

**Safer Alternatives to Bisphenol A (BPA)
Are Available for Food and Beverage
Packaging for Young Children**

**An Assessment of BPA-Free Alternatives
for Infant Formula, Baby Food and Toddler Food**

June 2012

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Environmental Health Strategy Center

Safer Alternatives to Bisphenol A (BPA) in Food and Beverage Packaging for Young Children

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June 2012

Prepared for the Alliance for a Clean and Healthy Maine by Michael E. Belliveau

In support of a petition and citizen-initiated rulemaking by registered voters and allied organizations requesting that the Maine Board of Environmental Protection prohibit the sale of infant formula, baby food and toddler food in packaging that contains BPA, in favor of safer alternatives that are widely available at comparable cost.

Summary of Qualifications

Michael E. Belliveau is an environmental public health expert with more than thirty years of experience in chemical hazard assessment, chemical policy analysis, and pollution prevention problem solving. He earned an S.B. degree from MIT through an interdisciplinary science program in environmental science. He has authored more than 30 major reports, books and journal articles on chemical hazards and safer alternatives. He has served on dozens of government advisory panels and testified many times before state legislatures, administrative agencies and Congress on chemical management solutions. Belliveau also organized a business-led consortium of manufacturers and university research engineers who are working to develop technology to produce bio-based plastics from wood chips and potato waste as a safer alternative to petrochemical-based plastics.

Mr. Belliveau is the president and chief executive officer of a private, Maine-based nonprofit corporation, the Environmental Health Strategy Center, with offices in Bangor and Portland. The Center is a ten-year old public health organization that develops independent policy analysis and programs to promote human health and safer chemicals in a sustainable economy. See the Appendix for Mr. Belliveau's full curriculum vitae.

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I. EXECUTIVE SUMMARY

One or more safer alternatives to bisphenol A (BPA) are available at comparable cost for infant formula, baby food and other food intended for or marketed to toddlers under the age of three. Historically, BPA-based epoxy resins have been used as a protective coating on metal food packaging such as cans and jar lids. Babies and toddlers are exposed to BPA when the priority chemical migrates from the coating of the metal into the food. A slow transition to BPA-free alternatives is underway. Because of the long shelf life of canned or jarred foods, exposure to BPA may continue for up to two years or longer after substitution.

The demonstrably safer alternatives, all of which are commercially available, functionally equivalent and affordable to the consumer, include the following food packaging products:

- ✓ Polyethylene plastic containers
- ✓ Polypropylene plastic containers
- ✓ Polylactic acid plastic containers
- ✓ Paperboard containers
- ✓ Aseptic cartons, e.g. Tetra Pak
- ✓ Laminated pouches, e.g. Cheer Pack
- ✓ Fresh food or frozen food

Infant Formula. Today, most infant formula is no longer sold in BPA-containing packaging. In response to parents' health concerns and state regulation, infant formula manufacturers have substantially switched to safer alternatives, e.g. plastic containers and aseptic cartons. Only one lagging manufacturer has not yet transitioned to BPA-free packaging. Infant formula makers appear to be abandoning metal packaging.

Baby Food. All but one manufacturer has switched to BPA-free packaging. Demonstrably safer alternatives in use include plastic containers and laminated pouches. Several manufacturers have failed to comply with Maine law, which requires an evaluation of safer alternatives to the continued use of BPA in the epoxy coating of metal lids on glass jars of baby food. Three companies have switched to a BPA-free coating for their jar lids. However, these baby food manufacturers have failed to provide sufficient information for the State or the public to determine the relative safety of the BPA-free alternatives.

Toddler Food consists of all other food intended for or intentionally marketed to children under age three. Although several BPA-free packaging strategies are available, BPA is still widely used. The greatest exposure to BPA from toddler food results from epoxy-lined canned foods intentionally marketed to toddlers through the use of cartoon characters popular with preschoolers. BPA is also used in metal packaging for some pediatric nutritional drinks intended for children age 1 to 10. The few companies that have phased out use of BPA failed to provide sufficient information to determine the relative safety of the BPA-free alternative coatings used in their metal food packaging.

With the market beginning to turn away from BPA in food packaging, it's the perfect time for public policy to speed this trend and compel the laggards to move. Full compliance by infant formula and baby food manufacturers with the requirement to submit alternatives assessments will inform the search for an expanded suite of truly safer alternatives.

II. Introduction to Safer Alternatives and Alternatives Assessments

The State of Maine has a long track record of success in phasing out unnecessary dangerous chemicals in consumer products in favor of safer alternatives. For example, the Maine Legislature virtually eliminated mercury and PBDEs, a group of flame retardant chemicals, in consumer products through a series of laws enacted since 2000. These policy actions were taken after an alternatives assessment demonstrated that safer alternatives to the use of mercury¹ and PBDEs² were available, effective and affordable for specific product uses.

The Legislature enacted the Kid-Safe Products Act in 2008,³ based on the same policy strategy. First, identify priority hazardous chemicals to which children are exposed. Second, require companies to report on priority chemical use and evaluate alternatives. Finally, phase out specific uses of priority chemicals whenever safer alternatives are available. Other U.S. states and countries have developed similar chemical policies.

Under Maine law, a “safer alternative” means either:

an alternative that, when compared to a priority chemical that it could replace, would reduce the potential for harm to human health or the environment **or** that has not been shown to pose the same or greater potential for harm to human health or the environment as that priority chemical.⁴ (emphasis added)

Safer alternatives can be identified through a comparative hazard assessment of the priority chemical with other chemicals from the alternatives.⁵ An alternatives assessment identifies and compares various available solutions that are functionally equivalent to the priority chemical for its intended purpose and cost comparable, in addition to being safer.⁶

Maine’s BPA rule requires companies to prepare alternatives assessments to ensure that BPA-free alternatives are safer than BPA, as well as available, effective and affordable:

No later than January 1, 2012, the manufacturer of infant formula or baby food that

¹ Galligan C, Morose G and Giordani J (2003). An Investigation of Alternatives to Mercury Containing Products. Lowell Center for Sustainable Production. Prepared for Maine Department of Environmental Protection. January 22. <http://www.sustainableproduction.org/downloads/An%20Investigation%20Hg.pdf> (accessed June 17, 2012).

² Rossi M and Heine L (2007). The Green Screen for Safer Chemicals: Evaluating Flame Retardants for TV Enclosures. Clean Production Action. Presented to the Natural Resources Committee, Maine Legislature. March. http://www.cleanproduction.org/library/Green_Screen_Report.pdf (accessed June 17, 2012).

³ 38 M.R.S.A. §§1691 *et seq.*, as amended. See P.L. 2007 ch. 643. LD 2048, An Act to Protect Children’s Health and the Environment from Toxic Chemicals in Toys and Children’s Products.

⁴ 38 M.R.S.A. §1691(12).

⁵ Clean Production Action. The GreenScreen™ for Safer Chemicals. v. 1.2. Web site. <http://www.cleanproduction.org/Greenscreen.php> (accessed May 22, 2012).

⁶ U.S. Environmental Protection Agency. Alternatives Assessments. Design for the Environment. http://epa.gov/dfe/alternative_assessments.html (accessed June 17, 2012).

is sold in a plastic container, jar or can that contains intentionally-added bisphenol A, shall submit to the department an assessment of the availability, cost, feasibility and performance, **including potential for harm to human health and the environment**, of alternatives to bisphenol A, polycarbonate plastic or epoxy resin, and the reason bisphenol A, polycarbonate plastic or epoxy resin is used in the manufacture of the infant formula or baby food container, jar or can in lieu of identified alternatives. This assessment must, at a minimum, include all of the elements of an acceptable assessment listed in 06-096 CMR Chapter 880 Regulation of Chemical Use in Children's Products.⁷ (emphasis added)

The required alternatives assessment must provide sufficient information on the specific chemical identity and hazards to determine whether identified alternatives are truly safer:

An **acceptable** assessment is one that:

- (a) Describes the function of the priority chemical in the product and list the specific characteristics of the chemical (e.g., physical or chemical properties; price; availability) that led to its selection to fulfill that function;
- (b) **Identifies the specific chemical and non-chemical alternatives** considered in lieu of the priority chemical, and describes why the priority chemical was selected over each identified alternatives;
- (c) **Identifies and describes any known emerging chemical and non-chemical alternatives** to use of the priority chemical in the product and, for each such alternative, provides the following information:
 - (i) The status of research and development;
 - (ii) The current barriers to introduction of the alternative into the marketplace;
 - (iii) The projected timeframe for introduction of the alternative into the marketplace; and
 - (iv) The advantages and disadvantages of using the alternative in lieu of the priority chemical, assuming the alternative is successfully introduced into the marketplace;
- (d) Identifies the key, distinguishing human health and environmental hazards (or "endpoints") associated with the priority chemical;
- (e) **Evaluates the human health and environmental hazard posed by the priority chemical and each identified chemical alternative** using the Green Screen or other evaluation methodology approved by the department; and
- (f) Provides copies of all peer-reviewed studies or government-generated studies identified through a search of publicly accessible databases and lists the search terms used...⁸ (emphasis added)

Despite the availability of standard methods and clear regulations, none of the seven companies requested to evaluate alternatives to the use of BPA in infant formula and baby food packaging have submitted an acceptable alternatives assessment to the State of Maine.

