

**Appendix A: Occupational Handler Assumptions for Metam Sodium**

**Appendix A/Table A1: Sources of Exposure Data Used In The Occupational Metam Sodium Handler Exposure And Risk Calculations**

Exposure Scenario (Number)	Data Source	Standard Assumptions (8-hr work day)	Comments
Mixer/Loader Descriptors			
Mixing/Loading Liquid Formulations (1a through 1d)	PHED V1.1	<b>Chemigation:</b> 350 acres for agricultural crops; <b>Drip Irrigation:</b> 100 acres for agricultural crops; <b>Shank Injection:</b> rangefinder of 80 to 128 acres for all crops; <b>Rotary Tiller:</b> rangefinder of 80 to 128 acres for all crops;	<b>Baseline:</b> Hands, dermal, and inhalation = acceptable grades. Hands = 53 replicates; Dermal = 72 to 122 replicates; and Inhalation = 85 replicates. High confidence in hand, dermal, and inhalation data. No protection factor was needed to define the unit exposures. <b>PPE:</b> The same dermal data are used as for baseline coupled with a 50% protection factor to account for an additional layer of clothing. Hands = acceptable grades. Hands = 59 replicates. High confidence in hand data. A respirator protection factor of 10 is applied to estimate the use of a half-face negative pressure respirator or a powered air purifying respirator (dust/mist filtering and/or organic vapor-removing). <b>Engineering Controls:</b> Hands, dermal, and inhalation = acceptable grades. Hands = 31 replicates; Dermal = 16 to 22 replicates; and Inhalation = 27 replicates. High confidence in hand, dermal, and inhalation data. <b>Gloves were used coupled with engineering controls since empirical data without gloves were not available and back calculation of gloves to a no glove scenario is believed to give erroneously high estimates.</b>
Mixing/Loading Liquid Formulations (1e and 1f)	Sodium tetrathiocarbonat e study used as surrogate data Study # 770AA11	<b>Chemigation:</b> 350 acres for agricultural crops; <b>Drip Irrigation:</b> 100 acres for agricultural crops	<b>Engineering Controls:</b> Dermal = 9 replicates. <b>Mechanical transfer systems were utilized in the mixing/loading process.</b>
Applying Descriptors			
Applying Liquids with Shank Injection Equipment (using PHED groundboom data) (2)	PHED V1.1	Rangefinder of 80 to 128 acres for all crops	<b>Baseline:</b> Hand, dermal, and inhalation = acceptable grades. Hands = 29 replicates, dermal = 23 to 42 replicates, and inhalation = 22 replicates. High confidence in hand, dermal, and inhalation data. No protection factors were needed to define the unit exposure values. <b>PPE:</b> The same dermal data are used as for baseline coupled with a 50% protection factor to account for an additional layer of clothing. Hands = ABC grades. Hands = 21 replicates. Medium confidence in hand data. A respirator protection factor of 10 is applied to estimate the use of a half-face negative pressure respirator or a powered air purifying respirator (dust/mist filtering and/or organic vapor-removing). <b>Engineering Controls:</b> Hand and dermal = ABC grade. Inhalation = acceptable grades. Hands = 16 replicates; dermal = 20 to 31 replicates; and inhalation = 16 replicates. Medium confidence in the hand and dermal data. High confidence in inhalation data. No protection factor needed to define the unit exposure value. Protective gloves not used.

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Exposure Scenario (Number)	Data Source	Standard Assumptions (8-hr work day)	Comments
Applying Liquids with Rotary Tiller equipment (using PHED groundboom data) (3)	PHED V1.1	Rangefinder of 80 to 128 acres for all crops	<p><b>Baseline:</b> Hand, dermal, and inhalation = acceptable grades. Hands = 29 replicates, dermal = 23 to 42 replicates, and inhalation = 22 replicates. High confidence in hand, dermal, and inhalation data. No protection factors were needed to define the unit exposure values.</p> <p><b>PPE:</b> The same dermal data are used as for baseline coupled with a 50% protection factor to account for an additional layer of clothing. Hands = ABC grades. Hands = 21 replicates. Medium confidence in hand data. A respirator protection factor of 10 is applied to estimate the use of a half-face negative pressure respirator or a powered air purifying respirator (dust/mist filtering and/or organic vapor-removing).</p> <p><b>Engineering Controls:</b> Hand and dermal = ABC grade. Inhalation = acceptable grades. Hands = 16 replicates; dermal = 20 to 31 replicates; and inhalation = 16 replicates. Medium confidence in the hand and dermal data. High confidence in inhalation data. No protection factor needed to define the unit exposure value. Protective gloves not used.</p>
Loader/Applicator Descriptors			
Transferring Liquids from Tank Delivery Truck to Shank Injection Equipment and then applying them via Shank Injection Equipment (using PHED groundboom MLA open cab data) (4a)	PHED V1.1	Rangefinder of 80 to 128 acres for all crops	<p><b>Baseline:</b> Hands = ABC grades. Dermal and inhalation = AB grades. Hands = 29 replicates, dermal = 17 to 67 replicates, and inhalation = 26 replicates. Medium confidence in hand and dermal data. High confidence in inhalation data. No protection factors were needed to define the unit exposure values.</p> <p><b>PPE:</b> The same dermal data are used as for baseline coupled with a 50% protection factor to account for an additional layer of clothing. Hands = AB grades. Hands = 32 replicates. Medium confidence in hand data. A respirator protection factor of 10 is applied to estimate the use of a half-face negative pressure respirator or a powered air purifying respirator (dust/mist filtering and/or organic vapor-removing).</p>
Transferring Liquids from Tank Delivery Truck to Shank Injection Equipment and then applying them via Shank Injection Equipment (using PHED groundboom MLA closed cab data) (4b)	PHED V1.1	Rangefinder of 80 to 128 acres for all crops	<p><b>Baseline:</b> Hands = AB grades. Dermal and inhalation = ABC grades. Hands = 14 replicates, dermal = 17 to 387 replicates, and inhalation = 15 replicates. Low confidence in hand and dermal data. Medium confidence in inhalation data. No protection factors were needed to define the unit exposure values.</p> <p><b>PPE:</b> The same dermal data are used as for baseline coupled with a 50% protection factor to account for an additional layer of clothing. Hands = AB grades. Hands = 24 replicates. Medium confidence in hand data. A respirator protection factor of 10 is applied to estimate the use of a half-face negative pressure respirator or a powered air purifying respirator (dust/mist filtering and/or organic vapor-removing).</p>
Transferring Water Soluble Liquids from Tank Delivery Truck to Rotary Tiller Equipment and then applying them via Rotary Tiller Equipment (using PHED groundboom MLA with open cab) (5a)	PHED V1.1	Rangefinder of 80 to 128 acres for all crops	<p><b>Baseline:</b> Hands = ABC grades. Dermal and inhalation = AB grades. Hands = 29 replicates, dermal = 17 to 67 replicates, and inhalation = 26 replicates. Medium confidence in hand and dermal data. High confidence in inhalation data. No protection factors were needed to define the unit exposure values.</p> <p><b>PPE:</b> The same dermal data are used as for baseline coupled with a 50% protection factor to account for an additional layer of clothing. Hands = AB grades. Hands = 32 replicates. Medium confidence in hand data. A respirator protection factor of 10 is applied to estimate the use of a half-face negative pressure respirator or a powered air purifying respirator (dust/mist filtering and/or organic vapor-removing).</p>

**Appendix A/Table A1: Sources of Exposure Data Used In The Occupational Metam Sodium Handler Exposure And Risk Calculations**

Exposure Scenario (Number)	Data Source	Standard Assumptions (8-hr work day)	Comments
Transferring Water Soluble Liquids from Tank Delivery Truck to Rotary Tiller Equipment and then applying them via Rotary Tiller Equipment (using PHED groundboom MLA with closed cab) (5b)	PHED V1.1	Rangefinder of 80 to 128 acres for all crops	<b>Baseline:</b> Hands = AB grades. Dermal and inhalation = ABC grades. Hands = 14 replicates, dermal = 17 to 387 replicates, and inhalation = 15 replicates. Low confidence in hand and dermal data. Medium confidence in inhalation data. No protection factors were needed to define the unit exposure values.  <b>PPE:</b> The same dermal data are used as for baseline coupled with a 50% protection factor to account for an additional layer of clothing. Hands = AB grades. Hands = 24 replicates. Medium confidence in hand data. A respirator protection factor of 10 is applied to estimate the use of a half-face negative pressure respirator or a powered air purifying respirator (dust/mist filtering and/or organic vapor-removing).
Chemigation Monitor			
Monitoring Liquid Chemigation Applications (6)			No PHED general or Metam Sodium specific data.
Soil Seal Irrigator			
Sealing Soil with Irrigation Water Following Shank Injection Applications Using Liquid Formulations (7)			No PHED general or Metam Sodium specific data.
Mixing/Loading/Applying Descriptors			
Mixing/Loading/Applying Liquids with a Sprinkling Can (using ORETF hose-end data) (8)	ORETF Study (Oct 19, 2000) OMA 004	40 gallons for tobacco plant beds and 1,000 square feet for all other crops	<b>Baseline:</b> ORETF study OMA 004 exposure data based on 60 replicates for dermal, hands and inhalation.
Mixing/Loading/Applying Liquids with a Hose Proportioner (using ORETF LCO hand-gun data) (9)	ORETF Study (October 22, 2000) OMA 002	2 acres for turf and 1,000 square feet for all other crops	<b>Baseline:</b> Dermal data = B grade and 15 replicates. <b>The only empirical data available are based on the use of chemical-resistant gloves.</b> It is generally not appropriate to back-calculate a non-glove hand exposure levels, an extrapolation has been completed for this scenario (90 percent protection factor), however, because the empirical data indicate that hands are a minor contributor to overall exposure levels. Inhalation = B grade and 15 replicates. Moderate to high confidence in inhalation data.  <b>PPE:</b> Dermal data = 15 replicates and high confidence, grade B. A 50 percent protection factor was added to account for the use of an additional layer of clothing. Gloved hand = 60 replicates. Respiratory protection not required for this assessment.  <b>Engineering Controls:</b> Not considered feasible for this exposure scenario.

**Appendix A/Table A1: Sources of Exposure Data Used In The Occupational Metam Sodium Handler Exposure And Risk Calculations**

Exposure Scenario (Number)	Data Source	Standard Assumptions (8-hr work day)	Comments
Mixing/Loading/Applying Water Soluble Liquids via power sprayer (using ORETF LCO hand-gun data - occupational) (10)	ORETF Study (October 22, 2000) OMA 002	5 acres	<p><b>Baseline:</b> Dermal data = B grade and 15 replicates. <b>The only empirical data available are based on the use of chemical-resistant gloves.</b> It is generally not appropriate to back-calculate a non-glove hand exposure levels, an extrapolation has been completed for this scenario (90 percent protection factor), however, because the empirical data indicate that hands are a minor contributor to overall exposure levels. Inhalation = B grade and 15 replicates. Moderate to high confidence in inhalation data.</p> <p><b>PPE:</b> Dermal data = 15 replicates and high confidence, grade B. A 50 percent protection factor was added to account for the use of an additional layer of clothing. Gloved hand = 60 replicates. Respiratory protection not required for this assessment.</p> <p><b>Engineering Controls:</b> Not considered feasible for this exposure scenario.</p>
Mixing/Loading/Applying Liquids with a Cement Mixer (using PHED Mixer/Loader data for Open-pour Liquids) (11)	PHED V1.1	54 cubic feet (from Dichlobenil RED estimate: 2 cubic yards treated -- 27 cubic feet/cubic yard)	<p><b>Baseline:</b> Hands, dermal, and inhalation = acceptable grades. Hands = 53 replicates; Dermal = 72 to 122 replicates; and Inhalation = 85 replicates. High confidence in hand, dermal, and inhalation data. No protection factor was needed to define the unit exposures.</p> <p><b>PPE:</b> The same dermal data are used as for baseline coupled with a 50% protection factor to account for an additional layer of clothing. Hands = acceptable grades. Hands = 59 replicates. High confidence in hand data. A respirator protection factor of 5 is applied to estimate the use of a quarter-face respirator (dust/mist filtering only). A respirator protection factor of 10 is applied to estimate the use of a half-face negative pressure respirator or a powered air purifying respirator (dust/mist filtering and/or organic vapor-removing).</p> <p><b>Engineering Controls:</b> Not considered feasible for this exposure scenario.</p>
Mixing/Loading/Applying Liquids with a Shredder (using PHED Mixer/Loader data for Open-pour Liquids) (12)	PHED V1.1	54 cubic feet (from Dichlobenil RED estimate: 2 cubic yards treated -- 27 cubic feet/cubic yard)	<p><b>Baseline:</b> Hands, dermal, and inhalation = acceptable grades. Hands = 53 replicates; Dermal = 72 to 122 replicates; and Inhalation = 85 replicates. High confidence in hand, dermal, and inhalation data. No protection factor was needed to define the unit exposures.</p> <p><b>PPE:</b> The same dermal data are used as for baseline coupled with a 50% protection factor to account for an additional layer of clothing. Hands = acceptable grades. Hands = 59 replicates. High confidence in hand data. A respirator protection factor of 5 is applied to estimate the use of a quarter-face respirator (dust/mist filtering only). A respirator protection factor of 10 is applied to estimate the use of a half-face negative pressure respirator or a powered air purifying respirator (dust/mist filtering and/or organic vapor-removing).</p> <p><b>Engineering Controls:</b> Not considered feasible for this exposure scenario.</p>
Mixing/Loading/Applying Liquids with Foaming Equipment (13)	PHED V1.1	Rangefinder of 13,500 gallons to 27,000 gallons.	<p><b>Baseline:</b> Hands, dermal, and inhalation = acceptable grades. Hands = 53 replicates; Dermal = 72 to 122 replicates; and Inhalation = 85 replicates. High confidence in hand, dermal, and inhalation data. No protection factor was needed to define the unit exposures.</p> <p><b>PPE:</b> The same dermal data are used as for baseline coupled with a 50% protection factor to account for an additional layer of clothing. Hands = acceptable grades. Hands = 59 replicates. High confidence in hand data. A respirator protection factor of 5 is applied to estimate the use of a quarter-face respirator (dust/mist filtering only). A respirator protection factor of 10 is applied to estimate the use of a half-face negative pressure respirator or a powered air purifying respirator (dust/mist filtering and/or organic vapor-removing).</p> <p><b>Engineering Controls:</b> Not considered feasible for this exposure scenario.</p>

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Exposure Scenario (Number)	Data Source	Standard Assumptions (8-hr work day)	Comments
Mixing/Loading/Applying Liquids via Open Pour (using PHED Mixer/Loader data for Open-pour Liquids) (14)	PHED V1.1	1,000 square feet	<p><b>Baseline:</b> Hands, dermal, and inhalation = acceptable grades. Hands = 53 replicates; Dermal = 72 to 122 replicates; and Inhalation = 85 replicates. High confidence in hand, dermal, and inhalation data. No protection factor was needed to define the unit exposures.</p> <p><b>PPE:</b> The same dermal data are used as for baseline coupled with a 50% protection factor to account for an additional layer of clothing. Hands = acceptable grades. Hands = 59 replicates. High confidence in hand data. A respirator protection factor of 5 is applied to estimate the use of a quarter-face respirator (dust/mist filtering only). A respirator protection factor of 10 is applied to estimate the use of a half-face negative pressure respirator or a powered air purifying respirator (dust/mist filtering and/or organic vapor-removing).</p> <p><b>Engineering Controls:</b> Not considered feasible for this exposure scenario.</p>

- C All Standard Assumptions are based on an 8-hour work day as estimated by the Agency.
- C All handler exposure assessments in this document are based on the "Best Available" data as defined by the HED SOP for meeting Subdivision U Guidelines (i.e., completing exposure assessments). Best available grades are assigned to data as follows: matrices with A and B grade data (i.e., Acceptable Grade Data) and a minimum of 15 replicates; if not available, then grades A, B and C data and a minimum of 15 replicates; if not available, then all data regardless of the quality (i.e., All Grade Data) and number of replicates. High quality data with a protection factor take precedence over low quality data with no protection factor. Generic data confidence categories are assigned as follows:
  - High = grades A and B and 15 or more replicates per body part
  - Medium = grades A, B, and C and 15 or more replicates per body part
  - Low = grades A, B, C, D and E or any combination of grades with less than 15 replicates.
- C **PHED grading criteria do not reflect overall quality of the reliability of the assessment. Sources of the exposure factors should also be considered in the risk**

**Appendix B: Occupational Handler Non-cancer Exposures Risks for Metam Sodium**

**Appendix B/Table B1: Short-term Margins of Exposure For Metam Sodium Occupational Handler Risk Assessment at Baseline Mitigation**

Exposure Scenario	Crop or Target	Application Rate <sup>a</sup>	Area Treated Daily <sup>b</sup>	Baseline Dermal Unit Exposure (mg/lb ai)	Inhalation Unit Exposure (ug/lb ai)	Baseline Dermal Dose	Baseline Dermal MOE <sup>d</sup>	Baseline Inhalation Dose	Baseline Inhalation MOE <sup>e</sup>
Loader									
Transferring Liquids from Tank Delivery Truck to Shank Injection Equipment (mechanical transfer system) (1a)	small areas of ornamentals, food, fiber crops, seed beds, plant beds, lawns	523 lb ai/acre	5 acres	2.9	1.2	3.2	1.3	0.052	21
	small areas of ornamentals, food, fiber crops, seed beds, plant beds, lawns	523 lb ai/acre	0.5 acres	2.9	1.2	0.32	13.0	0.0052	210
	tobacco plant beds	412 lb ai/acre	40 acres	2.9	1.2	20	0.2	0.33	3
	tobacco plant beds	412 lb ai/acre	20 acres	2.9	1.2	10	0.4	0.16	7
	tobacco plant beds	387 lb ai/acre	40 acres	2.9	1.2	19	0.2	0.31	4
	tobacco plant beds	387 lb ai/acre	20 acres	2.9	1.2	9.4	0.5	0.15	7
	ornamentals, food and fiber crops, turf (sod farm)	338 lb ai/acre	128 acres	2.9	1.2	52	0.1	0.87	1
	ornamentals, food and fiber crops, turf (sod farm)	338 lb ai/acre	80 acres	2.9	1.2	33	0.1	0.54	2
	turf (golf course)	338 lb ai/acre	40 acres	2.9	1.2	16	0.3	0.27	4
	turf (golf course)	338 lb ai/acre	20 acres	2.9	1.2	8.2	0.5	0.14	8
	ornamentals, food and fiber crops, orchard (replant/transplant), turf (sod farm)	320 lb ai/acre	128 acres	2.9	1.2	49	0.1	0.82	1
	ornamentals, food and fiber crops, orchard (replant/transplant), turf (sod farm)	320 lb ai/acre	80 acres	2.9	1.2	31	0.1	0.51	2
	turf (golf course)	320 lb ai/acre	40 acres	2.9	1.2	15	0.3	0.26	4
	turf (golf course)	320 lb ai/acre	20 acres	2.9	1.2	7.7	0.6	0.13	9
	peanuts (CBR susceptible cultivators)	63.3 lb ai/acre	128 acres	2.9	1.2	9.8	0.4	0.16	7
	peanuts (CBR susceptible cultivators)	63.3 lb ai/acre	80 acres	2.9	1.2	6.1	0.7	0.1	11
	cotton, soybeans, sugar beets	38 lb ai/acre	128 acres	2.9	1.2	5.9	0.7	0.097	11
	cotton, soybeans, sugar beets	38 lb ai/acre	80 acres	2.9	1.2	3.7	1.1	0.061	18
	peanuts (CBR resistant cultivators)	32 lb ai/acre	128 acres	2.9	1.2	4.9	0.9	0.082	14
	peanuts (CBR resistant cultivators)	32 lb ai/acre	80 acres	2.9	1.2	3.1	1.4	0.051	22
	wheat, barley	31.7 lb ai/acre	128 acres	2.9	1.2	4.9	0.9	0.081	14
	wheat, barley	31.7 lb ai/acre	80 acres	2.9	1.2	3.1	1.4	0.051	22
Transferring Liquids from Tank Delivery Truck to Rotary Tiller Equipment (mechanical transfer system) (1b)	ornamentals, food and fiber crops, turf (sod farm)	338 lb ai/acre	128 acres	2.9	1.2	52	0.1	0.87	1
	ornamentals, food and fiber crops, turf (sod farm)	338 lb ai/acre	80 acres	2.9	1.2	33	0.1	0.54	2
	turf (golf course)	338 lb ai/acre	40 acres	2.9	1.2	16	0.3	0.27	4
	turf (golf course)	338 lb ai/acre	20 acres	2.9	1.2	8.2	0.5	0.14	8
	ornamentals, food and fiber crops, turf (sod farm)	320 lb ai/acre	128 acres	2.9	1.2	49	0.1	0.82	1
	ornamentals, food and fiber crops, turf (sod farm)	320 lb ai/acre	80 acres	2.9	1.2	31	0.1	0.51	2
	turf (golf course)	320 lb ai/acre	40 acres	2.9	1.2	15	0.3	0.26	4
Transferring Liquids from Tank Delivery Truck to Pick-up Truck and subsequent transfer to Sprinkler irrigation Nurse Tank (mechanical transfer system) (1c)	turf (golf course)	320 lb ai/acre	20 acres	2.9	1.2	7.7	0.6	0.13	9
	tobacco plant beds	412 lb ai/acre	40 acres	2.9	1.2	20	0.2	0.33	3
	tobacco plant beds	412 lb ai/acre	20 acres	2.9	1.2	10	0.4	0.16	7
	tobacco plant beds	387 lb ai/acre	40 acres	2.9	1.2	19	0.2	0.31	4
	tobacco plant beds	387 lb ai/acre	20 acres	2.9	1.2	9.4	0.5	0.15	7
	ornamentals, food and fiber crops, turf (sod farm)	338 lb ai/acre	350 acres	2.9	1.2	140	0.0	2.4	0
	ornamentals, food and fiber crops, turf (sod farm)	320 lb ai/acre	350 acres	2.9	1.2	140	0.0	2.2	1

## **Appendix B/Table B1: Short-term Margins of Exposure For Metam Sodium Occupational Handler Risk Assessment at Baseline Mitigation**

**Appendix B/Table B1: Short-term Margins of Exposure For Metam Sodium Occupational Handler Risk Assessment at Baseline Mitigation**

Exposure Scenario	Crop or Target	Application Rate <sup>a</sup>	Area Treated Daily <sup>b</sup>	Baseline Dermal Unit Exposure (mg/lb ai)	Inhalation Unit Exposure (ug/lb ai)	Baseline Dermal Dose	Baseline Dermal MOE <sup>d</sup>	Baseline Inhalation Dose	Baseline Inhalation MOE <sup>e</sup>
Applicator									
Applying Liquids via Shank Injection Equipment (using PHED groundboom data) (2)	small areas of ornamentals, food, fiber crops, seed beds, plant beds, lawns	523 lb ai/acre	5 acres	0.014	0.74	0.015	280.0	0.032	34
	small areas of ornamentals, food, fiber crops, seed beds, plant beds, lawns	523 lb ai/acre	0.5 acres	0.014	0.74	0.0015	2,800.0	0.0032	340
	tobacco plant beds	412 lb ai/acre	40 acres	0.014	0.74	0.096	44.0	0.2	6
	tobacco plant beds	412 lb ai/acre	20 acres	0.014	0.74	0.048	88.0	0.1	11
	tobacco plant beds	387 lb ai/acre	40 acres	0.014	0.74	0.09	47.0	0.19	6
	tobacco plant beds	387 lb ai/acre	20 acres	0.014	0.74	0.045	93.0	0.095	12
	ornamentals, food and fiber crops, turf (sod farm)	338 lb ai/acre	128 acres	0.014	0.74	0.25	17.0	0.53	2
	ornamentals, food and fiber crops, turf (sod farm)	338 lb ai/acre	80 acres	0.014	0.74	0.16	27.0	0.33	3
	turf (golf course)	338 lb ai/acre	40 acres	0.014	0.74	0.079	54.0	0.17	7
	turf (golf course)	338 lb ai/acre	20 acres	0.014	0.74	0.039	110.0	0.083	13
	ornamentals, food and fiber crops, orchard (replant/transplant), turf (sod farm)	320 lb ai/acre	128 acres	0.014	0.74	0.24	18.0	0.51	2
	ornamentals, food and fiber crops, orchard (replant/transplant), turf (sod farm)	320 lb ai/acre	80 acres	0.014	0.74	0.15	28.0	0.32	4
	turf (golf course)	320 lb ai/acre	40 acres	0.014	0.74	0.075	57.0	0.16	7
	turf (golf course)	320 lb ai/acre	20 acres	0.014	0.74	0.037	110.0	0.079	14
	peanuts (CBR susceptible cultivators)	63.3 lb ai/acre	128 acres	0.014	0.74	0.047	89.0	0.1	11
	peanuts (CBR susceptible cultivators)	63.3 lb ai/acre	80 acres	0.014	0.74	0.03	140.0	0.062	18
	cotton, soybeans, sugar beets	38 lb ai/acre	128 acres	0.014	0.74	0.028	150.0	0.06	19
	cotton, soybeans, sugar beets	38 lb ai/acre	80 acres	0.014	0.74	0.018	240.0	0.037	30
	peanuts (CBR resistant cultivators)	32 lb ai/acre	128 acres	0.014	0.74	0.024	180.0	0.051	22
	peanuts (CBR resistant cultivators)	32 lb ai/acre	80 acres	0.014	0.74	0.015	280.0	0.032	35
	wheat, barley	31.7 lb ai/acre	128 acres	0.014	0.74	0.024	180.0	0.05	22
	wheat, barley	31.7 lb ai/acre	80 acres	0.014	0.74	0.015	290.0	0.031	35
Applying Water Soluble Liquids via Rotary Tiller Equipment (using PHED groundboom data) (3)	ornamentals, food and fiber crops, turf (sod farm)	338 lb ai/acre	128 acres	0.014	0.74	0.25	17.0	0.53	2
	ornamentals, food and fiber crops, turf (sod farm)	338 lb ai/acre	80 acres	0.014	0.74	0.16	27.0	0.33	3
	turf (golf course)	338 lb ai/acre	40 acres	0.014	0.74	0.079	54.0	0.17	7
	turf (golf course)	338 lb ai/acre	20 acres	0.014	0.74	0.039	110.0	0.083	13
	ornamentals, food and fiber crops, turf (sod farm)	320 lb ai/acre	128 acres	0.014	0.74	0.24	18.0	0.51	2
	ornamentals, food and fiber crops, turf (sod farm)	320 lb ai/acre	80 acres	0.014	0.74	0.15	28.0	0.32	4
	turf (golf course)	320 lb ai/acre	40 acres	0.014	0.74	0.075	57.0	0.16	7
	turf (golf course)	320 lb ai/acre	20 acres	0.014	0.74	0.037	110.0	0.079	14

**Appendix B/Table B1: Short-term Margins of Exposure For Metam Sodium Occupational Handler Risk Assessment at Baseline Mitigation**

Exposure Scenario	Crop or Target	Application Rate <sup>a</sup>	Area Treated Daily <sup>b</sup>	Baseline Dermal Unit Exposure (mg/lb ai)	Inhalation Unit Exposure (ug/lb ai)	Baseline Dermal Dose	Baseline Dermal MOE <sup>d</sup>	Baseline Inhalation Dose	Baseline Inhalation MOE <sup>e</sup>
Loader/Applicator									
Transferring Liquids from Tank Delivery Truck to Shank Injection Equipment (mechanical transfer system) and then applying them via Shank Injection Equipment (using PHED groundboom MLA open cab data) (4a) <sup>d</sup>	small areas of ornamentals, food, fiber crops, seed beds, plant beds, lawns	523 lb ai/acre	5 acres	0.88	1.3	0.96	4.4	0.057	20
	small areas of ornamentals, food, fiber crops, seed beds, plant beds, lawns	523 lb ai/acre	0.5 acres	0.88	1.3	0.096	44.0	0.0057	200
	tobacco plant beds	412 lb ai/acre	40 acres	0.88	1.3	6	0.7	0.36	3
	tobacco plant beds	412 lb ai/acre	20 acres	0.88	1.3	3	1.4	0.18	6
	tobacco plant beds	387 lb ai/acre	40 acres	0.88	1.3	5.7	0.7	0.34	3
	tobacco plant beds	387 lb ai/acre	20 acres	0.88	1.3	2.8	1.5	0.17	7
	ornamentals, food and fiber crops, turf (sod farm)	338 lb ai/acre	128 acres	0.88	1.3	16	0.3	0.94	1
	ornamentals, food and fiber crops, turf (sod farm)	338 lb ai/acre	80 acres	0.88	1.3	9.9	0.4	0.59	2
	turf (golf course)	338 lb ai/acre	40 acres	0.88	1.3	5	0.9	0.29	4
	turf (golf course)	338 lb ai/acre	20 acres	0.88	1.3	2.5	1.7	0.15	8
	ornamentals, food and fiber crops, orchard (replant/transplant), turf (sod farm)	320 lb ai/acre	128 acres	0.88	1.3	15	0.3	0.89	1
	ornamentals, food and fiber crops, orchard (replant/transplant), turf (sod farm)	320 lb ai/acre	80 acres	0.88	1.3	9.4	0.5	0.55	2
	turf (golf course)	320 lb ai/acre	40 acres	0.88	1.3	4.7	0.9	0.28	4
	turf (golf course)	320 lb ai/acre	20 acres	0.88	1.3	2.3	1.8	0.14	8
	peanuts (CBR susceptible cultivators)	63.3 lb ai/acre	128 acres	0.88	1.3	3	1.4	0.18	6
	peanuts (CBR susceptible cultivators)	63.3 lb ai/acre	80 acres	0.88	1.3	1.9	2.3	0.11	10
	cotton, soybeans, sugar beets	38 lb ai/acre	128 acres	0.88	1.3	1.8	2.4	0.11	11
	cotton, soybeans, sugar beets	38 lb ai/acre	80 acres	0.88	1.3	1.1	3.8	0.066	17
	peanuts (CBR resistant cultivators)	32 lb ai/acre	128 acres	0.88	1.3	1.5	2.8	0.089	13
	peanuts (CBR resistant cultivators)	32 lb ai/acre	80 acres	0.88	1.3	0.94	4.5	0.055	20
	wheat, barley	31.7 lb ai/acre	128 acres	0.88	1.3	1.5	2.8	0.088	13
	wheat, barley	31.7 lb ai/acre	80 acres	0.88	1.3	0.93	4.5	0.055	20

**Appendix B/Table B1: Short-term Margins of Exposure For Metam Sodium Occupational Handler Risk Assessment at Baseline Mitigation**

