MUNICIPAL PROPERTY ASSESSMENT CORPORATION

Analysis of Economic Obsolescence

Ontario Pharmaceutical Manufacturing Industry

2016 BASE YEAR

June 10, 2015

ANALYSIS OF ECONOMIC OBSOLESCENCE IN THE ONTARIO PHARMACEUTICAL MANUFACTURING INDUSTRY AS AT JANUARY 1, 2016

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June 10, 2015

Mr. Malcolm Stadig
Manager, Centralized Properties
Municipal Property Assessment Corporation
1340 Pickering Parkway, Suite 101
Pickering ON L1V 0C4

Re: Analysis of Economic Obsolescence in the Ontario Pharmaceutical Manufacturing Industry as at January 1, 2016

Dear Mr. Stadig:

EXECUTIVE SUMMARY

1. This report details the results of an analysis undertaken to determine the extent of economic obsolescence ("EO") present in the Ontario Pharmaceutical Manufacturing Industry (the "Industry"), or lack thereof, as at January 1, 2016 (the "Effective Date").

2. This report should be read in conjunction with the attached schedules, which are integral to the analysis and report commentary.

3. It is important to note that this estimate of EO as at the Effective Date reflects analysis and assumptions based on the most recently publicly disclosed financial results of guideline public companies, current economic data, and expectations regarding future economic events and financial trends that are anticipated to impact the Industry as at the date of this report (the "Report Date). Further, no guarantee is made or implied as to the accuracy of forecasts, projections or predictive statements referenced herein.

Summary of Conclusion on Economic Obsolescence

4. Based on the scope of review, research, and analysis carried out, and subject to the restrictions as set out herein, **the rate of EO present in the Industry as at January 1, 2016 is estimated to be 8% (see Schedule 1).**

INTRODUCTION & PURPOSE

5. It is understood that you have requested this report in order to confirm the existence of EO within the Industry (or lack thereof), on a broad level, as at the Effective Date. It is further understood that you will be incorporating this analysis into a mass appraisal of special purpose pharmaceutical manufacturing plants in Ontario using the Cost Approach method of valuation.

STATEMENT OF INDEPENDENCE AND IMPARTIALITY

6. The writer of this report has no stake, directly or indirectly, in the results of this analysis. The fee for this assignment is based solely on an hourly rate, and is in no way dependent upon the conclusion(s) expressed herein.

ECONOMIC OBSOLESCENCE

7. EO can be described as a form of depreciation or an incurable loss in value that occurs when influences external to an asset itself reduce the value of the asset.

8. In industry, EO exists when external influences occurring in an industry have an adverse impact on profits, thereby preventing industry participants from earning an optimal return on their asset investment. Consequently, the current value of the industry's assets is less than what it would be if the profits derived from the operation of those assets were optimal.

9. EO is most often present when external influences prompt a change in the supply and/or demand of an industry's products and/or cause a change in competition, leading to a decline in operating profits. Some examples of external influences that adversely impact operating profits, giving rise to EO, include (but are not limited to):

    - changes in industry economics, such as reduced demand or excess supply, which can put downward pressure on prices, thereby negatively impacting sales revenue and weakening profitability;

    - an increase in direct costs such as raw materials and labour without a corresponding increase in sales price due to adverse market conditions, thereby weakening profitability. Such a scenario results from declining demand for an industry's products and/or increased competition leading to excess supply and price pressure;

    - increased domestic and/or foreign competition, which puts downward pressure on prices and negatively impacts sales revenue and profits;

- government legislation and/or changes in regulations, which can negatively impact sales revenue and weaken profitability;

- economic factors over which an industry has no control, including changes in inflation, interest rates, foreign currency rates, all of which can negatively impact sales revenue and profitability; and,

- adverse global economic conditions.

SCOPE OF REVIEW

10. In preparing these comments and calculations, the following has been reviewed, considered and relied upon, inter alia:

    - information contained in a report as prepared by IMS Brogan (under contract for Industry Canada) entitled "Canada's Pharmaceutical Industry and Prospects" and dated 2013;

    - information contained in a report as published by IBISWorld entitled "Brand Name Pharmaceutical Manufacturing in Canada – September 2014";

    - information contained in a report as published by IBISWorld entitled "Generic Pharmaceutical Manufacturing in Canada – October 2014";

    - information as published by the Canadian Generic Pharmaceutical Association ("CGPA");

    - excerpts from an economic report for Ontario as published by TD Economics entitled "Provincial Economic Forecast" and dated April 10, 2015;

    - excerpts from an economic report for the U.S. entitled "Quarterly Economic Forecast" as published by TD Economics and dated March 24, 2015;

    - excerpts from a report as prepared by the Bank of Canada entitled "Monetary Policy Report - April 2015" and "Monetary Policy Report Summary - April 2015";

    - various financial and statistical data as published by Statistics Canada;

    - various information as published on the Industry Canada website – (http://www.ic.gc.ca/eic/site/lsg-pdsv.nsf/eng/h_hn01703.html); and,

- various financial and market data of publicly traded pharmaceutical companies as retrieved from the Thomson Reuters Eikon database.

CURRENT AND FUTURE OUTLOOK OF CANADIAN AND GLOBAL ECONOMY

11. Multinational pharmaceutical companies dominate the Industry. As these multinationals operate and trade internationally, they are significantly impacted by and exposed to both domestic and global economic conditions. Given this, in order to validate and support a conclusion on EO, this review incorporates an assessment of the domestic and global economic conditions existing around the Report Date.

12. Major economic indicators which are used to assess the overall state of the economy include changes in manufacturing activity, retail sales, gross domestic product, unemployment rates, the consumer price index and inflationary pressures, currency strength and interest rates, among others.

13. Below is commentary on the economic conditions and future outlook for the global economy extracted from a report entitled "Monetary Policy Report – April 2015" as published by the Bank of Canada.

Global Economy

Global financial conditions have eased further in recent months, as many central banks have added to monetary policy stimulus in response to persistent economic slack and below-target inflation. The effects of lower prices for oil and other commodities are working their way through the world economy, boosting overall global growth, but weakening growth prospects in some countries. All things considered, the Bank expects global economic growth to strengthen and average about 3 1/2 per cent over the 2015-17 period.

In this global context, the economic prospects of major economies continue to diverge. As the U.S. economy strengthens, the Federal Reserve is widely expected to start normalizing monetary policy later this year – in contrast to the ongoing easing in other advanced economies. The substantial strengthening of the U.S. dollar against most other currencies, notably the euro, the yen and the Canadian dollar, largely reflects such differences and, over time, will contribute to mitigating them by boosting net exports in the weaker economies.

The sharp drop in oil prices as well as lower commodity food prices have been key common factors behind weak total CPI inflation globally. Although the disinflationary effects of lower oil and food prices are generally expected

to be transitory, core inflation in many countries has been well below inflation targets for an extended period. Persistent excess global supply has been a steady source of downward pressure on underlying inflation in the advanced economies. Labour gaps also remain large. While some countries have achieved significant reductions in headline unemployment rates, in many advanced economies, high rates of long-term unemployment and modest wage growth suggest that labour market slack remains.

14. Below is commentary on the economic conditions and outlook for the US economy extracted from a report entitled "Monetary Policy Report Summary - April 2015" as published by the Bank of Canada and a report entitled "Quarterly Economic Forecast" as published by TD Economics and dated March 24, 2015.

US Economy

In the United States, despite a weak start to 2015, real GDP growth is expected to strengthen and to become increasingly self-sustaining, led by strong private domestic demand. Economic activity in the first quarter of 2015 was negatively affected by several transitory factors, including severe winter weather and disruptions caused by the West Coast port strike. Much of this activity is expected to be recovered over the coming months, however, as suggested by other indicators, such as employment growth and confidence. Together with low oil prices, an improving labour market should contribute to solid growth in real disposable income and household spending.

A sustained expansion in U.S. residential investment - a key market for Canada's exports - has been slow to materialize. However, with robust growth in labour income, low mortgage rates and signs that household formation is improving, new housing construction is still expected to post strong growth later this year. A pickup in household demand and ongoing improvements in confidence, combined with healthy firm balance sheets, should further stimulate business investment. The appreciation of the U.S. dollar, which reflects this relatively positive economic outlook, is nevertheless expected to be a drag on U.S. growth.

. . . . we expect the economy to grow by 3.0% in 2015, up from 2.4% in 2014. With the Federal Reserve slowly beginning to normalize monetary policy and with the unemployment rate falling to 5.0% in 2016, economic growth is expected to edge down to 2.8%.

15. Below is commentary on the economic conditions and outlook for the Canadian economy extracted from a report entitled "Monetary Policy Report Summary - April 2015" as published by the Bank of Canada.

Canadian Economy

GDP

The Canadian economy is estimated to have stalled in the first quarter of 2015. The Bank's assessment is that the impact of the oil price shock on growth will be more front-loaded – but not larger – than predicted in January. The ultimate size of this impact will need to be monitored closely. Underneath the effects of the oil price shock, the natural sequence of stronger non-energy exports, increasing investment, and improving labour markets is progressing. This sequence will be bolstered by the considerable easing in financial conditions that has occurred and by improving U.S. demand.

