Clark County
Renewable Energy Park
Waste to Energy Feasibility Study

10/19/2010
Whisper Mountain Professional Services, Inc

Acknowledgment: "This material is based upon work supported by the Department of Energy under Award Number DE-EE000141."

CLARK COUNTY RENEWABLE ENERGY PARK

WASTE TO ENERGY FEASIBILITY STUDY

EXECUTIVE SUMMARY

The use of biomass as a renewable energy feedstock is gaining wide support within Idaho. Idaho has a wide variety of potential biomass sources including but limited to, municipal solid waste, agriculture waste in the form of crop residues, livestock wastes, i.e., manures, and small diameter woody biomass from public and private lands. This feasibility study was conducted by Whisper Mountain Professional Services on behalf of Clark County Economic Development with the primary purpose of determining if use of biomass as a renewable energy feedstock could facilitate the creation of a waste to energy facility in Clark County's Centennial Energy Park which is located in Dubois Idaho.

The study was funded through an Idaho Office of Energy Resources Grant. In summary the study included the following specific areas:

- An assessment of the volume of municipal solid waste (MSW) available in the region.
- An assessment of the volume and types of potential agricultural waste available in the region.
- An assessment of the woody biomass feedstock availability in the region.
- The conceptual design of a thermo-chemical technology facility that can process approximately 250 tons per day of MSW.
- A discussion of the market(s) for the electricity.
- A discussion of the facility site location considerations, permitting requirements, and utility issues.
- Conclusions and subcontractor recommendations including cost effectiveness, barriers, risks, and financing options.

Four specific forms of biomass were examined as part of the study process, municipal solid waste, agricultural crop residues, livestock waste or manure, and woody biomass. The study area included six counties in eastern Idaho, Clark, Fremont, Teton, Madison, Jefferson, and Bonneville. In the assessment area there are more than sufficient biomass sources to power a renewable electrical generating energy facility however, it was discovered that because of acquisition costs of the biomass feedstocks and the low price paid for electrical energy supplies only municipal solid waste power facilities are cost effective.

The study also examined if there were technologies currently deployed which could be used to convert biomass feedstocks into renewable electrical energy. The target price for the technology was established as $3.5-4.0M per MWe capacity. Several technologies were given a cursory review however, most were immediately found to exceed the target price primarily due to the

high cost of emission treatment facilities. At the suggestion of the Director of the Idaho Department of Commerce, Clark County directed Whisper Mountain to examine the Dynamis Energy 3.0 Waste to Energy Technology and to include the findings in this study. The design basis cost for Dynamis's Technology is $3.5M per MWe. The Dynamis Technology is discussed in the body of this report and was found to be a feasible cost effective solution to the conversion of biomass to renewable electrical energy.

Unfortunately three of the biomass forms were not found to be cost effective feedstocks for electrical energy creation. Electrical energy prices in Idaho are well below the national average. While some feedstocks may be cost effective in other energy markets only municipal waste, because of its disposal fee subsidy was deemed to be a cost effective biomass resource.

The creation of the Eastern Idaho Regional Solid Waste District was brought about as a significant outcome of this study. The feasibility of partnering regionally to find a solution to the disposal of municipal solid waste was firmly established. The Waste District is comprised of four Counties; Clark, Bonneville, Madison, and Fremont. Using the information gathered in the study the Waste District has forged a partnership which will commence the construction of a Waste to Energy Facility at the Centennial Energy Park in Dubois Idaho in early spring 2011. The facility will process 250 tons per day of municipal solid waste and will create a total base load power supply of 12 MWe and provide an annual net return to the counties of approximately $2.4.

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CLARK COUNTY RENEWABLE ENERGY PARK

WASTE TO ENERGY FEASIBILITY STUDY

INTRODUCTION

As part of an ongoing economic development program, Clark County Idaho is establishing an energy park on a 151-acre parcel within the City of Dubois. The anchor facility at the park is a proposed Waste-to-Energy (WTE) plant. The concept of the facility is to gasify municipal solid waste (MSW) from Clark and surrounding counties to make electricity. In addition to MSW, the plant may be able to use agricultural waste and woody biomass available in the region for feedstock. The current plan is to provide about 250 tons of feedstock per day to the facility and have a plant capacity in the range of 12 to 14 MW.

The County commissioned a study to assess the feasibility of the WTE plant. Specifically the study will assess the availability and associated cost of providing MSW, agricultural waste, and woody biomass to the proposed energy park not only for the WTE facility, but also to other symbiotic facilities which may use biomass for other energy producing uses. Additionally, the study evaluated the thermo-chemical technology provided by Dynamis Energy, LLC to determine if using it would be cost effective and environmentally acceptable.

Specific areas of emphasis in the study include the following:

- An assessment of the volume of municipal solid waste (MSW) available in the region, how much may be obtained under long-term contract and the financial arrangements and impacts of bringing MSW feedstock to the proposed facility. The assessment includes costs of handling and storage of the MSW, how various amounts will be managed, and an agreement template with neighboring counties on providing MSW to the proposed waste-to-energy (WTE) facility.
- An assessment of the volume and types of potential agricultural waste available in the region, how much may be obtained under long-term contract, and the cost for the agricultural waste feedstock at the source and delivered. The assessment includes costs of handling and storage of the agricultural waste, how various amounts will be managed, and an agreement template with agricultural waste providers.
- An assessment of the woody biomass feedstock availability in the region, how much may be obtained under long-term contract, and the cost for the woody biomass feedstock at the source and delivered. The assessment will identify specific potential public and private biomass supply in the region which could potentially be used as feedstock for a waste-to-energy (WTE) facility. The assessment should discuss all potential sources of fuel that may be used for a WTE plant including wood manufacturing waste, wood chips, sawdust, forest thinnings, and removals.
- The conceptual design of the Dynamis Energy thermo-chemical technology facility will assess whether a facility of this type could process approximately 250 tons per day of MSW. The conceptual design includes a description of the facilities footprint, equipment, processes, byproducts, as well as the permitting, capital, and operational costs.

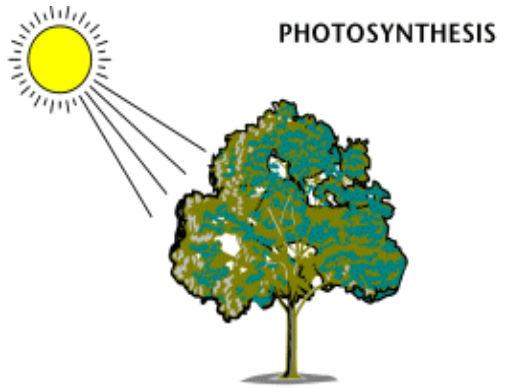
- A discussion of the market(s) for the electricity, including access to those markets, anticipated revenues, and return on the investment.
- A discussion of the facility site location considerations, permitting requirements, and utility issues.
- Conclusions and subcontractor recommendations including cost effectiveness, barriers, risks, and financing options.

DISCUSSION

In July 2009 Clark County Idaho was informed that its major private employer, Idahoan Foods, would be closing its potato processing facility outside of Dubois. The Idahoan Plant provided 60% of the private employment in Clark County. The County Commission tasked Ms. Kerri Ellis, the Clark County Economic Development Director to find a suitable replacement industry. The intent of the search was to replace the private jobs lost due to the Idahoan Plant closure. The County had been investigating several renewable energy projects in hopes of increasing County revenues. One such project was the creation of a Waste to Energy Facility whereby municipal solid waste could be converted to an energy source. This study examines the feasibility of converting Biomass to Energy and provides a path forward for Plant construction and operations.

Industry Perspective- Biomass to Energy

Biomass is organic material made from plants and animals. Biomass contains stored energy from the sun. Plants absorb the sun's energy in a process called photosynthesis. The chemical energy in plants gets passed on to animals and people that eat them. Biomass is a renewable energy source because we can always grow more trees and crops, and waste will always exist. Some examples of biomass fuels are wood, crops, and manure.



In the process of photosynthesis, plants convert radiant energy from the sun into chemical energy in the form of glucose - or sugar.

water + carbon dioxide + sunlight → glucose + oxygen
$6\ H_2O$ + $6\ CO_2$ + radiant energy → $C_6H_{12}O_6$ + $6\ O_2$

Another source of biomass is household garbage, also called municipal solid waste (MSW). Trash that comes from plant or animal products is biomass. Food scraps, lawn clippings, and leaves are all examples of biomass trash. Materials that are made out of glass, plastic, and metals are not biomass because they are made out of non-renewable materials. MSW can be a source of energy by either burning MSW in waste-to-energy plants, or by capturing biogas. In waste-to-energy plants, trash is burned to produce steam that can be used either to heat buildings or to generate electricity.

So garbage, the stuff nobody seems to want, can be used to produce electricity, heat, compost material, or fuels. For example California produces more than 60 million tons of biomass each year. Of this total, five million tons are now burned to make electricity. This is biomass from lumber mill wastes, urban wood waste, forest and agricultural residues, and other feed stocks.

If all of it was used, the 60 million tons of biomass in California could make close to 2,000 megawatt hours of electricity for California's growing population and economy. That's enough

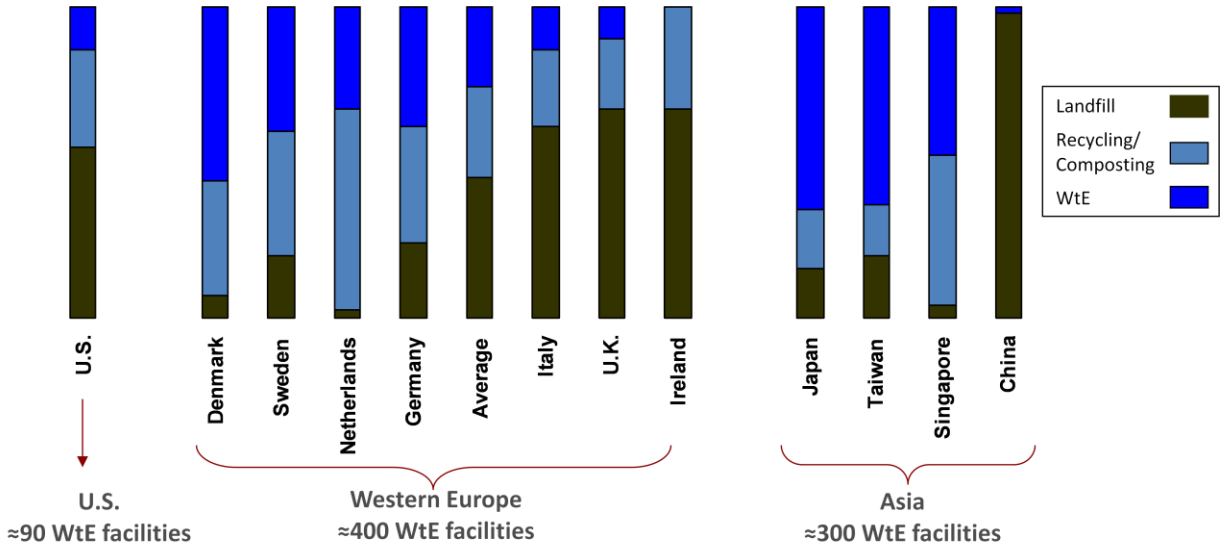
electricity for about two million homes!

Biomass is converted to energy in simple ways. The waste wood, tree branches, and other scraps are gathered together and transferred to receiving locations. Waste is also added from factories and farms at the receiving location. Rather than going to a landfill, local governments are seeking to utilize state of the art technologies to process the waste into energy.

Using biomass as an energy feedstock helps to reduce global warming compared to a fossil fuel-powered plant. Vegetation uses and stores carbon dioxide (CO2) when they grow, the stored CO2 in the plant is released when the plant material is burned or decays. By replanting the crops (renewal), the new plants can use the CO2 produced by the burned plants. So using biomass and replanting helps close the carbon dioxide cycle. However, if the crops are not replanted, then the carbon dioxide emitted through the process will contribute to global warming.[1] Use of biomass requires the "renewal" cycle to be a true carbon reduction practice.

The use of biomass to produce energy is a responsible environmental practice because the biomass is reduced, recycled, and then reused. Today, new ways of using biomass are still being discovered. The industry is moving quickly to the use of biomass conversion into Refuse Derived Fuels (RDF) as one way to reduce the carbon footprint and to create usable electrical energy.

Currently biomass fuels provide about 3 percent of the energy used in the United States. People in the USA are trying to develop ways to burn more biomass and less fossil fuel. Using biomass for energy can cut back on waste and support agricultural products grown in the United States. Biomass fuels also have a number of environmental benefits. The figure below illustrates the current status of waste to energy projects in the world.[2]

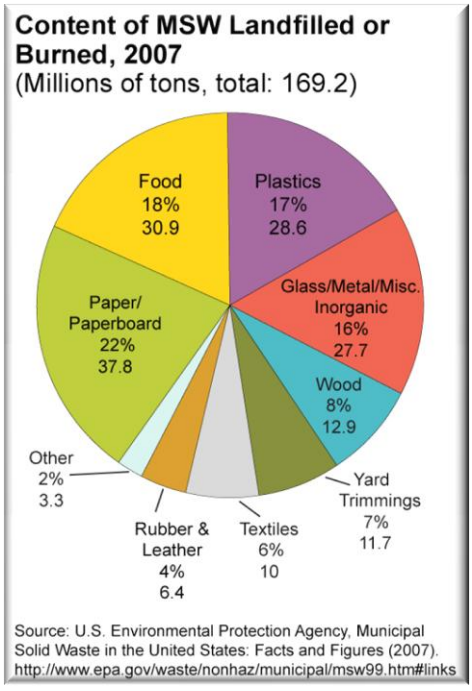


[1] http://www.eia.doe.gov/kids/energy.cfm?page=biomass_home-basics-k.cfm
[2] Dynamis Energy LLC, presentation to Clark County Board of County Commissioners, September 2009

MUNICIPAL SOLID WASTE

Although the first facility that combusted MSW for energy came on line in New York City in 1898, the industry did not experience rapid growth until 1978 with the enactment of the Public Utility Regulatory Policy Act (PURPA).[3] This legislation made it mandatory for utilities to purchase electricity from qualifying facilities (QFs), which were defined as "cogeneration or small power production facilities that meet certain ownership, operating, and efficiency criteria established by the Federal Energy Regulatory Commission pursuant to (PURPA)." This new law improved the economics of the many MSW waste-to-energy plants that qualified as QFs. PURPA mandated the price paid for electricity to be equal to the utility's avoided cost of energy and capacity, and this resulted in MSW QFs receiving a higher price for their power than they might otherwise have received.[4] MSW plants also benefited from the increased cost of landfilling due to increases in "tipping fees" (the cost to dump waste at a landfill), making disposing of MSW at a waste-to-energy plant less expensive than at a landfill in many cases.

MSW waste-to-energy plants have high capital costs, and in order to make these plants financially viable, project financers required the plant to obtain a reliable stream of low-cost fuel. Usually, a plant would enter into a "flow contract" in which a municipality delivered its waste stream to a specific plant. Thus, certain facilities held a *de facto* monopoly over a certain locality's MSW. In some cases, these contracts were seen as restricting interstate commerce in municipal wastes, and in 1994 the U.S. Supreme Court upheld a challenge to flow control, finding that it violated the interstate commerce clause of the Constitution. This ruling partially or fully voided many flow supply contracts and created an added constraint on the waste-to-energy industry. Subsequent to this ruling, few plants have been able to come on line.[5]



In Idaho the long term disposal contracts for MSW have also come under question because of the 2006 Frazier decision issued by the Idaho Supreme Court.[6] Based on this decision Idaho government entities cannot commit to long term contracts without the approval of the voters. While there currently is a proposal to amend the Idaho Constitution to remove this requirement all forms of local government in Idaho are held to the decision. This current constitutional limit makes it very difficult for counties to develop and fund renewable energy projects.

[3] Public Law 95-617, Public Utility Regulatory Policies Act of 1978.
[4] The incremental cost to the electric utility of alternative electric energy which the utility would have generated or purchased from another source
[5] http://biomass.ucdavis.edu/materials/reports%20and%20publications/2003/2003_Solid_Waste_Conversion.pdf
[6] Idaho Supreme Court, May 2005 Term, City of Boise v. Frazier, No. 30944, April 13, 2006

MSW as Biomass

Garbage, often called municipal solid waste (MSW), is the source of about 10% of the total biomass energy produced in the United States. MSW contains biomass (or biogenic) materials like paper, cardboard, food scraps, grass clippings, leaves, wood, and leather products, and other non-biomass combustible materials, mainly plastics and other synthetic materials made from petroleum.

Americans produce more and more waste each year. In 1960, the average American threw away 2.7 pounds of trash a day. Today, each American throws away about 4.5 pounds of trash every day.[7]

Municipal Solid Waste could be the primary feedstock converted in a waste to energy plant. The average Idaho County hauls 60,000 to 70,000 tons of municipal solid waste to landfills each year. Over the past decade counties have been researching ways to better use municipal solid waste. Recycling has become a normal part of the waste disposal program in most counties, aluminum cans, plastic, glass, and newspaper are recycled during the sanitation process either at the curb or at the transfer station. By using recycling counties can remove items that are reusable. The remaining waste includes various paper products (roughly 38% of waste), food/household waste, and construction or yard waste which could be considered as biomass.

As part of this study MSW samples from Bonneville, Madison, and Clark Counties were analyzed to determine suitability for the waste to energy conversion process. The complete results of the analysis are located in Appendix 3. The analysis demonstrated the complexities of waste acceptance and the need for a reliable dry, homogenous feed source. Moisture content of the waste has a significant effect on the BTU content of the fuel as it does with any fuel type.

The following table provides the historical view of the availability of MSW in Clark, Bonneville, Fremont, and Madison Counties.

County	2006	2007	2008	2009
Fremont (St. Anthony landfill only)	**3,726**	**3,259**	**4,282**	**4,360**
Madison	**13,959**	**14,482**	**14,313**	**15,167**
Clark	**427**	**443**	**447**	**459**
Bonneville	**83,325**	**89,796**	**90,034**	**85,403**
TOTAL	**101,437**	**107,980**	**109,076**	**105,389**

Table 1
MSW Availability

[7] http://www.eia.doe.gov/kids/energy.cfm?page=biomass_home-basics-k.cfm

The average tipping fee for municipal waste in the Western U.S. in 2004 was $37.74[8] that number rose to $42.08 in 2008. According to David Babbitt, the Public Works Director of Bingham County Idaho, the life cycle cost of waste placed in a county owned and operated landfill ranges from $18 to $22 a ton. Currently the cost to tip at the Jefferson County Landfill at Mud Lake is $30.55 a ton. That cost is expected to increase annually. By comparison, Bonneville County charges out of county users, $38.00 a ton to tip at their landfill. Counties participating in the Clark County Waste to Energy facility could be offered competitive tipping fees for their municipal waste as an incentive for renewing contracts with the Waste to Energy Facility. The cost of accepting tires as feedstock at a competitive rate may encourage shipment to the Clark County Facility, offering another option to participating counties.

Tires as MSW

Tires, even though they are not a form of biomass, are another form of municipal waste and could serve as an energy source. After contacting transfer stations in southeastern Idaho, it was discovered that currently many transfer stations charge $3.00 - $5.00 to dispose of tires, with an additional $1.00-$3.00 fee for removal of the rim. Larger tires, such as truck and farming equipment have an additional fee for disposal, if they are accepted at all. Tire rims are placed in the metal recycling and the tire is placed in the tire recycling. Tires in Southeastern Idaho are then shipped to a plant in Salt Lake City, Utah to be shredded and used in making playground equipment and high school or college tracks. Tires mixed with other waste will gasify at a higher BTU content, thereby producing more electricity. (The analytical results from a tire sample are provided in Appendix 1.)

Discarded tires are in abundance in the study area. A typical large commercial tire dealership generates 600-800 waste tires per month. This does not include tires discarded by homeowners or retreading businesses. A tire disposal and recycling business which processes tires for the States of Oregon, Washington, California, and Idaho reported that it processed 10 million tires in 2008.[9]

Under Idaho Statute, Title 39 Chapter 65, Section 39-6508 - "PURPOSE. The state of Idaho supports and encourages the reuse and recycling of waste tires. The legislature finds the paramount public interest in regulating waste tires is to protect public health and safety. In particular, the legislature is concerned with eliminating potential fire hazards; minimizing or eliminating potential breeding grounds for disease-bearing insects; and eliminating potential sources of surface and ground water contamination."[10] An excellent way to "recycle or reuse" tires could be as use as fuel in a waste to energy facility.

[8] http://www.environmentalistseveryday.org/docs/Tipping-Fee-Bulletin-2005.pdf
[9] http://www.tiredisposal-recycling.com/DisplayPage.aspx?pageid=25
[10] http://legislature.idaho.gov/idstat/Title39/T39CH65SECT39-6508.htm

Tire Type	Fee W/Rim	Fee W/O Rim
Car, Lt Truck	$8.00 ea	$3.00 ea
Truck	$11.00 ea	$6.00 ea
Farm Implement	$45.00 ea	$40.00 ea
Earthmoving Equip	N/A	$100.00
Shredded tires	N/A	$250.00 ton

Table 2
Bonneville County Tire Disposal Costs

Tire Type	Fee W/Rim	Fee W/O Rim
Car, Lt Truck	$4.00 ea	$2.00 ea
Truck	$15.00 ea	$7.50 ea
Farm Implement	$30.00 ea	$15.00 ea
Earthmoving Equip	$50.00 ea	$25.00 ea

Table 3
Madison County Tire Disposal Costs

Tire Type	Fee W/Rim	Fee W/O Rim
Car	$4.00 ea	$2.00 ea
Lt. Truck	$6.00 ea	$3.00 ea
Truck	$30.00 ea	$15.00 ea
Farm Implement	$50.00 ea	$25.00 ea
Earthmoving Equip	$80.00 ea	$50.00 ea

Table 4
Fremont County Tire Disposal Costs

To aid in the encouragement of proper disposal of tires Clark County could offer the opportunity for participating counties to have their tire waste gasified with their municipal waste. This would increase the available BTU content of the waste and would decrease the cost of disposal for the Counties.

