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Committee on Environment  
and Public Works

Subcommittee on Chemical Safety, Waste Management,  
Environmental Justice, and Regulatory Oversight

Washington, D.C.

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EXAMINING THE IMPACT OF PLASTIC USE AND IDENTIFYING SOLUTIONS  
FOR REDUCING PLASTIC WASTE

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The subcommittee, met, pursuant to notice, at 10:04 a.m. in room 406, Dirksen Senate Office Building, the Honorable Jeff Merkley [chairman of the subcommittee] presiding.

Present: Senators Merkley, Wicker, Carper, Whitehouse, Capito, Sullivan, Ernst.

STATEMENT OF THE HONORABLE JEFF MERKLEY, A UNITED STATES SENATOR  
FROM THE STATE OF OREGON

Senator Merkley. Good morning. Welcome to the final hearing of the Subcommittee on Chemical Safety, Waste Management, Environmental Justice, and Regulatory Oversight in the 117th Congress.

To Ranking Member Wicker and the rest of the committee members, I appreciate your work and partnership over these last two years as we have examined a number of issues important to people here in the United States. Now, we are looking at another issue, the issue of plastics.

I am going to ask my team to hold up, I will have them hold up first, this photo, which I took when I was out jogging along the Anacostia River. The river is just choked with plastic. I took some other pictures when I was running on the Potomac after a high tide event, and the entire running trail is covered with millions of pieces of little tiny pieces of plastic. It is what we would never see, except the river overflowed onto the running trail, and when the water receded, it left this deposit.

On the day I was undertaking this marathon along the Potomac, there were people out there on teams, and they were picking up each little tiny bit of plastic because they were trying to separate them from all the leaves and all the grass and everything else. In the time that I was running the

marathon and went down the Potomac and came back, each volunteer, in a couple hours, had cleared a two-square-foot section trying to pick all these little tiny bits out, all these millions of bits that would have been washed into the ocean, or are washed in, on every other hour of every other day.

Another reason for us holding this hearing, I will have them hold up the other poster here, is that we have an emerging problem of microplastics. Plastics don't really degrade. They break down into tinier and tinier pieces. We are now seeing that these plastics are everywhere. As the headline says, baby poop is loaded with microplastics. The Antarctic, far away, has microplastics. Human breast milk has plastics. We find them deep in the lungs of living people.

What we know is that plastics are loaded with thousands of chemicals with different effects, and that those chemicals are not even disclosed to the public. Here, we have thousands of chemicals deep in our lungs, in our breast milk, in our consumption, and we don't really understand all of the effects of those chemicals, but it is certainly a cause for concern. That is why we are holding this hearing.

It is my sense that plastics may well pose a very significant risk to human health. I am struck by the fact that it is estimated that each of us consumes, in our food and in the air we breathe, the water we drink, the equivalent of a credit

card-worth of plastic every single week. Think about that of your children, consuming those, if you will, 52 credit cards a year, and all the chemicals that are embedded in that plastic, and ask yourself, do we need to thoroughly understand this issue as it affects human health? Certainly, I think we have a responsibility to our children, to the generations to come, to thoroughly understand this and address this challenge.

Twenty-five percent of the more than 10,000 chemicals associated with plastics pose potential health or environmental damages, including chemicals that mimic, block, or alter the actions of hormones, that reduce fertility, and that damage the nervous system. Through every stage of its life cycle, plastic can release these toxins. From the petrochemicals used in their production that workers and frontline communities are exposed to, to the ones that are released through regular plastic use, and finally, to the toxins that make their way into the air, the soil, the water, when the plastics are thrown away.

Most of us have heard of the three Rs: reduce, reuse, recycle. It sounds like a magical way to address this challenge, but here is the story with plastics: it is not three Rs; it is three Bs. They are buried, they are burned, or they are borne out to sea. That is quite a different picture.

Then, we have the notion that we have recycling bins, and we put plastic items into them, and yet, very few people know

that often, those recycling bins are simply combined with the trash. In many, many institutions, they are simply greenwashing, and if they are being brought to recycling operations, only about 9 percent gets recycled.

That means just a fraction of the plastics recycled. Mostly what you do when you put something into a recycling bin with plastic, you are not recycling. You are wish-cycling. You are making a wish and a hope that somehow this plastic will be recycled when it is not going to be recycled.

The risks and dangers associated with plastic production and pollution are not going away. In fact, they are going to get worse. Plastic doesn't break down; it just breaks up. In the last 60 years, the world has produced more than eight billion tons of plastic, where six billion tons of that has become plastic pollution, meaning the plastic that has been produced has ended up in the environment, and it is still there, forevermore. The United States' rate of production is expected to triple over the next three decades, another reason this committee should be taking a thorough examination of it.

We have something that has caused a lot of concern, and yet we are blindly en route to tripling its presence. I think that that is not an acceptable formulation for the accountability that we bear as legislators to the people of the United States.

Without serious changes to our recycling systems, such as

proper labelling or requirements for companies to use recycled materials in their products, our Nation will continue, simply, to be wish-cycling.

That is why we are here this morning, to see what options there are, to hear from our various folks testifying about approaches. I have introduced the Break Free from Plastic Pollution Act. It says, basically, yes, let us improve our recycling, to the degree that that will make a difference. Let us eliminate single-use plastic that is absolutely unnecessary in the first place.

Let us use more producer responsibility, such as we do with ink cartridges for printers, to have a system in place that ensures far more of the stream of waste actually gets recycled. Let us have a national bottle bill. The bottle bill in States like my State, Oregon, the first in the Nation to have a bottle bill, its recycling rate on plastic bottles is up around 90 percent. Many States are closer to 15 or 20 percent without such a bottle bill.

We are delighted to have this panel of experts, and now, I would like to turn things over to my colleague and Ranking Member, Senator Wicker.

[The prepared statement of Senator Merkley follows:]

STATEMENT OF THE HONORABLE ROGER WICKER, A UNITED STATES SENATOR  
FROM THE STATE OF MISSISSIPPI

Senator Wicker. Thank you, Mr. Chairman, for calling today's subcommittee hearing.

Today, we are here to consider the impact of plastic use as well as solutions for reducing plastic waste. I appreciate our witnesses for joining us this morning to discuss this important topic.

I want to particularly thank Matt Seaholm, the CEO of the Plastics Industry Association, for being with us today. He will be able to share with the subcommittee the importance of plastics in our modern economy. They are essential to our economy, and I think both sides of the dais will acknowledge that. He will also discuss steps that industry is taking to respond to concerns, such as the ones the Chairman mentioned.

Eric Hartz, President and Cofounder of Nexus Circular, will be able to share with the committee some of the solutions being developed in the private sector to respond to plastic waste. The production of plastics has been pivotal for a number of advancements in our modern world, particularly for public health and hygiene. This was especially apparent during the COVID 19 pandemic. Front line workers and many others deemed essential relied on personal protective equipment, or PPE, that often contain plastics. Items such as gloves, gowns, and face



shields, are for protection for our most vulnerable and hardworking individuals.

Single-use plastics were also essential for creating COVID 19 vaccines and tests, two developments that allowed us to return to normal sooner. When considering the use of plastics, we should keep in mind the vast range of benefits that have been provided for public health because of plastics.

As with aluminum and other products, the use of more plastics has led to discussions about their production and disposal. Some States and localities, as the Chairman has said, have taken steps to encourage shoppers to use reusable bags instead of single-use plastic bags.

Several States have established bottle buyback programs, encouraging customers to return their plastic bottles after being used. In addition, recycling and advanced recycling offer promising solutions for dealing with plastic waste.

However, lack of demand and contamination issues have kept recycling from realizing its full potential. Access to recycling is a problem. It is limited, if not completely unavailable, in many parts of the Country, including rural areas, such as many places in my home State of Mississippi.

Congress has taken steps to tackle these issues. We addressed contamination concerns when we included Senator Portman's RECYCLE Act in the Bipartisan Infrastructure Law.

This legislation, which is now is statute, creates a new grant program to fund recycling education, with a goal of reducing contamination.

We also addressed recycling access issues when this committee and the Senate passed Ranking Member Capito's Recycling Infrastructure and Accessibility Act. This legislation seeks to make recycling easier and more accessible throughout the United States, particularly in underserved areas.

Congress also passed Senator Sullivan's Save Our Seas 2.0 Act in 2020, establishing a new grant to support improvements to municipal recycling programs.

Advanced recycling is another potential solution for plastic waste. This method of recycling dismantles plastics into their constituent parts, allowing for more materials to be repurposed. Advanced recycling technology can also extend the life of existing materials so that fewer virgin materials have to be used.

Notably, this method, advanced recycling, allows many previously unrecyclable plastics to be processed while also dealing with contamination issues. These advancements are important to keep in mind as we look to the future of plastics and continue to work to reduce plastic waste.

Thank you, Mr. Chairman.

[The prepared statement of Senator Wicker follows:]

Senator Merkley. Thank you very much.

We are going to turn now to our witnesses. I will first introduce Dr. Pete Myers, the founder, CEO, and Chief Scientist of the Environmental Health Services. We look forward to hearing your testimony.

Mr. Myers, the floor is yours.

