

Chemical Substances and Biological Agents

# Studies and Research Projects

REPORT R-504



**Results of the chemical analyses  
produced at the IRSST for 2001-2005**

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The results of the research work published in this document have been peer-reviewed.

## EXECUTIVE SUMMARY

The Québec prevention network includes several hundred people who regularly take samples for air quality evaluation in workplaces. These samples are analyzed at the IRSSST.

From 2001 to 2005, under the service agreement with the CSST (Commission de la santé et de la sécurité du travail du Québec – Québec Workers Compensation Board) and its network and the joint industrial associations (ASPs), annual reports made it possible to identify certain substances found in high concentrations in the major industrial sectors of the 1984 *Classification of Québec's economic activities* (CAEQ) (two-digit classification). This report presents an overview of the environmental analytical results issued by the IRSSST laboratories for this entire period. However, given that about 224,000 environmental analytical results were produced by the IRSSST, it is not only possible but even interesting to analyze the data in a way that presents a detailed picture of pollutant concentrations by CAEQ industrial class (four-digit classifications) rather than by major sectors. This choice should allow a more finely-tuned reading of the analytical results, with a sharper focus on exposure situations in which chemical substances considered individually are found in considerable concentrations in workplaces. To show the same reality from different angles, the results are presented by CAEQ industrial class, by CSST priority sector and by substance. The aim of the study is to provide researchers and stakeholders with information which can support new lines of research and intervention.

30,854 analytical results conform to the extraction criteria and show the chemical substance/industrial class pairings most likely to pose a problem among the sampled sectors. The study of these results distinguishes 50 chemical substances, divided into 141 industrial classes. It also reveals a total of 308 chemical substance/industrial class pairings which were subjected to at least 25 analyses in 2001-2005, for which at least 20% of the analytical results equal or exceed 50% of the standard. These data, presented in six appendices, show the great diversity of samples for which a proportion of the analytical results was measured in higher concentrations.

Among the exposure results, several situations seem particularly problematic. Examples where more than 60% of the samples taken were analyzed at more than double the standard include fibres in other machinery industries; hardwood and softwood dusts in forestry equipment and services; triglycidyl isocyanurate and hexamethylene diisocyanate oligomers in the custom metal coating industry; crystalline silica in the refined petroleum products industry, and lead in the other non-ferrous metal smelting and refining industries.



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## 1. INTRODUCTION

The IR SST performs several tens of thousands of chemical analyses a year to support prevention activities in Québec, whether for inspection by the CSST (Commission de la santé et de la sécurité du travail du Québec) or for implementation and monitoring of establishment-specific health programs by the health and social services agencies (ASSS) and the local community service centres (CLSC). It also produces analyses for the joint industrial associations (ASP, or *associations sectorielles paritaires*) and under specific provincial intervention programs implemented by the CSST with the collaboration of its different partners in response to specific problems.

The purpose of this document is to provide an inventory, for the 2001-2005 period, of the principal substances found in high concentrations in relation to the new standards in force <sup>(1)</sup> and to identify the industrial classes involved by using the four-digit Classification of Québec's economic activities (CAEQ, or *Classification des Activités Économiques du Québec*) <sup>(2)</sup>. It therefore focuses exclusively on the results of the environmental analyses performed by the IR SST laboratories under the service agreement with the CSST and the ASPs, for the period from January 2001 to December 2005 inclusive. These results will provide researchers and stakeholders with additional information, which can support strategic and operational research and intervention priorities in the major industrial sectors covered. Strict selection criteria were adopted so that the only situations highlighted are those which regularly showed the highest concentrations.

An initial analysis of the laboratory results was published in 1985 <sup>(3)</sup>. It referred to the population data since 1981 and profiled certain substances/indices for 1984. All of the information inventoried was processed manually in that period. Since then, a computerized management system has been implemented and a report on the laboratory analytical results has been published annually <sup>(4-25)</sup>. Research reports establishing the picture for wider time periods were also produced for 1989-1993 <sup>(19)</sup> and 1994-1996 <sup>(20)</sup>. The studies for the years 2001 <sup>(21)</sup>, 2002 <sup>(22)</sup>, 2003 <sup>(23)</sup>, 2004 <sup>(24)</sup> and 2005 <sup>(25)</sup> identified the substances found in high concentrations in the CAEQ's two-digit major sectors. The present study more specifically targets potential situations of high occupational exposure in the four-digit CAEQ industrial classes for which samples were taken from 2001 to 2005.

## 2. RESEARCH OBJECTIVES

The principal objective of this research is to determine the highest potential occupational exposure situations in Québec workplaces, based on the interpretation of the results of the environmental analyses produced by the IRSST for the period from January 2001 to December 2005.

Given the large number of environmental analytical results, about 224,000, only the most relevant results will be presented here, with the aim of identifying the chemical substances, the CAEQ industrial classes (four-digit classification) and the CSST priority sectors concerned. The conclusions can be used to establish the strategic and operational priorities of research or intervention in workplaces.

## 3. METHODOLOGY

### 3.1 Description of the information used to produce this report

#### 3.1.1 Data extraction

The IRSST analytical data are contained in a computerized database, the information in which essentially pertains to the date of the request, the reason for the request, identification of the substance, the new standard<sup>1</sup> adopted in Québec, the sampling volume, the analytical result, the CAEQ, the economic sector, the requesting party's contact information and region, and the name and contact information of the establishment where the sample was taken. All the chemical analytical results, namely 224,000, were selected from the parameters adopted for the requests for the period from January 2001 to December 2005. They were issued under the service agreement with the CSST and the ASPs. Four types of information served to produce this document:

- a) The substance, as indicated in the *Regulation to amend the Regulation respecting occupational health and safety* (Order-in-Council 885-2001; S-2.1, r.19.01), adopted in December 2006<sup>(1)</sup> (toluene, quartz, hardwood or softwood dusts, nickel,...) ;
- b) The four-digit industrial class of the Classification of Québec's economic activities (CAEQ, 1984 edition)<sup>(2)</sup>;
- c) The number of relevant analytical results per substance per four-digit industrial sector;
- d) The analytical results expressed in relation to the weighted average exposure value described in the ROHS<sup>(1)</sup>.

#### 3.1.2 Scope and limits of the results

The interpretation of an analytical result normally necessitates detailed documentation, including the objectives of the intervention, the sampling strategy, the substances present, the type of

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<sup>1</sup> The new standard adopted at the end of 2006 was chosen instead of the standard in force at the time of sampling, because the study's objectives is to determine the chemical substance/CAEQ industrial class pairings on which specific actions could be taken.

sampling, the task and workstations, the duration of occupational exposure and the representative nature of the periods for which the samples were taken. However, the IR SST does not have this information. The interpretation of a specific result then becomes impossible, because the concentrations measured cannot be related in any way to the workers' exposure doses. Consequently, the exposure results presented here must be interpreted very prudently, remembering that the objective of this study is to determine the chemical substance/industrial class pairings for which the highest concentrations were measured, and thus detect the potential problem situations in the work environment. In the final analysis, only a detailed analysis of each of these situations by stakeholders who have all of the relevant information could determine the situations for which it would be expedient to propose improvements of working conditions in establishments.

For 2001-2005, 224,000 results were produced for the CSST, the occupational health network and the joint industrial associations (ASP). Of this number, 30,854 results were the focus of attention, based on the application of extraction criteria intended to identify the situations in which the highest concentrations were measured. These are the results presented here.

### **3.2 Substance selection criteria**

To retain only the most relevant data in each of the major industrial sectors, the 224,000 analytical results were subjected to the following criteria:

- at least 25 results for the same substance in the same four-digit industrial class;
- and
- at least 20% of these results equal or exceed 50% of the standard.

This approach led to the selection of 30,854 results for the purposes of a more thorough analysis. To simplify their presentation, the results are reported in the tables and appendices according to the analysis performed in the laboratory, and not according to the ROHS nomenclature<sup>(1)</sup>, which may be different, particularly for metals, since the regulation often mentions metals and their inorganic salts. The gravimetric dust measurements will be considered as miscellaneous dusts, or MD.

### **3.3 Presentation of results**

The exposure results are presented according to three distinct approaches:

- a fixed preventive approach in relation to an action threshold, namely the target value starting from which a reduction of the workers' exposure to chemical substances is proposed. Like other international bodies, most of the occupational health stakeholders in Québec have set this action threshold at 50% of the standard;
- a second approach interpreting the results in terms of compliance with the standard;
- finally, a third approach targeting the results equalling or exceeding double the standard, thereby indicating, if not the urgency of intervention, at least a priority to be given to detailed documentation of the situation.

They are thus described in the appendices according to these different approaches, meaning that they are grouped in three concentration ranges in relation to the eight-hour time-weighted

average exposure value (TWA), then expressed as a percentage of the results for each of these concentration ranges. The total number of relevant analytical results is also accounted for. The domain of the concentration ranges is set out as follows:

- > 50% TWA: Includes, for each substance and industrial class, all the analytical results for which the concentrations exceed 50% of the standard. For most substances, this value represents the preventive action threshold of Québec occupational health stakeholders and of several international bodies.
- >100% TWA: Includes, for each substance and industrial class, all the analytical results for which the concentrations exceed the standard.
- >200% TWA: Includes, for each substance and industrial class, all the analytical results for which the concentrations exceed double the standard.

Finally, they are divided in detail into six appendices.

- ❖ Appendix 1: Environmental analyses performed most frequently in 2001-2005:

This appendix reports the principal environmental analyses performed at the IRSST at the request of its network clientele and selected as relevant for this study based on the extraction criteria.

- ❖ Appendix 2: Industrial classes for which at least one substance is measured in high concentrations in 2001-2005:

This appendix makes it possible to estimate the scope of the number of chemical analytical results conforming to the extraction criteria elaborated for each CAEQ four-digit industrial class, while identifying the CSST priority sector and the number of different chemical substances involved in each of these classes.

- ❖ Appendix 3: List of chemical substances found in higher concentrations by industrial class involved and distributed in relation to the standard, in 2001-2005:

This appendix presents a synthesis of all the chemical analytical results found in concentrations equal to or greater than 50% of the standard, the standard and double the standard for each chemical substance/industrial class pairing found. Only situations in which over 20% of the results exceeding 50% of the standard were selected. The presentation is based on the percentage of results, in descending order, that equal or exceed the standard. It identifies the substance involved, the CAEQ industrial class in which it was taken, the CSST priority sector to which this class is attached, the number of relevant analytical results and the distribution of the concentrations measured at more than 50% of the standard, the standard or double the standard.

- ❖ Appendix 4: List of chemical substances found in higher concentrations by industrial class involved and distributed in relation to double the standard, in 2001-2005:

This appendix presents the same results as for Appendix 3, but they are sorted to highlight the situations in which the exposure results most often equal or exceed

double the standard. Only situations in which over 20% of the results exceeded the standard are presented.

- ❖ Appendix 5: Industrial classes involved for the substances found in higher concentrations in 2001-2005:

This appendix groups the exposure results for each of the chemical substances analyzed, sorted in alphabetical order, indicating the industrial classes in which they are found in concentrations equalling or exceeding the standard in at least 20% of the cases. It allows visualization of the diversity of the sectors involved for each substance of interest and the percentages of relevant results found in concentrations equalling or exceeding the standards.

