United States Department of the Interior

FISH AND WILDLIFE SERVICE
Rock Island Field Office
4469 48th Avenue Court
Rock Island, Illinois 61201
Phone: (309) 793-5800 Fax: (309) 793-5804

IN REPLY REFER TO

FWS/RIFO

June 21, 2006

Ms. Pamela Blakley
U.S. Environmental Protection Agency
77 West Jackson Boulevard
Chicago, Illinois 60604-3590

Dear Ms. Blakley:

This responds to your June 13, 2006, letter in which you request for our concurrence pursuant to Section 7 of Endangered Species Act for the Prevention of Significant Deterioration (PSD) permit for the proposed City of Springfield Dallman Unit number 4 power plant. We have reviewed the information provided in your letter, biological evaluation, related attachments, and have coordinated with your staff.

We concur with your findings that approval of this PSD permit will not adversely affect the federally listed bald eagle and Indiana bat species in the action area defined in the biological evaluation. This precludes the need for further action on this project as required under Section 7 of the Endangered Species Act of 1973, as amended. Should the project be modified or new information indicate endangered species may be affected, consultation should be initiated.

This letter provides comments under the authority of and in accordance with provisions of the Endangered Species Act of 1973, as amended (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*)

Thank you for the opportunity to coordinate with you on this matter. Please feel free to call me at extension 201 or Mike Coffey of my staff at extension 206 if you have any questions or wish to discuss this further.

Sincerely,

Richard C. Nelson
Field Supervisor

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

JUN 13 2006

REPLY TO THE ATTENTION OF

(AR-18J)

Richard Nelson, Field Supervisor
Rock Island Illinois Field Office
United States Fish and Wildlife Service
4469 48th Avenue Court
Rock Island, Illinois 61201

Dear Mr. Nelson:

Pursuant to Section 7 of the Endangered Species Act (ESA), (87 Stat. 884, as amended; 16 U.S. C. 1531 et seq.), the United States Environmental Protection Agency (USEPA) has reviewed the biological information and analysis related to a Prevention of Significant Deterioration (PSD) permit for The City of Springfield, City Water, Light and Power (CWLP) Dallman Unit 4 to determine what impact there may be to any threatened or endangered species in the area around the proposed facility. The purpose of this letter is to seek concurrence from the United States Fish and Wildlife Service (USFWS) on our determination that the proposed project is not likely to adversely affect any federally listed species in relation to the proposed air quality permit for this facility.

The parties utilized the informal consultation process as specified in the "Endangered Species Consultation Handbook, procedures for conducting consultation and conference activities under Section 7 of the Endangered Species Act, (March 1998 final)," by the USFWS and National Marine Fisheries Service. The USEPA prepared this biological assessment following the guidance provided in the ESA consultation handbook, as well as the recommended content suggested in the ESA regulations found in 50 CFR Part 402.12(f). Additionally, USFWS provided USEPA a draft recommended scope of analysis on January 20, 2006.

Project Description

CWLP has proposed to construct a new subcritical pulverized coal-fired boiler to power a steam turbine generator, associated pollution control equipment, auxiliary equipment, cooling tower, and materials handling equipment. The new boiler will have a nominal new power output of approximately 250 MW and will provide base load power to the electric grid on a continual basis. As part of this project, CWLP will retire two existing units, Lakeside units 6 and 7. The projected will result in increases in three criteria air pollutants, carbon monoxide (CO), particulate matter (PM), and volatile organic compounds (VOC), in the amount of 1249.41 tons per year, 394.67 tons per year, and

31.46 tons per year respectively. The project will result in decreases in emissions for nitrogen oxides (NOx), sulfur dioxide (SO_2)and lead, with SO_2 emissions decreasing by 5605.71 tons per year. The project is expected to result in increased emission of certain metals, dioxins and furans. The projected emission levels are listed in Table 1 of the document "Supplement to Part 7 of PSD Permit Application: Additional Impact Analysis for Metals," which is included as Attachment 1.

Action Area

The CWLP site encompasses approximately 100 acres in Sangamon County. It is located near Lake Springfield in Section 13 of Township 15 North, Range 5 West.

List of Species

The species potentially occurring in the vicinity of the facility include the Eastern prairie fringed orchid (Platanthera leucophaea), the Prairie bush clover (Lespedeza leptostachya), the Bald eagle (Haliaeetus leucocephalus), and the Indiana bat (Myotis sodalis).

While the Eastern prairie fringed orchid and the Prairie bush clover are listed as statewide species, the USFWS informed USEPA in an e-mail dated March 13, 2006, that these species are not known to occur in Sangamon County. The USFWS indicated that the bald eagle and Indiana bat should be included in the evaluation.

The Indiana bat is listed as a statewide species. While there have been no known occurrences within the action area, there is suitable habitat. There are known summer populations in the counties to the west and east of Sangamon County. The bald eagle may be found during the summer or winter throughout much of Illinois, and suitable habitat is present in southern Sangamon County.

