**DEPARTMENT OF ENERGY**
Environmental Management Los Alamos Field Office (EM-LA)
Los Alamos, New Mexico 87544

EMLA-2022-BF003-02-001

March 14, 2022



Mr. Rick Shean
Bureau Chief
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87505-6313

Subject: Request for Certificates of Completion for 24 Solid Waste Management Units and 7 Areas of Concern in the Upper Sandia Canyon Aggregate Area

Dear Mr. Shean:

In accordance with Section XXI of the Compliance Order on Consent (Consent Order), the U.S. Department of Energy (DOE) is requesting certificates of completion for 24 solid waste management units (SWMUs) and 7 areas of concern (AOCs) within the Upper Sandia Canyon Aggregate Area. These SWMUs and AOCs were all recommended for corrective action complete in the "Supplemental Investigation Report for Upper Sandia Canyon Aggregate Area, Revision 1" (hereafter the SIR) (LA-UR-15-26598). The SIR was approved in the New Mexico Environment Department's (NMED's) letter, "Approval with Modifications, Supplemental Investigation Report for Upper Sandia Canyon Aggregate Area, Revision 1," dated January 24, 2017. The approval-with-modifications letter contained comments regarding some, but not all, of the sites recommended in the SIR for corrective action complete. NMED's comments on the sites recommended for corrective action complete are summarized below and responses are provided in Enclosure 1.

**Certificates of Completion without Controls**

DOE is requesting certificates of completion without controls for the following 13 SWMUs and 3 AOCs within the Upper Sandia Canyon Aggregate Area:

- SWMU 03-002(c), Storage Area
- SWMU 03-009(i), Surface Disposal Site
- SWMU 03-012(b), Operational Release
- AOC 03-014(b2), Outfall Associated with Former Wastewater Treatment Plant
- SWMU 03-014(u), Holding Tank Associated with Former Wastewater Treatment Plant
- SWMU 03-021, Outfall from Building 3-170
- SWMU 03-029, Asphalt Batch Plant (Disposal Area)
- SWMU 03-045(f), Outfall from Building 3-223
- SWMU 03-045(g), Storm Drain
- AOC 03-047(g), Soil Contamination from Former Storage Area
- AOC 03-052(b), Storm Drainage
- SWMU 03-056(a), Oil Storage Facility

- SWMU 03-056(d), Drum Storage
- SWMU 60-002, Storage Area
- SWMU 60-006(a), Septic System
- SWMU 60-007(b), Operational Release

SWMUs 03-002(c), 03-009(i), 03-012(b), 03-014(u), 03-021, 03-029, 03-045(f), 03-045(g), 03-056(a), 03-056(d), 60-002, 60-006(a), and 60-007(b) and AOCs 03-014(b2), 03-047(g), and 03-052(b) were recommended for corrective action complete without controls in the SIR. The SIR concluded the nature and extent of contamination are defined or no further sampling is warranted at SWMUs 03-002(c), 03-009(i), 03-012(b), 03-014(u), 03-021, 03-029, 03-045(f), 03-045(g), 03-056(a), 03-056(d), 60-002, 60-006(a), and 60-007(b) and AOCs 03-014(b2), 03-047(g), and 03-052(b). In addition, the SIR concluded the above-mentioned SWMUs and AOCs pose no potential unacceptable risks or doses to human health under the construction worker, residential, and, as appropriate, industrial scenarios and pose no potential unacceptable risk to ecological receptors. Therefore, neither site controls nor additional future actions under the Consent Order are necessary at these 16 sites.

**Certificates of Completion with Controls**

DOE is requesting certificates of completion with controls for the following 11 SWMUs and 4 AOCs:

- SWMU 03-009(a), Surface Disposal Site
- SWMU 03-014(k), Sludge Drying Bed Associated with Former Wastewater Treatment Plant
- SWMU 03-014(l), Sludge Drying Bed Associated with Former Wastewater Treatment Plant
- SWMU 03-014(m), Sludge Drying Bed Associated with Former Wastewater Treatment Plant
- SWMU 03-014(n), Sludge Drying Bed Associated with Former Wastewater Treatment Plant
- SWMU 03-014(o), Sludge Drying Bed Associated with Former Wastewater Treatment Plant
- SWMU 03-015, Outfall
- SWMU 03-045(a), Outfall from Building 3-22
- AOC 03-051(c), Soil Contamination from Vacuum Pump Leaking
- SWMU 03-052(f), Outfall from Building 3-38
- AOC 03-053, Building 3-141 Basement Area and Floor Drains
- AOC 03-056(k), Container Storage Area
- SWMU 03-059, Storage Area
- AOC 60-004(f), Storage Area
- SWMU 61-002, Transformer Storage Area

The SIR concluded the nature and extent of contamination are defined or no further sampling is warranted at SWMUs 03-009(a), 03-014(k), 03-014(l), 03-014(m), 03-014(n), 03-014(o), 03-015, 03-045(a), 03-052(f), 03-059, and 61-002 and AOCs 03-051(c), 03-053, 03-056(k), and 60-004(f). In addition, the SIR concluded that the above-mentioned SWMUs and AOCs pose no potential unacceptable risks or doses to human health under the construction worker and, as appropriate, industrial scenarios and pose no potential unacceptable risk to ecological receptors. The sites do pose potential unacceptable human health

risk under the residential scenario. Therefore, site controls to prevent future residential land use are necessary at these 15 sites.

**NMED Comments on Sites with a Recommendation for Certificate of Completion without Controls**

The approval with modifications letter included comments related to the recommendation for corrective action complete without controls for SWMU 03-056(a) and AOCs 03-047(g) and 03-051(c). For SWMU 03-056(a), NMED indicated they did not concur that vertical extent of contamination for total petroleum hydrocarbons-diesel range organics was defined and that additional sampling should be performed or additional lines of evidence should be provided to illustrate vertical extent is defined. For AOCs 03-047(g) and 03-051(c), NMED indicated that additional data for polycyclic aromatic hydrocarbons (PAHs) were needed to evaluate residential risk, but that the sites would meet corrective action complete with controls in lieu of additional data collection.

**NMED Comments on Sites with a Recommendation for Certificate of Completion with Controls**

The approval with modifications letter included comments related to the recommendation for corrective action complete with controls for SWMUs 03-014(k), 03-014(l), 03-014(m), 03-014(n), 03-015, 03-045(a), 03-052(f), and 61-002 and AOC 03-053. For SWMUs 03-014(k), 03-014(l), 03-014(m), and 03-014(n), NMED requested collection of additional data to allow calculation of upper confidence limits (UCLs), additional information to demonstrate PAHs are not site related, and additional information on proposed alternative exposure parameters. For SWMUs 03-015 and 03-045(a) and AOC 03-053, NMED requested additional information on calculation of UCLs. For SWMU 03-052(f), NMED requested additional information on calculation of UCLs and proposed alternative exposure parameters and indicated additional sampling for vertical extent of PAHs was needed. For SWMU 61-002, NMED requested evaluation of risk associated with a contamination hot spot in addition to risk associated with the entire site.

