August 3, 2010

The Honorable Lisa Jackson
United States Environmental Protection Agency
1200 Pennsylvania Avenue, N.W.
Washington, D.C. 20460

Re: Docket ID No **EPA-HQ-RCRA-2008-0329**

Dear Administrator Jackson:

The Massachusetts Environmental Energy Alliance appreciates the opportunity to comment on EPA's proposed waste rule. The following comments focus on the use of construction and demolition debris (C&D) wood as fuel in wood-burning energy facilities, and consist of brief observations on the waste rule itself, followed by a letter submitted to the Massachusetts Department of Environmental Protection in 2009. The relevance of the letter is that it analyzes a proposal to burn "sorted, clean" construction and demolition debris at a 38 MW power plant in Springfield, Massachusetts that would be characterized as an "area" source of hazardous air pollutants. The proposed power plant is to be built in a State-defined environmental justice area where rates of asthma and childhood blood lead levels of concern are twice the state average. The "sorting study" conducted to demonstrate that the fuel contamination levels met emissions criteria was flawed procedurally and statistically, and the emissions modeling was based on unsubstantiated assumptions about control efficiencies. This letter is entered into EPA's waste rule docket as a real world example of the difficulties of generating a safe fuel stream from C&D wood.

By defining "waste" narrowly and allowing it to be burned in area source facilities like the proposed Springfield facility, EPA is guaranteeing the widespread dispersion of toxic elements like lead, arsenic, and chromium. This Springfield facility is like many proposed energy plants that are reverse-engineering their air permits to avoid triggering regulatory thresholds that would cause them to be defined as major sources of hazardous air pollutants. Defined as area sources, and burning materials that should be classified as waste but which EPA is naively proposing to classify as "clean" fuels, these boilers will increase the toxic burden on the environment and people.

Various legislation and regulation has characterized construction and demolition debris as "renewable" biomass that can be used to generate "clean" energy. However, this trend, and EPA's evident belief that a clean fuel stream can be generated from these waste materials, is mistaken. Even after sorting, construction and demolition wood inevitably contains toxins – toxins that when burned will be diffused into the air, ultimately contaminating soils, water bodies, and living organisms. EPA needs to see past the current policy obsession with burning materials to produce "clean" energy and use the precautionary principle to regulate these materials as waste.

First, some specific comments on EPA's proposed waste rule:

The legitimacy criteria requires contaminants be comparable to traditional fuels
EPA states, "*this means, to summarize the legitimacy criteria very generally, if used as a fuel, it is handled as though it is a valuable product (loss must be minimal), it is a true fuel with legitimate heating value, and the material has comparable levels of contaminants to those contained in traditional fuels. In particular, if there are higher than comparable levels of contaminants, that would be an indication that the material is really a waste and it is being combusted to destroy the waste materials*."

Elsewhere (footnote 17) in talking about what constitutes "significant" contamination levels, EPA states *"In determining whether the concentration of contaminants in secondary materials is ''significantly higher,'' the Agency stated in the ANPRM that it could use a qualitative evaluation of the potential human health and environmental risks posed. A contaminant concentration could be elevated without posing unacceptable risk, and therefore may not be considered ''significant'' for the purposes of determining whether the secondary material is a legitimate fuel."*

Nowhere does EPA state which traditional fuels are considered to be the benchmark for comparison. In the case of C&D wood, are the contamination levels being compared to those in virgin wood? Or to those in fossil fuels? The Creosote Council has commented on this rule, claiming that because creosote is merely oil tar, creosote-impregnated wood, when combusted, produces emissions comparable to the traditional fuels of oil and wood, and therefore should not be considered waste. However, C&D wood and other "biomass" materials burned in biomass plants are being promoted as "clean" alternatives to fossil fuels and promoted with tax credits, granting of renewable energy credits, and other financial incentives, something that is not the case for fossil-fuel fired technologies. What is to be the benchmark against which contamination levels are measured?

EPA's own dataset of fuels and emissions from plants in the Northeast contains data on the metals levels in C&D fuel burned at facilities in Maine. Does EPA consider these levels to be "comparable" to traditional fuels? They are unquestionably much higher. Is EPA prepared to unqualifiedly state that no health risks arise from burning these fuels?

EPA asks about reporting requirements for combustion of non-waste materials
EPA states: "*However, we solicit comment on this and specifically request comment on whether the Agency should require, at least initially, if not on a periodic basis, notification and recordkeeping under RCRA by those persons who both generate or combust non-hazardous secondary materials that are not solid wastes, including documentation that explains or provides the basis for the nonhazardous secondary material meeting the legitimacy criteria, and thus, is not a solid waste."*

In the case of construction and demolition debris, the generation, processing, and burning of this material happen in three different places. Which entity is ultimately responsible for ensuring a "clean" fuel supply – the disposer of the waste, the sorting facility, or the facility where it is combusted? Since a dramatic increase in burning of waste materials is envisioned under this country's renewable energy policies, EPA should use the precautionary principle and require a high degree of materials tracking and documentation of what is combusted.

EPA believes that if a processed material is sold as a fuel, it's no longer a waste
EPA states, "*One of the difficulties the Agency faces with determining whether nonwaste fuels can be processed from discarded materials is that the combustion of materials is commonly associated with disposal, whether it is waste disposal in incinerators or waste disposal in energy recovery devices (e.g., municipal waste combustors that recover energy by producing electricity). Therefore, many equate the burning of any secondary material to discard, as some commenters have argued. This approach does not take into account that the secondary material has* ***in fact been produced in a process that uses the discarded material as a feed stream to produce a safe fuel product*** *that is a valuable commodity and sold in the marketplace no differently than traditional fuels. We view such an approach being a common sense interpretation of the statutory definition of solid waste under RCRA."*

EPA's statement that materials have "in fact" been processed to produce a "safe" fuel product is unsubstantiated and unwarranted. The letter attached below demonstrates that in fact, producing a truly "clean" fuel stream is incompatible with sorting materials in a cost-effective way. Further, EPA appears

to not understand the economics behind the waste combustion industry. Packaged as "clean energy" projects, these waste-burning boilers can receive a pass-through portion of tipping fees paid to wood sorting facilities, and can also collect fees to dispose of urban and utility line tree waste. The fuel at these facilities is in no way "sold in the marketplace no differently than traditional fuels". In fact, the economic model is reversed, so that the combustion facility is **paid to take the material**. They certainly don't pay the same prices that they would for traditional fuels.

