QCAT Evaluation:
Author: Michelle Gaither
Title: P2 Specialist
Organization: PPRC
Date: February 21, 2011/Update 3/20/12

Peer Review:
Reviewer: Alex Stone, Sc. D.
Title: Safer Chemical Alternative Chemist
Organization: WA Dept. of Ecology
Date: May 10, 2012

QCAT for Safer Chemicals Example Chemical Assessment Worksheet

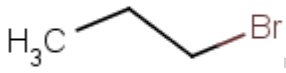
Chemical Name: n-Propyl bromide (nPB)

CAS #: 106-94-5

Also Called: 1-Bromopropane, 1-propyl bromide, propyl bromide *(which is also a synonym for 2-propyl bromide and should not be confused with 1-propyl bromide).*

Identify Applications/Functional Uses: Degreaser (replacement for TCE), dry cleaning fluid – "DrySolv" or other brand names). In Washington state, nPB is a P01 waste (extremely hazardous).

Chemical Structure: CH_3-CH_2-CH_3-Br



Hazard Summary Table:

Human - Group I					Human - Group II							Eco			Fate		Physical	
C	M	R	D	E	AT	ST	N	SnS	SnR	Irs	IrE	AA	CA	Eo	P	B	Ex	F
DG	DG	H	H	DG	M	?	?	?	?	?	?	L	?	?	H	L	?	?

Note: Please see Appendix A for glossary of hazard endpoint acronyms.

Initial Grade	**F**
Final Grade (data gaps)	**N/A[1]**

[1] No data gap analysis is necessary for a chemical that already is assigned a Grade F. Data gap analysis is only necessary when it could lower the initial grade and there is no lower grade than F.

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Human Health Effects – Group Ia

Carcinogenicity (C) Hazard Level (DG):

- Research Summary:
  As no data is available from QCAT sources on carcinogenic impacts of nPB, a **'DG'** for data gap is assigned for this criterion.

- References:

Mutagenicity and Genotoxicity (M) Hazard Level (DG):

- Research Summary:

  As no data is available from QCAT sources on mutagenic or genotoxic impacts of nPB, a **'DG'** for data gap is assigned for this criterion.

- References:

Reproductive Toxicity (R) Hazard Level (H):

- Research Summary:

  Based on data below, the reproductive toxicity of nPB ranks as **high**.

- References:

Data /Finding	Source
Repr 1B, H360FD (may damage fertility of the unborn child)	EC DG, Reproductive Toxicants List (Annex I of Directive 76/769 EEC) http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CONSLEG:1976L0769:20081211:EN:PDF
NTP Panel determined the scientific evidence of effects in lab animals sufficient to conclude that nBP may adversely affect human development and reproduction if exposures are sufficiently high. Report cites several study parameters/findings.	National Toxicology Program (NTP), Health Assessment and Translation OHAT Evaluations and Workshops http://ntp.niehs.nih.gov/?objectid=4980AA81-E919-4E85-60B789CA36E59FA5,
R60 (Also R63, R11, R36/37/38)	ESIS (for EU Risk Phrases) http://esis.jrc.ec.europa.eu/index.php?PGM=cla

Development Tox. incl. Developmental Neurotoxicity (D) Hazard Level (H):

- Research Summary:

  Based on data below, the developmental toxicity of nPB ranks as **high**. Three data sources confirm rank as **high**, which is the final ranking; however it has been assigned an EU Risk Phrase of R63, which is a moderate rank that is not considered due to three other data sources confirming **high** rank.

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- References:

Data /Finding	Source
Listed on California Prop 65 - Known to the state to cause developmental effects	California Prop 65 http://www.oehha.ca.gov/prop65/prop65_list/Newlist.html
NTP Panel determined the scientific evidence of effects in lab animals sufficient to conclude that nBP may adversely affect human development and reproduction if exposures are sufficiently high. Report cites several study parameters/findings.	National Toxicology Program (NTP), Health Assessment and Translation OHAT Evaluations and Workshops http://ntp.niehs.nih.gov/?objectid=4980AA81-E919-4E85-60B789CA36E59FA5,
"Propyl-bromide" is named on the Grandjean & Landrigan list, but does not distinguish between 1-propyl bromide (the chemical considered in this analysis) and 2-propyl bromide.	Grandjean & Landrigan (2008)

Endocrine Disruption (E) Hazard Level (DG):

- Research Summary:
  As no data is available from QCAT sources on the impacts of nBP on the endocrine system, a **'DG'** for data gap is assigned for this criterion.

