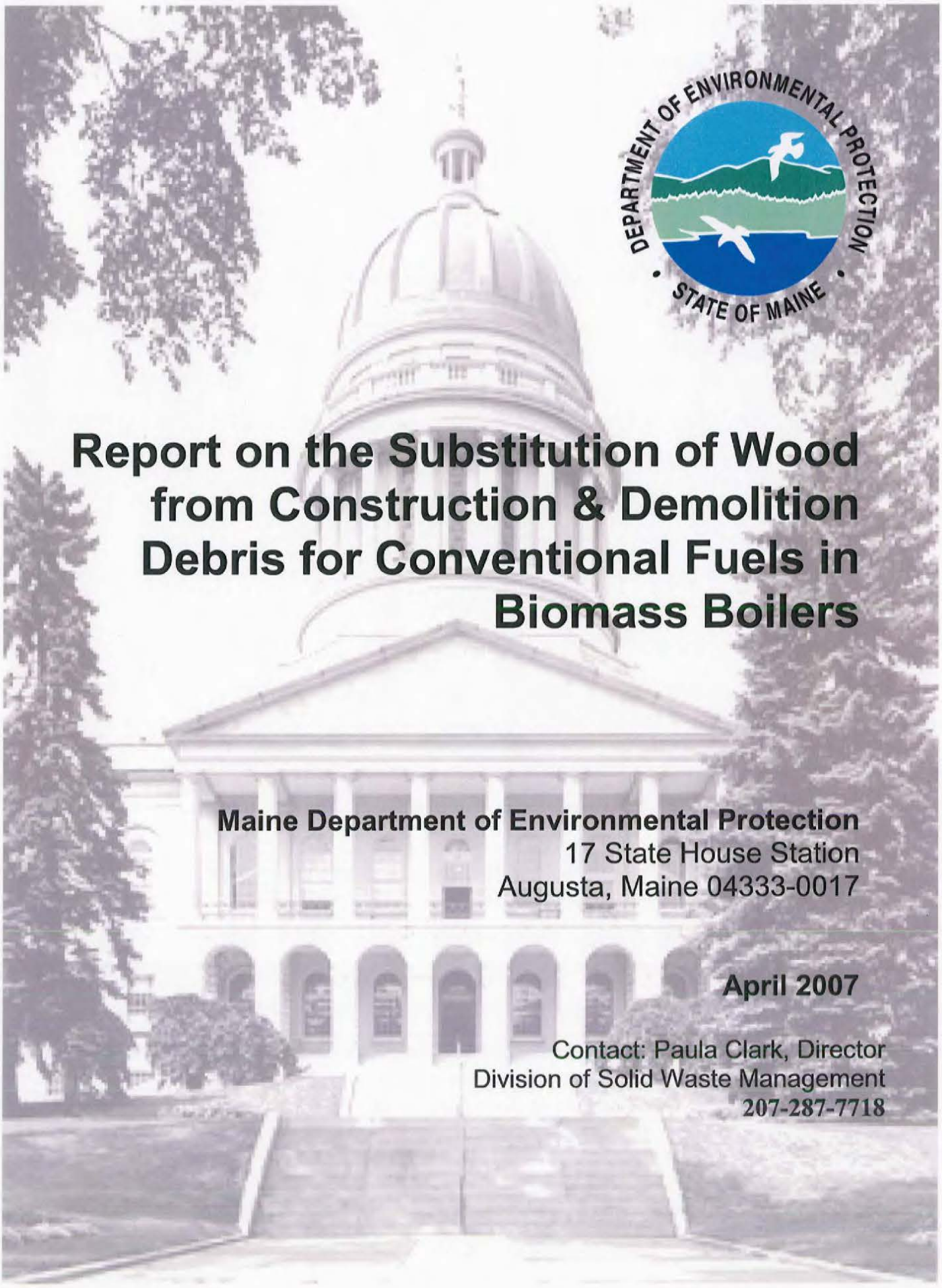

Report on the Substitution of Wood from Construction & Demolition Debris for Conventional Fuels in Biomass Boilers

Maine Department of Environmental Protection
17 State House Station
Augusta, Maine 04333-0017

April 2007

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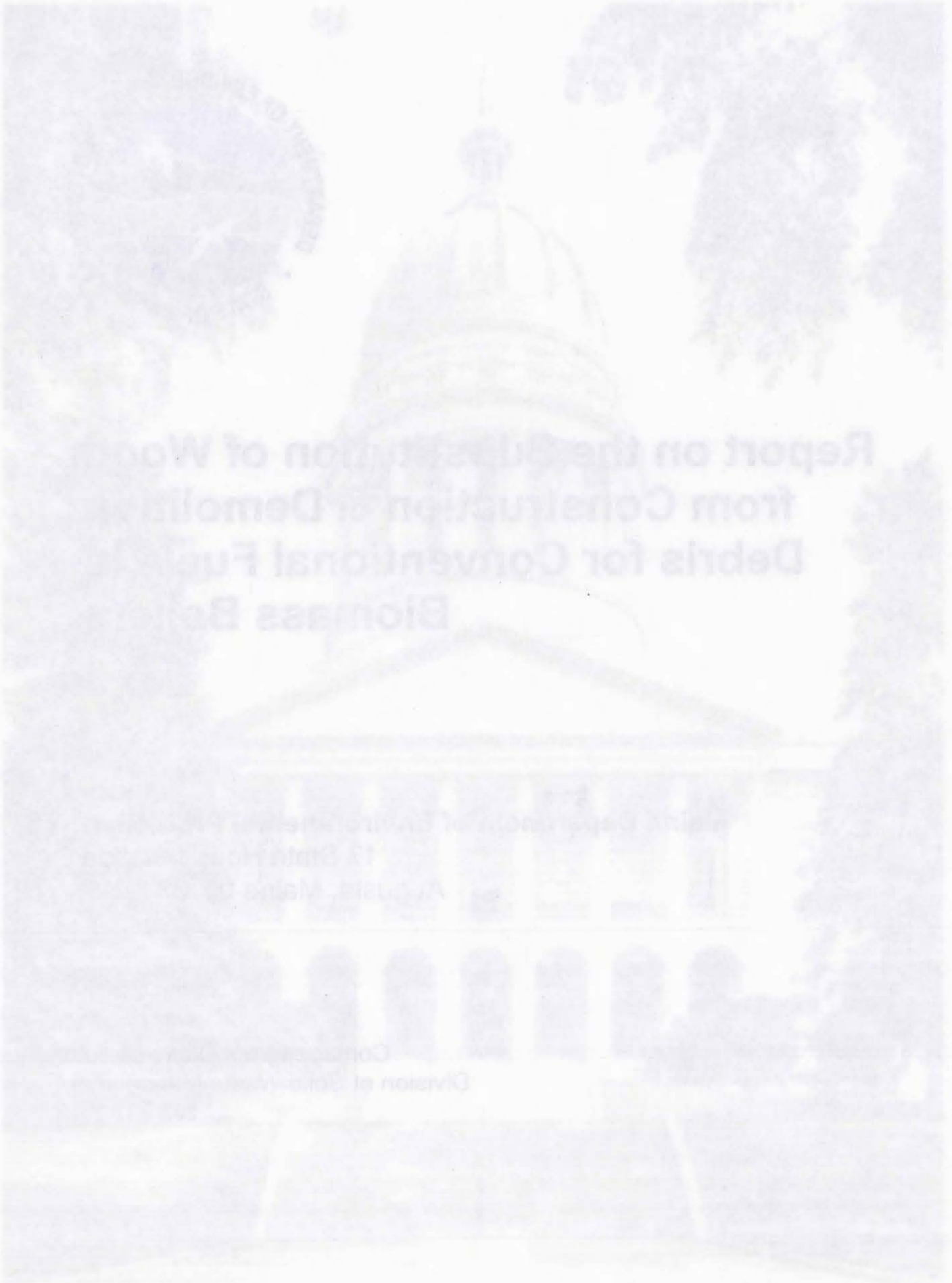

STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION

JOHN ELIAS BALDACCI
GOVERNOR

DAVID P. LITTELL
COMMISSIONER

April 12, 2007

Senator John L. Martin, Chair
Representative Theodore S. Koffman, Chair
Joint Standing Committee on Natural Resources
Maine State Legislature
State House Station
Augusta, Maine 04333

Dear Senator Martin, Representative Koffman, and Members of the Committee,

Attached is a "Report to the Legislature on the Substitution of Wood from Construction & Demolition Debris for Conventional Fuels in Biomass Boilers", submitted by the Department of Environmental Protection in accordance with the provisions of PL 2006 Chapter 617.

In part, the legislation directed the Department to:

- Evaluate the feasibility of requiring source separation and state-of-the-art processing that will achieve, to the greatest extent practicable, the removal of all toxic materials from construction and demolition debris prior to combustion in a boiler;
- Evaluate the economic and technological feasibility of requiring all boilers that burn construction and demolition debris to use the best available control technology in order to minimize toxic air emissions; and,
- Evaluate the effects of allowing the substitution of wood from construction and demolition debris for conventional fuels used in a boiler to exceed 50% of total fuel by weight combusted on an annual average basis.

We look forward to discussing this report with you.

Sincerely,

Paula M. Clark, Director
Division of Solid Waste Management
Bureau of Remediation & Waste Management

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Report to the Legislature on the
Substitution of Wood from Construction & Demolition Debris
For Conventional Fuels in Biomass Boilers
Submitted Pursuant to PL 2006 Chapter 617

I. INTRODUCTION

This report is submitted pursuant to PL 2006 Chapter 617 (attached as **Appendix A**) which was passed as emergency legislation during the last legislative session. In part, the legislation directed the Department to:

- Evaluate the feasibility of requiring source separation and state-of-the-art processing that will achieve, to the greatest extent practicable, the removal of all toxic materials from construction and demolition debris prior to combustion in a boiler;
- Evaluate the economic and technological feasibility of requiring all boilers that burn construction and demolition debris to use the best available control technology in order to minimize toxic air emissions; and,
- Evaluate the effects of allowing the substitution of wood from construction and demolition debris for conventional fuels used in a boiler to exceed 50% of total fuel by weight combusted on an annual average basis if the following conditions are met: 1. the boiler is designed and constructed for the primary purpose of power generation and not waste disposal; 2. the boiler employs the best available control technology as determined by the department; and 3. all other applicable regulatory standards are met with regard to the facility.

II. BACKGROUND - HISTORY

A. Biomass Energy in Maine

Maine has numerous forest product manufacturing plants that burn wood to generate steam, heat and or electricity for internal use. Additionally, ten "stand-alone" biomass facilities have been built in Maine to generate electrical power from the combustion of wood and wood by-products. The construction of these facilities was due in part to public policy that encouraged construction of renewable energy facilities. Specifically, state and federal law directed utilities to provide long-term purchase contracts for electricity from renewable energy facilities at rates that were projected to be the future cost for replacement power.

