



# Centre for Environmental Rights

Advancing Environmental Rights in South Africa

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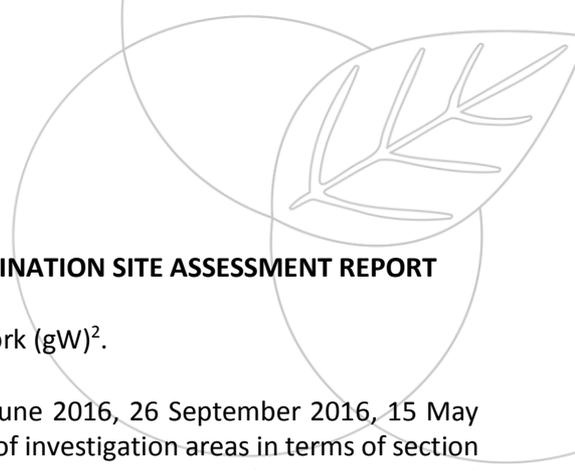
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**URGENT**

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Dear Sirs

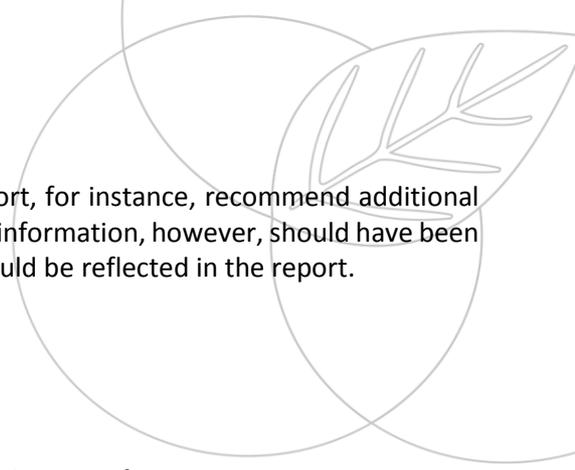
**ARCELORMITTAL SOUTH AFRICA (AMSA), VANDERBIJLPARK LAND CONTAMINATION SITE ASSESSMENT REPORT**

1. We act for the Vaal Environmental Justice Alliance (VEJA)<sup>1</sup> and groundwork (gW)<sup>2</sup>.
2. We refer to our previous correspondence dated: 13 January 2016, 10 June 2016, 26 September 2016, 15 May 2017, and 28 July 2017 pertaining to AMSA's 27 March 2015 notification of investigation areas in terms of section 36(5) of the National Environmental Management: Waste Act 59 of 2008 (NEMWA), to the Department of Environmental Affairs (DEA), as well as the subsequent response by DEA on 14 April 2015, advising that AMSA was required to conduct a site assessment report ("the report"). In our correspondence, we requested that DEA intervene and ensure that AMSA's land contamination site assessment ("the assessment") is completed and the report is submitted so that necessary remediation steps can be taken. To date, we have not received any substantive information regarding any steps taken by DEA in this regard.
3. On 21 November 2017, AMSA furnished Mr Phaladi of DEA with AMSA's Land Contamination Site Assessment Report (email attached) and made a copy available to the Centre for Environmental Rights (CER).
4. We write to advise DEA of numerous concerns and shortcomings in the report, which call into question certain findings and recommendations in the report, and which may render it in non-compliance with the requirements of NEMWA. We further advise DEA that, despite these shortcomings, serious contamination has been identified in AMSA's report and the report indicates that the contamination is migrating off its premises. As such, it should be remedied on an urgent basis. The summary of the concerns is as follows:
  - 4.1. exclusion of northern portion of AMSA's site from the assessment may lead to inaccurate findings related to the true extent of the contamination occurring on site and possibly migrating off-site;
  - 4.2. inadequate sampling and crucial information missing from the report (such as the most recent 2017 sampling results for both organic and inorganic constituents, limited and selective borehole results - of 15 boreholes out of 200 that AMSA usually monitors; and no results from the discharges into the Leeuspruit and Rietspruit, among others);
  - 4.3. evaluation of sampling results against incorrect standards – as AMSA is near waterways and receptors, only the stricter Soil Screening Value (SSV) 1 should be used, and use of SSV2 should be omitted as it detracts from the assessment and the recommendations;
  - 4.4. inadequate consideration of the history of pollution from its premises, and other considerations required in terms of NEMWA, as well as the accompanying Framework;
  - 4.5. inadequate consideration of the impact of certain contaminants on human health, surrounding communities and the environment, as required in terms of NEMWA, as well as the accompanying Framework. Further, the Risk Profile in the report is vague and makes no useful findings concerning how contamination from the site could harm sensitive receptors, and makes no assessment of health impacts from the contamination; and

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<sup>1</sup> VEJA is a democratic alliance of empowered civil society organisations in the Vaal Triangle, who have the knowledge, expertise and mandate to represent the determination of the communities in the area to control and eliminate emissions to air and water that are harmful to these communities and to the environment.

<sup>2</sup> groundWork is a non-profit environmental justice campaigning organisation working primarily in South Africa, in the areas of Climate & Energy Justice, Coal, Environmental Health, Global Green and Healthy Hospitals, Waste and Environmental Education.

