RISK ASSESSMENT IN A LARGE COMPLEX ORGANISATION

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ABSTRACT

At the core of Victoria's OHS regulations is the requirement to undertake risk assessments across a range of hazards.

In 1999, Monash undertook a review of its existing risk assessment processes. The review revealed a varying level of integration of risk management into the University's activities and highlighted a number of the difficulties of implementing a risk assessment program across a large complex organisation.

Based on the findings of the review, a new risk control program has been developed. At the centre of the new program is a five by five risk assessment matrix. Similar matrices are used across the major hazards relevant to a university environment. The COSHH essentials program has been used as the basis for the chemicals matrix. Additional challenges were posed by the need to integrate special hazard groups such as ionising radiation and biosafety into the program.

The new risk control program has proved to be successful and has increased the integration of risk management in the University's activities. The final challenge to ensure successful implementation of the program is to provide an information management system to support the data generated by the program.

1. INTRODUCTION

For over a decade, successive governments in Victoria have drafted and enacted OHS legislation enforcing a legislative framework that is performance-based in style, encompassing risk assessment as the primary regulative requirement. Consequently, at the core of all Victoria's OHS regulations is the requirement for employers, in consultation with employees, to undertake a process of hazard identification, risk assessment and risk control across a range of hazard groups. Codes of practice support the regulations. The codes of practice provide guidance on the risk assessment process, even to the extent of providing example forms and checklists. Although there is a consistent risk assessment methodology across the codes of practice, they generally remain single hazard specific. The legislators have not yet attempted to standardise the forms and process across the codes of practice to promote the concept of a multiple hazard risk assessment program. In response to each regulation Monash University has, over time, developed and implemented compliance strategies incorporating risk assessment, training and appropriate documentation. These strategies have also been correspondingly single hazard focussed.

During the development of a compliance strategy for the new Victorian Hazardous Substances Regulations 1999, Monash undertook a review of all the existing risk assessment processes currently been performed across the University's activities. This review included collecting and examining examples of assessments from the various faculty and non-faculty areas across a range of hazards.

2. THE REVIEW

The Occupational Health, Safety and Environment group (OHSE) of Monash University in preparation for the development of a compliance strategy for the Hazardous Substances Regulations 1999 undertook a critical review of its existing risk assessment processes. The terms of reference for the review was to establish the effectiveness of the existing programs, the level of integration of risk assessment into the University's activities and consistency of use across the faculty and non-faculty areas. The review compared the existing processes against the standard risk assessment protocol of hazard identification, risk assessment and risk control. The risk control phases of the existing processes were reviewed for the inclusion of the hierarchy of control methodology for the selection of control measures.

The conclusions drawn from the review were:

- Risk assessment processes had commenced in the University. The majority of the science and engineering based areas were regularly using a risk assessment process. Many of the non-laboratory based faculties had not commenced regular risk assessments nor had many of the non-faculty support service areas.
- Different risk assessment models were being used across the University. In some cases the risk assessment process had a clear and effective hazard identification phase, but tended to skip the assessment phase and end with controls being specified against each of the hazards identified. In these cases, no risk ranking or prioritisation had been undertaken and long lists of preventative work were established, with the ultimate difficulty of completing all of the listed work. In other cases lengthy checklists or elaborate weighting systems and risk calculations to determine the level of risk of each hazard followed the hazard identification phase. This resulted in effective risk ranking of the hazards, however, only in a few cases had controls been specified against the risks. It appeared as if though the hazard identification and risk assessment phases had taken so long to perform that the groups performing the assessment had run out of energy to complete the full process.
- Many of the Faculty of Science undergraduate and postgraduate laboratory and field trip activities required risk assessments to be performed by the students during their activities.
- There was little evidence of systematic methods to manage the information produced by the assessments. There were no formal methods to ensure the control measures specified were ultimately implemented, nor were there methods to revisit assessments periodically or when the activities changed.
- Often the risk assessments focussed on a single hazard group. For example, an assessment may have been completed for a task highlighting the manual handling risks of the task but it did not included a review of chemical or equipment hazards.

Monash University had also incorporated the risk assessment philosophy beyond health and safety management. The Audit and Risk Group of the University had developed and implemented a risk management program which focussed on the broader risks faced by the University, such as financial risks, risk to the University’s reputation and the risks of failure of infrastructure and IT support systems. At the core of their process was a generic risk assessment matrix (Figure 1) cross-referencing consequence versus likelihood to determine the level of risk.

