

## Kivalina Students at the Red Dog Mine



Climbing into heavy equipment with wheels taller than she is, was not intimidating to Kivalina high school student, Sherrell Hawley. "I want to become a heavy equipment operator," she grinned. Sherrell was often the first to volunteer, whether it was climbing into the driver's seat of a triple seven or peering into her schoolmate's eyes with a scope on a clinic tour. All of this happened during Career Awareness, January 15–17 at the Red Dog Mine.

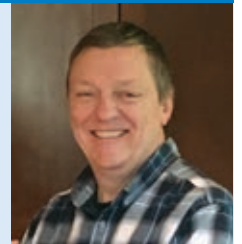
Each year, Red Dog partners with the Northwest Arctic Borough School District to bring primarily freshman and sophomore students from several schools to Red Dog for Career Awareness, where they tour areas such as the Heavy Equipment Shop, Mill, Mine and Clinic, and get to see firsthand the career opportunities at one of the world's largest lead and zinc mines.

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## Message from the General Manager

By Henri Letient



Already, the first quarter is behind us. It has been a very hectic quarter with many challenges thrown at us. It is always busy at Red Dog, but when Mother Nature decides to throw multiple winter storms our way in a short time frame, it quickly becomes particularly challenging. As always, Red Dog responded well as a team and we got through it, and most importantly, we kept our focus on safety. While these winter storms affected mine operations and we now are a bit behind, there are many positive things happening at Red Dog.

We are continuing our Courageous Safety Leadership (CSL) journey and are moving on our next stage—CSL4. I'm excited to hear the great conversations that are generated around the property and experience the level of engagement of each crew, who work as teams to ensure that *everyone goes home safe and healthy every day*.

Many safety initiatives introduced in recent years are ongoing, such as monthly Workplace Hazard Recognition Inspections, which focus on improving our overall recognition of workplace hazards. We have seen great Safety Team ideas brought forward and completed. This is an effective way to identify opportunities and seek solutions to improve safety in the workplace. The work team risk assessments ensure that we identify our high potential/fatal risks, have proper controls in place to mitigate these risks, and have processes in place to ensure our controls are effective.

Human development is important to continue making Red Dog a great place to work! It was great to see high school students from Kivalina on site in January. What a great way to get them first-hand experience of what it's like to work at a mine and inspire them in their career. I'm always proud of our employee apprentice graduates. Congratulations to those graduates who have received their Department of Labor Certificates this quarter and the last quarter in 2016! We have another 15 apprentices enrolled in the program and are enrolling more into our new Mill Operator Apprentice program, which is a first for the State of Alaska.

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## Kivalina Students at the Red Dog Mine

During this event, five McQueen school students received practical knowledge on what studies students should take in high school to prepare for jobs at the Mine. They learned of jobs where they can be outdoors a lot and use snow machines in the winter, such as being surveyors or environmental technicians. The students also received life advice, including following your passions and the importance of teamwork.

“The jobs here are pretty good and you need to get a good educational background,” said Sherrell. “When you work here, it’s not only about money. It’s about hard work and helping one another with all these jobs.”



## Quyaana

*Thank you to all who contributed to our newsletter.*

To submit topic ideas or an article about your work, a coworker spotlight, a special project or life at Red Dog, contact Managing Editor, Verna Westlake at [verna.westlake@teck.com](mailto:verna.westlake@teck.com) or [communityrelationsRDOG@teck.com](mailto:communityrelationsRDOG@teck.com)

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## Message from the General Manager

Engagement with the communities continues to be an essential part of what we do. A great step forward is the recent agreement between Teck and the Northwest Arctic Borough (NAB). Both parties have agreed to a new 10-year PILT (Payment in Lieu of Taxes) Agreement. The agreement will provide an increase in annual payments to the NAB, facilitate enhanced benefits for the region, and provide funding aimed at socioeconomic investment in the eleven Borough villages.

The Native Village of Kivalina has agreed with us on taking a novel approach to addressing their concerns through the formation of a working group led by an independent Project Manager. The Working Group will work on topics such as the environment, health, safety, subsistence and economic concerns of the community of Kivalina. This will be a great opportunity to work collaboratively with our closest community. Kivalina and Red Dog are located within the same watershed and the community is concerned—and rightfully so—that we are operating safely and protecting their environment.