- ❖ Appendix 6: Substances found in higher concentrations in each CSST industrial sector in 2001-2005:

The last appendix groups the exposure results for each industrial class in each of the CSST priority sectors, indicating the substances found in concentrations equalling or exceeding the standard in at least 20% of the cases. It identifies the targeted substance for each industrial class of interest and the percentages of the relevant results found in a concentration exceeding the standards.

## 4. RESULTS AND DISCUSSION

### 4.1 Overview of distribution of results in the various industrial classes

In all, approximately 224,000 analytical results were issued under the service agreement with the CSST and the ASPs in 2001-2005. The 30,854 most relevant results conforming to the extraction criteria are distributed among 50 chemical substances and 141 CAEQ industrial classes (Appendices 1 and 2). These results form 308 chemical substance/industrial class pairings, thus showing the great diversity of samples taken and the large number of economic sectors for which preventive exposure reduction actions appear to be desirable (Appendix 3).

The eight substances accounting for the greatest number of relevant analytical results alone add up to more than three quarters of the results selected (Appendix 1). Of these eight substances, several have been the object of preventive actions over the past few years, particularly in the case of welding fumes, styrene, quartz, beryllium and lead, for which a practical guide was updated recently <sup>(26)</sup>. Miscellaneous dusts represent analytical results relevant to the study in the greatest number of industrial sectors. It is also noted that hardwood and softwood dusts, which can now be identified among the gravimetric measurements, are found in high concentrations in 24 economic sectors. Toluene, normally present in the work environment simultaneously with other solvents, appears in significant concentrations in 15 CAEQ industrial classes.

Appendix 1 also distinguishes several substances found in high concentrations in several industrial classes, such as iron, methylene chloride, methyl ethyl ketone, nickel and HDI oligomers<sup>2</sup>. In this last group, only isocyanates have been the object of an integrated provincial approach.

Moreover, different types of aldehydes, alcohols, inorganic substances, solvents, fibres, isocyanates and complex mixtures are identified in one or more industrial classes and thus may represent a common exposure problem in different industrial classes.

Appendix 2 sets out the various CAEQ industrial classes relevant to this study and identifies, for each of them, the CSST economic sector to which they are attached, the number of analytical results pertaining to them and the number of substances meeting the extraction criteria. In all, 141 industrial classes are inventoried and slightly more than half are the focus of attention for more than one substance. Among the sectors showing the greatest diversity of substances found at high concentrations, other metal products industries rank first with nine substances, followed by the truck and bus bodies industry and the custom metal coating industry, which show eight substances each. Next come the wooden kitchen cabinets and bathroom vanities industry, other machinery and equipment industries, and machine shops for seven substances respectively.

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<sup>2</sup> The British Health and Safety Executive standard<sup>(27)</sup> was selected because there is no standard in Québec for these substances.

## 4.2 Results obtained for chemical substance/ industrial class pairings

Appendix 3 presents a set of data identifying the CSST priority sector, the industrial class, the substance, and the percentage of the analytical results exceeding 50% of the standard, the standard and double the standard. It also includes the acceptable exposure value for each substance and the total number of relevant analytical results. The CAEQ chemical substance/industrial class pairings are presented in descending order of percentage results equalling or exceeding the standard. Only situations for which 20% or more of the analytical results equal or exceed the standard were selected.

The chemical substance/industrial class pairings for which at least 25 analyses were performed in 2001-2005 are considered to be representative enough to infer potential problems in the different industrial classes. In all, 308 chemical substance/industrial class pairings meet this criterion. This number declines to 189 when only the pairings for which 20% or more of the analytical results equal or exceed the standard are retained. Of these pairings, 26 have analytical results equalling or exceeding the standard in at least 60% of the case. We are thus referring to the most problematic situations, in which beryllium, hardwood and softwood dusts, fibres, welding fumes, lead, grain dusts, quartz and triglycidyl isocyanurate can be found simultaneously in more than one industrial class. Crystalline silica, diethyl ether, hexamethylene diisocyanate (HDI) oligomers, miscellaneous dusts and methyl ethyl ketone are also found in such conditions, but for only one industrial class.

The custom metal coating industry, the boatbuilding and repair industry and the refined petroleum products industry (except lubricating oil and grease) are also sectors in which more than one substance exceeds the standard for over 60% of the analytical results.

Appendix 4 presents the situations in which a substance is found frequently at more than double the standard in an economic sector. It allows quick referencing of the substances and places for which the highest concentrations are found and which seem to require urgent intervention to minimize workers' exposure. It also shows that 80 of the 308 chemical substance/industrial class pairings found according to the extraction criteria in Appendix 3, or slightly more than a quarter, have analytical results equalling or exceeding double the standard in at least 20% of the cases.

Fibres and hardwood and softwood dusts were found in concentrations exceeding 50% of the TWA in 100% of the case, in the machinery and equipment industry and in forestry services. In the first cases, over 85% of the analyses also equal or exceed double the standard. This means that for this chemical substance/industrial class pairing, when the concentrations equal or exceed the action threshold, they are also likely to exceed double the standard. The same principle applies for triglycidyl isocyanurate and hexamethylene diisocyanate (HDI) oligomers in the custom metal coating industry, for crystalline silica in the refined petroleum products industry (except lubricating oil and grease) and for lead in other non-ferrous metals refining and smelting industries. As shown in Appendix 4, these chemical substance/industrial class pairings also correspond to the only pairings for which over 60% of the analytical results equal or exceed double the standard. They thus represent the highest priority problems observed during the 2001-2006 period.

### 4.3 Synthesis of the results obtained

Appendices 5 and 6 repeat the exposure results obtained in Appendix 3, classifying them respectively by substance and by CSST priority sector (subclassified by CAEQ industrial class). Only the chemical substance/industrial class pairings for which at least 20% of the analyses equal or exceed the standard are listed in these appendices.

Appendix 5 allows quick visualization of all the CAEQ industrial classes for which a specific chemical substance was measured at a concentration exceeding the standard for 20% of the analytical results. Thus, for example, acrylonitrile meets these conditions in only one industrial class while hardwood and softwood dusts conform to them in more than 20 different industrial classes. A strategic operation targeting a specific substance thus should quickly find the necessary information to establish the range of sectors to be covered and the nature of the efforts to be deployed.

Similarly, Appendix 6 identifies, for each CSST priority sector, the substances found in high concentrations versus the industrial classes affected. Once again, a strategic operation aimed at one of these sectors in particular should quickly be able to find which substances have already been measured in high concentrations and in which CAEQ classes. It then becomes easier to establish the relevance of the environmental assessments in a sectorial approach.

#### 4.3.1 Classification by substance

Presentation of the exposure results by substance makes it possible to highlight the products involved in high concentration exposure of workers in industries and determine whether a substance is found in high concentrations in only one or in several economic sectors. Appendix 5 summarizes the exposure results in alphabetical order by substance and shows that 34 of the 50 substances meeting the extraction criteria are found in a CAEQ industrial class with at least 20% of the analytical results equalling or exceeding the standard. These are welding fumes, which are found in high concentrations in the greatest number of industrial classes, with 31 classes concerned. They are followed by hardwood and softwood dusts (22 classes), miscellaneous dusts (20), quartz (19), styrene (9), beryllium (9), lead (8), hexamethylene diisocyanate (HDI) oligomers (7), nickel (6) and methylene chloride (5), all present in at least five CAEQ industrial classes with at least 20% of the analytical results equalling or exceeding the standard.

We should note that provincial integrated intervention programs were in progress during the study period<sup>3</sup> to minimize occupational exposure to three substances found in the highest concentrations, for the past few years, in several industrial classes at a time, namely quartz, welding fumes and styrene. A prevention guide on lead<sup>(26)</sup> was produced recently and a provincial intervention program on isocyanates<sup>4</sup>, currently concentrating on HDI, is being

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<sup>3</sup> Programs under the responsibility of the CSST and including prevention network partners: CSST, IRSST, ASSS, CLSC and ASP

<sup>4</sup> Program under the responsibility of the CSST and including prevention network partners: CSST, IRSST, ASSS, CLSC and ASP



implemented. Finally, committees have been formed and are already at work to minimize occupational exposure to fibres and beryllium<sup>5</sup>.

### **4.3.2 Classification by priority sector**

Based on the information in Appendix 3, Appendix 6 presents, by CSST priority sector, the chemical substance/industrial class pairings for which at least 20% of the analyses exceed the standard. We observe that the fabricated metal products sector (sector 05) is the most affected with 25 chemical substance/industrial class pairings that meet the extraction criteria. But several other sectors are also revealed, as shown in Synthesis Table 1.

We also find that of the ten CSST priority sectors with at least 10 chemical substance/industrial class pairings for which at least 20% of the analytical results equal or exceed the standards, only one, the machinery manufacturing (except electrical) sector, is not part of the CSST's major priority groups I, II and III.

Classification of substances by four-digit industrial class, in Appendix 6, shows the industrial classes that contain the greatest number of substances for which at least 20% of the analyses equal or exceed the standards. The custom metal coating industry (6 substances), machine shops (6), masonry work (5), the truck and bus body industry (5) and the boatbuilding and repair industry (5) all contain more than 5 substances with at least 20% of the analytical results equalling or exceeding the standard.

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<sup>5</sup> Committees under the responsibility of the CSST and including prevention network partners, as well as employer and union representatives.

**Table 1: Number of chemical substance/ industrial pairings found by CSST priority sector for which at least 20% of the analytical results equal or exceed the standard**

Major priority group	CSST priority sector	Sector description	Number of pairings involved
I	05	Fabricated metal products	25
II	08	Transportation equipment	18
II	06	Wood (except sawmills)	14
II	10	Non-metallic mineral products	13
III	13	Furniture and fixture industry	13
IV	18	Machinery manufacturing (except electrical)	13
II	09	Primary metal processing	12
II	07	Rubber, plastics	11
I	01	Buildings and public works	10
I	02	Chemical industry	10
I	04	Mines, quarries and oil wells	7
IV	16	Commerce	7
V	21	Other commercial and personal services	7
I	03	Forests and sawmills	6
III	12	Food and beverage industry	4
III	14	Paper industry and miscellaneous activities	4
VI	32	Miscellaneous manufacturing industries	4
V	24	Petroleum and coal products manufacturing	3
III	15	Transportation and warehousing	2
V	25	Electrical products manufacturing	2
VI	28	Teaching and related services	2
V	22	Communications, power transmission, utilities	1
VI	30	Medical and social services	1

## 5. CONCLUSION

In 2001-2005, 224,000 environmental analytical results were issued for CSST network stakeholders [inspectors, health and social services agencies (ASSS), local community service centres (CLSC) and ASPs]. Of this number, 30,854 met all the extraction criteria and were considered to be the most relevant for this study. This information finally made it possible to isolate the major trends and determine the situations potentially most at risk in Québec workplaces: 50 chemical substances divided into 141 industrial classes could be identified for a total of 308 chemical substance/industrial class pairings which were the object of at least 25 analyses with a least 20% of the results equalling or exceeding 50% of the standard.