Exposure Scenario	Crop or Target	Application Rate <sup>a</sup>	Area Treated Daily <sup>b</sup>	Baseline Dermal Unit Exposure (mg/lb ai)	Inhalation Unit Exposure (ug/lb ai)	Baseline Dermal Dose	Baseline Dermal MOE <sup>d</sup>	Baseline Inhalation Dose	Baseline Inhalation MOE <sup>e</sup>
Transferring Liquids from Tank Delivery Truck to Shank Injection Equipment (mechanical transfer system) and then applying them via Shank Injection Equipment (using PHED groundboom MLA with closed cab) (4b) <sup>d</sup>	small areas of ornamentals, food, fiber crops, seed beds, plant beds, lawns	523 lb ai/acre	5 acres	ND	ND	ND	ND	ND	ND
	small areas of ornamentals, food, fiber crops, seed beds, plant beds, lawns	523 lb ai/acre	0.5 acres	ND	ND	ND	ND	ND	ND
	tobacco plant beds	412 lb ai/acre	40 acres	ND	ND	ND	ND	ND	ND
	tobacco plant beds	412 lb ai/acre	20 acres	ND	ND	ND	ND	ND	ND
	tobacco plant beds	387 lb ai/acre	40 acres	ND	ND	ND	ND	ND	ND
	tobacco plant beds	387 lb ai/acre	20 acres	ND	ND	ND	ND	ND	ND
	ornamentals, food and fiber crops, turf (sod farm)	338 lb ai/acre	128 acres	ND	ND	ND	ND	ND	ND
	ornamentals, food and fiber crops, turf (sod farm)	338 lb ai/acre	80 acres	ND	ND	ND	ND	ND	ND
	turf (golf course)	338 lb ai/acre	40 acres	ND	ND	ND	ND	ND	ND
	turf (golf course)	338 lb ai/acre	20 acres	ND	ND	ND	ND	ND	ND
	ornamentals, food and fiber crops, orchard (replant/transplant), turf (sod farm)	320 lb ai/acre	128 acres	ND	ND	ND	ND	ND	ND
	ornamentals, food and fiber crops, orchard (replant/transplant), turf (sod farm)	320 lb ai/acre	80 acres	ND	ND	ND	ND	ND	ND
	turf (golf course)	320 lb ai/acre	40 acres	ND	ND	ND	ND	ND	ND
	turf (golf course)	320 lb ai/acre	20 acres	ND	ND	ND	ND	ND	ND
	peanuts (CBR susceptible cultivators)	63.3 lb ai/acre	128 acres	ND	ND	ND	ND	ND	ND
	peanuts (CBR susceptible cultivators)	63.3 lb ai/acre	80 acres	ND	ND	ND	ND	ND	ND
	cotton, soybeans, sugar beets	38 lb ai/acre	128 acres	ND	ND	ND	ND	ND	ND
	cotton, soybeans, sugar beets	38 lb ai/acre	80 acres	ND	ND	ND	ND	ND	ND
	peanuts (CBR resistant cultivators)	32 lb ai/acre	128 acres	ND	ND	ND	ND	ND	ND
	peanuts (CBR resistant cultivators)	32 lb ai/acre	80 acres	ND	ND	ND	ND	ND	ND
	wheat, barley	31.7 lb ai/acre	128 acres	ND	ND	ND	ND	ND	ND
	wheat, barley	31.7 lb ai/acre	80 acres	ND	ND	ND	ND	ND	ND
Transferring Water Soluble Liquids from Tank Delivery Truck to Rotary Tiller Equipment (mechanical transfer system) and then applying them via Rotary Tiller Equipment (using PHED groundboom MLA with open cab) (5a) <sup>d</sup>	ornamentals, food and fiber crops, turf (sod farm)	338 lb ai/acre	128 acres	0.88	1.3	16	0.3	0.94	1
	ornamentals, food and fiber crops, turf (sod farm)	338 lb ai/acre	80 acres	0.88	1.3	9.9	0.4	0.59	2
	turf (golf course)	338 lb ai/acre	40 acres	0.88	1.3	5	0.9	0.29	4
	turf (golf course)	338 lb ai/acre	20 acres	0.88	1.3	2.5	1.7	0.15	8
	ornamentals, food and fiber crops, turf (sod farm)	320 lb ai/acre	128 acres	0.88	1.3	15	0.3	0.89	1
	ornamentals, food and fiber crops, turf (sod farm)	320 lb ai/acre	80 acres	0.88	1.3	9.4	0.5	0.55	2
	turf (golf course)	320 lb ai/acre	40 acres	0.88	1.3	4.7	0.9	0.28	4
	turf (golf course)	320 lb ai/acre	20 acres	0.88	1.3	2.3	1.8	0.14	8

**Appendix B/Table B1: Short-term Margins of Exposure For Metam Sodium Occupational Handler Risk Assessment at Baseline Mitigation**

Exposure Scenario	Crop or Target	Application Rate <sup>a</sup>	Area Treated Daily <sup>b</sup>	Baseline Dermal Unit Exposure (mg/lb ai)	Inhalation Unit Exposure (ug/lb ai)	Baseline Dermal Dose	Baseline Dermal MOE <sup>d</sup>	Baseline Inhalation Dose	Baseline Inhalation MOE <sup>e</sup>
Transferring Liquids from Tank Delivery Truck to Rotary Tiller Equipment (mechanical transfer system) and then applying them via Rotary Tiller Equipment (using PHED groundboom MLA with closed cab) (5b) <sup>d</sup>	ornamentals, food and fiber crops, turf (sod farm)	338 lb ai/acre	128 acres	ND	ND	ND	ND	ND	ND
	ornamentals, food and fiber crops, turf (sod farm)	338 lb ai/acre	80 acres	ND	ND	ND	ND	ND	ND
	turf (golf course)	338 lb ai/acre	40 acres	ND	ND	ND	ND	ND	ND
	turf (golf course)	338 lb ai/acre	20 acres	ND	ND	ND	ND	ND	ND
	ornamentals, food and fiber crops, turf (sod farm)	320 lb ai/acre	128 acres	ND	ND	ND	ND	ND	ND
	ornamentals, food and fiber crops, turf (sod farm)	320 lb ai/acre	80 acres	ND	ND	ND	ND	ND	ND
	turf (golf course)	320 lb ai/acre	40 acres	ND	ND	ND	ND	ND	ND
	turf (golf course)	320 lb ai/acre	20 acres	ND	ND	ND	ND	ND	ND
Chemigation Monitor									
Monitoring Chemigation Applications Using Liquid Formulation (6)	No PHED general or Metam Sodium specific data available.								
Soil Seal Irrigator									
Sealing Soil with Irrigation Water Following Shank Injection Applications Using Liquid Formulations (7)	No PHED general or Metam Sodium specific data available.								
Mixer/Loader/Applicator									
Mixing/Loading/Applying Liquids via Sprinkling Can (using ORETF hose-end data - occupational) (8)	small areas of ornamentals, food, fiber crops, seed beds, plant beds, tobacco plant beds, lawns	12 lb ai/1000 sq ft	1000 sq ft	5.6	16	0.028	150.0	0.0032	350
	potting soil	4 lb ai/1000 sq ft	1000 sq ft	5.6	16	0.0093	450.0	0.0011	1,000
Mixing/Loading/Applying Water Soluble Liquids via hose-proportioner (using ORETF LCO hand-gun data - occupational) (9)	small areas of ornamentals, food, fiber crops, seed beds, plant beds, tobacco plant beds, lawns	350 lb ai/acre	5 acres	0.69	1.5	0.5	8.4	0.044	25
	small areas of ornamentals, food, fiber crops, seed beds, plant beds, tobacco plant beds, lawns	350 lb ai/acre	0.5 acres	0.69	1.5	0.05	84.0	0.0044	250
Mixing/Loading/Applying Water Soluble Liquids via power sprayer (using ORETF LCO hand-gun data - occupational) (10)	drained water bodies and shorelines	350 lb ai/acre	5 acres	0.69	1.5	0.5	8.4	0.044	25
Mixing/Loading/Applying Liquids via cement mixer (using PHED Mixer/Loader data for Open-pour Liquids) (11)	potting soil	0.012 lb ai/cu ft	54 cu ft	2.9	1.2	0.00078	5,400.0	0.000013	86,000

Appendix B/Table B1: Short-term Margins of Exposure For Metam Sodium Occupational Handler Risk Assessment at Baseline Mitigation									
Exposure Scenario	Crop or Target	Application Rate <sup>a</sup>	Area Treated Daily <sup>b</sup>	Baseline Dermal Unit Exposure (mg/lb ai)	Inhalation Unit Exposure (ug/lb ai)	Baseline Dermal Dose <sup>c</sup>	Baseline Dermal MOE <sup>d</sup>	Baseline Inhalation Dose	Baseline Inhalation MOE <sup>e</sup>
Mixing/Loading/Applying Liquids via shredder (using PHED Mixer/Loader data for Open-pour Liquids) (12)	potting soil	0.012 lb ai/cu ft	54 cu ft	2.9	1.2	0.00078	5,400.0	0.000013	86,000
Mixing/Loading/Applying Liquid with Foaming Equipment (using PHED Mixer/Loader data for Open-pour Liquids) (13)	sewer roots	0.212 lb ai/gal	1350 gallons	2.9	1.2	0.35	12.0	0.0057	190
	sewer roots	0.212 lb ai/gal	675 gallons	2.9	1.2	0.17	24.0	0.0029	390
Mixing/Loading/Applying Liquids via Open Pour (using PHED Mixer/Loader data for Open-pour Liquids) (14)	tree replanting	16 lb ai/1000 sq ft	1000 sq ft	2.9	1.2	0.019	220.0	0.00032	3,500

**Footnotes**

ND No Data

a Application rates are the maximum application rates determined from EPA registered labels for metam sodium.

b Amount handled per day values are EPA estimates of acreage treated or gallons applied based on Exposure SAC Policy #9 "Standard Values for Daily Acres Treated in Agriculture".

c Over estimate, PHED is open pour mixing/loading.

d Baseline Dermal MOE = NOAEL (4.22 mg/kg/day) / absorbed dermal daily dose (mg/kg/day), where absorbed dermal dose = daily unit exposure (mg/lb ai) x application rate x amount handled per day x dermal absorption factor (0.025) / body weight (60 kg adult).

e Baseline Inhalation MOE = NOAEL (1.11 mg/kg/day) / inhalation daily dose (mg/kg/day), where absorbed inhalation dose = daily unit exposure (ug/lb ai) x application rate x amount handled per day x conversion factor (1mg/1,000 ug / body weight (60 kg adult)).

**Appendix B/Table B2: Short-term Margins of Exposure For Metam Sodium Occupational Handler Risk Assessment at PPE Mitigation**

Exposure Scenario	Crop or Target	Application Rate <sup>a</sup>	Area Treated Daily <sup>b</sup>	PPE-G Dermal Unit Exposure (mg/lb ai)	PPE-G,DL Dermal Unit Exposure (mg/lb ai)	90% PPE-R Inhalation Unit Exposure (ug/lb ai)	PPE-G Dermal Dose	PPE-G Dermal MOE <sup>d</sup>	PPE-G,DL Dermal Dose	PPE-G,DL Dermal MOE <sup>d</sup>	90% PPE-R Inhalation Dose	90% PPE-R Inhalation MOE <sup>e</sup>
Loader												
Transferring Liquids from Tank Delivery Truck to Shank Injection Equipment (mechanical transfer system) (1a)	small areas of ornamentals, food, fiber crops, seed beds, plant beds, lawns	523 lb ai/acre	5 acres	0.023	0.017	0.12	0.025	170	0.019	230	0.0052	210
	small areas of ornamentals, food, fiber crops, seed beds, plant beds, lawns	523 lb ai/acre	0.5 acres	0.023	0.017	0.12	0.0025	1,700	0.0019	2,300	0.00052	2,100
	tobacco plant beds	412 lb ai/acre	40 acres	0.023	0.017	0.12	0.16	27	0.12	36	0.033	34
	tobacco plant beds	412 lb ai/acre	20 acres	0.023	0.017	0.12	0.079	53	0.058	72	0.016	67
	tobacco plant beds	387 lb ai/acre	40 acres	0.023	0.017	0.12	0.15	28	0.11	38	0.031	36
	tobacco plant beds	387 lb ai/acre	20 acres	0.023	0.017	0.12	0.074	57	0.055	77	0.015	72
	ornamentals, food and fiber crops, turf (sod farm)	338 lb ai/acre	128 acres	0.023	0.017	0.12	0.41	10	0.31	14	0.087	13
	ornamentals, food and fiber crops, turf (sod farm)	338 lb ai/acre	80 acres	0.023	0.017	0.12	0.26	16	0.19	22	0.054	21
	turf (golf course)	338 lb ai/acre	40 acres	0.023	0.017	0.12	0.13	33	0.096	44	0.027	41
	turf (golf course)	338 lb ai/acre	20 acres	0.023	0.017	0.12	0.065	65	0.048	88	0.014	82
	ornamentals, food and fiber crops, orchard (replant/transplant), turf (sod farm)	320 lb ai/acre	128 acres	0.023	0.017	0.12	0.39	11	0.29	15	0.082	14
	ornamentals, food and fiber crops, orchard (replant/transplant), turf (sod farm)	320 lb ai/acre	80 acres	0.023	0.017	0.12	0.25	17	0.18	23	0.051	22
	turf (golf course)	320 lb ai/acre	40 acres	0.023	0.017	0.12	0.12	34	0.091	47	0.026	43
	turf (golf course)	320 lb ai/acre	20 acres	0.023	0.017	0.12	0.061	69	0.045	93	0.013	87
	peanuts (CBR susceptible cultivators)	63.3 lb ai/acre	128 acres	0.023	0.017	0.12	0.078	54	0.057	74	0.016	68
	peanuts (CBR susceptible cultivators)	63.3 lb ai/acre	80 acres	0.023	0.017	0.12	0.049	87	0.036	120	0.01	110
	cotton, soybeans, sugar beets	38 lb ai/acre	128 acres	0.023	0.017	0.12	0.047	91	0.034	120	0.0097	110
	cotton, soybeans, sugar beets	38 lb ai/acre	80 acres	0.023	0.017	0.12	0.029	140	0.022	200	0.0061	180
	peanuts (CBR resistant cultivators)	32 lb ai/acre	128 acres	0.023	0.017	0.12	0.039	110	0.029	150	0.0082	140
	peanuts (CBR resistant cultivators)	32 lb ai/acre	80 acres	0.023	0.017	0.12	0.025	170	0.018	230	0.0051	220
	wheat, barley	31.7 lb ai/acre	128 acres	0.023	0.017	0.12	0.039	110	0.029	150	0.0081	140
	wheat, barley	31.7 lb ai/acre	80 acres	0.023	0.017	0.12	0.024	170	0.018	230	0.0051	220
Transferring Liquids from Tank Delivery Truck to Rotary Tiller Equipment (mechanical transfer system) (1b)	ornamentals, food and fiber crops, turf (sod farm)	338 lb ai/acre	128 acres	0.023	0.017	0.12	0.41	10	0.31	14	0.087	13
	ornamentals, food and fiber crops, turf (sod farm)	338 lb ai/acre	80 acres	0.023	0.017	0.12	0.26	16	0.19	22	0.054	21
	turf (golf course)	338 lb ai/acre	40 acres	0.023	0.017	0.12	0.13	33	0.096	44	0.027	41
	turf (golf course)	338 lb ai/acre	20 acres	0.023	0.017	0.12	0.065	65	0.048	88	0.014	82
	ornamentals, food and fiber crops, turf (sod farm)	320 lb ai/acre	128 acres	0.023	0.017	0.12	0.39	11	0.29	15	0.082	14
	ornamentals, food and fiber crops, turf (sod farm)	320 lb ai/acre	80 acres	0.023	0.017	0.12	0.25	17	0.18	23	0.051	22
	turf (golf course)	320 lb ai/acre	40 acres	0.023	0.017	0.12	0.12	34	0.091	47	0.026	43
Transferring Liquids from Tank Delivery Truck to Pick-up Truck and subsequent transfer to Sprinkler irrigation Nurse Tank (mechanical transfer system) (1c)	turf (golf course)	320 lb ai/acre	20 acres	0.023	0.017	0.12	0.061	69	0.045	93	0.013	87
	tobacco plant beds	412 lb ai/acre	40 acres	0.023	0.017	0.12	0.16	27	0.12	36	0.033	34
	tobacco plant beds	412 lb ai/acre	20 acres	0.023	0.017	0.12	0.079	53	0.058	72	0.016	67
	tobacco plant beds	387 lb ai/acre	40 acres	0.023	0.017	0.12	0.15	28	0.11	38	0.031	36
	tobacco plant beds	387 lb ai/acre	20 acres	0.023	0.017	0.12	0.074	57	0.055	77	0.015	72
	peanuts (CBR susceptible cultivators)	63.3 lb ai/acre	350 acres	0.023	0.017	0.12	1.1	4	0.84	5	0.24	5
	ornamentals, food and fiber crops, turf (sod farm)	320 lb ai/acre	350 acres	0.023	0.017	0.12	1.1	4	0.79	5	0.22	5
	peanuts (CBR susceptible cultivators)	63.3 lb ai/acre	350 acres	0.023	0.017	0.12	0.21	20	0.16	27	0.044	25

**Appendix B/Table B2: Short-term Margins of Exposure For Metam Sodium Occupational Handler Risk Assessment at PPE Mitigation**

**Appendix B/Table B2: Short-term Margins of Exposure For Metam Sodium Occupational Handler Risk Assessment at PPE Mitigation**

Exposure Scenario	Crop or Target	Application Rate <sup>a</sup>	Area Treated Daily <sup>b</sup>	PPE-G Dermal Unit Exposure (mg/lb ai)	PPE-G,DL Dermal Unit Exposure (mg/lb ai)	90% PPE-R Inhalation Unit Exposure (ug/lb ai)	PPE-G Dermal Dose	PPE-G Dermal MOE <sup>d</sup>	PPE-G,DL Dermal Dose	PPE-G,DL Dermal MOE <sup>d</sup>	90% PPE-R Inhalation Dose	90% PPE-R Inhalation MOE <sup>e</sup>
Applicator												
Applying Liquids via Shank Injection Equipment (using PHED groundboom data) (2)	small areas of ornamentals, food, fiber crops, seed beds, plant beds, lawns	523 lb ai/acre	5 acres	0.014	0.011	0.074	0.015	280	0.012	350	0.0032	340
	small areas of ornamentals, food, fiber crops, seed beds, plant beds, lawns	523 lb ai/acre	0.5 acres	0.014	0.011	0.074	0.0015	2,800	0.0012	3,500	0.00032	3,400
	tobacco plant beds	412 lb ai/acre	40 acres	0.014	0.011	0.074	0.096	44	0.076	56	0.02	55
	tobacco plant beds	412 lb ai/acre	20 acres	0.014	0.011	0.074	0.048	88	0.038	110	0.01	110
	tobacco plant beds	387 lb ai/acre	40 acres	0.014	0.011	0.074	0.09	47	0.071	59	0.019	58
	tobacco plant beds	387 lb ai/acre	20 acres	0.014	0.011	0.074	0.045	93	0.035	120	0.0095	120
	ornamentals, food and fiber crops, turf (sod farm)	338 lb ai/acre	128 acres	0.014	0.011	0.074	0.25	17	0.2	21	0.053	21
	ornamentals, food and fiber crops, turf (sod farm)	338 lb ai/acre	80 acres	0.014	0.011	0.074	0.16	27	0.12	34	0.033	33
	turf (golf course)	338 lb ai/acre	40 acres	0.014	0.011	0.074	0.079	54	0.062	68	0.017	67
	turf (golf course)	338 lb ai/acre	20 acres	0.014	0.011	0.074	0.039	110	0.031	140	0.0083	130
	ornamentals, food and fiber crops, orchard (replant/transplant), turf (sod farm)	320 lb ai/acre	128 acres	0.014	0.011	0.074	0.24	18	0.19	22	0.051	22
	ornamentals, food and fiber crops, orchard (replant/transplant), turf (sod farm)	320 lb ai/acre	80 acres	0.014	0.011	0.074	0.15	28	0.12	36	0.032	35
	turf (golf course)	320 lb ai/acre	40 acres	0.014	0.011	0.074	0.075	57	0.059	72	0.016	70
	turf (golf course)	320 lb ai/acre	20 acres	0.014	0.011	0.074	0.037	110	0.029	140	0.0079	140
	peanuts (CBR susceptible cultivators)	63.3 lb ai/acre	128 acres	0.014	0.011	0.074	0.047	89	0.037	110	0.01	110
	peanuts (CBR susceptible cultivators)	63.3 lb ai/acre	80 acres	0.014	0.011	0.074	0.03	140	0.023	180	0.0062	180
	cotton, soybeans, sugar beets	38 lb ai/acre	128 acres	0.014	0.011	0.074	0.028	150	0.022	190	0.006	190
	cotton, soybeans, sugar beets	38 lb ai/acre	80 acres	0.014	0.011	0.074	0.018	240	0.014	300	0.0037	300
	peanuts (CBR resistant cultivators)	32 lb ai/acre	128 acres	0.014	0.011	0.074	0.024	180	0.019	220	0.0051	220
	peanuts (CBR resistant cultivators)	32 lb ai/acre	80 acres	0.014	0.011	0.074	0.015	280	0.012	360	0.0032	350
	wheat, barley	31.7 lb ai/acre	128 acres	0.014	0.011	0.074	0.024	180	0.019	230	0.005	220
	wheat, barley	31.7 lb ai/acre	80 acres	0.014	0.011	0.074	0.015	290	0.012	360	0.0031	350
Applying Water Soluble Liquids via Rotary Tiller Equipment (using PHED groundboom data) (3)	ornamentals, food and fiber crops, turf (sod farm)	338 lb ai/acre	128 acres	0.014	0.011	0.074	0.25	17	0.2	21	0.053	21
	ornamentals, food and fiber crops, turf (sod farm)	338 lb ai/acre	80 acres	0.014	0.011	0.074	0.16	27	0.12	34	0.033	33
	turf (golf course)	338 lb ai/acre	40 acres	0.014	0.011	0.074	0.079	54	0.062	68	0.017	67
	turf (golf course)	338 lb ai/acre	20 acres	0.014	0.011	0.074	0.039	110	0.031	140	0.0083	130
	ornamentals, food and fiber crops, turf (sod farm)	320 lb ai/acre	128 acres	0.014	0.011	0.074	0.24	18	0.19	22	0.051	22
	ornamentals, food and fiber crops, turf (sod farm)	320 lb ai/acre	80 acres	0.014	0.011	0.074	0.15	28	0.12	36	0.032	35
	turf (golf course)	320 lb ai/acre	40 acres	0.014	0.011	0.074	0.075	57	0.059	72	0.016	70
	turf (golf course)	320 lb ai/acre	20 acres	0.014	0.011	0.074	0.037	110	0.029	140	0.0079	140

## **Appendix B/Table B2: Short-term Margins of Exposure For Metam Sodium Occupational Handler Risk Assessment at PPE Mitigation**

**Appendix B/Table B2: Short-term Margins of Exposure For Metam Sodium Occupational Handler Risk Assessment at PPE Mitigation**

**Appendix B/Table B2: Short-term Margins of Exposure For Metam Sodium Occupational Handler Risk Assessment at PPE Mitigation**

Exposure Scenario	Crop or Target	Application Rate <sup>a</sup>	Area Treated Daily <sup>b</sup>	PPE-G Dermal Unit Exposure (mg/lb ai)	PPE-G,DL Dermal Unit Exposure (mg/lb ai)	90% PPE-R Inhalation Unit Exposure (ug/lb ai)	PPE-G Dermal Dose	PPE-G Dermal MOE <sup>d</sup>	PPE-G,DL Dermal Dose	PPE-G,DL Dermal MOE <sup>d</sup>	90% PPE-R Inhalation Dose	90% PPE-R Inhalation MOE <sup>e</sup>
Applications Using Liquid Formulations (7)												
Mixer/Loader/Applicator												
Mixing>Loading/Applying Liquids via Sprinkling Can (using ORETF hose-end data - occupational) (8)												
Mixing>Loading/Applying Water Soluble Liquids via hose-proportioner (using ORETF LCO handgun data - occupational) (9)	small areas of ornamentals, food, fiber crops, seed beds, plant beds, tobacco plant beds, lawns	12 lb ai/1000 sq ft	1000 sq ft	ND	ND	ND	ND	ND	ND	ND	ND	ND
	potting soil	4 lb ai/1000 sq ft	1000 sq ft	ND	ND	ND	ND	ND	ND	ND	ND	ND
	small areas of ornamentals, food, fiber crops, seed beds, plant beds, tobacco plant beds, lawns	350 lb ai/acre	5 acres	0.48	0.25	0.15	0.35	12	0.18	23	0.0044	250
	small areas of ornamentals, food, fiber crops, seed beds, plant beds, tobacco plant beds, lawns	350 lb ai/acre	0.5 acres	0.48	0.25	0.15	0.035	120	0.018	230	0.00044	2,500

**Appendix B/Table B2: Short-term Margins of Exposure For Metam Sodium Occupational Handler Risk Assessment at PPE Mitigation**

Exposure Scenario	Crop or Target	Application Rate <sup>a</sup>	Area Treated Daily <sup>b</sup>	PPE-G Dermal Unit Exposure (mg/lb ai)	PPE-G,DL Dermal Unit Exposure (mg/lb ai)	90% PPE-R Inhalation Unit Exposure (ug/lb ai)	PPE-G Dermal Dose	PPE-G Dermal MOE <sup>d</sup>	PPE-G,DL Dermal Dose	PPE-G,DL Dermal MOE <sup>d</sup>	90% PPE-R Inhalation Dose	90% PPE-R Inhalation MOE <sup>e</sup>
Mixing>Loading/Applying Water Soluble Liquids via power sprayer (using ORETF LCO handgun data - occupational) (10)	drained water bodies and shorelines	350 lb ai/acre	5 acres	0.48	0.25	0.15	0.35	12	0.18	23	0.0044	250
Mixing>Loading/Applying Liquids via cement mixer (using PHED Mixer/Loader data for Open-pour Liquids) (11)	potting soil	0.012 lb ai/cu ft	54 cu ft	0.023	0.017	0.12	6.2e-06	680,000	4.6e-06	920,000	1.3e-06	860,000
Mixing>Loading/Applying Liquids via shredder (using PHED Mixer/Loader data for Open-pour Liquids) (12)	potting soil	0.012 lb ai/cu ft	54 cu ft	0.023	0.017	0.12	6.2e-06	680,000	4.6e-06	920,000	1.3e-06	860,000
Mixing>Loading/Applying Liquid with Foaming Equipment (using PHED Mixer/Loader data for Open-pour Liquids) (13)	sewer roots	0.212 lb ai/gal	1350 gallons	0.023	0.017	0.12	0.0027	1,500	0.002	2,100	0.00057	1,900
	sewer roots	0.212 lb ai/gal	675 gallons	0.023	0.017	0.12	0.0014	3,100	0.001	4,200	0.00029	3,900
Mixing>Loading/Applying Liquids via Open Pour (using PHED Mixer/Loader data for Open-pour Liquids) (14)	tree replanting	16 lb ai/1000 sq ft	1000 sq ft	0.023	0.017	0.12	1.5e-04	28,000	0.00011	37,000	0.000032	35,000

**Footnotes**

ND No Data

a Application rates are the maximum application rates determined from EPA registered labels for metam sodium.

b Amount handled per day values are EPA estimates of acreage treated or gallons applied based on Exposure SAC Policy #9 "Standard Values for Daily Acres Treated in Agriculture".

c Over estimate, PHED is open pour mixing/loading.

d PPE Dermal MOEs (Gloves and Gloves/Double Layers) = NOAEL (4.22 mg/kg/day) / absorbed dermal daily dose (mg/kg/day), where absorbed dermal dose = daily unit exposure (mg/lb ai) x application rate x amount handled per day x dermal absorption factor (0.025) / body weight (60 kg adult).

e 90 % PPE-R Inhalation MOE = NOAEL (1.11 mg/kg/day) / inhalation daily dose (mg/kg/day), where absorbed inhalation dose = daily unit exposure (ug/lb ai) x application rate x amount handled per day x conversion factor (1mg/1,000 ug / body weight (60 kg adult)).

