OVERVIEW

The goal of this project is establish fish mercury levels that safeguard the health of fish-eating wildlife in Wisconsin. To meet this goal, we are quantifying Common Loon methylmercury (MeHg) exposure on the breeding grounds of northern Wisconsin and assessing the MeHg toxicity risk posed to this population. This region (Iron, Vilas, Oneida, and Forest counties) is at greatest risk from elevated MeHg bioaccmulation in Wisconsin due to the proportion of lakes with pH <5.5 (5-20%) and enhanced Hg deposition rates (1-5 ug Hg/m^2) (*USEPA 1996, Mercury Report to Congress, Volume V*). The region is critical breeding habitat for common loons in the north-central United States. Laboratory analysis of tissues show that common loons receive the highest level of Hg exposure of all fish-eating wildlife in Wisconsin. Studies in Wisconsin and elsewhere indicate elevated Hg exposure is associated with alterations in common loon reproduction and behavior.

We have undertaken a rigorous, scientifically defensible effort to characterize common loon Hg exposure within this region of concern. Specifically, we are developing a Loon Model that incorporates field measures of food intake rates, dietary habits, and prey mercury content along with laboratory pharmacokinetic MeHg measures in a captive loon flock to predict Wisconsin common loon Hg exposure as a function of fish (prey) Hg content.

Loon Model

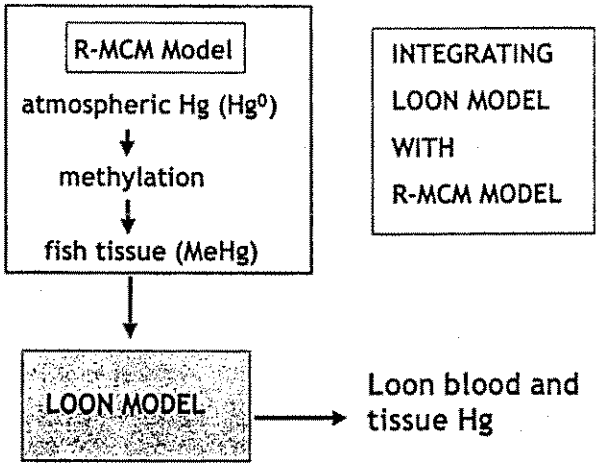
- **rate of food intake**
- **mercury content of food**

} **field**

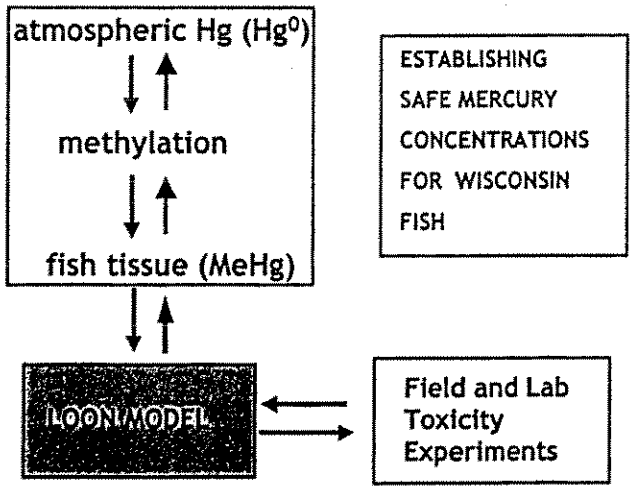
- **assimilation of mercury**
- **rate of excretion**
- **tissue partitioning**

} **laboratory**

We will then integrate these measures with the existing Regional Mercury Cycling Model (WDNR, Tetra Tech, Inc) to establish a quantitative relationship between atmospheric Hg loadings and common loon Hg exposure in Wisconsin.



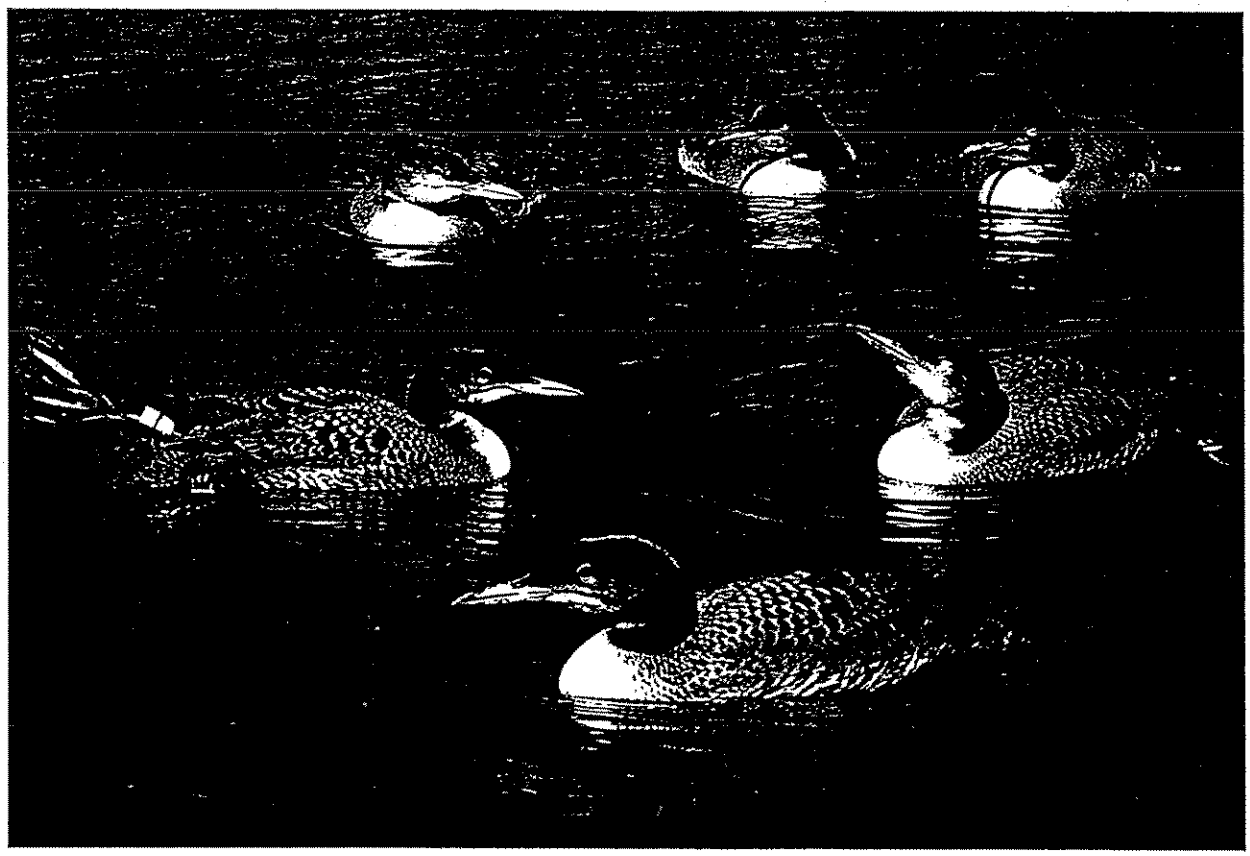
Determination of the MeHg toxicity risk posed to Common Loons in the region is the second component of the effort. Toxicity measurements have been quantified through field and laboratory experiments with loon chicks (Loon Chick Hg Risk) and field studies of adult loons (Adult Loon Hg Risk). Determination of the level of Hg exposure associated with adult and loon chick toxicity will permit us to establish target levels of Hg in fish that safeguard Wisconsin wildlife. Integration of this information with the R-MCM will allow for an assessment of benefits of Hg deposition reduction scenarios on wildlife Hg exposure in Wisconsin.



To date we have completed all field measures of loon dietary habits and energy requirements and are completing laboratory analysis of prey mercury content. One manuscript has been accepted for publication, a second is in preparation, and a Masters thesis is being completed. All phamacokinetic measurements have been completed and a manuscript has been submitted containing those results. Laboratory and field measures of Hg toxicity in adult loons

and chicks have been completed and analysis of this data is underway. Two manuscripts and a Masters thesis are currently in preparation describing the findings of the toxicity measures. Several additional manuscripts are anticipated.

Future work for 2002 includes 1) integration of the Loon Model with the R-MCM (we will consult with Mr. Reed Harris, Tetra Tech, Inc, to develop a workplan and budget to accomplish this effort), and 2) validation of the Loon Model via a captive loon feeding experiment at USGS Upper Midwest Environmental Science Center, La Crosse, WI. In the feeding experiment we will precisely measured MeHg intake, blood Hg content, and compare results to predictions of the Loon Model. Additional dose-response measures will also be conducted during the feeding experiment to strengthen the year 1999-2000 dose-response database.



CHARACTERIZING LOON HG EXPOSURE

The first step in modeling Common Loon Hg exposure is to estimate the amount of specific food items ingested daily. Food intake is a function of daily energy requirements and loon dietary habits.

Dietary Habits

Dietary habits of common loons have been quantified on >75 lakes in the study area during 2 thesis projects conducted by UW graduate students. Both studies have been completed and the dietary habitat data from the first study has been analyzed and a manuscript is currently in preparation (Merrill et al. in prep). A summary of prey species consumed by common loon chicks in that study is presented below. We will also summarize dietary habits by a) prey size class, b) lake pH category and c) chick age.

Table 1. Mean biomass consumption by loon chicks across 51 lakes from June to August in northern Wisconsin (from Merrill et al. in prep.)

Species	Biomass (g chick^{-1} hr^{-1})	SD	%
Perch	1.085	1.740	0.32
Bluegill	0.437	0.820	0.13
Minnow	0.208	0.432	0.06
Crappie	0.039	0.129	0.01
Small mouth bass	0.032	0.204	0.01
Large mouth bass	0.156	0.312	0.05
Sculpin	0.003	0.029	0.00
Bullhead	0.093	0.355	0.03
Unknown fish spp.	0.818	0.843	0.24
Leech	0.007	0.013	0.00
Larvae	0.016	0.038	0.00

Crayfish	0.339	1.010	0.10
Snail	0.001	0.002	0.00
Tadpole	0.0003	0.001	0.00
Unknown prey spp.	0.175	0.264	0.05

Analysis of dietary data from the second graduate project (Fevold et al.) is currently underway. These results will be pooled with those of Merrill et al. to provide a composite dietary habit database that can be queried for output which describes the dietary habits of loon chicks of various age classes on a range of lake type.

Prey Mercury Content

Measurement of prey mercury content is currently underway at the Wisconsin State Laboratory of Hygiene. Over 3000 prey samples have been collected from loon study lakes with lake pH ranging 4.9 – 8.0. We have submitted and received results from 63 samples and anticipate submitting an additional 500 composite samples over the next 3 months.

A preliminary relationship has been established between lake pH, prey size, and the mercury content of perch and bluegill – these prey items that comprise the bulk of loon food items. This relationship will be strengthened by inclusion of additional fish species and perch and bluegill of different size classes in the database. These additional samples were collected from a variety of lake type in year 2000.

Table 2. Relationships between lake pH, fish length (in), and mercury concentration of 3 major prey species of loons in northern Wisconsin (Merrill et al. in prep).

Species		r^2	P	n
Perch	lnμgHg/g DM = 0.735 + 0.152 length – 0.395 pH	0.65	<0.001	83
Bluegill	lnμgHg/g DM= 0.723 + 0.039 length – 0.166 pH	0.53	<0.001	46
Minnow	μgHg/g DM= 0.774 – 0.082 pH	0.13	<0.015	39

Daily energy requirements

Fournier et al. (ms. submitted) measured the daily energy expenditure of free-ranging common loon chicks aged 10, 21, and 35 days using doubly labeled water (DLW) in our study area. The average body mass of chicks during the DLW measures were 425g, 1052g, and 1963g for 10-

day-old, 21-day-old, and 35-day-old chicks, respectively. Loon chicks gained body mass during the sampling intervals and these changes corresponded to means of 51 g d^{-1}, 54 g d^{-1}, and 33 g d^{-1}, whereas their mean daily energy expenditures (DEE) were 645 kJ day^{-1}, 721 kJ day^{-1}, and 1819 kJ day^{-1} for 10-day-old, 21-day-old, and 35-day-old chicks, respectively. The rate of energy expenditure, as determined with doubly labeled water, can be used to determine the amount of food that an individual must consume, and this information can be very useful for those interested in fundamental questions of energetics, but it can also be used by wildlife toxicologists to determine the amount of toxicant that an individual ingests on a daily basis. For example, based on the birds' daily energy expenditures and energy deposited as new tissues, we calculated that they consumed between 144 and 406 g wet mass of fish day^{-1} (depending on age), and this would translate into chicks ingesting between 14.4 and 40.6 μg of contaminant (assuming a fish contaminant content of 0.1 $\mu g\ g^{-1}$ wet mass).

