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UPDATING THE HAZARDOUS CHEMICALS RULES,
1989 AND THE CHEMICAL ACCIDENTS RULES, 1996

SUBMISSIONS TO THE MINISTRY OF
ENVIRONMENT, FOREST AND CLIMATE CHANGE

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The Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989 (“MSIHC Rules”) and the Chemical Accidents (Emergency Planning, Preparedness and Response) Rules, 1996 (“Chemical Accidents Rules”), need to be upgraded significantly, taking into account recent global developments in the classification of hazardous substances and the prevention of chemical accidents. These developments have led towards a common harmonized approach in regulatory frameworks across jurisdictions. However, the Indian regulatory framework has not been updated correspondingly. In light of this, we believe it is imperative for the Ministry of Environment, Forest and Climate Change (“MoEFCC”) to incorporate global best practices regarding systems of classification, packaging, labelling, and transporting hazardous substances. This updating of the MSIHC Rules and the Chemical Accidents Rules would also be in line with suggestions from other government authorities like the National Disaster Management Authority (NDMA 2007).

Our comments in this note briefly set out some of the key reforms to the existing regulatory framework that are in urgent need of implementation.

A. Executing a Globally Harmonised System of Classification

The MSIHC Rules and the Chemical Accidents Rules apply to chemicals that satisfy the criteria laid down in Part I of Schedule 1, as well as those that are specifically listed in Part 2 of Schedule 1, Column 2 of Schedule 2 and Column 2 of Schedule 3 of both the Rules. This greatly limits the scope of applicability of the Rules for the following reasons:

- (i) The criteria in Part I of Schedule I of the Rules are restricted only to toxicity, flammability and explosiveness, thereby covering only 3 major groups of chemicals;
- (ii) The chemicals that are listed in Schedule 3 are divided into 5 groups that are based on very simple criteria: toxic substances (Groups 1 & 2), highly reactive substances (Group 3), explosive substances (Group 4) and flammable substances (Group 5).

The MSIHC Rules have set out only rudimentary criteria and instead rely primarily on listing individual chemicals. This makes their applicability unclear to substances that are preparations, mixtures or other products *containing* hazardous chemicals i.e. substances other than those where the hazardous chemical is present singly. In contrast, the Globally Harmonised System of Classification and Labelling of Chemicals (“GHS”) devised by the United Nations sets out detailed and comprehensive criteria to identify and classify hazardous chemicals, thereby widening their applicability. Unless the MSIHC Rules adopt a similar approach to classification, the Schedules will have to be regularly amended to add new chemicals, making this an inefficient approach to regulation.

The GHS is a product of the United Nations Conference on Environment and Development held at Rio de Janeiro, Brazil, 1992. Paragraphs 19.26 and 19.27 of Chapter 19 of Agenda 21, which was adopted at this conference speak of the need to develop ‘harmonized hazard classification and labelling systems.’ The year 2000 was targeted to make available ‘a globally harmonized hazard classification and compatible labelling system, including material safety data sheets and easily understandable symbols.’

Several countries have already taken steps to harmonize their regulatory frameworks in accordance with GHS. **The Indian framework ought to be similarly harmonised in order to fulfil its international obligations. Moreover, this harmonisation will also reduce barriers to free trade while ensuring the highest standards of public safety.** Some of the key features of the GHS that are recommended are set out below.

Under the GHS, the hazard classification process refers principally to hazards arising from the intrinsic properties of substances and mixtures, whether natural or synthetic. There is a three-fold categorisation of hazardous chemicals, based on the nature of chemicals and the risks they pose to the environment and human health. In the first instance, chemicals are classified on the basis of the ‘Hazard Statement’, which describes the nature of the chemical and broadly divides it into three kinds of hazards: physical, health and environmental. Each of these groups is further classified into 17, 10 and 2 hazard classes respectively. Finally, each of these classes is divided into different divisions based on criteria relating to the severity of the hazard based on internationally recognised guidelines (GHS 2015, Annexure III and Chapters 2-4).

Table I demonstrates the first two levels of classification under the GHS.

