

Chrys Ostrander

It's time to stop spreading sewage sludge on Washington State farms.

Most people don't know that a lot of the food we eat is grown on fields where municipal sewage is used for fertilizer. When they do find out about this, most people ask, is it legal?

Unfortunately, the Dept. of Ecology interprets existing regulations in such a manner that it is considered legal, but there are compelling reasons why Ecology should not consider the land application of sewage sludge to be legal. How many reasons? Let's start with 352.

According to the U.S. Environmental Protection Agency's Office of Inspector General, the EPA knows of 352 "pollutants" that can be found in municipal sewage sludge (the EPA regulations that govern this practice nationwide only require testing for nine). The Inspector General compared those 352 pollutants to three federally maintained lists of hazardous substances and found this: Of those 61 pollutants, 32 are hazardous wastes under the Resource Conservation and Recovery Act, including four described as acutely hazardous; 35 are EPA priority pollutants; 16 are on the National Institute for Occupational Safety and Health's list of hazardous drugs.

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"The EPA's controls over the land application of sewage sludge (biosolids) were incomplete or had weaknesses and may not fully protect human health and the environment."

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A 2009 U.S. Environmental Protection Agency study concluded that all sewage sludge contains toxic elements. Official estimates of the numbers of toxic contaminants that could be present in any given batch of sludge range into the thousands. One only needs to consider the hundreds of industrial, pharmaceutical and organic pollutant contaminants that our chemical-dependent society flushes down the drain every day. Antibiotic resistant bacteria and mobile antibiotic resistance genes are present in sewage sludge. Micro-plastic is an increasingly common component of sewage sludge and is no good for the soil it's spread on, the creatures that live in that soil or the wildlife that depend on it. Disease-causing bacteria, viruses, protozoa and parasites are never entirely killed off when sewage sludge is treated to be used as fertilizer and can grow back in the nutrient-rich sludge especially in the warm and moist conditions on a farm. Current interpretations of sewage sludge regulations shockingly allow sewage sludge in consumer fertilizer and compost products for home gardens-- the gardens that Washingtonians want your children to play in.

Recently, per- and polyfluoroalkyl substances (PFAS) chemicals are being found in increasing concentrations in sewage sludge. These are the man-made fire-retardant and non-stick chemicals that are now found all over the globe-- even in rain drops! PFAS have already caused havoc on farms all over the country where sludge has been used for fertilizer. Some farms have had to close because of the PFAS from sewage sludge fertilizer getting from the field into their food.

Government agencies like the Dept. of Ecology are reluctant to test farms extensively, fearing perhaps an iceberg-like food safety crisis if the problem on farms is confirmed to be widespread. I believe our regulatory agencies including the EPA and the Dept. of Ecology are so fearful of an

avalanche of lawsuits from food producers and consumers alike (since these agencies have not only allowed but promoted the unquestionably wrong-headed practice of the land-application of sewage sludge for decades now) that they will drag their feet and obstruct any changes in the status quo. And that is exactly what is happening. These agencies know how vulnerable they have made themselves having jumped on the land application band wagon so long ago. They are going to cling to that wagon. It's up to the people to push them off.

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Honestly, just the idea of letting sludge anywhere near our food seems crazy. And it is crazy. Why can't Ecology grow a pair and acknowledge that fact too?

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Ecology will state again and again, defending the sludge permitting program, that the draft permit language conforms to state and federal regulations (like if a batch of sludge passes tests for the nine contaminants and comes out okay, then it's alright to simply ignore the hundreds of other chemicals

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Ecology says "the draft permit streamlines some requirements, reducing the regulatory burden for about half of the 375 or so [biosolids] facilities in the state" as if that's a good thing? Less regulation: Just what we need when we are faced with hundreds of known contaminants and emerging contaminants of concern. I oppose any "streamlining" of biosolids regulations in WA. If you really want to streamline the process, end it. Do not re-issue the statewide biosolids permit.

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Science backs up banning the land application of sewage sludge even if the regulations don't. It's a new era. Trump is no longer president. Let's go with science.