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- 4.6. certain invalid recommendations are made. The findings in the report, for instance, recommend additional monitoring and/or the inclusion of certain missing information. This information, however, should have been available or ascertained during the assessment, and the findings should be reflected in the report.
  5. These concerns will be dealt with in detail below.
  6. The summary of the report is as follows:
    - 6.1. AMSA's premises has fair housekeeping with strict rules on waste and storage;<sup>3</sup>
    - 6.2. potential contamination sources were the: coke and dolomite storage area, coal stacking area, desalination plant, water treatment plant, north buffer dam (storm water dam), old waste disposal site, scrap yard and slag processing areas, gasscor tank farm, bulk storage areas, coke and chemicals area, coke ovens, biological water treatment plant, ore stock yard, total fuel depot, plate processing plant, and hot metal pits;<sup>4</sup>
    - 6.3. the majority of the soil samples taken exceed the soil screening value (SSV)1 threshold<sup>5</sup> in respect of arsenic, copper, manganese, and lead concentrations.<sup>6</sup> In addition, there were several other constituents exceeding SSV1 sampling values, including cadmium, nickel, vanadium, fluoride, nitrate, and sulphate;<sup>7</sup>
    - 6.4. the soil samples detected the presence of chromium (VI) (50.7mg/kg) and benzo[a]pyrene (7700ug/kg) from auger hole (AH) AH12A, manganese and benzo[a]pyrene at AH18A all exceeding SSV1 and SSV2 values; pyrene at AH18A and AH19A, benzo[a] pyrene at AH13 and AH19 all exceeding SSV1 values; and there were also SSV1 value sample exceedances in respect of benzene at AH25;<sup>8</sup>
    - 6.5. out of over 150 boreholes, *"only 26 of these were visited from which 15 predefined groundwater samples were collected...[the] results indicated the presence of copper, manganese, zinc, fluoride, chloride, nitrite, nitrate, sulphate and cyanide which exceeded the SANS and Aquatic Water Quality Standards"*.<sup>9</sup> The report indicates that in some cases, the exceedances in comparison to SANS 241: 2015 drinking water standards were extremely high, as much as 10 or 20 fold;<sup>10</sup>
    - 6.6. a dense non-aqueous phase liquids (DNAPL) coal tar pool of 3.02m thick was measured in one monitoring borehole T-11D located west of the waste storage area and the formerly-remediated Dam 10. A pump was installed at T-11D for product recovery, and this was a remediation measure which was considered to be successful.<sup>11</sup> 2014-2016 information indicated that dissolved phase organic compounds (light non-aqueous phase liquids (LNAPL)) were detected in several monitoring wells close to T-11D (including FD-26D, RT-7D, RT-5D and T-8D) and "based on the available data, these concentrations are increasing and plume migration is taking place off-site".<sup>12</sup> Accordingly, various organic chemicals (such as benzene, styrene, toluene,

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<sup>3</sup> GCS 10 November 2017 Vanderbijlpark Works Contaminated Land Assessment, page 68.

<sup>4</sup> GCS 10 November 2017 Vanderbijlpark Works Contaminated Land Assessment, page 68.

<sup>5</sup> SSV1 and SSV2 are thresholds against which soil samples are measured and defined in the National Norms and Standards for the remediation of Contamination Land and Soil Quality Regulation of 2 May 2014. SSV1 is defined as "soil quality values that are protective of both human health and ecotoxicological risk for multi-exposure pathways, inclusive of contaminant migration to the water resource". SSV2 is defined as "soil quality values that are protective of risk to human health in the absence of a water resource".

<sup>6</sup> GCS 10 November 2017 Vanderbijlpark Works Contaminated Land Assessment, page 68.

<sup>7</sup> GCS 10 November 2017 Vanderbijlpark Works Contaminated Land Assessment, page 65.

<sup>8</sup> GCS 10 November 2017 Vanderbijlpark Works Contaminated Land Assessment, pages 35-36 65, 68 – 69.

<sup>9</sup> GCS 10 November 2017 Vanderbijlpark Works Contaminated Land Assessment, page 69.

<sup>10</sup> GCS 10 November 2017 Vanderbijlpark Works Contaminated Land Assessment, page 42-46.

<sup>11</sup> GCS 10 November 2017 Vanderbijlpark Works Contaminated Land Assessment, pages 65-66 & 69-70.

<sup>12</sup> GCS 10 November 2017 Vanderbijlpark Works Contaminated Land Assessment, pages 66, 69-70.

naphthalene, xylene, and total petroleum hydrocarbons (TPH) among many others) were present at numerous boreholes for the period between 2014- 2016;<sup>13</sup>

6.7. in terms of evident risks to human health and the environment, two groundwater users (at boreholes HCBH1 and HCBH2) were identified as sensitive receptors within a 1km radius of the site. According to the report, water from the HCBH1 borehole is being abstracted to irrigate a “small vegetable garden” in the South Eastern area. The HCBH2 borehole is located at a lodge north of the site, and the site appears to be a homestead, however, samples could not be obtained as the assessor was apparently unable to access the property during the 1 year period of assessment;<sup>14</sup> and

6.8. in light of the abovementioned findings, the following recommendations were made:<sup>15</sup>