As the impact of the oil shock on growth dissipates, this natural sequence is expected to re-emerge as the dominant trend around mid-year. Real GDP growth is projected to rebound in the second quarter and subsequently strengthen to average about 2 1/2 per cent on a quarterly basis until the middle of 2016. The Bank expects real GDP growth of 1.9 per cent in 2015, 2.5 per cent in 2016, and 2.0 per cent in 2017.

After picking up in the middle of last year, business investment declined in the fourth quarter. The drop in oil prices is expected to lead to a rapid contraction in investment in the oil and gas sector. Steep cuts to capital expenditures in the oil industry have been announced, and rigging activity has decreased precipitously since the beginning of the year.

The Bank's estimate of real GDP in the first quarter of 2015 has been revised down since the January Report, to essentially no growth, primarily reflecting the pulling forward of the impact of the oil price shock. Other factors at play included harsh winter weather and temporary weakness in U.S. economic activity.

On an average annual basis, real GDP is expected to grow by 1.9 per cent in 2015 and 2.5 per cent in 2016, roughly the same as anticipated in January. However, the composition of growth will be somewhat different, with stronger exports and a smaller pickup in investment. In 2017, real GDP is expected to grow by 2.0 per cent.

Oil Prices

Three main oil price benchmarks are relevant for the Canadian economy: Brent, a global benchmark; West Texas Intermediate (WTI), the benchmark for light oil in North America; and Western Canada Select (WCS), a benchmark for heavy oil in Western Canada.

Following their sharp slide in the second half of 2014, the benchmark oil prices that are relevant for the Canadian economy have been quite volatile, fluctuating at or below levels assumed in the January Report. Prices for West Texas Intermediate (WTI) and Western Canada Select (WCS) - the main pricing benchmarks for Western Canadian producers - continue to be influenced by rising U.S. oil production, even as refinery maintenance and strikes have curbed demand.

By convention, the Bank assumes that energy prices will remain near their recent levels over the projection horizon. The U.S.-dollar prices for Brent, WTI and WCS have averaged roughly $55, $50 and $35 per barrel, respectively, since early March. Relative to assumptions in the January *Report,* these prices are $5 weaker for all three benchmarks.

Inflation

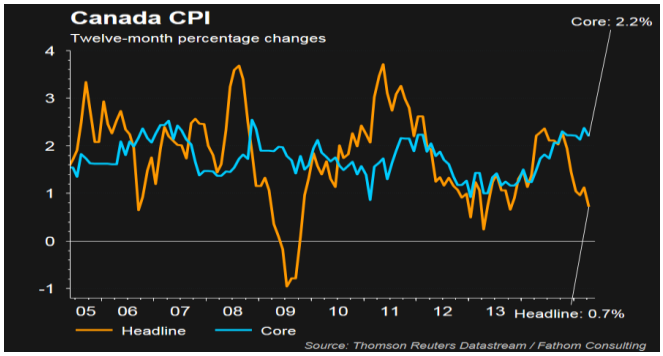
Core inflation is expected to remain near 2 per cent throughout the projection period. In the near term, the widening of the output gap is expected to exert additional downward pressure on inflation. Based on the assumption that the Canadian dollar stays around 79 cents, the pass-through effects are expected to peak in the second half of 2015 and to dissipate by the end of 2016. Meanwhile, as economic growth picks up and the output gap narrows, the disinflationary pressures from excess supply are expected to gradually diminish. The effects on core inflation of the lower dollar and the narrowing output gap roughly offset each other over the projection horizon.

As the economy reaches and remains at full capacity around the end of 2016 and with well-anchored inflation expectations, both total and core inflation are projected to be close to 2 per cent on a sustained basis.

While short-term expectations for total CPI inflation remain near the lower end of the control range, medium-term inflation expectations continue to be well anchored at 2 per cent. The March Consensus Economics forecast for total CPI inflation for 2015 is 0.9 per cent, down slightly from January, while the forecast for 2016 has remained unchanged, at 2.1 per cent. Results from the Bank's spring *Business Outlook Survey* show that the majority of

firms anticipate that, over the next two years, total CPI inflation will be in the bottom half of the Bank's 1 to 3 per cent inflation-control range. This is consistent with low total CPI inflation in 2015, reflecting the downward pressures coming from gasoline prices.

Based on the assumption that Brent will be priced at US$55 per barrel, total CPI inflation is expected to ease to slightly below 1 per cent in the coming months before rising to the 2 per cent target early in 2016. Core inflation is anticipated to remain near 2 per cent over the projection horizon, as the upward pressure from past exchange rate depreciation offsets the ongoing downward pressure from excess supply, which will gradually diminish as the output gap closes. The Bank continues to expect that core and total CPI inflation will be at 2 per cent on a sustainable basis around the end of 2016 as the economy reaches full capacity.



Thomson Reuters

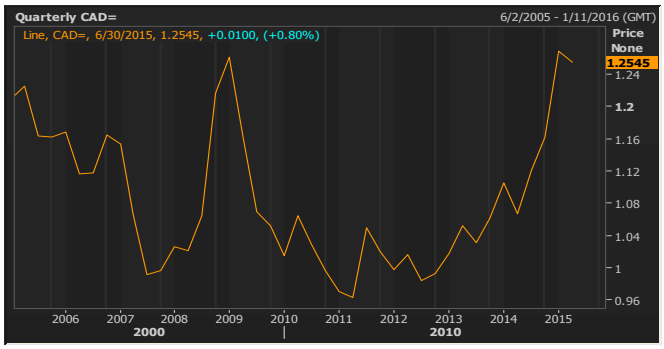
Key Interest Rate

Risks to the outlook for inflation are now roughly balanced and risks to financial stability appear to be evolving as expected. The Bank judges that the current degree of monetary policy stimulus remains appropriate and therefore is maintaining the target for the overnight rate at 3/4 per cent.

Exchange Rates

Since January, the Canadian dollar has depreciated against the U.S. dollar largely reflecting the broad strength of the U.S. dollar and the expected divergence in the paths for monetary policy in the two countries. The current level of the Canadian dollar is also consistent with the dollar's historical relationship with oil prices. By convention, the Canadian dollar is assumed to be close to its recent average level of 79 cents over the projection horizon. . . .

USD/CAD Exchange Rate



Thomson Reuters

Labour Markets

. . . . labour market conditions appear to have improved modestly, on balance, over the past six months. For example, the unemployment, underutilization and long-term unemployment rates have all eased, while prime-age labour force participation has begun to recover in recent months following weakness in the middle of 2014. Despite these encouraging developments, a material degree of slack persists in the labour market, as illustrated by the Bank's labour market indicator. Moreover, the full impact of the decline in oil prices has yet to show up in employment statistics. The balance of opinion on hiring intentions in the Business Outlook Survey fell to its lowest level since 2009, and firms reported that labour shortages remain low and are less intense than 12 months ago.

Capacity Utilization

Measures of the utilization of existing capital stock continue to indicate less excess capacity than do measures of labour market slack, consistent with the pattern expected following a destructive recession. Total industrial capacity utilization has risen above its historical average, to 83.6 per cent. Capacity utilization in many non-energy industries has also increased in recent quarters, a precursor to greater investment spending. The most recent Business Outlook Survey indicates that capacity pressures were more prevalent among export-oriented firms, which frequently cited physical capacity constraints as a key obstacle to meeting a sudden rise in demand.

Taking into account the various indicators of capacity pressures, the Bank judges that there is material slack in the Canadian economy. The amount of excess capacity in the first quarter is estimated to be between 1/2 and 1 1/2 per cent, suggesting more slack and disinflationary pressures than estimated in January.

16. The key Canadian financial market indicators around the date of this report are summarized below.

Government of Canada marketable bond average yield:	
1 to 3 years	0.65%
3 to 5 years	0.81%
5 to 10 years	1.33%
More than 10 years	2.15%
Canadian chartered bank prime lending rate	2.85%
Conventional mortgage lending rates:	
3 years	3.39%
5 years	4.64%
Chartered bank guaranteed investment certificate rates:	
3 years	1.03%
5 years	1.50%

17. Below is commentary on the economic conditions and outlook for the Ontario economy extracted from a report entitled "Provincial Economic Forecast" as published by TD Economics and dated April 10, 2015.

Ontario Economy

Ontario is projected to be the fastest growing economy over the 2015-16 period, with real GDP growth estimated at 2.7% on average.

U.S. real GDP growth is forecast to run at around 3% annually over the next two years which will translate into solid demand for Ontario's manufacturing sector. A lower Canadian dollar will also benefit Ontario producers. Already there is evidence of rising momentum in factory production, with manufacturing real GDP in Ontario up almost 5% Y/Y in 2014Q3. Somewhat mitigating the positive outlook for manufacturing is an expected contraction in auto production on account of the planned 14-week shutdown for retooling at the Chrysler plant in Windsor and the gradual shutdown of GM's Oshawa 2 plant.