A comprehensive analysis also shows that the samples are taken with extreme variability, depending on the risks evaluated in the different economic sectors and the major groups prioritized by the CSST. Table 1 (taken from Appendix 6) presents in this sense the number of chemical substance/industrial class pairings for which at least 20% of the analytical results equal or exceed the standard. This makes it possible to estimate the priorities and evaluate the intervention efforts which led to laboratory analyses for each major industrial sectors. As expected, the data show a very different level of intervention from one CSST major priority sector to another. Ten sectors have at least 10 chemical substance/ industrial class pairings for which at least 20% of the analyses equal or exceed the standard. Only one of these CSST priority sectors, machinery manufacturing (except electrical), is not part of the CSST's major priority groups I to III.

This study shows that welding fumes, miscellaneous dusts, quartz, styrene, lead and hexamethylene diisocyanate (HDI) oligomers are found frequently at levels equalling or exceeding the standard in several CAEQ classifications. The substances had already been identified in previous reports and some of them, specifically quartz, welding fumes and styrene, are currently the object of the CSST's provincial intervention programs<sup>6</sup> to minimize occupational exposure. A prevention guide on lead<sup>(26)</sup> was produced recently and a provincial intervention program on isocyanates<sup>7</sup>, currently concentrating on HDI, is being implemented. However, other substances are found frequently at a level equalling or exceeding the standard in several CAEQ classifications and seem to represent new problems. We are referring here to hardwood and softwood dusts, beryllium, nickel and methylene chloride. In addition, more specifically, there are the following substances for which over 60% of the analytical results equal or exceed the standard in a CAEQ: fibres, grain dusts, triglycidyl isocyanurate, crystalline silica, diethyl ether and methyl ethyl ketone. Consequently, to deal with these emerging problems, working groups have been formed, with the aim, in particular, of minimizing occupational exposure to fibres and beryllium<sup>8</sup>.

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<sup>6</sup> Programs under the responsibility of the CSST and including prevention network partners: CSST, IR SST, ASSS, CLSC and ASP

<sup>7</sup> Program under the responsibility of the CSST and including prevention network partners: CSST, IR SST, ASSS, CLSC and ASP

<sup>8</sup> Committees under the responsibility of the CSST and including prevention network partners as well as employer and union representatives.

Considered from another perspective, the exposure results show that five industries frequently obtained analytical results with high concentrations for at least five substances, namely machine shops, masonry work, the truck and bus body industry, the custom metal coating industry, and the boatbuilding and repair industry. These last two industries, in addition to the refined petroleum products industry (except lubricating oil and grease), also contain more than one substance for which at least 60% of the analytical results equal or exceed the standard.

Finally, a detailed examination identifies a certain number of particularly problematic industrial classes. Fibres in other machinery and equipment industry, triglycidyl isocyanurate and hexamethylene diisocyanate (HDI) oligomers in the custom metal coating industry, beryllium in the industrial inorganic chemical industry, lead in other non-ferrous metals refining and smelting industries, and hardwood and softwood dusts in forestry services represent the worst conditions sampled by the stakeholders in 2001-2005, with over 60% of the samples exceeding double the standard.

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## APPENDIX 1: NUMBER OF RELEVANT RESULTS OF ENVIRONMENTAL ANALYSES PERFORMED IN 2001-2005

Substances	Number of relevant results	Number of CAEQ classes involved
Gravimetric measurements (MD)	6153	70
Welding fumes	4580	36
Hardwood and softwood dusts	3528	24
Toluene	2659	15
Styrene (monomer)	2406	11
Quartz	2036	25
Beryllium	1264	12
Lead	892	9
Iron	784	7
Methylene chloride	775	11
Methyl ethyl ketone	664	7
Nickel	492	7
HDI (oligomers)	483	7
Cobalt	353	4
Normal hexane	322	4
Methyl alcohol	317	3
Chlorine dioxide	256	1
Normal propyl alcohol	230	2
Diethyl ether	187	1
Fibres	175	4
Ortho-xylene	163	2
Methyl methacrylate	162	3
HDI (monomers)	157	3
Triglycidyl isocyanurate	157	3
Chromium <sup>VI</sup>	126	3
Chromium	125	2
Trichloroethylene	122	4
Perchloroethylene	119	1
Copper	108	3
Grain dusts	88	2
Aluminum	87	1
Calcium oxide (in Ca)	84	1
Cristobalite, crystalline silica	77	2
MDI (monomer)	77	2
o-Dichlorobenzene	76	1
Benzene	70	1

<b>Substances</b>	<b>Number of relevant results</b>	<b>Number of CAEQ classes involved</b>
Manganese	47	1
Ammonia (by colorimetric tube)	45	1
Acetic acid	43	1
Acrylonitrile	42	1
VM&P naphtha	41	1
Stoddard solvent	40	1
Coal tar pitch	37	1
Zinc	37	1
Methoxy-1 propanol-2	33	1
Cadmium	32	1
Furfuryl alcohol	27	1
N,N-Dimethylformamide	26	1
Vinyl acetate	25	1
Formaldehyde	25	1



## APPENDIX 2: INDUSTRIAL CLASSES FOR WHICH AT LEAST ONE SUBSTANCE IS MEASURED IN HIGH CONCENTRATIONS IN 2001-2005

CSST priority sector	CAEQ	Industrial class description	Number of relevant results	Number of substances involved
05	3099	Other metal fabricating industries	1203	9
08	3241	Truck and bus body industry	799	8
05	3041	Custom metal coating industry	693	8
06	2542	Wooden kitchen cabinet and bathroom vanity industry	1670	7
18	3199	Other machinery and equipment industries	1133	7
05	3081	Machine shops	1074	7
02	3751	Paint and varnish industry	1202	6
08	3281	Boatbuilding and repair industry	1023	6
32	3999	Other manufacturing industries	206	6
05	3029	Other fabricated structural metal products industries	885	5
07	1699	Other plastic products industries	732	5
13	2619	Other household furniture industries	458	5
01	4231	Masonry work	236	5
14	2719	Other paper industries	541	4
07	1599	Other rubber products industries	404	4
02	3711	Industrial inorganic chemical industries	403	4
09	2941	Iron foundries	370	4
06	2599	Other wood industries	320	4
14	2711	Pulp industry	262	4
05	3011	Plate work industry	230	4
03	2512	Sawmill and planing mill products industry (except shingles)	1340	3
13	2611	Wooden household furniture industry	935	3
09	2951	Primary aluminum production industry	516	3
09	2999	Other rolled, cast and extruded non-ferrous metal products industries	381	3
05	3039	Other ornamental and architectural metal products industries	378	3
06	2549	Other millwork industries	328	3
18	3111	Agricultural implement industry	323	3
13	2699	Other furniture and fixture industries	299	3
10	3549	Other concrete products industries	211	3
15	4591	Highway, street and bridge maintenance industry	207	3

CSST priority sector	CAEQ	Industrial class description	Number of relevant results	Number of substances involved
13	2612	Upholstered household furniture industry	199	3
13	2692	Hotel, restaurant and institutional furniture and fixture industry	197	3
10	3551	Ready-mix concrete industry	176	3
10	3511	Clay products industry (Canadian clay)	156	3
03	2511	Shingle and split shingle industry	143	3
24	3611	Refined petroleum products industry (except lubricating oil and grease)	138	3
05	3031	Metal door and window industry	136	3
06	2581	Coffin industry	130	3
10	3531	Stone products industry	947	2
07	1641	Stratified or reinforced plastic products industry	628	2
08	3256	Plastic parts and accessories for motor vehicles industry	398	2
08	3242	Commercial semi-trailers and trailers industry	371	2
02	3799	Other chemical products industries	303	2
12	1072	Bread and other bakery products industry	235	2
28	8511	Teaching at the kindergarten, elementary and secondary levels	221	2
06	2545	Hardwood flooring industry	211	2
08	3211	Aircraft and aircraft parts industry	199	2
10	3521	Cement industry	196	2
32	3971	Sign and display industry	189	2
16	5912	Wholesale scrap and old metal dealers	167	2
16	6213	Furniture repair shops	160	2
05	3049	Other stamped and pressed metal products industries	134	2
18	3196	Construction and maintenance machinery and equipment industry	134	2
06	2592	Turned and shaped wood industry	130	2
22	4999	Other utility industries	130	2
30	8644	Sheltered workshops	123	2
07	1651	Architectural plastic products industry	116	2
06	2543	Wooden door and window industry	115	2
13	2642	Wooden office furniture industry	115	2
32	3931	Sporting goods industry	110	2
09	2959	Other non-ferrous metals refining and smelting industries	108	2
21	9953	Janitorial services	105	2
07	1611	Foamed and expanded plastic products industry	102	2

CSST priority sector	CAEQ	Industrial class description	Number of relevant results	Number of substances involved
07	1621	Plastic pipe and pipe fittings industry	100	2
21	7753	Research laboratory services	100	2
21	9942	Welding	98	2
12	1061	Animal feed industry	91	2
06	2561	Wooden box and pallet industry	87	2
16	5621	Hardware wholesale	82	2
05	3059	Other wire products industries	78	2
04	0812	Limestone quarries	76	2
25	3359	Other communication and electronic equipment industries	73	2
02	3791	Printing ink industry	63	2
06	2593	Particle board industry	62	2
21	9949	Other repair services	61	2
10	3599	Other non-metallic mineral products industries	60	2
01	4232	Siding installation and repair	55	2
25	3391	Battery industry	227	1
04	0623	Feldspar and quartz mines	188	1
02	3793	Explosives and munitions industry	187	1
12	1099	Other food products industries	174	1
07	1691	Plastic bag industry	161	1
18	3192	Handling equipment industry	136	1
04	0611	Gold mines	133	1
21	9721	Mechanized laundry or dry cleaning services	119	1
04	0619	Other metal mines	109	1
04	0622	Peat industry	109	1
18	3195	Pulp and paper machinery industry	103	1
01	4035	Highways, streets and bridges	98	1
08	3231	Motor vehicle industry	96	1
10	3594	Non-metallic mineral insulating materials industry	94	1
08	3271	Shipbuilding and repair industry	84	1
10	3562	Glass products industry (except glass containers)	78	1
13	2695	Frame industry	74	1
10	3591	Refractories industry	72	1
23	2819	Other commercial printing industries	69	1
01	4039	Other engineering work	67	1
10	3592	Asbestos products industry	65	1
18	3193	Wood harvesting, cutting and shaping machinery industry	55	1

