TITLE

Managing human risk during an oiled wildlife response

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ABSTRACT

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Human risks during an oiled wildlife response (OWR) can be divided principally amongst physical, chemical and biological hazards. This paper identifies the risks associated with these hazards to oiled wildlife responders, other responders and the general public. Hazards and risks are managed by specific risk management procedures. These commonly include identifying individual steps in the activity, identifying associated hazards and risks, quantifying the risks and then applying treatments and controls to eliminate or reduce risk exposure to an acceptable level. For treatments and controls to manage risks effectively these are applied as a part of pre-incident contingency planning, during incidents and post incidents. Treatments and controls identified in the paper include responder training, registration of personnel, incident planning, use of safety data sheet recommendations, personal protection equipment, minimising exposure times, applying call in procedures and communication systems, making available emergency supportive equipment, providing food and fluids, vaccinations for responders, applying dangerous wildlife risk reduction practices,

safe manual handling and transportation practices, safe motor driving and vessel handling practices, fatigue management practices, working in pairs as a minimum requirement, safety precautions when working near water and at industrial sites, equipment maintenance and safe use, safe practices around sharps, compliant waste disposal practices, reporting mechanisms for near misses and injuries and the systems to prevent their re-occurrence. Mental health hazards during incidents and post incident phases are also a key feature to manage and are often overlooked. Risks associated with mental health include stress and trauma. Supportive treatments and controls include response planning, professional counselling and medical support. The information to develop this paper was taken from a range of international responses.

INTRODUCTION

The safety of response personnel and the public is of paramount importance and the primary objective at any incident. This paper guides personnel on the mechanisms for managing workplace health and safety (WH&S) specific to oiled wildlife response (OWR). The information used to develop this paper was taken from first hand experiences and lessons learnt during OWRs in Australia, Timor Sea, New Zealand, Thailand, Brazil, South Africa, Spain and Alaska.

DISCUSSION

Background

During maritime environmental emergencies where contaminants are released into the environment wildlife may be threatened or directly impacted. Under these circumstances OWR personnel are commonly mobilised into the field to identify wildlife at risk, provide protection measures for wildlife or to respond to impacted wildlife. For wildlife protection

measures devices may be used to keep wildlife away from any threats, they may be transported to alternate clean environments or may be taken into captive care during the response phase. Where wildlife are impacted animals are generally taken into care and rehabilitated using best available practices.

OWR personnel either in the field or in care or rehabilitation facilities can be exposed to a range of hazards and risks. Broadly these can be categorised into physical, chemical and biological hazards.

Physical hazards may include the use of untrained personnel, transportation processes, general fieldwork, exposure to dangerous animals independent of the response, manual handling, vehicle driving, vessel operation, working near roads and water, construction activities, equipment use, exposure to sharps, working with animals and fatigue.

Chemical hazards may include the pollutants that responders are exposed to as a part of the incident, operational chemicals applied during the response to respond to the pollutant and chemicals in use at the wildlife care or rehabilitation centre.

Biological hazards include those that naturally occur in the environment (e.g. tetanus, melioidosis and insect spread diseases etc.) and zoonotic diseases from working with wildlife.

Managing Risk

Hazards and risks in the workplace, including during incidents, are managed by specific risk management processes. These are supported by a range of systems available and include processes such as Job Hazard Analysis (JHA), Job Safety Analysis (JSA) and Work Safe Practices (WSP) of which there are many others. These and other common systems used for risk management all follow a standard set of principles (Table 1).

Table 1 The broad risk assessment principles applied to risk management

1. Identify individual steps within the activity
2. Identify possible hazards for each step
3. Asses the risks associated with those hazards and quantify the risk numerically
4. Develop treatments and control measures to eliminate the hazards or minimize the associated risks
5. Apply treatment and control measures
6. Monitor and review the effectiveness of each treatment and control measure
7. Monitor for hazard or risk changes

Treatments and control mechanisms to manage risk can be applied during a number of incident stages including the pre-incident, incident and post incident phases (Table 2). Certainly pre-incident opportunities for applying treatments and controls maximises the opportunity to strengthen risk management and should be applied where ever possible.