A low interest rate environment has continued to fuel the housing market over the first few months of 2015 with both resales and average prices tracking higher. While our housing demand outlook has been nudged up since our January update, we still expect to see a gradual moderation in the resale market on account of an expected deterioration in affordability and elevated household debt. New construction activity is projected to

decline over the next few years after a period of overbuilding.

The Ontario government's fiscal outlook remains challenging, with a deficit elimination timetable still set for fiscal 2017-18. The upcoming spring budget should provide some additional details on how the government plans to keep program spending essentially flat through fiscal 2017-18.

Employment growth in Ontario has been slow out of the gate in 2015, up only 0.6% on a trend basis. Surprisingly, manufacturing employment is still tracking lower through February despite the uptick in activity. Our forecast pegs employment growth at 1% over the 2015-16 period. Steady gains in export-based manufacturing and tourism industries are expected to translate into increased hiring as 2015 progresses.

18. Economic conditions for the province of Ontario as at April 2015 are summarized in the chart below.

SELECTED ECONOMIC STATISTICS - ONTARIO
(Annual average % change, unless otherwise noted)

	Actual	Actual	Actual	Forecast (as at April 2015)		
	2012	2013	2014	2014E	2015F	2016F
Real GDP	1.7	1.3	-	2.4	2.8	2.5
Nominal GDP	3.2	2.4	-	4.0	3.8	4.7
Employment	0.7	1.8	0.8	-	1.0	1.0
Unemployment Rate (annual, %)	7.9	7.6	7.3	-	6.9	6.7
Retail Trade	1.6	2.3	4.8	-	3.6	4.0
Housing Starts (000's units)	77.4	60.9	58.4	-	57.4	57.3
Housing Starts	14.2	-21.4	-4.0	-	-1.8	-0.2
Existing Home Sales (000's units)	197.6	198.5	206.0	-	211.1	212.6
Existing Home Sales	-1.9	0.5	3.7	-	2.5	0.7
Average Home Price (000's C$)	381.3	400.7	428.6	-	446.7	455.5
Average Home Price	5.0	5.1	7.0	-	4.2	2.0
Consumer Price Index	1.4	1.0	2.3	-	0.7	2.2

SOURCE: *TD Economics – April 2015 (www.td.com/economics)*

PHARMACEUTICAL MANUFACTURING INDUSTRY IN CANADA AND ONTARIO

Background

19. The Industry develops and manufactures pharmaceutical products used in the treatment of illnesses in humans and animals. Canada's pharmaceutical manufacturing industry participants consist of a mix of large, multinational corporations and smaller local companies that operate in several sub-sectors that service different markets. These sub-sectors include branded pharmaceuticals, generic pharmaceuticals, biopharmaceuticals and contract service providers ("CSP's). Branded and generic multinational corporations dominate the Industry.

20. The majority of pharmaceutical companies operating in Ontario are situated in or around the Greater Toronto Area. The manufacturing end of the pharmaceutical sector employed approximately 26,300 people in Canada in 2014.[1] The employment rate in this sector has fallen by 6.3% over the past five years.[1]

21. More than half of the pharmaceutical production in Canada is exported, primarily to the United States.[1] Total Canadian pharmaceutical exports declined by a compound annual rate of 2.5% from 2008 to 2013.[1]

22. Branded pharmaceutical companies develop, manufacture and market patented drug products. Branded drugs account for the largest portion of total drug sales revenue in Canada. Most major branded pharmaceutical companies are foreign multinationals that operate subsidiaries within Canada.

23. The branded industry's primary activities include research and development (R&D), the manufacture of active ingredients used in pharmaceutical products, the manufacture of chemical pharmaceutical preparations and biological pharmaceutical products.

24. The leading branded companies in Canada, based on sales, that operate in Ontario include Johnson & Johnson Inc., Pfizer Inc., Sanofi Pasteur (division of Sanofi S.A), GlaxoSmithKline PLC, Eli Lilly & Company, Roche Holding AG, AstraZeneca PLC and Abbott Laboratories. Novartis AG and AstraZeneca PLC had operated manufacturing facilities in Mississauga, Ontario but these facilities were closed in the past several years.

25. The generic segment is a mix of Canadian-based and foreign multinationals and smaller companies. The generic industry's primary activities include gaining regulatory approval to produce generic drugs and developing, manufacturing, marketing and distributing generic drugs. Generic drugs are produced and distributed without patent protection and generic manufacturers market lower-priced generics once patents of branded products expire.

1 Source: http://www.ic.gc.ca/eic/site/lsg-pdsv.nsf/eng/h_hn01703.html.

26. The majority of the pharmaceutical manufacturing capacity that exists in Canada is generic and the majority of that is in Ontario.[2] The generic sector in Ontario has a workforce of 8,000 employees representing approximately 82% of Canadian production workers; 86% of administrative staff and 75% of R&D staff.[2]

27. Amongst the top 10 selling generic corporations, three of the corporations operate in Ontario: Teva Pharmaceutical Ind., Apotex Inc. and Pharmascience Inc.

28. Biopharmaceutical companies in Canada are small and generally focused on early stage R&D with few marketed products. Contract service providers (CSPs) represent a mix of smaller Canadian-headquartered companies and larger foreign companies. CSPs provide various contracted services including R&D and manufacturing.

29. In Canada, the Industry is second only to the Information Technology sector in R&D investment. Twenty pharmaceutical and biotechnology companies were listed in "Research Infosource's Top 100 Corporate R&D Spenders 2014" for Canada, however, the Industry's changing business model means more R&D is increasingly being carried out externally and through partnerships.[3]

30. An emerging niche market is also developing in Canada in the field of biologics. Biologics has the potential to become a key market for growth opportunities in the future.

Key External Influences Impacting the Industry

31. The key external influences impacting revenue growth and profitability within the Industry are identified and discussed below.

Health Expenditures/Aging Population

32. Total health expenditure measures the aggregate level of annual public and private spending on healthcare in Canada. According to the Canadian Institute of Health Information, pharmaceuticals are the second largest component of health care expenditures, representing approximately 16% of the total public and private healthcare expenditures allocated amongst hospitals, drugs and physician services in Canada.[4]

33. As North America's population grows increasingly older, total health expenditures will increase to meet the needs of an aging population, as will demand for pharmaceutical products, providing a potential opportunity for growth.

2 Source: The Canadian Generic Pharmaceutical Association ("CGPA").
3 Source: http://www.ic.gc.ca/eic/site/lsg-pdsv.nsf/eng/h_hn01703.html.
4 Source: http://www.ic.gc.ca/eic/site/lsg-pdsv.nsf/eng/h_hn01703.html.

Research and Development Expenditures

34. R&D is the backbone that drives the future of the Industry. When the total level of public and private spending on R&D in Canada increases, this trend benefits pharmaceutical manufacturers. A greater level of R&D leads to increased drug pipeline productivity and newly developed drug products which stimulates market demand and drives industry growth.

Government Regulations and Changing Reimbursement Policies

35. The risk exists that industry growth could be impeded by increasing global cost pressures on health systems. The underlying conditions in which the Industry operates are shaped by authorities, legislators and politicians.

36. Pharmaceutical products are subject to regulatory price controls in the Canadian and US markets and government reimbursement systems often favor less expensive generic medicines over branded products. The Patented Medicine Prices Review Board (PMPRB) sets maximum prices that brand-name drug manufacturers can charge for their products.

37. Private payers comprise an estimated 42.4% of total revenues for the Canadian pharmaceutical industry, which includes private insurance coverage and individuals paying out-of-pocket for their medications. Over the past five years, many private insurers have implemented mandatory generic substitution clauses into their coverage or have capped the amount that they will cover for brand-name drugs at the price of generic substitutes.[5]

38. Price controls and pricing pressure reduce earnings and may occasionally make the market launch of a new product unprofitable.

Currency Fluctuations

39. The Canadian-dollar effective exchange rate index (CERI) compares the Canadian dollar against the currencies of Canada's major trading partners. The six foreign currencies in the CERI include the U.S. dollar, the European Union euro, the Japanese yen, the Chinese yuan and the Mexican peso.

40. When the CERI decreases, the Canadian dollar depreciates and domestic products become relatively less expensive for foreign buyers typically increasing export demand for domestically produced goods. On the flip side, when the CERI rises this trend causes domestically manufactured goods to be relatively more expensive for global consumers, thereby cutting into global demand for Canadian exports.

5 Source: IBISWorld Industry Report 32541aCA – Brand Name Pharmaceutical Manufacturing in Canada

41. Given that a significant portion of the Industry's revenues are generated from exports, pharmaceutical manufacturers face substantial exchange rate risk and economic exposure from currency volatility. Changes in the CERI have a substantial influence on the operations and profitability of the Industry.