**Response to NMED Comments**

The approval with modifications letter calls for NMED's comments to be addressed in a Phase II investigation report. DOE does not believe additional sampling is needed for any of the sites addressed by NMED's approval with modifications comments, and these sites would not need to be included in the Phase II investigation report. Therefore, DOE is addressing the comments for these sites in this certificate of completion request. This approach will allow NMED to review the comment responses in advance of DOE preparing the Phase II investigation work plan for other sites that require additional sampling. In the event NMED does not concur with the comment response for a site, the specific investigation scope for that site can be identified for inclusion in the Phase II investigation work plan. In the event NMED does concur with the comment response for a site, a certificate of completion for that site can be issued. Addressing the comments in this certificate of completion request, therefore, will improve the overall efficiency of the administrative process for site closure.

Enclosure 1 provides responses to NMED's comments in the approval-with-modifications letter. Based on the conclusions and recommendations in the approved SIR and the information provided in the enclosure, DOE requests certificates of completion for the 24 SWMUs and 7 AOCs identified above.

If you have any questions, please contact Kent Rich at (505) 660-6570 (kent.rich@em-la.doe.gov) or Cheryl Rodriguez at (505) 414-0450 (cheryl.rodriguez@em.doe.gov).

Sincerely,

ARTURO DURAN

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Date: 2022.03.14 07:59:14 -06'00'

Arturo Q. Duran
Compliance and Permitting Manager
U.S. Department of Energy
Environmental Management
Los Alamos Field Office

Enclosure(s):

1. Two hard copies with electronic files – Response to New Mexico Environment Department Approval with Modifications Letter for Supplemental Investigation Report for Upper Sandia Canyon Aggregate Area, Revision 1, Dated January 24, 2017 (EM2021-0643)

cc (letter and enclosure[s] emailed):
Laurie King, EPA Region 6, Dallas, TX
Chris Catechis NMED-DOE-RPD
Steve Yanicak, NMED-DOE OB
Jennifer Payne, LANL
Stephen Hoffman, NA-LA
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**Response to the New Mexico Environment Department Approval with Modifications Letter for Supplemental Investigation Report for Upper Sandia Canyon Aggregate Area, Revision 1, Dated January 24, 2017**

## INTRODUCTION

The New Mexico Environment Department (NMED) disapproved the "Supplemental Investigation Report for Upper Sandia Canyon Aggregate Area" on April 14, 2015 (LANL 2013, 249068; NMED 2015, 600371). The supplemental investigation report was revised to address the disapproval comments, and NMED approved, with modifications, the "Supplemental Investigation Report for Upper Sandia Canyon Aggregate Area, Revision 1" (hereafter the SIR) on January 24, 2017 (LANL 2015, 600912; NMED 2017, 602127). NMED's "Approval with Modifications Supplemental Investigation Report for Upper Sandia Canyon Aggregate Area, Revision 1" (NMED 2017, 602127) referred to responses to 10 disapproval comments (General Comments 1 and 2 and Specific Comments 8, 12, 15, and 19 through 23) from the April 14, 2015, disapproval (NMED 2015, 600371). These comments referenced 12 solid waste management units (SWMUs) and areas of concern (AOCs) that were recommended for corrective action complete in the SIR. Table 1 identifies the SWMUs and AOCs referenced by each NMED approval with modifications comment. Specific responses to the approval with modifications comments are provided below. To facilitate review of this response, NMED's comments are included verbatim. The U.S. Department of Energy (DOE) Environmental Management Los Alamos Field Office responses follow each NMED comment.

## GENERAL COMMENTS

### NMED Comment

1. *The Permittees provide additional discussion and lines of evidence supporting the assertion that polycyclic aromatic hydrocarbons (PAH) exceedances found at some solid waste management units (SWMUs) and areas of concern (AOCs) [SWMUs 03-014(k,l,m,n), 03-045(a), 03-015, 03-052(f) and AOCs 03-047(g), 03-051(c), 03-053, 61-002] are not associated with site activities.*

    - ***SWMUs 03-045(a), 03-015, and AOC 03-053:*** *The first paragraph of the Response to General Comment 1 indicates that the Report does not dismiss PAHs at these sites as being not site related and further provides a discussion of uncertainties associated with the risk estimates (in excess of the NMED target risk level of $1x10^{-5}$) at SWMUs 03-045(a), 03-015 and AOC 03-053 that focuses on the "overestimation" of risk because the maximum detected concentration was used as the exposure point concentration (EPC). Section 9 .2.1 of the report (first paragraph page 246) states that PAHs are not related to site operations but result from runoff. The text was not clear that this statement only pertains to SWMU 0-052(f) and not all the sites addressed in that paragraph. For SWMUs 03-045(a), 03-015 and AOC 03-053, it is confirmed that PAHs were retained as COPCs.*

      *Risks at these sites were exceeded for the residential scenario as well as for the industrial worker. However, it is asserted that risks to the industrial worker are acceptable if the upper confidence level (UCL) is used as the EPC. Reviewing the data on Table I-2.3-37 (SWMU 03-045(a)), there are only three to four sample results for PAHs with detections ranging from one to two. This does not represent sufficient data to determine a UCL. ProUCL User's Guide 5.1 allows that statistics (e.g., UCL95) based upon only a few detected values (e.g., < 4) cannot be considered reliable enough to estimate EPCs which can have a potential impact on*

*human health and the environment. When the number of detected values is small, it is preferable to use ad hoc methods rather than using statistical methods to compute EPCs and other upper limits. Specifically, for data sets consisting of < 4 detects and for small data sets (e.g., size < 10) with low detection frequency (e.g.,< 10% ), the project team and the decision makers should decide, on a site-specific basis, how to estimate the average exposure (EPC) for the constituent and area under consideration. For data sets with low detection frequencies, other measures such as the median or mode represent better estimates (with lesser uncertainty) of the population measure of central tendency. Further, the Report does not provide any documentation (tables, input/output) as to how the UCL was determined. Based on the information provided, the determination and use of a UCL95 as the EPC has not been justified for SWMU 03-045(a).*

*For SWMU 03-015 and AOC 03-053 (Table I-2.3-38), six sample results are available with detections ranging from three to five. For these sites, calculation of a UCL may be acceptable; however, the Report does not provide documentation (input/output file) on how the UCL was derived. Further, and as noted above, due to the high number of non-detects, use of the median or mode may be a better estimate of the EPC.*

- ***AOCs 03-047(g) and 03-051(c):*** *The second paragraph of the Permittees Response to General Comment 1 indicates that the "unacceptable risk" at AOCs 03-047(g) and 03-051(c) under the residential scenario is based on the use of the maximum detected concentrations of PAHs. NMED does not support the use of the maximum detected concentration as the EPC as the primary line of evidence for eliminating the exceedance from further consideration in the risk assessment. Additional PAH data must be collected and a statistically derived EPC used to refine risk estimates. Risks using the maximum detected concentration for the industrial/construction worker were within acceptable risk levels (it is noted PAHs were not a COPC for the industrial scenario at 03-051(c)). In lieu of additional data collection, it is agreed that AOCs 03-047(g) and 03-051(c) meet corrective action complete with controls, but not complete without controls.*

