FROM THE FRONT PAGE

Docs: Military chemical hazards going unaddressed

Water flows off the former NAS-JRB Willow Grove property on July 12. Recent testing shows high levels of unregulated PFAS chemicals continue to appear in off-base waterways such as Park Creek and the Little Neshaminy Creek. [KYLE BAGENSTOSE / STAFF]

By Kyle Bagenstose and Jenny Wagner
kbagenstose@couriertimes.com
jwagner@couriertimes.com
@KyleBagenstose
@ATJWagner

Tom Johnston of Abington waits for a bite alongside the fishing pond at Kohler Park in Horsham on July 12. [JENNY WAGNER / STAFF]

What's in the water at Kohler Park's fishing pond in Horsham?

Tom Johnston says it's catfish, bass, carp, bluegills and "big turtles."

"You come over here, you catch something most of the time," Johnston, a retired truck driver and Abington resident, said from his canvas chair on a recent summer afternoon.

But are there chemicals?

Less than a mile from the pond is the former Naval Air Station-Joint Reserve Base Willow Grove. Five years after major drinking water contamination was discovered and cut off, chemicals called per- and polyfluoroalkyl substances (PFAS) continue to leak off the base through streams and groundwater, polluting the nearby environment.

Johnston says he knows about the situation, but he always throws the fish back into the pond. That's the rule in the park, anyway. Asked if he's concerned about PFAS, he shrugs.

But a collection of internal U.S. Department of Defense documents obtained by this news organization indicates that officials are aware of potential human health hazards stemming from fish and other "pathways" around the base.

The documents demonstrate that the potential for fish exposure was dropped from consideration in an early planning document, and that officials declined to ask state environmental regulators to study the issue, out of concern it could set a precedent. Other documents indicate Navy staff believe there are no ideal options to begin cleaning up the chemicals.

The documents were provided by Mark Cuker, an environmental attorney in Philadelphia who obtained them through the discovery process of an ongoing lawsuit against the federal government over PFAS contamination in the city's suburbs. Cuker provided the documents to this news organization, which reviewed and analyzed their 40,000 pages independently.

"It's pretty disturbing," Cuker said. "Kick the can down the road, is what they're doing."

PFAS originated in firefighting foams that the military began using in the 1970s. More recently, they've been linked to a variety of human health effects, including high cholesterol, thyroid disease, immunodeficiencies, some cancers, and reproductive and developmental issues.

Now, the military is investigating PFAS at hundreds of additional bases across the country, finding drinking water contamination at more than 50 sites so far. The DOD has prioritized cutting off drinking water exposures above a 70-parts-per-trillion (ppt) health advisory level developed by the U.S. Environmental Protection Agency and studying the extent of environmental contamination, but has otherwise made piecemeal efforts to contain or clean up the chemicals.

As of press time, the Navy, which is the primary point of contact on PFAS issues in the region, had not responded to a list of questions sent July 10. Public affairs officer Bill Franklin estimated responses would not be available until Aug. 9.

Fish consumption hazards discussed

Last summer, New Jersey became the latest in a small group of states to release studies detailing health risks faced by humans who catch and consume fish from PFAS-contaminated waterways.

At the time, officials at the Willow Grove base acknowledged the effort, but said they had no plans to take additional steps to assess whether residents could be exposed to PFAS emanating from the bases through fish consumption.

"The fish pathway has been initially discussed with the regulators. However, a determination of additional sampling has not yet been decided by the team," Franklin said at the time.

Documents show Navy officials internally considered potential fish exposures years earlier.

A December 2014 document displayed a draft "Conceptual Site Model" for Willow Grove, which is a chart developed early in environmental investigations to show all the potential ways humans or animals could be exposed to a chemical. In the document, Navy contractor AECOM included a "fish tissue" pathway and marked that "current/future off-site resident(s)," along with "future" trespassers, recreational users and on-site residents could potentially be exposed.

But in an updated draft from 2015, along with a version publicly released in 2018, fish consumption was gone. Those versions also removed the "current/future off-site resident" exposure category from the chart, which had shown additional potential exposures through the "incidental" ingestion of sediment and surface water from area streams and creeks.

Environmental testing conducted around the base between 2015 and 2019 has consistently shown high PFAS levels in creeks and streams near Willow Grove. Recent testing results taken by water supplier Aqua PA and provided to the EPA show upward of 5,000 ppt of PFAS in a tributary to Horsham's Graeme Park, 1,000 ppt in the park's spring, and levels reaching into the hundreds of parts per trillion in Park Creek and the Little Neshaminy Creek downstream.

"Somebody needs to bring this to the awareness of the public that there should not be places where families are fishing and taking the fish home and eating it," said Hope Grosse, co-founder of the local BuxMont Coalition for Safer Water, at a recent military meeting.