Which brings me to my final points: In fact, if interpreted appropriately, CURRENT LAW DOES PROHIBIT THE LAND APPLICATION OF SEWAGE SLUDGE. Consider the following:

RCW 69.04.020 - Food, Drugs, Cosmetics, And Poisons
"Contaminated with filth."

The term "contaminated with filth" applies to any food, drug, device, or cosmetic not securely protected from dust, dirt, and as far as may be necessary by all reasonable means, from all foreign or injurious contaminations.

Surely this is being violated every single time sewage sludge is applied to agricultural soils. Why is this law not being enforced?

RCW 7.48.140 - Actionable nuisances

Public nuisances enumerated.

It is a public nuisance:

(1) To cause or suffer the carcass of any animal or any offal, filth, or noisome substance to be collected, deposited, or to remain in any place to the prejudice of others;

The above pretty much is the definition of the land application of sewage sludge. Why is this law not being enforced?

21 U.S. Code § 342 - Adulterated food

A food shall be deemed to be adulterated—

(a) Poisonous, insanitary, etc., ingredients

(1) If it bears or contains any poisonous or deleterious substance which may render it injurious to health; but in case the substance is not an added substance such food shall not be considered adulterated under this clause if the quantity of such substance in such food does not ordinarily render it injurious to health.

(2)(A) if it bears or contains any added poisonous or added deleterious substance ... that is unsafe within the meaning of section 346 of this title; or ...

(3) if it consists in whole or in part of any filthy, putrid, or decomposed substance, or if it is otherwise unfit for food; or

(4) if it has been prepared, packed, or held under insanitary conditions whereby it may have become contaminated with filth, or whereby it may have been rendered injurious to health; ...

Sewage sludge is known to potentially contain hundreds of toxic pollutant contaminants, e.g. "poisonous or deleterious" substances, but because no regulations exist requiring every batch of sludge to be tested for their presence (in contravention of the intent set forth in this law), it's highly likely that food grown on sewage sludge-treated fields including meat and dairy products are adulterated, as defined by this statute, but regulators are apparently allowed to look the other way. This law, is still being violated because of the absence of data quantifying the "poisonous or deleterious" substances known to potentially be present.

21 U.S. Code § 346 - Tolerances for poisonous or deleterious substances in food; regulations

Any poisonous or deleterious substance added to any food, except where such substance is required in the production thereof [Ed. Note: Which is questionable in the case of sewage sludge used as fertilizer since many other non-toxic fertilizer products are readily available to growers] or cannot be avoided by good manufacturing practice shall be deemed to be unsafe for purposes of the application of clause (2)(A) of section 342(a) of this title; but when such substance is so required or cannot be so avoided, the Secretary shall promulgate regulations limiting the quantity therein or thereon to such extent as he finds necessary for the protection of public health, and any quantity exceeding the limits so fixed shall also be deemed to be unsafe for purposes of the application of

clause (2)(A) of section 342(a) of this title.

Again, the EPA itself has identified at least 352 pollutant contaminants in sewage sludge but regulations only exist for nine of them in direct contravention of this statute.

21 U.S. Code § 346 continued:

While such a regulation is in effect limiting the quantity of any such substance in the case of any food, such food shall not, by reason of bearing or containing any added amount of such substance, be considered to be adulterated within the meaning of clause (1) of section 342(a) of this title. In determining the quantity of such added substance to be tolerated in or on different articles of food the Secretary shall take into account the extent to which the use of such substance is required or cannot be avoided in the production of each such article, and the other ways in which the consumer may be affected by the same or other poisonous or deleterious substances.

The "Secretary," as well as the Dept. of Ecology, should consider the fact that the use of sewage sludge is NOT required and CAN BE AVOIDED in the production of food. Furthermore, the "Secretary," as well as the Dept. of Ecology, are FAILING, in the case of the land application of sewage sludge, to take into account "other ways in which the consumer may be affected by the same or other poisonous or deleterious substances."