Using MSW as a Feedstock

Municipal Solid Waste is abundant in the study area. Current practices include recycling of materials at the county owned transfer stations, curb side recycling on a limited basis, and then disposal of the remaining MSW at landfills. Fremont and Bonneville County still own and operate their own landfills. Fremont County has two landfills, one in St. Anthony and one it Island Park. The Island Park landfill is operated on land leased from the Targhee National Forest and will be full in a few years. The St. Anthony landfill is sufficient capacity for the anticipated need however, the landfill is unlined and the County is concerned about leachate from the landfill entering into the ground water. Bonneville County has a robust landfill system and has room for expansion for several years. Clark, Madison, Teton, and Jefferson all dispose of their waste at the Jefferson County Landfill at Mud Lake Idaho. The current tipping fee paid by Clark, Madison, and Teton Counties is $30.55 with an annual increase expected. This fee does not include the cost of transportation from the individual counties to the landfill. Teton County

estimates their total disposal fee at approximately $90/ton when the cost of their transfer station, transportation to the landfill, and the landfill tipping fee are totaled together.

During the study the Counties met together to discuss options for disposal including partnering on a Waste to Energy Facility. The limiting factor to the construction of a regional facility came back again and again to the availability of the Counties to fund such a facility in light of the Frazier Decision and the limits on long term contracting. A solution was discovered through investigation of the Idaho Statutes. Under Idaho Code, Title 31 Chapter 49, Counties are allowed to join together to form a regional solid waste district. The purpose of this district is to govern and control the disposal of all municipal solid waste in the created district unless specifically exempted by the Counties upon joining the district. The formation of the district also allows the district to issue revenue bonds to defray the cost of operations and the construction of disposal facilities without affecting the full faith and credit of the individual counties.[11]

A regional solid waste district was formed in June of 2010 with the Counties of Clark, Bonneville, Fremont, and Madison participating. The District was named the Eastern Idaho Regional Solid Waste District and was created solely for the purpose of the continued examination of the feasibility of development of a waste to energy facility at the Centennial Energy Park in Dubois Idaho. Creation document examples are provided in Appendix 1 of this report. All creation documents are based on similar documents created by the Southern Idaho Regional Solid Waste District located in Twin Falls, Idaho.

Another issue facing counties is the selection of a treatment option for MSW. Idaho Code also offers assistance in that matter. Under Idaho Code Title 31 Chapter 45, Pollution Control Financing, counties are allowed to bond for pollution prevention facilities and to also choose technologies as sole or single source style procurement. This statute allows counties to examine emerging renewable energy technologies which might also double as pollution control facilities.[12] For example, a waste to energy facility that diverts MSW from a landfill may be seen as a pollution control solution.

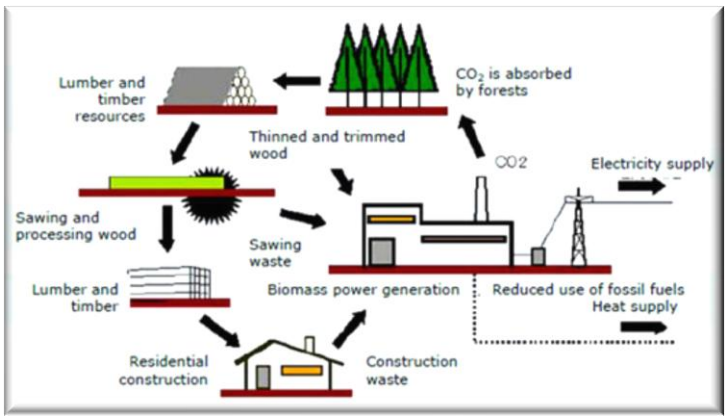
A key element of financing a waste to energy facility is the need to provide revenue guarantees. The basic elements of the revenue stream are the feedstock tipping fee and the power purchase agreement. Without those two elements in place this is not a viable project. The need to have a long term, i.e., 20 year waste contract is covered through county participation in the regional waste district. The ability for a long term power purchase agreement is also provided for through the waste district because the legislation specifically excluded waste districts from this constitutional requirement.

[11] http://www.legislature.idaho.gov/idstat/Title31/T31CH49SECT31-4901.htm
[12] http://www.legislature.idaho.gov/idstat/Title31/T31CH45SECT31-4502.htm

WOODY BIOMASS

The feasibility of woody biomass as a feedstock was examined. Woody biomass is defined as the by-products of forest management, restoration, and hazardous fuel reduction, including trees and woody plants grown in the forest. There are several types of woody biomass. To thoroughly study the feasibility of woody biomass all of the types will be addressed, as well as the benefits and costs.

Biomass waste, including forest and logging residue, municipal waste, agricultural residue, and animal waste accounts for 9% of the energy used in Idaho. However, there is not enough of this biomass in the state to supply all the energy the state uses. As an example, a typical 15 MWe power plant would need to consume 8,000 bone dry tons (BDT) per year per MW, or 120,000 BDT total of woody biomass for a 15 MWe Plant.



Woody biomass includes forest based biomass, including thinning, slash, and small diameter woods. Forest resources are the major component in woody biomass feedstock. The six county study area lies between two National Forests within a twenty-six to one hundred seventy mile radius. The Targhee-Caribou National Forest occupies over 3 million acres in southeastern Idaho and the Salmon-Challis National Forest occupies 4.3 million acres in east-central Idaho. In 2009 a stimulus bill provided money for three forests in the greater Yellowstone region, including Targhee-Caribou National Forest, to use the stimulus money for wildfire reduction and forest health.[13] The use of these resources as woody biomass would benefit the national forests, while assisting in President Obama's renewable energy stimulus plans.

Transportation/Hauling

Transporting woody biomass from the forests to Clark County would be possible, although a limited mileage radius would allow for better transportation costs. Transportation research shows that woody biomass shipped within an 80-100 mile radius would be more cost effective than longer hauls, with an average cost of 0.15 per ton/per mile. With this average cost in mind the ranger districts within a 102 mile distance from Dubois were examined, with an average distance of 86.5 miles at a cost of 0.15 per ton a twenty five ton trailer load would cost $3.75 a mile, the cost to transport the woody biomass from the forest would average $324 per load. Transport of fuel wood via rail is 35% less than trucking on hauls averaging 80 miles or more according to Union Pacific Railroad however, this does not include the rent of the individual cars.[14] In the scenario above this would save an estimated $113. In order to determine the best mode of transportation, rail access to the area must be assessed. Clark County would only have rail access to the Targhee woody biomass via St. Anthony. Eastern Idaho Railroad has a rail line from St. Anthony through Rigby to Idaho Falls; Union Pacific Railroad has a rail line from Idaho Falls

[13] http://wolves.wordpress.com/2009/02/19/bridger-teton-national-forest-quickly-moves-to-use-stimulus-money-for-anti-conservation-logging/=
[14] http://www.up.com/

through Dubois. A siding would need to be constructed at Dubois for off loading of any rail shipment of biomass of any sort. Rail access in or out of Teton County was abandoned in 1990.

Possible sources of woody biomass would include, mill residues, which might be the lowest cost woody biomass as the harvesting or logging cost have already been absorbed in the delivery to the mill; logging residues, for example tree limbs, tree tops, etc.; and, small diameter woody biomass removed from the forests as a method of fuel reduction.

Obtaining biomass from Forest

The estimated cost for obtaining biomass from forest fuel treatment thinning varies by the type of treatment methods used. The cut and skid treatments estimated cost is $30 to $40/dry ton or $6.20 to $8.30/MWH. "It increases slightly to $34 to $48/dry ton or $7.00 to $9.90/MWH when the cut/skid/chip method is adopted."[15]

The average cost for delivered logging residues (with a transport distance of 62 miles) is estimated to be $33/dry ton or $6.80/MWH using the full cost method.

The most commonly recognized types of woody biomass are wood pellets or wood chips.

Chipping

Chipping has been around for a long time. Chipping is the most widely recognized usage of woody biomass in biomass fuels. Wood chips are made from waste woods, wood residuals from construction, agriculture, logging, foresting and sawmills. Chipping on site with a chipper, may be less expensive than hauling the wood and then chipping.

The main advantages to wood chips are:

1. Wood chips are widely available,
2. Wood chips are a clean burning alternative to coal.

[15] www.forestbioenergy.net/.../fact-sheet-6-2-the-economics-of-forest-biomass-production-and-use

Loading to Truck Costs (per Humbolt, UC Davis file) Cost $/BDT

Type	Loading	Hauling	Grinding	System	Additional:
Hook Lift Truck & Centralized Grinding	$6.30	$10.32	$16.22	$32.84*	
Slash Bundling & Hook-lift Truck & Grinding	$2.99	$9.34	$17.97	$46.50*	Bundling= $16.20
Dump Truck & Centralized Grinding	$3.33	$6.91	$13.77	$24.01*	
Logging Truck hauling whole trees & Centralized Chipping	$2.61	$6.29	$14.42 for Chipping	$29.81*	Fell/Shovel=$6.50

- System cost does not include support cost, move-in cost, cost of employee transportation, cost of transportation to market, or profit allowance.

Slash

Although leaving slash in the forest may be good for fertility, it provides a fire hazard particularly in drier slopes, areas or seasons. In Idaho the landowner is required to reduce slash to an acceptable level to release the landowner from liability for any forest fire throughout the property. The types of slash that are recommended for removal is that which is smaller than three inches in diameter, material which is larger than three inches (referred to as coarse woody debris) is recommended to be left in place as it is less of a fire hazard and benefits wildlife.

A study done in 2008 for the Sierra Nevada Conservancy[16] on Forest Biomass Removal on National Forest Lands showed that a Biomass Boiler in Lincoln, California produced 4,652 MWH from 4,191 bone dry tons of slash from the Sierra Nevada. This would be close to the average of 1 dry ton producing 1 MWH depending on moisture content. The slash consisted of a combination of tree limbs, tops, small stems and other materials less than 3 inches in diameter from a variety of tree types. The cost of this biomass to collect, process (slash was chipped at the site) and transport from the project site was $58.43/bone dry ton with the current market price in the central Sierra Nevada region being $30/bone dry ton. The cost of the project included the use of two excavator/loaders, one water truck to keep down dust, three chipper vans, and one low bed truck for hauling.

Slash Bundler

The John Deere Company completed a study in seven different National Forests, including one in the Idaho Panhandle and one in Missoula Montana, completed by John Deer, using their 1490D Slash Bundler. The study showed that the bundler operated on slopes up to 40%. Production ranged from 6.5 bundles per hour to over 10 bundles per hour operating in the stand. Bundling of slash piles neared 20 bundles per hour. The bundler has the capability to produce 16' bundles.[17] There was a

[16] http://sierranevadaconservancy.ca.gov/
[17] http://www.forestprod.org/biomass09mitchell.pdf

notice of some loose debris from the loads; transporting bundles in solid bins would confine the material. These slash bundles have been processed as hog fuel in Idaho, Montana, Oregon, and California. The John Deer 1490D Slash Baler has the capacity to bundle between 150 and 200 bales a day. An average bale weighs approximately 1000 pounds. The cost to haul the bales an average of 50 miles is $6.50-$7.00 a ton.

A negative aspect to slash bundling is that the slash may contain soil and grit that preclude direct use for energy and fuel generation. A positive aspect of slash bundling is that since the bales are compressed and quite dense they can be stored as long as nine months and still retain 90 percent of their energy value, unlike chips which decay and degrade in energy value if stored for several weeks.

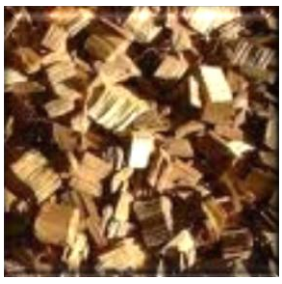
Urban Wood Waste

Urban wood waste is wood that includes; sawn lumber, pruned branches, stumps, and trees from street and park maintenance. The primary constituents in waste stream are used lumber, trim, shipping pallets, trees, branches, and other wood debris from construction, demolition, clearing, and landscaping activities. The waste generated from this type of woody biomass represents a significant portion of the solid waste stream and is estimated to be 28 percent of total tonnage. Treated wood waste may need to be managed using alternative methods. Wood which has been treated with chemicals to preserve it against insects, microbes, etc. will need to be handled using Idaho guidelines for chemically treated wood disposal.

Urban wood waste is largely used for engineered woods, landscape mulch, compost, and biomass fuel. All of these uses require processing; separating the wood from other wastes, removing of contaminants and fasteners and then processing through grinding or chipping. Demolition operations usually generate wood that is less desirable for most of these uses as it includes other materials. The best use for this type of wood is in biomass feedstock. The biomass facility would not need to purchase the urban wood and yard waste; a tipping fee similar to municipal solid waste could be assessed. To use this type of wood waste as a feedstock the facility would need to determine what to accept that would produce the energy desired verses the cost, keeping in mind possible treated woods and the process to remove the contaminants.

Mill Residue

Mill residue is byproducts such as sawdust, hog fuel, and wood chips from lumber mills, plywood manufacturing and other wood processing companies. An example of a biomass to energy plant that uses mill residue is in northeastern Washington. The facility purchases approximately 350,000 BDT per year of residue from mills and generates 46MW of electrical power. This facility has long-term contracts with mills to supply biomass for the facility. The success of this plant is its location in one of the most forested areas in the Pacific Northwest.



Hauling costs vary with distance and/or mileage. Several studies were

examined to determine hauling costs. Prices ranged from $13.49/ton for course materials to $33/dry ton for all forest residue/incorporating mill residue in with forest residue. As with all of the other types of woody biomass it is essential to determine the distance and amount of residue being transported to determine the overall cost effectiveness. There are several lumber companies/sawmills/log home builders within a 91 mile radius of Dubois. Calls made directly to these companies to determine if they would like to participate in the biomass facility by providing their mill residue were not returned. There was very little interest as most sell their residue to landscapers in the area.

Using Woody Biomass as a Feedstock

Woody biomass is an excellent renewable fuel however; access to the fuel in the study area is limited because of current forestry practices on the Targhee National Forest. In discussion with the Dubois District of the Targhee National Forest it was noted that Environmentalists have essentially shut down all logging in the area. Furthermore there is very little private forested land in the area. The study area is comprised primarily of high plain desert areas which have been adapted to agricultural uses. Wood resources are limited to northern Clark and Fremont Counties, eastern Teton and Madison Counties and southeastern Bonneville County. With the exception of riparian lands there are no forested areas in Jefferson County.

The cost of acquiring and delivery of woody biomass to a regional waste to energy facility is discussed at some length in the economic section of this study. While woody biomass is an excellent fuel type the lack of availability makes the use of it as a renewable fuel impractical to this particular study area, however, areas such as northern and central Idaho may find the opposite and so for those markets further feasibility studies may be of value.

AGRICULTURAL WASTE

Agricultural waste is recognized as byproducts from agricultural or farming activities, the parts of the plants not used in production or sale, and animal waste. Agricultural wastes include both natural and non-natural wastes from the packaging or production process of agricultural products. In this study the natural agricultural waste will be assessed including, livestock waste or manures, and crop residues.

Animal Wastes as Biomass

Conversion of crop residues and livestock waste (LsW) makes good use of what would otherwise be disposed of through landfill or land application. While land application is not necessarily a poor use of animal waste it is highly regulated and may contaminate nearby surface or groundwater. On average about 65% of these wastes are land applied. Livestock wastes are a problem to the environment in areas of particularly large feedlots, dairies or other areas where animals are concentrated in one location. There is increased pressure on local governments to restrict the size of such facilities because of the accumulation of large amounts of LsW. This waste is not only odorous, but is also thought to be polluting community water supplies.

Confined Animal Feeding Operations (CAFO) control by local governments has become an extremely emotional and contentious topic. Current CAFO ordinances require that LsW be applied to agricultural fields. This often requires CAFO operators to purchase land for no other reason than land application of the waste. Further, this land application is increasingly suspected to be linked to high nitrates in drinking water supplies. Use of LsW as a biomass renewable energy feedstock could benefit the farming community to include; less livestock waste being spread on fields, less livestock waste built up in piles, thereby resulting in less odor, and less flies. Less land application also eliminates the concern of surface water and ground water contamination from nitrates in the waste. Livestock waste does not have much economic value, but rather is an economic liability to the agricultural industry.

Removal costs are an estimated $0.348 per cow/per day for a typical farm with a stanchion barn.[18] There are several benefits from manure removal. One benefit realized by removing the manure once a week is decrease in the need to use insecticides. Although the use of insecticides would not be eliminated the less frequent use would slow the development of resistance to the insecticide by flies. Weekly removal of the manure would also eliminate the odor caused by buildup of manure. In the six county study area there are an estimated 21,033 head of cattle. The cost per cow/per day for removal of manure is $7,319.00 for the six county area or $222,634 a month. Most farmers/ranchers are responsible for the removal costs themselves leading farmers to land apply or sell manure at a minimal cost for fertilizer to local residents for gardens or other farm land.

The average cost for the removal of manure from one cow is $127.02 a year/or $10.85 a month. With a 100 cow dairy the cost of manure removal would only be $1085 a month which yields

[18] www.ncbi.nlm.nih.gov/pubmed/2768644

very little financial incentive to the owner to process the manure or consider it as a biomass fuel source.

Custom manure-hauling-spreading services in the Twin Falls area currently use a 10-ton truck with an eight-foot spreader. Costs for these services include; loading, hauling and spreading at an average of $19 per truck per load for a one mile round-trip.[19] There is also an additional charge of $1.50 per mile per truckload after the first mile. The average cost per ton for this service is $1.90.

Hauling costs for manure normally are charged against the manure's nutrient value. When considered in this way the cost to haul manure more than a mile exceeds its value as a fertilizer. However, this feasibility study is studying the use of animal waste as a form of biomass feedstock therefore only the cost of hauling the manure will be considered. In most cases trucks will be hauling a considerable amount of water, because of this custom haulers usually charge by cubic yard rather than by weight. Charges for hauling manure may also be based on cost per gallon, which averages between 0.8 cents to 1.5 cents/gallon or $7.00/per ton according to a survey of Illinois commercial manure haulers[20].

Disposal in existing landfills in the study area is also occurring on a limited basis. Bonneville County, Idaho has a landfill fee of $38.00 a ton for manure, hay, and straw. Madison County only accepts old hay, straw, and rotten potatoes at their Construction and Demolition (C&D) location and charges by the truck load for these types of agricultural waste. A pickup truck is $10.00 a load, while a 6 wheeler truck is $15.00 a load, and a 10 wheeler is $20.00 per load. Fremont County did not specify their charges for old hay, straw, and manure although they do accept it in their landfill. Jefferson County did not specify a cost to dispose of manure or straw at their landfill. Manure in Teton County is mixed with woods and used in processing compost at their transfer station.

In order for manure to be a viable biomass fuel it would of necessity be dried. Dry manure, manure which has been dewatered and allowed to dry for a week, can be better converted to energy through the conversion process as the moisture content is lower. Manures with higher moisture content would need to be dried through a heating process, adding an additional energy consumption process before being used as renewable energy feedstock.

Crop Residue as Biomass

For Idaho growers the common removal method for crop residue is through baling or open burning. The burning method is used as a way to control disease, weeds and pests. Such burning is conducted on approved "burn days" and overseen with regulations, procedures and registration for burning from the DEQ[21]. Burning may only be conducted in the fields where the crop residue originated. Burning of old bales of hay or straw is prohibited. While the burn may also improve yields for the next crop the occurrence of burns getting out of control is an issue as well as the smoke from those burns. A report from the Bureau

[19] Discussions with JMS, Jerome, Idaho
[20] http://www.sweeta.illinois.edu/pdf/manure_haulers_applicators.pdf
[21] http://www.deq.idaho.gov/air/prog_issues/burning/crop_residue_burning.cfm

of Land Management in April of 2008 stated that "so far this year, there have been numerous burn escapes due to conditions too windy to keep the fire contained . . " Fires such as this have burned several acres of both public and private land, endangering residents and wildlife. Grass/Straw farmers use the burn technique to remove crop residue even though chopping straw has been demonstrated and proven to work equally well in two other states. These types of burns have seen as much as 4500 acres burned on one day. Out of control burns and burns of large amounts of land have forced the State of Idaho to make burn regulations even stricter in 2008. Along with causing smoke, residents have seen smoke and ash blow across highways, homes, golf courses, and bike trails. Hospitals have even reported smoke in their ventilation systems and asthma sufferers are forced into emergency rooms.[22]

In response to these issues Clark County could receive crop residue at their Waste to Energy facility. Harvested crop residue is suitable as a feedstock. The six county area has a total harvested area of 170,688 acres.[23] The grains harvested in these areas include barley, winter wheat, spring wheat and oats; three of the counties also grow barley malt. Winter and Spring Wheat produce between 75-83 bushels per harvested acre; while Barley produces an average of 90 bushels per acre. Crop residue from these small grains ranges between 45% and 80%. To estimate the availability of crop residue the average in bushels per acre gives an average grain production of 82 bushels per acre harvested, multiply the acres harvested for a total of 13,996,416 bushels of harvested grain. The crop residue for a harvest of this size, at an average 62.5% (45% and 80% averaged) would produce 8,747,760 bushels of crop residue. The total crop residue harvested multiplied by the average crop residue weight of 40 lbs. per straw bale would equal 349,910,400 pounds or 174,955.2 tons of crop residue. As a feedstock the Clark County area produces a considerable amount of crop residue.

An additional factor in using crop residue as a feedstock is the cost of harvesting the residue. Crop residue, such as straw is often sold by the bale or ton. Straw that is baled in square or round bales costs approximately $14 a ton to bale plus an additional $2.50 a bale to haul or stack in the field.

Using Agricultural Waste as a Feedstock

Agricultural wastes, both manures and crop residues are feasible biomass fuels. Grain growers especially, based on individual discussions, are open to providing crop residues in any form required to processing. The limiting factors however, may be the amount of ash that is generated through the conversion of crop residues in renewable energy plants.[24] Because the difference in density crop residues tend to generate more ash per ton than their biomass counterparts during the combustion process.

