

OUR CHANGING TIMES WITH ENVIRONMENT, ECOLOGY AND POLLUTION

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As you know, Seattle is a very highly unemployed area and many businesses are quite depressed. The other evening a friend of ours called a theater and asked when the feature would start and the manager of the theater said "Lady, when do you want to come down?" Portland has its let down also and I've heard that tips especially are not what they used to be. Unemployment is high, money is tight and tips are small. Last night I heard that some guests sent down for a deck of cards and the bell boy made 52 trips. I went for a walk last night and stopped to listen to a Salvation Army unit over on the Lloyd Center Mall. A very good sermon and at the end the preacher asked that those who wanted to go to heaven step over to one side, several did but I turned away and the preacher said "Brother, wait, don't you want to go to heaven?" I said "Yes, but not with that group tonight."

Ecology - Environment - Pollution (EEP) - and Our Changing Times. Webster defines Ecology, Bionomics or Bionomy as the science of the laws of living functions, or the branch of biology treating the habits and adaptation of life. Environment encompasses ones surroundings. Pollution has a long list of adjectives, defilement, unclean, stain, soil, foul, dirty, pollute.

This is a paper on research and we will try to show you in the short time how EEP is playing a greater roll in your everyday job in our changing times. You have had a research paper on dry kiln fan systems, plastic stickers for dry kilns, basic and applied research in wood drying and many others. Our changing times are now with you every day. It's on your radios and on your TV's many times a day. For the past several weeks I've noted every magazine and newspaper that I've thumbed thru or read and none - No - not one didn't have one or many articles on EEP. Even the comic strips are now incorporating EEP in their stories. Good or bad EEP has been fanned into astronomical proportions. It seems as though it's the in thing to do and there are many writers and politicians to keep the pot boiling. The voices that are now heard have happened only in the past few years while such things as pollution have been going on since the earth was formed. You must remember that I am not talking against it, many parts are desirable. I am against the uncompromising approach. Even as a boy, and that's many years ago, I remember that we'd say that the Cuyohoga River flowing thru the center of Cleveland, Ohio was so polluted from factory wastes that you could walk across it and not sink, One needed only to look at it and smell it to know the condition that it was in. The story is told that a crew man on a lake steamer fell overboard into the river one day and when they found him a few hours later his eyes had been eaten out by the acids in the water. Ten years later I worked as a guard one summer on a beach where Rocky River flowed into Lake Erie some twenty miles west of where the Cuyahoga River flows into Lake Erie. Every morning during the summer the first job was to tour the swimming area and clean it as much as possible from the human excretions that had flowed into the lake from Rocky River. That was a long time ago and there was no TV. Radio was in its infancy and the minority and small voices of opposition were lost to suppression. These things have changed today. The voices and cries are now heard around the world and especially so in these United States where when something catches on it runs like wild fire. While we might rebel somewhat because our complacency has been disturbed I am sure that we will profit a great deal from our fight for better EEP and the other related programs.

EEP and changing times are effecting our approach to the overall lumber dry kiln picture. It's a more involved approach in many sawmills than it has been in the past. It's one that involves bark, sawdust, slabs, chips, electric power, the burner, plant location, and a whole host of others.

Today many times as we research a dry kiln installation, we make a study of the mills use of their lumber wastes such as sawdust, bark and chip fines. Bark is probably one of the most troublesome by-products for disposal. The cost of processing and moving to a market more often than not is too great for the return. Many detailed studies by very knowledgeable engineers and researchers are being carried out on bark. The subject of bark is a topic on many seminars today involving the forest products industry, sawdust and chip fines fall into the same class. To dispose of these three by-products costs many mills thousands of dollars a year.

The steam boiler is making a comeback since the internal combustion engine is a great polluter of the air. Rising costs for gas and oil lead many mills to look to the cost per BTU or KW. If they are using their wood wastes which they

have already paid for in the cost of their logs and the cost to manufacture the wood wastes is a cost of the manufacturing of lumber or chips including the barking, the cost for these wastes is really zero.

