

KEMENTERIAN SAINS,
TEKNOLOGI DAN INOVASI
MINISTRY OF SCIENCE, TECHNOLOGY AND INNOVATION



BENGKEL

“KNOW YOUR RISK & WASTE BEFORE ITS TOO LATE”

Pengurusan Risiko Tumpahan Bahan Kimia

TUJUAN

Garis panduan ini disediakan bertujuan untuk menerangkan cara-cara atau tindakan yang perlu diambil sekiranya berlaku sebarang tumpahan bahan kimia sama ada tumpahan berskala kecil/*minor spill* ataupun tumpahan besar/*major spill*.



Kenali Jenis tumpahan



Tumpahan kecil/*minor spill*

Tumpahan dengan kuantiti yang tidak menjadi ancaman segera kepada kesihatan dan tidak menyebabkan pencemaran kepada badan dan boleh dikendalikan oleh pengendali atau Pasukan ERT PTj yang terlatih. Tumpahan adalah kurang daripada 4 liter.

Tumpahan besar/*major spill*



Tumpahan yang memerlukan bantuan pembersihan daripada agensi lain. Keadaan berikut boleh diklasifikasikan sebagai Tumpahan Besar sekiranya berlakunya kebakaran, atau ancaman kebakaran, di luar ruang terkawal (kebuk wasap); atau terdapat kecederaan atau pendedahan yang mungkin memerlukan bantuan perubatan; atau tumpahan melibatkan bahan yang tidak diketahui atau sangat reaktif; atau terdapat pelepasan gas toksik atau gas mudah terbakar di luar ruang terkawal; atau tumpahan melebihi 4 liter.

Tindak Balas Tumpahan

Setiap orang yang mengendalikan bahan kimia perlulah mengetahui prosedur pengurusan tumpahan kimia dan bertanggungjawab ke atas tumpahan bahan kimia yang berlaku.