Table I: Abbreviated Classification of Hazard Classes under the GHS

<p>Physical Hazards:</p> <ul style="list-style-type: none"> • Explosives • Flammable gases • Flammable aerosols • Oxidizing gases • Gases under pressure • Flammable liquids • Flammable solids • Self-reactive substances and mixtures • Pyrophoric liquids • Pyrophoric solids • Self-heating substances and mixtures • Substances and mixtures which, in contact with water, emit flammable gases • Oxidizing liquids • Oxidizing solids • Organic peroxides • Corrosive to metals 	<p>Health Hazards:</p> <ul style="list-style-type: none"> • Acute toxicity • Skin corrosion/irritation • Serious eye damage/eye irritation • Respiratory or skin sensitization • Germ cell mutagenicity • Carcinogenicity • Reproductive toxicity • Specific target organ toxicity-single exposure • Specific target organ toxicity-repeated exposure • Aspiration hazard <p>Environmental Hazards:</p> <ul style="list-style-type: none"> • Hazardous to the aquatic environment • Hazardous to the ozone layer
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B. Packaging, Labelling and Transporting Hazardous Substances

Incorporation of detailed definitions under the MSIHC rules

The MSIHC Rules do not define key terms that are crucial to the effective regulation of hazardous substances. Currently, they do not define the characteristics of hazardous substances, what constitutes lethal doses, hazardous areas, or damage from chemical accidents. Global best practices, including the GHS recommend the incorporation of exhaustive definitions as an essential practice. For instance, the GHS defines chemical identity, critical temperature, explosive substance, flammable gas, hazard category and class, precautionary statement, product identifier etc among others. These are key definitions that ought to find place in the updated rules and guidelines.

Need for more detail in the MSIHC Rules on the labelling of hazardous chemicals

Under Rule 17 of the MSIHC Rules, every container of a hazardous chemical is to be clearly labelled or marked to identify the contents of the container, the name and address of the manufacturer or importer of the hazardous chemical, and the physical, chemical and toxicological data according to the criteria in Part I of Schedule I. In addition to these existing requirements, additional safeguards ought to be incorporated, as has been done under the GHS.

The GHS defines a label as an ‘appropriate group of written, printed or graphic information elements concerning a hazardous product, selected as relevant to the target sector(s), that is affixed to, printed on, or attached to the immediate container of a hazardous product, or to the outside packaging of a hazardous product.’

This label is intended to provide a primary message for workers, emergency responders, consumers and transporters. It must do this by providing a snapshot of the potential chemical hazard(s) that could be involved.

It is recommended that the MSIHC Rules be updated to incorporate the following standardised label elements recommended by the GHS. Chapter 1.4. of the GHS and Chapter 5.2 of the United Nations Recommendations on the Transport of Dangerous Goods- Model Regulations, 2015, ought to be used as a guide:

- (i) *Signal Words*: “Danger” or “Warning” are used to emphasize hazards and indicate the relative level of severity of the hazard in order to alert a reader.
- (ii) *Hazard Statements*: This is a phrase assigned to a hazard class and category that describes the nature of the hazards presented by a hazardous substance or mixture, including, where appropriate, the degree of hazard.
- (iii) *Precautionary Statements and Pictograms*: These describe recommended measures that should be taken to minimize or prevent the effects from exposure or improper storage, handling or disposal of the hazardous substance or mixture.
- (iv) *Product Identifier*: Information on the chemical identity of the hazardous substance, UN shipping number, Chemical Abstracts Service (CAS) number should also be part of the label.
- (v) *Supplier Identifier*: In addition to the name and address, the telephone number of the manufacturer or supplier of the substance should also be provided.

The importance of comprehensive labelling information is also set out in Paragraph 19.24 of Agenda 21, and is required as an international obligation while exporting chemicals under the provisions of the Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade, to which India is a party.

Provisions in the Indian Rules on the packaging and transport of hazardous substances must be similarly aligned with the GHS and the UN Model Regulations (mentioned above).

The packaging of hazardous substances plays a major role in the prevention of chemical accidents and reducing risks, should such accidents occur. This harmonisation must be simultaneously accompanied by updating transport rules such as the Central Motor Vehicles Rules, 1989, the Railway Red Tariff Rules, 2000, the Aircraft (Carriage of Dangerous Goods) Rules, 2003, the Inland Vessels (Amendment) Act, 2007 and any other laws or rules that might have a bearing on the transport or carriage of hazardous substances. **Provisions relating to hazard marks and labelling during transportation, such as the shape, dimension, colour and size of the marking, and the placing of the marking and placards should also be clearly specified in the Indian Rules.**

C. Safety Data Sheets

A safety data sheet (“SDS”) provides important information to businesses, workers, emergency responders, and other members of the public who may be exposed to the chemical.