6.8.1. groundwater contaminated with DNAPL and dissolved phase compounds as per the aerial image in the report, should be reported as contaminated in terms of Part 8 of NEMWA, and the image seems (according to our observations) to indicate that the contamination plume has migrated offsite;

6.8.2. DNAPL should continue to be monitored and recovered, and a remediation plan for the recovery should be developed. The plan should include measuring the thickness of the DNAPL volumes recovered to confirm the decrease in trend, monitoring of dissolved organic compounds, as well as re-evaluation of the remediation plan once DNAPL product has been recovered, to see if a more active remediation method would be required to remove the contaminants;

6.8.3. boreholes at P-8D, PL-9D, PL-10D, and RT-4D should be included in the monitored organic analysis to monitor plume migration;

6.8.4. the latest (2017) monitoring data should be evaluated to determine if the dissolved organic plume extent is increasing;

6.8.5. groundwater monitoring should be conducted at HCBH1 and HCBH2, and water should not be extracted from AMSA’s properties; and

6.8.6. the impact of stormwater flowing into the stormwater dam, located in the southwestern section of the site, should be determined and a stormwater management plan should be implemented at the site. This must include monitoring of water quality flowing into the dam to ensure no detrimental impact is posed by the stormwater originating from the site to surrounding surface water bodies.

7. In terms of section 37(2)(a) of NEMWA, a site assessment report “*must comply with any directions that may have been published or given by the Minister or MEC and must at least include information on whether the investigation area is contaminated*” (our emphasis). Further, section 37(2)(b) of NEMWA requires the following information to be included in a report if the findings of the assessment are that the land is contaminated:

*“(i) the contamination has already impacted on health or the environment;*

*(ii) the substances present in or on the land are toxic, persistent or bio-accumulative or are present in large quantities or high concentrations or occur in combinations;*

*(iii) there are exposure pathways available to the substances;*

*(iv) the use or proposed use of the land and adjoining land increases or is likely to increase the risk to health or the environment;*

*(v) the substances have migrated or are likely to migrate from the land;*

<sup>13</sup> GCS 10 November 2017 Vanderbijlpark Works Contaminated Land Assessment, pages 60-62 and 63-64.

<sup>14</sup> GCS 10 November 2017 Vanderbijlpark Works Contaminated Land Assessment, page 70.

<sup>15</sup> GCS 10 November 2017 Vanderbijlpark Works Contaminated Land Assessment, pages 70- 71.

*(vi) the acceptable exposure for human and environmental receptors in that environment have been exceeded;*  
*(vii) any applicable standards have been exceeded; and*  
*(viii) the area should be remediated or any other measures should be taken to manage or neutralise the risk.*

8. In addition to NEMWA, the procedure on how the assessment should be undertaken and what must be included in the report is outlined in the NEMWA National Norms and Standards for the Remediation of Contaminated Land and Soil Quality in the Republic of South Africa of 2014 (“the Norms and Standards”); the Guide for the Effective Implementation of Part 8 of NEMWA of 2014 (“the Guide”); as well as in the Framework for the Management of Contaminated Land, 2010 (“the Framework”).
9. Considering the assessment in relation to the various laws outlined above, it appears to be deficient in several ways, which are dealt with in turn in the paragraphs below.

#### **Exclusion of portions of AMSA’s land from the assessment**

10. According to the Framework, *“It is the responsibility of the site investigator to formulate an appropriate sampling program based upon accurate and reliable site specific information as far as practicable, and the reasoning behind the sampling plan should be made clear within any subsequent reporting”*.<sup>16</sup> However, the report does not indicate: how the soil and groundwater samples were “pre-selected” or “selected in consultation with client”, who conducted the sampling plan (AMSA or independent GCS), or the reasoning behind the sampling plan or the methodology used.
11. It appears from the report that the assessment was limited to certain portions of AMSA’s property, and *“remediation areas falling under the jurisdiction of a waste management licence (sic) were excluded from the assessment – predominantly the northern portion of the site.”*<sup>17</sup> The report indicates that the northern portion of the property includes a Waste dump, Dam 1-4, Dam 10, Coke and Chemicals operation, Coke Stacking, Historical CETP Sludge Dams, Central Effluent Treatment plant, Ore Bedding and Blending Plant (some of which have already been remediated).<sup>18</sup> The northern portion of the property also currently has a New G:S:B Waste Site, New G:L:B Metallurgical Waste Site, H:H leachate collection dam as well as the New H:H Salt Cell.<sup>19</sup> We therefore have reason to believe that there could be significant contamination in the northern portion of the property, which has largely been excluded from the assessment.
12. We are aware that the Norms and Standards contain a transitional provision whereby any person who is remediating contaminated land in terms of a waste management licence (WML) before 2 May 2014 must comply with the conditions set out in the WML. However, in order to determine if certain portions warranted such exclusion, AMSA should provide the following information in the report:
- 12.1. the exact coordinates and the description of the sites (i.e Dam x) which were excluded from the assessment;
  - 12.2. the methodology and the reasoning used to choose these “pre-selected” sites for soil sampling, and specify who made the initial selection (i.e independent auditor or AMSA);
  - 12.3. copies of the WMLs and record of decisions pertaining to the remediation, on which the exclusions were based;

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<sup>16</sup> section 6.2.2

<sup>17</sup> GCS 10 November 2017 Vanderbijlpark Works Contaminated Land Assessment, page 17.