The electrical rates awarded in the 1980's to most of biomass facilities, turned out to be significantly above the actual electrical market rates that exist now. In turn, most of these contracts have now expired or been terminated, forcing these facilities to sell electricity into the region's market at rates significantly below their original projections. This drop in electrical price has jeopardized the financial viability of biomass facilities. An analysis of electricity prices in New Hampshire forecast that electricity prices there will not reach a level at which existing biomass facilities can be profitable without external support until 2014. Maine's stand-alone biomass facilities have also been adversely affected by these lower prices; as many as six of the facilities have been idled for periods of time in recent years. Strategies that these facilities have used to remain financially viable include: timing operation to coincide with high electricity price period, participating in

"green power" markets, and diversifying their fuel to include wood from non-forest sources. These sources include wood fuel made from construction and demolition debris ("CDD"). CDD derived wood fuel is purchased by biomass plants at a significantly lower price than wood chips made directly from standing forest trees.[1]

B. The Use of Wood from CDD in Biomass Boilers

Throughout the 1980's and 1990's, Maine's stand-alone biomass facilities burned only wood chips from trees and wood by-products from forest based industries. In 2000, Boralex Athens Energy, Inc., located in Athens, Maine submitted the first application to the Maine Department of Environmental Protection (DEP) to utilize wood from CDD as part of its biomass fuel mix. This application was submitted under DEP's Chapter 418 rules, *Beneficial Use of Solid Wastes*, which, in part, regulate the use of waste or waste derived materials as fuel substitutes in industrial boilers. Prior fuel substitution applications received by the DEP were made primarily by paper mills for combustion of high fuel value mill wastes in the facility's own biomass boiler(s). Such proposals involved substituting a waste material that did not differ greatly from their current fuels and which constituted a relatively small portion of that boiler's fuel mix.

The Boralex Athens Energy application presented new issues and questions involving fuel quality and handling. At this time, the Department also considered the question of when a boiler is most appropriately licensed under the solid waste incinerator standards or under the standards for fuel substitution – beneficial use. As a matter of policy, the Department determined that licensing under the fuel substitution standards was appropriate when 50% or less of the total fuel supply was waste or waste derived. Volumes greater than 50% would categorize the boiler as a solid waste incinerator. The significance of this determination, in part, is that under Maine law, new commercial solid waste disposal facilities (landfills and incinerators) are prohibited. In January 2001, DEP issued the Boralex Athens Energy facility a license to substitute CDD derived wood fuel for up to 50% of its biomass fuel. The existing air emission license was also modified to accommodate differences in the type of fuel.

In 2002, a fire occurred in the biomass fuel stockpile at the Boralex Athens plant. As a result of questions concerning the composition of the fuel and subsequent uncontrolled emissions from the stockpile fire, the Department initiated an investigation of the quality of the CDD wood fuel then being used. This work, conducted by University of Maine Professor of Civil Engineering Dr. Dana Humphrey, analyzed the biomass fuel stockpile for the physical characteristics of its wood and non-wood components. The Department concluded that the quantity of metal, plastic and treated wood present was sufficient to raise concerns if the fuel burned in an uncontrolled manner, such as in the stockpile fire. It was further concluded that more studies were needed to better define the relationships between contaminants in the fuel and both fugitive and stack air emissions. The Department determined that it was appropriate and necessary to revise the beneficial use-

[1] Innovative Natural Resource Solutions LLC, *Current Conditions and Factors Influencing the Future of Maine's Forest Products Industry,* prepared for Department of Conservation - Maine Forest Service and Maine Technology Institute, March 2005, pages 150-152.

fuel substitution rules to more fully address the emerging issues associated with the processing, storage and use of CDD at biomass boilers.

By the end of 2005, the Department had approved the use of CDD wood fuel at six other power generation facilities: Boralex (Stratton), Boralex (Livermore Falls), Greenville Steam, Georgia-Pacific (Old Town; now owned by Red Shield), Lincoln Pulp and Paper (Lincoln), and Wheelabrator (Sherman).

At the present time only three biomass power plants are burning CDD wood fuel. The Boralex plant in Athens was shut down and sold to Georgia-Pacific for its Old Town paper mill. The plant is now owned and operated by Red Shield. The other biomass plants presently using CDD wood fuel are the Boralex plants in Livermore Falls and Stratton. An application for the use of CDD fuel at S.D.Warren in Westbrook is currently pending. Although an application has not yet been submitted, GenPower has indicated its interest in building a facility with "best available control technology" (BACT) to control air pollutants, that would be specifically designed to burn fuel that consists of 100% CDD derived wood fuel. Although Greenville Steam, Lincoln Pulp and Paper, and Wheelabrator-Sherman are licensed to burn CDD wood fuel, they have either never burned CDD wood fuel or have ceased using this fuel.

C. Regulation of the Use of CDD Wood Fuel

The use of CDD wood fuel is licensed by the Department as a fuel substitution activity under Chapter 418 (Beneficial Use of Solid Waste) of the Solid Waste Management Rules. Such use also requires an air emission license from the Department's Bureau of Air Quality.

Following the fuel fire in Athens, the Department determined that further research and evaluation concerning CDD fuel quality was necessary to form the technical foundation for rulemaking. Revisions to the rules were determined to be appropriate and necessary to strengthen and clarify the standards for use of CDD wood as fuel. A study was designed and implemented through the cooperative efforts of the Department (Solid Waste and Air Quality programs), the University of Maine, and Boralex Energy. The work was funded through a "supplemental environmental project (or "SEP") as part of an enforcement action against Boralex associated with violations at Boralex facilities in Maine. The project resulted in a May 2005 report entitled: "Fate of Dioxin and Arsenic from the Combustion of Construction and Demolition Debris and Treated Wood".

The study, done under the oversight of Dr. Dana Humphrey from the University of Maine, included combustion studies of multiple test fuel blends and the simultaneous monitoring of boiler operations, stack emissions and emissions controls, fuel quality, and ash quality. At the conclusion of the study the University of Maine issued the report which included a risk evaluation of the air emissions for dioxin and arsenic resulting from these different fuel blends. The study found that the worst case ambient air impact results were well below the Maximum Ambient Air Guidelines, leading the DEP to conclude that the levels of dioxin and arsenic emitted by biomass boilers burning CDD wood fuel

at any of these levels would not pose significant public health impacts from an ambient air quality standpoint. (Also see Section V(E) of this report.)

Based upon the results of this study and knowledge and experience gained over several years, the Department proposed revisions to the fuel substitution provisions of the rules. It was concluded by the Department that the most effective way to ensure environmental protection when CDD wood fuel is used, is through the application of specific fuel quality and fuel handling standards. The proposed revisions addressed the potential contaminants in CDD wood fuel itself, the allowable limits for these contaminants, fuel handling, fuel sampling and testing, and sampling and testing of the resultant ash. Fuel quality characteristics addressed in the rule included the amount of: pressure treated wood, plastics, non-combustible materials (such as metal), asbestos, and "fines". The rule also imposed specific chemical limits for arsenic, lead and PCBs. Revisions to the rule were adopted by the Board of Environmental Protection and became effective on June 16, 2006. The Department's rule concerning beneficial use of solid waste, specifically, the use of waste including CDD wood as a fuel substitute (CMR 06-096 Chapter 418 Section 6) is attached as **Appendix B.**

As a matter of practice and policy, prior to the adoption of the revised fuel substitution rules in 2006, the Department, through its licenses, did not allow the substitution of more than 50% CDD fuel (on an average annual basis) for conventional fuels at biomass boilers. This limitation was not imposed in response to a specific technical or scientific concern, but to address the policy need to distinguish, from a regulatory perspective, between a beneficial use activity (fuel substitution) and a solid waste disposal facility (incinerator). This distinction is important since there are certain statutory restrictions and standards that apply solely to "solid waste disposal facilities" (landfills and incinerators). Among these is a ban on the establishment of any new commercial solid waste incinerator. PL 2006 Chapter 617 provided specifically that the Department's rule: "may not allow the substitution of wood from construction and demolition debris for conventional fuels used in a boiler to exceed 50% of total fuel by weight combusted on an average annual basis".

III. GENERATION, HANDLING AND PROCESSING OF CDD

A. Municipal Collection of CDD

Maine towns manage CDD through their local solid waste facilities, including 239 transfer stations, 9 municipal solid waste landfills, 18 municipal CDD landfills, and 2 commercial landfills. The State Planning Office estimates that in 2005, Maine generated 301,549 tons of CDD.

Much of Maine's municipal solid waste is delivered to small transfer stations. These facilities are of a size and have a customer base that allow for significant control of how the waste is delivered. They have the ability to direct delivery of relatively pure components of the construction and demolition debris waste stream pre-separated for

reuse, recycling or processing. At these local facilities, residents can be required to separate yard waste for chipping and composting, asphalt shingles to be recycled into road patching material, tree limbs and trunks into firewood, and "clean" CDD wood (without plastics, pressure-treated wood, wall-board, glass and siding) for citizen reuse and/or processing into biomass fuel. Transfer stations which manage CDD waste wood for the fuel market by requiring source separation can typically receive a waste stream that is at least 95% wood.

In 2005, 571,834 tons of CDD waste (both in-state and out-of-state generated) was landfilled in Maine's three largest landfills having capacity available for municipal waste (Pine Tree in Hampden, Juniper Ridge in Old Town, and Waste Management in Norridgewock). Data from the Maine State Planning Office show that in 2004, 12,730 tons of CDD waste from municipalities was recycled. Most CDD in Maine is landfilled without processing. Additionally, at some small transfer stations, the wood portion of CDD waste suitable for fuel is not recycled; it is open-burned, without air pollution controls or energy recovery.

B. Processing of CDD

1. Methods

Mixed CDD is processed for reuse using a variety of methods at several different types of facilities. CDD processors can produce a fuel that meets the new standards of the solid waste rules by employing strategies to control the quality of CDD received for processing and by utilizing various processing technologies.

Mechanical processing, in combination with other methods, is used by the established CDD processing facilities to which CDD wastes are transported for processing into fuel and other products and recyclables. Processing facilities known as "positive pick" operations are designed to remove materials from the process conveyor line that <u>are</u> suitable to be processed into recycled materials such as CDD wood fuel.

"Negative pick" operations are designed to remove materials from the process conveyor line that <u>are not</u> suitable for such recycling (such as metal, plastics, treated wood, shingles, aggregates, etc.). All CDD processing facilities receive materials in a similar manner. Materials are "tipped" from the delivery container or truck onto a floor or pad where the load is inspected by the facility staff. Processing facilities immediately remove oversized materials that are clearly not suitable for further processing into a container destined for a disposal. Removal of oversized material is essential to efficient throughput of CDD materials and for protection of the processing equipment. CDD materials are then put through a vibrating shaker screen to remove dirt and aggregates. The remaining material is placed on a conveyor belt to remove the suitable wood material (in a positive pick process) or to remove the non-wood material (in a negative pick process). Non-wood materials are then removed for off-site disposal or recycling.

