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**Final Nevada PFAS Action Plan**

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# **Abbreviations & Acronyms List**

AB 97 Nevada Assembly Bill 97

AFFF Aqueous Film Forming Foam

AQOPs Air Quality Operating Permits

ASDWA Association of State Drinking Water Administrators

BCLs Basic Comparison Levels

CERCLA Comprehensive Environmental Response, Compensation, and Liability Act

DoD Department of Defense

EPA United States Environmental Protection Agency

FRS Facility Registry System

GIS Geographic Information System

ITRC Interstate Technology and Regulatory Council

HAL Lifetime Health Advisory Level

MCL Maximum Contaminant Level

µg/L Micrograms per liter

NAICS North America Industry Classification System

NDEP Nevada Division of Environmental Protection

NGWA National Groundwater Association

ng/L Nanograms per liter or parts per trillion (ppt)

OTM Other Test Method

PFAS Perfluoroalkyl Substances

PFBS Perfluorobutanesulfonic

PFHpA Perfluorohexanoic Acid

PFHXA Perfluoroheptanoic Acid

PFHxS Perfluorohexane sulfonate

PFNA Perfluorononanoic Acid

PFOA Perfluorooctanoic Acid

PFOS Perfluorooctanoic Sulfonate

PFPeA Perfluoropentanoic Acid

POTWs Publicly Owned Treatment Works

PWSs Public Water Systems

SWIs Surface Water Intakes

WWTPs Wastewater Treatment Plants

UCMR Unregulated Contaminant Monitoring Rule

# **Introduction**

Per- and polyfluoroalkyl substances (PFAS) are a class of emerging contaminants consisting of fluorinated compounds that make up several thousand chemicals. Due to their widespread use, including in consumer and commercial applications such as firefighting foams, stain repellants for clothing and carpets, and other sources, these chemicals are being detected in drinking water supplies, groundwater, surface water, landfill leachate, and air. As a result of more advanced laboratory analytical testing and epidemiological studies by federal health and environmental agencies, the U.S. Environmental Protection Agency (EPA) established a Lifetime Health Advisory Level (HAL) for two PFAS chemicals that have been most widely produced and studied, perfluorooctanoic acid (PFOA) and perfluorooctane sulfonic acid (PFOS), at 70 nanograms per liter (ng/L) (or parts per trillion (ppt)) in 2016. HALs are non-enforceable and non-regulatory advisories designed to provide technical information to states agencies and other public health officials on health effects, analytical methods, and treatment technologies associated with drinking water contamination. EPA also published a [PFAS Strategic Roadmap](https://us-east-2.protection.sophos.com/?d=epa.gov&u=aHR0cHM6Ly93d3cuZXBhLmdvdi9wZmFzL3BmYXMtc3RyYXRlZ2ljLXJvYWRtYXAtZXBhcy1jb21taXRtZW50cy1hY3Rpb24tMjAyMS0yMDI0&i=NWQ2NmU3N2I2YjA5ZWQxNjBkNjZmY2U3&t=UE05aUI5SVE4cTZ3di8vOHpVbnRBOHNIRHlnVXV6NXZRQlZsRi9NVzREbz0=&h=d5fd19660fed45e4b49dd5ed47a4fad7) in 2021. In May 2022 EPA calculated Regional Screening Levels for tap water for PFOA (6 ng/L), PFOS (4 ng/L), HFPO & HFPO-DA (6 ng/L), and PFBS (600 ng/L). On June 15, 2022, EPA published interim HALs for PFOA (0.004 ng/L) and PFOS (0.02 ng/L). EPA also published HALs for HFPO & HFPO-DA (10 ng/L) and PFBS (2,000 ng/L).

Nevada Assembly Bill AB 97 (AB 97) passed in 2021 called for the establishment of a working group to study issues relating to environmental contamination resulting from PFAS in Nevada. The purpose of the working group is to develop a Nevada PFAS Action Plan (Plan) as defined in Sec. 14.5.2 of AB 97 that will assist the state in achieving the following five objectives:

* Evaluate the potential for environmental contamination in the State resulting from PFAS
* Determine the location and extent of potentially significant discharges or releases of PFAS in the State
* Compile information relating to existing federal, State and local actions and identify data gaps to monitor, contain and clean up environmental contamination resulting from PFAS
* Determine the potential points of exposure to PFAS for residents of the State
* Develop recommendations for state and local action to prevent releases, monitor drinking water sources, and contain and clean up environmental contamination resulting from PFAS

The Nevada Division of Environmental Protection (NDEP) addressed this requirement through the development of a Working Group composed of representatives of interested state and local public agencies, academia, labor organizations, environmental groups, private industry, and trade associations to support the development of the PFAS Action Plan for the State of Nevada.

The overall objective of the Nevada PFAS Action Plan is to synthesize input from the PFAS Working Group and other stakeholders as the first step in creating appropriate, consistent, concise, and collaborative approaches for addressing PFAS in Nevada. This Plan is subject to changes in PFAS regulations promulgated either by EPA or NDEP. This Plan will be revised by NDEP as and when needed to reflect and incorporate such changes.

# **Potential PFAS in Nevada**

This Section of the Action Plan summarizes the current data on environmental contamination from PFAS in the State, the location of potentially significant discharges/releases within the State, and potential exposure to PFAS from these or other sources within the State.