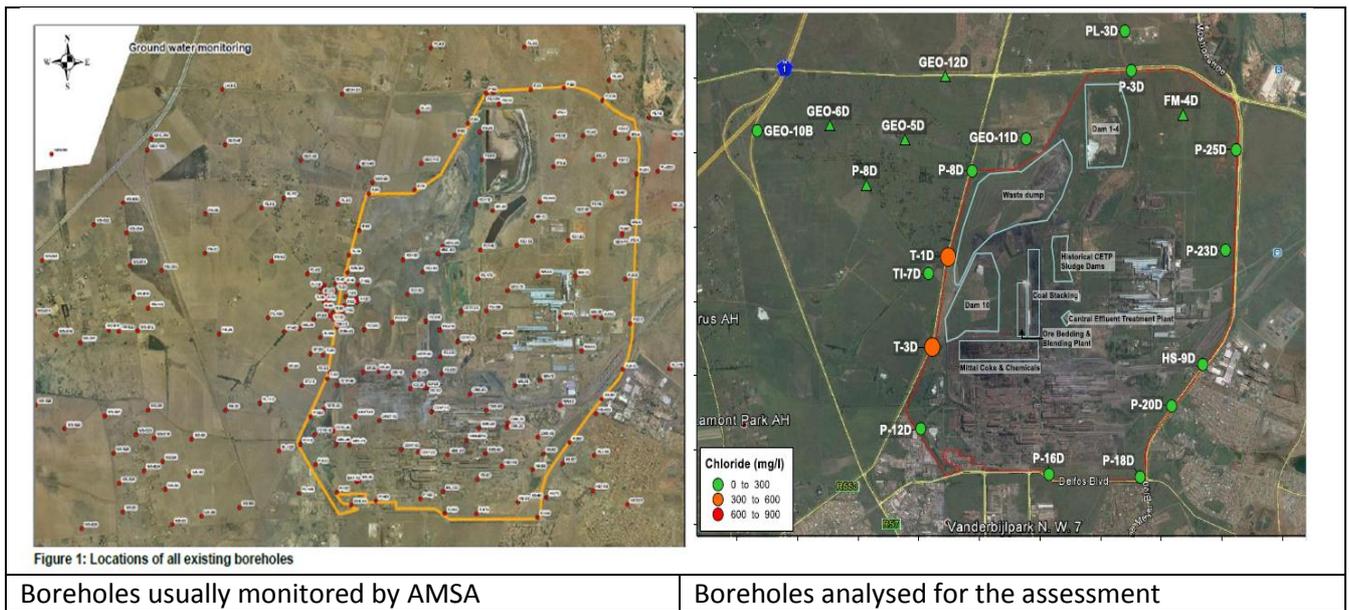
<sup>18</sup> GCS 10 November 2017 Vanderbijlpark Works Contaminated Land Assessment, page 41.

<sup>19</sup> Zantow 26 May 2017 External Audit Report: Metallurgical Waste Disposal Site at AMSA, page 23

- 12.4. the date of commencement of the remediation for each excluded site; an indication of whether the remediation measures were successful; the current status of the remediation, as well as the date of finalisation (or expected finalisation) of the excluded sites; and reasons for the delay (if any delays were experienced). This information would be particularly important not only to assess whether the exclusion of the portions of land was valid, but also to assess whether or not past, current, and future remediation measures are successful or adequate. For instance, the report indicates that Dam 10 was “successfully remediated and... the source of contamination has been removed”;<sup>20</sup> however, “relics from...Dam 10 source area are still present”.<sup>21</sup> Given that almost 7 years have passed since the Dam 10’s rehabilitation,<sup>22</sup> the remediation measures may be inadequate and further measures may be required; and
- 12.5. the exact co-ordinates of the new disposal and water treatment sites (such as the dams and water treatments sites, storm water canals, slag processing); whether these were excluded from the assessment; and if they were excluded, the reasons for the exclusion.

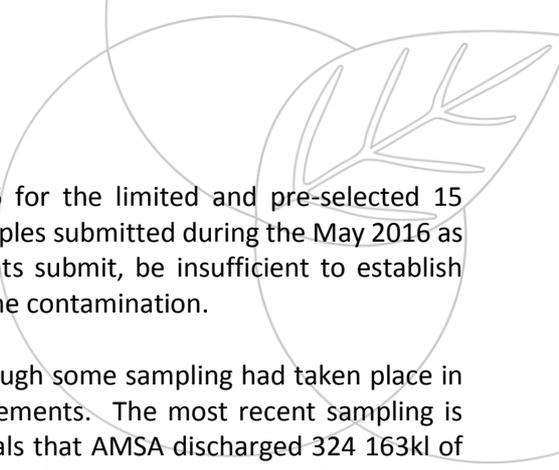
**Inadequate sampling and crucial information missing from the report**