Chemical Spills

<p>CHEMICAL SAFETY</p> <p>Using chemicals safely can reduce the risk of chemical hazards. You should be familiar with the relevant health & safety legislation and receive regular training on the action required during a chemical spill. COSHH data sheets about the chemicals in your workplace should also be available.</p> <p>PERSONAL PROTECTIVE EQUIPMENT (PPE)</p> <p>The type of PPE required during a spillage, such as gloves and masks, should be readily available and specific to the chemical hazard. You should also ensure that training is received in the use of PPE specific to your workplace risks.</p>	<p>IMMEDIATE FIRST AID</p> <p>PERSONAL PROTECTION</p> <p>Before attending to any casualties the first aider should ensure they are at no danger. This may mean wearing appropriate PPE. The casualty may need to be removed from the chemical hazard before starting your first aid checks, e.g. if they have fallen into the chemical or there is a chemical gas leak.</p> <p>CAUTION: If the chemical is on the casualty's face and resuscitation is required a face shield will be needed to protect the first aider from the chemical. If a resuscitator is being used as part of PPE the first aider will be unable to administer rescue breathing and a bag and shield with a clear supply of oxygen will be needed. Continued training in first aid procedures will be required.</p>	<p>RESPONSE, AIRWAY & BREATHING</p> <p>CHECK THE AIRWAY, BREATHING & CIRCULATION</p> <p>Check the casualty's response, always breathing and circulation. If the casualty is breathing but unconscious, place in the recovery position and continuously monitor their response, airway, breathing and circulation throughout the decontamination process.</p> <p>NOT BREATHING</p> <p>If the casualty is not breathing normally commence full CPR (CPR/CPR Resuscitation) at a rate of 30 compressions to 2 rescue breaths.</p>	<p>CHEMICAL DECONTAMINATION - EYE</p> <p>CHECK DRAGING WITH CHEMICAL CONTAMINATION OF THE EYES. THE PRIORITY IS TO DECONTAMINATE THE CHEMICAL AS SOON AS IS POSSIBLE.</p> <ol style="list-style-type: none"> 1. If using sterile eye wash, make sure the bottle is sealed. Expure the product in water in its expiry date and that the contents are clear and not cloudy. If any fluid is present discard and do not use. 2. If not brewed with eye wash, check COSHH to see if water can be used to irrigate. If you find it safer to use a cup or jug rather than the tap itself, ensure that the container is clean to avoid further contamination. 3. To irrigate the eye. 4. Put on protective glasses where available. 5. Working from the inside corner of the eye out, hold the casualty's head so that the affected eye is under gently running cold water for at least 20 minutes. 6. If the eye should shut owing to an involuntary spasm, gently pull the eyelids open being care that contaminated water does not affect the uninjured eye. 7. Request that the casualty holds a sterile eye dressing or non-fluffy eye pad over the injured eye. If you feel it may be some time before the casualty can receive medical attention, bandage the dressing loosely to them. 8. Identify the chemical if possible. If no COSHH sheet is available then gather as much information as possible (name, instructions etc). 9. Refer the casualty to hospital.
<p>CHEMICAL DECONTAMINATION - BODY</p> <p>REMOVE CONTAMINATED CLOTHING</p> <p>Ensure you do not contaminate further areas of skin. A heavy duty pair of scissors should be available to cut off the casualty's clothing. Any clothing should be taken out with water if it is with COSHH.</p> <p>EMERGENCY SHOWER</p> <p>Attend a conscious casualty to an emergency shower. If the casualty is unconscious the decontamination will need to take place where they have been placed in the recovery position. Where no shower is available irrigate with a hose in a water container.</p> <ol style="list-style-type: none"> 1. Ensure that clean uncontaminated water continuously flows over the contaminated area of the body. 2. Shower the contaminated area with water for 20 minutes ensuring the uncontaminated water does not spill onto an uncontaminated area. 3. At the same time call for assistance so that they can be moved to Emergency Medical Services (EMS) by dialling 999/112 before the EMS at the chemical hazard. <p>Do not continue to decontaminate the casualty.</p>	<p>SPILLAGE PROCEDURE</p> <p>ENSURE ALL EMPLOYEES ARE SAFE</p> <p>This may mean evacuating the area until appropriate PPE is available.</p> <p>IDENTIFY THE CHEMICAL SPILL</p> <p>Continue with the appropriate spillage procedure.</p> <ol style="list-style-type: none"> 1. The spill may need containment, for example by using absorbent pads / dams. Particular attention should be given to areas where the spillage may contaminate another chemical, or go into a drainage system. 2. If it is a liquid chemical spill, it should be prevented from reaching a source of electricity. 3. Ensure that the spill is cleaned correctly. 4. Decide what action is required to prevent / contain any future chemical spills (e.g. carry out a Risk Assessment). 	<p>RISK CONTROL</p> <p>SAFE SYSTEMS OF WORK</p> <p>A risk assessment should be made to ensure that all working practices are as safe as is reasonably practicable. You should receive training and detailed emergency plans should be in place.</p> <p>SAFE PLANT DESIGN</p> <p>Risk can be reduced or contained by a designed working environment.</p> <p>SAFE STORAGE</p> <p>Storage containers should be suitable for the chemical and stored safely. Regular safety checks of the storage area should be made.</p> <p>SAFE WASTE DISPOSAL</p> <p>Safe waste disposal will prevent harm to the employees, the public and the environment.</p> <p>SAFE TRANSPORTATION</p> <p>Suitable transport of the chemical both within the immediate working environment and outside it. All chemical containers should have appropriate labelling.</p> <p>EMERGENCY PROCEDURES</p> <p>All possible emergencies should be planned for. Information and training in these procedures is required for all employees.</p>	<p>ACCIDENT FOLLOW UP</p> <ol style="list-style-type: none"> 1. Be prepared to treat the casualty for other symptoms which the chemical may induce such as breathing difficulties. 2. Only use specific chemical antidotes if you are trained in its use. 3. Where practical send a copy of the COSHH data sheet of the chemical with the casualty to the hospital. 4. Request the incident to the site safety officer and Occupational Health Staff as soon as possible. 5. Depending upon the nature of the spillage, inform the Emergency Medical Services (EMS) and tell them the nature of the incident so that they are prepared with the appropriate PPE. <p>FIRST AID INFORMATION</p> <p>YOUR NEAREST BOX IS SITUATED AT:</p> <p>PERSON IN CHARGE: _____</p> <p>RESPONDING / CONTACT NO: _____</p>

Tindak balas yang perlu dilakukan jika berlakunya tumpahan adalah sebagaimana berikut :

- ➔ Menilai keselamatan dan pagar kawasan tumpahan.
- ➔ Mengenalpasti bahan kimia yang terlibat dengan merujuk SDS untuk mengetahui risiko hazard.
- ➔ Menggunakan peralatan perlindungan diri seperti sarung tangan kalis bahan kimia, pelindung mata, but dan pakaian pelindung yang sesuai.
- ➔ Membersihkan dan mengumpulkan tumpahan kimia.
- ➔ Mencuci kawasan tercemar mengikut kaedah di dalam SDS. Elakkan sentuhan secara langsung bahan kimia.
- ➔ Mengumpul sisa nyahcemar dan PPE yang digunakan untuk pelupusan.
- ➔ Membersihkan diri dan lakukan pemantauan.
- ➔ Membuat pemakluman kepada pihak JKPP PTj dan Pejabat OSHE.
- ➔ Mengisi semula Kit Tumpahan Kimia.