- ***SWMUs 03-014(k,l,m,n):*** *As indicated above NMED does not support use of the maximum detected concentration as the EPC as the primary line of evidence for eliminating the exceedance from further consideration in the risk assessment. Additional PAH data must be collected and a statistically derived EPC used to refine risk. The photographs of the SWMUs and the decaying berms provided by the Permittees as part of Attachment 3 of the Response were incorporated into Appendix I as figures. Discussion of the photographs was added to the uncertainty discussion for SWMU 03-014(k,l,m,n) and the discussion references Figure I-4.4.2 to illustrate sludge beds and decaying berms. The photographs show asphalt in the sludge beds but also indicate that the berms are integral to the design of these units (i.e., the decaying asphalt berms would not be present if it was not for the presence of the sludge beds). Thus it appears that the PAH contamination at SWMUs 03-014(k,l,m,n) is site related and is due to the design and operation of these units. The information presented on PAHs at SWMUs 03-014(k,l,m,n) in the main text and Appendix I of the revised SIR and in the Response must be reviewed and Phase II IR must indicate that the exceedances are driven by PAHs associated with the design and operation of the sludge beds. Alternatively, the Permittees must provide multiple lines of evidence demonstrating that the decaying asphalt berms are not associated with the design and operation of SWMUs 03-014(k,l,m,n). It is also noted that the PAH concentrations are orders of magnitude above SSLs; the occurrences of PAHs at such high levels is not typical on sites where the PAHs are a result of runoff from nearby asphalt surfaces.*

- ***SWMU 03-052(f):*** *The discussion at the bottom of page 3 and top of page 4 in the Response indicates that the "unacceptable risk" at this site under the industrial scenario is based on the use of the maximum detected concentrations of PAHs. As indicated above, NMED does not support the use of the maximum detected concentration as the EPC as the primary line of evidence for eliminating the exceedance from further consideration in the risk assessment. The last sentence of the discussion at the top of page 4 states that 95% UCLs were calculated for SWMU 03-052(f) for use as EPCs although the tools and/or methods used to derive the 95% UCLs are not identified or discussed. In addition, the discussion does not indicate why 95% UCLs were not used as EPCs in the initial risk estimates. The Phase II IR must identify and discuss the approach followed in calculating the 95% UCLs. If ProUCL or another statistical software package was used, the text must reference the location of the input and output files for the computer runs.*

  *In addition, the Response to General Comment 1 addresses uncertainties associated with the exposure time and exposure frequency used to estimate risk at SWMUs 03-014(k,l,m,n) and 03-052(f). The discussion proposes alternate values for exposure time (8 hours per day), and exposure frequency (12 and 24 hours per day) to reflect monthly and/or bimonthly maintenance of these outdoor sites. However, references for these values have not been provided. As such, deviating from the default exposure assumptions outlined in the NMED Soil Screening Guidance, SSG, (and default EPA values) has not been justified and has not been approved.*

**DOE Response**

1. **SWMU 03-045(a)**

   Carcinogenic risk for SWMU 03-045(a) for the industrial scenario was evaluated using maximum-detected concentrations as exposure point concentrations (EPCs) because the number of samples collected (four) was less than the minimum recommended number for calculating upper confidence limits (UCLs) (eight). The resulting risk was approximately $2 \times 10^{-5}$, which exceeded NMED's target of $1 \times 10^{-5}$. The SIR concluded use of maximum concentrations overestimated risk, and UCLs for those chemicals of potential concern (COPCs) having more than one detection were calculated. The risk using UCLs as EPCs was equivalent to NMED's target risk level.

   NMED's comment indicates that when the number of detected values is small, it is preferable to use ad hoc methods rather than using statistical methods to compute EPCs and other upper limits. For data sets with small sample size and low detection frequencies, other measures such as the median or mode represent better estimates (with lesser uncertainty) of the population measure of central tendency. Further, NMED notes the SIR did not provide any documentation (tables, input/output) as to how the UCLs were determined.

   Four samples in the depth interval of 0.0 to 1.0 ft below ground surface (bgs) were collected at SWMU 03-045(a). The unacceptable risk is primarily from polycyclic aromatic hydrocarbons (PAHs) and the PAH concentrations detected in one sample were substantially higher (i.e., at least an order of magnitude) than in the other samples. Therefore, the median would likely be a more representative EPC than the maximum concentration. Table 2 presents the industrial carcinogenic risk using the medians of results (i.e., detected values and detection limits) as EPCs. The total excess cancer risk using medians is $1 \times 10^{-6}$ and below the NMED target. This result indicates use of maximum-detected concentrations overestimates risk and SWMU 03-045(a) does not pose an unacceptable carcinogenic risk under the industrial scenario. SWMU 03-045(a) is, therefore, appropriate for corrective action complete with controls.

**SWMU 03-015 and AOC 03-053**

In the SIR, carcinogenic risk for SWMU 03-015 and AOC 03-053 for the industrial scenario was evaluated using maximum detected concentrations as EPCs because the number of samples collected (six) was less than the minimum recommended number for calculating UCLs (eight). The resulting risk was approximately $2 \times 10^{-5}$, which exceeded NMED's target of $1 \times 10^{-5}$. The SIR concluded use of maximum concentrations overestimated risk, and UCLs for those COPCs having more than one detection were calculated. The risk using UCLs as EPCs was equivalent to NMED's target risk level.

NMED's comment indicates that calculation of a UCL based on six samples with three to five detections may be acceptable, but the SIR did not provide documentation (e.g., input/output files) on how the UCLs were derived. Further, NMED notes that because of the high number of nondetections, use of the median or mode may be a better estimate of the EPC.

Table 3 presents the industrial carcinogenic risk using medians of results (i.e., detected values and detection limits) as EPCs rather than maximum detected concentrations. The total excess cancer risk using medians is $1 \times 10^{-6}$ and below the NMED target. These results indicate use of maximum detected concentrations overestimates risk and SWMU 03-015 and AOC 03-053 do not pose an unacceptable carcinogenic risk under the industrial scenario. SWMU 03-015 and AOC 03-053 are, therefore, appropriate for corrective action complete with controls.

**AOC 03-047(g)**

In the SIR, carcinogenic risk for AOC 03-047(g) for the residential scenario was evaluated using maximum detected concentrations as EPCs because the number of detected results (one to three) was less than the minimum recommended number for calculating UCLs (five). The resulting risk was approximately $2 \times 10^{-5}$, which exceeded NMED's target of $1 \times 10^{-5}$. The potentially unacceptable risk was primarily due to four PAHs [benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and indeno(1,2,3-cd)pyrene]. The SIR presented additional lines of evidence indicating these PAHs were likely not associated with the site but were present from asphalt paving. The residential risk without PAHs was $3 \times 10^{-6}$ and below NMED's target risk level.

NMED's comment notes NMED does not support the use of the maximum detected concentration as the EPC as the primary line of evidence for eliminating the exceedance from further consideration in the risk assessment. The comment indicated additional PAH data must be collected and a statistically derived EPC used to refine risk estimates. In lieu of additional data collection, however, NMED indicates the site meets corrective action complete with controls.

NMED's comments related to other sites where maximum concentrations were used as EPCs rather than UCLs because of small sample sizes or infrequent detections [e.g., SWMU 03-045(a)] indicate that other measures, such as medians or modes, might be used as EPCs. For the four PAHs contributing most to risk, the PAHs were detected in only one sample or detected in two samples with the higher detected concentration 4 to 14 times greater than the lower detected concentration. Therefore, the median would likely be a more representative EPC than the maximum concentration. Table 4 presents the residential carcinogenic risk using the medians of results (i.e., detected values and detection limits) as EPCs. The total excess cancer risk using medians is $4 \times 10^{-6}$, which is below the NMED target risk level. This result, combined with the lines of evidence indicating PAHs are not site related, indicates use of maximum detected concentrations of PAHs overestimates risk and AOC 03-047(g) does not pose an unacceptable carcinogenic risk under the residential scenario. AOC 03-047(g) is, therefore, appropriate for corrective action complete without controls.

