Via Certified Mail/Return Receipt Requested and E-mail

February 8, 2021

Administrator
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, NW #1101A
Washington, D.C. 20460
Regan.Michael@epa.gov

Re: Petition for Rulemaking Pursuant to Section 7004(A) of the Resource Conservation and Recovery Act; Section 21 of the Toxic Substances Control Act; and Section 553 of the Administrative Procedure Act Concerning the Regulation of Phosphogypsum and Process Wastewater from Phosphoric Acid Production.

Dear Administrator:

Please accept the enclosed petition from People for Protecting Peace River, Atchafalaya Basinkeeper, Bayou City Waterkeeper, Calusa Waterkeeper, Center for Biological Diversity, Cherokee Concerned Citizens, Healthy Gulf, ManaSota-88, Our Santa Fe River, People for Protecting Peace River, RISE St. James, Sierra Club's Florida and Delta chapters, Suncoast Waterkeeper, Tampa Bay Waterkeeper, Waterkeeper Alliance, Waterkeepers Florida, which includes all 14 of Florida's waterkeeper groups, and WWALS Watershed Coalition seeking the promulgation of rules that: (1) reverse the Environmental Protection Agency's (EPA) 1991 Bevill regulatory determination excluding phosphogypsum and phosphoric acid production process wastewater ("process wastewater") from the Resource Conservation and Recovery Act (RCRA) Subtitle C hazardous waste regulations; (2) govern the safe treatment, storage and disposal of phosphogypsum and process wastewater as hazardous wastes under RCRA Subtitle C; (3) initiate the prioritization process for designating phosphogypsum and process wastewater as high priority substances for risk evaluation under the Toxic Substances Control Act (TSCA) §6(b)(1)(B)(i); (4) require manufacturers to conduct testing on phosphogypsum and process wastewater under TSCA §4(a)1(A)(ii); and (5) determine under TSCA §5(a) that the use of phosphogypsum in road construction is a significant new use.

In considering this petition, note that EPA has already acknowledged—and scientific research demonstrates—the current improper management of phosphogypsum and process water poses a substantial present hazard and an unreasonable risk of injury to human health and the environment.

Thank you for your consideration.

On behalf of Petitioners,

Rachael Curran, Esq.
People for Protecting Peace River
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Arcadia, FL 34265
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Jaclyn Lopez, Esq.
Center for Biological Diversity
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St. Petersburg, FL 33731
Phone: 727-490-9190
E-mail: jlopez@biologicaldiversity.org

cc:

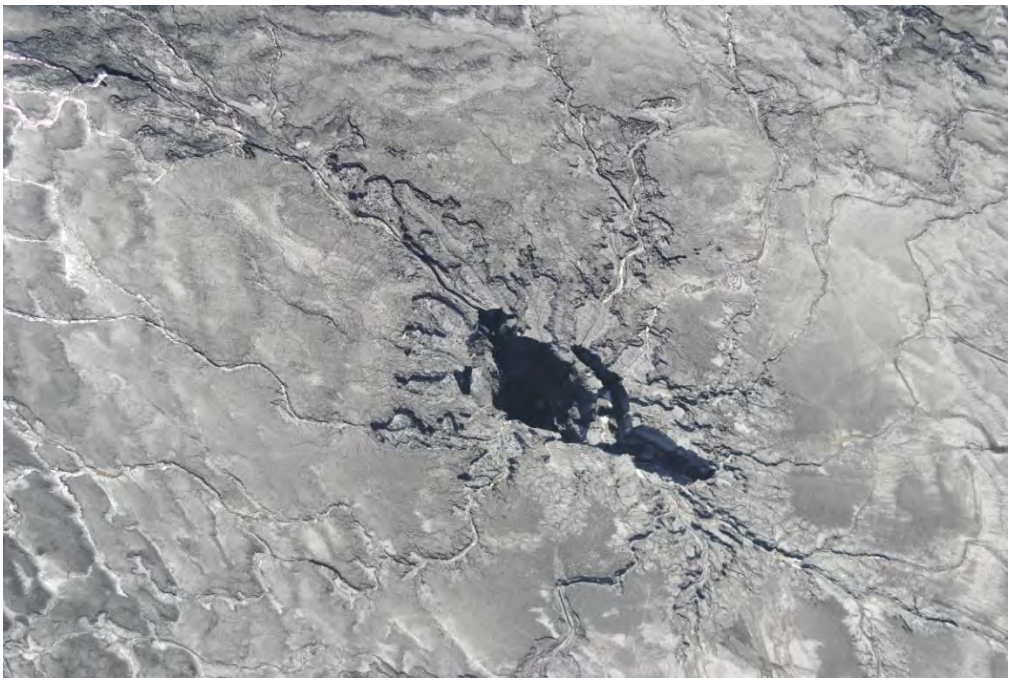
Office of Land and Emergency Management, Environmental Protection Agency, 1200 Pennsylvania Avenue, N.W., #5101T, Washington, DC 20460

Office of Chemical Safety and Pollution Prevention, Environmental Protection Agency, 1200 Pennsylvania Avenue, N.W., #7101M, Washington, DC 20460

Enclosures

BEFORE THE ADMINISTRATOR, ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF LAND AND EMERGENCY MANAGEMENT
and
OFFICE OF CHEMICAL SAFETY AND POLLUTION CONTROL

NOTICE OF PETITION FOR RULEMAKING PURSUANT TO SECTION 7004(A) OF THE RESOURCE CONSERVATION AND RECOVERY ACT, 42 U.S.C. § 6974(A); SECTION 21 OF THE TOXIC SUBSTANCES CONTROL ACT, 15 U.S.C. § 2620; AND SECTION 553(e) OF THE ADMINISTRATIVE PROCEDURE ACT, 5 U.S.C § 553(e), CONCERNING THE REGULATION OF PHOSPHOGYPSUM AND PROCESS WASTEWATER FROM PHOSPHORIC ACID PRODUCTION



A massive sinkhole in a phosphogypsum stack in Mulberry, Florida, which drained 215 million gallons of radioactive process wastewater and an undetermined amount of radioactive phosphogypsum into the Floridan aquifer, the primary drinking water source for 10 million people. Photo: Hannah Connor/Center for Biological Diversity, Sept. 20, 2016.

PEOPLE FOR PROTECTING PEACE RIVER, ATCHAFALAYA BASINKEEPER, BAYOU CITY WATERKEEPER, CALUSA WATERKEEPER, CENTER FOR BIOLOGICAL DIVERSITY, CHEROKEE CONCERNED CITIZENS, HEALTHY GULF, MANASOTA-88, OUR SANTA FE RIVER, RISE ST. JAMES, SIERRA CLUB DELTA CHAPTER, SIERRA CLUB FLORIDA CHAPTER, SUNCOAST WATERKEEPER, SUWANNEE RIVERKEEPER, TAMPA BAY WATERKEEPER, WATERKEEPER ALLIANCE, WATERKEEPERS FLORIDA, WWALS WATERSHED COALITION

PETITIONERS

FEBRUAY 8, 2021

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Consent Decree, United States of America v. J.R. Simplot Company and Simplot Phosphates, LLC, 20-CV-125-F (July 9, 2020). 9
Convent, Louisiana, *World Population Review* (Source: US Census Bureau 2018 American Community Survey). 37
EPA, *Background Report AP-42 Section 5.11 Phosphoric Acid*. 42
EPA, *Interpretive Statement on the Application of the NPDES Program to Releases of Pollutants from Point Sources to Groundwater* (2019). 42
EPA, *Major Fertilizer Producer Mosaic Fertilizer, LLC to Ensure Proper Handling, Storage and Disposal of 60 Billion Pounds of Hazardous Waste / Manufacturer committing close to $2 billion in funding to address environmental impacts* (Oct. 1, 2015). 9, 32
EPA, Mississippi Phosphates Corporation Site Pascagoula, Mississippi Factsheet (March 2017). 31
EPA, Mississippi Phosphates NPL Site Narrative (Jan. 2018). 32
EPA, Office of Solid Waste, *Feasibility Analysis: A Comparison of Phosphogypsum and Uranium Mill Tailing Waste Unit Designs* (1997). 38
EPA, *Potential Uses of Phosphogypsum and Associated Risks, Background Information Document* (1992). 38, 41
EPA, *Report to Congress on Special Wastes from Mineral Processing* (1990). passim
EPA, *Risks Posed by Bevill Wastes* (1997). 16, 25
EPA, *TENORM: Fertilizer and Fertilizer Production Wastes*. 7, 9, 32
Felony Information, *United States of America v. Mississippi Phosphates Corporation*, Case No.: 1:15-cr-00058-LG-RHW (2015). 35
Florida Department of Environmental Protection, *Florida's Phosphate Mines*. 7
Florida Department of Environmental Protection, *Geospatial Open Data, Mosaic Fertilizer, LLC New Wales South Stack*. 9
Florida Industrial and Phosphate Research Institute, *Phosphogypsum and the EPA Ban*. 40
Fuleihan, N.F. 2013. Investigation of 2013 Anomaly New Wales Plan Closed North Gypstack. 25
Hayhoe, Katharine et al. 2018. Our Changing Climate. In *Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II* [Reidmiller, D.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, and B.C. Stewart (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, pp. 72–144. 28, 29
Henderson, Carl. 2004. Piney Point Phosphate Plant: An Environmental Analysis, UNIVERSITY OF SOUTH FLORIDA ST. PETERBSURG. 30, 31
Horton, Thomas (EPA), *A Preliminary Radiological Assessment of Radon Exhalation from Phosphate Gypsum Piles and Inactive Uranium Mill Tailings Piles* (1979). 26, 38
Hu, Chuanmin et al. 2003. Satellite monitoring of the FDEP Gulf dispersal of the Piney Point treated wastewater, UNIVERSITY OF SOUTH FLORIDa. 31
Hughes, James et. al. 1998. Evaluation and Synthesis of Health Effects Studies of Communities Surrounding Arsenic Producing Industries, 17 INT'L J. EPIDEMIOL. (2):407.. 19

Idaho Department of Environmental Quality, Design and Construction of Phosphogypsum Stacks: Docket No. 58-0119-2001 25
JBM&R Engineering, Inc, *2020 Interim Stack System Management Plan*, Mosaic Fertilizer, LLC – New Wales Facility, Florida Department of Environmental Protection permit #MMR_FL0036421 (June 29, 2020). 9, 32
Kim, Kwang Po et al. 2006. Characterization of Radioactive Aerosols in Florida Phosphate Processing Facilities, 40 AEROSOL SCIENCE AND TECHNOLOGY 410 32
Kloeckner, Jane. 2010. Developing a Sustainable Hardrock Mining and Mineral Processing Industry: Environmental and Natural Resource Law for Twenty-First Century People, Prosperity, and the Planet, 25 J. ENVTL. LAW AND LITIGATION 123. 43
Lees, Peter S.J. 1991. Chromium and Disease: Review of Epidemiologic Studies with Particular Reference to Etiologic Information Provided by Measures of Exposure, 92 ENVIRONMENTAL HEALTH PERSPECTIVES 93 21
Lindsey, Rebecca (National Oceanic and Atmospheric Administration). 2021. *Climate Change: Global Sea Level*. 27
Little, C. M. et al. 2015. Joint projections of US East Coast sea level and storm surge. Nature Climate Change 5:1114-1121. 28
Louisiana DEQ, Letter for Water Management Options at the Mosaic Fertilizer, LLC - Uncle Sam Facility (July 30, 2019).. 30
Louisiana DEQ, Uncle Sam Facility, Government Review of Root Cause Analysis (March 2, 2020).. 29
Macías, Francisco et al. 2017. Environmental Assessment and Management of Phosphogypsum According to European and United States of America Regulations, 17 PROCEDIA EARTH AND PLANETARY SCIENCE 666. ..... 9, 32
Marshall, James, *Mountains of Waste Menace Florida's 'Swiss Cheese' Aquifers,* E&E NEWS (Apr. 9, 2020).. ..... 24, 25
ML2R Consultancy, *Raw Materials Requirements*. 9, 10
Monisha, Jaishankar et al. 2014. Toxicity, Mechanism and Health Effects of Some Heavy Metals, 7 INTERDISCIP TOXICOL 60. 19
Mosaic Fertilizer, LLC – Uncle Sam Facility, Notice of Critical Condition Pursuant to Attachment E of Appendix 1 to Consent Decree, *United States et al. v. Mosaic Fertilizer*, 15-cv-04889 (Jan. 10, 2019). 38
Mosaic Fertilizer, LLC , Quarter 1 Spray Evaporation Report– New Wales Facility, Florida Department of Environmental Protection permit #MMR_FL0036421 (April 28, 2020). 30
Mosaic Fertilizer, LLC, Notification of Completion of Construction – Spray Evaporator System, New Wales Facility, Florida Department of Environmental Protection permit #MMR_FL0036421 (Nov 18, 2019). 30
Mosaic Fertilizer, LLC, Weekly WebEx Presentation to LDEQ on Uncle Sam Side Slope Lateral Movement (Jan. 28, 2019). 38
NAACP and Clean Air Task Force. 2017. Fumes Across the Fence Line: The Health Impacts of Air Pollution from Oil & Gas Facilities on African American Communities. 36
National Oceanic and Atmospheric Administration, *Final Damage Assessment and Restoration Plan for December 7, 1997 Alafia River Spill* (July 21, 2000) 33, 34
Palmer, Tom. *Alafia River Appears to Have Healed After Acid Spill,* THE LEDGER (Dec. 9, 2007). 34

Pasley, James. *Inside Louisiana's Horrifying 'Cancer Alley,' an 85-mile Stretch of Pollution and Environmental Racism That's Now Dealing With Some of the Highest Coronavirus Death Rates in the Country*, BUSINESS INSIDER (April 9, 2020), ... 37
Perpich, Bill et. al. 2005. Mobile Wastewater Treatment Helps Remediate Concentrated Acidic Process Water at Fertilizer Plant, FLORIDA WATER RESOURCES JOURNAL. 26
Personal correspondence with EPA Docket Center, Arctic Slope Mission Services (ASMS) – Contractor, e-mail: docket-customerservice@epa.gov (Sept. 16, 2020). 16, 42
Personal correspondence, Vishwas Sathe, FDEP Phosphogypsum Management Program (August 14, 2020). 30
Pittman, Craig. *Phosphate waste threatens bay again, so what if we bottled it?* FLORIDA PHOENIX (Oct. 1, 2020). 31
Rahimzadeh, Mehrdad. 2017. Cadmium Toxicity: An Update, Caspian J Intern Med. 8(3): 135–145. 20
Raitnake, R. N. 2003. Acute and Chronic Arsenic Toxicity, POSTGRAD MED J. 19
Salman, John. *HRK knew of tearing problems before Piney Point spill*, THE BRADENTON HERALD (July 6, 2012). 31
Sandu, Daljit et. al. 2018. Fate and Transport of Radioactive Gypsum Stack Water Entering the Floridan Aquifer due to a Sinkhole Collapse, SCIENTIFIC REPORTS 8: 11439. ..... 23, 25
Sandu, Daljit. 2019. Implications of Groundwater Plume Transport and Analysis of Karst Aquifer Characteristics in Central Florida, UNIVERSITY OF CENTRAL FLORIDA. 23, 25
Southeast Florida Regional Climate Change Compact Sea Level Rise Work Group. 2019. Unified Sea Level Rise Projection. A document prepared for the Southeast Florida Regional Climate Change Compact Climate Leadership Committee. 28
Steiner, Gerald et al. 2020. Making Uranium Recovery from Phosphates Great Again? 54 Environ. Sci. Technol. 1287. 8
The Fertilizer Institute. Apr. 2020. *Revised Request for Approval of Additional Uses of Phosphogypsum Pursuant to 40 C.F.R. 61.206*. 32
United States Army Corps of Engineers. 2013. Areawide Environmental Impact Statement for the Central Florida Phosphate District. 10
United States Geological Survey, *Mineral Commodities 2020.* 7, 9
Wahl, Thomas. et al. 2015. Increasing risk of compound flooding from storm surge and rainfall for major US cities. NATURE CLIMATE CHANGE 5:1093-1098. 28
Wdowinski, Shimon. et al. 2016. Increasing flood hazard in coastal communities due to rising sea level: Case study of Miami Beach, Florida. Ocean & Coastal Management 126:1-8. 29
Wright, Tom. *Mosaic says it can keep wastewater on site in case of breach,* THE LENS (Feb.19, 2019). 29
Wu, Xiao et al. 2020 (preprinted). Exposure to Air Pollution and COVID-19 Mortality in the United States: A Nationwide Cross-Sectional Study, Harvard Chan School of Public Health. 26, 27
Yiin, James et al. 2016. A Study Update of Mortality in Workers at a Phosphate Fertilizer Production Facility, 59 AM J IND MED. 12. 32

I. Petitioners

People for Protecting Peace River
P.O. Box 3354
Arcadia, FL 34265

People for Protecting Peace River (3PR) is a non-profit 501(c)(3) organization incorporated in the State of Florida and committed to educating the public on the extraordinary value of the natural and agricultural lands of the Peace and Myakka River watersheds. Two of 3PR's primary goals are to end the damage caused by phosphate strip mining and fertilizer processing, and to promote a superior quality of life in Florida's heartland near the Peace River. In furtherance of its mission, 3PR seeks to maintain the rural quality of life characteristic to the region; keep natural soils intact; be free of the danger of harmful pollutants left in the ground and aquifer after phosphate mining and fertilizer processing; and see the beauty of Florida's unique natural world left for future generations to experience and appreciate. Many of 3PR's members live within the rural areas of Central Florida's Bone Valley adjacent to or near proposed phosphate mines and expanding phosphogypsum stacks. Appreciation of rural Florida, including its natural peacefulness and unique biodiversity, is one of the main reasons many of 3PR's members live in the area.

