UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

Pesticide Fact Sheet

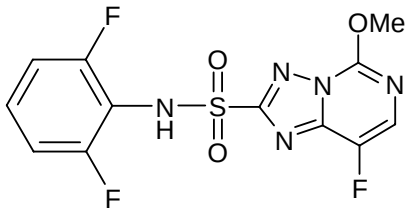
Name of Chemical: Florasulam
Reason for Issuance: Conditional Registration
Date Issued: September, 2007

1. Description of Chemical

Chemical Name: N-(2,6-difluorophenyl)-8-fluoro-5-methoxy(1,2,4)triazolo(1,5-c)pyrimidine-2-sulfonamide

Common Name: Florasulam

Chemical Formula:



EPA PC Code: 129108

Chemical Abstracts Service (CAS) Number: 145701-23-1

Year of Initial Registration: 2007

Pesticide Type: Herbicide

Chemical Class: Sulfonanilide and Triazolopyrimide Herbicide

U.S. Producer: Dow AgroSciences LLC

II. Use Patterns and Formulations

Application Sites: Florasulam is registered for use on cereal grains including wheat, barley, oats, rye, and triticale.

Types of Formulations: Florasulam Wet Cake Technical (EPA File Symbol 62719-LLO)
EF 1343 (EPA File Symbol 62719-LAN)
EF 1383 (EPA File Symbol 62719-LLI
EF 1440 (EPA File Symbol 62719-LAR)
GF 184 (EPA File Symbol 62719-LAG)
GF 1727 (EPA File Symbol 62719-LAE)

Application Methods And Rates: Florasulam may be applied as a single application to wheat, barley, oats, and triticale at 0.00446 pounds of active ingredient per acre. It may be applied as a single application to rye at 0.0037 pounds of active ingredient per acre. It may be applied post-emergent use when weeds are actively growing between 2 leaf and flag leaf emergence stage. Do not apply more than 0.00446 lb/ai/acre to be applied in a single growing season. Ground and aerial equipment may be used.

III. Physical and Chemical Properties:

Table 1 – Physical and Chemical Properties of Florasulam

Physical State	Solid
Melting point/range	193.5-230.5°C
Specific gravity	1.53 at 22°C
Water solubility	Medium — Solubility (g/L) water — 0.121 pH 5 — 0.084 pH 7 — 6.36 pH 9 — 94.2
Solvent solubility	Solvent — Solubility (g/L) acetone — 123 acetonitrile — 72.1 ethyl acetate — 15.9 methanol — 9.81 dichloromethane — 3.75 xylene — 0.227 n-octanol — 0.184

	n-heptane	0.000019
Vapor pressure	1 x 10^{-5} Pa at 25°C	
Dissociation constant (pK_a)	4.54	
Octanol/water partition coefficient (K_{ow}) at 22°C	pH 4 7 10	Log K_{ow} 1.00 -1.22 -2.06
UV/visible absorption spectrum	Form Acidic Basic Methanolic No absorbance above 300 nm.	λmax (nm) 259.8 203.8 262.4 209.7 204.1

IV. HUMAN HEALTH RISK ASSESSMENT

A. Toxicity

1. **Acute Toxicity:** Florasulam has low or minimal acute toxicity via the oral (Category IV), dermal (Category III), and inhalation routes of exposure (Category IV). It is non- irritating to the eye and skin (Category IV); it is not a skin sensitizer.

Table 2 – Acute Toxicity

Acute Toxicity of Florasulam			
Guideline No.	**Study Type**	**Results**	**Toxicity Category**
870.1100	Acute oral – rat	LD_{50} >= 5000 mg/kg	IV
870.1100	Acute oral – mouse	LD_{50} >= 5000 mg/kg	IV
870.1200	Acute dermal – rabbit	LD_{50} >= 2000 mg/kg	III
870.1300	Acute inhalation – rat	LC_{50} >= 5.0 mg/L	IV
870.2400	Acute eye irritation – rabbit	Non- irritating	IV
870.2500	Acute dermal irritation – rabbit	Non- irritating	IV
870.2600	Skin sensitization – guinea pig	No sensitization	

2. **Subchronic Toxicity:** Slight nephrotoxicity (increased kidney weights, hypertrophy, and degeneration/regeneration and inflammation of the descending portion of proximal tubules) was observed in the kidneys of rats (both sexes) after subchronic exposure to florasulam 90 days) at ≥500 mg/kg/day. Decreases in body weight and body weight gain were observed in females after subchronic (500 mg/kg/day) . Additionally at 500 mg/kg/day, papillary necrosis and hyperplasia of the transitional epithelium (papilla) were observed in the kidney (males). Decreases in body weight and body weight gain were also observed in females after subchronic (500 mg/kg/day)

3. **Chronic Toxicity:** Chronic exposure in rats led to slight nephrotoxicity (increased kidney weights, hypertrophy, and slight multi-focal mineralization of the papilla) at 250 and 500 mg/kg/day in males only. Additionally at 500 mg/kg/day, papillary necrosis and hyperplasia of the transitional epithelium (papilla) were observed in the kidney (males). Decreases in body weight and body weight gain were also observed in females after chronic exposure (250 mg/kg/day). Liver toxicity was observed in dogs (both sexes) in the form of increased alkaline phosphatase activity (59-127%), increased liver weights, hypertrophy, and hepatic vacuolation at 50 mg/kg/day after 90 days. After 1 year, there were increases in alkaline phosphatase (233-783%) in dogs (both sexes) but no changes in liver weights or gross or microscopic pathology at 50 mg/kg/day. Additionally, there were decreases in body weight, body weight gain and food consumption, as well as vacuolation of the zona reticularis and zona fasciculate in the adrenal gland (consistent with fatty change) in both sexes. There were no adverse effects noted after chronic exposure to florasulam in mice up to the limit dose of 1000 mg/kg/day.

4. **Carcinogenicity:** There were no treatment-related increases in tumors in rat and mouse carcinogenicity studies after exposure to florasulam.

5. **Developmental Toxicity/Developmental Neurotoxicity:** There were no treatment-related effects observed in dams or offspring in the developmental toxicity study in rabbits. In the rat developmental toxicity study, at 750 mg/kg/day, body weights were decreased by 4-6% during GD 6-19, resulting in a 16% decrease in body weight gains during treatment (GD 6-16); food consumption was also decreased (not statistically analyzed) by 6-13% during the treatment period. Additionally at this dose, absolute and relative (to body weight) kidney weights were increased ($p<=0.05$) by 8 and 12%, respectively. At ≥ 250 mg/kg/day, slight decreases (3-4%) were observed in fetal body weight, accompanied by delayed ossification (not significant) of the skull, ribs, and sternebrae at 750mg/kg/day. However, both findings were within the historical control range and attributed to the decreased maternal body weights also seen in this dose group. There was no evidence of neurotoxicity observed in the toxicology database. In the acute neurotoxicity study, there was a slight transient decrease in motor activity, increased incidence of minimal activity (open-field), and decreased reactivity to sharp noise (Day 1) at 2000 mg/kg/day. However, the differences from control values did not exceed the historical controls and complete recovery occurred by the next test session (Day 8). When the FOB and motor activity findings were

combined they were considered to be a treatment-related high dose effect. As there were no corroborative gross or neurological pathology, this pattern of decreased activity was considered to be likely due to general malaise. In the chronic neurotoxicity study, there were no compound-related effects on mortality, clinical signs, food consumption, FOB parameters, motor activity, or gross or neurological pathology observed at any dose. Organ weights were not provided; however, in the concurrently performed 2-year dietary chronic toxicity/carcinogenicity study, brain weight was unaffected after 12 and 24 months of treatment. There were no other potential signs of neurotoxicity noted in the toxicology database.

6. **Reproductive Toxicity:** In the 2-generation reproduction study, at 500 mg/kg/day, there were decreases in pre-mating body weights and food consumption (Weeks 3-10), resulting in decreased overall body weight gains (Weeks 0-10) in the F1 males and in the P and F1 females. During gestation, body weights and food consumption were decreased during gestation days (GD) 0-21, resulting in decreased overall (GD 0-21) body weight gains in the P and F1 females. During lactation, body weights were decreased during lactation days (LD) 1-14; however, food consumption and overall (LD 1-21) body weight gains were not adversely affected. Additionally at 500 mg/kg/day, there were increases in kidney weights and hypertrophy. In the offspring, there were no adverse treatment-related effects observed on birth index, live birth index, viability indices, clinical signs, developmental landmarks, kidney weights, or gross pathology. Transient decreases in pup body weights (500 mg/kg/day) were observed on PND 4 pre-culling (F1 and F2 males) and PND 7 (F1 females and F2 males and females); however, by PND 21, all treated groups were similar to controls. The decreases observed were associated with decreased maternal body weight and food consumption and were transient in nature; thus, they were not considered adverse. There were no other treatment-related effects noted.

7. **Metabolism:** Elimination was rapid. The administered dose was mostly eliminated within 12 hours in the urine. Total radioactivity found in the urine was approximately 90-92% of the dose following single or repeated low-dose treatment, and 81-85% of the dose following treatment at 500 mg/kg. Radioactivity in the feces accounted for another 5-7% at 10 mg/kg and 14-17% at 500 mg/kg. Thus, compared to the low dose, excretion of the high dose was slightly slower, and more of the compound was excreted in the feces.

