

**Docket ID Number: EPA-HQ-OPPT-2016-0741**

**Comments to the U.S. Environmental Protection Agency (EPA)  
on the Scope of its Risk Evaluation for the TSCA Work Plan Chemical:**

**1-BROMOPROPANE  
(also known as n-Propyl Bromide or nPB)  
CAS Reg. No. 106-94-5**

Submitted on March 15, 2017 by

**Safer Chemicals, Healthy Families  
Environmental Health Strategy Center  
Healthy Building Network**

**I. INTRODUCTION**

The Toxic Substances Control Act (TSCA), as amended in June 2016, requires the U.S. Environmental Protection Agency (EPA) to determine whether existing chemical substances pose an unreasonable risk to human health and the environment, both generally and for vulnerable subpopulations, without consideration of costs or other non-risk factors. When unreasonable risk is found, EPA must enact restrictions on the production (including both domestic manufacture and import), processing, distribution in commerce, use and/or disposal of that chemical, and/or materials and articles that contain that chemical, that are sufficient to extinguish such unreasonable risk.

Congress directed EPA to launch the risk evaluation process expeditiously. Accordingly, in section 6(b)(2)(A) of TSCA, it directed EPA to assure that evaluations are initiated within six months of the law's enactment on 10 substances drawn from the 2014 TSCA Work Plan list. EPA designated these 10 substances on December 19, 2016, and is now developing scoping documents for its evaluations. EPA's initial risk evaluations will provide an early test of the effectiveness of new law. It is therefore critical that they reflect the best information available on hazard and exposure, are based on a comprehensive understanding of the chemicals' conditions of use, and employ sound, precautionary methodologies that fully capture the risks they pose to human health and the environment.

Toward those ultimate environmental public health objectives, these comments provide information and recommendations to EPA on the scope its risk evaluation for one of the first ten Work Plan chemicals subject to the new TSCA requirements. These comments are jointly submitted as a collaborative work product by three not-for-profit organizations:

[Safer Chemicals, Healthy Families \(SCHF\)](#), a coalition of 450 national, state and local

organizations committed to ensuring the safety of chemicals used in our homes, workplaces and in the many products to which our families and children are exposed each day.

[Environmental Health Strategy Center](#) works at the state and national levels to ensure that all people are healthy and thriving in a healthy economy, through affordable access to safer food, water, and products; and investments that create and retain good, green jobs; and

[Healthy Building Network](#) transforms the market for building materials to advance the best environmental, health and social outcomes, including reduced use of hazardous chemicals in building products as a means of improving human health and the environment.

SCHF and its partners took a leadership role during the legislative process that led to the passage into law of the Frank R. Lautenberg Chemical Safety for the 21st Century Act, advocating the most health protective and effective policy on toxic chemicals in use today;

Our comments consists of three parts:

1. **Summary Comment** – This overview provides general comments on the scope of EPA’s risk evaluation, summarizes key findings from our attached technical report, and makes recommendations to EPA for related actions needed to meet TSCA requirements;
2. **Technical Appendix** – This technical report provides information on the production, trade, use, recycling, and disposal of this chemical, citing authoritative sources (with web links), emphasizing information not included in EPA’s chemical use profile; and
3. **Consumer Appendix** – This document profiles specific consumer product uses of the chemical as reported by retailers, distributors, and/or product manufacturers.

## II. GENERAL COMMENTS

As discussed in detail in our separate submission, “General Comments of Safer Chemicals Healthy Families on Risk Evaluation Scoping Efforts for Ten Chemical Substances under the Toxic Substances Control Act,” in order to properly scope its risk evaluation to determine whether this chemical poses an unreasonable risk to human health and the environment:

- EPA must evaluate the complete life cycle of the chemical, including production and imports, *all* uses, and its fate at the end of its useful life;

- EPA must evaluate exposure to *all* vulnerable groups, including communities of color and low-income people who may be disproportionately exposed;
- If EPA finds that data on any chemical use, hazard or exposure are insufficient to support risk evaluation, EPA must require industry to produce such data;
- EPA must assess the aggregate exposure to the most vulnerable groups and the general population for this chemical;
- EPA should assess cumulative exposure and risk, whenever practicable, for this chemical in combination with other risk factors;
- EPA should abandon its presumed safety threshold model for non-cancer effects, as recommended in the expert “Science and Decisions” report.

### III. METHODS and SOURCES

We accessed and analyzed several sources of information in an effort to identify manufacturers, importers, and uses of 1-Bromopropane (nPB) that were not included or not fully characterized in EPA’s recent chemical use profile.<sup>1</sup> These sources included:

- [Panjiva](#) – the trade data authority. Panjiva offers an extensive database of U.S. imports and exports of goods, including chemicals, and materials or articles containing chemicals. EPA should access these data for a modest subscription fee;
- European, United Nations, and other non-domestic agency sources;
- Chemical industry sources – from web sites, trade reports and other documentation;
- U.S. EPA data sources – the Toxics Release Inventory (TRI) database, Chemical Data Reporting (CDR) submissions (including 2016 submissions obtained through a Freedom of Information Act request), and other EPA sources; and
- [Pharos Chemical and Material Library](#) – a user-friendly hazard database available free for a 14-day trial.

### IV. SPECIFIC COMMENTS

The findings below, and recommendations that follow, are specific to 1-Bromopropane, referred to in these comments by the acronym for its synonym: nPB (for n-propyl bromide). The specific comments below provide an executive summary of our technical analysis. Please refer to the Technical Appendix for details, methods, additional

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<sup>1</sup> U.S. EPA, Preliminary Information on Manufacturing, Processing, Distribution, Use and Disposal: 1-Bromopropane, Support Document for EPA-HQ-OPPT-2016-0741, February 2017.  
<https://www.regulations.gov/document?D=EPA-HQ-OPPT-2016-0741-0003>

information, and citations to authoritative sources that provide the factual support for all comments.

## **A. Chemical Production and Trade**

***FINDING 1: The story of nPB is a classic tale of regrettable substitution: aggressively marketed to replace toxic chlorinated solvents and more potent ozone-depleting substances, nPB itself is a chemical of very high concern whose production and use in the U.S has increased tenfold in 15 years***

***FINDING 2: As many as 8 U.S. chemical companies imported nearly 3 million pounds of nPB from China in 2014-2015, but apparently failed to report that activity to EPA in violation of the Chemical Data Reporting TSCA rule***

In the last 15 years, U.S. production and use of nPB has increased nearly tenfold, primarily as a result of aggressive marketing of nPB as a drop-in substitute for the carcinogenic chlorinated solvents TCE and PCE, and as an “acceptable” substitute for other more potent ozone depleting substances. Now concerns are mounting about the health risks of nPB, as well as its own ozone depletion potential. For example, the European Union has designated nPB as a Substance of Very High Concern based on reproductive toxicity. This history and growing concerns mark nPB as a regrettable substitute. (See the Technical Appendix for production and marketing history and regulatory drivers).

Additional insights on the global trade in nPB can be derived from the Panjiva database on imports and exports, as well from industry websites and related documents. These results can inform EPA about specific nPB uses and facility locations of which it remains unaware.

For example, a comparison of the Panjiva trade search results with the Chemical Data Reporting (CDR) submissions for 2012 through 2015 reveals several discrepancies. (See Trade Data at the end of the Technical Appendix for detailed analysis on nPB imports).

Several chemical companies who imported nPB from China apparently did not submit CDR data to EPA as required by such imports. By our calculation, at least 1.4 million pounds of nPB was imported into the U.S. from China in 2014, and another 1.5 million pounds imported in 2015, that were *not* included in the 2016 CDR submissions provided to EPA by chemical manufacturers and processors.

The following companies may be in violation of the CDR rule under TSCA for failure to report nPB imports above the reporting threshold between 2012 and 2015, inclusive :

- |  |                  |
|--|------------------|
| ● Chemical Solvents                    | Cleveland, OH    |
| ● StorChem                             | Wilmington, DE   |
| ● Superior Oil (aka Superior Solvents) | Indianapolis, IN |

- Marashu Printing Technology Inc. / Unistar Chemical      Rolling Meadows, IL
- Dow Agrosiences      Midland, MI
- Prime Agency      City of Industry, CA
- First Continental International (NJ) Inc.      Glen Rock, NJ
- The Solvents Company      Kingston, NY

Additional detail about these companies, their Chinese suppliers, and intended uses for nPB are included in the attached Technical Appendix and Trade Data table.

## B. Chemical Use

***FINDING 3: Flame retardant use of nPB in both polyisocyanurate and polyurethane rigid foam insulation boards was indicated by Dow Chemical and others***

***FINDING 4: Cosmetics may be an unreported use for nPB, which was imported in 2014 and 2016 by a company that supplies the cosmetics industry***

***FINDING 5: Since EPA approved the use of nPB ten years as an “acceptable” substitute for other ozone depleting substances, use of the chemical has increased about five-fold, yet nPB itself also has known ozone depletion potential***

***FINDING 6: Several susceptible populations are potentially exposed to nPB, including workers and fenceline communities at sites of chemical manufacturing, foam furniture production, dry cleaning, and other nPB industrial uses***

***FINDING 7: There are some remaining nPB uses in commercial & consumer products***

In addition to the nPB uses profiled by EPA in its preliminary report, we found evidence for additional applications, as detailed in the Technical Appendix. These uses include:

- Flame retardant in rigid polyisocyanurate foam insulation (up to 5% by weight)
- Flame retardant in rigid polyurethane foam insulation
- Cosmetics and personal care products
- Mechanical degreasing of transmissions, gear assemblies, and forklifts

Although nPB is not yet regulated under the Montreal Protocol, its ozone depletion potential has long been recognized as ranging from 0.02 to 0.1, similar to the HCFCs that are beginning to be phased out.<sup>2</sup> The European Union has extended its reporting requirements for ozone depleting substances to nPB. We estimate that the U.S. equivalent production of nPB in 2013 and 2014 represents about ten times greater ozone depletion

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<sup>2</sup> United Nations Environment Programme, „Helping Developing Countries Phase Out HCFCs: List of HCFCs <http://web2.unep.fr/hcfc/about/default.aspx?type=list>

potential than for the reported European nPB emissions over the same period, and perhaps even greater than that due to under-reporting of imports of nPB into the United States.

Although EPA approved some nPB uses as an “acceptable” substitute for more potent ozone depleting substances in 2007, U.S. production and use of nPB has grown significantly since then, perhaps by five-fold or more. This raises growing concern about the impact of nPB on the stratospheric ozone layer that protects human health from skin cancer and cataracts.

Subpopulations that may be susceptible to reproductive toxicity or other adverse effects from nPB exposure include various groups of workers, occupational bystanders, fenceline community residents, and consumers who may be exposed during the production and use of the chemical by industry and in consumer and commercial products. The attached Consumer Appendix illustrates several consumer products sold at retail that reportedly contain nPB. These represent an additional source of potential exposure to consumers, commercial workers, and occupational bystanders.

## **V. RECOMMENDATIONS**

Based on our research and findings above, we urge EPA to take the following actions in parallel during the scoping and conduct of the risk evaluation for 1-Bromopropane.

### **A. EPA should include *all* uses and exposures within the scope of risk evaluation**

The scope of the risk evaluation for nPB should include, but not necessarily be limited to:

1. A characterization of all unreported and fugitive emissions of nPB;
2. An aggregate assessment of all exposures (occupational, fenceline-community, consumer, and general population) from industrial and product uses of nPB, and the use of nPB to manufacture chemicals, furniture, insulation and other products;
3. All uses of nPB as a flame retardant, and in cosmetics and personal care products;
4. An accurate accounting of all imports of nPB and compliance assurance activities to ensure that all importers are properly submitting CDR data to EPA.

### **B. EPA should assess *all* potentially exposed or susceptible subpopulations**

1. An assessment of specific exposures and risks to all workers, occupational bystanders, and fenceline community residents from direct and fugitive emissions from facilities that manufacture nPB or other chemicals that use nPB as a reactant, from metal degreasing, and from other industrial uses;

2. A determination as to whether any of the nPB use-related activities above result in disproportionate exposure to women of reproductive age, pregnant women and their fetuses, infants, children, and the elderly;
3. A determination as to whether any communities of color, or people of lower socioeconomic status, and their local community environments, are disproportionately exposed to nPB and thus constitute a “potentially exposed or susceptible subpopulation”, based on Census Bureau data, geocoded locations of industrial facilities and disposal sites, and modeled or measured exposures; and
4. In addition to its risk of adverse health effects from direct exposure, EPA should consider nPB’s ozone-depletion potential and global-warming potential in determining whether the chemical poses an unreasonable risk to human health and the environment.