**Appendix B/Table B3: Short-term Margins of Exposure For Metam Sodium Occupational Handler Risk Assessment at Engineering Controls Mitigation**

Exposure Scenario	Crop or Target	Application Rate <sup>a</sup>	Area Treated Daily <sup>b</sup>	Eng Con Dermal Unit Exposure (mg/lb ai)	Eng Con Inhalation Unit Exposure (ug/lb ai)	Eng Cont Dermal Dose	Eng Cont Dermal MOE <sup>d</sup>	Eng Cont Inhalation Dose	Eng Cont Inhalation MOE <sup>e</sup>
Loader									
Transferring Liquids from Tank Delivery Truck to Shank Injection Equipment (mechanical transfer system) (1a)	small areas of ornamentals, food, fiber crops, seed beds, plant beds, lawns	523 lb ai/acre	5 acres	0.0086	0.083	0.0094	450	0.0036	310
	small areas of ornamentals, food, fiber crops, seed beds, plant beds, lawns	523 lb ai/acre	0.5 acres	0.0086	0.083	0.00094	4,500	0.00036	3,100
	tobacco plant beds	412 lb ai/acre	40 acres	0.0086	0.083	0.059	71	0.023	49
	tobacco plant beds	412 lb ai/acre	20 acres	0.0086	0.083	0.03	140	0.011	97
	tobacco plant beds	387 lb ai/acre	40 acres	0.0086	0.083	0.055	76	0.021	52
	tobacco plant beds	387 lb ai/acre	20 acres	0.0086	0.083	0.028	150	0.011	100
	ornamentals, food and fiber crops, turf (sod farm)	338 lb ai/acre	128 acres	0.0086	0.083	0.16	27	0.06	19
	ornamentals, food and fiber crops, turf (sod farm)	338 lb ai/acre	80 acres	0.0086	0.083	0.097	44	0.037	30
	turf (golf course)	338 lb ai/acre	40 acres	0.0086	0.083	0.048	87	0.019	59
	turf (golf course)	338 lb ai/acre	20 acres	0.0086	0.083	0.024	170	0.0094	120
	ornamentals, food and fiber crops, orchard (replant/transplant), turf (sod farm)	320 lb ai/acre	128 acres	0.0086	0.083	0.15	29	0.057	20
	ornamentals, food and fiber crops, orchard (replant/transplant), turf (sod farm)	320 lb ai/acre	80 acres	0.0086	0.083	0.092	46	0.035	31
	turf (golf course)	320 lb ai/acre	40 acres	0.0086	0.083	0.046	92	0.018	63
	turf (golf course)	320 lb ai/acre	20 acres	0.0086	0.083	0.023	180	0.0089	130
	peanuts (CBR susceptible cultivators)	63.3 lb ai/acre	128 acres	0.0086	0.083	0.029	150	0.011	99
	peanuts (CBR susceptible cultivators)	63.3 lb ai/acre	80 acres	0.0086	0.083	0.018	230	0.007	160
	cotton, soybeans, sugar beets	38 lb ai/acre	128 acres	0.0086	0.083	0.017	240	0.0067	160
	cotton, soybeans, sugar beets	38 lb ai/acre	80 acres	0.0086	0.083	0.011	390	0.0042	260
	peanuts (CBR resistant cultivators)	32 lb ai/acre	128 acres	0.0086	0.083	0.015	290	0.0057	200
	peanuts (CBR resistant cultivators)	32 lb ai/acre	80 acres	0.0086	0.083	0.0092	460	0.0035	310
	wheat, barley	31.7 lb ai/acre	128 acres	0.0086	0.083	0.015	290	0.0056	200
	wheat, barley	31.7 lb ai/acre	80 acres	0.0086	0.083	0.0091	460	0.0035	320
Transferring Liquids from Tank Delivery Truck to Rotary Tiller Equipment (mechanical transfer system) (1b)	ornamentals, food and fiber crops, turf (sod farm)	338 lb ai/acre	128 acres	0.0086	0.083	0.16	27	0.06	19
	ornamentals, food and fiber crops, turf (sod farm)	338 lb ai/acre	80 acres	0.0086	0.083	0.097	44	0.037	30
	turf (golf course)	338 lb ai/acre	40 acres	0.0086	0.083	0.048	87	0.019	59
	turf (golf course)	338 lb ai/acre	20 acres	0.0086	0.083	0.024	170	0.0094	120
	ornamentals, food and fiber crops, turf (sod farm)	320 lb ai/acre	128 acres	0.0086	0.083	0.15	29	0.057	20
	ornamentals, food and fiber crops, turf (sod farm)	320 lb ai/acre	80 acres	0.0086	0.083	0.092	46	0.035	31
	turf (golf course)	320 lb ai/acre	40 acres	0.0086	0.083	0.046	92	0.018	63
	turf (golf course)	320 lb ai/acre	20 acres	0.0086	0.083	0.023	180	0.0089	130
Transferring Liquids from Tank Delivery Truck to Pick-up Truck and subsequent transfer to Sprinkler irrigation Nurse Tank (mechanical transfer system) (1c)	tobacco plant beds	412 lb ai/acre	40 acres	0.0086	0.083	0.059	71	0.023	49
	tobacco plant beds	412 lb ai/acre	20 acres	0.0086	0.083	0.03	140	0.011	97
	tobacco plant beds	387 lb ai/acre	40 acres	0.0086	0.083	0.055	76	0.021	52
	tobacco plant beds	387 lb ai/acre	20 acres	0.0086	0.083	0.028	150	0.011	100
	ornamentals, food and fiber crops, turf (sod farm)	338 lb ai/acre	350 acres	0.0086	0.083	0.42	10	0.16	7
	ornamentals, food and fiber crops, turf (sod farm)	320 lb ai/acre	350 acres	0.0086	0.083	0.4	11	0.15	7
	peanuts (CBR susceptible cultivators)	63.3 lb ai/acre	350 acres	0.0086	0.083	0.079	53	0.031	36

**Appendix B/Table B3: Short-term Margins of Exposure For Metam Sodium Occupational Handler Risk Assessment at Engineering Controls Mitigation**

Exposure Scenario	Crop or Target	Application Rate <sup>a</sup>	Area Treated Daily <sup>b</sup>	Eng Con Dermal Unit Exposure (mg/lb ai)	Eng Con Inhalation Unit Exposure (ug/lb ai)	Eng Cont Dermal Dose	Eng Cont Dermal MOE <sup>d</sup>	Eng Cont Inhalation Dose	Eng Cont Inhalation MOE <sup>e</sup>
	wheat, barley	31.7 lb ai/acre	350 acres	0.0086	0.083	0.04	110	0.015	72
	peanuts (CBR resistant cultivators)	32 lb ai/acre	350 acres	0.0086	0.083	0.04	110	0.015	72
Transferring Liquids from Tank Delivery Truck to Pick-up Truck and subsequent transfer to Drip Irrigation Nurse Tank (mechanical transfer system) (1d)	ornamentals, food and fiber crops, turf (sod farm)	320 lb ai/acre	100 acres	0.0086	0.083	0.11	37	0.044	25
	ornamentals, food and fiber crops, turf (sod farm)	239 lb ai/acre	100 acres	0.0086	0.083	0.086	49	0.033	34
	cotton, soybeans, sugar beets	38 lb ai/acre	100 acres	0.0086	0.083	0.014	310	0.0053	210
Loading Liquids to support Sprinkler Irrigation Applications (Sodium tetrathiocarbonate study used as surrogate data Study # 770AA11) (1e)	tobacco plant beds	412 lb ai/acre	40 acres	N/A	ND	0.011	390	ND	ND
	tobacco plant beds	412 lb ai/acre	20 acres	N/A	ND	0.0054	780	ND	ND
	tobacco plant beds	387 lb ai/acre	40 acres	N/A	ND	0.010	410	ND	ND
	tobacco plant beds	387 lb ai/acre	20 acres	N/A	ND	0.0051	830	ND	ND
	ornamentals, food and fiber crops, turf (sod farm)	338 lb ai/acre	350 acres	N/A	ND	0.078	54	ND	ND
	ornamentals, food and fiber crops, turf (sod farm)	320 lb ai/acre	350 acres	N/A	ND	0.074	57	ND	ND
	peanuts (CBR susceptible cultivators)	63.3 lb ai/acre	350 acres	N/A	ND	0.015	290	ND	ND
	wheat, barley	31.7 lb ai/acre	350 acres	N/A	ND	0.0074	570	ND	ND
	peanuts (CBR resistant cultivators)	32 lb ai/acre	350 acres	N/A	ND	0.0073	580	ND	ND
Loading Liquids to support Drip Irrigation Applications (Sodium tetrathiocarbonate study used as surrogate data Study # 770AA11) (1f)	ornamentals, food and fiber crops, turf (sod farm)	320 lb ai/acre	100 acres	N/A	ND	0.021	200	ND	ND
	ornamentals, food and fiber crops, turf (sod farm)	239 lb ai/acre	100 acres	N/A	ND	0.016	270	ND	ND
	cotton, soybeans, sugar beets	38 lb ai/acre	100 acres	N/A	ND	0.0025	1700	ND	ND

**Appendix B/Table B3: Short-term Margins of Exposure For Metam Sodium Occupational Handler Risk Assessment at Engineering Controls Mitigation**

Exposure Scenario	Crop or Target	Application Rate <sup>a</sup>	Area Treated Daily <sup>b</sup>	Eng Con Dermal Unit Exposure (mg/lb ai)	Eng Con Inhalation Unit Exposure (ug/lb ai)	Eng Cont Dermal Dose	Eng Cont Dermal MOE <sup>d</sup>	Eng Cont Inhalation Dose	Eng Cont Inhalation MOE <sup>e</sup>
Applicator									
Applying Liquids via Shank Injection Equipment (using PHED groundboom data) (2)	small areas of ornamentals, food, fiber crops, seed beds, plant beds, lawns	523 lb ai/acre	5 acres	0.005	0.043	0.0054	770	0.0019	590
	small areas of ornamentals, food, fiber crops, seed beds, plant beds, lawns	523 lb ai/acre	0.5 acres	0.005	0.043	0.00054	7,700	0.00019	5,900
	tobacco plant beds	412 lb ai/acre	40 acres	0.005	0.043	0.034	120	0.012	94
	tobacco plant beds	412 lb ai/acre	20 acres	0.005	0.043	0.017	250	0.0059	190
	tobacco plant beds	387 lb ai/acre	40 acres	0.005	0.043	0.032	130	0.011	100
	tobacco plant beds	387 lb ai/acre	20 acres	0.005	0.043	0.016	260	0.0055	200
	ornamentals, food and fiber crops, turf (sod farm)	338 lb ai/acre	128 acres	0.005	0.043	0.09	47	0.031	36
	ornamentals, food and fiber crops, turf (sod farm)	338 lb ai/acre	80 acres	0.005	0.043	0.056	75	0.019	57
	turf (golf course)	338 lb ai/acre	40 acres	0.005	0.043	0.028	150	0.0097	110
	turf (golf course)	338 lb ai/acre	20 acres	0.005	0.043	0.014	300	0.0048	230
	ornamentals, food and fiber crops, orchard (replant/transplant), turf (sod farm)	320 lb ai/acre	128 acres	0.005	0.043	0.085	49	0.029	38
	ornamentals, food and fiber crops, orchard (replant/transplant), turf (sod farm)	320 lb ai/acre	80 acres	0.005	0.043	0.053	79	0.018	61
	turf (golf course)	320 lb ai/acre	40 acres	0.005	0.043	0.027	160	0.0092	120
	turf (golf course)	320 lb ai/acre	20 acres	0.005	0.043	0.013	320	0.0046	240
	peanuts (CBR susceptible cultivators)	63.3 lb ai/acre	128 acres	0.005	0.043	0.017	250	0.0058	190
	peanuts (CBR susceptible cultivators)	63.3 lb ai/acre	80 acres	0.005	0.043	0.011	400	0.0036	310
	cotton, soybeans, sugar beets	38 lb ai/acre	128 acres	0.005	0.043	0.01	420	0.0035	320
	cotton, soybeans, sugar beets	38 lb ai/acre	80 acres	0.005	0.043	0.0063	670	0.0022	510
	peanuts (CBR resistant cultivators)	32 lb ai/acre	128 acres	0.005	0.043	0.0085	490	0.0029	380
	peanuts (CBR resistant cultivators)	32 lb ai/acre	80 acres	0.005	0.043	0.0053	790	0.0018	610
	wheat, barley	31.7 lb ai/acre	128 acres	0.005	0.043	0.0085	500	0.0029	380
	wheat, barley	31.7 lb ai/acre	80 acres	0.005	0.043	0.0053	800	0.0018	610
Applying Water Soluble Liquids via Rotary Tiller Equipment (using PHED groundboom data) (3)	ornamentals, food and fiber crops, turf (sod farm)	338 lb ai/acre	128 acres	0.005	0.043	0.09	47	0.031	36
	ornamentals, food and fiber crops, turf (sod farm)	338 lb ai/acre	80 acres	0.005	0.043	0.056	75	0.019	57
	turf (golf course)	338 lb ai/acre	40 acres	0.005	0.043	0.028	150	0.0097	110
	turf (golf course)	338 lb ai/acre	20 acres	0.005	0.043	0.014	300	0.0048	230
	ornamentals, food and fiber crops, turf (sod farm)	320 lb ai/acre	128 acres	0.005	0.043	0.085	49	0.029	38
	ornamentals, food and fiber crops, turf (sod farm)	320 lb ai/acre	80 acres	0.005	0.043	0.053	79	0.018	61
	turf (golf course)	320 lb ai/acre	40 acres	0.005	0.043	0.027	160	0.0092	120
	turf (golf course)	320 lb ai/acre	20 acres	0.005	0.043	0.013	320	0.0046	240

**Appendix B/Table B3: Short-term Margins of Exposure For Metam Sodium Occupational Handler Risk Assessment at Engineering Controls Mitigation**

Exposure Scenario	Crop or Target	Application Rate <sup>a</sup>	Area Treated Daily <sup>b</sup>	Eng Con Dermal Unit Exposure (mg/lb ai)	Eng Con Inhalation Unit Exposure (ug/lb ai)	Eng Cont Dermal Dose	Eng Cont Dermal MOE <sup>d</sup>	Eng Cont Inhalation Dose	Eng Cont Inhalation MOE <sup>e</sup>
Loader/Applicator									
Transferring Liquids from Tank Delivery Truck to Shank Injection Equipment (mechanical transfer system) and then applying them via Shank Injection Equipment (using PHED groundboom MLA open cab data) (4a) <sup>d</sup>	small areas of ornamentals, food, fiber crops, seed beds, plant beds, lawns	523 lb ai/acre	5 acres	ND	ND	ND	ND	ND	ND
	small areas of ornamentals, food, fiber crops, seed beds, plant beds, lawns	523 lb ai/acre	0.5 acres	ND	ND	ND	ND	ND	ND
	tobacco plant beds	412 lb ai/acre	40 acres	ND	ND	ND	ND	ND	ND
	tobacco plant beds	412 lb ai/acre	20 acres	ND	ND	ND	ND	ND	ND
	tobacco plant beds	387 lb ai/acre	40 acres	ND	ND	ND	ND	ND	ND
	tobacco plant beds	387 lb ai/acre	20 acres	ND	ND	ND	ND	ND	ND
	ornamentals, food and fiber crops, turf (sod farm)	338 lb ai/acre	128 acres	ND	ND	ND	ND	ND	ND
	ornamentals, food and fiber crops, turf (sod farm)	338 lb ai/acre	80 acres	ND	ND	ND	ND	ND	ND
	turf (golf course)	338 lb ai/acre	40 acres	ND	ND	ND	ND	ND	ND
	turf (golf course)	338 lb ai/acre	20 acres	ND	ND	ND	ND	ND	ND
	ornamentals, food and fiber crops, orchard (replant/transplant), turf (sod farm)	320 lb ai/acre	128 acres	ND	ND	ND	ND	ND	ND
	ornamentals, food and fiber crops, orchard (replant/transplant), turf (sod farm)	320 lb ai/acre	80 acres	ND	ND	ND	ND	ND	ND
	turf (golf course)	320 lb ai/acre	40 acres	ND	ND	ND	ND	ND	ND
	turf (golf course)	320 lb ai/acre	20 acres	ND	ND	ND	ND	ND	ND
	peanuts (CBR susceptible cultivators)	63.3 lb ai/acre	128 acres	ND	ND	ND	ND	ND	ND
	peanuts (CBR susceptible cultivators)	63.3 lb ai/acre	80 acres	ND	ND	ND	ND	ND	ND
	cotton, soybeans, sugar beets	38 lb ai/acre	128 acres	ND	ND	ND	ND	ND	ND
	cotton, soybeans, sugar beets	38 lb ai/acre	80 acres	ND	ND	ND	ND	ND	ND
	peanuts (CBR resistant cultivators)	32 lb ai/acre	128 acres	ND	ND	ND	ND	ND	ND
	peanuts (CBR resistant cultivators)	32 lb ai/acre	80 acres	ND	ND	ND	ND	ND	ND
	wheat, barley	31.7 lb ai/acre	128 acres	ND	ND	ND	ND	ND	ND
	wheat, barley	31.7 lb ai/acre	80 acres	ND	ND	ND	ND	ND	ND

**Appendix B/Table B3: Short-term Margins of Exposure For Metam Sodium Occupational Handler Risk Assessment at Engineering Controls Mitigation**

Exposure Scenario	Crop or Target	Application Rate <sup>a</sup>	Area Treated Daily <sup>b</sup>	Eng Con Dermal Unit Exposure (mg/lb ai)	Eng Con Inhalation Unit Exposure (ug/lb ai)	Eng Cont Dermal Dose	Eng Cont Dermal MOE <sup>d</sup>	Eng Cont Inhalation Dose	Eng Cont Inhalation MOE <sup>e</sup>
Transferring Liquids from Tank Delivery Truck to Shank Injection Equipment (mechanical transfer system) and then applying them via Shank Injection Equipment (using PHED groundboom MLA with closed cab) (4b) <sup>d</sup>	small areas of ornamentals, food, fiber crops, seed beds, plant beds, lawns	523 lb ai/acre	5 acres	0.089	0.35	0.097	44	0.015	73
	small areas of ornamentals, food, fiber crops, seed beds, plant beds, lawns	523 lb ai/acre	0.5 acres	0.089	0.35	0.0097	440	0.0015	730
	tobacco plant beds	412 lb ai/acre	40 acres	0.089	0.35	0.61	7	0.096	12
	tobacco plant beds	412 lb ai/acre	20 acres	0.089	0.35	0.31	14	0.048	23
	tobacco plant beds	387 lb ai/acre	40 acres	0.089	0.35	0.57	7	0.09	12
	tobacco plant beds	387 lb ai/acre	20 acres	0.089	0.35	0.29	15	0.045	25
	ornamentals, food and fiber crops, turf (sod farm)	338 lb ai/acre	128 acres	0.089	0.35	1.6	3	0.25	4
	ornamentals, food and fiber crops, turf (sod farm)	338 lb ai/acre	80 acres	0.089	0.35	1	4	0.16	7
	turf (golf course)	338 lb ai/acre	40 acres	0.089	0.35	0.5	8	0.079	14
	turf (golf course)	338 lb ai/acre	20 acres	0.089	0.35	0.25	17	0.039	28
	ornamentals, food and fiber crops, orchard (replant/transplant), turf (sod farm)	320 lb ai/acre	128 acres	0.089	0.35	1.5	3	0.24	5
	ornamentals, food and fiber crops, orchard (replant/transplant), turf (sod farm)	320 lb ai/acre	80 acres	0.089	0.35	0.95	4	0.15	7
	turf (golf course)	320 lb ai/acre	40 acres	0.089	0.35	0.47	9	0.075	15
	turf (golf course)	320 lb ai/acre	20 acres	0.089	0.35	0.24	18	0.037	30
	peanuts (CBR susceptible cultivators)	63.3 lb ai/acre	128 acres	0.089	0.35	0.3	14	0.047	23
	peanuts (CBR susceptible cultivators)	63.3 lb ai/acre	80 acres	0.089	0.35	0.19	22	0.03	38
	cotton, soybeans, sugar beets	38 lb ai/acre	128 acres	0.089	0.35	0.18	23	0.028	39
	cotton, soybeans, sugar beets	38 lb ai/acre	80 acres	0.089	0.35	0.11	37	0.018	63
	peanuts (CBR resistant cultivators)	32 lb ai/acre	128 acres	0.089	0.35	0.15	28	0.024	46
	peanuts (CBR resistant cultivators)	32 lb ai/acre	80 acres	0.089	0.35	0.095	44	0.015	74
	wheat, barley	31.7 lb ai/acre	128 acres	0.089	0.35	0.15	28	0.024	47
	wheat, barley	31.7 lb ai/acre	80 acres	0.089	0.35	0.094	45	0.015	75
Transferring Water Soluble Liquids from Tank Delivery Truck to Rotary Tiller Equipment (mechanical transfer system) and then applying them via Rotary Tiller Equipment (using PHED groundboom MLA with open cab) (5a) <sup>d</sup>	ornamentals, food and fiber crops, turf (sod farm)	338 lb ai/acre	128 acres	ND	ND	ND	ND	ND	ND
	ornamentals, food and fiber crops, turf (sod farm)	338 lb ai/acre	80 acres	ND	ND	ND	ND	ND	ND
	turf (golf course)	338 lb ai/acre	40 acres	ND	ND	ND	ND	ND	ND
	turf (golf course)	338 lb ai/acre	20 acres	ND	ND	ND	ND	ND	ND
	ornamentals, food and fiber crops, turf (sod farm)	320 lb ai/acre	128 acres	ND	ND	ND	ND	ND	ND
	ornamentals, food and fiber crops, turf (sod farm)	320 lb ai/acre	80 acres	ND	ND	ND	ND	ND	ND
	turf (golf course)	320 lb ai/acre	40 acres	ND	ND	ND	ND	ND	ND
Transferring Liquids from Tank Delivery Truck to Rotary Tiller Equipment (mechanical transfer system) and then applying them via Rotary Tiller Equipment (using PHED groundboom MLA with closed cab) (5b) <sup>d</sup>	turf (golf course)	320 lb ai/acre	20 acres	ND	ND	ND	ND	ND	ND
	ornamentals, food and fiber crops, turf (sod farm)	338 lb ai/acre	128 acres	0.089	0.35	1.6	3	0.25	4
	ornamentals, food and fiber crops, turf (sod farm)	338 lb ai/acre	80 acres	0.089	0.35	1	4	0.16	7
	turf (golf course)	338 lb ai/acre	40 acres	0.089	0.35	0.5	8	0.079	14
	turf (golf course)	338 lb ai/acre	20 acres	0.089	0.35	0.25	17	0.039	28
	ornamentals, food and fiber crops, turf (sod farm)	320 lb ai/acre	128 acres	0.089	0.35	1.5	3	0.24	5
	ornamentals, food and fiber crops, turf (sod farm)	320 lb ai/acre	80 acres	0.089	0.35	0.95	4	0.15	7
	turf (golf course)	320 lb ai/acre	40 acres	0.089	0.35	0.47	9	0.075	15
	turf (golf course)	320 lb ai/acre	20 acres	0.089	0.35	0.24	18	0.037	30

**Appendix B/Table B3: Short-term Margins of Exposure For Metam Sodium Occupational Handler Risk Assessment at Engineering Controls Mitigation**

Exposure Scenario	Crop or Target	Application Rate <sup>a</sup>	Area Treated Daily <sup>b</sup>	Eng Con Dermal Unit Exposure (mg/lb ai)	Eng Con Inhalation Unit Exposure (ug/lb ai)	Eng Cont Dermal Dose	Eng Cont Dermal MOE <sup>d</sup>	Eng Cont Inhalation Dose	Eng Cont Inhalation MOE <sup>e</sup>
Chemigation Monitor									
Monitoring Chemigation Applications Using Liquid Formulation (6)	No PHED general or Metam Sodium specific data available.								
Soil Seal Irrigator									
Sealing Soil with Irrigation Water Following Shank Injection Applications Using Liquid Formulations (7)	No PHED general or Metam Sodium specific data available.								
Mixer/Loader/Applicator									
Mixing/Loading/Applying Liquids via Sprinkling Can (using ORETF hose-end data - occupational) (8)	small areas of ornamentals, food, fiber crops, seed beds, plant beds, tobacco plant beds, lawns	12 lb ai/1000 sq ft	1000 sq ft	NF	NF	NF	NF	NF	NF
	potting soil	4 lb ai/1000 sq ft	1000 sq ft	NF	NF	NF	NF	NF	NF
Mixing/Loading/Applying Water Soluble Liquids via hose-proportioner (using ORETF LCO hand-gun data - occupational) (9)	small areas of ornamentals, food, fiber crops, seed beds, plant beds, tobacco plant beds, lawns	350 lb ai/acre	5 acres	NF	NF	NF	NF	NF	NF
	small areas of ornamentals, food, fiber crops, seed beds, plant beds, tobacco plant beds, lawns	350 lb ai/acre	0.5 acres	NF	NF	NF	NF	NF	NF
Mixing/Loading/Applying Water Soluble Liquids via power sprayer (using ORETF LCO hand-gun data - occupational) (10)	drained water bodies and shorelines	350 lb ai/acre	5 acres	NF	NF	NF	NF	NF	NF
Mixing/Loading/Applying Liquids via cement mixer (using PHED Mixer/Loader data for Open-pour Liquids) (11)	potting soil	0.012 lb ai/cu ft	54 cu ft	NF	NF	NF	NF	NF	NF
Mixing/Loading/Applying Liquids via shredder (using PHED Mixer/Loader data for Open-pour Liquids) (12)	potting soil	0.012 lb ai/cu ft	54 cu ft	NF	NF	NF	NF	NF	NF
Mixing/Loading/Applying Liquid with Foaming Equipment (using PHED Mixer/Loader data for Open-pour Liquids) (13)	sewer roots	0.212 lb ai/gal	1350 gallons	NF	NF	NF	NF	NF	NF
	sewer roots	0.212 lb ai/gal	675 gallons	NF	NF	NF	NF	NF	NF
Mixing/Loading/Applying Liquids via Open Pour (using PHED Mixer/Loader data for Open-pour Liquids) (14)	tree replanting	16 lb ai/1000 sq ft	1000 sq ft	NF	NF	NF	NF	NF	NF

**Footnotes**

N/A Not Applicable  
 ND No Data  
 NF Not Feasible

- a Application rates are the maximum application rates determined from EPA registered labels for metam sodium.
- b Amount handled per day values are EPA estimates of acreage treated or gallons applied based on Exposure SAC Policy #9 "Standard Values for Daily Acres Treated in Agriculture".
- c Over estimate, PHED is open pour mixing/loading.
- d Engineering Controls Dermal MOE = NOAEL (4.22 mg/kg/day) / absorbed dermal daily dose (mg/kg/day), where absorbed dermal dose = daily unit exposure (mg/lb ai) x application rate x amount handled per day x dermal absorption factor (0.025) / body weight (60 kg adult).
- e Engineering Controls Inhalation MOE = NOAEL (1.11 mg/kg/day) / inhalation daily dose (mg/kg/day), where absorbed inhalation dose = daily unit exposure ( $\mu$ g/lb ai) x application rate x amount handled per day x conversion factor (1mg/1,000  $\mu$ g / body weight (60 kg adult)).

**Appendix B/Table B4: Intermediate-term Margins of Exposure For Metam Sodium Occupational Handler Risk Assessment at Engineering Controls Mitigation**

Exposure Scenario	Crop or Target	Application Rate <sup>a</sup>	Area Treated Daily <sup>b</sup>	Baseline Dermal Unit Exposure (mg/lb ai)	Baseline Inhalation Unit Exposure (ug/lb ai)	Baseline Dermal Dose	Baseline Dermal MOE <sup>d</sup>	Baseline Inhalation Dose	Baseline Inhalation MOE <sup>e</sup>
Loader									
Transferring Liquids from Tank Delivery Truck to Shank Injection Equipment (mechanical transfer system) (1a)	small areas of ornamentals, food, fiber crops	523 lb ai/acre	5 acres	2.9	1.2	3.2	0.0	0.052	33
	small areas of ornamentals, food, fiber crops	523 lb ai/acre	0.5 acres	2.9	1.2	0.32	0.3	0.0052	330
	ornamentals, food and fiber crops	338 lb ai/acre	128 acres	2.9	1.2	52	0.0	0.87	2
	ornamentals, food and fiber crops	338 lb ai/acre	80 acres	2.9	1.2	33	0.0	0.54	3
	ornamentals, food and fiber crops	320 lb ai/acre	128 acres	2.9	1.2	49	0.0	0.82	2
	ornamentals, food and fiber crops	320 lb ai/acre	80 acres	2.9	1.2	31	0.0	0.51	3
	peanuts (CBR susceptible cultivators)	63.3 lb ai/acre	128 acres	2.9	1.2	9.8	0.0	0.16	11
	peanuts (CBR susceptible cultivators)	63.3 lb ai/acre	80 acres	2.9	1.2	6.1	0.0	0.1	17
	cotton, soybeans, sugar beets	38 lb ai/acre	128 acres	2.9	1.2	5.9	0.0	0.097	18
	cotton, soybeans, sugar beets	38 lb ai/acre	80 acres	2.9	1.2	3.7	0.0	0.061	29
	peanuts (CBR resistant cultivators)	32 lb ai/acre	128 acres	2.9	1.2	4.9	0.0	0.082	21
	peanuts (CBR resistant cultivators)	32 lb ai/acre	80 acres	2.9	1.2	3.1	0.0	0.051	34
	wheat, barley	31.7 lb ai/acre	128 acres	2.9	1.2	4.9	0.0	0.081	22
	wheat, barley	31.7 lb ai/acre	80 acres	2.9	1.2	3.1	0.0	0.051	35
Transferring Liquids from Tank Delivery Truck to Rotary Tiller Equipment (mechanical transfer system) (1b)	ornamentals, food and fiber crops	338 lb ai/acre	128 acres	2.9	1.2	52	0.0	0.87	2
	ornamentals, food and fiber crops	338 lb ai/acre	80 acres	2.9	1.2	33	0.0	0.54	3
	ornamentals, food and fiber crops	320 lb ai/acre	128 acres	2.9	1.2	49	0.0	0.82	2
	ornamentals, food and fiber crops	320 lb ai/acre	80 acres	2.9	1.2	31	0.0	0.51	3
Transferring Liquids from Tank Delivery Truck to Pick-up Truck and subsequent transfer to Sprinkler irrigation Nurse Tank (mechanical transfer system) (1c)	ornamentals, food and fiber crops	338 lb ai/acre	350 acres	2.9	1.2	140	0.0	2.4	1
	ornamentals, food and fiber crops	320 lb ai/acre	350 acres	2.9	1.2	140	0.0	2.2	1
	peanuts (CBR susceptible cultivators)	63.3 lb ai/acre	350 acres	2.9	1.2	27	0.0	0.44	4
	wheat, barley	31.7 lb ai/acre	350 acres	2.9	1.2	13	0.0	0.22	8
	peanuts (CBR resistant cultivators)	32 lb ai/acre	350 acres	2.9	1.2	14	0.0	0.22	8
Transferring Liquids from Tank Delivery Truck to Pick-up Truck and subsequent transfer to Drip Irrigation Nurse Tank (mechanical transfer system) (1d)	ornamentals, food and fiber crops	320 lb ai/acre	100 acres	2.9	1.2	39	0.0	0.64	3
	ornamentals, food and fiber crops	239 lb ai/acre	100 acres	2.9	1.2	29	0.0	0.48	4
	cotton, soybeans, sugar beets	38 lb ai/acre	100 acres	2.9	1.2	4.6	0.0	0.076	23
Loading Liquids to support Sprinkler Irrigation Applications (Sodium tetrathiocarbonate study used as surrogate data Study # 770AA11) (1e)	ornamentals, food and fiber crops	338 lb ai/acre	350 acres	ND	ND	ND	ND	ND	ND
	ornamentals, food and fiber crops	320 lb ai/acre	350 acres	ND	ND	ND	ND	ND	ND
	peanuts (CBR susceptible cultivators)	63.3 lb ai/acre	350 acres	ND	ND	ND	ND	ND	ND
	wheat, barley	31.7 lb ai/acre	350 acres	ND	ND	ND	ND	ND	ND
	peanuts (CBR susceptible cultivators)	32 lb ai/acre	350 acres	ND	ND	ND	ND	ND	ND

**Appendix B/Table B4: Intermediate-term Margins of Exposure For Metam Sodium Occupational Handler Risk Assessment at Engineering Controls Mitigation**

Exposure Scenario	Crop or Target	Application Rate <sup>a</sup>	Area Treated Daily <sup>b</sup>	Baseline Dermal Unit Exposure (mg/lb ai)	Baseline Inhalation Unit Exposure (ug/lb ai)	Baseline Dermal Dose	Baseline Dermal MOE <sup>d</sup>	Baseline Inhalation Dose	Baseline Inhalation MOE <sup>e</sup>
Loading Liquids to support Drip Irrigation Applications (Sodium tetraethiocarbonate study used as surrogate data Study # 770AA11) (1f)	ornamentals, food and fiber crops	320 lb ai/acre	100 acres	ND	ND	ND	ND	ND	ND
	ornamentals, food and fiber crops	239 lb ai/acre	100 acres	ND	ND	ND	ND	ND	ND
	cotton, soybeans, sugar beets	38 lb ai/acre	100 acres	ND	ND	ND	ND	ND	ND
Applicator									
Applying Liquids via Shank Injection Equipment (using PHED groundboom data) (2)	small areas of ornamentals, food, fiber crops	523 lb ai/acre	5 acres	0.014	0.74	0.015	6.6	0.032	54
	small areas of ornamentals, food, fiber crops	523 lb ai/acre	0.5 acres	0.014	0.74	0.0015	66.0	0.0032	540
	ornamentals, food and fiber crops	338 lb ai/acre	128 acres	0.014	0.74	0.25	0.4	0.53	3
	ornamentals, food and fiber crops	338 lb ai/acre	80 acres	0.014	0.74	0.16	0.6	0.33	5
	ornamentals, food and fiber crops	320 lb ai/acre	128 acres	0.014	0.74	0.24	0.4	0.51	4
	ornamentals, food and fiber crops	320 lb ai/acre	80 acres	0.014	0.74	0.15	0.7	0.32	6
	peanuts (CBR susceptible cultivators)	63.3 lb ai/acre	128 acres	0.014	0.74	0.047	2.1	0.1	18
	peanuts (CBR susceptible cultivators)	63.3 lb ai/acre	80 acres	0.014	0.74	0.03	3.4	0.062	28
	cotton, soybeans, sugar beets	38 lb ai/acre	128 acres	0.014	0.74	0.028	3.5	0.06	29
	cotton, soybeans, sugar beets	38 lb ai/acre	80 acres	0.014	0.74	0.018	5.6	0.037	47
	peanuts (CBR resistant cultivators)	32 lb ai/acre	128 acres	0.014	0.74	0.024	4.2	0.051	35
	peanuts (CBR resistant cultivators)	32 lb ai/acre	80 acres	0.014	0.74	0.015	6.7	0.032	55
	wheat, barley	31.7 lb ai/acre	128 acres	0.014	0.74	0.024	4.2	0.05	35
	wheat, barley	31.7 lb ai/acre	80 acres	0.014	0.74	0.015	6.8	0.031	56
Applying Water Soluble Liquids via Rotary Tiller Equipment (using PHED groundboom data) (3)	ornamentals, food and fiber crops	338 lb ai/acre	128 acres	0.014	0.74	0.25	0.4	0.53	3
	ornamentals, food and fiber crops	338 lb ai/acre	80 acres	0.014	0.74	0.16	0.6	0.33	5
	ornamentals, food and fiber crops	320 lb ai/acre	128 acres	0.014	0.74	0.24	0.4	0.51	4
	ornamentals, food and fiber crops	320 lb ai/acre	80 acres	0.014	0.74	0.15	0.7	0.32	6

**Appendix B/Table B4: Intermediate-term Margins of Exposure For Metam Sodium Occupational Handler Risk Assessment at Engineering Controls Mitigation**