⁷ 06-096 CMR ch. 882 §(4)(A)(2)

⁸ 06-096 CMR ch. 880 §3(B)(3)

III. Compliance Status - Infant Formula & Baby Food Manufacturers

Summary. The failure of manufacturers of infant formula and baby food to fully comply with Maine’s safer chemicals law has made it more difficult to characterize the safety of alternatives to BPA for use in metal packaging. Despite being legally required to do so, none of these companies have submitted a complete and acceptable evaluation of BPA alternatives for metal cans, metal lids on glass jars, or metal disks on caps. Under Maine’s BPA regulation, the burden remains on manufacturers of infant formula and baby food to identify and demonstrate the safety of BPA alternatives. Fortunately, while waiting for manufacturers to establish the relative safety of their BPA-free metal coatings, many safer alternatives for food packaging that don’t require coated metal are available to consumers.

Discussion. The Maine Board of Environmental Protection adopted a rule effective January 9, 2011,⁹ which requires manufacturers of infant formula and baby food:

1. by October 3, 2011, to report their use of BPA in packaging for infant formula and baby food sold in the state of Maine after January 9, 2011;¹⁰ and
2. by January 1, 2012, to submit an evaluation of alternatives to the use of BPA in packaging for infant formula and baby food.⁷ (Such a report is commonly referred to as an “alternatives assessment”).

Unfortunately, almost all of the companies subject to this rule have routinely violated these requirements, as shown in Table 1. As a result, the Maine Department of Environmental Protection has issued four Letters of Warning, followed by four Notices of Violation. An additional three companies have received less formal compliance requests from DEP.

Only one of the seven companies that sold infant formula or baby food in BPA-containing packaging in Maine after January 9, 2011 reported its BPA use on time. After being warned of non-compliance by DEP, five others finally reported their BPA use many months past the deadline. One company known to have sold infant formula in BPA-based packaging in 2011 has still not properly reported. At least two baby food manufactures have never used BPA-based packaging, and are thus exempt from Maine’s reporting requirements.

Not one single manufacturer submitted a BPA alternatives assessment by the January 1, 2012 deadline. More than six months later, two regulated companies have not responded at all. Five companies finally submitted partial assessments. Three received Notices of Violation on June 14, 2012 for failure to submit a complete and acceptable alternatives assessment: Nestle (Gerber), Hero (Beech-Nut) and Hain Celestial (Earth’s Best).¹¹

⁹ 06-096 CMR Chapter 882: Designation of Bisphenol A as a Priority Chemical and Regulation of Bisphenol A in Children’s Products. EFFECTIVE DATE: January 9, 2011 – filing 2011-3 (except Section 5)

¹⁰ 06-096 CMR ch. 882 §(4)(A)(1)

¹¹ Personal Communication. Kerri Malinowski, Safer Chemicals Program Coordinator, Maine Department of Environmental Protection. June 14, 2012.

Table 1. Widespread Non-Compliance with Maine's BPA Rule (as of June 14, 2012)

Deadline:	Timely Reported?		Enforcement Action (Date Issued)		Basis for Enforcement Action or Compliance Request
	10/3/11	1/1/12	LETTER OF WARNING	NOTICE OF VIOLATION	
COMPANY Brand	BPA Use Report	Alternatives Assessment			
ABBOTT Similac	NO	NO	-	-	DEP requested BPA use report and an alternatives assessment (5/29/12)
MEAD JOHNSON Enfamil	YES	NO	-	-	DEP requested submission of a BPA alternatives assessment (5/29/12)
NESTLÉ Gerber	YES, LATE	Partial LATE	4/2/12		Failure to report BPA use Failure to assess BPA alternatives
				6/14/12	Failure to submit a complete and acceptable alternatives assessment
PERRIGO / PBM Parent's Choice, etc.	YES, LATE	Partial LATE	12/21/11		Failure to timely report BPA use Failure to assess BPA alternatives
				2/21/12	Failure to submit a complete and acceptable alternatives assessment
HERO Beech-Nut	YES, LATE	Partial LATE	2/21/12		Failure to report BPA use Failure to assess BPA alternatives
				6/14/12	Failure to submit a complete and acceptable alternatives assessment
HAIN CELESTIAL Earth's Best	YES, LATE	Partial LATE	2/21/12		Failure to report BPA use Failure to assess BPA alternatives
				6/14/12	Failure to submit a complete and acceptable alternatives assessment
STONYFIELD YoBaby	EXEMPT		-	-	No BPA used in packaging
INITIATIVE FOODS Wild Harvest	YES, LATE	Partial LATE	-	-	Alternatives assessment NOT yet considered complete and acceptable
SPROUT FOODS	EXEMPT		-	-	No BPA used in packaging

Now, more than six months after the January 1, 2012 deadline, none of the BPA alternative assessments received have been deemed complete and acceptable to the Department. Industry non-compliance undermines the ability of the Board of Environmental Protection to take future action on BPA to implement the Kid Safe Products Act and places the Department at risk of violating a key policy directive from the Board.

The Maine Board of Environmental Protection previously expressed its intent to consider a future prohibition on the sale of BPA-containing infant formula and baby food, which would require a finding that “one or more safer alternatives to the priority chemicals are available at comparable cost.”¹² That’s why the Board, in its BPA rule, instructed the Department of Environmental Protection to evaluate the alternative assessments prepared by manufacturers and to report back with recommendations for action:

Upon receipt and review of acceptable alternatives assessment(s) submitted to, or prepared for, the department, and no later than January 1, 2013, the department shall report the findings of the alternatives assessment(s) to the Board of Environmental Protection and, if appropriate, propose an amendment to this chapter reflecting those findings.¹³

Despite rampant industry non-compliance, the Department has failed to exercise its legal authority to independently prepare an assessment of BPA alternatives at industry expense:

If an assessment acceptable to the department is not timely submitted, the department may assess fees as provided under 06-096 CMR 881 to cover the cost of preparing an independent assessment.¹⁴

This widespread non-compliance by infant formula and baby food manufacturers, and lack of independent alternatives assessment by Maine DEP, has jeopardized the ability of the Department to meet its January 1, 2013 obligation (cited above) to report and recommend further action on BPA by the Board of Environmental Protection.

Although the burden for demonstrating the safety of BPA alternatives remains on the manufacturers under Maine’s rule, an independent safer alternatives assessment is needed to support timely consideration of a prohibition on the sale of infant formula and baby food sold in BPA-containing packaging. The report herein provides such an assessment.

Despite the failure of manufacturers to disclose the chemical identity and characterize the safety of BPA-free metal packaging alternatives as required by Maine law, ample evidence presented in this report supports a finding that one or more safer alternatives to BPA are available at comparable cost for packaging of infant formula, baby food and toddler food.

¹² 38 MRSA §1696(1)(B); 06-096 CMR ch. 880 §4(A)(2)

¹³ 06-096 CMR ch. 882 §4(A)(4)

¹⁴ 06-096 ch. 880 §3(B)(3)

IV. BPA in INFANT FORMULA – Safer Alternatives are Available

Summary. For BPA-based packaging for infant formula, the evidence demonstrates that “one or more safer alternatives to the priority chemical are available at comparable cost,” which meets the criterion to support a prohibition on the sale of infant formula containing BPA under Maine law and regulation. Safer alternatives to BPA in infant formula containers are now widely available at comparable cost (see Table 2). These safer alternatives, which have been widely adopted, include containers made from polyethylene, polypropylene and from a laminated composite of paperboard, aluminum foil and plastic.

All new manufacturing of BPA-containing packaging for infant formula sold in the United States has ceased, except for one “ready-to-feed” infant formula product (sold under two brand names) made by one company representing less than 2% of the market (see Table 2). Some old inventory of infant formula packaged in metal cans that contain BPA may continue to be sold at retail for many more months given long shelf life.

Table 2. Safer Alternatives to BPA in Infant Formula Packaging are Widely Available

Company	Brand	BPA Use	Available BPA-Free Safer Alternative	New uses of BPA ended by:
Abbott Laboratories	Similac	Epoxy coating on metal cans of “ready-to-feed” and on metal tops & bottoms of “powdered” formulas	Plastic containers	October 2011
Mead Johnson	Enfamil		Plastic containers	October 2011
Nestlé Infant Nutrition	Gerber		Aseptic containers Plastic containers	October 2011
Perrigo Company (PBM Nutritionals)	Parent’s Choice Babies R Us	Epoxy coating on metal disk in cap of plastic bottles of “ready-to-feed”	NONE but has identified a BPA-free alternative	BPA still used
Hain Celestial Group	Earth’s Best	Epoxy coating on metal cans of “ready-to-feed”	Composite containers	March 2009

Note: Mead Johnson still sells metal cans of “ready-to-feed” Enfamil liquid formula. If this represents old inventory, these products may likely contain BPA and be sold into 2013.

Introduction. In October 2011, the U.S. Food and Drug Administration estimated that 90% of the infant formula packaging was BPA-free. A November 2011 survey of infant formula manufacturers confirmed that 100% of the new packaging for canned infant

formula (both liquid and powder) was BPA-free.¹⁵ The Vermont Department of Health identified 25 infant formula products that were available in the United States in BPA-free containers as of October 2011.¹⁶

(Note: These estimates are for *newly manufactured* packaging. Old inventory of infant formula in metal cans containing BPA may be sold for up to two years after the BPA phase-out date, given product shelf life and profit motive).

In 2008, the manufacturers' infant formula market share in the United States (and their brand name products) was 43 % for Abbott (Similac), 40% for Mead Johnson (Enfamil), 15% for Nestlé (Gerber), and less than 2% for Perrigo/PBM Nutritionals, which sells many store brands on private labels.¹⁷ Hain's market share (Earth's Best) was not reported.

