Resources and Environment of the Russian Federation echoed this view and further highlighted the importance and inevitability of global warming and the key role of the Paris Agreement that should help the countries address this issue, and he further expressed the hope that the funding of the Arctic Council Project Support Instrument (PSI) could make notable contributions to climate mitigation. He underlined the importance of this event and welcomed similar thematic events to be held in the future.

Representatives of the Ministry emphasized the importance of international collaboration on the issues of black carbon and methane pollution. This webinar was agreed to be the largest online event organized in cooperation with the Ministry.

In his opening statement, Mr Alexander Boldyrev, Technical Adviser at NEFCO, highlighted the importance of mitigation projects to be both profitable for the

companies and effective in reducing emissions. He referred to the study *Mitigation of Black Carbon and Methane Emissions from Associated Petroleum Gas Flaring in the Arctic Zone of the Russian Federation* (hereafter "Flare Reduction in the RAZ project") which was initiated by ACAP in 2017 and completed in 2020. The study performance has been managed by NEFCO and represents an important reference for issues covered at the webinar.

The webinar took stock of knowledge on the scale and characteristics of emissions from the oil and gas sector, discussed barriers, best practices, successful corporate action, and the role of international cooperation and national regulations. A common view among participants was that there is knowledge enough to act; it is well documented that black carbon and methane emissions from the oil and gas sector have severe impacts on the Arctic climate and on health. Nevertheless, the existing gaps in knowledge are detrimental to effective and cost-efficient abatement measures and policies and they create barriers to action through lack of awareness and motivation to reduce emissions.

Even if the broader statistical trends do not show downward trends in emissions, the webinar showed that there are clear signs of progress in closing the knowledge gap and spurring action. These are further described in this summary note and in presentations from the webinar.

Particularly, the following points presented and discussed at the webinar give reasons for optimism:

1. Important technological progress has been made in the identification and quantification of emission sources, both by ground-based equipment and remote sensing technologies. There is reason to expect that the reliability and comparability of emissions data will improve significantly. Improved data will form an important basis for research on emissions impacts, broader awareness, corporate action and policies and regulations.
2. The increasing prominence of climate change on the policy agenda, and as a priority in corporate strategies, has led to a rise in pledges to reduce emissions and search for cost-efficient mitigation options. Methane and flare reductions typically offer low-cost opportunities for large scale emission reductions that can be implemented quickly. The broad representation from oil and gas sector representatives at the webinar showed their keen interest in the themes covered.

3. International public-private partnerships and industry led initiatives are increasingly becoming a powerful force in methane and flare reduction efforts. Participation by governments and companies in these initiatives is growing. The challenge is to ensure good cooperation and coordination among them. They can offer important synergies for the operations of Arctic Council bodies such as the Arctic Contamination Action Program (ACAP) and the Expert Group on Black Carbon and Methane (EGBCM).
 4. Coordinating and harmonizing technical standards, best practices and policy goals are also increasingly emphasized. This has positive implications for the scope and effectiveness of regulations and measures taken voluntarily by the industry.
 5. The improved quality of emissions data and transparency of reporting gives important impetus to international research into Arctic climate and health impacts.
- ***Institutional collaboration and sharing of results and success stories.*** Institutional collaboration is inherent to addressing the issues above, and there is a considerable value in organizing events like this webinar to present and discuss results of ongoing efforts and as a platform to create new collaborative efforts. Further, sharing success stories can spur action by others.

In their closing remarks to the webinar both Ms Inger Johanne Wiese and Mr Nuritdin Inamov stated that the seminar had been a very important event for exchange of knowledge and perspectives and an excellent arena for fostering deeper international collaboration on black carbon and methane mitigation in the Arctic States. Mr Inamov emphasized the importance of the broad participation at the webinar of institutions which each have an important role to play in tackling SLCP emissions. Specifically, he was impressed by the strong presence from industry representatives. He contended that deep cuts in emissions are only possible through active participation by the industry. Ms Wiese concluded that we have the scientific foundation to act. Decisive measures and activities are taking place in many countries and regions, but there is an urgent need to scale up. She expressed appreciation for the exchange of knowledge and experiences at the webinar and the genuine interest across institutions to find common grounds for action. Finally, she expressed her confidence in a high focus and collaboration on SLCP emissions during the upcoming Russian Chairmanship of the Arctic Council.