Modeling Loon Chick Hg Intake

Dietary habit information, prey mercury content, and daily energy requirements will be incorporated into a predictive equation that outputs common loon daily mercury intake rate as a function of chick age and prey mercury content. This will allow us to predict loon Hg intake rates in the wild on lakes with widely varying water chemistry. These values then become input to the pharmacokinetic model (Equation 2) where R is daily mass-specific consumption rate (g of food/g body mass x day) and C_f is the concentration of toxicant in the food (μg Hg/g food). Our goal is to generate C_f for all potential loon territories in our study area by 1) developing a predictive mathematical relationship between lake water chemistry and loon prey item Hg content (ug/g) using multivariate analysis on the 55 study lakes (Table 2 represents preliminary models), and 2) by determining the age specific loon chick mercury intake rates on a given lake by

$$C_f = \Sigma\ Pr_i\ H_i \qquad (1)$$

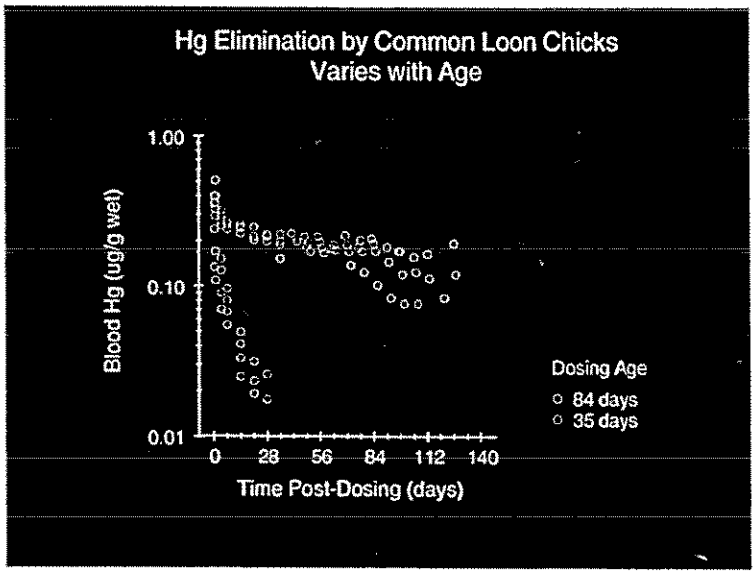
where Pr is the proportion of diet made up of prey item *i* and H is the predicted mercury content of prey item *i*.

Toxicokinetic Modeling

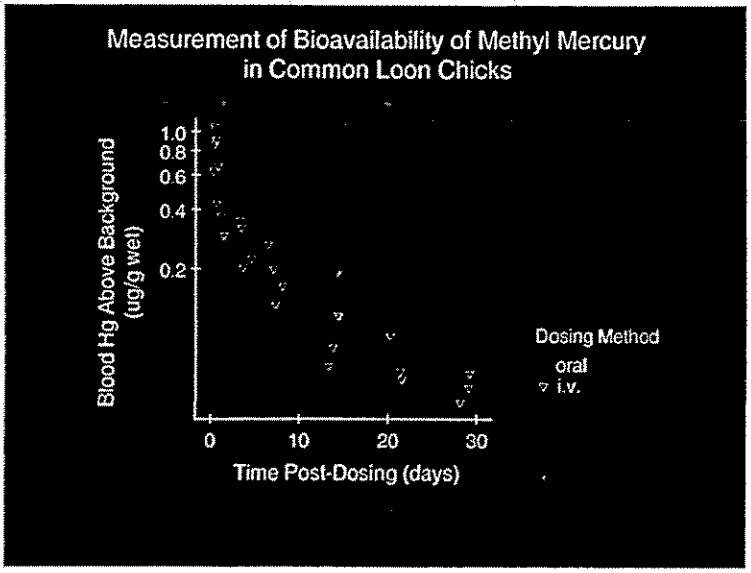
Data from the study of MeHg bioavailability and elimination in common loon chicks has been analyzed. Also, a preliminary analysis was performed of blood Hg in loons fed different doses of methyl Hg for 15 weeks. In those birds, blood Hg was linearly related to apparent dose, which supports a fundamental assumption of the kinetic modeling that the absorption and elimination rate constants are independent of Hg concentration in food or blood. The information on absorption and elimination are summarized in the following abstract of the paper submitted to Comparative Biochemistry and Physiology C:Toxicology and Pharmacology:

"We compared the toxicokinetics of methylmercury in captive common loon chicks during two time intervals to assess the impact of feather growth on the kinetics of mercury. We also determined the oral bioavailability of methylmercury during these trials to test for age-related changes. The blood concentration-time curves for individuals dosed during feather development (initiated 35 days post hatch) were best described by a one-compartment toxicokinetic model

with an elimination half-life of 4 days. The data for birds dosed following completion of feather growth (initiated 84 days post hatch) were best fitted by a two-compartment elimination model that includes an initial rapid distribution phase with a half-life of 0.9 days, followed by a slow elimination phase with a half-life of 116 days.



We determined the oral bioavailability of methylmercury during the first dosing interval by comparing the ratios of the area under the blood concentration-time curves ($AUC_{0\rightarrow\infty}$) for orally and intravascularly dosed chicks. The oral bioavailability of methylmercury during the first dosing period was 0.83, and did not appear to differ from the bioavailability estimate for the second dosing period. The results of this study highlight the importance of feather growth on the toxicokinetics of methylmercury."

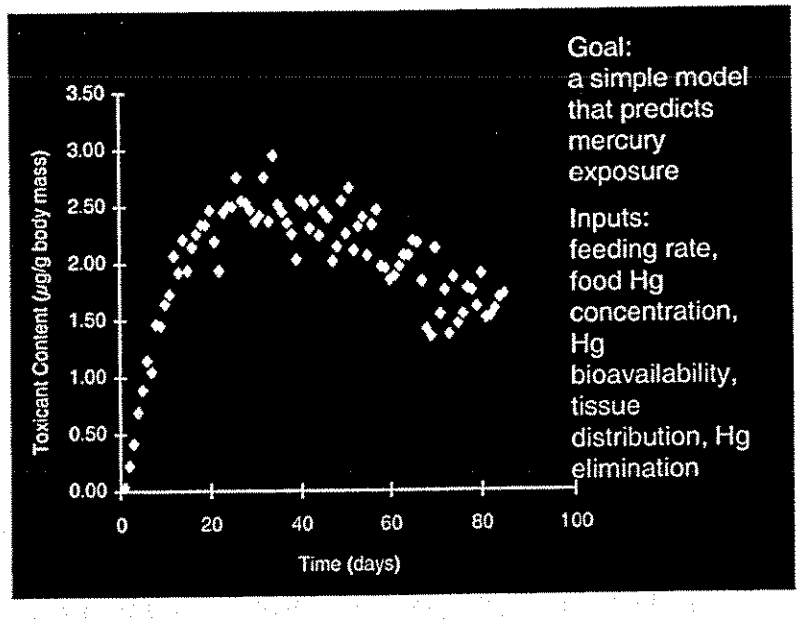


The data in hand should permit us to model loon blood Hg levels as a function of dietary exposure (Equation 1). We will use the values obtained from our measurements to determine the whole-body burden of mercury in loons chicks with the following equation (Newman 1995):

$$C_t = \frac{\alpha R C_f}{k_e}\left(1 - e^{-k_e t}\right) + C_0 e^{-k_e t} \qquad (2)$$

where C_t corresponds to the concentration of the toxicant in the body at time t (μg/g body mass), α is bioavailability (between 0 and 1), R is daily mass-specific consumption rate (g of food/g body mass x day), C_f is the concentration of toxicant in the food (μg Hg/g food), k_e is the excretion rate constant (day^{-1}), t is time (day), and C_0 is the initial concentration of toxicant in the organism (μg Hg/g body mass).

The next phase of the project should be a comparison of this model with Hg blood levels in loons fed fish with known Hg content (planned for 2002).



QUANTIFYING HG TOXICITY RISK

UMESC Loon/MeHg Dose-Response Experiment

Introduction

This report provides an overview and description of progress made to date on the study conducted under WDNR Research Contract Number NMI00001538, entitled "Assessing the Ecological Risk of Mercury Exposure in Common Loons (Gavia immer)". Discussion will focus on our experimentation that was initiated in 1999 to assess the effects of dietary methylmercury on captive-reared common loon chicks. Collaborating on this effort are Francois Fournier and William Karasov, University of Wisconsin (Pharmacokinetics); David Hoffman, Patuxent Wildlife Research Center (Biochemical); John Bickham, Texas A&M University (Genetics); Keith Grasman, Wright State University (Immune function); and Marilyn Spalding, University of Florida (Histology).

Background

The impetus for this work was to develop a scientifically defensible ecological risk assessment for mercury for wildlife, based on an at-risk species, using a combination of laboratory and field studies. Common loons are sensitive to the toxic effects of mercury and are at the greatest risk of mercury exposure among wildlife species on inland North American aquatic systems as they are high trophic level, long-lived, obligate piscivores. Recent field studies have found that loons nesting on acidic lakes in northern Wisconsin have elevated mercury levels in blood and eggs and exhibit reduced reproductive performance (Meyer et al. 1995, Meyer et al. 1998).

Quantifying the impact of contaminant exposure on wild populations is complicated by the confounding effects of environmental stressors. In this experiment we brought common loon chicks into a laboratory environment where the confounding stressors are controlled and where toxicity endpoints can be quantified under conditions of high quality control and assurance.

Objectives

The specific research objective addressed in this report is to quantify the level of mercury exposure associated with negative effects on loon chick survival and fitness (behavioral, biochemical, physiological, histological measures) using captive-reared common loon chicks. These measures will be used to establish the No Observable Adverse Effect Level (NOAEL) and Lowest Observable Adverse Effect Level (LOAEL) for mercury exposure in common loon chicks.

Complimentary to this work, we also conducted pharmacokinetic experiments with captive loons to develop a model that predicts loon tissue mercury concentrations as a function of loon age, body mass, and dietary MeHg exposure. Laboratory work associated with this objective was

completed in 1999.

These data, along with endpoints determined in related studies, will be used to calculate the level of mercury in fish that safeguards the reproduction and survival of the common loon. The final products of this research project will be incorporated into the Regional Mercury Cycling Model (developed by the Electric Power Research Institute, Tetra Tech Inc. and WDNR) from which regulatory goals for mercury emissions and water quality standards that are protective of at-risk wildlife species.

Study Design

The dose response study was conducted during the summers of 1999 and 2000. Common loon eggs were collected from a 4 county region of northern Wisconsin that has been the site of extensive loon/mercury research since 1992. Lakes in this region of the upper Midwest have been identified by the USEPA as sensitive to MeHg accumulation in fish due to high atmospheric mercury deposition rates and the area contains a high proportion of lakes with low buffering capacity - a water chemistry factor associated with elevated methylmercury bioaccumulation in fish. We collected a sample of eggs at lakes where loons are known to have elevated levels of mercury exposure (source of eggs was from low pH lakes) and at lakes where loons are known to have low levels of mercury exposure (source of eggs from neutral pH lakes). Egg source was incorporated into the study design because we suspected that potential *in ovo* differences in egg mercury burden may ultimately impact the response of the chicks fed diets containing elevated mercury content. Eggs were incubated and hatched at the Upper Midwest Environmental Sciences Center (UMESC).

In 1998, we developed husbandry techniques and demonstrated the necessary capabilities of the UMESC to successfully rear common loon chicks to fledging (K. P. Kenow et al., Unpubl.). We refined artificial incubation and hatching conditions for loon eggs, developed indoor and outdoor rearing facilities, and produced size-appropriate mercury-free forage fish for feeding chicks. Upon hatch, chicks were randomly assigned to one of four dose groups in 1999. Our intent to dose in 1999 was as follows: One group served as a control and was fed a diet containing no added mercury; A second group was to receive a fish diet containing 0.1 μg CH_3HgCl per g wet fish, or the level in loon prey associated with neutral pH lakes which are generally highly productive for loons; A third group was to receive a fish diet containing 0.5 μg CH_3HgCl per g wet fish, or the level in loon prey associated with lakes with low pH (<6.2) and low loon productivity; And a fourth group was to receive a diet containing 1.5 μg CH_3HgCl per g wet fish. Daily mercury doses were based on food intake and administered via rainbow trout containing gelatin capsules with prescribed amounts of CH_3HgCl for a 105-day period. While chicks initially received the intended dose level, laboratory analysis of dosing solutions used in 1999 indicated the concentration of methyl mercuric chloride (CH_3HgCl) may have increased by over two-fold over the period of use. The CH_3HgCl was dissolved in acetone and we suspect that the observed increase in concentration was the result of acetone volatilization. The vials containing the solutions were uncapped each time a dose was removed, approximately six times daily, which presented an opportunity for acetone to escape. Consequently, chicks received diets containing higher amounts of CH_3HgCl then intended.

Our intention in 2000 was to deliver the doses prescribed in the experimental design. We implemented precautions to minimize solution volatilization. In order to ensure the results of the 2000 field season could stand alone, if necessary, we decided to optimize analytical power among environmentally relevant dose levels (0.1 to 0.5 μg CH_3HgCl per g wet fish) in 2000. Consequently, we opted to drop the 3X high environmental level exposure group of 1.5 μg/g and incorporate only the control, 0.1 μg/g, and 0.5μg/g treatment groups in 2000. Unfortunately, we were unable to deliver the intended dose in 2000 as a re-analyses of the CH_3HgCl at the conclusion of the 2000 season indicated a purity of 64% as opposed to the 90% initially reported by the supplier of the chemical; and we also learned that the substance contained about 5% CH_3CH_2Hg. Consequently, chicks the dietary intake of CH3HgCl is not accurately known until we can conclude further testing.

