



COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY

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January 12, 2017

VIA ELECTRONIC MAIL

Mr. Jody Hawks
Environmental Specialist
BAE Systems, Ordnance Systems, Inc.
Radford Army Ammunition Plant
4050 Pepper's Ferry Road
Radford, Virginia 24141

**Re: Third Notice of Deficiency Addressing the Technical Completeness of the Part A and Part B Permit Applications for the Renewal of the Subpart X Open Burning Permit
Radford Army Ammunition Plant, Radford, VA
EPA ID No. VA1210020730**

Dear Mr. Hawks:

The Virginia Department of Environmental Quality, Office of Financial Responsibility and Waste Programs (DEQ) has completed the review of the *Response to the Second Technical Notice of Deficiency for the Open Burning Ground Renewal Application* (Second NOD OBG Response), dated September 9, 2016 and received on September 14, 2016. The Second NOD OBG Response was submitted in response to the Second Technical Notice of Deficiency (Second NOD), dated August 15, 2016.

Based on the review of the Second NOD OBG Response the DEQ has determined that the majority of the comments raised in the Second NOD have been resolved. However, there are deficiencies with the submitted revisions which have been addressed in the attached NOD.

Please review the comments and submit the requested response on a comment by comment basis within 30 days of your receipt of this letter (February 13, 2017). If more time is needed, please contact me at the email address or phone number listed below prior to the expiration of the 30 day deadline.

Please submit the responses to the DEQ in the form of one copy in PDF format and one copy in Microsoft WORD format, electronically attached to an e-mail and submit the responses to the EPA and the DEQ's Blue Ridge Regional Office in the PDF format. Please be advised that

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the DEQ requires all sections of the application to be in an electronic format, including drawings. The DEQ does not have the capability to copy large drawings, i.e., anything over 11 inches by 17 inches.

If you should have any questions regarding these comments, please contact me at (804) 698-4467 or by email at Ashby.Scott@deq.virginia.gov.

Sincerely,

A handwritten signature in black ink, appearing to read 'Ashby R. Scott', written in a cursive style.

Ashby R. Scott
Hazardous Waste Permit Writer
Office of Financial Responsibility and
Waste Programs

Attachments:

Notice of Deficiency — Third Notice of Deficiency Addressing the Technical Completeness of the Part A and Part B Permit Applications for the Renewal of the Subpart X Open Burning Permit, Sections 1 through 6

cc: Central Hazardous Waste Files
Cassie McGoldrick, EPA, Region III (3LC50)
Rebecca Wright, DEQ, BRRO
Leslie Romanchik, Sonal Iyer, Maria Livaniou, Hasan Keceli, Kurt Kochan, DEQ, CO

Jim McKenna, Radford Army Ammunition Plant

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Section 1 of the Notice of Deficiency Addressing the Technical Completeness of the Part A and Part B Permit Applications for the Renewal of the Subpart X Open Burning and Open Detonation Permit, Overall Technical Deficiencies of the Permit Application

General Comments on RAAP OBG Application:

1. Page and section numbers are incorrect across multiple sections. Please reformat the application so that page and section numbers are sequential for easier reference while reviewing.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP acknowledges discrepancies in the numbering of section pages throughout the application. We will correct these discrepancies as revisions are made to each section.

DEQ Response (1-1) – DEQ will review the revised section numbering when submitted by RAAP. If corrected this will satisfy the comment made.

Radford Response (1-1), (Response received on 9/14/2016) –

DEQ Response (1-1) – No response was provided with this submission. However an informal response was submitted which shows renumbering of sections that satisfies the comment made.

2. Attachment II.C has had the word “contamination” changed to “impacted or impact to soil”. Please provide a justification for this language change.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP will modify Attachment II.C as requested, reverting to the original word of "contamination" in each instance that it was changed to "impacted" or "impact to soil."

DEQ Response (1-1) – DEQ will review the revised language in Attachment II.C when submitted by RAAP. If corrected according to the comment made this will satisfy the comment made.

Radford Response (1-1), (Response received on 9/14/2016) – RFAAP provided a draft submittal addressing this comment on June 24, 2016. In this submittal, RFAAP modified Attachment II.C as requested, reverting to the original word of "contamination" in each instance that it was changed to "impacted" or "impact to soil." Formal submittal of this revision is awaiting DEQ review of the draft documents that were provided.

DEQ Response (1-1) – DEQ has reviewed the revised language and the comment is now satisfied.

Specific Comments for the RAAP Application:

1. **Attachment II.A: Figures II.A-2, II.A-4 and II.A.5** – Figures II.A-2, II.A-4 and II.A-5 are not at a scale of no more than 200 feet per inch as specified in 40 CFR 270.14(b)(19) and checklist item B-2(a). The facility shall resubmit the figures at the required scale.

Radford Response (1-1), (Response received on 5/5/2016) – As discussed with the explosive waste incinerator (EWI) permit application, it is not possible (nor practical) to provide one map specifying all of the information required by 40 CFR § 270.14(b)(19). Therefore, this information has been provided on multiple maps. The requirement to provide topographic contours at a scale of no more than 200 feet per inch is satisfied with Figure II.A-3.

DEQ Response (1-1) – DEQ agrees with the approach to satisfy the regulatory requirement RAAP has made and the comment is now satisfied.

2. **Attachment II.I: Section II.I.1(ii), Page II.I-1** – The language of Section II.I.1(ii) has been revised to state that no adverse effects to human health or the environment will occur for soils around the OBG in the event of a washout. While Section II.I.4 does describe the procedures to be followed after a washout in the Soil Monitoring Plan (SMP) there is no reference made to this section in Section II.I.1(ii) and simply a blanket statement regarding an assumption of no impact to soils after a washout which cannot be predicted by the facility, only verified by sampling and analysis of the soils after a washout. The language shall be revised to make reference to the requirements of Section II.I.4 or the SMP itself which will be used to verify if an impact to soils has occurred through approved sampling and analysis.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP will revise Section III.I.1(ii) to make reference to the requirements of Section II.I.4 or the SMP itself, as requested.

DEQ Response (1-1) – DEQ will review the revised language in Section II.I.1(ii) when submitted by RAAP. If the revised language corrects the deficiency noted in the comment it will satisfy the comment made.

3. Attachment II.I: Section II.I.3, Page II.I-2 – Section II.I.3 has been revised to contain the following language:

“If diesel has already been applied to the pans or if the waste in the pans is considered a Class 1.1 explosive, supervision will evaluate the risks to human health and the environment and will proceed in a manner that will most effectively mitigate these risks.”

The language shall be revised to provide examples of how the supervisor at the OBG will proceed in these specific instances. The examples may be added to Table II.I-1 and the

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language may be revised to incorporate the reference to the procedures to be used in the Table.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP will modify Section III.I.3 to provide examples of how the supervisor at the OBG will proceed if a precipitation event occurs after diesel has been applied to the pans or in the event that a Class 1.1 explosive has been loaded on the pans. RFAAP will clarify that this is a highly unlikely event but will make sure that procedural considerations have been given to its possible occurrence.

DEQ Response (1-1) – DEQ will review the revised language in Section III.I.3 when submitted by RAAP. If acceptable the comment will be satisfied.

4. **Attachment II.B, Section II.B.2f, Page II.B-8** – Section II.B.2f contains the following revision:

~~“The Group 20 wastes do not include any listed wastes nor does it exceed any of the limitations on specific constituents set forth in Module III of this permit carry any RCRA codes not authorized by this Permit.”~~

Please provide an explanation as to why the language was modified to describe Group 20 wastes as now being potentially able to include constituents in an amount which will violate the throughput limits on constituents being treated at the OBG. If no satisfactory explanation can be provided to the DEQ the current language in Section II.B.2f will be retained in the condition.

Radford Response (1-1), (Response received on 5/5/2016) – The concentration limits specified in Module III apply on an individual burn basis, not an individual waste group basis. For example, a waste group may have a barium concentration higher than the Module III limit. But, if the total concentration of barium in the burn is less than that specified in Module III, the burn may be performed as configured. Therefore, the statement regarding limitation of Group 20 wastes below the limits specified in Module III is inappropriate.

DEQ Response (1-1) – DEQ accepts the explanation provided by RAAP and the comment is now satisfied.

5. **Attachment II.B, Table 2** – Table 2, which presented a breakdown of the propellant constituent weight percent’s for each waste group, has been removed from the Waste Analysis Plan. The permittee shall revise Section II.B to include Table 2.

Radford Response (1-1), (Response received on 5/5/2016) – Table 2 in Attachment II.B provided a significant level of detail on each waste group that is irrelevant to regulation of that waste group under RCRA. There is no requirement under 40 CFR § 264.13 to provide this level of specification of the waste streams; RCRA only requires that information be

obtained that is necessary to store, treat, and dispose of the waste. Examples of this for the OBG would include determination of the waste code and determination of pollutants for which specific permit limits are provided. Furthermore, this analysis need only be maintained in the operating record; it is not required in the waste analysis plan pursuant to 40 CFR § 264.13(b). Therefore, RFAAP does not feel it appropriate to reinstate the table as requested.

In response to DEQ's concern for adequately documenting the expected characterization of each waste stream, RFAAP will develop and maintain onsite a profile of each waste group. Pursuant to Section II.B.5a of Attachment II.B, this profile will identify the hazardous constituents and characteristics necessary for proper designation and management of the waste stream. The profile will also include concentrations of all 40 CFR 261 Appendix VIII (adopted by reference in 9 VAC 20 60 261) constituents in that waste. Every waste profile will be reviewed at least annually in order to confirm that it still accurately represents the waste stream. A waste stream will be re-profiled whenever the Permittees have reason to believe that the process or operation generating the hazardous waste has changed.

DEQ Response (1-1) – DEQ accepts the explanation provided by RAAP and the comment is now satisfied.

6. **Attachment II.B, Tables 3-7** – Tables 3-7 of Attachment II.B have been removed as they have been replaced by VELAP approved SOPs. Please provide copies of the VELAP certifications and SOPs for these analytical methods for review by DEQ. The certifications and SOPs will not be included in the final permit documents but do need to be reviewed to ensure the methods will satisfy the regulatory requirements for waste analysis.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP will provide copies of the VELAP certifications and SOPs as requested.

DEQ Response (1-1) – DEQ has reviewed the submitted VELAP and SOP document and the comment is now satisfied.

7. **Attachment II.B, Section II.B.5a, Page II.B-13** – Section II.B.5a does not include several metals, and the associated analytical method, from the previous Table 3. The permittee shall revise Section II.B.5a to include the following metals: Antimony, Thallium, Cadmium, Nickel, Silver, Beryllium, Barium, Selenium, Mercury and Arsenic. Please revise the section to include these metals and their associated analytical method.

Radford Response (1-1), (Response received on 5/5/2016) – The metals specified in Section II.B.5a, Analysis for Compliance, are those metals on which individual concentration limits are established in Module III. The other metals specified in DEQ's comment are only determined for waste profiling analysis. Pursuant to 40 CFR 261, these determinations may be made via either process knowledge or waste analysis. Therefore, analysis for each of the metals specified by DEQ is not necessary. The bulleted list of metals provided in Section

II.B.5a, Analysis for Compliance, are determined monthly via waste analysis using the methods specified below the bullet list.

DEQ Response (1-1) – DEQ accepts the explanation provided but cautions RAAP that the list of metals with established concentration limits in Module III may change depending on the results of the risk assessment and that the list in Section II.B.5a will then need to be updated based on the rationale provided by RAAP.

Radford Response (1-2), (Response received on 9/14/2016) – RFAAP understands that limitations in the Permit may change as a result of the risk assessment and further understands that these changes may require that additional analyses be incorporated to the monthly analytical scheme.

DEQ Response (1-2) – DEQ concurs with RAAP's statement and the comment is now satisfied.

8. **Attachment II.B, Section II.B.5a, Page II.B-13** – Please explain the rationale by only reporting Chloride and Perchlorate testing as chloride equivalents instead of reporting them as distinct compounds.

Radford Response (1-1), (Response received on 5/5/2016) – The waste contains two types of chlorine - inorganic chlorine and organic chlorine as perchlorate. RFAAP has to comply with a concentration limit for total chlorine at the burning ground. Total chlorine (inorganic plus organic) is typically determined by placing a waste in a bomb calorimeter and converting all organic chlorine to chloride prior to performing the chloride analysis via ICP. Given the nature of RFAAP's wastes, placing a waste sample in a bomb calorimeter is not recommended. Therefore, RFAAP has developed an alternative method to determine total chlorine and comply with the concentration limit presented in our Permit. RFAAP determines inorganic chlorine and perchlorate. The perchlorate measurement is then converted to chloride equivalents to allow comparison with the total concentration limit provided in the Permit. This method of analysis and compliance has been consistent over the life of the Permit.

DEQ Response (1-1) – DEQ accepts the explanation provided by RAAP and the comment is now considered satisfied.

9. **Attachment II.B, Section II.B.4a, Page II.B-10** – Section II.B.4a regarding waste sampling has been changed to remove the requirement to attach the date the sample was taken from the sampling procedure and instead simply lists the month. This procedure is not adequate to ensure best QA/QC practices as the absence of a date will not allow the permittee to identify the waste which may be out of compliance with the operating limitations in Module III. The language shall be revised to incorporate the labeling of sampling containers with the full date the sample was taken.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP accumulates waste material in satellite accumulation areas and then stores this material on a temporary basis in less than 90 day storage areas. At the time the waste is sent to the area for destruction, it could have been in storage, either via satellite accumulation or temporary storage for over three months. Generally, a sample collection date is assigned to satisfy laboratory holding times. However, as the material is sitting in storage for an extended period of time, any sample date that is assigned to a sample provides an arbitrary representation of the "age" of that sample and is meaningless in determination and evaluation of sample holding time. Furthermore, the sample that is analyzed is reflective of a series of samples collected over the month to form the sample composite, not a single sample collected on a single date. Therefore, RFAAP assigns a sample month to the sample to reflect the month in which the composite sample was collected and allow tracking of the waste that went into each sample. Assigning a date to this composite is not appropriate.

DEQ Response (1-1) – Please explain how the dating of the waste samples is not appropriate to ensure compliance that the permitted waste groups, with constituents in the ratios dictated by the operating conditions, given there have been violations of the constituent limits for the waste groups treated at the open burning grounds. DEQ requests a more detailed rationale from RAAP and if found unacceptable the previous language will be retained in the permit.

Radford Response (1-2), (Response received on 9/14/2016) – RFAAP does apply dates to the waste samples. Our original objection to DEQ's request was that the date should specify the exact date (*e.g.*, 9/10/2016) on which the sample was taken. Instead of providing an exact date, RFAAP specifies the month that the composite sample was created (*e.g.*, 9/2016). Should an issue arise with the results of that sample, burn records and internal waste manifest records are then used to determine the specific waste tubs that would have been included in that sampling event.

DEQ Response (1-2) – The rationale provided does not satisfy the comment made. The preferences of the facility have been noted but they do not satisfy the requirements necessary to demonstrate compliance if/when a violation of the permit conditions occurs. Additionally from the language RAAP provided in the response it appears as though the current permit condition may have been violated as the current permit requires the date, as in date/month/year, to be written on the sample container and not just the month and year. The language specifying the date the sample was taken be affixed on the sample container will be retained.

10. **Attachment II.C, Section II.C.1, Page II.C-1** – Section II.C.1 has been revised to remove the reference to the floodplain standard which requires the removal of hazardous waste from the unit prior to a flood and a comment has been made by RAAP that this citation is incorrect. The DEQ reminds RAAP that the additional language provided in the revised application is applicable to Subpart X units **in addition to** the requirements in the previous

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citation of 40 CFR 264.18(b)(1)(i). The language from 40 CFR 264.18(b)(1)(i) shall be restored in a revised submittal of Attachment II.C.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP will revise Section II.C.1 as requested.

DEQ Response (1-1) – DEQ will review the revised language in Section II.C.1 when submitted to determine if the comment is satisfied.

Radford Informal Response (1-2), (Response received on 6/24/2016) – RFAAP has reverted the referenced text to that contained in the current Permit.

DEQ Informal Response (1-2) – DEQ has reviewed the restored language and the comment is now satisfied.

Radford Response (1-2), (Response received on 9/14/2016) – RFAAP provided a draft submittal addressing this comment on June 24, 2016. In this submittal, RFAAP reverted the referenced text to that contained in the current Permit. Formal submittal of this revision is awaiting DEQ review of the draft documents that were provided.

DEQ Response (1-2) – DEQ has reviewed the restored language and the comment is now satisfied.

11. **Attachment II.C, Section II.C.1, Page II.C-1** – The language of Section II.C.1 has been revised to the following:

“The analysis of soil samples and subsequent provisions for remediation will, in effect, serve as the way in which the Virginia Department of Environmental Quality (VDEQ) assures that no adverse effects on human health or the environment will result if washout of the area occurs.”

This revised language is incorrect as RAAP is the permittee, not DEQ, and is responsible for demonstrating that impacted soils have been removed and remediated according to the plan, which will demonstrate compliance with the floodplain protection standards in event of a washout. The language shall be revised to the previous version or an alternate version which reflects the comment made which will be evaluated for adequacy upon submittal.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP will revise the language in Section II.C.1 as requested.

DEQ Response (1-1) – DEQ will review the revised language in Section II.C.1 when submitted to determine if the comment is satisfied.

Radford Informal Response (1-2), (Response received on 6/24/2016) – RFAAP has reverted the referenced text to that contained in the current Permit.

DEQ Informal Response (1-2) – DEQ has reviewed the restored language and the comment is now satisfied.

Radford Response (1-2), (Response received on 9/14/2016) – RFAAP provided a draft submittal addressing this comment on June 24, 2016. In this submittal, RFAAP reverted the referenced text to that contained in the current Permit. Formal submittal of this revision is awaiting DEQ review of the draft documents that were provided.

DEQ Response (1-2) – DEQ has reviewed the restored language and the comment is now satisfied.

12. **Attachment II.C, Section II.C.3.1, Page II.C-3** - The language of Section II.C.3.1 has been revised to allow for one grab sample instead of the previous two and the combination of NB1 and NB2 into one sampling location. Please either provide a reference to a permit modification which has been approved by the DEQ to allow for this reduced sampling or revise the language to reflect two grab samples will be collected at the two locations NB-1 and NB-2.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP proposed to combine the two sampling locations based on historical data from the many years of soil sampling at the site. RFAAP will prepare a separate submittal that formalizes the request for combining the two site and provides justification necessary to substantiate this request.

DEQ Response (1-1) – DEQ will review the request for combining the two sampling locations, with the proper justification, when submitted to determine if the comment is satisfied.

Radford Response (1-2), (Response received on 9/14/2016) – RFAAP submitted the requested documentation to DEQ on September 8, 2016. RFAAP is awaiting DEQ review of the request and the data provided to substantiate it.

DEQ Response (1-2) – DEQ has reviewed the submission made on 9/8/2016 and does not concur with RAAP regarding the sampling sites. As these sites are chosen at random within the defined area to ensure contamination is not impacting the soil from the operating unit DEQ does not feel like it is appropriate to reduce the sampling locations. The language currently in the permit will remain unmodified.

13. **Attachment II.C, Section II.C.3.2, Page II.C-4** – Section II.C.3.2 has been revised to remove reference to the Risk Assessment performed upon the initial permit action. While this is not incorrect as a new risk assessment will be performed as part of the permitting process

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the permittee is reminded that a reference to the new risk assessment will be included in this section and that the COPCs listed in Table II.C-1 may be revised to reflect COPCs identified in the new risk assessment.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP has no objection to incorporating a reference to the new risk assessment once it is completed.

DEQ Response (1-1) – DEQ will review the revised language in Section II.C.3.2 when submitted after the risk assessment has been completed to determine if the comment is satisfied.

Radford Informal Response (1-2), (Response received on 6/24/2016) – No modifications are required at this time. RFAAP understands that a reference to the new risk assessment once it will be inserted once it is completed.

DEQ Informal Response (1-2) – As stated in the previous response DEQ will review the revised language once the risk assessment protocol has been finalized and the risk assessment report is submitted.

Radford Response (1-2), (Response received on 9/14/2016) – No modifications are required at this time. RFAAP understands that a reference to the new risk assessment once it will be inserted once it is completed.

DEQ Response (1-2) – As stated in the previous response DEQ will review the revised language once the risk assessment protocol has been finalized and the risk assessment report is submitted.

14. **Attachment II.C, Section II.C.3.2, Page II.C-5** – See Comment 12 regarding reduced grab samples and locations for applicable revised language in Section II.C.3.2.

Radford Response (1-1), (Response received on 5/5/2016) – As stated in response to Comment 12 above, RFAAP proposed to combine the two sampling locations based on historical data from the many years of soil sampling at the site. RFAAP will prepare a separate submittal that formalizes the request for combining the two site and provides justification necessary to substantiate this request.

DEQ Response (1-1) – DEQ will review the request for combining the two sampling locations, with the proper justification, when submitted to determine if the comment is satisfied.

Radford Response (1-2), (Response received on 9/14/2016) – RFAAP submitted the requested documentation to DEQ on September 8, 2016. RFAAP is awaiting DEQ review of the request and the data provided to substantiate it.

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DEQ Response (1-2) – DEQ has reviewed the submission made on 9/8/2016 and does not concur with RAAP regarding the sampling sites. As these sites are chosen at random within the defined area to ensure contamination is not impacting the soil from the operating unit DEQ does not feel like it is appropriate to reduce the sampling locations. The language currently in the permit will remain unmodified.

15. **Attachment II.C, Section II.C.3.2, Page II.C-6** – The language of Section II.C.3.2 has been revised as follows:

“~~Radford AARFAAP~~ will list each constituent detected ~~above the MDL in soil.~~”

As MDL’s can vary by laboratory and analytical procedure, which may not reflect the current achievable MDL for a chemical compound, RAAP will either provide a reference to the permit modification which allows for only constituents reported above the MDL to be reported or will revise the language to the previously permitted version which dictates that all constituents identified in soil sampling will be reported to DEQ.

Radford Response (1-1), (Response received on 5/5/2016) – The change proposed on Page II.C-6 of Section II.C.3.2 of Attachment II.C was consistent with permit modifications made in 2008 and 2011. The change was made at that time with the intent of clarifying the definition of the word "detected".

DEQ Response (1-1) – DEQ accepts the explanation provided by RAAP and the comment is now satisfied.

16. **Attachment II.C, Section II.C.3.2, Page II.C-6** – The language of Section II.C.3.2 has been revised to the following:

“~~Because 4-nitrophenol has no Region III RSL value., Radford AARFAAP will analyze for this compound, and if detected above the Reporting Limit RL, a site specific risk evaluation will be conducted. The risk evaluation will entail comparing the result will be compared to ecological screening level for 4-nitrophenol in soil the result to a listed in the June 23, 2000 USEPA memorandum Entitled Amended Guidance on Ecological Risk Assessment at Military Bases: Process Considerations, Timing of Activities, and Inclusion of Stakeholders.~~”

Please provide the reference to the DEQ approved modification to the current permit which allows for this significantly less stringent screening to be performed in lieu of a site specific risk assessment to be conducted. If no reference can be provided the permittee shall revise the language to the previously approved language which requires the risk assessment.

Radford Response (1-1), (Response received on 5/5/2016) – The referenced language was not substantially changed from that provided in the prior version of the permit language. The revision provided above was simply made to clarify what was previously a confusing

paragraph. Based on conversations with DEQ on March 30, 2016, the language is acceptable as proposed. No additional changes are required.

DEQ Response (1-1) – DEQ concurs with the explanation provided by RAAP and the comment is now satisfied.

17. **Attachment II.C, Section II.C.3.2, Pages II.C-6 and II.C-7** – The language of Section II.C.3.2 has been revised to remove the following paragraph and the permittee has added the additional justification language which has been requested to not be included in the final permit:

~~*“If ten or more non-carcinogenic COPCs are detected during a single sampling event, the concentrations will be compared to 1/10 of the RBC of those constituents. This comparison is a qualitative evaluation and will have no bearing on the risk evaluation of the site, and will not trigger corrective actions or interim measures at the site.”*~~

Justification

Permit requirements for open burning ground soil sampling, data analysis and response actions are very conservatively set in the existing facility permit and do not reflect several site-specific conditions and realities including the following:

- *The permit requirements for soil sampling, data evaluation and response actions for the Open Burning Ground OBG assume unprotected site worker exposure to the site soils at EPA and VDEQ default levels of exposure. The reality is that the facility is an active operation and not a closed hazardous waste management unit. As such the facility is accessible by authorized personnel only. Authorized personnel are typically site workers who work very limited hours a day on select days a week and not on a regular 40 hour work week schedule. Furthermore, the facility policies and procedures mandate specific personnel exposure limitations (e.g., no eating or drinking in active areas) and require the use of appropriate personal protection equipment that makes routine direct human exposure to site soils practically minimal. The site workers are therefore unlikely to ingest any site soils or have any direct dermal contact, and their removal from the area during pan initiation provide minimal exposure from inhalation. Therefore the very need for an active soil sampling and response actions **from the perspective of site worker protection is unnecessary.***
- *Considering the minimal levels of risks to site workers from exposure to site soils, comparison of site soil data to 1/10th action level for non-carcinogens is excessive and unnecessary and provides an unnecessary level of conservatism in the protection of human health and the environment. Furthermore, such comparisons and consequent additional screening and risk assessment of soil data have only one essentially end response action possible, i.e., removal of soil samples. Such action is*

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already required under the permit when any COPC concentration exceeds the actual Action Level.

We therefore RFAAP concludes that the removal of the referenced paragraph from the Permit is well justified and no replacement is necessary. Please remove the above noted justification section if VDEQ concurs.”

DEQ does not concur with the removal of the language which requires a site specific risk assessment or the justification RAAP has provided. The fact that the OBG is a currently operating unit, which means the potential for contamination to impact soils and worker health is ongoing, is the very reason why RAAP is required to provide a site specific risk assessment for industrial workers health to ensure the workers are protected at the currently detected levels of contamination in the soils.

Additionally given that the operating conditions in the submitted permit detail that ejected material from the pans will be picked up off the ground and retreated directly refutes RAAP's claim that there is no potential for dermal contact between workers and impacted soils.

The permittee shall revise the section language to include the struck paragraph or DEQ will add in the language while finalizing the draft permit.

Radford Response (1-1), (Response received on 5/5/2016) – During a meeting between the parties on March 31, 2016, several ideas concerning modification of the referenced language were presented. DEQ agreed to evaluate the proposed alternatives and return with a modified request concerning this NOD.

DEQ Response (1-1) – DEQ has reviewed the proposal and drafted alternate language for the condition which addresses RAAP's concerns. The language was sent to RAAP via electronic transmission on May 6, 2016 and no comments have been received by DEQ on the proposed language. Please submit comment on the proposed language with the next response to this comment.

Radford Informal Response (1-2), (Response received on 6/24/2016) – During a meeting between the parties on March 31, 2016, several ideas concerning modification of the referenced language were presented. DEQ agreed to evaluate the proposed alternatives and return with a modified request concerning this NOD.

In further correspondence provided from DEQ via e-mail on May 6, 2016, DEQ agreed that the original paragraph concerning 1/10th action levels, as well as the added “justification” text be deleted. The revised Attachment II.C incorporates these changes.

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DEQ Informal Response (1-2) – DEQ concurs with striking the language on Page II.C-9 regarding the non-carcinogenic COPCs being detected triggering a quantitative evaluation as agreed upon during the 5/31/2016 meeting.

However, RAAP has included the language DEQ suggested by struck from the permit on Page II.C-19 regarding the in-situ/ex-situ remediation strategy demonstration. As these remediation strategies are normally employed on closed units where contamination is not being continually added to the surrounding area RAAP shall remove this language from the permit application as this remedial approach is not appropriate for an operating unit and will only cause unnecessary delays in removal of identified soil contamination.

Radford Response (1-2), (Response received on 9/14/2016) – RFAAP reviewed and concurs with the proposal provided in DEQ's May 6, 2016, e-mail. RFAAP provided a draft submittal on June 24, 2016, that reflected the language specified above. Formal submittal of this revision is awaiting DEQ review of the draft documents that were provided.

