Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection

Southeast Regional Office • 20 Riverside Drive, Lakeville MA 02347 • 508-946-2700

Charles D. Baker
Governor

Karyn E. Polito
Lieutenant Governor

Matthew A. Beaton
Secretary

Martin Suuberg
Commissioner

February 7, 2017

AVX Corporation
1 AVX Boulevard
Fountain Inn, SC 29644
ATTN: Mr. Evan Slavitt

RE: **NEW BEDFORD**-BWSC
Release Tracking Number: 4-0000601
Former Aerovox Facility
740 Belleville Avenue
WRITTEN DETERMINATION REGARDING PHASE III REMEDIAL ACTION PLAN

Dear Mr. Slavitt:

The Massachusetts Department of Environmental Protection (MassDEP or the Department), Bureau of Waste Site Cleanup is tasked with ensuring the cleanup of oil and hazardous material (OHM) releases pursuant to the Massachusetts Oil and Hazardous Material Release Prevention and Response Act (M.G.L. c. 21E). The law is implemented through regulations known as the Massachusetts Contingency Plan (310 CMR 40.0000 et seq. – the MCP). Both M.G.L. c. 21E and the MCP require the performance of response actions to provide for the protection of harm to health, safety, public welfare and the environment which may result from releases and/or threats of releases of OHM at disposal sites.

Through the MCP, MassDEP is currently regulating an historic release of OHM that has occurred at the former Aerovox property located at 740 Belleville Avenue, New Bedford, Massachusetts (the Property). The term Site, as defined in the Administrative Consent Order (ACO-SE-09-3P-016 or the ACO) executed on June 3, 2010, means any place or area where a release of OHM at or from the property at 740 Belleville Avenue has come to be located, except for any such places or areas that are part of the New Bedford Harbor Superfund Site but inclusive of the sheet-pile wall that was previously installed at the Property. MassDEP has assigned Release Tracking Number (RTN) 4-0000601 to the Site. AVX Corporation (AVX) has been identified as a Potentially Responsible Party (PRP) for the Site and is conducting response actions pursuant to M.G.L., c. 21E, the MCP and the ACO.

The ACO, which was signed by MassDEP, the Massachusetts Attorney General's Office, and you (when used in this letter "you" and "your" refers to AVX), establishes, *inter alia*, deadlines for the completion of Comprehensive Response Actions. Pursuant to Paragraph 14 of the ACO, deadlines for completion of the subsequent Comprehensive Response Actions are dependent on AVX's receipt of MassDEP's written approval of each prior submittal. Paragraphs 14(a) – (c) of the ACO also specify that MassDEP will provide AVX with written notice of MassDEP's approval, conditional approval, deficiency or denial for each submittal made by AVX pursuant to the ACO. On August 22, 2016, Brown & Caldwell submitted a Phase III Remedial Action Plan (Phase III RAP) to MassDEP on behalf of AVX.

This information is available in alternate format. Contact Michelle Waters-Ekanem, Director of Diversity/Civil Rights at 617-292-5751.
TTY# MassRelay Service 1-800-439-2370
MassDEP Website: www.mass.gov/dep

Printed on Recycled Paper

As you are aware, on December 8, 2016 a meeting was held among MassDEP and its contractor (Nobis Engineering); you, your Licensed Site Professional (LSP) and your environmental consultant (Brown & Caldwell); the United States Environmental Protection Agency (EPA) and its contractor (Jacobs Engineering); the Army Corps of Engineers; and the City of New Bedford (City) and its environmental consultant (O'Reilly, Talbot & Okun Associates), to discuss MassDEP's review and determination regarding the Phase III RAP (MassDEP issued an agenda to the meeting participants on December 7, 2016 providing a written determination regarding the selected remedial alternatives in the Phase III RAP). Also discussed at the December 8, 2016 meeting were several deficiencies identified in the Conditional Approval letter for the Phase II Comprehensive Site Assessment Report (Phase II Conditional Approval) dated March 11, 2016, which either remain unaddressed, or which have been partially addressed in separate correspondence with MassDEP but which are still not included in the Phase III RAP (as required by 310 CMR 40.0810(3) and the Phase II Conditional Approval). The Attachments to this letter also describe the ongoing Phase II deficiencies that were not addressed in the Phase III RAP, organized under each operable unit (OU), as identified in the Phase III RAP and summarized below in this letter, to which the Phase II deficiency applies.

The purpose of this letter is to provide you with MassDEP's detailed written notice of its determination regarding each of the recommended remedial action alternatives presented in the Phase III RAP that was originally outlined in the meeting agenda provided to you on December 7, 2016 and discussed at the December 8, 2017. In addition, additional information that was not discussed at the December 8, 2017 meeting is included in this letter.

PHASE III REMEDIAL ACTION PLAN
REVIEW AND INFORMATION REGARDING WRITTEN DETERMINATION

The performance standards for a Phase III evaluation, established at 310 CMR 40.0850 *et seq.*, provide that a Phase III evaluation shall result in the identification and detailed evaluation of remedial action alternatives which are reasonably likely to achieve a level of No Significant Risk considering the OHM present, media contaminated, and site characteristics; and, the recommendation of a remedial action alternative that is a Permanent or Temporary Solution, where a Permanent Solution includes measures that reduce, to the extent feasible, the concentrations of OHM in the environment to levels that achieve or approach background (310 CMR 40.0853(1)(a)). Pursuant to 310 CMR 40.0853(2), the Phase III RAP "shall describe and document the information, reasoning and results used to identify and evaluate remedial action alternatives in sufficient detail to support the selection of the proposed remedial action alternative." Evaluation criteria for the screening of alternatives are specified in detail in 310 CMR 40.0858, and include the following: comparative effectiveness; short-term and long-term reliability; difficulty in implementing; costs; risks; benefits; timeliness; and the relative effect of the alternatives on non-pecuniary interests.

MassDEP understands the challenges associated with identifying and evaluating remedial action alternatives at this Site, as it involves significantly high concentrations of co-located polychlorinated biphenyls (PCBs) and trichloroethylene (TCE) in a heterogeneous overburden aquifer; Dense Non Aqueous Phase Liquid (DNAPL) consisting of mixed PCBs and TCE in both the overburden and bedrock aquifers; a shallow and deep bedrock aquifer system with DNAPL and high concentrations (above the MCP Groundwater Category GW-3 Standards) of PCBs and TCE; potential vapor intrusion issues; and tidal fluctuations that affect groundwater flow in both the overburden and bedrock aquifers. Notwithstanding these challenges, many of the alternatives identified in the Phase III RAP for each OU are expected to achieve a Permanent Solution. MassDEP acknowledges AVX's commitment to achieving a Permanent Solution for all individual OUs, and for the Site as a whole.

MassDEP notes the *Cooperation and Settlement Agreement* separately entered into by AVX and the City which establishes a framework for coordination and the completion of necessary response actions at the Site as between AVX and the City. In light of the fact that any post-Permanent Solution remedial activities and/or operation and maintenance (O&M) of any remedial activity would become the City's primary responsibility (upon AVX's receipt of written notice from MassDEP that all necessary response actions have been completed in accordance with Paragraph 14 of the ACO), the City's input and comments regarding any such ongoing activities and obligations have been appropriately considered by MassDEP. The Phase III RAP, information from the Immediate Response Action (IRA) Status Reports, information provided in a letter from Brown & Caldwell to MassDEP on August 22, 2016, and comments submitted to MassDEP by the City and by EPA were reviewed and considered by MassDEP during its evaluation of the Phase III RAP, and were incorporated as appropriate in MassDEP's determination whether/to what extent the Phase III performance standards have been met.

The following table presents a summary of key information for each OU identified in the Phase III RAP, including the location of each OU and associated type of contamination; the Remedial Action Alternatives recommended in the Phase III RAP for each OU; and MassDEP's December 7, 2016 written determination regarding each OU. MassDEP provides more detailed comments, conditions, and additional information regarding each OU determination in Attachments A through E to this letter, organized by OU (i.e., Attachment A pertains to OU1; Attachment B pertains to OU2; Attachment C pertains to OU3A; Attachment D pertains to OU3B; and Attachment E pertains to OU4).