## NMS Cooking Good, Looking Good!



*Back Row Left to Right: Walter Nazuruk, Arthur Prentice, Chef Mike Paul, Sean McBride, Brian Ramoth*  
*Front Row Left to Right: Alfred Foxglove Sr., Effie Ramoth, Sharon Dundas*

Suvisi (Sü-vĩ-see) in the Iñupiaq language means:

“What are the many people doing?”

## The Kivalina Biochar Reactor



*Kivalina Biochar Reactor Training, Port Site, December 6–8, 2017. Front row (left to right): Jerry Frank Norton (Kivalina Trainee), Jeff Roy (Lead Fabricator/Biomass Controls); Back row (left to right): Michael Gerace (Re-Locate), Stephen M. Koenig (Kivalina Trainee), Oral Robert Hawley (Kivalina Trainee), Jeff Hallowell (President, Biomass Controls), and Tony Donald Oktollik (Kivalina Trainee).*

KIVALINA, ALASKA – March, 2017 – Alaska’s first human solid waste bioreactor will soon arrive in Kivalina. The pioneering Kivalina Biochar Reactor is a pipe-less and relocatable sanitation system. It processes solid human waste separated by Urine Diverting Dry Toilets and transforms the waste into biochar—a carbon-rich, pathogen-free, value-added byproduct. Biochar can be used to filter odor, boost plant growth as a soil amendment, and remediate pollution at contaminated sites.

Biochar sanitation technologies could be transformational in communities like Kivalina where the infrastructural, environmental, and funding challenges to deploying centralized sewerage sanitation systems are well documented. Technologies like the biochar reactor offer opportunities to prototype and test alternative, world-class sanitation solutions to these challenges both in, and for, Alaska. Newly developed technologies like the Kivalina Biochar Reactor can reduce the volume of solid human waste disposed at landfills, offer an alternative to piped infrastructure,

lower monthly homeowner fees, and transform waste from a health hazard into a resource.

The concept for Kivalina’s bioreactor emerged from investigations into how new forms of non-sewered, haul-based sanitation systems from around the world could be adapted to serve communities in Alaska. The Kivalina Biochar Reactor is an Arctic adaptation of technology the Gates Foundation first built in India as part of its 2011 Reinvent the Toilet Challenge—an international competition to bring sustainable solutions to the 2.5 billion people worldwide who don’t have access to safe, affordable sanitation.

In 2015, the Kivalina City Council and the Native Village Council passed a Joint Resolution to design, test, and build a relocatable human waste bioreactor for Kivalina modeled off the Gates version. Like the Gates system, the Kivalina Biochar Reactor relies on existing local systems for waste collection and hauling, fits entirely within a shipping container, and runs off its own energy after start up. The goal is to eventually run Kivalina’s system entirely off grid. It uses a process of pyrolysis—

combustion at high temperatures in a low oxygen environment—to render a charcoal byproduct that is free of harmful pathogens. Unlike the Gates system, the Kivalina system uses forced air instead of a boiler to dry the waste. The reactor’s architecture was designed and fabricated to feature task-specific insulation, ventilation, safety and health measures, and a custom exterior graphic design. Wipes, toilet paper, cardboard, and other limited dry municipal wastes are preprocessed by a heavy-duty grinder before pyrolysis.

At the request of Kivalina’s Joint Councils, NANA’s Village Economic Development program and Teck invested in the reactor’s development and provided all the needed funding for the project. Biomass Controls, the engineering firm that built the India reactor for the Gates Foundation, built Kivalina’s Biochar Reactor. Re-Locate LLC—a small business set up to develop relocatable, decentralized infrastructure—designed and managed the project.

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## The Kivalina Biochar Reactor

The Kivalina Biochar Reactor is currently at Red Dog Port Site and will be delivered to Kivalina this summer. While waiting for the ice to go out, Re-Locate and Teck hosted the first operator training this past December. Four trainees from Kivalina spent three days learning how to start up, run, and shutdown the system. Port Site engineers, welders, and staff lent many gracious hands to support the training, offering spare tools, expert assistance with the temporary setup, hot meals, and safety tips. Subsequent trainings and regular operations will follow the reactor's arrival in Kivalina.