Ecology's foot-dragging when it comes to launching a major effort to conduct broadscale groundwater testing, conduct broadscale soil testing or conduct broadscale crop tissue analysis of areas where sewage sludge has been applied or to conduct broadscale blood sampling of farmers and others in proximity to areas where sewage sludge has been applied, is entirely unjustified, especially when it comes to testing for PFAS. There are PLENTY of data on PFAS and many accepted testing methodologies despite Ecology's claims otherwise. The following is just a sampling of articles and studies about PFAS from the Interstate Technology and Regulatory Council, a project of the Environmental Council of the States (ECOS) which works to improve the capability of state environmental agencies and their leaders to protect and improve human health and the environment of the United States of America. ECOS is the national nonprofit, nonpartisan association of state and territorial environmental agency leaders. The Washington State Department of Ecology is an official member of ECOS! To claim ignorance or lack of a mandate in the face of this avalanche of data is utterly disingenuous. Ecology claims they "are tracking information regarding biosolids work happening elsewhere" (such as what is referred to below) and yet they seem prepared to ignore what they find instead. In Ecology's call for comments on the statewide general permit for biosolids management they shamefully ask the public to provide documentation along with their public comments to back up assertions that biosolids are too dangerous to be allowed to be land-applied. No, Ecology only has to study and respond appropriately to the available evidence already in their possession and leave the politics behind and blinders. Ecology will suffer a reckoning someday for its malfeasance on this issue unless it abandons its goose-stepping conformity to an obviously unjustifiable legislative mandate to promote biosolid's "beneficial use." Ecology must put its mission above sewage sludge conformity.

PFAS — Per- and Polyfluoroalkyl Substances

<https://pfas-1.itrcweb.org>

It is the intention of ITRC to periodically update the document as significant new information and regulatory approaches for PFAS develop. The guidance document ...

Fact Sheets – PFAS — Per- and Polyfluoroalkyl Substances

<https://pfas-1.itrcweb.org/fact-sheets>

PFAS Fact Sheets. This page includes links for the ITRC PFAS fact sheets. The fact sheets are available as PDF files. Several tables of supporting information ...

2.2 Chemistry, Terminology, and Acronyms – PFAS — Per- and ...

<https://pfas-1.itrcweb.org/2-2-chemistry-terminology-and-acronyms>

PFAS are characterized by carbon atoms that are linked together with fluorine atoms attached to the carbons. A more specific and technical definition of PFAS ...

1 Introduction – PFAS — Per- and Polyfluoroalkyl Substances

<https://pfas-1.itrcweb.org/1-introduction>

Per- and polyfluoroalkyl substances (PFAS) are a very large family of thousands of chemicals that vary widely in their chemical and physical properties, as well ...

2 PFAS Chemistry and Naming Conventions, History and Use of ...

<https://pfas-1.itrcweb.org/2-pfas-chemistry-and-naming-conventions-history-an...>

The PFAS Team developed two training module videos with content related to ... and chemical properties of PFAS impart oil, water, stain, and soil repellency, ...

5 Environmental Fate and Transport Processes – PFAS — Per- and ...

<https://pfas-1.itrcweb.org/5-environmental-fate-and-transport-processes>

PFAS fate and transport describes the behavior of these compounds following their release to the environment. This includes the physical, chemical, and biological ...

Naming Conventions and Physical and Chemical Properties of Per ...

https://pfas-1.itrcweb.org/PFAS_Fact_Sheet_Naming_Conventions_April2020

1 Introduction. The following topics are covered in this fact sheet: • Polymer vs. Nonpolymer PFAS. • Perfluoroalkyl substances. • Polyfluoroalkyl substances.

11 Sampling and Analytical Methods – PFAS — Per- and ...

<https://pfas-1.itrcweb.org/11-sampling-and-analytical-methods>

Sampling conducted to determine PFAS concentrations in water, soil, sediment, air, biota, and other media is similar to that for other chemical compounds, but with ...

12 Treatment Technologies – PFAS — Per- and Polyfluoroalkyl ...

<https://pfas-1.itrcweb.org/12-treatment-technologies>

State of Development: GAC is an established water treatment technology proven to effectively treat long-chain PFAS (such as PFOS, PFOA, and PFNA). The ...