## Current Data Points

The following subsections identify and summarize available and ongoing and potential sources of data relative to PFAS within the State.

### Third Unregulated Contaminant Monitoring Rule (UCMR 3): 2013 – 2015

The third Unregulated Contaminant Monitoring Rule (UCMR 3) was published by EPA on May 2, 2012, requiring groundwater monitoring for 30 contaminants (28 chemicals and two viruses) between 2013 and 2015 using analytical methods developed by EPA, consensus organizations or both. This data consists of Public Water System (PWS) or EPA conducted sampling and analysis for assessment monitoring, screening survey, and pre-screen testing for contaminants. The following PFAS chemicals were selected for assessment monitoring with corresponding minimum reporting limits: perfluorooctanesulfonic acid (PFOS) 0.04 microgram per liter (µg/L), perfluorooctanoic acid (PFOA) 0.02 µg/L, perfluorobutanesulfonic acid (PFBS) 0.09 µg/L, perfluorohexanesulfonic acid (PFHxS) 0.03 µg/L, perfluoroheptanoic acid (PFHpA) 0.01 µg/L, and perfluorononanoic acid (PFNA) 0.02 µg/L.

The list of PWSs sampled in the state of Nevada were: Boulder City, City of Elko, Carson City Public Works, City of Henderson, Dayton Valley Water System, Double Diamond, Edgewood Water Company, Ely Municipal Water Department, Escapee Co-op of NV, Fernley Public Works, Gardnerville Ranchos GID, Las Vegas Valley Water District, North Las Vegas Utilities, Round Mountain PUC, South Truckee Meadows GID, Sun Valley GID, Truckee Meadows Water Authority, and Virgin Valley Water District. Additionally, Naval Air Station Fallon was sampled as part of UCMR 3.

All PFAS results from all PWSs were below the minimum reporting limits ([https://www.epa.gov/dwucmr/occurrence-data-unregulated-contaminant-monitoring-rule#3](https://www.epa.gov/dwucmr/occurrence-data-unregulated-contaminant-monitoring-rule" \l "3)).

### Desert Research Institute Study

A study from researchers at the Desert Research Institute (X. Bai, Y. Son; 2021) evaluated surface water and sediments collected from six locations along the Las Vegas Wash and Lake Mead and eight locations along the Truckee River, Lake Tahoe, and Pyramid Lake in Nevada. Of the 17 perfluoroalkyl compounds analyzed, 12 were detected in the surface water and 14 were detected in the sediments. The “totals” provided in this study were a sum of compound concentrations across multiple sample locations and events and do not represent the concentrations available for potential distribution and/or consumption.

* The predominant compounds found in the water were perﬂuorohexanoic acid (PFHxA) (1.5 – 187.0 ng/L), followed by perﬂuoropentanoic acid (PFPeA) (below detection limit [BDL] to 170 ng/L), PFOA (BDL to 65.5 ng/L), and PFBS (BDL to 44.7 ng/L).
* The predominant compounds in the sediments were perﬂuorodecane sulfonic acid (PFDS) (BDL to 88.2 μg/kg), PFHxA (BDL to 20.3 μg/kg), PFBS (BDL to 29.1 μg/kg), and perﬂuoroundecanoic acid (PFUA) (BDL to 22.9 μg/kg).

### Department of Defense Sampling Data

All DoD-owned and operated drinking water systems have been tested to identify drinking water exceeding the EPA Lifetime Health Advisory Levels for PFOS and PFOA. DoD drinking water systems at Nellis Air Force Base, Creech Air Force Base, Naval Air Station Fallon, and the Hawthorne Army Deport were tested for PFAS analytes under UCMR 3 (EPA Method 537) and/or DoD Policy (EPA Method 537.1) with no reported exceedances of the 2016 EPA Lifetime Health Advisory Levels for PFOS and PFOA. Per current DoD policy, these drinking water systems will continue to be monitored for PFAS and results will be included in installation Consumer Confidence Reports, where applicable.

In addition, DoD follows the federal cleanup law, the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 (also known as “Superfund”), and long-standing EPA regulations for all chemicals in its cleanup program, including PFAS. As of September 30, 2021, DoD was assessing the following seven installations in Nevada for PFAS use or potential release: Hawthorne Army Depot (Active), Las Vegas Cheyenne Army Aviation Support Facility (National Guard), Reno Army Aviation Support Facility (National Guard), Naval Air Station Fallon (Active), Creech Air Force Base (Active), Nellis Air Force Base (Active), and Reno Tahoe (National Guard). Additional environmental sampling for PFAS, including groundwater and surface water sampling, has been conducted under the CERCLA process, and is, or will be, available as part of the respective Administrative Record.

More information about DoD and PFAS is available online at <https://www.defense.gov/Spotlights/PFAS/> and <https://denix.osd.mil/dod-pfas/>.

### Other Research in Nevada

The State is aware that researchers at University Nevada Reno, University Nevada Las Vegas, Southern Nevada Water Authority and USGS are studying PFAS, its presence, effects, and/or more. As these data and results become available, they will be reviewed and incorporated into the State’s database.

Additional occurrence information for the Las Vegas Wash, Lake Mead and drinking water is available in from Quinones and Snyder (2009).

