NUFARM AGRICULTURE INC.

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

SUPPLIED BY:
Nufarm Agriculture Inc.
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MANUFACTURED BY:
Nufarm Agriculture Inc.
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PRODUCT: **2,4-D Ester 700 Liquid Herbicide**
PCP NUMBER: 27820
DATE PREPARED: September 6, 2011
PREPARER: Nufarm Agriculture Inc.; Regulatory Affairs & Research Department
CHEMICAL FAMILY/USE: Herbicide
FORMULA: $C_{16}H_{22}Cl_2O_3$
CHEMICAL SYNONYMS: 2,4-D 2 ethylhexyl ester (2-EHE); 2,4-Dichlorophenoxyacetic acid, 2-ethylhexyl ester.

2. COMPOSITION/INFORMATION ON INGREDIENTS

Hazardous Ingredients	Wt. %	CAS NO.
2,4-D 2-EHE	88 - 94	1928-43-4
Hydrocarbon solvent	< 5	64742-47-8

Other ingredients are proprietary.

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: DANGER-POISON. Keep out of reach of children. Avoid contact with skin, eyes and clothing. Do not inhale fumes. May cause eye and skin irritation. Harmful if absorbed through the skin. Harmful or fatal if swallowed or inhaled.

EFFECTS OF ACUTE EXPOSURE:
INGESTION: Harmful or fatal if swallowed. May cause nausea, vomiting, abdominal pain, decreased blood pressure, muscle weakness, muscle spasms.
SKIN CONTACT: Causes skin irritation. Overexposure by skin absorption may cause nausea, vomiting, abdominal pain, decreased blood pressure, muscle weakness, muscle spasms. May cause allergic reaction in sensitive individuals.
INHALATION: Contains materials that may be moderately toxic. Vapours could cause headache, dizziness, respiratory irritation and symptoms similar to those from ingestion.
EYE CONTACT: May cause eye irritation, generally of minimal degree. Causes redness and tearing.

MEDICAL CONDITIONS AGGRAVATED: Skin exposure may aggravate preexisting skin conditions. Inhalation of mist may aggravate preexisting respiratory conditions.
SUBCHRONIC (TARGET ORGAN) EFFECTS: (An adverse effect with symptoms that develop slowly over a long period of time): Repeated overexposure may cause effects to liver, kidneys, blood chemistry, and gross motor function. Rare cases of peripheral nerve damage have been reported, but extensive animal studies have failed to substantiate these observations, even at high doses of 2,4-D for prolonged periods.
CHRONIC EFFECTS/CARCINOGENICITY: The International Agency for Research on Cancer (IARC) lists exposure to chlorophenoxy herbicides as a class 2B carcinogen, the category for limited evidence for carcinogenicity in humans. However, more current 2,4-D lifetime feeding studies in rats and mice did not show carcinogenic potential. Products similar to the hydrocarbon component are not considered to be mutagenic and are unlikely to cause tumors.
REPRODUCTIVE TOXICITY: No impairment of reproductive function attributable to 2,4-D has been noted in laboratory animal studies.

DEVELOPMENTAL TOXICITY: Studies in laboratory animals with 2,4-D have shown decreased fetal body weights and delayed development in the offspring at doses toxic to mother animals. Products similar to the hydrocarbon component are not considered to be developmental toxicants.
GENOTOXICTY: There have been some positive and some negative studies, but the weight of evidence is that 2,4-D is not mutagenic. Products similar to the hydrocarbon component are not considered to be mutagenic.
PRINCIPLE ROUTES OF EXPOSURE: Eye contact. Skin absorption. Inhalation. Oral.
TOXICOLOGICALLY SYNERGISTIC MATERIALS: None known.
OTHER: None known.

4. FIRST AID MEASURES

If swallowed, call a poison control centre or doctor immediately for treatment advice. Do not induce vomiting unless told to do so by a poison control centre or doctor. Do not give **any** liquid to the person. Do not give anything by mouth to an unconscious person.
If on skin or clothing, take off contaminated clothing. Rinse skin immediately with plenty of water for 15–20 minutes. Call a poison control centre or doctor for treatment advice.
If in eyes, hold eye open and rinse slowly and gently with water for 15–20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. Call a poison control centre or doctor for treatment advice.
If inhaled, move person to fresh air. If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably by mouth-to-mouth, if possible. Call a poison control centre or doctor for further treatment advice.