13. According to the report, there are over 150 monitoring wells on and in close proximity to AMSA’s premises,<sup>23</sup> and in terms of AMSA’s water use licence (WUL) and WML, AMSA is required to conduct annual and/or biannual sampling of over 100 boreholes for organic and inorganic constituents. According to AMSA’s 2017 External Audit report on Metallurgical waste, AMSA “has extensive groundwater monitoring network...[and] monitoring data is available from the year 2000 to date”<sup>24</sup> (see figure 1 below). AMSA is also required to monitor discharges into the Leeuspruit and Rietspruit rivers in terms of its WUL, and some borehole samples were already taken in 2017 before the finalisation of the report in November 2017. Despite having such extensive data at hand, these were not adequately considered in the report, resulting in certain gaps in the report as well as resulting in the recommendation for inclusion of more recent or additional data. This is unacceptable as it causes unnecessary delays in the remediation process, with potentially significant impacts on the human health and the environment.



**FIGURE 1**

<sup>20</sup> GCS 10 November 2017 Vanderbijlpark Works Contaminated Land Assessment, page 65.  
<sup>21</sup> GCS 10 November 2017 Vanderbijlpark Works Contaminated Land Assessment, pages vii & 70.  
<sup>22</sup> Zantow 27 January 2017 External Audit Report in Fulfilment of Water Use Licence, page 21.  
<sup>23</sup> GCS 10 November 2017 Vanderbijlpark Works Contaminated Land Assessment, page III and 69.  
<sup>24</sup> Zantow 26 May 2017 External Audit Report: Metallurgical Waste Disposal Site at AMSA, page 22

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14. Whilst the report does make mention of trend analysis for 2014-2016 for the limited and pre-selected 15 boreholes, the mapping and findings seem largely based on one set of samples submitted during the May 2016 as per the annexures. Sampling taken during one season would, our clients submit, be insufficient to establish seasonal and annual variability in groundwater quality and evaluation of the contamination.
  15. Moreover, 2017 borehole samples were not taken into account, even though some sampling had taken place in 2017 in terms of AMSA's bi-annual and/or annual WUL sampling requirements. The most recent sampling is critical, especially since AMSA's January 2017 External Audit Report reveals that AMSA discharged 324 163kl of effluent during April 2016, and that phenolic compounds were also discharged (quantity not specified) on 18 and 19 July 2016.<sup>25</sup> AMSA's September 2017 External Audit Report, pertaining to the Coke Oven Clean Gas and Water Project, also indicates that a total of approximately 725 megalitres of effluents were discharged into the Rietspruit between February to July 2017. These discharges may have impacted on the surface and ground water system and these need to be evaluated. The report also recommends that 2017 borehole sampling assessments should be included - it is not clear why this was not assessed in the report and was added as a recommendation instead.
  16. In respect of sensitive receptors, the report states that "*National Groundwater Archive indicated five boreholes located within 4km radius, however these boreholes could not be located during the hydrocensus conducted on 3 June 2016*". Further, "*during the hydrocensus, properties within a 1km radius of the site was visited*". It is not clear what methods were used (including any public participation process) to identify all the borehole users within the vicinity, given that AMSA's property is directly flanked by residential areas and agricultural land, such as Vanderbijlpark, Boipatong to the South, Connie's Lodge, Metapelang Country Estate to the North, Sebokeng to the North East, and Steel Valley and Linkholm to the West.
  17. As for the sensitive receptors identified at HCBH1, it is not clear whether the land owner was interviewed to determine if the water was being used other than through irrigation and vegetable farming. Whilst figure 5.4<sup>26</sup> indicates that the water was tested for electrical conductivity, acidity, and total dissolved solids, it does not indicate when, how, and from where the sample was taken. Nor is the sampling result by an independent laboratory annexed to the report. In respect of HCBH2, the report states that sampling could not be obtained as the owner could not be contacted. Given the groundwater contamination outlined in the report and borehole being abstracted within 1km, our clients submit that a more concerted effort should have been made to obtain samples from HCBH2 during the 2016-2017 assessment, and both HCBH 1 and 2 should have been sampled for organic and inorganic constituents, to be included in the report.
  18. In addition, condition 14.9 of the WUL also requires the licensee to "*monitor the inorganic soil conditions in the area of Linkholm, Steel Valley, Cyferpan, Rietkuil and Louisrus area west of the site every two years with the first soil undertaken 31 December 2009*". These soil sampling surveys for 2009, 2011, 2013 and 2015 should therefore have been included in the report.
  19. AMSA should provide reasons why only 15 boreholes were considered, and the methodologies used to conclude that these boreholes were "representative", and adequate for the report, as required by the Framework. For instance, according to the trend analysis annexed to the report, in comparison to the Aquatic Water Quality Standards, there appear to be extremely large quantities of one or more organic constituents (such as Benzene, Naphthalene, Chrysene, Toulene, Xylene etc) at various boreholes (including CAST 1D, CEPT 1D T8D, FD26D, P25D, MP1D, RT7D among others). The exact level of exceedance in relation to the TQWR, were not included in the main report on pages 47, 59-62.<sup>27</sup> This would need to be verified, since units of measurement were not properly identified on the graphs. To understand the extent of the various contaminants, which, according to the report are migrating off the site, AMSA should have included not only more borehole sampling results within its premises (particularly near the origin of the contaminants) but also sampling results (with the exact level of exceedances in

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<sup>25</sup> Zantow, 27 January 2017, External Audit Report in Fulfillment of the Water Use Licence for AMSA, pgs 60-61.