8. **Mutagenicity:** Florasulam was negative for mutations and chromosomal aberrations across four in vitro/in vivo genotoxicity studies and was considered not to pose a mutagenic concern.

9. **Toxicology Profile:** The toxicological profile for florasulam is discussed in Table 3 below:

Table 3 – Toxicology Profile

Subchronic, Chronic and Other Toxicity Profile for Florasulam			
Guideline No.	**Study Type**	**MRID No./Doses**	**Results**
870.3100	90-day oral toxicity (rat)	46808219 0, 20, 100, 500, 1000/800 mg/kg/day [M/F])	NOAEL =100 mg/kg/day LOAEL = **500 mg/kg/day**, based on decreased body weights (5-8%) and body weight gains (21%) in females, and evidence of slight nephrotoxicity (increased kidney weights, hypertrophy, and degeneration/regeneration and inflammation of the descending portion of proximal tubules) in both sexes
870.3100	90-day oral toxicity (mouse)	46808222 0, 20, 100, 500, 1000 mg/kg /day	NOAEL = 1000 mg/kg/day. LOAEL = Not determined
870.3150	90-day oral toxicity (dog)	46808223 0, 5, 10, 100 mg/kg /day	NOAEL = 5 mg/kg/day LOAEL = 50 mg/kg/day, based on increased alkaline phosphatase (59-127%) activity, increased liver weights, hypertrophy and increased incidence/severity of hepatic vacuolation in both sexes.
870.3200	28-day dermal toxicity (rat)	468008225 0, 100, 500, 1000 mg/kg /day	Systemic NOAEL = 1000 mg/kg/day Systemic LOAEL = Not determined Dermal NOAEL = 500 mg/kg/day Dermal LOAEL = 1000 mg/kg/day, based on edema and erythema in males (4/5)
870.3700a	Prenatal developmental toxicity (rat)	46808234 46808231 0, 50,250, 750, mg/kg/day	Maternal NOAEL = 250 mg/kg/day LOAEL = 750 mg/kg/day based on decreased body weights (4-6%, GD 6-16), body weight gains (16%, GD 6-16%), food consumption (6-13%), and increased kidney weights. Developmental NOAEL = 750 mg/kg/day Developmental LOAEL = Not determined
870.3700b	Prenatal developmental toxicity (rabbit)	46808233 46808232 0, 50, 250, 500 mg/kg /day	Maternal NOAEL = 500 mg/kg/day Maternal LOAEL = Not determined Developmental NOAEL = 500 mg/kg/day Developmental LOAEL = Not determined Note: Study acceptable due to findings of preliminary developmental toxicity study at 600 mg/kg/day (mortality and decreased body weight gains and food consumption
870.3800	Prenatal developmental toxicity (rabbit)	46808235 0, 10, 100, 500 mg/kg /day	Parental/Systemic NOAEL = 100 mg/kg/day Parental/Systemic LOAEL = 500 mg/kg/day, based on decreased body weights, body weight gains, and food consumption, as well as kidney alterations. Offspring NOAEL = 500 mg/kg/day Offspring LOAEL = Not determined Reproductive NOAEL = 500 mg/kg/day Reproductive LOAEL = Not determined

870.4100b	Chronic toxicity (dog)	46808229 0, 0.5, 5, 100/50 mg/kg/day	NOAEL = 5 mg/kg/day LOAEL =100/50 mg/kg/day, based on decreased body weights (17%), body weight gains (68%), and food consumption in females; increased liver enzymes (alanine aminotransferase and alkaline phosphatase) and slight vacuolation of the zona reticularis and zona fasciculata in the adrenal gland (consistent with fatty change) in both sexes.
870.4200	Carcinogenicity (mouse)	46808230 0, 50, 500, or 1000 mg/kg /day	NOAEL = 1000 mg/kg/day. LOAEL = Not determined No evidence of carcinogenicity
870.4300	Combined chronic toxicity/carcinogenicity (rat)	46808236 0, 10, 250, 500 mg/kg /day	LOAEL = 250 mg/kg/day (males**)**, based on slight nephrotoxicity (increased kidney weights, hypertrophy, and slight multi-focal mineralization in the papilla); 250 mg/kg/day (females**)**, based on decreased body weights (3-8%) and body weight gains (14%).
870.5100	Bacterial gene mutation/mammalian activation gene mutation assay	46808240 M: 0, 10, 250, 500 mg/kg/day F:; 0, 10, 125, 250 mg/kg /day	Negative-No evidence of induced mutant colonies over background in the presence or absence of S9-induced activation
870.5300	Gene mutation at the HGPRT locus in Chinese hamster ovary cells	46808238 00, 187.5, 375, 750 1500, 3000 µg/mL	Negative – No evidence of induced mutant colonies over background in the presence or absence of S9-activation.
870.5375	Chromosomal aberration assay in rat lymphocytes	46808237 0, 30, 10, 30, 100, 300, 1000, 3000 µg/mL o	Negative – No evidence of induced mutant colonies over background in the presence or absence of S9-activation
870.5395	Mouse bone marrow micronucleus assay	46808239 0, 1250, 2500, 5000 mg/kg	Negative – No significant increase in the frequency of micronucleated polychromatic erythroctes in bone marrow .
870.6200a	Acute neurotoxicity screening battery (rat)	46808217 0, 200, 1000, 2000 mm/kg	Systemic NOAEL = 1000 mg/kg Systemic LOAEL = 2000 mg/kg, based on decreased body weight gain (21%) and general malaise (slight transient decrease in motor activity, minimal activity in open field, and reactivity) in males. NOAEL = 2000 mg/kg Neurotoxicity LOAEL = Not determined.
870.6200b	Chronic neurotoxicity screening battery (rat)	46808228 0, 10, 125 female only) 250, 500 (male only) mg/kg/day	Systemic NOAEL = 250 mg/kg/day Systemic LOAEL = 500 mg/kg/day, based on decreased body weight (9-15% at 6, 9, and 12 months) and body weight gain in males (61-67% at 3-12 months; 27% at 0-12 months) Neurotoxicity NOAEL = 250 mg/kg (highest dose tested in females). Neurotoxicity LOAEL= Not determined

870.7485	Metabolism and pharmacokinetics (rat)	46808301 46808303 10 and 500 mg/kg	Absorption was rapid and extensive (≈90-93% at 10 mg/kg; ≈82-86% at 500 mg/kg rats). Peak plasma concentrations (Cmax) were achieved within 0.5-1 hour. Cmax in the plasma did not increase proportionally with dose, possibly indicating a saturation of the absorption and/or excretion mechanisms at the high dose. The apparent volume of distribution was increased at the high dose, possibly indicative of increased tissue binding. Total recoveries at 168 hours post-dose were 95.9-100.2%. Elimination was rapid. The administered dose was mostly eliminated within 12 hours in the urine (>80% at 10 mg/kg; >60% at 500 mg/kg). Total radioactivity found in the urine was approximately 90-92% following single or repeated low-dose treatment, and 81-85% following treatment at 500 mg/kg. Radioactivity in the feces accounted for another 5-7% at 10 mg/kg and 14-17% at 500 mg/kg. Thus, compared to the low dose, excretion of the high dose was slightly slower, and more of the compound was excreted in the feces. At 24 hours, <0.5% of the dose was found in expired air. By 24 hours post-dose, plasma levels had declined to <0.1 µg eq/g plasma in both sexes at 10 mg/kg and <5.0 µg eq/g plasma in both sexes at 500 mg/kg. The highest residue levels were observed in the skin (single dose) and carcass (repeated dose), but the mean recovery of radioactivity in the tissues/carcass at sacrifice was <0.6% of the dose. Identified compounds accounted for 87.6-91.6% of the administered dose in each group. In each group, the following compounds were isolated: parent accounted for 77.7-85.0% dose, OH-phenyl-XR-570 accounted for 3.1-9.0% dose, OH-phenyl-XR-570 sulfate conjugate accounted for 2.8-3.7% dose, and 2 unidentified metabolites accounted for <=0.32% dose. In the high dose, more of the parent was isolated in the feces and less in the urine compared to the low dose. There were no sex-related differences in the metabolism or pharmacokinetics of the test compound. Similarly, the number of doses or the position of the radiolabel generally made no difference in the metabolism and pharmacokinetic profile. test compound. Similarly, the number of doses or the position of the radiolabel generally made no difference in the metabolism and pharmacokinetic profile.

870.7600	Dermal pentration (rat)	46808304 0.001 or 0.5 mg/ cm^2	In a dermal absorption study in rats, recovery of the applied dose (mass balance) was 100-103%. The majority of the dose was recovered in the skin swab (71-90% of the applied dose). Dermal absorption (based on the sum of residues in urine, feces, cage wash, tissues, residual carcass, and untreated skin) was only 0.13-0.45% of the applied dose and only 10-22% of the applied dose remained in the skin at the application site (considered potentially absorbable). Increasing the dose 200-fold resulted in only approximately 2-fold increase in absorption. Absorption increased 44% at 48 h and 61% at 72 h compared to 24 h in the low dose groups; however, a time-dependent increase in absorption was not evident in the high dose groups. The absorbed dose was almost completely excreted in the urine at the low dose, but was found primarily in the urine, cage wash, and untreated skin at the high dose. The amount of radioactivity at the treatment site increased at 48 hours in the low dose, but did not decrease within 72 hours at either dose, suggesting that the compound in the skin was not readily absorbable.