CSST priority sector	CAEQ	Industrial class description	Number of relevant results	Number of substances involved
18	3194	Turbine and mechanical power transmission equipment industry	55	1
16	5529	Other motor vehicle parts and accessories, wholesale	53	1
02	3792	Adhesives industry	50	1
16	5919	Other waste materials and recyclable materials, wholesale	50	1
18	3191	Compressor, pump and industrial fan industry	49	1
16	5639	Other building materials, wholesale	49	1
21	7799	Other business services	49	1
05	3042	Metal closure and container industry	48	1
05	3071	Heating equipment industry	48	1
02	3721	Chemical and mixed fertilizer industry	48	1
07	3731	Plastics and synthetic resin industry	48	1
13	2641	Metal office furniture industry	47	1
04	0811	Granite quarries	45	1
04	0821	Quarry and sand pit industries	45	1
08	3261	Railroad rolling stock industry	45	1
10	3541	Concrete pipe industry	44	1
16	6354	Motor vehicle glass replacement shops	43	1
16	6359	Other motor vehicle repair shops	42	1
06	2521	Hardwood and softwood veneer industry	39	1
09	2921	Steel pipe and tube industry	36	1
01	4299	Other trade work	36	1
17	1714	Boot and shoe accessories industry	35	1
08	3299	Other transportation equipment industries	34	1
32	3993	Floor tile and linoleum industry	34	1
01	4224	Concrete pouring and finishing	34	1
16	6533	Wood and construction materials, retail	34	1
04	0625	Salt mine	33	1
06	2544	Wooden structural products industry	33	1
07	1661	Plastic containers industry (except those in foam)	30	1
17	1712	Footwear industry	29	1
10	3512	Clay products industry (imported clay)	29	1
28	8531	University teaching	29	1
09	2912	Steel foundries	28	1
08	3255	Motor vehicle wheel and brake industry	28	1
02	3741	Pharmaceuticals and medicine industry	28	1
03	0511	Forestry services	26	1

<b>CSST priority sector</b>	<b>CAEQ</b>	<b>Industrial class description</b>	<b>Number of relevant results</b>	<b>Number of substances involved</b>
01	4024	Non-residential renovation	26	1
16	5721	Construction, forestry machinery, equipment and supplies, wholesale	26	1
21	9921	Automobile and truck rental services	26	1
09	2911	Ferrous alloys industry	25	1
09	2962	Aluminum casting and extruding mills	25	1
16	5911	Automobile recovery and dismantling	25	1

**APPENDIX 3: LIST OF SUBSTANCES FOUND IN HIGHER  
CONCENTRATIONS BY INDUSTRIAL CLASS INVOLVED AND  
DISTRIBUTION IN RELATION TO THE STANDARD IN 2001-2005  
(MINIMUM 20% OF ANALYSES > 50% OF THE TWA)**

CSST priority sector	CAEQ	Industrial class description	Substance	>50% TWA %	>100% TWA %	>200% TWA %	Relevant results
18	3199	Other machinery and equipment industries	Fibres	100,00	<b>97.62</b>	85.71	42
02	3711	Industrial inorganic chemical industries	Beryllium	90,24	<b>81.71</b>	64.63	82
10	3599	Other non-metallic mineral products industries	Quartz	85.19	<b>81.48</b>	44.44	27
16	5721	Construction, forestry machinery, equipment and supplies, wholesale	Welding fumes	88.46	<b>80,77</b>	34.62	26
09	2959	Other non-ferrous metals refining and smelting industries	Lead	80,26	<b>77.63</b>	63.16	76
03	0511	Forestry services	Hardwood and softwood dusts	100,00	<b>76.92</b>	61.54	26
32	3993	Floor tile and linoleum industry	Methyl ethyl ketone	94.12	<b>76.47</b>	47.06	34
08	3271	Shipbuilding and repair industry	Welding fumes	95.24	<b>75.00</b>	48.81	84
01	4231	Masonry work	Fibres	87.50	<b>75.00</b>	45.00	40
02	3793	Explosives and munitions industry	Diethyl ether	95.72	<b>72.73</b>	31.02	187
05	3041	Custom metal coating industry	HDI (oligomers)	74.47	<b>72.34</b>	61.70	94
05	3041	Custom metal coating industry	Triglycidyl isocyanurate	72.62	<b>71.43</b>	66.67	84
24	3611	Refined petroleum products industry (except lubricating oil and grease)	Quartz	86.67	<b>71.11</b>	42.22	45
10	3592	Asbestos products industry	Fibres	81.54	<b>70.77</b>	46.15	65
21	9953	Janitorial services	Beryllium	83.54	<b>69.62</b>	49.37	79
13	2692	Hotel, restaurant and institutional furniture and fixture industry	Hardwood and softwood dusts	93.94	<b>66.67</b>	42.42	33
12	1061	Animal feed industry	Grain dusts	72.13	<b>65.57</b>	45.90	61
08	3281	Boatbuilding and repair industry	Welding fumes	79.31	<b>65.52</b>	51.72	29
14	2711	Pulp industry	Hardwood and softwood dusts	84.62	<b>65.38</b>	30.77	26
06	2581	Coffin industry	Hardwood and softwood dusts	96.88	<b>64.06</b>	45.31	64
25	3391	Battery industry	Lead	76.65	<b>63.00</b>	38.33	227
12	1072	Bread and other bakery products industry	Grain dusts	81.48	<b>62.96</b>	40.74	27
18	3111	Agricultural implement industry	Triglycidyl isocyanurate	82.14	<b>60.71</b>	42.86	28
04	0625	Salt mine	MD <sup>9</sup>	84.85	<b>60.61</b>	33.33	33
24	3611	Refined petroleum products industry (except lubricating oil and grease)	Cristobalite, crystalline silica	60.00	<b>60.00</b>	44.44	45
08	3281	Boatbuilding and repair industry	Hardwood and	85.00	<b>60.00</b>	18.33	60

<sup>9</sup> MD = Miscellaneous dusts

CSST priority sector	CAEQ	Industrial class description	Substance	>50% TWA %	>100% TWA %	>200% TWA %	Relevant results
			softwood dusts				
32	3999	Other manufacturing industries	Welding fumes	81.48	<b>59.26</b>	7.41	27
01	4224	Concrete pouring and finishing	Quartz	67.65	<b>58.82</b>	47.06	34
16	6213	Furniture repair shops	Methylene chloride	65.18	<b>58.04</b>	44.64	112
13	2611	Wooden household furniture industry	Hardwood and softwood dusts	76.87	<b>56.62</b>	26.32	627
05	3011	Plate work industry	Welding fumes	82.95	<b>56.59</b>	18.60	129
09	2999	Other rolled, cast and extruded non-ferrous metal products industries	Lead	64.48	<b>55.60</b>	43.63	259
07	1699	Other plastic products industries	Methyl methacrylate	56.67	<b>55.00</b>	45.00	60
07	1641	Stratified or reinforced plastic products industry	MD	70.33	<b>53.85</b>	40.66	91
12	1061	Animal feed industry	MD	66.67	<b>53.33</b>	36.67	30
08	3256	Plastic parts and accessories for motor vehicles industry	Styrene (monomer)	72.36	<b>53.12</b>	15.72	369
05	3041	Custom metal coating industry	Copper	56.52	<b>52.17</b>	43.48	46
05	3039	Other ornamental and architectural metal products industries	Welding fumes	78.15	<b>52.10</b>	15.55	238
21	7753	Research laboratory services	Quartz	70.37	<b>51.85</b>	29.63	27
03	2511	Shingle and split shingle industry	Cobalt	65.71	<b>51.43</b>	22.86	35
04	0622	Peat industry	MD	77.06	<b>50.46</b>	30.28	109
05	3029	Other fabricated structural metal products industries	Welding fumes	76.42	<b>50.26</b>	15.15	581
21	9953	Janitorial services	MD	73.08	<b>50.00</b>	34.62	26
05	3031	Metal door and window industry	Hardwood and softwood dusts	69.44	<b>50.00</b>	19.44	36
16	5621	Hardware wholesale	Trichloroethylene	75.00	<b>50.00</b>	18.75	32
09	2941	Iron foundries	Welding fumes	89.29	<b>50.00</b>	14.29	28
18	3194	Turbine and mechanical power transmission equipment industry	Welding fumes	80.00	<b>49.09</b>	16.36	55
10	3549	Other concrete products industries	Welding fumes	79.49	<b>48.72</b>	17.95	39
05	3081	Machine shops	Copper	51.35	<b>48.65</b>	32.43	37
05	3041	Custom metal coating industry	MD	66.15	<b>47.92</b>	35.42	192
06	2549	Other millwork industries	Hardwood and softwood dusts	72.41	<b>47.41</b>	23.28	116
18	3193	Wood harvesting, cutting and shaping machinery industry	Welding fumes	70.91	<b>47.27</b>	10.91	55
01	4299	Other trade work	Beryllium	63.89	<b>47.22</b>	30.56	36
13	2699	Other furniture and fixture industries	Hardwood and softwood dusts	75.71	<b>47.14</b>	25.71	140
10	3511	Clay products industry (Canadian clay)	MD	51.52	<b>46.97</b>	42.42	66
09	2951	Primary aluminum production industry	Ammonia (by colorimetric tube)	51.11	<b>46.67</b>	42.22	45
08	3255	Motor vehicle wheel and brake industry	Fibres	78.57	<b>46.43</b>	17.86	28
13	2612	Upholstered household furniture industry	Hardwood and softwood dusts	78.21	<b>46.15</b>	20.51	78

CSST priority sector	CAEQ	Industrial class description	Substance	>50% TWA %	>100% TWA %	>200% TWA %	Relevant results
32	3999	Other manufacturing industries	Lead	59.46	<b>45.95</b>	24.32	37
07	1651	Architectural plastic products industry	MD	77.14	<b>45.71</b>	22.86	35
07	1621	Plastic pipe and pipe fittings industry	Styrene (monomer)	78.57	<b>45.71</b>	18.57	70
06	2593	Particle board industry	Hardwood and softwood dusts	57.58	<b>45.45</b>	21.21	33
30	8644	Sheltered workshops	MD	74.55	<b>45.45</b>	20.00	55
12	1099	Other food products industries	MD	60.34	<b>45.40</b>	25.29	174
01	4035	Highways, streets and bridges	Quartz	59.18	<b>44.90</b>	29.59	98
06	2592	Turned and shaped wood industry	Hardwood and softwood dusts	72.45	<b>44.90</b>	14.29	98
04	0623	Feldspar and quartz mines	Quartz	58.51	<b>44.15</b>	22.87	188
09	2962	Aluminum casting and extruding mills	Copper	48.00	<b>44.00</b>	32.00	25
04	0611	Gold mines	Quartz	62.41	<b>43.61</b>	26.32	133
15	4591	Highway, street and bridge maintenance industry	Welding fumes	56.41	<b>43.59</b>	30.77	39
05	3081	Machine shops	Cobalt	43.59	<b>43.59</b>	28.21	39
10	3511	Clay products industry (Canadian clay)	Styrene (monomer)	81.67	<b>43.33</b>	3.33	60
08	3281	Boatbuilding and repair industry	Styrene (monomer)	73.00	<b>43.09</b>	9.00	789
05	3081	Machine shops	Welding fumes	66.46	<b>42.63</b>	21.63	319
21	9921	Automobile and truck rental services	Beryllium	65.38	<b>42.31</b>	26.92	26
18	3199	Other machinery and equipment industries	Welding fumes	69.94	<b>42.20</b>	14.64	519
03	2512	Sawmill and planing mill products industry (except shingles)	Welding fumes	58.06	<b>41.94</b>	27.42	62
08	3241	Truck and bus body industry	Nickel	68.82	<b>41.94</b>	22.58	93
10	3531	Stone products industry	Quartz	65.29	<b>40.92</b>	28.28	435
05	3099	Other metal fabricating industries	Welding fumes	62.98	<b>40.87</b>	23.32	416
18	3196	Construction and maintenance machinery and equipment industry	Welding fumes	84.00	<b>40.00</b>	14.67	75
21	9949	Other repair services	Welding fumes	80.00	<b>40.00</b>	12.00	25
03	2511	Shingle and split shingle industry	Hardwood and softwood dusts	62.50	<b>40.00</b>	8.75	80
16	5912	Wholesale scrap and old metal dealers	MD	44.64	<b>39.29</b>	21.43	56
08	3241	Truck and bus body industry	Welding fumes	73.53	<b>38.97</b>	12.87	272
04	0812	Limestone quarries	Quartz	48.28	<b>37.93</b>	27.59	29
18	3192	Handling equipment industry	Welding fumes	71.32	<b>37.50</b>	11.76	136
28	8511	Teaching at the kindergarten, elementary and secondary levels	HDI (oligomers)	45.79	<b>37.38</b>	34.58	107
08	3242	Commercial semi-trailers and trailers industry	Welding fumes	72.41	<b>37.24</b>	12.41	290
01	4231	Masonry work	Beryllium	48.15	<b>37.04</b>	29.63	27
15	4591	Highway, street and bridge maintenance industry	Quartz	60.32	<b>36.51</b>	23.81	63
09	2911	Ferroalloys industry	Welding fumes	60.00	<b>36.00</b>	12.00	25



