

Department of the Navy (DON)
Perfluorinated Compounds (PFCs)/Per and Polyfluoralkyl Substances (PFAS)
Comprehensive Strategy Road Map
Version 2, 3 May 2016

BLUF: Perfluorinated compounds (PFCs)/per and polyfluoralkyl substances (PFASs) are a suite of over 100 chemicals, several of which are of emerging public health concern to the Department of the Navy (DON), U.S. Environmental Protection Agency (EPA), state regulators, public water systems, and the general public, primarily in drinking water systems. The term PFC will be used throughout this strategy as a surrogate for PFCs and PFASs. This strategy addresses PFCs in drinking water, the drinking water program, the environmental restoration program (on and off installation), and the acquisition, firefighting, and facilities management programs. DON policies, positions, and messages are aligned throughout the Department and with the Office of the Secretary of Defense.

Communications:

Need 1: DON repository of communication plans and supporting Frequently Asked Questions (FAQs), Q&As/questions and answers (Q&As), fact sheets, PAGs/Public Affairs Guides (PAGs), media responses, outreach material (internal and external [Environmental Protection Agency (EPA) and Agency for Toxic Substances and Disease Registry (ATSDR)]). We need to be accurate, consistent, transparent, and efficient.

- Where to store this info?
- Who maintains?
- Who has access?

Need 2: Standardized chain of command review/approval lines for media and congressional inquiries, CODEL requests, and leadership briefings/testimony.

- DASN (E) approval authority for policy decisions and new responses.
- Integrate into repository of FAQs, Q&As, etc. above to ensure everyone answers routine, similar, repeat questions consistently and efficiently.

Existing Policies and Guidance:

- DASN(E): Perfluorinated Compounds (PFCs) – An Emerging Environmental Issue, 21OCT14
- USMC: Sampling and Testing for Perfluorinated Compounds (PFCs) in Drinking Water, 12DEC14
- NAVFAC: Perfluorinated Compounds (PFCs) Interim Guidance/Frequently Asked Questions (FAQs), 29JAN15)
- OPNAV N45: Navy Drinking Water Sampling Policy for Perfluorochemicals Perfluorooctane Sulfonate and Perfluorooctanoic Acid, 14SEP15
- BUMED: Memo 6280 Ser M3B7/15UM30462, Testing for Perfluorochemicals Perfluorinated Compounds (PFCs) in Drinking Water, 24DEC15
- DoDI 4715.06, 4715.07 and 4715.18, DoDM 4715.20
- Air Force SAF/IEE: AFFF Disposal and Replacement – Crash Response Vehicles, 9MAR16
- UFC 4-211-01n “Aircraft Maintenance Hangars: Type I, Type II And Type III”

Comment [LN1]: NAVFAC EV: Do we want to mention somewhere in this strategy that our sampling focus will only be on PFOA/PFOS or on those PFCs that have PHA levels? I think this is crucial to ensure that we don't open the door for sampling to be done of the full suite of PFCs
Response: this is a very tricky issues and too complicated for this strategy since the answer depends. It depends on what the States establish as promulgated standards. It depends on what states identify for DSMOA QC samples. It depends on disposal of treated water. Etc.

Comment [WKCNCM2]: PFC issues are now affecting at least two land transfers – Melville Marina at Newport and a (BRAC?) site in CA. Suggest considering whether the strategy should include recommendations regarding property transfer issues as well.
Response: PFCs are just one more contaminant under DERP so there is nothing new here.

Comment [CJMCNAE3]: Recommend keeping a spreadsheet that includes: Date of inquiry, name of person inquiring, affiliation of person inquiring, recipient of inquiry, date of response.
Response: CHINFO has lead for how to manage this information.

Comment [LN4]: NAVFAC EV: NAVFAC EXWC maintains the ERB Web Page, there is some info on PFCs located there already for use in this DON repository; the RITS has also had a PFC topic presentation from 2015 with case studies from BRAC sites. Navy also has an Environmental Portal which could be used as a data repository.
Response: CHINFO has lead for housing info.

