ATTACHMENT F

NRDC, *Comments on the Triazine Risk Assessment*
(Aug. 21, 2006)

August 21, 2006

NRDC COMMENTS ON THE TRIAZINE CUMULATIVE RISK ASSESSMENT

(EPA-HQ-OPP-2005-0481-0003)
Docket ID# EPA-HQ-OPP-2005-0481
FR, Vol 71, No. 119, Wed June 21, 2006, p. 35664-35666.

> These comments are submitted by the Natural Resources Defense Council (NRDC). On behalf of our 1.2 million members and online activists, NRDC advocates for disclosure of government information, regard for scientific inquiry and facts, justice for disempowered people, honesty by government, and corporate accountability. We seek to establish sustainability and good stewardship of the Earth (www.nrdc.org). NRDC has no financial interest in atrazine or any agriculture chemical.

BACKGROUND

The Agency is seeking comment on the Cumulative Risk Assessment (CRA) for the Triazine pesticides (EPA-HQ-OPP-2005-0481-0003; henceforth referred to as the CRA), including the Agency's methodologies and assumptions used in the assessment. The Agency specifically invites information on any groups or segments of the population who, as a result of their location, cultural practices or other factors may have atypically or unusually high exposure or susceptibility to the triazine pesticides. The Agency states that, "if appropriate" the triazine cumulative assessment may be altered in response to received comments. (FR, 2006[1])

With the release of the Triazine CRA, the EPA announced that the interim Reregistration Decision (IRED) previously issued for atrazine in Docket OPP-2003-0072 and revised in Docket OPP-2003-0367 (68 FR 63085, Nov 7, 2003) "is now considered final; the tolerance reassessment and reregistration eligibility process for atrazine is complete" (FR, 2006 and memo at EPA-HQ-OPP-2003-0367-0153). Further, EPA has determined that with the mitigation measures in the 2006 simazine RED and the 2003 atrazine IREDs, "the established tolerances for atrazine meet the FFDCA safety standard and that no further risk mitigation is necessary as a result of the triazine cumulative risk assessment." (FR, 2006 and memo at EPA-HQ-OPP-2003-0367-0153)

The EPA announced that the chlorinated triazine group includes atrazine, simazine, and propazine, in addition to their three chlorinated degradates, desethyl-s-atrazine (DEA), desisopropyl-s-atrazine (DIA), and diaminochlorotriazine (DACT). Propazine was not included in the CRA because EPA does not anticipate any human exposure from dietary, drinking water, or residential uses.

The Triazine CRA announces that the EPA finds that the cumulative risks associated with the chlorinated triazine pesticides (atrazine, simazine, and the chlorinated degradates) are below the Agency's level of concern.

The draft drinking water level of concern (DWLOC; a seasonal average) of 12 ppb was based on a NOAEL of 1.8 mg/kg/day (a 6 month adult rat study of leutenizing hormone, LH, activity) with a 1000-fold uncertainty factor that included a 10X FQPA factor. The final DWLOC is 37.5 ppb through a reduction of the FQPA factor from 10X to 3X, believing that the registrant water monitoring program will eliminate uncertainties in exposure from drinking water.

The EPA has used a 3X FQPA factor for hazard (toxicity) uncertainties. Where models have been used to estimate drinking water exposure, no additional FQPA factor was used (Florida and California). In the Midwest, where monitoring data have been used that are not robust, an additional 3X FQPA factor for exposure uncertainties has been used in the cumulative risk assessment for drinking water exposures in the Midwest (CRA at 4).

DETAILED RESPONSE: Triazine CRA

CRA relied on registrant monitoring data: Monitoring data were available for the five triazine compounds in this assessment - atrazine, simazine, DEA, DIA and DACT – for 118 Community Water Systems in the Midwest. EPA reported that an analysis of 15 of these indicated that the risk estimates were above a Margin of Exposure (MOE) of 1000 at the 99.9th percentile for infants, children, and adult men and women, and therefore were not of concern (CRA at 5). EPA reported that these systems are being monitored by the registrant as part of the Memorandum of Agreement in the atrazine IRED. Why is EPA not working closely with USGS, States, and the water utilities to ensure that sites are monitored in a manner that is most likely to detect contamination, if present? It is unacceptable that EPA repeatedly abdicates its responsibilities to the registrant, while failing to partner with credible agencies and associations.