### **C. EPA should require industry to develop new information to close data gaps**

In parallel to the scoping and conduct of the risk evaluation, EPA should require chemical manufacturers and processors to fill data gaps whenever information is insufficient to support a determination of unreasonable risk. If so determined by EPA, candidates for additional data gathering under TSCA include but are not limited to the following:

1. Exposure and modeling data as necessary to inform the above exposure assessments; and
2. New hazard data on the endocrine activity, and the developmental and reproductive toxicity, of nPB..

### **D. EPA should require notification of *all* new uses, including in imported articles**

In order to ensure the completeness of the risk evaluation to support an unreasonable risk determination, EPA needs to establish with some certainty which uses in the United States are truly historic or never took place in this country, and also ensure that such uses are not encouraged or take place again in the future without EPA’s knowledge. Therefore:

1. EPA should propose a Significant New Use Rule (SNUR) for nPB, and for imported articles that contain nPB;

By proposing a SNUR soon, i.e. during the risk evaluation of nPB, EPA would allow industry to step forward and assert with clear evidence whether any such uses are in fact *existing* uses that continue rather than historic uses that would trigger notification if later reintroduced as new uses. This mechanism would provide EPA with more complete

information on which to base its risk evaluation and unreasonable risk determination.

## **VI. CONCLUSION**

We urge EPA to use its full authority under TSCA to support an expansive scope for the risk evaluation of 1-Bromopropane, as recommended above. Unlike in the past, nPB can no longer be treated as a safer alternative to cancer-causing chlorinated solvents or ozone depleting substances. The chemical itself presents similar hazards. In fact, it is a candidate for phase-out in Europe because it is toxic for reproduction and a Substance of Very High Concern. More action is needed to rid the upper atmosphere of nPB loading, similar to the HCFC phase-out. Given these multiple concerns, EPA should be able to support a finding of unreasonable risk, and celebrate its replacement with truly safer alternatives over a reasonable timeline.



TECHNICAL APPENDIX

## **n-Propyl Bromide (a/k/a 1-bromopropane)**

***Technical Report on production, imports, use, recycling, disposal, exposure scenarios, and associated environmental and human health hazards.***

***Healthy Building Network***

***In Collaboration with Safer Chemicals Healthy Families and the Environmental Health Strategy Center***

***March 15, 2017***

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## **n-Propyl Bromide (also known as 1-bromopropane)**

### **1. Identifying Information**

**CAS No.:** 106-94-5

**UN shipping code:** UN2344 (raw chemical only).

**Harmonized Tariff Schedule Numbers:**

2007 to present: HTS - 2903.39.1550: BROMINATED DERIVATIVES OF ACYCLIC HYDROCARBONS, NESOI

Prior to 2007: HTS - 2903.30.20: Fluorinated, brominated or iodinated derivatives of acyclic hydrocarbons, nesi<sup>1</sup>

Note: Both HTS categories cover a number of other chemicals.

**Synonyms:** 1-bromopropane; propyl bromide; nPB; nPB; 1-propyl bromide

**Trade Names:** Abzol; Ensolv; Lenium GS and Lenium ES; Solvon FB (historical)<sup>2</sup>

**TSCA Docket:** Docket: EPA-HQ-OPPT-2016-0741

<https://www.regulations.gov/docket?D=EPA-HQ-OPPT-2016-0741>

### **2. Research Methods**

In collaboration with Safer Chemicals Healthy Families and the Environmental Health Strategy Center, the Healthy Building Network research team reviewed the Chemical Data Reporting (CDR) forms submitted for n-propyl bromide (nPB, also called 1-bromopropane) and the EPA Preliminary Information on Manufacturing, Processing, Distribution, Use, and Disposal (released in February 2017). It cross-referenced these data with a variety of national, European and United Nations reports, chemical industry literature, and a shipping database (Panjiva) with the goal of identifying potentially missing producers, importers, and uses of nPB. Chemical hazard information is drawn from the Pharos Chemical and Material Library, available to any user for 14 days, after which a subscription is required.

In late 2015, EPA added nPB to the list of chemicals reported to the Toxics Release Inventory. Facility releases over 10,000 pounds per year from 2016 must be reported

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<sup>1</sup> <https://www.usitc.gov/publications/332/pub2720.pdf>

<sup>2</sup> [http://www.alchemchemical.com/products.html?file=tl\\_files/product\\_documents/MSDS/poly%20systems/solvon-acstech-11-20-08.pdf](http://www.alchemchemical.com/products.html?file=tl_files/product_documents/MSDS/poly%20systems/solvon-acstech-11-20-08.pdf)

beginning last year (2016).<sup>3</sup> In the the coming months, reporting of last year's emissions will generate additional knowledge about uses of nPB in the United States.

Findings that are not included in the EPA Preliminary Information document, or might not have been reported in CDRs, are **highlighted in yellow**.

### 3. Production/Trade

Two U.S. companies produce n-propyl bromide (nPB) in Arkansas. A substantial amount of made-in-Arkansas nPB is exported, previously to Japan, and now, to India. Producers in Israel and China also ship high volumes of nPB to the U.S. marketplace.

Commerce in nPB continues (outside of Europe), despite cascading health warnings and recent efforts by OSHA to better protect workers. According to a 2016 Montreal Protocol panel, rapidly emerging occupational health protections “indicate that its use in solvent applications is likely to be problematic, and will limit its use in countries with more stringent occupational health and safety controls. Nevertheless, n-propyl bromide continues to appear as a marketed solvent at trade exhibitions with demand in a number of markets (e.g. China, Japan and the US). Manufacture is occurring in a small number of countries, including China, Israel and the US.”<sup>4</sup>

The global scale of nPB production is poorly defined. The bromine industry does not publish precise information about individual or combined volumes of nPB produced in the U.S., and global estimates vary widely. The CDR reports submitted by Albemarle, Chemtura, and ICL are not useful, because all production and import volume information is redacted.

However, shipping records can help to fill in some details. Records of the shipping database Panjiva indicate that Albemarle is a major nPB *exporter*, and that Chemtura exports some too. The two companies account for about 90% and 10%, respectively, of the roughly 5 million pounds exported from the U.S. in the CDR reporting period (2012-2015). Their current overseas market is mostly India. The U.S. is also a major *importer* of nPB from China and Israel, which tend to evenly split shipments to the U.S., at a pace of about 2 to 2.5 million pounds per year, each.

In addition to these exports and imports, we estimate that Albemarle and Chemtura produce about 10.8 million pounds of nPB, combined, for the domestic market.

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<sup>3</sup> <https://www.epa.gov/toxics-release-inventory-tri-program/addition-1-bromopropane>

<sup>4</sup> [http://conf.montreal-protocol.org/meeting/oewg/oewg-38/presession/Background%20Documents%20%20TEAP%20Reports/TEAP\\_Progress\\_Report\\_June2016.pdf](http://conf.montreal-protocol.org/meeting/oewg/oewg-38/presession/Background%20Documents%20%20TEAP%20Reports/TEAP_Progress_Report_June2016.pdf)

Based on Panjiva over the past 3 years, and CDR data from 2012 to 2015, we estimate that the U.S., per year:

- **imports** about 5 million pounds of nPB;
- produces about 10.8 million pounds for **domestic consumption**; and
- produces about 5 million pounds for **export**, per year.

While the U.S. role in the global nPB trade is considerable, a fuller context is elusive. “Chemical manufacturers do not publicise their n-propyl bromide production data for commercial reasons,” wrote a Montreal Protocol technical committee last year. “In the absence of information provided by exporting and/or importing countries, it is difficult... to quantify the global consumption of n-propyl bromide and its emissions.”<sup>5</sup>

### 3.a. Chronology of nPB Production and Trade Data

1963: 4,000 pounds nPB sold in the U.S.<sup>6</sup>

1986-1990: U.S. produces 10,000 to 500,000 pounds.<sup>7</sup>

1992: Two producers operate in US: Diaz Chemical (now closed, and a Superfund site in New York) and Great Lakes Chemical (now part of Chemtura).<sup>8</sup>

1994: U.S. produces between 500,000 to 1 million pounds.<sup>9</sup>

1998: U.S. produces between 1 million to 10 million pounds (450 and 4,500 metric tons).<sup>10</sup> Japan consumes 1.4 million pounds (645 metric tons).<sup>11</sup>

1999-2001: Solvent supplier Enviro Tech estimates the U.S. imported around 2.9 million pounds per year in this period, and produced for sale domestically another 1.5 million pounds. It predicted that “the market for 1-BP as a replacement for chemicals banned by the Montreal Protocol in the U.S. is declining at a rapid pace, as the majority of banned compounds have already been substituted.” Seeking to slow regulatory action,

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<sup>5</sup> [http://conf.montreal-protocol.org/meeting/oewg/oewg-38/presession/Background%20Documents%20%20TEAP%20Reports/TEAP\\_Progress\\_Report\\_June2016.pdf](http://conf.montreal-protocol.org/meeting/oewg/oewg-38/presession/Background%20Documents%20%20TEAP%20Reports/TEAP_Progress_Report_June2016.pdf)

<sup>6</sup> United States Tariff Commission, Synthetic Organic Chemicals: United States Production and Sales, 1963, TC Publication 143. <https://www.usitc.gov/publications/332/pub143.pdf>

<sup>7</sup> [https://ntp.niehs.nih.gov/ntp/roc/thirteenth/monographs\\_final/1bromopropane\\_508.pdf](https://ntp.niehs.nih.gov/ntp/roc/thirteenth/monographs_final/1bromopropane_508.pdf)

<sup>8</sup> USITC Synthetic Organic Chemicals, 1992. <https://www.usitc.gov/publications/332/pub2720.pdf>

<sup>9</sup> [https://ntp.niehs.nih.gov/ntp/roc/thirteenth/monographs\\_final/1bromopropane\\_508.pdf](https://ntp.niehs.nih.gov/ntp/roc/thirteenth/monographs_final/1bromopropane_508.pdf)

<sup>10</sup> [https://ntp.niehs.nih.gov/ntp/roc/thirteenth/monographs\\_final/1bromopropane\\_508.pdf](https://ntp.niehs.nih.gov/ntp/roc/thirteenth/monographs_final/1bromopropane_508.pdf)

<sup>11</sup> <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1247523/>

Enviro Tech told the National Institute for Environmental Health Sciences, “this is not a growth market.”<sup>12</sup> (Not quite: Fifteen years later, the market is about four times larger.)

2000-2001: Industry estimates global sales of 9 million pounds.<sup>13</sup>

Early 2000s: The Brominated Solvents Consortium -- Albemarle, Dead Sea Bromine (now ICL), and Great Lakes (now Chemtura) -- estimates that global sales and emissions for nPB are 10.6 million pounds (4,839 metric tons).<sup>14</sup> U.S. imports and consumption (which EnviroTech estimated at 4.4 million pounds) therefore were about 40 percent of global sales.