STATEMENT OF JOHN PETERSON MYERS, PH.D., FOUNDER, CEO, AND CHIEF  
SCIENTIST, ENVIRONMENTAL HEALTH SCIENCES

Mr. Myers. Thank you very much, Chairman Merkley, Ranking Member Wicker, Senator Whitehouse. It is an honor to be in front of you today to provide testimony. As you said, my name is Pete Myers. I am founder, board chair, and chief scientist of Environmental Health Sciences, a C3 that promotes public understanding of the intersection between health and the environment.

I am also an adjunct professor of chemistry at Carnegie Mellon University and a founder and a board member of Sudoc.com, a chemical company building out sustainable chemistry.

You have invited me here today to talk about plastics and human health, right in my sweet spot. I have been doing it for a long time. I will summarize some of the key concepts in the science and then provide specific examples of where chemicals leeching out of plastics have harmed human health. I can't cover it all in five minutes because there is so much more, so please look at my written testimony.

Endocrine disrupting compounds, which Senator Merkley mentioned, are a key part of the story. They are not the only chemical hazard in plastics, but because they cause harm at such extraordinarily low doses, I will focus on them this morning.

What are endocrine disrupting compounds, EDCs? They hack

hormone signaling. Hormones are the messaging system that tells genes when to turn on and off. They affect literally all physiological processes throughout our bodies. They make sure the fetus grows up to a healthy adult. They also work to ensure that healthy adults age well.

When hormone signals are hacked, bad stuff happens. That is what endocrine disruption is about. We are exposed to hundreds of endocrine disrupting compounds throughout our lives, including from plastics. Many chemicals leeching out of plastics are EDCs. That links them to a wide array of today's epidemics of non-communicable diseases, like breast cancer, prostate cancer, testicular cancer, infertility, immune disorders, and brain impediments, including ADHD and autism.

Toxicity in plastics, you have to understand, comes from three different sources. One is the basic building block of plastics, what is known as the polymer, what becomes the chain that makes a plastic. Then you have the additives that are infused into the plastic that is composed of monomer. These molecules, like phthalates, alter the material characteristics of the plastic.

Finally, you have chemicals that were not intentionally added, and these are really important, but most people are unaware of them. They are the result of impurities in the reagents that are used to make the plastics originally. Those

impurities come from many different sources. They often can't be controlled, and it is really expensive to remove them. If you were to spend the money to remove them, plastic would be much more caustic.

Most chemicals in plastics have not been tested for safety. None have been tested thoroughly, but if you don't test, you don't know if they are safe. If you don't test, you don't know. That is one of my core messages: you must test. If you take a random sample of plastics from consumer shelves, about 75 percent of them will show at least one toxic feature, 75 percent, off the shelf.

Also, you can't assume that bioplastics are safe. Some are definitely not. You have to test to determine what is safe and what is not.

I studied endocrine disruption for 30 years. In 1991, I even gave it that name, endocrine disruption. In 1996, I coauthored the first book for the general public about endocrine disruption called *Our Stolen Future*. Since then, over a billion dollars and euros and yen and whatever need be, have been invested in EDC research around the world. Tens of thousands of scientific papers have been published in the peer-reviewed literature. We know so much more now than we did in the early 1990s.

Senator Merkley. Please feel free to hold on for a moment

while we figure out what happened to the lights.

Mr. Myers. I must have said something shocking.

[Laughter.]

Senator Merkley. Somebody doesn't like your testimony, apparently.

There we go. Now we are all now collectively enlightened. Thank you, please continue.

Mr. Myers. What we know now, after all that research, tells us that it is much worse than we thought when this discipline began, much worse. The ubiquity of EDCs in plastic and the abundance of plastic everywhere is a major factor in why it is worse.

Let me give you four quick examples, or at least start on four quick examples before my time runs out. One: data showed that, over the last five decades, there has been a 50 percent decline in sperm count in adult men. The original studies have only focused on men in the developed world, but just this past month, a new study came out that expanded it to the developing world also, and what it showed is the rate of decline is speeding up. It is not slowing down. It is global.

It is not just sperm count. Other features of male and female infertility are worsening also. If the current rate of sperm count decline continues, the average sperm count will decline asymptotically towards zero by the 2040s. That is not

very far off. Reproducing the old-fashioned way will become much less common. It just won't work.

To add injury to injury, some plastic chemicals interfere with artificial reproduction technologies, which, to begin with, are quite expensive. That is one.

Two: brains are being rewired by certain plastic chemicals. This has been proven definitively in animal experiments where you can take the brain apart. Epidemiological studies of kids whose mothers were monitored for chemicals during pregnancy shows patterns predicted by these experiments. Not always, but most of the evidence is consistent. ADHD and autism are part of the picture.

I will end with this. One expert in how thyroid hormone is key to proper brain wiring and how EDCs hack thyroid hormone has written that "Unless the long-term exponential increase in autism is stopped by 2045, one in two children born in the U.S. will be on the autism spectrum." Think about what that means for society.

I have several other examples I could go on about. Why do so many men have trouble peeing in the bathroom as they grow old, or some really interesting work on how chemicals interfere with breast cancer treatment, but I will stop here.

I look forward to your questions.

[The prepared statement of Mr. Myers follows:]



Senator Merkley. Thank you very much for your testimony.  
I do encourage people to read your full written testimony.

We are now going to turn to Ms. Enck. You serve as  
President of Beyond Plastics, and former EPA Regional  
Administrator for Region 2. The microphone is yours.

## STATEMENT OF JUDITH ENCK, PRESIDENT, BEYOND PLASTICS

Ms. Enck. Good morning, Senators. What an honor to be with you. Thank you for holding this hearing. It is so timely, and so vitally important that we get to solutions.

I am Judith Enck. I use she/her pronouns, former EPA regional administrator, founder of Beyond Plastics, and I am on the faculty at Bennington College in Vermont.

On the off chance that you are not riveted by my 22-page testimony today, I want to direct you to page eight, with a great cartoon by Liza Donnelly. There is a guy or a gal looking out the window with their daughter, saying, "Someday, daughter, all of this will be yours, and you will have to deal."

I included that cartoon because it is a reminder of what is at stake, that we cannot leave our kids and our grandchildren with this enormous problem of plastic pollution. There are solutions. I can go on forever with solutions we can grab off the shelf today.

There are also false solutions being promoted by the plastics industry, which I hope we can get into, which is chemical recycling, or advanced recycling. You all know, you open a package that you order on Amazon, for instance, it arrives really over-packaged, so much stuff you don't need. And in fact today, the prestigious national group, Oceana, put out a report on how much plastic packaging is produced by Amazon.

Amazon, we need you to do much, much better.

Oceana also commissioned a poll. Eighty-two percent of voters want you to adopt laws to reduce plastics. The poll results were bipartisan, Republicans, Democrats, Independents. When I served at the EPA, I met many people who were climate change deniers. I have never met a plastic pollution denier, because the evidence is everywhere. You walk down the street, you see plastic bags in the trees.

I also want to go on the record by saying, there are some uses of plastic. But we don't see medical waste hanging from trees. Medical waste, by the way, is a small percentage of plastic production.

Cars are more efficient if they have some plastic, making them lighter. I don't see car bumpers in my local park. I see a lot of single-use plastics.

This is a climate change issue. My organization did a report called *The New Coal: Plastics and Climate Change*. We looked at production, use and disposal of plastics, and learned that in the next decade, greenhouse gas emissions from plastics will exceed that of coal.

I support recycling. I started my town's recycling program over 30 years ago. Everyone should keep recycling metal, glass, cardboard, aluminum. However, plastic recycling has been an abysmal failure. It clocks in at under 10 percent.

I quickly want to explain why. If you take a newspaper and you put it in the recycling bin, it can then be recycled into a new newspaper. There are many, many different plastic resins, as Dr. Myers said, thousands of different plastic chemical additives in plastics, and many different colors.

In your own home, your washing machine probably has on top of it a bright orange detergent, hard plastic. In your refrigerator, you have a clear squeezable plastic. Those two cannot be recycled together. When the plastics industry says they can use chemical recycling and create new plastics, that is not true. What they are mostly producing is fossil fuel. That is the last thing we need, is more climate-warming fossil fuel.

Also, it is just not dealing with a large percentage of plastics that are out there. This is very much an environmental justice issue. Plastics are produced in environmental justice communities, places like Cancer Alley in Louisiana, where there is a concentration of petrochemical facilities.

These communities, typically low-income communities of color, are so overburdened on both the production side, and then because so little plastics actually get recycled, when it comes to disposal it is these same communities that are homes to landfills and incinerators.

We need to cut plastic production by 50 percent in the next 10 years. We can do it. Pass the Break Free from Plastic

Pollution Act, pass the National Bottle Bill, pass a sensible law called the Plastic Reduction and Recycling Act, also known as EPR, which has been introduced in State legislatures around the Country. We don't need a magical breakthrough. We need reduction, refill, and re-use. And if you absolutely cannot reduce or refill and re-use, then rely on paper, metal, glass. Get the toxics out, particularly out of the paper. Make sure that material is made from recycled content and are easily recyclable.

Local governments are drowning in plastics that you can't recycle. If you are a fiscal conservative, you should embrace plastics reduction. We have to be honest: plastics recycling isn't working. It is having a devastating impact on health in the communities where it is manufactured. Reduction is the way to go.

