ONSLOW SALT, AUGUST 2019

Darren Clark, Photographer

Salt is a raw material used for many commodities and demand for it is closely tied to economic growth and performance. In China, rapid economic development and the emergence of Chinese chlor-alkali manufacturers has led to soaring demand for industrial-use salt. The diverse end uses of caustic soda, chlorine and soda ash indicate just how prevalent and essential salt is in our lives. Caustic soda is used in the manufacture of pulp and paper, textiles, soaps and detergents; chlorine applications include the extremely versatile polyurethane plastics used in automobile components, PVC (polyvinyl chloride) employed as a building material, water purification and as a disinfectant; and soda ash is used most commonly in the production of glass. Australia is the world's largest exporter of salt, with 95% of production destined for the chemical industries of Japan, China, Taiwan, Korea, Indonesia and other countries. These markets are expanding currently at 3-4% annually driven by population growth and industrialisation. Demand for industrial salt is increasing and become more competitive.

IMAGE NO.	COMMENTS
BA2840/1427	Evening on the mudflats that surround the town of Onslow. This is a harsh environment yet in the right light there is beauty everywhere. The major barrier to entry for large-scale salt evaporation projects is having a large flat landholding on the coast in an area with low rainfall and high heat/wind conditions, and with favourable impermeable clay-type soil. Given that the operations are normally spread across 20-30km, they also need to be in an area with minimal environmental and social impact The weather conditions and natural environment around the Onslow area make it a perfect location to carry out solar salt mining.
BA2840/1428	One of the many small salt-water ponds next to the highway as you travel into Onslow.
BA2840/1429	A view looking across the Onslow landscape towards the Onslow Salt stockpile, from here the salt is loaded onto a conveyer belt and loaded onto waiting ships in Beadon Bay.

BA2840/1430	The Onslow Salt stockpile never stops being replenished, it's piled up whilst still wet and dries quickly forming a solid crust that prevents erosion. The Onslow Salt plant has been constructed right next to a small creek where the local Thalanyji people who are indigenous to Onslow believe the Rainbow Serpent lives.
BA2840/1431	The pumping station at Onslow Salt draws seawater straight from Beadon Creek at high tide and pumps it into the first of four ponds. Each pump draws 4000 litres a second. In this image only two of the three pumps are working because it is winter, which is a low salt production time of the year. During summer when there is a higher evaporation rate all three pumps would be working.
BA2840/1432	The water around the pumping station is full of fish that have been sucked up through the system into the pondage system. As the water pours out of the outlets nutrients float through the freshly aerated water and the bigger fish that are waiting around these inlets have a feeding frenzy. When we arrived at this location five big pelicans that had been feeding on the fish flew away and waited for us to leave before returning to continue feasting.
BA2840/1433	As I was driven around the pondage system by Jacques Le Roux who is the production manager at Onslow Salt, I was amazed by the size and scale of the infrastructure. These rock walls are designed to prevent waves from destroying the roads systems. The salt field was built by enclosing a vast natural flat area facing the Indian Ocean with sea wall levees. This topographical feature allows the salt field to manage the brine flow efficiently.
BA2840/1434	All of the rocks down on the waters edge are the result of the last cyclone that hit Onslow. It's a never-ending job maintaining these roads and dam walls.
BA2840/1435	The blue green algae in the pondage system feeds on the gypsum that is a soft sulphate mineral formed under salt water. When the salt water evaporates gypsum is left behind.
BA2840/1436	A close up of the blue green algae on the edge of the pondage system. The colours in this landscape are truly breathtaking.
BA2840/1437	The landscape around the Onslow Salt pondage system reminded me of a national park. No one gets to see this landscape and I was really appreciative to be able to document such a pristine environment.
BA2840/1438	When we arrived at the outflow from pond one to pond two I was blown away when I saw huge schools of garfish feeding on smaller fish that were passing though the outlets. Only the garfish gather at this location, Jacques told me that the salinity levels in the water seemed to agree with them here.
BA2840/1439	The longer we stood still at the outlet the closer the garfish came to us. It was at this point that I realised just how much the Onslow Salt infrastructure is part of the ecosystem. When you think about mining you can't help thinking about the destruction of the environment but Onslow Salts infrastructure has created a delicate and sustainable man made ecosystem that works with the environment that it has been built in.
BA2840/1440	Schools of large garfish feeding in the shallows of the second pondage system at Onslow Salt. The salt field encompasses an area of 220 square kilometres, of which operational ponds occupy 87 square kilometres. The salt field's operational ponds are closely interconnected. They consist of six evaporation ponds of 77 square