CRA considered only currently registered uses: Only currently registered uses have been considered and included in this cumulative risk assessment (CRA at 3). Are more uses planned?

CRA considered only typical use rates: For Florida and California water exposure scenarios, typical use rates of atrazine and simazine have been used in the model simulations (CRA at 6). EPA reported that all risk estimates were above the MOE of 300. At the 99.9th percentile, the MOE s are 569 for 3-5 yr olds and 510 for 1-2 yr olds; EPA reported that these cumulative exposures are not of concern. How were these values changed by using maximum label rates? Why had EPA not used conservative assumptions like maximum label rates? How often are applications made that use above-typical application rates?

CRA misrepresented mutagenicity data: EPA reports that the mutagenicity database is extensive, and indicates that atrazine is not mutagenic (CRA at 11). This is contradicted by an article co-authored by U.S. Environmental Protection Agency (EPA) scientists that compared the results from registrant-submitted mutagenicity studies to the EPA Office of Pesticide Programs with those from the published literature.[2](Dearfield et al. 1993) This article reported a selection bias, where registrant-submitted studies on atrazine mutagenicity were all negative (no mutagenic activity), whereas over a dozen studies in the published literature reported mutagenic activity. This article both suggests that atrazine may be mutagenic, and also suggests that registrant-supplied data is likely to be biased and unreliable. Unfortunately, EPA preferentially relies on registrant-sponsored data in almost all aspects of this CRA.

Cancer classification failed to rely on current cancer guidelines: EPA continues to rely on the 1999 Cancer Guidelines in the Triazine CRA (CRA at 11), although they have now been superseded by the 2003 Cancer Guidelines. The decision by the EPA to classify atrazine as "not likely" a human carcinogen is inconsistent with the 2003 Guidelines. The 2003 Cancer Guidelines provide a framework for "judging whether available data support a mode of carcinogenic action hypothesized for an agent."[3] This framework incorporates the criteria for causality used in epidemiological studies, as stated by Bradford Hill (1965), with subsequent modifications. Each criterion support the determination of causality, and the more criteria that are satisfied, the stronger the evidence for causality. However, it is not necessary, and not likely, that all criteria are satisfied to demonstrate causality.[4] Further, the Guidelines remind the user that support for one mode of action does not limit the possibility of other modes of action. Rather, the Agency is obligated to consider the highly likely possibility of other modes of action that may be consistent with tumor formation in humans. For example, atrazine has been shown in animals and in human-derived cell cultures to stimulate aromatase activity, resulting in conversion of testosterone to estrogen. Might this mode of action cause or contribute to observed mammary tumors in male atrazine-exposed animals? The possibility, coupled with all existing experimental and epidemiological data,[5] indicates that atrazine should be classified as a "likely" or "suggested" human carcinogen, in accordance with EPA 2003 Cancer Guidelines.

CRA failed to include related triazines: EPA reported in the CRA that studies from Stoker et al demonstrated that like atrazine, DIA, DEA, and DACT can also delay the onset of puberty in the male Wistar rat at doses similar to atrazine. These data indicate that all three metabolites share a common mode of action with atrazine (CRA at 20). NRDC agrees with this interpretation of data, and notes further that many of the triazines and their metabolites have not been adequately tested. EPA has determined the following triazines to share a common chemical structure, common metabolic products, and common toxic endpoints (and an ability to induce tumors in breast or endocrine glands): atrazine, simazine, propazine, cyanazine, terbutylazine, terbumeton, terbutryn, and tribenuron methyl (Express), 2-hydroxyatrazine, DACT, DIA, and DEA. EPA has chosen to exclude most of these from this CRA, without data to support this unprotective decision.[6] Has EPA issued a Data Call-in for these data? Are EPA scientists being supported to conduct these studies? If not, why not?

CRA failed to adequately evaluate neurotoxicity: Atrazine and its metabolites have not been evaluated in any standard guideline neurotoxicity assays, despite acknowledgement that atrazine has a CNS mode of action (CRA at 29). EPA acknowledged that, "it is not known whether atrazine's CNS mode of action would lead to behavioral effects in the young, or at what dose compared to its reproductive developmental effects" (CRA at 31). Has EPA issued a Data Call-in for these data? If not, why not? Are EPA scientists being supported to conduct these studies? If not, why not?