CSST priority sector	CAEQ	Industrial class description	Substance	>50% TWA %	>100% TWA %	>200% TWA %	Relevant results
06	2542	Wooden kitchen cabinet and bathroom vanity industry	Hardwood and softwood dusts	59.42	<b>35.99</b>	13.53	414
02	3799	Other chemical products industries	Methyl alcohol	63.49	<b>35.27</b>	11.20	241
08	3211	Aircraft and aircraft parts industry	Chromium <sup>VI</sup>	40.54	<b>35.14</b>	27.03	37
18	3111	Agricultural implement industry	Welding fumes	77.82	<b>34.73</b>	12.13	239
05	3081	Machine shops	MD	54.26	<b>34.53</b>	21.52	223
02	3711	Industrial inorganic chemical industries	MD	46.51	<b>34.42</b>	21.40	215
03	2512	Sawmill and planing mill products industry (except shingles)	Hardwood and softwood dusts	55.56	<b>34.11</b>	14.40	1035
05	3099	Other metal fabricating industries	Methylene chloride	57.45	<b>34.04</b>	14.89	47
18	3199	Other machinery and equipment industries	MD	53.09	<b>34.02</b>	15.98	194
09	2941	Iron foundries	Quartz	60.47	<b>33.49</b>	19.07	215
05	3099	Other metal fabricating industries	HDI (oligomers)	33.33	<b>33.33</b>	33.33	33
13	2642	Wooden office furniture industry	Hardwood and softwood dusts	52.38	<b>33.33</b>	9.52	42
07	1641	Stratified or reinforced plastic products industry	Styrene (monomer)	64.80	<b>32.96</b>	12.48	537
10	3521	Cement industry	Quartz	50.59	<b>32.94</b>	11.76	85
21	7753	Research laboratory services	Lead	46.58	<b>31.51</b>	16.44	73
24	3611	Refined petroleum products industry (except lubricating oil and grease)	MD	54.17	<b>31.25</b>	8.33	48
13	2619	Other household furniture industries	Triglycidyl isocyanurate	33.33	<b>31.11</b>	28.89	45
04	0811	Granite quarries	Quartz	60.00	<b>31.11</b>	13.33	45
06	2593	Particle board industry	MD	44.83	<b>31.03</b>	10.34	29
16	6359	Other motor vehicle repair shops	Lead	45.24	<b>30.95</b>	14.29	42
08	3211	Aircraft and aircraft parts industry	HDI (oligomers)	32.10	<b>30.86</b>	28.40	162
05	3049	Other stamped and pressed metal products industries	Welding fumes	61.68	<b>30.84</b>	13.08	107
06	2521	Hardwood and softwood veneer industry	Hardwood and softwood dusts	58.97	<b>30.77</b>	7.69	39
07	1699	Other plastic products industries	Styrene (monomer)	51.36	<b>30.61</b>	8.50	294
13	2619	Other household furniture industries	Hardwood and softwood dusts	45.83	<b>30.56</b>	8.33	72
04	0619	Other metal mines	Quartz	44.04	<b>30.28</b>	17.43	109
13	2612	Upholstered household furniture industry	Methylene chloride	53.13	<b>30.21</b>	15.63	96
01	4231	Masonry work	MD	44.58	<b>30.12</b>	14.46	83
02	3792	Adhesives industry	Methylene chloride	50.00	<b>30.00</b>	6.00	50
01	4232	Siding installation and repair	Quartz	40.74	<b>29.63</b>	0.00	27
10	3562	Glass products industry (except glass containers)	Quartz	42.31	<b>29.49</b>	23.08	78
06	2581	Coffin industry	Methyl alcohol	31.71	<b>29.27</b>	4.88	41
09	2999	Other rolled, cast and extruded non-ferrous metal products industries	Aluminum	31.03	<b>28.74</b>	21.84	87
06	2599	Other wood industries	Hardwood and	53.90	<b>28.57</b>	9.74	154

CSST priority sector	CAEQ	Industrial class description	Substance	>50% TWA %	>100% TWA %	>200% TWA %	Relevant results
			softwood dusts				
06	2561	Wooden box and pallet industry	Hardwood and softwood dusts	58.49	<b>28.30</b>	18.87	53
05	3041	Custom metal coating industry	Chromium <sup>VI</sup>	34.78	<b>28.26</b>	17.39	46
01	4231	Masonry work	Cristobalite, crystalline silica	37.50	<b>28.13</b>	15.63	32
10	3551	Ready-mix concrete industry	Trichloroethylene	60.00	<b>28.00</b>	8.00	25
03	2512	Sawmill and planing mill products industry (except shingles)	Cobalt	36.63	<b>27.98</b>	18.11	243
01	4231	Masonry work	Quartz	33.33	<b>27.78</b>	9.26	54
08	3242	Commercial semi-trailers and trailers industry	MD	49.38	<b>27.16</b>	14.81	81
18	3196	Construction and maintenance machinery and equipment industry	MD	67.80	<b>27.12</b>	13.56	59
05	3042	Metal closure and container industry	MD	60.42	<b>27.08</b>	10.42	48
10	3549	Other concrete products industries	Quartz	47.30	<b>27.03</b>	14.86	74
18	3199	Other machinery and equipment industries	Nickel	36.00	<b>26.67</b>	10.67	75
07	1611	Foamed and expanded plastic products industry	Acrylonitrile	50.00	<b>26.19</b>	23.81	42
22	4999	Other utility industries	Beryllium	27.27	<b>26.14</b>	22.73	88
06	2545	Hardwood flooring industry	Hardwood and softwood dusts	56.73	<b>25.73</b>	10.53	171
10	3594	Non-metallic mineral insulating materials industry	MD	43.62	<b>25.53</b>	11.70	94
13	2611	Wooden household furniture industry	MD	49.52	<b>25.00</b>	9.62	208
05	3059	Other wire products industries	Welding fumes	67.50	<b>25.00</b>	7.50	40
02	3751	Paint and varnish industry	Toluene	40.14	<b>24.74</b>	12.98	578
13	2619	Other household furniture industries	MD	37.70	<b>24.59</b>	16.39	122
08	3281	Boatbuilding and repair industry	VM&P naphtha	31.71	<b>24.39</b>	12.20	41
06	2542	Wooden kitchen cabinet and bathroom vanity industry	HDI (oligomers)	24.24	<b>24.24</b>	21.21	33
06	2599	Other wood industries	Styrene (monomer)	50.00	<b>24.14</b>	1.72	58
28	8531	University teaching	Hardwood and softwood dusts	44.83	<b>24.14</b>	0.00	29
16	5911	Automobile recovery and dismantling	Lead	36.00	<b>24.00</b>	4.00	25
05	3041	Custom metal coating industry	Nickel	35.64	<b>23.76</b>	16.83	101
14	2719	Other paper industries	Welding fumes	44.74	<b>23.68</b>	13.16	38
25	3359	Other communication and electronic equipment industries	Methyl ethyl ketone	23.33	<b>23.33</b>	16.67	30
02	3711	Industrial inorganic chemical industries	Welding fumes	46.67	<b>23.33</b>	16.67	30
21	9942	Welding	Welding fumes	67.31	<b>23.08</b>	3.85	52
01	4024	Non-residential renovation	N,N-Dimethylformamide	38.46	<b>23.08</b>	3.85	26
06	2542	Wooden kitchen cabinet and bathroom vanity industry	Styrene (monomer)	50.00	<b>23,08</b>	0.00	26

CSST priority sector	CAEQ	Industrial class description	Substance	>50% TWA %	>100% TWA %	>200% TWA %	Relevant results
05	3081	Machine shops	Beryllium	29.56	<b>22.96</b>	16.98	318
32	3971	Sign and display industry	Toluene	36.44	<b>22.88</b>	5.93	118
08	3281	Boatbuilding and repair industry	Methyl alcohol	22.86	<b>22.86</b>	14.29	35
09	2941	Iron foundries	Furfuryl alcohol	22.22	<b>22.22</b>	14.81	27
09	2959	Other non-ferrous metals refining and smelting industries	Cadmium	37.50	<b>21.88</b>	12.50	32
09	2951	Primary aluminum production industry	Beryllium	38.20	<b>21.74</b>	12.11	322
08	3241	Truck and bus body industry	Styrene (monomer)	40.54	<b>21.62</b>	4.05	74
08	3241	Truck and bus body industry	Methyl ethyl ketone	25.00	<b>21.43</b>	7.14	28
18	3195	Pulp and paper machinery industry	Welding fumes	46.60	<b>21.36</b>	7.77	103
13	2641	Metal office furniture industry	Welding fumes	38.30	<b>21.28</b>	0.00	47
05	3099	Other metal fabricating industries	HDI (monomers)	21.21	<b>21.21</b>	12.12	33
02	3791	Printing ink industry	Methyl ethyl ketone	51.52	<b>21.21</b>	6.06	33
08	3241	Truck and bus body industry	MD	35.21	<b>21.13</b>	11.27	71
02	3751	Paint and varnish industry	Methylene chloride	26.39	<b>20.83</b>	16.67	72
02	3721	Chemical and mixed fertilizer industry	MD	39.58	<b>20.83</b>	6.25	48
07	1599	Other rubber products industries	MD	23.38	<b>20.78</b>	16.88	77
16	5529	Other motor vehicle parts and accessories, wholesale	Lead	24.53	<b>20.75</b>	9.43	53
07	1699	Other plastic products industries	HDI (oligomers)	24.14	<b>20.69</b>	17.24	29
05	3011	Plate work industry	Nickel	48.28	<b>20.69</b>	6.90	29
10	3512	Clay products industry (imported clay)	MD	27.59	<b>20.69</b>	0.00	29
10	3541	Concrete pipe industry	MD	27.27	<b>20.45</b>	9.09	44
18	3191	Compressor, pump and industrial fan industry	Welding fumes	46.94	<b>20.41</b>	2.04	49
05	3081	Machine shops	Iron	32.11	<b>20.18</b>	8.26	109
14	2711	Pulp industry	Nickel	24.00	<b>20.00</b>	20.00	25
05	3029	Other fabricated structural metal products industries	HDI (oligomers)	20.00	<b>20.00</b>	20.00	25
07	1661	Plastic containers industry (except those in foam)	Beryllium	26.67	<b>20.00</b>	16.67	30
14	2711	Pulp industry	Chromium	20.00	<b>20.00</b>	16.00	25
07	1599	Other rubber products industries	Benzene	20.00	<b>20.00</b>	15.71	70
08	3261	Railroad rolling stock industry	Nickel	42.22	<b>20.00</b>	11.11	45
13	2612	Upholstered household furniture industry	MD	56.00	<b>20.00</b>	8.00	25
09	2999	Other rolled, cast and extruded non-ferrous metal products industries	Quartz	40.00	<b>20.00</b>	5.71	35
13	2692	Hotel, restaurant and institutional furniture and fixture industry	MD	40.00	<b>20.00</b>	2.22	45