If appropriately sized, positive pick facilities are capable of producing a higher quality CDD wood fuel with less effort than negative pick operations. They tend to require a more "wood rich" feedstock and to recover a lesser percentage of the total wood content due to their inability to remove small pieces of wood (<12 inches) at the picking stations. Positive pick facilities generally do not process as much CDD on a daily basis as negative picks, as the process sorting line is more heavily dependent on people than removal machinery. In general, negative pick facilities are able to process larger volumes of CDD on a daily basis and capture a greater percentage of the total wood content. In order to accomplish this however, significant capital and operational expenses are incurred for additional processing equipment with which to separate usable from non-usable materials (such as screens, float tanks, etc.) and for employees to hand pick unsuitable materials (such as metal, plastics, treated wood, shingles, etc.)

2. Contaminant Identification and Removal

The Department's rules concerning the use of CDD wood fuel focus on fuel quality and the removal of contaminants necessary to achieve the fuel quality standards. The rule establishes specific standards for: non-combustibles, plastics, treated wood, fines, asbestos, arsenic, lead and PCBs.

Plastics in the fuel may be removed by hand at the processing facility and by equipment such as screens or "classifiers" that separate low density plastics from more dense materials.

Non-combustibles and fines can also be removed by screens or sometimes by flotation units which separate the wood from heavier non-combustibles. "Fines" (small sized particles that may contain relatively high concentrations of certain contaminants such as lead), are a fuel contaminant that traditionally may be difficult for the small source separation facilities such as Maine's municipal transfer stations to minimize, since their fuel wood stockpiles may not be stored on a paved surface and the mobile processors that serve them many not employ screens to remove these fines. Negative pick facilities tend to generate a significant amount of fines and usually install additional processing equipment to remove them.

Pressure treated wood can be controlled by visual inspection and removal. This can first be carried out at the construction or demolition site by the people doing the construction/demolition work. It can also be carried out at the processing facility by people specifically tasked with spotting and removing any pressure treated wood that is delivered.

Studies concerning the accuracy and feasibility of using chemical or other methods to differentiate CCA treated wood from non-treated wood in construction and demolition debris have been on-going by the University of Miami and the

University of Florida since 2001. The most recent document completed on this subject was a final draft of a report dated January 3, 2006, entitled titled "*Augmented Sorting of Recovered Wood Waste Using Stain and X-ray Technologies*", and prepared for the Town of Medley, Florida. The report evaluated the effectiveness of visual identification of treated wood using a chemical indicator stain ("PAN indicator") and using no stain, and using a hand held X-ray fluorescence ("XRF") unit. Prior to this study, the performance of portable hand-held x-ray units for sorting wood waste had not been documented during either manual sorting or sorting through the traditional conveyor belt picking-line process.

The conclusions of this study were the following:

- the facility hosting the study was able to effectively identify loads of wood that were relatively uncontaminated by CCA wood by spot-checking source separated loads of wood as they entered the facility;
- visual sorting methods with no augmentation were found to be quick and reliable for relatively uncontaminated loads of construction and demolition debris wood;
- visual sorting augmented by PAN Indicator stain was most useful for source-separated loads that were suspected of containing a larger amount of suspect treated wood;
- visual methods augmented with PAN Indicator stain were found to be more time consuming and not sufficiently reliable with commingled construction and demolition debris wood;
- identification in commingled construction and demolition debris wood could be aided with the use of hand-held x-ray fluorescent (XRF) units to spot check suspect wood; and
- sorting times and accuracy depended highly on the individual sorting the wood although improvement was noticed with experience.

XRF units can present a safety issue in that the x-rays were found to penetrate through wood and therefore the units needed to be handled carefully and appropriately.

The report indicated that the relative costs per metric ton of the different sorting methods were influenced primarily by labor costs which ranged from $24 for visual sorting of relatively uncontaminated source-separated wood to $114 for XRF sorting of commingled wood.[2]

Two existing Maine programs target contaminants that can significantly contaminate CDD wood generated from demolition activity. These programs target the treatment and/or removal of asbestos and lead containing paint from standing structures and from some buildings scheduled for demolition.

[2] Solo-Gabriele, Helena, Gary Jacobi, Eduardo Lam and Timothy Townsend, *Augmented Sorting of Recovered Wood Waste Using Stain and X-ray Technologies,* Department of Civil, Arch., and Environ. Engineering, University of Miami, submitted January 3, 2006 (draft).

Department of Environmental Protection Regulation Chapter 425 (Asbestos Management Regulations) requires that prior to conducting a renovation or demolition activity that impacts any building material or component likely to contain ***asbestos***, the owner or operator must have an inspection conducted to determine if asbestos-containing materials are present or must presume that asbestos –containing materials are present and an asbestos abatement is required. Prior to renovation or demolition, if more than 3 square feet or 3 linear feet of asbestos containing material is present, that material must be removed by properly trained and licensed asbestos abatement professionals. Asbestos contained in materials that are intact and bound with a matrix that will minimize the potential release of asbestos fibers (e.g., floor tile, asphalt shingles) may be left in place when demolition is performed by large equipment and specific work practices and worker protection actions are implemented. Single family residences, and residences constructed after 1980 that consist of two (2) to four (4) units, are exempt from the inspection provisions stated above. The result of these regulatory requirements is that no building can legally be demolished or renovated in Maine in a manner likely to release asbestos fibers.

For structures demolished by large equipment with non-friable asbestos-containing flooring or roofing left in place, an additional processing step is needed to prevent asbestos contamination of wood fuel derived from construction and demolition debris. This additional process step must insure that asbestos-containing roofing and flooring and the attached substrate materials are separated from wood that is going to be shredded or abraded. Subjecting non-friable asbestos-containing materials ("ACM") to crushing, shredding or abrading will release previously bound asbestos fibers into the environment and contaminate other materials intended for use. State and federal laws require that the separated ACM and attached substrate be disposed of in a landfill licensed to accept asbestos waste.

The Department believes that ***lead*** is potentially present in the environment of almost 80% of the housing in Maine. Buildings built before 1950, could have been painted with paints containing up to 50% lead. Buildings built, painted or remodeled before 1978 are also likely to have paint coating that contain some percentage of lead. In 1997, Maine enacted an "Act to Ensure Safe Abatement of Lead Hazards" which directed the Maine DEP to adopt regulations establishing procedures and requirements for the certification and licensing of persons engaged in residential lead-based paint activities, work practice standards for those activities, and licensing and accreditation of lead abatement training programs.

The primary risk posed by lead-based paint and lead dust contamination in a pre-1978 house is the likelihood of causing lead poisoning in children and adults, with children under 6 (six) years of age being particularly vulnerable. Currently, the Maine *Lead Management Regulations* apply only to work performed on

residential buildings and child occupied facilities when the clear intent of the work is to abate lead hazards. The *Lead Management Regulations* do not apply to renovation or remodeling activities or to work on other commercial and industrial facilities and consequently do not serve to limit lead levels in construction or demolition wood that may be used as fuel. The Department has established in rule a specific standard for lead concentrations in blended CDD wood fuel (<375 mg/kg).

Neither of these Federal or Maine laws or regulations prevent the potential lead contamination of wood fuel derived from building remodeling or demolition activities. Levels of contamination higher than 350 mg/kg are considered to present a potential lead poisoning hazard to people who come in direct contact with the wood fuel or dust from the wood fuel that contains that concentration.

3. Products and Recyclables

Most large construction and demolition debris processing facilities produce a variety of recycled products in addition to CDD wood fuel. These facilities remove as much salvageable and reusable material from CDD as is practical in order to recover value from the waste constituents and to minimize the transportation and disposal costs associated with landfilling construction and demolition debris. Materials recovered by these facilities include aggregate from bricks, concrete, asphalt, rocks, and dirt; ferrous and non-ferrous metal; asphalt shingles, un-used gypsum board for reuse, and wood for reuse or for fuel in wood-fired biomass boilers. Additionally, other CDD components not suitable for recycling may be mixed with the recovered aggregate materials and marketed to operating landfills as a soil substitute to cover waste or for shaping and grading material for landfill closure projects. Generally, 35-40% of a mixed CDD waste stream can be processed into CDD wood fuel. (See **Appendix C:** "Components of Processed Construction and Demolition Debris From 4 New England Processing Facilities").

4. Maine Processing Facilities

Current in-state processing of CDD wood is performed by mobile shredders that process stockpiles of pre-separated CDD wood into fuel at municipal collection sites, and by four commercial processing plants – Aggregate Recycling Corp (ARC) in Eliot, Commercial Paving in Scarborough, KTI Biofuels in Lewiston, and Simpson, Inc. in Sanford. In 2005, these facilities processed a total of 69,787 tons of mixed CDD, with about 30,000 tons of this brought in from out of state.

5. New England Processing Facilities Review

In 2006, DEP staff visited 12 different processing facilities to review their operations and evaluate the quality of the CDD fuels produced (See Section IV-B for data and discussion regarding fuel quality). These facilities included the major commercial processors and several municipal source separation operations at which processing occurs through the use of mobile processing equipment.

Table 1 presents information concerning the volumes of material handled at these facilities and the processing methods used.

Table 1

Representative New England CDD Processing Facilities/Sites
Volumes of Material Received and Produced and Processing Technology - 2006

Facility/Site	Mixed CDD or Source Separated CDD Wood* Received (tons/yr)	CDD Wood Fuel Produced (tons/yr)	Fuel Sorting Technology
ERRCO (NH)	175,000	87,000	Negative Pick
LL&S (NH)	175,000	30,000	Negative Pick
KTI (ME)	48,800	18,130	Negative Pick
ARC (ME)	14,680	8,100	Negative Pick
Pond View (RI)	100,000	35,000	Positive Pick
NER (MA)	73,000	20,000	Positive Pick
Simpson (ME)	7,700	**	Positive Pick
Plan-It (ME)	4,200*	4,000	Source Separation
Old Town (ME)	850*	800	Source Separation
Crossroads (ME)	2,100*	2,000	Source Separation
Augusta (ME)	2,100*	2,000	Source Separation
Boothbay (ME)	5,250*	5,000	Source Separation

**** Number not available**

C. Material Recovery and Source Separation at the Point of Generation or Collection

Source separating non-pressure treated CDD wood at the point of its generation or collection can significantly simplify and facilitate the processing of this material into quality CDD wood fuel. At municipal transfer stations, source separation of many different types of materials is commonly required including the separation of newspaper, cardboard, plastics and glass for recycling. Similar requirements can be extended to individuals and companies that deliver construction and demolition debris so the wood suitable for processing into CDD wood fuel is pre-separated from roofing, siding, plastics or metal and from pressure treated wood.