Current Industry Performance and Market Trends

General

42. Total pharmaceutical sales in Canada doubled to $22 billion from 2001 to 2013 with governments accounting for 42% of drug expenditures and private insurers and individuals accounting for the remaining 58%.[6] Since 2005, total health expenditures and drug expenditures in Canada have risen by an annual growth rate of 4.9% and 4.3%, respectively.[6]

43. Annual domestic pharmaceutical manufacturing production was valued at $7.7 billion as of August 2014 with a declining compound annual rate of 2.5% since 2008.[6]

44. Factors that contributed to the decline in Canadian market growth over the latter half of the last decade include, for the most part, record levels of patent losses for major brand products (the "Patent Cliff"), few new blockbuster drug product developments, a slowdown in product approvals and longer processing time to access Ontario's public drug programs.

45. More recently, the Industry has been further negatively impacted by declining R&D productivity, the global economic downturn, price pressures from global competition, cost containment policies implemented by government and private insurers, and a shift in business operations towards emerging countries. Total business expenditures on R&D by pharmaceutical companies in Canada dropped below $1 billion following 2011, plunging 29% between 2001 and 2013.[6]

46. The global recession and the subsequent rise in the Canadian dollar relative to other markets has depressed export demand which has also been a significant contributing factor in the decline in the Industry's total revenue. Total Canadian exports of pharmaceuticals declined at an annualized rate of 2.5% to $5.6 billion from 2008 to 2013.[7]

Brand Sector

47. Demand for brand name pharmaceuticals is driven by the number of incidences of health ailments in Canada, the level of health insurance coverage and the price of substitute

6 Source: http://www.ic.gc.ca/eic/site/lsg-pdsv.nsf/eng/h_hn01703.html.
7 Source: http://www.ic.gc.ca/eic/site/lsg-pdsv.nsf/eng/h_hn01703.html.

generic drugs.

48. As a result of the Patent Cliff, more generic drugs have flooded the market over the past five years, thereby hindering revenue growth of branded drugs. According to data from Industry Canada, patent losses were estimated to reach $2.4 billion by 2012, up from $1.2 billion in 2007.[8]

49. The brand name sector has also grappled with generating sales volumes due to the Ontario government implementing incentives to bolster generic drug utilization rates. Prior to 2009, most generic drugs were priced from 63.0% to 73.0% of brand-name drugs, whereas six of the most prescribed generic drugs are currently priced at 18.0% of brand-name drugs.[9]

50. As a result of these pressures, brand drug industry revenue declined at an estimated compound annual rate of 2.4% to $16.7 billion over the five years to 2014.[9] Brand name industry exports are also estimated to decline at an annual rate of 6.5% to $4.5 billion for the five years to 2014 as a result of industry consolidation, coupled with slowing drug pipeline production.[9]

51. In response to the Patent Cliff, many brand pharmaceutical manufacturers have consolidated or have formed partnerships with third parties, such as academic institutions, to cut clinical trial and R&D costs. Additionally, many manufacturers have outsourced R&D and other business segments to contract service providers (CSPs).

52. The brand name segment exports primarily to the United States, which accounts for an estimated 64.8% of total exports, followed by Italy (6.7%), the United Kingdom (3.5%) and Belgium (2.7%).[9]

Generic Sector

53. Although demand has risen for generic drugs, generic manufacturers have also seen their revenues fall over the past five years. In response to a greater demand by Canadians for high-cost prescriptions drugs, the Ontario government has implemented pricing reforms for generic drugs, thus intensifying competition in the generic drug market.

54. The generic pharmaceutical industry has benefited from price regulations implemented by the provincial government and private insurance companies however, an increase in global competition has increased the supply of generic drugs available in the market creating further pricing pressures for generic manufacturers as well.

8 Source: Industry Canada - Canada's Pharmaceutical Industry and Prospects.

9 Source: IBISWorld Industry Report 32541aCA – Brand Name Pharmaceutical Manufacturing in Canada.

55. The Ontario government has set generic prices at 25.0% of brand-name drug prices, thereby intensifying competition in the generic drug industry. As a result of these price pressures, coupled with decreased export demand, generic industry revenue declined at a compound annual rate of 2.9% to an estimated $2.5 billion from 2009 to 2014.[10]

56. Canada's generic drug industry generates 40.0% of its annual sales volume from exporting primarily to the United States, amounting to more than $1 billion annually from Ontario and almost all generic drugs sold in Canada are made in the GTA or Montreal area.[11]

57. Even with the 2010 passage of major healthcare reform legislation in the United States, the generic drug industry's largest export market could not bolster demand for generic pharmaceutical exports. Consequently, the total value of exports fell 3.4% per year on average over the five year period to 2014 to an estimated $1.6 billion.[10]

Future Outlook for the Industry

General

58. The number of Canadian adults aged 65 and older has increased at an annual rate of 3.5% over the last five years, while the total Canadian population has increased by just 1.2% within the same timeframe. The growth trend towards senior citizens accounting for an increasingly larger share of the total national population will likely have a positive effect on the Industry's growth as this trend will heighten demand for pharmaceutical products.

59. Canada ranks low on the global corporate priority for R&D investment, with most global pharmaceutical companies spending less than 1.0% of their global direct R&D investments in Canada. As R&D expenditures increase, the Industry will incur significant costs to acquire employees and comply with regulations thus cutting into the Industry revenue growth. In 2014, R&D costs are expected to rise posing a greater risk to the Industry.[12]

60. The current extent of regulatory controls and market pressures on pricing is expected to persist or increase.

61. Exports are expected to rebound in the coming years as demand in overseas markets continues to recover from the global financial crisis. The Canadian dollar is expected to depreciate as well, making pharmaceuticals produced in Canada more competitively priced in foreign markets. Given that the US is the largest purchaser of Canadian pharmaceutical exports, the relative strength of the US currency against the Canadian dollar will lead to increased demand for Canadian pharmaceutical exports.

10 Source: IBISWorld Industry Report 32541bCA. Generic Pharmaceutical Manufacturing in Canada October 2014.
11 The Canadian Generic Pharmaceutical Association ("CGPA").
12 Source: Industry Canada - Canada's Pharmaceutical Industry and Prospects.

Branded

62. Over the next five years, branded pharmaceutical manufacturers are expected to exhibit growth, due to robust demand for biologic drugs. However, the brand drug industry will continue to struggle, facing strong competition from generic drug manufacturers.

63. An average of 30.0% of total brand spending is expected to be exposed to generic competition over the next five years.[13] Notwithstanding this, the brand drug industry is expected to revitalize given the Patent Cliff has been easing off since 2012, with patent drug losses expected to remain below $500 million by 2017.

64. During the five years from 2014 to 2019, revenues for the brand name sub-sector are forecast to grow at an annual rate of 4.1% to $20.4 billion due to a large proportion of specialty drugs flowing through the brand name drug pipeline.[13] However, despite growth in revenues, profits are expected to shrink from 20.4% of in 2014 to 19.5% in 2019 due to high operational costs and rising R&D costs.[13]

65. Brand name exports are anticipated to rise at an average annual rate of 1.1% to $4.7 billion over the five-year period from 2015 to 2019.[13] If the free trade agreement between Canada and the European Union ("CETA") is approved, this trend will likely add an average life of 2.7 years to drug patents, according to data from Industry Canada and Health Canada, which will help limit generic drug competition within the Industry. If CETA is approved, the agreement will begin to come into effect in 2016, at which time about 98% of the tariffs between Canada and the European Union will be eliminated

Generic

66. Core demand for generic drugs is expected to remain high and will only continue to increase in the next five years as an expansion of access to primary healthcare services in Canada will boost demand. As generic drug manufacturers are increasingly able to offer more generic versions of popular biologic and chemical pharmaceutical preparations, both demand in export markets and competition from foreign producers is expected to increase significantly.

67. After facing low export demand and severe pricing pressures over the past five years, the generic drug sector has significant opportunities to grow in the five years to 2019. Further patent expirations are expected to spike demand for new products with expirations expected to expose an additional $33.5 billion in brand name sales to competition in 2015.[14] The generic drug industry will likely expand to meet this demand with new companies entering the market to capitalize on new markets and growing margins, further

13 Source: IBISWorld Industry Report 32541aCA – Brand Name Pharmaceutical Manufacturing in Canada.
14 Source: IBISWorld Industry Report 32541bCA. Generic Pharmaceutical Manufacturing in Canada October 2014.

intensifying competition.

68. Rising R&D costs will hamper profit growth and the threat of further provincial cost containment measures for generic pharmaceuticals remains high. Notwithstanding this, the generic sector is projected to experience annual revenue growth of 3.4% to $3.0 billion by 2019.[15] The total value of generic exports is expected to grow 8.2% per year on average over the next five years to 2019 to an estimated $2.4 billion.[15]

69. The lingering effects of cost-cutting efforts undertaken by industry operators over the past five years is expected to improve profit margins in the next five years but rising wage and R&D costs will partially suppress this growth.

ANALYSIS OF EXISTENCE OF ECONOMIC OBSOLESCENCE

70. As discussed previously, EO exists when external influences adversely impact the economic returns an industry earns from the operation of its assets, thereby diminishing the value of those assets. The first step in determining if EO exists in an industry is to perform a qualitative analysis assessing the current economic conditions of the industry and the impact of external influences on that industry.

