AN EXPLOSIVE PROBLEM

The Radford Arsenal's Toxic Operations

EARTHJUSTICE

Center for Progressive Reform

This report is presented by Earthjustice's Community Partnerships Program and the Center for Progressive Reform in partnership with Citizens for Arsenal Accountability.

Citizens for Arsenal Accountability

Citizens for Arsenal Accountability is a community organization comprised of citizens in Southwest Virginia that advocates to stop the open burning of toxic munitions and eliminate pollution produced by the Radford Army Ammunition Plant to ensure clean air, water, and soil for the New River Valley.

Center for Progressive Reform

The Center for Progressive Reform (CPR) harnesses the power of law and public policy to create a responsive government, a healthy environment, and a just society.

Earthjustice's Community Partnerships Program

Earthjustice's Community Partnerships Program (CPP) provides legal and advocacy resources to local leaders demanding a safe, just, and healthy environment in which their communities can thrive – no matter how long the fight. CPP works hand-in-hand with frontline communities to remove environmental hazards and secure access to environmental benefits. CPP acts collectively with our community partners to challenge harmful social and political structures, and to improve the environmental conditions in neighborhoods. CPP supports community-led movements using a full range of advocacy strategies to challenge the status quo.

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EXECUTIVE SUMMARY

At military bases across the country, the Department of Defense (DoD) has for decades relied on a practice known as open burn/open detonation (OB/OD) to destroy excess, unserviceable, or obsolete military munitions, including small arms cartridges, rockets, mortars, missiles, and other items.[1] Open burn and open detonation harm the environment and human health as these practices result in the uncontrolled release of toxic constituents directly into the air, soil, and groundwater. This report focuses on one of the facilities that continues to use open burning to destroy munitions in close proximity to elementary schools, community members, and college students – the Radford Army Ammunition Plant (RAAP or the Arsenal) in Radford, Virginia.

RAAP has released millions of pounds of harmful toxins and heavy metals into surrounding communities and the environment as a result of its day-to-day operations. The facility has made matters worse with its long record of violations and lack of compliance with permitting requirements. As a result, nearby residents face pollution burdens that create an elevated risk of asthma and cancer compared to the rest of the state. On top of all of this, RAAP and the Virginia Department of Environmental Quality (VDEQ) have also failed to provide sufficient transparency about operations at the Arsenal. Community members are often left in the dark not knowing what they are being exposed to or what is being done to ensure they are protected.

In 2021, VDEQ renewed two ten-year hazardous waste permits for RAAP – one to continue open burning and a second that allows the continued use of two existing incinerators along with the construction of a new incinerator complex that will contain multiple hazardous waste units, including two incinerators and a contained burn chamber. These permits lack crucial protections and information that community members need. The open burning permit allows RAAP to open burn hazardous wastes for another decade even though safe alternatives exist now. Further, the incinerator permit allows the continued use of old incinerators that have been in operation since the 1970s along with the new incinerators that were supposed to replace them. All of this means that RAAP is permitted to operate numerous hazardous waste burning units at once, exacerbating concerns that nearby communities will be exposed to significant amounts of toxic pollution indefinitely. Additionally, RAAP never assessed the cumulative impacts of all of these operations occurring together, and instead piecemealed each risk assessment to only look at one process at a time even though that is not how community members experience toxic hazards. VDEQ also failed to sufficiently engage in outreach to community members during the permitting process, with many people unaware of the permit renewal processes at all and others provided with insufficient time to adequately comment on highly technical and complex documents.

The harmful pollution from RAAP has continued for too long without adequate oversight or accountability. As such, Citizens for Arsenal Accountability make the following recommendations:

1. **End Open Burning at RAAP:** Open burning of hazardous wastes at RAAP must end, and the facility should put in place the safest alternative technology.
2. **Third-Party Alternatives Assessment:** An alternatives assessment should be conducted by a neutral third party to ensure that the facility has chosen the most environmental and health protective option.

