

**Schedule of Compliance for Andersen AFB
Hazardous Waste OD Permit GUS002**

Item		Next steps	Date Projected
1	<p><u>Prevention Procedures: 40 CFR § 270.14(b)(8)</u></p> <p>The OD unit is not an engineered structure due to the impact of the blasting wave when in operation. Structural or engineered measures to prevent runoff, flooding, contamination of water supplies, mitigate effects of equipment failure, and to prevent releases to atmosphere are not able to be implemented at the permitted unit due to the inherent nature of open detonation and the site location.</p> <p>When determining safety of construction near an OD unit, explosive safety personal must account for blast wave scaling, ground shock, and Net Explosive Weight (NEW), to establish minimum safe distances and to ensure the integrity of engineered structures meet Department of Defense Explosive Safety Board (DDESB) guidelines. The DDESB is responsible for developing and maintaining DoD Explosive Safety and Regulations.</p> <p>The OD unit has a capability of supporting detonations up to 600 lbs. NEW. Such an event would result in blast waves and shock impacts, above and below ground, that result in severe buckling of structural metal within the blast zone, restricting the ability for construction on the range above or below ground.</p> <p>Given the minimum safe distances required as detailed in the Explosive Ordnance Disposal Demolition Range procedures in Appendix K of the permit application, and the limitations presented by the inherent nature of and the proximity to the ocean, there are limited engineered or structural measures that are reasonably can be implemented at the site (Tab 1. Appendix K EOD Demolition Range Procedures).</p> <p>JRM is committed to working with GEPA and USEPA Region 9 to address this issue and how to address it in the revised permit application.</p> <p>Tab 1. Appendix K of Permit Renewal Application, EOD Demolition Range Procedures</p>	Revised Permit Renewal Application	30 April 2025

**Schedule of Compliance for Andersen AFB
Hazardous Waste OD Permit GUS002**

2	<p><u>Facility Location Information: 40 CFR § 270.14(b)(11)(iv)</u></p> <p>The statement referenced by the agencies that the EOD range is within the 100-year flood plain was found in Appendix G Closure / Post Closure Plan in the 2021 permit renewal application. While portions of the larger EOD range are in the 100-year floodplain, the inactive open burn (OB), the active open detonation (OD) unit, and all adjacent areas in between them are not located in the 100-year floodplain based on the Federal Emergency Management Agency’s online National Flood Hazard Layer Viewer, 6600010050D, eff. 9/28/2007 - which is attached with the locations of the units noted (Tab 2. FEMA National Flood Hazard Map). Additionally, the Environmental Performance Standards in Appendix I already state that open detonation “will not be performed if major storms capable of flooding the EOD Range are forecasted to occur within 24 hours.” (Tab 3. Appendix I Process Information). Since the cited floodplain language appears in the Appendix G closure plan, JRM is committed to clarifying this issue in its revised closure plan in coordination with GEPA and USEPA Region 9.</p> <p>Tab 2. FEMA National Flood Hazard Map Tab 3. Appendix I Process Information</p>	Revised Closure Plan	30 April 2025
3	<p><u>Protection of Groundwater: 40 CFR § 270.14(c)</u></p> <p>The waste management area for the OD unit is a 3 x 3 meter area as detailed on Tab 2. Both the Guam EPA-approved 2018 permit and the 2021 permit renewal application include a topographic map on page 2 of Appendix H with proposed points of compliance, ground water flow direction, and the other requirements of 40 CFR § 270.14 (Tab 4. Appendix H Topographic Map). If the agencies have specific concerns about the content of the map or its compliance with 40 CFR § 270.14, JRM respectfully requests a meeting to further discuss this issue.</p> <p>The open detonation (OD) unit is located in an area of Andersen AFB that has restricted access and precludes the building or inhabitation of any permanent structures. Human receptors are limited to Explosive Ordinance Disposal personnel and wildlife personnel that occasionally access or use the site.</p> <p>The Groundwater Monitoring Plan, referenced in Appendix M of the permit, was developed based on the findings of the 2006 dye trace study. It was initially approved by the Administrator in 2012, and has been incorporated as part of subsequent Guam EPA-approved permits issued in 2012, 2015, and 2018 (Tab 5. OB/OD Permit, 2018).</p>	Development of Data quality objectives with GEPA and USEPA Region 9	30 Jul 2026 if additional groundwater investigation is required