The Federal Government could start using real dishes in all of all of its facilities, rather than single-use plastics. Schools need funding to install dishwashing equipment, to stop serving children on single-use, for instance polystyrene trays. How about public drinking water fountains everywhere you go, so you can fill this up rather than wasting your money on plastic water bottles?

Funding is key. When you look at infrastructure, I urge you to think about putting funding for States and local

governments into a re-use, refill infrastructure. Right now, local governments can't control everything that is coming at them. But packaging companies have choices to make. Are they going to provide sustainable packaging, or more and more multi-material packaging, that is either littered, buried or burned?

You and I don't want to use so much plastic. But we have little choice, which is why extended producer responsibility with teeth goes a long, long way.

[The prepared statement of Ms. Enck follows:]

Senator Merkley. Thank you very much for your testimony. Each of our first two witnesses went two minutes over their time, so we will establish the same possibility, should you wish to use it. We will next turn to Mr. Matt Seaholm, who serves as CEO of the Plastics Industry Association.

Senator Wicker. But in five minutes, we are going to turn the light out.

[Laughter.]

STATEMENT OF MATT SEAHOLM, PRESIDENT, PLASTICS INDUSTRY  
ASSOCIATION

Mr. Seaholm. Any distraction is welcome.

Good morning, Chairman Merkley, Ranking Member Wicker and esteemed members of the committee. Thank you for the opportunity to appear before you today.

My name is Matt Seaholm, and I am the President and CEO of the Plastics Industry Association. Founded in 1937, we represent the entire supply chain of the plastics industry in which nearly one million Americans are employed. Our membership includes material suppliers, equipment manufacturers, processors, and recyclers.

Let me first say we appreciate the commitment of this committee to pursue solutions that reduce waste. There is a saying in our industry, we love plastic, we hate plastic waste. The way we see it, any molecule of plastic material that leaves the economy is truly a waste. We need to collect, sort, and ultimately reprocess more material. And that goes for all substrates, not just plastic.

But today's hearing is first about the impacts of plastic use. So I would like to discuss a few of those, more importantly, the variety of people impacted. A husband hit head on at 50 miles per hour, and even though they had to cut him out of the car with the jaws of life, he surprised even the medics



onsite as the deployment of air bags made from plastic fibers left him unharmed. A teenager who only has access to nutrition thanks to plastic packaging because he lives in a food desert right here in our Nation's capital.

A retiree with Type 1 diabetes since childhood who remains active because of the sterile, interchangeable plastics used to support decades of treatments through the loss of kidney function. A young family without running water for an entire week because a hurricane flooded their neighborhood along the Gulf Coast, but were not thirsty because of plastic water bottles delivered to them in their time of need. A single mother who, during a crucial time of the baby formula shortage, was able to utilize pre-sterilized milk collection bags to safely store breast milk for her baby.

The list can go on and on. Before it is suggested, these aren't the types of applications truly at the heart of the discussion, I would point to three pieces of proposed legislation in this Congress that have called for the stoppage of production of plastics used in each of these scenarios.

If there is one thing a pandemic and now war on the European continent has taught us, stable supply chains are imperative. Producing plastic in America is a good thing and something that I believe should be embraced as essential, not abruptly stopped.

Plastic has become a preferred material in most applications because it uses the least number of resources to manufacture and transport as well as providing greater performance. However, we must also acknowledge that the incredible innovations in plastic materials and products have outpaced our ability to recycle them because infrastructure has not kept up. Our Nation's recycling rates are too low. That is why companies across our supply chain work tirelessly to improve recyclability and invest billions of dollars into the prevention of waste and the technologies to recycle.

However, our industry does not control the entire value chain of recycling in America. That is why we need partners to help get these rates where we all want them to go.

We see Congress as a very important partner in that process, and appreciate this hearing for the opportunity to talk about solutions to reduce plastic waste. A few policy approaches I might suggest: increase investments in critical recycling infrastructure to ensure the collection, sortation, processing that can keep up with the complexities of all materials in the marketplace. The EPA has started their process for granting resources included in the Infrastructure Investment and Jobs Act that stems from Save Our Seas 2.0 legislation passed in 2020. It is a great start, but certainly more is needed.

Promote end market development for the variety of plastic resins to ensure demand remains for recycled materials. Reasonable and attainable recycled content requirements can help spur investment and guarantee markets for recyclable material.

Encourage innovations in recycling technologies to ensure materials that cannot economically be recovered through traditional methods can still be recycled, moving us toward a more circular economy. But perhaps more importantly, I urge Congress to avoid stifling innovation and promising new technologies that are absolutely needed.

There is already real value in post-consumer plastic. These policies will help us better capture and keep it in our economy. At the end of the day, plastic is essential, plain and simple. We need it in our lives. But America does not recycle enough of it. Our industry wants to recycle more, and that is why every day we recycle more than we did the day before.

Working together, I know we can get these rates up. And together is the most important word in that sentence. I hope that is the spirit of today's discussion.

I thank you again for the opportunity to offer testimony on behalf of our industry. I look forward to answering your questions.

[The prepared statement of Mr. Seaholm follows:]

Senator Merkley. Thank you for your testimony.

Now, I would like to introduce our final witness, Mr. Eric Hartz, the co-founder and CEO of Nexus Circular.

## STATEMENT OF ERIC HARTZ, CO-FOUNDER AND CEO, NEXUS CIRCULAR

Mr. Hartz. Good morning, Chairman Merkley, Ranking Member Wicker, Senator Whitehouse, and other members of the subcommittee.

My name is Eric Hartz. I am co-founder and President of Nexus Circular. We are an advanced recycler that transforms used plastics for re-use with the objective of reducing plastic waste. While there are a variety of companies that process used plastics, Nexus Circular is unique. I am here to discuss what Nexus does and appropriately, what it does not.

I appreciate the opportunity to provide information to subcommittee members regarding our real, proven solution to the challenge of used plastics. Nexus Circular is a commercial-scale solution today that handles a wide array of plastics, including hard to recycle films that most recyclers cannot.

We convert these plastics in one single heating and cooling cycle to produce products that our partners can convert into virgin equivalent plastics using the same equipment they use to produce plastics today. Nexus does this without chemicals catalysts, water, special treatments, or burning.

Since our founding by Jeff Gold, our team has been laser focused on taking used plastics and turning them into circular products safely, economically, and with the ability to scale in a way that has a positive impact on the environment and the

communities we serve. We have an experienced, passionate team that is literate in chemistry, operations, engineering, logistics, safety, and finance.

Our philosophy from the start has always been, if our technology is not economically, environmentally friendly and scalable, then it will fail to provide the solution to the plastics challenge we all seek.

The used plastics we accept are not waste. They are materials that have been segregated from the waste stream and are often bound for landfills. We do some light sorting for suitability. We cover a broad array of plastics: polyethylene, polypropylene, polystyrene, and as mentioned, an expertise in hard to handle recycling films. All can be mixed together and there is no special recipe.

We heat the used plastics in the absence of oxygen at 580 to 750 Fahrenheit. At this temperature, the plastics not only melt but they depolymerize, breaking down at the molecular level. Turning into vapors, they are then cooled into circular liquids in an entirely closed system. These liquids are then made into new virgin equivalent plastics by our partners.

It is also why advanced recycling is referred to as molecular recycling. Because we recycle at the molecular level, these plastics can go through this process again and again indefinitely. Our products and those of our partners represent

a true circular plastics economy.

There is no burning, gasification, nor incineration, which all occur in the presence of oxygen at much higher temperatures of 1,800 to 2,700 Fahrenheit. Some mistakenly equate advanced recycling to incineration. Besides being three to four times hotter, incineration requires oxygen, whereas our process has practically none. Actually, our process would fail with oxygen present, since it would not yield sellable circular outputs.

Our land facility operates in compliance with all Federal and State laws in an industrial park in Fulton County, Georgia, a Clean Air Act non-attainment area under the purview of the EPA at the Federal level, and permits from the State of Georgia. We and our partners are ISCC Plus certified and follow audit procedures ensuring all materials are recycled. Our operating footprint is small, so we can site our facilities in similar areas across the Nation.

Advanced recycling complements mechanical recycling. It does not compete. The recycling hierarchy remains the same: reuse, repurpose, if necessary, mechanically recycle, which is melting and reforming of plastics, now if able advanced recycling, which is recycling at the molecular level, and if absolutely necessary, landfill.

Further, this is not an either-or solution. It is a both-and, meaning our approach supports both converting used plastics

into new ones and finding ways to reduce plastics where merited.

The demand for Nexus Circular's output far outstrips supply, because plastics producers have set ambitious recycled content goals to meet the demand of their own customers who ultimately down the line make products for consumers. We are proud to provide all of them an environmentally friendly job-creating approach while concurrently addressing the plastics challenge that impacts us all.

In short, our advanced molecular recycling process is an elegant solution to a seemingly intractable problem. It is lights out. But please, don't just take my word. We cordially invite all of you, any time, to visit our commercial scale operation in Atlanta, just 20 minutes from the airport or downtown. Once you see firsthand what we are doing, how we are doing it, and most importantly how it differs from what some think, we believe it will clear up any confusion about our approach.

Better yet, we expect it will generate true excitement about the potential of providing a real solution to addressing the used plastics problem.

Innovation is never easy. Chairman Merkley, as you will appreciate, this is a marathon. We have started this run together, and we are here to solve it together as well.

