Technical Memorandum

Technical Review Comments on "Signetics Focus Feasibility Study Work Plan" By Locus Technologies, Dated October 31, 2019

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From: Aptim Federal Services, LLC

Project No: 500291- 06610220

As requested by the U.S. Environmental Protection Agency (EPA), Aptim Federal Services, LLC (APTIM) reviewed the revised *Focused Feasibility Study Work Plan* (Work Plan) (Locus Technologies [Locus], October 31, 2019). The Work Plan was prepared on behalf of Philips Semiconductors (Philips) for the Signetics Site in Sunnyvale, California (Site). The Work Plan submission is required for compliance with the Administrative Settlement Agreement and Order on Consent for Focused Feasibility Study, Removal Site Evaluation and Removal Action (ASAOC).

1.0 GENERAL COMMENTS

General Comment 1:The ASAOC indicates that this focused feasibility study (FFS) will address groundwater; specifically, Section 1, Appendix C states that the FFS will include "the identification of preliminary remedial action objectives (RAOs) for groundwater; the identification and evaluation of potential remedial alternatives via a Treatability Study (TS) to meet the identified RAOs; the development of a draft FFS; and an RSE of vapor intrusion (VI) to indoor air and implementation of any mitigation measures determined to be necessary". The FFS Work Plan does not clearly state the scope and goals for the study. For example, both soil and indoor air are discussed in some portions of the FFS Work Plan such as Applicable or Relevant and Appropriate Requirements/To-Be Considereds (ARARs/TBCs) (Sections 3.3 and 3.4), RAOs (Section 3.5), and preliminary remedial action alternatives (pages 101–102). Also, indoor air and soil are not addressed in the general response actions (GRA) for the FFS (3rd bullet, bullet list, Section 5.1).

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The media that will be addressed in the FFS should be clarified early in the FFS Work Plan, preferably in Sections 1.1 or 1.2. For example, a statement, similar to the following, should be added: "The FFS will address risks associated with groundwater and the potential for groundwater to act as a source to indoor air impacts."

Soil has been previously evaluated, but as written in the FFS Work Plan, Philips will address soil under this FFS. The Work Plan should be reviewed, and the soil discussion should be removed unless it can be clarified how it relates to groundwater (for example as a pathway, groundwater to soil vapor to indoor air).

General Comment 2: The FFS objectives and scope have not been clearly defined in the current Work Plan, which makes it difficult to follow and comment. At a minimum FFS objectives should include:

1. Risks to be addressed.
2. Need to modify current remedial action (what is the deficiency or reason to evaluate additional remedial action).
3. Extent of the problem (i.e., is contamination contained).
4. All the pertinent information may be included in the discussion of the background/remedial actions at the Site, but there is no final discussion on the need for additional actions that warrants an FFS.

These objectives need to be based on current data collected from the Signetics Site as well as the adjacent sites so that migration of the plume can be evaluated using time trends and the most recent data. These objectives should be presented prior to the RAOs in the Work Plan.

2.0 SPECIFIC COMMENTS

1. Section 2.3.3.8, Enhanced In Situ bioremediation, first paragraph, last sentence, page 43: EPA has not approved the Treatability Study Work Plan for Bioremediation dated 18 October 2016.
2. Section 3.1.2, Chemicals of Concern, page 56: For clarity, the last sentence in this section should be updated to the following: "TCE is the chemical most commonly present at the Site, and therefore serves as the indicator chemical for remedial activities."
3. Section 3.1.4.3, Contaminant Migration, page 74: The conclusions of the EFW Investigation (1997) should be further updated to address preferred groundwater pathways. Recent more robust evaluations of the stratigraphic character of the A and B1 stream channels along the northeastern portion of the Site indicate a more complicated stream channel character beneath the Signetics Site (AECOM 2016). Smaller channels are likely present beneath the Site in addition to the A1 channel and the B1 channel. These preferred

pathways need to be identified and the procedures used to update the CSM more fully in Section 4.3 by applying Environmental Sequence Stratigraphy (EPA 2017).