Take container, label or product name and Pest Control Product Registration Number with you, when seeking medical attention.

NOTE TO PHYSICIAN: This product contains petroleum distillates. If large amounts have been ingested, empty the stomach by gastric intubation with the aid of a cuffed endotracheal tube to prevent aspiration and possible chemical pneumonia.
This product contains a phenoxy herbicidal chemical. No specific antidote. Treatment based on sound judgment of physician and individual reactions of patient. Overexposure to materials other than this product may have occurred.

5. FIRE FIGHTING MEASURES

FLASH POINT: .....>100°C.
CONDITIONS OF FLAMMABILITY: .....May burn under fire conditions.
FLAMMABLE LIMITS IN AIR - Upper (%): .....NA.
FLAMMABLE LIMITS IN AIR - Lower (%): .....NA.
AUTOIGNITION TEMPERATURE: .....NA.
SENSITIVITY TO MECHANICAL IMPACT (Y/N): .....NA. No sensitivity expected based on long handling history.
SENSITIVITY TO STATIC DISCHARGE: .....NA. No sensitivity expected based on long handling history.
EXTINGUISHING MEDIA: Water fog, alcohol foam, carbon dioxide, dry chemical.
SPECIAL FIREFIGHTING PROCEDURES: Firefighters should wear self-contained breathing apparatus and full protective clothing when fighting chemical fires. Minimize and contain water runoff.

6. ACCIDENTAL RELEASE MEASURES

ACTION TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED: Use safety equipment and procedures appropriate to the size of the spill. Keep unnecessary people away. Avoid runoff to natural waters and sewers. Surround and absorb spills with inert material such as perlite, sawdust, clay granules, vermiculite, sand or dirt. Contain all affected material in a closed, labeled container for proper disposal. Isolate from other waste materials. Clean contaminated area such as hard surfaces with detergent and water, collecting cleaning solution for proper disposal. Large spills to soil or similar surfaces may necessitate removal of top soil.

7. HANDLING AND STORAGE

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: Keep away from food and feed products. Avoid storage in close proximity to insecticides, fungicides, fertilizers, plants and seeds. Avoid contact with eyes, skin and clothing. Keep container

tightly closed when not in use.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

EXPOSURE LIMITS:

Hazardous Ingredients	TWA*	ACGIH TLV®	STEL	Units
2,4-D EHE	10**	10**	N/E	mg/M^3
Hydrocarbon solvent	1200***	N/E	N/E	mg/M^3

*8-hour TWA unless otherwise noted.
**Based on adopted limit for 2,4-D.
***Manufacturers recommendation, total hydrocarbon.

ENGINEERING CONTROLS: Use in a well ventilated area. General ventilation with a good source of make-up air recommended as minimum for indoor situations. Ventilation should be adequate to maintain air concentrations below exposure limits.
RESPIRATORY PROTECTION EQUIPMENT: Use an approved pesticide respirator if ventilation is not adequate or exposure to sprays, mists or vapours is likely.
PROTECTIVE GLOVES: All types of chemical-resistant gloves for handling chemicals are acceptable, provided that they can be cleaned. Rinse gloves before removal. Gloves are not required for applicator in enclosed tractor or airplane cockpit.
EYE AND FACE PROTECTION: Goggles or face shield when handling concentrate.
OTHER PROTECTIVE EQUIPMENT: Long sleeved shirt, long pants, socks and shoes are minimum work clothing. Coveralls or a chemical-resistant apron should also be worn when open pouring from containers greater than 5L. Use other equipment appropriate to specific situation.
VENTILATION: Use only in well ventilated area.

9. PHYSICAL AND CHEMICAL PROPERTIES

Note: Physical data are typical values, but may vary from sample to sample. A typical value should not be construed as a guaranteed analysis or as a specification.
BOILING POINT: .....>300°C (decomposition) (data on 2,4-D 2-EHE).
VAPOR PRESSURE: .....3.6×10^{-6} mm Hg @ 25°C (data on 2,4-D 2-EHE)
VAPOR DENSITY (air = 1): .....NA. Hydrocarbon component >1.
FREEZING POINT: .....NA.
MELTING POINT: .....NA.
PHYSICAL STATE: .....Liquid.
ODOUR: .....Characteristic phenolic.
COLOUR: .....Amber.
ODOR THRESHOLD (ppm): .....NA.
EVAPORATION RATE (butyl acetate = 1): .....NA.
SPECIFIC GRAVITY (water = 1): 1.13
DENSITY @ 25°C: 1.13
pH: .....5.0 (1% dilution)
SOLUBILITY IN WATER (20°C): .....Product is emulsifiable in water.
COEFFICIENT OF WATER/OIL DISTRIBUTION: .....NA. Product is oil soluble.