The use of manures is problematic since the BTU content of dry manure is higher than all other sources of biomass, the key requirement is dry. Manures must be dewatered and then dried

[22] http://www.agri.idaho.gov/Categories/Environment/CropResidueDisposal/indexsmoke.php

[23] www.city-data.com/**county**/***Clark County(or other County)***-ID.html (for each of the six counties-then added together for total number of acres). Information on grain production, bushels, etc. is from the associated city-data.com site for each county.

[24] http://www.astm.org/Standards/E1755.htm

before being used as biomass fuel feedstock. The drying of the manure requires a thermal process which may use as much energy as it creates. It would seem that farmers and ranchers would be interested in paying to have manures removed. We did not find that to be the case in our discussions with large CAFO owners it was evident that they considered the manure as a possible energy source for their own operations. Many have already determined the need to install anaerobic digesters at their facilities, capture methane, and fire generators to create electricity to be used on site. Many CAFO's in the Midwest are already using these practices as a solution to their waste management problems.

TECHNOLOGY

Author's Note:

Clark County Economic Development, through its consultants, Whisper Mountain Professional Services, and Precision Systems Engineering (PSE), has examined over 200 differing types of Waste to Energy Technologies over the past 2 years. The deployment cost for these technologies range between $5-7M per MWH capacity. Upon the recommendation of the Director of the Idaho Department of Commerce the Clark County Board of County Commissioners requested that Whisper Mountain and PSE examine technology owned by Dynamis Energy LLC of Eagle Idaho. Clark County under separate contract also requested that PSE conduct an independent engineering feasibility review of the Technology including a visit to the operations of a waste conversion facility in Barrow Alaska which uses an earlier version of the Dynamis Technology. Additionally Clark County contracted with Whisper Mountain to complete a due diligence process on their behalf on the technology and Dynamis Energy LLC. For sake of completeness the summary of the technology is provided in this feasibility study. All operating costs used in the following economic feasibility section of this report is based on the operations of the Dynamis Energy 3.0 Waste to Energy Plant.

The Waste to Energy Industry seems to combine most thermal treatments by the use of heat to treat MSW (waste) under the term incineration. Such processes under the term are vastly different in their applications, costs, and benefits a brief explanation of the main thermal technology classifications is presented below:

- *Incineration*-mass burn technology at high temperatures, non efficient energy production
- *Gasification* - process that converts carbonaceous materials, such as coal, petroleum, biofuel, or biomass, into carbon monoxide and hydrogen by reacting the raw material at high temperatures with a controlled amount of oxygen and/or steam
- *Pyrolysis* - a form of gasification that chemically decomposes organic materials by heat in the absence of oxygen that is unproven in large-scale applications.

The recovery of energy from MSW materials is already a well established technology. As the price of oil and other energy resources rise, waste products have become a valuable resource that can no longer be ignored. Many developing countries consider waste a renewable energy resource with incentives in tipping fees and for energy recovery. Energy from waste not only reduces the reliance on fossil fuels such as coal, oil, or gas, it also reduces the amount of land used for landfills. MSW (waste) can be economically used to produce heat, electricity and other usable energy forms for industrial and domestic use.

Recent advances in thermal technology have significantly improved the process of solid waste disposal. With modern thermal processes, many types of waste can be safely and efficiently handled, thus providing major benefits for both the waste producer and the environment. Energy from MSW (waste) is possible using a waste to energy recovery system (plant). These power plants practice municipal waste management, and use various methods to turn municipal solid waste into renewable green energy. This can be done through different methods, including incineration, gasification, pyrolysis, and anaerobic digestion. Waste to energy plants take waste,

which Americans create in enormous amounts, and create a renewable energy source that is not harmful to the environment.

Municipal waste management has become even more important because many landfills are becoming full, and a number of them have already closed. Traditional landfill methods involve dumping municipal solid waste into pits in the landfill, and then burying the waste. This is not effective municipal waste management, because the decomposing waste emits gases mainly in the form of methane gas. It can take years or even decades for this waste to decompose completely, if at all.

A waste to energy plant provides many benefits to the local community. Municipal waste management can become a renewable energy source that is green and provides benefits to the community. Municipal solid waste will be created, regardless of whether this waste is used in waste to energy programs or not. Waste to energy plants can eliminate municipal solid waste in an effective way, while generating much needed power at the same time. The economic rationale and the expected rate of return to be generated are based on the following facts:

- The present economic environment of many rural communities in the United States requires a low cost solution to the ever-increasing sanitation and waste disposal problems.
- Rural communities' energy resources are composed, largely, of potential solid fuels such as agricultural wastes, forestry wastes, as well as industrial, municipal and medical wastes.
- Those resources have traditionally, rarely been put to productive use.
- The increasing volume of municipal and industrial waste discharge is complicated by a lack of cost-effective methods of waste disposal and insufficient financial resources to deal with the implementation of modern environmentally sensitive solutions.

In view of these considerations as well as the reality of increasingly restrictive environmental protection regulations, municipalities have relatively few alternatives that are as cost effective as solid waste conversion to energy. Given the ever-increasing sanitary problems facing most populated centers today, and the certainty of increasing energy costs and demand, the most efficient, profitable, and environmentally sensitive conclusion is the construction of versatile waste to energy plants.

Clark County's Waste to Energy Project has chosen to utilize the Dynamis 3.0 Thermal Conversion Technology because it is competitively priced, meets environmental requirements, operates on a wide variety of feedstocks, and provides a methodology to divert municipal solid waste from landfills.

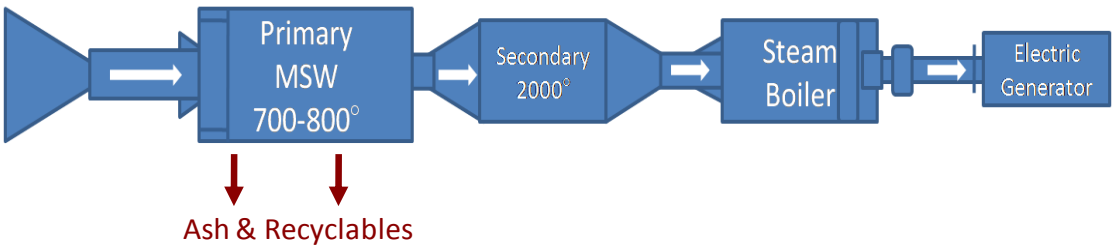
Technology Benefits

Though there are several companies in the market who offer technologies that mass burn MSW. These technologies typically require labor-intensive pre-handling of waste prior to treatment. The Dynamis Energy technology with its custom scale abilities, simple design, and limited amount of waste handling is unique in the market.

Issue	Dynamis Solution	Competitors
Presort Waste	No Presort Required	Most require presort and tipping floor
Dry, Grind, Prepare	No waste preparation required	Most require drying, grinding, or some prep
High Energy Operating Requirements	Self Sustaining Combustion	Most use up to 30% of power generated for plant ops
Stack Emission Equipment	None required, may add lime injection system	Most require expensive stack emission equipment
Plant Scalability	System easily scales, given available space	Most require proper sizing at initial construction
Proven Large Scale Capability	Modular design system is proven	Very few other than mass burn incineration

Dynamis 3.0 Thermal Conversion Technology

The two-stage process uses batch waste gasification and thermal combustion/oxidation. The untreated solid waste is initially loaded into a primary chamber where it is thermally reacted under starved oxygen conditions and transformed into burnable gases and ash. Unlike typical thermal treatment methods, the gasification reactions occur at relatively low temperatures under controlled conditions. This minimizes the production of airborne 'fly ash' particulates, carryover of toxic metals, and NOx. The gasification process provides a 95% reduction by volume of the waste. The remaining 5% is a sterile ash with minimal residual carbon. Metals and glass in the waste stay with the ash in inert forms and can be recovered by conventional recycling methods. To complete the process, the gases from the primary gasification chamber enter the secondary combustion chamber where they are mixed with oxygen (taken from ambient air) and oxidized at high temperature to complete the process. The energy from hot gas effluent is then recaptured in the form of high temperature, high pressure steam.



The Dynamis process actively addresses many potential emissions problems such as particulates, NOx, many toxic volatile metals, and dioxins/furans. The system incorporates either dry or wet lime scrubbers or other emission abatement systems to neutralize acid gases and absorb other dangerous by-products such as mercury, depending on the waste type destroyed.

Because the Dynamis system requires no pre-treatment of waste and has few moving parts, it has many advantages over other thermal treatment systems. Its durable, simple design is easy to

install and operate. Once the system is loaded it requires minimal operator attention and thus has lower labor costs. The modular design allows for flexibility in application to meet capacities from 5 to over 2000 tons per day.

Waste Types

A listing of acceptable solid waste types is provided below:

- Untreated Municipal Solid Waste (MSW)
- MSW with organic fraction removed for composting
- Biomass such as crop residues, manures, or small diameter wood
- Medical wastes
- Industrial wastes
- Tires
- Sewage sludge
- Oily absorbent wastes
- E-wastes

Dynamis 3.0 Thermal Conversion Process in Detail

Holding Bin/Conveyor to Primary

The process begins by loading municipal solid waste (MSW), directly from garbage trucks, into the holding bins. Next the MSW, up to 1,000 tons per combustion cycle, can be moved by conveyer into the Primary Gasification Chamber. A major benefit of the Dynamis process is its ability to accept waste in many different forms. Unlike many systems, there is no requirement to shred the waste. Waste materials can be accepted loose, bagged, baled, or on pallets. The system can also accept a wide range of bulky items such as vehicle tires, mattresses, furniture, and construction debris.

The Primary Gasification Chamber (PGC)

The process starts with untreated waste being bulk-loaded into the primary gasification chamber (PGC) through a hydraulically operated door at the top or front of the chamber. In many waste configurations, waste is charged into the PGC unit, and a carefully controlled flow of air is introduced. Only enough air is provided to allow sufficient burning for heating to occur, typically 70 to 80 percent of the stoichiometric air requirement is introduced into the PGC. Due to the air controlled (starved) environment, the MSW gasifies and is converted to a super rich syngas. Gasification occurs in the PGC at relatively low temperatures of 450-550°C (800-1000°F), converting the waste into gas and ash. The hot gases are then passed to the Secondary Combustion System.

The Secondary Combustion System (SCS)

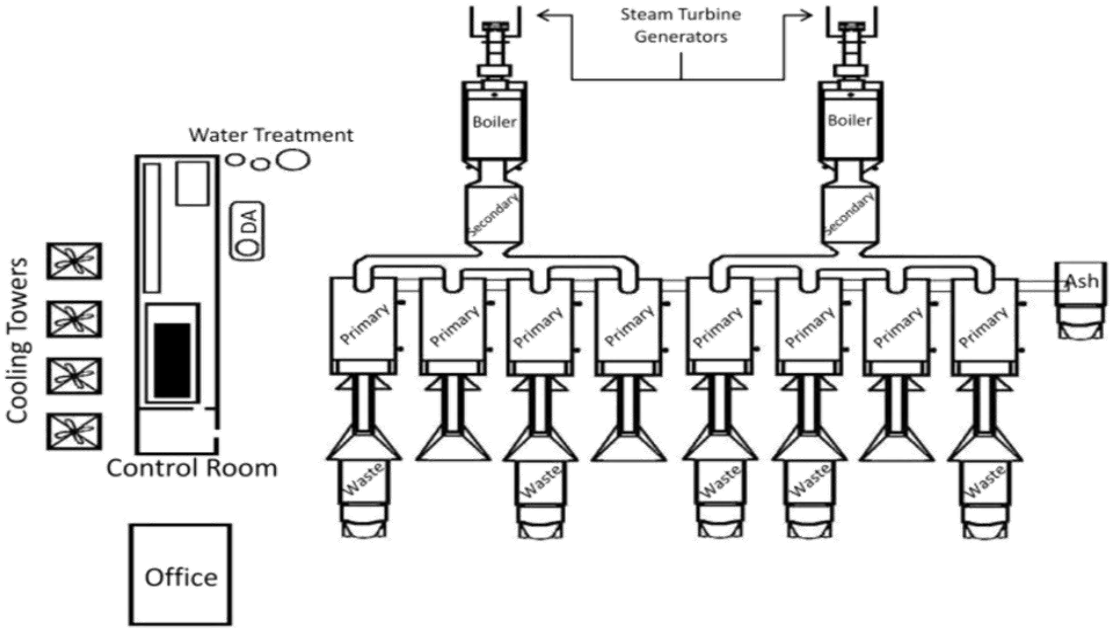
Once the hot gas is passed into the secondary combustion system (SCS) they are actively mixed with oxygen (taken from the ambient air). This process is achieved by the use of a Turbulent Air Ring which flashes (combusts) the mixture at temperatures of 1,800-2,000°F. The Turbulent Air Ring and temperature assure that a rapid and thorough mixture of the super rich syngas and oxygen is achieved providing optimum conditions for the combustion of all gases.

Boiler/Steam Production

The flame created by the Super Rich Gas/Oxygen combustion is directed through a high temperature power boiler where water is converted into high-pressure steam. In most installations the boilers will be configured as a fire tube, water tube, or scotch high temp high-pressure firebox boiler of three-pass construction for highest thermal efficiency. It has an extended retention time design that provides maximum furnace volume without excessive refractory, plus increased radiant surface for maximum heat absorption. In many waste configurations the construction of the boiler will be an integral part of the Secondary Combustion System, making them one complete unit.

Energy Production

This high pressure steam generated from the boiler can be sold, used for industrial applications, or directed through a power generation turbine creating electrical power that can be routed to the local electrical grid. The Dynamis waste to energy facilities (electrical generation) can generally provide electricity at a fraction of the cost of purchased power. In many installations, generation packages can operate parallel with plant electrical systems to reduce or eliminate the cost of purchase power. Where waste heat is available, boiler and generation systems are commonly applied to recover exhaust heat and enhance return on investment for the owner.



250 TPD Typical Plant Layout

Emissions Control Equipment

As noted above COMPLETE COMBUSTION of gases is not completely achievable, however it is assumed that emissions out the stack are to be identical in content to the ambient/breathable air of the atmosphere. Over the past 12+years, air quality tests have been run by independent third parties. These 60+ tests have all determined that the Dynamis process meets and exceeds all state and local government emission regulations based upon those guidelines published by the US Government Environmental Protection Act.

Contaminant	Units	Dynamis	EPA	California	EU	Ontario	B.C.
Total Particulate Matter	mg/m3	3.9	24	14	9	12	19
Hydrogen Chloride (HCI)	mg/m3	.01491	37	27	9	19	69
Sulphur Dioxide (SO2)	mg/m3	5.24	78	56	46	37	246
NOx expressed as NO2	mg/m3	62.09	282	202	183	207	344
Carbon Monoxide (CO)	mg/m3	2.29	57	42	47	-	55
Mercury (Hg)	mg/m3	.0000114	.080	.035	.046	.020	.19
Cadium (Cd)	mg/m3	< .00001	.020	.007	.046	.014	.10
Lead	mg/m3	.00000806	.2	.098	-	.142	.049
Dioxins and Furans	ng/m3	.553	13	9	.9	.040	.5

Dynamis Energy's Technology Air Testing Results

Results are from over 60 tests over the past 12+ years

Process Logic Control System

All aspects of combustion and fuel feed are monitored and controlled by state-of-the-art logic, 3 times per second. This is especially important with the ever-changing combustion conditions of biomass and waste fuels. The microprocessor analyses data from various inputs such as switches, thermocouples, RTDs, an oxygen sensor to continually monitor exhaust and optimize air-to-fuel mixture as well as signal when anything needs attention.

Reclamation

After a gasification cycle in the PGC, the remaining material (2- 5% of the original volume) can be moved by conveyor belt where all recyclables are sorted and retained automatically. The end by-product of the gasification process is inert fly ash, which has value in the marketplace and is an important additive in concrete and cement based building materials thereby eliminating any need for landfill use.

Environmental Advantages and Performance

The Dynamis Energy 3.0 Thermal Conversion System process was designed using state of the art processes and equipment which allows the system to achieve very low emissions and thus eliminate the need for auxiliary scrubbers. Most standard systems will operate without using downstream emissions abatement systems and still meet Environmental Protection Agency and European Union standards, thus demonstrating the efficiency of the Dynamis Energy process. The system has several design features that make it more environmentally compliant than other thermal treatment technologies:

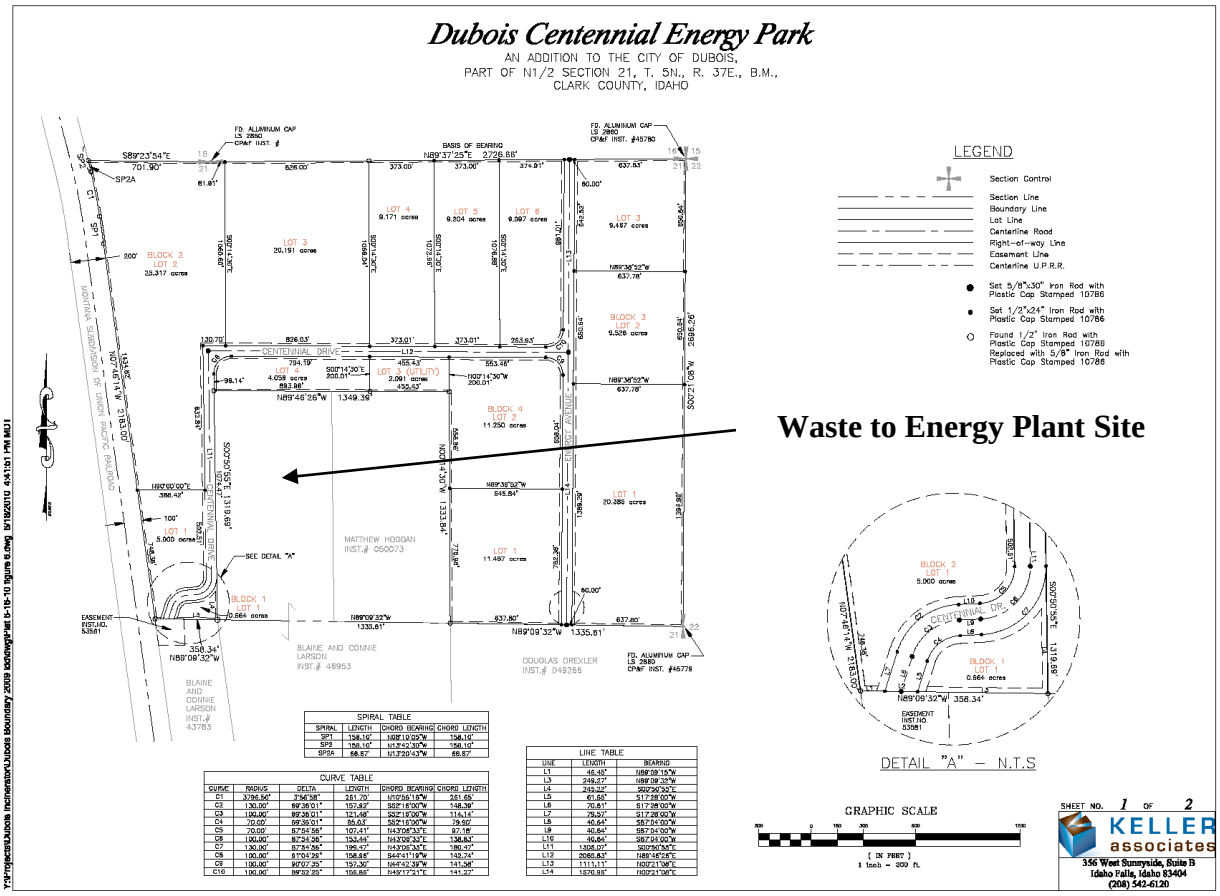
- Once the waste is loaded into the primary gasification chamber, it is sealed, and the waste is not moved or agitated as in other thermal processes. This means that during the gasification process, the production of small particulates (fly-ash) is reduced dramatically, thus reducing the emissions and minimizing the need for downstream scrubbers or filters.
- Prolonged exposure to temperatures in the primary chamber ensures that almost 100% carbon burn-out is achieved.
- The ash residue is nonhazardous and virtually inert, making it suitable for recycling.
- Accurate mass flow and temperature control in both chambers is achieved automatically through a Process Logic Controller (PLC). This allows the gasification process to be slow and stable, thus avoiding high temperature fluctuations which can result in incomplete combustion and NOx production. This also allows production of more consistent hot gas flows for efficient energy recovery.
- The low temperatures in the gasification stage allow light metals and alloys to remain intact, although totally sanitized.
- Turbulent mixing and retention of combustion gases in the secondary chamber with high temperature ensure that the combustion process is fully completed.

Waste to Energy System Cost Estimate

Clark County MSW Waste to Energy Project Facility Sized, process 250 tons day MSW, Wood Plastic and Rubber		
Main System Components	**Quantity**	
Steam Generators 75,000 PPH capacity	2	
Turbine / Generators 7.0 MW	2	
TOS Combustion W / Secondary	8	
Condenser/Condensate tank and pumps	2	
Electric Transformer and Controls	2	
Deaerators / Tank and Stand	2	
Operating Control Panel	2	
Pollution Equipment and Stack	2	
Air Compressor and Drier	2	
Economizer and Controls	2	
Ash Handling and Storage	2	
Main System Components Sub-Total:		$19,481,384
Building and Miscellaneous		
Power House Building		
Cooling Tower with Fans		
Roof Vents and Filters		
Over Head Doors		
Concrete and Labor		
Fire Extinguisher		
Building and Miscellaneous Sub-Total:		$ 7,775,629
Electrical and PLC, Labor		
Electrical Wiring, Harness, Controls		
PLC Programming and Controls		
Labor		
Electrical and PLC, Labor Sub-Total:		$ 3,104,155
Steel, Piping and Labor		
Air System Piping		
Boiler Set-up labor		
Turbine / Generator set-up Labor		
Steel, Piping and Labor Sub-Total:		$ 2,907,199
Construction Services		
Purchasing and Project Management		
Watchman and Guard Service		
Secretarial and Accounting		
Construction Utilities		
Subsistence and Travel		
Construction Services Sub-Total:		$ 1,723,400
Insurance, Legal, Permits, and Finance		
Insurance, Legal, Permits and Finance Sub-Total:		$ 929,500
Clark County Waste to Energy Project Total Cost Estimate:		**$35,921,267 (2010 Dollars)**

Waste to Energy Site

The Eastern Idaho Regional Solid Waste District will own and operate the Clark County Waste to Energy Plant. The Plant will be located at the Centennial Energy Park in Dubois Idaho, (see figure below).