Atchafalaya Basinkeeper
P.O. Box 410
Plaquemine, LA 70764

Atchafalaya Basinkeeper, a member organization of Waterkeeper Alliance, was founded by Dean Wilson in 2004 with a mission to protect and restore the swamps, lakes, rivers, streams and bayous of the Atchafalaya Basin for future generations. At the onset, Atchafalaya Basinkeeper set out to save Louisiana's coastal cypress forests from ongoing destruction by the cypress mulch industry. After working as a commercial fisherman for 16 years, Dean witnessed first-hand the systematic destruction of the Basin at the hands of regulators and private interests. Since its inception, Basinkeeper has worked to patrol and advocate for the Basin through education, monitoring and enforcement. Atchafalaya Basinkeeper works with diverse partner organizations, communities, agencies, regulated industry commercial and recreational users of the Basin, outdoor enthusiasts and concerned citizens in collective stewardship to preserve this ecological wonder.

Bayou City Waterkeeper
2010 N. Loop West, Ste 103
Houston, TX 77018

Bayou City Waterkeeper utilizes science, the law, and community empowerment to protect and restore our natural systems, achieve equitable policy solutions, and advance systematic change to benefit all who live within the Lower Galveston Bay watershed. Our activities include policy analyses and power mapping, targeted litigation against polluters and unscrupulous real estate developers, and the development of focused advocacy campaigns to drive change at the local, regional, and state level. At our core, our efforts center around ensuring

equal protection from environmental hazards, promoting nature-based solutions for climate adaptation, and providing opportunities for meaningful citizen involvement in decisions that affect environmental health. We aim to empower residents to address water-related issues in their own community, hold polluters and those in power accountable, and ensure our leaders have the tools to restore and conserve our natural systems

Calusa Waterkeeper
P.O. Box 1165
Fort Myers, FL 33902

Calusa Waterkeeper is a non-profit 501(c)(3) organization incorporated in the State of Florida dedicated to the protection of the Caloosahatchee River & Estuary, Lake Okeechobee, Nicodemus Slough, Charlotte Harbor, Estero Bay, the near-shore waters of Lee County, and their watersheds, through education and promotion of responsible use and enjoyment by all people. Calusa Waterkeeper, Inc. began in 1995 as Caloosahatchee River Citizens Association, Inc. (Riverwatch). We were admitted to Waterkeeper Alliance in 2015 as an Affiliate. In December 2016 we achieved full Member status in Waterkeeper Alliance, adopting the new name Calusa Waterkeeper, Inc.

Center for Biological Diversity
P.O. Box 2155
St. Petersburg, FL 33731

At the Center for Biological Diversity, we believe that the welfare of human beings is deeply linked to nature – to the existence in our world of a vast diversity of wild animals and plants. Because diversity has intrinsic value, and because its loss impoverishes society, we work to secure a future for all species, great and small, hovering on the brink of extinction. We do so through science, law and creative media, with a focus on protecting the lands, waters and climate that species need to survive.

Cherokee Concerned Citizens
1502 Cherokee St.
Pascagoula, MS 39581

The Cherokee Concerned Citizens is a fenceline community organized to protect the health and well-being of our families and neighbors from exposure to industrial pollution.

Healthy Gulf
PO Box 2245
New Orleans, LA 70176

Healthy Gulf's purpose is to collaborate with and serve communities who love the Gulf of Mexico by providing research, communications and coalition-building tools needed to reverse the long-pattern of over exploitation of the Gulf's natural resources.

ManaSota-88
P.O. Box 1728
Nokomis, Florida 34274

ManaSota-88 has spent over 50 years fighting to protect our environment. We are a 501.c3 non-profit organization, incorporated in the State of Florida. We are dedicated to protecting the public's health and preservation of the environment. Created in 1968, ManaSota-88 evolved from a major environmental health study sponsored by the U.S. Public Health Service, Florida State University, the University of Florida and the Sarasota and Manatee County Commissions. Our commitment to safeguard the air, land and water quality is aggressive and uncompromising. ManaSota-88 volunteers are unpaid. A steering committee provides overall leadership and direction. We operate entirely through volunteer support. We receive no contributions from the government or special interest groups. ManaSota-88 does not accept contributions from any polluting industries. Private citizens contribute 100% of our operating revenues.

Our Santa Fe River
2070 SW County Road 138
Fort White, FL 32038

Our Santa Fe River, Inc. is an all-volunteer 501(c)(3) organization formed in 2007 for the initial purpose of fighting off four companies seeking permits to bottle water from our iconic springs in north central Florida, and through a public appeal was successful in fending them off. Our completely volunteer citizen organization operates in the United States in the state of Florida and has evolved to endeavor to educate people to be good stewards of our waters and continue to advocate for the health and proliferation of our river, its springs and its underlying aquifer. More information is available at www.oursantferiver.org.

Rise St. James
P.O. Box 27
Vacherie, LA 70090

RISE St. James is a non-profit, grassroots, faith-based organization formed to advocate for racial and environmental justice in St. James Parish, Louisiana.

Sierra Club Delta Chapter
716 Adams Street
New Orleans, LA 70118

Sierra Club Florida Chapter
2127 S. Tamiami Trail
Osprey, FL 34229

The Sierra Club is America's largest and most influential grassroots environmental

organization, with more than 3.8 million members and supporters. In addition to protecting every person's right to get outdoors and access the healing power of nature, the Sierra Club works to promote clean energy, safeguard the health of our communities, protect wildlife, and preserve our remaining wild places through grassroots activism, public education, lobbying, and legal action. For more information, visit www.sierraclub/delta and www.sierraclub/florida.

Suncoast Waterkeeper
PO Box 1028
Sarasota, FL 34230

Suncoast Waterkeeper (SCWK) is a Florida non-profit public benefit corporation with members throughout Southwest Florida, including Pinellas, Hillsborough, Sarasota, Manatee, and Charlotte Counties. SCWK is dedicated to protecting and restoring the Florida Suncoast's waterways on behalf of its members through enforcement, fieldwork, advocacy, and environmental education for the benefit of the communities and SCWK's members that rely upon these precious coastal resources. To further its mission, SCWK actively seeks federal and state implementation of environmental laws, and, where necessary, directly initiates enforcement actions on behalf of itself and its members. SCWK has been registered as a non- profit corporation in Florida since 2012 and is a licensed member of Waterkeeper Alliance, Inc., an international non-profit environmental organization, made up of over 300 separate Waterkeeper programs.

Tampa Bay Waterkeeper
260 1st Avenue South, Box 226
St. Petersburg, FL 33701

Tampa Bay Waterkeeper (TBWK) is a Florida non-profit public benefit corporation with members throughout the Tampa Bay watershed. TBWK is dedicated to protecting and improving the Tampa Bay watershed while ensuring swimmable, drinkable and fishable water for all. TBWK's approach combines sound science, policy advocacy, grassroots community engagement and education to stand up for clean water together as a community, ensuring a clean and vibrant future for the Tampa Bay watershed. To further its mission, TBWK actively seeks federal and state implementation of environmental laws and, where necessary, directly initiates enforcement actions on behalf of itself and its members. TBWK is a licensed member of Waterkeeper Alliance, Inc., an international non-profit environmental organization, made up of over 300 separate Waterkeeper programs.

WWALS Watershed Coalition (Suwannee Riverkeeper)
PO BOX 88
Hahira, GA 31632

WWALS Watershed Coalition (WWALS) advocates for conservation and stewardship of the Withlacoochee, Willacoochee, Alapaha, Little, Santa Fe, and Suwannee River watersheds in South Georgia and North Florida through education, awareness, environmental monitoring, and citizen activities. Suwannee Riverkeeper is a staff position and a project of WWALS as the member of Waterkeeper Alliance for the Suwannee River Basin. WWALS opposes expansion of

the decades-old moonscape of a phosphate mine in Hamilton County, Florida and another proposed in Union and Bradford Counties. We oppose such mines anywhere, which is why we drafted the Resolution Against Phosphate Mines in Florida that Waterkeepers Florida passed as one of its first acts.

Waterkeeper Alliance
180 Maiden Lane, Suite 603
New York, NY 10038

Waterkeeper Alliance is a global movement uniting more than 350 Waterkeeper groups around the world, focusing citizen action on issues that affect our waterways, from pollution to climate change. The Waterkeeper movement patrols and protects over 2.75 million square miles of rivers, lakes, and coastlines in the Americas, Europe, Australia, Asia, and Africa. For more information please visit: www.waterkeeper.org.

Waterkeepers Florida
291 Cubbedge Road
St. Augustine, FL 32080

Waterkeepers Florida is a regional entity composed of all 14 Waterkeeper organizations working throughout the State of Florida to protect and restore our water resources across over 45,000 square miles of watershed which is home to over 15 million Floridians. For more information, visit: www.WaterkeepersFlorida.org.

Petitioners meet the Administrative Procedure Act (APA), Resource Conservation and Recovery Act (RCRA), and Toxic Substances Control Act (TSCA) statutory meanings of "person" and have the right to petition the government for a redress of grievances.[1] The APA requires that each agency "shall give an interested person the right to petition for the issuance . . . of a rule."[2] RCRA authorizes "any person" to seek the repeal or promulgation of a rule, and indeed encourages public participation in the development of any regulation or program by stating that such participation shall be "provided for, encouraged, and assisted" by the EPA.[3] TSCA provides that "[a]ny person may petition [EPA] to initiate a proceeding for the issuance of a rule" under sections governing the testing, prioritization, risk evaluation, and regulation of chemical substances.[4]

[1] *See* U.S. Const. amend. I ("Congress shall make no law … abridging the right of people … to petition the Government for redress of grievances.").
[2] 5 U.S.C. § 553(e).
[3] 42 U.S.C. § 6974.
[4] 15 U.S.C. § 2620.

II. Action Requested

Pursuant to section 7004(a) of RCRA,[5] RCRA's implementing regulations,[6] section 21 of TSCA,[7] and section 553(e) of the APA,[8] Petitioners hereby petition the Administrator of the EPA to: (1) issue a rule reversing EPA's 1991 Bevill regulatory determination excluding phosphogypsum and process wastewater from phosphoric acid production ("process wastewater") from RCRA Subtitle C[9] hazardous waste regulation;[10] (2) promulgate regulations under RCRA Subtitle C governing the safe treatment, storage and disposal of phosphogypsum and process wastewater as hazardous wastes;[11] (3) initiate the prioritization process for designating phosphogypsum and process wastewater as high priority substances for risk evaluation under TSCA §6(b)(1)(B)(i);[12] (4) issue a testing rule under TSCA §4(a)1(A)(ii) requiring phosphogypsum and process wastewater manufacturers to develop information with respect to health and environmental effects relevant to a determination that the disposal of these chemical substances does or does not present an unreasonable risk of injury to health or the environment;[13] and (5) make a determination by rule under TSCA §5(a) that the use of phosphogypsum in road construction is a significant new use.

EPA must respond to this petition within certain statutory timeframes. RCRA requires EPA to "take action" within a "reasonable time" and to "publish notice of such action in the Federal Register, together with the reasons therefor."[14] TSCA requires EPA to either grant or deny this petition for rulemaking within 90 days and to "promptly commence an appropriate proceeding if such action is warranted."[15] Furthermore, should EPA decline to regulate phosphogypsum and process wastewater under TSCA, EPA must publish the reasons for its denial in the Federal Register.[16] The APA also requires that "[p]rompt notice shall be given of the denial in whole or in part of a written application, petition, or other request of an interested person made in connection with any agency proceeding."[17] Courts may compel agency action unlawfully withheld or unreasonably delayed pursuant to the APA.[18] RCRA further allows for

[5] 42 U.S.C. § 6974(a).
[6] 40 C.F.R. § 260.20.
[7] 15 U.S.C. § 2620.
[8] 5 U.S.C. § 553(e).
[9] 42 U.S.C. §§ 6921—6939g.
[10] 40 C.F.R. § 261.4(b)(7). While the D.C. Circuit has distinguished between a determination and a regulation specifically in the context of RCRA Bevill regulatory determinations, the reversal sought by Petitioners constitutes an agency action subject to judicial review. See *Am. Portland Cement All. v. EPA*, 101 F.3d 772, 776 (D.C. Cir. 1996); *see also Brock v. Cathedral Bluffs Shale Oil Co*., 796 F.2d 533, 539 (D.C.Cir.1986).
[11] Adding specific standards for phosphogypsum and process wastewater to 40 C.F.R. Part 266.
[12] 15 U.S.C. § 2605(b)(1)(B)(i).
[13] 15 U.S.C. § 2603(a)(1)(A)(ii); "Manufacture," as defined by TSCA §3(9), means "to import . . .to produce, or manufacture." Phosphoric acid manufacturers also produce phosphogypsum and process wastewater. While chemical data reporting rules under TSCA §8 apply only to chemicals manufactured for distribution in commerce, of which phosphogypsum (with the exception of limited agricultural and road construction applications) and process wastewater are not, rules under §§4 and 6 are not subject to this limitation. 15 U.S.C §2602(9); 15 U.S.C. 2607(f).
[14] 42 U.S.C. § 6974(a).
[15] 15 U.S.C. § 2620(b)(3).
[16] *Id.*
[17] 5 U.S.C. § 555(e).
[18] 5 U.S.C. §706(1).

citizen suits against the EPA for failure to perform any nondiscretionary duty,[19] while TSCA provides for citizen suits against the EPA challenging a constructive denial whereby EPA fails to grant or deny a petition within the 90-day period.[20]

Petitioners may also challenge a denial of this petition under the APA,[21] RCRA and TSCA.[22]

III. Introduction

Over 70 mountainous piles of radioactive, toxic and hazardous waste scattered throughout the United States in Arkansas, Florida, Idaho, Illinois, Iowa, Louisiana, Mississippi, Missouri, North Carolina, Texas, Utah, and Wyoming,[23] concentrated among low-wealth communities. They pose a substantial present and future hazard and an unreasonable risk of injury to human health and the environment. EPA to date has abdicated its responsibility to evaluate and minimize the unreasonable risk or ensure protection of human health and the environment through adequate regulation.

Phosphogypsum is the radioactive, toxic waste created during wet-process phosphoric acid production, at a rate of approximately 5.2 tons for every ton of phosphoric produced.[24] Phosphoric acid is the intermediate feedstock of granular and liquid ammonium phosphate fertilizers.[25] In the United States, phosphoric acid is produced from phosphate rock mined from mineral deposits in Florida, North Carolina, Utah, and Idaho, with the largest deposit and the majority of the nation's phosphate mining occurring in Florida, where 27 strip mines span more than 450,000 acres.[26]

After strip mining and beneficiation to remove sand and clay from the phosphate matrix, calcium phosphate ore is transported to a fertilizer plant for processing by chemically digesting the phosphate ore in sulfuric acid.[27] This reaction results in a slurry of phosphoric acid and phosphogypsum (calcium sulfate dihydrate or calcium sulfate hemihydrate, depending on the type of wet process) as a suspended solid, at a rate of five tons of phosphogypsum waste for every one ton of phosphoric acid.[28] The phosphoric acid solution is filtered from the phosphogypsum and concentrated through evaporation to be sold as merchant-grade phosphoric acid, feed-grade phosphoric acid, and superphosphoric acid, or used as feedstock for finished fertilizer products like diammonium phosphate (DAP) or monoammonium phosphate (MAP).[29]

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[19] 42 U.S.C. § 6972(a)(2).
[20] 15 U.S.C. § 2620(b)(4).
[21] 5 U.S.C. §704.
[22] 42 U.S.C § 6976(a)(1); 15 U.S.C. § 2620(b)(4).
[23] EPA, *TENORM: Fertilizer and Fertilizer Production Wastes*, https://www.epa.gov/radiation/tenorm-fertilizer-and-fertilizer-production-wastes#tab-2 (last visited Feb 1, 2020).
[24] *Id.*
[25] United States Geological Survey, *Mineral Commodities 2020*, https://pubs.usgs.gov/periodicals/mcs2020/mcs2020.pdf.
[26] *Id.*; Florida Department of Environmental Protection, *Florida's Phosphate Mines*, https://floridadep.gov/water/mining-mitigation/content/phosphate (last visited Feb 1, 2021)
[27] EPA, *Report to Congress on Special Wastes from Mineral Processing* (1990) at 12-1.
[28] *Id.* at 12-2.
[29] *Id.*

The phosphogypsum waste is then reslurried with recycled process wastewater and pumped via pipeline for disposal in a settling pond impoundment atop a waste pile known as a phosphogypsum stack,[30] where the phosphogypsum settles, thereby growing the stack.[31] The settled phosphogypsum is dredged to build up embankments at the sides of the impoundment containing the process wastewater.[32] Cooling ponds containing process wastewater are also situated at or below grade along the perimeter of the stack.[33] The process wastewater is meant to be primarily recycled in fertilizer plant operations, making uninterrupted plant operation critical to maintaining a negative process water balance.[34] Even still, during periods of unplanned precipitation, discharges to surface waters are often permitted by the state.[35]

While modern, active stacks and adjacent cooling ponds are lined with a single synthetic geomembrane liner, these liners have torn and are designed to leak (i.e., permeable), creating a "zone of discharge"[36] in the surficial aquifer that is explicitly allowed by permit in the state of Florida.[37] As a stack grows in height, the settling impoundment atop the stack decreases in size until the settling pond capacity becomes too small and the pumping height requires too much energy.[38] At this point the stack is either expanded horizontally, or it reaches the end of its useful life.[39]

Phosphogypsum contains calcium sulfate and several contaminants including radionuclides from uranium, thorium and radium which decay to harmful radon gas, toxic heavy metals; fluoride; ammonia; and residual phosphoric and sulfuric acids.[40] The process wastewater also contains these harmful toxic constituents, an is highly acidic and corrosive with pH measurements as low as 0.5.[41]

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[30] Alternatively called "pond water" by industry and state regulating agencies. *See,* Typical Pond Water Analysis, http://www.fipr.state.fl.us/about-us/phosphate-primer/process-water/ (last visited July 17, 2020). "Process wastewater" also includes phosphogypsum stack runoff, wastewater generated from the uranium recovery step of phosphoric acid production, process wastewater from animal feed production, and process wastewater from superphosphate production. Mining Waste Exclusion, Final Rule, 55 Fed Reg. 2322, 2328 (Jan. 23, 1990) Uranium recovery from phosphate processing became uneconomic in the 1990s. Steiner, Gerald et al. 2020. Making Uranium Recovery from Phosphates Great Again? 54 Environ. Sci. Technol. 1287, https://pubs.acs.org/doi/pdf/10.1021/acs.est.9b07859.