**Schedule of Compliance for Andersen AFB
Hazardous Waste OD Permit GUS002**

According to the 2018 GEPA-approved groundwater monitoring plan for the OB/OD permit, regional groundwater moves from the interior of the island toward the sea on Andersen AFB. This is supported by the Dye Trace Study DTS conducted in 2006 at the OB/OD Range as dye concentrations demonstrated groundwater movement from the OB/OD Range toward the seeps located in the beach area. (Tab 6. OBOD Dye Trace Study Results, Oct 2006).

The 2006 dye trace report stated that: “Information provided in a pervious Dye Trace Study conducted in the Landfill Complex (ICF Technology, 1994) indicated that ground water in the vicinity of the OB/OD range travels through the aquifer at average velocities ranging from 20-36 ft per day. The groundwater gradient flows toward the Pacific Ocean are evident in seeps that are observed along the shoreline during low tides.” (Tab 6). Additionally, the 2006 dye trace report stated that: “The OB/OD range is located approximately 150 to 200 feet from the shoreline of the Pacific Ocean. The NGL is under basal conditions at the OB/OD range, and the freshwater lens is expected to be very thin to non-existent due to the mixing action caused by tides.” (Tab 6).

A 2013 USGS report, *The Effects of Withdrawals and Drought on Groundwater Availability in the Northern Guam Lens Aquifer, Guam* (Tab 7. USGS Groundwater Model, 2013) provides additional support for regional groundwater flow from the interior of the island out to the ocean, reporting that: “Fresh groundwater moves mainly from inland recharge areas to coastal areas where springs and seeps discharge above and below sea level. Flowing water from inland locations in northern Guam flows outward to discharge areas along the coast” (Tab 7). Additionally, the model calculated a groundwater discharge rate of 4.4 million gallons/day/mile in the area of the range.

The 2018 Northern Guam Lens Aquifer Map, by the Water and Environmental Research Institute of the Western Pacific’s (WERI), further corroborates the hydraulic flow towards the ocean based as evidenced by the water table contours at Andresen AFB (Tab 8. WERI Lens Aquifer Map, 2018).

Groundwater Monitoring

The 2008 Environmental Assessment study cited in the response stated that GEPA and Andersen agreed to focus on a contaminant source investigation by installing a temporary well downgradient of the OD unit for sampling. The investigation found that both limestone rock chip and groundwater samples indicated that the subsurface and groundwater were not impacted by site activities at the OD unit. Groundwater monitoring of seeps was incorporated into the 2012, 2015 and 2018 GEPA approved permit groundwater monitoring plans, indicating that the uncertainty discussed in the 2008 technical memo had been resolved.

**Schedule of Compliance for Andersen AFB
Hazardous Waste OD Permit GUS002**

The 2018 GEPA approved groundwater monitoring plan states: “Four groundwater seeps (SP-1, SP-2, SP-4, and SP-5) will serve as the downgradient sample locations (See Figure 3-2). These seeps were used during the Dye Trace Study (DTS) conducted in June 2006 at the OB/OD Range. Hydraulic connectivity between the upgradient well IRP-52, the OB/OD Range, and the seeps were observed during the study. The results of the DTS also recommended these seeps as groundwater monitoring locations because they demonstrated the strongest dye concentrations coming from the OB/OD Range. Further, the location of the seeps is geographically adjacent to the hazardous waste management area limits, which follows guidance conditions in the *RCRA Groundwater Monitoring Draft Technical Guidance* (USEPA, 1992b). These locations are ideal to intercept potential pathways of contaminant migration.” (Tab 5).

Please note there was an error on the down gradient seep location map in the groundwater monitoring plans and reports: the OB unit on the range was mislocated by approximately 200’ to the east of its actual location. The actual location of the site is corroborated by current groundwater documents, the dye trace study result report, the Site Characterization Sampling report, and the maps in Appendix H of the 2021 permit renewal application (Tab 4). A corrected map is provided with the OB unit location to its correct location (Tab 9. Groundwater Sampling Map). As a result of this change, the seep identified as SP-5 in the groundwater reports is associated with the OB unit rather than SP-4.