CRA failed to adequately evaluate chronic effects: EPA reported that the available data "suggest that the longer the duration of exposure to young animals, the lower the dose that is needed to produce effects" (CRA at 31). EPA summarizes that, "there is a reasonable basis to believe that atrazine longer term dosing that covered the critical developmental periods in gestation through puberty in both male and female rats could lead to lower NOAELs" (CRA at 31). Has EPA issued a Data Call-in for these data? If not, why not? Are EPA scientists being supported to conduct these studies? If not, why not?

CRA failed to adequately evaluate endocrine effects: EPA reported that although prenatal developmental toxicity studies are available for atrazine, these studies were done under old protocols that lacked sensitive measures of endocrine disruption (CRA at 28). Has EPA issued a Data Call-in for these data? If not, why not? Are EPA scientists being supported to conduct these studies? If not, why not?

CRA wrongly determined that toxicity database was complete: With inadequate data on chronic effects, including neurobehavioral effects, and inadequate data on endocrine effects, why has EPA determined that the toxicity database is complete for consideration of effects on infants and children (CRA at 28)?

CRA invoked only a 3X FQPA, despite acknowledging evidence of increased susceptibility and lack of key data on chronic and endocrine effects: The CRA acknowledges that the EPA review of relevant data by the HIARC (August 28, 2000) concluded that "there was evidence of increased susceptibility given the delayed puberty found in rat studies consistent with atrazine's CNS mode of action" (CRA at 32). The CRA reports that in a prenatal developmental toxicity study with DACT in rats, developmental effects were seen in the absence of maternal toxicity (CRA at 33). Nonetheless, the CRA applies a reduced FQPA factor of 3X to account for all "hazard-based" concerns, saying that the difference between the most sensitive endpoint in adults (NOAEL of 1.8 mg/kg/day in 6-month LH study) and in juvenile animals (NOAEL of 6.25 mg/kg/day in males) is less than 10X (CRA at 34). This fails, however, to acknowledge that these studies are unlikely to capture the most sensitive endpoints in juveniles exposed chronically through development (CRA at 31).

Triazine contamination of milk unaccounted for: The CRA reported that both atrazine and DACT have been found in mother's milk, including goat and cows milk (CRA at 33). The CRA presumed that exposure from food is negligible. Was milk tested? Were

triazine residues in milk incorporated into the CRA? If not, are federal experts being supported to conduct these studies? If not, why not?

CRA overrode evidence of excessive risk with limited registrant data: The CRA reported that risk estimates for cumulative exposure to triazines via drinking water are not of concern, despite previous single-chemical risk assessment for atrazine indicating that drinking water exposure exceeded the Agency level of concern (CRA at 58). The CRA claims that the single-chemical assessment relied on older monitoring data that did not take into account reductions to the maximum labeled use rat on corn (negotiated in the early 1990's), and that the current CRA relies on more recent, albeit smaller sampling, data. . However, this is contradicted by the most recent USGS report, which provides actual monitoring data demonstrating that atrazine detections in agricultural waters have stayed fairly constant over the last decade, 1992-2001.[7] The reliance on limited sampling from the registrant has likely biased the CRA conclusions inappropriately.

DETAILED RESPONSE: response to comments on 2003 atrazine IRED

EPA Response to comments delayed 3.5 yrs: EPA issued a response to comments document on April 14, 2006, to address public comments received for the January 2003 IRED for atrazine.[8] A delay of 3.5 years in responding to public comments seems unnecessary, and makes it difficult for the public to maintain continuity with the subject matter.

Hazard profile of atrazine: There is some evidence that exposure to atrazine may be associated with cancer in humans (lung, bladder, non-Hodgkin lymphoma, leukemia, multiple myeloma, ovarian cancer, colon cancer),[9] cancer in laboratory rats (mammary, uterine, combined leukemia and lymphoma),[10] delayed reproductive development in male and female laboratory rodents,[11] reduced sperm quality in rodents[12] and humans,[13] male hermaphroditism in amphibians,[14] and impaired immune system function leading to increased susceptibility to infection in amphibians[15] and juvenile rodents[16].