2002: U.S. produces between 1 million to 10 million pounds (450 and 4,500 metric tons).<sup>15</sup> Global sales estimated to be 12 million pounds.<sup>16</sup>

2002: UNEP working group of the Montreal Protocol reports “that n-propyl bromide (nPB) is being marketed aggressively and that nPB use and emissions in 2010 are currently projected to be around 40,000 metric tonnes” or 88 million lbs. worldwide. Parties to the protocol agreed to “urge industry and users to consider limiting the use of nPB to applications where more economically feasible and environmentally friendly alternatives are not available, and to urge them also to take care to minimize exposure and emissions during use and disposal.”<sup>17</sup>

2003: United States informs the World Trade Organization that EPA “proposes to list n-propyl bromide (nPB) as an acceptable substitute for ozone-depleting substances, subject to use conditions, in the solvent cleaning sector and aerosol solvents and adhesive end uses under the U.S. Environmental Protection Agency’s Significant New Alternatives Policy Program.”<sup>18</sup>

2003: Japan consumes 2,480,000 lbs. (1,125 metric tons).<sup>19</sup>

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<sup>12</sup> <https://wf1-ext-vip.niehs.nih.gov/evals/bromopropanes/pubcomm/Envirotech.pdf>

<sup>13</sup> Analysis of Economic Impacts of Final nPB Rulemaking for Cleaning Solvent Sector 2-7-07, <https://www.regulations.gov/contentStreamer?documentId=EPA-HQ-OAR-2002-0064-0297&contentType=pdf>

<sup>14</sup> [https://ntp.niehs.nih.gov/ntp/ohat/bromopropanes/1-bromopropane/1bp\\_monograph.pdf](https://ntp.niehs.nih.gov/ntp/ohat/bromopropanes/1-bromopropane/1bp_monograph.pdf)

<sup>15</sup> [https://ntp.niehs.nih.gov/ntp/roc/thirteenth/monographs\\_final/1bromopropane\\_508.pdf](https://ntp.niehs.nih.gov/ntp/roc/thirteenth/monographs_final/1bromopropane_508.pdf)

<sup>16</sup> Analysis of Economic Impacts of Final nPB Rulemaking for Cleaning Solvent Sector 2-7-07, <https://www.regulations.gov/contentStreamer?documentId=EPA-HQ-OAR-2002-0064-0297&contentType=pdf>

<sup>17</sup> [http://ozone.unep.org/Publications/MP\\_Handbook/Section\\_2\\_Decisions/Article\\_2/decs-new\\_substances/Decision\\_XIII-7.shtml](http://ozone.unep.org/Publications/MP_Handbook/Section_2_Decisions/Article_2/decs-new_substances/Decision_XIII-7.shtml)

<sup>18</sup> <http://www.commerce.nic.in/trade/Elec%20Machinery/US/TBT%20Notifications/TBT/electricals%20TBT/CFC%20Substitute%20-%20G.TBT.N.USA.45.doc>

<sup>19</sup> <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1247523/>

2003: Great Lakes (now Chemtura) says it is no longer selling nPB for use in solvents. Albemarle says its use “in adhesive and other applications in which 1-BP exposure cannot be controlled should be restricted or prohibited,” according to a National Toxicology Program (NTP) monograph.<sup>20</sup>

2005: EPA says “a more recent estimate predicts the worldwide market for nPB is 8 to 10 million pounds per year, with about half being used in the U.S.”<sup>21</sup>

2007: **EPA approves nPB as an acceptable alternative to ozone depleting solvents.**<sup>22</sup> Thereafter, manufacturers promoted nPB as a “drop-in replacement” for “suspect carcinogens or ozone-depleting chemicals,” according to NTP.<sup>23</sup> “Businesses found nPB appealing partly because the E.P.A. had given it an endorsement of sorts by adding it to a list of chemicals that do not harm the ozone layer,” later reported the *New York Times*. “But an unintended effect of that action was to allow sellers of the chemical to market it as federally approved, ‘nonhazardous,’ green and worker-friendly.”<sup>24</sup> One supplier advertised nPB as “the ideal, environmentally friendly, drop in replacement solvent” for trichloroethylene, perchloroethylene and other hazardous industrial solvents.<sup>25</sup>

2007: A Montreal Protocol panel says, “Complete and accurate data on production and uses of nPB have been difficult to obtain. The global production level was estimated to be 20,000-30,000 metric tonnes in 2007 [44 million to 66 million pounds, or six times higher than the 2005 estimates], with production taking place in several A(5) and non-A(5) countries.”<sup>26</sup>

2008: According to a trade association, “China is estimated to have produced around 20,000 metric tonnes, of which approximately 40% were exported.” Use as a solvent was reported to be growing at a rate of 15-20% per year in the United States (5,000 metric tonnes) and Asian countries other than China.<sup>27</sup>

2009: Japan consumes 1,100 to 1,200 metric tonnes.<sup>28</sup> (2,425,085 to 2,645,547 lbs)

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<sup>20</sup> [https://ntp.niehs.nih.gov/ntp/ohat/bromopropanes/1-bromopropane/1bp\\_monograph.pdf](https://ntp.niehs.nih.gov/ntp/ohat/bromopropanes/1-bromopropane/1bp_monograph.pdf)

<sup>21</sup> Analysis of Economic Impacts of Final nPB Rulemaking for Cleaning Solvent Sector 2-7-07, <https://www.regulations.gov/contentStreamer?documentId=EPA-HQ-OAR-2002-0064-0297&contentType=pdf>

<sup>22</sup> <https://www.gpo.gov/fdsys/pkg/FR-2007-05-30/pdf/E7-9707.pdf>

<sup>23</sup> [https://ntp.niehs.nih.gov/ntp/roc/thirteenth/monographs\\_final/1bromopropane\\_508.pdf](https://ntp.niehs.nih.gov/ntp/roc/thirteenth/monographs_final/1bromopropane_508.pdf)

<sup>24</sup> <http://www.nytimes.com/2013/03/31/us/osh-emphasizes-safety-health-risks-fester.html?pagewanted=all&r=0>

<sup>25</sup> <http://web.archive.org/web/20130622175035/http://www.envirotechint.com/products/degreasing/details/ensolv>

<sup>26</sup> Chemicals Technical Options Committee (CTOC), Montreal Protocol On Substances That Deplete The Ozone Layer, *2010 Assessment Report* (March 2011).

<sup>27</sup> <http://www.hsia.org/news/nPBPetitionsigned.pdf>

<sup>28</sup> <http://www.hsia.org/news/nPBPetitionsigned.pdf>

2012: U.S. production + imports = 18,770,090 lbs. (8,514 metric tons).<sup>29</sup>  
2012: European Union (EU) designates nPB as a Substance of Very High Concern.<sup>30</sup>

2013: U.S. production + imports = 24,039,932 lbs. (10,904 metric tons)<sup>31</sup>  
2013: EU imports = 2,235,487 lbs. (1,014 metric tons).<sup>32</sup>

2014: U.S. production + imports = 18,503,022 lbs. (8,392 metric tons).<sup>33</sup>  
2014 (March-Dec. only): U.S. imports = 3.5 million pounds. (HBN analysis of Panjiva records).  
2014: U.S. production in 2014 is no higher than 15 million pounds.  
2014: European Union imports 2.1 million lbs. (948 metric tons).<sup>34</sup>

2015: U.S. production + imports = 25,887,235 lbs. (11,742 metric tons).<sup>35</sup>  
2015: U.S. imports = 9.6 million lbs. (HBN analysis of Panjiva)  
2015: U.S. production no higher than 16.3 million pounds.  
2015: U.S. exports = 7.5 million lbs. (HBN analysis of Panjiva)

2016: U.S. imports = 4 million pounds. (HBN analysis of Panjiva)  
2016: U.S. exports = 2.8 million pounds. (HBN analysis of Panjiva)

2016: A Montreal Protocol technical panel says China has production capacity of 20,000 metric tons (44 million pounds).<sup>36</sup>

**Note to researchers:** Source such as NTP toxicological profiles rely upon an overly broad Harmonized Tariff Schedule chemical class code to estimate nPB trade. This classification includes many other brominated derivatives of acyclic hydrocarbons, some of which are very actively traded. Import and export volumes for this HTS code are considerably higher than the subset of nPB trade therein, and is not a suitable representation of market trends. Unfortunately, there are no narrower trade data classifications (and thus more precise government data) for nPB.

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<sup>29</sup> <https://www.epa.gov/sites/production/files/2017-02/documents/1-bromopropane.pdf>

<sup>30</sup> <https://www.sec.gov/Archives/edgar/data/941221/000104746914007594/a2221184zf-1.htm>

<sup>31</sup> <https://www.epa.gov/sites/production/files/2017-02/documents/1-bromopropane.pdf>

<sup>32</sup> [www.eea.europa.eu/publications/ozone-depleting-substances-2014/download](http://www.eea.europa.eu/publications/ozone-depleting-substances-2014/download)

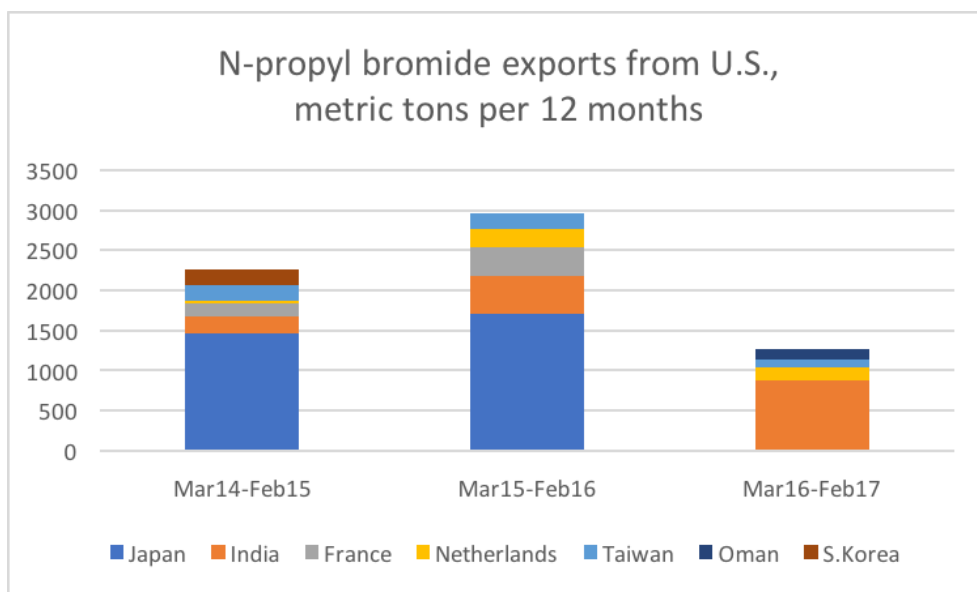
<sup>33</sup> <https://www.epa.gov/sites/production/files/2017-02/documents/1-bromopropane.pdf>

<sup>34</sup> [www.eea.europa.eu/publications/ozone-depleting-substances-2014/download](http://www.eea.europa.eu/publications/ozone-depleting-substances-2014/download)

<sup>35</sup> <https://www.epa.gov/sites/production/files/2017-02/documents/1-bromopropane.pdf>

<sup>36</sup> [http://conf.montreal-protocol.org/meeting/oewg/oewg-38/presession/Background%20Documents%20%20TEAP%20Reports/TEAP\\_Progress\\_Report\\_June2016.pdf](http://conf.montreal-protocol.org/meeting/oewg/oewg-38/presession/Background%20Documents%20%20TEAP%20Reports/TEAP_Progress_Report_June2016.pdf)





Healthy Building Network chart based on records in the Panjiva database.

### 3.b. DOMESTIC PRODUCERS

Albemarle (Magnolia, Arkansas) is the leading producer of nPB in the United States, and exports a considerable proportion of its production. In the past three years, Albemarle exported over 13.3 million pounds of nPB, which is about one-third of overall U.S. production. Chemtura also produces and exports nPB.

#### 3.b.i. Albemarle (Magnolia, Arkansas)

Albemarle is one of two current US manufacturers<sup>37</sup> of nPB.

As of 2003, according to an NTP report, “Albemarle has stated that use of 1-BP in adhesive and other applications in which 1-BP exposure cannot be controlled should be restricted or prohibited (21).”<sup>38</sup> This statement does not reflect current company practice, given the high volume global market for its ABZOL line of nPB cleaners, and considering that industrial cleaning is one of the uses declared in its 2012-2015 CDR report.

Albemarle reports via CDR that it manufactures nPB for use as a solvent for industrial cleaning and degreasing, and fabricated metal product manufacturing. It states that a small proportion (1%) is used as a reactive intermediate in basic inorganic chemical manufacturing. No consumer uses are listed.

<sup>37</sup> [http://www.unep.fr/ozonaction/information/tradenames/trade\\_chem.asp?ch=n-propyl\\$bromide](http://www.unep.fr/ozonaction/information/tradenames/trade_chem.asp?ch=n-propyl$bromide)

<sup>38</sup> [https://ntp.niehs.nih.gov/ntp/ohat/bromopropanes/1-bromopropane/1bp\\_monograph.pdf](https://ntp.niehs.nih.gov/ntp/ohat/bromopropanes/1-bromopropane/1bp_monograph.pdf)

Albemarle's website states Abzol varieties are "used in cleaning of consumer electronics and automotive/transportation."<sup>39</sup>

According to its website: "ABZOL® cleaners are high-performance precision cleaning solvents for vapor degreasing, cold cleaning and ultrasonic cleaning, but with some very important differences from the chlorocarbons, hydrochlorocarbons and chlorofluorocarbons you may be using now. They offer very low Ozone Depletion Potential (ODP) and very low Global Warming Potential (GWP)."<sup>40</sup>

Albemarle has been a prodigious exporter from the U.S. According to our analysis of records in the Panjiva shipping database, Albemarle accounts for 90 percent of U.S. nPB exports over the past three years.