4. Section 3.3, Applicable or Relevant and Appropriate Requirements, last paragraph, last two sentences, page 85: The statement is made that "the 1991 ARARS were reviewed as a part of the FFS Work Plan for any changes that would affect operations or protectiveness of the remedy. Based on the review of all the Five-Year Review reports, the five-year review process has yielded no changes in ARARs" referring to the ARARs provided in the 1991 Record of Decision (ROD). The five-year review process only reviews ARARs for the implemented alternative to determine if any changes have impacted the selected remedy. The FFS Work Plan needs to provide all ARARs for the Site, including those for all the remedial alternatives evaluated for the FFS, not just the remedy selected in the 1991 ROD. In addition, there may be changes to the regulations since 1991 that do not impact the remedy. The latest regulations should be cited in the FFS Work Plan. For example, there have been substantial changes since 1991 to the Resource Conservation and Recovery Act (RCRA) regulations provided in 40 Code of Federal Regulations (CFR) 268 cited in both the ROD and this FFS Work Plan. However, these changes do not impact the current remedy.

5. Section 3.3, Applicable or Relevant and Appropriate Requirements, general comment: This section does not address the applicability of Federal versus State ARARs (description of each and evaluation to determine the requirement that is most stringent). In addition, Philips may request the State provide current State ARARs for the Site. A request should be made in preparation of the FFS Report.

6. Sections 3.3.1-3.3.3, general comment: Although consistent with the 1991 ROD, current protocol is to cite the specific portions of the regulations that are an ARAR. For example, rather that citing the entire Clean Water Act or Safe Drinking Water Act, only those portions of the Act and/or the corresponding regulations should be provided. This is discussed further in the following comments.

7. Section 3.3.1 Chemical-Specific ARARs Last paragraph, last sentence, page 85: This sentence states that there have been no changes in maximum contaminant levels (MCLs) and maximum contaminant level goals (MCLGs) since the 1991 ROD. This statement is inaccurate. For example, there is now a California MCL for 1,2-dichlorobenzene. Review the values provided in Table 6 of the ROD and modify this sentence accordingly. State that Table 6 of the ROD will be updated for inclusion in the FFS.

8. Section 3.3.1, Chemical-Specific ARARs, general comment: The regulatory citations for the chemical-specific ARARs should be provided. For example, 40 CFR 141.50-141.52 provides the Federal MCLs.

9. Section 3.3.2, Location-Specific ARARs, second sentence, page 86: This section states that "In accordance with the ROD, location-specific ARARs for the Site entail the Fish and Coordination Act." Provide specific citations numbers and verbiage of this Act, or the

corresponding regulations that apply to the Site with the rationale for applicability of the Act/regulations.

10. Section 3.3.3 Action-Specific ARARs, page 86, general comment: Note that as remedial alternatives are developed for the FFS, additional action-specific ARARs may be required and included in the FFS. The ARARs provided in the 1991 ROD should not be considered comprehensive for the groundwater FFS. For example, if land covenants are used as part of land use controls, 22 CCR 67391.1. Requirements for Land Use Covenants would be applicable or at a minimum relevant.

11. Section 3.3.3 Action-Specific ARARs first bullet, page 86: Provide the regulatory citation for National Pollutant Discharge Elimination System (NPDES) regulations that are applicable to the Site. This bullet references the 1991 ROD. Instead, the regulation cited should be referenced.

12. Section 3.3.3 Action-Specific ARARs, fifth bullet, page 87: This discussion cites 40CFR268. Although consistent with the 1991 ROD, current protocol is to cite the specific portions of the regulations that are an ARAR. For example, F-listed wastes are provided in 40CFR261.31, characteristic wastes are provided in 40CFR261.21-14, and criteria for land disposal restrictions treatment standards are provided in 40CFR268.40-49.

13. Section 3.3.3 Action-Specific ARARs, sixth bullet, page 87: Provide the specific citation to the section of the Clean Water Act that is an ARAR for this Site and the state regulations related to the Clean Water Act that may be ARARs if more stringent.

14. Section 3.3.3 Action-Specific ARARs bullet list, page 88: Provide the specific citations for 40CFR262, 40CFR264, and RCRA Title C that are ARARs for this Site as discussed in previous comments. Provide a discussion of how each of the citations may be ARARs.

15. Section 3.3.3, Action-Specific ARARs, final paragraph of section, page 88: This paragraph states that it is not anticipated that RCRA-Regulated Hazardous waste will be identified. If that is a case, any regulations for non-hazardous (RCRA Subtitle D) waste should be included in the ARAR discussion. These regulations have not been provided in the ARARs list.

