02.03.01 – PESTICIDE MANAGEMENT PLANS FOR GROUND WATER PROTECTION

IDAHO CODE SECTION 22-101A STATEMENT: Section 22-101, Idaho Code provides that ISDA must clearly specify that the proposed rule, or portions of the proposed rule, are broader in scope or more stringent than federal law or regulation, or regulate an activity not regulated by the federal government.

The following is a summary of additional information required by Section 22-101A (3) and (4), Idaho Code. Information relating to Section 22-101A peer reviewed science and studies and analyses conducted by other states, USEPA, USDA and professional scientific and medical journals. The referenced studies and analyses will be included in the rulemaking record and can be viewed during the public comment period for further detailed information regarding health effects.

Section 22-101A(2)(a), Idaho Code. To the degree that a department action is based on science the department shall utilize best available peer reviewed science and supporting studies conducted in accordance with sound and objective scientific practices.

The presence of pesticides in ground water is universally accepted as evidence that the ground water has been contaminated with the use of pesticides. Pesticide contamination is an indicator that a potential health risk exits for individuals exposed to or ingesting high concentrations. The requirements set forth in this rule are based upon best available peer reviewed science and studies and analyses conducted by other states, the USEPA – United States Environmental Protection Agency (USEPA), the U.S. Geological Survey (USGS), and professional and scientific journals. The referenced studies and analyses will be included in the rulemaking record and can be reviewed during the public comment period.

Section 22-101A(2)(b), Idaho Code. To the degree that a department action is based on science the department shall utilize data collected by accepted methods or best available methods if the reliability of the method and the nature of the decision justifies use of the data.

Data were not collected or analyzed by ISDA as part of this rulemaking process. ISDA relied on information readily available to the public from federal and state government publications and articles from medical and scientific professional journals. The data collected by the EPA, USDA, and other sources was collected according to accepted scientific methods.

Section 22-101A(3)(a), Idaho Code. Identification of each population or receptor addressed by an estimate of public health effects or environmental effects.

In 2012, the worldwide estimate of pesticide use was approximately 6 billion pounds, with approximately 1.1 billion pounds used in the United States of America (Atwood and Paisley-Jones 2017). In 2012, an estimated 8.5 million pounds of pesticides were used in Idaho, with the greatest percentage in southern Idaho (Baker and Stone 2015 and appendices). In 2012, there were approximately 5.8 million acres in Idaho as cropland (NASS 2019). Therefore, pesticide use on agricultural lands is a significant portion of lands within the State of Idaho, and these numbers may not accurately reflect pesticide use on urban land-uses. The term ‘pesticides’ is the generic descriptor for the main categories, such as insecticides, herbicides, fumigants, fungicides, etc. (Costa et al. 2008). Whereas, the chemical composition of pesticides can be classified into various categories, such as organophosphorus, carbamates, etc. each with differing toxic properties for humans and there targeted controls (Costa et al. 2008).

Pesticides are known to reach stream and rivers, often at measureable and/or detrimental concentrations to aquatic life (Johnson et al. 2011). Surface water and ground waters are not necessarily disconnected, especially with the increased ground water recharge from surface waters in Idaho’s Snake River Plain. Additionally, pesticides applied at/near the soil surface area known to reach the ground water (Kolpin et al. 1998, Toccalino et al. 2014). Based on the USGS NAWQA data, pesticide detections in the shallow ground occurred in 61% and 55% of the samples for primarily agricultural and urban areas, respectively (Gilliom 2007). Ground water quality can be adversely effected by pesticides, but are typically identified in the Snake River Plain as below human-health based benchmarks (Frans et al. 2012).

Ground water provides approximately 95% of Idahoans with their drinking water, or approximately 1.5 million persons. Of these consumers, approximately 1 million persons receive their water from regulated municipal sources, with the remaining populations drawing on ground water from private wells. Pesticides that reach the ground water are thereby ingested. Ingestion of ground water is a pathway to exposure to pesticides (Toccalino and Norman 2006). Pesticide toxicity to humans is extremely variable, often correlated with age, size and consumption rate. Estimates of consumption are often based upon 10 kg child, consuming 1 L per day to calculate exposure, whereas adults are based upon a 70 kg adult, consuming 2L per day to calculate exposure (USEPA 2006, USEPA 2012, USEPA 2018). Note: consumption rates and body mass are being updated by the USEPA and other for determining the reference dose; adults are based upon an 80 kg adult, consuming 2.5 L per day to calculate exposure (USEPA 2017).