Villages in Alaska need not wait for world-class sanitation. Real alternatives are possible now. For updates, please visit [relocate-ak.org](http://relocate-ak.org) and our Facebook page [www.facebook.com/re.locate.kivalina/](http://www.facebook.com/re.locate.kivalina/)

## Sarah Randall—Inspiring Success



Proud Mom, Sarah Randall (right) on her daughter Teresa Baldwin's graduation day.

I've worked hard to help NANA shareholders achieve their dreams, through my Human Resources (HR) work with NANA Regional Corporation. I am honored and excited to serve in my new role with Teck as a Temporary HR Recruiter, based in the Anchorage office. I look forward to assisting the busy recruiters in the work they do at the Red Dog Mine.

When I started school to earn a degree in Business Administration and Management from Alaska Pacific University, I was determined to receive my degree before my own kids started college. It wasn't easy while working a full-time job and of course being a mom, but in 2011, I did it.

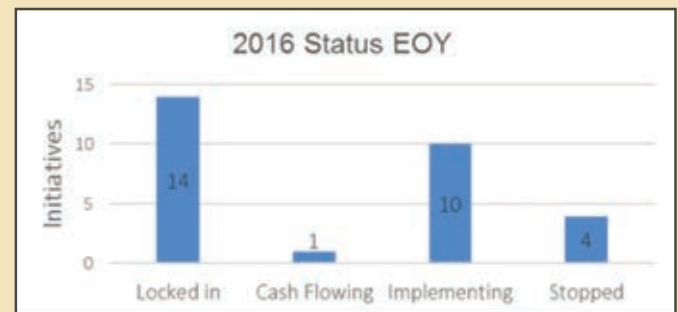
This is a picture of my proudest moment as a mother: seeing my daughter, Teresa Baldwin, graduate from the University of California San Diego in 2016.

## Business Improvement Goal

By Preston Miller

At Red Dog, we are always looking to improve the way we do things. Since its inception in 2008, the Business Improvement (BI) group has been helping not only to improve our cost and revenue positions, but also to make our site a better place to work. Every project that increases equipment reliability, decreases the time spent in cleanup, and reduces or eliminates unnecessary tasks enables our people to focus on safe, steady, and productive operation.

If there is a point of frustration or place where you believe we could do something better in your area, please share that with your supervisor as a possible improvement. If the idea is approved for implementation, the BI group will support you in carrying out the tasks needed for success. The mining industry will always be volatile, and the future is never clear—anything we can do to improve and sustain our performance will help to ensure that Red Dog stays operating safely and profitably for years to come.



### 2016 Red Dog Business Improvement Results

Red Dog finished 2016 strong, slightly exceeding the revenue improvement target of \$19.4M. Of 29 total initiatives, 15 were progressed to locked in and cash flowing (completed) and 10 are still in implementing phase. We did not have sufficient time and resources to bring all projects to completion—some of the high value improvement projects that we were implementing at the end of 2016 have been carried-over to 2017—most notably those in the area of mill filter deck enhancements

The Business Improvement team has identified key areas for development so that Red Dog finishes even stronger in 2017:

- Focus on the critical few projects that add the most value
- Develop and expand BI team to more effectively engage and drive projects
- Strengthen idea owner engagement
- Communicate wins to the business more effectively, reinvigorate culture of improvement

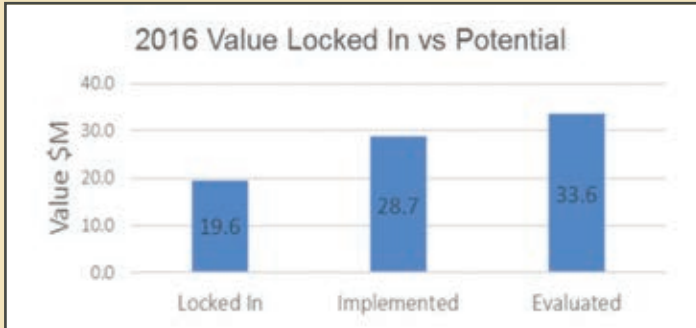
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## Business Improvement Goal

### 2017 BI Team Focus

A three-pronged approach has been developed for 2017 that will help us to achieve the Red Dog improvement goals.