	Likelihood				
	L1 Highly Likely	L2 Likely	L3 Occasionally	L4 Unlikely	L5 Highly Unlikely
C1 Major injury	Extreme	Extreme	High	High	Medium
C2 Severe	Extreme	High	High	High	Medium

3. THE CHALLENGE

The challenge for the OHSE group was to develop a risk assessment process for use across the University that was: -

a) A "one stop shop" process. Staff and students undertaking a risk assessment should consider all hazards when assessing a task. This is a far more effective and holistic method of performing the process.
b) A process that is quick and easy to use. To ensure the effective integration of the risk assessment process into research, teaching and support service activities, the process could not be time consuming. The process also had to be intuitive. The process had to require little training prior to the staff and students understanding the process and effectively using it. The process needed to be simple without allowing risks to be underestimated. Overestimating was not seen as a significant problem.
c) A process that is effective across a range of activities. The process had to be robust and sensitive enough to be useful in activities associated with scientific research and teaching as well as support activities such as gardening, catering, cleaning and office-based activities.
d) A process that focussed on the final phase, the control of risks. The underlining emphasis must be to control risks and ultimately eliminate injuries and illnesses or to reduce, so far as practicable, the consequence and likelihood of the risks.

4. THE NEW PROGRAM

Based on the findings of the review, a new risk assessment program has been developed by the OHSE group for use across the University.

The fundamental philosophy of requiring the people (staff or students) who work with the hazards to perform the risk assessments continues in the new model. For such a large University, a decentralised program is the only practical and cost effective method of achieving the University's legislative obligations. A significant cultural shift can also be achieved by decentralising the process. Awareness of health and safety issues is lifted throughout the University as more people actively participate in the risk assessment program.

At the centre of the new process is a five by five risk matrix with a consequence and likelihood axis. Similar matrices are used across the 5 major hazard groups relevant to a University environment. These 5 groups are:

- Manual handling and ergonomic hazards
- Equipment and process hazards
- Chemical exposure hazards
- Biological exposure hazards
- Radiation exposure hazards

In all cases, simple hazard identification checklists form the first stage of the process. Each of the identified hazards is then assessed using the consequence versus likelihood matrix to determine the estimated level of risk.

Instead of using one generic linear risk assessment matrix (Appendix - Figure 2) across all of the hazard groups, individual matrices have been developed and are used to increase the sensitivity of the assessments.

5. MANUAL HANDLING HAZARDS

In the manual handling matrix (Appendix - Figure 3) the consequence axis is re-scaled to make the highest consequence equivalent to a major musculo-skeletal injury as opposed to a fatality. The consequence axis is also translated using muscle force and posture descriptors to
allow better and more consistent assessment by staff and students groups. This vertical shift of the manual handling consequence axis does result in the manual handling hazards being ranked higher relative to the other hazard groups, however, this is seen to be appropriate as manual handling injuries represent over 50% of all injuries occurring in the University. In practical terms this will result in the University focussing on manual handling hazards to a greater degree than if they were assessed using a generic matrix which tends to rank manual handling hazards at the lower end of the risk scale. The likelihood axis is also translated into a more relative scale. Frequency and duration scales are used as an indicator of likelihood. The frequency scale has an emphasis on an increasing scale of repetitive muscle force exerted over short periods (seconds to minutes) whilst the duration scale places emphasis on an increasing scale of static muscle load exerted over longer periods (minutes to hours). The assessment groups select the appropriate scale depending on nature of the activity.

6. EQUIPMENT AND PROCESS HAZARDS

The equipment and process hazard group uses a more generic risk assessment matrix **(Appendix - Figure 4)** with the consequence axis ranging from minor injury to fatality. Similarly a more generic likelihood axis is used ranging from highly unlikely to highly likely. In the training the participants are taught a rough likelihood estimator of highly likely is equal to a one to one relationship, likely equals one to ten, occasionally equals one to hundred, unlikely equals one to thousand and highly unlikely equals one to ten thousand. This rough guide in combination with the participants being taught to perform the assessments in groups and to draw on each other's experience does result in appropriate determinations of likelihood.

7. CHEMICAL EXPOSURE HAZARDS

The approach used for the chemical exposure hazard is based on the *COSHH Essentials* ***(1)*** approach.