Table 2 Treatment and control application processes to manage risk during the different incident phases

Pre- incident Phase

1. Contingency planning specific to risk management
2. Pre-incident training (risk assessment processes, general safety, personal protective equipment (PPE) use & wildlife activities)
3. Collation of Safety Data Sheets for operational chemicals and high risk pollutants
4. Vaccinations for responders
5. Development of generic risk assessments to support incidents
6. Development of mechanisms for reporting near misses and safety incidents with follow up actions

7. Maintaining PPE stores that can be mobilised with response personnel at the time of an incident

Incident Phase

1. Register all personnel including data collection on skills, experience, medical information and emergency contacts
2. Screen personnel to specific tasks based on individual skill and experience assessments and medical data
3. Planning during the incident including the use of Incident Action Plan processes that provide operational considerations and approvals across all incident activities
4. Applying Safety Data Sheet recommendations for chemicals at risk
5. Monitoring and modelling of contaminants including volatiles
6. Media releases to the general public specific to safety matters
7. Preparation of safety notifications for all responders
8. Map zonation of the incident site for risk categories (e.g. hot, warm and cold risk zones)
9. Provide a low risk work environment for all risk zones
10. Provide general incident and individual site inductions
11. Provide tool box meetings immediately prior to each activity on a daily basis with all personnel directly involved
12. Instigate personnel management and tracking systems for managing fatigue and locational awareness of teams
13. Provide adequate fluids and food to responders
14. Apply strict hygiene controls (chemical and biological considerations)
15. The provision of PPE based on risks including training on use
16. Apply systems for reporting near misses and safety incidents with follow up actions
17. Having available medical support on standby for acute and chronic care

Post Incident Phase

1. Provide access to medical support for possible chronic health matters

Risk Management specific to OWR

As a part of the pre-incident phase there is significant value in preparing a generic risk management model to expedite the process during incidents. Table 3 provides an example of pre-identified steps, hazards, risks and supportive treatments and controls specific to OWR that has been applied to oil spill events in Queensland, Australia (e.g. Cape Upstart Spill 2016). This is not an exhaustive list but can be used as an initial guide or template for preparing a risk management processes during the incident response planning stage for a range of spill events.

Table 3 A model of information that can be used to facilitate risk management processes for OWR

Step: Use of untrained or inexperienced personnel

Hazard: Personnel are not aware of OWR risks or treatments or controls to manage risk

Risk: Physical injury, Chemical injury, Toxicity affects, Disease processes, Death

Treatments & Controls:

- All personnel appropriately inducted and trained specific to the risks and task
- All personnel to complete registration paperwork including skills, experience, medical information and emergency contacts
- All personnel to be allocated tasks based on individual skills, experience and medical assessments

Step: Exposure to chemicals

Hazard: Chemical contamination

Risk: Chemical burns, Toxicity effects

Treatments & Controls:

- For activities in the hot and warm zones seek operational approvals through the Incident Action Plan process factoring in safety considerations and other concurrent operational activities (e.g. application of chemical dispersants to the pollutant)
- Refer to Safety Data Sheets and apply recommendations including PPE for chemicals at risk
- Minimise exposure times generally to contaminants
- Provide decontamination facilities for personnel across the different risk zones

Step: Travel & General Field Work

Hazard: Environmental factors and features

Risk: Physical injury

Treatments & Controls:

- Ensure personnel adhere to strict "call in times"
- Have in place emergency systems to activate for "call in" failures
- Run regular checks on "call in" communication equipment and systems
- Ensure minimum of 2 persons are involved in each field activity

Step: Remote Area Operations

Hazards: Isolation, Extended time frames to provide assistance during emergencies

Risk: Physical injury, Death

Treatments & Controls:

- The provision of at least 2 forms of communication with at least 1 providing voice to voice capability (e.g. mobile/cellular phone; VHF & UHF Radio; Satellite Phone)
- Personnel must be trained/experienced in the use of available communication equipment
- Develop a communication plan prior to tasking including formalised "call in" procedures
- Provide direct access to appropriate safety/emergency support equipment (e.g. adequate volumes of water, shelter equipment, food & remote area first aid kits etc.)

