

May 25, 2018

Mr. Ken Kalman
U.S. Nuclear Regulatory Commission
11555 Rockville Pike
Rockville, MD 20852-2738

Mr. Paul Davis
Oklahoma Department of Environmental Quality
707 North Robinson
Oklahoma City, OK 73101

Mr. Robert Evans
U.S. Nuclear Regulatory Commission
1600 East Lamar Blvd; Suite 400
Arlington, TX 76011-4511

Re: Docket No. 70-925; License No. SNM-928
Explanation of 1206 Drainage Remediation Plan and Cost Impact at the Cimarron Site

Dear Sirs:

Environmental Properties Management LLC (EPM) met with the US Nuclear Regulatory Commission (NRC) and the Oklahoma Department of Environmental Quality (DEQ) on May 17, 2018. The meeting included a presentation on the review of lithologic information for the 1206 Drainage, the evaluation of remedial alternatives, and an improved remediation strategy for this area. A report presenting this information in more detail was submitted to NRC and DEQ on March 30, 2018. During the meeting, it became apparent that the comparison of the approach and associate cost of the previously presented remedial actions relative to the approach and cost presented in the March 30, 2018 submittal needs clarification. This letter is intended to clarify these issues.

Two drainage channels converge to discharge to the Cimarron River floodplain in the western part of the Trust property. Surface water sample location “1206” had been sampled as part of the environmental monitoring program from the 1980s through the early 2000s. These surface water samples were collected from a pool in the eastern branch of that drainage; consequently, the drainage channel came to be referred to as the “1206 Drainage”. The western branch of the 1206 Drainage (flowing north-northeast) is herein referred to as the “1206 West Drainage”. The eastern branch the 1206 Drainage (flowing north-northwest) is herein referred to as the “1206 East Drainage”. Collectively, they are referred to herein as the “1206 Drainage”.

Attachment 1 contains a drawing showing the locations of the 1206 West Drainage, the 1206 East Drainage, and several features referred to in this letter. Attachment 1 also contains the locations of groundwater samples collected from drive-point piezometers advanced during the 2014 Design Investigation, with 2014 uranium concentrations posted in micrograms per liter ($\mu\text{g/L}$).

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Need for Groundwater Remediation in the 1206 West Drainage

Licensed material had been buried in trenches in an area designated Burial Area #2 (BA2), located southwest of the upstream end of the 1206 West Drainage (see Attachment 1). The base elevations of the BA2 trenches were in Sandstone A, and uranium from the trenches impacted groundwater flowing from the trenches, through Sandstone A, and into the 1206 West Drainage.

Historically, uranium concentrations exceeded the State criterion (the maximum contaminant limit, or MCL) of 30 µg/L for uranium in one Sandstone A monitor well (1331) located between BA2 and the 1206 West Drainage. Consequently, the 2015 *Facility Decommissioning Plan* included a provision to remediate groundwater within Sandstone A downgradient from BA2. The plan included installation of a treated water injection trench (GWI-WU-02) that would flush impacted groundwater from Sandstone A into the 1206 West Drainage. Contaminants discharged to the 1206 West Drainage would eventually be recovered by a groundwater extraction trench (GETR-WAA-01) constructed within sediments located at the confluence of the 1206 West and 1206 East Drainages (i.e., the “1206 Confluence” area).

Groundwater samples from Monitor Well 1331 had been collected annually since 1989. Uranium concentrations have been declining for years, but as of 2015, the uranium concentration was typically above the MCL. Beginning in May 2016, the uranium concentration was 30.08 µg/L, and three samples collected in 2016 and 2017 yielded uranium below 30 µg/L. In July 2017, EPM submitted a letter proposing to eliminate the BA2 injection trench, since Sandstone A no longer appears to contain uranium concentrations exceeding the MCL.

Review of historic lithologic and contaminant concentration data for the 1206 Drainages revealed that a drive point piezometer advanced in sediment in the 1206 Confluence downstream of the 1206 West Drainage in 2014 produced groundwater containing 206 µg/L (570 pCi/L) uranium. This exceeds not only the MCL, but the NRC’s criterion of 180 pCi/L (the Federal Criterion) for uranium in groundwater. Although Sandstone A no longer requires remediation, it appears that groundwater in the sediment does.