Japan has been (but appears to no longer be) a major destination for these shipments. Albemarle shipped 7 million pounds to Japan between March 2014 and March 2016. Since then, shipments appear to have ceased. Albemarle's exports now mostly go to India, where it shipped over 12 million pounds of nPB in the past three years.

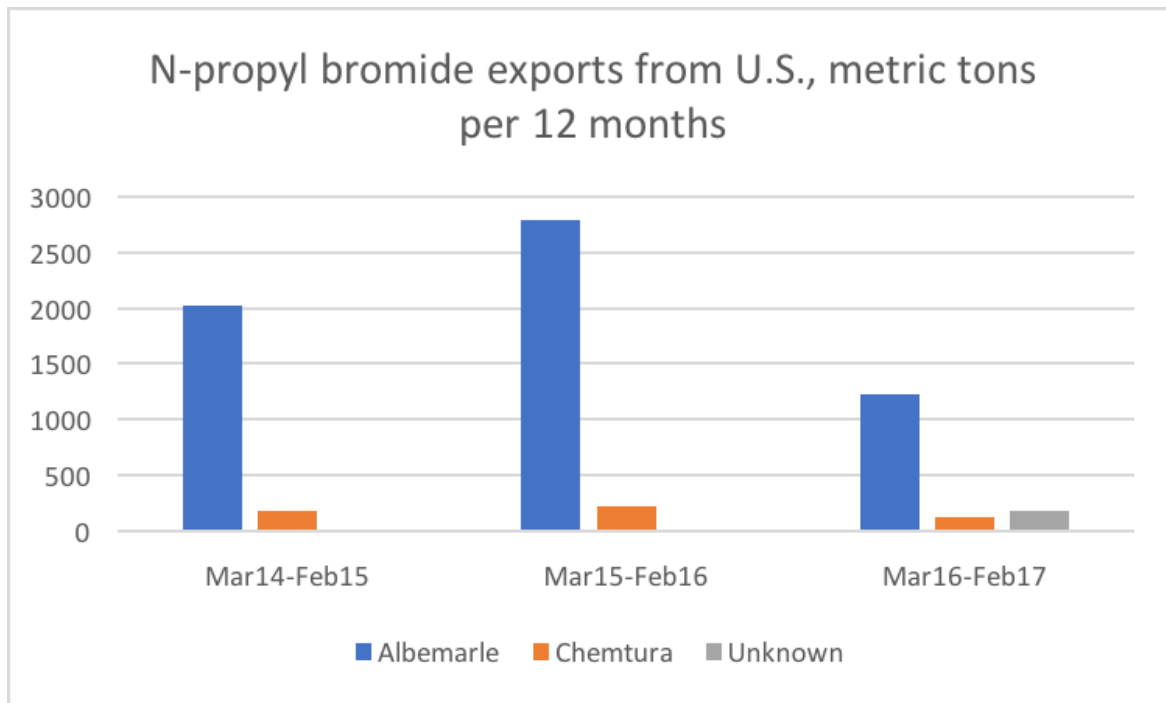
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<sup>39</sup> <http://www.albemarle.com/products---markets/specialty-chemicals/cleaning-solvents-2171.html>

<sup>40</sup> <http://www.albemarle.com/products---markets/specialty-chemicals/cleaning-solvents-2171.html>



Albemarle chemical plant, Magnolia, Arkansas. Google Earth Photo.



Healthy Building Network chart based on records in the Panjiva shipping database.

### 3.b.ii. Chemtura (El Dorado, Arkansas)

Chemtura, through its Great Lakes Solutions division, has been producing nPB in El Dorado, Arkansas since at least 1992.<sup>41</sup> It advertises nPB for use as an intermediary in the production of pharmaceuticals, agricultural chemicals, and solvents.<sup>42</sup>

Chemtura's CDR report for 2012-2015 redacts domestic manufacturing volumes.

In 2003, Great Lakes Chemical (now Chemtura) said it was no longer selling nPB solvent blends.<sup>43</sup>

Its CDR report for the 2012-2015 period lists industrial uses as 25% incorporated into solvents for the soap, cleaning compound, and toilet preparation manufacturing sector; 25% is used as an intermediate reactant in pesticide, fertilizer, and other agricultural chemical manufacturing; and 50% is used as a reactant in other basic organic chemical manufacturing. No commercial or consumer uses are listed.

In a Product Stewardship Summary for nPB, Chemtura says, "The USEPA has granted n-propyl bromide approval for certain cleaning solvent and paint solvent uses to replace ozone depleting substances; however, we do not sell directly to anyone for these uses. The stabilized form of n-propyl bromide marketed by Great Lakes Solutions is sold only to a highly specialized chemical distribution network that provides products to industrial companies that have invested in well-engineered parts cleaning systems. We work with our distribution network to ensure the stabilized n-propyl bromide that we supply is used only in applications where emissions and exposures are tightly controlled. Our standard version (non-stabilized) n-propyl bromide is only supplied to other chemical companies that make agricultural, pharmaceutical and industrial products that use it as a chemical intermediate (or "building block" chemical) to make other value added chemical products."<sup>44</sup>

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<sup>41</sup> <https://www.usitc.gov/publications/332/pub2720.pdf>

<sup>42</sup> <http://greatlakes.com/deployedfiles/ChemturaV8/GreatLakes/Bromine%20and%20Intermediates/BI%20Brochures/Bromine%20and%20Intermediates%20Product%20Guide.pdf> See also Great Lakes Solutions nPB Technical Information:

<http://greatlakes.com/deployedfiles/ChemturaV8/GreatLakes/Bromine%20and%20Intermediates/BI%20Products/n-Propyl%20Bromide%20TDS.pdf>

<sup>43</sup> [https://ntp.niehs.nih.gov/ntp/ohat/bromopropanes/1-bromopropane/1bp\\_monograph.pdf](https://ntp.niehs.nih.gov/ntp/ohat/bromopropanes/1-bromopropane/1bp_monograph.pdf)

<sup>44</sup> [http://www.chemtura.com/deployedfiles/CorporateV2/CorporateV2-en-US/Documents/Product%20Stewardship/PSS\\_GLS-N-PropylBromide\\_Feb2015-FINAL.PDF](http://www.chemtura.com/deployedfiles/CorporateV2/CorporateV2-en-US/Documents/Product%20Stewardship/PSS_GLS-N-PropylBromide_Feb2015-FINAL.PDF)



India is Chemtura's main customer for exported nPB (1.1 million pounds in last 3 years). Chemtura attempted to purchase an Indian nPB manufacturer (Solaris Chemtech), but that 2012 deal does not appear to have been consummated.<sup>45</sup>



Chemtura plant in El Dorado, Arkansas. Google Earth image.

### 3.b.iii. Diaz Chemical (closed, Holley NY)

Diaz Chemical produced brominated chemicals, including nPB,<sup>46</sup> in Holley, New York, but filed for bankruptcy in 2004 and dissolved as a corporate entity in 2012.<sup>47</sup> The abandoned factory and surrounding neighborhood are now a Superfund site.<sup>48</sup>

### 3.c. FOREIGN PRODUCERS / DOMESTIC CONSUMERS

U.S. nPB imports are sourced almost entirely from ICL or producers in China. In the last three years, imports were roughly split between the two sources, per Panjiva database records. ICL shipped at least 8.9 million pounds and China shipped at least

<sup>45</sup> <https://www.sec.gov/Archives/edgar/data/1091862/000104746913001629/a2213157z10-k.htm>

<sup>46</sup> Listed as one of two producers of nPB in 1992 ITC data. <https://www.usitc.gov/publications/332/pub2720.pdf>

<sup>47</sup> On the the NYS Department of State Division of Corporations "Corporation and Business Entity Database" search page, [https://appext20.dos.ny.gov/corp\\_public/CORPSEARCH.ENTITY\\_SEARCH\\_ENTRY](https://appext20.dos.ny.gov/corp_public/CORPSEARCH.ENTITY_SEARCH_ENTRY), enter "Diaz Chemical Corporation" in "Entity Name" box and select "All" in "Name Type" box

<sup>48</sup> <https://cumulis.epa.gov/supercpad/cursites/csitinfo.cfm?id=0203341>

9.6 million pounds, from March 2014 to February 2017. Imports surged from both sources in 2015, then dropped by half over the last year.

HEALTHY BUILDING NETWORK GRAPHIC, based upon HBN analysis of Panjiva shipping database records, March 2014 to February 2017.



ICL chemical plant in Ezor Be'er Sheva, Israel. Google Earth image.

### 3.c.i. ICL/Dead Sea Bromine (Israel Chemicals Ltd., Ezor Be'er Sheva, Israel).

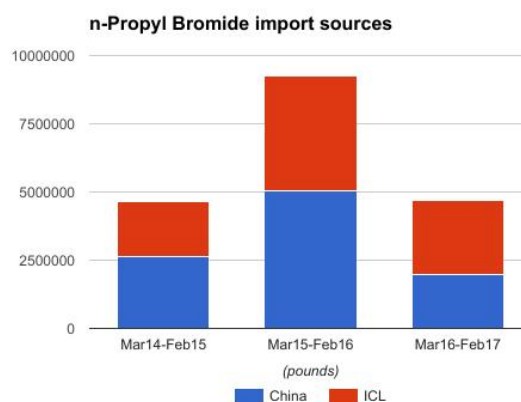
ICL is the leading supplier of imported nPB.

Panjiva shipping records document almost nine million pounds of ICL shipments to the U.S. since March 2014. (See “nPB production and trade” chart at the end of this Technical Appendix)

ICL’s Industrial Products division extracts bromine from the Dead Sea and produces a variety of brominated compounds, including nPB.

The company’s CDR form covering the period 2012 to 2015 redacts production/import volumes in full.

ICL says the nPB is used as solvent in computer and electronic product



manufacturing and commercial electrical and electronic products. ICL provides further consumption details on its website. One page reads: “As a producer of bromine and bromine compounds, Dead Sea Bromine (DSB) is actively involved in the development of n-Propyl Bromide (nPB) as a solvent replacement for ozone - depleting solvents. Solvent cleaning is used in four different sectors of the industry: - Metal cleaning - Electronics cleaning - Precision cleaning - Plastics cleaning.”<sup>49</sup> Another adds that “Propyl bromide (n-PB) is used as an intermediate inorganic synthesis [sic] and in the manufacture of Agrochemicals and Pharmaceuticals.”<sup>50</sup>

- *ICL → Petroferm*

Since 2014, ICL shipped at least 150 metric tons of nPB under the trade names “Lenium GS” and “Lenium ES.” A 2003 EPA analysis of solvent alternatives lists Lenium from Petroferm as a commonly available product.<sup>51</sup>

Petroferm has undergone a series of acquisitions and now operates under the Vantage Specialty Chemicals umbrella, owned by The Jordan Company, a private equity firm.<sup>52</sup> Vantage Specialty Chemicals continues to market nPB formulations for sale in the United States under the Petroferm website, within its line of Lenium solvents. The EPA’s February 2017 information document summarizes the uses of Lenium ES and Lenium GS as described by the company.