Step: Working outdoors

Hazard: Solar Radiation (Extreme high temperatures, UV exposure & heat radiation)

Risk: Sunburn, Skin Cancer, Heat stress, Dehydration, Fatigue

Treatments & Controls:

- Wear broad brimmed hat, apply sunscreen (SPF 30+) regularly, wear suitable clothing (long sleeve shirts and long pants), safety glasses / safety sun glasses (with UV protection)
- Utilise shade where possible
- Plan work during cooler parts of day where feasible
- Drink water routinely in line with climatic conditions and recommendations
- Take regular rest breaks

Step: Working outdoors

Hazard: Cold, Wet (extreme temperatures and climatic conditions)

Risk: Hypothermia

Treatments & Controls:

- Wear appropriate clothing to suit expected climatic conditions and risks (e.g. wet weather apparel, thermals, immersion suits etc.)

Step: General field activities

Hazard: Naturally occurring diseases

Risk: Disease processes, Death

Treatments & Controls:

- Current Tetanus vaccination
- Take precautions to prevent disease inoculations from insect vectors (cover skin with insect resistant clothing, use personal insect repellents)
- Cover adequately all skin breaks to prevent infections
- Maintain strict hygiene measures
- Wear appropriate PPE based on disease risk assessments at the time of incident

Step: Working at construction and industrial sites

Hazard: Flammable products; Crush and pinch sources; Heavy equipment and machinery activity; Exposure to hazardous materials; Risk of falling into open voids, dams or the ocean; Respiratory or eye irritation from particulates and inhalation of chemicals; Skin irritation from chemicals and materials

Risk: Physical injury, Burns, Chemical impacts, Death

Treatments & Controls:

- Restrict access of high risk individuals using medical assessment data (e.g. asthmatics, immunosuppressed etc.)
- Refer to Safety Data Sheets and apply recommendations including PPE

- Undertake site inductions prior to entering site
- Use recommended site supplied PPE where available
- Where site management is in place personnel to be under their control and direction at all times
- Conform to any legislative workplace requirements where directed (e.g. construction site certification)

Step: Exposure to dangerous animals

Hazard: Crocodiles, Marine Stingers, Snakes, Sharks

Risk: Bites, Poisoning, Death

Treatments & Controls:

Crocodiles

- Be aware, crocodiles may be present
- Apply crocodile risk reduction principles and assessment systems
    - Complete Crocodile Awareness training
    - Personnel must be aware of the surroundings when working in crocodile habitats and maintain vigilance at all times
    - Ensure that at least one team member watches the waterway or crocodile habitat at all times to monitor for crocodiles
    - Personnel to avoid operating with their back to the watercourse or marshland
    - Personnel are not to access within 5 meters of a watercourse or marshland that are known to be inhabited by crocodiles and must ensure that a visual risk assessment be performed before undertaking activities in these environments
    - Personnel must withdraw from the area to a safe place or higher ground if a

crocodile is sighted or suspected

Marine Stingers

- Wear stinger suits (or equivalent), protective boots etc. so no skin is exposed if entering water
- Be aware that stingers washed up on the shoreline may still sting

Snakes

- Avoid high grass or snake habitat areas
- Wear heavy long pants or specialised snake proof gaiters and boots in the field

Sharks

- Avoid wading into marine and estuarine waters that are murky and during dusk, dawn and night times

Step: Loading and unloading of equipment

Hazard: Manual handling

Risk: Physical injury

Treatments & Controls:

- Vary handling tasks to avoid repetition
- Check weights of objects before lifting
- Tag heavy objects
- Work in partnership for heavy loads or use lifting equipment
- Decide on best position, clear a path and face direction of movement before moving load
- Ensure sufficient space to lift load
- Ensure no obstructions in path of movement
- Ensure the load is carried as close to body as possible

- Ensure when lifting loads use straight back utilising leg muscles
- Apply above methods for placing load to its destination

Step: Transporting equipment

Hazard: Falling objects

Risk: Physical injury, Death

Treatments & Controls:

- Check all loads are correctly secured
- Check load weights do not exceed vehicle safety capacity
- Do not walk, stand or operate under loads

Step: Motor vehicle driving

Hazard: Collision, Fatigue, Vehicle failure, Driving conditions, Other road user

Risk: Physical injury, Permanent injuries, Death

Treatments & Controls:

- Ensure vehicle is fit for purpose
- Ensure driver is licensed for the class of vehicle
- Driver is to familiarise with operation of vehicle before driving
- Check vehicle before driving
- Take regular rest breaks
- Plan and study route beforehand to consider any hazards including road and weather conditions
- Advise supervisor of your intended route
- Be-aware of the emergency notification procedures in place