The entire Energy Park is located on the east side of the City of Dubois and is zoned Industrial. A building permit will be the only required local permit needed to begin construction. The water and sewer services will be provided by the City of Dubois. Fiber optic cabling will be provided to the site by the Mud Lake Telephone Cooperative. In the spring of 2010 an Economic Community Development Block Grant was awarded to the City of Dubois by the Idaho Department of Commerce to aid in the installation of roads, water and sewer services, and fiber optic cable. The project is currently in the engineering stages. Additional infrastructure to be installed includes the electrical substation and electrical distribution system. The conceptual design for the electrical system was completed by Precision Systems Engineering through funding from the Idaho Department of Commerce's GEM Grant program. The Plant will provide the funding for the substation as part of the interconnection with PacifiCorp. Additional revenues will be required to complete the electrical distribution system.

Electrical power from the Plant will be sold to PacifiCorp under the PURPA Qualified Facility program via an interconnection to the Dubois Substation operated for PacifiCorp by Rocky Mountain Power. A 69 KV line will be installed between the Park and the Dubois Substation. The line will be approximately 6 miles long and will cost an estimated $3.2M to construct. Once constructed the line will be owned and maintained by Rocky Mountain Power in behalf of PacifiCorp. The total cost of all interconnection activities including feasibility studies, impact studies, and construction engineering will total an estimated $50,000.

Air Quality permits will be required by Idaho Division of Environmental Quality. A permit to construct will be issued prior to Plant financing. Plant financing will be provided through the sale of Revenue Bonds issued by the Eastern Idaho Regional Solid Waste District. It is anticipated that the bond offering will be for approximately $50M. The repayment period will be 20 years at an interest rate of 4%.

ECONOMICS

In today's market there is a high probability of economic success when biomass is used in the energy conversion process. The most promising of all of the biomass sources in municipal solid waste. The average tipping fee for Municipal Solid Waste in the Western United States was $37.74 in 2004[25] that number rose to $42.08 in 2008. Tipping fees in the subject area are consistently lower than the national average however; they are competitive when using a technology which can be deployed in the $3-4M/MWe range. For an example using Dynamis' technology for a four county waste conversion facility designed to process 250 tons per day of waste the annual estimated revenue stream is over $12 million. The revenue includes the tipping fees associated with the waste disposal as well as a disposal fee for tires. The revenue stream also includes revenue from the sale of electricity and the sale of recycled tires. In this scenario the profit is shared between the host county, the operating contractor, and the four other partnering counties in the Regional Solid Waste District in a private/public partnership. For example if a County disposed of 20,000 tons of municipal solid waste a year and their tipping fees were currently $30.55/ton, (the regional average) the annual savings for the County would be in excess of $170,000 based on a tipping fee of $22/per ton at the plant plus a profit share of ~$436,000 which essentially covers the cost of disposal less the cost of transportation to the treatment facility.

The Waste to Energy Facility would also plan to gasify 300+ tires a day, along with the 250 tons of municipal solid waste. Current practices, described above, at County owned transfer stations accept tires at an average cost per tire of $4.00; with an additional $1.00-$3.00 fee for removal of the rim (tire costs are dependent on the tire size). Counties then pay to have their waste tires hauled to Utah for recycling. An average truckload of tires shipped to the recycling plant in Salt Lake City Utah costs a county $650. The Plant would process all tires delivered to the facility at approximately 35% of the current costs yielding even more savings to counties.

Using livestock waste as a biomass fuel source does not yield the type of return that municipal solid waste does. Livestock waste must be seen as a liability rather than a valuable feedstock. The average value of livestock waste from one cow is $54.57 a year/or $4.54 a month if used or sold as a fertilizer. This is before the expenses of loading, hauling, and spreading are deducted.

The cost of land application is slightly higher. The average cost of removal of livestock waste is 0.35 per cow/per day or $1.90 per to haul the waste for one mile roundtrip, with an additional $1.50 per mile after the initial roundtrip. In Southern Idaho, custom haulers charge $28 per load for a one mile roundtrip distance with a truck capacity of eleven ton, the cost would be 28/11 totaling $2.54 per ton for the first mile.[26] If this fee per mile were to stay at $2.54 the average cost to haul livestock waste to the Clark County facility from one of the participating counties would be $2.54/ton plus $1.5X67 miles totaling $170.12 for a 28 ton load. The tipping fee would then be $6/Ton. When a dairyman faces

[25] http://www.environmentalistseveryday.org/docs/Tipping-Fee-Bulletin-2005.pdf
[26] http://www.extension.org/faq/37143

this choice land application at $1.9 a ton is the appropriate option. The use of LsW as a viable biomass fuel, without significant environmental subsidies applied, would only be economically feasible when the energy could be created near the source.

The current landfill tipping fee for crop residues, like barley and wheat straw, averages $27/ton while the cost to bale, store, and sell the straw is approximately $14/ton. The purchase price however, seldom covers the cost of baling and so crop residue is normally left in the field or burned. Field burning has resulted in out of control burns, loss of property, and increased visits to emergency rooms from asthma sufferers and other smoke related illnesses.

The USDA has provided incentives to growers to utilize crop residues as biomass fuels. Farmers agreeing to provide this crop residue would be eligible for the Biomass Crop Assistance Program-CHST Matching Payments Program. The Biomass Crop Assistance program supports establishing and producing eligible crops for the conversion process, and allows payments of up to 75% of the cost of establishing an eligible biomass crop. The CHST Matching Payment Program provides eligible material owners match payments for the sale and delivery of eligible material to a CHST-qualified Biomass Conversion Facility.[27] In discussion with growers in Clark County the breakeven price for provision of crop residues would be ~$25/ton. Using crop residues as a fuel source alone in a gasification plant would not be cost effective even with the CHST incentive payments.

The third fuel type examined was woody biomass which gasifies at an even higher rate than municipal solid waste, livestock waste, or crop residue. Woody Biomass is defined as the by-products of forest management, restoration, and hazardous fuel reduction. This woody biomass as well as municipal waste, crop residue, and livestock waste accounts for 9% of the energy used in Idaho.

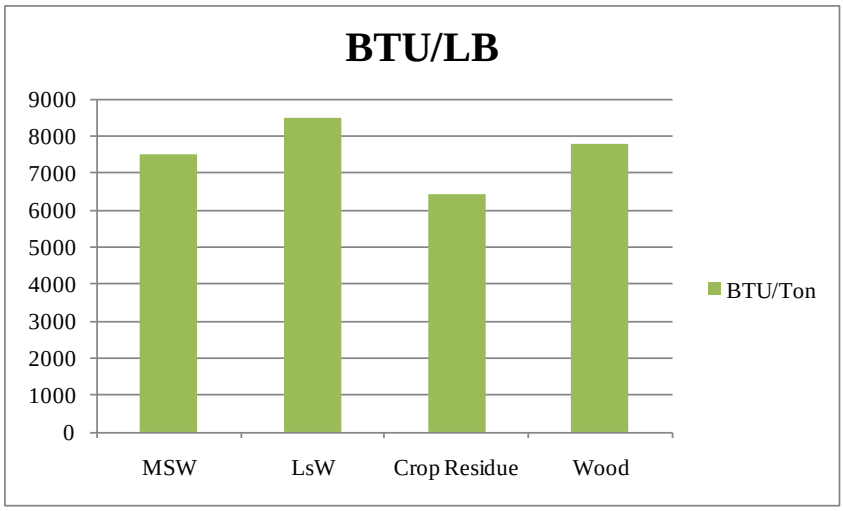
Woody biomass gasifies at a higher BTU content and thereby produces more electricity. While there is a supply of woody biomass a steady supply would be of concern. The Clark County Waste to Energy Plant, for example, will be situated within a twenty-six to one hundred sixty mile radius of two National Forests, the Targhee-Caribou National Forest and the Salmon-Challis National Forest. In the 2009 American Recovery stimulus bill funds were provided to national forests and parks to use in a beneficial way. Three forests in the Greater Yellowstone Region, including the Targhee-Caribou National Forest, moved to use the money for wildfire reduction and forest health. Using these funds to remove the forest slash from Targhee-Caribou National Forest would benefit the forest's wildfire reduction and supply feedstock for the Waste to Energy Facility.

Economic Comparisons

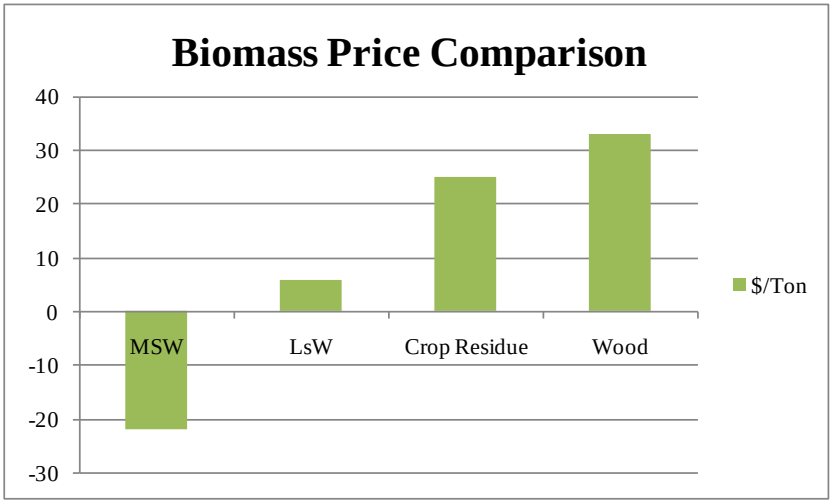
When one examines the differences between biomass forms as energy feedstock the first question to address is the heating values of the material. Each of the four biomass forms

[27] http://www.fsa.usda.gov/FSA/newsReleases?area=newsroom&subject=landing&subject-pfs

discussed are sensitive to moisture content which greatly impacts the energy values. To ensure consistent comparisons the higher heating value (HHV) for each biomass type is provided in the figure below. Note that the highest BTU content is for dry livestock waste. The next best heating value is for wood followed closely by municipal solid waste. This comparison could lead one to believe that there is really very little difference in the heating values of biomass, while that statement is true for dry biomass the challenge is how to reach a dry state. The amount of energy required to dewater and dry livestock waste for example could be equal to the amount of energy provided by the dried manure. The economic consideration then is the "dryness" or average moisture content of the biomass.



The second comparison that must be made is the cost of the biomass, both to obtain and to transport to the conversion facility. The figure below provides a comparison of cost of delivery for the four biomass forms. Note that the cost of delivery for municipal solid waste is a negative number compared to positive numbers for the three biomass forms. This is because waste to energy conversion facilities would be paid to receive and treat the municipal waste where the other forms are required purchases from the producers.



As the figure shows there is a significant cost difference between MSW and Woody Biomass. A simple one day comparison of MSW versus woody biomass yields the following:

> If a Waste to Energy Facility dedicated one full day a week to woody biomass gasification as a backup feedstock it would require one dry ton of woody biomass to produce 1.1 MWH of energy. Therefore, if the Waste to Energy Plant were to only use woody biomass for one day it would require 13.2 tons of dry biomass to produce 12 mega-watts per hour or a total of 316.8 Tons of dry woody biomass. The average cost for delivered logging residue, with a transport of 62 miles, is $33/dry ton. Therefore the cost of the woody biomass required to produce 12 MWH over a 24 hour period would be $10,454.40. The fuel cost to produce the power would be $36.30/MWH plus an operation cost of $81.37/MWH for a total of $117.67 MWH. In comparison the cost per MWH for MSW is $81.37 – $22.00 or $59.37 MWH a total difference over 24 hours of $16,790.40.

The example provided above clearly demonstrates that while all four forms of biomass are feasible feed stocks for renewable energy projects the best option is obviously municipal waste because of the fact that the delivery and acquisition price is subsidized by the county paid tipping fees. Other forms could be used depending on the value of the power sales agreements. The sale of electrical power from renewable energy sources is the main source of revenue for these types of facilities. The power purchase price has to be sufficient to not only pay for the biomass feed stock, but also cover all operational expenses.

Waste to Energy Operations Costs

The cost of operating a waste to energy facility was established for this study using the Dynamis 3.0 Waste to Energy Technology as the basis for operations. The following annual operations costs were established.

Labor	$1,809,000	
Benefits	$542,700	
Employment Taxes	$180,900	
Workers Comp/Liability	$30,000	
Propane	$48,000	
Vehicle Fuel	$150,000	
Utilities	$101,400	
Chemicals and Compounds	$120,000	
Disposable Equipment	$120,000	
Waste Disposal	$99,600	(non-biomass waste streams)
Equipment Leasing	$360,000	
Equipment Replacement	$180,000	
Facility Insurance	$336,480	(includes liquidated damages for power not produced)
Technical Oversight Fee	$240,000	(Dynamis technical oversight)
Contingency	$600,000	
SUBTOTAL	**$4,918,080**	
Debt Service	*$3,635,880*	
TOTAL ANNUAL COSTS	**$8,553,960**	

With an annual operations cost of $8,553,960 the average cost per MWH is $81.37. If the fuel or feed stock acquisition costs are added as with the example of woody biomass presented above

the average cost per MWH could raise above $117.00/MWH. In order for this type of project to be feasible electrical power purchase prices would of necessity be greater than $120.00/MWH. In Idaho the Idaho Public Utility Commission sets the electrical power prices under PURPA. For a non-fueled small generating facility, i.e., less than 10 MWh or 10 mega-watt hours average monthly net sold, the price per MWH for a 20 year contract with a delivery date commencing in 2012 is $85.71.

The following chart demonstrates an annual budget for a 250 TPD Municipal Solid Waste to Energy Facility using the Dynamis Energy 3.0 Technology. The facility would produce 12 MWH with a parasitic load of 2 MWH and a net sold under PURPA to PacifiCorp of 10 MWH. The budget also provides for sale of recycled metals and for the disposal of 300 tires per day at the facility. The net annual profit is estimated as $2,394,312.

Clark County Site Proforma	19-Oct												
250 TPD or 10000 TPY													
District Ownership/Clean Mt. Ops	Jan	Feb	Mar	April	May	June	July	August	September	October	November	December	Total
Based on 10000 tons MSW /yr 10% unable to be used/recycled(dirt,cement,other)													
Revenue													
Tipping Fees $22	183,333	183,333	183,333	183,333	183,333	183,333	183,333	183,333	183,333	183,333	183,333	183,333	2,199,996
Recycle ($110/ton)	123,750	123,750	123,750	123,750	123,750	123,750	123,750	123,750	123,750	123,750	123,750	123,750	1,485,000
Sale of Recs 10 MWe @$1.25 MWH	0	0	0	0	0	0	0	0	0	0	0	0	0
Tires 300 PD @ $2.00	18,250	18,250	18,250	18,250	18,250	18,250	18,250	18,250	18,250	18,250	18,250	18,250	219,000
Sale of Electricity at 10 aMWe @$85.71 MWH	625,683	625,683	625,683	625,683	625,683	625,683	625,683	625,683	625,683	625,683	625,683	625,683	7,508,196
Ash Sales @ 50/ton 7% Ash	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Revenue													
Electricity Production	951,016	951,016	951,016	951,016	951,016	951,016	951,016	951,016	951,016	951,016	951,016	951,016	11,412,192
(Tons)	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000	
Expenses													
Bond servicing 20 Year 50,000,000 at 4.0%	302,990	302,990	302,990	302,990	302,990	302,990	302,990	302,990	302,990	302,990	302,990	302,990	3,635,880
Facility Insurance	66,700	66,700	66,700	66,700	66,700	66,700	66,700	66,700	66,700	66,700	66,700	66,700	367,000
Insurances Worker Comp/Liability)	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	30,000
Management Salaries	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	600,000
Labor Wages	100,750	100,750	100,750	100,750	100,750	100,750	100,750	100,750	100,750	100,750	100,750	100,750	1,209,000
Social Security and Unemployment Taxes @10%	15,075	15,075	15,075	15,075	15,075	15,075	15,075	15,075	15,075	15,075	15,075	15,075	180,900
Benefits/ 30% of wages	45225	45225	45225	45225	45225	45225	45225	45225	45225	45225	45225	45225	542,700
Propane	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	48,000
Vehicle Fuel	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	150,000
Utilities	8,450	8,450	8,450	8,450	8,450	8,450	8,450	8,450	8,450	8,450	8,450	8,450	101,400
Chemicals and Compounds	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	120,000
Disposable Equipment and Supplies	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	120,000
Waste Disposal	8,300	8,300	8,300	8,300	8,300	8,300	8,300	8,300	8,300	8,300	8,300	8,300	234,000
Equipment Acquistion/Leasing	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	600,000
Dynamis/Clean Mountain Energy Oversight	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	240,000
Equipment Replacement	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	180,000
Contingency	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	600,000
Total Expense	751,490	751,490	751,490	751,490	751,490	751,490	751,490	751,490	751,490	751,490	751,490	751,490	9,017,880
Profit/Loss 250 TPD	199,526	199,526	199,526	199,526	199,526	199,526	199,526	199,526	199,526	199,526	199,526	199,526	2,394,312

Community Economic Impact

A local community Economic Impact Analysis on the Clark County Waste to Energy Plant was conducted in September 2009 by Timothy L. Solomon, the Executive Director of the Regional Development Alliance. The complete analysis report is included in this study as Appendix 2.

CONCLUSION

The purpose of this study has been to determine if there are suitable biomass feedstocks in the area to operate a renewable energy facility at the Centennial Energy Park and whether or not the operations would be feasible both from a technology and revenue generation basis. The answer to this question is a qualified yes. While there is more than sufficient feedstocks the real question is whether or not those feedstocks can be acquired over a long period of time at a reasonable cost.

Of the four biomass forms reviewed MSW is the most viable feedstock for a waste to energy facility. The cost of acquisition of the MSW would almost always be subsidized by a tipping fee. The idea of assessing a tipping fee for other forms of biomass is not viable. Crop residues and woody biomass are both viable as feedstock sources however, the cost of harvesting and shipping makes them unviable as a feedstock when compared to the subsidized MSW. The use of manures or livestock waste as a feedstock may be financially viable in some locations, but only if there was a market condition that allowed for a tipping or disposal fee. The cost of drying manure is also a liability.

The problem with long term MSW acquisition is sufficiently addressed by Title 31, Chapter 49 of Idaho Code. The Code provides for the creation of a regional solid waste district. There are two critical benefits that this legislation provides; 1) the code allows for the creation of a regional waste district for the sole purpose of the disposal of all municipal solid waste in the participating counties and governs the disposal practices for those whom participate, and 2) allows for funding of facilities and operations dedicated to waste disposal through revenue bonding without attaching the liability to the tax payers. Clark County used this provision as discussed above to partner with three other counties to form the Eastern Idaho Regional Solid Waste District. The formation of the District provided for a long term supply of municipal solid waste feedstock and also allowed for financing of a waste to energy facility without encumbrance of the tax revenues of the participating counties.

The Eastern Idaho Regional Solid Waste District has committed to construct a Waste to Energy Plant at the Centennial Energy Park. The Plant will process 250 tons per day of MSW using the Dynamis 3.0 Technology. The Plant will cost approximately $40M and will be financed using revenue bonds issued on behalf of the District. The facility will add 32 full time jobs to the area paying an average wage of $22/hr with benefits. Additional symbiotic users of energy are also examining the option of co-locating with the waste to energy plant to use by products such as low pressure steam, hot water, and ash.

The information gathered regarding crop residues and woody biomass has not gone unnoticed by others who have a desire to place facilities at the Energy Park. Recently the Regional Manager for the Great Plains, the Camelina Company, made contact with Clark County. Great Plains has a desire to construct a Camelina Seed press facility at the Energy Park. They would purchase low pressure steam from the Waste to Energy Plant to heat the seed prior to pressing. Additionally they are interested in purchasing biomass, either woody or crop residues, to run in their methanol/ethanol processes. These types of inquires provide hope that a robust biomass market will emerge in the eastern Idaho region.

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APPENDIX 1: EASTERN IDAHO REGIONAL SOLID WASTE DISTRICT DOCUMENTS

BYLAWS OF THE:

Eastern Idaho Regional Solid Waste District

23rd Day of June, 2010

ARTICLE I

Name

Section 1.1. The name of the district shall be the Eastern Idaho Regional Solid Waste District (hereinafter referred to as the "District"). The District was created pursuant to Section 31-4903, Idaho Code; by resolution of the boards of commissioners of Clark, Bonneville, Madison, and Fremont Counties, Idaho and is now composed of the counties of Clark, Bonneville, Madison, and Fremont Idaho.

ARTICLE II

Board of Directors

Section 2.1. The property, business, powers, and affairs of the District shall be managed and controlled by the board of directors thereof (the "Board"). The Board is vested with all powers as provided in Title 31, Chapter 49, Idaho Code, as the same exists or may hereafter be amended.

Section 2.2. The Board shall consist of a number of directors determined in accordance with the provisions of Section 31-4904, Idaho Code, with one (1) commissioner from each participating county serving as a Board member.

Section 2.3. Directors shall receive no compensation for their services, but shall be entitled to reimbursement from the District of their necessary expenses, including travel and per diem expenses, incurred in the discharge of their duties.

Section 2.4. Each director shall hold office for a two-year term or until his or her successor has been appointed and qualified, but in no event for a term greater than his or her term of office as commissioner of the participating county appointing him or her. A certificate of the appointment or reappointment of a director shall be filed with the secretary of the Board, and such certificate shall be conclusive evidence of the due and proper appointment of such director.

Section 2.5. The qualifications and eligibility of persons to serve on the Board shall be as defined and described in Section 31-4904, Idaho Code, as the same now exists or may be amended hereafter.