10. FQPA Hazard Considerations EPA has determined that reliable data show that it would be safe for infants and children to reduce the FQPA safety factor to 1X. That decision is based on the following findings:

i. The toxicology database is complete.

ii. There are no residual uncertainties concerning pre- and postnatal toxicity.

iii. There are no registered or proposed uses of florasulam which would result in residential exposure.

iv. There are no residual uncertainties identified in the exposure databases. [The dietary food exposure assessments were performed based on 100% crop treated (CT) and tolerance-level residues for all proposed commodities. By using this screening-level assessment, the acute and chronic exposures/risks will not be underestimated. The dietary drinking water assessment (unrefined estimates) utilizes values generated by model and associated modeling parameters which are designed to provide conservative, health protective, high-end estimates of water concentrations.

11. Toxicological Endpoints: A summary of the toxicological endpoints and doses chosen for the relevant exposure scenarios for dietary and occupational human health risk assessments is provided in the table below. The conventional interspecies

extrapolation (10X) and intraspecies variation (10X) uncertainty factors were applied for all exposure scenarios. As stated above, the FQPA SF for increased susceptibility was reduced to 1X for all exposures scenarios. A summary of the toxicological endpoints are shown below in Table 4:

Table 4 -- Summary of Toxicological Doses and Endpoints for Florasulam for Use in Human Health Risk Assessments

Exposure/ Scenario	Dose Use in Risk Assessment	Uncertainty/ FQPA Safety Factors	RfD, PAD, Level of Concern for Risk Assessment	Study and Toxicological Effects
Acute Dietary (General Population, including Infants and Children)	N/A	N/A	N/A	**The risk assessment was not conducted**. The effects observed in an acute neurotoxicity study were seen at a very high dose (2000 mg/kg/day) that is considered not applicable to human exposure.
Acute Dietary (Females 13-49 years of age)	N/A	N/A	N/A	**No appropriate endpoint identified.**
Chronic Dietary (All Populations)	NOAEL = 5 mg/kg/day	UF_A = 10X UF_H = 10X FQPA SF = 1X	Chronic RfD = 0.05 mg/kg/day cPAD = 0.05 mg/kg/day	**Chronic toxicity – dogs** LOAEL = 50 mg/kg/day, based on decreased body weights (17%), body weight gains (68%), and food consumption in the females; adverse liver alterations; slight vacuolation of the zona reticularis and zona fasciculata in the adrenal gland (fatty change) in both sexes.
Cancer (oral, dermal, inhalation)	"Not Likely to be Carcinogenic to Humans"			
Short-term (1-30 days)	N/A	N/A Dermal	N/A	**The risk assessment was not conducted** 28-day dermal toxicity study – rats LOAEL = not determined, no systemic effect up to the limit dose of 1000 mg/kg/day.
Inhalation Short-term(1-30 days	NOAEL = 5mg/kg/day IAF=100%	UF_A = 10X UF_H = 10X FQPA SF = 1X	Residential LOC for MOE = 100	**90-day oral toxicity – dogs** LOAEL = 50 mg/kg/day, based on increased alkaline phosphatase activity and increased incidence/severity of hepatic vacuolation in both sexes.

B. Dietary Exposure and Risk

1. **Dietary Exposure from Food:** As to residues in food, EPA relied upon tolerance level residues and assumed 100% crop treated for all commodities for chronic exposures.

2. **Dietary Exposure from Water:** Chronic dietary drinking water was incorporated directly into the dietary assessment using the chronic concentration for surface water generated by the FIRST model. Modeled estimates of drinking water concentrations were directly entered into the dietary exposure model. For chronic dietary risk assessment, the water concentration value of 1.35×10^{-2} ppb was used to access the contribution to drinking water.

3. **Acute Aggregate Risk:** No acute dietary endpoint was identified, therefore, an acute dietary risk assessment was not conducted.

4. **Chronic Aggregate Risk:** The exposure to florasulam from food and water will utilize less than 1% of the cPAD for the general U.S. population and less than 1% of the cPAD for children 1-2 years old, the most highly exposed population subgroup. Therefore, the chronic aggregate risk associated with the proposed uses of florasulam is not of concern to the general U.S. population or any subgroup.

5. **Cancer Aggregate Risk:** There were no treatment-related tumors observed in carcinogenicity studies in rats and mice. As a result, a cancer assessment was not conducted. A summary of the chronic dietary exposure analyses are shown in Table 5 below:

Table 5 -- Summary of the Dietary Exposure and Risk to Florasulam

Population Subgroup	cPAD (mg/kg/day)	Exposure (mg/kg/day)	% cPAD
General U.S. Population	0.05	0.000024	<1
All Infants (< 1 year old)	0.05	0.000029	<1
Children 1-2 years old	0.05	0.000054	<1
Children 3-5 years old	0.05	0.000053	<1
Children 6-12 years old	0.05	0.000036	<1
Youth 13-19 years old	0.05	0.000022	<1
Adults 20-49 years old	0.05	0.000020	<1
Females 13-49 years old	0.05	0.000019	<1
Adults 50+ years old	0.05	0.000018	<1

6. **Cumulative Risk**: Section 408(b)(2)(D)(v) of the FFDCA requires that, when considering whether to establish, modify, or revoke a tolerance, the Agency consider "available information concerning the cumulative effects" of a particular pesticide's residues and "other substances that have a common mechanism of toxicity." Unlike other pesticides for which EPA has followed a cumulative risk approach based on a common mechanism of toxicity, EPA has not made a common mechanism of toxicity finding as to florasulam and any other substances, and florasulam does not appear to produce a toxic metabolite produced by other substances. For the purposes of this tolerance action, EPA has not assumed that florasulam has a common mechanism of toxicity with other substances. For information regarding EPA's efforts to determine which chemicals have a common mechanism of toxicity and to evaluate the cumulative effects of such chemicals, see the policy statements released by EPA's Office of Pesticide Programs concerning common mechanism determinations and procedures for cumulating effects from substances found to have a common mechanism on EPA's website at http://www.epa.gov/pesticides/cumulative.

B. Handler and Worker Risk Assessments

1. **Worker Exposure:** The quantitative exposure/risk assessment developed for handlers is based on the following exposure scenarios: mixing/loading liquid for groundboom; applying liquid for groundboom to wheat, barley, rye, oats, and triticale; mixing/loading liquid for aerial application; applying liquid for aerial application to wheat, barley, rye, oats, and triticale; and flagger. Based on the number of seasonal applications indicated on the product labels, handler exposures are expected to be short-term in duration.

2. **Risk to Applicators and Mixer Loaders:** There were no adverse systemic or dermal effects seen up to the limit dose tested (1,000 mg/kg/day) in the 28-day dermal toxicity study. Therefore, a quantitative risk assessment for the dermal exposure route was not conducted. All MOEs for inhalation exposures are greater than 100 and therefore below EPA's level of concern. A summary of occupational short-term occupational risks associated with the proposed uses of florasulam are presented in Table 6 below:

Table 6 -- Summary of Short-Term Occupational Exposure and Risk Estimates for Florasulam

Florasulam Scenario	**Mitigation**	**Inhalation Unit Exposure (mg/lb ai)**	**Application Rate (lb ai/A)**	**Acres Treated (A/Day)**	**Daily Dose [a] (mg/kg/day)**	**Inhalation MOE [b]**
Mixer/Loader						
Groundboom	Baseline	0.0012	0.00446	200	0.00001529	330,000
Aerial				1200	0.0000917	54,000
Applicator						
Groundboom	Baseline	0.00074	0.00446	200	0.0000094	530,000
Aerial	Eng. Cont. [c]	0.000068		1200	0.0000052	960,000
Flagger						
Aerial	Baseline	0.011	0.00446	350	0.000245	20,000

a. Inhalation Dose (mg/kg/day) =[Rate (lb ai/A) x UE (mg /lb ai) x Acres Treated (A/day)] / BW (70 kg)
b. Inhalation MOE = [Inhalation NOAEL (5 mg/kg/day)] / Inhalation Dose (mg/kg/day)

3. **Risk to Postapplication Handlers:** A dermal non-cancer agricultural postapplication exposure assessment was not conducted due to the absence of systemic toxicity in the dermal toxicity study. Postapplication inhalation exposures are expected to be minimal and less than the application exposures. As all scenarios are for outdoor agricultural uses, inhalation postapplication exposure is expected to be negligible.

4. **Residential Exposure:** Currently there are no proposed residential uses for florasulam.

