

ST EUPHEMIA COLLEGE

K-12



CHEMICAL SAFETY PROCEDURES 2014

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1 St. Euphemia High School Chemical Safety Procedures

	Topic	#	Page	Type
Movement	Purchase of an chemical	1.1.1	3	Procedure
	Arrival of a chemical at the school	1.1.2	4	Procedure
	Moving of a chemical	1.1.3	5	Procedure
	Disposal of a chemical	1.1.4	6	Procedure
Stock	Chemical entering store	1.2.1	7	Procedure
	Store inspection	1.2.2	8	Procedure
	Store stock take	1.2.3	9	Procedure
Use	Chemical categories	1.3.1	10	Table
	General chemical user codes	1.3.2 a	10	Table
	Chemical user codes	1.3.2 b	11	Procedure
	Use of a chemical	1.3.3	12	Procedure
	Site specific risk assessment	1.3.4	13	Form
	SSRA form	1.3.5	14	Key
Emergency	Key to appendix D	1.3.6	15	
	Chemical spill	1.4.1	16	Procedure
	Fire and emergency	1.4.2	16	Procedure
	Personal injury involving chemicals	1.4.3	17	Procedure

Definitions:

Appendix D	List of chemicals, their user codes and their risks.
Appendix E	Disposal of waste chemicals.
Laboratory Assistant	Person in charge of chemical procedures and keeping up of chemical register.
Chemwatch	Chemical database computer program.
CSIS	Chemical safety in schools package.
DG	Dangerous Good.
Halogenated	Chemical that contains element chlorine, bromine, iodine or fluorine.
Haz	Hazardous Good.
Major spill	A large spill of a chemical, in case of an acid; more than 1 L of concentrated acid.
MSDS	Material Safety Data Sheet.
Organic	Chemical that contains element carbon.
PPE	Personal protection equipment.
SSRA	Specific site risk assessment.

Additional documents and materials needed to carry out the Chemical safety procedure:

Appendix D, CSIS package

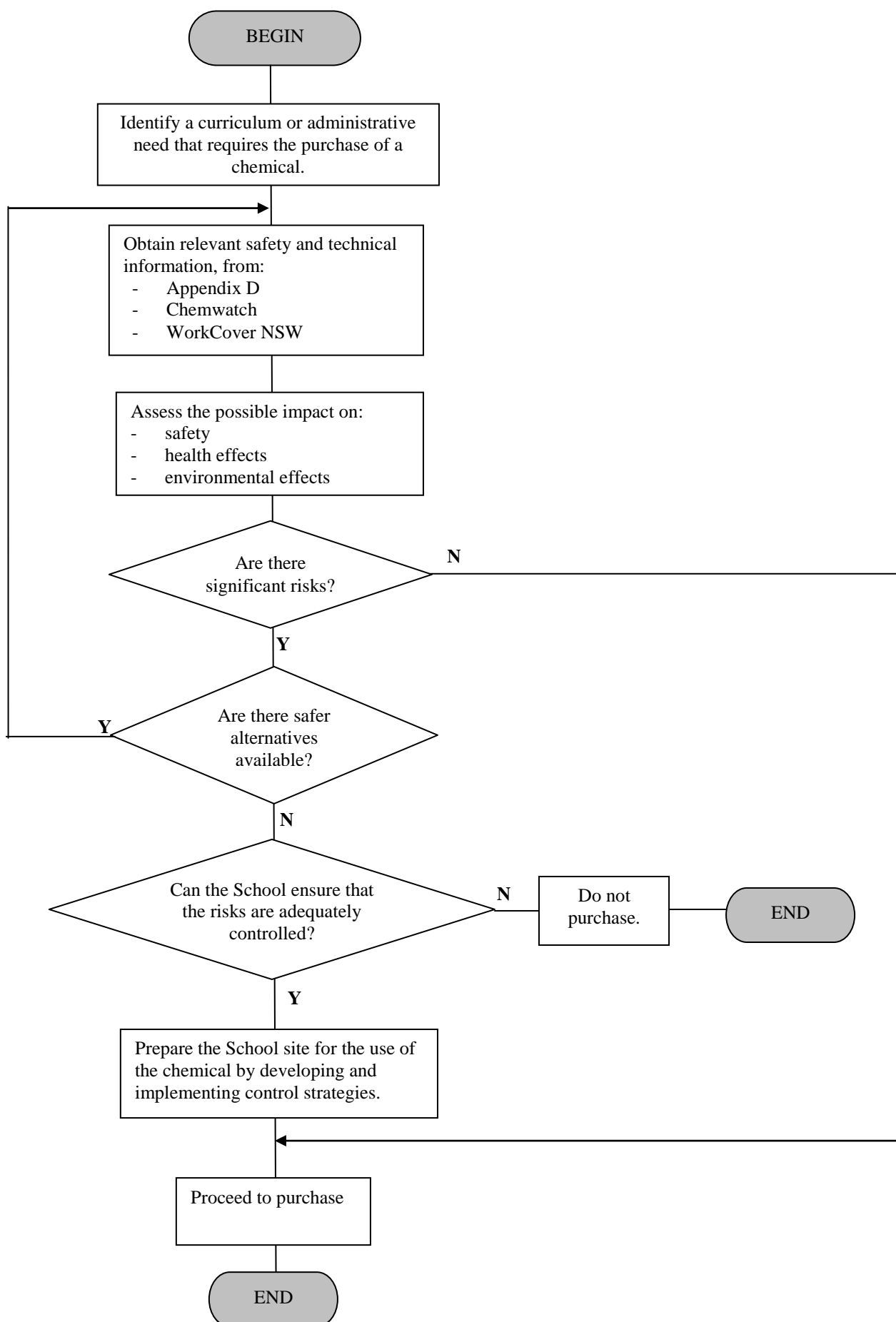
Appendix E, CSIS package

Chemwatch computer program

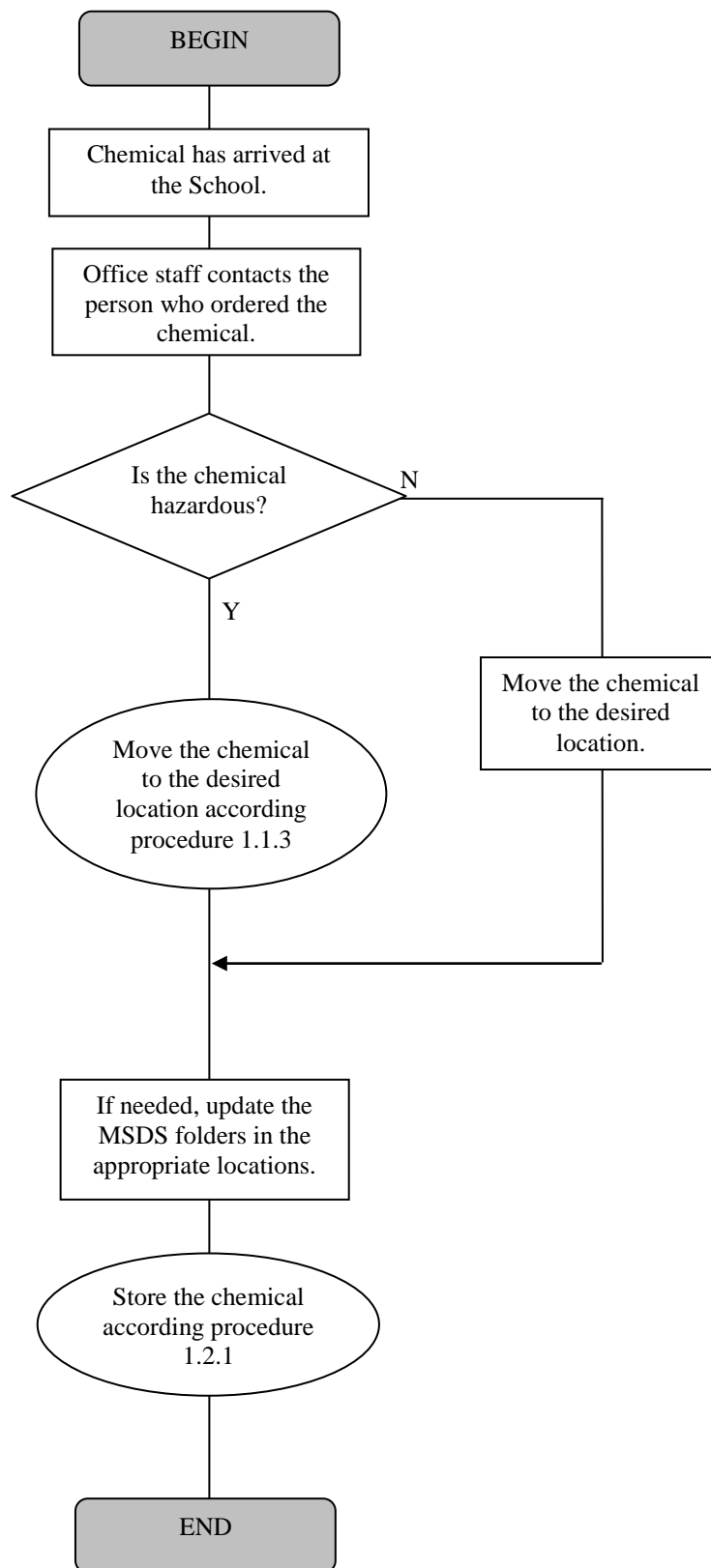
Chemical register high school in Excel file