A. BPA-Free Alternatives for Infant Formula are AVAILABLE

1. Abbott (Similac)

On September 27, 2011, Abbott Laboratories publicly announced that: "it has now achieved "BPA-free" status for all of its Similac brand. No BPA was used in the manufacturing of these containers."¹⁸ Abbott told the Maine Department of Environmental Protection: "In response to your request for an inventory of Abbott infant formula packaged in containers utilizing BPA, we submit: Our complete line of Similac® infant formula products in the U.S. is manufactured using "BPA free" packaging. Abbott's final conversion of product took place on October 1, 2011. No Bisphenol A (BPA) is used in the manufacturing process for the packaging. The safety of our products, including the ingredients used to make them and the packaging in which they are contained, remain a top priority of Abbott."¹⁹

¹⁵ Congressman Edward J. Markey (2012). Re: Petition Seeking Amendment to Food Additive Regulations to Remove Approval for the Use of Bisphenol A in Infant Formula and Baby and Toddler Food Packaging. U.S. Food and Drug Administration. Letter to Dr. Francis Lin, Director of Food Contact Notifications Review, Office of Food Additive Safety, Center for Food Safety and Applied Nutrition, U.S. Food and Drug Administration. March 16. <http://markey.house.gov/sites/markey.house.gov/files/documents/03-16-12%20BPA%20petition%20infant%20formula%20and%20baby%20food%5B1%5D.pdf> (accessed May 3, 2012).

¹⁶ Bister D and Chen H (2012). Report on Bisphenol-A Free Infant Formula Containers. Vermont Agency on Human Services, Department of Health. Report to the Vermont Legislature. January 15. <http://www.leg.state.vt.us/reports/2012ExternalReports/274796.pdf> (accessed May 2, 2012).

¹⁷ Oliveiri O, Frazão E and Smallwood D (2011). The Infant Formula Market: The Consequences of a Change in the WIC Contract Brand. Economic Research Service, United States Department of Agriculture. Economic Research Report Number 124. August. pp. 6-7. <http://www.ers.usda.gov/Publications/ERR124/ERR124.pdf> (accessed May 2, 2012).

¹⁸ Abbott Laboratories (2011). Abbott reports on BPA-free status of infant formula products. Press Release. <http://abbottnutrition.com/news/pressReleaseDetail.aspx?ContentTitle=abbott-leads-by-achieving-bpa-free-status-for-its-infant-formulas&year=2011> (accessed May 2, 2012).

¹⁹ Dale R. Johnson, Divisional Vice President, State Government Affairs, Abbott Laboratories. Letter of October 3, 2011 to Maine Department of Environmental Protection.

Some Abbott infant formulas are packaged in polypropylene containers.²⁰ Their “ready-to-feed” liquid infant formulas are now commonly sold in plastic containers made of high density polyethylene.²¹ No Similac infant formula was being sold in metal cans.¹⁵

Abbott Laboratories failed to submit a BPA use report or alternatives assessment for its BPA-containing infant formula sold after January 9, 2011. As a result, on May 29, 2012 the Maine Department of Environmental Protection concluded that: “Abbott is not in compliance with Maine Law” and requested both reports within thirty days.²²

2. Mead Johnson (Enfamil)

In response to Maine’s chemical use reporting rule for intentionally-added BPA, Mead Johnson reported in October 2011 that the packaging of their Enfamil brand infant formula sold in Maine in 2010 contained BPA in an amount greater than the practical quantification limit (PQL) and less than 100 parts per million. They also provided additional information stating that: “MJN has stopped manufacturing with package material that is required to be reported under this regulation. This report includes only product manufactured prior to that change (i.e., using 2010 full year sales data).”²³

Mead Johnson appears to be the only infant formula manufacturer that stills sell “ready-to-feed” infant formula in metal cans.^{15,24} This metal packaging may contain BPA, representing old inventory manufactured before October 2011. Two cans observed were stamped with instructions to “Use by 1 April 2013” and “Use by 1 July 2013,” which may be consistent with old inventory with a two-year shelf life.

The company failed to submit an alternatives assessment as required by Maine’s BPA rule, and has not provided any information suggesting a switch to an alternative BPA-free coating for continued use of metal cans. On May 29, 2012, Maine DEP formally requested submission of an alternatives assessment within thirty days, concluding that: “Mead Johnson is not in full compliance with Maine Law.”²⁵

Mead Johnson now sells “ready-to-feed” infant formula in polypropylene bottles.²⁴ The

²⁰ Graham Packaging Company (2008). Press release. Graham Packaging wins Supplier Excellence Award from Abbott. <http://investors.grahampackaging.com/phoenix.zhtml?c=122981&p=irol-newsArticle&ID=1390637&highlight=> (accessed May 14, 2012).

²¹ Personal observation. Field trip to Walmart. Bangor, Maine (visited May 16, 2012).

²² Kerri Malinowski, Safer Chemicals Program Coordinator, Maine Department of Environmental Protection. Letter of May 29, 2012 to Dale R. Johnson, Divisional Vice President, Abbott Laboratories.

²³ Craig Hadley, Mead Johnson & Company, LLC. October 3, 2011 Reporting Submission for Infant Formula and Baby Food Containers containing intentionally added BPA (Ch 882 § 4-A) to Maine Department of Environmental Protection.

²⁴ Personal observation. Field trip to Hannaford. Old Town, Maine (visited May 18, 2012).

²⁵ Kerri Malinowski, Safer Chemicals Program Coordinator, Maine Department of Environmental Protection. Letter of May 29, 2012 to Craig Hadley, Mead Johnson & Company, LLC.

paperboard packaging for a six-pack of these bottles was labeled “NEW!” suggesting that this is the BPA-free alternative packaging the company referred to in its letter to DEP.

3. Nestlé (Gerber)

In September 2011, Nestle-Gerber introduced new Tetra Pak brand aseptic cartons, which are manufactured without BPA, for its concentrated liquid and “ready-to-feed” infant formula.²⁶ The company also announced that: “there is no BPA in cans used to package Nestle GOOD START Supreme Milk and Soy based powdered infant formulas, which account for more than 80% of the type of infant formula we sell.”²⁷

In response to Maine’s BPA chemical use reporting rule, Nestlé Infant Nutrition/Gerber Products Company wrote that it “committed over three years ago to use only packaging made without BPA as soon as technically feasible for all our infant and toddler products, including infant formula and baby food. As a result of extensive efforts, including \$20 million in capital expenditures and investment, Nestlé Infant Nutrition has fully implemented packaging made without BPA for our entire Gerber portfolio. ... These efforts are an integral part of our mission to deliver safe and nutritious products to all consumers.”²⁸

In a recent site visit, all Gerber “ready-to-feed” infant formula was sold in an aseptic container; none was sold in metal cans.¹⁵ Gerber’s powdered infant formula was sold in a plastic container made of high density polyethylene.¹⁵

4. Perrigo (Parent’s Choice, Babies “R” Us)

Perrigo, through its subsidiary PBM Nutritionals, is the world’s largest supplier of private-label or store-brand infant formula and children’s nutrition products, with distribution at Walmart, Sam’s Club, Target, CVS, Walgreens, Babies “R” Us and elsewhere.²⁹ The company reported in January 2012 that it “does not currently use BPA in the packaging for baby foods in the United States.”³⁰ However, PBM later clarified that although it sells many types of children’s products in Maine within dozens of BPA-free packages, including infant formula, BPA is still used in the packaging for three products: a liquid “ready-to-feed”

²⁶ Nestlébaby. Packaging Update! Web site. http://www.nestle-baby.ca/en/products/formula/starter/good_start.htm (accessed May 2, 2012).

²⁷ Nestlé/Gerber (2011). Press release. *Quoted in* Footnote 1, p. 5 and on web site: <http://www.experts123.com/q/which-nestle-good-start-infant-formulas-are-bpa-free.html> (accessed May 3, 2012).

²⁸ Cheryl A. Callen, Director of Regulatory Affairs, Nestlé Infant Nutrition. Letter of September 30, 2011 to Maine Department of Environmental Protection.

²⁹ PBM Nutritionals. Web site. <http://www.pbmproducts.com/about-us.aspx> (accessed May 14, 2012).

³⁰ Cynthia M. Barber, Vice President, Regulatory, Medical and Clinical Affairs, PBM Nutritionals, LLC. Letter of January 3, 2012 to Kerri Malinowski, Maine Department of Environmental Protection.

infant formula and two pediatric nutritional drinks.³¹ (The pediatric drinks are discussed under “Toddler Food” below, since they are marketed to children age 1 to 10).³²

In its liquid “ready-to-feed” formula sold under two brand names - Parent’s Choice (sold at Walmart) and Babies “R” Us, PBM uses BPA to coat the exterior of a metal disk on the plastic cap to the plastic bottle.³³ In the alternatives assessment required under Maine’s BPA rule, the manufacturer of this cap, Crown Cork and Seal,³⁴ indicated that a BPA-free alternative coating is now available: “Polyester,” which “is ready for implementation” on a time frame that’s “immediate,” and that “[T]he alternative meets the threshold of performance acceptability.”³⁵ No date was provided by which the company would switch to the BPA-free alternative, nor was the shelf life of current inventory provided.