KIT TUMPAHAN KIMIA

Setiap makmal yang menyimpan dan mengendalikan bahan kimia berbahaya hendaklah mempunyai Kit Tumpahan Kimia.

Kit Tumpahan Kimia hendaklah disemak dan diselenggara setiap bulan bagi memastikan ianya setiap cukup dan dapat digunakan jika perlu.

Kit tersebut hendaklah dilabel, diletakkan ditempat yang mudah dicapai dan boleh digunakan pada bila-bila masa jika diperlukan.

Antara alat/bahan yang perlu ada dalam Kit Tumpahan Bahan Kimia adalah seperti berikut:

Peralatan Perlindungan Diri (PPE)

Penyerap Bahan Kimia seperti Zeolite, Vermiculite dan pad penyerap

Bahan Peneutralan Kimia.

Reagen untuk dekontaminasi seperti kalsium karbonat, natrium hidrogen karbonat (untuk tumpahan cecair yang mengakis).

Penyedok/pengaut, penyapu atau berus plastic

Beg Plastik sampah tebal dan pengikat

Tanda Amaran dan hazard Tape



PENGURUSAN TUMPAHAN KECIL/MINOR SPILL

Kenal pasti bahaya yang terlibat dan gunakan maklumat mengenai sifat fizikal dan kimia bahan tersebut untuk menilai tindak balas.

Jika terdapat pendedahan kimia kepada pekerja, berikan pertolongan cemas yang sesuai dan hubungi Pusat Kesihatan Universiti secepat mungkin.

Elakkan menghidu wap yang terhasil dari tumpahan tersebut.

Kawal sumber tumpahan.

Kandungi tumpahan dengan penghalang (*damming*) atau gunakan bahan penyerap yang sesuai dari kit tumpahan.



Bersihkan dengan segera dan teliti. Antara prosedur pembersihan bahan kimia adalah seperti berikut:

Tumpahan Kimia Asid

- Bendungkan cecair terlebih dahulu.
- Neutralkan asid tersebut dengan menaburkan Natrium bikarbonat atau Natrium karbonat atau Kalsium Karbonat di atas tumpahan bermula dari luar.
- Elakkan menghidu serbuk halus atau gas.

Tumpahan Kimia Alkali

- Pastikan pengudaraan yang mencukupi
- Hapuskan semua sumber penyalaan, termasuk bahan mudah terbakar.
- Betulkan bekas yang terbalik atau hentikan kebocoran hanya jika selamat untuk berbuat demikian.
- Elakkan mengendalikan cecair walaupun dengan sarung tangan.
- Neutralkan bahan alkali tersebut dengan menaburkan serbuk natrium bisulphite, asid boric atau asid oxalic diatas tumpahan bermula dari luar. Jauhi diri dari tumpahan dengan secepat mungkin.
- Gunakan alat bukan logam untuk membersihkan tumpahan

Tumpahan Kimia Pepejal

- Sapu bahan pepejal yang tertumpah ke dalam bekas plastik dan letakkan dalam bekas yang tertutup.
- Lap kawasan tumpahan dengan tuala kertas basah dan buang tuala tersebut ke dalam bekas yang tertutup.

Tumpahan Kimia Cecair

- Letakkan pad penyerap keatas tumpahan bermula dari tepi.
- Angkat pad yang tercemar dengan pengaut dan masukkan kedalam tong yang tahan bahan kimia.
- Lap kawasan tercemar dengan tuala kertas diikuti dengan mop basah bersama sabun (jika bahan kimia larut dalam air).

Tumpahan Kimia Cecair Mudah Terbakar

- Kawal semua sumber pencucuhan, termasuk peralatan elektrik dan haba.
- Letakkan pad penyerap keatas tumpahan bermula dari tepi.
- Angkat pad yang tercemar dengan pengaut dan masukkan ke dalam tong tahan bahan kimia.
- Lap kawasan tercemar dengan tuala kertas diikuti dengan mop basah bersama sabun (jika bahan kimia larut dalam air)

Dekontaminasi kawasan, peralatan dan pakaian yang terjejas dan lupuskan apa-apa bahan yang tercemar dengan sewajarnya.

