Klein, Heather

From: Lee, Anna, Public Health, OOD <Anna.Lee@acgov.org>
Sent: Monday, May 16, 2016 2:28 PM
To: Klein, Heather; OBOT
Cc: Davis M.D., Muntu, Public Health, OOD; Galvez, Sandi, Public Health, OOD; Watkins-Tartt, Kimi, Public Health, OOD; Lucky, Jennifer, Public Health, OOD; Willow, Pam, Public Health, CHS
Subject: Health and Safety Impacts of Fuel Oils, Gasoline, and Crude Oil Products
Attachments: OBOT Crude by rail - ACPHD letter 5-16-2016.pdf

Dear Ms. Klein:

Please find attached comments on behalf of Dr. Muntu Davis, Alameda County Health Officer, in regards to the public health and safety impacts of the transportation, transloading, handling and export of fuel oil, gasoline, and crude oil products through the Oakland Bulk and Oversized Terminal in West Oakland.

Feel free to contact me if you have any questions.

Best,
Anna Lee

Anna Lee
Local Policy Coordinator
Place Matters, Office of the Director
Alameda County Public Health Department
1000 Broadway, Suite 500
Oakland, CA 94607
anna.lee@acgov.org | Phone: (510) 267-8019
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Please consider the environment **before** printing this email.

ALAMEDA COUNTY HEALTH CARE SERVICES AGENCY **Rebecca Gebhart**, Acting Director
PUBLIC HEALTH DEPARTMENT **Dr. Muntu Davis**, Director and Health Officer

Office of the Health Officer
1000 Broadway, 5th Floor
Oakland, CA 94607

(510) 267-8000
(510) 267-3212

May 16, 2016

Heather Klein, Planner III
City of Oakland, Bureau of Planning
250 Frank H. Ogawa, Suite 2114
Oakland, CA 94612
hklein@oaklandnet.com; OBOT@oaklandnet.com

Re: Health and Safety Impacts of Transportation, Transloading, Handling and/or Export of Fuel Oil, Gasoline and Crude Oil Products Through the Oakland Bulk and Oversized Terminal

Dear Ms. Klein:

As the County Health Officer, I write to express concerns about the public health and safety impacts of the transport, transloading, handling and/ or export of fuel oil, gasoline and crude oil through the Oakland Bulk and Oversized Terminal ("OBOT") located at the Oakland Army Base in West Oakland. After reviewing the health data in Oakland and considering the additional health and safety threats associated with the transport, transloading and handling of fuel oil, gasoline and crude oil, I respectfully recommend that the Oakland City Council prohibit these activities. Any project involving the movement and handling of these fossil fuel products at OBOT could significantly impact the already compromised air-quality related health outcomes experienced by local residents in this area and will backpedal on important public health gains made in Oakland, including East and West Oakland.

As previously commented in the hearing on the transport of coal at OBOT, dense populations in Alameda County, include low-income and communities of color with some of the worst documented health outcomes in our County and state related to social and environmental burdens and areas with some of the worst air pollution from nearby freeways, rail lines, the Port of Oakland and other industrial uses. In 2014, BAAQMD's Community Air Risk Evaluation (CARE) program identified western Alameda County, including Oakland, as an area where air pollution contributes most to poor health impacts and where sensitive populations, such as children and seniors, are most vulnerable to air pollution. In East Oakland the overall rate of asthma hospitalizations is more than twice the rate in Alameda County.[1] In West Oakland the overall rate of asthma emergency department visits is also twice the County rate.[2] Environmental factors, including outdoor pollution from toxic air contaminants such as vehicle and fossil fuel emissions, can trigger asthma attacks. Asthma is a chronic disease that affects the airways in the lungs in children and adults. Asthma attacks cause airways to become inflamed, making it hard to breathe and can be mild, moderate, or serious, and even life threatening.

[1] For East Oakland zip codes 94601, 94603, 94605 and 94621, the asthma inpatient hospitalization rate is 265.0 per 100,000 residents; the county rate is 120.6 per 100,000. The childhood (0-4 year-olds) asthma hospitalization rate for East Oakland is 899.4 per 100,000; the county rate is 421.9 per 100,000. Source: CAPE Unit, Alameda County Public Health Department/ Health Care Services Agency with data from California Office of Statewide Health Planning and Development (OSHPD), 2011-2013.

[2] For West Oakland zip codes 94607, 94608, 94609, and 94612, the overall rate of asthma ED visits is 1014.6 per 100,000 residents; the Alameda County rate is 531.8 per 100,000. The asthma ED visit rate for children (0-4 year-olds) is 1224.3 per 100,000 compared to the Alameda County rate of 929.0 per 100,000. Source: CAPE Unit, Alameda County Public Health Department/ Health Care Services Agency with data from California Office of Statewide Health Planning and Development (OSHPD), 2011-2013.

The whole lifecycle to drill, capture, refine, transport and combust fossil fuels is extremely carbon and pollution intense, exacerbating global warming and undermining California's climate and environmental justice goals set forth in AB 32. Fossil fuel products and crude oil in particular contain high levels volatile organic compounds, benzene and hydrogen sulfide; all of which have established adverse impacts to human health. The 2012 Richmond Chevron refinery fire, for example, was caused by a diesel leak in the crude oil distillation unit that caught fire, and sent an estimated 15,000 people to the emergency room; the long-term health impacts of this incident have yet to be determined.[3]

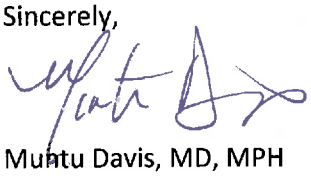
When fossil fuel products are transported via rail and truck, hazardous diesel particulates are released from emissions. Workers and residents in close proximity to fuel transport facilities are often unaware of the types of substances transported in their communities. Such products pose additional health and safety risks associated with spills, fires, and explosions that can have an impact radius of at least one mile. Also of concern are the many outdated tank cars in need of retrofitting which are used to transport crude oil, and currently risk leaking hazardous chemicals.[4] In 2013, a crude oil train derailment in Lac Megantic, Quebec resulted in 47 deaths, dozens of destroyed buildings, $1 billion in property damage and the displacement of thousands of residents.[5] If a derailment were to take place here in Oakland, this type of disaster would be worse in magnitude given Oakland's dense population and number of vulnerable communities. It would present a significant challenge to our emergency response system, and have the potential for long lasting health and economic impacts in our communities.

Existing City regulations do not adequately protect local communities from the known harmful impacts associated with the transport, transloading and handling of fossil fuel products, including fuel oil, gasoline and crude oil. OBOT was proposed as a facility to export non-containerized bulk commodities, such as iron ore and copper concentrate, and to primarily receive oversized or overweight cargo.[6] There are no specific conditions or mitigations that would sufficiently address the potential health and/or safety impacts of the transport of fossil fuel products at the OBOT in the Standard Conditions of Approval and/or Mitigation Measures contained in the 2012 Addendum's Standard Conditions of Approval/ Mitigation Monitoring Report (SCAMMRP). The list of conditions and mitigations prevent and reduce some emissions from the construction and operations of vehicle engines and machinery related to dust and diesel emissions from freight transportation specifically (See Air Quality Section). Thus, legislative action on this issue is needed to reaffirm the City's commitments to preventing harm to Oakland residents and workers.

Given the significant public health and safety risks, particularly for Oakland communities, I urge the City Council to prohibit the transport, transloading and handling of fuel oil, gasoline and crude oil through OBOT. This would allow projects involving safer commodities to move forward, ultimately resulting in fewer adverse health impacts and maximizing health benefits, particularly for our most vulnerable communities. I am committed to building on the work our health department has done in partnership with City of Oakland to ensure a cleaner environment for all Oakland residents.

Please feel free to contact me with any questions. Thank you for your consideration.

Sincerely,



Muntu Davis, MD, MPH
Alameda County Health Officer

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[3] Fire at Chevron Refinery in Richmond, Justin Berton, Kevin Fagan and Vivian Ho, San Francisco Chronicle, July 11, 2013. http://www.sfgate.com/bayarea/article/Fire-at-Chevron-refinery-in-Richmond-3767221.php

[4] Trains plus crude oil equals trouble down the track, Curtis Tate, Kansas City Star, December 31, 2014. http://www.kansascity.com/news/nation-world/national/article5237238.html

[5] Lac Megantic Explosion, The Huffington Post: http://www.huffingtonpost.com/news/lac-megantic-explosion/

[6] http://obotjv.com/uncategorized/hello-world/

Klein, Heather

From: Cappio, Claudia
Sent: Thursday, May 12, 2016 1:46 PM
To: Klein, Heather
Subject: FW: May 9 hearing on Fuel Oils & Gasoline in Oakland - Comment

Here you go with some testimony re: May 9 public hearing on fossil fuels, etc. C

From: Tom Smith [mailto:contratom@gmail.com]
Sent: Thursday, May 12, 2016 12:58 PM
To: Cappio, Claudia
Subject: May 9 hearing on Fuel Oils & Gasoline in Oakland - Comment

Assistant City Administrator Claudia Cappio

Please forward my comment to the appropriate folder. Thanks!

Bernard Smith,
20 Armanino Ct,
Oakland, CA 94618

2016-May-12

Re, Informational Public Hearing on Fuel Oils & Gasoline in Oakland, held May 9, 2016.

Written Testimony to the Special Concurrent Meeting of the Oakland Redevelopment Successor Agency/city Council

Dear Oakland City Counsel Members;

I am a resident of Oakland, a retired physicist and concerned about the harmful effects of coal dust. During my career, I have developed and utilized numerous instruments to monitor breathing air containing hazardous chemicals and small dust particles.

Even though coal is inert and harmless to handle or even to ingest, small coal dust particles suspended in our breathing air are dangerous. Small coal dust particles:

Are hard and sharp edged,
will not dissolve in water,
will not fall to the ground by the force of gravity,
remain suspended in the air for long time periods.

These harmful particles are too small to see individually, but in large quantities, may appear as a haze or a light fog. However, even in small quantities, when there is no apparent evidence of their presence, they cause harm when inhaled. Rain or water spray may clear the air of coal dust particles, but the water soon evaporates and the coal dust is again dispersed by light breezes and wind currents. The laws of physics are ever present.

Without a doubt, transporting and transferring coal between vessels, will release large quantities of coal dust into our atmosphere. Mitigation would be extremely difficult, if not IMPOSSIBLE.

Oakland residents must not be used as test subjects for “innovative” coal-dust containment that violate the laws of physics.

We must reject coal shipments through Oakland.

Respectfully,

Bernard “Tom” Smith

Klein, Heather

From: Quanah Brightman <qbrightman75@hotmail.com>
Sent: Wednesday, April 27, 2016 9:12 AM
To: Klein, Heather
Subject: RE: Notice Of Informational Public Hearing On The Health And/Or Safety Impacts Of Fuel Oils And Gasoline Products
Attachments: United Native Americans General Principals Since 1968.pdf

Quanah Parker Brightman is a Lakota Sioux and Creek Indian who was born in Oakland California. Quanah Brightman is the National President of United Native Americans Inc., a non-profit indigenous movement organization formed by Dr. Lehman L. Brightman in San Francisco, California in 1968 to promote the decolonization and unity of all Indigenous People.

In his capacity as member of UNA, Mr. Brightman has testified before the United Nations Listening Sessions, the U.S. Department of Education's Urban Indian Education Listening and Learning Sessions, Lobbied Against Fracking, Testified Against Coal Exports, Lobbied Against GMO Foods and founded Idle No More in the San Francisco Bay Area.

Quanah Parker Brightman has led and participated in many pro-indigenous protests, marches, and sit-ins throughout the United States. Mr. Brightman is a strong advocate against the many hate crimes that are affecting Indigenous people around the world. He advocates for the enforcement of all indigenous treaties made with the United States, reparations and accountability of the theft of tribal ancestral lands and natural resources, the protection of Native American sacred sites and burial sites, pro-indigenous curriculum to be taught in public schools (K-12), ending the use of the blood quantum, improving the negative image of indigenous people and ending tribal corruption in Indian gaming.

If you are interested in scheduling Quanah Parker Brightman to present a workshop or be a guest lecturer, please call (510)672-7187 or qbrightman75@hotmail.com

Quanah Parker Brightman
Executive Director of
United Native Americans
qbrightman75@hotmail.com
(510) 672-7187
http://unitednativeamericans.weebly.com/

From: HKlein@oaklandnet.com
To: HKlein@oaklandnet.com
Subject: Notice Of Informational Public Hearing On The Health And/Or Safety Impacts Of Fuel Oils And Gasoline Products
Date: Tue, 26 Apr 2016 18:03:53 +0000

To interested parties:

The purpose of this email is to inform you that on May 9, 2016 at 5:00 pm the City Council will conduct an informational public hearing to receive information, testimony and other evidence, oral or in writing, regarding the public health and/or safety impacts of transportation, transloading, handling and/or export of fuel oil and gasoline products through the Oakland Bulk and Oversized Terminal (OBOT) proposed to be located at the Oakland Army Base, the adequacy of existing regulations, and the City's ability to regulate the transportation and handling of such products.

PROPOSED GENERAL PRINCIPALS FOR
UNITED NATIVE AMERICANS

Many Indian organizations now exist, especially at the local level, and some are doing a good job. Too many are, however, simply cliques or some "leader" with a few followers, while others are controlled by tribal councils which are, in turn, controlled by cliques or by the Bureau of Indian Affairs.

A great need exists for a truly democratic pan-Indian organization, with local chapters to ensure grass- roots control, and one which will work for the progress and liberation of all Native Americans throughout the Americas.

TECUMSEH

BASIC PRINCIPLES AS REGARDS UNITED STATES INDIAN AFFAIRS:

1. All treaties and agreements made with Indian tribes or groups must be recognized as legally binding upon the United States and upon the States, except that treaties or agreements forced upon Indian tribes or groups against their will by illegal means shall not necessarily be binding upon the Indians

2. All treaties and agreements enforced by the United States (such as the California treaties of 1851 - 52), although never ratified by the U.S. Senate, must be recognized as contracts legally binding upon the Executive Branch unless the treaties were illegally forced upon the Indians.

3. The Fifth Amendment to the Constitution, which prohibits the seizure of private property without just compensation and "due process of law" must be recognized as applying to Indian property since "all persons" are protected by the Amendment. Indians have always been "persons" except in the eyes of racist courts, especially since white judges have ruled that aliens and white corporations are "persons".

4. Democratic practices must be applied to Indian affairs, and this means that Indians must be able to control those agencies which vitally affect their own communities, must be able to share in control over agencies which affect both Indians and non-Indians, and must have power in relation to the education of their children. This means that the programs of the Bureau of Indian Affairs, Indian Desk of the Office of Economic Opportunity, and Indian Public Health Service must be under democratic Indian control and that Indians must possess at least some control over Indian projects developed by state and local agencies.

5. Native Americans must possess complete control over their own heritage which means that they must be able to select their own names for their own tribes, reservations, mountains, rivers and towns; that they must own all objects removed from old Indian villages and burial grounds; that they must possess control over all so-called scientific investigation of Indian "sites"; and that Indian cemetaries and historical places must be protected from destruction.

6. Indian tribal territories (so-called reservations and other areas occupied by Indian People) have not yet been legally incorporated into the United States in a full sense. Their status as "domestic dependent nations" (that is, protectorates) of the U.S. has not been changed and cannot be changed legally except by means of bi-lateral agreements. Their status is basically similar to that of Puerto Rico, an "associated free state" of the U.S. The status of individual Indians as citizens of the U.S. in no way affects the status of Indian territories anymore than the status of Puerto Rico is affected by citizenship being possessed by individual Puerto Ricans.

7. The legal confusion resulting from illegal actions of the U.S. Congress and Executive Branch relating to the status of tribal territories and tribes can only be settled by new bi-lateral negotiations, agreed to by both the Indian people involved and the government.

8. UNITED NATIVE AMERICANS will always be guided in its actions by the wishes of a particular Indian people whenever these actions affect primarily that people. Each individual Indian community shall be encouraged to adopt its own goals and a set of tactics for achieving those goals, and this organization should respect those goals and tactics, although reserving the right to disagree with them in a fraternal spirit. This principle does not apply to the actions of a tribal council known to be controlled by a minority clique or by the government.

BASIC PRINCIPLES RELATING TO THE AMERICAS AS A WHOLE:

1. We recognize the brotherhood of all Indian peoples without regard to the whiteman's boundary lines and we also recognize our common cause with other native tribal groups under U.S. control such as the Polynesian and Micronesian peoples.

2. In those republics, territories, or provinces where Native Americans are the majority population (Paraguay, Bolivia, Peru, Ecuador, Guatemala, Greenland, etc.), they should possess dominant control over the political, linguistic, and cultural destiny of that area. Such self-determination should be obtained by peaceful,democratic procedures where possible but the use of force by the Indian people cannot be condemned when they are being oppressed by force.

3. The U.S. should be encouraged to break off diplomatic relations with governments which suppress or ignore the rights of Native American peoples and the U.S. should give support to Indian liberation efforts.

4. Throughout the Americas each native tribe or community should possess local autonomy and the right to preserve its own language, religion, and culture.

5. The inter-American Indian Institute, which is a part of the Organization of American States (Pan American Union) should be governed by a council composed of Native Americans only.

SPECIFIC PROGRAMS IN THE UNITED STATES:

1. The IMMEDIATE REPLACEMENT OF THE BUREAU OF INDIAN AFFAIRS BY A NON-PROFIT INDIAN-CONTROLLED DEVELOPMENT CORPORATION, and by tribal corporations.

2. An increase in federal money going to Indian education with funds going to Indian-controlled tribal or intertribal educational agencies.

3. The establishment of a democratically chosen Indian agency, such as a National Indian Assembly, with elected delegates, to supervise national Indian policy and to elect a "Trusteeship" Council. The Trusteeship Council should possess all of the powers now possessed by the Secretary of the Interior as a trustee of Indian property.

4. Until the above is done, transfering the above powers to the National Council on Indian Opportunity PROVIDED THAT THIS COUNCIL IS COMPOSED ONLY OF INDIANS CHOSEN OR APPOINTED IN SOME DEMOCRATIC WAY.

5. The abolition of the Indian Claims Commission and at the same time giving Indian tribes the right to sue in regular federal courts.

6. The IMMEDIATE RETURN TO THE INDIAN TRIBES OF ALL INDIAN-HELD LAND ILLEGALLY SEIZED BY THE GOVERNMENT AND STILL HELD BY THE GOVERNMENT as so-called "public domain," unless the individual tribe chooses to accept a just cash payment instead. In a case where a group of Indians vote to accept cash, each individual preferring land shall be able to get a portion of the "public domain" equal in value to the individual cash award (with the value of the land being determined by the value set by the government in determing the amount of cash award).

7. An increase in monies going for the economic development of Indian communities with all such funds going to Indian-controlled groups. ALL OEO PROGRAMS SHOULD BE UNDER INDIAN CONTROL IF THEY ARE DESIGNED TO BENEFIT INDIANS, INCLUDING THE "INDIAN DESK" ITSELF. THE OEO UNIVERSITY CONSORTIUM SHOULD BE ABOLISHED AND THE FUNDS SHOULD GO DIRECTLY TO AN INDIAN-CONTROLLED COLLEGE OR TRAINING ORGANIZATION.

8. The recognition of Indian tribal corporations, whether chartered under the Indian Reorganization Act, by state charter, or by self-charter, as corporations possessing full legal equality with all non-profit corporations and with all municipal-type corporations.

9. The recognition of all Indian tribes organized by Indian people as legitimate tribes deserving of federal aid, whether currently being aided by the BIA or not.

10. The recognition that the special status of Indian land is derived not from any trusteeship powers of the federal government but from the former sovereign character of Indian nations.

11. The recognition that all tribal territories have the right to select their future status, including the possibility of statehood in the case of the Navajo.

12. The complete abandonment of the "termination" idea both because it is bad and because the federal government has no power, legally, to terminate anything but services in any case.

13. The discontinuance of the relocation program until Indian peoples are in control of Indian affairs.

14. Already relocated and other urban Indians should be provided with funds to establish urban inter-tribal development corporations under elected democratic control. The funds for these corporations should come through a national Indian-controlled agency, but earmarked for urban use.

15. All reservations recognized in earlier years, but later abandoned or abolished by the BIA, should be restored immediately or replaced, unless they were replaced earlier by equal territory.

16. An American Indian University, under Indian control, should be established and Haskell and Santa Fe institutes and all major BIA vocational programs should be transferred to it.

17. The Congress should resolve that ancient Indian place-names shall be the correct and official place-names on all federal property.

18. The Congress should order the Post Office Department and the Treasury to issue coins and postage stamps recognizing the culture and history of the Indian people.

19. The U.S. Public Health Service, Indian Division, should be transferred to a non-profit Indian Health Service Corporation controlled by Indians. The IHS should be able to offer medical and dental care to all Indians, except those who are wealthy, everywhere, from the Atlantic Coast to the Pacific. This service might take the form of free insurance or a contract with an organization such as Kaiser Foundation.

20. Full veteran's benefits should be made available to the descendents of the Indian veterans of Indian wars who were earlier denied any veteran's benefits.

21. The Federal Communications Commission and the Interstate Commerce Commission should prohibit discrimination in advertising (not using Indian models etc.) and should stop anti- Indian films.

MEMBERSHIP AND STRUCTURE:

1. Membership should be open to all persons of Native American descent with associate membership for all other persons, provided that all members agree to uphold the basic principles.

2. UNA should be based on democratic chapters with representation at regional, national, and international levels being proportional to the size of the chapters.

Please see the attached Notice for further details regarding the hearing and public comment period.

If you have questions or would like to submit comments, please contact me at (510) 238-3659 or OBOT@oaklandnet.com.
Best,

Heather Klein, Planner III **|** City of Oakland | Bureau of Planning | 250 Frank H. Ogawa, Suite 2114 | Oakland, CA 94612 | Phone: (510)238-3659 | Fax: (510) 238-6538 | Email: hklein@oaklandnet.com | Website: www.oaklandnet.com/planning

Klein, Heather

From: clairbrown@gmail.com on behalf of Prof Clair Brown <cbrown@econ.berkeley.edu>
Sent: Monday, May 16, 2016 10:05 AM
To: OBOT
Subject: Material for Oakland City Council on safety of oil trains
Attachments: Oakland Oil Trains-Unsafe.docx

Please find attached file to be delivered to the City Council.
Thanks!

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Clair Brown, PhD
Professor of Economics
Director, Center for Work, Technology, and Society
University of California, Berkeley

Safety and health concerns from moving petroleum products through Oakland by train

Clair Brown, PhD
Professor of Economics
Director, Center for Work, Technology, and Society
University of California, Berkeley

Material submitted to Oakland City Council
Follow-up to hearing on May 9, 2016 to receive information and evidence on transportation of crude oil through Oakland (follow-up to Resolution 85054 CMS).

I am submitting excepts from the US Department of Transportation (DOT) report on the safety problems with transporting crude oil (and other flammable materials) by train, which is part of the new Federal regulations to make oil trains safer. As an economist, I point out problems raised by the report, and provide a critique of the underlying cost-benefit analysis used to create and justify the new safety regulations. The Oakland City Council may hear the argument from the transportation and fossil fuel industries that the new Federal safety regulations have made oil trains safe to travel through Oakland. My comments show that this is <u>*not*</u> *the case.*

NOTE: This Federal report by the Department of Transportation includes the safety risks, and does not include health risks. The health risks will be covered by testimony from public health experts, and is *in addition* to the safety risks covered here.

<u>SUMMARY OF MY ANALYSIS</u>

- <u>The public benefits from reducing derailment risks are calculated to be low</u>: The cost-benefit analysis underlying this report is biased toward the transportation and oil industries. The costs of implementing safer oil trains, which includes such costs as buying double-walled tank cars and reducing speed through sensitive areas (both to environment and to residents), are compared to the benefits to the public of reducing the probability of oil train accidents (derailments), which includes a reduction in the number of people injured or killed and a reduction in the property damage and the environmental degradation. The costs to industry are known, and so this part of the analysis is acceptable. As is typical in cost-benefit analysis, the benefits are not well-known because they are based on assumptions about the value of a life (both for a child and an adult), the type of property that will be destroyed, and the value of the environment degraded. The benefits are biased and low, because the value of a child's life is assumed to be very low (they are not working and have no income) and the value of an adult life is low and based only on their earnings. Property damage is also too low because it is based on accidents happening outside urban areas. If one placed a high (and realistic) value on life and urban property, then the benefits of reducing the probability of an oil train would sky-rocket. Then realistic high public benefits would turn the cost-benefit analysis on its head. Correctly accounting for public benefits from *decreasing the risks of oil trains derailments would show that public benefits far exceed industry costs.*

- <u>Therefore, the underlying economic analysis is flawed</u>: The government uses an erroneous cost-benefit analysis to figure out how much to reduce the risk that oil train

derailments will occur, and how much damage to expect from the resulting oil spills and explosive fires.

- Oil trains present a high risk to safety: The DOT report makes it clear that oil train accidents will happen, both from human errors and from train operations, and so the goal is to minimize the probability of accidents, *given the costs to the companies and the benefits to the public.* To run oil trains through a crowded metropolitan area, such as Oakland, presents a risk that should be unacceptable because the risk of death and injury to hundreds of Oakland residents must not be allowed.

- The public safety risks are extraordinary: The DOT report makes it clear that oil trains are dangerous, and there are no "safe" oil trains. An oil train derailment will cause oil spills and fires, and in a densely populated urban area, children and adults will be injured and killed. We must not pay for oil transport with our people's health and safety. The only way **not** to have safety problems from oil trains moving through Oakland is **to not allow oil trains to travel through Oakland.**

Below I provide relevant excepts from the DOT report, which is almost 400 pages long.
This Department of Transportation report provides an overview of the safety problems with oil trains, and the new safety regulations going into effect over the next decade. Note that these regulations can only reduce the risk of accidents and improve the first response to an oil train accident. It uses cost-benefit analysis to decide how much to improve the safety of the oil trains. Their final approach to the problem that oil trains will always have explosive accidents is to state that first response must be improved.

Hazardous Materials: Enhanced Tank Car Standards and Operational Controls for High Hazard Flammable Trains
AGENCY: Pipeline and Hazardous Materials Safety Administration (PHMSA), Department of Transportation (DOT).
ACTION: Final rule

Report found here:
http://www.phmsa.dot.gov/pv_obj_cache/pv_obj_id_C93438A3750672CC19C218658253009CC0511900/filename/HHFT_Final_Rule.pdf

Summary of final rule here: https://www.transportation.gov/mission/safety/rail-rule-summary
Note that deadline for retrofitting of nonjacketed and jacketed tank cars extends to 2025.
The earliest date in 2017 is for reporting of the number of retrofitted and non-retrofitted cars.

Excerpts from report (summary pages are not numbered here, and are in the first pages of the report):
"The number of carloads carrying oil in 2014 rose by more than 5,000 percent when compared with the numbers in 2008, according to the Association of American Railroads (AAR)."
"North Dakota's Bakken region accounts for much of this growth, with more than half of its production—around 700,000 barrels per day in early 2015—moving out of the region on rail.

That crude oil is moved to refineries predominantly on the East and West Coasts, where it is processed into useful petroleum products like heating oil, diesel fuel or gasoline."
"several high-profile incidents have brought the issue into the national spotlight and led some to call for greater rail safety standards for crude oil transports. In 2013, a derailment and explosion killed 47 people and spilled 1.5 million gallons of crude oil in Lac Mégantic, Quebec [The ensuing explosion and firestorm burned down 40 buildings in the town center and killed 47 people.] An analysis of federal data from DOT's Pipeline and Hazardous Materials Safety Administration (PHMSA) estimated that 1.15 million gallons of crude oil spilled from rail cars in the U.S. in 2013. The topic came to the forefront again in early 2015 after several derailments and spills occurred within a matter of weeks."
"The Federal Railroad Administration (FRA), one of 10 agencies under the DOT, has primary jurisdiction over railroad safety, covering the safety of track, grade crossings, rail equipment, operating practices, and movement of hazardous materials (hazmat). DOT's Pipeline and Hazardous Materials Safety Administration (PHMSA) and the U.S. Department of Homeland Security's Transportation Security Administration (TSA) issue safety standards for railways.The National Transportation Safety Board (NTSB), an independent federal agency, is responsible for making recommendations to prevent future incidents. Unlike the FRA, the NTSB has no regulatory authority although the FRA often agrees with the recommendations provided by the NTSB. In an effort to improve safety and reduce the potential for rail spills, government agencies in the U.S. and Canada have adopted additional safety standards and issued new regulations for crude oil railcars. The U.S. Department of Transportation (DOT), for instance, issued anemergency order in May 2014 that requires railroad operators to notify local emergency responders whenever oil shipments travel through their states."
"In May 2015, the DOT announced a final rule to strengthen safety standards for transportation of flammable liquids by rail. The rule was developed by PHMSA and FRA, in coordination with Canada. The rule establishes a variety of new standards, including: enhanced tank car standards, new braking standards, new testing and sampling requirements to determine product stability, and new operational protocols, such as routing requirements, speed restrictions and informing local agencies."

"Crude oil and ethanol comprise approximately 68 percent of the flammable liquids transported by rail. The inherent risk of flammability of these materials is compounded in the context of rail transportation because petroleum crude oil and ethanol are commonly shipped in large quantities, either as large blocks of material in a manifest train or as a single commodity train (commonly referred to as a "unit train"). As detailed in the NPRM, in recent years, train accidents/incidents (train accidents) involving the release of a flammable liquid and resulting in fires and other severe consequences have occurred… PHMSA and FRA focus on solutions designed to reduce the probability of accidents occurring and to minimize the consequences of an accident should one occur."

"Emergency Order not only applies to legacy DOT-111 tank cars but newer tank cars built to the CPC-1232 standard. While CPC-1232 tank cars have more robust protections than do legacy DOT-111 tank cars, recent accidents have shown that those cars may still release hazardous material when involved in derailments. Derailments in 2015 in Mt. Carbon, WV, Dubuque, IA, and Galena, IL involved CPC-1232 cars and resulted in the release of hazardous materials from those cars."

"In recent years, train accidents/incidents (train accidents) involving a flammable liquid release and resulting fire with severe consequences have occurred with increasing frequency (i.e., Arcadia, OH; Plevna, MT; Casselton, ND; Aliceville, AL; Lac-Mégantic, Quebec; Lynchburg, VA, Tiskilwa, IL, Columbus, OH, New Brighton, PA, Mount Carbon, WV, Galena, IL, Dubuque, IA, Timmins, Ontario, and Gogama, Ontario)." With footnote that "the last five accidents listed occurred in 2015 are not included in our supporting analysis" (p 74)

"We seek to ensure that the car selected will have the greatest net social benefits, with benefits primarily generated from the mitigation of accident severity. We are also aware of, and account for, the large economic effects associated with regulatory changes of this scale, as tank cars are a long-term investment." P 80

"Of the thirteen major crude oil/ethanol train accidents in the U.S. listed in the August 1, 2014 Federal Register notice that this letter is in response to, the proposed new tank car standard would have only prevented one of them from spilling contents from a damaged rail car. The rest of the accidents were from trains travelling from 23 to 48 miles per hour, well above the safe speeds for the new proposed tank designs." The Tulalip Tribes p 85

Clean Water Action has stated: "The agencies' promotion of a 40 miles per hour speed, when in fact nine of the major 13 train accidents (Table 3 of the NPRM) occurred with speeds under 40 miles per hour does not seem justified nor is it in the public interest. Fire resulted in 10 of the 13 accidents, three of which were involved in speeds over 40 miles per hour and five of which were between 30 miles per hour and 40 miles per hour. The 6 accidents involving crude oil resulted in over 1.2 million gallons of oil being spilled […] Clean Water Action encourages the agency to analyze reducing travel speeds to 30 mph and lower. […] Clean Water Action respectfully encourages the agency to examine additional speed restrictions in areas near public drinking water supplies and sensitive environments." P 147

"Rail accidents involving crude oil have risen along with the increase in crude oil production and rail shipments of crude oil… has raised the likelihood of a catastrophic train accident that would cause substantial damage to life, property, and the environment" Five derailment in 2013 and 6 derailments in 2014 (latest data shown). Figs 4 and 5: over 400,000 train cars expected to ship oil, from 2013 to 2034. Pp 284 and 285. (note these data exclude ethanol, which is reported separately)

<u>Final summary states:</u>
"The costs to society, the government, and the rail industry of an accident involving large shipments of flammable liquid are high. If no action is taken, the threat of catastrophic accidents in large populated areas or other sensitive environments will continue." P 311" The costs to society, the government, and the rail industry of an accident involving large shipments of flammable liquid are high. If no action is taken, the threat of catastrophic accidents in large populated areas or other sensitive environments will continue." P 352

Report argues: "Per ton-mile of transportation, cargo tank motor vehicles (CTMVs) emit significantly higher levels of volatile organic compounds, non-volatile hydrocarbons, carbon monoxide, oxides of nitrogen, carbon dioxide, and particulate matter than freight rail. In

addition, the fatality and injury rate per ton-mile from accidents is significantly higher than from freight rail." P 369
Note concern that the new rail safety measures could shift unsafe oil tank cars to hauling tar sands oil:
"In their comments, Earthjustice, Forest Ethics, Sierra Club, NRDC, and Oil Change International asserted, "the proposed rule would allow the DOT-111 and other unsafe tank cars to be shifted to tar sands service. The rule is thin on analysis to support this shift. However, on its face, it would be indefensible to allow unsafe tank cars to be used to ship tar sands bitumen diluted with chemicals that contain volatile components. Accidents involving diluted bitumen are notorious for being impossible to clean up."

Much public concern about the length of the train cars used to define movement of hazardous materials:

"Comments from the concerned public, local government, tribal communities, towns and cities voiced concern with the 20-car threshold, and that the 20-car threshold is an arbitrary number that is not justified in the NPRM. With regard to alternative scopes for this rulemaking, this group of commenters had varied opinions. Some even suggested that a train consisting of one or more tank cars carrying crude oil or any other hazardous material should be classified as an HHFT. Tribal communities, such as the Quinault Indian Nation and the Prairie Island Indian Community felt the proposed threshold was sufficient but could be even more stringent. Specifically, the Prairie Island Indian Community supported, "designating trains carrying more than 20 tank cars of flammable liquids as "high-hazard flammable train (HHFT)." The Quinault Indian Nation preferred a threshold of a single tank car. Environmental Groups such as the Sierra Club, Environmental Advocates of New York, Earthjustice, the Natural Resources Defense Council, Forest Keepers, and Oil Change had strong opinions about this threshold and the need to be more stringent. The Sierra Club noted that there are known risks associated with trains transporting less than 20 tank cars loaded with crude oil, particularly in legacy DOT-111 tank cars. The Environmental Advocates of New York suggested eliminating the combustible liquid exception for rail transportation to capture those materials. Finally, a joint comment from Earthjustice, Sierra Club, the Natural Resources Defense Council, Forest Keepers, and Oil Change suggested in addition to lowering the threshold for defining an HHFT, ensuring that diluted bitumen ("dilbit") is included in any amount towards this definition. Overall environmental groups supported a threshold below 20 tank cars loaded with Class 3 (flammable liquid) materials." pp 69-70

Also read report from National Conference of State Legislatures:
http://www.ncsl.org/research/energy/transporting-crude-oil-by-rail-state-and-federal-action.aspx

See one accident report: Derailment, with hazardous material release and fire: Illinois 2009
http://www.ntsb.gov/investigations/AccidentReports/Reports/RAR1201.pdf

CITY OF OAKLAND
OFFICE OF CITY MANAGER
16 MAY -6 PM 3: 26

April 29, 2016

Office of The City Administrator,
Sabrina B. Landreth, City Administrator
City Hall
1 Frank H. Ogawa Plaza
Oakland, CA 94612

Re: Movable Contaminants

Dear Sabrina Landreth,
Thanks for giving me the opportunity to express my concerns regarding the transportation of Crude Oil, Coal and what is termed as Petro. Coke through Our city.
I remember a few years ago there was a yeast manufacturing company, I believe the name was Red Dot, that produced cooking yeast for years just of 6th near Peralta Street in Oakland. Little did the surrounding community know the process of making yeast sent harmful contaminants into the air polluting the health of all who lived in the area.
At about the same time it was revealed that the trucks that hauled good to and from the Port polluted the community by its diesel exhaust emissions into the air.
Those of us living there did not know the extent of these elements cause health problems and we were being exposed to them daily.
We now know have been informed by the text of your letter and cause much concern for the health of all us citizens from the fallout of contaminants that will be released by transporting these products through our city to the Port.

"Hydraulic fracturing injects millions of gallons of water into oil and gas containing geologic formations deep underground. Scientific and government research indicates that fracking can cause earthquakes in two ways:

1. Primarily, during the fracking process: "*[Earthquakes] were caused by fluid injection during hydraulic fracturing in proximity to pre-existing faults.*"
2. Secondarily, via the disposal of fracking wastewater via underground injection.

Exposure to coal dust causes various pulmonary diseases, including **coal workers' pneumoconiosis** (CWP) and **chronic obstructive pulmonary disease** (COPD). 2. Coal exposed to crystalline silica dust, which causes **silicosis**, COPD, and other diseases.'

Based on my research, I implore the city of Oakland to reject this proposal to safeguard all the citizens of Oakland.

Felix Guillory

Klein, Heather

From: Gene Hazzard <genehazzard@gmail.com>
Sent: Saturday, May 14, 2016 10:17 PM
To: OBOT
Subject: Ref: Extension of the Public Comment Period on the Health and/or Safety Impact of Fuel Oil, Gasoline and/or Crude Oil Products

Atten: Ms. Heather Klein, Planner III

Ordinance 443 adopted by the Oakland City Council in 1913 Amended an earlier City Ordinance 391 of 1906.(see Public Records Request 15301)
443 Ordinance calls for the regulation and storage and the use of Petroleum Products. This Ordinance required the written permission of the City's Fire Marshall in order to store any Petroleum Products . The Fire Marshall has the responsibility of protecting the Health and Public Safety of the residents of Oakland.

The 1906 Ordinance was repealed by the then City Council in 1925. However, Ordinance 443 adopted by the City Council in 1913, remains in effect.

The City Council need only to AMEND Ordinance 443 to include the identified fossil fuels which are the subject of the extension of the public comment period including coal for the OBOT.

THE CITY NEED NOT HAVE TO CREATE A NEW ORDINANCE TO REGULATE THE STORAGE OF FOSSIL FUELS BECAUSE ORDINANCE 443 PRE-DATES THE. AGREEMENT WITH CCIG/PHIL TAGAMI FOR OBOT . Ordinance 443 would withstand any litigation by CCIG.

Klein, Heather

From: Gene Hazzard <genehazzard@gmail.com>
Sent: Saturday, May 14, 2016 9:18 PM
To: OBOT
Subject: Fwd: Storage of Coal/PRR #15301
Attachments: 3192 NS.PDF; 443 NS.PDF

Attend: Heather Klein
re: written comments /testimoney regarding the 1)health/and/or safety impacts of the transportation,trans loading, handling and/or export of fuel oils(hating oil, off-roa diesel fuel, high-sulfur diesel, residual fuel oils for furnaces and boilers, and fuel for low and medium speed diesel engines), gasoline(all grades),and crude oil in and through the OBOT...

MS. KLEIN

I noticed in the above list of fossil fuels COAL was inadvertedly not included. I hope this was an oversight.

The issue related to OBOT is the proposed storage and the export of COAL at OBOT. Please find attached Ordinance 443 passed by the City Council in 1913. This Ordinance AMENDED the 1893/1906 Ordinance that absolutely prohibited the STORAGE of Coal Oil, Kerosene, and Refined Petroleum Products. The Amended Ordinance required with written permission from the Fire Marshall would determine what is STORED. This is tantamount to a CONDITIONAL USE PERMIT.

IN 1925 the City Council repealed the 1906 Ordinance because of the Amended 443 Ordinance require the written permission to STORE any and all fossil fuels; being mindful of the public safety and health impact to the residents of Oakland.

The 1913 Ordinance 443 O.M.C. is still in effect.

Ordinance 443 predates the City's Agreement with CCIG/Phil Tagami for OBOT. The City needs only to AMEND Ordinance 443 to include the above referenced fossil fuels. THERE IS NO NEED TO CREATE A NEW ORDINANCE which may result in litigation from CCIG.

---------- Forwarded message ----------
From: "Scott, Deidre" <DScott@oaklandnet.com>
Date: May 9, 2016 1:29 PM
Subject: Storage of Coal/PRR #15301
To: "genehazzard@gmail.com" <genehazzard@gmail.com>
Cc:

Mr. Hazzard,

Attached as requested and included in the link below are the relevant ordinances. As noted in the request, if you would like complete versions of the ordnances, please advise. Here is the link to your new Public Records Request:

Introduced by Commissioner F. C. Turner

Approved as to form and legality
City Attorney

O.K Story

ORDINANCE No. 443 N. S.

AN ORDINANCE AMENDING SECTION 5. OF ORDINANCE NO. 391 N. S. REGULATING THE KEEPING, STORAGE AND USE OF PETROLEUM PRODUCTS ETC.

BE IT ORDAINED BY THE COUNCIL OF THE CITY OF OAKLAND, as follows:

Section 1. Section 5 of Ordinance No. 391 N. S. entitled, "An Ordinance regulating, the keeping, storage, and use of petroleum, distillate or any product of petroleum, or hydro-carbon liquids exceeding a certain flash test, within the City of Oakland and providing a penalty for the violation thereof" is hereby amended to read as follows:

Section 5. On written permission of the Fire Marshal it shall be lawful to keep or store, or to permit to be kept or stored, any of the oils or liquids mentioned in Section 4 hereof, in quantities of not more than 175 gallons in tanks constructed of galvanized steel of not less in thickness than number sixteen (16) guage; or quantities of not more than 300 gallons in tanks constructed of galvanized steel not less in thickness than number twelve (12) guage or in tanks constructed of iron not less in thickness than three-sixteenths (3/16) of an inch; such iron tanks to be riveted and caulked, coated with tar or other rust resisting material and all such galvanized steel tanks to be riveted steel to steel joints, soldered, and coated with tar or other rust resisting material. Except as otherwise provided by ordinance all such galvanized iron or steel tanks provided for in this section shall be placed not less than five feet outside the walls of any building and, if located within the fire limits of the City of Oakland as established by Ordinance, such tanks shall be covered with at least four feet of earth and placed with the tops of such tanks at least four feet underground but if located outside of the fire limits of the City of Oakland as established by Ordinance such tanks shall be covered with at least two feet of earth and shall be placed with the tops of such tanks at least two feet underground.

Such tanks shall be filled only from a tank wagon, or be delivered in tanks, drums or containers between sunrise and sunset of any one day, provided, however, that all tanks, drums or containers shall, immediately upon the delivery of such oils or liquids mentioned in Section 4 hereof, be removed from the premises. Oils shall be taken from said tanks only by pump with automatic shut-off; gravity, air, or water pressure, or syphon process shall not be permitted."

Section 2. The said section of the City Ordinance which it is hereby proposed ~~should~~ to amend now reads as follows:

"Section 5. On written permission of the Fire Marshal it shall be lawful to keep or store, or permit to be kept or stored any of the oils or liquids mentioned in Section 4 hereof, in quantities of not more than three hundred (300) gallons, in a tank constructed of not less than No: 12 guage galvanized steel

riveted steel to steel joints, soldered and coated with tar or other rust-resisting material, or in an iron tank not less than three sixteenths (3/16) of an inch in thickness, riveted and caulked, coated with tar or other rust-resisting material; such tank to be placed not less than five (5) feet outside the walls of any building, with its top at least four (4) feet underground and covered with at least four (4) feet of earth. Such tank shall be filled only through a section of hose suitable for the purpose directly connected to the tank delivery wagon, which hose shall be detached from feed pipe when not in service. Oil shall be taken from such tank only by a pump with automatic cut-off; gravity, air or water pressure, or syphon process shall not be permitted."

Section 3. This Ordinance shall take effect immediately.

IN COUNCIL, Oakland, Cal., April 16 1913 Passed by the following vote:

AYES—Commissioners ~~Anderson,~~ ~~Baccus,~~ Forrest, Turner, and President Mott. 3

NOES—None

EXCUSED FROM VOTING—None

ABSENT—Commissioners Anderson and Baccus 2.

Attest: Frank Mott

Mayor of the City of Oakland, Cal.

Attest: H. Magill

City Clerk and Clerk of the Council of the City of Oakland, Cal.

APPROVED AS TO FORM AND LEGALITY.

INTRODUCED BY COMMISSIONER

Leon E. Gray
CITY ATTORNEY.

ORDINANCE No. 3192 N. S.

AN ORDINANCE REPEALING ORDINANCE NO. 1906

BE IT ORDAINED BY THE COUNCIL OF THE CITY OF OAKLAND AS FOLLOWS:

SECTION 1. Ordinance No. 1906 is hereby repealed.

SECTION 2. This ordinance shall take effect immediately.

IN COUNCIL, OAKLAND, CAL., March 4, 1925

PASSED BY THE FOLLOWING VOTE:

AYES—COMMISSIONERS BACCUS, ~~CARTER, COLBOURN~~ GOODRICH, MOOREHEAD AND Vice PRESIDENT ~~DAVIE~~ COLBOURN — 4.

NOES— NONE

ABSENT— PRESIDENT DAVIE — 1

ATTEST: John L. Davie
MAYOR OF THE CITY OF OAKLAND, CAL.

ATTEST: Wylmer K. Hunt
CITY CLERK AND CLERK OF THE COUNCIL
OF THE CITY OF OAKLAND, CAL.

FORM O. 1

http://records.oaklandnet.com/city/request/15301

Respectfully,

Deidre Scott, Citywide Records Manager

City of Oakland

1 Frank H. Ogawa Plaza, Room 101

Oakland, CA 94612

Direct: 510-238-3624

dscott@oaklandnet.com

Klein, Heather

From: Woo, Winnie
Sent: Monday, May 09, 2016 9:52 AM
To: Cole, Doug; Monetta, John
Subject: FW: EPA Chief: US Quickly Phasing Out Coal For Clean Energy

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From: City Administrator's Office
Sent: Monday, May 09, 2016 8:31 AM
To: Woo, Winnie
Subject: FW: EPA Chief: US Quickly Phasing Out Coal For Clean Energy

FYI

From: Harvey Sherback [mailto:harveyincalifornia@gmail.com]
Sent: Friday, May 06, 2016 2:55 PM
To: Office of the Mayor
Cc: Kalb, Dan; Bolotina, Olga; Luby, Oliver; Harris, Monica; Sanchez, Susan; Guillen, Abel; Chen, Jessica; davis@oaklandnet.com; Henderson, Maria A.; McElhaney, Lynette; Wald, Zachary; Cook, Brigitte; Brisbin, Alessia; Marqusee, Alexander G.; Campbell Washington, Annie; Campbell Washington, Annie; Simons, Adam J.; English, Jamila A.; Maxson, Nayeli; Gallo, Noel; Garzon, Clara; Coto, Lisa C.; Ortega-Garcia, Luis A.; ortega-garcia@oaklandnet.com; Herrera, Victoria E.; Brooks, Desley; Winston, Ashley; bouldin@oaklandnet.com; brown@oaklandnet.com; Reid, Larry; Jones, Andre; Kaplan, Rebecca; At Large; Simmons, LaTonda; City Administrator's Office; Barazoto, Whitney; City Auditor; Knight, Timothy A.; Lawrence, Stephen; Lim, Jennifer; mcarnes@oakland.com; Seymour, Mary; Minshall, Oriana; tyarlott-davis@oaklandnet.com; Moss, Tomiquia; Nosakhare, Shereda; Moore, Peggy; Derryck, Erica; Cortes, Audrey; Silver, David; Corona, Jose E.; Hunt, Michael; Parker, Barbara; District1@acgov.org; District2@acgov.org; District3@acgov.org; District4@acgov.org; District5@acgov.org; cheryl.perkins@acgov.org; senator.hancock@sen.ca.gov; assemblymember.skinner@assembly.ca.gov; assemblymember.buchanan@assembly.ca.gov; assemblymember.hayashi@assembly.ca.gov; brittany.king@sierraclub.org; Jessica Yarnall Loarie; Bill Corcoran; stu@stuflash.com
Subject: Re: EPA Chief: US Quickly Phasing Out Coal For Clean Energy

City of Oakland
Oakland City Council Members
Libby Schaaf
Mayor

May 6th, 2016

Hello Mayor Schaaf, Oakland City Council Members & Staff,

Why go with a looser....it's time to invest in clean renewable energy.

Today - Headline: EPA Chief: US Quickly Phasing Out Coal For Clean Energy

"The top official at the Environmental Protection Agency says the ongoing legal fight over regulating carbon emissions from coal-fired power plants is not delaying the nation's accelerating shift to cleaner sources of energy.

EPA Administrator Gina McCarthy spoke Friday at an international conference, Climate Action 2016, in

Washington. She expressed confidence the United States will meet its obligations under the landmark climate treaty signed in Paris last December."

http://abcnews.go.com/Politics/wireStory/epa-chief-us-quickly-phasing-coal-clean-energy-38939485

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Today - Headline: Sorry, Coal Jobs Are Going Away

"Burning it creates pollution that kills thousands of people each year in the United States alone. And ending the use of coal -- as fast as possible -- is key to the fight against climate change."

http://www.cnn.com/2016/05/06/opinions/sutter-break-free-climate-change/index.html

Please stop the coal facility now while you can. Have you noticed that Governor Jerry Brown is not endorsing the coal export plan, why should you? Don't spend our tax dollars on this loosing proposition...Just Say No to coal exports out of Oakland.

Harvey Sherback
Berkeley, California

Klein, Heather

From: Jeffrey KESSEL <kessel_j@berkeley.edu>
Sent: Thursday, May 12, 2016 11:32 AM
To: OBOT
Subject: Fuel Transport and Storage

Ms. Klein,

Our government has not seen fit to adequately fund railroads. Hence rails and cars are old and dilapidated and often carry materials for which they do not have current certification. Allowing rail transport of explosive cargo into Oakland will result in a disaster sooner or later. The health and safety of Oakland residents should not be imperiled by powerful interests that put profit before health and safety.

Sincerely,
Jeffrey Kessel
371-50th Street
Oakland, CA
94609
510-654-8385

Klein, Heather

From: Margaret Rossoff <margaretmft@gmail.com>
Sent: Monday, May 16, 2016 9:20 AM
To: OBOT
Subject: Evidence regarding oil trains for the ordinance
Attachments: Oil Train Disaster Plans Blog.pdf; Oil Train Disaster Plans Blog.docx

Attached is a document to include in the evidence of the dangers of transporting oil by rail. It's in two formats, Word and pdf. This replaces the link I previously sent you, which was harder to read.

Thank you for your work on this.

Margaret Rossoff

Oil Train Disaster Plans: A burning need for the truth about oil train fires

Friday May 13, 2016 • Matt Krogh, Extreme Oil Campaign Director, Stand.earth

In the year since five fiery oil train disasters in the US and Canada brought national attention to the threat from trains hauling explosive crude oil, the rail industry has embarked on a high profile public relations exercise to reassure the public that deadly disasters can be averted by emergency responders. In fact, the reality of oil train accidents -- and the unanimous opinion of fire officials and federal rail safety experts -- proves that there is no fighting an oil train derailment and fire. The scene of a crude oil derailment and fire is an uncontrollable fire. All firefighters can do is evacuate the area and wait for the fire to burn itself out.

Images from oil train firefighter training circulated by railroad and oil companies show firefighters standing close to burning tank cars, training hoses on small fires. But as Fairfield, Iowa, Fire Chief Scott Vaughan described in 2014, “If there was a spill or a fire, our big thing would be containment and evacuation,” he said. “We train for it, but training and actually doing are two different things.” Very simply, there is no controlling an oil train fire.

In 2013 in Lac Megantic, Quebec, 47 people died when an oil train derailed and caught fire in the center of a small Canadian town. More than 1.5 million gallons of crude oil spilled in flowing “rivers of fire”, creating pool fires and filling sewers. Blocks away uncontrollable fires erupted from drains and manholes and more than 30 building were destroyed. Despite 1,000 firefighters responding from across Quebec and Maine the fire burned for two days.

When an oil train derails at any speed over the puncture velocity of roughly 10 miles an hour (for a common CPC-1232 tank car) a dozen or so cars typically come off the tracks, decouple and are thrown from their wheels. If tank cars are punctured, possibly by something on the ground or the couplers on the ends of the cars, the crude (either Bakken or diluted tar sands, both highly volatile) can easily self-ignite or find an ignition source.

Observations published by FEMA from County Emergency Manager Dave Rogness on the oil train explosion that rocked the small town of Casselton, ND, describe the derailment and the size of the spill:

On December 30, 2013 in Casselton, a BNSF westbound train with 112 grain cars went off the tracks. Thirteen of the cars derailed, and one fell on the eastbound tracks. Within two minutes, a BNSF eastbound crude oil train hit that car. That caused two front locomotives, a hopper car, and twenty cars on the eastbound train to derail, and 18 of them ruptured, exploded, and released 450,000 gallons of Bakken crude oil.

First responders to the Casselton accident were forced to pull far back from the scene because of the intense heat:

The command post was originally set up one-quarter mile from the scene, but they had to pull back to a half mile because it was too hot for the responders even inside their rigs.

A similar situation occurred in Galena, Illinois, where the fire from the March 2015 derailment burned for days. First responders, who unloaded emergency equipment nearby to fight the fire, were forced to abandon $10,000 in equipment on the scene when they pulled back to a safe distance.

The DOT Emergency Response Guidebook is quite clear on the initial response to a single tank car disaster: "If tank, rail car or tank truck is involved in a fire, isolate for 800 meters (1/2 mile) in all directions" But this direction is for a single tank car, and oil train disasters almost always involve many more than one car.

Emergency response to oil trains traveling across the US and Canada is left to municipal fire departments. Few fire departments have the manpower, training, or equipment to respond to more than a single burning 10,000-gallon tank truck of crude. An oil train tank car carries triple that, and most oil train disasters involve way more than a single tank car. As North Dakota Emergency Manager Rogness describes:

"There were few options for fighting the fire. Water should not be put on exploding crude oil. Firefighters did not have enough foam in four counties together to put the fire out, plus the foam would freeze in the cold. Dry chemicals were not available. The only choice was to let it burn, which BNSF responders said would take about 12 hours. It took more than 24. Political leaders were skeptical of the strategy.

In fact, federal guidelines for emergency responders for oil train fires state very clearly that the only option is to let the oil burn itself out.

In the event of an incident that may involve the release of thousands of gallons of product and ignition of tank cars of crude oil in a unit train, most emergency response organizations will not have the available resources, capabilities or trained personnel to safely and effectively extinguish a fire or contain a spill of this magnitude.

In 2015 in Mount Carbon, West Virginia, tens of thousands of gallons of burning crude escaped punctured cars, flowing into the nearby river and forming a pool fire under other tank cars. Under the intense heat those additional cars began to rupture and explode. A report on oil train safety by the Interagency Board, which coordinates local, state and federal agencies on emergency response, described the situation on the ground during the 2015 West Virginia oil train accident:

During the derailment sequence, two tank cars were initially punctured releasing more than 50,000 gallons of crude oil. Of the 27 tank cars that derailed, 19 cars became involved in the pileup and post-accident pool fire. The pool fire caused thermal tank shell failures on 13 tank cars that otherwise survived the initial accident.

Emergency responders at the Mount Carbon, WV incident reported the first thermal failure about 25 minutes after the accident. Within the initial 65 minutes of the incident, at least four tank car failures

with large fireball eruptions occurred. The 13th and last thermal failure occurred more than 10 hours after the accident.

With oil trains continuing to run across North America, it's a question of when, not if, we will experience the next fatal oil train accident. As Christopher A. Hart of the National Transportation Safety Board explained in January 2016, "We have been lucky thus far that derailments involving flammable liquids in America have not yet occurred in a populated area… But an American version of Lac-Megantic could happen at any time."

Realistic oil train disaster preparations would not involve firefighters spraying tank cars for cameras. The first, most important step would be to recognize -- as emergency responders across the country freely admit -- that no municipal fire department can control an oil train fire.

An upcoming Department of Transportation rulemaking is intended to provide oil train information and preparedness (materials and training) for first responders around the country. Unfortunately, that new rule has been delayed for years and the draft rules are not expected until late 2017. It will be years before the final rules are released, leaving dangerous tank cars, volatile crude, and unprepared communities to bear the risks of oil train traffic.

And thorough reporting by DeSmog Blog on the weak existing regulatory standards and the oil and rail industry's failure to meet them demonstrates, there have been no improvements in the safety of the 100,000 unsafe tank cars in the US fleet. The steps oil shippers have promised to improve the safety of oil trains are as hollow and inadequate as the promise of firefighters dousing burning oil tank cars.

Real emergency preparedness for oil trains would involve preparing for massive amounts of spilled crude oil by developing evacuation protocols for the 25 million Americans who live in the oil train blast zone. It would include modeling the flow of burning crude, likely toxic plumes and wildfires. It would also require much better information sharing and coordination with emergency officials on oil train hazardous cargo, routes, and scheduling, information which railroads have strongly resisted sharing.

According to the National Fire Protection Association 69 percent of the 1.1 million firefighters in North America serve in volunteer fire departments. They are not trained or equipped for effective oil train emergency response – in fact, the scale and danger of an oil train fire puts our emergency responders, like the millions who live along the tracks, at unacceptable risk. The railroads are providing some highly touted emergency training to a tiny sliver of this massive force, but the reality is that these efforts are staged to misinform the public, not prepare emergency responders.

Federal emergency response guidance and fire chiefs have long recognized that there is no effective emergency response to a crude oil derailment fire event. If even one tank car of crude oil is involved in a fire, federal guidelines are clear that firefighters should pull back half a mile and let it burn. And that is another good reason that oil trains are too dangerous for the rails.

Many thanks to Fred Millar for his research and analysis.

Oil Train Disaster Plans: A burning need for the truth about oil train fires

Friday May 13, 2016 • Matt Krogh, Extreme Oil Campaign Director, Stand.earth

In the year since five fiery oil train disasters in the US and Canada brought national attention to the threat from trains hauling explosive crude oil, the rail industry has embarked on a high profile public relations exercise to reassure the public that deadly disasters can be averted by emergency responders. In fact, the reality of oil train accidents -- and the unanimous opinion of fire officials and federal rail safety experts -- proves that there is no fighting an oil train derailment and fire. The scene of a crude oil derailment and fire is an uncontrollable fire. All firefighters can do is evacuate the area and wait for the fire to burn itself out.

Images from oil train firefighter training circulated by railroad and oil companies show firefighters standing close to burning tank cars, training hoses on small fires. But as Fairfield, Iowa, Fire Chief Scott Vaughan described in 2014, "If there was a spill or a fire, our big thing would be containment and evacuation," he said. "We train for it, but training and actually doing are two different things." Very simply, there is no controlling an oil train fire.

In 2013 in Lac Megantic, Quebec, 47 people died when an oil train derailed and caught fire in the center of a small Canadian town. More than 1.5 million gallons of crude oil spilled in flowing "rivers of fire", creating pool fires and filling sewers. Blocks away uncontrollable fires erupted from drains and manholes and more than 30 building were destroyed. Despite 1,000 firefighters responding from across Quebec and Maine the fire burned for two days.

When an oil train derails at any speed over the puncture velocity of roughly 10 miles an hour (for a common CPC-1232 tank car) a dozen or so cars typically come off the tracks, decouple and are thrown from their wheels. If tank cars are punctured, possibly by something on the ground or the couplers on the ends of the cars, the crude (either Bakken or diluted tar sands, both highly volatile) can easily self-ignite or find an ignition source.

Observations published by FEMA from County Emergency Manager Dave Rogness on the oil train explosion that rocked the small town of Casselton, ND, describe the derailment and the size of the spill:

On December 30, 2013 in Casselton, a BNSF westbound train with 112 grain cars went off the tracks. Thirteen of the cars derailed, and one fell on the eastbound tracks. Within two minutes, a BNSF eastbound crude oil train hit that car. That caused two front locomotives, a hopper car,

and twenty cars on the eastbound train to derail, and 18 of them ruptured, exploded, and released 450,000 gallons of Bakken crude oil.

First responders to the Casselton accident were forced to pull far back from the scene because of the intense heat:

The command post was originally set up one-quarter mile from the scene, but they had to pull back to a half mile because it was too hot for the responders even inside their rigs.

A similar situation occurred in Galena, Illinois, where the fire from the March 2015 derailment burned for days. First responders, who unloaded emergency equipment nearby to fight the fire, were forced to abandon $10,000 in equipment on the scene when they pulled back to a safe distance.

The DOT Emergency Response Guidebook is quite clear on the initial response to a single tank car disaster: "If tank, rail car or tank truck is involved in a fire, isolate for 800 meters (1/2 mile) in all directions" But this direction is for a single tank car, and oil train disasters almost always involve many more than one car.

Emergency response to oil trains traveling across the US and Canada is left to municipal fire departments. Few fire departments have the manpower, training, or equipment to respond to more than a single burning 10,000-gallon tank truck of crude. An oil train tank car carries triple that, and most oil train disasters involve way more than a single tank car. As North Dakota Emergency Manager Rogness describes:

"There were few options for fighting the fire. Water should not be put on exploding crude oil. Firefighters did not have enough foam in four counties together to put the fire out, plus the foam would freeze in the cold. Dry chemicals were not available. The only choice was to let it burn, which BNSF responders said would take about 12 hours. It took more than 24. Political leaders were skeptical of the strategy.

In fact, federal guidelines for emergency responders for oil train fires state very clearly that the only option is to let the oil burn itself out.

In the event of an incident that may involve the release of thousands of gallons of product and ignition of tank cars of crude oil in a unit train, most emergency response organizations will not have the available resources, capabilities or trained personnel to safely and effectively extinguish a fire or contain a spill of this magnitude.

In 2015 in Mount Carbon, West Virginia, tens of thousands of gallons of burning crude escaped punctured cars, flowing into the nearby river and forming a pool fire under other tank cars. Under the intense heat those additional cars began to rupture and explode. A report on oil train safety by the Interagency Board, which coordinates local, state and federal agencies on emergency response, described the situation on the ground during the 2015 West Virginia oil train accident:

During the derailment sequence, two tank cars were initially punctured releasing more than 50,000 gallons of crude oil. Of the 27 tank cars that derailed, 19 cars became involved in the pileup and post-accident pool fire. The pool fire caused thermal tank shell failures on 13 tank cars that otherwise survived the initial accident.

Emergency responders at the Mount Carbon, WV incident reported the first thermal failure about 25 minutes after the accident. Within the initial 65 minutes of the incident, at least four tank car failures with large fireball eruptions occurred. The 13th and last thermal failure occurred more than 10 hours after the accident.

With oil trains continuing to run across North America, it's a question of when, not if, we will experience the next fatal oil train accident. As Christopher A. Hart of the National Transportation Safety Board explained in January 2016, "We have been lucky thus far that derailments involving flammable liquids in America have not yet occurred in a populated area… But an American version of Lac-Megantic could happen at any time."

Realistic oil train disaster preparations would not involve firefighters spraying tank cars for cameras. The first, most important step would be to recognize -- as emergency responders across the country freely admit -- that no municipal fire department can control an oil train fire.

An upcoming Department of Transportation rulemaking is intended to provide oil train information and preparedness (materials and training) for first responders around the country. Unfortunately, that new rule has been delayed for years and the draft rules are not expected until late 2017. It will be years before the final rules are released, leaving dangerous tank cars, volatile crude, and unprepared communities to bear the risks of oil train traffic.

And thorough reporting by DeSmog Blog on the weak existing regulatory standards and the oil and rail industry's failure to meet them demonstrates, there have been no improvements in the safety of the 100,000 unsafe tank cars in the US fleet. The steps oil shippers have promised to improve the safety of oil trains are as hollow and inadequate as the promise of firefighters dousing burning oil tank cars.

Real emergency preparedness for oil trains would involve preparing for massive amounts of spilled crude oil by developing evacuation protocols for the 25 million Americans who live in the oil train blast zone. It would include modeling the flow of burning crude, likely toxic plumes and wildfires. It would also require much better information sharing and coordination with emergency officials on oil train hazardous cargo, routes, and scheduling, information which railroads have strongly resisted sharing.

According to the National Fire Protection Association 69 percent of the 1.1 million firefighters in North America serve in volunteer fire departments. They are not trained or equipped for effective oil train emergency response – in fact, the scale and danger of an oil train fire puts our emergency responders, like the millions who live along the tracks, at unacceptable risk. The railroads are providing some highly touted emergency training to a tiny sliver of this massive force, but the reality is that these efforts are staged to misinform the public, not prepare emergency responders.

Federal emergency response guidance and fire chiefs have long recognized that there is no effective emergency response to a crude oil derailment fire event. If even one tank car of crude oil is involved in a fire, federal guidelines are clear that firefighters should pull back half a mile and let it burn. And that is another good reason that oil trains are too dangerous for the rails.

Many thanks to Fred Millar for his research and analysis.

Klein, Heather

From: Margaret Rossoff <margaretmft@gmail.com>
Sent: Saturday, May 14, 2016 8:59 PM
To: OBOT
Subject: Testimony regarding oil at OBOT
Attachments: May 9 council on other fossil fuels.docx

Attached is the testimony I provided at the hearing on May 9.

Below is a relevant document I received by email and was unable to put into a better format. It concerns the frequent oil train disasters. I hope this can also be entered as evidence for the city to consider. From Matt Krogh at Stand.earth (formerly ForestEthics).

Oil Train Disaster Plans: A burning need for the truth about oil train fires

FRIDAY MAY 13, 2016

In the year since five fiery oil train disasters in the US and Canada brought national attention to the threat from trains hauling explosive crude oil, the rail industry has embarked on a high profile public relations exercise to reassure the public that deadly disasters can be averted by emergency responders. In fact, the reality of oil train accidents -- and the unanimous opinion of fire officials and federal rail safety experts -- proves that there is no fighting an oil train derailment and fire. The scene of a crude oil derailment and fire is an uncontrollable fire. All firefighters can do is evacuate the area and wait for the fire to burn itself out.

Images from oil train firefighter training circulated by railroad and oil companies show firefighters standing close to burning tank cars, training hoses on small fires. But as Fairfield, Iowa, Fire Chief Scott Vaughan described in 2014, “If there was a spill or a fire, our big thing would be containment and evacuation,” he said. “We train for it, but training and actually doing are two different things.” Very simply, there is no controlling an oil train fire.

In 2013 in Lac Megantic, Quebec, 47 people died when an oil train derailed and caught fire in the center of a small Canadian town. More than 1.5 million gallons of crude oil spilled in flowing “rivers of fire”, creating pool fires and filling sewers. Blocks away uncontrollable fires erupted from drains and manholes and more than 30 building were destroyed. Despite 1,000 firefighters responding from across Quebec and Maine the fire burned for two days.

When an oil train derails at any speed over the puncture velocity of roughly 10 miles an hour (for a common CPC-1232 tank car) a dozen or so cars typically come off the tracks, decouple and are thrown from their wheels. If tank cars are punctured, possibly by something on the ground or the couplers on the ends of the cars, the crude (either Bakken or diluted tar sands, both highly volatile) can easily self-ignite or find an ignition source. (more)

Thank you.

Margaret Rossoff

Testimony at May 9, 2016 special hearing on crude oil, fuel oils and gasoline

I am Margaret Rossoff, speaking on behalf of No Coal in Oakland.

As you all know well, we have spent more than a year encouraging you to pass an ordinance banning the storage and export of coal at the former Oakland Army Base. Tonight you are considering also including crude oil, fuel oil and gasoline. No Coal in Oakland supports banning all of these fossil fuels.

Coal, pet coke and oil are the fossil fuels named in the resolution this Council passed in 2014 opposing the transport of dangerous commodities. That position will become meaningful with legislative action on your part.

Other speakers are testifying to the specific ways oil and gasoline, like coal, endanger both local communities and life on planet Earth. It is time to transition from fossil fuels to renewable energy sources. We hope the City of Oakland will enact a ban on coal, pet coke, gasoline, fuel oil <u>and</u> crude oil—taking a powerful stand on behalf of a healthier future.

Klein, Heather

From: michael.armijo@comcast.net
Sent: Monday, May 16, 2016 1:44 PM
To: OBOT
Subject: submitted comments
Attachments: publiccomment.pdf

Heather Kline,

Please find our comments on the health and safety impacts of transporting fuel products through the OBOT, in the attached file.

Regards,

Michael Armijo
Catherine Kessler

Heather Kline,
Mayor Libby Schaaf,
Members of the Oakland City Council

I wish to add the following comments to the record.

My wife and I are longtime Oakland residents and homeowners.

We are hopeful that Oakland will be a vibrant and equitable community, where the health and welfare of all residents are valued equally.

We are asking that the members of the city council make protecting the health and well being of all Oakland residents their top priority.

After reviewing the submitted comments and materials supporting and opposing coal exports, we think it would be a grave mistake to allow coal to be exported through the proposed OBOT.

We also think it would be an unacceptable danger to Oakland residents and nearby communities to allow other fossil fuel products to be transported and handled in quantities that the OBOT operation would most likely entail.

Some of the impacts of exporting large quantities of fossil fuel products through Oakland:

- A risk of fire, explosion, spillage or other threats to human health and to the environment. These risks cannot be ignored. The Lac-Mégantic rail disaster (Canada, 2013) killed at least 42 people and destroyed large section of the town, is just one example of the potential risks.
- The increase in diesel-powered train traffic would produce a significant increase in the air pollution in neighborhoods already bearing the burden of high levels of pollution.

Please do not allow the OBOT to handle coal or other dangerous fossil fuel material.

Sincerely,
Michael Armijo
Catherine Kessler

Klein, Heather

From: Michael Kaufman <mvkaufman@gmail.com>
Sent: Monday, May 16, 2016 3:56 PM
To: Klein, Heather; OBOT
Cc: Office of the Mayor; McElhaney, Lynette; Campbell Washington, Annie; Kalb, Dan; Guillen, Abel; Gallo, Noel; Brooks, Desley; Reid, Larry; Kaplan, Rebecca; At Large
Subject: On The Health And/Or Safety Impacts Of Train Fossil Fuels - Tanker Car Spill List
Attachments: SpillList160516.docx

Dear Ms Klein, Mayor and Council Members

Please consider the below, AND ATTACHED, list of tanker car spills of fossil fuels and other hazardous commodities that have been endangering our citizens in the last three years.

These spills, explosions and pollution of neighborhoods and water ways will continue without end, until our elected leaders ban fossil fuels from being loaded or off loaded in our communities.

Thank You,
Michael Kaufman
323-632-2980
4016 Kansas St Apt D, Oakland, CA 94619

Tanker Car Spill List

Below is a very incomplete list of just some of the spills and explosions that have occurred in North America during the last three years. Oil pipeline capacity is maxed out in North American. Consequently oil rail car use has expanded forty fold from 2008.

The prior NTSB chair said that the overwhelming majority of oil train cars are not built to carry the toxic oil now being massively produced. The rules to control this form of oil transportation must be updated quickly; more quickly than is happening on the federal level.

The current rail cars for fossil fuel, DOT 111 type rail cars, are not crash resistant. This type of car is being banned and replaced in Canada but not in U.S. However some of the crashes and spills are also coming from newly designed, CPC-1232 type cars, which are supposed to be more crash resistant.

Normal fire departments don't have the capacity to deal with oil rail car spill, explosions and fires.

1. 03/27/13 Parkers Prairie, MN; 30,000 gallons of oil spilled

2. 03/29/13 Arkansas Exxon Pegasus Pipeline burst, 5,000-7,000 barrels of crude spilled

3. 05/21/13 Jansen Saskatchewan; 24,000 gallons of oil spilled

4. 06/27/13 Calgary, Alberta; oil train derailed on a bridge over Bow River, emergency crew prevented a spill

5. 07/06/13 Lac Magantic, Quebec; Explosions from derailed oil cars killed 47 people and destroyed 30 buildings in town center

6. 10/19/13 Gainford Alberta; 4 derailed oil tankers. evacuations were required due to explosions and fire

7. 11/08/13 Aliceville, Pickens County, Alabama; 90-car derailment, 749,000 gallons spilled. Fire burned for 2 days.

8. 12/30/13 Casselton, ND; 400,000 gallons of crude spilled, explosion caused evacuations of 2,000 people

9. 01/07/14 Plaster Rock, New Brunswick; explosion and fire caused 150-person evacuation for 3 nights

10. 01/20/14 Philadelphia PA; 6 train cars carrying Bakken crude derailed over Schuylkill River near university of PA and major hospitals, no spill

11. 02/13/14 Vandergrift PA; 4 tankers spill nearly 3,000 gallons of oil

12. 04/30/14 Lynchburg, VA; 17-car derailment, +29,000 gallons of oil spilled into the James River, threatening the Richmond, VA water supply

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14. 1/17/15 Yellowstone River, Glendive, Montana Oil Spill, 40,000 gallons of oil

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16. 1/27/15 Natural Gas Pipeline explosion in Brooke County, West Virginia from Pennsylvania Fracked Gas moving to Texas

17. 2/14/15 Timmons, Ontario 100-car Canadian National train carrying crude oil derailed. 30 cars caught fire. The tankers were the newer, CPC-1232, "safer" kind. The fires burned for days blocking a main rail line for three days.

18. 2/16/15 Mt Carbon, West Virginia Bakken Crude 109 car train, 27 tanker cars, the newer CPC 1232 cars, derailed and spilled crude into the Kanawha River. Vapor pressure in tank cars was 13.9, higher than allowed by N Dakota. laws. Tanker cars exploded catching house on fire. 1.5 mile circle of evacuation. Fire crews let fires burn for days.

19. 3/4/15 North Dakota Tioga spill 19,000 gallons of brine saltwater chemical petroleum mix

20. 3/5/15 Galena Illinois near Dubuque Iowa a unit oil train, 103 tanker cars derailed and exploded along the Galena River. 1 mile evacuation

21. 3/7/15 Gogama, Ontario 94 car oil train had 35 CPC-1232 oil tanker cars derail, with 5 falling into the Makami River, explosion and fire.

22. 5/6/15 Heimdal, ND another train blew up with 6 tankers carrying 180,000 gallons of Bakken Crude exploding. Heimdal was evacuated. Four separate fire department were dispatched and two Hazmat teams. The EPA is monitoring air quality. It is the fifth explosion in 2015 to date. This one was using the updated tanker cars, CPC-1232.

23. 7/1/16 Maryville Tennessee just south of Knoxville, one CSX car derailed, broke an axle and punctured the tanker and sparked a huge fire, which burned for over a day. The car was carrying Acrylonitrile, used in making plastics.

24. When it burns it releases cyanide gas, which can be fatal. Evacuated a 2 mile radius, and 5,000 people. Ten cops were hospitalized due to exposure. 55 were hospitalized with 25 admitted to the hospital.

25. 11/7/15 Alma Wisconsin 25 cars derailed and fell into the river with 20,000 gallons of ethanol spilled into the Mississippi River, highways closed, residents evacuated

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Klein, Heather

From: Michael Kaufman <mvkaufman@gmail.com>
Sent: Monday, May 16, 2016 3:51 PM
To: Klein, Heather; OBOT
Cc: Office of the Mayor; McElhaney, Lynette; Campbell Washington, Annie; Kalb, Dan; Guillen, Abel; Gallo, Noel; Brooks, Desley; Reid, Larry; Kaplan, Rebecca; At Large
Subject: On The Health And/Or Safety Impacts Of Train Fossil Fuels - Tanker Car Spill List

Dear Ms Klein, Mayor and Council Members

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Klein, Heather

From: Leben, Danielle <dleben@nrdc.org>
Sent: Monday, May 09, 2016 2:54 PM
To: OBOT
Cc: Wyenn, Morgan
Subject: NRDC Comments on OBOT
Attachments: NRDC Comment Letter OBOT May 9, 2016.pdf

Ms. Klein,

Attached to this email, please find the Natural Resources Defense Council's (NRDC) comments on the Health and Safety Impacts of Handling and/or Export of Fuel Oils and Gasoline Products through the Oakland Bulk and Oversized Terminal. Please feel free to contact me with any questions.

Thank you,

DANIELLE LEBEN
Attorney

NATURAL RESOURCES
DEFENSE COUNCIL

1314 SECOND STREET
SANTA MONICA, CA 90401
T 310.434.2300
F 310.434.2399

DLEBEN@NRDC.ORG
NRDC.ORG

Please save paper.
Think before printing.

PRIVILEGE AND CONFIDENTIALITY NOTICE

This message is intended only for the use of the individual or entity to which it is addressed and may contain information that is privileged, confidential, and exempt from disclosure under applicable law. If you are not the intended recipient of this message, you are hereby notified that disseminating, distributing, or copying it or any attachment to it is strictly prohibited. If you have received this message in error, please notify me immediately by email and delete the original message.

May 9, 2016

Via Email

Heather Klein
Planner III
Office of the City Administrator
1 Frank H. Ogawa Plaza
Oakland, CA 94612
OBOT@oaklandnet.com
(510) 238-3659

Re: The Health and Safety Impacts of Transportation, Transloading, Handling and/or Export of Fuel Oils and Gasoline Products through the Oakland Bulk and Oversized Terminal

On behalf of the Natural Resources Defense Council (NRDC), I submit these comments to express our concerns about the public health and safety effects of fuel oils, gasoline products, and other hazardous fossil fuel materials proposed to be transported through the Oakland Bulk and Oversized Terminal (OBOT) at the Oakland Army Base. Handling and transporting these hazardous materials will likely result in fugitive coal dust, diesel particulate and other locomotive emissions, and greenhouse gas emissions, which will significantly impact the air quality and pollution levels in the region. These impacts should be accurately analyzed, mitigated, and adequately regulated before these materials can be handled at the OBOT.

In addition, this Project poses short- and long-term health and safety risks to local communities. Transporting fuel oils, gasoline products, and other hazardous materials to and from the OBOT will result in disproportionate air quality and health impacts to vulnerable communities of color that reside near the Terminal and train routes. Exposure to emissions from diesel fuels, high-sulfur diesel, and heating and fuel oils can result in a range of serious health risks including respiratory symptoms and disease, cancer, and even premature death. In order to protect the environment and the public's health, it is critical that hazardous materials such as diesel, coal, fuel oils and gasoline products are not transported through the OBOT.

Thank you for your attention to this matter.

Sincerely,

Danielle Leben
Attorney
Natural Resources Defense Council

Klein, Heather

From: Eve-Fisher, Saundra D.
Sent: Thursday, May 12, 2016 9:23 AM
To: Cappio, Claudia; Klein, Heather
Subject: FW: Written Testimony on the Inofrmational Public Hearing of Fuel Oils, Gasoline and Crude Oil in Oakland
Attachments: SC_CBE_WOEIP et al Oakland_Oil_Exports_Comment.pdf

Importance: High

FYI.....

From: City Clerk
Sent: Wednesday, May 11, 2016 5:25 PM
To: DL - Agenda Team
Subject: FW: Written Testimony on the Inofrmational Public Hearing of Fuel Oils, Gasoline and Crude Oil in Oakland

Did everyone receive this?

From: Roger Lin [mailto:roger@cbecal.org]
Sent: Monday, May 09, 2016 4:33 PM
To: City Clerk
Subject: Written Testimony on the Inofrmational Public Hearing of Fuel Oils, Gasoline and Crude Oil in Oakland

To the Mayor and Members of the City Council,

Please see the attached written testimony for tonight's public hearing. The testimony includes reference and incorporation of several attachments that I will hand deliver on a CD at tonight's hearing.

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RE: Informational Public Hearing on the Transport and Export of Fuel Oils, Gasoline and Crude Oil in Oakland

To the Oakland City Council:

The Sierra Club, Communities for a Better Environment ("CBE"), West Oakland Environmental Indicators Project, the Asian Pacific Environmental Network and San Francisco Baykeeper provide the following written testimony and evidence detailing the several significant environmental impacts that would result from the City of Oakland's ("City") approval of any project to transport, handle, and/or export fuel oils, gasoline and crude oil in and through the City of Oakland and at the Oakland Bulk and Oversized Terminal ("OBOT").

We applaud the City of Oakland for holding a hearing to assess the health and safety impacts associated with oil handling and transport, similar to the City's hearing on coal and petroleum coke, held on September 21, 2015. The developer of OBOT, California Capital Investment Group ("CCIG"), was not honest with the community about its intentions to build a coal terminal. We are similarly concerned that there may be undisclosed current or future plans to site a crude oil, gasoline or fuel oil handling facility at OBOT. Apart from OBOT, there are broader trends that are pushing oil companies to look for additional West Coast oil handling capacity, as described further below.

As a preliminary matter, we highlight the absence of sufficient information in documents concerning the OBOT project – the OBOT plans, the preliminary Basis of Design document, the lack of any sufficient CEQA analysis, in particular pertaining to liquid bulk or oil related products, the draft scope of work for the City's environmental review consultant (Environmental Science Associates, "ESA"), and the April 22, 2016 Agenda Report – which prevent us from commenting with specificity on proposed oil-related activities at the OBOT. Therefore, we offer the following evidence highlighting general concerns of the transport of crude oil by rail to the OBOT and the export or handling of fuel oils and gasoline from the OBOT, looking to other proposed projects in the Bay Area and West Coast to provide analogous impacts.

This comment is accompanied by the comments of two refinery experts, Greg Karras and Dr. Phyllis Fox, and a rail safety expert, Dr. Fred Millar. Together, the following summary illustrates that there are simply no mitigation measures that could adequately address crude oil and fuel oil transportation and handling at the OBOT in order to protect public and worker health and safety.

The Significant Environmental Impacts of the Transport of Crude Oil

The City has already taken a strong stand against the transport of fossil fuels. In particular, there has been a spurt of crude oil proposals in recent years, which have faced vigorous fenceline and rail-line community, public and worker opposition.

The approval of any activity implicating the transport of crude through the City and the OBOT is in direct contravention of the City's Resolution No. 85054 C.M.S. ("2014 Resolution") – the City's unanimous opposition to the transport of crude oil by rail through the City, passed on June 17, 2014. As the 2014 Resolution notes, "the last few years have seen a dramatic rise in [the] transport of crude by rail nationwide." In fact, between 2012 and 2015, at least *ten* oil infrastructure proposals that could increase Bay Area refinery emissions by enabling changes in oil feedstock quality – a shift to more polluting, hazardous and volatile bitumen derived "tar sands" oils and fracked oils – have been proposed throughout the Bay Area. Several of these projects involve the transport of crude oil by rail or ship, including the Kinder Morgan Terminal in Richmond, the WesPac proposal to transload oil in Pittsburg from trains and ships to pipelines serving multiple Bay Area refineries, an oil train unloading proposal at the Valero Benicia Refinery, and five interrelated proposals at the Phillips 66 San Francisco Refinery in Rodeo which relies upon oil train and wharf unloading proposals and a corresponding throughput expansion at its upstream facility in San Luis Obispo.

The San Luis Obispo project, one half of the above Phillips 66 San Francisco Refinery project and known as the Phillips 66 Santa Maria Rail Spur Extension Project, is opposed by over 24,000 members of the public, highlighting the several significant environmental impacts of the transport of crude oil.[1] The Valero Crude by Rail project is similarly opposed by a petition by 4,081 members of the public who have signed the petition and/or written to Benicia calling for denial of Valero's proposal.[2]

Similar to the City's own resolution, the cities of Berkeley, Emeryville, El Cerrito, Richmond and Davis have also enacted formal resolutions opposing the transport of crude oil. CBE, the Sierra Club, Earthjustice, the Center for Biological Diversity, ForestEthics/Stand, 350 Bay Area, 350 Marin, San Luis Obispo Coastkeeper, San Francisco Baykeeper, the Sunflower Alliance, the Asian Pacific Environmental Network, Idle No More SF Bay, the California Nurses Association, the Richmond Progressive

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[1] *See* Staff Report, Phillips 66 Santa Maria Rail Spur Extension Project, noting, "Extensive community input has been submitted to the County with regards to the Project. Out of the approximately 24,500 comment letters received on the project (including comments on the Draft Environmental Impact Report, Recirculated Draft Environmental Impact Report and throughout the process) approximately 150 of these have been in support of the Project" *available at* http://agenda.slocounty.ca.gov/agenda/sanluisobispo/5611/SXRlbSBEb2N1bWVudCAoUHVibGljKSA=/14/n/56220.doc

[2] *See* Petition – Stop Crude by Rail! *available at* http://beniciaindependent.com/wp-content/uploads/2016/04/Petition-FINAL-for-presentation-2016-04-03.pdf

Alliance and several other community, academic and labor groups have also opposed these several refinery expansion projects facilitating the transport of crude oil.

The expert comments on these proposed projects are attached on the accompanying CD and detail numerous significant environmental impacts. The expert comments include:

1. Comment Letter from the Attorney General to the City of Benicia regarding the Valero Benicia Crude by Rail Project.
2. Comments from the Natural Resources Defense Council, CBE, SAFER and other organizations regarding the Valero Benicia Crude by Rail Project, including expert reports from Dr. Phyllis Fox, Diane Bailey, Dr. Fred Millar, and the Goodman Group.
3. Comments from CBE and the Rodeo Citizens Association regarding the Phillips 66 Propane Recovery Project in Rodeo, including the expert reports of Dr. Phyllis Fox and Greg Karras.
4. Comments from CBE and the Center for Biological Diversity regarding the Tesoro Martinez Marine Oil Terminal Lease Project.
5. Comments from CBE, Sierra Club, ForestEthics and other organizations regarding the Phillips 66 Santa Maria Rail Spur Extension Project in San Luis Obispo County, including the expert reports of Dr. Phyllis Fox and Greg Karras.
6. Letter from the Refinery Action Collaborative to Benicia GNSC.
7. The report compiled by CBE and ForestEthics, "Crude Injustice on the Rails."
8. The report, "New Climate Threat: Will Oil Refineries Make California the Gas Station of the Pacific Rim?" prepared by Greg Karras.
9. The article, "Combustion emissions from refining lower quality oil: what is the global warming potential?" prepared by Greg Karras.
10. "Oil Refinery CO2 Performance Measurement," prepared for the Union of Concerned Scientists by Greg Karras.
11. IPCC, 2014: Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change.
12. Report of the Refinery Action Collaborative to the Governor's Task Force on Refinery Safety.

As this evidence documents, as the oil industry shifts to new and different oil feedstocks, transport by rail and/or ship is becoming one of the primary modes of crude oil transport. The attached evidence documents dwindling traditional supplies of crude oil. In response to that decreased supply, oil refiners have sought out unconventional crude oils, such as "tar sands" from Canada and fracked oils from Bakken shale in North Dakota. These oils lack direct pipeline access, which has driven the refiners to seek approval of a series of infrastructure projects that can transport these oils by rail and/or ship to refineries in California, or even for direct, unrefined export from the OBOT. The new and different oils also present new and different environmental impacts.

These impacts include the increased risk of catastrophic failure from train derailment and explosion. A significant example is the fatal oil train derailment in Lac Megantic, Quebec, where a train carrying fracked oils derailed, killing at least 42 people and devastated the downtown area, where all but three of the thirty nine remaining downtown buildings are to be demolished due to petroleum contamination. Similarly, a spill of "tar sands" oil, either from a rail car or into the Bay, would prove impossible to clean up. The Kalamazoo River tar sands oil spill occurred in July 2010, and despite the hundreds of millions of dollars spent so far, cleanup efforts have proven insufficient to restore the habitat. The transport of crude oil thus also presents significant and unavoidable impacts to agriculture and sensitive species and ecosystems and water resources such as the San Francisco Bay along the rail lines or located in the vicinity of the OBOT.[3]

Significant environmental impacts are also present at the site of oil refining. Approval of any activity to transport crude oils through the OBOT directly implicates several of these environmental impacts. Notably, "tar sands" are heavier than traditional California-sourced oils. As documented in a peer reviewed article estimating the combustion of emissions from refining denser, more contaminated "lower quality" crude oils based on data from U.S. refineries in actual operation, processing these heavier oils result in greater greenhouse gas ("GHG") emissions[4] and greater co-pollutant emissions, increasing rates of asthma and other respiratory illnesses.[5] Similarly, the toxic contaminants injected during the oil extraction process are subsequently released into the atmosphere during the oil refining process. This includes increased BTEX compounds, or benzene, toluene, ethylbenzene, and xylenes, which damage the central nervous system. The impacts of the refining of these new, more polluting, hazardous and overall different quality oils are exacerbated by the recent lifting of the oil export ban.[6] Any export through the OBOT will cause greater local toxic pollution.

The refining of these new and different oils also increases the risk of catastrophic failure at destination refineries. The US Chemical Safety Board determined that processing more contaminated and heavier crude oil was a root cause of the August 2012 Chevron Richmond Refinery Fire that nearly killed refinery workers and sent 15,000 local residents to nearby hospitals.[7] The City should not turn a blind eye to how approval of any such export activities at the OBOT would result in increased hazards for workers and the public.

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[3] *See* supra, fn. 1.

[4] Combustion emissions from refining lower quality oil: What is the global warming potential? Greg Karras, *Env. Sci. Technol.* 44(24): 9584–9589 (2010). This study was published by the American Chemical Society in the journal *Environmental Science & Technology* in 2010, and a follow up study that extended this work with a focus on California and Bay Area refineries, which was peer reviewed and published by the Union of Concerned Scientists in 2011.

[5] *See* Minding the Climate Gap, Executive Summary, Manuel Pastor, Ph.D., Rachel Morello-Frosch, Ph.D., MPH, James Sadd, Ph.D., Justin Scoggins, M.S. (2013) *available at* https://dornsife.usc.edu/assets/sites/242/docs/mindingthegap_executive_summary.pdf

[6] *See* Reuters, Oil companies rush to exploit end of U.S. crude export ban, *available at* http://www.reuters.com/article/us-enterprise-products-exports-idUSKBN0U61Q920151223

[7] *See* Interim Investigation Report, *available at* http://www.csb.gov/chevron-refinery-fire/

Furthermore, approval of any activity at the OBOT involving the transport of crude oil by rail presents a clear environmental justice issue. As noted in our prior comments to the City on potential OBOT activities, West Oakland already faces a significant and disproportionate level of pollution from industrial activities. From the report, "Crude Injustice on the Rails – Race and the Disparate Risk from Oil Trains in California,"

> In the first five months of 2015, five major oil train disasters resulted in spills and fires that burned for days, forcing evacuations, polluting waterways, and putting rail workers and emergency responders at risk. These incidents, in West Virginia, Illinois, North Dakota, and two in Ontario, were all in rural, relatively unpopulated areas. However, each of these trains passed through heavily populated areas before derailing and exploding. Each would have passed through many more cities and towns, and over critical water supplies, before reaching its final destination.
>
> Our railways are not designed to carry hazardous materials. Railways connect population centers and our cities grew around rail lines. Moving oil by train means that hazardous oil train routes now cross through eight of the state's ten largest cities and through the downtowns of many smaller cities and towns. Increased oil train traffic is a threat to all Californians but brings greatest risk to environmental justice communities that already live with elevated health and safety risk from industrial spills, fires and explosions, as well as, chronic, daily air and water pollution.[8]

The report details the percentage of people in the oil train "blast zone" that live in environmental justice communities in the ten largest California cities on oil train routes. The blast zone is the one-mile evacuation area that the US Department of Transportation recommends in the case of an oil train derailment, spill, and fire. <u>In Oakland, 91% of those that live inside the blast zone are people of color</u>. The California Office of Environmental Health Hazard Assessment estimates that, in Oakland, these same communities already face a total environmental health hazard that is in the highest among all communities statewide.[9]

On May 4, 2015, the US Department of Transportation released new regulations for trains hauling liquid hazardous materials, including crude oil. These rules include new tank standards, but also a long phase-out period (up to 10 years) for hazardous cars, inadequate speed limits, deficient tanker shells, and a lack of transparency that still leaves these communities and the public at risk of catastrophe. Similarly, several environmental groups have consistently voiced concern regarding California's inadequate Oil Spill Prevention and Response System, critiquing the outdated state system that fails to

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[8] Crude Injustice on the Rails, *available at* http://www.cbecal.org/wp-content/uploads/2015/07/Crude-Injustice-on-the-Rails.pdf
[9] *Id.* at 21.

provide the best available technology and an adequate response to any spill of oil, let alone heavier crude oil, into the Bay.[10]

Unintentional fuel oil spills on land and in water can have a multitude of effects. Liquid petroleum products are absorbed into the tissues of aquatic organisms and increase in concentration up the food web ("biomagnification"), while heavier oils, including many crude oils, smother plants and animals. Individual plants and animals are also killed by spills, which eventually leads to habitat loss and dramatic changes in ecosystems. Further, accidents by aquatic vessels can release several gallons of liquid fuel, which negatively affects aquatic organisms and local businesses, ultimately impacting their revenue for several years.[11] Under the state and new federal rules, first responders still lack access to critical information about that quantity, type and routes of hazardous fuels moving through communities and there are inadequate resources and infrastructure for responders to adequately respond to oil spill disasters. These rules allow unnecessary harm and fail to protect public health and the environment. They also fail to consider the disproportionate impacts on environmental justice communities.

Finally, as stated by the Attorney General in her April 14, 2016 letter to the City of Benicia regarding the Valero Crude by Rail project, it is well within a local municipality's authority to consider significant and unavoidable *rail-related* environmental impacts when exercising its local land use authority. In fact, for a city to "turn a blind eye to the most serious of [a Project's] environmental impacts, merely because they flow from federally-regulated rail operations, would be contrary to both state and federal law."[12]

<u>The Significant Environmental Impact of the Export of Fuel Oils and Gasoline</u>[13]

Assessment Report 5 of the Intergovernmental Panel on Climate Change ("IPCC") remarks that preventing a climate disaster requires a global switch from oil before the year 2050.[14] The five refineries in and around Contra Costa County present the second largest refining center in the United States. Although West Coast refiners are boosting production, West Coast demand for petroleum products has dropped steadily since 2007. In 2008, West Coast oil production exceeded demand, and this production excess grew further in 2010 as oil refiners made more fuel for export. As of 2014, the

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[10] *See e.g.*. California Needs a 21st Century Oil Spill Prevention and Response System, August 2013, *available at* http://eacmarin.org/wp-content/uploads/2013/08/Coalition-Ltr_-to-Laird_Bonham_-Re-21st-Century-Oil-Spill-Prevention-System-needed_Aug-1-2013.pdf

[11] Congressional Research Service, Oil Spills in U.S. Coastal Waters: Background and Governance, RL33705 (Jan. 11, 2012), *available at* https://www.fas.org/sgp/crs/misc/RL33705.pdf

[12] Letter from Kamala Harris to City of Benicia, April 14, 2016 incorporated by reference and included on the accompanying CD.

[13] Data from New Climate Threat: Will Oil Refineries Make California the Gas Station of the Pacific Rim? Greg Karras, January 2016, incorporated by reference and included on the accompanying CD.

[14] *See* IPCC AR 5; and Williams et al., 2011. DOI: 10.1126/science.1208365.

U.S. produced 8.7 million barrels of oil per day, and that figure could increase to over 12 million barrels of oil per day by 2025.[15]

Across the Pacific, 3.5 billion people live in 21 Asian, Latin American and Oceanic nations that imported 181% more oil products from the United States in 2014 when compared to imports in 2007. That demand is growing. Approval of any activity to export crude oil, fuel oils and/or gasoline from the OBOT will exacerbate this problem in two distinct respects. First, it perpetuates the environmental injustice that communities of color, living on the fenceline of these Bay Area refineries, already face, as local GHG and co-pollutants increase, and second, in the process of increasing GHG emissions and destroying our climate in direct contrast to recommendations from the IPCC.

Overall, we offer our strong opposition to the approval of any project to transport, handle, and/or export fuel oils, gasoline and crude oil in and through the City and at the OBOT. In addition to the aforementioned significant impacts, the increased transportation of hazardous fuels will negatively impact local business and puts the local economy at risk from increased rail traffic generally, emissions, and risk of spill, fire, explosion. Given the revitalized business areas of Oakland and the surrounding area, and in order to adequately protect worker and public health and safety, the City should avoid any such severe environmental impacts, risks or hazards and take the appropriate steps to reject any project to transport, handle, and/or export fuel oils, gasoline and crude oil in and through the City and at the OBOT.

Sincerely,

Margaret Gordon
On behalf of West Oakland Environmental Indicators Project

Vivian Huang
On behalf of the Asian Pacific Environmental Network

Roger Lin
On behalf of Communities for a Better Environment

George Torgun
On behalf of San Francisco Baykeeper

Jessica Yarnall Loarie
On behalf of Sierra Club

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[15] *See* U.S. Energy Information Administration, U.S. Crude Oil Production to 2025 – Updated Projection of Crude Types (May 28, 2015), *available at* https://www.eia.gov/analysis/petroleum/crudetypes/pdf/crudetypes.pdf

Klein, Heather

From: Jessica Yarnall Loarie <jessica.yarnall@sierraclub.org>
Sent: Monday, May 16, 2016 3:55 PM
To: City Clerk; OBOT; Klein, Heather
Subject: Additional Sierra Club Oil comments
Attachments: Club--5-16-16ments-signed.pdf; Emergency Response Guidebook.pdf; 2016.5.3 Draft revisions to definitions VMC 20.150.pdf; 2016.5.3 Draft revisions to Industrial uses VMC 20.440.030.pdf; 2016.5.3 Vancouver Staff Presentation to Planning Commission Work Session.pdf; 16_05_03_r0_crudeoil_pc_wrksp.ppt

Please see the attached.

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CHAPTER VMC 20.150 Definitions

20.150.040A Section – Meanings of Specific Words and Terms A through D

Abutting. Contiguous or adjoining with a common boundary line, except that where two or more lots adjoin only at a corner or corners, they shall not be considered as "abutting" unless the common property line between the two parcels measures 8 feet or more in a single direction. It shall include the terms *adjacent, adjoining* and *contiguous*.

Accept. To receive as complete and in compliance with all submittal requirements.

Access or Access Way. The place, means or the way by which pedestrians and vehicles shall have safe, adequate and usable ingress and egress to a property or use as required by this title.

Accessory Dwelling Unit (ADU). One or more rooms with private bath and kitchen facilities comprising an independent, self-contained dwelling unit within or attached to a single-family dwelling or in a detached building on the same lot as the primary dwelling unit. An ADU is distinguishable from a duplex in that, unlike a duplex, it is clearly subordinate to the primary dwelling unit, both in use and appearance.

Accessory Equipment Structure. An unstaffed structure that is subordinate and clearly incidental to the principal use or structure on the lot and may be used to house and protect the equipment necessary for processing wireless communications signals. Associated equipment may include air conditioning and emergency generators.

Accessory Structure. A building or structure, no larger than 800 square feet, which is clearly incidental to the primary structure on the same lot.

Accessory Use. A use of land or portion there of which is clearly incidental and subordinate to the principle use of the land located on the same lot or premises.

Acre. A measure of land area containing 43,560 square feet.

Actual Construction. The actual placing of building materials in their permanent position, fastened in a permanent manner, including any excavation.

Addition. Means the same as enlargement.

Adjacent. Abutting or located directly across a street right-of-way.

Adjoin. Means the same as abutting.

Adult Bookstore. Any premises from which minors are excluded and in which the retail sale of books, magazines, newspapers, movie films, devices, slides or other photographic or written reproductions distinguished or characterized by their emphasis on matter depicting, describing or relating to specified sexual activities or specified anatomical areas is conducted as a principal use of the premise; or as an adjunct to some other business activity, but which constitutes the primary or a major attraction to the premises.

Adult Entertainment Shows. Any premises from which minors are excluded and in which live entertainment is provided, or any device is provided in which the subject matter is distinguished

or characterized by the emphasis on matter depicting, describing or relating to specified sexual activities or displaying specified anatomical areas as the principal use of the premises or is shown as an adjunct to some other business activity which is conducted on the premises and constitutes a major attraction; and wherein fees of any kind are charged.

Adult Motion Picture Theater. Any establishment from which minors are excluded in which motion pictures, slides or similar photographic reproductions are shown depicting adult entertainment as the principal use of the premises, or are shown as an adjunct to some other business activity which is conducted on the premises and constitutes a major attraction; and wherein fees of any kind are charged; and wherein such movies are shown on a regular basis, and not to include a theater showing adult movies less than 5% of the total showing time of the theater.

Agent. Any person authorized in writing to act on behalf of the legal owner.

Agriculture, Existing and Ongoing. Those activities conducted on lands defined in RCW 84.34.020(2), and those activities involved in the production of crops or livestock, for example, the operation and maintenance of farm and stock ponds or drainage ditches; the operation and maintenance of ditches, irrigation systems (including irrigation laterals, canals, or irrigation drainage ditches); changes between agricultural activities; and normal maintenance, repair, or operation of existing serviceable structures, facilities, or improved areas. Activities that bring an area into agricultural use are not part of an ongoing operation. An operation ceases to be ongoing when the area on which it is conducted is converted to a nonagricultural use or has lain idle for more than five years, unless the idle land is registered in a federal or state soils conservation program, or unless the activity is maintenance of irrigation ditches, laterals, canals, or drainage ditches related to an existing and ongoing agricultural activity. Forest practices are not included in this definition.

Airport Approach Surface. The surface which is longitudinally centered on an airport's extended runway centerline, extending outward and upward from the end of the primary surface. An approach surface is applied to each end of the runway based upon the type of approach procedure permitted. Because landings under instrument flight rules, using the Portland International Airport Localizer Directional Aid, are an approved procedure at Pearson Field, the following approach surface dimensions have been applied:
Width of approach surface: 500' at inner end, 4,000' at outer end (inner end begins at end of primary surface)
Length of approach surface: 10,000 feet
Slope of approach surface: 34:1 (one foot vertically for every 34 feet horizontally)

Airport Conical Surface. The conical surface is an inclined plane beginning at the edge of the horizontal surface and extending outward at a 20:1 slope for a distance of 4,000 feet.

Airport Horizontal Surface. The horizontal plane 150 feet above the established airport elevation. The shape of the plane is determined by striking arcs from the end of each primary surface. The radius of each arch is connected by lines tangent to the arcs. For Pearson Field, the radius of these arcs is 5,000 feet for runways 08 and 26.

Airport Transitional Surface. The transitional surface is an inclined plane extending outward from the primary and approach surfaces at a 7:1 slope. From the primary surface and approach surface, the transitional surface slopes upward to the horizontal surface. The transitional surface extends outward from the approach surface a distance of 5,000 feet.

Aisle. The corridor by which vehicles enter into and depart from parking spaces.

Alley. A public right-of-way or private easement not over 30 feet wide which provides a secondary means of access to abutting lots, not intended by the city for general traffic circulation.

Alteration, Structural. Any change in a supporting member of a building, such as a bearing wall, column, beam or girder, floor or ceiling joist, roof rafts, roof diaphragms, foundations, piles, or retaining wall or similar components.

Altered. Structurally changed.

Alternative Mode. Refers to any means of commute transportation other than that in which the single-occupant vehicle is the dominant mode.

Alternative Work Schedules. Programs such as compressed work weeks that eliminate commuting trips for affected employees. For the purposes of this chapter, changing the time of when an affected employee begins his work shift shall not be considered an alternative work schedule if it only moves trips out of the peak period and does not eliminate trips.

Amateur or Ham Radio. Radio facilities operated for non-commercial purposes by individuals licensed by the FCC with an interest in construction and operation of radio equipment, usually as a hobby or avocation.

Amendment. A change in the wording, context or substance of this title or the comprehensive plan, or a change in the boundaries of a district upon the zoning district map or the boundaries of a designation on the comprehensive plan map.

Amenity. A natural or created feature that enhances the aesthetic and functional quality or makes more attractive or satisfying a particular property, place or area.

Americans with Disabilities Act (ADA). A 1990 federal law designed to bring disabled americans into the economic mainstream by providing them equal access to jobs, transportation, public facilities and services. The ADA contains requirements for most developments including accessible parking stalls, entrances and exits, pathways, and public facilities such as restrooms.

Anadromous. Fish that migrate up rivers and streams from the ocean to breed in fresh water.

Annexation. The incorporation of a land area into the City of Vancouver with a resulting change in the boundaries of the city.

Annual Average Day/Night Sound Level (Ldn). Calculated in decibels, the Ldn is the 24-hour logarithmic average sound level from midnight to midnight, obtained after adding 10 decibels to sound levels in the night from midnight to 7 a.m., and from 10 p.m. to midnight (0000 to 0700, and 2200 to 2400 hours), and then logarithmically average day-to-day over a 12-month period.

Antenna. A device used to transmit and/or receive radio or electromagnetic waves between land- and/or satellite-based structures; any device commonly consisting of poles, panels, rods, reflecting discs or similar device use for the transmission or reception of radio frequency signals, typically mounted on a supporting tower, pole, mast or building.

Apartment. A dwelling unit in a multiple-family building.

Apartment House. Means the same as Dwelling, Multiple-Family.

Appeal. A request for an impartial review of a land use decision or interpretation of land use-related codes rendered by Community and Economic Development, its employees or any review body of the City of Vancouver.

Applicable Pretreatment Standards. For any specified pollutant, city prohibitive standards, city specific pretreatment standards (local limits), State of Washington pretreatment standards, or EPA's Categorical Pretreatment Standards, whichever standard is most appropriate or most stringent.

Applicant. A person submitting an application for development.

Approach Surface. The surface which is longitudinally centered on an airport's extended runway centerline, extending outward and upward from the end of the primary surface at a slope of 20 feet horizontally for each foot vertically. In plan, the perimeter of the approach surface coincides with the perimeter of the approach zone.

Approach Zone. An area at the end of an airport's runway which is 250 feet wide and expands outward uniformly to a width of 1,250 feet at a horizontal distance of 5,000 feet. The centerline of the zone is a continuation of the centerline of the runway.

Approved Plan. A plan that has been granted final approval by the appropriate approval authority.

Archaeological Interest. Capable of providing scientific or humanistic understandings of past human behavior, cultural adaptation, and related topics through the application of scientific or scholarly techniques such as controlled observation, contextual measurement, controlled collection, analysis, interpretation, and explanation [WAC 25-48-020(12)].

Archaeological Object. An object that comprises the physical evidence of an indigenous and subsequent culture including material remains of past human life including monuments, symbols, tools, facilities, and technological by-products [WAC 25-48-020(8)].

Archaeological Resources. Any material remains of human life or activities that are of archaeological interest. This shall include all sites, objects, structures, artifacts, implements, and locations of prehistoric or archaeological interest, whether previously recorded or still unrecognized, including, but not limited to, those pertaining to prehistoric and historic American Indian or aboriginal burials, campsites, dwellings, and their habitation sites, including rock shelters and caves, their artifacts and implements of culture such as projectile points, arrowheads, skeletal remains, grave goods, basketry, pestles, mauls, and grinding stones, knives, scrapers, rock carvings and paintings, and other implements and artifacts of any material [WAC 25-48-020(10)]. This shall also include any material remains of human life or activities from historic periods which are located at least partially below the ground surface necessitating the use of archaeological methods for study or recovery.

Archaeological Resource Survey. A procedure by which an archaeologist makes a determination of the actual existence (presence or absence) of an archaeological site in a disturbance area, a preliminary assessment of the site's potential significance, and a

recommendation for further evaluation, avoidance, mitigation, or recovery of resources in compliance with the provisions of this chapter.

Archaeological Site. Land or water areas that show evidence of artifacts of human, plant or animal activity, usually dating from periods of which only vestiges remain.

Archaeological Site, Known, Recorded. An archaeological site that has been recorded with the Washington State Department of Archaeology and Historic Preservation (DAHP) or its successor.