[31] Report to Congress, *supra* note 27 at 12-4.

[32] *Id.*

[33] *Id.*

[34] *Id.* at 12-2.

[35] *Id.*

[36] The horizontal extent of a permitted zone of discharge is typically the property boundary, but groundwater contamination exceeding drinking water standards often extends well beyond the zone. Report to Congress, *supra* note 27 at 12-13.

[37] Fla. Admin Code 62-673.320 (6).

[38] Carter, O.C. et. al. 1994. *Investigation of Metal and Non-Metal Ion Migration through an Active Phosphogypsum Stack*, INTERNATIONAL LAND RECLAMATION AND MINE DRAINAGE CONFERENCE AND THIRD INTERNATIONAL CONFERENCE ON THE ABATEMENT OF ACIDIC DRAINAGE at 199, https://www.asrs.us/Portals/0/Documents/Conference-Proceedings/1994-Volume-4/0199-Carter.pdf.

[39] *Id.*; *see also*, Ardaman & Associates, *Phase III Expansion Application*, Mosaic Fertilizer, LLC – New Wales Facility, Florida Department of Environmental Protection permit #MMR_FL0036421. (Oct. 25, 2019).

[40] Report to Congress, *supra* note 27 at 12-31.

[41] Report to Congress, *supra* note 27 at 12-4.

Phosphogypsum stack systems as currently managed are prone to extensive groundwater contamination, dike breaches, leakage, unexplained seepage, sinkholes, instability that threatens outright collapse, and excess process water balances in the event of a plant shutdown or abandonment necessitating intentional large-volume releases of process water to prevent further catastrophe.[42] Furthermore, this underregulated waste stream has been abused as a repository for illegal dumping for other already designated hazardous wastes.[43]

In 2019, the U.S. phosphate fertilizer industry was responsible for generating approximately 40 million tons of phosphogypsum.[44] While 50 percent of the phosphoric acid product was exported, 100 percent of the phosphogypsum waste remained in the United States, stored in ever-expanding phosphogypsum stacks near the fertilizer facilities that generated it.[45] Phosphogypsum stacks can be well over one square mile wide (800 acres)[46] and 500 feet tall[47] and collectively store over one billion tons of phosphogypsum and billions of gallons of process water in Florida alone.[48]

There are no imminent shortages of phosphate rock, and global consumption of phosphoric acid is expected to increase by 3 million tons in 2023.[49] In Florida, where the majority of the nation's phosphate mining occurs, the phosphate industry plans to strip mine an additional 90,905 acres for phosphate over the next 50 years, producing approximately another

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[42] Report to Congress, *supra* note 27 at 12-31.

[43] *See* Consent Decree, *United States of America and Louisiana Department of Environmental Quality v. Mosaic Fertilizer, LLC*, 15-cv-04889 (Sept. 30, 2015). https://www.epa.gov/sites/production/files/2015-10/documents/mosaiclouisiana-cd_0.pdf; Consent Decree, *United States of America and Florida Department of Environmental Protection v. Mosaic Fertilizer, LLC* (Sept. 30, 2015) https://www.epa.gov/sites/production/files/2016-03/documents/florida-cd.pdf; Consent Decree, *United States of America v. J.R. Simplot Company and Simplot Phosphates,* LLC, 20-CV-125-F (July 9, 2020), https://www.epa.gov/sites/production/files/2020-07/documents/jrsimplotcompany-cd.pdf.

[44] Based on 23 million metric tons of phosphate rock produced by US mines in 2019. United States Geological Survey, *Mineral Commodities 2020*, https://pubs.usgs.gov/periodicals/mcs2020/mcs2020.pdf. The wet process requires 3.3 metric tons of phosphate ore to produce 1 metric ton of phosphoric acid. ML2R Consultancy, *Raw Materials Requirements* http://ml2rconsultancy.com/raw-materials-requirements/. (last visited Feb. 1, 2021). One metric ton equals 1.10231 tons. For every ton of phosphoric acid produced, 5.2 tons of radioactive phosphogypsum is generated.

[45] *Id.*

[46] EPA, *TENORM: Fertilizer and Fertilizer Production Wastes*, https://www.epa.gov/radiation/tenorm-fertilizer-and-fertilizer-production-wastes#tab-2.

[47] EPA, *Major Fertilizer Producer Mosaic Fertilizer, LLC to Ensure Proper Handling, Storage and Disposal of 60 Billion Pounds of Hazardous Waste / Manufacturer committing close to $2 billion in funding to address environmental impacts* (Oct. 1, 2015), https://19january2017snapshot.epa.gov/enforcement/reference-news-release-major-fertilizer-producer-mosaic-fertilizer-llc-ensure-proper_.html

[48] *See*, Florida Department of Environmental Protection, *Geospatial Open Data, Mosaic Fertilizer, LLC New Wales South Stack*, https://geodata.dep.state.fl.us/datasets/6277c3b1eeae4a818f8683fc29e6b35b_0/data?geometry=-85.687%2C27.517%2C-78.364%2C29.209&page=2; Macías, Francisco et. al. 2017. *Environmental Assessment and Management of Phosphogypsum According to European and United States of America Regulations*, 17 PROCEDIA EARTH AND PLANETARY SCIENCE 666, https://doi.org/10.1016/j.proeps.2016.12.178. One phosphogypsum stack system in Florida alone has a process wastewater inventory of 1.672 billion gallons as of May 12, 2020. JBM&R Engineering, Inc, *2020 Interim Stack System Management Plan*, Mosaic Fertilizer, LLC – New Wales Facility, Florida Department of Environmental Protection permit #MMR_FL0036421. (June 29, 2020).

[49] United States Geological Survey, *Mineral Commodities 2020*, https://pubs.usgs.gov/periodicals/mcs2020/mcs2020.pdf.

billion tons of phosphogypsum from processing Florida phosphate rock alone.[50] Thus, these mountains of radioactive waste that are already a part of several states' environmental legacies will only get exponentially larger and more dangerous with time if the EPA does not take immediate action.

IV. Statutory Background

A. The Resource Conservation and Recovery Act

Finding that land is "too valuable a national resource to be needlessly polluted by discarded materials,"[51] Congress passed RCRA in 1976 to address increasing problems associated with the growing volume of industrial and municipal waste. RCRA's goals include reducing the amount of solid waste generated, ensuring that these wastes are managed in an environmentally sound manner,[52] and protecting human health and the environment from the potential hazards of waste disposal. To achieve these goals, RCRA established two distinct programs: (1) the solid waste program, under RCRA Subtitle D, encourages states to develop comprehensive plans to manage nonhazardous industrial solid waste and municipal solid waste, sets criteria for municipal solid waste landfills and other solid waste disposal facilities, and prohibits the open dumping of solid waste; and (2) the hazardous waste program, under RCRA Subtitle C, establishes a "cradle to grave" system for controlling hazardous waste from the time it is generated until its final disposal.

Within the meaning of solid waste, RCRA further defines "hazardous waste" as any discarded material "which because of its quantity, concentration characteristics, or physical, chemical or infectious characteristics may—

> (A) cause, or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or
> (B) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed."[53]

In its proposed regulatory framework for implementing the RCRA Subtitle C hazardous waste program, EPA first introduced the concept of "special wastes," which include mining, beneficiation, and ore processing because of their typically high volumes and perceived low—

[50] Based on a projected 734,170,244 tons of phosphate rock production in Central Florida over a 50-year period. *See* United States Army Corps of Engineers. 2013. Areawide Environmental Impact Statement for the Central Florida Phosphate District, Appendix H, Tables 3 and 5. Using the wet process, it takes 3.3 metric tons of phosphate rock to produce one metric ton of phosphoric acid (1 metric ton equals 1.10231 tons). Ml2R Consultancy, *Raw Materials Requirements*, http://ml2rconsultancy.com/raw-materials-requirements/ (last visited Feb 1, 2021).
[51] 42 U.S.C. § 6901(b).
[52] "'Solid waste' means any garbage, refuse, sludge from a waste treatment plant, water supply treatment plant, or air pollution control facility and other discarded material, including solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations, and from community activities," subject to certain exclusions. 42 U.S.C. § 6903(27).
[53] 42 U.S.C. § 6903(5).

but at the time understudied—hazard to human health and the environment. While the EPA's "special wastes" concept did not make it into the final rules published in 1980, it formed the basis of the Bevill Amendment passed by Congress later that year.

1. The Bevill Amendment

The 1980 Bevill Amendment suspended EPA's authority to regulate "special wastes," including mining and mineral processing wastes, as hazardous under Subtitle C until six months after EPA's completion of a detailed study on the adverse human health and environmental effects and a published Bevill determination for each particular category of special waste. Study requirements for mineral processing wastes like phosphogypsum and process wastewater included analysis of the following:

> (1) the source and volumes generated per year;
> (2) present disposal and utilization practices;
> (3) potential danger, if any, to human health and the environment from disposal and reuse;
> (4) documented cases in which danger to human health or the environment has been proved;
> (5) alternatives to current disposal methods;
> (6) the costs of such alternatives;
> (7) the impact of those alternatives on the use of phosphate rock and uranium ore, and other natural resources; and
> (8) the current and potential utilization.[54]

The EPA took more than a decade to make a Bevill determination for mineral processing wastes, including phosphogypsum and process wastewater.[55]

2. The Simpson Amendment

The 1984 Simpson Amendment provided that EPA can modify some of the requirements of Subtitle C for special wastes that the agency determines are hazardous waste. The modifications can account for the unique characteristics of mining and processing wastes and the practical difficulties associated with implementation, but must "assure protection of human health and the environment."[56] The amendment specifically lists phosphate mining and processing wastes as wastes eligible for this Subtitle C regulatory flexibility.[57]

[54] 42 U.S.C. § 6982(p).
[55] Special Wastes From Mineral Processing (Mining Waste Exclusion); Final Regulatory Determination and Final Rule, 56 Fed. Reg. 27300 (June 13, 1991).
[56] 42 U.S.C. § 6924.
[57] 42 U.S.C. § 6924(x).

B. The Toxic Substances Control Act as Amended by the Frank R. Lautenberg Chemical Safety Act of the 21st Century

The Toxic Substances Control Act of 1976 directs EPA to evaluate new and existing chemicals and their risks to human health and the environment, and to then implement regulations to manage unacceptable risks, therefore preventing or reducing pollution caused by these substances before they enter the environment. Under TSCA, EPA has the authority to impose record-keeping, reporting and testing requirements upon manufacturers, and to develop restrictions relating to chemical substances[58] and mixtures.[59] Once a substance is evaluated for risk, if EPA determines the risk of injury to human health and the environment is unreasonable, EPA must propose regulations under §6(a) to remove the unreasonable risk.

Faced with a significant backlog in EPA's evaluation and management of existing chemicals, the Frank R. Lautenberg Chemical Safety Act of 2016 mandated EPA evaluate existing chemicals for their risk of injury to human health and the environment, including a system of prioritization, with clear and enforceable deadlines. The amendment also directed EPA to conduct risk-based chemical evaluations without consideration of costs to the industry.

1. Prioritization under §6

A high-priority substance is a chemical substance EPA determines *may* present an unreasonable risk of injury to health or the environment because of a *potential* hazard and a *potential* route of exposure under the "conditions of use," which include disposal.[60] EPA must prioritize and make risk of injury determinations without consideration of costs, and include consideration of the risk to potentially exposed or susceptible subpopulations.[61]

EPA notes that through the prioritization process, EPA is ultimately making a judgment as to whether or not a particular chemical substance warrants further assessment and ultimately a §6(b) risk evaluation as a high priority substance.[62] It intends to select as high-priority chemicals those with the greatest hazard and exposure potential first.[63] Low priority substances are thus chemicals that EPA has determined, based on sufficient information to establish and without consideration of costs or other non-risk factors, that a §6(b) risk evaluation is not warranted at the time of priority designation.[64]

Once the prioritization process is initiated, EPA must publish a notice in the Federal Register, beginning a 90-day period during which interested persons may submit relevant

[58] "Chemical substance" means any organic or inorganic substance of a particular molecular identity, including— (i) any combination of such substances occurring in whole or in part as a result of a chemical reaction or occurring in nature, and (ii) any element or uncombined radical. 15 U.S.C. § 2602(2).
[59] The term "mixture" means any combination of two or more chemical substances if the combination does not occur in nature and is not, in whole or in part, the result of a chemical reaction. 15 U.S.C. § 2602(10).
[60] 40 C.F.R. § 702.3
[61] *Id.*
[62] Procedures for Prioritization of Chemicals for Risk Evaluation under Toxic Substances Control Act; Final Rule, 82 Fed. Reg. 33753 (July 20, 2017); 40 C.F.R §702.
[63] 40 C.F.R. § 702.5(a).
[64] 40 C.F.R. § 702.3.

information,[65] including information relevant to the following screening factors EPA will use to decide whether to propose designation as a high-priority or low-priority substance:

> (1) Hazard and exposure potential;
> (2) Persistence and bioaccumulation;
> (3) Potentially exposed or susceptible subpopulations;
> (4) Storage near significant sources of drinking water;
> (5) Conditions of use or significant changes in conditions of use, which include disposal;
> (6) Production volume or significant changes in production volume; and
> (7) Other risk-based criteria that EPA determines to be relevant to the designation of the chemical substance's priority.[66]

After conducting the screening review, EPA must then propose to list the chemical as either a high-priority or low-priority substance, and the proposed designation is subject to another 90-day public comment period.[67] A final high-priority designation is only appropriate after EPA initiates prioritization and the close of the second 90-day comment period. The entire prioritization process may take 9-12 months from the date of the first publication of the notice of initiation of prioritization.[68]

Once a substance is designated as a high priority substance, a risk evaluation is initiated and EPA has three years, subject to a possible one-time extension of six months, to complete the evaluation and make a final determination of risk.[69] For substances that EPA has determined pose an unreasonable risk, EPA has one year, extendable by up to two years, to propose a rule under §6(a) where the EPA takes action to manage or minimize the risk so that it is no longer unreasonable. Such action can include, among others, a ban, limitation on quantities produced, or regulation governing disposal.[70]

2. Testing Rules under §4

To facilitate the policy that "adequate information should be developed with respect to the effect of chemical substances and mixtures on health and the environment and that the development of such information should be the responsibility of those who manufacture and those who process such chemical substances and mixtures,"[71] TSCA requires EPA to direct testing on a chemical substance or mixture if it finds the following criteria are met:

> (1) the "manufacture, distribution in commerce, processing, use, or disposal of a chemical substance or mixture, or that any combination of such activities, may present an unreasonable risk of injury to health or the environment,"

[65] 40 C.F.R. § 702.7(d).
[66] 40 C.F.R. § 702.9(a).
[67] 40 C.F.R. § 702.9.
[68] 40 C.F.R. § 702.1(d).
[69] 40 C.F.R. § 702.49.
[70] 15 U.S.C. § 2605(a).
[71] 15 U.S.C. § 2601(b)(1).