I appreciate the opportunity to share our on the ground



experience. I look forward to your questions and comments.

Thank you.

[The prepared statement of Mr. Hartz follows:]

Senator Merkley. Thank you very much for your testimony.

We will now have five-minute rounds of questions. We might be able to get through a couple rounds if we are fortunate. I encourage you to keep your responses as succinct as you can so that we can get through as many points as possible.

Mr. Myers, I am going to start with you. You made reference to the endocrine-disrupting chemicals in plastics. Are plastic producers required by law to inform the public of all the chemicals that are in the different plastics they produce?

Mr. Myers. Not only are they not required by law, but it would be physically impossible. Because many of the compounds in plastics are what are called non-intentionally added substances, which get there basically by accident. They get there because they are impurities.

Senator Merkley. In terms of the chemicals that are added deliberately, for flexibility, for hardness, for colors, are those required to be disclosed to the public?

Mr. Myers. To my knowledge, they are not. It would be a good move if they were required.

Senator Merkley. Mr. Seaholm, do you support full transparency for the chemicals that are added to the plastics that go into the public realm?

Mr. Seaholm. We have full faith in the FDA's approval and

decision-making process. When it comes to food contact in particular, we never cut corners when it comes to safety.

Senator Merkley. So you support full disclosure of all the chemicals that go into the plastics that go into the public realm?

Mr. Seaholm. I guess it depends on which kind of plastics you are referring to. But if you are talking about food contact, which is really where safety comes first and foremost, I think the FDA approval process is certainly sufficient. We participate and fully support it.

Senator Merkley. Okay. I appreciate your point about those things that come in contact with food. But certainly, one of the challenges we have is all the other plastics degrade and have a huge impact that aren't touching food as they become microplastics, as they release chemicals over time.

I want to go to the impact that you noted, Mr. Myers, over the question of those specific chemicals that affect human reproduction. During my lifetime, we have seen a big increase in breast cancers, a big increase in prostate cancers. You noted a 50 percent decline in male sperm production.

Now, are all three of those related to the presence of endocrine disrupters in the products that are released into the public realm?

Mr. Myers. All three are predictable consequences of being

exposed to certain endocrine disruptors. But they aren't all three due to the same endocrine disruptor. It is a very complicated system. There are hundreds if not thousands of EDCs. They all have their unique characteristics of harm.

Senator Merkley. A few years ago, there was a whole movement across the Country saying, well, one in particular, not being a chemist, maybe I will mispronounce it, bisphenol A?

Mr. Myers. Bisphenol A.

Senator Merkley. Bisphenol A, or BPA, as it came to be called in the public realm, it was like, wow, we have to get this out of the lining of our tuna cans, and oh, my goodness, how about out of water bottles too. Has that actually changed by law, or is it just that some makers of water bottles now advertise that they are BPA-free?

Mr. Myers. One BPA product that has been eliminated by the FDA in the market is baby bottles. But that was done at the behest of manufacturers of baby bottles, because they were getting such bad press from all the big stories about BPA harm. Most products that include BPA have not been removed from the market.

Senator Merkley. So what about the water bottles that we buy in the store?

Mr. Myers. Those are largely motivated by marketers, by companies who have an alternative to BPA and want to advertise

that they are BPA-free. The problem is that most common replacement for BPA in water bottles is BPS, which is a minor variant on BPA. Subsequent research since that substitution became known has shown it is just as bad, if not worse, than BPA.

Senator Merkley. So you also mentioned in your written testimony phthalates and perfluoroalkyl compounds. Is that the same as PFAS?

Mr. Myers. Yes, it is.

Senator Merkley. So we have PFAS in plastics, we have phthalates. But I can't pick up a piece of package recycling that is going to exist in the universe for thousands of years to come and find out how much PFAS is in it, or phthalates are in it, because that disclosure is not required, isn't that right?

Mr. Myers. That disclosure is not required. Actually, there are loopholes in the FDA requirements for what you disclose in food packaging content. The common practice of fluorinating high-density polypropylene with fluoridation is not widely known, but is very common.

Senator Merkley. I have one second left, so I am stopping and I am going to encourage my colleagues to please stop at five minutes, since we have quite a few members who are here to ask questions.

Senator Wicker?

Senator Wicker. Thank you very much, Mr. Chairman.

Mr. Myers, some very startling testimony about male sperm count basically being ineffective by 2040, brain wiring, autism being caused by this.

Is it your testimony that there is scientific documentation that lower sperm count is being caused by plastic waste?

Mr. Myers. There is extensive scientific documentation. I would refer you to a book called Count Down by one of the principal scientists involved in those studies, which not only documents the study, which is published in the peer-reviewed literature, but also the book explains what is the basis of the evidence for including plastic chemicals as part of the causation.

Senator Wicker. And the same for autism?

Mr. Myers. Yes.

Senator Wicker. Okay, now, Ms. Enck, is it your testimony that plastic production should be cut by 50 percent in 10 years, or plastic pollution?

Ms. Enck. Production.

Senator Wicker. Production, okay.

Ms. Enck. Yes, because of the impact in low-income and minority communities where the production is taking place. If you cut the production, we will get what we all want, the reduction of pollution.

Senator Wicker. Mr. Seaholm, how about that? How practical is that? What do you say to the testimony that there is scientific documentation, peer-reviewed, concerning autism and sperm count?

Mr. Seaholm. Thank you, Senator. First, on the production question. If we don't produce plastic in the United States, it is going to be produced elsewhere. The likelihood that it is going to be produced with some sort of better environmental standards is unrealistic.

So the best thing for us to do is actually produce the plastic here. We can certainly talk about reduction, recycling, and re-use all day long. But actually stopping the production of it is really going to be detrimental.

Senator Wicker. What about 50 percent reduction?

Mr. Seaholm. One, it is not attainable. Nor should it be. It would absolutely cripple supply chains and economic progress in the United States.

On your second question, I think Dr. Myers in his opening statement actually said, most have not been tested, few have been tested thoroughly. I think to respond to that with, has there been significant scientific evidence, I think for the vast majority of the discussion on chemicals, no.

One thing I would say is in Senator Merkley's recently-introduced bill, there are studies that would be funded for it,

and we would welcome studies to be done looking at things like microplastics. Because there isn't sufficient scientific evidence to report the claims.

Senator Wicker. Mr. Hartz, with regard to your high temperature procedure that doesn't include oxygen, has that been peer-reviewed? Has anyone reviewed that and what do outside sources and scientists say about what you are doing?

Mr. Hartz. Thank you, Ranking Member Wicker, I appreciate the question. I think first we are talking about a two-tier problem here. One is plastics production, the impacts that it has, how it ends up in oceans, coming from land, of course.

Then the second is what we do with the plastics that are there. With all due respect, we don't actually run at a high temperature, relatively speaking. We actually, incineration occurs at a much higher temperature, so pyrolysis, the concept has been around since the 1960s. It has been something that has been involved.

The challenge has been doing it efficiently and doing it environmentally. That is beyond kind of peer-reviewed in that we are judged by the marketplace. The companies that we work with are also sincere about addressing this issue as well. They want to make sure we are doing it the right way.

So there are a couple of things that come into play. First, the efficiency side is we only heat once and cool once.



We do it at a lower temperature that doesn't incinerate. And we make a product that is clean and pure enough to run through the current plastics production system. That is the best review you can get. We have a very tight spec we have to meet.

Then secondly, on the environmental side, our footprint is quite small as a result. This has been something that has been scientifically reviewed for some time. But you have to go beyond the technology, because it is really about how you do it economically, or else we are not going to have an answer that --

Senator Wicker. Are you able to scale it yet?

Mr. Hartz. We are actually able to scale. We are running a commercial scale operation today, and again, invite anyone in this room to please come visit us and see it.

Senator Wicker. Ms. Enck, have you visited them, and what is wrong with what Mr. Hartz said?

Ms. Enck. I have not visited. What is wrong is they are super-heating or almost boiling plastics. There is very little plastic actually being handled by chemical recycling facilities. Currently only 0.26 percent of the plastic waste is handled by this technology. The plastics industry has suggested they want to have 150 plants in the U.S. That would only handle 5 percent.

Senator Wicker. Mr. Hartz, what do you say to that?

Mr. Hartz. Without being flip, any innovation has to start

somewhere. Low-flow toilets, when they started, had to be produced at small volumes to get to larger ones. When you can prove scalability, that is the cusp that we are on now. That is the job we have made about being efficient and environmentally friendly. That is where we are headed now.

So we actually believe, our footprint is quite small. We can go near the feedstock; we can multiply the plants that we have and we can process that material. I agree with Ms. Enck, this is a problem that is enormous. Even if we are successful on our own, we are not going to solve it alone. Our cohort needs to solve it together. There is a way to do that.

Senator Wicker. Thank you, Mr. Chairman.

Senator Merkley. Senator Whitehouse?

Senator Whitehouse. Thank you very much.

Let me first welcome the witnesses and agree with our Chairman, that plastics in the environment is an under-appreciated threat to wildlife, to the quality of life, and to human health. So I am really pleased that we are having this hearing to elucidate those things.