	kilometres and 15 crystalliser ponds of 10 square kilometres. Seawater is pumped into the first evaporation pond, and brine flows through most of the evaporation ponds by gravity.
BA2840/1441	A dead garfish that has been caught by one of the many species of birdlife that live on the Onslow Salt pondage systems. These are the biggest garfish that I have ever seen - back home in Victoria they are only half this size.
BA2840/1442	Harvesting salt from one of Onslow Salt's crystalliser ponds. This is one of the harshest work environments that I have ever experienced. As I stood there making images I could feel the moisture being draw out of me and the suns glare reflecting of the salt was blinding.
BA2840/1443	The scale of this operation is massive, each one of the wheels on this truck coast $22,000 dollars. OMG. Each truck weighs 365 tonnes and can carry a load of salt that weighs 225 tonnes. There are always three trucks on the go, one getting serviced and one on standby.
BA2840/1444	There are fifteen crystallizer ponds that have been built on top of mudflats. To create each crystallizer they first allow a layer of salt to form a thick, hard, base which they then flood with salt enriched water that has worked its way through the four evaporation ponds. Then over a year they allow the salt to grow to a harvestable level which is 280mm. There is no order to harvesting the crystallizers as it is all dictated by the weather.
BA2840/1445	Jacques Le Roux who is Onslow Salt's production manager holding a lump of salt that Onslow salt has grown. As the salt grows it also records the weather over a year. This lump of salt has a red line through the middle of it. Jacques told me this was from a dust storm that had swept through Onslow earlier this year leaving a sheet of red dust over the crystallizer ponds.
BA2840/1446	Each crystallizer pond covers an area of 65 hectares. This truck in the background is a massive vehicle yet it's dwarfed out here in this amazingly harsh environment.
BA2840/1447	One of the three belly loaders heading back to the stockpile after being filled with freshly harvested salt. Each truck repeats this process 14 to 15 times per twelve-hour shift seven days a week.
BA2840/1448	Before the salt can be harvested a grader rips open the hard surface and then pushes the wet salt into windrows ready for the harvester to pick up and load onto the waiting trucks.
BA2840/1449	This close up of the grader shows just how hard the environment is on the Onslow Salt equipment. Regular maintenance of the equipment is a big part of the work cycle as the salt promotes rust on everything.
BA2840/1450	The grader blade has to be cleaned once a week with high-pressure salt water to remove the salt that has built up on the blade because it sets rock solid.
BA2840/1451	A back view of the Onslow Salt grader blade with crystallised salt that has begun to set on the blade, it looks like snow but it is super corrosive.
BA2840/1452	One of the crystallizer ponds at Onslow Salt covered with salt enriched water that has worked its way through the pondage system. Each pond is drained ten days before harvesting and the salt is still wet throughout the process. This is a sterile environment and the super salty water is translucent, the colours out here are truly incredible to photograph.