(2) "there is insufficient information and experience upon which the effects of such manufacture, distribution in commerce, processing, use, or disposal of such substance or mixture, or of any combination of such activities on health or the environment can reasonably be determined or predicted," and
(3) "testing . . . is necessary to develop such information."[72]

3. Significant New Use Rules under §5(a)

A Significant New Use Rule promulgated under TSCA §5(a) requires notice to EPA before a chemical substance or mixture is used in a new way that might create environmental or human health concerns.[73] Under TSCA §5(a)(2), EPA must make a determination by rule as to whether a new use of a chemical substance is a significant new use, after considering all relevant factors, including the following:

- Projected volume of manufacturing and processing of a chemical substance.
- Extent to which a use changes the type or form of exposure of humans or the environment to a chemical substance.
- Extent to which a use increases the magnitude and duration of exposure of humans or the environment to a chemical substance.
- Reasonably anticipated manner and methods of manufacturing, processing, distribution in commerce, and disposal of a chemical substance.[74]

Once EPA determines that a use of a chemical substance is a significant new use, TSCA § 5(a) requires manufacturers and processors to submit a Significant New Use Notice to EPA at least 90 days before they manufacture or process the chemical substance for that new use.[75] During this review period, EPA must assess risks that may be associated with the significant new use, including risks to potentially exposed or susceptible subpopulations identified as relevant by EPA under the conditions of use and then make another determination as to whether the significant new use presents an unreasonable risk of injury to health or the environment, without consideration of costs or other non-risk factors.[76] If EPA determines the significant new use does present an unreasonable risk, EPA must regulate the proposed activity either by order prohibiting or limiting the manufacture, processing, or distribution in commerce of the substance, or by proposed rule under §6(a), to the extent necessary to protect against the unreasonable risk.[77]

V. Regulatory History of Phosphogypsum Stacks

EPA has acknowledged the need for comprehensive federal phosphogypsum stack regulation since at least 1984, when it stated its reason for declining to propose radionuclide emission standards for phosphogypsum stacks under §112 of the Clean Air Act (CAA) at the time was that RCRA was the more appropriate statute for regulating phosphoric acid production

[72] 15 U.S.C. § 2603(a)(1)(A)(ii).
[73] 15 U.S.C. § 2604(a).
[74] 15 U.S.C. § 2604(a)(2).
[75] 15 U.S.C. § 2604(a).
[76] 15 U.S.C. § 2604(a)(3).
[77] 15 U.S.C. § 2604(f).

wastes.[78] While still not making its required Bevill regulatory determination for mineral processing special wastes or proposing tailored solid waste management guidelines under RCRA Subtitle D, EPA subsequently reevaluated the need for radionuclide emission standards under the CAA after preliminary risk assessments indicated individual lifetime risks of cancer from exposure to radon emissions from existing stacks were as high as eight in ten thousand and that population risks were on the order of one fatal cancer per year.[79]

Eventually in 1989, citing concern that radium-rich phosphogypsum would be incorporated into other products and diffused throughout the country such that EPA would be unable to ensure phosphogypsum radon emissions do not present an unacceptable risk to public health, EPA promulgated a National Emissions Standards for Hazardous Air Pollutants (NESHAP) rule in the form of a work practice standard that required all phosphogypsum be disposed into stacks or old phosphate mines.[80] The rule also limited radon emissions from stacks to a flux of 20 pCi/m^2-s, but EPA acknowledged both the stack requirement and the numerical radon flux emission standard imposed on the stacks were simply a maintenance of the status quo, as phosphogypsum stacks were already standard industry practice, and the NESHAP imposed no additional control technology since EPA believed all existing stacks already met the numerical radon flux standard.[81] In other words, EPA did nothing to manage or reduce the measured risk of fatal cancer from radon exposure that at the time applied to 95 million people living within 80 kilometers of a stack.[82] Testing to demonstrate compliance with the flux standard need only be measured one time once a stack becomes inactive. If the standard is met, it never needs to be tested again.[83]

Still, with industry unsatisfied with the total ban on off-site uses of phosphogypsum, EPA amended the NESHAP in 1992 to allow for agricultural use so long as the radium content in the phosphogypsum does not exceed 10 pCi/g,[84] and in 1994, increased the permitted distribution of phosphogypsum to up to 7,000 pounds at a time for research and development activities.[85]

After a series of lawsuits imposing a deadline and requiring EPA to narrow the scope of its Bevill Amendment interpretation, EPA completed its study of phosphogypsum under RCRA and submitted the required report to Congress for 20 mineral processing special wastes, including phosphogypsum and process wastewater, in 1990.[86] The study found widespread

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[78] Withdrawal of Proposed Standards, National Emission Standards for Hazardous Air Pollutants; Regulation of Radionuclides, 49 Fed. Reg. 43906, 43914 (Oct. 31, 1984).
[79] *Id.*
[80] An old phosphate mine receiving phosphogypsum waste would then also become a "phosphogypsum stack" for the purposes of the NESHAP. National Emission Standards for Hazardous Air Pollutants; National Emissions Standards for Radon Emissions from Phosphogypsum Stacks; Final Rule, 54 Fed. Reg. 51654, 51675 (Dec.19, 1989).
[81] *Id.*
[82] *Id.*
[83] *Id.*
[84] EPA amended the NESHAP upon petitions to reconsider from The Fertilizer Institute, Consolidated Minerals, Inc., and U.S. Gypsum Co. National Emission Standards for Hazardous Air Pollutants; National Emissions Standards for Radon Emissions from Phosphogypsum Stacks, Final Rule, 57 Fed. Reg. 23305 (June 3, 1992).
[85] 40 C.F.R. Subpart R.
[86] *Concerned Citizens of Adamstown v. EPA* imposed the deadline. No. 84-3041 (D.D.C. Aug. 21, 1985); *Environmental Defense Fund v. EPA*, (EDF II) held EPA can only apply the Bevill exclusion to wastes generated in

groundwater contamination at phosphogypsum stack sites including contaminated off-site wells, the potential for drinking water source exposures, several documented damage cases that impacted both ground and surface waters and threatened and harmed aquatic life, increased air pathway cancer risk for those living near stacks, and varied and inadequate state regulation.[87] Constituents of most concern that present a hazard to human health and included radionuclides, arsenic, chromium, selenium, cadmium, radium-226, lead, vanadium, copper, antimony, thallium, fluoride, and selenium.[88] The report also found an increased hazard and contaminate release potential should the industry expand in the absence of Subtitle C regulation.[89]

Nevertheless, due to costs to the industry in complying with a Subtitle C program, EPA's determination published the following year exempted phosphogypsum and process wastewater (as well as all other special wastes) from Subtitle C regulation.[90] The determination promised a Subtitle D solid waste program with tailored minimum federal guidelines[91] for 18 of the special wastes, and announced the development and future promulgation of a TSCA regulatory program for phosphogypsum and process wastewater. EPA further stated it planned to use existing authorities under either RCRA §7003 or the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) §106 to address site-specific phosphogypsum and process wastewater groundwater contamination problems that pose substantial and imminent endangerment to human health or the environment.[92]

As part of its development of a TSCA regulatory program, EPA chartered the Phosphoric Acid Waste Dialogue Committee under the Federal Advisory Committee Act in 1992 to determine if TSCA could effectively regulate phosphoric acid wastes.[93] According to a later EPA report as part of EPA's 1998 Phase IV Land Disposal Restriction rulemaking, the dialogue committee could not identify any feasible in-plant process changes that would significantly reduce the volume and/or toxicity of phosphogypsum or phosphoric acid process wastewater.[94] The exact nature of the dialogue committee's activities, including which process changes were considered and what criteria were used to determine feasibility remain unknown, as EPA has acknowledged that the dialogue committee's report is "missing" from its document collection,

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high volume with *low* toxicity, in accordance with EPA's original "special waste" concept, as opposed to all mineral processing wastes. 852 F.2d 1316 (D.C. Cir. 1988); Report to Congress, *supra* note 27; Special Wastes From Mineral Processing (Mining Waste Exclusion), Final Regulatory Determination and Final Rule, 56 Fed. Reg. 27300 (June 13, 1991).

[87] Report to Congress, *supra* note 27.

[88] *Id.*

[89] *Id.* Both the industry and the size of many stacks have indeed expanded since 1990.

[90] Special Wastes From Mineral Processing (Mining Waste Exclusion), Final Regulatory Determination and Final Rule, 56 Fed. Reg. 27300 (June 13, 1991).

[91] EPA has acknowledged Subtitle D does not contain effective enforcement and oversight tools that would be necessary to create such a program, but said it would work with Congress to obtain these authorities, and would rely on the existing regulatory efforts of states to the extent possible. Regulatory Determination for Wastes from the Extraction and Beneficiation of Ores and Minerals, 51 Fed. Reg. 24,496 (July 21, 1986). Just as it never created a phosphogypsum and process wastewater TSCA program, EPA never created the subtitle D program for the other 18 mining processing special wastes.

[92] Special Wastes From Mineral Processing (Mining Waste Exclusion), Final Regulatory Determination and Final Rule, 56 Fed. Reg. 27300 (June 13, 1991).

[93] EPA, *Risks Posed by Bevill Wastes* at 7 (1997).

[94] *Id.* at 7—8.

perhaps destroyed in a basement flood with no available duplicate copies.[95] Nevertheless, somehow finding that TSCA regulation would not be possible, the EPA decided it would revisit the 1991 Bevill regulatory determination and determine whether RCRA Subtitle C regulation of phosphoric acid special wastes remained inappropriate.[96]

Following the conclusion of the dialogue committee, EPA evaluated the environmental risks posed by phosphogypsum and process wastewater at 13 Florida sites by applying the RCRA National Corrective Action Prioritization System to each site.[97] The results showed that all 13 facilities evaluated had groundwater contamination and all 13 would qualify as "high priority."[98] Despite this, EPA to date has neither revisited its Bevill determination for phosphogypsum and process wastewater nor initiated any rulemakings under TSCA concerning phosphogypsum and process wastewater.

VI. EPA's 1991 Bevill determination is reversible.

While the Bevill Amendment only requires one study and report to Congress for each special waste,[99] nothing precludes EPA from conducting additional study or revisiting the initial determination at a later date when more information about the present and potential hazard becomes known. Indeed, EPA has repeatedly acknowledged its authority to reverse its Bevill determination, starting with the notice publishing the determination itself:

> If information obtained or findings developed . . . are such that RCRA could better handle this matter, the Agency *will revisit today's regulatory determination*, and determine whether subtitle C regulation of the phosphoric acid special wastes remains inappropriate.[100]

EPA next suggested it would revisit its Bevill regulatory determinations for certain "high-risk" mining wastes in a 1997 rulemaking on various mining waste issues. The EPA cited concern about "environmental and natural resource damages from acid mine drainage, the use of cyanide and other toxic chemicals, radioactivity, stability of tailings and waste rock piles, and in-situ mining methods."[101]

In 2010, after a breach in an impoundment pond at the Tennessee Valley Authority's (TVA) Kingston, TN, power plant released 1.1 billion gallons of coal ash slurry, EPA revisited its May 2000 Bevill determination excluding coal combustion residuals from Subtitle C requirements. EPA proposed a reversal of its Bevill determination and regulation under Subtitle

[95] Personal correspondence with EPA Docket Center, Arctic Slope Mission Services (ASMS) – Contractor, e-mail: docket-customerservice@epa.gov (Sept. 16, 2020).
[96] EPA, *supra* note *93.*
[97] *Id.*.
[98] *Id.*.
[99] *See Solite Corp. v. EPA*, 952 F.2d 473 (D.C. Cir. 1991).
[100] Special Wastes From Mineral Processing (Mining Waste Exclusion); Final Regulatory Determination and Final Rule, 56 Fed. Reg. 27300, 27316 (June 13, 1991).
[101] Second Supplemental Proposal on Treatment Standards for Metal Wastes and Mineral Processing Wastes, Mineral Processing and Bevill Exclusion Issues, and the Use of Hazardous Waste as Fill; Proposed Rule, 62 Fed. Reg. 26041, 26054 (May 12, 1997) ("the Agency is therefore seeking comment on whether reexamination of some Bevill wastes is warranted.")

C, or in the alternative, minimum federal standards under Subtitle D.[102] Multiple, similar large-volume releases, as discussed below, have occurred in the phosphoric acid production waste context since EPA's 1991 Bevill regulatory determination.

Furthermore, EPA's stated plans in its Bevill determination to use RCRA and CERCLA enforcement authorities to manage the substantial present and future hazards posed by phosphogypsum and process wastewater in lieu of Subtitle C regulation is contrary to RCRA's statutory purpose. RCRA and its implementing regulations are designed to *prevent* harm caused by solid and hazardous wastes, and to adequately protect human health and the environment by ensuring these wastes are properly managed and disposed of in the first place. EPA cannot continue to ignore this mandate by pointing to authority—rarely exercised in the case of mineral processing industries anyway—to enforce corrective action clean-up or abatement orders after the harm has already occurred (i.e., remediation of site-specific groundwater contamination) under a higher imminent and substantial endangerment standard. EPA must ensure proper management and disposal of phosphogypsum and process wastewater under RCRA Subtitle C by reversing its Bevill determination and listing the wastes as hazardous before looking to future corrective actions, as said corrective actions would not be necessary if the waste were properly and safely managed.

VII. Phosphogypsum and process wastewater are hazardous wastes requiring RCRA Subtitle C regulation.

RCRA regulations provide that a solid waste not excluded from regulation as a hazardous waste may be designated as a listed "toxic waste" (hazardous waste with toxic constituent(s)) or a "characteristic hazardous waste."[103]

The solid waste may be listed as a toxic waste if 1) it contains a toxic constituent listed in Appendix VIII to 40 C.F.R. § 261 and 2) an analysis of 11 enumerated factors supports a conclusion that the waste is "capable of posing a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported or disposed of, or otherwise managed."[104] A "characteristic hazardous waste" must exhibit one of the four following hazardous waste characteristics: ignitability, corrosivity (as determined by pH), reactivity, or toxicity (as determined by a leaching test).[105]

As described below, phosphogypsum contains toxic constituents, and analysis of the 11 factors shows the waste is capable of posing substantial hazards and must be listed as a toxic

[102] Hazardous and Solid Waste Management System; Identification and Listing of Special Wastes; Disposal of Coal Combustion Residuals From Electric Utilities, Proposed Rule, 75 Fed. Reg. 35127 (June 21, 2010). The final rule adopted the Subtitle D minimum standards option, deferring a final Bevill regulatory determination "until additional information…needed to quantify the risks of CCR disposal, …the potential impacts of recent Agency regulations on the chemical composition of CCR, [and] the adequacy of the state programs" is available. Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals From Electric Utilities, Final Rule, 80 Fed Reg 21302, 21309 (April 17, 2015).
[103] 40 C.F.R. § 261.
[104] 40 C.F.R. § 261.11.
[105] 40 C.F.R. §§ 261.20—261.24.

waste. Process wastewater exhibits the characteristics of corrosivity and toxicity, satisfying the criteria for designation as a characteristic hazardous waste.[106]

A. Phosphogypsum satisfies RCRA's criteria for listing as a Toxic Waste.

1. Phosphogypsum contains toxic constituents.

Phosphogypsum leachate contains the following toxic constituents listed in Appendix VIII to 40 C.F.R. § 261: arsenic, lead, nickel, cadmium, chromium, silver, antimony, copper, mercury, and thallium,[107] with concentrations of arsenic and chromium in phosphogypsum solids also exceeding EPA's health-based screening criteria in 1990.[108] The substantial hazard to human health and the environment presented by these constituents are discussed below.

2. Phosphogypsum poses substantial hazards to human health and the environment.

a. Nature of the Toxicity Presented by Phosphogypsum Constituents

Arsenic

Arsenic is a protoplastic poison causing malfunctioning of cell respiration, cell enzymes and mitosis.[109] Several studies have noted an association between chronic exposure to high levels of arsenic and lung cancer in occupationally exposed subpopulations.[110] Prolonged ingestion of water contaminated with arsenic may result in the manifestations of toxicity in practically all systems of the human body.[111] Chronic oral exposure to inorganic arsenic causes a pattern of skin changes associated with changes in the blood vessels of the skin, including patches of darkened skin and the appearance of small "corns" or "warts" on the palms, soles, and torso.[112] Ingesting arsenic has been reported to increase the risk of cancer in the skin, liver, bladder, and lungs, and the Department of Health and Human Services has determined that inorganic arsenic is known to be a human carcinogen.[113]

Lead

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[106] In addition to satisfying listing criteria for a Toxic Waste, some phosphogypsum samples from Rock Springs, Wyoming also exhibited the toxicity characteristic for chromium in 1990 using the extraction procedure (EP) leach test. Report to Congress, *supra* note 27 at 12-3—12-4. The EP has since been replaced by the Toxicity Characteristic Leaching Procedure (TCLP). 40 C.F.R. § 261.24(a).

[107] Report to Congress, *supra* note 27 at 12-8.

[108] Report to Congress, *supra* note 27 at 12-6.

[109] Monisha, Jaishankar et al. 2014. Toxicity, Mechanism and Health Effects of Some Heavy Metals, 7 INTERDISCIP TOXICOL 60, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4427717/.

[110] Hughes, James et. al. 1998. Evaluation and Synthesis of Health Effects Studies of Communities Surrounding Arsenic Producing Industries, 17 INT'L J. EPIDEMIOL. (2):407, download (psu.edu).

