# MATERIAL SAFETY DATA SHEET

## SECTION 1 — PRODUCT AND COMPANY IDENTIFICATION

**Product identifier:** **ACES II**
**Synonyms:** ACES II CF
**Product use:** Fuel oil, diesel oil, kerosene, and bunker oil additive

**Supplier name and address:**
***American Clean Energy Systems, Inc.***
PO Box 175
Volant, PA, USA
16156
Phone: (708) 372-6924

**Manufacturer's name and address:**
***American Clean Energy Systems, Inc.***
8679 Freeway Drive
Macedonia, OH, USA
44056-1535

**24 Hour Emergency Telephone #: Infotrac** (800) 535-5053

## SECTION 2 —COMPOSITION/INFORMATION ON INGREDIENTS

| | | | ACGIH TLV | | OSHA PEL | |
|---|---|---|---|---|---|---|
| **Ingredients** | **CAS #** | **%(weight)** | **TWA** | **STEL** | **PEL** | **STEL** |
| Aromatic Petroleum Solvent | 68477-31-6 | 40 - 70 | N/Av | N/Av | N/Av | N/Av |
| Hydrocarbon Wax/ ParaffinWax | 8002-74-2 | 15 - 40 | 2 $mg/m^3$ (fume) | N/Av | 2 $mg/m^3$ (final rule/ vacated value) | N/Av |
| Toluene | 108-88-3 | 5-10 | 50 ppm (skin) | N/Av | 200 ppm | N/Av |
| This material is Classified as hazardous under OSHA Regulations (29CFR 1910.1200). | | | | | | |
| Morpholine | 110-91-8 | 2-6 | 20 ppm (skin) | | 70 $mg/m^3$ | 20 ppm (skin) |
| 1-nitropropane | 108-03-2 | 1-5.25 | 25 ppm (skin) | | 90 $mg/m^3$ | 25 ppm (skin) |

## SECTION 3 — HAZARDS IDENTIFICATION

**EMERGENCY OVERVIEW**

Pourable liquid, with tan or yellow colour. Mild ethereal odour.
Warning! Flammable liquid and vapour. Harmful or fatal if swallowed. Can enter lungs and cause damage.
Harmful if inhaled. Can cause headache, nausea and other central nervous system effects. May cause skin irritation.
Contains material that may cause birth defects, based on animal data.

***POTENTIAL HEALTH EFFECTS***

**Target organs:** Eyes, skin, respiratory system, digestive system, central nervous system
**Routes of exposure**: Skin contact, eye contact, inhalation, ingestion, absorption.
**Signs and symptoms of short-term (acute) exposure:**

*Inhalation:* Inhalation may cause irritation to the nose, throat, and respiratory tract. Central nervous system (CNS) depression may result. Symptoms of CNS depression may include headache, nausea, dizziness, drowsiness, incoordination, loss of consciousness and death.

*Skin contact:* Skin contact may cause moderate irritation. This product can be absorbed through the skin. Absorption may result in symptoms of CNS depression.

*Eye contact:* Direct eye contact may cause mild irritation.

*Ingestion:* Swallowing may cause irritation of the mouth, throat and stomach. Symptoms may include headache, nausea, dizziness, drowsiness and other symptoms of CNS depression. This product may present an aspiration hazard. Aspiration into the lungs following inhalation or ingestion may cause life-threatening lung injury.

## SECTION 3 — HAZARDS IDENTIFICATION Continued

**Chronic effects:** Repeated or prolonged exposure may result in drying, cracking and defatting of the skin (dermatitis).
**Conditions aggravated by exposure**: Pre-existing skin, eye, respiratory and central nervous system disorders.
**Carcinogenic status**: See TOXICOLOGICAL INFORMATION, Section 11.
**Additional health hazards**: Possible development hazard. See TOXICOLOGICAL INFORMATION, Section 11.
**Potential environmental effects**: See ECOLOGICAL INFORMATION, Section 12.

## SECTION 4 — FIRST AID MEASURES

**Inhalation:** If inhaled, immediately remove victim to fresh air. If not breathing, give artificial respiration. Obtain medical attention immediately.
**Skin contact:** Immediately remove contaminated clothing and shoes. Wash skin thoroughly with mild soap and running water. Obtain medical attention if irritation persists. Launder clothing before reuse.
**Eye contact:** Flush eyes with running water for at least 15 minutes. Obtain medical attention if irritation persists.
**Ingestion:** If swallowed, DO NOT induce vomiting. Obtain medical attention immediately. Never give anything by mouth to an unconscious or convulsing person. Guard against aspiration into the lungs.
**Note to Physicians**: Treat symptomatically.