Under the MSIHC Rules, the provisions relating to SDS apply to industrial activity involving hazardous chemicals that satisfy any of the criteria laid down in Part I of Schedule I or those that are listed in Column 2 of Part II of the same Schedule. An occupier who controls such industrial activities ought to arrange to obtain or develop information in the form of an SDS, as specified in Schedule 9. This information is *accessible upon request for reference*.

This provision unnecessarily limits the access of the general public to the SDS. It ought to be freely available and accompany the hazardous substance at all times, during, packaging, storage or transportation.

A brief summary of the SDS should also be prepared for it to be accessible to laymen. It **should be published in the local language** of the state; while transporting it across states, it should be translated into the most commonly spoken language across the relevant states.

We also recommend that each SDS be assigned a date and a version number, along with a declaration by the consignor/owner/downstream users of the chemical regarding the reliability and accuracy of the information. This declaration ought to be signed by a person authorised in this regard, along with the date and seal.

Finally, similar to the provisions on classification, packaging and labelling, the information required under Schedule 9 of the Indian Rules is far less comprehensive than the 16-section SDS format that is recommended under the GHS. Under the GHS, the SDS ought to be generated for all substances and mixtures that meet the harmonized criteria for physical,

health or environmental hazards as well as for all mixtures that contain ingredients that meet the criteria for carcinogenic, toxic to reproduction or target organ toxicity, in concentrations exceeding the cut-off limits specified.

We recommend that guidelines for the preparation of the SDS, as set out in Annexure 4 of the GHS be used as a basis for upgrading the current format in Schedule 9 of the MSIHC Rules in order to make it more detailed. Table II below sets out the information required in the SDS according to the GHS recommendations. It also demonstrates the manner in which the existing SDS under the MSIHC Rules falls short.

Table II: Comparison of SDS under the GHS and in Schedule 9 of the MSIHC Rules

GHS Guidelines on the SDS			Suggested Amendments to Schedule 9
1.	Identification of the substance or mixture and of the supplier	<ul style="list-style-type: none"> a) GHS Product Identifier b) Other means of identification c) Recommended use of the chemical and restrictions on use d) Supplier's details (including name, address, phone number etc.) e) Emergency phone number 	<p>Most of this information is required under Schedule 9. However, the recommended uses of the chemical and restrictions on use must also be included.</p> <p>Emergency contact details: The applicability of any restriction, such as hours of operation should also be specified.</p> <p>For more details that ought to be included, refer to Paragraph A4.3.1 of the GHS.</p>
2.	Hazard identification	a) GHS classification of the substance/mixture and any national or regional information	The SDS should adopt GHS Classification and include GHS label elements like signal words, hazard statements and precautionary statements.

		<p>b) GHS label elements, including precautionary statements. (Hazard symbols may be provided as a graphical reproduction of the symbols in black and white or the name of the symbol e.g. “flame”, “skull and crossbones”);</p> <p>c) Other hazards which do not fall within the classification (e.g. ‘dust explosion hazard’) or are not covered by the GHS.</p>	<p>Information on other hazards that might not fall under the GHS classification, but that may contribute to the overall hazards of the material should also be included. e.g. the formation of air contaminants during hardening or processing, dust explosion hazards etc.</p> <p>Should include a brief summary of the data.</p> <p>For more details that ought to be included, refer to Paragraph A4.3.2 of the GHS.</p>
3.	Composition/information on ingredients	<p><u>Substance</u></p> <p>a) Chemical identity;</p> <p>b) Common name, synonyms, etc.;</p> <p>c) CAS number and other unique identifiers</p> <p>d) Impurities and stabilizing additives which are themselves</p>	<p>Some of this information is required under Paragraph 1 of Schedule 9. More specific information ought to be required regarding impurities and stabilizing additives, which are themselves classified and contribute to classification of the substance.</p>

		<p>classified and which contribute to the classification of a substance.</p> <p><u>Mixture</u></p> <p>The chemical identity and concentration or concentration ranges of all ingredients which are hazardous within the meaning of the GHS and are present above their cut-off levels.</p>	<p>For mixtures, the concentration or concentration ranges of all hazardous ingredients should be also included.</p> <p>When using proportion ranges), the health and environmental hazard effects should describe the effects of the highest concentration of each ingredient, provided that the effects of the mixture as a whole are not available.</p> <p>For more details that ought to be included, please refer to Paragraph A4.3.3 of the GHS.</p>
4.	First aid measures	<p>a) Description of necessary measures, subdivided according to the different routes of exposure, i.e. inhalation, skin and eye contact and ingestion;</p> <p>b) Most important symptoms/effects, acute and delayed;</p>	<p>First aid measures need to be more detailed for acute and delayed effects. More description on clinical testing and medical monitoring is required as regards delayed effects from exposure</p> <p>For more details that ought to be included, please refer to Paragraph A4.3.4 of the GHS.</p>

		<p>c) Indication of immediate medical attention and special treatment needed, if necessary.</p>	
5.	Fire-fighting measures	<p>a) Suitable (and unsuitable) extinguishing media.</p> <p>b) Specific hazards arising from the chemical (e.g. nature of any hazardous combustion products).</p> <p>c) Special protective equipment and precautions for fire-fighters</p>	<p>Some of this information is required under Paragraphs 6 and 7 of Schedule 9. However, information on 'unsuitable media' should also be provided.</p> <p>The Personal Protective Equipment ("PPE") to be used during handling/working and during fire should be specified separately.</p> <p>For more details that ought to be included, please refer to Paragraph A4.3.5 of the GHS.</p>
6.	Accidental release measures	<p>a) Personal precautions, protective equipment and emergency procedures.</p> <p>b) Environmental precautions.</p>	<p>Guideline for distinguishing between large and small spills should also be included.</p> <p>Accidental release measures and precautions for non-emergency personnel and emergency responders should be separately specified.</p>

		c) Methods and materials for containment and cleaning up.	For more details that ought to be included, please refer to Paragraph A4.3.6 of GHS.
7.	Handling and storage	a) Precautions for safe handling. c) Conditions for safe storage, including any incompatibilities.	Handling and storage information should be separately specified and should be more descriptive. For more details that ought to be included, please refer to Paragraph A4.3.7 of GHS.
8.	Exposure controls/personal protection	a) Control parameters e.g. occupational exposure limit values or biological limit values. b) Appropriate engineering controls. c) Individual protection measures, such as personal protective equipment.	The information on permissible exposure limit is provided in Paragraph 5 of Schedule 9. However, more information is required on the appropriate engineering controls or specific requirement for PPE. For instance, the SDS should specify whether the use local exhaust ventilation systems are needed or whether mechanical handling should be used instead of human contact; whether PVC gloves or nitrile gloves should be used, as well as the thickness and breakthrough time of the gloves. For more details that ought to be included, please refer to Paragraphs A4.3.7 and A4.3.8 of GHS.
9.	Physical and chemical properties	a) Appearance (physical state, colour etc.);	Some of these parameters are covered by Paragraphs 2 and 3 of Schedule 9. However, additional

		<ul style="list-style-type: none"> b) Odour; c) Odour threshold; d) pH; e) Melting point/freezing point; f) Initial boiling point and boiling range; g) Flash point; h) Evaporation rate; i) Flammability (solid, gas); j) Upper/lower flammability or explosive limits; k) Vapour pressure; l) Vapour density; m) Relative density; n) Solubility(ies); 	<p>parameters that are required are the odour threshold, evaporation rate, relative density, decomposition temperature, viscosity, partition coefficient, decomposition temperature etc.</p> <p>For more guidance on the physical and chemical properties of substances that ought to be reported in the SDS, please refer to Tables A4.3.9.1, A4.3.9.2 and A4.3.9.3.</p>
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		<ul style="list-style-type: none"> o) Partition coefficient: n-octanol/water; p) Auto-ignition temperature; q) Decomposition temperature; r) Viscosity. 	
10.	Stability and reactivity	<ul style="list-style-type: none"> a) Reactivity; b) Chemical stability; c) Possibility of hazardous reactions; d) Conditions to avoid (e.g. static discharge, shock or vibration); e) Incompatible materials; f) Hazardous decomposition products. 	<p>Most of this information is covered under Paragraph 4 of Schedule 9. However, the SDS should also include information on the list of conditions under which hazardous reactions may occur.</p> <p>For more details that ought to be included, please refer to Paragraph A4.3.10.</p>
11.	Toxicological information	Concise but complete and comprehensive description of the various toxicological (health) effects and the available	Although some of this information is covered by Paragraph 5 of Schedule 9, the current format lacks clarity and detail.

		<p>data used to identify those effects, including:</p> <ul style="list-style-type: none"> a) Information on the likely routes of exposure (inhalation, ingestion, skin and eye contact); d) Symptoms related to the physical, chemical and toxicological characteristics; e) Delayed and immediate effects and also chronic effects from short and long term exposure; f) Numerical measures of toxicity (such as acute toxicity estimates). 	<p>The GHS recommends that the following 10 toxicological hazards always be listed in the SDS:</p> <ul style="list-style-type: none"> a) Acute toxicity b) Skin corrosion/irritation c) Serious eye damage/irritation d) Respiratory or skin sensitization e) Germ cell mutagenicity f) Carcinogenicity g) Reproductive toxicity h) STOT (Specific Target Organ Toxicity)-single exposure i) STOT-repeated exposure j) Aspiration hazard <p>Test data on health effects should also be included along with guidelines for presenting this information.</p> <p>All possible routes of exposure should be listed along with their effects separately.</p> <p>The symptoms of the exposure should be specified in detail. For instance, the SDS should describe the first symptom at lowest exposure through to the consequences of severe exposure, the delayed and immediate effects, chronic effects from short/long</p>
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			<p>exposures, and information on dose/concentration/condition/period of exposure that can cause adverse effects etc.</p> <p>For more details that ought to be included, please refer to Paragraph A4.3.11 of the GHS.</p>
12.	Ecological information	<p>a) Ecotoxicity (aquatic and terrestrial, where available);</p> <p>b) Persistence and degradability;</p> <p>c) Bioaccumulative potential;</p> <p>d) Mobility in the soil;</p> <p>a) Other adverse effects.</p>	<p>No information on the ecological effects of the hazardous substances is required under the SDS in Schedule 9.</p> <p>Description of the various ecotoxicological properties, and the data used to identify those properties should be provided.</p> <p>For more details that ought to be included, please refer to Paragraph A4.3.12 of the GHS.</p>
13.	Disposal information	Description of waste residues and information on their safe handling and methods of disposal, including the disposal of any contaminated packaging.	<p>Under Paragraph 7 of Schedule 9, the waste disposal method is required to be specified only for emergency measures. No specific and separate information on the disposal of hazardous substances or their packaging is currently required.</p> <p>Information on proper disposal, recycling or reclamation of the substance or mixture and its container should be required for</p>

			<p>ensuring safe and environmentally sound waste management options as well as the safety of the personnel involved.</p> <p>For more details that ought to be included, please refer to Paragraph A4.3.13 of the GHS</p>
14.	Transport information	<ul style="list-style-type: none"> a) UN number; b) UN proper shipping name: c) Transport hazard class(es); d) Packing group, where applicable e) Environmental hazards (e.g.: Marine pollutant (Yes/No)); f) Transport in bulk (according to Annex II of MARPOL 73/78 and the IBC Code); g) Special precautions which a user needs to be aware of, or needs to comply with, in connection with the transport or 	<p>Information on transport hazard classes, packing group and precautions to be taken is not required under the current SDS.</p> <p>This information should be included in the SDS for transporting/shipment of a hazardous substance by road/rail/sea/air.</p> <p>For more details that ought to be included, please refer to Paragraph A4.3.14 of the GHS</p>

		conveyance within or outside their premises.	
15.	Regulatory information	Safety, health and environmental regulations specific to the product in question.	Details on regulatory information (national and international) on the substance or mixture is not required under the current SDS. It is vital that this be included.
16.	Other information including information on preparation and revision of the SDS	The GHS allows for any additional information to be included.	Apart from the literature and sources of data used to compile the SDS, the date of preparation of the SDS, revisions/version no., key to abbreviations and synonyms, should also be specifically required under the SDS.

D. Extending the Applicability of the Rules beyond Industrial Installations

Under the MSIHC Rules, the duty to collect, develop and dissemination information in the SDS is imposed on the occupier in control of an industrial activity. Clause (h) of Rule 2 defines 'industrial activity' as operations or processes carried out at industrial installations referred to in Schedule 4 involving or likely to involve one or more hazardous chemicals. It also includes on-site storage and transport associated with the operation or process, isolated storage, and pipelines.

This definition of industrial activity does not extend the responsibility of developing and maintaining the SDS to downstream users, who may use the substances to develop other products for purposes other than industrial application. In such cases, these users must also share the responsibility for making distributors, consumers, emergency handlers and the general public aware about the possible hazards presented by the activities or by the product.

The MSIHC Rules are also vague about the demarcation of responsibility with regard to the labelling and marking of hazardous chemicals. For instance, clause (4) of Rule 17 only states that the container of a hazardous chemical should be clearly labelled or marked, without specifying whether this responsibility extends to all persons and/or entities involved in manufacturing, handling, supplying, storing or transporting the substance.

While updating the MSIHC Rules, we recommend that the MoEFCC specify the different responsibilities of the different user groups that play varying roles in the life cycle of hazardous substances. For example, under Regulation (EC) No 1272/2008 (amendment version June, 2015) of the European Parliament and of the Council, a general obligation is imposed on manufacturers, importers and downstream users to perform the following functions before placing hazardous substances on the market:

- classify, label and package substances (Article 4);
- identify and examine available information on substances for determining whether it entails a physical, health or environmental hazard (Article 5);
- identify and examine available information on mixtures (Article 6);
- evaluate hazard information for substances and mixtures (Article 9);
- review the classification of substances and mixtures (Article 15).

The Regulation also clearly defines the different kinds of user groups. For eg. ‘downstream user’ is defined as ‘any natural or legal person established within the Community, other than the manufacturer or the importer, who uses a substance, either on its own or in a mixture, in the course of his industrial or professional activities. A distributor or a consumer is not a downstream user.’ A ‘supplier’ is defined as ‘any manufacturer, importer, downstream user or distributor placing on the market a substance, on its own or in a mixture, or a mixture.’

While updating the MSIHC Rules, such distinctions between different groups ought to be taken into account and differing obligations ought to be clearly defined and demarcated.

E. Setting up a Chemical Hazard Management Portal

The National Disaster Management Guidelines for Chemical Accidents, 2007 prepared by the National Disaster Management Authority (“NDMA”), Government of India is a reliable reference document. It provides detailed information regarding the management of different kind of hazards from chemicals, including strengthening the regulatory framework. It also emphasises the need to augment technical support, to conduct regular safety audits, provide for crisis management, medical interventions, risk mapping, and to formulate a national response plan and post-disaster analysis and restoration. It also makes several recommendations to address these concerns. **Therefore, we strongly recommend that the concerns, measures and recommendations highlighted in the NDMA guidelines be appropriately adopted while updating the MSIHC Rules and the Chemical Accidents Rules.**

Rule 4 of the Chemical Accidents Rules requires the Central Government to constitute a Crisis Alert System that will include an information networking system with state and district control rooms, to publish a list of major accident hazard installations, major chemical accidents in chronological order and a list of members of different crisis groups, and to create awareness amongst the public with a view to preventing chemical accidents.

The current portal of the Hazardous Substance Management Division, MoEFCC, available at <<http://www.envfor.nic.in/divisions/hsmd/hsmd.html>> only provides information regarding a few, select regulations. The web page of the Central Crisis Group, available at <<http://www.envfor.nic.in/divisions/hsmd/v7.html>> does not carry any information other than the contact details of officers. Both these information systems are in urgent need of revision.

The NDMA guidelines have also highlighted the inadequacy of effective communication and networking between various stakeholders at all levels, like the related ministries, state governments, chemical industries, research & development organisations etc, in order to successfully orchestrate a response to chemical disasters. It also suggests making available an exhaustive list of hazardous chemicals, their side-effects and related dos and don'ts online.

We strongly recommend launching a national level portal which will become the single source for all information on chemicals, mixtures, products and any substances manufactured/imported with respect to their hazardous properties, labelling information, classification, UN No., CAS No., related regulations etc. This information ought to be presented in a user-friendly and searchable manner. It should also have an open geo-referenced inventory of all chemical accidents and hazardous industrial installations, using mapping applications such as Google Maps or Bhuvan. Provision should be made for the online reporting of all hazardous accidents. The website should be at par with the best portals currently set up by other governments in terms of technology, indexing and the breadth of information provided. Website links to some of these portals are listed below:

- Toxicology Data Network, United States of America <<https://toxnet.nlm.nih.gov/>>
- European Chemical Agency Information System <<https://echa.europa.eu/information-on-chemicals>>
- Chemical Classification and Information Database, New Zealand <<http://www.epa.govt.nz/search-databases/pages/hsno-ccid.aspx>>
- Hazardous Chemicals Information System, Australia <<http://hcis.safeworkaustralia.gov.au/>>

F. Periodic Review and Assessment of Hazardous Substances

The relevant authorities should also provide technical and scientific guidance and tools for the periodic review of classified chemicals and mixtures. Further, there is a need for systematic and periodic risk audits and on-site visits in line with global standards and practices for hazardous areas and ecologically sensitive regions. Industry practices and the threshold quantities of chemicals and mixtures should similarly be periodically revised. The determination of threshold quantities for hazardous chemicals should be contingent on reports of such risk audits and existing studies/reports. These assessments should be undertaken keeping in consideration the economic and environmental impact of the permits already granted. This should take place through greater co-ordination among the concerned ministries and through the harmonisation of existing policies governing the use and application of hazardous substances.

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