[111] Raitnake, R. N. 2003. Acute and Chronic Arsenic Toxicity, POSTGRAD MED J., https://pmj.bmj.com/content/postgradmedj/79/933/391.full.pdf

[112] Agency for Toxic Substances and Disease Registry, *Toxicological Profile for Arsenic* (2007), https://www.atsdr.cdc.gov/toxprofiles/tp2.pdf.

[113] *Id.*

Toxic effects of chronic lead exposure have been observed in every human organ system that has been rigorously studied. This is not surprising because the mechanisms that induce toxicity are common to all cell types and because lead is widely distributed throughout the body.[114] Adverse neurological, renal, cardiovascular, hematological, immunological, reproductive, and developmental effects, especially in children, have been observed at low measured blood levels (PbB) of less than 5 µg/d.[115] The Centers for Disease Control states that "no safe blood lead level in children has been identified."[116] The Department of Health and Human Services classifies lead and lead compounds as reasonably anticipated to be human carcinogens.[117]

Nickel

In nickel-sensitized individuals representing approximately 10-20% of the general population, dermal contact with a small amount of nickel or oral exposure to fairly low doses of nickel can result in dermatitis.[118] Occupational exposure to airborne nickel has caused chronic bronchitis, reduced lung function, and cancer of the lung and nasal sinus.[119] The Department of Health and Human Services has determined that metallic nickel may reasonably be anticipated to be a human carcinogen.[120]

Cadmium

Long-term exposure to cadmium through air, water, soil, and food leads to cancer and organ system toxicity such as skeletal, urinary, reproductive, cardiovascular, central and peripheral nervous, and respiratory systems.[121] Breathing air with very high levels of cadmium can severely damage the lungs and may cause death.[122] Chronic exposure to low levels of cadmium in the air results in a build-up of cadmium in the kidney and may result in kidney disease.[123] Damage to the lungs and nasal cavity has been observed in animals exposed to cadmium in the air.[124] Lung cancer has been found in some studies of workers exposed to cadmium in the air and studies of rats that breathed in cadmium.[125] Eating food or drinking water with very high cadmium levels severely irritates the stomach, leading to vomiting and diarrhea, and sometimes death.[126] Chronic ingestion of cadmium can lead to a build-up of

[114] Agency for Toxic Substances and Disease Registry, *Toxicological Profile for Lead* (2020) at 4, https://www.atsdr.cdc.gov/toxprofiles/tp13.pdf.
[115] *Id.* at 3.
[116] *Id.* at 3.
[117] *Id.* at 9.
[118] Agency for Toxic Substances and Disease Registry, *Toxicological Profile for Nickel* (2005) at 7, https://www.atsdr.cdc.gov/toxprofiles/tp15.pdf.
[119] *Id.*.
[120] *Id.* at 6.
[121] Rahimzadeh, Mehrdad. 2017. Cadmium Toxicity: An Update, Caspian J Intern Med. 8(3): 135–145. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5596182/#:~:text=Long%2Dterm%20exposure%20to%20cadmium,hair%2C%20nail%20and%20saliva%20samples.
[122] Agency for Toxic Substances and Disease Registry, *Toxicological Profile for Cadmium* (2012) at 4, https://www.atsdr.cdc.gov/toxprofiles/tp5.pdf.
[123] *Id*.
[124] *Id.*
[125] *Id.*. at 5
[126] *Id.* at 5

cadmium in the kidneys and kidney disease.[127] Chronic exposure to low levels of cadmium can also cause bones to become fragile and break easily.[128] Animal studies indicate that the young are more susceptible than adults to a loss of bone and decreased bone strength from exposure to cadmium.[129] Kidney and bone effects have also been observed in laboratory animals ingesting cadmium, as well as anemia, liver disease, and nerve or brain damage.[130] The U.S. Department of Health and Human Services has determined that cadmium and cadmium compounds are known human carcinogens.[131]

Chromium

The primary effects associated with exposure to chromium(VI) compounds are respiratory, gastrointestinal, immunological, hematological, reproductive, and developmental, while the primary effects associated with exposure to chromium(III) compounds are on the respiratory and immunological systems.[132] Numerous epidemiological studies recognizing the association between chromium inhalation and lung cancer have been published since the 1940s.[133] The International Agency for Research on Cancer (IARC) has determined that chromium(VI) compounds are carcinogenic to humans.[134]

Silver

Silver compounds can cause some areas of the skin and other body tissues to turn gray or blue-gray, a permanent condition known as "argyria."[135] Argyria occurs in people who eat or breathe in silver compounds over a long period of several months to years.[136] Exposure to dust containing relatively high levels of silver compounds may cause breathing problems, lung and throat irritation and stomach pain.[137]

Antimony

EKG alterations were found in about 50% of the workers exposed to antimony compounds.[138] Other health effects that have been observed in animals orally exposed to higher doses of antimony include hepatocellular vacuolization, hematological alterations including

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[127] *Id.*. at 5
[128] *Id.*. at 5
[129] *Id.* at 6.
[130] *Id.* at 5
[131] *Id.*. at 5
[132] Agency for Toxic Substances and Disease Registry, *Toxicological Profile for Chromium* (2012), https://www.atsdr.cdc.gov/toxprofiles/tp7.pdf.
[133] Lees, Peter S.J. 1991. Chromium and Disease: Review of Epidemiologic Studies with Particular Reference to Etiologic Information Provided by Measures of Exposure, 92 ENVIRONMENTAL HEALTH PERSPECTIVES 93, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1519377/pdf/envhper00388-0095.pdf
[134] Agency for Toxic Substances and Disease Registry, *supra* note 132 at 4.
[135] Agency for Toxic Substances and Disease Registry, *Toxicological Profile for Silver* (1990), https://www.atsdr.cdc.gov/toxprofiles/tp146.pdf.
[136] *Id.*
[137] *Id*.
[138] Agency for Toxic Substances and Disease Registry, *Toxicological Profile for Antimony and Compounds* (2019), https://www.atsdr.cdc.gov/toxprofiles/tp23.pdf.

decreases in red blood cell counts and hemoglobin levels, and histological alterations in the thyroid.[139]

Copper

Long-term exposure to copper dust can irritate the nose, mouth, and eyes, and cause headaches, dizziness, nausea, and diarrhea.[140] Water that contains higher than normal levels of copper may cause vomiting, stomach cramps, or diarrhea.[141] Intentionally high intakes of copper can cause liver and kidney damage and even death. [142]

Mercury

The nervous system is highly sensitive to mercury.[143] Some people who ate fish contaminated with large amounts of methylmercury or seed grains treated with methylmercury or other organic mercury compounds developed permanent damage to the brain and kidneys.[144] Permanent damage to the brain has also been shown to occur from exposure to sufficiently high levels of metallic mercury.[145] The kidneys are also sensitive to the effects of mercury, because mercury accumulates in the kidneys and causes higher exposures to these tissues, and thus more damage.[146] All forms of mercury can cause kidney damage if large enough amounts enter the body.[147]

Thallium

Thallium can affect the human nervous system, lung, heart, liver, and kidney if large amounts are eaten or drunk for short periods of time.[148] Temporary hair loss, vomiting, and diarrhea can also occur and death may result after exposure to large amounts of thallium for short periods. Thallium can be fatal from a dose as low as 1 gram.[149] The Agency for Toxic Substances Disease registry reports no information was found on health effects in humans after exposure to smaller amounts of thallium for longer periods.[150] As in humans, animal studies indicate that exposure to large amounts of thallium for brief periods of time can damage the

[139] *Id.*
[140] Agency for Toxic Substances and Disease Registry, *Toxicological Profile for Copper* at 6 (2004), https://www.atsdr.cdc.gov/ToxProfiles/tp132.pdf
[141] *Id.*.
[142] *Id.*. at 7
[143] Agency for Toxic Substances and Disease Registry, *Toxicological Profile for Mercury* (1999), https://www.atsdr.cdc.gov/toxprofiles/tp46.pdf.
[144] *Id.*.
[145] *Id.*
[146] *Id.*
[147] *Id.*
[148] Agency for Toxic Substances and Disease Registry, *Toxicological Profile for Thallium* (1992), https://www.atsdr.cdc.gov/toxprofiles/tp54.pdf.
[149] *Id.*
[150] *Id.*

nervous system and heart and can cause death. [151]Animal reproductive organs, especially the testes, are damaged after drinking small amounts of thallium contaminated water for 2 months.[152]

b. Concentration of Toxic Constituents in Phosphogypsum

Concentrations of toxic constituents vary from stack to stack according to the source phosphate ore processed. Concentrations of chromium and arsenic exceeded EPA's health-based risk screening criteria for inhalation in the 1990 study, meaning these constituents could pose a significant (i.e., greater than $lxl0^{-5}$) risk if phosphogypsum were released to the ambient air as particles.[153] Concentrations of arsenic also exceeded EPA's health-based risk screening criteria for ingestion.[154]

c. Migration Potential

Metal and nonmetal ions in phosphogypsum are highly mobile when leached due the acidity of process water, indicating a strong potential for groundwater contamination.[155] Once groundwaters in karst geological terrains like those in Florida are contaminated with toxic phosphogypsum constituents by large-scale pollution events like sinkholes forming within a phosphogypsum stack, they are difficult if not impossible to remediate due to uncertainty in the fate and transport of contaminants after sinkhole collapse[156] and a need for a better understanding of karst processes and characterization of fast-moving conduit flow patterns.[157]

d. Persistence

Heavy metals are persistent in the environment.[158]

e. Degradation Potential and Rate of Degradation

All of the toxic constituents in phosphogypsum are metals or other inorganics that do not degrade.[159]

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[151] *Id.*
[152] *Id.*
[153] Report to Congress, *supra* note 27 at 12-7.
[154] *Id.*
[155] Carter, O.C. et al., *supra* note 38.
[156] Sandu, Daljit et. al. 2018. Fate and Transport of Radioactive Gypsum Stack Water Entering the Floridan Aquifer due to a Sinkhole Collapse, SCIENTIFIC REPORTS 8: 11439, https://www.nature.com/articles/s41598-018-29541-0.
[157] Sandu, Daljit. 2019. Implications of Groundwater Plume Transport and Analysis of Karst Aquifer Characteristics in Central Florida, UNIVERSITY OF CENTRAL FLORIDA, http://purl.fcla.edu/fcla/etd/CFE0007723.
[158] Ali, Hazrat et al. 2019. *Environmental Chemistry and Ecotoxicology of Hazardous Heavy Metals: Environmental Persistence, Toxicity, and Bioaccumulation,* J. CHEMISTRY, 2019: 6730305, https://www.hindawi.com/journals/jchem/2019/6730305/.
[159] EPA, *supra* note 27 at 12-1.

f. Bioaccumulation

Both chromium and arsenic, which exceeded EPA's health-based screening criteria for phosphogypsum solids in 1990, bioaccumulate in aquatic species.[160]

g. Plausible Improper Management

Phosphogypsum stack mismanagement is not only plausible, but numerous documented damage cases have already occurred. The following is a brief description of what can and has gone wrong as a result of inadequate federal regulation.

1. Phosphogypsum stacks and stack expansions are built in sinkhole-prone areas atop drinking water sources.

Location of phosphogypsum stacks in West-Central Florida among reported sinkholes from the Florida Geological Survey's subsidence incident reports database. The area is known as "Sinkhole Alley." Graphic: Claudine Hellmuth/E&E News (2020).

Since EPA's Bevill determination, there have been three reported major sinkholes, underneath phosphogypsum stacks, releasing millions of gallons of untreated process wastewater and an undetermined amount of phosphogypsum into the Floridan aquifer: the 1994 sinkhole beneath a stack at the New Wales facility in Mulberry, FL releasing 80 million gallons of process wastewater;[161] the 2009 sinkhole beneath a phosphogypsum stack at the PCS facility in White

[160]Canivet, V. et. al., 2001. Toxicity and Bioaccumulation of Arsenic and Chromium in Epigean and Hypogean Freshwater Macroinvertebrates, 40 ENVT'L CONTAMINATION AND TOXICOL. 345, https://link.springer.com/article/10.1007/s002440010182.

[161]Marshall, James, *Mountains of Waste Menace Florida's 'Swiss Cheese' Aquifers,* E&E NEWS (Apr. 9, 2020), https://www.eenews.net/stories/1062576963.

Springs, Florida releasing 84 million gallons of process wastewater;[162] and most recently, the 2016 sinkhole beneath a phosphogypsum stack just 1.25 miles away from the 1994 original sinkhole at the New Wales facility in Mulberry, FL, releasing 215 million gallons of process wastewater.[163]

While still attempting to remediate the contamination caused by the 2016 sinkhole, Mosaic Fertilizer has applied for a 231-acre expansion of the same phosphogypsum stack.[164] And remediation of contamination in the Floridan aquifer is likely not even possible, as one study found "there is uncertainty in the fate of the contaminant waste after the sinkhole collapse"[165] and another study called for an improved understanding of karst processes and characterization of fast-moving conduit flow patterns.[166]

In addition to these reported sinkholes, at least two unreported sinkhole-like "anomalies" occurred in 2004 and 2013 at the same New Wales facility, releasing undetermined amounts of phosphogypsum and process wastewater to the aquifer below.[167]

2. Phosphogypsum stacks are single-lined at best.

All states containing phosphogypsum stacks have adopted the federal exclusion from hazardous waste regulations, and therefore do not require double liners with double leachate detection and collection systems above and between the liners.[168] While Florida's Phosphogypsum Management Rule now requires stacks to be lined with a single composite liner, the state of Florida allowed phosphate to be deposited in unlined stacks until March 25, 2001.[169] Louisiana considers phosphogypsum stacks to be solid waste landfills and has no regulations specific to phosphogypsum stacks, except that the regulatory authority may give "special consideration" to phosphogypsum stacks and waive or modify requirements, including the operation of liners and leachate collection and removal systems applicable to any other solid waste landfill.[170] These single liners are designed to leak and discharge water to underlying groundwater, creating a permitted "zone of discharge" in Florida.[171] Idaho does not currently apply any solid waste requirements to phosphogypsum stacks, but Idaho's Department of Environmental Quality is undergoing rulemaking for the design, construction, and management of phosphogypsum stacks and lateral expansions.[172] Mississippi, North Carolina, Texas, and Wyoming have no solid waste regulations specific to phosphogypsum stacks.[173]

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[162] *Id.*
[163] *Id.*
[164] Ardaman & Associates, Phase III Expansion Application, Mosaic Fertilizer-New Wales Facility, Florida Department of Environmental Protection Permit # MMR_FL0036421 (Oct. 25, 2019).
[165] Sandu et. al., *supra* note 156.
[166] Sandu, *supra* note 157.
[167] Fuleihan, N.F. 2013. Investigation of 2013 Anomaly New Wales Plan Closed North Gypstack.
[168] Report to Congress, supra note 27 at 12-34—12-35.
[169] Fla. Admin. Code 62-673.440.
[170] La. Admin. Code 33 Part VII § N.1.
[171] EPA, *Risks Posed by Bevill Wastes* (1997) at 15.
[172] Idaho Department of Environmental Quality, Design and Construction of Phosphogypsum Stacks: Docket No. 58-0119-2001, https://www.deq.idaho.gov/public-information/laws-guidance-and-orders/rulemaking/design-and-construction-of-phosphogypsum-stacks-docket-no-58-0119-2001/. (last visited Feb. 1, 2021)
[173] Report to Congress, supra note 27 at 12-34—12-35.