V. ENVIRONMENTAL RISK ASSESSMENT

A. Environmental Fate Characterization: Florasulam is a very mobile compound that is not persistent in aerobic soil, rapidly degrading to the major degradate 5-OH-XDE-570, which is in turn more slowly biodegraded to other degradates and eventually to CO2 and bound residues. Florasulam is not significantly degraded by abiotic processes. It readily degrades in aquatic systems, where it is biotransformed to 5-OH-XDE-570, which is then slowly further biotransformed in some aerobic systems, but stable in other aerobic systems and in anaerobic systems. The degradate 5-OH-XDE-570 is more mobile in soil than the parent compound. Persistence or accumulation of the parent compound is not expected in the field based on laboratory soil studies and terrestrial field dissipation studies. The persistence and accumulation of 5-OH-XDE-570 is more variable than that of the parent, indicating it may persist at some sites, but not others. Submitted data indicate that the parent compound has a very low potential to bioaccumulate in aquatic organisms.

There is a potential for florasulam to reach surface water through spray drift and for both the parent compound and 5-OH-XDE-570 to reach surface water through runoff or subsurface flow, although this will be somewhat decreased for the parent due to its rapid biodegradation in aerobic soild. For 5-OH-XDE-570, the potential to reach surface water through runoff is greater than for the parent due to its slower biotransformation in aerobic soil and higher water solubility. For both compounds, the potential to reach surface water through runoff will be reduced by any leaching that occurs in the field.

Based on the results of laboratory and field studies, in which leaching was observed, both florasulam and 5-OH-XDE-570 have the potential to leach to groundwater. However, for the parent, the potential to leach downward and to reach groundwater will be somewhat reduced by the fairly rapid biotransformation of the parent in aerobic soil. For 5-OH-XDE-570, the potential to leach is greater than that of the parent due to its slower biotransformation in aerobic soil and higher water solubility. For either compound, both of which partition mainly to the water phase, the potential to leach will be greater when there is excessive rainfall or irrigation, particularly if either of these occur close to the time of application. These concerns have also been identified in the Canadian and EU risk assessments for florasulam.

To address concerns with the potential leaching of florasulam that may result in groundwater contamination, label language will be required in the form of ground water advisories. This label language is described in more detail in Section V of the memo.

B. Exposure Characterization: Florasulam is considered practically nontoxic on an acute exposure basis to aquatic and terrestrial wildlife. There was 40%, 60% and 100% mortality at the three highest treatment levels in the avian acute oral study. There were no mortalities at the 175, 292 or 486 mg/kg treatment levels, but sublethal effects were noted at all but the lowest dose tested. No effects were observed in the avian subacute dietary or avian reproduction studies. No effects were reported in the acute rat study. Sublethal effects on weight gain were observed in the two-generation rat reproduction study at the highest treatment level. Some mortality (<20%) was observed in the contact and oral bee studies at 100 ug/bee. No adverse effects attributable to florasulam were observed in the contact and oral bee studies at 100 ug/bee. No adverse effects attributable to florasulam were observed in acute and chronic studies with fish and aquatic invertebrates. As expected with an herbicide, effects were observed in both aquatic and terrestrial plant studies.

C. Potential Risks to Non-Target Organisms: The baseline risk assessment that indicates potential risk exists to terrestrial plants. The use of florasulam according to label direction should not result in direct acute or chronic effects to aquatic or terrestrial wildlife. Based on the submitted studies, the RQs for direct effects to aquatic vascular and nonvascular plants are also below the level of concern. Adverse effects on sensitive terrestrial plant species cannot be precluded at distances of greater than 900 feet from the edge of the field. Indirect effects to terrestrial or aquatic wildlife cannot be ruled out due to the potential for florasulam to effect changes in plant populations which may lead to changes in food supply or habitat.

The Agency's strategy to mitigate these risks involves label language that is intended to keep the pesticide on the intended treatment area, and therefore reducing the potential for exposure to non-target plants. For example, spray drift management language will be required on the labeling, which advises users of applicator responsibilities and offers specific techniques to reduce the possibility of spray drift.

VI. REGULATORY DECISION

A. Conditional Registration: A conditional registration is issued for florasulam for use as a selective herbicide for control of broadleaf weeds in wheat, barley, oats, rye and triticale.

1. Conditional Data: A seedling emergence study (850.4100) with the major degradate, 5-OH-XDE750 is required.

2. **Public Interest Finding:** A conditional registration under FIFRA Section 3(c)(7)(C) may be granted only if EPA determines that use of the pesticide during such period will not cause any unreasonable adverse effect on the environment, and that use of the pesticide is in the public interest.

B. Tolerances: Tolerances are established for residues of florasulam in or on barley, grain at 0.01 ppm, barley, hay at 0.05 ppm, barley straw at 0.05 ppm, oat, grain at 0.01 ppm, oat, forage at 0.05 ppm, oat, hay at 0.05 ppm, oat, straw at 0.05 ppm, rye, grain at 0.01 ppm, rye, forage at 0.05 ppm, rye, straw at 0.05 ppm, wheat, grain at 0.01 ppm, wheat, forage at 0.05 ppm, wheat, hay at 0.05 ppm, wheat, straw at 0.05 ppm.

C. Required Environmental Label Statements: End use products containing florasulam as an active ingredient will be required to add the following protective language on the product labeling:

1. **Environmental Hazards:** "Do not apply directly to water, or to areas where surface water is present, or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment washwater or rinsate."

2. **Ground Water Advisory:** "This chemical has properties and characteristics associated with chemicals detected in groundwater. The use of this chemical in areas where soils are permeable, particularly where the water table is shallow, may result in groundwater contamination."

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MRID	Citation Reference

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165-1 Confined rotational crop

MRID	Citation Reference
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171-4B Residue Analytical Methods

MRID	Citation Reference

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171-4C Magnitude of the Residue [by commodity]

MRID	Citation Reference
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171-4A1 Characterization of Total Terminal Residue

MRID	Citation Reference
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171-4A3 Nature of the Residue in Livestock

MRID	Citation Reference
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830.1550 Product Identity and composition

MRID	Citation Reference

46806501	Keeney, N. (2006) Group A - Product Identity, Composition, and Analysis for EF-1440, a Suspension Concentrate Manufacturing-Use Product Containing Florasulam. Project Number: NAFST/06/035, EU/AM/98/007. Unpublished study prepared by Dow AgroSciences LLC. 135 p.
46806601	Keeney, N. (2006) Group A - Product Identity, Composition, and Analysis for GF-184, a Suspension Emulsion End-Use Product Containing Florasulam and Fluroxypyr Meptyl. Project Number: NAFST/06/034, HDHE/C/00030, 10071. Unpublished study prepared by Dow AgroSciences LLC. 155 p.
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47166901	Qin, K.; Stock, M. (2007) Group A- Product Identity, Composition and Analysis for GF-1848, A Liquid End Use Product Containing Pyroxsulam, Florasulam, (Inert Ingredient) and Fluroxypyr-meptyl. Project Number: NAFST/07/064. Unpublished study prepared by Dow AgroSciences, LLC. 133 p.

830.1600 Description of materials used to produce the product

MRID	Citation Reference
46806501	Keeney, N. (2006) Group A - Product Identity, Composition, and Analysis for EF-1440, a Suspension Concentrate Manufacturing-Use Product Containing Florasulam. Project Number: NAFST/06/035, EU/AM/98/007. Unpublished study prepared by Dow AgroSciences LLC. 135 p.

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46806701 Heim, D. (2006) Group A - Product Identity, Composition, and Analysis for GF-1727, a Suspension Emulsion End-Use Product Containing Florasulam and MCPA 2-Ethylhexyl Ester. Project Number: NAFST/06/014, EU/AM/98/007. Unpublished study prepared by Dow Agrosciences LLC. 144 p.

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46827901 Heim, D. (2006) Group A: Product Identity and Composition, Description of Materials Used to Produce the Product, Description of the Production Process, Discussion of Formation of Impurities, Certified Limits, Prelimiary Analysis, and Enforcement Analytical Methods for Florasulam Technical. Project Number: NAFST/06/030. Unpublished study prepared by Dow AgroSciences LLC and Dow Chemical, USA. 417 p.

47166901 Qin, K.; Stock, M. (2007) Group A- Product Identity, Composition and Analysis for GF-1848, A Liquid End Use Product Containing Pyroxsulam, Florasulam, (Inert Ingredient) and Fluroxypyr-meptyl. Project Number: NAFST/07/064. Unpublished study prepared by Dow AgroSciences, LLC. 133 p.

830.1620 Description of production process

MRID	Citation Reference
46827901	Heim, D. (2006) Group A: Product Identity and Composition, Description of Materials Used to Produce the Product, Description of the Production Process, Discussion of Formation of Impurities, Certified Limits, Prelimiary Analysis, and Enforcement Analytical Methods for Florasulam Technical. Project Number: NAFST/06/030. Unpublished study prepared by Dow AgroSciences LLC and Dow Chemical, USA. 417 p.