PENGURUSAN TUMPAHAN BESAR / MAJOR SPILL

Lindungi diri dan jangan sesekali menyentuh bahan yang berbahaya.

Keluar dari makmal. Tutup pintu untuk mengelakkan penyebaran pencemaran dan matikan sebarang sumber pencucuhan.

Asingkan dan kawal akses ke kawasan tumpahan. Jangan biarkan kakitangan yang tidak berkaitan memasuki kawasan tumpahan. Sediakan pita "Awas: Tumpahan Kimia"

Bunyikan penggera kecemasan. Hubungi pengurus makmal, ketua makmal atau SLO PTj dan Pejabat OSHE bagi mendapatkan bantuan kecemasan.

Jika terdapat pendedahan kimia kepada pekerja, berikan pertolongan cemas yang sesuai

Hubungi Pasukan Bomba dan Penyelamat dengan menyediakan maklumat berikut:

- Nama dan nombor telefon pelapor
- Nombor bangunan dan bilik tempat kejadian berlaku
- Nama dan jenis bahan
- Bahaya bahan yang diketahui
- Jumlah bahan tumpah
- Penjelasan mengenai apa yang berlaku
- Keadaan kakitangan yang cedera
- Status kawasan

Kurangkan penyebaran pencemaran dan mulakan prosedur pembersihan bersama dengan bantuan pakar (Bomba/ Pasukan ERT).

Setelah pembersihan selesai, tinjau kawasan tersebut.



Chemical Incident Response - Decision Logic

Key Information

- Container label is legible
- MSDS available

- No injuries
- Low reactivity
- Low flammability
- Familiar quantity
- No fire
- Low volatility
- Not a strong oxidizer

- I feel comfortable enough, to deal with this situation.
- I am trained in proper protective equipment use.
- I am trained how to use spill control equipment.
- All the right equipment is available to me here and now.

Ask yourself

Do I know what this substance is?

NO

YES

Is this release small enough to manage myself?

NO

YES

Can this chemical be contained or isolated safely?

NO

YES

Get Help!
This is not a "Simple" Spill

Follow your campus emergency response procedures. This could involve:

- Pull Alarm
- Evacuate
- Call 911
- Call your campus Environmental, Safety, or Facilities Management department

This is a "Simple" spill
I can clean it up myself, within my normal workday.

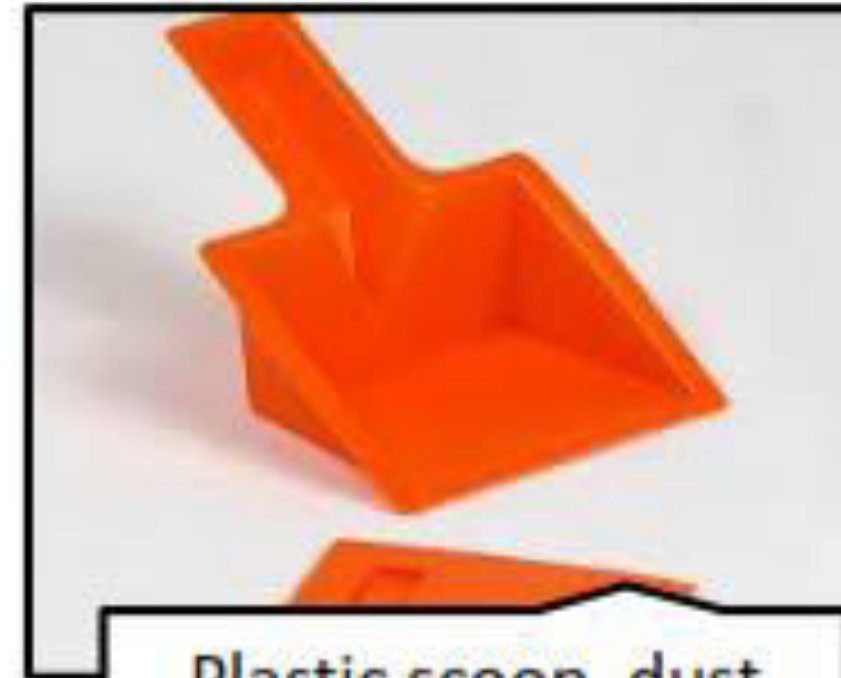




Chemical Absorbent



Chemical Neutralizing Material



Plastic scoop, dust pan, broom/ brush.