For chemical exposure hazards the assessment phase differs from the other hazard groups. Firstly it has 2 pre-matrices which link to estimate the likelihood of exposure to a chemical **(Appendix - Figure 5)**. These pre-matrices consider the volatility or dustiness of the chemical, the amount used and the environment in which it is used. The consequence axis of the matrix is translated into an increasing scale of health effects based on the risk phases for the chemicals. The increasing scale of health effects has been adopted directly from the technique of banding chemicals detailed in *COSHH Essentials* **(1).**

Secondly, the resultant risks (extreme to low) are also redistributed in a parabolic relationship **(Appendix - Figure 6)** to improve the quality of the assessments. The parabolic relationship has been created through experience with the model and ensures the risks are not grossly over-estimated.

An additional simplified 3 by 5 matrix has been included for assessment of effects due to skin exposure. The same scale of health effects is used with combining of some of the groups. The likelihood axis has been translated into more appropriate descriptors based on the likelihood of having skin contact with the liquid **(Appendix – Figure 7)**. This matrix conforms with the generic linear risk model.

7. BIOLOGICAL EXPOSURE HAZARDS

The biological exposure hazards have been divided into two groups: microbiological exposure hazards either from directly working with microorganisms or from working with human blood or bodily fluids; and biological exposure hazards when working with animals or insects. This was necessary as the risk profile is different for each group. For each hazard group the assessment phase includes a translation of the consequence axis into relevant descriptors to aid in the estimation of consequence. For both hazard groups the likelihood axis remains generic.

For the animal/insects exposure hazard group the resultants risks are distributed in a parabolic relationship (Appendix - Figure 8), whilst the resultant risks for the microbiological exposure hazard group have been redistributed in an exponential relationship (Appendix - Figure 9).

8. IONISING RADIATION EXPOSURE HAZARDS

The ionising radiation exposure hazards have been divided into two main groups: contamination exposure hazard (internal hazard); and external exposure hazard. It was necessary to split these groups as both the consequences and the measures of likelihood for each, is distinctly different.

There are some specific ionising radiation hazards which are excluded from these assessments. The first is neutron sources as the number of these type of source in use at the University is minimal. The second is apparatus that produces beams of ionising radiation, either x-ray apparatus or sealed source apparatus. This second group has been excluded as this type of equipment needs individual assessment.

For the contamination exposure hazard group the assessment phase is similar to the chemical exposure hazards in that 2 pre matrices are used **(Appendix - Figure 10)**. The assessment phase is modelled on the grading of radioisotope laboratories as described in AS2243.4 ***(2)***. The first pre-matrix uses the radiotoxicity group and the total activity used in a single operation to determine the hazard potential which is used for the consequence axis. The second pre-matrix is based on the modifying factors for procedures as detailed in AS2243.4 ***(2)*** to give an estimate of the likelihood of contamination based on the complexity of the procedure. The resultant risks (extreme to very low) are also redistributed in a parabolic relationship to improve the quality of the assessments. The parabolic relationship has been created through experience with the model and ensures the risks are not grossly over-estimated.

For the external exposure hazard the consequence axis is translated into the dose rate emitted by the ionising radiation source. The likelihood axis is translated into the duration of exposure in a one week period. One week was chosen so that both acute and chronic health outcomes could be managed by the one matrix. A unique feature of this matrix is the introduction of an additional risk descriptor of "unacceptable". In addition the consequence scale was stretched to seven categories to allow appropriate sensitivity to be achieved for potential typical usage situations which can range from long duration exposure to low dose rate sources in the biomedical area to short duration exposure to high dose sources in the physics area. The resultant risks (unacceptable to low) are also redistributed in a parabolic relationship to reflect the scientific data available regarding health effects versus dose **(Appendix – Figure 11)**.

9. HIERARCHY OF CONTROL

Across all of the hazard groups the final phase of the process, the control phase, remains consistent and relatively generic. The concept of the hierarchy of control is utilised in all cases with specific examples included to illustrate the practical application of the hierarchy. Although relatively generic, the control phase of the process is promoted as the most important phase. This has been reflected in the titling of the entire program by calling it the Monash University Risk Control Program.

HIERARCHY OF CONTROL

- Elimination
- Substitution
- Isolation
- Engineering Controls
- Administrative Controls
- Personal Protective Equipment (PPE)

10. TRAINING

A training course has been developed for the new risk control program. The course is conducted by the OHSE consultants and consists of one hour of risk management theory and explanation of the process and corresponding forms. The participants are then asked to return to their work area and trial the process on real work activities and return and present their results.

The feedback from the course evaluation sheets has been positive with the practical component of the course seen as most useful. The feedback is also indicating that the process is easy to understand and quick and efficient to use. The speed of understanding the process and using it in the workplace will hopefully increase the uptake of the program and consistency across the University.