**AOC 03-051(c)**

Carcinogenic risk for AOC 03-051(c) for the residential scenario was evaluated using maximum detected concentrations as EPCs because the number of samples collected (four) was less than the minimum recommended number for calculating UCLs (eight). The resulting risk was approximately $1 \times 10^{-4}$, which exceeded NMED's target of $1 \times 10^{-5}$. The potentially unacceptable risk was primarily due to five PAHs [benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, and indeno(1,2,3 cd)pyrene]. The SIR presented additional lines of evidence indicating these PAHs were likely not associated with the site but were present from asphalt paving. The residential risk without PAHs was $5 \times 10^{-7}$ and below NMEDs target risk level.

NMED's comment notes NMED does not support the use of the maximum detected concentration as the EPC as the primary line of evidence for eliminating the exceedance from further consideration in the risk assessment. The comment indicates additional PAH data must be collected and a statistically derived EPC used to refine risk estimates. In lieu of additional data collection, however, NMED indicates the site meets conditions for corrective action complete with controls.

Because there were only four samples and results from two samples are similar to or above residential soil screening levels (SSLs), the results are likely indicative of potential unacceptable risk under the residential scenario. The current and reasonably foreseeable future land use for this site is industrial rather than residential. As the site does not pose an unacceptable risk under the industrial and construction worker scenarios, AOC 03-051(c) is appropriate for corrective action complete with controls. Therefore, a certificate of completion with controls is now being requested, rather than a certificate of completion without controls as recommended in the SIR.

**SWMUs 03-014(k,l,m,n)**

SWMUs 03-014(k), 03-014(l), 03-014(m), and 03-014(n) are former sanitary wastewater sludge drying beds. The carcinogenic risk screening for SWMUs 03-014(k), 03-014(l), 03-014(m), and 03-014(n) for the industrial scenario showed potential unacceptable risk due primarily to three PAHs [benzo(a)anthracene, benzo(a)pyrene and dibenz(a,h)anthracene]. Carcinogenic risk for these three PAHs was evaluated using the maximum detected concentrations as EPCs because the number of detected results (one to four) was less than the minimum recommended number for calculating UCLs (five). The resulting risk was approximately $5 \times 10^{-5}$, which exceeded NMED's target of $1 \times 10^{-5}$. The SIR concluded use of maximum concentrations overestimated risk. The maximum concentration of each PAH was detected in the same sample and was at least 2 orders of magnitude greater than the next highest concentration or was the only detected value. Additionally, the SIR provided lines of evidence to demonstrate that the elevated PAH results were likely related to asphalt from decaying asphalt-lined drying bed berms rather than associated with waste managed at the site and were, therefore, not site related. The carcinogenic risk without PAHs was $4 \times 10^{-6}$ and below NMED's target risk level.

The SIR also noted that there is currently little to no exposure to a worker or any other receptor at SWMUs 03-014(k), 03-014(l), 03-014(m), and 03-014(n) because the area is not used for operational activities. The drying beds are unoccupied and the area is not used for any Los Alamos National Laboratory (LANL) activity other than perhaps temporary storage of materials or equipment. Therefore, evaluating potential risk using the generic industrial exposure parameters in NMED's risk assessment guidance (i.e., 8 hr/day, 225 days/yr, 25 yr) is not representative of any hypothetical or actual exposure at these sites (NMED 2019, 700550). The activity patterns that might be somewhat representative (other than no exposure) include groundskeeping and/or site maintenance/cleanup and occasional site visits if the drying bed area is used to store equipment or materials. These types

of activities entail much less exposure time and frequency than is currently used for the industrial scenario but may occur over a similar exposure duration. Therefore, the SIR indicated that an exposure frequency of 12 or 24 days/yr (1 day/month or 2 days/month), an exposure time of 8 hr/day, and an exposure duration of 25 yr would be more representative for actual exposure at these sites.

NMED's comment notes NMED does not support use of the maximum detected concentration as the EPC as the primary line of evidence for eliminating the exceedance from further consideration in the risk assessment. NMED indicates additional PAH data must be collected and statistically derived EPCs used to refine risk. NMED also indicates that because the berms were integral to the operation of the drying beds, PAHs from asphalt associated with the berms would be site related. NMED also notes the maximum PAH concentrations are orders of magnitude above SSLs and occurrences of such high levels are not typical on sites where the PAHs are a result of runoff from nearby asphalt surfaces. Finally, NMED's comment indicates references for the proposed alternate exposure frequencies (12 or 24 days/yr rather than 225 days/yr) used to adjust SSLs for site-specific exposure were not provided.

NMED's comments related to other sites where maximum concentrations were used as EPCs rather than UCLs because of small sample sizes or infrequent detections [e.g., SWMU 03-045(a)] indicate that other measures, such as medians or modes might be used as EPCs. Table 5 presents the industrial carcinogenic risk for SWMUs 03-014(k), 03-014(l), 03-014(m), and 03-014(n) using the medians of results (i.e., detected values and detection limits) as EPCs for those COPCs having too few detections to calculate UCLs. The total excess cancer risk using medians is $1 \times 10^{-5}$, which is equivalent to NMED's target risk level. These results indicate risk calculated using maximum concentrations for EPCs is overestimated based on elevated concentrations in just one sample, and SWMUs 03-014(k), 03-014(l), 03-014(m), and 03-014(n) do not pose an unacceptable carcinogenic risk under the industrial scenario. This evaluation includes PAHs as COPCs and is based on default exposure parameters. Therefore, it is not necessary to evaluate whether PAHs from the berms are site related or to provide references for alternate exposure parameters. SWMUs 03-014(k,l,m,n) are appropriate for corrective action complete with controls.

**NMED Comment**

2. *The Permittees indicate that the criteria noted in Comment 2 (Henry's Law Constant greater than IE-5 atm-m3/mole and an atomic mass of less than 200 g/mole) were used to identify volatile organic compounds (VOCs) to be included in the evaluation of the vapor intrusion pathway at the sites addressed in the SIR. Risks via the vapor intrusion (VI) pathway were qualitatively estimated for the residential scenario for some of the sites. Because only soil data are available, the Johnson & Ettinger- based advanced soil model (J&E Soil Model) was used to estimate risk-based soil concentrations for VOCs at the sites. While NMED no longer supports the application of the J&E Soil Model as the primary line of evidence for eliminating or dismissing the vapor intrusion pathway as a potential exposure source, the J&E Soil Model results were augmented to include multiple lines of evidence as described in Section 2.5.2 of the SSG. However, the resulting risks from the vapor intrusion pathway were not included in the overall site risks in accordance with Section 5.0 of the NMED SSG. It is noted that addition of the risk from the J&E model (Tables 1-4.3-1 through H-4.3-29) would not change the overall risk conclusions. However, in future assessments, if risks are estimated for the vapor intrusion pathway, the results must be included with overall risk (added to risks via comparison to SSLs). It is also recommended that the bulk soil J&E model not be used in future and that lines of evidence approach be applied as noted in the SSG.*

