



GUAM ENVIRONMENTAL PROTECTION AGENCY • AHENSIAN PRUTEKSIÓN LINA'LA' GUÅHAN
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RISK ASSESSMENT DOCUMENT:

**Interim Action Level for Dieldrin established by the Guam Environmental Protection Agency Board of Directors on November 21, 2024
pursuant to Guam Safe Drinking Water Act 10 GCA §53113
Updated: November 26, 2025**

1. Summary

The Guam Environmental Protection Agency (Guam EPA) established an Interim Action Level (IAL) for the pesticide, dieldrin in November of 2024. This IAL applies to drinking water obtained from all Public Water Systems (utilities, such as the Guam Waterworks Authority (GWA), U.S. Navy, or U.S. Air Force systems) and requires those Public Water Systems (PWS) to notify consumers in accordance with the requirements of this IAL. This IAL for dieldrin is established under the authority granted to Guam EPA by the Guam Safe Drinking Water Act at 10 GCA § 53113.

Dieldrin is a human-made chemical that was used as an insecticide from the 1950s until 1987. Dieldrin has been identified as a probable carcinogen by the U.S. EPA and exposure to trace levels over long-durations of time may increase the likelihood of developing cancer. Dieldrin is still being detected in Guam's drinking water.

2. What is Dieldrin?

Dieldrin is an insecticide and a breakdown product of another insecticide called aldrin. Dieldrin and aldrin were widely used on crops like cotton and corn from the 1950s to 1970. The U.S. Department of Agriculture cancelled all uses of aldrin and dieldrin in 1970 for environmental hazards and potentially carcinogenic effects.

In 1972, the U.S. Environmental Protection Agency (EPA) approved aldrin and dieldrin for killing termites. The manufacturer of aldrin and dieldrin cancelled the insecticides' registration for termite control in 1987.

The U.S. EPA recognizes that dieldrin and aldrin may have adverse effects on the health of people. They chose to not regulate them in drinking water based on findings that the pesticides were banned, exposure to the chemicals was not nationally widespread, and an assumption that the occurrence would decrease over time since these insecticides were not being produced anymore.

3. Dieldrin in the Environment

Aldrin and dieldrin may be found in soil, water, or homes where the chemicals were used. Aldrin converts to dieldrin within a relatively short timeframe under typical environmental conditions. Dieldrin does not break down quickly in soil or water. It may take many years for large deposits of dieldrin to break down in soil. Dieldrin also builds up in the fatty tissues of animals, humans, and can be absorbed by plants.



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4. Dieldrin in Guam's Water

Levels of dieldrin in Guam's public water systems range from non-detect to over 2.01-9 micrograms per liter (~~ug/L~~ ug/L or parts per billion - ppb). Dieldrin has been found at levels above the laboratory detection limit of 0.01 ppb in ~~81~~ the majority of Guam Waterworks Authority's (GWA's) active production wells, and ~~three~~ one of those production wells are currently above the Interim Action Level of 0.20 ppb, all of which are located in the northern part of Guam.

Current dieldrin monitoring data is ~~not available~~ being collected and evaluated for the Anderson Air Force Base and the U.S. Navy public water systems, ~~since it is not a regulated chemical.~~

Detections of aldrin are not typically found above levels of concern in Guam's water since it readily converts to dieldrin in the environment.

All drinking water vendors holding a valid DPHSS Sanitary Permit as of June 2023 have been verified by Guam EPA to provide treatment processes that are adequate to remove significant amounts of dieldrin. All of these systems employ both granular activated carbon and reverse osmosis processes. These treatments are proven to remove many contaminants from the water, including dieldrin.

5. Monitoring Requirements

Effective August 1, 2025, All Public Water Systems must initially monitor for dieldrin at all entry points at no less than a quarterly frequency, and then consistent with the monitoring requirements for other synthetic volatile organic compounds (SVOCs) under 22 GAR § 6141.24. Results must be obtained using EPA methods 525.2 or 505.