Summary of Analysis

In an October 29, 2005, letter, the Illinois Environmental Protection Agency (IEPA) requested that USEPA initiate consultation with USFWS under the ESA. In November 2005, USEPA contacted the Rock Island Field Office via telephone requesting that an informal consultation process by initiated for this project. On January 20, 2006, USFWS provided a draft document titled "Recommended Scope of Analysis for City of Springfield (CWLP) Dallman Unit 4 for Endangered Species Evaluation." On February 2, 2006, USEPA and USFWS held a conference call to discuss the draft document and any remaining areas of concern. USEPA has conducted this analysis in accordance with this scoping document and the information obtained during the February 2, 2006, call.

The scoping document provided by USFWS indicated that the modeling for this analysis should follow the general guidance provided in Chapter 3 of USEPA's Screening-Level Ecological Risk Assessment (SLERA) protocol for assessing chemical fate and transport, the modeling should show air concentrations and deposition rates for appropriate

pollutants, and that the total impacts should be evaluated looking at the combined effects of the vapor phase, particle phase and particle-bound phase of pollutants. The document indicated that ISCST3 was an acceptable model for the analysis. In addition, the document indicated that the evaluation should take into account the addition of Unit 4 as well as the shut down of the Lakeside Units 6 and 7.

ESA Effects Analysis

Criteria Pollutants

The project at CWLP will result in decreases in emissions for NOx of 192.61 tons per year and for SO_2 of 5605.71 tons per year. The project will also result in a small decrease in lead emissions. The local background soil concentration for lead is 36 mg/kg. The maximum modeled deposition concentration for lead of 0.236 mg/kg is less than 1% of background. Reductions in emissions are expected to be beneficial for the species. USEPA has concluded that the project is not likely to adversely effect the Indiana bat and the Bald eagle with respect to these pollutants.

The project will result in a small increase in VOC emissions of 31.46 tons per year. At the current time, USEPA is unaware of any reliable means to assess ozone changes through "point source" modeling. Although point source screening models have been developed, they have not been consistently applied with success for source changes of this small magnitude. Such screening models were developed for much larger VOC and NOx sources and/or emissions changes. Urban scale photochemical ozone models, such as the Urban Airshed Model, could be employed to assess the ambient impact of emission increases as well as emission decreases resulting from the implementation of emissions control programs. Past experience, however, with such models indicates that a VOC change of 31.46 tons per year would not produce a predicted change in ozone concentrations. The Urban Airshed Model, for example, has been shown to be relatively insensitive to changes in VOC emissions. Past modeling results considering VOC emissions changes on the order of hundreds to several thousand tons per year of VOC in major urban areas have shown only modest decreases in predicted peak ozone concentrations. Therefore, it is concluded that such models would likely show a zero ozone change for a VOC increase of 31.46 tons per year. Stated another way, based on the best available tools and information that exist today, one would not expect any measurable change in ambient ozone concentrations due to the Project's projected worst case VOC emissions increase of 31.46 tons per year. Based on this information, USEPA concludes the project will have no measurable effect, if not no effect, on the endangered species with respect to ozone. At a minimum, the project is not likely to adversely effect the endangered species as no measurable change in ozone will result from the project.

Hazardous Air Pollutants

The project will result in small increases in emissions of metals, dioxins, and furans. These maximum ground level concentrations of these pollutants are listed in Table 1 of

CWLP's analysis, which has been included as Attachment 1. Table 2 of CWLP's analysis shows the maximum modeled deposition concentration in comparison to the screening level and local background for each pollutant. With respect to the bald eagle an the Indiana bat, the main concern is metals and dioxins/furans bioaccumulation throughout the food web. Further analysis performed by USEPA is included as Attachment 2. The CWLP and USEPA analyses show that the impacts from this project are below the selected screening levels. Based on this information USEPA has found that the project is not likely to adversely affect the two species in question.

ESA Determination

After review of the likely effects of the proposed project, it would appear that the main area of concern is the impact of metals and dioxins/furans. The screening level models used to predict deposition concentrations for these pollutants, show levels below the conservative screening values used.

Considering this analysis in its entirety, USEPA concludes that the proposed construction and operation of this facility may affect, but is not likely to adversely affect, any the threatened and endangered species. USEPA respectfully requests USFWS concurrence on this determination.

Sincerely yours,

Pamela Blakley

Pamela Blakley, Chief
Air Permits Section

Attachments

cc: Laurel Kroak, IEPA

Attachment 1
City Water, Light and Power
Supplement to Part 7 of PSD Permit Application:
Additional Impact Analysis for Metals

An impact analysis of Dallman Unit 4 boiler's metal emissions was made as part of the Additional Impacts Analysis (Part 7 of the PSD Permit Application, revised in June 2005) required by PSD regulations. This supplement discusses the impacts of emitted metals on soils and plants from the Dallman Unit 4 project and was accomplished using the EPA-approved protocol "Screening Level Ecological Risk Assessment Protocol for Hazardous Wasted Combustion Facilities, Chapter 3: Air Dispersion and Deposition Modeling".