"Source separation" is the most basic strategy for controlling the quality of the waste. It entails the sorting of usable elements of CDD at the point of generation (i.e. a demolition site) or collection (i.e. a municipal transfer station). At transfer stations, residents bring in a variety of CDD materials and are typically required to sort them by component (wood, metal, etc.). Municipal wood piles are generally comprised of around 95% wood and are either processed into fuel by mobile processors or are open burned. Wood storage areas are inexpensive to construct and operate, but are heavily dependent on supervision of the customers to ensure adequate separation of potential contaminants such as plastics and pressure-treated wood.

At a transfer station, sorting and removal is most efficiently accomplished by having 1) adequate signage to educate the public on what are "suitable materials" and 2) by having facility staff inspect materials as they are disposed of in the smaller CDD "day pile" storage bins. As material is disposed of at the "day pile" by the public, facility staff are able effectively inspect this pile and remove any unsuitable material they encounter. Facility staff should be the only ones able to move the "day pile" to the larger CDD storage piles as they await adequate volume to enable material processing into CDD wood fuel.

Some facilities require source separated loads from demolition and building contractors. Typically, the processing facilities offer generators financial incentives to send wood rich loads of CDD separately from wood poor loads. This allows the processor to use the wood poor CDD loads to create landfill closure material or to by-pass the CDD directly to landfills for disposal.

1. Source Separation during Construction and Demolition

Separation of potentially suitable wood during building construction is straightforward and simple. Wood not used in the structure can be easily separated into a number of separate piles at a site. This scrap or leftover wood is often new lumber that can still be used for its original purpose. Wood from demolition activity is not nearly as readily separated for reuse. This wood has already been attached to lumber of other types, dimensions and grades, or to other non-wood building materials. In order to achieve a similar degree of material salvage at a demolition site, a significantly more involved process must be used.

Salvaging activities are differentiated by the scope of the salvaging operations. The removal of windows, doors, kitchen and bathroom fixtures, moldings, mantles, and other small architectural components is commonly referred to as "non-structural salvage". In this context, wooden molding is reused as molding, mantelpieces as mantelpieces, cabinets as cabinets and lumber as lumber. The removal of wooden barn boards, flooring, timbers and lumber; along with the salvaging of bricks or granite is considered to be "structural salvage". Such material salvaging is practical anywhere there is a real market for the items being salvaged, and is done throughout Maine and the U.S. Whether, when and how it is carried out is simply a matter of economics: the value of the salvaged material, the strength of markets for salvaged materials, and the expense of salvage operations.

Structural salvaging is also referred to as "deconstruction". The term "deconstruction", as currently used, is often interpreted to mean the complete disassembly of a building or portion of a building into its component parts and materials. In actuality, the complete dismantling and reuse of every component and all materials from a building is almost never carried out. Practical, timing and financial considerations often do not make comprehensive deconstruction and materials sorting operations feasible.

The bulk of current lumber reuse activities in Maine occur through the "Maine Housing & Building Materials Exchange" (located in Gray and Sanford, see Appendix C), through private transactions like those facilitated in *Uncle Henry's* weekly publication, and through reclamation at public recycling programs and transfer stations.

2. Economic Feasibility of Building Deconstruction

A defining characteristic of non-structural salvage is that it does not affect the structural integrity of the building. For example, the removal of fixtures, windows, doors, moldings and most cabinet will not normally weaken the construction integrity of the remaining structure. People can routinely still safely work inside the structure. Examples of this reuse or the marketing of salvaged items for reuse can be found each week in Uncle Henry's "Building Materials" section where typically many individuals and small companies will advertise the sale of salvaged fixtures and building items. Other examples include the monthly State Surplus Sales conducted by the Maine Bureau of General Services where unique windows, hardware and other building materials are available for purchaseafter major building renovation projects. Another notable example is the "Maine Housing & Building Materials Exchange" (BME) with locations in Gray and Sanford, Maine (See **Appendix C**).

The economic feasibility of structural salvage in a particular municipality, region or state is dependent upon a number of specific factors. Factors that can favorably influence the feasibility of structural salvage or sorting by component include:

- the building contains particularly valuable or unique raw materials such as unique timbers and lumber or other valuable building material;
- the project is not under tight time constraints and rebuilding pressure;
- there is sufficient space on or adjacent to the demolition site to allow for convenient material separation, sorting and organizing;
- contaminants have been removed from the building(s) prior to the start of demolition..

A number of factors can hamper the degree to which materials in a structure may be economically salvaged or sorted by component. These factors include:

- small, disparate projects where economies of scale are not possible;
- worker safety or exposure concerns;
- tight project time frame;
- high labor costs; and
- low salvaged material value.

One point of potential relevance to Maine is that often military base salvage projects can be structured to avoid the redevelopment pressures and timelines common among commercial development projects. At the same time, a military base often has a number of buildings consisting of similar building materials so

economies of scale may be possible. This may provide an opportunity for base redevelopment authorities to minimize the cost and amount of CDD waste associated with demolition activities on a base undergoing redevelopment.

IV. USE OF CDD WOOD FUEL IN BOILERS

A. CDD Wood Fuel Supply and Use

As discussed in Section II(B) above, only 3 of the 7 boilers approved for CDD wood fuel combustion are presently burning it: Boralex- Stratton, Boralex-Livermore, and Red Shield in Old Town. **Table 2** presents data relevant to the use of CDD wood fuel in biomass boilers in Maine in 2005. Using 286,338 tons of fuel in its power plant, Boralex-Livermore produced 217,002 megawatts of power, with CDD wood fuel accounting for about 44.2% of the total fuel used in the facility. Similarly, using 426,304 tons of fuel in its power plant, Boralex - Stratton produced 267,648 megawatts of power with CDD wood fuel accounting for about 25.9% of the total fuel used in the facility.

TABLE 2
2005 CDD Wood Fuel Use by Biomass Boilers in Maine

Boiler	Total annual wood fuel use	Tons CDD wood fuel	% CDD wood fuel	Tons ash generated	% ash per ton wood fuel
Boralex-Livermore	286,338 tons	128,494	45%	28,493 tons	10%
Boralex-Stratton	426,159 tons	110,499	26%	28,156 tons	6.6%

Roughly 75% of the CDD derived wood fuel for each of the Boralex plants was fuel that was processed outside of Maine and shipped as fuel to those facilities.

Red Shield is expected to burn 200,000 tons per year of wood fuel, of which 100,000 tons per year may be CDD wood fuel. The SAPPI biomass facility has capacity to burn 490,000 tons of wood fuel. This facility has submitted an application to burn up to 50% CDD wood fuel; if approved, this facility may combust up to 245,000 tons of CDD wood fuel annually.

As discussed earlier, GenPower has proposed construction of a new boiler designed to burn 100% CDD wood fuel while employing Best Available Control Technology ("BACT") to meet air emission standards. Its capacity was reported to be planned for 558,000 tons CDD wood fuel per year. DEP estimates that operating this facility at full capacity would produce 55,800 tons per year of ash.

At Maine's current rate of capture and processing of wood waste from CDD, Maine municipalities supply less than 1% of the maximum annual projected demand for CDD

wood fuel (1.37 million tons – See **Table 5**). Processing of in-state commercial waste currently provides an additional 3%. If all municipal CDD were managed to separate wood waste at the point of collection, and assuming that 25% of the CDD waste stream could be processed into wood fuel, Maine municipalities potentially could generate 75,500 tons of CDD wood fuel annually. This is an estimated 5% of the maximum CDD wood fuel permitted for use in Maine biomass boilers listed in **Table 5**. Managing municipal CDD for maximum CDD wood fuel generation could reduce the amount of Maine landfill capacity currently used for disposal of CDD by 133,200 yds^3 annually.

Several factors make it highly unlikely that the biomass boilers anticipated to routinely burn CDD wood fuel will combust their maximum allowed amounts:

- Currently, of the 5 boilers approved to burned 50% CDD derived wood fuel, 3 are not burning any CDD derived wood fuel, and 2 consistently burn less than the 50% allowed.
- There are practical limits to the amount of CDD derived wood fuel that a boiler burns that are related to operational costs and maintenance.
- There is not sufficient licensed processing capacity in all of New England to process the amount of CDD needed to create 1.3 million tons of CDD wood fuel.
- Processing CDD into fuel and other recycled products is a low profit undertaking which limits the ease and speed by which processing capacity anywhere could be increased.

To combust the maximum amount of CDD wood fuel approved for use, biomass boilers would need to rely upon CDD wood fuel that is produced in Maine from out-of-state CDD and/or on CDD wood fuel that originates outside of Maine, since Maine simply does not generated enough CDD to meet this demand. 238,000 tons (190,400 yds^3) of out-of state CDD was sent to Maine's commercial landfills in 2005. If this amount were separated and processed for CDD wood fuel production rather than landfilled, it would create an additional 83,300 tons of CDD wood fuel (6% of the projected maximum demand) and reduce the landfill capacity used by at least an equivalent amount.

The wholesale replacement of out-of-state processing capacity by in-state facilities is unlikely since it is significantly less expensive to process locally (nearer the sites of CDD generation) and pay to transport only the portion of CDD that is processed into wood fuel than to transport mixed CDD into Maine for processing. The degree to which out-of-state CDD processors can increase their operational capacity to meet increased fuel demand is also limited. Out-of-state processors are currently operating at close to capacity.

B. CDD Wood Fuel Quality

Shortly after the July 2006 implementation of the revised fuel substitution rules, the Department conducted sampling and analysis of CDD wood fuel from 12 different processing facilities which are representative of the regional CDD processing industry as a whole. The facilities were representative of different CDD sorting/processing technologies: 4 negative pick processors, 3 positive pick processors, and 5 source

separation facilities. Collectively the 12 facilities produce approximately 205,000 tons of CDD wood fuel annually. The CDD wood fuel sampled was tested to determine whether the fuel met the regulatory physical standards for plastics, non-burnable, treated wood, and fines, and the chemical standards for arsenic and lead.

An evaluation was conducted to determine whether there is a correlation between the amount of treated wood and arsenic, and the amount of painted wood and lead. The relationship between the arsenic and treated wood data does not support using the treated wood data to predict arsenic concentration in the CDD wood fuel. This result supports the conclusion of the university of Maine study that there may be sources of arsenic in the CDD wood fuel other than the treated wood fraction. Similarly, the painted wood data do not correlate well to lead concentrations in the CDD wood fuel. The percentage of painted wood in the CDD wood fuel has varied without significant corresponding changes in the concentration of lead in the fuel. There has been no correlation between the amount of painted wood in CDD derived wood fuel and lead concentration in either the fuel or resulting ash. All future analyses of both will be closely evaluated to determine if this remains true.