Section 2.6. The Board shall hold regular meetings without additional notice at the District Offices, (address) in Dubois , Idaho, on the last Wednesday of the month at the hour of 1:00 p.m. or such other time and place as may be determined by the Board and included as an amendment to these Bylaws.

Section 2.7. The President or a majority of the Board shall have power to call special meetings of the Board, the object of which shall be submitted to the Board in writing; the call and object, as well as the disposition thereof, shall be entered upon the minutes of the Secretary.

Special meetings may be held upon three (3) days' notice. The notice provided in this section may be dispensed with in the event a special meeting is called to deal with an emergency matter, such as one involving injury or damage to persons or property or the likelihood of such injury or damage. The only item to be discussed at such emergency meetings shall be the matter for which the meeting is called. Attendance by any director; in person or by proxy at such special meeting shall be deemed a waiver of any right to notice of such meeting.

Section 2.8. A majority of the members of the Board present at duly noticed meeting in person or by proxy shall constitute a quorum for the purpose of conducting business and exercising the powers of the District and for all other purposes. Notwithstanding the provisions of Idaho Code 31-4904, official action may be taken by the Board only upon the affirmative vote of at least three (3) members thereof present in person or by proxy at a duly convened regular or special meeting at which a quorum is present, except as otherwise specified in these Bylaws.

Section 2.9. The Board, by majority vote of the full Board, may employ an Executive Director, technical experts, legal counsel, waste operations contractor, and such other agents and employees, permanent and temporary, as the Board may require, and the qualifications and duties of and compensation for all of said persons so employed shall be determined by the Board.

Section 2.10. Any vacancy on the Board shall be filled by the commissioners of the county originally appointing the director whose office has become vacant.

Section 2.11. A member of the Board shall be entitled to have his or her vote cast by proxy, provided, however, that the only person entitled to cast such proxy shall be a member of the Board of Commissioners of the county in which the absent District board member resides. In order for a vote to be cast concerning a decision to be made by the Board, such vote must be cast in person at a meeting of the Board.

ARTICLE III

Officers

Section 3.1. The Board shall elect a President and Vice President from among its members, and shall appoint a Secretary and Treasurer, who need not be a director. The Offices of Secretary and Treasurer may be combined in one person.

Section 3.2. The Board shall elect the foregoing officers and such other officers as are deemed necessary for a term of one (1) year and until his or her successor is duly elected and qualified. Such elections shall occur at the regular meeting held in June. Officers elected at that meeting shall hold office until the regular meeting the following June.

Section 3.3. The President shall be the chief presiding officer of the District. The President shall execute all deeds, bonds, contracts, leases, and other legal documents authorized by the Board. The President shall also have such other powers and duties as may be assigned to him or her by the Board.

Section 3.4. The Vice President shall be possessed of all the powers and shall perform the duties of the President in the absence or disability of the President. The Vice President shall have the power to vote on any matter presented to the Board for its consideration. The Vice President shall also have such other powers and duties as may be assigned to him or her by the Board.

Section 3.5. The Secretary shall keep the minutes of all proceedings of the Board; shall attend to giving and serving all notices of meetings of the Board as required; shall execute with

the President in the name of the District all deeds, bonds, contracts, leases, and other legal documents and instruments as authorized by the Board, and shall be the custodian of the District seal, books, bylaws, and such other books, records, and documents of the Agency as the Board shall direct. In addition, he or she shall perform other duties and have such responsibilities as may be designated by the Board. In case of the absence or disability of the Secretary or his or her refusal or neglect to perform such duties, all duties required of the Secretary may be performed by the President or Vice President or such other person as may be designated by the Board.

Section 3.6. The Treasurer shall have the general custody of all the funds and securities of the District and shall have general supervision of the collection and disbursement of funds of the District. He or she shall endorse on behalf of the District, for collection, checks, notes, and other obligations and shall deposit the same to the credit of the District in such bank or banks or depositories as the Board may designate. He or she may sign, with the President or such other person or persons as may be designated for said purpose by the Board, all negotiable instruments. He or she shall enter or cause to be entered regularly in the books of the District full and accurate account of the District; shall at all reasonable times exhibit the District books and accounts to any director of the District at the office of the District during regular business hours; and, whenever required by the Board or the President, shall render a statement of his or her accounts. He or she shall perform such other duties as may be prescribed from time to time by the Board or by the bylaws. The Treasurer shall, before entering upon his or her duties; give bond for the faithful performance of his or her duties in such sum and with such surety as shall be approved by the Board.

Section 3.7. If any of the foregoing offices shall, for any reason, become vacant, the Board shall elect a successor who shall hold office for the unexpired term.

Section 3.8. Consistent with section 2.9 hereof, the Board may appoint an Executive Director or other administrative officer for the District. The Executive Director or other administrative office shall be the chief administrative officer of the District, shall serve at the pleasure of the Board, and shall have such powers and duties as may be assigned him or her by the Board. In addition, the Board may authorize the Executive Director to appoint such other administrative officers as it deems necessary, all of whom shall serve at the pleasure of the District, and shall have such powers and duties as may be assigned to them by the Executive Director.

ARTICLE IV

Miscellaneous

Section 4.1. The seal of the Eastern Idaho Regional Solid Waste District shall be circular in form and shall have the name of the District on the circumference and shall have the words "Corporate Seal" in the center.

Section 4.2. The Board may appoint one or more committees to investigate and study matters of District business and thereafter to report on and make recommendations concerning said matters assigned to the Board. When possible, each of said committees may be comprised of persons other than members of the Board. No such committees shall have the power to make final District decisions, that power being vested solely in the Board. The term of office, the persons serving, the matters to be studied and all procedural decisions relating to the functioning of such committees shall be made and decided by the Board.

Section 4.3. In addition to such bank accounts as may be authorized in the usual manner by resolution of the Board, the Treasurer, with the approval of the President, may authorize such bank accounts to be opened or maintained in the name and on the behalf of the District as he or she may deem necessary or appropriate. Payments from such bank accounts are to be made upon the check of the District, each of which checks shall be signed by two of such directors, officers, or bonded employees of the District as shall be authorized by the Board.

Section 4.4. The rules contained in the current edition of Robert's Rules of Order, Newly Revised, shall govern regular and special meetings of the Board in all cases to which they are applicable and in which they are not inconsistent with these Bylaws and any special rules of order which the Board may adopt.

Section 4.5. No director or employee of the District shall voluntarily acquire any personal interest, direct or indirect, in any project or property of the District or in any contract or proposed contract in connection with such project or property.

Section 4.6. Other counties that are not participating counties as of the date of adoption hereof may be included in the Eastern Idaho Solid Waste District upon the affirmative vote of two-thirds (2/3) of the full Board, and upon such terms and conditions as are imposed by the Board in its sole and absolute discretion.

Section 4.7. All budget receipts to be tendered to the District in any calendar year shall be payable in an amount not less than one-half (1/2) on or before the fourth Monday of January and the balance to be paid on or before the fourth Monday of July.

Section 4.8. The permissible service area of the District shall include all lands, including municipalities, contained within the counties of Clark, Bonneville, Madison, and Fremont unless specifically exempted by the waste flow control agreement entered into by the participating counties with the District.

Any additional area proposed for service outside of the counties designated in this paragraph 4.8 may be included in the District service area only upon the affirmative vote of two-thirds (2/3) of the Districts entire Board, which two-thirds (2/3) affirmative vote must include the affirmative vote of the Director who represents the county in which the proposed expanded use is located. In the event that the Director who is a representative of such county does not cast an affirmative vote, or in the event that the affirmative vote of two-thirds (2/3) of the entire Board of the District is not obtained, such expansion shall be disallowed.

ARTICLE V

We, the undersigned, being all of the members of the Board of Directors of the Eastern Idaho Regional Solid Waste District, do hereby certify that the foregoing Bylaws were duly adopted as the Amended and Restated Bylaws of said District on the 23rd day of June, 2010.

_____

William Fredriksen
Clark County

_____

Lee Staker
Bonneville County

_____

Jon Weber
Madison County

_____

LeRoy Miller
Fremont County

I, the undersigned, secretary of the Eastern Idaho Regional Solid Waste District, hereby certify that the foregoing Bylaws were duly adopted as the Bylaws of the District on the 23rd day of June, 2010.

_____

Kerri Ellis
Secretary

RESOLUTION 2010 -

WHEREAS, Clark County is a political subdivision of the State of Idaho charged with the responsibility for establishing, maintaining and operating a solid waste disposal system pursuant to Idaho Code 31-4401, et seq.; and

WHEREAS, the legislature of the State of Idaho has found and declared, pursuant to Idaho Code 31-4901, et seq. (the "Act") that the disposal of solid waste within the State of Idaho is an important public purpose, and that the creation of independent regional districts to administer solid waste disposal is an efficient and cost-effective method of meeting the state's solid waste disposal needs; and

WHEREAS, the Act has been adopted in order to enable counties to establish regional solid waste districts for the purpose of providing a regional solution to the problem of solid waste disposal through the operation and maintenance of a regional solid waste system; and

WHEREAS, Clark County deems it in its best interest to participate with the counties of Bonneville, Madison, Teton, and Fremont, in the establishment of an independent public body corporate and politic to be known as the Eastern Idaho Regional Solid Waste District ("District"), as more specifically set forth in 31-4903 of the Act; and

WHEREAS the participating Counties aforementioned have deemed it appropriate to create this District to further investigate the technical and financial feasibility of constructing a District owned waste to energy facility to be located in the Centennial Energy Park in Dubois, Idaho; and

NOW, THEREFORE, BE IT HEREBY RESOLVED that Clark County hereby elects to become a participating county with Bonneville, Madison, Teton, and Fremont Counties in the establishment of the Eastern Idaho Regional Solid Waste District (the "District") in accordance with the terms and provisions of the Act.

BE IT FURTHER RESOLVED that Clark County hereby appoints _____, one of its commissioners, to serve on the Board of the District.

BE IT FURTHER RESOLVED that Eastern Idaho Solid Waste District will be immediately dissolved if the waste to energy project is not deemed both technically or financially feasible as determined by a professional bond underwriter employed by the District and that Clark County nor any of the participating counties can or will be held liable for any debts or financial claims of the Eastern Idaho Solid Waste District.

Dated this ___ day of _____, 2010.

_____

_____

ATTEST

_____ _____

County Clerk

Eastern Idaho Regional Solid Waste District Agreement

FLOW CONTROL ORDINANCE

AN ORDINANCE REQUIRING THE DEPOSIT OF ALL SOLID WASTE GENERATED WITHIN THE BOUNDARIES OF THE COUNTY AT THE COUNTY'S TRANSFER STATION(S) OR, ALTERNATIVELY AT THE CLARK COUNTY WASTE TO ENERGY FACILITY; DEFINING TERMS; ESTABLISHING PENALTIES; AND PROVIDING FOR AN EFFECTIVE DATE.

WHEREAS, Idaho Code Title 31 Chapter 44 imposes the primary responsibility for the establishment of solid waste disposal sites on the counties of the State of Idaho, and

WHEREAS, _____ County has elected to become a member of the Eastern Idaho Regional Solid Waste District in order to fulfill duties imposed upon it by law regarding solid waste, and

WHEREAS, the Eastern Idaho Regional Solid Waste District, through its Board of Directors, has established a regional waste to energy facility at the Centennial Energy Park in Dubois, Idaho, and

WHEREAS, the Eastern Idaho Regional Solid Waste District, through cooperation with its member counties, has identified transfer stations within the boundaries of each county whereby solid waste may be delivered before finally being transported to the Clark County Waste to Energy Facility, and

WHEREAS, the Eastern Idaho Regional Solid Waste District has, through its Board of Directors, established a budget to defray the cost of its operation, and

WHEREAS, the money necessary to conduct the operations of the District are generated through means authorized by Idaho Code Section 31-4404, and

WHEREAS, a significant portion of the revenue of the District is derived from "tipping" fees which are fees collected for the deposit of solid waste at either a transfer station or the Clark County Waste to Energy facility, and

WHEREAS, the budget of the Eastern Idaho Regional Solid Waste District assumes that the solid waste generated within the boundaries of this County will be delivered to either the designated transfer station or the Clark County Waste to Energy Facility in order that the county's share of the budget of the Eastern Idaho Regional Solid Waste District may be realized, and

WHEREAS, for purposes of protecting the public health, providing for protection of land, water and air resources to facilitate the ability of the Eastern Idaho Regional Solid Waste District to be adequately financed and discharge its duties with regard to the disposal of solid waste, it is necessary that the County control the disposition of solid waste generated within its boundaries,

BE IT THEREFORE ORDAINED by the Board of County Commissioners of _____ County, a political subdivision of the State of Idaho as follows:

Section 1. Definition of Terms:

For purposes of this ordinance:

A. "Solid Waste" shall have the meaning set forth in Idaho Code Section 39-7403(50) as it now exists or as it may hereafter be amended.

B. "Regional Solid Waste District" means the Eastern Idaho Regional Solid Waste District formed and existing under the provisions of Idaho Code Section 31-4901, et seq.

C. "Board of Directors" means the duly elected and serving Board of Directors of the Eastern Idaho Solid Waste District.

D. "Transfer Station" means any transfer station officially identified as such within the boundaries of _____ County by action of the Board of Directors at the Eastern Idaho Regional Solid Waste District.

E. "Regional Waste to Energy Facility" means the Waste to Energy Facility owned by the Eastern Idaho Regional Solid Waste District in Clark County, and any additional landfill site owned or leased by the Eastern Idaho Regional Solid Waste District approved by the Idaho Department of Environmental Quality.

Section 2. Deposit of Solid Waste.

All solid waste generated within the boundaries of _____ County shall be deposited or collected exclusively at a transfer station located within the boundaries of the County or at the Regional Waste to Energy Facility.

Section 3. Deposit of Certain Waste at Regional Waste to Energy Facility.

At the direction of the Eastern Idaho Regional Solid Waste District, designated types of solid waste shall be deposited directly at the Regional Waste to Energy Facility and not at a transfer station. Such types of solid waste may include but not be limited to, those types of solid waste that have a high degree of potential for impact on human health or damage to property or which may require sophisticated inspection or handling prior to final disposition.

Section 4. Payment of Fees.

Every person or entity depositing solid waste at a transfer station or at the Regional Waste to Energy Facility shall pay an appropriate fee established by the resolution of the _____ County Board of Commissioners. The fee shall be payable at the time the solid waste is deposited.

Section 5. Penalty.

Any violation of this ordinance shall be a misdemeanor, punishable by a fine not to exceed Three Hundred Dollars ($300.00), imprisonment in the county jail for a period not to exceed six (6) months or both. Each individual act of failing to properly deposit solid waste or failure to pay the appropriate fee shall constitute a separate offense under this ordinance.

Section 6.

This ordinance shall become effective upon its passage and publication as provided by law.

PASSED BY THE _____ COUNTY BOARD OF COUNTY COMMISSIONERS THIS ___ DAY OF _____, 2010.

BOARD OF COUNTY COMMISSIONERS

_____
Chairman

_____
Commissioner

_____
Commissioner

ATTEST:

_____
Clerk

SOLID WASTE DISPOSAL AGREEMENT

ARTICLE I

ACCEPTANCE AND COSTS

Section 1.01. Acceptance of Solid Waste.

The District agrees to accept all solid waste delivered to a transfer station or stations or other solid waste disposal or resource recovery site or sites operated by the District in the County except hazardous waste. The District shall not be obligated to receive any material that is not solid waste. All solid waste received by the District pursuant to this Section shall be considered to be received by the District from the County. The District shall properly dispose of all solid waste received by it from the County.

Section 1.02. Solid Waste Disposal Charges.

(a) The District shall establish as a part of its budget for each fiscal year of the District (a "Fiscal Year") rates, fees and charges ("Solid Waste Disposal Charges") for the receipt of disposal of solid waste by the District, including the estimated total amount of Solid Waste Disposal Charges required to be received in such Fiscal Year (the "Annual Solid Waste Disposal Charges") from each participating county. The Annual Solid Waste Disposal Charges shall be sufficient, together with electrical production and other revenues received by the District, to cover the District's costs and expenses for such Fiscal Year, including but not limited to a reasonable operating reserve and any other reserves considered appropriate by the District in its discretion, and to provide any reasonable operating margin that the District in its discretion determines to be required for it to operate on a fiscally sound basis. At no time shall the total amount of revenue removed from the District funds in direct payment to the participating counties exceed thirty (30%) percent of the gross revenues even if a higher revenue to expenses ratio exists. If the gross revenues to expenses ratio (*net profit*) exceeds thirty five (35%) percent the Annual Solid Waste Disposal Charges will be reduced to meet the goal of 30%.

(b) The County shall pay to the District, for the receipt from the County by the District of Solid Waste and the disposal of such solid waste, Solid Waste Disposal Charges which shall be the portion of each Annual Solid Waste Disposal Charge allocated by the District to such solid waste in accordance with this Section (the "County's Solid Waste Disposal Charges"). In determining Solid Waste Disposal Charges and in making such allocation, the District may

(i) Base Solid Waste Disposal Charges and such allocation on weight or volume of solid waste received for disposal.

(ii) Establish categories of solid waste that may be received and charge different Solid Waste Disposal Charges and allocation for various kinds of solid waste received, such as tires and sewer sludge.

(iii) Establish separate Solid Waste Disposal Charges and allocations for Solid Waste received by it at transfer facilities owned by or leased to the District and for solid waste received by it from transfer facilities owned by counties and others delivering waste to the District.

(iv) Take into account such other factors and may make such other decisions as it

in its discretion deems appropriate.

The allocation to the County for solid waste received by the District from the County during each 12-month period ending on a December 31 (a "Disposal Period"), together with all allocations to other counties and others with whom the District has contracted for the receipt of solid waste ("Contracting Sources") for the Fiscal Year that includes such December 31, shall equal the Annual Solid Waste Disposal Charges for such Fiscal Year (after deduction of any Solid Waste Disposal Charges budgeted to be received from noncontracting customers during such Fiscal Year).

(c) The District shall establish its budget for each Fiscal Year in accordance with Section 31-4907 of the Act. No later than each April 15, the District shall determine the projected amount of the County's Solid Waste Disposal Charges for the Disposal Period ending on the immediately following December 31 by any methodology adopted by the District and may base such determination upon the solid waste received by the District from the County and from other Contracting Sources in the immediately preceding Disposal Period. The County shall pay one-half of said projected Solid Waste Disposal Charges for such Disposal Period semiannually on the fourth Monday in January during such Disposal Period and the remaining one-half of said projected County Solid Waste Disposal Charges on the fourth Monday in July immediately following such Disposal Period.

(d) Within 30 days after the end of each Disposal Period, the aggregate County Solid Waste Disposal Charges for the solid waste that was received by the District from the County during such Disposal Period shall be determined by the District based on allocation of the Annual Solid Waste Disposal Charges (after deduction of any Solid Waste Disposal Charges received or budgeted to be received from noncontracting customers during the then current Fiscal Year) of the solid waste received from the County and the solid waste received from other Contracting Sources in such Disposal Period. In the event said aggregate County Solid Waste Disposal Charges

(i) are in excess of the projected County Solid Waste Disposal Charges paid by the County for such Disposal Period pursuant to the preceding paragraph (c) , or

(ii) are less than the projected County Solid Waste Disposal Charges that have been paid by the County pursuant to the preceding paragraph (c),

the amount to be paid by the County during the immediately succeeding Fiscal Year shall be adjusted accordingly; provided that upon the termination of this Agreement pursuant to Section 1.02, the County shall pay any such excess County Solid Waste Disposal Charges, as appropriate, within 90 days after the termination of this Agreement.

(e) The District's determination of its budget, Solid Waste Disposal Charges, Annual Solid Waste Disposal Charges, the projected and actual County's Solid Waste Disposal Charges and other amounts related to this Agreement shall be binding upon the County.

(f) To the extent permitted by law, the County shall pay the District a delinquency charge on any Solid Waste Disposal Charges not paid when due pursuant to this Agreement, which delinquency charge shall be equal to the amount of said Solid Waste Disposal Charge due times a daily accrual charge for the number of days said Solid Waste Disposal Charge is

delinquent computed at the rate of 12% per annum or the maximum rate permitted by law, whichever is less.

(g) All Solid Waste Disposal Charges payable by the County shall be paid for the account of the District to _____ Bank, _____, Idaho (or another bank designated by the District in a written notice to the County) acting as a depository for District funds for payment for deposit into an account maintained by the District with said bank for the receipt of District funds.

(h) The County' obligations to pay Solid Waste Disposal Charges are in consideration for the receipt of solid waste delivered by the County to the District. The obligation of the County to pay Solid Waste Disposal Charges for solid waste received from the County by the District is absolute and unconditional without abatement, deduction, set-off, counterclaim, recoupment or defense, or any right of termination or cancellation. Nothing in this Section shall be construed as a waiver by the County of any rights or claims the County may have against the District under this Agreement or otherwise, but any recovery upon such rights or claims shall be had from the District separately.

Section 1.03. Covenants of the County.

(a) The County shall not acquire, construct or operate, or continue the operation of, any landfill site or any facility for the recovery of resources or the disposal of solid waste after a waste to energy facility of the District is operational unless agreed herein. The County shall take all actions necessary to require that all solid waste collected within the County be delivered to the District's Waste to Energy Facility or Facilities.

(b) The County agrees to obtain, budget and appropriate sufficient funds from sources legally available to it, including but not limited to the sources set forth in Section 31-4404 of the Idaho Code, to pay the Solid Waste Disposal Charges under this Agreement.

(c) Insert Specific exemptions as requested in this section -

ARTICLE II

EVENT OF DEFAULT AND REMEDIES

Section 2.01. Default by the County.

(a) If the County fails to pay any installment of the Landfill Closure Charge or any Solid Waste Disposal Charge when the same is due and such failure continues for 45 days after the District has given the County notice of such failure, the District may exercise any one or more of the following remedies:

(i) Refuse to accept any further solid waste from the County until such time as all installments of the Landfill Closure Charge due hereunder, all Solid Waste Disposal Charges due hereunder and any delinquency charges due hereunder have been paid in full.

(ii) Commence and pursue an action seeking payment for all sums due hereunder together with all costs of the District in prosecuting said action and pursuing remedies hereunder, including without limitation attorney's fees.