It is not clear from the documents who removed the exposure pathways and why. Tom Voltaggio, a former director of the EPA's regional Hazardous Waste program, said the reasons wouldn't necessarily be nefarious. The Navy or its contractors could have conducted a legitimate evaluation to determine fish consumption wasn't a problem, Voltaggio said.

"Have they proven that (there's not an issue), in order to eliminate that pathway?" Voltaggio said in an interview.

Questions about the conceptual site model were among those the Navy said it would answer by Aug. 9.

Documents show questions about fish consumption continued as the Navy investigated PFAS at Willow Grove.

In March 2016, Willie Lin, environmental coordinator for the former base, sent an email to a team of regional Navy officials on the topic. He noted that a recent letter from the U.S. Agency for Toxic Substances and Disease Registry (ATSDR) said the Navy "should" characterize exposure pathways other than drinking water, including fish, at the nearby Naval Air Warfare Center Warminster.

"I think it's likely that a similar ATSDR comment about fish consumption will be provided for ... Willow Grove, but the recent media and elected official interest in (PFAS) reflects a desire for prompt action," Lin wrote, before suggesting the group reach out to Pennsylvania regulators and request they create a health advisory for fish.

Jeffrey Dale, a remedial project manager for the Navy, wrote that he could also "evaluate" potential fish exposure pathways in Warminster, "if prudent to do so."

But Gregory Preston, director of the Navy's Base Realignment and Closure (BRAC) program on the East Coast, wrote back telling Lin to "hold off on that course of action" until the matter could be reviewed by higher-ranking officials.

"It could result in a precedent-setting protocol," Preston wrote.

It's unclear from the documents what happened next.

The following September, Lora Werner, regional director for the ATSDR, was still

See HAZARDS, A14

Mapping the contamination

Recent testing shows PFAS chemicals continue to slip off the former Willow Grove Base and Horsham Air Guard Station, contaminating local waterways. All values are in parts per trillion (ppt) for PFOS and PFOA.

Test sites
1. ANG Basin discharge (5,045 ppt)
2. Graeme Park Spring (1,236 ppt)
3. Park Creek at Kansas Rd. (557 ppt)
4. Little Neshamy Creek at Valley Rd. (366 ppt)

Other locations
A. NAS-JRB Willow Grove/ Horsham AGS
B. Kohler Park
C. Crop fields

Sources: Data from Aqua PA testing; maps4news.com/©HERE GATEHOUSE MEDIA

"Somebody needs to bring this to the awareness of the public that there should not be places where families are fishing and taking the fish home and eating it."

Hope Grosse, co-founder of the local BuxMont Coalition for Safer Water

HAZARDS

From Page A13

pressing the issue, according to documents obtained through public records requests. In an email sent to various state and federal officials, including Lin, Werner noted that residents had again brought up the issue.

"This is a question that is not going away, and ATSDR sees this as a current public health data gap that needs to be addressed," Werner wrote. "Until we have actual fish sampling data from the site area, we can't really answer this question."

In a reply email to Werner and two colleagues, Sharon Watkins, director of the Pennsylvania Department of Health's Bureau of Epidemiology, asked, "Have we had discussions with DEP that fish sampling for this site may be necessary from a public health point of view ... could that be something we try to engage our partners in ...?"

Werner replied that her email was an attempt to draw attention to the issue, and she thanked the DOH officials for their help. "I have been bringing this up to EPA and DOD for a while now, and there has been low interest so far, but I plan to keep raising the issue on the federal side," she wrote.

Last month, the ATSDR's communications office confirmed that fish near the Pennsylvania bases still had not been tested in the three years since Werner's concerns were documented.

"PFAS levels in fish near the Willow Grove/Warminster sites have not been evaluated. Sampling results for surface waters in the area indicate this could be a possible concern for native (non-stocked) fish," the office wrote in an email.

In an email last week, Pennsylvania DEP spokeswoman Beth Rementer wrote that her department "does not recall" ever being contacted by any Navy officials with a request that they analyze potential fish exposures. Rementer further noted that the EPA doesn't have approved methods for testing fish.

"EPA is working on developing methods. DEP expects this data gap to be closed once valid EPA methods are issued," she wrote.

Other states already have analyzed PFAS in fish tissue and created their own advisories.

In New Jersey, investigators looked at lakes near Joint Base McGuire-Dix-Lakehurst and found perfluorooctane sulfonate (PFOS) at amounts reaching about 100 ppt, well below the levels being found in Park Creek and the Little Neshaminy in Pennsylvania. But after studying fish flesh in the same waterbody near McGuire, they found the chemical had accumulated to more than 1,000 times the amount in water, and limited fish consumption of largemouth bass and yellow perch to just once a year.