Exposure Scenario	Crop or Target	Application Rate <sup>a</sup>	Area Treated Daily <sup>b</sup>	Baseline Dermal Unit Exposure (mg/lb ai)	Baseline Inhalation Unit Exposure (ug/lb ai)	Baseline Dermal Dose	Baseline Dermal MOE <sup>d</sup>	Baseline Inhalation Dose	Baseline Inhalation MOE <sup>e</sup>
Loader/Applicator									
Transferring Liquids from Tank Delivery Truck to Shank Injection Equipment (mechanical transfer system) and then applying them via Shank Injection Equipment (using PHED groundboom MLA open cab data) (4a)	small areas of ornamentals, food, fiber crops	523 lb ai/acre	5 acres	0.88	1.3	0.96	0.1	0.057	31
	small areas of ornamentals, food, fiber crops	523 lb ai/acre	0.5 acres	0.88	1.3	0.096	1.0	0.0057	310
	ornamentals, food and fiber crops	338 lb ai/acre	128 acres	0.88	1.3	16	0.0	0.94	2
	ornamentals, food and fiber crops	338 lb ai/acre	80 acres	0.88	1.3	9.9	0.0	0.59	3
	ornamentals, food and fiber crops, orchard (replant/transplant)	320 lb ai/acre	128 acres	0.88	1.3	15	0.0	0.89	2
	ornamentals, food and fiber crops, orchard (replant/transplant)	320 lb ai/acre	80 acres	0.88	1.3	9.4	0.0	0.55	3
	peanuts (CBR susceptible cultivators)	63.3 lb ai/acre	128 acres	0.88	1.3	3	0.0	0.18	10
	peanuts (CBR susceptible cultivators)	63.3 lb ai/acre	80 acres	0.88	1.3	1.9	0.1	0.11	16
	cotton, soybeans, sugar beets	38 lb ai/acre	128 acres	0.88	1.3	1.8	0.1	0.11	17
	cotton, soybeans, sugar beets	38 lb ai/acre	80 acres	0.88	1.3	1.1	0.1	0.066	27
	peanuts (CBR resistant cultivators)	32 lb ai/acre	128 acres	0.88	1.3	1.5	0.1	0.089	20
	peanuts (CBR resistant cultivators)	32 lb ai/acre	80 acres	0.88	1.3	0.94	0.1	0.055	32
	wheat, barley	31.7 lb ai/acre	128 acres	0.88	1.3	1.5	0.1	0.088	20
	wheat, barley	31.7 lb ai/acre	80 acres	0.88	1.3	0.93	0.1	0.055	32
Transferring Liquids from Tank Delivery Truck to Shank Injection Equipment (mechanical transfer system) and then applying them via Shank Injection Equipment (using PHED groundboom MLA with closed cab) (4b)	small areas of ornamentals, food, fiber crops	523 lb ai/acre	5 acres	ND	ND	ND	ND	ND	ND
	small areas of ornamentals, food, fiber crops	523 lb ai/acre	0.5 acres	ND	ND	ND	ND	ND	ND
	ornamentals, food and fiber crops	338 lb ai/acre	128 acres	ND	ND	ND	ND	ND	ND
	ornamentals, food and fiber crops	338 lb ai/acre	80 acres	ND	ND	ND	ND	ND	ND
	ornamentals, food and fiber crops, orchard (replant/transplant)	320 lb ai/acre	128 acres	ND	ND	ND	ND	ND	ND
	ornamentals, food and fiber crops, orchard (replant/transplant)	320 lb ai/acre	80 acres	ND	ND	ND	ND	ND	ND
	peanuts (CBR susceptible cultivators)	63.3 lb ai/acre	128 acres	ND	ND	ND	ND	ND	ND
	peanuts (CBR susceptible cultivators)	63.3 lb ai/acre	80 acres	ND	ND	ND	ND	ND	ND
	cotton, soybeans, sugar beets	38 lb ai/acre	128 acres	ND	ND	ND	ND	ND	ND
	cotton, soybeans, sugar beets	38 lb ai/acre	80 acres	ND	ND	ND	ND	ND	ND
	peanuts (CBR resistant cultivators)	32 lb ai/acre	128 acres	ND	ND	ND	ND	ND	ND
	peanuts (CBR resistant cultivators)	32 lb ai/acre	80 acres	ND	ND	ND	ND	ND	ND
	wheat, barley	31.7 lb ai/acre	128 acres	ND	ND	ND	ND	ND	ND
	wheat, barley	31.7 lb ai/acre	80 acres	ND	ND	ND	ND	ND	ND

## **Appendix B/Table B4: Intermediate-term Margins of Exposure For Metam Sodium Occupational Handler Risk Assessment at Engineering Controls Mitigation**

**Appendix B/Table B4: Intermediate-term Margins of Exposure For Metam Sodium Occupational Handler Risk Assessment at Engineering Controls Mitigation**

Exposure Scenario	Crop or Target	Application Rate <sup>a</sup>	Area Treated Daily <sup>b</sup>	Baseline Dermal Unit Exposure (mg/lb ai)	Baseline Inhalation Unit Exposure (ug/lb ai)	Baseline Dermal Dose	Baseline Dermal MOE <sup>d</sup>	Baseline Inhalation Dose	Baseline Inhalation MOE <sup>e</sup>
Liquids via shredder (using PHED Mixer/Loader data for Open-pour Liquids) (12)									
Mixing/Loading/Applying Liquid with Foaming Equipment (using PHED Mixer/Loader data for Open-pour Liquids) (13)	sewer roots	350 lb ai/acre	1350 gallons	2.9	1.2	0.35	0.3	0.0057	310
	sewer roots	0.012 lb ai/cu ft	675 gallons	2.9	1.2	0.17	0.6	0.0029	610
Mixing/Loading/Applying Liquids via Open Pour (using PHED Mixer/Loader data for Open-pour Liquids) (14)	tree replanting			No intermediate-term handler MOEs were calculated for this scenario.					

**Footnotes**

ND No Data

a Application rates are the maximum application rates determined from EPA registered labels for metam sodium.

b Amount handled per day values are EPA estimates of acreage treated or gallons applied based on Exposure SAC Policy #9 "Standard Values for Daily Acres Treated in Agriculture".

c Over estimate, PHED is open pour mixing/loading.

d Baseline Dermal MOE = NOAEL (4.22 mg/kg/day) / absorbed dermal daily dose (mg/kg/day), where absorbed dermal dose = daily unit exposure (mg/lb ai) x application rate x amount handled per day x dermal absorption factor (0.025) / body weight (60 kg adult).

e Baseline Inhalation MOE = NOAEL (1.11 mg/kg/day) / inhalation daily dose (mg/kg/day), where absorbed inhalation dose = daily unit exposure (ug/lb ai) x application rate x amount handled per day x conversion factor (1mg/1,000 ug / body weight (60 kg adult)).

**Appendix B/Table B5: Intermediate-term Margins of Exposure For Metam Sodium Occupational Handler Risk Assessment at PPE Mitigation**

Exposure Scenario	Crop or Target	Application Rate <sup>a</sup>	Area Treated Daily <sup>b</sup>	PPE-G Dermal Unit Exposure (mg/lb ai)	PPE-G,DL Dermal Unit Exposure (mg/lb ai)	90% PPE-R Inhalation Unit Exposure (ug/lb ai)	PPE-G Dermal Dose	PPE-G Dermal MOE <sup>d</sup>	PPE-G,DL Dermal Dose	PPE-G,DL Dermal MOE <sup>d</sup>	90% PPE-R Inhalation Dose	90% PPE-R Inhalation MOE <sup>e</sup>
Loader												
Transferring Liquids from Tank Delivery Truck to Shank Injection Equipment (mechanical transfer system) (1a)	small areas of ornamentals, food, fiber crops	523 lb ai/acre	5 acres	0.023	0.017	0.12	0.025	4	0.019	5	0.0052	330
	small areas of ornamentals, food, fiber crops	523 lb ai/acre	0.5 acres	0.023	0.017	0.12	0.0025	40	0.0019	54	0.00052	3,300
	ornamentals, food and fiber crops	338 lb ai/acre	128 acres	0.023	0.017	0.12	0.41	0	0.31	0	0.087	20
	ornamentals, food and fiber crops	338 lb ai/acre	80 acres	0.023	0.017	0.12	0.26	0	0.19	1	0.054	32
	ornamentals, food and fiber crops	320 lb ai/acre	128 acres	0.023	0.017	0.12	0.39	0	0.29	0	0.082	21
	ornamentals, food and fiber crops	320 lb ai/acre	80 acres	0.023	0.017	0.12	0.25	0	0.18	1	0.051	34
	peanuts (CBR susceptible cultivators)	63.3 lb ai/acre	128 acres	0.023	0.017	0.12	0.078	1	0.057	2	0.016	110
	peanuts (CBR susceptible cultivators)	63.3 lb ai/acre	80 acres	0.023	0.017	0.12	0.049	2	0.036	3	0.01	170
	cotton, soybeans, sugar beets	38 lb ai/acre	128 acres	0.023	0.017	0.12	0.047	2	0.034	3	0.0097	180
	cotton, soybeans, sugar beets	38 lb ai/acre	80 acres	0.023	0.017	0.12	0.029	3	0.022	5	0.0061	290
	peanuts (CBR resistant cultivators)	32 lb ai/acre	128 acres	0.023	0.017	0.12	0.039	3	0.029	3	0.0082	210
	peanuts (CBR resistant cultivators)	32 lb ai/acre	80 acres	0.023	0.017	0.12	0.025	4	0.018	6	0.0051	340
	wheat, barley	31.7 lb ai/acre	128 acres	0.023	0.017	0.12	0.039	3	0.029	4	0.0081	220
	wheat, barley	31.7 lb ai/acre	80 acres	0.023	0.017	0.12	0.024	4	0.018	6	0.0051	350
Transferring Liquids from Tank Delivery Truck to Rotary Tiller Equipment (mechanical transfer system) (1b)	ornamentals, food and fiber crops	338 lb ai/acre	128 acres	0.023	0.017	0.12	0.41	0	0.31	0	0.087	20
	ornamentals, food and fiber crops	338 lb ai/acre	80 acres	0.023	0.017	0.12	0.26	0	0.19	1	0.054	32
	ornamentals, food and fiber crops	320 lb ai/acre	128 acres	0.023	0.017	0.12	0.39	0	0.29	0	0.082	21
	ornamentals, food and fiber crops	320 lb ai/acre	80 acres	0.023	0.017	0.12	0.25	0	0.18	1	0.051	34
Transferring Liquids from Tank Delivery Truck to Pick-up Truck and subsequent transfer to Sprinkler irrigation Nurse Tank (mechanical transfer system) (1c)	ornamentals, food and fiber crops	338 lb ai/acre	350 acres	0.023	0.017	0.12	1.1	0	0.84	0	0.24	7
	ornamentals, food and fiber crops	320 lb ai/acre	350 acres	0.023	0.017	0.12	1.1	0	0.79	0	0.22	8
	peanuts (CBR susceptible cultivators)	63.3 lb ai/acre	350 acres	0.023	0.017	0.12	0.21	0	0.16	1	0.044	39
	wheat, barley	31.7 lb ai/acre	350 acres	0.023	0.017	0.12	0.11	1	0.079	1	0.022	79
	peanuts (CBR resistant cultivators)	32 lb ai/acre	350 acres	0.023	0.017	0.12	0.11	1	0.079	1	0.022	78
Transferring Liquids from Tank Delivery Truck to Pick-up Truck and subsequent transfer to Drip Irrigation Nurse Tank (mechanical transfer system) (1d)	ornamentals, food and fiber crops	320 lb ai/acre	100 acres	0.023	0.017	0.12	0.31	0	0.23	0	0.064	27
	ornamentals, food and fiber crops	239 lb ai/acre	100 acres	0.023	0.017	0.12	0.23	0	0.17	1	0.048	37
	cotton, soybeans, sugar beets	38 lb ai/acre	100 acres	0.023	0.017	0.12	0.036	3	0.027	4	0.0076	230

**Appendix B/Table B5: Intermediate-term Margins of Exposure For Metam Sodium Occupational Handler Risk Assessment at PPE Mitigation**

Exposure Scenario	Crop or Target	Application Rate <sup>a</sup>	Area Treated Daily <sup>b</sup>	PPE-G Dermal Unit Exposure (mg/lb ai)	PPE-G,DL Dermal Unit Exposure (mg/lb ai)	90% PPE-R Inhalation Unit Exposure (ug/lb ai)	PPE-G Dermal Dose	PPE-G Dermal MOE <sup>d</sup>	PPE-G,DL Dermal Dose	PPE-G,DL Dermal MOE <sup>d</sup>	90% PPE-R Inhalation Dose	90% PPE-R Inhalation MOE <sup>e</sup>
Loading Liquids to support Sprinkler Irrigation Applications (Sodium tetraethiocarbonate study used as surrogate data Study # 770AA11) (1e)	ornamentals, food and fiber crops	338 lb ai/acre	350 acres	ND	ND	ND	ND	ND	ND	ND	ND	ND
	ornamentals, food and fiber crops	320 lb ai/acre	350 acres	ND	ND	ND	ND	ND	ND	ND	ND	ND
	peanuts (CBR susceptible cultivators)	63.3 lb ai/acre	350 acres	ND	ND	ND	ND	ND	ND	ND	ND	ND
	wheat, barley	31.7 lb ai/acre	350 acres	ND	ND	ND	ND	ND	ND	ND	ND	ND
	peanuts (CBR susceptible cultivators)	32 lb ai/acre	350 acres	ND	ND	ND	ND	ND	ND	ND	ND	ND
Loading Liquids to support Drip Irrigation Applications (Sodium tetraethiocarbonate study used as surrogate data Study # 770AA11) (1f)	ornamentals, food and fiber crops	320 lb ai/acre	100 acres	ND	ND	ND	ND	ND	ND	ND	ND	ND
	ornamentals, food and fiber crops	239 lb ai/acre	100 acres	ND	ND	ND	ND	ND	ND	ND	ND	ND
	cotton, soybeans, sugar beets	38 lb ai/acre	100 acres	ND	ND	ND	ND	ND	ND	ND	ND	ND
Applicator												
Applying Liquids via Shank Injection Equipment (using PHED groundboom data) (2)	small areas of ornamentals, food, fiber crops	523 lb ai/acre	5 acres	0.014	0.011	0.074	0.015	7	0.012	8	0.0032	540
	small areas of ornamentals, food, fiber crops	523 lb ai/acre	0.5 acres	0.014	0.011	0.074	0.0015	66	0.0012	83	0.00032	5,400
	ornamentals, food and fiber crops	338 lb ai/acre	128 acres	0.014	0.011	0.074	0.25	0	0.2	1	0.053	33
	ornamentals, food and fiber crops	338 lb ai/acre	80 acres	0.014	0.011	0.074	0.16	1	0.12	1	0.033	52
	ornamentals, food and fiber crops, orchard (replant/transplant)	320 lb ai/acre	128 acres	0.014	0.011	0.074	0.24	0	0.19	1	0.051	35
	ornamentals, food and fiber crops, orchard (replant/transplant)	320 lb ai/acre	80 acres	0.014	0.011	0.074	0.15	1	0.12	1	0.032	55
	peanuts (CBR susceptible cultivators)	63.3 lb ai/acre	128 acres	0.014	0.011	0.074	0.047	2	0.037	3	0.01	180
	peanuts (CBR susceptible cultivators)	63.3 lb ai/acre	80 acres	0.014	0.011	0.074	0.03	3	0.023	4	0.0062	280
	cotton, soybeans, sugar beets	38 lb ai/acre	128 acres	0.014	0.011	0.074	0.028	4	0.022	5	0.006	290
	cotton, soybeans, sugar beets	38 lb ai/acre	80 acres	0.014	0.011	0.074	0.018	6	0.014	7	0.0037	470
	peanuts (CBR resistant cultivators)	32 lb ai/acre	128 acres	0.014	0.011	0.074	0.024	4	0.019	5	0.0051	350
	peanuts (CBR resistant cultivators)	32 lb ai/acre	80 acres	0.014	0.011	0.074	0.015	7	0.012	9	0.0032	550
	wheat, barley	31.7 lb ai/acre	128 acres	0.014	0.011	0.074	0.024	4	0.019	5	0.005	350
	wheat, barley	31.7 lb ai/acre	80 acres	0.014	0.011	0.074	0.015	7	0.012	9	0.0031	560
Applying Water Soluble Liquids via Rotary Tiller Equipment (using PHED groundboom data) (3)	ornamentals, food and fiber crops	338 lb ai/acre	128 acres	0.014	0.011	0.074	0.25	0	0.2	1	0.053	33
	ornamentals, food and fiber crops	338 lb ai/acre	80 acres	0.014	0.011	0.074	0.16	1	0.12	1	0.033	52
	ornamentals, food and fiber crops	320 lb ai/acre	128 acres	0.014	0.011	0.074	0.24	0	0.19	1	0.051	35
	ornamentals, food and fiber crops	320 lb ai/acre	80 acres	0.014	0.011	0.074	0.15	1	0.12	1	0.032	55

## **Appendix B/Table B5: Intermediate-term Margins of Exposure For Metam Sodium Occupational Handler Risk Assessment at PPE Mitigation**

**Appendix B/Table B5: Intermediate-term Margins of Exposure For Metam Sodium Occupational Handler Risk Assessment at PPE Mitigation**

Exposure Scenario	Crop or Target	Application Rate <sup>a</sup>	Area Treated Daily <sup>b</sup>	PPE-G Dermal Unit Exposure (mg/lb ai)	PPE-G,DL Dermal Unit Exposure (mg/lb ai)	90% PPE-R Inhalation Unit Exposure (ug/lb ai)	PPE-G Dermal Dose	PPE-G Dermal MOE <sup>d</sup>	PPE-G,DL Dermal Dose	PPE-G,DL Dermal MOE <sup>d</sup>	90% PPE-R Inhalation Dose	90% PPE-R Inhalation MOE <sup>e</sup>
Transferring Water Soluble Liquids from Tank Delivery Truck to Rotary Tiller Equipment (mechanical transfer system) and then applying them via Rotary Tiller Equipment (using PHED groundboom MLA with open cab) (5a) <sup>d</sup>	ornamentals, food and fiber crops	338 lb ai/acre	128 acres	0.057	0.036	0.13	1	0	0.65	0	0.094	19
	ornamentals, food and fiber crops	338 lb ai/acre	80 acres	0.057	0.036	0.13	0.64	0	0.41	0	0.059	30
	ornamentals, food and fiber crops	320 lb ai/acre	128 acres	0.057	0.036	0.13	0.97	0	0.61	0	0.089	20
	ornamentals, food and fiber crops	320 lb ai/acre	80 acres	0.057	0.036	0.13	0.61	0	0.38	0	0.055	32
Transferring Liquids from Tank Delivery Truck to Rotary Tiller Equipment (mechanical transfer system) and then applying them via Rotary Tiller Equipment (using PHED groundboom MLA with closed cab) (5b) <sup>d</sup>	ornamentals, food and fiber crops	338 lb ai/acre	128 acres	ND	ND	ND	ND	ND	ND	ND	ND	ND
	ornamentals, food and fiber crops	338 lb ai/acre	80 acres	ND	ND	ND	ND	ND	ND	ND	ND	ND
	ornamentals, food and fiber crops	320 lb ai/acre	128 acres	ND	ND	ND	ND	ND	ND	ND	ND	ND
	ornamentals, food and fiber crops	320 lb ai/acre	80 acres	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chemigation Monitor												
Monitoring Chemigation Applications Using Liquid Formulation (6)	No PHED general or Metam Sodium specific data available.											
Irrigator												
Irrigating Following Shank Injection Applications (7)	No PHED general or Metam Sodium specific data available.											
Mixer/Loader/Applicator												
Mixing/Loading/Applying Liquids via Sprinkling Can (using ORETF hose-end data - occupational) (8)	small areas of ornamentals, food, fiber crops	12 lb ai/1000 sq ft	1000 sq ft	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mixing/Loading/Applying Water Soluble Liquids via hose-proportioner (using ORETF LCO hand-gun data - occupational) (9)	small areas of ornamentals, food, fiber crops	350 lb ai/acre	5 acres	0.48	0.25	0.15	0.35	0	0.18	1	0.0044	400
	small areas of ornamentals, food, fiber crops	350 lb ai/acre	0.5 acres	0.48	0.25	0.15	0.035	3	0.018	6	0.00044	4,000

**Appendix B/Table B5: Intermediate-term Margins of Exposure For Metam Sodium Occupational Handler Risk Assessment at PPE Mitigation**

Exposure Scenario	Crop or Target	Application Rate <sup>a</sup>	Area Treated Daily <sup>b</sup>	PPE-G Dermal Unit Exposure (mg/lb ai)	PPE-G,DL Dermal Unit Exposure (mg/lb ai)	90% PPE-R Inhalation Unit Exposure (ug/lb ai)	PPE-G Dermal Dose	PPE-G Dermal MOE <sup>d</sup>	PPE-G,DL Dermal Dose	PPE-G,DL Dermal MOE <sup>d</sup>	90% PPE-R Inhalation Dose	90% PPE-R Inhalation MOE <sup>e</sup>
Mixing>Loading/Applying Water Soluble Liquids via power sprayer (using ORETF LCO hand-gun data - occupational) (10)	drained water bodies and shorelines										No intermediate-term handler MOEs were calculated for this scenario.	
Mixing>Loading/Applying Liquids via cement mixer (using PHED Mixer/Loader data for Open-pour Liquids) (11)	potting soil										No intermediate-term handler MOEs were calculated for this scenario.	
Mixing>Loading/Applying Liquids via shredder (using PHED Mixer/Loader data for Open-pour Liquids) (12)	potting soil										No intermediate-term handler MOEs were calculated for this scenario.	
Mixing>Loading/Applying Liquid with Foaming Equipment (using PHED Mixer/Loader data for Open-pour Liquids) (13)	sewer roots	350 lb ai/acre	1350 gallons	0.023	0.017	0.12	0.0027	36	0.002	49	0.00057	3,100
	sewer roots	0.012 lb ai/cu ft	675 gallons	0.023	0.017	0.12	0.0014	73	0.001	99	0.00029	6,100
Mixing>Loading/Applying Liquids via Open Pour (using PHED Mixer/Loader data for Open-pour Liquids) (14)	tree replanting										No intermediate-term handler MOEs were calculated for this scenario.	

**Footnotes**

ND No Data

a Application rates are the maximum application rates determined from EPA registered labels for metam sodium.

b Amount handled per day values are EPA estimates of acreage treated or gallons applied based on Exposure SAC Policy #9 "Standard Values for Daily Acres Treated in Agriculture".

c Over estimate, PHED is open pour mixing/loading.

d PPE Dermal MOEs (Gloves and Gloves/Double Layers) = NOAEL (4.22 mg/kg/day) / absorbed dermal daily dose (mg/kg/day), where absorbed dermal dose = daily unit exposure (mg/lb ai) x application rate x amount handled per day x dermal absorption factor (0.025) / body weight (60 kg adult).

e 90 % PPE-R Inhalation MOE = NOAEL (1.11 mg/kg/day) / inhalation daily dose (mg/kg/day), where absorbed inhalation dose = daily unit exposure (ug/lb ai) x application rate x amount handled per day x conversion factor (1mg/1,000 ug / body weight (60 kg adult)).

**Appendix B/Table B6: Intermediate-term Margins of Exposure For Metam Sodium Occupational Handler Risk Assessment at Engineering Controls Mitigation**

Exposure Scenario	Crop or Target	Application Rate <sup>a</sup>	Area Treated Daily <sup>b</sup>	Eng Con Dermal Unit Exposure (mg/lb ai)	Eng Con Inhalation Unit Exposure (ug/lb ai)	Eng Cont Dermal Dose	Eng Cont Dermal MOE <sup>d</sup>	Eng Cont Inhalation Dose	Eng Cont Inhalation MOE <sup>e</sup>
Loader									
Transferring Liquids from Tank Delivery Truck to Shank Injection Equipment (mechanical transfer system) (1a)	small areas of ornamentals, food, fiber crops	523 lb ai/acre	5 acres	0.0086	0.083	0.0094	11	0.0036	480
	small areas of ornamentals, food, fiber crops	523 lb ai/acre	0.5 acres	0.0086	0.083	0.00094	110	0.00036	4,800
	ornamentals, food and fiber crops	338 lb ai/acre	128 acres	0.0086	0.083	0.16	1	0.06	29
	ornamentals, food and fiber crops	338 lb ai/acre	80 acres	0.0086	0.083	0.097	1	0.037	47
	ornamentals, food and fiber crops	320 lb ai/acre	128 acres	0.0086	0.083	0.15	1	0.057	31
	ornamentals, food and fiber crops	320 lb ai/acre	80 acres	0.0086	0.083	0.092	1	0.035	49
	peanuts (CBR susceptible cultivators)	63.3 lb ai/acre	128 acres	0.0086	0.083	0.029	3	0.011	160
	peanuts (CBR susceptible cultivators)	63.3 lb ai/acre	80 acres	0.0086	0.083	0.018	6	0.007	250
	cotton, soybeans, sugar beets	38 lb ai/acre	128 acres	0.0086	0.083	0.017	6	0.0067	260
	cotton, soybeans, sugar beets	38 lb ai/acre	80 acres	0.0086	0.083	0.011	9	0.0042	420
	peanuts (CBR resistant cultivators)	32 lb ai/acre	128 acres	0.0086	0.083	0.015	7	0.0057	310
	peanuts (CBR resistant cultivators)	32 lb ai/acre	80 acres	0.0086	0.083	0.0092	11	0.0035	490
	wheat, barley	31.7 lb ai/acre	128 acres	0.0086	0.083	0.015	7	0.0056	310
	wheat, barley	31.7 lb ai/acre	80 acres	0.0086	0.083	0.0091	11	0.0035	500
Transferring Liquids from Tank Delivery Truck to Rotary Tiller Equipment (mechanical transfer system) (1b)	ornamentals, food and fiber crops	338 lb ai/acre	128 acres	0.0086	0.083	0.16	1	0.06	29
	ornamentals, food and fiber crops	338 lb ai/acre	80 acres	0.0086	0.083	0.097	1	0.037	47
	ornamentals, food and fiber crops	320 lb ai/acre	128 acres	0.0086	0.083	0.15	1	0.057	31
	ornamentals, food and fiber crops	320 lb ai/acre	80 acres	0.0086	0.083	0.092	1	0.035	49
Transferring Liquids from Tank Delivery Truck to Pickup Truck and subsequent transfer to Sprinkler irrigation Nurse Tank (mechanical transfer system) (1c)	ornamentals, food and fiber crops	338 lb ai/acre	350 acres	0.0086	0.083	0.42	0	0.16	11
	ornamentals, food and fiber crops	320 lb ai/acre	350 acres	0.0086	0.083	0.4	0	0.15	11
	peanuts (CBR susceptible cultivators)	63.3 lb ai/acre	350 acres	0.0086	0.083	0.079	1	0.031	57
	wheat, barley	31.7 lb ai/acre	350 acres	0.0086	0.083	0.04	3	0.015	110
	peanuts (CBR resistant cultivators)	32 lb ai/acre	350 acres	0.0086	0.083	0.04	3	0.015	110
Transferring Liquids from Tank Delivery Truck to Pickup Truck and subsequent transfer to Drip Irrigation Nurse Tank (mechanical transfer system) (1d)	ornamentals, food and fiber crops	320 lb ai/acre	100 acres	0.0086	0.083	0.11	1	0.044	40
	ornamentals, food and fiber crops	239 lb ai/acre	100 acres	0.0086	0.083	0.086	1	0.033	53
	cotton, soybeans, sugar beets	38 lb ai/acre	100 acres	0.0086	0.083	0.014	7	0.0053	330
Loading Liquids to support Sprinkler Irrigation Applications (Sodium tetrathiocarbonate study used as surrogate data Study # 770AA11) (1e)	ornamentals, food and fiber crops	338 lb ai/acre	350 acres	N/A	ND	0.078	1	ND	ND
	ornamentals, food and fiber crops	320 lb ai/acre	350 acres	N/A	ND	0.074	1	ND	ND
	peanuts (CBR susceptible cultivators)	63.3 lb ai/acre	350 acres	N/A	ND	0.015	7	ND	ND
	wheat, barley	31.7 lb ai/acre	350 acres	N/A	ND	0.0074	14	ND	ND
	peanuts (CBR susceptible cultivators)	32 lb ai/acre	350 acres	N/A	ND	0.0073	14	ND	ND
Loading Liquids to support Drip Irrigation Applications (Sodium tetrathiocarbonate study used as surrogate data Study # 770AA11) (1f)	ornamentals, food and fiber crops	320 lb ai/acre	100 acres	N/A	ND	0.021	5	ND	ND
	ornamentals, food and fiber crops	239 lb ai/acre	100 acres	N/A	ND	0.016	6	ND	ND
	cotton, soybeans, sugar beets	38 lb ai/acre	100 acres	N/A	ND	0.0025	40	ND	ND

**Appendix B/Table B6: Intermediate-term Margins of Exposure For Metam Sodium Occupational Handler Risk Assessment at Engineering Controls Mitigation**

Exposure Scenario	Crop or Target	Application Rate <sup>a</sup>	Area Treated Daily <sup>b</sup>	Eng Con Dermal Unit Exposure (mg/lb ai)	Eng Con Inhalation Unit Exposure (ug/lb ai)	Eng Cont Dermal Dose	Eng Cont Dermal MOE <sup>d</sup>	Eng Cont Inhalation Dose	Eng Cont Inhalation MOE <sup>e</sup>
Applicator									
Applying Liquids via Shank Injection Equipment (using PHED groundboom data) (2)	small areas of ornamentals, food, fiber crops	523 lb ai/acre	5 acres	0.005	0.043	0.0054	18	0.0019	930
	small areas of ornamentals, food, fiber crops	523 lb ai/acre	0.5 acres	0.005	0.043	0.00054	180	0.00019	9,300
	ornamentals, food and fiber crops	338 lb ai/acre	128 acres	0.005	0.043	0.09	1	0.031	56
	ornamentals, food and fiber crops	338 lb ai/acre	80 acres	0.005	0.043	0.056	2	0.019	90
	ornamentals, food and fiber crops, orchard (replant/transplant)	320 lb ai/acre	128 acres	0.005	0.043	0.085	1	0.029	60
	ornamentals, food and fiber crops	320 lb ai/acre	80 acres	0.005	0.043	0.053	2	0.018	95
	peanuts (CBR susceptible cultivators)	63.3 lb ai/acre	128 acres	0.005	0.043	0.017	6	0.0058	300
	peanuts (CBR susceptible cultivators)	63.3 lb ai/acre	80 acres	0.005	0.043	0.011	10	0.0036	480
	cotton, soybeans, sugar beets	38 lb ai/acre	128 acres	0.005	0.043	0.01	10	0.0035	500
	cotton, soybeans, sugar beets	38 lb ai/acre	80 acres	0.005	0.043	0.0063	16	0.0022	800
	peanuts (CBR resistant cultivators)	32 lb ai/acre	128 acres	0.005	0.043	0.0085	12	0.0029	600
	peanuts (CBR resistant cultivators)	32 lb ai/acre	80 acres	0.005	0.043	0.0053	19	0.0018	950
	wheat, barley	31.7 lb ai/acre	128 acres	0.005	0.043	0.0085	12	0.0029	600
	wheat, barley	31.7 lb ai/acre	80 acres	0.005	0.043	0.0053	19	0.0018	960
Applying Water Soluble Liquids via Rotary Tiller Equipment (using PHED groundboom data) (3)	ornamentals, food and fiber crops	338 lb ai/acre	128 acres	0.005	0.043	0.09	1	0.031	56
	ornamentals, food and fiber crops	338 lb ai/acre	80 acres	0.005	0.043	0.056	2	0.019	90
	ornamentals, food and fiber crops	320 lb ai/acre	128 acres	0.005	0.043	0.085	1	0.029	60
	ornamentals, food and fiber crops	320 lb ai/acre	80 acres	0.005	0.043	0.053	2	0.018	95
Loader/Applicator									
Transferring Liquids from Tank Delivery Truck to Shank Injection Equipment (mechanical transfer system) and then applying them via Shank Injection Equipment (using PHED groundboom MLA open cab data) (4a) <sup>c</sup>	small areas of ornamentals, food, fiber crops	523 lb ai/acre	5 acres	ND	ND	ND	ND	ND	ND
	small areas of ornamentals, food, fiber crops	523 lb ai/acre	0.5 acres	ND	ND	ND	ND	ND	ND
	ornamentals, food and fiber crops	338 lb ai/acre	128 acres	ND	ND	ND	ND	ND	ND
	ornamentals, food and fiber crops	338 lb ai/acre	80 acres	ND	ND	ND	ND	ND	ND
	ornamentals, food and fiber crops	320 lb ai/acre	128 acres	ND	ND	ND	ND	ND	ND
	ornamentals, food and fiber crops	320 lb ai/acre	80 acres	ND	ND	ND	ND	ND	ND
	peanuts (CBR susceptible cultivators)	63.3 lb ai/acre	128 acres	ND	ND	ND	ND	ND	ND
	peanuts (CBR susceptible cultivators)	63.3 lb ai/acre	80 acres	ND	ND	ND	ND	ND	ND
	cotton, soybeans, sugar beets	38 lb ai/acre	128 acres	ND	ND	ND	ND	ND	ND
	cotton, soybeans, sugar beets	38 lb ai/acre	80 acres	ND	ND	ND	ND	ND	ND
	peanuts (CBR resistant cultivators)	32 lb ai/acre	128 acres	ND	ND	ND	ND	ND	ND
	peanuts (CBR resistant cultivators)	32 lb ai/acre	80 acres	ND	ND	ND	ND	ND	ND
	wheat, barley	31.7 lb ai/acre	128 acres	ND	ND	ND	ND	ND	ND
	wheat, barley	31.7 lb ai/acre	80 acres	ND	ND	ND	ND	ND	ND