Archaeological Site, Potentially Significant. An archaeological site which:

1. contains archaeological objects at a density of at least 100 per cubic meter per stratigraphic or cultural unit; or
2. includes at least one feature; or
3. includes at least one relatively uncommon archaeological object; or
4. contains skeletal remains; or
5. is otherwise considered potentially significant by the archaeologist.

Archaeologist, Professional. "Professional archaeologist" means a person with qualifications meeting the federal secretary of the interior's standards for a professional archaeologist. Archaeologists not meeting this standard may be conditionally employed by working under the supervision of a professional archaeologist for a period of four years provided the employee is pursuing qualifications necessary to meet the federal secretary of the interior's standards for a professional archaeologist. During this four-year period, the professional archaeologist is responsible for all findings. The four-year period is not subject to renewal. RCW 27.53.030(8).

Areas of Special Flood Hazards. Lands in the flood plain subject to a 1% or greater chance of flooding in any given year. Designations on Flood Insurance Rate Maps always include the letter A. Also referred to as "Frequently Flooded Areas."

Arterial. Any principal arterial, minor arterial, or collector arterial streets.

Assessed Value. The value at which property is appraised for tax purposes.

Attached Antenna. An antenna is that affixed to an existing structure other than a wireless communication support structure.

Attached Sidewalks. Those sidewalks abutting the back of a curb.

Automobile Wrecking. The dismantling or disassembling of motor vehicles, or the storage, sale, or dumping of dismantled, partially dismantled, obsolete, or wrecked vehicles or their parts. Three or more dismantled, obsolete or inoperable motor vehicles on one lot shall constitute a wrecking yard.

Average. The arithmetic mean.

Average Daily Attendance (ADA). Regarding School Impact Fees, the average number of students attending an elementary or secondary school and used for the design of the facility.

Awning. A hood or cover which projects from the wall of a building, of a type which may be retracted, folded or collapsed against the face of a supporting building.

Banner. An on-site sign such as those used to announce an open house or a grand opening, or to make a special announcement. Normally, it is constructed of fabric and is without a rigid frame.

Base Flood. The flood having a 1% chance of being equaled or exceeded in any given year. Also referred to as the "100-year flood." Designated on Flood Insurance Rate Maps by the letter A.

Base Flood Elevation. The elevation that the base flood is expected to reach. Also referred to as the "100-year flood elevation."

Basement. A portion of a building included between a floor, with its level 2 feet or more below the level from which the height of the building is measured, and the ceiling next above said floor. For the purposes of VMC 20.740.120, Frequently Flooded Areas, basement means any area of a building having its floor subgrade (below ground level) on all sides.

Base zone. The zoning designation applicable to a parcel of property irrespective of an Overlay District as reflected on the Vancouver Zoning Map.

Beach Nourishment. With respect to bank erosion hazard areas, beach nourishment is the placement of sand or soil to fill an eroding bank.

Berm. A mound of earth, typically linear in form and generally used as a buffer between uses or properties.

Best Management Practices. Systems of practices and management measures that:

1. control soil loss and reduce water quality degradation caused by nutrients, animal waste, toxics, and sediment; and

2. minimize adverse impacts to surface water and groundwater flow, circulation patterns, and to the chemical, physical, and biological characteristics of fish and wildlife habitat conservation areas, wetlands and buffers.

Bike Lane. Lanes on an improved street which are designated for use by cyclists and separated from vehicular traffic either by striping or small concrete barrier.

Bikeway. A pathway, paved and separated from streets and sidewalks, designed to be used by cyclists.

Binding Site Plan. A type of land division that segregates a portion of a legal lot created for the sale or lease of commercially- or industrially-zoned property; placement of manufactured homes or travel trailers on leased sites; and creation of condominiums pursuant to 58.17.040 RCW.

Bioengineering Techniques. Techniques that apply the principles of the biological, ecological, and soils sciences and structural engineering to build structures which, using live plant materials as a main structural component, stabilize the soil against erosion, sedimentation, and flooding. Also referred to as "soft armoring techniques."

Biomass Generation. A major utility facility that provides for the production or collection of organic materials such as wood and agricultural residues and municipal solid waste that are primarily organic materials and the conversion or use of that material for the production of heat,

electricity, or substitute fuels through several processes including, but not limited to, burning, pyrolysis, or anaerobic digestion.

Block. A group of lots, tracts or parcels within well defined and fixed boundaries.

Bog. A type of wetland where (1) organic (peat or muck) soil layers comprise at least 16 of the first 32 inches of the soil profile; or (2) there is more than 70% cover of mosses at ground level and more than 30% of the total shrub and herbaceous cover consists of species listed in Table 3 – Characteristic Bog Species in Washington State found in Hruby, 2004, Washington State Wetlands Rating System for Western Washington, Ecology publication #04-06-025, or as revised by Ecology. Many bogs have soils classified as peat or muck, are nutrient poor, have a low pH (acidic), and are fed largely by rainfall rather than streams or groundwater.

Boundary Adjustment. The minor alteration of the boundary between two lots or tracts which does not result in the creation of any additional lot(s); also known as boundary line adjustment.

Breezeway. A structure for the principal purpose of connecting the main building or buildings on a property with other main buildings or accessory buildings.

Buffer. An area that is contiguous to and protects a critical area and which is required for the continued maintenance, functioning, and/or structural stability of a critical area.

Building. Any structure having a roof and walls, used or built for the shelter or enclosure of persons, animals or property of any kind.

Building Envelope. That portion of a legal lot exclusive of the areas required for front, side, and rear yards and other required open spaces and which is available for siting and constructing a building or buildings.

Building Height. The vertical distance from the average grade to the average height of the roof peak of the building, except in a shoreline jurisdictional area, in which case the height shall be measured from average existing grade (prior to development) to the highest point of a structure (see also WAC 173.27.030). For exceptions subject to airport height limits located within the approach, transitional and horizontal surfaces refer to Airport definitions and Sections 20.570 and 20.630.050 VMC.

Building, Main. A building within which is conducted the principal use permitted on the lot, as provided in this title.

Building Permit. The permit required for new construction and additions pursuant to Title 17 of the Vancouver Municipal Code (VMC).

Bulk Crude Storage. Bulk crude storage and handling facility, means any structure, group of structures, equipment, or device that stores or transfers any naturally occurring liquid petroleum extracted from geological formations beneath the earth's surface which requires further refinement before consumer use, including: conventional crude oil, extra heavy oil, and oil sands/bitumen. The term does not include facilities that store and handle finished products derived from petroleum.

Business Complex. Any building containing more than one business, or any group of buildings in close proximity to one another sharing parking, ownership, and ingress or egress.

Caliper. The diameter of a tree trunk measured at 6 feet above the ground for up to and including 4 inches caliper size, and one foot above the ground for larger trees.

Canopy. A permanent roofed structure attached to and supported by the building.

Canopy, Auto Dealership Plan District. A structure, enclosure, or shelter constructed of fabric or pliable materials supported by any manner, except by air or the contents it protects, and open without sidewalls or drops on 75% or more of the perimeter, consistent with Vancouver Fire Code Title 16, Section 16.04.060 and the International Fire Code (IFC).

Capital Facilities Plan. The City of Vancouver Capital Facilities Plan element of the Comprehensive Plan adopted pursuant to Chapter 36.70A RCW and RCW 82.02.050, and as such plan is amended.

Caretaker Residence. A single unit providing a complete independent living space for one or more persons, including permanent facilities for living, sleeping, eating, cooking and sanitation (same as Dwelling).

Central Business District. This area is the section of Vancouver defined as the commercial business district bounded by 4th Plain Boulevard to the north, Columbia River to the south, I-5 to the east, and Lincoln Avenue to the west. This can apply to other areas as developed in the city, with similar zoning.

Certificate of Concurrency. A document issued by the transportation manager pursuant to Section 20.980.120 VMC indicating: the location or other description of the property on which a development is proposed; the type of development application for which the certificate of concurrency is issued; an identification of any affected transportation corridor and TMZ; the specific uses, densities, intensities, and any transportation system improvements, strategies, or other mitigation measures that were considered in the determination to issue the certificate, and which are authorized or required for development of the property; the amount of capacity within the affected transportation corridor or TMZ that is reserved for the development described in the certificate, and a statement that the reservation of capacity is non-transferable to other development(s); any conditions required pursuant to Section 20.980.120 VMC; and an effective date.

Change of Use. Any use that differs from the previous use as defined in Chapter 20.160, Use Classifications.

Citizens Band Radio. Two-way radio facilities operated for a short-range personal and business communications, without necessity of a federal license, pursuant to 47 CFR Part 95.

City. The City of Vancouver, Washington.

City Council or Council. The City Council of the City of Vancouver, Washington.

City Standards. Shall mean standard specifications, technical drawings, detail drawings and other information the city has adopted as minimum standards.

Clark County Cultural Resources Inventory. The comprehensive inventory of historic resources within the boundaries of Clark County including resources identified in the Clark

County cultural resources inventory and other inventories by local jurisdictions within Clark County.

Clearing. The destruction or removal of vegetation from a site by physical, mechanical, chemical or other means. This does not include landscape maintenance or pruning consistent with accepted horticultural practices, such as those recommended by the Washington State University Extension Service, which does not impair the health or survival of the trees or native vegetation.

Closed Record Approval Hearing. An administrative hearing to approve or deny a project permit that is on the record to the City Council following an open record predecision hearing as defined by WAC 197-11-775 before the planning commission or hearings examiner.

Co-location. The use of a single wireless communications support structure or the use of a site by more than one wireless communications provider.

Commercial Nursery, or Tree Farm. A licensed plant or tree nursery or farm in relation to those trees planted and growing on the premises of the licensee, which are planted and grown for sale through retail or wholesale channels in the ordinary course of the licensee's business.

Commission or Planning Commission. Means the Planning Commission of the City of Vancouver, Washington.

Compatible. The capability of being able to function in a consistent and harmonious manner with others and surroundings.

Compatible Design. A building and/or site design which blends with the surrounding area. This might include a pitched roof of a similar pitch to surrounding roofs, trim, shutters or other architectural window detail; horizontal siding and/or brick exterior; and similar unit size or scale.

Comprehensive Plan. A long-range plan intended to guide the growth and development of a community or region that typically includes inventory and analytic sections leading to recommendations for the community's future economic development, housing, recreation and open space, transportation, community facilities and land use, all related to the community's goals and objectives for these elements.

Concurrent. Means that the existing capacity of an affected transportation corridor or transportation management zone is sufficient to accommodate the projected transportation impacts of a proposed development; or that transportation system improvements, strategies, or other mitigation measures which will achieve or maintain an operating level at or above the applicable level of service for the affected transportation corridor or management zone: and are planned, reasonably funded, and scheduled for completion no later than six years after development approval as reflected in the most recent version of the Six-Year Street Plan; and will be available and complete no later than six years after development approval, as provided by a voluntary financial commitment (where appropriate) by the applicant that is in place at the time development is approved by the Development Review Authority.

Conditional Use. An activity specified by this title as a principal or an accessory use, permitted when authorized by the appropriate approval authority and subject to certain conditions.

Contiguous. Means the same as abutting.

Contributing. A property which dates to the historic period and retains sufficient physical integrity so as to convey its historic character.

Contributing Area. When referring to wetlands, the land and/or water area adjacent to a wetland that drains into that wetland.

Conversion Option Harvest. A timber harvest as established in Washington State Department of Natural Resources Forest Practices Regulations and Chapter 20.770 VMC, Tree Conservation, whereby a property owner is allowed to harvest a limited amount of timber from their property within the City of Vancouver, while still maintaining the rights to convert their property to a use inconsistent with growing timber.

Conveyance. A mechanism for transporting water or other liquids from one point to another, including pipes, ditches, and channels.

Co-tenant. A person who resides with the applicant for the deferral and who has an ownership interest in the residence.

Court. An open, uncovered, and unoccupied space within an allotted property line.

Court Height. A measurement from the floor level of the lowest story in the building in which there are windows from rooms served by the court, to the highest point of the enclosing walls of the court.

Critical Aquifer Recharge Areas. Areas with a critical recharging effect on aquifers used for potable water as defined by the Washington State Growth Management Act. Critical aquifer recharge areas are regulated under VMC 14.26.

Critical Areas. Critical areas include fish and wildlife habitat conservation areas, wetlands, frequently flooded areas, critical aquifer recharge areas, and geologic hazard areas as defined by the Washington State Growth Management Act. Critical aquifer recharge areas are regulated under VMC 14.26. The others are regulated under VMC 20.740.

Critical Facility. Facilities that serve vulnerable populations, house emergency services, meet the definition of a Class I or Class II Operation under VMC 14.26, or perform other functions that would pose significant safety issues in even a slight landslide, flooding, erosion, seismic, or other natural hazard event. Critical facilities include, but are not limited to: schools, nursing homes, hospitals, police, fire, and emergency response installations, installations which produce, use, or store hazardous materials.

Critical Root Zone. The area where the tree's roots are located. This root zone is generally the area surrounding a tree trunk at a distance equal to one foot for every inch of tree diameter at breast height (dbh). This area is described as the radius of a circle around the tree.

Crown. The area of a tree containing leaf- or needle-bearing branches.

Crown Cover. The area within the drip line or perimeter of the foliage of a tree.

Cul-de-Sac. The circular turnaround at the end of a dead-end street.

Cultural Resources. The historic or prehistoric or archeological sites and standing structures, cemeteries, burial grounds and funerary objects and distributions of cultural remains and artifacts.

Decibels (dB). The measure of noise loudness on a scale weighted to approximate human ability to perceive sound (A). Each decibel is a measure of the difference in energy of a sound compared to another sound which is used as a reference. The reference sound is barely audible to the human ear, and each interval of 10 decibels indicates sound energy ten times greater than before. The A-weighted scale generally places zero dB at the threshold of hearing and 135 dB at the threshold of pain.

Dedication. The limited grant by a property owner allowing the use of property by the public for specified purposes by means of a deed or transfer to the city.

Dedication, Fee In Lieu Of. Payments in cash as an alternative to dedication of land or construction of improvements.

Deed. A legal document conveying ownership of real property.

Demolish. To raze, destroy, dismantle, deface or in any other manner cause partial or total ruin of a structure or other improvement.

Density. A measurement of ratio comparing the number of dwelling units with land area in relationship to a specified amount of land, expressed as the number of residential dwelling units per acre of land or the amount of land area expressed in the square feet of land assignable to each dwelling unit in a residential development.

Density, Net. The development density derived by dividing the net buildable area of the subject property (gross area less the total aggregate area required by the city for public or private streets, schools or other public facilities, not including parks and public or private recreation facilities dedicated or created as an integral part of the development) by the applicable lot size or area per unit.

Density, Gross. The development density derived by dividing the gross area of the subject property by the applicable minimum lot size. Gross density is used to determine the maximum number of lots that may be achieved on a parcel being developed.

Department. The Development Review Services Department, Long Range Planning Department, Public Works Department, or any division, subdivision, or organizational unit of the city established by ordinance, rule or order.

Detached Sidewalks. A sidewalk separated from the back of curb by a uniform width planting strip.

Developer. Any person, firm or corporation undertaking the development of any parcel of land.

Development. Any humanmade change to improved or unimproved real estate including but not limited to: mining, dredging, filling, drilling, grading, paving, or excavation, storage of equipment or materials; any subdivision or short platting of land; the construction or re-construction of residential, commercial, industrial, public or any other building or building space, and the placement of all types of manufactured homes defined herein. Development also includes the change in use of a building or land if approval is required pursuant to the Vancouver

Municipal Code, Title 17 (Building Code). As related to the Tree Conservation Ordinance, development shall mean the division of a parcel of land into two or more parcels; the construction, reconstruction, conversion, structural alteration, relocation, or enlargement of any structure; any mining, excavation, landfill, clearing or land disturbance.

Development Application. Any application (including supporting materials) for approval of a development to which the provisions of Title 20 VMC apply.

Development Review Authority. The planning official, the City Hearings Examiner, the Planning Commission, or City Council, each having authority to approve a development application pursuant to Title 20 VMC.

Diameter at Breast Height (DBH). A tree's diameter in inches at 4 ½ feet above the ground. On multi-stemmed or -trunk trees, the diameter shall be the diameter equivalent to the sum of trunk areas measured at 4 ½ foot above the ground.

Direct-to-Home Satellite Service. The distribution or broadcasting of programming or services by satellite directly to the subscriber's premises without use of ground-receiving or distribution equipment, except at the subscriber's premises or in the uplink process to the satellite.

Disturbance Area. Regarding archaeological resource protection, the geographical area in which archaeological resources could potentially be adversely impacted by a proposed ground-disturbing action or activity. It includes equipment or material staging areas; utility installation areas; temporary roads or haul routes; or other areas outside of the proposed building footprint(s) that could be disturbed during construction. The disturbance area shall not be smaller, and will generally be larger than the area of the property proposed for development. In no case shall the disturbance area be smaller than one acre or the area of the parcel(s) upon which the property proposed for development is located, whichever is less.

Dog Day Care. A facility where dogs may be groomed, trained, exercised, and socialized, but not kept or bred, sold, or let for hire.

Domestic Animal. Any animal other than livestock that lives and breeds in a tame condition including, but not limited to: dogs, cats, small birds and other animals kept as pets.

Doorway Identification Nameplates. A non-electric sign that is limited to the name, address, and number of the building, institution or person and is limited to the activity carried on in the building or institution or to the occupancy of the person.

Downed Woody Vegetation. Shrubs, trees, or their branches that have fallen and are on the ground or in, across, or dangling above streams, rivers, lakes, or ponds; also known as *large woody debris*.

Drive-Through Facility. A facility or structure that is designed and intended to allow drivers to remain in their vehicles before and during participation in an activity on the site.

Driveway. A private way providing ingress and egress from one or two lot parcels or tracts to a public or private street.

Dwelling. A single unit providing a complete independent living space for one or more persons, including permanent facilities for living, sleeping, eating, cooking and sanitation.

Dwelling, Efficiency Living Unit. Any room having cooking facilities, and used for combination living, dining, and sleeping purposes for not more than two persons, and designed as a separate apartment, not merely rooming accommodations. Each efficiency living unit shall be provided with a separate bathroom meeting the requirements of the Building Code.

Dwelling, Houseboat Moorage. A facility that provides moorings for houseboats.

Dwelling, Multiple-Family. A building or portion thereof designed or used as a residence by three or more households and containing three or more dwelling units.

Dwelling, Single-Family. A building designed or used for residence purposes by not more than one household and containing one dwelling unit only. Such dwelling units may be either detached (i.e., free-standing) or attached (i.e., sharing) common walls with other such units.

Dwelling, Single-Room Occupancy Housing (SRO). A building wherein furnished rooms without cooking facilities are rented for compensation to three or more non-transient persons not included in the family unit of the owner or tenant of the premises.

Dwelling, Two-Family, or Duplex. A building designed or used for residence purposes by not more than two households and containing two dwelling units.

DRAFT

Industrial
20.440.030, USES

A. Types of uses. For the purposes of this chapter, there are four kinds of use:

1. A permitted (P) use is one that is permitted outright, subject to all of the applicable provisions of this title.

2. A limited (L) use is permitted outright providing it is in compliance with special requirements, exceptions or restrictions.

3. A conditional use (C) is a discretionary use reviewed through the process set forth in Chapters 20.245 VMC and 20.210 VMC, governing Conditional Uses and Decision-Making Procedures, respectively.

4. A prohibited use (X) is one that is not permitted in a zoning district under any circumstances.

5. Uses may also be subject to restrictions and standards set forth in the Water Resource Protection Ordinance (Title 14).

B. Use table. A list of permitted, limited, conditional, and prohibited uses in the industrial zoning districts is shown in Table 20.440.030–1.

Table 20.440.030–1
Industrial Zoning Districts Use Table

USE	OCI[20]	IL[1]	IH	ECX[27]
RESIDENTIAL				
Household Living	L[2]	L[2]	L[2]	L[28]
Group Living	P[21]/X	X	X	P[21]/X
Transitional Housing	P[21]/X	X	X	P[21]/X
Home Occupation	L[3]	L[3]	L[3]	L[3]
HOUSING TYPES				
Single Dwelling, Attached	L[2]	X	X	L[28]
Single Dwelling, Detached	X	X	X	X
Accessory Dwelling Units	X	X	X	X
Duplexes	L[2]	X	X	L[28]
Multi-Dwelling Units	L[2]	L[2]	X	L[28]
Existing Manufactured Home Developments	X	X	X	X

USE	OCI[20]	IL[1]	IH	ECX[27]
Designated Manufactured	X	X	X	X
New Manufactured Homes	X	X	X	X
CIVIC (Institutional)				
Basic Utilities	P	P	P	P
Colleges	X	X	X	C
Community Recreation	L[24]	P	X	L[24]
Cultural Institutions	X	P	X	P
Day Care				
- Child Care Center	L[4]	L[4]	X	L[4]
- Adult Day Care	P	P	X	P
Emergency Services	P	P	P	P
Human Service Facilities	L[25]	L[25]	L[25]	L[25]
Medical Centers	C	X	X	P
Parks/Open Space				
- Neighborhood Parks	P	C	C	P
- Community Parks	C	C	C	C
- Regional Parks	C	C	C	C
- Trails	C	C	C	P
Postal Service	X	P	P	X
Religious Institutions	X	X	X	X
Schools	X	X	X	X
Social/Fraternal Clubs	X	X	X	X
Transportation Facility	P/X[26]	P	P	P/X[26]
Park & Ride Facilities				
Surface	X	L[1]	L[31]	X
Structure	L[31]	L[31]	L[31]	L[31]
COMMERCIAL				
Commercial Lodging	X	X	X	P
Eating/Drinking Establishments	L	L[5]	L[5]	L[6]
Entertainment-Oriented				
- Adult Entertainment	X	L[7]	L[7]	X
- Indoor Entertainment	X	X	X	X

USE	OCI[20]	IL[1]	IH	ECX[27]
- Major Event Entertainment	X	X	X	X
Artisan Small Scale Manufacturing	X	X	X	P
General Retail				
- Sales-Oriented	L	L[6]	L/C[6]	L[6]
- Personal Services	L	L[6]	X	L[6]
- Repair-Oriented	L	L[6]	X	L[6]
- Bulk Sales	X	X	X	X
- Outdoor Sales	X	X	P	X
Motor Vehicle Related				
- Motor Vehicle Sales/Rental	X	X	X	X
- Motor Vehicle Servicing/Repair	X	L[8]	L[8]	X
- Vehicle Fuel Sales	X	X	L[8]	L[8, 29]
- EV Basic Charging Stations (accessory and stand-alone)	P	P	P	P
- EV Rapid Charging Stations (accessory and stand-alone)	P	P	P	P
- EV Battery Exchange Stations	P	P	X	P
Office				
- General	P	P	L/C[9]	P
- Medical	P	P	X	P
- Extended	P	P	X	P
Marina (See also VMC 20.760)	X	C	X	X
Non-Accessory Parking	C[10]	L[10]/X	X	L[30]
Self-Service Storage	P	P	X	X
INDUSTRIAL				
Industrial Services	P	P	P	P
Manufacturing and Production	P	P[11]	P[11]	P
Railroad Yards	X	X	P	X
Bulk Crude Oil storage and handling facilities	X[35]	X[35]	X[35]	X[35]

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USE	OCI[20]	IL[1]	IH	ECX[27]
Oil and petroleum Refineries	X	X	X	X
Research and Development	P	P	C	P
Warehouse/Freight Movement	X	L[12]	P	X
Waste-Related	X	X	P[22]/X	X
Wholesale Sales	P	L[12]	X	X
Major Utility Facilities	X	X/P[32]	L[33]	X
OTHER				
Agriculture/Horticulture	X	P	P	X
Airport/Airpark	X	L19	P	X
Animal Kennel/Shelters	X	L[17]	L[17]	X
Cemeteries	X	X	C	X
Detention & Post Detention Facilities	X	C/X[13]	C[14]	X
Dog Day Care	L[15]	L[15]	L[15]	L[15]
Heliports	C	C	C	C
Medical Marijuana Collective Gardens	X	L[34]	L[34]	X
Recreational Marijuana Retail	X	X	X	X
Recreational Marijuana Growing or Processing	X	L[34]	L[34]	X
Mining	C[18]	C[18]	C[18]	C[18]
Rail Lines/Utility Corridors	P/X[23]	P	P	P/X[23]
Wireless Communication Facilities	L[16]	L[16]	L[16]	L[16]

[1] Due to the unique character and combination of uses in the Columbia Business Center area, uses existing prior to March 11, 2004, on parcels zoned IL in the Columbia Business Center may be altered, expanded or replaced regardless of use limitations in Table 20.440.030–1.

[2] In the OCI zone, multi-family housing allowed above ground floor only. In all industrial zones, one caretaker residence permitted per use.

[3] Subject to the conditions in chapter 20.860 VMC Home Occupations.

[4] Child care centers allowed as a Limited (L) use, subject to a Type II procedure. Child care centers are permitted in order to provide service for those employees working in the IL district, subject to provisions in Chapter 20.840 VMC Child Care Centers.

[5] If within an industrial building, these uses shall consume no more than 10% of the building's total gross square footage. If freestanding, they shall be considered together with the rest of the project and shall consume no more than 10% of the site's total gross square footage.

[6] These limited uses, separately or in combination, may not exceed 20% of the entire building square footage within a development complex. No retail uses shall exceed 40,000 gross square feet (gsf) per building or business; retail uses greater than 40,000 gsf but less than 60,000 gsf require conditional use review.

[7] Subject to provisions in Section 20.820 VMC Adult Entertainment.

[8] Subject to provisions in Section 20.895.070 Motor Vehicle Fuel Sales and Repair.

[9] Offices not accessory to a permitted use may not exceed 40,000 gsf; offices greater than 40,000 gsf but less than 60,000 gsf require conditional use review.

[10] In the OCI zone, non-accessory surface parking is conditionally permitted on brownfields where subsurface environmental constraints effectively preclude other uses, provided such development complies with applicable local, state and federal environmental standards. In the IL zone, non-accessory surface parking is permitted, and non-accessory structured parking is prohibited.

[11] Subject to NAICS Table 20.440-2.

[12] Permitted as limited use provided all activities, except outdoor storage of materials, are wholly contained within building(s).

[13] Secure Community Transition Facilities as per 20.150 are prohibited.

[14] In addition to other detention and post-detention facilities, Secure Community Transition Facilities are allowed by conditional use permit, subject to criteria set forth in 20.855.020(B)(6)(a).

[15] Subject to provisions in Chapter 20.850 VMC Dog Day Care.

[16] Subject to requirements in Chapter 20.890 VMC Wireless Telecommunications Facilities.

[17] Subject to provisions in Section 20.895.020 Kennels/Shelters.

[18] Surface mining is only allowed by conditional use on sites of 20 acres or larger which are adjacent to existing mining operations. Reclamation activity for existing mining operations approved by the Washington State Department of Natural Resources is a permitted use in any non-residential zoning district.

[19] Allow airport/airpark related activities such as hangars, air cargo, and warehousing, pilot schools, aircraft sales and repairs, aviation clubs, and museum in the Light Industrial District (IL). New airports/airparks are prohibited.

[20] All uses locating the OCI zone shall comply with the special use limitations of 20.440.040© VMC and 20.440.050(A) VMC. Development agreements in existence on the effective date

of this ordinance shall control the uses and development standards of the affected properties. In order to protect the investments made in reliance upon such agreements, improvements made or site plans approved consistence with these agreements shall not be deemed nonconforming.

[21] Existing legally established group living and transitional housing uses are permitted. New group living and transitional housing uses are prohibited.

[22] 10-day hazardous waste handling and transfer facilities, excluding facilities handling radioactive or high explosive materials, are allowed, provided such facilities: a) do not repackage waste (except as necessary to address damaged or improper packaging); b) are located at least 200' from any residential zoning district; and c) do not store hazardous wastes (except for "universal wastes," as that term is defined in Code of Federal Regulations, Title 40, Part 273) for more than ten days.

[23] Prohibited within 200' of a residential zone.

[24] Subject to provisions of Chapter 20.895.040 VMC Community Recreation and Related Facilities.

[25] Subject to provisions of Chapter 20.870 VMC Human Service Facilities.

[26] Transportation facilities are permitted except for large or land-intensive facilities such as water taxi and ferry stations.

[27] All uses locating in the ECX zone shall comply with VMC 20.690, Section 30 Employment Center Plan District. Development agreements in existence on the effective date of this ordinance shall control the uses and development standards of the affected properties, unless property owners choose differently as provided under VMC 20.690.030. In order to protect the investments made in reliance upon such agreements, improvements made or site plans approved consistent with these agreements shall not be deemed nonconforming.

[28] In the ECX zone, multi-family housing is allowed above ground floor only; and one caretaker residence permitted per use.

[29] Vehicle fuel sales is limited to one operation within the Section 30 Plan District

[30] Non- accessory structural parking only is permitted.

[31] See Section 20.430.040.E. Park & Ride Facilities Development Standards.

[32] Major Utility Facilities are prohibited with the exception that sewer treatment plants and lagoons are allowed outright.

[33] Biomass and coal energy generating plants are prohibited on Heavy Industrial zoned properties within the Vancouver City Center Subarea and Hough Neighborhood Association boundaries located west of Lincoln Street and east of the Burlington Northern Santa Fe Railroad tracks.

[34] Medical marijuana collective gardens are subject to location and special standards of Chapter 20.883, Medical Marijuana Collective Gardens. Recreational marijuana growing

and processing facilities shall be licensed by the Washington State Liquor Control Board, and shall be subject to VMC 20.883.060 Medical Marijuana Collective Gardens Special Standards, subsections A, B, C, and D. In the event of conflict or overlap with WAC 314.55 or other standards pursuant to state licensing, the more restrictive standards shall apply.

[35] **Existing bulk crude oil storage facilities including vested projects as of (ordinance date) are prohibited to expand the amount of crude oil storage.**

Table 20.440.030–2
North American Industrial Classification System (NAICS) for Industrial Zoning Uses

The following list of uses is based on the North American Industrial Classification System (NAICS). NAICS is organized in a hierarchical structure much like the existing SIC (Standard Industrial Classification). NAICS industries are identified by a 6-digit code, in contrast to the 4-digit SIC code. The longer code accommodates the larger number of sectors and allows more flexibility in designating subsectors. The use of NAICS codes for permitted uses refers only to the use of a particular site, rather than the type of industry involved. For example, office uses for manufacturing firms are treated as offices and are not permitted in the industrial zones.

— The first two digits designate a major economic sector (formerly division) such as agriculture or manufacturing.
— The third digit designates an economic subsector (formerly major group) such as crop production or apparel manufacturing.
— The fourth digit designates an industry group, such as grain and oil seed farming or fiber, yarn and thread mills.
— The fifth digit designates the NAICS industry such as wheat farming or broadwoven fabric mills. Retail uses are marked with a "1" in the table below. Please see the footnotes at the end of the table for an explanation of permitted development.

* Industrial uses may be further regulated by the Water Resource Protection Ordinance (Title 14).
* For Artisan and Specialty Goods Manufacturing Uses refer to Section 20.160.020C-10.

Manufacturing Uses			IL[2]	IH
311	**Food Manufacturing**			
	3111	Animal food manufacturing	P	P
	3112	Grain and oilseed milling	X	P
	3113	Sugar and confectionery product manufacturing	P	P
	3114	Fruit and vegetable preserving and specialty food manufacturing	P	P
	3115	Dairy product manufacturing	P	P

Manufacturing Uses			IL[2]	IH
	3116	Animal slaughtering and processing	X	P
	31161	Animal slaughtering and processing	X	P
	3117	Seafood product preparation and packaging	P	P
	3118	Bakeries and tortilla manufacturing	P	P
	3119	Other food manufacturing	P	P
312	**Beverage and Tobacco Product Manufacturing**			
	3121	Beverage manufacturing	P	P
	31211	Soft drink and ice manufacturing	P	P
	312111	Soft drink manufacturing	P	P
	312112	Bottled water manufacturing	P	P
	312113	Ice manufacturing	P	P
	31212	Breweries	C	P
	31213	Wineries	P	P
	31214	Distilleries	C	P
	3122	Tobacco manufacturing	P	P
313	**Textile Mills**			
	3131	Fiber, yarn, and thread mills	P	P
	3132	Fabric mills	P	P
	3133	Textile and fabric finishing and fabric coating mills	P	P
314	**Textile Product Mills**			
	3141	Textile furnishings mills	P	P
	3149	Other textile product mills	P	P
315	**Apparel Manufacturing**			
	3151	Apparel knitting mills	P	P
	3152	Cut and sew apparel manufacturing	P	P
	3159	Apparel accessories and other apparel manufacturing	P	P
316	**Leather and Allied Product Manufacturing**			
	3161	Leather and hide tanning and finishing	X	P
	3162	Footwear manufacturing	P	P

DRAFT

Manufacturing Uses			IL[2]	IH
	31621	Footwear manufacturing	P	P
	3169	Other leather and allied product manufacturing	P	P
321	**Wood Product Manufacturing**			
	3211	Sawmills and wood preservation	X	P
	3212	Veneer, plywood, and engineered wood product manufacturing	X	P
	3219	Other wood product manufacturing	P	P
322	**Paper Manufacturing**			
	3221	Pulp, paper, and paperboard mills	X	P
	3222	Converted paper product manufacturing	P	P
323	**Printing and Related Support Activities**			
	3231	Printing and related support activities	P	P
324	**Petroleum and Coal Products Manufacturing**			
	3241	Petroleum and coal products manufacturing	X	P
	324110	Oil and Petroleum Refineries	X	X
325	**Chemical Manufacturing**			
	3251	Basic chemical manufacturing	X	P
	3252	Resin, synthetic rubber, and artificial and synthetic fibers and filaments manufacturing	X	P
	3253	Pesticide, fertilizer, and other agricultural chemical manufacturing	X	C
	3254	Pharmaceutical and medicine manufacturing	P	P
	3255	Paint, coating, and adhesive manufacturing	X	P
	3256	Soap, cleaning compound, and toilet preparation manufacturing	P	P
	3259	Other chemical product and preparation manufacturing	X	P
	32591	Printing ink manufacturing	X	P
	32592	Explosives manufacturing	X	P
	32599	All other chemical product and preparation manufacturing	X	P
	325991	Custom compounding of purchased resins	P	P
	325992	Photographic film, paper, plate, and chemical manufacturing	X	P
	325998	All other miscellaneous chemical product and preparation	X	P

Manufacturing Uses			IL[2]	IH
		manufacturing		
326	**Plastics and Rubber Products Manufacturing**			
	3261	Plastics product manufacturing	X	P
	32611	Unsupported plastics film, sheet, and bag manufacturing	X	P
	32612	Plastics pipe, pipe fitting, and unsupported profile shape manufacturing	X	P
	32613	Laminated plastics plate, sheet, and shape manufacturing	X	P
	32614	Polystyrene foam product manufacturing	X	P
	32615	Urethane and other foam product (except polystyrene) manufacturing	X	P
	32616	Plastics bottle manufacturing	X	P
	32619	Other plastics product manufacturing	X	P
	3262	Rubber product manufacturing	X	P
	32621	Tire manufacturing	X	P
	326211	Tire manufacturing (except retreading)	X	P
	326212	Tire retreading	X	P
	32622	Rubber and plastics hoses and belting manufacturing	P	P
	32629	Other rubber product manufacturing	P	P
	326291	Rubber product manufacturing for mechanical use	C	P
	326299	All other rubber product manufacturing	P	P
327	**Nonmetallic Mineral Product Manufacturing**			
	3271	Clay product and refractory manufacturing	P	P
	3272	Glass and glass product manufacturing	P	P
	3273	Cement and concrete product manufacturing	X	P
	3274	Lime and gypsum product manufacturing	X	P
	3279	Other nonmetallic mineral product manufacturing	X	P
331	**Primary Metal Manufacturing**			
	3311	Iron and steel mills and ferroalloy manufacturing	X	P
	3312	Steel product manufacturing from purchased steel	X	P
	3313	Alumina and aluminum production and processing	X	P

Manufacturing Uses			IL[2]	IH
	3314	Nonferrous metal (except aluminum) production and processing	X	P
	3315	Foundries	X	P
332	**Fabricated Metal Product Manufacturing**			
	3321	Forging and stamping	P	P
	3322	Cutlery and hand tool manufacturing	P	P
	3323	Architectural and structural metals manufacturing	P	P
	3324	Boiler, tank, and shipping container manufacturing	P	P
	3325	Hardware manufacturing	P	P
	3326	Spring and wire product manufacturing	P	P
	3327	Machine shops; turned product; and screw, nut, and bolt manufacturing	P	P
	3328	Coating, engraving, heat treating, and allied activities	P	P
	33281	Coating, engraving, heat treating, and allied activities	P/X[1]	P/X[1]
	3329	Other fabricated metal product manufacturing	P	P
	33291	Metal valve manufacturing	P	P
	33299	All other fabricated metal product manufacturing	P	P
	332991	Ball and roller bearing manufacturing	P	P
	332992	Small arms ammunition manufacturing	X	P
	332993	Ammunition (except small arms) manufacturing	X	P
	332994	Small arms manufacturing	X	P
	332995	Other ordnance and accessories manufacturing	X	P
	332996	Fabricated pipe and pipe fitting manufacturing	P	P
	332997	Industrial pattern manufacturing	P	P
	332998	Enameled iron and metal sanitary ware manufacturing	P	P
	332999	All other miscellaneous fabricated metal product manufacturing	P	P
333	**Machinery Manufacturing**			
	3331	Agriculture, construction, and mining machinery manufacturing	P	P
	3332	Industrial machinery manufacturing	P	P
	3333	Commercial and service industry machinery manufacturing	P	P

Manufacturing Uses			IL[2]	IH
	3334	Ventilation, heating, air-conditioning, and commercial refrigeration equipment manufacturing	P	P
	3335	Metalworking machinery manufacturing	P	P
	3336	Engine, turbine, and power transmission equipment manufacturing	P	P
	3339	Other general purpose machinery manufacturing	P	P
334	**Computer and Electronic Product Manufacturing**			
	3341	Computer and peripheral equipment manufacturing	P	P
	3342	Communications equipment manufacturing	P	P
	3343	Audio and video equipment manufacturing	P	P
	3344	Semiconductor and other electronic component manufacturing	P	P
	3345	Navigational, measuring, electromedical, and control instruments manufacturing	P	P
	3346	Manufacturing and reproducing magnetic and optical media	P	P
335	**Electrical Equipment, Appliance, and Component Manufacturing**			
	3351	Electric lighting equipment manufacturing	P	P
	3352	Household appliance manufacturing	P	P
	3353	Electrical equipment manufacturing	P	P
	3359	Other electrical equipment and component manufacturing	P	P
336	**Transportation Equipment Manufacturing**			
	3361	Motor vehicle manufacturing	X	P
	3362	Motor vehicle body and trailer manufacturing	X	P
	3363	Motor vehicle parts manufacturing	P	P
	3364	Aerospace product and parts manufacturing	X	P
	3365	Railroad rolling stock manufacturing	X	P
	3366	Ship and boat building	X	P
	33661	Ship and boat building	X	P
	336611	Ship building and repairing	X	P
	336612	Boat building	P	P
	3369	Other transportation equipment manufacturing	X	P

Manufacturing Uses			IL[2]	IH
	33699	Other transportation equipment manufacturing	X	P
	336991	Motorcycle, bicycle, and parts manufacturing	P	P
	336992	Military armored vehicle, tank, and tank component manufacturing	X	P
	336999	All other transportation equipment manufacturing	X	P
337	**Furniture and Related Product Manufacturing**			
	3371	Household and institutional furniture and kitchen cabinet manufacturing	P	P
	3372	Office furniture (including fixtures) manufacturing	P	P
	3379	Other furniture related product manufacturing	P	P
339	**Miscellaneous Manufacturing**			
	3391	Medical equipment and supplies manufacturing	P	P
	3399	Other miscellaneous manufacturing	P	P
42	**Wholesale Trade**		P	P
444	**Building Material and Garden Equipment and Supplies Dealers**			
	44411	Home Centers	P	X
	44419	Other building materials dealers (with sales of bulk construction materials to contractors)	P	X
	5324	Commercial and Industrial machinery and equipment rental and leasing (except 53242 - Office machinery and equipment)	P	P
611	**Educational Services**			
	6111	Elementary and secondary schools (and IH)	C	X
	6112	Junior colleges (and IH)	C	X
	6113	Colleges, universities, and professional schools (and IH)	C	X
	6114	Business schools and computer and management training	C	X
811	**Repair and Maintenance**			
	8112	Electronic and precision equipment repair and maintenance	P	P
	8114	Personal and household goods repair and maintenance	P	P
812	**Personal and Laundry Services**			

Manufacturing Uses			IL[2]	IH
	81232	Dry cleaning and laundry services (except coin-operated)	P	P
	Miscellaneous			
		Offsite hazardous waste treatment and storage facilities (subject to state siting criteria)	P	X
		Branch Banks	P	P

[1] Electroplating and related uses not permitted.

[2] Due to the unique character and combination of uses in the Columbia Business Center area, uses existing prior to March 11, 2004, on parcels zoned IL in the Columbia Business Center may be altered, expanded or replaced regardless of use limitations in Table 20.440.030-2.

DRAFT

Crude Oil Moratorium

CITY OF
Vancouver
WASHINGTON

May 3, 2016

Vancouver City Council Workshop

Sandra Towne, Planning Manager
Brent Boger, Assistant City Attorney

Presentation Overview

What we plan to accomplish today:

- Provide brief background
- Provide staff recommendation on how to address the crude oil facilities moratorium
- Provide recommended next steps and schedule

Prior Council Review

- September 2014 – Ordinance M4090

Established a moratorium on applications for permits for the establishment or expansion of all crude petroleum facilities that accept crude oil except those vested or contingently vested.

- March 2015 – Ordinance M4118 moratorium extension
- August 2015 – Ordinance M-4132 moratorium extension
- February 2015 – Ordinance M-4157 moratorium extension (Expires 8/17/16)

Why the Moratorium

- Establishment of additional crude oil facilities will increase the transportation of Bakken crude oil and will result in an increase in the transportation of that commodity through the city
- Human error, acts of nature, and unforeseen disasters are beyond the control of measures proposed for the transportation of Bakken crude oil and could have devastating effects on the entire community
- The Association of American Railroads reported that the volume of crude oil shipped by rail increased from 9,500 carloads in 2008 to 400,000 car loads in 2013 and the volume transported by rail through Vancouver is expected to increase in the future.

Why the Moratorium

- The City has a paramount interest in the health, safety, and welfare of its citizens, and the City Council believes that the development of additional and expanded crude petroleum facilities is contrary to the health, safety, and welfare of its citizens and business community.

Staff Research

Two Washington Cities limit fossil fuel refining and storage

- City of Bellingham – prohibits petroleum refining and storage
  - The operation and manufacturing, compounding, processing, refining, treatment and assembly of significant quantities of the following materials is prohibited. For the purpose of this section, "significant quantity" consists of a barrel or more at a single time.
    - Petroleum processing and storage

Staff Research con't

- City of Hoquiam – Prohibits bulk crude oil storage and handling facilities and provides a definition for *bulk crude oil storage and handling facility*
  - *"Bulk crude oil storage and handling facility" means any structure, group of structures, equipment, pipeline or device that stores or transfers any naturally occurring petroleum extracted from geological formations beneath the earth's surface which requires further refinement before consumer use, including: conventional crude oil, heavy oil, extra heavy oil, and oil sands/bitumen. The term does not include facilities that store and handle finished products from petroleum.*

Staff Research cont

- Staff recommends to focus on bulk crude oil storage and oil refineries to address the Council's moratorium.
  - Substantial safety concerns across the nation provides justification to limit crude oil storage and refinement processes
  - Two other Washington city development codes provide good examples

Staff Recommendation

- Staff recommendation:
  - Prohibit bulk crude oil storage and handling facilities except for vested or contingently vested projects
  - Provide a definition of crude oil storage and handling facilities, based on Hoquiam's example
  - Prohibit oil refineries
  - Prohibit expansion of existing crude oil storage and handling facilities

Stakeholder /Interested Parties Outreach

- Attempt to schedule a specific stakeholder meeting with Vancouver petroleum companies, the Port, and CREDC
- Mailing to over 50 industrial companies
- Mailing to several environmental groups
- Mailing to Neighborhood Associations
- Planning Commission and City Council meetings

Next Steps/Timeline

- May 24, 2016 – Planning Commission public hearing
- June 13, 2016 – City Council workshop
- July 11, 2016 – City Council consent agenda
- July 18, 2016 – City Council public hearing
- August 17, 2016 – Ordinance M4157 expires

Questions and Discussion

Notes:

Via Electronic Mail
Oakland City Council
1 Frank Ogawa Plaza, 3rd Floor
Oakland, CA 94612
(510) 238-2386
cityclerk@oaklandnet.com
May 16, 2016

RE: Follow up comments on the Informational Public Hearing on the Transport and Export of Fuel Oils, Gasoline and Crude Oil in Oakland

To the Oakland City Council:

The Sierra Club writes to provide the following additional written testimony and evidence detailing the several significant environmental impacts that would result from the City of Oakland's ("City") approval of any project to transport, handle, and/or export fuel oils, gasoline and crude oil in and through the City of Oakland and at the Oakland Bulk and Oversized Terminal ("OBOT").

To follow up on the May 9, 2016 comments submitted by Communities for a Better Environment, et al, we submit the following additional information that supports testimony given at the public hearing on May 9.

New Risk for Crude Oil exports on the West Coast: Crude Oil Export Ban Lifted

Until late 2015, it was illegal to export unrefined crude oil. Unfortunately in December 2015, the Energy Policy and Conservation Act (EPCA) that banned crude oil exports for the last 40 years was modified to allow raw crude exports.[1] The first shipments started in January 2016. The change in the law leaves open the possibility for this dirty industry to expand in Oakland, absent some sort of City Council action.

West Coast Cities Taking Action on Crude Oil
Oakland has the power to take action, and Oakland is not alone in its thoughts to potentially ban crude oil. A few examples of West Coast Communities taking action::

1. **City of Hoquiam, WA**

[1] Wall Street Journal, Congressional Leaders Agree to LIft 40-year ban on oil exports, December 16, 2015, Accessed: http://www.wsj.com/articles/congressional-leaders-agree-to-lift-40-year-ban-on-oil-exports-1450242995

Unanimously passed ordinance banning crude oil storage and handling facilities in Fall 2015.[2]

2. **City of Bellingham, WA**

Prohibits petroleum refining, processing and storage of a barrel or more at time.[3]

3. **City of Vancouver, WA**

Considering the extension of a temporary oil moratorium into a permanent ban. Vote will occur on July 18, 2016.[4]

Health and Safety Hazards of Fuel Oil, Gasoline, and Petroleum Crude Oil

As noted in oral testimony at the public hearing on Monday, May 9, 2016, the U.S. Department of Transportation has a guidebook entitled 2012 Emergency Response Guidebook (attached), which is a guide for first responders during the initial phase of a dangerous goods/hazardous materials transportation incident. For fuel oil, gasoline, and petroleum crude oil, first responders are directed to "Guide No. 128" (see, e.g., Emergency Response Guidebook at pages 25, 45, 117, 118, 137). As noted in oral testimony, the information provided in Guide No. 128 (pages 194-95) demonstrates multiple health and safety hazards associated with transporting these products, for example:

Potential Hazards / Fire or Explosion:
- "HIGHLY FLAMMABLE: Will be easily ignited by heat, sparks or flames."
- "Vapors may form explosive mixtures with air."
- "Vapors may travel to source of ignition and flash back."
- "Vapor explosion hazard indoors, outdoors or in sewers."

Potential Hazards / Health:
- "Inhalation or contact with material may irritate or burn skin and eyes."
- "Fire may produce irritating, corrosive, and/or toxic gases."
- "Vapors may cause dizziness or suffocation."
- "Runoff from fire control or dilution water may cause pollution."

Public Safety / Evacuation:
- Large Spill: "Consider initiation downwind evacuation for at least 300 meters (1000 feet)."

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[2] Daily World, Hoquiam Finalizes Crude Oil Ban, September 15, 2015, http://thedailyworld.com/news/local/hoquiam-finalizes-crude-oil-ban
[3] City of Bellingham Municipal Code, http://www.codepublishing.com/WA/Bellingham/?Bellingham20/Bellingham2000.html.
[4] Vancouver City Council Pursues Oil Terminal Ban at Port, April 11, 2016, http://www.columbian.com/news/2016/apr/11/vancouver-city-council-pursues-oil-terminal-ban-at-port/

- Fire: "If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 miles) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions."

Emergency Response / Fire:
- "CAUTION: All these products have a very low flash point: Use of water spray when fighting fire may be inefficient.
- "ALWAYS stay away from tanks engulfed in fire."
- "For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn."

Emergency Response / Spill or Leak
- Large Spill: "Water spray may reduce vapor; but may not prevent ignition in closed spaces."

Emergency Response / First Aid
- "Remove and isolate contaminated clothing and shoes."
- "In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes."
- "In case of burns, immediately cool affected skin for as long as possible with cold water. Do not remove clothing if adhering to skin.
- "Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves."

Sincerely,

Jessica Yarnall Loarie and Elly Benson
On behalf of Sierra Club

enclosures

2012 EMERGENCY RESPONSE GUIDEBOOK

A Guidebook for First Responders During the Initial Phase of a Dangerous Goods/ Hazardous Materials Transportation Incident

U.S. Department of Transportation
Pipeline and Hazardous Materials Safety Administration

Transport Canada
Transports Canada

Secretariat of Transport and Communications

SHIPPING DOCUMENTS (PAPERS)

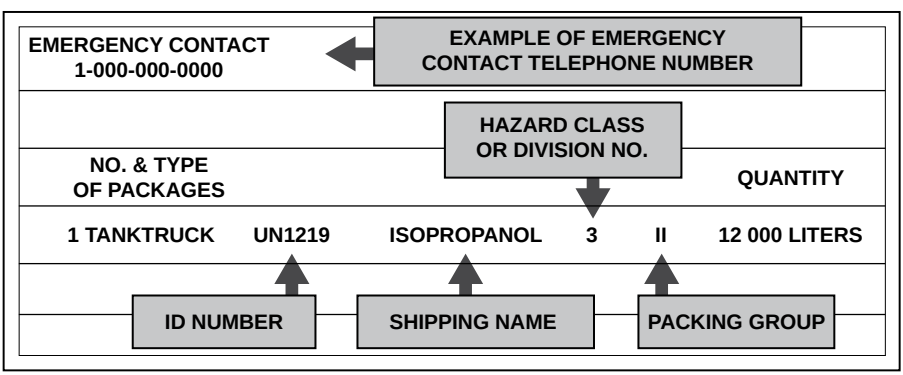
Shipping Documents (Papers) are synonymous and can be found as follows:

- Road – kept in the cab of a motor vehicle
- Rail – kept in possession of a crew member
- Aviation – kept in possession of the aircraft pilot
- Marine – kept in a holder on the bridge of a vessel

Shipping Documents (Papers) provide vital information regarding the hazardous materials/dangerous goods to initiate protective actions*

Information provided:

- 4-Digit Identification Number, UN or NA (go to Yellow Pages) **
- Proper Shipping name (go to Blue Pages)
- Hazard Class or Division number of material
- Packing Group
- Emergency Response Telephone Number
- Information describing the hazards of the material (entered on or attached to shipping document)



EXAMPLE OF PLACARD AND PANEL WITH ID NUMBER

The 4-digit ID Number may be shown on the diamond-shaped placard or on an adjacent orange panel displayed on the ends and sides of a cargo tank, vehicle or rail car.

A Numbered Placard

OR

A Placard and an Orange Panel

* For the purposes of this guidebook, the terms hazardous materials/dangerous goods are synonymous.

** After January 1, 2013 in the United States, the identification number **must** appear first in the basic description. For example, "UN2744, Cyclobutyl chloroformate, 6.1, (3, 8), PG II". This is currently optional in Canada.

HOW TO USE THIS GUIDEBOOK

RESIST RUSHING IN !

APPROACH INCIDENT FROM UPWIND, UPHILL OR UPSTREAM

STAY CLEAR OF ALL SPILLS, VAPORS, FUMES, SMOKE AND SUSPICIOUS SOURCES

STEP ONE: IDENTIFY THE MATERIAL AND USE ANY OF THE FOLLOWING:

- **IDENTIFICATION NUMBER** (4-DIGIT ID AFTER UN/NA) FROM A:
  - PLACARD
  - ORANGE PANEL
  - SHIPPING PAPER OR PACKAGE
- **NAME OF THE MATERIAL** FROM A:
  - SHIPPING DOCUMENT OR PACKAGE

STEP TWO: IDENTIFY 3-DIGIT GUIDE NUMBER, USE:

- ID NUMBER INDEX in yellow-bordered pages or
- NAME OF MATERIAL INDEX in blue-bordered pages

Guide number supplemented with the letter **(P)** indicates that the material may undergo violent polymerization if subjected to heat or contamination.

INDEX ENTRIES HIGHLIGHTED IN GREEN are a TIH (Toxic Inhalation Hazard) material, a chemical warfare agent or a Dangerous Water Reactive Material (produces toxic gas upon contact with water).

IDENTIFY ID NUMBER AND NAME OF MATERIAL IN TABLE 1 – INITIAL ISOLATION AND PROTECTIVE ACTION DISTANCES (the green-bordered pages).

IF NECESSARY, BEGIN PROTECTIVE ACTIONS IMMEDIATELY (see Protective Actions page 288). If no protective action required, use the information jointly with the 3-digit guide.

IF A REFERENCE TO A GUIDE CANNOT BE FOUND AND THIS INCIDENT IS BELIEVED TO INVOLVE DANGEROUS GOODS:

- Use GUIDE 111, UNTIL ADDITIONAL INFORMATION BECOMES AVAILABLE
- Use GUIDE 112, EXPLOSIVES (other than 1.4 and 1.6)
- Use GUIDE 114, EXPLOSIVES (1.4 and 1.6)

STEP THREE: TURN TO THE NUMBERED GUIDE (the orange-bordered pages) **READ CAREFULLY.**

IF A PLACARD IS THE ONLY SOURCE OF INFORMATION, turn to pages 6-7 and **use the 3-digit guide next to the placard and Proceed to Numbered Guide in orange-bordered pages**.

AS A LAST RESORT: IF ONLY THE CONTAINER CAN BE IDENTIFIED, CONSULT THE TABLE OF RAIL CAR AND ROAD TRAILER IDENTIFICATION CHART (pages 8-9). INFORMATION ASSOCIATED WITH THESE CONTAINERS IS FOR WORST-CASE SCENARIOS.

CALL THE EMERGENCY RESPONSE TELEPHONE NUMBER:

- Listed on the shipping paper, if available.
- If shipping paper is not available, IMMEDIATELY CALL the **appropriate emergency response agency telephone number listed on the inside back cover of this guidebook**.
- Provide as much information as possible, such as the name of the carrier (trucking company or railroad) and vehicle number.

BEFORE AN EMERGENCY – BECOME FAMILIAR WITH THIS GUIDEBOOK!

First responders must be trained in the use of this guidebook.

SAFETY PRECAUTIONS

RESIST RUSHING IN!

APPROACH CAUTIOUSLY FROM *UPWIND, UPHILL* OR *UPSTREAM*:

- Stay clear of ***Vapor***, ***Fumes***, ***Smoke*** and ***Spills***
- Keep vehicle at a safe distance from the scene

SECURE THE SCENE:

- Isolate the area and protect yourself and others

IDENTIFY THE HAZARDS USING ANY OF THE FOLLOWING:

- Placards
- Container labels
- Shipping documents
- Rail Car and Road Trailer Identification Chart
- Material Safety Data Sheets (MSDS)
- Knowledge of persons on scene
- Consult applicable guide page

ASSESS THE SITUATION:

- Is there a fire, a spill or a leak?
- What are the weather conditions?
- What is the terrain like?
- Who/what is at risk: people, property or the environment?
- What actions should be taken – evacuation, shelter in-place or dike?
- What resources (human and equipment) are required?
- What can be done immediately?

OBTAIN HELP:

- Advise your headquarters to notify responsible agencies and call for assistance from qualified personnel

RESPOND:

- Enter only when wearing appropriate protective gear
- Rescue attempts and protecting property must be weighed against you becoming part of the problem
- Establish a command post and lines of communication
- Continually reassess the situation and modify response accordingly
- Consider safety of people in the immediate area first, including your own safety

ABOVE ALL: Do not assume that gases or vapors are harmless because of lack of a smell—odorless gases or vapors may be harmful. Use **CAUTION** when handling empty containers because they may still present hazards until they are cleaned and purged of all residues.

NOTIFICATION AND REQUEST FOR TECHNICAL INFORMATION

Follow the steps outlined in your organization's standard operating procedures and/or local emergency response plan for obtaining qualified assistance. Generally, the notification sequence and requests for technical information beyond what is available in this guidebook should occur in the following order:

1. **NOTIFY YOUR ORGANIZATION/AGENCY**
   - Based on information provided, this will set in motion a series of events
   - Actions may range from dispatching additional trained personnel to the scene, to activating the local emergency response plan
   - Ensure that local fire and police departments have been notified

2. **CALL THE EMERGENCY RESPONSE TELEPHONE NUMBER ON THE SHIPPING DOCUMENT**
   - If shipping paper is not available, use guidance under next section **"NATIONAL ASSISTANCE"**

3. **NATIONAL ASSISTANCE**
   - Contact the appropriate emergency response agency listed on the inside back cover of this guidebook
   - Provide as much information about the hazardous material and the nature of the incident
   - The agency will provide immediate advice on handling the early stages of the incident
   - The agency will also contact the shipper or manufacturer of the material for more detailed information if necessary
   - The agency will request on-scene assistance when necessary

4. **PROVIDE AS MUCH OF THE FOLLOWING INFORMATION AS POSSIBLE**:
   - Your name, call-back telephone number, FAX number
   - Location and nature of problem (spill, fire, etc.)
   - Name and identification number of material(s) involved
   - Shipper/consignee/point-of-origin
   - Carrier name, rail car or truck number
   - Container type and size
   - Quantity of material transported/released
   - Local conditions (weather, terrain)
   - Proximity to schools, hospitals, waterways, etc.
   - Injuries and exposures
   - Local emergency services that have been notified

HAZARD CLASSIFICATION SYSTEM

The hazard class of dangerous goods is indicated either by its class (or division) number or name. Placards are used to identify the class or division of a material. The hazard class or division number must be displayed in the lower corner of a placard and is required for both primary and subsidiary hazard classes and divisions, if applicable. For other than Class 7 or the OXYGEN placard, text indicating a hazard (for example, "CORROSIVE") is not required. Text is shown only in the U.S. The hazard class or division number and subsidiary hazard classes or division numbers placed in parentheses (when applicable), must appear on the shipping document after each proper shipping name.

Class 1 - Explosives

Division 1.1	Explosives with a mass explosion hazard
Division 1.2	Explosives with a projection hazard
Division 1.3	Explosives with predominantly a fire hazard
Division 1.4	Explosives with no significant blast hazard
Division 1.5	Very insensitive explosives with a mass explosion hazard
Division 1.6	Extremely insensitive articles

Class 2 - Gases

Division 2.1	Flammable gases
Division 2.2	Non-flammable, non-toxic* gases
Division 2.3	Toxic* gases

Class 3 - Flammable liquids (and Combustible liquids [U.S.]**)**

Class 4 - Flammable solids; Spontaneously combustible materials; and Dangerous when wet materials/Water-reactive substances

Division 4.1	Flammable solids
Division 4.2	Spontaneously combustible materials
Division 4.3	Water-reactive substances/Dangerous when wet materials

Class 5 - Oxidizing substances and Organic peroxides

Division 5.1	Oxidizing substances
Division 5.2	Organic peroxides

Class 6 - Toxic* substances and Infectious substances

Division 6.1	Toxic*substances
Division 6.2	Infectious substances

Class 7 - Radioactive materials

Class 8 - Corrosive substances

Class 9 - Miscellaneous hazardous materials/Products, Substances or Organisms

* The words "poison" or "poisonous" are synonymous with the word "toxic".

INTRODUCTION TO THE TABLE OF PLACARDS

USE THE TABLE OF PLACARDS ONLY WHEN THE ID NUMBER OR PROPER SHIPPING NAME IS NOT AVAILABLE.

The next two pages display the placards used on transport vehicles carrying dangerous goods with the applicable reference GUIDE circled. Follow these steps:

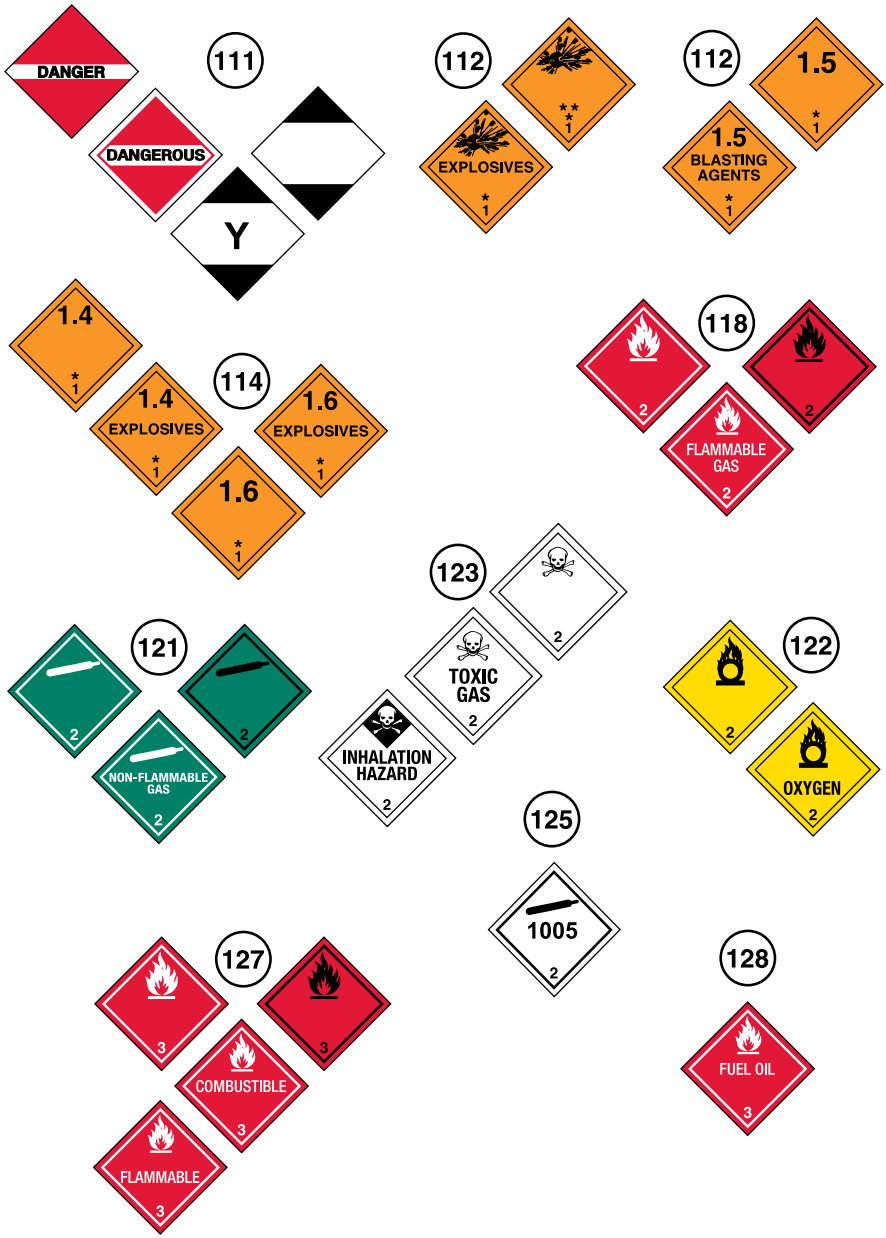
1. **Approach scene from upwind, uphill or upstream at a safe distance to safely identify and/or read the placard or orange panel. Use binoculars if available.**
2. **Match the vehicle placard(s) with one of the placards displayed on the next two pages**.
3. **Consult the circled guide number associated with the placard. Use that guide information for now. For example**:

   - Use GUIDE (127) for a FLAMMABLE (Class 3) placard
   - Use GUIDE (153) for a CORROSIVE (Class 8) placard
   - Use GUIDE (111) when the DANGER/DANGEROUS placard is displayed or the nature of the spilled, leaking or burning material is not known. Also use this GUIDE when the presence of dangerous goods is suspected but no placards can be seen.

   If multiple placards point to more than one guide, initially use the most conservative guide (i.e., the guide requiring the greatest degree of protective actions).
4. **Guides associated with the placards provide the most significant risk and/or hazard information**.
5. **When specific information, such as ID number or proper shipping name, becomes available, the more specific Guide recommended for that material must be consulted.**
6. **Asterisks (*) on orange placards represent explosives "Compatibility Group" letters; refer to the Glossary (page 375).**
7. **Double asterisks (**) on orange placards represent the division of the explosive.**

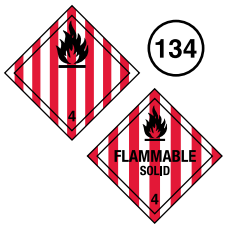
TABLE OF PLACARDS AND INITIAL

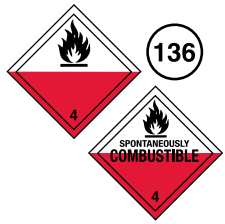
USE THIS TABLE ONLY IF MATERIALS CANNOT BE SPECIFICALLY IDENTIFIED BY

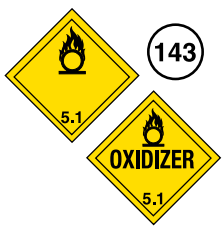


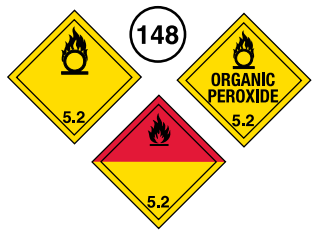
RESPONSE GUIDE TO USE ON-SCENE

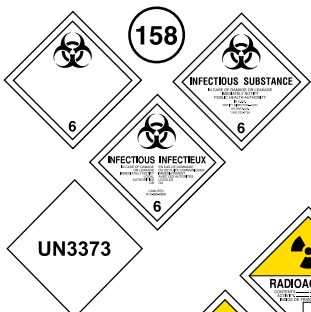
USING THE SHIPPING DOCUMENT, NUMBERED PLACARD, OR ORANGE PANEL NUMBER

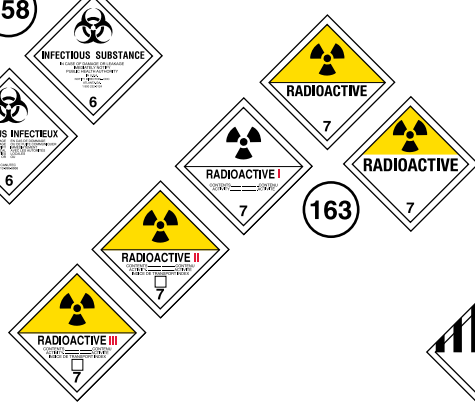


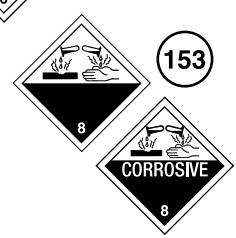


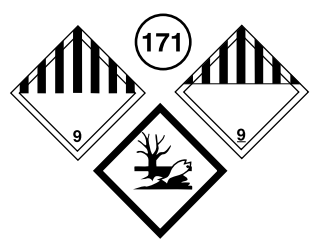


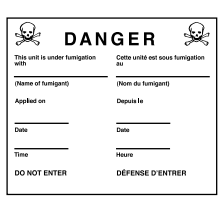




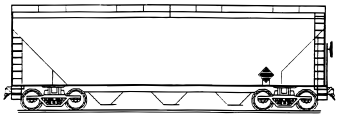




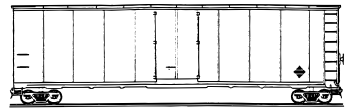




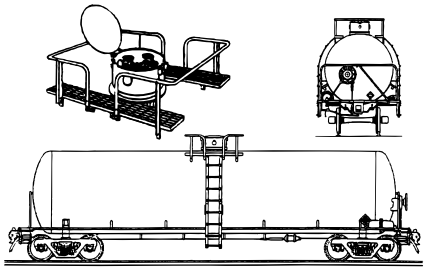
RAIL CAR IDENTIFICATION CHART*



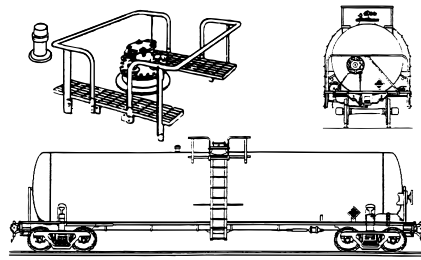
Hopper Car Dry Bulk **140**



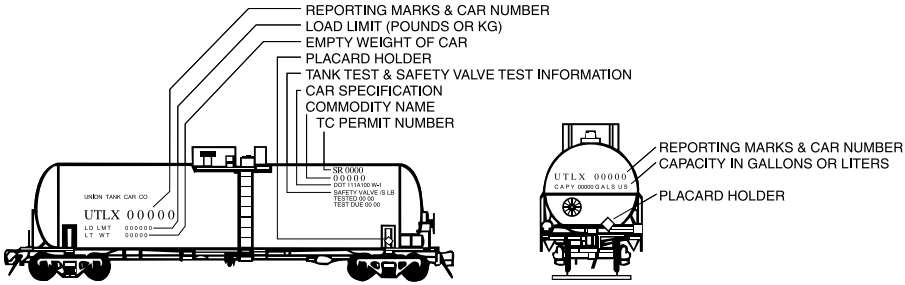
Box Car Mixed Cargo **111**



Pressure Tank Car Compressed Liquefied Gases (Closed Dome Only on top) **117**



Low Pressure Tank Car Liquids (Closed Dome and Outlets on top) **131**



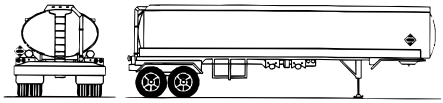
CAUTION: Emergency response personnel must be aware that rail tank cars vary widely in construction, fittings and purpose. Tank cars could transport products that may be solids, liquids or gases. The products may be under pressure. It is essential that products be identified by consulting shipping documents or train consist or contacting dispatch centers before emergency response is initiated.

The information stenciled on the sides or ends of tank cars, as illustrated above, may be used to identify the product utilizing:

a. the commodity name shown; or
b. the other information shown, especially reporting marks and car number which, when supplied to a dispatch center, will facilitate the identification of the product.

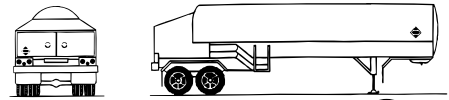
* **The recommended guides should be considered as last resort if the material cannot be identified by any other means.**

ROAD TRAILER IDENTIFICATION CHART*



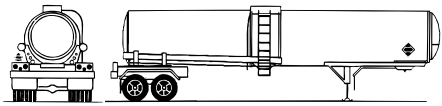
DOT406, TC406, SCT-306
Non-pressure Liquid Tank
(MC306, TC306)

131



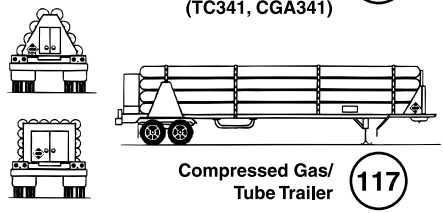
MC338, TC338, SCT-338
Cryogenic Liquid Tank
(TC341, CGA341)

117



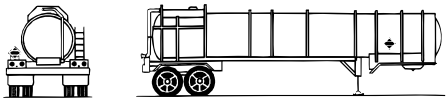
DOT407, TC407, SCT-307
Low Pressure Chemical Tank
(MC307, TC307)

137



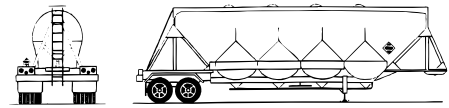
Compressed Gas/
Tube Trailer

117



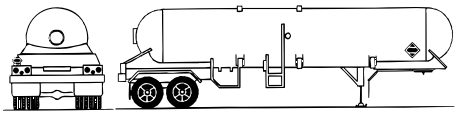
DOT412, TC412, SCT-312
Corrosive Liquid Tank
(MC312, TC312)

137



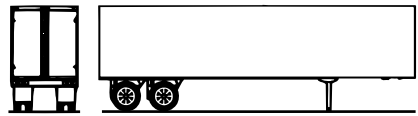
Dry Bulk Cargo
Trailer

134



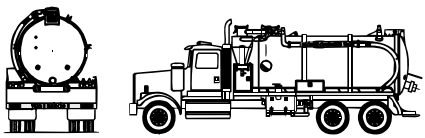
MC331, TC331, SCT-331
High Pressure Tank

117



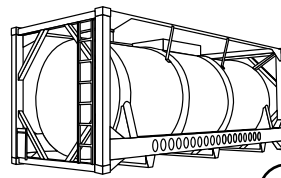
Mixed Cargo

111



DOT407, TC407, DOT412, TC412
Vacuum Loaded Tank
(TC350)

137



Intermodal Tank

117

CAUTION: This chart depicts only the most general shapes of road trailers. Emergency response personnel must be aware that there are many variations of road trailers, not illustrated above, that are used for shipping chemical products. The suggested guides are for the most hazardous products that may be transported in these trailer types.

* **The recommended guides should be considered as last resort if the material cannot be identified by any other means.**

HAZARD IDENTIFICATION NUMBERS DISPLAYED ON SOME INTERMODAL CONTAINERS

Hazard identification numbers utilized under European and some South American regulations, may be found in the top half of an orange panel on some intermodal bulk containers. The United Nations 4-digit identification number is in the bottom half of the orange panel.

The hazard identification number in the top half of the orange panel consists of two or three digits. In general, the digits indicate the following hazards:

2 - Emission of gas due to pressure or chemical reaction

3 - Flammability of liquids (vapors) and gases or self-heating liquid

4 - Flammability of solids or self-heating solid

5 - Oxidizing (fire-intensifying) effect

6 - Toxicity or risk of infection

7 - Radioactivity

8 - Corrosivity

9 - Risk of spontaneous violent reaction

NOTE: The risk of spontaneous violent reaction within the meaning of digit 9 include the possibility, due to the nature of a substance, of a risk of explosion, disintegration and polymerization reaction followed by the release of considerable heat or flammable and/or toxic gases.

- Doubling of a digit indicates an intensification of that particular hazard (i.e., 33, 66, 88).
- Where the hazard associated with a substance can be adequately indicated by a single digit, the digit is followed by a zero (i.e., 30, 40, 50).
- A hazard identification number prefixed by the letter “X” indicates that the substance will react dangerously with water (i.e., X88).

HAZARD IDENTIFICATION NUMBERS DISPLAYED ON SOME INTERMODAL CONTAINERS

The hazard identification numbers listed below have the following meanings:

20	Asphyxiant gas
22	Refrigerated liquefied gas, asphyxiant
223	Refrigerated liquefied gas, flammable
225	Refrigerated liquefied gas, oxidizing (fire-intensifying)
23	Flammable gas
239	Flammable gas which can spontaneously lead to violent reaction
25	Oxidizing (fire-intensifying) gas
26	Toxic gas
263	Toxic gas, flammable
265	Toxic gas, oxidizing (fire-intensifying)
268	Toxic gas, corrosive
30	Flammable liquid, or flammable liquid or solid in the molten state with a flash point above 60°C, heated to a temperature equal to or above its flash point, or self-heating liquid
323	Flammable liquid which reacts with water, emitting flammable gas
X323	Flammable liquid which reacts dangerously with water, emitting flammable gas
33	Highly flammable liquid
333	Pyrophoric liquid
X333	Pyrophoric liquid which reacts dangerously with water
336	Highly flammable liquid, toxic
338	Highly flammable liquid, corrosive
X338	Highly flammable liquid, corrosive, which reacts dangerously with water
339	Highly flammable liquid which can spontaneously lead to violent reaction
36	Flammable liquid, toxic, or self-heating liquid, toxic
362	Flammable liquid, toxic, which reacts with water, emitting flammable gas
X362	Flammable liquid, toxic, which reacts dangerously with water, emitting flammable gas
368	Flammable liquid, toxic, corrosive
38	Flammable liquid, corrosive or self-heating liquid, corrosive
382	Flammable liquid, corrosive, which reacts with water, emitting flammable gas
X382	Flammable liquid, corrosive, which reacts dangerously with water, emitting flammable gas
39	Flammable liquid which can spontaneously lead to violent reaction
40	Flammable solid, or self-reactive substance, or self-heating substance
423	Solid which reacts with water, emitting flammable gas, or flammable solid which reacts with water, emitting flammable gas, or self-heating solid which reacts with water, emitting flammable gas

HAZARD IDENTIFICATION NUMBERS
DISPLAYED ON SOME INTERMODAL CONTAINERS

X423	Solid which reacts dangerously with water, emitting flammable gas, or flammable solid which reacts dangerously with water, emitting flammable gas, or self-heating solid which reacts dangerously with water, emitting flammable gas
43	Spontaneously flammable (pyrophoric) solid
X432	Spontaneously flammable (pyrophoric) solid which reacts dangerously with water, emitting flammable gas
44	Flammable solid, in the molten state at an elevated temperature
446	Flammable solid, toxic, in the molten state at an elevated temperature
46	Flammable solid, toxic, or self-heating solid, toxic
462	Toxic solid which reacts with water, emitting flammable gas
X462	Solid which reacts dangerously with water, emitting toxic gas
48	Flammable or self-heating solid, corrosive
482	Corrosive solid which reacts with water, emitting flammable gas
X482	Solid which reacts dangerously with water, emitting corrosive gas
50	Oxidizing (fire-intensifying) substance
539	Flammable organic peroxide
55	Strongly oxidizing (fire-intensifying) substance
556	Strongly oxidizing (fire-intensifying) substance, toxic
558	Strongly oxidizing (fire-intensifying) substance, corrosive
559	Strongly oxidizing (fire-intensifying) substance which can spontaneously lead to violent reaction
56	Oxidizing (fire-intensifying) substance, toxic
568	Oxidizing (fire-intensifying) substance, toxic, corrosive
58	Oxidizing (fire-intensifying) substance, corrosive
59	Oxidizing (fire intensifying) substance which can spontaneously lead to violent reaction
60	Toxic substance
606	Infectious substance
623	Toxic liquid which reacts with water, emitting flammable gas
63	Toxic substance, flammable
638	Toxic substance, flammable, corrosive
639	Toxic substance, flammable, which can spontaneously lead to violent reaction
64	Toxic solid, flammable or self-heating
642	Toxic solid which reacts with water, emitting flammable gas
65	Toxic substance, oxidizing (fire-intensifying)
66	Highly toxic substance
663	Highly toxic substance, flammable
664	Highly toxic solid, flammable or self-heating

HAZARD IDENTIFICATION NUMBERS
DISPLAYED ON SOME INTERMODAL CONTAINERS

665	Highly toxic substance, oxidizing (fire-intensifying)
668	Highly toxic substance, corrosive
X668	Highly toxic substance, corrosive, which reacts dangerously with water
669	Highly toxic substance which can spontaneously lead to violent reaction
68	Toxic substance, corrosive
69	Toxic substance which can spontaneously lead to violent reaction
70	Radioactive material
78	Radioactive material, corrosive
80	Corrosive substance
X80	Corrosive substance which reacts dangerously with water
823	Corrosive liquid which reacts with water, emitting flammable gas
83	Corrosive substance, flammable
X83	Corrosive substance, flammable, which reacts dangerously with water
839	Corrosive substance, flammable, which can spontaneously lead to violent reaction
X839	Corrosive substance, flammable, which can spontaneously lead to violent reaction and which reacts dangerously with water
84	Corrosive solid, flammable or self-heating
842	Corrosive solid which reacts with water, emitting flammable gas
85	Corrosive substance, oxidizing (fire-intensifying)
856	Corrosive substance, oxidizing (fire-intensifying) and toxic
86	Corrosive substance, toxic
88	Highly corrosive substance
X88	Highly corrosive substance which reacts dangerously with water
883	Highly corrosive substance, flammable
884	Highly corrosive solid, flammable or self-heating
885	Highly corrosive substance, oxidizing (fire-intensifying)
886	Highly corrosive substance, toxic
X886	Highly corrosive substance, toxic, which reacts dangerously with water
89	Corrosive substance which can spontaneously lead to violent reaction
90	Miscellaneous dangerous substance; environmentally hazardous substance
99	Miscellaneous dangerous substance transported at an elevated temperature

PIPELINE TRANSPORTATION

In North America, hazardous materials are transported through millions of miles of underground pipelines and related structures that can contain natural gas, natural gas liquids, crude oil, gasoline, diesel fuel, anhydrous ammonia, carbon dioxide, jet fuel and other commodities. Although pipelines are buried, there are above-ground structures and signs indicating the presence of underground transmission pipelines (see page 19 for U.S. pipeline location information). Natural gas also is transported via underground distribution pipelines.

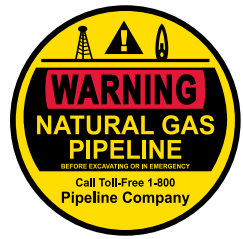
Gas Pipelines

Natural Gas Transmission Pipelines

Large-diameter, steel pipelines transporting flammable, toxic and non-toxic natural gas at very high pressure.

Structures: Compressor Station Buildings, Valves, Metering Stations, and Aerial Patrol Markers.

Markers: "Warning, Caution, or Danger" appear at road, railroad, and water crossings, or may be posted at property boundaries and include operator's emergency Point-of-Contact (POC) and product transported.



Natural Gas Distribution Pipelines

Natural gas is delivered directly to customers via distribution pipelines--typically smaller-diameter, lower-pressure pipelines, and can be steel, plastic, or cast iron.

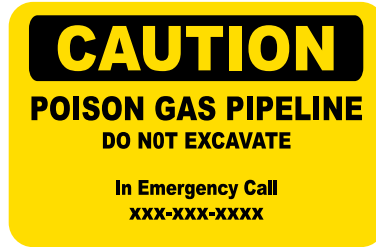
Structures: Regulator stations, customer meters and regulators, and valve box covers are the only above-ground indicators of gas distribution pipelines.

Gas Gathering and Gas Well Production Pipelines

Gas gathering/gas well production pipelines collect "raw" natural gas from wellheads and transport product to gas-processing and/or gas-treating plants. These gathering pipelines carry natural gas mixed with some level of gas liquids, water and, in some areas, contaminants such as hydrogen sulfide (H_2S).

Structures – Compressor Station Buildings, Valves, Metering Stations, and Aerial Patrol Markers.

Markers – Often appear at road, railroad, and water crossings. Signs may be posted at property boundaries. Signs include operator's POC and product transported. Warning, Caution, or Danger will appear on signs.



Note: **Pipelines transporting natural gas containing dangerous levels of H_2S may have signs that say: "Sour Gas" or "Poison Gas"**.

For Natural Gas Pipeline Incidents

Two important things to remember:

- Never attempt to extinguish a gas fire; this could prolong/worsen incident/cause another leak in the pipeline.
- Never attempt to operate pipeline valves; this could prolong/worsen incident/cause another leak in the pipeline.

SIGNS OF GAS PIPELINE RUPTURE:

- Loud roaring or explosive sound; OR
- Large flames and loud roaring noise.

Follow these steps:

- Immediately evacuate area;
- Move upwind, away from flames; prevent individuals from entering;
- If no flames present, do not start/turn off vehicles/electrical equipment (ex: cell phones, pagers, two-way radios, or lights) as this could cause spark/ignition;
- Abandon equipment used in/near area;
- If flames present, driving away from area is acceptable;
- Move far enough from noise to allow normal conversation;
- From safe location, call **911** or contact the local fire/law enforcement; and
- Notify pipeline operator.

ANY ONE OF THESE COULD INDICATE A SUSPECTED GAS PIPELINE LEAK:

- Whistling/hissing sound;
- Distinctive, strong odor, similar to rotten eggs;
- Dense fog, mist, or white cloud;
- Bubbling in water, ponds, or creeks;
- Dust or dirt blowing up from ground; OR
- Discolored/dead vegetation above pipeline right-of-way.

Follow these steps:

- Evacuate area to where you can no longer hear, see, or smell gas;
- Do not start/turn off vehicles/electrical equipment (ex: cell phones, pagers, two-way radios or lights) as this could cause spark/ignition;
- Abandon equipment used in/near the area;
- Avoid open flames;
- Prevent individuals from entering area;
- Call **911** or contact the local fire/law enforcement from a safe location; and
- Notify pipeline operator.

Considerations for Establishing Protective Action Distance:

- Type of product (eg. sour vs sweet);
- Pressure and diameter of pipe;
- Timing of valve closure by utility (quickly for automated valves/longer for manually operated valves);
- Dissipation time of gas in pipe once valves are closed;
- Heat factor of natural gas;
- Local variables such as climate/weather, wind direction, topography, population density, demographics, and fire suppression methods available;
- Nearby building construction material/density;
- Wild land/urban interface; and
- Natural and manmade barriers (highway).

If you know the material involved, identify the three-digit guide number by looking up the name in the alphabetical list (blue-bordered pages), then using the three-digit guide number, consult the recommendations in the assigned guide.

Liquids Pipelines

Petroleum and Hazardous Liquids Pipelines

Crude oil, refined petroleum products, and hazardous liquids often are transported by pipelines and include gasoline, jet fuels, diesel fuel, home heating oils, carbon dioxide and anhydrous ammonia. Sometimes liquids pipelines transport natural gas liquids, which, like carbon dioxide and anhydrous ammonia, rapidly change from liquid to gaseous state when released from a pressurized pipeline.

Structures – Storage Tanks, Valves, Pump Stations, Aerial Patrol Markers

Markers – Often appear at road, railroad and water crossings, and may be posted at property boundaries. Signs include operator emergency POCs and product transported. Warning, Caution, or Danger appear on signs.

For Petroleum and Hazardous Liquids Pipeline Incidents

Two important things to remember:

- Never attempt to extinguish flame before shutting off supply, as this can cause formation of explosive mixtures, and
- Never attempt to operate pipeline valves. This could prolong/worsen incident–or cause another pipeline leak.

SIGNS OF LIQUIDS PIPELINE RUPTURE:

- Loud roaring, hissing, or explosive sound; OR
- Very large flames and loud roaring noise.

Follow these steps:

- Immediately evacuate area;
- Move upwind, far from flames, prevent individuals from entering area;
- If no flames present, do not start/turn off vehicles/electrical equipment (ex: cell phones, pagers, two-way radios, or lights) as this could cause spark/ignition;
- Abandon equipment used in/near the area;
- Keep traffic away; secure the area;

- If flames present, driving away from area is acceptable;
- Move far enough away from noise to allow normal conversation;
- From safe location, call **911** or contact the local fire/law enforcement; and
- From a safe area, call toll-free emergency number on right-of-way marker to notify pipeline operator.

ANY ONE OF THESE COULD INDICATE SUSPECTED LIQUIDS PIPELINE LEAK:

- Liquids bubbling up from ground;
- “Oil slick” on flowing/standing water;
- Flames appearing from ground;
- Vapor clouds;
- Discolored vegetation or snow; and
- Unusual petroleum, skunk or rotten-egg odor.

Follow these steps:

- Do not drive into vapor cloud;
- Carefully evacuate the immediate area so you can no longer hear, see, smell odor;
- Avoid introducing sources of ignition--do not start/turn off vehicles/electrical equipment (ex: cell phones, pagers, two-way radios, or lights); as this could cause spark/ignition;
- Abandon equipment being used in/near area;
- Avoid open flames;
- Prevent individuals from entering area;
- Call **911** or contact the local fire/law enforcement from a safe location; and
- Notify pipeline operator.

Considerations For Establishing Protective Action Distance:

- Type of product (eg. sour vs sweet);
- Pressure/diameter of pipe;
- Timing of valve closure by utility (quickly for automated valves/longer for manually operated valves);
- Dissipation time of material in pipe once valves closed;
- Heat factor of product;
- Local variables such as climate/weather, wind direction, topography, population density, demographics and fire suppression methods available for use;

- Nearby building construction material/density;
- Wild land/urban interface; and
- Natural and man-made barriers (highway).

If you know the material involved, identify the three-digit guide number by looking up the name in the alphabetical list (blue-bordered pages), then using the three-digit guide number, consult the recommendations in the assigned guide.

U.S. Pipeline Resources

U.S. Pipeline Location Source: The National Pipeline Mapping System (NPMS) < *http://www.npms.phmsa.dot.gov* > indicates the locations of hazardous liquids and natural gas transmission pipelines found within the U.S.

U.S. Pipeline Training: Where appropriate, reference Pipeline Emergencies training materials, produced by PHMSA and the National Association of State Fire Marshals (NASFM). This training guide is available at < *http://www.pipelineemergencies.com* > and offers a thorough overview of U.S. pipeline operations and emergency response considerations.

GREEN HIGHLIGHTED ENTRIES IN YELLOW PAGES

For entries highlighted in green follow these steps:

- **IF THERE IS NO FIRE**:
  - Go directly to **Table 1** (green bordered pages)
  - Look up the ID number and name of material
  - Identify initial isolation and protective action distances

- **IF THERE IS A FIRE or A FIRE IS INVOLVED**:
  - Also consult the assigned orange guide
  - If applicable, apply the evacuation information shown under PUBLIC SAFETY

Note: If the name in **Table 1** is shown with "***When Spilled In Water***", these materials produce large amounts of Toxic Inhalation Hazard (TIH) gases when spilled in water. Some Water Reactive materials are also TIH materials themselves (e.g., Bromine trifluoride (1746), Thionyl chloride (1836), etc.). In these instances, two entries are provided in **Table 1** for land-based and water-based spills. If the Water Reactive material **is NOT** a TIH and this material **is NOT** spilled in water, **Table 1** and **Table 2** do not apply and safety distances will be found within the appropriate orange guide.

ID No.	Guide No.	Name of Material
——	**112**	Ammonium nitrate-fuel oil mixtures
——	**158**	Biological agents
——	**112**	Blasting agent, n.o.s.
——	**112**	Explosives, division 1.1, 1.2, 1.3 or 1.5
——	**114**	Explosives, division 1.4 or 1.6
——	**153**	Toxins
1001	**116**	Acetylene
1001	**116**	Acetylene, dissolved
1002	**122**	Air, compressed
1003	**122**	Air, refrigerated liquid (cryogenic liquid)
1003	**122**	Air, refrigerated liquid (cryogenic liquid), non-pressurized
1005	**125**	Ammonia, anhydrous
1005	**125**	Anhydrous ammonia
1006	**121**	Argon
1006	**121**	Argon, compressed
1008	**125**	Boron trifluoride
1008	**125**	Boron trifluoride, compressed
1009	**126**	Bromotrifluoromethane
1009	**126**	Refrigerant gas R-13B1
1010	**116P**	Butadienes, stabilized
1010	**116P**	Butadienes and hydrocarbon mixture, stabilized
1011	**115**	Butane
1011	**115**	Butane mixture
1012	**115**	Butylene
1013	**120**	Carbon dioxide
1013	**120**	Carbon dioxide, compressed
1014	**122**	Carbon dioxide and Oxygen mixture, compressed
1014	**122**	Oxygen and Carbon dioxide mixture, compressed
1015	**126**	Carbon dioxide and Nitrous oxide mixture
1015	**126**	Nitrous oxide and Carbon dioxide mixture
1016	**119**	Carbon monoxide
1016	**119**	Carbon monoxide, compressed
1017	**124**	Chlorine
1018	**126**	Chlorodifluoromethane
1018	**126**	Refrigerant gas R-22
1020	**126**	Chloropentafluoroethane
1020	**126**	Refrigerant gas R-115
1021	**126**	1-Chloro-1,2,2,2-tetrafluoroethane
1021	**126**	Chlorotetrafluoroethane
1021	**126**	Refrigerant gas R-124
1022	**126**	Chlorotrifluoromethane
1022	**126**	Refrigerant gas R-13
1023	**119**	Coal gas
1023	**119**	Coal gas, compressed
1026	**119**	Cyanogen
1026	**119**	Cyanogen gas
1027	**115**	Cyclopropane
1028	**126**	Dichlorodifluoromethane
1028	**126**	Refrigerant gas R-12
1029	**126**	Dichlorofluoromethane
1029	**126**	Refrigerant gas R-21
1030	**115**	1,1-Difluoroethane
1030	**115**	Difluoroethane
1030	**115**	Refrigerant gas R-152a
1032	**118**	Dimethylamine, anhydrous
1033	**115**	Dimethyl ether

ID No.	Guide No.	Name of Material
1035	115	Ethane
1035	115	Ethane, compressed
1036	118	Ethylamine
1037	115	Ethyl chloride
1038	115	Ethylene, refrigerated liquid (cryogenic liquid)
1039	115	Ethyl methyl ether
1039	115	Methyl ethyl ether
1040	119P	Ethylene oxide
1040	119P	Ethylene oxide with Nitrogen
1041	115	Carbon dioxide and Ethylene oxide mixture, with more than 9% but not more than 87% Ethylene oxide
1041	115	Carbon dioxide and Ethylene oxide mixtures, with more than 6% Ethylene oxide
1041	115	Ethylene oxide and Carbon dioxide mixture, with more than 9% but not more than 87% Ethylene oxide
1041	115	Ethylene oxide and Carbon dioxide mixtures, with more than 6 % Ethylene oxide
1043	125	Fertilizer, ammoniating solution, with free Ammonia
1044	126	Fire extinguishers with compressed gas
1044	126	Fire extinguishers with liquefied gas
1045	124	Fluorine
1045	124	Fluorine, compressed
1046	121	Helium
1046	121	Helium, compressed
1048	125	Hydrogen bromide, anhydrous
1049	115	Hydrogen
1049	115	Hydrogen, compressed
1050	125	Hydrogen chloride, anhydrous
1051	117	AC
1051	117	Hydrocyanic acid, aqueous solutions, with more than 20% Hydrogen cyanide
1051	117	Hydrogen cyanide, anhydrous, stabilized
1051	117	Hydrogen cyanide, stabilized
1052	125	Hydrogen fluoride, anhydrous
1053	117	Hydrogen sulfide
1053	117	Hydrogen sulphide
1055	115	Isobutylene
1056	121	Krypton
1056	121	Krypton, compressed
1057	115	Lighter refills (cigarettes) (flammable gas)
1057	115	Lighters (cigarettes) (flammable gas)
1058	120	Liquefied gases, non-flammable, charged with Nitrogen, Carbon dioxide or Air
1060	116P	Methylacetylene and Propadiene mixture, stabilized
1060	116P	Propadiene and Methylacetylene mixture, stabilized
1061	118	Methylamine, anhydrous
1062	123	Methyl bromide
1063	115	Methyl chloride
1063	115	Refrigerant gas R-40
1064	117	Methyl mercaptan
1065	121	Neon
1065	121	Neon, compressed
1066	121	Nitrogen

ID No.	Guide No.	Name of Material
1066	121	Nitrogen, compressed
1067	124	Dinitrogen tetroxide
1067	124	Nitrogen dioxide
1069	125	Nitrosyl chloride
1070	122	Nitrous oxide
1070	122	Nitrous oxide, compressed
1071	119	Oil gas
1071	119	Oil gas, compressed
1072	122	Oxygen
1072	122	Oxygen, compressed
1073	122	Oxygen, refrigerated liquid (cryogenic liquid)
1075	115	Butane
1075	115	Butane mixture
1075	115	Butylene
1075	115	Isobutane
1075	115	Isobutane mixture
1075	115	Isobutylene
1075	115	Liquefied petroleum gas
1075	115	LPG
1075	115	Petroleum gases, liquefied
1075	115	Propane
1075	115	Propane mixture
1075	115	Propylene
1076	125	CG
1076	125	Diphosgene
1076	125	DP
1076	125	Phosgene
1077	115	Propylene
1078	126	Dispersant gas, n.o.s.
1078	126	Refrigerant gas, n.o.s.