3. **Close the Old Incinerators:** The two old incinerators at RAAP must close once an alternative technology is in place, pursuant to a transparent and enforceable schedule.
4. **Improve Transparency and Community Involvement:** VDEQ and RAAP should make greater efforts to ensure that community members are aware of what is happening at the facility, including, for instance, creating an online repository of information.
5. **Improve Compliance:** VDEQ must ensure that there are consequences for noncompliance and that the facility takes affirmative steps to make sure that violations do not continue to occur.
6. **Conduct a Cumulative Hazard Assessment & a Community Health Assessment:** Virginia legislators should allocate funding so that a cumulative hazard assessment and a community health assessment can be conducted by a neutral third-party.

INTRODUCTION

RAAP has continually endangered community members and the environment through its use of open burning, as well as incineration, to treat hazardous wastes. The facility also repeatedly violates its permit limits resulting in additional pollution releases that are harmful to the health of community members and the environment. This report describes the history of RAAP, its current operations, its pattern of noncompliance, and the environmental and health risks presented by the facility's operations. Additionally, this report provides recommendations to address some of those adverse impacts to the community, including an end to open burning and implementation of improved compliance measures, among others. While this report focuses on RAAP, the facility's hazardous waste pollution is one example of a larger danger facing communities across the country.

ABOUT RADFORD ARMY AMMUNITION PLANT

HISTORY OF RAAP

The Radford Army Ammunition Plant is located on about 4,000 acres in southwestern Virginia. The plant began operations in 1941 as part of the war effort. Since that time, RAAP has continued to operate and is the only nitrocellulose-based propellant-manufacturing facility for the Department of Defense.[2] These propellants are used in military munitions such as explosives and rockets. The Department of Defense currently contracts with BAE Systems to operate RAAP.[3]

RAAP's historical operations have left behind a legacy of contamination that the facility is still addressing today. RAAP has been operating with a corrective action permit since 1989 that requires the facility to investigate and clean up on-site contamination at approximately eighty different units at the facility.[4] The constituents of concern at the site include chlorinated solvents, explosives, and perchlorate in the groundwater, as well as metals, explosives, and dioxins/furans in the soils.[5] In particular, perchlorate contamination is an ongoing concern as RAAP has exceeded the groundwater protection standard for perchlorate in recent years.[6] Perchlorate can impact the uptake of iodine in the thyroid gland, thus interfering with thyroid function, negatively impacting metabolism, and harming fetal and infant brain development and growth.[7] Short-term exposure to high doses can cause eye and skin irritation, coughing, nausea, vomiting, and diarrhea.[8]

In addition to the historical contamination, RAAP continues to emit millions of pounds of toxic pollutants into the air, soil, and water each year. RAAP has been ranked as the largest polluter in Virginia every year since 2001.[9] Not only that, the amount of pollution RAAP releases far exceed even the second highest polluter in Virginia by millions of pounds. For instance, in 2020, RAAP emitted over eight million more pounds of pollutants than the second highest polluter.[10] In total, for 2020, RAAP reported releases of over ten million pounds of pollutants, including almost two thousand pounds of lead, as well as nitrate compounds, nitroglycerin, copper compounds, and ammonia, among others.[11]

2020 Releases from RAAP[12] (lbs.)	
Ammonia	20,443
Copper compounds	2,712
Lead compounds	1,632
Nitrate compounds	10,249,528
Nitric acid	3,102
Nitroglycerin	77,895

RAAP'S OPERATIONS TODAY

Open Burning

A significant source of pollution at RAAP is the facility's use of open burning, in which munitions and explosives are placed out in the open and lit on fire with no pollution controls. At RAAP, this process occurs on the banks of the New River, a major resource for fishing and drinking water for local communities.[13] Open burning is known to pollute the air and damage the soil, groundwater, and surface water. In particular, open burning at RAAP is associated with emissions of heavy metals (including lead, arsenic, cadmium, and chromium), volatile organic compounds (including benzene, methylene chloride, and toluene), and dioxins/furans. Exposure to heavy metals can damage various organ systems, resulting in gastrointestinal, kidney, and immune