**APPENDIX 4: LIST OF SUBSTANCES FOUND IN HIGHER  
CONCENTRATIONS BY INDUSTRIAL CLASS INVOLVED AND  
DISTRIBUTION IN RELATION TO DOUBLE THE STANDARD IN 2001-  
2005 (MINIMUM 20% OF ANALYSES > 2 TWA)**

CSST priority sector	CAEQ	Industrial class description	Substance	TWA mg/m <sup>3</sup>	>50% TWA %	>100% TWA %	>200% TWA %	Relevant results
18	3199	Other machinery and equipment industries	Fibres	0.2 fcc	100.00	97.62	<b>85.71</b>	42
05	3041	Custom metal coating industry	Triglycidyl isocyanurate	0.05	72.62	71.43	<b>66.67</b>	84
02	3711	Industrial inorganic chemical industries	Beryllium	0.00015	90.24	81.71	<b>64.63</b>	82
09	2959	Other non-ferrous metals refining and smelting industries	Lead	0.05	80.26	77.63	<b>63.16</b>	76
05	3041	Custom metal coating industry	HDI (oligomers)	0.04	74.47	72.34	<b>61.70</b>	94
03	0511	Forestry services	Hardwood and softwood dusts	5	100.00	76.92	<b>61.54</b>	26
08	3281	Boatbuilding and repair industry	Welding fumes	5	79.31	65.52	<b>51.72</b>	29
21	9953	Janitorial services	Beryllium	0.00015	83.54	69.62	<b>49.37</b>	79
08	3271	Shipbuilding and repair industry	Welding fumes	5	95.24	75.00	<b>48.81</b>	84
32	3993	Floor tile and linoleum industry	Methyl ethyl ketone	150	94.12	76.47	<b>47.06</b>	34
01	4224	Concrete pouring and finishing	Quartz	0.1	67.65	58.82	<b>47.06</b>	34
10	3592	Asbestos products industry	Fibres	0.2 fcc	81.54	70.77	<b>46.15</b>	65
12	1061	Animal feed industry	Grain dusts	4	72.13	65.57	<b>45.90</b>	61
06	2581	Coffin industry	Hardwood and softwood dusts	5	96.88	64.06	<b>45.31</b>	64
01	4231	Masonry work	Fibres	0.2 fcc	87.50	75.00	<b>45.00</b>	40
07	1699	Other plastic products industries	Methyl methacrylate	205	56.67	55.00	<b>45.00</b>	60
16	6213	Furniture repair shops	Methylene chloride	174	65.18	58.04	<b>44.64</b>	112
10	3599	Other non-metallic mineral products industries	Quartz	0.1	85.19	81.48	<b>44.44</b>	27
24	3611	Refined petroleum products industry (except lubricating oil and grease)	Cristobalite, crystalline silica	0.05	60.00	60.00	<b>44.44</b>	45
09	2999	Other rolled, cast and extruded non-ferrous metal products industries	Lead	0.05	64.48	55.60	<b>43.63</b>	259
05	3041	Custom metal coating industry	Copper	0.2	56.52	52.17	<b>43.48</b>	46
18	3111	Agricultural implement industry	Triglycidyl isocyanurate	0.05	82.14	60.71	<b>42.86</b>	28
13	2692	Hotel, restaurant and institutional furniture and fixture	Hardwood and softwood dusts	5	93.94	66.67	<b>42.42</b>	33

CSST priority sector	CAEQ	Industrial class description	Substance	TWA mg/m <sup>3</sup>	>50% TWA %	>100% TWA %	>200% TWA %	Relevant results
		industry						
10	3511	Clay products industry (Canadian clay)	MD <sup>10</sup>	10	51.52	46.97	<b>42.42</b>	66
24	3611	Refined petroleum products industry (except lubricating oil and grease)	Quartz	0.1	86.67	71.11	<b>42.22</b>	45
09	2951	Primary aluminum production industry	Ammonia (by colorimetric tube)	17	51.11	46.67	<b>42.22</b>	45
12	1072	Bread and other bakery products industry	Grain dusts	4	81.48	62.96	<b>40.74</b>	27
07	1641	Stratified or reinforced plastic products industry	MD	10	70.33	53.85	<b>40.66</b>	91
25	3391	Battery industry	Lead	0.05	76.65	63.00	<b>38.33</b>	227
12	1061	Animal feed industry	MD	10	66.67	53.33	<b>36.67</b>	30
05	3041	Custom metal coating industry	MD	10	66.15	47.92	<b>35.42</b>	192
16	5721	Construction, forestry machinery, equipment and supplies, wholesale	Welding fumes	5	88.46	80.77	<b>34.62</b>	26
21	9953	Janitorial services	MD	10	73.08	50.00	<b>34.62</b>	26
28	8511	Teaching at the kindergarten, elementary and secondary levels	HDI (oligomers)	0.04	45.79	37.38	<b>34.58</b>	107
04	0625	Salt mine	MD	10	84.85	60.61	<b>33.33</b>	33
05	3099	Other metal fabricating industries	HDI (oligomers)	0.04	33.33	33.33	<b>33.33</b>	33
05	3081	Machine shops	Copper	0.2	51.35	48.65	<b>32.43</b>	37
09	2962	Aluminum casting and extruding mills	Copper	0.2	48.00	44.00	<b>32.00</b>	25
02	3793	Explosives and munitions industry	Diethyl ether	1210	95.72	72.73	<b>31.02</b>	187
14	2711	Pulp industry	Hardwood and softwood dusts	5	84.62	65.38	<b>30.77</b>	26
15	4591	Highway, street and bridge maintenance industry	Welding fumes	5	56.41	43.59	<b>30.77</b>	39
01	4299	Other trade work	Beryllium	0.00015	63.89	47.22	<b>30.56</b>	36
04	0622	Peat industry	MD	10	77.06	50.46	<b>30.28</b>	109
21	7753	Research laboratory services	Quartz	0.1	70.37	51.85	<b>29.63</b>	27
01	4231	Masonry work	Beryllium	0.00015	48.15	37.04	<b>29.63</b>	27
01	4035	Highways, streets and bridges	Quartz	0.1	59.18	44.90	<b>29.59</b>	98
13	2619	Other household furniture industries	Triglycidyl isocyanurate	0.05	33.33	31.11	<b>28.89</b>	45
08	3211	Aircraft and aircraft parts industry	HDI (oligomers)	0.04	32.10	30.86	<b>28.40</b>	162
10	3531	Stone products industry	Quartz	0.1	65.29	40.92	<b>28.28</b>	435
05	3081	Machine shops	Cobalt	0.02	43.59	43.59	<b>28.21</b>	39
04	0812	Limestone quarries	Quartz	0.1	48.28	37.93	<b>27.59</b>	29

<sup>10</sup> MD = Miscellaneous dusts

CSST priority sector	CAEQ	Industrial class description	Substance	TWA mg/m <sup>3</sup>	>50% TWA %	>100% TWA %	>200% TWA %	Relevant results
03	2512	Sawmill and planing mill products industry (except shingles)	Welding fumes	5	58.06	41.94	<b>27.42</b>	62
08	3211	Aircraft and aircraft parts industry	Chromium <sup>VI</sup>	0,01	40,54	35.14	<b>27.03</b>	37
21	9921	Automobile and truck rental services	Beryllium	0.00015	65.38	42.31	<b>26.92</b>	26
13	2611	Wooden household furniture industry	Hardwood and softwood dusts	5	76.87	56.62	<b>26.32</b>	627
04	0611	Gold mines	Quartz	0.1	62.41	43.61	<b>26.32</b>	133
13	2699	Other furniture and fixture industries	Hardwood and softwood dusts	5	75.71	47.14	<b>25.71</b>	140
12	1099	Other food products industries	MD	10	60.34	45.40	<b>25.29</b>	174
32	3999	Other manufacturing industries	Lead	0.05	59.46	45.95	<b>24.32</b>	37
15	4591	Highway, street and bridge maintenance industry	Quartz	0.1	60.32	36.51	<b>23.81</b>	63
07	1611	Foamed and expanded plastic products industry	Acrylonitrile	4.3	50.00	26.19	<b>23.81</b>	42
05	3099	Other metal fabricating industries	Welding fumes	5	62.98	40.87	<b>23.32</b>	416
06	2549	Other millwork industries	Hardwood and softwood dusts	5	72.41	47.41	<b>23.28</b>	116
10	3562	Glass products industry (except glass containers)	Quartz	0.1	42.31	29.49	<b>23.08</b>	78
04	0623	Feldspar and quartz mines	Quartz	0.1	58.51	44.15	<b>22.87</b>	188
03	2511	Shingle and split shingle industry	Cobalt	0.02	65.71	51.43	<b>22.86</b>	35
07	1651	Architectural plastic products industry	MD	10	77.14	45.71	<b>22.86</b>	35
22	4999	Other utility industries	Beryllium	0.00015	27.27	26.14	<b>22.73</b>	88
08	3241	Truck and bus body industry	Nickel	0.1	68.82	41.94	<b>22.58</b>	93
09	2999	Other rolled, cast and extruded non-ferrous metal products industries	Aluminum	2	31.03	28.74	<b>21.84</b>	87
05	3081	Machine shops	Welding fumes	5	66.46	42.63	<b>21.63</b>	319
05	3081	Machine shops	MD	10	54.26	34.53	<b>21.52</b>	223
16	5912	Wholesale scrap and old metal dealers	MD	10	44.64	39.29	<b>21.43</b>	56
02	3711	Industrial inorganic chemical industries	MD	10	46.51	34.42	<b>21.40</b>	215
06	2593	Particle board industry	Hardwood and softwood dusts	5	57.58	45.45	<b>21.21</b>	33
06	2542	Wooden kitchen cabinet and bathroom vanity industry	HDI (oligomers)	0.04	24.24	24.24	<b>21.21</b>	33
13	2612	Upholstered household furniture industry	Hardwood and softwood dusts	5	78.21	46.15	<b>20.51</b>	78
30	8644	Sheltered workshops	MD	10	74.55	45.45	<b>20.00</b>	55
14	2711	Pulp industry	Nickel	0.1	24.00	20.00	<b>20.00</b>	25