The resulting sample consisted of 60 loon chicks, 24 chicks in 1999 and 36 chicks in 2000. Chicks were held in indoor raceways for the first month and then moved to 50-m^2 (1/100th acre) outdoor ponds. Researchers were blind to the dose regimen for the course of the study and the research was conducted in accordance with EPA guidelines for Good Laboratory Practices.

Daily food intake was documented for each chick. Mass (± 0.1g) of all fish provided to chicks was determined and each loon chick was weighed daily. Technicians hand fed more than 112,500 rainbow trout weighing nearly 1480 kg (3,267 lbs; 1.6 tons) to the 58 loon chicks during the 2 years of the dose-response experiment (equivalent to 26 kg or 57 pounds each).

Because reduced food consumption and body growth has been associated with other mercury exposure studies, we determined a number of structural measures (e.g., culmen, skull, tarsus, wing, middle toe, body, and feather lengths) every 3-5 days yielding about 25 repeated measurements per bird. We also documented sequence, timing, and intensity of molt through examination of selected feather tracts every 6-10 days.

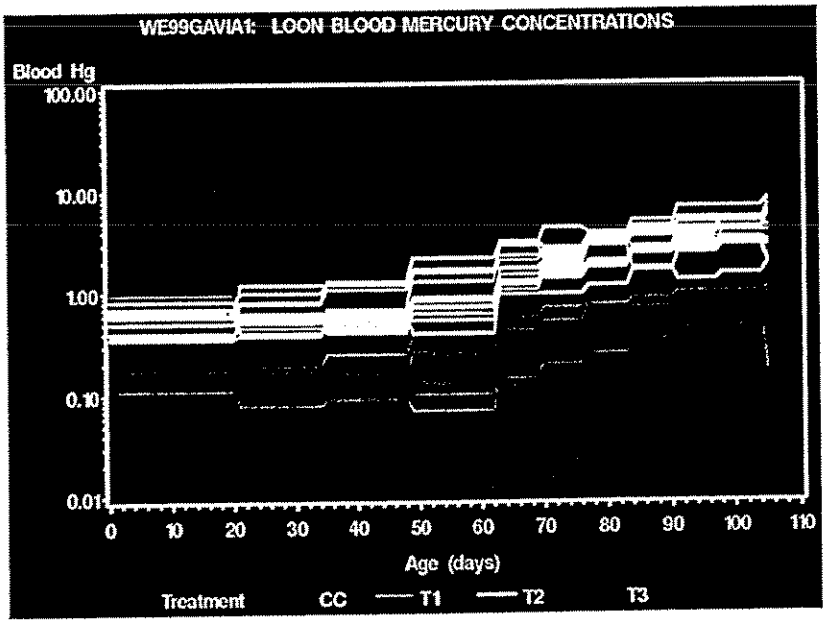
We conducted several behavioral assays to assess possible behavioral effects related to dietary MeHg. These assays include measurement of righting reflexes and ataxia every 3-5 days; time-activity budgets of chicks were also conducted every 3-5 days. We evaluated each chick's response to a frightening stimuli patterned after a device developed for mallard ducklings (Heinz 1975) at 2 and 8 days of age. Reactions of loon chicks to taped parental calls, expected to elicit either approach and avoidance response, were recorded periodically between 2 and 50 days of age. We also evaluated each chick's ability to follow an human to which it had been imprinted, periodically between 2 and 50 days of age. In addition, we conducted foraging trials to assess the chicks' abilities to locate, pursue, and capture fish various ages.

Blood samples are collected weekly for analyses of mercury residue, biochemical parameters indicative of oxidative stress, and evidence of genetic damage. To evaluate the effects of dietary mercury on immune function, toward the end of the 105-day experiment, we conducted a phyto-hemagglutinin skin response test to measure T lymphocyte-mediated immunity and a hemagglutination assay (antibody response to injection of sheep red blood cells) for antibody-mediated immunity. During the course of the experiment we also documented the incidence of bacterial infection in each chick.

Birds were euthanized at 105 days of age and necropsied. A number of tissues were harvested for residue, histology, biochemical, and genetic analyses. Histological samples of lesions, liver, spleen, bone marrow, bursa, thymus, adrenal gland, thyroid, gonad, pancreas, muscle, spinal cord, brachial nerve, sciatic nerve, brain, lung, and kidney were collected. Additional liver, kidney, and brain samples were collected for biochemical analyses. Spleen and bone marrow samples are being assessed for mercury-related cytogenetic damage using the flow cytometry method. Residue analyses are being conducted on brain, liver, kidney, muscle, carcass, and feathers.

Results

Examination of chick blood mercury levels indicate our dose regimen was effective in achieving the desired exposure. Despite the irregularities in the dosing regimen between the 2 years, chick blood mercury levels fell within discrete groups that were consistent with the intended treatment groups.



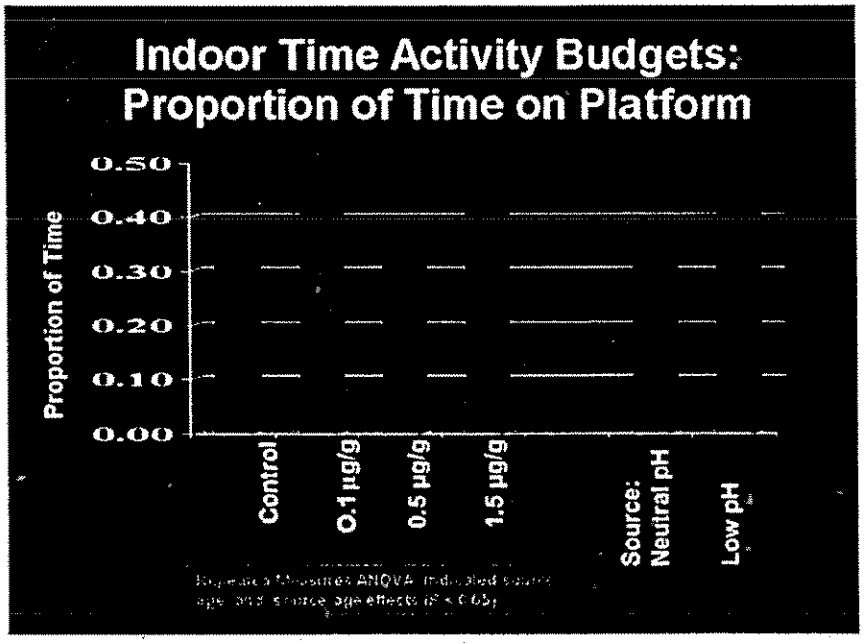
To assess the relevance of the achieved blood mercury levels to wild populations we compared the levels obtained in the laboratory at 5 weeks (loon chicks are typically 3-6 weeks of age when blood samples are collected in the field) to results obtained form wild birds. Blood mercury levels in loon chicks across North America, as reported by Evers et al. (1998), range from 0.03-0.78 ug/g (mean=0.16 ug/g) and fall within the range in this study of 0.03 (control) to 0.16 (0.1 ug/g) to 1.14 (0.5 ug/g). Blood mercury levels in the group dosed at the 1.5 ug/g level was 3.33 ug/g. Consequently, the laboratory exposure brackets the ecologically relevant exposure levels.

Mass of chicks at hatch did not differ among treatment groups (ANOVA; $F = 0.01$, $P = 0.99$) or egg source (t-test; $t = -1.4$, $P = 0.16$), although chicks from low pH lakes tended to be about 3.5%

smaller than chicks from neutral pH lakes. ANOVA indicated that blood mercury levels of control chicks at 7 days of age differed ($F = 5.46$, $P = 0.03$) between years (blood mercury = 0.27 in 1999 vs 0.17 in 2000) but did not differ with source of chicks ($F = 0.43$, $P = 0.52$). This indicates that *in ovo* exposure may not have varied substantially between the two lake pH groups.

Fifty three of the 60 chicks that initiated the experiment concluded the 105-day experiment. One chick died accidentally, one was euthanized following an accidental leg injury, four were euthanized after failing to recover from bacterial infections, and one was euthanized following suspected head trauma.

We observed no outright symptoms of mercury toxicosis and we found no significant difference in general behavior or food intake among the treatment groups. Repeated measures MANOVA indicated no effect of dietary mercury on the time activity budgets of loon chicks throughout the 105-day experiment, although age and year effects were identified. Chicks from low pH lakes did spend a significantly larger proportion of their time brooding on brooding platforms during the first 30 days following hatch.

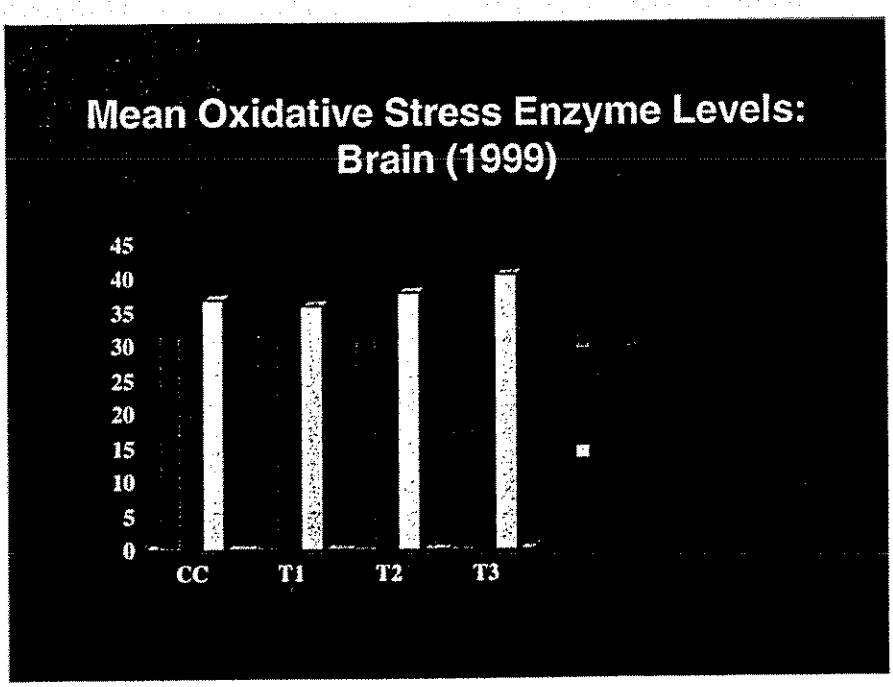


A Gompertz growth model was constructed from measures of daily mass of each chick to test for the contribution of dietary mercury intake (treatment), lake source, sex, and year effects. We evaluated three growth parameters: Asymptotic Mass, an index of the maximum size that was attained; Growth-rate Constant, a constant proportional to the overall rate of growth throughout the entire growing period; and Point of Inflection, the age at which the individuals growth curve chnages from concave upwards to concave downwards and represents the age at which maximum rate of growth is realized. The analysis indicated a significant effect of sex ($P < 0.0001$) and a marginal effect of lake source ($P = 0.0729$) on asymptotic mass. The growth rate constant differed significantly by year ($P < 0.0001$), lake source ($P = 0.0100$), and the 0.1 ug/g

and 0.5 ug/g treatment groups differed from controls ($P < 0.03$). Sex also had a significant effect on inflection point. In general, there is no consistent evidence of effect of dietary mercury intake on growth. However, chicks from eggs collected on low pH lakes grew at a slower rate and may have obtained lower asymptotic mass than chicks from neutral pH lakes.

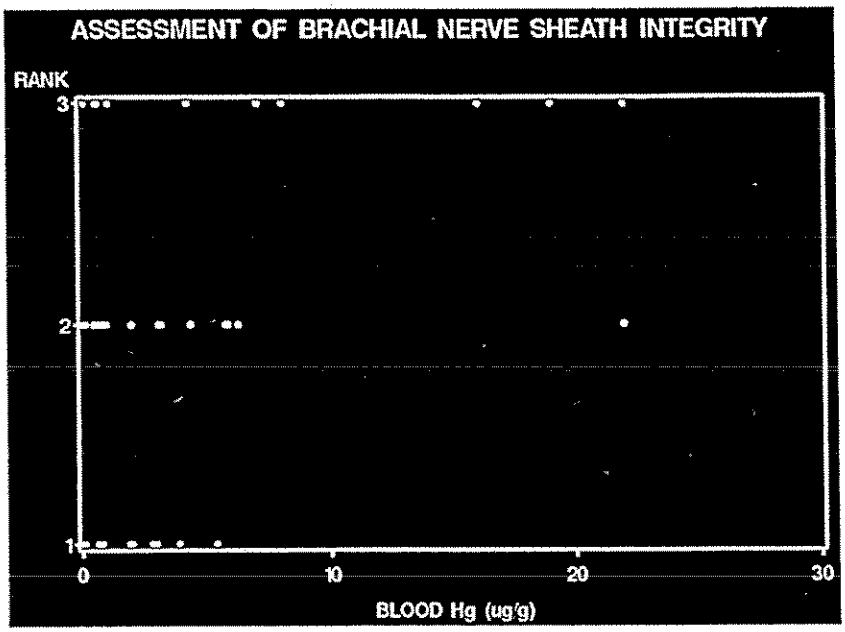
We assessed cytogenetic damage in loon chicks using the flow cytometry method, a biomarker that has proved useful in detecting DNA damage. Chromosome breaks result in the increase of cellular DNA content variance in tissues. Preliminary analyses suggest no evidence of a relationship of DNA content variance and level of dietary methyl mercury.