6 Media-Specific Occurrence – PFAS — Per- and Polyfluoroalkyl ...

<https://pfas-1.itrcweb.org/6-media-specific-occurrence>

This section focuses on occurrence in air, soil and sediment, groundwater, surface water, and biota. PFAS occurrence in several media types is an active area of ...

14 Risk Communication – PFAS — Per- and Polyfluoroalkyl ...

<https://pfas-1.itrcweb.org/14-risk-communication>

Additional human health and exposure factors that heighten risk perception for PFAS are summarized in Section 14.2, Risk Communication Challenges. This ...

3 Firefighting Foams – PFAS — Per- and Polyfluoroalkyl Substances

<https://pfas-1.itrcweb.org/3-firefighting-foams>

AFFF is a highly effective type of Class B foam that is especially effective on large liquid fuel fires. AFFF is of particular concern because it contains PFAS. As ...

History and Use of Per- and Polyfluoroalkyl Substances (PFAS)

https://pfas-1.itrcweb.org/PFAS_Fact_Sheet_History_and_Use_April2020

Certain PFAS, most notably some of the perfluoroalkyl acids (PFAAs), such as perfluorooctanoate (PFOA) and perfluorooctane sulfonate (PFOS), are mobile, ...

2.5 PFAS Uses – PFAS — Per- and Polyfluoroalkyl Substances

<https://pfas-1.itrcweb.org/2-5-pfas-uses>

The unique physical and chemical properties of PFAS impart oil, water, stain, and soil repellency, chemical and temperature resistance, friction reduction, and ...

13 Stakeholder Perspectives – PFAS — Per- and Polyfluoroalkyl ...

<https://pfas-1.itrcweb.org/13-stakeholder-perspectives>

PFAS — Per- and Polyfluoroalkyl Substances ... PFAS, including PFOA and PFOS, have been detected in biosolids produced at a wastewater treatment plant ...

2.6 PFAS Releases to the Environment – PFAS — Per- and ...

<https://pfas-1.itrcweb.org/2-6-pfas-releases-to-the-environment>

industrial facilities that produce PFAS or process PFAS, or facilities that use PFAS chemicals or products in manufacturing or other activities (Section 2.6.1); areas ...

2.3 Emerging Health and Environmental Concerns – PFAS — Per ...

<https://pfas-1.itrcweb.org/2-3-emerging-health-and-environmental-concerns>

PFAS — Per- and Polyfluoroalkyl Substances. HOME ... Like other emerging contaminants, knowledge and concern about PFAS in the environment has evolved ...

Remediation Technologies and Methods for Per- and Polyfluoroalkyl ...

https://pfas-1.itrcweb.org/pfas_fact_sheet_remediation_3_15_18

Certain PFAS have recently been the subject of regulatory actions and attempted soil, sediment, and water remediation. These compounds have unique chemical ...

4 Physical and Chemical Properties – PFAS — Per- and ...

<https://pfas-1.itrcweb.org/4-physical-and-chemical-properties>

Apr 14, 2020 ... For an individual PFAS compound (or mixture of PFAS) that exists as a liquid at ambient temperatures, density can influence its behavior in the ...

Per- and Polyfluoroalkyl Substances (PFAS)

https://pfas-1.itrcweb.org/uploads/2020/04/ITRC_PFAS_TechReg_April2020

Apr 1, 2020 ... Substances (PFAS). Technical/Regulatory Guidance. April 2020. Prepared by. The Interstate Technology & Regulatory Council (ITRC).

2.4 PFAS Reductions and Alternative PFAS Formulations – PFAS ...

<https://pfas-1.itrcweb.org/2-4-pfas-reductions-and-alternative-pfas-formulations>

1 3M Voluntary Phaseout of Certain Long-Chain PFAS. In early 2000, 3M was the principal worldwide manufacturer of PFOA and POSF-derived PFAS (for ...

10 Site Characterization – PFAS — Per- and Polyfluoroalkyl ...

<https://pfas-1.itrcweb.org/10-site-characterization>

There are also "secondary sources," such as PFAS concentrating into one portion of a plume (for example, groundwater into surface water) that then acts as a ...

7 Human and Ecological Health Effects of select PFAS – PFAS ...

<https://pfas-1.itrcweb.org/7-human-and-ecological-health-effects-of-select-pfas>

The best studied PFAAs are PFOS and PFOA, although considerable information is available for some other PFAS, including PFNA, PFHxS, PFBA, PFBS, and the ...

9 Site Risk Assessment – PFAS — Per- and Polyfluoroalkyl ...

<https://pfas-1.itrcweb.org/9-site-risk-assessment>

For PFAS chemicals as of September 2019: Tier 1 values are peer-reviewed toxicity values published on the USEPA's Integrated Risk Information System (IRIS).

8 Basis of Regulations – PFAS — Per- and Polyfluoroalkyl Substances

<https://pfas-1.itrcweb.org/8-basis-of-regulations>

Providing blood testing for PFAS for all DOD firefighters during their annual physical exam; Ensuring that no water contaminated with PFOA or PFOS above ...

Acronyms – PFAS — Per- and Polyfluoroalkyl Substances

<https://pfas-1.itrcweb.org/acronyms>

PFA, perfluoroalkoxy polymer. PFAA, perfluoroalkyl acid. PFAI, perfluoroalkyl iodides. PFAS, per- and polyfluoroalkyl substances. PFBA, perfluorobutanoate ...

17 Additional Information – PFAS — Per- and Polyfluoroalkyl ...

<https://pfas-1.itrcweb.org/17-additional-information>

Data presented include PFAS concentrations in water and particle phases. Water maximum: PFHxS: 281; PFOS: 2,920; PFHxA: 757; PFHpA: 277; PFOA: 767 ...

15 Case Studies – PFAS — Per- and Polyfluoroalkyl Substances

<https://pfas-1.itrcweb.org/15-case-studies>

presented a detailed characterization of a subset of PFAS soil and groundwater concentrations, focused on PFAAs in the vicinity of a former unlined burn pit where ...

and Polyfluoroalkyl Substances (PFAS)

https://pfas-1.itrcweb.org/PFAS_Fact_Sheet_Regulations_April2020

1. Regulations, Guidance, and Advisories for Per- and Polyfluoroalkyl Substances (PFAS). ITRC has developed a series of fact sheets to summarize the latest ...

Acknowledgments – PFAS — Per- and Polyfluoroalkyl Substances

<https://pfas-1.itrcweb.org/acknowledgements>

Submitted on this day of June 23, 2021 by

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RCW 7.48.140 - Actionable nuisances

Public nuisances enumerated.

It is a public nuisance:

(1) To cause or suffer the carcass of any animal or any offal, filth, or noisome substance to be collected, deposited, or to remain in any place to the prejudice of others;

The above pretty much is the definition of the land application of sewage sludge. Why is this law not being enforced?

21 U.S. Code § 342 - Adulterated food

A food shall be deemed to be adulterated—

(a) Poisonous, insanitary, etc., ingredients

(1) If it bears or contains any poisonous or deleterious substance which may render it injurious to health; but in case the substance is not an added substance such food shall not be considered adulterated under this clause if the quantity of such substance in such food does not ordinarily render it injurious to health.

(2)(A) if it bears or contains any added poisonous or added deleterious substance ... that is unsafe within the meaning of section 346 of this title; or ...

(3) if it consists in whole or in part of any filthy, putrid, or decomposed substance, or if it is otherwise unfit for food; or

(4) if it has been prepared, packed, or held under insanitary conditions whereby it may have become contaminated with filth, or whereby it may have been rendered injurious to health; ...

Sewage sludge is known to potentially contain hundreds of toxic pollutant contaminants, e.g. "poisonous or deleterious" substances, but because no regulations exist requiring every batch of sludge to be tested for their presence (in contravention of the intent set forth in this law), it's highly likely that food grown on sewage sludge-treated fields including meat and dairy products are adulterated, as defined by this statute, but regulators are apparently allowed to look the other way. This law, is still being violated because of the absence of data quantifying the "poisonous or deleterious" substances known to potentially be present.