ID No.	Guide No.	Name of Material
1079	125	Sulfur dioxide
1079	125	Sulphur dioxide
1080	126	Sulfur hexafluoride
1080	126	Sulphur hexafluoride
1081	116P	Tetrafluoroethylene, stabilized
1082	119P	Trifluorochloroethylene, stabilized
1083	118	Trimethylamine, anhydrous
1085	116P	Vinyl bromide, stabilized
1086	116P	Vinyl chloride, stabilized
1087	116P	Vinyl methyl ether, stabilized
1088	127	Acetal
1089	129	Acetaldehyde
1090	127	Acetone
1091	127	Acetone oils
1092	131P	Acrolein, stabilized
1093	131P	Acrylonitrile, stabilized
1098	131	Allyl alcohol
1099	131	Allyl bromide
1100	131	Allyl chloride
1104	129	Amyl acetates
1105	129	Amyl alcohols
1105	129	Pentanols
1106	132	Amylamines
1107	129	Amyl chloride
1108	128	n-Amylene
1108	128	1-Pentene
1109	129	Amyl formates
1110	127	n-Amyl methyl ketone
1110	127	Amyl methyl ketone
1110	127	Methyl amyl ketone

ID No.	Guide No.	Name of Material
1111	**130**	Amyl mercaptan
1112	**140**	Amyl nitrate
1113	**129**	Amyl nitrite
1114	**130**	Benzene
1120	**129**	Butanols
1123	**129**	Butyl acetates
1125	**132**	n-Butylamine
1126	**130**	1-Bromobutane
1126	**130**	n-Butyl bromide
1127	**130**	Butyl chloride
1127	**130**	Chlorobutanes
1128	**129**	n-Butyl formate
1129	**129**	Butyraldehyde
1130	**128**	Camphor oil
1131	**131**	Carbon bisulfide
1131	**131**	Carbon bisulphide
1131	**131**	Carbon disulfide
1131	**131**	Carbon disulphide
1133	**128**	Adhesives (flammable)
1134	**130**	Chlorobenzene
1135	**131**	Ethylene chlorohydrin
1136	**128**	Coal tar distillates, flammable
1139	**127**	Coating solution
1143	**131P**	Crotonaldehyde
1143	**131P**	Crotonaldehyde, stabilized
1144	**128**	Crotonylene
1145	**128**	Cyclohexane
1146	**128**	Cyclopentane
1147	**130**	Decahydronaphthalene
1148	**129**	Diacetone alcohol
1149	**128**	Butyl ethers

ID No.	Guide No.	Name of Material
1149	**128**	Dibutyl ethers
1150	**130P**	1,2-Dichloroethylene
1150	**130P**	Dichloroethylene
1152	**130**	Dichloropentanes
1153	**127**	Ethylene glycol diethyl ether
1154	**132**	Diethylamine
1155	**127**	Diethyl ether
1155	**127**	Ethyl ether
1156	**127**	Diethyl ketone
1157	**128**	Diisobutyl ketone
1158	**132**	Diisopropylamine
1159	**127**	Diisopropyl ether
1160	**132**	Dimethylamine, aqueous solution
1160	**132**	Dimethylamine, solution
1161	**129**	Dimethyl carbonate
1162	**155**	Dimethyldichlorosilane
1163	**131**	1,1-Dimethylhydrazine
1163	**131**	Dimethylhydrazine, unsymmetrical
1164	**130**	Dimethyl sulfide
1164	**130**	Dimethyl sulphide
1165	**127**	Dioxane
1166	**127**	Dioxolane
1167	**128P**	Divinyl ether, stabilized
1169	**127**	Extracts, aromatic, liquid
1170	**127**	Ethanol
1170	**127**	Ethanol, solution
1170	**127**	Ethyl alcohol
1170	**127**	Ethyl alcohol, solution
1171	**127**	Ethylene glycol monoethyl ether
1172	**129**	Ethylene glycol monoethyl ether acetate

ID No.	Guide No.	Name of Material
1173	**129**	Ethyl acetate
1175	**130**	Ethylbenzene
1176	**129**	Ethyl borate
1177	**130**	2-Ethylbutyl acetate
1177	**130**	Ethylbutyl acetate
1178	**130**	2-Ethylbutyraldehyde
1179	**127**	Ethyl butyl ether
1180	**130**	Ethyl butyrate
1181	**155**	Ethyl chloroacetate
1182	**155**	Ethyl chloroformate
1183	**139**	Ethyldichlorosilane
1184	**131**	Ethylene dichloride
1185	**131P**	Ethyleneimine, stabilized
1188	**127**	Ethylene glycol monomethyl ether
1189	**129**	Ethylene glycol monomethyl ether acetate
1190	**129**	Ethyl formate
1191	**129**	Ethylhexaldehydes
1191	**129**	Octyl aldehydes
1192	**129**	Ethyl lactate
1193	**127**	Ethyl methyl ketone
1193	**127**	Methyl ethyl ketone
1194	**131**	Ethyl nitrite, solution
1195	**129**	Ethyl propionate
1196	**155**	Ethyltrichlorosilane
1197	**127**	Extracts, flavoring, liquid
1197	**127**	Extracts, flavouring, liquid
1198	**132**	Formaldehyde, solution, flammable
1198	**132**	Formaldehyde, solutions (Formalin)
1199	**132P**	Furaldehydes
1199	**132P**	Furfural
1199	**132P**	Furfuraldehydes
1201	**127**	Fusel oil
1202	**128**	Diesel fuel
1202	**128**	Fuel oil
1202	**128**	Fuel oil, no. 1,2,4,5,6
1202	**128**	Gas oil
1202	**128**	Heating oil, light
1203	**128**	Gasohol
1203	**128**	Gasoline
1203	**128**	Motor spirit
1203	**128**	Petrol
1204	**127**	Nitroglycerin, solution in alcohol, with not more than 1% Nitroglycerin
1206	**128**	Heptanes
1207	**130**	Hexaldehyde
1208	**128**	Hexanes
1208	**128**	Neohexane
1210	**129**	Ink, printer's, flammable
1210	**129**	Printing ink, flammable
1210	**129**	Printing ink related material
1212	**129**	Isobutanol
1212	**129**	Isobutyl alcohol
1213	**129**	Isobutyl acetate
1214	**132**	Isobutylamine
1216	**128**	Isooctenes
1218	**130P**	Isoprene, stabilized
1219	**129**	Isopropanol
1219	**129**	Isopropyl alcohol
1220	**129**	Isopropyl acetate
1221	**132**	Isopropylamine
1222	**130**	Isopropyl nitrate

ID No.	Guide No.	Name of Material
1223	**128**	Kerosene
1224	**127**	Ketones, liquid, n.o.s.
1228	**131**	Mercaptan mixture, liquid, flammable, poisonous, n.o.s.
1228	**131**	Mercaptan mixture, liquid, flammable, toxic, n.o.s.
1228	**131**	Mercaptans, liquid, flammable, poisonous, n.o.s.
1228	**131**	Mercaptans, liquid, flammable, toxic, n.o.s.
1229	**129**	Mesityl oxide
1230	**131**	Methanol
1230	**131**	Methyl alcohol
1231	**129**	Methyl acetate
1233	**130**	Methylamyl acetate
1234	**127**	Methylal
1235	**132**	Methylamine, aqueous solution
1237	**129**	Methyl butyrate
1238	**155**	Methyl chloroformate
1239	**131**	Methyl chloromethyl ether
1242	**139**	Methyldichlorosilane
1243	**129**	Methyl formate
1244	**131**	Methylhydrazine
1245	**127**	Methyl isobutyl ketone
1246	**127P**	Methyl isopropenyl ketone, stabilized
1247	**129P**	Methyl methacrylate monomer, stabilized
1248	**129**	Methyl propionate
1249	**127**	Methyl propyl ketone
1250	**155**	Methyltrichlorosilane
1251	**131P**	Methyl vinyl ketone, stabilized
1259	**131**	Nickel carbonyl
1261	**129**	Nitromethane

ID No.	Guide No.	Name of Material
1262	**128**	Isooctane
1262	**128**	Octanes
1263	**128**	Paint (flammable)
1263	**128**	Paint related material (flammable)
1264	**129**	Paraldehyde
1265	**128**	Isopentane
1265	**128**	n-Pentane
1265	**128**	Pentanes
1266	**127**	Perfumery products, with flammable solvents
1267	**128**	Petroleum crude oil
1268	**128**	Petroleum distillates, n.o.s.
1268	**128**	Petroleum products, n.o.s.
1270	**128**	Oil, petroleum
1270	**128**	Petroleum oil
1272	**129**	Pine oil
1274	**129**	n-Propanol
1274	**129**	normal Propyl alcohol
1274	**129**	Propyl alcohol, normal
1275	**129**	Propionaldehyde
1276	**129**	n-Propyl acetate
1277	**132**	Monopropylamine
1277	**132**	Propylamine
1278	**129**	1-Chloropropane
1278	**129**	Propyl chloride
1279	**130**	1,2-Dichloropropane
1279	**130**	Dichloropropane
1279	**130**	Propylene dichloride
1280	**127P**	Propylene oxide
1281	**129**	Propyl formates
1282	**129**	Pyridine
1286	**127**	Rosin oil

ID No.	Guide No.	Name of Material
1287	**127**	Rubber solution
1288	**128**	Shale oil
1289	**132**	Sodium methylate, solution in alcohol
1292	**129**	Ethyl silicate
1292	**129**	Tetraethyl silicate
1293	**127**	Tinctures, medicinal
1294	**130**	Toluene
1295	**139**	Trichlorosilane
1296	**132**	Triethylamine
1297	**132**	Trimethylamine, aqueous solution
1298	**155**	Trimethylchlorosilane
1299	**128**	Turpentine
1300	**128**	Turpentine substitute
1301	**129P**	Vinyl acetate, stabilized
1302	**127P**	Vinyl ethyl ether, stabilized
1303	**130P**	Vinylidene chloride, stabilized
1304	**127P**	Vinyl isobutyl ether, stabilized
1305	**155P**	Vinyltrichlorosilane
1305	**155P**	Vinyltrichlorosilane, stabilized
1306	**129**	Wood preservatives, liquid
1307	**130**	Xylenes
1308	**170**	Zirconium metal, liquid suspension
1308	**170**	Zirconium suspended in a flammable liquid
1308	**170**	Zirconium suspended in a liquid (flammable)
1309	**170**	Aluminum powder, coated
1310	**113**	Ammonium picrate, wetted with not less than 10% water
1312	**133**	Borneol
1313	**133**	Calcium resinate
1314	**133**	Calcium resinate, fused
1318	**133**	Cobalt resinate, precipitated
1320	**113**	Dinitrophenol, wetted with not less than 15% water
1321	**113**	Dinitrophenolates, wetted with not less than 15% water
1322	**113**	Dinitroresorcinol, wetted with not less than 15% water
1323	**170**	Ferrocerium
1324	**133**	Films, nitrocellulose base
1325	**133**	Flammable solid, n.o.s.
1325	**133**	Flammable solid, organic, n.o.s.
1325	**133**	Fusee (rail or highway)
1326	**170**	Hafnium powder, wetted with not less than 25% water
1327	**133**	Bhusa, wet, damp or contaminated with oil
1327	**133**	Hay, wet, damp or contaminated with oil
1327	**133**	Straw, wet, damp or contaminated with oil
1328	**133**	Hexamethylenetetramine
1328	**133**	Hexamine
1330	**133**	Manganese resinate
1331	**133**	Matches, “strike anywhere”
1332	**133**	Metaldehyde
1333	**170**	Cerium, slabs, ingots or rods
1334	**133**	Naphthalene, crude
1334	**133**	Naphthalene, refined
1336	**113**	Nitroguanidine (Picrite), wetted with not less than 20% water
1336	**113**	Nitroguanidine, wetted with not less than 20% water
1336	**113**	Picrite, wetted
1337	**113**	Nitrostarch, wetted with not less than 20% water

ID No.	Guide No.	Name of Material
1337	**113**	Nitrostarch, wetted with not less than 30% solvent
1338	**133**	Phosphorus, amorphous
1338	**133**	Phosphorus, amorphous, red
1338	**133**	Red phosphorus
1338	**133**	Red phosphorus, amorphous
1339	**139**	Phosphorus heptasulfide, free from yellow and white Phosphorus
1339	**139**	Phosphorus heptasulphide, free from yellow and white Phosphorus
1340	**139**	Phosphorus pentasulfide, free from yellow and white Phosphorus
1340	**139**	Phosphorus pentasulphide, free from yellow and white Phosphorus
1341	**139**	Phosphorus sesquisulfide, free from yellow and white Phosphorus
1341	**139**	Phosphorus sesquisulphide, free from yellow and white Phosphorus
1343	**139**	Phosphorus trisulfide, free from yellow and white Phosphorus
1343	**139**	Phosphorus trisulphide, free from yellow and white Phosphorus
1344	**113**	Picric acid, wetted with not less than 30% water
1344	**113**	Trinitrophenol, wetted with not less than 30% water
1345	**133**	Rubber scrap, powdered or granulated
1345	**133**	Rubber shoddy, powdered or granulated
1346	**170**	Silicon powder, amorphous
1347	**113**	Silver picrate, wetted with not less than 30% water

ID No.	Guide No.	Name of Material
1348	**113**	Sodium dinitro-o-cresolate, wetted with not less than 15% water
1348	**113**	Sodium dinitro-ortho-cresolate, wetted
1349	**113**	Sodium picramate, wetted with not less than 20% water
1350	**133**	Sulfur
1350	**133**	Sulphur
1352	**170**	Titanium powder, wetted with not less than 25% water
1353	**133**	Fabrics impregnated with weakly nitrated Nitrocellulose, n.o.s.
1353	**133**	Fibers impregnated with weakly nitrated Nitrocellulose, n.o.s.
1353	**133**	Fibres impregnated with weakly nitrated Nitrocellulose, n.o.s.
1353	**133**	Toe puffs, nitrocellulose base
1354	**113**	Trinitrobenzene, wetted with not less than 30% water
1355	**113**	Trinitrobenzoic acid, wetted with not less than 30% water
1356	**113**	TNT, wetted with not less than 30% water
1356	**113**	Trinitrotoluene, wetted with not less than 30% water
1357	**113**	Urea nitrate, wetted with not less than 20% water
1358	**170**	Zirconium metal, powder, wet
1358	**170**	Zirconium powder, wetted with not less than 25% water
1360	**139**	Calcium phosphide
1361	**133**	Carbon, animal or vegetable origin
1361	**133**	Charcoal
1362	**133**	Carbon, activated
1363	**135**	Copra

ID No.	Guide No.	Name of Material
1364	133	Cotton waste, oily
1365	133	Cotton
1365	133	Cotton, wet
1366	135	Diethylzinc
1369	135	p-Nitrosodimethylaniline
1370	135	Dimethylzinc
1372	133	Fiber, animal or vegetable, n.o.s., burnt, wet or damp
1372	133	Fibers, animal or vegetable, burnt, wet or damp
1372	133	Fibres, animal or vegetable, burnt, wet or damp
1373	133	Fabrics, animal or vegetable or synthetic, n.o.s. with oil
1373	133	Fibers, animal or vegetable or synthetic, n.o.s. with oil
1373	133	Fibres, animal or vegetable or synthetic, n.o.s. with oil
1374	133	Fish meal, unstabilized
1374	133	Fish scrap, unstabilized
1376	135	Iron oxide, spent
1376	135	Iron sponge, spent
1378	170	Metal catalyst, wetted
1379	133	Paper, unsaturated oil treated
1380	135	Pentaborane
1381	136	Phosphorus, white, dry or under water or in solution
1381	136	Phosphorus, yellow, dry or under water or in solution
1381	136	White phosphorus, dry
1381	136	White phosphorus, in solution
1381	136	White phosphorus, under water
1381	136	Yellow phosphorus, dry
1381	136	Yellow phosphorus, in solution
1381	136	Yellow phosphorus, under water

ID No.	Guide No.	Name of Material
1382	135	Potassium sulfide, anhydrous
1382	135	Potassium sulfide, with less than 30% water of crystallization
1382	135	Potassium sulfide, with less than 30% water of hydration
1382	135	Potassium sulphide, anhydrous
1382	135	Potassium sulphide, with less than 30% water of crystallization
1382	135	Potassium sulphide, with less than 30% water of hydration
1383	135	Aluminum powder, pyrophoric
1383	135	Pyrophoric alloy, n.o.s.
1383	135	Pyrophoric metal, n.o.s.
1384	135	Sodium dithionite
1384	135	Sodium hydrosulfite
1384	135	Sodium hydrosulphite
1385	135	Sodium sulfide, anhydrous
1385	135	Sodium sulfide, with less than 30% water of crystallization
1385	135	Sodium sulphide, anhydrous
1385	135	Sodium sulphide, with less than 30% water of crystallization
1386	135	Seed cake, with more than 1.5% oil and not more than 11% moisture
1387	133	Wool waste, wet
1389	138	Alkali metal amalgam
1389	138	Alkali metal amalgam, liquid
1389	138	Alkali metal amalgam, solid
1390	139	Alkali metal amides
1391	138	Alkali metal dispersion
1391	138	Alkaline earth metal dispersion
1392	138	Alkaline earth metal amalgam

ID No.	Guide No.	Name of Material
1392	138	Alkaline earth metal amalgam, liquid
1393	138	Alkaline earth metal alloy, n.o.s.
1394	138	Aluminum carbide
1395	139	Aluminum ferrosilicon powder
1396	138	Aluminum powder, uncoated
1397	139	Aluminum phosphide
1398	138	Aluminum silicon powder, uncoated
1400	138	Barium
1401	138	Calcium
1402	138	Calcium carbide
1403	138	Calcium cyanamide, with more than 0.1% Calcium carbide
1404	138	Calcium hydride
1405	138	Calcium silicide
1407	138	Caesium
1407	138	Cesium
1408	139	Ferrosilicon
1409	138	Hydrides, metal, n.o.s.
1409	138	Metal hydrides, water-reactive, n.o.s.
1410	138	Lithium aluminum hydride
1411	138	Lithium aluminum hydride, ethereal
1413	138	Lithium borohydride
1414	138	Lithium hydride
1415	138	Lithium
1417	138	Lithium silicon
1418	138	Magnesium alloys powder
1418	138	Magnesium powder
1419	139	Magnesium aluminum phosphide
1420	138	Potassium, metal alloys

ID No.	Guide No.	Name of Material
1420	138	Potassium, metal alloys, liquid
1421	138	Alkali metal alloy, liquid, n.o.s.
1422	138	Potassium sodium alloys
1422	138	Potassium sodium alloys, liquid
1422	138	Sodium potassium alloys
1422	138	Sodium potassium alloys, liquid
1423	138	Rubidium
1423	138	Rubidium metal
1426	138	Sodium borohydride
1427	138	Sodium hydride
1428	138	Sodium
1431	138	Sodium methylate
1431	138	Sodium methylate, dry
1432	139	Sodium phosphide
1433	139	Stannic phosphides
1435	138	Zinc ashes
1435	138	Zinc dross
1435	138	Zinc residue
1435	138	Zinc skimmings
1436	138	Zinc dust
1436	138	Zinc powder
1437	138	Zirconium hydride
1438	140	Aluminum nitrate
1439	141	Ammonium dichromate
1442	143	Ammonium perchlorate
1444	140	Ammonium persulfate
1444	140	Ammonium persulphate
1445	141	Barium chlorate
1445	141	Barium chlorate, solid
1446	141	Barium nitrate
1447	141	Barium perchlorate
1447	141	Barium perchlorate, solid

ID No.	Guide No.	Name of Material
1448	**141**	Barium permanganate
1449	**141**	Barium peroxide
1450	**141**	Bromates, inorganic, n.o.s.
1451	**140**	Caesium nitrate
1451	**140**	Cesium nitrate
1452	**140**	Calcium chlorate
1453	**140**	Calcium chlorite
1454	**140**	Calcium nitrate
1455	**140**	Calcium perchlorate
1456	**140**	Calcium permanganate
1457	**140**	Calcium peroxide
1458	**140**	Borate and Chlorate mixtures
1458	**140**	Chlorate and Borate mixtures
1459	**140**	Chlorate and Magnesium chloride mixture
1459	**140**	Chlorate and Magnesium chloride mixture, solid
1459	**140**	Magnesium chloride and Chlorate mixture
1459	**140**	Magnesium chloride and Chlorate mixture, solid
1461	**140**	Chlorates, inorganic, n.o.s.
1462	**143**	Chlorites, inorganic, n.o.s.
1463	**141**	Chromium trioxide, anhydrous
1465	**140**	Didymium nitrate
1466	**140**	Ferric nitrate
1467	**143**	Guanidine nitrate
1469	**141**	Lead nitrate
1470	**141**	Lead perchlorate
1470	**141**	Lead perchlorate, solid
1470	**141**	Lead perchlorate, solution
1471	**140**	Lithium hypochlorite, dry
1471	**140**	Lithium hypochlorite mixture

ID No.	Guide No.	Name of Material
1471	**140**	Lithium hypochlorite mixtures, dry
1472	**143**	Lithium peroxide
1473	**140**	Magnesium bromate
1474	**140**	Magnesium nitrate
1475	**140**	Magnesium perchlorate
1476	**140**	Magnesium peroxide
1477	**140**	Nitrates, inorganic, n.o.s.
1479	**140**	Oxidizing solid, n.o.s.
1481	**140**	Perchlorates, inorganic, n.o.s.
1482	**140**	Permanganates, inorganic, n.o.s.
1483	**140**	Peroxides, inorganic, n.o.s.
1484	**140**	Potassium bromate
1485	**140**	Potassium chlorate
1486	**140**	Potassium nitrate
1487	**140**	Potassium nitrate and Sodium nitrite mixture
1487	**140**	Sodium nitrite and Potassium nitrate mixture
1488	**140**	Potassium nitrite
1489	**140**	Potassium perchlorate
1490	**140**	Potassium permanganate
1491	**144**	Potassium peroxide
1492	**140**	Potassium persulfate
1492	**140**	Potassium persulphate
1493	**140**	Silver nitrate
1494	**141**	Sodium bromate
1495	**140**	Sodium chlorate
1496	**143**	Sodium chlorite
1498	**140**	Sodium nitrate
1499	**140**	Potassium nitrate and Sodium nitrate mixture

ID No.	Guide No.	Name of Material
1499	140	Sodium nitrate and Potassium nitrate mixture
1500	140	Sodium nitrite
1502	140	Sodium perchlorate
1503	140	Sodium permanganate
1504	144	Sodium peroxide
1505	140	Sodium persulfate
1505	140	Sodium persulphate
1506	143	Strontium chlorate
1506	143	Strontium chlorate, solid
1506	143	Strontium chlorate, solution
1507	140	Strontium nitrate
1508	140	Strontium perchlorate
1509	143	Strontium peroxide
1510	143	Tetranitromethane
1511	140	Urea hydrogen peroxide
1512	140	Zinc ammonium nitrite
1513	140	Zinc chlorate
1514	140	Zinc nitrate
1515	140	Zinc permanganate
1516	143	Zinc peroxide
1517	113	Zirconium picramate, wetted with not less than 20% water
1541	155	Acetone cyanohydrin, stabilized
1544	151	Alkaloids, solid, n.o.s. (poisonous)
1544	151	Alkaloid salts, solid, n.o.s. (poisonous)
1545	155	Allyl isothiocyanate, stabilized
1546	151	Ammonium arsenate
1547	153	Aniline
1548	153	Aniline hydrochloride
1549	157	Antimony compound, inorganic, n.o.s.

ID No.	Guide No.	Name of Material
1549	157	Antimony compound, inorganic, solid, n.o.s.
1550	151	Antimony lactate
1551	151	Antimony potassium tartrate
1553	154	Arsenic acid, liquid
1554	154	Arsenic acid, solid
1555	151	Arsenic bromide
1556	152	Arsenic compound, liquid, n.o.s.
1556	152	Arsenic compound, liquid, n.o.s., inorganic
1556	152	MD
1556	152	Methyldichloroarsine
1556	152	PD
1557	152	Arsenic compound, solid, n.o.s.
1557	152	Arsenic compound, solid, n.o.s., inorganic
1558	152	Arsenic
1559	151	Arsenic pentoxide
1560	157	Arsenic chloride
1560	157	Arsenic trichloride
1561	151	Arsenic trioxide
1562	152	Arsenical dust
1564	154	Barium compound, n.o.s.
1565	157	Barium cyanide
1566	154	Beryllium compound, n.o.s.
1567	134	Beryllium powder
1569	131	Bromoacetone
1570	152	Brucine
1571	113	Barium azide, wetted with not less than 50% water
1572	151	Cacodylic acid
1573	151	Calcium arsenate

ID No.	Guide No.	Name of Material
1574	151	Calcium arsenate and Calcium arsenite mixture, solid
1574	151	Calcium arsenite and Calcium arsenate mixture, solid
1575	157	Calcium cyanide
1577	153	Chlorodinitrobenzenes
1577	153	Chlorodinitrobenzenes, liquid
1577	153	Chlorodinitrobenzenes, solid
1577	153	Dinitrochlorobenzenes
1578	152	Chloronitrobenzenes
1578	152	Chloronitrobenzenes, liquid
1578	152	Chloronitrobenzenes, solid
1579	153	4-Chloro-o-toluidine hydrochloride
1579	153	4-Chloro-o-toluidine hydrochloride, solid
1580	154	Chloropicrin
1581	123	Chloropicrin and Methyl bromide mixture
1581	123	Methyl bromide and Chloropicrin mixture
1582	119	Chloropicrin and Methyl chloride mixture
1582	119	Methyl chloride and Chloropicrin mixture
1583	154	Chloropicrin mixture, n.o.s.
1585	151	Copper acetoarsenite
1586	151	Copper arsenite
1587	151	Copper cyanide
1588	157	Cyanides, inorganic, n.o.s.
1588	157	Cyanides, inorganic, solid, n.o.s.
1589	125	CK
1589	125	Cyanogen chloride, stabilized
1590	153	Dichloroanilines
1590	153	Dichloroanilines, liquid
1590	153	Dichloroanilines, solid
1591	152	o-Dichlorobenzene
1593	160	Dichloromethane
1593	160	Methylene chloride
1594	152	Diethyl sulfate
1594	152	Diethyl sulphate
1595	156	Dimethyl sulfate
1595	156	Dimethyl sulphate
1596	153	Dinitroanilines
1597	152	Dinitrobenzenes
1597	152	Dinitrobenzenes, liquid
1597	152	Dinitrobenzenes, solid
1598	153	Dinitro-o-cresol
1599	153	Dinitrophenol, solution
1600	152	Dinitrotoluenes, molten
1601	151	Disinfectant, solid, poisonous, n.o.s.
1601	151	Disinfectant, solid, toxic, n.o.s.
1601	151	Disinfectants, solid, n.o.s. (poisonous)
1602	151	Dye, liquid, poisonous, n.o.s.
1602	151	Dye, liquid, toxic, n.o.s.
1602	151	Dye intermediate, liquid, poisonous, n.o.s.
1602	151	Dye intermediate, liquid, toxic, n.o.s.
1603	155	Ethyl bromoacetate
1604	132	Ethylenediamine
1605	154	Ethylene dibromide
1606	151	Ferric arsenate
1607	151	Ferric arsenite
1608	151	Ferrous arsenate

ID No.	Guide No.	Name of Material
1611	151	Hexaethyl tetraphosphate
1611	151	Hexaethyl tetraphosphate, liquid
1611	151	Hexaethyl tetraphosphate, solid
1612	123	Hexaethyl tetraphosphate and compressed gas mixture
1613	154	Hydrocyanic acid, aqueous solution, with less than 5% Hydrogen cyanide
1613	154	Hydrocyanic acid, aqueous solution, with not more than 20% Hydrogen cyanide
1613	154	Hydrogen cyanide, aqueous solution, with not more than 20% Hydrogen cyanide
1614	152	Hydrogen cyanide, stabilized (absorbed)
1616	151	Lead acetate
1617	151	Lead arsenates
1618	151	Lead arsenites
1620	151	Lead cyanide
1621	151	London purple
1622	151	Magnesium arsenate
1623	151	Mercuric arsenate
1624	154	Mercuric chloride
1625	141	Mercuric nitrate
1626	157	Mercuric potassium cyanide
1627	141	Mercurous nitrate
1629	151	Mercury acetate
1630	151	Mercury ammonium chloride
1631	154	Mercury benzoate
1634	154	Mercuric bromide
1634	154	Mercurous bromide
1634	154	Mercury bromides
1636	154	Mercuric cyanide

ID No.	Guide No.	Name of Material
1636	154	Mercury cyanide
1637	151	Mercury gluconate
1638	151	Mercury iodide
1639	151	Mercury nucleate
1640	151	Mercury oleate
1641	151	Mercury oxide
1642	151	Mercuric oxycyanide
1642	151	Mercury oxycyanide, desensitized
1643	151	Mercury potassium iodide
1644	151	Mercury salicylate
1645	151	Mercuric sulfate
1645	151	Mercuric sulphate
1645	151	Mercury sulfate
1645	151	Mercury sulphate
1646	151	Mercury thiocyanate
1647	151	Ethylene dibromide and Methyl bromide mixture, liquid
1647	151	Methyl bromide and Ethylene dibromide mixture, liquid
1648	127	Acetonitrile
1648	127	Methyl cyanide
1649	131	Motor fuel anti-knock mixture
1650	153	beta-Naphthylamine
1650	153	beta-Naphthylamine, solid
1650	153	Naphthylamine (beta)
1650	153	Naphthylamine (beta), solid
1651	153	Naphthylthiourea
1652	153	Naphthylurea
1653	151	Nickel cyanide
1654	151	Nicotine
1655	151	Nicotine compound, solid, n.o.s.

ID No.	Guide No.	Name of Material
1655	151	Nicotine preparation, solid, n.o.s.
1656	151	Nicotine hydrochloride
1656	151	Nicotine hydrochloride, liquid
1656	151	Nicotine hydrochloride, solid
1656	151	Nicotine hydrochloride, solution
1657	151	Nicotine salicylate
1658	151	Nicotine sulfate, solid
1658	151	Nicotine sulfate, solution
1658	151	Nicotine sulphate, solid
1658	151	Nicotine sulphate, solution
1659	151	Nicotine tartrate
1660	124	Nitric oxide
1660	124	Nitric oxide, compressed
1661	153	Nitroanilines
1662	152	Nitrobenzene
1663	153	Nitrophenols
1664	152	Nitrotoluenes
1664	152	Nitrotoluenes, liquid
1664	152	Nitrotoluenes, solid
1665	152	Nitroxylenes
1665	152	Nitroxylenes, liquid
1665	152	Nitroxylenes, solid
1669	151	Pentachloroethane
1670	157	Perchloromethyl mercaptan
1671	153	Phenol, solid
1672	151	Phenylcarbylamine chloride
1673	153	Phenylenediamines
1674	151	Phenylmercuric acetate
1677	151	Potassium arsenate
1678	154	Potassium arsenite
1679	157	Potassium cuprocyanide
1680	157	Potassium cyanide
1680	157	Potassium cyanide, solid
1683	151	Silver arsenite
1684	151	Silver cyanide
1685	151	Sodium arsenate
1686	154	Sodium arsenite, aqueous solution
1687	153	Sodium azide
1688	152	Sodium cacodylate
1689	157	Sodium cyanide
1689	157	Sodium cyanide, solid
1690	154	Sodium fluoride
1690	154	Sodium fluoride, solid
1691	151	Strontium arsenite
1692	151	Strychnine
1692	151	Strychnine salts
1693	159	Tear gas devices
1693	159	Tear gas substance, liquid, n.o.s.
1693	159	Tear gas substance, solid, n.o.s.
1694	159	Bromobenzyl cyanides
1694	159	Bromobenzyl cyanides, liquid
1694	159	Bromobenzyl cyanides, solid
1694	159	CA
1695	131	Chloroacetone, stabilized
1697	153	Chloroacetophenone
1697	153	Chloroacetophenone, liquid
1697	153	Chloroacetophenone, solid
1697	153	CN
1698	154	Adamsite
1698	154	Diphenylamine chloroarsine

ID No.	Guide No.	Name of Material
1698	154	DM
1699	151	DA
1699	151	Diphenylchloroarsine
1699	151	Diphenylchloroarsine, liquid
1699	151	Diphenylchloroarsine, solid
1700	159	Tear gas candles
1700	159	Tear gas grenades
1701	152	Xylyl bromide
1701	152	Xylyl bromide, liquid
1702	151	1,1,2,2-Tetrachloroethane
1702	151	Tetrachloroethane
1704	153	Tetraethyl dithiopyrophosphate
1704	153	Tetraethyl dithiopyrophosphate, mixture, dry or liquid
1707	151	Thallium compound, n.o.s.
1708	153	Toluidines
1708	153	Toluidines, liquid
1708	153	Toluidines, solid
1709	151	2,4-Toluenediamine
1709	151	2,4-Toluylenediamine
1709	151	2,4-Toluylenediamine, solid
1710	160	Trichloroethylene
1711	153	Xylidines
1711	153	Xylidines, liquid
1711	153	Xylidines, solid
1712	151	Zinc arsenate
1712	151	Zinc arsenate and Zinc arsenite mixture
1712	151	Zinc arsenite
1712	151	Zinc arsenite and Zinc arsenate mixture
1713	151	Zinc cyanide
1714	139	Zinc phosphide

ID No.	Guide No.	Name of Material
1715	137	Acetic anhydride
1716	156	Acetyl bromide
1717	155	Acetyl chloride
1718	153	Acid butyl phosphate
1718	153	Butyl acid phosphate
1719	154	Caustic alkali liquid, n.o.s.
1722	155	Allyl chlorocarbonate
1722	155	Allyl chloroformate
1723	132	Allyl iodide
1724	155	Allyltrichlorosilane, stabilized
1725	137	Aluminum bromide, anhydrous
1726	137	Aluminum chloride, anhydrous
1727	154	Ammonium bifluoride, solid
1727	154	Ammonium hydrogendifluoride, solid
1727	154	Ammonium hydrogen fluoride, solid
1728	155	Amyltrichlorosilane
1729	156	Anisoyl chloride
1730	157	Antimony pentachloride, liquid
1731	157	Antimony pentachloride, solution
1732	157	Antimony pentafluoride
1733	157	Antimony trichloride
1733	157	Antimony trichloride, liquid
1733	157	Antimony trichloride, solid
1733	157	Antimony trichloride, solution
1736	137	Benzoyl chloride
1737	156	Benzyl bromide
1738	156	Benzyl chloride
1739	137	Benzyl chloroformate
1740	154	Hydrogendifluorides, n.o.s.

ID No.	Guide No.	Name of Material
1740	**154**	Hydrogendifluorides, solid, n.o.s.
1741	**125**	Boron trichloride
1742	**157**	Boron trifluoride acetic acid complex
1742	**157**	Boron trifluoride acetic acid complex, liquid
1743	**157**	Boron trifluoride propionic acid complex
1743	**157**	Boron trifluoride propionic acid complex, liquid
1744	**154**	Bromine
1744	**154**	Bromine, solution
1744	**154**	Bromine, solution (Inhalation Hazard Zone A)
1744	**154**	Bromine, solution (Inhalation Hazard Zone B)
1745	**144**	Bromine pentafluoride
1746	**144**	Bromine trifluoride
1747	**155**	Butyltrichlorosilane
1748	**140**	Calcium hypochlorite, dry
1748	**140**	Calcium hypochlorite mixture, dry, with more than 39% available Chlorine (8.8% available Oxygen)
1749	**124**	Chlorine trifluoride
1750	**153**	Chloroacetic acid, liquid
1750	**153**	Chloroacetic acid, solution
1751	**153**	Chloroacetic acid, solid
1752	**156**	Chloroacetyl chloride
1753	**156**	Chlorophenyltrichlorosilane
1754	**137**	Chlorosulfonic acid
1754	**137**	Chlorosulfonic acid and Sulfur trioxide mixture
1754	**137**	Chlorosulphonic acid
1754	**137**	Chlorosulphonic acid and Sulphur trioxide mixture
1754	**137**	Sulfur trioxide and Chlorosulfonic acid mixture
1754	**137**	Sulphur trioxide and Chlorosulphonic acid mixture
1755	**154**	Chromic acid, solution
1756	**154**	Chromic fluoride, solid
1757	**154**	Chromic fluoride, solution
1758	**137**	Chromium oxychloride
1759	**154**	Corrosive solid, n.o.s.
1759	**154**	Ferrous chloride, solid
1760	**154**	Chemical kit
1760	**154**	Compound, cleaning liquid (corrosive)
1760	**154**	Compound, tree or weed killing, liquid (corrosive)
1760	**154**	Corrosive liquid, n.o.s.
1760	**154**	Ferrous chloride, solution
1761	**154**	Cupriethylenediamine, solution
1762	**156**	Cyclohexenyltrichlorosilane
1763	**156**	Cyclohexyltrichlorosilane
1764	**153**	Dichloroacetic acid
1765	**156**	Dichloroacetyl chloride
1766	**156**	Dichlorophenyltrichlorosilane
1767	**155**	Diethyldichlorosilane
1768	**154**	Difluorophosphoric acid, anhydrous
1769	**156**	Diphenyldichlorosilane
1770	**153**	Diphenylmethyl bromide
1771	**156**	Dodecyltrichlorosilane
1773	**157**	Ferric chloride
1773	**157**	Ferric chloride, anhydrous

ID No.	Guide No.	Name of Material
1774	154	Fire extinguisher charges, corrosive liquid
1775	154	Fluoboric acid
1775	154	Fluoroboric acid
1776	154	Fluorophosphoric acid, anhydrous
1777	137	Fluorosulfonic acid
1777	137	Fluorosulphonic acid
1778	154	Fluorosilicic acid
1778	154	Fluosilicic acid
1778	154	Hydrofluorosilicic acid
1779	153	Formic acid
1779	153	Formic acid, with more than 85% acid
1780	156	Fumaryl chloride
1781	156	Hexadecyltrichlorosilane
1782	154	Hexafluorophosphoric acid
1783	153	Hexamethylenediamine, solution
1784	156	Hexyltrichlorosilane
1786	157	Hydrofluoric acid and Sulfuric acid mixture
1786	157	Hydrofluoric acid and Sulphuric acid mixture
1786	157	Sulfuric acid and Hydrofluoric acid mixture
1786	157	Sulphuric acid and Hydrofluoric acid mixture
1787	154	Hydriodic acid
1787	154	Hydriodic acid, solution
1788	154	Hydrobromic acid
1788	154	Hydrobromic acid, solution
1789	157	Hydrochloric acid
1789	157	Hydrochloric acid, solution
1789	157	Muriatic acid

ID No.	Guide No.	Name of Material
1790	157	Hydrofluoric acid
1790	157	Hydrofluoric acid, solution
1791	154	Hypochlorite solution
1791	154	Hypochlorite solution, with more than 5% available Chlorine
1792	157	Iodine monochloride, solid
1793	153	Isopropyl acid phosphate
1794	154	Lead sulfate, with more than 3% free acid
1794	154	Lead sulphate, with more than 3% free acid
1796	157	Nitrating acid mixture with more than 50% nitric acid
1796	157	Nitrating acid mixture with not more than 50% nitric acid
1798	157	Aqua regia
1798	157	Nitrohydrochloric acid
1799	156	Nonyltrichlorosilane
1800	156	Octadecyltrichlorosilane
1801	156	Octyltrichlorosilane
1802	140	Perchloric acid, with not more than 50% acid
1803	153	Phenolsulfonic acid, liquid
1803	153	Phenolsulphonic acid, liquid
1804	156	Phenyltrichlorosilane
1805	154	Phosphoric acid
1805	154	Phosphoric acid, liquid
1805	154	Phosphoric acid, solid
1805	154	Phosphoric acid, solution
1806	137	Phosphorus pentachloride
1807	137	Phosphorus pentoxide
1808	137	Phosphorus tribromide
1809	137	Phosphorus trichloride

ID No.	Guide No.	Name of Material
1810	137	Phosphorus oxychloride
1811	154	Potassium hydrogendifluoride
1811	154	Potassium hydrogen difluoride, solid
1812	154	Potassium fluoride
1812	154	Potassium fluoride, solid
1813	154	Caustic potash, dry, solid
1813	154	Potassium hydroxide, dry, solid
1813	154	Potassium hydroxide, flake
1813	154	Potassium hydroxide, solid
1814	154	Caustic potash, liquid
1814	154	Caustic potash, solution
1814	154	Potassium hydroxide, solution
1815	132	Propionyl chloride
1816	155	Propyltrichlorosilane
1817	137	Pyrosulfuryl chloride
1817	137	Pyrosulphuryl chloride
1818	157	Silicon tetrachloride
1819	154	Sodium aluminate, solution
1823	154	Caustic soda, bead
1823	154	Caustic soda, flake
1823	154	Caustic soda, granular
1823	154	Caustic soda, solid
1823	154	Sodium hydroxide, bead
1823	154	Sodium hydroxide, dry
1823	154	Sodium hydroxide, flake
1823	154	Sodium hydroxide, granular
1823	154	Sodium hydroxide, solid
1824	154	Caustic soda, solution
1824	154	Sodium hydroxide, solution
1825	157	Sodium monoxide

ID No.	Guide No.	Name of Material
1826	157	Nitrating acid mixture, spent, with more than 50% nitric acid
1826	157	Nitrating acid mixture, spent, with not more than 50% nitric acid
1827	137	Stannic chloride, anhydrous
1827	137	Tin tetrachloride
1828	137	Sulfur chlorides
1828	137	Sulphur chlorides
1829	137	Sulfur trioxide, stabilized
1829	137	Sulphur trioxide, stabilized
1830	137	Sulfuric acid
1830	137	Sulfuric acid, with more than 51% acid
1830	137	Sulphuric acid
1830	137	Sulphuric acid, with more than 51% acid
1831	137	Sulfuric acid, fuming
1831	137	Sulfuric acid, fuming, with less than 30% free Sulfur trioxide
1831	137	Sulfuric acid, fuming, with not less than 30% free Sulfur trioxide
1831	137	Sulphuric acid, fuming
1831	137	Sulphuric acid, fuming, with less than 30% free Sulphur trioxide
1831	137	Sulphuric acid, fuming, with not less than 30% free Sulphur trioxide
1832	137	Sulfuric acid, spent
1832	137	Sulphuric acid, spent
1833	154	Sulfurous acid
1833	154	Sulphurous acid
1834	137	Sulfuryl chloride
1834	137	Sulphuryl chloride

ID No.	Guide No.	Name of Material
1835	153	Tetramethylammonium hydroxide
1835	153	Tetramethylammonium hydroxide, solution
1836	137	Thionyl chloride
1837	157	Thiophosphoryl chloride
1838	137	Titanium tetrachloride
1839	153	Trichloroacetic acid
1840	154	Zinc chloride, solution
1841	171	Acetaldehyde ammonia
1843	141	Ammonium dinitro-o-cresolate
1843	141	Ammonium dinitro-o-cresolate, solid
1845	120	Carbon dioxide, solid
1845	120	Dry ice
1846	151	Carbon tetrachloride
1847	153	Potassium sulfide, hydrated, with not less than 30% water of crystallization
1847	153	Potassium sulfide, hydrated, with not less than 30% water of hydration
1847	153	Potassium sulphide, hydrated, with not less than 30% water of crystallization
1847	153	Potassium sulphide, hydrated, with not less than 30% water of hydration
1848	132	Propionic acid
1848	132	Propionic acid, with not less than 10% and less than 90% acid
1849	153	Sodium sulfide, hydrated, with not less than 30% water
1849	153	Sodium sulphide, hydrated, with not less than 30% water
1851	151	Medicine, liquid, poisonous, n.o.s.

ID No.	Guide No.	Name of Material
1851	151	Medicine, liquid, toxic, n.o.s.
1854	135	Barium alloys, pyrophoric
1855	135	Calcium, metal and alloys, pyrophoric
1855	135	Calcium, pyrophoric
1855	135	Calcium alloys, pyrophoric
1856	133	Rags, oily
1857	133	Textile waste, wet
1858	126	Hexafluoropropylene
1858	126	Hexafluoropropylene, compressed
1858	126	Refrigerant gas R-1216
1859	125	Silicon tetrafluoride
1859	125	Silicon tetrafluoride, compressed
1860	116P	Vinyl fluoride, stabilized
1862	130	Ethyl crotonate
1863	128	Fuel, aviation, turbine engine
1865	131	n-Propyl nitrate
1866	127	Resin solution
1868	134	Decaborane
1869	138	Magnesium
1869	138	Magnesium, in pellets, turnings or ribbons
1869	138	Magnesium alloys, with more than 50% Magnesium, in pellets, turnings or ribbons
1870	138	Potassium borohydride
1871	170	Titanium hydride
1872	141	Lead dioxide
1873	143	Perchloric acid, with more than 50% but not more than 72% acid
1884	157	Barium oxide
1885	153	Benzidine

ID No.	Guide No.	Name of Material
1886	156	Benzylidene chloride
1887	160	Bromochloromethane
1888	151	Chloroform
1889	157	Cyanogen bromide
1891	131	Ethyl bromide
1892	151	ED
1892	151	Ethyldichloroarsine
1894	151	Phenylmercuric hydroxide
1895	151	Phenylmercuric nitrate
1897	160	Perchloroethylene
1897	160	Tetrachloroethylene
1898	156	Acetyl iodide
1902	153	Diisooctyl acid phosphate
1903	153	Disinfectant, liquid, corrosive, n.o.s.
1903	153	Disinfectants, corrosive, liquid, n.o.s.
1905	154	Selenic acid
1906	153	Acid, sludge
1906	153	Sludge acid
1907	154	Soda lime, with more than 4% Sodium hydroxide
1908	154	Chlorite solution
1908	154	Chlorite solution, with more than 5% available Chlorine
1908	154	Sodium chlorite, solution, with more than 5% available Chlorine
1910	157	Calcium oxide
1911	119	Diborane
1911	119	Diborane, compressed
1911	119	Diborane mixtures
1912	115	Methyl chloride and Methylene chloride mixture
1912	115	Methylene chloride and Methyl chloride mixture
1913	120	Neon, refrigerated liquid (cryogenic liquid)
1914	130	Butyl propionates
1915	127	Cyclohexanone
1916	152	2,2'-Dichlorodiethyl ether
1916	152	Dichloroethyl ether
1917	129P	Ethyl acrylate, stabilized
1918	130	Cumene
1918	130	Isopropylbenzene
1919	129P	Methyl acrylate, stabilized
1920	128	Nonanes
1921	131P	Propyleneimine, stabilized
1922	132	Pyrrolidine
1923	135	Calcium dithionite
1923	135	Calcium hydrosulfite
1923	135	Calcium hydrosulphite
1928	135	Methyl magnesium bromide in Ethyl ether
1929	135	Potassium dithionite
1929	135	Potassium hydrosulfite
1929	135	Potassium hydrosulphite
1931	171	Zinc dithionite
1931	171	Zinc hydrosulfite
1931	171	Zinc hydrosulphite
1932	135	Zirconium scrap
1935	157	Cyanide solution, n.o.s.
1938	156	Bromoacetic acid
1938	156	Bromoacetic acid, solution
1939	137	Phosphorus oxybromide
1939	137	Phosphorus oxybromide, solid

ID No.	Guide No.	Name of Material
1940	**153**	Thioglycolic acid
1941	**171**	Dibromodifluoromethane
1942	**140**	Ammonium nitrate, with not more than 0.2% combustible substances
1944	**133**	Matches, safety
1945	**133**	Matches, wax “vesta”
1950	**126**	Aerosol dispensers
1950	**126**	Aerosols
1951	**120**	Argon, refrigerated liquid (cryogenic liquid)
1952	**126**	Carbon dioxide and Ethylene oxide mixtures, with not more than 6% Ethylene oxide
1952	**126**	Carbon dioxide and Ethylene oxide mixtures, with not more than 9% Ethylene oxide
1952	**126**	Ethylene oxide and Carbon dioxide mixtures, with not more than 6% Ethylene oxide
1952	**126**	Ethylene oxide and Carbon dioxide mixtures, with not more than 9% Ethylene oxide
1953	**119**	Compressed gas, flammable, poisonous, n.o.s. (Inhalation Hazard Zone A)
1953	**119**	Compressed gas, flammable, poisonous, n.o.s. (Inhalation Hazard Zone B)
1953	**119**	Compressed gas, flammable, poisonous, n.o.s. (Inhalation Hazard Zone C)
1953	**119**	Compressed gas, flammable, poisonous, n.o.s. (Inhalation Hazard Zone D)
1953	**119**	Compressed gas, flammable, toxic, n.o.s. (Inhalation Hazard Zone A)
1953	**119**	Compressed gas, flammable, toxic, n.o.s. (Inhalation Hazard Zone B)
1953	**119**	Compressed gas, flammable, toxic, n.o.s. (Inhalation Hazard Zone C)
1953	**119**	Compressed gas, flammable, toxic, n.o.s. (Inhalation Hazard Zone D)
1953	**119**	Compressed gas, poisonous, flammable, n.o.s.
1953	**119**	Compressed gas, poisonous, flammable, n.o.s. (Inhalation Hazard Zone A)
1953	**119**	Compressed gas, poisonous, flammable, n.o.s. (Inhalation Hazard Zone B)
1953	**119**	Compressed gas, poisonous, flammable, n.o.s. (Inhalation Hazard Zone C)
1953	**119**	Compressed gas, poisonous, flammable, n.o.s. (Inhalation Hazard Zone D)
1953	**119**	Compressed gas, toxic, flammable, n.o.s.
1953	**119**	Compressed gas, toxic, flammable, n.o.s. (Inhalation Hazard Zone A)
1953	**119**	Compressed gas, toxic, flammable, n.o.s. (Inhalation Hazard Zone B)
1953	**119**	Compressed gas, toxic, flammable, n.o.s. (Inhalation Hazard Zone C)
1953	**119**	Compressed gas, toxic, flammable, n.o.s. (Inhalation Hazard Zone D)
1954	**115**	Compressed gas, flammable, n.o.s.
1954	**115**	Dispersant gas, n.o.s. (flammable)
1954	**115**	Refrigerant gas, n.o.s. (flammable)

ID No.	Guide No.	Name of Material
1955	123	Compressed gas, poisonous, n.o.s.
1955	123	Compressed gas, poisonous, n.o.s. (Inhalation Hazard Zone A)
1955	123	Compressed gas, poisonous, n.o.s. (Inhalation Hazard Zone B)
1955	123	Compressed gas, poisonous, n.o.s. (Inhalation Hazard Zone C)
1955	123	Compressed gas, poisonous, n.o.s. (Inhalation Hazard Zone D)
1955	123	Compressed gas, toxic, n.o.s.
1955	123	Compressed gas, toxic, n.o.s. (Inhalation Hazard Zone A)
1955	123	Compressed gas, toxic, n.o.s. (Inhalation Hazard Zone B)
1955	123	Compressed gas, toxic, n.o.s. (Inhalation Hazard Zone C)
1955	123	Compressed gas, toxic, n.o.s. (Inhalation Hazard Zone D)
1955	123	Organic phosphate compound mixed with compressed gas
1955	123	Organic phosphate mixed with compressed gas
1955	123	Organic phosphorus compound mixed with compressed gas
1956	126	Compressed gas, n.o.s.
1957	115	Deuterium
1957	115	Deuterium, compressed
1958	126	1,2-Dichloro-1,1,2,2-tetrafluoroethane
1958	126	Dichlorotetrafluoroethane
1958	126	Refrigerant gas R-114
1959	116P	1,1-Difluoroethylene
1959	116P	Refrigerant gas R-1132a
1961	115	Ethane, refrigerated liquid
1961	115	Ethane-Propane mixture, refrigerated liquid
1961	115	Propane-Ethane mixture, refrigerated liquid
1962	116P	Ethylene
1962	116P	Ethylene, compressed
1963	120	Helium, refrigerated liquid (cryogenic liquid)
1964	115	Hydrocarbon gas, compressed, n.o.s.
1964	115	Hydrocarbon gas mixture, compressed, n.o.s.
1965	115	Hydrocarbon gas, liquefied, n.o.s.
1965	115	Hydrocarbon gas mixture, liquefied, n.o.s.
1966	115	Hydrogen, refrigerated liquid (cryogenic liquid)
1967	123	Insecticide gas, poisonous, n.o.s.
1967	123	Insecticide gas, toxic, n.o.s.
1967	123	Parathion and compressed gas mixture
1968	126	Insecticide gas, n.o.s.
1969	115	Isobutane
1969	115	Isobutane mixture
1970	120	Krypton, refrigerated liquid (cryogenic liquid)
1971	115	Methane
1971	115	Methane, compressed
1971	115	Natural gas, compressed
1972	115	Liquefied natural gas (cryogenic liquid)
1972	115	LNG (cryogenic liquid)
1972	115	Methane, refrigerated liquid (cryogenic liquid)

ID No.	Guide No.	Name of Material
1972	**115**	Natural gas, refrigerated liquid (cryogenic liquid)
1973	**126**	Chlorodifluoromethane and Chloropentafluoroethane mixture
1973	**126**	Chloropentafluoroethane and Chlorodifluoromethane mixture
1973	**126**	Refrigerant gas R-502
1974	**126**	Bromochlorodifluoromethane
1974	**126**	Chlorodifluorobromomethane
1974	**126**	Refrigerant gas R-12B1
1975	**124**	Dinitrogen tetroxide and Nitric oxide mixture
1975	**124**	Nitric oxide and Dinitrogen tetroxide mixture
1975	**124**	Nitric oxide and Nitrogen dioxide mixture
1975	**124**	Nitric oxide and Nitrogen tetroxide mixture
1975	**124**	Nitrogen dioxide and Nitric oxide mixture
1975	**124**	Nitrogen tetroxide and Nitric oxide mixture
1976	**126**	Octafluorocyclobutane
1976	**126**	Refrigerant gas RC-318
1977	**120**	Nitrogen, refrigerated liquid (cryogenic liquid)
1978	**115**	Propane
1978	**115**	Propane mixture
1979	**121**	Rare gases mixture, compressed
1980	**121**	Oxygen and Rare gases mixture, compressed
1980	**121**	Rare gases and Oxygen mixture, compressed
1981	**121**	Nitrogen and Rare gases mixture, compressed
1981	**121**	Rare gases and Nitrogen mixture, compressed
1982	**126**	Refrigerant gas R-14
1982	**126**	Refrigerant gas R-14, compressed
1982	**126**	Tetrafluoromethane
1982	**126**	Tetrafluoromethane, compressed
1983	**126**	1-Chloro-2,2,2-trifluoroethane
1983	**126**	Chlorotrifluoroethane
1983	**126**	Refrigerant gas R-133a
1984	**126**	Refrigerant gas R-23
1984	**126**	Trifluoromethane
1986	**131**	Alcohols, flammable, poisonous, n.o.s.
1986	**131**	Alcohols, flammable, toxic, n.o.s.
1986	**131**	Alcohols, poisonous, n.o.s.
1986	**131**	Alcohols, toxic, n.o.s.
1987	**127**	Alcohols, n.o.s.
1988	**131**	Aldehydes, flammable, poisonous, n.o.s.
1988	**131**	Aldehydes, flammable, toxic, n.o.s.
1988	**131**	Aldehydes, poisonous, n.o.s.
1988	**131**	Aldehydes, toxic, n.o.s.
1989	**129**	Aldehydes, n.o.s.
1990	**129**	Benzaldehyde
1991	**131P**	Chloroprene, stabilized
1992	**131**	Flammable liquid, poisonous, n.o.s.
1992	**131**	Flammable liquid, toxic, n.o.s.
1993	**128**	Combustible liquid, n.o.s.
1993	**128**	Compound, cleaning liquid (flammable)

ID No.	Guide No.	Name of Material
1993	**128**	Compound, tree or weed killing, liquid (flammable)
1993	**128**	Diesel fuel
1993	**128**	Flammable liquid, n.o.s.
1993	**128**	Fuel oil
1994	**131**	Iron pentacarbonyl
1999	**130**	Asphalt
1999	**130**	Tars, liquid
2000	**133**	Celluloid, in blocks, rods, rolls, sheets, tubes, etc., except scrap
2001	**133**	Cobalt naphthenates, powder
2002	**135**	Celluloid, scrap
2003	**135**	Metal alkyls, water-reactive, n.o.s.
2003	**135**	Metal aryls, water-reactive, n.o.s.
2004	**135**	Magnesium diamide
2005	**135**	Magnesium diphenyl
2006	**135**	Plastic, nitrocellulose-based, spontaneously combustible, n.o.s.
2006	**135**	Plastics, nitrocellulose-based, self-heating, n.o.s.
2008	**135**	Zirconium powder, dry
2009	**135**	Zirconium, dry, finished sheets, strips or coiled wire
2010	**138**	Magnesium hydride
2011	**139**	Magnesium phosphide
2012	**139**	Potassium phosphide
2013	**139**	Strontium phosphide
2014	**140**	Hydrogen peroxide, aqueous solution, with not less than 20% but not more than 60% Hydrogen peroxide (stabilized as necessary)
2015	**143**	Hydrogen peroxide, aqueous solution, stabilized, with more than 60% Hydrogen peroxide
2015	**143**	Hydrogen peroxide, stabilized
2016	**151**	Ammunition, poisonous, non-explosive
2016	**151**	Ammunition, toxic, non-explosive
2017	**159**	Ammunition, tear-producing, non-explosive
2018	**152**	Chloroanilines, solid
2019	**152**	Chloroanilines, liquid
2020	**153**	Chlorophenols, solid
2021	**153**	Chlorophenols, liquid
2022	**153**	Cresylic acid
2023	**131P**	1-Chloro-2,3-epoxypropane
2023	**131P**	Epichlorohydrin
2024	**151**	Mercury compound, liquid, n.o.s.
2025	**151**	Mercury compound, solid, n.o.s.
2026	**151**	Phenylmercuric compound, n.o.s.
2027	**151**	Sodium arsenite, solid
2028	**153**	Bombs, smoke, non-explosive, with corrosive liquid, without initiating device
2029	**132**	Hydrazine, anhydrous
2029	**132**	Hydrazine, aqueous solutions, with more than 64% Hydrazine
2030	**153**	Hydrazine, aqueous solution, with more than 37% Hydrazine
2030	**153**	Hydrazine, aqueous solution, with not less than 37% but not more than 64% Hydrazine
2030	**153**	Hydrazine hydrate

ID No.	Guide No.	Name of Material
2031	**157**	Nitric acid, other than red fuming, with more than 70% nitric acid
2031	**157**	Nitric acid, other than red fuming, with not more than 70% nitric acid
2032	**157**	Nitric acid, fuming
2032	**157**	Nitric acid, red fuming
2033	**154**	Potassium monoxide
2034	**115**	Hydrogen and Methane mixture, compressed
2034	**115**	Methane and Hydrogen mixture, compressed
2035	**115**	Refrigerant gas R-143a
2035	**115**	1,1,1-Trifluoroethane
2035	**115**	Trifluoroethane, compressed
2036	**121**	Xenon
2036	**121**	Xenon, compressed
2037	**115**	Gas cartridges
2037	**115**	Receptacles, small, containing gas
2038	**152**	Dinitrotoluenes
2038	**152**	Dinitrotoluenes, liquid
2038	**152**	Dinitrotoluenes, solid
2044	**115**	2,2-Dimethylpropane
2045	**130**	Isobutyl aldehyde
2045	**130**	Isobutyraldehyde
2046	**130**	Cymenes
2047	**129**	Dichloropropenes
2048	**130**	Dicyclopentadiene
2049	**130**	Diethylbenzene
2050	**128**	Diisobutylene, isomeric compounds
2051	**132**	2-Dimethylaminoethanol
2051	**132**	Dimethylethanolamine
2052	**128**	Dipentene
2053	**129**	Methylamyl alcohol
2053	**129**	Methyl isobutyl carbinol
2053	**129**	M.I.B.C.
2054	**132**	Morpholine
2055	**128P**	Styrene monomer, stabilized
2056	**127**	Tetrahydrofuran
2057	**128**	Tripropylene
2058	**129**	Valeraldehyde
2059	**127**	Nitrocellulose, solution, flammable
2059	**127**	Nitrocellulose, solution, in a flammable liquid
2067	**140**	Ammonium nitrate fertilizers
2068	**140**	Ammonium nitrate fertilizers, with Calcium carbonate
2069	**140**	Ammonium nitrate fertilizers, with Ammonium sulfate
2069	**140**	Ammonium nitrate fertilizers, with Ammonium sulphate
2069	**140**	Ammonium nitrate mixed fertilizers
2070	**143**	Ammonium nitrate fertilizers, with Phosphate or Potash
2071	**140**	Ammonium nitrate fertilizer, with not more than 0.4% combustible material
2071	**140**	Ammonium nitrate fertilizers
2072	**140**	Ammonium nitrate fertilizer, n.o.s.
2072	**140**	Ammonium nitrate fertilizers
2073	**125**	Ammonia, solution, with more than 35% but not more than 50% Ammonia
2074	**153P**	Acrylamide
2074	**153P**	Acrylamide, solid
2075	**153**	Chloral, anhydrous, stabilized
2076	**153**	Cresols

ID No.	Guide No.	Name of Material
2076	153	Cresols, liquid
2076	153	Cresols, solid
2077	153	alpha-Naphthylamine
2077	153	Naphthylamine (alpha)
2078	156	Toluene diisocyanate
2079	154	Diethylenetriamine
2186	125	Hydrogen chloride, refrigerated liquid
2187	120	Carbon dioxide, refrigerated liquid
2188	119	Arsine
2188	119	SA
2189	119	Dichlorosilane
2190	124	Oxygen difluoride
2190	124	Oxygen difluoride, compressed
2191	123	Sulfuryl fluoride
2191	123	Sulphuryl fluoride
2192	119	Germane
2193	126	Hexafluoroethane
2193	126	Hexafluoroethane, compressed
2193	126	Refrigerant gas R-116
2193	126	Refrigerant gas R-116, compressed
2194	125	Selenium hexafluoride
2195	125	Tellurium hexafluoride
2196	125	Tungsten hexafluoride
2197	125	Hydrogen iodide, anhydrous
2198	125	Phosphorus pentafluoride
2198	125	Phosphorus pentafluoride, compressed
2199	119	Phosphine
2200	116P	Propadiene, stabilized

ID No.	Guide No.	Name of Material
2201	122	Nitrous oxide, refrigerated liquid
2202	117	Hydrogen selenide, anhydrous
2203	116	Silane
2203	116	Silane, compressed
2204	119	Carbonyl sulfide
2204	119	Carbonyl sulphide
2205	153	Adiponitrile
2206	155	Isocyanate solution, poisonous, n.o.s.
2206	155	Isocyanate solution, toxic, n.o.s.
2206	155	Isocyanate solutions, n.o.s.
2206	155	Isocyanates, n.o.s.
2206	155	Isocyanates, poisonous, n.o.s.
2206	155	Isocyanates, toxic, n.o.s.
2208	140	Bleaching powder
2208	140	Calcium hypochlorite mixture, dry, with more than 10% but not more than 39% available Chlorine
2209	132	Formaldehyde, solutions (Formalin) (corrosive)
2210	135	Maneb
2210	135	Maneb preparation, with not less than 60% Maneb
2211	133	Polymeric beads, expandable
2211	133	Polystyrene beads, expandable
2212	171	Asbestos
2212	171	Asbestos, blue
2212	171	Asbestos, brown
2212	171	Blue asbestos
2212	171	Brown asbestos
2213	133	Paraformaldehyde
2214	156	Phthalic anhydride

ID No.	Guide No.	Name of Material
2215	156	Maleic anhydride
2215	156	Maleic anhydride, molten
2216	171	Fish meal, stabilized
2216	171	Fish scrap, stabilized
2217	135	Seed cake, with not more than 1.5% oil and not more than 11% moisture
2218	132P	Acrylic acid, stabilized
2219	129	Allyl glycidyl ether
2222	128	Anisole
2224	152	Benzonitrile
2225	156	Benzenesulfonyl chloride
2225	156	Benzenesulphonyl chloride
2226	156	Benzotrichloride
2227	130P	n-Butyl methacrylate, stabilized
2232	153	Chloroacetaldehyde
2232	153	2-Chloroethanal
2233	152	Chloroanisidines
2234	130	Chlorobenzotrifluorides
2235	153	Chlorobenzyl chlorides
2235	153	Chlorobenzyl chlorides, liquid
2236	156	3-Chloro-4-methylphenyl isocyanate
2236	156	3-Chloro-4-methylphenyl isocyanate, liquid
2237	153	Chloronitroanilines
2238	129	Chlorotoluenes
2239	153	Chlorotoluidines
2239	153	Chlorotoluidines, liquid
2239	153	Chlorotoluidines, solid
2240	154	Chromosulfuric acid
2240	154	Chromosulphuric acid
2241	128	Cycloheptane
2242	128	Cycloheptene
2243	130	Cyclohexyl acetate
2244	129	Cyclopentanol
2245	128	Cyclopentanone
2246	128	Cyclopentene
2247	128	n-Decane
2248	132	Di-n-butylamine
2249	131	Dichlorodimethyl ether, symmetrical
2250	156	Dichlorophenyl isocyanates
2251	128P	Bicyclo[2.2.1]hepta-2,5-diene, stabilized
2251	128P	2,5-Norbornadiene, stabilized
2252	127	1,2-Dimethoxyethane
2253	153	N,N-Dimethylaniline
2254	133	Matches, fusee
2256	130	Cyclohexene
2257	138	Potassium
2257	138	Potassium, metal
2258	132	1,2-Propylenediamine
2258	132	1,3-Propylenediamine
2259	153	Triethylenetetramine
2260	132	Tripropylamine
2261	153	Xylenols
2261	153	Xylenols, solid
2262	156	Dimethylcarbamoyl chloride
2263	128	Dimethylcyclohexanes
2264	132	N,N-Dimethylcyclohexylamine
2264	132	Dimethylcyclohexylamine
2265	129	N,N-Dimethylformamide
2266	132	Dimethyl-N-propylamine
2267	156	Dimethyl thiophosphoryl chloride

ID No.	Guide No.	Name of Material
2269	153	3,3'-Iminodipropylamine
2270	132	Ethylamine, aqueous solution, with not less than 50% but not more than 70% Ethylamine
2271	128	Ethyl amyl ketone
2272	153	N-Ethylaniline
2273	153	2-Ethylaniline
2274	153	N-Ethyl-N-benzylaniline
2275	129	2-Ethylbutanol
2276	132	2-Ethylhexylamine
2277	130P	Ethyl methacrylate
2277	130P	Ethyl methacrylate, stabilized
2278	128	n-Heptene
2279	151	Hexachlorobutadiene
2280	153	Hexamethylenediamine, solid
2281	156	Hexamethylene diisocyanate
2282	129	Hexanols
2283	130P	Isobutyl methacrylate, stabilized
2284	131	Isobutyronitrile
2285	156	Isocyanatobenzotrifluorides
2286	128	Pentamethylheptane
2287	128	Isoheptenes
2288	128	Isohexenes
2289	153	Isophoronediamine
2290	156	IPDI
2290	156	Isophorone diisocyanate
2291	151	Lead compound, soluble, n.o.s.
2293	128	4-Methoxy-4-methylpentan-2-one
2294	153	N-Methylaniline
2295	155	Methyl chloroacetate
2296	128	Methylcyclohexane
2297	128	Methylcyclohexanone
2298	128	Methylcyclopentane
2299	155	Methyl dichloroacetate
2300	153	2-Methyl-5-ethylpyridine
2301	128	2-Methylfuran
2302	127	5-Methylhexan-2-one
2303	128	Isopropenylbenzene
2304	133	Naphthalene, molten
2305	153	Nitrobenzenesulfonic acid
2305	153	Nitrobenzenesulphonic acid
2306	152	Nitrobenzotrifluorides
2306	152	Nitrobenzotrifluorides, liquid
2307	152	3-Nitro-4-chlorobenzotrifluoride
2308	157	Nitrosylsulfuric acid
2308	157	Nitrosylsulfuric acid, liquid
2308	157	Nitrosylsulfuric acid, solid
2308	157	Nitrosylsulphuric acid
2308	157	Nitrosylsulphuric acid, liquid
2308	157	Nitrosylsulphuric acid, solid
2309	128P	Octadiene
2310	131	Pentan-2,4-dione
2310	131	2,4-Pentanedione
2310	131	Pentane-2,4-dione
2311	153	Phenetidines
2312	153	Phenol, molten
2313	129	Picolines
2315	171	Articles containing Polychlorinated biphenyls (PCB)
2315	171	PCB
2315	171	Polychlorinated biphenyls
2315	171	Polychlorinated biphenyls, liquid

ID No.	Guide No.	Name of Material
2315	**171**	Polychlorinated biphenyls, solid
2316	**157**	Sodium cuprocyanide, solid
2317	**157**	Sodium cuprocyanide, solution
2318	**135**	Sodium hydrosulfide, solid, with less than 25% water of crystallization
2318	**135**	Sodium hydrosulfide, with less than 25% water of crystallization
2318	**135**	Sodium hydrosulphide, solid, with less than 25% water of crystallization
2318	**135**	Sodium hydrosulphide, with less than 25% water of crystallization
2319	**128**	Terpene hydrocarbons, n.o.s.
2320	**153**	Tetraethylenepentamine
2321	**153**	Trichlorobenzenes, liquid
2322	**152**	Trichlorobutene
2323	**130**	Triethyl phosphite
2324	**128**	Triisobutylene
2325	**129**	1,3,5-Trimethylbenzene
2326	**153**	Trimethylcyclohexylamine
2327	**153**	Trimethylhexamethylenediamines
2328	**156**	Trimethylhexamethylene diisocyanate
2329	**130**	Trimethyl phosphite
2330	**128**	Undecane
2331	**154**	Zinc chloride, anhydrous
2332	**129**	Acetaldehyde oxime
2333	**131**	Allyl acetate
2334	**131**	Allylamine
2335	**131**	Allyl ethyl ether
2336	**131**	Allyl formate
2337	**131**	Phenyl mercaptan

ID No.	Guide No.	Name of Material
2338	**127**	Benzotrifluoride
2339	**130**	2-Bromobutane
2340	**130**	2-Bromoethyl ethyl ether
2341	**130**	1-Bromo-3-methylbutane
2342	**130**	Bromomethylpropanes
2343	**130**	2-Bromopentane
2344	**129**	2-Bromopropane
2344	**129**	Bromopropanes
2345	**130**	3-Bromopropyne
2346	**127**	Butanedione
2346	**127**	Diacetyl
2347	**130**	Butyl mercaptan
2348	**129P**	Butyl acrylates, stabilized
2350	**127**	Butyl methyl ether
2351	**129**	Butyl nitrites
2352	**127P**	Butyl vinyl ether, stabilized
2353	**132**	Butyryl chloride
2354	**131**	Chloromethyl ethyl ether
2356	**129**	2-Chloropropane
2357	**132**	Cyclohexylamine
2358	**128P**	Cyclooctatetraene
2359	**132**	Diallylamine
2360	**131P**	Diallyl ether
2361	**132**	Diisobutylamine
2362	**130**	1,1-Dichloroethane
2363	**129**	Ethyl mercaptan
2364	**128**	n-Propyl benzene
2366	**128**	Diethyl carbonate
2367	**130**	alpha-Methylvaleraldehyde
2367	**130**	Methyl valeraldehyde (alpha)
2368	**128**	alpha-Pinene

ID No.	Guide No.	Name of Material
2368	128	Pinene (alpha)
2370	128	1-Hexene
2371	128	Isopentenes
2372	129	1,2-Di-(dimethylamino)ethane
2373	127	Diethoxymethane
2374	127	3,3-Diethoxypropene
2375	129	Diethyl sulfide
2375	129	Diethyl sulphide
2376	127	2,3-Dihydropyran
2377	127	1,1-Dimethoxyethane
2378	131	2-Dimethylaminoacetonitrile
2379	132	1,3-Dimethylbutylamine
2380	127	Dimethyldiethoxysilane
2381	130	Dimethyl disulfide
2381	130	Dimethyl disulphide
2382	131	1,2-Dimethylhydrazine
2382	131	Dimethylhydrazine, symmetrical
2383	132	Dipropylamine
2384	127	Di-n-propyl ether
2384	127	Dipropyl ether
2385	129	Ethyl isobutyrate
2386	132	1-Ethylpiperidine
2387	130	Fluorobenzene
2388	130	Fluorotoluenes
2389	128	Furan
2390	129	2-Iodobutane
2391	129	Iodomethylpropanes
2392	129	Iodopropanes
2393	129	Isobutyl formate
2394	129	Isobutyl propionate
2395	132	Isobutyryl chloride

ID No.	Guide No.	Name of Material
2396	131P	Methacrylaldehyde, stabilized
2397	127	3-Methylbutan-2-one
2398	127	Methyl tert-butyl ether
2399	132	1-Methylpiperidine
2400	130	Methyl isovalerate
2401	132	Piperidine
2402	130	Propanethiols
2403	129P	Isopropenyl acetate
2404	131	Propionitrile
2405	129	Isopropyl butyrate
2406	127	Isopropyl isobutyrate
2407	155	Isopropyl chloroformate
2409	129	Isopropyl propionate
2410	129	1,2,3,6-Tetrahydropyridine
2410	129	1,2,5,6-Tetrahydropyridine
2411	131	Butyronitrile
2412	130	Tetrahydrothiophene
2413	128	Tetrapropyl orthotitanate
2414	130	Thiophene
2416	129	Trimethyl borate
2417	125	Carbonyl fluoride
2417	125	Carbonyl fluoride, compressed
2418	125	Sulfur tetrafluoride
2418	125	Sulphur tetrafluoride
2419	116	Bromotrifluoroethylene
2420	125	Hexafluoroacetone
2421	124	Nitrogen trioxide
2422	126	Octafluorobut-2-ene
2422	126	Refrigerant gas R-1318
2424	126	Octafluoropropane
2424	126	Refrigerant gas R-218

ID No.	Guide No.	Name of Material
2426	**140**	Ammonium nitrate, liquid (hot concentrated solution)
2427	**140**	Potassium chlorate, aqueous solution
2427	**140**	Potassium chlorate, solution
2428	**140**	Sodium chlorate, aqueous solution
2429	**140**	Calcium chlorate, aqueous solution
2429	**140**	Calcium chlorate, solution
2430	**153**	Alkyl phenols, solid, n.o.s. (including C2-C12 homologues)
2431	**153**	Anisidines
2431	**153**	Anisidines, liquid
2431	**153**	Anisidines, solid
2432	**153**	N,N-Diethylaniline
2433	**152**	Chloronitrotoluenes
2433	**152**	Chloronitrotoluenes, liquid
2433	**152**	Chloronitrotoluenes, solid
2434	**156**	Dibenzyldichlorosilane
2435	**156**	Ethylphenyldichlorosilane
2436	**129**	Thioacetic acid
2437	**156**	Methylphenyldichlorosilane
2438	**132**	Trimethylacetyl chloride
2439	**154**	Sodium hydrogendifluoride
2440	**154**	Stannic chloride, pentahydrate
2440	**154**	Tin tetrachloride, pentahydrate
2441	**135**	Titanium trichloride, pyrophoric
2441	**135**	Titanium trichloride mixture, pyrophoric
2442	**156**	Trichloroacetyl chloride
2443	**137**	Vanadium oxytrichloride
2444	**137**	Vanadium tetrachloride

ID No.	Guide No.	Name of Material
2445	**135**	Lithium alkyls
2445	**135**	Lithium alkyls, liquid
2446	**153**	Nitrocresols
2446	**153**	Nitrocresols, solid
2447	**136**	Phosphorus, white, molten
2447	**136**	White phosphorus, molten
2447	**136**	Yellow phosphorus, molten
2448	**133**	Sulfur, molten
2448	**133**	Sulphur, molten
2451	**122**	Nitrogen trifluoride
2451	**122**	Nitrogen trifluoride, compressed
2452	**116P**	Ethylacetylene, stabilized
2453	**115**	Ethyl fluoride
2453	**115**	Refrigerant gas R-161
2454	**115**	Methyl fluoride
2454	**115**	Refrigerant gas R-41
2455	**116**	Methyl nitrite
2456	**130P**	2-Chloropropene
2457	**128**	2,3-Dimethylbutane
2458	**130**	Hexadiene
2459	**128**	2-Methyl-1-butene
2460	**128**	2-Methyl-2-butene
2461	**128**	Methylpentadiene
2463	**138**	Aluminum hydride
2464	**141**	Beryllium nitrate
2465	**140**	Dichloroisocyanuric acid, dry
2465	**140**	Dichloroisocyanuric acid salts
2465	**140**	Sodium dichloroisocyanurate
2465	**140**	Sodium dichloro-s-triazinetrione
2466	**143**	Potassium superoxide
2468	**140**	Trichloroisocyanuric acid, dry

ID No.	Guide No.	Name of Material
2469	**140**	Zinc bromate
2470	**152**	Phenylacetonitrile, liquid
2471	**154**	Osmium tetroxide
2473	**154**	Sodium arsanilate
2474	**157**	Thiophosgene
2475	**157**	Vanadium trichloride
2477	**131**	Methyl isothiocyanate
2478	**155**	Isocyanate solution, flammable, poisonous, n.o.s.
2478	**155**	Isocyanate solution, flammable, toxic, n.o.s.
2478	**155**	Isocyanate solutions, n.o.s.
2478	**155**	Isocyanates, flammable, poisonous, n.o.s.
2478	**155**	Isocyanates, flammable, toxic, n.o.s.
2478	**155**	Isocyanates, n.o.s.
2480	**155**	Methyl isocyanate
2481	**155**	Ethyl isocyanate
2482	**155**	n-Propyl isocyanate
2483	**155**	Isopropyl isocyanate
2484	**155**	tert-Butyl isocyanate
2485	**155**	n-Butyl isocyanate
2486	**155**	Isobutyl isocyanate
2487	**155**	Phenyl isocyanate
2488	**155**	Cyclohexyl isocyanate
2490	**153**	Dichloroisopropyl ether
2491	**153**	Ethanolamine
2491	**153**	Ethanolamine, solution
2491	**153**	Monoethanolamine
2493	**132**	Hexamethyleneimine
2495	**144**	Iodine pentafluoride

ID No.	Guide No.	Name of Material
2496	**156**	Propionic anhydride
2498	**129**	1,2,3,6-Tetrahydrobenzaldehyde
2501	**152**	1-Aziridinyl phosphine oxide (Tris)
2501	**152**	Tri-(1-aziridinyl)phosphine oxide, solution
2501	**152**	Tris-(1-aziridinyl)phosphine oxide, solution
2502	**132**	Valeryl chloride
2503	**137**	Zirconium tetrachloride
2504	**159**	Acetylene tetrabromide
2504	**159**	Tetrabromoethane
2505	**154**	Ammonium fluoride
2506	**154**	Ammonium hydrogen sulfate
2506	**154**	Ammonium hydrogen sulphate
2507	**154**	Chloroplatinic acid, solid
2508	**156**	Molybdenum pentachloride
2509	**154**	Potassium hydrogen sulfate
2509	**154**	Potassium hydrogen sulphate
2511	**153**	2-Chloropropionic acid
2511	**153**	2-Chloropropionic acid, solid
2511	**153**	2-Chloropropionic acid, solution
2512	**152**	Aminophenols
2513	**156**	Bromoacetyl bromide
2514	**130**	Bromobenzene
2515	**159**	Bromoform
2516	**151**	Carbon tetrabromide
2517	**115**	1-Chloro-1,1-difluoroethane
2517	**115**	Chlorodifluoroethanes
2517	**115**	Difluorochloroethanes
2517	**115**	Refrigerant gas R-142b
2518	**153**	1,5,9-Cyclododecatriene
2520	**130P**	Cyclooctadienes

ID No.	Guide No.	Name of Material
2521	**131P**	Diketene, stabilized
2522	**153P**	2-Dimethylaminoethyl methacrylate
2522	**153P**	Dimethylaminoethyl methacrylate
2524	**129**	Ethyl orthoformate
2525	**156**	Ethyl oxalate
2526	**132**	Furfurylamine
2527	**129P**	Isobutyl acrylate, stabilized
2528	**130**	Isobutyl isobutyrate
2529	**132**	Isobutyric acid
2531	**153P**	Methacrylic acid, stabilized
2533	**156**	Methyl trichloroacetate
2534	**119**	Methylchlorosilane
2535	**132**	4-Methylmorpholine
2535	**132**	N-Methylmorpholine
2535	**132**	Methylmorpholine
2536	**127**	Methyltetrahydrofuran
2538	**133**	Nitronaphthalene
2541	**128**	Terpinolene
2542	**153**	Tributylamine
2545	**135**	Hafnium powder, dry
2546	**135**	Titanium powder, dry
2547	**143**	Sodium superoxide
2548	**124**	Chlorine pentafluoride
2552	**151**	Hexafluoroacetone hydrate
2552	**151**	Hexafluoroacetone hydrate, liquid
2554	**130P**	Methylallyl chloride
2555	**113**	Nitrocellulose with water, not less than 25% water
2556	**113**	Nitrocellulose with alcohol
2556	**113**	Nitrocellulose with not less than 25% alcohol
2557	**133**	Nitrocellulose
2557	**133**	Nitrocellulose mixture, without pigment
2557	**133**	Nitrocellulose mixture, without plasticizer
2557	**133**	Nitrocellulose mixture, with pigment
2557	**133**	Nitrocellulose mixture, with pigment and plasticizer
2557	**133**	Nitrocellulose mixture, with plasticizer
2558	**131**	Epibromohydrin
2560	**129**	2-Methylpentan-2-ol
2561	**128**	3-Methyl-1-butene
2564	**153**	Trichloroacetic acid, solution
2565	**153**	Dicyclohexylamine
2567	**154**	Sodium pentachlorophenate
2570	**154**	Cadmium compound
2571	**156**	Alkylsulfuric acids
2571	**156**	Alkylsulphuric acids
2571	**156**	Ethylsulfuric acid
2571	**156**	Ethylsulphuric acid
2572	**153**	Phenylhydrazine
2573	**141**	Thallium chlorate
2574	**151**	Tricresyl phosphate
2576	**137**	Phosphorus oxybromide, molten
2577	**156**	Phenylacetyl chloride
2578	**157**	Phosphorus trioxide
2579	**153**	Piperazine
2580	**154**	Aluminum bromide, solution
2581	**154**	Aluminum chloride, solution
2582	**154**	Ferric chloride, solution

ID No.	Guide No.	Name of Material
2583	**153**	Alkyl sulfonic acids, solid, with more than 5% free Sulfuric acid
2583	**153**	Alkyl sulphonic acids, solid, with more than 5% free Sulphuric acid
2583	**153**	Aryl sulfonic acids, solid, with more than 5% free Sulfuric acid
2583	**153**	Aryl sulphonic acids, solid, with more than 5% free Sulphuric acid
2584	**153**	Alkyl sulfonic acids, liquid, with more than 5% free Sulfuric acid
2584	**153**	Alkyl sulphonic acids, liquid, with more than 5% free Sulphuric acid
2584	**153**	Aryl sulfonic acids, liquid, with more than 5% free Sulfuric acid
2584	**153**	Aryl sulphonic acids, liquid, with more than 5% free Sulphuric acid
2585	**153**	Alkyl sulfonic acids, solid, with not more than 5% free Sulfuric acid
2585	**153**	Alkyl sulphonic acids, solid, with not more than 5% free Sulphuric acid
2585	**153**	Aryl sulfonic acids, solid, with not more than 5% free Sulfuric acid
2585	**153**	Aryl sulphonic acids, solid, with not more than 5% free Sulphuric acid
2586	**153**	Alkyl sulfonic acids, liquid, with not more than 5% free Sulfuric acid
2586	**153**	Alkyl sulphonic acids, liquid, with not more than 5% free Sulphuric acid
2586	**153**	Aryl sulfonic acids, liquid, with not more than 5% free Sulfuric acid
2586	**153**	Aryl sulphonic acids, liquid, with not more than 5% free Sulphuric acid
2587	**153**	Benzoquinone
2588	**151**	Pesticide, solid, poisonous
2588	**151**	Pesticide, solid, poisonous, n.o.s.
2588	**151**	Pesticide, solid, toxic, n.o.s.
2589	**155**	Vinyl chloroacetate
2590	**171**	Asbestos, white
2590	**171**	White asbestos
2591	**120**	Xenon, refrigerated liquid (cryogenic liquid)
2599	**126**	Chlorotrifluoromethane and Trifluoromethane azeotropic mixture with approximately 60% Chlorotrifluoromethane
2599	**126**	Refrigerant gas R-13 and Refrigerant gas R-23 azeotropic mixture with 60% Refrigerant gas R-13
2599	**126**	Refrigerant gas R-23 and Refrigerant gas R-13 azeotropic mixture with 60% Refrigerant gas R-13
2599	**126**	Refrigerant gas R-503 (azeotropic mixture of Refrigerant gas R-13 and Refrigerant gas R-23 with approximately 60% Refrigerant gas R-13)
2599	**126**	Trifluoromethane and Chlorotrifluoromethane azeotropic mixture with approximately 60% Chlorotrifluoromethane
2600	**119**	Carbon monoxide and Hydrogen mixture, compressed

ID No.	Guide No.	Name of Material
2600	119	Hydrogen and Carbon monoxide mixture, compressed
2601	115	Cyclobutane
2602	126	Dichlorodifluoromethane and Difluoroethane azeotropic mixture with approximately 74% Dichlorodifluoromethane
2602	126	Difluoroethane and Dichlorodifluoromethane azeotropic mixture with approximately 74% Dichlorodifluoromethane
2602	126	Refrigerant gas R-12 and Refrigerant gas R-152a azeotropic mixture with 74% Refrigerant gas R-12
2602	126	Refrigerant gas R-152a and Refrigerant gas R-12 azeotropic mixture with 74% Refrigerant gas R-12
2602	126	Refrigerant gas R-500 (azeotropic mixture of Refrigerant gas R-12 and Refrigerant gas R-152a with approximately 74% Refrigerant gas R-12)
2603	131	Cycloheptatriene
2604	132	Boron trifluoride diethyl etherate
2605	155	Methoxymethyl isocyanate
2606	155	Methyl orthosilicate
2607	129P	Acrolein dimer, stabilized
2608	129	Nitropropanes
2609	156	Triallyl borate
2610	132	Triallylamine
2611	131	Propylene chlorohydrin
2612	127	Methyl propyl ether
2614	129	Methallyl alcohol
2615	127	Ethyl propyl ether
2616	129	Triisopropyl borate
2617	129	Methylcyclohexanols
2618	130P	Vinyltoluenes, stabilized
2619	132	Benzyldimethylamine
2620	130	Amyl butyrates
2621	127	Acetyl methyl carbinol
2622	131P	Glycidaldehyde
2623	133	Firelighters, solid, with flammable liquid
2624	138	Magnesium silicide
2626	140	Chloric acid, aqueous solution, with not more than 10% Chloric acid
2627	140	Nitrites, inorganic, n.o.s.
2628	151	Potassium fluoroacetate
2629	151	Sodium fluoroacetate
2630	151	Selenates
2630	151	Selenites
2642	154	Fluoroacetic acid
2643	155	Methyl bromoacetate
2644	151	Methyl iodide
2645	153	Phenacyl bromide
2646	151	Hexachlorocyclopentadiene
2647	153	Malononitrile
2648	154	1,2-Dibromobutan-3-one
2649	153	1,3-Dichloroacetone
2650	153	1,1-Dichloro-1-nitroethane
2651	153	4,4'-Diaminodiphenylmethane
2653	156	Benzyl iodide
2655	151	Potassium fluorosilicate
2655	151	Potassium silicofluoride
2656	154	Quinoline
2657	153	Selenium disulfide

ID No.	Guide No.	Name of Material
2657	153	Selenium disulphide
2659	151	Sodium chloroacetate
2660	153	Mononitrotoluidines
2660	153	Nitrotoluidines (mono)
2661	153	Hexachloroacetone
2662	153	Hydroquinone
2662	153	Hydroquinone, solid
2664	160	Dibromomethane
2667	152	Butyltoluenes
2668	131	Chloroacetonitrile
2669	152	Chlorocresols
2669	152	Chlorocresols, liquid
2669	152	Chlorocresols, solid
2669	152	Chlorocresols, solution
2670	157	Cyanuric chloride
2671	153	Aminopyridines
2672	154	Ammonia, solution, with more than 10% but not more than 35% Ammonia
2672	154	Ammonium hydroxide
2672	154	Ammonium hydroxide, with more than 10% but not more than 35% Ammonia
2673	151	2-Amino-4-chlorophenol
2674	154	Sodium fluorosilicate
2674	154	Sodium silicofluoride
2676	119	Stibine
2677	154	Rubidium hydroxide, solution
2678	154	Rubidium hydroxide
2678	154	Rubidium hydroxide, solid
2679	154	Lithium hydroxide, solution
2680	154	Lithium hydroxide
2680	154	Lithium hydroxide, monohydrate
2680	154	Lithium hydroxide, solid
2681	154	Caesium hydroxide, solution
2681	154	Cesium hydroxide, solution
2682	157	Caesium hydroxide
2682	157	Cesium hydroxide
2683	132	Ammonium sulfide, solution
2683	132	Ammonium sulphide, solution
2684	132	3-Diethylaminopropylamine
2684	132	Diethylaminopropylamine
2685	132	N,N-Diethylethylenediamine
2686	132	2-Diethylaminoethanol
2686	132	Diethylaminoethanol
2687	133	Dicyclohexylammonium nitrite
2688	159	1-Bromo-3-chloropropane
2688	159	1-Chloro-3-bromopropane
2689	153	Glycerol alpha-monochlorohydrin
2690	152	N,n-Butylimidazole
2691	137	Phosphorus pentabromide
2692	157	Boron tribromide
2693	154	Bisulfites, aqueous solution, n.o.s.
2693	154	Bisulfites, inorganic, aqueous solution, n.o.s.
2693	154	Bisulphites, aqueous solution, n.o.s.
2693	154	Bisulphites, inorganic, aqueous solution, n.o.s.
2698	156	Tetrahydrophthalic anhydrides
2699	154	Trifluoroacetic acid
2705	153P	1-Pentol
2707	127	Dimethyldioxanes
2709	128	Butylbenzenes
2710	128	Dipropyl ketone

ID No.	Guide No.	Name of Material
2713	153	Acridine
2714	133	Zinc resinate
2715	133	Aluminum resinate
2716	153	1,4-Butynediol
2717	133	Camphor
2717	133	Camphor, synthetic
2719	141	Barium bromate
2720	141	Chromium nitrate
2721	141	Copper chlorate
2722	140	Lithium nitrate
2723	140	Magnesium chlorate
2724	140	Manganese nitrate
2725	140	Nickel nitrate
2726	140	Nickel nitrite
2727	141	Thallium nitrate
2728	140	Zirconium nitrate
2729	152	Hexachlorobenzene
2730	152	Nitroanisoles
2730	152	Nitroanisoles, liquid
2730	152	Nitroanisoles, solid
2732	152	Nitrobromobenzenes
2732	152	Nitrobromobenzenes, liquid
2732	152	Nitrobromobenzenes, solid
2733	132	Alkylamines, n.o.s.
2733	132	Amines, flammable, corrosive, n.o.s.
2733	132	Polyalkylamines, n.o.s.
2733	132	Polyamines, flammable, corrosive, n.o.s.
2734	132	Alkylamines, n.o.s.
2734	132	Amines, liquid, corrosive, flammable, n.o.s.
2734	132	Polyalkylamines, n.o.s.
2734	132	Polyamines, liquid, corrosive, flammable, n.o.s.
2735	153	Alkylamines, n.o.s.
2735	153	Amines, liquid, corrosive, n.o.s.
2735	153	Polyalkylamines, n.o.s.
2735	153	Polyamines, liquid, corrosive, n.o.s.
2738	153	N-Butylaniline
2739	156	Butyric anhydride
2740	155	n-Propyl chloroformate
2741	141	Barium hypochlorite, with more than 22% available Chlorine
2742	155	sec-Butyl chloroformate
2742	155	Chloroformates, n.o.s.
2742	155	Chloroformates, poisonous, corrosive, flammable, n.o.s.
2742	155	Chloroformates, toxic, corrosive, flammable, n.o.s.
2742	155	Isobutyl chloroformate
2743	155	n-Butyl chloroformate
2744	155	Cyclobutyl chloroformate
2745	157	Chloromethyl chloroformate
2746	156	Phenyl chloroformate
2747	156	tert-Butylcyclohexyl chloroformate
2748	156	2-Ethylhexyl chloroformate
2749	130	Tetramethylsilane
2750	153	1,3-Dichloropropanol-2
2751	155	Diethylthiophosphoryl chloride
2752	127	1,2-Epoxy-3-ethoxypropane
2753	153	N-Ethylbenzyltoluidines
2753	153	N-Ethylbenzyltoluidines, liquid
2753	153	N-Ethylbenzyltoluidines, solid
2754	153	N-Ethyltoluidines

ID No.	Guide No.	Name of Material
2757	**151**	Carbamate pesticide, solid, poisonous
2757	**151**	Carbamate pesticide, solid, toxic
2758	**131**	Carbamate pesticide, liquid, flammable, poisonous
2758	**131**	Carbamate pesticide, liquid, flammable, toxic
2759	**151**	Arsenical pesticide, solid, poisonous
2759	**151**	Arsenical pesticide, solid, toxic
2760	**131**	Arsenical pesticide, liquid, flammable, poisonous
2760	**131**	Arsenical pesticide, liquid, flammable, toxic
2761	**151**	Organochlorine pesticide, solid, poisonous
2761	**151**	Organochlorine pesticide, solid, toxic
2762	**131**	Organochlorine pesticide, liquid, flammable, poisonous
2762	**131**	Organochlorine pesticide, liquid, flammable, toxic
2763	**151**	Triazine pesticide, solid, poisonous
2763	**151**	Triazine pesticide, solid, toxic
2764	**131**	Triazine pesticide, liquid, flammable, poisonous
2764	**131**	Triazine pesticide, liquid, flammable, toxic
2771	**151**	Dithiocarbamate pesticide, solid, poisonous
2771	**151**	Dithiocarbamate pesticide, solid, toxic
2771	**151**	Thiocarbamate pesticide, solid, poisonous
2771	**151**	Thiocarbamate pesticide, solid, toxic

ID No.	Guide No.	Name of Material
2772	**131**	Dithiocarbamate pesticide, liquid, flammable, poisonous
2772	**131**	Dithiocarbamate pesticide, liquid, flammable, toxic
2772	**131**	Thiocarbamate pesticide, liquid, flammable, poisonous
2772	**131**	Thiocarbamate pesticide, liquid, flammable, toxic
2775	**151**	Copper based pesticide, solid, poisonous
2775	**151**	Copper based pesticide, solid, toxic
2776	**131**	Copper based pesticide, liquid, flammable, poisonous
2776	**131**	Copper based pesticide, liquid, flammable, toxic
2777	**151**	Mercury based pesticide, solid, poisonous
2777	**151**	Mercury based pesticide, solid, toxic
2778	**131**	Mercury based pesticide, liquid, flammable, poisonous
2778	**131**	Mercury based pesticide, liquid, flammable, toxic
2779	**153**	Substituted nitrophenol pesticide, solid, poisonous
2779	**153**	Substituted nitrophenol pesticide, solid, toxic
2780	**131**	Substituted nitrophenol pesticide, liquid, flammable, poisonous
2780	**131**	Substituted nitrophenol pesticide, liquid, flammable, toxic
2781	**151**	Bipyridilium pesticide, solid, poisonous
2781	**151**	Bipyridilium pesticide, solid, toxic
2782	**131**	Bipyridilium pesticide, liquid, flammable, poisonous

ID No.	Guide No.	Name of Material
2782	**131**	Bipyridilium pesticide, liquid, flammable, toxic
2783	**152**	Organophosphorus pesticide, solid, poisonous
2783	**152**	Organophosphorus pesticide, solid, toxic
2784	**131**	Organophosphorus pesticide, liquid, flammable, poisonous
2784	**131**	Organophosphorus pesticide, liquid, flammable, toxic
2785	**152**	4-Thiapentanal
2785	**152**	Thia-4-pentanal
2786	**153**	Organotin pesticide, solid, poisonous
2786	**153**	Organotin pesticide, solid, toxic
2787	**131**	Organotin pesticide, liquid, flammable, poisonous
2787	**131**	Organotin pesticide, liquid, flammable, toxic
2788	**153**	Organotin compound, liquid, n.o.s.
2789	**132**	Acetic acid, glacial
2789	**132**	Acetic acid, solution, more than 80% acid
2790	**153**	Acetic acid, solution, more than 10% but not more than 80% acid
2793	**170**	Ferrous metal borings, shavings, turnings or cuttings
2794	**154**	Batteries, wet, filled with acid
2795	**154**	Batteries, wet, filled with alkali
2796	**157**	Battery fluid, acid
2796	**157**	Sulfuric acid, with not more than 51% acid
2796	**157**	Sulphuric acid, with not more than 51% acid
2797	**154**	Battery fluid, alkali
2797	**154**	Battery fluid, alkali, with battery
2797	**154**	Battery fluid, alkali, with electronic equipment or actuating device
2798	**137**	Benzene phosphorus dichloride
2798	**137**	Phenylphosphorus dichloride
2799	**137**	Benzene phosphorus thiodichloride
2799	**137**	Phenylphosphorus thiodichloride
2800	**154**	Batteries, wet, non-spillable
2801	**154**	Dye, liquid, corrosive, n.o.s.
2801	**154**	Dye intermediate, liquid, corrosive, n.o.s.
2802	**154**	Copper chloride
2803	**172**	Gallium
2805	**138**	Lithium hydride, fused solid
2806	**138**	Lithium nitride
2807	**171**	Magnetized material
2809	**172**	Mercury
2809	**172**	Mercury metal
2810	**153**	Buzz
2810	**153**	BZ
2810	**153**	Compound, tree or weed killing, liquid (toxic)
2810	**153**	CS
2810	**153**	DC
2810	**153**	GA
2810	**153**	GB
2810	**153**	GD
2810	**153**	GF
2810	**153**	H
2810	**153**	HD
2810	**153**	HL

ID No.	Guide No.	Name of Material
2810	153	HN-1
2810	153	HN-2
2810	153	HN-3
2810	153	L (Lewisite)
2810	153	Lewisite
2810	153	Mustard
2810	153	Mustard Lewisite
2810	153	Poisonous liquid, n.o.s.
2810	153	Poisonous liquid, n.o.s. (Inhalation Hazard Zone A)
2810	153	Poisonous liquid, n.o.s. (Inhalation Hazard Zone B)
2810	153	Poisonous liquid, organic, n.o.s.
2810	153	Poisonous liquid, organic, n.o.s. (Inhalation Hazard Zone A)
2810	153	Poisonous liquid, organic, n.o.s. (Inhalation Hazard Zone B)
2810	153	Sarin
2810	153	Soman
2810	153	Tabun
2810	153	Thickened GD
2810	153	Toxic liquid, n.o.s.
2810	153	Toxic liquid, n.o.s. (Inhalation Hazard Zone A)
2810	153	Toxic liquid, n.o.s. (Inhalation Hazard Zone B)
2810	153	Toxic liquid, organic, n.o.s.
2810	153	Toxic liquid, organic, n.o.s. (Inhalation Hazard Zone A)
2810	153	Toxic liquid, organic, n.o.s. (Inhalation Hazard Zone B)

ID No.	Guide No.	Name of Material
2810	153	VX
2811	154	CX
2811	154	Poisonous solid, organic, n.o.s.
2811	154	Toxic solid, organic, n.o.s.
2812	154	Sodium aluminate, solid
2813	138	Water-reactive solid, n.o.s.
2814	158	Infectious substance, affecting humans
2815	153	N-Aminoethylpiperazine
2817	154	Ammonium bifluoride, solution
2817	154	Ammonium hydrogendifluoride, solution
2817	154	Ammonium hydrogen fluoride, solution
2818	154	Ammonium polysulfide, solution
2818	154	Ammonium polysulphide, solution
2819	153	Amyl acid phosphate
2820	153	Butyric acid
2821	153	Phenol solution
2822	153	2-Chloropyridine
2823	153	Crotonic acid
2823	153	Crotonic acid, liquid
2823	153	Crotonic acid, solid
2826	155	Ethyl chlorothioformate
2829	153	Caproic acid
2829	153	Hexanoic acid
2830	139	Lithium ferrosilicon
2831	160	1,1,1-Trichloroethane
2834	154	Phosphorous acid
2834	154	Phosphorous acid, ortho
2835	138	Sodium aluminum hydride
2837	154	Bisulfates, aqueous solution

ID No.	Guide No.	Name of Material
2837	**154**	Bisulphates, aqueous solution
2837	**154**	Sodium bisulfate, solution
2837	**154**	Sodium bisulphate, solution
2837	**154**	Sodium hydrogen sulfate, solution
2837	**154**	Sodium hydrogen sulphate, solution
2838	**129P**	Vinyl butyrate, stabilized
2839	**153**	Aldol
2840	**129**	Butyraldoxime
2841	**131**	Di-n-amylamine
2842	**129**	Nitroethane
2844	**138**	Calcium manganese silicon
2845	**135**	Ethyl phosphonous dichloride, anhydrous
2845	**135**	Methyl phosphonous dichloride
2845	**135**	Pyrophoric liquid, n.o.s.
2845	**135**	Pyrophoric liquid, organic, n.o.s.
2846	**135**	Pyrophoric solid, n.o.s.
2846	**135**	Pyrophoric solid, organic, n.o.s.
2849	**153**	3-Chloropropanol-1
2850	**128**	Propylene tetramer
2851	**157**	Boron trifluoride, dihydrate
2852	**113**	Dipicryl sulfide, wetted with not less than 10% water
2852	**113**	Dipicryl sulphide, wetted with not less than 10% water
2853	**151**	Magnesium fluorosilicate
2853	**151**	Magnesium silicofluoride
2854	**151**	Ammonium fluorosilicate
2854	**151**	Ammonium silicofluoride
2855	**151**	Zinc fluorosilicate
2855	**151**	Zinc silicofluoride

ID No.	Guide No.	Name of Material
2856	**151**	Fluorosilicates, n.o.s.
2856	**151**	Silicofluorides, n.o.s.
2857	**126**	Refrigerating machines, containing Ammonia solutions (UN2672)
2857	**126**	Refrigerating machines, containing non-flammable, non-poisonous gases
2857	**126**	Refrigerating machines, containing non-flammable, non-toxic gases
2858	**170**	Zirconium, dry, coiled wire, finished metal sheets or strips
2859	**154**	Ammonium metavanadate
2861	**151**	Ammonium polyvanadate
2862	**151**	Vanadium pentoxide
2863	**154**	Sodium ammonium vanadate
2864	**151**	Potassium metavanadate
2865	**154**	Hydroxylamine sulfate
2865	**154**	Hydroxylamine sulphate
2869	**157**	Titanium trichloride mixture
2870	**135**	Aluminum borohydride
2870	**135**	Aluminum borohydride in devices
2871	**170**	Antimony powder
2872	**159**	Dibromochloropropanes
2873	**153**	Dibutylaminoethanol
2874	**153**	Furfuryl alcohol
2875	**151**	Hexachlorophene
2876	**153**	Resorcinol
2878	**170**	Titanium sponge granules
2878	**170**	Titanium sponge powders
2879	**157**	Selenium oxychloride

ID No.	Guide No.	Name of Material
2880	**140**	Calcium hypochlorite, hydrated, with not less than 5.5% but not more than 16% water
2880	**140**	Calcium hypochlorite, hydrated mixture, with not less than 5.5% but not more than 16% water
2881	**135**	Metal catalyst, dry
2881	**135**	Nickel catalyst, dry
2900	**158**	Infectious substance, affecting animals only
2901	**124**	Bromine chloride
2902	**151**	Pesticide, liquid, poisonous, n.o.s.
2902	**151**	Pesticide, liquid, toxic, n.o.s.
2903	**131**	Pesticide, liquid, poisonous, flammable, n.o.s.
2903	**131**	Pesticide, liquid, toxic, flammable, n.o.s.
2904	**154**	Chlorophenates, liquid
2904	**154**	Chlorophenolates, liquid
2904	**154**	Phenolates, liquid
2905	**154**	Chlorophenates, solid
2905	**154**	Chlorophenolates, solid
2905	**154**	Phenolates, solid
2907	**133**	Isosorbide dinitrate mixture
2908	**161**	Radioactive material, excepted package, empty packaging
2909	**161**	Radioactive material, excepted package, articles manufactured from depleted Uranium
2909	**161**	Radioactive material, excepted package, articles manufactured from natural Thorium
2909	**161**	Radioactive material, excepted package, articles manufactured from natural Uranium
2910	**161**	Radioactive material, excepted package, empty packaging
2910	**161**	Radioactive material, excepted package, instruments or articles
2910	**161**	Radioactive material, excepted package, limited quantity of material
2911	**161**	Radioactive material, excepted package, instruments or articles
2912	**162**	Radioactive material, low specific activity (LSA), n.o.s.
2912	**162**	Radioactive material, low specific activity (LSA-I), non fissile or fissile-excepted
2913	**162**	Radioactive material, surface contaminated objects (SCO)
2913	**162**	Radioactive material, surface contaminated objects (SCO-I), non fissile or fissile-excepted
2913	**162**	Radioactive material, surface contaminated objects (SCO-II), non fissile or fissile-excepted
2915	**163**	Radioactive material, Type A package non-special form, non fissile or fissile-excepted
2916	**163**	Radioactive material, Type B(U) package, non fissile or fissile-excepted
2917	**163**	Radioactive material, Type B(M) package, non fissile or fissile-excepted
2918	**165**	Radioactive material, fissile, n.o.s.
2919	**163**	Radioactive material, transported under special arrangement, non fissile or fissile-excepted

ID No.	Guide No.	Name of Material
2920	132	Corrosive liquid, flammable, n.o.s.
2921	134	Corrosive solid, flammable, n.o.s.
2922	154	Corrosive liquid, poisonous, n.o.s.
2922	154	Corrosive liquid, toxic, n.o.s.
2923	154	Corrosive solid, poisonous, n.o.s.
2923	154	Corrosive solid, toxic, n.o.s.
2924	132	Flammable liquid, corrosive, n.o.s
2925	134	Flammable solid, corrosive, n.o.s.
2925	134	Flammable solid, corrosive, organic, n.o.s.
2926	134	Flammable solid, poisonous, n.o.s.
2926	134	Flammable solid, poisonous, organic, n.o.s.
2926	134	Flammable solid, toxic, organic, n.o.s.
2927	154	Ethyl phosphonothioic dichloride, anhydrous
2927	154	Ethyl phosphorodichloridate
2927	154	Poisonous liquid, corrosive, n.o.s.
2927	154	Poisonous liquid, corrosive, n.o.s. (Inhalation Hazard Zone A)
2927	154	Poisonous liquid, corrosive, n.o.s. (Inhalation Hazard Zone B)
2927	154	Poisonous liquid, corrosive, organic, n.o.s.
2927	154	Poisonous liquid, corrosive, organic, n.o.s. (Inhalation Hazard Zone A)
2927	154	Poisonous liquid, corrosive, organic, n.o.s. (Inhalation Hazard Zone B)
2927	154	Toxic liquid, corrosive, n.o.s.
2927	154	Toxic liquid, corrosive, n.o.s. (Inhalation Hazard Zone A)
2927	154	Toxic liquid, corrosive, n.o.s. (Inhalation Hazard Zone B)
2927	154	Toxic liquid, corrosive, organic, n.o.s.
2927	154	Toxic liquid, corrosive, organic, n.o.s. (Inhalation Hazard Zone A)
2927	154	Toxic liquid, corrosive, organic, n.o.s. (Inhalation Hazard Zone B)
2928	154	Poisonous solid, corrosive, n.o.s.
2928	154	Toxic solid, corrosive, organic, n.o.s.
2929	131	Poisonous liquid, flammable, n.o.s.
2929	131	Poisonous liquid, flammable, n.o.s. (Inhalation Hazard Zone A)
2929	131	Poisonous liquid, flammable, n.o.s. (Inhalation Hazard Zone B)
2929	131	Poisonous liquid, flammable, organic, n.o.s.
2929	131	Poisonous liquid, flammable, organic, n.o.s. (Inhalation Hazard Zone A)
2929	131	Poisonous liquid, flammable, organic, n.o.s. (Inhalation Hazard Zone B)
2929	131	Toxic liquid, flammable, n.o.s.
2929	131	Toxic liquid, flammable, n.o.s. (Inhalation Hazard Zone A)

ID No.	Guide No.	Name of Material
2929	131	Toxic liquid, flammable, n.o.s. (Inhalation Hazard Zone B)
2929	131	Toxic liquid, flammable, organic, n.o.s.
2929	131	Toxic liquid, flammable, organic, n.o.s. (Inhalation Hazard Zone A)
2929	131	Toxic liquid, flammable, organic, n.o.s. (Inhalation Hazard Zone B)
2930	134	Poisonous solid, flammable, n.o.s.
2930	134	Poisonous solid, flammable, organic, n.o.s.
2930	134	Toxic solid, flammable, n.o.s.
2930	134	Toxic solid, flammable, organic, n.o.s.
2931	151	Vanadyl sulfate
2931	151	Vanadyl sulphate
2933	129	Methyl 2-chloropropionate
2934	129	Isopropyl 2-chloropropionate
2935	129	Ethyl 2-chloropropionate
2936	153	Thiolactic acid
2937	153	alpha-Methylbenzyl alcohol
2937	153	alpha-Methylbenzyl alcohol, liquid
2937	153	Methylbenzyl alcohol (alpha)
2940	135	Cyclooctadiene phosphines
2940	135	9-Phosphabicyclononanes
2941	153	Fluoroanilines
2942	153	2-Trifluoromethylaniline
2943	129	Tetrahydrofurfurylamine
2945	132	N-Methylbutylamine
2946	153	2-Amino-5-diethylaminopentane
2947	155	Isopropyl chloroacetate
2948	153	3-Trifluoromethylaniline
2949	154	Sodium hydrosulfide, with not less than 25% water of crystallization
2949	154	Sodium hydrosulphide, with not less than 25% water of crystallization
2950	138	Magnesium granules, coated
2956	149	5-tert-Butyl-2,4,6-trinitro-m-xylene
2956	149	Musk xylene
2965	139	Boron trifluoride dimethyl etherate
2966	153	Thioglycol
2967	154	Sulfamic acid
2967	154	Sulphamic acid
2968	135	Maneb, stabilized
2968	135	Maneb preparation, stabilized
2969	171	Castor beans, meal, pomace or flake
2974	164	Radioactive material, special form, n.o.s.
2975	162	Thorium metal, pyrophoric
2976	162	Thorium nitrate, solid
2977	166	Radioactive material, Uranium hexafluoride, fissile
2977	166	Uranium hexafluoride, fissile containing more than 1% Uranium-235
2978	166	Radioactive material, Uranium hexafluoride
2978	166	Uranium hexafluoride
2978	166	Uranium hexafluoride, non fissile or fissile-excepted
2979	162	Uranium metal, pyrophoric
2980	162	Uranyl nitrate, hexahydrate, solution

ID No.	Guide No.	Name of Material
2981	**162**	Uranyl nitrate, solid
2982	**163**	Radioactive material, n.o.s.
2983	**129P**	Ethylene oxide and Propylene oxide mixture, with not more than 30% Ethylene oxide
2983	**129P**	Propylene oxide and Ethylene oxide mixture, with not more than 30% Ethylene oxide
2984	**140**	Hydrogen peroxide, aqueous solution, with not less than 8% but less than 20% Hydrogen peroxide
2985	**155**	Chlorosilanes, flammable, corrosive, n.o.s.
2985	**155**	Chlorosilanes, n.o.s.
2986	**155**	Chlorosilanes, corrosive, flammable, n.o.s.
2986	**155**	Chlorosilanes, n.o.s.
2987	**156**	Chlorosilanes, corrosive, n.o.s.
2987	**156**	Chlorosilanes, n.o.s.
2988	**139**	Chlorosilanes, n.o.s.
2988	**139**	Chlorosilanes, water-reactive, flammable, corrosive, n.o.s.
2989	**133**	Lead phosphite, dibasic
2990	**171**	Life-saving appliances, self-inflating
2991	**131**	Carbamate pesticide, liquid, poisonous, flammable
2991	**131**	Carbamate pesticide, liquid, toxic, flammable
2992	**151**	Carbamate pesticide, liquid, poisonous
2992	**151**	Carbamate pesticide, liquid, toxic
2993	**131**	Arsenical pesticide, liquid, poisonous, flammable
2993	**131**	Arsenical pesticide, liquid, toxic, flammable
2994	**151**	Arsenical pesticide, liquid, poisonous
2994	**151**	Arsenical pesticide, liquid, toxic
2995	**131**	Organochlorine pesticide, liquid, poisonous, flammable
2995	**131**	Organochlorine pesticide, liquid, toxic, flammable
2996	**151**	Organochlorine pesticide, liquid, poisonous
2996	**151**	Organochlorine pesticide, liquid, toxic
2997	**131**	Triazine pesticide, liquid, poisonous, flammable
2997	**131**	Triazine pesticide, liquid, toxic, flammable
2998	**151**	Triazine pesticide, liquid, poisonous
2998	**151**	Triazine pesticide, liquid, toxic
3002	**151**	Phenyl urea pesticide, liquid, poisonous
3002	**151**	Phenyl urea pesticide, liquid, toxic
3005	**131**	Dithiocarbamate pesticide, liquid, poisonous, flammable
3005	**131**	Dithiocarbamate pesticide, liquid, toxic, flammable
3005	**131**	Thiocarbamate pesticide, liquid, poisonous, flammable
3005	**131**	Thiocarbamate pesticide, liquid, toxic, flammable
3006	**151**	Dithiocarbamate pesticide, liquid, poisonous
3006	**151**	Dithiocarbamate pesticide, liquid, toxic
3006	**151**	Thiocarbamate pesticide, liquid, poisonous
3006	**151**	Thiocarbamate pesticide, liquid, toxic

ID No.	Guide No.	Name of Material
3009	**131**	Copper based pesticide, liquid, poisonous, flammable
3009	**131**	Copper based pesticide, liquid, toxic, flammable
3010	**151**	Copper based pesticide, liquid, poisonous
3010	**151**	Copper based pesticide, liquid, toxic
3011	**131**	Mercury based pesticide, liquid, poisonous, flammable
3011	**131**	Mercury based pesticide, liquid, toxic, flammable
3012	**151**	Mercury based pesticide, liquid, poisonous
3012	**151**	Mercury based pesticide, liquid, toxic
3013	**131**	Substituted nitrophenol pesticide, liquid, poisonous, flammable
3013	**131**	Substituted nitrophenol pesticide, liquid, toxic, flammable
3014	**153**	Substituted nitrophenol pesticide, liquid, poisonous
3014	**153**	Substituted nitrophenol pesticide, liquid, toxic
3015	**131**	Bipyridilium pesticide, liquid, poisonous, flammable
3015	**131**	Bipyridilium pesticide, liquid, toxic, flammable
3016	**151**	Bipyridilium pesticide, liquid, poisonous
3016	**151**	Bipyridilium pesticide, liquid, toxic
3017	**131**	Organophosphorus pesticide, liquid, poisonous, flammable
3017	**131**	Organophosphorus pesticide, liquid, toxic, flammable
3018	**152**	Organophosphorus pesticide, liquid, poisonous
3018	**152**	Organophosphorus pesticide, liquid, toxic
3019	**131**	Organotin pesticide, liquid, poisonous, flammable
3019	**131**	Organotin pesticide, liquid, toxic, flammable
3020	**153**	Organotin pesticide, liquid, poisonous
3020	**153**	Organotin pesticide, liquid, toxic
3021	**131**	Pesticide, liquid, flammable, poisonous, n.o.s.
3021	**131**	Pesticide, liquid, flammable, toxic, n.o.s.
3022	**127P**	1,2-Butylene oxide, stabilized
3023	**131**	2-Methyl-2-heptanethiol
3023	**131**	tert-Octyl mercaptan
3024	**131**	Coumarin derivative pesticide, liquid, flammable, poisonous
3024	**131**	Coumarin derivative pesticide, liquid, flammable, toxic
3025	**131**	Coumarin derivative pesticide, liquid, poisonous, flammable
3025	**131**	Coumarin derivative pesticide, liquid, toxic, flammable
3026	**151**	Coumarin derivative pesticide, liquid, poisonous
3026	**151**	Coumarin derivative pesticide, liquid, toxic
3027	**151**	Coumarin derivative pesticide, solid, poisonous
3027	**151**	Coumarin derivative pesticide, solid, toxic
3028	**154**	Batteries, dry, containing Potassium hydroxide solid
3048	**157**	Aluminum phosphide pesticide
3049	**138**	Metal alkyl halides, water-reactive, n.o.s.

ID No.	Guide No.	Name of Material
3049	138	Metal aryl halides, water-reactive, n.o.s.
3050	138	Metal alkyl hydrides, water-reactive, n.o.s.
3050	138	Metal aryl hydrides, water-reactive, n.o.s.
3051	135	Aluminum alkyls
3052	135	Aluminum alkyl halides
3052	135	Aluminum alkyl halides, liquid
3052	135	Aluminum alkyl halides, solid
3053	135	Magnesium alkyls
3054	129	Cyclohexanethiol
3054	129	Cyclohexyl mercaptan
3055	154	2-(2-Aminoethoxy)ethanol
3056	129	n-Heptaldehyde
3057	125	Trifluoroacetyl chloride
3064	127	Nitroglycerin, solution in alcohol, with more than 1% but not more than 5% Nitroglycerin
3065	127	Alcoholic beverages
3066	153	Paint (corrosive)
3066	153	Paint related material (corrosive)
3070	126	Dichlorodifluoromethane and Ethylene oxide mixture, with not more than 12.5% Ethylene oxide
3070	126	Dichlorodifluoromethane and Ethylene oxide mixtures, with not more than 12% Ethylene oxide
3070	126	Ethylene oxide and Dichlorodifluoromethane mixture, with not more than 12.5% Ethylene oxide
3070	126	Ethylene oxide and Dichlorodifluoromethane mixtures, with not more than 12% Ethylene oxide
3071	131	Mercaptan mixture, liquid, poisonous, flammable, n.o.s.
3071	131	Mercaptan mixture, liquid, toxic, flammable, n.o.s.
3071	131	Mercaptans, liquid, poisonous, flammable, n.o.s.
3071	131	Mercaptans, liquid, toxic, flammable, n.o.s.
3072	171	Life-saving appliances, not self-inflating
3073	131P	Vinylpyridines, stabilized
3076	138	Aluminum alkyl hydrides
3077	171	Environmentally hazardous substances, solid, n.o.s.
3077	171	Hazardous waste, solid, n.o.s.
3077	171	Other regulated substances, solid, n.o.s.
3078	138	Cerium, turnings or gritty powder
3079	131P	Methacrylonitrile, stabilized
3080	155	Isocyanate solution, poisonous, flammable, n.o.s.
3080	155	Isocyanate solution, toxic, flammable, n.o.s.
3080	155	Isocyanate solutions, n.o.s.
3080	155	Isocyanates, n.o.s.
3080	155	Isocyanates, poisonous, flammable, n.o.s.
3080	155	Isocyanates, toxic, flammable, n.o.s.
3082	171	Environmentally hazardous substances, liquid, n.o.s.
3082	171	Hazardous waste, liquid, n.o.s.