### 3.c.ii. Producers in China

China is a leading nPB supplier to the U.S. market. Over the past three years, Panjiva records show that nearly 10 million pounds of nPB were shipped to U.S. consumers. A United Nations panel last year said China has the capacity to produce 20,000 metric tons (44 million pounds) per year,<sup>53</sup> which the country apparently has maintained since at least 2008, when the Halogenated Solvents Industry Alliance said China produced that much nPB.<sup>54</sup>

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<sup>49</sup> <http://icl-ip.com/applications/cleaning-solvent/>

<sup>50</sup> <http://icl-ip.com/products/propyl-bromide>

<sup>51</sup> <https://www.epa.gov/sites/production/files/2014-11/documents/epasolventmarketreport.pdf>

<sup>52</sup> <http://www.vantagespecialties.com/content/history>

<sup>53</sup> [http://conf.montreal-protocol.org/meeting/oewg/oewg-](http://conf.montreal-protocol.org/meeting/oewg/oewg-38/presession/Background%20Documents%20%20TEAP%20Reports/TEAP_Progress_Report_June2016.pdf)

[38/presession/Background%20Documents%20%20TEAP%20Reports/TEAP\\_Progress\\_Report\\_June2016.pdf](http://conf.montreal-protocol.org/meeting/oewg/oewg-38/presession/Background%20Documents%20%20TEAP%20Reports/TEAP_Progress_Report_June2016.pdf)

<sup>54</sup> <http://www.hsia.org/news/nPBPetitionsigned.pdf>

- **Weifang Longwei Industrial Co. (Shandong, China)**

Shandong Weifang Longwei Industrial Co. is situated in “the largest ocean chemical production base in China.” It manufactures industrial salt, chemicals, and seafood.<sup>55</sup>

- **Shuoguang Weidong Chemical Co. (Yangkou Town, Shandong, China)**

Established in 1956, this complex of five “saltworks” and four chemical plants covers a 20 square kilometer area along the south coast of Laizhou Bay north of Shuoguang city in Shandong Province. It produces brominated, phosphorous, and nitrogen flame retardants, industrial salt, industrial sulfur hexafluoride, and industrial bromine.<sup>56</sup> It advertises nPB for use as “Solvent for Industrial Cleaning; Organic Synthesis; Pharmaceutical Intermediate.”<sup>57</sup>

**3.c.iii. Shipments from China likely included in CDR submissions**

- **Weifang Longwei Industrial Co. → Enviro Tech International (Modesto, Calif. And Melrose Park, Ill.)**

Enviro Tech imported nearly 3 million pounds of nPB from China in 2015 alone, according to records in the Panjiva shipping database. Our analysis finds that this is most likely the company that chose to conceal its identity in the 2012-2015 nPB CDR submissions. The undisclosed company reported importing 3,325,390 pounds. The only other undisclosed importing company brought in just 37,400 pounds in 2015.

Enviro Tech<sup>58</sup> was one of four members of the International Brominated Solvents Association. Enviro Tech’s CEO was executive director of the International Brominated Solvents Association from 2003 to 2007. The company introduced nPB to the dry cleaning market in 2005 (DrySolv, which is 93% nPB by weight).<sup>59</sup>

“Enviro Tech has become the top supplier of n-propyl bromide solvents since creating the first formula back in 1994,” reads a company website. In addition to its standard

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<sup>55</sup> <http://longweichem.win.mofcom.gov.cn/en/plate01/index.asp>

<sup>56</sup> <http://www.wdchem.com/products01en/id/23.html>

<sup>57</sup> <http://www.wdchem.com/products01en/id/11.html>

<sup>58</sup> <http://www.envirotechint.com/industrial-solvents/npb-solvents/>

<sup>59</sup>

[https://books.google.com/books?id=10m3BgAAQBAJ&lpg=PR33&ots=KgDWOCz\\_Sy&dq=international%20brominate%20solvents%20association&pg=PA158#v=onepage&q&f=false](https://books.google.com/books?id=10m3BgAAQBAJ&lpg=PR33&ots=KgDWOCz_Sy&dq=international%20brominate%20solvents%20association&pg=PA158#v=onepage&q&f=false) and <http://www.envirotechint.com/pdf/EnSolv%20LO%20SDS.pdf>



product line, it offers third party labeling and toll-blending.<sup>60</sup> Markets for its nPB solvents include aerospace, electronics, metal working, vapor degreasing, medical, asphalt extraction, aerosol (dry) cleaning, and refrigeration flushing.<sup>61</sup>

- **Weifang Longwei Industrial Co. → Amity Imp./Custom Synthesis (Anderson, S.C.)**

Amity Imports, which imports from Weifang Longwei Industrial and is a subsidiary of the Chinese company, is not listed in CDR data. However, it is most likely related to Custom Synthesis (see below), which shares the same address as Amity (1704 Denver Road, Anderson, S.C.) and did submit CDR 2015 data. Panjiva records show that Custom Synthesis imported 734,579 pounds of nPB in the past three years, including 392,422 pounds in 2015; that same year, it reported importing 555,406 pounds in its CDR form.

Custom Synthesis is a toll manufacturer (meaning it provides raw materials or a subset of manufacturing processes to a third-party manufacturer). It serves a wide range of industries including paper, plastics, metal working, Kosher applications, personal care and **cosmetics**.<sup>62</sup>

Custom Synthesis' CDR form says it imported 555,406 pounds in 2015, 476,064 pounds in 2014, 558,936 pounds in 2013 and 289,240 pounds in 2012. It states the chemicals were incorporated into solvents (for cleaning and degreasing) for electrical equipment, appliance, and component manufacturing for industrial and commercial uses.



Custom Synthesis / Amity plant in Anderson, SC. Google Maps Street View.

<sup>60</sup> <http://www.envirotechint.com/blog/p.131111000/enviro-tech-pioneers-of-the-npb-solvent-industry/>

<sup>61</sup> <http://www.envirotechint.com/industries-served/>

<sup>62</sup> <http://customsynthesis.net/index.php/services>

- **Weifang Longwei Industrial Co. → Wego Chemical & Mineral Corp** (Great Neck, N.Y.)

Wego Chemical fully disclosed CDR data for the reporting period. It reported importing 714,340 pounds of nPB in 2015, 297,221 pounds in 2014, 490,770 pounds in 2013, and 238,097 pounds in 2012.

Its CDR form said the chemicals are used as solvents in industrial services, and commercial cleaning and furnishing care products.

Its website says, “Wego Chemical Group is an experienced importer of N-Propylbromide. Wego has the capability to stock and sell N-Propylbromide in numerous countries around the world. Wego is a supplier and distributor of N-Propylbromide worldwide. As a supplier of N-Propylbromide, Wego provides supply chain solutions to partners and customers in numerous industries. We do this by working with competitive and reliable manufacturers of N-Propylbromide.

“Wego Chemical Group supplies N-Propylbromide in N-Propylbromide Neat, N-Propylbromide Stabilized, N-Propylbromide Tech grade(s). Wego supplies N-Propylbromide to users/customers for Adhesives & Sealants, **Flame Retardants**, Household, Industrial & Institutional Chemicals, Industrial Chemicals, Metal Working, Finishing & Flux, Solvents & Degreasers.”<sup>63</sup>

- **MC International** (Miami, Fla.)

MC International, which also does business as Miami Chemical,<sup>64</sup> specializes “in providing chemical products originating from around the world such as secure China, South America, India, and Eastern Europe.”<sup>65</sup>

MC International submitted CDR reports indicating that it imported undisclosed quantities of nPB in each year of the reporting period (2012 to 2015). Its submission says the chemical is incorporated into **construction adhesives** used in the industrial, commercial and consumer sectors. HBN could not identify any corresponding shipment records in the Panjiva database.

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<sup>63</sup> <http://www.wegochem.com/supplier-distributor/n-propyl-bromide/2603/106-94-5>

<sup>64</sup> [https://www.usitc.gov/publications/701\\_731/pub4630.pdf](https://www.usitc.gov/publications/701_731/pub4630.pdf)

<sup>65</sup> <http://www.miamichemical.com/>

- **China (likely Weifang Longwei) → Phoenix Chemical** (Calhoun, Georgia)

According to its CDR submission, Phoenix Chemical imported 88,080 pounds in 2015, and none in prior years. The form states that it packages the chemical for industrial uses that are “not known or reasonably ascertainable.”

Panjiva records show Phoenix Chemical imported at least 69,005 pounds of nPB in 2015, and 42,990 pounds in 2016 (which is after the reporting period).

“Phoenix offers a wide range of functional specialties that deliver unique performance characteristics for the **cosmetic industry**,” says its website.<sup>66</sup>

According to its listing in UL Prospector, “Phoenix Chemical, Inc. engages in developing and supplying unique chemical products for the **Personal Care and Cosmetics** industry. This company focuses on custom synthesis, and produces various kinds of hair conditioning agents, nail laquer polymers, foam stabilizers, and emulsifying aids.”<sup>67</sup>

### **3.c.iv. Shipments possibly not included in CDR submissions**

HBN’s analysis of CDR and Panjiva data found that as many as eight companies have imported reportable amounts of nPB and may not have submitted CDR forms in compliance with TSCA reporting requirements.

We calculate that at least 1.4 million pounds of nPB imports in 2014 and 1.5 million pounds in 2015, all from China, were not reported in CDR submissions.

See Attachment 2 for further details of this calculation. Potentially unreported imports include the following, listed in order of total weight of nPB imported in 2015.

- **Shuoguang Weidong → Chemical Solvents (3751 Jennings Road, Cleveland OH 44109)**

Chemical Solvents Inc. of Cleveland, Ohio routinely imports nPB from Shuoguang Weidong Chemical Co. It imported at least 244,713 pounds in 2014, 232,808 pounds in 2015, and 155,205 pounds in 2016.

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<sup>66</sup> <http://phoenix-chem.com/>

<sup>67</sup> <https://www.ulprospector.com/en/na/PersonalCare/Detail/1267/44557/PELEMOL-G45L>

A Chemical Solvents press release in 2015 describes nPB as a “nonflammable, non-chlorinated industrial solvent that removes wax, oil and grease from metals. It can replace solvents like TCE, PCE and DCM all of which are rated as HAPs (Hazardous Air Pollutants). NPB provides superior acid neutralization, white metals reaction prevention, superior soil lifting, rust formation prevention and is U.S. EPA SNAP approved. NPB can be used for vapor degreasing, ultrasonic cleaning, dip tanks, flushing and cold cleaning as well as a solvent in adhesive formulations and aerosol formulations. Chemical Solvents, Inc. stocks 550 net pound drums and 55 pound pails as well as recycled NPB. NPB can also be easily recycled. Chemical Solvents, Inc. is headquartered in Cleveland, Ohio and provides custom blending, commodity chemicals and solvents, toll manufacturing and waste solutions for industry.”<sup>68</sup>

- Shuoguang Weidong → **Storchem** (103 Foulk Rd, Suite 202, Wilmington DE 19803)

Storchem of Wilmington, Delaware, imported 222,887 pounds of n-propyl bromide from Shuoguang Weidong in 2015. Storchem sells a wide variety of solvents and other chemicals. Its online list of solvents, however, no longer includes nPB.<sup>69</sup>

- Shuoguang Weidong → **Superior Oil** (1402 N Capitol Ave., Indianapolis IN 46202) (a/k/a **Superior Solvents**)

Superior Oil, which also operates under the name Superior Solvents, imported 171,960 pounds of nPB in 2015, and, after the CDR reporting period ended, 126,104 pounds in 2016.

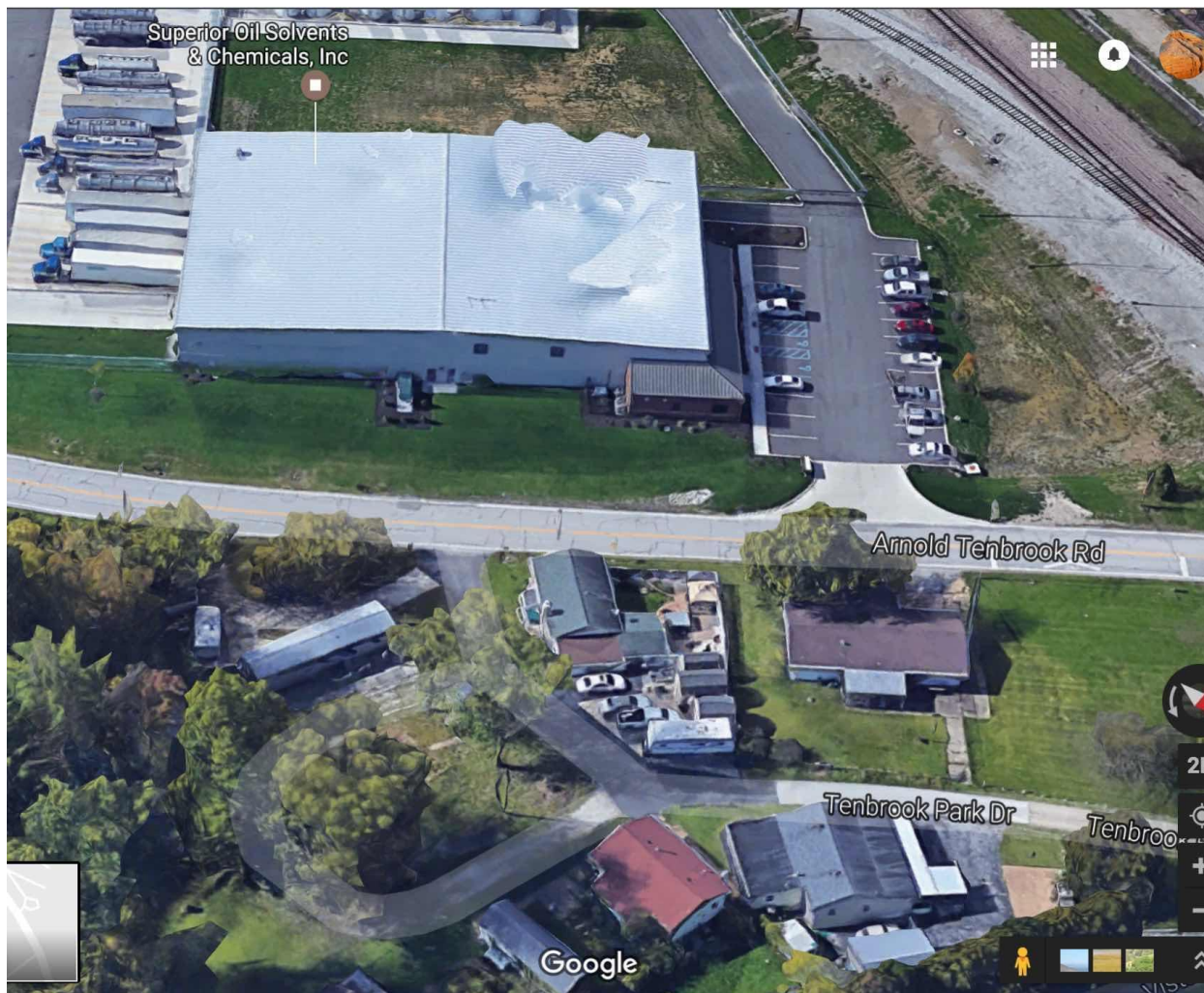
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<sup>68</sup> <https://www.send2press.com/wire/n-propyl-bromide-an-alternative-for-tce-pce-and-dcm-2015-0629-03/>