In addition to criteria pollutants, other materials are present in the coal or can be formed as a by-product of combustion in the boiler and have the potential to be emitted in small quantities. The metal elements that can be emitted may have an adverse effect on plants and soils. Emission estimates for metals are based on emission factors taken from AP-42 Section 1.1, *Bituminous and Subbituminous Coal Combustion* (9/98). Several assumptions were made to allow for a "worst-case" calculation of emissions. It is assumed that the boiler will burn coal at the rate of 2,438 MMBtu per hour for the entire year (8,760 hours), and the firing process will release all of these contaminants contained in the coal. None of these pollutants were assumed to be entrained in the bottom ash and the control devices available will be the SCR, the wet FGD, and a fabric filter. In actuality, the unit will operate for less than 8,760 hours annually and some of the material will be captured in the bottom ash while other material will be more effectively removed in the SCR, wet FGD, and particulate control systems (fabric filter and wet electrostatic precipitator).

The emission rates of each of the metals that may be emitted from the Dallman Unit 4 boiler were modeled using the EPA-approved ISC model in the same manner as the criteria pollutants (described in Section 6 of the PSD Permit Application) and annual impacts were obtained for each. In addition, because deposition was used in the modeling process meteorological data along with some additional inputs into ISC needed to be adjusted according to the EPA's document, "Screening Level Ecological Risk Assessment Protocol for Hazardous Wasted Combustion Facilities". Meteorological data in ISC was determined using the following rural and grassland assumptions (tables can be found in Appendix A along with PCRAMET Log with these values):

- Monin-Obukhov Length: 25 meters for residential
- Anemometer height (known): 9.4488 meters

- Surface Roughness: 0.1 for grassland
- Albedo: 0.25875 average of the seasons for grassland (0.65 and 0.30 for winter)
- Bowen Ratio: 0.7 for grassland
- Anthropogenic heat flux: 0.0 for rural areas
- Net Radiation: 0.15 for rural areas

In addition to the meteorological data, deposition terms were associated into the model and included mean particle diameter (μg), fraction of total mass, density (g/cm^3) (assumed to be 1.0), and wet scavenging rate coefficient (hr/s-mm). The wet scavenging rate coefficient is a function of particle diameter. . The value is used for both liquid and frozen particle deposition.

Because the Dallman Unit 4 boiler has the potential to emit 99.99 percent of all HAPs emitted by this facility, only the metals, dioxins, and furans emitted from the Dallman Unit 4 boiler were included in this modeling. Metals present in the coal along with dioxins and furans are listed in Table 1 along with their emission factors and modeled ground level concentrations.

Table 1
Modeled Metal Emissions

Pollutant	Emission Rate* 100% Load on Coal (lb/hr)	Maximum Modeled Annual Ground Level Concentration ($\mu g/m^3$)
Arsenic	0.049	9.00×10^{-5}
Cadmium	0.006	1.00×10^{-5}
Chromium	0.031	6.00×10^{-5}
Cobalt	0.012	2.00×10^{-5}
Fluorides	0.596	1.12×10^{-3}
Lead	0.050	9.00×10^{-5}
Manganese	0.059	1.10×10^{-4}
Mercury	0.005	1.00×10^{-5}
Nickel	0.034	6.00×10^{-5}
Selenium	0.156	2.90×10^{-4}
Dioxins	2.93×10^{-5}	0.00
Furans	2.93×10^{-5}	0.00

* Based on AP-42: Table 1.1-18 and maximum coal rate of 120.0 tons/hr.

In determining the effects that the metals, dioxins, and furans have on the soil, the deposition concentration of the trace elements on soils were calculated by using the screening techniques described in the EPA's document, "Screening Level Ecological Risk Assessment Protocol for

Hazardous Wasted Combustion Facilities", Section 3.11.1 – Calculation of COPC Concentrations in Soil. The formula for calculating the soil concentration is as follows:

$$Cs = \frac{Ds \cdot [1 - \exp(-ks \cdot tD)]}{ks}$$

Where:

CS = COPC (compound of particular concern) concentration in soil (mg COPC/kg soil)

Ds = Deposition Term (mg/kg-yr)

ks = COPC soil loss constant due to all processes (yr^{-1})

tD= Total time period over which deposition occurs (yr, assume 100 yrs)

The deposition term (Ds) and soil lost constant (ks) are both calculated using more in-depth equations/variables which are included in Appendix A. After applying above equation to the ground level concentrations that were modeled, the soil concentration was compared to the acceptable background and screening levels designated by the EPA, both values in (mg/kg). The background concentrations were taken from Tiered Approach to Corrected Action Objectives (TACO) appendix presented by the Illinois EPA. The background concentrations are specific to Illinois and are different for metropolitan/non metropolitan counties. Sangamon County, where the facility is located, is considered metropolitan. Background levels are not available for the fluorides, dioxins, and furans.

The soil screening levels used were No Observed Adverse Effect Levels (NOAEL) and are specific to different animals. The screening levels were taken from the "Toxicology Benchmarks for Wildlife: 1996 revision" given to the U.S. Department of Energy. For this particular ecological risk, the animals in of concern are the bald eagle and Indiana bat. The closest species for the analysis for the metals was the Great Blue Heron. Screening levels were available for all metals from this document. For the dioxins, the NOAEL level of 2,3,7,8-Tetrachloro Dibenzodioxin (TCDD) for a Ring Necked Pheasant was used to represent the closest available species and was the worst-case screening level for dioxins. TCDD is also considered the most toxic of all dioxins and is commonly used as a reference for all other dioxins. For the furans, the NOAEL level of 2,3,7,8-Tetrachloro Dibenzofuran (TDBF) for a Great Blue Heron was used to represent the worst-case screening level for furans.

