APPENDIX B: OIL SPILL RESPONSE TECHNIQUES

This appendix provides supplemental information to the SACP on response strategies for oil spills that may be appropriate for a variety of locations within the sub-area. A key component of the sub-area oil spill response planning effort is development of pre-planned response strategies. Field reconnaissance activities have occurred in coordination with the Sub-Area Committee to identify accessible control points along streams, rivers, and creeks where response strategies could be implemented relatively quickly. These SACP control points were identified and response strategies were developed to provide sufficient information to expedite and guide the initial response actions to a worst-case oil discharge. The selected control points were determined to be the best locations under normal flow conditions to contain/collect oil with the goal of protecting sensitive resources during the initial 24- to 72-hour response period when response equipment and resources are often limited. The control points and associated booming strategies for those locations are available on The Emergency Response Application (TERA) Viewer at the link provided below. In the event of a major oil spill incident, the incident specific planning will ultimate direct the operations and equipment needs for the long-term response actions.

EPA Region 8 TERA Viewer link: https://r8.ercloud.org/tera_external/index.html

The oil spill control points and response strategies presented on the TERA Viewer are intended to provide the basic information needed for oil spill response planning at those specific locations. Conversely, the response strategies/techniques discussed in this document are not site/location-specific and are intended for broad planning use. Facility- and incident-specific response plans should also be developed as required to supplement the sub-area planning efforts completed to date. It should be noted that sub-area response planning, including identification of oil spill control points and response strategies, is not a substitute for regulatory planning requirements that facilities may be subject to.

Per 40 Code of Federal Regulations, Part 300, (National Contingency Plan), Section 300.317, safety of human life is the highest priority during a response. Stabilizing the situation to prevent worsening of the event is the next priority. The response must use all necessary containment and removal tactics in a coordinated manner to ensure a timely, effective response that minimizes adverse impact on the environment. There are various techniques that emergency responders may use to control oil spills and minimize impacts to human health and the environment. A key to effectively mitigating oil spills is responding as quickly as possible to minimize the migration of oil and proper selection and use of equipment and materials best suited to the type of oil involved in the incident and appropriate for conditions at the spill site. Most spill response equipment and materials are greatly affected by environmental factors such as water velocity/current and wind, and may vary to suit the size of the water

body where the spill occurred. Oil-related damage to shorelines and threats to flora, fauna, and sensitive areas can be reduced by timely and proper use of response equipment.

Detailed below are techniques that can be utilized during an oil spill response. These techniques are most applicable for spills to small drainages, as well as larger rivers and streams. Additionally, detailed below is an approach (and subsequent strategies) that can be utilized on large open water bodies. Three oil spill response scenarios have been identified that are most likely within Region 8 and are all applicable for this sub-area. Those scenarios are:

- Dry ditches/coulees and small flowing streams/ditches
- Large flowing rivers/streams
- Open water bodies

For each of these scenarios, photographs of oil containment techniques that could be implemented during an incident are provided below. It should be noted that early stoppage of a spill source and quick containment will greatly reduce the scope of cleanup operations and environmental damage.

Vital to any response is the timely identification of locations where on-site activities can be successfully conducted. Some potential locations be predetermined during spill planning activities. Such locations should meet the following criteria: (1) accessible by truck (or boat) so that response personnel and equipment can efficiently collect and remove spilled oil, and (2) located within the oil flow path so that the spilled material can be intercepted/diverted, particularly at sensitive areas. These locations should be selected to avoid high flow/current conditions and areas with poor anchoring options.

<u>Response Techniques for Dry Ditches/Coulees and Small, Flowing Streams/Ditches</u>:

- Earthen dams
- Under flow dams (small, large, and T-pipe)
- Straw bale dams
- Wier dams
- Culvert block dams
- Sorbent boom
- Containment boom

Earthen Dam

Small Under Flow Dam

Large Under Flow Dam

T-Pipe Under Flow Dam

Straw Bale Dam

Wood Wier Dam/Culvert Block

Sorbent Boom

Containment Boom

Response Techniques for Large, Flowing Rivers/Streams:

- Containment Boom
- In-situ Burn/Fire Boom

As previously mentioned, as part of the ongoing sub-area planning activities within EPA Region 8, control points and response strategies have been developed to address worst-case discharge spill projections. Some of the control point locations and booming strategies identified for the larger rivers and streams within the sub-area are available on the TERA Viewer.

Response strategies to be implemented at each control point were developed for average/typical conditions (flow velocity, weather impacts, etc.). Response personnel must be knowledgeable and ready to modify the response strategies as needed to mitigate the threat, if unusual environmental conditions are encountered during a response. It should be noted there are condition-related limitations regarding the deployment of certain response equipment. These limitations are often associated with high flow conditions and flooding. Under high flow conditions, a primary objective is to limit the spread of oil within the flood zone and backwater areas. Health and safety of response workers must be taken into consideration under all circumstances.

Containment Boom

Under certain conditions, in-situ burning may offer a logistically simple, rapid, inexpensive, and relatively safe means for reducing impacts of an oil spill. Burning can substantially reduce need for

collection, storage, transport, and disposal of recovered material. Under certain circumstances, such as oil spilled under ice, burning may be the only viable response technique. In-situ burning may have significant short-term impacts (e.g., airborne release of particulate matter and hazardous substances, etc.), but may actually produce the lowest long-term impact because it removes the oil quickly. In-situ burning should augment, not replace, other oil spill response techniques such as mechanical removal. Burning often requires the use of fire boom as shown in the picture below. Other factors associated with in-situ burns are detailed in the strategies/priorities discussion for large, open water bodies section below.