Comment [djb5]: At a minimum, public affairs POCs should have access to the approved FAQs, so that response to media inquiries can be consistent and as painless as possible for RPM.
Response: CHINFO will address this at implementation

Comment [djb6]: Not that I'm in favor of it, nor does it say too much, but should the revised AF guidance & "press release" be included?
Response: I do not think so
Should the Navy be developing something similar?
Response: That is what this strategy is all about and there will be additional policies and direction as a result of this strategy.

Comment [CJMCNAE7]: Also, if we are going to include AF information they have an interim policy from 2012 that we should include.
Please send it to me and I will consider adding it as another reference.

- UFC 3-601-02 Operation and Maintenance: Inspection, Testing, and Maintenance of Fire Protection Systems
- NFPA 412 Standard for Evaluating Aircraft Rescue and Fire-Fighting Foam Equipment, 2014
- NFPA 11 Standard for Low-, Medium, and High-Expansion Foam, 2016

Navy DON Drinking Water Program:

- DON complied with the third Unregulated Contaminant Monitoring Rule (UCMR3) sampling requirements in the U.S. Under UCMR3, DON tested drinking water at 19 Navy and seven USMC installations with no exceedance of the Provisional Health Advisory (PHA) levels for perfluorooctanoic acid (PFOA) or perfluorooctane sulfonate (PFOS). Four other PFCs were also tested under the UCMR, however, there are no PHA levels or other criteria for these PFCs.
- DASN(E) policy required testing at additional locations in the U.S. if there was a known or suspected release of PFCs within about approximately a mile upgradient of the drinking water source water. Navy sampled 40-11 installations, with Naval Auxiliary Landing Field (NALF) Fentress, which serves approximately 50 people, in Chesapeake, VA as the only installation with an exceedance of the PHA. USMC sampled one installation with no PHA exceedances.
- DASN(E) policy also required testing at all overseas locations. USMC completed testing at four locations with no PHA exceedances. Navy sampling is underway. All compiled sample results expected by May 2016.
- DON policy is to utilize the PHA values for drinking water as if they were a regulatory standard and provide alternative water to personnel on base for drinking and cooking if the PHA is exceeded. When/if final health advisory (HA) values or Safe Drinking Water Act (SDWA) regulatory standards (e.g. maximum contaminant levels (MCLs)) are established, these will replace the PHAs as PHA action levels. DON will is also complying with any State standards that are properly promulgated and used within consistently across the State pursuant to the State's delegated federal authority under the SDWA (e.g., PFNA in NJ).
- USMC will fund using local O&M/base operating funds, with support from higher HQ as required. Navy will require funding by the drinking water system facility maintenance owner.
- A looming question posed by DON leadership is "can we say now that all of our personnel on base are provided water without PFCs above an action level?" Since not every installation has sampled for PFCs under the SDWA, UCMR, or DON policy, the current answer has to be no. To determine the universe of sites where this question cannot be answered, ODASN(E) will request from Navy and USMC provide a list of installations under the following categories by 31 May:
 - DON owned water system sampled under UCMR
 - DON owned water system (including overseas) sampled under DON policy
 - DON purchased water from off installation where public water system (PWS) sampled under UCMR
 - DON owned water system not sampled (non-public water systems, water systems that did not meet the policy criteria)

Comment [SRGCNME8]: Do we need to address other routes of exposure that are currently being established that will ultimately create a risk-specifically eco (ingestion of animals with PFCs since they bioaccumulate). Possibly add a sentence that says "as screening values are established for other routes of exposure, new policy/guidance will be established".

Response: This suggestion is true, but I am not aware of any near term actions that would result in a need to add this information at this time.

Comment [djb9]: Also for completeness, these installations should be listed here or in an attachment.

Response: that level of detail is too much for an ASN level strategy. That info will be in the PAO FAQs and Q&As

Comment [SRGCNME10]: One clarification regarding the evaluation of testing of Navy water systems. Initially, only Navy public water systems (those serving more than 25 people) were evaluated for testing. There are approximately 35 Navy water systems that serve less than 25 people. The strategy should clarify address whether we are also going to evaluate testing at Navy Non-PWS. Cutler was a system that fell into this category.