EEP and our changing times have resulted in major cost increases. Gas, oil and electricity are becoming more expensive every day. Inexpensive Bunker C oil is becoming so poor in quality that the maintenance and down time of boilers using it are making its use almost prohibitive. The sulphur content is also so great that Bunker C oil is not usable due to the SO₂ emitted into the air. Gas prices are soaring and on the lower priced interruptable rate your yearly days lost due to poor weather can run from 30 to 160 days. The president of the Puget Sound Power & Light Company, Mr. Ralph Davis, said in a talk in Seattle in April of this year that we would need the power of 830 Coulee Dams by the year 2000. The ominous message here is a sharp increase in the cost of electricity. I feel that many mills should investigate the use of their wood wastes mainly their bark, sawdust and chip fines for making steam for use in their dry kilns, plant electricity and other plant use. Mr. J. Irwin Miller, chairman of the board of directors of the Cummins Engine Company, said in Seattle earlier this week that our population would rise to 300, 000, 000 in the next 30 years.

Let's take a look at some figures and remember these are general but they do reveal some facts that bear looking into. Probably most of the lumber companies using their wood wastes under their boilers realize the great savings in using these products, if they are using them correctly. Many lumber companies without these facilities should study them very carefully and it could be an immense hidden asset, with fuel at no cost. There are several companies manufacturing steam plants today that operate on wood waste that meet the new rigid state and federal laws for EEP.

Now, here is where the research relating to figures comes in. Remember these are not computerized, they are quite broad in their use but they bring out the hidden or unrealized by many potential of the wood waste use in the manner that we have been talking about.

1 - Boiler horse power	33, 472 BTU/hour
1 - Boiler horse power	34.5 lbs Steam/hour from and at 212 F.
1 - Boiler horse power	10.1 KW 1-KW 3413 BTU/Hr.
Bunker C Oil	152, 000 BTU/gal. Recent oil institute figures
P. S. 300 Oil	149, 000 BTU/gal. Recent oil institute figures
Diesel Oil	148, 000 BTU/gal. Recent oil institute figures
1 Therm Gas	100, 000 BTU/gal. Recent oil institute figures
Propane	92, 000 BTU/gal. Recent oil institute figures
200 Cubic Feet	Bark - 20 to 25 lbs/cubic foot
1 (unit) Hog fuel	4500 lbs/unit - 4500 BTU/lbs = 20, 250, 000 BTU
200 Cubic Feet	Green sawdust 25-30 lbs/cubic foot
1 (unit) Hog fuel	5500 lbs/unit - 4500 BTU/lbs = 24, 750, 000 BTU
200 Cubic Feet	Dry Shavings 10 lbs/cubic foot
1 (unit) Hog fuel	2000 lbs/unit - 8000 BTU/lbs = 16, 000, 000 BTU
1 lb: Bone Dry Wood	9, 000 BTU

In order to put all fuels on an equal basis we have calculated our estimated cost on a 100, 000 BTU basis. Gas is 4 cents/100, 000 BTU's interruptable (and increase have been asked for) could be 6 cents to 8 cents/100, 000 BTU's non-interruptable. I have been told that the gas companies will not take on large volume gas users on anything other than an interruptable basis. Information gathered early this week showed from 30 days to 160 days interruptable basis on gas for the coming winter and you should check with your local gas companies. There are so many that we were unable to cover them all. Propane is 14 cents/100, 000 BTU's and varies with volume. Fuel oil is 8 cents/100, 000 BTU's and could vary in different areas.

Wood waste costs nothing when used as fuel against a continuing cost to disposal and you have already paid for it in the cost of the log and processing in the mill. I know of areas where sawdust brings \$3.00 a unit (200 cubic feet). At 24, 750, 000 BTU equals 247.5 therms of fuel or \$9.90 worth of gas at 4 cents per therm which is a vanishing figure. Six cents to 8 cents are more realistic which increases the value of sawdust close to \$20.00 a unit when used as a fuel as against \$3.00 to other sources.