Response Approach for Large, Open Water Bodies:

An oil spill to a large, open water body poses many challenges. Response strategies and techniques that should be considered during such a spill are discussed below. Once oil is released to an open water body, it will naturally spread, fragment, and disperse under the influence of wind, waves, and current.

Approach:

- Assess the amount and type of spilled oil via surveillance and tracking. Aerial flights may be warranted if the area/shoreline associated with a spill is large, and access to visually assess the spill is limited.
- Based on surveillance data, determine the most effective uses of response equipment. Response resources may be limited during the first 24 to 36 hours following a spill, so determination of where to mobilize resources is critical.
- Utilize existing information/plans to identify pre-existing control/access points where response activities can be implemented.

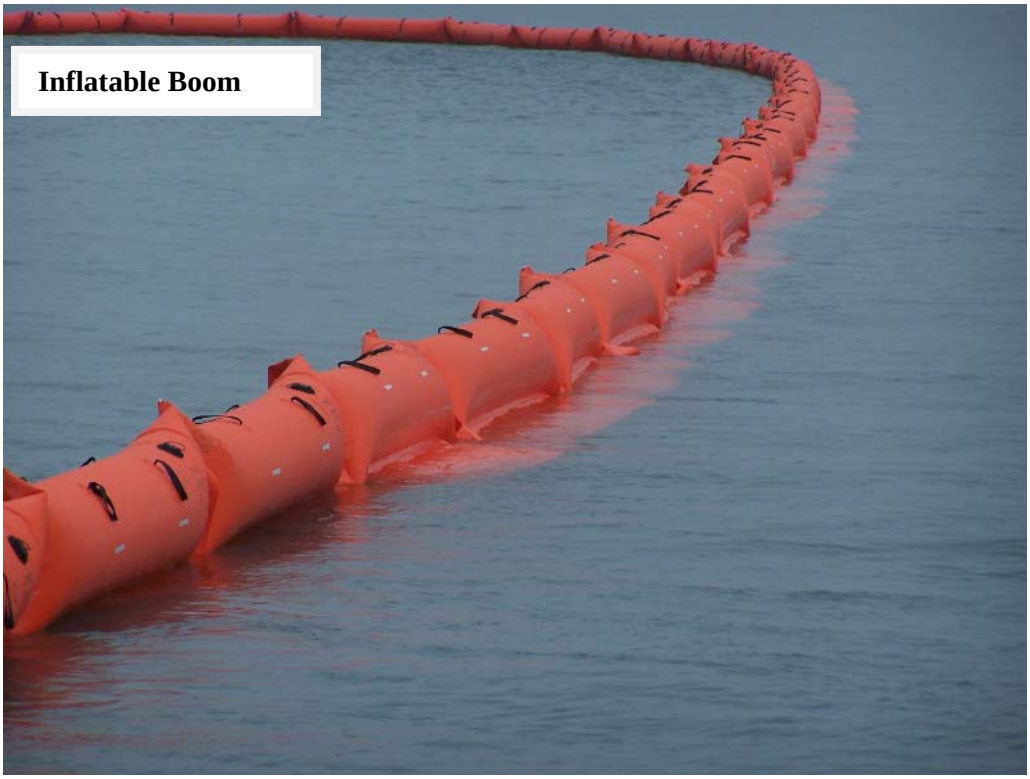
Strategies/Priorities for Large, Open Water Bodies:

The highest priorities during a response are safety and then stabilization. For an open water environment, in non-ice conditions, environmental factors (flow/current and wind in particular) will determine the oil flow path and locations where spilled oil will accumulate. Listed below are strategies/techniques that can be applied to an oil spill response on large, open water bodies. These strategies and techniques are not listed by priority. Response strategies implemented during the initial phases (24 to 72 hours) of a response will largely be dependent on access points and resource/equipment availability. All factors must be evaluated to ensure an effective response is conducted. Followup evaluation will be required as additional resources become available.

- Protection: Identify sensitive areas regarding human health and environment (drinking water intakes, critical habitats, etc.) that could be impacted by the spill. Implement response activities for protection of these areas. Response actions may include placement of deflection or protection boom to divert or prevent oil from impacting the sensitive area/receptor/resource. Based on the availability of oil spill equipment/boom, protection may not be feasible until additional equipment and boom become available.
- Containment: Based on initial surveillance information, identify where oil has accumulated and where collection can be performed most efficiently. These locations are likely to be in bays, inlets, and shoreline pockets. Containment boom can be used to either deflect oil into collection areas or to contain the oil so collection can occur. As a note, bay inlets on some lakes within Region 8 can reach up to 1 mile in distance; therefore, implementation of this strategy may depend on the amount of required resources (boom). Large reels of inflatable

boom may be the best option for rapid deployment of boom, if available. Photographs of inflatable boom are included below.

- Collection: Additional techniques that can be used to collect oil in open water include corralling oil using two boats (working together) to drag containment boom (with trapped oil) to recovery sites, and use of open water skimmer boats. This method is slow and will be of limited benefit in significant wave and wind conditions.
- In-situ Burning: Oil accumulation may occur in areas where mechanical removal is more harmful or not practical, and in-situ burning may be preferred to reduce the long-term impacts to aquatic and riparian/shoreline ecosystems. This type of action must be well managed to ensure the fire will not damage other resources, and generally it will require an evaluation by the resource trustees and acquisition of emergency air release permits. Time is also a consideration for in-situ burning. The longer oil is exposed to the environment, the less likely it is to effectively burn.



Inflatable Boom

Inflatable Boom