830.1650 Description of formulation process

MRID	Citation Reference

46806501	Keeney, N. (2006) Group A - Product Identity, Composition, and Analysis for EF-1440, a Suspension Concentrate Manufacturing-Use Product Containing Florasulam. Project Number: NAFST/06/035, EU/AM/98/007. Unpublished study prepared by Dow AgroSciences LLC. 135 p.
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46806901	Keeney, N. (2006) Group A - Product Identity, Composition, and Analysis for EF-1383, a Suspension Emulsion End-use Product Containing Florasulam and 2,4-D 2-Ethylhexyl Ester. Project Number: NAFST/06/033, EU/AM/98/007, 99036/DA. Unpublished study prepared by Dow Agrosciences LLC. 140 p.
47166901	Qin, K.; Stock, M. (2007) Group A- Product Identity, Composition and Analysis for GF-1848, A Liquid End Use Product Containing Pyroxsulam, Florasulam, (Inert Ingredient) and Fluroxypyr-meptyl. Project Number: NAFST/07/064. Unpublished study prepared by Dow AgroSciences, LLC. 133 p.

830.1670 Discussion of formation of impurities

MRID	Citation Reference
46806501	Keeney, N. (2006) Group A - Product Identity, Composition, and Analysis for EF-1440, a Suspension Concentrate Manufacturing-Use Product Containing Florasulam. Project Number: NAFST/06/035, EU/AM/98/007. Unpublished study prepared by Dow AgroSciences LLC. 135 p.
46806601	Keeney, N. (2006) Group A - Product Identity, Composition, and Analysis for GF-184, a Suspension Emulsion End-Use Product Containing Florasulam and Fluroxypyr Meptyl. Project Number: NAFST/06/034, HDHE/C/00030, 10071. Unpublished study prepared by Dow AgroSciences LLC. 155 p.
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46806801	Keeney, N. (2006) Group A - Product Identity, Composition, and Analysis for EF-1343, a Suspension Concentrate End-Use Product Containing Florasulam. Project Number: NAFST/06/036, EU/AM/98/007, 99036/DA. Unpublished study prepared by Dow Agrosciences LLC. 136 p.
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46827901	Heim, D. (2006) Group A: Product Identity and Composition, Description of Materials Used to Produce the Product, Description of the Production Process, Discussion of Formation of Impurities, Certified Limits, Prelimiary Analysis, and Enforcement Analytical Methods for Florasulam Technical. Project Number: NAFST/06/030. Unpublished study prepared by Dow AgroSciences LLC and Dow Chemical, USA. 417 p.
47166901	Qin, K.; Stock, M. (2007) Group A- Product Identity, Composition and Analysis for GF-1848, A Liquid End Use Product Containing Pyroxsulam, Florasulam, (Inert Ingredient) and Fluroxypyr-meptyl. Project Number: NAFST/07/064. Unpublished study prepared by Dow AgroSciences, LLC. 133 p.

830.1700 Preliminary analysis

MRID	Citation Reference
46827901	Heim, D. (2006) Group A: Product Identity and Composition, Description of Materials Used to Produce the Product, Description of the Production Process, Discussion of Formation of Impurities, Certified Limits, Prelimiary Analysis, and Enforcement Analytical Methods for Florasulam Technical. Project Number: NAFST/06/030. Unpublished study prepared by Dow AgroSciences LLC and Dow Chemical, USA. 417 p.

830.1750 Certified limits

MRID	Citation Reference
46806501	Keeney, N. (2006) Group A - Product Identity, Composition, and Analysis for EF-1440, a Suspension Concentrate Manufacturing-Use Product Containing Florasulam. Project Number: NAFST/06/035, EU/AM/98/007. Unpublished study prepared by Dow AgroSciences LLC. 135 p.

46806601	Keeney, N. (2006) Group A - Product Identity, Composition, and Analysis for GF-184, a Suspension Emulsion End-Use Product Containing Florasulam and Fluroxypyr Meptyl. Project Number: NAFST/06/034, HDHE/C/00030, 10071. Unpublished study prepared by Dow AgroSciences LLC. 155 p.
46806701	Heim, D. (2006) Group A - Product Identity, Composition, and Analysis for GF-1727, a Suspension Emulsion End-Use Product Containing Florasulam and MCPA 2-Ethylhexyl Ester. Project Number: NAFST/06/014, EU/AM/98/007. Unpublished study prepared by Dow Agrosciences LLC. 144 p.
46806801	Keeney, N. (2006) Group A - Product Identity, Composition, and Analysis for EF-1343, a Suspension Concentrate End-Use Product Containing Florasulam. Project Number: NAFST/06/036, EU/AM/98/007, 99036/DA. Unpublished study prepared by Dow Agrosciences LLC. 136 p.
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47166901	Qin, K.; Stock, M. (2007) Group A- Product Identity, Composition and Analysis for GF-1848, A Liquid End Use Product Containing Pyroxsulam, Florasulam, (Inert Ingredient) and Fluroxypyr-meptyl. Project Number: NAFST/07/064. Unpublished study prepared by Dow AgroSciences, LLC. 133 p.

830.1800 Enforcement analytical method

MRID	Citation Reference
46806501	Keeney, N. (2006) Group A - Product Identity, Composition, and Analysis for EF-1440, a Suspension Concentrate Manufacturing-Use Product Containing Florasulam. Project Number: NAFST/06/035, EU/AM/98/007. Unpublished study prepared by Dow AgroSciences LLC. 135 p.
46806601	Keeney, N. (2006) Group A - Product Identity, Composition, and Analysis for GF-184, a Suspension Emulsion End-Use Product Containing Florasulam and Fluroxypyr Meptyl. Project Number: NAFST/06/034, HDHE/C/00030, 10071. Unpublished study prepared by Dow AgroSciences LLC. 155 p.
46806701	Heim, D. (2006) Group A - Product Identity, Composition, and Analysis for GF-

	1727, a Suspension Emulsion End-Use Product Containing Florasulam and MCPA 2-Ethylhexyl Ester. Project Number: NAFST/06/014, EU/AM/98/007. Unpublished study prepared by Dow Agrosciences LLC. 144 p.
46806801	Keeney, N. (2006) Group A - Product Identity, Composition, and Analysis for EF-1343, a Suspension Concentrate End-Use Product Containing Florasulam. Project Number: NAFST/06/036, EU/AM/98/007, 99036/DA. Unpublished study prepared by Dow Agrosciences LLC. 136 p.
46806901	Keeney, N. (2006) Group A - Product Identity, Composition, and Analysis for EF-1383, a Suspension Emulsion End-use Product Containing Florasulam and 2,4-D 2-Ethylhexyl Ester. Project Number: NAFST/06/033, EU/AM/98/007, 99036/DA. Unpublished study prepared by Dow Agrosciences LLC. 140 p.
46827901	Heim, D. (2006) Group A: Product Identity and Composition, Description of Materials Used to Produce the Product, Description of the Production Process, Discussion of Formation of Impurities, Certified Limits, Prelimiary Analysis, and Enforcement Analytical Methods for Florasulam Technical. Project Number: NAFST/06/030. Unpublished study prepared by Dow AgroSciences LLC and Dow Chemical, USA. 417 p.
47166901	Qin, K.; Stock, M. (2007) Group A- Product Identity, Composition and Analysis for GF-1848, A Liquid End Use Product Containing Pyroxsulam, Florasulam, (Inert Ingredient) and Fluroxypyr-meptyl. Project Number: NAFST/07/064. Unpublished study prepared by Dow AgroSciences, LLC. 133 p.

830.6302 Color

MRID	Citation Reference
46806602	Huntley, K. (2006) Group B: Physical and Chemical Properties of Florasulam + Fluroxypyr Methylheptyl Ester (2.5 + 144 G/L) SE, GF-184. Project Number: NAFST/06/020, GHE/P/10034, KLP/00/006. Unpublished study prepared by Dow AgroSciences LLC. 107 p.
46806702	Huntley, K. (2005) Determination of Color, Physical State, Odor, Oxidizing and Reducing Action, Flammability, Explodability, pH, Viscosity and Density of GF-1727, an End-Use Product Containing Florasulam and MCPA 2-EHE. Project Number: FAPC/052/011. Unpublished study prepared by Dow Agrosciences LLC. 18 p.
46806802	Huntley, K. (2006) Gropu B: Physical and Chemical Properties of XDE-570 50 G/L SC Herbicide, ED-1343. Project Number: NAFST/06/018, GHE/P/7916, KLP/97/005. Unpublished study prepared by Dow AgroSciences LLC. 77 p.
46806902	Huntley, K. (2006) Group B: Physical and Chemical Properties of DE-570 + 2,4-D 2-Ethylhexyl Ester 6.25 + 300 (AE) G/L SE Herbicide, EF-1383. Project

	Number: NAFST/06/021, DOS391/042115, DOS/391. Unpublished study prepared by Dow Agrosciences LLC. 171 p.
46808002	Huntley, K. (2006) Group B: Physical and Chemical Properties of Florasulam Technical. Project Number: NAFST/06/024, 96/DES396/0863, 93030/CL. Unpublished study prepared by Dow AgroSciences LLC. 318 p.
47166902	Stock, M. (2007) Group B- Physical/Chemical Properties for GF-1848, A Liquid End Use Product Containing Pyroxsulam, Florasulam, (Inert Ingredient) and Fluroxypyr-meptyl. Project Number: NAFST/07/054. Unpublished study prepared by Dow AgroSciences, LLC. 5 p.