Operable Unit	**Disposal Site Location and Type of Contamination**	**Recommended Remedial Action Alternative**	**MassDEP Determination**
OU1-1	Titleist property, southerly abutter to former Aerovox property; surficial soils impacted with PCBs.	Soil excavation, soil cap, and an Activity and Use Limitation (AUL) requiring monitoring, maintenance, and documentation of the cap and repairs as necessary, and prohibiting residential use of the area, et al.	**Conditionally Approved**
OU2-1	Precix property, northerly abutter; although indoor air is not presently impacted, the concentration of TCE in the sub-slab soil gas is approximately 200 times greater than the commercial/industrial sub-slab soil gas screening value indicating that a potential future impact to indoor air exists.	Monitored natural attenuation (MNA) and an AUL that would require continued monitoring of groundwater, sub-slab soil gas and indoor air quality; prohibit both disruption to the building floor slab and residential use of the property.	**Conditionally Approved**
OU3A-3	Aerovox property - overburden soil; PCBs, TCE, and DNAPL.	Asphalt cap over soil with PCBs > 2 mg/kg; Engineered barrier over soil with PCBs > Upper Concentration Limits (UCLs), and an AUL to prohibit residential use of the property; require continued monitoring, maintenance and	**Deficient**

Operable Unit	Disposal Site Location and Type of Contamination	Recommended Remedial Action Alternative	MassDEP Determination
		documentation of the cap and any necessary repairs.	
OU3B-4	Aerovox property – groundwater in overburden aquifer; PCBs, TCE, and DNAPL.	Vertical barrier wall, permeable reactive barrier (PRB), in-situ treatment of soil Hot Spots that act as a source of groundwater contamination.	**Denied**
OU4-1	Aerovox property – groundwater in bedrock aquifer; PCBs, TCE, and DNAPL.	In-Situ Chemical Oxidation (ISCO) using sodium permanganate for TCE and alkaline persulfate for PCBs and TCE in areas with contaminant concentrations exceeding UCLs.	**Deficient**

DISPUTE RESOLUTION

As you are aware, Paragraph 22(a) of the ACO provides that AVX may invoke dispute resolution to challenge a decision by MassDEP under paragraph 14 (and paragraph 20) of the ACO within five (5) days after obtaining knowledge of such a dispute. On December 12, 2016, in response to AVX's receipt of MassDEP's December 7, 2016 written determination for each of the recommended OU alternatives, your legal counsel submitted a letter to MassDEP invoking dispute resolution regarding MassDEP's denial of the recommended PRB remedial action alternative for OU3B-4. In anticipation of a meeting between the parties to discuss and attempt to resolve the dispute raised by AVX regarding MassDEP's denial of OU3B-4, and in order to facilitate the dispute resolution process, this letter provides additional information regarding MassDEP's December 7, 2016 written determination, including matters discussed at the December 8, 2016 meeting as well as more detailed information regarding the basis for MassDEP's determination, along with requested guidance for addressing the issues raised in an anticipated modification to the Phase III RAP (Phase II RAP Modification). As of the date of this letter, no other dispute besides the pending dispute regarding MassDEP's denial of the recommended PRB alternative for OU3B-4 has been raised by AVX in response to MassDEP's December 7, 2016 written notice of determination.

INTERIM DEADLINE

MassDEP hereby establishes, Friday February 17, 2017 as the deadline by which MassDEP, AVX, and their respective consultants and counsel shall participate in a conference call or meeting to discuss the following: (1) the dispute raised by AVX regarding MassDEP's denial of the recommended PRB remedial alternative for OU3B-4 (as per ACO Amendment #5, which affords ten (10) days from AVX's receipt of this letter to confer); (2) ongoing deficiencies identified in the Phase II Conditional Approval and in this letter that must be addressed in order for AVX to obtain the necessary MassDEP approvals; and, (3) any/all remaining issues regarding MassDEP's December 7, 2016 written determination for the Phase III RAP, including the additional information provided in this letter. This date constitutes an enforceable Interim Deadline pursuant to 310 CMR 40.0167. Failure to comply with an Interim Deadline may result in enforcement actions by the MassDEP, including, but not limited to, the issuances of a Notice of Noncompliance, an Administrative Penalty, and/or Enforcement Orders, or, referral to the Massachusetts Attorney General's Office.

If you have any questions regarding this matter, please contact Angela Gallagher at 508-946-2790. All future communications regarding this matter must reference Release Tracking Number 4-0000601.

Sincerely,

Gerard M.R. Martin
Deputy Regional Director
Bureau of Waste Site Cleanup

M/AG/lg

Attachments: Attachment A – OU1
Attachment B – OU2
Attachment C – OU3A
Attachment D – OU3B
Attachment E – OU4

CERTIFIED MAIL # 7016 0750 0000 1748 9506
RETURN RECEIPT REQUESTED

ec: City of New Bedford
Mayor's Office
Office of Environmental Stewardship
Health Department

LSP-of-Record
Marilyn Wade, P.E., LSP
mwade@brwncald.com

AVX Attorney
Gary Gill-Austern, Esq.
Nutter, McLennan, and Fish

U.S. EPA
Ginny Lombardo, Former Team Leader, New Bedford Harbor Superfund Site
Elaine Stanley, Former Remedial Project Manager, New Bedford Harbor Superfund Site
Kim Tisa, TSCA Program
David Lederer, Team Leader
Dave Dickerson, Remedial Project Manager

DEP-SERO
Millie Garcia-Serrano, SERO Regional Director

Angela Gallagher, BWSC Project Manager
Dawn Stolfi Stalenhoef, Chief Regional Counsel

DEP-Boston
Paul Locke, Assistant Commissioner, BWSC
Paul Craffey
Garry Waldeck

Nobis Engineering
David Lang
Jennifer Davis
Denis McGrath

ATTACHMENT A
OPERABLE UNIT 1 – TITLEIST PROPERTY
Conditional Approval

Operable Unit	OU1 - This area encompasses the Titleist property which is located south of the former Aerovox property at 700 Belleville Avenue. Contamination in this OU consists of surficial soils that have been impacted with PCBs. Groundwater contamination is not generally an issue in this OU.
Selected Remedial Option	The Phase III RAP proposes excavation and disposal of the top two feet of surficial soils and all additional soils with concentration of PCBs greater than the UCL of 100 mg/kg. Once the excavation is complete, an asphalt cap will be constructed over the area. A deed restriction in the form of an AUL will be placed on the property requiring continued monitoring and maintenance of the asphalt cap and documentation of the monitoring and maintenance activities. Additionally, the property will be restricted from residential use, and the current owner and potential future owners would be required to implement a Soil Management Plan and Health and Safety Plan to mitigate potential direct contact with impacted soils remaining on this portion of the site should there be any future excavation.
MassDEP Review of Remedial Solution	MassDEP conditionally approves the cleanup strategy selected in the Phase III RAP. However, MassDEP offers the comments below that must be addressed before MassDEP will concur that the next phase of comprehensive response actions can be initiated.

Comments/Conditions:

1. MassDEP understands that the recommended alternative (OU1-1) as proposed in the Phase III RAP requires that the owner of this property agrees to provide access and also agrees to the filing of an AUL for the property. During the December 8, 2016 meeting, AVX informed MassDEP that the owners of this property rejected the remedial alternative proposed in the Phase III RAP (OU1-1). AVX indicated that the owner of this property will require OU1-3 to be implemented, which consists of excavating and disposing of soil with concentrations of PCBs greater than 1 mg/kg.

2. MassDEP understands that additional data obtained from the Titleist/Acushnet Company property by the EPA for the purposes of evaluating the New Bedford Harbor Superfund Site has been provided to AVX. The extent of contamination for the site should evaluated and documented in the Phase III RAP Modification.

3. During IRA activities in July, August, and September 2016, sheens were observed in the river surface which likely resulted from the disturbance of soil and sediment during test pitting activities, sheet pile wall installation, and soil excavation activities. Given this past occurrence and the proposed alternative for soil excavation at the Titleist property that will likely result in similar formation of sheens on the Acushnet River, the Phase III RAP Modification should include the cost of a construction monitoring plan in the Phase III Modification that addresses the potential occurrence of sheens during construction activities. These costs should be added to the costs already identified for this recommended alternative.