The presentations and discussions after each session of the webinar revealed a number of issues for further work and collaboration among institutions. The following were noted as particularly important for follow up by ACAP and other Arctic Council bodies:

1. ***Further development and alignment of methods and procedures for quantification and reporting of black carbon and methane emissions.*** It is important that the Arctic Council stay engaged in initiatives to improve transparency, comparability and quality of SLCP emissions data which promotes active engagement from research institutions and the industry.
- ***Focus on policies and measures to decarbonize Arctic oil and gas supply chains.*** There is increased scrutiny into the carbon intensity of oil and gas supply chains and achieving low intensities from Arctic States can be a challenge. It will be crucial to apply best practices, and deploy new technologies and solutions (e.g. renewables and carbon capture and storage), explore s new and innovative policies and regulations. Studies should be promoted to analyze this specifically for Arctic oil and gas supply chains.

SESSION A: TAKING STOCK OF THE KNOWLEDGE AND EXPERIENCES

This session presented results from recent research on black carbon and methane emissions from Arctic states and the ongoing work of relevant Arctic Council bodies.

The **Arctic Management and Assessment Program (AMAP)** is the principal body engaged in providing knowledge on SLCPs and their impacts on Arctic climate and health. Work on the 2021 Assessment Report to be published in early 2021 was presented. The work is in its nature quantitative, involving over 50 scientists from around the world, and combining a large volume of information about emissions and emission scenarios, including information from both national emission inventories and independent sources; observations of levels and trends of short-lived climate forcers (SLCFs) and modelling of climate and human health impacts of SLCFs. The assessment will deliver a technical report that will provide details about the key sources of emissions, their magnitude and impacts on air quality, climate and health, as well as actions to control these emissions. It will also provide the scientific basis for a summary for policy makers with key findings and policy-relevant recommendations.

The work of the **Expert Group on Black Carbon and Methane (EGBCM)** with its focus on both emissions reporting and enhanced mitigation action for black carbon and methane is closely linked to the theme of the webinar. EGBCM is in the process of preparing its 3rd Summary Report of progress and recommendations planned for delivery and adoption by Ministers in May 2021. The recommendations are not completed but those from the 2019 report were presented and they touch upon key issues which were presented and discussed throughout the two days webinar: i) development of methane strategies and use of best practises and technologies to achieve flare emission reductions ii) urge companies to undertake voluntary measures and participate in international initiatives, and iii) promote targeted measures to eliminate large methane emission sources. The Russian representative to the EGBCM presented preliminary assessment of black carbon emissions originating from the Arctic regions in the country, including their sectoral breakdown, which highlighted the importance of gas flaring as a source of black carbon emissions.

An overview was also presented of relevant projects by the chair of the **ACAP Expert Group on short-lived climate pollutants (ACAP EG SLCP)**. This includes

four pilot projects (of which “Flare Reduction in the RAZ” project is the largest and separately present under this session and Session C) and two summary reports on SLCPs. Sectors covered by the pilot projects are oil and gas, transport, agriculture and the residential sector. Successful pilot projects have in many instances pointed towards clear economic benefits and positive health impacts. Lessons learned should be disseminated and the challenge now is to scale up from the pilots.

The three-year project **“EU-funded Action on Black Carbon in the Arctic” managed by AMAP** is an important knowledge building and outreach effort to strengthen the collective responses to reduce black carbon emissions in the Arctic and enhance international cooperation to protect the Arctic environment. The project will be completed in early 2021. The project covers five main sources of black carbon, including gas flaring and open burning. Reports addressing gaps in knowledge in black carbon reporting systems and environmental observing systems, and proposals for filling these, and technical guidance including BAT for reducing black carbon emissions from oil and gas flaring have been produced and disseminated.¹ In addition, a Roadmap for international cooperation to reduce the emissions of black carbon is being prepared, through a process with stakeholders/users.