<sup>26</sup> Zantow, 27 January 2017, External Audit Report in Fulfillment of the Water Use Licence for AMSA, pg15.

<sup>27</sup> Zantow, 27 January 2017, External Audit Report in Fulfillment of the Water Use Licence for AMSA, pg15

comparison to the target water quality range (TWQR)) outside its perimeters and in the neighbouring areas mentioned above.

20. As you are aware, the stricter SSV1 soil sampling values exist so as to be protective of nearby water sources. Therefore it is important that the report assess the groundwater interaction with the river and the level of contamination flowing into the river system. Whilst AMSA discharges stormwater and effluents into both the Leeuspruit and Rietspruit, and monitors these discharges, these are not assessed in the report. The report should therefore include surface water sampling results and an analysis of groundwater-surface water interactions as part of the assessment of the site impacts.
21. The inclusion of as many on-site and offsite boreholes, surface water impacts as well as groundwater-surface water impacts as possible is vital to assessing the pollution onsite and migrating offsite. This is particularly so since, in the 2002-2003 AMSA report, it was found that the pollution extended beyond AMSA's perimeter; in some cases 1.2km along the Leeuspruit.<sup>28</sup> Further, inorganic plumes extended towards La Mont Park and Louisrus South Small Holdings.<sup>29</sup> DNAPL plumes were also found within AMSA's perimeters (as many as 18 of 44 boreholes around the Central Residue Management Facility (CRMF) alone), and extended beyond its property.<sup>30</sup>
22. For the reasons outlined above, one set of samples taken for 15 "pre-selected" boreholes is therefore inadequate to determine the true extent of contamination on and from the site. Further, the exclusion of 2017 borehole water sample results, as well as monitoring data for discharge into Leeuspruit and Rietspruit rivers demonstrates an inadequate assessment of contamination on and from AMSA's perimeters.

#### **Evaluation of samples using incorrect standards**

23. It is worth noting that, according to the Framework, SSV1 values are defined as soil quality values that are protective of both human health and eco-toxicological risk for multi-exposure pathways, inclusive of contaminant migration to the water resource; whereas SSV2 is defined as soil quality values that are protective of risk to human health in the absence of a water resource. The Framework states that soil samples should be measured in terms of SSV1 if the area is adjacent to surface water, or groundwater users within 1km. The primary consideration for whether SSV1 or 2 values should be used therefore is whether or not the land in question is near a water source/pathway - irrespective of whether or not the land use or zoning being industrial.
24. AMSA's report indicates that, whilst its property is zoned as industrial, it is situated adjacent to surface water, on ground which is vulnerable to contaminant migration to water resources and there are groundwater users within 1km of the site. As such, our clients submit that, irrespective of zoning, only SSV1 should have been used in the report, and any reference to SSV2 should be removed (in the mapping or text) as it detracts from the findings pertaining to the soil assessment and the remediation measures required in respect thereof.
25. Although AMSA's property is zoned as industrial, since AMSA's land is near water, likely to impact the surface and groundwater, and has groundwater users within 1km, the exceedances of SSV1 should be used to assess the contamination and as there are numerous SSV1 exceedances, significant remediation measures are required.<sup>31</sup>
26. AMSA should also explain the details pertaining to the mapping in section 6.1 and 6.2 of the report ("the summary maps"),<sup>32</sup> which indicates the summary of inorganic and organic contaminants. It is not clear what threshold value was used to determine soil (SSV1 or 2) and water (SANS 241 or TWQR) contamination, in order to derive the summary maps. It is also not clear what distinguishes the 5 levels of contamination, as there are no definitions of

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<sup>28</sup> Environmental Master Plan: Specialist Report - Groundwater Series I Document IVS/SR/02, Vol 5 of 7, pg 319

<sup>29</sup> Environmental Master Plan: Summary Report Series I Document IVS/MP/001, pg 20-21

<sup>30</sup> Environmental Master Plan: Summary Report Series I Document IVS/MP/001, pg 20-22; Environmental Master Plan: Specialist Report - Groundwater Series I Document IVS/SR/02, Vol 5 of 7, pg 57-58

<sup>31</sup> DEA May 2010, Framework for the Management of Contaminated Land, pages 8-10

<sup>32</sup> GCS 10 November 2017 Vanderbijlpark Works Contaminated Land Assessment, pages 49-51.

what the different classes mean. For instance, elsewhere in the report,<sup>33</sup>AH 24 was found to have elevated levels of arsenic, but the summary map indicates AH24 to be uncontaminated (it is indicated as 0 on the scale of 0 to 5 contamination level). Lastly, the text in paragraph 6<sup>34</sup> does not correspond with the mapping, for instance, the second paragraph refers to “*inorganic laboratory results...as represented in figure 6.1*”; however, figure 6.1 is a mapping on organic contaminants.