## Potential Location of Releases

The following subsections identify and summarize generic information on where releases could occur based other states experience, in no particular order or ranking of likely release. NDEP is also working to develop a GIS mapping layer to display known PFAS releases within the State.

### Publicly Owned Treatment Works / Wastewater Treatment Plants

Most businesses in Nevada discharge their liquid wastes to publicly owned treatment works (POTWs). If the liquid wastes from a commercial facility cannot be discharged to a POTW because of the presence of regulated pollutants, the waste is typically either sent to an industrial landfill, deep-well injected, or sent to an incinerator, depending on the specific waste and regulatory requirements.

Due to the widespread use of PFAS from different sources, all POTWs are expected to receive some PFAS, but not produce PFAS. If PFAS are present, they could ultimately be released to the environment because conventional treatment processes used by POTWs and Wastewater Treatment Plants (WWTPs) are not designed for the treatment of PFAS. Information on Nevada industries that discharge PFAS to a POTW is needed to assess if PFAS releases could be occurring from POTWs. No WWTP in Nevada has been identified that accepts influent from a manufacturer or significant user of PFAS chemicals.

Additional information related to long-term trends of PFAS concentrations and seasonal patterns of the presence of PFAS at wastewater treatment plants is available in Thompson et.al. (2022).

### Land Application of Biosolids

Biosolids are typically generated at POTWs. Common sludge treatment processes, e.g., lime treatment, digestion, thermal drying, do not reduce PFAS that may be in sludge from the POTW inputs. Therefore, land application of biosolids from POTWs could be a potential source of PFAS in the environment if there were significant amounts in the influent, which could include consumer product use. However, currently no POTW in Nevada has been identified that accepts influent from a manufacturer or significant user of PFAS chemicals.

### Industrial Manufacturing of PFAS or Use in Manufacturing

No industries in Nevada have been identified that manufacture PFAS.

Current or historical manufacturing could have used and/or released PFAS and the use of PFAS in industrial applications could range from minimal (or no) use to significant use. Certain coatings and manufacturing of fluids may have included use of PFAS. Many metal plating operations have historically used PFAS, or still use PFAS (e.g., hexavalent chromium plating). Concerns with potential industrial sources should be approached using a process similar to that used for any other potential release, i.e., investigate potential uses and where there was, or could have been, a use, then evaluate for potential releases. Where there was a use and a known or potential release, then a source to the environment could exist. Additional information on potential uses of PFAS in industry are available from EPA (2017, 2021a, 2021b), Glüge et al 2020, and Table 2-4 of the ITRC PFAS web page.

### Aqueous Film Forming Foam (AFFF) Storage and Use Locations

Many AFFFs, which are often used to extinguish different to suppress fires (particularly Class B fires involving petroleum products or other flammable liquids), contain or have contained PFAS from the late 1960s to present. Uses and releases of AFFF present potential sources to the environment. AB 97 Sec. 12 and 13, prohibits with certain exceptions discharges of Class B firefighting foam that contains intentionally added perfluoroalkyl and polyfluoroalkyl substances for testing or firefighting training purposes. AFFF is further discussed in Section 6.2 of this document.

# **Sources, Potential Exposure, and Screening Levels**

## Sources of Exposure

The following graphic illustrates common sources to the environment and potential exposures that may be relevant to PFAS.



Figure 1 Example Conceptual Site Model (from GHD, 2022)

### Drinking Water

Safe drinking water is vital to the public health, welfare, and economy of Nevada. Ingestion of PFAS in drinking water is a primary human exposure pathway. The Bureau of Safe Drinking Water is responsible for reviewing compliance sampling data from about 600 public water systems based on State and Federal regulations. If a water system’s sampling data exceeds a maximum contaminant level (MCL) or an action level, then the system is referred to as being non-complaint and has an opportunity to come into compliance.

Surface water intakes (SWIs) draw water from rivers and lakes after which it undergoes routine testing and treatment prior to supplying the public with drinking water. There are over 30 such intakes in Nevada. NDEP is continuously working to ensure the protection of water quality at intakes from pollution. Similar to the protection of groundwater sources, surface water intake protection areas are designated within the watershed (i.e., Source Water Assessment delineated areas) for management of potential contaminant sources. Protection of water quality at multiple intakes drawing from the same river or lake remains a priority.

As previously mentioned, all PFAS results from all PWSs were below the minimum reporting limits during the UCMR 3 sampling event.

### Surface Water

PFAS potentially discharged to surface water bodies can result in exposure to humans and aquatic species. PFAS impacted surface water bodies may result from but not limited to:

* Releases from commercial and industrial sources via permitted discharges or stormwater runoff
* Disposal/land application of municipal biosolids
* Discharge of effluent from municipal wastewater treatment systems
* Release of landfill leachate

Surface water used as a source of drinking water is another potential exposure pathway. Surface water is used in a greater number of ways than other waters (i.e., groundwater) and therefore represents potential direct exposure routes through dermal contact during recreational activities and water ingestion (see 3.1.1 Drinking Water), and indirect exposure through consumption of fish and shellfish (ITRC, 2021).

### Groundwater

PFAS containing discharges can potentially impact groundwater (NGWA, 2021). Groundwater used as a drinking water source is a potential exposure pathway (see 3.1.1 Drinking Water). Furthermore, groundwater contaminated with PFAS has the potential to discharge to surface water (NGWA, 2017) and vice versa.