Plastic is readily separated from wood on a pick line in large part because it is often colored and contrasts sharply with wood. When more plastic than usual is found in the CDD wood fuel the cause is often the presence of a plastic/wood composite that is designed to resemble wood. This can be addressed by mechanical separation, as plastics and wood differ significantly in density. Fuels from all facilities reviewed were well within Chapter 418 CDD wood fuel standards for plastic content.

Non-burnable material exclusive of rocks, concrete and brick is reported as metal. Magnetic removal of small pieces of ferrous metal generally works well with the pick line removing larger pieces of metal. However, small non-ferrous metal, especially if attached to a larger chunk of wood is able to pass through with the CDD wood. Technology in the form of an eddy current separator can be used, however this may be cost prohibitive for all but the larger processors. Two of the three facilities that exceeded the non-burnable standard use source separated CDD wood as feedstock. As has been stated earlier in this report, more diligent supervision of customers as they drop off CDD waste, together with more efficient CDD management and storage design at Maine's transfer stations and landfills are most likely to lead to improvement in CDD wood fuel quality.

CDD wood fuel samples from 2 of 12 facilities failed to meet the treated wood standard. Treated wood cannot be removed by mechanical means. Only by a trained person picking over the waste wood can the characteristic yellow-green color be seen and removed. Many processors have begun to reach out to their commercial customers who generate the CDD waste to encourage them to inspect their jobs for treated wood and to organize delivery of their waste by identifying particular loads containing the treated wood. Such activity has been shown to lower the quantity of treated wood that must be removed during CDD wood processing. This in turn lowers the quantity of treated wood

in the CDD wood fuel produced. The effectiveness of this method recommends it to a broader application with all CDD wood fuel producers.

The CDD wood fuel standard most often exceeded is the fines standard. Fines include wood, dirt, and small often unrecognizable bits of everything present in the mixed CDD waste. It was established during the University of Maine study of the Boralex biomass plants, that the fines fraction of the CDD wood fuel contains a higher percentage of potential contaminants than the remainder of the fuel. The standard of <10% fines in commercial CDD wood fuel was established to limit the contaminant load through a means not achievable by simply limiting recognizable plastic, metal, or treated wood. By limiting fines, the overall quality of the CDD wood fuel has been significantly improved. One interesting way of making this point is to note that a typical truckload of CDD wood fuel prior to the Chapter 418 rules weighed in at about 28 tons while currently the same volume load would weigh about 24 tons. Since the volume per truckload has not changed, this means approximately 4 tons of fines and contaminants have been removed as a result of Maine's new CDD fuel standards.

Table 3 allows the comparison of each facility's success in removing treated wood. The values given are in 100% CDD wood fuel rather than the <50% CDD wood fuel blended with unadulterated wood (ie. whole tree chips) which is allowed as fuel in biomass boilers licensed to burn CDD wood fuel. The requirement for using a CDD wood blended with clean wood provides an additional margin of safety for all contaminants with respect to air emissions.

The two facilities sampled which exceeded the treated wood standard have 2 options for addressing this issue to ensure that their fuel products meet the standards in the future. They can work with their customers to see that jobs are surveyed prior to demolition and that treated wood is batched into designated truckloads for special handling at the processing facility, or they can place more resources into treated wood identification and removal within their processes

Table 3

CDD Wood Fuel Testing

Results for Physical Parameters

(DEP Sampling – 2006)

Facility	Plastic	Non-burnable	Treated Wood	Fines
STANDARD	**<1.0%**	**<1.0%**	**<1.5%**	**<10%** commercial **<20%** municipal
ERRCO (NH)	0.1	0.0	0.9	8.0
LL&S (NH)	0.5	0.6	1.8	8.8
KTI (ME)	0.4	4.0	3.7	4.1
ARC (ME)	0.0	0.3	0.0	8.3
PondView. (RI)	0.1	0.1	0.0	11.7
NER (MA)	0.0	0.0	0.3	9.6
Simpson (ME)	0.3	0.8	0.3	11.6
Plan-It (ME)	0.0	1.1	1.4	3.0
OldTown (ME)	0.1	1.3	1.5	11.8
WMI (ME)	0.1	0.5	0.6	11.3
Augusta (ME)	0.1	1.0	1.0	4.7
Boothbay (ME)	0.1	0.2	0.0	21.3

Results are presented as the percent by weight. Shaded results exceeded Chapter 418 standards.

Table 4

CDD Wood Fuel Testing

Results for Chemical Parameters

(DEP Sampling – 2006)

Facility	Treated Wood	Arsenic	Painted Wood	Lead
STANDARD	**<1.5%**	**50 mg/kg**	**no standard**	**<350 mg/kg**
ERRCO(NH)	0.9%	81	10.0%	44
LL&S(NH)	1.8%	14.8	5.1%	314
KTI(ME)	3.7%	77	12.2%	24
ARC(ME)	0.0%	67	6.0%	119
Pond View.(RI)	0.0%	41.5	1.5%	82
NER(MA)	0.3%	110	1.4%	44
Simpson(ME)	0.3%	51.8	7.9%	56
Plan-It(ME)	1.4%	23.2	8.4%	139
Old Town(ME)	1.5%	55.3	12.9%	78
WMI(ME)	0.6%	51.2	4.9%	46
Augusta(ME)	1.0%	17.9	15.5%	124
Boothbay(ME)	0.0%	40.2	4.3%	76

Shaded results exceeded Chapter 418 standards.

C. CDD Wood Fuel Use – Impacts

1. Ash Generation

The amount of ash generated by a biomass boiler depends upon the composition of the fuel used. For planning purposes, the standard industry assumption when burning 100% "green" wood (i.e., no CDD wood) is that the weight of ash will be 3% of the weight of the fuel input. No similar standard assumptions have been developed for facilities that burn any defined amount of CDD wood fuel. To project the amount of ash that may be generated by facilities operating in Maine, Department staff developed the following estimates based on historic data and accounting for the significant decrease in percent fines allowed in CDD wood fuel under the new Chapter 418 standards:

Ash derived form burning 50/50 CDD/greenwood = 6%
Ash derived form burning 100% CDD = 8%

Table 5 shows the amounts of ash expected to be generated by each facility if it burns no CDD wood fuel and burns its maximum permitted amount of CDD wood fuel. These numbers can be used to calculate landfill capacity needed to accommodate ash from the combustion of CDD wood fuel in these biomass boilers.

Table 5
Annual Maximum Fuel Use and Ash Generation from Current and Proposed CDD Wood Combustion Facilities

Facility	Maximum Tons Fuel	Maximum tons CDD wood fuel	Tons Ash no CDD wood fuel	Tons Ash max CDD wood fuel	Cubic Yards Ash* – no CDD wood fuel	Cubic Yards Ash* – max CDD wood fuel
Boralex – Livermore	396,000	198,000	11,880	23,760	9,504	19,008
Boralex – Stratton	540,000	270,000	16,200	32,400	12,960	25,920
Red Shield Old Town	200,000	100,000	6,000	12,000	4,800	9,600
S.D. Warren Westbrook	490,000	245,000	14,700	29,400	11,760	23,520
Gen Power	558,000	558,000	N/A	44,640	N/A	35,712
Totals	2,184,000	1,371,000	48,780	142,200	39,024	113,760

***Density of CDD ash averages 1.25 tons/cubic yard when landfilled.**

If these five biomass boilers burned CDD wood fuel at their actual/proposed maximum licensed/designed capacities, 100,752 yds^3 more ash would be generated annually than if they burned only green wood and no CDD wood fuel.

Based on historic operations, it is more likely that the facilities which are not specifically designed to burn CDD wood fuel will burn less than 50%. If GenPower is licensed and built to combust only up to 50% CDD wood fuel and all five facilities burn a somewhat lower percentage of CDD wood fuel, assuming that the resulting amount of ash will be 5% of the fuel input, the total expected increased landfill capacity needed would be 87,360 yds^3 annually. (GenPower would generate 13,392 yds^3 more ash if it burned 100% CDD wood fuel than if it only burned 50% CDD wood fuel).

In general, ash from the burning of CDD wood fuel is similar to ash derived from the burning of municipal solid waste or from open-burning of CDD at transfer stations or landfills in the state, as shown in **Table 6**. The levels of arsenic and lead present are significantly below the hazardous thresholds.

Table 6
Comparison of Ash Sampling Results from
Biomass Boilers, Waste to Energy Facilities and Open Burn Piles
(2005-2006 Sampling Data)

	arsenic	lead	mercury
Hazardous Threshold	5.0 mg/kg	5.0 mg/kg	0.20 mg/kg
BIOMASS BOILERS (burning CDD wood)			
Stratton (combined ash)	0.14	0.1	not detected
Livermore(fly ash)	0.23	0.3	not detected
Livermore.(bottom ash)	0.16	0.2	not detected
WASTE TO ENERGY FACILITIES			
Maine Energy (RDF*)	0.084	0.220	0.003
EcoMaine. (mass burn)	0.035	0.375	0.003
OPEN BURN PILE ASH			
Mean**	0.19	0.46	<0.20

****Refuse derived fuel***
***** Mean calculated from data representative of ash from 12 municipal transfer station open burn piles.***

2. Landfill Capacity

To the DEP's knowledge, none of the residues from the out-of-state processing of CDD wood into fuel was sent to Maine landfills. Therefore, the impact on landfill capacity that out-of-state fuel had on Maine landfill disposal capacity is limited to that portion of the boiler ash that was derived from out-of-state fuel, i.e., approximately 43,000 tons or 34,300 yds^3 (cubic yards).

Some out-of-state CDD was processed by KTI in Lewiston, Maine, and the resulting CDD wood fuel was utilized by Boralex. The wastes from processing

this CDD into fuel were disposed in Maine. In 2005, KTI received 58,117 tons of in-state and out-of-state waste. Of this waste, 23% of the material received (13,368 tons) was non-processible waste that was landfilled in Maine. About 50% of this was derived from out-of-state material, resulting in 6,685 tons of out-of-state waste landfilled in Maine after processing, using about 5,347 yds^3 of landfill space.

In 2005, 16,106 tons (12,885 yds^3) of ash from Boralex Livermore was disposed of in the IP papermill landfill in Jay, Maine to increase the stability of the landfilled paper mill sludge. The amount of IP's landfill capacity used in that year for Boralex-Livermore ash derived from out-of-state CDD wood fuel was less than 4% of the capacity used that year. Assuming that both the ash from Boralex Stratton and the process waste from KTI-Lewiston were disposed in the Pine Tree landfill in Hampden in 2005, 22,791 tons of CDD processing waste and fuel combustion ash are attributable to out-of-state sources. Pine Tree Landfill received a total of 672,317 tons of waste (all types) in 2005. Therefore, the waste attributable to out-of-state CDD wood fuel from Stratton and processing of out-of-state CDD at KTI was less than 3.5% of the total waste received by Pine Tree Landfill in 2005. Maine's two commercial landfills, Pine Tree and Waste Management in Norridgewock, also received about 238,000 tons of mixed CDD from out of state in 2005.