Oxidative stress has been proposed as one cause of mercury toxicicity that may ultimately result in cellular dysfunction and damage. Reduced gluathione and associated antioxidant enzymes are major combatants of oxidative stress. We assayed brain, kidney, and liver tissues for enzymes related to glutathione metabolism and antioxidant activity. We found a decrease ($P = 0.0001$) in the activity of glutathione peroxidase in the brain and higher ($P = 0.0631$) lipid peroxidation in the brain was detected by increased thiobarbituric reactive substances with increasing levels of blood mercury exposure. These findings indicate cellular damage may be occurring in the brain but are related only to those loon chicks exposed to the highest level (1.5 ug/g CH_3HgCl) of dietary exposure.



Necropsy of loon chicks was performed immediately upon euthanasia and 105 days of age. Tissues were preserved and provided to Dr. Marilyn Spaulding, Univ. of Florida for preparation and examination of histological slides. We compared differences in histological changes with respect to blood mercury exposure using general linear modeling and categorical analysis procedures. Preliminary analyses indicated significant ($P = 0.004$) atrophy of the myelin of the brachial nerve sheath in those birds with high levels of blood mercury exposure (resulting from

1.5 ug/g CH_3HgCl diet).



About half of the chicks in 1999 developed bacterial infections during the course of the summer. Blinded to the dosing regimen, we had no way of knowing if the infection was related to suppression of the immune system as a result of mercury ingestion. Consequently, we treated the affected chicks with antibiotics (all recovered) and employed the immune function assays. In 1999 we found patterns related to dietary MeHg in both the incidence of bacterial infection and antibody response. Incidence of bacterial infection appeared to increase with intake of dietary mercury. In 2000, incidence of bacterial infection was limited to only seven of 36 chicks and there was no apparent relationship to mercury exposure.

In 1999, we saw an 8-fold depression of mean primary antibody response with treatment. While not statistically significant, the results suggested that even low levels of dietary mercury may be suppressing immune function. In 2000, we found that mean primary antibody response was unrelated to treatment. Further analysis indicated that antibody response was most significantly related to sex (female response higher than males) and incidence of aspergillus infection (infected birds had higher antibody response).

MSI varied by year ($P = 0.01$) with levels in 2000 significantly higher than those recorded in 1999; thus indicating possible difference in quality of PHA-P between years. An assessment (2-way ANOVA) of MSI in 2000 indicated tendencies for MSI to decrease with level of mercury exposure ($P = 0.21$) and egg source ($P = 0.19$).

This has been a very labor-intensive project that promises to 1) yield some very useful results to identify levels of dietary methylmercury that have an adverse effect on juvenile common loons in addition to 2) describing the pharmocokinetics of methylmercury in loons. This project

demonstrates the synergistic benefits produced by partnerships between federal and state governments, academic, and private sector scientists and environmental managers. Study efforts will now turn to completing analyses of the 1999 and 2000 data and reporting final results.

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Public Service Commission of Wisconsin

Ave M. Bie, Chairperson
Joseph P. Mettner, Commissioner
Robert M. Garvin, Commissioner

610 North Whitney Way
P.O. Box 7854
Madison, WI 53707-7854

October 2, 2001

Mr. Jon Heinrich
Department of Natural Resources
Bureau of Air Management
P.O. Box 7921
Madison, WI 53707

Re: Department of Natural Resources Proposed Revisions to Wis. Admin. Code Relating to the Control of the Atmospheric Deposition of Mercury AM-27-01

Dear Mr. Heinrich:

The following are comments from the Public Service Commission (Commission) in opposition to the Department of Natural Resources (DNR) proposed administrative rules (Chapter NR 446 Control of Mercury Emissions) to regulate mercury emissions from power plants in the state of Wisconsin. The proposed rule targets coal-fired generation as the principal source of the mercury reductions, although the draft regulations also identify waste incinerators, industrial boilers, and other stationary emissions that release more than ten pounds of mercury a year. The DNR's proposed rules would compel our state's energy providers to reduce their current level of mercury emissions by 90 percent over the next twelve to fifteen years.

No one disputes the DNR's lofty policy objectives nor its laudable efforts to ensure Wisconsin is the "first in the country" to take affirmative steps to establish rules designed to reduce the level of mercury in our streams and lakes. We recognize that increasing mercury levels in our lakes is a real environmental problem. We have all read or heard about the numerous fish consumption advisories issued by health officials in Wisconsin and our neighboring states at least partly due to mercury contamination in fish. It is also an issue that both sportsmen and traditional environmental groups can agree upon, and they have formed an unusual alliance that generally is in support of the DNR's proposed regulations.

While we share the concerns of the public over the increased levels of mercury in our lakes, rivers, and streams, our agency is taking this unusual step of actively opposing these proposed rules on the grounds that such rules would:

- present unacceptable future impacts on the reliability of the state's electric supply portfolio;
- present adverse future impacts on the state's electric generation fuel mix;
- result in unreasonable rate increases for Wisconsin's electric consumers;
- produce insignificant environmental and health benefits;

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- represent an endorsement of a fundamentally flawed state-based mercury reductions program.

The Natural Resources Board, at its meeting on December 6, 2001, directed the DNR staff to promulgate rules that protected the public health and the environment, but are cost-effective, reasonable, and do not interfere with the ability of electric utilities to supply the state's energy needs. The proposed rules simply fail to comply with the Board's directive—the rules are not cost-effective, are not reasonable, and will interfere with the ability of electric utilities to supply the state's energy needs.

On July 31, 2001, the Commission issued a Notice of Investigation under docket 05-EI-130 to solicit comments from electric utilities, independent power producers, and interested persons on the potential impacts on the reliability, fuel mix, and cost of the state's existing and planned generation portfolio as a result of the Mercury Emissions Rules being proposed by the DNR. The investigation was commenced pursuant to the authority of the Commission under Wis. Stat. §§ 196.02(7) and 196.28.

The concerns expressed by the public in our informal investigation were generally in opposition to the proposed rule.

While our agency supports mercury emissions standards that are based on established science and provide a clear benefit to the environment, the proposed rules establish a completely unrealistic timetable to achieve mercury reductions in light of the uncertainty regarding the availability to commercially viable control technologies to address this important problem. Like many of the commenters in our investigation, our agency simply does not believe that proven technology yet exists to control mercury emissions from coal-fired power plants to the extent mandated by the proposed rule. The proposed rule is simply not realistic given the current state of reduction technologies available. The proposed reduction requirements of 30 percent in five years, 50 percent in ten years, and 90 percent in fifteen years from a baseline would drive electric utilities to fuel switch from coal to natural gas. This would require massive capital expenditures to prematurely retire coal-fired production facilities and result in the construction of many new natural gas-fired replacement facilities. This type of dramatic "switching" of fuel sources would cost the consumers in our state millions of dollars over a relatively short period of time. For these reasons, if the DNR believes that a state-based program is desirable over the federal efforts to deal with mercury, it should focus its efforts on achieving a more realistic ten percent reduction in mercury emissions by 2007 and a 40 percent reduction by 2012. In addition, we believe that a much better approach would be a multi-pollutant reduction program that would require emission reductions in multiple pollutants with environmental benefits beyond existing regulations.

Currently, coal-fired power plants provide well over half of our state's electrical generation. Our state's valuable and reliable fossil fleet has helped our state's energy companies deliver low cost

and reliable electricity to our citizens for several decades. The unforeseen cost consequences of this rule, if implemented too rapidly, may see coal-fired generation significantly decline as a viable fuel source in our economy.

Our agency is deeply concerned that the proposed offset provision would have a chilling effect on future development of coal-fired generation in the state. It is extremely doubtful that sufficient offsets would be available after ten years and most certainly after fifteen years to allow development of new coal-fired generation. The state's current fuel mix of approximately 70 percent coal, 15 percent nuclear, and 10 percent natural gas would be drastically changed. If these rules were to ever be promulgated, our state's fuel mix would be predominately natural gas. This would negatively impact both the reliability and cost of the state's generation portfolio. The potential shut down of existing coal-fired power plants and replacing them with natural gas-fired technology would be very costly. Equally important, it is questionable that sufficient gas pipeline capacity exists or could be built to satisfy such a high percentage of natural gas fueled electric production capacity over such a short period of time. A more reasonable and technically feasible approach would be to require a Maximum Available Control Technology (MACT) for new coal plant emissions consistent with developing federal standards.

There is no doubt that the DNR and our state's utilities and other industries have worked to reduce emissions of nitrous oxide (NO_x) and sulfur oxides (SO_2). In order to comply with tighter environmental regulations, our utilities have installed a variety of technologies at their coal-fired plants including scrubbers, which are used to remove acid rain-causing sulfur oxides from smokestacks. In addition, they are currently in the process of installing catalytic converters, similar to those used in automobiles, to remove nitrous oxide, which contributes to ground-level ozone pollution.

But achieving mercury reductions is a much more difficult and expensive task than either sulfur oxides or nitrous oxide. The DNR has not adequately addressed the impact of a "Wisconsin only" strategy ahead of federal regulations. The United States Environmental Protection Agency (USEPA) is moving forward to implement mercury reduction standards by 2003. Regional contributions to mercury deposition need to be better understood along with their impacts on Wisconsin's environment, and it is therefore unwise to move forward with a Wisconsin-only rulemaking before the USEPA rules are set.

Apart from the tremendous financial consequences on businesses and ultimately ratepayers these rules would have, our agency is concerned about the effectiveness on the ultimate goal—which is to reduce the level of mercury in our lakes and streams. Even if Wisconsin adopts stringent and costly regulations to limit mercury emissions from its power plants, will they actually achieve the reductions?

There may be factors that are entirely out of Wisconsin's control that are driving the increased mercury levels in our lakes. Again, this argument is more for a federal, rather than a state-based,

initiative that will do little to address the problem we face in our state. For these reasons, creating a balkanized mercury emissions policy in Wisconsin makes little sense at the present time.

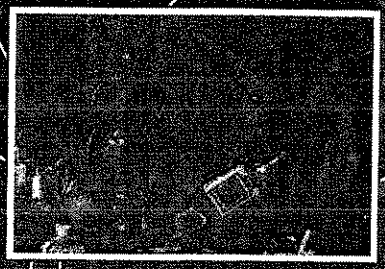
CONCLUSION

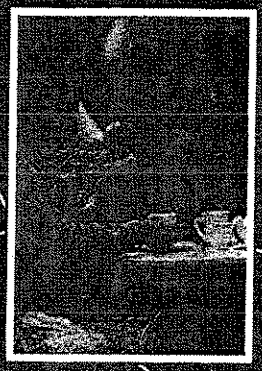
While we share the DNR's interest in addressing this important environmental issue, we have deep reservations about the economic, reliability-related, and practical consequences that such a rule, if adopted now, would have on our state's economy and its citizens. As members of the Public Service Commission, our regulatory responsibility is to the "consuming public." We believe policymakers at all levels should be careful about a "regulate first, study later" approach to an emissions policy that strikes at the heart of Wisconsin's traditional diverse fuel mix (coal, gas, nuclear, renewables) for producing electricity. For these reasons, the Public Service Commission of Wisconsin urges the Board to reject the current proposed rules or direct the staff to substantially modify these proposed rules.

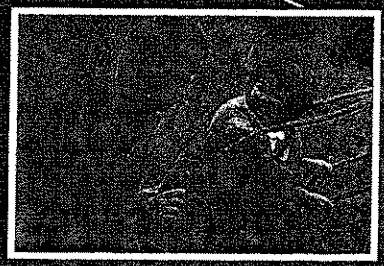
Sincerely,

Ave M. Bie Chairperson	Joseph P. Mettner Commissioner	Robert M. Garvin Commissioner

AMB/JPM/RMG/JDL:k:Commissioners Letters/AM-27-01







Healthiest Wisconsin 2010:

A Partnership Plan to Improve the Health of the Public

Part I of a report from the Wisconsin Turning Point Transformation Team to the Wisconsin Department of Health and Family Services

In fulfillment of the legislative requirement to develop a state public health plan at least once every ten years as required in s.250.07 Wisconsin Statutes.

Health Priority: Environmental and Occupational Health Hazards

Definition

Exposure to toxic substances, noise, vibration and other hazardous agents in the environment or the workplace that can create or aggravate health conditions. (Note: hazards that result in injury are considered in a separate health priority described as "Intentional and Unintentional Injuries and Violence").

Impact

Environmental and occupational health hazards continue to contribute significantly to disease, disability and premature death in Wisconsin.

Diagnoses related to environmental health hazards remain common. These hazards are encountered from a variety of sources, each of which poses a unique set of challenges to public health. Preventing these health hazards from becoming health problems requires that these hazards be fully understood and addressed.