ID No.	Guide No.	Name of Material
3082	**171**	Other regulated substances, liquid, n.o.s.
3083	**124**	Perchloryl fluoride
3084	**140**	Corrosive solid, oxidizing, n.o.s.
3085	**140**	Oxidizing solid, corrosive, n.o.s.
3086	**141**	Poisonous solid, oxidizing, n.o.s.
3086	**141**	Toxic solid, oxidizing, n.o.s.
3087	**141**	Oxidizing solid, poisonous, n.o.s.
3087	**141**	Oxidizing solid, toxic, n.o.s.
3088	**135**	Self-heating solid, organic, n.o.s.
3089	**170**	Metal powder, flammable, n.o.s.
3090	**138**	Lithium batteries
3090	**138**	Lithium batteries, liquid or solid cathode
3090	**138**	Lithium metal batteries (including lithium alloy batteries)
3091	**138**	Lithium batteries contained in equipment
3091	**138**	Lithium batteries packed with equipment
3091	**138**	Lithium metal batteries contained in equipment (including lithium alloy batteries)
3091	**138**	Lithium metal batteries packed with equipment (including lithium alloy batteries)
3092	**129**	1-Methoxy-2-propanol
3093	**140**	Corrosive liquid, oxidizing, n.o.s.
3094	**138**	Corrosive liquid, water-reactive, n.o.s.
3094	**138**	Corrosive liquid, which in contact with water emits flammable gases, n.o.s.
3095	**136**	Corrosive solid, self-heating, n.o.s.
3096	**138**	Corrosive solid, water-reactive, n.o.s.
3096	**138**	Corrosive solid, which in contact with water emits flammable gases, n.o.s.
3097	**140**	Flammable solid, oxidizing, n.o.s.
3098	**140**	Oxidizing liquid, corrosive, n.o.s.
3099	**142**	Oxidizing liquid, poisonous, n.o.s.
3099	**142**	Oxidizing liquid, toxic, n.o.s.
3100	**135**	Oxidizing solid, self-heating, n.o.s.
3101	**146**	Organic peroxide type B, liquid
3102	**146**	Organic peroxide type B, solid
3103	**146**	Organic peroxide type C, liquid
3104	**146**	Organic peroxide type C, solid
3105	**145**	Organic peroxide type D, liquid
3106	**145**	Organic peroxide type D, solid
3107	**145**	Organic peroxide type E, liquid
3108	**145**	Organic peroxide type E, solid
3109	**145**	Organic peroxide type F, liquid
3110	**145**	Organic peroxide type F, solid
3111	**148**	Organic peroxide type B, liquid, temperature controlled
3112	**148**	Organic peroxide type B, solid, temperature controlled
3113	**148**	Organic peroxide type C, liquid, temperature controlled
3114	**148**	Organic peroxide type C, solid, temperature controlled

ID No.	Guide No.	Name of Material
3115	**148**	Organic peroxide type D, liquid, temperature controlled
3116	**148**	Organic peroxide type D, solid, temperature controlled
3117	**148**	Organic peroxide type E, liquid, temperature controlled
3118	**148**	Organic peroxide type E, solid, temperature controlled
3119	**148**	Organic peroxide type F, liquid, temperature controlled
3120	**148**	Organic peroxide type F, solid, temperature controlled
3121	**144**	Oxidizing solid, water-reactive, n.o.s.
3122	**142**	Poisonous liquid, oxidizing, n.o.s.
3122	**142**	Poisonous liquid, oxidizing, n.o.s. (Inhalation Hazard Zone A)
3122	**142**	Poisonous liquid, oxidizing, n.o.s. (Inhalation Hazard Zone B)
3122	**142**	Toxic liquid, oxidizing, n.o.s.
3122	**142**	Toxic liquid, oxidizing, n.o.s. (Inhalation Hazard Zone A)
3122	**142**	Toxic liquid, oxidizing, n.o.s. (Inhalation Hazard Zone B)
3123	**139**	Poisonous liquid, water-reactive, n.o.s.
3123	**139**	Poisonous liquid, water-reactive, n.o.s. (Inhalation Hazard Zone A)
3123	**139**	Poisonous liquid, water-reactive, n.o.s. (Inhalation Hazard Zone B)
3123	**139**	Poisonous liquid, which in contact with water emits flammable gases, n.o.s.
3123	**139**	Poisonous liquid, which in contact with water emits flammable gases, n.o.s. (Inhalation Hazard Zone A)
3123	**139**	Poisonous liquid, which in contact with water emits flammable gases, n.o.s. (Inhalation Hazard Zone B)
3123	**139**	Toxic liquid, water-reactive, n.o.s.
3123	**139**	Toxic liquid, water-reactive, n.o.s. (Inhalation Hazard Zone A)
3123	**139**	Toxic liquid, water-reactive, n.o.s. (Inhalation Hazard Zone B)
3123	**139**	Toxic liquid, which in contact with water emits flammable gases, n.o.s.
3123	**139**	Toxic liquid, which in contact with water emits flammable gases, n.o.s. (Inhalation Hazard Zone A)
3123	**139**	Toxic liquid, which in contact with water emits flammable gases, n.o.s. (Inhalation Hazard Zone B)
3124	**136**	Poisonous solid, self-heating, n.o.s.
3124	**136**	Toxic solid, self-heating, n.o.s.
3125	**139**	Poisonous solid, water-reactive, n.o.s.
3125	**139**	Poisonous solid, which in contact with water emits flammable gases, n.o.s.
3125	**139**	Toxic solid, water-reactive, n.o.s.
3125	**139**	Toxic solid, which in contact with water emits flammable gases, n.o.s.
3126	**136**	Self-heating solid, corrosive, organic, n.o.s.

ID No.	Guide No.	Name of Material
3127	**135**	Self-heating solid, oxidizing, n.o.s.
3128	**136**	Self-heating solid, poisonous, organic, n.o.s.
3128	**136**	Self-heating solid, toxic, organic, n.o.s.
3129	**138**	Water-reactive liquid, corrosive, n.o.s.
3130	**139**	Water-reactive liquid, poisonous, n.o.s.
3130	**139**	Water-reactive liquid, toxic, n.o.s.
3131	**138**	Water-reactive solid, corrosive, n.o.s.
3132	**138**	Water-reactive solid, flammable, n.o.s.
3133	**138**	Water-reactive solid, oxidizing, n.o.s.
3134	**139**	Water-reactive solid, poisonous, n.o.s.
3134	**139**	Water-reactive solid, toxic, n.o.s.
3135	**138**	Water-reactive solid, self-heating, n.o.s.
3136	**120**	Trifluoromethane, refrigerated liquid
3137	**140**	Oxidizing solid, flammable, n.o.s.
3138	**115**	Acetylene, Ethylene and Propylene in mixture, refrigerated liquid containing at least 71.5% Ethylene with not more than 22.5% Acetylene and not more than 6% Propylene
3138	**115**	Ethylene, Acetylene and Propylene in mixture, refrigerated liquid containing at least 71.5% Ethylene with not more than 22.5% Acetylene and not more than 6% Propylene
3138	**115**	Propylene, Ethylene and Acetylene in mixture, refrigerated liquid containing at least 71.5% Ethylene with not more than 22.5% Acetylene and not more than 6% Propylene
3139	**140**	Oxidizing liquid, n.o.s.
3140	**151**	Alkaloids, liquid, n.o.s. (poisonous)
3140	**151**	Alkaloid salts, liquid, n.o.s. (poisonous)
3141	**157**	Antimony compound, inorganic, liquid, n.o.s.
3142	**151**	Disinfectant, liquid, poisonous, n.o.s.
3142	**151**	Disinfectant, liquid, toxic, n.o.s.
3142	**151**	Disinfectants, liquid, n.o.s. (poisonous)
3143	**151**	Dye, solid, poisonous, n.o.s.
3143	**151**	Dye, solid, toxic, n.o.s.
3143	**151**	Dye intermediate, solid, poisonous, n.o.s.
3143	**151**	Dye intermediate, solid, toxic, n.o.s.
3144	**151**	Nicotine compound, liquid, n.o.s.
3144	**151**	Nicotine preparation, liquid, n.o.s.
3145	**153**	Alkyl phenols, liquid, n.o.s. (including C2-C12 homologues)
3146	**153**	Organotin compound, solid, n.o.s.
3147	**154**	Dye, solid, corrosive, n.o.s.
3147	**154**	Dye intermediate, solid, corrosive, n.o.s.
3148	**138**	Water-reactive liquid, n.o.s.

ID No.	Guide No.	Name of Material
3149	**140**	Hydrogen peroxide and Peroxyacetic acid mixture, with acid(s), water and not more than 5% Peroxyacetic acid, stabilized
3150	**115**	Devices, small, hydrocarbon gas powered, with release device
3150	**115**	Hydrocarbon gas refills for small devices, with release device
3151	**171**	Polyhalogenated biphenyls, liquid
3151	**171**	Polyhalogenated terphenyls, liquid
3152	**171**	Polyhalogenated biphenyls, solid
3152	**171**	Polyhalogenated terphenyls, solid
3153	**115**	Perfluoromethyl vinyl ether
3153	**115**	Perfluoro(methyl vinyl ether)
3154	**115**	Perfluoroethyl vinyl ether
3154	**115**	Perfluoro(ethyl vinyl ether)
3155	**154**	Pentachlorophenol
3156	**122**	Compressed gas, oxidizing, n.o.s.
3157	**122**	Liquefied gas, oxidizing, n.o.s.
3158	**120**	Gas, refrigerated liquid, n.o.s.
3159	**126**	Refrigerant gas R-134a
3159	**126**	1,1,1,2-Tetrafluoroethane
3160	**119**	Liquefied gas, poisonous, flammable, n.o.s.
3160	**119**	Liquefied gas, poisonous, flammable, n.o.s. (Inhalation Hazard Zone A)
3160	**119**	Liquefied gas, poisonous, flammable, n.o.s. (Inhalation Hazard Zone B)
3160	**119**	Liquefied gas, poisonous, flammable, n.o.s. (Inhalation Hazard Zone C)
3160	**119**	Liquefied gas, poisonous, flammable, n.o.s. (Inhalation Hazard Zone D)
3160	**119**	Liquefied gas, toxic, flammable, n.o.s.
3160	**119**	Liquefied gas, toxic, flammable, n.o.s. (Inhalation Hazard Zone A)
3160	**119**	Liquefied gas, toxic, flammable, n.o.s. (Inhalation Hazard Zone B)
3160	**119**	Liquefied gas, toxic, flammable, n.o.s. (Inhalation Hazard Zone C)
3160	**119**	Liquefied gas, toxic, flammable, n.o.s. (Inhalation Hazard Zone D)
3161	**115**	Liquefied gas, flammable, n.o.s.
3162	**123**	Liquefied gas, poisonous, n.o.s.
3162	**123**	Liquefied gas, poisonous, n.o.s. (Inhalation Hazard Zone A)
3162	**123**	Liquefied gas, poisonous, n.o.s. (Inhalation Hazard Zone B)
3162	**123**	Liquefied gas, poisonous, n.o.s. (Inhalation Hazard Zone C)
3162	**123**	Liquefied gas, poisonous, n.o.s. (Inhalation Hazard Zone D)
3162	**123**	Liquefied gas, toxic, n.o.s.
3162	**123**	Liquefied gas, toxic, n.o.s. (Inhalation Hazard Zone A)
3162	**123**	Liquefied gas, toxic, n.o.s. (Inhalation Hazard Zone B)
3162	**123**	Liquefied gas, toxic, n.o.s. (Inhalation Hazard Zone C)
3162	**123**	Liquefied gas, toxic, n.o.s. (Inhalation Hazard Zone D)

ID No.	Guide No.	Name of Material
3163	**126**	Liquefied gas, n.o.s.
3164	**126**	Articles, pressurized, hydraulic (containing non-flammable gas)
3164	**126**	Articles, pressurized, pneumatic (containing non-flammable gas)
3165	**131**	Aircraft hydraulic power unit fuel tank
3166	**128**	Engine, fuel cell, flammable gas powered
3166	**128**	Engine, fuel cell, flammable liquid powered
3166	**128**	Engine, internal combustion
3166	**128**	Engines, internal combustion, flammable gas powered
3166	**128**	Engines, internal combustion, flammable liquid powered
3166	**128**	Vehicle, flammable gas powered
3166	**128**	Vehicle, flammable liquid powered
3166	**128**	Vehicle, fuel cell, flammable gas powered
3166	**128**	Vehicle, fuel cell, flammable liquid powered
3167	**115**	Gas sample, non-pressurized, flammable, n.o.s., not refrigerated liquid
3168	**119**	Gas sample, non-pressurized, poisonous, flammable, n.o.s., not refrigerated liquid
3168	**119**	Gas sample, non-pressurized, toxic, flammable, n.o.s., not refrigerated liquid
3169	**123**	Gas sample, non-pressurized, poisonous, n.o.s., not refrigerated liquid
3169	**123**	Gas sample, non-pressurized, toxic, n.o.s., not refrigerated liquid

ID No.	Guide No.	Name of Material
3170	**138**	Aluminum dross
3170	**138**	Aluminum processing by-products
3170	**138**	Aluminum remelting by-products
3170	**138**	Aluminum smelting by-products
3171	**154**	Battery-powered equipment (wet battery)
3171	**154**	Battery-powered vehicle (wet battery)
3171	**154**	Wheelchair, electric, with batteries
3172	**153**	Toxins, extracted from living sources, liquid, n.o.s.
3172	**153**	Toxins, extracted from living sources, n.o.s.
3172	**153**	Toxins, extracted from living sources, solid, n.o.s.
3174	**135**	Titanium disulfide
3174	**135**	Titanium disulphide
3175	**133**	Solids containing flammable liquid, n.o.s.
3176	**133**	Flammable solid, organic, molten, n.o.s.
3178	**133**	Flammable solid, inorganic, n.o.s.
3178	**133**	Smokeless powder for small arms
3179	**134**	Flammable solid, poisonous, inorganic, n.o.s.
3179	**134**	Flammable solid, toxic, inorganic, n.o.s.
3180	**134**	Flammable solid, corrosive, inorganic, n.o.s.
3180	**134**	Flammable solid, inorganic, corrosive, n.o.s.
3181	**133**	Metal salts of organic compounds, flammable, n.o.s.

ID No.	Guide No.	Name of Material
3182	**170**	Metal hydrides, flammable, n.o.s.
3183	**135**	Self-heating liquid, organic, n.o.s.
3184	**136**	Self-heating liquid, poisonous, organic, n.o.s.
3184	**136**	Self-heating liquid, toxic, organic, n.o.s.
3185	**136**	Self-heating liquid, corrosive, organic, n.o.s.
3186	**135**	Self-heating liquid, inorganic, n.o.s.
3187	**136**	Self-heating liquid, poisonous, inorganic, n.o.s.
3187	**136**	Self-heating liquid, toxic, inorganic, n.o.s.
3188	**136**	Self-heating liquid, corrosive, inorganic, n.o.s.
3189	**135**	Metal powder, self-heating, n.o.s.
3189	**135**	Self-heating metal powders, n.o.s.
3190	**135**	Self-heating solid, inorganic, n.o.s.
3191	**136**	Self-heating solid, inorganic, poisonous, n.o.s.
3191	**136**	Self-heating solid, inorganic, toxic, n.o.s.
3191	**136**	Self-heating solid, poisonous, inorganic, n.o.s.
3191	**136**	Self-heating solid, toxic, inorganic, n.o.s.
3192	**136**	Self-heating solid, corrosive, inorganic, n.o.s.
3194	**135**	Pyrophoric liquid, inorganic, n.o.s.
3200	**135**	Pyrophoric solid, inorganic, n.o.s.
3203	**135**	Pyrophoric organometallic compound, water-reactive, n.o.s.
3205	**135**	Alkaline earth metal alcoholates, n.o.s.
3206	**136**	Alkali metal alcoholates, self-heating, corrosive, n.o.s.
3207	**138**	Organometallic compound, water-reactive, flammable, n.o.s.
3207	**138**	Organometallic compound dispersion, water-reactive, flammable, n.o.s.
3207	**138**	Organometallic compound solution, water-reactive, flammable, n.o.s.
3208	**138**	Metallic substance, water-reactive, n.o.s.
3209	**138**	Metallic substance, water-reactive, self-heating, n.o.s.
3210	**140**	Chlorates, inorganic, aqueous solution, n.o.s.
3211	**140**	Perchlorates, inorganic, aqueous solution, n.o.s.
3212	**140**	Hypochlorites, inorganic, n.o.s.
3213	**140**	Bromates, inorganic, aqueous solution, n.o.s.
3214	**140**	Permanganates, inorganic, aqueous solution, n.o.s.
3215	**140**	Persulfates, inorganic, n.o.s.
3215	**140**	Persulphates, inorganic, n.o.s.
3216	**140**	Persulfates, inorganic, aqueous solution, n.o.s.
3216	**140**	Persulphates, inorganic, aqueous solution, n.o.s.
3218	**140**	Nitrates, inorganic, aqueous solution, n.o.s.
3219	**140**	Nitrites, inorganic, aqueous solution, n.o.s.
3220	**126**	Pentafluoroethane

ID No.	Guide No.	Name of Material
3220	**126**	Refrigerant gas R-125
3221	**149**	Self-reactive liquid type B
3222	**149**	Self-reactive solid type B
3223	**149**	Self-reactive liquid type C
3224	**149**	Self-reactive solid type C
3225	**149**	Self-reactive liquid type D
3226	**149**	Self-reactive solid type D
3227	**149**	Self-reactive liquid type E
3228	**149**	Self-reactive solid type E
3229	**149**	Self-reactive liquid type F
3230	**149**	Self-reactive solid type F
3231	**150**	Self-reactive liquid type B, temperature controlled
3232	**150**	Self-reactive solid type B, temperature controlled
3233	**150**	Self-reactive liquid type C, temperature controlled
3234	**150**	Self-reactive solid type C, temperature controlled
3235	**150**	Self-reactive liquid type D, temperature controlled
3236	**150**	Self-reactive solid type D, temperature controlled
3237	**150**	Self-reactive liquid type E, temperature controlled
3238	**150**	Self-reactive solid type E, temperature controlled
3239	**150**	Self-reactive liquid type F, temperature controlled
3240	**150**	Self-reactive solid type F, temperature controlled
3241	**133**	2-Bromo-2-nitropropane-1, 3-diol
3242	**149**	Azodicarbonamide
3243	**151**	Solids containing poisonous liquid, n.o.s.
3243	**151**	Solids containing toxic liquid, n.o.s.
3244	**154**	Solids containing corrosive liquid, n.o.s.
3245	**171**	Genetically modified micro-organisms
3245	**171**	Genetically modified organisms
3246	**156**	Methanesulfonyl chloride
3246	**156**	Methanesulphonyl chloride
3247	**140**	Sodium peroxoborate, anhydrous
3248	**131**	Medicine, liquid, flammable, poisonous, n.o.s.
3248	**131**	Medicine, liquid, flammable, toxic, n.o.s.
3249	**151**	Medicine, solid, poisonous, n.o.s.
3249	**151**	Medicine, solid, toxic, n.o.s.
3250	**153**	Chloroacetic acid, molten
3251	**133**	Isosorbide-5-mononitrate
3252	**115**	Difluoromethane
3252	**115**	Refrigerant gas R-32
3253	**154**	Disodium trioxosilicate
3253	**154**	Disodium trioxosilicate, pentahydrate
3254	**135**	Tributylphosphane
3254	**135**	Tributylphosphine
3255	**135**	tert-Butyl hypochlorite
3256	**128**	Elevated temperature liquid, flammable, n.o.s., with flash point above 37.8°C (100°F), at or above its flash point
3256	**128**	Elevated temperature liquid, flammable, n.o.s., with flash point above 60°C (140°F), at or above its flash point

ID No.	Guide No.	Name of Material
3257	**128**	Elevated temperature liquid, n.o.s., at or above 100°C (212°F), and below its flash point
3258	**171**	Elevated temperature solid, n.o.s., at or above 240°C (464°F)
3259	**154**	Amines, solid, corrosive, n.o.s.
3259	**154**	Polyamines, solid, corrosive, n.o.s.
3260	**154**	Corrosive solid, acidic, inorganic, n.o.s.
3261	**154**	Corrosive solid, acidic, organic, n.o.s.
3262	**154**	Corrosive solid, basic, inorganic, n.o.s.
3263	**154**	Corrosive solid, basic, organic, n.o.s.
3264	**154**	Corrosive liquid, acidic, inorganic, n.o.s.
3265	**153**	Corrosive liquid, acidic, organic, n.o.s.
3266	**154**	Corrosive liquid, basic, inorganic, n.o.s.
3267	**153**	Corrosive liquid, basic, organic, n.o.s.
3268	**171**	Air bag inflators
3268	**171**	Air bag inflators, pyrotechnic
3268	**171**	Air bag modules
3268	**171**	Air bag modules, pyrotechnic
3268	**171**	Seat-belt modules
3268	**171**	Seat-belt pre-tensioners
3268	**171**	Seat-belt pre-tensioners, pyrotechnic
3269	**128**	Polyester resin kit
3270	**133**	Nitrocellulose membrane filters
3271	**127**	Ethers, n.o.s.
3272	**127**	Esters, n.o.s.
3273	**131**	Nitriles, flammable, poisonous, n.o.s.
3273	**131**	Nitriles, flammable, toxic, n.o.s.
3274	**132**	Alcoholates solution, n.o.s., in alcohol
3275	**131**	Nitriles, poisonous, flammable, n.o.s.
3275	**131**	Nitriles, toxic, flammable, n.o.s.
3276	**151**	Nitriles, liquid, poisonous, n.o.s.
3276	**151**	Nitriles, liquid, toxic, n.o.s.
3276	**151**	Nitriles, poisonous, liquid, n.o.s.
3276	**151**	Nitriles, poisonous, n.o.s.
3276	**151**	Nitriles, toxic, liquid, n.o.s.
3276	**151**	Nitriles, toxic, n.o.s.
3277	**154**	Chloroformates, poisonous, corrosive, n.o.s.
3277	**154**	Chloroformates, toxic, corrosive, n.o.s.
3278	**151**	Organophosphorus compound, liquid, poisonous, n.o.s.
3278	**151**	Organophosphorus compound, liquid, toxic, n.o.s.
3278	**151**	Organophosphorus compound, poisonous, liquid, n.o.s.
3278	**151**	Organophosphorus compound, poisonous, n.o.s.
3278	**151**	Organophosphorus compound, toxic, liquid, n.o.s.
3278	**151**	Organophosphorus compound, toxic, n.o.s.
3279	**131**	Organophosphorus compound, poisonous, flammable, n.o.s.
3279	**131**	Organophosphorus compound, toxic, flammable, n.o.s.

ID No.	Guide No.	Name of Material
3280	151	Organoarsenic compound, liquid, n.o.s.
3280	151	Organoarsenic compound, n.o.s.
3281	151	Metal carbonyls, liquid, n.o.s.
3281	151	Metal carbonyls, n.o.s.
3282	151	Organometallic compound, liquid, poisonous, n.o.s.
3282	151	Organometallic compound, liquid, toxic, n.o.s.
3282	151	Organometallic compound, poisonous, liquid, n.o.s.
3282	151	Organometallic compound, poisonous, n.o.s.
3282	151	Organometallic compound, toxic, liquid, n.o.s.
3282	151	Organometallic compound, toxic, n.o.s.
3283	151	Selenium compound, n.o.s.
3283	151	Selenium compound, solid, n.o.s.
3284	151	Tellurium compound, n.o.s.
3285	151	Vanadium compound, n.o.s.
3286	131	Flammable liquid, poisonous, corrosive, n.o.s.
3286	131	Flammable liquid, toxic, corrosive, n.o.s.
3287	151	Poisonous liquid, inorganic, n.o.s.
3287	151	Poisonous liquid, inorganic, n.o.s. (Inhalation Hazard Zone A)
3287	151	Poisonous liquid, inorganic, n.o.s. (Inhalation Hazard Zone B)
3287	151	Toxic liquid, inorganic, n.o.s.
3287	151	Toxic liquid, inorganic, n.o.s. (Inhalation Hazard Zone A)
3287	151	Toxic liquid, inorganic, n.o.s. (Inhalation Hazard Zone B)
3288	151	Poisonous solid, inorganic, n.o.s.
3288	151	Toxic solid, inorganic, n.o.s.
3289	154	Poisonous liquid, corrosive, inorganic, n.o.s.
3289	154	Poisonous liquid, corrosive, inorganic, n.o.s. (Inhalation Hazard Zone A)
3289	154	Poisonous liquid, corrosive, inorganic, n.o.s. (Inhalation Hazard Zone B)
3289	154	Toxic liquid, corrosive, inorganic, n.o.s.
3289	154	Toxic liquid, corrosive, inorganic, n.o.s. (Inhalation Hazard Zone A)
3289	154	Toxic liquid, corrosive, inorganic, n.o.s. (Inhalation Hazard Zone B)
3290	154	Poisonous solid, corrosive, inorganic, n.o.s.
3290	154	Toxic solid, corrosive, inorganic, n.o.s.
3291	158	(Bio)Medical waste, n.o.s.
3291	158	Clinical waste, unspecified, n.o.s.
3291	158	Medical waste, n.o.s.
3291	158	Regulated medical waste, n.o.s.
3292	138	Batteries, containing Sodium
3292	138	Cells, containing Sodium
3293	152	Hydrazine, aqueous solution, with not more than 37% Hydrazine
3294	131	Hydrogen cyanide, solution in alcohol, with not more than 45% Hydrogen cyanide
3295	128	Hydrocarbons, liquid, n.o.s.

ID No.	Guide No.	Name of Material
3296	**126**	Heptafluoropropane
3296	**126**	Refrigerant gas R-227
3297	**126**	Chlorotetrafluoroethane and Ethylene oxide mixture, with not more than 8.8% Ethylene oxide
3297	**126**	Ethylene oxide and Chlorotetrafluoroethane mixture, with not more than 8.8% Ethylene oxide
3298	**126**	Ethylene oxide and Pentafluoroethane mixture, with not more than 7.9% Ethylene oxide
3298	**126**	Pentafluoroethane and Ethylene oxide mixture, with not more than 7.9% Ethylene oxide
3299	**126**	Ethylene oxide and Tetrafluoroethane mixture, with not more than 5.6% Ethylene oxide
3299	**126**	Tetrafluoroethane and Ethylene oxide mixture, with not more than 5.6% Ethylene oxide
3300	**119P**	Carbon dioxide and Ethylene oxide mixture, with more than 87% Ethylene oxide
3300	**119P**	Ethylene oxide and Carbon dioxide mixture, with more than 87% Ethylene oxide
3301	**136**	Corrosive liquid, self-heating, n.o.s.
3302	**152**	2-Dimethylaminoethyl acrylate
3303	**124**	Compressed gas, poisonous, oxidizing, n.o.s.
3303	**124**	Compressed gas, poisonous, oxidizing, n.o.s. (Inhalation Hazard Zone A)
3303	**124**	Compressed gas, poisonous, oxidizing, n.o.s. (Inhalation Hazard Zone B)
3303	**124**	Compressed gas, poisonous, oxidizing, n.o.s. (Inhalation Hazard Zone C)
3303	**124**	Compressed gas, poisonous, oxidizing, n.o.s. (Inhalation Hazard Zone D)
3303	**124**	Compressed gas, toxic, oxidizing, n.o.s.
3303	**124**	Compressed gas, toxic, oxidizing, n.o.s. (Inhalation Hazard Zone A)
3303	**124**	Compressed gas, toxic, oxidizing, n.o.s. (Inhalation Hazard Zone B)
3303	**124**	Compressed gas, toxic, oxidizing, n.o.s. (Inhalation Hazard Zone C)
3303	**124**	Compressed gas, toxic, oxidizing, n.o.s. (Inhalation Hazard Zone D)
3304	**123**	Compressed gas, poisonous, corrosive, n.o.s.
3304	**123**	Compressed gas, poisonous, corrosive, n.o.s. (Inhalation Hazard Zone A)
3304	**123**	Compressed gas, poisonous, corrosive, n.o.s. (Inhalation Hazard Zone B)
3304	**123**	Compressed gas, poisonous, corrosive, n.o.s. (Inhalation Hazard Zone C)
3304	**123**	Compressed gas, poisonous, corrosive, n.o.s. (Inhalation Hazard Zone D)
3304	**123**	Compressed gas, toxic, corrosive, n.o.s.
3304	**123**	Compressed gas, toxic, corrosive, n.o.s. (Inhalation Hazard Zone A)

ID No.	Guide No.	Name of Material
3304	123	Compressed gas, toxic, corrosive, n.o.s. (Inhalation Hazard Zone B)
3304	123	Compressed gas, toxic, corrosive, n.o.s. (Inhalation Hazard Zone C)
3304	123	Compressed gas, toxic, corrosive, n.o.s. (Inhalation Hazard Zone D)
3305	119	Compressed gas, poisonous, flammable, corrosive, n.o.s.
3305	119	Compressed gas, poisonous, flammable, corrosive, n.o.s. (Inhalation Hazard Zone A)
3305	119	Compressed gas, poisonous, flammable, corrosive, n.o.s. (Inhalation Hazard Zone B)
3305	119	Compressed gas, poisonous, flammable, corrosive, n.o.s. (Inhalation Hazard Zone C)
3305	119	Compressed gas, poisonous, flammable, corrosive, n.o.s. (Inhalation Hazard Zone D)
3305	119	Compressed gas, toxic, flammable, corrosive, n.o.s.
3305	119	Compressed gas, toxic, flammable, corrosive, n.o.s. (Inhalation Hazard Zone A)
3305	119	Compressed gas, toxic, flammable, corrosive, n.o.s. (Inhalation Hazard Zone B)
3305	119	Compressed gas, toxic, flammable, corrosive, n.o.s. (Inhalation Hazard Zone C)
3305	119	Compressed gas, toxic, flammable, corrosive, n.o.s. (Inhalation Hazard Zone D)
3306	124	Compressed gas, poisonous, oxidizing, corrosive, n.o.s.
3306	124	Compressed gas, poisonous, oxidizing, corrosive, n.o.s. (Inhalation Hazard Zone A)
3306	124	Compressed gas, poisonous, oxidizing, corrosive, n.o.s. (Inhalation Hazard Zone B)
3306	124	Compressed gas, poisonous, oxidizing, corrosive, n.o.s. (Inhalation Hazard Zone C)
3306	124	Compressed gas, poisonous, oxidizing, corrosive, n.o.s. (Inhalation Hazard Zone D)
3306	124	Compressed gas, toxic, oxidizing, corrosive, n.o.s.
3306	124	Compressed gas, toxic, oxidizing, corrosive, n.o.s. (Inhalation Hazard Zone A)
3306	124	Compressed gas, toxic, oxidizing, corrosive, n.o.s. (Inhalation Hazard Zone B)
3306	124	Compressed gas, toxic, oxidizing, corrosive, n.o.s. (Inhalation Hazard Zone C)
3306	124	Compressed gas, toxic, oxidizing, corrosive, n.o.s. (Inhalation Hazard Zone D)
3307	124	Liquefied gas, poisonous, oxidizing, n.o.s.
3307	124	Liquefied gas, poisonous, oxidizing, n.o.s. (Inhalation Hazard Zone A)
3307	124	Liquefied gas, poisonous, oxidizing, n.o.s. (Inhalation Hazard Zone B)
3307	124	Liquefied gas, poisonous, oxidizing, n.o.s. (Inhalation Hazard Zone C)
3307	124	Liquefied gas, poisonous, oxidizing, n.o.s. (Inhalation Hazard Zone D)

ID No.	Guide No.	Name of Material
3307	124	Liquefied gas, toxic, oxidizing, n.o.s.
3307	124	Liquefied gas, toxic, oxidizing, n.o.s. (Inhalation Hazard Zone A)
3307	124	Liquefied gas, toxic, oxidizing, n.o.s. (Inhalation Hazard Zone B)
3307	124	Liquefied gas, toxic, oxidizing, n.o.s. (Inhalation Hazard Zone C)
3307	124	Liquefied gas, toxic, oxidizing, n.o.s. (Inhalation Hazard Zone D)
3308	123	Liquefied gas, poisonous, corrosive, n.o.s.
3308	123	Liquefied gas, poisonous, corrosive, n.o.s. (Inhalation Hazard Zone A)
3308	123	Liquefied gas, poisonous, corrosive, n.o.s. (Inhalation Hazard Zone B)
3308	123	Liquefied gas, poisonous, corrosive, n.o.s. (Inhalation Hazard Zone C)
3308	123	Liquefied gas, poisonous, corrosive, n.o.s. (Inhalation Hazard Zone D)
3308	123	Liquefied gas, toxic, corrosive, n.o.s.
3308	123	Liquefied gas, toxic, corrosive, n.o.s. (Inhalation Hazard Zone A)
3308	123	Liquefied gas, toxic, corrosive, n.o.s. (Inhalation Hazard Zone B)
3308	123	Liquefied gas, toxic, corrosive, n.o.s. (Inhalation Hazard Zone C)
3308	123	Liquefied gas, toxic, corrosive, n.o.s. (Inhalation Hazard Zone D)
3309	119	Liquefied gas, poisonous, flammable, corrosive, n.o.s.
3309	119	Liquefied gas, poisonous, flammable, corrosive, n.o.s. (Inhalation Hazard Zone A)
3309	119	Liquefied gas, poisonous, flammable, corrosive, n.o.s. (Inhalation Hazard Zone B)
3309	119	Liquefied gas, poisonous, flammable, corrosive, n.o.s. (Inhalation Hazard Zone C)
3309	119	Liquefied gas, poisonous, flammable, corrosive, n.o.s. (Inhalation Hazard Zone D)
3309	119	Liquefied gas, toxic, flammable, corrosive, n.o.s.
3309	119	Liquefied gas, toxic, flammable, corrosive, n.o.s. (Inhalation Hazard Zone A)
3309	119	Liquefied gas, toxic, flammable, corrosive, n.o.s. (Inhalation Hazard Zone B)
3309	119	Liquefied gas, toxic, flammable, corrosive, n.o.s. (Inhalation Hazard Zone C)
3309	119	Liquefied gas, toxic, flammable, corrosive, n.o.s. (Inhalation Hazard Zone D)
3310	124	Liquefied gas, poisonous, oxidizing, corrosive, n.o.s.
3310	124	Liquefied gas, poisonous, oxidizing, corrosive, n.o.s. (Inhalation Hazard Zone A)
3310	124	Liquefied gas, poisonous, oxidizing, corrosive, n.o.s. (Inhalation Hazard Zone B)

ID No.	Guide No.	Name of Material
3310	124	Liquefied gas, poisonous, oxidizing, corrosive, n.o.s. (Inhalation Hazard Zone C)
3310	124	Liquefied gas, poisonous, oxidizing, corrosive, n.o.s. (Inhalation Hazard Zone D)
3310	124	Liquefied gas, toxic, oxidizing, corrosive, n.o.s.
3310	124	Liquefied gas, toxic, oxidizing, corrosive, n.o.s. (Inhalation Hazard Zone A)
3310	124	Liquefied gas, toxic, oxidizing, corrosive, n.o.s. (Inhalation Hazard Zone B)
3310	124	Liquefied gas, toxic, oxidizing, corrosive, n.o.s. (Inhalation Hazard Zone C)
3310	124	Liquefied gas, toxic, oxidizing, corrosive, n.o.s. (Inhalation Hazard Zone D)
3311	122	Gas, refrigerated liquid, oxidizing, n.o.s.
3312	115	Gas, refrigerated liquid, flammable, n.o.s.
3313	135	Organic pigments, self-heating
3314	171	Plastic molding compound
3314	171	Plastics moulding compound
3315	151	Chemical sample, poisonous
3315	151	Chemical sample, poisonous liquid
3315	151	Chemical sample, poisonous solid
3315	151	Chemical sample, toxic
3315	151	Chemical sample, toxic liquid
3315	151	Chemical sample, toxic solid
3316	171	Chemical kit
3316	171	First aid kit

ID No.	Guide No.	Name of Material
3317	113	2-Amino-4,6-dinitrophenol, wetted with not less than 20% water
3318	125	Ammonia solution, with more than 50% Ammonia
3319	113	Nitroglycerin mixture, desensitized, solid, n.o.s., with more than 2% but not more than 10% Nitroglycerin
3319	113	Nitroglycerin mixture with more than 2% but not more than 10% Nitroglycerin, desensitized
3320	157	Sodium borohydride and Sodium hydroxide solution, with not more than 12% Sodium borohydride and not more than 40% Sodium hydroxide
3321	162	Radioactive material, low specific activity (LSA-II), non fissile or fissile-excepted
3322	162	Radioactive material, low specific activity (LSA-III), non fissile or fissile-excepted
3323	163	Radioactive material, Type C package, non-fissile or fissile excepted
3324	165	Radioactive material, low specific activity (LSA-II), fissile
3325	165	Radioactive material, low specific activity (LSA-III), fissile
3326	165	Radioactive material, surface contaminated objects (SCO-I), fissile
3326	165	Radioactive material, surface contaminated objects (SCO-II), fissile
3327	165	Radioactive material, Type A package, fissile, non-special form

ID No.	Guide No.	Name of Material
3328	**165**	Radioactive material, Type B(U) package, fissile
3329	**165**	Radioactive material, Type B(M) package, fissile
3330	**165**	Radioactive material, Type C package, fissile
3331	**165**	Radioactive material, transported under special arrangement, fissile
3332	**164**	Radioactive material, Type A package, special form, non fissile or fissile-excepted
3333	**165**	Radioactive material, Type A package, special form, fissile
3334	**171**	Aviation regulated liquid, n.o.s.
3334	**171**	Self-defense spray, non-pressurized
3335	**171**	Aviation regulated solid, n.o.s.
3336	**130**	Mercaptan mixture, liquid, flammable, n.o.s.
3336	**130**	Mercaptans, liquid, flammable, n.o.s.
3337	**126**	Refrigerant gas R-404A
3338	**126**	Refrigerant gas R-407A
3339	**126**	Refrigerant gas R-407B
3340	**126**	Refrigerant gas R-407C
3341	**135**	Thiourea dioxide
3342	**135**	Xanthates
3343	**113**	Nitroglycerin mixture, desensitized, liquid, flammable, n.o.s., with not more than 30% Nitroglycerin
3344	**113**	Pentaerythrite tetranitrate mixture, desensitized, solid, n.o.s., with more than 10% but not more than 20% PETN
3344	**113**	Pentaerythritol tetranitrate mixture, desensitized, solid, n.o.s., with more than 10% but not more than 20% PETN
3344	**113**	PETN mixture, desensitized, solid, n.o.s., with more than 10% but not more than 20% PETN
3345	**153**	Phenoxyacetic acid derivative pesticide, solid, poisonous
3345	**153**	Phenoxyacetic acid derivative pesticide, solid, toxic
3346	**131**	Phenoxyacetic acid derivative pesticide, liquid, flammable, poisonous
3346	**131**	Phenoxyacetic acid derivative pesticide, liquid, flammable, toxic
3347	**131**	Phenoxyacetic acid derivative pesticide, liquid, poisonous, flammable
3347	**131**	Phenoxyacetic acid derivative pesticide, liquid, toxic, flammable
3348	**153**	Phenoxyacetic acid derivative pesticide, liquid, poisonous
3348	**153**	Phenoxyacetic acid derivative pesticide, liquid, toxic
3349	**151**	Pyrethroid pesticide, solid, poisonous
3349	**151**	Pyrethroid pesticide, solid, toxic
3350	**131**	Pyrethroid pesticide, liquid, flammable, poisonous
3350	**131**	Pyrethroid pesticide, liquid, flammable, toxic
3351	**131**	Pyrethroid pesticide, liquid, poisonous, flammable
3351	**131**	Pyrethroid pesticide, liquid, toxic, flammable
3352	**151**	Pyrethroid pesticide, liquid, poisonous
3352	**151**	Pyrethroid pesticide, liquid, toxic

ID No.	Guide No.	Name of Material
3353	**126**	Air bag inflators, compressed gas
3353	**126**	Air bag modules, compressed gas
3353	**126**	Seat-belt pre-tensioners, compressed gas
3354	**115**	Insecticide gas, flammable, n.o.s.
3355	**119**	Insecticide gas, poisonous, flammable, n.o.s.
3355	**119**	Insecticide gas, poisonous, flammable, n.o.s. (Inhalation Hazard Zone A)
3355	**119**	Insecticide gas, poisonous, flammable, n.o.s. (Inhalation Hazard Zone B)
3355	**119**	Insecticide gas, poisonous, flammable, n.o.s. (Inhalation Hazard Zone C)
3355	**119**	Insecticide gas, poisonous, flammable, n.o.s. (Inhalation Hazard Zone D)
3355	**119**	Insecticide gas, toxic, flammable, n.o.s.
3355	**119**	Insecticide gas, toxic, flammable, n.o.s. (Inhalation Hazard Zone A)
3355	**119**	Insecticide gas, toxic, flammable, n.o.s. (Inhalation Hazard Zone B)
3355	**119**	Insecticide gas, toxic, flammable, n.o.s. (Inhalation Hazard Zone C)
3355	**119**	Insecticide gas, toxic, flammable, n.o.s. (Inhalation Hazard Zone D)
3356	**140**	Oxygen generator, chemical
3356	**140**	Oxygen generator, chemical, spent

ID No.	Guide No.	Name of Material
3357	**113**	Nitroglycerin mixture, desensitized, liquid, n.o.s., with not more than 30% Nitroglycerin
3358	**115**	Refrigerating machines, containing flammable, non-poisonous, liquefied gases
3358	**115**	Refrigerating machines, containing flammable, non-toxic, liquefied gases
3359	**171**	Fumigated cargo transport unit
3359	**171**	Fumigated unit
3360	**133**	Fibers, vegetable, dry
3360	**133**	Fibres, vegetable, dry
3361	**156**	Chlorosilanes, poisonous, corrosive, n.o.s.
3361	**156**	Chlorosilanes, toxic, corrosive, n.o.s.
3362	**155**	Chlorosilanes, poisonous, corrosive, flammable, n.o.s.
3362	**155**	Chlorosilanes, toxic, corrosive, flammable, n.o.s.
3363	**171**	Dangerous goods in apparatus
3363	**171**	Dangerous goods in machinery
3364	**113**	Picric acid, wetted with not less than 10% water
3364	**113**	Trinitrophenol, wetted with not less than 10% water
3365	**113**	Picryl chloride, wetted with not less than 10% water
3365	**113**	Trinitrochlorobenzene, wetted with not less than 10% water
3366	**113**	TNT, wetted with not less than 10% water
3366	**113**	Trinitrotoluene, wetted with not less than 10% water
3367	**113**	Trinitrobenzene, wetted with not less than 10% water

ID No.	Guide No.	Name of Material
3368	113	Trinitrobenzoic acid, wetted with not less than 10% water
3369	113	Sodium dinitro-o-cresolate, wetted with not less than 10% water
3370	113	Urea nitrate, wetted with not less than 10% water
3371	129	2-Methylbutanal
3372	138	Organometallic compound, solid, water-reactive, flammable, n.o.s.
3373	158	Biological substance, category B
3373	158	Clinical specimens
3373	158	Diagnostic specimens
3374	116	Acetylene, solvent free
3375	140	Ammonium nitrate emulsion
3375	140	Ammonium nitrate gel
3375	140	Ammonium nitrate suspension
3376	113	4-Nitrophenylhydrazine, with not less than 30% water
3377	140	Sodium perborate monohydrate
3378	140	Sodium carbonate peroxyhydrate
3379	128	Desensitized explosive, liquid, n.o.s.
3380	133	Desensitized explosive, solid, n.o.s.
3381	151	Poisonous by inhalation liquid, n.o.s. (Inhalation Hazard Zone A)
3381	151	Toxic by inhalation liquid, n.o.s. (Inhalation Hazard Zone A)
3382	151	Poisonous by inhalation liquid, n.o.s. (Inhalation Hazard Zone B)
3382	151	Toxic by inhalation liquid, n.o.s. (Inhalation Hazard Zone B)
3383	131	Poisonous by inhalation liquid, flammable, n.o.s. (Inhalation Hazard Zone A)
3383	131	Toxic by inhalation liquid, flammable, n.o.s. (Inhalation Hazard Zone A)
3384	131	Poisonous by inhalation liquid, flammable, n.o.s. (Inhalation Hazard Zone B)
3384	131	Toxic by inhalation liquid, flammable, n.o.s. (Inhalation Hazard Zone B)
3385	139	Poisonous by inhalation liquid, water-reactive, n.o.s. (Inhalation Hazard Zone A)
3385	139	Toxic by inhalation liquid, water-reactive, n.o.s. (Inhalation Hazard Zone A)
3386	139	Poisonous by inhalation liquid, water-reactive, n.o.s. (Inhalation Hazard Zone B)
3386	139	Toxic by inhalation liquid, water-reactive, n.o.s. (Inhalation Hazard Zone B)
3387	142	Poisonous by inhalation liquid, oxidizing, n.o.s. (Inhalation Hazard Zone A)
3387	142	Toxic by inhalation liquid, oxidizing, n.o.s. (Inhalation Hazard Zone A)
3388	142	Poisonous by inhalation liquid, oxidizing, n.o.s. (Inhalation Hazard Zone B)
3388	142	Toxic by inhalation liquid, oxidizing, n.o.s. (Inhalation Hazard Zone B)
3389	154	Poisonous by inhalation liquid, corrosive, n.o.s. (Inhalation Hazard Zone A)
3389	154	Toxic by inhalation liquid, corrosive, n.o.s. (Inhalation Hazard Zone A)

ID No.	Guide No.	Name of Material
3390	154	Poisonous by inhalation liquid, corrosive, n.o.s. (Inhalation Hazard Zone B)
3390	154	Toxic by inhalation liquid, corrosive, n.o.s. (Inhalation Hazard Zone B)
3391	135	Organometallic substance, solid, pyrophoric
3392	135	Organometallic substance, liquid, pyrophoric
3393	135	Organometallic substance, solid, pyrophoric, water-reactive
3394	135	Organometallic substance, liquid, pyrophoric, water-reactive
3395	135	Organometallic substance, solid, water-reactive
3396	138	Organometallic substance, solid, water-reactive, flammable
3397	138	Organometallic substance, solid, water-reactive, self-heating
3398	135	Organometallic substance, liquid, water-reactive
3399	138	Organometallic substance, liquid, water-reactive, flammable
3400	138	Organometallic substance, solid, self-heating
3401	138	Alkali metal amalgam, solid
3402	138	Alkaline earth metal amalgam, solid
3403	138	Potassium, metal alloys, solid
3404	138	Potassium sodium alloys, solid
3404	138	Sodium potassium alloys, solid
3405	141	Barium chlorate, solution
3406	141	Barium perchlorate, solution
3407	140	Chlorate and Magnesium chloride mixture, solution
3407	140	Magnesium chloride and Chlorate mixture, solution
3408	141	Lead perchlorate, solution
3409	152	Chloronitrobenzenes, liquid
3410	153	4-Chloro-o-toluidine hydrochloride, solution
3411	153	beta-Naphthylamine, solution
3411	153	Naphthylamine (beta), solution
3412	153	Formic acid, with not less than 5% but less than 10% acid
3412	153	Formic acid, with not less than 10% but not more than 85% acid
3413	157	Potassium cyanide, solution
3414	157	Sodium cyanide, solution
3415	154	Sodium fluoride, solution
3416	153	Chloroacetophenone, liquid
3417	152	Xylyl bromide, solid
3418	151	2,4-Toluylenediamine, solution
3419	157	Boron trifluoride acetic acid complex, solid
3420	157	Boron trifluoride propionic acid complex, solid
3421	154	Potassium hydrogen difluoride, solution
3422	154	Potassium fluoride, solution
3423	153	Tetramethylammonium hydroxide, solid
3424	141	Ammonium dinitro-o-cresolate, solution
3425	156	Bromoacetic acid, solid
3426	153P	Acrylamide, solution
3427	153	Chlorobenzyl chlorides, solid
3428	156	3-Chloro-4-methylphenyl isocyanate, solid

ID No.	Guide No.	Name of Material
3429	153	Chlorotoluidines, liquid
3430	153	Xylenols, liquid
3431	152	Nitrobenzotrifluorides, solid
3432	171	Polychlorinated biphenyls, solid
3433	135	Lithium alkyls, solid
3434	153	Nitrocresols, liquid
3435	153	Hydroquinone, solution
3436	151	Hexafluoroacetone hydrate, solid
3437	152	Chlorocresols, solid
3438	153	alpha-Methylbenzyl alcohol, solid
3439	151	Nitriles, poisonous, solid, n.o.s.
3439	151	Nitriles, solid, poisonous, n.o.s.
3439	151	Nitriles, solid, toxic, n.o.s.
3439	151	Nitriles, toxic, solid, n.o.s.
3440	151	Selenium compound, liquid, n.o.s.
3441	153	Chlorodinitrobenzenes, solid
3442	153	Dichloroanilines, solid
3443	152	Dinitrobenzenes, solid
3444	151	Nicotine hydrochloride, solid
3445	151	Nicotine sulfate, solid
3445	151	Nicotine sulphate, solid
3446	152	Nitrotoluenes, solid
3447	152	Nitroxylenes, solid
3448	159	Tear gas substance, solid, n.o.s.
3449	159	Bromobenzyl cyanides, solid
3450	151	Diphenylchloroarsine, solid
3451	153	Toluidines, solid
3452	153	Xylidines, solid
3453	154	Phosphoric acid, solid
3454	152	Dinitrotoluenes, solid
3455	153	Cresols, solid
3456	157	Nitrosylsulfuric acid, solid
3456	157	Nitrosylsulphuric acid, solid
3457	152	Chloronitrotoluenes, solid
3458	152	Nitroanisoles, solid
3459	152	Nitrobromobenzenes, solid
3460	153	N-Ethylbenzyltoluidines, solid
3461	135	Aluminum alkyl halides, solid
3462	153	Toxins, extracted from living sources, solid, n.o.s.
3463	132	Propionic acid, with not less than 90% acid
3464	151	Organophosphorus compound, poisonous, solid, n.o.s.
3464	151	Organophosphorus compound, solid, poisonous, n.o.s.
3464	151	Organophosphorus compound, solid, toxic, n.o.s.
3464	151	Organophosphorus compound, toxic, solid, n.o.s.
3465	151	Organoarsenic compound, solid, n.o.s.
3466	151	Metal carbonyls, solid, n.o.s.
3467	151	Organometallic compound, poisonous, solid, n.o.s.
3467	151	Organometallic compound, solid, poisonous, n.o.s.
3467	151	Organometallic compound, solid, toxic, n.o.s.
3467	151	Organometallic compound, toxic, solid, n.o.s.
3468	115	Hydrogen in a metal hydride storage system
3468	115	Hydrogen in a metal hydride storage system contained in equipment

ID No.	Guide No.	Name of Material
3468	**115**	Hydrogen in a metal hydride storage system packed with equipment
3469	**132**	Paint, flammable, corrosive
3469	**132**	Paint related material, flammable, corrosive
3470	**132**	Paint, corrosive, flammable
3470	**132**	Paint related material, corrosive, flammable
3471	**154**	Hydrogendifluorides, solution, n.o.s.
3472	**153**	Crotonic acid, liquid
3473	**128**	Fuel cell cartridges contained in equipment, containing flammable liquids
3473	**128**	Fuel cell cartridges containing flammable liquids
3473	**128**	Fuel cell cartridges packed with equipment, containing flammable liquids
3474	**113**	1-Hydroxybenzotriazole, anhydrous, wetted with not less than 20% water
3474	**113**	1-Hydroxybenzotriazole, monohydrate
3475	**127**	Ethanol and gasoline mixture, with more than 10% ethanol
3475	**127**	Ethanol and motor spirit mixture, with more than 10% ethanol
3475	**127**	Ethanol and petrol mixture, with more than 10% ethanol
3475	**127**	Gasoline and ethanol mixture, with more than 10% ethanol
3475	**127**	Motor spirit and ethanol mixture, with more than 10% ethanol
3475	**127**	Petrol and ethanol mixture, with more than 10% ethanol
3476	**138**	Fuel cell cartridges contained in equipment, containing water-reactive substances
3476	**138**	Fuel cell cartridges, containing water-reactive substances
3476	**138**	Fuel cell cartridges packed with equipment, containing water-reactive substances
3477	**153**	Fuel cell cartridges contained in equipment, containing corrosive substances
3477	**153**	Fuel cell cartridges, containing corrosive substances
3477	**153**	Fuel cell cartridges packed with equipment, containing corrosive substances
3478	**115**	Fuel cell cartridges contained in equipment, containing liquefied flammable gas
3478	**115**	Fuel cell cartridges, containing liquefied flammable gas
3478	**115**	Fuel cell cartridges packed with equipment, containing liquefied flammable gas
3479	**115**	Fuel cell cartridges contained in equipment, containing hydrogen in metal hydride
3479	**115**	Fuel cell cartridges, containing hydrogen in metal hydride
3479	**115**	Fuel cell cartridges packed with equipment, containing hydrogen in metal hydride
3480	**147**	Lithium ion batteries (including lithium ion polymer batteries)
3481	**147**	Lithium ion batteries contained in equipment (including lithium ion polymer batteries)
3481	**147**	Lithium ion batteries packed with equipment (including lithium ion polymer batteries)
3482	**138**	Alkali metal dispersion, flammable

ID No.	Guide No.	Name of Material
3482	138	Alkaline earth metal dispersion, flammable
3483	131	Motor fuel anti-knock mixture, flammable
3484	132	Hydrazine aqueous solution, flammable, with more than 37% hydrazine, by mass
3485	140	Calcium hypochlorite, dry, corrosive, with more than 39% available chlorine (8.8% available oxygen)
3485	140	Calcium hypochlorite mixture, dry, corrosive, with more than 39% available chlorine (8.8% available oxygen)
3486	140	Calcium hypochlorite mixture, dry, corrosive, with more than 10% but not more than 39% available chlorine
3487	140	Calcium hypochlorite, hydrated, corrosive, with not less than 5.5% but not more than 16% water
3487	140	Calcium hypochlorite, hydrated mixture, corrosive, with not less than 5.5% but not more than 16% water
3488	131	Poisonous by inhalation liquid, flammable, corrosive, n.o.s. (Inhalation Hazard Zone A)
3488	131	Toxic by inhalation liquid, flammable, corrosive, n.o.s. (Inhalation Hazard Zone A)
3489	131	Poisonous by inhalation liquid, flammable, corrosive, n.o.s. (Inhalation Hazard Zone B)
3489	131	Toxic by inhalation liquid, flammable, corrosive, n.o.s. (Inhalation Hazard Zone B)
3490	155	Poisonous by inhalation liquid, water-reactive, flammable, n.o.s. (Inhalation Hazard Zone A)
3490	155	Toxic by inhalation liquid, water-reactive, flammable, n.o.s. (Inhalation Hazard Zone A)
3491	155	Poisonous by inhalation liquid, water-reactive, flammable, n.o.s. (Inhalation Hazard Zone B)
3491	155	Toxic by inhalation liquid, water-reactive, flammable, n.o.s. (Inhalation Hazard Zone B)
3492	131	Poisonous by inhalation liquid, corrosive, flammable, n.o.s. (Inhalation Hazard Zone A)
3492	131	Toxic by inhalation liquid, corrosive, flammable, n.o.s. (Inhalation Hazard Zone A)
3493	131	Poisonous by inhalation liquid, corrosive, flammable, n.o.s. (Inhalation Hazard Zone B)
3493	131	Toxic by inhalation liquid, corrosive, flammable, n.o.s. (Inhalation Hazard Zone B)
3494	131	Petroleum sour crude oil, flammable, toxic
3495	154	Iodine
3496	171	Batteries, nickel-metal hydride
3497	133	Krill meal
3498	157	Iodine monochloride, liquid
3499	171	Capacitor, electric double layer
3500	126	Chemical under pressure, n.o.s.
3501	115	Chemical under pressure, flammable, n.o.s.
3502	123	Chemical under pressure, poisonous, n.o.s.
3502	123	Chemical under pressure, toxic, n.o.s.
3503	125	Chemical under pressure, corrosive, n.o.s.
3504	119	Chemical under pressure, flammable, poisonous, n.o.s.
3504	119	Chemical under pressure, flammable, toxic, n.o.s.

ID No.	Guide No.	Name of Material
3505	**118**	Chemical under pressure, flammable, corrosive, n.o.s.
3506	**172**	Mercury contained in manufactured articles
8000	**171**	Consumer commodity
9035	**123**	Gas identification set
9191	**143**	Chlorine dioxide, hydrate, frozen
9202	**168**	Carbon monoxide, refrigerated liquid (cryogenic liquid)
9206	**137**	Methyl phosphonic dichloride
9260	**169**	Aluminum, molten
9263	**156**	Chloropivaloyl chloride
9264	**151**	3,5-Dichloro-2,4,6-trifluoropyridine
9269	**132**	Trimethoxysilane
9279	**115**	Hydrogen absorbed in metal hydride

ID No.	Guide No.	Name of Material

GREEN HIGHLIGHTED ENTRIES IN BLUE PAGES

For entries highlighted in green follow these steps:

- **IF THERE IS NO FIRE**:
  - Go directly to **Table 1** (green bordered pages)
  - Look up the ID number and name of material
  - Identify initial isolation and protective action distances

- **IF THERE IS A FIRE or A FIRE IS INVOLVED**:
  - Also consult the assigned orange guide
  - If applicable, apply the evacuation information shown under PUBLIC SAFETY

Note: If the name in **Table 1** is shown with "***When Spilled In Water***", these materials produce large amounts of Toxic Inhalation Hazard (TIH) gases when spilled in water. Some Water Reactive materials are also TIH materials themselves (e.g., Bromine trifluoride (1746), Thionyl chloride (1836), etc.). In these instances, two entries are provided in **Table 1** for land-based and water-based spills. If the Water Reactive material **is NOT** a TIH and this material **is NOT** spilled in water, **Table 1** and **Table 2** do not apply and safety distances will be found within the appropriate orange guide.

Name of Material	Guide No.	ID No.
AC	117	1051
Acetal	127	1088
Acetaldehyde	129	1089
Acetaldehyde ammonia	171	1841
Acetaldehyde oxime	129	2332
Acetic acid, glacial	132	2789
Acetic acid, solution, more than 10% but not more than 80% acid	153	2790
Acetic acid, solution, more than 80% acid	132	2789
Acetic anhydride	137	1715
Acetone	127	1090
Acetone cyanohydrin, stabilized	155	1541
Acetone oils	127	1091
Acetonitrile	127	1648
Acetyl bromide	156	1716
Acetyl chloride	155	1717
Acetylene	116	1001
Acetylene, dissolved	116	1001
Acetylene, solvent free	116	3374
Acetylene, Ethylene and Propylene in mixture, refrigerated liquid containing at least 71.5% Ethylene with not more than 22.5% Acetylene and not more than 6% Propylene	115	3138
Acetylene tetrabromide	159	2504
Acetyl iodide	156	1898
Acetyl methyl carbinol	127	2621
Acid, sludge	153	1906
Acid butyl phosphate	153	1718
Acridine	153	2713
Acrolein, stabilized	131P	1092

Name of Material	Guide No.	ID No.
Acrolein dimer, stabilized	129P	2607
Acrylamide	153P	2074
Acrylamide, solid	153P	2074
Acrylamide, solution	153P	3426
Acrylic acid, stabilized	132P	2218
Acrylonitrile, stabilized	131P	1093
Adamsite	154	1698
Adhesives (flammable)	128	1133
Adiponitrile	153	2205
Aerosol dispensers	126	1950
Aerosols	126	1950
Air, compressed	122	1002
Air, refrigerated liquid (cryogenic liquid)	122	1003
Air, refrigerated liquid (cryogenic liquid), non-pressurized	122	1003
Air bag inflators	171	3268
Air bag inflators, compressed gas	126	3353
Air bag inflators, pyrotechnic	171	3268
Air bag modules	171	3268
Air bag modules, compressed gas	126	3353
Air bag modules, pyrotechnic	171	3268
Aircraft hydraulic power unit fuel tank	131	3165
Alcoholates solution, n.o.s., in alcohol	132	3274
Alcoholic beverages	127	3065
Alcohols, flammable, poisonous, n.o.s.	131	1986
Alcohols, flammable, toxic, n.o.s.	131	1986
Alcohols, n.o.s.	127	1987
Alcohols, poisonous, n.o.s.	131	1986

Name of Material	Guide No.	ID No.
Alcohols, toxic, n.o.s.	131	1986
Aldehydes, flammable, poisonous, n.o.s.	131	1988
Aldehydes, flammable, toxic, n.o.s.	131	1988
Aldehydes, n.o.s.	129	1989
Aldehydes, poisonous, n.o.s.	131	1988
Aldehydes, toxic, n.o.s.	131	1988
Aldol	153	2839
Alkali metal alcoholates, self-heating, corrosive, n.o.s.	136	3206
Alkali metal alloy, liquid, n.o.s.	138	1421
Alkali metal amalgam	138	1389
Alkali metal amalgam, liquid	138	1389
Alkali metal amalgam, solid	138	1389
Alkali metal amalgam, solid	138	3401
Alkali metal amides	139	1390
Alkali metal dispersion	138	1391
Alkali metal dispersion, flammable	138	3482
Alkaline earth metal alcoholates, n.o.s.	135	3205
Alkaline earth metal alloy, n.o.s.	138	1393
Alkaline earth metal amalgam	138	1392
Alkaline earth metal amalgam, liquid	138	1392
Alkaline earth metal amalgam, solid	138	3402
Alkaline earth metal dispersion	138	1391
Alkaline earth metal dispersion, flammable	138	3482
Alkaloids, liquid, n.o.s. (poisonous)	151	3140
Alkaloids, solid, n.o.s. (poisonous)	151	1544
Alkaloid salts, liquid, n.o.s. (poisonous)	151	3140
Alkaloid salts, solid, n.o.s. (poisonous)	151	1544
Alkylamines, n.o.s.	132	2733
Alkylamines, n.o.s.	132	2734
Alkylamines, n.o.s.	153	2735
Alkyl phenols, liquid, n.o.s. (including C2-C12 homologues)	153	3145
Alkyl phenols, solid, n.o.s. (including C2-C12 homologues)	153	2430
Alkyl sulfonic acids, liquid, with more than 5% free Sulfuric acid	153	2584
Alkyl sulfonic acids, liquid, with not more than 5% free Sulfuric acid	153	2586
Alkyl sulfonic acids, solid, with more than 5% free Sulfuric acid	153	2583
Alkyl sulfonic acids, solid, with not more than 5% free Sulfuric acid	153	2585
Alkylsulfuric acids	156	2571
Alkyl sulphonic acids, liquid, with more than 5% free Sulphuric acid	153	2584
Alkyl sulphonic acids, liquid, with not more than 5% free Sulphuric acid	153	2586
Alkyl sulphonic acids, solid, with more than 5% free Sulphuric acid	153	2583
Alkyl sulphonic acids, solid, with not more than 5% free Sulphuric acid	153	2585
Alkylsulphuric acids	156	2571
Allyl acetate	131	2333
Allyl alcohol	131	1098
Allylamine	131	2334

Name of Material	Guide No.	ID No.
Allyl bromide	131	1099
Allyl chloride	131	1100
Allyl chlorocarbonate	155	1722
Allyl chloroformate	155	1722
Allyl ethyl ether	131	2335
Allyl formate	131	2336
Allyl glycidyl ether	129	2219
Allyl iodide	132	1723
Allyl isothiocyanate, stabilized	155	1545
Allyltrichlorosilane, stabilized	155	1724
Aluminum, molten	169	9260
Aluminum alkyl halides	135	3052
Aluminum alkyl halides, liquid	135	3052
Aluminum alkyl halides, solid	135	3052
Aluminum alkyl halides, solid	135	3461
Aluminum alkyl hydrides	138	3076
Aluminum alkyls	135	3051
Aluminum borohydride	135	2870
Aluminum borohydride in devices	135	2870
Aluminum bromide, anhydrous	137	1725
Aluminum bromide, solution	154	2580
Aluminum carbide	138	1394
Aluminum chloride, anhydrous	137	1726
Aluminum chloride, solution	154	2581
Aluminum dross	138	3170
Aluminum ferrosilicon powder	139	1395
Aluminum hydride	138	2463
Aluminum nitrate	140	1438
Aluminum phosphide	139	1397
Aluminum phosphide pesticide	157	3048
Aluminum powder, coated	170	1309
Aluminum powder, pyrophoric	135	1383
Aluminum powder, uncoated	138	1396
Aluminum processing by-products	138	3170
Aluminum remelting by-products	138	3170
Aluminum resinate	133	2715
Aluminum silicon powder, uncoated	138	1398
Aluminum smelting by-products	138	3170
Amines, flammable, corrosive, n.o.s.	132	2733
Amines, liquid, corrosive, flammable, n.o.s.	132	2734
Amines, liquid, corrosive, n.o.s.	153	2735
Amines, solid, corrosive, n.o.s.	154	3259
2-Amino-4-chlorophenol	151	2673
2-Amino-5-diethylaminopentane	153	2946
2-Amino-4,6-dinitrophenol, wetted with not less than 20% water	113	3317
2-(2-Aminoethoxy)ethanol	154	3055
N-Aminoethylpiperazine	153	2815
Aminophenols	152	2512
Aminopyridines	153	2671
Ammonia, anhydrous	125	1005
Ammonia, solution, with more than 10% but not more than 35% Ammonia	154	2672
Ammonia, solution, with more than 35% but not more than 50% Ammonia	125	2073
Ammonia solution, with more than 50% Ammonia	125	3318
Ammonium arsenate	151	1546
Ammonium bifluoride, solid	154	1727
Ammonium bifluoride, solution	154	2817
Ammonium dichromate	141	1439
Ammonium dinitro-o-cresolate	141	1843

Name of Material	Guide No.	ID No.
Ammonium dinitro-o-cresolate, solid	141	1843
Ammonium dinitro-o-cresolate, solution	141	3424
Ammonium fluoride	154	2505
Ammonium fluorosilicate	151	2854
Ammonium hydrogendifluoride, solid	154	1727
Ammonium hydrogendifluoride, solution	154	2817
Ammonium hydrogen fluoride, solid	154	1727
Ammonium hydrogen fluoride, solution	154	2817
Ammonium hydrogen sulfate	154	2506
Ammonium hydrogen sulphate	154	2506
Ammonium hydroxide	154	2672
Ammonium hydroxide, with more than 10% but not more than 35% Ammonia	154	2672
Ammonium metavanadate	154	2859
Ammonium nitrate, liquid (hot concentrated solution)	140	2426
Ammonium nitrate, with not more than 0.2% combustible substances	140	1942
Ammonium nitrate emulsion	140	3375
Ammonium nitrate fertilizer, n.o.s.	140	2072
Ammonium nitrate fertilizer, with not more than 0.4% combustible material	140	2071
Ammonium nitrate fertilizers	140	2067
Ammonium nitrate fertilizers	140	2071
Ammonium nitrate fertilizers	140	2072
Ammonium nitrate fertilizers, with Ammonium sulfate	140	2069
Ammonium nitrate fertilizers, with Ammonium sulphate	140	2069
Ammonium nitrate fertilizers, with Calcium carbonate	140	2068
Ammonium nitrate fertilizers, with Phosphate or Potash	143	2070
Ammonium nitrate-fuel oil mixtures	112	——
Ammonium nitrate gel	140	3375
Ammonium nitrate mixed fertilizers	140	2069
Ammonium nitrate suspension	140	3375
Ammonium perchlorate	143	1442
Ammonium persulfate	140	1444
Ammonium persulphate	140	1444
Ammonium picrate, wetted with not less than 10% water	113	1310
Ammonium polysulfide, solution	154	2818
Ammonium polysulphide, solution	154	2818
Ammonium polyvanadate	151	2861
Ammonium silicofluoride	151	2854
Ammonium sulfide, solution	132	2683
Ammonium sulphide, solution	132	2683
Ammunition, poisonous, non-explosive	151	2016
Ammunition, tear-producing, non-explosive	159	2017
Ammunition, toxic, non-explosive	151	2016
Amyl acetates	129	1104
Amyl acid phosphate	153	2819
Amyl alcohols	129	1105
Amylamines	132	1106
Amyl butyrates	130	2620
Amyl chloride	129	1107
n-Amylene	128	1108
Amyl formates	129	1109

Name of Material	Guide No.	ID No.
Amyl mercaptan	130	1111
n-Amyl methyl ketone	127	1110
Amyl methyl ketone	127	1110
Amyl nitrate	140	1112
Amyl nitrite	129	1113
Amyltrichlorosilane	155	1728
Anhydrous ammonia	125	1005
Aniline	153	1547
Aniline hydrochloride	153	1548
Anisidines	153	2431
Anisidines, liquid	153	2431
Anisidines, solid	153	2431
Anisole	128	2222
Anisoyl chloride	156	1729
Antimony compound, inorganic, liquid, n.o.s.	157	3141
Antimony compound, inorganic, n.o.s.	157	1549
Antimony compound, inorganic, solid, n.o.s.	157	1549
Antimony lactate	151	1550
Antimony pentachloride, liquid	157	1730
Antimony pentachloride, solution	157	1731
Antimony pentafluoride	157	1732
Antimony potassium tartrate	151	1551
Antimony powder	170	2871
Antimony trichloride	157	1733
Antimony trichloride, liquid	157	1733
Antimony trichloride, solid	157	1733
Antimony trichloride, solution	157	1733
Aqua regia	157	1798
Argon	121	1006

Name of Material	Guide No.	ID No.
Argon, compressed	121	1006
Argon, refrigerated liquid (cryogenic liquid)	120	1951
Arsenic	152	1558
Arsenic acid, liquid	154	1553
Arsenic acid, solid	154	1554
Arsenical dust	152	1562
Arsenical pesticide, liquid, flammable, poisonous	131	2760
Arsenical pesticide, liquid, flammable, toxic	131	2760
Arsenical pesticide, liquid, poisonous	151	2994
Arsenical pesticide, liquid, poisonous, flammable	131	2993
Arsenical pesticide, liquid, toxic	151	2994
Arsenical pesticide, liquid, toxic, flammable	131	2993
Arsenical pesticide, solid, poisonous	151	2759
Arsenical pesticide, solid, toxic	151	2759
Arsenic bromide	151	1555
Arsenic chloride	157	1560
Arsenic compound, liquid, n.o.s.	152	1556
Arsenic compound, liquid, n.o.s., inorganic	152	1556
Arsenic compound, solid, n.o.s.	152	1557
Arsenic compound, solid, n.o.s., inorganic	152	1557
Arsenic pentoxide	151	1559
Arsenic trichloride	157	1560
Arsenic trioxide	151	1561
Arsine	119	2188

Name of Material	Guide No.	ID No.
Articles containing Polychlorinated biphenyls (PCB)	171	2315
Articles, pressurized, hydraulic (containing non-flammable gas)	126	3164
Articles, pressurized, pneumatic (containing non-flammable gas)	126	3164
Aryl sulfonic acids, liquid, with more than 5% free Sulfuric acid	153	2584
Aryl sulfonic acids, liquid, with not more than 5% free Sulfuric acid	153	2586
Aryl sulfonic acids, solid, with more than 5% free Sulfuric acid	153	2583
Aryl sulfonic acids, solid, with not more than 5% free Sulfuric acid	153	2585
Aryl sulphonic acids, liquid, with more than 5% free Sulphuric acid	153	2584
Aryl sulphonic acids, liquid, with not more than 5% free Sulphuric acid	153	2586
Aryl sulphonic acids, solid, with more than 5% free Sulphuric acid	153	2583
Aryl sulphonic acids, solid, with not more than 5% free Sulphuric acid	153	2585
Asbestos	171	2212
Asbestos, blue	171	2212
Asbestos, brown	171	2212
Asbestos, white	171	2590
Asphalt	130	1999
Aviation regulated liquid, n.o.s.	171	3334
Aviation regulated solid, n.o.s.	171	3335

Name of Material	Guide No.	ID No.
1-Aziridinyl phosphine oxide (Tris)	152	2501
Azodicarbonamide	149	3242
Barium	138	1400
Barium alloys, pyrophoric	135	1854
Barium azide, wetted with not less than 50% water	113	1571
Barium bromate	141	2719
Barium chlorate	141	1445
Barium chlorate, solid	141	1445
Barium chlorate, solution	141	3405
Barium compound, n.o.s.	154	1564
Barium cyanide	157	1565
Barium hypochlorite, with more than 22% available Chlorine	141	2741
Barium nitrate	141	1446
Barium oxide	157	1884
Barium perchlorate	141	1447
Barium perchlorate, solid	141	1447
Barium perchlorate, solution	141	3406
Barium permanganate	141	1448
Barium peroxide	141	1449
Batteries, containing Sodium	138	3292
Batteries, dry, containing Potassium hydroxide solid	154	3028
Batteries, nickel-metal hydride	171	3496
Batteries, wet, filled with acid	154	2794
Batteries, wet, filled with alkali	154	2795
Batteries, wet, non-spillable	154	2800
Battery fluid, acid	157	2796
Battery fluid, alkali	154	2797
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Carbamate pesticide, liquid, poisonous	151	2992
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Chlorosilanes, n.o.s.	155	2985
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Chlorosilanes, toxic, corrosive, n.o.s.	156	3361
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Chlorotoluidines, liquid	153	3429
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Compressed gas, poisonous, corrosive, n.o.s. (Inhalation Hazard Zone A)	123	3304
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Compressed gas, poisonous, flammable, n.o.s.	119	1953
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Compressed gas, poisonous, n.o.s.	123	1955
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Compressed gas, poisonous, oxidizing, n.o.s.	124	3303
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Compressed gas, poisonous, oxidizing, n.o.s. (Inhalation Hazard Zone B)	124	3303
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Compressed gas, poisonous, oxidizing, n.o.s. (Inhalation Hazard Zone D)	124	3303
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Compressed gas, toxic, corrosive, n.o.s. (Inhalation Hazard Zone A)	123	3304
Compressed gas, toxic, corrosive, n.o.s. (Inhalation Hazard Zone B)	123	3304
Compressed gas, toxic, corrosive, n.o.s. (Inhalation Hazard Zone C)	123	3304
Compressed gas, toxic, corrosive, n.o.s. (Inhalation Hazard Zone D)	123	3304
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Cyanogen chloride, stabilized	125	1589
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Cyanuric chloride	157	2670
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1,3-Dichloroacetone	153	2649
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Diethyl sulfate	152	1594
Diethyl sulfide	129	2375
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Difluoroethane	115	1030
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1,1-Dimethoxyethane	127	2377
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Dimethylamine, solution	132	1160
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Dinitrotoluenes	152	2038
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Diphenylchloroarsine	151	1699
Diphenylchloroarsine, liquid	151	1699
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Diphenylchloroarsine, solid	151	3450
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Diphenylmethyl bromide	153	1770
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Dipicryl sulfide, wetted with not less than 10% water	113	2852
Dipicryl sulphide, wetted with not less than 10% water	113	2852
Dipropylamine	132	2383
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Dithiocarbamate pesticide, liquid, flammable, poisonous	131	2772
Dithiocarbamate pesticide, liquid, flammable, toxic	131	2772
Dithiocarbamate pesticide, liquid, poisonous	151	3006
Dithiocarbamate pesticide, liquid, poisonous, flammable	131	3005
Dithiocarbamate pesticide, liquid, toxic	151	3006
Dithiocarbamate pesticide, liquid, toxic, flammable	131	3005
Dithiocarbamate pesticide, solid, poisonous	151	2771
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Dodecyltrichlorosilane	156	1771
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Dye, liquid, poisonous, n.o.s.	151	1602
Dye, liquid, toxic, n.o.s.	151	1602
Dye, solid, corrosive, n.o.s.	154	3147
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Dye intermediate, liquid, corrosive, n.o.s.	154	2801
Dye intermediate, liquid, poisonous, n.o.s.	151	1602

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Dye intermediate, liquid, toxic, n.o.s.	151	1602
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Dye intermediate, solid, poisonous, n.o.s.	151	3143
Dye intermediate, solid, toxic, n.o.s.	151	3143
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Elevated temperature liquid, flammable, n.o.s., with flash point above 60°C (140°F), at or above its flash point	128	3256
Elevated temperature liquid, n.o.s., at or above 100°C (212°F), and below its flash point	128	3257
Elevated temperature solid, n.o.s., at or above 240°C (464°F)	171	3258
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1,2-Epoxy-3-ethoxypropane	127	2752
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Ethane	115	1035
Ethane, compressed	115	1035
Ethane, refrigerated liquid	115	1961
Ethane-Propane mixture, refrigerated liquid	115	1961
Ethanol	127	1170
Ethanol and gasoline mixture, with more than 10% ethanol	127	3475
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Ethanol and petrol mixture, with more than 10% ethanol	127	3475
Ethanol, solution	127	1170
Ethanolamine	153	2491
Ethanolamine, solution	153	2491
Ethers, n.o.s.	127	3271
Ethyl acetate	129	1173
Ethylacetylene, stabilized	116P	2452
Ethyl acrylate, stabilized	129P	1917
Ethyl alcohol	127	1170
Ethyl alcohol, solution	127	1170
Ethylamine	118	1036
Ethylamine, aqueous solution, with not less than 50% but not more than 70% Ethylamine	132	2270
Ethyl amyl ketone	128	2271
2-Ethylaniline	153	2273
N-Ethylaniline	153	2272
Ethylbenzene	130	1175
N-Ethyl-N-benzylaniline	153	2274
N-Ethylbenzyltoluidines	153	2753
N-Ethylbenzyltoluidines, liquid	153	2753
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N-Ethylbenzyltoluidines, solid	153	3460

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2-Ethylbutanol	129	2275
2-Ethylbutyl acetate	130	1177
Ethylbutyl acetate	130	1177
Ethyl butyl ether	127	1179
2-Ethylbutyraldehyde	130	1178
Ethyl butyrate	130	1180
Ethyl chloride	115	1037
Ethyl chloroacetate	155	1181
Ethyl chloroformate	155	1182
Ethyl 2-chloropropionate	129	2935
Ethyl chlorothioformate	155	2826
Ethyl crotonate	130	1862
Ethyldichloroarsine	151	1892
Ethyldichlorosilane	139	1183
Ethylene	116P	1962
Ethylene, Acetylene and Propylene in mixture, refrigerated liquid containing at least 71.5% Ethylene with not more than 22.5% Acetylene and not more than 6% Propylene	115	3138
Ethylene, compressed	116P	1962
Ethylene, refrigerated liquid (cryogenic liquid)	115	1038
Ethylene chlorohydrin	131	1135
Ethylenediamine	132	1604
Ethylene dibromide	154	1605
Ethylene dibromide and Methyl bromide mixture, liquid	151	1647
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Ethylene glycol monoethyl ether acetate	129	1172
Ethylene glycol monomethyl ether	127	1188
Ethylene glycol monomethyl ether acetate	129	1189
Ethyleneimine, stabilized	131P	1185
Ethylene oxide	119P	1040
Ethylene oxide and Carbon dioxide mixture, with more than 9% but not more than 87% Ethylene oxide	115	1041
Ethylene oxide and Carbon dioxide mixture, with more than 87% Ethylene oxide	119P	3300
Ethylene oxide and Carbon dioxide mixtures, with more than 6 % Ethylene oxide	115	1041
Ethylene oxide and Carbon dioxide mixtures, with not more than 6% Ethylene oxide	126	1952
Ethylene oxide and Carbon dioxide mixtures, with not more than 9% Ethylene oxide	126	1952
Ethylene oxide and Chlorotetrafluoroethane mixture, with not more than 8.8% Ethylene oxide	126	3297
Ethylene oxide and Dichlorodifluoromethane mixture, with not more than 12.5% Ethylene oxide	126	3070
Ethylene oxide and Dichlorodifluoromethane mixtures, with not more than 12% Ethylene oxide	126	3070
Ethylene oxide and Pentafluoroethane mixture, with not more than 7.9% Ethylene oxide	126	3298

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Ethylene oxide and Propylene oxide mixture, with not more than 30% Ethylene oxide	129P	2983
Ethylene oxide and Tetrafluoroethane mixture, with not more than 5.6% Ethylene oxide	126	3299
Ethylene oxide with Nitrogen	119P	1040
Ethyl ether	127	1155
Ethyl fluoride	115	2453
Ethyl formate	129	1190
Ethylhexaldehydes	129	1191
2-Ethylhexylamine	132	2276
2-Ethylhexyl chloroformate	156	2748
Ethyl isobutyrate	129	2385
Ethyl isocyanate	155	2481
Ethyl lactate	129	1192
Ethyl mercaptan	129	2363
Ethyl methacrylate	130P	2277
Ethyl methacrylate, stabilized	130P	2277
Ethyl methyl ether	115	1039
Ethyl methyl ketone	127	1193
Ethyl nitrite, solution	131	1194
Ethyl orthoformate	129	2524
Ethyl oxalate	156	2525
Ethylphenyldichlorosilane	156	2435
Ethyl phosphonothioic dichloride, anhydrous	154	2927
Ethyl phosphonous dichloride, anhydrous	135	2845
Ethyl phosphorodichloridate	154	2927
1-Ethylpiperidine	132	2386
Ethyl propionate	129	1195
Ethyl propyl ether	127	2615
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Ethylsulfuric acid	156	2571
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Extracts, aromatic, liquid	127	1169
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Extracts, flavouring, liquid	127	1197
Fabrics, animal or vegetable or synthetic, n.o.s. with oil	133	1373
Fabrics impregnated with weakly nitrated Nitrocellulose, n.o.s.	133	1353
Ferric arsenate	151	1606
Ferric arsenite	151	1607
Ferric chloride	157	1773
Ferric chloride, anhydrous	157	1773
Ferric chloride, solution	154	2582
Ferric nitrate	140	1466
Ferrocerium	170	1323
Ferrosilicon	139	1408
Ferrous arsenate	151	1608
Ferrous chloride, solid	154	1759
Ferrous chloride, solution	154	1760
Ferrous metal borings, shavings, turnings or cuttings	170	2793
Fertilizer, ammoniating solution, with free Ammonia	125	1043
Fiber, animal or vegetable, n.o.s., burnt, wet or damp	133	1372
Fibers, animal or vegetable or synthetic, n.o.s. with oil	133	1373

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Fibers, animal or vegetable, burnt, wet or damp	133	1372
Fibers, vegetable, dry	133	3360
Fibers impregnated with weakly nitrated Nitrocellulose, n.o.s.	133	1353
Fibres, animal or vegetable, burnt, wet or damp	133	1372
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Liquefied gas, toxic, oxidizing, n.o.s.	124	3307
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Nitroguanidine, wetted with not less than 20% water	113	1336
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Nitrosylsulphuric acid, solid	157	3456
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Organoarsenic compound, n.o.s.	151	3280
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Organochlorine pesticide, liquid, flammable, toxic	131	2762
Organochlorine pesticide, liquid, poisonous	151	2996
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Organochlorine pesticide, solid, poisonous	151	2761
Organochlorine pesticide, solid, toxic	151	2761
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Organometallic compound, liquid, toxic, n.o.s.	151	3282
Organometallic compound, poisonous, liquid, n.o.s.	151	3282
Organometallic compound, poisonous, n.o.s.	151	3282
Organometallic compound, poisonous, solid, n.o.s.	151	3467
Organometallic compound, solid, poisonous, n.o.s.	151	3467
Organometallic compound, solid, toxic, n.o.s.	151	3467
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Organometallic compound, toxic, n.o.s.	151	3282
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Organophosphorus compound, poisonous, n.o.s.	151	3278
Organophosphorus compound, poisonous, solid, n.o.s.	151	3464
Organophosphorus compound, solid, poisonous, n.o.s.	151	3464
Organophosphorus compound, solid, toxic, n.o.s.	151	3464
Organophosphorus compound, toxic, flammable, n.o.s.	131	3279
Organophosphorus compound, toxic, liquid, n.o.s.	151	3278
Organophosphorus compound, toxic, n.o.s.	151	3278
Organophosphorus compound, toxic, solid, n.o.s.	151	3464
Organophosphorus pesticide, liquid, flammable, poisonous	131	2784
Organophosphorus pesticide, liquid, flammable, toxic	131	2784
Organophosphorus pesticide, liquid, poisonous	152	3018
Organophosphorus pesticide, liquid, poisonous, flammable	131	3017
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Organophosphorus pesticide, liquid, toxic, flammable	131	3017
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Organophosphorus pesticide, solid, toxic	152	2783
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Organotin compound, solid, n.o.s.	153	3146
Organotin pesticide, liquid, flammable, poisonous	131	2787
Organotin pesticide, liquid, flammable, toxic	131	2787
Organotin pesticide, liquid, poisonous	153	3020
Organotin pesticide, liquid, poisonous, flammable	131	3019
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Substituted nitrophenol pesticide, liquid, poisonous, flammable	131	3013
Substituted nitrophenol pesticide, liquid, toxic	153	3014
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Sulfamic acid	154	2967
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Sulfur chlorides	137	1828
Sulfur dioxide	125	1079
Sulfur hexafluoride	126	1080
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Sulfuric acid, fuming	137	1831
Sulfuric acid, fuming, with less than 30% free Sulfur trioxide	137	1831
Sulfuric acid, fuming, with not less than 30% free Sulfur trioxide	137	1831
Sulfuric acid, spent	137	1832
Sulfuric acid, with more than 51% acid	137	1830
Sulfuric acid, with not more than 51% acid	157	2796
Sulfuric acid and Hydrofluoric acid mixture	157	1786
Sulfurous acid	154	1833
Sulfur tetrafluoride	125	2418
Sulfur trioxide, stabilized	137	1829
Sulfur trioxide and Chlorosulfonic acid mixture	137	1754
Sulfuryl chloride	137	1834
Sulfuryl fluoride	123	2191
Sulphamic acid	154	2967
Sulphur	133	1350
Sulphur, molten	133	2448
Sulphur chlorides	137	1828
Sulphur dioxide	125	1079
Sulphur hexafluoride	126	1080
Sulphuric acid	137	1830
Sulphuric acid, fuming	137	1831
Sulphuric acid, fuming, with less than 30% free Sulphur trioxide	137	1831
Sulphuric acid, fuming, with not less than 30% free Sulphur trioxide	137	1831
Sulphuric acid, spent	137	1832
Sulphuric acid, with more than 51% acid	137	1830
Sulphuric acid, with not more than 51% acid	157	2796
Sulphuric acid and Hydrofluoric acid mixture	157	1786
Sulphurous acid	154	1833
Sulphur tetrafluoride	125	2418
Sulphur trioxide, stabilized	137	1829
Sulphur trioxide and Chlorosulphonic acid mixture	137	1754
Sulphuryl chloride	137	1834
Sulphuryl fluoride	123	2191
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Tear gas substance, solid, n.o.s.	159	3448
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Tellurium hexafluoride	125	2195
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1,1,2,2-Tetrachloroethane	151	1702
Tetrachloroethane	151	1702
Tetrachloroethylene	160	1897
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Tetraethylenepentamine	153	2320
Tetraethyl silicate	129	1292
1,1,1,2-Tetrafluoroethane	126	3159
Tetrafluoroethane and Ethylene oxide mixture, with not more than 5.6% Ethylene oxide	126	3299
Tetrafluoroethylene, stabilized	116P	1081
Tetrafluoromethane	126	1982
Tetrafluoromethane, compressed	126	1982
1,2,3,6-Tetrahydrobenzaldehyde	129	2498
Tetrahydrofuran	127	2056
Tetrahydrofurfurylamine	129	2943

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1,2,5,6-Tetrahydropyridine	129	2410
Tetrahydrothiophene	130	2412
Tetramethylammonium hydroxide	153	1835
Tetramethylammonium hydroxide, solid	153	3423
Tetramethylammonium hydroxide, solution	153	1835
Tetramethylsilane	130	2749
Tetranitromethane	143	1510
Tetrapropyl orthotitanate	128	2413
Textile waste, wet	133	1857
Thallium chlorate	141	2573
Thallium compound, n.o.s.	151	1707
Thallium nitrate	141	2727
4-Thiapentanal	152	2785
Thia-4-pentanal	152	2785
Thickened GD	153	2810
Thioacetic acid	129	2436
Thiocarbamate pesticide, liquid, flammable, poisonous	131	2772
Thiocarbamate pesticide, liquid, flammable, toxic	131	2772
Thiocarbamate pesticide, liquid, poisonous	151	3006
Thiocarbamate pesticide, liquid, poisonous, flammable	131	3005
Thiocarbamate pesticide, liquid, toxic	151	3006
Thiocarbamate pesticide, liquid, toxic, flammable	131	3005
Thiocarbamate pesticide, solid, poisonous	151	2771

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Thioglycol	153	2966
Thioglycolic acid	153	1940
Thiolactic acid	153	2936
Thionyl chloride	137	1836
Thiophene	130	2414
Thiophosgene	157	2474
Thiophosphoryl chloride	157	1837
Thiourea dioxide	135	3341
Thorium metal, pyrophoric	162	2975
Thorium nitrate, solid	162	2976
Tinctures, medicinal	127	1293
Tin tetrachloride	137	1827
Tin tetrachloride, pentahydrate	154	2440
Titanium disulfide	135	3174
Titanium disulphide	135	3174
Titanium hydride	170	1871
Titanium powder, dry	135	2546
Titanium powder, wetted with not less than 25% water	170	1352
Titanium sponge granules	170	2878
Titanium sponge powders	170	2878
Titanium tetrachloride	137	1838
Titanium trichloride, pyrophoric	135	2441
Titanium trichloride mixture	157	2869
Titanium trichloride mixture, pyrophoric	135	2441
TNT, wetted with not less than 10% water	113	3366
TNT, wetted with not less than 30% water	113	1356
Toe puffs, nitrocellulose base	133	1353

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Toluene	130	1294
2,4-Toluenediamine	151	1709
Toluene diisocyanate	156	2078
Toluidines	153	1708
Toluidines, liquid	153	1708
Toluidines, solid	153	1708
Toluidines, solid	153	3451
2,4-Toluylenediamine	151	1709
2,4-Toluylenediamine, solid	151	1709
2,4-Toluylenediamine, solution	151	3418
Toxic by inhalation liquid, corrosive, flammable, n.o.s. (Inhalation Hazard Zone A)	131	3492
Toxic by inhalation liquid, corrosive, flammable, n.o.s. (Inhalation Hazard Zone B)	131	3493
Toxic by inhalation liquid, corrosive, n.o.s. (Inhalation Hazard Zone A)	154	3389
Toxic by inhalation liquid, corrosive, n.o.s. (Inhalation Hazard Zone B)	154	3390
Toxic by inhalation liquid, flammable, corrosive, n.o.s. (Inhalation Hazard Zone A)	131	3488
Toxic by inhalation liquid, flammable, corrosive, n.o.s. (Inhalation Hazard Zone B)	131	3489
Toxic by inhalation liquid, flammable, n.o.s. (Inhalation Hazard Zone A)	131	3383
Toxic by inhalation liquid, flammable, n.o.s. (Inhalation Hazard Zone B)	131	3384
Toxic by inhalation liquid, n.o.s. (Inhalation Hazard Zone A)	151	3381
Toxic by inhalation liquid, n.o.s. (Inhalation Hazard Zone B)	151	3382

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Toxic by inhalation liquid, oxidizing, n.o.s. (Inhalation Hazard Zone A)	142	3387
Toxic by inhalation liquid, oxidizing, n.o.s. (Inhalation Hazard Zone B)	142	3388
Toxic by inhalation liquid, water-reactive, flammable, n.o.s. (Inhalation Hazard Zone A)	155	3490
Toxic by inhalation liquid, water-reactive, flammable, n.o.s. (Inhalation Hazard Zone B)	155	3491
Toxic by inhalation liquid, water-reactive, n.o.s. (Inhalation Hazard Zone A)	139	3385
Toxic by inhalation liquid, water-reactive, n.o.s. (Inhalation Hazard Zone B)	139	3386
Toxic liquid, corrosive, inorganic, n.o.s.	154	3289
Toxic liquid, corrosive, inorganic, n.o.s. (Inhalation Hazard Zone A)	154	3289
Toxic liquid, corrosive, inorganic, n.o.s. (Inhalation Hazard Zone B)	154	3289
Toxic liquid, corrosive, n.o.s.	154	2927
Toxic liquid, corrosive, n.o.s. (Inhalation Hazard Zone A)	154	2927
Toxic liquid, corrosive, n.o.s. (Inhalation Hazard Zone B)	154	2927
Toxic liquid, corrosive, organic, n.o.s.	154	2927
Toxic liquid, corrosive, organic, n.o.s. (Inhalation Hazard Zone A)	154	2927
Toxic liquid, corrosive, organic, n.o.s. (Inhalation Hazard Zone B)	154	2927
Toxic liquid, flammable, n.o.s.	131	2929
Toxic liquid, flammable, n.o.s. (Inhalation Hazard Zone A)	131	2929
Toxic liquid, flammable, n.o.s. (Inhalation Hazard Zone B)	131	2929
Toxic liquid, flammable, organic, n.o.s.	131	2929
Toxic liquid, flammable, organic, n.o.s. (Inhalation Hazard Zone A)	131	2929
Toxic liquid, flammable, organic, n.o.s. (Inhalation Hazard Zone B)	131	2929
Toxic liquid, inorganic, n.o.s.	151	3287
Toxic liquid, inorganic, n.o.s. (Inhalation Hazard Zone A)	151	3287
Toxic liquid, inorganic, n.o.s. (Inhalation Hazard Zone B)	151	3287
Toxic liquid, n.o.s.	153	2810
Toxic liquid, n.o.s. (Inhalation Hazard Zone A)	153	2810
Toxic liquid, n.o.s. (Inhalation Hazard Zone B)	153	2810
Toxic liquid, organic, n.o.s.	153	2810
Toxic liquid, organic, n.o.s. (Inhalation Hazard Zone A)	153	2810
Toxic liquid, organic, n.o.s. (Inhalation Hazard Zone B)	153	2810
Toxic liquid, oxidizing, n.o.s.	142	3122
Toxic liquid, oxidizing, n.o.s. (Inhalation Hazard Zone A)	142	3122
Toxic liquid, oxidizing, n.o.s. (Inhalation Hazard Zone B)	142	3122
Toxic liquid, water-reactive, n.o.s.	139	3123
Toxic liquid, water-reactive, n.o.s. (Inhalation Hazard Zone A)	139	3123
Toxic liquid, water-reactive, n.o.s. (Inhalation Hazard Zone B)	139	3123
Toxic liquid, which in contact with water emits flammable gases, n.o.s.	139	3123

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Toxic liquid, which in contact with water emits flammable gases, n.o.s. (Inhalation Hazard Zone A)	139	3123
Toxic liquid, which in contact with water emits flammable gases, n.o.s. (Inhalation Hazard Zone B)	139	3123
Toxic solid, corrosive, inorganic, n.o.s.	154	3290
Toxic solid, corrosive, organic, n.o.s.	154	2928
Toxic solid, flammable, n.o.s.	134	2930
Toxic solid, flammable, organic, n.o.s.	134	2930
Toxic solid, inorganic, n.o.s.	151	3288
Toxic solid, organic, n.o.s.	154	2811
Toxic solid, oxidizing, n.o.s.	141	3086
Toxic solid, self-heating, n.o.s.	136	3124
Toxic solid, water-reactive, n.o.s.	139	3125
Toxic solid, which in contact with water emits flammable gases, n.o.s.	139	3125
Toxins	153	——
Toxins, extracted from living sources, liquid, n.o.s.	153	3172
Toxins, extracted from living sources, n.o.s.	153	3172
Toxins, extracted from living sources, solid, n.o.s.	153	3172
Toxins, extracted from living sources, solid, n.o.s.	153	3462
Triallylamine	132	2610
Triallyl borate	156	2609
Triazine pesticide, liquid, flammable, poisonous	131	2764
Triazine pesticide, liquid, flammable, toxic	131	2764
Triazine pesticide, liquid, poisonous	151	2998
Triazine pesticide, liquid, poisonous, flammable	131	2997
Triazine pesticide, liquid, toxic	151	2998
Triazine pesticide, liquid, toxic, flammable	131	2997
Triazine pesticide, solid, poisonous	151	2763
Triazine pesticide, solid, toxic	151	2763
Tri-(1-aziridinyl)phosphine oxide, solution	152	2501
Tributylamine	153	2542
Tributylphosphane	135	3254
Tributylphosphine	135	3254
Trichloroacetic acid	153	1839
Trichloroacetic acid, solution	153	2564
Trichloroacetyl chloride	156	2442
Trichlorobenzenes, liquid	153	2321
Trichlorobutene	152	2322
1,1,1-Trichloroethane	160	2831
Trichloroethylene	160	1710
Trichloroisocyanuric acid, dry	140	2468
Trichlorosilane	139	1295
Tricresyl phosphate	151	2574
Triethylamine	132	1296
Triethylenetetramine	153	2259
Triethyl phosphite	130	2323
Trifluoroacetic acid	154	2699
Trifluoroacetyl chloride	125	3057
Trifluorochloroethylene, stabilized	119P	1082
1,1,1-Trifluoroethane	115	2035
Trifluoroethane, compressed	115	2035
Trifluoromethane	126	1984

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Trifluoromethane, refrigerated liquid	120	3136
Trifluoromethane and Chlorotrifluoromethane azeotropic mixture with approximately 60% Chlorotrifluoromethane	126	2599
2-Trifluoromethylaniline	153	2942
3-Trifluoromethylaniline	153	2948
Triisobutylene	128	2324
Triisopropyl borate	129	2616
Trimethoxysilane	132	9269
Trimethylacetyl chloride	132	2438
Trimethylamine, anhydrous	118	1083
Trimethylamine, aqueous solution	132	1297
1,3,5-Trimethylbenzene	129	2325
Trimethyl borate	129	2416
Trimethylchlorosilane	155	1298
Trimethylcyclohexylamine	153	2326
Trimethylhexamethylenediamines	153	2327
Trimethylhexamethylene diisocyanate	156	2328
Trimethyl phosphite	130	2329
Trinitrobenzene, wetted with not less than 10% water	113	3367
Trinitrobenzene, wetted with not less than 30% water	113	1354
Trinitrobenzoic acid, wetted with not less than 10% water	113	3368
Trinitrobenzoic acid, wetted with not less than 30% water	113	1355
Trinitrochlorobenzene, wetted with not less than 10% water	113	3365
Trinitrophenol, wetted with not less than 10% water	113	3364
Trinitrophenol, wetted with not less than 30% water	113	1344
Trinitrotoluene, wetted with not less than 10% water	113	3366
Trinitrotoluene, wetted with not less than 30% water	113	1356
Tripropylamine	132	2260
Tripropylene	128	2057
Tris-(1-aziridinyl)phosphine oxide, solution	152	2501
Tungsten hexafluoride	125	2196
Turpentine	128	1299
Turpentine substitute	128	1300
Undecane	128	2330
Uranium hexafluoride	166	2978
Uranium hexafluoride, fissile containing more than 1% Uranium-235	166	2977
Uranium hexafluoride, non fissile or fissile-excepted	166	2978
Uranium metal, pyrophoric	162	2979
Uranyl nitrate, hexahydrate, solution	162	2980
Uranyl nitrate, solid	162	2981
Urea hydrogen peroxide	140	1511
Urea nitrate, wetted with not less than 10% water	113	3370
Urea nitrate, wetted with not less than 20% water	113	1357
Valeraldehyde	129	2058
Valeryl chloride	132	2502
Vanadium compound, n.o.s.	151	3285
Vanadium oxytrichloride	137	2443
Vanadium pentoxide	151	2862
Vanadium tetrachloride	137	2444
Vanadium trichloride	157	2475
Vanadyl sulfate	151	2931

Name of Material	Guide No.	ID No.
Vanadyl sulphate	151	2931
Vehicle, flammable gas powered	128	3166
Vehicle, flammable liquid powered	128	3166
Vehicle, fuel cell, flammable gas powered	128	3166
Vehicle, fuel cell, flammable liquid powered	128	3166
Vinyl acetate, stabilized	129P	1301
Vinyl bromide, stabilized	116P	1085
Vinyl butyrate, stabilized	129P	2838
Vinyl chloride, stabilized	116P	1086
Vinyl chloroacetate	155	2589
Vinyl ethyl ether, stabilized	127P	1302
Vinyl fluoride, stabilized	116P	1860
Vinylidene chloride, stabilized	130P	1303
Vinyl isobutyl ether, stabilized	127P	1304
Vinyl methyl ether, stabilized	116P	1087
Vinylpyridines, stabilized	131P	3073
Vinyltoluenes, stabilized	130P	2618
Vinyltrichlorosilane	155P	1305
Vinyltrichlorosilane, stabilized	155P	1305
VX	153	2810
Water-reactive liquid, corrosive, n.o.s.	138	3129
Water-reactive liquid, n.o.s.	138	3148
Water-reactive liquid, poisonous, n.o.s.	139	3130
Water-reactive liquid, toxic, n.o.s.	139	3130
Water-reactive solid, corrosive, n.o.s.	138	3131
Water-reactive solid, flammable, n.o.s.	138	3132
Water-reactive solid, n.o.s.	138	2813
Water-reactive solid, oxidizing, n.o.s.	138	3133
Water-reactive solid, poisonous, n.o.s.	139	3134
Water-reactive solid, self-heating, n.o.s.	138	3135
Water-reactive solid, toxic, n.o.s.	139	3134
Wheelchair, electric, with batteries	154	3171
White asbestos	171	2590
White phosphorus, dry	136	1381
White phosphorus, in solution	136	1381
White phosphorus, molten	136	2447
White phosphorus, under water	136	1381
Wood preservatives, liquid	129	1306
Wool waste, wet	133	1387
Xanthates	135	3342
Xenon	121	2036
Xenon, compressed	121	2036
Xenon, refrigerated liquid (cryogenic liquid)	120	2591
Xylenes	130	1307
Xylenols	153	2261
Xylenols, liquid	153	3430
Xylenols, solid	153	2261
Xylidines	153	1711
Xylidines, liquid	153	1711
Xylidines, solid	153	1711
Xylidines, solid	153	3452
Xylyl bromide	152	1701
Xylyl bromide, liquid	152	1701
Xylyl bromide, solid	152	3417
Yellow phosphorus, dry	136	1381

Name of Material	Guide No.	ID No.
Yellow phosphorus, in solution	136	1381
Yellow phosphorus, molten	136	2447
Yellow phosphorus, under water	136	1381
Zinc ammonium nitrite	140	1512
Zinc arsenate	151	1712
Zinc arsenate and Zinc arsenite mixture	151	1712
Zinc arsenite	151	1712
Zinc arsenite and Zinc arsenate mixture	151	1712
Zinc ashes	138	1435
Zinc bromate	140	2469
Zinc chlorate	140	1513
Zinc chloride, anhydrous	154	2331
Zinc chloride, solution	154	1840
Zinc cyanide	151	1713
Zinc dithionite	171	1931
Zinc dross	138	1435
Zinc dust	138	1436
Zinc fluorosilicate	151	2855
Zinc hydrosulfite	171	1931
Zinc hydrosulphite	171	1931
Zinc nitrate	140	1514
Zinc permanganate	140	1515
Zinc peroxide	143	1516
Zinc phosphide	139	1714
Zinc powder	138	1436
Zinc residue	138	1435
Zinc resinate	133	2714
Zinc silicofluoride	151	2855
Zinc skimmings	138	1435

Name of Material	Guide No.	ID No.
Zirconium, dry, coiled wire, finished metal sheets or strips	170	2858
Zirconium, dry, finished sheets, strips or coiled wire	135	2009
Zirconium hydride	138	1437
Zirconium metal, liquid suspension	170	1308
Zirconium metal, powder, wet	170	1358
Zirconium nitrate	140	2728
Zirconium picramate, wetted with not less than 20% water	113	1517
Zirconium powder, dry	135	2008
Zirconium powder, wetted with not less than 25% water	170	1358
Zirconium scrap	135	1932
Zirconium suspended in a flammable liquid	170	1308
Zirconium suspended in a liquid (flammable)	170	1308
Zirconium tetrachloride	137	2503

GUIDES

POTENTIAL HAZARDS

FIRE OR EXPLOSION

- May explode from heat, shock, friction or contamination.
- May react violently or explosively on contact with air, water or foam.
- May be ignited by heat, sparks or flames.
- Vapors may travel to source of ignition and flash back.
- Containers may explode when heated.
- Ruptured cylinders may rocket.

HEALTH

- Inhalation, ingestion or contact with substance may cause severe injury, infection, disease or death.
- High concentration of gas may cause asphyxiation without warning.
- Contact may cause burns to skin and eyes.
- Fire or contact with water may produce irritating, toxic and/or corrosive gases.
- Runoff from fire control may cause pollution.

PUBLIC SAFETY

- **CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.**
- As an immediate precautionary measure, isolate spill or leak area for at least 100 meters (330 feet) in all directions.
- Keep unauthorized personnel away.
- Stay upwind.
- Keep out of low areas.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Structural firefighters' protective clothing provides limited protection in fire situations ONLY; it may not be effective in spill situations.

EVACUATION

Fire

- If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

EMERGENCY RESPONSE

FIRE

CAUTION: Material may react with extinguishing agent.

Small Fire

- Dry chemical, CO_2, water spray or regular foam.

Large Fire

- Water spray, fog or regular foam.
- Move containers from fire area if you can do it without risk.

Fire involving Tanks

- Cool containers with flooding quantities of water until well after fire is out.
- Do not get water inside containers.
- Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- ALWAYS stay away from tanks engulfed in fire.

SPILL OR LEAK

- Do not touch or walk through spilled material.
- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).
- All equipment used when handling the product must be grounded.
- Keep combustibles (wood, paper, oil, etc.) away from spilled material.
- Use water spray to reduce vapors or divert vapor cloud drift. Avoid allowing water runoff to contact spilled material.
- Prevent entry into waterways, sewers, basements or confined areas.

Small Spill

- Take up with sand or other non-combustible absorbent material and place into containers for later disposal.

Large Spill

- Dike far ahead of liquid spill for later disposal.

FIRST AID

- Move victim to fresh air.
- Call 911 or emergency medical service.
- Give artificial respiration if victim is not breathing.
- **Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.**
- Administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- Shower and wash with soap and water.
- Keep victim warm and quiet.
- Effects of exposure (inhalation, ingestion or skin contact) to substance may be delayed.
- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

POTENTIAL HAZARDS

FIRE OR EXPLOSION

- **MAY EXPLODE AND THROW FRAGMENTS 1600 meters (1 MILE) OR MORE IF FIRE REACHES CARGO.**
- **For information on "Compatibility Group" letters, refer to Glossary section.**

HEALTH

- Fire may produce irritating, corrosive and/or toxic gases.

PUBLIC SAFETY

- **CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.**
- Isolate spill or leak area immediately for at least 500 meters (1/3 mile) in all directions.
- Move people out of line of sight of the scene and away from windows.
- Keep unauthorized personnel away.
- Stay upwind.
- Ventilate closed spaces before entering.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Structural firefighters' protective clothing will only provide limited protection.

EVACUATION

Large Spill

- **Consider initial EVACUATION for 800 meters (1/2 mile) in all directions.**

Fire

- If rail car or trailer is involved in a fire, ISOLATE for 1600 meters (1 mile) in all directions; also, initiate evacuation including emergency responders for 1600 meters (1 mile) in all directions.

