Denise Trabbic-Pointer, CHMM Emeritus
1/16/2024; Revised 1/17/2024

Denise Trabbic-Pointer is a Chemical Engineer with a BS and MS in Hazardous Materials Management, a career EHS professional and a Certified Hazardous Material Manager (CHMM) Emeritus. Her education and EHS career included an emphasis on the health impacts and effects of exposure to chemicals in the workplace. Denise retired in January 2019 after 42 years with DuPont and a spin-off company, Axalta Coating Systems, as their Global Environmental Competency Leader. Since May 2019, Denise has been the Sierra Club – Michigan Chapter, Toxics & Remediation Specialist, and works nationally as a technical resource for communities impacted by releases of toxics to air, water and/or soil.

The following are documents and facts regarding the use of and potential exposure to Agent Orange and dioxin/furans by veterans, their families and other workers that lived and worked at Fort Ord Army base on Monterey Bay in California.

In summary, new information includes:

1. There is documented evidence[1] that indicates Agent Orange was stored and extensively used at Fort Ord.
2. There was potential exposure, not only to Agent Orange, but also to dioxin/furans across a large portion of Fort Ord.
3. Exposure to these chemicals posed serious health hazards to veterans, their families and other people living at Fort Ord historically and throughout closure activities.
4. New analytical methods and knowledge of the hazards of these chemicals once in the environment has advanced and this fact needs to be considered in the new ATSDR review and any new claims submitted to the VA.

Documented proof that Agent Orange (AO) was used at Fort Ord

- From the VA, Citation Nr: 1235530, Decision Date: 10/15/12, Archive Date: 10/23/12, DOCKET NO. 09-49 139
  "Notably, the Veteran has submitted a letter from the Department of the Army, dated in December 1980, noting that the Pest Control Shop at Fort Ord had monthly records dating back to January 1973 of all herbicides used on that installation, and that 2-4-5 T and 2-4 D usage was included in the records."

  Forms of 2,4,5-T and 2,4-D were used as defoliants in the Vietnam War (e.g., Agent Orange)
  https://www.va.gov/vetapp12/files5/1235530.txt

- POISON OAK CONTROL WORK AT FORT ORD, CALIFORNIA Floyd L. Otter Management Agronomist u. s. Army, Fort Ord, California Not Dated
  https://ucanr.edu/repository/a/?a=164771

AO products and wastes stored at Fort Ord – Further documented proof

Documents:

- BW-2083A, RCRA Closure Certification Report, December 2000
- Tables and Results from RCRA Closure, including Table 3: Types and quantities of wastes disposed per the 1989 Biennial Report
- RCRA Closure Appendix B, Fort Ord HQ 1995 RCRA Part A Permit application

[1] Documents found by Osla A. McKercher and Pat Elder

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According to the VA, the two active ingredients in the Agent Orange herbicide combination were equal amounts of 2,4-dichlorophenoxyacetic acid (2,4-D) and 2,4,5-trichlorophenoxyacetic acid (2,4,5-T), which contained traces of 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD). The dioxin TCDD was an unwanted byproduct of herbicide production. The building or location referred to as the “Pest Control Shop” where AO was reportedly stored by veterans could not be confirmed.

What is known is that waste AO would have been considered a hazardous waste and would have been stored at the DRMO Hazardous Waste Container Storage Unit located near what is currently the Arts Park at the former East Garrison. When no longer useful, Agent Orange is an F027 hazardous waste. F027 is a RCRA listed hazardous waste and is characterized as “Discarded unused formulations containing tri-, tetra-, or pentachlorophenol or discarded unused formulations containing compounds derived from these chlorophenols." The 1995 Part A RCRA permit application indicates that the Fort Ord base assessed up to 1,000 lbs/year of F027 waste might be stored and sent offsite to be disposed. Approximately 36 cy of soil was reportedly removed as part of the RCRA closure of the container storage unit and was taken to the OU2 landfill on base.

Table 3 from the RCRA Closure indicates that “Solid and liquid, poison, from pest, vegetation control activity” disposed in 1989 equaled approximately 543 pounds. Where and how much of the waste AO product sent for final disposal is unknown.