As Wisconsin seeks to maintain and expand its economic base, the recognition, evaluation and control of occupational health hazards will remain a critical challenge. Exposure to workplace hazards continues to contribute to illness in Wisconsin.

Water Quality

Maintaining a safe and plentiful supply of drinking water is critical to good health. Water supplies are subject to contamination from both naturally occurring substances (such as arsenic and radium) and chemical pollutants from man-made sources such as petroleum storage tanks and industrial facilities. Nitrate and pesticides may enter water supplies as a result of agricultural practices, and declining water tables in several areas in Wisconsin suggest that the availability of high-quality drinking water may be limited in the future.

Air Quality

Air pollution remains an important health concern in Wisconsin. The incidence of asthma, a respiratory condition commonly attributed to environmental and occupational exposures, has increased sharply in the past two decades. Research showing increased death rates in major population centers on days with high concentrations of ambient particulate matter suggests that continuing efforts toward pollution prevention may be of significant benefit for public health. (Samet, Dominici, Curriero, Coursac, & Zeger, 2000).

Hazardous Wastes

The presence of sites contaminated with hazardous materials in Wisconsin poses a continuing public health challenge. Waste disposal options such as landfilling, incineration and surface application each present unique ecological and human health risks. Elevated levels of chemical contaminants in sport-caught fish have led to the issuance of consumption advisories as an interim public health intervention. The development of long-term management strategies for contaminated materials will remain a key environmental health issue into the future.

Environmental Radiation

Exposure to environmental radiation may contribute to health risks as well. Naturally occurring sources such as radon in indoor air have attracted increased regulatory attention in recent years. The use of radioactive materials in industry, medicine and academic research represents valuable advances in technology. Providing assurance that these uses can occur without adversely affecting the health of patients, workers and the public remains an important public health role.

Indoor Air Quality

Chemical hazards in residential settings represent an important public health threat and an opportunity for disease prevention. In spite of the increasing availability of carbon monoxide (CO) detectors, reports of carbon monoxide poisonings remain common (Knobeloch & Jackson, 1999). Research in the past decade points to indoor air pollutants

such as tobacco smoke, dust mites and cockroach allergens as important contributors to asthma and other respiratory conditions.

Environmental Lead Exposure

The presence of lead-based paint in the home is the primary cause of childhood lead poisoning. Concern about the effects of lead exposure has recently led to changes in State of Wisconsin rules for the removal of lead paint from rental properties. Providing educational outreach programs for landlords, as well as employers and employees who work or come into contact with lead, are vital to decrease the incidence of childhood and adult lead poisoning.

Occupational Illness and Repetitive Injury

Healthcare, laboratory and other employees who are at risk for needlestick injuries and exposure to blood and body fluids have an increased risk for bacterial and viral disease exposure. Employees who are required to perform repetitive activities at work are also at risk for developing conditions such as back injuries, carpal tunnel syndrome and other repetitive motion injuries. Recent federal legislation regarding bloodborne pathogens and repetitive trauma has necessitated public educational programs for businesses. These outreach programs focuses on methods the business community can use to reduce the incidence of these conditions for their employees.

Occupational Disease

Occupational disease can have a significant impact on an employee's quantity and quality of life. Cancer, pneumoconiosis, tuberculosis and hearing loss related to exposure to chemicals, asbestos, crystalline silica and other dusts, bacterial and viral agents, and high noise levels can be avoided with training and proper personal protective equipment. To have an impact with these diseases, it is vital to educate employers and employees about the proper equipment to use for each type of exposure and the importance of using the equipment.

Workplace Exposures Affecting Reproductive Health

Exposures to chemical and other occupational hazards can affect men and women and their ability to have healthy children. It is important that adequate information is available to workers, health care providers and employers on identifying and mitigating risks of reproductive workplace hazards. This knowledge enables Wisconsin citizens to work without risk to their growing families.

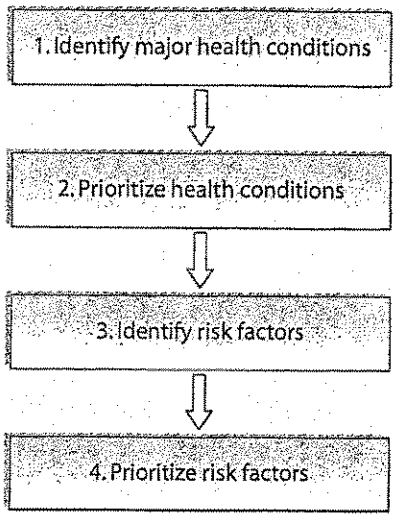
Economic Burden

The burden of environmental and occupational health hazards may include a vast range of costs, including pollution prevention efforts, medical care, spill-related evacuations and lost productivity. Data from the U.S. Bureau of Economic Analysis (1995) suggests that over $100 billion is spent on pollution control and abatement in the U.S. each year. The annual cost associated with asthma was estimated in 1990 at $6.2 billion, with much of this cost associated with emergency room use and hospitalization (Weiss, Gerben, & Hodgson, 1992). Data from a 1997 CDC study showed that direct and indirect costs of occupational injuries and illnesses totaled $171 billion ($145 billion for injuries and $26 billion for diseases). These costs compare to $33 billion for AIDS, $67.3 billion for Alzheimer's Disease, $164 billion for circulatory diseases, and $170.7 billion for cancer (U.S. Department of Health and Human Services, 1999).

Important Disparities

Differences in health problems associated with environmental or occupational exposures are primarily related to where people live and work. The prevalence of asthma and lead poisoning are particularly common among inner-city children, while rural children are at higher risk for conditions resulting from contamination of private drinking water wells. Consumption of fish from Wisconsin waterways is common among American Indians and Southeast Asians, putting them at greater risk from chemical contaminants in Wisconsin sport fish.

FIGURE 2 Stepwise process for identifying priority risk factors



Step 1: Identify major health conditions

The DEAG realized that cataloging the risk factors for each of the thousands of different diseases and injuries that affect Wisconsin citizens each year was not possible given available time and resources. Therefore, it was decided to limit risk factor analysis to the certain high priority health conditions. Identification of the priority health conditions was a two-step process. The first step was to identify the major health conditions that impact Wisconsin residents; the second step was to select the highest priority health conditions for risk factor analysis.

For the purpose of this process, a health condition was defined as a disease or injury that is listed in the International Classification of Disease, 9th Edition (ICD-9). This document lists over 15,000 diagnostic codes for different diseases and injuries. To identify the major health conditions, DEAG reviewed past health plans from the federal government, Wisconsin, and other states. Input was also obtained from Chief Medical Officers in the Wisconsin Division of Public Health, local public health agencies, physicians, social scientists, health care provides and clinicians, individual DEAG members, and other experts. This process resulted in the identification of 160 major health conditions.

Step 2: Prioritize health conditions

Because of time and resource limitations DEAG considered that a thorough risk factor analysis was practical for only about 50 conditions To select the health conditions for risk factor analysis DEAG needed a process to prioritize the list of 160 major health conditions. The DEAG health condition prioritization process had three components:

1. estimating the magnitude of each condition,
2. estimating the severity of each condition, and
3. identifying a method for selection of priority health conditions.

Magnitude estimates

The magnitude of a health condition was defined as the number of persons in Wisconsin affected by the condition during a typical year. This includes persons with onset of a condition during a year and persons who had onset in the past but continue to be affected by the condition. Magnitude estimates included, but were not restricted to, fatal cases.

To obtain magnitude data for each of the 160 major conditions, persons with expertise in each condition were identified. These experts included Chief Medical Officers and program epidemiologists from the Wisconsin Division of Public Health, local public health officials, physicians, social scientists, clinicians, and others. Experts were asked to provide their best estimate of magnitude for conditions for which they had expertise. For some conditions state-specific data sources were available to guide estimates. In some instances estimates were extrapolated from national data. Magnitude estimates obtained from experts were used to assign a magnitude score for each condition using the ranges shown in Table 1.

TABLE 1 Categorical magnitude scoring ranges

SCORE	NUMBER AFFECTED BY CONDITION	MINIMUM PERCENT OF WISCONSIN POPULATION
1	Less than 500	0.0%
2	500–999	0.01%
3	1,000–4,999	0.02%
4	5,000–9,999	0.1%
5	10,000–24,999	0.2%
6	25,000–49,999	0.5%
7	50,000–99,999	1%
8	100,000–249,999	2%
9	250,000–499,999	5%
10	500,000 or more	10%

Characterization of severity

The severity of conditions was estimated using an expert rating process. Over 100 expert raters were identified and were divided into 11 teams. Each team had between 8 and 11 members and was assigned between 12 and 18 conditions to rate. To estimate inter-team reliability, 2 conditions, *ischemic heart disease* and HIV infection, were assigned to all 11 teams.

Raters were asked to estimate the impact that each condition had on affected individuals and score the severity on a scale of one to ten, with ten being the most severe. Raters were provided guidelines to consider while making their determinations (Table 2). After the initial rating, the severity scores for each condition were averaged and reported back to the expert raters who were then allowed to reconsider their scores. After the reconsideration process, final average severity scores were calculated for each condition.

TABLE 2 Issues considered during the severity rating process

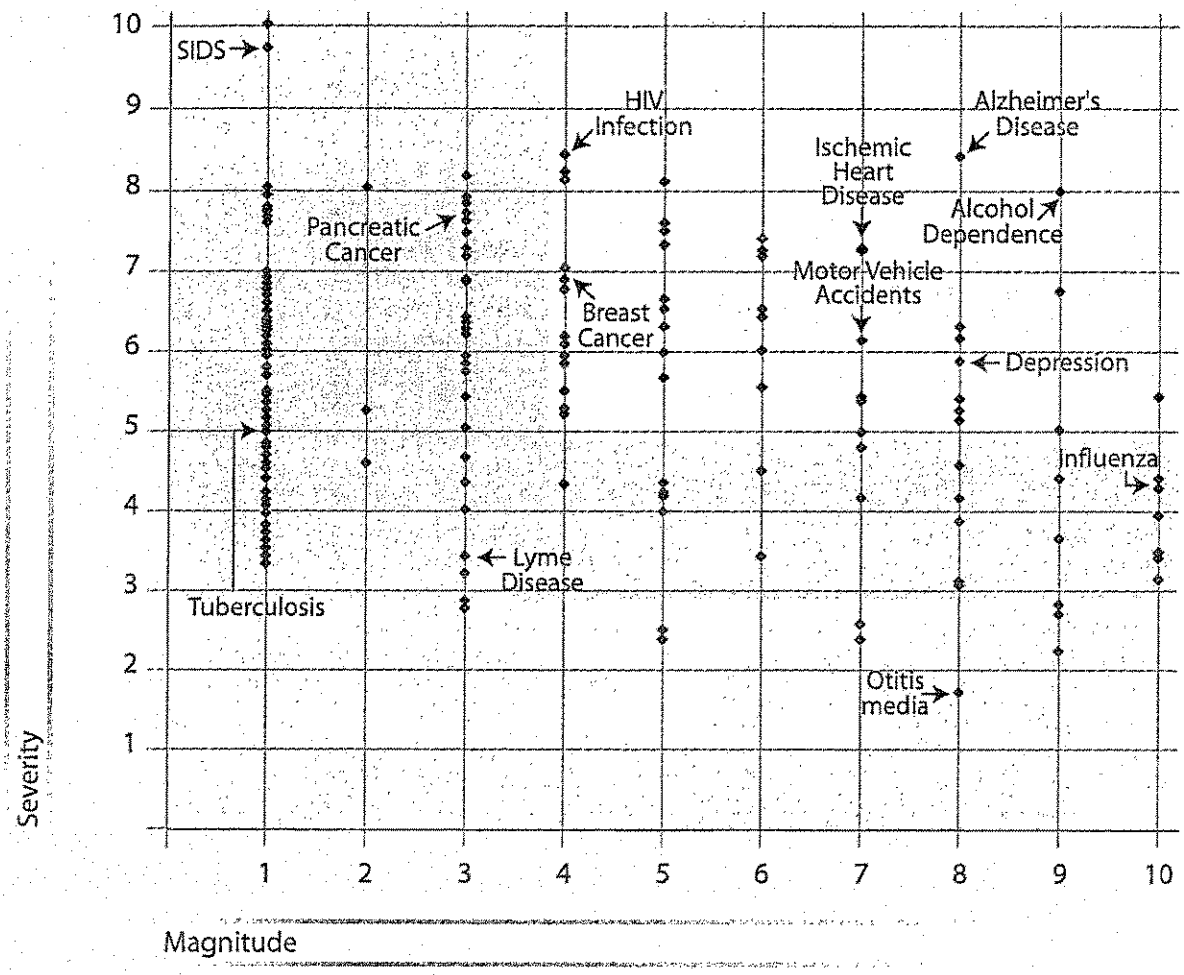
Potential for death
Impact on family, community and society
Impact on effected individuals usual activities
Potential for utilization of medical care
Economic burden for each case

Prioritization of health conditions

The rationale behind the health condition prioritization process was that a higher priority should be accorded to health conditions with high magnitude and severity than for those with lower magnitude and severity. Figure 3 graphically depicts each of the 160 major health conditions as a function of their magnitude and severity scores. Certain conditions are labeled to provide benchmarks. The highest priority conditions are in the upper right quadrant (high magnitude and high severity). For example, *Alzheimer's Disease* and alcohol dependence were judged by the expert raters to have both high magnitude and severity. In contrast, *otitis media* was judged to have a high magnitude but low severity compared to other conditions, while *Sudden Infant Death Syndrome (SIDS)* had a very high severity rating, but a low magnitude.