16. Section 3.4, To-Be Considered Criteria and Remediation Goals, first paragraph, page 88: this section references Department of Energy (DOE) 2019. The DOE did not define TBCs. The proper reference is either the regulatory citation, or the EPA guidance documents.

17. Section 3.4, To-Be Considered Criteria and Remediation Goals, first paragraph, last sentence, page 88: TBCs may also be used when an ARAR exists, if the TBC is a lower value and more appropriate to meet the remedial action objectives.

18. Section 3.4, To-Be Considered Criteria and Remediation Goals, last paragraph, pages 88–89: Indoor air TBCs are discussed. Provide an explanation for use of these TBCs in the

groundwater FFS. For example, will these TBCs be considered to develop groundwater cleanup levels that are protective of indoor air?

19. Section 3.4, To-Be Considered Criteria and Remediation Goals, first partial paragraph on page 89, last sentence: this paragraph references future use of action levels in Table 3 of the draft Vapor Work Plan. It should be noted that these values will be reviewed for any updates as part of the FFS.

20. Section 3.4, To-Be Considered Criteria and Remediation Goals, soil discussion, pages 89–90: The focus of the FFS is groundwater. Soil TBCs for protection of human health and to address ecological risks is not appropriate in the groundwater FFS.

21. Section 3.4, To-Be Considered Criteria and Remediation Goals, last paragraph, first sentence, page 89. EPA Regional Screening Levels (RSLs) are re-evaluated every six months to a year. The latest values should be used in the ARARs/TBCs in the FFS.

22. Section 3.4, To-Be Considered Criteria and Remediation Goals, first full paragraph, page 90: The Ecological Screening Levels (ESLs) for soil should not be addressed in the groundwater FFS.

23. Section 3.4, To-Be Considered Criteria and Remediation Goals, second full paragraph, page 90: Risk to human health from soils is not a remedial action objective in the groundwater FFS, and a discussion of soil TBCs is not needed.

24. Section 3.4, To-Be Considered Criteria and Remediation Goals, second paragraph, page 90: The last sentence states that the site cleanup standard for soil (1 mg/kg total VOCs) is more conservative than these RSLs. This statement is incorrect as some of the RSLs listed are less than 1 mg/kg. However, this paragraph is not needed as it is based on risks from soil.

25. Section 3.4, To-Be Considered Criteria and Remediation Goals, last paragraph, page 91–92. This paragraph discusses the use of soil screening levels (SSLs) to evaluate impact to groundwater based on use as a drinking water supply. Soil cleanup should not be addressed in the scope of the groundwater FFS or in the RAOs. Similar comment for ESLs in the following paragraph.

26. Section 3.4, To-Be Considered Criteria and Remediation Goals, first paragraph, page 93: A deed restriction is a land use control that is used as a remedial measure to address use of groundwater as drinking water supply. It does not eliminate a TBC as a possible cleanup level but is a mechanism used to prevent risk from use of the groundwater.

27. Section 3.5 Evaluation of Current Remedial Action Objectives and Remediation Goals, general comment. The RAOs from the 1991 ROD are used as the basis for the RAOs presented. These RAOs are general in nature. According to the ASAOC, the focus of the FFS is groundwater. The RAOs need to be more specific and address the risks identified including the contaminant, pathway, and receptors. The introduction of this section

should note that the RAOs provided will be updated for the groundwater FFS in the RAO Technical Memorandum (TM) as discussed in Section 5.4.

28. Section 3.5 Evaluation of Current Remedial Action Objectives and Remediation Goals, List of RAOs, page 94: The first RAO from the 1991 ROD presented in this section referenced exposure to groundwater and soil. The ASAOC indicates the focus of the FFS is groundwater. This RAO should be revised for the FFS to omit the risk to human health from soil and address the risks identified including the contaminant, pathway, and receptors (see comment above concerning RAOs). If updated RAOs are not presented in this Work Plan, they need to be presented in the TM and the TM referenced here.

29. Section 3.5 Evaluation of Current Remedial Action Objectives and Remediation Goals, List of RAOs, page 94, general comment: Note, the ASAOC requires preparation of a TM for development of the RAOs once existing information has been evaluated with agreement by EPA. This TM should be mentioned in this section and reference added to Section 5.4 of the FFS Work Plan. Update of the RAOs in the TM could address comments on the current RAOs presented in the above comments.