Vygon Consulting presented the results of the ACAP project **“Flare Reduction in the RAZ”** funded by the Arctic Council’s Project Support Instrument (PSI). This work brought together the regulators, oil and gas companies and industry experts with the main objective to contribute to associated gas flaring reduction in the country. The project provided forecasts of flaring volumes in the Russian Arctic until 2025 under different scenarios and evaluated the environmental impacts of flaring and gas utilization. The team has also reviewed available best practices to reduce SLCP emissions from flaring and identified the most applicable options for selected companies. The need for aligning methodologies used for assessment of SLCP emissions across countries was highlighted, especially in light of discussions of carbon border tax adjustment in the EU. The project has provided a significant foundation for the development of technologies for reducing black carbon emissions in the Arctic zone and boosting the application thereof. For this reason, it is important to conduct further research of the technologies in question within the

1 <https://eua-bca.amap.no/>



framework of industry events and platforms for discussion. Furthermore, this project can serve as a basis for finding solutions for the gas industry, where the issue of decarbonization is currently particularly relevant.

Above: AGP flaring.
CREDIT: iSTOCK

Following on from the presentation of this first session which demonstrated progress in knowledge and awareness the **panel discussion** focused on three questions: i) do we have sufficient knowledge and experiences to implement measures? ii) given that many incremental but insufficient steps have been taken, what can we do to scale up and what are the gains? and iii) what are the barriers to scale-up?

This brought up complex matters where there are different perspectives, but generally there were considerable commonality in views:

1. even if there continues to be large knowledge gaps this should not be seen as an excuse or argument for not acting now;
2. there is a need to step up dissemination of knowledge on the nature and scale of emissions and on lessons learned from mitigation actions;
3. although important progress has been made in terms of new regulations and motivation among companies to act, barriers remain large and requires attention from all institutions engaged in back carbon and methane emission reductions.

SECTION B: INTERNATIONAL INITIATIVES AND PARTNERSHIPS

The focus during this session was on international cooperation through public-private partnerships and industry led initiatives. The number of such initiatives have grown, and they have become important forces for improved resource efficiency and emission reductions from oil and gas operations. Representatives from four of them, and Gazprom, covered issues that are central to the Arctic SLCPs emission reductions, and the presentations clearly showed the potential for synergies with the effort of Arctic Council bodies such as EGBCM and ACAP EG SLCP.

The Zero Routine Flaring (ZRF) by 2030 initiative² was launched in 2015 by the UN Secretary General and representatives from 25 other institutions that initially has endorsed the initiative. To date 32 governments, 41 companies and 15 development institutions have endorsed the initiative, including the Arctic states with oil and gas production as well as companies with oil and gas sector operations in Arctic states. Reaching the objective of zero routine flaring by 2030 would represent a significant reduction from current levels of flaring of associated gas. Routine flaring is typically considered to account for 95% of associated gas flaring and countries, including Russia, have set targets to reach 95% gas utilization. The report from the ACAP project “Flare Reduction in the RAZ” documents the significance of reaching such a target for flare and black carbon emission reduction in the Russian Arctic. Through endorsement of the ZRF governments, companies will report on flare levels and flare reduction and will adhere to a set of principles to avoid and reduce flaring.