4. Pursuant to 310 CMR 40.0853(1)(a), "a Phase III evaluation shall result in the identification and evaluation of remedial action alternatives that are reasonably likely to achieve a level of No Significant Risk considering the OHM present, media contaminated, and site characteristics." The initial screening of remedial alternatives presented in Section 4.1.1.5 and Table 4.1 in the Phase III RAP identify excavation and on-site (at the former Aerovox property) consolidation of contaminated soil as an option that is reasonably likely to achieve a Permanent Solution. Table 4.1 also indicates that this alternative would be retained for OU1. However, excavation and on-site consolidation, as a whole, was not part of the detailed evaluation for OU1. It was also not discussed in the sections covering OU3 (the operable unit that would contain the on-site consolidation – see Attachment C of this letter for additional information). 310 CMR 40.0855(2)(b) requires that a detailed evaluation be included for those alternatives identified in the initial screening. Therefore, excavation and on-site consolidation should have been considered as part of the detailed evaluation of OU1 (and for OU3, where the on-site consolidation would be located).

5. It is unclear whether some references to depth in the Phase III RAP are presented as feet below the ground surface (bgs) or as feet above mean sea level (amsl).

ATTACHMENT B
OPERABLE UNIT 2 – PRECIX PROPERTY
Conditional Approval

Operable Unit	OU2 – This area encompasses the soil, vadose zone, and groundwater beneath the Precix property as well as the indoor air in the Precix building. Precix abuts the former Aerovox site to the north at 744 Belleville Avenue. The indoor air within the Precix building, and soil, soil gas, and groundwater on the Precix property have been impacted with TCE. PCBs are not a concern for indoor air, soil, soil gas, and groundwater for this operable unit.
Selected Remedial Option	The Phase III RAP proposes MNA of groundwater and soil vapor. In addition, an AUL will be implemented requiring continued monitoring of groundwater, sub-slab soil gas and indoor air quality; prohibiting the disruption to the building floor slab; prohibiting residential use of the property; and mandating the use of a Soil Management Plan and Health and Safety Plan to mitigate direct contact with impacted soils remaining on site.
MassDEP Review of Remedial Solution	MassDEP conditionally approves the cleanup strategy identified in the Phase III RAP. However, MassDEP offers the comments below that must be addressed before MassDEP will concur that the next phase of comprehensive response actions can be initiated.

Comments/Conditions:

1. The recommended remedial alternative for this area is MNA and the implementation of an AUL as described in the above table. Although a complete vapor intrusion pathway was identified, it was determined that neither a condition of No Significant Risk nor No Substantial Hazard existed at this time. MassDEP understands that for the recommended alternative to be implemented, the owner of this property would have to agree to provide access and to the filing of an AUL. MassDEP's approval of this alternative is conditioned upon Precix's acceptance of this alternative.

2. During Phase II activities, access to the Coyne Laundry property was not granted; therefore, evaluation of the northernmost portion of the disposal site could not be completed and the extent of contamination was not fully evaluated to the north of Aerovox and Precix. The Phase II Conditional Approval letter from MassDEP to AVX stated that this information should be provided in the Phase III. Information related to this issue was subsequently presented in (IRA Status Reports 6 and 7 and by telephone to MassDEP after the submittal of the Phase III RAP. However, this information should have been included in the Phase III RAP.

3. The extent of contaminated groundwater in the bedrock aquifer north of Precix, toward Coyne, has not been fully delineated and should be further evaluated in this portion of the Site.

4. It is unclear whether some references to depth in the Phase III RAP are presented as feet below the ground surface (bgs) or as feet above mean sea level (amsl).

ATTACHMENT C
OPERABLE UNIT 3A – SOIL AT FORMER AEROVOX PROPERTY
Notice of Deficiency

Operable Unit	OU3A – This area encompasses the PCB contaminated overburden soils on the Aerovox property. This OU also encompasses the contaminated sediment in the storm water sewers on the site.
Selected Remedial Option	The Phase III RAP proposes the construction of an asphalt cap over soils with concentrations of PCBs greater than 2 mg/kg and construction of engineered barriers over soils with PCB concentrations greater than the UCLs. An AUL requiring continued monitoring, maintenance, and documentation of the cap and repairs as necessary; limitations prohibiting residential use of the property; and mandated Soil Management Plan and Health and Safety Plan to mitigate potential direct contact with impacted soils that remain on site will be incorporated into this alternative. The storm water system remediation will consist of cleaning and lining or replacing the system dependent upon the condition of the system at the time of remediation.
MassDEP Review of Remedial Solution	MassDEP has identified several deficiencies for this OU which are described below and must be addressed before MassDEP will consider approving a remedial option.

Deficiencies:

1. The Phase II Report states that DNAPL containing both PCBs and TCE is present at the northeast corner of the sheet pile wall and may also be present in the shallow soil above the peat layer near the south culvert. While it is known that DNAPL areas were excavated at MIP-23, UV-17, and BGP-20 under IRA activities in 2016, DNAPL was not addressed in its entirety in the Phase III RAP. The anticipated Phase III Modification should include a discussion of DNAPL removed under the IRA and any residual DNAPL that exists or is believed to exist based on analytical data at the site and on construction obstacles encountered during IRA activities. The Phase III Modification should include a comprehensive summary of all lines of evidence regarding DNAPL at the site (direct observations, Mise-a-la-Masse survey (MALM), concentrations in soil above threshold DNAPL saturation/partitioning, elevated groundwater concentrations relative to solubility, concentration trends with depth and over time, and site use history. A tabular presentation may be a more efficient summary of this information. Site maps presenting confirmed and probably DNAPL source zones may also provide an efficient visual presentation.

2. The Phase II Conditional Approval letter indicated that a description/discussion of the hydrologic conditions of the Acushnet River was required but was not included in the Phase III RAP (MassDEP acknowledges that AVX and Brown & Caldwell attempted to address this question in their August 22, 2016 letter but did not satisfy MassDEP's requirements). MassDEP understands that there are two sources of historic flooding (drainage to the Site and high tide/weather effects from the Acushnet River), and that AVX has partially addressed drainage issues. However, three mechanisms have still not been addressed: (1) On-site flooding from the Acushnet River at flood stage, inundating the Site with surface water flowing at a relatively high velocity resulting in the potential

for erosion; (2) Coastal flooding from the Acushnet River onto the Site from significant storm events; and (3) Overland flow from heavy rain events.

Although the New Bedford Harbor Superfund Site has been administratively separated from the former Aerovox disposal Site in the ACO, flooding of the former Aerovox Site from the Acushnet River must be considered when evaluating contaminant migration pathways as part of the Phase II Assessment. As MassDEP has commented previously, it has not been adequately demonstrated that the "steel sheet pile cutoff wall" installed "to serve as a vertical barrier between PCB-contaminated soils and groundwater, and tidal flow into and out of the Acushnet River" (ACO at paragraph (6)(k)) has been effective at serving its defined purpose. Given that the Site is located immediately adjacent to the Acushnet River and has been affected by tidal influences (including the recent King tides and other storm surges), consideration of flooding and other storm-related events is crucial to determining the appropriate remedial alternatives for the former Aerovox Site.

3. The Phase II Conditional Approval letter requires that AVX provide information to support that DNAPL is not migrating to the Acushnet River. MassDEP acknowledges that AVX has asserted in various IRA Status Reports and in the Phase II Report that DNAPL is present in the mid- to late-stage of a chlorinated solvent release and that, on the basis of a November 2011 Interstate Technology Regulatory Council (ITRC) document called, "Integrated DNAPL Site Strategy," at this late stage the DNAPL is not likely to migrate. However, AVX has not presented any site-specific data to support the assertion that DNAPL is not migrating to the river despite variable and dynamic conditions, nor has AVX demonstrated that DNAPL will not migrate in response to the planned New Bedford Harbor dredging (which AVX is required to consider, in accordance with the MCP performance standards for the Phase III RAP). MassDEP has requested site-specific support for this conclusion on multiple occasions, and it remains a significant gap in the phased analysis upon which the remedial alternatives must be developed.

