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**MEMORANDUM**

To: Michael Aube, Vicki Rusbult  
Eastern Maine Development Corporation

From: Rachel Selsky, Jim Damicis

Date: February 12, 2016

Re: **Economic impact of paper/pulp mill and Edwards plant closures**

**Other Offices:**

Scarborough, ME  
Brattleboro, VT

In response to the closure of several paper and pulp mills and the Edwards electrical equipment manufacturing plant in the Penobscot Valley region, Eastern Maine Development Corporation (EMDC) hired Camoin Associates to conduct an economic impact analysis in order to determine the regional job losses, both direct and indirect, associated with these closures. EMDC asked Camoin Associates to calculate the impact using 1,750 jobs as an input. This figure represents 1,400 jobs lost at paper mills plus additional manufacturing jobs lost from the Edwards plant and the closure of other smaller manufacturing facilities.

For the purposes of this analysis, the Eastern Maine Development Corporation region is defined as Penobscot, Piscataquis, Hancock, and Waldo counties. Figures presented in this memo are estimates of losses in terms of jobs, wages, and sales that are likely to occur within this four-county region.<sup>1</sup>

With the loss of such a significant number of manufacturing jobs, the region can expect additional indirect job losses as firms located within the region that supply to the paper/pulp mills and Edwards plant are forced to lay off workers and/or close as a result of decreased demand for their products and services. In turn, these direct and indirect job losses will decrease the spending power of households in the region and result in further economic losses in retail and other consumer goods sectors, which will have additional regional ripple effects.

The estimate of direct job losses provided by EMDC was used as the direct input into the economic impact model developed by Economic Modeling Specialists, Intl. (EMSI).<sup>2</sup> These 1,750 jobs account for approximately 23% of all manufacturing jobs in the region. We modelled the impact of these jobs losses.

Economic Impact			
	Direct	Indirect	Total
Jobs	1,750	2,087	3,837
Earnings	\$ 131,794,296	\$ 76,440,692	\$ 208,234,988
Sales	\$ 827,489,857	\$ 223,573,382	\$ 1,051,063,239

Source: EMSI

<sup>1</sup> The Edwards plant is in Pittsfield, Maine, which is located in neighboring Somerset County. Most of the plant's 296 employees, however, live within the four-county study region.

<sup>2</sup> EMSI allows the analyst to input the amount of foregone direct economic activity (jobs) occurring within the region to estimate the spillover effects that the lost jobs have as fewer dollars circulate through the regional economy. This is captured in the indirect impacts and is commonly referred to as the "multiplier effect." See Attachment A for more information on economic impact analysis.



The table above summarizes the economic impact of these job losses on the region. In addition to the 1,750 direct jobs, an additional 2,087 indirect jobs will be lost, for a total of 3,837 jobs. Total earnings losses are estimated to amount to about \$208 million, and total losses in sales will amount to \$1 billion.

The following table details the 2-digit NAICS sectors within the region that are likely to experience the greatest job losses indirectly as a result of the closures. Some of these are industries that are part of the facilities' supply chains, while others will be impacted due to decreases in consumer spending by the region's households.

Estimated Indirect Job Losses by Industry, 2-digit NAICS		
NAICS	Industry	Estimated Job Losses
62	Health Care and Social Assistance	259
44	Retail Trade	235
11	Crop and Animal Production	212
56	Administrative and Support	175
31	Manufacturing	165
72	Accommodation and Food Services	162
81	Other Services (except Public Administration)	131
54	Professional, Scientific, and Technical Services	122
90	Government	111
23	Construction	105
42	Wholesale Trade	81
48	Transportation and Warehousing	80
53	Real Estate and Rental and Leasing	49
52	Finance and Insurance	45
71	Arts, Entertainment, and Recreation	42
61	Educational Services	42
51	Information	28
22	Utilities	18
55	Management of Companies and Enterprises	13
21	Mining, Quarrying, and Oil and Gas Extraction	10
	<b>Total</b>	<b>2,087</b>

Source: EMSI, Camoin Associates

The Health Care and Social Assistance sector will be the most affected—it is estimated to shed 259 jobs as a result of the closures. Retail Trade will lose 235 jobs, and Crop and Animal Production (previously Agriculture, Forestry, Fishing and Hunting) will see employment decline by 212. Beyond the 1,750 manufacturing jobs being lost at the Edwards plant and pulp/paper mills themselves, another 165 jobs in the Manufacturing sector will be lost.



The table below provides finer detail as to the specific industries (this time at the 4-digit NAICS level) that will experience job losses. Logging is likely to lose 160 jobs, followed by Restaurants (119 jobs), Services to Buildings and Dwellings (106 jobs), and Hospitals (63 jobs).