Atrazine has multiple toxic mechanisms that EPA failed to adequately consider: The disruptive effects of atrazine on endocrine activity has been suggested to occur via multiple mechanisms, including inhibition of androgen receptors in mammals,[17] disruption of the hypothalamic control of pituitary-ovarian function in mammals,[18] alteration of corticosterone and thyroid hormones in amphibians,[19] and by induction of aromatase that results in an increased conversion of androgen to estrogen in human cell lines,[20] amphibians,[21] and potentially in reptiles.[22] In addition, there is some evidence that atrazine may induce non-Hodgkin's lymphoma (NHL) cancer through a cytogenic mechanism; one study reported an elevated risk of NHL associated with atrazine use only in cases with a particular chromosomal translocation (OR 1.7, 95% CI = 1.0-2.8).[23] Nonetheless, atrazine and its metabolites have not been evaluated in any standard guideline neurotoxicity assays, despite acknowledgement that atrazine has a CNS mode of action (CRA at 29).

EPA failed to work effectively with States: Ohio EPA requested that EPA work with states to identify appropriate community water systems (CWS) for the atrazine monitoring study that is being conducted by the registrant (EPA response[24], p. 1). This concern was also raised by the East Central Region (Indiana) of American Water, expressing a desire to preferentially reduce atrazine in the watersheds rather than the costly process of removing it from drinking water (EPA response, p. 13). EPA responds that it has worked with states to develop the CWS monitoring program (EPA response, p. 1). EPA did not provide specific examples of meaningful state involvement. In contrast, EPA actively engaged with the registrant to develop a water monitoring program in a manner that was neither public nor inclusive of states, or other interests. Specifically, the Agency announced in its January 31, 2003 Press Release that "The provisions of this action, contained in the IRED, have also been incorporated into an agreement with the principal registrant of atrazine, Syngenta." Not only does this process of private deal making violate EPA's Special Review rules at 40 C.F.R. Part 154, it also violates the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), 7 U.S.C. §136 *et seq.*, the Federal Advisory Committee Act (FACA), 5 U.S.C. App. II, and the Administrative Procedure Act (APA), 5 U.S.C. §551 *et seq.* (APA).

EPA failed to work effectively with water utilities: In response to a request by AWWA to participate in the water monitoring process, the EPA stated that it welcomes input from the AWWA and water utilities. In contrast, EPA actively engaged with the registrant to develop a water monitoring program in a manner that was neither public nor inclusive of AWWA, water utilities, states, or other interests. Specifically, the agency announced in its January 31, 2003 Press Release that "The provisions of this action, contained in the IRED, have also been incorporated into an agreement with the principal registrant of atrazine, Syngenta." It appears evident that EPA developed significant portions of the water monitoring program in consultation only with Syngenta, in direct violation of its regulations.[25] Why is EPA not working closely with USGS, States, and the water utilities to ensure that sites are monitored in a manner that is most likely to detect contamination, if present? It is unacceptable that EPA repeatedly abdicates its responsibilities to the registrant, while failing to partner with credible agencies and associations.

Mitigation trigger should be lowered: The Association of State Drinking Water Administrators commented on both the January and October 2003 atrazine IREDs that the trigger for drinking water mitigation should be lowered, and any trigger above the current maximum contaminant level (MCL) of 3 ppb is not adequate (EPA response, p. 14). This comment was echoed by the Association of Metropolitan Water Agencies (EPA response, p. 19). The American Waterworks Association (AWWA) also noted that the trigger for drinking water mitigation of 37.5 ppb should be lowered, saying it is currently not low enough to lead to mitigation (EPA response, p. 2). AWWA suggests that either 12 ppb (the draft DWLOC; a seasonal average) or ideally the MCL of 3 ppb (an annual average) should be used as a trigger for mitigation. EPA responded by indicating that the MCL is currently being reconsidered. EPA also responded that the draft DWLOC of 12 ppb was based on an endpoint of 1.8 mg/kg/day with a 1000-fold uncertainty factor that included a 10X FQPA factor. The DWLOC has since been revised upwards, to 37.5 ppb

(a 90-day average for a performance standard) through a reduction of the FQPA factor from 10X to 3X, believing that the registrant water monitoring program will eliminate uncertainties in exposure from drinking water. EPA did point out that if the MCL is violated, the registrant is required to implement a mitigation plan, or atrazine may be prohibited from use in that watershed. The response by EPA is inadequate. The current MCL for atrazine, codified in the C.F.R., is 3 ppb (annual average of 4 quarterly samples). *See* 40 C.F.R. §141.62(c). Moreover, EPA has determined, through notice and comment rulemaking, that the MCL Goal (MCLG) – the "level at which no known or anticipated adverse effects on the health of persons occur, and which allows an adequate margin of safety" – for atrazine is 3 ppb, a level also codified in the C.F.R. *See* 40 C.F.R. §141.50(b). NRDC continues to maintain that the finalized DWLOC of 37.5 ppb is not protective: first, adverse effects in aquatic plants and animals have been reported at levels of 10 ppb, and in some studies at levels as low as 0.1 ppb; second, the level of 37.5 ppb is a seasonal average that would allow peak levels to exceed this level, for example during the spring – the key time for reproduction of aquatic plants and animals.