BA2840/1453	The colours out on the crystallizer ponds at Onslow Salt affected me deeply. I never thought that I would love working in a sterile environment like this one, but the truth is I couldn't get enough of it. The band of what looks like seaweed is dead algae that the wind has pushed to one end of the pond.
BA2840/1454	The size of Onslow Salt's stockpile of salt is breathtaking. From up close it looks like an iceberg or as the men call it Pilbara "snow".
BA2840/1455	There is a hard skin like surface over each of the mountains of salt at Onslow Salt. A hard crust forms over the stockpile that stops it dissipating in the rain or blowing away.
BA2840/1456	A frontend loader is used to crack the outer shell of the salt and push it down the working face to be loaded onto a conveyer belt where it is then put through a cleaning machine.
BA2840/1457	A side view of the Onslow Salts stockpile gives a better understanding of the scale of this operation. This mountain of salt is always in motion, whilst being added to at one end, the other is being clipped away and loaded onto the waiting conveyer belt.
BA2840/1458	Ashley Roper is one of the machine operators at Onslow Salt. He is highly skilled at his job and has been driving dozers for the past eight years. Ashley told me that he can feel every movement of both the machine he is operating, which in this case is a 375 D10 Komatsu dozer, and the salt stock pile which he very skilfully pushes down the open face to a smaller dozer at the bottom.
BA2840/1459	Inside the service centre at Onslow Salt. This is one of the hardest jobs at Onslow Salt due to the fact that the diesel mechanics are exposed to the full force of the environment. During Summer this shed's temperatures ranges from the mid 30sc into the high 40sc. All of the other employees work in air conditioned environments.
BA2840/1460	The day shift crew of Diesel mechanics servicing a harvest trucks, during summer this shed is like a furnace to work in.
BA2840/1461	The main work complex at Onslow Salt. In this shed you will find the mechanics workshop, the science lab, an office and the lunchroom also known as a crib room on heavy industry sites such as this one.
BA2840/1462	Evening down at the Onslow Salt loading jetty, Sunset Beach Onslow.
BA2840/1463	The Onslow Salt loading jetty at Sunset Beach, Onslow.
BA2840/1464	Onslow Salts wash Station. From here the salt is washed down, and then dumped onto the stockpile.
BA2840/1465	When I arrived on Saturday morning at the Onslow Salt plant the shift crew that I was working with were busy cleaning diesel out of one of the bays in the washing plant. On the previous shift a belly dump truck had burst a fuel line and spilt diesel into the first bay of the washing plant. This crew's job was to wash all of the contaminated salt out of the bay and get the plant operating again as quickly as possible. In this image Phil Stewart is pouring dispersing agent down onto the salt pile below the screen.

BA2840/1466	Salt travelling up a conveyer belt to the top of the wash plant to be washed. Here all the dirt and impurities are removed from the salt and magnesium and calcium are sprayed back onto the salt as it leaves on a conveyer belt on its way to the stockpile.
BA2840/1467	Looking across to the drop bridge from on top of the wash station, here the salt is sized before being washed.
BA2840/1468	Clearing the first hopper after a diesel spill. When accidents such as this one occur, the whole production line shuts down
BA2840/1469	Phil Stewart is a true Onslow local who has lived in Onslow since he was 8 years old, He is now 61 years old and has worked at Onslow Salt for the past twenty years. Phil told me that he started working at Onslow Salt driving a water truck during the construction of the plant. He enjoys the work at Onslow Salt but the new work roster is killing him. Phil wasn't the only one complaining about the 12 hour shifts, which consisted of seven day shifts followed by seven night shifts and then seven days off. Phil told me that being a single man it was really challenging to come home after a long hard shift and cook himself a decent meal before going to bed because he was so fatigued. Since the new roster started the number of work sick days taken by the staff and work related accidents has risen.
BA2840/1470	Ashley Roper is a leading hand at Onslow Salt. He lives down in the northern suburbs of Perth and flys up to Onslow every two weeks to work. Ashley pays for his own flights. I asked Ashley if it was expensive to travel back and forth from Perth all the time, he replied, " yes it is but I don't want to live in Onslow because there is nothing here for me to do".
BA2840/1471	Looking out onto the Onslow Salt stockpile from on top of the stacker. The men all call this the Pilbara snowfield.
BA2840/1472	Looking down onto the Onslow Salt stockpile from up on the stacker.
BA2840/1473	Looking down the conveyer belt towards the Onslow Salt plant.
BA2840/1474	The Onslow Salt stockpile.
BA2840/1475	Onslow Salt team leader Dwayne Archer with leading hand Ashley Roper.
BA2840/1476	Onslow Salt team leader Dwayne Archer is an old hand when it comes to working in the resource industry sector. He has lived and worked in mining towns such as Newman, Tom Price and Paraburdoo for most of his life. Dwayne enjoys living in Onslow but he told me that it is a town divided by different resource companies. He said that the B.H.P. and Chevron employees don't mix with the Onslow locals because it was company policy.
BA2840/1477	Onslow Salt employees clearing contaminated salt out of the No1 hopper after a diesel spill.
BA2840/1478	Smoko at the Onslow Salt mine in Onslow.
BA2840/1479	The conveyer belt at Onslow Salt is 1.2km long and carries 250 tons of salt at a time out to waiting ships loading at the end of the pier.