DEQ Response (1-2) – As stated in the informal comment above the language regarding in-situ/ex-situ remediation shall be struck in order for the comment to be satisfied.

18. **Attachment II.C, Section II.C.4.1, Page II.C-8** – See Comment 12 regarding revision of NB-1 and NB-2 into one sampling site. Language shall be revised to reflect two distinct sampling locations.

Radford Response (1-1), (Response received on 5/5/2016) – As stated in response to Comment 12 above, RFAAP proposed to combine the two sampling locations based on historical data from the many years of soil sampling at the site. RFAAP will prepare a separate submittal that formalizes the request for combining the two sites and provide justification necessary to substantiate this request.

DEQ Response (1-1) – DEQ will review the request for combining the two sampling locations, with the proper justification, when submitted to determine if the comment is satisfied.

Radford Response (1-2), (Response received on 9/14/2016) – RFAAP submitted the requested documentation to DEQ on September 8, 2016. RFAAP is awaiting DEQ review of the request and the data provided to substantiate it.

DEQ Response (1-2) – DEQ has reviewed the submission made on 9/8/2016 and does not concur with RAAP regarding the sampling sites. As these sites are chosen at random within the defined area to ensure contamination is not impacting the soil from the operating unit DEQ does not feel like it is appropriate to reduce the sampling locations. The language currently in the permit will remain unmodified.

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19. **Attachment II.C, Section II.C.4.2, Pages II.C-8 and II.C-9** – The language of Section II.C.4.2 has been revised to remove the following paragraph:

“The contract laboratory will keep a logbook to document the processing steps that are applied to the sample. All sample preparation techniques and instrumental methods must be identified in this logbook. The results of the analysis of all quality control samples should be identified specific to each batch of groundwater samples analyzed. The logbook should also include the time, date, and name of person (and company affiliation if subcontracted) who performed each processing step.”

RAAP has noted in comment RFAAP19 that this condition is covered under the laboratory’s VELAP accreditation. Please provide a revised Attachment II.C which includes the current accreditation documents which contains this language for incorporation into the permit.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP will reinstate the struck language. However, we request that DEQ recognize that these are minimum requirements and individual laboratory VELAP/QA/QC programs will direct the procedures employed. Clarifying language will be added in this regard.

DEQ Response (1-1) – DEQ accepts the rationale provided by RAAP to satisfy the comment but reminds RAAP that responsibility to ensure contract laboratories are operating at or above the minimum standards in this condition ultimately falls on the facility relying on the laboratory data to ensure compliance with the permit conditions.

Radford Informal Response (1-2), (Response received on 6/24/2016) – RFAAP has reverted the referenced language to that provided in the current Permit. For clarity and to incorporate the current laboratory accreditation requirements, RFAAP has also added a reference to the individual laboratory’s VELAP-approved QA/QC programs.

DEQ Informal Response (1-2) – DEQ has reviewed the revised language, including the reinstated language, and the comment is now satisfied.

Radford Response (1-2), (Response received on 9/14/2016) – RFAAP understands this compliance burden. RFAAP provided a draft submittal addressing this comment on June 24, 2016. In this submittal, RFAAP reverted the referenced language to that provided in the current Permit. For clarity and to incorporate the current laboratory accreditation requirements, RFAAP also added a reference to the individual laboratory’s VELAP-approved QA/QC programs. Formal submittal of this revision is awaiting DEQ review of the draft documents that were provided.

DEQ Response (1-2) – DEQ has reviewed the revised language, including the reinstated language, and the comment is now satisfied.

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20. **Attachment II.C, Section II.C.4.3, Page II.C-9** – The sampling device referenced in Section II.C.4.3 has been changed from a tulip bulb sampler to a trowel. Please provide a technical justification for this revision.

Radford Response (1-1), (Response received on 5/5/2016) – The referenced change was made to be consistent with more modern sampling techniques. Based on conversations with DEQ on March 30, 2016, the language is acceptable as proposed. However, for clarification and consistency with the ASTM standard, the sampling device will be changed to reference "a stainless steel sampling device able to collect an undisturbed soil sample."

DEQ Response (1-1) – DEQ accepts the explanation provided by RAAP and the comment is now satisfied.

Radford Informal Response (1-2), (Response received on 6/24/2016) – The referenced change was made to be consistent with more modern sampling techniques. For clarification and consistency with the ASTM standard, the sampling device was changed to reference "a stainless steel sampling device able to collect an undisturbed soil sample." A reference to the appropriate revised ASTM standard has also been added.

DEQ Informal Response (1-2) – DEQ has reviewed the revised language and the comment is now satisfied.

21. **Attachment II.C, Section II.C.4.3, Page II.C-9** – The language has been revised to remove the words "at each burn pad" from the description of the measurement of the sampling locations. The language shall be revised to incorporate these words as it may seem like RAAP is not required to sample at each burn pad otherwise.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP will revise and reinstate "at each burn pad" in Section II.C.4.3 where requested.

DEQ Response (1-1) – DEQ will review the revised language of Section II.C.4.3 when submitted by RAAP and determine if the comment is satisfied.

Radford Informal Response (1-2), (Response received on 6/24/2016) – RFAAP has revised the referenced text to include the language "at each burn pad" in Section II.C.4.3 where requested.

DEQ Informal Response (1-2) – DEQ has reviewed the revised language and the comment is now satisfied.

Radford Response (1-2), (Response received on 9/14/2016) – RFAAP provided a draft submittal addressing this comment on June 24, 2016. In this submittal, RFAAP revised the referenced text to include the language "at each burn pad" in Section II.C.4.3 where

requested. Formal submittal of this revision is awaiting DEQ review of the draft documents that were provided.

DEQ Response (1-2) – DEQ has reviewed the revised language and the comment is now satisfied.

22. **Attachment II.C, Section II.C.4.4, Page II.C-10** – The reference to SW-846 test methods has been removed. The language shall be revised to reflect the inclusion of SW-846 methods and VELAP approved methods for testing.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP will make the requested revision to Section II.C.4.4.

DEQ Response (1-1) – DEQ will review the revised language of Section II.C.4.4 when submitted by RAAP and determine if the comment is satisfied.

Radford Informal Response (1-2), (Response received on 6/24/2016) – RFAAP has reverted the text to that contained within the current Permit, adding a reference to VELAP accreditation as requested.

DEQ Informal Response (1-2) – DEQ has reviewed the revised language and the comment is now satisfied.

Radford Response (1-2), (Response received on 9/14/2016) – RFAAP provided a draft submittal addressing this comment on June 24, 2016. In this submittal, RFAAP reverted the text to that contained within the current Permit, adding a reference to VELAP accreditation as requested. Formal submittal of this revision is awaiting DEQ review of the draft documents that were provided.

DEQ Response (1-2) – DEQ has reviewed the revised language and the comment is now satisfied.

23. **Attachment II.C, Section II.C.4.5, Pages II.C-11 through 13** – The submitted Section II.C.4.5 has been revised to be significantly less stringent in regards to sample COC requirements and analysis reports to be sent and maintained at RAAP for review by inspectors to ensure compliance with the COC requirements of this permit. While RAAP has indicated in Comment RFAAP21 that the revisions were included to reflect the groundwater SAP that does not allow the COC requirements for the SMP to become less restrictive than already permitted. The language shall be revised as follows or the permittee may submit a revision which incorporates all of the current and proposed requirements:

“The soil monitoring program incorporates a COC program to track the custody of the samples from time of collection, to shipment to and receipt at the laboratory. The monitoring

*of sample possession from field sampling to laboratory analysis is important in the event that unexpected **laboratory lab** results occur and the **documentation of sample possession can be evaluated.***

This documentation contains several records and logs that assist in the quality control of the program.

*Sample labels are used to prevent misidentification of samples. The labels are completed and affixed to the sample containers prior to field sampling. **COC control for all samples will consist of the following:***

- 1. Labels will be placed on individual sample containers while sampling containing the following information:*
 - Sample identification number*
 - Name of sampler (initials)*
 - Date and time of sample collection*
 - Sampling location*
 - Constituents to be analyzed.*

Additionally, sample custody seals affixed over each shipping cooler should be used when a common carrier transports the sample shipment to the laboratory. These seals ensure that the samples have not been disturbed during transportation. The sample custodian sample identification name and date will be included on the custody sample seal.

- 2. A custody seal should be placed on the shipping container or on the individual sample bottles. Custody seals provide prevention or easy detection of sample tampering. The custody seal should bear the signature of the collector and the date signed. The custody seal can be placed on the front and back of a cooler, around the opening of a polyethylene overpack bag or on the lid of each sample container.*
- 3. No sample should be brought back to the laboratory for preservation. It is recommended that two polyethylene overpack bags be used in shipping. The first will contain the sample bottles, the second the ice needed to keep history of the samples should be maintained as a QC measure. Upon receipt of the shipment, the laboratory should record the temperature on the COC. The method holding time is defined by the analytical method and listed in Table II.C-3. Holding time refers to the period from sample collection to sample extraction and/or analysis.*
- 4. A COC record should be completed and should accompany every sample shipment. The COC record should contain enough copies so that each person possessing the shipment receives his/her own and should be designed to allow the Permittee to reconstruct how and under what circumstances a sample was collected, including any problems encountered. An example of a COC form that includes the necessary information is included as Attachment II.C-A.*

5. *Samples will be packaged and labeled for shipment in compliance with current U.S. Department of Transportation regulations. All samples will be shipped priority/overnight via commercial carrier or hand delivered to the laboratory.*
6. *Samples will arrive at the laboratory via the overnight delivery service or hand delivery. Upon delivery to the laboratory, the ice chests will be checked for intact custody seals and the samples will be unpacked and the information on the accompanying COC records will be examined. If the samples shipped match those described on the COC form, the laboratory sample coordinator will sign the form and assume responsibility for the samples. If problems are found with the sample shipment, the laboratory sample custodian will sign the form and record the problems in the "remarks" section.*
7. *Any missing samples, missing sample tags, broken sample bottles, or unpreserved samples will be noted on the COC record. If there are problems with individual samples, the sample custodian will inform the laboratory coordinator of such problems. The laboratory custodian will then contact the Permittee to determine a viable solution to the problem.*
8. *All information relevant to the sample will be secured at the end of each business day. All samples will be stored in a designated sample storage refrigerator, access to which will be limited to laboratory employees.*

The completed form COC is returned to RFAAP included with the certificate of analyses (i.e., laboratory report package), for each Unit. An example chain-of-custody form is included in Appendix II.C-A. The sample possession is established from time of collection to the time of analysis. This record The COC contains the following information:

- *Sample identification and location*
- *Signature of sampler*
- *Date and time of sampling*
- *Sample type*
- *Identification*
- *Number of containers*
- *Required analysis*
- *Signatures of person(s) involved in possession*
- *Times and dates of possession*
- *Method of transportation*
- *Tracking number from transporter*
- *Statement for packing on ice*
- *Temperature during shipment (min & max)*
- *Internal temperature of shipping cooler (or sample containers) upon arrival at Laboratory*

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A sample analysis request sheet can further clarify the samples for each requested constituent. This additional check sheet will be utilized when necessary (i.e., beginning of a new contract with a new laboratory). This sheet sent along with the samples will contain the following information:

- *Name of person receiving samples*
- *Laboratory sample number*
- *Date of sample receipt*
- *Analysis to be performed*
- *Internal temperature during shipping.”*

Radford Response (1-1), (Response received on 5/5/2016) – During a meeting between the parties on March 30, 2016, RFAAP explained that the COC requirements may vary depending on the laboratory performing the analysis. However, RFAAP agreed that general COC requirements can be specified that would be required at a minimum for all projects. Therefore, RFAAP will revise the referenced language to incorporate the minimum COC requirements for any sampling event and to reference laboratory VELAP QA/QC programs for further specification of requirements.

DEQ Response (1-1) – DEQ will review the revised language of Section II.C.4.5 when submitted by RAAP and determine if the comment is satisfied.

Radford Informal Response (1-2), (Response received on 6/24/2016) – During a meeting between the parties on March 30, 2016, RFAAP explained that the COC requirements may vary depending on the laboratory performing the analysis. However, RFAAP agreed that general COC requirements can be specified that would be required at a minimum for all projects. Therefore, RFAAP revised the referenced language to incorporate the minimum COC requirements for any sampling event and to reference laboratory VELAP QA/QC programs for further specification of requirements.

DEQ Informal Response (1-2) – DEQ has reviewed the revised language and the comment is now satisfied.

Radford Response (1-2), (Response received on 9/14/2016) – RFAAP provided a draft submittal addressing this comment on June 24, 2016. In this submittal, RFAAP revised the text as described above. Formal submittal of this revision is awaiting DEQ review of the draft documents that were provided.

DEQ Response (1-2) – DEQ has reviewed the revised language and the comment is now satisfied.

24. **Attachment II.C, Section II.C.6.2, Pages II.C-15 and II.C-16** – As noted in Comment 19 please provide the QA/QC documentation required by the VELAP accreditation which is

replacing the equivalent language in this section for inclusion into the permit language as an appendix to be referenced in Section II.C.6.2.

Radford Response (1-1), (Response received on 5/5/2016) – Including specific QA/QC documentation from a specific contract laboratory in the Permit restricts RFAAP to use to that contract laboratory for all future analyses. Given that each VELAP accredited laboratory is required to have a QA/QC plan and that plan is reviewed, approved and deemed adequate for regulatory analysis by DCLS, there should be no need to include the documentation in the Permit. Simply making reference that QA/QC should be performed according to the VELAP-approved QA/QC program for each laboratory should be sufficient.

DEQ Response (1-1) – DEQ has reviewed RAAP's rationale and requests that language stating the QA/QC plans for each VELAP accredited laboratory be maintained at the facility for review by DEQ inspectors be added to Section II.C.6.2.

Radford Informal Response (1-2), (Response received on 6/24/2016) – Including specific QA/QC documentation from a specific contract laboratory in the Permit restricts RFAAP to use to that contract laboratory for all future analyses. Given that each VELAP accredited laboratory is required to have a QA/QC plan and that plan is reviewed, approved and deemed adequate for regulatory analysis by DCLS, there should be no need to include the documentation in the Permit. Simply making reference that QA/QC should be performed according to the VELAP-approved QA/QC program for each laboratory should be sufficient. As such, RFAAP worked with DCLS to provide proposed language for this section that would specify the requirements to the level necessary and allow room for laboratory VELAP programs to function as intended. The proposed language provided in Section II.C.6.2 represents a combination of efforts between DCLS and RFAAP. Ms. Cathy Westerman from DCLS was our primary source of consultation.

DEQ Informal Response (1-2) – DEQ has reviewed the revised language and the comment is mostly satisfied. RAAP shall modify the language to the following to completely satisfy the comment:

“The analytical laboratory must develop, implement and maintain a quality system program to generate data of known and documented quality based on national performance standards adopted under the National Environmental Laboratory Accreditation Program (NELAP). Analytical laboratories producing compliance data must be ~~VELAP~~-accredited under 1VAC30-46, also called the Virginia Environmental Laboratory Accreditation Program (VELAP). VELAP accreditation under 1VAC30-46 incorporates **TNI** (*Qualify this acronym*) standards and its quality system requirements.”

Radford Response (1-2), (Response received on 9/14/2016) – RFAAP provided a draft submittal addressing this comment on June 24, 2016. In making the changes provided in the draft submittal, RFAAP worked with DCLS to provide proposed language for this section

that would specify the requirements to the level necessary and allow room for laboratory VELAP programs to function as intended. Formal submittal of this revision is awaiting DEQ review of the draft documents that were provided.

DEQ Response (1-2) – As stated in the informal response above the comment is mostly satisfied by the proposed changes. To completely satisfy the comment please make the revisions identified in the informal response and submit the language for review.

25. **Attachment II.C, Section II.C.7.2.2, Page II.C-18** – Section II.C.7.2.2 has been revised to change the word shall into the word should. The language shall be revised back to include the word shall and remove the word should as should is not a legally enforceable term for a permit condition.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP will revise Section II.C.7.2.2 as requested.

DEQ Response (1-1) – DEQ will review the revised language of Section II.C.7.2.2 when submitted by RAAP and determine if the comment is satisfied.

Radford Informal Response (1-2), (Response received on 6/24/2016) –RFAAP has reverted the language in Section II.C.7.2.2 to that contained in the current Permit as requested.

DEQ Informal Response (1-2) – DEQ has reviewed the revised language and the comment is now satisfied.

Radford Response (1-2), (Response received on 9/14/2016) – RFAAP provided a draft submittal addressing this comment on June 24, 2016. In this submittal, RFAAP reverted the language in Section II.C.7.2.2 to that contained in the current Permit as requested. Formal submittal of this revision is awaiting DEQ review of the draft documents that were provided.

DEQ Response (1-2) – DEQ has reviewed the revised language and the comment is now satisfied.

26. **Attachment II.C, Section II.C.7.2.3, Page II.C-18** – The language of Section II.C.7.2.3 has been revised to significantly modify the procedures to be used to identify data outliers. As data outliers may not just indicate improper sampling and analysis procedures and may indicate a spike in contaminated soil not previously identified this language shall be revised to the previous language included in the Permittee's current permit.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP will reinstate struck language as requested.

DEQ Response (1-1) – DEQ will review the revised language of Section II.C.7.2.3 when submitted by RAAP and determine if the comment is satisfied.

Radford Informal Response (1-2), (Response received on 6/24/2016) – RFAAP has reinstated the struck language as requested.

DEQ Informal Response (1-2) – DEQ has reviewed the revised language and the comment is now satisfied.

Radford Response (1-2), (Response received on 9/14/2016) – RFAAP provided a draft submittal addressing this comment on June 24, 2016. In this submittal, RFAAP reinstated the struck language as requested. Formal submittal of this revision is awaiting DEQ review of the draft documents that were provided.

DEQ Response (1-2) – DEQ has reviewed the revised language and the comment is now satisfied.

27. **Attachment II.C, Section II.C.7.2.1, Page II.C-19** – Section II.C.7.2.1 contains language referencing the changes in Section II.C.7.2.3 regarding treatment of outliers. As this language has been found to be deficient by the DEQ the language of Section II.C.7.2.1 shall be revised to the previous language contained in the Permittee's current permit.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP will reinstate the previous language as requested.

DEQ Response (1-1) – DEQ will review the revised language of Section II.C.7.2.1 when submitted by RAAP and determine if the comment is satisfied.

Radford Informal Response (1-2), (Response received on 6/24/2016) – RFAAP has reinstates the previous language as requested.

DEQ Informal Response (1-2) – DEQ has reviewed the revised language and the comment is now satisfied.

Radford Response (1-2), (Response received on 9/14/2016) – RFAAP provided a draft submittal addressing this comment on June 24, 2016. In this submittal, RFAAP reinstated the struck language as requested. Formal submittal of this revision is awaiting DEQ review of the draft documents that were provided.

DEQ Response (1-2) – DEQ has reviewed the revised language and the comment is now satisfied.

28. **Attachment II.C, Section II.C.7.3.6, Page II.C-19** – Section II.C.7.3.6 has revised the word possible into practical. The language shall be revised to include the word possible as practical is not a synonym of possible and verification sampling is not to be restricted to when it shall be convenient for the permittee to conduct it.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP will revise Section II.C.7.3.6 as requested.

DEQ Response (1-1) – DEQ will review the revised language of Section II.C.7.3.6 when submitted by RAAP and determine if the comment is satisfied.

Radford Informal Response (1-2), (Response received on 6/24/2016) – RFAAP has reverted the language in Section II.C.7.3.6 to that contained in the current Permit as requested.

DEQ Informal Response (1-2) – DEQ has reviewed the revised language and the comment is now satisfied.

Radford Response (1-2), (Response received on 9/14/2016) – RFAAP provided a draft submittal addressing this comment on June 24, 2016. In this submittal, RFAAP reinstated the struck language as requested. Formal submittal of this revision is awaiting DEQ review of the draft documents that were provided.

DEQ Response (1-2) – DEQ has reviewed the revised language and the comment is now satisfied.

29. **Attachment II.C, Section II.C.7.8, Page II.C-17** – Section II.C.7.8 has been revised to change the deadline to submit a modification request to DEQ from 90 days to “the duration specified by VDEQ”. Please note that this duration was previously specified in the permit language and is 90 days. The language of the condition shall be revised to reflect the 90 day deadline requirement.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP will reinstate the 90 day requirement in Section II.C.7.8.

DEQ Response (1-1) – DEQ will review the revised language of Section II.C.7.8 when submitted by RAAP and determine if the comment is satisfied.

Radford Informal Response (1-2), (Response received on 6/24/2016) – RFAAP has reinstated the 90 day requirement in Section II.C.7.8 as requested.

DEQ Informal Response (1-2) – DEQ has reviewed the revised language and the comment is now satisfied.

Radford Response (1-2), (Response received on 9/14/2016) – RFAAP provided a draft submittal addressing this comment on June 24, 2016. In this submittal, RFAAP reinstated the 90-day requirement as requested. Formal submittal of this revision is awaiting DEQ review of the draft documents that were provided.

DEQ Response (1-2) – DEQ has reviewed the revised language and the comment is now satisfied.

30. **Attachment II.C, Table C.II-1** - There are multiple constituents which have been removed from Table C.II-1. Please provide a reference for the permit modification which has been approved by DEQ to remove these constituents or submit a revised table which includes the struck constituents.

Radford Response (1-1), (Response received on 5/5/2016) – Attachment II.C.3.3 of the permit allows opportunity to modify the sample locations and/or constituent list. Most of the constituents proposed for removal have not been detected at or above the RL since 2005. RFAAP will provide a separate submittal that summarizes the historical data for each removed pollutant and justifies the basis for removal.

DEQ Response (1-1) – DEQ will review the separate submittal and make a determination on whether the proposed changes are appropriate based on the justification and supporting sampling data.

Radford Response (1-2), (Response received on 9/14/2016) – RFAAP provided the requested documentation in a separate submittal on September 8, 2016. Please note that if RFAAP's requests for removal of constituents from Table C.II-1 is granted, RFAAP requests that DEQ consider removal of a subset of these same constituents from Module VII, Attachment VII.C, Corrective Action Program - Annual Groundwater Monitoring List, as these analytes have not been detected in groundwater samples in over a decade. Furthermore, similar to pyrene, if these constituents are no longer COCs in soil, inclusion of them in the groundwater monitoring program would no longer be appropriate.

DEQ Response (1-2) – DEQ does not concur with RFAAP's request to remove the constituents from soil monitoring. As these COC's were identified in the risk assessment and the OBG is currently an operating unit the potential for these COC's to be found in the soil exists. However DEQ will reconsider the request if the risk assessment for the renewal permit does not show these constituents to be a COC based on the available data.

31. **Attachment II.C, Table C.II-2** – The links to the current RSL table used for the TEQ values are not functioning in the footnote of Table C.II-2. Please revise the web addresses to the functional links.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP will correct the web addresses for the RSL table in Table C.II-2.

DEQ Response (1-1) – DEQ will review the revised web address in Table C.II-2 when submitted by RAAP and determine if the comment is satisfied.

Radford Informal Response (1-2), (Response received on 6/24/2016) – RFAAP corrected the web addresses for the RSL table in Table C.II-2 and updated the references to the most recent (May 2016) RSL table.

DEQ Informal Response (1-2) – DEQ has reviewed the revised language and the comment is now satisfied.

Radford Response (1-2), (Response received on 9/14/2016) – RFAAP provided a draft submittal addressing this comment on June 24, 2016. In this submittal, RFAAP corrected the web reference as requested. Formal submittal of this revision is awaiting DEQ review of the draft documents that were provided.

DEQ Response (1-2) – DEQ has reviewed the revised language and the comment is now satisfied.

32. **Module III, Section III.B.2, Pages III-1 through III-3** – While RAAP has commented that because of the Human Health and Ecological Risk Assessment the throughput and maximum constituent concentrations in the waste have been removed, the amount of diesel fuel required for a skid burn has also been removed from the submitted language. If the removal of the amount of diesel fuel to be required per burn is anticipated to be adjusted from the results of the risk assessment the removal may stand as a place holder for a revised throughput limit on diesel per burn. If not then the operating limit must be returned to the permit language.

Radford Response (1-1), (Response received on 5/5/2016) – Diesel fuel is not a hazardous waste and, therefore, regulation of the amount of diesel fuel burned at the facility is not a matter of RCRA limitation. The diesel fuel emissions from the OBG are accounted for and reported to DEQ's Air Division. Implementation of a diesel fuel limit under the RCRA program is not appropriate.

DEQ Response (1-1) – DEQ accepts the explanation provided by RAAP and the comment is now satisfied.

33. **Module III, Section III.D, Page III-5** – The submitted language of Section III.D has removed references to the analytical test methods which will be performed on the ash residue in order to determine if it is hazardous. The language shall be revised to incorporate the analytical methods which will be performed on the ash to make the determination. RAAP

may use the site-specific methods which have been approved by VELAP after they have been reviewed by DEQ for technical adequacy.

Radford Response (1-1), (Response received on 5/5/2016) – As discussed with DEQ during our March 30, 2016, meeting, the only analytical method removed from Section III.D appears to be the reference to SW846 Method 8330. This method is not being used to determine energetic content of the ash residue. The internal reactivity procedure described in the Waste Analysis Plan (and referenced in this section) is being used to determine whether the waste is hazardous for reactivity. Therefore, inclusion of the Method 8330 reference is not appropriate.

DEQ Response (1-1) – DEQ concurs with the explanation provided by RAAP and the comment is now satisfied.

34. **Module VII, Pages V.II-1 through V.II-17** –The submitted groundwater corrective action program does not contain any figures, tables or language which delineates the extent of the contaminant plumes for perchlorate and carbon tetrachloride, identifies the concentrations of the constituents in the plume or delineates the vertical extent of the plume. The section shall be revised to incorporate this information.

Radford Response (1-1), (Response received on 5/5/2016) – The referenced figures and tables were inadvertently omitted from the permit application. RFAAP will add the information requested.

DEQ Response (1-1) – DEQ will review the figures and tables when submitted by RAAP and determine if the comment is satisfied.

Radford Informal Response (1-2), (Response received on 6/24/2016) – The referenced figures and tables were inadvertently omitted from the permit application. With this submission, RFAAP is supplying the missing information. This includes the addition of information gathered from the existing corrective action program to Section VII.E.1, and the addition of tables and graphical depictions of the historical sampling data for perchlorate and carbon tetrachloride.

DEQ Informal Response (1-2) – DEQ has reviewed the revised language in Section VII.E.1 and the tables and figures included in Attachment VII.D and the comment is now satisfied.

Radford Response (1-2), (Response received on 9/14/2016) – RFAAP provided a draft submittal addressing this comment on June 24, 2016. In this submittal, RFAAP provided the omitted figures and tables. Formal submittal of this revision is awaiting DEQ review of the draft documents that were provided.

DEQ Response (1-2) – DEQ has reviewed the revised language and the comment is now satisfied.

35. **Module IV, Attachment IV.A, Section II.A, Pages IV.A-12 and IV.A-12** – Section II.B of Attachment IV.A has been removed and a comment has been made that the QA/QC procedures are no longer applicable since the methods used are all VELAP certified. Please provide the VELAP approved method documentation which specifies the QA/QC procedures to be followed. These QA/QC procedures will then be incorporated into the permit as an appendix to Attachment IV.A and updated as needed by permit modification if the methods are changed.

Radford Response (1-1), (Response received on 5/5/2016) – Including specific QA/QC documentation from a specific contract laboratory in the Permit restricts RFAAP to use to that contract laboratory for all future analyses. Given that each VELAP accredited laboratory is required to have a QA/QC plan and that plan is reviewed, approved and deemed adequate for regulatory analysis by DCLS, there should be no need to include the documentation in the Permit. Simply making reference that QA/QC should be performed according to the VELAP-approved QA/QC program for each laboratory should be sufficient.

DEQ Response (1-1) – DEQ has reviewed RAAP's rationale and requests that language stating the QA/QC plans for each VELAP accredited laboratory be maintained at the facility for review by DEQ inspectors be added to Section II.A.