EPA needs to understand: these so-called clean energy facilities burning primarily secondary materials quack like incinerators. EPA's convoluted criteria for allowing waste materials to escape regulation as waste will dramatically increase the amount of secondary materials burned in very large facilities which nonetheless, as "area" sources, are subject to almost no regulation of emissions. There are other examples of very large area sources that will burn secondary materials: for instance, the proposed 47 MW "Pioneer Renewable Energy" plant in Greenfield, MA, will burn mostly forest wood, but also "recycled wood waste" and "urban wood residues". It will be a minor source for HAPs, emitting a total of 23.7 tons of HAPs per year, according to its air permit application.[1] Another example is the ADAGE biomass plant proposed in Gadsen County, FL. This will be a 55.5 MW plant that somehow is managing to be considered as a minor source. Their fuel supply includes:

Source Separated Construction Wood Waste: This is defined as any clean construction wood waste that was a primary mill product and has not been treated in any way such as pallets, dimensional lumber (2x4s etc.), clean wood trim, clean milled lumber. This excludes anything that has been painted or glued (such as laminated beams, finger jointed trim, sheet goods, particle board, medium density fiberboard (mdf), etc).[2]

According to the RISI industry database of the approximately 100 direct-fired wood-burning biomass plants that are proposed or in permitting, about 72% will be 50 MW or less. The ADAGE plant, at 55.5 MW, is still managing to come in under the regulatory thresholds and be considered a minor/area source. This threshold of 50 MW may be an important cutoff point for emissions; there is every reason to assume a good proportion of the plants proposed will be considered area sources. EPA must leave the idealized world where waste processing and fuel testing can guarantee a clean fuel supply and see the reality – that as the biomass industry grows, and fuel supplies tighten, a huge amount of secondary material is going to look attractive as fuel. It is essential that EPA put in place real measures to tightly regulate this waste material.

Thank you for the opportunity to comment.

Mary S. Booth, PhD
Massachusetts Environmental Energy Alliance

[1] Pioneer Renewable Energy. Major comprehensive air plan approval application, submitted to Massachusetts Department of Environmental Protection, July 2, 2009.
[2] Application of ADAGE Gadsen LLC for Air Permit to construct a proposed nominal 55.5MW net woody biomass electric power plant. Submitted to Florida Department of Environmental Protection. January 27, 2010.

Daniel Hall
Solid Waste Section Chief
Bureau of Waste Prevention - Western Region
436 Dwight Street
Springfield, Massachusetts 01103

Re: Springfield - SWM - Power Plant
BWP SW 40; Transmittal No. X226904; TF-22
Beneficial Use Determination
Provisional Permit Approval
C&D Derived Wood Fuel
09-281-050

November 16, 2009

Dear Mr. Hall,

The Massachusetts Environmental Energy Alliance submits the following comments on the draft Beneficial Use Determination (BUD) issued to Palmer Renewable Energy (PRE) for its fuel supply.

The concept of the BUD is generally flawed

The BUD is not protective

The objective of a beneficial use determination is to ensure that new uses of waste materials do not cause harm to humans or the environment. The BUD guidance document from the Massachusetts Department of Environmental Protection (DEP)[3] states that "more stringent health protective criteria have been used in the BUD process to prevent the introduction of new constituents into the environment to prevent the creation of new environmental contamination." However, as written, the BUD for PRE will clearly introduce contaminants to the environment, very likely at amounts greater than stated in the document. The BUD's goal of "optimizing" the fuel supply and reducing the amount of chromated copper arsenate (CCA)-treated wood and contamination down to 1.5% demonstrates that DEP realizes that the amounts of pollutants emitted under this permit as it now stands are insufficiently protective. If this were not so, then there would be no need to reduce the amounts emitted.

As the BUD presently stands as applied at New England Recycling (NER), the fuel specification does not differ from what is currently being sent to Maine. Supposedly, Maine's fuel meets a 1.5% CCA-content wood specification already, and NER claims to already meet this standard. We thus wonder why the fuel specification for PRE has been set to include twice as much arsenic- and chromium-containing wood as is ostensibly sent to Maine (3% for PRE, instead of 1.5%). We note however that the BUD does not require removal of painted and glued wood from the fuel stream. This means that there is no level of control for lead and other glue-related toxics provided at the level of the sorting plant.

Even if the wood specification were properly protective, which it is not, it is unrealistic to assume that PRE will only burn wood that meets the specification. Wood that is delivered and determined to not meet the specification will have to be treated as a solid waste, requiring special disposal, while combustion of the material offers a much simpler means of disposal. The reality of this BUD is that no matter what PRE demonstrates, tests for, or shows statistically, the plant operators will not have control over their fuel supply, and they will not be able to know what toxics were combusted until much later, and then only in an aggregate average. Enforcement of the fuel standards and monitoring of the fuel on anything but a post-hoc average basis will be impossible. Most importantly, no one will know in any day or during any week what is being burned. There is no stack monitoring of toxins, no real-time third party testing of chips as they go into the burner. Chips will come from third parties that have every incentive to bend the fuel specification standards (as will PRE), and the chips will be impossible to assess as they are burned.

Further, it is also quite unrealistic to expect that the amounts of CCA-treated wood could be reduced, given the paucity of the supply of truly "clean" wood relative to PRE's needs, and also given the number of fuel producers from whom PRE plans on acquiring

[3] Massachusetts Department of Environmental Protection, Bureau of Waste Prevention. 2004. Draft interim guidance document for beneficial use determination regulations 310 CMR 19.060.

wood. The application names 16 producers in Massachusetts alone. Additionally, there is good reason to expect that the amount of CCA-treated wood in the waste stream is not declining. The very brochure that PRE included with their BUD application, from the Florida Center for Solid and Hazardous Waste contains data showing that the amount of CCA-treated wood in the CDD waste stream is actually increasing, and states "The projected amount of CCA-treated wood that will be disposed of in year 2010 is much greater than what it was in the year 2000." Further, the EPA is re-registering CCA for use,[4] which means it will continue to be part of the construction scene for a long time.

We note that the BUD appears to downplay the fact that much of the wood burned at the plant will come from out of state, a fact that is made more clear in the application and supporting documents. Meaningful oversight of fuel quality by PRE at out-of-state facilities seems unlikely, and DEP has no regulatory power at such sites.

The BUD will establish the precedent for CDD combustion in Massachusetts

It is highly concerning that so much of the wood for even this one proposal will likely come from out of state. Once PRE is built, the precedent will be set, and it will be impossible to prevent others from being built. There is nothing to prevent Massachusetts from becoming become the destination for waste that other states themselves have banned burning. Wood for fuel is shipped over enormous distances – even internationally. Interstate commerce laws make it impossible to keep it out, once it has been turned into a commodity, and there is established precedent for CDD-burning biomass plants to file lawsuits against towns that have the temerity to refuse their waste. Does Massachusetts want to be known as the destination for the CDD waste of the Northeast and beyond?

Why is this a beneficial use of CDD wood?

The very concept of "beneficial use" of CDD wood to replace forest biomass as a product to be burned is misguided. Considering the greenhouse gas footprint of manufactured wood products, a better "beneficial use" of this wood would be in recycled wood products. Biomass plants, both those fueled with forest biomass and those fueled with CDD, represent a major source of greenhouse gas emissions and air pollutants. It is not "beneficial" to replace one wood product with another if the use is for energy generation, because the whole concept is increasingly discredited.

Further, the clear identification of burning CDD instead of landfilling it as a means of disposal demonstrates that this is a significant intent of the plant. If PRE's purpose is to dispose of waste (as is indicated by the statement in the BUD application that "The project offers a beneficial in-state solution to MassDEP's ban on disposal of C&D wood in landfills") then it should be treated as the waste incinerator that it really is, and subjected to MEPA review on the basis that it triggers the requirement for a mandatory EIR due to the project incinerating over 150 tons of waste a day.

[4] United States Environmental Protection Agency. Reregistration eligibility decision for chromated arsenicals. List A, Case No. 0132. EPA 739-R-08-006. September, 2008.