<sup>69</sup> <http://www.storchem.com/products-catalogue/solvents/> . An old url -- <http://www.storchem.com/pdf/npropcomparo.pdf> -- linking to nPB product information is no longer available and is not available on the Wayback Machine.



Superior Oil's catalog lists nPB among a wide variety of solvents serving a wide range of industries.



Google Earth image. Superior Solvents' chemical distribution facility in the neighborhood of Arnold, Missouri, holds an air permit to release certain amounts of volatile organic compounds and hazardous air pollutants.<sup>70</sup>

- Weifang Longwei Industrial Co. → **Murashu Printing Technology Inc. / Unistar Chemical** (5301 Keystone Court, Rolling Meadows IL 60008)

Murashu Printing Technology and Unistar Chemical share the same address in Rolling Meadows, Illinois. Combined, according to Panjiva records, they imported at least 379,415 pounds of nPB from China in 2014 and 95,901 pounds in 2015.

<sup>70</sup> <https://dnr.mo.gov/env/apcp/permits/docs/superiorsolv-arnold2013cp.pdf>

Murashu Printing Technology is categorized as a one-person privately held company that prints fiber and silk broadwoven fabrics.<sup>71</sup> Unistar Chemical operates five warehouses and sells nPB, PERC, TCE and trans-1,2-dichloroethylene.<sup>72</sup> Unistar sells nPB for use as a dry cleaning solvent, an intermediate for solvents, foam blowing agents and refrigerants, and services the medical equipment cleaning industry.<sup>73</sup>

- **Unknown source** → **Dow Agrosciences** (Client 10 Extension Bldg 489, Midland MI 48667.)

On December 23, 2015, according to Panjiva, Dow Agrosciences imported 85,980 lbs. of nPB from an unidentified supplier in Asia. The shipment went through Busan, South Korea, a frequent transshipment point for brominated chemicals made in China.

Dow incorporates nPB (at <5% by weight) in its Thermax **polyisocyanurate** insulation,<sup>74</sup> and a Dow technical paper says nPB is used as a flame retardant in this type of insulation.<sup>75</sup>

- **Unknown supplier (China)** → **Prime Agency** (17595 Almahurst Rd., Suite 209, City Of Industry CA 91748)

Prime Agency, a shipping logistics company, imported one tank of nPB, weighing 34,479 pounds, on January 17, 2015.

- **Weifang Longwei Industrial Co.** → **First Continental International (NJ) Inc.** (11 Harristown Rd, 1st Fl., Glen Rock NJ 07452)

In 2014, First Continental International (NJ) Inc. imported 225,312 pounds of nPB from Weifang Longwei, according to Panjiva records. It also imported 44,974 pounds in 2016, after the CDR reporting period.

According to its website, which does not discuss nPB, “First Continental International (NJ) Inc. is a global leader in the sourcing and distribution of chemicals and other raw materials directly from manufacturers in China and Asia. From its inception as a subsidiary of Sinochem— China’s largest chemical manufacturing and distribution

<sup>71</sup> <http://www.manta.com/c/mb40x8z/murashu-printing-technology-inc>

<sup>72</sup> <http://www.unistarchemical.com/products.htm>

<sup>73</sup> <http://www.unistarchemical.com/>

<sup>74</sup> <https://www.pharosproject.net/uploads/files/sources/20/1373050828.pdf>

<sup>75</sup>

[https://www.researchgate.net/profile/Steven\\_Crain2/publication/292158835\\_New\\_Class\\_of\\_Brominated\\_Polymeric\\_Flame\\_Retardants\\_for\\_Use\\_in\\_Rigid\\_Polyurethane\\_Foams/links/56abd48b08ae43a39809ceb4.pdf](https://www.researchgate.net/profile/Steven_Crain2/publication/292158835_New_Class_of_Brominated_Polymeric_Flame_Retardants_for_Use_in_Rigid_Polyurethane_Foams/links/56abd48b08ae43a39809ceb4.pdf)

entity— FCI has grown into an independent, American-based company that maintains direct relationships with over 800 of China's most reliable and well-established chemical manufacturers."<sup>76</sup> First Continental's primary customer is the **cosmetics** industry.<sup>77</sup>

- **Shuoguang Weidong (China) → The Solvents Company** (75 Clarendon Ave., Kingston NY 12401)

Solvents Co. Inc. imported 129,190 pounds of nPB from an unnamed company in China in 2014, 77,943 pounds from Shuoguang Weidong in 2016, and 25,331 lbs. from Shuogang Weidong in February 2017.

Company description: "We at Solvents Company are dedicated to the development and sales of non-flammable, cleaning solvents. We serves (*sic*) any and all industries that has (*sic*) a need to clean parts and assemblies made of any available substance."<sup>78</sup>

It sells three products<sup>79</sup>: a "regulated chlorinated" "heavy-duty industrial degreaser," an "ultra degreaser" that is neither nPB-based or chlorinated, and an nPB-based "high-performance super degreaser." The nPB product's technical data sheet recommends its use for:

- Mechanical degreasing: "motors, brakes, clutch, **transmission**, and **gear assemblies**, **forklifts**, engines, chains, cables, air tools, dies, molds, bearings, generators, compressors"; and
- Electrical cleaning: "contactors / relays, sensors, high-voltage cables, contacts, controls, circuit breakers, instrumentation, meters, switches."<sup>80</sup>

Note this potential exposure scenario: Solvents Company appears to be located in an old brick warehouse in a residential/retail area of Kingston, NY.<sup>81</sup>

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<sup>76</sup> <http://www.fci-nj.com/>

<sup>77</sup> <http://www.fci-nj.com/so.asp?t=2&key=solvent&button.x=0&button.y=0&button=Search>  
<http://www.fci-nj.com/About.asp?id=10>

<sup>78</sup> <http://www.solventsco.com/about-us>

<sup>79</sup> <http://www.solventsco.com/products/industrial>

<sup>80</sup> [http://www.solventsco.com/application/files/2014/7946/1889/TDS\\_H-P\\_Super\\_Degreaser.pdf](http://www.solventsco.com/application/files/2014/7946/1889/TDS_H-P_Super_Degreaser.pdf)

<sup>81</sup> <https://www.google.com/maps/place/9+Cornell+St,+Kingston,+NY+12401/@41.929852,-74.005047,399m/data=!3m1!1e3!4m5!3m4!1s0x89dd0fa0f6542b45:0xfaa170a8730fc9c5!8m2!3d41.929742!4d-74.003399>

### 3.c.v. Imports after the last CDR reporting period (i.e. for 2016 and 2017)

- **Shouguang Fukang Pharmaceutical** (China) → **PHT International** (Charlotte, NC)

PHT International imported two shipments of nPB from Shouguang Fukang Pharmaceutical of China in 2016 totalling 91,933 pounds. According to the company's website: "Since 1993, PHT International, Inc., has been a versatile supplier and manufacturer of fine and specialty chemicals including high purity intermediates for the agrochemical, pharmaceutical, polymer/industrial and food/beverage industries. PHT International utilizes its own plant and other high quality production partners in China to establish and maintain a stable global market for our products."<sup>82</sup>

### 4. Use

n-Propyl Bromide uses not listed in EPA Preliminary Information				
Uses	CDR reports (2012 - 2015)	Listed in EPA Use Profile (Feb 2017)	Historic	Current Lit.
Cosmetics, Personal Care	no	no	no	Phoenix
Flame Retardant (general, in polyisocyanurate insulation, in blowing agent of foams)	no	no	HSIA (FR adhesive)	Wego, Dow, Tulsar
Mechanical degreasing of transmissions, gear assemblies, forklifts	no	Not specifically	no	Solvents Co.
Research & Development	no	no	no	Oakwood

#### Sources:

Phoenix: <http://phoenix-chem.com/> and

<https://www.ulprospector.com/en/na/PersonalCare/Detail/1267/44557/PELEMOL-G45L>

Wego: <http://www.wegochem.com/supplier-distributor/n-propyl-bromide/2603/106-94-5>

Dow:

[https://www.researchgate.net/profile/Steven\\_Crain2/publication/292158835\\_New\\_Class\\_of\\_Brominated\\_Polymeric\\_Flame\\_Retardants\\_for\\_Use\\_in\\_Rigid\\_Polyurethane\\_Foams/links/56abd48b08ae43a39809ceb4.pdf](https://www.researchgate.net/profile/Steven_Crain2/publication/292158835_New_Class_of_Brominated_Polymeric_Flame_Retardants_for_Use_in_Rigid_Polyurethane_Foams/links/56abd48b08ae43a39809ceb4.pdf)

Tulsar: <http://www.tulstar.com/products/chemicals/solvents-and-cleaners/n-propyl-bromide-npb/>

HSIA: <http://www.hsia.org/news/nPBPetitionsigned.pdf>

<sup>82</sup> <http://www.phtchemical.com/>



Solvents Co.: [http://www.solventsco.com/application/files/2014/7946/1889/TDS\\_H-P\\_Super\\_Degreaser.pdf](http://www.solventsco.com/application/files/2014/7946/1889/TDS_H-P_Super_Degreaser.pdf)

Oakwood:

<http://www.oakwoodchemical.com/ProductsList.aspx?CategoryID=-2&txtSearch=125890&ExtHyperLink=1>

## - Flame Retardant in Polyisocyanurate Insulation

EPA's public information document briefly references the use of nPB in Dow's THERMAX insulation. A second polyisocyanurate insulation, not in the document, also contains nPB at up to 5% by weight of OX Engineered Products' ISO RED insulation, at the same proportion as in Dow's THERMAX.<sup>83</sup> Dow scientists recently wrote that n-propyl bromide is used as a flame retardant in rigid polyurethane foam insulation. "Brominated flame retardants most commonly used in a rigid thermoset PU foam include isocyanate reactive arylbrominated polyester polyols, reactive aliphatic brominated small molecules such as dibromoneopentyl glycol, tribromoneopentyl alcohol and non-reactive brominated additive molecules such as HBCD or n-propyl bromide."<sup>84</sup>

## - Research & Development

Oakwood Chemicals offers nPB for sale for research and development.<sup>85</sup> Oakwood Chemicals is a customer of Fluorochem Ltd. (Derbyshire, U.K.),<sup>86</sup> which also lists R&D as the relevant use of the nPB it offers for sale.<sup>87</sup> No recent Panjiva shipping data were found for either Oakwood or Fluorochem.

## 5. End of Life

Very little literature addresses the fate of nPB after products that contain it are discarded or recycled.