OPEN BURN & OPEN DETONATION

Open burn (OB) is primarily used to destroy propellants and it involves placing the materials on concrete pads or metal pans and burning them. In some instances, if the items are large, the open burn occurs directly on the ground or in trenches. Open detonation (OD) is mainly used for waste explosives and other types of munitions and can involve detonations on the soil surface or in a pit or trench below ground. Historically, OB/OD has been the standard method of disposal for excess, unserviceable, or obsolete military munitions.

system dysfunction; nervous system disorders; vascular damage; birth defects; and cancer.[14] Benzene is a known carcinogen that can cause leukemia and negatively impact the immune system.[15] Dioxins/furans are known as persistent organic pollutants due to "their highly toxic potential" and impact on numerous organs and body systems.[16] Further, dioxins/furans are known to bioaccumulate in the ecosystem and in the human body because they are chemically stable and are absorbed by fat tissue.[17]

RAAP is only allowed to engage in open burning because of an outdated exception in EPA's federal regulations.[18] EPA banned open burning and open detonation of all hazardous wastes in 1980 but, due to push back from the military and its claims that there were no other alternatives at that time, the agency allowed this practice to continue only for explosive hazardous wastes for which no safe alternatives existed.[19] Congressional committees and affected communities have, for decades, pushed the military and EPA to phase out the use of OB/OD but EPA has failed to do so despite the development of alternative technologies.[20] Recent reports from EPA itself and the National Academies of Sciences, Engineering, and Medicine (NAS) make clear that there are numerous safer alternative technologies available now that can take the place of OB/OD.[21]

Hazardous Waste Incinerators

Open burning is not the only pollutant emitting process occurring at the facility.[22] RAAP also uses hazardous waste incinerators to destroy some waste streams. These incinerators emit similar compounds, including lead, cadmium, chromium, VOCs, dioxins/furans, as well as energetic compounds, such as 2,4-dinitrotoluene (2,4-DNT). 2,4-DNT is classified as a probable human carcinogen that is toxic to most organisms and can result in organ damage.[23] Further, 2,4-DNT can be transported in surface water and groundwater so releases to water are "important sources of human exposure" and are a "significant environmental concern."[24]

While RAAP's use of incinerators to treat some of its hazardous waste may seem like a step up from open burning, incineration comes with its own dangers as the process still results in the release of hazardous emissions as well as the creation of toxic byproducts.

"RAAP is permitted to open burn waste for the next ten years."

Open Burn & Incinerator Permitting

In 2021, permits for the open burning ground and existing incinerators, as well as a new incinerator complex, were approved by the Virginia Department of Environmental Quality (VDEQ). These permits and VDEQ's permitting process were flawed and leave community members without sufficient protections. For starters, VDEQ permitted RAAP to continue open burning its waste for the next ten years even though safe alternatives are available. Further, although RAAP is planning to construct a

Open burning at RAAP. *Source: EPA.*

new incinerator complex to treat many of the wastes that were typically open burned or burned in the old incinerators, VDEQ nevertheless has allowed the facility to continue open burning and using the old incinerators even when the new incinerator complex is constructed. Open burning should no longer be used at RAAP given the known dangers of this practice and the availability of safer alternatives; and the old incinerators should be closed given that they are outdated and thus pose more of a risk to community members and the environment.

In addition, in making the decision to build a new incinerator complex as an alternative to open burning, RAAP failed to sufficiently analyze other available alternative technologies that would produce less pollution than incineration. RAAP prepared an alternatives assessment several years ago that merely summarized select technologies and then dismissed them for reasons like lack of data, testing, or approvals, citing technology reviews that were done long before – in some cases thirty years before – more recent developments in alternative technologies.[25] RAAP's alternatives assessment was also conducted prior to the release of the NAS and EPA reports – both of which confirmed that alternative technologies were available and already in use at other facilities. A neutral third-party should assess alternative technologies and determine if there are any other options that could handle RAAP's waste while releasing fewer harmful pollutants into nearby communities and the environment.

Furthermore, the open burn and incinerator permits are dangerously deficient as they did not account for the cumulative impacts of operating the open burning ground, the old incinerators, and the new incinerators (in addition to the other polluting processes at RAAP). It is vital to understand the cumulative hazards of these processes because affected communities experience exposures cumulatively. For instance, a human health risk assessment of the open burning ground alone found an elevated risk of exposure to lead from emissions. Although VDEQ reduced the amount of waste that could be open burned as a result of this finding, the agency did not consider emissions of lead from other sources at RAAP, thus potentially allowing the facility to subject the public to undue risks.[26] In addition to failing to assess cumulative impacts from all on-site processes, RAAP did not include all emitted constituents in the risk assessments it conducted.[27] Specifically, for the open burn risk assessment, RAAP did not assess forty percent of the identified pollutants of potential concern.[28] For these pollutants, RAAP considered the health risks to be zero or non-existent

"We cannot keep relying on outdated technology to dispose of hazardous waste and toxic chemicals. We require the safest, most advanced technology to safeguard our community against toxic pollution."

-Alyssa Carpenter, co-founder and co-chair of CAA

simply because the facility lacked certain toxicity data but lack of data does not equate to a lack of harm. A neutral third-party must engage in a cumulative hazard assessment that takes into account all polluting processes from RAAP's operations, as well as tenant operations, and considers all emitted pollutants.

The permit processes were also plagued by a lack of information and transparency, and insufficient outreach to impacted communities. For instance, VDEQ did not post on its website many documents that were necessary to evaluate the draft renewal permits, leaving it to members of the public to guess what documents and information may exist and then request such documents and information individually. VDEQ could remedy this by creating an online repository of information for community members to access. In addition, there were numerous requests for an extension of the comment period for the open burning permit – from environmental and public health groups, residents, and local politicians – but all were denied by VDEQ. Two months was wholly insufficient for public review and comment on such a significant draft renewal permit that would have serious implications for the surrounding community for the next decade, particularly given the extent and complexity of the documents and data underlying it. Further, because the communities around RAAP are considered environmental justice communities, VDEQ should have made additional efforts to provide meaningful involvement – defined by Virginia's Environmental Justice law to mean providing residents with "access and opportunities to participate in the full cycle of the decision-making process about a proposed activity that will affect their environment or health."[29]

VDEQ's permitting process was also flawed because the agency segmented review of the two permits – with the comment period for the open burn permit running from March to May 2021 and the incinerator permit from July to September 2021. This only added to the confusion of community members because these permits were clearly related to each other, as both pertained to the management of hazardous waste at RAAP, but the draft incinerator renewal permit was not accessible to the public until after the comment period for the open burn permit had already ended. Many community members were also unaware of the comment periods for these permits and, thus, were unable to participate due to insufficient outreach by VDEQ. In addition to VDEQ's shortcomings, RAAP itself has failed to meaningfully engage with community members in ways that allow them to be fully informed about the facility's operations and the associated health and environmental impacts.

RAAP'S TROUBLED RECORD

RAAP has a long history of permit violations that have resulted in releases of even more harmful pollution.[30] EPA has characterized RAAP as a facility "of significant environmental concern for its surrounding community."[31] According to EPA's enforcement database, RAAP is listed as a high priority violator of Clean Air Act requirements and it has been out of compliance for seven of the past twelve quarters.[32] RAAP has also been out of compliance with its Clean Water Act requirements for six of the past twelve quarters.[33] RAAP has faced eleven informal enforcement actions related to violations of Clean Air Act, Clean Water Act, and hazardous waste requirements and five formal enforcement actions that have resulted in almost $550,000 in penalties in the past five years alone.[34]

Further, RAAP continues to violate its permits and regulations month after month, year after year without any requirement to take action to ensure that similar violations do not continue to occur. RAAP's violations have resulted in worker injury and death, excess releases of toxic chemicals, and threats to the groundwater, among other things. The following timeline shows RAAP's history of noncompliance and environmental harm over the last decade from July 2012 to July 2022. VDEQ must ensure that there are meaningful consequences for RAAP's noncompliance, and that the facility takes affirmative steps to address these violations and make sure that they do not continue to occur.

2012

July 1 & 2, 2012: Discharged 15,000 gallons of sulfuric acid.[35]

Oct. 16, 2012: Discharged about 500 gallons of diethyl ether into the New River.[36]

2013

Mar. 27, 2013: Discharged 35,000 gallons of wastewater.[37]

June 6, 2013: Discharged 450 gallons of untreated wastewater.[38]

2014

Nov. 4, 2014: Exceeded the lead limit for open burning permit.[39]

Nov. 19, 2014: Released propellant-contaminated wastewater from incinerator.[40]

Dec. 2014: EPA Compliance Investigation noted numerous violations, including failure to comply with emissions standards; missing data from the incinerators; disposing hazardous ash from the incinerators in the non-hazardous general trash; failure to self-report 287 violations of smokestack regulations; failure to address corrective actions identified during a 2010 audit; and failure to accurately report chemical amounts to EPA's Toxic Release Inventory for lead, dibutyl phthalate, and nitric acid.[41]

2015

Apr. 2015: Incinerator units emitted chromium in excess of allowable limit.[42]

June 18, 2015: Discharged 300 gallons of nitric acid.[43]

June 22, 2015: Released 110,000 gallons of wastewater containing 118 pounds of nitroglycerin.[44]

2016

Apr. 18, 2016: Released nitroglycerin.[45]

Aug. 18, 2016: Released acidic wastewater.[46]

Sept. 28, 2016: Released acidic wastewater.[47]

Nov. 29, 2016: Released 25 gallons of ethyl ether[48] and a fire occurred at the open burning ground after propellant popped out of the burn pan and surrounding vegetation caught fire.[49]

2017

Feb. 1, 2017: Released DNT-contaminated wastewater.[50]

Feb. 17, 2017: Fire occurred at open burning ground after propellant popped out of the burn pan and surrounding vegetation caught fire.[51]

Apr. 13, 2017: Enforcement order issued by Virginia; $79,334 penalty assessed.[52]

Apr. 15, 2017: Released acidic wastewater.[53]

May 11, 2017: Released DNT-contaminated wastewater into the New River.[54]

July 2 & 5, 2017: Exceeded the allowable level for lead during open burning (twice the permitted amount).[55]

Aug. 3, 2017: Administrative consent order issued; $263,335 penalty assessed.[56]

Aug. 17, 2017: 500 pounds of propellant slurry released from the incinerators.[57]

Sept. 15, 2017: EPA assessed a $203,200 penalty for RAAP's violations of numerous environmental laws.[58]

Oct. 17, 2017: Released nitric acid and emitted nitrogen oxides.[59]

Nov. 28, 2017: Released nitrocellulose-contaminated wastewater to the New River.[60]

2018

Jan. 23, 2018: EPA issued a Consent Agreement and Final Order for RAAP's violations of numerous environmental laws; $279,700 penalty assessed.[61]

Mar. 6, 2018: Released sludge.[62]

June 2018: Flash fire occurred, resulting in the death of one worker and serious injuries to two other workers. OSHA cited RAAP for numerous serious violations and BAE paid over $80,000 as part of a final agreement regarding these violations.[63]

Sept. 4, 2018: Chemical leak occurred at the plant, causing some personnel to be evacuated.[64]

Oct. 5, 2018: 100-200 pounds of propellant slurry released from incinerator.[65]

Oct. 12, 2018: Released oil from warehouse, impacting the New River.[66]

Oct. 30, 2018: Virginia issued an enforcement order to RAAP for releasing excess emissions; $64,287 penalty assessed.[67]

2019

Jan. 4, 2019: Consent order issued for disposing hazardous waste contaminated with lead at a landfill that was not permitted to receive hazardous waste; $76,086 penalty assessed.[68]

Feb. 24, 2019: Overflow of nitrocellulose-laden wastewater, impacting the New River.[69]

Apr. 25, 2019: Discharged about 10,000 gallons of industrial wastewater resulting in a threat to groundwater.[70]

June 6, 2019: Fire occurred at the facility resulting in one employee being injured and three firemen being hospitalized due to smoke inhalation.[71]

July 8, 2019: Released industrial wastewater, resulting in a threat to groundwater.[72]

Aug. 22, 2019: Released nitric acid, impacting the New River.[73]

Sept. 16, 2019: Release of nitric acid/ sulfuric acid mixture onto the ground.[74]

2020

Feb. 7, 2020: Discharged sewage into the New River.[75]

Nov. 11, 2020: Discharged sewage into the New River.[76]

2021

Mar. 29, 2021: Released over 100 pounds of ethyl ether into a dike leading to the New River.[77]

June 15, 2021: Released acidic wastewater.[78]

Aug. 2, 2021: Released over 2,000 gallons of hydraulic oil onto the ground.[79]

Sept. 22, 2021: Industrial wastewater released into the New River[80]; and Virginia issued an enforcement order and $20,000 penalty to RAAP for Clean Air Act violations.[81]

2022

Feb. 7, 2022: Released about 100 pounds of anhydrous ammonia to the air causing employees to be evacuated.[82]

Feb. 28, 2022: Nine violations of water discharge requirements for four pollutants, including 2,4-DNT present at a level 2,304 percent above the limit.[83]

Mar. 31, 2022: Two violations of water discharge requirements.[84]

Apr. 6, 2022: Letter of Violation/Warning Letter issued related to Clean Water Act compliance.[85]

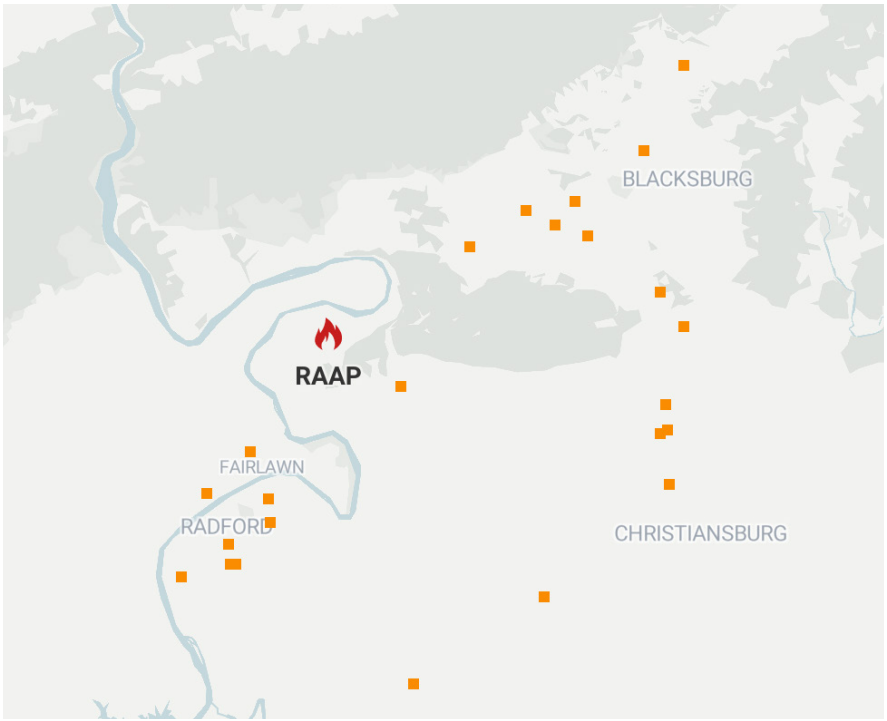
HEALTH & ENVIRONMENTAL IMPACTS

RAAP is located in Montgomery County, near Radford – a town of about 17,800 residents and the location of Radford University. Community members near RAAP are exposed to numerous toxic pollutants that pose a risk to public health. For instance, according to the Virginia Environmental Justice screening tool, the tract where RAAP is located ranks in the 80th percentile for concentration of high-risk chemical facilities, and in the 98th percentile for wastewater releases, compared to all census tracts in the state.[86]

Air pollution is a significant concern. Drone air monitoring of open burning emissions at RAAP detected arsenic, lead, and cadmium at levels 37, 5, and 1.5 times greater, respectively, than predicted in EPA models.[87] Arsenic is a human carcinogen linked to elevated cancer risk and ingesting high concentrations can lead to death. Arsenic exposure can also contribute to respiratory irritation, gastrointestinal issues, immune system dysfunction, and damage to blood vessels.[88] Lead is a potent neurotoxin that accumulates in the body and is toxic to many bodily systems and organs, including the cardiovascular system, the blood (thus, causing conditions like anemia), the kidneys, the nervous system (thus, producing symptoms such as headache, lethargy, muscle weakness, tremors, and paralysis), and the reproductive system.[89] There is no safe level of exposure to lead and even very low blood lead levels are linked to neurological damage in children.[90] Cadmium is also a human carcinogen, and inhaling high concentrations can severely damage the lungs.[91]

In addition to permitted emissions of particulates, heavy metals, and other contaminants from open burning, communities are also exposed to additional pollutants from unplanned releases and incidents at RAAP. For instance, between January 2018 and June 2022 alone there were at least twenty-nine incidents of fires or unpermitted releases of hazardous substances, sewage, and petroleum products at the facility.[92]

Evidence also suggests that there is contamination in regional surface waters and groundwater. The New River is categorized as impaired due to contamination by polychlorinated biphenyls (PCBs), with health advisories for fish consumption.[93] While PCBs are detected in the river upstream of the facility, sampling of effluent and stormwater outfalls at RAAP detected PCBs, likely contributing to overall concentrations in the River.[94] In 2021, the Consumer Confidence Report for the City of Radford's public water utility, which draws from the New River, showed that water samples exceeded the safe drinking water threshold for lead.[95] Furthermore, groundwater



Sensitive Population Sites Near RAAP

sampling at RAAP detected fifty-seven compounds at concentrations above drinking water comparison values – including nitrate, perchlorate, heavy metals, and trichloroethylene – an industrial solvent and potent human carcinogen.[96]

Additionally, there are clear indicators that the facility is not adequately preventing harm to community members. For starters, a 2021 investigation by ProPublica found that air emissions of nitroglycerin, 2,4-DNT, and polycyclic aromatic compounds at RAAP contribute to an estimated one in 19,000 excess lifetime cancer risk.[97] This means that out of every 19,000 people living in this area over a presumed seventy-year lifetime, at least one additional person would likely develop cancer. This far exceeds EPA's goal to "protect the greatest number of people possible" from an excess lifetime cancer risk higher than one in one million.[98] Additionally, between 2015 and 2019, the all-site cancer incidence rate in the City of Radford was roughly twenty-seven percent greater than in the state overall.[99] In addition to an elevated cancer risk, the City of Radford also has among the highest asthma rates in the state according to CDC PLACES and the Virginia Environmental Justice screening tool.[100]

As shown in the figure above, RAAP is located within ten kilometers (or about six miles) of eight schools, eleven day-care centers, two hospitals, and three nursing homes. Children, hospital patients, and the elderly all may face an elevated risk of harm from exposure to pollutants emitted at the facility. According to the University of Massachusetts Amherst Political Economy

Open Burning Grounds at RAAP, located directly alongside the New River.

Research Institute, six schools in Radford and Fairlawn (Belview Elementary, Riverlawn Elementary, Belle Heth Elementary, Radford High School, and John N. Dalton Intermediate) are in the 99th percentile for toxic hazards compared to the state overall.[101] Air toxics concentrations at Belview Elementary – which is less than two miles from RAAP – are nearly fifty-seven times greater than the average for schools in Virginia.[102]

The sheer number and range of toxic emissions illustrates how RAAP contributes to degradation of the air, water, and land that communities in the region rely on. But, as discussed previously, the cumulative impact of all of these emissions has never been studied. Community members urge Virginia legislators to allocate funding to study the cumulative impacts of RAAP's operations, particularly within the context of other social, economic, and health burdens that they face and take steps to minimize harm.

OB/OD FACILITIES IN VIRGINIA

RAAP is unfortunately not the only facility engaged in OB/OD in Virginia. There are two other facilities in the state: Naval Surface Warfare Center Dahlgren Division and NASA Wallops Flight Facility. Both of these facilities are Superfund sites due to the significant contamination that is present. For instance, operations at Dahlgren have led to contamination of the soil, groundwater, and sediment with numerous toxic chemicals, including arsenic, benzene, and lead, among others. At the NASA Wallops Flight Facility, the soil, groundwater, surface water, and sediment have been contaminated with polychlorinated biphenyls (PCBs), lead and other metals, volatile organic compounds, perchlorate, and per- and polyfluoroalkyl substances (PFAS).

Citizens for Arsenal Accountability urging the end to open burning at RAAP.

CONCLUSION & RECOMMENDATIONS

RAAP's operations have contaminated the air, water, and land in nearby communities with toxic chemicals. RAAP has also been a bad neighbor with its recurring violations that exacerbate the dangers community members face. RAAP, VDEQ, and Virginia legislators must act and prioritize the health of community members and the environment.

To that end, Citizens for Arsenal Accountability make the following recommendations:

1. **End Open Burning at RAAP:** Open burning of hazardous wastes at RAAP must end, and the facility should put in place the safest alternative technology.
2. **Third-Party Alternatives Assessment:** An alternatives assessment should be conducted by a neutral third party to ensure that the facility has chosen the most environmental and health protective option.
3. **Close the Old Incinerators:** The two old incinerators at RAAP must close once an alternative technology is in place, pursuant to a transparent and enforceable schedule.
4. **Improve Transparency and Community Involvement:** VDEQ and RAAP should make greater efforts to ensure that community members are aware of what is happening at the facility, including, for instance, creating an online repository of information.
5. **Improve Compliance:** VDEQ must ensure that there are consequences for noncompliance and that the facility takes affirmative steps to make sure that violations do not continue to occur.
6. **Conduct a Cumulative Hazard Assessment & a Community Health Assessment:** Virginia legislators should allocate funding so that a cumulative hazard assessment and a community health assessment can be conducted by a neutral third-party.

ENDNOTES

1. OB/OD also occurs at facilities run by other governmental agencies, such as the Department of Energy, and facilities operated by the private sector. See, e.g., EPA, *Alternative Treatment Technologies to Open Burning and Open Detonation of Energetic Hazardous Wastes at 5* (Dec. 2019), https://www.epa.gov/sites/production/files/201912/documents/final_obod_alttechreport_for_publication_dec2019_508_v2.pdf.
2. BAE Systems, Radford Army Ammunition Plant, https://www.baesystems.com/en-us/product/radford-army-ammunition-plant; VDEQ, RCRA Subtitle C, Compliance Evaluation Inspection Report at 3 (Aug. 31 – Sept. 2, 2020).
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