Remaining capacity for the landfills that are licensed to accept ash from biomass boilers that burn CDD wood fuel is estimated to be:

- Pine Tree Landfill 1,026,915 yds^3
- Juniper Ridge Landfill 9,500,000 yds^3
- Waste Management Crossroads Landfill 4,300,000 yds^3

(Total: 14,826,915 yds^3)

Maximum use of CDD wood fuel in the next few years would use less than 1% of this current remaining landfill capacity annually. Also, it is likely that some of the ash from the biomass boilers will continue to be disposed of in generator-owned landfills to add stability to papermill sludge.

V. BEST AVAILABLE CONTROL TECHNOLOGY FOR BURNING CDD WOOD FUEL

A. Best Available Control Technology

"Best Available Control Technology" as defined in 06-096 Chapter §100 means: "an emission limitation (including a visible emissions standard) based on the maximum degree of reduction for each pollutant emitted from or which results from the new or modified emissions unit which the Department on a case-by-case basis, taking into account energy, environmental and economic impacts and other costs, determines is achievable for such emissions unit through application of production processes or

available methods, systems, and techniques, including fuel cleaning or treatment or innovative fuel combination techniques for control of each pollutant. In no event shall application of BACT result in emissions of any pollutant which would exceed the emissions allowed by any applicable standard under 40 CFR Part 60 and 61 or any applicable emission standard established by the Department. If the Department determines that technological or economic limitations on the application of measurement methodology to a particular emissions unit would make the imposition of an emission standard infeasible, a design, equipment, work practice, operational standard or combination thereof may be prescribed instead to satisfy the requirement for the application of BACT. Such standard shall, to the degree possible, set forth the emission reduction achievable by implementation of such design, equipment, work practice or operation, and shall provide for compliance by means which achieve equivalent results."

BACT analyses for the criteria air pollutants (nitrogen oxides, sulfur dioxide, carbon monoxide, particulate matter and volatile organic compounds) have been required since the 1977 Clean Air Act Requirements became effective. The program required that, regardless of existing air quality, new emission sources subject to the EPA New Source Review program would be controlled to a level that represents BACT. This requirement precludes potential applicants from shopping for areas with less stringent emission limitations, and also promotes the research and development of more efficient and more economic alternative technologies.

The Northeast States for Coordinated Air Use Management (NESCAUM) developed a BACT Guideline in June 1991 to promote consistent analyses of proposed control technologies and consistent procedures for reviewing BACT determinations from state to state. A uniform set of procedures ensures equitable treatment for prospective applicants and also reduces pressure on reviewing agencies to establish less stringent controls compared to similar projects located elsewhere.

The NESCAUM BACT Guideline employs a "top down" approach. The starting assumption for the top down approach is that the most stringent control possible is BACT. The burden of proof for applying a less stringent level of control rests in the applicant's case specific evaluation of the control alternatives.

B. Maximum Achievable Control Technology (MACT)

The Environmental Protection Agency adopted a new strategy for dealing with air toxics in the 1990 Clean Air Act Amendments called Maximum Achievable Control Technology, or MACT.

The strategy abandoned EPA's 1977 Amendments' risk based approach to controlling air toxics in favor of a new technology approach. The standards were developed based on control strategies used by source categories or industries and are comprised of three components. In the first phase, EPA developed a list of 188 hazardous air pollutants (HAPS) and the industries or source categories emitting those pollutants were

determined. This created a matrix of 174 different source categories covering major emitters of the 188 HAPS. EPA also designated a list of seven carcinogenic or persistent bioaccumulative toxins (PBT's) which would also be regulated under 40 CFR Part 63.

EPA next began developing MACT standards for these pollutant-source combinations. The MACT standards required sources to meet specific emissions limits that are based on emission levels already being achieved by similar sources in the country. To accomplish this, EPA surveyed a source category or industry and determined the top 12% best controlled facilities. For categories with less than 30 sources, EPA looked at the top five best controlled facilities. EPA developed emission standards based on the control technologies or operational practices utilized by these top sources.

After the implementation of all the MACT standards, EPA will return to a risk-based approach to assess how these technology-based emission limits are protecting public health and the environment. Based on this assessment, EPA may implement additional standards to address any significant remaining, or residual, health or environmental risks.

Boilers at facilities which are major emitters of hazardous air pollutants are subject to 40 CFR Part 63, Subpart DDDDD, National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers and Process Heaters. New units at these facilities must meet 0.025 lbs per million Btu for particulate matter, and existing units must meet 0.07 lbs per million Btu. All existing units in Maine subject to this MACT standard presently meet the 0.07 lbs per million Btu limit and most already meet the 0.025 lbs per million Btu standard required of new sources

C. Air Toxic Regulation in Maine

There are few air toxics in Maine which have ambient air quality standards (MAAQs) developed and contained in statute. Other air toxics are evaluated using risk based, Maine Ambient Air Guidelines (MAAG) developed by the Department of Health and Human Services' Center for Disease Control and Prevention, Division of Environmental Health (DEH). The DEH uses a risk-based approach for developing MAAG values that are set to be protective for both carcinogenic and non-carcinogenic effects. When considering the non-carcinogenic toxicological effects, the levels are set that represent a minimal risk of a deleterious effect from lifetime exposure even for sensitive subpopulations.

For carcinogenic or probable human carcinogens the MAAG values are derived using a quantitative estimate for the chemical's inhalation carcinogenic potency which is used with the target incremental lifetime cancer risk over background rates of a cancer risk of one in one-hundred thousand to calculate the MAAG value. Thus, a lifetime exposure above the MAAG concentration value could result in a cancer occurrence of one in one hundred thousand individuals.

D. BACT for CDD in Maine

There are presently seven facilities in the State licensed by Department's Bureau of Air Quality (air emission licenses) to combust CDD wood fuel. These facilities are;

- Red Shield in Old Town
- Greenville Steam in Greenville
- SAPPI in Westbrook
- Wheelabrator Sherman in Sherman; and
- Boralex - Stratton,
- Boralex - Livermore Falls
- Boralex - Ashland.

These facilities may utilize between 5% and 50% (by weight on an annual basis) CDD as their total fuel fed to the boilers.

BACT for boilers utilizing CDD wood as a fuel has included high efficiency particulate control in the form of electrostatic precipitators. Air toxic emissions, namely metals and dioxins, adhere to particulate matter and can be effectively removed in this manner. Electrostatic precipitators generally perform at greater than 99% efficiency for removing particulate matter from the flue gas stream. The electrostatic precipitators can also meet Subpart DDDDD, MACT limits. Another form of high efficiency particulate control is through the use of a baghouse. Baghouse control can achieve a slightly higher efficiency than electrostatic precipitators and would likely be required of a new source proposing to combust CDD wood fuel.

E. Fate of Dioxin and Arsenic from CDD Burning

The University of Maine study resulting in the report entitled, "Fate of Dioxin and Arsenic from the Combustion of Construction and Demolition Debris and Treated Wood", as described in Section II(C) above, was evaluated by the Bureau of Air Quality. The study determined that the worst case ambient air quality impact results from the Livermore Falls facility were only 30% of the Maine Ambient Air Guideline (MAAG) value for arsenic and 0.47% of the MAAG value for dioxin. For the Stratton facility, the worst case impact levels were 3.5% of the MAAG value for arsenic and 0.24% of the MAAG value for dioxin. These values were calculated based on Industrial Source Complex Simple Terrain (ISCST3), refined air dispersion modeling using 5 years of hourly off-site meteorological data.

It was reported in the study that elevated arsenic levels were observed during one of the stack test runs for particulate matter at the Boralex Livermore Falls facility. One of the four electrostatic precipitator fields (ESP) was shut off during the run, leaving only three fields energized. Additional testing runs using all ESP fields resulted in arsenic levels that were approximately 3.5% of the MAAG value for arsenic. As a result of that information, Bureau of Air Quality staff has amended the air emission licenses for those utilizing electrostatic precipitators to require that all fields be in operation when burning CDD wood fuel.

The study determined that arsenic and dioxin emissions from the combustion of CDD wood do not pose an unreasonable risk to public health based on the Maine Ambient Air Guidelines. It is the Department's expectation that the concentrations of metals and compounds currently being tested for at the facilities burning CDD wood will likewise not pose unreasonable public health risks. The Department is presently evaluating that data.

F. Ongoing Air Toxics Investigation into CDD Wood Fuel

In November of 2005, the Bureau of Air Quality (Bureau) convened a meeting with those facilities in Maine that were burning CDD wood fuel. At that meeting, the Bureau expressed its concern about the relationship between arsenic emissions and electrostatic precipitator operations, as well as the need for increased stack emission testing for additional chemicals and compounds. Those in attendance acknowledged the need for additional air toxics data on stack emissions and agreed to sample for the following metals and compounds based on the frequency noted below, as well as to submit applications to amend their air emission licenses to make the additional testing agreements enforceable:

- For facilities burning between 25 to 50% CDD, stack test two times per year for two years spaced six months apart;
- For facilities burning between 10 to 25% CDD, stack test once per year for two years; and
- For facilities burning less than 10% CDD there is no additional stack testing requirement.

The chemicals and compounds to be stack tested for are antimony, arsenic, cadmium, chromium, copper, lead, mercury, nickel, selenium, vanadium, hydrogen chloride, and dioxin.

The results of the stack testing will be used with facilities' previous site specific air dispersion modeling analyses to determine that the Maine Ambient Air Guidelines are being met. Further, the Department indicated that it would evaluate the data after the first two years of sampling to determine future testing requirements.

Some stack testing data had been obtained and a preliminary review of one data set for the SAPPI Westbrook facility is show below in **Table** 7 . The data was used in concert with previous ISCST3, refined air dispersion modeling performed on the mill's #20 power boiler and shows the predicted impacts from the seven metals and compounds listed to be well below either the Maine Ambient Air Quality Standard or the Maine Ambient Air Guideline.

Table 7
Westbrook Stack Testing – Metals
(2006 data)

Metal	Maine Ambient Air Standard (ug/m^3)	Bureau of Health Ambient Air Guideline (ug/m^3)	Impact (ug/m^3)	% of Guideline or Standard
Arsenic		0.002	0.00062	31%
Cadmium		0.006	0.000039	0.65%
Chromium	0.3		0.00029	0.65%
Copper		2	0.00039	0.02%
Lead	1.5		0.034	0.23%
Manganese		0.05	0.00088	1.8%
Mercury		0.3	<0.00029	0.1%

G. Conclusion: What is BACT for CDD?

BACT for CDD wood fuel combustion will vary depending on the type and configuration of the facility proposed.