In order for these figures to make more sense lets set up a hypothetical case. Let's say that a lumber company cuts 1, 000, 000 board feet of lumber a week. From figures that we have in our files, and those of others to whom we have talked, this volume should generate about 25 units (200 cubic feet) of bark and 60 units (200 cubic feet) of sawdust a day. There are the average number of units of chips from this volume of lumber that are produced and go to the pulp plant. Bark and sawdust develop and suddenly we want dry kilns. Our sawdust is being sold for \$2 to \$3 a unit and the EEP has given us an ultimatum that our bark be disposed of. We can buy a large ravine five miles down the road and dump the bark there for several years, say 10 acres at \$10, 000. A 10 yard dump truck costs \$10, 000. Twenty-five units (200 cubic feet per unit) equals 5000 cubic feet or 185 cubic yards of bark a day to move. This does not include the sawdust. Dump truck costs are: 10 mile round trip at 20 round trips per day equals 200 miles. At 30 cents per mile for gas, oil, insurance, depreciation, tires, etc. at 200 miles per day equals \$60.00 per day.

Therefore, the cost per day to dispose of bark:

\$ 60.00	truck costs
120.00	labor (1/2 hour per round trip at 10 hours a day)
60.00	part time helper per day
10.00	prorate bulldozer at dump per day

Total	<u>\$250.00</u>
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We should layer this bark about one foot bark and one foot dirt to eliminate spontaneous combustion. This figure of \$250 per day is conservative. So at \$250.00 a day for 250 days a year, the cost per year to handle the bark would be \$62, 500.

Let's assume this 1, 000, 000 board feet per week is 8/4 studs and we will use a modified high temperature (230-250 F. dry bulb schedule). We should have available 1, 000 HP for this drying job. At times we will require the 1, 000 HP and at other times not over 500 HP so that we can average out to 750 HP or 750 HP x 33, 472 BTU's/hour x 168 hours in a week = 4, 217, 472, 000 BTU's (looks like the national debt or the Gross National Product in a few years). An average of 22, 000, 000 BTU's per units of hog fuel would be 4, 217, 472, 00 ÷ 22, 000, 000 or 192 units. This plant has available 125 units bark and 300 units sawdust which is more than ample fuel to produce the required BTU's. If we were to use gas at 6 cents per therm (100, 000 BTU's) we'd require 40, 582 therms per week at a cost of \$2434.92 per week and a 50 week working year would equal \$111, 746.00 cost per year. Cost to dispose of bark was \$62, 500 and the cost of gas was \$111, 746 for a savings of \$174, 246 if bark were used over gas. With oil at approximately 8 cents a therm would result in a savings of \$225, 500 if bark were used over oil.

We have looked at several sets of figures wherein a 1000 HP steam plant using wood wastes for fuel and meeting all EEP standards today will cost approximately \$250, 000 to \$300, 000. You can see that you will pay for this plant in from 1.5 to 2 years and after that time will feel the full effect of 100 percent utilization of the logs that you are buying thru increased profits. All of this is being more rapidly brought to the attention of the lumber man, large and small by EEP and our changing times. I have been told that smaller HP boilers using these wood wastes will cost from \$8 to \$10 a pound per hour of steam capacity. Remember that an EEP burner will cost over \$50, 000 to install and hundreds of dollars a month to operate and maintain. This all to burn up wood wastes that are worth at least \$100, 000 a year to you for generating 1000 HP of steam. Some lumber men are now looking to generating their own electricity from their wood wastes which opens another area for you to investigate.

As I've said earlier these are overall figures that point the way for the lumbermen to investigate further in detail. As the demand for more uniformly dried lumber increases you can use the EEP and changing times as an area to investigate to help you obtain these results.

I want to thank you all for giving me this opportunity to present this paper.