#### Increase effectiveness



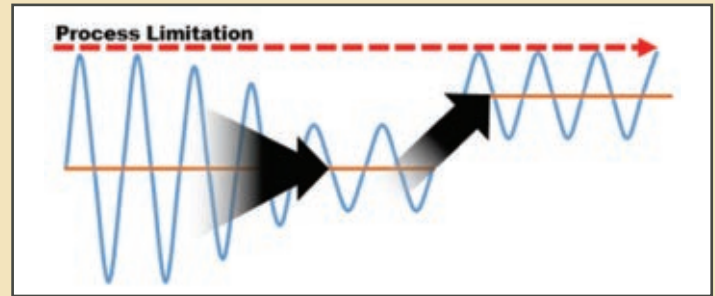
- Focus on the few projects that generate the most value
- Evaluate and implement new BI tools/skills as appropriate
- Identify and drive the critical few KPIs

#### Engage

- Increase frequency of management engagements for alignment and support
- Regularly hold idea generating sessions with line and report back on status of ideas
- Develop credibility throughout the operation
- Celebrate wins

#### Develop site BI aptitude

- Team member led BI training for other groups and departments
- Create a pull for other groups to rotate their members through the team



### Site Focus for 2017

The mill is currently the constraint that keeps Red Dog from producing additional saleable concentrate. Inside the mill are the sub-areas of grinding, flotation, and dewatering that alternate as the primary mill constraint, depending on feed parameters.

Improvements for 2017 have been selected for their impact on reducing preventable variation in mill feed and performance, improving overall throughput, and reliability. With variation reduced and availability increased, baseline performance will be shifted upward.

### Highlight: M2M Stockpile Feed Variation Reduction

With the adoption of Blast Movement Monitoring (BMM), the mine group does a good job at ensuring that the blasted ore is accounted for and makes it to the mill. Remaining benefit resides in moving material to the correct stockpile, and blending it in a manner that reduces feed grade variation.

Mill feed grade varies significantly within stockpiles and even shift-to-shift variations of 2% Zn are not uncommon. Unsteady feed grade is a significant factor leading to reduced throughput and recovery. Improved ore tracking through high precision GPS combined with improved stockpile building and feeding procedures have the potential to decrease shift-to-shift feed grade variation by more than half, resulting in a revenue increase of over \$2M per year.

### For Current Job Vacancies (or opportunities)

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# Congratulations, Red Dog Apprentice Graduates!

By Mike Skeeters



*Thurston Mitchell (L) and Travis Clark (R) celebrate the completion of their apprenticeships following their presentations to co-workers, trainers and management.*

## **Thurston Mitchell, Heavy Equipment Apprentice and Travis Clark, Millwright Apprentice**

Thurston Mitchell and Travis Clark completed their respective four-year apprenticeships with their final presentations on Tuesday, March 21, 2017.

Thurston, or TJ as he is better known, is from Noatak where he was born, raised and lives today with his family. He started the Heavy Equipment Apprenticeship on January 29, 2013. Prior to the Apprenticeship, TJ worked as a wash bay attendant. During his Apprenticeship, he worked on all types of heavy equipment, mostly Caterpillar, but other machines as well. Some of the things TJ worked on were hydraulic systems, electrical systems, HVAC systems, troubleshooting problems, and fuel systems to name a few.

Travis Clark was raised in Talkeetna where he finished his schooling. Today he and his family live in Wasilla. He joined the Millwright Apprenticeship on March 3, 2013. Before joining the Apprenticeship, Travis worked with the Warehouse and Mill Operations. During his Apprenticeship, he worked in the Mill on various types of rotating equipment, pumps, machine

alignments, welding work, pipe fitting, conveyors, and different types of pressurized systems.

TJ and Travis had to meet certain requirements to graduate our DOL (Federal Department of Labor) program. Both were required to complete four years of training. This training included 144 hours/year of classroom training and between 8 and 10,000 hours of on the job training. As part of their agreement, they also maintained a log book of the work they performed each day. They spent time doing cross training with other departments. TJ worked with Mine Operations and the Electrical and Instrumentation departments. Travis did his cross-training with the Powerhouse.