CSST priority sector	CAEQ	Industrial class description	Substance	TWA mg/m <sup>3</sup>	>50% TWA %	>100% TWA %	>200% TWA %	Relevant results
05	3029	Other fabricated structural metal products industries	HDI (oligomers)	0.04	20.00	20.00	<b>20.00</b>	25

**APPENDIX 5: INDUSTRIAL CLASSES INVOLVED FOR SUBSTANCES  
FOUND IN HIGHER CONCENTRATIONS IN 2001-2005  
(MINIMUM 20% OF ANALYSES > TWA)**

Substance	CAEQ	Industrial class description	>100% TWA %
Acrylonitrile	1611	Foamed and expanded plastic products industry	26.19
Aluminum	2999	Other rolled, cast and extruded non-ferrous metal products industries	28.74
Ammonia (by colorimetric tube)	2951	Primary aluminum production industry	46.67
Benzene	1599	Other rubber products industries	20.00
Beryllium	3711	Industrial inorganic chemical industries	81.71
	9953	Janitorial services	69.62
	4299	Other trade work	47.22
	9921	Automobile and truck rental services	42.31
	4231	Masonry work	37.04
	4999	Other utility industries	26.14
	3081	Machine shops	22.96
	2951	Primary aluminum production industry	21.74
	1661	Plastic containers industry (except those in foam)	20.00
Cadmium	2959	Other non-ferrous metals refining and smelting industries	21.88
Chromium	2711	Pulp industry	20.00
Chromium <sup>VI</sup>	3211	Aircraft and aircraft parts industry	35.14
	3041	Custom metal coating industry	28.26
Cobalt	2511	Shingle and split shingle industry	51.43
	3081	Machine shops	43.59
	2512	Sawmill and planing mill products industry (except shingles)	27.98
Cristobalite, crystalline silica	3611	Refined petroleum products industry (except lubricating oil and grease)	60.00
	4231	Masonry work	28.13
Copper	3041	Custom metal coating industry	52.17
	3081	Machine shops	48.65
	2962	Aluminum casting and extruding mills	44.00
Diethyl ether	3793	Explosives and munitions industry	72.73
Fibres	3199	Other machinery and equipment industries	97.62
	4231	Masonry work	75.00
	3592	Asbestos products industry	70.77
	3255	Motor vehicle wheel and brake industry	46.43
Furfuryl alcohol	2941	Iron foundries	22.22
Grain dusts	2512	Sawmill and planing mill products industry (except shingles)	34.11
	1072	Bread and other bakery products industry	62.96
Hardwood and softwood dusts	0511	Forestry services	76.92



Substance	CAEQ	Industrial class description	>100% TWA %
Hardwood and softwood dusts (continued)	2692	Hotel, restaurant and institutional furniture and fixture industry	66.67
	2711	Pulp industry	65.38
	2581	Coffin industry	64.06
	3281	Boatbuilding and repair industry	60.00
	2611	Wooden household furniture industry	56.62
	3031	Metal door and window industry	50.00
	2549	Other millwork industries	47.41
	2699	Other furniture and fixture industries	47.14
	2612	Upholstered household furniture industry	46.15
	2593	Particle board industry	45.45
	2592	Turned and shaped wood industry	44.90
	2511	Shingle and split shingle industry	40.00
	2542	Wooden kitchen cabinet and bathroom vanity industry	35.99
	2512	Sawmill and planing mill products industry (except shingles)	34.11
	2642	Wooden office furniture industry	33.33
	2521	Hardwood and softwood veneer industry	30.77
	2619	Other household furniture industries	30.56
	2599	Other wood industries	28.57
2561	Wooden box and pallet industry	28.30	
2545	Hardwood flooring industry	25.73	
8531	University teaching	24.14	
HDI (monomers)	3099	Other metal fabricating industries	21.21
HDI (oligomers)	3041	Custom metal coating industry	72.34
	8511	Teaching at the kindergarten, elementary and secondary levels	37.38
	3099	Other metal fabricating industries	33.33
	3211	Aircraft and aircraft parts industry	30.86
	2542	Wooden kitchen cabinet and bathroom vanity industry	24.24
	1699	Other plastic products industries	20.69
	3029	Other fabricated structural metal products industries	20.00
Iron	3081	Machine shops	20.18
Methyl alcohol	3799	Other chemical products industries	35.27
	2581	Coffin industry	29.27
	3281	Boatbuilding and repair industry	22.86
Methylene chloride	6213	Furniture repair shops	58.04
	3099	Other metal fabricating industries	34.04
	2612	Upholstered household furniture industry	30.21
	3792	Adhesives industry	30.00
	3751	Paint and varnish industry	20.83
Methyl ethyl ketone	3993	Floor tile and linoleum industry	76.47
	3359	Other communication and electronic equipment industries	23.33
	3241	Truck and bus body industry	21.43
	3791	Printing ink industry	21.21
Methyl methacrylate	1699	Other plastic products industries	55.00
N,N-Dimethylformamide	4024	Non-residential renovation	23.08

Substance	CAEQ	Industrial class description	>100% TWA %
Nickel	3241	Truck and bus body industry	41.94
	3199	Other machinery and equipment industries	26.67
	3041	Custom metal coating industry	23.76
	3011	Plate work industry	20.69
	2711	Pulp industry	20.00
	3261	Railroad rolling stock industry	20.00
Lead	2959	Other non-ferrous metals refining and smelting industries	77.63
	3391	Battery industry	63.00
	2999	Other rolled, cast and extruded non-ferrous metal products industries	55.60
	3999	Other manufacturing industries	45.95
	7753	Research laboratory services	31.51
	6359	Other motor vehicle repair shops	30.95
	5911	Automobile recovery and dismantling	24.00
	5529	Other motor vehicle parts and accessories, wholesale	20.75
MD (miscellaneous dusts)	0625	Salt mine	60.61
	1641	Stratified or reinforced plastic products industry	53.85
	1061	Animal feed industry	53.33
	0622	Peat industry	50.46
	9953	Janitorial services	50.00
	3041	Custom metal coating industry	47.92
	3511	Clay products industry (Canadian clay)	46.97
	1651	Architectural plastic products industry	45.71
	8644	Sheltered workshops	45.45
	1099	Other food products industries	45.40
	5912	Wholesale scrap and old metal dealers	39.29
	3081	Machine shops	34.53
	3711	Industrial inorganic chemical industries	34.42
	3199	Other machinery and equipment industries	34.02
	3611	Refined petroleum products industry (except lubricating oil and grease)	31.25
	2593	Particle board industry	31.03
	4231	Masonry work	30.12
	3242	Commercial semi-trailers and trailers industry	27.16
	3196	Construction and maintenance machinery and equipment industry	27.12
	3042	Metal closure and container industry	27.08
	3594	Non-metallic mineral insulating materials industry	25.53
	2611	Wooden household furniture industry	25.00
	2619	Other household furniture industries	24.59
	3241	Truck and bus body industry	21.13
	3721	Chemical and mixed fertilizer industry	20.83
	1599	Other rubber products industries	20.78
	3512	Clay products industry (imported clay)	20.69
	3541	Concrete pipe industry	20.45
	2612	Upholstered household furniture industry	20.00
	2692	Hotel, restaurant and institutional furniture and fixture industry	20.00

Substance	CAEQ	Industrial class description	>100% TWA %
Quartz	3599	Other non-metallic mineral products industries	81.48
	3611	Refined petroleum products industry (except lubricating oil and grease)	71.11
	4224	Concrete pouring and finishing	58.82
	7753	Research laboratory services	51.85
	4035	Highways, streets and bridges	44.90
	0623	Feldspar and quartz mines	44.15
	0611	Gold mines	43.61
	3531	Stone products industry	40.92
	0812	Limestone quarries	37.93
	4591	Highway, street and bridge maintenance industry	36.51
	2941	Iron foundries	33.49
	3521	Cement industry	32.94
	0811	Granite quarries	31.11
	0619	Other metal mines	30.28
	4232	Siding installation and repair	29.63
	3562	Glass products industry (except glass containers)	29.49
	4231	Masonry work	27.78
3549	Other concrete products industries	27.03	
2999	Other rolled, cast and extruded non-ferrous metal products industries	20.00	
Styrene (monomer)	3256	Plastic parts and accessories for motor vehicles industry	53.12
	1621	Plastic pipe and pipe fittings industry	45.71
	3511	Clay products industry (Canadian clay)	43.33
	3281	Boatbuilding and repair industry	43.09
	1641	Stratified or reinforced plastic products industry	32.96
	1699	Other plastic products industries	30.61
	2599	Other wood industries	24.14
	2542	Wooden kitchen cabinet and bathroom vanity industry	23.08
	3241	Truck and bus body industry	21.62
Toluene	3751	Paint and varnish industry	24.74
	3971	Sign and display industry	22.88
Trichloroethylene	5621	Hardware wholesale	50.00
	3551	Ready-mix concrete industry	28.00
Triglycidyl isocyanurate	3041	Custom metal coating industry	71.43
	3111	Agricultural implement industry	60.71
	2619	Other household furniture industries	31.11
VM&P naphtha	3281	Boatbuilding and repair industry	24.39
Welding fumes	5721	Construction, forestry machinery, equipment and supplies, wholesale	80.77
	3271	Shipbuilding and repair industry	75.00
	3281	Boatbuilding and repair industry	65.52
	3999	Other manufacturing industries	59.26
	3011	Plate work industry	56.59
	3039	Other ornamental and architectural metal products industries	52.10
	3029	Other fabricated structural metal products industries	50.26
	2941	Iron foundries	50.00
	3194	Turbine and mechanical power transmission equipment industry	49.09

Substance	CAEQ	Industrial class description	>100% TWA %
Welding fumes (continued)	3549	Other concrete products industries	48.72
	3193	Wood harvesting, cutting and shaping machinery industry	47.27
	4591	Highway, street and bridge maintenance industry	43.59
	3081	Machine shops	42.63
	3199	Other machinery and equipment industries	42.20
	2512	Sawmill and planing mill products industry (except shingles)	41.94
	3099	Other metal fabricating industries	40.87
	3196	Construction and maintenance machinery and equipment industry	40.00
	9949	Other repair services	40.00
	3241	Truck and bus body industry	38.97
	3192	Handling equipment industry	37.50
	3242	Commercial semi-trailers and trailers industry	37.24
	2911	Ferrous alloys industry	36.00
	3111	Agricultural implement industry	34.73
	3049	Other stamped and pressed metal products industries	30.84
	3059	Other wire products industries	25.00
	2719	Other paper industries	23.68
	3711	Industrial inorganic chemical industries	23.33
	9942	Welding	23.08
	3195	Pulp and paper machinery industry	21.36
2641	Metal office furniture industry	21.28	
3191	Compressor, pump and industrial fan industry	20.41	