Need for Groundwater Remediation in the 1206 East Drainage

Licensed material had been buried in trenches in an area designated Burial Area #3 (BA3), located East of the upstream (south) end of the 1206 East Drainage. The BA3 trenches were excavated into Sandstone A, and uranium from the trenches impacted groundwater flowing from the trenches, through Sandstone A, and into the 1206 East Drainage.

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Although uranium concentrations have varied widely over time in this area, uranium has frequently exceeded the NRC criterion for uranium in two Sandstone A monitor wells (1351 and 1356), both located between BA3 and the 1206 East Drainage. Uranium also exceeds the MCL in Monitor Well 1352, located north of Monitor Well 1356. Nitrate concentrations exceed the State Criterion in both Monitor Well 1351 and Monitor Well 1352. Consequently, the 2015 *Facility Decommissioning Plan* included a provision to remediate groundwater within Sandstone A downgradient from BA3. The plan included installation of a treated water injection trench (GWI-WU-01) that would flush impacted groundwater from Sandstone A into the 1206 East Drainage. Contaminants discharged to the 1206 East Drainage would eventually be recovered by the groundwater extraction trench (GETR-WAA-01) constructed in the 1206 Confluence.

2018 Assessment of the 1206 Drainages

The duration of remediation was calculated for most of the site areas yielding groundwater contaminant of concern (COC) concentrations exceeding Federal or State criteria. These duration estimates were presented in the 2015 *Facility Decommissioning Plan*; however, the time required to achieve the State criteria in the 1206 Drainage was not calculated. The combination of uncertainties related to 1) the time required to flush the sandstone, 2) the movement of water through the sediment in the 1206 Drainages, 3) the time required for impacted groundwater to report to Extraction Trench GETR-WAA-01, and 4) the sorption and desorption of uranium in the various formation types made estimating the duration of remediation impractical.

With the apparent decline in the uranium concentration in Sandstone A, the project team concluded that additional information regarding the extent and volume of sediment in the 1206 Drainages could be useful in identifying, evaluating, and selecting the most cost effective and technically feasible groundwater remediation strategies for sediment in both the 1206 West and 1206 East Drainages. Because of equipment access constraints and lack of sediment depth, the upstream reaches of both drainages had not historically been probed to assess sediment volume in either drainage. In 2018, a soil probe was used to assess the thickness of sediment in the upstream reaches of both drainages. This data was combined with historical data to produce a 3-dimensional model and calculate the volume of the sediment in the drainages. This analysis was also used to modify the previous remedial approach and develop a remediation plan specific to this area.

A report on the soil probe investigations, compilation of recent and historical data, development and presentation of the 3-dimensional model, and planned remediation strategy was submitted to the NRC and the DEQ in the technical memorandum “*1206 Drainage Sediment Assessment and Remedial Alternative Evaluation*”, submitted to the NRC and the DEQ on March 30, 2018.

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This technical memorandum included a summary of the cost savings associated with the removal of the BA2 injection trench. It also provided the estimated cost of work proposed for the expedited remediation of the 1206 East Drainage. However, it did not clearly convey that plans and costs associated with eliminating the BA2 injection trench and excavating 1206 West Drainage sediments were completely independent of plans and costs associated with the revised 1206 East Drainage remediation strategy (sediment excavation). The following two sections are intended to clarify cost savings associated with the remediation plan for both 1206 Drainages, and to describe the rationale for the newly-added remediation infrastructure planned for the 1206 East Drainage.

1206 West Drainage – Conclusion & Path Forward

The March 2018 technical memorandum described the evaluation of alternative remedial actions considered for this area. Due to the very small volume of sediment in the 1206 West Drainage, by far the most expedient and economical strategy for remediating groundwater in this drainage is the removal of the sediment. The sediment already complies with the NRC criterion for unrestricted release for soil; a portion of the sediment contains groundwater which may exceed the State and/or NRC criterion for uranium in groundwater. Excavation of approximately 140 cubic yards (cy) of sediment will remove both the soil and the groundwater from the drainage. When the excavated sediment is placed with the unimpacted excess spoils from the trenches that will be constructed in the Uranium Pond #1 and/or Uranium Pond #2 Areas, what little impacted groundwater is present within the excavated sediment will evaporate or be absorbed into the soil mixture.