**DOE Response**

2. No response required.

**SPECIFIC COMMENTS**

**NMED Comment**

***8. Section 6.5.4.4, Nature and Extent of Contamination, page 46:***

*As indicated in the Response, the text in Section 6.5.4.4 was revised to state: "Concentrations did not change markedly across the site." NMED does not agree with the general characterization that concentrations did not change markedly. The Response also states that the difference in copper concentrations across the site was "only 9.5 mg/kg." While this difference of less than 10 mg/kg is not presented and/or discussed in Section 6.5.4.4, it represents a change of over 1300% between the minimum and maximum copper concentrations at the site. The Permittees also cite the difference between minimum and maximum background concentrations of copper for the site. The percent difference is even larger than for the site copper concentrations. Thus, it appears that the variation in copper concentrations over the site underscore the need to use statistically based estimates of pertinent concentrations when making site-based decisions. The Phase II Investigation Report (IR) must eliminate characterizations such as: "Concentrations did not change markedly across the site" and replace them with statements such as: "Concentrations varied across the site from a minimum of 0.696 mg/kg to a maximum of 10.2 mg/kg."*

**DOE Response**

8. No response required.

**NMED Comment**

***12. Section 6.7.4.4, Nature and Extent of Contamination, page 65:***

*The Response provides information on the numerical magnitude of the difference between the sample results at 0-1 foot below ground surface (bgs) and 1-2 feet bgs for eight PAHs. In addition, the Response proposes alternate values for exposure time and exposure frequency for the industrial scenario. The Response does not address the risk exceedance for the residential scenario.*

*As noted in NMED Comment, benzo(a)anthracene, benzo(a)pyrene, and benzo(b)fluoranthene were detected above the NMED residential SSLs at all depths at sample location 03-608219. It does not appear that any samples were collected below the 1-2 feet bgs depth interval at any sampling locations associated with SWMU 03-052(f). Because PAH concentrations at location 03-608219 exceed their residential SSLs at the maximum sampled depth and no samples have been collected at SWMU 03-052(f) at depths greater than 2 feet bgs, it appears that the vertical extent of contamination is not defined at the site and additional sampling is required to define the vertical extent of contamination at SWMU 03-052(f).*

**DOE Response**

12. In the SIR, carcinogenic risk for SWMU 03-052(f) for the industrial scenario was evaluated using maximum detected concentrations as EPCs because the number of samples collected (seven) was less than the minimum recommended number for calculating UCLs (eight). The resulting risk was approximately $1 \times 10^{-4}$, which exceeded NMED's target of $1 \times 10^{-5}$. The SIR concluded use of maximum concentrations overestimated risk, and UCLs for carcinogenic COPCs were calculated. Additionally, SSLs were adjusted to account for more realistic exposure frequency. The risk using UCLs as EPCs, coupled with SSLs adjusted for site-specific exposure frequency, was equivalent to NMED's target risk level.

    NMED's General Comment 1 notes the use of UCLs as EPCs but indicates the tools and/or methods used to derive the 95% UCLs are not identified or discussed in the SIR. The comment also notes the use of SSLs adjusted for site-specific exposure periods (12 or 24 days/yr rather than 225 days/yr) but indicates references for these alternate exposure periods were not provided.

    NMED's comments related to other sites where maximum concentrations were used as EPCs rather than UCLs because of small sample sizes or infrequent detections [e.g., SWMU 03-045(a)] indicate that other measures, such as medians or modes might be used as EPCs. At SWMU 03-052(f), the concentration range for each PAH generally covered 2 or 3 orders of magnitude. The maximum concentrations were all from the same sample and were approximately an order of magnitude greater than the next highest concentration. Thus, use of maximum concentrations as EPCs is not representative of sitewide exposure. Table 6 presents the carcinogenic industrial risk using the medians of detected values and detection limits as EPCs. The total excess cancer risk using medians is $1 \times 10^{-5}$, which is equivalent to the NMED target. This result indicates use of maximum detected concentrations of PAHs overestimates risk and SWMU 03-052(f) does not pose an unacceptable carcinogenic risk under the industrial scenario. This evaluation is based on default exposure parameters. Therefore, it is not necessary to provide references for alternate exposure parameters.

    The SIR concluded that although concentrations of PAHs increased with depth at one location, further sampling for vertical extent of PAHs was not warranted. NMED's comment indicates that because PAH concentrations at location 03-608219 exceed their residential SSLs at the maximum sampled depth and no samples have been collected at depths greater than 2.0 ft bgs, it appears that the vertical extent of contamination is not defined at the site and additional sampling is required to define the vertical extent of contamination.

    Samples were collected at depth intervals of 0.0 to 1.0 ft bgs and 1.0 to 2.0 ft bgs at 7 locations. A total of 17 PAHs were detected in 1 to 13 samples at 1 to 7 locations. As noted in the SIR, PAH concentrations decreased with depth at all locations except location 03-608219. A total of 15 PAHs were detected at location 03-608219 and residential SSLs for 12 of these PAHs were greater than the maximum detected concentration at this location. The residential SSLs for these 12 PAHs ranged from approximately 1.2 times to 12,600 times the maximum concentrations at location 03-608219. The maximum concentrations of the remaining 3 PAHs [benzo(a)anthracene, benzo(a)pyrene, and benzo(b)fluoranthene] detected at location 03-608219 exceeded the residential SSLs by approximately 1.7 times, 17 times, and 2.2 times, respectively. As noted in the SIR, the concentration increases with depth for benzo(a)anthracene, benzo(a)pyrene, and benzo(b)fluoranthene at location 03-608219 were 0.62 mg/kg (from 1.93 mg/kg to 2.55 mg/kg), 0.52 mg/kg (from 1.98 mg/kg to 2.5 mg/kg), and 0.59 mg/kg (from 2.6 mg/kg to 3.19 mg/kg), respectively. These trends do not suggest a substantial continued increase with depth below 2.0 ft bgs.

Although vertical extent of PAHs is not defined at location 03-608219, further sampling for vertical extent would not be warranted unless the results of the additional sampling would likely affect the recommendations for corrective actions at the site. Concentrations of benzo(a)anthracene, benzo(a)pyrene, and benzo(b)fluoranthene exceed residential SSLs at location 03-608219, but residential SSLs for these COPCs are also exceeded in samples collected at three or four other locations where concentrations decrease with depth, and the concentrations detected at location 03-608219 are approximately 8 times less than the maximum concentrations detected at the site. Thus, existing data indicate the site poses an unacceptable risk for the residential scenario and additional sampling at location 03-608219 would not affect this conclusion. The current and foreseeable future land use at SWMU 03-052(f) is industrial. Collection of additional samples at depths below 1.0 ft bgs would not change conclusions regarding risk under the industrial scenario. Therefore, additional sampling for vertical extent of PAHs at location 03-608219 is not warranted, and SWMU 03-052(f) is appropriate for corrective action complete with controls.

**NMED Comment**

***15. Section 6.20.4.4, Extent of Contamination, page 165:***

*The Response provides information that no concentrations of TPH-DRO at SWMU 03-056(a) exceed the applicable screening criteria. The Response does not address the potential for TPH-DRO concentrations at depths greater than 2 feet bgs to be higher than the 288 mg/kg obtained at location 03-608347 for the 1-2 feet bgs depth interval. Samples were only collected from two depths, and concentrations were higher in samples collected from greater depth. In addition, the statement in the Response incorrectly states that TPH-DRO concentrations were greater than the corresponding screening value when, in fact, they are not. Either additional samples must be collected or additional lines of evidence must be provided to illustrate the vertical extent of TPH-DRO contamination at SWMU 03-056(a) has been defined.*

**DOE Response**

15. SWMU 03-056(a) is an inactive, used-oil accumulation facility. Samples having detectable total petroleum hydrocarbons-diesel range organics (TPH-DRO) were collected at four locations at depths of 0.0 to 1.0 ft bgs and 1.0 to 2.0 ft bgs. Concentrations of TPH-DRO increased with depth at three locations (104 mg/kg to 288 mg/kg at location 03-608347, 8.87 mg/kg to 10.1 mg/kg at location 03-608348, and not detectable to 9.35 mg/kg at location 03-608350). NMED's Specific Comment 15 indicates that additional lines of evidence should be provided to illustrate vertical extent is defined; otherwise, additional samples should be collected.