The DTS identified that the seep sample location SP-1 was recommended as the groundwater monitoring point downgradient from the OD Unit, stating “there is a clear indication of a groundwater pathway connecting the OD Unit and the groundwater seep at SP-1(Tab 6). Similar correlation for dye presence was detected at SP-2 but to a lesser degree. These two locations continue to provide representative groundwater samples for the OD unit.

The 2018 Guam EPA-approved permit includes language accepting the use of seeps for groundwater compliance:

“After considering the Permittee's Subpart X application for the OB/OD unit, the Administrator has determined that the site monitoring program shall consist of groundwater monitoring to ensure that any release of hazardous waste or hazardous constituents from open burning/open detonation of reactive wastes to the shallow unconfined aquifer beneath the OB/OD unit are detected and, as appropriate, addressed through corrective action. The elements of the site monitoring program to be established by the Permittee are derived from Part VI.A. [Adopts by reference 40 CFR Part 264, Subpart F] of the GHWMRs, but have been tailored as detailed herein to the site- and unit-specific risks and circumstances posed by this Subpart X unit.

**Schedule of Compliance for Andersen AFB
Hazardous Waste OD Permit GUS002**

<p>Due to the proximity of the facility to the ocean, additional information was collected for the design of the groundwater-monitoring program. The Permittee submitted a Dye Trace Study Work Plan for the purpose of determining suitable monitoring points for monitoring groundwater. The Dye Trace Study Work Plan has been implemented, and results reported in the Dye Trace Study Results Report. The Permittee used the data from the Dye Trace Study Results Report to prepare the facility Groundwater Monitoring Plan (Appendix M of the Permit). The Groundwater Monitoring Plan was approved by the Administrator in 2012 and is currently being implemented” (Tab 5).</p> <p>The seeps are sampled for chloride prior to sampling for munitions constituents. Per the sampling plan, a chloride value of 550-5000 mg/L is required to be considered a freshwater sample, but water with chloride of these concentrations would be considered brackish within Environmental Protection Agency’s definition of brackish water (https://www.epa.gov/superfund/hazard-ranking-system-glossary-terms-and-acronyms-l-superfund).</p> <p>As reported in the 2018 GEPA-approved permit, the inorganic geochemistry of the groundwater at the OB/OD Range was analyzed using both upgradient well, IRP-52, and downgradient seep locations, SP-1, SP-2, SP-4, and SP-5. A total of two (2) water samples were taken from each location in June 2014 and March 2015. “Chloride, sulfate, sodium, potassium, magnesium, calcium and bicarbonate were analyzed for their total ionic concentrations. The samples do not show any differences in groundwater quality between the sample locations over time. In addition, the results indicate similar geochemistry at both the upgradient and the downgradient locations, indicating that the groundwater originates from the same source” (Tab 5).</p> <p>The most recent 2024 groundwater monitoring report found that operations at the OD unit have not resulted in a release to the groundwater (Tab 10. 1st GW Sampling Report, 2024).</p> <p>Installation of monitoring wells and use of pressure transducers with the blast zone are prohibitive as wells would subject to collapse, and any pressure transducer within the blast zone would be rendered inoperable after a single detonation due to blast wave and ground shock impacts.</p> <p>JRM understands that GEPA and EPA Region 9 are requesting additional groundwater data associated with the OD range; based on the above information, we respectfully request a meeting to further discuss data quality objectives and what new data are necessary.</p>		
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**Schedule of Compliance for Andersen AFB
Hazardous Waste OD Permit GUS002**