**Appendix B/Table B6: Intermediate-term Margins of Exposure For Metam Sodium Occupational Handler Risk Assessment at Engineering Controls Mitigation**

Exposure Scenario	Crop or Target	Application Rate <sup>a</sup>	Area Treated Daily <sup>b</sup>	Eng Con Dermal Unit Exposure (mg/lb ai)	Eng Con Inhalation Unit Exposure (ug/lb ai)	Eng Cont Dermal Dose	Eng Cont Dermal MOE <sup>d</sup>	Eng Cont Inhalation Dose	Eng Cont Inhalation MOE <sup>e</sup>
Transferring Liquids from Tank Delivery Truck to Shank Injection Equipment (mechanical transfer system) and then applying them via Shank Injection Equipment (using PHED groundboom MLA with closed cab) (4b) <sup>c</sup>	small areas of ornamentals, food, fiber crops	523 lb ai/acre	5 acres	0.089	0.35	0.097	1	0.015	110
	small areas of ornamentals, food, fiber crops	523 lb ai/acre	0.5 acres	0.089	0.35	0.0097	10	0.0015	1,100
	ornamentals, food and fiber crops	338 lb ai/acre	128 acres	0.089	0.35	1.6	0	0.25	7
	ornamentals, food and fiber crops	338 lb ai/acre	80 acres	0.089	0.35	1	0	0.16	11
	ornamentals, food and fiber crops	320 lb ai/acre	128 acres	0.089	0.35	1.5	0	0.24	7
	ornamentals, food and fiber crops	320 lb ai/acre	80 acres	0.089	0.35	0.95	0	0.15	12
	peanuts (CBR susceptible cultivators)	63.3 lb ai/acre	128 acres	0.089	0.35	0.3	0	0.047	37
	peanuts (CBR susceptible cultivators)	63.3 lb ai/acre	80 acres	0.089	0.35	0.19	1	0.03	59
	cotton, soybeans, sugar beets	38 lb ai/acre	128 acres	0.089	0.35	0.18	1	0.028	62
	cotton, soybeans, sugar beets	38 lb ai/acre	80 acres	0.089	0.35	0.11	1	0.018	99
	peanuts (CBR resistant cultivators)	32 lb ai/acre	128 acres	0.089	0.35	0.15	1	0.024	73
	peanuts (CBR resistant cultivators)	32 lb ai/acre	80 acres	0.089	0.35	0.095	1	0.015	120
Transferring Water Soluble Liquids from Tank Delivery Truck to Rotary Tiller Equipment (mechanical transfer system) and then applying them via Rotary Tiller Equipment (using PHED groundboom MLA with open cab) (5a) <sup>c</sup>	ornamentals, food and fiber crops	338 lb ai/acre	128 acres	ND	ND	ND	ND	ND	ND
	ornamentals, food and fiber crops	338 lb ai/acre	80 acres	ND	ND	ND	ND	ND	ND
	ornamentals, food and fiber crops	320 lb ai/acre	128 acres	ND	ND	ND	ND	ND	ND
	ornamentals, food and fiber crops	320 lb ai/acre	80 acres	ND	ND	ND	ND	ND	ND
	ornamentals, food and fiber crops	338 lb ai/acre	128 acres	0.089	0.35	1.6	0	0.25	7
Transferring Liquids from Tank Delivery Truck to Rotary Tiller Equipment (mechanical transfer system) and then applying them via Rotary Tiller Equipment (using PHED groundboom MLA with closed cab) (5b) <sup>c</sup>	ornamentals, food and fiber crops	338 lb ai/acre	80 acres	0.089	0.35	1	0	0.16	11
	ornamentals, food and fiber crops	320 lb ai/acre	128 acres	0.089	0.35	1.5	0	0.24	7
	ornamentals, food and fiber crops	320 lb ai/acre	80 acres	0.089	0.35	0.95	0	0.15	12
	Chemigation Monitor								
Monitoring Chemigation Applications Using Liquid Formulation (6)	No PHED general or Metam Sodium specific data available.								
Irrigator									
Irrigating Following Shank Injection Applications (7)	No PHED general or Metam Sodium specific data available.								
Mixer/Loader/Applicator									
Mixing/Loading/Applying Liquids via Sprinkling Can (using ORETF hose-end data - occupational) (8)	small areas of ornamentals, food, fiber crops	12 lb ai/1000 sq ft	1000 sq ft	NF	NF	NF	NF	NF	NF

**Appendix B/Table B6: Intermediate-term Margins of Exposure For Metam Sodium Occupational Handler Risk Assessment at Engineering Controls Mitigation**

Exposure Scenario	Crop or Target	Application Rate <sup>a</sup>	Area Treated Daily <sup>b</sup>	Eng Con Dermal Unit Exposure (mg/lb ai)	Eng Con Inhalation Unit Exposure (ug/lb ai)	Eng Cont Dermal Dose	Eng Cont Dermal MOE <sup>d</sup>	Eng Cont Inhalation Dose	Eng Cont Inhalation MOE <sup>e</sup>
Mixing/Loading/Applying Water Soluble Liquids via hose-proportioner (using ORETF LCO hand-gun data - occupational) (9)	small areas of ornamentals, food, fiber crops	350 lb ai/acre	5 acres	NF	NF	NF	NF	NF	NF
	small areas of ornamentals, food, fiber crops	350 lb ai/acre	0.5 acres	NF	NF	NF	NF	NF	NF
Mixing/Loading/Applying Water Soluble Liquids via power sprayer (using ORETF LCO hand-gun data - occupational) (10)	drained water bodies and shorelines						No intermediate-term handler MOEs were calculated for this scenario.		
Mixing/Loading/Applying Liquids via cement mixer (using PHED Mixer/Loader data for Open-pour Liquids) (11)	potting soil						No intermediate-term handler MOEs were calculated for this scenario.		
Mixing/Loading/Applying Liquids via shredder (using PHED Mixer/Loader data for Open-pour Liquids) (12)	potting soil						No intermediate-term handler MOEs were calculated for this scenario.		
\Mixing/Loading/Applying Liquid with Foaming Equipment (using PHED Mixer/Loader data for Open-pour Liquids) (13)	sewer roots	350 lb ai/acre	1350 gallons	NF	NF	NF	NF	NF	NF
	sewer roots	0.012 lb ai/cu ft	675 gallons	NF	NF	NF	NF	NF	NF
Mixing/Loading/Applying Liquids via Open Pour (using PHED Mixer/Loader data for Open-pour Liquids) (14)	tree replanting						No intermediate-term handler MOEs were calculated for this scenario.		

**Footnotes**

N/A Not Applicable

ND No Data

NF Not Feasible

a Application rates are the maximum application rates determined from EPA registered labels for metam sodium.

b Amount handled per day values are EPA estimates of acreage treated or gallons applied based on Exposure SAC Policy #9 "Standard Values for Daily Acres Treated in Agriculture".

c Over estimate, PHED is open pour mixing/loading.

d Engineering Controls Dermal MOE = NOAEL (4.22 mg/kg/day) / absorbed dermal daily dose (mg/kg/day), where absorbed dermal dose = daily unit exposure (mg/lb ai) x application rate x amount handled per day x dermal absorption factor (0.025) / body weight (60 kg adult).

e Engineering Controls Inhalation MOE = NOAEL (1.11 mg/kg/day) / inhalation daily dose (mg/kg/day), where absorbed inhalation dose = daily unit exposure (μg/lb ai) x application rate x amount handled per day x conversion factor (1mg/1,000 μg / body weight (60 kg adult)).

## **Appendix C: Occupational Handler Non-cancer Assumptions for MITC**

**Appendix C/Table C1: Sources of Exposure Data Used In The Occupational MITC Handler Exposure And Risk Calculations**

Scenario	Replicate	Residue (Adjusted for Field Fortification, if needed) ( $\pm$ g)	Replicate length (min)	Flow rate (L/min)	Application Rate (lb ai/A)	Concentration ( $\pm$ g/m <sup>3</sup> )	Concentration Normalized to Maximum Application Rate ( $\pm$ g/m <sup>3</sup> )	Individual Study Geometric Mean	Geometric Mean for All Replicates in Scenario
<b>CHEMIGATION</b>									
<b>CHEMIGATION LOADER</b>									
<b>MRID# 42968402 - Chemigation Loader - Loaded from Tank Truck to Interim Tank then to Nurse Tank</b>									
Loaded from tank truck to truck-mounted interim tank and then drove to site of nurse tank and transferred to nurse tank that would feed irrigation system	1	4.89	70	0.85	320	8.22e+01	8.22e+01	<b>4.40e+02</b>	<b>2.12e+02</b>
	2	23.89	65	1.1	320	3.34e+02	3.34e+02		
	3	5.43	74	0.95	320	7.73e+01	7.73e+01		
	4	25.84	70	1	320	3.69e+02	3.69e+02		
	5	46.94	63	0.95	320	7.84e+02	7.84e+02		
	6	9.51	78	0.95	320	1.28e+02	1.28e+02		
	7	26.93	68	1	320	3.96e+02	3.96e+02		
	8	122.30	47	0.95	320	2.74e+03	2.74e+03		
	9	93.53	43	0.95	320	2.29e+03	2.29e+03		
	10	78.62	56	1	320	1.40e+03	1.40e+03		
<b>MRID# 42958401 - Chemigation Loader - Loaded from Tank Truck to Nurse Tank</b>									
Loaded from tank truck directly into nurse tank that would feed irrigation system	1	1.00	8	1	320	1.25e+02	1.25e+02	<b>1.02e+02</b>	
	2	1.00	9	1	320	1.11e+02	1.11e+02		
	3	1.00	9	1	320	1.11e+02	1.11e+02		
	4	1.00	12	1	320	8.33e+01	8.33e+01		
	5	1.00	12	0.98	320	8.50e+01	8.50e+01		

**Appendix C/Table C1: Sources of Exposure Data Used In The Occupational MITC Handler Exposure And Risk Calculations**

Scenario	Replicate	Residue (Adjusted for Field Fortification, if needed) ( : g)	Replicate length (min)	Flow rate (L/min)	Application Rate (lb ai/A)	Concentration ( : g/m <sup>3</sup> )	Concentration Normalized to Maximum Application Rate ( : g/m <sup>3</sup> )	Individual Study Geometric Mean	Geometric Mean for All Replicates in Scenario
<b>CHEMIGATION MONITOR</b>									
<b>MRID#45123902 - Monitored Chemigation Application - Applied Through Sprinkler Irrigation</b>									
First replicate lost; Monitors 2 and 3 spent more time on the treated field than the others	1	Sample Lost - No Data						<b>1.18e+02</b>	
	2	45.70	131	1	320	3.49e+02	3.49e+02		
	3	18.10	122	1	320	1.48e+02	1.48e+02		
	4	19.90	122	1	320	1.63e+02	1.63e+02		
	5	6.00	121	1	320	4.96e+01	4.96e+01		
	6	6.70	122	1	320	5.49e+01	5.49e+01		
<b>MRID# 42968402 - Monitored Chemigation Application - Applied Through Sprinkler Irrigation</b>									
Monitored sprinkler irrigation -- spent much of time inside car/truck	1	41.67	254	1	320	1.64e+02	1.64e+02	<b>8.91e+02</b>	<b>2.10e+02</b>
	2	18.78	241	0.95	320	8.20e+01	8.20e+01		
	3	66.98	243	0.95	320	2.90e+02	2.90e+02		
	4	374.47	245	0.9	320	1.70e+03	1.70e+03		
	5	153.13	240	0.95	320	6.72e+02	6.72e+02		
	6	395.68	240	0.95	320	1.74e+03	1.74e+03		
	7	642.34	241	0.95	320	2.81e+03	2.81e+03		
	8	640.29	243	0.95	320	2.77e+03	2.77e+03		
	9	551.55	241	1.2	320	1.91e+03	1.91e+03		
	10	561.86	240	0.85	320	2.75e+03	2.75e+03		
<b>MRID# 42958401 - Monitored Chemigation Application - Applied Through Sprinkler Irrigation</b>									
Monitors application by adjusting/checking system - spends most time in car parked 10 to 50 feet away	1	19.30	241	1	320	8.01e+01	8.01e+01	<b>8.77e+01</b>	
	2	18.20	240	1	320	7.58e+01	7.58e+01		
	3	30.30	240	0.98	320	1.29e+02	1.29e+02		
	4	17.60	240	1	320	7.33e+01	7.33e+01		
	5	19.80	224	0.98	320	9.02e+01	9.02e+01		

**Appendix C/Table C1: Sources of Exposure Data Used In The Occupational MITC Handler Exposure And Risk Calculations**

Scenario	Replicate	Residue (Adjusted for Field Fortification, if needed) (: g)	Replicate length (min)	Flow rate (L/min)	Application Rate (lb ai/A)	Concentration (: g/m <sup>3</sup> )	Concentration Normalized to Maximum Application Rate (: g/m <sup>3</sup> )	Individual Study Geometric Mean	Geometric Mean for All Replicates in Scenario		
<b>SHANK INJECTION</b>											
<b>SHANK INJECTION: LOADER</b>											
<b>MRID#42968402 Loader Supporting Shank Injection</b>											
Loader only - loaded from tanker truck into injection equipment with pumps and hoses (mostly closed system)	1	0.50	17	1.1	320	2.67e+01	2.67e+01	<b>2.12e+02</b>	<b>2.12e+02</b>		
	2	0.50	7	1	320	7.14e+01	7.14e+01				
	3	5.16	9	1	320	5.73e+02	5.73e+02				
	4	4.63	4	1	320	1.16e+03	1.16e+03				
	5	0.50	7	0.95	320	7.52e+01	7.52e+01				
	6	0.50	5	1	320	1.00e+02	1.00e+02				
	7	2.91	4	1	320	7.27e+02	7.27e+02				
	8	2.31	3	1	320	7.71e+02	7.71e+02				
	9	1.60	5	0.95	320	3.37e+02	3.37e+02				
	10	0.50	5	1	320	1.00e+02	1.00e+02				
<b>SHANK INJECTION: APPLICATOR - ENCLOSED CAB CHARCOAL FILTER</b>											
<b>MRID#42968402 Shank Injection Applicator - Enclosed Cab Charcoal Filter</b>											
Applicator only - exited cab for repairs	1	13.52	78	1	320	1.73e+02	1.73e+02	<b>2.22e+02</b>	<b>2.22e+02</b>		
	2	17.91	63	1	320	2.84e+02	2.84e+02				
<b>SHANK INJECTION: APPLICATOR - ENCLOSED CAB CELLULOSE FILTER</b>											
<b>MRID#42968402 Shank Injection Applicator - Enclosed Cab Cellulose (A/C) Filter</b>											
Applicator only - exited cab for repairs	1	83.63	74	1	320	1.13e+03	1.13e+03	<b>1.49e+03</b>	<b>1.49e+03</b>		
	2	103.80	61	0.95	320	1.79e+03	1.79e+03				
	3	88.37	60	0.95	320	1.55e+03	1.55e+03				
	4	93.12	60	1	320	1.55e+03	1.55e+03				

Appendix C/Table C1: Sources of Exposure Data Used In The Occupational MITC Handler Exposure And Risk Calculations											
Scenario	Replicate	Residue (Adjusted for Field Fortification, if needed) (: g)	Replicate length (min)	Flow rate (L/min)	Application Rate (lb ai/A)	Concentration (: g/m <sup>3</sup> )	Concentration Normalized to Maximum Application Rate (: g/m <sup>3</sup> )	Individual Study Geometric Mean	Geometric Mean for All Replicates in Scenario		
<b>SHANK INJECTION: APPLICATOR - OPEN CAB</b>											
<b>MRID#42968402 Shank Injection Applicator - Open Cab</b>											
Applicator only - exited cab for repairs	1	26.69	60	1	320	4.45e+02	4.45e+02	<b>7.19e+02</b>	<b>7.19e+02</b>		
	2	296.56	77	1	320	3.85e+03	3.85e+03				
	3	40.93	61	0.95	320	7.06e+02	7.06e+02				
	4	15.07	62	1.1	320	2.21e+02	2.21e+02				
<b>SHANK INJECTION - SAMPLER INSIDE ENCLOSED CAB WITH CHARCOAL FILTER</b>											
<b>MRID#45123902 In-Cab Sampler - Enclosed Cab - Charcoal Filter</b>											
Sampling pump was operated in enclosed tractor cab with charcoal filter	1	32.40	113	1	160	2.87e+02	5.73e+02	<b>7.87e+02</b>	<b>9.75e+02</b>		
	2	42.70	144	1	160	2.97e+02	5.93e+02				
	3	47.50	121	1	160	3.93e+02	7.85e+02				
	4	54.10	116	1	160	4.66e+02	9.33e+02				
	5	39.80	111	1	160	3.59e+02	7.17e+02				
	6	53.80	81	1	160	6.64e+02	1.33e+03				
<b>MRID#45703703 In-Cab Sampler - Enclosed Cab - Charcoal Filter</b>											
Sampling pump was operated in enclosed tractor cab with charcoal filter	1	106.39	176	1	160	6.04e+02	1.21e+03	<b>1.21e+03</b>	<b>1.21e+03</b>		
	2	74.52	118	1	160	6.31e+02	1.26e+03				
	3	88.13	153	1	160	5.76e+02	1.15e+03				

**Appendix C/Table C1: Sources of Exposure Data Used In The Occupational MITC Handler Exposure And Risk Calculations**

Scenario	Replicate	Residue (Adjusted for Field Fortification, if needed) (: g)	Replicate length (min)	Flow rate (L/min)	Application Rate (lb ai/A)	Concentration (: g/m <sup>3</sup> )	Concentration Normalized to Maximum Application Rate (: g/m <sup>3</sup> )	Individual Study Geometric Mean	Geometric Mean for All Replicates in Scenario		
<b>SHANK INJECTION: LOADER/APPLICATOR: ENCLOSED CAB-CHARCOAL FILTER</b>											
<b>MRID#45123902 Loader/Applicator: Enclosed Cab - Charcoal Filter</b>											
Loaded from tank truck into injection equipment; drove the tractor, but left the tractor to make repairs.	1	32.50	116	1	160	2.80e+02	5.60e+02	1.02e+03	1.19e+03		
	2	54.20	142	1	160	3.82e+02	7.63e+02				
	3	147.60	121	1	160	1.22e+03	2.44e+03				
	4	81.80	116	1	160	7.05e+02	1.41e+03				
	5	48.00	111	1	160	4.32e+02	8.65e+02				
	6	36.60	81	1	160	4.52e+02	9.04e+02				
<b>MRID#45703703 Loader/Applicator: Enclosed Cab - Charcoal Filter</b>											
Loaded from tank truck into injection equipment; drove the tractor, but left the tractor to make repairs.	1	112.28	174	1	160	6.45e+02	1.29e+03	1.38e+03			
	2	80.75	118	1	160	6.84e+02	1.37e+03				
	3	113.42	152	1	160	7.46e+02	1.49e+03				
<b>SHANK INJECTION FIELD IRRIGATOR FOLLOWING APPLICATION</b>											
<b>MRID#45123902 Handler Irrigated Fields Following Shank Injections</b>											
Irrigated field shortly after shank application to water-seal the field behind the application equipment.	1	41.40	140	1	160	2.96e+02	5.91e+02	2.65e+02	3.51e+02		
	2	22.00	135	1	160	1.63e+02	3.26e+02				
	3	18.10	107	1	160	1.69e+02	3.38e+02				
	4	11.80	114	1	160	1.04e+02	2.07e+02				
	5	8.80	120	1	160	7.33e+01	1.47e+02				
	6	10.40	118	1	160	8.81e+01	1.76e+02				
<b>MRID#45703703 Handler Irrigated Fields Following Shank Injections</b>											
Irrigated field shortly after shank application to water-seal the field behind the application equipment	1	Sample Lost: No Data						4.64e+02			
	2	31.08	181	1	160	1.72e+02	3.43e+02				
	3	58.98	179	1	160	3.29e+02	6.59e+02				
	4	35.05	181	1	160	1.94e+02	3.87e+02				
	5	61.70	202	1	160	3.05e+02	6.11e+02				
	6	40.26	200	1	160	2.01e+02	4.03e+02				

**Appendix C/Table C1: Sources of Exposure Data Used In The Occupational MITC Handler Exposure And Risk Calculations**

Scenario	Replicate	Residue (Adjusted for Field Fortification, if needed) ( $\pm$ g)	Replicate length (min)	Flow rate (L/min)	Application Rate (lb ai/A)	Concentration ( $\pm$ g/m <sup>3</sup> )	Concentration Normalized to Maximum Application Rate ( $\pm$ g/m <sup>3</sup> )	Individual Study Geometric Mean	Geometric Mean for All Replicates in Scenario		
<b>ROTARY TILLER APPLICATION</b>											
<b>ROTARY TILLER: LOADER</b>											
<b>MRID#42958401 Loader Supporting Rotary Tiller Application</b>											
Loaded from tank truck to rotary tiller equipment with pumps and hoses	1	1.00	11	1	320	9.09e+01	9.09e+01	<b>3.14e+02</b>	<b>3.14e+02</b>		
	2	8.76	5	1	320	1.75e+03	1.75e+03				
	3	2.88	9	1	320	3.19e+02	3.19e+02				
	4	6.18	5	1	320	1.24e+03	1.24e+03				
	5	1.00	8	0.98	320	1.28e+02	1.28e+02				
	6	2.24	8	1	320	2.80e+02	2.80e+02				
	7	1.00	8	0.98	320	1.28e+02	1.28e+02				
	8	2.64	8	1	320	3.30e+02	3.30e+02				
	9	2.06	3	1	320	6.88e+02	6.88e+02				
	10	1.00	7	1	320	1.43e+02	1.43e+02				
<b>ROTARY TILLER: APPLICATOR - ENCLOSED CAB CHARCOAL FILTER</b>											
<b>MRID#42958401 Rotary Tiller Applicator - Enclosed Cab Charcoal Filter</b>											
Applicator only - exited cab for repairs	1	41.60	65	0.98	320	6.53e+02	6.53e+02	<b>5.96e+02</b>	<b>5.96e+02</b>		
	2	174.50	70	1	320	2.49e+03	2.49e+03				
	3	31.80	63	0.95	320	5.31e+02	5.31e+02				
	4	23.90	72	0.93	320	3.57e+02	3.57e+02				
	5	16.50	68	1	320	2.43e+02	2.43e+02				
<b>ROTARY TILLER: APPLICATOR - ENCLOSED CAB CELLULOSE (A/C) FILTER</b>											
<b>MRID#42958401 Rotary Tiller Applicator - Enclosed Cab Cellulose (A/C) Filter</b>											
Applicator only - exited cab for repairs	1	25.30	56	0.98	320	4.61e+02	4.61e+02	<b>5.67e+02</b>	<b>5.67e+02</b>		
	2	12.40	57	1	320	2.18e+02	2.18e+02				
	3	60.10	60	0.98	320	1.02e+03	1.02e+03				
	4	27.60	60	0.98	320	4.69e+02	4.69e+02				
	5	72.90	63	0.95	320	1.22e+03	1.22e+03				

**Appendix D: Occupational Handler Cancer Assumptions and Exposures Risks for Metam Sodium**

**Appendix D/Table D1: Noncommercial Applicator Cancer Risks For Metam Sodium Occupational Handler Risk Assessment at Baseline Mitigation**

Exposure Scenario	Crop Type	Typical Application Rate <sup>a</sup>	Area Treated <sup>b</sup>	Baseline Dermal Unit Exposure (mg/lb ai)	Baseline Inhalation Unit Exposure (ug/lb ai)	Noncommercial Applicator Total Baseline LADD (mg/kg/day)	Noncommercial Applicator Baseline Cancer Risk
Mixer/Loader							
Transferring Liquids from Tank Delivery Truck to Shank Injection Equipment (mechanical transfer system) (1a)	seed beds, plant beds	523 lb ai/acre	5 acres	2.9	1.2	1.9E-02	3.7E-03
	tobacco plant beds	387 lb ai/acre	20 acres	2.9	1.2	5.6E-02	1.1E-02
	orchard replant/transplant sites	320 lb ai/acre	100 acres	2.9	1.2	2.3E-01	4.6E-02
	turf (sod farms)	252 lb ai/acre	100 acres	2.9	1.2	1.8E-01	3.6E-02
	turf (golf courses)	252 lb ai/acre	20 acres	2.9	1.2	3.6E-02	7.2E-03
	wheat, barley	162 lb ai/acre	100 acres	2.9	1.2	1.2E-01	2.3E-02
	ornamentals and food crops	108 lb ai/acre	100 acres	2.9	1.2	7.8E-02	1.5E-02
	fiber crops (cotton)	44.4 lb ai/acre	100 acres	2.9	1.2	3.2E-02	6.3E-03
Transferring Liquids from Tank Delivery Truck to Rotary Tiller Equipment (mechanical transfer system) (1b)	peanuts	27.5 lb ai/acre	100 acres	2.9	1.2	2.0E-02	3.9E-03
	turf (sod farms)	252 lb ai/acre	100 acres	2.9	1.2	1.8E-01	3.6E-02
	turf (golf courses)	252 lb ai/acre	20 acres	2.9	1.2	3.6E-02	7.2E-03
	ornamentals and food crops	108 lb ai/acre	100 acres	2.9	1.2	7.8E-02	1.5E-02
Transferring Liquids from Tank Delivery Truck to Pick-up Truck and subsequent transfer to Sprinkler irrigation Nurse Tank (mechanical transfer system) (1c)	fiber crops (cotton)	44.4 lb ai/acre	100 acres	2.9	1.2	3.2E-02	6.3E-03
	tobacco plant beds	387 lb ai/acre	20 acres	2.9	1.2	5.6E-02	1.1E-02
	orchard replant/transplant sites	320 lb ai/acre	350 acres	2.9	1.2	8.1E-01	1.6E-01
	turf (sod farms)	252 lb ai/acre	350 acres	2.9	1.2	6.4E-01	1.3E-01
	wheat, barley	162 lb ai/acre	350 acres	2.9	1.2	4.1E-01	8.1E-02
	ornamentals and food crops	108 lb ai/acre	350 acres	2.9	1.2	2.7E-01	5.4E-02
Transferring Liquids from Tank Delivery Truck to Pick-up Truck and subsequent transfer to Drip Irrigation Nurse Tank (mechanical transfer system) (1d)	fiber crops (cotton)	44.4 lb ai/acre	350 acres	2.9	1.2	1.1E-01	2.2E-02
	peanuts	27.5 lb ai/acre	350 acres	2.9	1.2	6.9E-02	1.4E-02
	turf (sod farms)	252 lb ai/acre	100 acres	2.9	1.2	1.8E-01	3.6E-02
Loading Liquids to support Sprinkler Irrigation Applications (Sodium tetraethiocarbonate study used as surrogate data Study # 770AA11) (1e)	ornamentals and food crops	108 lb ai/acre	100 acres	2.9	1.2	7.8E-02	1.5E-02
	fiber crops (cotton)	44.4 lb ai/acre	100 acres	2.9	1.2	3.2E-02	6.3E-03
	tobacco plant beds	ND	ND	ND	ND	ND	ND
	orchard replant/transplant sites	ND	ND	ND	ND	ND	ND
	turf (sod farms)	ND	ND	ND	ND	ND	ND
	wheat, barley <sup>d</sup>	ND	ND	ND	ND	ND	ND
Loading Liquids to support Drip Irrigation Applications (Sodium tetraethiocarbonate study used as surrogate data Study # 770AA11) (1f)	ornamentals and food crops	ND	ND	ND	ND	ND	ND
	cotton, soybeans, sugar beets	ND	ND	ND	ND	ND	ND
	peanuts	ND	ND	ND	ND	ND	ND
	turf (sod farms)	ND	ND	ND	ND	ND	ND
Loading Liquids to support Drip Irrigation Applications (Sodium tetraethiocarbonate study used as surrogate data Study # 770AA11) (1f)	ornamentals and food crops	ND	ND	ND	ND	ND	ND
	cotton, soybeans, sugar beets	ND	ND	ND	ND	ND	ND

**Appendix D/Table D1: Noncommercial Applicator Cancer Risks For Metam Sodium Occupational Handler Risk Assessment at Baseline Mitigation**