EPA relied on industry-sponsored data to evaluate endocrine effects: NRDC and the Children's Environmental Health Network requested that EPA establish a DWLOC that specifically considers children, including the potential endocrine risks. Specifically, the CEHN and NRDC argue for retaining the 10X FQPA, and opposed its reduction to 3X for toxicity uncertainties. In its response, EPA "noted that endocrine disruption is now considered the main toxic mode of action of atrazine", but that, "residual uncertainties remain….regarding that mode of toxic action, and the timing of exposure in the available database".[26] NRDC is pleased that EPA has now acknowledged the substantial database on endocrine effects, including data from EPA staff scientists. However, EPA claimed that "the assessment addresses these uncertainties by added additional FQPA factors". There are no "added additional" FQPA factors. Instead, EPA has recommended that the registrant conduct additional studies on the "hormonal and developmental changes in the young" using an animal model. NRDC challenges EPA to conduct or support independent research that is rigorous, reliable and credible, rather than rely in industry-sponsored data.[27] In an analogous situation, the deputy editor of the Journal of the American Medical Association acknowledged problems of corporate malfeasance in reporting of drug trial data, and called for, "A perfectly independent agency…", to conduct drug trials, saying, "There will be two classes of trials -- the believable ones and the non-believable ones."[28] The situation for atrazine and other commercial chemicals is no different. NRDC has commented that in establishing a tolerance for atrazine, EPA is expressly required to consider any effect "that is similar to an effect produced by a naturally occurring estrogen or other endocrine effects." FFDCA §408(c)(2)(D)(viii), 21 U.S.C. §346(c)(2)(D)(viii).[29] EPA cannot meet this requirement with shoddy, biased, untrustworthy data.

Chronic exposures to kids from well water still exceed level of concern: In its response to comments, EPA reports "some concerns for chronic exposures of infants and children drawing water from rural wells located directly in atrazine use areas, i.e. adjacent to fields where atrazine was used".[30] EPA reported that eight of 1505 wells (0.5%) monitored had residues of atrazine and chlorinated degradates at levels at or exceeding

12.5 ppb, the DWLOC for infants, but that later sampling showed levels less than 12.5 ppb. This provides no comfort to the parents of those infants already exposed. Moreover, approximately ten percent of the US population gets their drinking water from 13 million wells; therefore the sample taken is highly inadequate. Thus, EPA has continued to ignore the known aggregate risks of atrazine contamination to private well owners (and users of springs and other non-regulated water systems), in violation of the aggregate risk requirements of FFDCA § 408(b).[31]

EPA relied on industry-sponsored water monitoring data that is contradicted by government reports: EPA misleadingly reports that it has data indicating that levels are decreasing over time. This is contradicted by the most recent USGS report, which provides actual monitoring data demonstrating that the trends in atrazine use tracks fairly closely with trends in atrazine detections in agricultural waters, and that both have stayed fairly constant over the last decade, 1992-2001.[32] USGS also reported that atrazine is the most frequently detected pesticide water contaminant in US waters, with the parent compound and its degradates detected in about 75% of stream samples and about 40% of ground-water samples in agriculture areas across the U.S. between 1992 and 2001, at levels as high as 201 ppb (95th percentile is 2.86 ppb for streams at agriculture sites). [33] It is unclear why the EPA is reporting data that is contradicted by its sister federal agency, but it deserves close scrutiny. Reliance solely on registrant-supplied data lacks the independent oversight that the public should expect from government. Despite reports that atrazine is exceeding the DWLOC for infants, EPA has reported that it will do no more than require the registrant to conduct a study on predictive aspects of vulnerable wells.[34] EPA claims that it can use statistical inferences to extrapolate from the 40 monitored watersheds to predict contamination in the 1,172 watersheds considered to be the most potentially vulnerable (EPA response, p. 10-11). However, no calculations have been provided as evidence that this small sample will provide sufficient statistical power to extrapolate with statistical confidence. Moreover, the registrant-sponsored monitoring data may be less likely than independent researchers to find contaminated sites. It is unacceptable that EPA responded to each indicator of unacceptable risk by inaction, while repeatedly abdicating its responsibilities to the registrant. This failure to take meaningful action to prevent excessive and unsafe exposure is a violation of the aggregate risk requirements of FFDCA § 408(b).[35]

