Comments from IPEN - Proposed text after para 69 (submitted earlier but not included in the revised draft in May)

1. Mercury from historical small-scale gold production sites and currently operating ASGM sites can leach into water bodies such as rivers, lakes and dams, then recombine and form pools of elemental mercury on the river or lake bed, providing a long-term contamination source. This form of mercury pooling can be detected using LiDAR scanning technology and be removed using a vehicle mounted vacuum eduction unit fitted with carbon filters to prevent vapor releases. The holding tank allows environmentally sound removal of mercury pools from water bodies which can be further treated in ex-situ vacuum distillation facilities and recovered for stabilisation. This technology has significant potential for ASGM site remediation adjacent to water bodies[1].

ASGM sites

2. ASGM sites are a challenging form of mercury contaminated site to manage and remediate as many of them can be occupied settlements which impacts management and remediation options. Some newly established ASGM sites are only occupied for relatively short periods due to a 'gold rush' phenomenon and are then abandoned once the ore body is depleted. Other sites may involve long-term occupation by groups who have worked an ore body for generations as an economic supplement to agricultural or other occupations. In some cases, the use of mercury for ASGM may be divided between the ore working site and nearby permanent settlements where ball mills and other equipment extract further gold from concentrated ore. In such cases mercury contamination may occur in both the mining location as well as in associated established settlements, including residential settings some distance from the mine.

3. Identification of mercury contaminated ASGM sites can follow the same processes of preliminary site identification, detailed site identification and site characterisation as any other mercury contaminated site but additional complexity arises when the site is active, occupied and in a dynamic state of contamination (i.e. new contamination is occurring constantly in new locations within the subject area). This differs from unoccupied sites where the hot spots are relatively stable and the site can be characterised without the expectation of contamination arising at new locations within the overall site.

4. The complexity arising due to the overlap between ASGM activity, contamination and permanent or temporary settlement of the site, public engagement and awareness raising among the affected community is essential. Section C of this guidance provides information on the establishment of a public engagement process for contaminated site remediation and management. In addition to that guidance, additional measures may need to be considered when engaging with communities engaged in ASGM activities. ASGM sites may have a mix of transient and established workers and the activity may even be considered illegal in some locations and this can act as a barrier to effective engagement. Careful consideration of the profile of community at risk should be undertaken before attempting to develop an engagement program and potential representatives of informal miners, local settlements and health care workers should be identified to assist with developing the engagement process.

5. As the ASGM activity may be the sole economic activity in some locations, a Local Action Plan may need to be developed with local representatives to inform and support miners to transition rapidly away from mercury use, identify and isolate contaminated hot spots, implement health surveillance and intervention measures and remediate sites. Using this wholistic approach with community support, the problem of dynamic mercury contamination may be reduced or eliminated allowing the contamination of the site(s) to be managed effectively. A Local Action Plan supported by government officials in cooperation with affected communities can also develop scenarios for alternate livelihoods for miners reducing the potential for community opposition to mercury use elimination and ongoing contamination.

6. Remediation of impacted dwellings where mercury amalgamation (or mercury spills in a non-ASGM setting) has been practised requires a separate process within the overall site identification and management plan. Residential dwellings or commercial buildings (such as gold traders who burn amalgam on site) that are suspected of mercury contamination can initially be screened using a handheld device such as a Jerome Mercury Vapor Analyzer (MVA), Lumex 915+ and Lumex RA-915 Light meters or devices with equivalent sensitivity.). If real time readings exceed assessment and clearance screening levels (ACSL) of 300 ng/m3 then decontamination is required. If levels are highly

Commented [LB1]: Structures (residential or otherwise) could be included under a sub-heading of ASGM.

[1] AgroEco Systems Pty Ltd (2010) Request for Additional Information, Feral Mercury Recovery Project, Upper Goulburn River Catchment, Victoria (EPBC 2010/5477)

elevated clean-up workers should wear level C PPE (air-purifying respirators with mercury vapor cartridges).

Commented [LB2]: (a)Para 73 to 76 contribute to "Existing procedures for the characterization of contaminated sites, including approaches and techniques for sampling and analysis;" In this case it identifies sampling practices in sub-locations.

7. An (ACSL) of 300 ng/m3is the inhalation reference concentration (RfC) for elemental mercury established by the USEPA estimate of a continuous inhalation exposure concentration to people (including sensitive subgroups) that is likely to be without risk of deleterious effects during a lifetime. Reducing the mercury vapor levels in an occupied dwelling to below the ACSL is critical to the health of the occupants.

8. Decontaminating the structure and contents requires a combination of approaches (Thompson 2012) including;

- Assessment, inventorying and decontaminating items within the structure (using a decontaminating agent such as HgX) and purpose-built vacuums (such as the Nilfisk SS Mercury Vacuum)[2].
- Heating and ventilating the structure. Heating should be conducted for at least 8 hours duration above 26ºC then lowered to 21ºC with at least 2 hours venting. In some cases, existing heating devices inside the structure combined with open windows is sufficient to bring vapors below the ACSL. If monitoring shows this is ineffective, then portable heaters combined with negative pressure air pumps fitted with activated carbon filters can be effective.
- Household items that cannot be decontaminated below 1,000 ng/m3 can be disposed of as household waste.
- Household items that cannot be decontaminated below 10,000 ng/m3 should be disposed of as hazardous waste.
- Some household items may be removed from the site for decontamination by heating in sealed bags to 32-60ºC and then ventilated for 2 hours. They should then be tested to ensure vapor release is below 1,000 ng/m3.
- More porous items such as mattresses, rugs, leather shoes and plastic toys may not be possible to decontaminate. All food including frozen food should be disposed of.
- Structures built with high porosity building materials may also prove difficult to decontaminate.

9. Technical measures to manage and remediate ASGM contaminated sites should take into account that the sites may be located in remote terrain that is difficult to access. If treatment of contaminated environmental media to remove mercury is the objective of the management plan, then equipment will either need to be moved to the impacted location or the impacted soils and sediment will need to be transported to established treatment facilities. The latter scenario will, in most cases, prove prohibitively expensive. Therefore, standard methods and techniques for decontamination of soil, sediment and sludge based around ex-situ technology (generally on industrial sites) may need to adapted to permit smaller, modular, transportable and environmentally sound technology to be brought to the contaminated site to treat contaminated materials. In the case of contaminated water treatment this may be unavoidable.

10. In cases where it is possible to detect pooled mercury from ASGM activity on the beds of rivers, lakes or reservoirs using remote sensing system such as LiDAR, technology has been developed to remove such pools without significant sediment disturbance that may occur if dredging technology is applied (see new para 68).

[2] Under no circumstances should ordinary household vacuums be used as they become contaminated and liberate mercury vapors through their exhaust for long periods after initial use.