Both employees were required to complete a final project and do a presentation discussing their project and their time in the Apprenticeship. TJ built a wiring practice board for future apprentices. He used the Cat 777 truck system for his electrical troubleshooting practice board. He built a functional board that can be manipulated to simulate electrical problems. The Apprentice could use the wiring diagram to locate the source of the problem. Travis took on an alignment and air gap check on #6 Main Engine. The pads under the Wartsilla engine had been changed and Travis used

the Laser Alignment system to align the coupling from the engine to the generator. He then took air gap readings on the stator and exciter and moved them to within spec for their air gaps.

Both men did an excellent job on their presentations. We are happy to see two more of our Apprentices graduate the program and receive their DOL Certificates.

## **Alvin Morris, Millwright Apprentice**

After four years of study and over 9,000 hours of "on the job" training, Alvin Morris graduated the Millwright Apprenticeship on January 24, 2017.

Alvin was born in Kotzebue and raised in Kiana, Alaska. He graduated from high school in 2001. Growing up in Kiana, Alvin lived a subsistence hunting and fishing lifestyle. Around the age of 16, he started racing snow machines, which he still participates in today. This hobby peaked his interest in all things mechanical, which included maintenance of and improvements for his machines.

Alvin started as a seasonal employee at the Red Dog Port in 2011. He completed another seasonal position in 2012 after which he applied for and was hired in the Mill Maintenance Department. During his time in the Apprenticeship, Alvin worked on pump rebuilds, tower mills, agitators, SAG mill relines, conveyors and other pieces of equipment around the mill. Alvin learned to do many things during his training. Some of these included lay-out, math for building, hydraulics, pneumatics, and three types of equipment alignment. Alvin also completed "cross training" with Mill Operations, a final project of rebuilding a tower mill gearbox, and a final presentation to management and his peers where he talked about his experiences during the past four years.

Alvin has a good work attitude and is a pleasure to work with. He is and will continue be, a valuable asset to Red Dog Operations in the coming years.

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## Congratulations, Red Dog Apprentice Graduates!



### **Thomas Bernhardt, Mill Maintenance**

Thomas Bernhardt was raised in Kobuk, Alaska. Kobuk is a small village on the upper reaches of the Kobuk River. He attended most of his schooling in Kobuk and finished high school in Galena, Alaska in 2010.

While in Galena, Thomas became interested in electricity after taking an introductory course in that subject. Thomas says he thought he'd lie around a little while after graduation, but his Dad told him that was not going to happen. He came to Red Dog two weeks after he graduated from high school.

Thomas started his career at Red Dog in June 2010 as Laborer for Mill Maintenance. He spent his first summer working on a large reclaim water piping project. In November of that year, he transferred to the Electrical and Instrumentation (E&I) Department. In March of 2011, Thomas joined the Apprenticeship as an Electrician. He graduated from the E&I Apprenticeship on October 6, 2016.

During his time in the E&I Apprenticeship, Thomas studied the basic theory of electricity, circuit installation with lighting, receptacles, switches, breakers and panels, among other things. He also spent a lot of time

trouble shooting and disconnecting and reconnecting electric motors. Our E&I Apprenticeship required that Thomas complete over 8,000 hours of on-the-job training and over 600 hours of classroom training. He completed four levels of electrical studies and two levels of instrumentation studies. Thomas also attended and successfully completed, three, two-week classes in electrical work in Seward, at the Alaska Institute of Technology (AVTEC).

At Red Dog, we require an apprentice to do cross-training with another department, complete a final project, and do a final presentation in front of management and peers on the apprenticeship journey. Thomas spent cross-training time with the Powerhouse. As a final project, he developed an improved Lock out/ Tag out/ Try out presentation. Thomas made his presentation to close to 300 Red Dog employees over a two-month period as a Safety Blitz for 2016. Thomas gave his final presentation and demonstrated his knowledge of his craft.

Thomas will play an important role in the E&I Department in the coming years.

### **Eugene Mitchell, Jr., Planner Scheduler**



#### **What do you like most about Red Dog?**

It's laid back and quiet.

#### **What surprised you most about Red Dog?**

That there is no phone service.