Radford Informal Response (1-2), (Response received on 6/24/2016) – Including specific QA/QC documentation from a specific contract laboratory in the Permit restricts RFAAP to use to that contract laboratory for all future analyses. Given that each VELAP accredited laboratory is required to have a QA/QC plan and that plan is reviewed, approved and deemed adequate for regulatory analysis by DCLS, there should be no need to include the documentation in the Permit. Simply making reference that QA/QC should be performed according to the VELAP-approved QA/QC program for each laboratory should be sufficient. As such, RFAAP worked with DCLS to provide proposed language for this section that would specify the requirements to the level necessary and allow room for laboratory VELAP programs to function as intended. The proposed language provided in Section II.B of Attachment IV.A represents a combination of efforts between DCLS and RFAAP. Ms. Cathy Westerman from DCLS was our primary source of consultation.

DEQ Informal Response (1-2) – DEQ has reviewed the revised language and the comment is mostly satisfied. RAAP shall modify the language to the following to completely satisfy the comment:

“The analytical laboratory must develop, implement and maintain a quality system program to generate data of known and documented quality based on national performance standards adopted under the National Environmental Laboratory Accreditation Program (NELAP).

Analytical laboratories producing compliance data must be ~~VELAP~~-accredited under 1VAC30-46, also called the Virginia Environmental Laboratory Accreditation Program (VELAP). VELAP accreditation under 1VAC30-46 incorporates **TNI (*Qualify this acronym*)** standards and its quality system requirements.”

Radford Response (1-2), (Response received on 9/14/2016) – RFAAP provided a draft submittal addressing this comment on June 24, 2016. In making the changes provided in the draft submittal, RFAAP worked with DCLS to provide proposed language for this section that would specify the requirements to the level necessary and allow room for laboratory VELAP programs to function as intended. Formal submittal of this revision is awaiting DEQ review of the draft documents that were provided.

DEQ Response (1-2) – The comment is mostly satisfied but additional revisions are required to completely satisfy the comment. Please see the informal response above for the required language revisions.

36. **Module IV, Attachment IV.A, Section II.A, Page IV.A-12** – The language of the permit has been revised to read as follows:

“All analyses must be conducted by a laboratory that is VELAP accredited for the analytical method, matrix and target analyte (where applicable).”

The words “as applicable” are not consistent with the VELAP certification requirement for facilities using laboratory data to certify compliance with relevant permit conditions. All methods used must be VELAP certified in order to be considered valid analytical results for compliance with a DEQ issued permit condition. The language shall be revised to remove the words “as applicable” from the statement.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP will remove the phrase "where applicable" from Section II.A of Attachment IV.A.

DEQ Response (1-1) – DEQ will review the revised language of Section II.A when submitted by RAAP and determine if the comment is satisfied.

Radford Informal Response (1-2), (Response received on 6/24/2016) – RFAAP has removed the phrase "where applicable" from Section II.A of Attachment IV.A as requested.

DEQ Informal Response (1-2) – DEQ has reviewed the revised language and the comment is not satisfied as the language was not changed to reflect the comment made. RAAP shall modify the language to remove the words “where applicable” in order to satisfy the comment.

Radford Response (1-2), (Response received on 9/14/2016) – RFAAP provided a draft submittal addressing this comment on June 24, 2016. In this submittal, RFAAP removed the “where applicable” phrase as requested. Formal submittal of this revision is awaiting DEQ review of the draft documents that were provided.

DEQ Response (1-2) – The comment is mostly satisfied but additional revisions are required to completely satisfy the comment. Please see the informal response above for the required language revisions.

37. Module IV, Attachment IV.A, Appendix 6, Section B, Page IV.A-24 – The last sentence in section B of Appendix 6 has been revised as follows:

“Any elimination of an outlier ~~must be approved by the Department shall be properly documented and its basis for exclusion noted.~~”

Exclusion of data outliers without DEQ approval and simply noting the exclusion is not consistent with standard statistical procedures. The language shall be changed to reflect the original statement included in the permit.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP will restore the language in Section B of Attachment IV.A, Appendix 6, as requested.

DEQ Response (1-1) – DEQ will review the revised language of Section B of Attachment IV.A, Appendix 6 when submitted by RAAP and determine if the comment is satisfied.

Radford Informal Response (1-2), (Response received on 6/24/2016) – RFAAP has reverted the language in Section B of Attachment IV.A, Appendix 6, to that contained in the current Permit as requested.

DEQ Informal Response (1-2) – DEQ has reviewed the revised language and the comment is now satisfied.

Radford Response (1-2), (Response received on 9/14/2016) – RFAAP provided a draft submittal addressing this comment on June 24, 2016. In this submittal, RFAAP reverted the language to that contained within the current Permit as requested. Formal submittal of this revision is awaiting DEQ review of the draft documents that were provided.

DEQ Response (1-2) – DEQ has reviewed the revised language and the comment is now satisfied.

38. Module II, Attachment II.H, Section II.H.4m Pages II.H-2 and II.H-3 – Section II.H.4m has been revised to remove the specifications of the fencing which acts as a barrier to control entry into the facility. Please revise the section to include language which references the

national security policy which excludes the information from being included in the permit condition.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP will add the requested information to Section II.D.1.

DEQ Response (1-1) – DEQ will review the revised language of Section II.D.1 when submitted by RAAP and determine if the comment is satisfied.

Radford Informal Response (1-2), (Response received on 10/4/2016) – RFAAP has added the requested information to Section II.D.1.

DEQ Informal Response (1-2) – DEQ has reviewed the informal submission and while the revised language is satisfactory the placement of the language needs to be revised to mirror the agreed upon language for the Explosive Waste Incinerator application. The language shall be moved to Section II.H.4 to satisfy the comment made.

Radford Informal Response (1-3), (Response received on 11/10/2016) – RFAAP has added the requested information to Section II.D.4.

DEQ Informal Response (1-3) – DEQ has reviewed the revised language in Section II.D.4 and the comment is now satisfied.

39. **Module II, Attachment II.D, Section II.D.1, Page II.D-1** – Section II.D.1 as submitted has removed language referring to the inspection checklists and the checklists themselves. While the checklists are not required to be included in the final permit document they do need to be submitted for review by the DEQ to determine if they are sufficient to demonstrate compliance with the inspection requirements in this permit. Please submit the checklists with the revised application for review by the DEQ.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP will provide the requested information as confidential business information with the understanding that the checklists will not be incorporated to the Permit.

DEQ Response (1-1) – DEQ has reviewed the checklists and the comment is now satisfied.

40. **Module II, Attachment II.D, Table II.D.1, Page II.D-5** – Table II.D.1 has been revised to remove items of Personal Protective Equipment, Respirators, Air Compressors, Portable Pumps, Facility Barricades, Flashing Red Lights and Facility Signs which are required to be inspected by this permit. Please provide a technical justification as to why these items were removed from the inspection schedule other than the one provided in Comment RFAAP4 as this comment is not a sufficient justification for removal of the items.

Radford Response (1-1), (Response received on 5/5/2016) – The items that were removed from Table II.D.1 were either not necessary for operation of the OBG or were associated with the incinerator area and simply copied into this Permit as a matter of error. The items remaining in Table II.D.1 reflect those necessary to ensure compliant operation of the OBG.

DEQ Response (1-1) – DEQ accepts the rationale provided by RAAP and the comment is now satisfied.

41. **Module II, Attachment II.F, Table II.F-1** - Table II.F-1 does not contain a reference to the specific policy which requires the names, home phone numbers and home addresses of the emergency coordinators to be withheld. Please revise the notation below the table to include a reference to the specific policy documents which does not allow for this information to be included.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP will add the requested information to Table II.F-1.

DEQ Response (1-1) – DEQ will review the revised Table II.F-1 when submitted by RAAP and determine if the comment is satisfied.

DEQ Response (1-2) – No response for this comment was received by RAAP with the 9/14/2016 NOD response. The comment still stands as unsatisfied and shall be addressed in the next submission or the application may be considered technically incomplete.

42. **Module II, Attachment II.F, Section II.F.6b.ii, Pages II.F-9 through II.F-10** – The language of Section II.F.6b.ii is not consistent with what is required by 40 CFR 264.56 regarding reporting of an incident which involves the implementation of the contingency plan. The language on Pages II.F-5 and II.F-6 shall be revised to the following:

“The owner or operator must note in the operating record the time, date, and details of any incident that requires implementing the contingency plan. Within 15 days after the incident, he must submit a written report on the incident to the Regional Administrator. The report must include:

- (1) Name, address, and telephone number of the owner or operator;*
- (2) Name, address, and telephone number of the facility;*
- (3) Date, time, and type of incident (e.g., fire, explosion);*
- (4) Name and quantity of material(s) involved;*
- (5) The extent of injuries, if any;*
- (6) An assessment of actual or potential hazards to human health or the environment, where this is applicable; and*
- (7) Estimated quantity and disposition of recovered material that resulted from the incident.”*

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP will revise Section II.F.6b.ii as requested.

DEQ Response (1-1) – DEQ will review the revised language of Section II.F.6b when submitted by RAAP and determine if the comment is satisfied.

DEQ Response (1-2) – No response for this comment was received by RAAP with the 9/14/2016 NOD response. The comment still stands as unsatisfied and shall be addressed in the next submission or the application may be considered technically incomplete.

43. **Module II, Attachment II.F, Section II.F.2c, Pages II.F-6 through II.F-8** – Section II.F.2c of attachment has been revised to remove the waste description and corresponding waste codes from the permit language. As the contingency plan is supposed to be a standalone document the section shall be revised to include the following struck language:

“These wastes include the following:

1. Wastes which exhibit only the following hazardous characteristic(s):

a. Reactivity (hazardous waste number D003) as specified in 9 VAC 20-60-261; 40 CFR Part 261.23;

b. Reactivity (hazardous waste number D003) as specified in 9 VAC 20-60-261; 40 CFR 261.23 and the characteristic of toxicity, as specified in 9 VAC 20-60-261; 40 CFR 261.24, for one of the following constituents:

i. Lead (hazardous waste number D008);

ii. 2,4-Dinitrotoluene (hazardous waste number D030); and/or

iii. Barium (hazardous waste number D005)

c. Ignitability (hazardous waste number D001) as specified in 9 VAC 20-60-261; 40 CFR 261.21. Ignitable wastes are limited to clean up residue of propellant ingredients. Ignitable wastes are mixed with sawdust and are not a liquid when brought to the permitted treatment and storage area.

2. Wastes which are not listed pursuant to 9 VAC 20-60-261; 40 CFR 261.31, 32, and 33; and

3. Wastes which are one of the following (as identified in the Waste Analysis Plan):

a. Off-specification propellants and propellant intermediates, generated at the facility;

- b. Load, assemble and pack waste, consisting of energetic materials from assembling cartridges;*
- c. Specialty product wastes containing propellant with nitrocellulose, nitrate esters, nitroguanidine, solid explosives, and one of the following combinations of additional materials:*
 - i. 40 CFR 261 Appendix VIII constituents (D003)*
 - ii. 40 CFR 261 Appendix VIII constituents, chlorides and/or perchlorates (D003)*
 - iii. 40 CFR 261 Appendix VIII constituents and/or metals (D003, D004-D010)*
- d. Other miscellaneous waste, described in Module II, Attachment II.B, Appendix II.B-1, Table I, as one of the following:*
 - i. Ignitable and reactive liquids in sawdust (D001, D003)*
 - ii. Off-specification dinitrotoluene, trinitrotoluene, or Isotriol”*

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP will revise Section II.F.2c to include a summary of the managed wastes consistent with the description provided in the Waste Analysis Plan.

DEQ Response (1-1) – DEQ will review the revised language of Section II.F.2c when submitted by RAAP and determine if the comment is satisfied.

DEQ Response (1-2) – No response for this comment was received by RAAP with the 9/14/2016 NOD response. The comment still stands as unsatisfied and shall be addressed in the next submission or the application may be considered technically incomplete.

44. **Module II, Attachment II.F, Section II.F.5, Page II.F-12** – Section II.F.5 references safeguards in place to prevent a fire or explosion of the reactive hazardous waste but does not provide any examples of these safeguards. The section shall be revised to incorporate some examples of these safeguards so they may be evaluated for technical adequacy.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP will revise Section II.F.5 as requested.

DEQ Response (1-1) – DEQ will review the revised language of Section II.F.5 when submitted by RAAP and determine if the comment is satisfied.

DEQ Response (1-2) – No response for this comment was received by RAAP with the 9/14/2016 NOD response. The comment still stands as unsatisfied and shall be addressed in the next submission or the application may be considered technically incomplete.

45. **Module II, Attachment II.F, Section II.F.5b, Pages II.F-12 through II.F-13** – Section II.F.5b references standard operating procedures which guide emergency response staff to prevent the recurrence or spread of fires, explosions and release but does not list any supplemental appendices or attachments which detail these procedures. Table 1 and Appendix A which have been struck out from the submitted application contained the Emergency Procedures and RFAAP Disaster Control Plan and Plant Protection Plan respectively. The permittee shall revise the application to include the applicable portions of these plans as they apply to the OBG operations.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP will revise Section II.F.5b as requested.

DEQ Response (1-1) – DEQ will review the revised language of Section II.F.5b when submitted by RAAP and determine if the comment is satisfied.

DEQ Response (1-2) – No response for this comment was received by RAAP with the 9/14/2016 NOD response. The comment still stands as unsatisfied and shall be addressed in the next submission or the application may be considered technically incomplete.

46. **Module II, Attachment II.F, Section II.F.6d, Page II.F-7** – The title of Item 7 of Section II.F.6d has been revised from *Storage and Treatment of Release Material* to *Accumulation and Treatment of Release Material*. The permittee shall revise the item title to the previous language to make it consistent with the wording in the regulatory requirements of 40 CFR 264.56(g).

Radford Response (1-1), (Response received on 5/5/2016) – As no permitted storage areas are provided at the OBG or within the confines of this permit, referencing storage of hazardous waste seemed inappropriate. The title was changed to reflect the activities included in this Permit. RFAAP will add clarifying language to this regard in Section II.F.6d.

DEQ Response (1-1) – DEQ will review the revised language of Section II.F.6d when submitted by RAAP and determine if the comment is satisfied.

DEQ Response (1-2) – No response for this comment was received by RAAP with the 9/14/2016 NOD response. The comment still stands as unsatisfied and shall be addressed in the next submission or the application may be considered technically incomplete.

47. **Module II, Attachment II.F, Section II.F.7** – Section II.F.7 and Table 2 reference the copies of the mutual aid agreement being kept on-site but copies of the agreements were not submitted with the application. The permittee shall submit copies of the agreements for evaluation by DEQ.

Radford Response (1-1), (Response received on 5/5/2016) – Copies of the agreements will be provided for DEQ's review. However, consistent with the EWI Permit, we do not expect the actual agreements to be included in the Permit.

DEQ Response (1-1) – DEQ will review the Mutual Aid Agreements when submitted and the comment will be satisfied once a determination of technical adequacy is made.

Radford Response (1-2), (Response received on 9/14/2016) – Copies of the requested mutual aid agreements are included in Attachment 2 to this submittal. As noted previously, while these agreements are being provided for DEQ review, we do not expect the actual agreements to be included in the Permit.

DEQ Response (1-2) – DEQ has reviewed the mutual aid agreements and the comment is now satisfied. As agreed the documents will not be incorporated into the permit with the understanding that they will be made available for inspection upon request.

48. **Module II, Attachment II.F, Section II.F.8** – Section II.F.8 does not contain a description of the signals to be used to indicate an evacuation of the OBG. The permittee shall revise the section to contain a description of the signals used.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP will revise Section II.F.8 as requested.

DEQ Response (1-1) – DEQ will review the revised language of Section II.F.8 when submitted by RAAP and determine if the comment is satisfied.

DEQ Response (1-2) – No response for this comment was received by RAAP with the 9/14/2016 NOD response. The comment still stands as unsatisfied and shall be addressed in the next submission or the application may be considered technically incomplete.

49. **Module II, Attachment II.E, Table II.E-1** – Table II.E.1 does not contain the names of staff which currently hold the job described. The table shall be revised to incorporate this information.

Radford Response (1-1), (Response received on 5/5/2016) – As explained with other sections of the Permit, National Security policy prohibits the inclusion of names of personnel in the Permit to protect the security of the facility and the personnel holding those positions.

RFAAP will add a reference to this policy as has been done with other sections of the application.

DEQ Response (1-1) – DEQ accepts the rationale provided by RAAP and will determine if the comment is satisfied once the revised language in Table II.E.1 is submitted.

Radford Informal Response (1-2), (Response received on 10/4/2016) – As explained with other sections of the Permit, National Security policy prohibits the inclusion of names of personnel in the Permit to protect the security of the facility and the personnel holding those positions. RFAAP has added a reference to this policy in a footnote to revised Table II.E.1.

DEQ Informal Response (1-2) – DEQ has reviewed the proposed revision to the language in the informal response and the comment will be satisfied with the revisions made once submitted formally to DEQ.

Radford Informal Response (1-3), (Response received on 11/10/2016) – As explained with other sections of the Permit, National Security policy prohibits the inclusion of names of personnel in the Permit to protect the security of the facility and the personnel holding those positions. RFAAP has added a reference to this policy in a footnote to revised Table II.E.1.

DEQ Informal Response (1-3) – DEQ has reviewed the revised language in the footnote for Table II.E.1 and the comment is now satisfied.

50. **Module II, Attachment II.E, Section II.E.7** – Section II.E.7 has been revised to remove the standard operating procedures for the open burning ground operations. The section shall be revised to include the language as it is required to demonstrate the training program is adequate.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP will revise Section II.E.7 to include the introductory paragraph regarding standard operating procedures (SOPs). However, inclusion of the bulleted list of procedure sections is overly burdensome, as it would require a permit modification every time the procedure is modified, even in the case that the title of the section is slightly modified or the procedure renumbered. To ensure that the SOP addresses all necessary areas of unit operation, RFAAP will provide DEQ a copy of the SOP to review as part of the permitting process. This copy will be submitted as confidential business information (CBI).

DEQ Response (1-1) – DEQ accepts the rationale provided by RAAP and will determine if the comment is satisfied once the SOPs have been submitted for review.

Radford Informal Response (1-2), (Response received on 10/4/2016) – RFAAP has revised Section II.E.7 to include the introductory paragraph regarding standard operating procedures (SOPs) as requested. However, inclusion of the bulleted list of procedure sections

is overly burdensome, as it would require a permit modification every time the procedure is modified, even in the case that the title of the section is slightly modified or the procedure renumbered. To ensure that the SOP addresses all necessary areas of unit operation, RFAAP will provide DEQ a copy of the SOP to review under separate cover. This copy will be submitted as confidential business information (CBI).

DEQ Informal Response (1-2) – DEQ has reviewed the SOPs associated with the OBG and the comment is now satisfied.

Radford Informal Response (1-3), (Response received on 11/10/2016) – As explained with other sections of the Permit, National Security policy prohibits the inclusion of names of personnel in the Permit to protect the security of the facility and the personnel holding those positions. RFAAP has added a reference to this policy in a footnote to revised Table II.E.1.

DEQ Informal Response (1-3) – DEQ has reviewed the revised language in the footnote for Table II.E.1 and the comment is now satisfied.

51. **Module II, Attachment II.E, Section II.E.9** – Section II.E.9 does not provide a demonstration that the training director is trained in hazardous waste management procedures. The section shall be revised to incorporate language which provides this demonstration.

Radford Response (1-1), (Response received on 5/5/2016) – The information provided herein is identical to that provided with and approved for the EWI RCRA permit application. Based on clarifications provided by DEQ during our meeting on March 30, 2016, we will revised the introduction to this section to indicate that the training director ensures that the specified criteria is satisfied.

DEQ Response (1-1) – DEQ will review the revised language of Section II.E.9 when submitted by RAAP and determine if the comment is satisfied.

Radford Informal Response (1-2), (Response received on 10/4/2016) – The information provided herein is identical to that provided with and approved for the EWI RCRA permit application. Based on clarifications provided by DEQ during our meeting on March 30, 2016, RFAAP has revised the introduction to this section to indicate that the training director ensures that the specified criteria is satisfied.

DEQ Informal Response (1-2) – DEQ has reviewed the revised language in the response and the comment is satisfied.

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Radford Informal Response (1-3), (Response received on 11/10/2016) – The information provided herein is identical to that provided with and approved for the EWI RCRA permit application. Based on clarifications provided by DEQ during our meeting on March 30, 2016, RFAAP has revised the introduction to this section to indicate that the training director ensures that the specified criteria is satisfied.

DEQ Informal Response (1-3) – DEQ has reviewed the revised language in the footnote for Table II.E.1 and the comment is now satisfied.

52. **Module II, Attachment II.G, Section II.G.4a , Page II.G-10** - Section II.G.4a subpart (c) contains inapplicable citations for closure of a tank system and an incinerator. While DEQ recognizes the language was most likely mirrored from RAAP's EWI permit the corrected language which follows shall be submitted as a revision by the permittee:

“(c) Complies with the closure requirements of 9 VAC 20-60-264; 40 CFR 264 Subpart G, and 264.601 through 264.603.”

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP will revise Section II.G.4a as requested.

DEQ Response (1-1) – DEQ will review the revised language of Section II.G.4a when submitted by RAAP and determine if the comment is satisfied.

DEQ Response (1-2) – No response for this comment was received by RAAP with the 9/14/2016 NOD response. The comment still stands as unsatisfied and shall be addressed in the next submission or the application may be considered technically incomplete.

53. **Module II, Attachment II.G, Section II.G.4b , Pages II.G-11 and II.G-12** - The text of Section II.G.4b has been revised to reflect that only three closure options are available from the previous four and has combined clean and risk based closure into one option. The permittee is reminded that clean closure and risk based closure are two separate closure standards and that the revised text is technically incorrect in its assumption that these standards are the same. The text shall be revised to reflect there are four distinct closure options for the OBG.

Radford Response (1-1), (Response received on 5/5/2016) – The language of Section II.G.4b is identical to that provided with and approved for the EWI RCRA permit application. Based on conversations with DEQ during our meeting on March 30, 2016, this section will be modified to be more specific for the OBG since the potential for site contamination is greater. RFAAP will make changes accordingly.

DEQ Response (1-1) – DEQ will review the revised language of Section II.G.4b when submitted by RAAP and determine if the comment is satisfied.

DEQ Response (1-2) – No response for this comment was received by RAAP with the 9/14/2016 NOD response. The comment still stands as unsatisfied and shall be addressed in the next submission or the application may be considered technically incomplete.

54. **Module II, Attachment II.G, Section II.G.4b , Pages II.G-11 and II.G-12** - The language in Section II.G.4b regarding the closure options has been significantly revised from the previous permit language and does not accurately reflect the closure options and required actions which will be necessary to close the OBG. Options for closure are “clean closure” for both solids and groundwater or a “hybrid” where either soils or groundwater meet the ”clean closure” standard, but the other media does not. In either of these cases the permittee must perform closure and post-closure care as a landfill and obtain a post-closure care permit. The language shall be revised to remove the closure options and detail the available routes of closure, either clean closure or closure as a landfill with the required monitoring.

Radford Response (1-1), (Response received on 5/5/2016) – The language of Section II.G.4b was revised to be essentially identical to that provided with and approved for the EWI RCRA permit application. Based on conversations with DEQ during our meeting on March 30, 2016, this section will be modified to be more specific for the OBG since the potential for site contamination is greater. RFAAP will make changes accordingly.

DEQ Response (1-1) – DEQ will review the revised language of Section II.G.4b when submitted by RAAP and determine if the comment is satisfied.

DEQ Response (1-2) – No response for this comment was received by RAAP with the 9/14/2016 NOD response. The comment still stands as unsatisfied and shall be addressed in the next submission or the application may be considered technically incomplete.

55. **Module II, Attachment II.G, Table II.G-1** – There are multiple constituents which have been removed from Table II.G-1. Please provide a reference to the permit modification which was approved by the DEQ or revise the table to include the constituents in the previously approved permit.

Radford Response (1-1), (Response received on 5/5/2016) – Table II.G-1 was revised based upon the multitude of current soil and groundwater monitoring data available on the site, as well as information available on the materials present in or expected to be formed from the combustion of the managed wastes. The original table was developed prior to the availability of this information and, therefore, was highly speculative in nature. To support the proposed removal of each constituent, RFAAP will prepare a summary of this historical data and provide justification for each constituent.

DEQ Response (1-1) – DEQ will review the justification provided when submitted by RAAP and determine if the rationale provided is acceptable and if comment is satisfied.

DEQ Response (1-2) – No response for this comment was received by RAAP with the 9/14/2016 NOD response. The comment still stands as unsatisfied and shall be addressed in the next submission or the application may be considered technically incomplete.

56. **Module II, Attachment II.G, Section II.G.5c, Pages II.G-16 through II.G-18** - The permittee has removed the language in Section II.G.5c which references the evaluation of surface and subsurface impact and has replaced it with a reference to the SMP in Attachment II.C. The permittee is reminded that DEQ has specifically stated that the requirements of the SMP cannot be used as a substitute for sampling for closure of the unit. The permittee shall revise the language in Section II.G.5c to the language of the previously approved permit.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP consolidated the language in the first paragraph of this section, combining two sentences. The previous version of the paragraph also referenced the soil monitoring plan (SMP) in Attachment II.C for the methodologies and procedures that would be employed. The remaining paragraphs were deleted, as they duplicated language provided in the referenced SMP (refer to SMP Section II.C.3.1 - "Sample Locations" and Section II.C.9.1 - "Hot Spot Evaluation and Soil Removal" for similar descriptions). (The original closure plan was developed prior to the SMP. When the SMP was developed, it pulled language from the closure plan). In discussions with DEQ on March 30, 2016, it was agreed that the language can remain as proposed provided that the paragraph beginning with "Prior to..." be added back to the referenced section.

DEQ Response (1-1) – DEQ accepts the rationale provided by RAAP and will review the revised language in Section II.C.3.1 when submitted to determine if the comment is satisfied.

DEQ Response (1-2) – No response for this comment was received by RAAP with the 9/14/2016 NOD response. The comment still stands as unsatisfied and shall be addressed in the next submission or the application may be considered technically incomplete.

57. **Module II, Attachment II.G, Section II.G.5e, Page II.G-18** – The following sentence has been removed from Section II.G.5e:

“Additional constituents may be added to the analyses at the time of closure, pending VDEQ approval.”

The language shall be revised to include this sentence as it is standard in all closure plans and ensures that additional constituents may be evaluated as needed

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP will revise Section II.G.5e as requested.

DEQ Response (1-1) – DEQ will review the revised language of Section II.II.G.5 when submitted by RAAP and determine if the comment is satisfied.

DEQ Response (1-2) – No response for this comment was received by RAAP with the 9/14/2016 NOD response. The comment still stands as unsatisfied and shall be addressed in the next submission or the application may be considered technically incomplete.

Section 2 of the Notice of Deficiency Addressing the Technical Completeness of the Part A and Part B Permit Applications for the Renewal of the Subpart X Open Burning and Open Detonation Permit, Technical Deficiencies of the Groundwater Modules of the Permit Application

Note: DEQ groundwater technical staff has reviewed the submitted responses and have the following additional comments. Unless a specifically noted deficiency in the following comments addresses language noted as deficient in the previous round of comments the previous comments are considered satisfied by the submission.

1. Module IV: IV.D.3.a

Facility Proposed in NOD response: Background groundwater quality for a new monitoring parameter or constituent shall be based on data from quarterly sampling of 13MW2 obtained over the course of one year. Existing data may be used to establish background concentrations provided it is of sufficient quality.

DEQ Proposed: Existing data may be used to establish background concentrations provided it is of sufficient quality *with approval from DEQ.*

2. Modules IV.E.3. -Remove “where applicable”.

3. Modules IV: ATTACHMENT IV.I.A - Remove “13MW1 may also be used as another source for background concentration data at the discretion of the Permittee”.

4. **Module V: V.B.1** - To be consistent with Module IV, Section IV.D.3.a, the following language in this section should be struck. *Further, the facility may collect background data from 13MW1 following approval from the Department.*

5. **Module V: V.D.1.c**

Facility Proposed in NOD response: Background groundwater quality for a new monitoring parameter or constituent shall be based on data from quarterly sampling of 13MW2 obtained over the course of one year. Existing data may be used to establish background concentrations provided it is of sufficient quality.