30. Section 3.5 Evaluation of Current Remedial Action Objectives and Remediation Goals, last paragraph, page 94: It states that "based on this preliminary evaluation, the groundwater cleanup goals specified in the 1991 ROD (California MCLs) are probably adequate as a numerical criteria for groundwater concentrations." This section should address the possibility that unacceptable vapor intrusion from contaminated groundwater may be a pathway (consistent with the fifth RAO added in this section). If that is the case, concentrations in groundwater that could impact indoor air should be considered in the development of action levels used in the FFS. A statement should be included that these values will be reviewed and updated as needed in the RAO Technical Memorandum (Section 5.4).

31. Section 3.5 Evaluation of Current Remedial Action Objectives and Remediation Goals, first paragraph, page 95: It states that "it is clear that the technical practicability of cleanup must be considered in developing RAOs." This statement is inconsistent with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). CERCLA is a risk-based process, and RAOs are developed to achieve an acceptable risk and ARARs. If this objective cannot be achieved, then the responsible party may apply for a technical impracticability (TI) waiver which provides the technical documentation that ARARs cannot be achieved in a reasonable period of time using currently available technology. TI waivers are one of the means of waiving ARARs, consistent with CERCLA Section 121 (b) and by the National Contingency Plan (NCP) (see Section 300.430(f)(1)(ii)(C)(3)) through analysis of site data and demonstration of the technical impracticability of achieving those ARARs (EPA 2012, Summary of Technical Impartibility Waivers at National Priority Sites) and consistent with EPA 1993 (Guidelines

for Evaluating the Technical Impracticability of Ground Water Restoration, OSWER Directive 9234.2-25, September).

32. Section 3.6, Preliminary General Response Actions and Remedial Action Alternatives, page 99: In discussing the update to groundwater extraction consideration must be addressed indicating that extraction has been occurring at the Signetics Site since 1982 and that the initial estimate for restoration of the groundwater was 24 years.

33. Section 3.6 Preliminary General Response Actions and Remedial Acton Alternatives: The first two bullets on page 102 include remedial technologies for indoor air and soil remediation. The ASAOC indicates that the FFS will address groundwater only. As stated in previous comments, please clarify the media evaluated in the FFS. For clarification, the media addressed by the FFS should be clearly defined in Sections 1.0 (Objectives) and 5.0 (FFS Process).

34. Section 4.2, Data Needs: As data generated by the adjacent TRW Site indicates, preferred pathways of contaminant transport have yet to be fully identified at the Signetics Site. An Environmental Sequence Stratigraphic study should be added to the data needs to identify these preferred pathways.

35. Section 5.0, FFS Tasks, first paragraph, last sentence, page 109: Sentence states that "a detailed analysis of alternatives will result in an appropriate remedy for the site"—sentence could be interpreted as the remedy will be provided in the FFS. The FFS does not select a remedy. Suggest rewording to state that "the detailed analysis will be used to provide a basis for proposing a preferred remedial alternative in the Proposed Plan."

36. Sections 5.0 and 5.1, FFS Tasks and Updating the Conceptual Site Model, pages 109 and 110, general comment: The requirements for identification of ARARs and TBCs in the FFS should be provided in Section 5.0. Although a discussion of ARARs and TBCs is provided in Sections 3.3 and 3.4 of this Work Plan, ARARs should be provided in the FFS Report and may need to be updated. The ARARs are used in the development of RAOs, and compliance with ARARs is one of the CERCLA evaluation criteria. Also, regulations may have been revised since preparation of the FFS Work Plan or additional ARARs may be required in the FFS as remedial alternatives are developed. A section should be added to Section 5.0 that describes the ARAR requirements, and this task should be added to the bullet list in Section 5.1.

37. Section 5.2, Updating the Conceptual Site Model, First Paragraph: The ASAOC does not restrict update of the CSM to new information generated during the FFS. As previously stated, an Environmental Sequence Stratigraphic study is needed to identify preferred pathways transporting contaminants through and downgradient of the Site. The procedures to be used to update the CSM should be included in the discussion, not just questions.

38. Section 5.2, Updating the Conceptual Site Model bullet List, final bullet, page 110: For grammatical consistency this bullet should start with a verb, such as performs or provides.