3. Phosphogypsum and process wastewater are not treated.

Despite high migration potential of contaminants within phosphogypsum and process water, neither is treated to remove impurities like radionuclides or heavy metals either while active or at time of closure. Process water is only treated by double-liming,[174] or in some cases reverse osmosis, when release is necessary to maintain surge capacity or to prevent an uncontrolled release.[175]

4. Phosphogypsum stacks are uncovered, open-air dumps.

Active phosphogypsum stacks as currently managed are entirely uncovered, open-air dumps. Even inactive portions of active stacks can remain uncovered until stack closure, when a vegetated cover is finally installed.[176] Phosphogypsum stacks with a soil cover of just 0.5 meters of dirt would emit less radon (6 pCi/m^2-s) than the current management practice of no soil cover (up to 20 pCi/m^2-s).[177] EPA has already concluded that phosphogypsum stacks pose a considerable air pathway cancer risk as a result of radon emissions.[178] In addition, disturbed phosphogypsum (e.g., construction vehicles driving over the stacks and removing the crust) and wind erosion cause fugitive dust emissions.[179] These dust emissions provide an inhalation pathway for toxic constituents within phosphogypsum particles, including arsenic, chromium, and radionuclides.[180] Combining the risk from radon inhalation from the stacks themselves with the risks of radionuclide, arsenic and chromium-containing particle inhalation, EPA estimated a total air pathway lifetime maximally exposed individual cancer risk of approximately $9x10^{-5}$.[181]

Long-term exposure to fine particulate matter also adversely affects the respiratory and cardiovascular systems and otherwise increases mortality risk.[182] For instance, particulate matter

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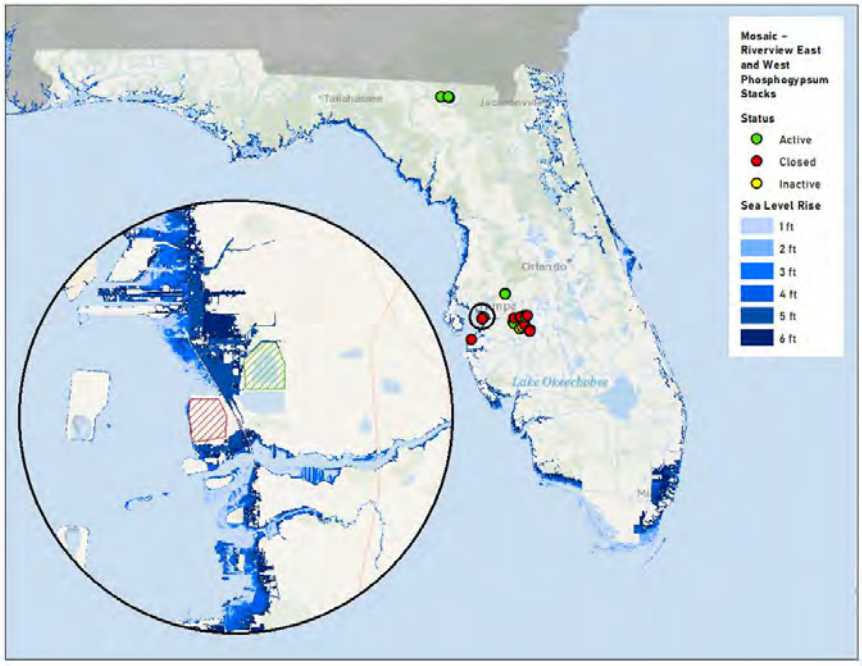
[174] Report to Congress, *supra* note 27 at 12-24.
[175] Perpich, Bill et. al. 2005. Mobile Wastewater Treatment Helps Remediate Concentrated Acidic Process Water at Fertilizer Plant, FLORIDA WATER RESOURCES JOURNAL, https://www.fwrj.com/TechArticle05/0705%20FWRJ_tech%201.pdf.
[176] Fla. Admin. Code 62-673.610.
[177] National Emission Standards for Hazardous Air Pollutants; National Emissions Standards for Radon Emissions from Phosphogypsum Stacks; Final Rule. 54 Fed. Reg. 51654, 51676 (Dec.19, 1989).
[178] Report to Congress, *supra* note 27 at 12-17.
[179] *Id.* In some parts of the country, fugitive dust emissions from wind erosion occur even without phosphogypsum disturbance. For example, in Idaho, phosphogypsum stacks have a sandy consistency that do not crust over due to the type of phosphate ore and beneficiation process used prior to phosphoric acid production. Idaho stacks also do no not receive the same level of dust suppression influenced by rainfall as stacks in the subtropical Southeast. Horton, Thomas (EPA). *A Preliminary Radiological Assessment of Radon Exhalation from Phosphate Gypsum Piles and Inactive Uranium Mill Tailings Piles* at 2 (1979).
[180] *Id.*
[181] *Id.*
[182] Wu, Xiao et al. 2020 (preprinted). Exposure to Air Pollution and COVID-19 Mortality in the United States: A Nationwide Cross-Sectional Study, Harvard Chan School of Public Health, https://www.medrxiv.org/content/medrxiv/early/2020/04/27/2020.04.05.20054502.full.pdf.

exposure is associated with an increased risk of COVID-19 death in the United States, with an increase of only 1 $\mu g/m^3$ associated with an 8% increase in the COVID-19 death rate.[183]

5. Phosphogypsum stacks and stack expansions are prone to dam breaches and are built in coastal areas vulnerable to sea level rise and hurricanes.

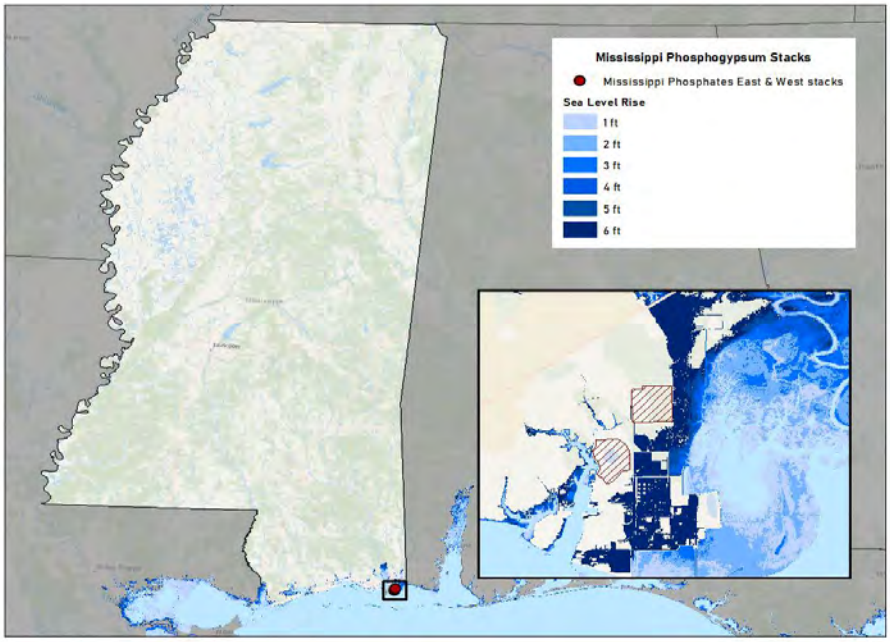
To effectuate the transport of phosphate rock and phosphoric acid to and from fertilizer facilities, associated nearby phosphogypsum stack systems are often located in coastal areas of the Gulf. The Gulf region is particularly vulnerable to sea level rise, with the highest rates of sea level rise in the nation occurring from the mouth of the Mississippi River westward,[184] where several stacks are located. As seas continue to rise in the coming decades, many of the Gulf coast stacks are likely to be catastrophically inundated, as illustrated below.



Graphic: Kara Clauser/Center for Biological Diversity

[183] *Id.*

[184] Lindsey, Rebecca (National Oceanic and Atmospheric Administration). 2021. *Climate Change: Global Sea Level,* https://www.climate.gov/news-features/understanding-climate/climate-change-global-sea-level. (last visited Feb. 1, 2021).



Graphic: Kara Clauser/Center for Biological Diversity

On this backdrop of rising sea levels, coastal regions are threatened by increased flooding and intensifying storm surge, which in combination further threaten the integrity of coastal phosphogypsum stacks and future stack expansions.[185] Coastal flooding is becoming more damaging as hurricane-generated storm surges grow more severe due to climate change.[186] Projections anticipate an increase in the acceleration of sea level rise in Florida,[187] which when combined with intensifying hurricanes and storm surge, is greatly increasing the flooding risk.[188] Under a lower emissions RCP 4.5 scenario, storm surge is projected to increase by 25 to 47 percent along the U.S. Gulf and Florida coasts due to the combined effects of sea level rise and growing hurricane intensity.[189] The increasing frequency of extreme precipitation events is also compounding coastal flooding risk when storm surge and heavy rainfall occur together.[190]

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[185] Climate Central, *Surging Seas Risk Zone Map*, http://sealevel.climatecentral.org/maps. (last visited Feb. 1, 2021).
[186] Hayhoe, Katharine et al. 2018. Our Changing Climate. In *Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II* [Reidmiller, D.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, and B.C. Stewart (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, pp. 72–144, https://nca2018.globalchange.gov/downloads/NCA4_Ch02_Changing-Climate_Full.pdf
[187] Southeast Florida Regional Climate Change Compact Sea Level Rise Work Group. 2019. Unified Sea Level Rise Projection. A document prepared for the Southeast Florida Regional Climate Change Compact Climate Leadership Committee, https://southeastfloridaclimatecompact.org/wp-content/uploads/2020/04/Sea-Level-Rise-Projection-Guidance-Report_FINAL_02212020.pdf.
[188] Little, C. M. et al. 2015. Joint projections of US East Coast sea level and storm surge. Nature Climate Change 5:1114-1121, https://scholarship.libraries.rutgers.edu/discovery/delivery?vid=01RUT_INST:ResearchRepository&repId=12643403030004646#13643523080004646.
[189] Balaguru, K. et al. 2016. Future hurricane storm surge risk for the U.S. gulf and Florida coasts based on projections of thermodynamic potential intensity. Climatic Change 138:99-110.
[190] Wahl, Thomas. et al. 2015. Increasing risk of compound flooding from storm surge and rainfall for major US cities. NATURE CLIMATE CHANGE 5:1093-1098, https://www.nature.com/articles/nclimate2736.epdf?no_publisher_access=1&r3_referer=nature

Flooding concerns extend to those associated with high tide. Since the 1960s, sea level rise has increased the frequency of high tide flooding by a factor of 5 to 10 for several U.S. coastal communities, and flooding rates are accelerating in many Atlantic and Gulf Coast cities.[191] A local sea level rise of 1.0 to 2.3 feet would be sufficient to turn nuisance high tide events into major destructive floods.[192] In Florida specifically, which could have over six feet of sea level rise by the end of the century, nuisance flooding due to sea level rise has already resulted in severe property damage and social disruption.[193] The frequency, depth, and extent of tidal flooding are expected to continue to increase in the future.[194] As the sea level rises, storm surge and tidal flooding will occur on an increasingly higher sea surface which will push water further inland and create more flooding.[195] With water pushed further inland, not just during storm surge events but also due to a general state of elevated sea level, areas once deemed suitable for phosphogypsum stack construction will no longer be so.

Climate change-driven and increasingly frequent, intense, and precipitous storms and hurricanes have already created major problems for phosphogypsum stack management, where maintaining design freeboard and surge capacity in process wastewater impoundments is critical to dam integrity and preventing large-volume releases to the environment. See section (i) below for a summary of major releases of untreated process wastewater to surface waters occurring since EPA last comprehensively reviewed phosphogypsum stack damage cases in 1990.

6. Phosphogypsum stacks are too large and appear to be built upon weak soils, and are thus subject to instability.

The north slope of Mosaic Fertilizer's No. 4 stack at the Uncle Sam facility in Convent, Louisiana has been subject to lateral movement since January 2019, putting surrounding communities and farms at risk of outright collapse and ecological disaster. The state's review of the root cause determined that a 5 to 10-foot zone of under-consolidated, interbedded weak organic and marine clay, ignored at the time of stack design, is at fault.[196] In 1990, EPA considered Louisiana phosphogypsum stacks higher than 12 meters (40 feet) to be unstable due to the weak nature of Louisiana soils.[197] Yet, because of inadequate federal oversight, the Uncle Sam stack is now nearing 60 meters (200 feet),[198] and is predictably unstable.

7. Phosphogypsum stack systems have been used to dump other listed hazardous wastes.

[191] Hayhoe et al., *supra* note 186.
[192] *Id*.
[193] Wdowinski, S. et al. 2016. Increasing flood hazard in coastal communities due to rising sea level: Case study of Miami Beach, Florida. Ocean & Coastal Management 126:1-8.
[194] Hayhoe et al., *supra* note 186.
[195] Tebaldi, C. et al. 2012. Modelling sea level rise impacts on storm surges along US coasts. Environmental Research Letters 7:014032, https://iopscience.iop.org/article/10.1088/1748-9326/7/1/014032/pdf.
[196] Louisiana DEQ, Uncle Sam Facility, Government Review of Root Cause Analysis (March 2, 2020), https://edms.deq.louisiana.gov/app/doc/queryresults.aspx.
[197] Report to Congress, *supra* note 127 at 12-19.
[198] Wright, Tom. *Mosaic says it can keep wastewater on site in case of breach,* The Lens (Feb.19, 2019), https://thelensnola.org/2019/02/13/mosaic-says-it-can-keep-wastewater-on-site-in-case-of-breach/.

In 2015, EPA announced a record $2 billion RCRA settlement with Mosaic Fertilizer, LLC for illegally commingling 60 billion pounds of hazardous waste with Bevill-exempt waste at several facilities in Florida and Louisiana. More recently, EPA settled with J.R. Simplot Company in July 2020, where the company agreed to pay a civil penalty of $775,000, also for placing hazardous wastes in a Bevill-exempt phosphogypsum stack system.[199]

8. Phosphogypsum stacks use mechanical evaporators to spray hazardous process wastewater into the ambient air.

Mosaic Fertilizer installed four mechanical evaporators in 2019 at its New Wales facility in order to increase process wastewater evaporation and help maintain a negative process wastewater balance.[200] However, Mosaic has been unable to determine the amount of process wastewater evaporated in this way due to "numerous operational and climatic inputs and outputs."[201] Florida's Department of Environmental Protection (FDEP) authorized the use of these evaporators through NPDES and Title V air permit modifications without reviewing any industrial health testing conducted by the applicant[202], while Louisiana's Department of Environmental Quality (LDEQ) rejected a similar proposal at the Uncle Sam facility due to health and safety concerns.[203]

9. Phosphogypsum stack owners have gone bankrupt and abandoned their facilities, leaving emergency operations to state and federal environmental agencies.

Mulberry Phosphates at Piney Point, Palmetto Florida

Mulberry Phosphates declared bankruptcy in February 2001, giving the FDEP approximately 48 hours-notice that it would abandon its Piney Point facility and that the phosphogypsum stack there was in need of continuous maintenance for which the corporation would be unable to provide any of funding.[204] The total process water and pore volume the time was 1.2 billion gallons when Mulberry Phosphate Inc. declared bankruptcy.[205] Since each inch of rain that falls on the facility has been calculated to add approximately 12.5 million gallons of water to the process wastewater volume, a series of reasonably strong rain events adding 12 to 15 inches, or a 50 or 100- year storm, could overflow part of the berm and collapse the entire

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[199] Complaint, *United States of America v. J.R. Simplot Company and Simplot Phosphates, LLC*, United States District Court of Wyoming, 20-CV-125-F (July 9, 2020).
[200] Mosaic Fertilizer, LLC, Notification of Completion of Construction – Spray Evaporator System, New Wales Facility, Florida Department of Environmental Protection permit #MMR_FL0036421 (Nov 18, 2019).
[201] Mosaic Fertilizer, LLC , Quarter 1 Spray Evaporation Report– New Wales Facility, Florida Department of Environmental Protection permit #MMR_FL0036421 (April 28, 2020).
[202] Personal correspondence, Vishwas Sathe, FDEP Phosphogypsum Management Program (August 14, 2020).
[203] Louisiana DEQ, Letter for Water Management Options at the Mosaic Fertilizer, LLC - Uncle Sam Facility (July 30, 2019), https://edms.deq.louisiana.gov/app/doc/queryresults.aspx.
[204] Henderson, Carl. 2004. Piney Point Phosphate Plant: An Environmental Analysis at 40, UNIVERSITY OF SOUTH FLORIDA ST. PETERSBURG, https://digital.stpetersburg.usf.edu/cgi/viewcontent.cgi?article=1062&context=honorstheses.
[205] Similar to process water in chemical composition, pore water is not ponded, but rather interspersed throughout the stack. *Id*. at 41.

structure, releasing several million gallons of process water and some portion of the pore waters as a slurry and putting over 60 homeowners in the immediate area in imminent danger of a spill.[206]

The state moved to assume receivership in bankruptcy proceedings and was then forced to immediately discharge 50 million gallons of process wastewater after only single lime treatment into adjacent Bishop's Harbor.[207] Single lime treatment raises the process wastewater pH to 4.5 standard units and removes most of the metal constituents, but does not remove enough phosphorus or nitrogen to meet state or federal water quality standards or to be discharged on even a limited basis to surface waters such as the poorly flushed Bishop's Harbor.[208]

While the state managed the site, it intentionally released 248 million gallons of partially treated process wastewater into the Gulf of Mexico via 35 barge trips from July 20 to November 30, 2003.[209]

Between 2005 and 2009, FDEP drained and lined the ponds a top the stack as part of a project to "reclaim" the stack for beneficial reuse. Today the stack is managed by HRK Holdings, Inc. and is used for deposition of dredge material from the adjacent Port Manatee expansion activities. This attempted beneficial reuse of a phosphogypsum stack has been an utter failure, resulting in multiple liner tears and releases into Bishop Harbor, with a 2011 leak sending 170 million gallons in Bishop's Harbor.[210] HRK Holdings has informed local officials that the ponds are again nearing capacity, able to store only an additional 60 million gallons of water, or 19 inches of rainfall.[211]

Mississippi Phosphates in Pascagoula, Mississippi

Mississippi Phosphates Corporation filed for Chapter 11 bankruptcy in December of 2014, ceasing plant operations at the time and leaving more than 700 million gallons of In December of 2014, Mississippi Phosphates declared Chapter 11 bankruptcy, leaving more than 700 million gallons of process wastewater stored at the facility, with an additional nine million gallons generated for every one inch of rainfall.[212] The bankruptcy settlement established a trust which was used to pay for process wastewater treatment overseen by the state, but the funds were depleted on February10, 2017. The EPA's Superfund Removal Program took control of the facility on February 11 2017, and wastewater treatment is occurring at a rate of approximately 2,000,000 gallons per day at a cost to taxpayers of approximately $1,000,000 per month.[213]

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[206] *Id.*. at 40.
[207] *Id.* at 41.
[208] *Id.*.
[209] Hu, Chuanmin et al. 2003. Satellite monitoring of the FDEP Gulf dispersal of the Piney Point treated wastewater, UNIVERSITY OF SOUTH FLORIDA at 2.
[210] Salman, John. *HRK knew of tearing problems before Piney Point spill*, THE BRADENTON HERALD (July 6, 2012), https://www.bradenton.com/news/business/article34551327.html.
[211] Pittman, Craig. *Phosphate waste threatens bay again, so what if we bottled it?* FLORIDA PHOENIX (Oct. 1, 2020), https://www.floridaphoenix.com/2020/10/01/phosphate-waste-threatens-bay-again-so-what-if-we-bottled-it/.
[212] EPA, Mississippi Phosphates Corporation Site Pascagoula, Mississippi Factsheet (March 2017), https://www.epa.gov/sites/production/files/2017-03/documents/mpc_fact_sheet_1_finalv2.pdf.
[213] *Id*.