Reagents for decontamination

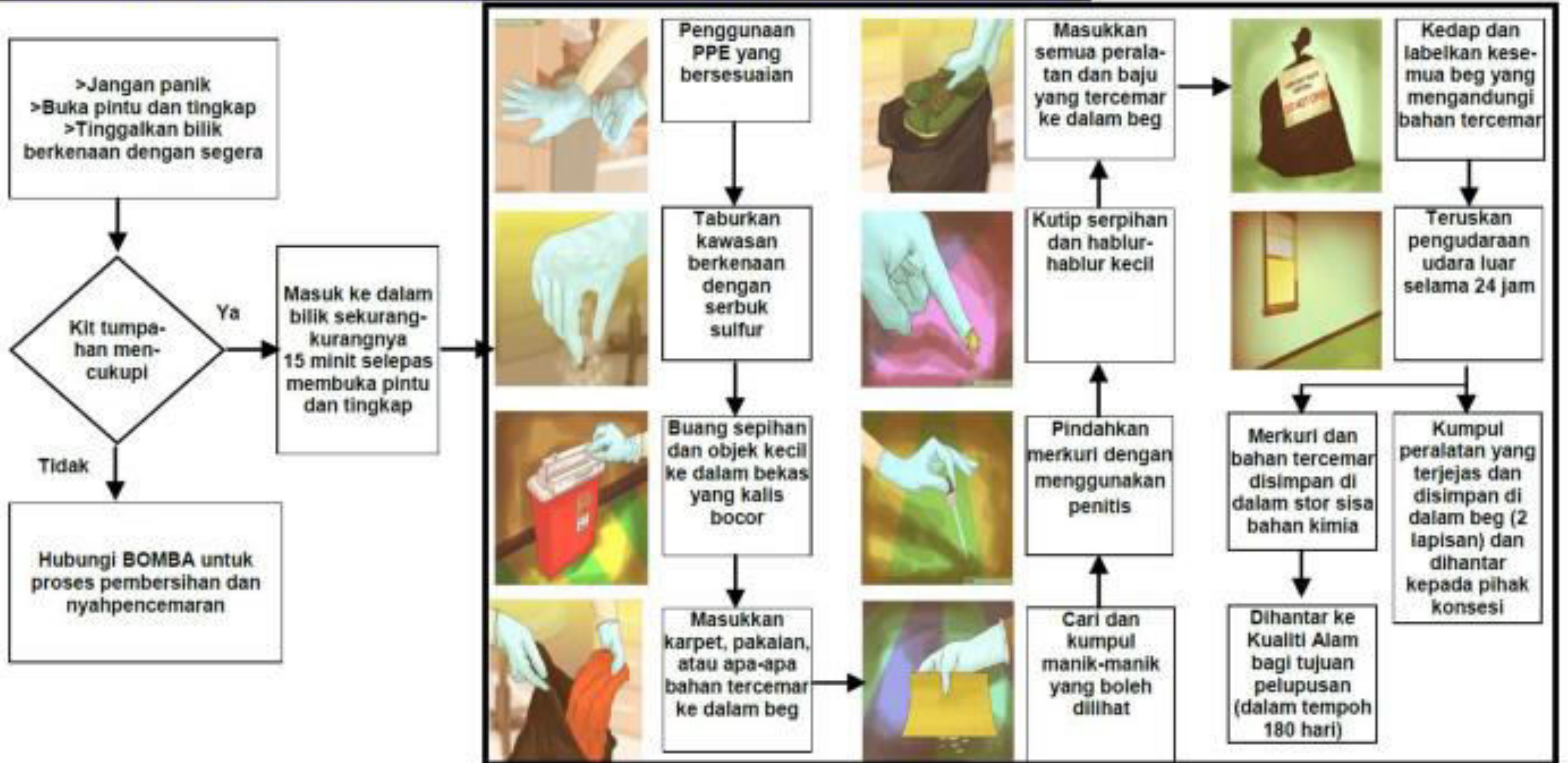


Strong, heavy duty leak-proof waste bag



Hazardous waste labels, warning sign

LANGKAH PEMBERSIHAN TUMPAHAN MERKURI



Absorbent Pad Spill Kit



**BAG AND TAG
FOR EH&S
WASTE REMOVAL**

**PLACE A BARRIER
AROUND THE SPILL**

**COVER COMPLETELY
WITH APPROPRIATE
MATERIAL**

CLEAN UP



**BAG AND TAG
FOR EH&S
WASTE REMOVAL**

Floor Dry Spill Kit

*Thank you
for Listening!*



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