   MassDEP does not accept the assertion in the Phase III that source control on the former Aerovox Site is "contingent upon" source removal in the Acushnet River or as part of the EPA New Bedford Harbor Superfund cleanup. AVX's obligation to address source control on the Aerovox Site is not properly made subject to such qualification. Moreover, as mentioned above and discussed further below, 310 CMR 40.0858(3)(b) specifically requires that integration of remedial action alternatives with "other current or potential remedial actions" be considered in the Phase III evaluation. The planned harbor dredging is quite clearly an "other current or potential remedial action" which must be considered when evaluating remedial alternatives in the Phase III.

4. The Phase II Conditional Letter requested that details regarding the existing sheet pile wall be described in the Phase III RAP. MassDEP notes that relevant information pertaining to the construction details and location of the sheet-pile wall relative to the areas of known contamination has been provided in IRA Status Report #4; in plans generated by EPA and others after the sheet-pile wall was installed; and in the required annual cap inspection reports under the EPA Action Memorandum and Toxic Substances Control Act (TSCA) determination. However, in order to satisfy the requirements of the Phase II Conditional Approval and 310 CMR 40.0810(3), and to provide the public with a complete record of the phased Comprehensive Response Action process, this information must be provided in the modification of the Phase III RAP.

5. As noted in the Interim IRA Status report dated December 2, 2016, the DNAPL in the vicinity of UV-17 and BGP-20 has been excavated to just below the peat layer. The soil above the peat in MIP-23 has also been excavated. It is unclear whether the IRA excavation has changed the estimated extent

of contaminated soil that needs to be addressed under OU3A and whether this will affect the evaluation and scoring of remedial alternatives.

6. The following cost discrepancies were identified between Appendix D of the Phase III RAP and Section 5.3.1.4 (the text matches Table 5.3):

   a. OU3A-1: Appendix D capital = $19.4 million (M), elsewhere capital = $22.7 M
   b. OU3A-1: Appendix D estimated total net worth = $20.6 M, elsewhere total net worth = $23.1 M
   c. OU3A-2: Appendix D capital = $17.6 M, elsewhere capital = $26.3 M
   d. OU3A-2: Appendix D estimated total net worth = $18.8 M, elsewhere total net worth = $26.7 M
   e. OU3A-3: Appendix D capital = $2.0 M, elsewhere capital = $2.5 M
   f. OU3A-3: Appendix D estimated total net worth = $3.2 M, elsewhere total net worth = $2.9 M

   AVX has indicated that they are aware of these discrepancies. However, the discrepancies do not appear to have affected the scoring of the remedial alternatives.

7. Pursuant to 310 CMR 40.0853(2), reasoning and results used to identify and evaluate remedial action alternatives in sufficient detail to support the selection of the remedial alternative shall be described and documented in the Phase III RAP. However, options OU3A-1 and OU3A-2 do not contain and apparently do not consider the estimated volume of soil with PCBs at concentrations that exceed 100 ppm.

8. The Phase I Report for Aerovox, prepared by URS Corporation on August 15, 2013, references a 2006 Conceptual Site Model study completed by ENSR that concluded up to 109,000 kg of PCBs (up to 120 tons) were present in the soil at the Aerovox facility at that time (see Table 3 in the Phase I). Using the data from this table and eliminating the data from the top two (2) feet of soil (which was likely excavated during building demolition), an estimated 50 tons of PCBs remain in the soil at the Site. Moreover, of the estimated 50 tons of PCBs remaining in the soil at the Site, approximately 90% of PCBs in the soil are located on the eastern portion of the Site, within 100 feet of the Acushnet River (MassDEP recognizes that the recent excavation of PCB-contaminated soil as part of the IRA has decreased the amount of PCB-contaminated soil). Revised PCB mass calculations should be incorporated in the Phase III Modification to update current conditions. These calculations should then be used to evaluate the effectiveness, reliability, risks, costs, and implementability of the remedial alternatives.

   In addition, the total mass of TCE should also be calculated, if possible. MassDEP acknowledges that it may not be possible to accurately calculate the mass of TCE. If the mass of TCE cannot be calculated, the Phase III Modification should state the reason(s) it was not possible.

9. As mentioned in the comments relative to OU1, the initial screening of remedial alternatives presented in Section 4.1.1.5 and Table 4.1 identify excavation and on-site consolidation of contaminated soil as an option that is reasonably likely to achieve a Permanent Solution. Table 4.1 indicates that this alternative would be retained for OU1 (the abutting Titleist property/Acushnet Rubber property) and OU3 (the Aerovox property), but this alternative was not considered nor discussed for OU3 (the Aerovox property) in the Phase III RAP. Although Section 4.2.1 of the Phase III states that on-site consolidation at the Aerovox property (OU3) is an alternative to consider, the

cost estimates provided are for off-site disposal facilities. Pursuant to 310 CMR 40.0855(2)(b), a full evaluation of excavation and on-site consolidation should have been considered as part of the detailed evaluation of OU3.

10. Numerical tables summarizing itemized costs and soil volumes were not provided to support the calculations of soil volumes and estimated remediation costs to evaluate the feasibility of remedial options. Specifically, for alternatives OU3A-1 and OU3A-2, the cost of the portion of the proposed 26,000 cubic yards of soil with concentrations of PCBs greater than 100 mg/kg has not been provided separately from the disposal costs of the remaining soil. With regard to scoring of the alternatives, factors affecting each individual rating in Tables 5-1 through 5-4 were not included and therefore do not provide an understanding of how scoring was conducted. The background information for costs and soil volumes must be provided in the Phase III Modification, as well as a clear and concise description of the scoring methodology, in order to satisfy the requirements of 310 CMR 40.0853(2) (e.g., reasoning and results used to identify and evaluate remedial action alternatives in sufficient detail to support the selection of the remedial alternative shall be described and documented in the Phase III RAP).

11. Pursuant to 310 CMR 40.0858(2), the comparative short-term and long-term reliability of the remedial alternatives shall be evaluated, including the degree of certainty that the alternative will be successful; and the effectiveness of any measures required to manage residues or remaining wastes or control emissions or discharges to the environment. However, information on the long-term reliability and certainty of the proposed remedial alternatives, including the chosen remedial option of a cap and barrier under OU3A, was not presented in the Phase III RAP. Reliability criteria should consider storm events, tidal fluctuations, and flooding, which can erode an asphalt cap and/or engineered barrier, and whether it is certain that the cap and barrier can withstand such forces. Further, if the cap or barrier were to fail because of storm events or extremely high tides, or for any other unforeseen event, the management of a release as a result of such destruction has been not evaluated. To satisfy the requirements of 310 CMR 40.0858(2), a discussion of the short term and long term reliability of the alternatives evaluated under this operable unit should have been included in the Phase III RAP. The scoring of this alternative should be modified based upon this evaluation.

12. According to the Phase III RAP, the Acushnet River is "...also a source of contaminants back into the Aerovox site...[and mitigation of contaminant migration from Aerovox] is contingent upon EPA also completing source removal in the river..." However, 310 CMR 40.0858(3)(b) requires that the Phase III RAP consider the remedial activities planned by EPA within the Acushnet River when it evaluates the implementability of its remedial alternatives. EPA's plan to dredge to remove PCB and TCE contaminated sediment from the area immediately east of the Aerovox facility by utilizing the Aerovox shoreline has been known to AVX for many years, and certainly was known to AVX sufficiently in advance of conducting its Phase III evaluations that it could have been appropriately considered. However, none of the remedial alternatives under OU3A considered the planned EPA dredging or whether the recommended remedial alternative would impede the future dredging or potentially impact the sediment once the dredging is completed. Further, the Phase III RAP presents no specific information on the required integration of remedial efforts along the boundary between Aerovox and the Acushnet River. Given that the highest contaminant concentrations are found immediately landward of the existing sheet pile wall, containment needs to be provided directly along the existing boundary. This analysis is critical to evaluating an appropriate remedial alternative.