For facilities combusting CDD wood, the study noted above identified a direct correlation between arsenic emissions and electrostatic precipitator operation. Upon discovery of that correlation, the Department moved to amend the air emission licenses of those facilities with electrostatic precipitators which were combusting CDD wood. These facilities are now required to cease CDD wood combustion unless all of the fields of the electrostatic precipitator are fully operational. Any future BACT determination for CDD combustion at existing facilities utilizing electrostatic precipitators will contain this requirement.

BACT for new sources applying to use CDD wood as fuel shall be the use of a baghouse for high efficiency particulate control and the emission unit shall be subject to the requirements of 40 CFR, Part 60, Subpart DDDDD, National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers and Process Heaters.

List of Appendices

- Appendix A – PL 2006 Chapter 617, An Act to Ensure Proper Disposal of Debris and Protection of the Environment
- Appendix B – CMR 06-096 Chapter 418 Section 6 (Beneficial use of Solid Waste – Fuel Substitution)
- Appendix C – Components of Processed Construction and Demolition Debris from 4 New England Processing Facilities

APPENDIX A

Pl 2006 Chapter 617
An Act to Ensure Proper Disposal of Debris and Protection of the Environment

APPROVED CHAPTER

MAY 02 '06 617

BY GOVERNOR PUBLIC LAW

STATE OF MAINE

IN THE YEAR OF OUR LORD
TWO THOUSAND AND SIX

S.P. 47 - L.D. 141

An Act To Ensure Proper Disposal of Debris and Protection of the Environment

Emergency preamble. **Whereas,** acts of the Legislature do not become effective until 90 days after adjournment unless enacted as emergencies; and

Whereas, the current rules regarding beneficial use of secondary materials do not adequately provide for the regulation of the use of construction and demolition debris; and

Whereas, rules are needed to provide facilities and potential facilities that are seeking to make investments in the State with the necessary regulatory framework under which facilities will be required to operate; and

Whereas, in the judgment of the Legislature, these facts create an emergency within the meaning of the Constitution of Maine and require the following legislation as immediately necessary for the preservation of the public peace, health and safety; now, therefore,

Be it enacted by the People of the State of Maine as follows:

Sec. 1. 38 MRSA §1306, sub-§6 is enacted to read:

6. **Construction and demolition debris.** The substitution of wood from construction and demolition debris for conventional fuels used in a boiler may not exceed 50% of total fuel by weight combusted on an average annual basis.

Sec. 2. Rule adoption. Notwithstanding the Maine Revised Statutes, Title 5, chapter 375 and Title 38, section 341-D, subsection 1-B, within 30 days after the effective date of this Act, the Board of Environmental Protection shall adopt the rule amendments to Chapter 418: Beneficial Use of Solid Wastes, Chapter 402: Transfer Stations and Storage Sites for Solid Waste, Chapter 405: Water Quality Monitoring, Leachate Monitoring, and Waste Characterization and Chapter 409: Processing Facilities that were proposed to the Board of Environmental Protection by the Department of Environmental Protection and that, following notice and comment as required by Title 5, chapter 375, were the subject of a public hearing before the board on November 17, 2005, except that the rules must reflect the changes made by the department that were contained in the draft rules submitted to the board on March 16, 2006 and may not allow the substitution of wood from construction and demolition debris for conventional fuels used in a boiler to exceed 50% of total fuel by weight combusted on an average annual basis pursuant to Title 38, section 1306, subsection 6. Amendments to chapters 418, 402, 405 and 409 that are adopted by the board after 30 days after the effective date of this Act are routine technical rules as defined by Title 5, chapter 375, subchapter 2-A.

Sec. 3. Source separation report. The Department of Environmental Protection shall evaluate the feasibility of requiring source separation and state-of-the-art processing that will achieve, to the greatest extent practicable, the removal of all toxic materials from construction and demolition debris prior to combustion in a boiler. The evaluation must include, but is not limited to, a review of the "positive pick" method of sorting, and requiring material separation at the location at which buildings are demolished. By February 1, 2007, the department shall submit a report in connection with the evaluation to the joint standing committee of the Legislature having jurisdiction over natural resources matters. The report must include the department's findings and recommendations and any proposed legislation.

Sec. 4. Best available control technology report. The Department of Environmental Protection shall evaluate the economic and technological feasibility of requiring all boilers that burn construction and demolition debris to use the best available control technology in order to minimize toxic air emissions. By February 1, 2007, the department shall submit a report in connection with the evaluation to the joint standing committee of the Legislature having jurisdiction over natural resources matters. The report must include the department's findings and recommendations and any proposed legislation.

Sec. 5. Report regarding amount of construction and demolition debris wood fuel substitution. The Department of Environmental Protection shall evaluate the effects of allowing the substitution of wood from construction and demolition debris for conventional fuels used in a boiler to exceed 50% of total fuel by weight combusted on an annual average basis if the following conditions are met:

1. The boiler is designed and constructed for the primary purpose of power generation and not waste disposal;

2. The boiler employs the best available control technology as determined by the department; and

3. All other applicable regulatory standards are met with regard to the facility.

By February 1, 2007, the Department of Environmental Protection shall submit a report in connection with the evaluation to the joint standing committee of the Legislature having jurisdiction over natural resources matters. The report must include the department's findings and recommendations and any proposed legislation.

Sec. 6. Authority to report legislation. The joint standing committee of the Legislature having jurisdiction over natural resources matters may report out legislation to the First Regular Session of the 123rd Legislature relating to the reports submitted by the Department of Environmental Protection pursuant to sections 3, 4 and 5.

Emergency clause. In view of the emergency cited in the preamble, this Act takes effect when approved.

APPENDIX B

CMR 06-096 Chapter 418 Section 6
(Beneficial Use of Solid Waste – Fuel Substitution)

(6) A handling and use plan including provisions for storage and de-watering of the dredge material. It must provide that the storage will not pose a hazard to public health and that the storage or beneficial use of the dredge material will not result in any illegal discharge of sediments or contaminants to waters of the State.

(7) If the beneficial use of ash or dredge material is proposed, a construction drawing for the location(s) of the beneficial use activity, with the property boundary and the location of ash or dredge material in plan and representative cross section views clearly marked and noted on the drawing. The cross-section must clearly indicate the location and depth of each material layer as applicable (gravel, ash geotextile, surface course, etc.).

(8) If the beneficial use of ash is proposed, written permission from the owner of the property on which the ash is to be beneficially used must be submitted.

(9) If the beneficial use of ash as a construction material under paragraph B is proposed, documentation that the beneficial use is not within the watershed of a water body classified GP-A; or, if the beneficial use is in a class GP-A watershed, a phosphorus control plan that minimizes adverse affects to surface waters must be submitted.

6. Fuel Substitution. Any person proposing to beneficially use secondary materials as a fuel in a boiler or cement kiln designed to combust conventional fuels, including fossil or biomass fuels, must obtain a license pursuant to the requirements of this section and the general standards of section 3 of this rule. The substitution of secondary material(s) for conventional fuels used in a boiler or cement kiln shall not exceed 50% of total fuel by weight combusted on an average annual basis.

For the purpose of this rule, "wood from construction or demolition debris" or "CDD wood" means the wood component of solid waste resulting from construction, remodeling, repair and demolition of structures.

A. Application Requirements. The following information must be submitted to the Department in an application for a fuel substitution permit.

(1) A description of the secondary material proposed for fuel use.

(2) An Operations Manual in accordance with the requirements of this Section.

(3) The most recent, full size U.S. Geological Survey topographic map (7.5 minute series, if available), or equivalent map of the area, showing the property boundary and location on that property of the boiler or cement kiln proposing the fuel substitution. GPS coordinates of the activity shall be provided in the project description.

(4) A signed contract or letter of intent from a facility licensed to accept all residues and by-pass wastes.

(5) A hazardous and special waste handling and exclusion plan in accordance with the provisions of Chapter 400, section 9 of these rules.

(6) The results of a trial burn, unless such a burn is specifically waived by the Department, and any other appropriate information regarding the suitability of the waste for fuel use. Trial burns and the submission of related information shall be conducted in accordance with the following provisions:

(a) Prior to conducting a trial burn, the applicant shall notify the Department's Bureau of Air Quality of the proposed test burn. The following information must be submitted to the Division of Solid Waste Management, as a Letter of Intent, a minimum of ten (10) working days prior to the start of the trial burn:

(i) The estimated maximum annual quantity of the secondary material proposed for combustion.

(ii) Results of the characterization of the secondary material, including a minimum of one sample for each 100 tons of waste for the first 400 tons from each source for each proposed fuel or fuel blend proposed for study during the trial, and one sample for each 1,000 tons thereafter for the parameters below:

a. TCLP metals parameters;

b. total Arsenic, Lead, Asbestos and PCB;

c. physical characterization using Department approved methods; and,

d. other parameters as required by the Department.

For CDD wood fuel, each sample must be a composite of 20 one quart samples representative of the trial period; large particle size solid fuel must be pulverized and thoroughly mixed prior to sample reduction and analysis using a Department approved method. Enough fuel must be available to conduct a trial burn for each proposed fuel blend to allow sampling over an 8 hour period.

(iii)Information outlining the objectives of the trial burn, how the secondary material waste will be transported, stored, and otherwise managed, the quantity of waste to be burned, the scheduled times and dates of the trial burn, and an ash testing program needed to adequately characterize ash constituents and levels of pollutants.

(b) The trial burn will be conducted per the submitted Letter of Intent and approval obtained from the Bureau of Air Quality Control. .

B. Operating Requirements. Each licensee must comply with the following operating requirements.

(1) Residue and Waste. The licensee shall maintain a valid contract or agreement with a solid waste facility approved to accept by-passed waste and/or residues from the boiler or cement kiln.

(2) Dust, Litter and Odor Control. The licensee shall undertake suitable measures to control dust, litter (including fines from fuel and ash) and odors resulting from the use of secondary material as a fuel.

(3) Storage Requirements.

(a) All fuel substitution licensed under this section must occur at a boiler or cement kiln designed and operated to collect, store and handle ash in enclosed buildings, or the equivalent (e.g., covered conveyors and transfer points, leak proof containers, tanks), to prevent fugitive dust emissions and to prevent direct exposure of the ash to the weather during collection, storage, handling and transport off site.

(b) Storage areas for secondary material for use as substitute fuel shall be clearly identified and public access excluded.

(c) Secondary material that cannot be used as substitute fuel by the boiler or cement kiln shall be removed and disposed of at a licensed facility at least weekly unless other procedures have been reviewed and approved by the Department.

(d) Licensees shall manage fuel according to a fuel management plan which shall be included in the Operations Manual for the facility. The fuel management plan shall include:

(i) A detailed description of the fuel storage area and its operation including: an asphalt or concrete base pad shown in plan view along with typical cross sections; provisions for leachate management, collection and disposal; and, control of wind blown fines;

(ii) For CDD wood fuel, limitation of the fuel pile size to no more than 8 weeks of fuel;

(iii)Description of fuel flow through the facility that provides for consumption of oldest fuel first and a plan view of the storage pad at a minimum scale of 1"=50' that depicts the sequence of fuel flow, oldest to newest, throughout the pad area;

(iv) Procedures for blending fuel;

(v) Procedure for the minimization of fuel stockpile volume and fuel fire risk for the duration of planned shutdowns;

(vi) For CDD wood fuel, a Fire Safety Action Plan that includes procedures for monitoring internal pile temperatures or the use of thermal imaging devices or other technology that provide for maintaining internal pile temperatures less than 185 degrees Fahrenheit. The Fire Safety Action Plan must describe procedures and equipment that will be used when internal pile temperatures meet or exceed 185 degrees F or in the event of a pile fire. The Fire Safety Action Plan shall be submitted to the local fire safety authority for its review. If that authority makes recommendations concerning the plan, those recommendations shall be included in the plan prior to submittal to the Department. The Department may waive the requirement for a Fire Safety Action Plan upon a showing that such a plan is not

warranted due to small volumes of CDD wood fuel proposed to be stored and/or short residency times in storage.

(vii) For facilities that store fuel outside, an Environmental Monitoring Program designed and implemented in accordance with Chapter 405;

(viii) A storage pad inspection and maintenance program that provides for annual inspection and repair of the pad.

(4) Acceptable Secondary Materials.

(a) General Standard. The licensee may beneficially use as a fuel substitute only the type and quantity of secondary material specifically licensed or allowed under this chapter.

(b) Prohibited Materials. A licensee may not accept CDD wood as a fuel unless the Quality Assurance / Quality Control Plan required by Section 6(B)(4)(d) specifically provides that the source(s) of the wood fuel has implemented a plan for the removal of arsenic and pentachlorophenol treated wood (including but not limited to utility poles) prior to processing of the CDD wood into fuel.

(c) Standards for CDD Wood Fuel. Sources of processed construction or demolition debris wood must be examined by the licensee and found to consistently produce a product that meets or exceeds the wood fuel quality standards in (i) below prior to blending with other fuels. The fuel quality standards in (ii) below must be met after any blending and prior to combustion. As used in this subsection, "source" means the facility where the processing of CDD wood into fuel occurs; and "publicly owned source" means a facility where the processing of CDD wood into fuel occurs that only accepts CDD wood that is generated in member municipalities, and that is owned by a municipality, a quasi-municipal entity, a county, a public waste disposal corporation under 38 MRA Section 1304-B, or a refuse disposal district under 38 MRSA Section 1701 et seq.

(i). Fuel Quality Standards for CDD Wood:

a.	non-combustible fraction exclusive of rocks, brick, and concrete	<1%
b.	plastics	<1%
c.	CCA (chromated copper arsenate) treated wood	<1.5%
d.	#4 minus fines (for publicly owned sources regulated under the Maine Solid Waste Management Rules)	20%
e.	#4 minus fines (for sources other than publicly owned)	10%
f.	asbestos	<1%

(ii) Fuel Quality Standards for Blended Biomass Wood Fuel:

g.	arsenic	<50 mg/kg
h	lead	<375 mg/kg
i.	PCB	<0.74 mg/kg

(d) The licensee shall provide the Department with a Quality Assurance/Quality Control Plan for assuring that CDD wood fuel used by the facility will remain consistent with the standards above. The QA/QC plan shall be included in the Operations Manual for the facility. The plan shall include the following elements:

(i) All work involved in certifying that the fuel meets standards in paragraph 4(c) of this section for CDD wood fuel must be done by a qualified third party, independent from the fuel source and the licensee. A minimum of 4 composite samples over a thirty day period per source is necessary to certify a new source . Annually thereafter, each source must be recertified. A minimum of 1 composite sample per 10,000 tons or if less than 40,000 tons is received from a source each year, 4 samples per year. Each sample must be a composite of a minimum of 20 one quart samples; Facilities that process fewer than 4 times per year must sample once per processing event.

(ii) Sampling and analysis required by Section 6(B) shall be done using Department approved methods. Physical sampling and analysis must be done in conformance with procedures established in Chapter 405, section 6(C)(6).

(iii) For each source, provide:

a. the name, location and a detailed description of the fuel processing methodology;

b. the compliance history for the past five years;

c. the estimated tons per year of fuel the source generates;

d. the estimated tons per year of fuel that will be supplied to the licensee;

e. a determination that each source has a program equivalent to the licensee's Hazardous and Special Waste Exclusion Plan referenced in Section 6(A)(5) of this rule for the removal of hazardous waste, arsenic and pentachlorophenol treated, charred or burned wood prior to processing fuel;

f. a description of the method by which the facility will evaluate and accept or reject the fuel certification information provided by the third party fuel inspector.

g. documentation that each source supplies CDD wood fuel that meets or exceeds the standards in 6(B)(4)(c)(i) of this rule.

h. a description of the method to inspect and accept or reject each load of CDD fuel.

(iv) On a monthly basis the boiler operator shall collect an 8-hour composite sample of the approved blended fuel from the conveyor feeding the boiler, combine 3 monthly composites for a quarterly composite, and analyze for chemical parameters listed in subsection 6(B)(4)(c)(ii) of this rule.

(v) When the sampling conducted under sub-section 6(B)(4)(c)(iv) above detects fuel that fails to meet the CDD fuel standards the licensee shall:

a. Retest within 7 days of receipt of notification of non-compliance with the standards and conduct: a statistical analysis in conformance with the approved QA/QC plan, of the data from the sampling and testing program; an evaluation of sources which may have caused or contributed to the possible deterioration of the fuel quality; and, an evaluation of possible errors, such as errors in sampling, analysis or mathematical problems with the test data;

b. Notify the Department of the results of the evaluation within 7 days of its completion;

c. If the evaluation confirms that the fuel does not meet the CDD fuel standards of Section (B)(4)(c), notify the source(s) of the substandard fuel;

d. Request submission of a report from the source(s) within 14 days of the notification provided pursuant to Section 6(B)(4)(d)(v)(c) above, for submission to and review by the Department, describing and documenting correction of the circumstances or conditions that caused the fuel to become non-compliant with the CDD wood fuel standards; and,

e. Cease acceptance of fuel from the source(s) if: the report requested pursuant to Section 6(B)(4)(d)(v)(d) above is not submitted to the Department within 14 days of the licensee's notification to the source(s); the report required pursuant to Section 6(B)(4)(v)(d) above is not approved by the Department; or the Department determines after review of the sampling and analytical results and the evaluation required in Section 6(B)(4)(d)(v)(b) above, that continued acceptance of the substandard fuel poses an unreasonable risk to public health or the environment.

(5) Boiler Operation

Facilities burning CDD wood fuel in their boilers shall:

(a) comply with stack testing requirements as specified by the Bureau of Air Quality; and,

(b) operate the boiler to meet all applicable emission standards and operate the particulate control device to Best Practical Treatment standards as specified by the Bureau of Air Quality.

NOTE: Facilities burning secondary materials in their boilers must comply with all applicable licensing and operating requirements of the Bureau of Air Quality.

C. **Operating Manual.** The licensee shall prepare and maintain an operating manual of current policies and procedures related to the beneficial use of the waste as a fuel substitute. The operating manual must include all information that would enable supervisory and operating personnel, and persons evaluating the beneficial use, to determine what sequence of operation, plans, diagrams, policies, procedures and legal requirements must be followed for orderly and successful operation on a daily and yearly basis. The manual must address all items contained in this Section. The licensee shall take whatever measures are necessary to familiarize all personnel responsible for beneficial use with relevant sections of the operating manual.

7. **Beneficial Use Licenses.** The requirements of this section apply to proposals for beneficial use of secondary materials which do not qualify for licensing under Sections 4, 5, or 6 of this rule.

A. **Pre-Application Requirements.** A person proposing to license the beneficial use of a secondary material under this section shall request a pre-application meeting with the Department. The pre-application meeting will include a discussion of the beneficial use proposal, and provide an opportunity for the applicant to receive guidance on risk assessment and/or risk management measures that may be required.

At least two weeks prior to the pre-application meeting, the applicant shall submit the following information to the Department.

(1) A description of the secondary material and its proposed use. This must include sufficient information to demonstrate that the proposed project is a beneficial use.

(2) Information regarding the physical, chemical and, where appropriate, biological characteristics of the secondary material.

(3) Results of analytical testing conducted in accordance with the requirements of Chapter 405 section 6(A), (B), and (C). The analytical requirements of Chapter 405, section 6(C) must be modified with Departmental approval to reflect all constituents that may reasonably be thought to be present and which may pose a risk to human health or the environment.

(4) The quantities, by weight and/or volume of the secondary material.

(5) A description of any risk management techniques being considered.

(6) If it is known that a risk assessment is necessary, a description of the proposed protocol for conducting the risk assessment.

B. **Risk Standard.** In addition to the general standards in Section 3 of this rule, the beneficial use of the secondary material must not result in a greater risk than that posed by current construction practices and materials, or in an aggregate risk to a highly exposed individual under the proposed use or all future planned uses exceeding an Incremental Lifetime Cancer Risk of 5 X 10-6 and a Hazard Index of 1/2. Any secondary material which does not contain levels of constituents in

APPENDIX C

Components of Processed Construction and Demolition Debris from 4 New England Processing Facilities

Components Of Processed Construction and Demolition Debris From 4 New England Processing Facilities

This chart prepared by DEP Staff on 1/19/2006

	KTI	ERRCO	LL&S	Pondview
Processed CDD Wood fuel	40%	40%	20%	35%
Shaping/Grading/ADC	28%	20%	30%	NA
Aggregate Material Used In Construction	5%	10%	22%	20%
Scrap Metal Recycled	4%	5%	8%	20%
Non-processable waste to landfill	23%	25%	20%	25%

Shaping/Grading/ADC materials are used within the confines of a landfill to shape and contour the landfill cap to promote drainage and as an alternate daily cover material.

Aggregate materials are dirt, brick, rocks and concrete and are used in various construction activities, usually as a road base material.

ERRCO is located in Epping, NH. Non-processable waste is landfilled in several NH landfills. The facility processes about 750 tons per day.

LL&S is located in Salem, NH. Non-processable waste is landfilled in several NH privately owned landfills. The facility processes about 750 tons per day.

Pondview is located East Providence, RI. Non-processable waste is landfilled at the RI Central Landfill (a State of RI owned facility) and by rail to other private disposal facilities out of state. The facility processes about 500 tons per day.

KTI Bio-Fuels is located in Lewiston, ME and non-processable waste is landfilled at a privately owned landfill in Hampden, ME. The facility processes < than 500 tons per day.