



## A Practitioner's Guide to Using the HPV Data for Alternatives Assessment

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During the process of evaluating alternatives to toxic chemicals, we must frequently compare the environmental health and safety characteristics of one chemical or mixture to other alternatives. The first challenge in this process is collecting comprehensive and up-to-date information on those characteristics. There are many data sources available, including Hazardous Substances Data Base (HSDB), IRIS, NIOSH and others.

The newest data source in this arsenal is EPA's High Production Volume Information System, or HPVIS. The information in this database has been submitted by chemical manufacturers and industry consortiums in response to EPA's HPV Challenge Program (see [www.epa.gov/hpv](http://www.epa.gov/hpv) for more information). The following example demonstrates one way to use the HPVIS when your objective is to find basic environmental, health and safety data on a particular chemical. It also includes several "practitioner tips" to using the HPVIS – these are solely the opinion of this one practitioner at this point in time; future enhancements may render them obsolete and others may have equally or more efficient ways of accessing the wealth of information submitted to EPA under the HPV Challenge Program! This brief walk-through example also assumes some familiarity with the HPV Challenge Program, general web site navigation, and chemical information.

Example:

### Alternatives to Deca-BDE (decabromodiphenyl ether)

In this example, a manufacturer has identified 4 technically feasible alternatives to their current use of the flame retardant deca-BDE. Their next step is to compare the EH&S characteristics of the alternatives. Information has been gathered from some public sources, but there are still data gaps and concerns, particularly around the PBT comparison.

Currently Used Flame Retardant:

Deca-BDE (CAS# 1163-19-5)

Alternatives:

1,2-bis(tetrabromophthalimido)ethane (EBTBP) (CAS # 32588-76-4)

Bis(tribromophenoxy)ethane (37853-59-1)

Hexabromocyclododecane (HBCD) (3194-55-6)

Resorcinol bis(diphenylphosphate) (RDP) (57583-54-7)

*Tip #1: Search the HPVIS using CAS #'s*

*The HPVIS does not contain synonyms, so searching on the chemical name does not always produce results, or produces too many results. Use Google or your favorite chemical look-up source to first find the CAS number.*

➤ Check to see which chemicals are in HPVIS

1. First, check to see which chemicals are in HPVIS. Look for each CAS # in the right-hand box on the main HPVIS page  
<http://www.epa.gov/hpvis/index.html>
2. putting in 32588-76-4 returns one result for  
 “1H-Isoindole-1,3(2H)-dione, 2,2'-(1,2-ethanediy)bis[4,5,6,7-tetrabromo-“  
 this result illustrates the benefit of the CAS # search technique!  
 Clicking on chemical name shows the endpoints in HPVIS and how many studies are included. At first glance, most endpoints are present, although there are few studies.
3. For 37853-59-1, it is present in HPVIS, with many endpoints.
4. For 3194-55-6 (HBCD), it is present in HPVIS, with many endpoints and many more studies than the previous 2 chemicals.
5. For 57583-54-7 (RDP), it is NOT present in HPVIS.
6. For the existing chemical, deca-BDE (1163-19-5), it is also NOT present in HPVIS.

*Tip #2: Go to the HPV Chemical Lists to find status of chemicals not in HPVIS  
 The lists will tell you whether the SIDS data exists elsewhere, whether the chemical has been sponsored under the HPV Challenge, etc.*

➤ Research Chemicals not Found in HPVIS

1. From the HPV home page, click on “How to Use HPV Challenge Chemical Lists,”  
<http://epa.gov/hpv/pubs/update/hpvchmlt.htm>  
 At the bottom of that page, there is a Search option for the two main HPV lists (1990 and 1994) as well as database and pdf files of those two lists, as well as the “Additional Chemicals Sponsored under the HPV Challenge Program” list.
2. Search for the 2 chemicals not found in HPVIS:  
 For deca-BDE (1163-19-5), click the blue “SEARCH” heading, which will take you to a form where you can put the CAS # in as your “search term.” Try first for the 1990 HPV list. Submitting the query returns a hit for deca-BDE. It gives an “indicator value” as 2, which means it is being otherwise handled under the OECD SIDS program. Sponsorship Status is “F” – fully sponsored. You will have to go outside the EPA HPV website to get this information (instructions provided later in this example).
3. For RDP (57583-54-7), there is no match for either the 1990 or 1994 HPV lists, so try the “additional chemicals” list in .pdf or .dbf format. Searching this list also finds no match. Therefore, the chemical is not an EPA HPV chemical, unless it is covered under one of the chemical categories, but is not listed under the category as a CAS number with test results. The only way to check for this is to go back to the HPVIS main page and browse (scroll through) the categories looking for something that might include your chemical.

*Tip #3: If you can't find a chemical on the first pass, but you think it would have been an HPV chemical in the 1990's, then do some sleuthing for similar CAS #s and chemicals*

4. For RDP, a Google search of “hpv 57583-54-7” turns up a comment letter from EPA to the sponsor of a similar chemical (125997-21-9) with comments that imply some confusion over which specific chemical is the HPV chemical, and whether test results for RDP are sufficient for the HPV chemical. You now have a CAS # that is part of the HPV Challenge program to investigate.