## SECTION 5 — FIRE FIGHTING MEASURES

**Fire hazards/conditions of flammability** Flammable liquid. This material will ignite when exposed to extreme heat, direct flame and other sources of ignition. Vapours are heavier than air and will collect in low-lying areas and confined spaces. Closed containers may rupture if exposed to excess heat or flame due to a build-up of internal pressure. Product will float and may be re-ignited at the water's surface.
**Flammability classification** (**OSHA 29 CFR 1910.1200**): Flammable Liquid Class 1C.
**Flash point (Method):** 29.4$^{o}$C / 85$^{o}$F (COC)
**Auto-ignition temperature:** N/Av
**Lower flammable limit (% by volume):** 2.1
**Upper flammable limit (% by volume):** 20.1
**Explosion data:** *Sensitivity to mechanical impact / static discharge:* Not expected to be sensitive to mechanical impact. Can accumulate static charge by flow or agitation. Vapour may be ignited by static discharge.
**Oxidizing properties:** N/Av
**Suitable extinguishing media:** Use water fog, dry chemical, carbon dioxide or foam. Do not use water jet.
**Special fire-fighting procedures/equipment:** Firefighters should wear proper protective equipment and a self-contained breathing apparatus. Move containers from fire area if it can be done without risk. Water spray may be useful in minimizing or dispersing vapours, and cooling equipment and containers exposed to heat and flame. Avoid spreading burning liquid with water spray used for cooling purposes.
**Hazardous combustion products:** Carbon oxides, nitrogen oxides, reactive hydrocarbons, aldehydes and other irritating fumes and smoke.

## SECTION 6 — ACCIDENTAL RELEASE MEASURES

**Personal precautions:** Restrict access to area until completion of clean-up. Ensure clean-up is conducted by trained personnel only. All persons dealing with clean-up should wear the appropriate chemically protective equipment. Keep all other personnel upwind and away from the spill/release. Refer to Section 8, EXPOSURE CONTROLS AND PERSONAL PROTECTION, for additional information on acceptable personal protective equipment.
**Environmental precautions:** Ensure spilled product does not enter drains, sewers, waterways, or confined spaces. Dike far ahead of the spill with non-combustible, inert absorbent material.
**Spill response/Cleanup:** Eliminate all sources of ignition. Use only non-sparking tools during the clean up process. Ventilate area of release. Stop leak if you can do so without risk. Contain and absorb spilled liquid with non-combustible, inert absorbent material (e.g. sand, earth), then place absorbent material into a suitable container for later disposal (see Section 13). Contaminated absorbent material may pose the same hazards as the spilled product. Notify the appropriate authorities as required.
**Prohibited materials:** None known.

**Special spill response procedures**: If a spill/release in excess of EPA reportable quantity is made into the environment, immediately notify the national response center in the United States (phone: 1-800-424-8002).

DOT/CERCLA Reportable quantity (RQ): Toluene (1000 lbs)

## SECTION 7 — HANDLING AND STORAGE

**Safe handling procedures:** This material is a flammable liquid. Wear appropriate protective equipment during handling. Use in a well-ventilated area. Avoid inhalation of vapors. Avoid contact with skin, eyes, and clothing. Wash thoroughly after handling. Keep away from heat, flame and other sources of ignition. Use non sparking tools. Ground all equipment during handling operations. Keep away from incompatibles (see Section 10). Use caution when opening cap. Keep container tightly closed when not in use. Assume empty containers contain residues, which are hazardous.

**Storage requirements:** Store in a cool, dry, well-ventilated area away from all sources of ignition, incompatible materials and direct sunlight. Storage area should be clearly identified, clear of obstruction and accessible only to trained and authorized personnel. Inspect periodically for damage or leaks. No smoking in the area.

**Special packaging materials:** Always keep in containers made of the same materials as the supply container.

## SECTION 8 — EXPOSURE CONTROLS / PERSONAL PROTECTION

**Ventilation and engineering controls:** Use in well-ventilated area. Local mechanical exhaust / extraction ventilation may be required if used indoors on a continuous basis.