21 U.S. Code § 346 - Tolerances for poisonous or deleterious substances in food; regulations

Any poisonous or deleterious substance added to any food, except where such substance is required in the production thereof [Ed. Note: Which is questionable in the case of sewage sludge used as fertilizer since many other non-toxic fertilizer products are readily available to growers] or cannot be avoided by good manufacturing practice shall be deemed to be unsafe for purposes of the application of clause (2)(A) of section 342(a) of this title; but when such substance is so required or cannot be so avoided, the Secretary shall promulgate regulations limiting the quantity therein or thereon to such extent as he finds necessary for the protection of public health, and any quantity exceeding the limits so fixed shall also be deemed to be unsafe for purposes of the application of clause (2)(A) of section 342(a) of this title.

Again, the EPA itself has identified at least 352 pollutant contaminants in sewage sludge but regulations only exist for nine of them in direct contravention of this statute.

21 U.S. Code § 346 continued:

While such a regulation is in effect limiting the quantity of any such substance in the case of any food, such food shall not, by reason of bearing or containing any added amount of such substance, be considered to be adulterated within the meaning of clause (1) of section 342(a) of this title. In determining the quantity of such added substance to be tolerated in or on different

articles of food the Secretary shall take into account the extent to which the use of such substance is required or cannot be avoided in the production of each such article, and the other ways in which the consumer may be affected by the same or other poisonous or deleterious substances.

The "Secretary," as well as the Dept. of Ecology, should consider the fact that the use of sewage sludge is NOT required and CAN BE AVOIDED in the production of food. Furthermore, the "Secretary," as well as the Dept. of Ecology, are FAILING, in the case of the land application of sewage sludge, to take into account "other ways in which the consumer may be affected by the same or other poisonous or deleterious substances."

Ecology's foot-dragging when it comes to launching a major effort to conduct broadscale groundwater testing, conduct broadscale soil testing or conduct broadscale crop tissue analysis of areas where sewage sludge has been applied or to conduct broadscale blood sampling of farmers and others in proximity to areas where sewage sludge has been applied, is entirely unjustified, especially when it comes to testing for PFAS. There are PLENTY of data on PFAS and many accepted testing methodologies despite Ecology's claims otherwise. The following is just a sampling of articles and studies about PFAS from the Interstate Technology and Regulatory Council, a project of the Environmental Council of the States (ECOS) which works to improve the capability of state environmental agencies and their leaders to protect and improve human health and the environment of the United States of America. ECOS is the national nonprofit, nonpartisan association of state and territorial environmental agency leaders. The Washington State Department of Ecology is an official member of ECOS! To claim ignorance or lack of a mandate in the face of this avalanche of data is utterly disingenuous. Ecology claims they "are tracking information regarding biosolids work happening elsewhere" (such as what is referred to below) and yet they seem prepared to ignore what they find instead. In Ecology's call for comments on the statewide general permit for biosolids management they shamefully ask the public to provide documentation along with their public comments to back up assertions that biosolids are too dangerous to be allowed to be land-applied. No, Ecology only has to study and respond appropriately to the available evidence already in their possession and leave the politics behind and blinders. Ecology will suffer a reckoning someday for its malfeasance on this issue unless it abandons its goose-stepping conformity to an obviously unjustifiable legislative mandate to promote biosolid's "beneficial use." Ecology must put its mission above sewage sludge conformity.

PFAS — Per- and Polyfluoroalkyl Substances
<https://pfas-1.itrcweb.org>

It is the intention of ITRC to periodically update the document as significant new information and regulatory approaches for PFAS develop. The guidance document ...

Fact Sheets – PFAS — Per- and Polyfluoroalkyl Substances
<https://pfas-1.itrcweb.org/fact-sheets>

PFAS Fact Sheets. This page includes links for the ITRC PFAS fact sheets. The fact sheets are available as PDF files. Several tables of supporting information ...

2.2 Chemistry, Terminology, and Acronyms – PFAS — Per- and ...
<https://pfas-1.itrcweb.org/2-2-chemistry-terminology-and-acronyms>

PFAS are characterized by carbon atoms that are linked together with fluorine atoms attached to the carbons. A more specific and technical definition of PFAS ...

