**Environmental Impact Summary: Water and Air Content Analysis**

**Project**: Aluminum Dynamics Ingot Casting Center
**Location**: Benson, Arizona
**Document Reviewed**: ADEQ Class I Permit Application (submitted November 13, 2024)

**I. Water Content and Usage**

**1. Cooling Towers**

* **Infrastructure**: Two mechanical draft wet cooling towers:
	+ Cooling Tower #1: 3,500 gallons per minute (gpm)
	+ Cooling Tower #2: 1,500 gpm
* **Total Usage**: **5,000 gpm** maximum potential draw
* **Purpose**: To support casting machine cooling and general plant operations.
* **Environmental Implication**:
	+ **High water consumption** in a semi-arid region with limited water resources.
	+ No documentation on **water sourcing**, **conservation practices**, or **recycling systems**.
* **Impact Diagnosis**: 🔴 **Negative**

**2. Casting and Metal Cooling**

* **Process**: Vertical Direct Chill (VDC) casting involves direct water spray cooling.
* **Water Content Notes**: Usage aligns with industry standards.
* **Impact Diagnosis**: 🟡 **Neutral**
	+ Environmental risks are typical for casting processes and manageable with best practices.

**II. Air Emissions and Quality Impacts**

**1. Criteria Pollutants (tons per year - tpy)**

| **Pollutant** | **Emissions (tpy)** | **Title V Threshold** | **PSD Threshold** | **Diagnosis** |
| --- | --- | --- | --- | --- |
| PM10 | 61.7 | 100 | 100 | 🟠 Moderate Negative |
| PM2.5 | 52.2 | 100 | 100 | 🟠 Moderate Negative |
| NOx | 93.7 | 100 | 100 | 🔴 Negative |
| VOCs | 93.3 | 100 | 100 | 🔴 Negative |
| CO | 80.3 | 100 | 100 | 🟡 Neutral |
| SO₂ | 0.3 | 100 | 100 | 🟢 Minimal |
| Lead | 0.00305 | 10 | 100 | 🟢 Minimal |

* **Controls**: Multiple baghouses, regenerative burners, dust collection, and voluntary limits for NOx/VOCs.
* **Environmental Implication**:
	+ Many emissions approach major source thresholds.
	+ **NOx and VOC levels** particularly concerning for ozone formation in attainment areas.
	+ Fugitive dust from vehicle movement and storage yards adds cumulative PM burden.

**2. Hazardous Air Pollutants (HAPs)**

* **Hydrogen Chloride (HCl)**: 92.3 tpy
* **Total HAPs**: 100.7 tpy
* **Regulatory Thresholds**:
	+ Major source threshold for HAPs: 25 tpy (total), 10 tpy (any single)
* **Diagnosis**: 🔴 **Negative**
	+ Exceeds thresholds significantly, triggering Maximum Achievable Control Technology (MACT) requirements under SMACT rules.

**3. Greenhouse Gases (GHGs)**

* **CO₂-equivalent (CO₂e)**: 86,398 tons/year
* **Diagnosis**: 🔴 **Negative**
	+ Though marketed as a low-carbon facility, actual emissions are substantial.
	+ Emissions approach federal PSD GHG significance level (100,000 tpy).

**III. Conclusion: Environmental Impact Determination**

| **Category** | **Impact** | **Justification** |
| --- | --- | --- |
| **Water Use** | 🔴 Negative | Extremely high consumption (5,000 gpm) in a sensitive region, without a defined sourcing or recycling strategy. |
| **Air Emissions** | 🔴 Negative | High emissions across PM, NOx, VOC, and HAPs; major source thresholds exceeded or nearly met despite mitigation controls. |

**Overall Assessment**:
While the proposed facility includes several mitigation measures (e.g., baghouses, regenerative burners, paved roads), its **aggregate impact on air quality and water resources is strongly negative** from an environmental standpoint. This is particularly critical in an ecologically sensitive and water-constrained region like southeastern Arizona.