A reduction in monitoring frequency may be granted by Guam EPA on the basis of supportive monitoring data as allowable for other SVOCs under 22 GAR § 6141.24. Any detection of dieldrin in a compliance sample will trigger quarterly testing for a minimum four (4) consecutive quarters.

Upon the installation of adequate, approved treatment by a PWS to a production well or wells, a minimum of 4 consecutive, weekly tests will be required, and monthly testing for a minimum of 12 months thereafter will be required.

6. Interim Action Level (IAL)

~~Dieldrin is not regulated by the U.S. EPA and based on the risk assessment references listed below, Guam EPA established the following Health-Based IAL for dieldrin (Chemical Abstract Service (CAS) 60-57-1) in drinking water:~~

~~The Interim Action Level (IAL) will mandate public notification (within 30 days) to public water system customers in addition to issuing a "Do Not Drink without Treatment" advisory for areas receiving water that exceeds 0.2 ug/L (ppb).~~

~~In addition, public water system customers who receive or have received water that exceeds the non-cancer short-term health advisory of 0.5 ug/L shall be specifically notified (within 24 hours) of the average dieldrin concentration they have received and that it exceeds the short-term health advisory concentration.~~

~~Applicability of the IAL will be based on the running annual average of quarterly monitoring data~~



for dieldrin, where it exists:

Guam EPA established an Interim Action Level for the detection dieldrin to be 0.20 µg/L (or ppb). The IAL is exceeded when the average of samples from any given quarter when monitoring is required exceeds 0.20 µg/L, and shall remain exceeded until adequate and approved treatment is installed, and a minimum of 4 consecutive weekly samples that demonstrate that no single result is over 0.20 µg/L. An exceedance of 0.50 µg/L will require a Tier 1 Public Notice within 24 hours, and an exceedance of 0.20 µg/L to 0.49 µg/L will require a Tier 2 Public Notice within 30 days.

If any one sample result during the compliance period is greater than or equal to 0.80 µg/L, then the IAL is exceeded, and shall remain exceeded until adequate and approved treatment is installed, and a minimum of 4 consecutive weekly samples demonstrate that no single result is over 0.20 µg/L.

If a PWS elects to remove any well from production due to the exceedance of the IAL, it must notify customers previously served by the well in accordance with the level of exceedance, notify Guam EPA's Safe Drinking Water Program within 24 hours, and may not reenter production without the installation of adequate and approved treatment, and a minimum of 4 consecutive weekly samples that demonstrate that no single result is over 0.20 µg/L.

7. Consumer Health Information and Recommendations

If you receive water that is above the IAL:

~~Dieldrin is classified by the U.S. EPA as a probable human carcinogen. Long-term consumption of water that exceeds the dieldrin IAL of 0.2 micrograms per liter (ug/L or parts per billion — ppb) represents an unacceptable long-term likelihood, or risk of developing cancer. Similarly, long-term consumption of water with elevated levels of dieldrin has been associated with adverse impacts on the liver and nervous system. Some people who drink water containing dieldrin in excess of the IAL over many years could experience problems with their liver or nervous system, and may have an increased risk of getting cancer.~~

You should not drink or cook with water that contains dieldrin above the IAL without treatment. The most reliable form of treatment is granular activated carbon filters installed by your Public Water System (utility).

If a treatment system has not yet been installed by your Public Water System, Guam EPA recommends that you obtain water for drinking and cooking from a Department of Public Health and Social Services (DPHSS)-approved drinking water vendor. As of June 2023, all of the DPHSS approved drinking water vending services, employ both granular activated carbon and reverse osmosis processes. These treatments are proven to remove many contaminants from the water, including dieldrin.