The selection of priority health conditions from this array was the responsibility of the Transformation Team. This was accomplished through a multistep process. First, the Transformation Team determined that health conditions with a magnitude of equal to or greater than four (representing at least 5,000 affected persons) and a severity of equal to or greater than five would be considered high priority. This region is depicted by the rectangle in Figure 3.

FIGURE 3 Adverse health conditions characterized by mangitude and severity



Second, the health conditions that fell just outside of this region were considered and added as appropriate. For example, of the several sexually transmitted diseases (*genital herpes simplex infection, chlamydia, human papillomavirus infection, and gonorrhea*), each one was of very high magnitude, but had a severity score just below the cutoff. The Transformation Team decided to collapse these conditions into a single entity (sexually transmitted disease) and include it as a priority condition.

Next, the Transformation Team reviewed age, race/ethnic and gender-specific mortality data to assure that leading causes death for certain sub-populations were given appropriate consideration. For example, SIDS was outside of the high priority region, but was made a priority because it is a leading cause of death for infants in Wisconsin.

Finally, the Transformation Team reviewed all conditions and added priority conditions as was deemed necessary. Several priority health conditions, including adverse conditions resulting from health care, airborne infectious disease, and vector-borne infectious disease, were added to the priority list at this time. The final list of priority health conditions is shown in Table 3.

TABLE 3 Fifty-four priority health conditions

- Adverse conditions resulting from health care
- Airborne infectious disease
- Alcohol abuse
- Alzheimer's disease
- Asthma
- Autism
- Breast cancer
- Cerebrovascular disease
- Chronic obstructive pulmonary disease
- Colorectal cancer
- Congenital anomalies
- Congestive heart failure and other heart disease
- Degenerative disc disease
- Dental disease
- Depression
- Diabetes
- Domestic abuse and neglect
- Drug abuse
- Eating disorders
- Epilepsy
- Farm injuries
- Food and waterborne disease
- Food insecurity
- Gestational diabetes
- Hearing impairment
- Hepatitis B
- Hepatitis C
- HIV infection and AIDS
- Homicide and injuries purposely inflicted by others
- Hypertension
- Ischemic heart disease
- Lead poisoning
- Low birth weight
- Lung cancer
- Melanoma/Skin cancer
- Motor vehicle accidents
- Multiple sclerosis
- Neonatal sepsis
- Osteoporosis
- Parkinson's disease
- Pneumonia/Influenza
- Pre-eclampsia/toxemia
- Primary arthritis
- Prostate cancer
- Reactive arthritis
- Schizophrenia and other psychoses
- Sexual assault
- Sexually transmitted disease
- Sudden infant death syndrome
- Suicide and other self-inflicted injuries
- Teen pregnancy
- Urinary incontinence
- Vector-borne infectious disease
- Workplace injuries

Step 3: Identify risk factors

Once the priority health conditions had been identified, the next step was to compile a risk factor profile for each condition. A preliminary list of risk factors for each condition was identified by individuals with expertise in that condition. These risk factors were then categorized into each of the four risk factor domains (non-modifiable risk factors, environmental risk factors, societal risk factors and individual risk factors) and used to populate a DEAG risk factor worksheet.

The DEAG identified 140 individuals for the risk factor expert rating process. Each rater was provided with 5 to 10 DEAG risk factor worksheets for conditions in their area of expertise. Raters were asked to first estimate the percentage of risk for that condition that could be attributed to each of the 4 risk factor domains. Next raters were asked to specify risk factors and quantify the percent of risk attributable to each risk factors within each domain. The risk factors provided on the DEAG risk factor worksheet guided this process. However, raters were free to use or ignore these risk factors or to enter additional risk factors as they considered appropriate.

For example, for a hypothetical health condition a rater might assign 50 percent of the total risk to individual factors, 10 percent to environmental factors, 25 percent to non-modifiable factors and 15 percent to societal factors. The sum of these four domain scores was always 100 percent. Next, within the individual risk factor domain the rater might specify that smoking represented 60 percent of the risk, diet 10 percent, lack of exercise 15 percent and alcohol use 15 percent. The sum of the scores for risk factors within a domain was also always 100 percent.

DEAG scored the risk factor worksheets received from the expert raters. The score for

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(oppose)

Statement of Dairyland Power Cooperative

Regarding Natural Resources Rule NR 01081

August 13, 2003

Thank you Chairpersons Johnsrud and Kedzie and members for this hearing to listen to concerns and opinions regarding the proposed mercury rule, NR 01081. On behalf of Dairyland Power Cooperative, based in La Crosse, and our 235,000 member-owners located in four states, we appreciate your willingness to address issues we and many others have with this proposed rule. I appear today in opposition to the rule as proposed, with hopes that modifications can be made which would allow us to support an alternative mercury reduction plan.

Each year, delegates from throughout our service territory gather at our annual meeting to conduct business, elect board members and pass resolutions on issues facing our generation and transmission electric cooperative. On the topic of mercury, our most recent resolution, passed in June of 2003, said Dairyland should work to reduce mercury emissions from all sources, including our own plants, and support a "reasonable, responsible and balanced response" to the global pollutant of mercury. Dairyland has publicly gone on record supporting mercury reduction proposals that have met those goals. For example, we joined other Wisconsin utilities in recommending a plan to reduce mercury 10% over five years and 40% in 10 years. So we stand ready to support rules that are balanced, responsible and reasonable.

Unfortunately, we do not believe the proposed rule before us meets the test of being reasonable, responsible or balanced in its approach to this important issue.

We believe the rule is not reasonable given the fact that it will result in only a small, small reduction of mercury going into Wisconsin lakes, and, by the DNR's own admission, will not lead to removing a single lake from the mercury watch list. Anyone who has studied this issue knows that a national response, if not international, is the appropriate way to deal with this global pollutant, since very little of the mercury released in the atmosphere in Wisconsin actually affects our own lakes. The vast majority of mercury deposition in our state is generated far beyond our state boundaries. The US Government has recognized this fact, and is working to promulgate mercury regulations that will be proposed in December of this year and put in place by December of next year. When the federal government acts, it makes sense that Wisconsin's regulations should mirror those at the federal level, and that we not attempt to establish regulations inconsistent with those placed on our neighboring states. Indeed, when federal rules are enacted there is absolutely no need for duplicative rules at the state level.

A second concern is that the rule before us requires Dairyland and three other Wisconsin utilities to reduce emissions, but leaves many other emitters of mercury with no restrictions. At the same time, the rule does nothing to promote positive approaches to the problem such as a small source reduction program to remove mercury from the state's waste stream. Just one example might be appropriate here…the state of Wisconsin's own power plants are not covered by this rule. We believe this rule is not a balanced way to

approach mercury reduction, since it is extremely selective in which industries are regulated, and since it provides no incentives or alternative programs to help us reduce mercury in our environment.

Thirdly, passing this rule is not responsible because control technology specific for removal of mercury is not yet commercially available to achieve the aggressive control requirements. No matter how good our intentions, without even one long-term, full-scale demonstration of the technology, we remain gravely concerned about the capability to achieve an 80% reduction in mercury emissions. We are unwilling to support a rule on the theory that technology *may* be developed in the future to meet the rule requirements passed today.

Finally, the cost impact, particularly on Dairyland, is very significant, and our ratepayers, who are our owners, will bear all of these costs. We estimate a minimum 4% increase in electric bills for implementing phase one, and a 5.8% increase for implementing phase two. Other costs – such as replacement power while our plants are under renovation – are not included in these conservative cost projections. Our members have raised the question about these high costs versus the very minimal benefits. We are hit especially hard in the cost area because of our small size; because of the few number of plants we operate – only two of which are larger plants – at two different locations, we would have to retrofit both locations to achieve a 40% reduction, while larger utilities with more plants have greater flexibility and more options.

I mentioned at the outset that Dairyland Power is prepared to support a rule with modifications. I encourage the two committees gathered today to request modifications to make this rule balanced, responsible and reasonable. Specifically, I would encourage:

- Consistent with current state law, clarify that the rule does not apply to sources subject to federal mercury emission standards. We should specify that the Wisconsin rules will be in effect only in the absence of a federal mercury MACT or any other federal mercury control legislation.
- Delete the second phase 80% reduction requirement, and develop language that specifies the second stage of reductions will be set after the demonstration of technology to achieve the first stage 40% reduction level, at which time we will have an indication if the technology is available for further reductions.
- A bankable and tradable credit program should be included in the rule to reward early reduction efforts and to recognize, as well as encourage, reductions in excess of rule requirements.
- A small source reduction program should be included in the rule to complement other reduction efforts.

We encourage the DNR to work with the members of this committee to develop a more balanced, reasonable and responsible approach to this difficult issue. Our members eat fish, they are often sports enthusiasts, and many of them are involved in tourism-related businesses. We want to support mercury reduction. We seek, however, revisions so we can support a rule, and encourage your help in accomplishing this.

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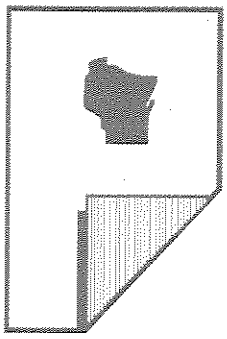

August 13, 2003

MEMORANDUM TO: Senate Committee on Environment and Natural Resources
Assembly Committee on Natural Resources

FROM: Edward J. Wilusz
Director, Government Relations

SUBJECT: **NR 446 – Control of Mercury Air Emissions**

Clearinghouse Rule 01-081 makes significant revisions to NR 446 relating to the control of mercury air emissions. The final rule would require a 40% reduction in mercury emissions from major utilities by 2010 and an 80% reduction by 2015.

The Wisconsin Paper Council does not oppose NR 446. Removal of the industrial emissions cap was very positive and addressed our major concern. However, another significant concern is the likely increase in energy costs that would result from mercury controls on the major utilities. Our assessment, using information currently available, indicates that costs for the first phase of NR 446 could be incurred regardless of NR 446 due to forthcoming federal requirements such as the utility boiler MACT and/or legislation like the Clear Skies initiative. The impacts of the second phase of NR 446 are less clear and we strongly urge that the state-federal reconciliation requirements in the rule be strengthened. Finally, we are committed to working with the Department and others on a voluntary energy efficiency initiative aimed at reducing mercury emissions, both directly and indirectly. The following discussion expands on these issues.

As an initial matter, we have always questioned the benefits of a state-only mercury reduction rule. Mercury air deposition is a global phenomenon. Local actions are expensive and will likely have little, if any, direct benefit on aquatic resources in Wisconsin. The state would do well to wait for national action that could address emissions on a much broader scale, such as the federal utility MACT or Clear Skies legislation.

Removal of the emissions cap on industrial and small utility sources was entirely appropriate. Industrial boilers are already proposed to be regulated for mercury under the federal industrial and commercial boiler MACT. A cap on industrial sources would effectively limit economic growth at affected facilities or drive these facilities to convert to natural gas, a very costly and potentially unreliable option. Industrial boilers are much smaller than major utility boilers and operate in fundamentally different ways – controls, if needed to meet a cap, are untested on these sources and would be extremely expensive. A voluntary energy efficiency initiative, in cooperation with the DNR, is a much better alternative that provides a potential win-win situation.

Costs associated with the rule are a significant concern. The paper industry is facing serious global competitive challenges. Reducing costs is the top priority of the industry. It is very important that the state not take actions that would increase the cost of doing business in Wisconsin compared to other states and countries.

Mercury emission controls for utility sources will be costly. Using the same methodology used by the Department to estimate costs, we estimate that the first phase of the rule could cost the paper industry $3.1-3.6 million annually and the second phase could cost our members $10-12 million annually. These are significant cost increases. However, in assessing the potential cost impacts of NR 446, we must consider the likely impacts from federal regulation that will be incurred regardless of NR 446.

Based on the information that is available, we anticipate that the federal utility MACT, scheduled for proposal by EPA this fall and promulgation in 2004, could require mercury reductions from major utilities that are in the same range as those proposed in NR 446. Assuming no significant delays due to legal challenges, the federal mercury control requirements could be similar to or slightly more stringent than the requirements in phase one of NR 446. As a result, cost increases associated with phase one of NR 446 could be incurred under federal regulation, regardless of NR 446. Federal mercury control regulations may or may not be as stringent as phase two of NR 446. As a result, the potential cost increases under phase two compared to federal regulation are much less clear.

To address potential cost concerns associated with NR 446, the state-federal reconciliation requirements should be strengthened. As drafted, the rule requires DNR staff to report on new federal mercury control regulations or laws, and how to reconcile any federal action with NR 446, within six months of the federal action. (Note – Webster defines "reconcile" to mean "settle, resolve <differences>" and "make consistent, congruous".)