5. Hain Celestial (Earth’s Best)

Hain told the Maine Department of Environmental Protection that: “We have invested extensive resources to proactively remove Bisphenol-A (BPA from packaging intended for use in children’s products ... We converted to BPA-free canisters for our *Earth’s Best Organic*® infant formula products in March 2009.”³⁶ For its infant formula, Hain converted from steel cans to composites, which are BPA-free.³⁷ Presumably, the composites are a layered aseptic container similar to or the same as manufactured by Tetra Pak.

B. BPA-Free Alternatives for Infant Formula are SAFER

Summary. The vast majority of the infant formula sold today, probably between 79% and 99%,³⁸ is packaged with BPA-free safer alternatives (see Table 3). Safer alternative

³¹ Mark E. Spitzley, Senior Legal Counsel, PMB Nutritionals, LLC. Letter of March 22, 2012 to Kerri Malinowski, Maine Department of Environmental Protection.

³² PBM Nutritionals. Web site. <http://www.pbmproducts.com/pediatric-nutritionals.aspx> (accessed May 14, 2012).

³³ PBM Nutritionals, A Perrigo Company. Reporting Submission for Infant Formula and Baby Food Containers containing intentionally added BPA (Ch 882 §4-A). Submitted on March 22, 2012 to Maine Department of Environmental Protection.

³⁴ CJ Woodburn, for PBM Nutritionals. Alternatives Assessment. Enclosed with Letter of March 22, 2012 from Mark E. Spitzley, Senior Legal Counsel, PMB Nutritionals, LLC to Kerri Malinowski, Maine Department of Environmental Protection.

³⁵ CJ Woodburn, for PBM Nutritionals. Alternatives Assessment – Updated April 25, 2012. Enclosed with letter of April 25, 2012 from Mark E. Spitzley, Senior Legal Counsel, PMB Nutritionals, LLC to Kerri Malinowski, Maine Department of Environmental Protection.

³⁶ Gerry F. Amantea, PhD, Vice President, Technical Services, The Hain Celestial Group, Inc. Letter of January 6, 2012 to Kerri Malinowski, Maine Department of Environmental Protection.

³⁷ The Hain Celestial Group (2009). Corporate Social Responsibility Report 2009. p.10. http://www.hain-celestial.com/press/hcg_csr_2009.pdf (accessed May 14, 2012).

³⁸ The low-end estimate of 79%, which is based on reported market share in 2008, assumes that 43% (Abbott) and 15% (Nestlé/Gerber) are BPA-free, and that one-half of Mead Johnson (i.e. 20%) represents sales of old inventory of metal cans containing BPA and one-half of Perrigo/PBM (i.e. 1%) includes current

packaging materials include plastic containers made of polyethylene or polypropylene, and aseptic containers made of thin layers of paperboard, polyethylene and aluminum foil.

Discussion. No infant formula packaging manufactured after October 2011 for sale in the United States contains BPA, except for some “ready-to-feed” bottles with a metal disk in the cap sold by Perrigo/PBM Nutritionals. Some “ready-to-feed” infant formula is still sold in metal cans but that may likely represent old inventory that still contains BPA.

In its incomplete alternatives assessment, PBM Nutritionals reports that a vinyl coating was originally considered for the metal disk on its plastic cap, but this BPA-free alternative didn’t adhere well and was no safer than BPA. They have identified an effective, commercially available polyester coating but have not provided the information required by the BPA rule that’s needed to demonstrate its comparative safety.

Table 3. Summary Evaluation of BPA Alternatives in Infant Formula Packaging

BPA-Free Alternative	Available?	Effective?	Affordable?	Safer?
Polyethylene	YES	YES	YES	YES
Polypropylene	YES	YES	YES	YES
Aseptic composite	YES	YES	YES	YES
Vinyl-based polymer coating for metal disk	YES	NO	YES	NO
Polyester-based polymer coating for metal disk	YES Commercially available	YES Acceptable performance	YES More expensive	UNKNOWN Insufficient information

1. Plastic Containers - Polyethylene and Polypropylene

Polyethylene and polypropylene are commonly used safer alternatives for packaging of infant formula. These materials do not contain chemicals of concern and they reduce the potential for harm to human health and the environment compared to BPA-containers.

For infant formula packaging, the Maine Board of Environmental Protection should use the same reasoning it applied in 2010, when it concluded that polyethylene and polypropylene were safer alternatives to reusable food and beverage containers made from BPA. In 2010, the Board provisionally adopted a rule (later authorized by the Legislature and finally adopted by the Board) to prohibit the sale of reusable food and beverage containers containing BPA on the basis that alternatives were widely available in the market, and that the alternatives were presumed to be safer alternatives because several other states had banned the same products. Among the alternative materials cited at the time were containers made of polyethylene (high density and low density) and polypropylene, which

sales of BPA-based caps. The high-end estimate assumes that Mead Johnson has switched to a BPA-free coating for its metal cans, which is safer alternative that has not yet been disclosed.

are two types of plastics commonly used for food packaging and storage.³⁹

In 2009, Pure Strategies, Inc., a leading sustainability consulting firm, prepared an assessment of alternatives to BPA that, for these alternative materials, concluded:⁴⁰

a. Polyethylene: Polyethylene is a safer alternative to BPA-containing packaging. High Density Polyethylene (HDPE) has a long history of use in one-way containers for milk, juice, water and other beverages. The chemical monomers used to make the polyethylene polymer [CAS Nos. 9002-88-4 and 26221-73-8] include ethylene [CAS No. 74-85-1], hexene [CAS No. 592-41-6] or octene [CAS No. 25377-83-7]. These chemicals and polyethylene itself *passed* a Human Health and Environment screen, which consisted of threshold values for cancer, persistence, bioaccumulation, toxicity and presence of BPA. Neither polyethylene nor its constituent chemicals are Chemicals of High Concern, based on an even more rigorous screen, according to Pure Strategies, Inc. The State of Maine has *not* identified any of these as Chemicals of Concern.⁴¹

b. Polypropylene: Polypropylene is a safer alternative to BPA-containing packaging. It has a long history of use in food containers, such as for yogurt, and as a reusable water bottle alternative. The chemical monomer used to make the polypropylene polymer [CAS No. 9003-07-0] is propylene [CAS No. 115-07-1]. These chemicals *passed* both of Pure Strategies' screens for Human Health and Environment and Chemicals of High Concern. The State of Maine has *not* identified any of these substances as Chemicals of Concern.

2. Aseptic Containers and Paperboard

Aseptic packaging is a safer BPA-free alternative for infant formula packaging. Aseptic containers have been historically used for juices, soups and liquid dairy products. Aseptic containers consist of several layers of paper (about 70% of the package), polyethylene (24%), and aluminum foil (6%).⁴² Tetra Pak is a major manufacturer of aseptic packaging. Paper and forest products are exempt from the definition of consumer product under the Kid Safe Products Act.⁴³ Nonetheless, aseptic packaging does not contain any Chemicals of Concern identified by the State of Maine.

³⁹ Maine Department of Environmental Protection (2010). Basis Statement for Chapter 882: Designation of Bisphenol A as a Priority Chemical and Regulation of Bisphenol A in Children's Products and Safer Chemicals Program Support Document. June 2. pp. 9-10.
http://www.maine.gov/dep/safechem/rules/bisphenol_a_supportdocumentbasisstatement.pdf (accessed May 3, 2012).

⁴⁰ Pure Strategies, Inc. (2009). Bisphenol A (BPA): An Investigation of Alternatives for High Priority Applications. December. Draft prepared for Coming Clean Collaborative.

⁴¹ Maine Department of Environmental Protection (2011). Chemicals of Concern List. Revised December 30.
<http://www.maine.gov/dep/safechem/highconcern/index.html> (accessed May 3, 2012).

⁴² Aseptic Packaging Council (undated). Maximum Benefit, Minimum Waste: The Truth About Aseptic Packaging. <http://infohouse.p2ric.org/ref/27/26415.pdf> (accessed May 3, 2012).

⁴³ 38 M.R.S.A. §1691(8)

3. Metal Packaging with BPA-Free Coating

Historically, metal packaging has been lined with a protective, BPA-based epoxy resin coating that leached the priority chemical into the infant formula. The primary use was in metal cans of “ready-to-feed” liquid infant formula. Far less metal packaging is used for infant formula today. All manufacturers, except Perrigo/PBM, have indicated that no new packaging containing BPA has been manufactured since October 2011.

It’s not completely clear to what extent BPA-containing metal packaging for infant formula is still sold in Maine. Three types of metal packaging for infant formula may still be in use:

- Traditional metal cans for “ready-to-feed” liquid infant formula
- Metal bottoms (and removable tops) for paperboard containers of powdered formula
- Metal disks on plastics caps on plastic bottles for “ready-to-fee” liquid formula

A. Metal Cans

Mead Johnson still sells Enfamil liquid infant formula in steel cans. The company indicated that new manufacturing of BPA-containing packaging ended by October 2011. So these cans represent either old inventory (containing BPA) or a switch to a BPA-free coating. The company failed to file an alternatives assessment as required by Maine’s rule or provide further information to clarify. If they are using a BPA-free coating, no information is available to determine whether it’s a safer alternative to a BPA-based epoxy resin coating.

No other manufacturer appears to be still selling infant formula in metal cans in Maine. However, four of the thirty-two Similac products featured by Abbott Laboratories on their website are described as “cans” with capacities measured in fluid ounces, but the packaging material is not described.¹⁸

B. Metal Bottoms and Tops

Some infant formula powders may still be sold in paperboard containers with a metal bottom and a thin removable metal lid that’s replaced by a plastic lid during use. If so, the metal would be coated to prevent corrosion. (Such containers are commonly used for some dried baby and toddler foods, too). A BPA-free coating has not been disclosed or identified for such containers. None of the infant formula manufacturers submitted alternatives assessments as required, which may have shed light on this question.