Table 2, below, indicates that the calculated depositions concentrations (mg/kg) from the modeled results are well below the standard screening level for each metal and dioxin/furans. Likewise, Table 2 indicates that the soil concentrations are well below the local background concentrations.

Table 2
Trace Concentration Compared to Screening and Background Levels

Pollutant	Maximum Modeled Deposition Concentration (mg/kg)	Screening Level (mg/kg)	Local Background Concentration (mg/kg)
Arsenic	0.115	5.1	13
Cadmium	0.003	1.45	0.6
Chromium	0.093	1	16.2
Cobalt	3.89×10^{-5}	0.14	8.9
Fluorides	0.0096	7.8	N/A
Lead	0.236	3.85	36
Manganese	0.001	997	636
Mercury	6.30×10^{-4}	0.45	0.06
Nickel	0.077	77.4	18
Selenium	0.253	0.5	0.48
Dioxins	2.01×10^{-9}	1.40×10^{-5}	N/A
Furans	1.94×10^{-11}	1.00×10^{-6}	N/A

Pollutant	Emission Rate		
	lb/hr	tpy	(g/s)
Arsenic	4.92E-02	2.15E-01	6.20E-03
Cadmium	6.12E-03	2.68E-02	7.71E-04
Chromium	3.12E-02	1.37E-01	3.93E-03
Cobalt	1.20E-02	5.26E-02	1.51E-03
Fluorides (Chlorine)	5.96E-01	2.61E+00	7.51E-02
Lead	5.04E-02	2.21E-01	6.35E-03
Manganese	5.88E-02	2.58E-01	7.41E-03
Mercury	5.25E-03	2.30E-02	6.61E-04
Nickel	3.36E-02	1.47E-01	4.23E-03
Selenium	1.56E-01	6.83E-01	1.97E-02
Dioxins	2.93E-05	1.28E-04	3.69E-06
Furans	2.93E-05	1.28E-04	3.69E-06

	Appendix A-2 Variables for each Metal (and Dioxins/Furans)					
Pollutant	Fv	Kds (pH=6.8) (cm^3/g)	Da (cm^2/s)	H (atm m^3/mol)	Source	
Arsenic	0.00	29.00	0.1070	0.00	Appendix A-2, Table A-2-14, Page A-2-49	
Cadmium	0.00	75.00	0.0816	0.00	Appendix A-2, Table A-2-35, Page A-2-71	
Chromium	0.00	1.80E+06	0.1010	0.00	Appendix A-2, Table A-2-52, Page A-2-89	
Cobalt	0.00	0.00	0.0000	0.00	None, Fv & H Assumed for all metals	
Fluorides (Chlorine)	1.00	0.00	0.1100	0.00	Appendix A-2, Table A-2-39, Page A-2-75	
Lead	0.00	900.00	0.0543	0.00	Appendix A-2, Table A-2-128, Page A-2-169	
Manganese	0.00	0.00	0.0000	0.00	None, Fv & H Assumed for all metals	
Mercury	1.00	1000.00	0.0109	7.10E-03	Appendix A-2, Table A-2-131, Page A-2-172	
Nickel	0.00	65.00	0.1260	0.00	Appendix A-2, Table A-2-145, Page A-2-186	
Selenium	0.00	5.00	0.1030	0.00	Appendix A-2, Table A-2-172, Page A-2-215	
Dioxins	0.49	9.77E+05	0.0127	1.60E-05		
Furans	1.00	3.72E+06	0.1310	5.30E-05		

Fv: Fraction of COPC air concentration in vapor phase
Kds (cm^3/g): soil-water partition coefficient
Da (cm^2/s): Diffusivity of COPC in air
H (atm m^3/mol) Henry's Law Constant

Variables for all Metals		Units	Source
tD time period	100	yr	Appendix B, Table B-1-1, Page B-3
Zs: Soil Mixing Depth (assumed Tilled)	20	cm	Appendix B, Table B-1-1, Page B-4
BD: Soil Bulk Density	1.5	g/cm^3	Appendix B, Table B-1-1, Page B-4
Vdv: Dry Deposition Velocity	3	cm/s	Appendix B, Table B-1-1, Page B-5
Kse: loss constant due to erosion	0	1/yr	Appendix B, Table B-1-3, Page B-14
θsw: Soil volumetric water constant	0.2	mL/cm^3	Appendix B, Table B-1-4, Page B-21
R : Universal Gas Constant	8.205E-05	atm-m^3/mol-K	Appendix B, Table B-1-6, Page B-32
Ta: Ambient Air Temperature	298	K	Appendix B, Table B-1-6, Page B-32
ρs: Solids Particle Density	2.7	g/cm^3	Appendix B, Table B-1-6, Page B-33
RO: Average annual surface runoff	25.4	cm/yr	USGS Map
P: Average Annual Precipitation	90.32	cm/yr	National Weather Service
I: Average Annual Irrigation	0	cm/yr	Per Don Pitts at Illinois Department of Water
Ev: Average Annual Evapotranspiration	76.2	cm/yr	USGS Map