1 Introduction – PFAS — Per- and Polyfluoroalkyl Substances

<https://pfas-1.itrcweb.org/1-introduction>

Per- and polyfluoroalkyl substances (PFAS) are a very large family of thousands of chemicals that vary widely in their chemical and physical properties, as well ...

2 PFAS Chemistry and Naming Conventions, History and Use of ...

<https://pfas-1.itrcweb.org/2-pfas-chemistry-and-naming-conventions-history-an...>

The PFAS Team developed two training module videos with content related to ... and chemical properties of PFAS impart oil, water, stain, and soil repellency, ...

5 Environmental Fate and Transport Processes – PFAS — Per- and ...

<https://pfas-1.itrcweb.org/5-environmental-fate-and-transport-processes>

PFAS fate and transport describes the behavior of these compounds following their release to the environment. This includes the physical, chemical, and biological ...

Naming Conventions and Physical and Chemical Properties of Per ...

https://pfas-1.itrcweb.org/PFAS_Fact_Sheet_Naming_Conventions_April2020

1 Introduction. The following topics are covered in this fact sheet: • Polymer vs. Nonpolymer PFAS. • Perfluoroalkyl substances. • Polyfluoroalkyl substances.

11 Sampling and Analytical Methods – PFAS — Per- and ...

<https://pfas-1.itrcweb.org/11-sampling-and-analytical-methods>

Sampling conducted to determine PFAS concentrations in water, soil, sediment, air, biota, and other media is similar to that for other chemical compounds, but with ...

12 Treatment Technologies – PFAS — Per- and Polyfluoroalkyl ...

<https://pfas-1.itrcweb.org/12-treatment-technologies>

State of Development: GAC is an established water treatment technology proven to effectively treat long-chain PFAS (such as PFOS, PFOA, and PFNA). The ...

6 Media-Specific Occurrence – PFAS — Per- and Polyfluoroalkyl ...

<https://pfas-1.itrcweb.org/6-media-specific-occurrence>

This section focuses on occurrence in air, soil and sediment, groundwater, surface water, and biota.

PFAS occurrence in several media types is an active area of ...

14 Risk Communication – PFAS — Per- and Polyfluoroalkyl ...

<https://pfas-1.itrcweb.org/14-risk-communication>

Additional human health and exposure factors that heighten risk perception for PFAS are summarized in Section 14.2, Risk Communication Challenges. This ...

3 Firefighting Foams – PFAS — Per- and Polyfluoroalkyl Substances

<https://pfas-1.itrcweb.org/3-firefighting-foams>

AFFF is a highly effective type of Class B foam that is especially effective on large liquid fuel fires.

AFFF is of particular concern because it contains PFAS. As ...

History and Use of Per- and Polyfluoroalkyl Substances (PFAS)

https://pfas-1.itrcweb.org/PFAS_Fact_Sheet_History_and_Use_April2020

Certain PFAS, most notably some of the perfluoroalkyl acids (PFAAs), such as perfluorooctanoate (PFOA) and perfluorooctane sulfonate (PFOS), are mobile, ...

2.5 PFAS Uses – PFAS — Per- and Polyfluoroalkyl Substances

<https://pfas-1.itrcweb.org/2-5-pfas-uses>

The unique physical and chemical properties of PFAS impart oil, water, stain, and soil repellency, chemical and temperature resistance, friction reduction, and ...

13 Stakeholder Perspectives – PFAS — Per- and Polyfluoroalkyl ...

<https://pfas-1.itrcweb.org/13-stakeholder-perspectives>

PFAS — Per- and Polyfluoroalkyl Substances ... PFAS, including PFOA and PFOS, have been detected in biosolids produced at a wastewater treatment plant ...

2.6 PFAS Releases to the Environment – PFAS — Per- and ...

<https://pfas-1.itrcweb.org/2-6-pfas-releases-to-the-environment>

industrial facilities that produce PFAS or process PFAS, or facilities that use PFAS chemicals or products in manufacturing or other activities (Section 2.6.1); areas ...

2.3 Emerging Health and Environmental Concerns – PFAS — Per ...

<https://pfas-1.itrcweb.org/2-3-emerging-health-and-environmental-concerns>

PFAS — Per- and Polyfluoroalkyl Substances. HOME ... Like other emerging contaminants, knowledge and concern about PFAS in the environment has evolved ...