An alternative to a water vendor would be to install a Point of Entry (POE) or Point of Use (POU) device located at your home that includes granular activated carbon as part of its treatment process. A POE device or system treats all water entering a home, business, school, or facility, and a POU device is a treatment device installed at a single faucet or



spigot, both for the purpose of reducing contaminants in drinking water at the source of installation. You should ensure that any POE/POU device used in your home is certified by the National Sanitation Foundation (NSF) to meet the NSF-53 or 401 Standards. Make sure you replace the granular activated carbon filter in accordance with the POE/POU device manufacturer's recommendations.

8. Notification Requirements

Upon final approval of this IAL, all Public Water Systems are required to notify ~~their~~ affected customers in accordance with this IAL and the public notification requirements under the Guam Safe Drinking Water Regulations Subpart Q, 22 GAR §§ 6141.201 – 6141.299 as follows, with the exception that exceedances of the IAL for dieldrin will not be considered a “violation” as stated in the Regulations because there is no established maximum contaminant level (MCL).³

IAL Public Notice. Where monitoring data demonstrates that the IAL has been exceeded, public notification under the IAL will be considered a Tier 2 Public Notice, and must follow the relevant requirements of 22 GAR § 6141.203. At minimum, ~~P~~public notices must contain the mandatory notification language below. An IAL Tier 2 Public Notice template is attached. The Tier 2 Public Notice rules require that Public Water Systems provide the public notice “as soon as practical, but no later than 30 days after the system learns of the violation.”

For public water system customers who receive water or have received water that exceeds the non-cancer short-term health advisory of 0.50 ~~ug/L~~ ug/L, a Tier 1 Public Notice shall be issued and must follow the relevant requirements of 22 GAR § 6141.202. An IAL Tier 1 Public Notice template is attached. The Tier 1 Public Notice rules require that Public Water Systems provide the public notice “as soon as practical, but no later than 24 hours after the system learns of the violation.”

Mandatory Notification Language for Tier 2 Public Notification:

“Dieldrin is classified by the U.S. EPA as a probable human carcinogen. Water supplied by this public water system in your area exceeds the dieldrin IAL of 0.20 micrograms per liter (~~ug/L~~ ug/L or parts per billion – ppb) established by Guam EPA. Some people who drink water dieldrin in excess of the IAL over many years could experience problems with their liver or nervous system, and may have an increased risk of getting cancer. ~~and potentially represents an unacceptable long term cancer risk. Long-term consumption of water containing dieldrin above the IAL increases the likelihood of developing cancer above acceptable levels.~~

You should not drink or cook with water that contains dieldrin above the IAL without treatment. The most reliable form of treatment is granular activated carbon filters installed by your Public Water System (utility). If a treatment system has not yet been installed by your Public Water System, Guam EPA recommends that you obtain water for drinking and cooking from a Department of Public Health and Social Services (DPHSS)-approved drinking water vendor or a Point of Entry (POE) or Point of Use (POU) device located at your home that includes granular activated carbon as part of its treatment process.

A POE device or system treats all water entering a home, business, school, or facility, and a POU device is a treatment device installed at a single faucet or spigot, both for the purpose of reducing contaminants in drinking water at the source of installation. You should ensure that any POE/POU device used in your home is certified by the National Sanitation Foundation (NSF) to meet the NSF-53 or 401 Standards. Also, make sure you replace the granular activated carbon filter in accordance with the POE/POU device manufacturer's recommendations.



~~All drinking water vendors holding a valid DPHSS Sanitary Permit as of June 2023 have been verified by Guam EPA to provide treatment processes that are adequate to remove significant amounts of dieldrin. All of these systems employ both granular activated carbon and reverse osmosis processes. These treatments are proven to remove many contaminants from the water, including dieldrin.”~~

Mandatory Notification Language for Tier 1 Public Notification:

~~“Dieldrin is classified by the U.S. EPA as a probable human carcinogen. Water supplied by this public water system in your area exceeds the dieldrin IAL of 0.20 micrograms per liter ($\mu\text{g/L}$ or parts per billion – ppb) established by Guam EPA. In addition to exceeding the IAL, water in your area also exceeds the short-term, non-cancer health advisory concentration of 0.50 $\mu\text{g/L}$. Some people who drink water containing dieldrin in excess of the IAL over many years could experience problems with their liver or nervous system, and may have an increased risk of getting cancer, and potentially represents an unacceptable long term cancer risk. Long term consumption of water containing dieldrin above the IAL increases the likelihood of developing cancer above acceptable levels.~~