Health outcomes from exposure to AO

The VA has recognized certain cancers and other health problems as presumptive diseases associated with exposure to Agent Orange or other herbicides during military service. Veterans and their survivors may be eligible for benefits for these diseases. A list of diseases is located at this link.

Health outcomes from exposure to dioxin/furans

The CDC assessed health hazards from Dioxins, Furans and Dioxin-Like Polychlorinated Biphenyls and links to other agency findings are located at this link.

EPA Dioxin Website. Dioxin and dioxin-like compounds (“dioxins”) are persistent bioaccumulative toxic (PBT) chemicals characterized by EPA as probable human carcinogens. It also biomagnifies similar to PCB where animals eat impacted foliage and other animals eat them through the food chain and dioxin levels are increasingly magnified. People near dioxin-impacted environmental media (soil, water, air) can be exposed to dioxin through oral, dermal and inhalation routes. Any burn areas where chlorinated solvents and/or used oil was included will likely include dioxin in the list of soil/GW contamination.

Active movement and remediation of soil containing dioxin would likely have been cause for particulate to become airborne. This risk would have been particularly increased when the facility was performing closure activities (1995 to final closure activity).

Furans should be included whenever mentioning dioxin as they are created in essentially the same manner. There are 210 different dioxins and furans. All dioxins have the same basic chemical "skeleton," and they all have chlorine atoms as part of their make-up. Furans are similar but have a different "skeleton". Furan is listed in the Department of Health and Human Services list of carcinogens and considered as possibly carcinogenic by the International Agency for Research on Cancer (IARC).

How dioxin/furans are created (specific to chemicals and activities at Fort Ord)

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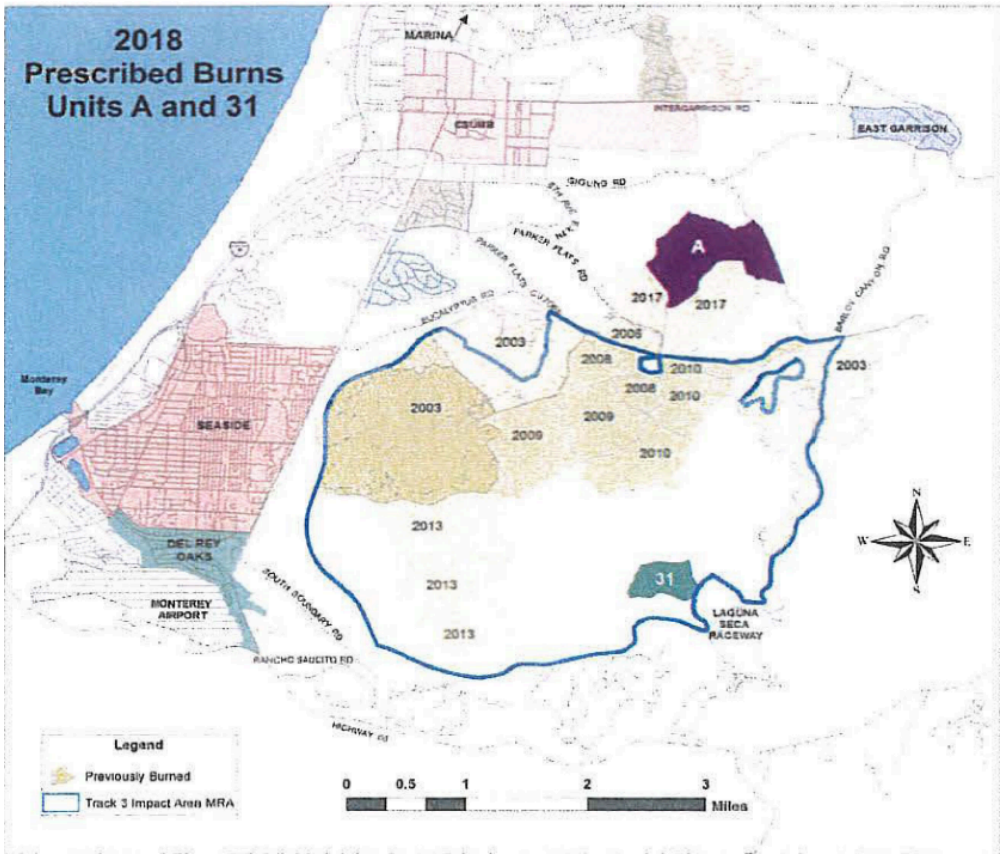
Dioxins are mainly byproducts of industrial practices. They are produced through a variety of incineration processes, including improper municipal waste incineration, and burning of trash, and can be released into the air during natural processes, such as forest fires and volcanoes.