Equations

$$Cs = \frac{Ds \cdot [1 - \exp(-ks \cdot tD)]}{ks}$$ concentration in soil (mg/kg)

$$Ds = \frac{100 \cdot Q}{Z_s \cdot BD} \cdot [F_v (0.31536 \cdot Vdv \cdot Cyv + Dywv) + (Dydp + Dywp) \cdot (1 - F_v)]$$ Deposition term (mg/kg-yr)

KS = Ksg +Kse + Ksr +Ksl +Ksv — soil loss constant due to all processes (1/yr)

Ksg = 0 For All Metals — loss constant due to abiotic and biotic degradation (1/yr)

Kse= 0 For Metals and Dioxins/Furans — loss constant due to soil erosion (1/yr)

$$ksr = \frac{RO}{\theta_{sw} \cdot Z_s} \cdot \left(\frac{1}{1 + (Kd_s \cdot BD / \theta_{sw})} \right)$$ loss constant due to surface runoff (1/yr)

$$ksl = \frac{P + I - RO - E_v}{\theta_{sw} \cdot Z_s \cdot [1.0 + (BD \cdot Kd_s / \theta_{sw})]}$$ loss constant due to leaching (1/yr)

$$ksv = \left[\frac{3.1536 \times 10^7 \cdot H}{Z_s \cdot Kd_s \cdot R \cdot T_a \cdot BD} \right] \cdot \left(\frac{D_a}{Z_s} \right) \cdot \left[1 - \left(\frac{BD}{\rho_s} \right) - \theta_{sw} \right]$$ loss constant due to volatization (1/yr)

Pollutant	Cyv (µg/m^3)	Deposition Dywp + Dydp g/m^2-yr	Dywv (g/m^2-yr)	Comments
Arsenic	9.00E-05	0.11181	0	Zero since Fv is zero
Cadmium	1.00E-05	0.01391	0	Zero since Fv is zero
Chromium	6.00E-05	0.07091	0	Zero since Fv is zero
Cobalt	2.00E-05	0.02727	0	Zero since Fv is zero
Fluorides	1.12E-03	1.35405	1.35405	Modeled
Lead	9.00E-05	0.11454	0	Zero since Fv is zero
Manganese	1.10E-04	0.13363	0	Zero since Fv is zero
Mercury	1.00E-05	0.01193	0.01193	Modeled
Nickel	6.00E-05	0.07636	0	Zero since Fv is zero
Selenium	2.90E-04	0.35454	0	Zero since Fv is zero
Dioxins	0.00E+00	0.00007	0.00007	Modeled
Furans	0.00E+00	0.00007	0.00007	Modeled

Cyv: Maximum Modeled Annual Ground Level Concentration (µg/m^3)

						With Depletion					
Pollutant	Ksr (1/yr)	Ksl (1/yr)	Ksv (1/yr)	Ksg (1/yr)	KS (1/yr)	DS (mg/kg-yr)	CS (mg/kg)	Background Concentration (mg/kg)	Screening Levels (mg/kg)	Exceed Background?	Exceed Screening?
Arsenic	2.91E-02	-1.29E-02	0.00E+00	0.00	1.62E-02	2.31E-03	1.15E-01	13	5.1	no	no
Cadmium	1.13E-02	-5.00E-03	0.00E+00	0.00	6.27E-03	3.58E-05	2.66E-03	0.6	1.45	no	no
Chromium	4.70E-07	-2.09E-07	0.00E+00	0.00	2.62E-07	9.29E-04	9.29E-02	16.2	1	no	no
Cobalt	6.35E+00	-2.82E+00	0.00E+00	0.00	3.53E+00	1.37E-04	3.89E-05	8.9	0.14	no	no
Fluorides	6.35E+00	-2.82E+00	0.00E+00	0.00	3.53E+00	3.39E-01	9.60E-02	N/A	7.8	N/A	no
Lead	9.41E-04	-4.18E-04	0.00E+00	0.00	5.23E-04	2.42E-03	2.36E-01	36	3.85	no	no
Manganese	6.35E+00	-2.82E+00	0.00E+00	0.00	3.53E+00	3.30E-03	9.35E-04	636	997	no	no
Mercury	8.47E-04	-3.76E-04	4.07E-02	0.00	4.11E-02	2.63E-05	6.30E-04	0.06	0.45	no	no
Nickel	1.30E-02	-5.77E-03	0.00E+00	0.00	7.23E-03	1.08E-03	7.67E-02	18	77.4	no	no
Selenium	1.65E-01	-7.32E-02	0.00E+00	0.00	9.17E-02	2.32E-02	2.53E-01	0.48	0.5	no	no
Dioxins	8.67E-07	-3.85E-07	1.09E-07	0.429	4.29E-01	8.61E-10	2.01E-09	N/A	1.40E-05	N/A	no
Furans	2.28E-07	-1.01E-07	9.81E-07	44.3	4.43E+01	8.61E-10	1.94E-11	N/A	1.00E-06	N/A	no

Attachment 2
USEPA Analysis

Additional analysis of CWLP screening data

April 13, 2006

The modeled maximum deposition composition for mercury represents total mercury and not what is bioavailable but we know the bioavailable portion is less than the total. The concentration of mercury contributed from the project is about 1 percent of the current estimated background so the risk analysis will not realistically be able to provide a meaningful number for a hazard estimate.