The BUD application also argues that PRE will be beneficial in that "Massachusetts Sustainable Development Principles call for "maximiz[ing] energy efficiency and renewable energy opportunities; support[ing] energy conservation strategies, local clean power generation, distributed generation technologies, and innovative industries; and reduc[ing] greenhouse gas emissions and consumption of fossil fuels." However, the fact that the project will emit more CO2 per unit energy produced than any fossil fuel plant invalidates the project as one that reduces greenhouse gas emissions. The argument that landfilling CDD wood results in methane emissions with a greater global warming potential than the carbon dioxide emitted during combustion is has also its course; landfill methane capture for energy generation is increasingly common. We note that DEP actually did request that PRE provide a summary of greenhouse gas emissions at the facility, a request that PRE summarily denied.[5] We hope that DEP will repeat its request to this and every applicant proposing biomass energy facilities, and not take no for an answer. For materials like CDD where no "resequestration" of carbon is even possible, the math on the impossibility of carbon neutral or even "low carbon" power generation seems very clear. It is good to see that some in DEP are starting to grapple with this issue. In a memo to MEPA[6] on the proposed Somerset coal plant conversion to CDD fuel, DEP states

> "MassDEP believes it is highly unlikely that Somerset Power could make an acceptable demonstration that construction and demolition is a source of carbon neutral fuel. It would be difficult, if not impossible, to have the information necessary to provide a reliable carbon neutral life-cycle analysis that includes consideration of material source, harvesting practices, transportation, impact of any coatings or treatments applied, and land use changes. At this time, it is unclear how such an analysis would even be done and evaluated."

We hope that the Western Region of DEP will acknowledge and act upon the common sense shown in this matter by their colleagues in the Southeast Regional Office.

Enforcement of fuel standards is not possible

PRE's sorting study failed to demonstrate the fuel standard can be achieved

The BUD application, memos about the sorting study from DEP, and the draft BUD itself all contain justifications about how the sorting study was designed to over-represent the amount of contamination present in the fuel, thus assuring that the lower contamination level specified in the BUD could actually be met. The draft BUD states

[5] Dale Raczynski's response to questions posed by DEP, dated March 25 2009. "It is PRE's position that the plant will have no net climate change emissions..."
[6] from David Johnston, Southeast Regional Office DEP, to Alicia McDevitt, EOEEA.

> "The results of the NER study indicate that the processes employed at the facility are capable of generating wood fuel in compliance with the specification. The study did find that the 3-day averages for percent chromated copper arsenate ("CCA") treated wood and arsenic were exceeded in some cases. However, the study was intentionally designed to illustrate a worst case scenario for the NER facility because all wood (including CCA-treated wood, painted wood, and manufactured wood products such as plywood) was selected. It should be noted that the main source of arsenic in the wood product is CCA treated wood. During actual operation, NER will instruct its workers to reduce the quantity of CCA treated wood in the wood fuel product to the lowest practicable level by kick sorting and by not picking identifiable treated wood (however, some weathered treated wood may not be readily identifiable because the green color typically fades to a gray color similar to untreated weathered wood). Such efforts should ensure compliance with the CCA and arsenic limits. (Note that NER does not normally pick all wood from the conveyor as it did during the test conducted for PRE. As a result, its existing work practices are compatible with the goal of reducing CCA wood, arsenic, and chromium.)"

However, this considerably dilutes the actual situation. Table 3-4 from the sorting study shows that the amount of CCA-treated wood in the study was 4.86%, considerably higher than the standard of 3% that PRE is supposed to meet, and far higher than the ostensible target of 1.5%. The daily results from the sorting study show that 14 out of 20 days, or 70% of the time, the amount of CCA-treated wood was more than 3% of the total, and sometimes considerably more. Further, about half of the three-day average values for arsenic were higher than 75 mg/kg, the standard in the permit.

The crux of the BUD – the statement upon which everything else turns – is that "such [sorting] efforts should ensure compliance with the CCA and arsenic limits". It is really not acceptable that DEP would settle for "should". In fact, the real conclusion of the sorting study clearly is that the prescribed standard was not met. As a result, it seems that a more prudent course of action would be to have the applicant demonstrate that they can secure a fuel supply that meets the project specification *before* giving them the go-ahead to start construction on a multi-million dollar project. Particularly given that New England Recycling already claims to be meeting a 1.5% CCA-treated wood specification for the wood it ships to Maine, what is the objection to conducting another, properly-designed sampling study at the plant? In fact, such studies should be required at all the plants that have been identified by PRE as potential fuel suppliers, including out-of-state plants. The costs of such studies are trivial compared to the cost of plant construction.

Relying on visual analysis of CCA-treated wood for sorting is not adequate

As noted within the BUD itself, and quoted above, visual sorting for CCA-treated wood is not adequate to achieve a really clean wood supply. DEP's own website

(www.mass.gov/dep/toxics/ptwoodqa.htm#one) states that once the wood is aged, it is next to impossible to tell whether it is pressure treated:

> "You can usually recognize pressure treated wood by its greenish tint, especially on the cut end, and staple-sized slits that line the wood. However, the greenish tint fades with time, and not all pressure treated wood has the slits. If you are uncertain what your structure was made of, try contacting the manufacturer or builder. If your deck or swing set is more than one or two years old, unless it was made of cedar, it was probably made with arsenic treated wood."

But how much of the wood supply falls into the category of aged CCA-treated wood that is impossible to identify? Neither DEP nor PRE offer any estimate.

DEP has delegated its enforcement authority to the developer

Early on in PRE's application process, DEP appeared to be struggling with how to control contamination in the fuel supply. In a letter to developer Vincent Gatto dated January 3, 2007, Mr. Gorski of DEP stated that DEP was considering requiring individual sorting facilities to obtain BUDs "in order to ensure that the fuel specification is met at the individual fuel suppliers". Instead, however, DEP appears to have almost completely ceded its regulatory authority to the developer. Employees of PRE itself will be expected to monitor wood supplies at the various sorting facilities; PRE's sorting study even states that "In the case of arsenic and CCA treated wood, it may be necessary in practice to prevent some fraction of the CCA wood entering the C&D processing facilities to prevent slugs of material over the averaging period." There is no established procedure or mechanism for PRE employees to do this themselves, or convince employees at sorting facilities to do this, nor is there any procedure for DEP oversight, even if PRE could take on this impossible task

The fact that much of PRE's fuel supply will be coming from out of state actually precludes DEP's regulatory authority. It is disappointing that DEP has chosen to deal with this fatal flaw by handing over its authority to the very entity that has least interest in enforcing a rigorous fuel standard. It has long been clear that there is great resistance on the part of the applicant to meeting fuel standards. In a letter from Dale Raczynski of Epsilon Associates to Mr. Howland of DEP (dated February 6, 2007), it states that previous discussions had

> "stressed the importance of providing a viable outlet for both "clean" or "A" wood and painted and treated "B" wood... As shown in the preliminary air dispersion modeling set forth in the enclosed protocol, even assuming conservatively high levels of contaminants associated with painted and treated or B wood, the air pollution controls that will be required as BACT for this facility will result in emissions that will meet all of the MassDEP's stringent ambient air limits. To reiterate what Vic Gatto mention in his letter of January 17, 2007, <u>without the use of C&D wood, including A and B wood, the PRE project will not be viable</u>"

To be clear: this letter from the chief engineer from the consulting firm working on the project directly states that that the plant needs to burn pressure-treated wood to be financially viable. PRE's resistance to having a sorting protocol that removes painted wood was also expressed in the BUD application, which states, "A specific sorting step for painted wood would result in losses of wood with no lead, losing the opportunity for safe beneficial use of this material". Apparently this argument won the day with DEP, since the draft BUD contains no limit on the amount of painted wood that can be burned at PRE.