However, the staff report may include other, unspecified recommendations instead of code changes. Also, the Natural Resources Board may choose to not make code changes, even if code changes are recommended by staff. We strongly urge that the language in NR 446.12(2) & (3) be strengthened to clearly require that NR 446 be reconciled with federal regulations or laws. This will assure consistency with other states and prevent Wisconsin from becoming a higher cost regulatory island. As long as there is consistency, Wisconsin companies will be on a level playing-field with companies in other states – at least relating to energy costs associated with mercury controls.

We hope you find these comments useful. Please contact us with any questions.

ss
cc: Secretary Scott Hassett, Department of Natural Resources
Lloyd Eagan, Department of Natural Resources

ALLIANT ENERGY - WISCONSIN POWER & LIGHT

BEFORE THE SENATE COMMITTEE ON ENVIRONMENT AND NATURAL RESOURCES and THE ASSEMBLY COMMITTEE ON NATURAL RESOURCES RE: CLEARINGHOUSE RULE 01-081

August 13, 2003

My name is Michele Pluta, and I am a Senior Environmental Engineer for Alliant Energy - Wisconsin Power & Light. In Wisconsin, Alliant Energy is the second largest utility with over 2,000 megawatts of generating capacity serving approximately 450,000 households, as well as, many commercial and industrial customers. On behalf of Alliant Energy, I appreciate this opportunity to provide comments on the Wisconsin Department of Natural Resources' proposed mercury rule package.

Alliant Energy, along with other Wisconsin utilities, is among the few utilities in the country that have supported controls on mercury emissions. Caring for the environment is a core value at Alliant Energy. This core value is demonstrated through our land stewardship efforts, our leadership in energy conservation and efficiency through our Shared Savings program, our renewable energy programs, and our investment in innovative emission reduction projects like our Combustion Initiative. As an environmental leader, we support emission standards that are based on sound science, realistic technology assessments, and take into consideration the potential impacts on electric reliability and price to customers.

While we believe Wisconsin can and should be a leader in adopting reasonable mercury emission regulation, we also believe Wisconsin's standards should ultimately align with the rest of the nation's - so as not to put our state at a regulatory, and therefore,

economic disadvantage. Air emissions of mercury do not recognize state or national boundaries, so policies should strive to be consistent in creating solutions that address emission issues from a regional, national and global perspective.

The significant impact these rules will have on each and every Wisconsin citizen through electric utility rates, service reliability, air quality and economic development ensures that it is in everyone's best interest to establish rules that balance these sometimes competing objectives in the most effective manner possible. We are concerned that the Wisconsin Department of Natural Resources' proposed standards contained in this proposed rule do not meet these objectives in their present form.

Alliant Energy has actively participated in development of this rulemaking providing significant comment on the original proposed rule, and we believe that the revised rules represent a much-improved product. For instance, we think the inclusion of the multi-pollutant alternative by the DNR is a very positive step - although, we think DNR should have also made it available for the second phase reduction of their implementation plan.

In an effort to continue on this successful course, Alliant Energy submitted written comments prior to the June 25 Board meeting, in order to provide additional feedback we believed could further improve the revised rules. However, the proposed rule package was approved without revision. Therefore, we wish to take this opportunity to provide the committees with some of the same comments we provided for your consideration.

ALLIANT ENERGY - WISCONSIN POWER & LIGHT

The following modifications to the mercury rule, which Alliant Energy also suggested to the DNR and Board, are suggested improvements that we believe are critical:

1.) It is absolutely vital that the rule specify that it is in effect only in the absence of a federal MACT or other mercury regulation (including multi-emissions legislation), so that when federal rules or legislation are implemented, units subject to the federal requirements are exempted from the Wisconsin rule. This is the only way to ensure that these rules serve as an appropriate bridge and do not put Wisconsin at an economic development disadvantage.

2.) Good public policy should encourage and provide credit for early action on emission reductions. In this case, credit should be given for early voluntary reductions in the determination of baselines and the ability to bank credits for reductions beyond the rule's requirements should be established.

3.) An 80% reduction in phase two may be too high or too low a reduction level for the second phase. Because we can only speculate as to the technological capabilities that will be available at that time, the determination of the second phase of reduction level should not yet be specified. Rather, it should only be established based on a review of available technology after the first phase has been achieved, in consultation with affected utilities and other stakeholders at that time.

Each of these modifications is critical as we seek to provide safe, reliable and affordable electric service to our customers while achieving the public policy goal of reducing mercury emissions. We must never lose sight of the fact that our customers will ultimately pay for reaching this public policy objective and must always be sensitive to the impact these additional costs will have on them.

In summary, while we support controls on mercury emissions to the environment, we strongly believe our suggestions - in particular the ultimate federalization of this State rule - will make a Wisconsin mercury initiative acceptable. This step will also represent a significant regulatory move toward a more unified and comprehensive approach to regulatory policy in our State, while still achieving Wisconsin's environmental and leadership objectives.

Alliant Energy is submitting a written copy of these comments for the record. Thank you for your time and continued support in addressing this important environmental issue for the State of Wisconsin.

Forest County Potawatomi Community
P.O. BOX 340 • Crandon, WI 54520

Testimony on CR 01-081
Proposed Rules on Mercury Emissions
August 13, 2003

Thank you, chairmen and committee members, for the opportunity to testify today on the Department of Natural Resources' proposed rules limiting mercury emissions from power plants.

I am Bill McClenahan, of Martin Schreiber & Associates. I was honored to represent the Forest County Potawatomi Community on the DNR's Mercury Citizen Advisory Committee. On behalf of the Potawatomi, I am here to support this rule, but to strongly recommend two changes:

(1) Base required reductions on current ***emissions***, not fuel content, and

(2) Require offsets for ***new*** utility sources of mercury in the rule.

The Potawatomi tribe endorses strong and effective restrictions on mercury emissions. The tribe wants you to know that a substantial majority of people in Wisconsin agree.

In April 2002, the Potawatomi polled 600 people on utility objections to the mercury rule and the fact that it may cost people money. The question was:

> Mercury in air pollution from coal-fired power plants and other sources ends up in Wisconsin lakes, leading to government recommendations that people should limit the amount of fish they eat from Wisconsin lakes. State utilities argue that mercury also comes into Wisconsin from other states and that limiting their mercury emissions from Wisconsin power plants would increase the cost of electricity. Do you support or

oppose strict reductions of mercury emissions by utilities and other sources?

73.0% of the people polled supported the strict reduction of mercury emissions. Only 19.5% opposed them. Support was strong across the board, regardless of geography, party affiliation, income or gender.

The Potawatomi tribe's interest in this rule stems from its tradition of environmental stewardship – a belief that we are all the keepers of the earth for our children and our children's children. It is the responsibility of all of us to protect and preserve our water, our air and our land for future generations.

The tribe is also involved because mercury emissions into the air, and the subsequent contamination of waters, reduce the opportunity for tribal members to participate in traditional practices that depend on clean resources, such as hunting, fishing, cultural, religious and medicinal practices.

In addition, tribal enterprises rely on tourism. Protection of our natural resources is essential to the continued success of tourism in Northern Wisconsin.

The Potawatomi also have a special interest in the mercury issue because they are participating with the DNR in a study of the impacts of mercury deposition in Wisconsin lakes. The tribe is working with Dr. Carl Watras to test levels of mercury in Devil's Lake on the Potawatomi reservation in Forest County. This testing is being done as a result of the tribe's Class I air agreement with the DNR.

The levels of mercury found at Devil's Lake are cause for great concern. They are similar or higher than the levels found at other lakes where methylmercury is being found to bioaccumulate in the muscle of fish. People often think of PCBs accumulating in lipids, and so they cut away the fatty parts of fish, hoping to reduce the amount of mercury they eat. However, mercury is accumulating in the ***muscle*** of fish – the meat of the fish that people eat.

This is a major human health issue for the Potawatomi reservation, for Wisconsin and for the nation. The fact that the impacts of mercury often hit

children the hardest emphasizes the need for action. Wisconsin must take action for our children and for the children of generations to come. And we must take action to protect our Mother Earth.

The tribe is encouraged, however, by evidence that taking action can and will yield results. Dr. Watras has evidence that Wisconsin lakes respond quickly and positively to changes in atmospheric mercury deposition.

But I also want to emphasize that the tribe rejects any suggestion that our responsibility to the environment ends at Wisconsin's borders. Polluting the air or water of our neighbors is no more ethical than polluting the water where we live. It is also important to remember that the fish we eat (and others eat) do not come solely from Wisconsin waters – they come from lakes and rivers and oceans around the world. Wisconsin must stop the emissions of poisons that end up in those fish.

For these reasons, the tribe supports the proposed rule. The Potawatomi urge the state to enact strict limits on mercury emissions – not just to protect the environment from our own emissions, but to set a standard for the federal government to duplicate when it adopts its own mercury regulations.

The tribe does, however, object to the loophole that would base mercury reductions on the mercury ***content*** of the fuel. Reductions should be made from the current baseline of mercury ***emissions***, as under the proposal that previously went to hearing.

The tribe also objects to the exemption for ***new*** sources of mercury. Why should we carve out new coal plants and exclude them from the new state regulations? Again, the tribe urges the board to return to the previous version of the rule and to require utilities to achieve further reductions in existing emissions if they want to build new power plants that put mercury into our environment.

The Potawatomi tribe, like the general population of Wisconsin, wants an environment that is healthy for fish, for animals and for our children. So please vote today to endorse strong and effective restrictions on mercury emissions.

Thank you for the opportunity to testify.

Testimony of the National Wildlife Federation on Proposed Mercury Reduction Rules Before the Wisconsin Legislature

(Delivered by Wisconsin Wildlife Federation)
August 13, 2003

Senator Kedzie and Representative Johnsrud, and Other Members of the Senate Environment and Natural Resources and House Natural Resources Committees,

On behalf of over four million members and supporters of the National Wildlife Federation, I urge you to strengthen the mercury reduction rules before the Wisconsin Legislature. The time for bold initiatives to reduce mercury contamination in the state and region is now.

Like many other states, Wisconsin is significantly impacted by mercury contamination. Although mercury is naturally occurring, human activities (including mercury mining, production, use and disposal of mercury-containing products, and combustion of fossil fuels – in particular coal) have significantly increased levels in the biosphere compared to preindustrial times. While there has been progress in the last decade in reducing mercury uses and releases in many industries, several sectors remain large mercury sources – in 1999 in Wisconsin, coal-fired power plants were responsible for over forty percent of the state's mercury emissions, according to the Environmental Protection Agency (EPA) National Emissions Inventory.

Once mobilized in the environment, mercury can be converted in water bodies to an organic form, methylmercury, that can build up to high levels in the food chain. It is widely recognized that consumption of mercury-contaminated fish is the predominant human exposure route to methylmercury.

Wisconsin is one of 19 states nationwide with a statewide fish consumption advisory in place for inland waters – this includes a recommendation for women of childbearing age and young children to restrict their consumption of popular sport fish such as walleye, northern pike and other fish to no more than one meal per month. Six of the seven other Great Lakes states also have a statewide mercury fish advisory in place.

Even at relatively low levels, mercury can cause subtle but real impacts on the development of children's nervous systems. The most recent data published from the Centers for Disease Control and Prevention indicates that as many as 320,000 babies are born each year at risk for neurodevelopmental delays (including in language, attention, and memory) due to mercury exposure they received in the womb. This translates into approximately 5,500 babies potentially impacted each year in Wisconsin. In addition, recent research indicates that chronic, moderate mercury exposures can impact adults as well – several studies have found increased cardiovascular diseases in middle-aged men associated with mercury exposure through fish consumption.

In addition to direct impacts on human health, mercury contamination can threaten the economy as well. According to the U.S. Fish and Wildlife Service 2001 survey, over 1.3 million people took part in fishing activities in Wisconsin that year, ranking the state fourth nationally. These anglers spent over $1 billion on fishing and auxiliary equipment, food and lodging, transportation, and other expenses related to fishing trips. All of those anglers have to deal with the issue of mercury contamination, in determining which and how many fish they and their families can safely eat.

In addition to threatening human health and the economy, mercury pollution threatens a number of wildlife in the state, including loons, mink, bald eagles, and other fish-eating wildlife.

So while it is clear we have a problem with mercury contamination, it is also clear that Wisconsin – like other states – can do much more to reduce the problem. While good progress has been made in reducing some sources, it is clear that significant reductions in mercury releases from coal-fired power plants will be needed to restore the state's lakes and rivers.

Technology exists now to significantly reduce mercury emissions coming from power plants – with appropriate additions, mercury reductions of over 80-90 percent (from existing emissions) are possible from Wisconsin's coal-fired power plants, and could be adopted in a manner that is both cost effective and ensures reliability. EPA and other studies have estimated that costs of incorporation of mercury controls at coal-fired power plants would be in the range of costs a number of utilities are already incurring for upgrading equipment to control smog-forming nitrogen oxide emissions. And assuming the history of controls for other pollutants is a good guide, adoption of strong mercury control measures in Wisconsin and other states will almost invariably spur technology developments that will bring costs down even further in the near and medium-term.