* FOR INFORMATION ON "COMPATIBILITY GROUP" LETTERS, REFER TO THE GLOSSARY SECTION.

EMERGENCY RESPONSE

FIRE

CARGO Fire

- **DO NOT fight fire when fire reaches cargo! Cargo may EXPLODE!**
- Stop all traffic and clear the area for at least 1600 meters (1 mile) in all directions and let burn.
- **Do not move cargo or vehicle if cargo has been exposed to heat.**

TIRE or VEHICLE Fire

- **Use plenty of water - FLOOD it! If water is not available, use CO_2, dry chemical or dirt.**
- If possible, and WITHOUT RISK, use unmanned hose holders or monitor nozzles from maximum distance to prevent fire from spreading to cargo area.
- Pay special attention to tire fires as re-ignition may occur. Stand by with extinguisher ready.

SPILL OR LEAK

- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).
- All equipment used when handling the product must be grounded.
- Do not touch or walk through spilled material.
- DO NOT OPERATE RADIO TRANSMITTERS WITHIN 100 meters (330 feet) OF ELECTRIC DETONATORS.
- **DO NOT CLEAN-UP OR DISPOSE OF, EXCEPT UNDER SUPERVISION OF A SPECIALIST.**

FIRST AID

- Move victim to fresh air.
- Call 911 or emergency medical service.
- Give artificial respiration if victim is not breathing.
- Administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

* FOR INFORMATION ON "COMPATIBILITY GROUP" LETTERS, REFER TO THE GLOSSARY SECTION.

Flammable Solids - Toxic (Wet/Desensitized Explosive)

POTENTIAL HAZARDS

FIRE OR EXPLOSION

- Flammable/combustible material.
- May be ignited by heat, sparks or flames.
- **DRIED OUT material may explode if exposed to heat, flame, friction or shock; Treat as an explosive (GUIDE 112).**
- **Keep material wet with water or treat as an explosive (GUIDE 112).**
- Runoff to sewer may create fire or explosion hazard.

HEALTH

- Some are toxic and may be fatal if inhaled, swallowed or absorbed through skin.
- Contact may cause burns to skin and eyes.
- Fire may produce irritating, corrosive and/or toxic gases.
- Runoff from fire control or dilution water may cause pollution.

PUBLIC SAFETY

- **CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.**
- Isolate spill or leak area immediately for at least 100 meters (330 feet) in all directions.
- Keep unauthorized personnel away.
- Stay upwind.
- Ventilate closed spaces before entering.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Structural firefighters' protective clothing will only provide limited protection.

EVACUATION

Large Spill

- **Consider initial EVACUATION for 500 meters (1/3 mile) in all directions.**

Fire

- If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

EMERGENCY RESPONSE

FIRE

CARGO Fire

- **DO NOT fight fire when fire reaches cargo! Cargo may EXPLODE!**
- Stop all traffic and clear the area for at least 800 meters (1/2 mile) in all directions and let burn.
- **Do not move cargo or vehicle if cargo has been exposed to heat.**

TIRE or VEHICLE Fire

- **Use plenty of water - FLOOD it! If water is not available, use CO_2, dry chemical or dirt.**
- If possible, and WITHOUT RISK, use unmanned hose holders or monitor nozzles from maximum distance to prevent fire from spreading to cargo area.
- Pay special attention to tire fires as re-ignition may occur. Stand by with extinguisher ready.

SPILL OR LEAK

- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).
- All equipment used when handling the product must be grounded.
- Do not touch or walk through spilled material.

Small Spill

- Flush area with flooding quantities of water.

Large Spill

- Wet down with water and dike for later disposal.
- KEEP "WETTED" PRODUCT WET BY SLOWLY ADDING FLOODING QUANTITIES OF WATER.

FIRST AID

- Move victim to fresh air.
- Call 911 or emergency medical service.
- Give artificial respiration if victim is not breathing.
- Administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

POTENTIAL HAZARDS

FIRE OR EXPLOSION

- **MAY EXPLODE AND THROW FRAGMENTS 500 meters (1/3 MILE) OR MORE IF FIRE REACHES CARGO.**
- **For information on "Compatibility Group" letters, refer to Glossary section.**

HEALTH

- Fire may produce irritating, corrosive and/or toxic gases.

PUBLIC SAFETY

- **CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.**
- Isolate spill or leak area immediately for at least 100 meters (330 feet) in all directions.
- Move people out of line of sight of the scene and away from windows.
- Keep unauthorized personnel away.
- Stay upwind.
- Ventilate closed spaces before entering.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Structural firefighters' protective clothing will only provide limited protection.

EVACUATION

Large Spill

- **Consider initial EVACUATION for 250 meters (800 feet) in all directions.**

Fire

- If rail car or trailer is involved in a fire, ISOLATE for 500 meters (1/3 mile) in all directions; also initiate evacuation including emergency responders for 500 meters (1/3 mile) in all directions.

* FOR INFORMATION ON "COMPATIBILITY GROUP" LETTERS, REFER TO THE GLOSSARY SECTION.

EMERGENCY RESPONSE

FIRE

CARGO Fire

- **DO NOT fight fire when fire reaches cargo! Cargo may EXPLODE!**
- Stop all traffic and clear the area for at least 500 meters (1/3 mile) in all directions and let burn.
- **Do not move cargo or vehicle if cargo has been exposed to heat.**

TIRE or VEHICLE Fire

- **Use plenty of water - FLOOD it! If water is not available, use CO_2, dry chemical or dirt.**
- If possible, and WITHOUT RISK, use unmanned hose holders or monitor nozzles from maximum distance to prevent fire from spreading to cargo area.
- Pay special attention to tire fires as re-ignition may occur. Stand by with extinguisher ready.

SPILL OR LEAK

- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).
- All equipment used when handling the product must be grounded.
- Do not touch or walk through spilled material.
- DO NOT OPERATE RADIO TRANSMITTERS WITHIN 100 meters (330 feet) OF ELECTRIC DETONATORS.
- **DO NOT CLEAN-UP OR DISPOSE OF, EXCEPT UNDER SUPERVISION OF A SPECIALIST.**

FIRST AID

- Move victim to fresh air.
- Call 911 or emergency medical service.
- Give artificial respiration if victim is not breathing.
- Administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

SUPPLEMENTAL INFORMATION

- Packages bearing the 1.4S label or packages containing material classified as 1.4S are designed or packaged in such a manner that when involved in a fire, may burn vigorously with localized detonations and projection of fragments.
- Effects are usually confined to immediate vicinity of packages.
- If fire threatens cargo area containing packages bearing the 1.4S label or packages containing material classified as 1.4S, consider isolating at least 15 meters (50 feet) in all directions. Fight fire with normal precautions from a reasonable distance.

* FOR INFORMATION ON "COMPATIBILITY GROUP" LETTERS, REFER TO THE GLOSSARY SECTION.

POTENTIAL HAZARDS

FIRE OR EXPLOSION

- **EXTREMELY FLAMMABLE.**
- Will be easily ignited by heat, sparks or flames.
- Will form explosive mixtures with air.
- Vapors from liquefied gas are initially heavier than air and spread along ground.

CAUTION: Hydrogen (UN1049), Deuterium (UN1957), Hydrogen, refrigerated liquid (UN1966) and Methane (UN1971) are lighter than air and will rise. Hydrogen and Deuterium fires are difficult to detect since they burn with an invisible flame. Use an alternate method of detection (thermal camera, broom handle, etc.)

- Vapors may travel to source of ignition and flash back.
- Cylinders exposed to fire may vent and release flammable gas through pressure relief devices.
- Containers may explode when heated.
- Ruptured cylinders may rocket.

HEALTH

- Vapors may cause dizziness or asphyxiation without warning.
- Some may be irritating if inhaled at high concentrations.
- Contact with gas or liquefied gas may cause burns, severe injury and/or frostbite.
- Fire may produce irritating and/or toxic gases.

PUBLIC SAFETY

- **CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.**
- As an immediate precautionary measure, isolate spill or leak area for at least 100 meters (330 feet) in all directions.
- Keep unauthorized personnel away.
- Stay upwind.
- Many gases are heavier than air and will spread along ground and collect in low or confined areas (sewers, basements, tanks).
- Keep out of low areas.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Structural firefighters' protective clothing will only provide limited protection.
- Always wear thermal protective clothing when handling refrigerated/cryogenic liquids.

EVACUATION

Large Spill

- Consider initial downwind evacuation for at least 800 meters (1/2 mile).

Fire

- If tank, rail car or tank truck is involved in a fire, ISOLATE for 1600 meters (1 mile) in all directions; also, consider initial evacuation for 1600 meters (1 mile) in all directions.

EMERGENCY RESPONSE

FIRE

- **DO NOT EXTINGUISH A LEAKING GAS FIRE UNLESS LEAK CAN BE STOPPED.**

CAUTION: Hydrogen (UN1049), Deuterium (UN1957) and Hydrogen, refrigerated liquid (UN1966) burn with an invisible flame. Hydrogen and Methane mixture, compressed (UN2034) may burn with an invisible flame.

Small Fire

- Dry chemical or CO_2.

Large Fire

- Water spray or fog.
- Move containers from fire area if you can do it without risk.

Fire involving Tanks

- Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- Cool containers with flooding quantities of water until well after fire is out.
- Do not direct water at source of leak or safety devices; icing may occur.
- Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- ALWAYS stay away from tanks engulfed in fire.
- For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.

SPILL OR LEAK

- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).
- All equipment used when handling the product must be grounded.
- Do not touch or walk through spilled material.
- Stop leak if you can do it without risk.
- If possible, turn leaking containers so that gas escapes rather than liquid.
- Use water spray to reduce vapors or divert vapor cloud drift. Avoid allowing water runoff to contact spilled material.
- Do not direct water at spill or source of leak.
- Prevent spreading of vapors through sewers, ventilation systems and confined areas.
- Isolate area until gas has dispersed.

CAUTION: When in contact with refrigerated/cryogenic liquids, many materials become brittle and are likely to break without warning.

FIRST AID

- Move victim to fresh air.
- Call 911 or emergency medical service.
- Give artificial respiration if victim is not breathing.
- Administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes.
- Clothing frozen to the skin should be thawed before being removed.
- In case of contact with liquefied gas, thaw frosted parts with lukewarm water.
- In case of burns, immediately cool affected skin for as long as possible with cold water. Do not remove clothing if adhering to skin.
- Keep victim warm and quiet.
- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

POTENTIAL HAZARDS

FIRE OR EXPLOSION

- **EXTREMELY FLAMMABLE.**
- Will be easily ignited by heat, sparks or flames.
- Will form explosive mixtures with air.
- Silane will ignite spontaneously in air.
- Those substances designated with a **(P)** may polymerize explosively when heated or involved in a fire.
- Vapors from liquefied gas are initially heavier than air and spread along ground.
- Vapors may travel to source of ignition and flash back.
- Cylinders exposed to fire may vent and release flammable gas through pressure relief devices.
- Containers may explode when heated.
- Ruptured cylinders may rocket.

HEALTH

- Vapors may cause dizziness or asphyxiation without warning.
- Some may be toxic if inhaled at high concentrations.
- Contact with gas or liquefied gas may cause burns, severe injury and/or frostbite.
- Fire may produce irritating and/or toxic gases.

PUBLIC SAFETY

- **CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.**
- As an immediate precautionary measure, isolate spill or leak area for at least 100 meters (330 feet) in all directions.
- Keep unauthorized personnel away.
- Stay upwind.
- Many gases are heavier than air and will spread along ground and collect in low or confined areas (sewers, basements, tanks).
- Keep out of low areas.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Structural firefighters' protective clothing will only provide limited protection.

EVACUATION

Large Spill

- Consider initial downwind evacuation for at least 800 meters (1/2 mile).

Fire

- If tank, rail car or tank truck is involved in a fire, ISOLATE for 1600 meters (1 mile) in all directions; also, consider initial evacuation for 1600 meters (1 mile) in all directions.

EMERGENCY RESPONSE

FIRE

- **DO NOT EXTINGUISH A LEAKING GAS FIRE UNLESS LEAK CAN BE STOPPED.**

Small Fire

- Dry chemical or CO_2.

Large Fire

- Water spray or fog.
- Move containers from fire area if you can do it without risk.

Fire involving Tanks

- Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- Cool containers with flooding quantities of water until well after fire is out.
- Do not direct water at source of leak or safety devices; icing may occur.
- Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- ALWAYS stay away from tanks engulfed in fire.
- For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.

SPILL OR LEAK

- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).
- All equipment used when handling the product must be grounded.
- Stop leak if you can do it without risk.
- Do not touch or walk through spilled material.
- Do not direct water at spill or source of leak.
- Use water spray to reduce vapors or divert vapor cloud drift. Avoid allowing water runoff to contact spilled material.
- If possible, turn leaking containers so that gas escapes rather than liquid.
- Prevent entry into waterways, sewers, basements or confined areas.
- Isolate area until gas has dispersed.

FIRST AID

- Move victim to fresh air.
- Call 911 or emergency medical service.
- Give artificial respiration if victim is not breathing.
- Administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes.
- In case of contact with liquefied gas, thaw frosted parts with lukewarm water.
- In case of burns, immediately cool affected skin for as long as possible with cold water. Do not remove clothing if adhering to skin.
- Keep victim warm and quiet.
- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

Gases - Toxic - Flammable (Extreme Hazard)

POTENTIAL HAZARDS

HEALTH

- **TOXIC; Extremely Hazardous.**
- May be fatal if inhaled or absorbed through skin.
- Initial odor may be irritating or foul and may deaden your sense of smell.
- Contact with gas or liquefied gas may cause burns, severe injury and/or frostbite.
- Fire will produce irritating, corrosive and/or toxic gases.
- Runoff from fire control may cause pollution.

FIRE OR EXPLOSION

- These materials are extremely flammable.
- May form explosive mixtures with air.
- May be ignited by heat, sparks or flames.
- Vapors from liquefied gas are initially heavier than air and spread along ground.
- Vapors may travel to source of ignition and flash back.
- Runoff may create fire or explosion hazard.
- Cylinders exposed to fire may vent and release toxic and flammable gas through pressure relief devices.
- Containers may explode when heated.
- Ruptured cylinders may rocket.

PUBLIC SAFETY

- **CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.**
- As an immediate precautionary measure, isolate spill or leak area for at least 100 meters (330 feet) in all directions.
- Keep unauthorized personnel away.
- Stay upwind.
- Many gases are heavier than air and will spread along ground and collect in low or confined areas (sewers, basements, tanks).
- Keep out of low areas.
- Ventilate closed spaces before entering.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection.
- Structural firefighters' protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible.

EVACUATION

Spill

- See Table 1 - Initial Isolation and Protective Action Distances.

Fire

- If tank, rail car or tank truck is involved in a fire, ISOLATE for 1600 meters (1 mile) in all directions; also, consider initial evacuation for 1600 meters (1 mile) in all directions.

EMERGENCY RESPONSE

FIRE

DO NOT EXTINGUISH A LEAKING GAS FIRE UNLESS LEAK CAN BE STOPPED.

Small Fire

- Dry chemical, CO_2, water spray or regular foam.

Large Fire

- Water spray, fog or regular foam.
- Move containers from fire area if you can do it without risk.
- Damaged cylinders should be handled only by specialists.

Fire involving Tanks

- Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- Cool containers with flooding quantities of water until well after fire is out.
- Do not direct water at source of leak or safety devices; icing may occur.
- Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- ALWAYS stay away from tanks engulfed in fire.

SPILL OR LEAK

- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).
- All equipment used when handling the product must be grounded.
- Fully encapsulating, vapor protective clothing should be worn for spills and leaks with no fire.
- Do not touch or walk through spilled material.
- Stop leak if you can do it without risk.
- Use water spray to reduce vapors or divert vapor cloud drift. Avoid allowing water runoff to contact spilled material.
- Do not direct water at spill or source of leak.
- If possible, turn leaking containers so that gas escapes rather than liquid.
- Prevent entry into waterways, sewers, basements or confined areas.
- Isolate area until gas has dispersed.
- Consider igniting spill or leak to eliminate toxic gas concerns.

FIRST AID

- Move victim to fresh air.
- Call 911 or emergency medical service.
- Give artificial respiration if victim is not breathing.
- **Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.**
- Administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- In case of contact with liquefied gas, thaw frosted parts with lukewarm water.
- In case of burns, immediately cool affected skin for as long as possible with cold water. Do not remove clothing if adhering to skin.
- Keep victim warm and quiet.
- Keep victim under observation.
- Effects of contact or inhalation may be delayed.
- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

POTENTIAL HAZARDS

FIRE OR EXPLOSION

- **EXTREMELY FLAMMABLE.**
- May be ignited by heat, sparks or flames.
- May form explosive mixtures with air.
- Vapors from liquefied gas are initially heavier than air and spread along ground.
- Vapors may travel to source of ignition and flash back.
- Some of these materials may react violently with water.
- Cylinders exposed to fire may vent and release flammable gas through pressure relief devices.
- Containers may explode when heated.
- Ruptured cylinders may rocket.

HEALTH

- May cause toxic effects if inhaled.
- Vapors are extremely irritating.
- Contact with gas or liquefied gas may cause burns, severe injury and/or frostbite.
- Fire will produce irritating, corrosive and/or toxic gases.
- Runoff from fire control may cause pollution.

PUBLIC SAFETY

- **CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.**
- As an immediate precautionary measure, isolate spill or leak area for at least 100 meters (330 feet) in all directions.
- Keep unauthorized personnel away.
- Stay upwind.
- Many gases are heavier than air and will spread along ground and collect in low or confined areas (sewers, basements, tanks).
- Keep out of low areas.
- Ventilate closed spaces before entering.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection.
- Structural firefighters' protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible.

EVACUATION

Large Spill

- Consider initial downwind evacuation for at least 800 meters (1/2 mile).

Fire

- If tank, rail car or tank truck is involved in a fire, ISOLATE for 1600 meters (1 mile) in all directions; also, consider initial evacuation for 1600 meters (1 mile) in all directions.

EMERGENCY RESPONSE

FIRE

- **DO NOT EXTINGUISH A LEAKING GAS FIRE UNLESS LEAK CAN BE STOPPED.**

Small Fire

- Dry chemical or CO_2.

Large Fire

- Water spray, fog or regular foam.
- Move containers from fire area if you can do it without risk.
- Damaged cylinders should be handled only by specialists.

Fire involving Tanks

- Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- Cool containers with flooding quantities of water until well after fire is out.
- Do not direct water at source of leak or safety devices; icing may occur.
- Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- ALWAYS stay away from tanks engulfed in fire.

SPILL OR LEAK

- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).
- All equipment used when handling the product must be grounded.
- Fully encapsulating, vapor protective clothing should be worn for spills and leaks with no fire.
- Do not touch or walk through spilled material.
- Stop leak if you can do it without risk.
- If possible, turn leaking containers so that gas escapes rather than liquid.
- Use water spray to reduce vapors or divert vapor cloud drift. Avoid allowing water runoff to contact spilled material.
- Do not direct water at spill or source of leak.
- Isolate area until gas has dispersed.

FIRST AID

- Move victim to fresh air.
- Call 911 or emergency medical service.
- Give artificial respiration if victim is not breathing.
- **Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.**
- Administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes.
- In case of contact with liquefied gas, thaw frosted parts with lukewarm water.
- In case of burns, immediately cool affected skin for as long as possible with cold water. Do not remove clothing if adhering to skin.
- Keep victim warm and quiet.
- Keep victim under observation.
- Effects of contact or inhalation may be delayed.
- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

POTENTIAL HAZARDS

HEALTH

- **TOXIC; may be fatal if inhaled or absorbed through skin.**
- Contact with gas or liquefied gas may cause burns, severe injury and/or frostbite.
- Fire will produce irritating, corrosive and/or toxic gases.
- Runoff from fire control may cause pollution.

FIRE OR EXPLOSION

- Flammable; may be ignited by heat, sparks or flames.
- May form explosive mixtures with air.
- Those substances designated with a **(P)** may polymerize explosively when heated or involved in a fire.
- Vapors from liquefied gas are initially heavier than air and spread along ground.
- Vapors may travel to source of ignition and flash back.
- Some of these materials may react violently with water.
- Cylinders exposed to fire may vent and release toxic and flammable gas through pressure relief devices.
- Containers may explode when heated.
- Ruptured cylinders may rocket.
- Runoff may create fire or explosion hazard.

PUBLIC SAFETY

- **CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.**
- As an immediate precautionary measure, isolate spill or leak area for at least 100 meters (330 feet) in all directions.
- Keep unauthorized personnel away.
- Stay upwind.
- Many gases are heavier than air and will spread along ground and collect in low or confined areas (sewers, basements, tanks).
- Keep out of low areas.
- Ventilate closed spaces before entering.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection.
- Structural firefighters' protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible.

EVACUATION

Spill

- See Table 1 - Initial Isolation and Protective Action Distances for highlighted materials. For non-highlighted materials, increase, in the downwind direction, as necessary, the isolation distance shown under “PUBLIC SAFETY”.

Fire

- If tank, rail car or tank truck is involved in a fire, ISOLATE for 1600 meters (1 mile) in all directions; also, consider initial evacuation for 1600 meters (1 mile) in all directions.

EMERGENCY RESPONSE

FIRE

- **DO NOT EXTINGUISH A LEAKING GAS FIRE UNLESS LEAK CAN BE STOPPED.**

Small Fire

- Dry chemical, CO_2, water spray or alcohol-resistant foam.

Large Fire

- Water spray, fog or alcohol-resistant foam.
- **FOR CHLOROSILANES, DO NOT USE WATER;** use AFFF alcohol-resistant medium expansion foam.
- Move containers from fire area if you can do it without risk.
- Damaged cylinders should be handled only by specialists.

Fire involving Tanks

- Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- Cool containers with flooding quantities of water until well after fire is out.
- Do not direct water at source of leak or safety devices; icing may occur.
- Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- ALWAYS stay away from tanks engulfed in fire.

SPILL OR LEAK

- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).
- All equipment used when handling the product must be grounded.
- Fully encapsulating, vapor protective clothing should be worn for spills and leaks with no fire.
- Do not touch or walk through spilled material.
- Stop leak if you can do it without risk.
- Do not direct water at spill or source of leak.
- Use water spray to reduce vapors or divert vapor cloud drift. Avoid allowing water runoff to contact spilled material.
- **FOR CHLOROSILANES**, use AFFF alcohol-resistant medium expansion foam to reduce vapors.
- If possible, turn leaking containers so that gas escapes rather than liquid.
- Prevent entry into waterways, sewers, basements or confined areas.
- Isolate area until gas has dispersed.

FIRST AID

- Move victim to fresh air. • Call 911 or emergency medical service.
- Give artificial respiration if victim is not breathing.
- **Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.**
- Administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- In case of contact with liquefied gas, thaw frosted parts with lukewarm water.
- In case of burns, immediately cool affected skin for as long as possible with cold water. Do not remove clothing if adhering to skin.
- Keep victim warm and quiet.
- Keep victim under observation.
- Effects of contact or inhalation may be delayed.
- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

POTENTIAL HAZARDS

HEALTH

- Vapors may cause dizziness or asphyxiation without warning.
- Vapors from liquefied gas are initially heavier than air and spread along ground.
- Contact with gas or liquefied gas may cause burns, severe injury and/or frostbite.

FIRE OR EXPLOSION

- **Non-flammable gases.**
- Containers may explode when heated.
- Ruptured cylinders may rocket.

PUBLIC SAFETY

- **CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.**
- As an immediate precautionary measure, isolate spill or leak area for at least 100 meters (330 feet) in all directions.
- Keep unauthorized personnel away.
- Stay upwind.
- Many gases are heavier than air and will spread along ground and collect in low or confined areas (sewers, basements, tanks).
- Keep out of low areas.
- Ventilate closed spaces before entering.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Structural firefighters' protective clothing will only provide limited protection.
- Always wear thermal protective clothing when handling refrigerated/cryogenic liquids or solids.

EVACUATION

Large Spill

- Consider initial downwind evacuation for at least 100 meters (330 feet).

Fire

- If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

EMERGENCY RESPONSE

FIRE

- Use extinguishing agent suitable for type of surrounding fire.
- Move containers from fire area if you can do it without risk.
- Damaged cylinders should be handled only by specialists.

Fire involving Tanks

- Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- Cool containers with flooding quantities of water until well after fire is out.
- Do not direct water at source of leak or safety devices; icing may occur.
- Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- ALWAYS stay away from tanks engulfed in fire.

SPILL OR LEAK

- Do not touch or walk through spilled material.
- Stop leak if you can do it without risk.
- Use water spray to reduce vapors or divert vapor cloud drift. Avoid allowing water runoff to contact spilled material.
- Do not direct water at spill or source of leak.
- If possible, turn leaking containers so that gas escapes rather than liquid.
- Prevent entry into waterways, sewers, basements or confined areas.
- Allow substance to evaporate.
- Ventilate the area.

CAUTION: When in contact with refrigerated/cryogenic liquids, many materials become brittle and are likely to break without warning.

FIRST AID

- Move victim to fresh air.
- Call 911 or emergency medical service.
- Give artificial respiration if victim is not breathing.
- Administer oxygen if breathing is difficult.
- Clothing frozen to the skin should be thawed before being removed.
- In case of contact with liquefied gas, thaw frosted parts with lukewarm water.
- Keep victim warm and quiet.
- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

POTENTIAL HAZARDS

HEALTH

- Vapors may cause dizziness or asphyxiation without warning.
- Vapors from liquefied gas are initially heavier than air and spread along ground.

FIRE OR EXPLOSION

- **Non-flammable gases.**
- Containers may explode when heated.
- Ruptured cylinders may rocket.

PUBLIC SAFETY

- **CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.**
- As an immediate precautionary measure, isolate spill or leak area for at least 100 meters (330 feet) in all directions.
- Keep unauthorized personnel away.
- Stay upwind.
- Many gases are heavier than air and will spread along ground and collect in low or confined areas (sewers, basements, tanks).
- Keep out of low areas.
- Ventilate closed spaces before entering.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Structural firefighters' protective clothing will only provide limited protection.

EVACUATION

Large Spill

- Consider initial downwind evacuation for at least 100 meters (330 feet).

Fire

- If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

EMERGENCY RESPONSE

FIRE

- Use extinguishing agent suitable for type of surrounding fire.
- Move containers from fire area if you can do it without risk.
- Damaged cylinders should be handled only by specialists.

Fire involving Tanks

- Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- Cool containers with flooding quantities of water until well after fire is out.
- Do not direct water at source of leak or safety devices; icing may occur.
- Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- ALWAYS stay away from tanks engulfed in fire.

SPILL OR LEAK

- Do not touch or walk through spilled material.
- Stop leak if you can do it without risk.
- Use water spray to reduce vapors or divert vapor cloud drift. Avoid allowing water runoff to contact spilled material.
- Do not direct water at spill or source of leak.
- If possible, turn leaking containers so that gas escapes rather than liquid.
- Prevent entry into waterways, sewers, basements or confined areas.
- Allow substance to evaporate.
- Ventilate the area.

FIRST AID

- Move victim to fresh air.
- Call 911 or emergency medical service.
- Give artificial respiration if victim is not breathing.
- Administer oxygen if breathing is difficult.
- Keep victim warm and quiet.
- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

Gases - Oxidizing (Including Refrigerated Liquids)

POTENTIAL HAZARDS

FIRE OR EXPLOSION

- Substance does not burn but will support combustion.
- Some may react explosively with fuels.
- May ignite combustibles (wood, paper, oil, clothing, etc.).
- Vapors from liquefied gas are initially heavier than air and spread along ground.
- Runoff may create fire or explosion hazard.
- Containers may explode when heated.
- Ruptured cylinders may rocket.

HEALTH

- Vapors may cause dizziness or asphyxiation without warning.
- Contact with gas or liquefied gas may cause burns, severe injury and/or frostbite.
- Fire may produce irritating and/or toxic gases.

PUBLIC SAFETY

- **CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.**
- As an immediate precautionary measure, isolate spill or leak area for at least 100 meters (330 feet) in all directions.
- Keep unauthorized personnel away.
- Stay upwind.
- Many gases are heavier than air and will spread along ground and collect in low or confined areas (sewers, basements, tanks).
- Keep out of low areas.
- Ventilate closed spaces before entering.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection.
- Structural firefighters' protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible.
- Always wear thermal protective clothing when handling refrigerated/cryogenic liquids.

EVACUATION

Large Spill

- Consider initial downwind evacuation for at least 500 meters (1/3 mile).

Fire

- If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

EMERGENCY RESPONSE

FIRE

- Use extinguishing agent suitable for type of surrounding fire.

Small Fire

- Dry chemical or CO_2.

Large Fire

- Water spray, fog or regular foam.
- Move containers from fire area if you can do it without risk.
- Damaged cylinders should be handled only by specialists.

Fire involving Tanks

- Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- Cool containers with flooding quantities of water until well after fire is out.
- Do not direct water at source of leak or safety devices; icing may occur.
- Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- ALWAYS stay away from tanks engulfed in fire.
- For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.

SPILL OR LEAK

- Keep combustibles (wood, paper, oil, etc.) away from spilled material.
- Do not touch or walk through spilled material.
- Stop leak if you can do it without risk.
- If possible, turn leaking containers so that gas escapes rather than liquid.
- Do not direct water at spill or source of leak.
- Use water spray to reduce vapors or divert vapor cloud drift. Avoid allowing water runoff to contact spilled material.
- Prevent entry into waterways, sewers, basements or confined areas.
- Allow substance to evaporate.
- Isolate area until gas has dispersed.
- **CAUTION: When in contact with refrigerated/cryogenic liquids, many materials become brittle and are likely to break without warning.**

FIRST AID

- Move victim to fresh air.
- Call 911 or emergency medical service.
- Give artificial respiration if victim is not breathing.
- Administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes.
- Clothing frozen to the skin should be thawed before being removed.
- In case of contact with liquefied gas, thaw frosted parts with lukewarm water.
- Keep victim warm and quiet.
- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

POTENTIAL HAZARDS

HEALTH

- **TOXIC; may be fatal if inhaled or absorbed through skin.**
- Vapors may be irritating.
- Contact with gas or liquefied gas may cause burns, severe injury and/or frostbite.
- Fire will produce irritating, corrosive and/or toxic gases.
- Runoff from fire control may cause pollution.

FIRE OR EXPLOSION

- Some may burn but none ignite readily.
- Vapors from liquefied gas are initially heavier than air and spread along ground.
- Cylinders exposed to fire may vent and release toxic and/or corrosive gas through pressure relief devices.
- Containers may explode when heated.
- Ruptured cylinders may rocket.

PUBLIC SAFETY

- **CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.**
- As an immediate precautionary measure, isolate spill or leak area for at least 100 meters (330 feet) in all directions.
- Keep unauthorized personnel away.
- Stay upwind.
- Many gases are heavier than air and will spread along ground and collect in low or confined areas (sewers, basements, tanks).
- Keep out of low areas.
- Ventilate closed spaces before entering.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection.
- Structural firefighters' protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible.

EVACUATION

Spill

- See Table 1 - Initial Isolation and Protective Action Distances for highlighted materials. For non-highlighted materials, increase, in the downwind direction, as necessary, the isolation distance shown under “PUBLIC SAFETY”.

Fire

- If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

EMERGENCY RESPONSE

FIRE

Small Fire

- Dry chemical or CO_2.

Large Fire

- Water spray, fog or regular foam.
- Do not get water inside containers.
- Move containers from fire area if you can do it without risk.
- Damaged cylinders should be handled only by specialists.

Fire involving Tanks

- Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- Cool containers with flooding quantities of water until well after fire is out.
- Do not direct water at source of leak or safety devices; icing may occur.
- Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- ALWAYS stay away from tanks engulfed in fire.

SPILL OR LEAK

- Fully encapsulating, vapor protective clothing should be worn for spills and leaks with no fire.
- Do not touch or walk through spilled material.
- Stop leak if you can do it without risk.
- If possible, turn leaking containers so that gas escapes rather than liquid.
- Prevent entry into waterways, sewers, basements or confined areas.
- Use water spray to reduce vapors or divert vapor cloud drift. Avoid allowing water runoff to contact spilled material.
- Do not direct water at spill or source of leak.
- Isolate area until gas has dispersed.

FIRST AID

- Move victim to fresh air.
- Call 911 or emergency medical service.
- Give artificial respiration if victim is not breathing.
- **Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.**
- Administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes.
- In case of contact with liquefied gas, thaw frosted parts with lukewarm water.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- Keep victim warm and quiet.
- Keep victim under observation.
- Effects of contact or inhalation may be delayed.
- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

POTENTIAL HAZARDS

HEALTH

- **TOXIC; may be fatal if inhaled or absorbed through skin.**
- Fire will produce irritating, corrosive and/or toxic gases.
- Contact with gas or liquefied gas may cause burns, severe injury and/or frostbite.
- Runoff from fire control may cause pollution.

FIRE OR EXPLOSION

- Substance does not burn but will support combustion.
- Vapors from liquefied gas are initially heavier than air and spread along ground.
- These are strong oxidizers and will react vigorously or explosively with many materials including fuels.
- May ignite combustibles (wood, paper, oil, clothing, etc.).
- Some will react violently with air, moist air and/or water.
- Cylinders exposed to fire may vent and release toxic and/or corrosive gas through pressure relief devices.
- Containers may explode when heated.
- Ruptured cylinders may rocket.

PUBLIC SAFETY

- **CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.**
- As an immediate precautionary measure, isolate spill or leak area for at least 100 meters (330 feet) in all directions.
- Keep unauthorized personnel away.
- Stay upwind.
- Many gases are heavier than air and will spread along ground and collect in low or confined areas (sewers, basements, tanks).
- Keep out of low areas.
- Ventilate closed spaces before entering.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection.
- Structural firefighters' protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible.

EVACUATION

Spill

- See Table 1 - Initial Isolation and Protective Action Distances.

Fire

- If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

EMERGENCY RESPONSE

FIRE

Small Fire

CAUTION: These materials do not burn but will support combustion. Some will react violently with water.

- Contain fire and let burn. If fire must be fought, water spray or fog is recommended.
- **Water only; no dry chemical, CO_2 or Halon®.**
- Do not get water inside containers.
- Move containers from fire area if you can do it without risk.
- Damaged cylinders should be handled only by specialists.

Fire involving Tanks

- Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- Cool containers with flooding quantities of water until well after fire is out.
- Do not direct water at source of leak or safety devices; icing may occur.
- Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- ALWAYS stay away from tanks engulfed in fire.
- For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.

SPILL OR LEAK

- Fully encapsulating, vapor protective clothing should be worn for spills and leaks with no fire.
- Do not touch or walk through spilled material.
- Keep combustibles (wood, paper, oil, etc.) away from spilled material.
- Stop leak if you can do it without risk.
- Use water spray to reduce vapors or divert vapor cloud drift. Avoid allowing water runoff to contact spilled material.
- Do not direct water at spill or source of leak.
- If possible, turn leaking containers so that gas escapes rather than liquid.
- Prevent entry into waterways, sewers, basements or confined areas.
- Isolate area until gas has dispersed.
- Ventilate the area.

FIRST AID

- Move victim to fresh air.
- Call 911 or emergency medical service.
- Give artificial respiration if victim is not breathing.
- **Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.**
- Administer oxygen if breathing is difficult.
- Clothing frozen to the skin should be thawed before being removed.
- Remove and isolate contaminated clothing and shoes.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- Keep victim warm and quiet.
- Keep victim under observation.
- Effects of contact or inhalation may be delayed.
- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

POTENTIAL HAZARDS

HEALTH

- **TOXIC; may be fatal if inhaled, ingested or absorbed through skin.**
- Vapors are extremely irritating and corrosive.
- Contact with gas or liquefied gas may cause burns, severe injury and/or frostbite.
- Fire will produce irritating, corrosive and/or toxic gases.
- Runoff from fire control may cause pollution.

FIRE OR EXPLOSION

- Some may burn but none ignite readily.
- Vapors from liquefied gas are initially heavier than air and spread along ground.
- Some of these materials may react violently with water.
- Cylinders exposed to fire may vent and release toxic and/or corrosive gas through pressure relief devices.
- Containers may explode when heated.
- Ruptured cylinders may rocket.

PUBLIC SAFETY

- **CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.**
- As an immediate precautionary measure, isolate spill or leak area for at least 100 meters (330 feet) in all directions.
- Keep unauthorized personnel away.
- Stay upwind.
- Many gases are heavier than air and will spread along ground and collect in low or confined areas (sewers, basements, tanks).
- Keep out of low areas.
- Ventilate closed spaces before entering.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection.
- Structural firefighters' protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible.

EVACUATION

Spill

- See Table 1 - Initial Isolation and Protective Action Distances for highlighted materials. For non-highlighted materials, increase, in the downwind direction, as necessary, the isolation distance shown under “PUBLIC SAFETY”.

Fire

- If tank, rail car or tank truck is involved in a fire, ISOLATE for 1600 meters (1 mile) in all directions; also, consider initial evacuation for 1600 meters (1 mile) in all directions.

EMERGENCY RESPONSE

FIRE

Small Fire

- Dry chemical or CO_2.

Large Fire

- Water spray, fog or regular foam.
- Move containers from fire area if you can do it without risk.
- Do not get water inside containers.
- Damaged cylinders should be handled only by specialists.

Fire involving Tanks

- Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- Cool containers with flooding quantities of water until well after fire is out.
- Do not direct water at source of leak or safety devices; icing may occur.
- Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- ALWAYS stay away from tanks engulfed in fire.

SPILL OR LEAK

- Fully encapsulating, vapor protective clothing should be worn for spills and leaks with no fire.
- Do not touch or walk through spilled material.
- Stop leak if you can do it without risk.
- If possible, turn leaking containers so that gas escapes rather than liquid.
- Prevent entry into waterways, sewers, basements or confined areas.
- Do not direct water at spill or source of leak.
- Use water spray to reduce vapors or divert vapor cloud drift. Avoid allowing water runoff to contact spilled material.
- Isolate area until gas has dispersed.

FIRST AID

- Move victim to fresh air.
- Call 911 or emergency medical service.
- Give artificial respiration if victim is not breathing.
- **Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.**
- Administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes.
- In case of contact with liquefied gas, thaw frosted parts with lukewarm water.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- **In case of contact with Hydrogen fluoride, anhydrous (UN1052),** flush skin and eyes with water for 5 minutes; then, for skin exposures rub on a calcium/gel combination; for eyes flush with a water/calcium solution for 15 minutes.
- Keep victim warm and quiet.
- Keep victim under observation.
- Effects of contact or inhalation may be delayed.
- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

Gases - Compressed or Liquefied (Including Refrigerated Gases)

POTENTIAL HAZARDS

FIRE OR EXPLOSION

- Some may burn but none ignite readily.
- Containers may explode when heated.
- Ruptured cylinders may rocket.

HEALTH

- Vapors may cause dizziness or asphyxiation without warning.
- Vapors from liquefied gas are initially heavier than air and spread along ground.
- Contact with gas or liquefied gas may cause burns, severe injury and/or frostbite.
- Fire may produce irritating, corrosive and/or toxic gases.

PUBLIC SAFETY

- **CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.**
- As an immediate precautionary measure, isolate spill or leak area for at least 100 meters (330 feet) in all directions.
- Keep unauthorized personnel away.
- Stay upwind.
- Many gases are heavier than air and will spread along ground and collect in low or confined areas (sewers, basements, tanks).
- Keep out of low areas.
- Ventilate closed spaces before entering.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection.
- Structural firefighters' protective clothing will only provide limited protection.

EVACUATION

Large Spill

- Consider initial downwind evacuation for at least 500 meters (1/3 mile).

Fire

- If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

EMERGENCY RESPONSE

FIRE

- Use extinguishing agent suitable for type of surrounding fire.

Small Fire

- Dry chemical or CO_2.

Large Fire

- Water spray, fog or regular foam.
- Move containers from fire area if you can do it without risk.
- Damaged cylinders should be handled only by specialists.

Fire involving Tanks

- Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- Cool containers with flooding quantities of water until well after fire is out.
- Do not direct water at source of leak or safety devices; icing may occur.
- Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- ALWAYS stay away from tanks engulfed in fire.
- Some of these materials, if spilled, may evaporate leaving a flammable residue.

SPILL OR LEAK

- Do not touch or walk through spilled material.
- Stop leak if you can do it without risk.
- Do not direct water at spill or source of leak.
- Use water spray to reduce vapors or divert vapor cloud drift. Avoid allowing water runoff to contact spilled material.
- If possible, turn leaking containers so that gas escapes rather than liquid.
- Prevent entry into waterways, sewers, basements or confined areas.
- Allow substance to evaporate.
- Ventilate the area.

FIRST AID

- Move victim to fresh air.
- Call 911 or emergency medical service.
- Give artificial respiration if victim is not breathing.
- Administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes.
- In case of contact with liquefied gas, thaw frosted parts with lukewarm water.
- Keep victim warm and quiet.
- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

Flammable Liquids (Polar/Water-Miscible)

POTENTIAL HAZARDS

FIRE OR EXPLOSION

- **HIGHLY FLAMMABLE: Will be easily ignited by heat, sparks or flames.**
- Vapors may form explosive mixtures with air.
- Vapors may travel to source of ignition and flash back.
- Most vapors are heavier than air. They will spread along ground and collect in low or confined areas (sewers, basements, tanks).
- Vapor explosion hazard indoors, outdoors or in sewers.
- Those substances designated with a **(P)** may polymerize explosively when heated or involved in a fire.
- Runoff to sewer may create fire or explosion hazard.
- Containers may explode when heated.
- Many liquids are lighter than water.

HEALTH

- Inhalation or contact with material may irritate or burn skin and eyes.
- Fire may produce irritating, corrosive and/or toxic gases.
- Vapors may cause dizziness or suffocation.
- Runoff from fire control may cause pollution.

PUBLIC SAFETY

- **CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.**
- As an immediate precautionary measure, isolate spill or leak area for at least 50 meters (150 feet) in all directions.
- Keep unauthorized personnel away.
- Stay upwind.
- Keep out of low areas.
- Ventilate closed spaces before entering.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Structural firefighters' protective clothing will only provide limited protection.

EVACUATION

Large Spill

- Consider initial downwind evacuation for at least 300 meters (1000 feet).

Fire

- If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

EMERGENCY RESPONSE

FIRE

CAUTION: All these products have a very low flash point: Use of water spray when fighting fire may be inefficient.

Small Fire

- Dry chemical, CO_2, water spray or alcohol-resistant foam.

Large Fire

- Water spray, fog or alcohol-resistant foam.
- **Do not use straight streams**.
- Move containers from fire area if you can do it without risk.

Fire involving Tanks or Car/Trailer Loads

- Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- Cool containers with flooding quantities of water until well after fire is out.
- Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- ALWAYS stay away from tanks engulfed in fire.
- For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.

SPILL OR LEAK

- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).
- All equipment used when handling the product must be grounded.
- Do not touch or walk through spilled material.
- Stop leak if you can do it without risk.
- Prevent entry into waterways, sewers, basements or confined areas.
- A vapor suppressing foam may be used to reduce vapors.
- Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers.
- Use clean non-sparking tools to collect absorbed material.

Large Spill

- Dike far ahead of liquid spill for later disposal.
- Water spray may reduce vapor; but may not prevent ignition in closed spaces.

FIRST AID

- Move victim to fresh air.
- Call 911 or emergency medical service.
- Give artificial respiration if victim is not breathing.
- Administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- Wash skin with soap and water.
- In case of burns, immediately cool affected skin for as long as possible with cold water. Do not remove clothing if adhering to skin.
- Keep victim warm and quiet.
- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

Flammable Liquids (Non-Polar/Water-Immiscible)

POTENTIAL HAZARDS

FIRE OR EXPLOSION

- **HIGHLY FLAMMABLE: Will be easily ignited by heat, sparks or flames.**
- Vapors may form explosive mixtures with air.
- Vapors may travel to source of ignition and flash back.
- Most vapors are heavier than air. They will spread along ground and collect in low or confined areas (sewers, basements, tanks).
- Vapor explosion hazard indoors, outdoors or in sewers.
- Those substances designated with a **(P)** may polymerize explosively when heated or involved in a fire.
- Runoff to sewer may create fire or explosion hazard.
- Containers may explode when heated.
- Many liquids are lighter than water.
- Substance may be transported hot.
- For UN3166, if Lithium ion batteries are involved, also consult GUIDE 147.
- **If molten aluminum is involved, refer to GUIDE 169.**

HEALTH

- Inhalation or contact with material may irritate or burn skin and eyes.
- Fire may produce irritating, corrosive and/or toxic gases.
- Vapors may cause dizziness or suffocation.
- Runoff from fire control or dilution water may cause pollution.

PUBLIC SAFETY

- **CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.**
- As an immediate precautionary measure, isolate spill or leak area for at least 50 meters (150 feet) in all directions.
- Keep unauthorized personnel away.
- Stay upwind.
- Keep out of low areas.
- Ventilate closed spaces before entering.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Structural firefighters' protective clothing will only provide limited protection.

EVACUATION

Large Spill

- Consider initial downwind evacuation for at least 300 meters (1000 feet).

Fire

- If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

EMERGENCY RESPONSE

FIRE

CAUTION: All these products have a very low flash point: Use of water spray when fighting fire may be inefficient.

CAUTION: For mixtures containing alcohol or polar solvent, alcohol-resistant foam may be more effective.

Small Fire

- Dry chemical, CO_2, water spray or regular foam.

Large Fire

- Water spray, fog or regular foam.
- **Do not use straight streams**.
- Move containers from fire area if you can do it without risk.

Fire involving Tanks or Car/Trailer Loads

- Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- Cool containers with flooding quantities of water until well after fire is out.
- Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- ALWAYS stay away from tanks engulfed in fire.
- For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.

SPILL OR LEAK

- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).
- All equipment used when handling the product must be grounded.
- Do not touch or walk through spilled material.
- Stop leak if you can do it without risk.
- Prevent entry into waterways, sewers, basements or confined areas.
- A vapor suppressing foam may be used to reduce vapors.
- Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers.
- Use clean non-sparking tools to collect absorbed material.

Large Spill

- Dike far ahead of liquid spill for later disposal.
- Water spray may reduce vapor; but may not prevent ignition in closed spaces.

FIRST AID

- Move victim to fresh air.
- Call 911 or emergency medical service.
- Give artificial respiration if victim is not breathing.
- Administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- Wash skin with soap and water.
- In case of burns, immediately cool affected skin for as long as possible with cold water. Do not remove clothing if adhering to skin.
- Keep victim warm and quiet.
- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

Flammable Liquids (Polar/Water-Miscible/Noxious)

POTENTIAL HAZARDS

FIRE OR EXPLOSION

- **HIGHLY FLAMMABLE: Will be easily ignited by heat, sparks or flames.**
- Vapors may form explosive mixtures with air.
- Vapors may travel to source of ignition and flash back.
- Most vapors are heavier than air. They will spread along ground and collect in low or confined areas (sewers, basements, tanks).
- Vapor explosion hazard indoors, outdoors or in sewers.
- Those substances designated with a **(P)** may polymerize explosively when heated or involved in a fire.
- Runoff to sewer may create fire or explosion hazard.
- Containers may explode when heated.
- Many liquids are lighter than water.

HEALTH

- May cause toxic effects if inhaled or absorbed through skin.
- Inhalation or contact with material may irritate or burn skin and eyes.
- Fire will produce irritating, corrosive and/or toxic gases.
- Vapors may cause dizziness or suffocation.
- Runoff from fire control or dilution water may cause pollution.

PUBLIC SAFETY

- **CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.**
- As an immediate precautionary measure, isolate spill or leak area for at least 50 meters (150 feet) in all directions.
- Keep unauthorized personnel away.
- Stay upwind.
- Keep out of low areas.
- Ventilate closed spaces before entering.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Structural firefighters' protective clothing will only provide limited protection.

EVACUATION

Large Spill

- Consider initial downwind evacuation for at least 300 meters (1000 feet).

Fire

- If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

EMERGENCY RESPONSE

FIRE

CAUTION: All these products have a very low flash point: Use of water spray when fighting fire may be inefficient.

Small Fire

- Dry chemical, CO_2, water spray or alcohol-resistant foam.
- **Do not use dry chemical extinguishers to control fires involving nitromethane or nitroethane.**

Large Fire

- Water spray, fog or alcohol-resistant foam.
- **Do not use straight streams.**
- Move containers from fire area if you can do it without risk.

Fire involving Tanks or Car/Trailer Loads

- Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- Cool containers with flooding quantities of water until well after fire is out.
- Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- ALWAYS stay away from tanks engulfed in fire.
- For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.

SPILL OR LEAK

- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).
- All equipment used when handling the product must be grounded.
- Do not touch or walk through spilled material.
- Stop leak if you can do it without risk.
- Prevent entry into waterways, sewers, basements or confined areas.
- A vapor suppressing foam may be used to reduce vapors.
- Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers.
- Use clean non-sparking tools to collect absorbed material.

Large Spill

- Dike far ahead of liquid spill for later disposal.
- Water spray may reduce vapor; but may not prevent ignition in closed spaces.

FIRST AID

- Move victim to fresh air.
- Call 911 or emergency medical service.
- Give artificial respiration if victim is not breathing.
- Administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- Wash skin with soap and water.
- In case of burns, immediately cool affected skin for as long as possible with cold water. Do not remove clothing if adhering to skin.
- Keep victim warm and quiet.
- Effects of exposure (inhalation, ingestion or skin contact) to substance may be delayed.
- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

Flammable Liquids (Non-Polar/Water-Immiscible/Noxious)

POTENTIAL HAZARDS

FIRE OR EXPLOSION

- **HIGHLY FLAMMABLE: Will be easily ignited by heat, sparks or flames.**
- Vapors may form explosive mixtures with air.
- Vapors may travel to source of ignition and flash back.
- Most vapors are heavier than air. They will spread along ground and collect in low or confined areas (sewers, basements, tanks).
- Vapor explosion hazard indoors, outdoors or in sewers.
- Those substances designated with a **(P)** may polymerize explosively when heated or involved in a fire.
- Runoff to sewer may create fire or explosion hazard.
- Containers may explode when heated.
- Many liquids are lighter than water.

HEALTH

- May cause toxic effects if inhaled or absorbed through skin.
- Inhalation or contact with material may irritate or burn skin and eyes.
- Fire will produce irritating, corrosive and/or toxic gases.
- Vapors may cause dizziness or suffocation.
- Runoff from fire control or dilution water may cause pollution.

PUBLIC SAFETY

- **CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.**
- As an immediate precautionary measure, isolate spill or leak area for at least 50 meters (150 feet) in all directions.
- Keep unauthorized personnel away.
- Stay upwind.
- Keep out of low areas.
- Ventilate closed spaces before entering.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Structural firefighters' protective clothing will only provide limited protection.

EVACUATION

Large Spill

- Consider initial downwind evacuation for at least 300 meters (1000 feet).

Fire

- If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

EMERGENCY RESPONSE

FIRE

CAUTION: All these products have a very low flash point: Use of water spray when fighting fire may be inefficient.

Small Fire

- Dry chemical, CO_2, water spray or regular foam.

Large Fire

- Water spray, fog or regular foam.
- **Do not use straight streams.**
- Move containers from fire area if you can do it without risk.

Fire involving Tanks or Car/Trailer Loads

- Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- Cool containers with flooding quantities of water until well after fire is out.
- Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- ALWAYS stay away from tanks engulfed in fire.
- For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.

SPILL OR LEAK

- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).
- All equipment used when handling the product must be grounded.
- Do not touch or walk through spilled material.
- Stop leak if you can do it without risk.
- Prevent entry into waterways, sewers, basements or confined areas.
- A vapor suppressing foam may be used to reduce vapors.
- Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers.
- Use clean non-sparking tools to collect absorbed material.

Large Spill

- Dike far ahead of liquid spill for later disposal.
- Water spray may reduce vapor; but may not prevent ignition in closed spaces.

FIRST AID

- Move victim to fresh air.
- Call 911 or emergency medical service.
- Give artificial respiration if victim is not breathing.
- Administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- Wash skin with soap and water.
- In case of burns, immediately cool affected skin for as long as possible with cold water. Do not remove clothing if adhering to skin.
- Keep victim warm and quiet.
- Effects of exposure (inhalation, ingestion or skin contact) to substance may be delayed.
- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

POTENTIAL HAZARDS

HEALTH

- **TOXIC; may be fatal if inhaled, ingested or absorbed through skin.**
- Inhalation or contact with some of these materials will irritate or burn skin and eyes.
- Fire will produce irritating, corrosive and/or toxic gases.
- Vapors may cause dizziness or suffocation.
- Runoff from fire control or dilution water may cause pollution.

FIRE OR EXPLOSION

- **HIGHLY FLAMMABLE: Will be easily ignited by heat, sparks or flames.**
- Vapors may form explosive mixtures with air.
- Vapors may travel to source of ignition and flash back.
- Most vapors are heavier than air. They will spread along ground and collect in low or confined areas (sewers, basements, tanks).
- Vapor explosion and poison hazard indoors, outdoors or in sewers.
- Those substances designated with a **(P)** may polymerize explosively when heated or involved in a fire.
- Runoff to sewer may create fire or explosion hazard.
- Containers may explode when heated.
- Many liquids are lighter than water.

PUBLIC SAFETY

- **CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.**
- As an immediate precautionary measure, isolate spill or leak area for at least 50 meters (150 feet) in all directions.
- Keep unauthorized personnel away.
- Stay upwind.
- Keep out of low areas.
- Ventilate closed spaces before entering.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection.
- Structural firefighters' protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible.

EVACUATION

Spill

- See Table 1 - Initial Isolation and Protective Action Distances for highlighted materials. For non-highlighted materials, increase, in the downwind direction, as necessary, the isolation distance shown under “PUBLIC SAFETY”.

Fire

- If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

EMERGENCY RESPONSE

FIRE

CAUTION: All these products have a very low flash point: Use of water spray when fighting fire may be inefficient.

Small Fire

- Dry chemical, CO_2, water spray or alcohol-resistant foam.

Large Fire

- Water spray, fog or alcohol-resistant foam.
- Move containers from fire area if you can do it without risk.
- Dike fire-control water for later disposal; do not scatter the material.
- Use water spray or fog; do not use straight streams.

Fire involving Tanks or Car/Trailer Loads

- Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- Cool containers with flooding quantities of water until well after fire is out.
- Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- ALWAYS stay away from tanks engulfed in fire.
- For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.

SPILL OR LEAK

- Fully encapsulating, vapor protective clothing should be worn for spills and leaks with no fire.
- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).
- All equipment used when handling the product must be grounded.
- Do not touch or walk through spilled material.
- Stop leak if you can do it without risk.
- Prevent entry into waterways, sewers, basements or confined areas.
- A vapor suppressing foam may be used to reduce vapors.
- **Small Spill** •Absorb with earth, sand or other non-combustible material and transfer to containers for later disposal.
- Use clean non-sparking tools to collect absorbed material.
- **Large Spill** • Dike far ahead of liquid spill for later disposal.
- Water spray may reduce vapor; but may not prevent ignition in closed spaces.

FIRST AID

- Move victim to fresh air. • Call 911 or emergency medical service.
- Give artificial respiration if victim is not breathing.
- **Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.**
- Administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- Wash skin with soap and water.
- In case of burns, immediately cool affected skin for as long as possible with cold water. Do not remove clothing if adhering to skin. • Keep victim warm and quiet.
- Effects of exposure (inhalation, ingestion or skin contact) to substance may be delayed.
- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

POTENTIAL HAZARDS

FIRE OR EXPLOSION

- Flammable/combustible material.
- May be ignited by heat, sparks or flames.
- Vapors may form explosive mixtures with air.
- Vapors may travel to source of ignition and flash back.
- Most vapors are heavier than air. They will spread along ground and collect in low or confined areas (sewers, basements, tanks).
- Vapor explosion hazard indoors, outdoors or in sewers.
- Those substances designated with a **(P)** may polymerize explosively when heated or involved in a fire.
- Runoff to sewer may create fire or explosion hazard.
- Containers may explode when heated.
- Many liquids are lighter than water.

HEALTH

- May cause toxic effects if inhaled or ingested/swallowed.
- Contact with substance may cause severe burns to skin and eyes.
- Fire will produce irritating, corrosive and/or toxic gases.
- Vapors may cause dizziness or suffocation.
- Runoff from fire control or dilution water may cause pollution.

PUBLIC SAFETY

- **CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.**
- As an immediate precautionary measure, isolate spill or leak area for at least 50 meters (150 feet) in all directions.
- Keep unauthorized personnel away.
- Stay upwind.
- Keep out of low areas.
- Ventilate closed spaces before entering.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection.
- Structural firefighters' protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible.

EVACUATION

Spill

- See Table 1 - Initial Isolation and Protective Action Distances for highlighted materials. For non-highlighted materials, increase, in the downwind direction, as necessary, the isolation distance shown under “PUBLIC SAFETY”.

Fire

- If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

EMERGENCY RESPONSE

FIRE

- **Some of these materials may react violently with water.**

Small Fire

- Dry chemical, CO_2, water spray or alcohol-resistant foam.

Large Fire

- Water spray, fog or alcohol-resistant foam.
- Move containers from fire area if you can do it without risk.
- Dike fire-control water for later disposal; do not scatter the material.
- Do not get water inside containers.

Fire involving Tanks or Car/Trailer Loads

- Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- Cool containers with flooding quantities of water until well after fire is out.
- Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- ALWAYS stay away from tanks engulfed in fire.
- For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.

SPILL OR LEAK

- Fully encapsulating, vapor protective clothing should be worn for spills and leaks with no fire.
- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).
- All equipment used when handling the product must be grounded.
- Do not touch or walk through spilled material.
- Stop leak if you can do it without risk.
- Prevent entry into waterways, sewers, basements or confined areas.
- A vapor suppressing foam may be used to reduce vapors.
- Absorb with earth, sand or other non-combustible material and transfer to containers (except for Hydrazine).
- Use clean non-sparking tools to collect absorbed material.

Large Spill

- Dike far ahead of liquid spill for later disposal.
- Water spray may reduce vapor; but may not prevent ignition in closed spaces.

FIRST AID

- Move victim to fresh air. • Call 911 or emergency medical service.
- Give artificial respiration if victim is not breathing.
- **Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.**
- Administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- In case of burns, immediately cool affected skin for as long as possible with cold water. Do not remove clothing if adhering to skin.
- Keep victim warm and quiet.
- Effects of exposure (inhalation, ingestion or skin contact) to substance may be delayed.
- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

POTENTIAL HAZARDS

FIRE OR EXPLOSION

- Flammable/combustible material.
- May be ignited by friction, heat, sparks or flames.
- Some may burn rapidly with flare burning effect.
- Powders, dusts, shavings, borings, turnings or cuttings may explode or burn with explosive violence.
- Substance may be transported in a molten form at a temperature that may be above its flash point.
- May re-ignite after fire is extinguished.

HEALTH

- Fire may produce irritating and/or toxic gases.
- Contact may cause burns to skin and eyes.
- Contact with molten substance may cause severe burns to skin and eyes.
- Runoff from fire control may cause pollution.

PUBLIC SAFETY

- **CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.**
- As an immediate precautionary measure, isolate spill or leak area for at least 25 meters (75 feet) in all directions.
- Keep unauthorized personnel away.
- Stay upwind.
- Keep out of low areas.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Structural firefighters' protective clothing will only provide limited protection.

EVACUATION

Large Spill

- Consider initial downwind evacuation for at least 100 meters (330 feet).

Fire

- If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

EMERGENCY RESPONSE

FIRE

Small Fire

- Dry chemical, CO_2, sand, earth, water spray or regular foam.

Large Fire

- Water spray, fog or regular foam.
- Move containers from fire area if you can do it without risk.

Fire Involving Metal Pigments or Pastes (e.g. "Aluminum Paste")

- Aluminum Paste fires should be treated as a combustible metal fire. Use DRY sand, graphite powder, dry sodium chloride based extinguishers, G-1® or Met-L-X® powder.
  Also, see GUIDE 170.

Fire involving Tanks or Car/Trailer Loads

- Cool containers with flooding quantities of water until well after fire is out.
- For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.
- Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- ALWAYS stay away from tanks engulfed in fire.

SPILL OR LEAK

- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).
- Do not touch or walk through spilled material.

Small Dry Spill

- With clean shovel place material into clean, dry container and cover loosely; move containers from spill area.

Large Spill

- Wet down with water and dike for later disposal.
- Prevent entry into waterways, sewers, basements or confined areas.

FIRST AID

- Move victim to fresh air.
- Call 911 or emergency medical service.
- Give artificial respiration if victim is not breathing.
- Administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- Removal of solidified molten material from skin requires medical assistance.
- Keep victim warm and quiet.
- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

POTENTIAL HAZARDS

FIRE OR EXPLOSION

- Flammable/combustible material.
- May be ignited by heat, sparks or flames.
- When heated, vapors may form explosive mixtures with air: indoors, outdoors and sewers explosion hazards.
- Contact with metals may evolve flammable hydrogen gas.
- Containers may explode when heated.

HEALTH

- **TOXIC;** inhalation, ingestion or skin contact with material may cause severe injury or death.
- Fire will produce irritating, corrosive and/or toxic gases.
- Runoff from fire control or dilution water may be corrosive and/or toxic and cause pollution.

PUBLIC SAFETY

- **CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.**
- As an immediate precautionary measure, isolate spill or leak area for at least 25 meters (75 feet) in all directions.
- Stay upwind.
- Keep unauthorized personnel away.
- Keep out of low areas.
- Ventilate enclosed areas.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection.
- Structural firefighters' protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible.

EVACUATION

Large Spill

- Consider initial downwind evacuation for at least 100 meters (330 feet).

Fire

- If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

EMERGENCY RESPONSE

FIRE

Small Fire

- Dry chemical, CO_2, water spray or alcohol-resistant foam.

Large Fire

- Water spray, fog or alcohol-resistant foam.
- Move containers from fire area if you can do it without risk.
- Use water spray or fog; do not use straight streams.
- Do not get water inside containers.
- Dike fire-control water for later disposal; do not scatter the material.

Fire involving Tanks or Car/Trailer Loads

- Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- Cool containers with flooding quantities of water until well after fire is out.
- Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- ALWAYS stay away from tanks engulfed in fire.

SPILL OR LEAK

- Fully encapsulating, vapor protective clothing should be worn for spills and leaks with no fire.
- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).
- Stop leak if you can do it without risk.
- Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.
- Prevent entry into waterways, sewers, basements or confined areas.
- Use clean non-sparking tools to collect material and place it into loosely covered plastic containers for later disposal.

FIRST AID

- Move victim to fresh air.
- Call 911 or emergency medical service.
- Give artificial respiration if victim is not breathing.
- **Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.**
- Administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- For minor skin contact, avoid spreading material on unaffected skin.
- Keep victim warm and quiet.
- Effects of exposure (inhalation, ingestion or skin contact) to substance may be delayed.
- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

POTENTIAL HAZARDS

FIRE OR EXPLOSION

- Flammable/combustible material.
- May ignite on contact with moist air or moisture.
- May burn rapidly with flare-burning effect.
- Some react vigorously or explosively on contact with water.
- Some may decompose explosively when heated or involved in a fire.
- May re-ignite after fire is extinguished.
- Runoff may create fire or explosion hazard.
- Containers may explode when heated.

HEALTH

- Fire will produce irritating, corrosive and/or toxic gases.
- Inhalation of decomposition products may cause severe injury or death.
- Contact with substance may cause severe burns to skin and eyes.
- Runoff from fire control may cause pollution.

PUBLIC SAFETY

- **CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.**
- As an immediate precautionary measure, isolate spill or leak area in all directions for at least 50 meters (150 feet) for liquids and at least 25 meters (75 feet) for solids.
- Stay upwind.
- Keep unauthorized personnel away.
- Keep out of low areas.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection.
- Structural firefighters' protective clothing will only provide limited protection.

EVACUATION

Spill

- See Table 1 - Initial Isolation and Protective Action Distances for highlighted materials. For non-highlighted materials, increase, in the downwind direction, as necessary, the isolation distance shown under "PUBLIC SAFETY".

Fire

- If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

EMERGENCY RESPONSE

FIRE

- **DO NOT USE WATER, CO_2 OR FOAM ON MATERIAL ITSELF.**
- Some of these materials may react violently with water.

EXCEPTION: For Xanthates, UN3342 and for Dithionite (Hydrosulfite/Hydrosulphite) UN1384, UN1923 and UN1929, USE FLOODING AMOUNTS OF WATER for SMALL AND LARGE fires to stop the reaction. Smothering will not work for these materials, they do not need air to burn.

Small Fire

- Dry chemical, soda ash, lime or DRY sand, **EXCEPT for UN1384, UN1923, UN1929 and UN3342**.

Large Fire

- DRY sand, dry chemical, soda ash or lime **EXCEPT for UN1384, UN1923, UN1929 and UN3342**, or withdraw from area and let fire burn.
- **CAUTION**: **UN3342** when flooded with water will continue to evolve flammable Carbon disulfide/Carbon disulphide vapors.
- Move containers from fire area if you can do it without risk.

Fire involving Tanks or Car/Trailer Loads

- Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- Do not get water inside containers or in contact with substance.
- Cool containers with flooding quantities of water until well after fire is out.
- Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- ALWAYS stay away from tanks engulfed in fire.

SPILL OR LEAK

- Fully encapsulating, vapor protective clothing should be worn for spills and leaks with no fire.
- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).
- Do not touch or walk through spilled material.
- Stop leak if you can do it without risk.

Small Spill

EXCEPTION: For spills of Xanthates, UN3342 and for Dithionite (Hydrosulfite/Hydrosulphite), UN1384, UN1923 and UN1929, dissolve in 5 parts water and collect for proper disposal.

- **CAUTION**: **UN3342** when flooded with water will continue to evolve flammable Carbon disulfide/Carbon disulphide vapors.
- Cover with DRY earth, DRY sand or other non-combustible material followed with plastic sheet to minimize spreading or contact with rain.
- Use clean non-sparking tools to collect material and place it into loosely covered plastic containers for later disposal.
- Prevent entry into waterways, sewers, basements or confined areas.

FIRST AID

- Move victim to fresh air.
- Call 911 or emergency medical service.
- Give artificial respiration if victim is not breathing.
- Administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- Keep victim warm and quiet.
- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

POTENTIAL HAZARDS

FIRE OR EXPLOSION

- Extremely flammable; will ignite itself if exposed to air.
- Burns rapidly, releasing dense, white, irritating fumes.
- Substance may be transported in a molten form.
- May re-ignite after fire is extinguished.
- Corrosive substances in contact with metals may produce flammable hydrogen gas.
- Containers may explode when heated.

HEALTH

- Fire will produce irritating, corrosive and/or toxic gases.
- **TOXIC**; ingestion of substance or inhalation of decomposition products will cause severe injury or death.
- Contact with substance may cause severe burns to skin and eyes.
- Some effects may be experienced due to skin absorption.
- Runoff from fire control may be corrosive and/or toxic and cause pollution.

PUBLIC SAFETY

- **CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.**
- As an immediate precautionary measure, isolate spill or leak area in all directions for at least 50 meters (150 feet) for liquids and at least 25 meters (75 feet) for solids.
- Stay upwind.
- Keep unauthorized personnel away.
- Keep out of low areas.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection.
- Structural firefighters' protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible.
- **For Phosphorus (UN1381): Special aluminized protective clothing should be worn when direct contact with the substance is possible.**

EVACUATION

Spill

- Consider initial downwind evacuation for at least 300 meters (1000 feet).

Fire

- If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

EMERGENCY RESPONSE

FIRE

Small Fire

- Water spray, wet sand or wet earth.

Large Fire

- Water spray or fog.

Do not scatter spilled material with high pressure water streams.

- Move containers from fire area if you can do it without risk.

Fire involving Tanks or Car/Trailer Loads

- Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- Cool containers with flooding quantities of water until well after fire is out.
- Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- ALWAYS stay away from tanks engulfed in fire.

SPILL OR LEAK

- Fully encapsulating, vapor protective clothing should be worn for spills and leaks with no fire.
- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).
- Do not touch or walk through spilled material.
- Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.
- Stop leak if you can do it without risk.

Small Spill

- Cover with water, sand or earth. Shovel into metal container and keep material under water.

Large Spill

- Dike for later disposal and cover with wet sand or earth.
- Prevent entry into waterways, sewers, basements or confined areas.

FIRST AID

- Move victim to fresh air.
- Call 911 or emergency medical service.
- Give artificial respiration if victim is not breathing.
- Administer oxygen if breathing is difficult.
- In case of contact with substance, keep exposed skin areas immersed in water or covered with wet bandages until medical attention is received.
- Removal of solidified molten material from skin requires medical assistance.
- Remove and isolate contaminated clothing and shoes at the site and place in metal container filled with water. Fire hazard if allowed to dry.
- Effects of exposure (inhalation, ingestion or skin contact) to substance may be delayed.
- Keep victim warm and quiet.
- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

POTENTIAL HAZARDS

HEALTH

- CORROSIVE and/or TOXIC; inhalation, ingestion or contact (skin, eyes) with vapors, dusts or substance may cause severe injury, burns or death.
- Fire will produce irritating, corrosive and/or toxic gases.
- Reaction with water may generate much heat that will increase the concentration of fumes in the air.
- Contact with molten substance may cause severe burns to skin and eyes.
- Runoff from fire control or dilution water may cause pollution.

FIRE OR EXPLOSION

- **EXCEPT FOR ACETIC ANHYDRIDE (UN1715), THAT IS FLAMMABLE,** some of these materials may burn, but none ignite readily.
- May ignite combustibles (wood, paper, oil, clothing, etc.).
- Substance will react with water (some violently), releasing corrosive and/or toxic gases and runoff.
- Flammable/toxic gases may accumulate in confined areas (basement, tanks, hopper/tank cars, etc.).
- Contact with metals may evolve flammable hydrogen gas.
- Containers may explode when heated or if contaminated with water.
- Substance may be transported in a molten form.

PUBLIC SAFETY

- **CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.**
- As an immediate precautionary measure, isolate spill or leak area in all directions for at least 50 meters (150 feet) for liquids and at least 25 meters (75 feet) for solids.
- Keep unauthorized personnel away.
- Stay upwind.
- Keep out of low areas.
- Ventilate enclosed areas.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection.
- Structural firefighters' protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible.

EVACUATION

Spill

- See Table 1 - Initial Isolation and Protective Action Distances for highlighted materials. For non-highlighted materials, increase, in the downwind direction, as necessary, the isolation distance shown under “PUBLIC SAFETY”.

Fire

- If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

EMERGENCY RESPONSE

FIRE

- **When material is not involved in fire, do not use water on material itself.**

Small Fire

- Dry chemical or CO_2.
- Move containers from fire area if you can do it without risk.

Large Fire

- Flood fire area with large quantities of water, while knocking down vapors with water fog. If insufficient water supply: knock down vapors only.

Fire involving Tanks or Car/Trailer Loads

- Cool containers with flooding quantities of water until well after fire is out.
- Do not get water inside containers.
- Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- ALWAYS stay away from tanks engulfed in fire.

SPILL OR LEAK

- Fully encapsulating, vapor protective clothing should be worn for spills and leaks with no fire.
- Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.
- Stop leak if you can do it without risk.
- Use water spray to reduce vapors; do not put water directly on leak, spill area or inside container.
- Keep combustibles (wood, paper, oil, etc.) away from spilled material.

Small Spill

- Cover with DRY earth, DRY sand or other non-combustible material followed with plastic sheet to minimize spreading or contact with rain.
- Use clean non-sparking tools to collect material and place it into loosely covered plastic containers for later disposal.
- Prevent entry into waterways, sewers, basements or confined areas.

FIRST AID

- Move victim to fresh air.
- Call 911 or emergency medical service.
- Give artificial respiration if victim is not breathing.
- **Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.**
- Administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- For minor skin contact, avoid spreading material on unaffected skin.
- Removal of solidified molten material from skin requires medical assistance.
- Keep victim warm and quiet.
- Effects of exposure (inhalation, ingestion or skin contact) to substance may be delayed.
- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

POTENTIAL HAZARDS

FIRE OR EXPLOSION

- Produce flammable gases on contact with water.
- May ignite on contact with water or moist air.
- Some react vigorously or explosively on contact with water.
- May be ignited by heat, sparks or flames.
- May re-ignite after fire is extinguished.
- Some are transported in highly flammable liquids.
- Runoff may create fire or explosion hazard.

HEALTH

- Inhalation or contact with vapors, substance or decomposition products may cause severe injury or death.
- May produce corrosive solutions on contact with water.
- Fire will produce irritating, corrosive and/or toxic gases.
- Runoff from fire control may cause pollution.

PUBLIC SAFETY

- **CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.**
- As an immediate precautionary measure, isolate spill or leak area in all directions for at least 50 meters (150 feet) for liquids and at least 25 meters (75 feet) for solids.
- Keep unauthorized personnel away.
- Stay upwind.
- Keep out of low areas.
- Ventilate the area before entry.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection.
- Structural firefighters' protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible.

EVACUATION

Spill

- See Table 1 - Initial Isolation and Protective Action Distances for highlighted materials. For non-highlighted materials, increase, in the downwind direction, as necessary, the isolation distance shown under “PUBLIC SAFETY”.

Fire

- If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

EMERGENCY RESPONSE

FIRE

- **DO NOT USE WATER OR FOAM.**

Small Fire

- Dry chemical, soda ash, lime or sand.

Large Fire

- DRY sand, dry chemical, soda ash or lime or withdraw from area and let fire burn.
- Move containers from fire area if you can do it without risk.

Fire Involving Metals or Powders (Aluminum, Lithium, Magnesium, etc.)

- Use dry chemical, DRY sand, sodium chloride powder, graphite powder or Met-L-X® powder; in addition, for Lithium you may use Lith-X® powder or copper powder.
  Also, see GUIDE 170.

Fire involving Tanks or Car/Trailer Loads

- Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- Do not get water inside containers.
- Cool containers with flooding quantities of water until well after fire is out.
- Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- ALWAYS stay away from tanks engulfed in fire.

SPILL OR LEAK

- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).
- Do not touch or walk through spilled material.
- Stop leak if you can do it without risk.
- Use water spray to reduce vapors or divert vapor cloud drift. Avoid allowing water runoff to contact spilled material.

DO NOT GET WATER on spilled substance or inside containers.

Small Spill

- Cover with DRY earth, DRY sand or other non-combustible material followed with plastic sheet to minimize spreading or contact with rain.
- Dike for later disposal; do not apply water unless directed to do so.

Powder Spill

- Cover powder spill with plastic sheet or tarp to minimize spreading and keep powder dry.
- **DO NOT CLEAN-UP OR DISPOSE OF, EXCEPT UNDER SUPERVISION OF A SPECIALIST.**

FIRST AID

- Move victim to fresh air.
- Call 911 or emergency medical service.
- Give artificial respiration if victim is not breathing.
- Administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes.
- In case of contact with substance, wipe from skin immediately; flush skin or eyes with running water for at least 20 minutes.
- Keep victim warm and quiet.
- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

Substances - Water-Reactive (Emitting Flammable And Toxic Gases)

POTENTIAL HAZARDS

FIRE OR EXPLOSION

- Produce flammable and toxic gases on contact with water.
- May ignite on contact with water or moist air.
- Some react vigorously or explosively on contact with water.
- May be ignited by heat, sparks or flames.
- May re-ignite after fire is extinguished.
- Some are transported in highly flammable liquids.
- Containers may explode when heated.
- Runoff may create fire or explosion hazard.

HEALTH

- Highly toxic: contact with water produces toxic gas, may be fatal if inhaled.
- Inhalation or contact with vapors, substance or decomposition products may cause severe injury or death.
- May produce corrosive solutions on contact with water.
- Fire will produce irritating, corrosive and/or toxic gases.
- Runoff from fire control may cause pollution.

PUBLIC SAFETY

- **CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.**
- As an immediate precautionary measure, isolate spill or leak area in all directions for at least 50 meters (150 feet) for liquids and at least 25 meters (75 feet) for solids.
- Keep unauthorized personnel away.
- Stay upwind.
- Keep out of low areas.
- Ventilate the area before entry.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection.
- Structural firefighters' protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible.

EVACUATION

Spill

- See Table 1 - Initial Isolation and Protective Action Distances for highlighted materials. For non-highlighted materials, increase, in the downwind direction, as necessary, the isolation distance shown under “PUBLIC SAFETY”.

Fire

- If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

EMERGENCY RESPONSE

FIRE

- **DO NOT USE WATER OR FOAM. (FOAM MAY BE USED FOR CHLOROSILANES, SEE BELOW)**

Small Fire

- Dry chemical, soda ash, lime or sand.

Large Fire

- DRY sand, dry chemical, soda ash or lime or withdraw from area and let fire burn.
- **FOR CHLOROSILANES, DO NOT USE WATER**; use AFFF alcohol-resistant medium expansion foam; **DO NOT USE** dry chemicals, soda ash or lime on chlorosilane fires (large or small) as they may release large quantities of hydrogen gas that may explode.
- Move containers from fire area if you can do it without risk.

Fire involving Tanks or Car/Trailer Loads

- Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- Cool containers with flooding quantities of water until well after fire is out.
- Do not get water inside containers.
- Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- ALWAYS stay away from tanks engulfed in fire.

SPILL OR LEAK

- Fully encapsulating, vapor protective clothing should be worn for spills and leaks with no fire.
- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).
- Do not touch or walk through spilled material.
- Stop leak if you can do it without risk.

DO NOT GET WATER on spilled substance or inside containers.

- Use water spray to reduce vapors or divert vapor cloud drift. Avoid allowing water runoff to contact spilled material.
- **FOR CHLOROSILANES**, use AFFF alcohol-resistant medium expansion foam to reduce vapors.

Small Spill

- Cover with DRY earth, DRY sand or other non-combustible material followed with plastic sheet to minimize spreading or contact with rain.
- Dike for later disposal; do not apply water unless directed to do so.

Powder Spill

- Cover powder spill with plastic sheet or tarp to minimize spreading and keep powder dry.
- **DO NOT CLEAN-UP OR DISPOSE OF, EXCEPT UNDER SUPERVISION OF A SPECIALIST.**

FIRST AID

- Move victim to fresh air.
- Call 911 or emergency medical service.
- Give artificial respiration if victim is not breathing.
- **Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.**
- Administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes.
- In case of contact with substance, wipe from skin immediately; flush skin or eyes with running water for at least 20 minutes.
- Keep victim warm and quiet.
- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

POTENTIAL HAZARDS

FIRE OR EXPLOSION

- These substances will accelerate burning when involved in a fire.
- Some may decompose explosively when heated or involved in a fire.
- May explode from heat or contamination.
- Some will react explosively with hydrocarbons (fuels).
- May ignite combustibles (wood, paper, oil, clothing, etc.).
- Containers may explode when heated.
- Runoff may create fire or explosion hazard.

HEALTH

- Inhalation, ingestion or contact (skin, eyes) with vapors or substance may cause severe injury, burns or death.
- Fire may produce irritating, corrosive and/or toxic gases.
- Runoff from fire control or dilution water may cause pollution.

PUBLIC SAFETY

- **CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.**
- As an immediate precautionary measure, isolate spill or leak area in all directions for at least 50 meters (150 feet) for liquids and at least 25 meters (75 feet) for solids.
- Keep unauthorized personnel away.
- Stay upwind.
- Keep out of low areas.
- Ventilate closed spaces before entering.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection.
- Structural firefighters' protective clothing will only provide limited protection.

EVACUATION

Large Spill

- Consider initial downwind evacuation for at least 100 meters (330 feet).

Fire

- If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

EMERGENCY RESPONSE

FIRE

Small Fire

- Use water. Do not use dry chemicals or foams. CO_2 or Halon® may provide limited control.

Large Fire

- Flood fire area with water from a distance.
- Do not move cargo or vehicle if cargo has been exposed to heat.
- Move containers from fire area if you can do it without risk.

Fire involving Tanks or Car/Trailer Loads

- Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- Cool containers with flooding quantities of water until well after fire is out.
- ALWAYS stay away from tanks engulfed in fire.
- For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.

SPILL OR LEAK

- Keep combustibles (wood, paper, oil, etc.) away from spilled material.
- Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.
- Stop leak if you can do it without risk.
- Do not get water inside containers.

Small Dry Spill

- With clean shovel place material into clean, dry container and cover loosely; move containers from spill area.

Small Liquid Spill

- Use a non-combustible material like vermiculite or sand to soak up the product and place into a container for later disposal.

Large Spill

- Dike far ahead of liquid spill for later disposal.
- **Following product recovery, flush area with water.**

FIRST AID

- Move victim to fresh air.
- Call 911 or emergency medical service.
- Give artificial respiration if victim is not breathing.
- Administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes.
- Contaminated clothing may be a fire risk when dry.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- Keep victim warm and quiet.
- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

POTENTIAL HAZARDS

FIRE OR EXPLOSION

- These substances will accelerate burning when involved in a fire.
- May explode from heat or contamination.
- Some may burn rapidly.
- Some will react explosively with hydrocarbons (fuels).
- May ignite combustibles (wood, paper, oil, clothing, etc.).
- Containers may explode when heated.
- Runoff may create fire or explosion hazard.

HEALTH

- Toxic by ingestion.
- Inhalation of dust is toxic.
- Fire may produce irritating, corrosive and/or toxic gases.
- Contact with substance may cause severe burns to skin and eyes.
- Runoff from fire control or dilution water may cause pollution.

PUBLIC SAFETY

- **CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.**
- As an immediate precautionary measure, isolate spill or leak area in all directions for at least 50 meters (150 feet) for liquids and at least 25 meters (75 feet) for solids.
- Keep unauthorized personnel away.
- Stay upwind.
- Keep out of low areas.
- Ventilate closed spaces before entering.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection.
- Structural firefighters' protective clothing will only provide limited protection.

EVACUATION

Large Spill

- Consider initial downwind evacuation for at least 100 meters (330 feet).

Fire

- If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

EMERGENCY RESPONSE

FIRE

Small Fire

- Use water. Do not use dry chemicals or foams. CO_2 or Halon® may provide limited control.

Large Fire

- Flood fire area with water from a distance.
- Do not move cargo or vehicle if cargo has been exposed to heat.
- Move containers from fire area if you can do it without risk.

Fire involving Tanks or Car/Trailer Loads

- Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- Cool containers with flooding quantities of water until well after fire is out.
- ALWAYS stay away from tanks engulfed in fire.
- For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.

SPILL OR LEAK

- Keep combustibles (wood, paper, oil, etc.) away from spilled material.
- Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.
- Stop leak if you can do it without risk.

Small Dry Spill

- With clean shovel place material into clean, dry container and cover loosely; move containers from spill area.

Large Spill

- Dike far ahead of spill for later disposal.

FIRST AID

- Move victim to fresh air.
- Call 911 or emergency medical service.
- Give artificial respiration if victim is not breathing.
- Administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes.
- Contaminated clothing may be a fire risk when dry.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- Keep victim warm and quiet.
- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

POTENTIAL HAZARDS

FIRE OR EXPLOSION

- These substances will accelerate burning when involved in a fire.
- May explode from heat or contamination.
- Some will react explosively with hydrocarbons (fuels).
- May ignite combustibles (wood, paper, oil, clothing, etc.).
- Containers may explode when heated.
- Runoff may create fire or explosion hazard.

HEALTH

- **TOXIC;** inhalation, ingestion or contact (skin, eyes) with vapors or substance may cause severe injury, burns or death.
- Fire may produce irritating, corrosive and/or toxic gases.
- Toxic/flammable fumes may accumulate in confined areas (basement, tanks, tank cars, etc.).
- Runoff from fire control or dilution water may cause pollution.

PUBLIC SAFETY

- **CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.**
- As an immediate precautionary measure, isolate spill or leak area for at least 50 meters (150 feet) in all directions.
- Keep unauthorized personnel away.
- Stay upwind.
- Keep out of low areas.
- Ventilate closed spaces before entering.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection.
- Structural firefighters' protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible.

EVACUATION

Spill

- See Table 1 - Initial Isolation and Protective Action Distances for highlighted materials. For non-highlighted materials, increase, in the downwind direction, as necessary, the isolation distance shown under “PUBLIC SAFETY”.

Fire

- If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

EMERGENCY RESPONSE

FIRE

Small Fire

- Use water. Do not use dry chemicals or foams. CO_2 or Halon® may provide limited control.

Large Fire

- Flood fire area with water from a distance.
- Do not move cargo or vehicle if cargo has been exposed to heat.
- Move containers from fire area if you can do it without risk.

Fire involving Tanks or Car/Trailer Loads

- Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- Cool containers with flooding quantities of water until well after fire is out.
- ALWAYS stay away from tanks engulfed in fire.
- For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.

SPILL OR LEAK

- Keep combustibles (wood, paper, oil, etc.) away from spilled material.
- Fully encapsulating, vapor protective clothing should be worn for spills and leaks with no fire.
- Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.
- Stop leak if you can do it without risk.
- Use water spray to reduce vapors or divert vapor cloud drift.
- Do not get water inside containers.

Small Liquid Spill

- Use a non-combustible material like vermiculite or sand to soak up the product and place into a container for later disposal.

Large Spill

- Dike far ahead of liquid spill for later disposal.

FIRST AID

- Move victim to fresh air.
- Call 911 or emergency medical service.
- Give artificial respiration if victim is not breathing.
- **Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.**
- Administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes.
- Contaminated clothing may be a fire risk when dry.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- Keep victim warm and quiet.
- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

POTENTIAL HAZARDS

FIRE OR EXPLOSION

- May explode from friction, heat or contamination.
- These substances will accelerate burning when involved in a fire.
- May ignite combustibles (wood, paper, oil, clothing, etc.).
- Some will react explosively with hydrocarbons (fuels).
- Containers may explode when heated.
- Runoff may create fire or explosion hazard.

HEALTH

- **TOXIC;** inhalation, ingestion or contact (skin, eyes) with vapors, dusts or substance may cause severe injury, burns or death.
- Fire may produce irritating and/or toxic gases.
- Toxic fumes or dust may accumulate in confined areas (basement, tanks, hopper/tank cars, etc.).
- Runoff from fire control or dilution water may cause pollution.

PUBLIC SAFETY

- **CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.**
- As an immediate precautionary measure, isolate spill or leak area in all directions for at least 50 meters (150 feet) for liquids and at least 25 meters (75 feet) for solids.
- Keep unauthorized personnel away.
- Stay upwind.
- Keep out of low areas.
- Ventilate closed spaces before entering.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection.
- Structural firefighters' protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible.

EVACUATION

Spill

- See Table 1 - Initial Isolation and Protective Action Distances for highlighted materials. For non-highlighted materials, increase, in the downwind direction, as necessary, the isolation distance shown under “PUBLIC SAFETY”.

Fire

- If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

EMERGENCY RESPONSE

FIRE

Small Fire

- Use water. Do not use dry chemicals or foams. CO_2 or Halon® may provide limited control.

Large Fire

- Flood fire area with water from a distance.
- Do not move cargo or vehicle if cargo has been exposed to heat.
- Move containers from fire area if you can do it without risk.
- Do not get water inside containers: a violent reaction may occur.

Fire involving Tanks or Car/Trailer Loads

- Cool containers with flooding quantities of water until well after fire is out.
- Dike fire-control water for later disposal.
- ALWAYS stay away from tanks engulfed in fire.
- For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.

SPILL OR LEAK

- Keep combustibles (wood, paper, oil, etc.) away from spilled material.
- Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.
- Use water spray to reduce vapors or divert vapor cloud drift.
- Prevent entry into waterways, sewers, basements or confined areas.

Small Spill

- Flush area with flooding quantities of water.

Large Spill

- **DO NOT CLEAN-UP OR DISPOSE OF, EXCEPT UNDER SUPERVISION OF A SPECIALIST.**

FIRST AID

- Move victim to fresh air.
- Call 911 or emergency medical service.
- Give artificial respiration if victim is not breathing.
- Administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes.
- Contaminated clothing may be a fire risk when dry.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- Keep victim warm and quiet.
- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

POTENTIAL HAZARDS

FIRE OR EXPLOSION

- May ignite combustibles (wood, paper, oil, clothing, etc.).
- React vigorously and/or explosively with water.
- Produce toxic and/or corrosive substances on contact with water.
- Flammable/toxic gases may accumulate in tanks and hopper cars.
- Some may produce flammable hydrogen gas upon contact with metals.
- Containers may explode when heated.
- Runoff may create fire or explosion hazard.

HEALTH

- **TOXIC;** inhalation or contact with vapor, substance, or decomposition products may cause severe injury or death.
- Fire will produce irritating, corrosive and/or toxic gases.
- Runoff from fire control or dilution water may cause pollution.

PUBLIC SAFETY

- **CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.**
- As an immediate precautionary measure, isolate spill or leak area in all directions for at least 50 meters (150 feet) for liquids and at least 25 meters (75 feet) for solids.
- Keep unauthorized personnel away.
- Stay upwind.
- Keep out of low areas.
- Ventilate closed spaces before entering.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection.
- Structural firefighters' protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible.

EVACUATION

Spill

- See Table 1 - Initial Isolation and Protective Action Distances for highlighted materials. For non-highlighted materials, increase, in the downwind direction, as necessary, the isolation distance shown under “PUBLIC SAFETY”.

Fire

- If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

EMERGENCY RESPONSE

FIRE

- **DO NOT USE WATER OR FOAM.**

Small Fire

- Dry chemical, soda ash or lime.

Large Fire

- DRY sand, dry chemical, soda ash or lime or withdraw from area and let fire burn.
- Do not move cargo or vehicle if cargo has been exposed to heat.
- Move containers from fire area if you can do it without risk.

Fire involving Tanks or Car/Trailer Loads

- Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- Cool containers with flooding quantities of water until well after fire is out.
- Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- ALWAYS stay away from tanks engulfed in fire.

SPILL OR LEAK

- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).
- Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.
- Stop leak if you can do it without risk.
- Use water spray to reduce vapors or divert vapor cloud drift. Avoid allowing water runoff to contact spilled material.
- **DO NOT GET WATER on spilled substance or inside containers.**

Small Spill

- Cover with DRY earth, DRY sand or other non-combustible material followed with plastic sheet to minimize spreading or contact with rain.

Large Spill

- **DO NOT CLEAN-UP OR DISPOSE OF, EXCEPT UNDER SUPERVISION OF A SPECIALIST.**

FIRST AID

- Move victim to fresh air.
- Call 911 or emergency medical service.
- Give artificial respiration if victim is not breathing.
- **Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.**
- Administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes.
- Contaminated clothing may be a fire risk when dry.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- Keep victim warm and quiet.
- Keep victim under observation.
- Effects of contact or inhalation may be delayed.
- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

Organic Peroxides (Heat and Contamination Sensitive)

POTENTIAL HAZARDS

FIRE OR EXPLOSION

- May explode from heat or contamination.
- May ignite combustibles (wood, paper, oil, clothing, etc.).
- May be ignited by heat, sparks or flames.
- May burn rapidly with flare-burning effect.
- Containers may explode when heated.
- Runoff may create fire or explosion hazard.

HEALTH

- Fire may produce irritating, corrosive and/or toxic gases.
- Ingestion or contact (skin, eyes) with substance may cause severe injury or burns.
- Runoff from fire control or dilution water may cause pollution.

PUBLIC SAFETY

- **CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.**
- As an immediate precautionary measure, isolate spill or leak area in all directions for at least 50 meters (150 feet) for liquids and at least 25 meters (75 feet) for solids.
- Keep unauthorized personnel away.
- Stay upwind.
- Keep out of low areas.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection.
- Structural firefighters' protective clothing will only provide limited protection.

EVACUATION

Large Spill

- Consider initial evacuation for at least 250 meters (800 feet) in all directions.

Fire

- If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

EMERGENCY RESPONSE

FIRE

Small Fire

- Water spray or fog is preferred; if water not available use dry chemical, CO_2 or regular foam.

Large Fire

- Flood fire area with water from a distance.
- Use water spray or fog; do not use straight streams.
- Do not move cargo or vehicle if cargo has been exposed to heat.
- Move containers from fire area if you can do it without risk.

Fire involving Tanks or Car/Trailer Loads

- Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- Cool containers with flooding quantities of water until well after fire is out.
- ALWAYS stay away from tanks engulfed in fire.
- For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.

SPILL OR LEAK

- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).
- Keep combustibles (wood, paper, oil, etc.) away from spilled material.
- Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.
- Keep substance wet using water spray.
- Stop leak if you can do it without risk.

Small Spill

- Take up with inert, damp, non-combustible material using clean non-sparking tools and place into loosely covered plastic containers for later disposal.

Large Spill

- Wet down with water and dike for later disposal.
- Prevent entry into waterways, sewers, basements or confined areas.
- **DO NOT CLEAN-UP OR DISPOSE OF, EXCEPT UNDER SUPERVISION OF A SPECIALIST.**

FIRST AID

- Move victim to fresh air.
- Call 911 or emergency medical service.
- Give artificial respiration if victim is not breathing.
- Administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes.
- Contaminated clothing may be a fire risk when dry.
- Remove material from skin immediately.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- Keep victim warm and quiet.
- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

Organic Peroxides (Heat, Contamination and Friction Sensitive)

POTENTIAL HAZARDS

FIRE OR EXPLOSION

- May explode from heat, shock, friction or contamination.
- May ignite combustibles (wood, paper, oil, clothing, etc.).
- May be ignited by heat, sparks or flames.
- May burn rapidly with flare-burning effect.
- Containers may explode when heated.
- Runoff may create fire or explosion hazard.

HEALTH

- Fire may produce irritating, corrosive and/or toxic gases.
- Ingestion or contact (skin, eyes) with substance may cause severe injury or burns.
- Runoff from fire control or dilution water may cause pollution.

PUBLIC SAFETY

- **CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.**
- As an immediate precautionary measure, isolate spill or leak area in all directions for at least 50 meters (150 feet) for liquids and at least 25 meters (75 feet) for solids.
- Keep unauthorized personnel away.
- Stay upwind.
- Keep out of low areas.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection.
- Structural firefighters' protective clothing will only provide limited protection.

EVACUATION

Large Spill

- Consider initial evacuation for at least 250 meters (800 feet) in all directions.

Fire

- If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

EMERGENCY RESPONSE

FIRE

Small Fire

- Water spray or fog is preferred; if water not available use dry chemical, CO_2 or regular foam.

Large Fire

- Flood fire area with water from a distance.
- Use water spray or fog; do not use straight streams.
- Do not move cargo or vehicle if cargo has been exposed to heat.
- Move containers from fire area if you can do it without risk.

Fire involving Tanks or Car/Trailer Loads

- Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- Cool containers with flooding quantities of water until well after fire is out.
- ALWAYS stay away from tanks engulfed in fire.
- For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.

SPILL OR LEAK

- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).
- Keep combustibles (wood, paper, oil, etc.) away from spilled material.
- Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.
- Keep substance wet using water spray.
- Stop leak if you can do it without risk.

Small Spill

- Take up with inert, damp, non-combustible material using clean non-sparking tools and place into loosely covered plastic containers for later disposal.

Large Spill

- Wet down with water and dike for later disposal.
- Prevent entry into waterways, sewers, basements or confined areas.
- **DO NOT CLEAN-UP OR DISPOSE OF, EXCEPT UNDER SUPERVISION OF A SPECIALIST.**

FIRST AID

- Move victim to fresh air.
- Call 911 or emergency medical service.
- Give artificial respiration if victim is not breathing.
- Administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes.
- Contaminated clothing may be a fire risk when dry.
- Remove material from skin immediately.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- Keep victim warm and quiet.
- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

POTENTIAL HAZARDS

FIRE OR EXPLOSION

- Lithium ion batteries contain flammable liquid electrolyte that may vent, ignite and produce sparks when subjected to high temperatures (> 150 ^{0}C (302 ^{0}F)), when damaged or abused (e.g., mechanical damage or electrical overcharging).
- May burn rapidly with flare-burning effect.
- May ignite other batteries in close proximity.

HEALTH

- Contact with battery electrolyte may be irritating to skin, eyes and mucous membranes.
- Fire will produce irritating, corrosive and/or toxic gases.
- Burning batteries may produce toxic hydrogen fluoride gas (see GUIDE 125).
- Fumes may cause dizziness or suffocation.

PUBLIC SAFETY

- **CALL Emergency Response Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.**
- As an immediate precautionary measure, isolate spill or leak area for at least 25 meters (75 feet) in all directions.
- Keep unauthorized personnel away.
- Stay upwind.
- Keep out of low areas.
- Ventilate closed spaces before entering.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Structural firefighters' protective clothing will only provide limited protection.

EVACUATION

Large Spill

- Consider initial downwind evacuation for at least 100 meters (330 feet).

Fire

- If rail car or trailer is involved in a fire, ISOLATE for 500 meters (1/3 mile) in all directions; also initiate evacuation including emergency responders for 500 meters (1/3 mile) in all directions.

EMERGENCY RESPONSE

FIRE

Small Fire

- Dry chemical, CO_2, water spray or regular foam.

Large Fire

- Water spray, fog or regular foam.
- Move containers from fire area if you can do it without risk.

SPILL OR LEAK

- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).
- Do not touch or walk through spilled material.
- Absorb with earth, sand or other non-combustible material.
- Leaking batteries and contaminated absorbent material should be placed in metal containers.

FIRST AID

- Move victim to fresh air.
- Call 911 or emergency medical service.
- Give artificial respiration if victim is not breathing.
- Administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

Organic Peroxides (Heat and Contamination Sensitive/Temperature Controlled)

POTENTIAL HAZARDS

FIRE OR EXPLOSION

- May explode from heat, contamination or loss of temperature control.
- These materials are particularly sensitive to temperature rises. Above a given "Control Temperature" they decompose violently and catch fire.
- May ignite combustibles (wood, paper, oil, clothing, etc.).
- May ignite spontaneously if exposed to air.
- May be ignited by heat, sparks or flames.
- May burn rapidly with flare-burning effect.
- Containers may explode when heated.
- Runoff may create fire or explosion hazard.

HEALTH

- Fire may produce irritating, corrosive and/or toxic gases.
- Ingestion or contact (skin, eyes) with substance may cause severe injury or burns.
- Runoff from fire control or dilution water may cause pollution.

PUBLIC SAFETY

- **CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.**
- As an immediate precautionary measure, isolate spill or leak area in all directions for at least 50 meters (150 feet) for liquids and at least 25 meters (75 feet) for solids.
- Keep unauthorized personnel away.
- Stay upwind.
- Keep out of low areas.
- **DO NOT allow the substance to warm up. Obtain liquid nitrogen (wear thermal protective clothing, see GUIDE 120), dry ice or ice for cooling. If this is not possible or none can be obtained, evacuate the area immediately.**

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection.
- Structural firefighters' protective clothing will only provide limited protection.

EVACUATION

Large Spill

- Consider initial evacuation for at least 250 meters (800 feet) in all directions.

Fire

- If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

EMERGENCY RESPONSE

FIRE

- **The temperature of the substance must be maintained at or below the "Control Temperature" at all times.**

Small Fire

- Water spray or fog is preferred; if water not available use dry chemical, CO_2 or regular foam.

Large Fire

- Flood fire area with water from a distance.
- Use water spray or fog; do not use straight streams.
- Do not move cargo or vehicle if cargo has been exposed to heat.
- Move containers from fire area if you can do it without risk.

Fire involving Tanks or Car/Trailer Loads

- Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- Cool containers with flooding quantities of water until well after fire is out.
- **BEWARE OF POSSIBLE CONTAINER EXPLOSION.**
- ALWAYS stay away from tanks engulfed in fire.
- For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.

SPILL OR LEAK

- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).
- Keep combustibles (wood, paper, oil, etc.) away from spilled material.
- Do not touch or walk through spilled material.
- Stop leak if you can do it without risk.

Small Spill

- Take up with inert, damp, non-combustible material using clean non-sparking tools and place into loosely covered plastic containers for later disposal.

Large Spill

- Dike far ahead of liquid spill for later disposal.
- Prevent entry into waterways, sewers, basements or confined areas.
- **DO NOT CLEAN-UP OR DISPOSE OF, EXCEPT UNDER SUPERVISION OF A SPECIALIST.**

FIRST AID

- Move victim to fresh air.
- Call 911 or emergency medical service.
- Give artificial respiration if victim is not breathing.
- Administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes.
- Contaminated clothing may be a fire risk when dry.
- Remove material from skin immediately.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- Keep victim warm and quiet.
- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

POTENTIAL HAZARDS

FIRE OR EXPLOSION

- **Self-decomposition or self-ignition may be triggered by heat, chemical reaction, friction or impact.**
- May be ignited by heat, sparks or flames.
- Some may decompose explosively when heated or involved in a fire.
- May burn violently. Decomposition may be self-accelerating and produce large amounts of gases.
- Vapors or dust may form explosive mixtures with air.

HEALTH

- Inhalation or contact with vapors, substance or decomposition products may cause severe injury or death.
- May produce irritating, toxic and/or corrosive gases.
- Runoff from fire control may cause pollution.

PUBLIC SAFETY

- **CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.**
- As an immediate precautionary measure, isolate spill or leak area in all directions for at least 50 meters (150 feet) for liquids and at least 25 meters (75 feet) for solids.
- Keep unauthorized personnel away.
- Stay upwind.
- Keep out of low areas.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection.
- Structural firefighters' protective clothing will only provide limited protection.

EVACUATION

Large Spill

- Consider initial downwind evacuation for at least 250 meters (800 feet) in all directions.

Fire

- If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

EMERGENCY RESPONSE

FIRE

Small Fire

- Dry chemical, CO_2, water spray or regular foam.

Large Fire

- Flood fire area with water from a distance.
- Move containers from fire area if you can do it without risk.

Fire involving Tanks or Car/Trailer Loads

- **BEWARE OF POSSIBLE CONTAINER EXPLOSION.**
- Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- Cool containers with flooding quantities of water until well after fire is out.
- Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- ALWAYS stay away from tanks engulfed in fire.

SPILL OR LEAK

- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).
- Do not touch or walk through spilled material.
- Stop leak if you can do it without risk.

Small Spill

- Take up with inert, damp, non-combustible material using clean non-sparking tools and place into loosely covered plastic containers for later disposal.
- Prevent entry into waterways, sewers, basements or confined areas.

FIRST AID

- Move victim to fresh air.
- Call 911 or emergency medical service.
- Give artificial respiration if victim is not breathing.
- Administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- Keep victim warm and quiet.
- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

POTENTIAL HAZARDS

FIRE OR EXPLOSION

- **Self-decomposition or self-ignition may be triggered by heat, chemical reaction, friction or impact.**
- Self-accelerating decomposition may occur if the specific control temperature is not maintained.
- These materials are particularly sensitive to temperature rises. Above a given "Control Temperature" they decompose violently and catch fire.
- May be ignited by heat, sparks or flames.
- Some may decompose explosively when heated or involved in a fire.
- May burn violently. Decomposition may be self-accelerating and produce large amounts of gases.
- Vapors or dust may form explosive mixtures with air.

HEALTH

- Inhalation or contact with vapors, substance or decomposition products may cause severe injury or death.
- May produce irritating, toxic and/or corrosive gases.
- Runoff from fire control may cause pollution.

PUBLIC SAFETY

- **CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.**
- As an immediate precautionary measure, isolate spill or leak area in all directions for at least 50 meters (150 feet) for liquids and at least 25 meters (75 feet) for solids.
- Keep unauthorized personnel away.
- Stay upwind.
- Keep out of low areas.
- **DO NOT allow the substance to warm up. Obtain liquid nitrogen (wear thermal protective clothing, see GUIDE 120), dry ice or ice for cooling. If this is not possible or none can be obtained, evacuate the area immediately**.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection.
- Structural firefighters' protective clothing will only provide limited protection.

EVACUATION

Large Spill

- Consider initial evacuation for at least 250 meters (800 feet) in all directions.

Fire

- If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

EMERGENCY RESPONSE

FIRE

- **The temperature of the substance must be maintained at or below the "Control Temperature" at all times.**

Small Fire

- Dry chemical, CO_2, water spray or regular foam.

Large Fire

- Flood fire area with water from a distance.
- Move containers from fire area if you can do it without risk.

Fire involving Tanks or Car/Trailer Loads

- **BEWARE OF POSSIBLE CONTAINER EXPLOSION.**
- Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- Cool containers with flooding quantities of water until well after fire is out.
- Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- ALWAYS stay away from tanks engulfed in fire.

SPILL OR LEAK

- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).
- Do not touch or walk through spilled material.
- Stop leak if you can do it without risk.

Small Spill

- Take up with inert, damp, non-combustible material using clean non-sparking tools and place into loosely covered plastic containers for later disposal.
- Prevent entry into waterways, sewers, basements or confined areas.
- **DO NOT CLEAN-UP OR DISPOSE OF, EXCEPT UNDER SUPERVISION OF A SPECIALIST.**

FIRST AID

- Move victim to fresh air.
- Call 911 or emergency medical service.
- Give artificial respiration if victim is not breathing.
- Administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- Keep victim warm and quiet.
- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

POTENTIAL HAZARDS

HEALTH

- **Highly toxic**, may be fatal if inhaled, swallowed or absorbed through skin.
- Avoid any skin contact.
- Effects of contact or inhalation may be delayed.
- Fire may produce irritating, corrosive and/or toxic gases.
- Runoff from fire control or dilution water may be corrosive and/or toxic and cause pollution.

FIRE OR EXPLOSION

- Non-combustible, substance itself does not burn but may decompose upon heating to produce corrosive and/or toxic fumes.
- Containers may explode when heated.
- Runoff may pollute waterways.

PUBLIC SAFETY

- **CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.**
- As an immediate precautionary measure, isolate spill or leak area in all directions for at least 50 meters (150 feet) for liquids and at least 25 meters (75 feet) for solids.
- Keep unauthorized personnel away.
- Stay upwind.
- Keep out of low areas.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection.
- Structural firefighters' protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible.

EVACUATION

Spill

- See Table 1 - Initial Isolation and Protective Action Distances for highlighted materials. For non-highlighted materials, increase, in the downwind direction, as necessary, the isolation distance shown under “PUBLIC SAFETY”.

Fire

- If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

EMERGENCY RESPONSE

FIRE

Small Fire

- Dry chemical, CO_2 or water spray.

Large Fire

- Water spray, fog or regular foam.
- Move containers from fire area if you can do it without risk.
- Dike fire-control water for later disposal; do not scatter the material.
- Use water spray or fog; do not use straight streams.

Fire involving Tanks or Car/Trailer Loads

- Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- Do not get water inside containers.
- Cool containers with flooding quantities of water until well after fire is out.
- Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- ALWAYS stay away from tanks engulfed in fire.
- For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.

SPILL OR LEAK

- Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.
- Stop leak if you can do it without risk.
- Prevent entry into waterways, sewers, basements or confined areas.
- Cover with plastic sheet to prevent spreading.
- Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers.
- DO NOT GET WATER INSIDE CONTAINERS.

FIRST AID

- Move victim to fresh air.
- Call 911 or emergency medical service.
- Give artificial respiration if victim is not breathing.
- **Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.**
- Administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- For minor skin contact, avoid spreading material on unaffected skin.
- Keep victim warm and quiet.
- Effects of exposure (inhalation, ingestion or skin contact) to substance may be delayed.
- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

POTENTIAL HAZARDS

HEALTH

- **Highly toxic,** may be fatal if inhaled, swallowed or absorbed through skin.
- Contact with molten substance may cause severe burns to skin and eyes.
- Avoid any skin contact.
- Effects of contact or inhalation may be delayed.
- Fire may produce irritating, corrosive and/or toxic gases.
- Runoff from fire control or dilution water may be corrosive and/or toxic and cause pollution.