Response: The final bullet of this section is designed to gather that information so leadership can decide whether to direct additional testing.

Comment [SRGCNME11]: Recommend that "source water" be changed to "Water supply source (e.g. lakes, reservoirs, wells)"

Response: Edited to match DASN(E) policy.

Comment [MSACCN12]: Has this policy been properly vetted and approved through DoD? Given the direction many states are going, this could be problematic.

Response: This is common practice and OSD is aware of it.

- DON purchased water from off installation where PWS not sampled

Environmental Restoration Program:

- DON is following policy/guidance in DoDI 4715.07, DoDM 4715.20, DoDI 4715.18, and Navy Environmental Restoration Program (NERP) Manual to conduct Defense Environmental Restoration Program (DERP) response actions for PFCs, consistent with any other contaminant. No additional policy is required to address PFC releases under DERP, however DASN(E) plans to issue the direction is developing/implementing the process below (more details in inserted flowchart) to efficiently complete identify, validate, and prioritize a comprehensive DERP Site and Area of concern (AOC) inventory of potential release sites across DON.
- NOTE: While not covered by DERP, restoration, if conducted required at overseas installations must would need to be conducted in accordance with DoD Instruction 4715.08 and country-specific restoration guidance, if any, provided by DoD Lead Environmental Components pursuant to DoDI 4715.08.
- NOTE: OSD responded to a reporter's question and in December 2015 released a list of 664 fire or crash training sites (DERP sites identified in KBCRS database) throughout DoD. This list was compiled by searching for certain terms (e.g., fire training) without any verification of site status/applicability. Of the 664 sites, 143 are identified as DON sites. Fire and crash sites are just one category of potential PFC release sites, so this list is not complete or necessarily accurate for DON or DOD.
- DON is identifying existing DERP sites/AOCs, validating them as potential PFC sites, filling data gaps, and prioritizing further actions in a risk based approach. Until a validated list of sites is determined, the site counts will not be included in this strategy or other documentation. The attached flowchart outlines in detail and with schedule milestones, the process being implemented by DASN (E), NAVFAC (ER, N and BRAC), CNIC, and USMC. The major steps include:
 - Key word search of existing databases to generate initial list of potential where PFC DERP Sites/AOCs, may have been used or and released.
 - Validate initial list.
 - Provide validated list and potential PFC release mechanisms to CNIC and USMC to fill site/AOC gaps, in coordination with NAVFAC RPMs.
 - Need to further identify additional known or suspected releases of PFCs on active installation and BRAC locations. Since conducting CERCLA preliminary assessments is costly and time consuming, DASN(E) will be issuing direction to quickly and cost effectively identify all (~95-99% solution) known or suspected PFC release sites. DASN(E) will disseminate the existing lists of DERP sites and PFC release categories to CNIC and USMC who will conduct facility wide reviews to identify additional potential DERP sites to "assess". Prioritize sites based on risk to drinking water/receptors.
 - Prioritization — a All known or suspected PFC release sites will need to be assessed to determine whether they require further DERP response actions. The number one objective is to identify sites with likely/potential direct exposure via DON-caused contamination reaching public or private drinking water supplies so that the unacceptable exposure can be eliminated.

- Flowchart:

Comment [LN13]: NAVFAC EV: For further identification of known and suspected releases, NAVSEA hosts a database identified as NOSC Net, which would be a useful source of data for release sites. With respect to remote crash sites, many of these self-extinguish prior to responders arriving on scene. For hangar system releases, AFFF is often not contained because hangar doors are left open.
Response: Gunarti, please track this down and incorporate into process as appropriate.

Comment [LN14]: 5090.ID does not currently require reporting of AFFF spills - We may want to consider changing Chapter 39 to require spill reporting (using the message format) which would be tracked in NOSC Net.
Response: Concur.