BA2840/1480	Salt pouring off the stockpile conveyer belt down onto another conveyer belt that takes the salt out onto the loading Jetty to be loaded onto a waiting ship.
BA2840/1481	Cameron Elliott driving a 16-meter grader on one of Onslow Salt's crystallizer ponds. In this image Cameron is making a new track for the belly dumper to drive on when harvesting the salt from the crystallizer pond.
BA2840/1482	Onslow Salt employee and Onslow local Cameron Elliott. Cameron has lived with his wife in Onslow for the past eighteen years. For the first two years Cameron worked as a boiler maker at one of the local engineering companies before finding employment at Onslow Salt. Cameron told me that he enjoys living the country lifestyle in Onslow, " I love this part of the country, and the Pilbara is a big part of who I am". During his time off he goes fishing with his wife and camping in the outback.
BA2840/1483	Onslow Salt employee Cameron Elliott in his grader ripping salt ready to be harvested, Cameron was happy when I made this image of him because I allowed him to keep his Sunglasses on.
BA2840/1484	A belly dump truck leaving one of the crystallizers with a full load of salt.
BA2840/1485	A portrait of the hardest worker at the Onslow Salt Mine - me.
BA2840/1486	Team Leader Dwayne Archer inspecting the bucket on a Cat 992 loader.
BA2840/1487	One of the stockpiles of salt at Onslow Salt, all the boy's call these Pilbara snow stacks.
BA2840/1488	One of the Onslow Salt stockpiles of Salt ready to be shipped out.
BA2840/1489	The transfer conveyer snowed in after an electrical fault. When one piece of machinery breaks down the whole line stops and production grinds to a halt.
BA2840/1490	Replenishing the stockpile at Onslow Salt is a never ending job.
BA2840/1491	Salt being loaded onto a waiting ship down at the Sunset Beach loading jetty. Onslow Salt's port facilities enable 50,000-ton class ships to berth.
BA2840/1492	Filling the forward hatch with industrial salt ready to be shipped over to Asia. The project, which dispatched its first shipload of 45,000 ton of salt in July 2002, services the rapidly growing chlor-alkali and other salt consuming industries across the Asia-Pacific region, and represents a further step in the development of Australia's $300m a year solar salt export industry.
BA2840/1493	There are five hatches on this ship, each taking four and a half hours to fill. The conveyer belt loads four hundred tonnes of salt per hour.
BA2840/1494	Looking down into the forward hatch of the ship I was blown away by how much salt each hatch held.
BA2840/1495	Rod Fulwood operating the conveyer belt that loads the ships. He told me that he likes this job because he was out on the loading jetty by himself for most of the day which allowed him to find some head space.