C. Metal Disks on Caps

As discussed above, Crown Cork and Seal, the manufacturer of the cap for PBM Nutritionals’ “ready-to-feed” liquid infant formula previously considered an unspecified “vinyl” coating. Presumably, they mean polyvinyl chloride (PVC), although other “vinyl” chemical polymers are possible. PVC is not a safer alternative to BPA-based epoxy because it’s made from two carcinogens (vinyl chloride and ethylene dichloride) and typically

contains many toxic additives from heavy metal stabilizers to phthalate plasticizers.⁴⁴ Equating BPA with PVC would match the description in PBM's partial alternatives assessment: "Under the Green Screen criteria, the priority chemical (BPA) would be considered a benchmark 4 [*sic*] chemical. The alternative chemical would also be considered a benchmark 4 [*sic*] chemical."³³ Actually, the company's assessment is in error: BPA and PVC would both score as Benchmark 1 in the GreenScreen, with a recommended action at this level to "Avoid – Chemical of High Concern" (*not* as Benchmark 4: "Prefer – Safer Chemical").⁴⁵

PBM also reported that Crown has identified a commercially viable, BPA-free "polyester" coating that's immediately ready for implementation to replace the BPA-based epoxy coating currently used on the metal disk in their plastic cap. PBM has indicated its intent to initiate replacement of its BPA-based epoxy coating with the new polyester coating for this "ready-to-feed" formula container, but no timetable was provided.

"Polyester" is a generic term for a broad family of polymers that all contain a repeating ester functional group in a carbon chain. (An "ester" is chemical compound that includes a carbon atom that's double-bonded to an oxygen atom and single-bonded to another oxygen atom, which is connected to a second carbon atom). Whether a polyester polymer coating is a safer alternative to a BPA-based epoxy polymer depends of the specific chemical constituents of and additives to the polyester polymer. Some polyesters will be safer alternatives or as safe as BPA. Other polyesters will not be safer alternatives to BPA. More information is needed to assess the comparative hazards of this polyester alternative in relation to BPA-based epoxy polymers.

Although Perrigo/PBM is one of the few manufacturers to respond, their alternatives assessment is neither complete nor acceptable because it does not "identify the specific chemical ... alternative" or "evaluate the human health and environmental hazard posed by each chemical alternative," as required by the Maine rules.

Insufficient information is available to determine whether this "polyester" coating is a safer alternative to the BPA-based epoxy resin coating it aims to replace.

⁴⁴ Affidavit of Judith Schreiber, Public Health Scientist, New York Office of Attorney General in the matter of Resilient Floor Covering Institute vs. New York State Department of Environmental Conservation (2003). http://www.healthybuilding.net/pvc/NYS_vinyl_affidavit_js.pdf (accessed June 6, 2012).

⁴⁵ Clean Production Action. The GreenScreen™ for Safer Chemicals. v. 1.2. Web site. <http://www.cleanproduction.org/Greenscreen.php> (accessed May 22, 2012).

V. BPA in BABY FOOD – Safer Alternatives are Available

Summary. For BPA-based packaging for baby food, the evidence demonstrates that “one or more safer alternatives to the priority chemical are available at comparable cost,” which meets the criterion to support a prohibition on the sale of baby food containing BPA under Maine law and regulation. Safer alternatives to BPA in baby food containers are now widely available at comparable cost (see Table 4). About two-thirds of the prepared baby food on store shelves is already packaged in BPA-free plastic containers or laminated pouches made of plastic, paperboard and aluminum foil. All of these containers are available, effective and affordable. In a comparative chemical hazard assessment, the constituents of the materials in these containers are safer alternatives to BPA.

Two of the seven baby food manufacturers identified never used BPA-based packaging. Only one of the seven still uses BPA in the packaging for its newly manufactured baby food.

Table 4. Almost all Manufacturers Sell Baby Food in BPA-Free Packaging

Company	Brand	BPA Use	Available BPA-Free Safer Alternatives	New uses of BPA ended by:
Nestle	Gerber	Epoxy coating on metal lids of glass jars	Plastic containers Laminated pouches	October 2011 but <i>old</i> jars with BPA lids still sold
Hero	Beech-Nut			
Hain Celestial	Earth’s Best			
Danone (Stonyfield)	YoBaby	<i>Never used BPA</i>	Plastic containers	-
Initiative Foods	Wild Harvest Full Circle Healthy Times	Epoxy coating on metal lids of glass jars	NONE	Still uses BPA
Sprout Foods	Sprout	<i>Never used BPA</i>	Laminated pouches	-
PBM Nutritionals	Parent’s Choice	???	Plastic containers	???

BPA leaches into baby food from the epoxy resin coating on the metal lids of glass jars. Three of the four companies that sell some baby food in glass jars with metal lids, representing 89% of the prepared baby food market, no longer manufacture new baby food containers with BPA, as of October 2011. However, they continue to sell old BPA-containing inventory, taking advantage of a two-year shelf life. Only one laggard, representing less than 2% of the market, has not ended its use of BPA on new metal jar lids.

In addition to using BPA-free plastic containers and laminated pouches, the top manufacturers are also packaging new baby food with a BPA-free polymer coating on the metal lids of glass jars. However, they have failed to meet their obligation to submit

acceptable alternatives assessments that provide information sufficient enough to determine whether the new polymer coatings on the metal lids are truly safer alternatives to BPA-based epoxy coatings.

Introduction. Functionally, the BPA-based epoxy coating serves to protect the steel substrate of the lid from corrosion during the shelf life of the product. According to Crown Cork and Seal, which supplies metal caps used for glass jars to package baby food products:

The outside (non-food contact surface) top of the cap is steel covered with a 3-layer coating system. All three layers contain the priority chemical, BPA. The inside of the cap (food contact surface) has 2-3 layers of coating. The base coat of the 2-layer system contains the priority chemical BPA. The base coat and middle coat of the 3-layer system contains the priority chemical BPA. BPA is not intentionally added to the top coat (actual food contact surface) used with either the 2 or 3 layer interior system.⁴⁶

In 2008, the market share for prepared baby food (by brand name) was 73% for Gerber, 11% for Beech-Nut, 9% for Stonyfield, 5% for Earth's Best and 2% for Nature's Goodness.⁴⁷ TreeHouse Foods, which sold Nature's Goodness baby food at Walmart and other mass food outlets, discontinued the brand in December 2010, but may still be in production for the private-label market as a contract manufacturer. Initiative Foods is now the largest distributor of private-label or store-brand baby food, selling in Maine, for example, under the Wild Harvest brand at Shaw's.

A. BPA-Free Alternatives for Baby Food are AVAILABLE

1. Nestlé (Gerber)

As discussed above for infant formula, as of October 2011, all Gerber baby food products that are newly manufactured for sale in the United States are packaged in BPA-free containers, including glass jars with metal lids.²⁸ However, old inventory of BPA-based baby food jars may continue to be sold for up to two years, resulting in continued infant exposure to BPA.

Gerber now packages much of the same varieties of baby food in both glass jars and plastic containers. Its plastic packaging is not labeled with a recycling code to identify which commodity resin is used. Reportedly, their plastic containers consist of a composite blend, with an inner layer of polyethylene in contact with the baby food, and an outer layer of

⁴⁶ Sandra Miller, Regulatory Affairs & Analytical Services, Crown Packaging Technology, Inc. Letter of April 2, 2012 to John Ypma, President, Initiative Foods, LLC. Submitted to Maine Department of Environmental Protection.

⁴⁷ Chen V (2009). The Evolution of the Baby Food Industry: 2000-2008. Working Paper No. 297. Bureau of Economics, Federal Trade Commission. April. <http://www.ftc.gov/be/workpapers/wp297.pdf> (accessed May 14, 2012).

polystyrene.⁴⁸

Other Gerber baby foods are packaged in paperboard containers with metal bottoms, in high density polyethylene plastic containers, or in laminated pouches manufactured by Cheer Pack NA. The Cheer Pack pouch consists of a polyester outer layer, middle layers that may include nylon or aluminum foil, and an inner layer of polyethylene or polypropylene, which is in contact with the food.⁴⁹ No BPA or phthalates are used to make Cheer Pack pouches.⁵⁰

On April 2, 2012, the Maine Department of Environmental Protection issued a Letter of Warning to Nestle / Gerber, citing their non-compliance with Maine law for failing to report its BPA use and failing to submit an assessment of BPA alternatives.⁵¹ The company was required to submit the documents to attain compliance within thirty days of receipt of the warning letter.

Gerber submitted an alternatives assessment as required by Maine's BPA rule on May 4, 2012 but claimed the submission to be confidential.⁵² They have not publicly disclosed the chemical identity or hazards associated with its alternative BPA-free polymer coating for the metal lids on its glass jars of baby food. On June 14, 2012, DEP issued a Notice of Violation to Nestlé/Gerber for its failure to submit a complete and acceptable alternatives assessment.¹¹

However, one of Gerber's competitors, Initiative Foods, asserts that Crown Packaging Technology, a major supplier of metal lids for baby food jars: "describes a commercially available alternative which is used by Gerber ... it is 'polyester'. We have been told by Crown that this compound also includes Melamine."⁵³ A possible polyester-melamine polymer coating is evaluated in the next section on the safety of alternatives.