Contamination in the fuel supply is probably higher than represented

The sampling study does not use valid techniques to characterize fuel toxics

The problem of poor statistical techniques being used to characterize materials for beneficial use analysis is well known. The DEP's own BUD guidance document states "The Department experience with BUD applications shows that statistical representation is not often considered when sampling secondary materials," and "Any person applying to beneficially use secondary materials needs to ensure that analytical and other data used in support of any application are scientifically valid and defensible, and of a level of precision and accuracy commensurate with its stated or intended use. Applications that do not conform to these criteria will be rejected." The EPA method for solid waste characterization used by the applicant (SW-846) devotes a whole chapter to proper statistical design (chapter 9, available at http://www.epa.gov/waste/hazard/testmethods/sw846/online/index.htm).

Despite the abundance of guidance on the correct statistical methods for materials characterization provided by DEP and EPA, PRE's study violated several fundamental principles of sampling design. First, sample size should be a function of fuel variability, and where variability can even be guessed at, it is still possible to perform power analyses using estimated data. However, neither DEP nor PRE conducted a power analysis to ascertain how many samples would be needed to adequately characterize contamination in the wood supply, given its variability. DEP's letter to Victor Gatto on the sampling study instead suggest that the decision to collect a single composite sample on 20 continuous days was almost completely arbitrary, stating "The Protocol proposes to collect 20 daily composite samples. Although this *should* yield useful information as to the average concentration of contaminants in the wood, MassDEP *believes* that taking *some* grab sample would *help* define the variability of certain contaminants. As a result, MassDEP is requesting that PRE collect 10 grab samples during the 20-day sampling period and analyze them for [several contaminants]" (emphases on tenuous-sounding words added).

Sampling on just 20 continuous days (about 5% of a year) was also arbitrary, and likely insufficient. There is no way to know if this time period was sufficient to capture the "slugs" of contaminated material that PRE admits periodically move through a sorting facility. In order to capture a valid sample, wood samples would need to be collected

throughout the year to capture wood from different sources, and also seasonal variability in the supply, which is likely to exist given that construction is certainly seasonal. Unless various sources are sampled, samples from 20 continuous days are nearly meaningless. The study also used timed sampling of chips from the conveyor, instead of random sampling, which is the only way to ensure that every unit in a population has a theoretically equivalent chance of being sampled (a prerequisite if a sample is to be considered representative).

Further, the wood supply was being actively adjusted and manipulated as the sorting study was conducted. DEP's May 4 memo from Jim Scheffler, written a day after the sorting study inspection of the sampling study, shows the potential for the wood supply to have been manipulated, either consciously or unconsciously, at the sorting line:

> "Normally, two wood streams are sorted from the waste, which NER refers to as "clean" and "dirty" wood. "Clean" wood at this facility appears to be defined as uncoated and untreated wood that is free from processed wood products (e.g. plywood, pressboard, chipboard, etc.) and adhered contaminants. "Dirty" wood may include painted or coated wood, treated wood, and wood products such as plywood, chip board, etc. However, the C&D material that PRE proposes to combust would be better characterized as a mix of the two streams. As a result, NER was switching back and forth between normal two-stream wood sorting and combined wood sorting so that PRE could collect combined wood samples"

This suggests that "clean" wood from the pellet stream may have been diluting the wood supply sampled for the study, but in fact, because there are several differing accounts of how the sorting study was conducted, it is difficult to conclude what exactly was happening.

Another error in the statistical design was the assumption of normality in the fuel supply. As DEP's BUD guidance states, "the curve for contamination within a solid waste is considered to be a normal distribution", which is a pre-requisite for producing statistically valid estimates. The primary COC of concern, CCA-treated/arsenic wood is demonstrably not normally distributed – CCA-treated wood (and its constituents of arsenic and chromium) is either not present, or present at one of three concentrations.[7] Examination of the sampling results for the major metals shows that contamination in the composite samples – essentially the average values for each day – were not normally distributed. In fact, not only are the data not normally distributed, but they many not even be continuous, and should be tested to determine whether they are characterized by a discrete distribution.

In direct contravention of the procedures outlined in both the DEP BUD guidance and EPA's guidance on sampling, the NER fuel study reported only means for contamination levels of wood, and no variances. As stated in DEP's BUD guidance, "for purposes of evaluating solid wastes, the probability level (confidence interval) of 80% has been selected. That is to say that for each chemical COC, a confidence interval (CI) is

[7] see http://www.ccaresearch.org/metals_concentration.htm

described around the true mean for which 80 out of 100 samples are expected to fall. The 80% CI is then compared with the appropriate regulatory threshold." (and is expected to fall beneath that threshold). Thus, comparing the mean to the regulatory threshold, as the applicant did, produces a number that is lower than the upper 80% CI and not valid under DEP's own protocol.

Other problems with the sampling study included the use of predominantly composite samples, which obscure real variability. The argument that three days of wood from the sorting facility adds up to one day of burning works well for PRE, but aggregating three days of sampling from NER into a single "one-day" value for wood input into the boiler further obscures real variability. Finally, it is extremely unusual that average contamination levels in fuel samples were generated by testing the fuel samples once, *then regrinding the sample*, testing again, then taking the average of these two means. Manipulating a sample between duplicate runs obviates the point of running duplicates. Interestingly, the grinding affected different contaminants in different ways, causing some species to decline (primarily the really toxic compounds, like arsenic) but not so for copper. This itself raises questions about the integrity of the study.

The sampling plan outlined in the BUD for fuel testing at PRE itself is similarly flawed. Nowhere in the protocol is any concept of random sampling even mentioned, except for when trucks are to be tested, and there it seems that the concept of randomness is included in only the most casual sense. The protocol states that six samples of woodchips on the conveyer feeding the boiler should be taken every four hours, but there is nothing to prevent those samples from being actively selected, particularly since it is PRE employees themselves that will do the sampling. Further, given the sheer volume of material to be burned – the plant will combust the equivalent of 45 20-ton loads of wood a day – how can a few samples grabbed off the conveyer belt and composited into a single daily sample possibly be representative? The fact is that DEP does not even know whether this amount of sampling would produce a valid sample, because again, no power analysis has been performed. DEP cannot really expect a valid and statistically defensible, representative sampling scheme to emerge from this guidance. DEP does maintain the right to visit PRE and conduct their own sampling, but infrequent sampling visits will add nothing to the statistical assessment of true contamination levels. Further, the reporting provisions for the sampling are inadequate and not protective. The draft BUD states "within 30 days after the end of each calendar quarter, PRE shall submit a report summarizing the results of all sampling and analysis that took place during the quarter." DEP has abandoned meaningful, real-time regulation of stack emissions under this protocol where reporting occurs months after the emissions have escaped the stack. This plan will do nothing to allay the real and justified concerns (based on PRE's own statements) that the plant will be burning contaminated fuel.