ZRF is managed by the same team at the World Bank who manages the Global Gas Flaring Reduction partnership (GGFR).³ GGFR has most of the large international oil companies and flare countries as partners. An important part of its work has been to publish global flare estimated based on satellite data compiled by the National Oceanic Atmospheric Administration (NOAA). Satellite estimates and ground-based data, including national statistics, often show major discrepancies and efforts has been made to reconcile the two sources. Further efforts to this end have now started by the **Oil and Gas Climate Initiative (OGCI)**.⁴ OGCI is

sponsoring a program with the Payne Institute to develop a new web-based platform to map gas flaring globally.⁵ OGCI, which is an industry lead consortium that aims to accelerate the industry response to climate change, presented this project. The aim of the project is to help improve estimation of flare volumes from satellite images and reconcile these with data from OGCI member companies so as to spot and explain data discrepancies. Further, mapping and tracking of global flare data will be available on a public web platform from early 2022. Clearly this can become very important for mapping of gas flaring and for tracking progress in flare reduction, for example in relation to the ZRF initiative and for efforts targeted at improving knowledge and preparing for action to reduce flaring and black carbon emissions in the Arctic. OGCI is also very active in efforts to reduce methane emissions and their member companies have collectively set an ambition to reduce their methane intensity by 1/3 from 2017 to 2025.

The next presentation focused on methane emissions. **The Oil and Gas Methane Partnership (OGMP)**⁶ brings together governments, international organizations NGOs and industry to help companies reduce methane emissions in the oil and gas sector. OGMP has developed and recently launched a new version of its reporting framework for methane emissions (OGMP 2.0), aimed to become the gold standard reporting platform for methane emissions. Under the OGMP 2.0 reporting framework, more detailed and transparent information about methane emissions will be provided to industry, civil society, and governments with the long-term objective of incentivizing the use of natural gas with the lowest possible methane emissions intensity. Under OGMP 2.0, oil and gas companies will report methane emissions from all sources at both operated and non-operated ventures across the oil and gas value chain at an unprecedented level of accuracy and granularity.

OGMP 2.0 plays an important role in the EU Methane Reduction Strategy.⁷ Related to this, the United Nations Environment Programme (UNEP), which coordinates the activities of OGMP, plans to establish a Methane Emissions Observatory in collaboration with the

2 <https://www.worldbank.org/en/programs/zero-routine-flaring-by-2030>

3 <https://www.worldbank.org/en/programs/gasflaringreduction>

4 <https://oilandgasclimateinitiative.com/>

5 <https://oilandgasclimateinitiative.com/ogci-launches-1m-partnership-with-payne-institute-to-develop-new-web-platform-to-map-gas-flaring/>

6 <https://globalmethane.org/challenge/ogmp.html>

7 https://ec.europa.eu/energy/sites/ener/files/eu_methane_strategy.pdf



EU Commission and the International Energy Agency (IEA). An important task of the Observatory will be to compile and publish an annual report of methane emissions from the fossil fuel supply chains, drawn from different data sources (OGMP company reports, satellite data, direct measurement studies).

Oil rig.

CREDIT: WORKSITE LTD
/ UNSPLASH

The Methane Guiding Principles (MGP)⁸ is a voluntary, international, multi-stakeholder initiative between industry and civil society organizations focusing on priority areas for action to reduce emissions of methane along the natural gas supply chain. Priority action areas under the principles include improving data quality, engaging the value chain, advocating for regulation, and improving transparency. Each signatory has completed a report, available via the MGP website, providing information on their methane emissions, and the work they are undertaking to address those emissions in line with the principles. MGP has close to 40 members, a number of which have operations in the Arctic region, including Gazprom, Novatek and Rosneft of the Russian Federation.

As a signatory to MGP and Russia's largest gas supplier **Gazprom** presented the company's methane management practices. This included the company's direct measurement of methane leaks, instrument-calculation method for scoping methane leaks and an overview of collaboration with foreign partners over the past 25 years in conducting measurement campaigns. An interesting aspect is also the recent use of satellite data in the identification and verification of emission sources. The collaboration with the national authorities to improve the national methane emissions inventory. This has led to significant revisions to the national data.

