Producing Sustainable Aviation Fuel (SAF) in Minnesota

To encourage the development of the SAF supply chain in Minnesota and provide strong oversight to SAF production, the Walz/Flanagan administration is focused on the "three Rs" — recruit, review, and regulate. This document provides a more detailed overview of what regulation and review processes are likely applicable for SAF production in Minnesota and is written primarily for people who are interested in production of SAF or interested in supply chain for SAF production.

Why Minnesota for SAF Production?

Minnesota is positioned to lead the Sustainable Aviation Fuel (SAF) sector. The state offers a strategic location, tax incentives, a well-developed agricultural and forestry base, water resources, and a knowledgeable regulatory environment. Minnesota's transparent, science-based approach to permitting and environmental review reduces long-term risk and fosters durable public trust.

Benefits include:

- Strategic access to major airline hubs (Delta).
- A broad network of partnerships, including public agencies, private businesses, and research institutions, all working toward its success.
- Abundant resources for SAF production, including a variety of feedstocks and woody biomass.
- Strong state and federal tax incentives for SAF production.
- Advanced bioeconomy infrastructure and knowledgeable workforce.
- Transparent, predictable environmental review and permitting.
- A commitment to balancing economic growth with environmental stewardship.

Understanding Environmental Review (ER) and Permitting

Permits are required to fulfill federal requirements in the Clean Air Act and Clean Water Act and other state requirements. Projects will need permits for certain groupings of activities, such as production, waste, and water usage.

- Minnesota has a state-level Environmental Review (ER) process. Environmental Review (ER) evaluates how a proposed project might impact the environment. It is a research process, not an approval step, and helps guide permitting decisions without directly approving projects.
- The Minnesota Pollution Control Agency (MPCA) usually leads ER for SAF projects.
- While ER and permit applications can be worked on at the same time, final permits will not be issued until ER is finished. Permitting requirements depend on the project type.
- Complete documentation and responsiveness by project proposers can prevent delays and ensure a smooth ER process. Consistent and early communication is key.
- Staff at MPCA can help project proposers determine if ER is required for individual projects.
- Assuming a project is well-developed, all steps are completed, and there are no substantial project changes, the estimated timeline is 8-14 months.

Best Practices for All SAF Projects

- Reach out to Minnesota Business First Stop, led by the Department of Employment and Economic Development (DEED). It helps businesses navigate permitting and regulations, provides expert guidance, and supports complex location and expansion projects by working closely with business leaders and their consultants.
- Reach out to MPCA's environmental review unit to initiate early conversations.
- Coordinate early and often for permitting with MPCA, Department of Natural Resources (DNR), and Public Utilities Commission (PUC).
- Due to potentially high-water demand of these types of projects and limited water availability in parts of Minnesota, DNR strongly encourages early coordination prior to final site selection.

Key Permitting Thresholds and Considerations

Air Potential or Actual Emission Thresholds (per MPCA):

- Nitrogen Oxides (NO_X): 100 tons/year
- Sulfur Dioxide (SO_2): 50 tons/year
- Particulate matter less than 10 microns in diameter PM_{10}: 25 tons/year
- Carbon monoxide (CO): 100 tons/year
- Lead: 0.5 tons/year
- Greenhouse gas (CO_2e): 100,000 tons/year
- Single hazardous air pollutant (HAP): 10 tons/year
- Combined 2+ HAPs: 25 tons/year
- Other permits triggered under New Source Review (NSR): 100 tons/year

Water Thresholds:

- Water use >10,000 gallons/day or >1 million/year triggers DNR appropriation permit

Hydrogen Infrastructure:

- Regulatory framework for hydrogen storage/production, including geologic hydrogen production, still developing
- May require coordination on geologic storage and CO_2 sequestration

Pathway-Specific Permitting and Review

Key considerations and assumptions for all pathways:

Every project is unique and specific project design will always influence regulatory requirements. The list of permits relies on the following assumptions about the process; if these assumptions are not applicable, required permits are likely to be different than listed here.

- The oil input (crushed oil seeds, used cooking oil (UCO)/animal fats/tallow) will be procured and not produced at the facility.
- Grain storage bins are already permitted locally and licensed by Minnesota Department of Agriculture (MDA) Plant Protection Division (if not, they will require an MDA licensing process).

HEFA Pathway (Hydroprocessed Esters and Fatty Acids)

Required permits:

- DNR Water Appropriation
- MPCA NPDES/SDS (stormwater, wastewater)

Project specific permits:

- MPCA 401 Certification (state-level water quality certification)
- MPCA Air Permits (may trigger New Source Review)
- MPCA Storage Tanks
- PUC Route and Site Permits (if pipelines or transmission lines involved)
- DNR License to cross public lands or waters (for rail lines)
- MDA Compliance Agreement and Certificates (for transporting unprocessed woody biomass)

Air regulatory standards for HEFA facilities producing hydrocarbon fuels:

- Review required National Emissions Standards for Hazardous Air Pollutants (NESHAP), which are federal standards regulating hazardous air emissions from specific industrial sources to protect health and the environment.

Processes and equipment needing review for an air permit:

- Bulk petroleum distribution (loading refined product into trucks, barges, and railcars)
- Solvent and Petroleum storage tanks greater than 10,000 gallons (including non-hazardous air pollutant Volatile Organic Compounds (VOC) storage tanks, gasoline storage tanks, fuel oil storage tanks)
- Industrial ovens or furnaces
- Internal combustion engines (e.g., generators)

Key considerations and assumptions:

- Crushed oil seeds and Used Cooking Oil (UCO)/animal fats/tallow will be imported or procured locally.
- New grain storage bins will require a 3-day licensing process, if they are not already permitted locally and licensed by Plant Protection Division (MDA).