BA2840/1496	Looking down the conveyer belt line as it loads a ship with industrial salt. Onslow Salt Pty Ltd is capable of producing 2.5 million tonnes of sodium chloride per annum. The project has handling facilities to transport, process, store and load salt into ships for export. The jetty is approximately a 1.3 kilometre steel trestle way and is situated off Sunset Beach.
BA2840/1497	Every employee at Onslow Salt has to take an alcohol test before they are allowed out of the team leaders office each morning. When I arrived at 6.30am two employees from the night shift burst into the office and started yelling at Dwayne about the way the entry points were being made onto the crystallizer ponds to harvest the salt. Dwayne listened to their argument and tried to explain to them why it was being done the way it was but they didn't want to listen. They just kept on yelling and then stormed out of the office. Dwayne being the professional that he is kept his cool and settled his day shift crew down because they had also copped a blast from these two blokes, both of whom have only been working at Onslow Salt for the past two years and they were trying to tell people who have worked at the company for the past fifteen to twenty years how to do their jobs. There are so many different personality types all thrown together in the Pilbara chasing the big bucks and they're all working long hours doing the hard yards in an extremely harsh environment and at some stage everybody loses it out here.
BA2840/1498	Shane Boyle is Onslow Salts pond tenderer, each day he takes weather reading which help to predict the evaporation levels.
BA2840/1499	Onslow Salt pond tenderer Shane Boyle topping up a class A evaporation pan.The class A evaporation pan is a standard device for manual measurement of evaporation. The pan represents an open body of water: It is filled with water and exposed on a flat plateau. The evaporation rate is calculated by the change in level of the free water surface (daily manual readings) and the recorded rainfall (in millimetres). Data can be calculated for any period required for estimation of evaporation and evapotranspiration rates.
BA2840/1500	Onslow Salt pond tenderer Shane Boyle taking a sample of water from one of the evaporation ponds so that the calcium level can be measured. Fully saturated brine is stored in the last evaporation pond before being fed into the crystalliser ponds. Large crystalliser ponds allow the Onslow Salt salt fields to utilise the area efficiently and operate a productive harvesting operation.
BA2840/1501	Angela Brockman who is a contract laboratory technician dispensing the daily samples taken from Onslow Salts pondage system. The samples are tested every three hours to check calcium and magnesium levels.
BA2840/1502	When I was walking back to my car after watching a ship being loaded at the end of the Onslow Salt loading jetty, I noticed what looked like an eagles nest right in the middle of the work plant. Dwayne told me that it the base of an old cray fishing pot that one of the men had placed on top of a pole. An osprey eagle has turned this craypot into its nest and for the past two years has hatched its chicks there.
BA2840/1503	The Onslow salt production manager Jacques Le Roux. Jacques and his wife Su-Mari left their home country of South Africa in 2002 for Western Australia were Jacques found work as a production superintendent at the St Ives Gold mine in Kalgoorlie and they lived in Kalgoorlie for one year. In 2008 Jacques was offered a job at Onslow

	Salt as the production manager and he and his family are still here today. Jacques enjoys living in Onslow and thinks that it is a nice quiet place to bring up his four children. Jacques said that the social life around town can be a little bit challenging at times but he and his family mostly keep to themselves.
BA2840/1504	An infrared image of Onslow salt production manager Jacques Le Roux in the landscape around Onslow.
BA2840/1505	Onslow salt production manager Jacques Le Roux with his three young sons, Saskia (6) Tristan (9) and Keagan who is 14 years old. Two of the boys attend Onslow Primary School, whilst 14-year-old Keagan attends a private college in Geraldton.
BA2840/1506	The mudflats of the Wagyl at Sunrise. The Thalanyji people are the local traditional owners in the Onslow area. The Thalanyji cultural tradition is associated with the rainbow serpent Burra Balanyji that created underground tunnels in the area which link all of the water bodies around Onslow – the rivers, the creeks and all the fresh water soaks. The areas where freshwater exists inland are considered sacred, as are the hunting grounds of the creek and river. There has been consultation with the Thalanyji people in the review of the structure and the review identifies areas of cultural sensitivity. On the morning that I made this image I was walking through the sand dunes down towards to Onslow Salt's stockpile and I was amazed by the number of Kangaroos that were hopping along just in front of me. Burrba Balayji is a significant site located near the Sunset Beach which was used as an old camping ground for the Thalanyji and Nhuwala people in the early days. They got fresh water from the soak here and hunted around the area for animals and shellfish.
BA2840/1507	As the sun rose up over the sand dunes around the Onslow Salt mine the landscape came alive. With every step that I took a skylark flew up into the sky singing its heart out, flocks of finches darted around the sand dunes chatting to one another and the buzzing of insects filled my ears. I followed the tracks that the Kangaroos had made down to the edge of the Wagyl, it is here that the local indigenous people believe that the Rainbow Serpent lives. I had to be careful as I moved through this delicate ecosystem because small spiders had spun their silky webs everywhere and my legs were exposed to them because I was wearing my work shorts, I spent half an hour making images of the beautiful landscape as the golden light of the morning slowly kissed the mudflats.
BA2840/1508	Loading Salt down at the jetty at Sunset Beach on a Friday night. Onslow. The Pilbara never sleeps.