Exposure Scenario	Crop Type	Typical Application Rate <sup>a</sup>	Area Treated <sup>b</sup>	Baseline Dermal Unit Exposure (mg/lb ai)	Baseline Inhalation Unit Exposure (ug/lb ai)	Noncommercial Applicator Total Baseline LADD (mg/kg/day)	Noncommercial Applicator Baseline Cancer Risk
Applicator							
Applying Liquids via Shank Injection Equipment (using PHED groundboom data) (2)	seed beds, plant beds	523 lb ai/acre	5 acres	0.014	0.74	2.8E-04	5.5E-05
	tobacco plant beds	387 lb ai/acre	20 acres	0.014	0.74	8.3E-04	1.6E-04
	orchard replant/transplant sites	320 lb ai/acre	100 acres	0.014	0.74	3.4E-03	6.8E-04
	turf (sod farms)	252 lb ai/acre	100 acres	0.014	0.74	2.7E-03	5.3E-04
	turf (golf courses)	252 lb ai/acre	20 acres	0.014	0.74	5.4E-04	1.1E-04
	wheat, barley	162 lb ai/acre	100 acres	0.014	0.74	1.7E-03	3.4E-04
	ornamentals and food crops	108 lb ai/acre	100 acres	0.014	0.74	1.2E-03	2.3E-04
	fiber crops (cotton)	44.4 lb ai/acre	100 acres	0.014	0.74	4.7E-04	9.4E-05
Applying Water Soluble Liquids via Rotary Tiller Equipment (using PHED groundboom data) (3)	peanuts	27.5 lb ai/acre	100 acres	0.014	0.74	2.9E-04	5.8E-05
	turf (sod farms)	252 lb ai/acre	100 acres	0.014	0.74	2.7E-03	5.3E-04
	turf (golf courses)	252 lb ai/acre	20 acres	0.014	0.74	5.4E-04	1.1E-04
	ornamentals and food crops	108 lb ai/acre	100 acres	0.014	0.74	1.2E-03	2.3E-04
Loader/Applicator							
Transferring Liquids from Tank Delivery Truck to Shank Injection Equipment (mechanical transfer system) and then applying them via Shank Injection Equipment (using PHED groundboom MLA open cab data) (4a) <sup>c</sup>	seed beds, plant beds	523 lb ai/acre	5 acres	0.88	1.3	6.0E-03	1.2E-03
	tobacco plant beds	387 lb ai/acre	20 acres	0.88	1.3	1.8E-02	3.5E-03
	orchard replant/transplant sites	320 lb ai/acre	100 acres	0.88	1.3	7.3E-02	1.4E-02
	turf (sod farms)	252 lb ai/acre	100 acres	0.88	1.3	5.7E-02	1.1E-02
	turf (golf courses)	252 lb ai/acre	20 acres	0.88	1.3	1.1E-02	2.3E-03
	wheat, barley	162 lb ai/acre	100 acres	0.88	1.3	3.7E-02	7.3E-03
	ornamentals and food crops	108 lb ai/acre	100 acres	0.88	1.3	2.5E-02	4.9E-03
	fiber crops (cotton)	44.4 lb ai/acre	100 acres	0.88	1.3	1.0E-02	2.0E-03
Transferring Liquids from Tank Delivery Truck to Shank Injection Equipment (mechanical transfer system) and then applying them via Shank Injection Equipment (using PHED groundboom MLA with enclosed cab) (4b) <sup>c</sup>	peanuts	27.5 lb ai/acre	100 acres	0.88	1.3	6.3E-03	1.2E-03
	seed beds, plant beds	523 lb ai/acre	5 acres	ND-OC	ND-OC	ND	ND
	tobacco plant beds	387 lb ai/acre	20 acres	ND-OC	ND-OC	ND	ND
	orchard replant/transplant sites	320 lb ai/acre	100 acres	ND-OC	ND-OC	ND	ND
	turf (sod farms)	252 lb ai/acre	100 acres	ND-OC	ND-OC	ND	ND
	turf (golf courses)	252 lb ai/acre	20	ND-OC	ND-OC	ND	ND
	wheat, barley	162 lb ai/acre	100 acres	ND-OC	ND-OC	ND	ND
	ornamentals and food crops	108 lb ai/acre	100 acres	ND-OC	ND-OC	ND	ND
Transferring Water Soluble Liquids from Tank Delivery Truck to Rotary Tiller Equipment (mechanical transfer system) and then applying them via Rotary Tiller Equipment (using PHED groundboom MLA with open cab) (5a) <sup>c</sup>	fiber crops (cotton)	44.4 lb ai/acre	100 acres	ND-OC	ND-OC	ND	ND
	peanuts	27.5 lb ai/acre	100 acres	ND-OC	ND-OC	ND	ND
	turf (sod farms)	252 lb ai/acre	100 acres	0.88	1.3	5.7E-02	1.1E-02
	turf (golf courses)	252 lb ai/acre	20 acres	0.88	1.3	1.1E-02	2.3E-03
Transferring Water Soluble Liquids from Tank Delivery Truck to Rotary Tiller Equipment (mechanical transfer system) and then applying them via Rotary Tiller Equipment (using PHED groundboom MLA with open cab) (5a) <sup>c</sup>	ornamentals and food crops	108 lb ai/acre	100 acres	0.88	1.3	2.5E-02	4.9E-03
	fiber crops (cotton)	44.4 lb ai/acre	100 acres	0.88	1.3	1.0E-02	2.0E-03

**Appendix D/Table D1: Noncommercial Applicator Cancer Risks For Metam Sodium Occupational Handler Risk Assessment at Baseline Mitigation**

Exposure Scenario	Crop Type	Typical Application Rate <sup>a</sup>	Area Treated <sup>b</sup>	Baseline Dermal Unit Exposure (mg/lb ai)	Baseline Inhalation Unit Exposure (ug/lb ai)	Noncommercial Applicator Total Baseline LADD (mg/kg/day)	Noncommercial Applicator Baseline Cancer Risk
Transferring Liquids from Tank Delivery Truck to Rotary Tiller Equipment (mechanical transfer system) and then applying them via Rotary Tiller Equipment (using PHED groundboom MLA with closed cab) (5b) <sup>c</sup>	turf (sod farms)	252 lb ai/acre	100 acres	ND-OC	ND-OC	No Data	No Data
	turf (golf courses)	252 lb ai/acre	20 acres	ND-OC	ND-OC	No Data	No Data
	ornamentals and food crops	108 lb ai/acre	100 acres	ND-OC	ND-OC	No Data	No Data
	fiber crops (cotton)	44.4 lb ai/acre	100 acres	ND-OC	ND-OC	No Data	No Data
Chemigation Monitor							
Monitoring Chemigation Applications Using Liquid Formulation (6)	No PHED general or Metam Sodium specific data available.						
Soil Seal Irrigator							
Sealing Soil with Irrigation Water Following Shank Injection Applications Using Liquid Formulations (7)	No PHED general or Metam Sodium specific data available.						
Mixer/Loader/Applicator							
Mixing/Loading/Applying Liquids via Sprinkling Can (using ORETF hose-end data - occupational) (8)	small areas of ornamentals, food, fiber crops, seed beds, plant beds, tobacco plant beds, lawns	12 lb ai/1000 sq ft	1000 sq ft	5.6	16	1.8E-04	3.6E-05
	potting soil	4 lb ai/1000 sq ft	1000 sq ft	5.6	16	6.1E-05	1.2E-05
Mixing/Loading/Applying Water Soluble Liquids via hose-proportioner (using ORETF hand-gun data - occupational) (9)	small areas of ornamentals, food, fiber crops, seed beds, plant beds, tobacco plant beds, lawns	350 lb ai/acre	5 acres	0.69	1.5	3.2E-03	6.4E-04
	small areas of ornamentals, food, fiber crops, seed beds, plant beds, tobacco plant beds, lawns	350 lb ai/acre	0.5 acres	0.69	1.5	3.2E-04	6.4E-05
Mixing/Loading/Applying Water Soluble Liquids via power sprayer (using ORETF LCO hand-gun data - occupational) (10)	drained water bodies and shorelines	350 lb ai/acre	5 acres	0.69	1.5	3.2E-03	6.4E-04
Mixing/Loading/Applying Liquids via cement mixer (using PHED Mixer/Loader data for Open-pour Liquids) (11)	potting soil	0.012 lb ai/cu ft	54 lb ai/cu ft	2.9	1.2	4.7E-06	9.3E-07
Mixing/Loading/Applying Liquids via shredder (using PHED Mixer/Loader data for Open-pour Liquids) (12)	potting soil	0.012 lb ai/cu ft	54 lb ai/cu ft	2.9	1.2	4.7E-06	9.3E-07

**Appendix D/Table D1: Noncommercial Applicator Cancer Risks For Metam Sodium Occupational Handler Risk Assessment at Baseline Mitigation**

Exposure Scenario	Crop Type	Typical Application Rate <sup>a</sup>	Area Treated <sup>b</sup>	Baseline Dermal Unit Exposure (mg/lb ai)	Baseline Inhalation Unit Exposure (ug/lb ai)	Noncommercial Applicator Total Baseline LADD (mg/kg/day)	Noncommercial Applicator Baseline Cancer Risk
Mixing/Loading/Applying Liquid with Foaming Equipment (using PHED Mixer/Loader data for Open-pour Liquids) (13)	sewer roots	0.212 lb ai/gal	1350 gals	2.9	1.2	2.1E-03	4.1E-04
	sewer roots	0.212 lb ai/gal	675 gals	2.9	1.2	1.0E-03	2.0E-04
Mixing>Loading/Applying Liquids via Open Pour (using PHED Mixer/Loader data for Open-pour Liquids) (14)tree replanting	tree replanting	16 lb ai/1000 sq ft	1000 sq ft	2.9	1.2	1.2E-04	2.3E-05

**Footnotes:**

\* Noncommercial applicator exposure was considered to be 5 days per year for 35 years over a 70 year lifetime.

ND No Data

ND-OC No Data, see open cab scenario above

a Application rates are the typical application rates determined from EPA registered labels for metam sodium.

b Amount handled per day values are EPA estimates of acreage treated or gallons applied based on Exposure SAC Policy #9 "Standard Values for Daily Acres Treated in Agriculture".

c Over estimate, PHED is open pour mixing/loading.

**Appendix D/Table D2: Noncommercial Applicator Cancer Risks For Metam Sodium Occupational Handler Risk Assessment at PPE Mitigation**

Exposure Scenario	Crop Type	Typical Application Rate <sup>a</sup>	Area Treated <sup>b</sup>	PPE-1 (gl)	PPE-2 (gl, dl)	90% PPE (resp) Inhalation Unit	Noncommercial LADDs				Noncommercial Cancer Risks			
				Dermal Unit Exposur	Dermal Unit Exposur		PPE-G-NR (mg/kg/day)	PPE-G, DL-NR (mg/kg/day)	PPE-G-90%R (mg/kg/day)	PPE-G, DL-90%R (mg/kg/day)	Applicato r PPE-G-NR <sup>c</sup>	Applicato r PPE-G, DL-NR <sup>d</sup>	Applicator PPE-G-90%R <sup>e</sup>	Applicator PPE-G, DL-90%R <sup>f</sup>
		e (mg/lb)	e (mg/lb)	Exposure <sup>g</sup> (mg/lb·hr)	Mixer/Loader									
Transferring Liquids from Tank Delivery Truck to Shank Injection Equipment (mechanical transfer system) (1a)	seed beds, plant beds	523 lb ai/acre	5 acres	0.023	0.017	0.12	0.00045	0.00042	0.00018	0.00014	9.0E-05	8.2e-05	3.5E-05	2.8E-05
	tobacco plant beds	387 lb ai/acre	20 acres	0.023	0.017	0.12	0.0013	0.0012	0.00053	0.00041	2.7E-04	2.4e-04	1.0E-04	8.2E-05
	orchard replant/transplant sites	320 lb ai/acre	100 acres	0.023	0.017	0.12	0.0056	0.0051	0.0022	0.0017	1.1E-03	1.0e-03	4.3E-04	3.4E-04
	turf (sod farms)	252 lb ai/acre	100 acres	0.023	0.017	0.12	0.0044	0.004	0.0017	0.0013	8.7E-04	7.9e-04	3.4E-04	2.7E-04
	turf (golf courses)	252 lb ai/acre	20 acres	0.023	0.017	0.12	0.00088	0.0008	0.00034	0.00027	1.7E-04	1.6e-04	6.8E-05	5.3E-05
	wheat, barley	162 lb ai/acre	100 acres	0.023	0.017	0.12	0.0028	0.0026	0.0011	0.00086	5.6E-04	5.1e-04	2.2E-04	1.7E-04
	ornamentals and food crops	108 lb ai/acre	100 acres	0.023	0.017	0.12	0.0019	0.0017	0.00073	0.00058	3.7E-04	3.4e-04	1.5E-04	1.1E-04
	fiber crops (cotton)	44.4 lb ai/acre	100 acres	0.023	0.017	0.12	0.00077	0.00071	0.0003	0.00024	1.5E-04	1.4e-04	6.0E-05	4.7E-05
	peanuts	27.5 lb ai/acre	100 acres	0.023	0.017	0.12	0.00048	0.00044	0.00019	0.00015	9.5E-05	8.7e-05	3.7E-05	2.9E-05
Transferring Liquids from Tank Delivery Truck to Rotary Tiller Equipment (mechanical transfer system) (1b)	turf (sod farms)	252 lb ai/acre	100 acres	0.023	0.017	0.12	0.0044	0.004	0.0017	0.0013	8.7E-04	7.9e-04	3.4E-04	2.7E-04
	turf (golf courses)	252 lb ai/acre	20 acres	0.023	0.017	0.12	0.00088	0.0008	0.00034	0.00027	1.7E-04	1.6e-04	6.8E-05	5.3E-05
	ornamentals and food crops	108 lb ai/acre	100 acres	0.023	0.017	0.12	0.0019	0.0017	0.00073	0.00058	3.7E-04	3.4e-04	1.5E-04	1.1E-04
	fiber crops (cotton)	44.4 lb ai/acre	100 acres	0.023	0.017	0.12	0.00077	0.00071	0.0003	0.00024	1.5E-04	1.4e-04	6.0E-05	4.7E-05
Transferring Liquids from Tank Delivery Truck to Pick-up Truck and subsequent transfer to Sprinkler irrigation Nurse Tank (mechanical transfer system) (1c)	tobacco plant beds	387 lb ai/acre	20 acres	0.023	0.017	0.12	0.0013	0.0012	0.00053	0.00041	2.7E-04	2.4e-04	1.0E-04	8.2E-05
	orchard replant/transplant sites	320 lb ai/acre	350 acres	0.023	0.017	0.12	0.019	0.018	0.0076	0.006	3.9E-03	3.5e-03	1.5E-03	1.2E-03
	turf (sod farms)	252 lb ai/acre	350 acres	0.023	0.017	0.12	0.015	0.014	0.006	0.0047	3.0E-03	2.8e-03	1.2E-03	9.3E-04
	wheat, barley	162 lb ai/acre	350 acres	0.023	0.017	0.12	0.0098	0.009	0.0039	0.003	1.9E-03	1.8e-03	7.6E-04	6.0E-04
	ornamentals and food crops	108 lb ai/acre	350 acres	0.023	0.017	0.12	0.0066	0.006	0.0026	0.002	1.3E-03	1.2e-03	5.1E-04	4.0E-04
	fiber crops (cotton)	44.4 lb ai/acre	350 acres	0.023	0.017	0.12	0.0027	0.0025	0.0011	0.00083	5.3E-04	4.9e-04	2.1E-04	1.6E-04
	peanuts	27.5 lb ai/acre	350 acres	0.023	0.017	0.12	0.0017	0.0015	0.00065	0.00051	3.3E-04	3.0e-04	1.3E-04	1.0E-04

## Appendix D/Table D2: Noncommercial Applicator Cancer Risks For Metam Sodium Occupational Handler Risk Assessment at PPE Mitigation

**Appendix D/Table D2: Noncommercial Applicator Cancer Risks For Metam Sodium Occupational Handler Risk Assessment at PPE Mitigation**

Exposure Scenario	Crop Type	Typical Application Rate <sup>a</sup>	Area Treated <sup>b</sup>	PPE-1 (gl)	PPE-2 (gl, dl)	90% PPE (resp) Inhalation Unit	Noncommercial LADDs				Noncommercial Cancer Risks			
				Dermal Unit Exposur	Dermal Unit Exposur		PPE-G-NR (mg/kg/day)	PPE-G, DL-NR (mg/kg/day)	PPE-G-90%R (mg/kg/day)	PPE-G, DL-90%R (mg/kg/day)	Applicato r PPE-G-NR <sup>c</sup>	Applicato r PPE-G, DL-NR <sup>d</sup>	Applicator PPE-G-90%R <sup>e</sup>	Applicator PPE-G, DL-90%R <sup>f</sup>
		e (mg/lb)	e (mg/lb)	Exposure Applicator										
Applying Liquids via Shank Injection Equipment (using PHED groundboom data) (2)	seed beds, plant beds	523 lb ai/acre	5 acres	0.014	0.011	(0.014)	0.00028	0.00026	0.00011	0.000089	5.5E-05	5.1e-05	2.1E-05	1.8E-05
	tobacco plant beds	387 lb ai/acre	20 acres	0.014	0.011	0.074	0.00083	0.00077	0.00032	0.00026	1.6E-04	1.5e-04	6.4E-05	5.2E-05
	orchard replant/transplant sites	320 lb ai/acre	100 acres	0.014	0.011	0.074	0.0034	0.0032	0.0013	0.0011	6.8E-04	6.3e-04	2.6E-04	2.2E-04
	turf (sod farms)	252 lb ai/acre	100 acres	0.014	0.011	0.074	0.0027	0.0025	0.001	0.00086	5.3E-04	5.0e-04	2.1E-04	1.7E-04
	turf (golf courses)	252 lb ai/acre	20 acres	0.014	0.011	0.074	0.00054	0.0005	0.00021	0.00017	1.1E-04	9.9e-05	4.1E-05	3.4E-05
	wheat, barley	162 lb ai/acre	100 acres	0.014	0.011	0.074	0.0017	0.0016	0.00067	0.00055	3.4E-04	3.2e-04	1.3E-04	1.1E-04
	ornamentals and food crops	108 lb ai/acre	100 acres	0.014	0.011	0.074	0.0012	0.0011	0.00045	0.00037	2.3E-04	2.1e-04	8.9E-05	7.3E-05
	fiber crops (cotton)	44.4 lb ai/acre	100 acres	0.014	0.011	0.074	0.00047	0.00044	0.00018	0.00015	9.4E-05	8.7e-05	3.6E-05	3.0E-05
Applying Water Soluble Liquids via Rotary Tiller Equipment (using PHED groundboom data) (3)	turf (sod farms)	252 lb ai/acre	100 acres	0.014	0.011	0.074	0.0027	0.0025	0.001	0.00086	5.3E-04	5.0e-04	2.1E-04	1.7E-04
	turf (golf courses)	252 lb ai/acre	20 acres	0.014	0.011	0.074	0.00054	0.0005	0.00021	0.00017	1.1E-04	9.9e-05	4.1E-05	3.4E-05
	ornamentals and food crops	108 lb ai/acre	100 acres	0.014	0.011	0.074	0.0012	0.0011	0.00045	0.00037	2.3E-04	2.1e-04	8.9E-05	7.3E-05
	fiber crops (cotton)	44.4 lb ai/acre	100 acres	0.014	0.011	0.074	0.00047	0.00044	0.00018	0.00015	9.4E-05	8.7e-05	3.6E-05	3.0E-05
Loader/Applicator														
Transferring Liquids from Tank Delivery Truck to Shank Injection Equipment (mechanical transfer system) and then applying them via Shank Injection Equipment (using PHED groundboom MLA open cab data) (4a) <sup>g</sup>	seed beds, plant beds	523 lb ai/acre	5 acres	0.057	0.036	0.13	0.0007	0.00056	0.0004	0.00026	1.4E-04	1.1e-04	7.9E-05	5.2E-05
	tobacco plant beds	387 lb ai/acre	20 acres	0.057	0.036	0.13	0.0021	0.0017	0.0012	0.00078	4.1E-04	3.3e-04	2.3E-04	1.5E-04
	orchard replant/transplant sites	320 lb ai/acre	100 acres	0.057	0.036	0.13	0.0085	0.0069	0.0049	0.0032	1.7E-03	1.4e-03	9.6E-04	6.4E-04
	turf (sod farms)	252 lb ai/acre	100 acres	0.057	0.036	0.13	0.0067	0.0054	0.0038	0.0025	1.3E-03	1.1e-03	7.6E-04	5.0E-04
	turf (golf courses)	252 lb ai/acre	20 acres	0.057	0.036	0.13	0.0013	0.0011	0.00077	0.00051	2.7E-04	2.1e-04	1.5E-04	1.0E-04
	wheat, barley	162 lb ai/acre	100 acres	0.057	0.036	0.13	0.0043	0.0035	0.0025	0.0016	8.6E-04	6.9e-04	4.9E-04	3.2E-04
	ornamentals and food crops	108 lb ai/acre	100 acres	0.057	0.036	0.13	0.0029	0.0023	0.0016	0.0011	5.7E-04	4.6e-04	3.3E-04	2.2E-04
	fiber crops (cotton)	44.4 lb ai/acre	100 acres	0.057	0.036	0.13	0.0012	0.00096	0.00068	0.00045	2.3E-04	1.9e-04	1.3E-04	8.9E-05

**Appendix D/Table D2: Noncommercial Applicator Cancer Risks For Metam Sodium Occupational Handler Risk Assessment at PPE Mitigation**

Exposure Scenario	Crop Type	Typical Application Rate <sup>a</sup>	Area Treated <sup>b</sup>	PPE-1 (gl) Dermal Unit Exposur	PPE-2 (gl, dl) Dermal Unit Exposur	90% PPE (resp) Inhalation Unit	Noncommercial LADDs				Noncommercial Cancer Risks			
							PPE-G-NR (mg/kg/day)	PPE-G, DL-NR (mg/kg/day)	PPE-G-90%R (mg/kg/day)	PPE-G, DL-90%R (mg/kg/day)	Applicator PPE-G-NR <sup>c</sup>	Applicator PPE-G, DL-NR <sup>d</sup>	Applicator PPE-G-90%R <sup>e</sup>	Applicator PPE-G, DL-90%R <sup>f</sup>
	peanuts	27.5 lb ai/acre	100 acres	e (mg/lb 0.457)	e (mg/lb 0.036)	Exposure (ug/13 ai)	0.00073	0.00059	0.00042	0.00028	1.5E-04	1.2e-04	8.3E-05	5.5E-05
Transferring Liquids from Tank Delivery Truck to Shank Injection Equipment (mechanical transfer system) and then applying them via Shank Injection Equipment (using PHED groundboom MLA with enclosed cab) (4b) <sup>g</sup>	seed beds, plant beds	523 lb ai/acre	5 acres	ND-OC	ND-OC	ND-OC	ND	ND	ND	ND	ND	ND	ND	ND
	tobacco plant beds	387 lb ai/acre	20 acres	ND-OC	ND-OC	ND-OC	ND	ND	ND	ND	ND	ND	ND	ND
	orchard replant/transplant sites	320 lb ai/acre	100 acres	ND-OC	ND-OC	ND-OC	ND	ND	ND	ND	ND	ND	ND	ND
	turf (sod farms)	252 lb ai/acre	100 acres	ND-OC	ND-OC	ND-OC	ND	ND	ND	ND	ND	ND	ND	ND
	turf (golf courses)	252 lb ai/acre	20	ND-OC	ND-OC	ND-OC	ND	ND	ND	ND	ND	ND	ND	ND
	wheat, barley	162 lb ai/acre	100 acres	ND-OC	ND-OC	ND-OC	ND	ND	ND	ND	ND	ND	ND	ND
	ornamentals and food crops	108 lb ai/acre	100 acres	ND-OC	ND-OC	ND-OC	ND	ND	ND	ND	ND	ND	ND	ND
	fiber crops (cotton)	44.4 lb ai/acre	100 acres	ND-OC	ND-OC	ND-OC	ND	ND	ND	ND	ND	ND	ND	ND
	peanuts	27.5 lb ai/acre	100 acres	ND-OC	ND-OC	ND-OC	ND	ND	ND	ND	ND	ND	ND	ND
Transferring Water Soluble Liquids from Tank Delivery Truck to Rotary Tiller Equipment (mechanical transfer system) and then applying them via Rotary Tiller Equipment (using PHED groundboom MLA with open cab) (5a) <sup>g</sup>	turf (sod farms)	252 lb ai/acre	100 acres	0.057	0.036	0.13	0.0067	0.0054	0.0038	0.0025	1.3E-03	1.1e-03	7.6E-04	5.0E-04
	turf (golf courses)	252 lb ai/acre	20 acres	0.057	0.036	0.13	0.0013	0.0011	0.00077	0.00051	2.7E-04	2.1e-04	1.5E-04	1.0E-04
	ornamentals and food crops	108 lb ai/acre	100 acres	0.057	0.036	0.13	0.0029	0.0023	0.0016	0.0011	5.7E-04	4.6e-04	3.3E-04	2.2E-04
	fiber crops (cotton)	44.4 lb ai/acre	100 acres	0.057	0.036	0.13	0.0012	0.00096	0.00068	0.00045	2.3E-04	1.9e-04	1.3E-04	8.9E-05

## **Appendix D/Table D2: Noncommercial Applicator Cancer Risks For Metam Sodium Occupational Handler Risk Assessment at PPE Mitigation**

**Appendix D/Table D2: Noncommercial Applicator Cancer Risks For Metam Sodium Occupational Handler Risk Assessment at PPE Mitigation**

Exposure Scenario	Crop Type	Typical Application Rate <sup>a</sup>	Area Treated <sup>b</sup>	PPE-1 (gl) Dermal Unit Exposur	PPE-2 (gl, dl) Dermal Unit Exposur	90% PPE (resp) Inhalation Unit	Noncommercial LADDs				Noncommercial Cancer Risks			
							PPE-G-NR (mg/kg/day)	PPE-G, DL-NR (mg/kg/day)	PPE-G-90%R (mg/kg/day)	PPE-G, DL-90%R (mg/kg/day)	Applicator PPE-G-NR <sup>c</sup>	Applicator PPE-G, DL-NR <sup>d</sup>	Applicator PPE-G-90%R <sup>e</sup>	Applicator PPE-G, DL-90%R <sup>f</sup>
Mixing/Loading/ Applying Water Soluble Liquids via hose-proportioner (using ORETF hand-gun data - occupational) (9)	small areas of ornamentals, food, fiber crops, seed beds, plant beds, tobacco plant beds, lawns	350 lb ai/acre	5 acres	e (mg/lb ai) 0.48	e (mg/lb ai) 0.25	Exposure (ug/lb ai) 0.15	0.0023	0.0013	0.0021	0.0011	4.6E-04	2.6e-04	4.1E-04	2.2E-04
	small areas of ornamentals, food, fiber crops, seed beds, plant beds, tobacco plant beds, lawns	350 lb ai/acre	0.5 acres	0.48	0.25	0.15	0.00023	0.00013	0.00021	0.00011	4.6E-05	2.6e-05	4.1E-05	2.2E-05
Mixing/Loading/ Applying Water Soluble Liquids via power sprayer (using ORETF LCO hand-gun data - occupational) (10)	drained water bodies and shorelines	350 lb ai/acre	5 acres	0.48	0.25	0.15	0.0023	0.0013	0.0021	0.0011	4.6E-04	2.6e-04	4.1E-04	2.2E-04
Mixing/Loading/ Applying Liquids via cement mixer (using PHED Mixer/Loader data for Open-pour Liquids) (11)	potting soil	0.012 lb ai/cu ft	54 lb ai/cu ft	0.023	0.017	0.12	0.00000011	0.0000001	4.4E-08	3.5E-08	2.2E-08	2.0e-08	8.7E-09	6.8E-09
Mixing/Loading/ Applying Liquids via shredder (using PHED Mixer/Loader data for Open-pour Liquids) (12)	potting soil	0.012 lb ai/cu ft	54 lb ai/cu ft	0.023	0.017	0.12	0.00000011	0.0000001	4.4E-08	3.5E-08	2.2E-08	2.0e-08	8.7E-09	6.8E-09
Mixing/Loading/ Applying Liquid with Foaming Equipment (using PHED Mixer/Loader data for Open-pour Liquids) (13)	sewer roots	0.212 lb ai/gal	1350 gals	0.023	0.017	0.12	0.00005	0.000046	0.000019	0.000015	9.8E-06	9.0e-06	3.9E-06	3.0E-06
	sewer roots	0.212 lb ai/gal	675 gals	0.023	0.017	0.12	0.000025	0.000023	0.0000097	0.0000076	4.9E-06	4.5e-06	1.9E-06	1.5E-06
Mixing/Loading/	tree replanting	16 lb ai/1000	1000 sq	0.023	0.017	0.12	0.0000028	0.0000025	0.0000011	0.00000085	5.5E-07	5.0e-07	2.2E-07	1.7E-07

**Appendix D/Table D2: Noncommercial Applicator Cancer Risks For Metam Sodium Occupational Handler Risk Assessment at PPE Mitigation**

Exposure Scenario	Crop Type	Typical Application Rate <sup>a</sup>	Area Treated <sup>b</sup>	PPE-1 (gl) Dermal Unit Exposure	PPE-2 (gl, dl) Dermal Unit Exposure	90% PPE (resp) Inhalation Unit	Noncommercial LADDs				Noncommercial Cancer Risks			
							PPE-G-NR (mg/kg/day)	PPE-G, DL-NR (mg/kg/day)	PPE-G-90%R (mg/kg/day)	PPE-G, DL-90%R (mg/kg/day)	Applicator PPE-G-NR <sup>c</sup>	Applicator PPE-G, DL-NR <sup>d</sup>	Applicator PPE-G-90%R <sup>e</sup>	Applicator PPE-G, DL-90%R <sup>f</sup>
Applying Liquids via Open Pour (using PHED Mixer/Loader data for Open-pour Liquids) (14)		sq ft	ft	e (mg/lb ai)	e (mg/lb ai)	Exposure (ug/lb ai)								

**Footnotes**

\* Noncommercial applicator exposure was considered to be 5 days per year for 35 years over a 70 year lifetime.

ND No Data

ND-OC No Data, see open cab scenario above

a Application rates are the typical application rates determined from EPA registered labels for metam sodium.

b Amount handled per day values are EPA estimates of acreage treated or gallons applied based on Exposure SAC Policy #9 "Standard Values for Daily Acres Treated in Agriculture".

c PPE, G-NR = single layer + gloves + baseline inhalation

d PPE-2,G-NR = double layer + gloves + baseline inhalation

e PPE, G-90%R = single layer + gloves + OV respirator

f PPE-2,G-90%R = double layer + gloves + OV respirator

g Over estimate, PHED is open pour mixing/loading.