27. In addition, DNAPLs being denser than water, these generally sink below the water table until reaching an impenetrable surface. Therefore, given the presence of DNAPL, it is not clear why vertical delineation of the contamination in groundwater was not addressed in the evaluation.

### **Inadequate consideration of the history of AMSA’s premises**

28. The Framework provides a detailed guideline on what should be included in the report during Phase 1 and 2 of the assessment, which includes among others, “local usage of ground and surface water resources, including presence, rate and location of abstractions (current and historical); site layout plans showing present and past industrial processes; historical uses of adjacent land; relevant complaint history; inventory of materials and waste products associated with site use and their on-site storage and/or disposal locations; product spill and loss history; recorded discharges to land, water and air (authorised and unauthorised); on-site and off-site disposal locations; contaminant source areas and pathways on-site and off-site; and assessment of the accuracy of the information”. Further, there must be clear statements made in the report regarding the status of the contamination of the site and it must also reach a conclusion as to whether the site requires urgent clean-up, remediation measures over a period of time, the application of management measures, on-going monitoring, or a combination of these.

29. It should be noted that a more detailed assessment was conducted in AMSA’s 2003 Master plan, indicating, *inter alia*, the DNAPL plume migration, over 200 boreholes in neighbouring suburbs, and the source of the pollution. AMSA’s external audit reports, and the compliance inspection report issued by DEA in respect of a compliance inspection conducted at AMSA’s facility during June 2016 also contains more detailed information which is more indicative of AMSA’s historical issues with contamination.

30. The report appears to be lacking in detail required in terms of the Framework.

### **Inadequate evaluation of the impact of the contaminants on health and the surrounding communities and environment**

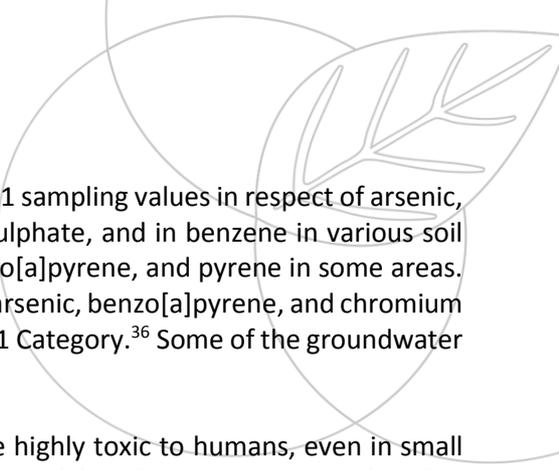
31. Section 37(2)(b) of NEMWA requires the assessment report to contain information on the toxicity or persistent or bio-accumulative nature of the contaminants, as well as whether they occur in large quantities or concentrations. However, this was not adequately addressed in the report.

32. The International Agency for Research on Cancer (IARC), is a specialised cancer agency of the World Health Organisation, which has studied and evaluated causes of cancer. The IARC Monographs on the Evaluation of Carcinogenic Risk to Humans identifies various risks and is meant to support actions to prevent exposure to potential carcinogens. The IARC has grouped cancer-causing substances into Categories 1, 2A, 2B, 3 and 4 - Category 1 identifies substances which are carcinogenic to humans, with conclusive evidence that they cause cancer in humans; Category 2A describes substances which are probably toxic to humans, and although not conclusive, there is strong evidence to suggest that they are cancer-causing; whilst category 4 are substances probably not carcinogenic to humans.<sup>35</sup>

<sup>33</sup> GCS 10 November 2017 Vanderbijlpark Works Contaminated Land Assessment, pages 30-31, Fig 5.4,

<sup>34</sup> GCS 10 November 2017 Vanderbijlpark Works Contaminated Land Assessment, pages 49..

<sup>35</sup> <http://monographs.iarc.fr/ENG/Preamble/CurrentPreamble.pdf>; <http://monographs.iarc.fr/ENG/Classification/index.php>; [https://en.wikipedia.org/wiki/International\\_Agency\\_for\\_Research\\_on\\_Cancer](https://en.wikipedia.org/wiki/International_Agency_for_Research_on_Cancer)