Another reason that emissions from PRE are likely to be higher than set out in the draft BUD and the air permit is that the emissions modeling incorrectly assumes a lower fuel moisture than is likely to be the case. The applicant states that the forest biomass component of the fuel will be at 40% moisture content, which is not realistic. The standard moisture content value for forest biomass is assumed to be between 45% and

50%, as is documented in the state's own extensive reports on forest biomass.[8] We believe DEP has identified this same error in the fuel supply modeling for the Pioneer biomass plant in Greenfield and assume that a consistent standard will be applied to the Palmer facility. Further, the CDD fuel moisture content will also likely be higher than represented in the application. The application states that a significant amount of the fuel will come from out of state, and the Maine facilities including CPRC store wood outside, uncovered and exposed to precipitation. Further, the fuel will be sprayed with water for dust control at PRE. Conservative, true "worst-case" modeling would assume that fuel moisture contents were higher than have been claimed. This modeling is not only relevant to emissions, but also to plant power output, since there is a linear relationship between fuel moisture and its potential for heat generation.

Toxics emissions are unacceptably high and are likely underestimated

In CDD wood, the contaminants of most obvious concern are the copper, chromium, and arsenic in pressure-treated wood, and lead in painted wood. Other toxics of concern include PCB's, dioxins, and chlorine, which contributes to dioxin formation. Projected emissions from many of these toxics at PRE are unacceptably high, and given the clear problems with the derivation of the fuel specification in the BUD and the calculation of the emissions at the stack, the actual emissions will likely be even higher than projected. Problems with the emissions calculations include the selection of allowable toxics levels in fuel that are above those found in the sorting study and the and apparently flexible setting of emissions control levels. No data on background air concentrations of toxics is presented, so all hazardous air pollutants (HAPs) are modeled as PRE is the only source emitting pollution into otherwise pristine air. This is demonstrably not true. There are a number of EPA-listed emission sites within a couple miles of PRE, including National Metal Finishing, Elite Chemical, Firestone Building Products, Solutia, Nova Chemicals, Ineos Melamines, GE Silicones, Smith and Wesson, Le Belcher petroleum terminal, Valley Plating, Doncasters Inc, and of course, Palmer Paving Corporation itself. All of these sites emit HAPs and several are significant sources of heavy metals; many more metals and HAPs emitting sites exist slightly further away in the greater Springfield area, including the Bondi's Island waste incinerator, located less than five miles to the southwest of the PRE site. DEP should not allow PRE to modeling the hazardous air pollutant emissions from the plant without acknowledging the air toxics burden already imposed on the people living in this area.

Arsenic

The BUD's arsenic fuel specification of 75 mg/kg results in calculated stack emissions that are 51% of DEP's threshold effects level (TEL), the 24-hour health standard. This is significantly lower than the emissions that were originally calculated, however. Nothing changed about the fuel standard or the amount of arsenic that would be contained in fuel – instead, what changed was the stated control efficiency of equipment at the plant,

[8] Innovative Natural Resource Solutions, LLC. 2007. Biomass Availability Analysis – Five Counties of Western Massachusetts. Portland, ME.

which was increased from 99.9% control to 99.95% control between the November 2008 and June 2009 versions of the air pollution control plan. Early documents submitted by PRE stated that HAPs emissions were extremely close to 25 tons per year, the mandatory threshold for regulation as a major source under the federal Clean Air Act. Increases in stated control efficiency (which occurred for several pollutants), combined with some changes in the fuel specification, have removed PRE from the realm of being considered a major source for HAPs, and subsequent filings have reduced projected HAPs emissions to around 14 tons per year. To say that we are skeptical of this new number would be a major understatement.

It is interesting to note that early runs with the air quality monitoring program AERMOD produced arsenic results that were over DEP's TEL. This engendered a chain of emails, reproduced in Appendix D of the initial air plan application, where PRE and DEP agreed to throw out a high data point from the modeling so that the modeled arsenic emissions would not exceed health standards. Subsequently, DEP provided a new set of meteorological data to PRE to remodel the pollution impacts. This dataset spanned 1992 to 1995, and resulted in lower modeled air pollution impacts than produced under the previous dataset. An email from PRE to DEP[9] notes "As your initial run showed (1992), the impacts have gone down for all 5 years.... The Arsenic impact (using the 24 hr H) is predicted to be below the TEL". A subsequent email[10] notes that the new version of a document submitted to DEP no longer contained Appendix D since there was "no need for DEP correspondence on the arsenic issue, now resolved by lower impacts allowing use of the highest impact, now under the TEL."

We would like to know why the most recent meteorological data have not been used in air pollution impacts modeling. Data from 1992- 2005 is one to nearly two decades old. Just as importantly, why does DEP appear to be going to such lengths to help PRE reduce its apparent emissions impacts?

Why, also, do the stated emissions control efficiencies increase from the early to the later drafts submitted by PRE? The draft BUD clearly identifies that metals emissions are chiefly associated with the PM10 fraction of particulate matter emissions, stating

> "The metal HAP emissions (excluding mercury) are considered to be PM at exhaust gas temperatures and are mostly PM-10 consisting of arsenic, chromium, chromium (VI), lead, nickel, cadmium, manganese, antimony, beryllium, cobalt and selenium. The metal HAP emissions are first controlled by the fuel specification limits, found in Table 1 herein, which were established pursuant to the PRE's Beneficial Use Determination, Transmittal #X226904. The metal HAPs will be further controlled by the use of a combination of add-on control devices consisting of a dry scrubber in conjunction with a fabric collector. "

[9] from Elizabeth Hendrick of Epsilon Associates to Stephen Dennis, DEP, January 13, 2009.
[10] From Dale Raczynski of Epsilon Associates to Marc Simpson, DEP, January 19, 2009.

Since nothing about the particulate matter emissions changed between the two filings of the air plan, it is difficult to understand how nearly a ten-times increase in control efficiency for metals can be claimed to be achievable over what was specified in the initial filings, if metals emissions are supposed to be associated with particulate emissions. The early draft of the air plan application stated that the removal efficiency for particulates is 99%, consistent with the product specifications provided by Babcock Power in Appendix C of the application, which compares inlet particulate rates at the control site at 2 lb/MMBtu, with outlet (baghouse) concentrations of 0.02 lb/MMBtu, indeed comprising a 99% control rate. None of the product specifications from Babcock Power, or anything else included in the air plan application, indicate that the equipment manufacturers guarantee the control efficiencies that are integral to the calculation of the low emissions rates for toxics. PRE and DEP should demonstrate that these guarantees have been granted. However, even if it can be demonstrated that the equipment manufacturer guarantees a certain removal efficiency, should not DEP be assuming that the equipment will *not* always operate at peak performance? Some of the air toxics are going to be emitted at concentrations very close to DEP's 24-hour health standard, the TEL. The emissions rate for arsenic, for instance, is at 51% of the TEL. This level is almost certain to be exceeded on some days. Would it not be most protective to assume that there will likely be days when the equipment does not function at 100% efficiency, even if its year-round performance is acceptable, and thus compensate for this by setting the *other* control on toxics emissions, that is, the amount of contaminated wood actually entering the boiler, at lower and more protective levels?