Both the presentation and the **panel discussion** that followed showed that flare reduction and methane emissions reduction are high on the list of priorities for action both by oil and gas sector operators and policy makers and ambitious and quantitative targets are being set for reductions. There has been a rapidly growing number of international initiatives, both public-private and industry led, with the objective to improve knowledge of the scale and nature of the problem and to spur action. Much of the panel discussion and interaction with participants of the webinar centered around finding good means of collaboration and exchange of information between institutions/initiatives. It was pointed out that technology progress which combines ground-based data and remote sensing should lead to new and interesting ways of collaborating. Greater harmonization and transparency in monitoring and reporting of emissions data will do the same.

SESSION C: SUCCESS STORIES, BEST PRACTICES AND REGULATIONS

This session took most of the second day of the webinar and covered quite diverse but still related themes such as pledges and successful actions by corporations, best technologies and practices, and national regulations.

CORPORATE ACTION

The first part of the session had three presentations on actions by companies. Gazprom Neft presented a case of associated petroleum gas utilization at one of their large assets in the Arctic, which focused on maximization of the gas value through its use for electricity generation and gas reinjection. Further development of gas processing infrastructure at the field will allow production and supply to market of natural gas and other valuable petroleum products.

Following on from this VYGON Consulting presented **phase 2 of the ACAP Mitigation of SLCPs from APG Flaring in RAZ project**. The project analyzed the economics of flare avoidance through gas injection at remote fields in the Russian Arctic Zone. The analysis was based on the Gazprom Neft project and explores for how many fields reinjection options might be suitable. The study identified only limited potential for gas reinjection in the Russian Arctic, mainly due to geological conditions. Therefore, evaluation of the potential of other APG utilization technologies should become the next step for identifying an effective solution for all fields in the region.

Following on from this, **Equinor** made a presentation of its actions to reduce and ultimately eliminate flaring and methane emissions from its operations. Equinor already has low emissions, particularly at fields operated at the Norwegian Continental Shelf. Consistent with national regulation there is no routine flaring and intermittent flaring is kept at a low level through use of closed flare gas recovery systems. The ambition is to bring methane emissions to “near zero”. Both direct measurement techniques and remote sensing technologies are being used in efforts to meet this target.

Guiding principles for corporate reporting were presented and discussed under Session C (see above). Under this session broader best practice guidelines for methane management were presented, first

through a document developed by the **United Nations Economic Commission for Europe (UN ECE)**⁹ in collaboration with the Global Methane Initiative.¹⁰ The best practice guidelines cover methane management (quantification and mitigation) along: i) the physical dimension from exploration, extraction, gathering and processing, to long distance transmission, distribution to end users, and ii) the institutional dimension from company, national, and international. Linkages and interdependencies across these dimensions are important to understand, as well as synergies that might be achieved through coordination and cooperation between them. The document is meant to serve as a resource for a broad audience, including owners and operators of oil and gas facilities, and policymakers at all levels of government.

The next presentation by **Carbon Limits** reviewed the existing best available techniques (BAT) to address black carbon from gas flaring. A guidance document, combining existing knowledge of such technologies and practices was compiled as part of the EU-funded Action on Black Carbon project (also presented under Session A). Existing sectoral guidance often overlooks emissions of black carbon or provides only general recommendations (e.g., increase gas utilization), whilst this document aimed to provide a detailed account of specific technologies and practices, their applicability criteria, costs and impact on emissions. Whilst quantifying resultant reductions in black carbon emissions may be uncertain due to large discrepancies in emission factors used, implementing BAT should be considered best practice for reducing black carbon emissions from flaring, even if specific effectiveness will largely depend on site-specific economic and technical parameters.

The **panel discussion** covered issues of climate risks, including uncertainty about policies and regulations, and the use of new technology for quantification and enhanced reduction efforts. In addition to policy and regulatory risks (seen from a corporate perspective) physical impacts risk connected with damage to infrastructure due to adverse climate change impacts are becoming increasingly relevant in the Arctic, as are the market risks related to decrease in demand for fossil fuels in the future in light of transition to low carbon options. In order to respond to these strategic challenges, companies should identify the

9 <https://www.unece.org/energy/welcome/areas-of-work/methane-management/activities/methane-management-in-extractive-industries/oil-and-gas-sector/best-practice-guidance/model-framework-for-reducing-methane-emissions-along-the-gas-value-chain.html>

10 <https://www.globalmethane.org/>

most effective decarbonization technologies for the oil and gas industry. New technologies to monitor and measure methane emissions (drones, satellites, etc) that are becoming more available while the speed at which these are being deployed varies greatly across companies and geography.