### Ambient air and dust

Some PFAS are found in ambient air, with elevated concentrations detected or expected in urban areas nearest to major emission sources such as industrial facilities that produce PFAS or use PFAS. Additionally, areas near a release of Class B firefighting foams containing fluorine, waste management facilities including landfills and wastewater treatment plants, and areas of biosolids production and application have observed elevated PFAS concentrations in the air. Atmospheric transport and deposition from points of significant emissions may result in PFAS contaminating soil, groundwater, and other media of concern up to several miles from the emission source (ITRC, 2021).

## Tracking of Sources

There is limited tracking of historical PFAS use in Nevada and limited environmental monitoring data. Therefore, the locations of facilities that are potentially associated with PFAS materials as identified in the Association of State Drinking Water Administrators (ASDWA) guidance ([ASDWA, Mapping Guide for Per- and Polyfluoroalkyl Substances (PFAS) Source Water Assessments, Appendix A](https://www.asdwa.org/wp-content/uploads/2020/05/ASDWA-PFAS-SWP-Mapping-Guide_FINAL.pdf)) are being used to help inform where PFAS might be present in the environment. Details on the evaluation are based on the following available information:

### Facilities by NAICS Code

1. All facilities with North American Industry Classification System (NAICS) Codes in ASDWA guidance from EPA facility registry system (FRS) database
2. Large Quantity Hazardous Waste Generators with NAICS Codes in ASDWA guidance from EPA FRS database
3. Facilities having air quality operating permits (AQOPs) with NAICS Codes in ASDWA guidance from NDEP database

### Facilities From NDEP databases

1. Landfills
2. POTWs / WWTPs
3. Military bases and other Airports
4. Other facilities (firefighter training, large scale hydrocarbon refining and storage, etc.)

### NPDES Permits with EPA

EPA has stated that for federally issued NPDES permits, the agency will restrict PFAS discharge, require monitoring for PFAS, require best management practices, and establish practices to address PFAS-containing firefighting foams in storm water (Addressing PFAS Discharges in EPA-Issued NPDES Permits and Expectations Where EPA is the Pretreatment Control Authority, [USEPA, 2022](https://www.epa.gov/system/files/documents/2022-04/npdes_pfas-memo.pdf)). These actions will generate data on sources and quantities.

## Basic Comparison Levels (BCLs)

The NDEP Basic Comparison Levels (BCLs) address human health exposure pathways for use at the BMI Complex and Common Areas in Henderson, Nevada. The comparison of site characterization data against risk-based media concentrations provide for an initial screening evaluation to assist in the evaluation of data usability, determination of extent of contamination, identification of chemicals of potential concern, and identification of preliminary remediation goals. At the BMI Complex and Common Areas, the BCLs for PFOA and PFOS in Residential Water are 0.667 µg/L in addition to PFBS at 667 µg/L. As mentioned in the “[User’s Guide and Background Technical Document for the Nevada Division of Environmental Protection Basic Comparison Levels for Human Health for the BMI Complex and Common Areas](https://ndep.nv.gov/resources/risk-assessment-and-toxicology-basic-comparison-levels)” from 2020, the BCLs for PFOA and PFOS were derived using the toxicity criteria utilized by EPA (2016a, b) to develop the 2016 drinking water health advisories for these two chemicals.

The BMI Complex and Common Areas BCLs were calculated for that location and therefore their applicability at other locations would need to be verified prior to use.

# **PFAS in other States**

States across the US are addressing PFAS related issues. Some of these States have historical PFAS manufacturing and use leading to elevated levels of environmental contamination. Furthermore, some States have established maximum contaminant levels (MCLs) for PFAS in addition to guidance values for groundwater and surface water. More information on the specific actions taken by other States is available from the [Environmental Council of States (ECOS)](https://www.ecos.org/pfas/), [EPA](https://www.epa.gov/pfas/us-state-resources-about-pfas) and individual state websites.

How states regulate PFAS varies. Some states have regulatory programs for PFAS that may have different priorities, guidelines, and overall focus from other states. California, under Proposition 65, listed PFOS and PFOA as potential developmental (reproductive) toxicants. This listing has labeling requirements for manufacturers, distributors, and retailers of consumer products in addition to prohibiting companies from discharging PFOA or PFOS to sources of drinking water if the discharges would result in exposures that exceed a health-based level. Other states, including Vermont, New York, New Jersey, Colorado, and Alaska, have formal regulations on perfluoroalkyl acids (PFAAs) as hazardous substances (ITRC, 2021). In contrast, other states have no established regulations and defer to EPA.

Safer States (<https://www.saferstates.org/vision/>) is at the forefront of a state-driven national movement to address exposures to PFAS with the goal to reduce concentrations and ensure safe drinking water. Chemical management plans for PFAS in other states include elimination of these chemicals from consumer products, limitations/restrictions above a certain quantity, testing of drinking water supplies, requiring manufacturers to disclose PFAS and other information on publicly accessible platforms, prohibiting the sale or distribution of consumer goods, and prohibiting the disposal of PFAS containing foam via incineration. The requirements in AB 97 set forth the first steps for moderating the use and minimizing the release of PFAS in Nevada.