St Euphemia College Fire and Emergency procedures

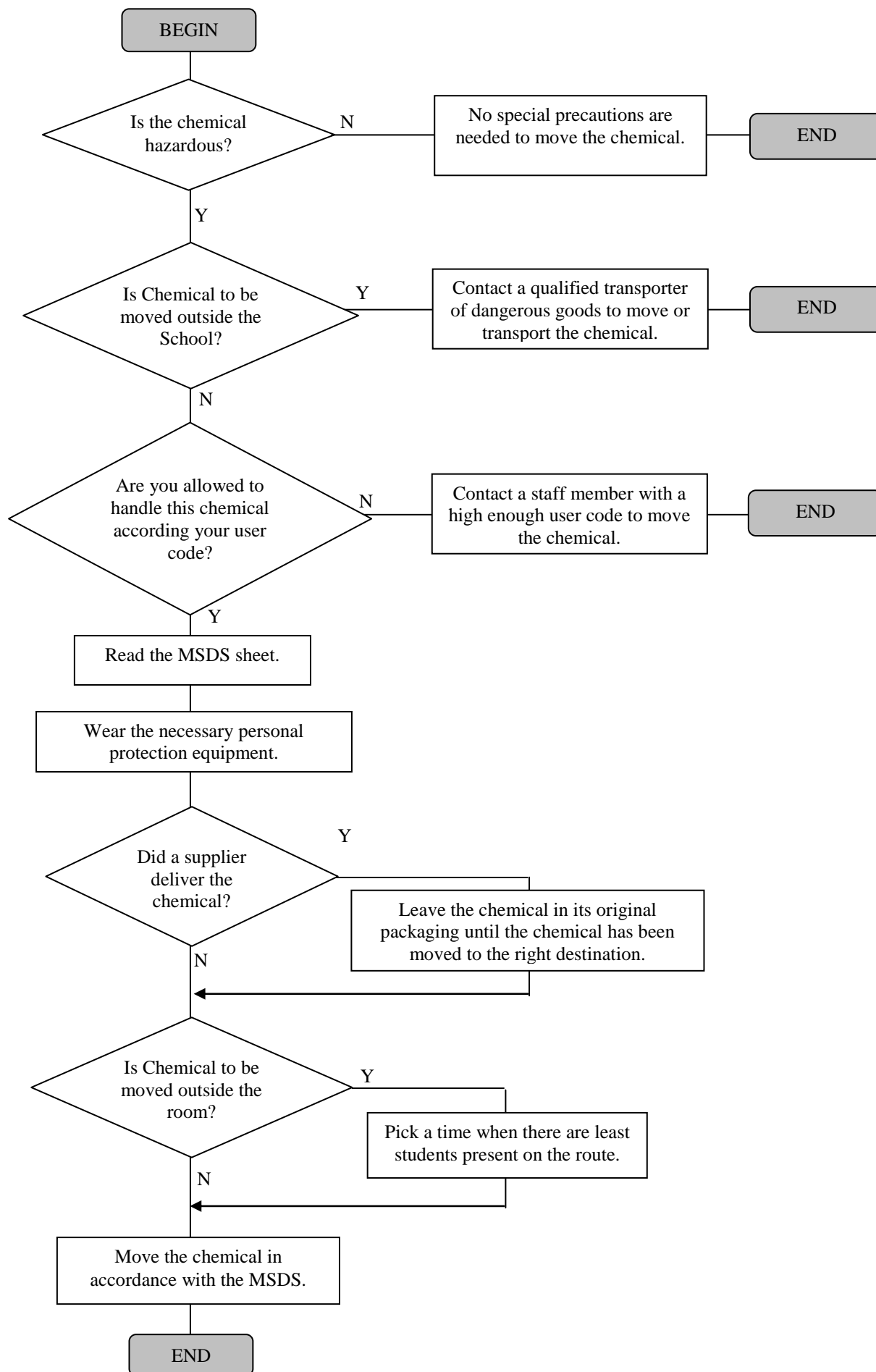
1.1.1 Purchase of a chemical



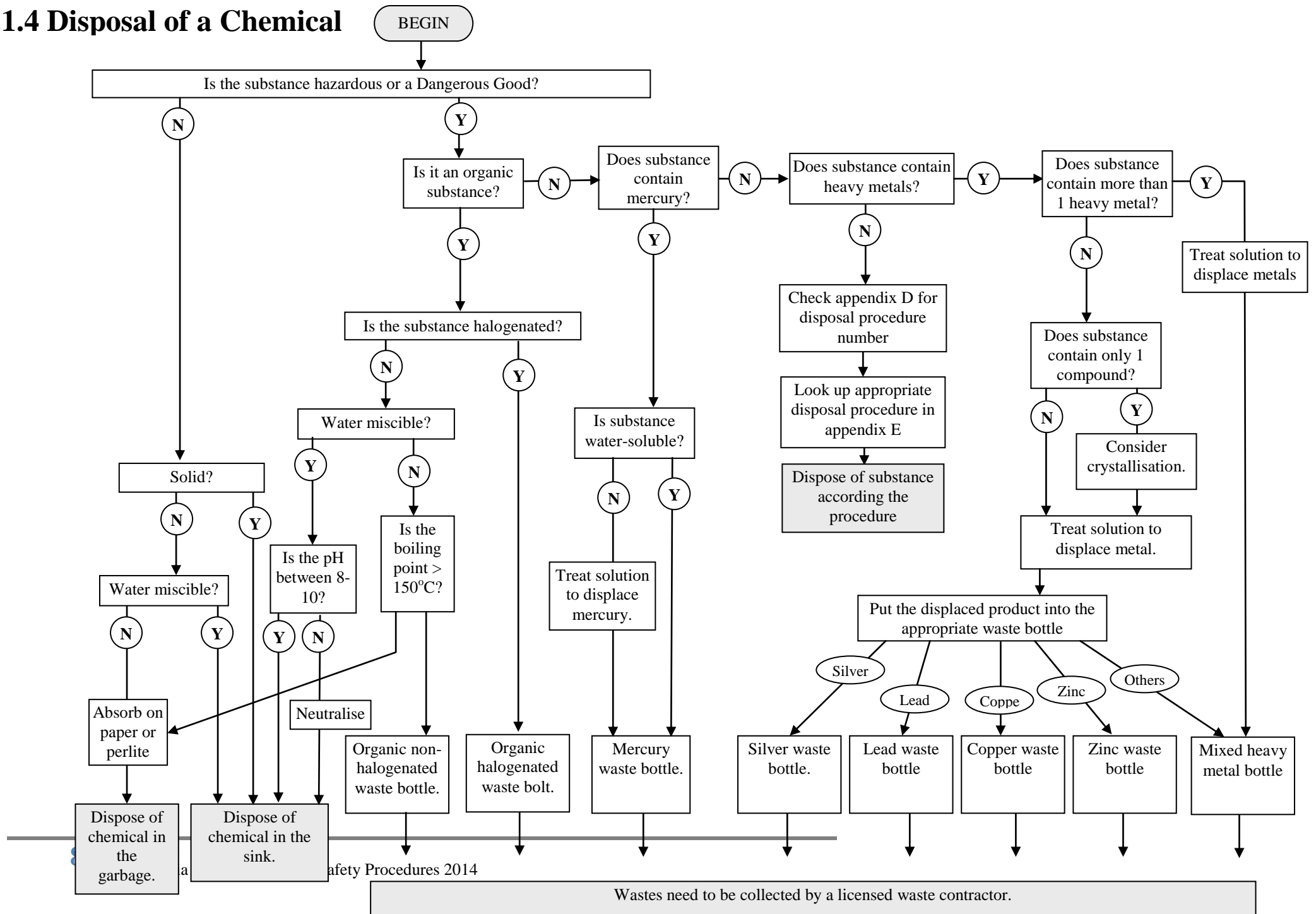
1.1.2 Arrival of a chemical



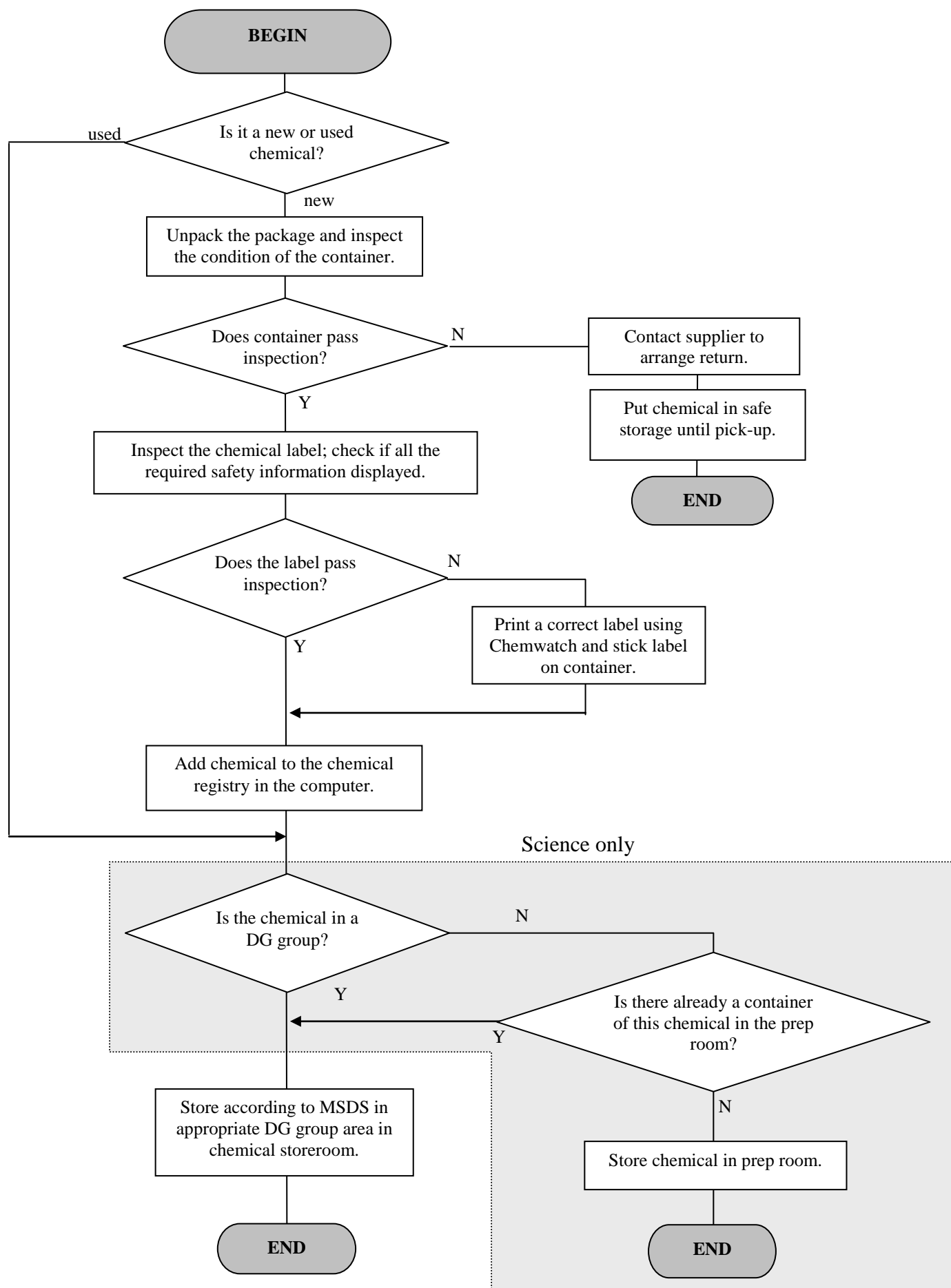
1.1.3 Moving of a chemical



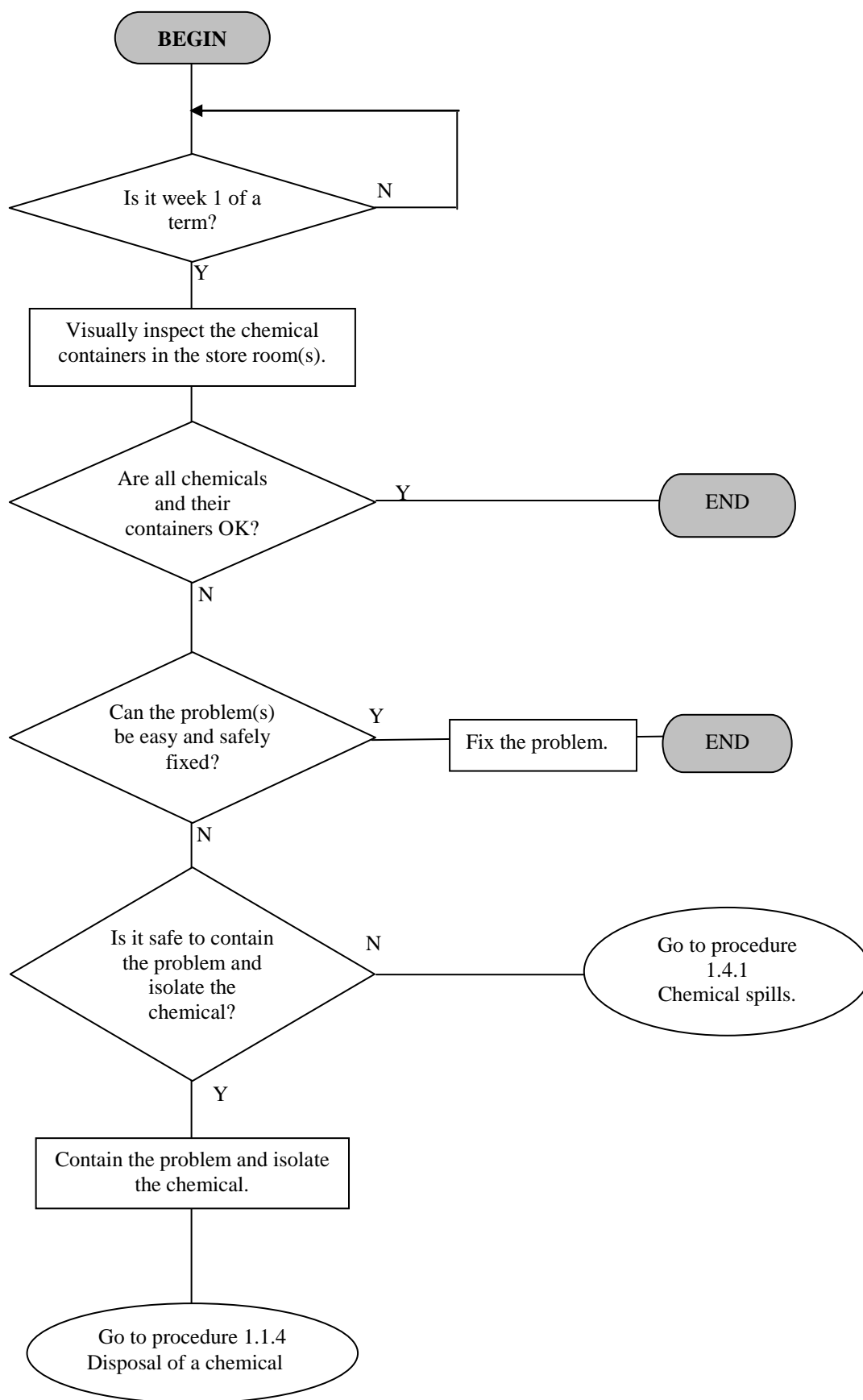
1.1.4 Disposal of a Chemical



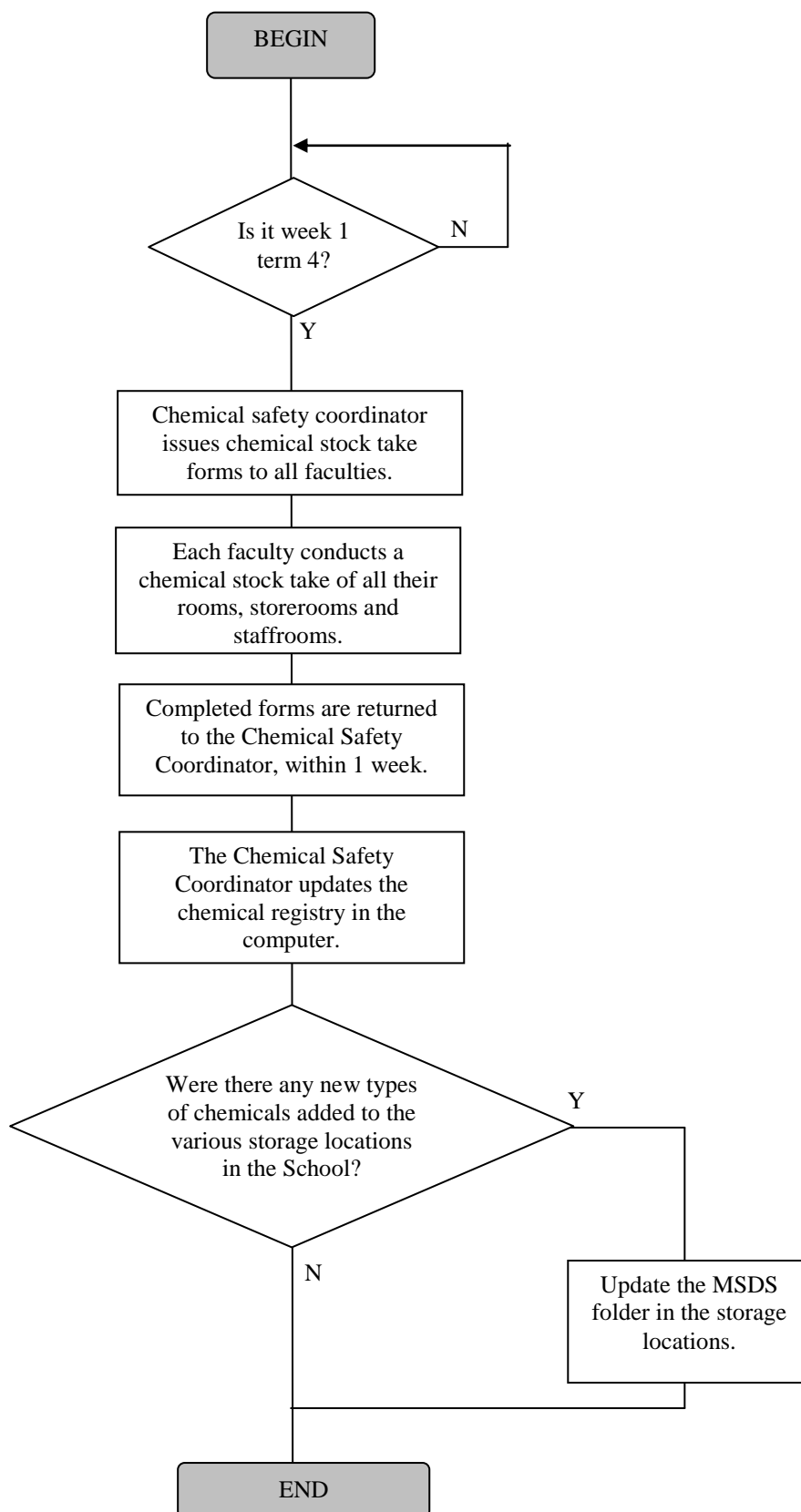
1.2.1 Chemicals entering the store



1.2.2 Store inspection



1.2.3 Store stock take



1.3.1 Chemical categories table

Category	Colour code	Description
X	N/A	The use of this chemical is banned in schools.
N	Black	Not recommended for use in schools, Use in teaching and learning situations is restricted to approved teachers and demonstrations only, after completing and documenting a SSRA.