At Fort Ord, wherever waste, trash or other materials were burned are likely locations where dioxin/furans could be found. A common practice at Fort Ord was to perform prescribed burns prior to munitions cleanup. The following is from the 2019 document OE-0973, Prescribed Burn Frequently Asked Questions: Former Impact Area, from the Fort Ord Base Realignment and Closure Office.

“Prescribed burns are an important part of the munitions cleanup and are also required under an agreement between the Army and the U.S. Fish and Wildlife Service as a part of the Installation-Wide Multispecies Habitat Management Plan.

The prescribed burn will make the ground surface accessible for safe munitions removal to follow.”

These prescribe burn occurred all across the Fort Ord base. The following map shows prescribed burn areas at the base from 2003 to 2019. Many of these areas were previously treated with Agent Orange and other pesticides. As mentioned, dioxin/furan would remain wherever AO and/or chlorinated solvents were released or used.



Differences in current and historic analytical results for dioxin

There is nothing in the documents that were reviewed that mentions testing for pesticides or dioxin/furans prior to or after prescribed burns. There is data at one location where chemical

contamination was assessed and where dioxin was included in the analyses. The former Burn Pit, Site 10, is one location where a variety of materials were burned and where dioxin/furans were assessed before and after cleanup activities. There are several things to highlight in this example: 1) the test methods back in 1996 were much less accurate than they are today, 2) the area prior to cleanup included many contaminants that were above criteria and therefore a potential exposure hazard to people working around this burn pit, and 3) Site 10 Burn Pit was the only area we found in documents where impacted soils were excavated and where dioxin was assessed to confirm cleanup. The latter is important because, as mentioned above, none of the prescribed burn areas were cleaned up or assessed for residual dioxin/furans.

The following is information specific to the Site 10 Burn Pit.

Site10 is in the Main Garrison, approximately 160 feet south of the Fort Ord Fire Station (Building 4400). The site consists of a burn pit in which petroleum hydrocarbons were ignited and extinguished for firefighting training. The pit is approximately 45 feet long, 25 feet wide, and 2 feet deep. An approximately 2-inch-diameter pipe extends through the southern wall of the pit. A drainage swale apparently consisting of soil that settled following installation of the pipe leads away from the southern end of the burn pit. During fire suppression, the burn pit was filled with water and fuel and ignited. Fuels used at the burn pit reportedly included off-specification jet fuel [JP-4), gasoline, diesel, and waste oil (potentially contaminated with solvents and PCB). Water and residual unburned fuel remaining after firefighting training were allowed to percolate into the ground through the base of the burn pit. The pipe apparently was installed to regulate the fluid level in the burn pit.

In 1996, remediation consultants HLA conducted a final supplemental investigation to evaluate the distribution of contaminants in soil at Site10.The final supplemental investigation consisted of conducting two phases of surface soil sample collection, drilling, and sampling six soil borings, and performing an exploratory excavation of the drainage swale at the southern end of the burn pit.

Confirmatory samples were collected from the Burn Pit following removal of soil at Site 10. The HLA report included data tables of all confirmatory sample results. The following is what was determined from review of this data.