DEQ Proposed: Existing data may be used to establish background concentrations provided it is of sufficient quality *with approval from DEQ.*

6. **Module V: V.H.5.b**

Facility Proposed in NOD response: Background groundwater quality for a new monitoring parameter or constituent shall be based on data from quarterly sampling of 13MW2 obtained over the course of one year as specified in **Permit Attachment IV.A, Appendix 6 (Statistical Analysis)**. Existing data may be used to establish background concentrations provided it is of sufficient quality with approval from DEQ. Background monitoring well(s) are specified in **Permit Condition V.B.1**.

DEQ: This maintains consistency with other modules.

7. **Module VII: VII.F.1.b**

Facility Proposed in NOD: Monitoring well 13MW2 is located upgradient of the unit and will serve as the background well for the OBG. Monitoring wells 13MW3, 13MW4, and 13MW7 are located downgradient of the unit and will serve as the point of compliance wells. Monitoring wells 13MW5, 13MW6, and 13MW-8 are the downgradient plume monitoring wells for the unit. In addition, well 13MW1 will be used as a piezometer to measure static groundwater elevations during each sampling event.. Additional monitoring wells, if required will serve as plume wells for the monitoring of the HCOCs and daughter products and for the MNA parameters listed in **Permit Attachment VII.B**

DEQ: This maintains consistency with other modules.

8. **Permit Attachment V.B: Compliance Groundwater Monitoring List-** The proposed Constituents of Concern (COC) for removal from the permit are not approved at this time as this is still an operating unit except for pyrene as this constituent is not a COC in soil.
9. **Permit Attachment V.C: Open Burning Ground Calculated Background Values -** Pyrene should be removed from the list as it is no longer a COC.

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10. **Permit Attachment V.D: Appendix IX Groundwater Monitoring List** - The proposed Constituents of Concern (COC) for removal from the permit are not approved at this time as this is still an operating unit except for pyrene as this constituent is not a COC in soil.
11. **Permit Attachment V.E: Groundwater Protection Standards** – The changes are acceptable. Comment referred to Permit Attachment V.D: Appendix IX Groundwater Monitoring List.
12. **Permit Attachment VII.C: Corrective Action Program -- Annual Groundwater Monitoring List for Radford OBG/HWMU-13** - All COCs proposed for removal and previously accepted are not approved except pyrene as this is still an operating unit and these constituents were identified as COCs.

Note: Previous comments are included for recordkeeping purposes only. Unless specifically noted in the above comments all comments below are considered satisfied.

1. **Module IV, Section IV.D.3.a, Page IV-5** – The permittee has revised the following language:

*“Background groundwater quality for a **new** monitoring parameter or constituent shall be based on data from quarterly sampling of 13MW2 obtained over the course of for one year. **Optionally, the facility may collect quarterly background data from 13MW1 at their discretion to obtain a more robust background dataset. In this case, the background dataset would be one year's worth of data from the combination of wells 13MW1 and 13MW2. Existing data may be used to establish background concentrations provided it is of sufficient quality.**”*

The DEQ concurs with the revisions with the exception of the language which allows the additional background sampling from 13MW1 to be optional, not requiring DEQ approval before sampling proceeds and the frequency of sampling. The language shall be revised as follows:

*“Background groundwater quality for a **new** monitoring parameter or constituent shall be based on data from quarterly sampling of 13MW2 obtained over the course of for one year. **In addition, the facility may collect quarterly background data from 13MW1 following approval from the DEQ, to obtain a more robust background dataset. In this case, the background dataset would be one year's worth of quarterly data from well 13MW1 and supplemental data from 13MW2. ~~Optionally, the facility may collect quarterly background data from 13MW1 at their discretion to obtain a more robust background dataset. In this case, the background dataset would be one year's worth of data from the combination of wells 13MW1 and 13MW2.~~ Existing data may be used to establish background concentrations provided it is of sufficient quality.**”*

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP will revise Section IV.D.3.a as requested.

DEQ Response (1-1) – DEQ will review the revised language of Section IV.D.3 when submitted by RAAP and determine if the comment is satisfied.

Radford Response (1-2), (Response received on 9/14/2016) – RFAAP provided a draft submittal addressing this comment on June 24, 2016. In this submittal, RFAAP revised the text as requested. Formal submittal of this revision is awaiting DEQ review of the draft documents that were provided.

DEQ Response (1-2) – The comment is now satisfied.

2. **Module V, Section V.B.1, Page V-5** – The permittee has revised the following language in section V.B.1:

“V.B.1. Groundwater Monitoring System

*Groundwater beneath ~~HWMU-13OBG~~ shall be monitored with one (1) upgradient background groundwater monitoring well, ~~five three (53)~~ downgradient point of compliance wells, and ~~one three (13)~~ downgradient plume monitoring well located as specified on the maps presented in Figures V.A.3 and V.A.4 of **Permit Attachment V.A.** Monitoring well 13MW-2 is located upgradient of the unit and will serve as the background well for the OBG. Monitoring wells 13MW-3, 13MW-4, ~~13MW-5, 13MW-6~~ and 13MW-7 are located downgradient of the unit and will serve as the point of compliance wells. Monitoring wells ~~13MW5, 13MW6, and 13MW-8~~ ~~is~~ are the downgradient plume monitoring wells for the unit. In addition, well 13MW-1 will be used as a piezometer to measure static groundwater elevations during each sampling event. *Optionally, the facility may collect background data from 13MW1 at their discretion.*”*

The DEQ concurs with the revisions with the exception of the language which allows the additional background sampling from 13MW1 to be optional and not requiring DEQ approval before sampling proceeds. The language shall be revised as follows:

“V.B.1. Groundwater Monitoring System

*Groundwater beneath ~~HWMU-13OBG~~ shall be monitored with one (1) upgradient background groundwater monitoring well, ~~five three (53)~~ downgradient point of compliance wells, and ~~one three (13)~~ downgradient plume monitoring well located as specified on the maps presented in Figures V.A.3 and V.A.4 of **Permit Attachment V.A.** Monitoring well 13MW-2 is located upgradient of the unit and will serve as the background well for the OBG. Monitoring wells 13MW-3, 13MW-4, ~~13MW-5, 13MW-6~~ and 13MW-7 are located downgradient of the unit and will serve as the point of compliance wells. Monitoring wells ~~13MW5, 13MW6, and 13MW-8~~ ~~is~~ are the downgradient plume monitoring wells for the unit. In addition, well 13MW-1 will be used as a piezometer to measure static groundwater*

elevations during each sampling event. Further, the facility may collect background data from 13MW1 following approval from the Department. ~~Optionally, the facility may collect background data from 13MW1 at their discretion~~

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP will revise Section V.B.1 as requested.

DEQ Response (1-1) – DEQ will review the revised language of Section V.B.1 when submitted by RAAP and determine if the comment is satisfied.

Radford Response (1-2), (Response received on 9/14/2016) – RFAAP provided a draft submittal addressing this comment on June 24, 2016. In this submittal, RFAAP revised the text as requested. Formal submittal of this revision is awaiting DEQ review of the draft documents that were provided.

DEQ Response (1-2) – The comment is now satisfied.

3. **Module V, Section V.D.1.c, Page V-7** – The permittee has revised the following language in section V.D.1.c:

*“c. Background concentrations established at the time of permit issuance are listed in **Permit Attachment V.C**. For any newly detected hazardous constituents, background values shall be established in accordance with 40 CFR 264.97(g) and as specified in **Permit Attachment IV.A, Appendix 6**. ~~Background groundwater quality for a constituent or monitoring parameter shall be based on at least four (4) data points collected at background monitoring well(s) during a period not exceeding one (1) year. Background groundwater quality for a new monitoring parameter or constituent shall be based on data from quarterly sampling of 13MW2 obtained over the course of one year. Optionally, the facility may collect quarterly background data from 13MW1 at their discretion to obtain a more robust background dataset. In this case, the background dataset would be one year's worth of data from the combination of wells 13MW1 and 13MW2. Existing data may be used to establish background concentrations provided it is of sufficient quality.~~”*

The DEQ concurs with the revisions with the exception of the language which allows the additional background sampling from 13MW1 to be optional, not specifying the sampling frequency and not requiring DEQ approval before sampling proceeds. The language shall be revised as follows:

*“c. Background concentrations established at the time of permit issuance are listed in **Permit Attachment V.C**. For any newly detected hazardous constituents, background values shall be established in accordance with 40 CFR 264.97(g) and as specified in **Permit Attachment IV.A, Appendix 6**. ~~Background groundwater quality for a constituent or~~*

monitoring parameter shall be based on at least four (4) data points collected at background monitoring well(s) during a period not exceeding one (1) year. Background groundwater quality for a new monitoring parameter or constituent shall be based on data from quarterly sampling of 13MW2 obtained over the course of one year. In addition, the facility may collect quarterly background data from 13MW1 following approval from the DEQ, to obtain a more robust background dataset. In this case, the background dataset would be one year's worth of quarterly data from well 13MW1 and supplemental data from 13MW2. Optionally, the facility may collect quarterly background data from 13MW1 at their discretion to obtain a more robust background dataset. In this case, the background dataset would be one year's worth of data from the combination of wells 13MW1 and 13MW2. Existing data may be used to establish background concentrations provided it is of sufficient quality."

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP will revise Section V.D.1.c, as requested.

DEQ Response (1-1) – DEQ will review the revised language of Section V.D.1.c when submitted by RAAP and determine if the comment is satisfied.

Radford Response (1-2), (Response received on 9/14/2016) – RFAAP provided a draft submittal addressing this comment on June 24, 2016. In this submittal, RFAAP revised the text as requested. Formal submittal of this revision is awaiting DEQ review of the draft documents that were provided.

DEQ Response (1-2) – The comment is now satisfied.

4. **Module VII, Section VII.F.1.b, Page VII-7** – The permittee has revised the following language in section VII.F.1.b:

*"b. Monitoring well 1 13MW2 is located upgradient of the unit and will serve as the background well for the OBG. Monitoring wells 13MW3, 13MW4, ~~13MW5, 13MW6~~ and 13MW7 are located downgradient of the unit and will serve as the point of compliance wells. Monitoring wells ~~13MW5, 13MW6,~~ and 13MW-8 ~~is~~ are the downgradient plume monitoring wells for the unit. In addition, well 13MW-1 will be used as a piezometer to measure static groundwater elevations during each sampling event. ~~Optionally, the facility may collect background data from 13MW1 at their discretion.~~ Additional monitoring wells, if required ~~as a result of the SAE,~~ will serve as plume wells for the monitoring of the HCOCs and daughter products and for the MNA parameters listed in **Permit Attachment VII.B.**"*

The DEQ concurs with the revisions with the exception of the language which allows the additional background sampling from 13MW1 to be optional, not specifying the sampling

frequency and not requiring DEQ approval before sampling proceeds. The language shall be revised as follows:

*“b. Monitoring well 1 13MW2 is located upgradient of the unit and will serve as the background well for the OBG. Monitoring wells 13MW3, 13MW4, ~~13MW5, 13MW6~~ and 13MW7 are located downgradient of the unit and will serve as the point of compliance wells. Monitoring wells ~~13MW5, 13MW6, and 13MW-8~~ *is are* the downgradient plume monitoring wells for the unit. In addition, well 13MW-1 will be used as a piezometer to measure static groundwater elevations during each sampling event. *Further, the facility may collect quarterly background data from 13MW1 following approval from the DEQ, to obtain a more robust background dataset. ~~Optionally, the facility may collect background data from 13MW1 at their discretion.~~* Additional monitoring wells, if required *as a result of the SAE*, will serve as plume wells for the monitoring of the HCOCs and daughter products and for the MNA parameters listed in **Permit Attachment VII.B.**”*

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP will revise Section VII.F.1.b as requested.

DEQ Response (1-1) – DEQ will review the revised language of Section VII.F.1.b when submitted by RAAP and determine if the comment is satisfied.

Radford Response (1-2), (Response received on 9/14/2016) – RFAAP provided a draft submittal addressing this comment on June 24, 2016. In this submittal, RFAAP revised the text as requested. Formal submittal of this revision is awaiting DEQ review of the draft documents that were provided.

DEQ Response (1-2) – The comment is now satisfied.

- 5. Module V, Attachment V.B, Compliance Groundwater Monitoring List** – The proposed Constituents of Concern (COC) for removal from the permit are not approved at this time as this is still an operating unit except for pyrene as this constituent is not a COC in soil.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP will revise the COC list as approved by DEQ. Please note that the facility is currently in corrective action monitoring at this time. When the unit returns to Compliance Monitoring, a permit modification will be prepared and additional changes to the COC list will be proposed, with appropriate justification, at that time.

DEQ Response (1-1) – DEQ will review the revised language of the COC list when submitted by RAAP and determine if the comment is satisfied.

Radford Response (1-2), (Response received on 9/14/2016) – DEQ permitted removal of pyrene from the Groundwater Compliance Monitoring list as noted above because pyrene is not a COC in soil. As a result of this approval, RFAAP again reviewed the Compliance Monitoring List and the Soil Monitoring Program COC list and determined that, like pyrene, dibenzofuran and di-n-octylphthalate are not COCs in soil and have not been detected in groundwater since 2005. The request for removal of these two constituents from Attachment V.B, Compliance Groundwater Monitoring List was requested in the original permit renewal application for Attachment V.B but was denied. However, based on DEQ approval to remove pyrene, RFAAP requests DEQ re-evaluate removal of dibenzofuran and di-n-octylphthalate from Attachment V.B.

Additionally, during review of the other permit module attachments in response to the NODs provided, it was noted that a clerical error was observed on the original RLSO submittal of Detection Groundwater Monitoring - Module IV - Attachment IV.B, Groundwater Monitoring List and IV.C – Initial Background Concentrations. Several target analytes proposed for removal were inadvertently deleted. RFAAP intends to resubmit the corrected Attachments IV.B and IV.C with these modifications. As noted above, when the unit returns to Detection Monitoring, a permit modification will be prepared and additional changes to applicable lists for Module IV will be proposed, with appropriate justification, at that time.

DEQ Response (1-2) – The comment is now satisfied.

6. **Module V, Attachment V.C, Open Burning Ground Calculated Background Values -** Pyrene should be removed from the list as it is no longer a COC.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP will revise Attachment V.C to remove pyrene.

DEQ Response (1-1) – DEQ will review the revised language of Attachment V.C when submitted by RAAP and determine if the comment is satisfied.

Radford Response (1-2), (Response received on 9/14/2016) – RFAAP provided a draft submittal addressing this comment on June 24, 2016. In this submittal, RFAAP revised the text as requested. Formal submittal of this revision is awaiting DEQ review of the draft documents that were provided.

However, upon further review of this section, RFAAP noted that DEQ permitted removal of pyrene from the groundwater monitoring program since pyrene is not a COC in soil. As a result of this approval, RFAAP again reviewed Attachment V.C, Open Burning Ground Calculated Background Values and the Soil Monitoring Program COC list, and determined that, like pyrene, dibenzofuran and di-n-octylphthalate are not COCs in soil and have not been detected in groundwater since 2005. Therefore, based on DEQ's approval to remove

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pyrene, RFAAP requests DEQ evaluate removal of dibenzofuran and di-n-octylphthalate from Attachment V.C.

DEQ Response (1-2) – The comment is now satisfied.

7. **Module V, Attachment V.D, Appendix IX Groundwater Monitoring List** - The proposed Constituents of Concern (COC) for removal from the permit are not approved at this time as this is still an operating unit except for pyrene as this constituent is not a COC in soil.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP will revise the COC list as approved by DEQ. Please note that the facility is currently in corrective action monitoring at this time. When the unit returns to Compliance Monitoring, a permit modification will be prepared and additional changes to the COC list will be proposed, with appropriate justification, at that time.

DEQ Response (1-1) – DEQ will review the revised language of the COC list when submitted by RAAP and determine if the comment is satisfied.

Radford Response (1-2), (Response received on 9/14/2016) – RFAAP provided a draft submittal addressing this comment on June 24, 2016. In this submittal, RFAAP revised the COC list as requested. Formal submittal of this revision is awaiting DEQ review of the draft documents that were provided.

However, upon further review of this section, RFAAP noted that DEQ permitted removal of pyrene from Attachment V.D, Appendix IX since pyrene is not a COC in soil. As a result of this approval, RFAAP again reviewed Attachment V.D, Appendix IX and the Soil Monitoring Program COC list, and determined that, like pyrene, dibenzofuran and di-n-octylphthalate are not COCs in soil and have not been detected in groundwater since 2005. Therefore, based on DEQ's approval to remove pyrene, RFAAP requests DEQ evaluate removal of dibenzofuran and di-n-octylphthalate from Attachment V.D.

DEQ Response (1-2) – The comment is now satisfied.

8. **Module V, Attachment V.E, Groundwater Protection Standards** - The proposed Constituents of Concern (COC) for removal from the permit are approved at this time except Acetonitrile, Acrylonitrile, Sulfide, PCBs, 1,4-Dioxane, Total TCDF, Total PeCDF, Total HxCDD, Total TCDD, 2,3,7,8-TCDD, Total PeCDD, Total HxCDD.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP will revise the COC list as allowed. However, please note that we do not concur with the addition of COCs acetonitrile, acrylonitrile, sulfide, PCBs, 1,4-dioxane, the various total D/F compounds, and 2,3,7,8-TCDD. These COCs were not listed on Attachment V.E previously and we do not understand the basis/justification for their addition. In discussions with DEQ on March 30,

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2016, DEQ agreed to revisit this request and determine whether the additional constituents are in fact necessary.

DEQ Response (1-1) – This comment was in response to **table Permit Attachment V.D. APPENDIX IX of 40 CFR Part 264 GROUNDWATER MONITORING LIST**. This was part of confusion during the March 30, 2016 discussion. The following constituents are deemed necessary as they are in part byproducts of combustion or of partial combustion: Total TCDF, Total PeCDF, Total HxCDD, Total TCDD, 2,3,7,8-TCDD, Total PeCDD, Total HxCDD. As for 1,4-dioxane, literature searches indicate the potential for use as a solvent in the processing of crude petroleum, petroleum refining, petrochemicals and explosives and acetonitrile is associated with energetic materials. Based upon the above, DEQ will require the analysis for these constituents unless further justification is provided by the Facility for their removal. PCBs, acrylonitrile and sulfide may be removed.

Radford Response (1-2), (Response received on 9/14/2016) – RFAAP recognizes that the comment was actually intended for Permit Attachment V.D, Appendix IX Groundwater Monitoring List. In addition to the removal of pyrene provided in comments 5 through 7 above, RFAAP concurs with DEQ approval to remove PCBs, acrylonitrile and sulfide from Permit Attachment V.D. APPENDIX IX of 40 CFR Part 264 GROUNDWATER MONITORING LIST. RFAAP recognizes that DEQ requires that acetonitrile, 1,4-dioxane, the various total D/F compounds, and 2,3,7,8-TCDD remain on Attachment V.D, Appendix IX Groundwater Monitoring List.

With respect to Permit Attachment V.E. Groundwater Protection Standards: Based on the removal of pyrene from the other monitoring programs (please refer to responses above), RFAAP requests removal of pyrene from Module V, Attachment V.E, Groundwater Protection Standards for groundwater monitoring since pyrene is not a COC in soil. In addition, as a result of DEQ approval to remove pyrene, RFAAP reviewed Module V, Attachment V.E., Groundwater Protection Standards and the Soil Monitoring Program COC list, and determined that, like pyrene, dibenzofuran and di-n-octylphthalate are not COCs in soil and have not been detected in groundwater since 2005. The request for removal of these two constituents from Attachment V.E. Groundwater Protection Standards was requested in the original permit renewal application but was denied. Based on DEQ approval to remove pyrene, RFAAP requests DEQ re-evaluate removal of dibenzofuran and di-n-octylphthalate from Attachment V.E., Groundwater Protection Standards.

DEQ Response (1-2) – The comment is now satisfied.

- Module VII, Attachment VII.C, Corrective Action Program - Annual Groundwater Monitoring List for Radford OBG/HWMU-13 - 2,6-Dinitrotoluene**, changed from 0.48 to 0.048 as per VA DEQ Alternate Concentration Limit. January 21, 2015 (effective February 15, 2015).

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Radford Response (1-1), (Response received on 5/5/2016) – RFAAP will modify the limit for 2,6-dinitrotoluene in Attachment VII.C from 0.48 to 0.048.

DEQ Response (1-1) – DEQ will review the revised language of Attachment VII.C when submitted by RAAP and determine if the comment is satisfied.

Radford Response (1-2), (Response received on 9/14/2016) – RFAAP provided a draft submittal addressing this comment on June 24, 2016. In this submittal, RFAAP updated the risk screening levels (RSLs) and alternate concentration limits (ACLs) using the latest data released from VDEQ (February 15, 2016) and USEPA (May 2016). Formal submittal of this revision is awaiting DEQ review of the draft documents that were provided.

While making these revisions, RFAAP noted that DEQ permitted removal of pyrene from Module V, Attachment V.B, Compliance Groundwater Monitoring List. The list provided in Module VII, Attachment VII.C, Corrective Action Program, is based upon the referenced list from Module V. Therefore, RFAAP requests that DEQ also allow removal of pyrene from the corrective action program annual groundwater monitoring list.

Furthermore, as a result of DEQ approval to remove pyrene from the referenced monitoring lists, RFAAP reviewed the Attachment VII. C- Corrective Action Program - Annual Groundwater Monitoring List and the Soil Monitoring Program COC list, and determined that, like pyrene, dibenzofuran and di-n-octylphthalate are not COCs in soil and have not been detected in groundwater since 2005. The request for removal of these two constituents from Module VII, Attachment VII. C- Corrective Action Program - Annual Groundwater Monitoring List was requested in the original permit renewal application but was denied. Based on DEQ approval to remove pyrene as noted above, RFAAP requests DEQ re-evaluate removal of dibenzofuran and di-n-octylphthalate from Module VII, Attachment VII. C, Corrective Action Program - Annual Groundwater Monitoring List.

Lastly, as noted in response to comment Specific Comment 30 under Section 1, RFAAP submitted a separate request for removal of additional soil monitoring constituents from the Soil Monitoring Program (Permit Module II, Attachment II.C) on September 9, 2016. Pending DEQ approval of this request, RFAAP proposes to submit a revised Permit Module VII, Attachment VII.C, Corrective Action Program - Annual Groundwater Monitoring List for Radford OBG/HWMU-13 to remove a subset of the same constituents. As discussed above, if our September 9, 2016, request is approved, these analytes would no longer be COCs in soil and, considering that these analytes have not been detected in groundwater in over a decade, would therefore not be appropriate for inclusion in the groundwater monitoring program.

DEQ Response (1-2) – The comment is now satisfied.

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Section 3 of the Notice of Deficiency Addressing the Technical Completeness of the Part A and Part B Permit Applications for the Renewal of the Subpart X Open Burning and Open Detonation Permit, Technical Deficiencies of the Proposed Statistical Methods Used In the Permit Modules

1. **Module II, Attachment II.C, Section II.C.7.2.3, Page II.C-18** - Paragraph 1 of the draft permit states that “An outlier refers to a data point which is an inconsistently large or small value.” Please note that an outlier test is applicable for background dataset. The facility is advised to include following language; “The facility will check only background data for outliers (unusually high values in the dataset). Facility may re-sample (in an area near the initial sample) if an extreme value is noticed in the compliance dataset. Re-samples will occur during the compliance period of the initial soil sampling event”.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP disagrees that outlier evaluations are only applicable for background data sets. Outliers can occur at any point in time during analysis of either background or compliance data. These outliers may occur due to problems with the sampling technique, analytical difficulties, *etc.* If the sample can be confirmed to be an outlier due to any of these reasons, elimination of it should be permissible regardless of when the outlier occurs. In a meeting between the parties on March 30, 2016, the differences on this issue appeared to relate to the term "background data." DEQ agreed that an outlier could be associated with any data (i.e., historical, background or compliance data). Additionally, with compliance data, typically a verification event would be conducted if a usually high value was observed eliminating the need for an outlier test.

DEQ Response (1-1) – If the facility has sampling problems which results in data not accurately representing the site condition, the facility should re-sample to determine if there was an error in the sampling protocol. If extreme values occur in the background or on-site data without any sampling problem, the facility should collect a re-sample during the compliance period of the initial sampling event. This will enable to the DEQ to distinguish between what may be an extreme value in the sampling location and give an indication of whether the contaminated soil is due to the facility’s treatment activities. Please note that background observations which are considered to be outliers should not be in the statistical analysis to preserve the power of the test.

Radford Response (1-2), (Response received on 9/14/2016) – RFAAP acknowledges the additional comment. The language proposed is acceptable and will be incorporated to Attachment II.C.

DEQ Response (1-2) – DEQ has reviewed the revised language and the comment is now satisfied.

2. **Module II, Attachment II.C, Section II.C.7.2.3, Page II.C-18** – The draft permit states that “the historical data should be screened for the existence of outliers (USEPA 1992 section

6.2) using the method described by Dixon (1953).” The facility is advised to clearly state that only background data will be screened for the existence of outlier(s).

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP disagrees that outlier evaluations are only applicable for background data sets. Outliers can occur at any point in time during analysis of either background or compliance data. These outliers may occur due to problems with the sampling technique, analytical difficulties, *etc.* If the sample can be confirmed to be an outlier due to any of these reasons, elimination of it should be permissible regardless of when the outlier occurs. In a meeting between the parties on March 30, 2016, the differences on this issue appeared to relate to the term "background data." DEQ agreed that an outlier could be associated with any data (i.e., historical, background or compliance data). Additionally, with compliance data, typically a verification event would be conducted if a usually high value was observed eliminating the need for an outlier test.

DEQ Response (1-1) – As stated previously in DEQ Response 1-1 to Comment 1, if the facility has sampling problems which results in data not accurately representing the site condition, the facility should re-sample to determine if there was an error in the sampling protocol. If extreme values occur in the background or on-site data without any sampling problem, the facility should collect a re-sample during the compliance period of the initial sampling event. This will enable to the DEQ to distinguish between what may be an extreme value in the sampling location and give an indication of whether the contaminated soil is due to the facility’s treatment activities. Please note that background observations which are considered to be outliers should not be in the statistical analysis to preserve the power of the test.

Radford Response (1-2), (Response received on 9/14/2016) – RFAAP acknowledges the additional comment. The language proposed is acceptable and will be incorporated to Attachment II.C.

DEQ Response (1-2) –The comment is now satisfied.

3. **Module II, Attachment II.C, Section II.C.7.2.1, Page II.C-19** – Section II .C.7.2.1, paragraph 1 of the draft permit states that “Absent the outlier evaluation discussed previously, no statistical manipulation of the data shall be performed prior to this comparison.” Please note that outlier evaluation is not applicable to compliance sampling event. The facility is advised to remove above sentence from the draft permit.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP disagrees that outlier evaluations are only applicable for background data sets. Outliers can occur at any point in time during analysis of either background or compliance data. These outliers may occur due to problems with the sampling technique, analytical difficulties, *etc.* If the sample can be confirmed to be an outlier due to any of these reasons, elimination of it should be permissible regardless of when the outlier occurs. In a meeting between the parties on March 30, 2016,

the differences on this issue appeared to relate to the term "background data." DEQ agreed that an outlier could be associated with any data (i.e., historical, background or compliance data). Additionally, with compliance data, typically a verification event would be conducted if a usually high value was observed eliminating the need for an outlier test.

DEQ Response (1-1) – As stated previously in DEQ Response 1-1 to Comment 1, if the facility has sampling problems which results in data not accurately representing the site condition, the facility should re-sample to determine if there was an error in the sampling protocol. If extreme values occur in the background or on-site data without any sampling problem, the facility should collect a re-sample during the compliance period of the initial sampling event. This will enable to the DEQ to distinguish between what may be an extreme value in the sampling location and give an indication of whether the contaminated soil is due to the facility's treatment activities. Please note that background observations which are considered to be outliers should not be in the statistical analysis to preserve the power of the test.

Radford Response (1-2), (Response received on 9/14/2016) – RFAAP acknowledges the additional comment. The language proposed is acceptable and will be incorporated to Attachment II.C.

DEQ Response (1-2) –The comment is now satisfied.