REGULATIONS

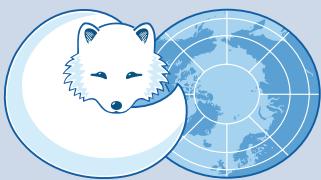
Information on policies and regulations in Norway, Canada, Finland, and Russia was presented. **Norway** has had strict regulation of flaring from the early days of oil production in the 1970s. An approved solution for associated gas utilization (including reinjections) has been required before field commissioning. From the early 1990s flaring, as well as gas used for energy purposes at oil and gas installations, have been subject to a CO₂ tax. The combined effect of the CO₂ tax and the emission trading system gives currently a “carbon price” of about US\$ 50 per metric tonne CO₂ emitted. This has provided incentives also to reduce intermittent flaring through gas recovery systems being economically attractive. Direct emissions of methane through venting and leaks are also low but quantified volumes have been uncertain. The government, in cooperation with the industry, therefore conducted a detailed survey of emission sources which resulted in a downward revision of emission estimates by almost 50% (though some sources showed higher values). In turn, new quantification and methodologies and guidelines for reporting were developed. At the same time abatement opportunities and costs were studied and voluntary measures by the industry implemented and some policy instruments were strengthened, including a seven-fold increase in the tax on direct releases of methane to about 25 US\$/MMbtu.

Canada’s presentation focused on the policies and regulations to achieve the ambitious target to reduce methane emissions from the oil and gas sector by 40% below 2012 levels by 2025. Regulatory standards and emission limits have been developed through comprehensive consultative processes with the industry and other stakeholders. The most important source of emissions is fugitive emissions (leaks) accounting for about 1/3 of emissions. Leak detection and repair (LDAR) programs are being mandated from 2020 onwards for large facilities (> 60,000 m³ gas per annum). Other large sources of emissions, such as pneumatic devices, compressors and storage tanks are regulated through technology standards or emission limits.

Finland’s policies and measures to reduce black carbon and methane emissions are addressed under broader multi-pollutant frameworks, including specific national strategies and legislations, EU regulations, and active participation in international fora such as Climate and Clean Air Coalition, the Global Gas Flaring Reduction Partnership and the Arctic Council. As a result, Finland has achieved a steady decline in black carbon and methane emissions since the early 1990s, primarily due to reduced black carbon emissions from transport vehicles and lower methane emissions from the waste sector.

Russia’s presentation focused on the overarching strategy for Arctic development until 2035 that was established in October 2020, which includes minimization of APG flaring, as well as emissions to air and discharges of water when conducting activities in such vulnerable zone. The presentation also covered the legislative background for emissions monitoring and mitigation that exists in Russia. Special focus was on the implementation of BAT regulations that has started in 2015 and is now at the pilot stage, with over 300 large existing enterprises and new companies starting to implement technologies identified in the Russian BAT guidance documents to limit their emissions. Economic incentives are implemented to promote transition of companies to BAT.

The role of regulations was discussed at the **panel discussion** at the end of this session, but regulations was also a recurring theme throughout the webinar. The new and innovative methane regulation in Canada was discussed and it was noted with interest the process of consultation with industry that was conducted before the regulation was enacted. This follows very much from the fact that regulating methane emissions raises many complex technical issues where input from the industry is needed in order to design a cost-efficient regulation. More generally there was a common view that national regulation of methane emissions should be stepped up. Regulations will be an important means to lift barriers to action. New technologies and standards for monitoring, reporting and verification (MRV) need to be taken into account, and as shown with experiences from Canada and Norway, dialogue and cooperation with the industry when designing regulations will be essential for it to work well.



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