13. Pursuant to 310 CMR 40.0858(4) and (5), the comparative costs and risks must be evaluated with respect to the actual implementation of the alternative and the short term on-site and off-site risks posed during implementation of the alternative. Therefore, the Phase III RAP should have included the cost to address shoreline releases occurring during construction activities.

14. 310 CMR 40.0858(5) states that the comparative risks of the alternatives must be evaluated with respect to short-term on-site and off-site risks posed during the implementation of the remedial option; on-site and off-site risks posed over the period of time required for the alternative to attain applicable remedial standards; and the potential risk of harm to health, safety, public welfare or the environment posed to human or environmental receptors by any OHM remaining at the disposal site after completion of the remedial action. The ratings in Section 5.3.1.1 that presents the risks associated with remediation at OU3A appear to more heavily weigh short term risks associated with construction of the alternatives over the long term risks of leaving soils with concentrations of PCBs above the UCL in place along a shoreline that is vulnerable to flooding, storm events, and tidal fluctuations. The Phase III Modification must consider and evaluate long term risks of leaving contaminated soil along the shoreline.

15. With regard to 310 CMR 40.0858(8), which requires that the relative effect of non-pecuniary interests be evaluated, MassDEP notes that under the recommended alternative a significant amount of contamination is left in place immediately adjacent to the Acushnet River. As discussed in paragraph 8 above, there may be approximately 50 tons of PCBs remaining in the soil at the Site (as mentioned previously, MassDEP anticipates that the Phase III RAP Modification will update this information). This remedial alternative may therefore be the least desirable non-pecuniary scenario for the City. As such, the community acceptance rating of the chosen alternative should be reconsidered based upon discussions with the City, and re-evaluated relative to the community acceptance ratings assigned to other alternatives, especially the excavation and off-site disposal and the excavation and on-site consolidation options. A fresh comparison of these options may yield a different rating for non-pecuniary interests, after discussion with the City. Although Brown & Caldwell suggested during the December 8, 2016 meeting that on-site consolidation would score very low due to community concerns, no detailed evaluation was provided in the Phase III RAP that provides a basis for that conclusion or compares this option with the other options presented. Meeting the performance standards for this evaluation criterion requires that the remedial alternatives for OU3A be re-evaluated, and should have presented more fully developed and analyzed on-site consolidation options.

16. It is unclear whether some references to depth in the Phase III RAP are presented as feet below the ground surface (bgs) or as feet above mean sea level (amsl).

ATTACHMENT D
OPERABLE UNIT 3B – SHALLOW AND DEEP OVERBURDEN GROUNDWATER AT FORMER AEROVOX PROPERTY
Notice of Deficiency and Partial Denial

Operable Unit	OU3B – This area comprises shallow and deep overburden groundwater on the Aerovox property contaminated with both dissolved phase TCE and PCBs and DNAPL consisting of TCE and PCBs.
Selected Remedial Option	The Phase III RAP proposes the installation of a containment system consisting of a vertical barrier wall along the northern, southern, and eastern boundaries of the former Aerovox property; a Permeable Reactive Barrier (PRB) along the Acushnet River (the eastern boundary of the site); and the in-situ treatment of soils acting as a source of TCE and PCBs to groundwater by using enhanced reductive dechlorination (ERD).
MassDEP Review of Remedial Solution	MassDEP has denied the PRB remedial option and identified several deficiencies in evaluating remedial options for this operable unit as a whole. The deficiencies must be addressed before MassDEP will consider this remedial alternative remedial option.

Deficiencies:

1. The Phase II report indicated that DNAPL containing both PCBs and chlorinated solvents is present at the northeast corner of the sheet pile wall and within the overburden aquifer. In addition, DNAPL has been measured in MW-15D, and the IRA activities in 2016 unsuccessfully attempted to remove this DNAPL. As mentioned earlier in this letter, the issues that have been raised regarding DNAPL were not fully addressed in the Phase III RAP. The Phase III RAP should have included a discussion of DNAPL as it pertains to its presence or anticipated presence in the shallow and deep overburden groundwater. In addition, the presence of DNAPL should have been discussed as it relates to the New Bedford Harbor dredging project.

2. The Phase II Conditional Approval letter indicated that a description/discussion of the hydrologic conditions of the Acushnet River was required but was not included in the Phase III RAP (MassDEP acknowledges that AVX and Brown & Caldwell attempted to address this question in their August 22, 2016 letter but did not satisfy MassDEP's requirements). MassDEP understands that there are two sources of historic flooding (drainage to the Site and high tide/weather effects from the Acushnet River), and that AVX has partially addressed drainage issues. However, three mechanisms have still not been addressed: (1) On-site flooding from the Acushnet River at flood stage, inundating the Site with surface water flowing at a relatively high velocity resulting in the potential for erosion; (2) Coastal flooding from the Acushnet River onto the Site from significant storm events; and (3) Overland flow from heavy rain events.

   Although the New Bedford Harbor Superfund Site has been administratively separated from the former Aerovox disposal Site in the ACO, flooding of the former Aerovox Site from the Acushnet River must be considered when evaluating contaminant migration pathways as part of the Phase II Assessment. As you are aware, the "steel sheet pile cutoff wall" installed "to serve as a vertical

barrier between PCB-contaminated soils and groundwater, and tidal flow into and out of the Acushnet River" (ACO at Paragraph (6)(k)) has not been fully effective at serving this defined purpose. As there is no disagreement that the Site is located immediately adjacent to the Acushnet River and has been affected by tidal influences (including the recent King tides and other storm surges), consideration of flooding and other storm-related events is crucial to determining the appropriate remedial alternatives for the former Aerovox Site. The Phase III RAP should have incorporated an evaluation of the river's hydrologic conditions as they pertain to an appropriate remedial alternative.

3. The Phase II Conditional Approval letter requires that AVX provide information to support that DNAPL is not migrating to the Acushnet River. MassDEP acknowledges various IRA Status Reports and the Phase II Report have documented that DNAPL is present in the mid- to late-stage of a chlorinated solvent release and that, on the basis of a November 2011 ITRC document called, "Integrated DNAPL Site Strategy," at this late stage the DNAPL is not likely to migrate. However, neither the Phase II Report nor the Phase III RAP have provide any site-specific data to support the assertion that the DNAPL is not migrating to the river despite variable and dynamic conditions, nor has AVX demonstrated that DNAPL will not migrate in response to the planned New Bedford Harbor dredging (which AVX is required to consider, in accordance with the MCP performance standards for the Phase III RAP). MassDEP has requested site-specific support for this conclusion on multiple occasions, and it remains a significant gap in the phased analysis upon which the remedial alternatives must be developed.

   MassDEP does not accept the assertion in the Phase III RAP that source control on the former Aerovox Site is "contingent upon" source removal in the Acushnet River or as part of the EPA New Bedford Harbor Superfund cleanup. The obligation to control the source at the Aerovox Site is not subject to this type of qualification. Moreover, as noted above and further below, 310 CMR 40.0858(3)(b) specifically requires that integration of remedial action alternatives with "other current or potential remedial actions" be considered in the Phase III RAP. The harbor dredging is an "other current or potential remedial action" which must be considered when evaluating remedial alternatives.

4. The Phase II Conditional Letter requested that details regarding the existing sheet pile wall be described in the Phase III RAP. MassDEP notes that relevant information pertaining to the construction details and location of the sheet-pile wall relative to the areas of known contamination has been provided in IRA Status Report #4; in plans generated by EPA and others after the sheet-pile wall was installed; and in the required annual cap inspection reports under the EPA Action Memorandum and TSCA determination. However, in order to satisfy the requirements of the Phase II Conditional Approval and 310 CMR 40.0810(3), and to provide the public with a complete record of the phased Comprehensive Response Action process, this information should have been included in the Phase III RAP.

5. The following cost discrepancies were identified between Appendix D of the Phase III RAP and Section 5.3.2.4 (the text matches Table 5.3):

   a. OU3B-2: Appendix D estimated total net worth = $20.0 M, elsewhere total net worth = $13.9 M
   b. OU3B-3: Appendix D estimated total net worth = $15.4 M, elsewhere total net worth = $11.8 M

   AVX has verbally indicated that they are aware of these discrepancies and intends to correct this error.