4. **Module IV, Attachment IV, Appendix 6, Section B, Page IV.A-24** – Appendix 6, Section B (outliers), paragraph 1 of guidance states that "Any elimination of an outlier shall be properly documented and its basis for exclusion noted." The facility is advised to replace above language from the draft permit with the following: Any elimination of an outlier data must be approved by the Department.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP will revise Attachment IV, Appendix 6, Section B as requested.

DEQ Response (1-1) – DEQ will review the revised language of Section B when submitted.

Radford Response (1-2), (Response received on 9/14/2016) – RFAAP provided a draft submittal addressing this comment on June 24, 2016. In this submittal, RFAAP revised the text as requested. Formal submittal of this revision is awaiting DEQ review of the draft documents that were provided.

DEQ Response (1-2) – DEQ has reviewed the revised language and the comment is now satisfied.

5. **Module IV, Attachment IV, Appendix 6, Section H, Pages IV.A-27 and IV.A-28** – Appendix 6, Section H, (COMPARISON OF POINT OF COMPLIANCE WELL DATA TO

A STANDARD DURING COMPLIANCE OR CORRECTIVE ACTION MONITORING). The facility is advised to replace language of section H with the following: The facility will initially perform a value-to-value comparison to GPS for all groundwater monitoring data. If a GPS exceedance is noted during the value-to-value comparison for a parameter(s), the facility may collect a verification sample and results from the verification sample will be compared to the GPS in a value-to-value comparison as long as the comparison is completed within 30 days of the initial sampling event. Further, the facility may collect three additional independent groundwater samples during the compliance period for the suspect constituent(s) in order to perform a statistical comparison to GPSs that is based on ACL or MCL. The facility should calculate lower normal confidence limit to compare it to the standard compliance wells data. The facility should calculate upper normal confidence limit to compare it to the standard corrective action monitoring wells data. The level of confidence of the interval should be 80% for a sample size of 4-7 and 90% for a sample size of 8-10.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP will revise Module IV, Attachment IV, Appendix 6, Section H with the language suggested.

DEQ Response (1-1) – DEQ will review the revised language of Section H when submitted.

Radford Response (1-2), (Response received on 9/14/2016) – RFAAP provided a draft submittal addressing this comment on June 24, 2016. In this submittal, RFAAP revised the text as requested. Formal submittal of this revision is awaiting DEQ review of the draft documents that were provided.

DEQ Response (1-2) – DEQ has reviewed the revised language and the comment is now satisfied.

Section 4 of the Notice of Deficiency Addressing the Technical Completeness of the Part A and Part B Permit Applications for the Renewal of the Subpart X Open Burning and Open Detonation Permit, Technical Deficiencies of the Alternative Treatment Technology Review of the Permit Application

General Comments

1. The Alternative Treatment Analysis should provide a detailed description of the waste stream, including chemical composition. This description should include the total quantity of energetic material (EM) produced, a breakdown of what percentage of the waste is considered “non-contaminated” versus EM contaminated with foreign object debris (FOD), and approximate proportions of EM types (single-base, composite, etc.). If possible, an estimation of the proportion of FOD within the contaminated waste stream should also be derived as this could have significant implications for the evaluation of alternative treatments.

Radford Response (1-1), (Response received on 5/5/2016) – In a meeting between the parties on March 30, 2016, RFAAP questioned what detail on the wastes above that presented in the permit was desired. DEQ clarified that they wanted the Alternative Treatment Technologies Report (ATTR) to be a standalone document. Therefore, additional detail from that provided in the Permit is not necessarily required; the information presented in the Waste Analysis Plan should just be repeated in the ATTR as appropriate.

As a result of this discussion, RFAAP agreed to add a description of the wastes managed to the ATTR. This description will be similar to that provided in the Waste Analysis Plan. Information on the historical distribution of the various waste groups will also be provided.

DEQ Response (1-1) – DEQ will review the revised language of the Alternative Treatment Analysis when submitted to determine if the comment is satisfied.

DEQ Response (1-2) – No response for this comment was received by RAAP with the 9/14/2016 NOD response. The comment still stands as unsatisfied and shall be addressed in the next submission or the application may be considered technically incomplete.

2. In order to provide an adequate baseline for comparison, a full evaluation of the current open burning and incineration processes should be presented prior to the potential alternative treatments. The evaluations should include:
 - A detailed description of the process
 - Current throughput in kg/month,
 - Maximum throughput
 - Capability to treat the various propellants produced at the facility
 - Characterization of secondary waste streams such as air emissions and residual soil contamination
 - Ability to meet applicable regulatory requirements
 - Costs
 - Requirements for worker safety
 - Any limitations associated with the processes

Radford Response (1-1), (Response received on 5/5/2016) – In a meeting between the parties on March 30, 2016, DEQ explained their hopes with the level of detail, walking

through the bullets provided above. In response to those discussions, RFAAP offers the following:

- RFAAP will add a description of the current onsite treatment options to the ATTR. These descriptions will be limited to the level of detail already present in permitting materials.
- The throughput for each unit varies significantly due to production changes. Additionally, there are concerns with plant and corporate security in publically documenting waste and production numbers. To satisfy this request, RFAAP will prepare a summary of historical (past three year) waste processing records for both the EWI and the OBG. This summary will be submitted as confidential business information.
- The maximum throughputs for each unit are in their respective permits. We will add this information to the ATTR.
- In the process description for the EWI, RFAAP will include a discussion on the limitations associated with the waste materials that can be processed in the EWI. (Materials not able to be processed in the EWI are sent to the burning ground for destruction.)
- RFAAP will include general discussions on how each of the waste streams are generated with the waste information requested under Item 4.1 above.
- RFAAP will provide a general discussion on the ability of the OBG and the EWI to meet all current permit limitations. We will discuss discharge streams from each and how they are regulated.
- RFAAP will provide a measure of the overall feasibility of each treatment technology and alternative on a qualitative basis, rather than detailing costs of each option.
- RFAAP will provide a qualitative evaluation on worker safety, providing generally information such as "labor intensive/high exposure technology" versus "limited exposure/limited exposure" technology.
- RFAAP will provide an overall summary for each technology of the evaluations provided in each of the prior bullets.

DEQ Response (1-1) – DEQ will review the revised language of the Alternative Treatment Analysis when submitted to determine if the comment is satisfied.

DEQ Response (1-2) – No response for this comment was received by RAAP with the 9/14/2016 NOD response. The comment still stands as unsatisfied and shall be addressed in the next submission or the application may be considered technically incomplete.

3. Please evaluate technologies with potential for the successful treatment of large quantities of EM in the same manner as described in Comment 2 where applicable. At a minimum all technologies that have been demonstrated at the pilot level or above should be included in this analysis. Technologies that do not have the capability to be scaled up (such as the Donovan Chamber) should be screened out of the detailed analysis for clarity. The matrices provided are limited in scope and score technologies on a highly subjective scale. Some of the definitions used for the criteria may not be appropriate or are not intuitive. Please see

Comment 15 for more information regarding the criteria used to evaluate alternative treatment technologies.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP will modify the matrix provided with the ATTR based on DEQ's comments provided in the March 30, 2016 meeting. The ATTR will present a hierarchal evaluation of the technologies, ranging from those that are possible but not practical or fully developed to those that may be possible with several modifications, etc.

DEQ Response (1-1) – DEQ will review the revised language of the Alternative Treatment Analysis when submitted to determine if the comment is satisfied.

DEQ Response (1-2) – No response for this comment was received by RAAP with the 9/14/2016 NOD response. The comment still stands as unsatisfied and shall be addressed in the next submission or the application may be considered technically incomplete.

4. To what extent is recycling of waste EM utilized? With over 163,000 kg of waste EM produced annually there appears to be significant potential for recycling. Recycling material could result in significant reductions to both operating costs and environmental releases. Processes to safely reintroduce waste EM into the production process (such as foreign object debris (FOD) screening) should be evaluated. Ideally, other methods to reduce the amount of waste generated should also be considered in the permit, if not in the Alternative Treatment Analysis.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP already utilizes rework material in their production lines where possible. While waste reduction is a primary focus and waste minimization an ongoing goal of RCRA, we believe the current waste load to the EWI and the OBG to be that necessary based on current plant production demands, product quality requirements, and processing limitations. RFAAP will modify the ATTR to include some discussion of the efforts currently being taken to accomplish this goal.

DEQ Response (1-1) – DEQ will review the revised language of the Alternative Treatment Analysis when submitted to determine if the comment is satisfied.

DEQ Response (1-2) – No response for this comment was received by RAAP with the 9/14/2016 NOD response. The comment still stands as unsatisfied and shall be addressed in the next submission or the application may be considered technically incomplete.

5. Throughout various portions of the document it is noted that DDESB has not approved several technologies. As noted in the January 23, 2015 Information Paper by Luke Robertson, "Actual AE [ammunition and explosives] demilitarization procedures are established by the Defense Logistics Agency, the DoD Components, or the Single Manager for Conventional Ammunition (SMCA)." DDESB's primary role is to ensure worker and

public safety from explosive risks and evaluates situations on a case-by-case basis. By stating that a technology has “not been approved by DDESB,” the impression is given that a technology does not meet explosives safety criteria and thus is not viable. Please eliminate DDESB approval as a screening criteria for alternative treatment technologies.

Radford Response (1-1), (Response received on 5/5/2016) – DDESB approval is critical to ANY explosives management process and cannot be eliminated. The use of non-DDESB approved processes is counter to current DOD policy. RFAAP will provide an overview of this selection matrix and ruling policy documents in the revised ATTR and will explain why a lack of DDESB approval makes any technology a less preferred option.

DEQ Response (1-1) - DEQ acknowledges that DDESB plays an important role in the explosives management process. However, as DEQ understands this role DDESB reviews processes on a case by case basis and requires a submittal of design and sitting for approval. DDESB does not evaluate the effectiveness of new technologies, only their safety (not including environmental risks). At this preliminary stage, full designs and sitting are not feasible for RFAAP to submit to DDESB. Use of DDESB approval as a screen in the alternative treatment technology evaluation therefore biases the selection process to existing technologies and prevents consideration of newer, potentially more efficient ones. The alternatives evaluation may consider previous DDESB approvals at other sites when evaluating technologies and discuss potential hurdles to eventual DDESB approval within discussions of feasibility. However, lack of DDESB approval alone should not be considered sufficient to eliminate a technology and the evaluation should be clear regarding the role, timing, and submittal requirements for the DDESB process.

Radford Response (1-2), (Response received on 9/14/2016) – RFAAP will revise technology selection matrix as requested and not consider DDESB approval as a primary requirement; however, RFAAP will consider safety as a primary requirement as highlighted in the meeting between the parties on March 30, 2016, detailed under Section 4 of the Notice of Deficiency, General Comments 2.

DEQ Response (1-2) – The comment is now satisfied.

6. Please include a brief discussion of the policy framework that the treatment technologies evaluated are subject to. This discussion should include both RCRA and DoD policy requirements such as the Single Manager for Conventional Ammunition’s Joint Conventional Ammunition Policies and Procedures, Army Regulation 700-144, and DoD 4145.26-M. The ability of a technology to satisfy these rules, guidance, and regulations should be considered a primary metric used in the evaluation.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP can provide this information to DEQ and in the ATTR, but please note, per our response to NOD 4.5, DDESB

is very much part of this process. The role of the DDESB will be further explained and clarified pursuant to this NOD and NOD 4.5.

DEQ Response (1-1) – Response accepted pending review of submittal, but note that at this stage the requirements of Army Regulation 700-144 and DoD 4145.26.M should be the primary regulatory and policy points of comparison in addition to applicable RCRA laws and regulations.

Radford Response (1-2), (Response received on 9/14/2016) – RFAAP will consider the guidance in Army Regulation 700-144 which references DoD 4145.26.M; however, RFAAP does not recommend following the details in DoD 4145.26.M which is primarily for the construction of a selected technical alternative as the ATTR is to assist in a potential alternative selection. The DDESB approved technologies have the advantage of having already been through the Army Regulation 700-144 and DoD 4145.26.M requirements and are proven for that treatment option; those technologies that have not been approved by the DDESB, but have been reviewed by the DDESB would require further development to meet the Army Regulation 700-144 and DoD 4145.26.M requirements.

DEQ Response (1-2) – The comment is now satisfied.

7. The evaluation makes no mention of the plan to incinerate 95% of RFAAP's explosive waste using a combined EWI and contaminated waste processor facility referenced in a paper dated November 10, 2015 that is available on the facility's website. The paper notes that design for the facility will begin this year. The technology should be evaluated in the alternative treatment analysis, as it appears that RFAAP has already determined it to be a viable treatment option.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP has secured funding to design a combined EWI/CWP facility. At this time, one of the goals is to significantly reduce the waste load going to the OBG. However, a complete elimination of the OBG will not be possible. Furthermore, as this unit has not yet been designed, we cannot guarantee that the goals on waste load to the OBG will be satisfied. There are materials targeted for this facility that may or may not be capable of being treated in it. In addition, while funding for the design has been secured, the actual cost for construction of the facility is unknown and those funds have not been secured. RFAAP will add a discussion and update on this project to the ATTR.

DEQ Response (1-1) – For clarity, DEQ requests that this technology be evaluated alongside open burning and other potential treatment technologies.

Radford Response (1-2), (Response received on 9/14/2016) – RFAAP will add a discussion and update on this project to the ATTR.

DEQ Response (1-2) – DEQ will review the revised language of the Alternative Treatment Analysis when submitted to determine if the comment is satisfied.

Specific Comments for the Technical Deficiencies of the Alternative Treatment Technology Review of the Permit Application

1. **Alternative Treatment Technologies to Open Burning of Propellants, Section 3.1.2, Supercritical Water Oxidation with Pretreatment, Pages 3 and 4** - The Army study referenced that evaluated Supercritical Water Oxidation was specific to Camp Minden and M6 propellant. It is unclear how applicable this evaluation is to Radford as the EM to be treated at Camp Minden was considered to be unstable due to improper storage or needed to be treated on a time-critical basis. DDESB did not approve in part because at the time none of the systems evaluated had been tested for large-scale M-6 destruction and the challenges of treating such a large quantity of shock-sensitive material in a short time.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP contends that there are other concerns with the use of SCWO that prevented its use at Camp Minden and, furthermore, that prevents its use at RFAAP. In addition, there are elements of the October 2000 failure that are directly applicable to the RFAAP application. RFAAP will expand this discussion in the ATTR and will include reference to the ongoing SCWO project at the Blue Grass Army Depot.

DEQ Response (1-1) – DEQ will review the revised language of the Alternative Treatment Analysis when submitted to determine if the comment is satisfied.

DEQ Response (1-2) – No response for this comment was received by RAAP with the 9/14/2016 NOD response. The comment still stands as unsatisfied and shall be addressed in the next submission or the application may be considered technically incomplete.

2. **Alternative Treatment Technologies to Open Burning of Propellants, Section 3.1.2, Neutralization Process for SCWO, Page 3, Last Paragraph** - The October 2000 incident described here should not be considered an inherent failure of the technology. According to the cited report, “The severity of the incident might have been mitigated if consideration had been given to the reaction that was taking place between the propellant and the caustic. Failure to stop the steam trace heating on the recirculation loop helped to sustain the temperature needed for the reaction to continue, and closing the valves at both ends of the segment of the loop below the tank ensured that the gases produced would build up pressure.” Please include a description of how and why the incident occurred as well as the corrective actions suggested by NRC such as the use of sound engineering practices and better training for personnel.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP contends that there are other concerns with the use of SCWO that prevented its use at Camp Minden and, furthermore, that prevents its use at RFAAP. In addition, there are elements of the October 2000 failure that are directly applicable to the RFAAP application. RFAAP will expand this

discussion in the ATTR and will include reference to the ongoing SCWO project at the Blue Grass Army Depot.

DEQ Response (1-1) – DEQ will review the revised language of the Alternative Treatment Analysis when submitted to determine if the comment is satisfied.

DEQ Response (1-2) – No response for this comment was received by RAAP with the 9/14/2016 NOD response. The comment still stands as unsatisfied and shall be addressed in the next submission or the application may be considered technically incomplete.

- 3. Alternative Treatment Technologies to Open Burning of Propellants, Section 3.1.2, Super Critical Water Oxidation, Pages 3 and 4** -The 2013 NRC paper cited does not appear to make reference to DDESB approval after a brief review. Additionally, the report is focused on the destruction of chemical weapon munitions (CWM) as opposed to the EM being evaluated during the Alternative Treatment Analysis. It is unclear from the DDESB memo as to whether or not DDESB has actually evaluated SCWO. Has the Army or BAE requested DDESB review of any SCWO units? It is DEQ's understanding that at least one SCWO unit has been approved and used for large scale use (the Blue Grass Chemical Agent Destruction Pilot Plant). Please provide more information as to the applicability of this technology towards conventional munitions and explosives treatment.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP contends that there are other concerns with the use of SCWO that prevented its use at Camp Minden and, furthermore, that prevents its use at RFAAP. In addition, there are elements of the October 2000 failure that are directly applicable to the RFAAP application. RFAAP will expand this discussion in the ATTR and will include reference to the ongoing SCWO project at the Blue Grass Army Depot.

DEQ Response (1-1) – DEQ will review the revised language of the Alternative Treatment Analysis when submitted to determine if the comment is satisfied.

DEQ Response (1-2) – No response for this comment was received by RAAP with the 9/14/2016 NOD response. The comment still stands as unsatisfied and shall be addressed in the next submission or the application may be considered technically incomplete.

- 4. Alternative Treatment Technologies to Open Burning of Propellants, Section 3.1.6, Pages 5 and 6** – Section 3.1.6 states that examples of alternative treatment technologies provided by DEQ all require size reduction of the case hardened propellant grain. However RAAP has not provided an explanation as to why the contaminated waste could not be wetted prior to grinding, cut using a hydromilling, or cut using liquid nitrogen. Please provide the reasoning for not adjusting the grinder operation to accommodate the contaminated waste as the current language states that safety issues were identified with hydromilling but does not explicitly state them.

Radford Response (1-1), (Response received on 5/5/2016) – The size reduction concept and technology was not discussed or further developed in the Army plan. While some combination of potential technologies may present a feasible concept, a large-scale engineering effort such as that which would be required to develop this concept relative to this technology is outside the scope of the ATTR. RFAAP will, however, include a section on size-reduction technologies in the ATTR and provide a discussion on their applicability to the RFAAP wastes.

DEQ Response (1-1) – DEQ will review the revised language of the Alternative Treatment Analysis when submitted to determine if the comment is satisfied.

DEQ Response (1-2) – No response for this comment was received by RAAP with the 9/14/2016 NOD response. The comment still stands as unsatisfied and shall be addressed in the next submission or the application may be considered technically incomplete.

5. **Alternative Treatment Technologies to Open Burning of Propellants, Section 3.2, Pages 6 through 9** – The permittee has evaluated several demilitarization technologies which do not seem to have any applicability to the waste stream being discussed. Please provide an explanation as to why these technologies for dismantlement of finished rockets, ammunition and ordinance are being presented when the waste stream being discussed is raw propellant.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP wanted to provide a complete picture of demilitarization technologies that are available to address concerns that the public may have about implementation of this technology for RFAAP materials. However, recognizing DEQ's concern to eliminate the discussion of non-relevant technologies, we will remove these from the ATTR.

DEQ Response (1-1) – DEQ will review the revised language of the Alternative Treatment Analysis when submitted to determine if the comment is satisfied.

DEQ Response (1-2) – No response for this comment was received by RAAP with the 9/14/2016 NOD response. The comment still stands as unsatisfied and shall be addressed in the next submission or the application may be considered technically incomplete.

6. **Alternative Treatment Technologies to Open Burning of Propellants, Section 3.2.2, Page 7** - How does this technology differ from the incinerator currently used at the facility? Would it be possible to scale up this technology to deal with the significant waste stream currently produced? If the technology can treat fully assembled ammunition as suggested in the description, how would FOD impact its use?

Radford Response (1-1), (Response received on 5/5/2016) – The deactivation furnace is designed to treat fully loaded ammunition items, not exposed propellant. As DEQ pointed out in their comments, there are considerable differences between treating fully loaded

conventional ammunition items and exposed propellant. These units have fed packaged propellant in limited amounts during performance tests. These instances presented serious safety concerns related to premature ignition of the propellant, clogging of the feed chute on the kiln, and fires in the control system due to uncontrolled transfer of packaging materials downstream. (All of which stemmed from the unit not being designed to process raw propellant). In addition, the inner construction of the kiln used in this technology is also not amenable to exposed ignition of propellant. RFAAP provided information to this regard in the ATTR, explaining the material handling, safety, and throughput limitations with this technology.

DEQ Response (1-1) – DEQ will review the revised language of the Alternative Treatment Analysis when submitted to determine if the comment is satisfied.

DEQ Response (1-2) – No response for this comment was received by RAAP with the 9/14/2016 NOD response. The comment still stands as unsatisfied and shall be addressed in the next submission or the application may be considered technically incomplete.

- 7. Alternative Treatment Technologies to Open Burning of Propellants, Section 3.3, Page 9** - Please include any technologies such as SCWO that have been successfully utilized at the production level in this section.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP will include a hierarchal discussion in the ATTR, one category of which eliminates technologies that have not be successfully utilized at the production scale.

DEQ Response (1-1) – DEQ will review the revised language of the Alternative Treatment Analysis when submitted to determine if the comment is satisfied.

DEQ Response (1-2) – No response for this comment was received by RAAP with the 9/14/2016 NOD response. The comment still stands as unsatisfied and shall be addressed in the next submission or the application may be considered technically incomplete.

- 8. Alternative Treatment Technologies to Open Burning of Propellants, Section 3.3.3, Pages 10 and 11** – Section 3.3.3 states that the Actodemil process is problematic because of residual metals left in the end product fertilizer. Please explain why the process could not be modified to allow for the metals to be precipitated out of the solution before final processing into the end product?

Radford Response (1-1), (Response received on 5/5/2016) – While redesigning the Actodemil process is outside the scope of this ATTR, RFAAP was able to further research these limitations. The Actodemil process binds the metals in humic acid and a HUMAXX proprietary reagent similar to Ethylenediamine-tetraacetic acid (EDTA). EDTA is used in chelation therapy for the treatment of acute and chronic lead poisoning. It works by pulling

toxins (including heavy metals such as lead, cadmium, and mercury) from the bloodstream., which prevents precipitation of the metals. Unfortunately, the EDTA-like reagent from HUMAXX does not totally precipitate metals and can actually bind to plant components, making those metals available for plant uptake. RFAAP will add a summary of this limitation to the ATTR.

DEQ Response (1-1) – DEQ will review the revised language of the Alternative Treatment Analysis when submitted to determine if the comment is satisfied.

DEQ Response (1-2) – No response for this comment was received by RAAP with the 9/14/2016 NOD response. The comment still stands as unsatisfied and shall be addressed in the next submission or the application may be considered technically incomplete.

9. **Alternative Treatment Technologies to Open Burning of Propellants, Section 4.0, Pages 11 and 12** - Please include expansion of the current explosive waste incinerator (EWI) operations in the assessment of identified alternatives. The submitted Alternative Treatment Analysis provides no information as to why EM contaminated with FOD cannot be treated utilizing this technology. Furthermore, if FOD would impact the EWI please discuss the feasibility of screening the contaminated EM waste stream for FOD as part of this analysis. Federal guidance for ammunition and explosives production appears to require FOD screening within the production process, and it is unclear as to why this screening could not be applied to the contaminated EM waste stream.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP will add some of this information to the ATTR to the level that information is currently developed. However, please recognize that redesigning the EWI system or the feed system is outside the scope of the ATTR.

DEQ Response (1-1) – DEQ will review the revised language of the Alternative Treatment Analysis when submitted to determine if the comment is satisfied.

DEQ Response (1-2) – No response for this comment was received by RAAP with the 9/14/2016 NOD response. The comment still stands as unsatisfied and shall be addressed in the next submission or the application may be considered technically incomplete.

10. **Alternative Treatment Technologies to Open Burning of Propellants, Section 4/Table 1, Pages 11 and 12** - The criteria and overall evaluation of alternatives needs to be more substantive. The criteria in particular are either evaluating aspects not intuitive to their definitions or only capture a portion of aspects required for evaluation as per Comment 2 of the General Comments section of Section 4. Comparison of these alternatives to the status quo (which is left largely undefined by the document, see Comment 1) using a subjective rating system does not provide the analysis that would be required for proper evaluation. For instance, a theoretical treatment that would result in zero environmental releases would score

exactly the same as a technology that creates a secondary waste stream requiring treatment at a waste-water treatment plant. In addition, many of the technologies carried forward because “pilot or production units are available” are not feasible on a production scale (e.g. Donvan Chambers).

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP will assess all technologies consistent with the bulleted list of evaluations provided in NOD 4.2 and will design their evaluation matrix/table based on these bullets, providing information to compare each basis presented in NOD 4.2.

DEQ Response (1-1) – DEQ will review the revised language of the Alternative Treatment Analysis when submitted to determine if the comment is satisfied.

DEQ Response (1-2) – No response for this comment was received by RAAP with the 9/14/2016 NOD response. The comment still stands as unsatisfied and shall be addressed in the next submission or the application may be considered technically incomplete.

11. Alternative Treatment Technologies to Open Burning of Propellants, Table 1, Criteria Definitions - The definitions for each criterion are poorly defined, and often the analysis provided in the matrix does not match well with the provided definition. In general, quantifiable metrics should be used as criteria whenever possible. Specific issues with criteria definitions and applications are listed below. Before moving forward, DEQ and BAE should have agreement on what and how criteria will be used in the final evaluation.

- **Safety Hazards:** The table defines Safety Hazards as “Treatment of energetic and associated pre-treatment, treatment, and post-treatment.” This definition is incredibly broad and does not intuitively reflect discussions of safety. The general assumption is that this criterion refers to worker safety. However, statements such as “Requires additional chemicals” or “Two-step process of digesting the propellant and then neutralization-oxidation” have no specific context in regards to worker safety. Prior DDESB approval of a technology should be noted here.
- **Waste Stream Variability:** Without the required context of the exact chemical nature of the waste stream this evaluation is of limited use. This criterion should evaluate what percentage of the waste stream has the potential to be treated using the technology and what specific classes of propellants or portions of the waste stream could not be treated. As previously noted, it is unclear how some of the descriptions evaluating technologies for this category are applicable. As an example, “Only one detonation can occur every other day per EDS. Cutting charges are required to treat the chemical munitions” refers not to the capability of the technology to treat various waste streams but the maximum throughput the technology is capable of. This category also limits evaluations to one technology at

a time when combinations of technologies may be capable of completely treating the waste stream.

- **Environmental Releases:** This criterion should provide specifics as to the nature of environmental releases related to each technology. DEQ requires knowledge of what constituents would make up the secondary waste stream and the quantity generated. An effort should be made to provide values from research papers, peer-reviewed literature, or other official documentation whenever possible. If these sources are unavailable estimates can be provided using mass-balance equations or modeling software where applicable. Next to worker safety, this evaluation is the most critical to DEQ's review of the permit regardless of how difficult it is to monitor or model.
- **Engineering Controls:** No Comments
- **Layout Possibilities:** I suggest replacing this criterion with "Feasibility" to better incorporate design restrictions, throughput, etc.
- **Support:** To what degree would this impact the selection of the technology? In theory vendors ought to be able to provide the appropriate technical support for any equipment they provide.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP has multiple concerns with the level of detail requested in this NOD. Several of the requests require effort similar to an engineering design review as opposed to a feasibility study. However, based on our discussions with DEQ on March 30, 2016, we will provide a new table that provides more detail on the ATTR process and technologies evaluated. We will craft this table so that it can stand alone for subsequent discussions on alternative treatments to the RFAAP OBG. Furthermore, we will make sure that evaluation provided for each category/definition is appropriate for that definition.

DEQ Response (1-1) – DEQ will review the revised language of the Alternative Treatment Analysis when submitted to determine if the comment is satisfied.

DEQ Response (1-2) – No response for this comment was received by RAAP with the 9/14/2016 NOD response. The comment still stands as unsatisfied and shall be addressed in the next submission or the application may be considered technically incomplete.