The cost to excavate, transport, and spread the 1206 West Drainage sediment in the laydown area is estimated to be less than \$10,000 (including indirect costs, but without contingency). Based upon revised unit costs obtained from the 2017 Pilot Test, the estimated cost to construct injection trench GWI-WU-02 (including communication, piping, and power) is approximately \$145,000 (including \$38,000 in indirect costs, but without contingency). In addition to reducing the 1206 West Drainage remediation cost by approximately \$135,000, the remediation of this area would be achieved within the one or two weeks required to excavate and mix the sediment and provide greater certainty for the remediation approach.

1206 East Drainage – Conclusion & Path Forward

The March 2018 technical memorandum also described the evaluation of alternative remedial actions for this area. The evaluation of remediation alternatives for the 1206 East Drainage is very complex; BA3 will be a source of uranium and nitrate to the 1206 East Drainage until residual concentrations in this area fall below their respective cleanup criteria. Groundwater containing elevated concentrations of nitrate will also be flushed from Sandstone A in the UP1

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Area into the 1206 East Drainage. Under the remediation scenario presented in the 2015 *Facility Decommissioning Plan*, this seepage will discharge into the 1206 East Drainage and will then migrate through approximately 600 feet of sediment-laden channel before reaching the 1206 Confluence. The time it will take seepage from Sandstone A to infiltrate the sediment and migrate to Extraction Trench GETR-WAA-01 cannot be practically estimated; however, given the permeability of the sediment material, a low seepage velocity and extended remediation timeframe would be expected.

Excavation of approximately 2,000 cubic yards of sediment and installation of a non-reactive conduit (i.e., French drain) within the channel would allow seepage to bypass approximately 600 feet of sediment and directly infiltrate the 1206 Confluence. Seepage discharging to the 1206 Confluence would have to flow through only 50 – 75 feet of sediment to be recovered by GETR-WAA-01. Though it may be impracticable to calculate the time differential, the provision of a direct conduit for seepage to flow to the 1206 Confluence and will greatly reduce the time required to remediate groundwater in the confluence sediment. The cost to implement the remediation plan described in the March 30, 2018 technical memorandum sediment excavation and French drain construction) is slightly over \$200,000 (including direct costs but without contingency). Implementation of this plan will help eliminate potentially far greater costs by providing for earlier termination of treatment or will provide for more reduction of uranium and nitrate concentrations in western area groundwater, bringing final concentrations closer to the cleanup criteria.

Additional capital costs associated with the revised 1206 East Drainage remediation plan (\$200,000) should not be construed as an increase from capital costs associated with the elimination of the GWI-WU-02 injection trench (\$145,000) from the 1206 West Drainage remediation plan. Rather, the \$145,000 capital cost associated with the former GWI-WU-02 injection trench has been replaced with a \$10,000 (estimate) sediment excavation and approximately \$200,000 will be invested in the 1206 East Drainage to significantly reduce risks and uncertainties associated with remediating this area. The revised 1206 East Drainage remediation plan is also expected to significantly improve the effectiveness of groundwater remediation reduce long term costs.

Note: Estimated costs referenced herein were developed using budgetary cost information based on a conceptual level of detail. In addition, competitive bids were not obtained for cost estimate preparation. Detailed aspects of the remediation design described herein, such as specific component dimensions and final material quantities, have yet to be determined. Consequently, the projected costs and savings discussed herein should be considered reasonable order-of-magnitude estimates that are intended for comparison purposes only.

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EPM would be happy to meet with DEQ or the NRC to provide further explanation of the information presented herein.