830.6303 Physical state

MRID	Citation Reference
46806602	Huntley, K. (2006) Group B: Physical and Chemical Properties of Florasulam + Fluroxypyr Methylheptyl Ester (2.5 + 144 G/L) SE, GF-184. Project Number: NAFST/06/020, GHE/P/10034, KLP/00/006. Unpublished study prepared by Dow AgroSciences LLC. 107 p.
46806702	Huntley, K. (2005) Determination of Color, Physical State, Odor, Oxidizing and Reducing Action, Flammability, Explodability, pH, Viscosity and Density of GF-1727, an End-Use Product Containing Florasulam and MCPA 2-EHE. Project Number: FAPC/052/011. Unpublished study prepared by Dow Agrosciences LLC. 18 p.
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46806902	Huntley, K. (2006) Group B: Physical and Chemical Properties of DE-570 + 2,4-D 2-Ethylhexyl Ester 6.25 + 300 (AE) G/L SE Herbicide, EF-1383. Project Number: NAFST/06/021, DOS391/042115, DOS/391. Unpublished study prepared by Dow Agrosciences LLC. 171 p.
46808002	Huntley, K. (2006) Group B: Physical and Chemical Properties of Florasulam Technical. Project Number: NAFST/06/024, 96/DES396/0863, 93030/CL. Unpublished study prepared by Dow AgroSciences LLC. 318 p.
47166902	Stock, M. (2007) Group B- Physical/Chemical Properties for GF-1848, A Liquid End Use Product Containing Pyroxsulam, Florasulam, (Inert Ingredient) and Fluroxypyr-meptyl. Project Number: NAFST/07/054. Unpublished study prepared by Dow AgroSciences, LLC. 5 p.

830.6304 Odor

MRID	Citation Reference
46806502	Huntley, K. (2006) Group B: Physical and Chemical Properties of EF-1440, a Liquid Manufacturing Concentrate Containing DE-570. Project Number: NAFST/06/023, KLP/98/003, GHE/P/7913. Unpublished study prepared by Dow AgroSciences LLC. 45 p.
46806602	Huntley, K. (2006) Group B: Physical and Chemical Properties of Florasulam + Fluroxypyr Methylheptyl Ester (2.5 + 144 G/L) SE, GF-184. Project Number: NAFST/06/020, GHE/P/10034, KLP/00/006. Unpublished study prepared by Dow AgroSciences LLC. 107 p.
46806702	Huntley, K. (2005) Determination of Color, Physical State, Odor, Oxidizing and Reducing Action, Flammability, Explodability, pH, Viscosity and Density of GF-1727, an End-Use Product Containing Florasulam and MCPA 2-EHE. Project Number: FAPC/052/011. Unpublished study prepared by Dow Agrosciences LLC. 18 p.
46806902	Huntley, K. (2006) Group B: Physical and Chemical Properties of DE-570 + 2,4-D 2-Ethylhexyl Ester 6.25 + 300 (AE) G/L SE Herbicide, EF-1383. Project Number: NAFST/06/021, DOS391/042115, DOS/391. Unpublished study prepared by Dow Agrosciences LLC. 171 p.
46808002	Huntley, K. (2006) Group B: Physical and Chemical Properties of Florasulam Technical. Project Number: NAFST/06/024, 96/DES396/0863, 93030/CL. Unpublished study prepared by Dow AgroSciences LLC. 318 p.
47166902	Stock, M. (2007) Group B- Physical/Chemical Properties for GF-1848, A Liquid End Use Product Containing Pyroxsulam, Florasulam, (Inert Ingredient) and Fluroxypyr-meptyl. Project Number: NAFST/07/054. Unpublished study prepared by Dow AgroSciences, LLC. 5 p.

830.6313 Stability to sunlight, normal and elevated temperatures, metals, and metal ions

MRID	Citation Reference
46808002	Huntley, K. (2006) Group B: Physical and Chemical Properties of Florasulam Technical. Project Number: NAFST/06/024, 96/DES396/0863, 93030/CL. Unpublished study prepared by Dow AgroSciences LLC. 318 p.

830.6314 Oxidizing or reducing action

MRID	Citation Reference

46806502	Huntley, K. (2006) Group B: Physical and Chemical Properties of EF-1440, a Liquid Manufacturing Concentrate Containing DE-570. Project Number: NAFST/06/023, KLP/98/003, GHE/P/7913. Unpublished study prepared by Dow AgroSciences LLC. 45 p.
46806602	Huntley, K. (2006) Group B: Physical and Chemical Properties of Florasulam + Fluroxypyr Methylheptyl Ester (2.5 + 144 G/L) SE, GF-184. Project Number: NAFST/06/020, GHE/P/10034, KLP/00/006. Unpublished study prepared by Dow AgroSciences LLC. 107 p.
46806702	Huntley, K. (2005) Determination of Color, Physical State, Odor, Oxidizing and Reducing Action, Flammability, Explodability, pH, Viscosity and Density of GF-1727, an End-Use Product Containing Florasulam and MCPA 2-EHE. Project Number: FAPC/052/011. Unpublished study prepared by Dow Agrosciences LLC. 18 p.
46806802	Huntley, K. (2006) Gropu B: Physical and Chemical Properties of XDE-570 50 G/L SC Herbicide, ED-1343. Project Number: NAFST/06/018, GHE/P/7916, KLP/97/005. Unpublished study prepared by Dow AgroSciences LLC. 77 p.
46806902	Huntley, K. (2006) Group B: Physical and Chemical Properties of DE-570 + 2,4-D 2-Ethylhexyl Ester 6.25 + 300 (AE) G/L SE Herbicide, EF-1383. Project Number: NAFST/06/021, DOS391/042115, DOS/391. Unpublished study prepared by Dow Agrosciences LLC. 171 p.
47166902	Stock, M. (2007) Group B- Physical/Chemical Properties for GF-1848, A Liquid End Use Product Containing Pyroxsulam, Florasulam, (Inert Ingredient) and Fluroxypyr-meptyl. Project Number: NAFST/07/054. Unpublished study prepared by Dow AgroSciences, LLC. 5 p.

830.6315 Flammability

MRID	Citation Reference
46806502	Huntley, K. (2006) Group B: Physical and Chemical Properties of EF-1440, a Liquid Manufacturing Concentrate Containing DE-570. Project Number: NAFST/06/023, KLP/98/003, GHE/P/7913. Unpublished study prepared by Dow AgroSciences LLC. 45 p.
46806602	Huntley, K. (2006) Group B: Physical and Chemical Properties of Florasulam + Fluroxypyr Methylheptyl Ester (2.5 + 144 G/L) SE, GF-184. Project Number: NAFST/06/020, GHE/P/10034, KLP/00/006. Unpublished study prepared by Dow AgroSciences LLC. 107 p.
46806702	Huntley, K. (2005) Determination of Color, Physical State, Odor, Oxidizing and Reducing Action, Flammability, Explodability, pH, Viscosity and Density of

	GF-1727, an End-Use Product Containing Florasulam and MCPA 2-EHE. Project Number: FAPC/052/011. Unpublished study prepared by Dow Agrosciences LLC. 18 p.
46806802	Huntley, K. (2006) Gropu B: Physical and Chemical Properties of XDE-570 50 G/L SC Herbicide, ED-1343. Project Number: NAFST/06/018, GHE/P/7916, KLP/97/005. Unpublished study prepared by Dow AgroSciences LLC. 77 p.
46806902	Huntley, K. (2006) Group B: Physical and Chemical Properties of DE-570 + 2,4-D 2-Ethylhexyl Ester 6.25 + 300 (AE) G/L SE Herbicide, EF-1383. Project Number: NAFST/06/021, DOS391/042115, DOS/391. Unpublished study prepared by Dow Agrosciences LLC. 171 p.
47166902	Stock, M. (2007) Group B- Physical/Chemical Properties for GF-1848, A Liquid End Use Product Containing Pyroxsulam, Florasulam, (Inert Ingredient) and Fluroxypyr-meptyl. Project Number: NAFST/07/054. Unpublished study prepared by Dow AgroSciences, LLC. 5 p.

830.6316 Explodability

MRID	Citation Reference
46806502	Huntley, K. (2006) Group B: Physical and Chemical Properties of EF-1440, a Liquid Manufacturing Concentrate Containing DE-570. Project Number: NAFST/06/023, KLP/98/003, GHE/P/7913. Unpublished study prepared by Dow AgroSciences LLC. 45 p.
46806602	Huntley, K. (2006) Group B: Physical and Chemical Properties of Florasulam + Fluroxypyr Methylheptyl Ester (2.5 + 144 G/L) SE, GF-184. Project Number: NAFST/06/020, GHE/P/10034, KLP/00/006. Unpublished study prepared by Dow AgroSciences LLC. 107 p.
46806702	Huntley, K. (2005) Determination of Color, Physical State, Odor, Oxidizing and Reducing Action, Flammability, Explodability, pH, Viscosity and Density of GF-1727, an End-Use Product Containing Florasulam and MCPA 2-EHE. Project Number: FAPC/052/011. Unpublished study prepared by Dow Agrosciences LLC. 18 p.
46806802	Huntley, K. (2006) Gropu B: Physical and Chemical Properties of XDE-570 50 G/L SC Herbicide, ED-1343. Project Number: NAFST/06/018, GHE/P/7916, KLP/97/005. Unpublished study prepared by Dow AgroSciences LLC. 77 p.
46806902	Huntley, K. (2006) Group B: Physical and Chemical Properties of DE-570 + 2,4-D 2-Ethylhexyl Ester 6.25 + 300 (AE) G/L SE Herbicide, EF-1383. Project Number: NAFST/06/021, DOS391/042115, DOS/391. Unpublished study prepared by Dow Agrosciences LLC. 171 p.