Estimated Indirect Job Losses by Industry, 4-digit NAICS		
NAICS	Industry	Estimated Job Losses
1133	Logging	160
7225	Restaurants and Other Eating Places	119
5617	Services to Buildings and Dwellings	106
3211	Sawmills and Wood Preservation	73
6221	General Medical and Surgical Hospitals	63
9036	Education and Hospitals (Local Government)	54
9039	Local Government, Excluding Education and Hospitals	50
4451	Grocery Stores	44
3221	Pulp, Paper, and Paperboard Mills	38
6211	Offices of Physicians	37
2382	Building Equipment Contractors	28
4841	General Freight Trucking	27
7211	Traveler Accommodation	27
8111	Automotive Repair and Maintenance	26
6231	Nursing Care Facilities (Skilled Nursing Facilities)	25
5419	Other Professional, Scientific, and Technical Services	24
5413	Architectural, Engineering, and Related Services	23
6241	Individual and Family Services	23
6213	Offices of Other Health Practitioners	22
1131	Timber Tract Operations	22

Source: EMSI, Camoin Associates

In sum, the direct loss of 1,750 manufacturing jobs in the region will lead to an estimated 2,087 indirect job layoffs throughout the Eastern Maine region. These 3,837 jobs amount to approximately 3% of regional employment.



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## Attachment A: What is economic impact analysis?

The purpose of conducting an economic impact study is to ascertain the total cumulative changes in employment, earnings and output in a given economy due to some initial "change in final demand". To understand the meaning of "change in final demand", consider the installation of a new widget manufacturer in Anytown, USA. The widget manufacturer sells \$1 million worth of its widgets per year exclusively to consumers in Canada. Therefore, the annual change in final demand in the United States is \$1 million because dollars are flowing in from outside the United States and are therefore "new" dollars in the economy.

This change in final demand translates into the first round of buying and selling that occurs in an economy. For example, the widget manufacturer must buy its inputs of production (electricity, steel, etc.), must lease or purchase property and pay its workers. This first round is commonly referred to as the "Direct Effects" of the change in final demand and is the basis of additional rounds of buying and selling described below.

To continue this example, the widget manufacturer's vendors (the supplier of electricity and the supplier of steel) will enjoy additional output (i.e. sales) that will sustain their businesses and cause them to make additional purchases in the economy. The steel producer will need more pig iron and the electric company will purchase additional power from generation entities. In this second round, some of those additional purchases will be made in the US economy and some will "leak out". What remains will cause a third round (with leakage) and a fourth (and so on) in ever-diminishing rounds of spending. These sets of industry-to-industry purchases are referred to as the "Indirect Effects" of the change in final demand.

Finally, the widget manufacturer has employees who will naturally spend their wages. As with the Indirect Effects, the wages spent will either be for local goods and services or will "leak" out of the economy. The purchases of local goods and services will then stimulate other local economic activity; such effects are referred to as the "Induced Effects" of the change in final demand.

Therefore, the total economic impact resulting from the new widget manufacturer is the initial \$1 million of new money (i.e. Direct Effects) flowing in the US economy, plus the Indirect Effects and the Induced Effects. The ratio between Direct Effects and Total Effects (the sum of Indirect and Induced Effects) is called the "multiplier effect" and is often reported as a dollar-of-impact per dollar-of-change. Therefore, a multiplier of 2.4 means that for every dollar (\$1) of change in final demand, an additional \$1.40 of indirect and induced economic activity occurs for a total of \$2.40.

Key information for the reader to retain is that this type of analysis requires rigorous and careful consideration of the geography selected (i.e. how the "local economy" is defined) and the implications of the geography on the computation of the change in final demand. If this analysis wanted to consider the impact of the widget manufacturer on the entire North American continent, it would have to conclude that the change in final demand is zero and therefore the economic impact is zero. This is because the \$1 million of widgets being purchased by Canadians is not causing total North American demand to increase by \$1 million. Presumably, those Canadian purchasers will have \$1 million less to spend on other items and the effects of additional widget production will be cancelled out by a commensurate reduction in the purchases of other goods and services.

Changes in final demand, and therefore Direct Effects, can occur in a number of circumstances. The above example is easiest to understand: the effect of a manufacturer producing locally but selling globally. If, however, 100% of domestic demand for a good is being met by foreign suppliers (say, DVD players being imported into the US from Korea and Japan), locating a manufacturer of DVD players in the US will cause a change in final demand because all of those dollars currently leaving the US economy will instead remain. A situation can be envisioned whereby a producer is serving both local and foreign demand, and an impact analysis would have to be careful in calculating how many "new" dollars the producer would be causing to occur domestically.