Alcohol-to-Jet Pathway

Required permits:

- DNR Water Appropriation
- MPCA NPDES/SDS (stormwater, wastewater)

Project specific permits:

- MPCA 401 Certification (state-level water quality certification)
- MPCA Air Permits (may trigger New Source Review)
- MPCA Storage Tanks
- PUC Route and Site Permits (if pipelines or transmission lines involved)
- DNR License to cross public lands or waters (for rail lines)
- MDA Compliance Agreement and Certificates (for transporting unprocessed woody biomass)
- Hazardous Waste and Air Compliance (for Synthetic Organic Chemical Manufacturing Industry (SOCMI) sources)

Likely Applicable Air Regulatory Standards:

- New Source Performance Standards (NSPS) Subpart RRRa (SOCMI Reactor Processes)
- Subpart Kb (VOC Storage Tanks)
- 40 Code of Federal Regulation (CFR) Part 79/80 (Fuel Registration)

Processes and equipment needing review for an air permit:

- Bulk petroleum distribution (loading refined product into trucks, barges, and railcars)
- Solvent and Petroleum storage tanks greater than 10,000 gallons (including non-hazardous air pollutant VOC storage tanks, gasoline storage tanks, fuel oil storage tanks)
- Industrial ovens or furnaces
- Internal combustion engines (e.g., generators)

Key considerations and assumptions:

- Permitting processes will differ depending on whether using CO_2 coming from a pipeline or from on-site carbon capture and utilization (CCU) technologies.
- Fermented corn and ethanol will be brought to Minnesota or procured locally.
- New grain storage bins will require a 3-day licensing process, if they are not already permitted locally and licensed by Plant Protection Division (MDA).

Power-to-Liquid / Fischer-Tropsch Pathway

Required permits:

- MPCA 401 Certification (state-level water quality certification)
- MPCA Storage Tanks
- MPCA NPDES/SDS (stormwater, wastewater)
- DNR Water Appropriation

Project specific permits:

- MPCA Air Permits
- PUC Route and Site Permits (if pipelines or transmission lines involved)
- DNR License to cross public lands or waters (for rail lines)
- Hazardous Waste

Likely Applicable Air Regulatory Standards:

- Subpart Kb (VOC Storage Tanks)
- 40 CFR Part 79/80 (Fuel Registration)

Processes and equipment needing a review for an air permit:

- Bulk petroleum distribution (loading refined product into trucks, barges, and railcars)
- Solvent and Petroleum storage tanks greater than 10,000 gallons (including non-hazardous air pollutant VOC storage tanks, gasoline storage tanks, fuel oil storage tanks)
- Industrial ovens or furnaces
- Internal combustion engines (e.g., generators)
- Wood boilers or other combustions source greater than 3 MMBtu/hr

Key considerations and assumptions:

- There is no existing woody biomass or pelletizing infrastructure in Minnesota. Agricultural and wood wastes will be pelletized offsite or brought to Minnesota, with existing permits or reevaluation for expansion by the current facility; no new permits are required by the SAF facility, but the pelletizing facility will need a water appropriation permit.
- Hydrogen (H_2) will be produced externally and/or on-site, with on-site storage required. The Environmental Quality Board (EQB) will brief the board on geologic permitting for hydrogen and helium wells.
- This pathway requires high electricity and water needs.
- There is emerging regulation around hydrogen production and storage.

Things to Know About Minnesota

- Minnesota's environmental review standards are thorough and transparent, offering project developers consistency, public trust, and long-term certainty when siting and permitting SAF facilities.
- Water quantities vary regionally; early coordination with DNR is strongly recommended.
- Feedstock sourcing (tallow, corn, biomass) may trigger additional permitting for upstream suppliers.
- New feedstock facilities in Minnesota will require evaluation and permits including water appropriation; air; hydrogen storage/production; wastewater and stormwater.
- Hydrogen production and storage permitting is evolving; updates are expected from EQB and the Gas Resources Technical Advisory Committee (GTAC).
- Public trust in the permitting process requires clear documentation and proactive engagement.

Questions to Consider When Planning your Project

Feedstock Processing & Sourcing

- Will feedstocks be processed at the SAF production facility?
- Will feedstocks need processing before arrival at the SAF production facility?
- Are the feedstocks (quantity, type) expected to remain the same throughout the lifetime of the facility?
- Will feedstocks be purchased from within Minnesota?
- Will feedstocks be purchased from outside of Minnesota?
- Will the feedstocks require pelletization at the SAF production facility?
- Is SAF production expected to vary based on seasonality?

Water Usage & Wastewater Management

- How much wastewater will be generated?
- Where will the wastewater be discharged?
- How much water does the facility need (onsite)?
- What is the proposed water source (groundwater, surface water, reuse—and source of reuse), and what is the name of the source?
- Does water require additional treatment before use?
- Where is water used in the process (electrolysis, cooling, carbon capture, etc.)?
- Where/how will wastewaters be treated and discharged?

Energy & Emissions

- What are the power needs of the facility—operational and backup?
- What are the air emission sources?

Contact

- Lisa Hughes, Business and Community Development Specialist, Department of Employment and Economic Development (Lisa.Hughes@state.mn.us)