Senator Sullivan is here, and he and I have worked together to get some bipartisan legislation done with respect to marine ocean plastic. We have done, I think, extremely well considering the constraints we began with, which is, Congress had never regulated in this space before, and we are going to

have to pass our bill by unanimous consent. Considering that, I think we have actually gotten a lot done, and I look forward to continuing to work with Senator Sullivan on Save Our Seas 3.0, which our staffs are in discussion on right now.

Particularly 2.0 also created a platform that allowed the United States to move forward in the international arena. I think the Nairobi deal is positive. The U.N. process is very promising. We need to lean in very hard, because I am sick to death of reports coming out of the ocean plastics meetings that the U.S. was the weak link and the laggard. We need to move from being laggards to leaders. I am hoping that with Secretary Medina's initiative, we will be doing that.

I share Ms. Enck's view that plastic recycling is essentially phony. As Mr. Hartz said, even if we can get to something effective with high-temp or chemical recycling, it is still only a very small piece of a much broader solution that we need.

So it is not a panacea that allows us to take our eye off the ball, the fact that we are flooding our work with plastics. There may be no constituency for the albatross here or other seabirds, but when essentially every caught seabird has plastic in its gut, it is a signal from Mother Nature that we need to pay attention here.

I offer anybody the chance to respond to my comments in the

way of response or a question for the record. I would flag that in addition to the plastics problem on the land and in the human environment, we also have a really significant ghost fishing gear problem. Because plastic fishing gear lasts forever, and after people lose it, the long lines keep catching fish, the nets keep catching fish. They are just massacres flowing through the ocean.

We need to make sure that it is very lucrative for a fisherman, when they get near ghost gear, to haul it out of the water and have that be their catch for the day. Because that will help clean up our oceans a lot.

The last thing I think I will mention is that we can do a lot more here. The industry can do a lot more here, particularly if you look at the areas of industry leadership. You know that it is feasible when industry is already doing it.

I was in Norway at the Our Oceans conference when Unilever announced its pledge, it is a major seller of goods, major distributor of plastic and packaging, and they made the pledge that for every pound of plastic that they put out into the economy, they were going to find a pound of plastic in the ocean or in the environment, and get it back and dispose of it properly.

To me, at the moment, I think that is the corporate high point for responsibility. I would like to see every major

plastics manufacturers make that exact same commitment and then we can look on what else needs to be done.

But it is to me a little bit ridiculous when we have a problem of this magnitude and an industry that is responsible for it that when the industry sets a high-water mark of good behavior, the rest of the industry isn't already there with them right away.

So I think we need to take this a lot more seriously. I am very grateful to Chairman Merkley for having this hearing. Again, I have used my limited time here to make those points. I encourage anyone who has a response to them to feel free to respond to me in the nature of a response to a question for the record, because my time is out. QFR responses have to be written. So I see your hand up, Mr. Myers, but I am afraid I have run out of time.

Senator Merkley. You can respond in 10 seconds, then it Senator Capito's turn.

Mr. Myers. Senator Whitehouse, we are a both-and solution. We agree that it is a large problem, and that we can do it that way. Secondly, Judith, I think you quoted Mario Bono, and I agree with the quote, that zero waste done perfectly by a few is not enough. But zero waste done by millions imperfectly would be great. Regulatory and other behaviors that we can incent would be great to do that.

Senator Merkley. Mr. Myers, you are at 20 seconds.

Mr. Myers. I think it would be useful if members of the committee, if they are not already familiar with it, examine the chemical strategy for sustainability implementation in the European Union. It answers a lot of the questions that we have been talking about today. It is the best thing that is happening in the world right now on these issues.

Senator Merkley. Thank you. Senator Capito?

Senator Capito. Thank you, Mr. Chairman, and thank the witnesses for being here today.

I have a big interest in recycling. We have had hearings on recycling in more general terms, not just focused on plastic. We see some other industries have been very successful in recycling for many, many years. I will use the paper industry as an example of that.

Chairman Carper and Senator Boozman are the Senate Recycling cochairs. Senator Lummis and Senator Merkley and I are members of that. We also have two recycling bills; I am going to shout out to the House and ask them to try to get those moved.

Some people would say that recycling is kind of a myth and sort of a scam. So Mr. Seaholm, I would like to hear what your response is to that. In terms of one of the comments that I heard, Ms. Enck, to stop the production of plastics. You look

around, I am sure this sweater probably has some, certainly this has. You can't even look anywhere without seeing plastic somewhere.

Is there a movement in your business to even consider this? Let's talk recycling first, and then manufacturing.

Mr. Seaholm. Thank you, Senator. No, recycling is not a myth. Nor is it phony. I think Mr. Hartz would probably take umbrage to that as well.

But we don't do enough of it. We recognize that. Recycling is not a single act. It is a system. It is a process.

But I have to tell you, I have been to dozens of facilities where they are actually reprocessing the material. I ask them all the same question: what is keeping you from expanding? The answer is always availability of material. Availability of feedstock. They can't get enough material. That means there is a breakdown in the system of just getting the material there.

So to the thousands, tens of thousands of hardworking men and women in the recycling industry, absolutely not a myth. But we have to grow it.

Senator Capito. I would say too, that is a point of several of our bills, is to get recycling into smaller and more rural areas. We have heard this, you said it nicely, we need more materials. Some people say we need more trash.

If I look at just computers alone, the old computers that we had back when our kids were going through school, what do you do with all of that. I don't know, Mr. Hartz, is that the type of recycling that you are doing? Why is your technique called advanced recycling, as opposed to just recycling?

Mr. Hartz. Senator, to answer the second question first, thank you, by the way, Senator Capito. Advanced recycling is a nomenclature I think that kind of became what it was. The reason I refer to it as molecular recycling, I think that makes it sound really complex. But the fact that we are operating at the molecular level allows this to be done repeatedly over and over. These plastics can come back.

I share that in theory, all plastic currently above ground is all we would ever need if we do this properly. To Senator Whitehouse's point, that doesn't solve the production issue, that doesn't solve the size of the problem. If we can do that concurrently, back to the both-and point, I think that would be great.

In terms of types of plastic that can go through, there are also some misnomers sometimes. The chemistry is that polypropylene, polyethylene and polystyrene are the ideal plastics to go through the system. And there are ample amounts. Films are also incredibly difficult for mechanical recyclers. It fouls their equipment. They don't want to see it, which is



why we complement what we are doing.

But if someone says, gee, we take all plastics, PET is an oxygenated plastic. You are going to get char, you are going to get benzoic acids, other things that clog your system. PVC has chlorides in it. We have to meet a parts per million spec, so we want to avoid those as well.

So you can't just say, gee, we will take all plastics. But the system is such that we can get the plastics we need, and concurrent with that, build an infrastructure and habit set that allows the plastics to come to us, and we have an answer to the problem.

Senator Capito. I would encourage this. What is the percentage now of plastics that are recycled? Was that the .026?

Ms. Enck. It is 5 to 6 percent.

Senator Capito. Five to six. I will go back to the paper industry. I think they testified 80 percent. I might be wrong on that.

Ms. Enck. About 65.

Senator Capito. They have been doing it a lot longer, too. So I think that goes to your point, Mr. Hartz, you have to start small before you can get big. So I appreciate you all coming in today.

Thank you, Mr. Chair.

Senator Merkley. We are checking on our supply stream of Senators here.

[Laughter.]

Senator Merkley. Senator Sullivan was here, is he ready to step in? Senator Duckworth is not on right now, and Senator Carper is on his way. So if Senator Sullivan would like to step in, if not, I am happy to ask a question. Senator Carper is here.

While we are waiting for Senator Carper to arrive, Mr. Hartz, you have a permit to, you sought through Georgia Environmental Protection Division to be able to emit hydrochloric acid, is that correct?

Mr. Hartz. I am not sure when you are saying emit hydrochloric acid. We have a general permit for air, for water, and that may be part of that.

Senator Merkley. It is. I just wanted to note that, because it sounded from your testimony like it is a closed loop, nothing escapes. Were you not cited for violations in your emissions in two quarters of the last year, 2021?

Mr. Hartz. Actually, it was in the last two quarters, and the actual violation by definition was a flow meter on a device. It had nothing to do with the system. We built our system out, we obviously went through all the permitting process. When they came back and revisited, they actually requested a flow meter on

the system, which we rapidly repaired.

But I would not consider that a violation of our system as much as a violation, if you will, of a rule about the flow.

Senator Merkley. Thank you.

Senator Carper is now here. So we will turn this over to him.

Senator Carper. Thanks, Mr. Chair. I want to thank our Chairman, I want to thank our Ranking Member Senator Wicker, for holding this hearing, a really important hearing today. I want to welcome our panel of guests, and I want to thank our Ranking Member of the full committee, Senator Capito, for her support, not just in discussing this topic, but addressing this challenge. We thank all of our witnesses, again, for joining us.

As some of you know, this is something I care deeply about, have forever. I am 75 years old and I have been working as a private citizen on recycling for, gosh, ever since I was a lieutenant JG in the Navy a million years ago in Palo Alto, California, during the Vietnam war. I have never stopped caring about it. I was a treasurer of Delaware, Congressman, Governor of Delaware, and I think we have made real progress in our State.

I like to run, I like to exercise, a bunch of us like to exercise. We have folks who were walking not too far from where

we live, and there is too much litter, everywhere. It is not just in the areas, the part of the State where we live, it is all over our State. It is other States, it is in neighboring States, it is all over the Country.