In 2002, the parties to the Montreal Protocol urged industry and users of products containing nPB "to take care to minimize exposure and emissions during use and disposal."<sup>88</sup>

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<sup>83</sup> [http://oxengineeredproducts.com/wp-content/uploads/2015/01/SDS\\_OX-ISO-Red-MAX-Sheathing\\_2015\\_0724.pdf](http://oxengineeredproducts.com/wp-content/uploads/2015/01/SDS_OX-ISO-Red-MAX-Sheathing_2015_0724.pdf)

<sup>84</sup> [https://www.researchgate.net/profile/Steven\\_Crain2/publication/292158835\\_New\\_Class\\_of\\_Brominated\\_Polymeric\\_Flame\\_Retardants\\_for\\_Use\\_in\\_Rigid\\_Polyurethane\\_Foams/links/56abd48b08ae43a39809ceb4.pdf](https://www.researchgate.net/profile/Steven_Crain2/publication/292158835_New_Class_of_Brominated_Polymeric_Flame_Retardants_for_Use_in_Rigid_Polyurethane_Foams/links/56abd48b08ae43a39809ceb4.pdf)

<sup>85</sup> <http://www.oakwoodchemical.com/ProductsList.aspx?CategoryID=-2&txtSearch=125890&ExtHyperLink=1>

<sup>86</sup> Panjiva.

<sup>87</sup> [www.fluorochem.co.uk/System/DownloadSDS?fileName=\(EN\)BR1117\\_1.00.pdf](http://www.fluorochem.co.uk/System/DownloadSDS?fileName=(EN)BR1117_1.00.pdf)

<sup>88</sup> [http://ozone.unep.org/Publications/MP\\_Handbook/Section\\_2\\_Decisions/Article\\_2/decs-new\\_substances/Decision\\_XIII-7.shtml](http://ozone.unep.org/Publications/MP_Handbook/Section_2_Decisions/Article_2/decs-new_substances/Decision_XIII-7.shtml)

Polyisocyanurate insulation foam, in which nPB functions as a flame retardant, can deliver nPB into construction & demolition (C&D) waste streams. Any material that has been glued with an nPB-bearing adhesive can also carry this toxic chemical into landfills, incinerators, and recycling operations. Materials potentially bearing nPB include laminates, particle board, upholstery, fabrics, and furniture foam.

## 6. Potentially Vulnerable Populations / Exposure Scenarios

### a. Global Population (Ozone Layer Depletion)

The potential contribution of nPB to **ozone layer depletion** is an exposure scenario not contemplated in EPA's February 2017 information summary. Although EPA promoted nPB as a substitution for ozone depleting substances (ODS), nPB itself is also an ODS.

Global environmental authorities sounded many warnings. In 2002, the parties to the Montreal Protocol agreed to "urge industry and users to consider limiting the use of nPB to applications where more economically feasible and environmentally friendly alternatives are not available."<sup>89</sup> The same year, World Meteorological Association's Ozone Assessment said the impact of nPB "can be significant if [its] emissions are large."<sup>90</sup>

In 2003, ozone layer experts noted, "A range of new chemicals, used in everything from fire extinguishers to cleaning fluids, are appearing on the market to the concern of scientists studying the ozone layer. The new substances, with names such as n-propyl bromide and halon-1202, are not controlled by the Montreal Protocol. Studies indicate that some of the new substances, which are being used as replacements for banned ones, may have the potential to damage the ozone layer. The quantities being manufactured are at the moment believed to be small, but over the coming years they may be produced in ever increasing quantities. Until recently it was thought that these new substances could not damage the ozone layer, because they did not live long enough to reach the stratosphere. However new research is changing this view."<sup>91</sup>

In 2010, the UNEP Chemicals Technical Options Committee noted that "because of the presence of bromine in the molecule there is potential for ozone depletion arising from transfer of nPB to the stratosphere, and decomposition there with release of bromine atoms.... Because emitted nPB is rapidly destroyed in the lower atmosphere, and therefore does not give rise to significant stratospheric bromine concentrations, its ODP

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<sup>89</sup> [http://ozone.unep.org/Publications/MP\\_Handbook/Section\\_2\\_Decisions/Article\\_2/decs-new\\_substances/Decision\\_XIII-7.shtml](http://ozone.unep.org/Publications/MP_Handbook/Section_2_Decisions/Article_2/decs-new_substances/Decision_XIII-7.shtml)

<sup>90</sup> [https://www.esrl.noaa.gov/csd/assessments/ozone/2002/executive\\_summary.html](https://www.esrl.noaa.gov/csd/assessments/ozone/2002/executive_summary.html)

<sup>91</sup> <http://www.un.org/earthwatch/atmosphere/ozonedepletion.html>

[ozone depleting potential] is calculated to be in the range of 0.02-0.1,<sup>92</sup> similar to those of HCFCs.”<sup>93</sup>

While the Montreal Protocol does not yet control nPB,<sup>94</sup> in 2009, the European Union extended its Ozone Depleting Substance reporting requirements to nPB. EU countries reported importing 1,014 metric tonnes of nPB in 2013<sup>95</sup> and 948 metric tons in 2014,<sup>96</sup> with ODPs of 101.4 and 94.8 metric tons, respectively.

Using the EU’s ODP conversion factor of 0.1 for nPB, the production and import of n-propyl bromide in the USA of **87,200,279** pounds during the CDR reporting period (2012-2015) exceeded 3,955 ODP tons, exceeded 3,955 ODP tons over the recent four-year CDR reporting period,<sup>97</sup> and was likely higher due to unreported imports.

The U.S. and EU’s ODP tons equivalent of reported nPB production and import were almost even during the two year 2013-2104 period (933 ODP tons per year from the US, 981 tpy from the EU).

## - SPECIFIC POPULATIONS

The NTP says “a significant number of people in the United States are exposed to 1-bromopropane as a result of widespread usage, high production volume, and high levels of 1-bromopropane in commercial and industrial settings.”<sup>98</sup> Particularly vulnerable populations include:

- **Chemical plant manufacturers.** A medical team in China surveyed female workers at a factory in 2001 and “confirmed the neurotoxicity of 1-BP in humans.”<sup>99</sup>
- **Furniture foam workers.** Health impacts on North Carolina furniture workers and holes in OSHA that allow these impacts are profiled in a [2013 New York Times article](#). “Royale has not switched away from the nPB glues, managers said, because alternatives did not work well, were sometimes more dangerous

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<sup>92</sup> Ozone Depletion Potential (ODP) values represent a substance’s ability to degrade the stratospheric ozone layer relative to CFC-11 (which has an ODP of 1.0).

<sup>93</sup> [https://acd-ext.gsfc.nasa.gov/Documents/O3\\_Assessments/Docs/WMO\\_2010/2010assessment/CTOC\\_2010\\_Assessment\\_Report.pdf](https://acd-ext.gsfc.nasa.gov/Documents/O3_Assessments/Docs/WMO_2010/2010assessment/CTOC_2010_Assessment_Report.pdf)

<sup>94</sup> [http://www.unep.fr/ozonaction/information/tradenames/trade\\_chem.asp?ch=n-propyl\\$bromide](http://www.unep.fr/ozonaction/information/tradenames/trade_chem.asp?ch=n-propyl$bromide)

<sup>95</sup> [www.eea.europa.eu/publications/ozone-depleting-substances-2014/download](http://www.eea.europa.eu/publications/ozone-depleting-substances-2014/download)

<sup>96</sup> [www.eea.europa.eu/publications/ozone-depleting-substances-2014/download](http://www.eea.europa.eu/publications/ozone-depleting-substances-2014/download) and [www.eea.europa.eu/publications/ozone-depleting-substances-2015/download](http://www.eea.europa.eu/publications/ozone-depleting-substances-2015/download)

<sup>97</sup> CDR reported total 87,200,279 pounds production + imports, 2012-2015, converted to metric tons and multiplied by 0.1 ODP.

<sup>98</sup> <https://ntp.niehs.nih.gov/ntp/roc/content/profiles/bromopropane.pdf>

<sup>99</sup> <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1247523/#b5-ehp0112-001319>

and were almost always more expensive.” See also: “N-Acetyl-S-(n-Propyl)-l-Cysteine in Urine from Workers Exposed to 1-Bromopropane in Foam Cushion Spray Adhesives” <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2758670/>

- **Dry cleaning workers.** A 2010 “Preliminary study of propyl bromide exposure among New Jersey dry cleaners” noted that “very little information is known about toxicity and exposure to nPB. Some nPB-containing products are marketed as nonhazardous and “green” or “organic.” This has resulted in some users perceiving the solvent as nontoxic and has resulted in at least one significant poisoning incident in New Jersey.”<sup>100</sup>
- **Fenceline communities.** In addition to workers, neighbors are exposed to releases from dry cleaning and other operations that use nPB, as the Chemical Safety Advisory Committee discussed last year. The CSAC found that any risk assessment should consider including “chronic exposure of the general public near facilities using 1-BP... (E)xposures occurring in close proximity to facilities using 1-BP could result in a disproportionate health risk in **low-income communities and communities of color**, as has been documented with perchloroethylene emissions from dry cleaning facilities.”<sup>101</sup> As several organizations explained last year, “Exposure to 1-BP due to its presence in ambient air from dry cleaning, foam and furniture manufacturing and chemical manufacturing likely disproportionately impacts low-income communities and communities of color. For example, EPA found that air emissions from foam fabricators covered by a separate air toxics rule created disproportionate exposure and other impacts for African Americans, since African Americans are overrepresented in communities within a 3 mile radius of foam fabricators. The African American population in areas surrounding foam manufacturing facilities exceeds the national average by 53% (19% versus 13%).”<sup>102</sup>

*“When efforts are made to eliminate a highly hazardous chemical in products, manufacturers frequently substitute another hazardous chemical in its place.... For example... less-studied and unregulated halogenated solvents (are) adopted in place of ones that have been extensively studied.”*

<sup>100</sup> <https://www.ncbi.nlm.nih.gov/pubmed/20863050>

<sup>101</sup> [https://www.epa.gov/sites/production/files/2016-08/documents/final\\_csac\\_minutes\\_no\\_2016-02\\_082216.pdf](https://www.epa.gov/sites/production/files/2016-08/documents/final_csac_minutes_no_2016-02_082216.pdf)

<sup>102</sup> Eve Gardner and Emma Cheuse, Comments on TSCA Work Plan Chemical Risk Assessment Peer Review Draft 1- Bromopropane; Docket ID: EPA-HQ-OPPT-2015-0084, Earthjustice, on behalf of Blue Green Alliance, Earthjustice, Environmental Health Strategy, Natural Resources Defense Council, Safer Chemicals Healthy Families and Sierra Club Toxics Committee, May 9, 2016

- United Nations Environment Programme Annual Yearbook 2013<sup>103</sup>

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<sup>103</sup> [http://www.unep.org/pdf/uyb\\_2013\\_new.pdf](http://www.unep.org/pdf/uyb_2013_new.pdf)

## 7. Health and Environmental Hazards Associated with n-Propyl Bromide

Hazards taken from Pharos CML, February 24, 2017

Hazards associated with CAS: 106-94-5

Red are very high concern to avoid; Orange are high concern to avoid. More details on hazards and hazard levels [here](#).