FIRE OR EXPLOSION

- Combustible material: may burn but does not ignite readily.
- Containers may explode when heated.
- Runoff may pollute waterways.
- Substance may be transported in a molten form.

PUBLIC SAFETY

- **CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.**
- As an immediate precautionary measure, isolate spill or leak area in all directions for at least 50 meters (150 feet) for liquids and at least 25 meters (75 feet) for solids.
- Keep unauthorized personnel away.
- Stay upwind.
- Keep out of low areas.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection.
- Structural firefighters' protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible.

EVACUATION

Spill

- See Table 1 - Initial Isolation and Protective Action Distances for highlighted materials. For non-highlighted materials, increase, in the downwind direction, as necessary, the isolation distance shown under “PUBLIC SAFETY”.

Fire

- If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

EMERGENCY RESPONSE

FIRE

Small Fire

- Dry chemical, CO_2 or water spray.

Large Fire

- Water spray, fog or regular foam.
- Move containers from fire area if you can do it without risk.
- Dike fire-control water for later disposal; do not scatter the material.
- Use water spray or fog; do not use straight streams.

Fire involving Tanks or Car/Trailer Loads

- Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- Do not get water inside containers.
- Cool containers with flooding quantities of water until well after fire is out.
- Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- ALWAYS stay away from tanks engulfed in fire.
- For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.

SPILL OR LEAK

- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).
- Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.
- Stop leak if you can do it without risk.
- Prevent entry into waterways, sewers, basements or confined areas.
- Cover with plastic sheet to prevent spreading.
- Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers.
- DO NOT GET WATER INSIDE CONTAINERS.

FIRST AID

- Move victim to fresh air.
- Call 911 or emergency medical service.
- Give artificial respiration if victim is not breathing.
- **Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.**
- Administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- For minor skin contact, avoid spreading material on unaffected skin.
- Keep victim warm and quiet.
- Effects of exposure (inhalation, ingestion or skin contact) to substance may be delayed.
- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

POTENTIAL HAZARDS

HEALTH

- **TOXIC**; inhalation, ingestion or skin contact with material may cause severe injury or death.
- Contact with molten substance may cause severe burns to skin and eyes.
- Avoid any skin contact.
- Effects of contact or inhalation may be delayed.
- Fire may produce irritating, corrosive and/or toxic gases.
- Runoff from fire control or dilution water may be corrosive and/or toxic and cause pollution.

FIRE OR EXPLOSION

- Combustible material: may burn but does not ignite readily.
- When heated, vapors may form explosive mixtures with air: indoors, outdoors and sewers explosion hazards.
- Those substances designated with a **(P)** may polymerize explosively when heated or involved in a fire.
- Contact with metals may evolve flammable hydrogen gas.
- Containers may explode when heated.
- Runoff may pollute waterways.
- Substance may be transported in a molten form.

PUBLIC SAFETY

- **CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.**
- As an immediate precautionary measure, isolate spill or leak area in all directions for at least 50 meters (150 feet) for liquids and at least 25 meters (75 feet) for solids.
- Keep unauthorized personnel away.
- Stay upwind.
- Keep out of low areas.
- Ventilate enclosed areas.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection.
- Structural firefighters' protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible.

EVACUATION

Spill

- See Table 1 - Initial Isolation and Protective Action Distances for highlighted materials. For non-highlighted materials, increase, in the downwind direction, as necessary, the isolation distance shown under “PUBLIC SAFETY”.

Fire

- If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

EMERGENCY RESPONSE

FIRE

Small Fire

- Dry chemical, CO_2 or water spray.

Large Fire

- Dry chemical, CO_2, alcohol-resistant foam or water spray.
- Move containers from fire area if you can do it without risk.
- Dike fire-control water for later disposal; do not scatter the material.

Fire involving Tanks or Car/Trailer Loads

- Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- Do not get water inside containers.
- Cool containers with flooding quantities of water until well after fire is out.
- Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- ALWAYS stay away from tanks engulfed in fire.

SPILL OR LEAK

- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).
- Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.
- Stop leak if you can do it without risk.
- Prevent entry into waterways, sewers, basements or confined areas.
- Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers.
- DO NOT GET WATER INSIDE CONTAINERS.

FIRST AID

- Move victim to fresh air.
- Call 911 or emergency medical service.
- Give artificial respiration if victim is not breathing.
- **Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.**
- Administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- For minor skin contact, avoid spreading material on unaffected skin.
- Keep victim warm and quiet.
- Effects of exposure (inhalation, ingestion or skin contact) to substance may be delayed.
- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

Substances - Toxic and/or Corrosive (Non-Combustible)

POTENTIAL HAZARDS

HEALTH

- **TOXIC**; inhalation, ingestion or skin contact with material may cause severe injury or death.
- Contact with molten substance may cause severe burns to skin and eyes.
- Avoid any skin contact.
- Effects of contact or inhalation may be delayed.
- Fire may produce irritating, corrosive and/or toxic gases.
- Runoff from fire control or dilution water may be corrosive and/or toxic and cause pollution.

FIRE OR EXPLOSION

- Non-combustible, substance itself does not burn but may decompose upon heating to produce corrosive and/or toxic fumes.
- Some are oxidizers and may ignite combustibles (wood, paper, oil, clothing, etc.).
- Contact with metals may evolve flammable hydrogen gas.
- Containers may explode when heated.
- For UN3171, if Lithium ion batteries are involved, also consult GUIDE 147.

PUBLIC SAFETY

- **CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.**
- As an immediate precautionary measure, isolate spill or leak area in all directions for at least 50 meters (150 feet) for liquids and at least 25 meters (75 feet) for solids.
- Keep unauthorized personnel away.
- Stay upwind.
- Keep out of low areas.
- Ventilate enclosed areas.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection.
- Structural firefighters' protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible.

EVACUATION

Spill

- See Table 1 - Initial Isolation and Protective Action Distances for highlighted materials. For non-highlighted materials, increase, in the downwind direction, as necessary, the isolation distance shown under “PUBLIC SAFETY”.

Fire

- If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

EMERGENCY RESPONSE

FIRE

Small Fire

- Dry chemical, CO_2 or water spray.

Large Fire

- Dry chemical, CO_2, alcohol-resistant foam or water spray.
- Move containers from fire area if you can do it without risk.
- Dike fire-control water for later disposal; do not scatter the material.

Fire involving Tanks or Car/Trailer Loads

- Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- Do not get water inside containers.
- Cool containers with flooding quantities of water until well after fire is out.
- Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- ALWAYS stay away from tanks engulfed in fire.

SPILL OR LEAK

- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).
- Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.
- Stop leak if you can do it without risk.
- Prevent entry into waterways, sewers, basements or confined areas.
- Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers.
- DO NOT GET WATER INSIDE CONTAINERS.

FIRST AID

- Move victim to fresh air.
- Call 911 or emergency medical service.
- Give artificial respiration if victim is not breathing.
- **Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.**
- Administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- For minor skin contact, avoid spreading material on unaffected skin.
- Keep victim warm and quiet.
- Effects of exposure (inhalation, ingestion or skin contact) to substance may be delayed.
- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

POTENTIAL HAZARDS

FIRE OR EXPLOSION

- **HIGHLY FLAMMABLE: Will be easily ignited by heat, sparks or flames.**
- Vapors form explosive mixtures with air: indoors, outdoors and sewers explosion hazards.
- Most vapors are heavier than air. They will spread along ground and collect in low or confined areas (sewers, basements, tanks).
- Vapors may travel to source of ignition and flash back.
- Those substances designated with a **(P)** may polymerize explosively when heated or involved in a fire.
- Substance will react with water (some violently) releasing flammable, toxic or corrosive gases and runoff.
- Contact with metals may evolve flammable hydrogen gas.
- Containers may explode when heated or if contaminated with water.

HEALTH

- **TOXIC**; inhalation, ingestion or contact (skin, eyes) with vapors, dusts or substance may cause severe injury, burns or death.
- **Bromoacetates and chloroacetates are extremely irritating/lachrymators.**
- Reaction with water or moist air will release toxic, corrosive or flammable gases.
- Reaction with water may generate much heat that will increase the concentration of fumes in the air.
- Fire will produce irritating, corrosive and/or toxic gases.
- Runoff from fire control or dilution water may be corrosive and/or toxic and cause pollution.

PUBLIC SAFETY

- **CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.**
- As an immediate precautionary measure, isolate spill or leak area in all directions for at least 50 meters (150 feet) for liquids and at least 25 meters (75 feet) for solids.
- Keep unauthorized personnel away.
- Stay upwind.
- Keep out of low areas.
- Ventilate enclosed areas.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection.
- Structural firefighters' protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible.

EVACUATION

Spill

- See Table 1 - Initial Isolation and Protective Action Distances for highlighted materials. For non-highlighted materials, increase, in the downwind direction, as necessary, the isolation distance shown under “PUBLIC SAFETY”.

Fire

- If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

EMERGENCY RESPONSE

FIRE

- Note: Most foams will react with the material and release corrosive/toxic gases.

CAUTION: For Acetyl chloride (UN1717), use CO_2 or dry chemical only.

Small Fire

- CO_2, dry chemical, dry sand, alcohol-resistant foam.

Large Fire

- Water spray, fog or alcohol-resistant foam.
- **FOR CHLOROSILANES, DO NOT USE WATER**; use AFFF alcohol-resistant medium expansion foam.
- Move containers from fire area if you can do it without risk.
- Use water spray or fog; do not use straight streams.

Fire involving Tanks or Car/Trailer Loads

- Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- Do not get water inside containers.
- Cool containers with flooding quantities of water until well after fire is out.
- Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- ALWAYS stay away from tanks engulfed in fire.

SPILL OR LEAK

- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).
- All equipment used when handling the product must be grounded.
- Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.
- Stop leak if you can do it without risk.
- A vapor suppressing foam may be used to reduce vapors.
- **FOR CHLOROSILANES**, use AFFF alcohol-resistant medium expansion foam to reduce vapors.
- **DO NOT GET WATER on spilled substance or inside containers.**
- Use water spray to reduce vapors or divert vapor cloud drift. Avoid allowing water runoff to contact spilled material.
- Prevent entry into waterways, sewers, basements or confined areas.

Small Spill

- Cover with DRY earth, DRY sand or other non-combustible material followed with plastic sheet to minimize spreading or contact with rain.
- Use clean non-sparking tools to collect material and place it into loosely covered plastic containers for later disposal.

FIRST AID

- Move victim to fresh air.
- Call 911 or emergency medical service.
- Give artificial respiration if victim is not breathing.
- **Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.**
- Administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- For minor skin contact, avoid spreading material on unaffected skin.
- Keep victim warm and quiet.
- Effects of exposure (inhalation, ingestion or skin contact) to substance may be delayed.
- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

Substances - Toxic and/or Corrosive (Combustible/Water-Sensitive)

POTENTIAL HAZARDS

FIRE OR EXPLOSION

- Combustible material: may burn but does not ignite readily.
- Substance will react with water (some violently) releasing flammable, toxic or corrosive gases and runoff.
- When heated, vapors may form explosive mixtures with air: indoors, outdoors and sewers explosion hazards.
- Most vapors are heavier than air. They will spread along ground and collect in low or confined areas (sewers, basements, tanks).
- Vapors may travel to source of ignition and flash back.
- Contact with metals may evolve flammable hydrogen gas.
- Containers may explode when heated or if contaminated with water.

HEALTH

- **TOXIC;** inhalation, ingestion or contact (skin, eyes) with vapors, dusts or substance may cause severe injury, burns or death.
- Contact with molten substance may cause severe burns to skin and eyes.
- Reaction with water or moist air will release toxic, corrosive or flammable gases.
- Reaction with water may generate much heat that will increase the concentration of fumes in the air.
- Fire will produce irritating, corrosive and/or toxic gases.
- Runoff from fire control or dilution water may be corrosive and/or toxic and cause pollution.

PUBLIC SAFETY

- **CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.**
- As an immediate precautionary measure, isolate spill or leak area in all directions for at least 50 meters (150 feet) for liquids and at least 25 meters (75 feet) for solids.
- Keep unauthorized personnel away.
- Stay upwind.
- Keep out of low areas.
- Ventilate enclosed areas.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection.
- Structural firefighters' protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible.

EVACUATION

Spill

- See Table 1 - Initial Isolation and Protective Action Distances for highlighted materials. For non-highlighted materials, increase, in the downwind direction, as necessary, the isolation distance shown under “PUBLIC SAFETY”.

Fire

- If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

EMERGENCY RESPONSE

FIRE

- Note: Most foams will react with the material and release corrosive/toxic gases.

Small Fire

- CO_2, dry chemical, dry sand, alcohol-resistant foam.

Large Fire

- Water spray, fog or alcohol-resistant foam.
- **FOR CHLOROSILANES, DO NOT USE WATER**; use AFFF alcohol-resistant medium expansion foam.
- Move containers from fire area if you can do it without risk.
- Use water spray or fog; do not use straight streams.

Fire involving Tanks or Car/Trailer Loads

- Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- Do not get water inside containers.
- Cool containers with flooding quantities of water until well after fire is out.
- Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- ALWAYS stay away from tanks engulfed in fire.

SPILL OR LEAK

- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).
- All equipment used when handling the product must be grounded.
- Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.
- Stop leak if you can do it without risk.
- A vapor suppressing foam may be used to reduce vapors.
- **FOR CHLOROSILANES**, use AFFF alcohol-resistant medium expansion foam to reduce vapors.
- **DO NOT GET WATER on spilled substance or inside containers.**
- Use water spray to reduce vapors or divert vapor cloud drift. Avoid allowing water runoff to contact spilled material.
- Prevent entry into waterways, sewers, basements or confined areas.

Small Spill

- Cover with DRY earth, DRY sand or other non-combustible material followed with plastic sheet to minimize spreading or contact with rain.
- Use clean non-sparking tools to collect material and place it into loosely covered plastic containers for later disposal.

FIRST AID

- Move victim to fresh air.
- Call 911 or emergency medical service.
- Give artificial respiration if victim is not breathing.
- **Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.**
- Administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- For minor skin contact, avoid spreading material on unaffected skin.
- Keep victim warm and quiet.
- Effects of exposure (inhalation, ingestion or skin contact) to substance may be delayed.
- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

Substances - Toxic and/or Corrosive (Non-Combustible/Water-Sensitive)

POTENTIAL HAZARDS

HEALTH

- **TOXIC**; inhalation, ingestion or contact (skin, eyes) with vapors, dusts or substance may cause severe injury, burns or death.
- Reaction with water or moist air may release toxic, corrosive or flammable gases.
- Reaction with water may generate much heat that will increase the concentration of fumes in the air.
- Fire will produce irritating, corrosive and/or toxic gases.
- Runoff from fire control or dilution water may be corrosive and/or toxic and cause pollution.

FIRE OR EXPLOSION

- Non-combustible, substance itself does not burn but may decompose upon heating to produce corrosive and/or toxic fumes.
- For UN1796, UN1826, UN2031 at high concentrations and for UN2032, these may act as oxidizers, also consult GUIDE 140.
- Vapors may accumulate in confined areas (basement, tanks, hopper/tank cars etc.).
- Substance may react with water (some violently), releasing corrosive and/or toxic gases and runoff.
- Contact with metals may evolve flammable hydrogen gas.
- Containers may explode when heated or if contaminated with water.

PUBLIC SAFETY

- **CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.**
- As an immediate precautionary measure, isolate spill or leak area in all directions for at least 50 meters (150 feet) for liquids and at least 25 meters (75 feet) for solids.
- Keep unauthorized personnel away.
- Stay upwind.
- Keep out of low areas.
- Ventilate enclosed areas.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection.
- Structural firefighters' protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible.

EVACUATION

Spill

- See Table 1 - Initial Isolation and Protective Action Distances for highlighted materials. For non-highlighted materials, increase, in the downwind direction, as necessary, the isolation distance shown under “PUBLIC SAFETY”.

Fire

- If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

EMERGENCY RESPONSE

FIRE

- Note: Some foams will react with the material and release corrosive/toxic gases.

Small Fire

- CO_2 (except for Cyanides), dry chemical, dry sand, alcohol-resistant foam.

Large Fire

- Water spray, fog or alcohol-resistant foam.
- Move containers from fire area if you can do it without risk.
- Use water spray or fog; do not use straight streams.
- Dike fire-control water for later disposal; do not scatter the material.

Fire involving Tanks or Car/Trailer Loads

- Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- Do not get water inside containers.
- Cool containers with flooding quantities of water until well after fire is out.
- Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- ALWAYS stay away from tanks engulfed in fire.

SPILL OR LEAK

- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).
- All equipment used when handling the product must be grounded.
- Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.
- Stop leak if you can do it without risk.
- A vapor suppressing foam may be used to reduce vapors.
- DO NOT GET WATER INSIDE CONTAINERS.
- Use water spray to reduce vapors or divert vapor cloud drift. Avoid allowing water runoff to contact spilled material.
- Prevent entry into waterways, sewers, basements or confined areas.

Small Spill

- Cover with DRY earth, DRY sand or other non-combustible material followed with plastic sheet to minimize spreading or contact with rain.
- Use clean non-sparking tools to collect material and place it into loosely covered plastic containers for later disposal.

FIRST AID

- Move victim to fresh air.
- Call 911 or emergency medical service.
- Give artificial respiration if victim is not breathing.
- **Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.**
- Administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- **In case of contact with Hydrofluoric acid (UN1790)**, flush skin and eyes with water for 5 minutes; then, for skin exposures rub on a calcium/gel combination; for eyes flush with a water/calcium solution if available, otherwise continue with water for 15 minutes.
- For minor skin contact, avoid spreading material on unaffected skin.
- Keep victim warm and quiet.
- Effects of exposure (inhalation, ingestion or skin contact) to substance may be delayed.
- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

POTENTIAL HAZARDS

HEALTH

- Inhalation or contact with substance may cause infection, disease or death.
- Runoff from fire control may cause pollution.
- **Note: Damaged packages containing solid CO_2 as a refrigerant may produce water or frost from condensation of air. Do not touch this liquid as it could be contaminated by the contents of the parcel.**

FIRE OR EXPLOSION

- Some of these materials may burn, but none ignite readily.
- Some may be transported in flammable liquids.

PUBLIC SAFETY

- **CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.**
- As an immediate precautionary measure, isolate spill or leak area for at least 25 meters (75 feet) in all directions.
- Keep unauthorized personnel away.
- Stay upwind.
- Obtain identity of substance involved.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Structural firefighters' protective clothing will only provide limited protection.

EMERGENCY RESPONSE

FIRE

Small Fire

- Dry chemical, soda ash, lime or sand.

Large Fire

- Use extinguishing agent suitable for type of surrounding fire.
- Do not scatter spilled material with high pressure water streams.
- Move containers from fire area if you can do it without risk.

SPILL OR LEAK

- Do not touch or walk through spilled material.
- Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.
- Absorb with earth, sand or other non-combustible material.
- Cover damaged package or spilled material with damp towel or rag and keep wet with liquid bleach or other disinfectant.
- **DO NOT CLEAN-UP OR DISPOSE OF, EXCEPT UNDER SUPERVISION OF A SPECIALIST.**

FIRST AID

- Move victim to a safe isolated area.

CAUTION: Victim may be a source of contamination.

- Call 911 or emergency medical service.
- Remove and isolate contaminated clothing and shoes.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- Effects of exposure (inhalation, ingestion or skin contact) to substance may be delayed.
- **For further assistance, contact your local Poison Control Center.**
- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

POTENTIAL HAZARDS

HEALTH

- Inhalation of vapors or dust is extremely irritating.
- May cause burning of eyes and flow of tears.
- May cause coughing, difficult breathing and nausea.
- Brief exposure effects last only a few minutes.
- Exposure in an enclosed area may be very harmful.
- Fire will produce irritating, corrosive and/or toxic gases.
- Runoff from fire control or dilution water may cause pollution.

FIRE OR EXPLOSION

- Some of these materials may burn, but none ignite readily.
- Containers may explode when heated.

PUBLIC SAFETY

- **CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.**
- As an immediate precautionary measure, isolate spill or leak area in all directions for at least 50 meters (150 feet) for liquids and at least 25 meters (75 feet) for solids.
- Keep unauthorized personnel away.
- Stay upwind.
- Keep out of low areas.
- Ventilate closed spaces before entering.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection.
- Structural firefighters' protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible.

EVACUATION

Spill

- See Table 1 - Initial Isolation and Protective Action Distances for highlighted materials. For non-highlighted materials, increase, in the downwind direction, as necessary, the isolation distance shown under “PUBLIC SAFETY”.

Fire

- If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

EMERGENCY RESPONSE

FIRE

Small Fire

- Dry chemical, CO_2, water spray or regular foam.

Large Fire

- Water spray, fog or regular foam.
- Move containers from fire area if you can do it without risk.
- Dike fire-control water for later disposal; do not scatter the material.

Fire involving Tanks or Car/Trailer Loads

- Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- Do not get water inside containers.
- Cool containers with flooding quantities of water until well after fire is out.
- Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- ALWAYS stay away from tanks engulfed in fire.
- For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.

SPILL OR LEAK

- Do not touch or walk through spilled material.
- Stop leak if you can do it without risk.
- Fully encapsulating, vapor protective clothing should be worn for spills and leaks with no fire.

Small Spill

- Take up with sand or other non-combustible absorbent material and place into containers for later disposal.

Large Spill

- Dike far ahead of liquid spill for later disposal.
- Prevent entry into waterways, sewers, basements or confined areas.

FIRST AID

- Move victim to fresh air.
- Call 911 or emergency medical service.
- Give artificial respiration if victim is not breathing.
- **Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.**
- Administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- For minor skin contact, avoid spreading material on unaffected skin.
- Keep victim warm and quiet.
- Effects should disappear after individual has been exposed to fresh air for approximately 10 minutes.
- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

POTENTIAL HAZARDS

HEALTH

- Toxic by ingestion.
- Vapors may cause dizziness or suffocation.
- Exposure in an enclosed area may be very harmful.
- Contact may irritate or burn skin and eyes.
- Fire may produce irritating and/or toxic gases.
- Runoff from fire control or dilution water may cause pollution.

FIRE OR EXPLOSION

- Some of these materials may burn, but none ignite readily.
- Most vapors are heavier than air.
- Air/vapor mixtures may explode when ignited.
- Container may explode in heat of fire.

PUBLIC SAFETY

- **CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.**
- As an immediate precautionary measure, isolate spill or leak area for at least 50 meters (150 feet) in all directions.
- Keep unauthorized personnel away.
- Stay upwind.
- Many gases are heavier than air and will spread along ground and collect in low or confined areas (sewers, basements, tanks).
- Keep out of low areas.
- Ventilate closed spaces before entering.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Wear chemical protective clothing that is specifically recommended by the manufacturer.
- Structural firefighters' protective clothing will only provide limited protection.

EVACUATION

Large Spill

- Consider initial downwind evacuation for at least 100 meters (330 feet).

Fire

- If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

EMERGENCY RESPONSE

FIRE

Small Fire

- Dry chemical, CO_2 or water spray.

Large Fire

- Dry chemical, CO_2, alcohol-resistant foam or water spray.
- Move containers from fire area if you can do it without risk.
- Dike fire-control water for later disposal; do not scatter the material.

Fire involving Tanks or Car/Trailer Loads

- Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- Cool containers with flooding quantities of water until well after fire is out.
- Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- ALWAYS stay away from tanks engulfed in fire.

SPILL OR LEAK

- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).
- Stop leak if you can do it without risk.

Small Liquid Spill

- Take up with sand, earth or other non-combustible absorbent material.

Large Spill

- Dike far ahead of liquid spill for later disposal.
- Prevent entry into waterways, sewers, basements or confined areas.

FIRST AID

- Move victim to fresh air.
- Call 911 or emergency medical service.
- Give artificial respiration if victim is not breathing.
- Administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- For minor skin contact, avoid spreading material on unaffected skin.
- Wash skin with soap and water.
- Keep victim warm and quiet.
- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

Radioactive Materials (Low Level Radiation)

POTENTIAL HAZARDS

HEALTH

- Radiation presents minimal risk to transport workers, emergency response personnel and the public during transportation accidents. Packaging durability increases as potential hazard of radioactive content increases.
- Very low levels of contained radioactive materials and low radiation levels outside packages result in low risks to people. Damaged packages may release measurable amounts of radioactive material, but the resulting risks are expected to be low.
- Some radioactive materials cannot be detected by commonly available instruments.
- Packages do not have RADIOACTIVE I, II, or III labels. Some may have EMPTY labels or may have the word "Radioactive" in the package marking.

FIRE OR EXPLOSION

- Some of these materials may burn, but most do not ignite readily.
- Many have cardboard outer packaging; content (physically large or small) can be of many different physical forms.
- Radioactivity does not change flammability or other properties of materials.

PUBLIC SAFETY

- **CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.**
- **Priorities for rescue, life-saving, first aid, fire control and other hazards are higher than the priority for measuring radiation levels.**
- Radiation Authority must be notified of accident conditions. Radiation Authority is usually responsible for decisions about radiological consequences and closure of emergencies.
- As an immediate precautionary measure, isolate spill or leak area for at least 25 meters (75 feet) in all directions.
- Stay upwind.
- Keep unauthorized personnel away.
- Detain or isolate uninjured persons or equipment suspected to be contaminated; delay decontamination and cleanup until instructions are received from Radiation Authority.

PROTECTIVE CLOTHING

- Positive pressure self-contained breathing apparatus (SCBA) and structural firefighters' protective clothing will provide adequate protection.

EVACUATION

Large Spill

- Consider initial downwind evacuation for at least 100 meters (330 feet).

Fire

- When a large quantity of this material is involved in a major fire, consider an initial evacuation distance of 300 meters (1000 feet) in all directions.

EMERGENCY RESPONSE

FIRE

- Presence of radioactive material will not influence the fire control processes and should not influence selection of techniques.
- Move containers from fire area if you can do it without risk.
- Do not move damaged packages; move undamaged packages out of fire zone.

Small Fire

- Dry chemical, CO_2, water spray or regular foam.

Large Fire

- Water spray, fog (flooding amounts).

SPILL OR LEAK

- Do not touch damaged packages or spilled material.
- Cover liquid spill with sand, earth or other non-combustible absorbent material.
- Cover powder spill with plastic sheet or tarp to minimize spreading.

FIRST AID

- Call 911 or emergency medical service.
- Medical problems take priority over radiological concerns.
- Use first aid treatment according to the nature of the injury.
- Do not delay care and transport of a seriously injured person.
- Give artificial respiration if victim is not breathing.
- Administer oxygen if breathing is difficult.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- Injured persons contaminated by contact with released material are not a serious hazard to health care personnel, equipment or facilities.
- Ensure that medical personnel are aware of the material(s) involved, take precautions to protect themselves and prevent spread of contamination.

Radioactive Materials (Low to Moderate Level Radiation)

POTENTIAL HAZARDS

HEALTH

- Radiation presents minimal risk to transport workers, emergency response personnel and the public during transportation accidents. Packaging durability increases as potential hazard of radioactive content increases.
- Undamaged packages are safe. Contents of damaged packages may cause higher external radiation exposure, or both external and internal radiation exposure if contents are released.
- Low radiation hazard when material is inside container. If material is released from package or bulk container, hazard will vary from low to moderate. Level of hazard will depend on the type and amount of radioactivity, the kind of material it is in, and/or the surfaces it is on.
- Some material may be released from packages during accidents of moderate severity but risks to people are not great.
- Released radioactive materials or contaminated objects usually will be visible if packaging fails.
- Some exclusive use shipments of bulk and packaged materials will not have “RADIOACTIVE” labels. Placards, markings and shipping papers provide identification.
- Some packages may have a “RADIOACTIVE” label and a second hazard label. The second hazard is usually greater than the radiation hazard; so follow this GUIDE as well as the response GUIDE for the second hazard class label.
- Some radioactive materials cannot be detected by commonly available instruments.
- Runoff from control of cargo fire may cause low-level pollution.

FIRE OR EXPLOSION

- Some of these materials may burn, but most do not ignite readily.
- Uranium and Thorium metal cuttings may ignite spontaneously if exposed to air (see GUIDE 136).
- Nitrates are oxidizers and may ignite other combustibles (see GUIDE 141).

PUBLIC SAFETY

- **CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.**
- **Priorities for rescue, life-saving, first aid, fire control and other hazards are higher than the priority for measuring radiation levels.**
- Radiation Authority must be notified of accident conditions. Radiation Authority is usually responsible for decisions about radiological consequences and closure of emergencies.
- As an immediate precautionary measure, isolate spill or leak area for at least 25 meters (75 feet) in all directions.
- Stay upwind.
- Keep unauthorized personnel away.
- Detain or isolate uninjured persons or equipment suspected to be contaminated; delay decontamination and cleanup until instructions are received from Radiation Authority.

PROTECTIVE CLOTHING

- Positive pressure self-contained breathing apparatus (SCBA) and structural firefighters’ protective clothing will provide adequate protection.

EVACUATION

Large Spill

- Consider initial downwind evacuation for at least 100 meters (330 feet).

Fire

- When a large quantity of this material is involved in a major fire, consider an initial evacuation distance of 300 meters (1000 feet) in all directions.

EMERGENCY RESPONSE

FIRE

- Presence of radioactive material will not influence the fire control processes and should not influence selection of techniques.
- Move containers from fire area if you can do it without risk.
- Do not move damaged packages; move undamaged packages out of fire zone.

Small Fire

- Dry chemical, CO_2, water spray or regular foam.

Large Fire

- Water spray, fog (flooding amounts).
- Dike fire-control water for later disposal.

SPILL OR LEAK

- Do not touch damaged packages or spilled material.
- Cover liquid spill with sand, earth or other non-combustible absorbent material.
- Dike to collect large liquid spills.
- Cover powder spill with plastic sheet or tarp to minimize spreading.

FIRST AID

- Call 911 or emergency medical service.
- Medical problems take priority over radiological concerns.
- Use first aid treatment according to the nature of the injury.
- Do not delay care and transport of a seriously injured person.
- Give artificial respiration if victim is not breathing.
- Administer oxygen if breathing is difficult.
- In case of contact with substance, wipe from skin immediately; flush skin or eyes with running water for at least 20 minutes.
- Injured persons contaminated by contact with released material are not a serious hazard to health care personnel, equipment or facilities.
- Ensure that medical personnel are aware of the material(s) involved, take precautions to protect themselves and prevent spread of contamination.

Radioactive Materials (Low to High Level Radiation)

POTENTIAL HAZARDS

HEALTH

- Radiation presents minimal risk to transport workers, emergency response personnel and the public during transportation accidents. Packaging durability increases as potential hazard of radioactive content increases.
- Undamaged packages are safe. Contents of damaged packages may cause higher external radiation exposure, or both external and internal radiation exposure if contents are released.
- Type A packages (cartons, boxes, drums, articles, etc.) identified as “Type A” by marking on packages or by shipping papers contain non-life endangering amounts. Partial releases might be expected if “Type A” packages are damaged in moderately severe accidents.
- Type B packages, and the rarely occurring Type C packages, (large and small, usually metal) contain the most hazardous amounts. They can be identified by package markings or by shipping papers. Life threatening conditions may exist only if contents are released or package shielding fails. Because of design, evaluation and testing of packages, these conditions would be expected only for accidents of utmost severity.
- The rarely occurring "Special Arrangement" shipments may be of Type A, Type B or Type C packages. Package type will be marked on packages, and shipment details will be on shipping papers.
- Radioactive White-I labels indicate radiation levels outside single, isolated, undamaged packages are very low (less than 0.005 mSv/h (0.5 mrem/h)).
- Radioactive Yellow-II and Yellow-III labeled packages have higher radiation levels. The transport index (TI) on the label identifies the maximum radiation level in mrem/h one meter from a single, isolated, undamaged package.
- Some radioactive materials cannot be detected by commonly available instruments.
- Water from cargo fire control may cause pollution.

FIRE OR EXPLOSION

- Some of these materials may burn, but most do not ignite readily.
- Radioactivity does not change flammability or other properties of materials.
- Type B packages are designed and evaluated to withstand total engulfment in flames at temperatures of 800°C (1475°F) for a period of 30 minutes.

PUBLIC SAFETY

- **CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.**
- **Priorities for rescue, life-saving, first aid, fire control and other hazards are higher than the priority for measuring radiation levels.**
- Radiation Authority must be notified of accident conditions. Radiation Authority is usually responsible for decisions about radiological consequences and closure of emergencies.
- As an immediate precautionary measure, isolate spill or leak area for at least 25 meters (75 feet) in all directions. • Stay upwind. • Keep unauthorized personnel away.
- Detain or isolate uninjured persons or equipment suspected to be contaminated; delay decontamination and cleanup until instructions are received from Radiation Authority.

PROTECTIVE CLOTHING

- Positive pressure self-contained breathing apparatus (SCBA) and structural firefighters’ protective clothing will provide adequate protection against internal radiation exposure, but not external radiation exposure.

EVACUATION

Large Spill

- Consider initial downwind evacuation for at least 100 meters (330 feet).

Fire

- When a large quantity of this material is involved in a major fire, consider an initial evacuation distance of 300 meters (1000 feet) in all directions.

EMERGENCY RESPONSE

FIRE

- Presence of radioactive material will not influence the fire control processes and should not influence selection of techniques.
- Move containers from fire area if you can do it without risk.
- Do not move damaged packages; move undamaged packages out of fire zone.

Small Fire

- Dry chemical, CO_2, water spray or regular foam.

Large Fire

- Water spray, fog (flooding amounts).
- Dike fire-control water for later disposal.

SPILL OR LEAK

- Do not touch damaged packages or spilled material.
- Damp surfaces on undamaged or slightly damaged packages are seldom an indication of packaging failure. Most packaging for liquid content have inner containers and/or inner absorbent materials.
- Cover liquid spill with sand, earth or other non-combustible absorbent material.

FIRST AID

- Call 911 or emergency medical service.
- Medical problems take priority over radiological concerns.
- Use first aid treatment according to the nature of the injury.
- Do not delay care and transport of a seriously injured person.
- Give artificial respiration if victim is not breathing.
- Administer oxygen if breathing is difficult.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- Injured persons contaminated by contact with released material are not a serious hazard to health care personnel, equipment or facilities.
- Ensure that medical personnel are aware of the material(s) involved, take precautions to protect themselves and prevent spread of contamination.

POTENTIAL HAZARDS

HEALTH

- Radiation presents minimal risk to transport workers, emergency response personnel and the public during transportation accidents. Packaging durability increases as potential hazard of radioactive content increases.
- Undamaged packages are safe; contents of damaged packages may cause external radiation exposure, and much higher external exposure if contents (source capsules) are released.
- Contamination and internal radiation hazards are not expected, but not impossible.
- Type A packages (cartons, boxes, drums, articles, etc.) identified as "Type A" by marking on packages or by shipping papers contain non-life endangering amounts. Radioactive sources may be released if "Type A" packages are damaged in moderately severe accidents.
- Type B packages, and the rarely occurring Type C packages, (large and small, usually metal) contain the most hazardous amounts. They can be identified by package markings or by shipping papers. Life threatening conditions may exist only if contents are released or package shielding fails. Because of design, evaluation and testing of packages, these conditions would be expected only for accidents of utmost severity.
- Radioactive White-I labels indicate radiation levels outside single, isolated, undamaged packages are very low (less than 0.005 mSv/h (0.5 mrem/h)).
- Radioactive Yellow-II and Yellow-III labeled packages have higher radiation levels. The transport index (TI) on the label identifies the maximum radiation level in mrem/h one meter from a single, isolated, undamaged package.
- Radiation from the package contents, usually in durable metal capsules, can be detected by most radiation instruments.
- Water from cargo fire control is not expected to cause pollution.

FIRE OR EXPLOSION

- Packagings can burn completely without risk of content loss from sealed source capsule.
- Radioactivity does not change flammability or other properties of materials.
- Radioactive source capsules and Type B packages are designed and evaluated to withstand total engulfment in flames at temperatures of 800°C (1475°F) for a period of 30 minutes.

PUBLIC SAFETY

- **CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.**
- **Priorities for rescue, life-saving, first aid, fire control and other hazards are higher than the priority for measuring radiation levels.**
- Radiation Authority must be notified of accident conditions. Radiation Authority is usually responsible for decisions about radiological consequences and closure of emergencies.
- As an immediate precautionary measure, isolate spill or leak area for at least 25 meters (75 feet) in all directions.
- Stay upwind. • Keep unauthorized personnel away.
- Delay final cleanup until instructions or advice is received from Radiation Authority.

PROTECTIVE CLOTHING

- Positive pressure self-contained breathing apparatus (SCBA) and structural firefighters' protective clothing will provide adequate protection against internal radiation exposure, but not external radiation exposure.

EVACUATION

Large Spill

- Consider initial downwind evacuation for at least 100 meters (330 feet).

Fire

- When a large quantity of this material is involved in a major fire, consider an initial evacuation distance of 300 meters (1000 feet) in all directions.

EMERGENCY RESPONSE

FIRE

- Presence of radioactive material will not influence the fire control processes and should not influence selection of techniques.
- Move containers from fire area if you can do it without risk.
- Do not move damaged packages; move undamaged packages out of fire zone.

Small Fire

- Dry chemical, CO_2, water spray or regular foam.

Large Fire

- Water spray, fog (flooding amounts).

SPILL OR LEAK

- Do not touch damaged packages or spilled material.
- Damp surfaces on undamaged or slightly damaged packages are seldom an indication of packaging failure. Contents are seldom liquid. Content is usually a metal capsule, easily seen if released from package.
- If source capsule is identified as being out of package, **DO NOT TOUCH**. Stay away and await advice from Radiation Authority.

FIRST AID

- Call 911 or emergency medical service.
- Medical problems take priority over radiological concerns.
- Use first aid treatment according to the nature of the injury.
- Do not delay care and transport of a seriously injured person.
- Persons exposed to special form sources are not likely to be contaminated with radioactive material.
- Give artificial respiration if victim is not breathing.
- Administer oxygen if breathing is difficult.
- Injured persons contaminated by contact with released material are not a serious hazard to health care personnel, equipment or facilities.
- Ensure that medical personnel are aware of the material(s) involved, take precautions to protect themselves and prevent spread of contamination.

Radioactive Materials (Fissile/Low to High Level Radiation)

POTENTIAL HAZARDS

HEALTH

- Radiation presents minimal risk to transport workers, emergency response personnel and the public during transportation accidents. Packaging durability increases as potential radiation and criticality hazards of the content increase.
- Undamaged packages are safe. Contents of damaged packages may cause higher external radiation exposure, or both external and internal radiation exposure if contents are released.
- Type AF or IF packages, identified by package markings, do not contain life-threatening amounts of material. External radiation levels are low and packages are designed, evaluated and tested to control releases and to prevent a fission chain reaction under severe transport conditions.
- Type B(U)F, B(M)F and CF packages (identified by markings on packages or shipping papers) contain potentially life endangering amounts. Because of design, evaluation and testing of packages, fission chain reactions are prevented and releases are not expected to be life endangering for all accidents except those of utmost severity.
- The rarely occurring "Special Arrangement" shipments may be of Type AF, BF or CF packages. Package type will be marked on packages, and shipment details will be on shipping papers.
- The transport index (TI) shown on labels or a shipping paper might not indicate the radiation level at one meter from a single, isolated, undamaged package; instead, it might relate to controls needed during transport because of the fissile properties of the materials. Alternatively, the fissile nature of the contents may be indicated by a criticality safety index (CSI) on a special FISSILE label or on the shipping paper.
- Some radioactive materials cannot be detected by commonly available instruments.
- Water from cargo fire control is not expected to cause pollution.

FIRE OR EXPLOSION

- These materials are seldom flammable. Packages are designed to withstand fires without damage to contents.
- Radioactivity does not change flammability or other properties of materials.
- Type AF, IF, B(U)F, B(M)F and CF packages are designed and evaluated to withstand total engulfment in flames at temperatures of 800°C (1475°F) for a period of 30 minutes.

PUBLIC SAFETY

- **CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover**
- **Priorities for rescue, life-saving, first aid, fire control and other hazards are higher than the priority for measuring radiation levels.**
- Radiation Authority must be notified of accident conditions. Radiation Authority is usually responsible for decisions about radiological consequences and closure of emergencies.
- As an immediate precautionary measure, isolate spill or leak area for at least 25 meters (75 feet) in all directions. • Stay upwind. • Keep unauthorized personnel away.
- Detain or isolate uninjured persons or equipment suspected to be contaminated; delay decontamination and cleanup until instructions are received from Radiation Authority.

PROTECTIVE CLOTHING

- Positive pressure self-contained breathing apparatus (SCBA) and structural firefighters' protective clothing will provide adequate protection against internal radiation exposure, but not external radiation exposure.

EVACUATION

Large Spill

- Consider initial downwind evacuation for at least 100 meters (330 feet).

Fire

- When a large quantity of this material is involved in a major fire, consider an initial evacuation distance of 300 meters (1000 feet) in all directions.

EMERGENCY RESPONSE

FIRE

- Presence of radioactive material will not influence the fire control processes and should not influence selection of techniques.
- Move containers from fire area if you can do it without risk.
- Do not move damaged packages; move undamaged packages out of fire zone.

Small Fire

- Dry chemical, CO_2, water spray or regular foam.

Large Fire

- Water spray, fog (flooding amounts).

SPILL OR LEAK

- Do not touch damaged packages or spilled material.
- Damp surfaces on undamaged or slightly damaged packages are seldom an indication of packaging failure. Most packaging for liquid content have inner containers and/or inner absorbent materials.

Liquid Spill

- Package contents are seldom liquid. If any radioactive contamination resulting from a liquid release is present, it probably will be low-level.

FIRST AID

- Call 911 or emergency medical service.
- Medical problems take priority over radiological concerns.
- Use first aid treatment according to the nature of the injury.
- Do not delay care and transport of a seriously injured person.
- Give artificial respiration if victim is not breathing.
- Administer oxygen if breathing is difficult.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- Injured persons contaminated by contact with released material are not a serious hazard to health care personnel, equipment or facilities.
- Ensure that medical personnel are aware of the material(s) involved, take precautions to protect themselves and prevent spread of contamination.

Radioactive Materials - Corrosive (Uranium Hexafluoride/Water-Sensitive)

POTENTIAL HAZARDS

HEALTH

- Radiation presents minimal risk to transport workers, emergency response personnel and the public during transportation accidents. Packaging durability increases as potential radiation and criticality hazards of the content increase.
- Chemical hazard greatly exceeds radiation hazard.
- Substance reacts with water and water vapor in air to form toxic and corrosive hydrogen fluoride gas and an extremely irritating and corrosive, white-colored, water-soluble residue.
- If inhaled, may be fatal.
- Direct contact causes burns to skin, eyes, and respiratory tract.
- Low-level radioactive material; very low radiation hazard to people.
- Runoff from control of cargo fire may cause low-level pollution.

FIRE OR EXPLOSION

- Substance does not burn.
- The material may react violently with fuels.
- Containers in protective overpacks (horizontal cylindrical shape with short legs for tie-downs), are identified with "AF", "B(U)F" or "H(U)" on shipping papers or by markings on the overpacks. They are designed and evaluated to withstand severe conditions including total engulfment in flames at temperatures of 800°C (1475°F) for a period of 30 minutes.
- Bare filled cylinders, identified with UN2978 as part of the marking (may also be marked H(U) or H(M)), may rupture in heat of engulfing fire; bare empty (except for residue) cylinders will not rupture in fires.
- Radioactivity does not change flammability or other properties of materials.

PUBLIC SAFETY

- **CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.**
- **Priorities for rescue, life-saving, first aid, fire control and other hazards are higher than the priority for measuring radiation levels.**
- Radiation Authority must be notified of accident conditions. Radiation Authority is usually responsible for decisions about radiological consequences and closure of emergencies.
- As an immediate precautionary measure, isolate spill or leak area for at least 25 meters (75 feet) in all directions.
- Stay upwind.
- Keep unauthorized personnel away.
- Detain or isolate uninjured persons or equipment suspected to be contaminated; delay decontamination and cleanup until instructions are received from Radiation Authority.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection.
- Structural firefighters' protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible.

EVACUATION

Spill

- See Table 1 - Initial Isolation and Protective Action Distances.

Fire

- When a large quantity of this material is involved in a major fire, consider an initial evacuation distance of 300 meters (1000 feet) in all directions.

EMERGENCY RESPONSE

FIRE

- DO NOT USE WATER OR FOAM ON MATERIAL ITSELF.
- Move containers from fire area if you can do it without risk.

Small Fire

- Dry chemical or CO_2.

Large Fire

- Water spray, fog or regular foam.
- Cool containers with flooding quantities of water until well after fire is out.
- If this is impossible, withdraw from area and let fire burn.
- ALWAYS stay away from tanks engulfed in fire.

SPILL OR LEAK

- Do not touch damaged packages or spilled material.
- Without fire or smoke, leak will be evident by visible and irritating vapors and residue forming at the point of release.
- Use fine water spray to reduce vapors; do not put water directly on point of material release from container.
- Residue buildup may self-seal small leaks.
- Dike far ahead of spill to collect runoff water.

FIRST AID

- Call 911 or emergency medical service.
- Medical problems take priority over radiological concerns.
- Use first aid treatment according to the nature of the injury.
- Do not delay care and transport of a seriously injured person.
- Give artificial respiration if victim is not breathing.
- Administer oxygen if breathing is difficult.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- Effects of exposure (inhalation, ingestion or skin contact) to substance may be delayed.
- Injured persons contaminated by contact with released material are not a serious hazard to health care personnel, equipment or facilities.
- Ensure that medical personnel are aware of the material(s) involved, take precautions to protect themselves and prevent spread of contamination.

POTENTIAL HAZARDS

HEALTH

- **TOXIC; may be fatal if inhaled.**
- Vapors are extremely irritating.
- Contact with gas or liquefied gas will cause burns, severe injury and/or frostbite.
- Vapors from liquefied gas are initially heavier than air and spread along ground.
- Runoff from fire control may cause pollution.

FIRE OR EXPLOSION

- Substance does not burn but will support combustion.
- This is a strong oxidizer and will react vigorously or explosively with many materials including fuels.
- May ignite combustibles (wood, paper, oil, clothing, etc.).
- Vapor explosion and poison hazard indoors, outdoors or in sewers.
- Containers may explode when heated.
- Ruptured cylinders may rocket.

PUBLIC SAFETY

- **CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.**
- As an immediate precautionary measure, isolate spill or leak area for at least 100 meters (330 feet) in all directions.
- Keep unauthorized personnel away.
- Stay upwind.
- Many gases are heavier than air and will spread along ground and collect in low or confined areas (sewers, basements, tanks).
- Keep out of low areas.
- Ventilate closed spaces before entering.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection.
- Structural firefighters' protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible.
- Always wear thermal protective clothing when handling refrigerated/cryogenic liquids.

EVACUATION

Spill

- See Table 1 - Initial Isolation and Protective Action Distances.

Fire

- If tank, rail car or tank truck is involved in a fire, ISOLATE for 1600 meters (1 mile) in all directions; also, consider initial evacuation for 1600 meters (1 mile) in all directions.

EMERGENCY RESPONSE

FIRE

Small Fire

- Dry chemical, soda ash, lime or sand.

Large Fire

- Water spray, fog (flooding amounts).
- Do not get water inside containers.
- Move containers from fire area if you can do it without risk.

Fire involving Tanks

- Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- Cool containers with flooding quantities of water until well after fire is out.
- Do not direct water at source of leak or safety devices; icing may occur.
- Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- ALWAYS stay away from tanks engulfed in fire.
- For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.

SPILL OR LEAK

- Do not touch or walk through spilled material.
- If you have not donned special protective clothing approved for this material, do not expose yourself to any risk of this material touching you.
- **Do not direct water at spill or source of leak.**
- A fine water spray remotely directed to the edge of the spill pool can be used to direct and maintain a hot flare fire that will burn the spilled material in a controlled manner.
- Keep combustibles (wood, paper, oil, etc.) away from spilled material.
- Stop leak if you can do it without risk.
- Use water spray to reduce vapors or divert vapor cloud drift. Avoid allowing water runoff to contact spilled material.
- If possible, turn leaking containers so that gas escapes rather than liquid.
- Prevent entry into waterways, sewers, basements or confined areas.
- Isolate area until gas has dispersed.
- Ventilate the area.

FIRST AID

- Move victim to fresh air.
- Call 911 or emergency medical service.
- Give artificial respiration if victim is not breathing.
- Administer oxygen if breathing is difficult.
- Clothing frozen to the skin should be thawed before being removed.
- Remove and isolate contaminated clothing and shoes.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- Keep victim warm and quiet.
- Keep victim under observation.
- Effects of contact or inhalation may be delayed.
- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

POTENTIAL HAZARDS

HEALTH

- **TOXIC; Extremely Hazardous.**
- Inhalation extremely dangerous; may be fatal.
- Contact with gas or liquefied gas may cause burns, severe injury and/or frostbite.
- Odorless, will not be detected by sense of smell.

FIRE OR EXPLOSION

- **EXTREMELY FLAMMABLE.**
- May be ignited by heat, sparks or flames.
- Flame may be invisible.
- Containers may explode when heated.
- Vapor explosion and poison hazard indoors, outdoors or in sewers.
- Vapors from liquefied gas are initially heavier than air and spread along ground.
- Vapors may travel to source of ignition and flash back.
- Runoff may create fire or explosion hazard.

PUBLIC SAFETY

- **CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.**
- As an immediate precautionary measure, isolate spill or leak area for at least 100 meters (330 feet) in all directions.
- Keep unauthorized personnel away.
- Stay upwind.
- Many gases are heavier than air and will spread along ground and collect in low or confined areas (sewers, basements, tanks).
- Keep out of low areas.
- Ventilate closed spaces before entering.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection.
- Structural firefighters' protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible.
- Always wear thermal protective clothing when handling refrigerated/cryogenic liquids.

EVACUATION

Spill

- See Table 1 - Initial Isolation and Protective Action Distances.

Fire

- If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

EMERGENCY RESPONSE

FIRE

- **DO NOT EXTINGUISH A LEAKING GAS FIRE UNLESS LEAK CAN BE STOPPED.**

Small Fire

- Dry chemical, CO_2 or water spray.

Large Fire

- Water spray, fog or regular foam.
- Move containers from fire area if you can do it without risk.

Fire involving Tanks

- Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- Cool containers with flooding quantities of water until well after fire is out.
- Do not direct water at source of leak or safety devices; icing may occur.
- Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- ALWAYS stay away from tanks engulfed in fire.

SPILL OR LEAK

- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).
- All equipment used when handling the product must be grounded.
- Fully encapsulating, vapor protective clothing should be worn for spills and leaks with no fire.
- Do not touch or walk through spilled material.
- Stop leak if you can do it without risk.
- Use water spray to reduce vapors or divert vapor cloud drift. Avoid allowing water runoff to contact spilled material.
- Do not direct water at spill or source of leak.
- If possible, turn leaking containers so that gas escapes rather than liquid.
- Prevent entry into waterways, sewers, basements or confined areas.
- Isolate area until gas has dispersed.

FIRST AID

- Move victim to fresh air.
- Call 911 or emergency medical service.
- Give artificial respiration if victim is not breathing.
- Administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- In case of contact with liquefied gas, thaw frosted parts with lukewarm water.
- Keep victim warm and quiet.
- Keep victim under observation.
- Effects of contact or inhalation may be delayed.
- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

POTENTIAL HAZARDS

FIRE OR EXPLOSION

- Substance is transported in molten form at a temperature above 705°C (1300°F).
- Violent reaction with water; contact may cause an explosion or may produce a flammable gas.
- Will ignite combustible materials (wood, paper, oil, debris, etc.).
- Contact with nitrates or other oxidizers may cause an explosion.
- Contact with containers or other materials, including cold, wet or dirty tools, may cause an explosion.
- Contact with concrete will cause spalling and small pops.

HEALTH

- Contact causes severe burns to skin and eyes.
- Fire may produce irritating and/or toxic gases.

PUBLIC SAFETY

- **CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.**
- As an immediate precautionary measure, isolate spill or leak area for at least 50 meters (150 feet) in all directions.
- Keep unauthorized personnel away.
- Ventilate closed spaces before entering.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Wear flame retardant structural firefighters' protective clothing, including faceshield, helmet and gloves, this will provide limited thermal protection.

EMERGENCY RESPONSE

FIRE

- **Do Not Use Water, except in life threatening situations and then only in a fine spray.**
- **Do not use halogenated extinguishing agents or foam.**
- Move combustibles out of path of advancing pool if you can do so without risk.
- Extinguish fires started by molten material by using appropriate method for the burning material; keep water, halogenated extinguishing agents and foam away from the molten material.

SPILL OR LEAK

- Do not touch or walk through spilled material.
- Do not attempt to stop leak, due to danger of explosion.
- Keep combustibles (wood, paper, oil, etc.) away from spilled material.
- Substance is very fluid, spreads quickly, and may splash. Do not try to stop it with shovels or other objects.
- Dike far ahead of spill; use dry sand to contain the flow of material.
- Where possible allow molten material to solidify naturally.
- Avoid contact even after material solidifies. Molten, heated and cold aluminum look alike; do not touch unless you know it is cold.
- Clean up under the supervision of an expert after material has solidified.

FIRST AID

- Move victim to fresh air.
- Call 911 or emergency medical service.
- Give artificial respiration if victim is not breathing.
- Administer oxygen if breathing is difficult.
- For severe burns, immediate medical attention is required.
- Removal of solidified molten material from skin requires medical assistance.
- Remove and isolate contaminated clothing and shoes.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- Keep victim warm and quiet.

Metals (Powders, Dusts, Shavings, Borings, Turnings, or Cuttings, etc.)

POTENTIAL HAZARDS

FIRE OR EXPLOSION

- May react violently or explosively on contact with water.
- Some are transported in flammable liquids.
- May be ignited by friction, heat, sparks or flames.
- Some of these materials will burn with intense heat.
- Dusts or fumes may form explosive mixtures in air.
- Containers may explode when heated.
- May re-ignite after fire is extinguished.

HEALTH

- Oxides from metallic fires are a severe health hazard.
- Inhalation or contact with substance or decomposition products may cause severe injury or death.
- Fire may produce irritating, corrosive and/or toxic gases.
- Runoff from fire control or dilution water may cause pollution.

PUBLIC SAFETY

- **CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.**
- As an immediate precautionary measure, isolate spill or leak area in all directions for at least 50 meters (150 feet) for liquids and at least 25 meters (75 feet) for solids.
- Stay upwind.
- Keep unauthorized personnel away.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Structural firefighters' protective clothing will only provide limited protection.

EVACUATION

Large Spill

- Consider initial downwind evacuation for at least 50 meters (160 feet).

Fire

- If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

EMERGENCY RESPONSE

FIRE

- **DO NOT USE WATER, FOAM OR CO_2.**
- Dousing metallic fires with water will generate hydrogen gas, an extremely dangerous explosion hazard, particularly if fire is in a confined environment (i.e., building, cargo hold, etc.).
- Use DRY sand, graphite powder, dry sodium chloride based extinguishers, G-1® or Met-L-X® powder.
- Confining and smothering metal fires is preferable rather than applying water.
- Move containers from fire area if you can do it without risk.

Fire involving Tanks or Car/Trailer Loads

- If impossible to extinguish, protect surroundings and allow fire to burn itself out.

SPILL OR LEAK

- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).
- Do not touch or walk through spilled material.
- Stop leak if you can do it without risk.
- Prevent entry into waterways, sewers, basements or confined areas.

FIRST AID

- Move victim to fresh air.
- Call 911 or emergency medical service.
- Give artificial respiration if victim is not breathing.
- Administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- Keep victim warm and quiet.
- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

POTENTIAL HAZARDS

FIRE OR EXPLOSION

- Some may burn but none ignite readily.
- Containers may explode when heated.
- Some may be transported hot.

HEALTH

- Inhalation of material may be harmful.
- Contact may cause burns to skin and eyes.
- Inhalation of Asbestos dust may have a damaging effect on the lungs.
- Fire may produce irritating, corrosive and/or toxic gases.
- Some liquids produce vapors that may cause dizziness or suffocation.
- Runoff from fire control may cause pollution.

PUBLIC SAFETY

- **CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.**
- As an immediate precautionary measure, isolate spill or leak area in all directions for at least 50 meters (150 feet) for liquids and at least 25 meters (75 feet) for solids.
- Keep unauthorized personnel away.
- Stay upwind.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Structural firefighters' protective clothing will only provide limited protection.

EVACUATION

Spill

- See Table 1 - Initial Isolation and Protective Action Distances for highlighted materials. For non-highlighted materials, increase, in the downwind direction, as necessary, the isolation distance shown under "PUBLIC SAFETY".

Fire

- If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

EMERGENCY RESPONSE

FIRE

Small Fire

- Dry chemical, CO_2, water spray or regular foam.

Large Fire

- Water spray, fog or regular foam.
- Do not scatter spilled material with high pressure water streams.
- Move containers from fire area if you can do it without risk.
- Dike fire-control water for later disposal.

Fire involving Tanks

- Cool containers with flooding quantities of water until well after fire is out.
- Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- ALWAYS stay away from tanks engulfed in fire.

SPILL OR LEAK

- Do not touch or walk through spilled material.
- Stop leak if you can do it without risk.
- Prevent dust cloud.
- Avoid inhalation of asbestos dust.

Small Dry Spill

- With clean shovel place material into clean, dry container and cover loosely; move containers from spill area.

Small Spill

- Take up with sand or other non-combustible absorbent material and place into containers for later disposal.

Large Spill

- Dike far ahead of liquid spill for later disposal.
- Cover powder spill with plastic sheet or tarp to minimize spreading.
- Prevent entry into waterways, sewers, basements or confined areas.

FIRST AID

- Move victim to fresh air.
- Call 911 or emergency medical service.
- Give artificial respiration if victim is not breathing.
- Administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

POTENTIAL HAZARDS

HEALTH

- Inhalation of vapors or contact with substance will result in contamination and potential harmful effects.
- Fire will produce irritating, corrosive and/or toxic gases.

FIRE OR EXPLOSION

- Non-combustible, substance itself does not burn but may react upon heating to produce corrosive and/or toxic fumes.
- Runoff may pollute waterways.

PUBLIC SAFETY

- **CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.**
- As an immediate precautionary measure, isolate spill or leak area for at least 50 meters (150 feet) in all directions.
- Stay upwind.
- Keep unauthorized personnel away.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Structural firefighters' protective clothing will only provide limited protection.

EVACUATION

Large Spill

- Consider initial downwind evacuation for at least 100 meters (330 feet).

Fire

- When any large container is involved in a fire, consider initial evacuation for 500 meters (1/3 mile) in all directions.

EMERGENCY RESPONSE

FIRE

- Use extinguishing agent suitable for type of surrounding fire.
- **Do not direct water at the heated metal.**

SPILL OR LEAK

- Do not touch or walk through spilled material.
- Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.
- Stop leak if you can do it without risk.
- Prevent entry into waterways, sewers, basements or confined areas.
- Do not use steel or aluminum tools or equipment.
- Cover with earth, sand or other non-combustible material followed with plastic sheet to minimize spreading or contact with rain.
- For mercury, use a mercury spill kit.
- Mercury spill areas may be subsequently treated with calcium sulphide/calcium sulfide or with sodium thiosulphate/sodium thiosulfate wash to neutralize any residual mercury.

FIRST AID

- Move victim to fresh air.
- Call 911 or emergency medical service.
- Give artificial respiration if victim is not breathing.
- Administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- Keep victim warm and quiet.
- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

NOTES

INTRODUCTION TO GREEN TABLES - INITIAL ISOLATION AND PROTECTIVE ACTION DISTANCES

Table 1 - Initial Isolation and Protective Action Distances suggests distances useful to protect people from vapors resulting from spills involving dangerous goods that are considered toxic by inhalation (TIH). This list includes certain chemical warfare agents and materials that produce toxic gases upon contact with water. Table 1 provides first responders with initial guidance until technically qualified emergency response personnel are available.

The **Initial Isolation Zone** defines an area SURROUNDING the incident in which persons may be exposed to dangerous (upwind) and life threatening (downwind) concentrations of material. The **Protective Action Zone** defines an area DOWNWIND from the incident in which persons may become incapacitated and unable to take protective action and/or incur serious or irreversible health effects. Table 1 provides specific guidance for small and large spills occurring day or night.

Adjusting distances for a specific incident involves many interdependent variables and should be made only by personnel technically qualified to make such adjustments. For this reason, no precise guidance can be provided in this document to aid in adjusting the table distances; however, general guidance follows.

Factors That May Change the Protective Action Distances

The orange-bordered guide for a material clearly indicates under the section EVACUATION – Fire, the evacuation distance required to protect against fragmentation hazard of a large container. If the material becomes involved in a **FIRE**, the toxic hazard may be less than the fire or explosion hazard. In these cases, the **Fire** hazard distance should be used.

Initial isolation and protective action distances in this guidebook are derived from historical data on transportation incidents and the use of statistical models. For worst-case scenarios involving the instantaneous release of the entire contents of a package (e.g., as a result of terrorism, sabotage or catastrophic accident) the distances may increase substantially. For such events, doubling of the initial isolation and protective action distances is appropriate in absence of other information.

If more than one tank car containing TIH materials involved in the incident is leaking, LARGE SPILL distances may need to be increased.

For a material with a protective action distance of 11.0+ km (7.0+ miles), the actual distance can be larger in certain atmospheric conditions. If the dangerous goods vapor plume is channeled in a valley or between many tall buildings, distances may be larger than shown in Table 1 due to less mixing of the plume with the atmosphere. Daytime spills in regions with known strong inversions or snow cover, or occurring near sunset, may require an increase of the protective action distance because airborne contaminants mix and disperse more slowly and may travel much farther downwind. In such cases, the nighttime protective action distance may be more appropriate. In addition, protective action distances may be larger for liquid spills when either the material or outdoor temperature exceeds 30°C (86°F).

Materials which react with water to produce large amounts of toxic gases are included in Table 1 - Initial Isolation and Protective Action Distances. Note that some water-reactive materials (WRM) which are also TIH (e.g., Bromine trifluoride (1746), Thionyl chloride (1836), etc.) produce additional TIH materials when spilled in water. For these materials, two entries are provided in Table 1 - Initial Isolation and Protective Action Distances (i.e., for spills on land and for spills in water). **If it is not clear whether the spill is on land or in water, or in cases where the spill occurs both on land and in water, choose the larger Protective Action Distance**.

Following Table 1, **Table 2** – Water-Reactive Materials Which Produce Toxic Gases lists materials that produce large amounts of Toxic Inhalation Hazard gases (TIH) when spilled in water as well as the toxic gases that are produced when spilled in water.

When a water-reactive TIH producing material is spilled into a river or stream, the source of the toxic gas may move with the current and stretch from the spill point downstream for a substantial distance.

Finally, **Table 3** lists Initial Isolation and Protective Action Distances for Toxic Inhalation Hazard materials that may be more commonly encountered.

The selected materials are:

- Ammonia, anhydrous (UN1005)
- Chlorine (UN1017)
- Ethylene oxide (UN1040)
- Hydrogen chloride (UN1050) and Hydrogen chloride, refrigerated liquid (UN2186)
- Hydrogen fluoride (UN1052)
- Sulfur dioxide/Sulphur dioxide (UN1079)

The materials are presented in alphabetical order and provide Initial Isolation and Protective Action Distances for large spills (more than 208 liters or 55 US gallons) involving different container types (therefore different volume capacities) for day time and night time situations and for different wind speeds.

PROTECTIVE ACTION DECISION FACTORS TO CONSIDER

The choice of protective actions for a given situation depends on a number of factors. For some cases, evacuation may be the best option; in others, sheltering in-place may be the best course. Sometimes, these two actions may be used in combination. In any emergency, officials need to quickly give the public instructions. The public will need continuing information and instructions while being evacuated or sheltered in-place.

Proper evaluation of the factors listed below will determine the effectiveness of evacuation or in-place protection (shelter in-place). The importance of these factors can vary with emergency conditions. In specific emergencies, other factors may need to be identified and considered as well. This list indicates what kind of information may be needed to make the initial decision.

The Dangerous Goods

- Degree of health hazard
- Chemical and physical properties
- Amount involved
- Containment/control of release
- Rate of vapor movement

The Population Threatened

- Location
- Number of people
- Time available to evacuate or shelter in-place
- Ability to control evacuation or shelter in-place
- Building types and availability
- Special institutions or populations, e.g., nursing homes, hospitals, prisons

Weather Conditions

- Effect on vapor and cloud movement
- Potential for change
- Effect on evacuation or shelter in-place

PROTECTIVE ACTIONS

Protective Actions are those steps taken to preserve the health and safety of emergency responders and the public during an incident involving releases of dangerous goods. Table 1 - Initial Isolation and Protective Action Distances (green-bordered pages) predicts the size of downwind areas which could be affected by a cloud of toxic gas. People in this area should be evacuated and/or sheltered in-place inside buildings.

Isolate Hazard Area and Deny Entry means to keep everybody away from the area if they are not directly involved in emergency response operations. Unprotected emergency responders should not be allowed to enter the isolation zone. This "isolation" task is done first to establish control over the area of operations. This is the first step for any protective actions that may follow. See Table 1 - Initial Isolation and Protective Action Distances (green-bordered pages) for more detailed information on specific materials.

Evacuate means to move all people from a threatened area to a safer place. To perform an evacuation, there must be enough time for people to be warned, to get ready, and to leave an area. If there is enough time, evacuation is the best protective action. Begin evacuating people nearby and those outdoors in direct view of the scene. When additional help arrives, expand the area to be evacuated downwind and crosswind to at least the extent recommended in this guidebook. Even after people move to the distances recommended, they may not be completely safe from harm. They should not be permitted to congregate at such distances. Send evacuees to a definite place, by a specific route, far enough away so they will not have to be moved again if the wind shifts.

Shelter In-Place means people should seek shelter inside a building and remain inside until the danger passes. **Sheltering in-place is used when evacuating the public would cause greater risk than staying where they are, or when an evacuation cannot be performed.** Direct the people inside to **close all doors and windows** and to **shut off all ventilating, heating and cooling systems.** In-place protection (shelter in-place) may not be the best option if (a) the vapors are flammable; (b) if it will take a long time for the gas to clear the area; or (c) if buildings cannot be closed tightly. Vehicles can offer some protection for a short period if the windows are closed and the ventilating systems are shut off. Vehicles are not as effective as buildings for in-place protection.

It is vital to maintain communications with competent persons inside the building so that they are advised about changing conditions. **Persons protected-in-place should be warned to stay far from windows** because of the danger from glass and projected metal fragments in a fire and/or explosion.

Every dangerous goods incident is different. Each will have special problems and concerns. Action to protect the public must be selected carefully. These pages can help with **initial** decisions on how to protect the public. Officials must continue to gather information and monitor the situation until the threat is removed.

BACKGROUND ON TABLE 1 - INITIAL ISOLATION AND PROTECTIVE ACTION DISTANCES

Initial Isolation and Protective Action Distances in this guidebook were determined for small and large spills occurring during day or night. The overall analysis was statistical in nature and utilized state-of-the-art emission rate and dispersion models; statistical release data from the U.S. DOT HMIS (Hazardous Materials Information System) database; meteorological observations from over 120 locations in United States, Canada and Mexico; and the most current toxicological exposure guidelines.

For each chemical, thousands of hypothetical releases were modeled to account for the statistical variation in both release amount and atmospheric conditions. Based on this statistical sample, the 90th percentile Protective Action Distance for each chemical and category was selected to appear in the Table. A brief description of the analysis is provided below. A detailed report outlining the methodology and data used in the generation of the Initial Isolation and Protective Action Distances may be obtained from the U.S. Department of Transportation, Pipeline and Hazardous Materials Safety Administration.

Release amounts and emission rates into the atmosphere were statistically modeled based on (1) data from the U.S. DOT HMIS database; (2) container types and sizes authorized for transport as specified in 49 CFR §172.101 and Part 173; (3) physical properties of the individual materials, and (4) atmospheric data from a historical database. The emission model calculated the release of vapor due to evaporation of pools on the ground, direct release of vapors from the container, or a combination of both, as would occur for liquefied gases which can flash to form both a vapor/aerosol mixture and an evaporating pool. In addition, the emission model also calculated the emission of toxic vapor by-products generated from spilling water-reactive materials in water. Spills that involve releases of approximately 208 liters for liquids (55 US gallons) and 300 kg for solids (660 pounds) or less are considered Small Spills, while spills that involve greater quantities are considered Large Spills. An exception to this is certain chemical warfare agents where Small Spills include releases up to 2 kg (4.4 lbs), and Large Spills include releases up to 25 kg (55 lbs). These agents are BZ, CX, GA, GB, GD, GF, HD, HL, HN1, HN2, HN3, L and VX.

Downwind dispersion of the vapor was estimated for each case modeled. Atmospheric parameters affecting the dispersion, and the emission rate, were selected in a statistical fashion from a database containing hourly meteorological data from 120 cities in the United States, Canada and Mexico. The dispersion calculation accounted for the time dependent emission rate from the source as well as the density of the vapor plume (i.e., heavy gas effects). Since atmospheric mixing is less effective at dispersing vapor plumes during nighttime, day and night were separated in the analysis. In Table 1, “Day” refers to time periods after sunrise and before sunset, while “Night” includes all hours between sunset and sunrise.

Toxicological short-term exposure guidelines for the materials were applied to determine the downwind distance to which persons may become incapacitated and unable to take protective action or may incur serious health effects after a once-in-a-lifetime, or rare, exposure. When available, toxicological exposure guidelines were chosen from AEGL-2 or ERPG-2 emergency response guidelines, with AEGL-2 values being the first choice. For materials that do not have AEGL-2 or ERPG-2 values, emergency response guidelines estimated from lethal concentration limits derived from animal studies were used, as recommended by an independent panel of toxicological experts from industry and academia.

HOW TO USE TABLE 1 - INITIAL ISOLATION AND PROTECTIVE ACTION DISTANCES

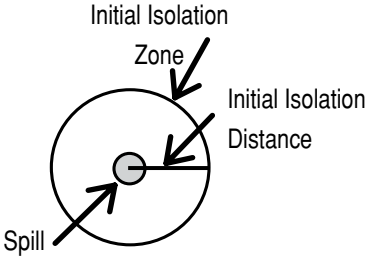
(1) The responder should already have:

- Identified the material by its ID Number and Name; (if an ID Number cannot be found, use the Name of Material index in the blue-bordered pages to locate that number.)
- Found the three-digit guide for that material in order to consult the emergency actions recommended jointly with this table;
- **Noted the wind direction.**

(2) Look in Table 1 (the green-bordered pages) for the ID Number and Name of the Material involved in the incident. Some ID Numbers have more than one shipping name listed—look for the specific name of the material. (If the shipping name is not known and Table 1 lists more than one name for the same ID Number, use the entry with the largest protective action distances.)

(3) Determine if the incident involves a SMALL or LARGE spill and if DAY or NIGHT. Generally, a SMALL SPILL is one which involves a single, small package (e.g., a drum containing up to approximately 208 liters (55 US gallons)), a small cylinder, or a small leak from a large package. A LARGE SPILL is one which involves a spill from a large package, or multiple spills from many small packages. DAY is any time after sunrise and before sunset. NIGHT is any time between sunset and sunrise.

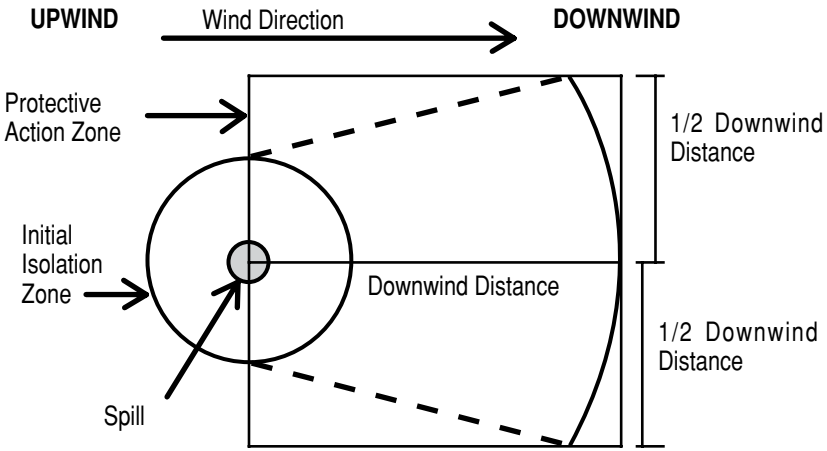
(4) Look up the INITIAL ISOLATION DISTANCE. Direct all persons to move, in a crosswind direction, away from the spill to the distance specified—in meters and feet.



(5) Look up the initial PROTECTIVE ACTION DISTANCE shown in Table 1. For a given material, spill size, and whether day or night, Table 1 gives the downwind distance—in kilometers and miles— for which protective actions should be considered. For practical purposes, the Protective Action Zone (i.e., the area in which people are at risk of harmful exposure) is a square, whose length and width are the same as the downwind distance shown in Table 1.

(6) Initiate Protective Actions to the extent possible, beginning with those closest to the spill site and working away from the site in the downwind direction. When a water-reactive TIH producing material is spilled into a river or stream, the source of the toxic gas may move with the current or stretch from the spill point downstream for a substantial distance.

The shape of the area in which protective actions should be taken (the Protective Action Zone) is shown in this figure. The spill is located at the center of the small circle. The larger circle represents the INITIAL ISOLATION zone around the spill.



NOTE 1: See "Introduction To Green Tables – Initial Isolation And Protective Action Distances" under "Factors That May Change the Protective Action Distances" (page 285)

NOTE 2: See Table 2 – Water-Reactive Materials which Produce Toxic Gases for the list of gases produced when these materials are spilled in water.

Call the emergency response telephone number listed on the shipping paper or the appropriate response agency as soon as possible for additional information on the material, safety precautions and mitigation procedures.

TABLE 1 - INITIAL ISOLATION AND PROTECTIVE ACTION DISTANCES

			SMALL SPILLS (From a small package or small leak from a large package)				LARGE SPILLS (From a large package or from many small packages)			
			First **ISOLATE** in all Directions	Then **PROTECT** persons Downwind during-			First **ISOLATE** in all Directions	Then **PROTECT** persons Downwind during-		
ID No.	**Guide**	**NAME OF MATERIAL**	Meters (Feet)	**DAY** Kilometers (Miles)	**NIGHT** Kilometers (Miles)		Meters (Feet)	**DAY** Kilometers (Miles)	**NIGHT** Kilometers (Miles)	
1005 *	**125**	Ammonia, anhydrous	30 m (100 ft)	0.1 km (0.1 mi)	0.2 km (0.1 mi)		150 m (500 ft)	0.8 km (0.5 mi)	2.0 km (1.3 mi)	
1005 *	**125**	Anhydrous ammonia								
1008	**125**	Boron trifluoride	30 m (100 ft)	0.1 km (0.1 mi)	0.5 km (0.4 mi)		300 m (1000 ft)	1.7 km (1.1 mi)	4.8 km (3.0 mi)	
1008	**125**	Boron trifluoride, compressed								
1016	**119**	Carbon monoxide	30 m (100 ft)	0.1 km (0.1 mi)	0.2 km (0.1 mi)		200 m (600 ft)	1.2 km (0.8 mi)	4.8 km (3.0 mi)	
1016	**119**	Carbon monoxide, compressed								
1017 *	**124**	Chlorine	60 m (200 ft)	0.4 km (0.2 mi)	1.5 km (1.0 mi)		500 m (1500 ft)	3.0 km (1.9 mi)	7.9 km (4.9 mi)	
1023	**119**	Coal gas	60 m (200 ft)	0.2 km (0.1 mi)	0.2 km (0.1 mi)		100 m (300 ft)	0.4 km (0.2 mi)	0.5 km (0.3 mi)	
1023	**119**	Coal gas, compressed								
1026	**119**	Cyanogen	30 m (100 ft)	0.1 km (0.1 mi)	0.5 km (0.3 mi)		60 m (200 ft)	0.4 km (0.2 mi)	1.7 km (1.0 mi)	
1026	**119**	Cyanogen gas								
1040 *	**119P**	Ethylene oxide	30 m (100 ft)	0.1 km (0.1 mi)	0.2 km (0.1 mi)		150 m (500 ft)	0.9 km (0.5 mi)	2.0 km (1.3 mi)	
1040 *	**119P**	Ethylene oxide with Nitrogen								
1045	**124**	Fluorine	30 m (100 ft)	0.1 km (0.1 mi)	0.2 km (0.1 mi)		100 m (300 ft)	0.5 km (0.3 mi)	2.3 km (1.4 mi)	
1045	**124**	Fluorine, compressed								
1048	**125**	Hydrogen bromide, anhydrous	30 m (100 ft)	0.1 km (0.1 mi)	0.3 km (0.2 mi)		200 m (600 ft)	1.2 km (0.8 mi)	3.9 km (2.4 mi)	
1050 *	**125**	Hydrogen chloride, anhydrous	30 m (100 ft)	0.1 km (0.1 mi)	0.3 km (0.2 mi)		60 m (200 ft)	0.3 km (0.2 mi)	1.3 km (0.8 mi)	
1051	**117**	AC **(when used as a weapon)**	60 m (200 ft)	0.3 km (0.2 mi)	1.0 km (0.6 mi)		1000 m (3000 ft)	3.7 km (2.3 mi)	8.4 km (5.3 mi)	

1051	**117**	Hydrocyanic acid, aqueous solutions, with more than 20% Hydrogen cyanide	60 m	(200 ft)	0.2 km	(0.1 mi)	0.6 km	(0.4 mi)	400 m	(1250 ft)	1.4 km	(0.9 mi)	3.8 km	(2.4 mi)
1051	**117**	Hydrogen cyanide, anhydrous, stabilized												
1051	**117**	Hydrogen cyanide, stabilized												
1052 *	**125**	Hydrogen fluoride, anhydrous	30 m	(100 ft)	0.1 km	(0.1 mi)	0.5 km	(0.3 mi)	300 m	(1000 ft)	1.5 km	(0.9 mi)	3.2 km	(2.0 mi)
1053	**117**	Hydrogen sulfide	30 m	(100 ft)	0.1 km	(0.1 mi)	0.4 km	(0.3 mi)	300 m	(1000 ft)	1.7 km	(1.0 mi)	5.6 km	(3.5 mi)
1053	**117**	Hydrogen sulphide												
1062	**123**	Methyl bromide	30 m	(100 ft)	0.1 km	(0.1 mi)	0.2 km	(0.2 mi)	100 m	(300 ft)	0.6 km	(0.4 mi)	1.9 km	(1.2 mi)
1064	**117**	Methyl mercaptan	30 m	(100 ft)	0.1 km	(0.1 mi)	0.3 km	(0.2 mi)	150 m	(500 ft)	1.0 km	(0.7 mi)	3.2 km	(2.0 mi)
1067	**124**	Dinitrogen tetroxide	30 m	(100 ft)	0.1 km	(0.1 mi)	0.4 km	(0.2 mi)	300 m	(1000 ft)	1.1 km	(0.7 mi)	2.7 km	(1.7 mi)
1067	**124**	Nitrogen dioxide												
1069	**125**	Nitrosyl chloride	30 m	(100 ft)	0.2 km	(0.2 mi)	1.1 km	(0.7 mi)	600 m	(2000 ft)	3.6 km	(2.3 mi)	9.5 km	(5.9 mi)
1071	**119**	Oil gas	60 m	(200 ft)	0.2 km	(0.1 mi)	0.2 km	(0.1 mi)	100 m	(300 ft)	0.4 km	(0.2 mi)	0.5 km	(0.3 mi)
1071	**119**	Oil gas, compressed												
1076	**125**	CG **(when used as a weapon)**	150 m	(500 ft)	0.8 km	(0.5 mi)	3.2 km	(2.0 mi)	1000 m	(3000 ft)	7.5 km	(4.7 mi)	11.0+ km	(7.0+ mi)
1076	**125**	Diphosgene	30 m	(100 ft)	0.2 km	(0.1 mi)	0.2 km	(0.1 mi)	30 m	(100 ft)	0.3 km	(0.2 mi)	0.5 km	0.3 mi)
1076	**125**	DP **(when used as a weapon)**	30 m	(100 ft)	0.2 km	(0.1 mi)	0.7 km	(0.4 mi)	200 m	(600 ft)	1.0 km	(0.7 mi)	2.4 km	(1.5 mi)
1076	**125**	Phosgene	100 m	(300 ft)	0.6 km	(0.4 mi)	2.7 km	(1.7 mi)	500 m	(1500 ft)	3.1 km	(1.9 mi)	10.8 km	(6.7 mi)
1079 *	**125**	Sulfur dioxide	100 m	(300 ft)	0.7 km	(0.4 mi)	2.8 km	(1.7 mi)	1000 m	(3000 ft)	5.6 km	(3.5 mi)	11.0+ km	(7.0+ mi)
1079 *	**125**	Sulphur dioxide												
1082	**119P**	Trifluorochloroethylene, stabilized	30 m	(100 ft)	0.1 km	(0.1 mi)	0.2 km	(0.1 mi)	60 m	(200 ft)	0.4 km	(0.3 mi)	0.9 km	(0.6 mi)
1092	**131P**	Acrolein, stabilized	150 m	(500 ft)	1.4 km	(0.9 mi)	4.0 km	(2.5 mi)	800 m	(2500 ft)	9.3 km	(5.8 mi)	11.0+ km	(7.0+ mi)
1098	**131**	Allyl alcohol	30 m	(100 ft)	0.1 km	(0.1 mi)	0.1 km	(0.1 mi)	60 m	(200 ft)	0.3 km	(0.2 mi)	0.5 km	(0.3 mi)

"+" means distance can be larger in certain atmospheric conditions

*** PLEASE ALSO CONSULT TABLE 3 FOR THIS MATERIAL**

TABLE 1 - INITIAL ISOLATION AND PROTECTIVE ACTION DISTANCES

			SMALL SPILLS (From a small package or small leak from a large package)				LARGE SPILLS (From a large package or from many small packages)			
			First ISOLATE in all Directions	Then PROTECT persons Downwind during-			First ISOLATE in all Directions	Then PROTECT persons Downwind during-		
ID No.	Guide	NAME OF MATERIAL	Meters (Feet)	DAY Kilometers (Miles)		NIGHT Kilometers (Miles)	Meters (Feet)	DAY Kilometers (Miles)		NIGHT Kilometers (Miles)
1135	**131**	Ethylene chlorohydrin	30 m (100 ft)	0.1 km	(0.1 mi)	0.1 km (0.1 mi)	60 m (200 ft)	0.3 km	(0.2 mi)	0.4 km (0.3 mi)
1143 1143	**131P** **131P**	Crotonaldehyde Crotonaldehyde, stabilized	30 m (100 ft)	0.1 km	(0.1 mi)	0.2 km (0.1 mi)	60 m (200 ft)	0.5 km	(0.3 mi)	1.0 km (0.6 mi)
1162	**155**	Dimethyldichlorosilane **(when spilled in water)**	30 m (100 ft)	0.1 km	(0.1 mi)	0.2 km (0.2 mi)	60 m (200 ft)	0.6 km	(0.4 mi)	1.9 km (1.2 mi)
1163 1163	**131** **131**	1,1-Dimethylhydrazine Dimethylhydrazine, unsymmetrical	30 m (100 ft)	0.2 km	(0.1 mi)	0.5 km (0.4 mi)	100 m (300 ft)	1.1 km	(0.7 mi)	2.2 km (1.4 mi)
1182	**155**	Ethyl chloroformate	30 m (100 ft)	0.1 km	(0.1 mi)	0.2 km (0.1 mi)	60 m (200 ft)	0.4 km	(0.2 mi)	0.6 km (0.4 mi)
1183	**139**	Ethyldichlorosilane **(when spilled in water)**	30 m (100 ft)	0.1 km	(0.1 mi)	0.3 km (0.2 mi)	60 m (200 ft)	0.7 km	(0.5 mi)	2.2 km (1.4 mi)
1185	**131P**	Ethyleneimine, stabilized	30 m (100 ft)	0.2 km	(0.1 mi)	0.5 km (0.3 mi)	100 m (300 ft)	1.0 km	(0.6 mi)	2.0 km (1.3 mi)
1196	**155**	Ethyltrichlorosilane **(when spilled in water)**	30 m (100 ft)	0.2 km	(0.1 mi)	0.7 km (0.5 mi)	200 m (600 ft)	2.1 km	(1.3 mi)	6.3 km (3.9 mi)
1238	**155**	Methyl chloroformate	30 m (100 ft)	0.2 km	(0.2 mi)	0.6 km (0.4 mi)	150 m (500 ft)	1.1 km	(0.7 mi)	2.3 km (1.4 mi)
1239	**131**	Methyl chloromethyl ether	30 m (100 ft)	0.3 km	(0.2 mi)	1.1 km (0.7 mi)	200 m (600 ft)	2.2 km	(1.4 mi)	4.6 km (2.9 mi)
1242	**139**	Methyldichlorosilane **(when spilled in water)**	30 m (100 ft)	0.1 km	(0.1 mi)	0.3 km (0.2 mi)	60 m (200 ft)	0.8 km	(0.5 mi)	2.5 km (1.6 mi)
1244	**131**	Methylhydrazine	30 m (100 ft)	0.3 km	(0.2 mi)	0.6 km (0.4 mi)	100 m (300 ft)	1.4 km	(0.9 mi)	2.3 km (1.4 mi)
1250	**155**	Methyltrichlorosilane **(when spilled in water)**	30 m (100 ft)	0.1 km	(0.1 mi)	0.3 km (0.2 mi)	100 m (300 ft)	0.9 km	(0.6 mi)	2.6 km (1.7 mi)

1251	**131P**	Methyl vinyl ketone, stabilized	100 m	(300 ft)	0.3 km	(0.2 mi)	0.8 km	(0.5 mi)	800 m	(2500 ft)	1.5 km	(1.0 mi)	3.0 km	(1.9 mi)
1259	**131**	Nickel carbonyl	100 m	(300 ft)	1.4 km	(0.9 mi)	5.4 km	(3.4 mi)	1000 m	(3000 ft)	11.0+ km	(7.0+ mi)	11.0+ km	(7.0+ mi)
1295	**139**	Trichlorosilane **(when spilled in water)**	30 m	(100 ft)	0.1 km	(0.1 mi)	0.3 km	(0.2 mi)	60 m	(200 ft)	0.7 km	(0.4 mi)	2.2 km	(1.4 mi)
1298	**155**	Trimethylchlorosilane **(when spilled in water)**	30 m	(100 ft)	0.1 km	(0.1 mi)	0.2 km	(0.1 mi)	60 m	(200 ft)	0.6 km	(0.4 mi)	1.6 km	(1.0 mi)
1305	**155P**	Vinyltrichlorosilane **(when spilled in water)**	30 m	(100 ft)	0.1 km	(0.1 mi)	0.2 km	(0.2 mi)	60 m	(200 ft)	0.6 km	(0.4 mi)	2.0 km	(1.3 mi)
1305	**155P**	Vinyltrichlorosilane, stabilized **(when spilled in water)**												
1340	**139**	Phosphorus pentasulfide, free from yellow and white Phosphorus **(when spilled in water)**	30 m	(100 ft)	0.1 km	(0.1 mi)	0.2 km	(0.1 mi)	60 m	(200 ft)	0.4 km	(0.2 mi)	1.4 km	(0.9 mi)
1340	**139**	Phosphorus pentasulphide, free from yellow and white Phosphorus **(when spilled in water)**												
1360	**139**	Calcium phosphide **(when spilled in water)**	30 m	(100 ft)	0.2 km	(0.1 mi)	0.7 km	(0.4 mi)	300 m	(1000 ft)	1.1 km	(0.7 mi)	3.8 km	(2.4 mi)
1380	**135**	Pentaborane	60 m	(200 ft)	0.6 km	(0.4 mi)	2.0 km	(1.2 mi)	200 m	(600 ft)	2.7 km	(1.7 mi)	8.2 km	(5.1 mi)
1384	**135**	Sodium dithionite **(when spilled in water)**	30 m	(100 ft)	0.2 km	(0.1 mi)	0.6 km	(0.4 mi)	60 m	(200 ft)	0.8 km	(0.5 mi)	2.7 km	(1.7 mi)
1384	**135**	Sodium hydrosulfite **(when spilled in water)**												
1384	**135**	Sodium hydrosulphite **(when spilled in water)**												
1397	**139**	Aluminum phosphide **(when spilled in water)**	60 m	(200 ft)	0.2 km	(0.2 mi)	0.9 km	(0.6 mi)	500 m	(1500 ft)	2.1 km	(1.3 mi)	7.5 km	(4.7 mi)

"+" means distance can be larger in certain atmospheric conditions

TABLE 1 - INITIAL ISOLATION AND PROTECTIVE ACTION DISTANCES

			SMALL SPILLS (From a small package or small leak from a large package)				LARGE SPILLS (From a large package or from many small packages)			
			First **ISOLATE** in all Directions		Then **PROTECT** persons Downwind during-		First **ISOLATE** in all Directions		Then **PROTECT** persons Downwind during-	
ID No.	**Guide**	**NAME OF MATERIAL**	Meters (Feet)		**DAY** Kilometers (Miles)	**NIGHT** Kilometers (Miles)	Meters (Feet)		**DAY** Kilometers (Miles)	**NIGHT** Kilometers (Miles)
1419	**139**	Magnesium aluminum phosphide **(when spilled in water)**	60 m	(200 ft)	0.2 km (0.1 mi)	0.9 km (0.5 mi)	500 m	(1500 ft)	1.9 km (1.2 mi)	6.5 km (4.1 mi)
1432	**139**	Sodium phosphide **(when spilled in water)**	30 m	(100 ft)	0.2 km (0.1 mi)	0.6 km (0.4 mi)	400 m	(1250 ft)	1.4 km (0.9 mi)	4.2 km (2.6 mi)
1510	**143**	Tetranitromethane	30 m	(100 ft)	0.2 km (0.2 mi)	0.4 km (0.2 mi)	60 m	(200 ft)	0.5 km (0.4 mi)	1.0 km (0.6 mi)
1541	**155**	Acetone cyanohydrin, stabilized **(when spilled in water)**	30 m	(100 ft)	0.1 km (0.1 mi)	0.1 km (0.1 mi)	100 m	(300 ft)	0.3 km (0.2 mi)	1.0 km (0.7 mi)
1556	**152**	MD **(when used as a weapon)**	300 m	(1000 ft)	1.6 km (1.0 mi)	4.3 km (2.7 mi)	1000 m	(3000 ft)	11.0+ km (7.0+ mi)	11.0+ km (7.0+ mi)
1556	**152**	Methyldichloroarsine	100 m	(300 ft)	1.4 km (0.9 mi)	2.2 km (1.4 mi)	300 m	(1000 ft)	3.8 km (2.4 mi)	6.9 km (4.3 mi)
1556	**152**	PD **(when used as a weapon)**	60 m	(200 ft)	0.4 km (0.3 mi)	0.4 km (0.3 mi)	300 m	(1000 ft)	1.6 km (1.0 mi)	1.6 km (1.0 mi)
1560 1560	**157** **157**	Arsenic chloride Arsenic trichloride	30 m	(100 ft)	0.2 km (0.1 mi)	0.3 km (0.2 mi)	100 m	(300 ft)	1.0 km (0.6 mi)	1.6 km (1.0 mi)
1569	**131**	Bromoacetone	30 m	(100 ft)	0.4 km (0.3 mi)	1.2 km (0.8 mi)	150 m	(500 ft)	1.9 km (1.2 mi)	3.6 km (2.3 mi)
1580	**154**	Chloropicrin	30 m	(100 ft)	0.4 km (0.3 mi)	1.0 km (0.6 mi)	150 m	(500 ft)	1.6 km (1.0 mi)	3.1 km (1.9 mi)
1581 1581	**123** **123**	Chloropicrin and Methyl bromide mixture Methyl bromide and Chloropicrin mixture	30 m	(100 ft)	0.1 km (0.1 mi)	0.6 km (0.4 mi)	300 m	(1000 ft)	2.1 km (1.3 mi)	5.9 km (3.7 mi)

1582	**119**	Chloropicrin and Methyl chloride mixture	30 m	(100 ft)	0.1 km	(0.1 mi)	0.4 km	(0.3 mi)	60 m	(200 ft)	0.4 km	(0.2 mi)	1.7 km	(1.1 mi)
1582	**119**	Methyl chloride and Chloropicrin mixture												
1583	**154**	Chloropicrin mixture, n.o.s.	30 m	(100 ft)	0.4 km	(0.3 mi)	1.0 km	(0.6 mi)	150 m	(500 ft)	1.6 km	(1.0 mi)	3.1 km	(1.9 mi)
1589	**125**	CK **(when used as a weapon)**	150 m	(500 ft)	1.0 km	(0.6 mi)	3.8 km	(2.4 mi)	800 m	(2500 ft)	5.7 km	(3.6 mi)	11.0+ km	(7.0+ mi)
1589	**125**	Cyanogen chloride, stabilized	100 m	(300 ft)	0.5 km	(0.3 mi)	2.2 km	(1.4 mi)	400 m	(1250 ft)	2.6 km	(1.7 mi)	8.6 km	(5.4 mi)
1595	**156**	Dimethyl sulfate	30 m	(100 ft)	0.2 km	(0.1 mi)	0.2 km	(0.1 mi)	60 m	(200 ft)	0.5 km	(0.3 mi)	0.8 km	(0.5 mi)
1595	**156**	Dimethyl sulphate												
1605	**154**	Ethylene dibromide	30 m	(100 ft)	0.1 km	(0.1 mi)	0.1 km	(0.1 mi)	30 m	(100 ft)	0.2 km	(0.1 mi)	0.2 km	(0.1 mi)
1612	**123**	Hexaethyl tetraphosphate and compressed gas mixture	100 m	(300 ft)	0.8 km	(0.5 mi)	2.7 km	(1.7 mi)	400 m	(1250 ft)	3.5 km	(2.2 mi)	8.1 km	(5.1 mi)
1613	**154**	Hydrocyanic acid, aqueous solution, with not more than 20% Hydrogen cyanide	60 m	(200 ft)	0.2 km	(0.1 mi)	0.2 km	(0.1 mi)	150 m	(500 ft)	0.5 km	(0.3 mi)	1.3 km	(0.8 mi)
1613	**154**	Hydrogen cyanide, aqueous solution, with not more than 20% Hydrogen cyanide												
1614	**152**	Hydrogen cyanide, stabilized (absorbed)	60 m	(200 ft)	0.2 km	(0.1 mi)	0.7 km	(0.4 mi)	150 m	(500 ft)	0.5 km	(0.4 mi)	1.7 km	(1.1 mi)
1647	**151**	Ethylene dibromide and Methyl bromide mixture, liquid	30 m	(100 ft)	0.1 km	(0.1 mi)	0.2 km	(0.2 mi)	100 m	(300 ft)	0.6 km	(0.4 mi)	1.9 km	(1.2 mi)
1647	**151**	Methyl bromide and Ethylene dibromide mixture, liquid												
1660	**124**	Nitric oxide	30 m	(100 ft)	0.1 km	(0.1 mi)	0.6 km	(0.4 mi)	100 m	(300 ft)	0.6 km	(0.4 mi)	2.3 km	(1.5 mi)
1660	**124**	Nitric oxide, compressed												
1670	**157**	Perchloromethyl mercaptan	30 m	(100 ft)	0.2 km	(0.2 mi)	0.4 km	(0.2 mi)	100 m	(300 ft)	0.7 km	(0.5 mi)	1.3 km	(0.8 mi)

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TABLE 1 - INITIAL ISOLATION AND PROTECTIVE ACTION DISTANCES

			SMALL SPILLS (From a small package or small leak from a large package)				LARGE SPILLS (From a large package or from many small packages)			
			First **ISOLATE** in all Directions		Then **PROTECT** persons Downwind during-		First **ISOLATE** in all Directions		Then **PROTECT** persons Downwind during-	
					DAY	**NIGHT**			**DAY**	**NIGHT**
ID No.	**Guide**	**NAME OF MATERIAL**	Meters	(Feet)	Kilometers (Miles)	Kilometers (Miles)	Meters	(Feet)	Kilometers (Miles)	Kilometers (Miles)
1680	**157**	Potassium cyanide **(when spilled in water)**	30 m	(100 ft)	0.1 km	(0.1 mi)	0.2 km	(0.1 mi)	100 m	(300 ft)	0.3 km	(0.2 mi)	1.2 km	(0.8 mi)
1680	**157**	Potassium cyanide, solid **(when spilled in water)**												
1689	**157**	Sodium cyanide **(when spilled in water)**	30 m	(100 ft)	0.1 km	(0.1 mi)	0.2 km	(0.1 mi)	100 m	(300 ft)	0.4 km	(0.2 mi)	1.4 km	(0.9 mi)
1689	**157**	Sodium cyanide, solid **(when spilled in water)**												
1694	**159**	CA **(when used as a weapon)**	30 m	(100 ft)	0.1 km	(0.1 mi)	0.4 km	(0.3 mi)	100 m	(300 ft)	0.5 km	(0.4 mi)	2.6 km	(1.6 mi)
1695	**131**	Chloroacetone, stabilized	30 m	(100 ft)	0.1 km	(0.1 mi)	0.2 km	(0.1 mi)	60 m	(200 ft)	0.4 km	(0.3 mi)	0.8 km	(0.5 mi)
1697	**153**	CN **(when used as a weapon)**	30 m	(100 ft)	0.1 km	(0.1 mi)	0.2 km	(0.1 mi)	60 m	(200 ft)	0.3 km	(0.2 mi)	1.2 km	(0.8 mi)
1698	**154**	Adamsite **(when used as a weapon)**	30 m	(100 ft)	0.1 km	(0.1 mi)	0.3 km	(0.2 mi)	60 m	(200 ft)	0.3 km	(0.2 mi)	1.4 km	(0.9 mi)
1698	**154**	DM **(when used as a weapon)**												
1699	**151**	DA **(when used as a weapon)**	30 m	(100 ft)	0.2 km	(0.1 mi)	0.8 km	(0.5 mi)	300 m	(1000 ft)	1.9 km	(1.2 mi)	7.5 km	(4.7 mi)
1716	**156**	Acetyl bromide **(when spilled in water)**	30 m	(100 ft)	0.1 km	(0.1 mi)	0.2 km	(0.1 mi)	60 m	(200 ft)	0.5 km	(0.3 mi)	1.3 km	(0.8 mi)
1717	**155**	Acetyl chloride **(when spilled in water)**	30 m	(100 ft)	0.1 km	(0.1 mi)	0.3 km	(0.2 mi)	100 m	(300 ft)	1.0 km	(0.6 mi)	2.8 km	(1.7 mi)
1722	**155**	Allyl chlorocarbonate	100 m	(300 ft)	0.4 km	(0.2 mi)	0.9 km	(0.6 mi)	400 m	(1250 ft)	1.5 km	(1.0 mi)	3.0 km	(1.9 mi)
1722	**155**	Allyl chloroformate												

1724	**155**	Allyltrichlorosilane, stabilized **(when spilled in water)**	30 m	(100 ft)	0.1 km	(0.1 mi)	0.2 km	(0.2 mi)	60 m	(200 ft)	0.6 km	(0.4 mi)	1.9 km	(1.2 mi)
1725	**137**	Aluminum bromide, anhydrous **(when spilled in water)**	30 m	(100 ft)	0.1 km	(0.1 mi)	0.1 km	(0.1 mi)	30 m	(100 ft)	0.2 km	(0.1 mi)	0.6 km	(0.4 mi)
1726	**137**	Aluminum chloride, anhydrous **(when spilled in water)**	30 m	(100 ft)	0.1 km	(0.1 mi)	0.3 km	(0.2 mi)	60 m	(200 ft)	0.6 km	(0.4 mi)	2.2 km	(1.4 mi)
1728	**155**	Amyltrichlorosilane **(when spilled in water)**	30 m	(100 ft)	0.1 km	(0.1 mi)	0.2 km	(0.2 mi)	60 m	(200 ft)	0.6 km	(0.4 mi)	1.9 km	(1.2 mi)
1732	**157**	Antimony pentafluoride **(when spilled in water)**	30 m	(100 ft)	0.1 km	(0.1 mi)	0.5 km	(0.3 mi)	150 m	(500 ft)	1.2 km	(0.7 mi)	4.2 km	(2.6 mi)
1741	**125**	Boron trichloride **(when spilled on land)**	30 m	(100 ft)	0.1 km	(0.1 mi)	0.3 km	(0.2 mi)	100 m	(300 ft)	0.6 km	(0.4 mi)	1.4 km	(0.9 mi)
1741	**125**	Boron trichloride **(when spilled in water)**	30 m	(100 ft)	0.1 km	(0.1 mi)	0.5 km	(0.3 mi)	100 m	(300 ft)	1.3 km	(0.8 mi)	3.8 km	(2.4 mi)
1744 1744 1744	**154** **154** **154**	Bromine Bromine, solution Bromine, solution (Inhalation Hazard Zone A)	60 m	(200 ft)	0.6 km	(0.4 mi)	1.9 km	(1.2 mi)	300 m	(1000 ft)	2.8 km	(1.8 mi)	6.5 km	(4.0 mi)
1744	**154**	Bromine, solution (Inhalation Hazard Zone B)	60 m	(200 ft)	0.5 km	(0.3 mi)	1.3 km	(0.8 mi)	150 m	(500 ft)	1.8 km	(1.1 mi)	4.2 km	(2.6 mi)
1745	**144**	Bromine pentafluoride **(when spilled on land)**	30 m	(100 ft)	0.4 km	(0.2 mi)	1.4 km	(0.9 mi)	200 m	(600 ft)	2.3 km	(1.4 mi)	5.1 km	(3.2 mi)
1745	**144**	Bromine pentafluoride **(when spilled in water)**	30 m	(100 ft)	0.1 km	(0.1 mi)	0.6 km	(0.4 mi)	150 m	(500 ft)	1.2 km	(0.8 mi)	4.4 km	(2.7 mi)
1746	**144**	Bromine trifluoride **(when spilled on land)**	30 m	(100 ft)	0.1 km	(0.1 mi)	0.2 km	(0.1 mi)	30 m	(100 ft)	0.3 km	(0.2 mi)	0.5 km	(0.4 mi)
1746	**144**	Bromine trifluoride **(when spilled in water)**	30 m	(100 ft)	0.1 km	(0.1 mi)	0.5 km	(0.3 mi)	100 m	(300 ft)	1.1 km	(0.7 mi)	4.1 km	(2.5 mi)

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			First **ISOLATE** in all Directions		Then **PROTECT** persons Downwind during-		First **ISOLATE** in all Directions		Then **PROTECT** persons Downwind during-	
					DAY	**NIGHT**			**DAY**	**NIGHT**
ID No.	**Guide**	**NAME OF MATERIAL**	Meters	(Feet)	Kilometers (Miles)	Kilometers (Miles)	Meters	(Feet)	Kilometers (Miles)	Kilometers (Miles)
1747	**155**	Butyltrichlorosilane **(when spilled in water)**	30 m	(100 ft)	0.1 km (0.1 mi)	0.2 km (0.2 mi)	60 m	(200 ft)	0.6 km (0.4 mi)	1.8 km (1.1 mi)
1749	**124**	Chlorine trifluoride	60 m	(200 ft)	0.3 km (0.2 mi)	1.2 km (0.8 mi)	300 m	(1000 ft)	1.5 km (0.9 mi)	4.6 km (2.9 mi)
1752	**156**	Chloroacetyl chloride **(when spilled on land)**	30 m	(100 ft)	0.3 km (0.2 mi)	0.6 km (0.4 mi)	100 m	(300 ft)	1.2 km (0.8 mi)	2.3 km (1.4 mi)
1752	**156**	Chloroacetyl chloride **(when spilled in water)**	30 m	(100 ft)	0.1 km (0.1 mi)	0.1 km (0.1 mi)	30 m	(100 ft)	0.3 km (0.2 mi)	0.9 km (0.6 mi)
1753	**156**	Chlorophenyltrichlorosilane **(when spilled in water)**	30 m	(100 ft)	0.1 km (0.1 mi)	0.1 km (0.1 mi)	30 m	(100 ft)	0.3 km (0.2 mi)	1.0 km (0.7 mi)
1754	**137**	Chlorosulfonic acid **(when spilled on land)**	30 m	(100 ft)	0.1 km (0.1 mi)	0.1 km (0.1 mi)	30 m	(100 ft)	0.3 km (0.2 mi)	0.4 km (0.2 mi)
1754	**137**	Chlorosulfonic acid **(when spilled in water)**	30 m	(100 ft)	0.1 km (0.1 mi)	0.3 km (0.2 mi)	60 m	(200 ft)	0.7 km (0.5 mi)	2.5 km (1.5 mi)
1754	**137**	Chlorosulfonic acid and Sulfur trioxide mixture **(when spilled on land)**	100 m	(300 ft)	0.4 km (0.2 mi)	0.9 km (0.5 mi)	400 m	(1250 ft)	2.9 km (1.8 mi)	5.7 km (3.5 mi)
1754	**137**	Chlorosulfonic acid and Sulfur trioxide mixture **(when spilled in water)**	30 m	(100 ft)	0.1 km (0.1 mi)	0.3 km (0.2 mi)	60 m	(200 ft)	0.7 km (0.5 mi)	2.5 km (1.5 mi)
1754	**137**	Chlorosulphonic acid **(when spilled on land)**	30 m	(100 ft)	0.1 km (0.1 mi)	0.1 km (0.1 mi)	30 m	(100 ft)	0.3 km (0.2 mi)	0.4 km (0.2 mi)

1754	**137**	Chlorosulphonic acid **(when spilled in water)**	30 m	(100 ft)	0.1 km	(0.1 mi)	0.3 km	(0.2 mi)	60 m	(200 ft)	0.7 km	(0.5 mi)	2.5 km	(1.5 mi)
1754	**137**	Chlorosulphonic acid and Sulphur trioxide mixture **(when spilled on land)**	100 m	(300 ft)	0.4 km	(0.2 mi)	0.9 km	(0.5 mi)	400 m	(1250 ft)	2.9 km	(1.8 mi)	5.7 km	(3.5 mi)
1754	**137**	Chlorosulphonic acid and Sulphur trioxide mixture **(when spilled in water)**	30 m	(100 ft)	0.1 km	(0.1 mi)	0.3 km	(0.2 mi)	60 m	(200 ft)	0.7 km	(0.5 mi)	2.5 km	(1.5 mi)
1754	**137**	Sulfur trioxide and Chlorosulfonic acid mixture **(when spilled on land)**	100 m	(300 ft)	0.4 km	(0.2 mi)	0.9 km	(0.5 mi)	400 m	(1250 ft)	2.9 km	(1.8 mi)	5.7 km	(3.5 mi)
1754	**137**	Sulfur trioxide and Chlorosulfonic acid mixture **(when spilled in water)**	30 m	(100 ft)	0.1 km	(0.1 mi)	0.3 km	(0.2 mi)	60 m	(200 ft)	0.7 km	(0.5 mi)	2.5 km	(1.5 mi)
1754	**137**	Sulphur trioxide and Chlorosulphonic acid mixture **(when spilled on land)**	100 m	(300 ft)	0.4 km	(0.2 mi)	0.9 km	(0.5 mi)	400 m	(1250 ft)	2.9 km	(1.8 mi)	5.7 km	(3.5 mi)
1754	**137**	Sulphur trioxide and Chlorosulphonic acid mixture **(when spilled in water)**	30 m	(100 ft)	0.1 km	(0.1 mi)	0.3 km	(0.2 mi)	60 m	(200 ft)	0.7 km	(0.5 mi)	2.5 km	(1.5 mi)
1758	**137**	Chromium oxychloride **(when spilled in water)**	30 m	(100 ft)	0.1 km	(0.1 mi)	0.1 km	(0.1 mi)	30 m	(100 ft)	0.2 km	(0.2 mi)	0.8 km	(0.5 mi)
1762	**156**	Cyclohexenyltrichlorosilane **(when spilled in water)**	30 m	(100 ft)	0.1 km	(0.1 mi)	0.2 km	(0.1 mi)	30 m	(100 ft)	0.4 km	(0.3 mi)	1.4 km	(0.9 mi)
1763	**156**	Cyclohexyltrichlorosilane **(when spilled in water)**	30 m	(100 ft)	0.1 km	(0.1 mi)	0.2 km	(0.1 mi)	30 m	(100 ft)	0.4 km	(0.3 mi)	1.4 km	(0.9 mi)