Section 5 of the Notice of Deficiency Addressing the Technical Completeness of the Part A and Part B Permit Applications for the Renewal of the Subpart X Open Burning and Open Detonation Permit, Technical Deficiencies of the Risk Assessment Protocol of the Permit Application

1. **Multi-pathway Risk Assessment Protocol for the Radford Army Ammunition Plant Open Burning Grounds, Introduction** - In the introduction section, please add a section that discusses alternate treatment methods and provides reference of the alternate treatment technology evaluation report that is prepared by the facility.

Radford Response (1-1), (Response received on 5/5/2016) – Considering the significant comments provided on the ATTR, RFAAP will provide a temporary placeholder for this discussion in the RAP and will delay full implementation of this NOD until such time that a final, approved ATTR is available.

DEQ Response (1-1) –DEQ understands that the alternate treatment method section will change in response to DEQ comments. To ensure that the risk assessment does not need to be updated/delayed due to these changes, please provide a very brief description of what the alternate treatment methods covers and provide a complete reference so that the reader can find this information easily. The purpose of this section is to inform the reader on where to find more information on the alternate treatment methods. DEQ does not believe that adding this information in the RA needs to be delayed till full implementation of NOD.

Radford Response (1-2), (Response received on 9/14/2016) – RFAAP will modify the introduction of the RAP to provide the requested reference to the ATTR being prepared and submitted under separate cover.

DEQ Response (1-2) – DEQ will review the new information when submitted and will determine if the comment is satisfied.

2. **Multi-pathway Risk Assessment Protocol for the Radford Army Ammunition Plant Open Burning Grounds, Section 1.4. Study Area Description, Pages 1-3** - In the third paragraph, the protocol mentions that numerous creeks and streams and smaller ponds are ‘generally not used for fishing on a reliable consumption basis.’ Please provide source of this information- e.g., angler survey or other such information. In absence of actual data supporting this assertion, please remove this statement.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP can provide the requested data. However, we wish to clarify that we were not proposing to eliminate these waterbodies from consideration in the fishing scenario, but were merely clarifying that in large, inclusion of these overestimates the risk to the population.

DEQ Response (1-1) –This response is confusing, DEQ is not asking to include a risk assessment for fish from each pond. DEQ is requesting for RAAP to provide supporting data/basis for RAAP’s assertion that the ponds are not used for fishing.

Radford Response (1-2), (Response received on 9/14/2016) – RFAAP will add a reference to the RAP substantiating this claim as requested.

DEQ Response (1-2) – DEQ will review the new information when submitted and will determine if the comment is satisfied.

3. Multi-pathway Risk Assessment Protocol for the Radford Army Ammunition Plant Open Burning Grounds, Section 2.1.1. Site-Specific Emissions Sampling, Page 2-2-

- i. VDEQ understands that this section cannot be completed until flyer testing results are available and therefore the final list of COPCs to be included in quantitative risk assessment (QRA) cannot be developed at this time. However, please include the information about the chemical list for each waste group that can be treated at the OB ground. Please include a table similar to - but appropriately updated with the latest information - tables 2-1 through 2-9 from the previous HHRA report dated 07/27/2015. VDEQ understands that these tables will be refined based on flyer testing data.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP will provide the requested information in the revised RAP from the 2005 HHRA report (note the error provided in the report date in DEQ's comment).

DEQ Response (1-1) – DEQ will review the information provided by RAAP when submitted and determine if the comment is satisfied.

DEQ Response (1-2) – No response for this comment was received by RAAP with the 9/14/2016 NOD response. The comment still stands as unsatisfied and shall be addressed in the next submission or the application may be considered technically incomplete.

- ii. Please use the following guidelines for determining the final COPC list:
 - Compounds detected *in at least one* or more test run samples and not meeting any of the exclusion criteria below will be included in the MPRA;
 - Compounds reported as non-detect in all of the test run samples will be excluded from the COPC list *provided that the DL is lower than the lowest risk based screening criteria available at the time of testing from EPA RSL table –indoor air;*
 - Compounds present in test run samples that are also present in the method blank at greater than 50 percent of the test level will be excluded from the COPC list; *at 5x concentration for non-common laboratory chemicals and 10x for common laboratory contaminants will be included in the COPC list (please refer to the QAPP for the flyer testing for more details);*
 - *All J and U flagged data will be included as COPC and other laboratory flags will be considered as described in the QAPP and SAP;*

- Compounds without any chemical specific *emission factor* fate, transport, and/or toxicity data will be excluded from the COPC list, but will be discussed qualitatively in the MPRA report; *and*
- *Any chemical that is present in the waste group, not detected in the test run but based on thermodynamic modeling is reasonably suspected to be present in emissions- these include PICs..*

Radford Response (2-1), (Response received on 5/5/2016) – In general, RFAAP has no objections to this request. During the meeting, DEQ offered the following clarifications on this NOD:

- The comparison of the DL to the residential indoor air criteria is only to assess the ability of the DL to be used to screen out constituents (i.e., is the detection limit low enough). Absent this, the indoor air criteria will have no use in the risk assessment.
- On the inclusion of blank-detected compounds in the risk assessment - For those compounds that are not common laboratory contaminants, any compound present in the blank sample at a level $\geq 1/5$ th of the run sample may be excluded. For those compounds that are common laboratory contaminants, any compound present in the blank sample at a level $\geq 1/10$ th of the run sample may be excluded.

DEQ Response (2-1) – DEQ will review the revised Section 2.1.1 when submitted by RAAP and determine if the comment is satisfied.

DEQ Response (2-2) – No response for this comment was received by RAAP with the 9/14/2016 NOD response. The comment still stands as unsatisfied and shall be addressed in the next submission or the application may be considered technically incomplete.

4. **Multi-pathway Risk Assessment Protocol for the Radford Army Ammunition Plant Open Burning Grounds, Section 2.1.2. Supplemental Emission Factors, Page 2-2** - Please provide a table listing bang box & AP-42 emission factors, and a last column that lists the more conservative value from these two sources. VDEQ understands that the final emission factor chosen for the calculations will depend on the results of flyer testing. Please note that the results of flyer testing will be compared against the last column of the table and the maximum emission rate will be used in HHRA.

Radford Response (1-1), (Response received on 5/5/2016) – The intent of the flyer testing is to provide site-specific emissions data for the OBG. If this emissions data will not be allowed for use in the risk assessment if it is lower than non-site specific default emission factors, there is no point in collecting the data. Furthermore, the most **recent** data should be used in the assessment, as each iteration of factor reflects an improvement in the ability to

collect data or analyze/model emissions from a source. A significant amount of work went into development of the new AP42 emission factors, including an evaluation of the older bang-box data. If, after consideration of all this data, ASTM determined a more appropriate, lower value was representative of OB emissions, than that lower value should be used. Requiring the facility to use the higher of a myriad of emission factors presents an overly conservative and significantly unrepresentative estimate of risk from the facility.

DEQ Response (1-1) –As discussed at the March 31, 2016 meeting between DEQ and RAAP, data from the flyer sampling test event will be used when available and after a review by DEQ. For chemicals that do not have flyer sampling test data, RAAP will use an emissions rate which represents the worst-case emission scenario using the maximum emissions rate from Bang Box and AP-42 references. While AP-42 represents newer data, the factors for ordinance detonation are marked ‘draft.’ As the FAQ on the EPA website states, *“AP-42 sections designated as 'final' have completed the public comment process and all issues have been resolved. Sections designated as 'draft' reflect the fact that the comment period on these sections has passed, but not all issues have been resolved. EPA might receive additional data or comments that would cause a re-evaluation of the available data and possibly open another comment period. Users are encouraged to use factors from finalized sections, if available, but may decide that the draft emissions factors provide better estimates after reviewing the supporting documentation.”* Further, the waste stream for OB may or may not be consistent, it also contains items that are not pure ordinance related (e.g. floor sweeps etc.) and exact mixture waste treated at OB ground may not match cartridge size and other categories evaluated in the AP-42 evaluation. Given several unknowns in the air emission estimation and waste group fluctuations, it is prudent to assess human health in a way that reduces the probability of false negative outputs. Therefore, a more conservative approach is deemed the most appropriate.

Radford Response (1-2), (Response received on 9/14/2016) – RFAAP would prefer to defer further comment on this NOD until after the results of the flyer testing are available. The results of the flyer testing will provide more information on what level of data supplement is required. Based on this information, RFAAP will then review the AP-42 and bang box emission factors and provide a pollutant by pollutant review of the appropriateness of each to RFAAP waste streams and emission estimates.

DEQ Response (1-2) – DEQ will review the new information when submitted and will determine if the comment is satisfied.

5. Multi-pathway Risk Assessment Protocol for the Radford Army Ammunition Plant Open Burning Grounds, Section 2.2 Discussion of Selected COPCs, Page 2-3 -

- i. **General comment** - The protocol refers to EPA R6 HHRAP guidance as source for COPCs. This reference is correct. But the list of COPCs, especially groups such as D/F and PAHs, may not be completely reflective of the wastes managed at the OB facility.

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Further, the thermodynamics of OD process are different than incinerators or similar controlled combustion processes, thus resulting in somewhat different combustion products. Therefore, please consider EPA R 6 guidance as a starting point and add, as necessary, to the COPC list based on facility specific information. This approach also applies to chemical specific parameters (including toxicity values, VOC & mutagenic status) and exposure/input defaults used in human as well as ecological risk assessment. This comment also applies to subsections and other sections of the report as well.

Radford Response (1-1), (Response received on 5/5/2016) – While the COPC lists provided in the HHRAP are written as guidance for hazardous waste combustion facilities, they also reflect general limits on analytical capability and provide those chemicals that can generally be determined via standard stack sampling methods and/or that have fate and transport data available. Including compounds not provided on this list provides little value if they cannot be analytically determined (recognizing the ultimate goal is to provide quantification of OBG emissions via the flyer program) or quantitatively assessed. If DEQ wishes that RFAAP consider additional compounds in the assessment, we request that DEQ provide a specific list of those compounds they feel are necessary. We will then review this list against our waste materials and process knowledge and provide specific feedback on each compound. (Note that during a meeting between the parties on March 31, 2016, DEQ clarified that the referenced sources provided in the HHRAP should be used as the source of fate and transport data. If these sources do not have data available for a certain compound, it need not be included in the quantitative assessment).

DEQ Response (1-1) – HHRAP guidance was developed over 10 years ago and as analytical capabilities have significantly improved since then relying solely on HHRAP guidance may not be the most appropriate approach. As RAAP mentioned at the March 31, 2016 meeting, flyer testing will not be able to test for every compound which needs to be included in the risk assessment. Generally speaking as a starting point, all the chemicals that are present in every waste stream, including combustion byproducts of each of these chemicals, are to be included in the COPC list. Additionally, chemicals which can be analyzed by standard EPA analytical methods for VOC, SVOC, Dioxin/Furans, PCBs, energetics, and TAL metals are to be included. The justification for not including specific chemicals (e.g., certain metals) or groups of chemicals (e.g. PCBs) needs to be included in the application by the permittee for DEQ's approval. Please note that as part of the permit application, the permittee is to provide a complete and correct list of COPCs which is reflective of the waste treated at the unit for DEQ's review and approval. Therefore, DEQ will not be able to develop unit-specific COPC list for the permittee but requests the facility to refer to this comment to help develop a complete COPC list that is reflective of the OB unit operations. As discussed at the March 31, 2016 meeting, the chemicals which do not have either F and T/emission factors for air modeling or toxicity data will be discussed qualitatively only.

Radford Response (1-2), (Response received on 9/14/2016) – RFAAP will revise the COPC discussion in the OBG RAP and determine if the addition of any compounds is

appropriate based upon the chemicals typically found in the RFAAP waste streams. Note that we cannot provide an exact chemical composition of each of our wastes due to the fact that these chemical formulations would be protected under confidentiality agreements and military protocols.

DEQ Response (1-2) – DEQ would like to clarify the following:

- (a) Based on previous DEQ comments, the facility will develop and provide a list of chemicals that are present in waste and could be present in emissions as a result of combustion process for DEQ's review and approval. DEQ cannot provide list of chemicals that may be present in facility's waste streams.
 - (b) DEQ is not requesting proprietary formulations - only the names of the chemicals that are in the waste streams treated at OB unit.
- ii. Please include Hexachlorobenzene & Pentachlorophenol under section 2.2.

Radford Response (2-1), (Response received on 5/5/2016) – The HHRAP specifically states that "these chlorinated compounds are difficult to make even under controlled conditions [and] the combustion properties of these chlorinated compounds indicate that they aren't likely to be formed as PICs if they aren't present in the waste feed stream." As such, USEPA no longer recommends automatically including these compounds in risk assessments. They only recommend their inclusion for waste feeds containing the compounds, wood preservatives, pesticides, or highly variable waste streams, like municipal solid waste. As none of the wastes at the RFAAP contain these compounds, contain a significant amount of chlorine, or meet the other criteria specified by USEPA, inclusion of these compounds is not inappropriate and counter to USEPA guidance.

DEQ Response (2-1) – While the wastes produced by RAAP may not contain chlorine compounds the wastes produced by tenant organizations, which are allowed to be burned at the OBG with proper notification to DEQ, may contain chlorine compounds. Please provide information which demonstrates that no waste produced by tenant organizations contains chlorine compounds.

Radford Response (1-2), (Response received on 9/14/2016) – RFAAP is not asserting that the RFAAP's wastes contain no chlorine. The wastes do, as documented in historical analytical results, contain a small amount of chlorine. However, RFAAP asserts that the chlorinated compounds referenced in DEQ's original NOD are not present in our waste streams. As such, and using the HHRAP as a reference, RFAAP asserts that it is not reasonable to assume that the referenced compounds (hexachlorobenzene and pentachlorophenol) would be present in emissions.

DEQ Response (1-2) – Facility’s response does not clarify if tenant’s waste streams contain hexachlorobenzene and pentachlorophenol. Please provide this information.

- 6. Multi-pathway Risk Assessment Protocol for the Radford Army Ammunition Plant Open Burning Grounds, General comment** - Please specify if emissions from open burning will be estimated using the POLU13 combustion model that calculates emissions based on propellant material mixing with air then burned to form atmospheric pollutants. If so, which waste streams will be used for the modeling and how are these specific waste streams representative of the worst-case emission scenario?

Radford Response (1-1), (Response received on 5/5/2016) – The goal of the flyer testing is to eliminate as much modeling as possible. If, in fact, sufficient data is available from the flyer testing, there will be no need to utilize POLU13, as measured values will already represent the actual emissions from the unit. During a meeting between the parties on March 31, 2016, DEQ requested that a brief description of POLU13 be added to the RAP as a back-up plan for those constituents not able to be determined via flyer testing. RFAAP will make this addition to the RAP.

DEQ Response (1-1) – DEQ will review the revised RAP when submitted by RAAP and determine if the comment is satisfied.

DEQ Response (1-2) – No response for this comment was received by RAAP with the 9/14/2016 NOD response. The comment still stands as unsatisfied and shall be addressed in the next submission or the application may be considered technically incomplete.

- 7. Multi-pathway Risk Assessment Protocol for the Radford Army Ammunition Plant Open Burning Grounds, General comment** - Please specify if the incinerator trial burn data for combustion byproducts from the burning of propellant wastes at RAAP will be considered since the same waste streams that are burned in the incinerator also will be burned at the Open Burning Ground.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP does not intend to use any test data from the incinerators in application of the OBG risk assessment. Not only is the form of the wastes sent to the incinerator very different from those treated at the OBG, the method of combustion is also considerably different. Therefore, we do not consider the EWI emissions data to be appropriate for use at the OBG.

DEQ Response (1-1) – The comment is now satisfied.

- 8. Multi-pathway Risk Assessment Protocol for the Radford Army Ammunition Plant Open Burning Grounds, Section 2.2.2. Polynuclear Aromatic Hydrocarbons, Page 2-3** - In addition to the 7 PAH mentioned in R 6 guidance, please include the remaining 13 PAHs from the RSL table. Please consult latest update of the RSL table for toxicity values.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP will consider the inclusion of these PAHs pending their likelihood for formation from the wastes that are treated at the OBG. Assuming that these PAHs are included in the risk assessment, we request DEQ provide appropriate fate and transport data for them, as they are not available from the Region 6 guidance. (Note that during a meeting between the parties on March 31, 2016, DEQ clarified that the referenced sources provided in the HHRAP should be used as the source of fate and transport data. If these sources do not have data available for a certain compound, it need not be included in the quantitative assessment).

DEQ Response (1-1) – DEQ will review the revised Section 2.2.2 when submitted by RAAP and determine if the comment is satisfied then.

DEQ Response (1-2) – No response for this comment was received by RAAP with the 9/14/2016 NOD response. The comment still stands as unsatisfied and shall be addressed in the next submission or the application may be considered technically incomplete.

9. **Multi-pathway Risk Assessment Protocol for the Radford Army Ammunition Plant Open Burning Grounds, Section 2.2.8. Metals, Page 2-5** - VDEQ understands that the final list will be developed after the flyer test, but please include all TAL (target analyte list) metals (Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Ni, K, Se, Ag, Na, Tih, V, Zn) and Hg (elemental and divalent) in the initial list of COPCs.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP does not feel it appropriate to include metals in the COPC list that are not present or not expected to be present in the waste materials being combusted at the OBG. Unlike organics, if a metal is not present in the waste feed, it is not possible for it to be present in the emissions. RFAAP will provide a target analyte list for metals that reflects all metals reasonably expected to be present in the waste feed. However, many of those requested by DEQ in this NOD are not expected to be present.

DEQ Response (1-1) – DEQ will review the revised Section 2.2.8 when submitted by RAAP and determine if the comment is satisfied.

DEQ Response (1-2) – No response for this comment was received by RAAP with the 9/14/2016 NOD response. The comment still stands as unsatisfied and shall be addressed in the next submission or the application may be considered technically incomplete.

10. **Multi-pathway Risk Assessment Protocol for the Radford Army Ammunition Plant Open Burning Grounds, Section 2.2.8.1. Chromium, Page 2-5** - The last sentence about recalculating chromium as trivalent chromium is not acceptable as there is no speciation data available. In absence of the speciation data, all chromium will be considered to be in hexavalent form. Please revise.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP will initially perform the assessment assuming all emitted chromium is in the hexavalent form (assuming that it is not possible to speciate chromium in the flyer testing). However, the statement provided indicates that, should chromium be a driver in the assessment, RFAAP will consider the potential overestimation of impacts and quantify that potential overestimate by recalculating all risk assuming all chromium is trivalent. We would propose using this recalculation in determining an appropriate safety factor for any permit limitation resulting from chromium risk or hazard.

DEQ Response (1-1) – RAAP’s response is adequate except for the proposal for recalculation. If hexavalent chromium becomes the risk driver and RAAP wishes to revise the risk assessment, RAAP will need to provide the supporting data and justification to support the assumption of trivalent chromium.

Radford Response (1-2), (Response received on 9/14/2016) – RFAAP will provide the requested data if recalculation of risk becomes necessary.

DEQ Response (1-2) – The comment is now satisfied.

11. **Multi-pathway Risk Assessment Protocol for the Radford Army Ammunition Plant Open Burning Grounds, Section 2.2.8.2. Lead, Page 2-5** - In addition to IEUBK, please include ALM.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP will add ALM modeling to Section 2.2.8.2 of the RAP.

DEQ Response (1-1) – The response indicates the detailed information requested by DEQ will be provided at a later date. DEQ will review the new information when available and determine if the comment is satisfied at that time.

DEQ Response (1-2) – No response for this comment was received by RAAP with the 9/14/2016 NOD response. The comment still stands as unsatisfied and shall be addressed in the next submission or the application may be considered technically incomplete.

12. **Multi-pathway Risk Assessment Protocol for the Radford Army Ammunition Plant Open Burning Grounds, Section 2.2.8.3. Mercury** –

- i. This section is unclear- mercury species have different toxicity via different routes of exposure and distribution percentages assume elemental, divalent as well as methyl mercury. Will all emissions be treated as ‘total’ and distribution of various species be done and then each species will be included in QRA? What toxicity values will be used?

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP will modify the text to indicate that mercury speciation will be consistent with recommendations provided in the HHRAP and will further detail this speciation. The toxicity data used will be that for each individual mercury species. Total mercury will only be used to establish the initial emission factor.

DEQ Response (1-1) – The response indicates the detailed information requested by DEQ will be provided at a later date. DEQ will review the new information when available and determine if the comment is satisfied at that time.

DEQ Response (1-2) – No response for this comment was received by RAAP with the 9/14/2016 NOD response. The comment still stands as unsatisfied and shall be addressed in the next submission or the application may be considered technically incomplete.

- ii. The bullets under mercury mentions some speciation related distribution numbers that seem to be in line with R 6 guidance. For food items, please conservatively assume all mercury to be in methyl mercury form.

Radford Response (2-1), (Response received on 5/5/2016) – RFAAP disagrees with considering all mercury in food items to be in methyl mercury form. The speciation criteria provided in the HHRAP are based on scientific analyses and deviation from them without scientific data to justify such a deviation is inappropriate. Assuming that mercury is in the most hazardous form despite scientific data showing a different distribution is overly conservative. Despite this point, RFAAP will provide an initial assessment of food exposure using the toxicity data for methyl mercury for all types of mercury assessed. However, should this result in significant risk to the receptor, risk will be reassessed using data specific to the mercury congener being evaluated. (Note: All mercury speciation will still be handled according to the recommendations specified in the HHRAP).

DEQ Response (2-1) – RAAP's approach of evaluating all food items using methylmercury and then if needed performing a reassessment using different species is adequate. However, please clarify if this reassessment is done will the mercury species used will reflect the predicted species and phase specific allocations provided in EPA HHRAP?

DEQ Response (2-2) – No response for this comment was received by RAAP with the 9/14/2016 NOD response. The comment still stands as unsatisfied and shall be addressed in the next submission or the application may be considered technically incomplete.

- iii. Please note that based on flyer data, some of the mercury speciation and distribution assumptions may need to be revised.

Radford Response (3-1), (Response received on 5/5/2016) – RFAAP wishes to clarify that there is no intent (nor identified capability) to collect speciated mercury emissions data using

the flyer technique. Therefore, we do not expect that the data generated will result in any different distribution than that provided in the RAP.

DEQ Response (3-1) – The comment is now satisfied.

13. **Multi-pathway Risk Assessment Protocol for the Radford Army Ammunition Plant Open Burning Grounds**, Please include discussion about Nickel in a separate subsection under section 2.2.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP will add a separate discussion on Nickel to Section 2.2 of the RAP.

DEQ Response (1-1) – The response indicates the detailed information requested by DEQ will be provided at a later date. DEQ will review the new information when available and determine if the comment is satisfied at that time.

DEQ Response (1-2) – No response for this comment was received by RAAP with the 9/14/2016 NOD response. The comment still stands as unsatisfied and shall be addressed in the next submission or the application may be considered technically incomplete.

14. **Multi-pathway Risk Assessment Protocol for the Radford Army Ammunition Plant Open Burning Grounds, Section 3., Dispersion and Deposition Modeling** - The comments provided in the current section of the NOD, Section 5, relate only to the HHRA and EcoRA. VDEQ's Office of Air Quality Assessments (AQA) will be providing technical and detailed comments on this section and for all the proposed inputs to the model including grid spacing, terrain, use of surrogate compounds, meteorological data and averaging time.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP has reviewed AQA's comments provided with the overall NOD transmittal and has responded to each. DEQ indicated that no separate comments from AQA are being provided as an addendum to the initial NOD letter.

DEQ Response (1-1) – The comment is now satisfied.

15. **Multi-pathway Risk Assessment Protocol for the Radford Army Ammunition Plant Open Burning Grounds, General comments about Section 3** –

- i. While *Human Health Risk Assessment Protocol (HHRAP) for Hazardous Waste Combustion Facilities* provides a very detailed discussion about HHRA for combustion facilities, please also refer to EPA Region 3 OB OD permitting guidelines for OB specific requirements to ensure the required information is included in the protocol. This guideline can be found at:

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http://www3.epa.gov/reg3wcmd/ca/pdf/RCRA_OpenBurnOpenDet_Guide.pdf

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP will review the EPA Region 3 guidance and incorporate information as appropriate.

DEQ Response (1-1) – The response indicates the detailed information requested by DEQ will be provided at a later date. DEQ will review the new information when available and determine if the comment is satisfied at that time.

DEQ Response (1-2) – No response for this comment was received by RAAP with the 9/14/2016 NOD response. The comment still stands as unsatisfied and shall be addressed in the next submission or the application may be considered technically incomplete.

ii. Please provide all input parameters that will be used in the modeling.

Radford Response (2-1), (Response received on 5/5/2016) – As there are a significant number of input parameters utilized in the air emission modeling, the fate and transport assessment, and the final risk calculations, we request further clarification on which input parameters DEQ wants specified.

DEQ Response (2-1) – Please provide a table (or several tables, if needed) of all the air modeling inputs which will be used. If a specific website will be used to obtain certain standard or default values, please provide the web address and name of the source. Except for meteorological data, if any site-specific information is used please provide supporting data/information which justifies the use of site-specific values. This comment also applies to the response for 17.i.

DEQ Response (2-2) – No response for this comment was received by RAAP with the 9/14/2016 NOD response. The comment still stands as unsatisfied and shall be addressed in the next submission or the application may be considered technically incomplete.

16. Multi-pathway Risk Assessment Protocol for the Radford Army Ammunition Plant Open Burning Grounds, Section 3.2.2. Emission Scenario, Pages 3-2 to 3-3 –

i. Please provide some more details and description of the propellant and skid burn procedures and process.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP will modify the descriptions provided in the RAP to be consistent (the same level of detail as) those provided in the 2005 RAR.

DEQ Response (1-1) – The response indicates the detailed information requested by DEQ will be provided at a later date. DEQ will review the new information when available and determine if the comment is satisfied at that time.

DEQ Response (1-2) – No response for this comment was received by RAAP with the 9/14/2016 NOD response. The comment still stands as unsatisfied and shall be addressed in the next submission or the application may be considered technically incomplete.

- ii. From this section it is unclear exactly how many modeling runs will be performed and using what burn conditions and which waste groups. Please provide a table listing the model runs and conditions it represents.

Radford Response (2-1), (Response received on 5/5/2016) – RFAAP will review Section 3.2.2 and provide clarifying tables as appropriate.

DEQ Response (2-1) – The response indicates the detailed information requested by DEQ will be provided at a later date. DEQ will review the new information when available and determine if the comment is satisfied at that time.

DEQ Response (2-2) – No response for this comment was received by RAAP with the 9/14/2016 NOD response. The comment still stands as unsatisfied and shall be addressed in the next submission or the application may be considered technically incomplete.

- iii. This section lists several operational scenarios. Please note that these will have to be included in the permit as explicit operating conditions and the modeling will need to be run using scenarios that represent these conditions. Based on information in section 3.2.2 and Table 3-2 the following conditions are identified:

- Half the pans, i.e., 8 pans are ignited during any burn,
- Total maximum capacity of 8000 lbs for propellant and 2000 lbs for skid burn per day; not more than 292000 lbs per year,
- One burn event per day- either skid or propellant but never both on the same day,
- Conservatively assume 365 burn events per year,
- Burn only during daylight hours,
- Burns only during favorable weather conditions- wind speed between 3-15 mph, no precipitation or thunderstorms occurring or in the vicinity,
- Disposal event restricted during wind speed of 3-15 mph.

Radford Response (3-1), (Response received on 5/5/2016) – RFAAP recognizes that the operating restrictions employed in the modeling may be incorporated as Permit limitations and finds each of them to be reasonable limitations.

DEQ Response (3-1) – The comment is now satisfied.

- iv. Skid burn has potential to burn for 7 hours or more but the modeling will be looking at only 1st hour. How will the emissions from the remaining time be included in the air modeling? VDEQ understands that this simmering time will have very different emission properties but may also have a different chemical profile than the one considered in the 1st hour. Please provide a discussion on this aspect and please include this item in the uncertainty analysis as a contributor to potential underestimation of risk.

Radford Response (4-1), (Response received on 5/5/2016) – Note that RFAAP is proposing to model the skid burn in a manner identical to that previously modeled in terms of burn duration versus modeled duration. RFAAP will provide more detail in the RAP on the proposed methodology.