6. ERD is not a generally accepted technology to remediate DNAPL. Even it if were to be effective, what is known about ERD strongly suggests that it would likely not achieve that goal within the proposed ten-year timeframe. In addition, the overwhelming state of the evidence indicates that PCBs are not reliably remediated using ERD.

7. Pursuant to 310 CMR 40.0858(2), the comparative short-term and long-term reliability of alternatives shall be evaluated, including the degree of certainty that the alternative will be successful, and the effectiveness of any measures required to manage residues or remaining wastes or control emissions or discharges to the environment. Information on the long-term reliability and certainty of the proposed remedial alternatives, including the chosen remedial option of a PRB under OU3B, was not presented in the Phase III RAP. Storm events, tidal fluctuations and flooding, which may alter the effectiveness of a PRB, were not evaluated in the Phase III RAP and there is no known information that suggests a PRB could withstand such forces. High tides have been documented at the Site recently, which have caused flooding of river water over the existing sheet pile wall and onto the Aerovox property. This flooding has occurred absent of any storm event. Storm surges are occurring more frequently and causing an increase in erosion. Collapse of the PRB could occur as a result. The risk of this occurring is sufficient to persuade MassDEP that the use of PRB technology as proposed would not be sufficiently protective of health, safety, public welfare and the environment. In MassDEP's opinion, it is therefore not appropriate, given the contamination present on the Aerovox property. Control of contamination released from a PRB failure of any kind, but particularly due to flooding, storm surges and tidal fluctuations (or a combination thereof), would be extremely difficult if not impossible to recover or control. The comparative short term and long term risks were not evaluated in detail, and thus, the scoring of the remedial alternative is not accurate without the incorporation of this information.

8. According to the Phase III RAP, contamination in the Acushnet River is "...also a source of contaminants back into the Aerovox site...[and mitigation of contaminant migration from Aerovox] is contingent upon EPA completing source removal in the river..." However, 310 CMR 40.0858(3)(b) requires that the Phase III RAP consider the remedial activities planned by EPA within the Acushnet River when it evaluates the implementability of its remedial alternatives. EPA's plan to dredge PCB and TCE contaminated sediment from the area immediately east of the Aerovox propertyy by utilizing the Aerovox shoreline has been known to AVX for many years, and sufficiently in advance of to consider the dredging in the Phase III evaluation. However, none of the remedial alternatives under OU3A considered the planned EPA dredging or whether the recommended remedial alternative would impede the future dredging or potentially impact the sediment once the dredging is completed. Further, the Phase III RAP presents no specific information on the required integration of remedial efforts along the boundary between Aerovox and the Acushnet River. Given that the highest contaminant concentrations are found immediately landward of the existing sheet pile wall, containment needs to be provided directly along the existing boundary. This analysis is critical to evaluating an appropriate remedial alternative.

9. As mentioned previously, there is no discussion as to the effect of EPA's New Bedford Harbor dredging on the proposed alternatives, particularly for OU3 and OU4. Such consideration must be included in any Phase III evaluation in meet the performance standards of a Phase III RAP. 310 CMR 40.0858(3)(b) specifically states that the comparative difficulty in implementing each alternative in terms of facility operations and other current or potential remedial actions must be addressed. The remedial alternatives presented in the Phase III RAP should discuss whether the EPA dredging will affect the individual remedial alternative's effectiveness and how the selected alternatives will

maintain a level of No Significant Risk (NSR) upon completion of the dredging. The New Bedford Harbor dredging project must be discussed relative to the selected remedial alternative, to ensure that the selected alternative will not compromise the dredging and that the dredging will not compromise the selected remedial alternative or cause an exacerbation of contamination. The scoring and detailed evaluation criteria for each remedial alternative must consider EPA's planned harbor dredging, as required by 310 CMR 40.0858(3). MassDEP urges AVX to confer with EPA and to craft a coordinated approach to the remedial actions that will be undertaken concurrently on both sides of the sheet pile wall.

10. With respect to the groundwater modeling presented in Appendix C of the Phase III RAP, the boundary conditions include a single recharge boundary applied over the uppermost model layer, with a recharge value of 10 inches per year. However, a significant portion of the domain area is paved or under building cover, including the former Aerovox property. The use of 10 inches for recharge should be technically justified or adjusted to account for the amount of impervious cover in the area.

11. The groundwater model in Appendix C of the Phase III RAP was developed to support the recommended remedial alternative, which, according to the Phase III RAP, is a PRB to address the contaminated groundwater in the overburden aquifer. The PRB wall is proposed to be installed parallel to the shoreline, where up to 11 monitoring wells have been installed. Hydraulic conductivity was calculated using 16 wells, but it appears that only two of the wells are located along the shoreline. Given that groundwater flow and contaminant migration is sensitive to variations in the hydraulic conductivity, the available slug test data is not representative of Site-specific hydraulic conductivity in the area where the PRB would be located. Using a larger set of wells with varying subsurface characteristics (if available in this area) will provide a more conservative estimate of hydraulic conductivity.

12. Insufficient detail is provided to assess the quality of the steady-state model calibration results in the groundwater modeling presented in Appendix C of the Phase III RAP. While a comparison of observed and modeled groundwater elevation is provided (Appendix C, Figure 1-7), there is no accompanying documentation to facilitate evaluation of potential systematic bias that should be used to ascertain the adequacy of the model domain.

13. The Phase III Modification should evaluate and discuss whether the excavation of UV-17, BGP-20, and MIP-23 have changed, or will change, the modeled groundwater flow regime in this area.

14. It is unclear whether some references to depth in the Phase III RAP are presented as feet below the ground surface (bgs) or as feet above mean sea level (amsl).

15. Mass Flux calculations were not completed for overburden groundwater. While the sheet pile wall does limit and/or contain the groundwater in the overburden, the Phase III RAP acknowledges that mass flux of the contaminated groundwater in the vicinity of monitoring well MW-15D is occurring in the deep overburden aquifer (under the current sheet pile wall and below the peat layer). The mass flux calculations of contaminated groundwater in the overburden aquifer based on plume configuration, similar to the bedrock evaluation, are necessary to develop/evaluate remedial alternatives for addressing groundwater contamination in the overburden aquifer. In addition, according to page 3-4 of the Phase III RAP, the preliminary remedial goals for OU3 include, in part, to "reduce concentrations to the extent practicable, and control migration of overburden groundwater impacted by PCBs and/or CVOCs at concentrations that could migrate into and present a risk to

receptors in surface water and sediment after New Bedford Harbor remediation is complete." This disclosure further supports the conclusion that PCBs and CVOCs are migrating to the New Bedford Harbor, despite the intended purpose of the sheet pile wall that has served as the administrative eastern boundary of the Aerovox Site pursuant to the ACO. If the PRB technology, according to the Phase III RAP, was intended to "treat CVOCs and PCBs in the overburden deposits prior to their discharge to the Acushnet River" (page 4-16, 4th full paragraph), then mass flux calculations would be fundamental to evaluating the effectiveness of TCE and PCB removal by the PRB. While additional mass flux calculations could be performed to address this specific comment, MassDEP anticipates that the information would ultimately not be sufficient to support the use of a PRB for the additional reasons described herein.

Please be aware that MassDEP does request additional information regarding certain mass flux calculations provided in Appendix B to the Phase III RAP, in order to address deficiencies in other recommended remedial alternatives as noted throughout the attachments to the letter.

16. As mentioned in paragraph 8 under the discussion of OU3A (Attachment C of this letter), the amount of PCBs along the eastern portion of the site is approximately 50 tons. PCBs and TCE are co-located in the soil at concentrations exceeding UCLs. TCE is known to mobilize PCBs. Accordingly, allowing this volume of PCBs to potentially filter through a PRB is not reasonable or appropriate, or sufficiently protective, given the absence of data demonstrating that PRBs can effectively remediate PCBs and TCE.