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			First **ISOLATE** in all Directions		Then **PROTECT** persons Downwind during-		First **ISOLATE** in all Directions		Then **PROTECT** persons Downwind during-	
					DAY	**NIGHT**			**DAY**	**NIGHT**
ID No.	**Guide**	**NAME OF MATERIAL**	Meters (Feet)		Kilometers (Miles)	Kilometers (Miles)	Meters (Feet)		Kilometers (Miles)	Kilometers (Miles)
1765	**156**	Dichloroacetyl chloride **(when spilled in water)**	30 m	(100 ft)	0.1 km (0.1 mi)	0.1 km (0.1 mi)	30 m	(100 ft)	0.3 km (0.2 mi)	1.0 km (0.6 mi)
1766	**156**	Dichlorophenyltrichlorosilane **(when spilled in water)**	30 m	(100 ft)	0.1 km (0.1 mi)	0.2 km (0.2 mi)	60 m	(200 ft)	0.6 km (0.4 mi)	2.1 km (1.3 mi)
1767	**155**	Diethyldichlorosilane **(when spilled in water)**	30 m	(100 ft)	0.1 km (0.1 mi)	0.1 km (0.1 mi)	30 m	(100 ft)	0.4 km (0.3 mi)	1.1 km (0.7 mi)
1769	**156**	Diphenyldichlorosilane **(when spilled in water)**	30 m	(100 ft)	0.1 km (0.1 mi)	0.2 km (0.1 mi)	30 m	(100 ft)	0.4 km (0.3 mi)	1.3 km (0.8 mi)
1771	**156**	Dodecyltrichlorosilane **(when spilled in water)**	30 m	(100 ft)	0.1 km (0.1 mi)	0.2 km (0.1 mi)	60 m	(200 ft)	0.5 km (0.3 mi)	1.4 km (0.9 mi)
1777	**137**	Fluorosulfonic acid **(when spilled in water)**	30 m	(100 ft)	0.1 km (0.1 mi)	0.1 km (0.1 mi)	30 m	(100 ft)	0.2 km (0.2 mi)	0.8 km (0.5 mi)
1777	**137**	Fluorosulphonic acid **(when spilled in water)**								
1781	**156**	Hexadecyltrichlorosilane **(when spilled in water)**	30 m	(100 ft)	0.1 km (0.1 mi)	0.1 km (0.1 mi)	30 m	(100 ft)	0.2 km (0.2 mi)	0.7 km (0.4 mi)
1784	**156**	Hexyltrichlorosilane **(when spilled in water)**	30 m	(100 ft)	0.1 km (0.1 mi)	0.2 km (0.1 mi)	60 m	(200 ft)	0.5 km (0.3 mi)	1.5 km (0.9 mi)
1799	**156**	Nonyltrichlorosilane **(when spilled in water)**	30 m	(100 ft)	0.1 km (0.1 mi)	0.2 km (0.1 mi)	60 m	(200 ft)	0.5 km (0.3 mi)	1.6 km (1.0 mi)
1800	**156**	Octadecyltrichlorosilane **(when spilled in water)**	30 m	(100 ft)	0.1 km (0.1 mi)	0.2 km (0.1 mi)	60 m	(200 ft)	0.5 km (0.3 mi)	1.5 km (1.0 mi)

1801	**156**	Octyltrichlorosilane **(when spilled in water)**	30 m	(100 ft)	0.1 km	(0.1 mi)	0.2 km	(0.1 mi)	60 m	(200 ft)	0.5 km	(0.3 mi)	1.6 km	(1.0 mi)
1804	**156**	Phenyltrichlorosilane **(when spilled in water)**	30 m	(100 ft)	0.1 km	(0.1 mi)	0.2 km	(0.1 mi)	60 m	(200 ft)	0.5 km	(0.3 mi)	1.5 km	(1.0 mi)
1806	**137**	Phosphorus pentachloride **(when spilled in water)**	30 m	(100 ft)	0.1 km	(0.1 mi)	0.2 km	(0.2 mi)	30 m	(100 ft)	0.4 km	(0.3 mi)	1.5 km	(0.9 mi)
1808	**137**	Phosphorus tribromide **(when spilled in water)**	30 m	(100 ft)	0.1 km	(0.1 mi)	0.4 km	(0.2 mi)	60 m	(200 ft)	0.6 km	(0.4 mi)	2.0 km	(1.2 mi)
1809	**137**	Phosphorus trichloride **(when spilled on land)**	30 m	(100 ft)	0.2 km	(0.1 mi)	0.5 km	(0.3 mi)	100 m	(300 ft)	1.0 km	(0.6 mi)	2.2 km	(1.4 mi)
1809	**137**	Phosphorus trichloride **(when spilled in water)**	30 m	(100 ft)	0.1 km	(0.1 mi)	0.3 km	(0.2 mi)	60 m	(200 ft)	0.8 km	(0.5 mi)	2.5 km	(1.6 mi)
1810	**137**	Phosphorus oxychloride **(when spilled on land)**	30 m	(100 ft)	0.3 km	(0.2 mi)	0.7 km	(0.4 mi)	100 m	(300 ft)	1.2 km	(0.7 mi)	2.2 km	(1.4 mi)
1810	**137**	Phosphorus oxychloride **(when spilled in water)**	30 m	(100 ft)	0.1 km	(0.1 mi)	0.3 km	(0.2 mi)	60 m	(200 ft)	0.7 km	(0.4 mi)	2.3 km	(1.4 mi)
1815	**132**	Propionyl chloride **(when spilled in water)**	30 m	(100 ft)	0.1 km	(0.1 mi)	0.1 km	(0.1 mi)	30 m	(100 ft)	0.3 km	(0.2 mi)	0.8 km	(0.5 mi)
1816	**155**	Propyltrichlorosilane **(when spilled in water)**	30 m	(100 ft)	0.1 km	(0.1 mi)	0.3 km	(0.2 mi)	60 m	(200 ft)	0.6 km	(0.4 mi)	2.0 km	(1.3 mi)
1818	**157**	Silicon tetrachloride **(when spilled in water)**	30 m	(100 ft)	0.1 km	(0.1 mi)	0.3 km	(0.2 mi)	100 m	(300 ft)	0.9 km	(0.6 mi)	2.8 km	(1.7 mi)
1828	**137**	Sulfur chlorides **(when spilled on land)**	30 m	(100 ft)	0.1 km	(0.1 mi)	0.1 km	(0.1 mi)	60 m	(200 ft)	0.3 km	(0.2 mi)	0.5 km	(0.3 mi)
1828	**137**	Sulfur chlorides **(when spilled in water)**	30 m	(100 ft)	0.1 km	(0.1 mi)	0.2 km	(0.1 mi)	30 m	(100 ft)	0.4 km	(0.2 mi)	1.2 km	(0.8 mi)
1828	**137**	Sulphur chlorides **(when spilled on land)**	30 m	(100 ft)	0.1 km	(0.1 mi)	0.1 km	(0.1 mi)	60 m	(200 ft)	0.3 km	(0.2 mi)	0.5 km	(0.3 mi)

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TABLE 1 - INITIAL ISOLATION AND PROTECTIVE ACTION DISTANCES

			SMALL SPILLS (From a small package or small leak from a large package)				LARGE SPILLS (From a large package or from many small packages)			
			First **ISOLATE** in all Directions		Then **PROTECT** persons Downwind during-		First **ISOLATE** in all Directions		Then **PROTECT** persons Downwind during-	
					DAY	**NIGHT**			**DAY**	**NIGHT**
ID No.	**Guide**	**NAME OF MATERIAL**	Meters	(Feet)	Kilometers (Miles)	Kilometers (Miles)	Meters	(Feet)	Kilometers (Miles)	Kilometers (Miles)
1828	**137**	Sulphur chlorides **(when spilled in water)**	30 m	(100 ft)	0.1 km (0.1 mi)	0.2 km (0.1 mi)	30 m	(100 ft)	0.4 km (0.2 mi)	1.2 km (0.8 mi)
1829 1829	**137** **137**	Sulfur trioxide, stabilized Sulphur trioxide, stabilized	100 m	(300 ft)	0.4 km (0.2 mi)	0.9 km (0.5 mi)	400 m	(1250 ft)	2.9 km (1.8 mi)	5.7 km (3.5 mi)
1831 1831 1831 1831	**137** **137** **137** **137**	Sulfuric acid, fuming Sulfuric acid, fuming, with not less than 30% free Sulfur trioxide Sulphuric acid, fuming Sulphuric acid, fuming, with not less than 30% free Sulphur trioxide	100 m	(300 ft)	0.4 km (0.2 mi)	0.9 km (0.5 mi)	400 m	(1250 ft)	2.9 km (1.8 mi)	5.7 km (3.5 mi)
1834	**137**	Sulfuryl chloride **(when spilled on land)**	30 m	(100 ft)	0.2 km (0.1 mi)	0.5 km (0.4 mi)	100 m	(300 ft)	0.9 km (0.6 mi)	2.0 km (1.3 mi)
1834	**137**	Sulfuryl chloride **(when spilled in water)**	30 m	(100 ft)	0.1 km (0.1 mi)	0.2 km (0.1 mi)	60 m	(200 ft)	0.5 km (0.3 mi)	1.8 km (1.1 mi)
1834	**137**	Sulphuryl chloride **(when spilled on land)**	30 m	(100 ft)	0.2 km (0.1 mi)	0.5 km (0.4 mi)	100 m	(300 ft)	0.9 km (0.6 mi)	2.0 km (1.3 mi)
1834	**137**	Sulphuryl chloride **(when spilled in water)**	30 m	(100 ft)	0.1 km (0.1 mi)	0.2 km (0.1 mi)	60 m	(200 ft)	0.5 km (0.3 mi)	1.8 km (1.1 mi)
1836	**137**	Thionyl chloride **(when spilled on land)**	30 m	(100 ft)	0.2 km (0.2 mi)	0.7 km (0.5 mi)	100 m	(300 ft)	0.9 km (0.6 mi)	1.9 km (1.2 mi)

1836	**137**	Thionyl chloride **(when spilled in water)**	100 m	(300 ft)	1.1 km	(0.7 mi)	3.0 km	(1.9 mi)	800 m	(2500 ft)	9.9 km	(6.2 mi)	11.0+ km	(7.0+ mi)
1838	**137**	Titanium tetrachloride **(when spilled on land)**	30 m	(100 ft)	0.1 km	(0.1 mi)	0.2 km	(0.1 mi)	30 m	(100 ft)	0.4 km	(0.3 mi)	0.7 km	(0.4 mi)
1838	**137**	Titanium tetrachloride **(when spilled in water)**	30 m	(100 ft)	0.1 km	(0.1 mi)	0.2 km	(0.1 mi)	60 m	(200 ft)	0.5 km	(0.3 mi)	1.8 km	(1.1 mi)
1859 1859	**125** **125**	Silicon tetrafluoride Silicon tetrafluoride, compressed	30 m	(100 ft)	0.2 km	(0.1 mi)	0.8 km	(0.5 mi)	100 m	(300 ft)	0.6 km	(0.4 mi)	2.5 km	(1.6 mi)
1892	**151**	ED **(when used as a weapon)**	150 m	(500 ft)	2.0 km	(1.2 mi)	2.9 km	(1.8 mi)	1000 m	(3000 ft)	10.4 km	(6.5 mi)	11.0+ km	(7.0+ mi)
1892	**151**	Ethyldichloroarsine	150 m	(500 ft)	1.5 km	(1.0 mi)	2.4 km	(1.5 mi)	500 m	(1500 ft)	5.2 km	(3.3 mi)	10.2 km	(6.1 mi)
1898	**156**	Acetyl iodide **(when spilled in water)**	30 m	(100 ft)	0.1 km	(0.1 mi)	0.2 km	(0.2 mi)	60 m	(200 ft)	0.5 km	(0.3 mi)	1.1 km	(0.7 mi)
1911 1911	**119** **119**	Diborane Diborane, compressed	60 m	(200 ft)	0.3 km	(0.2 mi)	1.0 km	(0.7 mi)	200 m	(600 ft)	1.3 km	(0.8 mi)	3.9 km	(2.5 mi)
1923 1923 1923	**135** **135** **135**	Calcium dithionite **(when spilled in water)** Calcium hydrosulfite **(when spilled in water)** Calcium hydrosulphite **(when spilled in water)**	30 m	(100 ft)	0.2 km	(0.1 mi)	0.7 km	(0.4 mi)	60 m	(200 ft)	0.8 km	(0.5 mi)	2.8 km	(1.7 mi)
1929 1929 1929	**135** **135** **135**	Potassium dithionite **(when spilled in water)** Potassium hydrosulfite **(when spilled in water)** Potassium hydrosulphite **(when spilled in water)**	30 m	(100 ft)	0.2 km	(0.1 mi)	0.6 km	(0.4 mi)	60 m	(200 ft)	0.7 km	(0.4 mi)	2.5 km	(1.5 mi)

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TABLE 1 - INITIAL ISOLATION AND PROTECTIVE ACTION DISTANCES

			SMALL SPILLS (From a small package or small leak from a large package)				LARGE SPILLS (From a large package or from many small packages)			
			First **ISOLATE** in all Directions	Then **PROTECT** persons Downwind during-			First **ISOLATE** in all Directions	Then **PROTECT** persons Downwind during-		
ID No.	**Guide**	**NAME OF MATERIAL**	Meters (Feet)	**DAY** Kilometers (Miles)	**NIGHT** Kilometers (Miles)		Meters (Feet)	**DAY** Kilometers (Miles)	**NIGHT** Kilometers (Miles)	
1931	**171**	Zinc dithionite **(when spilled in water)**	30 m (100 ft)	0.2 km (0.1 mi)	0.6 km (0.4 mi)		60 m (200 ft)	0.7 km (0.5 mi)	2.5 km (1.6 mi)	
1931	**171**	Zinc hydrosulfite **(when spilled in water)**								
1931	**171**	Zinc hydrosulphite **(when spilled in water)**								
1953	**119**	Compressed gas, flammable, poisonous, n.o.s. (Inhalation Hazard Zone A)	100 m (300 ft)	0.5 km (0.3 mi)	2.2 km (1.4 mi)		600 m (2000 ft)	2.6 km (1.7 mi)	8.6 km (5.4 mi)	
1953	**119**	Compressed gas, flammable, poisonous, n.o.s. (Inhalation Hazard Zone B)	30 m (100 ft)	0.1 km (0.1 mi)	0.3 km (0.2 mi)		300 m (1000 ft)	1.3 km (0.8 mi)	3.5 km (2.2 mi)	
1953	**119**	Compressed gas, flammable, poisonous, n.o.s. (Inhalation Hazard Zone C)	30 m (100 ft)	0.1 km (0.1 mi)	0.3 km (0.2 mi)		200 m (600 ft)	1.0 km (0.7 mi)	3.2 km (2.0 mi)	
1953	**119**	Compressed gas, flammable, poisonous, n.o.s. (Inhalation Hazard Zone D)	30 m (100 ft)	0.1 km (0.1 mi)	0.2 km (0.1 mi)		200 m (600 ft)	0.8 km (0.5 mi)	2.0 km (1.3 mi)	
1953	**119**	Compressed gas, flammable, toxic, n.o.s. (Inhalation Hazard Zone A)	100 m (300 ft)	0.5 km (0.3 mi)	2.2 km (1.4 mi)		600 m (2000 ft)	2.6 km (1.7 mi)	8.6 km (5.4 mi)	
1953	**119**	Compressed gas, flammable, toxic, n.o.s. (Inhalation Hazard Zone B)	30 m (100 ft)	0.1 km (0.1 mi)	0.3 km (0.2 mi)		300 m (1000 ft)	1.3 km (0.8 mi)	3.5 km (2.2 mi)	

1953	**119**	Compressed gas, flammable, toxic, n.o.s. (Inhalation Hazard Zone C)	30 m	(100 ft)	0.1 km	(0.1 mi)	0.3 km	(0.2 mi)	200 m	(600 ft)	1.0 km	(0.7 mi)	3.2 km	(2.0 mi)
1953	**119**	Compressed gas, flammable, toxic, n.o.s. (Inhalation Hazard Zone D)	30 m	(100 ft)	0.1 km	(0.1 mi)	0.2 km	(0.1 mi)	200 m	(600 ft)	0.8 km	(0.5 mi)	2.0 km	(1.3 mi)
1953 1953	**119** **119**	Compressed gas, poisonous, flammable, n.o.s. Compressed gas, poisonous, flammable, n.o.s. (Inhalation Hazard Zone A)	100 m	(300 ft)	0.5 km	(0.3 mi)	2.2 km	(1.4 mi)	600 m	(2000 ft)	2.6 km	(1.7 mi)	8.6 km	(5.4 mi)
1953	**119**	Compressed gas, poisonous, flammable, n.o.s. (Inhalation Hazard Zone B)	30 m	(100 ft)	0.1 km	(0.1 mi)	0.3 km	(0.2 mi)	300 m	(1000 ft)	1.3 km	(0.8 mi)	3.5 km	(2.2 mi)
1953	**119**	Compressed gas, poisonous, flammable, n.o.s. (Inhalation Hazard Zone C)	30 m	(100 ft)	0.1 km	(0.1 mi)	0.3 km	(0.2 mi)	200 m	(600 ft)	1.0 km	(0.7 mi)	3.2 km	(2.0 mi)
1953	**119**	Compressed gas, poisonous, flammable, n.o.s. (Inhalation Hazard Zone D)	30 m	(100 ft)	0.1 km	(0.1 mi)	0.2 km	(0.1 mi)	200 m	(600 ft)	0.8 km	(0.5 mi)	2.0 km	(1.3 mi)
1953 1953	**119** **119**	Compressed gas, toxic, flammable, n.o.s. Compressed gas, toxic, flammable, n.o.s. (Inhalation Hazard Zone A)	100 m	(300 ft)	0.5 km	(0.3 mi)	2.2 km	(1.4 mi)	600 m	(2000 ft)	2.6 km	(1.7 mi)	8.6 km	(5.4 mi)
1953	**119**	Compressed gas, toxic, flammable, n.o.s. (Inhalation Hazard Zone B)	30 m	(100 ft)	0.1 km	(0.1 mi)	0.3 km	(0.2 mi)	300 m	(1000 ft)	1.3 km	(0.8 mi)	3.5 km	(2.2 mi)
1953	**119**	Compressed gas, toxic, flammable, n.o.s. (Inhalation Hazard Zone C)	30 m	(100 ft)	0.1 km	(0.1 mi)	0.3 km	(0.2 mi)	200 m	(600 ft)	1.0 km	(0.7 mi)	3.2 km	(2.0 mi)

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			First **ISOLATE** in all Directions	Then **PROTECT** persons Downwind during-		First **ISOLATE** in all Directions	Then **PROTECT** persons Downwind during-	
ID No.	**Guide**	**NAME OF MATERIAL**	Meters (Feet)	**DAY** Kilometers (Miles)	**NIGHT** Kilometers (Miles)	Meters (Feet)	**DAY** Kilometers (Miles)	**NIGHT** Kilometers (Miles)
1953	**119**	Compressed gas, toxic, flammable, n.o.s. (Inhalation Hazard Zone D)	30 m (100 ft)	0.1 km (0.1 mi)	0.2 km (0.1 mi)	200 m (600 ft)	0.8 km (0.5 mi)	2.0 km (1.3 mi)
1955 1955	**123** **123**	Compressed gas, poisonous, n.o.s. Compressed gas, poisonous, n.o.s. (Inhalation Hazard Zone A)	100 m (300 ft)	0.5 km (0.3 mi)	2.2 km (1.4 mi)	600 m (2000 ft)	3.5 km (2.2 mi)	9.4 km (5.9 mi)
1955	**123**	Compressed gas, poisonous, n.o.s. (Inhalation Hazard Zone B)	30 m (100 ft)	0.2 km (0.1 mi)	0.8 km (0.5 mi)	300 m (1000 ft)	1.5 km (0.9 mi)	4.6 km (2.9 mi)
1955	**123**	Compressed gas, poisonous, n.o.s. (Inhalation Hazard Zone C)	30 m (100 ft)	0.1 km (0.1 mi)	0.3 km (0.2 mi)	150 m (500 ft)	0.9 km (0.6 mi)	2.8 km (1.7 mi)
1955	**123**	Compressed gas, poisonous, n.o.s. (Inhalation Hazard Zone D)	30 m (100 ft)	0.1 km (0.1 mi)	0.2 km (0.1 mi)	150 m (500 ft)	0.8 km (0.5 mi)	2.0 km (1.3 mi)
1955 1955	**123** **123**	Compressed gas, toxic, n.o.s. Compressed gas, toxic, n.o.s. (Inhalation Hazard Zone A)	100 m (300 ft)	0.5 km (0.3 mi)	2.2 km (1.4 mi)	600 m (2000 ft)	3.5 km (2.2 mi)	9.4 km (5.9 mi)
1955	**123**	Compressed gas, toxic, n.o.s. (Inhalation Hazard Zone B)	30 m (100 ft)	0.2 km (0.1 mi)	0.8 km (0.5 mi)	300 m (1000 ft)	1.5 km (0.9 mi)	4.6 km (2.9 mi)
1955	**123**	Compressed gas, toxic, n.o.s. (Inhalation Hazard Zone C)	30 m (100 ft)	0.1 km (0.1 mi)	0.3 km (0.2 mi)	150 m (500 ft)	0.9 km (0.6 mi)	2.8 km (1.7 mi)

1955	**123**	Compressed gas, toxic, n.o.s. (Inhalation Hazard Zone D)	30 m	(100 ft)	0.1 km	(0.1 mi)	0.2 km	(0.1 mi)	150 m	(500 ft)	0.8 km	(0.5 mi)	2.0 km	(1.3 mi)
1955 1955 1955	**123** **123** **123**	Organic phosphate compound mixed with compressed gas Organic phosphate mixed with compressed gas Organic phosphorus compound mixed with compressed gas	100 m	(300 ft)	0.9 km	(0.6 mi)	2.6 km	(1.6 mi)	500 m	(1500 ft)	3.9 km	(2.4 mi)	9.4 km	(5.9 mi)
1967 1967 1967	**123** **123** **123**	Insecticide gas, poisonous, n.o.s. Insecticide gas, toxic, n.o.s. Parathion and compressed gas mixture	100 m	(300 ft)	0.9 km	(0.6 mi)	2.6 km	(1.6 mi)	500 m	(1500 ft)	3.9 km	(2.4 mi)	9.4 km	(5.9 mi)
1975 1975 1975 1975 1975 1975	**124** **124** **124** **124** **124** **124**	Dinitrogen tetroxide and Nitric oxide mixture Nitric oxide and Dinitrogen tetroxide mixture Nitric oxide and Nitrogen dioxide mixture Nitric oxide and Nitrogen tetroxide mixture Nitrogen dioxide and Nitric oxide mixture Nitrogen tetroxide and Nitric oxide mixture	30 m	(100 ft)	0.1 km	(0.1 mi)	0.6 km	(0.4 mi)	100 m	(300 ft)	0.6 km	(0.4 mi)	2.3 km	(1.5 mi)
1994	**131**	Iron pentacarbonyl	100 m	(300 ft)	0.9 km	(0.6 mi)	2.1 km	(1.3 mi)	400 m	(1250 ft)	4.8 km	(3.0 mi)	8.3 km	(5.2 mi)
2004	**135**	Magnesium diamide **(when spilled in water)**	30 m	(100 ft)	0.1 km	(0.1 mi)	0.5 km	(0.3 mi)	100 m	(300 ft)	0.7 km	(0.5 mi)	2.4 km	(1.5 mi)
2011	**139**	Magnesium phosphide **(when spilled in water)**	60 m	(200 ft)	0.2 km	(0.1 mi)	0.8 km	(0.5 mi)	500 m	(1500 ft)	1.8 km	(1.1 mi)	6.0 km	(3.8 mi)

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ID No.	**Guide**	**NAME OF MATERIAL**	Meters (Feet)	**DAY** Kilometers (Miles)	**NIGHT** Kilometers (Miles)	Meters (Feet)	**DAY** Kilometers (Miles)	**NIGHT** Kilometers (Miles)
2012	**139**	Potassium phosphide **(when spilled in water)**	30 m (100 ft)	0.1 km (0.1 mi)	0.6 km (0.4 mi)	300 m (1000 ft)	1.2 km (0.8 mi)	4.0 km (2.5 mi)
2013	**139**	Strontium phosphide **(when spilled in water)**	30 m (100 ft)	0.1 km (0.1 mi)	0.6 km (0.4 mi)	300 m (1000 ft)	1.2 km (0.7 mi)	3.8 km (2.4 mi)
2032 2032	**157** **157**	Nitric acid, fuming Nitric acid, red fuming	30 m (100 ft)	0.1 km (0.1 mi)	0.3 km (0.2 mi)	150 m (500 ft)	0.5 km (0.3 mi)	1.1 km (0.7 mi)
2186 *	**125**	Hydrogen chloride, refrigerated liquid	30 m (100 ft)	0.1 km (0.1 mi)	0.3 km (0.2 mi)	300 m (1000 ft)	2.0 km (1.3 mi)	7.6 km (4.7 mi)
2188	**119**	Arsine	150 m (500 ft)	1.0 km (0.6 mi)	4.0 km (2.5 mi)	1000 m (3000 ft)	5.8 km (3.6 mi)	11.0+ km (7.0+ mi)
2188	**119**	SA **(when used as a weapon)**	300 m (1000 ft)	1.9 km (1.2 mi)	5.7 km (3.6 mi)	1000 m (3000 ft)	8.9 km (5.6 mi)	11.0+ km (7.0+ mi)
2189	**119**	Dichlorosilane	30 m (100 ft)	0.1 km (0.1 mi)	0.4 km (0.2 mi)	200 m (600 ft)	1.2 km (0.8 mi)	2.9 km (1.8 mi)
2190 2190	**124** **124**	Oxygen difluoride Oxygen difluoride, compressed	200 m (600 ft)	0.4 km (0.3 mi)	2.1 km (1.3 mi)	1000 m (3000 ft)	2.2 km (1.4 mi)	8.6 km (5.4 mi)
2191 2191	**123** **123**	Sulfuryl fluoride Sulphuryl fluoride	30 m (100 ft)	0.1 km (0.1 mi)	0.5 km (0.3 mi)	300 m (1000 ft)	1.9 km (1.2 mi)	5.1 km (3.2 mi)
2192	**119**	Germane	150 m (500 ft)	0.8 km (0.5 mi)	3.2 km (2.0 mi)	800 m (2500 ft)	4.4 km (2.7 mi)	10.6 km (6.6 mi)
2194	**125**	Selenium hexafluoride	200 m (600 ft)	1.1 km (0.7 mi)	3.7 km (2.3 mi)	800 m (2500 ft)	5.0 km (3.1 mi)	11.0+ km (7.0+ mi)
2195	**125**	Tellurium hexafluoride	200 m (600 ft)	1.2 km (0.7 mi)	4.4 km (2.8 mi)	1000 m (3000 ft)	6.7 km (4.2 mi)	11.0+ km (7.0+ mi)
2196	**125**	Tungsten hexafluoride	30 m (100 ft)	0.2 km (0.1 mi)	0.8 km (0.5 mi)	150 m (500 ft)	0.9 km (0.6 mi)	3.1 km (2.0 mi)
2197	**125**	Hydrogen iodide, anhydrous	30 m (100 ft)	0.1 km (0.1 mi)	0.3 km (0.2 mi)	150 m (500 ft)	0.9 km (0.6 mi)	2.8 km (1.7 mi)

2198 2198	**125** **125**	Phosphorus pentafluoride Phosphorus pentafluoride, compressed	30 m	(100 ft)	0.2 km	(0.1 mi)	0.8 km	(0.5 mi)	150 m	(500 ft)	0.9 km	(0.5 mi)	3.3 km	(2.0 mi)
2199	**119**	Phosphine	60 m	(200 ft)	0.2 km	(0.2 mi)	1.0 km	(0.7 mi)	400 m	(1250 ft)	1.3 km	(0.8 mi)	4.1 km	(2.5 mi)
2202	**117**	Hydrogen selenide, anhydrous	200 m	(600 ft)	1.1 km	(0.7 mi)	4.9 km	(3.1 mi)	1000 m	(3000 ft)	8.5 km	(5.3 mi)	11.0+ km	(7.0+ mi)
2204 2204	**119** **119**	Carbonyl sulfide Carbonyl sulphide	30 m	(100 ft)	0.1 km	(0.1 mi)	0.3 km	(0.2 mi)	300 m	(1000 ft)	1.3 km	(0.8 mi)	3.5 km	(2.2 mi)
2232 2232	**153** **153**	Chloroacetaldehyde 2-Chloroethanal	30 m	(100 ft)	0.2 km	(0.1 mi)	0.4 km	(0.2 mi)	60 m	(200 ft)	0.7 km	(0.5 mi)	1.3 km	(0.8 mi)
2308 2308 2308 2308 2308 2308	**157** **157** **157** **157** **157** **157**	Nitrosylsulfuric acic **(when spilled in water)** Nitrosylsulfuric acic, liquid **(when spilled in water)** Nitrosylsulfuric acic, solid **(when spilled in water)** Nitrosylsulphuric acic **(when spilled in water)** Nitrosylsulphuric acic, liquid **(when spilled in water)** Nitrosylsulphuric acic, solid **(when spilled in water)**	30 m	(100 ft)	0.1 km	(0.1 mi)	0.4 km	(0.3 mi)	300 m	(1000 ft)	0.9 km	(0.6 mi)	2.5 km	(1.6 mi)
2334	**131**	Allylamine	30 m	(100 ft)	0.2 km	(0.1 mi)	0.6 km	(0.4 mi)	150 m	(500 ft)	1.5 km	(0.9 mi)	2.8 km	(1.7 mi)
2337	**131**	Phenyl mercaptan	30 m	(100 ft)	0.1 km	(0.1 mi)	0.1 km	(0.1 mi)	30 m	(100 ft)	0.3 km	(0.2 mi)	0.5 km	(0.3 mi)
2353	**132**	Butyryl chloride **(when spilled in water)**	30 m	(100 ft)	0.1 km	(0.1 mi)	0.1 km	(0.1 mi)	30 m	(100 ft)	0.4 km	(0.2 mi)	1.0 km	(0.6 mi)
2382 2382	**131** **131**	1,2-Dimethylhydrazine Dimethylhydrazine, symmetrical	30 m	(100 ft)	0.2 km	(0.1 mi)	0.4 km	(0.2 mi)	60 m	(200 ft)	0.8 km	(0.5 mi)	1.5 km	(1.0 mi)

"+" means distance can be larger in certain atmospheric conditions

*** PLEASE ALSO CONSULT TABLE 3 FOR THIS MATERIAL**

TABLE 1 - INITIAL ISOLATION AND PROTECTIVE ACTION DISTANCES

			SMALL SPILLS (From a small package or small leak from a large package)			LARGE SPILLS (From a large package or from many small packages)		
			First **ISOLATE** in all Directions	Then **PROTECT** persons Downwind during-		First **ISOLATE** in all Directions	Then **PROTECT** persons Downwind during-	
ID No.	**Guide**	**NAME OF MATERIAL**	Meters (Feet)	**DAY** Kilometers (Miles)	**NIGHT** Kilometers (Miles)	Meters (Feet)	**DAY** Kilometers (Miles)	**NIGHT** Kilometers (Miles)
2395	**132**	Isobutyryl chloride **(when spilled in water)**	30 m (100 ft)	0.1 km (0.1 mi)	0.1 km (0.1 mi)	30 m (100 ft)	0.2 km (0.2 mi)	0.6 km (0.4 mi)
2407	**155**	Isopropyl chloroformate	30 m (100 ft)	0.1 km (0.1 mi)	0.2 km (0.2 mi)	60 m (200 ft)	0.5 km (0.3 mi)	1.0 km (0.6 mi)
2417 2417	**125** **125**	Carbonyl fluoride Carbonyl fluoride, compressed	100 m (300 ft)	0.6 km (0.4 mi)	2.3 km (1.4 mi)	600 m (2000 ft)	3.7 km (2.3 mi)	8.0 km (5.0 mi)
2418 2418	**125** **125**	Sulfur tetrafluoride Sulphur tetrafluoride	100 m (300 ft)	0.5 km (0.4 mi)	2.6 km (1.6 mi)	600 m (2000 ft)	3.5 km (2.2 mi)	9.4 km (5.9 mi)
2420	**125**	Hexafluoroacetone	60 m (200 ft)	0.3 km (0.2 mi)	1.4 km (0.9 mi)	1000 m (3000 ft)	7.6 km (4.7 mi)	11.0+ km (7.0+ mi)
2421	**124**	Nitrogen trioxide	60 m (200 ft)	0.4 km (0.3 mi)	1.8 km (1.1 mi)	300 m (1000 ft)	1.9 km (1.2 mi)	6.7 km (4.2 mi)
2434	**156**	Dibenzyldichlorosilane **(when spilled in water)**	30 m (100 ft)	0.1 km (0.1 mi)	0.1 km (0.1 mi)	30 m (100 ft)	0.2 km (0.1 mi)	0.6 km (0.4 mi)
2435	**156**	Ethylphenyldichlorosilane **(when spilled in water)**	30 m (100 ft)	0.1 km (0.1 mi)	0.1 km (0.1 mi)	30 m (100 ft)	0.4 km (0.2 mi)	1.1 km (0.7 mi)
2437	**156**	Methylphenyldichlorosilane **(when spilled in water)**	30 m (100 ft)	0.1 km (0.1 mi)	0.2 km (0.1 mi)	30 m (100 ft)	0.4 km (0.3 mi)	1.4 km (0.9 mi)
2438	**132**	Trimethylacetyl chloride	30 m (100 ft)	0.3 km (0.2 mi)	0.6 km (0.4 mi)	100 m (300 ft)	1.2 km (0.8 mi)	2.1 km (1.3 mi)
2442	**156**	Trichloroacetyl chloride	30 m (100 ft)	0.2 km (0.1 mi)	0.3 km (0.2 mi)	60 m (200 ft)	0.6 km (0.4 mi)	1.2 km (0.8 mi)
2474	**157**	Thiophosgene	60 m (200 ft)	0.7 km (0.4 mi)	2.0 km (1.2 mi)	300 m (1000 ft)	2.7 km (1.7 mi)	5.5 km (3.4 mi)
2477	**131**	Methyl isothiocyanate	30 m (100 ft)	0.1 km (0.1 mi)	0.1 km (0.1 mi)	30 m (100 ft)	0.2 km (0.2 mi)	0.4 km (0.2 mi)
2480	**155**	Methyl isocyanate	150 m (500 ft)	1.7 km (1.1 mi)	5.8 km (3.6 mi)	1000 m (3000 ft)	11.0+ km (7.0+ mi)	11.0+ km (7.0+ mi)

2481	**155**	Ethyl isocyanate	150 m	(500 ft)	1.8 km	(1.2 mi)	5.9 km	(3.7 mi)	1000 m	(3000 ft)	11.0+ km	(7.0+ mi)	11.0+ km	(7.0+ mi)
2482	**155**	n-Propyl isocyanate	100 m	(300 ft)	1.1 km	(0.7 mi)	2.8 km	(1.7 mi)	600 m	(2000 ft)	7.8 km	(4.9 mi)	11.0+ km	(7.0+ mi)
2483	**155**	Isopropyl isocyanate	100 m	(300 ft)	1.2 km	(0.8 mi)	3.1 km	(1.9 mi)	800 m	(2500 ft)	10.1 km	(6.3 mi)	11.0+ km	(7.0+ mi)
2484	**155**	tert-Butyl isocyanate	100 m	(300 ft)	1.1 km	(0.7 mi)	2.7 km	(1.7 mi)	600 m	(2000 ft)	7.2 km	(4.5 mi)	11.0+ km	(7.0+ mi)
2485	**155**	n-Butyl isocyanate	60 m	(200 ft)	0.8 km	(0.5 mi)	1.7 km	(1.1 mi)	300 m	(1000 ft)	4.0 km	(2.5 mi)	6.7 km	(4.2 mi)
2486	**155**	Isobutyl isocyanate	60 m	(200 ft)	0.8 km	(0.5 mi)	1.7 km	(1.1 mi)	300 m	(1000 ft)	4.0 km	(2.5 mi)	6.5 km	(4.1 mi)
2487	**155**	Phenyl isocyanate	30 m	(100 ft)	0.2 km	(0.2 mi)	0.3 km	(0.2 mi)	60 m	(200 ft)	0.8 km	(0.5 mi)	1.2 km	(0.8 mi)
2488	**155**	Cyclohexyl isocyanate	30 m	(100 ft)	0.2 km	(0.1 mi)	0.2 km	(0.1 mi)	60 m	(200 ft)	0.5 km	(0.3 mi)	0.7 km	(0.5 mi)
2495	**144**	Iodine pentafluoride **(when spilled in water)**	30 m	(100 ft)	0.1 km	(0.1 mi)	0.6 km	(0.4 mi)	150 m	(500 ft)	1.2 km	(0.8 mi)	4.6 km	(2.9 mi)
2521	**131P**	Diketene, stabilized	30 m	(100 ft)	0.1 km	(0.1 mi)	0.1 km	(0.1 mi)	30 m	(100 ft)	0.3 km	(0.2 mi)	0.5 km	(0.3 mi)
2534	**119**	Methylchlorosilane	30 m	(100 ft)	0.1 km	(0.1 mi)	0.3 km	(0.2 mi)	100 m	(300 ft)	0.7 km	(0.4 mi)	1.8 km	(1.1 mi)
2548	**124**	Chlorine pentafluoride	30 m	(100 ft)	0.2 km	(0.2 mi)	1.2 km	(0.7 mi)	300 m	(1000 ft)	1.8 km	(1.1 mi)	7.3 km	(4.6 mi)
2600	**119**	Carbon monoxide and Hydrogen mixture, compressed	30 m	(100 ft)	0.1 km	(0.1 mi)	0.2 km	(0.1 mi)	200 m	(600 ft)	1.2 km	(0.8 mi)	4.8 km	(3.0 mi)
2600	**119**	Hydrogen and Carbon monoxide mixture, compressed												
2605	**155**	Methoxymethyl isocyanate	30 m	(100 ft)	0.4 km	(0.2 mi)	0.5 km	(0.4 mi)	100 m	(300 ft)	1.2 km	(0.8 mi)	1.8 km	(1.2 mi)
2606	**155**	Methyl orthosilicate	30 m	(100 ft)	0.1 km	(0.1 mi)	0.1 km	(0.1 mi)	30 m	(100 ft)	0.2 km	(0.1 mi)	0.3 km	(0.2 mi)
2644	**151**	Methyl iodide	30 m	(100 ft)	0.1 km	(0.1 mi)	0.2 km	(0.1 mi)	100 m	(300 ft)	0.3 km	(0.2 mi)	0.7 km	(0.5 mi)
2646	**151**	Hexachlorocyclopentadiene	30 m	(100 ft)	0.1 km	(0.1 mi)	0.1 km	(0.1 mi)	30 m	(100 ft)	0.3 km	(0.2 mi)	0.4 km	(0.3 mi)
2668	**131**	Chloroacetonitrile	30 m	(100 ft)	0.1 km	(0.1 mi)	0.1 km	(0.1 mi)	30 m	(100 ft)	0.1 km	(0.1 mi)	0.2 km	(0.1 mi)
2676	**119**	Stibine	60 m	(200 ft)	0.4 km	(0.2 mi)	1.7 km	(1.1 mi)	300 m	(1000 ft)	1.9 km	(1.2 mi)	6.5 km	(4.0 mi)

"+" means distance can be larger in certain atmospheric conditions

TABLE 1 - INITIAL ISOLATION AND PROTECTIVE ACTION DISTANCES

			SMALL SPILLS (From a small package or small leak from a large package)				LARGE SPILLS (From a large package or from many small packages)			
			First **ISOLATE** in all Directions		Then **PROTECT** persons Downwind during-		First **ISOLATE** in all Directions		Then **PROTECT** persons Downwind during-	
					DAY	**NIGHT**			**DAY**	**NIGHT**
ID No.	**Guide**	**NAME OF MATERIAL**	Meters (Feet)		Kilometers (Miles)	Kilometers (Miles)	Meters (Feet)		Kilometers (Miles)	Kilometers (Miles)
2691	**137**	Phosphorus pentabromide **(when spilled in water)**	30 m	(100 ft)	0.1 km (0.1 mi)	0.2 km (0.1 mi)	30 m	(100 ft)	0.3 km (0.2 mi)	1.0 km (0.6 mi)
2692	**157**	Boron tribromide **(when spilled on land)**	30 m	(100 ft)	0.1 km (0.1 mi)	0.3 km (0.2 mi)	30 m	(100 ft)	0.3 km (0.2 mi)	0.7 km (0.4 mi)
2692	**157**	Boron tribromide **(when spilled in water)**	30 m	(100 ft)	0.1 km (0.1 mi)	0.4 km (0.3 mi)	60 m	(200 ft)	0.8 km (0.5 mi)	2.5 km (1.6 mi)
2740	**155**	n-Propyl chloroformate	30 m	(100 ft)	0.1 km (0.1 mi)	0.3 km (0.2 mi)	60 m	(200 ft)	0.6 km (0.4 mi)	1.1 km (0.7 mi)
2742	**155**	sec-Butyl chloroformate	30 m	(100 ft)	0.1 km (0.1 mi)	0.2 km (0.1 mi)	30 m	(100 ft)	0.4 km (0.3 mi)	0.6 km (0.4 mi)
2742	**155**	Isobutyl chloroformate	30 m	(100 ft)	0.1 km (0.1 mi)	0.2 km (0.1 mi)	30 m	(100 ft)	0.3 km (0.2 mi)	0.5 km (0.3 mi)
2743	**155**	n-Butyl chloroformate	30 m	(100 ft)	0.1 km (0.1 mi)	0.2 km (0.1 mi)	30 m	(100 ft)	0.4 km (0.2 mi)	0.5 km (0.4 mi)
2806	**138**	Lithium nitride **(when spilled in water)**	30 m	(100 ft)	0.1 km (0.1 mi)	0.5 km (0.3 mi)	60 m	(200 ft)	0.6 km (0.4 mi)	2.1 km (1.3 mi)
2810	**153**	Buzz **(when used as a weapon)**	60 m	(200 ft)	0.4 km (0.2 mi)	1.7 km (1.1 mi)	400 m	(1250 ft)	2.2 km (1.4 mi)	8.1 km (5.0 mi)
2810	**153**	BZ **(when used as a weapon)**								
2810	**153**	CS **(when used as a weapon)**	30 m	(100 ft)	0.1 km (0.1 mi)	0.6 km (0.4 mi)	100 m	(300 ft)	0.4 km (0.3 mi)	1.9 km (1.2 mi)
2810	**153**	DC **(when used as a weapon)**	30 m	(100 ft)	0.1 km (0.1 mi)	0.6 km (0.4 mi)	60 m	(200 ft)	0.4 km (0.3 mi)	1.8 km (1.1 mi)
2810	**153**	GA **(when used as a weapon)**	30 m	(100 ft)	0.2 km (0.1 mi)	0.2 km (0.1 mi)	100 m	(300 ft)	0.5 km (0.4 mi)	0.6 km (0.4 mi)
2810	**153**	GB **(when used as a weapon)**	60 m	(200 ft)	0.4 km (0.3 mi)	1.1 km (0.7 mi)	400 m	(1250 ft)	2.1 km (1.3 mi)	4.9 km (3.0 mi)
2810	**153**	GD **(when used as a weapon)**	60 m	(200 ft)	0.4 km (0.3 mi)	0.7 km (0.5 mi)	300 m	(1000 ft)	1.8 km (1.1 mi)	2.7 km (1.7 mi)

2810	**153**	GF **(when used as a weapon)**	30 m	(100 ft)	0.2 km	(0.2 mi)	0.3 km	(0.2 mi)	150 m	(500 ft)	0.8 km	(0.5 mi)	1.0 km	(0.6 mi)
2810 2810	**153** **153**	H **(when used as a weapon)** HD **(when used as a weapon)**	30 m	(100 ft)	0.1 km	(0.1 mi)	0.1 km	(0.1 mi)	60 m	(200 ft)	0.3 km	(0.2 mi)	0.4 km	(0.3 mi)
2810	**153**	HL **(when used as a weapon)**	30 m	(100 ft)	0.1 km	(0.1 mi)	0.3 km	(0.2 mi)	100 m	(300 ft)	0.5 km	(0.3 mi)	1.0 km	(0.6 mi)
2810	**153**	HN-1 **(when used as a weapon)**	60 m	(200 ft)	0.3 km	(0.2 mi)	0.5 km	(0.3 mi)	200 m	(600 ft)	1.1 km	(0.7 mi)	1.8 km	(1.1 mi)
2810	**153**	HN-2 **(when used as a weapon)**	60 m	(200 ft)	0.3 km	(0.2 mi)	0.6 km	(0.4 mi)	300 m	(1000 ft)	1.3 km	(0.8 mi)	2.1 km	(1.3 mi)
2810	**153**	HN-3 **(when used as a weapon)**	30 m	(100 ft)	0.1 km	(0.1 mi)	0.1 km	(0.1 mi)	60 m	(200 ft)	0.3 km	(0.2 mi)	0.3 km	(0.2 mi)
2810 2810	**153** **153**	L (Lewisite) **(when used as a weapon)** Lewisite **(when used as a weapon)**	30 m	(100 ft)	0.1 km	(0.1 mi)	0.3 km	(0.2 mi)	100 m	(300 ft)	0.5 km	(0.3 mi)	1.0 km	(0.6 mi)
2810	**153**	Mustard **(when used as a weapon)**	30 m	(100 ft)	0.1 km	(0.1 mi)	0.1 km	(0.1 mi)	60 m	(200 ft)	0.3 km	(0.2 mi)	0.4 km	(0.3 mi)
2810	**153**	Mustard Lewisite **(when used as a weapon)**	30 m	(100 ft)	0.1 km	(0.1 mi)	0.3 km	(0.2 mi)	100 m	(300 ft)	0.5 km	(0.3 mi)	1.0 km	(0.6 mi)
2810 2810	**153** **153**	Poisonous liquid, n.o.s. Poisonous liquid, n.o.s. (Inhalation Hazard Zone A)	60 m	(200 ft)	0.4 km	(0.3 mi)	1.3 km	(0.8 mi)	200 m	(600 ft)	2.3 km	(1.4 mi)	5.1 km	(3.2 mi)
2810	**153**	Poisonous liquid, n.o.s. (Inhalation Hazard Zone B)	30 m	(100 ft)	0.2 km	(0.1 mi)	0.2 km	(0.1 mi)	60 m	(200 ft)	0.5 km	(0.3 mi)	0.7 km	(0.5 mi)
2810 2810	**153** **153**	Poisonous liquid, organic, n.o.s. Poisonous liquid, organic, n.o.s. (Inhalation Hazard Zone A)	30 m	(100 ft)	0.3 km	(0.2 mi)	1.1 km	(0.7 mi)	300 m	(1000 ft)	1.8 km	(1.1 mi)	4.5 km	(2.8 mi)
2810	**153**	Poisonous liquid, organic, n.o.s. (Inhalation Hazard Zone B)	30 m	(100 ft)	0.2 km	(0.1 mi)	0.2 km	(0.1 mi)	60 m	(200 ft)	0.5 km	(0.3 mi)	0.7 km	(0.5 mi)

"+" means distance can be larger in certain atmospheric conditions

TABLE 1 - INITIAL ISOLATION AND PROTECTIVE ACTION DISTANCES

			SMALL SPILLS (From a small package or small leak from a large package)				LARGE SPILLS (From a large package or from many small packages)			
			First **ISOLATE** in all Directions	Then **PROTECT** persons Downwind during-			First **ISOLATE** in all Directions	Then **PROTECT** persons Downwind during-		
ID No.	**Guide**	**NAME OF MATERIAL**	Meters (Feet)	**DAY** Kilometers (Miles)	**NIGHT** Kilometers (Miles)		Meters (Feet)	**DAY** Kilometers (Miles)	**NIGHT** Kilometers (Miles)	
2810	**153**	Sarin **(when used as a weapon)**	60 m (200 ft)	0.4 km (0.3 mi)	1.1 km (0.7 mi)		400 m (1250 ft)	2.1 km (1.3 mi)	4.9 km (3.0 mi)	
2810	**153**	Soman **(when used as a weapon)**	60 m (200 ft)	0.4 km (0.3 mi)	0.7 km (0.5 mi)		300 m (1000 ft)	1.8 km (1.1 mi)	2.7 km (1.7 mi)	
2810	**153**	Tabun **(when used as a weapon)**	30 m (100 ft)	0.2 km (0.1 mi)	0.2 km (0.1 mi)		100 m (300 ft)	0.5 km (0.4 mi)	0.6 km (0.4 mi)	
2810	**153**	Thickened GD **(when used as a weapon)**	60 m (200 ft)	0.4 km (0.3 mi)	0.7 km (0.5 mi)		300 m (1000 ft)	1.8 km (1.1 mi)	2.7 km (1.7 mi)	
2810 2810	**153** **153**	Toxic liquid, n.o.s. Toxic liquid, n.o.s. (Inhalation Hazard Zone A)	60 m (200 ft)	0.4 km (0.3 mi)	1.3 km (0.8 mi)		200 m (600 ft)	2.3 km (1.4 mi)	5.1 km (3.2 mi)	
2810	**153**	Toxic liquid, n.o.s. (Inhalation Hazard Zone B)	30 m (100 ft)	0.2 km (0.1 mi)	0.2 km (0.1 mi)		60 m (200 ft)	0.5 km (0.3 mi)	0.7 km (0.5 mi)	
2810 2810	**153** **153**	Toxic liquid, organic, n.o.s. Toxic liquid, organic, n.o.s. (Inhalation Hazard Zone A)	30 m (100 ft)	0.3 km (0.2mi)	1.1 km (0.7 mi)		300 m (1000 ft)	1.8 km (1.1 mi)	4.5 km (2.8 mi)	
2810	**153**	Toxic liquid, organic, n.o.s. (Inhalation Hazard Zone B)	30 m (100 ft)	0.2 km (0.1 mi)	0.2 km (0.1 mi)		60 m (200 ft)	0.5 km (0.3 mi)	0.7 km (0.5 mi)	
2810	**153**	VX **(when used as a weapon)**	30 m (100 ft)	0.1 km (0.1 mi)	0.1 km (0.1 mi)		60 m (200 ft)	0.4 km (0.2 mi)	0.3 km (0.2 mi)	
2811	**154**	CX **(when used as a weapon)**	60 m (200 ft)	0.2 km (0.2 mi)	1.1 km (0.7 mi)		200 m (600 ft)	1.2 km (0.7 mi)	5.1 km (3.2 mi)	
2826	**155**	Ethyl chlorothioformate	30 m (100 ft)	0.1 km (0.1 mi)	0.2 km (0.1 mi)		30 m (100 ft)	0.4 km (0.3 mi)	0.7 km (0.4 mi)	

2845	**135**	Ethyl phosphonous dichloride, anhydrous	30 m	(100 ft)	0.3 km	(0.2 mi)	0.8 km	(0.5 mi)	150 m	(500 ft)	1.5 km	(0.9 mi)	2.8 km	(1.7 mi)
2845	**135**	Methyl phosphonous dichloride	30 m	(100 ft)	0.4 km	(0.3 mi)	1.2 km	(0.8 mi)	200 m	(600 ft)	2.3 km	(1.4 mi)	4.3 km	(2.7 mi)
2901	**124**	Bromine chloride	60 m	(200 ft)	0.3 km	(0.2 mi)	1.1 km	(0.7 mi)	400 m	(1250 ft)	2.5 km	(1.5 mi)	6.7 km	(4.2 mi)
2927	**154**	Ethyl phosphonothioic dichloride, anhydrous	30 m	(100 ft)	0.1 km	(0.1 mi)	0.1 km	(0.1 mi)	30 m	(100 ft)	0.2 km	(0.1 mi)	0.2 km	(0.1 mi)
2927	**154**	Ethyl phosphorodichloridate	30 m	(100 ft)	0.1 km	(0.1 mi)	0.1 km	(0.1 mi)	30 m	(100 ft)	0.2 km	(0.1 mi)	0.2 km	(0.1 mi)
2927 2927	**154** **154**	Poisonous liquid, corrosive, n.o.s. Poisonous liquid, corrosive, n.o.s. (Inhalation Hazard Zone A)	60 m	(200 ft)	0.4 km	(0.2 mi)	0.9 km	(0.6 mi)	200 m	(600 ft)	1.5 km	(1.0 mi)	3.0 km	(1.9 mi)
2927	**154**	Poisonous liquid, corrosive, n.o.s. (Inhalation Hazard Zone B)	30 m	(100 ft)	0.2 km	(0.1 mi)	0.2 km	(0.1 mi)	30 m	(100 ft)	0.4 km	(0.3 mi)	0.7 km	(0.4 mi)
2927 2927	**154** **154**	Poisonous liquid, corrosive, organic, n.o.s. Poisonous liquid, corrosive, organic, n.o.s. (Inhalation Hazard Zone A)	60 m	(200 ft)	0.3 km	(0.2 mi)	0.8 km	(0.5 mi)	300 m	(1000 ft)	1.5 km	(1.0 mi)	3.0 km	(1.9 mi)
2927	**154**	Poisonous liquid, corrosive, organic, n.o.s. (Inhalation Hazard Zone B)	30 m	(100 ft)	0.2 km	(0.1 mi)	0.2 km	(0.1 mi)	30 m	(100 ft)	0.4 km	(0.3 mi)	0.6 km	(0.4 mi)
2927 2927	**154** **154**	Toxic liquid, corrosive, n.o.s. Toxic liquid, corrosive, n.o.s. (Inhalation Hazard Zone A)	60 m	(200 ft)	0.4 km	(0.2 mi)	0.9 km	(0.6 mi)	200 m	(600 ft)	1.5 km	(1.0 mi)	3.0 km	(1.9 mi)
2927	**154**	Toxic liquid, corrosive, n.o.s. (Inhalation Hazard Zone B)	30 m	(100 ft)	0.2 km	(0.1 mi)	0.2 km	(0.1 mi)	30 m	(100 ft)	0.4 km	(0.3 mi)	0.7 km	(0.4 mi)

"+" means distance can be larger in certain atmospheric conditions

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			SMALL SPILLS (From a small package or small leak from a large package)				LARGE SPILLS (From a large package or from many small packages)			
			First **ISOLATE** in all Directions		Then **PROTECT** persons Downwind during-		First **ISOLATE** in all Directions		Then **PROTECT** persons Downwind during-	
					DAY	**NIGHT**			**DAY**	**NIGHT**
ID No.	**Guide**	**NAME OF MATERIAL**	Meters (Feet)		Kilometers (Miles)	Kilometers (Miles)	Meters (Feet)		Kilometers (Miles)	Kilometers (Miles)
2927	**154**	Toxic liquid, corrosive, organic, n.o.s.	60 m	(200 ft)	0.3 km (0.2 mi)	0.8 km (0.5 mi)	300 m	(1000 ft)	1.5 km (1.0 mi)	3.0 km (1.9 mi)
2927	**154**	Toxic liquid, corrosive, organic, n.o.s. (Inhalation Hazard Zone A)								
2927	**154**	Toxic liquid, corrosive, organic, n.o.s. (Inhalation Hazard Zone B)	30 m	(100 ft)	0.2 km (0.1 mi)	0.2 km (0.1 mi)	30 m	(100 ft)	0.4 km (0.3 mi)	0.6 km (0.4 mi)
2929	**131**	Poisonous liquid, flammable, n.o.s.	60 m	(200 ft)	0.8 km (0.5 mi)	1.7 km (1.1 mi)	300 m	(1000 ft)	4.0 km (2.5 mi)	6.5 km (4.1 mi)
2929	**131**	Poisonous liquid, flammable, n.o.s. (Inhalation Hazard Zone A)								
2929	**131**	Poisonous liquid, flammable, n.o.s. (Inhalation Hazard Zone B)	30 m	(100 ft)	0.1 km (0.1 mi)	0.2 km (0.1 mi)	60 m	(200 ft)	0.5 km (0.3 mi)	0.7 km (0.5 mi)
2929	**131**	Poisonous liquid, flammable, organic, n.o.s.	30 m	(100 ft)	0.4 km (0.3 mi)	1.2 km (0.8 mi)	200 m	(600 ft)	2.2 km (1.4 mi)	4.6 km (2.9 mi)
2929	**131**	Poisonous liquid, flammable, organic, n.o.s. (Inhalation Hazard Zone A)								
2929	**131**	Poisonous liquid, flammable, organic, n.o.s. (Inhalation Hazard Zone B)	30 m	(100 ft)	0.1 km (0.1 mi)	0.2 km (0.1 mi)	60 m	(200 ft)	0.5 km (0.3 mi)	0.7 km (0.5 mi)

2929 2929	**131** **131**	Toxic liquid, flammable, n.o.s. Toxic liquid, flammable, n.o.s. (Inhalation Hazard Zone A)	60 m	(200 ft)	0.8 km	(0.5 mi)	1.7 km	(1.1 mi)	300 m	(1000 ft)	4.0 km	(2.5 mi)	6.5 km	(4.1 mi)
2929	**131**	Toxic liquid, flammable, n.o.s. (Inhalation Hazard Zone B)	30 m	(100 ft)	0.1 km	(0.1 mi)	0.2 km	(0.1 mi)	60 m	(200 ft)	0.5 km	(0.3 mi)	0.7 km	(0.5 mi)
2929 2929	**131** **131**	Toxic liquid, flammable, organic, n.o.s. Toxic liquid, flammable, organic, n.o.s. (Inhalation Hazard Zone A)	30 m	(100 ft)	0.4 km	(0.3 mi)	1.2 km	(0.8 mi)	200 m	(600 ft)	2.2 km	(1.4 mi)	4.6 km	(2.9 mi)
2929	**131**	Toxic liquid, flammable, organic, n.o.s. (Inhalation Hazard Zone B)	30 m	(100 ft)	0.1 km	(0.1 mi)	0.2 km	(0.1 mi)	60 m	(200 ft)	0.5 km	(0.3 mi)	0.7 km	(0.5 mi)
2977 2977	**166** **166**	Radioactive material, Uranium hexafluoride, fissile **(when spilled in water)** Uranium hexafluoride, fissile containing more than 1% Uranium-235 **(when spilled in water)**	30 m	(100 ft)	0.1 km	(0.1 mi)	0.4 km	(0.3 mi)	60 m	(200 ft)	0.5 km	(0.3 mi)	2.4 km	(1.5 mi)
2978 2978 2978	**166** **166** **166**	Radioactive material, Uranium hexafluoride **(when spilled in water)** Uranium hexafluoride **(when spilled in water)** Uranium hexafluoride, non-fissile or fissile-excepted **(when spilled in water)**	30 m	(100 ft)	0.1 km	(0.1 mi)	0.4 km	(0.3 mi)	60 m	(200 ft)	0.5 km	(0.3 mi)	2.3 km	(1.5 mi)

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TABLE 1 - INITIAL ISOLATION AND PROTECTIVE ACTION DISTANCES

			SMALL SPILLS (From a small package or small leak from a large package)				LARGE SPILLS (From a large package or from many small packages)			
			First **ISOLATE** in all Directions	Then **PROTECT** persons Downwind during-			First **ISOLATE** in all Directions	Then **PROTECT** persons Downwind during-		
ID No.	**Guide**	**NAME OF MATERIAL**	Meters (Feet)	**DAY** Kilometers (Miles)	**NIGHT** Kilometers (Miles)		Meters (Feet)	**DAY** Kilometers (Miles)	**NIGHT** Kilometers (Miles)	
2985	**155**	Chlorosilanes, flammable, corrosive, n.o.s. **(when spilled in water)**	30 m (100 ft)	0.1 km (0.1 mi)	0.2 km (0.1 mi)		60 m (200 ft)	0.5 km (0.3 mi)	1.6 km (1.0 mi)	
2985	**155**	Chlorosilanes, n.o.s. **(when spilled in water)**								
2986	**155**	Chlorosilanes, corrosive, flammable, n.o.s. **(when spilled in water)**	30 m (100 ft)	0.1 km (0.1 mi)	0.2 km (0.1 mi)		60 m (200 ft)	0.5 km (0.3 mi)	1.6 km (1.0 mi)	
2986	**155**	Chlorosilanes, n.o.s. **(when spilled in water)**								
2987	**156**	Chlorosilanes, corrosive, n.o.s. **(when spilled in water)**	30 m (100 ft)	0.1 km (0.1 mi)	0.2 km (0.1 mi)		60 m (200 ft)	0.5 km (0.3 mi)	1.6 km (1.0 mi)	
2987	**156**	Chlorosilanes, n.o.s. **(when spilled in water)**								
2988	**139**	Chlorosilanes, n.o.s. **(when spilled in water)**	30 m (100 ft)	0.1 km (0.1 mi)	0.2 km (0.1 mi)		60 m (200 ft)	0.5 km (0.3 mi)	1.6 km (1.0 mi)	
2988	**139**	Chlorosilanes, water-reactive, flammable, corrosive, n.o.s. **(when spilled in water)**								
3023	**131**	2-Methyl-2-heptanethiol	30 m (100 ft)	0.2 km (0.1 mi)	0.2 km (0.2 mi)		60 m (200 ft)	0.5 km (0.3 mi)	0.9 km (0.5 mi)	
3023	**131**	tert-Octyl mercaptan								
3048	**157**	Aluminum phosphide pesticide **(when spilled in water)**	60 m (200 ft)	0.2 km (0.2 mi)	0.9 km (0.6 mi)		500 m (1500 ft)	2.1 km (1.3 mi)	7.4 km (4.6 mi)	

3049 3049	**138** **138**	Metal alkyl halides, water-reactive, n.o.s. **(when spilled in water)** Metal aryl halides, water-reactive, n.o.s. **(when spilled in water)**	30 m	(100 ft)	0.1 km	(0.1 mi)	0.2 km	(0.1 mi)	60 m	(200 ft)	0.4 km	(0.3 mi)	1.3 km	(0.8 mi)
3052 3052 3052	**135** **135** **135**	Aluminum alkyl halides **(when spilled in water)** Aluminum alkyl halides, liquid **(when spilled in water)** Aluminum alkyl halides, solid **(when spilled in water)**	30 m	(100 ft)	0.1 km	(0.1 mi)	0.2 km	(0.1 mi)	60 m	(200 ft)	0.4 km	(0.3 mi)	1.3 km	(0.8 mi)
3057	**125**	Trifluoroacetyl chloride	30 m	(100 ft)	0.2 km	(0.1 mi)	1.0 km	(0.6 mi)	800 m	(2500 ft)	4.2 km	(2.7 mi)	11.0+ km	(7.0+ mi)
3079	**131P**	Methacrylonitrile, stabilized	30 m	(100 ft)	0.1 km	(0.1 mi)	0.2 km	(0.1 mi)	60 m	(200 ft)	0.4 km	(0.3 mi)	0.8 km	(0.5 mi)
3083	**124**	Perchloryl fluoride	30 m	(100 ft)	0.1 km	(0.1 mi)	0.6 km	(0.4 mi)	400 m	(1250 ft)	2.5 km	(1.6 mi)	7.7 km	(4.8 mi)
3122 3122	**142** **142**	Poisonous liquid, oxidizing, n.o.s. Poisonous liquid, oxidizing, n.o.s. (Inhalation Hazard Zone A)	30 m	(100 ft)	0.4 km	(0.2 mi)	1.4 km	(0.9 mi)	200 m	(600 ft)	2.3 km	(1.4 mi)	5.1 km	(3.2 mi)
3122	**142**	Poisonous liquid, oxidizing, n.o.s. (Inhalation Hazard Zone B)	30 m	(100 ft)	0.1 km	(0.1 mi)	0.3 km	(0.2 mi)	60 m	(200 ft)	0.5 km	(0.4 mi)	1.0 km	(0.6 mi)
3122 3122	**142** **142**	Toxic liquid, oxidizing, n.o.s. Toxic liquid, oxidizing, n.o.s. (Inhalation Hazard Zone A)	30 m	(100 ft)	0.4 km	(0.2 mi)	1.4 km	(0.9 mi)	200 m	(600 ft)	2.3 km	(1.4 mi)	5.1 km	(3.2 mi)
3122	**142**	Toxic liquid, oxidizing, n.o.s. (Inhalation Hazard Zone B)	30 m	(100 ft)	0.1 km	(0.1 mi)	0.3 km	(0.2 mi)	60 m	(200 ft)	0.5 km	(0.4 mi)	1.0 km	(0.6 mi)

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TABLE 1 - INITIAL ISOLATION AND PROTECTIVE ACTION DISTANCES

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			First **ISOLATE** in all Directions	Then **PROTECT** persons Downwind during-			First **ISOLATE** in all Directions	Then **PROTECT** persons Downwind during-		
ID No.	**Guide**	**NAME OF MATERIAL**	Meters (Feet)	**DAY** Kilometers (Miles)	**NIGHT** Kilometers (Miles)		Meters (Feet)	**DAY** Kilometers (Miles)	**NIGHT** Kilometers (Miles)	
3123	**139**	Poisonous liquid, water-reactive, n.o.s.	60 m (200 ft)	0.4 km (0.3 mi)	1.3 km (0.8 mi)		200 m (600 ft)	2.3 km (1.4 mi)	5.1 km (3.2 mi)	
3123	**139**	Poisonous liquid, water-reactive, n.o.s. (Inhalation Hazard Zone A)								
3123	**139**	Poisonous liquid, water-reactive, n.o.s. (Inhalation Hazard Zone B)	30 m (100 ft)	0.2 km (0.1 mi)	0.2 km (0.1 mi)		60 m (200 ft)	0.5 km (0.3 mi)	0.7 km (0.5 mi)	
3123	**139**	Poisonous liquid, which in contact with water emits flammable gases, n.o.s.	60 m (200 ft)	0.4 km (0.3 mi)	1.3 km (0.8 mi)		200 m (600 ft)	2.3 km (1.4 mi)	5.1 km (3.2 mi)	
3123	**139**	Poisonous liquid, which in contact with water emits flammable gases, n.o.s. (Inhalation Hazard Zone A)								
3123	**139**	Poisonous liquid, which in contact with water emits flammable gases, n.o.s. (Inhalation Hazard Zone B)	30 m (100 ft)	0.2 km (0.1 mi)	0.2 km (0.1 mi)		60 m (200 ft)	0.5 km (0.3 mi)	0.7 km (0.5 mi)	
3123	**139**	Toxic liquid, water-reactive, n.o.s.	60 m (200 ft)	0.4 km (0.3 mi)	1.3 km (0.8 mi)		200 m (600 ft)	2.3 km (1.4 mi)	5.1 km (3.2 mi)	
3123	**139**	Toxic liquid, water-reactive, n.o.s. (Inhalation Hazard Zone A)								

3123	**139**	Toxic liquid, water-reactive, n.o.s. (Inhalation Hazard Zone B)	30 m	(100 ft)	0.2 km	(0.1 mi)	0.2 km	(0.1 mi)	60 m	(200 ft)	0.5 km	(0.3 mi)	0.7 km	(0.5 mi)
3123 3123	**139** **139**	Toxic liquid, which in contact with water emits flammable gases, n.o.s. Toxic liquid, which in contact with water emits flammable gases, n.o.s. (Inhalation Hazard Zone A)	60 m	(200 ft)	0.4 km	(0.3 mi)	1.3 km	(0.8 mi)	200 m	(600 ft)	2.3 km	(1.4 mi)	5.1 km	(3.2 mi)
3123	**139**	Toxic liquid, which in contact with water emits flammable gases, n.o.s. (Inhalation Hazard Zone B)	30 m	(100 ft)	0.2 km	(0.1 mi)	0.2 km	(0.1 mi)	60 m	(200 ft)	0.5 km	(0.3 mi)	0.7 km	(0.5 mi)
3160 3160	**119** **119**	Liquefied gas, poisonous, flammable, n.o.s. Liquefied gas, poisonous, flammable, n.o.s. (Inhalation Hazard Zone A)	100 m	(300 ft)	0.5 km	(0.3 mi)	2.2 km	(1.4 mi)	600 m	(2000 ft)	2.6 km	(1.7 mi)	8.6 km	(5.4 mi)
3160	**119**	Liquefied gas, poisonous, flammable, n.o.s. (Inhalation Hazard Zone B)	30 m	(100 ft)	0.1 km	(0.1 mi)	0.3 km	(0.2 mi)	300 m	(1000 ft)	1.3 km	(0.8 mi)	3.5 km	(2.2 mi)
3160	**119**	Liquefied gas, poisonous, flammable, n.o.s. (Inhalation Hazard Zone C)	30 m	(100 ft)	0.1 km	(0.1 mi)	0.3 km	(0.2 mi)	200 m	(600 ft)	1.0 km	(0.7 mi)	3.2 km	(2.0 mi)
3160	**119**	Liquefied gas, poisonous, flammable, n.o.s. (Inhalation Hazard Zone D)	30 m	(100 ft)	0.1 km	(0.1 mi)	0.2 km	(0.1 mi)	200 m	(600 ft)	0.8 km	(0.5 mi)	2.0 km	(1.3 mi)

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ID No.	**Guide**	**NAME OF MATERIAL**	Meters (Feet)	**DAY** Kilometers (Miles)	**NIGHT** Kilometers (Miles)		Meters (Feet)	**DAY** Kilometers (Miles)	**NIGHT** Kilometers (Miles)	
3160 3160	**119** **119**	Liquefied gas, toxic, flammable, n.o.s. Liquefied gas, toxic, flammable, n.o.s. (Inhalation Hazard Zone A)	100 m (300 ft)	0.5 km (0.3 mi)	2.2 km (1.4 mi)		600 m (2000 ft)	2.6 km (1.7 mi)	8.6 km (5.4 mi)	
3160	**119**	Liquefied gas, toxic, flammable, n.o.s. (Inhalation Hazard Zone B)	30 m (100 ft)	0.1 km (0.1 mi)	0.3 km (0.2 mi)		300 m (1000 ft)	1.3 km (0.8 mi)	3.5 km (2.2 mi)	
3160	**119**	Liquefied gas, toxic, flammable, n.o.s. (Inhalation Hazard Zone C)	30 m (100 ft)	0.1 km (0.1 mi)	0.3 km (0.2 mi)		200 m (600 ft)	1.0 km (0.7 mi)	3.2 km (2.0 mi)	
3160	**119**	Liquefied gas, toxic, flammable, n.o.s. (Inhalation Hazard Zone D)	30 m (100 ft)	0.1 km (0.1 mi)	0.2 km (0.1 mi)		200 m (600 ft)	0.8 km (0.5 mi)	2.0 km (1.3 mi)	
3162 3162	**123** **123**	Liquefied gas, poisonous, n.o.s. Liquefied gas, poisonous, n.o.s. (Inhalation Hazard Zone A)	100 m (300 ft)	0.5 km (0.3 mi)	2.2 km (1.4 mi)		600 m (2000 ft)	3.5 km (2.2 mi)	9.4 km (5.9 mi)	
3162	**123**	Liquefied gas, poisonous, n.o.s. (Inhalation Hazard Zone B)	30 m (100 ft)	0.2 km (0.1 mi)	0.8 km (0.5 mi)		300 m (1000 ft)	1.5 km (0.9 mi)	4.6 km (2.9 mi)	
3162	**123**	Liquefied gas, poisonous, n.o.s. (Inhalation Hazard Zone C)	30 m (100 ft)	0.1 km (0.1 mi)	0.3 km (0.2 mi)		150 m (500 ft)	0.9 km (0.6 mi)	2.8 km (1.7 mi)	
3162	**123**	Liquefied gas, poisonous, n.o.s. (Inhalation Hazard Zone D)	30 m (100 ft)	0.1 km (0.1 mi)	0.2 km (0.1 mi)		150 m (500 ft)	0.8 km (0.5 mi)	2.0 km (1.3 mi)	

3162	**123**	Liquefied gas, toxic, n.o.s.	100 m	(300 ft)	0.5 km	(0.3 mi)	2.2 km	(1.4 mi)	600 m	(2000 ft)	3.5 km	(2.2 mi)	9.4 km	(5.9 mi)
3162	**123**	Liquefied gas, toxic, n.o.s. (Inhalation Hazard Zone A)												
3162	**123**	Liquefied gas, toxic, n.o.s. (Inhalation Hazard Zone B)	30 m	(100 ft)	0.2 km	(0.1 mi)	0.8 km	(0.5 mi)	300 m	(1000 ft)	1.5 km	(0.9 mi)	4.6 km	(2.9 mi)
3162	**123**	Liquefied gas, toxic, n.o.s. (Inhalation Hazard Zone C)	30 m	(100 ft)	0.1 km	(0.1 mi)	0.3 km	(0.2 mi)	150 m	(500 ft)	0.9 km	(0.6 mi)	2.8 km	(1.7 mi)
3162	**123**	Liquefied gas, toxic, n.o.s. (Inhalation Hazard Zone D)	30 m	(100 ft)	0.1 km	(0.1 mi)	0.2 km	(0.1 mi)	150 m	(500 ft)	0.8 km	(0.5 mi)	2.0 km	(1.3 mi)
3246	**156**	Methanesulfonyl chloride	30 m	(100 ft)	0.1 km	(0.1 mi)	0.1 km	(0.1 mi)	30 m	(100 ft)	0.2 km	(0.1 mi)	0.3 km	(0.2 mi)
3246	**156**	Methanesulphonyl chloride												
3275	**131**	Nitriles, poisonous, flammable, n.o.s.	30 m	(100 ft)	0.1 km	(0.1 mi)	0.2 km	(0.1 mi)	60 m	(200 ft)	0.4 km	(0.3 mi)	0.8 km	(0.5 mi)
3275	**131**	Nitriles, toxic, flammable, n.o.s.												
3276	**151**	Nitriles, liquid, poisonous, n.o.s.	30 m	(100 ft)	0.1 km	(0.1 mi)	0.2 km	(0.1 mi)	60 m	(200 ft)	0.4 km	(0.3 mi)	0.8 km	(0.5 mi)
3276	**151**	Nitriles, liquid, toxic, n.o.s.												
3276	**151**	Nitriles, poisonous, liquid, n.o.s.												
3276	**151**	Nitriles, poisonous, n.o.s.												
3276	**151**	Nitriles, toxic, liquid, n.o.s.												
3276	**151**	Nitriles, toxic, n.o.s.												

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			First ISOLATE in all Directions	Then PROTECT persons Downwind during-			First ISOLATE in all Directions	Then PROTECT persons Downwind during-		
ID No.	Guide	NAME OF MATERIAL	Meters (Feet)	DAY Kilometers (Miles)	NIGHT Kilometers (Miles)		Meters (Feet)	DAY Kilometers (Miles)	NIGHT Kilometers (Miles)	
3278	**151**	Organophosphorus compound, liquid, poisonous, n.o.s.	30 m (100 ft)	0.4 km (0.3 mi)	1.2 km (0.8 mi)		200 m (600 ft)	2.3 km (1.4 mi)	4.3 km (2.7 mi)	
3278	**151**	Organophosphorus compound, liquid, toxic, n.o.s.								
3278	**151**	Organophosphorus compound, poisonous, liquid, n.o.s.								
3278	**151**	Organophosphorus compound, poisonous, n.o.s.								
3278	**151**	Organophosphorus compound, toxic, liquid, n.o.s.								
3278	**151**	Organophosphorus compound, toxic, n.o.s.								
3279	**131**	Organophosphorus compound, poisonous, flammable, n.o.s.	30 m (100 ft)	0.4 km (0.3 mi)	1.2 km (0.8 mi)		200 m (600 ft)	2.3 km (1.4 mi)	4.3 km (2.7 mi)	
3279	**131**	Organophosphorus compound, toxic, flammable, n.o.s.								
3280	**151**	Organoarsenic compound, liquid, n.o.s.	30 m (100 ft)	0.2 km (0.1 mi)	0.8 km (0.5 mi)		150 m (500 ft)	1.8 km (1.1 mi)	4.5 km (2.8 mi)	
3280	**151**	Organoarsenic compound, n.o.s.								
3281	**151**	Metal carbonyls, liquid, n.o.s.	100 m (300 ft)	1.4 km (0.9 mi)	5.4 km (3.4 mi)		1000 m (3000 ft)	11.0+ km (7.0+ mi)	11.0+ km (7.0+ mi)	
3281	**151**	Metal carbonyls, n.o.s.								

3287	**151**	Poisonous liquid, inorganic, n.o.s.	60 m	(200 ft)	0.6 km	(0.4 mi)	2.0 km	(1.2 mi)	300 m	(1000 ft)	2.8 km	(1.8 mi)	6.5 km	(4.0 mi)
3287	**151**	Poisonous liquid, inorganic, n.o.s. (Inhalation Hazard Zone A)												
3287	**151**	Poisonous liquid, inorganic, n.o.s. (Inhalation Hazard Zone B)	30 m	(100 ft)	0.2 km	(0.1 mi)	0.3 km	(0.2 mi)	100 m	(300 ft)	1.0 km	(0.6 mi)	1.6 km	(1.0 mi)
3287	**151**	Toxic liquid, inorganic, n.o.s.	60 m	(200 ft)	0.6 km	(0.4 mi)	2.0 km	(1.2 mi)	300 m	(1000 ft)	2.8 km	(1.8 mi)	6.5 km	(4.0 mi)
3287	**151**	Toxic liquid, inorganic, n.o.s. (Inhalation Hazard Zone A)												
3287	**151**	Toxic liquid, inorganic, n.o.s. (Inhalation Hazard Zone B)	30 m	(100 ft)	0.2 km	(0.1 mi)	0.3 km	(0.2 mi)	100 m	(300 ft)	1.0 km	(0.6 mi)	1.6 km	(1.0 mi)
3289	**154**	Poisonous liquid, corrosive, inorganic, n.o.s.	30 m	(100 ft)	0.4 km	(0.2 mi)	1.4 km	(0.9 mi)	200 m	(600 ft)	2.3 km	(1.4 mi)	5.1 km	(3.2 mi)
3289	**154**	Poisonous liquid, corrosive, inorganic, n.o.s. (Inhalation Hazard Zone A)												
3289	**154**	Poisonous liquid, corrosive, inorganic, n.o.s. (Inhalation Hazard Zone B)	30 m	(100 ft)	0.1 km	(0.1 mi)	0.3 km	(0.2 mi)	100 m	(300 ft)	0.5 km	(0.3 mi)	1.1 km	(0.7 mi)
3289	**154**	Toxic liquid, corrosive, inorganic, n.o.s.	30 m	(100 ft)	0.4 km	(0.2 mi)	1.4 km	(0.9 mi)	200 m	(600 ft)	2.3 km	(1.4 mi)	5.1 km	(3.2 mi)
3289	**154**	Toxic liquid, corrosive, inorganic, n.o.s. (Inhalation Hazard Zone A)												
3289	**154**	Toxic liquid, corrosive, inorganic, n.o.s. (Inhalation Hazard Zone B)	30 m	(100 ft)	0.1 km	(0.1 mi)	0.3 km	(0.2 mi)	100 m	(300 ft)	0.5 km	(0.3 mi)	1.1 km	(0.7 mi)

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			First ISOLATE in all Directions	Then PROTECT persons Downwind during-			First ISOLATE in all Directions	Then PROTECT persons Downwind during-		
ID No.	Guide	NAME OF MATERIAL	Meters (Feet)	DAY Kilometers (Miles)	NIGHT Kilometers (Miles)		Meters (Feet)	DAY Kilometers (Miles)	NIGHT Kilometers (Miles)	
3294	**131**	Hydrogen cyanide, solution in alcohol, with not more than 45% Hydrogen cyanide	60 m (200 ft)	0.2 km (0.1 mi)	0.4 km (0.2 mi)		200 m (600 ft)	0.7 km (0.4 mi)	2.0 km (1.2 mi)	
3300	**119P**	Carbon dioxide and Ethylene oxide mixture, with more than 87% Ethylene oxide	30 m (100 ft)	0.1 km (0.1 mi)	0.2 km (0.1 mi)		150 m (500 ft)	0.9 km (0.5 mi)	2.0 km (1.3 mi)	
3300	**119P**	Ethylene oxide and Carbon dioxide mixture, with more than 87% Ethylene oxide								
3303	**124**	Compressed gas, poisonous, oxidizing, n.o.s.	60 m (200 ft)	0.4 km (0.3 mi)	2.1 km (1.3 mi)		600 m (2000 ft)	2.6 km (1.7 mi)	8.6 km (5.4 mi)	
3303	**124**	Compressed gas, poisonous, oxidizing, n.o.s. (Inhalation Hazard Zone A)								
3303	**124**	Compressed gas, poisonous, oxidizing, n.o.s. (Inhalation Hazard Zone B)	60 m (200 ft)	0.3 km (0.2 mi)	1.1 km (0.7 mi)		400 m (1250 ft)	2.5 km (1.5 mi)	6.7 km (4.2 mi)	
3303	**124**	Compressed gas, poisonous, oxidizing, n.o.s. (Inhalation Hazard Zone C)	30 m (100 ft)	0.1 km (0.1 mi)	0.3 km (0.2 mi)		200 m (600 ft)	0.9 km (0.6 mi)	2.8 km (1.7 mi)	
3303	**124**	Compressed gas, poisonous, oxidizing, n.o.s. (Inhalation Hazard Zone D)	30 m (100 ft)	0.1 km (0.1 mi)	0.2 km (0.1 mi)		200 m (600 ft)	0.7 km (0.4 mi)	2.0 km (1.3 mi)	

3303	**124**	Compressed gas, toxic, oxidizing, n.o.s.	60 m	(200 ft)	0.4 km	(0.3 mi)	2.1 km	(1.3 mi)	600 m	(2000 ft)	2.6 km	(1.7 mi)	8.6 km	(5.4 mi)
3303	**124**	Compressed gas, toxic, oxidizing, n.o.s. (Inhalation Hazard Zone A)												
3303	**124**	Compressed gas, toxic, oxidizing, n.o.s. (Inhalation Hazard Zone B)	60 m	(200 ft)	0.3 km	(0.2 mi)	1.1 km	(0.7 mi)	400 m	(1250 ft)	2.5 km	(1.5 mi)	6.7 km	(4.2 mi)
3303	**124**	Compressed gas, toxic, oxidizing, n.o.s. (Inhalation Hazard Zone C)	30 m	(100 ft)	0.1 km	(0.1 mi)	0.3 km	(0.2 mi)	200 m	(600 ft)	0.9 km	(0.6 mi)	2.8 km	(1.7 mi)
3303	**124**	Compressed gas, toxic, oxidizing, n.o.s. (Inhalation Hazard Zone D)	30 m	(100 ft)	0.1 km	(0.1 mi)	0.2 km	(0.1 mi)	200 m	(600 ft)	0.7 km	(0.4 mi)	2.0 km	(1.3 mi)
3304	**123**	Compressed gas, poisonous, corrosive, n.o.s.	100 m	(300 ft)	0.5 km	(0.4 mi)	2.6 km	(1.6 mi)	600 m	(2000 ft)	3.5 km	(2.2 mi)	9.4 km	(5.9 mi)
3304	**123**	Compressed gas, poisonous, corrosive, n.o.s. (Inhalation Hazard Zone A)												
3304	**123**	Compressed gas, poisonous, corrosive, n.o.s. (Inhalation Hazard Zone B)	60 m	(200 ft)	0.3 km	(0.2 mi)	1.2 km	(0.8 mi)	300 m	(1000 ft)	1.5 km	(0.9 mi)	4.6 km	(2.9 mi)
3304	**123**	Compressed gas, poisonous, corrosive, n.o.s. (Inhalation Hazard Zone C)	30 m	(100 ft)	0.1 km	(0.1 mi)	0.3 km	(0.2 mi)	150 m	(500 ft)	0.9 km	(0.6 mi)	2.8 km	(1.7 mi)
3304	**123**	Compressed gas, poisonous, corrosive, n.o.s. (Inhalation Hazard Zone D)	30 m	(100 ft)	0.1 km	(0.1 mi)	0.2 km	(0.1 mi)	150 m	(500 ft)	0.8 km	(0.5 mi)	2.0 km	(1.3 mi)

"+" means distance can be larger in certain atmospheric conditions

TABLE 1 - INITIAL ISOLATION AND PROTECTIVE ACTION DISTANCES

			SMALL SPILLS (From a small package or small leak from a large package)				LARGE SPILLS (From a large package or from many small packages)			
			First ISOLATE in all Directions	Then PROTECT persons Downwind during-			First ISOLATE in all Directions	Then PROTECT persons Downwind during-		
ID No.	Guide	NAME OF MATERIAL	Meters (Feet)	DAY Kilometers (Miles)	NIGHT Kilometers (Miles)		Meters (Feet)	DAY Kilometers (Miles)	NIGHT Kilometers (Miles)	
3304	**123**	Compressed gas, toxic, corrosive, n.o.s.	100 m (300 ft)	0.5 km (0.4 mi)	2.6 km (1.6 mi)		600 m (2000 ft)	3.5 km (2.2 mi)	9.4 km (5.9 mi)	
3304	**123**	Compressed gas, toxic, corrosive, n.o.s. (Inhalation Hazard Zone A)								
3304	**123**	Compressed gas, toxic, corrosive, n.o.s. (Inhalation Hazard Zone B)	60 m (200 ft)	0.3 km (0.2 mi)	1.2 km (0.8 mi)		300 m (1000 ft)	1.5 km (0.9 mi)	4.6 km (2.9 mi)	
3304	**123**	Compressed gas, toxic, corrosive, n.o.s. (Inhalation Hazard Zone C)	30 m (100 ft)	0.1 km (0.1 mi)	0.3 km (0.2 mi)		150 m (500 ft)	0.9 km (0.6 mi)	2.8 km (1.7 mi)	
3304	**123**	Compressed gas, toxic, corrosive, n.o.s. (Inhalation Hazard Zone D)	30 m (100 ft)	0.1 km (0.1 mi)	0.2 km (0.1 mi)		150 m (500 ft)	0.8 km (0.5 mi)	2.0 km (1.3 mi)	
3305	**119**	Compressed gas, poisonous, flammable, corrosive, n.o.s.	100 m (300 ft)	0.5 km (0.4 mi)	2.6 km (1.6 mi)		600 m (2000 ft)	3.5 km (2.2 mi)	9.4 km (5.9 mi)	
3305	**119**	Compressed gas, poisonous, flammable, corrosive, n.o.s. (Inhalation Hazard Zone A)								
3305	**119**	Compressed gas, poisonous, flammable, corrosive, n.o.s. (Inhalation Hazard Zone B)	60 m (200 ft)	0.3 km (0.2 mi)	1.2 km (0.8 mi)		300 m (1000 ft)	1.5 km (0.9 mi)	4.6 km (2.9 mi)	

3305	**119**	Compressed gas, poisonous, flammable, corrosive, n.o.s. (Inhalation Hazard Zone C)	30 m	(100 ft)	0.1 km	(0.1 mi)	0.3 km	(0.2 mi)	200 m	(600 ft)	0.9 km	(0.6 mi)	2.8 km	(1.7 mi)
3305	**119**	Compressed gas, poisonous, flammable, corrosive, n.o.s. (Inhalation Hazard Zone D)	30 m	(100 ft)	0.1 km	(0.1 mi)	0.2 km	(0.1 mi)	200 m	(600 ft)	0.8 km	(0.5 mi)	2.0 km	(1.3 mi)
3305 3305	**119** **119**	Compressed gas, toxic, flammable, corrosive, n.o.s. Compressed gas, toxic, flammable, corrosive, n.o.s. (Inhalation Hazard Zone A)	100 m	(300 ft)	0.5 km	(0.4 mi)	2.6 km	(1.6 mi)	600 m	(2000 ft)	3.5 km	(2.2 mi)	9.4 km	(5.9 mi)
3305	**119**	Compressed gas, toxic, flammable, corrosive, n.o.s. (Inhalation Hazard Zone B)	60 m	(200 ft)	0.3 km	(0.2 mi)	1.2 km	(0.8 mi)	300 m	(1000 ft)	1.5 km	(0.9 mi)	4.6 km	(2.9 mi)
3305	**119**	Compressed gas, toxic, flammable, corrosive, n.o.s. (Inhalation Hazard Zone C)	30 m	(100 ft)	0.1 km	(0.1 mi)	0.3 km	(0.2 mi)	200 m	(600 ft)	0.9 km	(0.6 mi)	2.8 km	(1.7 mi)
3305	**119**	Compressed gas, toxic, flammable, corrosive, n.o.s. (Inhalation Hazard Zone D)	30 m	(100 ft)	0.1 km	(0.1 mi)	0.2 km	(0.1 mi)	200 m	(600 ft)	0.8 km	(0.5 mi)	2.0 km	(1.3 mi)
3306 3306	**124** **124**	Compressed gas, poisonous, oxidizing, corrosive, n.o.s. Compressed gas, poisonous, oxidizing, corrosive, n.o.s. (Inhalation Hazard Zone A)	100 m	(300 ft)	0.5 km	(0.4 mi)	2.6 km	(1.6 mi)	600 m	(2000 ft)	3.5 km	(2.2 mi)	9.4 km	(5.9 mi)
3306	**124**	Compressed gas, poisonous, oxidizing, corrosive, n.o.s. (Inhalation Hazard Zone B)	60 m	(200 ft)	0.3 km	(0.2 mi)	1.1 km	(0.7 mi)	400 m	(1250 ft)	2.5 km	(1.5 mi)	6.7 km	(4.2 mi)
3306	**124**	Compressed gas, poisonous, oxidizing, corrosive, n.o.s. (Inhalation Hazard Zone C)	30 m	(100 ft)	0.1 km	(0.1 mi)	0.3 km	(0.2 mi)	200 m	(600 ft)	0.9 km	(0.6 mi)	2.8 km	(1.7 mi)

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TABLE 1 - INITIAL ISOLATION AND PROTECTIVE ACTION DISTANCES

			SMALL SPILLS (From a small package or small leak from a large package)				LARGE SPILLS (From a large package or from many small packages)			
			First ISOLATE in all Directions	Then PROTECT persons Downwind during-			First ISOLATE in all Directions	Then PROTECT persons Downwind during-		
ID No.	Guide	NAME OF MATERIAL	Meters (Feet)	DAY Kilometers (Miles)	NIGHT Kilometers (Miles)		Meters (Feet)	DAY Kilometers (Miles)	NIGHT Kilometers (Miles)	
3306	**124**	Compressed gas, poisonous, oxidizing, corrosive, n.o.s. (Inhalation Hazard Zone D)	30 m (100 ft)	0.1 km (0.1 mi)	0.2 km (0.1 mi)		200 m (600 ft)	0.8 km (0.5 mi)	2.0 km (1.3 mi)	
3306 3306	**124** **124**	Compressed gas, toxic, oxidizing, corrosive, n.o.s. Compressed gas, toxic, oxidizing, corrosive, n.o.s. (Inhalation Hazard Zone A)	100 m (300 ft)	0.5 km (0.4 mi)	2.6 km (1.6 mi)		600 m (2000 ft)	3.5 km (2.2 mi)	9.4 km (5.9 mi)	
3306	**124**	Compressed gas, toxic, oxidizing, corrosive, n.o.s. (Inhalation Hazard Zone B)	60 m (200 ft)	0.3 km (0.2 mi)	1.1 km (0.7 mi)		400 m (1250 ft)	2.5 km (1.5 mi)	6.7 km (4.2 mi)	
3306	**124**	Compressed gas, toxic, oxidizing, corrosive, n.o.s. (Inhalation Hazard Zone C)	30 m (100 ft)	0.1 km (0.1 mi)	0.3 km (0.2 mi)		200 m (600 ft)	0.9 km (0.6 mi)	2.8 km (1.7 mi)	
3306	**124**	Compressed gas, toxic, oxidizing, corrosive, n.o.s. (Inhalation Hazard Zone D)	30 m (100 ft)	0.1 km (0.1 mi)	0.2 km (0.1 mi)		200 m (600 ft)	0.8 km (0.5 mi)	2.0 km (1.3 mi)	
3307 3307	**124** **124**	Liquefied gas, poisonous, oxidizing, n.o.s. Liquefied gas, poisonous, oxidizing, n.o.s. (Inhalation Hazard Zone A)	60 m (200 ft)	0.4 km (0.3 mi)	2.1 km (1.3 mi)		600 m (2000 ft)	2.6 km (1.7 mi)	8.6 km (5.4 mi)	

3307	**124**	Liquefied gas, poisonous, oxidizing, n.o.s. (Inhalation Hazard Zone B)	60 m	(200 ft)	0.3 km	(0.2 mi)	1.1 km	(0.7 mi)	400 m	(1250 ft)	2.5 km	(1.5 mi)	6.7 km	(4.2 mi)
3307	**124**	Liquefied gas, poisonous, oxidizing, n.o.s. (Inhalation Hazard Zone C)	30 m	(100 ft)	0.1 km	(0.1 mi)	0.3 km	(0.2 mi)	200 m	(600 ft)	0.9 km	(0.6 mi)	2.8 km	(1.7 mi)
3307	**124**	Liquefied gas, poisonous, oxidizing, n.o.s. (Inhalation Hazard Zone D)	30 m	(100 ft)	0.1 km	(0.1 mi)	0.2 km	(0.1 mi)	200 m	(600 ft)	0.7 km	(0.4 mi)	2.0 km	(1.3 mi)
3307 3307	**124** **124**	Liquefied gas, toxic, oxidizing, n.o.s. Liquefied gas, toxic, oxidizing, n.o.s. (Inhalation Hazard Zone A)	60 m	(200 ft)	0.4 km	(0.3 mi)	2.1 km	(1.3 mi)	600 m	(2000 ft)	2.6 km	(1.7 mi)	8.6 km	(5.4 mi)
3307	**124**	Liquefied gas, toxic, oxidizing, n.o.s. (Inhalation Hazard Zone B)	60 m	(200 ft)	0.3 km	(0.2 mi)	1.1 km	(0.7 mi)	400 m	(1250 ft)	2.5 km	(1.5 mi)	6.7 km	(4.2 mi)
3307	**124**	Liquefied gas, toxic, oxidizing, n.o.s. (Inhalation Hazard Zone C)	30 m	(100 ft)	0.1 km	(0.1 mi)	0.3 km	(0.2 mi)	200 m	(600 ft)	0.9 km	(0.6 mi)	2.8 km	(1.7 mi)
3307	**124**	Liquefied gas, toxic, oxidizing, n.o.s. (Inhalation Hazard Zone D)	30 m	(100 ft)	0.1 km	(0.1 mi)	0.2 km	(0.1 mi)	200 m	(600 ft)	0.7 km	(0.4 mi)	2.0 km	(1.3 mi)
3308 3308	**123** **123**	Liquefied gas, poisonous, corrosive, n.o.s. Liquefied gas, poisonous, corrosive, n.o.s. (Inhalation Hazard Zone A)	100 m	(300 ft)	0.5 km	(0.4 mi)	2.6 km	(1.6 mi)	600 m	(2000 ft)	3.5 km	(2.2 mi)	9.4 km	(5.9 mi)

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TABLE 1 - INITIAL ISOLATION AND PROTECTIVE ACTION DISTANCES

			SMALL SPILLS (From a small package or small leak from a large package)				LARGE SPILLS (From a large package or from many small packages)			
			First ISOLATE in all Directions	Then PROTECT persons Downwind during-			First ISOLATE in all Directions	Then PROTECT persons Downwind during-		
ID No.	Guide	NAME OF MATERIAL	Meters (Feet)	DAY Kilometers (Miles)		NIGHT Kilometers (Miles)	Meters (Feet)	DAY Kilometers (Miles)		NIGHT Kilometers (Miles)
3308	**123**	Liquefied gas, poisonous, corrosive, n.o.s. (Inhalation Hazard Zone B)	60 m (200 ft)	0.3 km	(0.2 mi)	1.2 km (0.8 mi)	300 m (1000 ft)	1.5 km	(0.9 mi)	4.6 km (2.9 mi)
3308	**123**	Liquefied gas, poisonous, corrosive, n.o.s. (Inhalation Hazard Zone C)	30 m (100 ft)	0.1 km	(0.1 mi)	0.3 km (0.2 mi)	150 m (500 ft)	0.9 km	(0.6 mi)	2.8 km (1.7 mi)
3308	**123**	Liquefied gas, poisonous, corrosive, n.o.s. (Inhalation Hazard Zone D)	30 m (100 ft)	0.1 km	(0.1 mi)	0.2 km (0.1 mi)	150 m (500 ft)	0.8 km	(0.5 mi)	2.0 km (1.3 mi)
3308 3308	**123** **123**	Liquefied gas, toxic, corrosive, n.o.s. Liquefied gas, toxic, corrosive, n.o.s. (Inhalation Hazard Zone A)	100 m (300 ft)	0.5 km	(0.4 mi)	2.6 km (1.6 mi)	600 m (2000 ft)	3.5 km	(2.2 mi)	9.4 km (5.9 mi)
3308	**123**	Liquefied gas, toxic, corrosive, n.o.s. (Inhalation Hazard Zone B)	60 m (200 ft)	0.3 km	(0.2 mi)	1.2 km (0.8 mi)	300 m (1000 ft)	1.5 km	(0.9 mi)	4.6 km (2.9 mi)
3308	**123**	Liquefied gas, toxic, corrosive, n.o.s. (Inhalation Hazard Zone C)	30 m (100 ft)	0.1 km	(0.1 mi)	0.3 km (0.2 mi)	150 m (500 ft)	0.9 km	(0.6 mi)	2.8 km (1.7 mi)
3308	**123**	Liquefied gas, toxic, corrosive, n.o.s. (Inhalation Hazard Zone D)	30 m (100 ft)	0.1 km	(0.1 mi)	0.2 km (0.1 mi)	150 m (500 ft)	0.8 km	(0.5 mi)	2.0 km (1.3 mi)

3309	**119**	Liquefied gas, poisonous, flammable, corrosive, n.o.s.	100 m	(300 ft)	0.5 km	(0.4 mi)	2.6 km	(1.6 mi)	600 m	(2000 ft)	3.5 km	(2.2 mi)	9.4 km	(5.9 mi)
3309	**119**	Liquefied gas, poisonous, flammable, corrosive, n.o.s. (Inhalation Hazard Zone A)												
3309	**119**	Liquefied gas, poisonous, flammable, corrosive, n.o.s. (Inhalation Hazard Zone B)	60 m	(200 ft)	0.3 km	(0.2 mi)	1.2 km	(0.8 mi)	300 m	(1000 ft)	1.5 km	(0.9 mi)	4.6 km	(2.9 mi)
3309	**119**	Liquefied gas, poisonous, flammable, corrosive, n.o.s. (Inhalation Hazard Zone C)	30 m	(100 ft)	0.1 km	(0.1 mi)	0.3 km	(0.2 mi)	200 m	(600 ft)	0.9 km	(0.6 mi)	2.8 km	(1.7 mi)
3309	**119**	Liquefied gas, poisonous, flammable, corrosive, n.o.s. (Inhalation Hazard Zone D)	30 m	(100 ft)	0.1 km	(0.1 mi)	0.2 km	(0.1 mi)	200 m	(600 ft)	0.8 km	(0.5 mi)	2.0 km	(1.3 mi)
3309	**119**	Liquefied gas, toxic, flammable, corrosive, n.o.s.	100 m	(300 ft)	0.5 km	(0.4 mi)	2.6 km	(1.6 mi)	600 m	(2000 ft)	3.5 km	(2.2 mi)	9.4 km	(5.9 mi)
3309	**119**	Liquefied gas, toxic, flammable, corrosive, n.o.s. (Inhalation Hazard Zone A)												
3309	**119**	Liquefied gas, toxic, flammable, corrosive, n.o.s. (Inhalation Hazard Zone B)	60 m	(200 ft)	0.3 km	(0.2 mi)	1.2 km	(0.8 mi)	300 m	(1000 ft)	1.5 km	(0.9 mi)	4.6 km	(2.9 mi)
3309	**119**	Liquefied gas, toxic, flammable, corrosive, n.o.s. (Inhalation Hazard Zone C)	30 m	(100 ft)	0.1 km	(0.1 mi)	0.3 km	(0.2 mi)	200 m	(600 ft)	0.9 km	(0.6 mi)	2.8 km	(1.7 mi)
3309	**119**	Liquefied gas, toxic, flammable, corrosive, n.o.s. (Inhalation Hazard Zone D)	30 m	(100 ft)	0.1 km	(0.1 mi)	0.2 km	(0.1 mi)	200 m	(600 ft)	0.8 km	(0.5 mi)	2.0 km	(1.3 mi)

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			First **ISOLATE** in all Directions	Then **PROTECT** persons Downwind during-			First **ISOLATE** in all Directions	Then **PROTECT** persons Downwind during-		
ID No.	**Guide**	**NAME OF MATERIAL**	Meters (Feet)	**DAY** Kilometers (Miles)	**NIGHT** Kilometers (Miles)		Meters (Feet)	**DAY** Kilometers (Miles)	**NIGHT** Kilometers (Miles)	
3310	**124**	Liquefied gas, poisonous, oxidizing, corrosive, n.o.s.	100 m (300 ft)	0.5 km (0.4 mi)	2.6 km (1.6 mi)		600 m (2000 ft)	3.5 km (2.2 mi)	9.4 km (5.9 mi)	
3310	**124**	Liquefied gas, poisonous, oxidizing, corrosive, n.o.s. (Inhalation Hazard Zone A)								
3310	**124**	Liquefied gas, poisonous, oxidizing, corrosive, n.o.s. (Inhalation Hazard Zone B)	60 m (200 ft)	0.3 km (0.2 mi)	1.1 km (0.7 mi)		400 m (1250 ft)	2.5 km (1.5 mi)	6.7 km (4.2 mi)	
3310	**124**	Liquefied gas, poisonous, oxidizing, corrosive, n.o.s. (Inhalation Hazard Zone C)	30 m (100 ft)	0.1 km (0.1 mi)	0.3 km (0.2 mi)		200 m (600 ft)	0.9 km (0.6 mi)	2.8 km (1.7 mi)	
3310	**124**	Liquefied gas, poisonous, oxidizing, corrosive, n.o.s. (Inhalation Hazard Zone D)	30 m (100 ft)	0.1 km (0.1 mi)	0.2 km (0.1 mi)		200 m (600 ft)	0.8 km (0.5 mi)	2.0 km (1.3 mi)	
3310	**124**	Liquefied gas, toxic, oxidizing, corrosive, n.o.s.	100 m (300 ft)	0.5 km (0.4 mi)	2.6 km (1.6 mi)		600 m (2000 ft)	3.5 km (2.2 mi)	9.4 km (5.9 mi)	
3310	**124**	Liquefied gas, toxic, oxidizing, corrosive, n.o.s. (Inhalation Hazard Zone A)								
3310	**124**	Liquefied gas, toxic, oxidizing, corrosive, n.o.s. (Inhalation Hazard Zone B)	60 m (200 ft)	0.3 km (0.2 mi)	1.1 km (0.7 mi)		400 m (1250 ft)	2.5 km (1.5 mi)	6.7 km (4.2 mi)	

3310	**124**	Liquefied gas, toxic, oxidizing, corrosive, n.o.s. (Inhalation Hazard Zone C)	30 m	(100 ft)	0.1 km	(0.1 mi)	0.3 km	(0.2 mi)	200 m	(600 ft)	0.9 km	(0.6 mi)	2.8 km	(1.7 mi)
3310	**124**	Liquefied gas, toxic, oxidizing, corrosive, n.o.s. (Inhalation Hazard Zone D)	30 m	(100 ft)	0.1 km	(0.1 mi)	0.2 km	(0.1 mi)	200 m	(600 ft)	0.8 km	(0.5 mi)	2.0 km	(1.3 mi)
3318	**125**	Ammonia solution, with more than 50% Ammonia	30 m	(100 ft)	0.1 km	(0.1 mi)	0.2 km	(0.1 mi)	150 m	(500 ft)	0.8 km	(0.5 mi)	2.0 km	(1.3 mi)
3355 3355	**119** **119**	Insecticide gas, poisonous, flammable, n.o.s. Insecticide gas, poisonous, flammable, n.o.s. (Inhalation Hazard Zone A)	100 m	(300 ft)	0.5 km	(0.3 mi)	2.2 km	(1.4 mi)	600 m	(2000 ft)	2.6 km	(1.7 mi)	8.6 km	(5.4 mi)
3355	**119**	Insecticide gas, poisonous, flammable, n.o.s. (Inhalation Hazard Zone B)	30 m	(100 ft)	0.1 km	(0.1 mi)	0.3 km	(0.2 mi)	300 m	(1000 ft)	1.3 km	(0.8 mi)	3.5 km	(2.2 mi)
3355	**119**	Insecticide gas, poisonous, flammable, n.o.s. (Inhalation Hazard Zone C)	30 m	(100 ft)	0.1 km	(0.1 mi)	0.3 km	(0.2 mi)	200 m	(600 ft)	1.0 km	(0.7 mi)	3.2 km	(2.0 mi)
3355	**119**	Insecticide gas, poisonous, flammable, n.o.s. (Inhalation Hazard Zone D)	30 m	(100 ft)	0.1 km	(0.1 mi)	0.2 km	(0.1 mi)	200 m	(600 ft)	0.8 km	(0.5 mi)	2.0 km	(1.3 mi)
3355 3355	**119** **119**	Insecticide gas, toxic, flammable, n.o.s. Insecticide gas, toxic, flammable, n.o.s. (Inhalation Hazard Zone A)	100 m	(300 ft)	0.5 km	(0.3 mi)	2.2 km	(1.4 mi)	600 m	(2000 ft)	2.6 km	(1.7 mi)	8.6 km	(5.4 mi)
3355	**119**	Insecticide gas, toxic, flammable, n.o.s. (Inhalation Hazard Zone B)	30 m	(100 ft)	0.1 km	(0.1 mi)	0.3 km	(0.2 mi)	300 m	(1000 ft)	1.3 km	(0.8 mi)	3.5 km	(2.2 mi)

"+" means distance can be larger in certain atmospheric conditions

TABLE 1 - INITIAL ISOLATION AND PROTECTIVE ACTION DISTANCES

			SMALL SPILLS (From a small package or small leak from a large package)				LARGE SPILLS (From a large package or from many small packages)			
			First **ISOLATE** in all Directions		Then **PROTECT** persons Downwind during-		First **ISOLATE** in all Directions		Then **PROTECT** persons Downwind during-	
					DAY	**NIGHT**			**DAY**	**NIGHT**
ID No.	**Guide**	**NAME OF MATERIAL**	Meters (Feet)		Kilometers (Miles)	Kilometers (Miles)	Meters (Feet)		Kilometers (Miles)	Kilometers (Miles)
3355	**119**	Insecticide gas, toxic, flammable, n.o.s. (Inhalation Hazard Zone C)	30 m	(100 ft)	0.1 km (0.1 mi)	0.3 km (0.2 mi)	200 m	(600 ft)	1.0 km (0.7 mi)	3.2 km (2.0 mi)
3355	**119**	Insecticide gas, toxic, flammable, n.o.s. (Inhalation Hazard Zone D)	30 m	(100 ft)	0.1 km (0.1 mi)	0.2 km (0.1 mi)	200 m	(600 ft)	0.8 km (0.5 mi)	2.0 km (1.3 mi)
3361	**156**	Chlorosilanes, poisonous, corrosive, n.o.s. **(when spilled in water)**	30 m	(100 ft)	0.1 km (0.1 mi)	0.2 km (0.1 mi)	60 m	(200 ft)	0.5 km (0.3 mi)	1.6 km (1.0 mi)
3361	**156**	Chlorosilanes, toxic, corrosive, n.o.s. **(when spilled in water)**								
3362	**155**	Chlorosilanes, poisonous, corrosive, flammable, n.o.s. **(when spilled in water)**	30 m	(100 ft)	0.1 km (0.1 mi)	0.2 km (0.1 mi)	60 m	(200 ft)	0.5 km (0.3 mi)	1.6 km (1.0 mi)
3362	**155**	Chlorosilanes, toxic, corrosive, flammable, n.o.s. **(when spilled in water)**								
3381	**151**	Poisonous by inhalation liquid, n.o.s. (Inhalation Hazard Zone A)	60 m	(200 ft)	0.4 km (0.3 mi)	1.3 km (0.8 mi)	200 m	(600 ft)	2.3 km (1.4 mi)	5.1 km (3.2 mi)
3381	**151**	Toxic by inhalation liquid, n.o.s. (Inhalation Hazard Zone A)								

3382	**151**	Poisonous by inhalation liquid, n.o.s. (Inhalation Hazard Zone B)	30 m	(100 ft)	0.2 km	(0.1 mi)	0.2 km	(0.1 mi)	60 m	(200 ft)	0.5 km	(0.3 mi)	0.7 km	(0.5 mi)
3382	**151**	Toxic by inhalation liquid, n.o.s. (Inhalation Hazard Zone B)												
3383	**131**	Poisonous by inhalation liquid, flammable, n.o.s. (Inhalation Hazard Zone A)	60 m	(200 ft)	0.8 km	(0.5 mi)	1.7 km	(1.1 mi)	300 m	(1000 ft)	4.0 km	(2.5 mi)	6.5 km	(4.1 mi)
3383	**131**	Toxic by inhalation liquid, flammable, n.o.s. (Inhalation Hazard Zone A)												
3384	**131**	Poisonous by inhalation liquid, flammable, n.o.s. (Inhalation Hazard Zone B)	30 m	(100 ft)	0.1 km	(0.1 mi)	0.2 km	(0.1 mi)	60 m	(200 ft)	0.5 km	(0.3 mi)	0.7 km	(0.5 mi)
3384	**131**	Toxic by inhalation liquid, flammable, n.o.s. (Inhalation Hazard Zone B)												
3385	**139**	Poisonous by inhalation liquid, water-reactive, n.o.s. (Inhalation Hazard Zone A)	60 m	(200 ft)	0.4 km	(0.3 mi)	1.3 km	(0.8 mi)	200 m	(600 ft)	2.3 km	(1.4 mi)	5.1 km	(3.2 mi)
3385	**139**	Toxic by inhalation liquid, water-reactive, n.o.s. (Inhalation Hazard Zone A)												
3386	**139**	Poisonous by inhalation liquid, water-reactive, n.o.s. (Inhalation Hazard Zone B)	30 m	(100 ft)	0.2 km	(0.1 mi)	0.2 km	(0.1 mi)	60 m	(200 ft)	0.5 km	(0.3 mi)	0.7 km	(0.5 mi)
3386	**139**	Toxic by inhalation liquid, water-reactive, n.o.s. (Inhalation Hazard Zone B)												

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TABLE 1 - INITIAL ISOLATION AND PROTECTIVE ACTION DISTANCES

			SMALL SPILLS (From a small package or small leak from a large package)				LARGE SPILLS (From a large package or from many small packages)			
			First ISOLATE in all Directions	Then PROTECT persons Downwind during-			First ISOLATE in all Directions	Then PROTECT persons Downwind during-		
ID No.	Guide	NAME OF MATERIAL	Meters (Feet)	DAY Kilometers (Miles)	NIGHT Kilometers (Miles)		Meters (Feet)	DAY Kilometers (Miles)	NIGHT Kilometers (Miles)	
3387	**142**	Poisonous by inhalation liquid, oxidizing, n.o.s. (Inhalation Hazard Zone A)	30 m (100 ft)	0.4 km (0.2 mi)	1.4 km (0.9 mi)		200 m (600 ft)	2.3 km (1.4 mi)	5.1 km (3.2 mi)	
3387	**142**	Toxic by inhalation liquid, oxidizing, n.o.s. (Inhalation Hazard Zone A)								
3388	**142**	Poisonous by inhalation liquid, oxidizing, n.o.s. (Inhalation Hazard Zone B)	30 m (100 ft)	0.1 km (0.1 mi)	0.3 km (0.2 mi)		60 m (200 ft)	0.5 km (0.4 mi)	1.0 km (0.6 mi)	
3388	**142**	Toxic by inhalation liquid, oxidizing, n.o.s. (Inhalation Hazard Zone B)								
3389	**154**	Poisonous by inhalation liquid, corrosive, n.o.s. (Inhalation Hazard Zone A)	60 m (200 ft)	0.4 km (0.2 mi)	0.9 km (0.6 mi)		200 m (600 ft)	1.5 km (1.0 mi)	3.0 km (1.9 mi)	
3389	**154**	Toxic by inhalation liquid, corrosive, n.o.s. (Inhalation Hazard Zone A)								
3390	**154**	Poisonous by inhalation liquid, corrosive, n.o.s. (Inhalation Hazard Zone B)	30 m (100 ft)	0.2 km (0.1 mi)	0.2 km (0.1 mi)		30 m (100 ft)	0.4 km (0.3 mi)	0.7 km (0.4 mi)	
3390	**154**	Toxic by inhalation liquid, corrosive, n.o.s. (Inhalation Hazard Zone B)								

3456	**157**	Nitrosylsulfuric acid, solid **(when spilled in water)**	30 m	(100 ft)	0.1 km	(0.1 mi)	0.5 km	(0.3 mi)	200 m	(600 ft)	0.7 km	(0.5 mi)	2.5 km	(1.6 mi)
3456	**157**	Nitrosylsulphuric acid, solid **(when spilled in water)**												
3461	**135**	Aluminum alkyl halides, solid **(when spilled in water)**	30 m	(100 ft)	0.1 km	(0.1 mi)	0.2 km	(0.1 mi)	60 m	(200 ft)	0.4 km	(0.3 mi)	1.3 km	(0.8 mi)
3488	**131**	Poisonous by inhalation liquid, flammable, corrosive, n.o.s. (Inhalation Hazard Zone A)	60 m	(200 ft)	0.8 km	(0.5 mi)	1.7 km	(1.1 mi)	300 m	(1000 ft)	4.0 km	(2.5 mi)	6.5 km	(4.1 mi)
3488	**131**	Toxic by inhalation liquid, flammable, corrosive, n.o.s. (Inhalation Hazard Zone A)												
3489	**131**	Poisonous by inhalation liquid, flammable, corrosive, n.o.s. (Inhalation Hazard Zone B)	30 m	(100 ft)	0.1 km	(0.1 mi)	0.2 km	(0.1 mi)	60 m	(200 ft)	0.5 km	(0.3 mi)	0.7 km	(0.5 mi)
3489	**131**	Toxic by inhalation liquid, flammable, corrosive, n.o.s. (Inhalation Hazard Zone B)												
3490	**155**	Poisonous by inhalation liquid, water-reactive, flammable, n.o.s. (Inhalation Hazard Zone A)	60 m	(200 ft)	0.8 km	(0.5 mi)	1.7 km	(1.1 mi)	300 m	(1000 ft)	4.0 km	(2.5 mi)	6.5 km	(4.1 mi)
3490	**155**	Toxic by inhalation liquid, water-reactive, flammable, n.o.s. (Inhalation Hazard Zone A)												
3491	**155**	Poisonous by inhalation liquid, water-reactive, flammable, n.o.s. (Inhalation Hazard Zone B)	30 m	(100 ft)	0.1 km	(0.1 mi)	0.2 km	(0.1 mi)	60 m	(200 ft)	0.5 km	(0.3 mi)	0.7 km	(0.5 mi)
3491	**155**	Toxic by inhalation liquid, water-reactive, flammable, n.o.s. (Inhalation Hazard Zone B)												

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TABLE 1 - INITIAL ISOLATION AND PROTECTIVE ACTION DISTANCES

			SMALL SPILLS (From a small package or small leak from a large package)				LARGE SPILLS (From a large package or from many small packages)			
			First **ISOLATE** in all Directions	Then **PROTECT** persons Downwind during-			First **ISOLATE** in all Directions	Then **PROTECT** persons Downwind during-		
ID No.	**Guide**	**NAME OF MATERIAL**	Meters (Feet)	**DAY** Kilometers (Miles)	**NIGHT** Kilometers (Miles)		Meters (Feet)	**DAY** Kilometers (Miles)	**NIGHT** Kilometers (Miles)	
3492	**131**	Poisonous by inhalation liquid, corrosive, flammable, n.o.s. (Inhalation Hazard Zone A)	60 m (200 ft)	0.8 km (0.5 mi)	1.7 km (1.1 mi)		300 m (1000 ft)	4.0 km (2.5 mi)	6.5 km (4.1 mi)	
3492	**131**	Toxic by inhalation liquid, corrosive, flammable, n.o.s. (Inhalation Hazard Zone A)								
3493	**131**	Poisonous by inhalation liquid, corrosive, flammable, n.o.s. (Inhalation Hazard Zone B)	30 m (100 ft)	0.1 km (0.1 mi)	0.2 km (0.1 mi)		60 m (200 ft)	0.5 km (0.3 mi)	0.7 km (0.5 mi)	
3493	**131**	Toxic by inhalation liquid, corrosive, flammable, n.o.s. (Inhalation Hazard Zone B)								
3494	**131**	Petroleum sour crude oil, flammable, toxic	30 m (100 ft)	0.2 km (0.1 mi)	0.2 km (0.1 mi)		60 m (200 ft)	0.5 km (0.3 mi)	0.7 km (0.5 mi)	
9191	**143**	Chlorine dioxide, hydrate, frozen **(when spilled in water)**	30 m (100 ft)	0.1 km (0.1 mi)	0.1 km (0.1 mi)		30 m (100 ft)	0.2 km (0.2 mi)	0.6 km (0.4 mi)	
9202	**168**	Carbon monoxide, refrigerated liquid (cryogenic liquid)	30 m (100 ft)	0.1 km (0.1 mi)	0.2 km (0.1 mi)		200 m (600 ft)	1.2 km (0.8 mi)	4.8 km (3.0 mi)	
9206	**137**	Methyl phosphonic dichloride	30 m (100 ft)	0.1 km (0.1 mi)	0.2 km (0.1 mi)		30 m (100 ft)	0.4 km (0.3 mi)	0.6 km (0.4 mi)	
9263	**156**	Chloropivaloyl chloride	30 m (100 ft)	0.1 km (0.1 mi)	0.1 km (0.1 mi)		30 m (100 ft)	0.3 km (0.2 mi)	0.3 km (0.2 mi)	
9264	**151**	3,5-Dichloro-2,4,6-trifluoropyridine	30 m (100 ft)	0.1 km (0.1 mi)	0.1 km (0.1 mi)		30 m (100 ft)	0.3 km (0.2 mi)	0.3 km (0.2 mi)	

9269	**132**	Trimethoxysilane	30 m	(100 ft)	0.2 km	(0.1 mi)	0.5 km	(0.3 mi)	100 m	(300 ft)	0.9 km	(0.6 mi)	1.9 km	(1.2 mi)

See Next Page for Table of Water-Reactive Materials Which Produce Toxic Gases

"+" means distance can be larger in certain atmospheric conditions

HOW TO USE TABLE 2 – WATER-REACTIVE MATERIALS WHICH PRODUCE TOXIC GASES

Table 2 lists materials which produce large amounts of Toxic Inhalation Hazard (TIH) gases when spilled in water and identifies the TIH gases produced.