11. THE FINAL CHALLENGE

As an increasing number of areas are using the program the final challenge, for such a large organisation as Monash University, is the effective management of the information generated from the program. The need for a robust information management system is becoming increasing important. The system is required to demonstrate compliance with the regulations during workplace audits and investigations by the WorkSafe Victoria. The information systems will also provide the management tool for review and updating of assessments and the follow up of the implementation of proposed control measures.

Monash University is initially investigating the use of simple Access databases for storing the assessment information at the local level. Periodically, the OHSE group will collect the data from across the University and establish an ongoing central database. At both the local and University level the information system must deliver the capacity for the assessments to be shared. Assessments for similar activities and tasks performed across the University must be able to be shared and/or possibly modified through the system. The sharing of assessments will reduce duplication and increase the speed of the assessment program by allowing the use of generic assessments. The system should provide data recording and retention functionality, multiple user read and write access and standard and adhoc management reports.

OHSE considers the design and implementation of a responsive information management system as the final phase to the successful integration of the risk control program. The ultimate goal is to have a Web based database system that is accessible to all Monash staff. This system will require significant development and investment prior to implementation.

12. CONCLUSION

For over a decade Monash University has been developing and implementing risk assessment programs to ensure legislative compliance and to control workplace hazards. The programs have been rolled out to faculty and non-faculty areas for use by staff and students. A varying level of effectiveness and integration has been achieved across the University. The review of past programs highlighted a number of the difficulties of implementing a risk assessment program across a large complex university environment.

The new risk control program incorporates a common methodology across the major hazard groups relevant to a university environment. The new program promotes a multi-hazard assessment of tasks and places the main emphasis on the control phase of the process. The new risk control program has proved to be successful and has increased the integration of risk management to the University's activities. An increasing number of the research, teaching and support service areas are now using the program.

The final challenge to ensure successful implementation of the program is to provide an information management system to support the data generated by the program. The system should not only provide an ability to record, retain and share the assessments across the university, it must also provide the management reports to drive the ongoing University commitment to this essential legislative requirement.

13. REFERENCES

(1) COSHH Essentials – Easy Steps To Control Chemicals, Health and Safety Executives, 1999

(2) Australian Standard 2243.4 – 1998 *Safety in Laboratories Part 4: Ionizing Radiations*

Appendix

Figure 2. Linear Distribution of Risk Levels

	Likelihood				
Consequence	**L1. Highly Likely**	**L2. Likely**	**L3. Occasionally**	**L4. Unlikely**	**L5 Highly Unlikely**
C1 Major	Extreme	Extreme	High	High	High
C2 Severe	Extreme	High	High	High	Medium
C3 Moderate	High	High	High	Medium	Medium
C4 Minor	High	Medium	Medium	Medium	Low
C5 Irritant	Medium	Medium	Medium	Low	Low

Figure 3. Manual handling risk assessment matrix

		Likelihood				
		Duration				
		D1 Long periods all day = day	**D2 Long periods the majority of the day > ½ day**	**D3 Long periods some of the day < ½ day**	**D4 Short periods frequently <1hr**	**D5 Short periods infrequently < 1hr**
		Frequency				
	Consequence	**F1 > than 30/min**	**F2 > than 5/min**	**F3 1 to 5 per min**	**F4 <than 1/min**	**F5 Occasionally**
Near maximum effort - poor posture	**M1. Major injury**	Extreme	Extreme	High	High	Medium
Considerable effort - poor posture	**M2. Severe injury**	Extreme	High	High	High	Medium
Sustained moderate effort - poor posture Max/considerable effort - good posture	**M3. Moderate injury**	High	High	High	Medium	Medium
Sustained small effort - poor posture Moderate effort - good posture	**M4. Minor injury**	High	Medium	Medium	Medium	Low
Small effort – good posture	**M5. Negligible injury**	Medium	Medium	Medium	Low	Low

Figure 4. Equipment and process risk assessment matrix

		Likelihood of injury after current controls are considered				
	Consequence	**L1. Highly Likely**	**L2. Likely**	**L3. Occasionally**	**L4. Unlikely**	**L5 Highly Unlikely**
Injury resulting in death or permanent incapacity	**C1 Major Injury**	Extreme	Extreme	High	High	High
Injury requiring extensive medical treatment and/or hospitalization	**C2 Severe Injury**	Extreme	High	High	High	Medium
Injury requiring medical treatment by health service, LMO etc.	**C3 Moderate Injury**	High	High	Medium	Medium	Medium
Injury requiring first aid treatment	**C4 Minor Injury**	High	Medium	Medium	Medium	Low
Short term discomfort	**C5 Negligible Injury**	Medium	Medium	Medium	Low	Low