Bald Eagle

Risk calculations for higher trophic level animals such as Bald eagle can be quite complex but since the amount of additional mercury will be so small it should be sufficient to provide a simple evaluation to demonstrate that the result is not likely to adversely affect the species. Mercury does biomagnify and the Bald eagle will be exposed to mercury through its primary food source which is fish. Since the location of the project is away from a sizeable body of water and the Bald eagle's feeding area, it is expected that the additional mercury from the project will not contribute appreciably to the mercury load to Bald eagles near Springfield.

Indiana Bat

For the Indiana bat, a simple food web analysis was performed to evaluate a very conservative exposure scenario (see attached). Since only soil media concentrations are available, it was assumed that the exposure pathway is from soil and terrestrial insects to the bat (acknowledging that this does not represent the usual scenario for bats). A normalized dose for the bat was calculated to be 0.0008 which was compared to a mammalian (No Observed Adverse Effect Level for mink) toxicity reference value (TRV) of 1 mg/kg/day. This demonstrates an exposure far below the TRV and a hazard quotient value would be 0.0008 with 1 being the point when further analysis might be deemed necessary.

Screening Level Values

With regard to the screening level values provided in Table 2, the numbers are conservative. The USEPA has developed Eco-Soil Screening Levels (Ec0_SSLs) for arsenic, cadmium, chromium, cobalt, and lead, all of which are higher than the screening levels shown in the table. In Table 2 the screening levels are often below the background concentrations but the Eco-SSLs are not. These values can be found at www.epa.gov/ecotox/ecossl/. The resulting assessment of effect on species does not change but the information provided by comparing with the Eco-SSLs makes a better argument that there is not likely to be an adverse effect from the additional load of contaminants.

Additional Analysis for Springfield Dallman (CWLP)
to Include Aquatic Food Sources in Diet of Indiana Bat and Bald Eagle
June 2, 2006

Additional information was provided that indicates air deposition will occur over Lake Springfield. Therefore further analysis is provided to include aquatic food sources in the diet for the Bald eagle and Indiana bat.

Bald eagle

1. In the recent evaluation done for the Prairie State Generating Station Screening Level Ecological Risk Assessment an avian sediment screening level was calculated using EcoRiskView© software (available commercially) which uses draft USEPA guidance (1999). The avian sediment screening levels for mercury were:

   = 0.2 mg/kg for mercuric chloride
   = 0.2 mg/kg for methyl mercury

2. As provided by CWLP in "Supplement to Part 7 of PSD Permit Application – Additional Impact Analysis for Metals", the additional soil total mercury concentration (after 100 yrs) = 6.3E-04 mg/kg.

   For a worst case scenario, assume sediment concentration is 2 times the soil concentration (erosion of soil to water body w/ no loss, deposition to water body same as to soil and 100% ends up on surface of sediment)

   ∴ sediment conc. = 1.26E-03 mg/kg

3. Existing condition for surface sediments in central Illinois range from 200 – 500 ppb total mercury (per ISGS email on 6/1/06)

   ∴ assume existing total mercury sediment concentration for Lake Springfield is 0.5 mg/kg (as a worst case).

5. Future condition (existing + new) = 0.5 + 1.26E-03 = 0.50126 mg/kg

6. New contribution is 0.25% of the future condition for total mercury (using 0.5 mg/kg as the current condition). (Or 0.6% if the existing condition is deemed to be 0.2 mg/kg)

   ∴ Any effect from the additional mercury may not be measurable at these levels.

7. Total mercury does not represent the amount of mercury that is bioavailable. USEPA (1999) recommends using the assumption that mercury is 85% divalent & 15% methyl mercury.

8. Assuming 15% in methylated form (0.50126 mg/kg total Hg * .15 = 0.075 mg/kg).

9. 0.075 mg/kg methyl mercury < screening value of 0.2 mg/kg methyl mercury.

Without fish tissue or water column data any more refined analysis is not practical or defensible for this food web analysis.

Indiana bat

See revised spreadsheet and calculations on the attached. Several scenarios are presented showing different dietary amounts for terrestrial and aquatic insects. Since water column values are not available for the mercury this analysis is incomplete. In the scenarios presented the hazard quotients are less than one.

Reference:

USEPA. 1999. Screening Level Ecological Risk Assessment Protocol for Hazardous Waste Combustion Facilities. Peer Review Draft. EPA530-D-99-001A, August 1999.