	<p>Tab 2. FEMA National Flood Hazard Map Tab 4. Appendix H Topographic Map Tab 5. AAFB 2018 Permit, 2018 Tab 6. OBOD Dye Trace Study Results, 2006 Tab 7. USGS Groundwater Model, 2013 Tab 8. WERI Lens Aquifer Map, 2018 Tab 9. Groundwater Sampling Map, 2024 Tab 10. 1st GW Sampling Report, 2024</p>		
4	<p><u>Protectiveness of a Subpart X Miscellaneous Unit: 40 CFR § 270.23</u></p> <p>Similar to the 40 CFR § 270.14(b)(8) comment, the submitted 2021 permit renewal application includes operation, maintenance, monitoring, inspection and closure details. As this is an OD unit, JRM is limited to providing dimensions of the unit construction as there is no existing infrastructure associated with the unit, and any construction in the area would not survive a blast wave associated with treatment at the unit.</p> <p>In addition, the 2021 permit renewal application included an Inspection Schedule in Appendix C (Tab 11. Appendix C of Permit Renewal Application, 2021) and an OD Residue Management Plan in Appendix J (Tab 12. Appendix J of Permit Renewal Application, 2021).</p> <p>The OD unit has a capability of supporting detonations up to 600 lbs. NEW resulting with impacts from blast waves and shock impacts resulting in severe buckling of structural metal above and below ground, restricting the ability for construction on the range.</p> <p>JRM is committed to working with GEPA and USEPA Region 9 to address this issue and how to address it in the revised permit renewal application.</p> <p>Tab 11. Appendix C of Permit Renewal Application, 2021 Tab 12. Appendix J of Permit Renewal Application, 2021</p>	Revised Permit Renewal Application	30 April 2025
5	<p><u>Establish and Maintain an Information Repository:</u></p> <p>JRM has published a webpage which includes much of the requested information regarding the permit, and the page will continue to be updated as more information is available. This webpage can be found at: https://www.andersen.af.mil/About-Us/Protecting-the-Environment/Information-Repository-for-Open-Detonation/</p>	Further updates will be made as available	Information Repository webpage online as of 19 November 2024

**Schedule of Compliance for Andersen AFB
Hazardous Waste OD Permit GUS002**

	<p>After discussing with the agencies, JRM does not believe that providing a static 14-day notice in advance of permitted OD activity would meet the agencies’ stated goal of providing notice to the citizens of Guam to stay away from the area because operational needs may change in the meantime. JRM has instead provided a link to the US Coast Guard’s multimedia Maritime Safety Information network, where updates on activities at the Tarague Embayment and other areas around Guam are provided to mariners advising them to avoid those areas, as part of this information repository. A link is also provided where citizens can sign up to receive email updates from the Coast Guard directly.</p> <p>JRM welcomes additional conversations and commits to working with the agencies to ensure that no citizens are in the blast zone when OD activity is taking place.</p>		
6	<p><u>Protectiveness of a Subpart X Miscellaneous Unit located in a 100-year floodplain: 40 CFR § 264.18(b)(1)(ii)</u></p> <p>The inactive open burn (OB), the active open detonation (OD) unit, and all adjacent areas in between them are not located in the 100-year floodplain based on the Federal Emergency Management Agency’s online National Flood Hazard Layer Viewer, 6600010050D, eff. 9/28/2007 - which is attached with the locations of the units noted (Tab 2). JRM is committed to clarifying this issue in its revised closure plan.</p> <p>Tab 2. FEMA National Flood Hazard Map</p>	Revised Closure Plan	30 April 2025
7	<p><u>Closure of OB Unit:</u></p> <p>In March 2024, EPA stated that “some OB/OD units no longer treat hazardous or solid wastes but continue to receive waste explosives contaminants from adjacent operations, such as an active OB/OD unit or an active military range. Again, it would be impractical to require closure of the inactive unit when it will continue or has the potential to continue to receive the same or similar contaminants” (89 FR 19952, 19986). Even though the inactive OB unit no longer treats hazardous wastes and can no longer legally do so under Guam law, it is in the middle of the larger active EOD Range and may continue to be impacted by adjacent operations at the EOD range that may contain similar wastes that were previously treated at the permitted OB unit.</p> <p>To be responsive to the agencies’ requests, JRM commits to submitting a new closure plan for approval by Guam EPA to address the concerns raised by the agencies and separate out the closure of the OB unit from the OD unit. JRM expects this plan to address surface clearance of OB area, soil sampling, installation and sampling of temporary monitoring wells, and potentially removal of soil if found to be impacted by OB activities.</p>	Revised Permit Renewal Application and OB Closure Plan	30 April 2025