The materials are listed by ID number order.

These Water Reactive materials are easily identified in Table 1 as their name is immediately followed by (**when spilled in water**).

Note: Some Water Reactive materials are also TIH materials themselves (e.g., Bromine trifluoride (1746), Thionyl chloride (1836), etc.). In these instances, two entries are provided in **Table 1** for land-based and water-based spills. If the Water Reactive material **is NOT** a TIH and this material **is NOT** spilled in water, **Table 1** and **Table 2** do not apply and safety distances will be found within the appropriate orange guide.

TABLE 2 - WATER-REACTIVE MATERIALS WHICH PRODUCE TOXIC GASES

Materials Which Produce Large Amounts of Toxic-by-Inhalation (TIH) Gas(es)
When Spilled in Water

ID No.	Guide No.	Name of Material	TIH Gas(es) Produced
1162	155	Dimethyldichlorosilane	HCl
1183	139	Ethyldichlorosilane	HCl
1196	155	Ethyltrichlorosilane	HCl
1242	139	Methyldichlorosilane	HCl
1250	155	Methyltrichlorosilane	HCl
1295	139	Trichlorosilane	HCl
1298	155	Trimethylchlorosilane	HCl
1305	155P	Vinyltrichlorosilane	HCl
1305	155P	Vinyltrichlorosilane, stabilized	HCl
1340	139	Phosphorus pentasulfide, free from yellow and white Phosphorus	H_2S
1340	139	Phosphorus pentasulphide, free from yellow and white Phosphorus	H_2S
1360	139	Calcium phosphide	PH_3
1384	135	Sodium dithionite	H_2S SO_2
1384	135	Sodium hydrosulfite	H_2S SO_2
1384	135	Sodium hydrosulphite	H_2S SO_2
1397	139	Aluminum phosphide	PH_3
1419	139	Magnesium aluminum phosphide	PH_3
1432	139	Sodium phosphide	PH_3
1541	155	Acetone cyanohydrin, stabilized	HCN
1680	157	Potassium cyanide	HCN
1680	157	Potassium cyanide, solid	HCN
1689	157	Sodium cyanide	HCN
1689	157	Sodium cyanide, solid	HCN

Chemical Symbols for TIH Gases:

Br_2	Bromine	HF	Hydrogen fluoride	NO_2	Nitrogen dioxide
Cl_2	Chlorine	HI	Hydrogen iodide	PH_3	Phosphine
HBr	Hydrogen bromide	H_2S	Hydrogen sulfide	SO_2	Sulfur dioxide
HCl	Hydrogen chloride	H_2S	Hydrogen sulphide	SO_2	Sulphur dioxide
HCN	Hydrogen cyanide	NH_3	Ammonia		

Use this list only when material is spilled in water.

TABLE 2 - WATER-REACTIVE MATERIALS WHICH PRODUCE TOXIC GASES

Materials Which Produce Large Amounts of Toxic-by-Inhalation (TIH) Gas(es)
When Spilled in Water

ID No.	Guide No.	Name of Material	TIH Gas(es) Produced
1716	156	Acetyl bromide	HBr
1717	155	Acetyl chloride	HCl
1724	155	Allyltrichlorosilane, stabilized	HCl
1725	137	Aluminum bromide, anhydrous	HBr
1726	137	Aluminum chloride, anhydrous	HCl
1728	155	Amyltrichlorosilane	HCl
1732	157	Antimony pentafluoride	HF
1741	125	Boron trichloride	HCl
1745	144	Bromine pentafluoride	HF Br_2
1746	144	Bromine trifluoride	HF Br_2
1747	155	Butyltrichlorosilane	HCl
1752	156	Chloroacetyl chloride	HCl
1753	156	Chlorophenyltrichlorosilane	HCl
1754	137	Chlorosulfonic acid	HCl
1754	137	Chlorosulfonic acid and Sulfur trioxide mixture	HCl
1754	137	Chlorosulphonic acid	HCl
1754	137	Chlorosulphonic acid and Sulphur trioxide mixture	HCl
1754	137	Sulfur trioxide and Chlorosulfonic acid	HCl
1754	137	Sulphur trioxide and Chlorosulphonic acid	HCl
1758	137	Chromium oxychloride	HCl
1762	156	Cyclohexenyltrichlorosilane	HCl
1763	156	Cyclohexyltrichlorosilane	HCl
1765	156	Dichloroacetyl chloride	HCl

Chemical Symbols for TIH Gases:

Br_2	Bromine	HF	Hydrogen fluoride	NO_2	Nitrogen dioxide
Cl_2	Chlorine	HI	Hydrogen iodide	PH_3	Phosphine
HBr	Hydrogen bromide	H_2S	Hydrogen sulfide	SO_2	Sulfur dioxide
HCl	Hydrogen chloride	H_2S	Hydrogen sulphide	SO_2	Sulphur dioxide
HCN	Hydrogen cyanide	NH_3	Ammonia		

Use this list only when material is spilled in water.

TABLE 2 - WATER-REACTIVE MATERIALS WHICH PRODUCE TOXIC GASES

Materials Which Produce Large Amounts of Toxic-by-Inhalation (TIH) Gas(es)
When Spilled in Water

ID No.	Guide No.	Name of Material	TIH Gas(es) Produced
1766	156	Dichlorophenyltrichlorosilane	HCl
1767	155	Diethyldichlorosilane	HCl
1769	156	Diphenyldichlorosilane	HCl
1771	156	Dodecyltrichlorosilane	HCl
1777	137	Fluorosulfonic acid	HF
1777	137	Fluorosulphonic acid	HF
1781	156	Hexadecyltrichlorosilane	HCl
1784	156	Hexyltrichlorosilane	HCl
1799	156	Nonyltrichlorosilane	HCl
1800	156	Octadecyltrichlorosilane	HCl
1801	156	Octyltrichlorosilane	HCl
1804	156	Phenyltrichlorosilane	HCl
1806	137	Phosphorus pentachloride	HCl
1808	137	Phosphorus tribromide	HBr
1809	137	Phosphorus trichloride	HCl
1810	137	Phosphorus oxychloride	HCl
1815	132	Propionyl chloride	HCl
1816	155	Propyltrichlorosilane	HCl
1818	157	Silicon tetrachloride	HCl
1828	137	Sulfur chlorides	HCl SO_2 H_2S
1828	137	Sulphur chlorides	HCl SO_2 H_2S
1834	137	Sulfuryl chloride	HCl
1834	137	Sulphuryl chloride	HCl

Chemical Symbols for TIH Gases:

Br_2	Bromine	HF	Hydrogen fluoride	NO_2	Nitrogen dioxide
Cl_2	Chlorine	HI	Hydrogen iodide	PH_3	Phosphine
HBr	Hydrogen bromide	H_2S	Hydrogen sulfide	SO_2	Sulfur dioxide
HCl	Hydrogen chloride	H_2S	Hydrogen sulphide	SO_2	Sulphur dioxide
HCN	Hydrogen cyanide	NH_3	Ammonia		

Use this list only when material is spilled in water.

TABLE 2 - WATER-REACTIVE MATERIALS WHICH PRODUCE TOXIC GASES

Materials Which Produce Large Amounts of Toxic-by-Inhalation (TIH) Gas(es)
When Spilled in Water

ID No.	Guide No.	Name of Material	TIH Gas(es) Produced
1836	137	Thionyl chloride	HCl SO_2
1838	137	Titanium tetrachloride	HCl
1898	156	Acetyl iodide	HI
1923	135	Calcium dithionite	H_2S SO_2
1923	135	Calcium hydrosulfite	H_2S SO_2
1923	135	Calcium hydrosulphite	H_2S SO_2
1929	135	Potassium dithionite	H_2S SO_2
1929	135	Potassium hydrosulfite	H_2S SO_2
1929	135	Potassium hydrosulphite	H_2S SO_2
1931	171	Zinc dithionite	H_2S SO_2
1931	171	Zinc hydrosulfite	H_2S SO_2
1931	171	Zinc hydrosulphite	H_2S SO_2
2004	135	Magnesium diamide	NH_3
2011	139	Magnesium phosphide	PH_3
2012	139	Potassium phosphide	PH_3
2013	139	Strontium phosphide	PH_3
2308	157	Nitrosylsulfuric acid	NO_2
2308	157	Nitrosylsulfuric acid, liquid	NO_2
2308	157	Nitrosylsulfuric acid, solid	NO_2
2308	157	Nitrosylsulphuric acid	NO_2
2308	157	Nitrosylsulphuric acid, liquid	NO_2
2308	157	Nitrosylsulphuric acid, solid	NO_2
2353	132	Butyryl chloride	HCl

Chemical Symbols for TIH Gases:

Br_2	Bromine	HF	Hydrogen fluoride	NO_2	Nitrogen dioxide
Cl_2	Chlorine	HI	Hydrogen iodide	PH_3	Phosphine
HBr	Hydrogen bromide	H_2S	Hydrogen sulfide	SO_2	Sulfur dioxide
HCl	Hydrogen chloride	H_2S	Hydrogen sulphide	SO_2	Sulphur dioxide
HCN	Hydrogen cyanide	NH_3	Ammonia		

Use this list only when material is spilled in water.

TABLE 2 - WATER-REACTIVE MATERIALS WHICH PRODUCE TOXIC GASES

Materials Which Produce Large Amounts of Toxic-by-Inhalation (TIH) Gas(es)
When Spilled in Water

ID No.	Guide No.	Name of Material	TIH Gas(es) Produced
2395	132	Isobutyryl chloride	HCl
2434	156	Dibenzyldichlorosilane	HCl
2435	156	Ethylphenyldichlorosilane	HCl
2437	156	Methylphenyldichlorosilane	HCl
2495	144	Iodine pentafluoride	HF
2691	137	Phosphorus pentabromide	HBr
2692	157	Boron tribromide	HBr
2806	138	Lithium nitride	NH_3
2977	166	Radioactive material, Uranium hexafluoride, fissile	HF
2977	166	Uranium hexafluoride, fissile containing more than 1% Uranium-235	HF
2978	166	Radioactive material, Uranium hexafluoride	HF
2978	166	Uranium hexafluoride	HF
2978	166	Uranium hexafluoride, non fissile or fissile-excepted	HF
2985	155	Chlorosilanes, flammable, corrosive, n.o.s	HCl
2985	155	Chlorosilanes, n.o.s	HCl
2986	155	Chlorosilanes, corrosive, flammable, n.o.s	HCl
2986	155	Chlorosilanes, n.o.s	HCl
2987	156	Chlorosilanes, corrosive, n.o.s	HCl
2987	156	Chlorosilanes, n.o.s	HCl
2988	139	Chlorosilanes, n.o.s	HCl
2988	139	Chlorosilanes, water-reactive, flammable, corrosive, n.o.s.	HCl
3048	157	Aluminum phosphide pesticide	PH_3

Chemical Symbols for TIH Gases:

Br_2	Bromine	HF	Hydrogen fluoride	NO_2	Nitrogen dioxide
Cl_2	Chlorine	HI	Hydrogen iodide	PH_3	Phosphine
HBr	Hydrogen bromide	H_2S	Hydrogen sulfide	SO_2	Sulfur dioxide
HCl	Hydrogen chloride	H_2S	Hydrogen sulphide	SO_2	Sulphur dioxide
HCN	Hydrogen cyanide	NH_3	Ammonia		

Use this list only when material is spilled in water.

TABLE 2 - WATER-REACTIVE MATERIALS WHICH PRODUCE TOXIC GASES

Materials Which Produce Large Amounts of Toxic-by-Inhalation (TIH) Gas(es)
When Spilled in Water

ID No.	Guide No.	Name of Material	TIH Gas(es) Produced
3049	138	Metal alkyl halides, water-reactive, n.o.s	HCl
3049	138	Metal aryl halides, water-reactive, n.o.s	HCl
3052	135	Aluminum alkyl halide	HCl
3052	135	Aluminum alkyl halides, liquid	HCl
3052	135	Aluminum alkyl halides, solid	HCl
3361	156	Chlorosilanes, poisonous, corrosive, n.o.s.	HCl
3361	156	Chlorosilanes, toxic, corrosive, n.o.s.	HCl
3362	155	Chlorosilanes, poisonous, corrosive, flammable, n.o.s.	HCl
3362	155	Chlorosilanes, toxic, corrosive, flammable, n.o.s.	HCl
3456	157	Nitrosylsulfuric acid, solid	NO_2
3456	157	Nitrosylsulphuric acid, solid	NO_2
3461	135	Aluminum alkyl halides, solid	HCl
9191	143	Chlorine dioxide, hydrate, frozen	Cl_2

Chemical Symbols for TIH Gases:

Br_2	Bromine	HF	Hydrogen fluoride	NO_2	Nitrogen dioxide
Cl_2	Chlorine	HI	Hydrogen iodide	PH_3	Phosphine
HBr	Hydrogen bromide	H_2S	Hydrogen sulfide	SO_2	Sulfur dioxide
HCl	Hydrogen chloride	H_2S	Hydrogen sulphide	SO_2	Sulphur dioxide
HCN	Hydrogen cyanide	NH_3	Ammonia		

Use this list only when material is spilled in water.

NOTES

HOW TO USE TABLE 3 – INITIAL ISOLATION AND PROTECTIVE ACTION DISTANCES FOR DIFFERENT QUANTITIES OF SIX COMMON TIH GASES

Table 3 lists Toxic Inhalation Hazard materials that may be more commonly encountered.

The selected materials are:

- Ammonia (UN1005)
- Chlorine (UN1017)
- Ethylene oxide (UN1040)
- Hydrogen chloride (UN1050) and Hydrogen chloride, refrigerated liquid (UN2186)
- Hydrogen fluoride (UN1052)
- Sulfur dioxide/Sulphur dioxide (UN1079)

The materials are presented in alphabetical order and provide Initial Isolation and Protective Action Distances for large spills (more than 208 liters or 55 US gallons) involving different container types (therefore different volume capacities) for day time and night time situations and different wind speeds.

TABLE 3 - INITIAL ISOLATION AND PROTECTIVE ACTION DISTANCES FOR DIFFERENT QUANTITIES OF SIX COMMON TIH GASES

TRANSPORT CONTAINER	UN1005 Ammonia, anhydrous: Large Spills													
	First ISOLATE in all Directions		Then PROTECT persons Downwind during											
			DAY						NIGHT					
			Low wind (< 6 mph = < 10 km/h)		Moderate wind (6-12 mph = 10 - 20 km/h)		High wind (> 12 mph = > 20 km/h)		Low wind (< 6 mph = < 10 km/h)		Moderate wind (6-12 mph = 10 - 20 km/h)		High wind (> 12 mph = > 20 km/h)	
	Meters	(Feet)	Km	(Miles)	Km	(Miles)	Km	(Miles)	Km	(Miles)	Km	(Miles)	Km	(Miles)
Rail tank car	300	(1000)	2.3	(1.4)	1.3	(0.8)	1.0	(0.6)	6.3	(3.9)	2.6	(1.6)	1.3	(0.8)
Highway tank truck or trailer	125	(400)	1.0	(0.6)	0.5	(0.3)	0.3	(0.2)	2.6	(1.6)	0.8	(0.5)	0.5	(0.3)
Agricultural nurse tank	60	(200)	0.6	(0.4)	0.3	(0.2)	0.3	(0.2)	1.5	(0.9)	0.5	(0.3)	0.3	(0.2)
Multiple small cylinders	30	(100)	0.3	(0.2)	0.2	(0.1)	0.2	(0.1)	0.8	(0.5)	0.3	(0.2)	0.2	(0.1)
TRANSPORT CONTAINER	UN1017 Chlorine: Large Spills													
Rail tank car	1000	(3000)	11+	(7+)	9.0	(5.6)	5.5	(3.4)	11+	(7+)	11+	(7+)	7.1	(4.4)
Highway tank truck or trailer	1000	(3000)	10.6	(6.6)	3.5	(2.2)	2.9	(1.8)	11+	(7+)	5.5	(3.4)	4.2	(2.6)
Multiple ton cylinders	400	(1250)	4.0	(2.5)	1.5	(0.9)	1.1	(0.7)	7.9	(4.9)	2.7	(1.7)	1.5	(0.9)
Multiple small cylinders or single ton cylinder	250	(800)	2.6	(1.6)	1.0	(0.6)	0.8	(0.5)	5.6	(3.5)	1.8	(1.1)	0.8	(0.5)

"+" means distance can be larger in certain atmospheric conditions

TRANSPORT CONTAINER	UN1040 Ethylene oxide: Large Spills													
	First ISOLATE in all Directions		Then **PROTECT** persons Downwind during											
			DAY						NIGHT					
			Low wind (< 6 mph = < 10 km/h)		Moderate wind (6-12 mph = 10 - 20 km/h)		High wind (> 12 mph = > 20 km/h)		Low wind (< 6 mph = < 10 km/h)		Moderate wind (6-12 mph = 10 - 20 km/h)		High wind (> 12 mph = > 20 km/h)	
	Meters	(Feet)	Km	(Miles)	Km	(Miles)	Km	(Miles)	Km	(Miles)	Km	(Miles)	Km	(Miles)
Rail tank car	200	(600)	1.4	(0.9)	0.8	(0.5)	0.6	(0.4)	4.0	(2.5)	1.4	(0.9)	0.8	(0.5)
Highway tank truck or trailer	100	(300)	0.8	(0.5)	0.5	(0.3)	0.3	(0.2)	2.1	(1.3)	0.6	(0.4)	0.5	(0.3)
Multiple small cylinders or single ton cylinder	30	(100)	0.3	(0.2)	0.2	(0.1)	0.2	(0.1)	0.8	(0.5)	0.3	(0.2)	0.2	(0.1)
TRANSPORT CONTAINER	UN1050 Hydrogen chloride: Large Spills UN2186 Hydrogen chloride, refrigerated liquid: Large Spills													
Rail tank car	600	(2000)	6.1	(3.8)	2.3	(1.4)	1.8	(1.1)	11+	(7+)	4.0	(2.5)	2.6	(1.6)
Highway tank truck or trailer	300	(1000)	3.1	(1.9)	1.1	(0.7)	0.8	(0.5)	7.4	(4.6)	2.1	(1.3)	1.0	(0.6)
Multiple ton cylinders	60	(200)	0.6	(0.4)	0.3	(0.2)	0.2	(0.1)	1.8	(1.1)	0.3	(0.2)	0.2	(0.1)
Multiple small cylinders or single ton cylinder	45	(150)	0.5	(0.3)	0.2	(0.1)	0.2	(0.1)	1.5	(0.9)	0.3	(0.2)	0.2	(0.1)

TRANSPORT CONTAINER	UN1052 Hydrogen fluoride: Large Spills													
	First ISOLATE in all Directions		Then **PROTECT** persons Downwind during											
			DAY						NIGHT					
			Low wind (< 6 mph = < 10 km/h)		Moderate wind (6-12 mph = 10 - 20 km/h)		High wind (> 12 mph = > 20 km/h)		Low wind (< 6 mph = < 10 km/h)		Moderate wind (6-12 mph = 10 - 20 km/h)		High wind (> 12 mph = > 20 km/h)	
	Meters	(Feet)	Km	(Miles)	Km	(Miles)	Km	(Miles)	Km	(Miles)	Km	(Miles)	Km	(Miles)
Rail tank car	400	(1250)	3.2	(2.0)	1.9	(1.2)	1.6	(1.0)	7.9	(4.9)	3.1	(1.9)	1.9	(1.2)
Highway tank truck or trailer	210	(700)	1.9	(1.2)	1.0	(0.6)	0.8	(0.5)	3.9	(2.4)	1.6	(1.0)	1.0	(0.6)
Multiple small cylinders or single ton cylinder	100	(300)	0.8	(0.5)	0.3	(0.2)	0.3	(0.2)	1.6	(1.0)	0.5	(0.3)	0.3	(0.2)
TRANSPORT CONTAINER	UN1079 Sulfur dioxide/Sulphur dioxide: Large Spills													
Rail tank car	1000	(3000)	11+	(7+)	11+	(7+)	7.6	(4.7)	11+	(7+)	11+	(7+)	10.8	(6.7)
Highway tank truck or trailer	1000	(3000)	11+	(7+)	7.6	(4.7)	5.1	(3.2)	11+	(7+)	10	(6.2)	6.1	(3.8)
Multiple ton cylinders	600	(2000)	7.1	(4.4)	2.7	(1.7)	1.9	(1.2)	10.5	(6.5)	4.7	(2.9)	2.9	(1.8)
Multiple small cylinders or single ton cylinder	300	(1000)	5.3	(3.3)	1.6	(1.0)	1.1	(0.7)	7.9	(4.9)	2.7	(1.7)	1.5	(0.9)

"+" means distance can be larger in certain atmospheric conditions

ERG2012 USER'S GUIDE

The 2012 Emergency Response Guidebook (ERG2012) was developed jointly by Transport Canada (TC), the U.S. Department of Transportation (DOT), the Secretariat of Transport and Communications of Mexico (SCT) and with the collaboration of CIQUIME (Centro de Información Química para Emergencias) of Argentina, for use by fire fighters, police, and other emergency services personnel who may be the first to arrive at the scene of a transportation incident involving dangerous goods. **It is primarily a guide to aid first responders in quickly identifying the specific or generic hazards of the material(s) involved in the incident, and protecting themselves and the general public during the initial response phase of the incident.** For the purposes of this guidebook, the "initial response phase" is that period following arrival at the scene of an incident during which the presence and/or identification of dangerous goods is confirmed, protective actions and area securement are initiated, and assistance of qualified personnel is requested. It is not intended to provide information on the physical or chemical properties of dangerous goods.

This guidebook will assist responders in making initial decisions upon arriving at the scene of a dangerous goods incident. It should not be considered as a substitute for emergency response training, knowledge or sound judgment. ERG2012 does not address all possible circumstances that may be associated with a dangerous goods incident. It is primarily designed for use at a dangerous goods incident occurring on a highway or railroad. Be mindful that there may be limited value in its application at fixed facility locations.

ERG2012 incorporates dangerous goods lists from the most recent United Nations Recommendations as well as from other international and national regulations. Explosives are not listed individually by either proper shipping name or ID Number. They do, however, appear under the general heading "Explosives" on the first page of the ID Number index (yellow-bordered pages) and alphabetically in the Name of Material index (blue-bordered pages). Also, the letter **(P)** following the guide number in the yellow-bordered and blue-bordered pages identifies those materials which present a polymerization hazard under certain conditions, for example: Acrolein, stabilized **131P.**

First responders at the scene of a dangerous goods incident should seek additional specific information about any material in question as soon as possible. The information received by contacting the appropriate emergency response agency, by calling the emergency response telephone number on the shipping document, or by consulting the information on or accompanying the shipping document, may be more specific and accurate than this guidebook in providing guidance for the materials involved.

BEFORE AN EMERGENCY – BECOME FAMILIAR WITH THIS GUIDEBOOK! In the U.S., according to the requirements of the U.S. Department of Labor's Occupational Safety and Health Administration (OSHA, 29 CFR 1910.120), and regulations issued by the U.S. Environmental Protection Agency (EPA, 40 CFR Part 311), first responders must be trained regarding the use of this guidebook.

GUIDEBOOK CONTENTS

1-Yellow-bordered pages: Index list of dangerous goods in numerical order of ID number. This section quickly identifies the guide to be consulted from the ID Number of the material involved. This list displays the 4-digit ID number of the material followed by its assigned emergency response guide and the material name.

For example:	**ID No.**	**GUIDE No.**	**Name of Material**
	1090	127	Acetone

2-Blue-bordered pages: Index list of dangerous goods in alphabetical order of material name. This section quickly identifies the guide to be consulted from the name of the material involved. This list displays the name of the material followed by its assigned emergency response guide and 4-digit ID number.

For example:	**Name of Material**	**GUIDE No.**	**ID No.**
	Sulfuric acid	137	1830

3-Orange-bordered pages: This section is the most important section of the guidebook because it is where all safety recommendations are provided. It comprises a total of 62 individual guides, presented in a two-page format. Each guide provides safety recommendations and emergency response information to protect yourself and the public. The left hand page provides safety related information whereas the right hand page provides emergency response guidance and activities for fire situations, spill or leak incidents and first aid. Each guide is designed to cover a group of materials which possess similar chemical and toxicological characteristics.

The guide title identifies the general hazards of the dangerous goods covered.

For example: **GUIDE 124** - Gases-Toxic and/or Corrosive-Oxidizing.

Each guide is divided into three main sections: the first section describes **potential hazards** that the material may display in terms of fire/explosion and health effects upon exposure. The highest potential is listed first. The emergency responder should consult this section first. This allows the responder to make decisions regarding the protection of the emergency response team as well as the surrounding population.

The second section outlines suggested **public safety** measures based on the situation at hand. It provides general information regarding immediate isolation of the incident site, recommended type of protective clothing and respiratory protection. Suggested evacuation distances are listed for small and large spills and for fire situations (fragmentation hazard). It also directs the reader to consult the tables listing Toxic Inhalation Hazard (TIH) materials, chemical warfare agents and water-reactive materials (green-bordered pages) when the material is highlighted in the yellow-bordered and blue-bordered pages.

The third section covers **emergency response** actions, including first aid. It outlines special precautions for incidents which involve fire, spill or chemical exposure. Several recommendations are listed under each part which will further assist in the decision making process. The information on first aid is general guidance prior to seeking medical care.

4-Green-bordered pages: This section contains three tables.

Table 1 lists, by ID number order, TIH materials, including certain chemical warfare agents, and water-reactive materials which produce toxic gases upon contact with water. This table provides two different types of recommended safe distances which are "Initial isolation distances" and "Protective action distances". The materials are highlighted in green for easy identification in both numeric (yellow-bordered pages) and alphabetic (blue-bordered pages) lists of the guidebook. This table provides distances for both small (approximately 208 liters (55 US gallons) or less for liquids and 300 kilograms (660 pounds) or less for solids when spilled in water) and large spills (more than 208 liters (55 US gallons) for liquids and more than 300 kilograms (660 pounds) for solids when spilled in water) for all highlighted materials. The list is further subdivided into daytime and nighttime situations. This is necessary due to varying atmospheric conditions which greatly affect the size of the hazardous area. The distances change from daytime to nighttime due to different mixing and dispersion conditions in the air. During the night, the air is generally calmer and this causes the material to disperse less and therefore create a toxic zone which is greater than would usually occur during the day. During the day, a more active atmosphere will cause a greater dispersion of the material resulting in a lower concentration of the material in the surrounding air. The actual area where toxic levels are reached will be smaller (due to increased dispersion). In fact, it is the quantity or concentration of the material vapor that poses problems not its mere presence.

The "Initial Isolation Distance" is a distance within which all persons should be considered for evacuation <u>in all directions</u> from the actual spill/leak source. It is a distance (radius) which defines a circle (Initial Isolation Zone) within which persons may be exposed to dangerous concentrations upwind of the source and may be exposed to life threatening concentrations downwind of the source. For example, in the case of Compressed gas, toxic, n.o.s., ID No. 1955, Inhalation Hazard Zone A, the isolation distance for small spills is 100 meters (300 feet), therefore, representing an evacuation circle of 200 meters (600 feet) in diameter.

For the same material, the "Protective Action Distance" for a small spill is 0.5 kilometers (0.3 mile) for a daytime incident and 2.2 kilometers (1.4 miles) for a nighttime incident, these distances represent a downwind distance from the spill/leak source within which Protective Actions could be implemented. Protective Actions are those steps taken to preserve the health and safety of emergency responders and the public. People in this area could be evacuated and/or sheltered in-place. For more information, consult pages 285 to 291.

<u>What is a TIH?</u> It is a gas or volatile liquid which is known to be so toxic to humans as to pose a hazard to health during transportation, or in the absence of adequate data on human toxicity, is presumed to be toxic to humans because when tested on laboratory animals it has a Lethal Concentration 50 (LC50) value of not more than 5000 ppm.

It is important to note that even though the term zone is used, the hazard zones do not represent any actual area or distance. The assignment of the zones is strictly a function of their Lethal Concentration 50 (LC50); for example, TIH Zone A is more toxic than Zone D. All distances which are listed in the green-bordered pages are calculated by the use of mathematical models for each TIH material. For the assignment of hazard zones refer to the glossary.

Table 2 lists, by ID number order, materials that produce large amounts of Toxic Inhalation Hazard (TIH) gases when spilled in water and identifies the TIH gases produced. These Water Reactive materials are easily identified in **Table 1** as their name is immediately followed by (**when spilled in water**). Some Water Reactive materials are also TIH materials themselves (e.g., Bromine trifluoride (1746), Thionyl chloride (1836), etc.). In these instances, two entries are provided in **Table 1** for land-based and water-based spills. If the Water Reactive material is NOT a TIH and this material is NOT spilled in water, **Table 1** and **Table 2** do not apply and safety distances will be found within the appropriate orange-bordered guide.

Table 3 provides, by alphabetical order of material name, initial isolation and protective action distances for six Toxic Inhalation Hazard materials that may be more commonly encountered. The selected materials are:

- Ammonia, anhydrous (UN1005)
- Chlorine (UN1017)
- Ethylene oxide (UN1040)
- Hydrogen chloride (UN1050) and Hydrogen chloride, refrigerated liquid (UN2186)
- Hydrogen fluoride (UN1052)
- Sulfur dioxide/Sulphur dioxide (UN1079)

The table provides Initial Isolation and Protective Action Distances for large spills (more than 208 liters or 55 US gallons) involving different container types (therefore different volume capacities) for day time and night time situations and different wind speeds.

ISOLATION AND EVACUATION DISTANCES

Isolation or evacuation distances are shown in the guides (orange-bordered pages) and in the Table 1 - Initial Isolation and Protective Action Distances (green-bordered pages). This may confuse users not thoroughly familiar with ERG2012.

It is important to note that some guides refer only to non-TIH materials (36 guides), some refer to both TIH and non-TIH materials (21 guides) and some (5 guides) refer only to TIH or Water-reactive materials (WRM). A guide refers to both TIH and non-TIH materials (for example see GUIDE 131) when the following sentence appears under the title EVACUATION-Spill: "See Table 1 - Initial Isolation and Protective Action Distances for highlighted materials. For non-highlighted materials, increase, in the downwind direction, as necessary, the isolation distance shown under 'PUBLIC SAFETY.'" A guide refers only to TIH or WRM materials (for example see GUIDE 124) when the following sentence appears under the title EVACUATION-Spill: "See Table 1 - Initial Isolation and Protective Action Distances". If the previous sentences do not appear in a guide, then this particular guide refers only to non-TIH materials (for example see GUIDE 128).

In order to identify appropriate isolation and protective action distances, use the following:

If you are dealing with a **TIH/WRM/Chemical warfare** material (highlighted entries in the index lists), the isolation and evacuation distances are found directly in the green-bordered pages. The guides (orange-bordered pages) also remind the user to refer to the green-bordered pages for evacuation specific information involving highlighted materials.

If you are dealing with a **non-TIH material but the guide refers to both TIH and non-TIH materials,** an immediate isolation distance is provided under the heading PUBLIC SAFETY as a precautionary measure to prevent injuries. It applies to the non-TIH materials only. In addition, for evacuation purposes, the guide informs the user under the title EVACUATION-Spill to increase, for non-highlighted materials, in the downwind direction, if necessary, the immediate isolation distance listed under "PUBLIC SAFETY". For example, GUIDE 131 – Flammable Liquids-Toxic, instructs the user to: "As an immediate precautionary measure, isolate spill or leak area for at least 50 meters (150 feet) in all directions." In case of a large spill, the isolation area could be expanded from 50 meters (150 feet) to a distance deemed as safe by the On-scene commander and emergency responders.

If you are dealing with a **non-TIH material and the guide refers only to non-TIH materials,** the immediate isolation and evacuation distances are specified as actual distances in the guide (orange-bordered pages) and are not referenced in the green-bordered pages.

Note 1: If an entry is highlighted in green in either the yellow-bordered or blue-bordered pages AND THERE IS NO FIRE, go directly to Table 1 - Initial Isolation and Protective Action Distances (green-bordered pages) and look up the ID number and name of material to obtain initial isolation and protective action distances. IF THERE IS A FIRE, or IF A FIRE IS INVOLVED, ALSO CONSULT the assigned guide (orange-bordered pages) and apply as appropriate the evacuation information shown under PUBLIC SAFETY.

Note 2: If the name in **Table 1** is shown with "***When Spilled In Water***", these materials produce large amounts of Toxic Inhalation Hazard (TIH) gases when spilled in water. Some Water Reactive materials are also TIH materials themselves (e.g., Bromine trifluoride (1746), Thionyl chloride (1836), etc.). In these instances, two entries are provided in **Table 1** for land-based and water-based spills. If the Water Reactive material **is NOT** a TIH and this material **is NOT** spilled in water, **Table 1** and **Table 2** do not apply and safety distances will be found within the appropriate orange-bordered guide.

PROTECTIVE CLOTHING

Street Clothing and Work Uniforms. These garments, such as uniforms worn by police and emergency medical services personnel, provide almost no protection from the harmful effects of dangerous goods.

Structural Fire Fighters' Protective Clothing (SFPC). This category of clothing, often called turnout or bunker gear, means the protective clothing normally worn by fire fighters during structural fire fighting operations. It includes a helmet, coat, pants, boots, gloves and a hood to cover parts of the head not protected by the helmet and facepiece. This clothing must be used with full-facepiece positive pressure self-contained breathing apparatus (SCBA). This protective clothing should, at a minimum, meet the OSHA Fire Brigades Standard (29 CFR 1910.156). Structural fire fighters' protective clothing provides limited protection from heat and cold, but may not provide adequate protection from the harmful vapors or liquids that are encountered during dangerous goods incidents. Each guide includes a statement about the use of SFPC in incidents involving those materials referenced by that guide. Some guides state that SFPC provides limited protection. In those cases, the responder wearing SFPC and SCBA may be able to perform an expedient, that is quick "in-and-out", operation. However, this type of operation can place the responder at risk of exposure, injury or death. The incident commander makes the decision to perform this operation only if an overriding benefit can be gained (i.e., perform an immediate rescue, turn off a valve to control a leak, etc.). The coverall-type protective clothing customarily worn to fight fires in forests or wildlands is not SFPC and **is not** recommended nor referred to elsewhere in this guidebook.

Positive Pressure Self-Contained Breathing Apparatus (SCBA). This apparatus provides a constant, positive pressure flow of air within the facepiece, even if one inhales deeply while doing heavy work. Use apparatus certified by NIOSH and the Department of Labor/Mine Safety and Health Administration in accordance with 42 CFR Part 84. Use it in accordance with the requirements for respiratory protection specified in OSHA 29 CFR 1910.134 (Respiratory Protection) and/or 29 CFR 1910.156 (f) (Fire Brigades Standard). Chemical-cartridge respirators or other filtering masks are not acceptable substitutes for positive pressure self-contained breathing apparatus. Demand-type SCBA does not meet the OSHA 29 CFR 1910.156 (f)(1)(i) of the Fire Brigades Standard. If it is suspected that a Chemical Warfare Agent (CW) is involved, the use of NIOSH-certified respirators with CBRN protection are highly recommended.

Chemical Protective Clothing and Equipment. Safe use of this type of protective clothing and equipment requires specific skills developed through training and experience. It is generally not available to, or used by, first responders. This type of special clothing may protect against one chemical, yet be readily permeated by chemicals for which it was not designed. Therefore, protective clothing should not be used unless it is compatible with the released material. This type of special clothing offers little or no protection against heat and/ or cold. Examples of this type of equipment have been described as (1) Vapor Protective Suits (NFPA 1991), also known as Totally-Encapsulating Chemical Protective (TECP) Suits or Level A* protection (OSHA 29 CFR 1910.120, Appendix A & B), and (2) Liquid-Splash

Protective Suits (NFPA 1992 & 1993), also known as Level B* or C* protection (OSHA 29 CFR 1910.120, Appendix A & B) or suits for chemical/biological terrorism incidents (NFPA 1994), class 1, 2 or 3 Ensembles and Standard CAN/CGSB/CSA-Z1610-11 – Protection of first responders from chemical, biological, radiological, and nuclear (CBRN) events (2011). No single protective clothing material will protect you from all dangerous goods. Do not assume any protective clothing is resistant to cold and/or heat or flame exposure unless it is so certified by the manufacturer (NFPA 1991 5-3 Flammability Resistance Test and 5-6 Cold Temperature Performance Test).

* Consult glossary for additional protection levels under the heading “Protective Clothing”.

FIRE AND SPILL CONTROL

FIRE CONTROL

Water is the most common and generally most available fire extinguishing agent. Exercise caution in selecting a fire extinguishing method since there are many factors to be considered in an incident. Water may be ineffective in fighting fires involving some materials; its effectiveness depends greatly on the method of application.

Fires involving a spill of flammable liquids are generally controlled by applying a fire fighting foam to the surface of the burning material. Fighting flammable liquid fires requires foam concentrate which is chemically compatible with the burning material, correct mixing of the foam concentrate with water and air, and careful application and maintenance of the foam blanket. There are two general types of fire fighting foam: regular and alcohol-resistant. Examples of regular foam are protein-base, fluoroprotein, and aqueous film forming foam (AFFF). Some flammable liquids, including many petroleum products, can be controlled by applying regular foam. Other flammable liquids, including polar solvents (flammable liquids which are water soluble) such as alcohols and ketones, have different chemical properties. A fire involving these materials cannot be easily controlled with regular foam and requires application of alcohol-resistant foam. Polar-solvent fires may be difficult to control and require a higher foam application rate than other flammable liquid fires (see NFPA/ANSI Standards 11 and 11A for further information). Refer to the appropriate guide to determine which type of foam is recommended. Although it is impossible to make specific recommendations for flammable liquids which have subsidiary corrosive or toxic hazards, alcohol-resistant foam may be effective for many of these materials. The emergency response telephone number on the shipping document, or the appropriate emergency response agency, should be contacted as soon as possible for guidance on the proper fire extinguishing agent to use. The final selection of the agent and method depends on many factors such as incident location, exposure hazards, size of the fire, environmental concerns, as well as the availability of extinguishing agents and equipment at the scene.

WATER REACTIVE MATERIALS

Water is sometimes used to flush spills and to reduce or direct vapors in spill situations. Some of the materials covered by the guidebook can react violently or even explosively with water. In these cases, consider letting the fire burn or leaving the spill alone (except to prevent its spreading by diking) until additional technical advice can be obtained. The applicable guides clearly warn you of these potentially dangerous reactions. These materials require technical advice since

(1) water getting inside a ruptured or leaking container may cause an explosion;

(2) water may be needed to cool adjoining containers to prevent their rupturing (exploding) or further spread of the fires;

(3) water may be effective in mitigating an incident involving a water-reactive material only if it can be applied at a sufficient flooding rate for an extended period; and

(4) the products from the reaction with water may be more toxic, corrosive, or otherwise more undesirable than the product of the fire without water applied.

When responding to an incident involving water-reactive materials, take into account the existing conditions such as wind, precipitation, location and accessibility to the incident, as well as the availability of the agents to control the fire or spill. Because there are variables to consider, the decision to use water on fires or spills involving water-reactive materials should be based on information from an authoritative source; for example, a producer of the material, who can be contacted through the emergency response telephone number or the appropriate emergency response agency.

VAPOR CONTROL

Limiting the amount of vapor released from a pool of flammable or corrosive liquids is an operational concern. It requires the use of proper protective clothing, specialized equipment, appropriate chemical agents, and skilled personnel. Before engaging in vapor control, get advice from an authoritative source as to the proper tactics.

There are several ways to minimize the amount of vapors escaping from pools of spilled liquids, such as special foams, adsorbing agents, absorbing agents, and neutralizing agents. To be effective, these vapor control methods must be selected for the specific material involved and performed in a manner that will mitigate, not worsen, the incident.

Where specific materials are known, such as at manufacturing or storage facilities, it is desirable for the dangerous goods response team to prearrange with the facility operators to select and stockpile these control agents in advance of a spill. In the field, first responders may not have the most effective vapor control agent for the material available. They are likely to have only water and only one type of fire fighting foam on their vehicles. If the available foam is inappropriate for use, they are likely to use water spray. Because the water is being used to form a vapor seal, care must be taken not to churn or further spread the spill during application. Vapors that do not react with water may be directed away from the site using the air currents surrounding the water spray. Before using water spray or other methods to safely control vapor emission or to suppress ignition, obtain technical advice, based on specific chemical name identification.

BLEVE (Boiling Liquid Expanding Vapor Explosion)

The following section presents, in a two-page format, background information on BLEVEs and includes a chart that provides important safety-related information to consider when confronted with this type of situation involving Liquefied Petroleum Gases (LPG), UN1075. LPGs include the following flammable gases; Butane, UN1011; Butylene, UN1012; Isobutylene, UN1055; Propylene, UN2077; Isobutane, UN1969; and Propane, UN1978.

What are the main hazards from a BLEVE?

The main hazards from a propane or LPG BLEVE are:

- fire
- thermal radiation from the fire
- blast
- projectiles

The danger from these decreases as you move away from the BLEVE centre. The furthest reaching hazard is projectiles.

This information was prepared for Transport Canada, the Canadian Association of Fire Chiefs and the Propane Gas Association of Canada Inc. by Dr. A. M. Birk, Queen's University, Kingston (Ontario) Canada.

For a free download or to order a DVD of the video ***BLEVE Response and Prevention***, please visit <*http://www.tc.gc.ca/eng/tdg/bleve-1119.htm*> or contact us at 1-888-830-4911, or by Email: MPS@tc.gc.ca.

To download a free copy, first click on the green "View/Download" button and then left-click the video link to view the video or right-click to download a copy by selecting "Save target as" to save to your computer.

BLEVE – SAFETY PRECAUTIONS

Use with caution. The following table gives a summary of tank properties, critical times, critical distances and cooling water flow rates for various tank sizes. This table is provided to give responders some guidance but it should be used with caution.

Tank dimensions are approximate and can vary depending on the tank design and application.

Minimum time to failure is based on ***severe torch fire impingement*** on the vapour space of a tank in good condition, and is approximate. Tanks may fail earlier if they are damaged or corroded. Tanks may fail minutes or hours later than these minimum times depending on the conditions. It has been assumed here that the tanks are not equipped with thermal barriers or water spray cooling.

Minimum time to empty is based on an engulfing fire with a properly sized pressure relief valve. If the tank is only partially engulfed then time to empty will increase (i.e., if tank is 50% engulfed then the tanks will take twice as long to empty). Once again, it has been assumed that the tank is not equipped with a thermal barrier or water spray.

Tanks equipped with thermal barriers or water spray cooling significantly increase the times to failure and the times to empty. A thermal barrier can reduce the heat input to a tank by a factor of ten or more. This means it could take ten times as long to empty the tank through the Pressure Relief Valve (PRV).

Fireball radius and emergency response distance is based on mathematical equations and is approximate. They assume spherical fireballs and this is not always the case.

Two safety distances for public evacuation. The minimum distance is based on tanks that are launched with a small elevation angle (i.e., a few degrees above horizontal). This is most common for horizontal cylinders. The preferred evacuation distance has more margin of safety since it assumes the tanks are launched at a 45 degree angle to the horizontal. This might be more appropriate if a vertical cylinder is involved.

It is understood that these distances are very large and may not be practical in a highly populated area. However, it should be understood that the risks increase rapidly the closer you are to a BLEVE. Keep in mind that the furthest reaching projectiles tend to come off in the zones 45 degrees on each side of the tank ends.

Water flow rate is based on $\sqrt[5]{\text{capacity (USgal)}}$ = usgal/min needed to cool tank metal.

Warning: the data given are approximate and should only be used with extreme caution. For example, where times are given for tank failure or tank emptying through the pressure relief valve – these times are typical but they can vary from situation to situation. Therefore, never risk life based on these times.

BLEVE
(USE WITH CAUTION)

Capacity	Diameter	Length	Propane Mass	Minimum time to failure for severe torch	Approximate time to empty for engulfing fire	Fireball radius	Emergency response distance	Minimum evacuation distance	Preferred evacuation distance	Cooling water flow rate	
Litres (Gallons)	Meters (Feet)	Meters (Feet)	Kilograms (Lbs)	Minutes	Minutes	Meters (Feet)	Meters (Feet)	Meters (Feet)	Meters (Feet)	Litres/min	USgal/min
100 (38.6)	0.3 (1)	1.5 (4.9)	40 (88)	4	8	10 (33)	90 (295)	154 (505)	307 (1007)	94.6	25
400 (154.4)	0.61 (2)	1.5 (4.9)	160 (353)	4	12	16 (53)	90 (295)	244 (801)	488 (1601)	189.3	50
2000 (772)	0.96 (3.2)	3 (9.8)	800 (1764)	5	18	28 (92)	111 (364)	417 (1368)	834 (2736)	424	112
4000 (1544)	1 (3.3)	4.9 (16.1)	1600 (3527)	5	20	35 (115)	140 (459)	525 (1722)	1050 (3445)	598	158
8000 (3088)	1.25 (4.1)	6.5 (21.3)	3200 (7055)	6	22	44 (144)	176 (577)	661 (2169)	1323 (4341)	848	224
22000 (8492)	2.1 (6.9)	6.7 (22)	8800 (19400)	7	28	62 (203)	247 (810)	926 (3038)	1852 (6076)	1404	371
42000 (16212)	2.1 (6.9)	11.8 (38.7)	16800 (37037)	7	32	77 (253)	306 (1004)	1149 (3770)	2200 (7218)	1938	512
82000 (31652)	2.75 (9)	13.7 (45)	32800 (72310)	8	40	96 (315)	383 (1257)	1435 (4708)	2200 (7218)	2710	716
140000 (54040)	3.3 (10.8)	17.2 (56.4)	56000 (123457)	9	45	114 (374)	457 (1499)	1715 (5627)	2200 (7218)	3539	935

CRIMINAL/TERRORIST USE OF CHEMICAL/BIOLOGICAL/RADIOLOGICAL AGENTS

The following is intended to supply information to first responders for use in making a preliminary assessment of a situation that they suspect involves criminal/terrorist use of chemical, biological agents and/or radioactive materials (CBRN). To aid in the assessment, a list of observable indicators of the use and/or presence of a CB agent or radioactive material is provided in the following paragraphs. This section ends with a Safe Standoff Distance Chart for various threats when Improvised Explosive Devices are involved.

DIFFERENCES BETWEEN A CHEMICAL, BIOLOGICAL AND RADIOLOGICAL AGENT

Chemical and biological agents as well as radioactive materials can be dispersed in the air we breathe, the water we drink, or on surfaces we physically contact. Dispersion methods may be as simple as opening a container, using conventional (garden) spray devices, or as elaborate as detonating an improvised explosive device.

Chemical Incidents are characterized by the rapid onset of medical symptoms (minutes to hours) and easily observed signatures (colored residue, dead foliage, pungent odor, dead insects and animals).

Biological Incidents are characterized by the onset of symptoms in hours to days. Typically, there will be no characteristic signatures because biological agents are usually odorless and colorless. Because of the delayed onset of symptoms in a biological incident, the area affected may be greater due to the movement of infected individuals.

Radiological Incidents are characterized by the onset of symptoms, if any, in days to weeks or longer. Typically, there will be no characteristic signatures because radioactive materials are usually odorless and colorless. Specialized equipment is required to determine the size of the affected area, and whether the level of radioactivity presents an immediate or long-term health hazard. Because radioactivity is not detectable without special equipment, the affected area may be greater due to the migration of contaminated individuals.

At the levels created by most probable sources, not enough radiation would be generated to kill people or cause severe illness. In a radiological incident generated by a “dirty bomb”, or Radiological Dispersal Device (RDD), in which a conventional explosive is detonated to spread radioactive contamination, the primary hazard is from the explosion. However, certain radioactive materials dispersed in the air could contaminate up to several city blocks, creating fear and possibly panic, and requiring potentially costly cleanup.

INDICATORS OF A POSSIBLE CHEMICAL INCIDENT

Dead animals/birds/fish	Not just an occasional road kill, but numerous animals (wild and domestic, small and large), birds, and fish in the same area.
Lack of insect life	If normal insect activity (ground, air, and/or water) is missing, check the ground/water surface/shore line for dead insects. If near water, check for dead fish/aquatic birds.

INDICATORS OF A POSSIBLE CHEMICAL INCIDENT (Continued)

Unexplained odors	Smells may range from fruity to flowery to sharp/pungent to garlic/ horseradish-like to bitter almonds/peach kernels to new mown hay. It is important to note that the particular odor is completely out of character with its surroundings.
Unusual numbers of dying or sick people (mass casualties)	Health problems including nausea, disorientation, difficulty in breathing, convulsions, localized sweating, conjunctivitis (reddening of eyes/nerve agent symptoms), erythema (reddening of skin/vesicant symptoms) and death.
Pattern of casualties	Casualties will likely be distributed downwind, or if indoors, by the air ventilation system.
Blisters/rashes	Numerous individuals experiencing unexplained water-like blisters, weals (like bee stings), and/or rashes.
Illness in confined area	Different casualty rates for people working indoors versus outdoors dependent on where the agent was released.
Unusual liquid droplets	Numerous surfaces exhibit oily droplets/film; numerous water surfaces have an oily film. (No recent rain.)
Different looking areas	Not just a patch of dead weeds, but trees, shrubs, bushes, food crops, and/or lawns that are dead, discolored, or withered. (No current drought.)
Low-lying clouds	Low-lying cloud/fog-like condition that is not consistent with its surroundings.
Unusual metal debris	Unexplained bomb/munitions-like material, especially if it contains a liquid.

INDICATORS OF A POSSIBLE BIOLOGICAL INCIDENT

Unusual numbers of sick or dying people or animals	Any number of symptoms may occur. Casualties may occur hours to days after an incident has occurred. The time required before symptoms are observed is dependent on the agent used.
Unscheduled and unusual spray being disseminated	Especially if outdoors during periods of darkness.
Abandoned spray devices	Devices may not have distinct odors.

INDICATORS OF A POSSIBLE RADIOLOGICAL INCIDENT

Radiation Symbols	Containers may display a “propeller” radiation symbol.
Unusual metal debris	Unexplained bomb/munitions-like material.

INDICATORS OF A POSSIBLE RADIOLOGICAL INCIDENT (continued)

Heat-emitting material	Material that is hot or seems to emit heat without any sign of an external heat source.
Glowing material	Strongly radioactive material may emit or cause radioluminescence.
Sick people/animals	In very improbable scenarios there may be unusual numbers of sick or dying people or animals. Casualties may occur hours to days or weeks after an incident has occurred. The time required before symptoms are observed is dependent on the radioactive material used, and the dose received. Possible symptoms include skin reddening or vomiting.

PERSONAL SAFETY CONSIDERATIONS

When approaching a scene that may involve CB agents or radioactive materials, the most critical consideration is the safety of oneself and other responders. Protective clothing and respiratory protection of appropriate level of safety must be used. In incidents where it is suspected that CBRN materials have been used as weapons, NIOSH-certified respirators with CBRN protection are highly recommended. Be aware that the presence and identification of CB agents or radioactive materials may not be verifiable, especially in the case of biological or radiological agents. The following actions/measures to be considered are applicable to either a chemical, biological or radiological incident. The guidance is general in nature, not all encompassing, and its applicability should be evaluated on a case-by-case basis.

Approach and response strategies. Protect yourself and use a safe approach (minimize any exposure time, maximize the distance between you and the item that is likely to harm you, use cover as protection and wear appropriate personal protective equipment and respiratory protection). Identify and estimate the hazard by using indicators as provided above. Isolate the area and secure the scene; potentially contaminated people should be isolated and decontaminated as soon as possible. To the extent possible, take measures to limit the spread of contamination. In the event of a chemical incident, the fading of chemical odors is not necessarily an indication of reduced vapor concentrations. Some chemicals deaden the senses giving the false perception that the chemical is no longer present.

If there is any indication that an area may be contaminated with radioactive materials, including the site of any non-accidental explosion, responder personnel should be equipped with radiation detection equipment that would alert them if they are entering a radiologically compromised environment, and should have received adequate training in its use. This equipment should be designed in such a way that it can also alert the responders when an unacceptable ambient dose rate or ambient dose has been reached.

Initial actions to consider in a potential CBRN/Hazmat Terrorism Event:

- Avoid using cell phones, radios, etc. within 100 meters (300 feet) of a suspect device
- NOTIFY your local police by calling 911.
- Set up Incident command upwind and uphill of the area.
- Do NOT touch or move suspicious packages/containers.
- Be cautious regarding potential presence of secondary devices (e.g. Improvised Explosive Devices, IEDs).
- Avoid contamination.
- Limit access to only those responsible for rescue of victims or assessment of unknown materials or devices.
- Evacuate and isolate individuals potentially exposed to dangerous goods/hazardous materials.
- Isolate contaminated areas and secure the scene for analysis of material.

Decontamination measures. Emergency responders should follow standard decontamination procedures (flush-strip-flush). Mass casualty decontamination should begin as soon as possible by stripping (all clothing) and flushing (soap and water). If biological agents are involved or suspected, careful washing and use of a brush are more effective. If chemical agents are suspected, the most important and effective decontamination will be the one done within the first one or two minutes. If possible, further decontamination should be performed using a 0.5% hypochlorite solution (1 part household bleach mixed with 9 parts water). If biological agents are suspected, a contact time of 10 to 15 minutes should be allowed before rinsing. The solution can be used on soft tissue wounds, but must not be used in eyes or open wounds of the abdomen, chest, head, or spine. For further information contact the agencies listed in this guidebook.

For persons contaminated with radioactive material, remove them to a low radiation area if necessary. Remove their clothing and place it in a clearly marked sealed receptacle, such as a plastic bag, for later testing. Use decontamination methods described above, but avoid breaking the skin, e.g., from shaving, or overly vigorous brushing. External radiological contamination on intact skin surface rarely causes a high enough dose to be a hazard to either the contaminated person or the first responders. For this reason, except in very unusual circumstances, an injured person who is also radiologically contaminated should be medically stabilized, taking care to minimize the spread of the contamination to the extent possible, before decontamination measures are initiated.

Note: The above information was developed in part by the Department of National Defence (Canada), the U.S. Department of the Army, Aberdeen Proving Ground and the Federal Bureau of Investigation (FBI).

Improvised Explosive Device (IED)
SAFE STAND OFF DISTANCE

	Threat Description	Explosives Mass (TNT equivalent)[1]		Building Evacuation Distance[2]		Outdoor Evacuation Distance[3]	
High Explosives (TNT Equivalent)	Pipe Bomb	5 lbs	2.3 kg	70 ft	21 m	850 ft	259 m
	Suicide Belt	10 lbs	4.5 kg	90 ft	27 m	1,080 ft	330 m
	Suicide Vest	20 lbs	9 kg	110 ft	34 m	1,360 ft	415 m
	Briefcase/Suitcase Bomb	50 lbs	23 kg	150 ft	46 m	1,850 ft	564 m
	Compact Sedan	500 lbs	227 kg	320 ft	98 m	1,500 ft	457 m
	Sedan	1,000 lbs	454 kg	400 ft	122 m	1,750 ft	534 m
	Passenger/Cargo Van	4,000 lbs	1 814 kg	640 ft	195 m	2,750 ft	838 m
	Small Moving Van/ Delivery Truck	10,000 lbs	4 536 kg	860 ft	263 m	3,750 ft	1 143 m
	Moving Van/Water Truck	30,000 lbs	13 608 kg	1,240 ft	375 m	6,500 ft	1 982 m
	Semitrailer	60,000 lbs	27 216 kg	1,570 ft	475 m	7,000 ft	2 134 m

	Threat Description	LPG Mass/ Volume[1]		Fireball Diameter[4]		Safe Distance[5]	
Liquefied Petroleum Gas (LPG - Butane or Propane)	Small LPG Tank	20 lbs/5 gal	9 kg/19 L	40 ft	12 m	160 ft	48 m
	Large LPG Tank	100 lbs/25 gal	45 kg/95 L	69 ft	21 m	276 ft	84 m
	Commercial/ Residential LPG Tank	2,000 lbs/500 gal	907 kg/1 893 L	184 ft	56 m	736 ft	224 m
	Small LPG Truck	8,000 lbs/2,000 gal	3 630 kg/7 570 L	292 ft	89 m	1,168 ft	356 m
	Semitanker LPG	40,000 lbs/10,000 gal	18 144 kg/37 850 L	499 ft	152 m	1,996 ft	608 m

[1] Based on the maximum amount of material that could reasonably fit into a container or vehicle. Variations possible.

[2] Governed by the ability of an unreinforced building to withstand severe damage or collapse.

[3] Governed by the greater of fragment throw distance or glass breakage/falling glass hazard distance. These distances can be reduced for personnel wearing ballistic protection. Note that the pipe bomb, suicide belt/vest, and briefcase/ suitcase bomb are assumed to have a fragmentation characteristic that requires greater standoff distances than an equal amount of explosives in a vehicle.

[4] Assuming efficient mixing of the flammable gas with ambient air.

[5] Determined by U.S. firefighting practices wherein safe distances are approximately 4 times the flame height. Note that an LPG tank filled with high explosives would require a significantly greater standoff distance than if it were filled with LPG.

NOTES

Glossary

AEGL(s) Acute Exposure Guideline Level(s), AEGLs represent threshold exposure limits for the general public after a once-in-a-lifetime, or rare, exposure and are applicable to emergency exposure periods ranging from 10 minutes to 8 hours. Three levels AEGL-1, AEGL-2 and AEGL-3 are developed for each of five exposure periods (10 and 30 minutes, 1 hour, 4 hours, and 8 hours) and are distinguished by varying degrees of severity of toxic effects; see AEGL-1, AEGL-2 and AEGL-3.

AEGL-1 AEGL-1 is the airborne concentration (expressed as parts per million or milligrams per cubic meter [ppm or mg/m^3]) of a substance above which it is predicted that the general population, including susceptible individuals, could experience notable discomfort, irritation, or certain asymptomatic, non-sensory effects. However, the effects are not disabling and are transient and reversible upon cessation of exposure.

AEGL-2 AEGL-2 is the airborne concentration (expressed as ppm or mg/m^3) of a substance above which it is predicted that the general population, including susceptible individuals, could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape.

AEGL-3 AEGL-3 is the airborne concentration (expressed as ppm or mg/m^3) of a substance above which it is predicted that the general population, including susceptible individuals, could experience life-threatening health effects or death.

Alcohol resistant foam A foam that is resistant to "polar" chemicals such as ketones and esters which may break down other types of foam.

Biological agents Living organisms that cause disease, sickness and mortality in humans. Anthrax and Ebola are examples of biological agents. **Refer to GUIDE 158.**

Blister agents (vesicants) Substances that cause blistering of the skin. Exposure is through liquid or vapor contact with any exposed tissue (eyes, skin, lungs). Mustard (H), Distilled Mustard (HD), Nitrogen Mustard (HN) and Lewisite (L) are blister agents.

Symptoms: Red eyes, skin irritation, burning of skin, blisters, upper respiratory damage, cough, hoarseness.

Glossary

Blood agents Substances that injure a person by interfering with cell respiration (the exchange of oxygen and carbon dioxide between blood and tissues). Hydrogen cyanide (AC) and Cyanogen chloride (CK) are blood agents.

Symptoms: Respiratory distress, headache, unresponsiveness, seizures, coma.

Burn Refers to either a chemical or thermal burn, the former may be caused by corrosive substances and the latter by liquefied cryogenic gases, hot molten substances, or flames.

CBRN Chemical, biological, radiological or nuclear warfare agent.

Choking agents Substances that cause physical injury to the lungs. Exposure is through inhalation. In extreme cases, membranes swell and lungs become filled with liquid (pulmonary edema). Death results from lack of oxygen; hence, the victim is "choked". Phosgene (CG) is a choking agent.

Symptoms: Irritation to eyes/nose/throat, respiratory distress, nausea and vomiting, burning of exposed skin.

CO_2 Carbon dioxide gas.

Cold zone Area where the command post and support functions that are necessary to control the incident are located. This is also referred to as the clean zone, green zone or support zone in other documents. (EPA Standard Operating Safety Guidelines, OSHA 29 CFR 1910.120, NFPA 472)

Combustible liquid Liquids which have a flash point greater than 60°C (140°F) and below 93°C (200°F). U.S. regulations permit a flammable liquid with a flash point between 38°C (100°F) and 60°C (140°F) to be reclassed as a combustible liquid.

Compatibility Group Letters identify explosives that are deemed to be compatible. The definition of these Compatibility Groups in this Glossary are intended to be descriptive. Please consult the transportation of dangerous goods/hazardous materials or explosives regulations of your jurisdiction for the exact wording of the definitions. Class 1 materials are considered to be "compatible" if they can be transported together without significantly increasing either the probability of an incident or, for a given quantity, the magnitude of the effects of such an incident.

A Substances which are expected to mass detonate very soon after fire reaches them.

B Articles which are expected to mass detonate very soon after fire reaches them.

C Substances or articles which may be readily ignited and burn violently without necessarily exploding.

D Substances or articles which may mass detonate (with blast and/or fragment hazard) when exposed to fire.

E&F Articles which may mass detonate in a fire.

G Substances and articles which may mass explode and give off smoke or toxic gases.

H Articles which in a fire may eject hazardous projectiles and dense white smoke.

J Articles which may mass explode.

K Articles which in a fire may eject hazardous projectiles and toxic gases.

L Substances and articles which present a special risk and could be activated by exposure to air or water.

N Articles which contain only extremely insensitive detonating substances and demonstrate a negligible probability of accidental ignition or propagation.

S Packaged substances or articles which, if accidentally initiated, produce effects that are usually confined to the immediate vicinity.

Control zones Designated areas at dangerous goods incidents, based on safety and the degree of hazard. Many terms are used to describe control zones; however, in this guidebook, these zones are defined as the hot/exclusion/red/restricted zone, warm/contamination reduction/yellow/limited access zone, and cold/support/green/clean zone. (EPA Standard Operating Safety Guidelines, OSHA 29 CFR 1910.120, NFPA 472)

Cryogenic liquid A refrigerated, liquefied gas that has a boiling point colder than -90°C (-130°F) at atmospheric pressure.

Dangerous Water Reactive Material Produces significant toxic gas when it comes in contact with water.

Decomposition products Products of a chemical or thermal break-down of a substance.

Glossary

Decontamination The removal of dangerous goods from personnel and equipment to the extent necessary to prevent potential adverse health effects. Always avoid direct or indirect contact with dangerous goods; however, if contact occurs, personnel should be decontaminated as soon as possible. Since the methods used to decontaminate personnel and equipment differ from one chemical to another, contact the chemical manufacturer, through the agencies listed on the inside back cover, to determine the appropriate procedure. Contaminated clothing and equipment should be removed after use and stored in a controlled area (warm/contamination reduction/yellow/limited access zone) until cleanup procedures can be initiated. In some cases, protective clothing and equipment cannot be decontaminated and must be disposed of in a proper manner.

Dry chemical A preparation designed for fighting fires involving flammable liquids, pyrophoric substances and electrical equipment. Common types contain sodium bicarbonate or potassium bicarbonate.

Edema The accumulation of an excessive amount of watery fluid in cells and tissues. Pulmonary edema is an excessive buildup of water in the lungs, for instance, after inhalation of a gas that is corrosive to lung tissue.

ERPG(s) Emergency Response Planning Guideline(s). Values intended to provide estimates of concentration ranges above which one could reasonably anticipate observing adverse health effects; see ERPG-1, ERPG-2 and ERPG-3.

ERPG-1 The maximum airborne concentration below which it is believed nearly all individuals could be exposed for up to 1 hour without experiencing more than mild, transient adverse health effects or without perceiving a clearly defined objectionable odor.

ERPG-2 The maximum airborne concentration below which it is believed nearly all individuals could be exposed for up to 1 hour without experiencing or developing irreversible or other serious health effects or symptoms that could impair an individual's ability to take protective action.

ERPG-3 The maximum airborne concentration below which it is believed nearly all individuals could be exposed for up to 1 hour without experiencing or developing life-threatening health effects.

Flammable liquid A liquid that has a flash point of 60°C (140°F) or lower.

Glossary

Flash point — Lowest temperature at which a liquid or solid gives off vapor in such a concentration that, when the vapor combines with air near the surface of the liquid or solid, a flammable mixture is formed. Hence, the lower the flash point, the more flammable the material.

Hazard zones (Inhalation Hazard Zones)

HAZARD ZONE A: Gases: LC50 of less than or equal to 200 ppm,
Liquids: V equal to or greater than 500 LC50 and LC50 less than or equal to 200 ppm,

HAZARD ZONE B: Gases: LC50 greater than 200 ppm and less than or equal to 1000 ppm, Liquids: V equal to or greater than 10 LC50; LC50 less than or equal to 1000 ppm and criteria for Hazard Zone A are not met.

HAZARD ZONE C: LC50 greater than 1000 ppm and less than or equal to 3000 ppm,

HAZARD ZONE D: LC50 greater than 3000 ppm and less than or equal to 5000 ppm.

Hot zone — Area immediately surrounding a dangerous goods incident which extends far enough to prevent adverse effects from released dangerous goods to personnel outside the zone. This zone is also referred to as exclusion zone, red zone or restricted zone in other documents. (EPA Standard Operating Safety Guidelines, OSHA 29 CFR 1910.120, NFPA 472)

IED — See “Improvised Explosive Device”.

Immiscible — In this guidebook, means that a material does not mix readily with water.

Improvised Explosive Device — A bomb that is manufactured from commercial, military or homemade explosives.

Large spill — A spill that involves quantities that are greater than 208 liters (55 US gallons) for liquids and greater than 300 kilograms (660 pounds) for solids.

LC50 — Lethal concentration 50. The concentration of a material administered by inhalation that is expected to cause the death of 50% of an experimental animal population within a specified time. (Concentration is reported in either ppm or mg/m^3)

Glossary

Mass explosion — Explosion which affects almost the entire load virtually instantaneously.

mg/m^3 — Milligrams of a material per cubic meter of air.

Miscible — In this guidebook, means that a material mixes readily with water.

mL/m^3 — Milliliters of a material per cubic meter of air. (1 mL/m^3 equals 1 ppm)

Nerve agents — Substances that interfere with the central nervous system. Exposure is primarily through contact with the liquid (via skin and eyes) and secondarily through inhalation of the vapor. Tabun (GA), Sarin (GB), Soman (GD) and VX are nerve agents.

Symptoms: Pinpoint pupils, extreme headache, severe tightness in the chest, dyspnea, runny nose, coughing, salivation, unresponsiveness, seizures.

Non-polar — See "Immiscible".

n.o.s. — These letters refer to "not otherwise specified". The entries which use this description are generic names such as "Corrosive liquid, n.o.s." This means that the actual chemical name for that corrosive liquid is not listed in the regulations; therefore, a generic name must be used to describe it on shipping papers.

Noxious — In this guidebook, means that a material may be harmful or injurious to health or physical well-being.

Oxidizer — A chemical which supplies its own oxygen and which helps other combustible material burn more readily.

P — The letter (**P**) following a guide number in the yellow-bordered and blue-bordered pages identifies a material which may polymerize violently under high temperature conditions or contamination with other products. It is used to identify materials that have a strong potential for polymerization in the absence of an inhibitor or due to the inhibitor depletion caused by the accident conditions. This polymerization will produce heat and high pressure buildup in containers which may explode or rupture. (See polymerization below)

Packing Group — The Packing Group (PG) is assigned based on the degree of danger presented by the hazardous material:

PG I : Great danger
PG II : Medium danger
PG III : Minor danger

Glossary

PG — See Packing Group

pH — pH is a value that represents the acidity or alkalinity of a water solution. Pure water has a pH of 7. A pH value below 7 indicates an acid solution (a pH of 1 is extremely acidic). A pH above 7 indicates an alkaline solution (a pH of 14 is extremely alkaline). Acids and alkalies (bases) are commonly referred to as corrosive materials.

PIH — Poison Inhalation Hazard. Term used to describe gases and volatile liquids that are toxic when inhaled. (Same as TIH)

Polar — See "Miscible".

Polymerization — This term describes a chemical reaction which is generally associated with the production of plastic substances. Basically, the individual molecules of the chemical (liquid or gas) react with each other to produce what can be described as a long chain. These chains can be formed in many useful applications. A well known example is the styrofoam (polystyrene) coffee cup which is formed when liquid molecules of styrene react with each other or polymerize forming a solid, therefore changing the name from styrene to polystyrene (poly means many).

ppm — Parts per million. (1 ppm equals 1 mL/m^3)

Protective clothing — Includes both respiratory and physical protection. One cannot assign a level of protection to clothing or respiratory devices separately. These levels were accepted and defined by response organizations such as U.S. Coast Guard, NIOSH, and U.S. EPA.

Level A: SCBA plus totally encapsulating chemical resistant clothing (permeation resistant).

Level B: SCBA plus hooded chemical resistant clothing (splash suit).

Level C: Full or half-face respirator plus hooded chemical resistant clothing (splash suit).

Level D: Coverall with no respiratory protection.

Pyrophoric — A material which ignites spontaneously upon exposure to air (or oxygen).

Glossary

Radiation Authority — As referred to in GUIDES 161 through 166 for radioactive materials, the Radiation Authority is either a Federal, state/provincial agency or state/province designated official. The responsibilities of this authority include evaluating radiological hazard conditions during normal operations and during emergencies. If the identity and telephone number of the authority are not known by emergency responders, or included in the local response plan, the information can be obtained from the agencies listed on the inside back cover. They maintain a periodically updated list of radiation authorities.

Radioactivity — The property of some substances to emit invisible and potentially harmful radiation.

Refrigerated liquid — See “Cryogenic liquid”.

Small spill — A spill that involves quantities that are less than 208 liters (55 U.S. Gallons) for liquids and less than 300 kilograms (660 pounds) for solids.

Straight (solid) stream — Method used to apply or distribute water from the end of a hose. The water is delivered under pressure for penetration. In an efficient straight (solid) stream, approximately 90% of the water passes through an imaginary circle 38 cm (15 inches) in diameter at the breaking point. Hose (solid or straight) streams are frequently used to cool tanks and other equipment exposed to flammable liquid fires, or for washing burning spills away from danger points. However, straight streams will cause a spill fire to spread if improperly used or when directed into open containers of flammable and combustible liquids.

TIH — Toxic Inhalation Hazard. Term used to describe gases and volatile liquids that are toxic when inhaled. (Same as PIH)

V — Saturated vapor concentration in air of a material in mL/m^3 (volatility) at 20^oC and standard atmospheric pressure.

Vapor density — Weight of a volume of pure vapor or gas (with no air present) compared to the weight of an equal volume of dry air at the same temperature and pressure. A vapor density less than 1 (one) indicates that the vapor is lighter than air and will tend to rise. A vapor density greater than 1 (one) indicates that the vapor is heavier than air and may travel along the ground.

Vapor pressure — Pressure at which a liquid and its vapor are in equilibrium at a given temperature. Liquids with high vapor pressures evaporate rapidly.

Glossary

Viscosity Measure of a liquid's internal resistance to flow. This property is important because it indicates how fast a material will leak out through holes in containers or tanks.

Warm zone Area between Hot and Cold zones where personnel and equipment decontamination and hot zone support take place. It includes control points for the access corridor and thus assists in reducing the spread of contamination. Also referred to as the contamination reduction corridor (CRC), contamination reduction zone (CRZ), yellow zone or limited access zone in other documents. (EPA Standard Operating Safety Guidelines, OSHA 29 CFR 1910.120, NFPA 472)

Water-sensitive Substances which may produce flammable and/or toxic decomposition products upon contact with water.

Water spray (fog) Method or way to apply or distribute water. The water is finely divided to provide for high heat absorption. Water spray patterns can range from about 10 to 90 degrees. Water spray streams can be used to extinguish or control the burning of a fire or to provide exposure protection for personnel, equipment, buildings, etc. **(This method can be used to absorb vapors, knock-down vapors or disperse vapors. Direct a water spray (fog), rather than a straight (solid) stream, into the vapor cloud to accomplish any of the above).**

Water spray is particularly effective on fires of flammable liquids and volatile solids having flash points above 37.8°C (100°F).

Regardless of the above, water spray can be used successfully on flammable liquids with low flash points. The effectiveness depends particularly on the method of application. With proper nozzles, even gasoline spill fires of some types have been extinguished when coordinated hose lines were used to sweep the flames off the surface of the liquid. Furthermore, water spray carefully applied has frequently been used with success in extinguishing fires involving flammable liquids with high flash points (or any viscous liquids) by causing frothing to occur only on the surface, and this foaming action blankets and extinguishes the fire.

PUBLICATION DATA

The 2012 Emergency Response Guidebook (ERG2012) was prepared by the staff of Transport Canada, the U.S. Department of Transportation, and the Secretariat of Communications and Transport of Mexico with the assistance of many interested parties from government and industry including the collaboration of CIQUIME of Argentina. The principal authors of the ERG are Transport Canada's Michel Cloutier and U.S. DOT's George Cushmac. Printing and publication services are provided through U.S. DOT's Pipeline and Hazardous Materials Safety Administration, (PHMSA) Outreach, Training, and Grants Division.

ERG2012 is based on earlier Transport Canada, U.S. DOT, and Secretariat of Communications and Transport emergency response guidebooks. ERG2012 is published in three languages: English, French and Spanish. The Emergency Response Guidebook has been translated and printed in other languages, including Chinese, German, Hebrew, Japanese, Portuguese, Korean, Hungarian, Polish, Turkish and Thai.

We encourage countries that wish to translate this Guidebook to please contact any of the websites or telephone numbers in the next paragraph.

DISTRIBUTION OF THIS GUIDEBOOK

The primary objective is to place one copy of the ERG2012 in each publicly owned emergency service vehicle through distribution to Federal, state, provincial and local public safety authorities. The distribution of this guidebook is being accomplished through the voluntary cooperation of a network of key agencies. Emergency service organizations that have not yet received copies of ERG2012 should contact the respective distribution center in their country, state or province. In the U.S., information about the distribution center for your location may be obtained from the Office of Hazardous Materials Safety web site at http://hazmat.dot.gov or call 202-366-4900. In Canada, contact CANUTEC at 613-992-4624 or via the web site at < *http://www.canutec.gc.ca for information* >. In Mexico, call SCT at 52-55-5684-1275 or 684-0188 or via email at iflores@sct.gob.mx. In Argentina, call CIQUIME at 011-4613-1100, or via the web site at http://www.ciquime.org.ar, or via email at gre2012@ciquime.org.ar

REPRODUCTION AND RESALE

Copies of this document which are provided free of charge to fire, police and other emergency services may not be resold. ERG2012 (PHH50-ERG2012) may be reproduced without further permission subject to the following:

The names and the seals of the participating governments may not be reproduced on a copy of this document unless that copy accurately reproduces the entire content (text, format, and coloration) of this document without modification. In addition, the publisher's full name and address must be displayed on the outside back cover of each copy, replacing the wording placed on the center of the back cover.

Constructive comments concerning ERG2012 are solicited; in particular, comments concerning its use in handling incidents involving dangerous goods. Comments should be addressed to:

In Canada:

Director, CANUTEC
Transport Dangerous Goods
Transport Canada
Ottawa, Ontario
Canada K1A 0N5

Phone: 613-992-4624 (information)
Fax: 613-954-5101
Email: canutec@tc.gc.ca

In the U.S.:

U. S. Department of Transportation
Pipeline and Hazardous Materials Safety Administration
Outreach, Training, and Grants Division (PHH-50)
Washington, DC 20590-0001

Phone: 202-366-4900
Fax: 202-366-7342
Email: ERG2012@dot.gov

In Mexico:

Secretariat for Communications and Transport
Land Transport Directorate
Hazardous Materials and Wastes Directorate
Calz. de las Bombas No. 411-9 piso
Col. San Bartolo Coapa
Coyoacan 04800, D.F.
Mexico

Phone and Fax: +52-55-5684-1275 and 684-0188

In Argentina:

Chemistry Information Center for Emergencies (CIQUIME)
Juan Bautista Alberdi 2986
C1406GSS Buenos Aires, Argentina
Tel. +54-11-4613-1100 Fax (011) 4613-3707
Email: gre2012@ciquime.org.ar

The Emergency Response Guidebook is normally revised and reissued every four years. However, in the event of a significant mistake, omission or change in the state of knowledge, special instructions to change the guidebook (in pen-and-ink, with paste-over stickers, or with a supplement) may be issued.

Users of this guidebook should check periodically (about every 6 months) to make sure their version is current. Changes should be annotated below. Contact:

DOT/PHMSA
http://hazmat.dot.gov/pubs/erg/guidebook.htm

TRANSPORT CANADA
http://www.tc.gc.ca/eng/canutec/guide-guide-338.htm

CIQUIME
http://www.ciquime.org.ar

This guidebook incorporates changes dated:

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CANADA AND UNITED STATES NATIONAL RESPONSE CENTERS

CANADA

1. CANUTEC

CANUTEC is the **Canadian Transport Emergency Centre** operated by the Transport Dangerous Goods Directorate of Transport Canada.
CANUTEC provides a national bilingual (French and English) advisory service and is staffed by professional scientists experienced and trained in interpreting technical information and providing emergency response advice.

In an emergency, CANUTEC may be called collect at 613-996-6666 (24 hours)
***666 cellular (Press Star 666, Canada only)**

In a non-emergency situation, please call the information line at 613-992-4624 (24 hours).

2. PROVINCIAL/TERRITORIAL AGENCIES

Although technical information and emergency response assistance can be obtained from **CANUTEC**, there are federal, provincial and territorial regulations requiring the reporting of dangerous goods incidents to certain authorities.

The following list of provincial/territorial agencies is supplied for your convenience.

Province	Emergency Authority and/or Telephone Number
Alberta	Local Police and Provincial Authorities 1-800-272-9600 or 780-422-9600
British Columbia	Local Police and Provincial Authorities 1-800-663-3456
Manitoba	Provincial Authority 204-945-4888 and Local Police or fire brigade, as appropriate
New Brunswick	Local Police or 1-800-565-1633 or 902-426-6030
Newfoundland and Labrador	Local Police and 709-772-2083
Northwest Territories	867-920-8130
Nova Scotia	Local Police or 1-800-565-1633 or 902-426-6030
Nunavut	Local Police and 867-920-8130 or 1-800-693-1666
Ontario	Local Police
Prince Edward Island	Local Police or 1-800-565-1633 or 902-426-6030
Quebec	Local Police
Saskatchewan	Local Police or 1-800-667-7525
Yukon Territory	867-667-7244

NOTE:

1. The appropriate federal agency must be notified in the case of rail, air or marine incidents.
2. The nearest police department must be notified in the case of lost, stolen or misplaced explosives, radioactive materials or infectious substances.
3. **CANUTEC must** be notified in the case of:
   a. lost, stolen or unlawfully interfered with dangerous goods (except Class 9);
   b. an incident involving infectious substances;
   c. an accidental release from a cylinder that has suffered a catastrophic failure;
   d. an incident where the shipping documents display **CANUTEC's** telephone number 613-996-6666 as the emergency telephone number; or
   e. a dangerous goods incident in which a railway vehicle, a ship, an aircraft, an aerodrome or an air cargo facility is involved.

UNITED STATES

NATIONAL RESPONSE CENTER (NRC)

The NRC, which is operated by the U.S. Coast Guard, receives reports required when dangerous goods and hazardous substances are spilled. After receiving notification of an incident, the NRC will immediately notify the appropriate Federal On-Scene Coordinator and concerned Federal agencies. Federal law requires that anyone who releases into the environment a reportable quantity of a hazardous substance (including oil when water is, or may be affected) or a material identified as a marine pollutant, must **immediately** notify the NRC. When in doubt as to whether the amount released equals the required reporting levels for these materials, the NRC should be notified.

CALL **NRC** (24 hours)

1-800-424-8802

(Toll-free in the U.S., Canada, and the U.S. Virgin Islands)

202-267-2675 in the District of Columbia

Calling the emergency response telephone number, CHEMTREC®, CHEMTEL, INC., INFOTRAC or 3E COMPANY, does not constitute compliance with regulatory requirements to call the NRC.

EMERGENCY RESPONSE TELEPHONE NUMBERS

MEXICO

1. SETIQ

01-800-00-214-00 in the Mexican Republic
For calls originating in Mexico City and the Metropolitan Area
5559-1588
For calls originating elsewhere, call
+52-55-5559-1588

2. CENACOM

01-800-00-413-00 in the Mexican Republic
For calls originating in Mexico City and the Metropolitan Area
5128-0000 exts. 11470, 11471, 11472, 11473, 11474, 11475 and 11476
For calls originating elsewhere, call
+52-55-5128-0000 exts. 11470, 11471, 11472, 11474, 11475 and 11476

ARGENTINA

1. CIQUIME

0-800-222-2933 in the Republic of Argentina
For calls originating elsewhere, call
+54-11-4613-1100

BRAZIL

1. PRÓ-QUÍMICA

0-800-118270
(Toll-free in Brazil)
For calls originating elsewhere, call
+55-11-232-1144
(Collect calls are accepted)

COLOMBIA

1. CISPROQUIM

01-800-091-6012 in Colombia
For calls originating in Bogotá, Colombia call
288-6012

For calls originating elsewhere call
+57-1-288-6012

EMERGENCY RESPONSE TELEPHONE NUMBERS

CANADA

1. CANUTEC, provides a 24 hour national bilingual (French and English) emergency response advisory service:

613-996-6666 *

***666 (STAR 666) cellular (**in Canada only)

UNITED STATES

1. CHEMTREC®, a 24 hour emergency response communication service:

1-800-424-9300 *

(Toll-free in the U.S., Canada and the U.S. Virgin Islands)

703-527-3887 For calls originating elsewhere

2. CHEMTEL, INC., a 24 hour emergency response communication service:

1-888-255-3924 *

(Toll-free in the U.S., Canada, Puerto Rico and the U.S. Virgin Islands)

813-248-0585 For calls originating elsewhere

3. INFOTRAC, a 24 hour emergency response communication service:

1-800-535-5053 *

(Toll-free in the U.S., Canada and the U.S. Virgin Islands)

352-323-3500 For calls originating elsewhere

4. 3E COMPANY, a 24 hour emergency response communication service:

1-800-451-8346 *

(Toll-free in the U.S., Canada and the U.S. Virgin Islands)

760-602-8703 For calls originating elsewhere

The emergency response information services shown above have requested to be listed as providers of emergency response information and have agreed to provide emergency response information to all callers. They maintain periodically updated lists of state and Federal radiation authorities who provide information and technical assistance on handling incidents involving radioactive materials.

5. MILITARY SHIPMENTS, for assistance at incidents involving materials being shipped by, for, or to the Department of Defense (DOD), call one of the following numbers (24 hours):

703-697-0218 * - Explosives/ammunition incidents

(U.S. Army Operations Center)

1-800-851-8061 (Toll-free in the U.S.) - All other dangerous goods incidents

(Defense Logistics Agency)

6. NATIONWIDE POISON CONTROL CENTER (United States only)

1-800-222-1222 (Toll-free in the U.S.)

* Collect calls are accepted

THIS DOCUMENT SHOULD NOT BE USED TO DETERMINE COMPLIANCE WITH THE DANGEROUS GOODS REGULATIONS
OR
TO CREATE WORKER SAFETY DOCUMENTS FOR SPECIFIC CHEMICALS

NOT FOR SALE

This document is distributed free of charge to Public Safety Organizations and may not be resold.

U.S. Department of Transportation
Pipeline and Hazardous Materials Safety Administration
http://phmsa.dot.gov/hazmat

Transport Canada Transports Canada
http://www.tc.gc.ca/TDG

Secretariat of Transport and Communications
http://www.sct.gob.mx

Crude Oil Moratorium

May 3, 2016

Vancouver City Council Workshop

Sandra Towne, Planning Manager
Brent Boger, Assistant City Attorney

CITY OF Vancouver WASHINGTON

Presentation Overview

What we plan to accomplish today:

- Provide brief background
- Provide staff recommendation on how to address the crude oil facilities moratorium
- Provide recommended next steps and schedule

Prior Council Review

- September 2014 – Ordinance M4090

Established a moratorium on applications for permits for the establishment or expansion of all crude petroleum facilities that accept crude oil except those vested or contingently vested.

- March 2015 – Ordinance M4118 moratorium extension
- August 2015 – Ordinance M-4132 moratorium extension
- February 2015 – Ordinance M-4157 moratorium extension (Expires 8/17/16)

Why the Moratorium

- Establishment of additional crude oil facilities will increase the transportation of Bakken crude oil and will result in an increase in the transportation of that commodity through the city
- Human error, acts of nature, and unforeseen disasters are beyond the control of measures proposed for the transportation of Bakken crude oil and could have devastating effects on the entire community
- The Association of American Railroads reported that the volume of crude oil shipped by rail increased from 9,500 carloads in 2008 to 400,000 car loads in 2013 and the volume transported by rail through Vancouver is expected to increase in the future.

Why the Moratorium

- The City has a paramount interest in the health, safety, and welfare of its citizens, and the City Council believes that the development of additional and expanded crude petroleum facilities is contrary to the health, safety, and welfare of its citizens and business community.

Staff Research

Two Washington Cities limit fossil fuel refining and storage

- City of Bellingham – prohibits petroleum refining and storage
  - The operation and manufacturing, compounding, processing, refining, treatment and assembly of significant quantities of the following materials is prohibited. For the purpose of this section, “significant quantity” consists of a barrel or more at a single time.
    - Petroleum processing and storage

Staff Research con't

- City of Hoquiam – Prohibits bulk crude oil storage and handling facilities and provides a definition for *bulk crude oil storage and handling facility*
  - *"Bulk crude oil storage and handling facility" means any structure, group of structures, equipment, pipeline or device that stores or transfers any naturally occurring petroleum extracted from geological formations beneath the earth's surface which requires further refinement before consumer use, including: conventional crude oil, heavy oil, extra heavy oil, and oil sands/bitumen. The term does not include facilities that store and handle finished products from petroleum.*

Staff Research cont

- Staff recommends to focus on bulk crude oil storage and oil refineries to address the Council's moratorium.
  - Substantial safety concerns across the nation provides justification to limit crude oil storage and refinement processes
  - Two other Washington city development codes provide good examples

Staff Recommendation

- Staff recommendation:
  - Prohibit bulk crude oil storage and handling facilities except for vested or contingently vested projects
  - Provide a definition of crude oil storage and handling facilities, based on Hoquiam's example
  - Prohibit oil refineries
  - Prohibit expansion of existing crude oil storage and handling facilities

Stakeholder /Interested Parties Outreach

- Attempt to schedule a specific stakeholder meeting with Vancouver petroleum companies, the Port, and CREDC
- Mailing to over 50 industrial companies
- Mailing to several environmental groups
- Mailing to Neighborhood Associations
- Planning Commission and City Council meetings

Next Steps/Timeline

- May 24, 2016 – Planning Commission public hearing
- June 13, 2016 – City Council workshop
- July 11, 2016 – City Council consent agenda
- July 18, 2016 – City Council public hearing
- August 17, 2016 – Ordinance M4157 expires

Questions and Discussion

Klein, Heather

From: OBOT Oakland <obot.oakland@gmail.com>
Sent: Tuesday, May 10, 2016 1:37 PM
To: Klein, Heather; OBOT
Cc: tagami@obotjv.com; mmcclure@obotjv.com; dsmith@sticeblock.com; jbridges@tlspops.com
Subject: OBOT Joinder in Terminal Logistic Solutions Submittals
Attachments: 5_10_16 OBOT Joinder.pdf

Dear Ms. Klein,

On behalf of OBOT, please find attached a letter regarding the submittals made by TLS in response to the Notice of Informational Public Hearing on the Health and/or Safety Impacts of Fuel Oils, Gasoline and/or Crude Oil Products.

Regards,
Megan Morodomi

The Rotunda Building
300 Frank H. Ogawa Plaza, Suite 340
Oakland, CA 94612

OAKLAND BULK AND OVERSIZED TERMINAL

May 10, 2016

Heather Klein
Planner III
City Of Oakland
250 Frank H. Ogawa Plaza, Suite 2114
Oakland, California 94612

Re: Joinder in Terminal Logistic Solutions submittals in response to Notice of Informational Public Hearing on the Health and/or Safety Impacts of Fuel Oils, Gasoline and/or Crude Oil Products ("Notice")

Dear Ms. Klein:

Oakland Bulk and Oversized Terminal ("OBOT") has reviewed the submittals to the City by Terminal Logistics Solutions ("TLS") in response to the Notice, specifically:

- 7 binders related to rail and import/export data, railroad safety requirements, and news articles submitted on May 4, 2016; and
- 1 binder related to federal, state, and local requirements submitted on May 9, 2016.

OBOT hereby joins in the comments and submissions by TLS in response to the Notice.

Should you have any questions regarding this joinder, please feel free to contact me.

Respectfully,

Phil Tagami

OAKLAND BULK AND OVERSIZED TERMINAL
300 FRANK H. OGAWA PLAZA, SUITE 340 OAKLAND CA 94612 (T) 510-268-8500 (F) 510-225-3954

Klein, Heather

From: Deborah Moore <DMoore@ucsusa.org>
Sent: Monday, May 16, 2016 1:37 PM
To: OBOT
Subject: Comments on OBOT from UCS
Attachments: UCS Letter to Oakland City Council No Oil Trains 5-16-16.pdf

Dear Ms. Klein – Please find attached written comments from the Union of Concerned Scientists regarding our concerns about the negative health and safety consequences from the Oakland Bulk and Oversized Terminal. UCS opposes this project for the reasons described in the written and oral testimony.

Thank you for your consideration.

Sincerely,

Deborah Moore

Deborah Moore
Western States Senior Campaign Manager
Union of Concerned Scientists
500 12th Street, Suite 340
Oakland, CA 94607

O: 510-809-1574
C: 510-206-3754
dmoore@ucsusa.org
Skype: deborahxmoore
Visit us at www.ucsusa.org

Union of Concerned Scientists
ucsusa.org Two Brattle Square, Cambridge, MA 02138-3780 t 617.547.5552 f 617.864.9405
1825 K Street NW, Suite 800, Washington, DC 20006-1232 t 202.223.6133 f 202.223.6162
500 12th Street, Suite 340, Oakland, CA 94607-4087 t 510.843.1872 f 510.843.3785
One North LaSalle Street, Suite 1904, Chicago, IL 60602-4064 t 312.578.1750 f 312.578.1751

May 16, 2016

Oakland City Council
1 Frank Ogawa Plaza, 3rd Floor
Oakland, CA 94612

Dear Mayor Schaaf and City Council Members:

Union of Concerned Scientist is a leading national organization – with an office in downtown Oakland – working to ensure that the best science is used in decision-making to create a healthier planet and a safer world for all people. We work to promote clean energy, stabilize our climate, and promote clean vehicles in California, Oregon, and Washington, as well as contribute to our national efforts to reduce global warming emissions. We have a network of more than 16,000 scientists who we engage to provide expert input to public policies and decision-making, and we have thousands of members and supporters in the Bay Area.

In 2015, UCS provided testimony against the coal train proposal. Today, we continue to have significant concerns about the health and safety of transporting large amounts of highly hazardous crude, gasoline and fuel oil. UCS is working to cut oil use in half in California by 2030, supporting Governor Brown's Executive Order, and nationally.

The Paris climate agreement signed by President Obama in April 2016 sets a goal of reducing carbon emissions and stabilizing temperature increases below 2 degrees Celsius. Meeting this agreement will require that we – collectively – decrease our reliance on dirty, hazardous fuels. The City of Oakland will undermine these efforts if it authorizes the handling and exporting of these fuels from the Oakland Bulk and Oversized Terminal (OBOT). Indeed, mayors from elsewhere in the Bay Area oppose this project, as well as other elected officials like Oakland's State Senator, Loni Hancock. And facilities for transport and export of coal and oil are being blocked in Oregon and Washington, as well. In fact, Oregon just passed the Clean Electricity and Coal Transition Act (SB 1547) to phase out coal completely – the first state in the nation – and set a 50% renewable energy standard. Oakland should not be promoting the greater use of fossil fuels in California or elsewhere.

Oakland residents already bear a disproportionate burden of environmental pollution and toxins, and this project will only exacerbate these unjust impacts and worsen the health of Oakland residents and disadvantaged and vulnerable communities. Asthma rates are already epidemic among Oakland's children, and this project risks exacerbating these health risks.

These trains are an accident waiting to happen. There is very little information available about plans, no CEQA review, and the consequences to air, water, and health could be irreversible. There is substantial evidence of health and safety problems with oil and coal trains elsewhere, with numerous accidents in the past few years. As other West Coast ports

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block new fossil fuel export facilities, Oakland should not become the port of last resort and a dumping ground for dirty fuels.

There are greater solar and clean energy jobs in California and in Oakland and these are the jobs of the future, not the dirty jobs of the past.

We do not think this project is appropriate in a dense urban area like Oakland, and it is inappropriate given our region's, our state's and our country's commitments to reduce fossil fuel emissions. Oakland should prohibit the handling and export of these hazardous fuels.

Sincerely,

Deborah Moore
Western States Senior Campaign Manager

Klein, Heather

From: Kalb, Dan
Sent: Sunday, May 15, 2016 12:38 PM
To: Klein, Heather
Subject: Fwd: Comment and Recommendations re Health and Safety Impacts of Fuel Oil

Begin forwarded message:

From: RH RH <rehher123@gmail.com>
Date: May 15, 2016 at 12:33:42 PM PDT
To: OBOT@oaklandnet.com
Cc: Libby Schaaf <officeofthemayor@oaklandnet.com>, "Reid, Larry" <lreid@oaklandnet.com>, "Kalb, Dan" <dkalb@oaklandnet.com>, Claudia Cappio <CCappio@oaklandnet.com>, "Hon. Rebecca Kaplan" <RKaplan@oaklandnet.com>, "Brooks, Desley" <dbrooks@oaklandnet.com>, "Guillen, Abel" <aguillen@oaklandnet.com>, "ngallo@oaklandnet.com" <ngallo@oaklandnet.com>, "Campbell Washington, Annie" <ACampbellWashington@oaklandnet.com>, "Hon. Lynette McElhaney" <lmcelhaney@oaklandnet.com>
Subject: Comment and Recommendations re Health and Safety Impacts of Fuel Oil

Good Sunday to everyone,

Below are my comments regarding the health and/or safety impacts of fuel oil and gasoline products:

Comment - While I am thankful for the opportunity to express myself, t is unfortunate that in 2016 we are still debate fossil fuels.....

Recommendations -

A) Make amendments to then utilize Ordinance 443. Amend the Ordinance so that it identifies all Fossil Fuels that are detrimental to our human and environmental sustainability. Do not leave it up to the Fire Marshall, mandate that your role will be to ensure that the citizens who work and/or reside within the geographic boundaries that are Oakland's will never be impacted by these Fuels. Road, rail, ship and highway transport of any of the Fuels will not be allowed for the next 100 years.

I understand that you may have governmental limitations or individual resistance to achieving this and this is why I also recommend that you:

B) Take the Ordinance and use it as a framing document to create a ***No Coal in Oakland Treaty***. Through the construction of a cross-jurisdictional and public agency Task Force you, Mr. Kalb, should engage the expertise of the Sierra Club, Air District, Port of Oakland, County and Federal representatives as well as local environmental justice advocates, the EPA, rail, the WOCAG and Caltrans so that this Treaty is a groundbreaking and comprehensive Agreement that firms the commitment of all parties to keep all our lives Fossil Fuel free.

As this is my recommendation, I offer my time and services as co-facilitator to make the Treaty a reality.

Respectfully,

Robyn Hodges
West Oakland resident
WOCAG Vice Co-Chair

Candidate for Oakland City Council, District Three