Figure 5. Chemical exposure risk assessment matrix

	How volatile or dusty is the chemical during use?			
Amount to be used	High Dust or Aerosol **High Volatility**	**Medium Volatility**	**Medium Dust or Aerosol**	**Low Dust or Aerosol Low Volatility**
High (tonne or m³)	Very High	High	High	Moderate
Medium (kg or litre)	High	High	Moderate	Moderate
Small (g or ml)	Moderate	Moderate	Low	Low
Very Small (mg or µl)	Low	Low	Negligible	Negligible
Micro (µg or < µl)	Low	Negligible	Negligible	Negligible

	Inhalation Potential				
Control	**Very High**	**High**	**Moderate**	**Low**	**Negligible**
Room Ventilation - general dilution	Highly Likely	Highly Likely	Likely	Unlikely	Unlikely
Open air – wind dispersion	Highly Likely	Likely	Occasionally	Occasionally	Unlikely
Appropriate Respirator	Likely	Occasionally	Occasionally	Unlikely	Highly Unlikely
Local exhaust ventilation	Occasionally	Occasionally	Unlikely	Unlikely	Highly Unlikely
Fume cupboard	Unlikely	Highly Unlikely	Highly Unlikely	Highly Unlikely	Highly Unlikely

	Likelihood of inhalation after current controls are considered					
	Health Effect	**L1. Highly Likely**	**L2. Likely**	**L3. Occasionally**	**L4. Unlikely**	**L5 Highly Unlikely**
Hazard Group E	**C1 Major**	Extreme	Extreme	High	Medium	Low
Hazard Group D	**C2 Severe**	Extreme	High	Medium	Medium	Low
Hazard Group C	**C3 Moderate**	High	Medium	Low	Low	Low
Hazard Group B	**C4 Minor**	Medium	Medium	Low	Low	Low
Hazard Group A	**C5 Irritant**	Medium	Medium	Low	Low	Low

Figure 6. Parabolic distribution of risk levels

	Likelihood				
Health Effect	**L1. Highly Likely**	**L2. Likely**	**L3. Occasionally**	**L4. Unlikely**	**L5 Highly Unlikely**
C1 Major	Extreme	Extreme	High	Medium	Low
C2 Severe	Extreme	High	Medium	Medium	Low
C3 Moderate	High	Medium	Low	Low	Low
C4 Minor	Medium	Medium	Low	Low	Low
C5 Irritant	Medium	Medium	Low	Low	Low

Figure 7. Risk assessment matrix for skin exposure to chemicals

		Likelihood of injury after current controls are considered				
		Will have or very likely to have direct contact with the chemical.	**Likely to have chemical contact due to splashes.**	**May have chemical contact due to splashes occasionally.**	**Unlikely to have contact with chemical**	**Highly unlikely to have any contact with liquid**
	Health Effect	**L1. Highly Likely**	**L2. Likely**	**L3. Occasionally**	**L4. Unlikely**	**L5 Highly Unlikely**
Hazard Groups D or E	**C1 Major**	Extreme	Extreme	High	Medium	Low
Hazard Group C	**C2 Severe**	Extreme	High	Medium	Low	Low
Hazard Groups A or B	**C3 Moderate**	High	Medium	Low	Low	Low

Figure 8. Biological Hazards - Animals or Insects Exposure Hazard Group

		Likelihood				
		L1 Highly Likely	**L2 Likely**	**L3 Occasional ly**	**L4 Unlikely**	**L5 Highly Unlikely**
Death or an injury, infection or allergy that is likely to significantly shorten life span or lead to total incapacitation	***C1. Major***	Extreme	Extreme	Extreme	High	Medium
Severe injury, infection or allergy that permanently significantly alters lifestyle.	***C2. Severe***	Extreme	High	High	Medium	Medium
Injury or infection that results in medical treatment; Allergy that does not significantly affect lifestyle.	***C3. Moderate***	High	High	Medium	Medium	Medium
First aid treatment, minor injury, minor infection.	***C4. Minor***	High	Medium	Medium	Low	Low
Bruising or short term discomfort.	***C5. Negligible***	Medium	Medium	Low	Low	Low