- References:
  N/A

Human Health Effects – Group II

Acute Mammalian Toxicity (AT) Hazard Level (M):

- Research Summary:

  Based upon the data and risk phrase assignment stated below, nBP poses a **moderate** risk for impacts to acute mammalian toxicity. While nine other sources found LC50 or LD50 studies that would rank acute mammalian toxicity as low, these two findings solidify the rank as **moderate**.

- References:

Data or Finding	Source
LC_{50}=7,000 mg/kg inhalation rat	HSDB: ACGIH 2005 http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB
Risk Phrase R20 (Harmful by inhalation)	ESIS (for EU Risk Phrases) http://esis.jrc.ec.europa.eu/index.php?PGM=cla

Environmental Health Effects

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Acute Aquatic (AA) Toxicity Hazard Level: (L):

- Research Summary:

  Based upon the data below, nPB poses a **low** risk for impacts to acute aquatic toxicity. Also, KEMI database states that nPB is "not classified".

- References:

Data or Finding	Source
"No" for toxicity to aquatic organisms.	Canada DSL http://www.ec.gc.ca/lcpe-cepa/eng/subs_list/DSL/DSLsearch.cfm
LC_{50} 67,300 ug/L, 96 hour, fathead minnow	Gieger 2005, found in EPA's EcoTOX http://cfpub.epa.gov/ecotox/quick_query.htm

Environmental Fate

Persistence (P) Hazard Level: (H):

- Research Summary:

  Based upon the information below, nPB ranks as a **high** level of persistence. According to the EPA PBT Profiler, nPB could rank as moderate based on half life in soil, however, because the Profiler is based on modeling results, and the Step I data source (Canada DSL) takes higher priority in ranking per the QCAT, the rank of **high** is the final decision.

- References:

Data or Finding	Source
"Yes" for persistence.	Canada DSL http://www.ec.gc.ca/lcpe-cepa/eng/subs_list/DSL/DSLsearch.cfm
Half-lives: Water 15 day with 42% partition; Soil 30 day half-life with 11% partition, Air 18 day half-life (a) with 46% partition, (0% partition for sediment).	EPA's PBT Profiler http://www.pbtprofiler.net/entry.asp

Bioaccumulation (B) Potential Hazard Level: (L):

- Research Summary:

  Based upon the information below, nPB has a **low** level of bioaccumulation.

- References:

Data or Finding	Source
"No" for bioaccumulation.	Canada DSL http://www.ec.gc.ca/lcpe-cepa/eng/subs_list/DSL/DSLsearch.cfm
BCF = 11	EPA PBT Profiler http://www.pbtprofiler.net/entry.asp

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Appendix A:

AA	=	Acute Aquatic Toxicity
AT	=	Acute Mammalian Toxicity
B	=	Bioaccumulation
C	=	Carcinogenicity
CA	=	Chronic Aquatic Toxicity
D	=	Developmental Toxicity (incl. Developmental Neurotoxicity)
E	=	Endocrine Activity
Eo	=	Other Ecotoxicity studies
F	=	Flammability
IrE	=	Irritation-Eye
IrS	=	Irritation-Skin
M	=	Mutagenicity & Genotoxicity
N	=	Neurotoxicity
P	=	Persistence
R	=	Reproductive Toxicity
Rd	=	Repeat dose
Rx	=	Reactivity
Sd	=	Single dose
SnR	=	Sensitization-Respiratory
SnS	=	Sensitization-Skin
ST	=	Systemic Toxicity & Organ Effects (incl. Immunotoxicity)