(iii) Take any other action at law or in equality to enforce the rights of the District under this Agreement.

(b) In the event the County shall fail to perform any of its other obligations hereunder and the County does not cure such failure within 30 days after the District has given the District written notice of such failure (or, if such failure cannot be cured during such 30-day period, such longer period as is acceptable to the District in its discretion), then the District may take any available action at law or in equity to enforce its rights hereunder.

Section 2.02. Default by the District.

In the event the District shall fail to perform any of its obligations hereunder and the District does not cure such failure within 30 days after the County has given the District written notice of such failure (or, if such failure cannot be cured during such 30-day period, such longer period as is acceptable to the District in its discretion), then the County may take any available action at law or in equity to enforce its rights hereunder.

ARTICLE III

REVENUE SHARING

Section 3.01 Payments.

Revenues generated by the operations of the Waste to Energy Conversion Facility shall be determined by the ratio between the revenue generated from all sources over expenses included debt and operating contract incentive payments. The annual budget shall reflect a goal of a net positive ratio of not less than 30% and not more than 35%. Revenues shall be shared as follows:

a) Waste to Energy Facility Operation Contractor twenty (20%) percent incentive payment
b) Waste to Energy Conversion Facility host county forty percent (40%) of the remaining eighty (80%) percent
c) Other participating counties will split sixty (60%) of the remaining eighty (80%) percent based on their percentage of the waste dispose of at the facility.

The revenues shall be paid within 45 days upon successful completion of the fiscal year.

ARTICLE IV

CONDITIONS

Section 4.01. Term.

This Agreement shall be effective for a term commencing with its execution and delivery by the parties hereto and ending on December 31, 2032, unless extended expressly by a written instrument executed by both parties hereto. The obligations of the County and the District to make any payments under Section 1.01(d) with respect to such Disposal Period shall survive expiration of the term of this Agreement.

Section 4.02. Governing Law.

This Agreement shall be governed by and construed in accordance with the laws of the State of Idaho.

Section 4.03. No Personal Liability.

All liabilities of the parties under this Agreement are solely liabilities of the County and the District, and no commissioner, director, officer, employee or agent of the County or the District shall have any personal individual liability under this Agreement.

Section 4.04. Binding Effect.

This Agreement shall inure to and be binding upon the County and the District and their respective successors and assigns.

Section 4.05. Entire Agreement

This Agreement is a final expression of the agreement between the parties hereto and such agreement may not be contradicted by evidence of any prior oral agreement or of a contemporaneous oral agreement between the parties hereto. No unwritten oral agreement between the parties exists.

Section 4.06. Amendments.

This Agreement may not be effectively amended, changed, modified, altered, or supplemented except with the written consent of both the County and the District. Any waiver of any provision of this Agreement or any right or remedy hereunder must be affirmatively and expressly made in writing and shall not be implied from inaction, course of dealing or otherwise.

Section 4.07. Notices.

Any notices required or permitted under this Agreement shall be sufficient if same is duly mailed by registered or certified mail, postage prepaid, and addressed as follows:

(a) If to the County:

(b) If to the Eastern Idaho Regional Solid Waste District:

IN WITNESS WHEREOF, the parties hereto have entered into this Agreement as of the day and year first above written.

Eastern Idaho Regional Solid Waste District

By: _____

President

(SEAL)

ATTEST:

_____

Secretary

APPENDIX 2: CLARK COUNTY COMMUNITY ECONOMIC IMPACT ANALYSIS

CLARK COUNTY, IDAHO WASTE TO ENERGY PLANT:
Economic Impact Analysis --- November 2009

Prepared By:

Timothy L. Solomon
Executive Director
Regional Development Alliance, Inc.
2300 North Yellowstone
Idaho Falls, ID 83401

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INTRODUCTION

A tri-party agreement is being considered for a waste to energy plant in Clark County, Idaho. The partnership consists of both public and private entities including Clark County.

The plant would use gasification technology rather than incineration to convert waste typically headed for landfills into electricity. Waste would come through contracts with surrounding counties and cities. The process employs a patented technology for receiving and combusting the waste and creating the steam to run an electric generator. Estimates place the amount of waste available in a 12 county area at more than 300,000 tons of waste produced annually.

Two initial plant sizes are being considered. The first is a 250-ton plant that would produce approximately 12 MW of electrical power. The second is a 500-ton plant that would produce approximately 24 MW of electrical power. One MW of power is generally assumed to power 400 – 900 homes depending on residential usage. The plant would be designed to easily expand to 4,000 tons.

This analysis considers only the economic impacts of a 250-ton plant and a 500-ton plant in Clark County, Idaho. No consideration of additional availability of electricity to county residents has been considered in the study as the independent power producer is a wholesaler and will be selling to utilities. Residents will continue buying their power directly from the utilities.

The revenue model for the plant owners would be structured around four (4) sources:

1. Power sales
2. Sale of recyclables
3. Tipping fees
4. Alternative energy subsidies and credits

SCOPE OF ANALYSIS

This analysis has been conducted at the request of Clark County Economic Development. The analysis considers only impacts to Clark County, Idaho.

Clark County is a rural county located in the southeastern portion of Idaho. The county sits approximately 1.5 hours from Yellowstone National Park on the northeast, 50 miles from Idaho Falls, Idaho (Bonneville County) on the south, and borders Montana on the north.

Two (2) plant sizes were considered in the analysis: 250-ton per day and 500-ton per day. Both plant sizes are assumed to require 12 months to construct with additional workers required on the 500-ton plant to complete within the allotted time.

The construction of the 250-ton plant was assumed to require 150 full-time equivalent workers while the 500-ton plant was assumed to require 250 full-time equivalent workers. Construction of the 250-ton plant is budgeted at $30 million while the 500-ton plant is anticipated to be exactly double at $60 million.

The analysis assumes a 25-year operating timeframe for the plant regardless of size. The 250-ton plant is anticipated to require 35 employees including management. The 500-ton plant is anticipated to require 43 employees including management.

Waste receipts, energy production and revenue are assumed constant although typical plant operations will see variations in all three throughout a 25-year period. Of course, this is not a revenue analysis for the plant but an economic impact analysis based on employment, production and local purchasing. In order to properly account for variations in the out-years, output and GDP deflators have been used.

All models have been developed and analyzed using IMPLAN V3 and 2008 datasets.

STUDY AREA DATA

As mentioned earlier, Clark County is a rural county located in southeastern Idaho. Total land area is 1,765 square miles. Gross Regional Product (GRP) was $50,527,301 in 2008. Table 1 shows components of GRP.

Table 1 - COMPONENTS OF GROSS REGIONAL PRODUCT FOR CLARK COUNTY, IDAHO

Employee Compensation	**$27,115,125**
Proprietor Income	**$4,594,938**
Other Property Type Income	**$15,935,110**
Indirect Business Taxes	**$2,882,128**
TOTAL GROSS REGIONAL PRODUCT	**$50,527,301.00**

Total personal income during 2008 was $35,596,940. There are 367 households in the study area with an average household income of $96,994. Please note, however, that the real average is going to be lower than the $96,994 due to in-commuters who come to work in the county. Data on actual household income for resident vs. non-resident personal income are unavailable.

The total number of people employed in the county in 2008 was 1,087 while the total 2008 population was estimated at 910 people. Various agricultural concerns in the county attract in-commuters from at least two surrounding counties thus accounting for the number employed vs. the population. There are a total of 60 industry sectors accounted for in Clark County. Table 2 – Clark County, ID Industries, Relative Employment, Output & Compensation provides a comparison across Clark County industries for employment and allied characteristics.

One of the concerns for county officials is that a large potato processing plant recently announced plans to close and dislocate 70 local employees. It is hoped that the construction and operation of the waste to energy plant will employ a portion of the dislocated workers. Of course, diversity in employment is important to any given study area. By using the Shannon-Weaver Diversity Index (a tool designed to measure diversity in and among wide-ranging elements) as an economic indicator

Table 2 - CLARK COUNTY, ID INDUSTRIES, RELATIVE EMPLOYMENT, OUTPUT & COMPENSATION (Ranked by Employment)

INDUSTRY TYPE	EMPLOYMENT	OUTPUT	EMPLOYEE COMPENSATION
Food Processing	104	$53,084,512	$5,323,321
Cattle Ranching & Farming	89	$6,852,637	$1,555,159
Grain Farming	83	$4,294,782	$315,785
Employment Services	69	$1,897,607	$1,108,215
Real Estate	62	$2,460,633	$0
State & Local Government Education	57	$2,474,352	$2,184,596
Federal Government (Non-Military)	55	$5,058,977	$4,453,605
Auto Repair	50	$2,185,712	$0
State & Local Government (Non-Education)	44	$1,399,997	$1,236,053
Wholesale Trade	39	$5,923,698	$2,162,953
Business Support Services	39	$2,219,710	$826,382
Religious Organizations	33	$4,072,208	$418,150
Individual and Family Services	30	$824,586	$291,686
Personal Care Services	27	$887,080	$124,367
Fitness & Recreational	23	$543,221	$11,624
Retail Stores – Food & Beverage	21	$845,510	$355,507
Performing Arts	19	$483,079	$0
Vegetable and Melon Farming	15	$2,103,962	$825,508
Auto Equipment Rental & Leasing	15	$2,064,765	$0
Support Activities for Ag and Forestry	15	$423,948	$50,218
All Other Misc. Professional, Scientific & Tech. Services	16	$3,584,036	$374,997
Retail Stores – Gasoline Stations	15	$710,372	$199,596
Food Services & Drinking Places	14	$599,497	$24,445
Private Household Operations	13	$85,631	$74,719
Insurance	13	$2,217,937	$1,049,989
Other State & Local Government Enterprises	12	$2,281,943	$222,471
Other Basic Organic Chemical Manufacturing	12	$27,411,624	$917,811
Telecommunications	10	$3,402,827	$370,453
Hotels/Motels	8	$567,180	$101,461
Construction	8	$899,884	$251,623
Private Educational Services	8	$622,802	$283,753
Transport by Truck	6	$795,690	$296,228
Relay & Industrial Control Manufacturing	6	$1,911,219	$316,715
Retail Stores – Clothing	6	$216,047	$68,205
Couriers & Messengers	5	$26,420	$0
Community Food, Housing & Other Relief Services	5	$139,819	$74,993
Other Information Services	5	$2,218,091	$338,389
Specialized Design Services	4	$438,839	$80,068
Federal Government – Military	4	$244,669	$167,022
Computer Systems Design Services	3	$214,163	$137,471
Retail Stores – Misc.	3	$98,378	$45,492
Amusement (arcade, candy machines, etc.)	3	$288,125	$28,932
Oil/Natural Gas Services	3	$1,257,630	$0
Monetary Authority and Depository Credit	3	$690,923	$188,254
Custom Computer Programming Services	2	$149,542	$60,814
U.S. Postal Service	2	$150,453	$94,769
Animal Production Except Cattle, Poultry and Eggs	2	$59,372	$28,568
Retail Stores – Motor Vehicles & Parts	1	$11,340	$0
Retail Non-stores – Direct and Electronic Sales	1	$13,379	$0
Retail Stores – Sporting Goods, Hobby, Book and Music	1	$8,339	$0
Personal and Household Goods Repair and Maintenance	1	$30,307	$0
Maintenance & Repair of Non-Residential Structures	1	$90,414	$45,999
Commercial & Industrial Machinery and Equipment Repair	1	$90,408	$28,759
Commercial Hunting & Trapping	1	$98,220	$0
TOTALS	**1087**	**$151,726,496.00**	**$27,115,125.00**

tool we find that Clark County has an index of 0.55915. An index of 1.0 would assume that the same numbers of people are employed in each industry found within the study area. Anything less than 1.0 shows decreasing diversity or, in other words more people employed in one industry than another. A greater diversity is desired in order to decrease the possibility of employment losses within an area.

When building the model, it was necessary to "add" the industry sector "electric power generation, transmission, and distribution" to the study area as that industry is not currently present. Upon adding the industry to other industries already present in the study area, the Shannon-Weaver Diversity Index improved to 0.56453. The addition of the industry is a good example of how diversity improves as additional industries are added to the area.

Table 3 – Labor Income Per Worker by Industry, shows relative comparisons of how specific industries contribute to the economy through labor income. Components of labor income include employee compensation and sole proprietor income. In addition, Table 3 shows the top industries located in Clark County relative to total employment and output. Keep in mind that the food processing industry is being impacted with the closure of the largest plant and will impact the county negatively.

It is important to note that Table 3 *includes* the addition of "electric power generation, transmission, and distribution" in order to offer a comparison of labor income to other industries currently located in Clark County.

Table 4 shows the top 10 segments in demand by households in Clark County along with the relative amounts paid by households to the various segments annually. Note that rental housing is the segment most in demand, and the segment "medical and diagnostic labs and outpatient services" is number 10.

Table 5 compares the number of households by income level for the study area.

Table 3 - LABOR INCOME PER WORKER BY INDUSTRY (Ranked Highest to Lowest Labor Income)

INDUSTRY TYPE	LABOR INCOME PER WORKER
Electric Power Generation, Transmission, and Distribution	$90,158
Insurance	$83,776
Federal Government – Non-military	$80,855
Other Basic Organic Chemical Manufacturing	$79,926
Vegetable and Melon Farming	$71,178
Monetary Authorities and Depository Credit	$71,041
Other Information Services	$68,498
Management, Scientific, and Technical Consulting	$61,871
Computer Systems Design Services	$60,125
Wholesale Trade	$56,207
Food Processing	$53,323
Relay and Industrial Control Manufacturing	$52,831
Transport by Truck	$48,523
Oil & Natural Gas Services	$47,929
Maintenance & Repair of Non-Residential Structures	$47,795
U.S. Postal Service	$47,778
Construction	$35,349
Custom Computer Programming Services	$32,113
Misc. Professional, Scientific and Technical Services	$29,881
Commercial and Industrial Machinery and Equipment Repair	$29,248
State & Local Government – Non-Education	$28,332
Support Activities for Ag and Forestry	$27,395
Business Support Services	$26,461
Automotive Equipment Rental and Leasing	$24,613
Hotels/Motels	$19,230
Other State & Local Government Enterprises	$18,852
Employment Services	$17,942
Cattle Ranching & Farming	$17,690
Retail Stores – Food and Beverage	$17,158
Amusement	$16,879
Retail Stores – Misc.	$16,252
Community Food, Housing and Other Relief Services	$15,588
Retail Stores – Gasoline	$14,149
Religious Organizations	$13,648
Auto Repair and Maintenance	$12,907
Personal Care Services	$12,063
Retail Stores – Clothing	$11,956
Food Services & Drinking Places	$11,903
Individual and Family Services	$10,954
Commercial Hunting & Trapping	$10,029
Fitness & Recreation	$4,834

Table 4 - HOUSEHOLD COMMODITY/SERVICE DEMAND, CLARK COUNTY, IDAHO

COMMODITY/SERVICE	AMOUNT SPENT BY HOUSEHOLDS ANNUALLY
Rental Services of Owner-Occupied Buildings	$177,146
Private Hospital Services	$70,014
Physicians, Dentists, Other Healthcare	$54,637
Restaurant, Bar and Drinking Places Services	$50,797
Insurance	$47,131
Wholesale Trade Distribution Services	$27,879
Higher Education	$24,591
Retail Services – Food & Beverage	$23,469
Retail Services – General Merchandise	$20,676
Medical & Diagnostic Labs and Outpatient Services	$19,860

Table 5- HOUSEHOLDS BY INCOME CATEGORY

HOUSEHOLD INCOME CATEGORY	NUMBER OF HOUSEHOLDS
Less Than $10,000 Per Year	48
$10,000 to $15,000 Per Year	35
$15,000 to $25,000 Per Year	67
$25,000 to $35,000 Per Year	52
$35,000 to $50,000 Per Year	116
$50,000 to $75,000 Per Year	32
$75,000 to $100,000 Per Year	14
$100,000 to $150,000 Per Year	1
$150,000 or More Per Year	2
TOTAL	367

Understanding local supply and demand for various services/commodities is important to understanding how economies are impacted with changes in dollar and trade flows. Table 6 expresses the percentage of local demand for key commodities/services that is satisfied by local producers/providers. In other words, the Table shows the percent of local demand that is satisfied by local producers for any given commodity.

Table 6 - PERCENT LOCAL DEMAND SATSIFIED BY LOCAL SUPPLY FOR ANY GIVEN COMMODITY

COMMODITY/SERVICE	PERCENT LOCAL SUPPLY
Commercial & Industrial Machinery & Equipment Repairs and Maintenance	96%
Home Health Care Services	96%
Accounting, Tax Preparation, Bookkeeping, and Payroll Services	96%
Custom Computer Programming Services	94%
Retail Services - Non-Store, Direct & Electronic Sales	93%
Monetary Authorities & Depository Credit Intermediation Services	92%
Nursing & Residential Care Facilities	91%
Environmental & Other Technical Consulting Services	91%
Wholesale Trade Distribution Services	87%
Retail Services - Sporting Goods, Hobby, Book and Music	79%
Retail Services - Motor Vehicle & Parts	75%
Restaurant, Bar & Drinking Place Services	74%
Retail Services – Misc.	70%
Retail Services – Food & Beverages	68%
Retail Services – Clothing	62%
Vegetables & Melons	50%
Retail Services – Gasoline Stations	31%
Cattle from Ranches & Farms	21%
Auto Repair and Maintenance	20%
Truck Transportation Services	14%
Fitness & Recreational Sports Center Services	14%
Soft Drinks & Manufactured Ice	11%
Frozen Foods	0.28%
Cookies, Crackers & Pasta	0.13%
Breakfast Cereal	0.12%
Seasonings & Dressings	0.12%
Relay & Industrial Controls	0.12%
Snack Foods	0.06%
Switchgear and Switchboard Apparatus	0.02%

ECONOMIC IMPACT – 250-TON PLANT

Construction Phase -- Employment Compensation and Household Spending Impacts

The construction phase of the 250-ton plant is anticipated to last 12 months and employ 150 people at an average of $30,473 annually. Most of the construction workers will come from outside the county and most of their compensation will be spent outside. Only about 23% of the construction workforce (34 people) is anticipated to come from within the study area. It is important to note that even though in theory 34 people could be employed from Clark County during the construction process, there is no guarantee that 34 people can or will be found and hired. This analysis simply assumes that 34 people can be found and will be hired in order to assess the impacts of such an employment change.

Although construction workers not residing in Clark County will spend some of their income locally for grocery items and perhaps some rent, most will be exported outside. Those expenditures are not part of this study.

In any study area, only a percentage of the actual employee compensation actually makes it into the pockets of the workers. The remainder goes to federal, state and local taxes and is exported out of the county. In the 25 – 35k household income range in Clark County, 72% of employee compensation paid by industries actually gets to the household. Of that 72% only 42% is spent locally. The remainder is exported through purchases made at regional shopping centers, professional services (e.g., medical care), through on-line purchases, etc.

After applying appropriate deflators, the total amount of employee compensation coming to construction workers residing in Clark County will be $1,038,969 (out of $4,570,950 gross employment compensation for all construction labor). Of that, $748,058 (72%) will actually make it to the pockets of the workers. Forty-two percent of that, or $314,184, would typically be spent locally while

$433,874 (58%) would likely be spent in the broader region. Table 7 shows the likely ways in which the $314,184 would be absorbed into the local economy.

The employment effects of spending the $314,184 locally over a one year period would likely result in the creation of 2.7 additional equivalent jobs in the county with resulting labor income of $41,865 (or $15,505.55 average employment compensation) for the 2.7 equivalent people. Even though the data suggest an additional 2.7 people hired, the odds are that no jobs would be created at all specifically because of the construction spending. All that is being suggested is that the resulting income to businesses in the area from construction spending would be the *equivalent* of hiring 2.7 people spread across many business sectors where spending occurs.

The spending would also likely result in an additional $12,960 in income to sole proprietorships in the study area.

Over that same 12-month period, due to construction spending, approximately $21,427 would be received in indirect business taxes (drivers' licenses, hunting and fishing licenses, sales tax, permits, etc.). Total taxes from construction employment spending going to state and local taxing districts would likely be $20,754. Total taxes going to federal government would likely be $8,999.

Table 7 - TOP 13 SECTORS WHERE RESIDENT CONSTRUCTION WORKERS WILL LIKELY SPEND THEIR INCOME

Housing (Rent)
Real Estate Transactions
Telecommunications
Wholesale Trade
Other State And Local Government Enterprises
Retail Stores – Food And Beverage
Individual And Family Services
Religious Organizations
Food Services And Drinking Places
Automotive Repair And Maintenance, Except Car Washes
Personal Care Services
Monetary Authorities And Depository Credit Intermediation Activities
Retail Stores – Gasoline Stations

Construction Phase -- Plant Construction Activities Impacts

Construction of the 250-ton plant, as referenced above, is expected to take 12 months. Total plant construction is expected to cost $30 million including the employee compensation discussed above.

Most of the materials and equipment expenditures will occur external to the county. Direct output (economic activity in the county) would approximate $6,818,761. Indirect output (local supplier spending) would approximate $415,537 locally. Induced output (employee spending) could stimulate an additional $200,230 in local spending. The remainder of the total output associated with construction ($30 million) would be exported to the broader region.

As a result of local suppliers doing business related to the construction work (the indirect effects), approximately 4.9 jobs will be created in the supplier chain with resulting employee compensation of approximately $102,464 (or $20,911 average per employee). Total indirect labor income including sole proprietors is anticipated at $126,383.

Table 8 shows the top 10 industries impacted by spending in the indirect (supplier) round.

Table 8 - TOP 10 INDUSTRIES IMPACTED BY INDIRECT ROUND OF SPENDING

INDUSTRY	PROJECTED AMOUNT FROM INDIRECT ROUND OF SPENDING
Wholesale Trade	$120,840
Telecommunications	$83,448
Automotive Repair	$32,234
Employment Services	$26,495
Real Estate Establishments	$21,921
Retail Stores – Food & Beverage	$19,356
Commercial & Industrial Machinery & Equipment Repair	$16,784
Banks	$15,691
Scientific, Professional, Technical Services	$13,029
Other Consulting Services	$11,058

Construction Phase – Combined Impacts of Employment Compensation/Household Spending and Plant Construction Activities

Table 9 shows the combined total anticipated impacts of all construction activities for the 250-ton plant construction period. Note that the impact results listed are for ***ONLY*** Clark County and do not anticipate impacts on surrounding counties.