    As noted in NMED's current risk assessment guidance, the TPH SSLs for petroleum products are based on assumed compositions of aromatic and aliphatic hydrocarbons in the products (NMED 2019, 700550). NMED's risk assessment guidance also indicates that site cleanup decisions cannot be based solely on the results of TPH sampling. Rather, the TPH SSLs must be used in conjunction with the SSLs for individual petroleum-related contaminants listed in the guidance. That is, site-specific data on petroleum-related contaminants provide an indication of the actual rather than assumed composition of the petroleum products. The only individual petroleum-related contaminants detected at SWMU 03-056(a) were anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, fluoranthene, phenanthrene, and pyrene. Fluoranthene was detected in three samples, pyrene was detected in four samples, and the other constituents were detected in one sample. Detected concentrations ranged from 0.0111 mg/kg to 0.0398 mg/kg and the residential SSLs ranged from approximately 11 to 1,550,000 times the maximum concentrations.

Concentrations of petroleum-related contaminants decrease with depth at all locations and vertical extent is defined. Based on the detected concentrations of petroleum-related contaminants, TPH-DRO does not pose a potential risk and further sampling for vertical extent of TPH-DRO is not warranted. SWMU 03-056(a) is appropriate for corrective action complete without controls.

**NMED Comment**

***19. Section 8.3.5, Summary of Health Risk Screening, page 233:***

*NMED's Notice of Approval Letter issued on November 9, 2010 for the Investigation Report for Upper Sandia Canyon Aggregate Area states that the investigations conducted in 2005 and 2006 clearly identified the limited source area of petroleum hydrocarbons in the northwest area. The Permittees opted not to remediate, and instead use an industrial land use scenario as a justification not to conduct additional cleanup. Contamination was detected in samples collected from depth to 23-25 ft below ground surface (bgs). The Permittees excavated to four ft bgs and backfilled the excavated area with clean backfill material. Aroclor-1254 was detected at 11 mg/kg and 2.4 mg/kg in samples collected from a depth of 1.5-2.0 ft bgs (locations 61-24316 and 61-24314, respectively). To clarify the comment as stated earlier in the NOD, use of 95% upper confidence level of the mean to calculate exposure point concentrations (EPCs) is not appropriate as there is a clear hot spot. The hot spot is located within an area of potential exposure. In such cases, an EPC specific to the hot spot must be evaluated to determine whether removals are needed. Inclusion of data associated with the hot spot in the overall site EPC only serves to minimize the potential risk due to the hot spot and does not allow for adequate evaluation of potential risks. Source areas were identified, were limited in size, were accessible, but inexplicably not removed. The residual concentrations at location 61-24352 (10-10.5 ft) for naphthalene, trimethylbenzene[1,2,4-], xylene[total], TPH-DRO and TPH-GRO were1300 mg/kg, 610 mg/kg, 870 mg/kg, 16,000 mg/kg, and 8500 mg/kg, respectively. NMED had previously recommended removal of the hotspot. However, the Permittees state that further remediation of hotspot is not warranted and have recommended corrective action complete with controls for SWMU 61-002. If the current land use changes, the Permittees will likely be required to evaluate the vapor intrusion pathway.*

*In the next to last paragraph of the Response, the Permittees state that the NMED's November 9, 2010 letter indicated that use of 95% UCLs as EPCs was inappropriate when evaluating risks. Since that time, the 2012 and 2014 versions of NMED's SSG have provided recommended approaches for determining 95% UCLs suitable for use as EPCs when evaluating risk. However, as stated above, the intent of the use of the 95% UCL in this case was to average away the contamination associated with the hot spot by not specially evaluating potential risks within the hotspot. The risk and hazard under the residential scenario must be reevaluated using 95% UCLs calculated for both the hot spot and the rest of the site excluding the data associated with the hot spot. Based on the results, conclusions and recommendations for SWMU 61-002 must be reevaluated and presented in the Phase II IR. The reevaluated risk(s) must also be presented as a line of evidence supporting the revised conclusions and recommendations regarding SWMU 61-002.*

**DOE Response**

19. SWMU 61-002 is the former location of an electrical equipment storage area in the western portion of TA-61 on the south side of East Jemez Road, east of the former radio repair shop (former building 61-23). During the 2005 investigation and remediation of residual polychlorinated biphenyl (PCB) contamination associated with SWMU 61-002, petroleum hydrocarbon contamination was discovered in the subsurface of the northwestern portion of the SWMU. The source of the subsurface

petroleum hydrocarbon contamination is not known, but it may have been associated with the storage of petroleum products. Two underground product lines and a total of 424 $yd^3$ of soil were removed in August 2005 during an accelerated corrective action (ACA) (LANL 2005, 091150).

Although a hot spot of residual petroleum contamination remained in place after the ACA, analytical data collected in 2006 confirmed that the residual petroleum hydrocarbon contamination is limited to a small subsurface area at concentrations that do not pose an unacceptable risk to site workers or ecological receptors (LANL 2007, 100722). As done for other sites having a sufficient number of samples, risk was evaluated using UCLs as EPCs when there was a sufficient number of detections. NMED's comment states the intent of using of 95% UCLs for evaluating risk at this site was to average away the contamination associated with the petroleum hot spot by not specifically evaluating potential risks within the hot spot. The comment further indicates the risk and hazard under the residential scenario must be reevaluated using 95% UCLs calculated for both the hot spot and the rest of the site excluding the data associated with the hot spot.

In accordance with NMED's guidance, residential risk was evaluated using COPC data from samples collected within the interval of 0.0 to 10.0 ft bgs. As shown in Appendix I, Table I-4.2-302, of the revised SIR, 97% of the residential carcinogenic risk was due to five PAHs [benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, indeno(1,2,3-cd)pyrene, and naphthalene] (LANL 2015, 600912). As shown in Appendix I, Table I 2.3-84, of the revised SIR, the EPCs for the five PAHs driving residential carcinogenic risk are all maximum detected concentrations because of the low number of detected concentrations (two or three detections each) in the depth interval of 0.0 to 10.0 ft bgs (LANL 2015, 600912). Therefore, the potential residential carcinogenic risk for the site is not affected by use of 95% UCLs, because UCLs were not used as EPCs for the COPCs driving risk. All detections of benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and indeno(1,2,3-cd)pyrene within the depth interval of 0.0 to 10.0 ft bgs were outside the hot spot area and the risk due to these COPCs is not representative of the hot spot. The maximum concentration of naphthalene was detected within the hot spot, and the risk for naphthalene is representative of the hot spot area because the maximum concentration was used as the EPC. Because benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and indeno(1,2,3-cd)pyrene were not detected in the hot spot area in the depth interval of 0.0 to 10.0 ft bgs, the risk for the hot spot area can be estimated as the sitewide risk ($5 \times 10^{-5}$) minus the risk due to benzo(a)anthracene ($3.99 \times 10^{-6}$), benzo(a)pyrene ($3.15 \times 10^{-5}$), benzo(b)fluoranthene ($2.64 \times 10^{-6}$), and indeno(1,2,3-cd)pyrene ($2.50 \times 10^{-6}$). The estimated residential carcinogenic risk for the hot spot area is approximately $3 \times 10^{-6}$, and no additional cleanup of the hot spot is warranted based on carcinogenic risk. The maximum concentrations of petroleum-related contaminants within the hot spot area are from samples collected below 10.0 ft bgs and do not contribute to residential risk.