**Appendix D/Table D3: Noncommercial Applicator Cancer Risks For Metam Sodium Occupational Handler Risk Assessment at Engineering Controls Mitigation**

Exposure Scenario	Crop Type	Typical Application Rate <sup>a</sup>	Area Treated <sup>b</sup>	Eng Con Dermal Unit Exposure (mg/lb ai)	Eng Con Inhalation Unit Exposure (ug/lb ai)	Eng Control Noncommercial Applicator Total LADD (mg/kg/day)	Eng Control Noncommercial Applicator Cancer Risk
Mixer/Loader							
Transferring Liquids from Tank Delivery Truck to Shank Injection Equipment (mechanical transfer system) (1a)	seed beds, plant beds	523 lb ai/acre	5 acres	0.0086	0.083	7.6E-05	1.5E-05
	tobacco plant beds	387 lb ai/acre	20 acres	0.0086	0.083	2.3E-04	4.5E-05
	orchard replant/transplant sites	320 lb ai/acre	100 acres	0.0086	0.083	9.3E-04	1.8E-04
	turf (sod farms)	252 lb ai/acre	100 acres	0.0086	0.083	7.3E-04	1.5E-04
	turf (golf courses)	252 lb ai/acre	20 acres	0.0086	0.083	1.5E-04	2.9E-05
	wheat, barley	162 lb ai/acre	100 acres	0.0086	0.083	4.7E-04	9.4E-05
	ornamentals and food crops	108 lb ai/acre	100 acres	0.0086	0.083	3.1E-04	6.2E-05
	fiber crops (cotton)	44.4 lb ai/acre	100 acres	0.0086	0.083	1.3E-04	2.6E-05
	peanuts	27.5 lb ai/acre	100 acres	0.0086	0.083	8.0E-05	1.6E-05
Transferring Liquids from Tank Delivery Truck to Rotary Tiller Equipment (mechanical transfer system) (1b)	turf (sod farms)	252 lb ai/acre	100 acres	0.0086	0.083	7.3E-04	1.5E-04
	turf (golf courses)	252 lb ai/acre	20 acres	0.0086	0.083	1.5E-04	2.9E-05
	ornamentals and food crops	108 lb ai/acre	100 acres	0.0086	0.083	3.1E-04	6.2E-05
	fiber crops (cotton)	44.4 lb ai/acre	100 acres	0.0086	0.083	1.3E-04	2.6E-05
	tobacco plant beds	387 lb ai/acre	20 acres	0.0086	0.083	2.3E-04	4.5E-05
Transferring Liquids from Tank Delivery Truck to Pick-up Truck and subsequent transfer to Sprinkler irrigation Nurse Tank (mechanical transfer system) (1c)	orchard replant/transplant sites	320 lb ai/acre	350 acres	0.0086	0.083	3.3E-03	6.5E-04
	turf (sod farms)	252 lb ai/acre	350 acres	0.0086	0.083	2.6E-03	5.1E-04
	wheat, barley	162 lb ai/acre	350 acres	0.0086	0.083	1.7E-03	3.3E-04
	ornamentals and food crops	108 lb ai/acre	350 acres	0.0086	0.083	1.1E-03	2.2E-04
	fiber crops (cotton)	44.4 lb ai/acre	350 acres	0.0086	0.083	4.5E-04	9.0E-05
	peanuts	27.5 lb ai/acre	350 acres	0.0086	0.083	2.8E-04	5.6E-05
Transferring Liquids from Tank Delivery Truck to Pick-up Truck and subsequent transfer to Drip Irrigation Nurse Tank (mechanical transfer system) (1d)	turf (sod farms)	252 lb ai/acre	100 acres	0.0086	0.083	7.3E-04	1.5E-04
	ornamentals and food crops	108 lb ai/acre	100 acres	0.0086	0.083	3.1E-04	6.2E-05
	fiber crops (cotton)	44.4 lb ai/acre	100 acres	0.0086	0.083	1.3E-04	2.6E-05
Loading Liquids to support Sprinkler Irrigation Applications (Sodium tetrathiocarbonate study used as surrogate data Study # 770AA11) (1e)	tobacco plant beds	408 lb ai/acre	350 acres	N/A	ND	3.4E-04	6.8E-05
	turf	252 lb ai/acre	350 acres	N/A	ND	3.0E-05	5.9E-06
	orchard planting sites	325 lb ai/acre	350 acres	N/A	ND	4.3E-04	8.6E-05
	ornamentals and food crops	108 lb ai/acre	350 acres	N/A	ND	1.5E-04	2.9E-05
	fiber crops (cotton)	44.4 lb ai/acre	350 acres	N/A	ND	8.7E-05	1.7E-05
	peanuts	27.5 lb ai/acre	350 acres	N/A	ND	7.0E-05	1.4E-05
	wheat, barley	31.7 lb ai/acre	350 acres	N/A	ND	5.1E-04	1.0E-04
Loading Liquids to support Drip Irrigation Applications (Sodium tetrathiocarbonate study used as surrogate data Study # 770AA11) (1f)	turf (sod farms)	252 lb ai/acre	100 acres	N/A	ND	3.1E-04	6.2E-04
	ornamentals and food crops	108 lb ai/acre	100 acres	N/A	ND	1.3E-04	2.7E-05
	fiber crops (cotton)	44.4 lb ai/acre	100 acres	N/A	ND	6.3E-05	1.2E-05

**Appendix D/Table D3: Noncommercial Applicator Cancer Risks For Metam Sodium Occupational Handler Risk Assessment at Engineering Controls Mitigation**

Applicator							
Applying Liquids via Shank Injection Equipment (using PHED groundboom data) (2)	seed beds, plant beds	523 lb ai/acre	5 acres	0.005	0.043	4.3E-05	8.5E-06
	tobacco plant beds	387 lb ai/acre	20 acres	0.005	0.043	1.3E-04	2.5E-05
	orchard replant/transplant sites	320 lb ai/acre	100 acres	0.005	0.043	5.3E-04	1.0E-04
	turf (sod farms)	252 lb ai/acre	100 acres	0.005	0.043	4.1E-04	8.2E-05
	turf (golf courses)	252 lb ai/acre	20 acres	0.005	0.043	8.3E-05	1.6E-05
	wheat, barley	162 lb ai/acre	100 acres	0.005	0.043	2.7E-04	5.3E-05
	ornamentals and food crops	108 lb ai/acre	100 acres	0.005	0.043	1.8E-04	3.5E-05
	fiber crops (cotton)	44.4 lb ai/acre	100 acres	0.005	0.043	7.3E-05	1.4E-05
	peanuts	27.5 lb ai/acre	100 acres	0.005	0.043	4.5E-05	9.0E-06
Applying Water Soluble Liquids via Rotary Tiller Equipment (using PHED groundboom data) (3)	turf (sod farms)	252 lb ai/acre	100 acres	0.005	0.043	4.1E-04	8.2E-05
	turf (golf courses)	252 lb ai/acre	20 acres	0.005	0.043	8.3E-05	1.6E-05
	ornamentals and food crops	108 lb ai/acre	100 acres	0.005	0.043	1.8E-04	3.5E-05
	fiber crops (cotton)	44.4 lb ai/acre	100 acres	0.005	0.043	7.3E-05	1.4E-05
Loader/Applicator							
Transferring Liquids from Tank Delivery Truck to Shank Injection Equipment (mechanical transfer system) and then applying them via Shank Injection Equipment (using PHED groundboom MLA open cab data) (4a) <sup>c</sup>	seed beds, plant beds	523 lb ai/acre	5 acres	ND	ND	ND	ND
	tobacco plant beds	387 lb ai/acre	20 acres	ND	ND	ND	ND
	orchard replant/transplant sites	320 lb ai/acre	100 acres	ND	ND	ND	ND
	turf (sod farms)	252 lb ai/acre	100 acres	ND	ND	ND	ND
	turf (golf courses)	252 lb ai/acre	20 acres	ND	ND	ND	ND
	wheat, barley	162 lb ai/acre	100 acres	ND	ND	ND	ND
	ornamentals and food crops	108 lb ai/acre	100 acres	ND	ND	ND	ND
	fiber crops (cotton)	44.4 lb ai/acre	100 acres	ND	ND	ND	ND
	peanuts	27.5 lb ai/acre	100 acres	ND	ND	ND	ND
Transferring Liquids from Tank Delivery Truck to Shank Injection Equipment (mechanical transfer system) and then applying them via Shank Injection Equipment (using PHED groundboom MLA with enclosed cab) (4b) <sup>c</sup>	seed beds, plant beds	523 lb ai/acre	5 acres	0.089	0.35	6.6E-04	1.3E-04
	tobacco plant beds	387 lb ai/acre	20 acres	0.089	0.35	2.0E-03	3.9E-04
	orchard replant/transplant sites	320 lb ai/acre	100 acres	0.089	0.35	8.1E-03	1.6E-03
	turf (sod farms)	252 lb ai/acre	100 acres	0.089	0.35	6.3E-03	1.3E-03
	turf (golf courses)	252 lb ai/acre	20	0.089	0.35	1.3E-03	2.5E-04
	wheat, barley	162 lb ai/acre	100 acres	0.089	0.35	4.1E-03	8.1E-04
	ornamentals and food crops	108 lb ai/acre	100 acres	0.089	0.35	2.7E-03	5.4E-04
	fiber crops (cotton)	44.4 lb ai/acre	100 acres	0.089	0.35	1.1E-03	2.2E-04
	peanuts	27.5 lb ai/acre	100 acres	0.089	0.35	6.9E-04	1.4E-04
Transferring Water Soluble Liquids from Tank Delivery Truck to Rotary Tiller Equipment (mechanical transfer system) and then applying them via Rotary Tiller Equipment (using PHED groundboom MLA with open cab) (5a) <sup>c</sup>	turf (sod farms)	252 lb ai/acre	100 acres	ND	ND	ND	ND
	turf (golf courses)	252 lb ai/acre	20 acres	ND	ND	ND	ND
	ornamentals and food crops	108 lb ai/acre	100 acres	ND	ND	ND	ND
	fiber crops (cotton)	44.4 lb ai/acre	100 acres	ND	ND	ND	ND

**Appendix D/Table D3: Noncommercial Applicator Cancer Risks For Metam Sodium Occupational Handler Risk Assessment at Engineering Controls Mitigation**

Transferring Liquids from Tank Delivery Truck to Rotary Tiller Equipment (mechanical transfer system) and then applying them via Rotary Tiller Equipment (using PHED groundboom MLA with closed cab) (5b) <sup>c</sup>	turf (sod farms)	252 lb ai/acre	100 acres	0.089	0.35	6.3E-03	1.3E-03
	turf (golf courses)	252 lb ai/acre	20 acres	0.089	0.35	1.3E-03	2.5E-04
	ornamentals and food crops	108 lb ai/acre	100 acres	0.089	0.35	2.7E-03	5.4E-04
	fiber crops (cotton)	44.4 lb ai/acre	100 acres	0.089	0.35	1.1E-03	2.2E-04
Chemigation Monitor							
Monitoring Chemigation Applications Using Liquid Formulation (6)	No PHED general or Metam Sodium data is available for this scenario.						
Soil Seal Irrigator							
Sealing Soil with Irrigation Water Following Shank Injection Applications Using Liquid Formulations (7)	No PHED general or Metam Sodium data is available for this scenario.						
Mixer/Loader/Applicator							
Mixing/Loading/Applying Liquids via Sprinkling Can (using ORETF hose-end data - occupational) (8)	small areas of ornamentals, food, fiber crops, seed beds, plant beds, tobacco plant beds, lawns	12 lb ai/1000 sq ft	1000 sq ft	NF	NF	NF	NF
	potting soil	4 lb ai/1000 sq ft	1000 sq ft	NF	NF	NF	NF
Mixing/Loading/Applying Water Soluble Liquids via hose-proportioner (using ORETF hand-gun data - occupational) (9)	small areas of ornamentals, food, fiber crops, seed beds, plant beds, tobacco plant beds, lawns	350 lb ai/acre	5 acres	NF	NF	NF	NF
	small areas of ornamentals, food, fiber crops, seed beds, plant beds, tobacco plant beds, lawns	350 lb ai/acre	0.5 acres	NF	NF	NF	NF
Mixing/Loading/Applying Water Soluble Liquids via power sprayer (using ORETF LCO hand-gun data - occupational) (10)	drained water bodies and shorelines	350 lb ai/acre	5 acres	NF	NF	NF	NF
Mixing/Loading/Applying Liquids via cement mixer (using PHED Mixer/Loader data for Open-pour Liquids) (11)	potting soil	0.012 lb ai/cu ft	54 lb ai/cu ft	NF	NF	NF	NF
Mixing/Loading/Applying Liquids via shredder (using PHED Mixer/Loader data for Open-pour Liquids) (12)	potting soil	0.012 lb ai/cu ft	54 lb ai/cu ft	NF	NF	NF	NF

**Appendix D/Table D3: Noncommercial Applicator Cancer Risks For Metam Sodium Occupational Handler Risk Assessment at Engineering Controls Mitigation**

Mixing/Loading/Applying Liquid with Foaming Equipment (using PHED Mixer/Loader data for Open-pour Liquids) (13)	sewer roots	0.212 lb ai/gal	1350 gals	NF	NF	NF	NF
	sewer roots	0.212 lb ai/gal	675 gals	NF	NF	NF	NF
Mixing/Loading/Applying Liquids via Open Pour (using PHED Mixer/Loader data for Open-pour Liquids) (14)	tree replanting	16 lb ai/1000 sq ft	1000 sq ft	NF	NF	NF	NF

**Footnotes:**

\* Noncommercial applicator exposure was considered to be 5 days per year for 35 years over a 70 year lifetime.

N/A Not applicable

ND No Data

NF Not Feasible

a Application rates are the typical application rates determined from EPA registered labels for metam sodium.

b Amount handled per day values are EPA estimates of acreage treated or gallons applied based on Exposure SAC Policy #9 "Standard Values for Daily Acres Treated in Agriculture".

c Over estimate, PHED is open pour mixing/loading.

**Appendix D/Table D4: Commercial Applicator Cancer Risks For Metam Sodium Occupational Handler Risk Assessment at Baseline Mitigation**

Exposure Scenario	Crop Type	Typical Application Rate <sup>a</sup>	Area Treated <sup>b</sup>	Baseline Dermal Unit Exposure (mg/lb ai)	Baseline Inhalation Unit Exposure (ug/lb ai)	Commercial Applicator Total Baseline LADD (mg/kg/day)	Commercial Applicator Baseline Cancer Risk
Mixer/Loader							
Transferring Liquids from Tank Delivery Truck to Shank Injection Equipment (mechanical transfer system) (1a)	wheat, barley	162 lb ai/acre	100 acres	2.9	1.2	4.7E-01	9.3E-02
	ornamentals and food crops	108 lb ai/acre	100 acres	2.9	1.2	3.1E-01	6.2E-02
	fiber crops (cotton)	44.4 lb ai/acre	100 acres	2.9	1.2	1.3E-01	2.5E-02
	peanuts	27.5 lb ai/acre	100 acres	2.9	1.2	7.9E-02	1.6E-02
Transferring Liquids from Tank Delivery Truck to Rotary Tiller Equipment (mechanical transfer system) (1b)	ornamentals and food crops	108 lb ai/acre	100 acres	2.9	1.2	3.1E-01	6.2E-02
	fiber crops (cotton)	44.4 lb ai/acre	100 acres	2.9	1.2	1.3E-01	2.5E-02
Transferring Liquids from Tank Delivery Truck to Pick-up Truck and subsequent transfer to Sprinkler irrigation Nurse Tank (mechanical transfer system) (1c)	wheat, barley	162 lb ai/acre	350 acres	2.9	1.2	1.6E+00	3.2E-01
	ornamentals and food crops	108 lb ai/acre	350 acres	2.9	1.2	1.1E+00	2.2E-01
	fiber crops (cotton)	44.4 lb ai/acre	350 acres	2.9	1.2	4.5E-01	8.9E-02
	peanuts	27.5 lb ai/acre	350 acres	2.9	1.2	2.8E-01	5.5E-02
Transferring Liquids from Tank Delivery Truck to Pick-up Truck and subsequent transfer to Drip Irrigation Nurse Tank (mechanical transfer system) (1d)	ornamentals and food crops	108 lb ai/acre	100 acres	2.9	1.2	3.1E-01	6.2E-02
	fiber crops (cotton)	44.4 lb ai/acre	100 acres	2.9	1.2	1.3E-01	2.5E-02
Loading Liquids to Support Irrigation Applications (Sodium tetrathiocarbonate study used as surrogate data, Study # 770AA11) (1e)	wheat, barley <sup>d</sup>	162 lb ai/acre	350 acres	ND	ND	ND	ND
	ornamentals and food crops	108 lb ai/acre	350 acres	ND	ND	ND	ND
	cotton, soybeans, sugar beets n)	44.4 lb ai/acre	350 acres	ND	ND	ND	ND
	peanuts	27.5 lb ai/acre	350 acres	ND	ND	ND	ND
Loading Liquids to Support Drip Irrigation Applications (Sodium tetrathiocarbonate study used as surrogate data, Study # 770AA11) (1f)	ornamentals and food crops	108 lb ai/acre	100 acres	ND	ND	ND	ND
	cotton, soybeans, sugar beets	44.4 lb ai/acre	100 acres	ND	ND	ND	ND
Applicator							
Applying Liquids via Shank Injection Equipment (using PHED groundboom data) (2)	wheat, barley	162 lb ai/acre	100 acres	0.014	0.74	6.9E-03	1.4E-03
	ornamentals and food crops	108 lb ai/acre	100 acres	0.014	0.74	4.6E-03	9.1E-04
	fiber crops (cotton)	44.4 lb ai/acre	100 acres	0.014	0.74	1.9E-03	3.8E-04
	peanuts	27.5 lb ai/acre	100 acres	0.014	0.74	1.2E-03	2.3E-04
Applying Water Soluble Liquids via Rotary Tiller Equipment (using PHED groundboom data) (3)	ornamentals and food crops	108 lb ai/acre	100 acres	0.014	0.74	4.6E-03	9.1E-04
	fiber crops (cotton)	44.4 lb ai/acre	100 acres	0.014	0.74	1.9E-03	3.8E-04
Loader/Applicator							
Transferring Liquids from Tank Delivery Truck to Shank Injection Equipment (mechanical transfer system) and then applying them via Shank Injection Equipment (using PHED groundboom MLA open cab data) (4a) <sup>c</sup>	wheat, barley	162 lb ai/acre	100 acres	0.88	1.3	1.5E-01	2.9E-02
	ornamentals and food crops	108 lb ai/acre	100 acres	0.88	1.3	9.8E-02	2.0E-02
	fiber crops (cotton)	44.4 lb ai/acre	100 acres	0.88	1.3	4.0E-02	8.0E-03
	peanuts	27.5 lb ai/acre	100 acres	0.88	1.3	2.5E-02	5.0E-03

## Appendix D/Table D4: Commercial Applicator Cancer Risks For Metam Sodium Occupational Handler Risk Assessment at Baseline Mitigation

**Appendix D/Table D4: Commercial Applicator Cancer Risks For Metam Sodium Occupational Handler Risk Assessment at Baseline Mitigation**

Exposure Scenario	Crop Type	Typical Application Rate <sup>a</sup>	Area Treated <sup>b</sup>	Baseline Dermal Unit Exposure (mg/lb ai)	Baseline Inhalation Unit Exposure (ug/lb ai)	Commercial Applicator Total Baseline LADD (mg/kg/day)	Commercial Applicator Baseline Cancer Risk
Mixing/Loading/Applying Liquid with Foaming Equipment (using PHED Mixer/Loader data for Open-pour Liquids) (13)	sewer roots	0.212 lb ai/gal	1350 gallons	2.9	1.2	8.3E-03	1.6E-03
	sewer roots	0.212 lb ai/gal	675 gallons	2.9	1.2	4.1E-03	8.2E-04
Mixing/Loading/Applying Liquid via Open Pour (using PHED Mixer/Loader data for Open-pour Liquids) (14)	No commercial cancer risks were calculated for this scenario.						

**Footnotes:**

\* Commercial applicator exposure was considered to be 20 days per year for 35 years over a 70 year lifetime.

ND No Data

ND-OC No Data, see open cab scenario above

NF Not Feasible

a Application rates are the typical application rates determined from EPA registered labels for metam sodium.

b Amount handled per day values are EPA estimates of acreage treated or gallons applied based on Exposure SAC Policy #9 "Standard Values for Daily Acres Treated in Agriculture".

c Over estimate, PHED is open pour mixing/loading.

**Appendix D/Table D5: Commercial Applicator Cancer Risks For Metam Sodium Occupational Handler Risk Assessment at PPE Mitigation**

Exposure Scenario	Crop Type	Typical Application Rate <sup>a</sup>	Area Treated <sup>b</sup>	PPE-1 (gl, dl) Dermal Unit Exposure (mg/lb ai)	PPE-2 (gl, dl) Dermal Unit Exposure (mg/lb ai)	90% PPE (resp) Inhalation Unit Exposure (ug/lb ai)	Noncommercial LADDs				Noncommercial Cancer Risks			
							PPE-G-NR (mg/kg/day) <sup>c</sup>	PPE-G, DL-NR (mg/kg/day)	PPE-G-90%R (mg/kg/day)	PPE-G, DL-90%R (mg/kg/day)	Applicator PPE-G-NR <sup>c</sup>	Applicator PPE-G, DL-NR <sup>d</sup>	Applicator PPE-G-90%R <sup>e</sup>	Applicator PPE-G, DL-90%R <sup>f</sup>
Mixer/Loader														
Transferring Liquids from Tank Delivery Truck to Shank Injection Equipment (mechanical transfer system) (1a)	wheat, barley	162 lb ai/acre	100 acres	0.023	0.017	0.12	0.011	0.01	0.0044	0.0035	2.2E-03	2.0E-03	8.7E-04	6.8E-04
	ornamentals and food crops	108 lb ai/acre	100 acres	0.023	0.017	0.12	0.0075	0.0069	0.0029	0.0023	1.5E-03	1.4E-03	5.8E-04	4.6E-04
	fiber crops (cotton)	44.4 lb ai/acre	100 acres	0.023	0.017	0.12	0.0031	0.0028	0.0012	0.00095	6.1E-04	5.6E-04	2.4E-04	1.9E-04
	peanuts	27.5 lb ai/acre	100 acres	0.023	0.017	0.12	0.0019	0.0017	0.00075	0.00059	3.8E-04	3.5E-04	1.5E-04	1.2E-04
Transferring Liquids from Tank Delivery Truck to Rotary Tiller Equipment (mechanical transfer system) (1b)	ornamentals and food crops	108 lb ai/acre	100 acres	0.023	0.017	0.12	0.0075	0.0069	0.0029	0.0023	1.5E-03	1.4E-03	5.8E-04	4.6E-04
	fiber crops (cotton)	44.4 lb ai/acre	100 acres	0.023	0.017	0.12	0.0031	0.0028	0.0012	0.00095	6.1E-04	5.6E-04	2.4E-04	1.9E-04
Transferring Liquids from Tank Delivery Truck to Pick-up Truck and subsequent transfer to Sprinkler irrigation Nurse Tank (mechanical transfer system) (1c)	wheat, barley	162 lb ai/acre	350 acres	0.023	0.017	0.12	0.039	0.036	0.015	0.012	7.8E-03	7.1E-03	3.1E-03	2.4E-03
	ornamentals and food crops	108 lb ai/acre	350 acres	0.023	0.017	0.12	0.026	0.024	0.01	0.0081	5.2E-03	4.8E-03	2.0E-03	1.6E-03
	fiber crops (cotton)	44.4 lb ai/acre	350 acres	0.023	0.017	0.12	0.011	0.0099	0.0042	0.0033	2.1E-03	2.0E-03	8.4E-04	6.6E-04
	peanuts	27.5 lb ai/acre	350 acres	0.023	0.017	0.12	0.0067	0.0061	0.0026	0.0021	1.3E-03	1.2E-03	5.2E-04	4.1E-04
Transferring Liquids from Tank Delivery Truck to Pick-up Truck and subsequent transfer to Drip Irrigation Nurse Tank (mechanical transfer system) (1d)	ornamentals and food crops	108 lb ai/acre	100 acres	0.023	0.017	0.12	0.0075	0.0069	0.0029	0.0023	1.5E-03	1.4E-03	5.8E-04	4.6E-04
	fiber crops (cotton)	44.4 lb ai/acre	100 acres	0.023	0.017	0.12	0.0031	0.0028	0.0012	0.00095	6.1E-04	5.6E-04	2.4E-04	1.9E-04

**Appendix D/Table D5: Commercial Applicator Cancer Risks For Metam Sodium Occupational Handler Risk Assessment at PPE Mitigation**

Exposure Scenario	Crop Type	Typical Application Rate <sup>a</sup>	Area Treated <sup>b</sup>	PPE-1 (gl, dl) Dermal Unit Exposure (mg/lb ai)	PPE-2 (gl, dl) Dermal Unit Exposure (mg/lb ai)	90% PPE (resp) Inhalation Unit Exposure (ug/lb ai)	Noncommercial LADDs				Noncommercial Cancer Risks			
							PPE-G-NR (mg/kg/day) <sup>c</sup>	PPE-G, DL-NR (mg/kg/day)	PPE-G-90%R (mg/kg/day)	PPE-G, DL-90%R (mg/kg/day)	Applicator PPE-G-NR <sup>c</sup>	Applicator PPE-G, DL-NR <sup>d</sup>	Applicator PPE-G-90%R <sup>e</sup>	Applicator PPE-G, DL-90%R <sup>f</sup>
Loading Liquids to Support Irrigation Applications (Sodium tetra thiocarbonat e study used as surrogate data, Study # 770AA11) (1e)	wheat, barley <sup>d</sup>	162 lb ai/acre	350 acres	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	ornamentals and food crops	108 lb ai/acre	350 acres	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	cotton, soybeans, sugar beets n)	44.4 lb ai/acre	350 acres	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	peanuts	27.5 lb ai/acre	350 acres	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Loading Liquids to Support Drip Irrigation Applications (Sodium tetra thiocarbonat e study used as surrogate data, Study # 770AA11) (1f)	ornamentals and food crops	108 lb ai/acre	100 acres	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	cotton, soybeans, sugar beets	44.4 lb ai/acre	100 acres	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Applicator														
Applying Liquids via Shank Injection Equipment (using PHED groundboom data) (2)	wheat, barley	162 lb ai/acre	100 acres	0.014	0.011	0.074	0.0069	0.0064	0.0027	0.0022	1.4E-03	1.3E-03	5.3E-04	4.4E-04
	ornamentals and food crops	108 lb ai/acre	100 acres	0.014	0.011	0.074	0.0046	0.0043	0.0018	0.0015	9.1E-04	8.5E-04	3.5E-04	2.9E-04
	fiber crops (cotton)	44.4 lb ai/acre	100 acres	0.014	0.011	0.074	0.0019	0.0018	0.00074	0.00061	3.8E-04	3.5E-04	1.5E-04	1.2E-04
	peanuts	27.5 lb ai/acre	100 acres	0.014	0.011	0.074	0.0012	0.0011	0.00046	0.00038	2.3E-04	2.2E-04	9.0E-05	7.4E-05
Applying Water Soluble Liquids via Rotary Tiller Equipment (using PHED groundboom data) (3)	ornamentals and food crops	108 lb ai/acre	100 acres	0.014	0.011	0.074	0.0046	0.0043	0.0018	0.0015	9.1E-04	8.5E-04	3.5E-04	2.9E-04
	fiber crops (cotton)	44.4 lb ai/acre	100 acres	0.014	0.011	0.074	0.0019	0.0018	0.00074	0.00061	3.8E-04	3.5E-04	1.5E-04	1.2E-04

## Appendix D/Table D5: Commercial Applicator Cancer Risks For Metam Sodium Occupational Handler Risk Assessment at PPE Mitigation

## Appendix D/Table D5: Commercial Applicator Cancer Risks For Metam Sodium Occupational Handler Risk Assessment at PPE Mitigation

## Appendix D/Table D5: Commercial Applicator Cancer Risks For Metam Sodium Occupational Handler Risk Assessment at PPE Mitigation

**Appendix D/Table D5: Commercial Applicator Cancer Risks For Metam Sodium Occupational Handler Risk Assessment at PPE Mitigation**

Exposure Scenario	Crop Type	Typical Application Rate <sup>a</sup>	Area Treated <sup>b</sup>	PPE-1 (gl, dl) Dermal Unit Exposure (mg/lb ai)	PPE-2 (gl, dl) Dermal Unit Exposure (mg/lb ai)	90% PPE (resp) Inhalation Unit Exposure (ug/lb ai)	Noncommercial LADDs				Noncommercial Cancer Risks			
							PPE-G-NR (mg/kg/day) <sup>c</sup>	PPE-G, DL-NR (mg/kg/day)	PPE-G-90%R (mg/kg/day)	PPE-G, DL-90%R (mg/kg/day)	Applicator PPE-G-NR <sup>c</sup>	Applicator PPE-G, DL-NR <sup>d</sup>	Applicator PPE-G-90%R <sup>e</sup>	Applicator PPE-G, DL-90%R <sup>f</sup>
Open Pour (using PHED Mixer/Loader data for Open-pour Liquids) (14)														

**Footnotes:**

\* Commercial applicator exposure was considered to be 20 days per year for 35 years over a 70 year lifetime.

ND No Data

ND-OC No Data, see open cab scenario above

NF Not Feasible

a Application rates are the typical application rates determined from EPA registered labels for metam sodium.

b Amount handled per day values are EPA estimates of acreage treated or gallons applied based on Exposure SAC Policy #9 "Standard Values for Daily Acres Treated in Agriculture".

c PPE, G-NR = single layer + gloves + baseline inhalation

d PPE-2,G-NR = double layer + gloves + baseline inhalation

e PPE, G-90%R = single layer + gloves + OV respirator

f PPE-2,G-90%R = double layer + gloves + OV respirator

g Over estimate, PHED is open pour mixing/loading.