71. Government legislation limiting the number of years of patent protection on brand name drugs has led to a glut of competition from generic competitors. The increase in competition and supply of cheaper drugs has put downward pressure on brand drug prices, weakening revenue growth and profitability of brand name drug manufacturers.

72. In addition, a flood of generic competitors entered the market following the Patent Cliff resulting in an increase in generic drug supply, thereby putting downward pressure on generic sales prices and negatively impacting the generic industry's revenue growth and operating profits.

73. Further, on-going price control regulations implemented by provincial health plan reforms and private insurers has also put pressure on drug prices further weakening the Industry's revenue growth and profits.

74. Over the long-term, demand for pharmaceutical products is expected to rise given the aging population and an increasing demand by the U.S. for Canadian pharmaceutical exports stimulated by a further depreciation of the Canada dollar against the U.S. dollar.

75. Notwithstanding this, the adverse impact government regulations are having on the pharmaceutical sector provides some evidence of the existence of EO within the Industry at

15 Source: IBISWorld Industry Report 32541bCA. Generic Pharmaceutical Manufacturing in Canada October 2014.

the Report Date.

APPROACH TO QUANTIFYING ECONOMIC OBSOLESCENCE

76. In addition to a review of the qualitative factors associated with EO as discussed above, a quantitative analysis of key profitability and efficiency ratios of guideline public companies operating in the Industry was completed as a method of quantifying the level of EO present in the Industry, or lack thereof, on a broad level.

77. The guideline public companies considered most appropriate for this analysis were selected based on the leading pharmaceutical manufacturing companies that currently operate in Canada (or recently discontinued operations in Canada); generate at least 50% of their revenue from the production of pharmaceuticals; and, have publicly available financial results.

78. The companies selected were as follows: Pfizer Inc.; Sanofi SA; GlaxoSmithKline PLC; Eli Lilly & Company; Roche Holding AG; AstraZeneca PLC; Abbott Laboratories; Teva Pharmaceutical Industries Ltd.; and, Novartis AG. The selected guideline public companies are collectively referred to hereafter as the "Guideline Companies".

79. Johnson & Johnson Inc. is the only company operating in Ontario whose pharmaceutical product sales account for less than 50% of its total revenue. Consequently, this company was not included in the selection of the Guideline Companies as its operating results include a significant portion of non-pharmaceutical derived revenues and profits (losses).

80. The specific profitability and efficiency ratios analyzed (and explained in greater detail further below) are as follows:

    - return on invested capital;
    - gross profit margin percentage;
    - inventory turnover ratio;
    - fixed asset turnover ratio;
    - price to book ratio; and,
    - industrial capacity utilization rates.

81. The key profitability and efficiency ratios reviewed were analyzed over a ten year period from 2004 to 2013 in order to derive historical industry performance benchmarks. The

current profitability and efficiency ratios of the Guideline Companies based on 2014 were then compared against the historical benchmarks.

82. If the current performance ratios of the Guideline Companies are trending below their historical performance benchmarks by a material amount, on a collective basis, this can signal that EO is present in the Industry.

83. The percentage decline in the current ratios from their historical performance benchmarks, as measured on a collective basis based on the results of the Guideline Companies, can be used as an overall benchmark for the rate of EO present in an industry, on a broad level.

QUANTIFYING ECONOMIC OBSOLESCENCE

84. A description of the key profitability and efficiency ratios reviewed as well as a discussion of the analysis undertaken to quantify EO follows below.

Return on Invested Capital Analysis

85. Return on invested capital ("ROIC") is a profitability ratio that measures how efficiently a company generates income from capital invested by comparing net operating profit to capital invested. The ROIC is a better measurement than return on equity as it measures how well a company is using both its equity and debt to generate profits. A low ROIC indicates that a company is making poor use of its capital resources.

86. The return on invested capital is calculated as follows:

Return = (Net Operating Profit after Taxes)

divided by

Invested Capital = (Interest-bearing Debt + Equity)

87. The ROIC is informative when tracked on a trend line annually as it will indicate long-term changes in the operating performance of a company. A decline in operating profits while invested capital remains constant or increases will cause the ROIC to decline.

88. A decline in the ROIC can signal that external influences occurring in the marketplace are negatively impacting profitability, giving rise to EO.

89. Any or all of the following external influences can negatively impact operating profits and the ROIC, giving rise to EO: a declining demand for an industry's products; increased competition creating excess supply and price pressure; and, government regulations

requiring increased investment and/or price caps. All of these factors can impede the ability of an industry to earn an economic rate of return on its assets.

90. The historical rates of ROIC of the Guideline Companies from 2004 to 2013 were analyzed to derive historical benchmarks. The historical benchmarks were based on the median ROIC realized over this period under the assumption that this benchmark is the best measure of an economic rate of return for the Industry.

91. The historical benchmarks were then compared against the current rates of ROIC based on 2014 to gauge if current rates of ROIC are consistent with historical benchmarks.

92. The majority of the Guideline Companies realized a decline in their rate of ROIC in 2014 when compared to their historical benchmark. The indicated EO of the Guideline Companies that did realize a decline ranged from nominal to significant. Consequently, there was a wide divergence in the rates of indicated EO based on the ROIC analysis of the Guideline Companies.

93. The overall rate of indicated EO chosen was based on the median of the range of indicated EO values of the Guideline Companies. The calculation of the rate of indicated EO based on the ROIC analysis is presented on **Schedule 2**.

Gross Profit Margin (%) Analysis

94. Gross profit margin percentage is a profitability ratio that measures the percentage by which sales revenue exceeds the expenses required to manufacture a product, known as the cost of goods sold (the "COGS").

95. The COGS includes the cost of the raw materials, direct labour and production overheads that go into producing the goods sold and is included on a company's income statement where is it is deducted from revenue in order to calculate the company's gross margin dollars. The gross margin dollars reflect the amount of dollars earned from the sale of products and services before consideration of non-production costs such as selling and administrative costs.

96. Gross profit margin percentage is calculated as follows:

Gross Profit Margin (%) = (Sales Revenue – COGS / Sales Revenue) x 100

97. The gross profit margin percentage when tracked on a trend line indicates if any significant changes in sales and/or the COGS have occurred over a period of time. The gross profit margin percentage declines when sales revenue decreases however, the COGS remains constant or increases, as less gross margin dollars are being generated per unit sold.

98. A decline in the gross profit margin percentage can be an indication that external influences occurring in the marketplace are negatively impacting sales and/or the COGS, thereby giving rise to EO.

99. Similar to the ROIC, external influences that cause declining demand for an industry's products and/or increased competition leading to excess supply put downward pressure on prices and can negatively impact an industry's gross profit, thereby impeding the ability of an industry to earn an economic return on its assets.

100. In addition, when the COGS increases however, the increase cannot be passed on to the consumer through a price increase due to adverse market conditions such as government price caps and/or price pressure due to increased competition, the additional costs must be absorbed by the manufacturer and gross profits decline, negatively impacting industry returns.

101. The historical gross profit margin percentages of the Guideline Companies from 2004 to 2013 were analyzed to derive historical benchmarks. The historical benchmarks were based on the median gross profit margin percentage realized over this period under the assumption that this benchmark is the best measurement of an economic rate for the Industry.

102. The historical benchmarks were then compared against the current gross profit margin percentages based on 2014 to gauge if current gross margin percentages are consistent with historical benchmarks.

103. The majority of the Guideline Companies realized a decline in their gross profit margin percentage when compared to their historical benchmark, however, the indicated EO of the Guideline Companies that did realize a decline was nominal. Consequently, there is no indication that, on an industry wide level, pharmaceutical manufacturers have experienced any substantial decline in gross profit margin percentage based on the analysis of the gross profit margin percentages of the Guideline Companies.

104. The overall rate of indicated EO chosen was based on the median of the range of indicated EO values of the Guideline Companies. The calculation of the rate of indicated EO based on the gross profit margin percentage analysis is presented on **Schedule 3**.

Inventory Turnover Ratio Analysis

105. The inventory turnover ratio ("ITR") is an efficiency ratio that reflects how frequently a company flushes inventory from its system by comparing cost of goods sold with average inventory for a period. In other words, it measures how many times a company sells its total average inventory dollar amount during the year.

106. The ITR is calculated as follows:

Inventory Turnover Ratio = COGS / Average Dollar Value of Inventory On-Hand

107. Generally, a higher ITR implies a stronger demand for an industry's products given a certain amount of inventory. In contrast, a low ITR is generally indicative of excess production capacity and/or excess supply and can signal that external influences occurring in the marketplace are causing a decline in demand for an industry's products.

108. The historical ITR's of the Guideline Companies were analyzed from 2004 to 2013 to derive historical benchmarks. The historical benchmarks were based on the median ITR over this period under the assumption that this benchmark is the best measurement of an economic rate for the Industry.