As shown in in Appendix I, Table I-4.2-303, of the revised SIR, 97% of the residential hazard index (HI) (exclusive of lead, which should not be included in the HI) is due to Aroclor-1254; 2-methylnaphthalene; 1,2,4-trimethylbenzene; 1,3,5-trimethylbenzene; and 1,3-xylene+1,4-xylene (LANL 2015, 600912). As shown in Appendix I, Table I 2.3-84, of the revised SIR, the EPCs for Aroclor-1254 and 1,2,4-trimethylbenzene are 95% UCLs and the EPCs for 2-methylnaphthalene; 1,3,5-trimethylbenzene; and xylenes are maximum detected concentrations (LANL 2015, 600912). The maximum detected concentration of Aroclor-1254 (11 mg/kg) is outside the hot spot area in the area where PCBs were previously remediated. All detections of Aroclor-1254 within the depth interval of 0.0 to 10.0 ft bgs were from outside the hot spot area, and the residential hazard quotient (HQ) for the hot spot would be 0 compared with a sitewide HQ of 0.5. There were five detections of 1,2,4-trimethylbenzene within the depth interval of 0.0 to 10.0 ft bgs, with the four highest concentrations (3.2 mg/kg to 42 mg/kg) being within the hot spot area and one detection (0.0003 mg/kg) outside the hot spot area. Because there are too few detections within the hot spot

area to calculate a 95% UCL, the 1,2,4-trimethylbenzene EPC for the hot spot area would be the maximum detected concentration of 42 mg/kg. This EPC would result in a residential HQ for the hot spot of 0.68, compared with the UCL-based, sitewide HQ of 0.0387. The maximum concentrations of 2-methylnaphthalene; 1,3,5-trimethylbenzene; and 1,3-xylene+1,4-xylene were detected in samples collected within the hot spot area and the sitewide residential HQs for these COPCs are representative of the hot spot. The residential HI for the hot spot area can then be estimated as the sitewide HI (0.8), minus the HQs for lead (0.0343) and Aroclor-1254 (0.503), plus the HQ for 1,2,4-trimethylbenzene adjusted from 0.0378 to 0.68. The estimated residential HI for the hot spot is approximately 0.9, and no additional cleanup of the hot spot is warranted based on noncarcinogenic risk. SWMU 61-002 is appropriate for corrective action complete with controls.

**NMED Comment**

***20. Section I-4.4.2, Exposure Evaluation pages I-45 – I-51:***

*The last paragraph of the Response indicates that Section I-4.4.2 has been revised to include a discussion addressing the activity patterns of the receptors addressed in the SIR. Review of the revisions to Section I-4.4.2 indicates that the majority of the information contained in the Response to NMED Comment 20 has been incorporated into Appendix I of the revised SIR. However, the information in the Response related to the activity patterns of ecological receptors was not found. Additional documentation in the Phase II IR is required to include the information furnished in the Response regarding activity patterns for ecological receptors.*

**DOE Response**

20. No response required.

**NMED Comment**

***21. Section I-4.4.2, Exposure Evaluation pages I-45 – I-51:***

*As indicated by the Permittees, Section I-4.4.2 has been revised to include the information contained in the response to NMED Comment 21. However, note the additional issues related to PAHs at some sites remain and are discussed in the General Comment 1.*

**DOE Response**

21. Please refer to General Comment 1 response.

**NMED Comment**

***22. Section I-4.4.2, Exposure Evaluation pages I-45 – I-51:***

*The Response does not address the issue raised in the original comment. However, the Response notes that the issues raised in NMED Comment 22 are addressed in the Response to NMED Comment 1.NMED has addressed the outstanding issues related to PAHs at some sites in the evaluation of NMED Comment 1.*

**DOE Response**

22. Please refer to General Comment 1 response.

**NMED Comment**

***23. Section I-4.4.2, Exposure Evaluation pages I-45 – I-51***

*The Response partially addresses the issue raised in the original comment. The Permittees have revised Section I-4.5.9 as indicated; however, issues related to existing contamination at SWMUs 03-014(k,1,m,n) remain and are addressed in NMED's evaluation of the response to NMED Comment 1.*

**DOE Response**

23. Please refer to General Comment 1 response.

## REFERENCES


LANL (Los Alamos National Laboratory), December 2005. "Remedy Completion Report for the Investigation and Remediation of Area of Concern 03-001(i) and Solid Waste Management Units 03-029 and 61-002," Los Alamos National Laboratory document LA-UR-05-8863, Los Alamos, New Mexico. (LANL 2005, 091150)

LANL (Los Alamos National Laboratory), November 2007. "Remedy Completion Report for the Investigation and Remediation of Solid Waste Management Unit 61-002 at Technical Area 61, Revision 1," Los Alamos National Laboratory document LA-UR-07-7695, Los Alamos, New Mexico. (LANL 2007, 100722)

LANL (Los Alamos National Laboratory), August 2013. "Supplemental Investigation Report for Upper Sandia Canyon Aggregate Area," Los Alamos National Laboratory document LA-UR-13-26024, Los Alamos, New Mexico. (LANL 2013, 249068)

LANL (Los Alamos National Laboratory), September 2015. "Supplemental Investigation Report for Upper Sandia Canyon Aggregate Area, Revision 1," Los Alamos National Laboratory document LA-UR-15-26598, Los Alamos, New Mexico. (LANL 2015, 600912)

NMED (New Mexico Environment Department), April 14, 2015. "Disapproval, Supplemental Investigation Report Upper Sandia Canyon Aggregate Area," New Mexico Environment Department letter to C. Gelles (DOE-NA-LA) and M.T. Brandt (LANL) from J.E. Kieling (NMED-HWB), Santa Fe, New Mexico. (NMED 2015, 600371)

NMED (New Mexico Environment Department), January 24, 2017. "Approval with Modifactions [sic], Supplemental Investigation Report for Upper Sandia Canyon Aggregate Area, Revision 1," New Mexico Environment Department letter to D. Hintze (DOE-EM) and M. Brandt (LANL) from J.E. Kieling (NMED-HWB), Santa Fe, New Mexico. (NMED 2017, 602127)

NMED (New Mexico Environment Department), June 19, 2019. "Risk Assessment Guidance for Site Investigations and Remediation, Volume 1, Soil Screening Guidance for Human Health Risk Assessments," February 2019 (Revision 2, 6/19/19), Hazardous Waste Bureau and Ground Water Quality Bureau, Santa Fe, New Mexico. (NMED 2019, 700550)

**Table 1**
**Sites Referenced in NMED's**
**Approval with Modifications Letter, Dated January 24, 2017**

| Site | General Comments | | Specific Comments | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2[a] | 8[a] | 12 | 15 | 19 | 20[a] | 21[b] | 22[b] | 23[b] |
| SWMU 03-014(k) | X[c] | —[d] | — | — | — | — | — | — | — | X |
| SWMU 03-014(l) | X | — | — | — | — | — | — | — | — | X |
| SWMU 03-014(m) | X | — | — | — | — | — | — | — | — | X |
| SWMU 03-014(n) | X | — | — | — | — | — | — | — | — | X |
| SWMU 03-015 | X | — | — | — | — | — | — | — | — | — |
| SWMU 03-045(a) | X | — | — | — | — | — | — | — | — | — |
| AOC 03-047(g) | X | — | — | — | — | — | — | — | — | — |
| AOC 03-051(c) | X | — | — | — | — | — | — | — | — | — |
| SWMU 03-052(f) | X | — | — | X | — | — | — | — | — | — |
| AOC 03-053 | X | — | — | — | — | — | — | — | — | — |
| SWMU 03-056(a) | — | — | — | — | X | — | — | — | — | — |
| SWMU 61-002 | — | — | — | — | — | X | — | — | — | — |

[a] Response not required.