Documents show fish consumption issues also were discussed at higher levels in the Navy. In the spring of 2016, Richard Mach, director of environmental compliance and restoration policy with the Navy, emailed several dozen colleagues asking for comments on a draft PFAS strategy the department was formulating for several assistant secretaries of the Navy.

The draft or final strategy document was not included in the files reviewed by this news organization. However, Robert Schirmer, an environmental restoration manager for a naval engineering program, responded back with comments. They included a suggestion for "consideration for other routes of exposure" to PFAS beyond drinking water, and "specifically" the ingestion of animals containing PFAS.

Lights at the former NAS-JRB Willow Grove can be seen beyond a corn field adjacent to Graeme Park in Horsham Township on July 12. Research has shown PFAS in soil can be sucked up into plants and food crops. [JENNY WAGNER / STAFF]

A sign by Kohler Park's fishing pond emphasizes that it is for catch and release only. It's been that way for years, Horsham Township officials said. [JENNY WAGNER / STAFF]

"We have been able to 'fend' off other routes of exposure to date by simply stating Navy policy only allows me to address direct ingestion of drinking water by human consumption," Schirmer wrote. "But I'm pretty sure this will not be sufficient."

It's unclear what became of Schirmer's suggestion.

Tracy Carluccio, deputy director of the environmental nonprofit Delaware Riverkeeper Network, called the Navy's communications on fish consumption "outrageous."

"Their attitude is to ... avoid controversy at the expense of public health," Carluccio said. "Congress and government oversight agencies need to step in and ensure the right decisions are being made and important avenues like fish consumption are vigorously pursued."

The EPA did not respond by deadline to questions about potential fish consumption hazards.

Other exposure routes

Potential PFAS hazards discussed by Navy officials extended beyond those posed by fish consumption. Several aligned with concerns that have been raised publicly over the years by scientists and advocates, who have noted that once PFAS pollution enters the environment from a source such as firefighting foam use, it can take a variety of paths into the human body other than through groundwater used for drinking water.

For example, the chemicals can reach sewer systems that all funnel to a treatment plant, resulting in a concentrated discharge that contaminates areas downstream. Or, the chemicals can concentrate in sewage sludge, which is often reused as fertilizer at farming operations. More simply, the chemicals can accumulate in places like private gardens, where they're sucked up into plants and vegetables.

Such hazards already have gone beyond the theoretical. Dairy farms in Maine and New Mexico have been devastated by PFAS contamination. In Maine, the issue resulted from "biosolids" from wastewater treatment plants being used as fertilizer on fields, while a farm in New Mexico alleges its groundwater was contaminated by a nearby Air Force base.

Christopher Higgins, a professor of civil and environmental engineering at the Colorado School of Mines, has studied how PFAS behave in soil and can be absorbed by different types of plants, including food crops.

Generally, Higgins said, concentrations of some types of PFAS can be expected in soil that has been previously treated with biosolids that contain the chemicals or irrigated with contaminated water. He added that contamination in soil ultimately will only decrease through PFAS slipping down into groundwater, being absorbed by plants or blowing away.

"(PFAS) are extremely persistent in the environment," Higgins said, adding that contamination can last "many years."

There's no evidence that PFAS have contaminated any local commercial farming operations or backyard gardens, but also no signs they have been evaluated. Immediately adjacent to the base and Graeme Park are about 100 acres of cropland that public records show are owned by Horsham Township and the estate of Samuel LaRocca.A 2015 administrative order from the EPA identified groundwater wells on the LaRocca property as potentially impacted and required the Navy to provide water filtration. It did not say what the wells were being used for.Individuals affiliated with the LaRocca estate and owners of the farm that leases the township property could not be reached for comment about where the crops are sold or used, and whether they've been tested for PFAS. Horsham Township Manager Bill Walker said he believes the corn and soybeans grown on the land are used for animal feed, but he wasn't certain.

Documents show officials from the Navy, which is the military department that oversees firefighting foams, also were notified of and generally discussed unconventional pathways.

Included in Mach's collection of documents turned over during discovery was a 2016 slideshow presentation from PFAS scientists and contractors summarizing their knowledge. On slides attributed to Jennifer Field, a PFAS expert from Oregon State University, a chart displayed various PFAS "Sources & Exposure Pathways." It showed foam going into a field and then reaching humans through food ingestion. A waterway route led to tap water and fish consumption.

A similar slide in a presentation from engineering consulting firm Arcadis in the same month mapped PFAS from firefighting foam use to humans through drinking water, fish, farmland and animal consumption.

Schirmer touched on some routes in his comments on the Navy's draft policy, noting that officials at the Navy's Fentress facility in Chesapeake, Virginia, had been "repeatedly asked" about where PFAS-containing materials had been disposed of in the past.