**Respiratory protection:** Respiratory protection is required if airborne concentrations are above recommended TLV's or are not known. Use NIOSH/MSHA-approved respirators. In emergency situations or when concentrations are not known, a self-contained breathing apparatus may be required. Advice should be sought from respiratory protection specialists.

**Skin protection and other protective equipment**: It is recommended that protective gloves impervious to the material be worn at all times during use. Confirmation of what type of material is most suitable for the intended application, should be obtained from glove suppliers. An eyewash station and safety shower should be made available in the immediate working area. Other equipment may be required depending on workplace standards.

**Eye/face protection:** Chemical splash goggles to prevent direct contact, irritation, or injury.

**General hygiene considerations:** Avoid breathing vapours or mists. Avoid contact with eyes, skin and clothing. Do not eat, drink or smoke when working. Upon completion of work, wash hands before eating, drinking, smoking or use of toilet facilities. Remove soiled clothing and was it thoroughly before reuse.

**Permissible exposure levels:** For individual ingredient exposure levels, See Section 2.

## SECTION 9 — PHYSICAL AND CHEMICAL PROPERTIES

**Physical form, colour and odour:** Pourable liquid, with tan or yellow colour. Mild ethereal odour.

**Odour threshold:** N/Av
**Boiling point:** 64.4°C / 148°F
**Specific gravity (water=1):** 0.9293
**Coefficient of oil/water distribution:** < 1
**Solubility in water (%):** 1.9
**Volatile organic compounds (VOC's):** N/Av
**pH:** 9.2
**Evaporation rate (nBuAC=1):** 1.0
**Melting/freezing point:** -53.3°C / -64°F
**Vapour pressure (PSI):** 1.4
**Vapour density (Air=1):** 2.6
**Percent Volatile by Weight:** < 1

## SECTION 10 — STABILITY AND REACTIVITY

**Stability and reactivity:** Stable under the recommended storage and handling conditions prescribed.

**Hazardous polymerization:** Will not occur.

**Conditions to avoid:** Extreme heat, open flame and direct sunlight.

**Materials to avoid (**Incompatibles) Strong oxidizing agents and oxidizers, strong acids, sulphur dichloride, tetranitromethane, uranium hexafluoride.

**Hazardous decomposition products:** None known. Refer to 'Hazardous combustion products', Section 5.

## SECTION 11 — TOXICOLOGICAL INFORMATION

**Toxicological data:** There is no available data for the product itself, only for the ingredients. See below for individual ingredient acute toxicity data.

## SECTION 11 — TOXICOLOGICAL INFORMATION Continued

| Ingredients | $LC_{50}$ (ppm/4hr) inh, rat | $LD_{50}$ (mg/kg) | |
|---|---|---|---|
| | | oral, rat | dermal, rabbit |
| Aromatic petroleum solvent | N/Av | 2551 | N/Av |
| Hydrocarbon wax/Paraffin wax | N/Av | N/Av | N/Av |
| Toluene Morpholine | 7350 | 2600-7500 | 12225 |
| 1-nitropropane | 746 mg/l | 620 mg/kg | 420 mg/kg |
| | 746 mg/l | 620 mg/kg | 420 mg/kg |

**Carcinogenic status:** None of the ingredients listed are classified as carcinogenic by IARC, ACGIH, or NTP.

**Reproductive effects, Teratogenicity, Mutagenicity:** This product contains Toluene. Toluene may cause embryotoxic and teratogenic effects (e.g. reduced fetal weight, behavioural effects) at doses which are not maternally toxic.
**Sensitization to material:** No skin or respiratory sensitization effects are known.
Other important hazards: None known.
**Synergistic materials:** Not available.

## SECTION 12 — ECOLOGICAL INFORMATION

**Chemical fate information:** The ecological characteristics of this product have not been fully investigated. The product should not be allowed to enter drains or water courses or be deposited where it can affect ground or surface waters. Do not discharge product unmonitored into the environment.