#### **You're happiest when?**

Making money and being with my son.

#### **Describe what you were like growing up?**

I was quiet, into music and dancing. I was a DJ and had scoliosis back surgery, so I didn't play sports.

#### **Describe what you were like at age 10.**

I was quiet and liked to stay home all day and watch TV.

#### **Any random facts you could share with us?**

Tom Brady was NOT the first ever 5- time Super Bowl champ. That achievement belongs to Charles Haley, who played linebacker and defensive end for the 49ers and Cowboys in the 1990s.

## William Brewster, Mill Maintenance Planner Scheduler



### What do you like most about Red Dog?

I am impressed with the unity amongst the workers on the floor, the men and women in the mill. Everyone really works as a team eliminating the weakest link.

### What surprises you most about Red Dog?

Red Dog's commitment to safety as well as their commitment to strive for improvement in their daily operations.

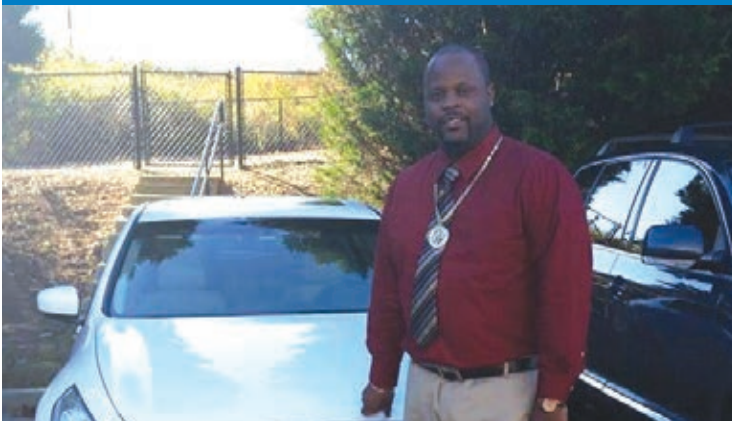
### You're happiest when?

In the Virgin Islands with my kids. I find happiness when surrounded by great conversation.

### Describe what you were like at age 10?

I had a lot of freedom growing up in the Virgin Islands from riding my bike to the beach to cooking food in the mountains, listening to Bob Marley grooving with nature. Use to always feel I was destined for greatness, but growing up on a small island, the reality of a youth fulfilling their dreams seemed impossible. Now I've become living proof that you can achieve whatever you put your mind to. I strive to show others who may come from a small, remote place that the world is huge and you can make it if you truly want it.

## Ferdinand Bosely Maynard Jr., Maintenance Planner/LTE Coordinator



### Describe what you were like growing up?

Being that I am the first boy and the 6th child of my parents 7 children, we played a lot outdoors. I also grew up in church. LITERALLY! We were at church all the time once the church doors opened, from Tuesday through Sunday. Mommy always says "If you want to go, you're going. If you do not want to go, you are still going." I learned to play a lot of instruments as well such as; keyboards/piano, drums, bass guitar, tuba, alto saxophone, steel drum, xylophone, baritone and I loved to sing.

I started working in the Refinery (Hovensa) at the age of 18 and was named "Young Boy" which never left me up to this day. Having the coolest job and one of the hottest Honda Civics on the island brought a lot of fame to me. LOL.

### Describe what you were like at age 10.

If my memory serves me correct, I just played outside, went to the beach and church. Hmmm...

### Any random facts you could share with us?

I am happily married with three children and I love spending quality time with them as much as I can. One of my specialties is playing the video game Call of Duty on my PS3 or PS4. Right now, out of 3 million players in the world, I am ranked 175 in EXO. That is a BIG DEAL right there. I love going to parties, social gatherings or a club and dance till everything is done. Watching movies is a must for me and sleeping every chance I get.

### What do you like most about Red Dog?

I like that it is family orientated. Even though I am far from home, Red Dog seems like it brings home to me. The food is phenomenal along with the people here.

### What surprised you most about Red Dog?

To see that people have been doing this [rotational schedule] for 20 years or more travelling back and forth from their homes.

### You're happiest when?

Every time I see my wife, children and family. Other than family, watching horse racing makes me happy. I also love dancing and having open conversations with people.