Comment [LN15]: NAVFAC Washington: It is noted below that "preliminary assessments [are] costly and time consuming" and instead "DASN(E) will disseminate the existing lists of DERP sites and PFC release categories to CNIC and USMC who will conduct facility-wide reviews to identify additional potential DERP sites to "assess"". Are these not essentially PAs? And if so, wouldn't it behoove the Navy to conduct the investigations as PAs such that our regulatory partners are satisfied that our "facility-wide reviews" are truly comprehensive? With the same considerations in mind, for those sites that the "facility-wide review" recommends further investigation, shouldn't follow-on sampling be conducted as an SI (or at least follow SI guidance) and have a UFP-SAP? Presumably for those sites that have now been sampled (as part of an SI or not) and have been identified as having PFCs in environmental media, new sites should be opened in NORM at Phase 2. And, regardless of what process was used in the past (PA/SI or other), the next phase would be an RI, which would follow CERCLA guidance like any other ER site. Is that the case?
Response: Addressed in flowchart and business rules.

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16-05-03 PFC DERP
Site and AOC Flowchart

Once a list of potential sites is known, the following prioritization hierarchy should be used to assess each installation/site, taking into account site-specific circumstances.

- Each installation shall identify known or suspected PFC release sites, determine known or likely groundwater flow direction, and identify potential drinking water exposure pathways (e.g., public or private drinking water wells) within approximately 1 mile down gradient. If the conceptual site model is incomplete for any reason, sites should not be removed from sampling consideration without appropriate justification. In coordination with the installation cleanup team (team composition and designations vary but normally include NAVFAC project manager, State regulator, and sometimes EPA regulator), these exposure pathways/drinking water sources shall be investigated, and if levels exceed thresholds (e.g., PHA levels), eliminate the exposure pathway (e.g., provide alternative water).
- Remaining sites shall be prioritized for assessment, investigation, and remediation (if needed) in coordination with the cleanup teams for each installation. Factors to consider are:
 - Groundwater designation (e.g., beneficial or non-beneficial use)
 - Property ownership (e.g., DON-owned or transferred)
 - Potential exposure pathways other than drinking water
 - For BRAC, timeframe for anticipated future property transfers
 - Potential for other potentially responsible parties
- Completion of all DERP response actions will be a multi-year process similar to any other contaminated site.

Funding:

- Conduct all investigations, removal, and remedial actions using ER,N or BRAC funding.
- Address all off-installation contaminant migration, including provision of alternative water, where appropriate, using ER,N or BRAC funding.
- Do not use ER,N funding to provide alternative water on an installation (e.g., NALF Fentress) or to install, operate, or test finished drinking water treatment systems. These on-installation drinking water systems must meet all SDWA and DON policy requirements. USMC will fund using local O&M/base operating funds, with support from higher HQ as required. Navy will require funding by the drinking water system facility maintenance owner.
- Remediation conducted at overseas installations must be funded with Environmental Compliance funding, not ER,N funding.

Technology:

To support our drinking water and cleanup programs, we plan to consolidate information on the state of technology and research and development investments being made regarding:

- Drinking water treatment technologies

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Comment [SRGCNME17]: It is imperative that the RPM understands the entire CSM for the base, including possible source area, migration pathways, lithology, points of extraction, septic tank locations, treatment facilities (including disposal areas for same facilities), etc)

Response: Agree, but not in this strategy.

Comment [LN18]: NAVFAC Washington: It does not say anything about actually sampling the groundwater. Assuming this prioritization is to be done before sampling is to take place? Additionally, this section does not read as a prioritization hierarchy. The only true prioritization in the section are the sites with down-gradient drinking water wells within one mile. The rest of the paragraph are factors to consider for all other sites, but no direction as to which determine priority.

Response: Addressed in flowchart and business rules.

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Comment [SRGCNME19]: Regulators as asking about where has the past disposal of possible PFC contaminated material has gone (sludges, filter backwash, etc) . Past practice of spray application of material on land may have created an issue.