EPA reduced FQPA factor but acknowledges significant residual toxicity and exposure uncertainties: The FQPA factor was reduced from 10X to 3X. EPA reports that the 10X FQPA was to account for two types of uncertainties, toxic effects on developing children, and extent and magnitude of exposure from drinking water.[36] EPA now believes that the registrant water monitoring program will eliminate the exposure uncertainties, so that a 3X FQPA remains to account for all other uncertainties pertaining to toxic effects on developing children (EPA response, p. 2). However, it appears a contradiction when, several pages later, EPA acknowledges that both toxicity and exposure uncertainties remain (EPA response, p. 10). Moreover, the CRA that states, "an additional FQPA safety factor of 3X for exposure-based residual uncertainty related to deficiencies in monitoring data was applied to the cumulative risk assessment for drinking water exposures in the Midwest" (CRA at 4). EPA must clarify its use of the FQPA factor,

because it appears right now that significant uncertainties remain in both exposure and toxicity issues that pertain to children, including heavy reliance on registrant-sponsored monitoring data of an extremely small sample of sites.

EPA relied on proprietary model: The Center for Regulatory Effectiveness noted that EPA is using a proprietary and inadequate model, the CASM model, to interpret whether the amount of atrazine in the water over time is sufficient to cause adverse effects to aquatic communities (EPA response, p. 12). EPA responded that the CASM model is from the registrant, and a public domain version will be made available. Why has EPA not used its own in-house validated PRZM/EXAMS model? Results from models are similar to a critical review of the overall scientific literature, in that they incorporate the results of many studies to generate an overall summary of the data. As such, models can be highly subjective, depending on the bias of the sponsor and any financial interests they may have in the regulations that may result. The scientific journals have recognized this reality, and many have strict guidelines against allowing financial interested parties to write scientific review papers. The potential for financial interests to bias scientific results, or the interpretation of results, has been the focus of much attention.[37] The need to make EPA regulatory decisions as transparent as possible, and to allow others to reproduce EPA calculations and derivation of numbers, is essential to elevating the public confidence in EPA assessments. All models used to inform regulatory decisions should be accompanied by comprehensive, publicly available documentation that describes the conceptual and theoretical basis for the model, the process used to evaluate the model, and access to input and output data such that the public can replicate results derived from the model. It is unacceptable that EPA repeatedly abdicate its responsibilities to the registrant, while failing to provide opportunity for effective public oversight, credible validation, and independent peer-review of registrant-sponsored submissions.

EPA failed to create an advantage for reduced-risk alternatives: Beyond Pesticides commented that the trigger for water mitigation should be lowered, the FQPA should remain at 10X, and that safe alternatives should be substituted for atrazine use (EPA response, p. 14). NRDC supports these comments. EPA responded that it is aware of alternative herbicides, but did not give any indication that the Agency will actively promote safe alternatives. EPA could create a market advantage for reduced risk alternatives by reducing or eliminating agriculture chemicals with elevated risks.

Registrant argued against use of FQPA factor: EPA applied a 10X FQPA to dietary risk assessments for atrazine, based on residual uncertainties regarding toxicity and the extent of exposure. Syngenta, the registrant, commented that EPA should remove the FQPA factor completely (EPA response, p. 15). EPA responded that it has residual uncertainties about exposures during early life-stages as well as possible risks of earlier developmental exposure with longer duration of exposure throughout development. EPA and the Scientific Advisory Panel (Report No 2000-05) noted that the developmental effects could translate into severe effects that may not be detectable until later in life, including behavior and learning effects. NRDC supports the concerns raised by the SAP and EPA technical staff, but disagrees with EPA that a 3X FQPA would adequately account for these hazard-based (toxicity) residual uncertainties. In fact, EPA has no idea

of the magnitude of its uncertainty, and should therefore be maintaining the default 10X FQPA. Under FQPA, EPA must maintain the 10X in its risk assessments to "take into account potential pre– and post–natal developmental toxicity and completeness of the data with respect to exposure and toxicity to infants and children." EPA can depart from this requirement and use a different margin of safety "only if, on the basis of reliable data, such margin will be safe for infants and children."