830.6317 Storage stability of product

MRID	Citation Reference
46806502	Huntley, K. (2006) Group B: Physical and Chemical Properties of EF-1440, a Liquid Manufacturing Concentrate Containing DE-570. Project Number: NAFST/06/023, KLP/98/003, GHE/P/7913. Unpublished study prepared by Dow AgroSciences LLC. 45 p.
46806602	Huntley, K. (2006) Group B: Physical and Chemical Properties of Florasulam + Fluroxypyr Methylheptyl Ester (2.5 + 144 G/L) SE, GF-184. Project Number: NAFST/06/020, GHE/P/10034, KLP/00/006. Unpublished study prepared by Dow AgroSciences LLC. 107 p.
46806802	Huntley, K. (2006) Gropu B: Physical and Chemical Properties of XDE-570 50 G/L SC Herbicide, ED-1343. Project Number: NAFST/06/018, GHE/P/7916, KLP/97/005. Unpublished study prepared by Dow AgroSciences LLC. 77 p.
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46808006	Teasdale, R. (1999) The Stability of DE-570 in Wheat Under Frozen Storage Conditions Over 18 Months (Supplementary Report). Project Number: GHE/P/8203, ST96/001. Unpublished study prepared by Dow AgroSciences LLC. 196 p.

830.6320 Corrosion characteristics

MRID	Citation Reference
46806502	Huntley, K. (2006) Group B: Physical and Chemical Properties of EF-1440, a Liquid Manufacturing Concentrate Containing DE-570. Project Number: NAFST/06/023, KLP/98/003, GHE/P/7913. Unpublished study prepared by Dow AgroSciences LLC. 45 p.
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46806802	Huntley, K. (2006) Gropu B: Physical and Chemical Properties of XDE-570 50 G/L SC Herbicide, ED-1343. Project Number: NAFST/06/018, GHE/P/7916, KLP/97/005. Unpublished study prepared by Dow AgroSciences LLC. 77 p.

46806902	Huntley, K. (2006) Group B: Physical and Chemical Properties of DE-570 + 2,4-D 2-Ethylhexyl Ester 6.25 + 300 (AE) G/L SE Herbicide, EF-1383. Project Number: NAFST/06/021, DOS391/042115, DOS/391. Unpublished study prepared by Dow Agrosciences LLC. 171 p.

830.7000 pH of water solutions or suspensions

MRID	Citation Reference
46806502	Huntley, K. (2006) Group B: Physical and Chemical Properties of EF-1440, a Liquid Manufacturing Concentrate Containing DE-570. Project Number: NAFST/06/023, KLP/98/003, GHE/P/7913. Unpublished study prepared by Dow AgroSciences LLC. 45 p.
46806602	Huntley, K. (2006) Group B: Physical and Chemical Properties of Florasulam + Fluroxypyr Methylheptyl Ester (2.5 + 144 G/L) SE, GF-184. Project Number: NAFST/06/020, GHE/P/10034, KLP/00/006. Unpublished study prepared by Dow AgroSciences LLC. 107 p.
46806702	Huntley, K. (2005) Determination of Color, Physical State, Odor, Oxidizing and Reducing Action, Flammability, Explodability, pH, Viscosity and Density of GF-1727, an End-Use Product Containing Florasulam and MCPA 2-EHE. Project Number: FAPC/052/011. Unpublished study prepared by Dow Agrosciences LLC. 18 p.
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46806902	Huntley, K. (2006) Group B: Physical and Chemical Properties of DE-570 + 2,4-D 2-Ethylhexyl Ester 6.25 + 300 (AE) G/L SE Herbicide, EF-1383. Project Number: NAFST/06/021, DOS391/042115, DOS/391. Unpublished study prepared by Dow Agrosciences LLC. 171 p.
46808002	Huntley, K. (2006) Group B: Physical and Chemical Properties of Florasulam Technical. Project Number: NAFST/06/024, 96/DES396/0863, 93030/CL. Unpublished study prepared by Dow AgroSciences LLC. 318 p.
47166902	Stock, M. (2007) Group B- Physical/Chemical Properties for GF-1848, A Liquid End Use Product Containing Pyroxsulam, Florasulam, (Inert Ingredient) and Fluroxypyr-meptyl. Project Number: NAFST/07/054. Unpublished study prepared by Dow AgroSciences, LLC. 5 p.

830.7100 Viscosity

MRID	Citation Reference

46806502	Huntley, K. (2006) Group B: Physical and Chemical Properties of EF-1440, a Liquid Manufacturing Concentrate Containing DE-570. Project Number: NAFST/06/023, KLP/98/003, GHE/P/7913. Unpublished study prepared by Dow AgroSciences LLC. 45 p.
46806602	Huntley, K. (2006) Group B: Physical and Chemical Properties of Florasulam + Fluroxypyr Methylheptyl Ester (2.5 + 144 G/L) SE, GF-184. Project Number: NAFST/06/020, GHE/P/10034, KLP/00/006. Unpublished study prepared by Dow AgroSciences LLC. 107 p.
46806702	Huntley, K. (2005) Determination of Color, Physical State, Odor, Oxidizing and Reducing Action, Flammability, Explodability, pH, Viscosity and Density of GF-1727, an End-Use Product Containing Florasulam and MCPA 2-EHE. Project Number: FAPC/052/011. Unpublished study prepared by Dow Agrosciences LLC. 18 p.
46806802	Huntley, K. (2006) Gropu B: Physical and Chemical Properties of XDE-570 50 G/L SC Herbicide, ED-1343. Project Number: NAFST/06/018, GHE/P/7916, KLP/97/005. Unpublished study prepared by Dow AgroSciences LLC. 77 p.
46806902	Huntley, K. (2006) Group B: Physical and Chemical Properties of DE-570 + 2,4-D 2-Ethylhexyl Ester 6.25 + 300 (AE) G/L SE Herbicide, EF-1383. Project Number: NAFST/06/021, DOS391/042115, DOS/391. Unpublished study prepared by Dow Agrosciences LLC. 171 p.
47166902	Stock, M. (2007) Group B- Physical/Chemical Properties for GF-1848, A Liquid End Use Product Containing Pyroxsulam, Florasulam, (Inert Ingredient) and Fluroxypyr-meptyl. Project Number: NAFST/07/054. Unpublished study prepared by Dow AgroSciences, LLC. 5 p.

830.7200 Melting point/melting range

MRID	Citation Reference
46808002	Huntley, K. (2006) Group B: Physical and Chemical Properties of Florasulam Technical. Project Number: NAFST/06/024, 96/DES396/0863, 93030/CL. Unpublished study prepared by Dow AgroSciences LLC. 318 p.

830.7300 Density/relative density

MRID	Citation Reference
46806502	Huntley, K. (2006) Group B: Physical and Chemical Properties of EF-1440, a

	Liquid Manufacturing Concentrate Containing DE-570. Project Number: NAFST/06/023, KLP/98/003, GHE/P/7913. Unpublished study prepared by Dow AgroSciences LLC. 45 p.
46806602	Huntley, K. (2006) Group B: Physical and Chemical Properties of Florasulam + Fluroxypyr Methylheptyl Ester (2.5 + 144 G/L) SE, GF-184. Project Number: NAFST/06/020, GHE/P/10034, KLP/00/006. Unpublished study prepared by Dow AgroSciences LLC. 107 p.
46806702	Huntley, K. (2005) Determination of Color, Physical State, Odor, Oxidizing and Reducing Action, Flammability, Explodability, pH, Viscosity and Density of GF-1727, an End-Use Product Containing Florasulam and MCPA 2-EHE. Project Number: FAPC/052/011. Unpublished study prepared by Dow Agrosciences LLC. 18 p.
46806802	Huntley, K. (2006) Gropu B: Physical and Chemical Properties of XDE-570 50 G/L SC Herbicide, ED-1343. Project Number: NAFST/06/018, GHE/P/7916, KLP/97/005. Unpublished study prepared by Dow AgroSciences LLC. 77 p.
46806902	Huntley, K. (2006) Group B: Physical and Chemical Properties of DE-570 + 2,4-D 2-Ethylhexyl Ester 6.25 + 300 (AE) G/L SE Herbicide, EF-1383. Project Number: NAFST/06/021, DOS391/042115, DOS/391. Unpublished study prepared by Dow Agrosciences LLC. 171 p.
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830.7370 Dissociation constant in water

MRID	Citation Reference
46808002	Huntley, K. (2006) Group B: Physical and Chemical Properties of Florasulam Technical. Project Number: NAFST/06/024, 96/DES396/0863, 93030/CL. Unpublished study prepared by Dow AgroSciences LLC. 318 p.