The complete lack of rigorous monitoring for toxics at PRE is a significant disappointment. This is a untested application of a control technology for a fuel that is new in Massachusetts. Given the acknowledged likelihood of spikes of CCA-treated wood in the fuel supply, the lack of real-time monitoring of fuel metals content going into the boiler, and the likelihood that operational emissions control efficiencies will be lower than stated, DEP should require as close to continuous emissions monitoring (CEM) for arsenic and other metals as it is possible to achieve. At this point it does not see that there is a CEM technology available for arsenic. However, DEP should be able to determine a surrogate system, probably by collecting stack samples of particulates on a filter system, then analyzing these particulates for metals content. This was discussed; why has it not been required?

Chromium

Chromium emissions from PRE intersect with several interesting regulatory issues. First, chromium was another of the toxics where the emissions control efficiency was seen to change form the initial filing by the plant, when it was stated to be 99.521%, to 99.8% in subsequent filings. As of yet, neither PRE nor DEP has provided documentation that the manufacturer of the emissions control equipment guarantees this control rate to be achievable 100 percent of the time.

Further, arsenic and chromium occur in roughly a one-to-one ratio in CCA-treated wood, and as expected, mean chromium concentrations in the NER study were found to be approximately equal to mean arsenic concentrations. Why then has DEP has set a

chromium fuel specification that is more than two times higher than that set for arsenic (180 mg/kg for chromium versus 75 mg/kg for arsenic)?

We assume that the relatively high fuel specification value for chromium was selected to provide fuel flexibility for PRE. Yet the specification is confusing. While DEP states in the BUD that chromium will be regulated as total chromium, and not the most toxic hexavalent form, this appears to be inconsistent with federal policies that mandate modeling *all* chromium emissions as if they are in the hexavalent form, unless the proportion of emissions as hexavalent can be conclusively demonstrated. In PRE's initial filings, air emissions for chromium were modeled under the assumption that only 20% of total chromium was in the hexavalent form, an assertion for which the developer provided no documentation. In overturning this assumption, however, DEP has done the opposite from what they should have – by allowing a fuel standard of 180 mg/kg, they appear to be effectively assuming that all chromium is in the less toxic trivalent form. In fact, it appears that DEP is choosing to ignore the air standards for hexavalent chromium altogether, since calculating chromium air emissions using a fuel specification of 180 mg/kg shows that if 50% of the chromium is emitted in the hexavalent form, a scenario that is entirely possible, the stack emissions would actually be 105% of the AAL. Why has DEP not taken this into account? Even under the applicant's original and too-optimistic assumption that only 20% of chromium would be emitted in the hexavalent form, the chromium emissions from PRE will be 42% of the AAL with a fuel specification of 180 mg/kg.

The chemistry and transformations of chromium among valence states in pressure-treated wood are complex and poorly characterized, and few assumptions can be made about what proportion is present in the hexavalent form at any stage in the wood's lifecycle. Chromium added to CCA-treated wood starts out in the hexavalent form. "Fixation" and conversion to the less toxic trivalent form occurs after the chemical is added to the wood. However, studies of CDD wood ash indicate that significant amounts of chromium can be converted back to the hexavalent form during combustion. The conversion occurs at higher pH levels, and at least for ash products, is of concern because facilities that add lime to scrub the exhaust gas, as PRE plans to do, generate a very alkaline residual.[11] The precautionary principle dictates that if the proponent cannot demonstrate conclusively that only a small proportion of chromium will be emitted in the hexavalent form, then all emissions should be treated as if they are hexavalent, which has been EPA policy in the past.[12] The error in the proponent's emissions accounting arises because if fuel containing 180 mg/kg chromium is treated

[11] Song, J., et al. 2006. Implication of chromium speciation on disposal of discarded CCA-treated wood. Journal of Hazardous Materials B128: 280-288.

[12] October 17, 1989 letter from the Office of Solid Waste to Elliot Cooper of Waste-Tech Services, Inc: All Chromium Is Assumed To Be Hexavalent: "The recommended guidance assumes all chromium is in the highly potent hexavalent state unless the applicant documents otherwise.". Also, January 20 1991 letter to Mark J. Lupo, K.W. Brown and Associates, Inc: "The Health Based Level (HBL) for chromium is based on hexavalent chromium which is carcinogenic when inhaled. EPA determines exceedence based on the total volume of chromium using the hexavalent HBL. If BP Oil is to use only the amount of hexavalent chromium to determine exceedence, they must substantiate how these values are separated from total chromium."

as if it is all emitted in the hexavalent form, this produces an emission rate of that is 211% of the DEP AAL and 82% of the TEL.

Classification of the BUD as a Category 2 Beneficial Use is not supported

The treatment of chromium emissions also intersects with questions about DEP's decision to classify the PRE BUD as a "Category 2" beneficial use determination. The DEP BUD guidance document states that Category 2 beneficial use determinations are granted to regulate potential adverse impacts in regulated systems, stating

> "If the use of a secondary material is subject to an existing facility permit, order, policy, regulation or other approval, the use is considered adequately regulated for purposes of the Solid Waste Facility Regulations, 310 CMR 19.000. However, if there are any aspects of the beneficial use not covered that have the potential to create significant risk or cause adverse impacts to the public health, safety, and the environment or result in nuisance conditions then these concerns will be regulated under a BUD."[13]

Regarding the need for a risk assessment to be performed, the guidance document states

> If the use substantively eliminates release and exposure pathways, DEP may determine that a quantitative risk assessment is not needed. Such a determination is contingent upon the applicant providing detailed information and data demonstrating that release and exposure pathways are, in fact, adequately controlled under current and future conditions of the beneficial use.[14]

Risk assessments are required for Category 3 BUDs, where materials are used in restricted applications, to demonstrate that all contaminants of concern (COCs) are below Upper Contamination Limits (UCLs) set by DEP, or that all COCs are below background soil levels, or that "environmental release and exposure pathways are substantively eliminated over the product's lifecycle under conditions of the beneficial use and DEP concurs."[15] While on first glance it would appear that classification of the PRE BUD as a Category 3 application would have been justified, it appears that DEP decided that PRE qualified for a Category 2 BUD classification, and further did not require a risk assessment to be performed, because the use of materials was already subject to regulation. According to communications with DEP, "the Category 2 application is appropriate for PRE because the wood processors already have a MassDEP solid waste permit (recycling) to produce a C&D derived wood fuel and the fuel will be used at the PRE facility with an quality approval that has demonstrated conformance with NAAQS and Massachusetts air toxics guideline." [16]

[13] Page 10 of Draft Interim Guidance Document for Beneficial Use Determinations
[14] BUD guidance document, page 17
[15] BUD guidance document, page 10.
[16] Email from Dave Howland, DEP.

It is questionable how the Category 2 classification is correct, however. In fact a solid waste permit for recycling held by a sorting facility is *not* a permit to produce wood fuel for use in Massachusetts; if it were, PRE itself would not require a BUD. The fact that wood fuel is produced for Maine is irrelevant to this determination. Second, flaws in the statistical characterization of the fuel and the continual tweaking and upward adjustment of emissions control efficiencies for air toxics in the emissions application by PRE make it highly questionable whether in fact emissions will be in conformance with the NAAQS and the Massachusetts air toxics guideline, or whether this compliance exists only on paper.