2. Hero (Beech-Nut)

According to a certified statement by this company: "As of October 20, 2011, Beech-Nut does not use containers or lids that contain intentionally added BPA to package its baby

⁴⁸ Safe Mama (2008). Gerber Baby Food and Number 7 Plastics. Web site. February 26. <http://safemama.com/2008/02/26/gerber-baby-food-and-number-7-plastics/> (accessed May 23, 2012).

⁴⁹ Cheer Pack North America. Web site. <http://www.cheerpack.com/index.html> (accessed May 23, 2012).

⁵⁰ Cheer Pack North America. Packaging Options. Web site. <http://www.cheerpack.com/packaging-options.html> (accessed May 23, 2012).

⁵¹ Kerri Malinowski, Maine Department of Environmental Protection. Letter of Warning. Letter of April 2, 2012 to Cheryl Callen, Director, Regulatory Affairs, Nestle Nutrition, Gerber Products Company.

⁵² Cheryl A. Callen, Director Regulatory Affairs, Nestle Infant Nutrition & Performance Nutrition. Email message of May 4, 2012 to Kerri Malinowski, Maine Department of Environmental Protection.

⁵³ John Ypma, President, Initiative Foods, LLC. Email message of April 3, 2012 to Kerri Malinowski, Maine Department of Environmental Protection.

foods ...”⁵⁴ While this is a positive achievement, old inventory of glass baby food jars with a BPA-based coating on metal lids may continue to be sold for up to two years, resulting in ongoing exposure of babies to BPA.

Beech-Nut’s BPA-free packaging sold today includes the laminated foil pouch manufactured by Cheer Pack (discussed above), a demonstrably safer alternative.

Beech-Nut was issued a Letter of Warning on February 21, 2012 for its failure to submit a BPA use report and an alternatives assessment as required by the BPA rule.⁵⁵ Although the company’s response confirmed sale of baby food packaged with BPA-based metal lids,⁵⁶ the Department had to request an alternatives assessment for a second time on April 19, 2012.⁵⁷

On May 23, 2012, Beech-Nut Nutrition Corporation, a subsidiary of Hero AG, finally submitted an alternatives assessment as required by Maine’s BPA rule,⁵⁸ but the document was withheld from the public as confidential. An acceptable evaluation would indicate whether the company now sells a glass baby food jar with a BPA-free coating for its metal lid and, if so, which chemicals are used in the alternative coating, and whether they are truly safer.

On June 14, 2012, Maine DEP issued a Notice of Violation to Beech-Nut Nutrition Corporation for its failure to submit a complete and acceptable alternatives assessment.¹¹

3. Danone (Stonyfield)

In the last decade NH-based Stonyfield, now owned by food giant Danone, gained a significant market share with its YoBaby brand of prepared baby food. The product appears to have never been packaged in any BPA-based containers.

Instead, Stonyfield has used two types of plastic containers for its packaging, both of which are demonstrably safer alternatives to BPA. These are polypropylene and polylactic acid (PLA), the biodegradable plastic derived from corn starch.

⁵⁴ James R. Schneider, President/Chief Executive Officer, Beech-Nut Nutrition Corporation. Letter of February 15, 2012 to Kerri Malinowski, Maine Department of Environmental Protection.

⁵⁵ Kerri Malinowski, Safer Chemicals Program Coordinator, Maine Department of Environmental Protection. Letter of Warning of February 21, 2012 to James R. Schneider, President, Beech-Nut Nutrition Corporation.

⁵⁶ James R. Schneider, President/Chief Executive Officer, Beech-Nut Nutrition Corporation. Reporting Submission for Infant Formula and Baby Food Containers containing intentionally-added BPA (Ch 882 § 4-A). Attachment to Letter of March 14, 2012 to Kerri Malinowski, Maine Department of Environmental Protection.

⁵⁷ Kerri Malinowski, Safer Chemicals Program Coordinator, Maine Department of Environmental Protection. Letter of April 19, 2012 to James R. Schneider, President, Beech-Nut Nutrition Corporation.

⁵⁸ Shen-Youn Chang, Ph.D., VP Technical Services, Beech-Nut Nutrition Corporation. Email message of May 23, 2012 to Kerri Malinowski, Maine Department of Environmental Protection.

4. Hain Celestial (Earth's Best)

Some of Earth's Best baby food is packaged in laminated pouches (made by Cheer Pack), which include a polyester outer layer, aluminum foil and a polyethylene inner layer and cap. This container provides a demonstrably safer alternative to BPA for baby food.

Regarding the metal lids of glass jars, Hain Celestial stated: "effective October, 2011, all of our *Earth's Best Organic*® jarred baby foods are already being manufactured utilizing a polyester primer/vinyl top coat, non-BPA intent closure lidding material ... *Earth's Best Organic*® jarred baby food products have a two year shelf-life."⁵⁹

On February 21, 2012, the Maine Department of Environmental Protection issued a Letter of Warning to Hain Celestial that cited the company for non-compliance for its failure to report BPA use and its failure to evaluate alternatives to BPA, and which required correction within thirty days of receipt of this letter.⁶⁰ After the company disputed these requirements⁵⁵, Maine DEP responded on April 19 stating: "Currently, Hain Celestial is not in compliance with Maine law."⁶¹ For a second time, DEP requested submission within thirty days of the BPA use report and alternatives assessment.

On May 22, 2012, Hain Celestial finally submitted an alternatives assessment, as required by Maine's BPA rule, which is supposed to provide sufficient information to determine the relative safety of its alternative lid coating.⁶² However, on June 14, 2012, Maine DEP issued a Notice of Violation to Hain Celestial for its failure to submit a complete and acceptable alternatives assessment.¹¹

The relative safety of a BPA-free polyester / vinyl-based coating for metal lids, which the company reportedly uses, is discussed in the section below on safety of alternatives.

5. Initiative Foods (Wild Harvest)

California-based Initiative Foods LLC makes premium organic and conventional baby food for private label store brands, including Wild Harvest (sold in Maine at Shaw's), Full Circle and Healthy Times. After Initiative Foods reported late on its use of BPA in the metal lids of

⁵⁹ Gerry F. Amantea, PhD, Vice President, Technical Services, The Hain Celestial Group, Inc. Letter of April 9, 2012 to Kerri Malinowski, Maine Department of Environmental Protection.

⁶⁰ Kerri Malinowski, Safer Chemicals Program Coordinator, Maine Department of Environmental Protection. Letter of Warning of February 21, 2012 to Gerry F. Amantea, PhD, Vice President, Technical Services, The Hain Celestial Group, Inc.

⁶¹ Kerri Malinowski, Safer Chemicals Program Coordinator, Maine Department of Environmental Protection. Letter of April 19, 2012 to Gerry F. Amantea, PhD, Vice President, Technical Services, The Hain Celestial Group, Inc.

⁶² Gerry F. Amantea, PhD, Vice President, Technical Services. Letter of May 22, 2012 to Kerri Malinowski, Safer Chemicals Program Coordinator, Maine Department of Environmental Protection.

glass jars of its baby food,⁶³ Maine DEP requested that they submit an assessment of alternatives to BPA in its baby food packaging, stating: “Currently, Initiative is not in full compliance with Maine law.”⁶⁴ Initiative submitted additional information on alternatives to BPA-based coatings on metal lids from its exclusive cap maker dated April 2, 2012.⁶⁵

The information provided by Initiative’s exclusive metal cap supplier, Crown Packaging Technology (also known as Crown Cork and Seal), indicates that at the time the metal cap was first introduced, a vinyl coating was considered and rejected as an alternative to BPA-based epoxy coating. The vinyl coating, which was confirmed in email correspondence to be polyvinyl chloride (PVC),⁶⁶ did not properly adhere to the cap and was rejected for poor performance.

Initiative Foods reported that Crown, its packaging vendor identified one BPA-free coating that is available now (so-called Gen 1) and another BPA-free coating that is still under development (so-called Gen 2).⁶³

Initiative/Crown describe the Gen 1 substitute as “polyester” with “melamine.” (Melamine, a nitrogen-based cyclic compound, can be polymerized to form a plastic coating itself and can also be used as a “cross-linker” additive that chemically bonds to the primary polymer to enhance its technical properties). Reportedly, this alternative is commercially available now and being used on Gerber lids. The increased cost of the Gen 1 coating relative to the BPA-based epoxy coating is about 1 cent per lid (or about a 25% increase in the cost of the lid, which represents about a 1% to 2% increase in the cost of the final product).

The Gen 2 BPA-free alternative lid coating, “which is being tested now,” was only described as “polyester” without the use of melamine. No further chemical identity information was provided. The company indicated that: “The due date for Gen 2 is unknown at present as the testing required includes a time component to be certain the cap is effective during the life of the product of at least 2 years.”

6. Sprout Foods

Sprout Foods sells baby food in a BPA-free laminated pouch that uses a polypropylene inner layer (in contact with food), foil and an unspecified outer layer of plastic.

⁶³ John Ypma, President, Initiative Foods LLC. Letter of February 16, 2012 to Maine Department of Environmental Protection, with attached Reporting Submission for Infant Formula and Baby Food Containers containing intentionally-added BPA (Ch 882 § 4-A).

⁶⁴ Kerri Malinowski, Safer Chemicals Program Coordinator, Maine Department of Environmental Protection. Letter of February 24, 2012 to John Ypma, President, Initiative Foods LLC.