Table 9 - COMBINED EMPLOYEE/HOUSEHOLD SPENDING AND CONSTRUCTION ACTIVITY IMPACTS

IMPACT CATEGORY	IMPACT RESULT
Total Output (economic activity)	$6,818,761
Direct Employment	34
Indirect Employment	4.9
Induced Employment	2.7
Direct Employee Compensation	$1,038,969
Indirect Employee Compensation	$102,464
Induced Employee Compensation	$41,865
Direct Labor Income (includes proprietors)	$1,429,223
Indirect Labor Income (includes proprietors)	$126,383
Induced Labor Income (includes proprietors)	$54,825
Indirect Business Taxes (total)	$78,731

Operations Phase – Introduction

As outlined above, this analysis assumes a 25- year plant operating history with 35 employees. For the purposes of analysis we assume that the employment level will remain static. Of course static employment rarely occurs over any significant period of time whether due to attrition, markets, labor supply, or production changes.

As noted in the introductory pages of this document, the industry "electric power generation, transmission, and distribution" was not present in Clark County and, therefore, had to be added. The model was customized to include that industry along with appropriate employment, production, and labor income numbers. As such, the results of the Operations Phase include the normal interactions that would occur between the added industry and other industries present in the county.

It should be noted here that with the addition of the power generation and transmission sector, not only did the Shannon-Weaver Diversity Index improve (as noted in the document introductory pages) but we also found that the amount of indirect business taxes improved substantially.

In short, the amount of total indirect business taxes in Clark County went from $2,882,127 prior to the sector addition to $6,637,278 following. That's an additional $3,755,151 in indirect business taxes by adding this one industry.

In addition, as noted in Table 3, electric power generation, transmission, and distribution has a substantially higher level of per worker labor income than other industries currently in operation in Clark County.

Operations Phase -- Employment Compensation and Household Spending Impacts

As noted above, the Operations Phase is taken out 25 years in the analysis and assumes employment static at 35 for all 25 years. Using appropriate deflators, we find that year-one total employee compensation will be $1,236,623. Total direct employee compensation over the 25-year period is projected at $42,336,283. Approximately $29,544,780 will make it to the pockets of the workers after taxes, etc. Total indirect (supplier chain) employee compensation is $2,503,654. Total induced employee compensation is $579,965. Total direct, indirect, and induced employee compensation for the 25 year operating history, then, is $45,419,902.

As with resident construction workers, only 72% of employee compensation makes it into the pockets of the workers and 42% is spent locally (on an average basis). As such, of the $29,544,780 total direct employee compensation that will make it to the worker, $12,408,808 would likely be spent within Clark County over the 25-year period. The same is likely to occur for the indirect and induced impacts as well with a slightly higher percentage of the induced employee compensation figure being spent locally. Of the total (direct, indirect and induced) employee

compensation over 25 years we could reasonably expect that $13,703,928 would be spent within the county.

Household spending over the 25-year period could result in the creation of an additional 47.1 jobs in the county. The sectors in which employees would typically spend their income are found in Table 10.

Table 10 – TOP 10 CLARK COUNTY INDUSTRY SECTORS IN WHICH RESIDENT WORKERS WOULD LIKELY SPEND THEIR INCOME

Wholesale Trade
Retail Stores – Food and Beverages
Individual and Family Services
Telecommunications
Other Private Educational Services
Retail Stores – Gasoline Stations
Monetary Authorities & Depository Credit Intermediation Services
Retail Stores – Clothing
Other State & Local Government Enterprises
Retail Stores – Misc.

Operations Phase – Plant Operations Impacts

When considering the total impact of plant operations, including employee compensation, we find that direct output (economic activity/production) over 25 years will be approximately $797,650,700. The indirect effects of that activity could result in $15,356,860 being spent with local businesses (or approximately $614,274 per year). There are no guarantees that such spending will occur with local businesses. The data only suggest that such spending *could* be absorbed within the local area by businesses.

As the interactions occur between plant operations and local businesses over 25 years, it is likely that an additional 132.5 indirect equivalent jobs (or equivalent employee compensation) would be created locally in the plant supplier/vendor chain. It is important to remember that those jobs would be created over 25 years on an average of 5.3 per year. Those jobs are associated only with businesses

currently located in Clark County and do not take into account additional businesses that might come because of the plant operations. Total indirect labor income (employee compensation + proprietor income) for the 132.5 jobs over 25 years is projected to be $3,434,865 (or $137,394 per year total and $25,924 per employee per year). When considering ONLY employee compensation (removing proprietor income) we see that the average annual compensation per employee is $18,896. Table 11 shows the likely sectors in which jobs might be created by economic activity generated by plant operations.

Table 11 - SECTORS IN WHICH INDIRECT JOBS MIGHT BE CREATED BECAUSE OF PLANT OPERATIONS (SECTORS GAINING LESS THAN 1 JOB ARE EXCLUDED)

INDUSTRY	POTENTIAL FOR JOBS
Food Services & Drinking Places	27.9
Real Estate Establishments	22.1
Employment Services	21.3
Misc. Professional, Scientific and Technical Consulting	15.5
Wholesale Trade	7.3
Maintenance & Repair Construction of Non-residential Structures	6.3
Telecommunications	5.9
Business Support Services	4.9
Monetary Authorities and Depository Credit	4.8
Other Information Services	2.2
Management, Scientific Consulting	2.2
Fitness & Recreation	2.0
Other State & Local Government Enterprises	2.0
U.S. Postal Service	1.7
Computer System Design Services	1.3
Specialized Design Services	1.1

When considering the tax impacts associated with 25-years of plant operations, we find that total state and local taxes received would likely be $88,049,490. Total federal tax revenue would likely be $26,541,936. Table 12 shows the details of state & local revenue projections. Table 13 shows the details of federal tax revenue projections.

Table 12 – STATE & LOCAL TAX & OTHER REVENUE PROJECTIONS OVER 25 YEARS

DESCRIPTION	PROJECTED TAX REVENUE
Social Insurance Tax – Employee Contribution	$17,794
Social Insurance Tax – Employer Contribution	$76,556
Sales Tax	$40,853,032
Business Property Tax	$33,505,680
Motor Vehicle Licenses	$1,256,485
Severance Tax	$146,889
Other Taxes	$4,849,844
Other State & Local Revenue (non-taxes)	$4,748,785
Corporate Profits Tax	$2,228,558
Personal Income Tax	$286,039
Fines & Fees	$39,770
Personal Tax - Property Tax	$9,304
Other Taxes – Fishing/Hunting Licenses, etc.	$30,754
TOTALS	$88,049,490.00

Table 13 - FEDERAL TAX REVENUE PROJECTIONS OVER 25 YEARS

DESCRIPTION	PROJECTED TAX REVENUE
Social Insurance Tax – Employee Contribution	$1,992,148
Social Insurance Tax – Employer Contribution	$2,014,666
Indirect Business Taxes	$13,124,475
Corporate Tax	$8,872,866
Personal Income Tax	$537,781
TOTALS	$26,541,936.00

Operations Phase – Combined Impacts of Employment Compensation/Household Spending and Plant Operations Activities

Table 14 shows the combined total anticipated impacts of all operations activities for the 250-ton plant 25-year operations period. Note that the impact results listed are for ***ONLY*** Clark County and do not anticipate impacts on surrounding counties.

Table 14 - COMBINED IMPACTS OF EMPLOYEE/HOUSEHOLD SPENDING AND PLANT ACTIVITIES FOR THE 25-YEAR OPERATIONS PHASE

IMPACT CATEGORY	IMPACT RESULT
Total Output (economic activity)	$817,603,200
Direct Employment	35 (895.9 Equivalent over 25 years)
Indirect Employment	132.5 (5.3 per year)
Induced Employment	47.1 (1.8 per year)
Direct Employee Compensation	$42,336,283 ($1,693,451 per year)
Indirect Employee Compensation	$2,503,654 ($100,146 per year)
Induced Employee Compensation	$579,965 ($23,199 per year)
Direct Labor Income (includes proprietors)	$81,987,800 ($3,279,512 per year)
Indirect Labor Income (includes proprietors)	$3,434,865 ($137,395 per year)
Induced Labor Income (includes proprietors)	$797,333 ($31,893 per year)
Indirect Business Taxes (total)	$98,461,940

ECONOMIC IMPACT – 500-TON PLANT

Introduction

In this section, only those pertinent impact changes associated building and operating a 500-ton plant rather than a 250-ton plant are considered. The 500-ton plant will cost approximately $60 million to construct and require approximately 250 full-time workers who are assumed to be paid $30,473 annually. Of the 250 workers, approximately 57 will come from Clark County.

The Operations Phase is the same 25-year period but will require 43 full-time employees who will, the analysis assumes, reside in Clark County. The workers will be paid the same annual average of $35,332 as the 250-ton plant. As with the construction workers, and as is consistent with the 250-ton plant, workers will spend approximately 42% of their compensation locally.

Construction Phase -- Employment Compensation and Household Spending Impacts

The total amount of employee compensation coming to construction workers residing in Clark County will be $2,013,924. Of that, $1,450,025 (72%) will actually make it to the pockets of the workers. Forty-two percent of that, or $609,010 would typically be spent locally while $841,015 (58%) would likely be spent in the broader region. The sectors displayed in Table 15 show the likely ways in which the $609,010 would be absorbed into the local economy.

The employment effects of spending the $609,010 locally over a one year period would likely result in the creation of 3.3 additional equivalent jobs in the county with resulting labor income of $51,168 (or $15,505.55 average employment compensation) for the 3.3 equivalent people.

As with the 250-ton plant, even though the data suggest an additional 3.3 people might be employed, the odds are that no jobs would be created at all specifically because of the construction spending. All that is being suggested is that the resulting income to businesses in the area from construction spending would be the *equivalent* of hiring 3.3 people spread across many business sectors where spending occurs.

Over that same 12-month period, due to construction spending, approximately $35,183 would be received in indirect business taxes (drivers' licenses, hunting and fishing licenses, sales tax, permits, etc.). Total taxes from construction employment spending going to state and local taxing districts would likely be $34,077. Total taxes going to federal government would likely be $15,092.

Table 15 - TOP 16 SECTORS WHERE RESIDENT CONSTRUCTION WORKERS WILL LIKELY SPEND THEIR INCOME

Housing (Rent)
Real Estate Transactions
Telecommunications
Wholesale Trade
Other State And Local Government Enterprises
Retail Stores – Food And Beverage
Individual And Family Services
Religious Organizations
Food Services And Drinking Places
Automotive Repair And Maintenance, Except Car Washes
Personal Care Services
Monetary Authorities And Depository Credit Intermediation Activities
Retail Stores – Gasoline Stations
Fruit And Vegetables Canning, Pickling And Drying
Other Private Educational Services
Retail Stores – Clothingand Clothing Accessories

Construction Phase -- Plant Construction Activities Impacts

Most of the materials and equipment expenditures will occur external to the county. Direct output (economic activity in the county) would approximate $12,556,940. Indirect output (local supplier spending) would approximate

$765,223 locally. Induced output (employee spending) would approximate $320,726 locally. The remainder of the total output associated with construction ($60 million) would be exported to the broader region and beyond.

As a result of local suppliers doing business related to the construction work (the indirect effects), approximately 9.1 jobs will be created in the supplier chain with resulting employee compensation of approximately $190,290 (or $20,911 average per employee). Total indirect labor income including sole proprietors is anticipated at $232,737. Table 16 shows the top 10 industries impacted by spending in the indirect (supplier) round.

Table 16 - TOP 10 INDUSTRIES IMPACTED BY INDIRECT ROUND OF SPENDING

INDUSTRY	PROJECTED AMOUNT FROM INDIRECT ROUND OF SPENDING
Wholesale Trade	$222,531
Telecommunications	$153,673
Automotive Repair	$59,360
Employment Services	$48,791
Real Estate Establishments	$40,367
Retail Stores – Food & Beverage	$35,645
Commercial & Industrial Machinery & Equipment Repair	$30,909
Banks	$28,896
Scientific, Professional, Technical Services	$23,994
Other Consulting Services	$20,363

Construction Phase – Combined Impacts of Employment Compensation/Household Spending and Plant Construction Activities

Table 17 shows the combined total anticipated impacts of all construction activities for the 500-ton plant construction period. Note that the impact results listed are for ***ONLY*** Clark County and do not anticipate impacts on surrounding counties.

Table 17 - COMBINED EMPLOYEE/HOUSEHOLD SPENDING AND CONSTRUCTION ACTIVITY IMPACTS

IMPACT CATEGORY	IMPACT RESULT
Total Output (economic activity)	$12,556,940
Direct Employment	57
Indirect Employment	9.1
Induced Employment	3.3
Direct Employee Compensation	$1,652,845
Indirect Employee Compensation	$188,690
Induced Employee Compensation	$51,683
Direct Labor Income (includes proprietors)	$2,371,561
Indirect Labor Income (includes proprietors)	$232,737
Induced Labor Income (includes proprietors)	$55,354
Indirect Business Taxes (total)	$140,811

Operations Phase -- Employment Compensation and Household Spending Impacts

As noted above, the Operations Phase is taken out 25 years in the analysis and assumes employment static at 43 for all 25 years. Using appropriate deflators, we find that year-one total employee compensation will be $1,519,279. Total direct employee compensation over the 25-year period is projected at $51,621,170. Approximately $37,167,242 will make it to the pockets of the workers after taxes, etc. Total indirect (supplier chain) employee compensation is $3,062,502. Total induced employee compensation is $709,422. Total direct, indirect, and induced employee compensation for the 25 year operating history, then, is $55,393,094.

As with resident construction workers, only 72% of employee compensation makes it into the pockets of the workers and 42% is spent locally (on an average basis). As such, of the $37,167,242 total direct employee compensation that will make it to the worker, $15,610,242 would likely be spent within Clark County over the 25-year period. The same is likely to occur for the indirect and induced impacts as well with a slightly higher percentage of the induced employee compensation figure being spent locally. Of the total (direct, indirect and induced) employee

compensation over 25 years we could reasonably expect that $17,194,450 would be spent within the county.

Household spending over the 25-year period could result in the creation of an additional 57.6 jobs in the county. The sectors in which employees would typically spend their income are found in Table 18 on the following page.

Table 18 – TOP 10 CLARK COUNTY INDUSTRY SECTORS IN WHICH RESIDENT WORKERS WOULD LIKELY SPEND THEIR INCOME

Wholesale Trade
Retail Stores – Food and Beverages
Individual and Family Services
Telecommunications
Other Private Educational Services
Retail Stores – Gasoline Stations
Monetary Authorities & Depository Credit Intermediation Services
Retail Stores – Clothing
Other State & Local Government Enterprises
Retail Stores – Misc.

Operations Phase – Plant Operations Impacts

When considering the total impact of plant operations, including employee compensation, we find that direct output (economic activity/production) over 25 years will be approximately $975,697,500. The indirect effects of that activity could result in $18,784,660 being spent with local businesses (or approximately $751,386 per year). There are no guarantees that such spending will occur with local businesses. The data only suggest that such spending *could* be absorbed within the local area by businesses.

As the interactions occur between plant operations and local businesses over 25 years, it is likely that an additional 162 indirect equivalent jobs (or equivalent employee compensation) would be created locally in the plant supplier/vendor chain. It is important to remember that those jobs would be created over 25 years on an average of 6.5 per year. Those jobs are associated only with businesses

currently located in Clark County and do not take into account additional businesses that might come because of the plant operations. Total indirect labor income (employee compensation + proprietor income) for the 162 jobs over 25 years is projected to be $4,201,568 (or $168,063 per year total and $25,856 per employee per year). When considering ONLY employee compensation (removing proprietor income) we see that the average annual compensation per employee is $18,904. Table 19 shows the likely sectors in which jobs might be created by economic activity generated by plant operations.

Table 19 - SECTORS IN WHICH INDIRECT JOBS MIGHT BE CREATED BECAUSE OF PLANT OPERATIONS (SECTORS GAINING LESS THAN 1 JOB ARE EXCLUDED)

INDUSTRY	POTENTIAL FOR JOBS
Food Services & Drinking Places	34.2
Real Estate Establishments	27.1
Employment Services	26
Misc. Professional, Scientific and Technical Consulting	18.9
Wholesale Trade	9
Maintenance & Repair Construction of Non-residential Structures	7.7
Telecommunications	7.3
Business Support Services	5.9
Monetary Authorities and Depository Credit	5.9
Other Information Services	2.7
Management, Scientific Consulting	2.7
Fitness & Recreation	2.5
Other State & Local Government Enterprises	2.5
U.S. Postal Service	2.1
Computer System Design Services	1.6
Specialized Design Services	1.3
Automotive Repair & Maintenance	1.0

When considering the tax impacts associated with 25-years of plant operations, we find that total state and local taxes received would likely be $107,703,371. Total federal tax revenue would likely be $32,466,465. Table 20 shows the details of state & local revenue projections. Table 21 shows the details of federal tax revenue projections.

Table 20 – STATE & LOCAL TAX & OTHER REVENUE PROJECTIONS OVER 25 YEARS

DESCRIPTION	PROJECTED TAX REVENUE
Social Insurance Tax – Employee Contribution	$21,766
Social Insurance Tax – Employer Contribution	$93,645
Sales Tax	$49,971,992
Business Property Tax	$40,984,612
Motor Vehicle Licenses	$1,536,950
Severance Tax	$179,677
Other Taxes	$5,932,397
Other State & Local Revenue (non-taxes)	$5,808,779
Corporate Profits Tax	$2,726,003
Personal Income Tax	$349,887
Fines & Fees	$48,648
Personal Tax - Property Tax	$11,381
Other Taxes – Fishing/Hunting Licenses, etc.	$37,619
TOTALS	$107,703,356.00

Table 21 - FEDERAL TAX REVENUE PROJECTIONS OVER 25 YEARS

DESCRIPTION	PROJECTED TAX REVENUE
Social Insurance Tax – Employee Contribution	$2,436,823
Social Insurance Tax – Employer Contribution	$2,464,367
Indirect Business Taxes	$16,054,040
Corporate Tax	$10,853,414
Personal Income Tax	$657,821
TOTALS	$32,466,465.00

Operations Phase – Combined Impacts of Employment Compensation/Household Spending and Plant Operations Activities

Table 22 shows the combined total anticipated impacts of all operations activities for the 500-ton plant 25-year operations period. Note that the impact results listed are for ***ONLY*** Clark County and do not anticipate impacts on surrounding counties.

Table 22 - COMBINED IMPACTS OF EMPLOYEE/HOUSEHOLD SPENDING AND PLANT ACTIVITIES FOR THE 25-YEAR OPERATIONS PHASE

IMPACT CATEGORY	IMPACT RESULT
Total Output (economic activity)	$975,697,500
Direct Employment	43 (1,095.9 equivalent over 25 years)
Indirect Employment	162 (6.5 per year)
Induced Employment	57.6 (2.3 per year)
Direct Employee Compensation	$51,621,170 ($1,486,690 per year)
Indirect Employee Compensation	$3,062,502 ($122,500 per year)
Induced Employee Compensation	$709,422 ($28,378 per year)
Direct Labor Income (includes proprietors)	$100,288,600 ($4,011,544 per year)
Indirect Labor Income (includes proprietors)	$4,201,568 ($168,063 per year)
Induced Labor Income (includes proprietors)	$975,309 ($39,012 per year)
Indirect Business Taxes (total)	$120,440,000

Table 23 gives a list of the top 20 businesses that typically would typically benefit from the location of a power generation plant.