109. The historical benchmarks were then compared against the current ITR's based on 2014 to gauge if current ITR's are consistent with the historical benchmarks.

110. Approximately half of the Guideline Companies realized a decline in their ITR in 2014 when compared to their historical benchmark. The indicated EO of the Guideline Companies that did realize a decline ranged from nominal to significant. Consequently, there was a wide divergence in the rates of indicated EO based on the ITR analysis of the Guideline Companies.

111. The overall rate of indicated EO chosen was based on the median of the range of indicated EO values of the Guideline Companies. The calculation of the rate of indicated EO based on the ITR analysis is presented on **Schedule 4**.

Fixed Asset Turnover Ratio Analysis

112. The fixed asset turnover ratio ("FATR") measures a company's ability to generate net sales from fixed-asset investments; specifically property, plant and equipment, net of depreciation. This ratio is often used as a measure in manufacturing industries, where major purchases are made for property, plant and equipment to help increase output.

113. The FATR is calculated as follows:

Fixed Asset Turnover Ratio = Sales Revenue / Net Property, Plant and Equipment

114. Generally, a high FATR indicates that a company has been more effective in using its investment in fixed assets to generate revenues and/or a stronger demand for an industry's products given a certain amount of fixed-asset investment.

115. In contrast, a low FATR is generally indicative of over-investment in fixed assets and can signal that external factors occurring in the marketplace are causing a decline in demand for an industry's products and negatively impacting an industry's economic return on its fixed-asset investment, giving rise to EO.

116. The historical FATR's of the Guideline Companies were analyzed from 2004 to 2013 to derive historical benchmarks. The historical benchmarks were based on the median FATR over this period under the assumption that this benchmark is the best measurement of an economic rate for the Industry.

117. The historical benchmarks were then compared against the current FATR's based on 2014 to gauge if current FATR's are consistent with the historical benchmarks.

118. Similar to the ITR analysis, approximately half of the Guideline Companies realized a decline in their FATR in 2014 when compared to their historical benchmark. The indicated EO of the Guideline Companies that did realize a decline ranged from nominal to significant. Consequently, there was a wide divergence in the rates of indicated EO based on the FATR analysis of the Guideline Companies.

119. The overall rate of indicated EO chosen was based on the median of the range of indicated EO values of the Guideline Companies. The calculation of the rate of indicated EO based on the FATR analysis is presented on **Schedule 5**.

Price to Book Ratio Analysis

120. The price-to-book ratio ("PBR") measures the market price of a company's net assets in relation to their book value. The ratio denotes how much equity investors are paying for each dollar in net assets.

121. A company's market price is the market value of a company's outstanding shares, also known as its market capitalization. Book value is the value of a company's net assets according to its balance sheet. Traditionally, a company's book value is its total assets based on original cost less any depreciation, amortization or impairment costs minus liabilities.

122. A company's PBR is impacted by external factors related to investor sentiment regarding the current economic state of the industry that the company operates in; i.e., demand for industry products, competitive landscape, etc. If the market price of the company declines significantly or drops below its book value, this may be an indication that investors are becoming wary of the company and/or the industry that the company operates in and can signal that EO may be present.

123. The PBR of the S&P/TSX Industrials Sector Index can be used as a benchmark to gauge investor-perception of the value of the net assets of a particular industry in comparison to the weighted average value of the net assets of all other industries included in the index.

124. The PBR of the S&P/TSX Industrials Sector Index around the Report Date was compared against the median PBR of the Guideline Companies approximate to the Report Date. The median PBR of the Guideline Companies of 3.9 is slightly above the PBR of the S&P TSX Industrials Sector Index of 3.7. Consequently, the market values the net assets of the Guideline Companies to be worth slightly more than the weighted average value of the net assets of all industries combined based on the composition of companies listed on the S&P TSX Industrials Sector Index.

125. It is important to note that the PBR measure is not considered a reliable indicator of EO given that the PBR can be impacted by other variables not related to EO such as a company's capital structure, the extent of analyst coverage and dividend policy, among other things. Notwithstanding this, the results of the analysis are presented on **Schedule 6** for information purposes.

Industrial Capacity Utilization Rate Analysis

126. The capacity utilization rate indicates the rate of production capacity which is actually being utilized in comparison to the maximum production capacity available.

127. A decline in the utilization rate when compared to historical industry norms indicates that current production is below the supply capacity available and may be a signal that external factors occurring in the marketplace are causing a decline in demand for an industry's products, which can negatively impact an industry's economic return, giving rise to EO.

128. The capacity utilization rate can be calculated as follows:

Capacity Utilization Rate =

[(Actual Output – Potential Output) / Potential Output]^scale factor

129. Data on the industrial capacity utilization rates of pharmaceutical manufacturing plants operating in Ontario and/or Canada was not available. As a substitute, the industrial capacity utilization rates of the Canadian Chemical Manufacturing sector (which includes pharmaceutical manufacturing) were analyzed from 2004 to 2014 to gauge if current production levels are consistent with historical levels.

130. The current capacity utilization rate for the Canadian Chemical Manufacturing sector (NAICS 325) based on the average capacity utilization rate for 2014 is slightly above the

median rate over the past ten years.

131. Accordingly, it appears that the current productivity rate of the Canadian Chemical Manufacturing sector is consistent with historical levels.

132. It is important to note that EO can exist even when an asset's capacity utilization rate is at maximum and/or at the industry norm because, although the asset may be operating at its normal/maximum capacity utilization rate, the return being generated by the asset(s) may still be below an economic level.

133. The results of the analysis of industrial capacity utilization rates for the Canadian Chemical Manufacturing industry have not been factored into the conclusion on the rate of EO present in the Industry given that sector specific data was not available and because of the limitations regarding the analysis as detailed above however, the calculations are presented on **Schedule 7** for information purposes.

CONCLUSION

134. Based on the scope of review, research, and analysis carried out, and subject to the restrictions as set out herein, the rate of EO present in the Industry as at January 1, 2016 is estimated to be as follows **(see Schedule 1)**:

PHARMACEUTICAL MANUFACTURING INDUSTRY

Guideline Company Ratio Analysis	Indicated EO	Assigned Weight	Weighted Average
Return on Invested Capital	21.5%	2	43.0%
Gross Profit Margin (%)	2.4%	2	4.8%
Inventory Turnover Ratio	0.0%	1	0.0%
Fixed Asset Turnover Ratio	2.9%	1	2.9%
Price to Book Ratio	0.0%	0	0.0%
Industrial Capacity Utilization	0.0%	0	0.0%
		6	50.7%
	divide by total assigned weight		*6*
Estimated Rate of EO as at January 1, 2016			**8.0%**

135. In concluding on the rate of EO, the greatest weight was assigned to the EO indicated by the ROIC and gross profit margin (%) analyses given that these analyses best reflect

financial/economic performance as they directly measure changes in profitability and overall return on total assets.

136. The EO indicated by the ITR and FATR analyses were assigned a lower weight given that although these analyses reflect changes in the magnitude of sales revenue generated in relation to inventory and fixed asset investments, they do not directly measure changes in profitability and/or overall return on investment.

137. A weighting of zero was assigned to the PBR analysis given that it is not a reliable measure of EO as it can be impacted by other variables unrelated to a change in the economic return on an investment. Accordingly, this analysis is presented for information purposes only.

138. A weighting of zero was also assigned to the industrial capacity utilization analysis as sector specific rates for the pharmaceutical manufacturing industry were not available and because of the limitations regarding the analysis as described previously. Accordingly, this analysis is presented for information purposes only.

ASSUMPTIONS AND RESTRICTIONS

139. The financial and operating results of the Guideline Companies, as sourced from the Thompson Reuters Eikon database ("Reuters"), are fairly stated and free of material errors. If the financial and operating results of the Guideline Companies, as sourced from Reuters, are not free of material errors, such errors could have a material impact on the conclusion(s) stated herein.

140. The information contained in the IBISWorld reports, including aggregate financial results, statistics and prospects of the brand and generic pharmaceutical industries in Canada, is accurate, reasonable and reflects best estimates based on the information available at the Report Date.

141. There will be no significant change in the operating and financial results of the Guideline Companies from fiscal 2014 to the Effective Date. If a significant change in the operating and financial results of the Guideline Companies does occur during this period, such changes may cause the conclusion(s) stated herein to be materially different at the Effective Date.

142. There will be no significant changes in market conditions and/or Canadian/global economic conditions from the Report Date to the Effective Date. If any significant changes in market conditions and/or Canadian/global economic conditions do occur from the Report Date to the Effective Date, such changes may cause the conclusion(s) stated herein to be materially different at the Effective Date.

143. This report is not intended for general circulation or publication, nor is it to be reproduced or used for any purpose other than that outlined above without prior written consent in each specific instance. No responsibility or liability is assumed for losses resulting from the circulation, publication, reproduction or use of this report contrary to the provisions of this paragraph.