Sometimes people think I go to run just to pick up recyclables. The good news is, I do. And I can recycle that stuff. But there is a lot of stuff I pick up that can't be recycled and it is going to end up in the trash, in a landfill some place in my State.

Anyway, I am going to ask unanimous consent to enter for the record a statement if I could.

Senator Merkley. I hear no objection.

[The prepared statement of Senator Carper follows:]

Senator Carper. And I would like to turn to my first of 12 questions.

Senator Merkley. You are the Chairman.

[Laughter.]

Senator Carper. I promise you it is not 12.

Mr. Seaholm, as a Navy guy, I like your name. Mr. Hartz, nice meeting with you briefly earlier today.

I have heard concerns from the plastics recycling community that increasing the number of chemical recycling facilities in the U.S. could hurt the financial liability of mechanical recycling facilities, as increased demand would restrict access to plastic feedstocks. This could further reduce our already very low plastic recycling rate.

Question if I could, Mr. Seaholm, for you. Would you discuss this concern, please?

Mr. Seaholm. Sure. Our belief is that it should be an all of the above approach. In order for us to get where we want to go, it should be mechanical and molecular recycling as part of the solution. There are certainly applications that molecular recycling does better in terms of purity, in particular, and when it comes to food contact, it is actually presenting us with some fantastic options.

So our belief is the demand is going to be there. We strongly support both types.

Senator Carper. All right. Mr. Hartz, would you identify any backstops that the industry has in place to make sure that as chemical recycling grows, the industry does not take feedstock from the mechanical recycling facilities? Do we need for the government to provide those backstops?

Mr. Hartz. Chairman Carper, thank you again for your questions. In terms of backstops, I was mentioning earlier that mechanical recycling is actually less work, if you will. There is some heat, you cut plastics up, you reform them. There is a lot of plastics that can go there. Those are not the plastics we seek.

So we do not see ourselves going after the plastics. The numbers we hear, 5 to 8 percent, are mechanically recycled today, and there is a reason for that, because those are the ones that work. So the other materials that are flowing by, those are the ones we are interested in. Those are the ones that work.

So the other materials that are flowing by, those are the ones that we are interested in. Particularly, we are interested in those plastic films.

The other part of the economics of this, it is generally just cheaper to mechanically recycle. You shouldn't be doing advanced recycling if you can mechanically recycle. We actually support that.

So the backstop is going to be the marketplace that allows for that to happen. If we find ourselves in a situation that we are all going after the same material, then to Senator Whitehouse's earlier point, we are not solving the problem in the first place.

Senator Carper. All right, thank you.

Mr. Seaholm, back to you. Last fall, we held a roundtable series and a committee hearing on the concept of a circular economy. We heard from stakeholders from a variety of industries and organizations, as well as State and local governments about what it would take to transition to an economy that values and promotes circularity at every step of the industrial process, including in the plastics industry.

Senator Merkley's bill, the Break Free from Plastics Act, includes several policies that are designed to help reduce plastic pollution, as you know. My question is, would you elaborate on why the plastic industry has advocated for recycled content mandates, extended producer responsibility laws, and bottle bills to be implemented together? Could you explain how these policies could interact with one another to improve overall plastic recycling rates?

Mr. Seaholm. Absolutely. Thank you, Senator. Everything you just described falls into two categories. One is demand, and the other is supply. Recycled content requirements, done

reasonably, actually can help spur investment in the infrastructure side of things, because the demand is guaranteed to be there. So increasing demand is most important for the value to be ensured.

Then on the extended producer responsibility component of it, the industry has come to a point of accepting a fee on products in order to fund recycling infrastructure, because at the heart of the matter is the infrastructure has simply not kept up. That is what we have to fund.

Senator Carper. Good. My time is expired. Thanks, Mr. Chairman.

Ms. Enck, I have a question I am going to submit for the record, if you would take the time to respond to it, regarding turning plastics into fuel should not be considered recycling on that particular issue. If you would respond, I would appreciate it.

Ms. Enck. Could I just say no and then respond for the record?

Senator Carper. If you could, that would be great.

Mr. Myers, we look forward to having a question for you next time, maybe later today.

Mr. Chairman, thank you very much for a timely and important hearing. And for those on our committee that have worked on this as well, you know who you are, thank you very



much.

Senator Merkley. Thank you, Senator Carper.

Senator Sullivan?

Senator Sullivan. Thank you, Mr. Chairman. Greetings to our witnesses on this very important topic. I appreciate your holding the hearing, Mr. Chairman. Senator Whitehouse mentioned already the work that he and I have been doing for a number of years now on the Save Our Seas Acts, Save Our Seas 2.0 and following up on that. We will continue to work on it.

One of the reasons this is so important to me and my State on the ocean debris issue is Alaska has more coastline than the rest of the Country combined. People don't know that. We have a very important fishing industry where we care deeply about sustainable fisheries and healthy fisheries. Two-thirds of all seafood harvested in America, commercial, sport, recreational, subsistence, comes from Alaska. Two-thirds. So these are big issues for my constituents and my State.

One question I want to ask all four of the panelists is this issue, at least for remote communities like mine in remote States, we do these big beach cleanups of ocean debris and waste. NOAA estimates that after the Japan tsunami, some of the worst affected beaches in Alaska had 30 tons of waste per miles. So we get this enormous amount of waste and plastic, and to Senator Whitehouse's point, derelict fishing gear that winds up

on our shores. Mostly it is from Asia, not from Alaska.

Once the marine debris is collected, there is no place to put it. Most landfills in Alaska can't accept it. So we have to then ship it to the lower 48. By the way, this is the same issue with PFAS. We ship PFAS to Oregon. None of this makes sense, particularly when most building materials that we get in Alaska are imported, mostly from Asia.

So the technology now exists to have a local solution, convert some of this plastic waste into components for building materials. So that is just one idea.

Given this situation in Alaska and other remote communities, how would you help solve this problem? It is a big problem for my State, but I am sure it is a big problem for other States as well.

Why don't we just go down the line, starting with you, Mr. Hartz?

Mr. Hartz. Sure, Senator Sullivan. Thanks for your question. I share your concern as well. I am an avid outdoor person, and I see the same things that you do.

I think at the end of the day it is a question of aggregation of plastics. I think the statistics you are talking about are very concerning. What we have found is when you have a good answer to a problem, like water, it finds the lowest point.

So even today we have materials usually within a 150, 250-mile radius that we source from. But we actually have materials coming much further away to us because they say they cannot find a place to properly recycle it, and we can.

Senator Sullivan. Right.

Mr. Hartz. So to your point, I think it is getting the right answer out there. That will attract the plastics we need. And frankly, it will motivate all of us if there is an answer. So that is how we approach it.

Senator Sullivan. And to be able to do it in places that aren't big cities and stuff like that.

Mr. Hartz. We actually have a relatively small footprint. But you can't go against the gravity of economics. So often you have to have a certain scale, but it doesn't have to be oversized. We have designed our operations to be a small footprint because it is better to be closer to the feedstock. Because there is less density, if you will, than the material we produce, which is easier then to transport to make new plastics.

Senator Sullivan. Great. Thank you.

Mr. Seaholm, how about you?

Mr. Seaholm. I think everything that Mr. Hartz just referenced on the economies of plastic and recycling I would agree with 100 percent. In addition, I would say that accessibility is an important issue across the entire Country.

We want to make it as easy as possible or that waste to get to where it needs to be. But a lot of times, that is the consumers getting it into the stream. Senate Bill 3742 by Senator Capito and Senator Carper is something we wholeheartedly support, in order to increase accessibility for rural communities.

But without a doubt, in those situations, especially with marine debris, by all means, let's figure out the best way to get it to where it needs to go.

Senator Sullivan. Good. Ms. Enck?

Ms. Enck. Hi, Senator. Scientists tell us that within the next decade, for every three pounds of fish in the ocean there will be one pound of plastic. Once it is in the ocean, it is virtually impossible to get it back. Most of it falls down to the sea floor, not the surface.

The solution is making less plastic.

Senator Sullivan. Right, no, I know. But I just want to give you, if you can answer my question that I posed to you, which is, if we collect a lot, we have to ship it, what do you think? I understand. I have seen your testimony.

But my direct question, if you can try to answer that, that is the reality my State deals with today. Our Save Our Seas Act tries to deal with this. But I just want, you guys are the experts. So if you can just answer that question.

Mr. Chairman, sorry I am going over. I just want to see if

they have a quick answer.

Ms. Enck. Well, there is very little you can recycle. I started my town's rural recycling program in upstate New York. There is just so much.

So if you are collecting all of this, the only thing you can do, which is a bad option, is ship it to a distant landfill or even worse, a garbage incinerator.

Senator Sullivan. Okay. Dr. Myers?

Mr. Myers. You describe a really important issue and challenge to us. When I think about using marine plastics as building material, I think about what happens when that building burns. That means the people living in it or working in it will be exposed to very serious toxins.

And I don't know what the solution is. But I know that we can't contribute to tomorrow's problems with solutions today that ultimately don't make sense.

Senator Sullivan. Okay, thank you. Mr. Chairman, thanks. I have additional questions I will submit for the record.