T	Red	Use in teaching and learning situations is restricted to teacher demonstration only.
11/12	Orange	Approved for use in teaching and learning situations with senior students only.
7/12	Green	Approved for use in teaching and learning situations with students year 7-12.
K	Blue	Approved for use in teaching and learning situations with students year K-12.
PS	N/A	Approved for use by teaching and support staff for professional or administrative purposes or in the performance of their duties.

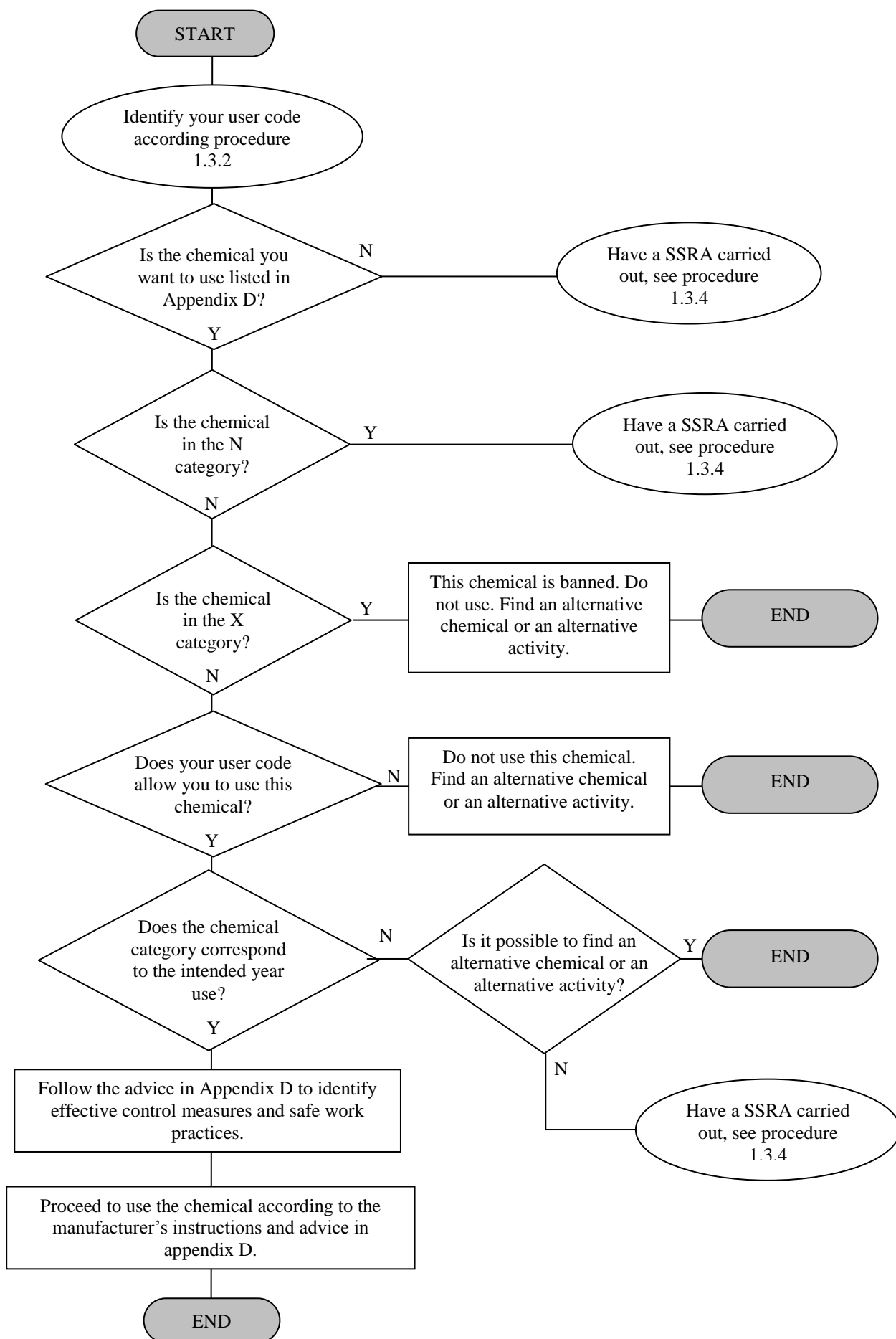
1.3.2.a General staff user code table

User Code	Description
1	Teaching staff with tertiary qualifications in chemistry or related areas.
1	Staff approved as code 1 users by the Principal.
2	Teaching staff with tertiary qualifications in science.
2	Appropriately trained and experienced school support staff working in science.
2	Staff approved as code 2 users by the Principal.
3	Teaching staff with tertiary qualifications in TAS.
3	Appropriately trained and experienced school support staff working in TAS.
3	Staff approved as code 3 users by the Principal.
4	Teaching staff with tertiary qualifications in Visual Arts.
4	Appropriately trained and experienced school support staff working in Visual Arts.
4	Staff approved as code 4 users by the Principal
5	Teaching and support staff approved by the principal to use a specific chemical for a particular purpose.
6	Teaching and support staff with a general understanding of and an occasional use of chemicals.