Table 23 - TOP 20 BUSINESS SECTORS THAT WOULD BENEFIT FROM THE LOCATION OF A POWER GENERATION PLANT (ASSUMING ALL SECTORS WERE AVAILABLE IN A STUDY AREA)(NATIONAL DATA)

Extraction of Oil & Natural Gas
Mining Coal
Petroleum Refineries
Rail Transport
Pipeline Transport
Maintenance and Repair Construction of Nonresidential Structures
Misc. Professional, Scientific and Technical Services
Monetary Authorities and Depository Credit Intermediation Activities
Legal Services
Food Services & Drinking Places
Lessors of Nonfinancial Intangible Assets
Real Estate Establishments
Wholesale Trade Business
Telecommunications
Management of Companies and Enterprises
Securities, Commodity Contracts, Investments and Related Activities
Transport by Truck
Architectural, Engineering and Related Services
Electric Power Generation, Transmission & Distribution
Turbine and Turbine Generator Set Units Manufacturing

APPENDIX 3: MSW ANALYTICAL RESULTS

Clark County Waste to Energy

Municipal Waste Analysis Results

Clark County Sample #1

Proximate/Ultimate Analysis

PROXIMATE ANALYSIS (%)	AS RECD	DRY	EQM
MOISTURE	11.08		
ASH	6.46	7.26	
SULFUR	0.14	0.16	
BTU/#	7652	8605	
		9279	

ULTIMATE ANALYSIS (%)	AS RECD	DRY
MOISTURE	11.08	
ASH	6.46	7.26
SULFUR	0.14	0.16
NITROGEN	1.03	1.16
CARBON	41.17	46.30
HYDROGEN	5.61	6.31
OXYGEN	34.51	38.81

ADDITIONAL DATA	
AIR DRY LOSS	5.95
LBS H20/MM BTU	14.48
LBS ASH/MM BTU	8.44
LBS SULFUR/MM BTU	0.19
BASE/ACID RATIO	
T250	DEG F
% ALKALI AS Na2O	
SPECIFIC GRAVITY	
FREE SWELLING INDEX	

Trace Element Analysis

TRACE ELEMENT, DRY BASIS			RESULT
ARSENIC	As	PPM	0.2
BARIUM	Ba	PPM	17
CADMIUM	Cd	PPM	0.03
CHLORINE	Cl	PPM	8505
CHROMIUM	Cr	PPM	4
LEAD	Pb	PPM	1.8
MERCURY	Hg	PPM	<0.01
SELENIUM	Se	PPM	0.1
SILVER	Ag	PPM	0.04

TCLP Analysis

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL PROPERTIES							
Filterable	No					SW1311	08/26/10 17:01 / dcj
METALS - TCLP EXTRACTABLE							
Arsenic	ND	mg/L		0.5	5	SW6010B	09/07/10 23:47 / cp
Barium	ND	mg/L		10	100	SW6010B	09/07/10 23:47 / cp
Cadmium	ND	mg/L		0.1	1	SW6010B	09/07/10 23:47 / cp
Chromium	5.6	mg/L	*	0.5	5	SW6010B	09/07/10 23:47 / cp
Lead	ND	mg/L		0.5	5	SW6010B	09/07/10 23:47 / cp
Mercury	ND	mg/L		0.02	0.2	SW7470A	08/30/10 09:05 / rdw
Selenium	ND	mg/L		0.1	1	SW6010B	09/07/10 23:47 / cp
Silver	ND	mg/L		0.5	5	SW6010B	09/07/10 23:47 / cp

Clark County Sample #2

Proximate/Ultimate Analysis

PROXIMATE ANALYSIS (%)	AS RECD	DRY	EQM
MOISTURE	9.31		
ASH	0.44	0.48	
SULFUR	0.05	0.05	
BTU/#	8157	8994	
		9037	

ULTIMATE ANALYSIS (%)	AS RECD	DRY
MOISTURE	9.31	
ASH	0.44	0.48
SULFUR	0.05	0.05
NITROGEN	0.11	0.12
CARBON	46.48	51.25
HYDROGEN	5.56	6.13
OXYGEN	38.06	41.97

ADDITIONAL DATA	
AIR DRY LOSS	3.17
LBS H20/MM BTU	11.41
LBS ASH/MM BTU	0.53
LBS SULFUR/MM BTU	0.06
BASE/ACID RATIO	
T250	DEG F
% ALKALI AS Na2O	
SPECIFIC GRAVITY	
FREE SWELLING INDEX	

Trace Element Analysis

TRACE ELEMENT, DRY BASIS			RESULT
ARSENIC	As	PPM	<0.1
BARIUM	Ba	PPM	9
CADMIUM	Cd	PPM	0.06
CHLORINE	Cl	PPM	116
CHROMIUM	Cr	PPM	<1.0
LEAD	Pb	PPM	<0.2
MERCURY	Hg	PPM	<0.01
SELENIUM	Se	PPM	<0.1
SILVER	Ag	PPM	0.04

TCLP Analysis

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL PROPERTIES							
Filterable	No					SW1311	08/26/10 17:01 / dcj
METALS - TCLP EXTRACTABLE							
Arsenic	ND	mg/L		0.5	5	SW6010B	09/07/10 23:55 / cp
Barium	ND	mg/L		10	100	SW6010B	09/07/10 23:55 / cp
Cadmium	ND	mg/L		0.1	1	SW6010B	09/07/10 23:55 / cp
Chromium	ND	mg/L		0.5	5	SW6010B	09/07/10 23:55 / cp
Lead	ND	mg/L		0.5	5	SW6010B	09/07/10 23:55 / cp
Mercury	ND	mg/L		0.02	0.2	SW7470A	08/30/10 09:12 / rdw
Selenium	ND	mg/L		0.1	1	SW6010B	09/07/10 23:55 / cp
Silver	ND	mg/L		0.5	5	SW6010B	09/07/10 23:55 / cp

Madison #1

Proximate/Ultimate Analysis

PROXIMATE ANALYSIS (%)	AS RECD	DRY	EQM
MOISTURE	29.11		
ASH	12.24	17.26	
SULFUR	0.09	0.13	
BTU/#	5164	7285	
		8805	

ULTIMATE ANALYSIS (%)	AS RECD	DRY
MOISTURE	29.11	
ASH	12.24	17.26
SULFUR	0.09	0.13
NITROGEN	0.51	0.72
CARBON	29.92	42.21
HYDROGEN	3.82	5.39
OXYGEN	24.31	34.29

ADDITIONAL DATA	
AIR DRY LOSS	24.06
LBS H20/MM BTU	56.37
LBS ASH/MM BTU	23.69
LBS SULFUR/MM BTU	0.18
BASE/ACID RATIO	
T250	DEG F
% ALKALI AS Na2O	
SPECIFIC GRAVITY	
FREE SWELLING INDEX	

Trace Element Analysis

TRACE ELEMENT, DRY BASIS			RESULT
ARSENIC	As	PPM	0.9
BARIUM	Ba	PPM	28
CADMIUM	Cd	PPM	0.02
CHLORINE	Cl	PPM	1992
CHROMIUM	Cr	PPM	4
LEAD	Pb	PPM	1.7
MERCURY	Hg	PPM	0.016
SELENIUM	Se	PPM	0.4
SILVER	Ag	PPM	0.15

TCLP Analysis

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL PROPERTIES							
Filterable	No					SW1311	08/26/10 17:01 / dcj
METALS - TCLP EXTRACTABLE							
Arsenic	ND	mg/L		0.5	5	SW6010B	09/08/10 00:23 / cp
Barium	ND	mg/L		10	100	SW6010B	09/08/10 00:23 / cp
Cadmium	ND	mg/L		0.1	1	SW6010B	09/08/10 00:23 / cp
Chromium	ND	mg/L		0.5	5	SW6010B	09/08/10 00:23 / cp
Lead	ND	mg/L		0.5	5	SW6010B	09/08/10 00:23 / cp
Mercury	ND	mg/L		0.02	0.2	SW7470A	08/30/10 09:27 / rdw
Selenium	ND	mg/L		0.1	1	SW6010B	09/08/10 00:23 / cp
Silver	ND	mg/L		0.5	5	SW6010B	09/08/10 00:23 / cp

Madison #2

Proximate/Ultimate Analysis

PROXIMATE ANALYSIS (%)	AS RECD	DRY	EQM
MOISTURE	20.15		
ASH	3.39	4.24	
SULFUR	0.17	0.21	
BTU/#	7143	8946	
		9342	

ULTIMATE ANALYSIS (%)	AS RECD	DRY
MOISTURE	20.15	
ASH	3.39	4.24
SULFUR	0.17	0.21
NITROGEN	0.97	1.21
CARBON	38.87	48.68
HYDROGEN	5.25	6.58
OXYGEN	31.21	39.08

ADDITIONAL DATA	
AIR DRY LOSS	14.95
LBS H20/MM BTU	28.21
LBS ASH/MM BTU	4.74
LBS SULFUR/MM BTU	0.23
BASE/ACID RATIO	
T250	DEG F
% ALKALI AS Na2O	
SPECIFIC GRAVITY	
FREE SWELLING INDEX	

Trace Element Analysis

TRACE ELEMENT, DRY BASIS			RESULT
ARSENIC	As	PPM	0.1
BARIUM	Ba	PPM	9
CADMIUM	Cd	PPM	0.06
CHLORINE	Cl	PPM	4456
CHROMIUM	Cr	PPM	2
LEAD	Pb	PPM	1.1
MERCURY	Hg	PPM	<0.01
SELENIUM	Se	PPM	0.1
SILVER	Ag	PPM	0.03

TCLP Analysis

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL PROPERTIES							
Filterable	No					SW1311	08/26/10 17:01 / dcj
METALS - TCLP EXTRACTABLE							
Arsenic	ND	mg/L		0.5	5	SW6010B	09/08/10 00:27 / cp
Barium	ND	mg/L		10	100	SW6010B	09/08/10 00:27 / cp
Cadmium	ND	mg/L		0.1	1	SW6010B	09/08/10 00:27 / cp
Chromium	3.6	mg/L		0.5	5	SW6010B	09/08/10 00:27 / cp
Lead	ND	mg/L		0.5	5	SW6010B	09/08/10 00:27 / cp
Mercury	ND	mg/L		0.02	0.2	SW7470A	08/30/10 09:34 / rdw
Selenium	ND	mg/L		0.1	1	SW6010B	09/08/10 00:27 / cp
Silver	ND	mg/L		0.5	5	SW6010B	09/08/10 00:27 / cp

Bonneville #1

Proximate/Ultimate Analysis

PROXIMATE ANALYSIS (%)	AS RECD	DRY	EQM
MOISTURE	22.03		
ASH	4.23	5.43	
SULFUR	0.09	0.11	
BTU/#	7463	9572	
		10122	

ULTIMATE ANALYSIS (%)	AS RECD	DRY
MOISTURE	22.03	
ASH	4.23	5.43
SULFUR	0.09	0.11
NITROGEN	1.22	1.56
CARBON	40.82	52.35
HYDROGEN	5.14	6.59
OXYGEN	26.48	33.96

ADDITIONAL DATA	
AIR DRY LOSS	16.93
LBS H20/MM BTU	29.52
LBS ASH/MM BTU	5.67
LBS SULFUR/MM BTU	0.11
BASE/ACID RATIO	
T250	DEG F
% ALKALI AS Na2O	
SPECIFIC GRAVITY	
FREE SWELLING INDEX	

Trace Element Analysis

TRACE ELEMENT, DRY BASIS			RESULT
ARSENIC	As	PPM	0.2
BARIUM	Ba	PPM	14
CADMIUM	Cd	PPM	0.04
CHLORINE	Cl	PPM	8553
CHROMIUM	Cr	PPM	4
LEAD	Pb	PPM	2.0
MERCURY	Hg	PPM	0.011
SELENIUM	Se	PPM	0.1
SILVER	Ag	PPM	0.05

TCLP Analysis

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL PROPERTIES							
Filterable	No					SW1311	08/26/10 17:01 / dcj
METALS - TCLP EXTRACTABLE							
Arsenic	ND	mg/L		0.5	5	SW6010B	09/08/10 00:31 / cp
Barium	ND	mg/L		10	100	SW6010B	09/08/10 00:31 / cp
Cadmium	ND	mg/L		0.1	1	SW6010B	09/08/10 00:31 / cp
Chromium	6.7	mg/L	*	0.5	5	SW6010B	09/08/10 00:31 / cp
Lead	ND	mg/L		0.5	5	SW6010B	09/08/10 00:31 / cp
Mercury	ND	mg/L		0.02	0.2	SW7470A	08/30/10 09:38 / rdw
Selenium	ND	mg/L		0.1	1	SW6010B	09/08/10 00:31 / cp
Silver	ND	mg/L		0.5	5	SW6010B	09/08/10 00:31 / cp

Bonneville #2

Proximate/Ultimate Analysis

PROXIMATE ANALYSIS (%)	AS RECD	DRY	EQM
MOISTURE	26.04		
ASH	2.49	3.36	
SULFUR	0.10	0.13	
BTU/#	6900	9329	
		9653	

ULTIMATE ANALYSIS (%)	AS RECD	DRY
MOISTURE	26.04	
ASH	2.49	3.36
SULFUR	0.10	0.13
NITROGEN	0.78	1.05
CARBON	38.98	52.71
HYDROGEN	5.12	6.92
OXYGEN	26.50	35.83

ADDITIONAL DATA	
AIR DRY LOSS	21.22
LBS H20/MM BTU	37.74
LBS ASH/MM BTU	3.60
LBS SULFUR/MM BTU	0.14
BASE/ACID RATIO	
T250	DEG F
% ALKALI AS Na2O	
SPECIFIC GRAVITY	
FREE SWELLING INDEX	

Trace Element Analysis

TRACE ELEMENT, DRY BASIS			RESULT
ARSENIC	As	PPM	0.1
BARIUM	Ba	PPM	7
CADMIUM	Cd	PPM	0.37
CHLORINE	Cl	PPM	1960
CHROMIUM	Cr	PPM	1
LEAD	Pb	PPM	1.3
MERCURY	Hg	PPM	<0.01
SELENIUM	Se	PPM	0.2
SILVER	Ag	PPM	0.04

TCLP Analysis

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL PROPERTIES							
Filterable	No					SW1311	08/26/10 17:01 / dcj
METALS - TCLP EXTRACTABLE							
Arsenic	ND	mg/L		0.5	5	SW6010B	09/07/10 23:55 / cp
Barium	ND	mg/L		10	100	SW6010B	09/07/10 23:55 / cp
Cadmium	ND	mg/L		0.1	1	SW6010B	09/07/10 23:55 / cp
Chromium	ND	mg/L		0.5	5	SW6010B	09/07/10 23:55 / cp
Lead	ND	mg/L		0.5	5	SW6010B	09/07/10 23:55 / cp
Mercury	ND	mg/L		0.02	0.2	SW7470A	08/30/10 09:12 / rdw
Selenium	ND	mg/L		0.1	1	SW6010B	09/07/10 23:55 / cp
Silver	ND	mg/L		0.5	5	SW6010B	09/07/10 23:55 / cp

Bonneville #3

Proximate/Ultimate Analysis

PROXIMATE ANALYSIS (%)	AS RECD	DRY	EQM
MOISTURE	8.10		
ASH	6.43	7.00	
SULFUR	0.15	0.16	
BTU/#	8200	8923	
		9595	

ULTIMATE ANALYSIS (%)	AS RECD	DRY
MOISTURE	8.10	
ASH	6.43	7.00
SULFUR	0.15	0.16
NITROGEN	0.40	0.44
CARBON	45.17	49.15
HYDROGEN	5.88	6.40
OXYGEN	33.87	36.85

ADDITIONAL DATA	
AIR DRY LOSS	3.89
LBS H20/MM BTU	9.88
LBS ASH/MM BTU	7.84
LBS SULFUR/MM BTU	0.18
BASE/ACID RATIO	
T250	DEG F
% ALKALI AS Na2O	
SPECIFIC GRAVITY	
FREE SWELLING INDEX	

Trace Element Analysis

TRACE ELEMENT, DRY BASIS			RESULT
ARSENIC	As	PPM	0.3
BARIUM	Ba	PPM	16
CADMIUM	Cd	PPM	0.02
CHLORINE	Cl	PPM	2513
CHROMIUM	Cr	PPM	1
LEAD	Pb	PPM	1.2
MERCURY	Hg	PPM	<0.01
SELENIUM	Se	PPM	0.1
SILVER	Ag	PPM	0.02

TCLP Analysis

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL PROPERTIES							
Filterable	No					SW1311	08/26/10 17:01 / dcj
METALS - TCLP EXTRACTABLE							
Arsenic	ND	mg/L		0.5	5	SW6010B	09/08/10 00:03 / cp
Barium	ND	mg/L		10	100	SW6010B	09/08/10 00:03 / cp
Cadmium	ND	mg/L		0.1	1	SW6010B	09/08/10 00:03 / cp
Chromium	ND	mg/L		0.5	5	SW6010B	09/08/10 00:03 / cp
Lead	ND	mg/L		0.5	5	SW6010B	09/08/10 00:03 / cp
Mercury	ND	mg/L		0.02	0.2	SW7470A	08/30/10 09:20 / rdw
Selenium	ND	mg/L		0.1	1	SW6010B	09/08/10 00:03 / cp
Silver	ND	mg/L		0.5	5	SW6010B	09/08/10 00:03 / cp

Bonneville #4

Proximate/Ultimate Analysis

PROXIMATE ANALYSIS (%)	AS RECD	DRY	EQM
MOISTURE	44.11		
ASH	4.71	8.43	
SULFUR	0.11	0.19	
BTU/#	4466	7990	
		8726	

ULTIMATE ANALYSIS (%)	AS RECD	DRY
MOISTURE	44.11	
ASH	4.71	8.43
SULFUR	0.11	0.19
NITROGEN	1.08	1.93
CARBON	25.34	45.34
HYDROGEN	3.15	5.63
OXYGEN	21.51	38.48

ADDITIONAL DATA	
AIR DRY LOSS	37.56
LBS H20/MM BTU	98.77
LBS ASH/MM BTU	10.55
LBS SULFUR/MM BTU	0.24
BASE/ACID RATIO	
T250	DEG F
% ALKALI AS Na2O	
SPECIFIC GRAVITY	
FREE SWELLING INDEX	

Trace Element Analysis

TRACE ELEMENT, DRY BASIS			RESULT
ARSENIC	As	PPM	0.2
BARIUM	Ba	PPM	61
CADMIUM	Cd	PPM	0.24
CHLORINE	Cl	PPM	12118
CHROMIUM	Cr	PPM	2
LEAD	Pb	PPM	2.4
MERCURY	Hg	PPM	0.011
SELENIUM	Se	PPM	0.1
SILVER	Ag	PPM	<0.02

TCLP Analysis

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL PROPERTIES							
Filterable	No					SW1311	08/26/10 17:01 / dcj
METALS - TCLP EXTRACTABLE							
Arsenic	ND	mg/L		0.5	5	SW6010B	09/07/10 23:55 / cp
Barium	ND	mg/L		10	100	SW6010B	09/07/10 23:55 / cp
Cadmium	ND	mg/L		0.1	1	SW6010B	09/07/10 23:55 / cp
Chromium	ND	mg/L		0.5	5	SW6010B	09/07/10 23:55 / cp
Lead	ND	mg/L		0.5	5	SW6010B	09/07/10 23:55 / cp
Mercury	ND	mg/L		0.02	0.2	SW7470A	08/30/10 09:12 / rdw
Selenium	ND	mg/L		0.1	1	SW6010B	09/07/10 23:55 / cp
Silver	ND	mg/L		0.5	5	SW6010B	09/07/10 23:55 / cp

Bonneville #5

Proximate/Ultimate Analysis

PROXIMATE ANALYSIS (%)	AS RECD	DRY	EQM
MOISTURE	12.06		
ASH	8.72	9.92	
SULFUR	0.03	0.03	
BTU/#	3612	4107	
		4559	

ULTIMATE ANALYSIS (%)	AS RECD	DRY
MOISTURE	12.06	
ASH	8.72	9.92
SULFUR	0.03	0.03
NITROGEN	0.22	0.25
CARBON	35.60	40.48
HYDROGEN	4.78	5.44
OXYGEN	38.59	43.88

ADDITIONAL DATA	
AIR DRY LOSS	7.97
LBS H20/MM BTU	33.39
LBS ASH/MM BTU	24.15
LBS SULFUR/MM BTU	0.07
BASE/ACID RATIO	
T250	DEG F
% ALKALI AS Na2O	
SPECIFIC GRAVITY	
FREE SWELLING INDEX	

Trace Element Analysis

TRACE ELEMENT, DRY BASIS			RESULT
ARSENIC	As	PPM	0.1
BARIUM	Ba	PPM	10
CADMIUM	Cd	PPM	0.04
CHLORINE	Cl	PPM	1466
CHROMIUM	Cr	PPM	2
LEAD	Pb	PPM	0.6
MERCURY	Hg	PPM	<0.01
SELENIUM	Se	PPM	<0.1
SILVER	Ag	PPM	0.03

TCLP Analysis

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL PROPERTIES							
Filterable	No					SW1311	08/26/10 17:01 / dcj
METALS - TCLP EXTRACTABLE							
Arsenic	ND	mg/L		0.5	5	SW6010B	09/08/10 00:40 / cp
Barium	ND	mg/L		10	100	SW6010B	09/08/10 00:40 / cp
Cadmium	ND	mg/L		0.1	1	SW6010B	09/08/10 00:40 / cp
Chromium	ND	mg/L		0.5	5	SW6010B	09/08/10 00:40 / cp
Lead	ND	mg/L		0.5	5	SW6010B	09/08/10 00:40 / cp
Mercury	ND	mg/L		0.02	0.2	SW7470A	08/30/10 09:45 / rdw
Selenium	ND	mg/L		0.1	1	SW6010B	09/08/10 00:40 / cp
Silver	ND	mg/L		0.5	5	SW6010B	09/08/10 00:40 / cp

Bonneville Carpet

Proximate/Ultimate Analysis

PROXIMATE ANALYSIS (%)	AS RECD	DRY	EQM
MOISTURE	1.93		
ASH	10.26	10.46	
SULFUR	0.04	0.04	
BTU/#	11983	12219	
		13646	

ULTIMATE ANALYSIS (%)	AS RECD	DRY
MOISTURE	1.93	
ASH	10.26	10.46
SULFUR	0.04	0.04
NITROGEN	6.13	6.25
CARBON	55.81	56.91
HYDROGEN	7.57	7.72
OXYGEN	18.26	18.62

ADDITIONAL DATA	
AIR DRY LOSS	1.12
LBS H20/MM BTU	1.61
LBS ASH/MM BTU	8.56
LBS SULFUR/MM BTU	0.03
BASE/ACID RATIO	
T250	DEG F
% ALKALI AS Na2O	
SPECIFIC GRAVITY	
FREE SWELLING INDEX	

Trace Element Analysis

TRACE ELEMENT, DRY BASIS			RESULT
ARSENIC	As	PPM	0.3
BARIUM	Ba	PPM	1030
CADMIUM	Cd	PPM	0.10
CHLORINE	Cl	PPM	1727
CHROMIUM	Cr	PPM	5
LEAD	Pb	PPM	13.0
MERCURY	Hg	PPM	0.091
SELENIUM	Se	PPM	<0.1
SILVER	Ag	PPM	0.14

TCLP Analysis

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL PROPERTIES							
Filterable	No					SW1311	08/26/10 17:01 / dcj
METALS - TCLP EXTRACTABLE							
Arsenic	ND	mg/L		0.5	5	SW6010B	09/07/10 23:59 / cp
Barium	26	mg/L		10	100	SW6010B	09/07/10 23:59 / cp
Cadmium	ND	mg/L		0.1	1	SW6010B	09/07/10 23:59 / cp
Chromium	ND	mg/L		0.5	5	SW6010B	09/07/10 23:59 / cp
Lead	4.6	mg/L		0.5	5	SW6010B	09/07/10 23:59 / cp
Mercury	ND	mg/L		0.02	0.2	SW7470A	08/30/10 09:16 / rdw
Selenium	ND	mg/L		0.1	1	SW6010B	09/07/10 23:59 / cp
Silver	ND	mg/L		0.5	5	SW6010B	09/07/10 23:59 / cp

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Acknowledgment: "This material is based upon work supported by the Department of Energy under Award Number DE-EE000141."