Data for Component: **Morpholine**

**Movement & Partitioning**

Bioconcentration potential is low (BCF less than 100 or log Pow less than 3). Potential for mobility in soil is very high (Koc between 0 and 50). Given its very low Henry's constant, volatilization from natural bodies of water or moist soil is not expected to be an important fate process.
**Henry's Law Constant (H):** 1.15E-6 atm*m3/mole; 25 °C Estimated
**Partition coefficient, n-octanol/water (log Pow):** -0.86 Measured
**Partition coefficient, soil organic carbon/water (Koc):** 5.1 - 8 Estimated
**Bioconcentration Factor (BCF):** < 2.8; common carp (Cyprinus carpio)

**Biological oxygen demand (BOD):**

| BOD 5 | BOD 10 | BOD 20 | BOD 28 |
|---|---|---|---|
| | | 38.1 % | |

**Theoretical Oxygen Demand:** 2.57 mg/mg

Data for Component: **1-Nitropropane**

**Movement & Partitioning**

Bioconcentration potential is low (BCF less than 100 or log Pow less than 3). Potential for mobility in soil is high (Koc between 50 and 150).
**Henry's Law Constant (H):** 8.70E-5 atm*m3/mole; 25 °C Estimated
**Partition coefficient, n-octanol/water (log Pow):** 0.87 Measured
**Partition coefficient, soil organic carbon/water (Koc):** 71 Estimated
**Bioconcentration Factor (BCF):** 1.3; fish; Measured

## SECTION 12 — ECOLOGICAL INFORMATION Continued

Material is highly toxic to aquatic organisms on an acute basis (LC50/EC50 between 0.1 and 1 mg/L in the most sensitive species tested). Material is practically non-toxic to birds on an acute basis (LD50 > 2000 mg/kg). Material is practically non-toxic to birds on a dietary basis (LC50 > 5000 ppm).
Material is very toxic to aquatic organisms (LC50/EC50/IC50 below 1 mg/L in most sensitive species).

**Fish Acute & Prolonged Toxicity**
LC50, rainbow trout (Oncorhynchus mykiss): 1.1 mg/l
**Aquatic Invertebrate Acute Toxicity**
LC50, water flea Daphnia magna: 1.9 mg/l
**Aquatic Plant Toxicity**
EC50, green alga Selenastrum capricornutum, biomass growth inhibition, 72 h: 0.35 mg/l
**Toxicity to Micro-organisms**
EC50; activated sludge, respiration inhibition: 306 mg/l
**Toxicity to Non-mammalian Terrestrial Species**
oral LD50, mallard (Anas platyrhynchos): 2,695 mg/kg
dietary LC50, bobwhite (Colinus virginianus): > 5,620 ppm
dietary LC50, mallard (Anas platyrhynchos): > 5,620 ppm

## SECTION 13 — DISPOSAL CONSIDERATIONS

**Handling for disposal:** Empty containers may contain product residue or vapours. Handle according to recommendations listed in Section 7.

**Methods of disposal:** Dispose in accordance with all applicable federal, state, provincial and/or local regulations. Contact your local, state, provincial, and/or federal environmental agency for specific rules.

**RCRA**: If this product, as supplied, becomes a waste, it may meet the criteria of a hazardous waste as defined under RCRA, Title 40 CFR 261. Under the RCRA, it is the responsibility of the waste generator to determine the proper waste identification and disposal method. For disposal of unused or waste material, check with local, state and federal environmental agencies.

## SECTION 14 — TRANSPORT INFORMATION

**US 49 CFR information:**

| | | | |
|---|---|---|---|
| Proper Shipping Name: | FLAMMABLE LIQUID, N.O.S. (Toluene) | | |
| Hazard Class – Primary: | 3 | Identification No.: | UN1993 |
| Hazard Class (es) – Subsidiary: | None | Packing Group: | III |
| RQ Components: | Toluene (1000 lbs.) | | |
| Marine pollutant: | None | | |

*Special Transportation Notes:* For shipments by ground within the United States, the Limited Quantity or Consumer commodity exceptions may apply to inner packagings not over 5 Liters (1.3 gallons) net capacity each, packed in strong outer packagings. Under the US 49 CFR, refer to Section 173.150 for additional exception requirements.

**Canadian Transportation of Dangerous Goods Regulations (TDGR) Shipping Information:**

| | | | |
|---|---|---|---|
| Proper Shipping Name: | FLAMMABLE LIQUID, N.O.S. (Toluene) | | |
| Identification No.: | UN1993 | Packing Group: | III |
| Primary Class: | 3 | Subsidiary Classes (es): | None |

*Other Shipping Information:* This product may be shipped by ground within Canada, as a 'Consumer commodity' or a 'Limited Quantity', when transported in containers which hold 5 Litres or less of the material. Refer to Section 1.17 for additional requirements for Limited Quantities and Consumer Commodities.