# **PFAS at the Federal Level**

The EPA Council on PFAS developed a strategic roadmap to lay out its whole-of-agency approach to address these emerging contaminants. The roadmap sets timelines by which the Agency plans to take specific actions between 2021 and 2024 building upon the policy actions identified in the Agency’s 2019 action plan. A preliminary rule is anticipated by the end of 2022 with a final rule promulgated in the fall of 2023. EPA’s integrated approach to PFAS is on three main directives:

1. Research – Invest in research, development, and innovation to better understand PFAS exposures and toxicities, human health and ecological effects, and effective interventions that incorporate the best available science.
2. Restrict – Comprehensive approach to prevent PFAS entering the environment at levels that can adversely impact human health and the environment.
3. Remediate – Broaden and accelerate the cleanup of PFAS contamination.

More details related to EPA’s roadmap are found in Figure 1 and at the Agency’s [website](https://www.epa.gov/pfas/pfas-strategic-roadmap-epas-commitments-action-2021-2024).

Timeline

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Figure 2 USEPA’s Strategic Roadmap (GHD adapted from USEPA 2021c)

# **Recommendations [Actions to Address PFAS]**

## Monitoring and Notification Tools

NDEP has utilized a GIS based sampling prioritization tool to conduct a preliminary PFAS screening of drinking water protection areas (DWPA) within Nevada. NDEP has developed DWPAs for public drinking water sources. The tool uses multiple factors to calculate a sample prioritization score for each DWPA and will serve as an initial approach for a screening level evaluation. Additional analytical and hydrogeologic data, and location information should be added to the tool as information becomes available to help inform characterization of PFAS in Nevada for decision makers and the public. The quality of the data included within the tool should also be reviewed and validated to ensure accuracy and prior to decision making.

Information on Nevada industries that discharge PFAS is needed to assess whether or not POTWs/WWTPs may be contributing sources of PFAS in the environment.

Additional considerations may be given to address locations in the State that rely on private domestic wells for drinking water, especially near known or suspected sources of PFAS, such as:

* 1. Providing options for low-cost testing of domestic wells
  2. Volunteer sampling programs
  3. Providing educational information on PFAS, which could include how to sample for it

Future actions may also include developing a routine monitoring strategy based on the potential exposures identified in order to characterize the extent of PFAS in the environment and potential exposure through drinking water sources, including for disadvantaged communities. The following items are some of the initially planned actions that will support efforts to characterize the extent of PFAS contamination in Nevada:

1. Grant funding from EPA for Drinking Water & Environmental Sampling
   1. Small Amount for targeted/voluntary sampling
   2. Begin Contract in 2nd Half 2022
2. Using and evaluated data developed through the fifth Unregulated Contaminant Monitoring Rule (UCMR 5)

UCMR 5 published on December 27, 2021, requires sample collection for 30 chemical contaminants between 2023 and 2025 using analytical methods developed by EPA and consensus organizations. All PWSs serving more than 10,000 people, all serving 3,300 to 10,000 people, and 800 representative PWSs serving fewer than 3,300 people will be monitored. UCMR 5 will provide new data that is needed to improve overall understanding of the frequency of 29 PFAS compounds that may be found in drinking water systems with corresponding levels. Currently, EPA is responsible for all analytical costs associated with monitoring at systems serving ≤10,000 people. More information on the EPA’s monitoring scope can be found at the Agency’s [website.](https://www.epa.gov/dwucmr/fifth-unregulated-contaminant-monitoring-rule)

The results from the UCMR 5 sampling and monitoring strategies will be compared to the current EPA’s HALs. If drinking water sources are impacted above the HALs, then exceedances will be treated in the same manner as a typical discovery of a contaminant above action levels including going through the corrective action case processes. Further actions will be considered such as:

1. Notifications to the affected population to not drink the water
2. Treatment or alternative water supplies
3. Investigation of potential sources
4. Blending of water above the HAL with water below the HAL
5. Repeat testing of impacted water supply

Action items for PFAS exceedances, including investigative and clean-up activities, could be required in the future at and from specific sources. Currently, EPA and the State do not regulate PFAS; however, if this were to change, then future action items could include investigation of nature and extent of site-related sources (similar to procedures with other chemicals), treatment or remediation, etc. The path forward in this area is described below.

## Reporting of PFAS Releases in Nevada

NDEP has a process for reporting of releases to the environment via the **NDEP Spill Hotline** (toll free by phone (888) 331-6337 or online at ndep.nv.gov). The recommendation has been made that the reporting of releases of PFAS should be made to the spill hotline under the following circumstances:

### Mandatory Reporting of the Discharge, Use, or Release of Class B Firefighting Foams Containing PFAS

* Authority for mandatory reporting comes from NRS 459.684.
* Military installations and civilian airports, under the authority of the Federal Aviation Administration, are exempt from this requirement.
* This requirement does not apply to any other class of firefighting foams/products and does not apply to any Class B foam that does not contain PFAS. Before using a Class B firefighting foam and before reporting of any discharge or release, the operator should confirm through consultation of the Safety Data Sheets (SDS) or other product labelling or documentation whether the formulation of the Class B firefighting foam contains PFAS.
* The mandatory reporting is not limited to accidental releases and includes any intentional use or discharge of Class B firefighting foams containing PFAS including during firefighting actions, operation of fire suppression systems, or testing of delivery equipment. Accidental releases of Class B firefighting foams containing PFAS must be reported for any amount and under any circumstance.
* Reports of PFAS release should include the time, date, location, and an estimate of the amount of the discharge, use, or release of the foam. If intentional, the purpose or reason for the discharge or use should be clearly stated, and if the purpose was for the testing of a fire suppression system or delivery mechanism of a mobile vehicle, the reporter must verify that the measures necessary to contain, treat, and properly dispose of the foam were present and were implemented.
* Reporters should indicate to the Spill Hotline either verbally on the phone or through selection of the appropriate field online that the report is being made in accordance with NRS 459.684 (or AB97), so that data specific to the discharge, use or release of Class B firefighting foams containing PFAS may be tracked.
* All firefighting training with Class B firefighting foams containing PFAS is prohibited in accordance with NRS 459.682(1)(b). Any reports received through the Spill Hotline of firefighting training with PFAS foams will be investigated as a possible misdemeanor.

### Mandatory Reporting of Any PFAS Released to Surface Waters

* Authority for mandatory reporting comes from the definition of “pollutant” and “contaminant” in the release reporting regulations at NAC 445A.345 to NAC 445A.348, inclusive.
* Mandatory reporting applies to any amount of any product which contains intentionally added PFAS released or discharged to surface water.
* Military installations and civilian airports are not exempt from the requirement to report releases of PFAS to surface waters.
* Any permitted discharges to surface water should be handled under permit reporting requirements and limits. Volunteer reporting to be sought where not required under permit.
* Response actions should be implemented immediately by the responsible party to mitigate uncontrolled flow of PFAS containing products.
* Regulatory follow-up from State and local officials with authority over water quality should be expected.

### Strongly Encouraged Reporting for Detection of PFAS in Groundwater

* The definition of “pollutant” and “contaminant” in the release reporting regulations at NAC 445A.245 to NAC 445A.348, inclusive may support mandatory reporting of the discovery of PFAS to groundwater; however, at this time the NDEP is only strongly encouraging the reporting of PFAS discovery in groundwater.
* Action taken by the EPA to list PFAS as a CERCLA hazardous substance would make reporting to NDEP of PFAS discoveries in groundwater mandatory rather than strongly encouraged, based on the definition of “hazardous substance” in the state’s release reporting regulations.
* Reports of concentrations above EPA Lifetime HALs may result in follow-up actions to prioritize the identification of sources and to provide guidance to potentially affected drinking water receptors.
* Reporting of groundwater concentrations of PFAS below EPA Lifetime HALs will still assist the NDEP to understand the prevalence of PFAS in groundwater statewide and to prioritize source identification, but the reporting party should not expect the initiation of response actions or follow-up contact.

### Voluntary Reporting of Any Other PFAS Release or Discovery

* The NDEP Spill Hotline takes all calls it receives and generates a Spill Report even if the release does not appear to meet reportable triggers. Any release of PFAS to soil or paved surfaces can be reported to the Spill Hotline.
* The Spill Hotline will route any accidental releases of PFAS to the soil or paved surfaces to the Bureau of Corrective Actions, other NDEP bureaus, and local agencies for informational purposes. The Bureau of Corrective Action may work with property owners or operators on a voluntary basis to document response actions to contain, treat, and dispose of released product or contaminated material.
* Action taken by the EPA to list PFAS as a CERCLA hazardous substance would make reporting to NDEP of PFAS releases mandatory rather than voluntary, based on the definition of “hazardous substance” in the State’s release reporting regulations. However, the NDEP would issue guidance on the reportable quantity of PFAS releases subject to reporting.

### Use of Information Obtained Through the NDEP Spill Hotline

* Spill/Complaint Reports generated by the NDEP Spill Hotline are routed to state or local agencies that have regulatory authority to respond or follow-up on the information. For PFAS releases, which may not have defined regulatory triggers for action, the NDEP Spill Hotline will route the report as though it were any other hazardous substance subject to regulation. Receiving agencies will make the determination whether regulatory action is authorized and appropriate.
* One of the purposes of the PFAS Action Plan is to inform policy makers about the prevalence and scope of PFAS use or impacts in the State, so the NDEP Spill Hotline will make all information about PFAS Spill Reports available to stakeholder agencies upon request and will generate summary reports that are made publicly available on the NDEP PFAS webpages.

## PFAS Release Response

The NDEP has not formally declared that PFAS releases are subject to environmental cleanup requirements under NAC 445A.226 to 445A.22725 (Action Levels for Contaminated Sites). At this time there are no clear reportable triggers or quantities of PFAS in the environment that must trigger corrective actions, and the regulatory landscape across state and federal governments is in flux as it relates to health-based standards and cleanup levels. However, future federal or state action in the upcoming years will likely result in modification to Nevada’s soil, groundwater, and surface water response and cleanup programs. The Action Plan recommends considering the following for cleanup and response actions at this time, including triggers for changes to the regulatory framework:

* Federal action that results in the listing of any PFAS as a hazardous substance under 40 CFR Part 302 would immediately result in the application of Nevada release reporting requirements under NAC 445A.345 to NAC 445A.348 and corrective action requirements under NAC 445A.226 to 445A.22725 for that PFAS.
* If federal action to list PFAS as a CERCLA hazardous substance does not occur within a timeframe that meets Nevada’s need to address impacts identified in the State, the NDEP may pursue regulatory rulemaking to establish reporting requirements and cleanup action levels for soil and groundwater contamination.
* Federal action that results in the establishment of a Maximum Contaminant Limit for any PFAS pursuant to the Safe Drinking Water Act would immediately establish action levels and remediation standards for groundwater in the State of Nevada. Until that time, the NDEP will consider the Lifetime HALs as the appropriate groundwater screening level.
* The US Environmental Protection Agency has published Regional Screening Levels for five commonly detected PFAS (<https://www.epa.gov/risk/regional-screening-levels-rsls>). The NDEP Bureau of Corrective Action relies on these screening levels when making decisions about site investigation and cleanup for soil impacts.
* For releases of PFAS containing products to paved surfaces, property owners or operators should take appropriate steps to contain, treat, and properly dispose of any adsorbent material used to prevent the product from reaching soil or storm drain inlets. Documentation of the response actions taken may be submitted voluntarily to the NDEP Bureau of Corrective Action, similarly to what is done under NAC 445A.2269(3)(c) for other hazardous substances, hazardous wastes, or regulated substances released to paved surfaces.

## Outreach and Communication Plan

The most effective risk communication strategies employ a combination of techniques that build trust and demonstrate a partnership with the community through clear science communication that is accessible, factual, and transparent. The dynamic considerations related to communicating PFAS challenges to concerned citizens, the regulated community, and other stakeholders are important for transparency and collaboration within the State of Nevada.

Numerous agencies and other stakeholders participating in the Working Group have successful education and outreach programs related to PFAS that may help the public, community utilities, businesses, and local decision makers understand the issues and leverage available resources. Future partnering, including funding, between new and/or existing programs to share outreach and education tools about PFAS can be a mechanism to reach broader audiences and leverage resources to address PFAS. Stormwater, non-point source pollution, source water protection, corrective action, science education and public health are all programs that have active outreach components where PFAS education could be incorporated.

All PFAS updates, communications, and tools for water system operators for public notice related to this action plan are recommended to be made available via NDEP’s website, <http://ndep.nv.gov/water/pfas-action-plan>.

## Analytical Methods and Procedures

Analytical methods for PFAS detection, identification, and quantitation continue to be revised as improvements are made to sample preparation and instrumentation techniques and it is recommended that the most current methods, including evaluation of appropriate reporting limits, be considered. At present, EPA has several multi-laboratory validated methods specifically for drinking water samples. [EPA Method 533](https://www.epa.gov/sites/default/files/2019-12/documents/method-533-815b19020.pdf) focuses on short-chain PFAS compounds including perfluorinated acids, sulfonates, fluorotelomers, and poly/perfluorinated ether carboxylic acids. [EPA Method 537.1](https://cfpub.epa.gov/si/si_public_record_Report.cfm?dirEntryId=343042&Lab=NERL) focuses on the PFAS compounds that have the potential to contaminate drinking water that have been identified or introduced as PFOA/PFOS alternatives such as HFPO-DA (component of GenX processing aid technology). Both of these methods combined can quantify 29 unique PFAS compounds in drinking water. EPA Method 8327 is a liquid chromatography/tandem mass spectrometry method for the analysis of 24 PFAS compounds in aqueous and solid samples. [Draft Method 1633](https://www.epa.gov/cwa-methods/cwa-analytical-methods-and-polyfluorinated-alkyl-substances-pfas) is currently a single-laboratory validated method for 40 PFAS compounds in wastewater, surface water, groundwater, soil, biosolids, sediment, landfill leachate, and fish tissue. This draft method is being developed in collaboration with EPA and the Department of Defense (DoD). A multi-laboratory validation study will be conducted by DoD with the EPA.

Other PFAS and fluorine analytical methods are in different stages of development such as the Other Test Method (OTM)-45. Draft Method 1631, which measures total adsorbable organic fluorine in aqueous samples has been released as a screening tool to identify PFAS absence and presence at the microgram per liter level. More information on all of the analytical methods is available at the Agency’s [website](https://www.epa.gov/water-research/pfas-analytical-methods-development-and-sampling-research). Furthermore, practical comparisons of the available methods have been performed by the Interstate Technology and Regulatory Council’s (ITRC’s) PFAS team and is available in the current [technical guidance document](https://pfas-1.itrcweb.org/11-sampling-and-analytical-methods/" \l "11_2).

## Treatment Technologies

Treatment technologies for PFAS-impacted matrices including soil and water are still evolving and it is recommended that the most current technologies be considered. Remedial alternatives are being prioritized based on the overall protection of drinking water supplies, reduction of exposure to sensitive receptors such as ecological receptors and environmental resources, and reduction of source area mass.

At this point, a variety of treatment technologies are available at different stages of implementation. The field-implemented technologies that are demonstrated at full-scale for liquids are sorption technologies such as granular activated carbon and ion exchange resin. Additionally, reverse osmosis that pushes water under pressure through a semipermeable membrane has been demonstrated at full-scale for PFAS removal. Such technologies remove PFAS from water, but do not destroy PFAS; therefore, these technologies result in a waste stream of PFAS that must be properly disposed of or treated. NDEP will likely require implementation of such treatments options to be coupled with techniques that either highly concentrate the waste stream (such as foam fractionation) to reduce the volume for disposal or destroy PFAS (such as supercritical water oxidation) to prevent discharge to a sanitary sewer or storm sewer.