"This is yet another reason that it is so important the (environmental manager) needs to completely understand" potential pathways, Schirmer wrote. "Which includes contaminated source areas, migration pathways ... any treatment facilities, and ultimate disposal of sludges/backwash."

Schirmer wasn't alone. Elizabeth Nashold, the Navy's environmental director for the mid-Atlantic region, also suggested that the Navy "consider developing the strategy to be flexible enough to account ... for other routes of exposure (more than ingestion) that may be promulgated in the future."

Filtration problems recognized

The Navy's documents present another troubling challenge: Even where the military works to clean PFAS from water using filtration systems, the chemicals could be slipping through.

At many sites around the country, the DOD has agreed to pay for alternative water supplies or carbon filters that strip PFOS and perfluorooctanoic acid (PFOA), the two primary chemicals of concern, from the water. Costs to the Navy have reached into the tens of millions of dollars at Willow Grove and Warminster alone.

But documents also show Navy officials are aware that carbon filters are not effective for all PFAS, and that their use can potentially exacerbate contamination issues in some cases.

See HAZARDS, A15

"Their attitude is to ... avoid controversy at the expense of public health. Congress and government oversight agencies need to step in and ensure the right decisions are being made and important avenues like fish consumption are vigorously pursued."

Tracy Carluccio, deputy director of the environmental nonprofit Delaware Riverkeeper Network

HAZARDS

From Page A14

In May 2017, Rear Adm. Bret Muilenburg, who was then commander of the Naval Facilities Engineering Command, noted in an email to colleagues that "existing contaminant treatment techniques, like filtering with (carbon), have limited effectiveness."

He also noted that several Navy research efforts were "underway" for fiscal years 2017 and 2018 to "review and determine effective treatment solutions." In an attached slide presentation, one page noted that the PFAS chemical family is comprised of "thousands of compounds." It added again that "most conventional treatments are ineffective" and that activated carbon was effective only "for some PFAS."

Researchers have pointed out that carbon filtration is typically most effective for larger perfluorochemicals such as PFOS and PFOA, but that smaller chemical family members, with unknown toxicity levels, slip through more quickly.

The problem is further laid out in a publicly-available document on the Navy's website, which provides assistance to environmental managers across the country. Under a section titled "What treatment technologies are available?" for PFAS, the document describes issues with the two traditional methods of chemical treatment.

First, it states that removing PFAS from the ground to run through carbon filters can potentially be detrimental, because unstudied PFAS chemical family members might pass through the filters and be released to surface waterways, where they move through the surrounding area more quickly.

Tom Johnston of Abington casts out a line into the fishing pond at Kohler Park in Horsham on July 12. [JENNY WAGNER / STAFF]

"Because the toxicity of these other (PFAS) is not well defined at this time, the potential impact of their release to surface water is unknown," the document states.

The guidance further states that while there are some "promising" technologies in development to break down the chemicals without removing them from the ground, such techniques could present additional challenges as larger PFAS degrade to smaller varieties, the toxicity of which is again unknown.

"Because the relative toxicity of smaller chained (PFAS) has not been defined, this alternative runs the risk of potentially increasing the toxicity of the plume," the document stated. "Thus, treatment which breaks down the PFOA and PFOS to smaller chained (PFAS) should be avoided until such time that there is a better understanding of the relative toxicity of these chemicals."

The Department of Defense further highlighted the concerns in a list of talking points prepared ahead of a meeting with the EPA in May 2015. Shared with officials with the Air Force, Navy and Army, the talking points included a note that there was a "concern" about the lack of methods to eliminate PFAS in groundwater.

"So contain contamination," the talking points prompted.

Other communications raise the specter that the disposal of carbon can also create new exposure routes.

In a 2017 email, John Farley, a director of firefighting research for the Navy, notified Mach of a research proposal that had been submitted for funding.

The proposal stated that although carbon and other filtration methods can attract some PFAS, they then require hazardous disposal of the concentrated waste.

Destruction by incineration, a common technique, poses issues, as the process simply breaks PFOS and PFOA down into smaller PFAS, the proposal stated.

The incineration process "may contribute to atmospheric contamination," the proposal read, adding it could result in "potentially greater exposure to humans."

Carluccio, with the Riverkeepers, said she believes issues with PFAS treatment should be subject to "full public exposure."

"If DOD knows that some treatment technologies are not very effective or have downsides, this should be discussed publicly so the best technologies can be implemented, and also so safeguards can be put in place to address any unintended problems," Carluccio said.

"Because the relative toxicity of smaller chained (PFAS) has not been defined, this alternative runs the risk of potentially increasing the toxicity of the plume. Thus, treatment which breaks down the PFOA and PFOS to smaller chained (PFAS) should be avoided until such time that there is a better understanding of the relative toxicity of these chemicals."

A section titled "What treatment technologies are available?" in a publicly-available document on the Navy's website