It is also questionable whether, if a risk assessment were conducted for the PRE BUD as would be required under a Category 3 BUD classification, the risk assessment criteria would be met by this application. Of particular note is the issue of chromium emissions. To begin with, it is interesting to note that DEP's AAL for chromium VI, which is set at 0.0001 ug/m3, is slightly higher than the EPA risk assessment threshold of 0.00008 ug/m3, corresponding to a 1.25- in-one-million increased chance of developing cancer.[17] (DEP's AAL for arsenic is set at 0.0002 ug/m3 and matches EPA's base risk assessment threshold of a one-in-a-million increased risk of cancer.[18]).

Under DEP's BUD risk management criteria set out in the BUD guidance document, the individual chemical risk threshold for cancer is set at 0.5E-06, even lower than the one-in-a-million standard that forms the lowest number reported in EPA's risk assessment valuations. Using EPA's linear dose-risk relationship for hexavalent chromium, the air concentration of hexavalent chromium corresponding to a 0.5E-06 cancer risk is 0.00004 ug/m3, nearly an order of magnitude lower than DEP's AAL standard of 0.0001 ug/m3. If these calculations are correct (and we acknowledge that they may not be) this suggests that hexavalent chromium emissions from PRE would be higher than permitted if a risk assessment were performed.

It is important to again note that hexavalent chromium from the plant will not be emitted into a pristine atmosphere – background levels of chromium in the area may actually be elevated. Besides emissions from nearby industrial operations (some of which are identified as chromium emitters by EPA), a study on hexavalent chromium concentrations conducted by EPA in urban environments found the highest daily averages and the second-highest annual averages were found at the Massachusetts monitoring site in Boston (19 sites, including 14 metropolitan statistical areas, were sampled across the country.)[19] DEP should treat *any* amount of chromium emissions as an additional health risk for the population in Springfield, especially given the number of plating shops and other chromium emitters in the area. It is very likely the case that it is only the absence of such data on chromium and other toxics that is allowing this plant to be considered at all.

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[17] http://www.epa.gov/ttn/atw/hlthef/chromium.html
[18] http://www.epa.gov/ttn/atw/hlthef/arsenic.html
[19] EPA, 2007. 2005 Urban air toxics monitoring program (UATMP) – hexavalent chromium. EPA-454/R-07-005.

Mercury

Since the initial filings by PRE, the amount of mercury emissions projected for the plant have been reduced by more than half. However, this reduction may be illusory since it would take only a few excursions over the permitted daily fuel specification to exceed the annual emissions standard. We note that emissions at the plant of mercury will exceed those from the much larger Mount Tom Coal plant. It is ironic that coal plants in Massachusetts have been asked to so significantly lower their mercury emissions, and at such cost, but a plant with a smaller generating capacity such as PRE is allowed to emit more mercury to the atmosphere. Any new emissions are not consistent with Massachusetts Zero Mercury emissions initiative.

Lead

Lead is another air toxic where the emissions control efficiency was increased on paper between subsequent filings by PRE. In the early air plan application, the control efficiency for lead was stated to be 99%, but this was later revised to 99.8%. This factor, combined with lowering of the fuel specification to 375 mg/kg for a daily input and 100 mg/kg for the annual input, has significantly reduced projected lead emissions from what was modeled initially.

However, since nothing about the fuel supply or the actual emissions control equipment has changed, and since the "daily" wood chip sampling results at the plant will not be available in real time, there is good reason to believe that lead emissions from PRE will be significantly higher than stated. The plant's use of fuel from out-of-state suppliers, such as the CPRC facility in Maine, is problematic. The BUD application states that samples from CPRC were found to have up to 1200 mg/kg lead content, and that this is likely due to "less processing" than in the Massachusetts C&D sorting facilities. Yet PRE also claims that CPRC wood is clean as it arrives "pre-sorted", and that such wood should be considered "the equivalent" of the positively sorted wood from NER. It is significant that PRE states in the BUD application that their "best judgment" is that 500 mg/kg lead content is achievable for a daily standard. The statement that lead paint in the wood supply should "only decrease over time" may be true over a decadal time-frame, but has little relevance to the need for reducing toxic emissions now. In any case, the photographs included in the BUD application show the CPRC woodpile to contain a high proportion of painted wood, and as stated previously, NER also does not remove painted wood from their fuel stream.

Dioxins

Dioxins are yet another toxic where subsequent filings by PRE show increasing removal efficiency by pollution control equipment. The sorting study states that a control efficiency of 99.6% was assumed for dioxins; yet the revised air plan application shows a removal efficiency of 99.9%. As currently modeled, emissions of dioxins are at 41% of the DEP AAL, but at 99.6% control efficiency, they would be at 166% of the AAL. Even 41% is unacceptably high, given the uncertainties in the fuel modeling and the lack of meaningful monitoring either in the fuel supply or at the stack for dioxins. In fact, DEP itself highlighted concerns about dioxins in the fuel supply. In comments to the applicant dated April 14, 2007, DEP stated

> "The sampling and analysis protocol and proposed fuel specification do not include any testing or limits for dioxins/furans (PCDD/F), despite the fact that these contaminants were detected during testing at the NER facility. The BUD application should discuss the extent to which PCDD/F in the wood fuel may be destroyed during combustion and captured in the air pollution control equipment, so that MassDEP can evaluate whether additional testing and a limit within the fuel specification are appropriate"

However, no such discussion was included in the BUD application, and we further note that the BUD itself does not contain any mention of dioxin. Is the fact that dioxins were found in the fuel supply no longer of concern to DEP? Why has the draft BUD been issued while these issues remain unaddressed?

It is important to note that because dioxin emissions are currently modeled to be 41% of the AAL, dioxin may be another toxic where the emissions would not conform to levels set under a risk analysis. DEP should perform a risk analysis for dioxin that takes into account the potential pre-existing levels of fuel contamination as well as realistic estimates of how much dioxin could be created during combustion.

A final point with regard to dioxins is that combustion of plastics generates chlorine, which is integral to dioxin formation. At PRE, amount of plastic that will be allowed in the fuel stream is larger than that which was found in the sorting study, but it is not clear whether this has been taken into account in the calculation of dioxin emissions. It is important to emphasize that this diffuse air toxic is actually created by the combustion process, an irony under the determination of "beneficial use". Dioxin is widely considered to be one of the most toxic substances known because it acts at such extremely low concentrations. Burning material creates dioxin that did not exist before, and pumps it into the surrounding environment. How can combustion of CDD that leads to creation of dioxins that previously existed as inert ingredients be a "beneficial use" of this material?

PCPs

The NER sorting study also found that PCPs (another wood preservative sometimes found in the waste wood supply) was found at "higher than expected concentrations" in the samples from NER. However, as is the case for dioxins, no concentration of this highly toxic contaminant is identified in the BUD's fuel specification. PRE had originally applied to be allowed to burn telephone poles, which often contain PCBs as a preservative, but were told by DEP early on that this was likely a non-starter. While modeled emissions of PCPs comprise just a small fraction of DEP's health standards, the fact that PCPs were detected at higher-than-expected levels in the fuel supply suggests that contaminated wood

is present. How much more will this be the case for out-of-state suppliers? Is the ban on burning of waste wood containing PCBs even enforceable?