*Tip #4: Don't just look at the HPVIS; there is a rich information source on the chemicals, their uses, and narratives about the toxicological studies in the written test plans and robust summaries!*

#### Further Investigation of Chemicals in Robust Summaries and Test Plans

1. Go to the HPV home page, and click on "Robust Summaries and Test Plans." This will take you to a second page; click on [Robust Summaries and Test Plans Enhanced Search Page](#), which takes you to <http://cfpub.epa.gov/hpv-s/>
2. Use CAS # list – note that they are in alpha, not numeric, order, so just look for your first digit, second digit, etc. Searching on 125997-21-9, returns a 2001 submission for [Phosphoric trichloride, polymer with 1,3-benzenediol, phenyl ester](#).
3. Glancing at the letters of transmittal, there is discussion about the identity of the chemical and the commercial flame retardant formulation, with a promise from the sponsor that it will be clarified in the revised robust summaries. Those revised summaries are not yet posted.
4. Another question: During the technical evaluation phase, there were questions about whether HBCD was typically used in similar applications, and also about impurities in commercial formulations. Do a similar search within the Robust Summaries and Test Plans on 3194-55-6. Click on the Test Plan. On page 2 and 3 of the Test Plan, the manufacturers of HBCD describe its uses. On pg 3 and 4, the purity of the samples used in conducting the tests is described (mixed samples from each of 3 manufacturers produced 90% - 100% purity samples) as well as 2 of the common impurities (tetrabromocyclododecene and isobutanol).

*Tip #5: Use the OECD Integrated HPV Database to find many common chemicals that are not in EPA's HPVIS*

#### Finding Data in OECD Integrated HPV Database - (Method #1)

1. For OECD SIDS chemicals, go to the OECD Integrated HPV Database <http://cs3-hq.oecd.org/scripts/hpv/>
2. Click "Search" in upper right hand corner; input CAS # (without dashes) when the search page appears. (1163195 for Deca-BDE). It brings up a summary of available information and links to 5 existing reports.
3. Click on "View" to see the list of 5 existing reports. (Note: one of those links is to the USEPA's HPV site, presumably with a list of sponsored chemicals, but the link is not current). With some browsers, this "mini-window" will not expand when it links to the referenced report, so is of limited utility (sort of like trying to read the paper through a mail slot).
4. To get to the European Union's Existing chemicals information site, you can click on this page, on "the final report available from: [SIAR published by EU](#)" and follow the HPV-LPV link. Or, go directly to ESIS, the European Chemicals Bureau web site: <http://ecb.jrc.it/esis/index.php?PGM=hpv>  
Look at the HPV-LPV tab, and search on the CAS number for deca-BDE. It will return a summary sheet. Click on the "IUCLID Chemical Data Sheet." ["The IUCLID Chemical Data Sheets Information System provides you with an extract of data from the IUCLID

(International Uniform Chemical Information Database) on High Production Volume Chemicals reported by European Industry in the frame of the European existing chemicals risk assessment programme.”] You will notice in some of the EPA HPV robust summaries, that they are a direct copy of the IUCLID submission. It will take some browsing, but there is a lot of information here. What EPA has done with the HPVIS is to take these kinds of summaries and put them in a standard database format.

#### Finding OECD Chemical Information using the eChem Portal (Method #2)

1. Go to the new OECD E-Chem Portal:  
<http://webnet3.oecd.org/echemportal/>  
and input the CAS # (either with or without dashes), 1163195, for Deca BDE. Leave the default of search in “All Databases.” Clicking on “OECD HPV” gets you to the same page as step 2 in the previous method.
2. Clicking on “CHRIP” will take you to information about biodegradation and bioaccumulation of existing chemicals in Japan’s Chemical Risk information platform (CHRIP).
3. Clicking on “ESIS” takes you to the same site as in step 4 of the previous method.
4. Clicking on “INCHEM” takes you to a search result for the “Chemical Safety Information from Intergovernmental Organizations” (INCHEM), which includes IARC monographs, WHO reports, and other sources of information. It is maintained by the International Programme on Chemical Safety (IPCS).

*Tip #6: If you only need to look up selected endpoints for a few chemicals, just use the quick search, rather than creating special reports.*

#### Comparing Endpoint data for Selected Chemicals

1. To compare persistence of the 4 alternative flame retardants, search on each one separately using the quick search. For the first alternative, EBTBP, (32588-76-4) a look at the fugacity model shows that it is likely to partition to soil and sediment. This can also be seen from the very low vapor pressure and water solubility (unlikely to partition to air or water). The “biodegradation” studies show no tendency to biodegrade, therefore, it should be considered persistent. There is no “bioaccumulation” data entry, but if you go back to the Test Plan, on pg. 5 it describes a study showing that EBTBP did not bioconcentrate in fish.
2. For the second alternative (37853-59-1) it similarly partitions and is not readily biodegradable. This chemical also lists bioaccumulation tests and shows it to have some potential for bioaccumulation.
3. Continue process for other chemicals and for eco-toxicity to get PBT information.

*Tip #7: Researchers looking at other sources have often found toxicological studies not included in the HPVIS or the sponsor’s submissions. Especially where you have uncertainty or conflicting studies, it is important to use multiple data sources.*

Summary: For a modest investment in time, the HPVIS can add additional data from manufacturers to the EH&S assessment information you have available from other public databases. There are many chemicals not included, but it is worth a quick check to see what you find!