## SECTION 15 — REGULATORY INFORMATION

**US Federal Information:**

**TSCA information:** All ingredients are listed on the TSCA inventory.
**CERCLA Reportable Quantity (RQ) (40 CFR 117.302):** Toluene (1000 lbs.)
**SARA Title III:**
*Sec. 302, Extremely Hazardous Substances, 40 CFR 355:* No Extremely Hazardous Substances are present.
*SEC. 311 and 312, MSDS Requirements, 40 CFR 370 Hazard Classes:* Immediate (Acute); Delayed (chronic);

## SECTION 15 — REGULATORY INFORMATION Continued

Fire Hazard. Under SARA Sections 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The thresholds for extremely hazardous substances are 500 lbs or the individual chemical's threshold planning quantity (TPQ), whichever is lower; and 10,000 lbs for all other hazardous chemicals.

*Sec. 313 Toxic Chemicals Notification, 40 CFR 372:* This material may be subject to SARA notification requirements, since it contains Toluene, a Toxic Chemical constituent above the d*e minimus* concentration

**US State Right to Know Laws:**

**California Proposition 65:** This product contains Toluene, which is known to the state of California to cause developmental harm

**New Jersey Labelling Requirements:** This product contains the following substances that may be required to be disclosed on product labelling:

| Chemical Name | CAS # | %(weight) | New Jersey Hazardous Substance |
|---|---|---|---|
| Aromatic petroleum solvent | 68477-31-6 | 40-70 | No |
| Hydrocarbon wax/Paraffin wax | 8002-74-2 | 15-40 | No |
| Toluene | 108-88-3 | 5-10 | Yes |
| Morpholine | 110-91-8 | 2-6 | No |
| 1-nitropropane | 108-03-2 | 1-5.25 | No |

**International Information:**

**Canadian WHMIS Classification:** **Class B2** (Flammable Liquids); **Class D2A** (Materials Causing Other Toxic Effects – Very Toxic Material); **Class D2B** (Materials Causing Other Toxic Effects – Toxic Material)

***This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and this MSDS contains all the information required by the CPR.***

**Canadian CEPA information:** All ingredients are listed on the DSL.

## SECTION 16 — OTHER INFORMATION

**NFPA Rating:**

0 – Minimal 1 – Slight 2 – Moderate 3 – Serious 4 - Severe

Health: 1 Flammability: 3 Instability: 0 Special Hazard: None

**HMIS Rating:**

* - Chronic hazard 0 – Minimal 1 – Slight 2 – Moderate 3 – Serious 4 – Severe

Health: *2 Flammability: 3 Reactivity: 0

**Legend:** ACGIH: American Conference of Governmental Industrial Hygienists
CAS: Chemical Abstract Services
CERCLA: US Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CFR: US Code of Federal Regulations
COC: Cleveland Open Cup
DOT: US Department of Transportation
DSL: Canadian Domestic Substances List
EPA: US Environmental Protection Agency
HMIS: Hazardous Materials Identification System
HSDB: Hazardous Substances Data Bank
IARC: International Agency for Research on Cancer
MSHA: Mine Safety and Health Administration
N/Ap: not applicable
N/Av: not available
NFPA: National Fire Protection Association

## SECTION 16 — OTHER INFORMATION Continued

NIOSH: National Institute of Occupational Safety and Health
NiT: National Toxicology Program
OSHA: Occupational Safety and Health Administration
PEL: Permissible Exposure Limit
PSI: Pounds per Square Inch
RCRA: US Resource Conservation and Recovery Act
RTECs: Registry of Toxic Effects of Chemical Substances
SARA: US Superfund Amendments & Reauthorization Act
STEL: Short Term Exposure Limit
TLV: Threshold Limit Values
TSCA: Toxic Substances Control Act
TLV: Threshold Limit Values
WHMIS: Workplace Hazardous Materials Information System

References:
1. ACGIH, Threshold Limit Values and Biological Exposure Indices for 2006.
2. International Agency for Research on Cancer Monographs, searched 2007.
3. Canadian Centre for Occupational Health and Safety, CCInfoWeb databases, 2007 (Chempendium and RTECs).
4. Material Safety Data Sheet from manufacturer.
5. US EPA Title III List of Lists – January 27, 2005 version.
6. California Proposition 65 List – September 29, 2006 version.

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**Preparation date:** July 11, 2008

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