830.7550 Partition coefficient (n-octanol/water), shake flask method

MRID	Citation Reference

46808002 Huntley, K. (2006) Group B: Physical and Chemical Properties of Florasulam Technical. Project Number: NAFST/06/024, 96/DES396/0863, 93030/CL. Unpublished study prepared by Dow AgroSciences LLC. 318 p.

830.7840 Water solubility: Column elution method, shake flask method

MRID	Citation Reference
46808002	Huntley, K. (2006) Group B: Physical and Chemical Properties of Florasulam Technical. Project Number: NAFST/06/024, 96/DES396/0863, 93030/CL. Unpublished study prepared by Dow AgroSciences LLC. 318 p.

830.7950 Vapor pressure

MRID	Citation Reference
46808002	Huntley, K. (2006) Group B: Physical and Chemical Properties of Florasulam Technical. Project Number: NAFST/06/024, 96/DES396/0863, 93030/CL. Unpublished study prepared by Dow AgroSciences LLC. 318 p.

850.1075 Fish acute toxicity test, freshwater and marine

MRID	Citation Reference
46808313	Jenkins, C. (1996) EF-1343: Acute Toxicity to Rainbow Trout: Final Report. Project Number: DES/345, 96/DES345/0351, MA130/DES345. Unpublished study prepared by Huntingdon Life Sciences, Ltd. 42 p.

850.1730 Fish BCF

MRID	Citation Reference
46808322	Rick, D.; Kirk, H.; Miller, J. (1997) The Bioconcentration of XDE-570 by the Rainbow Trout, Onchorhynchus mykiss Walbaum. Project Number: ES/3038. Unpublished study prepared by The Dow Chemical Co. 68 p.

850.4100 Terrestrial plant toxicity, Tier 1 (seeding emergence)

MRID	Citation Reference

46808323	Ehr, R.; Alexander, A. (1997) The Activity of DE-570 in Herbicide, Insecticide and Fungicide Screening Tests and the Herbicidal Activity of DE-570 Soil Metabolites. Project Number: RJE/TS/07/28/97. Unpublished study prepared by Dow Agrosciences LLC. 34 p.

850.4150 Terrestrial plant toxicity, Tier 1 (vegetative vigor)

MRID	Citation Reference
46808323	Ehr, R.; Alexander, A. (1997) The Activity of DE-570 in Herbicide, Insecticide and Fungicide Screening Tests and the Herbicidal Activity of DE-570 Soil Metabolites. Project Number: RJE/TS/07/28/97. Unpublished study prepared by Dow Agrosciences LLC. 34 p.

850.4225 Seedling emergence, Tier II

MRID	Citation Reference
46808324	Cordes, R. (1998) The Effects of DE-570 on the Emergence and Vegetative Vigor of Non-Target Terrestrial Plants (Tier II Study). Project Number: ENV98072. Unpublished study prepared by Dow Agrosciences LLC. 216 p.

850.4250 Vegetative vigor, Tier II

MRID	Citation Reference
46808324	Cordes, R. (1998) The Effects of DE-570 on the Emergence and Vegetative Vigor of Non-Target Terrestrial Plants (Tier II Study). Project Number: ENV98072. Unpublished study prepared by Dow Agrosciences LLC. 216 p.

860.1200 Directions for use

MRID	Citation Reference
46806805	Johnson, I. (1996) EF-1343 (XDE-570 50 SC): Acute Percutaneous Toxicity Study in the Rat. Project Number: DES/313, 95/DES313/0906. Unpublished study prepared by Huntingdon Life Sciences Ltd. 40 p.

860.1340 Residue analytical method

MRID	Citation Reference
46808007	Butcher, S.; Gibson, R.; Hastings, M.; et. al. (1996) Determination of XDE-570 Residues in Wheat and Barley. Project Number: RV95/004. Unpublished study prepared by Dowelanco Ltd. 28 p.
46808008	Butcher, S. (1996) Independent Validation of Dowelanco Analytical Method ERC 95.6 for the Determination of XDE-570 Residues in Wheat and Barley. Project Number: GHE/P/5036. Unpublished study prepared by Dowelanco Ltd. 61 p.
46808009	Ghosh, D.; Maycock, R.; Todd, M.; et. al. (1996) Determination of the Residues of XDE-570 and 5-Hydroxy XDE-570 in Soil Using Aqueous Extraction. Project Number: ERC/95/2. Unpublished study prepared by Dowelanco Ltd. 25 p.
46808010	Ghosh, D.; Maycock, R.; Todd, M.; et. al. (1996) Determination of Residues of XDE-570 and 5-Hydroxy XDE-570 in Soil Using Organic Extraction. Project Number: ERC/95/1. Unpublished study prepared by Dowelanco Ltd. 26 p.
46808011	Butcher, S.; Gibson, R. (1996) Determination of the Residues of XDE-570 and its 5-Hydroxy Metabolite in Surface Water. Project Number: RV96/014, ERC/96/15. Unpublished study prepared by Dowelanco Ltd. 24 p.
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46808013	Butcher, S.; Wright, D.; Bratby, B.; et. al. (1996) Determination of the Residues of XDE-570 and its 5-Hydroxy Metabolite in Soil Using Organic Extraction. Project Number: ERC/96/23. Unpublished study prepared by Dowelanco Ltd. 21 p.
46808014	Maycock, R.; Roberts, R.; Gibson, R. (1997) Determination of Bioavailable Residues of DE-570 in Soil Using a Magnetic Particle-Based Immunoassay Test Kit. Project Number: ERC/96/21, RV97/012. Unpublished study prepared by Dowelanco Ltd. 32 p.
46808015	Maycock, R.; Roberts, R.; Gibson, R. (1997) Validation of Analytical Method ERC 97.04 - Determination of Bioavailable Residues of DE-570 in Soil Using a Magnetic Particle-Based Immunoassay Test Kit. Project Number: GHE/P/6355. Unpublished study prepared by Dowelanco Ltd. 41 p.
46808016	Maycock, R.; Roberts, R. (1997) A Comparison of Three Analytical Methods (Immunochemical, LC/MS-MS and Bioassay) to Determine the Bioavailable Residues of DE-570 from Field Derived Soils. Project Number: GHE/P/6365. Unpublished study prepared by Dowelanco Ltd. 76 p.

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46808020	Eckert, J.; West, S. (1999) Independent Laboratory Validation of Method GRM 98.01 - Determination of DE-570 (Florasulam) in Cereal Crop Commodities: Forage and Immature Green; Grain, Hay and Immature Dried; and Straw by Capillary Gas Chromatography with Mass Selective Detection. Project Number: DOW/05/99. Unpublished study prepared by Enviro-Bio-Tech, Ltd. 75 p.

860.1360 Multiresidue method

MRID	Citation Reference
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860.1380 Storage stability data

MRID	Citation Reference
46808022	Bargar, E.; Jackson, R. (1999) A Re-Evaluation of DE-570 Residue Data in Immature Green Plants and Hay for Storage Correction Factors. Project Number: GH/C/4895. Unpublished study prepared by Dowelanco North American Environmental. 294 p.
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46827905	Gambie, A.; Teasdale, R. (1999) The Stability of DE-570 in Wheat Under Frozen Storage Conditions Over 18 Months (Final Report): Florasulam. Project Number: GHE/P/7904, ST96/001. Unpublished study prepared by Dowelanco Ltd. 30 p.

860.1400 Water, fish, and irrigated crops

MRID	Citation Reference
46808026	Roberts, R. (1993) Determination of XDE-570 Concentrations in Drinking Water Using Both LC/UV and Immunoassay Methods. Project Number: GHE/P/4774. Unpublished study prepared by Ohmicron, Inc. and CEM Analytical Services, Ltd. 67 p.
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860.1500 Crop field trials

MRID	Citation Reference
46808022	Bargar, E.; Jackson, R. (1999) A Re-Evaluation of DE-570 Residue Data in

Immature Green Plants and Hay for Storage Correction Factors. Project Number: GH/C/4895. Unpublished study prepared by Dowelanco North American Environmental. 294 p.

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46808034 Butcher, S.; Gibson, R. (1996) Residues of XDE-570 in Winter Barley at Intervals Following a Single or Double Application of EF-1343, Northern France - 1995. Project Number: GHE/P/4869, R95/017. Unpublished study prepared by Dowelanco Ltd and DowElanco SA. 45 p.

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870.1100 Acute oral toxicity

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870.1200 Acute dermal toxicity

MRID	Citation Reference
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870.1300 Acute inhalation toxicity

MRID	Citation Reference
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870.2400 Acute eye irritation

MRID	Citation Reference
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870.2500 Acute dermal irritation

MRID	Citation Reference
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870.2600 Skin sensitization

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870.3800 Reproduction and fertility effects

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870.7485 Metabolism and pharmacokinetics

MRID	Citation Reference

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850.7100 Data reporting for environmental chemistry methods

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