17. Analytical data provided in the Phase II Report indicates the presence of TCE and PCBs in soil within the top 15 feet in the vicinity of MW-15D at concentrations exceeding the UCLs. MW-15D is located in the northeastern portion of the Aerovox property and is located immediately upgradient of the proposed PRB. Analytical data for groundwater from the deep overburden aquifer indicates up to 70 micrograms-per-liter (µg/L) of PCBs in the samples collected from MW-15D. This concentration is approaching the UCL of 100 µg/L for PCBs. TCE is known to mobilize PCBs and could increase the concentrations of PCBs in the groundwater migrating to and through the PRB. The PRB would be installed to the top of bedrock along the shoreline, further indicating that PCBs in groundwater are assumed to be captured by the PRB. However, since it is already established that TCE mobilizes PCBs, that PCBs in groundwater are approaching UCLs, that there are already UCL exceedances of PCBs and TCE in soil above the deeper aquifer, and that there is no information available to indicate that PRBs are effective at removing PCBs (including the statement in Table 4.1 of the Phase III RAP that PRBs are "unproven for PCBs"), MassDEP's reasonable conclusion is that the PRB is not an appropriate remedial alternative technology and that it would not be sufficiently protective or otherwise satisfy the purposes of the MCP.

18. The evaluation of the recommended remedial alternative, along with a review of reliable industry literature, simply does not support an assertion that the PRB would effectively treat both TCE and PCB in a salt water environment with daily tidal fluctuations causing the groundwater to flush back and forth (e.g., travel in both directions) through the PRB.

19. A significant data gap exists relative to the hydraulic properties and contaminant concentrations in the uppermost bedrock aquifer due to the method of drilling utilized (rock socket). It is unknown if DNAPL is present in this zone. MassDEP understands that the actual installation of a shallow bedrock monitoring well could cause cross-contamination of contaminants in the groundwater from the deep overburden aquifer to the groundwater in the bedrock aquifer. Therefore, MassDEP does not expect AVX to install a well in the shallow bedrock and acknowledges that this data gap is

unavoidable. The Phase III RAP indicates that the groundwater in this zone does not have significant concentrations of TCE and/or PCBs. However, appropriately conservative estimates should consider that this shallow bedrock is likely to be significantly contaminated and potentially contains DNAPL. As outlined above, it has not been adequately demonstrated that the PRB would be effective at preventing DNAPL from migrating to the river.

20. Installation of the PRB may itself exacerbate contamination to the Acushnet River and to the aquifer below the PRB. Specifically, when the PRB is being installed, it is a reasonable assumption that cross contamination would occur between the overburden and the upper bedrock aquifers in much the same way well installation in the shallow bedrock could cross-contaminate the upper bedrock aquifer, as described previously.

Denial of the recommended PRB Remedial Alternative:

MassDEP's review of the Phase III RAP, combined with analysis provided by MassDEP's consultant, Nobis (including a review of the research to date regarding PRB technology), leads to the conclusion that the recommended PRB remedial alternative would be experimental for this Site. The uncertainty surrounding the effectiveness, reliability, implementability, costs, risks, benefits, and timeliness concerns render the PRB inappropriate for the Aerovox Site. It is MassDEP's opinion that further study of the PRB remedial alternative in the face of overwhelming evidence against its appropriateness would frustrate the purposes of MGL ch. 21E and the MCP, which seeks to encourage parties to undertake necessary response actions that will result in the cleanup of sites in a timely fashion, using technologies that are appropriate for site-specific conditions and have a reasonable likelihood of success. After consideration of all the evidence presented in the Phase III RAP and other documents, and all available research regarding PRB technology, MassDEP has concluded that the recommended PRB remedial alternative is not reasonably likely to succeed, would not prove effective relative to all other evaluated alternatives at reducing risk at the Site (as required by 310 CMR 40.0860(6)(b)), and indeed is more likely to increase risk. MassDEP therefore denies the use of PRB technology as a remedial component of OU3B as not sufficiently protective and not capable of satisfying the Phase III evaluation criteria or RAPS, as required by the MCP. MassDEP notes thattwo (2) other feasible remedial alternatives for reaching a Permanent Solution at the Site are identified in the Phase III RAP, and encourages that these alternatives be further develop in the Phase III RAP Modification considering the comments provided in this letter.

ATTACHMENT E
OPERABLE UNIT 4 – BEDROCK GROUNDWATER AT FORMER AEROVOX PROPERTY
Notice of Deficiency

Operable Unit	OU4 – This operable unit is comprised of bedrock groundwater impacted with TCE and PCBs above UCLs and Method 3 Cleanup Standards.
Selected Remedial Option	The Phase III RAP proposes in-situ chemical oxidation (ISCO) using sodium permanganate for TCE remediation and alkaline persulfate for both PCB and TCE remediation. ISCO would be followed by MNA.
MassDEP Review of Remedial Solution	MassDEP has identified several deficiencies for this operable unit that must be addressed before MassDEP considers approving this remedial option.

Deficiencies:

1. The Phase II Conditional Approval letter indicated that a description/discussion of the hydrologic conditions of the Acushnet River was required but was not included in the Phase III RAP (MassDEP acknowledges that AVX and Brown & Caldwell attempted to address this question in their August 22, 2016 letter but did not satisfy MassDEP's requirements). MassDEP understands that there are two sources of historic flooding (drainage to the Site and high tide/weather effects from the Acushnet River), and that AVX has partially addressed drainage issues. However, three mechanisms have still not been addressed: (1) On-site flooding from the Acushnet River at flood stage, inundating the Site with surface water flowing at a relatively high velocity resulting in the potential for erosion; (2) Coastal flooding from the Acushnet River onto the Site from significant storm events; and (3) Overland flow from heavy rain events.

   Although the New Bedford Harbor Superfund Site has been administratively separated from the former Aerovox disposal Site in the ACO, flooding of the former Aerovox Site from the Acushnet River must be considered when evaluating contaminant migration pathways as part of the Phase II Assessment. As you are aware, the "steel sheet pile cutoff wall" installed "to serve as a vertical barrier between PCB-contaminated soils and groundwater, and tidal flow into and out of the Acushnet River" (ACO at paragraph (6)(k)) has not been fully effective at serving its defined purpose). As there is no disagreement that the Site is located immediately adjacent to the Acushnet River and has been affected by tidal influences (including the recent King tides and other storm surges), consideration of flooding and other storm-related events is crucial to determining the appropriate remedial alternatives for the former Aerovox Site. The Phase III RAP should have included an evaluation of the river's hydrologic conditions as they pertain to an appropriate remedial alternative.

2. The Phase II Conditional Approval letter requires that information to support that DNAPL is not migrating to the Acushnet River be provided in the Phase III RAP. MassDEP acknowledges that AVX has asserted in various IRA Status Reports and in the Phase II Report that DNAPL is present in the mid- to late-stage of a chlorinated solvent release and that, on the basis of a November 2011 ITRC document called, "Integrated DNAPL Site Strategy," at this late stage the DNAPL is not likely to migrate. However, neither the Phase II Report nor the Phase III RAP have presented any site-specific

data to support the assertion that the DNAPL is not migrating to the river despite variable and dynamic conditions, nor has it been demonstrated that DNAPL will not migrate in response to the planned New Bedford Harbor dredging (which is required to be considered in accordance with the MCP performance standards for the Phase III RAP). MassDEP has requested site-specific support for this conclusion on multiple occasions, and it remains a significant gap in the phased analysis upon which the remedial alternatives must be developed.

3. The Phase II Conditional Approval letter indicated that DNAPL in the bedrock aquifer would be considered a source of contamination and must be addressed in the Phase III report. In addition, the horizontal and vertical extent of the dissolved phase contamination in the bedrock aquifer has not been fully delineated and must also be addressed. MassDEP acknowledges that some information relative to the distribution of contaminants in the groundwater and the hydrogeologic properties of the bedrock aquifer, including the deep bedrock aquifer, has been documented in the Phase III RAP. However, additional data from the installation of new recovery wells in the vicinity of MW-15 that would supplement what is known relative to the shallow bedrock aquifer should have been included in the Phase III RAP.

4. Some information relative to the distribution of contaminants in the groundwater and the hydrogeologic properties of the bedrock aquifer, including the deep bedrock aquifer, has been documented in the Phase III RAP. However, additional data from the installation of new recovery wells in the vicinity of MW-15 that would supplement what is known relative to the shallow bedrock aquifer should have been included in the Phase III RAP, and was required per the Conditional Approval of the Phase II.