⁶⁵ Sandra Miller, Regulatory Affairs & Analytical Services, Crown Packaging Technology, Inc. Letter of April 2, 2012 to John Ypma, Initiative Foods LLC.

⁶⁶ John Ypma. Email of April 25, 2012 to Kerri Malinowski. Subject: FW: Maine questions for Initiative Foods– REVIEW. Attachments: Emails of April 25, 2012 from Galen German to John Ypma, and April 23, 2012 from John Ypma to Brian Schuler and Terry Zeik.

7. PBM Nutritionals

PBM Nutritionals sells some baby food in plastic containers made of high density polyethylene (HDPE), a common BPA-free plastic.

B. One or More BPA-Free Alternatives for Baby Food are SAFER

Several safer alternatives to BPA-based packaging are available at comparable cost today for baby food. The demonstrably safer alternatives include plastic containers made of polyethylene, polypropylene or polylactic acid, and laminated pouches made of layers of similar plastics, aluminum foil and paperboard (see Table 5).

1. Plastic Containers – Polyethylene and Polypropylene

Plastic containers that made of polyethylene or polypropylene are demonstrably safer alternative to BPA-based packaging. See discussion and documentation in Section IV above under Infant Formula.

Table 5. Safer Alternatives to BPA in Baby Food Packaging are Widely Available

BPA-Free Alternative	Available?	Effective?	Affordable?	Safer?
Polyethylene container	YES	YES	YES	YES
Polypropylene container	YES	YES	YES	YES
Polylactic acid container	YES	YES	YES	YES
Laminated pouches	YES	YES	YES	YES
Other plastic containers	YES	YES	YES	UNKNOWN

2. Plastic Containers – Polylactic Acid (PLA)

PLA, the first of a new generation of bio-based plastics, is a type of polyester made from renewable feedstocks rather than petroleum. It is made from starches or sugars, which are fermented to produce lactic acid, a food grade commodity substance. In a two-step process, lactic acid is converted to lactide, which is then polymerized to produce polylactic acid. No Chemicals of Concern identified by the State of Maine are used in the manufacturer of PLA. In an analysis that concluded that PLA was a safer alternative to the petroleum-based polyester known as polyethylene terephthalate (PET), lactic acid and lactide, the monomers used to make PLA, were scored at Benchmark 3 under the GreenScreen.⁶⁷ Bisphenol A, however, was scored as a Benchmark 1 chemical, which is “to be avoided” as

⁶⁷ Rossi M and Franjevic S (2009). Environmental and Human Health Assessments of PET and PLA from Cradle to Gate. Clean Production Action. Prepared for the Maine Sustainable Bioplastics Cluster Enhancement Project. March 15.

the highest hazard ranking under the GreenScreen.² Therefore, PLA is a demonstrably safer alternative than BPA-based packaging for baby food.

3. Laminated Pouches

As discussed above, the laminated pouch manufactured by Cheer Pack is made of inherently safe materials than BPA-based packaging, including polyethylene as the food contact surface. See also, a similar analysis for the laminated layers of Tetra Pak aseptic packaging discussed under Infant Formula in Section IV above. This is a demonstrably safer alternative for baby food packaging than BPA-based epoxy resin coatings.

C. Failure to Disclose Information on BPA-Free Metal Lid Coatings

As of June 14, 2012, none of the baby food manufacturers had fully complied with Maine law and the BPA rule, which requires submission of an evaluation sufficient to characterize the safety of the alternatives to the continued use of BPA. See the compliance discussion in Section III above.

Three of the four manufacturers that still sell baby food in glass jars have switched to a BPA-free coating on the metal lids of the container. However, they have not provided the specific chemical identity or chemical constituents of the polymer coating. As a result, there is insufficient information to characterize the safety of the BPA-free lid coatings.

Table 6 summarizes the state of public knowledge regarding the alternative BPA-free lid coatings, based on the very general or indirect information that manufacturers provided to the State of Maine. Contrary the Maine law, not enough information has been provided to characterize the safety of the alternatives relative to BPA-based epoxy coatings.

Table 6. BPA-Free Alternatives for Metal Lids Have Not Been Fully Characterized

Company (Brand) that Uses	BPA-Free Polymer Coating on Metal Lids	Available?	Effective?	Safer?
none	Polyvinyl chloride (PVC)	YES	NO	NO
Nestlé (Gerber)	Polyester with melamine	YES	YES	UNKNOWN
Hero (Beech-Nut)	UNKNOWN	YES	YES	UNKNOWN
Hain Celestial (Earth's Best)	Polyester (primer) and Vinyl (topcoat)	YES	YES	UNKNOWN
none	Polyester without melamine	NOT YET	NOT YET	UNKNOWN

VI. BPA in TODDLER FOOD – Safer Alternatives are Available

Toddler food is intended for or intentionally marketed for use by children under the age of three, but does not include infant formula or baby food. Manufacturers of toddler food were not required to report the use of BPA in packaging when Maine's BPA rule was first adopted in 2010. Therefore, limited information is available to characterize the use of BPA in toddler food. Also, the market for toddler food appears more fragmented and less defined than for infant formula or baby food. Therefore, it's not as readily possible to identify all of the manufacturers of toddler food and the brand name products they sell.

Food *intended* for toddlers includes a variety of foods with packaging or a product label that specifically indicates the food is for toddlers or older babies. Food intended for toddlers also includes pediatric nutritional drinks, which are liquid formula intended for children aged 1 to 10 years.

Food *intentionally marketed* to toddlers includes canned foods with labels and packaging that's marked with popular animated characters, e.g. Dora the Explorer or SpongeBob SquarePants, from television shows or movies whose target audience is preschoolers, which includes toddlers. These images are used to intentionally market canned food for use by toddlers.

A. One or More Safer Alternatives are Available for Toddler Food

Based on an informal retail survey, and the analysis above on infant formula and baby food, one or more safer alternatives to BPA-based packaging for toddler food are readily available at comparable cost (see Table 7). Much of the food intended for toddlers is packaged in containers similar to those used for prepared baby food. These include plastic containers, aseptic laminated containers, and some glass jars with metal lids (although the latter are used less frequently than for baby food). Pediatric nutritional drinks (PNDs) are a unique liquid formula intended for children from ages 1 to 10 years old.⁶⁸ PNDs are typically packaged in plastic bottles with metal disks in a plastic cap, and in aseptic cartons. Some canned foods are also intentionally marketed to toddlers, although many of the same foods are available in alternative packaging such as aseptic cartons.

⁶⁸ Abbott Laboratory (2005). Pediatric nutritionals enjoy generations of growth. *Abbott World*. May. p.13. <http://marthaoconnell.com/PDFs/ABTPediatricNutritionals.pdf> (visited June 11, 2012).

Table 7. Safer BPA-Free Alternatives are Available for all Toddler Food

Toddler Food	Product Type	Use of BPA	Safer Alternatives
INTENDED for Use by Children Under Age Three	The package or label says for toddlers or older babies	Epoxy coating of metal lids on glass jars	Plastic containers Aseptic cartons Laminated pouches Paperboard containers
	Soy-based Pediatric Nutritional Drinks	Epoxy coating of aluminum cans	Plastic bottles
	Milk-based Pediatric Nutritional Drinks	Epoxy coating of metal disk on plastic cap of plastic bottle	Aseptic cartons Plastic bottles
INTENTIONALLY MARKETED for Use by Children Under Age Three	Canned foods labeled with cartoon characters that target preschooler audience	Epoxy coating of steel cans and tops	Plastic containers Aseptic cartons Paperboard containers Fresh or frozen food

B. BPA-Free Alternatives for Pediatric Nutritional Drinks (PNDs)

BPA has been used in the packaging for at least some pediatric nutritional drinks (PNDs), which are intended for toddlers as well as older children (see Table 8). Milk-based PNDs are packaged in a plastic bottle, typically made of polypropylene. However, the plastic cap often has a metal disk that has been coated with a BPA-based epoxy resin. One company sells a soy-based PND that’s packaged in an aluminum can lined with BPA-based epoxy.

Table 8. Alternatives to BPA-Based Packaging for Some Pediatric Nutritional Drinks

Company	Brand	Base	BPA Use	Available BPA-Free Alternatives
Abbott	PediaSure	Milk	Not reported	Plastic bottle Aseptic carton
Perrigo / PBM Nutritionals	Home 360 Parent’s Choice Baby Basics	Milk	Exterior coating on metal disk in plastic cap	Polyester coating on metal cap
	Parent’s Choice Bright Beginnings	Soy	Inner coating of aluminum can	Plastic bottle

Information on BPA use in PNDs became publicly available when Perrigo Company, through its subsidiary PBM Nutritionals, reported its BPA use to the Maine Department of Environmental Protection after the company was asked to comply with the reporting requirement for BPA use in infant formula and baby food.⁶⁹ The company reported that it currently “does not use BPA in the packaging for baby foods in the United States.” But “With respect to **toddler foods**, Perrigo manufactures a soy liquid nutritional drink (Soy PND) that is currently packaged in an aluminum can made with BPA.”³⁰ (emphasis added).

Soy-Based PNDs. PBM has documented exposure of toddlers to BPA from its product. PBM disclosed laboratory analyses of three samples of its soy-based PND that confirmed the presence of BPA directly in the toddler food. The concentration of BPA in the soy-based drink ranged from 9.84 parts per billion (ppb) to 14.2 ppb.⁷⁰

PBM initially identified a safer alternative to the continued exposure of toddlers to BPA from its soy-based pediatric nutritional drink. In December 2011, PBM told Maine DEP that the company “is in the process of transitioning this product into an improved 8 oz. plastic bottle, not made with BPA.”⁷¹ The company further stated that: “This represents a more expensive package and we may not be able to afford the transition for this product.” However, the company failed to provide an alternatives assessment, which must include an evaluation of the cost to the consumer of the safer alternative, as required by Maine law.