Indiana bat (*Myotis sodalis*) food exposure pathway risk calculation for Springfield CWLP project (Version 1a)

Chemical: Mercury (methyl)

Assumptions: **15% methylation of sediments**

100% infaunal aquatic insects

Future Soil Concentration	0.00063	mg/Kg dw	total mercury
Existing Soil Concentration	0.06	mg/Kg dw	total mercury
Soil to Invert BAF	8.5	unitless	
Future Sediment Concentration	0.000189	mg/Kg dw	assume 15% methylation rate for sed total Hg conc of 0.00126 mg/kg
Existing Sediment Concentration	0.075	mg/Kg dw	assume 15% methylation rate for sed total Hg conc of 0.5 mg/kg
Sediment to Invert BAF	0.48	unitless	Model considered dw to ww conversion or may use X 0.2978
Future Water Concentration	0	mg/L	no water concentration available
Water to Invert BAF	55000	unitless	
Normalized Food Ingestion Rate	0.333	Kg/Kg-bw/d ww	Diet rates from Sample *et al.* 1996 for little brown bat
Percent terrestrial insects	0	%	
Percent infaunal aquatic insects	1	%	<u>These three values must be ≤ 1</u>
Percent epifaunal aquatic insects	0	%	
Normalized Water Intake Rate	0	L/Kg-bw/d	
Area Use Factor	1	unitless	
Seasonal Use Factor	1	unitless	
Incidental Exposures (*e.g on insects*)	0.01	% of food rate	
Body Weight	0.0075	Kg	
Toxicity Reference Value NOAEL	0.32	mg/kg-bw/d	TRVs from Sample et al 1996 (rat) - primary reference Verschuuren et al 1976
Toxicity Reference Value LOAEL?	0.16	mg/kg-bw/d	
Soil to bug burden	0.515355	mg/kg/d	
Sediment to bug burden	0.03609072	mg/kg/d	
Water to bug burden	0	mg/L/d	
Normalized Food dose	0.01201821	mg/kg-bw/d	
Drinking water dose	0	mg/kg-bw/d	
Normalized Food & Water Dose	0.012138392	mg/kg-bw/d	
Hazard Quotient NOAEL	0.0379	unitless	
Hazard Quotient LOAEL	0.0759	unitless	

Σ Weighted (Abiotic Media Concentration X Bioaccumulation Factor) X Food Ingestion Rate/Body Weight X Use Factors = Dose / Toxicity Reference Value = Hazard Quotient

1 ng = 0.001 μg = 0.00001 mg
ppm = mg/Kg = μg/g = ng/mg = 1000 ppb
ppb = μg/Kg = ng/g = pg/mg 0.001 ppm
ppt = ng/Kg = pg/g = fg/mg

1.5E-03 = 0.0015

Indiana bat (*Myotis sodalis*) food exposure pathway risk calculation for Springfield CWLP project (Version 2a)

Chemical: Mercury (total)

Assumptions: **uses total Hg concentration**

100 % infaunal aquatic insects

Future Soil Concentration	0.00063	mg/Kg dw	
Existing Soil Concentration	0.06	mg/Kg dw	
Soil to Invert BAF	8.5	unitless	
Future Sediment Concentration	0.00126	mg/Kg dw	
Existing Sediment Concentration	0.5	mg/Kg dw	
Sediment to Invert BAF	0.48	unitless	Model considered dw to ww conversion or may use X 0.2978
Future Water Concentration	0	mg/L	no water concentration available
Water to Invert BAF	55000	unitless	
Normalized Food Ingestion Rate	0.333	Kg/Kg-bw/d ww	Diet rates from Sample *et al.* 1996 for little brown bat
Percent terrestrial insects	0	%	
Percent infaunal aquatic insects	1	%	<u>These three values must be ≤ 1</u>
Percent epifaunal aquatic insects	0	%	
Normalized Water Intake Rate	0	L/Kg-bw/d	
Area Use Factor	1	unitless	
Seasonal Use Factor	1	unitless	
Incidental Exposures (*e.g on insects*)	0.01	% of food rate	
Body Weight	0.0075	Kg	
Toxicity Reference Value NOAEL	0.32	mg/kg-bw/d	TRVs for methyl mercury from Sample et al 1996 (rat) - primary reference Verschuu
Toxicity Reference Value LOAEL?	0.16	mg/kg-bw/d	
Soil to bug burden	0.515355	mg/kg/d	
Sediment to bug burden	0.2406048	mg/kg/d	
Water to bug burden	0	mg/L/d	
Normalized Food dose	0.080121398	mg/kg-bw/d	
Drinking water dose	0	mg/kg-bw/d	
Normalized Food & Water Dose	0.080922612	mg/kg-bw/d	
Hazard Quotient NOAEL	0.2529	unitless	
Hazard Quotient LOAEL	0.5058	unitless	

Σ Weighted (Abiotic Media Concentration X Bioaccumulation Factor) X Food Ingestion Rate/Body Weight X Use Factors = Dose / Toxicity Reference Value = Hazard Quotient

1 ng = 0.001 μg = 0.00001 mg
ppm = mg/Kg = μg/g = ng/mg = 1000 ppb
ppb = μg/Kg = ng/g = pg/mg 0.001 ppm
ppt = ng/Kg = pg/g = fg/mg

1.5E-03 = 0.0015

Indiana bat (*Myotis sodalis*) food exposure pathway risk calculation for Springfield CWLP project (Version 1b)

Chemical: Mercury (methyl)