DEQ Response (4-1) – The response indicates the detailed information requested by DEQ will be provided at a later date. DEQ will review the new information when available and determine if the comment is satisfied at that time.

DEQ Response (4-2) – No response for this comment was received by RAAP with the 9/14/2016 NOD response. The comment still stands as unsatisfied and shall be addressed in the next submission or the application may be considered technically incomplete.

- v. If burns are not going to be allowed on days when there is a reasonable probability of precipitation (permit condition would need to state this explicitly), the pollutants may be sufficiently dispersed that wet deposition in the study area may be negligible. However the particulates that may be released in air during OB may still be deposited via wet deposition when rain follows the OB event. Since OBODM cannot calculate wet deposition, the uncertainty section must clearly state this limitation which may under predict overall risk.

Radford Response (5-1), (Response received on 5/5/2016) – RFAAP will include a description on OBODM limitations in the uncertainty discussions in the Risk Assessment Report (RAR).

DEQ Response (5-1) – The response indicates the detailed information requested by DEQ will be provided at a later date. DEQ will review the new information when available and determine if the comment is satisfied at that time.

DEQ Response (5-2) – No response for this comment was received by RAAP with the 9/14/2016 NOD response. The comment still stands as unsatisfied and shall be addressed in the next submission or the application may be considered technically incomplete.

- vi. Section 3.2.2 provides discussions of the burn and section 3.2.3 lists model runs but it is unclear how the proposed model runs reflect all the discussions provided in Section 3.2.2. Please provide the link between these two sections.

Radford Response (6-1), (Response received on 5/5/2016) – RFAAP will modify Sections 3.2.2 and 3.2.3 to provide the clarity requested by DEQ.

DEQ Response (6-1) – The response indicates the detailed information requested by DEQ will be provided at a later date. DEQ will review the new information when available and determine if the comment is satisfied at that time.

DEQ Response (6-2) – No response for this comment was received by RAAP with the 9/14/2016 NOD response. The comment still stands as unsatisfied and shall be addressed in the next submission or the application may be considered technically incomplete.

17. Multi-pathway Risk Assessment Protocol for the Radford Army Ammunition Plant Open Burning Grounds, Section 3.2.3. Material Characteristics, Page 3-5 –

- i. Please provide fugacity coefficient and the phase. Please also provide all the other input parameters, assumptions, and defaults that will be used in the modeling.

Radford Response (1-1), (Response received on 5/5/2016) – As there are a significant number of input parameters utilized in the air emission modeling, the fate and transport assessment, and the final risk calculations, we request further clarification on which input parameters DEQ wants specified.

DEQ Response (1-1) – Please see the response for 15.ii.

DEQ Response (1-2) – No response for this comment was received by RAAP with the 9/14/2016 NOD response. The comment still stands as unsatisfied and shall be addressed in the next submission or the application may be considered technically incomplete.

- ii. It is unclear why the facility wants to use surrogate COPCs when the COPC list, emission factors, results of flyer test, etc. are available. Surrogate compounds are typically used for new facilities for which compound-specific information is not available. Please provide equations that will be used for proposed calculations and also explain why this approach will represent more health-protective air concentrations.

Radford Response (2-1), (Response received on 5/5/2016) – The surrogate COPCs are provided for air modeling purposes only. These surrogate pollutants will be used to provide a unity-type air concentration and deposition parameter based on a 1 g/s emission rate for each type of COPC that the surrogate represents. The modeled concentrations and deposition rates will then be scaled based on the estimated emissions of each and every COPC. Note that RFAAP is not proposing to only assess two COPCs in the risk assessment. We are merely proposing to run the air model for a vapor phase surrogate and a particle phase surrogate to develop the unity-based air concentrations and deposition rates, as is common practice.

DEQ Response (2-1) – DEQ concurs with RAAP’s rationale and the comment is now satisfied.

18. Multi-pathway Risk Assessment Protocol for the Radford Army Ammunition Plant Open Burning Grounds, Section 3.3. Receptor Grid, Page 3-6 –

- i. The maximum concentrations at grid level will be the sum of the particulate and vapor phase concentrations, thus representing the maximum theoretical concentration (not counting wet deposition)?

Radford Response (1-1), (Response received on 5/5/2016) – The ground-level pollutant concentrations will be calculated in accordance with the equations provided in Section 5 the HHRAP and the referenced appendices (minus the wet deposition component). The ground-level air concentration will be the modeled air concentration (vapor phase plus particle phase) at the given location. The media concentrations will be a combination of the modeled air concentrations and deposition parameters.

DEQ Response (1-1) – The response indicates the detailed information requested by DEQ will be provided at a later date. DEQ will review the new information when available and determine if the comment is satisfied at that time.

DEQ Response (1-2) – No response for this comment was received by RAAP with the 9/14/2016 NOD response. The comment still stands as unsatisfied and shall be addressed in the next submission or the application may be considered technically incomplete.

- ii. Please ensure the following are identified on the grid and the predicted concentrations are available: current schools, daycares, hospitals, nursing homes, hospice and similar elderly care centers.

Radford Response (2-1), (Response received on 5/5/2016) – The specified location of each special subpopulation receptor is provided in Table 4-6. A figure will be provided in the RAR depicting each of these locations on a map. In addition, each of these locations will be included in a discrete receptor grid in the modeling runs.

DEQ Response (2-1) – DEQ will review the figure RAAP will submit to determine if the comment is satisfied.

DEQ Response (2-2) – No response for this comment was received by RAAP with the 9/14/2016 NOD response. The comment still stands as unsatisfied and shall be addressed in the next submission or the application may be considered technically incomplete.

- iii. Please include surface water bodies on the grid and include predicted concentrations at those locations.

Radford Response (3-1), (Response received on 5/5/2016) – RFAAP will include a discrete receptor grid for all waterbodies. In the RAR, RFAAP will provide the predicted concentrations at each of these locations.

DEQ Response (3-1) – DEQ will review the revised Section 3.3 when submitted by RAAP and determine if the comment is satisfied.

DEQ Response (3-2) – No response for this comment was received by RAAP with the 9/14/2016 NOD response. The comment still stands as unsatisfied and shall be addressed in the next submission or the application may be considered technically incomplete.

19. **Multi-pathway Risk Assessment Protocol for the Radford Army Ammunition Plant Open Burning Grounds, Section 3.5.1. Averaging Times, Page 3-9** - The modeling may be carried out for every daylight hour but for risk assessment purposes, please select the ‘worst case’ operating scenario for averaging time.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP anticipated using the worst-case modeling runs for the risk assessment as explained in Section 3.5.1. In a meeting between the parties on March 31, 2016, DEQ concurred with this approach and indicated that no further action is required.

DEQ Response (1-1) – The comment is now satisfied.

20. **Multi-pathway Risk Assessment Protocol for the Radford Army Ammunition Plant Open Burning Grounds, Section 4.1.3. Water bodies and Watersheds, Pages 4-4 to 4-6** –

- i. In place of using GPS to identify current receptor, VDEQ strongly recommends that risk assessment be carried out using maximum predicted surface water concentrations based on air modeling results. Once these calculations are done, current receptors etc. may be discussed as additional consideration for risk management decisions.

Radford Response (1-1), (Response received on 5/5/2016) – Recognizing that the location of each waterbody is a fairly well established historical location and that new waterbodies do

not generally appear in an assessment area within any reasonable timeframe, RFAAP will model the waterbodies using the actual coordinates for those waterbodies. In addition, each watershed will be modeled based on the sum of the general receptors located within that watershed. Drinking water input locations are also well defined and not subject to new withdraw points without substantial infrastructure modifications or permitting actions. Therefore, these too will be based on actual geographical coordinates.

DEQ Response (1-1) – This response is confusing. Per the meeting on March 31, 2016, the quantitative risk assessment is to be conducted using the worst case waterbody concentration for fishing (and recreational activities). If there is the presence of a waterbody which is used for drinking water, then it will be included in QRA using the predicted concentrations specific to this waterbody. Please make changes to Section 4.1.3 accordingly.

Radford Response (1-2), (Response received on 9/14/2016) – RFAAP will review the section to clarify the approach that will be used for modeling waterbodies.

DEQ Response (1-2) – DEQ will review the new information when submitted and will determine if the comment is satisfied.

- ii. VDEQ understands that there may be fish consumption advisory on several waterbodies within the study area, but the human and ecological risk assessment calculations will not eliminate any exposure pathway based on the advisories.

Radford Response (2-1), (Response received on 5/5/2016) – RFAAP is not proposing to eliminate any exposure pathway based on these advisories. We are merely providing information on the advisories that exist and indicating that these are not in place due to any specific actions by the RFAAP. (We are adding to the description of the exposure setting and may utilize this information in a future uncertainty discussion).

DEQ Response (2-1) – The comment is now satisfied.

21. **Multi-pathway Risk Assessment Protocol for the Radford Army Ammunition Plant Open Burning Grounds, Section 4.2 Exposure Scenarios, Page 4-7** -Please also include 'surface water via deposition' in the bulleted list.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP will revise the bulleted list in Section 4.2 as requested.

DEQ Response (1-1) – The response indicates the detailed information requested by DEQ will be provided at a later date. DEQ will review the new information when available and determine if the comment is satisfied at that time.

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DEQ Response (1-2) – No response for this comment was received by RAAP with the 9/14/2016 NOD response. The comment still stands as unsatisfied and shall be addressed in the next submission or the application may be considered technically incomplete.

22. Multi-pathway Risk Assessment Protocol for the Radford Army Ammunition Plant Open Burning Grounds, Section 4.2.1.1. General Receptors, Page 4-7 - Please also include recreational receptor for direct exposure to surface water.

Radford Response (1-1), (Response received on 5/5/2016) – During a meeting between the parties on March 31, 2016, DEQ clarified that they were referring to a recreational receptor (e.g., someone swimming in the impacted waters, experiencing dermal exposure), not a recreational fisher. DEQ agreed to provide further information on the details for this exposure scenario (e.g., pathways, duration, frequency, etc.). Once this information is provided, RFAAP will add the recreational receptor to the RAP.

DEQ Response (1-1) – Please use the EPA RSL ‘Recreator Surface Water Equations’ and exposure defaults (where available) to calculate risk/hazard for this receptor. The recreational exposure defaults for surface water are as follows:

Water ingestion rate (L/hr) 0.05

Exposure Time (hr/event) 2

Event frequency (events/day) 1

Skin Surface Area-adult (cm²) 19,652

Skin Surface Area-child (cm²) 6,378

Exposure Frequency (days/years) 195

Exposure Duration -adult (years) 20

Exposure Duration-child (years) 6

Body Weight –adult (kg) 80

Body Weight-child (kg) 15

Radford Response (1-2), (Response received on 9/14/2016) – RFAAP will revise the RAP to include the recreational receptor and will utilize the exposure criteria provided above by DEQ.

DEQ Response (1-2) – DEQ will review the new information when submitted and will determine if the comment is satisfied.

23. **Multi-pathway Risk Assessment Protocol for the Radford Army Ammunition Plant Open Burning Grounds, Section 4.2.2.1. General Receptors, Page 4-10** - This section name is repeated. Please correct. This section and several other sections mention that the HHRA will be refined using ‘realistic’ land use and/or food consumptions, etc. Please note that the facility has no control over activities and exposures of off-site receptors therefore ‘site-specific’ consideration cannot be considered. Therefore, please remove such language from this section and elsewhere in the protocol.

Radford Response (1-1), (Response received on 5/5/2016) – While RFAAP has no control over the activities of off-site receptors, local zoning offices do draw jurisdictions and establish areas in which different types of activity are permitted. For example, without extensive re-zoning efforts, an area zoned industrial cannot be used for agricultural farmland or a housing development. In addition, those areas for which extensive clearing of land or existing neighborhoods would be required to conduct subsistence farming, or for which the terrain (e.g., steep grade or cliff) would prohibit subsistence farming, or those areas falling within a transportation line (e.g., railway thoroughfare) would not be considered for the farming scenario. An examination of the exposure scenario map provided in Figure 4-2 reflects these considerations.

DEQ Response (1-1) – DEQ requires further clarification from RAAP to satisfy the comment. DEQ believes RAAP will conduct a QRA using maximum concentrations as described under response 18.i for all the receptors (except fishing/recreational where maximum concentration for a waterbody will be used). In addition, RAAP will make a case for various other locations as described in response 23. Please confirm whether this is an accurate summary of the calculations to be completed for the QRA.

Radford Response (1-2), (Response received on 9/14/2016) – The summary provided above by DEQ is accurate.

DEQ Response (1-2) – The comment is now satisfied.

24. **Multi-pathway Risk Assessment Protocol for the Radford Army Ammunition Plant Open Burning Grounds, Section 4.2.1.2. Special Subpopulations, Page 4-8** - Schools and day care centers have different exposure scenarios so please separate the two. Please also refer to comments below related to Section 4.3.3. Another section 4.2.2.2 has the same name which is confusing- please either combine the sections or give different names to each section.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP will establish a separate exposure scenario for schools and daycare centers. However, recognizing that EPA

guidance presents these two locations as having the same exposure assumptions, we request clarification from DEQ on the assumptions they propose we use for each scenario.

DEQ Response (1-1) – DEQ’s comment was related to the information provided in October 2015 report Section 4.2.1.2 and Table 4.4 which listed day care facilities and schools as having separate exposure defaults. Based on the discussion at the March 31, 2016 meeting, a separate line item will be provided in Table 4.4 representing daycare age (0-6 years) and elementary school student age (6-10 years). DEQ remains unclear how the other exposure defaults will be used for the elementary school student as proposed by the facility. Per March 31, 2016 meeting, DEQ is requesting RAAP to provide exposure defaults for this receptor. This comment also applies to response 26.

Radford Response (1-2), (Response received on 9/14/2016) – RFAAP will revise Section 4.2.1.2 and Table 4.4 as requested.

DEQ Response (1-2) – DEQ will review the new information when submitted and will determine if the comment is satisfied.

25. **Multi-pathway Risk Assessment Protocol for the Radford Army Ammunition Plant Open Burning Grounds, Section 4.2.2. Exposure Pathways, Page 4-8** - Please add inhalation and dermal pathway of exposure of soil for all receptors. Please also provide all the exposure defaults for *every receptor and each media* that will be used for calculations in a table. Please obtain the exposure from EPA RSL user’s guide; for defaults that are not available in the RSL guidance, please refer to EPA’s exposure factors handbook and EPA R 6 HHRAP guidance. This comment also applies to section 4.3 and all subsections.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP will add the requested pathways to each scenario. RFAAP will provide information on the exposure defaults for each exposure scenario in the RAR, as requested during our March 31, 2016, meeting.

DEQ Response (1-1) – The response indicates the detailed information requested by DEQ will be provided at a later date. DEQ will review the new information when available and determine if the comment is satisfied at that time.

DEQ Response (1-2) – No response for this comment was received by RAAP with the 9/14/2016 NOD response. The comment still stands as unsatisfied and shall be addressed in the next submission or the application may be considered technically incomplete.

26. **Multi-pathway Risk Assessment Protocol for the Radford Army Ammunition Plant Open Burning Grounds, Table 4.4** - Please specify that inhalation includes vapor and particulates. Further child receptor is counted from 0-6 years, not 1 to 6 years. Schools can have students up to age of 18 years, so please explain why only 10 years is selected.

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Radford Response (1-1), (Response received on 5/5/2016) – RFAAP will modify Section 4.3.1.1 of the RAP to clarify that the air concentration is a combination of the vapor and particulate concentrations.

During a meeting between the parties on March 31, 2016, RFAAP further explained the age ranges of each receptor that was chosen. DEQ requested several modifications to these child receptors:

- Daycare should be reflective of children from 0 to 6 years old, not 1 to 6 years old.
- School scenario should be clarified as an elementary school scenario.
- Assessment of middle schools and high schools is not necessary at this time, as generally the daycare and elementary school students are more susceptible to risks from exposure.

RFAAP will make the changes requested and will verify the body weights that will be used for each scenario.

DEQ Response (1-1) – The response indicates the detailed information requested by DEQ will be provided at a later date. DEQ will review the new information when available and determine if the comment is satisfied at that time. Please also see the response to Comment 24.

DEQ Response (1-2) – No response for this comment was received by RAAP with the 9/14/2016 NOD response. The comment still stands as unsatisfied and shall be addressed in the next submission or the application may be considered technically incomplete.

27. **Multi-pathway Risk Assessment Protocol for the Radford Army Ammunition Plant Open Burning Grounds, Section 4.2.3. Exposure Locations, Page 4-10** - Please use the maximum deposited concentration (same concentration value) for each receptor for human health and land based ecological receptors for QRA. Information regarding current receptors at the predicted area of maximum deposition and locations of sensitive receptors may be discussed separately for risk management decision making and/or uncertainty analysis.

Radford Response (1-1), (Response received on 5/5/2016) – In a meeting between the parties on March 31, 2016, RFAAP clarified that they intended to assess risk as the location with the highest modeled air concentration and the location with the highest modeled deposition rates. This will likely result in assessment at multiple locations. (One, worst-case location that includes the highest air concentration and highest deposition rate will not be modeled, as it is overly conservative). DEQ indicated that they found this approach to be acceptable.

DEQ Response (1-1) – The facility has proposed the following: The maximum modeled air concentration -annual and hourly - will be used for inhalation and acute risk assessment, respectively and highest depositional (volatile and particulate) will be used for soil and all

other related media concentrations. Please confirm if this is an accurate summation of what is being proposed.

Radford Response (1-2), (Response received on 9/14/2016) – The summary provided above is incorrect. RFAAP will perform the risk assessment at multiple locations. One location for this assessment will be that receptor with the maximum air concentration (Location A). The assessment of the receptor at this location will use the air concentrations and deposition rates from Location A. Another location (Location B) will be that receptor with the maximum deposition rate. The assessment of the receptor at this location will use the air concentrations and deposition rates from Location B. RFAAP will not create or model a fictional location that uses the air concentration from the receptor with the maximum air concentration and the deposition rates from the receptor with the maximum deposition rates. This presents an inaccurate, unrealistic, and in appropriate depiction of impact of unit emissions on the surrounding community.

DEQ Response (1-2) – Based on the meeting discussion of March 31, 2016, no further discussions are required for the proposed two locations for risk assessment (maximum air concentration and maximum deposition).

28. **Multi-pathway Risk Assessment Protocol for the Radford Army Ammunition Plant Open Burning Grounds, Section 4.3. Quantification of Exposure, Page 4-13** - Please provide information on what equations, what input assumptions and values, and what algorithms will be used to calculate the exposure point concentration for each media studied. If commercial software is used for this purpose, VDEQ will need to evaluate the software for adequacy review. This comment applies to all the subsections of 4.3.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP indicates in the RAP that the HHRAP Volume III will be used to calculate media concentrations. We are uncertain of what specification is required above and beyond this reference.

DEQ Response (1-1) – Per the discussions with RAAP on March 31, 2016, RAAP will provide exposure/input values which are different from the ones provided in the RSL table and EPA HHRAP with text justifying the use of these non-default values. For exposure defaults, the EPA RSL values will supersede EPA HHRAP where available. All the input values used in the calculation will be included in the HHRA report. This comment also applies to Response 30.

Radford Response (1-2), (Response received on 9/14/2016) – RFAAP will provide the exposure and input values as requested in the RAR. Any values differing from those provided in the above references will be justified.

DEQ Response (1-2) – DEQ will review when the exposure defaults become available. On a related note, DEQ has released a quantitative risk Assessment tool called VURAM. This

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access based tool and User's Guide are available at available at:
<http://deq.state.va.us/Programs/LandProtectionRevitalization/RemediationProgram/RiskAssessment.aspx>. The facility may consult this tool and user's guide to ensure that the risk assessment calculations meet DEQ requirements. The facility may choose to use this tool for quantifying risk once all media concentrations are available but note that this tool does not include calculations for risk via mother's milk. If facility decides to use this tool, additional exposure scenario not included in VURAM will need to be calculated outside of VURAM and added to overall risk.

29. **Multi-pathway Risk Assessment Protocol for the Radford Army Ammunition Plant Open Burning Grounds, Section 4.3.1.2. Soil Concentrations, Page 4-14** - There is no screening level evaluation for RCRA permitting related RA. All COPCs that have emission factor and toxicity will be included in the quantitative risk assessment for human health and ecological evaluation. Please remove any references to screening level evaluation throughout the document for both human and ecological risk assessment, including section 4.3.1.3 and section 7.3.

Radford Response (1-1), (Response received on 5/5/2016) – In regards to the human health risk assessment, the word screening is not applied in this discussion. We consistently refer to the human health risk assessment as the MPRA (multipathway risk assessment).

The term screening is applied to the ecological assessment and used in Sections 4.3.1.3 and 7.3 based on similar wording and descriptions provided by USEPA in their guidance document (and DEQ's recommended reference) *Screening Level Ecological Risk Assessment Protocol for Hazardous Waste Combustion Facilities*. Therefore, the use of the word "screening" is consistent with USEPA terminology and DEQ recommendations.

DEQ Response (1-1) – DEQ concurs with RAAP's rationale and the comment is now satisfied.

30. **Multi-pathway Risk Assessment Protocol for the Radford Army Ammunition Plant Open Burning Grounds, Section 4.3.1.3. Surface Water and Sediment Concentrations, Page 4-14** - Please provide the full reference citation for Volume three of HHRAP. Please provide all input variables.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP will add the requested citation. However, we request DEQ provide further clarification on which input parameters DEQ wants specified as there are a significant number of input parameters utilized in the modeling, fate and transport assessment, and the final risk calculations.

DEQ Response (1-1) – Please see the response to Comment 28.

DEQ Response (1-2) – No response for this comment was received by RAAP with the 9/14/2016 NOD response. The comment still stands as unsatisfied and shall be addressed in the next submission or the application may be considered technically incomplete.

31. **Multi-pathway Risk Assessment Protocol for the Radford Army Ammunition Plant Open Burning Grounds, Section 4.3.3. Exposure frequency and Duration** - Please refer to Comment 23 above. The facility may use the exposure assumptions and scenarios specified in R 6 guidance and toxicity values which have been developed to account for toxicity to account for sensitive receptors or evaluate sensitive receptor separately as proposed. If the facility chooses to evaluate sensitive receptor separately, please provide references and rationale for selecting exposure values. Exposure at school may be 180 days but daycare may be far greater. Therefore please use 350 days/year. Further, childcare can have infants up to 12 years of age. Please make necessary adjustment. What is the source of the assumption of a 7 day stay in nursing home? How are hospice and longer term facilities accounted for? Also for elderly, how is the immune-compromised status and differential susceptibility to be accommodated in the calculations? Please provide more information on the data source for a nursing home stay of 3 years. Please also provide the equations that will be used to calculate intake concentrations for sensitive populations.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP will provide the requested information in the revised RAP.

DEQ Response (1-1) – The response indicates the detailed information requested by DEQ will be provided at a later date. DEQ will review the new information when available and determine if the comment is satisfied at that time.

DEQ Response (1-2) – No response for this comment was received by RAAP with the 9/14/2016 NOD response. The comment still stands as unsatisfied and shall be addressed in the next submission or the application may be considered technically incomplete.

32. **Multi-pathway Risk Assessment Protocol for the Radford Army Ammunition Plant Open Burning Grounds, Section 5.1. Toxicity Information for noncarcinogenic effects, and Section 5.2. Toxicity Information for Carcinogenic Effects, Page 5-1** - Please consult the latest update of the EPA Region 3 RSL table to obtain carcinogenic as well as noncarcinogenic toxicity values. While the RSL table itself obtains toxicity values from several primary sources (IRIS, PPRTV, ATSDR MRLS, CalEPA RELS and cancer potency values and provisional PPRTVs and HEAST), VDEQ recommends using the RSL table so that it is easy to keep a track of updates in relation to the date of report. The RCRA Corrective Action website lists several compounds that are used as surrogate compounds. Please consult this list. Chemicals that have SFO and/or IUR in the RSL table will be considered to be a carcinogen. Chemicals that have a RfD and/or RfC in the RSL table will be considered to be noncarcinogens and chemicals that have both carcinogenic and

noncarcinogenic toxicity values, both, risk and hazard will need to be calculated. Please make necessary changes in the text to reflect this information.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP will revise Section 5.2 accordingly.

DEQ Response (1-1) – The response indicates the detailed information requested by DEQ will be provided at a later date. DEQ will review the new information when available and determine if the comment is satisfied at that time.

DEQ Response (1-2) – No response for this comment was received by RAAP with the 9/14/2016 NOD response. The comment still stands as unsatisfied and shall be addressed in the next submission or the application may be considered technically incomplete.

33. **Multi-pathway Risk Assessment Protocol for the Radford Army Ammunition Plant Open Burning Grounds, Section 6.1. Noncarcinogenic Hazard Index Estimate, Page 6-1**

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- i. The TRI report is neither representative of background concentrations, nor does it in any capacity give any indication of background concentrations of any of the constituents. The TRI report simply reports permitted and some fugitive emissions by certain groups of industries that have inventories exceeding a certain quantity. Therefore, please do not use TRI values as background levels. Please remove this entire discussion from the protocol.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP was not using the TRI values as background concentrations, but was using them as a representation of the lack of other facilities that are contributing to the level of regulated constituents in the assessment area. This is necessary and important both when establishing target values for the risk assessment, as well as discussing and evaluating modeled impacts on the surrounding area. We feel the discussion important to document surrounding industrial activities and aide future discussions in the RAR. However, to clarify that the intent of this section is only for information purposes only (and not to base some alternate risk/hazard criteria on), RFAAP will move this discussion to another portion of the RAP.

DEQ Response (1-1) – The response indicates the detailed information requested by DEQ will be provided at a later date. DEQ will review the new information when available and determine if the comment is satisfied at that time.

DEQ Response (1-2) – No response for this comment was received by RAAP with the 9/14/2016 NOD response. The comment still stands as unsatisfied and shall be addressed in the next submission or the application may be considered technically incomplete.

- ii. Target level HQ for individual noncarcinogens irrespective of target organ (i.e., hazard from one chemical via all exposure media and pathways for a receptor): 0.25. Target level HI for all noncarcinogens irrespective of target organ (i.e., hazard from all COPCs combined via all exposure media and pathways for a receptor): 1.0 The target level for blood lead levels in children is no more than 5% of children exceeding a blood lead level of 10 µg/dL.

Radford Response (2-1), (Response received on 5/5/2016) – RFAAP finds these targets appropriate and will modify the discussion in Section 6.1 of the RAP to reflect this specification.

DEQ Response (2-1) – The response indicates the detailed information requested by DEQ will be provided at a later date. DEQ will review the new information when available and determine if the comment is satisfied at that time.

DEQ Response (1-2) – No response for this comment was received by RAAP with the 9/14/2016 NOD response. The comment still stands as unsatisfied and shall be addressed in the next submission or the application may be considered technically incomplete.

34. **Multi-pathway Risk Assessment Protocol for the Radford Army Ammunition Plant Open Burning Grounds, Section 6.2. Carcinogenic Risk Estimate, Page 6-3 - Chronic Exposure:** Individual risk (i.e., risk from one chemical via all exposure media and pathways for a receptor): at or below 1E-6. Cumulative risk (i.e., risk from all chemicals via all exposure media and pathways for a receptor): at or below 1E-4.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP finds these targets appropriate and will modify the discussion in Section 6.2 of the RAP to reflect this specification.

DEQ Response (1-1) – The response indicates the detailed information requested by DEQ will be provided at a later date. DEQ will review the new information when available and determine if the comment is satisfied at that time.

DEQ Response (1-2) – No response for this comment was received by RAAP with the 9/14/2016 NOD response. The comment still stands as unsatisfied and shall be addressed in the next submission or the application may be considered technically incomplete.

35. **Multi-pathway Risk Assessment Protocol for the Radford Army Ammunition Plant Open Burning Grounds, Section 6.3. Acute Hazard Assessment, Page 6-3 -** Please provide a table listing COPC specific acute toxicity value that is proposed to be used and the source of this value. Please use acute exposure Target level AHQ for individual noncarcinogens irrespective of target organ: not to exceed 0.25.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP will provide a table with the requested toxicity values. However, information on the values proposed is provided

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in the RAP in Section 5.1. Consistent with this discussion, RFAAP will provide the requested table once a final COPC list has been determined.