Sincerely,



Jeff Lux, P.E.
Project Manager

Attachment

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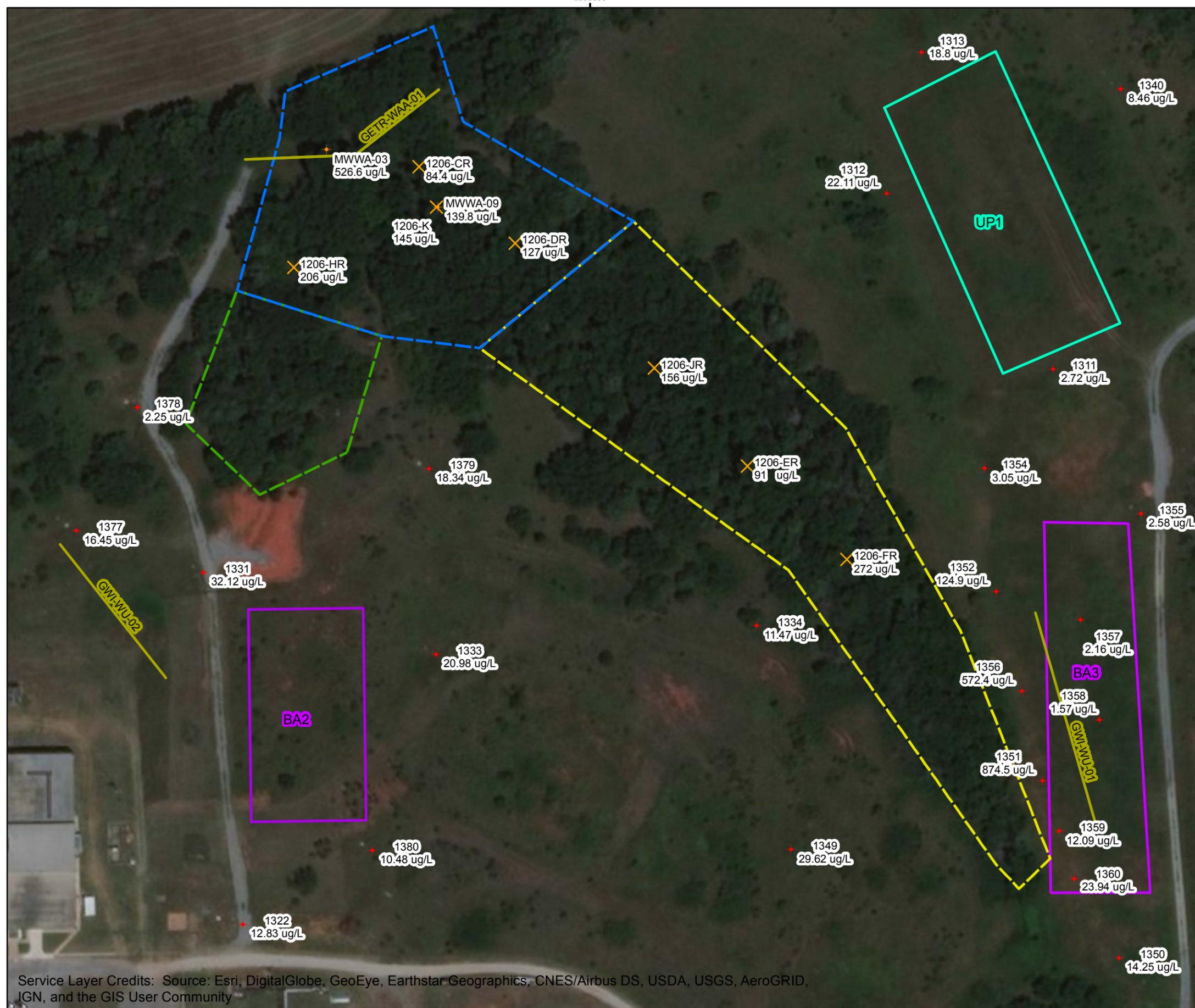
ATTACHMENT 1
1206 DRAINAGE AND RELATED FEATURES

**ATTACHMENT 1
1206 DRAINAGE AND RELATED FEATURES
CIMARRON SITE, OKLAHOMA**



Legend

- ✕ 1206 DRIVE POINT PIEZOMETER
- ✦ MONITOR WELL IN TRANSITION ZONE
- ✦ MONITOR WELL IN SANDSTONE A
- REMEDIATION TRENCH
- 1206 CONFLUENCE (APPROXIMATE)
- 1206 EAST DRAINAGE (APPROXIMATE)
- 1206 WEST DRAINAGE (APPROXIMATE)
- BURIAL AREA (BA)
- URANIUM POND (UP)



COORDINATES :
(NAD 83) STATE PLANE OKLAHOMA NORTH FEET

DATE :
MAP PRODUCED - 5/24/2018

Path: Z:\Clients\ENSCERT\ ClientInfo\Sites\Database\Geospatial\Maps & Dwg\ArcGIS\BMC\CD_Files\Arcdocs\2018\1206 Drainage\Attachment 1 - 1206 Drainage.mxd
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