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Yours very truly,

Deborah Sprenger

Deborah Sprenger, CPA, CGA, CBV

Schedule 1

MUNICIPAL PROPERTY ASSESSMENT CORPORATION
ANALYSIS OF ECONOMIC OBSOLESCENCE
PHARMACEUTICAL MANUFACTURING INDUSTRY
SUMMARY OF GUIDELINE COMPANIES RATIO ANALYSIS

Guideline Company Ratio Analysis		Indicated EO	Assigned Weight (Note 1)	Weighted Average
Return on Invested Capital	Schedule 2	21.5%	2	43.0%
Gross Profit Margin (%)	Schedule 3	2.4%	2	4.8%
Inventory Turnover Ratio	Schedule 4	0.0%	1	0.0%
Fixed Asset Turnover Ratio	Schedule 5	2.9%	1	2.9%
Price to Book Ratio	Schedule 6	0.0%	0	0.0%
Industrial Capacity Utilization	Schedule 7	0.0%	0	0.0%
			6	50.7%
Range of EO Indicators - 0% to 21%			***divide by total assigned weight***	*6*
Estimated Rate of EO as at January 1, 2016 (rounded) (Note 1)				**8.0%**

Note:

(1) In concluding on the rate of EO, the greatest weight was assigned to the EO indicated by the ROIC and gross profit margin (%) analyses given that these analyses best reflect financial/economic performance as they directly measure changes in profitability and overall return on total assets.

The EO indicated by the ITR and FATR analyses were assigned a lower weight given that although these analyses reflect changes in the magnitude of sales revenue generated in relation to inventory and fixed asset investments, they do not directly measure changes in profitability and/or overall return on investment.

A weighting of zero was assigned to the PBR analysis given that it is not a reliable measure of EO as it can be impacted by other variables unrelated to a change in the economic return on an investment.

A weighting of zero was also assigned to the industrial capacity utilization analysis as sector specific rates for the pharmaceutical manufacturing industry were not available and because of the limitations regarding the analysis as described in the narrative portion of this report.

Schedule 2

MUNICIPAL PROPERTY ASSESSMENT CORPORATION
ANALYSIS OF ECONOMIC OBSOLESCENCE
PHARMACEUTICAL MANUFACTURING INDUSTRY
RETURN ON INVESTED CAPITAL ANALYSIS

											2004 to 2013					Indicated
		2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Max	Min	Mean	Median	2014	EO
		(Note 1)	(Note 1)	(Note 1)	(Note 1)	(Note 1)	(Note 1)	(Note 1)	(Note 1)	(Note 1)	(Note 1)	(Note 2)	(Note 2)	(Note 2)	(Note 2) (**A**)	(Note 1) (**B**)	(Note 3,4) **(A-B/A)**
1	Pfizer Inc.	11.6%	8.2%	12.1%	8.8%	9.1%	6.6%	4.9%	4.8%	5.7%	7.5%	12.1%	4.8%	7.9%	7.9%	6.2%	21.5%
2	AstraZeneca PLC	20.5%	25.6%	31.7%	21.2%	18.6%	21.4%	21.2%	26.2%	16.4%	6.5%	31.7%	6.5%	20.9%	21.2%	3.0%	85.8%
3	Teva Pharmaceutical Ind.	5.8%	13.8%	4.5%	11.4%	2.9%	8.1%	12.3%	8.7%	5.3%	3.5%	13.8%	2.9%	7.6%	7.0%	8.8%	0.0%
4	Novartis AG	13.4%	14.7%	14.5%	11.9%	13.6%	12.3%	11.9%	9.9%	9.7%	9.3%	14.7%	9.3%	12.1%	12.1%	10.8%	10.7%
5	GlaxoSmithKline PLC	30.8%	30.5%	31.0%	27.7%	19.1%	19.2%	6.3%	20.1%	18.0%	20.7%	31.0%	6.3%	22.3%	20.4%	10.4%	49.0%
6	Roche Holding AG	11.1%	14.3%	17.1%	20.7%	19.6%	16.2%	18.9%	22.0%	22.6%	26.2%	26.2%	11.1%	18.9%	19.3%	20.1%	0.0%
7	Sanofi S.A.	4.8%	3.1%	5.7%	7.9%	5.6%	7.2%	6.6%	6.0%	5.4%	4.6%	7.9%	3.1%	5.7%	5.7%	5.5%	3.5%
8	Eli Lilly and Company	10.8%	11.1%	14.9%	15.5%	-11.0%	23.4%	22.5%	17.8%	16.1%	17.9%	23.4%	-11.0%	13.9%	15.8%	9.1%	42.4%
9	Abbot Laboratories Ltd.	15.5%	15.4%	7.5%	13.2%	15.4%	16.4%	11.2%	2.6%	0.5%	4.6%	16.4%	0.5%	10.2%	12.2%	5.4%	55.7%
	Mean	19.7%		3.7%	13.3%	13.5%		8.8%			29.8%						
	Median	16.4%		4.8%	12.1%	12.2%		8.8%			21.5%						

Notes:

(1) Source: Thomson Reuters Eikon database.

(2) The Max, Min, Mean and Median values are based on the historical rates of the Guideline Companies from 2004 to 2013.

(3) Indicated EO for each of the Guideline Companies was measured by calculating the differential in the historical return on invested capital ("ROIC") benchmark (based on the median rate from 2004 to 2013) and the current ROIC based on 2014 as follows: ((Median ROIC - Current ROIC) / Median ROIC). If the current ROIC was higher than the benchmark, a differential of 0.0% was calculated as the indicated EO.

(4) The overall rate of EO chosen was based on the median of the range of indicated EO values of the Guideline Companies.

Schedule 3

MUNICIPAL PROPERTY ASSESSMENT CORPORATION
ANALYSIS OF ECONOMIC OBSOLESCENCE
PHARMACEUTICAL MANUFACTURING INDUSTRY
GROSS PROFIT MARGIN ANALYSIS

		2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2004 to 2013 Max	2004 to 2013 Min	2004 to 2013 Mean	2004 to 2013 Median	2014	Indicated EO
		(Note 1)	(Note 1)	(Note 1)	(Note 1)	(Note 1)	(Note 1)	(Note 1)	(Note 1)	(Note 1)	(Note 1)	(Note 2)	(Note 2)	(Note 2)	(Note 2) (**A**)	(Note 1) (**B**)	(Note 3,4) **(A-B/A)**
1	Pfizer Inc.	87.0%	84.7%	84.2%	76.8%	84.7%	83.0%	78.1%	80.8%	82.6%	81.9%	87.0%	76.8%	82.4%	82.8%	80.8%	2.4%
2	AstraZeneca PLC	75.8%	77.6%	79.0%	79.7%	80.4%	83.0%	81.2%	82.1%	80.7%	80.0%	83.0%	75.8%	80.0%	80.2%	78.6%	2.0%
3	Teva Pharmaceutical Ind.	46.7%	47.2%	50.7%	51.8%	53.8%	53.0%	56.2%	52.0%	52.4%	52.7%	56.2%	46.7%	51.7%	52.2%	54.5%	0.0%
4	Novartis AG	74.4%	73.6%	73.2%	71.7%	73.1%	73.0%	71.9%	68.0%	67.4%	68.6%	74.4%	67.4%	71.5%	72.5%	67.7%	6.6%
5	GlaxoSmithKline PLC	78.2%	78.0%	78.4%	77.1%	76.3%	75.0%	72.9%	72.0%	71.7%	69.8%	78.4%	69.8%	74.9%	75.7%	69.4%	8.3%
6	Roche Holding AG	73.9%	73.9%	68.4%	70.2%	70.1%	70.2%	72.0%	72.6%	73.8%	73.6%	73.9%	68.4%	71.9%	72.3%	72.8%	0.0%
7	Sanofi S.A.	71.8%	73.5%	74.3%	74.1%	74.5%	74.0%	72.4%	68.9%	69.1%	67.0%	74.5%	67.0%	72.0%	73.0%	67.7%	7.3%
8	Eli Lilly and Company	76.7%	76.3%	77.4%	77.2%	78.5%	80.6%	81.1%	79.1%	78.8%	78.8%	81.1%	76.3%	78.5%	78.7%	74.9%	4.8%
9	Abbot Laboratories Ltd.	54.9%	52.4%	56.3%	55.9%	57.3%	57.1%	58.3%	53.0%	53.3%	53.2%	58.3%	52.4%	55.2%	55.4%	54.6%	1.4%

Mean	74.1%	66.7%	70.9%	71.4%	69.0%	3.6%
Median	74.5%	68.4%	72.0%	73.0%	69.4%	2.4%

Notes:

(1) Source: Thomson Reuters Eikon database.

(2) The Max, Min, Mean and Median values are based on the historical rates of the Guideline Companies from 2004 to 2013.

(3) Indicated EO for each of the Guideline Companies was measured by calculating the differential in the historical gross margin (%) benchmark (based on the median rate from 2004 to 2013) and the current gross margin (%) based on 2014 as follows: ((Median GM% - Current GM%) / Median GM%). If the current GM(%) was higher than the benchmark, a differential of 0.0% was calculated as the indicated EO.