Senator Merkley. Thank you very much. I will follow up with you. I think the point you are making is that the landfills that you are shipping to are because you can't open similar landfills in Alaska. I would be happy for you to open those landfills in Alaska and not ship it to Oregon.

[Laughter.]

Senator Sullivan. We ship PFAS contaminated soil to Oregon. And we could do it in Alaska.

Senator Merkley. More discussion to come. If we can keep the PFAS out of products, that would be helpful as well.

Senator Ernst?

Senator Ernst. Thank you very much, Chairman Merkley, and to as well Ranking Member Wicker for having this subcommittee hearing. This is a very important topic for all of us. I am grateful for the work that has been done on Save Our Seas.

Iowa does not have seas. But we care about it as well.

Mr. Hartz, let's start with you. Some of the opponents of advanced recycling have called it basically an unproven technology that is unable to operate at scale. Can you talk a little bit about some of the investments that you see being made in advanced recycling?

Mr. Hartz. Thank you, Senator Ernst. I appreciate it.

I was talking earlier that we are here really to talk about nexus, in terms of how the industry goes. But we are inviting anyone to come see what we are doing. So in terms of showing scale and showing something that is commercially viable, our plant in Atlanta is that. It is not a lab scale, it is not a pilot scale. It is a commercial scale plant.

So we ourselves have through sweat equity as well as financial investments built a plant that is doing just that, and

are now looking to proliferate that. But you are correct, there are other investments being made elsewhere. The term advanced recycling is kind of an umbrella term. You can have various types of technologies under that.

We always push that economic and environmental footprint come first. The technology could work great, but if it can't scale in those ways, and I feel a little bit like a broken record, and I apologize, but that is how innovation happens.

So that is where the investments are being made. Like any new industry, there are going to be successes and failures. That is also kind of what we do here in this Country, is try to create new things that way.

Senator Ernst. I appreciate that, because just as Senator Sullivan was saying, we have this problem, it is here, it is now. We can't just look toward the future with maybe not having different types of plastics out there. But we have to deal with what we have now. So I appreciate that.

Can you also talk, Mr. Hartz, about environmental standards and safeguards that your particular facility in Georgia operates under?

Mr. Hartz. Sure. So we are in a non-attainment area, under Federal purview by the EPA. We also obviously have State permits as well. We meet all air, water requirements, and we actually, in some areas are permit by rule.

Our footprint is actually smaller. For a non-attainment area, as you are well aware, it is actually very tight. We are actually tighter beyond that still.

And then we also manage very carefully. We try to keep a closed system. Of course, you are always going to potentially have, at valve points, you are going to have some VOCs that make it out. You manage for that as well. But we are very diligent about that. Because again, if we can't prove the point, this is not going to grow. We will be here trying to discuss regulation otherwise if we are not doing our job right.

Senator Ernst. Very good. So I am from Iowa, wonderful home State. Eddyville, Iowa is home to construction of the world's first bio BDO facility. GENO Technology will power the Qore and Cargill facility to produce bio BDO single-use plastics, in addition to electronics, apparel, auto parts, and other consumer goods.

And notably, compared to conventional BDO produced using fossil fuels, bio BDO offers 90 percent greenhouse gas emissions savings.

Bio BDO is not only better for the environment, but producing it in the U.S. also supports our local farmers right there in Iowa. When the Eddyville facility comes online and in active production, it will process about 30,000 bushels of corn every single day, which is great for our farmers.



Mr. Seaholm, what role do you see the bio economy play in furthering this type of innovation with bio based plastic products?

Mr. Seaholm. Thank you, Senator. Similar to my previous answer, it is an all of the above. There are opportunities to use all sorts of different types of original feedstock, and bioplastics are a growing part of the marketplace.

We have members who are in the bioplastics division and we strongly support bio as an option, especially for many of the restaurant type applications, where you have compostable streams and it does present a good opportunity.

Senator Ernst. Very good. What have the consumer and markets reaction to these types of alternatives been?

Mr. Seaholm. I think it has been great. I think everybody is looking to use an environmentally beneficial product. I always say, people don't feel guilty when they use plastic, they feel guilty when they are done using plastic if they feel like it doesn't ultimately go where it is supposed to go. That is why recycling is so important.

The same thing goes for bio-based. If it goes into a compostable stream, fantastic.

Senator Ernst. Yes, wonderful. Well, we wish great success to our folks in Iowa, and congratulations to our farmers that engage in this.

I will yield back. Thank you, Mr. Chair, and thanks to our witnesses.

Senator Merkley. Thank you very much.

A few decades ago, a scheme was developed regarding triangles printed on products with different numbers representing the different basic types of plastics. The idea was that oh, if we know the basic category of each plastic, each article can be grouped accordingly, and then an appropriate system can be found to recycle it.

We now hear that this system basically doesn't work. How many plastic forks do you put into your system, Mr. Hartz?

Mr. Hartz. Excuse me, Chairman Merkley, how many plastic forks?

Senator Merkley. Forks. Utensils.

Mr. Hartz. I would not know the answer to that.

Senator Merkley. Isn't the answer none?

Mr. Hartz. No, sir. Forks can be made from polypropylene can be made from other plastic materials.

Senator Merkley. Sure, but you don't have an industrial stream feeding your plant. And forks are contaminated with food, so they go into the garbage bin, not even the recycling bin.

Mr. Hartz. Actually, Chairman Merkley, we do actually take consumer type materials as well. It is not a large part of our

stream, but we do take materials from grocery stores, for instance. We also take, we are part of the Energy Bag program, and we handle it that way, too.

Senator Merkley. Okay, I am going to have some questions for you for the record. Because I am probably the only person up here who has actually visited a chemical recycling site. And in this site, they said, hey, we have a particular stream that we need to take advantage of, because we know what those chemicals are, we know what we are going to reduce. The purchaser of the oil they were producing wants to make sure they know what that stream is.

If you go down to the cafeteria down below here, you will find that every piece of plastic that touches food is directed to be put into the waste stream, not into the recycling stream. If you follow the recycling stream, it is probably dumped in with the rest of the garbage as well, as opposed to actually sent anywhere.

So one of the questions I will ask you is exactly how many pounds of forks or straws or plastic lids. Because that model does not fit with what I witnessed when I visited a chemical recycling site.

I think another interesting piece of that puzzle is going back to these triangles. Ms. Enck, why has the triangle system fallen apart? Why does it not work?

Ms. Enck. Well, it was originally created just to identify the resin. And it doesn't work because plastic recycling is a failure. It is only 5 to 6 percent recycling.

So consumers are always flipping it over, the numbers seem to get smaller and smaller. They really should only put number 1 and number 2 into your recycling bin. That leaves the majority of plastics as non-recyclable.

It is even worse when companies put the iconic recycling logo on their packaging, a plastic bag film, and that will contaminate the waste stream. In fact, the California attorney general, Rob Banta, has launched an investigation around deceptive advertising around plastic recycling.

So people want to recycle. Americans really want to get it going. But other than bottle bills, where you have the deposit, the material is kept separate, you get a high recycling rate, other than plastics from bottle bill States, plastics recycling is a dead end. We should just call it that and move on to reduction.

Senator Merkley. Ms. Enck, I went to a hardware store recently, I needed to buy a hammer. I don't know why I misplaced my hammer. I had had it for 40 years. But I lost it.

I was fascinated to see that a hammer, which is designed for beating up on things, was wrapped at the hardware store in a plastic bag. Are we not using plastic in all kinds of settings

where it is absolutely unnecessary?

Ms. Enck. Yes, and it is because the company that packaged it has no skin in the game in terms of what happens to it after you buy the product. They will use different materials. They are not thinking in a circular way.

That is why we need strong, some call it extended producer responsibility, I call it packaging reduction and re-use requirements. Just like we have fuel efficiency standards for cars and appliances, we need environmental standards for packaging so things are not so overpackaged.

Senator Merkley. So I recently was given a gift box from a wonderful company, not from my home State. It had a nice little glass jar of peanut butter and a couple of jams in it. All nestled into this beautiful little nest of straw. I thought, that is really cool.

I picked up the straw, and underneath it was plastic noodles. I thought, why are these plastic noodles in here? It didn't go with the whole theme of this nice package.

I have noticed that in a variety of packaging, as more and more of us order things online, and are brought into the Amazon-esque, you see a lot of different packaging coming in your front door. I have noticed in some settings various strategies for corrugated cardboard to replace what was previously either Styrofoam or plastic noodles.

Is it possible to pack most things without using plastics?

Ms. Enck. Yes. New York State has banned polystyrene for food packaging and also banned the little polystyrene peanuts. We are doing okay in New York not getting massive amounts of polystyrene peanuts with our packaging.

Another world is possible. But it was because the State legislature adopted a law. The voluntary initiatives just are not working.

Senator Merkley. So we have interstate commerce. Producers tell me, we want consistency as we move our products from State to State. New York doesn't ban products from out of state that are packed in plastic noodles, right?

Ms. Enck. No, industry is doing just fine.

Senator Merkley. But my point is that your State can change what you produce but you can't change what you receive?

Ms. Enck. Oh, no, it includes shipping into the State. You are prohibited from using plastic peanuts in shipping.

Senator Merkley. So this company I was just referring to that does these gift packages and ships them all over the Nation, it is actually illegal for them to ship to New York?