Hazard and Level	Sources
<b>Human Health Hazards</b>	
Cancer	<ul style="list-style-type: none"> <li>➤ <a href="#">US NIH - Report on Carcinogens - Reasonably Anticipated to be Human Carcinogen</a></li> <li>➤ <a href="#">MAK - Carcinogen Group 2 - Considered to be carcinogenic for man</a></li> <li>➤ <a href="#">CA EPA - Prop 65 - Carcinogen</a></li> </ul>
Cancer	<ul style="list-style-type: none"> <li>➤ <a href="#">US EPA - PPT Chemical Action Plans - Possible carcinogen - TSCA Criteria met</a></li> <li>➤ <a href="#">IARC - Group 2B - Possibly carcinogenic to humans</a></li> <li>➤ <a href="#">Australia - GHS - H351 - Suspected of causing cancer</a></li> <li>➤ <a href="#">Japan - GHS - Carcinogenicity - Category 2</a></li> </ul>
Developmental	<ul style="list-style-type: none"> <li>➤ <a href="#">US NIH - Reproductive &amp; Developmental Monographs - Clear Evidence of Adverse Effects - Developmental Toxicity</a></li> <li>➤ <a href="#">CA EPA - Prop 65 - Developmental toxicity</a></li> </ul>
Developmental	<ul style="list-style-type: none"> <li>➤ <a href="#">EU - R-phrases - R63 - Possible risk of harm to the unborn child</a></li> </ul>
Reproductive	<ul style="list-style-type: none"> <li>➤ <a href="#">US NIH - Reproductive &amp; Developmental Monographs - Clear Evidence of Adverse Effects - Reproductive Toxicity</a></li> <li>➤ <a href="#">EU - R-phrases - R60 - May impair fertility</a></li> <li>➤ <a href="#">CA EPA - Prop 65 - Reproductive Toxicity - Female</a></li> <li>➤ <a href="#">CA EPA - Prop 65 - Reproductive Toxicity - Male</a></li> <li>➤ <a href="#">EU - GHS (H-Statements) - H360FD - May damage fertility. May damage the unborn child</a></li> <li>➤ <a href="#">EU - REACH Annex XVII CMRs - Toxic to Reproduction Category 2 - Substances which should be regarded as if they impair fertility or cause Developmental Toxicity in humans</a></li> <li>➤ <a href="#">EU - Annex VI CMRs - Reproductive Toxicity - Category 1B</a></li> <li>➤ <a href="#">EU - SVHC Authorisation List - Toxic to reproduction - Prioritized for listing</a></li> <li>➤ <a href="#">Japan - GHS - Toxic to reproduction - Category 1B</a></li> </ul>
Reproductive	<ul style="list-style-type: none"> <li>➤ <a href="#">Japan - GHS - Toxic to reproduction - Category 2</a></li> </ul>
Organ Toxicant	<ul style="list-style-type: none"> <li>➤ <a href="#">EU - R-phrases - R48: Danger of serious damage to health by prolonged exposure.</a></li> <li>➤ <a href="#">Japan - GHS - Specific target organs/systemic toxicity following repeated exposure - Category 1</a></li> </ul>
<b>Environmental Hazards</b>	
Ozone Depletion	<ul style="list-style-type: none"> <li>➤ <a href="#">EU - Ozone depletion substances - Annex II Part B: substances to be reported under Article 27</a></li> </ul>

## **n-Propyl Bromide Production and Trade Chart**

## nPB production and trade

### 1-Bromopropane (n-Propyl Bromide) Imports, Production, Exports, 2012 to present

[illegible]



## nPB production and trade

1-Bromopropane (n-Propyl Bromide) Imports, Production, Exports, 2012 to present (continued)							
		2012	2013	2014	2015	2016	2017 (Jan-Feb)
<b>Possible CDR-reported amounts in other Panjiva records (deficits in Panjiva records for CDR reporting companies)</b>							
Enviro Tech (most likely to be Company A)				1,003,534	412,205		
Custom Synthesis / Amity				243,256	162,984		
Phoenix Chemical				0	19,075		
Wego Chemical				277,820	504,460		
<b>A. TOTAL - CDR data not accounted for directly in Panjiva search</b>				521,076	686,519		
<b>Companies not named in CDRs (Panjiva records)</b>				(March-Dec 2014 only)			
Chemical Solvents				244,713	232,808	155,205	0
Storchem				0	222,887	0	0
Superior Oil / Superior Solvents				0	171,960	126,104	0
Unistar Chemical				305,560	95,901	0	0
Dow Chemical				0	85,980	0	0
Prime Agency				0	34,479	0	0
First Continental				225,312	0	42,770	0
Murashu Printing Technology Inc.				73,855	0	0	0
Solvents Co.				129,190	0	291,010	0
Pht International				0	0	91,933	0
Tw Logistics				0	0	44,974	0
Unipac Shipping				0	0	42,329	0
Unknown				690,487	858,479	614,428	42,770
<b>B. TOTAL - Companies not named in CDRs and/or Panjiva</b>				1,669,117	1,702,494		
Minimum imports not reported in CDRs (Total B minus Total A)				1,148,041	1,015,975		
				(*) March to Dec.			
<b>Healthy Building Network synthesis and analysis of shipping records of the Panjiva database, March 2017.</b>							

Docket ID Number: EPA-HQ-OPPT-2016-0741

## Consumer Appendix

### Consumer Products Containing nPB

**Introduction.** Below is a list of products sold on retail websites, and thus available for purchase by consumers, that have been verified to contain 1-bromopropane (n-Propyl Bromide or nPB) (CASRN 106-94-5) from Material Safety Data Sheets (MSDSs) or Safety Data Sheets (SDSs).

**Methodology.** To find these products, Safer Chemicals, Healthy Families staff searched via Google for MSDSs and SDSs referring to “106-94-5,” including key words for relevant product types, and then confirmed the products described in the MSDSs are sold on major retail websites such as [www.amazon.com](http://www.amazon.com) or [www.walmart.com](http://www.walmart.com). Additionally, we reviewed the “List of Products and Articles” in EPA’s February 2017 “Preliminary Information on Manufacturing, Processing, Distribution, Use, and Disposal” for nPB to determine which products are sold on retail websites. An asterisk means the product is on EPA’s February 2017 list.

**Notes.** The product descriptions quoted below are from the seller’s website, unless otherwise noted. Safer Chemicals, Healthy Families has not verified the accuracy of the product descriptions.

#### CLEANERS AND DEGREASERS

➤ **ACL Staticide Lubricant Contact Renew Aerosol**



Product Description:

“... engineered to clean, lubricate and protect connectors in one easy step. This nonflammable cleaner/lubricant will clean contact surfaces and provide a long-lasting protective film that protects the contact from corrosion.”

Sold At: [https://www.amazon.com/ACL-Staticide-Lubricant-Contact-Aerosol/dp/B00K0C13TK/ref=sr\\_1\\_1](https://www.amazon.com/ACL-Staticide-Lubricant-Contact-Aerosol/dp/B00K0C13TK/ref=sr_1_1)

Contains 65-75% nPB by weight, according to the MSDS:  
[http://www.aclstaticide.com/safety\\_datasheets/8606SDS\\_14.pdf](http://www.aclstaticide.com/safety_datasheets/8606SDS_14.pdf)

➤ **ACL Staticide Precision Rinse NS Aerosol\***



**Product Description:**

"... a nonflammable cleaner that quickly removes flux, grease, oils, dirt, dust and other contaminants from electronic components and assemblies."

Sold At: <https://www.amazon.com/ACL-Staticide-Precision-Rinse-Aerosol/dp/B00K0C136S>

Contains 65-75% nPB by weight, according to the MSDS:  
[http://www.aclstaticide.com/safety\\_datasheets/8603MSDS\\_14.pdf](http://www.aclstaticide.com/safety_datasheets/8603MSDS_14.pdf)

➤ **CRC Cable Clean Degreaser\***



**Product Description:**

"... quickly removes grease, oil, wax, dirt, silicone lubricants and other contaminants from electrical machinery and the semi-conductive jackets and insulations of high voltage cables ... Low toxicity - lower toxicity than most common chlorinated solvents."

Sold At: <https://www.amazon.com/CRC-Voltage-Cleaner-Degreaser-Aerosol/dp/B000L9QF7W>

Contains 90-100% nPB, according to the SDS:  
<http://docs.crcindustries.com/msds/2064.pdf>

➤ **CRC Cable Clean RD\***



**About This Item:**

Non-flammable, Residue free, rapid evaporation; Removes wire pulling compounds, antioxidation compounds, and semi-conductive particles which can remain on cable after removal of insulation; Non-corrosive, non-conductive and non-staining

Sold At: <https://www.walmart.com/ip/16-Oz-Cable-Clean/150980390>

Contains 1-3% nPB, according to the SDS:  
<http://docs.crcindustries.com/msds/2150.PDF>

➤ **CRC Lecithin Mold Release Aerosol**



**Product Description:**

“... suitable for most applications where post-mold parts will be painted, stenciled, glued, bonded, laminated, hot-stamped or metalized. This product is a food-approved, vegetable based, non-silicone mold release.”

Sold At: <https://www.amazon.com/CRC-Lecithin-Release-Aerosol-Clear/dp/B007IABF04>

Contains 20-30% nPB, according to the SDS:  
<http://docs.crcindustries.com/msds/3306.pdf>

➤ **CRC Silicone Mold Release Spray Aerosol\***



**Product Description:**

“... suitable for most applications where post-mold painting is not required ... Excellent for use in injection and compression molding of ABS, acetal, acrylic, epoxy resins, HDPE, Noryl, nylon, Polypropylene, polysulfone, and wax.”

Sold At: <https://www.amazon.com/CRC-03300-Silicone-Release-Aerosol/dp/B0013IZSDM>

Contains 20-30% nPB, according to the SDS:  
<http://docs.crcindustries.com/msds/3300.pdf>

➤ **CRC Super Degreaser/Cleaner Aerosol\***



**Product Description:**

“... utilizes new technology that combines the power of a high performance, industrial strength degreaser with lower volatile organic compounds (VOCs) ... offers performance of 1,1,1-Trichloroethane without the associated risks.”

Sold At: <https://www.amazon.com/CRC-Super-Degreaser-Cleaner-Aerosol/dp/B000LEZ8S0>

Contains 40-50% nPB, according to the SDS:  
<http://docs.crcindustries.com/msds/3110.pdf>

➤ **Johnsen's Premium Non-Flammable Complete A/C Flush\***



Product Description from [Johnsen's website](#):

"Non-flammable and non-ozone depleting replacement for R-141b. Strong cleaning action. Evaporates quickly. Safe for machines. Strong cleaning action, removes mineral oil, residue refrigerant and contaminants."

Sold At: <https://www.amazon.com/Johnsens-6645-6-Premium-Non-Flammable-Complete/dp/B00C874SNI>

Contains >90% nPB, according to the SDS:

<http://www.johnsens.com/uploads/files/6645-6.pdf>

➤ **KoinSolv Coin Contaminant Cleaner\***



Product Description:

"A neutral, non-flammable solvent used to clean contaminants such as oil, tape, PVC, and grease from coins, tokens or medals, etc. . . . KOINSOLV is the ideal cleaning solvent to use on prized coins."

Sold At: <https://www.amazon.com/4715-KoinSolv-coin-contaminant-cleaner/dp/B009K4WZAU>

Contains 50-100% nPB by weight, according to the likely SDS:

<http://www.wizardcoinsupply.com/old/files/images/Koinsolv-SDS-061115.pdf> from [here](#) (note the picture)

➤ **LPS Instant Super Degreaser\***



Product Description from [the LPS website](#):

"Rapidly evaporates, leaving no residue . . . Safe on all metals . . . Excellent degreaser for removing greases and oils"

Sold At: [https://www.amazon.com/Instant-Super-Degreaser-Size-oz/dp/B001AIZLAU/ref=sr\\_1\\_6](https://www.amazon.com/Instant-Super-Degreaser-Size-oz/dp/B001AIZLAU/ref=sr_1_6)

Contains 90-100% nPB, according to the SDS:

[http://www.lpslabs.com/site\\_files/tech\\_downloads/10720.pdf](http://www.lpslabs.com/site_files/tech_downloads/10720.pdf)

➤ **Osborn High Tech Electronic Cleaner Aerosol\***



**Product Description:**

“Cleans, lubricates and protects high-precision electronic instruments and components . . . Lifts dust and dirt . . . Use on printed circuitry . . . telephone equipment . . .”

Sold At: <https://www.amazon.com/Osborn-76334-Electronic-Cleaner-Aerosol/dp/B00IKIFV6W>

Contains 50% nPB by weight, according to the SDS:  
<http://www.osborn.com/media/msds/pdf/76334.pdf>

➤ **Sprayway SW299 NPB Degreaser\***



**Product Description:**

“A high-performance, nonflammable alternative to chlorinated and chloro-fluorinated solvents. Formulated for use on energized electrical equipment.”

Sold At: <https://www.autopartcart.com/products/sprayway-sw299-npb-degreaser>

Contains 90-100% nPB, according to the SDS:  
<http://www.spraywayinc.com/sites/all/themes/theme687/msds/sw299.pdf> from here - <http://www.spraywayinc.com/content/sds-safety-data-sheets>

## GLUE

➤ **NCF Hot Pump Accelerator Spray\***



**Product Description from [the supplier's website](#):**

“. . . is an extremely fast-acting accelerator. NCF Hot dramatically decreases the curing time of the glue and forces the glue to cure when it wouldn't otherwise.”

Sold At: <https://www.amazon.com/NCF-Hot-Pump-Accelerator-Spray/dp/B000603TOE>

Contains 98-99% nPB by weight, according to the SDS:  
[http://www.caglu.com/assets/msds/NCF\\_Hot\\_and\\_Mild.pdf](http://www.caglu.com/assets/msds/NCF_Hot_and_Mild.pdf) from here  
[http://www.caglu.com/SDS-ep\\_44.html](http://www.caglu.com/SDS-ep_44.html)