Figure 9. Biological Hazards – Microbiological Exposure Hazard Group

		Likelihood				
		L1 Highly Likely	**L2 Likely**	**L3 Occasionally**	**L4 Unlikely**	**L5 Highly Unlikely**
Death or an infection that is likely to significantly shorten life span or lead to total incapacitation	***C1. Major***	Extreme	Extreme	Extreme	High	Medium
Severe infection or disease that has permanent health implications that significantly alter lifestyle.	***C2. Severe***	Extreme	High	High	Medium	Medium
Infection or disease that results in medical treatment but does not have permanent health implications.	***C3. Moderate***	High	High	Medium	Medium	Low
Minor infection.	***C4. Minor***	Medium	Medium	Low	Low	Low
Negligible infection.	***C5. Negligible***	Low	Low	Low	Low	Low

Figure 10. Ionising Radiation – Contamination Hazards (Internal Exposure Risk)

Table 1: Determine the Hazard Potential

	Total Activity Used/Handled In A Single Operation				
Radioisotope Radiotoxicity Group^^	**> 20,000 MBq** (> 540 mCi)	**≥ 2000 MBq to ≤ 20,000 MBq** (≥ 54 mCi to < 540 mCi)	**≥ 20 MBq to < 2000 MBq** (≥ 0.54 mCi to < 54 mCi)	**≥ 0.2 MBq to < 20 MBq** (5.4 µCi to < 0.54 mCi)	**< 0.2 MBq** (< 5.4 µCi)
1 (Am-241)	Very High	Very High	High	Medium	Low
2 (I-125, Co-57, Co-60, Ra-226)	Very High	High	Medium	Low	Low
3a (P-32)	High (Use finger TLD)	Medium	Low	Low	Low
3b (Co-57, Fe-55, Na-22, P-33, S-35)	High (Use finger TLD)	Medium	Low	Low	Very Low
4 (H-3, C-14, Cr-51, Tc-99m)	High	Medium	Low	Very Low	Very Low

^^ Consult AS2243.4 Table C3 for a more comprehensive listing. If your radioisotope is not listed in this standard contact the RPO for advice.

Table 2: Determine the Likelihood of Contamination

Procedure	Likelihood of Contamination	Examples
Simple storage	Highly Unlikely	Material stored in proper storage
Very simple wet operations	Unlikely	Using aliquots of stock solutions
Normal chemical operations	Occasionally	Analysis of simple chemical preparations.
Complex wet operations	Occasionally	Multiple operations. Operations with complex glass apparatus. Northern blots.
Work with volatile radioactive compounds	Likely	Using ^{14}C-Toluene. Performing an iodination.
Simple dry operations work	Likely	Manipulation of powders
Complex dry operations	Highly Likely	Where powders are likely to become airborne.
Work with radioactive gases	Highly Likely	

Table 3. Determine the Risk of Internal Exposure

	Likelihood of Contamination				
Hazard Potential	**Highly Likely**	**Likely**	**Occasionally**	**Unlikely**	**Highly Unlikely**
Very High	Extreme	Extreme	Extreme	High	Medium
High	Extreme	Extreme	High	Medium	Medium
Medium	Extreme	High	Medium	Low	Low
Low	High	Medium	Low	Low	Low
Very Low	Medium	Medium	Low	Very Low	Very Low

Figure 11. Ionising Radiation – External Exposure Hazard

	Duration of exposure over a one week period (7 days)				
Dose Rate*	**≥ 16 hrs & ≤ 40 hrs**	**≥ 8 hrs & < 16 hrs**	**≥ 1 hrs & < 8 hrs**	**≥ 5 min & < 1 hrs**	**< 5 min**
> 500 μSv/h to ≤ 1500 μSv/h+	Unacceptable	Unacceptable	Unacceptable	Extreme/ Unacceptable	High
> 50 μSv/h to ≤ 500 μSv/h	Unacceptable	Unacceptable	Unacceptable	Extreme	Medium
>25 μSv/h to ≤ 50 μSv/h	Unacceptable	Extreme	High	Medium	Low
>10 μSv/h to ≤ 25 μSv/h	Extreme	High	Medium	Low	Low
> 5 μSv/h to ≤ 10 μSv/h	High	High	Medium	Low	Low
> 1 μSv/h to ≤ 5 μSv/h	High	Medium	Low	Low	Low
≤ 1 μSv/h	Low	Low	Low	Low	Low

* Equivalent dose rate is typically used for this risk assessment process.
+ Dose rates above 1500 μSv/h present an unacceptable risk regardless of the exposure time.