Chlorine

The chlorine (Cl) fuel specification is important not only for the emission of HCl, but also for dioxin formation. Chlorine emissions are partially linked to the amount of plastic in the fuel supply. The BUD allows 0.1% by weight chlorine content in the fuel on a 24-hour basis, and 0.027% on an annual basis. The daily specification is ten times higher than the amount of Cl that was actually found during the NER fuel sampling study, but the annual allowable average is only 2 – 3 times the level that was found. Under the BUDs physical specifications, the fuel supply will be allowed to include up to 1% non-wood materials, which means that the amount of plastic could be greater than the 0.08% plastic that was found in the NER study. If PRE does burn up to 1% plastic, as allowed under the fuel specification, they might have difficulty controlling their chlorine emissions to the specification level, which is derived from the lower amounts of plastic that were found in the sorting study. This could also result in generation of more dioxins than has been anticipated.

We also note that PRE's annual fuel specification of 0.027% chlorine content in fuel is a third again higher than Babcock Power's operating parameters. Vendor information from Babcock Power included in Appendix C of the revised air permit application states that "HCl inlet concentration is based on the expected annual average of 0.02 wt% chlorine in the fuel. The maximum Cl content in the fuel is 0.1 wt% (24-hr average), which would give an HCl inlet concentration of 0.151 lb/MMBtu (24-hr average)." The information also warns that operating conditions must be adjusted to accommodate higher chlorine contents than 0.02% to "avoid acid condensation and corrosion issues in the Turbosorp system". It is interesting to note that the problem of acid corrosion of air emissions control equipment has been experienced by the Bondi's Island facility in the past, and that this facility has sometimes been out of compliance with its emissions standards.

Also relevant to fuel chlorine content, and as is the case for other air toxics, the removal efficiency for hydrochloric acid (HCl) was increased from the initial filing by PRE, where it was stated to be 81%, to 97.1% in the revised air plan application, Table 4-6. The reasoning behind this action is reflected in answers provided by PRE in response to technical questions posed by DEP in March of 2009. DEP queried, "please evaluate the ambient air quality impact analysis for firing 100% construction and demolition wood on an annual basis for purposes of alleviating fuel blending compliance concerns." PRE answered

> "This would mean removing the annual average limits of the fuel spec and the resulting emission rates. This could work by increasing the HCl removal efficiency to 97.1%, likewise increasing HF (hydrogen fluoride) removal to 95% and lowering the formaldehyde emission rate to 3.8E-04 (removing outliers and assuming 80% removal by oxidation catalysts, this is still higher than Russell used for an emission factor); and by increasing

the lead removal rate to 99.1%.[20] By making these changes, we would not need any annual averages and could meet the AAL's (annual avg) based on the 24-hr averages and keep below 25 tpy of HAPs based on 24-hr avg."[21]

While we always prefer to believe that there is an innocent explanation behind such statements, it is difficult to convey how acutely uncomfortable we are with such manipulation of data and control efficiency numbers, and how little faith we have that emissions from this plant will really be as low as have been stated.

Summary

To conclude, we present the following list of issues still outstanding with the BUD:

Fuel sorting

- PRE should be held to a higher standard for its fuel specification than is currently the case. The plant should not be permitted to burn painted or manufactured wood products such as plywood. There should be greater measures in place to ensure that *all* CCA-treated wood is removed from the fuel stream, and not just that portion that is easily identified.

Fuel sampling

- The statistical design and analysis of the fuel sampling study did not conform with DEP's and EPA's own standards. It should be redone using a full year's sampling at more than one plant, using truly random sampling and no manipulation of the wood supply while sampling is conducted.
- All contaminants in fuel should be examined for normal distribution and statistical analyses adjusted accordingly. Fuel specifications should acknowledge the true variability of toxics in the fuel supply.
- The plan for daily fuel sampling at PRE does not represent a legitimate statistical design. Further, oversight of sampling by PRE employees is not adequate to ensure that only clean fuel will be burned. The sampling plan should be revised to include truly representative sampling and a far greater oversight role for DEP.

Emissions modeling

- DEP has granted the applicant too much latitude in restatement of emissions control numbers. The applicant should be required to produce documentation that the manufacturers of the emissions control equipment guarantee performance specifications 100% of the time.
- The toxic emissions should be remodeled assuming conservative and realistic control efficiencies.
- Emissions modeling and effects on ambient air concentrations of toxic should be recalculated taking into account the local concentrations of air toxics on the

[20] Note, the lead removal rate was subsequently increased to 99.8%, not 99.1%.
[21] Staying below 25 tons per year of HAPs means the facility won't be considered a "major source" of HAPs under the Clean Air Act.

HAPs list. If current concentrations of air toxics can not be reasonably estimated, then the plant should not be built.
- Emissions estimates should be calculated assuming that fuel moisture levels are at realistic levels, higher than the applicant has stated thus far.

Risk analysis
- All fuel contaminants and emissions estimates should be subjected to a full risk analysis. The PRE BUD should be reclassified as a Category 3 and should be subjected to full scrutiny required by that classification.
- The fuel specification should be revised to include levels for dioxins and PCBs, and risk analysis performed to ensure that emissions of these contaminants can conform to DEP's risk analysis standards.

Emissions levels
- Fuel specification should ensure that emissions of any air toxic are no more than an extremely small percentage of the DEP TELs and AALs – one or two percent, at most.
- The issue of chromium emissions, both total and hexavalent, must be revisited. Chromium emissions from the plant should be remodeled using the precautionary principle and assuming that 100% of emissions are in the hexavalent form.
- Mercury emissions at the plant should be held to the same standard as is required for coal plants in Massachusetts.

Fuel contaminants and emissions reporting
- Quarterly reporting is required for the fuel supply; quarterly reporting is required for toxics emissions at the stack. Neither is sufficient to ensure that emissions of toxics are prevented in real-time, instead of being reported greatly after the fact. The frequency of fuel testing reporting should be greatly increased, and daily particulate sampling should be conducted at the stack to track actual emissions of heavy metals, as has been discussed by DEP.

Greenhouse gas emissions and "beneficial use"
- PRE should be required to produce a full accounting of its greenhouse gas emissions and should be compelled to remove as a justification for beneficial use that the plant will result in a reduction of greenhouse gas emissions.

Our scrutiny of air permitting documents filed by the applicant has convinced us that toxics emissions at PRE will likely exceed DEP's health standards. This plant will produce a trivial amount of power while continually mobilizing toxics from largely inert and concentrated forms, where they do not present a risk to the population, to diffuse, widespread, unrecoverable, and inhalable forms. PRE will also produce vast amounts of criteria pollutants and greenhouse gases both from the wood fuel and from the natural gas that will be burned at the plant. The many hundreds of diesel tractor-trailers

required to deliver wood fuel each week will also degrade local air quality with toxic, criteria, and greenhouse gas emissions. Palmer Renewable Energy has been sold as a source of “green and renewable power”, a wretched irony that rides on the backs of an environmental justice population that is already surrounded by toxics-emitting industries and that already endures asthma and elevated childhood blood lead levels at rates twice the state average. We are sure that the state can do better than this for a renewable energy policy. We are sure that DEP can bring a higher level of scrutiny to this project.

Thank you for the opportunity to comment.

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cc: Ian Bowles, EOEEA
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