~~Drinking water containing dieldrin is also associated with a wide range of adverse, non-cancer health effects at higher concentrations. In addition to exceeding the IAL, water in your area also exceeds the short term, non-cancer health advisory concentration of 0.50 $\mu\text{g/L}$. Shorter term consumption of water with dieldrin levels above this concentration have been associated with an increased likelihood of adverse impacts on the liver and nervous system.~~

You should not drink or cook with water that contains dieldrin above the IAL without treatment. The most reliable form of treatment is granular activated carbon filters installed by your Public Water System (utility). If a treatment system has not yet been installed by your Public Water System, Guam EPA recommends that you obtain water for drinking and cooking from a Department of Public Health and Social Services (DPHSS)-approved drinking water vendor or a Point of Entry (POE) or Point of Use (POU) device located at your home that includes granular activated carbon as part of its treatment process.

A POE device or system treats all water entering a home, business, school, or facility, and a POU device is a treatment device installed at a single faucet or spigot, both for the purpose of reducing contaminants in drinking water at the source of installation. You should ensure that any POE/POU device used in your home is certified by the National Sanitation Foundation (NSF) to meet the NSF-53 or 401-Standards. Also, make sure you replace the granular activated carbon filter in accordance with the POE/POU device manufacturer’s recommendations.

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9. Basis for IAL and Risk Assessment References

Guam EPA has reviewed available state and federal guidelines as well as risk assessments and has elected to establish an IAL for dieldrin at the level of 0.20 $\mu\text{g/L}$ (ppb), which corresponds to a lifetime excess cancer risk of 10^{-4} (one-in-ten thousand). This is consistent with the National Contingency Plan (NCP) and the U.S. EPA risk assessment guidance, which generally recommends a range of acceptable risk for exposure to carcinogens between 10^{-6} (one-in-one million) to 10^{-4} (one-in-ten thousand). Additionally, the IAL of 0.20 $\mu\text{g/L}$ is the same as the State of Hawaii’s “Health Advisory” level.

The IAL is set to a level that is also protective of the wide range of dieldrin’s adverse, non-cancer



health effects, including impacts on the liver and nervous system. The U.S. EPA's short-term health advisory concentration for children is 0.50 ug/L (ppb). (U.S. EPA, 2018).

The federal risk assessments used in the development of Guam EPA's IAL for dieldrin may be accessed through the internet addresses provided below:

U.S. Environmental Protection Agency (U.S. EPA). (2018). *2018 Edition of the Drinking Water Standards and Health Advisories Tables* (EPA 822-F-18-001).
<https://www.epa.gov/system/files/documents/2022-01/dwtable2018.pdf>

U.S. EPA. (2003). *EPA Health Effects Support Document for Aldrin/Dieldrin* (EPA 822-R-03-001). U.S. Environmental Protection Agency (USEPA).
https://www.epa.gov/sites/default/files/2014-09/documents/support_cc1_aldrin-dieldrin_healtheffects.pdf



ATTACHMENT #1: IAL Tier 1 Public Notice Template

**DRINKING WATER WARNING
AND
DO NOT DRINK WITHOUT TREATMENT ADVISORY**
[Water System Name] has high levels of dieldrin

Our water system recently exceeded the dieldrin Interim Action Level (IAL). As our customers, you have a right to know what this means, what you should do, and what is being done to correct this situation.

On [given date], we received notice that the sample collected on [given date] showed dieldrin levels of [level and units]. This is above the dieldrin IAL for the short-term, non-cancer health advisory concentration of 0.50 micrograms per liter (~~ug/L~~ ug/L or parts per billion – ppb).

What does this mean?