The recommended target for the acute hazard assessment seems overly conservative and is not consistent with USEPA guidance. However, since prior applications of the OBG risk assessment at the RFAAP utilized this target criteria, RFAAP will modify the RAP to use the values proposed above.

DEQ Response (1-1) – The response indicates the detailed information requested by DEQ will be provided at a later date. DEQ will review the new information when available and determine if the comment is satisfied at that time.

DEQ Response (1-2) – No response for this comment was received by RAAP with the 9/14/2016 NOD response. The comment still stands as unsatisfied and shall be addressed in the next submission or the application may be considered technically incomplete.

36. **Multi-pathway Risk Assessment Protocol for the Radford Army Ammunition Plant Open Burning Grounds, Section 7.2. Ecological COPC selection, Page 7-4** - The list of COPC and the concentration of COPC must be same for ecological and human health risk assessment. This list may be adjusted based on availability of TRVs, NOELs, and LOELS. Please clarify this in the report.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP agrees that the initial COPC list will be the same for both assessments. However, the actual list of COPCs included in the assessment will vary depending upon human and ecological criteria available on each COPC. We will revise this section to clarify this.

DEQ Response (1-1) – The response indicates the detailed information requested by DEQ will be provided at a later date. DEQ will review the new information when available and determine if the comment is satisfied at that time.

DEQ Response (1-2) – No response for this comment was received by RAAP with the 9/14/2016 NOD response. The comment still stands as unsatisfied and shall be addressed in the next submission or the application may be considered technically incomplete.

37. **Multi-pathway Risk Assessment Protocol for the Radford Army Ammunition Plant Open Burning Grounds, Table 7-1. Habitat Distributions Within the Assessment Area, Page 7-3 and Appendix A - Table 1 in Animal Survey at RAAP by Radford University** - It appears that the habitats listed in these tables needs to be included in the screening level ecological risk assessment using EPA Region 6 SLERA protocol. Please consult this document for further details.

Radford Response (1-1), (Response received on 5/5/2016) – In the RAP provided, RFAAP proposed to perform an initial screening level ecological assessment that compared modeled

concentrations to ecological screening criteria. During a meeting between the parties on March 31, 2016, DEQ indicated that this level of assessment was not acceptable and that a more detailed assessment, consistent with that described in the SLERA must be performed. RFAAP will modify the RAP to provide this revised type of assessment.

DEQ Response (1-1) – The response indicates the detailed information requested by DEQ will be provided at a later date. DEQ will review the new information when available and determine if the comment is satisfied at that time.

DEQ Response (1-2) – No response for this comment was received by RAAP with the 9/14/2016 NOD response. The comment still stands as unsatisfied and shall be addressed in the next submission or the application may be considered technically incomplete.

38. **Multi-pathway Risk Assessment Protocol for the Radford Army Ammunition Plant Open Burning Grounds, Section 7.4. Phase II assessment, Page 7-5** - Please refer to Comment 27 regarding ‘Phase I’ and rename this section. This section is incomplete as it does not have information regarding habitats, food webs, representative species, assessment endpoints, measurement endpoints, BCFs, BAFs, FCM, TRVs, and other toxicity related information, concentration calculation for each food items, etc. Please include a very detailed discussion of the step-wise process by which ecological risk assessment will be carried out. Please use the following ESQ: For all COPC for a receptor at a given location: acceptable ESQTotal will be at or below 1.

Radford Response (1-1), (Response received on 5/5/2016) – In the RAP provided, RFAAP proposed to perform an initial screening level ecological assessment that compared modeled concentrations to ecological screening criteria. During a meeting between the parties on March 31, 2016, DEQ indicated that this level of assessment was not acceptable and that a more detailed assessment, consistent with that described in the SLERA must be performed. RFAAP will modify the RAP to provide this revised type of assessment. DEQ indicated that they will provide a series of reference sources of ecological criteria to RFAAP for use in this assessment.

DEQ Response (1-1) – Please see attached hierarchy of references for SLERA (Attachment 1 – NASA Wallops Appendix D-2 and D-3).

Radford Response (1-2), (Response received on 9/14/2016) – RFAAP will review the references provided and will incorporate information from each of them into our protocol for an ecological risk assessment as appropriate.

DEQ Response (1-2) – DEQ will review the new information when submitted and will determine if the comment is satisfied.

39. **Multi-pathway Risk Assessment Protocol for the Radford Army Ammunition Plant Open Burning Grounds, Section 8.1. Types of Uncertainty, Page 8-1** - Please add the following types of uncertainty: wet deposition is not included thereby underestimating the risk; COCP that do not have either emission factor or toxicity values are not counted in risk/hazard calculation, thus underestimating risk; uncertainties associated with sampling and laboratory based analysis that may under or overestimate risk.
Radford Response (1-1), (Response received on 5/5/2016) – RFAAP will revise Section 8.1 accordingly.

DEQ Response (1-1) – The response indicates the detailed information requested by DEQ will be provided at a later date. DEQ will review the new information when available and determine if the comment is satisfied at that time.

DEQ Response (1-2) – No response for this comment was received by RAAP with the 9/14/2016 NOD response. The comment still stands as unsatisfied and shall be addressed in the next submission or the application may be considered technically incomplete.

40. **Multi-pathway Risk Assessment Protocol for the Radford Army Ammunition Plant Open Burning Grounds, Section 8.1.1. Assumptions and Variables, Page 8-1** - For the most part, the exposure defaults are conservative and more likely to result in overestimating than underestimating human risk. This approach ensures protection of the public health as well as scientific validity, and minimizes serious errors in estimating risks and potential liability. This section needs to explain the rationale for selection of conservative defaults. Further, as mentioned previously, ‘site-specific’ parameters do not apply. Therefore please remove language indicating use of ‘site-specific’ exposure parameters.

Radford Response (1-1), (Response received on 5/5/2016) – Many of the considerations that feed the risk assessment are based on site-specific factors, such as waste composition, site location, exposure setting, subpopulation locations, *etc.* However, we recognize that DEQ's intent with this comment was to prevent the use of site-specific exposure factors/consumption practices for individuals within the assessment area. The values proposed for these factors will be consistent with the HHRAP and will be defined in the RAP and RAR.

DEQ Response (1-1) – The response indicates the detailed information requested by DEQ will be provided at a later date. DEQ will review the new information when available and determine if the comment is satisfied at that time.

DEQ Response (1-2) – No response for this comment was received by RAAP with the 9/14/2016 NOD response. The comment still stands as unsatisfied and shall be addressed in the next submission or the application may be considered technically incomplete.

Section 6 of the Notice of Deficiency Addressing the Technical Completeness of the Part A and Part B Permit Applications for the Renewal of the Subpart X Open Burning and Open Detonation Permit, Technical Deficiencies of the Air Modeling of the Risk Assessment Protocol of the Permit Application

General Comments

1. All input and output files (e.g., OBODM, pre-processing and post-processing files), including any spreadsheets and 3rd party software project files (e.g., BEEST, Lakes, Trinity, utility programs) shall be provided to DEQ in electronic format.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP will provide all modeling files in electronic format with the RAR.

DEQ Response (1-1) – DEQ will review the modeling files upon receipt to determine if the comment is satisfied.

DEQ Response (1-2) – No response for this comment was received by RAAP with the 9/14/2016 NOD response. The comment still stands as unsatisfied and shall be addressed once the revised RA protocol is submitted.

2. The final risk assessment report should include graphics (e.g., contour maps) that show the extent of the air quality impacts and shall utilize a base map that is readily understandable by the general public. DEQ encourages the applicant to also submit Geographic Information System (GIS) shape files of the air quality impacts if available.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP will provide the requested information in the RAR.

DEQ Response (1-1) – DEQ will review the revised protocol upon receipt to determine if the comment is satisfied.

DEQ Response (1-2) – No response for this comment was received by RAAP with the 9/14/2016 NOD response. The comment still stands as unsatisfied and shall be addressed once the revised RA protocol is submitted.

3. A complete copy of all modeling correspondence should be sent to the DEQ Air Division's Office of Air Quality Assessments and the DEQ Land Division.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP will provide a copy of all modeling-related correspondence to both the DEQ Air Division and the DEQ Land Division as requested.

DEQ Response (1-1) – DEQ will review the revised protocol upon receipt to determine if the comment is satisfied.

DEQ Response (1-2) – No response for this comment was received by RAAP with the 9/14/2016 NOD response. The comment still stands as unsatisfied and shall be addressed once the revised RA protocol is submitted.

4. Generally speaking, every input parameter that will be used for the modeling will need to be included in this protocol for DEQ's review and approval.

Radford Response (1-1), (Response received on 5/5/2016) – As there are a significant number of input parameters utilized in the air emission modeling, we request further clarification on which input parameters DEQ wants specified. During a meeting between the parties on March 31, 2016, DEQ indicated that they will provide a specific table of parameters that they wish to have specified in the RAP.

DEQ Response (1-1) – This comment is now rescinded by DEQ. No table is needed and the comment is satisfied.

5. The protocol should provide a justification for the use of OBODM in terms of this model being the best available tool to characterize worst-case exposures. Also, can AERMOD be used in addition to the OBODM model to evaluate wet deposition and particle phase emissions in complex terrain?

Radford Response (1-1), (Response received on 5/5/2016) – OBODM was selected as the model for this application, as it was the model recommended by DEQ and provided in EPA Region 3's OBOD guidance (reference page 4-9 of EPA's guidance). While AERMOD can be used to model wet deposition from air emission sources, we do not feel it appropriate to do so for this application. EPA specifically recommended the use of OBODM despite its limitations in this area, recognizing that OB activities were not conducted during precipitation events, thereby nullifying the concerns with this deficiency. We do not intend to utilize AERMOD in this effort to supplement the OBODM modeling. RFAAP will prepare a separate submittal providing the necessary justification for this approach.

DEQ Response (1-1) – DEQ will review the revised protocol upon receipt to determine if the comment is satisfied.

DEQ Response (1-2) – No response for this comment was received by RAAP with the 9/14/2016 NOD response. The comment still stands as unsatisfied and shall be addressed once the revised RA protocol is submitted.

Specific Comments for the Multi-pathway Risk Assessment Protocol for the Radford Army Ammunition Plant Open Burning Grounds Air Modeling :

1. **Multi-pathway Risk Assessment Protocol for the Radford Army Ammunition Plant Open Burning Grounds, Section 1.4, Page 1-3** - The protocol states that “*USEPA guidance indicates that a 10-kilometer (km) radius is usually more appropriate for air dispersion and deposition modeling.*” Please provide the reference for this information.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP will modify Section 1.4 to include the requested reference.

DEQ Response (1-1) – DEQ will review the revised protocol upon receipt to determine if the comment is satisfied.

DEQ Response (1-2) – No response for this comment was received by RAAP with the 9/14/2016 NOD response. The comment still stands as unsatisfied and shall be addressed once the revised RA protocol is submitted.

2. **Multi-pathway Risk Assessment Protocol for the Radford Army Ammunition Plant Open Burning Grounds, Section 3.1, Page 3-1** - The latest version of OBODM is Version 01.3.0024 which was released on February 9, 2010.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP will update the OBODM version in Section 3.11.

DEQ Response (1-1) – DEQ will review the revised protocol upon receipt to determine if the comment is satisfied.

DEQ Response (1-2) – No response for this comment was received by RAAP with the 9/14/2016 NOD response. The comment still stands as unsatisfied and shall be addressed once the revised RA protocol is submitted.

3. **Multi-pathway Risk Assessment Protocol for the Radford Army Ammunition Plant Open Burning Grounds, Section 3.2.2, Pages 3-2 through 3-4** - The applicant has several assumptions in Table 3-2. These include the maximum amount of waste (total), the maximum amount of waste (per pan), the duration of each burn, the hours for each burn, and the conditions for each burn. These assumptions will likely need to be included in enforceable permit conditions.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP recognizes that the assumptions specified in Table 3-2 may be incorporated as Permit limitations and finds each of them to be reasonable limitations.

DEQ Response (1-1) – DEQ concurs with the applicant’s response and the comment is now satisfied.

- 4. Multi-pathway Risk Assessment Protocol for the Radford Army Ammunition Plant Open Burning Grounds, Section 3.2.2, Pages 3-2 through 3-4** - Consistent with recommendations contained in *40 CFR Part 51, Appendix W - Guideline on Air Quality Models*, the OB modeling should include a range of conditions that ensure that the burn scenario that causes maximum ground-level concentrations is identified. Therefore, a detailed discussion of the possible scenarios, including the model input parameters, should be provided prior to the commencement of the modeling analysis.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP provided a description of the two main burn scenarios (propellant burns and skid burns) in the RAP and provided information on the differences between these two in Section 3.2.2 of the RAP. There are no burn scenarios other than these two scenarios. In a meeting between the parties on March 31, 2016, DEQ clarified that they were simply looking for an increased level of detail in the descriptions provided. RFAAP will make modifications as requested.

DEQ Response (1-1) – DEQ will review the revised protocol upon receipt to determine if the comment is satisfied.

DEQ Response (1-2) – No response for this comment was received by RAAP with the 9/14/2016 NOD response. The comment still stands as unsatisfied and shall be addressed once the revised RA protocol is submitted.

- 5. Multi-pathway Risk Assessment Protocol for the Radford Army Ammunition Plant Open Burning Grounds, Section 3.2.4, Page 3-6** - We recommend using NAD83 or WGS84 instead of NAD27 in Table 3-4 because the results are more easily translated to Google Earth and other software packages.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP will revise all maps and coordinate descriptions to utilize the NAD83 datum as requested.

DEQ Response (1-1) – DEQ concurs with the applicant’s response and the comment is now satisfied.

- 6. Multi-pathway Risk Assessment Protocol for the Radford Army Ammunition Plant Open Burning Grounds, Section 3.2.4, Page 3-6** - Please provide a graphical representation (i.e., a satellite image) of the coordinates in Table 3-4.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP will add a new figure to the RAP that provides a graphical representation of the pan coordinates.

DEQ Response (1-1) – DEQ concurs with the applicant’s response and the comment is now satisfied.

- 7. Multi-pathway Risk Assessment Protocol for the Radford Army Ammunition Plant Open Burning Grounds, Section 3.3, Pages 3-6 through 3-7** – DEQ recommends the use of a higher resolution receptor grid than what is being proposed by the applicant. Specific guidance is located at:

http://www.deq.virginia.gov/Portals/0/DEQ/Air/Assessments/dispersion/VA_Modeling_Guideline_03172015.pdf

Specifically, DEQ and EPA Region III recommend 25-meter receptor spacing along the facility’s ambient air boundary (e.g., fenceline). In addition, it is suggested that 50-meter receptor spacing be used within 1 kilometer (km) of the facility, 100-meter spacing from 1 to 3 km, 250-meter spacing from 3 to 10 km, and 500-meter spacing beyond 10 km. Also, it is recommended that refined modeling be conducted using 50-meter receptor spacing to ensure that the maximum impact has been identified in the event that any maximum occurs beyond the initial 50-meter receptor grid.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP notes that the receptor grid proposed is consistent with EPA guidance provided in the HHRAP. However, RFAAP can reduce the receptor spacing within the defined receptor grid as requested. We do not agree with expanding the receptor grid to an extent of 50 kilometers (>30 miles) from the source, especially considering that prior modeling efforts have shown the most impacted locations are less than 3 kilometers from the source. In a meeting between the parties on March 31, 2016, DEQ agreed with this proposed modification.

DEQ Response (1-1) – DEQ did not specifically recommend using a grid to an extent of 50 kilometers (>30 miles) from this facility. The general DEQ modeling guidelines suggest that AERMOD is valid to a range of 50 kilometers. DEQ concurs that a smaller grid that ensures that the maximum impact is captured is appropriate. A grid extending to 10 kilometers is likely adequate.

- 8. Multi-pathway Risk Assessment Protocol for the Radford Army Ammunition Plant Open Burning Grounds, Section 3.3, Pages 3-6 through 3-7** - We recommend using NAD83 or WGS84 instead of NAD27 for all receptor locations because the results are more easily translated to Google Earth and other software packages.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP will revise all maps and coordinate descriptions to utilize the NAD83 datum as requested.

DEQ Response (1-1) – DEQ concurs with the applicant’s response and the comment is now satisfied.

9. **Multi-pathway Risk Assessment Protocol for the Radford Army Ammunition Plant Open Burning Grounds, Section 3.3, Pages 3-6 through 3-7** - We recommend using the USGS National Elevation Dataset (NED) in lieu of USGS Digital Elevation Models (DEM) because the NED data is generally considered to be more accurate. The applicant should use the highest resolution USGS NED available which is typically 10-meter data.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP actually used the NED in establishing the receptor and source elevation data. The description provided in Section 3.3 was incorrect and will be revised accordingly.

DEQ Response (1-1) – DEQ will review the revised protocol upon receipt to determine if the comment is satisfied.

DEQ Response (1-2) – No response for this comment was received by RAAP with the 9/14/2016 NOD response. The comment still stands as unsatisfied and shall be addressed once the revised RA protocol is submitted.

10. **Multi-pathway Risk Assessment Protocol for the Radford Army Ammunition Plant Open Burning Grounds, Section 3.4, Pages 3-7 through 3-9** - Applicants in regulatory modeling analyses are allowed to substitute for up to 10 percent of the data; conversely, the meteorological data base must be 90 percent complete (before substitution) in order to be acceptable for use in regulatory dispersion modeling. Please provide the supporting documentation for purposes of assessing compliance with the 90 percent completeness criteria for the Virginia Tech, Kentland Farm data. The 90 percent requirement applies on a quarterly basis such that 4 consecutive quarters with 90 percent recovery are required for an acceptable one-year data base. The 90 percent requirement applies to each of the variables: wind direction, wind speed, stability, and temperature and to the joint recovery of wind direction, wind speed, and stability.

Radford Response (1-1), (Response received on 5/5/2016) – The level of effort requested by DEQ in this evaluation is substantial. During a meeting between the parties on March 31, 2016, RFAAP agreed to provide further information on the Kentland Farm data and complete an assessment as to the completeness and availability of it. However, before proceeding with this completeness review, RFAAP will provide an evaluation of the quality of the data consistent with the information requested in NOD 6.12 below.

DEQ Response (1-1) – DEQ will review the RFAAP data quality evaluation, consistent with the information requested in NOD 6.12, and will then determine if additional quality assurance documentation is needed.

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DEQ Response (1-2) – No response for this comment was received by RAAP with the 9/14/2016 NOD response. The comment still stands as unsatisfied and shall be addressed once the revised RA protocol is submitted.

11. **Multi-pathway Risk Assessment Protocol for the Radford Army Ammunition Plant Open Burning Grounds, Section 3.4, Pages 3-7 through 3-9** - The applicant should use up to 5 years of the Kentland Farm data. EPA guidance (Section 8.3.1.2 of 40 CFR Part 51, Appendix W) stipulates that a minimum of 1 year of onsite data can be used but that additional data up to 5 years should be used if available.

Radford Response (1-1), (Response received on 5/5/2016) – Recognizing the request for a detailed completeness review for each quarter and each year of data utilized, we believe the requirement to use five years of essentially site-specific data to be overly burdensome. As EPA guidance specifies one year of site-specific data is adequate, we feel that one year of data should be all that is required. DEQ clarified that at least one year of data must be used but more years, up to five, is preferred. DEQ recommended that the quality and completeness assessments be completed before this discussion is finalized.

DEQ Response (1-1) – DEQ does not concur with the RFAAP’s response for several reasons. As previously stated, EPA guidance (Section 8.3.1.2 of 40 CFR Part 51, Appendix W) stipulates that a minimum of 1 year of site-specific data can be used but that additional data up to 5 years should be used if available. There appears to be a significant period of data available for the Kentland Farm site. DEQ does not agree that utilizing 5 years of these data for input to the model represents an “overly burdensome” requirement since all air permit applicants conducting modeling conform to these methods. In addition, Kentland Farm, while in relatively close proximity to the RFAAP, does not constitute “site-specific data” as outlined in Appendix W. Five years of data has also been selected by EPA as an appropriate period of record because it sufficiently represents the year-to-year variability in meteorological conditions.

Radford Response (1-2), (Response received on 9/14/2016) – RFAAP defers further comment on the amount of data appropriate for inclusion until we complete the requested quality review of the data. If in this review, RFAAP determines that the referenced Kentland farm data is appropriate and adequate data meeting the referenced QA/QC criteria is available, RFAAP will provide further response on the use of one or five years of data at that time. (For example, if in our review RFAAP determines that three years of acceptable data is available, then RFAAP will proposed to use three years of data. If RFAAP determines that five years of acceptable data is available, then RFAAP will propose to use five years of data). However, we believe it necessary to complete this review until we can comment further.

DEQ Response (1-2) – The comment is now satisfied.

12. **Multi-pathway Risk Assessment Protocol for the Radford Army Ammunition Plant Open Burning Grounds, Section 3.4, Pages 3-7 through 3-9** - Please provide any Quality Assurance Project Plan (QAPP) and supporting documentation that details how the data was collected and how it was quality assured.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP will have to work with the Virginia Tech meteorological staff to develop the requested documentation. Recognizing that this will require considerable effort, we request further information from DEQ on what specific information they would like presented on the data and data collection methodologies. During a meeting between the parties on March 31, 2016, DEQ agreed to provide an example QAPP and/or bulleted list of quality evaluations that must be made on the data.

DEQ Response (1-1) – DEQ will provide the example QAPP document for the Dominion Virginia Power Ambient Air Monitoring Station and Dominion Virginia Power Air Quality Monitoring Program Quarterly Monitoring Report to RFAAP for review. Both documents are included as Attachments 2 and 3 of this document.

Radford Response (1-2), (Response received on 9/14/2016) – RFAAP will use the provided documents in reviewing and assessing the Kentland Farm data and will use them in guides in developing the requested QAPP.

DEQ Response (1-2) – The comment is now satisfied.

13. **Multi-pathway Risk Assessment Protocol for the Radford Army Ammunition Plant Open Burning Grounds, Section 3.4, Pages 3-7 through 3-9** - The applicant should use upper air data from NWS Station 53829 (Roanoke/Blacksburg) in lieu of data from NWS Station 13723 (Greensboro/High Point/Winston Salem).

Radford Response (1-1), (Response received on 5/5/2016) – According to the NWS reliability score for the last three months, data from NWS 53829 presents multiple reliability problems. Therefore, we chose NWS 13723, as it presents much more consistent and favorable reliability scores from the NWS. During a meeting between the parties on March 31, 2016, DEQ indicated that they have performed a completeness assessment on the Roanoke data and found the data from the period between 2010 and 2014 to be acceptable. DEQ will provide a copy of this data. (In their assessment of the data, DEQ substituted any missing data from the Roanoke station with data from the Greensboro/Highpoint station). RFAAP will review the data once it is provided by DEQ and provide a final proposal/justification for the source of upper air data.

DEQ Response (1-1) – DEQ will provide the upper air data to RFAAP for use in the modeling analysis.

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Radford Response (1-2), (Response received on 9/14/2016) – We appreciate DEQ’s assistance in this effort and will utilize the data provided. Once we have information on the years we anticipate to use in the model, we will provide this information to DEQ.

DEQ Response (1-2) – The comment is now satisfied.

14. **Multi-pathway Risk Assessment Protocol for the Radford Army Ammunition Plant Open Burning Grounds, Section 3.4, Pages 3-7 through 3-9** - The applicant should also refer to Section 6.8 of EPA’s *Meteorological Monitoring Guidance for Regulatory Modeling Applications, February 2000*, for procedures on treatment of missing data and substitution methods.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP will revise the reference in Section 3.4 to indicate that the requested document will be used for missing data substitution.

DEQ Response (1-1) – DEQ concurs with the applicant’s response and the comment is now satisfied.

15. **Multi-pathway Risk Assessment Protocol for the Radford Army Ammunition Plant Open Burning Grounds, Section 3.5.1, Page 3-9** - The applicant assumes that “...*only one burn can be conducted per day (due to safety restrictions), the actual maximum number of events per year is 365 events, rather than the 3,285 considered in the annual modeling scenario, which assumes 10 events per day (one event for every hour between 0800 and 1700 hours).*” These assumptions will likely need to be included in enforceable permit conditions.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP recognizes that the assumptions specified in Section 3.5.1 may be incorporated as Permit limitations and finds each of them to be reasonable limitations.

DEQ Response (1-1) – DEQ concurs with the applicant’s response and the comment is now satisfied.

16. **Multi-pathway Risk Assessment Protocol for the Radford Army Ammunition Plant Open Burning Grounds, Section 3.5.2, Page 3-9** – Even though the applicant states that the OB operations will not be conducted during precipitation events, it is possible for some of the compounds emitted during a burn to adsorb to atmospheric particulates and gases where they may remain until removed through precipitation (wet deposition). Therefore, please discuss the possibility of using AERMOD for the purposes of quantifying the wet deposition pathway. Omission of wet deposition may underestimate the off-site soil and surface water concentrations.

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Radford Response (1-1), (Response received on 5/5/2016) – While AERMOD can be used to model wet deposition from air emission sources, we do not feel it appropriate to do so for this application. USEPA specifically recommended the use of OBODM despite its limitations in this area, recognizing that OB activities were not conducted during precipitation events, thereby nullifying the concerns with this deficiency. We do not intend to utilize AERMOD in this effort to supplement the OBODM modeling.

With these considerations, we disagree that omission of wet deposition will underestimate off-site concentrations. If OB operations are not conducted during precipitation events, then the contribution from wet deposition is essentially zero.

During a meeting between the parties on March 31, 2016, RFAAP agreed to provide a series of comparisons between AERMOD runs and OBODM runs that have been conducted for multiple scenarios as multiple facilities to substantiate our proposal to not supplement the OBODM run with AERMOD runs.

DEQ Response (1-1) – DEQ will review the modeling comparisons between AERMOD and OBODM upon receipt to determine if the comment is satisfied.

DEQ Response (1-2) – No response for this comment was received by RAAP with the 9/14/2016 NOD response. The comment still stands as unsatisfied and shall be addressed once the revised RA protocol is submitted.

17. **Multi-pathway Risk Assessment Protocol for the Radford Army Ammunition Plant Open Burning Grounds, Section 3.5.2, Page 3-9** - If used, the AERMOD wet deposition analyses should be consistent with the latest EPA guidance contained on EPA's Technology Transfer Network Support Center for Regulatory Atmospheric Modeling:

AERMOD Deposition Algorithms – Science Document (Revised Draft)

http://www.epa.gov/ttn/scram/7thconf/aermod/aer_scid.pdf

Deposition Parameterizations for the Industrial Source Complex (ISC3) Model, M. L. Wesely, P. V. Doskey, and J. D. Shannon, Environmental Research Division, Argonne National Laboratory, June 2002.

<http://www.epa.gov/ttn/scram/7thconf/aermod/drisdep.zip>

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP does not intend to utilize AERMOD in the OBG risk assessment process. Additional information justifying this decision will be provided in a separate submittal.

DEQ Response (1-1) – DEQ will review the modeling comparisons between AERMOD and OBODM upon receipt to determine if the comment is satisfied.

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DEQ Response (1-2) – No response for this comment was received by RAAP with the 9/14/2016 NOD response. The comment still stands as unsatisfied and shall be addressed once the revised RA protocol is submitted.

18. **Multi-pathway Risk Assessment Protocol for the Radford Army Ammunition Plant Open Burning Grounds, Section 3.5.3, Page 3-10** - The use of the independent study, *Explosion Dust Particle Size Measurements (Pinnick et. al, 1983)*, is subject to DEQ Land Division approval. Generally, DEQ recommends that the applicant make an effort to develop site-specific particle size distribution data in lieu of national default values.

Radford Response (1-1), (Response received on 5/5/2016) – RFAAP requests further information on when we can expect DEQ review and comment on the proposed particle size distribution data. We do not expect to be able to collect site-specific particle size distribution data with the flyer study. Therefore, this prior study is the best available data for this effort. Considering this, DEQ agreed in the March 31, 2016, meeting that the proposed particle size distribution provided in the RAP is acceptable.

DEQ Response (1-1) – DEQ concurs with the applicant’s response on the basis that the facility cannot collect site-specific particle size distribution data and the comment is now satisfied.