In December 2011, Maine DEP issued a Letter of Warning to PBM Nutritionals for its failure to comply with the requirement to submit an alternatives assessment.⁷²

In its January 2012 submission, which was incomplete, the company dropped all reference to the identified safer alternative. Instead, PBM stated that it “has requested BPA-free alternative packaging from all of our packaging suppliers... Polyester coatings may be used in place of BPA liners. Ball Plastics has informed us that they may have a BPA free aluminum can available in March of 2012.”³⁰

In February 2012, Perrigo/PBM was issued a Notice of Violation for failing to submit a

⁶⁹ Perrigo (PBM Nutritionals). Reporting Submission for Infant Formula and Baby Food Containers containing intentionally added BPA (Ch 882 §4-A). Submitted on December 9, 2011 to Maine Department of Environmental Protection.

⁷⁰ Lori Ross, Associate Director, Covance Laboratories, Inc. Certificate of Analysis. Final Report to PBM Nutritionals, LLC. Sample Name: SOY PND. Covance Sample: 1113831, 1113832, 1113833. December 21, 2011. Attachment 1 to Letter from Cynthia M. Barber, Ph.D. (Perrigo Nutritionals) to Kerri Malinowski (Maine DEP). January 3, 2012.

⁷¹ Cynthia M Barber, PhD, Vice President Regulatory & Medical Affairs, Perrigo Nutritionals. Undated letter (submitted December 9, 2011) to Kerri (Malinowski), (Maine Department of Environmental Protection).

⁷² Kerri Malinowski, Safer Chemicals Program Coordinator, Maine Department of Environmental Protection. Letter of Warning. Letter of December 21, 2011 to Cynthia M. Barber, VP Regulatory & Medical Affairs, PBM Nutritionals, L.L.C.

complete and acceptable alternatives assessment.⁷³

In its March 2012 response, it stated: “PBM is working diligently toward a non-BPA alternative.”³¹ However, in April 2012, PBM revised its stance, stating that: “There are no commercially viable alternatives to the polymer in use at this time. A new polymer coating without the priority chemical has been identified ... (but it’s) not commercially viable due to technical difficulties which lead to commercially unacceptable cost increases.”⁷⁴ No evaluation of the costs to the consumer was provided, as required by Maine’s BPA rule.

Milk-Based PNDs. PBM revised its BPA use report in March 2012, revealing additional BPA use in another line of pediatric nutritional drinks (as well as in its “ready-to-feed” infant formula). PBM uses BPA to coat the exterior of a metal disk on the plastic cap to the plastic bottle used to package three store-brands of its milk-based PNDs.⁷⁵ The company stated: “PBM has worked ... to initiate the replacement of the cap with a non-BPA cap.” In the alternatives assessment required under Maine’s BPA rule, the manufacturer of this cap, Crown Cork and Seal,³⁴ indicated that a BPA-free alternative coating is now available: “Polyester,” which “is ready for implementation” on a time frame that’s “immediate,” and that “[T]he alternative meets the threshold of performance acceptability.”³⁵ No date was provided by which the company would switch to the BPA-free alternative, nor was the shelf life of current inventory provided.

C. Failure to Disclose Information on BPA-Free Metal Can Coatings

Some foods are intentionally marketed to toddlers through the use of animated characters that appeal to that target audience. The images of these popular cartoon characters, such as Dora the Explorer and SpongeBob SquarePants, have been added to the labels and packaging of foods intentionally marketed to preschoolers, including toddlers. Such intentionally marketed toddler foods are packaged by a variety of means, including in plastic containers, paperboard containers, aseptic cartons and laminated pouches, and in steel cans.

Canned foods that are intentionally marketed to toddlers are packaged in steel coated with BPA-based epoxy resin. Toddlers are exposed to BPA because the chemical routinely escapes from the epoxy resin lining into the canned toddler food.

Many food companies have announced their commitment to transition to BPA-free coatings

⁷³ Kerri Malinowski, Program Coordinator, Maine Department of Environmental Protection. Notice of Violation. Letter of February 21, 2012 to Cynthia M. Barber, VP Regulatory & Medical Affairs, PBM Nutritionals, L.L.C.

⁷⁴ Mark E. Spitzley, Senior Legal Counsel, PBM Nutritionals, LLC. Letter of April 25, 2012 to Kerri Malinowski, Maine Department of Environmental Protection.

⁷⁵ PBM Nutritionals, A Perrigo Company. Reporting Submission for Infant Formula and Baby Food Containers containing intentionally added BPA (Ch 882 §4-A). Submitted on March 22, 2012 to Maine Department of Environmental Protection.

for their metal packaging (see Table 9). Some, such as Eden Foods, already sells BPA-free canned foods. Canned food intentionally marketed to children under age 3 is not currently subject to the requirement of Maine's BPA rule to submit a BPA use report and an alternatives assessment.

These companies have not publicly disclosed the chemistry of their alternative BPA-free coatings that they intend to bring to market.

Campbell's Foods, which intentionally markets canned food to toddlers, announced this year that: "we have already started using alternatives to BPA in some of our soup packaging and we are working to phase out the use of BPA in the lining of all of our canned products. The cost of this effort is not expected to be material."⁷⁶ However, they have failed to provide information on specific chemical identity of the BPA-free alternative or indicate their planned timeline for phasing out the use of BPA in its metal packaging.

VII. CONCLUSION

A review and analysis of the available evidence demonstrates that one or more safer alternatives to the use of BPA in food and beverage packaging for infant formula, baby food and toddler food are available at comparable cost, notwithstanding the insufficient information provided on BPA-free coatings on metal packaging for these same products.

⁷⁶ Craig Owens, Chief Financial Officer, Campbell Soup Company, *quoted in* A. Westervelt, "Responding to Consumer Concern, Campbell Goes BPA-Free," *Forbes*, March 5, 2012. <http://www.forbes.com/sites/amywestervelt/2012/03/05/under-pressure-from-parents-advocacy-groups-campbells-goes-bpa-free/> (visited June 12, 2012).

Table 9. BPA-Free Alternatives for Metal Cans Have Not Been Fully Characterized

Company	Canned Products	BPA-Free Metal Can Coating	Safer Alternative?	BPA-Free Since?
Eden Foods ⁷⁷	Low acid foods e.g. beans	Oleoresinous c-enamel	UNKNOWN	1999
	High acid foods e.g. tomatoes	[Amber glass jars & metal lids]	Reduced BPA exposure	Starting in 2011
Trader Joe's ⁷⁸	Corn, beans, fish, poultry, beef	UNKNOWN	UNKNOWN	2010?
ConAgra Foods ⁷⁹	Tomato products	Vinyl	UNKNOWN	2011
	Desert toppings & cooking sprays	Polyester	UNKNOWN	
General Mills ⁸⁰	Muir Glen tomatoes	Vinyl ⁸¹	UNKNOWN	Oct. 2011
Amy's Kitchen ⁸²	All canned foods	UNKNOWN	UNKNOWN	March 2012
Del Monte Foods ⁸³	Some tomato, vegetables & fruit	UNKNOWN	UNKNOWN	2012
Campbell Soup ⁷⁶	Soups, etc.	UNKNOWN	UNKNOWN	Not Yet

⁷⁷ Eden Foods, Inc. Eden Foods Bisphenol-A (BPA) Free Pioneer. Web Site. http://www.edenfoods.com/articles/view.php?articles_id=178 (accessed June 12, 2012).

⁷⁸ A.K. Streeter. Treehugger. 7 Companies You Can Trust to Use BPA-Free Cans. Blog. March 2, 2010. <http://www.treehugger.com/green-food/7-companies-you-can-trust-to-use-bpa-free-cans.html> (accessed June 13, 2012).

⁷⁹ Gail Tavill, Vice President, Sustainable Development, Research, Quality & Innovation, ConAgra Foods. Letter of May 24, 2011 to Breast Cancer Fund. <http://www.breastcancerfund.org/big-picture-solutions/make-our-products-safe/cans-not-cancer/corporate-bpa-positions.html> (accessed June 13, 2012).

⁸⁰ General Mills (2011). Corporate Social Responsibility. pp. 78-9. http://www.generalmills.com/~media/Files/CSR/2011_csr_final.ashx (accessed June 13, 2012).

⁸¹ General Mills. Spokesperson, *quoted in* Rob Endelman. The Delicious Truth Everyone Needs to Know. Blog Post. March 9, 2012. <http://thedelicioustruth.blogspot.com/2012/03/muir-glens-slightly-veiled-response-to.html> (accessed June 13, 2012).

⁸² SF Gate, San Francisco Chronicle. Amy's Products Now Produced in Non-BPA Cans. Press Release. May 23, 2012. <http://www.sfgate.com/cgi-bin/article.cgi?f=/g/a/2012/05/23/prweb9525036.DTL> (accessed June 13, 2012).

⁸³ Meg Villarreal, Government and Industry Relations, Del Monte Foods. Letter of March 13, 2012 to Congressman Edward Markey. <http://markey.house.gov/sites/markey.house.gov/files/documents/3-13-2012%20All%20canned%20food%20and%20beverage%20company%20responses.pdf> (accessed June 13, 2012).