The field-implemented technologies that are demonstrated at full-scale for solids are sorption followed by stabilization to reduce the potential for PFAS to leach from the material and subsequently, excavated for disposal to permitted landfills.

Other treatment technologies are available for liquids and solids. Practical comparisons of the available technologies are found within the ITRC’s PFAS Team [technical guidance document](https://pfas-1.itrcweb.org/12-treatment-technologies/). Additional studies and information are also available on the State’s website.

## Other Needs

Potential existing or future funding sources, State or other federal, should be identified to assist private and public entities to obtain solutions to PFAS related issues, concerns, opportunities, etc.

Consider newly identified and relevant existing and future PFAS related research, data, technology and health studies as it becomes available.

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USEPA, 2022. Addressing PFAS Discharges in EPA-Issued NPDES Permits and Expectations Where EPA is the Pretreatment Control Authority. From Radhika Fox to Water Division Directors. April 28.

# **Glossary**

Action level a level of a harmful or toxic substance/activity in air, water or soil which if exceeded requires monitoring or clean-up

Biosolids treated sewage sludge used for land application and surface disposal (EPA)

Contaminant any physical, chemical, biological or radiological substance or matter which is added to (NAC-445A) water

Discharge any addition of a pollutant to water (NAC-445A)

Effluent chemical, physical, biological and other constituents which are discharged from point sources into any waters of the State. (NAC-445A)

Exposure pathway refers to the way a person can come into contact with a hazardous substance. There are three basic exposure pathways: inhalation, ingestion, or direct contact. (EPA)

Hazardous substance includes, without limitation, hazardous material, a regulated substance, a pollutant and a contaminant (NAC-445A)

Incineration burning of certain types of solid, liquid, or gaseous materials; or a treatment technology (EPA)

Influent water, waste water or other liquid flowing into a reservoir, basin or treatment plant (OECD)

Leachate formed when rain water filters through wastes placed in a landfill. When this liquid comes in contact with buried wastes, it leaches, or draws out, chemicals or constituents from those wastes (EPA)

Non-point source pollution pollution caused by land runoff, precipitation, atmospheric deposition, drainage, seepage or hydrologic modification (EPA)

Point source any discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft, from which pollutants are or may be discharged. The term does not include return flows from irrigated agriculture. (NAC-445A)

Pollutant dredged soil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal and agricultural waste discharged into water (NAC-445A)

Pollution artificially made or artificially induced alterations of the chemical, physical, biological and radiological integrity of water (NAC-445A)

# **Attachment(s)**

Links to embedded websites, example document(s), and sources of additional tools/information

1. <https://doi.org/10.1021/es9024707>
2. [https://www.epa.gov/dwucmr/occurrence-data-unregulated-contaminant-monitoring-rule#3](https://www.epa.gov/dwucmr/occurrence-data-unregulated-contaminant-monitoring-rule" \l "3)

<https://www.wwdmag.com/biosolids-management/addressing-impacts-pfas-biosolids>

[PFAS - The Environmental Council of the States (ECOS)](https://www.ecos.org/pfas/) (https://www.ecos.org/pfas/)

[U.S. State Resources about PFAS | US EPA](https://www.epa.gov/pfas/us-state-resources-about-pfas) (https://www.epa.gov/pfas/us-state-resources-about-pfas)

<https://www.saferstates.org/vision/>

1. [PFAS Strategic Roadmap: EPA's Commitments to Action 2021-2024 | US EPA](https://www.epa.gov/pfas/pfas-strategic-roadmap-epas-commitments-action-2021-2024) (https://www.epa.gov/pfas/pfas-strategic-roadmap-epas-commitments-action-2021-2024)

1. [Fifth Unregulated Contaminant Monitoring Rule | US EPA](https://www.epa.gov/dwucmr/fifth-unregulated-contaminant-monitoring-rule) (https://www.epa.gov/dwucmr/fifth-unregulated-contaminant-monitoring-rule)
2. <https://www.epa.gov/risk/regional-screening-levels-rsls>
3. <http://ndep.nv.gov/water/pfas-action-plan>
4. EPA Method 533 (<https://www.epa.gov/sites/default/files/2019-12/documents/method-533-815b19020.pdf>)
5. EPA Method 537.1 (<https://cfpub.epa.gov/si/si_public_record_Report.cfm?dirEntryId=343042&Lab=NERL>)
6. EPA draft Method 1633 (<https://www.epa.gov/cwa-methods/cwa-analytical-methods-and-polyfluorinated-alkyl-substances-pfas>)
7. <https://www.epa.gov/water-research/pfas-analytical-methods-development-and-sampling-research>
8. ITRC PFAS Technical Guidance Document ([https://pfas-1.itrcweb.org/11-sampling-and-analytical-methods/#11\_2](https://pfas-1.itrcweb.org/11-sampling-and-analytical-methods/" \l "11_2))
9. <http://dx.doi.org/10.1016/j.watres.2013.10.067>
10. <http://dx.doi.org/10.1016/j.jhazmat.2013.06.033>
11. <https://doi.org/10.1002/aws2.1269>
12. <https://doi.org/10.1002/aws2.1247>
13. https://doi.org/10.1016/j.watres.2018.07.018