The National Wildlife Federation supports efforts to tackle multiple pollutants from power plants in a comprehensive manner, as long as the targets for each pollutant are sufficiently aggressive. A program that includes adoption of strong control measures and encourages a more aggressive move to cleaner energy sources (including wind, biomass, efficiency improvements and conservation) is necessary to reduce emissions of other pollutants (such as the aforementioned nitrogen oxides, acid-rain forming sulfur dioxide, haze-forming particulate matter, and the global warming gas carbon dioxide) that continue to threaten our environment and public health.

Although moderate additional costs will be incurred in controlling mercury emissions from power plants, recent research has shown that both anglers and the broader population place high value on reducing fish contamination. For example, based on extending findings from an earlier survey of four Wisconsin regions, the state's Great Lakes anglers would value a 20 percent reduction in toxic chemical contamination at over

$13 million. A recent study in Minnesota examining state and regional mercury reduction scenarios found that residents would be willing to pay $212 million in support of a policy reducing mercury deposition by 12 percent statewide.

While the mercury rules before the legislature are an important beginning, we believe they should be strengthened by the Department of Natural Resources to reflect the need for more aggressive mercury reductions in the state. The rules should include:

- **A 90% reduction of current mercury pollution from coal-fired power plants**
- **A measurement of mercury reductions from what is coming out of power plant stacks, NOT from the mercury that is in the coals**
- **A 150% offset for new sources of mercury.**

Adopting such an approach would put Wisconsin at the forefront with other states (such as Connecticut) that have recognized the need for strong state action on mercury from power plants, given the uncertain prognosis for adequate power plant mercury controls at the federal level. Such an action would also support burgeoning efforts in other Great Lakes states (including Michigan and Illinois) considering power plant controls for mercury.

Now is the time to take strong action on mercury, both for Wisconsin's children, and for the health of the state's wildlife.

Thank you for the opportunity to communicate to you on this important issue.

Sincerely,

Michael Murray, Ph.D.

Staff Scientist
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August 13, 2003

Comments from the Wisconsin League of Conservation Voters to the Senate Environment and Natural Resources Committee and the Assembly Natural Resources Committee in support of CR 01-081, the DNR Mercury Rule.

Chairman Kedzie, Chairman Johnsrud, honorable committee members, thank you for this opportunity to comment on the mercury rules package approved by the Natural Resources Board in June.

The problem of mercury contamination of the air and water is a perfect example of the link between environmental and conservation issues. In this case, the air pollution leads to mercury-laden fish and a statewide advisory on eating fish from any of our lakes in Wisconsin. The net result is a hit to our tourism industry and a continuing threat to the health of those who consume fish regularly from our lakes.

The rules approved by the NRB are a big step forward in protecting our tourism industry and the health of our residents and visitors. In fact, as others have pointed out, the rules should be strengthened insure that actual emissions are reduced enough to clean up our lakes and protect human health. Despite this, several members of your committees have expressed strong reservations about these rules.

Yes, mercury is carried on the air into Wisconsin from sources outside this state. Yes, there is an effort to establish a national emissions standard for mercury. However, it is incumbent upon us to do what we can, now, to start dealing with this problem. Wisconsin should implement strong mercury emission standards now and help move the national discussion forward in a decisive way.

This issue is important to lake users and anglers across the state. As such, the mercury rules are a priority issue for the Wisconsin League of Conservation Voters. Your votes to support, strengthen, or oppose Clearinghouse Rule 01-081, will be documented in the 2004 Conservation Scorecard. Because part of the mission of the WLCV is to educate the voting public about key conservation issues, we also are likely to publicize your actions in support of or against this rule during the 2004 election season.

Clean Air - Clean Water - Clear Choices

Post Office Box 455, Waunakee, Wisconsin 53597-0455 • Tel. (608) 850-4585 • Fax (608) 850-4588
info@wlcv.org • www.wlcv.org

Make no mistake about it. This rule is a key issue to conservation groups and their members across the state. Friday fish fries may be second only to beer and brats in Wisconsin's food traditions. The threat of mercury poisoning should not be a part of that tradition. Your chance to act on this is now, and we hope to be able to tell your constituents and the citizens of this state that you voted for clean air and water, and have helped move this state forward toward a day when our fish-consumption advisories are a thing of the past.

Kathy F. Pielsticker
Executive Director, WLCV

cleanwisconsin

your environmental voice since 1970

Statement on the Proposed Mercury Rule (CR-01-181)
Before the Senate and Assembly Committees on Natural Resources
August 13, 2003

Thank you for the opportunity to address the Committees today. I'm Marc Looze and I'm the mercury campaign director for Clean Wisconsin, the group formerly known as Wisconsin's Environmental Decade. I am also the mercury issue chair for the Wisconsin Stewardship Network, a coalition of 50 sporting and environmental groups who have chosen mercury as a top priority issue for the group.

My organization helped write the citizen petition to the DNR in 2000. In it, we requested a 90% reduction in mercury pollution from power plants and all sources of mercury 10 pounds and greater by 2010.

We realize that some compromise is necessary, which is why we supported the draft rule that went to public hearing in 2001. That rule was a compromise which contained numerous provisions that were weaker than what the citizen petition requested. The current rule draft is even weaker. Yet, there are groups and individuals who want to further gut Wisconsin's mercury rule.

On behalf of the thousands of concerned citizens I represent, I respectfully ask you to reject those efforts to weaken this rule and instead to strengthen the proposed mercury rule to include:

- **A 90% reduction of current mercury pollution from coal plants**

- **A measurement of mercury reductions from what is coming out of power plant smokestacks, NOT from the mercury that is in the coal**

- **A 150% offset for new sources of mercury**
  If our goal is to make fish safe to eat for everyone in the future, we can't just clean up existing sources of mercury pollution and replace them with new mercury polluters, like large coal-fired power plants that will be around for 40-50 years.

These provisions were supported in public comment and should be reinserted into the rule.

Utilities and their industry trade groups have and always will use the same arguments against reducing pollution: It costs too much. We can't do it. They claim it's an issue of too much regulation.

-OVER-

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Wisconsin Utility Investors, Inc.

10 East Doty Street, Suite 500, Madison, WI, 53703-3397 – (608) 663-5813 – Fax (608) 283-2589 – wui@wuiinc.org

Date: **August 13, 2003**

To: **Chairman and Members**
Senate Environment and Natural Resources Committee

Chairman and Members
Assembly Natural Resources Committee

From: **Kenyon C. Kies, Executive Director**
Wisconsin Utility Investors, Inc.

Subject: **DNR Mercury Rule (Clearinghouse Rule 01-181)**

Good Morning Mr. Chairman and members of the committees. My name is Kenyon Kies and I am here today representing the more than sixteen thousand members of Wisconsin Utility Investors, all of whom are shareholders in Wisconsin utility companies and your constituents. The vast majority of these individuals rely on their dividends for their retirement income and they are, therefore, deeply concerned about the health of Wisconsin's economy and the health of the state's utilities since the two are inextricably entwined.

Our concerns can be summed up quickly. We certainly understand the dangers created by mercury. We also understand that more than 95% of the mercury deposited here comes from outside sources and that even eliminating 100% of the instate sources will do little to improve our environment. DNR officials have admitted the improvements might not even be measurable. The only real solution is for national or international action. For Wisconsin to go it alone, as suggested by this rule, will only lead to much higher utility rates for Wisconsin residents and industries. It will make the state uncompetitive for current businesses and act as a deterrent for potential new businesses. In addition to hurting the state economy generally, it will damage the state's utilities. Congress is currently considering strong mercury controls. This is clearly the best way to address this problem, both in terms of effectiveness and in terms of fairness, since all states will be treated equally.

Let me be clear. We do not oppose the state promulgating a mercury rule. However, that rule must be realistic about what can be accomplished. At present, no technology exists which would allow our companies to comply with the 80% requirement by 2015. The rule must also make it clear that whatever its provisions, they will be superseded by and the state bound by the provisions of federally mandated rules. Fairness requires that the state rules not be more severe.

For these reasons, our members urge your committees to return the rule to the DNR for revisions that would include these changes. We would like to thank you for allowing us to appear. I would be happy to answer any questions.

"The Voice of Investors"

AUGUST 13, 2003 RULE 01-081 (DNR)

STATE CAPITOL, MADISON

MY NAME IS KEN PETERSEN, GENERAL MANAGER, BARRON ELECTRIC COOPERATIVE, BARRON, WI.

THE MEMBER-CONSUMERS OF BARRON ELECTRIC ARE COMMITTED TO A CLEAN ENVIRONMENT. HOWEVER, THEY GENERALLY BECOME STUBBORN WHEN IT COMES TO PAYING FOR SOMETHING THAT HAS A QUESTIONABLE BENEFIT. THAT ASIDE, THE "PAYING" IS WHAT I WOULD LIKE TO ADDRESS. BARRON ELECTRIC INTENDS TO ITEMIZE THE COST OF THIS MANDATE, IF APPROVED, ON EACH MEMBER'S MONTHLY BILL. SINCE EACH MEMBER'S BILL IS SUBJECT TO SALES TAX AND GROSS RECEIPTS TAX, THE MANDATE EXPECTED TO PAID WILL BE TAXED IN OUR SERVICE TERRITORY @ 5.5% SALES AND @ 3.19% GROSS RECEIPTS, FOR A TOTAL OF 8.69%. THIS AMOUNTS TO A TAX ON A TAX ON A MANDATE.

PLEASE OBJECT TO THIS RULE. THANK YOU.

Ken Petersen 8-13-03

Wisconsin Utilities Association
44 East Mifflin Street, Suite 202
Madison, Wisconsin 53703

To: **Senate and Assembly Environmental Committees**

From: **Bill Skewes, Executive Director**
Wisconsin Utilities Association

Re: **Mercury Rules**

Date: **August 13, 2003**

Good morning Mr. Chairman and members of the committees. Thank you for the opportunity to speak to you today. My name is Bill Skewes and I am the Executive Director of the Wisconsin Utilities Association. Joining me this morning are representatives of my member companies including Kathleen Standen of We Energies, Ed Newman of Wisconsin Public Service Corp., Mike Ricciardi of MG&E and Michele Pluta of Alliant Energy.

On behalf of Wisconsin's investor-owned gas and electric utilities, WUA urges your committees to adopt two critical changes to the proposed mercury rules. First, we request that the rules be amended to ensure that when federal rules are promulgated next year, stationary sources subject to the proposed NR 446 would be exempt from state rules and that the federal rules would prevail. As you may know, the EPA is under a federal court order to draft mercury reduction rules before the end of this year and promulgate them in early 2004. In addition, Congress is also considering multi-emission legislation to include mercury reductions. Federal multi-emission legislation could replace Clean Air Act mercury requirements.

Although it would seem obvious under Section 285.27 (2) (a) Stats. that federal rules governing the emissions of mercury would supersede state rules, it is extremely important that the state-only rules include specific language that recognizes this underlying statutory limitation. The addition of a simple reference to the existing state law would avoid regulatory duplication with the pending federal requirements, and ensure that the state rules are implemented consistent with prior legislative intent.

A second important amendment that we request is the elimination of the requirement of an 80% reduction by 2015. First, this section of the proposed rule is unnecessary, since federal rules will be in place well before then. This rule, promoted by the DNR as a "bridge" to federal rules, simply need not attempt to address reductions 12 years into the future. While the pending federal rules make this extraneous, it is also shortsighted to mandate a reduction that is not currently possible with today's proven technology. Wisconsin utilities have consistently supported a 40% reduction in order to support Wisconsin being proactive and taking the first step in managing the national and international issue. This reduction level is reasonable for state-only rules. An 80% reduction requirement goes beyond equitable state-only rules.

Utilities invest many millions of dollars in research every year to find ways to minimize their environmental footprint. In fact, We Energies, in cooperation with the US Department of Energy, has pioneered research into the development of sorbent injection technology at its Pleasant Prairie plant, which will be the method most likely used to control mercury emissions at Wisconsin power plants.

An initial, short-term, small-scale test of the sorbent injection technology averaged 60% last year. However, this is a far cry from a guaranteed 80% system-wide reduction.

To be sure, the research is yielding promising results and Wisconsin utilities will continue to pursue development of sorbent injection and other control technologies. However, until this technology is ready for system-wide use, there is no guarantee that it will work on the scale that the proposed rule requires.

There are other reasons why these changes to the proposed rules are needed, such as the relatively high cost to ratepayers when compared to its negligible environmental benefit. Preliminary cost-of-compliance estimates by one utility show that DNR's projections have under-predicted utility compliance costs by a factor of four. These costs need to be considered in light of the environmental benefits that can be achieved as a result of state-only rules. Research showing that that Wisconsin utilities contribute only 1-5% of the mercury that is deposited in Wisconsin lakes was introduced during the rule-making process. We ask for your legislative oversight in balancing the state's desire to be an environmental leader with some simple accounting of economic costs and environmental benefits.

For these and for reasons you will hear from other speakers today, WUA respectfully urges the committee to adopt the changes we suggest. We have proposed language to submit if it would assist you in drafting these amendments. We have also included the list of rules changes we requested of the DNR and NR Board as they considered the final rules. Thank you and we would be happy to attempt to answer your questions.