- For long trips plan for adequate rest breaks and have 2 drivers to share drive
- Drivers must be fit for work
- Drivers must be experienced for conditions and vehicle type including towing of trailer where applicable
- For travel in off road conditions drivers must be trained and experienced in driving these conditions (e.g. 4WD Beach driving etc.)
- Reduce vehicle speed when loaded or towing a trailer
- Check validity and currency of drivers licence
- Obey all road rules
- All occupants to wear seat belts
- Drive at the speed appropriate to the road condition and loads
- Reduce risk by avoiding or minimising alcohol consumption prior to drive
- Take into account any medication that may affect the ability or eligibility to drive
- Understand signs of fatigue
- Have sufficient sleep before driving and do not drive when feeling tired
- Take 15minutes rest break with exercise after every 2 hours of driving as a minimum
- Plan only to drive during normal waking hours
- Reduce the risk by not using mobile/cellular phones, iPad or similar when driving
- Have the non-driving passenger (2nd driver) manage any incoming calls or messages or pull over when safe
- During storms when lightening is overhead or close park vehicle and wait till the weather passes
- Do not drive through flooded or fast moving waters
- Do not eat or drink when driving

- Pre-set music/radio, climate control, seat belts and mirrors before driving
- Secure any loose objects within vehicle
- Pull over to adjust equipment, check maps etc.

Step: Vessel operation

Hazard: Fatigue, Vessel failure, Adverse weather, Dangerous wildlife, Person overboard

Risk: Physical injury, Permanent injury, Bites, Drowning, Death

Treatments & Controls:

- Ensure vessel is fit for purpose
- Ensure vessel checks are undertaken and all safety equipment is available and operational
- Ensure adequate communications systems in place
- Ensure adequate fuel and water is available
- Do not overload vessel and ensure vessel is loaded to meet stability requirements
- Provide vessel inductions for all personnel
- All personnel must be competent swimmers and sufficient number on board must have current first aid including Cardiopulmonary Resuscitation (CPR)
- Vessel master must be suitably qualified and experienced
- Vessels master to be supported by competent crew member/s
- Vessel operations must be limited to licenced area and hours of operation and within capability of vessel considering weather conditions and activity
- Perform visual inspections for hazards before performing vessel operations
- Apply safety requirements for launching vessel
- Factor in crocodile and shark attack considerations when launching and working in shallow waters

- Implement actions to minimise crush injuries, personnel falling overboard and general injuries
- Take regular breaks
- Maintain regular weather checks
- Abide by all maritime legislative requirements
- All personnel to wear personal flotation devices and suitable PPE specific to the climatic conditions
- Comply to fatigue management principles

Step: Working near roads

Hazard: Mechanical, Moving objects

Risk: Physical injury, Permanent injury, Death

Treatments & Controls:

- When parking vehicle assess roadside risks before pulling over
- Park the vehicle to provide maximum protection to personnel from other vehicles
- Maintain flashing lights (safety & hazard) when parking and whilst parked
- Two persons to be present at all times with one acting as a spotter for the other
- Hi-vis clothing must be worn at all times

Step: Working near water

Hazard: Excessive flooding, Tidal/Ocean and Aquatic hazards

Risk: Physical injury, Permanent injury, Dangerous wildlife, Drowning, Death

Treatments & Controls:

- Undertake visual assessment for hazards before approaching or entering water body

- All personnel must be competent swimmers
- Sufficient number of personnel must have current first aid and CPR
- Show caution and care when entering water bodies
- Never jump or dive into water
- Wear dive boots, sea boots or consider wearing waders if safe
- Be aware of high water velocities, slippery or irregular stream beds, whirlpools, floating and submerged debris, deep water, cold water and dangerous wildlife

Step: Construction activities

Hazard: Hand tool operation, Hot Work (Grinding, welding, thermal, cutting brazing), Power tool operation (Noise, electrical, vibration, contact with others)

Risk: Physical injury, Permanent injury, Heat Burns, Electrocution, Death

Treatments & Controls:

- Competent people only to use tools and undertake construction activities
- Tools to be used for intended purpose only
- Wear minimum PPE including steel capped footwear, long sleeved shirts and long pants and have available hand, head, eye and ear protection
- Wear additional PPE based on manufacturers recommendations and risk assessments specific to tools and activity
- Tools to be maintained in line with manufacturers recommendations
- All electrical tools to be test tagged and current in line with WHS requirements
- Defective tools are to be tagged and removed from service
- Flash arrestors must be fitted to all oxy-fuel welding equipment
- Select equipment with noise suppression devices where possible