**APPENDIX 6: SUBSTANCES FOUND IN HIGHER CONCENTRATIONS  
IN EACH OF THE CSST PRIORITY SECTORS IN 2001-2005  
(MINIMUM 20% OF ANALYSES > TWA)**

CSST priority sector	CAEQ	Industrial class description	Substance	%>100% TWA
01	4024	Non-residential renovation	N,N-Dimethylformamide	23.08
	4035	Highways, streets and bridges	Quartz	44.90
	4224	Concrete pouring and finishing	Quartz	58.82
	4231	Masonry work	Fibres	75.00
			Beryllium	37.04
			MD <sup>11</sup>	30.12
			Cristobalite, crystalline silica	28.13
4232	Siding installation and repair	Quartz	27.78	
4299	Other trade work	Quartz	29.63	
02	3711	Industrial inorganic chemical industries	Beryllium	47.22
			MD	81.71
			Welding fumes	34.42
	3721	Chemical and mixed fertilizer industry	MD	23.33
	3751	Paint and varnish industry	Toluene	20.83
			Methylene chloride	24.74
	3791	Printing ink industry	Methyl ethyl ketone	20.83
	3792	Adhesives industry	Methylene chloride	21.21
3793	Explosives and munitions industry	Diethyl ether	30.00	
3799	Other chemical products industries	Methyl alcohol	72.73	
03	0511	Forestry services	Methyl alcohol	35.27
	2511	Shingle and split shingle industry	Hardwood and softwood dusts	76.92
			Cobalt	51.43
	2512	Sawmill and planing mill products industry (except shingles)	Hardwood and softwood dusts	40.00
			Welding fumes	41.94
Hardwood and softwood dusts			34.11	
04	0611	Gold mines	Cobalt	27.98
	0619	Other metal mines	Quartz	43.61
	0622	Peat industry	Quartz	30.28
	0623	Feldspar and quartz mines	MD	50.46
	0625	Salt mine	Quartz	44.15
	0811	Granite quarries	MD	60.61
	0812	Limestone quarries	Quartz	31.11
			Quartz	37.93

<sup>11</sup> MD = Miscellaneous dusts

CSST priority sector	CAEQ	Industrial class description	Substance	%>100% TWA
05	3011	Plate work industry	Welding fumes	56.59
			Nickel	20.69
	3029	Other fabricated structural metal products industries	Welding fumes	50.26
			HDI (oligomers)	20.00
	3031	Metal door and window industry	Hardwood and softwood dusts	50.00
	3039	Other ornamental and architectural metal products industries	Welding fumes	52.10
	3041	Custom metal coating industry	HDI (oligomers)	72.34
			Triglycidyl isocyanurate	71.43
			Copper	52.17
			MD	47.92
			Chromium <sup>VI</sup>	28.26
	3042	Metal closure and container industry	Nickel	23.76
MD			27.08	
3049	Other stamped and pressed metal products industries	Welding fumes	30.84	
3059	Other wire products industries	Welding fumes	25.00	
3081	Machine shops	Copper	48.65	
		Cobalt	43.59	
		Welding fumes	42.63	
		MD	34.53	
		Beryllium	22.96	
3099	Other metal fabricating industries	Iron	20.18	
		Welding fumes	40.87	
		Methylene chloride	34.04	
		HDI (oligomers)	33.33	
		HDI (monomers)	21.21	
06	2521	Hardwood and softwood veneer industry	Hardwood and softwood dusts	30.77
	2542	Wooden kitchen cabinet and bathroom vanity industry	Hardwood and softwood dusts	35.99
			HDI (oligomers)	24.24
			Styrene (monomer)	23.08
	2545	Hardwood flooring industry	Hardwood and softwood dusts	25.73
	2549	Other millwork industries	Hardwood and softwood dusts	47.41
	2561	Wooden box and pallet industry	Hardwood and softwood dusts	28.30
	2581	Coffin industry	Hardwood and softwood dusts	64.06
Methyl alcohol			29.27	
2592	Turned and shaped wood industry	Hardwood and softwood dusts	44.90	
2593	Particle board industry	Hardwood and softwood dusts	45.45	

CSST priority sector	CAEQ	Industrial class description	Substance	%>100% TWA
	2599	Other wood industries	MD	31.03
			Hardwood and softwood dusts	28.57
			Styrene (monomer)	24.14
07	1599	Other rubber products industries	MD	20.78
			Benzene	20.00
	1611	Foamed and expanded plastic products industry	Acrylonitrile	26.19
	1621	Plastic pipe and pipe fittings industry	Styrene (monomer)	45.71
	1641	Stratified or reinforced plastic products industry	MD	53.85
			Styrene (monomer)	32.96
	1651	Architectural plastic products industry	MD	45.71
1661	Plastic containers industry (except those in foam)	Beryllium	20.00	
1699	Other plastic products industries	Methyl methacrylate	55.00	
		Styrene (monomer)	30.61	
		HDI (oligomers)	20.69	
08	3211	Aircraft and aircraft parts industry	Chromium <sup>VI</sup>	35.14
			HDI (oligomers)	30.86
	3241	Truck and bus body industry	Nickel	41.94
			Welding fumes	38.97
			Styrene (monomer)	21.62
			Methyl ethyl ketone	21.43
			MD	21.13
	3242	Commercial semi-trailers and trailers industry	Welding fumes	37.24
			MD	27.16
	3255	Motor vehicle wheel and brake industry	Fibres	46.43
	3256	Plastic parts and accessories for motor vehicles industry	Styrene (monomer)	53.12
3261	Railroad rolling stock industry	Nickel	20.00	
3271	Shipbuilding and repair industry	Welding fumes	75.00	
3281	Boatbuilding and repair industry	Welding fumes	65.52	
		Hardwood and softwood dusts	60.00	
		Styrene (monomer)	43.09	
		VM&naphtha	24.39	
		Methyl alcohol	22.86	

CSST priority sector	CAEQ	Industrial class description	Substance	%>100% TWA
09	2911	Ferroalloys industry	Welding fumes	36.00
	2941	Iron foundries	Welding fumes	50.00
			Quartz	33.49
			Furfuryl alcohol	22.22
	2951	Primary aluminum production industry	Ammonia (by colorimetric tube)	46.67
	2959	Other non-ferrous metals refining and smelting industries	Beryllium	21.74
Lead			77.63	
2962	Aluminum casting and extruding mills	Cadmium	21.88	
		Copper	44.00	
		Lead	55.60	
2999	Other rolled, cast and extruded non-ferrous metal products industries	Aluminum	28.74	
		Quartz	20.00	
10	3511	Clay products industry (Canadian clay)	MD	46.97
			Styrene (monomer)	43.33
	3512	Clay products industry (imported clay)	MD	20.69
	3521	Cement industry	Quartz	32.94
	3531	Stone products industry	Quartz	40.92
	3541	Concrete pipe industry	MD	20.45
	3549	Other concrete products industries	Welding fumes	48.72
			Quartz	27.03
	3551	Ready-mix concrete industry	Trichloroethylene	28.00
	3562	Glass products industry (except glass containers)	Quartz	29.49
	3592	Asbestos products industry	Fibres	70.77
3594	Non-metallic mineral insulating materials industry	MD	25.53	
3599	Other non-metallic mineral products industries	Quartz	81.48	
12	1061	Animal feed industry	Grain dusts	65.57
			MD	53.33
	1072	Bread and other bakery products industry	Grain dusts	62.96
1099	Other food products industries	MD	45.40	



CSST priority sector	CAEQ	Industrial class description	Substance	%>100% TWA
13	2611	Wooden household furniture industry	Hardwood and softwood dusts	56.62
			MD	25.00
	2612	Upholstered household furniture industry	Hardwood and softwood dusts	46.15
			Methylene chloride	30.21
	2619	Other household furniture industries	MD	20.00
			Triglycidyl isocyanurate	31.11
	2641	Metal office furniture industry	Hardwood and softwood dusts	30.56
MD			24.59	
2642	Wooden office furniture industry	Welding fumes	21.28	
14	2692	Hotel, restaurant and institutional furniture and fixture industry	Hardwood and softwood dusts	33.33
			MD	20.00
	2699	Other furniture and fixture industries	Hardwood and softwood dusts	66.67
14	2711	Pulp industry	Hardwood and softwood dusts	47.14
			Chromium	20.00
	2719	Other paper industries	Nickel	20.00
Welding fumes			23.68	
15	4591	Highway, street and bridge maintenance industry	Welding fumes	43.59
			Quartz	36.51
16	5529	Other motor vehicle parts and accessories, wholesale	Lead	20.75
	5621	Hardware wholesale	Trichloroethylene	50.00
	5721	Construction, forestry machinery, equipment and supplies, wholesale	Welding fumes	80.77
	5911	Automobile recovery and dismantling	Lead	24.00
	5912	Wholesale scrap and old metal dealers	MD	39.29
	6213	Furniture repair shops	Methylene chloride	58.04
	6359	Other motor vehicle repair shops	Lead	30.95

CSST priority sector	CAEQ	Industrial class description	Substance	%>100% TWA
18	3111	Agricultural implement industry	Triglycidyl isocyanurate	60.71
			Welding fumes	34.73
	3191	Compressor, pump and industrial fan industry	Welding fumes	20.41
	3192	Handling equipment industry	Welding fumes	37.50
	3193	Wood harvesting, cutting and shaping machinery industry	Welding fumes	47.27
	3194	Turbine and mechanical power transmission equipment industry	Welding fumes	49.09
	3195	Pulp and paper machinery industry	Welding fumes	21.36
	3196	Construction and maintenance machinery and equipment industry	Welding fumes	40.00
MD			27.12	
3199	Other machinery and equipment industries	Fibres	97.62	
		Welding fumes	42.20	
		MD	34.02	
		Nickel	26.67	
21	7753	Research laboratory services	Quartz	51.85
			Lead	31.51
	9921	Automobile and truck rental services	Beryllium	42.31
	9942	Welding	Welding fumes	23.08
	9949	Other repair services	Welding fumes	40.00
9953	Janitorial services	Beryllium	69.62	
		MD	50.00	
22	4999	Other utility industries	Beryllium	26.14
24	3611	Refined petroleum products industry (except lubricating oil and grease)	Quartz	71.11
			Cristobalite, crystalline silica	60.00
			MD	31.25
25	3359	Other communication and electronic equipment industries	Methyl ethyl ketone	23.33
	3391	Battery industry	Lead	63.00
28	8511	Teaching at the kindergarten, elementary and secondary levels	HDI (oligomers)	37.38
	8531	University teaching	Hardwood and softwood dusts	24.14
30	8644	Sheltered workshops	MD	45.45
32	3971	Sign and display industry	Toluene	22.88
	3993	Floor tile and linoleum industry	Methyl ethyl ketone	76.47
	3999	Other manufacturing industries	Welding fumes	59.26
Lead			45.95	