Ms. Enck. Correct. I doubt there is an enforcement action being taken, but they are out of compliance with the New York law.

Senator Merkley. Wouldn't it make more sense for us to

support the producers by not having a 50-State pattern and actually having packing rules that support replacing plastics with corrugated cardboard or so forth, rather than doing it State by State?

Ms. Enck. We would welcome that, as long as -- yes.

Senator Merkley. Well, I do hope we will continue in this subcommittee to examine these issues. Because it seems like there is a lot that can be done, apart from plastic disappearing.

It has been pointed out on the panel today that there are advantages for plastics in medical gear, that there are advantages in certain other settings, perhaps in lighter weight automobile components or compression zones that makes cars safer. I am sure one could find an additional list, including in medical vaccine applications that have been mentioned and so forth.

But I think it also becomes clear from the testimony that there is a whole lot of plastic that is absolutely necessary to have in our economy. I have received interest for bottlers in saying, we know that our plastic bottles get a bad rap, we would like to see some recycling. I sat in, in 1976, in a Senate debate on the Floor of the Senate, where Senator Hatfield had a national recycling bill based on the Oregon bottle bill. Of course, it was ferociously opposed.

But I think we are at a different point in starting to understand the impacts of plastic on human health and on the health of animals and our environment. There is no way to get those microplastics out of the ocean, those that Senator Sullivan was concerned about and many of us are concerned about.

The idea that we now have plastics inhabiting basically, like anywhere you test, you find microplastics. We are starting to be aware that microplastics are produced including by washing our clothes, and plastic fibers being flushed into our streams.

Mr. Myers, you brought your scientific knowledge of the impact on human health, reproductive health. I read that in detail in your extended testimony, and I encourage others to do so as well. Because the more you read about it, the scarier it gets.

If I read your testimony correctly, you noted that because of the way that these chemicals disrupt the way genes are turned on and off, that in studies of animals, that even after a second generation, where the DNA itself, the gene order has not been changed, but you see the impacts of these endocrine disruptors having changed how the genes are turned on and off affecting health, so that even a child of a child, if you will, could potentially in theory, in animal studies.

Did I understand this correctly that, there are effects that persevere beyond just the immediate health effects of the



individual?

Mr. Myers. You read correctly, and thank you for doing that. That phenomenon is called transgenerational epigenetic inheritance. It has now been seen in multiple types of organisms. Lots of laboratory experiments have established it clearly. We don't know the detailed mechanism by which it works, but it definitely works.

In animal experiments, we see effects down four generations. It is too expensive to do tests on the fifth generation.

Senator Merkley. Mr. Seaholm, I know that you professionally represent the plastics industry. But when you hear about plastics appearing in human breast milk, and when you are aware of the impacts of endocrine disruptors as chemicals, do you have any concerns at all about the impact of plastics on human health?

Mr. Seaholm. Absolutely. Like I said earlier, the most important thing that our members, especially those manufacturing anything that is going to come in contact with the human body, care about, is safety. If they don't have a safe product, they don't have a sustainable business.

So safety is at the forefront of everything they do.

Senator Merkley. And you mentioned recycling. Is your industry supportive of nationwide strategy such as a bottle

recycling bill to try to greatly reduce the amounts of bottles?  
Can we hold up that picture behind me again, of those bottles  
that were in the Anacostia River?

This is not rare. I could take you out tomorrow, this is a  
couple of years ago, we would find the same thing. It is in our  
streams, it is being flushed out, it is becoming microplastics.

Would your industry support a national recycling bill for  
bottles?

Mr. Seaholm. Specific to bottles?

Senator Merkley. I say that because it is considered one  
of the easier things to do, the plastic is more consistent,  
about what is put into those bottles, States that have a bottle  
bill like mine, they basically recycle all the bottles that come  
through the system. The kids' clubs collect the bottles in blue  
bags and submit them and they raise money for their Boy Scout  
troop or their swimming club or whatever.

It works. So we have a model that works, and it is a more  
consistent form of plastic than the huge variety of things that  
have different hardeners, different other colors, additives and  
so forth. So it is considered the lowest fruit. That is why I  
am asking, on this lowest fruit, would you support a strong  
strategy to reach a very high level of national bottle  
recycling?

Mr. Seaholm. There is no doubt that bottle bills work.

Bottle deposits work. We have seen it. Would the industry support a bottle bill, crafted correctly? I think it certainly would be open to that on a national scale. Again, crafted correctly.

Senator Merkley. Well, the details matter. But if crafted correctly means that we recycle a high amount, certainly my door is open. I would like to work with you all.

Mr. Hartz, when you hear about plastics being in breast milk and that some of the ingredients have these hormone disrupting impacts, and there is a close correlation and perhaps causation according to various studies, these chemicals' impact on human health reproduction, be it prostate cancer, breast cancer, low sperm counts and so forth, do you share that concern? Is that concern a part of what has propelled you into the business you are in now, of trying to find a solution?

Mr. Hartz. Chairman Merkley, I smile when you ask the question, it is the whole reason we got into this. All the team has had a history of wanting to address these kinds of issues. This particular one, the facts bear out.

I think there are two threads of discussion here. One is the problem of plastics as frankly, you are defining it, but there are also the benefits. I am not here to defend or not what the benefits are, but that is a thread of discussion that needs to be addressed.

Then there is the solution. That is why I am trying to offer today, a real solution to that issue. So absolutely, I am concerned about these things.

To your earlier point, just for clarification, we do tolerate reasonable amounts of contamination, because you can't expect a clean stream of plastics to come in. We live in a very complex world. I just want to share that we do see those things and we try to work with that. Again, any time, please come by and see us, because there are different ways to do this.

Senator Merkley. Yes, Mr. Myers.

Mr. Myers. Thank you. I want to return to something I mentioned briefly, the chemical strategy for sustainability in Europe. One of the key concepts they are introducing is the importance of distinguishing between essential uses of plastic and uses that are not essential, and using that as a priority way to decide which ones you are going to work first to reduce. Once you reduce those, then you can focus on the other types of plastics that are essential and find other ways to do the same thing that aren't plastic.

Europe is thinking very logically and very big about how to approach this question.

Senator Merkley. Okay, essential versus non-essential.

Ms. Enck?

Ms. Enck. On chemical recycling, Senator, I think it is

important for you to know that the American Chemistry Council has gotten 20 States to adopt laws to exempt chemical recycling from some important environmental laws at the State level.

Then secondly, looking for public subsidies. I don't think it is a solution. It is not going to solve the problem.

I think we may have heard breaking news from Mr. Seaholm on a national bottle bill. We need a national bottle bill. If you just look at PET plastic beverage bottles in the 10 States that have bottle bills, the PET recycling rate is 63 percent. Without a deposit it is only 17 percent. Bottle bills not only prevent litter, but they work.

Senator Merkley. What was that again for the States that have it, the recycling rate is what?

Ms. Enck. Bottle bill States for PET, if you have a deposit, 63 percent recycling rate. No deposit, 17 percent recycling rate. So having the plastics industry support a national bottle bill and getting the details right would be really helpful.

Senator Merkley. Are you going on to say Oregon is one of the highest recyclers of bottles?

Ms. Enck. Oregon and Michigan, because you have had it a long time. I understand you championed it when you were in the State legislature there. Having a 10-cent deposit rather than 5 cents really works.

Then it is crucial to make it easy for consumers. If you pay the deposit, you should be able to return the container to the store. The redemption centers and the depots are nice supplements to return-to-retail. But I am super busy. In New York, I return my containers right to the supermarket where I shop. It is easy.

Senator Merkley. I will tell you, in Oregon it is much harder to return to stores now. However, there is an interesting model that has been developed by the State of green bags and blue bags. So you get these green bags, unless you are a non-profit, you put a quick response code on the sack.

When the sack is full, you throw it through the door at the recycling center. And it is then automatically sorted by computers that take a picture of all the bottles that were in that bag, immediately credits your bank account. It does the same for non-profits.

Much easier than sticking a bottle one bottle at a time through a hole and having a machine try to register it and having the machine break down and all the other challenges.

I think we should explore the best strategies from around the Country, what works and what doesn't. I think Maine is also very high and sometimes beats Oregon, and I am told that is because they recycle liquor bottles, which we do not. But more work to be done.

I think at least we need to take the pieces of this where we can find some common ground, and move forward while recognizing that that will help but it will only modestly help against the massive amounts of plastics that are finding their way to being burned overseas.

We were shipping a ton of plastics overseas where it was often burned for power. China now says, we don't want that anymore. It was so polluting, thank you very much. That disrupted a lot of the strategies that we had here.

So we have a lot of work to do on this. I appreciate you all bringing your insights and perspectives to bear.

With that, I need to read the formal comments for adjourning. I would like to ask unanimous consent to submit for the record a variety of materials that include letters from stakeholders and other materials that relate to today's hearing. I hear no objections. So ordered.

[The referenced information follows:]

Senator Merkley. Additionally, Senators will be allowed to submit written questions for the record through close of business on Thursday, December 29th. We will compile the questions, send them out to all of you. We ask that you try to get replies in by Thursday, January 12th, in the new year of 2023, a year in which we will all dedicate ourselves to make our communities, our States, our Country and the world a better place.

With that, I adjourn the last hearing of 2022.

[Whereupon, at 11:46 a.m., the hearing was adjourned.]