Response: Gunarti, please ensure this is included as a potential release mechanism in the data call to CNIC and USMC.

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Comment [MSACCN21]: Technically providing alternate water or taking action to filter the water could be considered a removal/remedial action. If this is done as part of a remedy selection then ... [2]

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Comment [SRGCNME22]: Due to current level of measurement requirements in parts per trillion, need to develop a consistent approach on how off base monitoring will proceed, if detections are ... [3]

Comment [SRGCNME23]: Midlant is currently planning to use our CNIC N4 utilities account as the funding source at Fentress

Response: thanks.

Comment [LN24]: EXWC Tech Review was completed in Feb 2016. Document will be forwarded under separate cover.

Response: thanks.

- Groundwater treatment technology for both in-situ and ex-situ implementation
- Soil treatment technologies for on site
- Off-site disposal of soil or other contaminated media

Specific Installations:

To date, two BRAC and two active installations have been at the forefront of the PFC issue due to PFC being detected in public and/or private drinking water wells on or near these installations. Each installation has generated a lot of material, fact sheets, PAGs, Q&As, etc. The four locations and their established web links are:

- Warminster:
http://www.bracpmo.navy.mil/brac_bases/northeast/former_warfare_center_warminster.html
- Willow Grove:
http://www.bracpmo.navy.mil/brac_bases/northeast/reserve_base_willow_grove.html
- Fentress: <http://www.cnic.navy.mil/fentressinfo>
- Earle: <http://www.cnic.navy.mil/earleinfo>

Health Studies:

- Many requests are being made to conduct health studies where there is contamination on site or in drinking water; however, the desired outcomes of the requested studies are not always clear.
- Health studies cannot determine whether an individual's exposure to past PFC contaminated water has caused or will/may cause specific adverse health effects in the future. The public has been exposed to PFCs for many years as PFCs are in many consumer products (e.g., non-stick cookware, microwave popcorn bags, stain resistant carpet, etc.). There are also many other confounding factors (e.g., other chemical exposures, smoking, etc.) that cause similar adverse health effects and thus preclude the ability to determine a conclusive cause and effect for an individual.
- DON is investing funds proactively to eliminate exposures from DON releases, as discussed above.
- ~~BUMED's policy recommends not sampling individual's blood is:~~
 - Healthcare providers should perform routine diagnostic or screening tests as medically indicated, based on their patients' history, physical examination, and assessment, and not based on PFOS/PFOA levels.
 - Blood testing for PFOS/PFOA is not medically necessary. While blood tests can measure the level of PFCs in person's body at the time of the test, the blood tests cannot identify the source of the PFCs.
 - Providers should advise patients: That there are many sources of PFCs in a person's living and working environment, and that health studies have not consistently found any specific health effects from exposure to PFCs. Also that there are no medically approved "treatments" or methods to remove PFCs from a person's body other than to decrease total exposure and allow the levels to decrease through natural elimination.

Comment [WKCNC25]: Suggest rephrasing this. Whose desired outcome? Phrase is too subjective. Suggest moving up the BUMED point here and saying something like "however, BUMED and other health agencies do not recommend them at this time."
Response: this was meant to be general. The requests are all over the map and neither BUMED or ATSDR have definitively said no, yet. We are working on this issue with our health professionals, OSD, and ATSDR.

- ATSDR has guidance on health studies, but does not make definitive recommendations or policy statements regarding the capabilities and limitations of such studies. Here is some of their material. Will want to summarize and reference.



- Need to develop a unified DON/DoD position, plan, statement, etc. to address this matter. DON is working with OSD and the DoD Components to address these concerns. OSD is initiating discussions with ATSDR. More to follow.