Ground water beneath the plant is contaminated with arsenic, cadmium, lead, selenium and thallium at levels above EPA's Safe Drinking Water Act Maximum Contaminant Levels, and multiple city-owned groundwater wells are located within 4 miles of the site.[214] Surface soil contains arsenic above screening values for site workers and elevated levels of cadmium, chromium, lead, nickel, vanadium, radium-226, radium-228 and associated decay products. Bayou Cossette sediment is contaminated with arsenic, chromium and lead above screening values for the saltwater environment.[215]

h. Quantities of Waste Generated

As described above, phosphogypsum is produced at a rate of 5.2 tons of waste for one ton of phosphoric acid. Approximately 46 million tons of phosphogypsum are created in the U.S. annually.[216] A phosphogypsum stack can be over one square mile wide[217] and 500 feet tall,[218] and contain a process water inventory of over a billion gallons.[219] Over 30 million tons per year are produced in Florida alone,[220] and an estimated one billion tons are already stacked there.[221]

i. Nature and Severity of the Human Health and Environmental Damage that Has Occurred

Human Health Damage

A study examining mortality over decades in a cohort of Florida phosphate fertilizer plant workers found significant elevated mortality due to all causes, all cancers, lung cancer, and leukemia as compared to the overall U.S. population and the population of Florida, as well as increased incidence of mental disorders and chronic obstructive pulmonary disease (COPD).[222] Although an exposure-response relation could not be established due to limitations of the study, the authors noted that phosphate processing results in exposures to aerosolized radiation, acid vapors, and other airborne toxins.[223] Radiation exposure routes to fertilizer plant workers and local residents near fertilizer plants include external radiation, inhalation and ingestion of radionuclide-containing dust, and inhalation of radon and radon daughters.[224]

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[214] EPA, Mississippi Phosphates NPL Site Narrative (Jan. 2018), https://semspub.epa.gov/work/HQ/197100.pdf.
[215] *Id.*
[216] The Fertilizer Institute. Apr. 2020. *Revised Request for Approval of Additional Uses of Phosphogypsum Pursuant to 40 C.F.R. 61.206* at 6, https://www.epa.gov/sites/production/files/2020-10/documents/4-7-2020_pg_petition.pdf.
[217] EPA, *supra* note 46.
[218] EPA, *supra* note 47.
[219] JBM&R Engineering, Inc, *2020 Interim Stack System Management Plan*, Mosaic Fertilizer, LLC – New Wales Facility, Florida Department of Environmental Protection permit #MMR_FL0036421.
[220] Burnett, William C. et al.. 1996. Radionuclide Flow During the Conversion of Phosphogypsum to Ammonium Aulfate, 32 J. ENVT'L RADIOACTIVITY 33, https://doi.org/10.1016/0265-931X(95)00078-O.
[221] Macías, Francisco et al. 2017. Environmental Assessment and Management of Phosphogypsum According to European and United States of America Regulations, 17 PROCEDIA EARTH AND PLANETARY SCIENCE 666, 667, https://doi.org/10.1016/j.proeps.2016.12.178.
[222] Yiin, James et al. 2016. A Study Update of Mortality in Workers at a Phosphate Fertilizer Production Facility, 59 AM J IND MED. 12, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4913354/.
[223] *Id.*
[224] Kim, Kwang Po et al. 2006. Characterization of Radioactive Aerosols in Florida Phosphate Processing Facilities, 40 AEROSOL SCIENCE AND TECHNOLOGY 410, https://doi.org/10.1080/02786820600643313.

Petitioners are not aware of any phosphogypsum epidemiological studies evaluating residential (nonoccupational) exposure data and long-term health outcomes, a gap in science that EPA must rectify (see section XII).

Environmental Damage

The following is a summary of major releases to surface and groundwaters occurring since EPA last comprehensively reviewed phosphogypsum and process wastewater environmental damage cases in 1990.

Mobil Mining and Minerals in Pasadena, Texas: Cotton Patch Bayou Spill

On April 6, 1992, the southern retaining wall of Mobil Mining and Mineral's No. 3 phosphogypsum stack experienced structural failure, releasing 45 million gallons of phosphogypsum and process water with a pH of less than two standard units.[225] The release flowed into Cotton Patch Bayou and eventually the Houston Ship Channel through a barge basin, covering large areas of terrestrial and aquatic habitat and adversely affecting surface water quality within approximately seven miles of the Houston Ship Channel for at least a week, and a fish and macro-crustacean kill was observed.[226] Freshwater, marine, and estuarine wildlife, fish, invertebrates, plants, and sediments all sustained injuries, as well as terrestrial wildlife, plants, and soils.[227] Cotton Patch Bayou was severely impacted, and prior to the release the bayou provided habitat for species of songbirds and wading birds, terrestrial reptiles, amphibians, mammals, crayfish and numerous other invertebrates.[228]

Mulberry Phosphates in Mulberry, Florida: Alafia River Spill

During a rainstorm on December 7, 1997, the crest of the south wall containing a settlement pond atop the Mulberry Facility's south stack washed out, causing approximately 54 million gallons of process wastewater and an undetermined amount of phosphogypsum slurry to spill into Skin Sampling Creek and the North Prong of the Alafia River,[229] eventually traversing 35 miles of the Alafia River before reaching Hillsborough and Tampa Bays.[230] With a pH of 2, the process wastewater discharge drastically altered pH throughout the length of the Alafia River, with post-spill pH measurements ranging from 2.8 standard units in the upper, freshwater portion of the river to 4 standard units in the lower, estuarine portion for several days.[231]

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[225] Consent Decree Addressing Natural Resource Damages, *United States of America v. Mobil Mining and Minerals Co.*, United States District Court for the Southern District of Texas, Case No.: H96-0695 (1996), https://www.gc.noaa.gov/gc-cd/mobl-cd.pdf.
[226] *Id.*
[227] *Id.*
[228] *Id.*
[229] Amundsen & Moore, Summary Report of Determination of Cause of Process Water Discharge From South Gypsum Stack Expansion Area, Mulberry Phosphates, Inc., Mulberry, Polk County, Florida at 1, FDEP Permit # MMR_FL0334944 (Jan 20, 1998).
[230] National Oceanic and Atmospheric Administration, *Final Damage Assessment and Restoration Plan for December 7, 1997 Alafia River Spill* at 6 (July 21, 2000), http://www.atlassettlements.com/wp-content/uploads/Atlas_Settlements_Mulberry_Case_Study.pdf.
[231] *Id.*

Reported as the "worst environmental disaster in the Alafia River's history," the spill caused a significant fish kill reported throughout the length of the river from Mulberry to Hillsborough Bay, including an estimated 1.3 billion baitfish and shellfish and 72,900 gamefish.[232] The spill also caused injuries to freshwater benthic communities, oysters, and mussels.[233] Through the loss of habitat and prey, the spill may also have indirectly injured birds that utilize the Alafia River and surrounding wetlands, including for breeding.[234] Approximately 377 acres of freshwater vegetation were injured or lost to the spill, including the die-off of freshwater wetland vegetation and 8 acres of mature hardwoods.[235] And due to the 350 tons of nitrogen ultimately sent to Tampa Bay,[236] the spill caused imbalances in aquatic fauna, algae blooms, and increased chlorophyll *a* concentrations in both the river and bay through May of the following year.[237]

A consultant-led investigation determined that the dike breach formed as a result of the routine removal of a decant pipe and subsequent backfilling of the pipe trench with phosphogypsum, a process "similar to that used by many gypsum stack operators worldwide."[238]

Cargill Fertilizer in Riverview, Florida: South Archie Creek/ Hillsborough Bay Spill

During Hurricane Frances on September 5, 2004, high winds and rain eroded a berm atop a phosphogypsum stack at Cargill Fertilizer's Riverview Facility,[239] causing 65 million gallons of process wastewater to discharge into South Archie Creek and eventually Hillsborough Bay.[240] The spill caused documented death and injury to many estuarine dependent species, including tidal marsh, red, black, and white mangrove forests, salt grass, blue crab, fiddler crab, various shrimp species, water column organisms, sea grasses, sand seatrout, striped mullet, spadefish, stingray, croaker, menhaden, sea robin, hog choaker, white grunt, scaled sardine, mojarra, spotted seatrout, red drum, and common snook.[241] In addition, the open waters of Hillsborough Bay provide important habitat for seabirds, marine fish species, and marine mammals like the bottlenose dolphin and West Indian Manatee, although no direct injuries of these species were observed.[242] Approximately 78.4 acres of mangroves and 57.3 acres of tidal marsh experienced die-off, while 21.57 of 24.44 acres of seagrass along the shoreline of Hillsborough Bay showed signs of stress after contact with the process wastewater, with the remaining 2.87 acres of sea grass no longer visible after the discharge.[243]

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[232] Palmer, Tom. *Alafia River Appears to Have Healed After Acid Spill,* THE LEDGER (Dec. 9, 2007), https://www.theledger.com/article/LK/20071209/News/608133314/LL.
[233] National Oceanic and Atmospheric Administration, *supra* note 230 at 10.
[234] *Id*. at 11.
[235] *Id*. at 15.
[236] Palmer, Tom, *supra* note 232.
[237] National Oceanic and Atmospheric Administration, *supra* note 230 at 22.
[238] Amundsen & Moore, supra note 229 at 4—5.
[239] Now owned by Mosaic Fertilizer, LLC.
[240] Complaint for Natural Resource Damages, *United States of America et al. v. Mosaic Fertilizer, LLC*, Case No: 13-cv-00386-RAL-TGW (2013).
[241] Consent Decree Addressing Natural Resource Damages, *United States of America et al. v. Mosaic Fertilizer, LLC*, Case No: 13-cv-00386-RAL-TGW, Appendix A at 9 (2013).
[242] *Id.* at 10.
[243] *Id.* at 11.

Mississippi Phosphates in Pascagoula, Mississippi: Bangs Lake and Bayou Cosette Spills

On April 14, 2005, a rainfall of 26 cm in less than 24 hours caused a stack breach at the Mississippi Phosphates facility, releasing over 17 million gallons of process wastewater and damaging marsh vegetation, fish, and oysters at the Bangs Lake station of the Grand Bay National Estuarine Research Reserve.[244] Seven years later, after 76 cm of rain fell from August 28-30 due to Hurricane Isaac, the facility released another 90 million gallons of process wastewater over the course of 3 days into Bayou Cosette, where a fish kill was observed.[245]

Prior to filing for bankruptcy, Mississippi Phosphates had been cited for hundreds of violations of its Clean Water Act permit for discharging wastewater that exceeded limits for ammonia, phosphorous, total suspended solids, fluoride, temperature, and pH.[246] In 2015, the company plead guilty to discharging over 38 million gallons of acidic process wastewater in August of 2013, failing to treat the water with caustics to mitigate its toxicity to marine life as required by its permit.[247] The illegal discharge resulted in the death of over 47,000 fish and the closing of Bayou Cosette, one of the most productive nurseries for aquatic species on the Gulf Coast.[248]

Releases to Groundwater

As detailed in section j.5 above, since the 1990 Report to Congress there have been three reported sinkholes in Florida releasing large volumes of phosphogypsum and process wastewater into the aquifer below. The contamination plume from the most recent of these, the 2016 Mosaic Fertilizer New Wales sinkhole in Mulberry, Florida, remains to this day as Mosaic continuously pumps over 4,000 gallons per minute from its recovery wells in an attempt to recover contaminated groundwater from the Floridan aquifer, a primary source of drinking water for the state. Approximately 215 million gallons of process wastewater and an undetermined amount of phosphogypsum entered the Floridan aquifer as a result of the sinkhole.

[244] Beck, Marcus et al. 2018. Water Quality Trends Following Anomalous Phosphorus Inputs to Grand Bay, Mississippi, USA. Gulf and Caribbean Research, 29:1. http://ftp.sccwrp.org/pub/download/DOCUMENTS/WorkPlan/RestrictedJournalArticles/1018_GrandBayPhosphorousInputs.pdf.

[245] *Id.*

[246] Felony Information, *United States of America v. Mississippi Phosphates Corporation*, Case No.: 1:15-cr-00058-LG-RHW (2015).

[247] *Id.*

[248] *Id.*

j. Action Taken by Other Governmental Agencies or Regulatory Programs Based on the Health or Environmental Hazard Posed by Phosphogypsum Stacks

Florida adopted its Phosphogypsum Management Rule in 1993, which established a performance standard based on the permitted zone of discharge.[249] Stacks are required to be designed, operated, and maintained such that groundwater and surface water quality standards are not violated beyond the zone.[250] The state has entered into numerous consent orders and corrective action plans for permit violations. For instance, after the 2016 New Wales sinkhole, where Mosaic Fertilizer, LLC violated its permit's vertical zone of discharge by discharging into the Floridan aquifer, the FDEP and Mosaic entered into a consent order directing the company to study methods and technologies to locate "zones of weakness, solution cavities, erosion features or other subsurface anomalies" that may cause sinkholes.[251]

k. Other Appropriate Factors

1. Phosphogypsum stacks are disproportionately located in communities of color and low-wealth.

The proximity of massive volumes of phosphogypsum and process wastewater to vulnerable communities represents an environmental injustice. African-Americans are 75 percent more likely than other Americans to live in "fence-line" communities near industrial facilities, including those that produce hazardous waste, and are directly affected by the facilities' operation.[252] The injustice presented by phosphogypsum and process wastewater is made all the worse by the fact that the hazardous wastes stored near these communities are not currently managed in RCRA-permitted hazardous waste treatment, storage, and disposal facilities with strict manifest and land disposal requirements, but rather in underregulated open air stacks that emit radon and are prone to large-volume releases. The following are two examples of fence-line communities subject to the threat of nearby phosphogypsum stacks.

Riverview/Old Progress Village in Florida

The active phosphogypsum stack at Mosaic's Riverview facility south of Tampa currently sits adjacent to the historically Black community of Old Progress Village ("Progress Village"). Progress Village was designed in the 1950s as a means to provide home ownership to Tampa's segregated Black residents, who lived primarily in housing projects and were purposefully displaced by construction of an interstate.[253] The community learned in 1982 of then-owner Gardiner's plans to build a second phosphogypsum stack, this time across the street

[249] Fla. Admin. Code 62-673.340.
[250] *Id.*
[251] Consent Order, *State of Florida Department of Environmental Protection v. Mosaic Fertilizer, LLC*, OGC No. 16-1356 (Oct. 24, 2016).
[252] NAACP and Clean Air Task Force. 2017. Fumes Across the Fence Line: The Health Impacts of Air Pollution from Oil & Gas Facilities on African American Communities, https://www.naacp.org/climate-justice-resources/fumes-across-fence-line/.
[253] Baum, Laura E. 2016. Neighborhood Perceptions of Proximal Industries in Progress Village, FL, UNIVERSITY OF SOUTH FLORIDA SCHOLAR COMMONS (2016) at 7-8.

from Progress Village and near a school, and fought hard to stop the company from obtaining its necessary local permit. Community members organized petitions and protests and showed up in large numbers to several county commission meetings over the course of the next two years.[254] At one meeting, a resident voiced:

> What do you tell people 15 or 20 years from now when someone wants to know who let a company put two mountains of waste within the city limits of Tampa? How do you tell the next generation that we have messed up again? What do I tell my grandkids? Will their mother and father let them visit me? What do I do when I retire? I won't have the funds to move to the mountains or some resort area or take extended vacations in Europe. No, Mr. and Mrs. Commissioners. I'll be stuck with that gypsum pile the rest of my life. So, I appeal to you as God-fearing and law-abiding citizens. Please for one time give us a break. Let the little people win one. We already have an ammonia pipeline[255] running through Progress Village that could burst anytime. We don't need to be subjugated to another hazard. Vote no against the gypsum pile proposal.[256]

The little people did not win, and Hillsborough County commissioners approved the proposal in 1984.[257] Gardiner entered into an agreement with Progress Village leaders that year providing mostly short-term beautification benefits and a scholarship program.[258] There is some dispute if the agreement was necessary to gain county approval for stack construction or if it was merely a side deal aimed at bettering community relations.[259] Little remains of the benefits promised, but the growing radioactive, hazardous mountain will remain forever.[260]

Convent, St. James Parrish in Cancer Alley, Louisiana

Mosaic Fertilizer's Uncle Sam facility is located in an infamous 85-mile stretch of industrial area in southern Louisiana containing 150 facilities, known as Cancer Alley due to its increased cancer rates when compared to the rest of the nation.[261] The population of Convent, where the stack is located, is 62.20% Black, with average annual earnings of $35,667.[262] This community is now facing the consequences of an inadequately regulated stack system that has been permitted to grow too large and unstable given the weak nature of Louisiana soils noted by EPA three decades ago; the north slope of the facility's No. 4 phosphogypsum stack has been

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[254] *Id*. at 71
[255] The ammonia pipeline through Old Progress Village was constructed in the 1970s to transport ammonia from the Port of Tampa to another fertilizer facility in Bartow, FL. *Id*. at 65.
[256] *Id.*. at 72-73.
[257] *Id*. at 74.
[258] *Id. at* 75.
[259] *Id.* at 73-74.
[260] *Id.* at 97.
[261] Pasley, James. *Inside Louisiana's Horrifying 'Cancer Alley,' an 85-mile Stretch of Pollution and Environmental Racism That's Now Dealing With Some of the Highest Coronavirus Death Rates in the Country*, BUSINESS INSIDER (April 9, 2020), https://www.businessinsider.com/louisiana-cancer-alley-photos-oil-refineries-chemicals-pollution-2019-11#in-total-about-150-facilities-line-the-alley-its-the-second-biggest-producer-of-petrochemicals-in-the-country-after-texas-but-the-key-difference-is-that-texas-industry-is-spread-out-over-hundreds-of-miles-5.
[262] Convent, Louisiana, *World Population Review*, https://worldpopulationreview.com/us-cities/convent-la-population (Source: US Census Bureau 2018 American Community Survey) (last visited Sept. 24, 2020).

moving laterally since at least January 9, 2019.[263] In response, Mosaic has been shifting its process wastewater inventory from the pond atop the stack to other nearby ponds in an attempt to both relieve pressure caused by the weight of the process wastewater on the northern slope and to mitigate the damage caused in the plausible event of a collapse and resulting release of process wastewater from the pond onto adjacent agricultural fields and the surrounding community.[264] To date, however, the stack slope containing millions of gallons of process wastewater is still moving and threatening collapse.