Assumption: **15% methylation of sediments**

50% terrestrial & 50% infaunal aquatic

Future Soil Concentration	0.00063	mg/Kg dw	total Hg
Existing Soil Concentration	0.06	mg/Kg dw	total Hg
Soil to Invert BAF	8.5	unitless	
Future Sediment Concentration	0.000189	mg/Kg dw	assume 15% methylation rate for sed total Hg conc of 0.00126 mg/kg
Existing Sediment Concentration	0.075	mg/Kg dw	assume 15% methylation rate for sed total Hg conc of 0.5 mg/kg
Sediment to Invert BAF	0.48	unitless	Model considered dw to ww conversion or may use X 0.2978
Future Water Concentration	0	mg/L	no water concentration available
Water to Invert BAF	0	unitless	
Normalized Food Ingestion Rate	0.333	Kg/Kg-bw/d ww	Diet rates from Sample *et al.* 1996 for little brown bat
Percent terrestrial insects	0.5	%	
Percent infaunal aquatic insects	0.5	%	<u>These three values must be < 1</u>
Percent epifaunal aquatic insects	0	%	
Normalized Water Intake Rate	0	L/Kg-bw/d	
Area Use Factor	1	unitless	
Seasonal Use Factor	1	unitless	
Incidental Exposures (*e.g on insects*)	0.01	% of food rate	
Body Weight	0.0075	Kg	
Toxicity Reference Value NOAEL	0.32	mg/kg-bw/d	TRVs from Sample et al 1996 (rat) - primary reference Verschuuren et al 1976
Toxicity Reference Value LOAEL?	0.16	mg/kg-bw/d	
Soil to bug burden	0.515355	mg/kg/d	
Sediment to bug burden	0.03609072	mg/kg/d	
Water to bug burden	0	mg/L/d	
Normalized Food dose	0.091815712	mg/kg-bw/d	
Drinking water dose	0	mg/kg-bw/d	
Normalized Food & Water Dose	0.09273387	mg/kg-bw/d	
Hazard Quotient NOAEL	0.2898	unitless	
Hazard Quotient LOAEL	0.5796	unitless	

Σ Weighted (Abiotic Media Concentration X Bioaccumulation Factor) X Food Ingestion Rate/Body Weight X Use Factors = Dose / Toxicity Reference Value = Hazard Quotient

1 ng = 0.001 μg = 0.00001 mg
ppm = mg/Kg = μg/g = ng/mg = 1000 ppb
ppb = μg/Kg = ng/g = pg/mg 0.001 ppm
ppt = ng/Kg = pg/g = fg/mg

1.5E-03 = 0.0015

Indiana bat (*Myotis sodalis*) food exposure pathway risk calculation for Springfield CWLP project (Version 2b)

Chemical: Mercury (total)

Assumptions: **uses total Hg concentration**

50% terrestrial and 50% infaunal aquatic insects

Future Soil Concentration	0.00063	mg/Kg dw	
Existing Soil Concentration	0.06	mg/Kg dw	
Soil to Invert BAF	8.5	unitless	
Future Sediment Concentration	0.00126	mg/Kg dw	
Existing Sediment Concentration	0.5	mg/Kg dw	
Sediment to Invert BAF	0.48	unitless	Model considered dw to ww conversion or may use X 0.2978
Future Water Concentration	0	mg/L	no water concentration available
Water to Invert BAF	55000	unitless	
Normalized Food Ingestion Rate	0.333	Kg/Kg-bw/d ww	Diet rates from Sample *et al.* 1996 for little brown bat
Percent terrestrial insects	0.5	%	
Percent infaunal aquatic insects	0.5	%	<u>These three values must be ≤ 1</u>
Percent epifaunal aquatic insects	0	%	
Normalized Water Intake Rate	0	L/Kg-bw/d	
Area Use Factor	1	unitless	
Seasonal Use Factor	1	unitless	
Incidental Exposures (*e.g on insects*)	0.01	% of food rate	
Body Weight	0.0075	Kg	
Toxicity Reference Value NOAEL	0.32	mg/kg-bw/d	TRVs for methyl mercury from Sample et al 1996 (rat) - primary reference Verschuu
Toxicity Reference Value LOAEL?	0.16	mg/kg-bw/d	
Soil to bug burden	0.515355	mg/kg/d	
Sediment to bug burden	0.2406048	mg/kg/d	
Water to bug burden	0	mg/L/d	
Normalized Food dose	0.125867307	mg/kg-bw/d	
Drinking water dose	0	mg/kg-bw/d	
Normalized Food & Water Dose	0.12712598	mg/kg-bw/d	
Hazard Quotient NOAEL	0.3973	unitless	
Hazard Quotient LOAEL	0.7945	unitless	

Σ Weighted (Abiotic Media Concentration X Bioaccumulation Factor) X Food Ingestion Rate/Body Weight X Use Factors = Dose / Toxicity Reference Value = Hazard Quotient

1 ng = 0.001 μg = 0.00001 mg
ppm = mg/Kg = μg/g = ng/mg = 1000 ppb
ppb = μg/Kg = ng/g = pg/mg 0.001 ppm
ppt = ng/Kg = pg/g = fg/mg

1.5E-03 = 0.0015

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