39. Section 5.3, Groundwater Containment Technical Memorandum, page 112: The ASAOC, Appendix C, pages 7–8 provides the requirements for this technical memorandum. These requirements should be included in the FFS Work Plan.

40. Section 5.4, Updating Remedial Action Objectives and Remediation Goals, first paragraph, page 112: It should be stated that groundwater RAOs will address the contaminants of concern, exposure routes and receptors, and acceptable contaminant levels for each exposure route. Although at least some of these factors are presented in the bullet list, it should be clearly stated that RAOs address risk including the factors provided in this comment. It should also be noted that the RAOs for this FFS focus on groundwater.

41. Section 5.4, Updating Remedial Action Objectives and Remediation Goals, first paragraph and bullet list, page 112. Clarify that the RAOs will be revised to specifically address groundwater, the focus of the FFS.

42. Section 5.4, Updating Remedial Action Objectives and Remediation Goals, Item f, page 112: Define "resource values".

43. Section 5.5, General Response Actions, page 113, general. The text should state that the general response actions will focus on groundwater and be updated to include monitoring, engineering controls, and institutional controls.

44. Section 5.6, Identifying, Screening, and Evaluation of Remedial technologies and Process Options, last paragraph, page 114: This paragraph states that the identification, screening, and evaluation of remedial technologies and process options will be documented in the FFS report or in an Identification of Candidate Treatment Technologies Technical Memorandum as previously discussed in Section 4.5. As described in Section 4.5 of the FFS Work Plan and in Appendix C, Section III.D.1 of the ASAOC, this Technical Memorandum will only identify candidate treatment technologies for the treatability studies. If the Technical Memorandum is used to provide the screening of remedial technologies and process options, all potential treatment technologies and the other GRAs should be included in the Technical Memorandum. Suggest keeping this information in the FFS and referencing the Technical Memorandum only for treatment technologies included in the treatability study.

45. Section 5.7, Development and Screening of Remedial Alternatives, first paragraph, first sentence, page 114: The first sentence references technology types and process options for each media of interest. As stated in previous comments, this FFS is focused on groundwater, according to the ASAOC.

46. Section 5.7.2, Screening Evaluation, general comment: The ASAOC, Appendix C, Section III.E.2.c provides a detailed discussion of the information required to be provided if

institutional controls (IC) are identified as a selected remedial action. This same detail for ICs should be included for remedial alternative development in this section.

47. Section 5.7.2, Screening Evaluation, first paragraph, second sentence, page 115: Not only is it media specific, the previous technology and process option screen evaluates only a single technology while the alternative screen evaluates the combination of technologies included in the remedial alternative.

48. Section 5.8, Detailed Analysis of Alternatives, page 116, general comment. This section should include the nine remedial alternative evaluation criteria for a feasibility study as defined in the NCP. The five criteria that are listed in the bullet list are the statutory requirements to be met for the selected remedy (these are not evaluation criteria for remedial alternative screening). A remedy is not selected in the FFS. First, a preferred remedial alternative is presented in the Proposed Plan. Then, the selected remedy is presented in the ROD or ROD addendum, and the selected remedy is compared to the statutory requirements in the ROD.

49. Section 5.8.1, Alternative Definition, first sentence, page 117: Add "for detailed analysis" after "The alternatives selected" to clarify the statement.

50. Section 5.8.2, Individual Analysis of Alternatives, page 117, general comment: In the ASAOC, Appendix C, Section III.A.2.c (page 7) states that the FFS work plan will define expected performance requirements of treatment alternatives, including consideration of 1) site physical characteristics, 2) physical and chemical characteristics of groundwater contamination, and 3) volume of contamination and extent of contamination. Some of this information is included in this section, but these three considerations need to be specifically discussed.

51. Section 5.8.2, Individual Analysis of Alternatives, page 117, general comment: A description/discussion of each of the seven evaluation criteria should be presented in this section.

52. Section 5.9 Draft Focused Feasibility Study Report, bullet list, page 119: In the description of the report organization:

    - Section 2.0 should also discuss the results of sampling performed to support the FFS, the risk assessment, the conceptual site model (CSM), and any remedial actions performed to date at the Site.
    - Section 3.0 should include the ARARs and TBCs.
    - Section 3.0 should include a summary of the results of any FFS treatability studies performed to support the technology evaluation.