**Appendix D/Table D6: Commercial Applicator Cancer Risks For Metam Sodium Occupational Handler Risk Assessment at Engineering Controls Mitigation**

Exposure Scenario	Crop Type	Typical Application Rate <sup>a</sup>	Area Treated	Eng Con Dermal Unit Exposure (mg/lb ai)	Eng Con Inhalation Unit Exposure (ug/lb ai)	Eng Control Commercial Applicator Total LADD (ug/kg/day)	Eng Control Commercial Applicator Cancer Risk (mg/kg/day)
<b>Mixer/Loader</b>							
Transferring Liquids from Tank Delivery Truck to Shank Injection Equipment (mechanical transfer system) (1a)	wheat, barley	162 lb ai/acre	100 acres	0.0086	0.083	1.9E-03	3.7E-04
	ornamentals and food crops	108 lb ai/acre	100 acres	0.0086	0.083	1.3E-03	2.5E-04
	fiber crops (cotton)	44.4 lb ai/acre	100 acres	0.0086	0.083	5.2E-04	1.0E-04
	peanuts	27.5 lb ai/acre	100 acres	0.0086	0.083	3.2E-04	6.4E-05
Transferring Liquids from Tank Delivery Truck to Rotary Tiller Equipment (mechanical transfer system) (1b)	ornamentals and food crops	108 lb ai/acre	100 acres	0.0086	0.083	1.3E-03	2.5E-04
	fiber crops (cotton)	44.4 lb ai/acre	100 acres	0.0086	0.083	5.2E-04	1.0E-04
Transferring Liquids from Tank Delivery Truck to Pick-up Truck and subsequent transfer to Sprinkler irrigation Nurse Tank (mechanical transfer system) (1c)	wheat, barley	162 lb ai/acre	350 acres	0.0086	0.083	6.6E-03	1.3E-03
	ornamentals and food crops	108 lb ai/acre	350 acres	0.0086	0.083	4.4E-03	8.7E-04
	fiber crops (cotton)	44.4 lb ai/acre	350 acres	0.0086	0.083	1.8E-03	3.6E-04
	peanuts	27.5 lb ai/acre	350 acres	0.0086	0.083	1.1E-03	2.2E-04
Transferring Liquids from Tank Delivery Truck to Pick-up Truck and subsequent transfer to Drip Irrigation Nurse Tank (mechanical transfer system) (1d)	ornamentals and food crops	108 lb ai/acre	100 acres	0.0086	0.083	1.3E-03	2.5E-04
	fiber crops (cotton)	44.4 lb ai/acre	100 acres	0.0086	0.083	5.2E-04	1.0E-04
Loading Liquids to Support Irrigation Applications (Sodium tetraphiocarbonate study used as surrogate data, Study # 770AA11) (1e)	wheat, barley <sup>d</sup>	162 lb ai/acre	350 acres	N/A	ND	2.0E-03	4.0E-04
	ornamentals and food crops	108 lb ai/acre	350 acres	N/A	ND	5.9E-04	1.2E-04
	cotton, soybeans, sugar beets n)	44.4 lb ai/acre	350 acres	N/A	ND	3.5E-04	6.9E-05
	peanuts	27.5 lb ai/acre	350 acres	N/A	ND	2.8E-04	5.6E-05
Loading Liquids to Support Drip Irrigation Applications (Sodium tetraphiocarbonate study used as surrogate data, Study # 770AA11) (1f)	ornamentals and food crops	108 lb ai/acre	100 acres	N/A	ND	5.4E-04	1.1E-04
	cotton, soybeans, sugar beets	44.4 lb ai/acre	100 acres	N/A	ND	2.5E-04	5.0E-05
<b>Applicator</b>							
Applying Liquids via Shank Injection Equipment (using PHED groundboom data) (2)	wheat, barley	162 lb ai/acre	100 acres	0.005	0.043	1.1E-03	2.1E-04
	ornamentals and food crops	108 lb ai/acre	100 acres	0.005	0.043	7.1E-04	1.4E-04
	fiber crops (cotton)	44.4 lb ai/acre	100 acres	0.005	0.043	2.9E-04	5.8E-05
	peanuts	27.5 lb ai/acre	100 acres	0.005	0.043	1.8E-04	3.6E-05

**Appendix D/Table D6: Commercial Applicator Cancer Risks For Metam Sodium Occupational Handler Risk Assessment at Engineering Controls Mitigation**

Exposure Scenario	Crop Type	Typical Application Rate <sup>a</sup>	Area Treated	Eng Con Dermal Unit Exposure (mg/lb ai)	Eng Con Inhalation Unit Exposure (ug/lb ai)	Eng Control Commercial Applicator Total LADD (mg/kg/day)	Eng Control Commercial Applicator Cancer Risk
Applying Water Soluble Liquids via Rotary Tiller Equipment (using PHED groundboom data) (3)	ornamentals and food crops	108 lb ai/acre	100 acres	0.005	0.043	7.1E-04	1.4E-04
	fiber crops (cotton)	44.4 lb ai/acre	100 acres	0.005	0.043	2.9E-04	5.8E-05

**Appendix D/Table D6: Commercial Applicator Cancer Risks For Metam Sodium Occupational Handler Risk Assessment at Engineering Controls Mitigation**

Exposure Scenario	Crop Type	Typical Application Rate <sup>a</sup>	Area Treated	Eng Con Dermal Unit Exposure (mg/lb ai)	Eng Con Inhalation Unit Exposure (ug/lb ai)	Eng Control Commercial Applicator Total LADD (ug/kg/day)	Eng Control Commercial Applicator Cancer Risk (mg/kg/day)
<b>Loader/Applicator</b>							
Transferring Liquids from Tank Delivery Truck to Shank Injection Equipment (mechanical transfer system) and then applying them via Shank Injection Equipment (using PHED groundboom MLA open cab data) (4a) <sup>c</sup>	wheat, barley	162 lb ai/acre	100 acres	ND	ND	NF	NF
	ornamentals and food crops	108 lb ai/acre	100 acres	ND	ND	NF	NF
	fiber crops (cotton)	44.4 lb ai/acre	100 acres	ND	ND	NF	NF
	peanuts	27.5 lb ai/acre	100 acres	ND	ND	NF	NF
Transferring Liquids from Tank Delivery Truck to Shank Injection Equipment (mechanical transfer system) and then applying them via Shank Injection Equipment (using PHED groundboom MLA with enclosed cab) (4b) <sup>c</sup>	wheat, barley	162 lb ai/acre	100 acres	0.089	0.35	1.6E-02	3.2E-03
	ornamentals and food crops	108 lb ai/acre	100 acres	0.089	0.35	1.1E-02	2.2E-03
	fiber crops (cotton)	44.4 lb ai/acre	100 acres	0.089	0.35	4.5E-03	8.9E-04
	peanuts	27.5 lb ai/acre	100 acres	0.089	0.35	2.8E-03	5.5E-04
Transferring Water Soluble Liquids from Tank Delivery Truck to Rotary Tiller Equipment (mechanical transfer system) and then applying them via Rotary Tiller Equipment (using PHED groundboom MLA with open cab) (5a) <sup>c</sup>	ornamentals and food crops	108 lb ai/acre	100 acres	ND	ND	NF	NF
	fiber crops (cotton)	44.4 lb ai/acre	100 acres	ND	ND	NF	NF
Transferring Liquids from Tank Delivery Truck to Rotary Tiller Equipment (mechanical transfer system) and then applying them via Rotary Tiller Equipment (using PHED groundboom MLA with closed cab) (5b) <sup>c</sup>	ornamentals and food crops	108 lb ai/acre	100 acres	0.089	0.35	1.1E-02	2.2E-03
	fiber crops (cotton)	44.4 lb ai/acre	100 acres	0.089	0.35	4.5E-03	8.9E-04
<b>Chemigation Monitor</b>							
Monitoring Chemigation Applications Using Liquid Formulation (6)	No PHED general or Metam Sodium specific data is available for this scenario.						
<b>Soil Seal Irrigator</b>							
Sealing Soil with Irrigation Water Following Shank Injection Applications Using Liquid Formulations (7)	No PHED general or Metam Sodium specific data is available for this scenario.						
<b>Mixer/Loader/Applicator</b>							
Mixing/Loading/Applying Liquids via Sprinkling Can (using ORETF hose-end data - occupational) (8)	small areas of ornamentals, food, fiber crops	12 lb ai/1000 sq ft	1000 sq ft	Not feasible	Not Feasible	Not feasible	Not feasible

**Appendix D/Table D6: Commercial Applicator Cancer Risks For Metam Sodium Occupational Handler Risk Assessment at Engineering Controls Mitigation**

Exposure Scenario	Crop Type	Typical Application Rate <sup>a</sup>	Area Treated	Eng Con Dermal Unit Exposure (mg/lb ai)	Eng Con Inhalation Unit Exposure (ug/lb ai)	Eng Control Commercial Applicator Total LADD (ug/kg/day)	Eng Control Commercial Applicator Cancer Risk
Mixing/Loading/Applying Water Soluble Liquids via hose-proportioner (using ORETF hand-gun data - occupational) (9)	small areas of ornamentals, food, fiber crops	350 lb ai/acre	5 acres	Not Feasible	Not Feasible	Not feasible	Not feasible
	small areas of ornamentals, food, fiber crops	350 lb ai/acre	0.5 acres	Not Feasible	Not Feasible	Not feasible	Not feasible
Mixing/Loading/Applying Water Soluble Liquids via Power Sprayer (using ORETF hand-gun data - occupational) (10)	No commercial cancer risks were calculated for this scenario.						
Mixing/Loading/Applying Liquid via Cement Mixer (using PHED Mixer/Loader data for Open-pour Liquids) (11)	No commercial cancer risks were calculated for this scenario.						
Mixing/Loading/Applying Liquid via Shredder (using PHED Mixer/Loader data for Open-pour Liquids) (12)	No commercial cancer risks were calculated for this scenario.						
Mixing/Loading/Applying Liquid with Foaming Equipment (using PHED Mixer/Loader data for Open-pour Liquids) (13)	sewer roots	0.212 lb ai/gal	1350 gallons	Not feasible	Not feasible	Not feasible	Not feasible
	sewer roots	0.212 lb ai/gal	675 gallons	Not feasible	Not feasible	Not feasible	Not feasible
Mixing/Loading/Applying Liquid via Open Pour (using PHED Mixer/Loader data for Open-pour Liquids) (14)	No commercial cancer risks were calculated for this scenario.						

**Footnotes:**

\* Noncommercial applicator exposure was considered to be 20 days per year for 35 years over a 70 year lifetime.

N/A Not applicable

ND No Data

NF Not Feasible

a Application rates are the typical application rates determined from EPA registered labels for metam sodium.

b Amount handled per day values are EPA estimates of acreage treated or gallons applied based on Exposure SAC Policy #9 "Standard Values for Daily Acres Treated in Agriculture".

c Over estimate, PHED is open pour mixing/loading.

**Appendix E: Occupational Handler Cancer Assumptions and Exposures Risks for MITC**

**Appendix E/Table E1: Noncommercial Cancer Risks to Handlers for MITC**

Exposure Scenario	Crop or Target	Typical Application Rate	Minutes Exposed per Day	Baseline Average Daily Concentration (mg/kg/day)	Applicator Lifetime Average Daily Concentration	Applicator Baseline Cancer Risk	90% OV Respirator Average Daily Concentration (mg/kg/day)	Applicator Lifetime Average Daily Concentration	Applicator 90% OV Respirator Cancer Risk
Loader									
Transferring Water Soluble Liquids from Tank Delivery Truck to Shank Injection Equipment (mechanical transfer system): MRID# 42968402 (1a)	seed beds, plant beds	523 lb ai/acre	60	3.5e-03	2.4e-05	8.4e-06	3.5e-04	2.4e-06	8.4e-07
	tobacco plant beds	387 lb ai/acre	180	7.8e-03	5.4e-05	1.9e-05	7.8e-04	5.4e-06	1.9e-06
	orchard replant/transplanting sites	320 lb ai/acre	480	1.7e-02	1.2e-04	4.1e-05	1.7e-03	1.2e-05	4.1e-06
	turf (sod farms)	252 lb ai/acre	480	1.4e-02	9.3e-05	3.2e-05	1.4e-03	9.3e-06	3.2e-06
	wheat, barley	162 lb ai/acre	480	8.7e-03	6.0e-05	2.1e-05	8.7e-04	6.0e-06	2.1e-06
	ornamentals and food crops	108 lb ai/acre	480	5.8e-03	4.0e-05	1.4e-05	5.8e-04	4.0e-06	1.4e-06
	fiber crops (cotton)	44.4 lb ai/acre	480	2.4e-03	1.6e-05	5.7e-06	2.4e-04	1.6e-06	5.7e-07
	peanuts	27.5 lb ai/acre	480	1.5e-03	1.0e-05	3.5e-06	1.5e-04	1.0e-06	3.5e-07
Transferring Water Soluble Liquids from Tank Delivery Truck to Rotary Tiller Equipment (mechanical transfer system): MRID# 42958401 (1b)	turf (sod farms)	252 lb ai/acre	480	1.8e-02	1.2e-04	4.3e-05	1.8e-03	1.2e-05	4.3e-06
	ornamentals and food crops	108 lb ai/acre	480	7.8e-03	5.3e-05	1.8e-05	7.8e-04	5.3e-06	1.8e-06
	fiber crops (cotton)	44.4 lb ai/acre	480	3.2e-03	2.2e-05	7.6e-06	3.2e-04	2.2e-06	7.6e-07
	tobacco plant beds	387 lb ai/acre	180	6.1e-03	4.2e-05	1.5e-05	6.1e-04	4.2e-06	1.5e-06
Transferring Water Soluble Liquids from Tank Delivery Truck to Pickup Truck and subsequent transfer to Sprinkler irrigation Nurse Tank (mechanical transfer system): MRID# 42968402 and 42958401 (1c)	orchard replant/transplanting sites	320 lb ai/acre	480	1.3e-02	9.2e-05	3.2e-05	1.3e-03	9.2e-06	3.2e-06
	turf (sod farms)	252 lb ai/acre	480	1.1e-02	7.3e-05	2.5e-05	1.1e-03	7.3e-06	2.5e-06
	wheat, barley	162 lb ai/acre	480	6.8e-03	4.7e-05	1.6e-05	6.8e-04	4.7e-06	1.6e-06
	ornamentals and food crops	108 lb ai/acre	480	4.6e-03	3.1e-05	1.1e-05	4.6e-04	3.1e-06	1.1e-06
	fiber crops (cotton)	44.4 lb ai/acre	480	1.9e-03	1.3e-05	4.5e-06	1.9e-04	1.3e-06	4.5e-07
	peanuts	27.5 lb ai/acre	480	1.2e-03	7.9e-06	2.8e-06	1.2e-04	7.9e-07	2.8e-07
Transferring Water Soluble Liquids from Tank Delivery Truck to Pickup Truck and subsequent transfer to Drip Irrigation Nurse Tank (mechanical transfer system): MRID# 42968402 and 42958401 (1d)	turf (sod farms)	252 lb ai/acre	480	1.1e-02	7.3e-05	2.5e-05	1.1e-03	7.3e-06	2.5e-06
	ornamentals and food crops	108 lb ai/acre	480	4.6e-03	3.1e-05	1.1e-05	4.6e-04	3.1e-06	1.1e-06
	fiber crops (cotton)	44.4 lb ai/acre	480	1.9e-03	1.3e-05	4.5e-06	1.9e-04	1.3e-06	4.5e-07
Applicator: Personal Pump Samplers									
Applying Water Soluble Liquids via Shank Injection Equipment (enclosed cab with charcoal filter): MRID# 42968402 (2a)	seed beds, plant beds	523 lb ai/acre	60	2.9e-03	2.0e-05	6.9e-06	2.9e-04	2.0e-06	NF
	tobacco plant beds	387 lb ai/acre	180	6.4e-03	4.4e-05	1.5e-05	6.4e-04	4.4e-06	NF
	orchard replant/transplanting sites	320 lb ai/acre	480	1.4e-02	9.7e-05	3.4e-05	1.4e-03	9.7e-06	NF
	turf (sod farms)	252 lb ai/acre	480	1.1e-02	7.6e-05	2.7e-05	1.1e-03	7.6e-06	NF
	wheat, barley	162 lb ai/acre	480	7.2e-03	4.9e-05	1.7e-05	7.2e-04	4.9e-06	NF
	ornamentals and food crops	108 lb ai/acre	480	4.8e-03	3.3e-05	1.1e-05	4.8e-04	3.3e-06	NF
	fiber crops (cotton)	44.4 lb ai/acre	480	2.0e-03	1.3e-05	4.7e-06	2.0e-04	1.3e-06	NF
	peanuts	27.5 lb ai/acre	480	1.2e-03	8.3e-06	2.9e-06	1.2e-04	8.3e-07	NF

**Appendix E/Table E1: Noncommercial Cancer Risks to Handlers for MITC**

Exposure Scenario	Crop or Target	Typical Application Rate	Minutes Exposed per Day	Baseline Average Daily Concentration (mg/kg/day)	Applicator Lifetime Average Daily Concentration	Applicator Baseline Cancer Risk	90% OV Respirator Average Daily Concentration (mg/kg/day)	Applicator Lifetime Average Daily Concentration	Applicator 90% OV Respirator Cancer Risk
Applying Water Soluble Liquids via Shank Injection Equipment (enclosed cab with cellulose filter): MRID# 42968402 (2b)	seed beds, plant beds	523 lb ai/acre	60	1.9e-02	1.3e-04	4.6e-05	1.9e-03	1.3e-05	4.6e-06
	tobacco plant beds	387 lb ai/acre	180	4.3e-02	2.9e-04	1.0e-04	4.3e-03	2.9e-05	1.0e-05
	orchard replant/transplanting sites	320 lb ai/acre	480	9.5e-02	6.5e-04	2.3e-04	9.5e-03	6.5e-05	2.3e-05
	turf (sod farms)	252 lb ai/acre	480	7.5e-02	5.1e-04	1.8e-04	7.5e-03	5.1e-05	1.8e-05
	wheat, barley	162 lb ai/acre	480	4.8e-02	3.3e-04	1.1e-04	4.8e-03	3.3e-05	1.1e-05
	ornamentals and food crops	108 lb ai/acre	480	3.2e-02	2.2e-04	7.6e-05	3.2e-03	2.2e-05	7.6e-06
	fiber crops (cotton)	44.4 lb ai/acre	480	1.3e-02	9.0e-05	3.1e-05	1.3e-03	9.0e-06	3.1e-06
Applying Water Soluble Liquids via Shank Injection Equipment (open cab): MRID# 42968402 (2c)	peanuts	27.5 lb ai/acre	480	8.1e-03	5.6e-05	1.9e-05	8.1e-04	5.6e-06	1.9e-06
	seed beds, plant beds	523 lb ai/acre	60	9.4e-03	6.4e-05	2.2e-05	9.4e-04	6.4e-06	2.2e-06
	tobacco plant beds	387 lb ai/acre	180	2.1e-02	1.4e-04	5.0e-05	2.1e-03	1.4e-05	5.0e-06
	orchard replant/transplanting sites	320 lb ai/acre	480	4.6e-02	3.1e-04	1.1e-04	4.6e-03	3.1e-05	1.1e-05
	turf (sod farms)	252 lb ai/acre	480	3.6e-02	2.5e-04	8.6e-05	3.6e-03	2.5e-05	8.6e-06
	wheat, barley	162 lb ai/acre	480	2.3e-02	1.6e-04	5.5e-05	2.3e-03	1.6e-05	5.5e-06
	ornamentals and food crops	108 lb ai/acre	480	1.5e-02	1.1e-04	3.7e-05	1.5e-03	1.1e-05	3.7e-06
Applying Water Soluble Liquids via Shank Injection Equipment-In-Cab Sampler Pumps (enclosed cab with charcoal filter): MRID# 45123902 and 45703703 (2d)	fiber crops (cotton)	44.4 lb ai/acre	480	6.4e-03	4.4e-05	1.5e-05	6.4e-04	4.4e-06	1.5e-06
	peanuts	27.5 lb ai/acre	480	3.9e-03	2.7e-05	9.4e-06	3.9e-04	2.7e-06	9.4e-07
	seed beds, plant beds	523 lb ai/acre	60	1.2e-02	8.1e-05	2.8e-05	1.2e-03	8.1e-06	NF
	tobacco plant beds	387 lb ai/acre	180	2.6e-02	1.8e-04	6.3e-05	2.6e-03	1.8e-05	NF
	orchard replant/transplanting sites	320 lb ai/acre	480	5.8e-02	4.0e-04	1.4e-04	5.8e-03	4.0e-05	NF
	turf (sod farms)	252 lb ai/acre	480	4.6e-02	3.1e-04	1.1e-04	4.6e-03	3.1e-05	NF
	wheat, barley	162 lb ai/acre	480	2.9e-02	2.0e-04	7.0e-05	2.9e-03	2.0e-05	NF
Applying Water Soluble Liquids via Rotary Tiller Equipment (enclosed cab with charcoal filter): MRID# 42958401 (3a)	ornamentals and food crops	108 lb ai/acre	480	2.0e-02	1.3e-04	4.7e-05	2.0e-03	1.3e-05	NF
	fiber crops (cotton)	44.4 lb ai/acre	480	8.0e-03	5.5e-05	1.9e-05	8.0e-04	5.5e-06	NF
	peanuts	27.5 lb ai/acre	480	5.0e-03	3.4e-05	1.2e-05	5.0e-04	3.4e-06	NF
Applying Water Soluble Liquids via Rotary Tiller Equipment (enclosed cab with cellulose filter): 42958401 (3b)	turf (sod farms)	252 lb ai/acre	480	2.9e-02	2.0e-04	7.0e-05	2.9e-03	2.0e-05	NF
	ornamentals and food crops	108 lb ai/acre	480	1.3e-02	8.6e-05	3.0e-05	1.3e-03	8.6e-06	NF
	fiber crops (cotton)	44.4 lb ai/acre	480	5.1e-03	3.5e-05	1.2e-05	5.1e-04	3.5e-06	NF
Applying Water Soluble Liquids via Rotary Tiller Equipment (enclosed cab with cellulose filter): 42958401 (3b)	turf (sod farms)	252 lb ai/acre	480	3.0e-02	2.1e-04	7.1e-05	3.0e-03	2.1e-05	7.1e-06
	ornamentals and food crops	108 lb ai/acre	480	1.3e-02	8.8e-05	3.1e-05	1.3e-03	8.8e-06	3.1e-06
	fiber crops (cotton)	44.4 lb ai/acre	480	5.2e-03	3.6e-05	1.2e-05	5.2e-04	3.6e-06	1.2e-06

## **Appendix E/Table E1: Noncommercial Cancer Risks to Handlers for MITC**

**Appendix E/Table E1: Noncommercial Cancer Risks to Handlers for MITC**

Exposure Scenario	Crop or Target	Typical Application Rate	Minutes Exposed per Day	Baseline Average Daily Concentration (mg/kg/day)	Applicator Lifetime Average Daily Concentration	Applicator Baseline Cancer Risk	90% OV Respirator Average Daily Concentration (mg/kg/day)	Applicator Lifetime Average Daily Concentration	Applicator 90% OV Respirator Cancer Risk
Mixing/Loading/Applying Water Soluble Liquids via cement mixer (using PHED Mixer/Loader data for Liquids) (11)	No MITC specific data is available for this scenario.								
Mixing/Loading/Applying Water Soluble Liquids via shredder (using PHED Mixer/Loader data for Liquids) (12)	No MITC specific data is available for this scenario.								
Mixing/Loading/Applying foam with foaming Equipment (13)	No MITC specific data is available for this scenario.								
Mixing/Loading/Applying Water Soluble Liquids via open pour (using PHED Mixer/Loader data for Liquids) (14)	No MITC specific data is available for this scenario.								

**Footnotes:**

NF: Not feasible, already engineering controls.

\* Noncommercial applicator exposure was considered to be 5 days per year for 35 years over a 70 year lifetime.

**Appendix E/Table E1: Commercial Cancer Risks to Handlers for MITC**

Exposure Scenario	Crop or Target	Typical Application Rate	Minutes Exposed per Day	Baseline Average Daily Concentration (mg/kg/day)	Applicator Lifetime Average Daily Concentration	Applicator Baseline Cancer Risk	90% OV Respirator Average Daily Concentration (mg/kg/day)	Applicator Lifetime Average Daily Concentration	Applicator 90% OV Respirator Cancer Risk
Loader									
Transferring Water Soluble Liquids from Tank Delivery Truck to Shank Injection Equipment (mechanical transfer system): MRID# 42968402 (1a)	seed beds, plant beds	523 lb ai/acre	60	3.5e-03	NCCR	NCCR	3.5e-04	NCCR	NCCR
	tobacco plant beds	387 lb ai/acre	180	7.8e-03	NCCR	NCCR	7.8e-04	NCCR	NCCR
	orchard replant/transplanting sites	320 lb ai/acre	480	1.7e-02	NCCR	NCCR	1.7e-03	NCCR	NCCR
	turf (sod farms)	252 lb ai/acre	480	1.4e-02	NCCR	NCCR	1.4e-03	NCCR	NCCR
	wheat, barley	162 lb ai/acre	480	8.7e-03	2.4e-04	8.3e-05	8.7e-04	5.1e-10	1.768E-10
	ornamentals and food crops	108 lb ai/acre	480	5.8e-03	1.6e-04	5.5e-05	5.8e-04	8.3e-10	2.9e-10
	fiber crops (cotton)	44.4 lb ai/acre	480	2.4e-03	6.6e-05	2.3e-05	2.4e-04	1.521E-09	5.3e-10
	peanuts	27.5 lb ai/acre	480	1.5e-03	4.059E-05	1.4e-05	1.5e-04	9.4e-10	3.3e-10
Transferring Water Soluble Liquids from Tank Delivery Truck to Rotary Tiller Equipment (mechanical transfer system): MRID# 42958401 (1b)	turf (sod farms)	252 lb ai/acre	480	1.8e-02	NCCR	NCCR	1.8e-03	NCCR	NCCR
	ornamentals and food crops	108 lb ai/acre	480	7.8e-03	2.1e-04	7.4e-05	7.8e-04	3.9e-10	1.4e-10
	fiber crops (cotton)	44.4 lb ai/acre	480	3.2e-03	8.7e-05	3.0e-05	3.2e-04	1.7e-10	6.0e-11
	tobacco plant beds	387 lb ai/acre	180	6.1e-03	NCCR	NCCR	6.1e-04	NCCR	NCCR
Transferring Water Soluble Liquids from Tank Delivery Truck to Pickup Truck and subsequent transfer to Sprinkler irrigation Nurse Tank (mechanical transfer system): MRID# 42968402 and 42958401 (1c)	orchard replant/transplanting sites	320 lb ai/acre	480	1.3e-02	NCCR	NCCR	1.3e-03	NCCR	NCCR
	turf (sod farms)	252 lb ai/acre	480	1.1e-02	NCCR	NCCR	1.1e-03	NCCR	NCCR
	wheat, barley	162 lb ai/acre	480	6.8e-03	1.9e-04	6.5e-05	6.8e-04	2.9e-11	1.0e-11
	ornamentals and food crops	108 lb ai/acre	480	4.6e-03	1.2e-04	4.3e-05	4.6e-04	1.1e-11	3.9e-12
	fiber crops (cotton)	44.4 lb ai/acre	480	1.9e-03	5.1e-05	1.8e-05	1.9e-04	1.7e-09	5.8e-10
	peanuts	27.5 lb ai/acre	480	1.2e-03	3.2e-05	1.1e-05	1.2e-04	3.1e-10	1.1e-10
Transferring Water Soluble Liquids from Tank Delivery Truck to Pickup Truck and subsequent transfer to Drip Irrigation Nurse Tank (mechanical transfer system): MRID# 42968402 and 42958401 (1d)	turf (sod farms)	252 lb ai/acre	480	1.1e-02	NCCR	NCCR	1.1e-03	NCCR	NCCR
	ornamentals and food crops	108 lb ai/acre	480	4.6e-03	1.2e-04	4.3e-05	4.6e-04	5.2e-11	1.8e-11
	fiber crops (cotton)	44.4 lb ai/acre	480	1.9e-03	5.1e-05	1.8e-05	1.9e-04	5.1e-10	1.8e-10
Applicator: Personal Pump Samplers									
Applying Water Soluble Liquids via Shank Injection Equipment (enclosed cab with charcoal filter): MRID# 42968402 (2a)	seed beds, plant beds	523 lb ai/acre	60	2.9e-03	NCCR	NCCR	2.9e-04	NCCR	NCCR
	tobacco plant beds	387 lb ai/acre	180	6.4e-03	NCCR	NCCR	6.4e-04	NCCR	NCCR
	orchard replant/transplanting sites	320 lb ai/acre	480	1.4e-02	NCCR	NCCR	1.4e-03	NCCR	NCCR
	turf (sod farms)	252 lb ai/acre	480	1.1e-02	NCCR	NCCR	1.1e-03	NCCR	NCCR
	wheat, barley	162 lb ai/acre	480	7.2e-03	2.0e-04	6.8e-05	7.2e-04	5.8e-10	NF
	ornamentals and food crops	108 lb ai/acre	480	4.8e-03	1.3e-04	4.6e-05	4.8e-04	2.9e-10	NF
	fiber crops (cotton)	44.4 lb ai/acre	480	2.0e-03	5.3e-05	1.9e-05	2.0e-04	1.0e-10	NF
	peanuts	27.5 lb ai/acre	480	1.2e-03	3.3e-05	1.2e-05	1.2e-04	1.8e-11	NF

**Appendix E/Table E1: Commercial Cancer Risks to Handlers for MITC**

Exposure Scenario	Crop or Target	Typical Application Rate	Minutes Exposed per Day	Baseline Average Daily Concentration (mg/kg/day)	Applicator Lifetime Average Daily Concentration	Applicator Baseline Cancer Risk	90% OV Respirator Average Daily Concentration (mg/kg/day)	Applicator Lifetime Average Daily Concentration	Applicator 90% OV Respirator Cancer Risk
Applying Water Soluble Liquids via Shank Injection Equipment (enclosed cab with cellulose filter): MRID# 42968402 (2b)	seed beds, plant beds	523 lb ai/acre	60	1.9e-02	NCCR	NCCR	1.9e-03	NCCR	NCCR
	tobacco plant beds	387 lb ai/acre	180	4.3e-02	NCCR	NCCR	4.3e-03	NCCR	NCCR
	orchard replant/transplanting sites	320 lb ai/acre	480	9.5e-02	NCCR	NCCR	9.5e-03	NCCR	NCCR
	turf (sod farms)	252 lb ai/acre	480	7.5e-02	NCCR	NCCR	7.5e-03	NCCR	NCCR
	wheat, barley	162 lb ai/acre	480	4.8e-02	1.3e-03	4.6e-04	4.8e-03	6.9e-12	2.4e-12
	ornamentals and food crops	108 lb ai/acre	480	3.2e-02	8.8e-04	3.0e-04	3.2e-03	5.8e-10	2.0e-10
	fiber crops (cotton)	44.4 lb ai/acre	480	1.3e-02	3.6e-04	1.3e-04	1.3e-03	1.1e-10	3.7e-11
Applying Water Soluble Liquids via Shank Injection Equipment (open cab): MRID# 42968402 (2c)	peanuts	27.5 lb ai/acre	480	8.1e-03	2.2e-04	7.8e-05	8.1e-04	1.8e-11	6.2e-12
	seed beds, plant beds	523 lb ai/acre	60	9.4e-03	NCCR	NCCR	9.4e-04	NCCR	NCCR
	tobacco plant beds	387 lb ai/acre	180	2.1e-02	NCCR	NCCR	2.1e-03	NCCR	NCCR
	orchard replant/transplanting sites	320 lb ai/acre	480	4.6e-02	NCCR	NCCR	4.6e-03	NCCR	NCCR
	turf (sod farms)	252 lb ai/acre	480	3.6e-02	NCCR	NCCR	3.6e-03	NCCR	NCCR
	wheat, barley	162 lb ai/acre	480	2.3e-02	6.4e-04	2.2e-04	2.3e-03	6.4e-05	2.213E-05
	ornamentals and food crops	108 lb ai/acre	480	1.5e-02	4.2e-04	1.5e-04	1.5e-03	4.2e-05	1.5e-05
Applying Water Soluble Liquids via Shank Injection Equipment-In-Cab Sampler Pumps (enclosed cab with charcoal filter): MRID# 45123902 and 45703703 (2d)	fiber crops (cotton)	44.4 lb ai/acre	480	6.4e-03	1.7e-04	6.1e-05	6.4e-04	1.7e-05	6.1e-06
	peanuts	27.5 lb ai/acre	480	3.9e-03	1.1e-04	3.8e-05	3.9e-04	1.1e-05	3.8e-06
	seed beds, plant beds	523 lb ai/acre	60	1.2e-02	NCCR	NCCR	1.2e-03	NCCR	NCCR
	tobacco plant beds	387 lb ai/acre	180	2.6e-02	NCCR	NCCR	2.6e-03	NCCR	NCCR
	orchard replant/transplanting sites	320 lb ai/acre	480	5.8e-02	NCCR	NCCR	5.8e-03	NCCR	NCCR
	turf (sod farms)	252 lb ai/acre	480	4.6e-02	NCCR	NCCR	4.6e-03	NCCR	NCCR
	wheat, barley	162 lb ai/acre	480	2.9e-02	8.0e-04	2.8e-04	2.9e-03	8.0e-05	NF
Applying Water Soluble Liquids via Rotary Tiller Equipment (enclosed cab with charcoal filter): MRID# 42958401 (3a)	ornamentals and food crops	108 lb ai/acre	480	2.0e-02	8.0e-04	2.8e-04	2.0e-03	8.0e-05	NF
	fiber crops (cotton)	44.4 lb ai/acre	480	8.0e-03	2.2e-04	1.9e-04	8.0e-04	5.4e-05	NF
	peanuts	27.5 lb ai/acre	480	5.0e-03	1.4e-04	7.7e-05	5.0e-04	1.4e-05	NF
Applying Water Soluble Liquids via Rotary Tiller Equipment (enclosed cab with cellulose filter): 42958401 (3b)	turf (sod farms)	252 lb ai/acre	480	2.9e-02	NCCR	NCCR	2.9e-03	NCCR	NCCR
	ornamentals and food crops	108 lb ai/acre	480	1.3e-02	3.4e-04	1.2e-04	1.3e-03	3.4e-05	NF
	fiber crops (cotton)	44.4 lb ai/acre	480	5.1e-03	1.4e-04	4.9e-05	5.1e-04	1.4e-05	NF
Applying Water Soluble Liquids via Rotary Tiller Equipment (enclosed cab with cellulose filter): 42958401 (3b)	turf (sod farms)	252 lb ai/acre	480	3.0e-02	NCCR	NCCR	3.0e-03	NCCR	NCCR
	ornamentals and food crops	108 lb ai/acre	480	1.3e-02	3.5e-04	1.3e-04	1.3e-03	3.5e-05	1.2e-05
	fiber crops (cotton)	44.4 lb ai/acre	480	5.2e-03	1.4e-04	1.2e-04	5.2e-04	1.4e-05	1.2e-05

## **Appendix E/Table E1: Commercial Cancer Risks to Handlers for MTC**

**Appendix E/Table E1: Commercial Cancer Risks to Handlers for MITC**

Exposure Scenario	Crop or Target	Typical Application Rate	Minutes Exposed per Day	Baseline Average Daily Concentration (mg/kg/day)	Applicator Lifetime Average Daily Concentration	Applicator Baseline Cancer Risk	90% OV Respirator Average Daily Concentration (mg/kg/day)	Applicator Lifetime Average Daily Concentration	Applicator 90% OV Respirator Cancer Risk
Mixing/Loading/Applying Water Soluble Liquids via cement mixer (using PHED Mixer/Loader data for Liquids) (11)	No MITC specific data is available for this scenario.								
Mixing/Loading/Applying Water Soluble Liquids via shredder (using PHED Mixer/Loader data for Liquids) (12)	No MITC specific data is available for this scenario.								
Mixing/Loading/Applying foam with foaming Equipment (13)	No MITC specific data is available for this scenario.								
Mixing/Loading/Applying Water Soluble Liquids via open pour (using PHED Mixer/Loader data for Liquids) (14)	No MITC specific data is available for this scenario.								

**Footnotes:**

NF: Not feasible, already engineering controls.

NCCR: No commercial cancer risks calculated

\* Commercial applicator exposure was considered to be 20 days per year for 35 years over a 70 year lifetime.