2. Phosphogypsum is radioactive.

Phosphogypsum has very high levels of gross alpha and beta radiation (10 to 100 pCi/g) relative to levels in typical soils (approximately 1 pCi/g).[265] Radium-226 concentrations in U.S. phosphogypsum samples have measured as high as 49 pCi/g.[266] EPA has repeatedly compared phosphogypsum stacks to uranium mill tailing impoundments in both size and radiation exposure.[267] Yet, uranium byproduct materials are managed under standards—in place since 1983—that are identical to Subtitle C standards for hazardous waste treatment, storage and disposal facilities,[268] while state-managed phosphogypsum stack designs, according to EPA, do not even "approach the protectiveness of the uranium mill tailings standards."[269]

B. Process wastewater is a characteristic hazardous waste.

1. Process wastewater exhibits the corrosivity characteristic.

Process wastewater is measured with pH values typically lower than 2, and as extreme as 0.5 (battery acid has a pH of around 1).[270]

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[263] Mosaic Fertilizer, LLC – Uncle Sam Facility, Notice of Critical Condition Pursuant to Attachment E of Appendix 1 to Consent Decree, *United States et al. v. Mosaic Fertilizer*, 15-cv-04889 (Jan. 10, 2019), https://edms.deq.louisiana.gov/app/doc/view.aspx?doc=11478492&ob=yes&child=yes.

[264] Mosaic Fertilizer, LLC, Weekly WebEx Presentation to LDEQ on Uncle Sam Side Slope Lateral Movement at 7 (Jan. 28, 2019), https://edms.deq.louisiana.gov/app/doc/view.aspx?doc=11628070&ob=yes&child=yes.

[265] Report to Congress, *supra* note 27 at 12-7.

[266] EPA, *Potential Uses of Phosphogypsum and Associated Risks, Background Information Document* (1992).

[267] Horton, Thomas (EPA), *A Preliminary Radiological Assessment of Radon Exhalation from Phosphate Gypsum Piles and Inactive Uranium Mill Tailings Piles* at 13 (1979) ("The population . . .exposure within 80 km of a typical Florida phosphate gypsum pile is as great or greater than from a typical inactive uranium mill tailings pile."); EPA, Office of Solid Waste, *Feasibility Analysis: A Comparison of Phosphogypsum and Uranium Mill Tailing Waste Unit Designs* at 9 (1997) ("The uranium mill tailings are a high-volume waste stream that is in some respects analogous to phosphogypsum.").

[268] Uranium mill tailings waste unit design standards are established under the Uranium Mill Tailings Reclamation Act at 40 C.F.R. § 192.

[269] EPA, Office of Solid Waste, *Feasibility Analysis: A Comparison of Phosphogypsum and Uranium Mill Tailing Waste Unit Designs* at 26 (1997) ("[G]ypsum stacks constructed or proposed since the enactment of the 1993 Florida Phosphogypsum Management regulations have followed or exceeded the Florida standards but none of the designs approach the protectiveness of the uranium mill tailings standards.").

[270] Report to Congress, *supra* note 27 at 12-58.

2. Process wastewater exhibits the toxicity characteristic.

Concentrations of cadmium, chromium, and selenium in process wastewater exceeded EP regulatory levels in 1990.[271]

VIII. The RCRA Simpson Amendment affords EPA flexibility in Subtitle C regulation of mineral processing wastes, including phosphogypsum and process wastewater.

All practical difficulties in implementing Subtitle C regulations to such large volumes of waste can be addressed by tailored regulations, or a "Subtitle C minus" program as described in the 1990 report to Congress.[272] Rather than avail itself of this option, EPA has instead opted for no regulation at all.

IX. EPA must initiate prioritization for phosphogypsum and process wastewater as high priority chemical substances for risk evaluation under TSCA §6.

Despite a preference for initiating prioritization for substances listed on the 2014 TSCA Work Plan for Chemical Substances ("work plan"),[273] EPA retains discretion to initiate prioritization for substances not on the work plan, like phosphogypsum and process wastewater from phosphoric acid production, since TSCA regulations require only that 50 percent of the substances currently undergoing risk evaluation are drawn from the work plan.[274] Because EPA indicated almost 30 years ago that phosphoric acid production wastes would be subject to a future TSCA regulatory program, EPA should now initiate their prioritization as high priority substances under the Act.

X. Information necessary to prioritize phosphogypsum and process wastewater is reasonably available.

In order to initiate prioritization, TSCA regulations require only that EPA believe information on relative hazard and exposure potential necessary to prioritize the substance is reasonably available.[275] The information and findings in EPA's 1990 Report to Congress on Special Wastes from Mineral Processing ("Report to Congress") and any supplemental analysis concerning the risks of phosphogypsum and process wastewater to human health and the environment are certainly reasonably available and provide enough information on the risks of these substances to not only initiate prioritization but also to make a high priority designation based on the exposure potential and substantial hazard findings in that report alone, especially when considering that both the size of the stacks and exposed populations have greatly increased since 1990. Once EPA initiates the prioritization process, however, any information EPA has

[271] The Extraction Procedure test has since been replaced by the more rigorous TCLP test. 40 C.F.R. §261.24(a).
[272] Report to Congress, *supra* note 27 at 12-49.
[273] EPA, *A Working Approach for Identifying Potential Candidate Chemicals for Prioritization* (Sept. 27, 2018) https://www.epa.gov/sites/production/files/2018-09/documents/preprioritization_white_paper_9272018.pdf; 40 C.F.R. § 702.5(c).
[274] 40 C.F.R. § 702.5(c)(2).
[275] 40 C.F.R. § 702.5(a).

obtained or any findings EPA has made, including those in the 1990 Report to Congress, concerning the costs to the industry of certain regulatory, management, or disposal alternatives must not be considered under TSCA as amended by the Lautenberg Act.

A. EPA has already determined that a risk management regulatory program under TSCA §6 is appropriate based on reasonably available information.

As described above, regulation of chemical substances under TSCA involves a three-step process: 1) evaluation of the substance's risk to human health and the environment, without consideration of costs; 2) a determination that the risk is unreasonable; and 3) promulgation of regulations necessary to minimize or manage the unreasonable risk posed by the chemical substance so that the risk is no longer unreasonable. EPA's 1991 Bevill determination not only exempted phosphogypsum and process wastewater from RCRA Subtitle C regulation, it also determined that a TSCA regulatory program was more appropriate, rather than a RCRA Subtitle D program or no regulation at all.[276] Inherent to this determination that TSCA regulation is appropriate is an unreasonable risk determination. EPA's investigation of a TSCA regulatory program to manage phosphogypsum and process wastewater means these substances not only may—but do—pose an unreasonable risk of injury to human health and the environment.

XI. A TSCA §4 testing rule is necessary to fill gaps in current science and to better inform a future risk evaluation.

Rather than study the toxicity, concentration of hazardous constituents at various U.S. phosphogypsum stacks, exposure, and other health and environmental effects relevant to an unreasonable risk finding, the majority of current, published phosphogypsum research is centered on potential commercial uses that are already banned by EPA under the NESHAP due to the risk of widespread radon exposure. With such misdirected science, many people living near a phosphogypsum stack may not even know what the substances in the stack are, let alone the risks they are being subjected to. In this respect, the state-funded Florida Industrial and Phosphate Research Institute, which advocates for a reversal of the limited ban,[277] might as well be a trade association.

Since the 1990 Report to Congress, updated information on population-level exposure risks for radionuclide constituents and radon emissions for phosphogypsum stack systems is necessary, as the population within 80 kilometers of each phosphogypsum stack has likely greatly increased, as well as the number and size of the stacks themselves. Updated toxicity information using the Toxicity Characteristic Leach Procedure (TCLP), which replaced the Extraction Procedure (EP), is also necessary. Should EPA designate phosphogypsum and process wastewater as high-priority substances and conduct a risk evaluation, a testing rule under

[276] Special Wastes From Mineral Processing (Mining Waste Exclusion); Final Regulatory Determination and Final Rule, 56 Fed. Reg. 27300,56 Fed. Reg. 27300, 27316 (June 13, 1991).
[277] *See* Florida Industrial and Phosphate Research Institute, *Phosphogypsum and the EPA Ban,* http://www.fipr.state.fl.us/about-us/phosphate-primer/phosphogypsum-and-the-epa-ban/) (last visited July 20, 2020).

§4(a)(1)(II)[278] will contribute to the development of information necessary to conduct the risk evaluation.

The need for a §4 testing rule is only further underscored should EPA find that this petition does not set forth sufficient facts to warrant initiation of prioritization. Furthermore, should EPA initiate prioritization but find that the development of new information is necessary to finalize a prioritization decision for phosphogypsum and process wastewater, EPA should exercise its authority under §4(a)(2)(B) to obtain that information and establish priority.

XII. EPA's approval of the use of phosphogypsum in road construction is a significant new use.

On October 20, 2020, the EPA reversed course on its 30+ years of finding that radon from phosphogypsum poses an unacceptable risk to public health if used in road construction and approved the use of phosphogypsum in roads.[279]

In 1992, the EPA finalized its National Emission Standards for Radon Emissions from phosphogypsum stacks finding that "regardless of the radium-226 concentration, the use of phosphogypsum in road construction always resulted in a MIR [(maximum individual risk)] significantly greater than the presumptive safe level….Therefore, EPA has determined that the use of phosphogypsum in road construction presents an unacceptable level of risk to public health."[280] EPA also found that phosphogypsum "contains appreciable quantities of radium-226, uranium, and other uranium decay products…The radionuclides of significance are uranium-238, uranium-234, thorium-230, radon-222, lead-210, polonium-210,"[281] and that these toxins can be resuspended into the air by wind and vehicular traffic. It found that "trace metals may also be leached from phosphogypsum, as are radionuclides, and migrate to nearby surfaces and groundwater resources, that chromium and arsenic may also pose a significant health risk, and that a "number of potential constituents in phosphogypsum from some facilities…may cause adverse effects or restrictions of potential uses of nearby surface and groundwater resources" such as arsenic, lead, cadmium, chromium, fluoride, zinc, antimony, and copper.[282]

The approval authorizes the construction of roads using phosphogypsum with a radium content as high as 35 pCi/g, up to 2.25% phosphogypsum by weight in surface pavement and up to 50% phosphogypsum by weight in the road base.[283]

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[278] 15 U.S.C. § 4(a)(1)(II).
[279] Approval of the Request for Other Use of Phosphogypsum by the Fertilizer Institute, 85 Federal Register 66550 (Oct. 20, 2020).
[280] National Emission Standards for Hazardous Air Pollutants; National Emissions Standards for Radon Emissions from Phosphogypsum Stacks, 57 Fed. Reg. 23305 (June 3, 1992).
[281] EPA, *Potential Uses of Phosphogypsum and Associated Risk, Background Information Document* (1992).
[282] *Id*.
[283] Approval of the Request for Other Use of Phosphogypsum by the Fertilizer Institute, 85 Fed. Reg. 66550, 66552 (Oct. 20, 2020).

XIII. Other Federal Regulatory Programs Are Inadequate to Manage the Risk of Injury to Human Health and the Environment Posed by Phosphogypsum and Process Wastewater

Under TSCA §9, if a chemical substance's risk of injury to human health and the environment is managed effectively under a different statute, regulation under TSCA is not necessary. Section 9 also directs that if EPA determines that a risk to health or the environment associated with a chemical substance or mixture could be eliminated or reduced to a sufficient extent by actions taken under those other federal laws, EPA must use those other laws unless EPA determines it is in the public interest to protect against such risk by actions taken under TSCA.

With the exception of Subtitle C regulation under RCRA, from which phosphogypsum and process wastewater remain Bevill-excluded, other federal regulatory programs remain inadequate to manage the risk of injury to human health and the environment. The EPA has concluded that the Clean Water Act's NPDES permitting requirements govern point source discharges to surface waters, but not groundwaters.[284] The Safe Drinking Water Act's regulations apply only to public water systems, with limited enforcement at the tap. And the Clean Air Act's NESHAP remains minimally protective for radon emissions, containing no prescriptive requirements other than the numerical radon flux standard tested once at the time of closure and imposing no pollution control technology.

XIV. Feasible Alternatives to Current Phosphogypsum and Process Wastewater Management Are Available

Despite EPA's unsupported finding that there are no feasible processes to reduce the toxicity or volume of phosphogypsum and process wastewater production,[285] there are alternatives that EPA can explore after it fully evaluates the risk posed by these substances. These include, without limitation:

- Taking advantage of the high mobility of metal and nonmetal ions in phosphogypsum when leached by implementing a closure technique where the entire stack is rinsed with a "clean" but non-potable water, the leachate collected, and treated.[286]

- Requiring new stack expansions like the 231-acre expansion planned for New Wales to have double geomembrane liners and leak detection leachate systems in place.

- Requiring facilities to use the hemihydrate wet process rather than the dihydrate process, since the hemihydrate process produces less impurities in both the phosphoric acid product and phosphogypsum than the dihydrate process.[287]

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[284] EPA, *Interpretive Statement on the Application of the NPDES Program to Releases of Pollutants from Point Sources to Groundwater* (2019), https://www.epa.gov/sites/production/files/201904/documents/interpretative_statement_factsheet_41519.pdf.
[285] *See* Personal Correspondence, *supra* note 95.
[286] Carter, O.C. et al., *supra* note 38 at 200.
[287] EPA, *Background Report AP-42 Section 5.11 Phosphoric Acid* at 4, https://www3.epa.gov/ttn/chief/ap42/ch08/bgdocs/b08s09.pdf.

- Requiring reverse osmosis treatment for stored process wastewater and stack leachate.
- Requiring a soil, synthetic, or artificial turf cover for inactive portions of active stacks.
- Phosphate ore quality control, as the radioactivity of phosphogypsum is dependent on the radium content of the mined phosphate ore itself. Ore producing phosphogypsum with a radium-226 concentration higher than 10 pCi/g should not be mined in the first place.
- Phosphoric acid production limits to limit the amount of phosphogypsum generated.

XV. Conclusion

The damage already caused by phosphogypsum and process wastewater disposal is a consequence of this country's "most dramatic environmental regulatory loophole."[288] EPA's failure to establish specific regulations to control phosphoric acid production wastes as promised under either RCRA or TSCA is now over 30 years in the making. Given the substantial present and potential hazards to human health and the environment posed by these improperly managed wastes, EPA must reverse its Bevill regulatory determination for phosphogypsum and process wastewater and subject these hazardous waste mountains to RCRA Subtitle C regulations. Furthermore, given the magnitude of potential exposure, EPA must begin the prioritization process for a phosphogypsum and process wastewater risk evaluation under TSCA §6 and issue a §4 testing rule to develop information with respect to health and environmental effects relevant to an unreasonable risk finding for disposed phosphogypsum, and a TSCA Significant New Use Rule under §5 for phosphogypsum used in road construction.

[288] Kloeckner, Jane. 2010. Developing a Sustainable Hardrock Mining and Mineral Processing Industry: Environmental and Natural Resource Law for Twenty-First Century People, Prosperity*, and the Planet,* 25 J. ENVTL. LAW AND LITIGATION 123,131 (quoting *Oversight Hearing to Consider Whether Potential Liability Deters Abandoned HardRock Mine Cleanup: Hearing Before the S. Comm. on Environment and Public Works, 109th Cong. 70* (2006) (statement of Velma M. Smith, Senior Policy Associate, National Environmental Trust)).