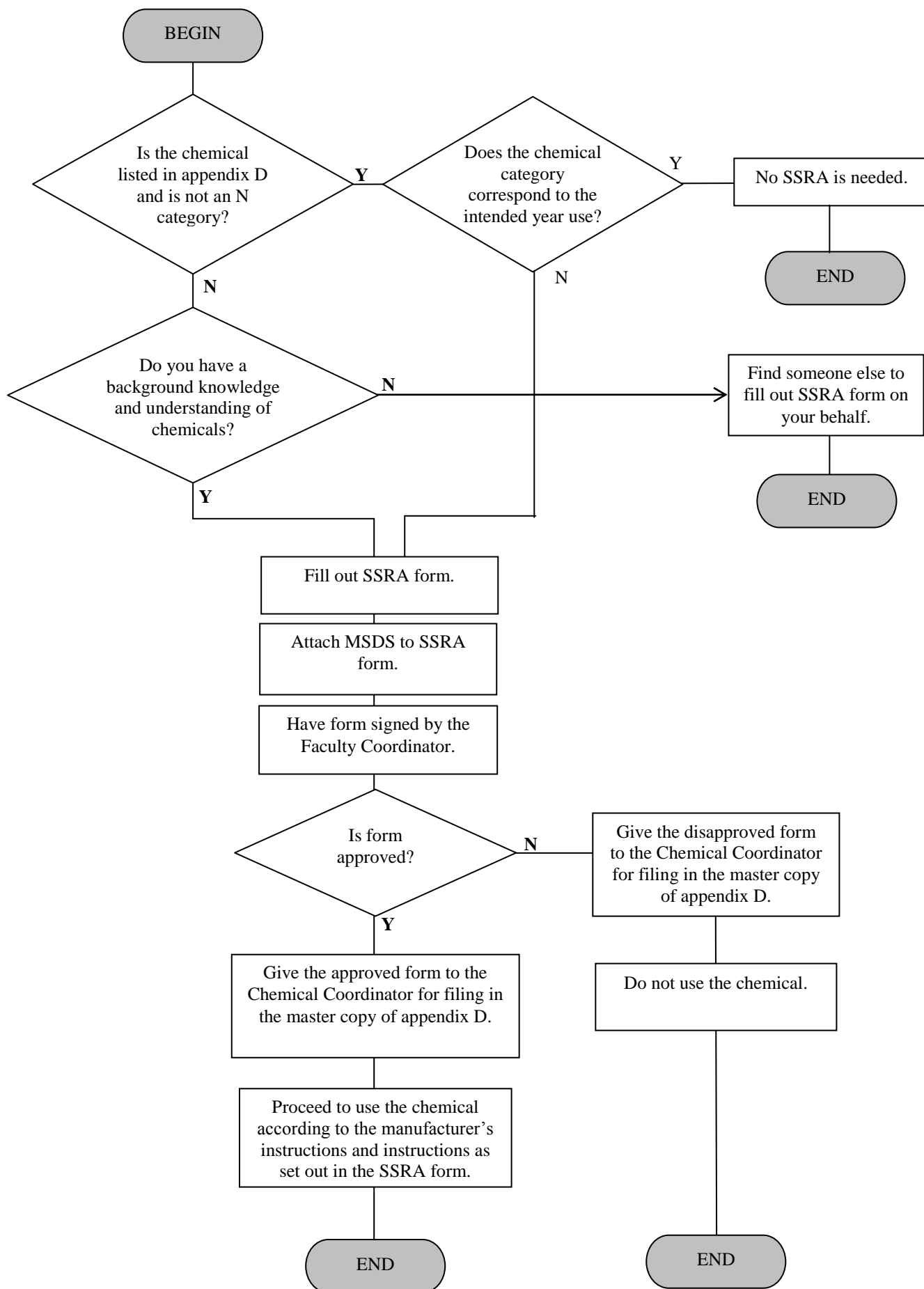
1.3.2 b Chemical user code table for staff

Faculty	Name	User code	Description
Science	Ms Nikas	1	Teaching staff with tertiary qualifications in Chemistry
Science	Dr Papagelis	2	Teaching staff with tertiary qualifications in Science
Science	Mr Dang	2	Teaching staff with tertiary qualifications in Science
Science	K-6 Staff	2	Teaching staff with tertiary qualifications in Science
Science	Ms Nguyen	2	Appropriately trained and experienced school support staff working in Science
TAS / Science	Ms Papadimatos	3	Teaching staff with tertiary qualifications in TAS
TAS	Ms Omeros	3	Teaching staff with tertiary qualifications in TAS
TAS	Ms Wassef	3	Teaching staff with tertiary qualifications in TAS
TAS	Ms McCoramck	3	Teaching staff with tertiary qualifications in TAS
TAS	Ms Zeidan	3	Teaching staff with tertiary qualifications in TAS
Art	Ms Ntiamoah	4	Teaching staff with tertiary qualifications in Visual Arts
Art	K-6 Staff	4	Teaching staff with tertiary qualifications in Visual Arts
Other	All other staff	6	Teaching and support staff with a general understanding of and an occasional use of chemicals

1.3.3 Use of a chemical



1.3.4 Site Specific Risk Assessment



1.3.5 Site Specific Risk Assessment (SSRA) form St Euphemia College

Faculty:	Date:
Name of teacher:	Position of Teacher:
Signature teacher:	Name of Faculty Coordinator:

IDENTITY	Substance name:
	MSDS: Attached / Available
	Intended use:
	Educational rationale:
	Hazardous products:
	Location for use:

ASSESS	Hazards (as per MSDS):
	Exposure estimates: Time of exposure:
	Frequency:
	Routes of exposure:
	Health effects and/or risks:
	Assessment

CONTROL	Recommended controls (Procedures, PPE, safety apparatus):
	Disposal:

I approve / do not approve of the use of the substance	
Signature of Faculty Coordinator:	Date:

Filed by Chemical Coordinator:	Signature:	Date
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1.3.6 Key to appendix D

Chemical name: **acetone*
 Chemical category: 7-12 students, PS
 Classification as a Dangerous Good: 3 Class 3 (flammable liquid)
 Dangerous goods Packing Group: II (moderate danger)

Other names: *propanone*
dimethyl ketone
 User codes: 1, 2, 3, 4, 5
 NR not a regulated dangerous good by Australian Dangerous Goods Code (ADGC) or ChemWatch assessment of chemical using (ADGC) dangerous goods criteria

** name used on ChemWatch MSDS*
 UN no.: 1090
 CAS no. 67-64-1

Chemical	Category/ Code	DG class	DG PG	UN CAS No	Guidance notes
acetic orcein <i>orcein, ethenoic</i>	11-12 1 2 3 - 5 - -	NR Not H		1400-62-0	Moderately toxic by ingestion. Used to stain chromosomes and nuclei crimson and cytoplasm pink. Prepare by dissolving 1g orcein in 45 mL of nearly boiling glacial acetic acid. Cool and add 55 mL distilled water. Shake well and filter. Add 1-2 mL conc. hydrochloric acid. Slide containing section and stain may be heated carefully in the hot air above a bunsen flame using forceps, do not boil. Waste solutions of this chemical may be disposed of down the sink.
<i>*acetone</i> <i>propanone</i> <i>dimethyl ketone</i>	7-12 1 2 3 4 5 - PS	3 CW	II	1090 67-64-1	Highly flammable ; irritant vapour; skin irritant; slightly toxic if ingested. Use in a fume cupboard if practicable; otherwise use small quantities (<50 mL) in a well-ventilated area. Acetone reacts violently – sometime explosively – with chloroform (addition at the carbonyl group), especially in the presence of base or after an induction period; do not mix acetone and chloroform. Ethyl acetate has similar solvent properties to acetone and can serve as a substitute. Used as solvent in nail polish and as a nail polish remover. Note: 7-10 students are only to use acetone as a cold solvent. They are not to react or heat acetone. Always heat acetone solutions on a water bath; never use a naked flame. Methyl isobutyl ketone is another alternative solvent with similar properties and is less volatile (BP: 116°C versus 56°C). (See also KETONES.)