Dieldrin is classified by the U.S. EPA as a probable human carcinogen. Water supplied by this public water system in your area exceeds the dieldrin IAL of 0.20 micrograms per liter (~~ug/L~~ ug/L or parts per billion – ppb) established by Guam EPA. In addition to exceeding the IAL, water in your area also exceeds the short-term, non-cancer health advisory concentration of 0.50 ~~ug/L~~ ug/L. Some people who drink water containing dieldrin in excess of the IAL over many years could experience problems with their liver or nervous system, and may have an increased risk of getting cancer, and potentially represents an unacceptable long-term cancer risk. Long-term consumption of water containing dieldrin above the IAL increases the likelihood of developing cancer above acceptable levels.

~~Drinking water containing dieldrin is also associated with a wide range of adverse, non-cancer health effects at higher concentrations. In addition to exceeding the IAL, water in your area also exceeds the short-term, non-cancer health advisory concentration of 0.50 ~~ug/L~~ ug/L. Shorter-term consumption of water with dieldrin levels above this concentration have been associated with an increased likelihood of adverse impacts on the liver and nervous system.~~

What should I do?

You should not drink or cook with water that contains dieldrin above the IAL without treatment. The most reliable form of treatment is granular activated carbon filters installed by your Public Water System (utility). If a treatment system has not yet been installed by your Public Water System, Guam EPA recommends that you obtain water for drinking and cooking from a Department of Public Health and Social Services (DPHSS)-approved drinking water vendor or a Point of Entry (POE) or Point of Use (POU) device located at your home that includes granular activated carbon as part of its treatment process.

A POE device or system treats all water entering a home, business, school, or facility, and a POU device is a treatment device installed at a single faucet or spigot, both for the purpose of reducing contaminants in drinking water at the source of installation. You should ensure that any POE/POU device used in your home is certified by the National Sanitation Foundation (NSF) to meet the NSF-53 or 401 Standards. Also, make sure you replace the granular activated carbon filter in accordance with the POE/POU device manufacturer's recommendations.

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What is being done?

[Describe corrective action.]

We are still detecting dieldrin. We will inform you when our sampling shows that no dieldrin is present. We anticipate resolving the problem within [estimated time frame].

For more information, please contact [name of contact] at [phone number] or [mailing address].

Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.

This notice is being sent to you by [system]:

PWS ID#:

Date distributed:



ATTACHMENT #2: IAL Tier 2 Public Notice Template

IMPORTANT INFORMATION ABOUT YOUR DRINKING WATER
AND
DO NOT DRINK WITHOUT TREATMENT ADVISORY
Tests Show Dieldrin in [System] Water

Our water system recently exceeded the dieldrin Interim Action Level (IAL). Although this is not an emergency, as our customers, you have a right to know what this means, what you should do, and what is being done to correct this situation.

On [given date], we received notice that the sample collected on [given date] showed dieldrin levels of [level and units]. This is above the dieldrin IAL of 0.20 micrograms per liter (~~ug/L~~ µg/L or parts per billion – ppb).

What does this mean?

Dieldrin is classified by the U.S. EPA as a probable human carcinogen. Water supplied by this public water system in your area exceeds the dieldrin IAL of 0.20 micrograms per liter (~~ug/L~~ µg/L or parts per billion – ppb) established by Guam EPA. ~~Some people who drink water containing dieldrin in excess of the IAL over many years could experience problems with their liver or nervous system, and may have an increased risk of getting cancer, and potentially represents an unacceptable long-term cancer risk. Long-term consumption of water containing dieldrin above the IAL increases the likelihood of developing cancer above acceptable levels.~~

What should I do?

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What is being done?

[Describe corrective action.]

We are still detecting dieldrin. We will inform you when our sampling shows that no dieldrin is present. We anticipate resolving the problem within [estimated time frame].

For more information, please contact [name of contact] at [phone number] or [mailing address].

Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.

This notice is being sent to you by [system]:

PWS ID#:

Date distributed:

