

U.S. EPA Comments on Post-Closure Maintenance Plan
Ordot Landfill Superfund Site

1. U.S. EPA's comments are based on review of the following documents:
 - Revised Final Post-Closure Maintenance Plan (dated April 2015 and revised in response to US EPA comments of December 2014, and February and March 2015; with appendices E, F and G, dated April 2015, and appendices A, B, C, D, dated November 2014)
 - Revised Post-Closure Cost Estimate and Cost Assumptions (dated April 2015)
2. Overall, U.S. EPA appreciates the Receiver's effort to address our initial concerns and improve the content of the post-closure plan, the cost estimate, and cost assumptions.
3. Three overarching concerns remain, however, and warrant further technical discussion: a) the landfill gas exceedances at the site boundary, adjacent to Dero Road and near the community of Ordot Chalan-Pago, b) the post-closure cost estimate, and c) the proposed groundwater (and surface water) monitoring program. A discussion of each follows.
 - a) Landfill (Methane) Gas Exceedances at the Site Boundary, Adjacent to Dero Road and Near the Community of Ordot Chalan-Pago

Last year, the Receiver agreed to immediately begin addressing the methane gas exceedances at the Site boundary. Since that time, and following numerous technical discussions, we agreed that testing of remediation approaches needed to commence as soon as practicable, in tandem with further investigation to develop a site conceptual model for landfill gas migration in this vicinity. On May 8, 2017, the Receiver submitted a proposal for "Additional Landfill Gas Investigation and Pilot Test Workplan." U.S. EPA will review this proposal as soon as practicable, as it is imperative that the investigation and pilot testing commence and a remedial approach be selected prior to the Receiver's departure. The Post-Closure Maintenance Plan will need to be revised, accordingly.

b) Post-Closure Cost Estimate

In 2016, the U.S. District Court of Guam adopted the Receiver's financing plan for post-closure care, which included the use of an independent trustee and an independent engineer during the post-closure period. U.S. EPA's subject matter expert, Scott Walker, indicated in his Declaration to the Court that the cost of such an independent engineer can be significant, particularly in the early years of post-closure care. The Receiver acknowledges that the cost estimate needs to be revised to include the independent trustee and engineer. U.S. EPA, with support from our subject matter experts on post-closure implementation, believe we can provide particular expertise in further defining the role of the independent engineer and estimating the associated costs of such engineer. We hope we can be of assistance.

The cost estimate also must be updated to include remediating the landfill gas exceedances, and implementing a U.S. EPA-accepted groundwater (and surface water) monitoring and reporting program.

U.S. EPA understands that there have been occasional temporary increases in the volume of leachate generated and requiring treatment and disposal at the WWTP. It may be prudent to review the current cost estimate to ensure it can accommodate fluctuations in the costs of leachate treatment and disposal. Similarly, we note that costs for weekly lab samples of the composite leachate stream (Section 5.10) should be included if such samples are being taken.

To enable a general understanding of the current cost estimate, U.S. EPA requests a copy of the back-up information for the \$15.6 million net present value calculation.

c) Groundwater (and Surface Water) Monitoring Program

While U.S. EPA appreciates the effort to address our early comments on the groundwater monitoring program, U.S. EPA continues to have concerns. As we've recently discussed, U.S. EPA does not agree that it is appropriate, based on four events of groundwater monitoring conducted in 2012, to reduce the monitoring program as proposed at Appendix F, Table 5. The primary focus of the 2012 groundwater monitoring program was site investigation and to assist in the development of a site conceptual model for groundwater flow. The 2012 program preceded the initiation and completion of closure construction activities. Moreover, throughout decades of operation, the Government of Guam did not perform any routine groundwater monitoring and therefore, there has been no ongoing sampling and analysis of groundwater data.

Consequently, U.S. EPA believes that the Ordot Site should remain in Assessment Monitoring, as described at 40 CFR §258.55. The Receiver should develop an Assessment Monitoring Program that meets the requirements at 40 CFR §§258.50 – 258.53, and §258.55, including establishing background and groundwater protection standards for all constituents being monitored, and statistical procedures to analyze and compare results. The Assessment Monitoring program must sample and analyze all constituent identified in appendix II, and given the Site's stated historic use as a military landfill, must also include the following:

Radionuclides: Low-level radioactive wastes are specific to military bases, but rarely predominant constituents of military landfills. Analysis of radionuclides in groundwater should be considered given their occurrence in military landfills.

Perchlorate: Perchlorate (ClO_4) salts were first produced on a large scale in the 1940s as components in solid propellant for rockets and missiles and have also been used in some explosive and incendiary munitions fillers, smoke-producing compounds, training simulators, and signal flares (DoD, 2006). Given the history of the landfill and detections of low levels of Munitions and Explosives of Concern (MEC) in groundwater (B&C, 2013) and the soluble and stable nature of dissolved perchlorate (DoD, 2006), it's prudent to include analysis of perchlorate.

Hexavalent chromium: Hexavalent chromium or chromium-6 is the more toxic form of chromium (the other being trivalent chromium of low toxicity) making up total chromium. Hexavalent chromium is linked to cancer when ingested and is considered an emerging contaminant due to its detection in groundwater supplies. Groundwater samples at the Ordot dump have been analyzed for chromium (presumably total). Given that chromium has been

detected above the Guam Water Quality Standard (WQS) and U.S. EPA Regional Screening Level (RSL) in groundwater samples from the Ordot dump, analysis of groundwater samples for hexavalent chromium should be included in future groundwater monitoring.

All analytes included in SW846-8330B and picric acid tied to Japanese munitions:

Analyte	Abbreviation	CAS Number	Degradation Product or Explosive Impurity	Solubility
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	HMX	2691-41-0		7 mg/L
Hexahydro-1,3,5-trinitro-1,3,5-triazine	RDX	121-82-4		38 mg/L
1,3,5-Trinitrobenzene	1,3,5-TNB	99-35-4	x	330 mg/L
1,3-Dinitrobenzene	1,3-DNB	99-65-0	x	Insol
Methyl-2,4,6-trinitrophenylnitramine	Tetryl	479-45-8	x	Insol
Nitrobenzene	NB	98-95-3	x	20 g/l
2,4,6-Trinitrotoluene	2,4,6-TNT	118-96-7		130 mg/L
4-Amino-2,6-dinitrotoluene	4-Am-DNT	19406-51-0	x	43 mg/L
2-Amino-4,6-dinitrotoluene	2-Am-DNT	35572-78-2	x	38 mg/L
2,4-Dinitrotoluene	2,4-DNT	121-14-2	x	270 mg/L
2,6-Dinitrotoluene	2,6-DNT	606-20-2	x	0.1 g/L
2-Nitrotoluene	2-NT	88-72-2	x	7 g/L
3-Nitrotoluene	3-NT	99-08-1	x	5 g/L
4-Nitrotoluene	4-NT	99-99-0	x	4 g/L
Nitroglycerin	NG	55-63-0		1.3 g/L
Pentaerythritol tetranitrate	PETN	78-11-5		Insol
3,5-Dinitroaniline	3,5-DNA	618-87-1	x	1-2g/L
Picric Acid				12.7 g/L

Following the minimum four (4) rounds of monitoring (two dry seasons, two wet seasons, commencing with the next groundwater monitoring event scheduled by the Receiver), the operator may provide written analysis and appropriate documentation to propose the inclusion/exclusion of constituents from the monitoring program, and whether to remain in Assessment Monitoring, or move to Corrective Action.

To help determine whether the groundwater chemistry of the landfill has changed, the full suite of appendix II constituents and the additional constituents in the table and listed above, need to be included in the “Contaminants of Concern” list that is analyzed every five (5) years, irrespective of their inclusion/exclusion in the routine Assessment Monitoring program.

Emerging contaminants such as per- and polyfluoroalkyl substances (PFASs) and 1,4-dioxane may be of concern at Ordot. These contaminants should be added to the monitoring requirements in the future if federal standards are promulgated. At that time, it may be prudent to sample for these contaminants in the furthest downgradient well or wells and surface water locations. If the contaminants are not found in these downgradient locations, then it may not be necessary to sample in and around the landfill. The Assessment Monitoring program should include a process to review for and add constituents during the post-closure period, as appropriate.

With respect to the content of the semi-annual Assessment Monitoring reports, such reports need to contain adequate detail, analysis, statistical evaluation, and supporting documentation, such as:

- Description of the Assessment Monitoring program and its requirements and how the data collected for a given event satisfy those requirements.
- Description of the background data sets and how they were developed and used for statistical analysis.
- Description of statistical analyses and computer software (e.g. Sanitas) used to perform analyses.
- Statistical analysis results including charts and output from the statistical analysis computer software used.
- Interpretation of the statistical analysis results and comparison to the GWPS relative to the assessment monitoring program requirements, hydrogeologic conditions and changes such as areas where waste is in contact with groundwater, operational or construction changes to the landfill corrective measures such as the cap, leachate collection systems, surface water conveyance, landfill gas systems, etc.
- Time-series graphs of constituent concentrations and groundwater levels in each monitoring well over time.
- Tabulated concentration data and water level data for all historical monitoring events.
- Comparison of groundwater and leachate concentration data, and discussion/interpretation of if/how they are related, as appropriate.
- Comparison of groundwater and surface water concentration data, and discussion/interpretation of if/how they are related, as appropriate.
- Comparison of groundwater and landfill gas concentration data, and discussion/interpretation of if/how they are related, as appropriate.

With respect to the surface water monitoring program, given the apparent interconnection between the groundwater underlying the Ordot Site and the Lonfit River, it is prudent to sample and analyze for the same constituents as those in the Assessment Monitoring program.

4. This version of the Post-Closure Maintenance Plan precedes many important developments at the Ordot Landfill Superfund Site. Namely, closure construction was completed on March 1, 2016. Consequently, the text will need to be updated accordingly.
5. There are inconsistencies in the text of the Post-Closure Maintenance Plan that need to be reconciled, and/or clarified when the Plan is updated. For example, tables are not in correct locations and information in the tables do not match text descriptions.
6. Given the current timeline for completion of the consent decree projects, U.S. EPA does not see any value in developing numerous iterations of comments/responses, and requests that no formal response to these comments be prepared. Rather, we suggest that the Receiver focus its immediate effort on developing an appropriate Assessment Monitoring program. To help facilitate the process, U.S. EPA will share in this overall effort by revising the text of the current Post-Closure Maintenance Plan to address at least our noted concerns, as possible. U.S. EPA and its subject matter experts will be available by teleconference during this development period. After completing our respective efforts, however, an in-person meeting with the Receiver may be

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helpful to review and revise the Assessment Monitoring program, discuss and reach conclusions on the remedial approach for the landfill gas exceedances, discuss and define the role and necessary expertise of the independent engineer, and, as appropriate, update the text of the Post-Closure Maintenance Plan to reflect meeting outcomes. Although U.S. EPA recognizes the desire to minimize travel costs, as the deadline for the end of the Receivership approaches, an in-person technical working meeting with the Receiver may offer a cost-effective solution to ensure timely completion.