(4) The overall rate of EO chosen was based on the median of the range of indicated EO values of the Guideline Companies.

Schedule 4

MUNICIPAL PROPERTY ASSESSMENT CORPORATION
ANALYSIS OF ECONOMIC OBSOLESCENCE
PHARMACEUTICAL MANUFACTURING INDUSTRY
INVENTORY TURNOVER RATIO ANALYSIS

		2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2004 to 2013 Max	Min	Mean	Median	2014	Indicated EO
		(Note 1)	(Note 1)	(Note 1)	(Note 1)	(Note 1)	(Note 1)	(Note 1)	(Note 1)	(Note 1)	(Note 1)	(Note 2)	(Note 2)	(Note 2)	(Note 2) (**A**)	(Note 1) (**B**)	(Note 3,4) **(A-B/A)**
1	Pfizer Inc.	1.0	1.2	1.3	2.0	1.5	1.0	1.4	1.6	1.5	1.5	2.0	1.0	1.4	1.5	1.6	0.0%
2	AstraZeneca PLC	1.7	2.0	2.5	2.7	3.3	3.3	3.6	3.4	2.8	2.6	3.6	1.7	2.8	2.8	2.9	0.0%
3	Teva Pharmaceutical Ind.	2.2	2.3	2.8	2.1	1.8	1.9	2.0	2.0	1.8	1.8	2.8	1.8	2.1	2.0	2.0	0.0%
4	Novartis AG	2.1	2.3	2.3	2.2	2.0	2.1	2.4	3.2	3.0	2.4	3.2	2.0	2.4	2.3	2.6	0.0%
5	GlaxoSmithKline PLC	2.0	2.2	2.2	1.9	1.6	1.7	1.9	2.0	1.9	2.0	2.2	1.6	1.9	2.0	1.7	15.0%
6	Roche Holding AG	1.6	1.9	2.5	2.3	2.3	2.5	2.5	2.3	2.3	2.2	2.5	1.6	2.2	2.3	1.9	17.4%
7	Sanofi S.A.	2.3	2.3	2.1	2.0	2.0	2.0	2.0	2.0	1.8	1.7	2.3	1.7	2.0	2.0	1.7	15.0%
8	Eli Lilly and Company	1.5	1.7	1.7	1.8	1.7	1.6	1.6	2.1	1.9	1.8	2.1	1.5	1.7	1.7	1.7	0.0%
9	Abbot Laboratories Ltd.	3.3	4.1	3.7	4.0	4.4	4.4	4.5	3.1	2.5	2.8	4.5	2.5	3.7	3.9	3.4	12.8%
	Mean	2.8	1.7	2.2	2.3	2.2	6.7%										
	Median	2.5	1.7	2.1	2.0	1.9	0.0%										

Notes:

(1) Source: Thomson Reuters Eikon database.

(2) The Max, Min, Mean and Median values are based on the historical rates of the Guideline Companies from 2004 to 2013.

(3) Indicated EO for each of the Guideline Companies was measured by calculating the differential in the historical inventory turnover rate ("ITR") benchmark (based on the median rate from 2004 to 2013) and the current ITR based on 2014 as follows: ((Median ITR - Current ITR) / Median ITR). If the current ITR was higher than the benchmark, a differential of 0.0% was calculated as the indicated EO.

(4) The overall rate of EO chosen was based on the median of the range of indicated EO values of the Guideline Companies.

Schedule 5

MUNICIPAL PROPERTY ASSESSMENT CORPORATION
ANALYSIS OF ECONOMIC OBSOLESCENCE
PHARMACEUTICAL MANUFACTURING INDUSTRY
FIXED ASSET TURNOVER RATIO ANALYSIS

		2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2004 to 2013 Max	Min	Mean	Median	2014	Indicated EO
		(Note 1)	(Note 1)	(Note 1)	(Note 1)	(Note 1)	(Note 1)	(Note 1)	(Note 1)	(Note 1)	(Note 1)	(Note 2)	(Note 2)	(Note 2)	(Note 2) (**A**)	(Note 1) (**B**)	(Note 3,4) **(A-B/A)**
1	Pfizer Inc.	2.7	2.7	2.9	3.0	3.3	2.7	3.2	3.5	3.8	4.0	4.0	2.7	3.2	3.1	4.1	0.0%
2	AstraZeneca PLC	2.7	3.2	3.7	3.8	4.1	4.6	4.7	5.0	4.5	4.3	5.0	2.7	4.1	4.2	4.4	0.0%
3	Teva Pharmaceutical Ind.	4.6	4.0	4.7	4.0	3.6	3.7	4.0	3.6	3.3	3.1	4.7	3.1	3.9	3.8	3.1	18.4%
4	Novartis AG	3.5	3.7	3.6	3.3	3.3	3.3	3.5	3.8	3.5	3.0	3.8	3.0	3.4	3.5	3.1	11.4%
5	GlaxoSmithKline PLC	3.2	3.4	3.4	3.1	2.8	3.0	3.1	3.1	3.0	3.0	3.4	2.8	3.1	3.1	2.6	16.1%
6	Roche Holding AG	2.4	2.6	2.7	2.7	2.5	2.7	2.8	2.6	2.9	3.0	3.0	2.4	2.7	2.7	2.9	0.0%
7	Sanofi S.A.	4.3	4.7	4.8	4.6	4.3	4.2	4.3	3.7	3.4	3.2	4.8	3.2	4.1	4.3	3.3	23.3%
8	Eli Lilly and Company	2.0	1.9	2.0	2.2	2.4	2.6	2.9	3.1	2.9	2.9	3.1	1.9	2.5	2.5	2.5	0.0%
9	Abbot Laboratories Ltd.	3.2	3.7	3.5	3.6	4.0	4.2	4.5	2.7	2.4	2.8	4.5	2.4	3.5	3.5	3.4	2.9%
	Mean	4.0	2.7	3.4	3.4	3.3	8.0%										
	Median	4.0	2.7	3.4	3.5	3.1	2.9%										

Notes:

(1) Source: Thomson Reuters Eikon database.

(2) The Max, Min, Mean and Median values are based on the historical rates of the Guideline Companies from 2004 to 2013.

(3) Indicated EO for each of the Guideline Companies was measured by calculating the differential in the historical fixed asset turnover rate ("FATR") benchmark (based on the median rate from 2004 to 2013) and the current FATR based on 2014 as follows: ((Median FATR - Current FATR) / Median FATR). If the current FATR was higher than the benchmark, a differential of 0.0% was calculated as the indicated EO.

(4) The overall rate of EO chosen was based on the median of the range of indicated EO values of the Guideline Companies.

Schedule 6

MUNICIPAL PROPERTY ASSESSMENT CORPORATION
ANALYSIS OF ECONOMICAL OBSOLESCENCE
PHARMACEUTICAL MANUFACTURING INDUSTRY
PRICE TO BOOK RATIO ANALYSIS

	Price to Book Value Ratio at May 28, 2015	(Note 1)
1	Pfizer Inc.	3.0
2	AstraZeneca PLC	4.5
3	Teva Pharmaceutical Ind.	2.5
4	Novartis AG	3.9
5	GlaxoSmithKline PLC	16.5
6	Roche Holding AG	12.3
7	Sanofi S.A.	2.2
8	Eli Lilly and Company	5.4
9	Abbot Laboratories Ltd.	3.4

Maximum	16.5
Minimum	2.2
Mean	6.0
Median	3.9
S&P / TSX Industrials Sector Index at May 28, 2015 (Note 1)	3.7
Indicated EO (Note 2)	**0.0%**

Notes:

(1) Source: Thomson Reuters Eikon database.

(2) Indicated EO was measured by calculating the differential in the median of the range of price to book value ratios of the Guideline Companies and the weighted average price to book value ratio of the S&P/TSX Industrials Sector Index.

Schedule 7

MUNICIPAL PROPERTY ASSESSMENT CORPORATION
ANALYSIS OF ECONOMIC OBSOLESCENCE
PHARMACEUTICAL MANUFACTURING INDUSTRY
INDUSTRIAL CAPACITY UTILIZATION RATES - CHEMICAL MANUFACTURING (NAICS 325)

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
	(Note 1)	(Note 1)	(Note 1)	(Note 1)	(Note 1)	(Note 1)	(Note 1)	(Note 1)	(Note 1)	(Note 1)	(Note 1)
Chemical manufacturing	81.5	80.2	79.8	82.0	75.0	70.9	75.3	75.8	77.0	77.2	77.8

Maximum - 2004 to 2013	82.0
Minimum - 2004 to 2013	70.9
Median - 2004 to 2013	77.1
Five Year Average - 2009 to 2013	75.2
Ten Year Average - 2004 to 2013	77.5
2014	77.8
Indicated EO (Note 2)	**0.0%**

Notes:

(1) Source: Statistics Canada - CANSIM Table 028-0002

(2) Indicated EO was measured by calculating the differential in the median capacity utilization rate from 2004 to 2013 and the current rate based on the average capacity utilization rate for 2014.