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Aqueous Film Forming Foam (AFFF):

The DoD Emerging Contaminants Governance Council (ECGC) issued a policy memorandum on January 28, 2016 that specifies:

- The Military Services will:
 - Issue Service-specific risk management procedures to prevent uncontrolled land-based releases of AFFF during maintenance, testing, and training activities.
 - Where and when practical to do so, remove and properly dispose of PFOS-based AFFF from the local stored supplies for non-shipboard use to prevent future environmental response action costs. Focus on removing and replacing known PFOS-based AFFF in unopened drums/can versus AFFF already loaded into systems tanks/bladders. PFOS-free AFFF is available on the DoD Qualified Products List.
- DLA will support the Services risk management actions to include AFFF procurement strategies and inventory assessment.
- The DoD Strategic Environmental Research and Development Program will issue a Statement of Need to initiate research to develop a fluorine-free AFFF.

Comment [WKCNC26]: Is this a new environmental liability cost that needs to be budgeted? How should that be done?
Response: No. We do not budget for potential future releases.

Comment [LN27]: CNIC N3/N45-NAVFAC EV: Will DLA be able to provide assistance in the development a comprehensive disposal strategy in addition to "support the Services risk management actions to include AFFF procurement strategies and inventory assessment"?
Response: we are discussing this with DLA.

Proposed elements for ASN(~~EL&EEH~~) policy to meet these DoD directions are:

- Require Best Management Practices (BMPs)/containment for all AFFF storage and system applications. This includes HAZMAT/supply areas, mobile equipment, training locations, fixed flooding systems, etc.
- Require assessment of the availability of PFOA/PFOS-free AFFF products on QPL-24385. DON policy will be needed to define PFOA/PFOS-free.
- Identify/secure funding and rRequire replacement and proper disposal of all AFFF containing PFOA or PFOS, as follows:
 - All partial and full containers of material on installations within 6 months and from ships within 12 months
 - All mobile firefighting and ~~crash response~~ aircraft rescue and fire-fighting vehicles within 12 months
 - All fixed and training systems without complete containment and disposal BMPs in place within 18 months
 - All fixed and training systems ~~with~~ complete containment and disposal BMPs in place and properly maintained and operated within 36 months

Comment [mrp28]: Matches item 2 of the 28 JAN 16 DoD ECGC guidance.
Also, from the 5 APR 16 meeting, no confidence in availability of "PFOA-free" AFFF. Even in the newest "C-6", "non C-8" or "Meets EPA 2015 Guidance" formulations, there might be trace amounts of PFOA.
If PFC-free AFFF becomes available, then initiate another program to replace and dispose of PFC-containing AFFF.
Response: We will address this in the future DON policy direction.

- All shipboard systems during next availability, but no later than ~~60~~ 72 month
- * ~~Analyze new C-6, non C-8 or Meets EPA 2015 Guidance AFFF formulations for other PFCs of concern.~~
- Require guidance/information be provided for purchasers and end users for ordering PFOA/PFOS-free AFFF products on QPL-24385 via NAVMSG, Advisory, other (advanced change notice to MIL-SPEC; applicable Tech. Manuals, etc.).
- * ~~Require cancellation of national stock numbers (NSNs) (or other) for all PFOA/PFOS containing AFFF products on the QPL-24385 by [future date certain].~~
- ~~Require the development of an emergency response plan (region/installation) that can be implemented within 48 hours; ensuring that alternate water supplies are delivered to affected on base personnel. Plan shall have an approved funding sources identified~~
- * ~~Require all new purchase firefighting and crash response vehicles and ships with AFFF systems to only use C-6, non-C8, or Meets EPA 2015 Guidance AFFF.~~
- * ~~Continue R&D on PFC-free AFFF.~~

Comment [mrp29]: All of the remaining requirements, with the exception of R&D on PFC-free alternatives, should only be valid if new formulations of AFFF do not contain high levels of other PFCs of concern. It does no good to simply swap PFOA for another PFC of concern.
Response: Agree

Comment [mrp30]: This will need to be coordinated with ASN(RD&A).
Response: Agree

[REDACTED]

[REDACTED]

Due to current level of measurement requirements in parts per trillion, need to develop a consistent approach on how off base monitoring will proceed, if detections are below PHA. Need to ensure that using 25% of PHA level for continued monitoring is the desired path forward

Response: Agree, but not included in this strategy.