|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Primary Sources** | **Secondary Sources** | **Transport Mechanisms** | **Exposure Pathways** | **Exposed Population Characterisation** |
| ◼ Product Storage  (tank, drums, etc.)  ◼ Piping/Distribution  (manifolds, lines,  pumps, etc.)  ◼ Operations (wash  areas, repair bays,  water treatment,  bending tanks,  formulation areas)  ❑ Waste Management  Unit (impound-  ments, dry wells,  sludge disposal, etc.)  **Legend**  ❑ Potential  ◼ Unknown  ◼ Impacted surficial  soils (<0.6m deep)  ❑ Impacted  Subsurface Soil  (>0.6m deep)  ◼ Dissolved  Groundwater  Plume  ❑ NAPL Plume  ❑ Impacted  surficial soil,  sediment, or  surface water  ❑ Wind erosion and  Atmospheric  Dispersion  ❑ Stormwater/  Surface Water  Transport  ❑ Mobile Free-  Liquid Migration  ◼ Volatilisation and  Atmospheric  Dispersion  ◼ Volatilisation and  Enclosed  Accumulation  ◼ Leaching and  Groundwater  Transport  ❑ Soil ingestion/  Absorption  ◼ Inhalation  ◼ Potable Water  Use  ❑ Recreational  Use/Sensitive  Habitat  ❑ Residential  ❑ Commercial/  Industrial  ❑ Construction worker  ❑ Sensitive ecosystem  ❑ Other (e.g. playground)  ◼ Residential  ◼ Commercial/  Industrial  ❑ Construction worker  ❑ Sensitive ecosystem  ❑ Other (specific)  ◼ Residential  ❑ Commercial/  Industrial  ❑ Construction worker  ❑ Sensitive ecosystem  ❑ Other (specific)  ❑ Recreational  ❑ Sensitive ecosystem  ❑ Other (specific) | | | |  |

Figure 2. Example Conceptual Site Model flow diagram (modified from ASTM, 1995)

A conceptual site model can inform the development of and be incorporated into the detailed scope for a human health risk assessment such as is shown in Figure 3. This example deals with the scoping of a risk assessment for hazardous air pollutants (HAP) and persistent, bioaccumulative and toxic pollutants (PBT)

The schema identifies the sources, contaminants of concern (stressors), exposure pathways, potential receptors, and adverse human health effects that the risk assessment will address. The pathways presented are for illustrative purposes only and are not relevant to any specific scenario.

**Figure 3: Example of scoping a risk assessment for air pollutants, indicating pathways considered (bold lines) and pathways no considered. (Adapted from NRC 2008)**

|  |
| --- |
| **Sources**  Extrinsic ‘background’ in other media  Indoor air sources  Extrinsic ‘background’ in air  Mobile (on- and off-road)  Small ‘area’ sources  Major Industrial |
| **Stressors**  Other 155 Clean Air Act HAPS  (including PBTs)  33 Priority Urban HAPS  (including PBTs) |
| Subset of PBTs  Subset of PBTs  **Pathways/**  Indoor air  microenvironments  Outdoor air  **Media**  Soil  Food  Water |
| **Routes**  Dermal  Ingestion  Inhalation |
| General Population  **Populations**  Adolescents  Young Children  African/Hispanic  Indigenous  Adults  Asian  Caucasian  Elderly |
| Estimated percent of population within specified ranges of index values  **Endpoints**  (Specific non-cancer target organ endpoints shown; for example purposes)  Cancers (e.g. leukaemia)  lung, others)  Blood (including marrow & spleen)  CNS  Other health effects  Liver & kidney  Respiratory  Cardiovascular |
| **Metrics**  **Possible Carcinogens**  **Cardiovascular Hazard Index**  (HAP-specific and cumulative (e.g. by cancer type, weight of evidence, by target organ-specific hazard index) by  **Respiratory System Hazard Index**  **Blood Hazard Index**  **CNS Hazard Index**  **Liver and Kidney Hazard Index**  Estimated number of cancer cases  Estimated percent of population within specified cancer risk ranges  Distribution of high-end cancer risk estimates  **Known Carcinogens**  **Probable Carcinogens**  State |

Distribution of estimated index values