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33. As indicated in paragraph 6.3-6.4 above, the soil samples exceeded the SSV1 sampling values in respect of arsenic, copper, manganese, lead, cadmium, nickel, vanadium, fluoride, nitrate, sulphate, and in benzene in various soil samples. There were also extremely large quantities of chromium VI, benzo[a]pyrene, and pyrene in some areas. Whilst not all of these substances are listed in IARC Monograph, cadmium, arsenic, benzo[a]pyrene, and chromium (VI) are listed as cancer-causing and toxic to humans, and are in the Group 1 Category.<sup>36</sup> Some of the groundwater contaminants are also in the Group 1 category.
34. Some of the contaminants found in the soil and groundwater samples are highly toxic to humans, even in small quantities, and accumulate in the body. The South African Water Quality Guideline for Domestic Use identifies cadmium, chromium(VI), lead, and mercury to be acutely toxic constituents, as they have acute and/or irreversible effects on human health, even at very low concentrations. It is therefore advised that water containing these constituents above the target water quality range, not be used.<sup>37</sup>
35. In the case of arsenic, *“even once-off exposure to a high concentration of arsenic can have serious long term health effects, and even a single high dose exposure to arsenic may occur by ingestion or inhalation and causes nausea, diarrhea and abdominal pain, with multi-organ failure after severe exposure via ingestion. Arsenic compounds are irritants to eyes and skin and cause a variety of vascular diseases. Chronic exposure can affect the respiratory tract, central nervous system, liver, kidneys and gastrointestinal system. Arsenic is a known human carcinogen with exposure linked to the development of skin cancer, bladder and lung cancer and acts via genotoxic mechanism.”*<sup>38</sup>
36. In the case of chromium, although chromium III is prevalent in nature, chromium VI rarely occurs naturally – yet extremely high quantities were found in one sample.<sup>39</sup> It is known to be highly toxic, causing lung cancer, as well as possible nose cancer, and if swallowed, causes damage to the liver and kidneys.<sup>40</sup> Cadmium also does not generally occur in nature, and has a tendency to bio-accumulate in the food chain. The half-life of cadmium in the body is several decades, therefore it is important to avoid exposure. It also accumulates in the body, and even in small amounts, can be highly toxic, causing renal failure, acute gastroenteritis, damage to the kidney (rapid and irreversible uptake) and bones.<sup>41</sup>
37. Coal tar (see references to DNAPL and LNAPL contamination above) contains over 100 chemicals, including benzo[a]pyrene and benzene, which are also toxic to human beings.<sup>42</sup> Benzene causes various forms of acute leukemia, and benzo[a]pyrene may be genotoxic and may damage the DNA.<sup>43</sup>
38. Further, the Risk Profile<sup>44</sup> mentioned in the report is also vague and makes no useful findings concerning how contamination from the site could harm sensitive receptors and makes no assessment of health impacts from the contamination.

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<sup>36</sup> [http://monographs.iarc.fr/ENG/Classification/List\\_of\\_Classifications.pdf](http://monographs.iarc.fr/ENG/Classification/List_of_Classifications.pdf).

<sup>37</sup> Page 11

<sup>38</sup> DEA May 2010, Framework for the Management of Contaminated Land, Appendix B page 2.

<sup>39</sup> GCS 10 November 2017 Vanderbijlpark Works Contaminated Land Assessment, pages 65 & 83.

<sup>40</sup> <http://monographs.iarc.fr/ENG/Monographs/vol100C/mono100C-9.pdf>; DEA May 2010, Framework for the Management of Contaminated Land, Appendix B page 9-14.

<sup>41</sup> DEA May 2010, Framework for the Management of Contaminated Land, Appendix B page 6; South African Water Quality Guideline: domestic Use, pg 39

<sup>42</sup> DEA May 2010, Framework for the Management of Contaminated Land, no page number;

<http://monographs.iarc.fr/ENG/Classification/index.php>

<sup>43</sup> <http://monographs.iarc.fr/ENG/Monographs/vol100F/mono100F.pdf>.

<sup>44</sup> GCS 10 November 2017 Vanderbijlpark Works Contaminated Land Assessment, section 8 and pages vi-vii

## Invalid recommendations

39. Due to the potential contamination from the AMSA site not being adequately assessed, certain recommendations in the report - especially pertaining to further monitoring and studies without any immediate action and remediation measures – are inadequate.
40. AMSA's report also does not seem to adequately address section 37(2)(a) and (b) of NEMWA (which, as mentioned above, specifies what should be addressed in the report - such as health impacts) and also does not provide for the urgent intervention of the accumulation of DNAPL and LNAPL. The report indicates that "**based on the available data, these concentrations are increasing and plume migration is taking place off site**".<sup>45</sup>

## Conclusion

41. In order for the Minister or MEC to make a full and informed consideration of the report in terms of section 38 of the NEMWA, there needs to be an accurate assessment of, and complete information on, the land contamination on AMSA's entire property – as well as potential contamination spreading outside of the property. Furthermore, the report needs to meet the requirements of section 37(2)(b) of NEMWA, the Framework, the Norms and Standards, and the Guide. Based on the information provided above, the report currently falls short of these legislated requirements in many respects.
42. In light of the significant and unacceptable delays (more than 2 years) in conducting the assessment and making the report available, we request that AMSA be required to address these shortcomings in the report urgently – with a deadline by which the amended report must be submitted – given the risks of significant and irreparable harm that is potentially resulting from AMSA's contamination. DEA should also critically evaluate these and other shortcomings that may be present in the report, and take urgent action to prevent and remediate the contamination from the AMSA site, including in relation to the DNAPL and LNAPL contamination that is migrating off the premises.
43. Should DEA not critically evaluate the compliance report and take urgent action, CER will explore legal avenues available to enforce compliance.
44. In the interim, we look forward to receiving your urgent feedback on what action DEA has taken to address the shortcomings in AMSA's report, as well as what action it has taken against AMSA to remedy the contamination which has been reported to be migrating off its premises **on or before 12 March 2018.**
45. All our clients' rights are reserved.

Yours faithfully

**CENTRE FOR ENVIRONMENTAL RIGHTS**

per:



**Michelle Koyama**  
**Attorney**

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<sup>45</sup>GCS 10 November 2017, AMSA Vanderbijl Park Contaminated Land Assessment Report, page 65-66.