[b] Response addressed by General Comment 1.

[c] X = Site referenced in comment.

[d] — = Site not referenced in comment.

**Table 2**
**Industrial Carcinogenic Screening**
**Evaluation at SWMU 03-045(a) Using Medians as EPCs**

| COPC | EPC (mg/kg) | Industrial SSL (mg/kg)* | Cancer Risk |
|---|---|---|---|
| Aroclor-1254 | 0.0243 | 8.26 | 2.94E-08 |
| Aroclor-1260 | 0.0178 | 8.26 | 2.15E-08 |
| Benzo(a)anthracene | 0.197 | 23.4 | 8.42E-08 |
| Benzo(a)pyrene | 0.186 | 2.34 | 7.95E-07 |
| Benzo(b)fluoranthene | 0.321 | 23.4 | 1.37E-07 |
| Chrysene | 0.195 | 2340 | 8.33E-10 |
| Indeno(1,2,3-cd)pyrene | 0.0994 | 23.4 | 4.25E-08 |
| Naphthalene | 0.228 | 241 | 9.46E-09 |
| | | **Total Excess Cancer Risk** | **1E-06** |

* SSLs from Los Alamos National Laboratory (LANL 2015, 600912, Table I-4.2-128).

**Table 3**
**Industrial Carcinogenic Screening Evaluation**
**at SWMU 03-015 and AOC 03-053 Using Medians as EPCs**

| COPC | EPC (mg/kg) | Industrial SSL (mg/kg)* | Cancer Risk |
|---|---|---|---|
| Aroclor-1254 | 0.0446 | 8.26 | 5.40E-08 |
| Aroclor-1260 | 0.0352 | 8.26 | 4.26E-08 |
| Benzo(a)anthracene | 0.174 | 23.4 | 7.44E-08 |
| Benzo(a)pyrene | 0.156 | 2.34 | 6.67E-07 |
| Benzo(b)fluoranthene | 0.344 | 23.4 | 1.47E-07 |
| Chrysene | 0.198 | 2340 | 8.46E-10 |
| Indeno(1,2,3-cd)pyrene | 0.0779 | 23.4 | 3.33E-08 |
| Naphthalene | 0.037 | 241 | 1.54E-09 |
| | | **Total Excess Cancer Risk** | **1E-06** |

* SSLs from Los Alamos National Laboratory (LANL 2015, 600912, Table I-4.2-101).

**Table 4**
**Residential Carcinogenic Screening**
**Evaluation at AOC 03-047(g) Using Medians as EPCs**

| COPC | EPC (mg/kg) | Industrial SSL (mg/kg)* | Cancer Risk |
|---|---|---|---|
| Aroclor-1242 | 0.0184 | 2.22 | 8.29E-08 |
| Aroclor-1260 | 0.0184 | 2.22 | 8.29E-08 |
| Benzo(a)anthracene | 0.0428 | 1.48 | 2.89E-07 |
| Benzo(a)pyrene | 0.0428 | 0.148 | 2.89E-06 |
| Benzo(b)fluoranthene | 0.0432 | 1.48 | 2.92E-07 |
| Chrysene | 0.0428 | 148 | 2.89E-09 |
| Indeno(1,2,3-cd)pyrene | 0.0428 | 1.48 | 2.89E-07 |
| Tetrachloroethene | 0.00123 | 7.02 | 1.75E-09 |
| | | **Total Excess Cancer Risk** | **4E-06** |

* SSLs from Los Alamos National Laboratory (LANL 2015, 600912, Table I-4.2-189).

**Table 5**
**Industrial Carcinogenic Screening Evaluation at**
**SWMUs 03-014(k), 03-014(l), 03-014(m), and 03-014(n) Using Medians as EPCs**

| COPC | EPC (mg/kg)[a] | Industrial SSL (mg/kg)[b] | Cancer Risk |
|---|---|---|---|
| Aroclor-1254 | 3[c] | 8.26 | 3.63E-06 |
| Aroclor-1260 | 0.099[c] | 8.26 | 1.20E-07 |
| Benzo(a)anthracene | 0.34 | 23.4 | 1.45E-07 |
| Benzo(a)pyrene | 0.34 | 2.34 | 1.45E-06 |
| Benzo(b)fluoranthene | 7.09[c] | 23.4 | 3.03E-06 |
| Bis(2-ethylhexyl)phthalate | 0.366 | 1370 | 2.67E-09 |
| Buytlbenzylphthalate | 0.366 | 9100 | 4.02E-10 |
| Chrysene | 0.34 | 2340 | 1.45E-09 |
| Dibenz(a,h)anthracene | 0.34 | 2.34 | 1.45E-06 |
| Dichlorobenzene[1,4-] | 0.366 | 177 | 2.07E-08 |
| Indeno(1,2,3-c,d)pyrene | 0.34 | 23.4 | 1.45E-07 |
| Naphthalene | 0.34 | 241 | 1.41E-08 |
| | | **Total Excess Cancer Risk** | **1E-05** |

[a] EPC is median unless otherwise noted.

[b] SSLs from LANL (2015, 600912, Table I-4.2-65).

[c] EPC is UCL (LANL 2012, 600912, Table I-2.3-20).

**Table 6**
**Industrial Carcinogenic Screening**
**Evaluation at SWMU 03-052(f) Using Medians as EPCs**

| COPC | EPC (mg/kg) | Industrial SSL (mg/kg)* | Cancer Risk |
|---|---|---|---|
| Aroclor-1254 | 0.0971 | 8.26 | 1.18E-07 |
| Aroclor-1260 | 0.117 | 8.26 | 1.42E-07 |
| Benzo(a)anthracene | 1.93 | 23.4 | 8.25E-07 |
| Benzo(a)pyrene | 1.93 | 2.34 | 8.25E-06 |
| Benzo(b)fluoranthene | 2.6 | 23.4 | 1.11E-06 |
| Benzo(k)fluoranthene | 1.02 | 234 | 4.36E-08 |
| Bis(2-ethylhexyl)phthalate | 0.144 | 1370 | 1.05E-09 |
| Chrysene | 2.21 | 2340 | 9.44E-09 |
| Dibenz(a,h)anthracene | 0.0863 | 2.34 | 3.69E-07 |
| Indeno(1,2,3-cd)pyrene | 0.67 | 23.4 | 2.86E-07 |
| Naphthalene | 0.127 | 241 | 5.27E-09 |
| Nitroaniline[4-] | 0.388 | 860 | 4.51E-09 |
| | | **Total Excess Cancer Risk** | **1E-05** |

* SSLs from LANL (2015, 600912, Table I-4.2-202).