Remediation Technologies and Methods for Per- and Polyfluoroalkyl ...

https://pfas-1.itrcweb.org/pfas_fact_sheet_remediation_3_15_18

Certain PFAS have recently been the subject of regulatory actions and attempted soil, sediment, and water remediation. These compounds have unique chemical ...

4 Physical and Chemical Properties – PFAS — Per- and ...

<https://pfas-1.itrcweb.org/4-physical-and-chemical-properties>

Apr 14, 2020 ... For an individual PFAS compound (or mixture of PFAS) that exists as a liquid at ambient temperatures, density can influence its behavior in the ...

Per- and Polyfluoroalkyl Substances (PFAS)

https://pfas-1.itrcweb.org/uploads/2020/04/ITRC_PFAS_TechReg_April2020

Apr 1, 2020 ... Substances (PFAS). Technical/Regulatory Guidance. April 2020. Prepared by. The Interstate Technology & Regulatory Council (ITRC).

2.4 PFAS Reductions and Alternative PFAS Formulations – PFAS ...

<https://pfas-1.itrcweb.org/2-4-pfas-reductions-and-alternative-pfas-formulations>

1 3M Voluntary Phaseout of Certain Long-Chain PFAS. In early 2000, 3M was the principal worldwide manufacturer of PFOA and POSF-derived PFAS (for ...

10 Site Characterization – PFAS — Per- and Polyfluoroalkyl ...

<https://pfas-1.itrcweb.org/10-site-characterization>

There are also “secondary sources,” such as PFAS concentrating into one portion of a plume (for example, groundwater into surface water) that then acts as a ...

7 Human and Ecological Health Effects of select PFAS – PFAS ...

<https://pfas-1.itrcweb.org/7-human-and-ecological-health-effects-of-select-pfas>

The best studied PFAAs are PFOS and PFOA, although considerable information is available for some other PFAS, including PFNA, PFHxS, PFBA, PFBS, and the ...

9 Site Risk Assessment – PFAS — Per- and Polyfluoroalkyl ...

<https://pfas-1.itrcweb.org/9-site-risk-assessment>

For PFAS chemicals as of September 2019: Tier 1 values are peer-reviewed toxicity values published on the USEPA’s Integrated Risk Information System (IRIS).

8 Basis of Regulations – PFAS — Per- and Polyfluoroalkyl Substances

<https://pfas-1.itrcweb.org/8-basis-of-regulations>

Providing blood testing for PFAS for all DOD firefighters during their annual physical exam; Ensuring that no water contaminated with PFOA or PFOS above ...

Acronyms – PFAS — Per- and Polyfluoroalkyl Substances

<https://pfas-1.itrcweb.org/acronyms>

PFA, perfluoroalkoxy polymer. PFAA, perfluoroalkyl acid. PFAI, perfluoroalkyl iodides. PFAS, per- and polyfluoroalkyl substances. PFBA, perfluorobutanoate ...

17 Additional Information – PFAS — Per- and Polyfluoroalkyl ...

<https://pfas-1.itrcweb.org/17-additional-information>

Data presented include PFAS concentrations in water and particle phases. Water maximum: PFHxS: 281; PFOS: 2,920; PFHxA: 757; PFHpA: 277; PFOA: 767 ...

15 Case Studies – PFAS — Per- and Polyfluoroalkyl Substances

<https://pfas-1.itrcweb.org/15-case-studies>

presented a detailed characterization of a subset of PFAS soil and groundwater concentrations, focused on PFAAs in the vicinity of a former unlined burn pit where ...

and Polyfluoroalkyl Substances (PFAS)

https://pfas-1.itrcweb.org/PFAS_Fact_Sheet_Regulations_April2020

1. Regulations, Guidance, and Advisories for Per- and Polyfluoroalkyl Substances (PFAS). ITRC has developed a series of fact sheets to summarize the latest ...

Acknowledgments – PFAS — Per- and Polyfluoroalkyl Substances

<https://pfas-1.itrcweb.org/acknowledgements>

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