- Laboratory methods are much improved since 1995/1996 and Reporting Limits (RL) are much lower now. A Reporting limit (RL) is the limit of detection for a specific target analyte for a specific sample after any adjustments have been made for dilutions or percent moisture. So, where they have marked analytes as ND (non-detect) from the 1996 report doesn't mean that the analytes were not there and that they wouldn't be above today's screening levels. Mercury is a good example. The 1996 results indicate an RL for mercury of 0.100 and 0.110 ppm. The screening level now for protection of groundwater is 0.033 ppb versus the 1996 RL of 110 ppb. Many of the 1996 results, and especially metals, really aren't telling us anything about actual levels of analytes indicated and non-detect (ND).

- Antimony, Arsenic, Beryllium, Cadmium, Chromium, Copper, Lead and Zinc are all detected above the RL in every sample from the 1996 data. The same situation here, the screening levels now are orders of magnitude lower than the 1996 RL. For example, one of the samples shows Arsenic results as 1100 ppb. The screening level now for protection of groundwater is 0.0015 ppb.

  The message here is that even areas that were deemed clean and closed in 1995/1996 would likely not meet today’s standards. This is particularly important for bioaccumulative, persistent

and toxic materials like Agent Orange, active ingredients, dioxin/furans and per- and polyfluoroalkyl substances (PFAS).

- 1996 confirmatory sample results included an assessment of dioxin/furans. Even back in 1996, a few laboratories were able to analyze environmental media for dioxin/furans to parts per trillion(ppt) levels. Then and now, dioxin/furan results must be compared for acceptable levels by using toxic equivalents to TCDD. The “Toxic Equivalent” (TEQ) scheme weighs the toxicity of the less toxic compounds as fractions of the toxicity of the most toxic TCDD. Each compound is attributed a specific “Toxic Equivalency Factor” (TEF). This factor indicates the degree of toxicity compared to 2,3,7,8-TCDD, which is given a reference value of 1.

- Assessment of residual levels of dioxin/furans in the Burn Pit after remediation were found by HLA in 1996 to be acceptable. Recalculation of the data now also found Total TCDD-TE Concentration levels were below current acceptable levels. EPA and ATSDR all state that 50 parts per trillion (ppt) of TCDD-TE in soil is acceptable. The 1998 CDC Policy Guideline established a screening level of 0.05 ppb TEQ (50 ppt), an evaluation level (>0.05 ppb TEQ, <1 ppb), and an action level of 1 ppb TEQ (1,000 ppt) for dioxins in residential soil and made recommendations for specific considerations or public health actions. The calculated level of residual TCDD-TE in 1996 was 0.00043 ppb and recent recalculation is 0.00037 ppb. [The reason the recalculation is lower is because the Toxic Equivalence Factor for one of the dioxins, Octachlorodibenzodioxins, All Isomers (OCDD,TOT), was significantly lowered between 1996 and now.]

- It is important to note that, before excavation in 1996, detected contaminants in the Site 10 Burn Pit included 4-methylphenol (one sample at 460pg.lkg), benzoic acid (one sample at 1,800 ug/kg), naphthalene (one sample at 1,800 pg/kg), 2-methylnaphthalene (one sample at 3,400 pg/kg), 2-nitroaniline (one sample at 1,800 ug/kg), pentachlorophenol (PCP) (one sample at 36 pg/kg], phenanthrene (one sample at 480 pg/kg), di-n-butylphthalate (one sample at 36 pg/kg), pyrene (two samples at 450 and 750 ug/kg), and bis(2-ethylhexyl) phthalate (15 samples ranging from 46 to 1,700 ug/kg). Dioxins were detected at concentrations ranging from 1.6 to 6,400 picograms per gram(pg/g) which exceeds the preliminary remediation goal (PRG). Furans were detected at concentrations ranging from 3.6 to 110pg/g.

  What can be concluded from the results at Site 10 Burn Pit is that the area was highly contaminated with numerous contaminants, including dioxin/furans above criteria, prior to the Interim Action of removing soil.

  Because closure of Sites at Fort Ord were historically confirmed and accepted by relevant agencies, there is no recourse that we are aware of to request that areas should be resampled using today’s advanced analytical methods and knowledge of the hazards of the contaminants. But what is a legitimate request from veterans and their families is to insist that ATDSR include this information and considerations in their new review of health hazards posed to people living and working at Fort Ord during the time period they have determined and through facility cleanup activities.

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