Pesticide exposure has many known effects on human health, including, but not limited to, convulsions, fatigue nausea, vomiting, cardiac arrhythmias, acidosis, and diarrhea (Abdollahi et al. 2004). Research into organophosphorus pesticides identified that "children living in agricultural regions represent an important subpopulation for public health evaluation, and that their exposures fall within a range of regulatory concern." (Fenske et al. 2000). Additionally, there are statistically significant risks for childhood cancers in counties with high to moderate agricultural activity (Carozza et al. 2008). "…Cancers associated with pesticides among children, such as leukemia, brain cancer, non-Hodgkin's disease, soft-tissue sarcoma, and Hodgkin's disease" (Zahm and Ward 1998). Many of these cancers are the same as those associated with pesticide exposure in adults (Zahm, Ward and Blair 1997). While there is sufficient evidence to support the causal factors associated with pesticides and cancer, there may be other factors, such as genetic disposition that may also be associated with the development of cancer (Infante-Rivard and Weichenthal 2007). Concerns with fetal development and pesticide exposure are reviewed and compiled, identifying risks to the fetus' immune system, cancer, neurodevelopmental and growth (Gilden, Huffling and Sattler 2009). With new pesticides entering the marketplace, there is continuous research into emerging contaminants and their effects on human health and drinking water, and the need to develop criteria and benchmarks to protect human health. (Schriks et al. 2010).

Section 22-101A(3)(b) and (c), Idaho Code. Identification of the expected risk or central estimate of risk for the specific population or receptor and identification of each appropriate upper bound or lower bound estimate of risk.

Ground water provides approximately 95% of Idahoans with their drinking water, or approximately 1.5 million persons. Of these consumers, approximately 1 million persons receive their water from regulated municipal sources, with the remaining populations drawing on ground water from private wells.

In a USGS study, the herbicide atrazine (or a metabolite) was found in 121 of the 197 domestic (private) wells in the Western Snake River Plain (Donato 2000). Whereas in the Upper Snake River Basin, ID, of the 253 wells tested, over half had measurable levels of atrazine (or a metabolite) in domestic wells, which provide drinking water (Rupert 1998). Atrazine has limited mobility in ground water, however, the breakdown products or metabolites (e.g. desethyl atrazine) are mobile and persistent (Jablonowski, Schäffer, and Burauel 2011) and are of a similar toxicity to the parent herbicide (USEPA 2003, WHO 2003, WHO 2010,). Atrazine has a Maximum Contaminant Level (MCL) of 3 ug/L as a federally regulated chemical (EPA 2018). USGS NAQWA results from 1992 – 2010 found that over 30% of the sampled domestic wells had detectable pesticide concentrations with 10 pesticides commonly identified (Frans et al. 2012). Of those pesticides, atrazine (or metabolites) was identified in approximately 40% of the tested wells (Frans et al. 2012). In the Palouse River subunit of the Columbia Plateau, 15 of the 53 wells tested had pesticide detections, with atrazine, desethyl atrazine and simazine being the most commonly detected pesticides (Wagner and Roberts 1998).

Section 22-101A(3)(d), Idaho Code. Identification of each significant uncertainty identified in the process of the assessment of public health effects or environmental effects and any studies that would assist in resolving the uncertainty.

Identification of uncertainty and assessment has been through three main approaches. The first being through the combined USEPA's "Drinking Water Standards and Health Advisories Tables" for regulated chemicals and pesticides and then promulgated in Idaho's "Ground Water Quality Rule," IDAPA 58.01.11. These federally determined concentration/dose levels encompass impacts of pesticides on human health. Pesticides measured at concentrations below these Maximum Contaminant Levels (MCL) are deemed to remain protective to human health.

The second and third approaches are through human health benchmarks developed by the USEPA (approach 2) and another by the USGS (approach 3) for pesticides not having federal determination of MCLs. These benchmarks for pesticides for which there are no federal laws nor regulations that regulate these pesticides concentrations in ground water. Therefore, the best available science is used to protect human health and other identified beneficial uses. Incorporated into the Rule, 02.03.01(004)(01-06) there are multiple references that directly relate to the application of this rule. By inference, updated versions of these references are promulgated through 02.03.01(150)(d)(i-iii) "A reference point based on: best scientific information currently available on adverse effects of the contaminant(s); and protection of a beneficial use(s); and practical quantitation levels for the pesticides, if they exceed the levels identified in IDAPA 58.01.11, "Ground Water Quality Rule," Subsection 200.01.a."

Both the U.S. Environmental Protection Agency and the U.S. Geological Survey have compiled reference points that distinguish these protective concentrations. Reference points (or benchmarks) for the USEPA are available online at https://iaspub.epa.gov/apex/pesticides/f?p=HHBP:home:10911636297819 (USEPA online). Whereas the USGS has their Health Based Screening Levels (HBSL) for evaluating water-quality data online at http://water.usgs.gov/nawqa/HBSL (USGS online). Determinations from these tables are typically based on the lifetime values for the general populations, or in cases of a risk of pesticides also being a carcinogen, and then the reference point is selected by whichever value is the lowest to meet the Clean Water Act guidance for being protective of human health. Development of these tools are set forth in works by the USEPA (2017) and Toccalino et al. (2003).

An additional resource to identify pesticides and their human effects would include the Drinking Water Contaminant Candidate List (CCL) and Regulatory Determination, listings and/or nominations are indications of concern that can provide an added margin of error to develop data assessments that are protective of human health (Federal Register 2016).

Section 22-101A(3)(e), Idaho Code. Identification of studies known to the director that support, are directly relevant to, or fail to support any estimate of public health effects or environmental effects and the methodology used to reconcile inconsistencies in the data.

The referenced studies and analyses will be included and can be reviewed for further detailed information regarding health effects.

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