Registrant denied drinking water risks: Syngenta did not agree that ground water contamination was a concern, and indicated that its own research indicated that atrazine is not a risk to endangered or threatened species (EPA response, p. 15). This is contradicted by EPA, and suggests a bias and lack of credibility in the registrant claims. The EPA assessment acknowledges a number of ways that atrazine may jeopardize endangered species (IRED at 66-67; Atrazine EFEC at 94-95).[38] EPA's levels of concern for endangered terrestrial plants and vascular aquatic plants are exceeded (Atrazine EFEC at 94). Acute levels of concern for endangered species are exceeded for aquatic invertebrates, and chronic levels of concern are exceeded for fish and aquatic invertebrate reproduction (Atrazine EFEC at 95). Furthermore, EPA acknowledges that atrazine may indirectly affect endangered birds, mammals, and beneficial insects through loss of food sources and habitat disruption caused by atrazine's adverse chronic effects on terrestrial and aquatic plants (Atrazine EFEC at 94). Moreover, adverse effects of atrazine on aquatic vegetation may cause a loss of vegetative habitat that could affect populations of endangered aquatic invertebrates and endangered fish species (Atrazine EFEC at 95).

Registrant argued against use of protective endpoint for toxicity: Syngenta argued against the use of leutenizing hormone (LH; from a 6-mos rat study of the mechanism of mammary tumor formation) as the toxic endpoint for infants and children in the intermediate and chronic risk assessment. EPA responded that it is the most protective endpoint in the database, and is directly relevant to the developing nervous system because LH activity is a biomarker of atrazine's ability to alter hypothalamic-pituitary function generally. NRDC supports use of this endpoint, but notes that atrazine is likely to have multiple mechanisms of action in addition to attenuation of the LH surge, and alternate mechanisms may be more sensitive to atrazine, or may cause more serious effects. These should also be explored.

EPA awaits registrant-sponsored data to evaluate risks to amphibians: EPA in its response to public comments claims that it is "concerned about the potential for atrazine to cause developmental damage to amphibians" (EPA response, p. 23). The EPA has therefore required additional research from Syngenta, the registrant, on these issues. This is unsatisfactory. The atrazine registrant, Syngenta, has proven itself biased and untrustworthy in its scientific conduct. Notably, Syngenta submitted a dozen atrazine studies for review by the EPA Scientific Advisory Panel on endocrine effects in amphibians. The Syngenta-supported research team has subsequently published some of these data along with additional study results that routinely fail to find effects attributable to levels of atrazine commonly found in the environment.[39] Significant concerns were raised by EPA scientists regarding the questionable quality of the Syngenta submissions, including design flaws, insufficient statistical power, and high variability.[40] EPA is

failing in its mission to protect human health and the environment by repeatedly abdicating its responsibility to the registrant.

CONCLUSION:

The Triazine Cumulative Risk Assessment is significantly flawed. The Assessment both understates legitimate risks from atrazine exposure (such as the endocrine effects, neurobehavioral effects, and cancer risks) and ignores the risks that it does acknowledge (such as the ecological harm and jeopardy to endangered species). In light of the above comments, EPA cannot reregister atrazine without violating the Agency's obligation under FIFRA to prevent unreasonable adverse effects on human health and the environment. FIFRA §§ 3(c)(5) & 4(g)(2).

Respectfully,
Jennifer Sass

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[1] FR, Vol 71, No. 119, Wed June 21, 2006, p. 35664-35666

[2] Dearfield KL, Stack HF, Quest JA, Whiting RJ, Waters MD. 1993. A survey of EPA/OPP and open literature data on selected pesticide chemicals tested for mutagenicity. I. Introduction and first ten chemicals. Mutat Res 297(3):197-233.

[3] Draft Cancer guidelines. 2003. p. 2-31. Section 2.5.3

[4] Draft Cancer guidelines. 2003. p. 2-31, lines 30-32

[5] Hoar SK, Blair A, Holmes FF, Boysen CD, Robel RJ, Hoover R, et al. Agricultural herbicide use and risk of lymphoma and soft-tissue sarcoma. Jama 1986;256(9):1141-7.

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