10. STABILITY AND REACTIVITY

STABILITY: Stable.
HAZARDOUS POLYMERIZATION: Will not occur.
HAZARDOUS THERMAL DECOMPOSITION/COMBUSTION PRODUCTS: Hydrogen chloride, other chlorine compounds, carbon dioxide, carbon monoxide, oxides of nitrogen and other potentially toxic combustion products may be present.

INCOMPATIBILITY (MATERIALS TO AVOID): Avoid contact with strong acidic, basic or oxidizing agents.
CONDITIONS TO AVOID: None known.

11. TOXICOLOGICAL INFORMATION

Data on this product or a similar formulation:
ACUTE ORAL LD_{50} (mg/kg): .....737 (Rat)
ACUTE DERMAL LD_{50} (mg/kg): .....>2000 (Rabbit)
ACUTE INHALATION LC_{50} (mg/l): .....>2.66 mg/l (Rat, 4-hour nose-only exposure)
OTHER: Tested as mildly irritating to the eye and slightly irritating to skin (Rabbit).

12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION:
Data on 2,4-D 2-EHE or EC formulation:
96-HOUR LC_{50} (mg/L): 7.2 (Rainbow Trout)
96-HOUR LC_{50} (mg/L): > 5 (Bluegill)
48-HOUR EC_{50} (mg/L): > 5 (Daphnia)
DIETARY LC_{50} (ppm): > 5620 (Bobwhite Quail)
DIETARY LC_{50} (ppm): > 5620 (Mallard Duck)

CHEMICAL FATE INFORMATION: In representative laboratory and field studies, 2,4-D 2-EHE rapidly hydrolyzed to parent acid. The typical half-life of the resultant 2,4-D acid ranged from a few days to a few weeks.

13. DISPOSAL CONSIDERATIONS

DISPOSAL METHOD: For information on disposal of unused, unwanted product, contact the manufacturer or the provincial regulatory agency. Disposal should be made in accordance with federal, provincial and local regulations. Contact the manufacturer and the provincial regulatory agency in case of a spill, and for clean up of spills.

Emptied container retains vapor and product residue. Observe all labeled safeguards until container is cleaned, reconditioned or destroyed. Do not reuse container for any purpose. If applicable, return container in accordance with return program. If a recyclable container, dispose of at a container collection site. Contact local distributor, dealer or municipality for the location of the nearest collection site. Before taking the container to the collection site, triple or pressure rinse the empty container adding rinsings to spray tank, and make container unsuitable for further use. If there is no container collection site in your area, dispose of the container in accordance with provincial requirements.

14. TRANSPORT INFORMATION

CANADIAN TDG DESCRIPTION (Road & Rail): Not dangerous for transport by road/rail in Canada. Contact manufacturer for updates to transport information.

15. REGULATORY INFORMATION

WHMIS HAZARD CLASS: D2B Toxic Material.
WHMIS TRADE SECRET: Exempt. (This product is regulated under the Pest Control Products Act - WHMIS exempt.)
CANADIAN INVENTORY: This product is currently exempt from CEPA.
HAZARD RATING SYSTEMS:
HMIS: Not Available
National Fire Protection Association (NFPA®) Hazard Ratings:

Ratings for This Product		Key to Ratings	
2	Health Hazard	0	Minimal
1	Flammability	1	Slight

0	Instability	2 3 4	Moderate Serious Severe

16. OTHER INFORMATION

REVISIONS:
The following has been revised since the last issue of this MSDS: Section 1, 4 revisions.

ADDITIONAL INFORMATION:
Abbreviations used throughout the MSDS are:

NA = Not available
NAp = Not applicable
N/E = None Established.

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

Company references utilized in preparation of the MSDS.

*****END OF MSDS*****