- Rotate workers for repetitive tasks regularly
- Isolate noise risk sources from others
- Create safe work zones
- Restrict general pedestrian movement through the construction zone
- Where there are risks to others incorporate a spotter to the activity

Step: Equipment use generally

Hazard: Injuries

Risk: Physical injury, Permanent injury, Electrocution, Death

Treatments & Controls:

- Comply with all manufacture recommendations for equipment use and maintenance
- All electrical equipment to be test tagged and current in line with WHS requirements
- Defective equipment is to be tagged and removed from service
- Operator of equipment must be appropriately licensed or competent
- Operate only on stable ground
- Wear minimum PPE including steel capped footwear and make available hand, head, eye and ear protection
- Wear additional PPE based on manufacturers recommendations and risk assessments specific to tools and activity
- Where there are risks to others incorporate a spotter to the activity

Step: Exposure to sharps

Hazard: Cuts and Stab wounds

Risk: Physical injuries, Disease processes

Treatments & Controls:

- Provide sharps specific induction training
- Make use of sharps containers apply appropriate waste disposal practices
- Supervise high risk sharp areas
- Have available first aid care to support sharps injuries

Step: Working with animals generally

Hazard: Cuts, Scratches, Pecks, Bruising, Zoonotic diseases

Risk: Physical injuries, Disease processes

Treatments & Controls:

- Provide animal handling training specific to species likely to be encountered
- Apply close supervision of activities by competent staff
- Handle animals correctly in line with best available practices
- Wear appropriate PPE for animal handling (species specific) and disease protection
- Dispose of animal carcasses as directed by waste management guidelines
- Apply hygiene standards appropriate to disease risk

Step: Reporting of all near misses to supervisor

Hazard: Actual injuries

Risk: Physical injuries, Permanent injuries, Disease processes, Chemical effects, Death

Treatments & Controls:

- Personnel to report all near misses to supervisor as soon as practical
- Supervisor to apply immediate actions to minimise the incident recurring and report to Operations officer

Step: Reporting all injuries to supervisor

Hazard: Repetitive injuries occur from unsafe practices

Risk: Physical injuries, Permanent injuries, Disease processes, Chemical effects, Death

Treatments & Controls:

- Having readily available medical support on standby for acute care
- Personnel to report injuries to supervisor as soon as practical
- Supervisor to apply immediate actions to minimise incident recurring and report to Operations officer

Step: Managing working hours and rest breaks

Hazard: Fatigue

Risk: Physical injuries, Permanent injuries, Disease processes, Chemical effects, Death

Treatments & Controls:

- All personnel will endeavour to work no more than a 10 hour day unless approved by their supervisor
- Working a 14 hour day is the maximum permissible in exceptional circumstances
- 10 hour breaks must be observed after each shift ends
- Personnel are not to work longer than 10 days in total without having a minimum full day break and ideally two days
- In situations when personnel are not likely to comply with these requirements a specific risk assessment process must be applied to minimise the risk to an acceptable level
- Staff are to use their time away from work in a reasonable manner in order to rest and recuperate

Chronic Health Issues

Mental health hazards during and post incident is certainly a key element to consider for risk management especially for protracted or large scale OWR events. To date this has been addressed as a part of pre-incident contingency planning and planning during the incident to manage the risk in the first instance using standard fatigue management practices and then to have in place supportive mechanisms that can be applied where circumstances require (including post incident). Risks for mental health include stress and mental trauma with supportive mechanisms including professional counselling and medical support. The issue with mental health hazards for OWR is that the trauma of working with large numbers of sick and injured animals and being exposed to animals dying for some people can be overwhelming and difficult to apply effective treatment and control measures. Mental health specific to OWR is an emerging topic and one that requires further investigation by qualified health professionals for practices on how to better manage.

CONCLUSION

Risk management is a standard for protecting the public and responder safety in all workplaces and environments associated with incidents. The processes described in this document identify physical, chemical, biological and mental health hazards and includes treatments and controls to eliminate or manage their associated risks for OWR. The information in this paper has been drawn from a range of OWR incidents globally demonstrating what has been actually applied during real applications reinforcing the practicality and effectiveness to the solutions listed.