**Schedule of Compliance for Andersen AFB
Hazardous Waste OD Permit GUS002**

	<p>However, more time is necessary to develop and evaluate such plans to ensure that these activities do not interfere with activities on the active EOD range, adjacent OD unit, or disturb sensitive wildlife in the vicinity. Based on the results of this evaluation, delayed closure of the OB unit may still be necessary and supportable under 40 CFR § 264.113; JRM anticipates that need will be known and communicated upon submittal of the revised closure plan. As such, JRM cannot currently commit to a date-certain for closure of the OB unit.</p> <p>However, JRM unequivocally commits to not use the unit for new OB activities and will remove all operational references to OB in the revised permit renewal application, including removing the estimated quantity of waste treated by open burn in Hazardous Waste Permit Part A Form section 7, line 1. JRM respectfully requests the agencies advise if they would like these changes to be submitted as part of the overall revised permit renewal application after all outstanding items are completed or if they would like an interim revised permit renewal application submitted on 30 April 2025.</p>		
8	<p><u>Alternative Technologies Evaluation:</u></p> <p>We understand that Guam Environmental Protection Agency (GEPA) and EPA Region 9 would like to see the alternative technology evaluation completed at an accelerated rate. The first step of any alternative technology evaluation is the waste analysis which the assessment is based on. As the alternative technology evaluation is already underway, JRM respectfully requests that the agencies provide any technical comments they may have on the draft waste analysis plan by 16 December 2024 to facilitate the timely completion of our alternative technology evaluation.</p>	<p>GEPA/ USEPA Region provide comments on draft waste analysis plan</p> <p>Onsite kickoff meeting with contractor</p>	<p>Contract award 30 Sep 2024 with estimated completion date of 30 Sep 2025</p> <p>Revised draft waste analysis plan submitted on 19 Sep 2024</p>
9	<p><u>Environmental Performance Standards: 40 CFR § 264.601</u></p> <p>Section A3.B. of Appendix I to the 2021 permit renewal application contains a list of 21 Environmental Performance Standards applicable to the OD unit's operations (Tab 3). Similar to the previous sections discussing the requirements of 40 CFR § 270.14(b)(8) and 40 CFR § 270.23, the submitted 2021 permit renewal application overall includes operation, maintenance, monitoring, inspection and closure details. As this is an OD unit, JRM is limited to providing dimensions of the unit construction as there is no existing infrastructure associated with the unit, and any construction in the area would not survive blast wave associated with treatment at the unit.</p>	<p>JRM to establish series or re-occurring meetings at the AO level to address items of concern with the permit renewal application.</p>	<p>Final revised permit renewal application 30 Jul 2026</p>

**Schedule of Compliance for Andersen AFB
Hazardous Waste OD Permit GUS002**

<p>In addition, the 2021 permit renewal application included an Inspection Schedule in Appendix C (Tab 11) and an OD Residue Management Plan in Appendix J (Tab 12).</p> <p>JRM is committed to clarifying the limitations for construction in its revised permit renewal application and respectfully requests the agencies advise if they would like these clarifications to be submitted as part of the overall revised permit renewal application after all outstanding items are completed or if they would like an interim revised permit renewal application submitted on 30 April 2025. We expect other concerns raised by the agencies under this section will be addressed by the actions discussed in previous sections; if there are still concerns, JRM respectfully requests another meeting to further discuss.</p> <p>Tab 3. Appendix I of Permit Renewal Application, Process Information, 2021 Tab 11. Appendix C of Permit Renewal Application, 2021 Tab 12. Appendix J of Permit Renewal Application, 2021</p>		
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Tabs:

- Tab 1. Appendix K of Permit Renewal Application, EOD Demolition Range Procedures, 2021
- Tab 2. FEMA National Flood Hazard Map, 2007
- Tab 3. Appendix I of Permit Renewal Application, Process Information, 2021
- Tab 4. Appendix H of Permit Renewal Application, Topographic map, 2021
- Tab 5. AAFB GEPA Approved Permit, 2018
- Tab 6. OBOD Dye Trace Study Results, 2006
- Tab 7. USGS Groundwater Model, 2013
- Tab 8. WERI Lens Aquifer Map, 2018
- Tab 9. Groundwater Sampling Map, 2024
- Tab 10. 1st GW Sampling Report, 2024
- Tab 11. Appendix C of Permit Renewal Application, 2021
- Tab 12. Appendix J of Permit Renewal Application, 2021