5. The chosen alternative for OU4 does not include any remedial approach to prevent groundwater with TCE concentration above the Groundwater Category GW-3 Standards from migrating from the bedrock aquifer to the Acushnet River. Given that there is good hydraulic communication between the bedrock aquifer and the river and the concentration of contaminants in the groundwater, hydraulic control is critical to achieve NSR. The effectiveness and reliability of groundwater extraction and hydraulic control should be evaluated for OU4. The Phase III RAP indicated in Section 4.1.2.1 that hydraulic control/containment of the groundwater in the bedrock aquifer, in conjunction with other alternatives, is a potentially good alternative for the bedrock aquifer. However, this option was not included in the detailed evaluation. A groundwater extraction system targeting the known high-concentration deep bedrock fractures may not have the same problem with required high extraction rates compared to shallow bedrock, and may be comparable in feasibility to other treatment methods. The Phase III RAP should have included further evaluation of this alternative.

6. The treatment area for the deep bedrock aquifer is identified as two hot spots, both located in the northern half of the property. Based on a review of the groundwater analytical data from monitoring wells in the area, and the distribution of existing monitoring wells, the extent of the hot spots may not have been adequately assessed to the east and west. Additional characterization should be conducted as part of the remedial design to determine the lateral extent of the hot spots of groundwater contamination in the bedrock aquifer. Additional evaluation should be conducted to determine whether hot spot treatment could mobilize/exacerbate contamination, particularly the DNAPL that has been observed at the MW-15 cluster. Appropriate groundwater modeling and/or additional well installation may be necessary. A discussion related to the extent of contamination in the deep bedrock should have been included in the Phase III RAP to address this data gap.

7. Previous IRA activities beginning in 2014 and again in 2016 have included the recovery of DNAPL via both manual recovery, and most recently, the installation of a free product recovery system (FPRS). However, DNAPL did not pool in the bedrock well at a recoverable volume to render the FPRS effective. The Phase III RAP should have included a discussion of the DNAPL in the bedrock aquifer as it relates to implementation of the remedial alternatives for this OU and the potential for DNAPL mobilization for each alternative.

8. MassDEP does not accept the assertion in the Phase III RAP that source control on the former Aerovox Site is "contingent upon" source removal in the Acushnet River or as part of the EPA New Bedford Harbor Superfund cleanup. AVX's obligation to address source control on the Aerovox Site is not reasonably subject to such qualification. Moreover, as mentioned above and discussed further below, 310 CMR 40.0858(3)(b) specifically requires that integration of remedial action alternatives with "other current or potential remedial actions" be considered in the Phase III evaluation. The planned harbor dredging is indisputably an "other current or potential remedial action" which must be considered when evaluating remedial alternatives in the Phase III RAP.

9. As mentioned previously, there is no discussion as to the effect of EPA's planned New Bedford Harbor dredging on the proposed alternatives, particularly for OU3 and OU4. Such consideration must be included in any Phase III evaluation in order to meet the performance standards of a Phase III RAP. 310 CMR 40.0858(3)(b) specifically states that the comparative difficulty in implementing each alternative in terms of facility operations and other current or potential remedial actions must be addressed. The remedial alternatives presented in the Phase III RAP should discuss whether the EPA dredging will affect the individual remedial alternative's effectiveness and how the selected alternatives will maintain a level of NSR upon completion of the dredging. The New Bedford Harbor dredging project must be discussed relative to the selected remedial alternative, to ensure that the selected alternative will not compromise the dredging and that the dredging will not compromise the selected remedial alternative or cause an exacerbation of contamination. The scoring and detailed evaluation criteria for each remedial alternative must consider EPA's planned harbor dredging, as required by 310 CMR 40.0858(3). MassDEP urges AVX to confer with EPA and to craft a coordinated approach to the remedial actions that will be undertaken concurrently on both sides of the sheet pile wall.

10. The areas of the bedrock aquifer determined to be without fractures, and therefore without contaminated groundwater, may not be representative of Site conditions and may underestimate the concentrations of contaminants in the groundwater discharging into the river. Additional technical justification is necessary to support this assertion.

11. The groundwater from the northernmost deep bedrock well (MW-34B) has TCE concentrations approaching 500,000 µg/L. There are no monitoring wells screened in the deep bedrock aquifer downgradient and to the north of MW-34B which are necessary to delineate the northern extent of groundwater contamination. The full extent of contaminated groundwater in the deep bedrock aquifer must be determined to adequately determine the mass flux of contaminants into the river and, therefore, to conduct a complete evaluation of remedial alternatives.

12. The piezometric head data for the deep bedrock aquifer is extremely limited. Developing piezometric contours and calculating hydraulic gradients would provide more accurate mass flux calculations, which, as mentioned, could affect the final remedial alternative evaluation.

13. The bulk hydraulic conductivity of the deep bedrock aquifer is likely lower than the bulk hydraulic conductivity of the shallow bedrock aquifer, because the deeper aquifer has fewer water-bearing fractures. Therefore, using the shallow bedrock hydraulic conductivity value for deep bedrock is conservative as stated in the Phase III RAP. However, in the Phase III RAP, the bedrock contaminant mass has already been limited to few zones within the deep bedrock. Therefore, the ultimate mass flux calculated may not be excessively conservative, and should be evaluated as such with respect to the remedial alternatives presented in the Phase III.

14. The thickness of the groundwater contaminant plume at the northern section of the Site is assumed to be the length of the 10-foot well screen in MW-34B, and the thickness of the zone of groundwater contamination at the southern section of the Site is assumed to be the thickness of the 20-foot well screen in MW-32B, according to the Phase III RAP. Given the limited number of monitoring wells installed in the deep bedrock aquifer, and the irregular nature of the fractures, a larger contaminated deep bedrock thickness should be used to estimate the mass flux in deep bedrock, such as double the thickness of the screened zones (20 feet in the northern section and 40 feet in the southern section). MassDEP acknowledges that plume thickness assumptions made in the Phase III RAP were based, in part, on heat pulse flow meter (HPFM) data summarized in the Phase II report. However, in addition to a summary of the data from the HPFM, contaminant thickness should also consider the limited number of deep bedrock wells to provide a more conservative approach to estimate the thickness of the groundwater contaminant plume.

15. The hydrogeologic properties and groundwater contaminant concentration (including potential for DNAPL) of the uppermost portion of the shallow bedrock aquifer, from approximately 10' below the ground surface to 35' below the ground surface, has not been evaluated adequately because this portion of the aquifer is generally drilled using a roller bit to install a rock socket. DNAPL has been observed in both MW-15D and MW-15B and the groundwater in the vicinity of these wells is significantly impacted with both PCBs and TCE, and since no data has been provided that demonstrates the interval between the two monitoring wells is free of contamination, the top of the groundwater contamination in the shallow bedrock aquifer should be the top of bedrock for both the northern and southern portions of the Site. This should be considered when calculating the mass flux.

16. According to the Phase III RAP, mass flux calculations were not provided for PCBs because, "[a]lthough PCBs have been detected above UCLs in one bedrock well (MW-15B), PCBs have much lower mobility and therefore were not considered a driver for the mass flux calculations." However, the mobility of PCBs is likely affected by being co-located with TCE. In addition, the Phase III RAP compares the calculated TCE pore water concentration to the Method 1 GW-3 Standard for TCE (5,000 µg/L), which is much higher than the Method 1 GW-3 standard for PCBs (10 µg/L). This information was used in the Phase III RAP to conclude that active bedrock remediation of PCBs is not necessary. However, the National Recommended Water Quality Criteria for PCBs for protection of aquatic life is 0.03 µg/L. TCE and PCBs vary widely in chemistry, fate and transport. Therefore, PCB mass flux calculations are critical to understanding the potential continuing impact that PCBs from the former Aerovox Site may have on the Acushnet River, and should be considered in the Phase III RAP in order to satisfy the applicable performance standards and appropriately evaluate remedial options.

17. It is unclear whether some references to depth in the Phase III RAP are presented as feet below the ground surface (bgs) or as feet above mean sea level (amsl).