Chemical available from Q-Stores

Shading identifies the substance as hazardous according to:

- The list of designated hazardous substances (**DHS**)
- ChemWatch using Worksafe criteria (**CW**), or
- DET consultants, using Worksafe criteria (**DET**). (Only provided where Worksafe or ChemWatch classification not available.)

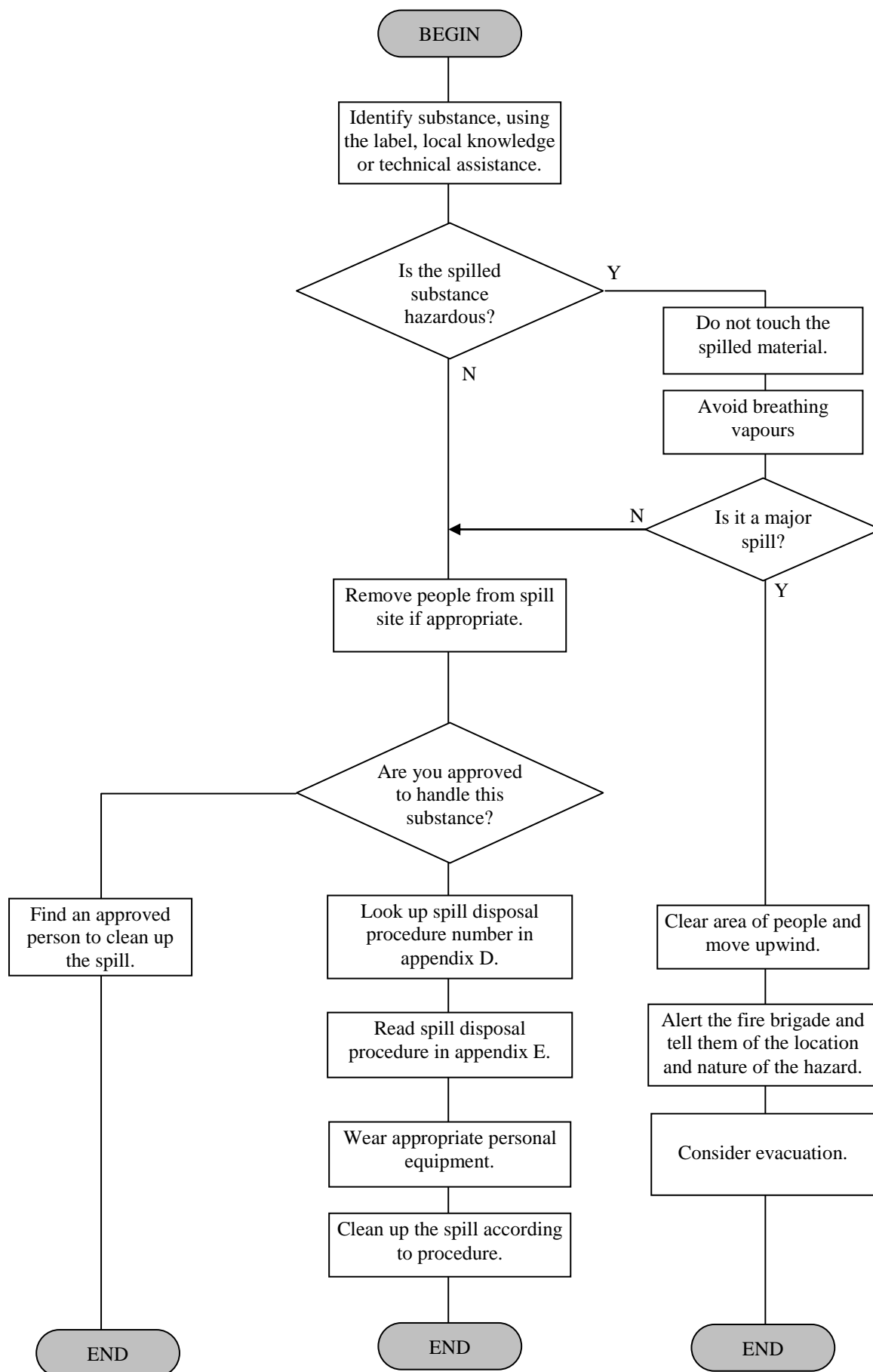
If the column for the substance is not shaded the substance has been assessed as not hazardous given the exposure limits in schools. This is reinforced by the **Not H** code printed in the column.

Guidance notes provided by Unisearch and DET using MSDS and other sources. These notes incorporate:

- risk assessment advice based on the frequency, amount, concentration and toxicity of the chemical used in normal teaching/learning practice
- best practice in the use of the chemical
- specific issues presented by the chemical, such as explosive combinations and toxic products
- less toxic or less dangerous alternatives

Spill disposal procedure in Appendix E.

1.4.1 Chemical spill



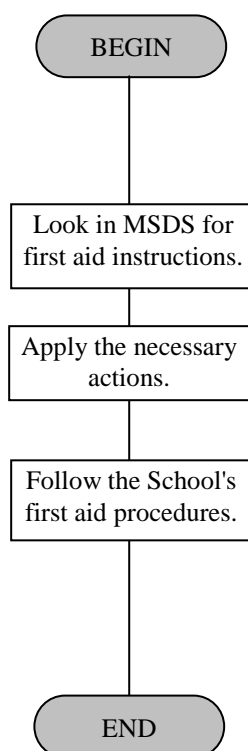
1.4.2 Fire and emergency

Refer to the St Euphemia Fire & Emergency Procedures.

In addition to these procedures:

In case of a school evacuation the Chemical register needs to be taken outside the School.

1.4.3 Chemical injury



2. St. Euphemia College Ionising Radiation Safety Procedures

Topic	#	page	Type
Ionising Radiation Safety Officer	2.1	18	List
Ionising radiation	2.2	18	Information
Using and handling radioactive materials	2.3.1	19	Procedure
Using and handling X-ray producing equipment	2.3.2	20	Procedure
Storing radiation sources	2.4	20	Procedure
Maintaining radiation sources	2.5	21	Procedure
Radiation source logbook	2.6.1	21	Procedure
Radiation source logbook form	2.6.2	22	Form

Definitions:

MSDS	Material Safety Data Sheet.
DG	Dangerous Good.
ANSTO	Australian Nuclear Science and Technology Organisation
Chemwatch	Chemical database computer program.
ARI	Australian Radioactive Isotopes
IRSO	Ionising Radiation Safety Officer

Additional documents and materials needed to carry out the ionising radiation safety procedure:

Chemwatch computer program

Chemical register high school in Excel file

St Euphemia College Fire and Emergency procedures

Getting it to work, physics equipment for high schools

2.1 Ionising Radiation Safety Officer (IRSO)

The IRSO is responsible for:

- Supervising that experiments are conducted in such a way that recommended dose limits cannot be exceeded.
- The secure storage of radiation sources.
- Reporting if a source of radiation is lost or stolen.
- Supervising that only approved sources of radiation are used.
- Contact ANSTO if a student or staff member is accidentally exposed to excess radiation
- Identify equipment that can produce by-product X-rays.
- Upkeep of the radiation sources log book.
- Routine check of all radioactive sealed sources.

2.2 Ionising radiation

Ionising radiation consists of alpha particles, beta particles, gamma rays and X-rays.

The normal background radiation is approximately 50 counts/Min.

Source	Radiation	Symbol	Half life	In stock	Stopped by:
Americium 241 Radium 226 Polonium 210 Uranium ore (Uranium 238)	Alpha particles	α	432 years 1622 years 138 days 4.5 G years	Yes Yes Yes yes	Sheet of paper, surface layers of skin, gloves or 6cm of air.
Strontium 90 Caesium 137	Beta particles	β	29 years 30 years	Yes No	Few millimetres aluminium or 1-2 cm of plastic.
Cobalt 60	Gamma articles	γ	4.26 years	Yes	1 meter of concrete or 5cm of lead. Most will pass trough human body.
Gas discharge tubes	X-rays	N/A	N/A	Yes	2-3mm of lead or 10-15cm of concrete will pass trough the human body with some absorption.

2.3.1 Using and handling radioactive materials

The only radioactive materials that are allowed to be used in science practicals are sealed sources, sources supplied with equipment (such as cloud chamber kits.), miniaturised radioisotope generator or uranium/thorium ore.

Radioactive experiments always have to be set up on the teacher bench, not on a student bench.

A science teacher or lab assistant may only transport radioactive materials around the school.

Using radioactive sources

- Wear disposable gloves when handling radioactive sources.
- Preferably handle radioactive sources with tongs.
- Keep the radioactive source away from the trunk of your body.
- Minimise handling time.
- May be handled by science teachers or lab assistants.
- Senior student may only handle the radioactive sources when under direct supervision from a teacher.
- The teacher may demonstrate radioactive sources and their detection to junior students, but the students must not handle the sources.
- Never put anything in the opening of an alpha source.
- The radioactive sources must be returned to the metal container when not in use.
- After the period of instruction is concluded all the radioactive sources need to be returned to the metal container and be accounted for.

Using radioactive ores

- Wear a dust-mask when handling unsealed radioactive ores.
- Wear disposable gloves when handling radioactive ores.
- Avoid direct contact.
- Keep the radioactive ores away from the trunk of your body.
- Minimise handling time.
- Radioactive ores must be kept in glass containers
- May be handled by science teachers or lab assistants.
- May not be handled by students.
- Only allowed to be used in demonstration and only when a small amount of the ore is in a glass container.
- After the demonstration is concluded all radioactive ores need to be accounted for.
- Radioactive ores are chemically toxic
- Dispose of dust-mask and gloves after use.

Using the

- See book getting it to work, physics equipment for high schools.
- Do not remove or dismantle the Americium 241 source.
- The cloud chamber must be returned to the metal container when not in use.

2.3.2 Using and handling X-ray producing equipment

When gas discharge tubes are operated above 5000V (5mm spark) they can inadvertently produce by-product X-rays. An induction coil does not produce X-rays, although warnings on the coil might say otherwise. Gas discharge tubes that are connected to the induction coil produce X-rays.

The following warning below has to be displayed on equipment that produces X-rays.

When setting up a Crookes tube, position the point of a Crookes tube to the wall, so that the wall will absorb any produced X-rays.

When using a gas discharge tube keep people 2 meters away.

X-RAYS MAY RESULT FROM THE OPERATION OF THIS EQUIPMENT

2.4 Storing radiation sources

A group 7 Radioactive DG label has to be displayed on each radioactive storage container.

A list of contents has to be displayed on the outside of each container.

Storing uranium or thorium ore

- Store in a secure location.
- Store these in a ventilated area to prevent the built up of radioactive radon gas.
- Accumulating large volumes of ore is undesirable.
- Stocktake each year and update logbook.

Storing radioactive sources

- Store in a secure location.
- All sources must be stored in a locked, metal container.
- The container must be permanently labelled to indicate that it contains radioactive substances.
- Also the cloud chamber needs to be stored in the locked metal container.
- Stock take each year and update logbook.

2.5 Maintaining radiation sources

The main supplier of sealed radioactive sources to schools is Australian Radioactive Isotopes (ARI), a subdivision from the Australian Nuclear Science and technology Organisation (ANSTO). New sources can be obtained from them and old, faulty, or unwanted sources must be returned to them. They can also check for contamination and source viability.

The Ionising safety radiation officer carries out a routine wipe test of the radioactive sealed sources. This routine check is made every 5 years. A physical check is made every year.

If there are any concerns about the condition of a source after a fire or physical damage, the source should be returned to ARI and replaced.

Before disposing any sealed radioactive source call ARI or ANSTO for instructions

Wipe test procedure for sealed alpha sources:

- Wear disposable gloves.
- Moisten a piece of filter paper with ethanol.
- Wipe the source with the filter paper.
- Wait until the ethanol has evaporated from the filter paper.
- Make sure the Geiger counter can detect alpha particles.
- Measure the radioactivity near the wipe area on the filter paper.
- Update log book.

Wipe test procedure for sealed beta and gamma sources:

- Wear disposable gloves.
- Moisten a piece of filter paper with water.
- Wipe the source with the filter paper.
- Measure the radioactivity near the wipe area on the filter paper.
- Update log book.

2.6.1 Radiation source logbook

- Fill in a Radiation Source Logbook Form for each radioactive source in stock.
- File the filled out forms in the Radiation Source Logbook.
- Issue each source with a serial number.
- Update this form with the stocktake each year.
- Update the form with the wipe-test details every 5 years.
- Update form when the radioactive sources are disposed off.
- File a MSDS of each radioactive Source type in the Logbook.
- Make note of each radioactive source in the chemical register.

2.6.2 Radiation Source Logbook Form

St Euphemia College

Source:	Serial number:
Purchased from:	Purchase date:

Radiation type: <input type="checkbox"/> alpha <input type="checkbox"/> beta <input type="checkbox"/> gamma	Half-life:
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	Accounted for yes / no	Physical condition good / bad	Radiation (counts/min)	Signature IRSO	Wipe test result pass / fail
Stock take 2002					n/a
Wipe test 2003					
Stock take 2003					n/a
Stock take 2004					n/a
Stock take 2005					n/a
Stock take 2006					n/a
Stock take 2007					n/a
Wipe test 2008					
Stock take 2008					n/a
Stock take 2009					n/a
Stock take 2010					n/a
Stock take 2011					n/a
Stock take 2012					n/a
Wipe test 2013					
Stock take 2013					n/a
Stock take 2014					n/a
Stock take 2015					n/a
Stock take 2016					n/a
Stock take 2017					n/a
Wipe test 2018					
Stock take 2018					n/a

Disposal

Reason for disposal:	Method of disposal:
Date:	Signature IRSO