



PENGELOLAAN AIR DAN EFLUEN

[103-1][103-2][103-3]

Air merupakan aspek penting yang menjadi kebutuhan utama dalam operasional dan keperluan pendukung ANTAM. Perusahaan berkomitmen untuk mengelola air dengan baik dan berusaha mengurangi penggunaan air yang berasal dari sumber air baku. ANTAM melakukan pengelolaan air sesuai dengan kaidah *good mining practice* sesuai peraturan yang berlaku. Salah satu upaya tersebut adalah pemenuhan Surat Ijin Pengusahaan Air Tanah dan Surat Ijin Pemakaian Air (SIPA) di unit bisnis. Melalui upaya ini diharapkan aktivitas Perusahaan tidak mempengaruhi ketersediaan air bersih bagi masyarakat di sekitar wilayah operasi. [303-1]

Berdasarkan *Country Water Assessment* oleh Asia Development Bank, secara umum Indonesia tidak mengalami kekurangan air. Namun ada potensi jangka panjang terjadi *water stress* di daerah padat-daerah penduduk seperti Pulau Jawa dan Sumatera. ANTAM memiliki dua unit bisnis yang berada di Pulau Jawa yakni UBP Emas, dan UBPP Logam Mulia serta Kantor Pusat. Namun, seluruh area ANTAM, baik yang ada di Jawa maupun area lainnya, memiliki komitmen terhadap air sebagai sumber daya bersama yang amat penting bagi masyarakat, lingkungan dan keberlanjutan operasional Kami. [303-1]

Untuk itu, seluruh area operasional ANTAM memiliki strategi pengelolaan air yang terdiri dari tiga fokus utama. Pertama, ANTAM berupaya mengurangi beban pengambilan air baku dari alam terutama air tanah dan air permukaan. Kedua, memaksimalkan penggunaan air hasil resirkulasi dan daur ulang untuk proses produksi dan penggunaan lain seperti *landscaping*, penyiraman, kebutuhan air lain di area operasional. Ketiga, memastikan kualitas air yang akan dialirkan kembali ke badan air umum telah sepenuhnya memenuhi baku mutu yang diatur oleh peraturan yang berlaku. [303-1]

Setelah air digunakan dalam proses operasional, Kami senantiasa memonitor baku mutu keluaran air dari operasional ANTAM sebelum dialirkan kembali ke badan air umum (sungai dan laut).

WATER AND EFFLUENT MANAGEMENT

[103-1][103-2][103-3]

Water is an important aspect and the primary requirement in ANTAM's operations. The Company is committed to managing water properly and trying to reduce usage from raw water sources. ANTAM handles water that suitable with a good mining practice that meets with applicable regulations. One of these efforts is fulfilling a Groundwater Concession Permit and a Water Use Permit (SIPA) in the business unit. Through this effort, it is expected that the Company's activities will not affect clean water availability for the communities around the operating area. [303-1]

Based on the *Country Water Assessment* by the Asia Development Bank, Indonesia does not experience water shortages. However, there is long-term potential for water stress to occur in densely populated areas such as Java and Sumatera. ANTAM has two Business Units and a head office in Java, namely Gold Mining Business Unit and Precious Metals Processing and Refinery Business Unit. However, all ANTAM areas, both in Java and other regions, have a commitment to water as a shared resource that is particularly important to society, the environment, and Our operational sustainability. [303-1]

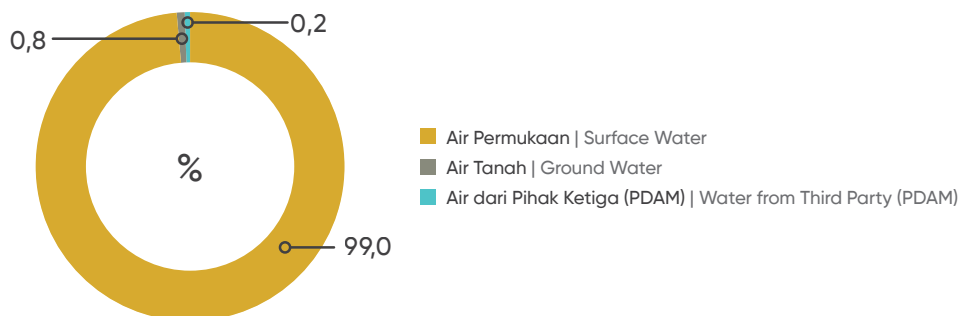
For this reason, all of ANTAM's operational areas have a water management strategy that consists of three main focuses. First, ANTAM seeks to reduce the burden of taking raw water from nature, primarily groundwater and surface water. Second, maximizing the use of re-circulated and recycled water for production processes and other services such as landscaping, sprinkling, different water needs in operational areas. Third, ensure that water quality that will return to public watershed has fully met the quality standards stipulated by applicable regulations. [303-1]

After the water is consumed in the operational process, we continually monitor the quality standards of water output from ANTAM's operations before returning to the public watershed (rivers and seas).

Jumlah Pengambilan Air | Amount of Water Withdrawal [303-3]

Berdasarkan Sumber Air Base on Water Source	Volume Pengambilan Air (Megaliter) Water Withdrawal Volume (Mega liter)	%
Air Permukaan Surface Water	8,038	99,0%
Air Tanah Ground Water	63,34	0,8%
Air dari Pihak Ketiga (PDAM) Water from Third Party (PDAM)	16,16	0,2%
TOTAL Pengambilan Air TOTAL Water Withdrawal	8.120	100%

Berdasarkan Kategori Kualitas Air Base on Water Quality Category	Volume Pengambilan Air (Megaliter) Water Withdrawal Volume (Mega liter)	%
Freshwater (TDS ≤ 1000 mg/L)	8.120	100%
Non-Freshwater (TDS>1000 mg/L)	0	0%
TOTAL Pengambilan Air TOTAL Water Withdrawal	8.120	100%



Catatan:

- Area operasional di luar Pulau Jawa, tidak menghitung Total Dissolved Solid (TDS) karena Peraturan Pemerintah setempat hanya mewajibkan pengukuran *Total Soluble Solid* (TSS). Untuk itu, TDS dihitung menggunakan estimasi dari titik tertinggi TSS hasil uji laboratorium dari sampel air yang diambil secara berkala.
- Sedangkan area operasional yang ada di Pulau Jawa, dilakukan penghitungan TDS berdasarkan peraturan pemerintah daerah setempat.

Notes:

- Operational areas outside Java, do not measure Total Dissolved Solid (TDS) because local government regulations only require the measurement of Total Soluble Solid (TSS). For this reason, TDS is calculated using estimates from the highest point of TSS laboratory test results base on water samples taken periodically.
- Meanwhile, for operational areas in Java, the TDS calculation is carried out based on local government regulations.

Dalam kegiatan operasional, ANTAM menghasilkan air limbah yang merupakan hasil samping dari proses produksi. ANTAM senantiasa berkomitmen terhadap tanggung jawab penanganan air limbah sesuai ketentuan yang berlaku dengan memastikan baku mutu air limbah sebelum dilepaskan ke badan air umum. ANTAM berharap dengan upaya ini, kebutuhan masyarakat terhadap air di sekitar wilayah operasi tidak terpengaruh dan tetap memiliki kualitas yang baik. [303-2]

In operational activities, ANTAM produces wastewater which is a byproduct of the production process. ANTAM is always committed to handling wastewater by applicable regulations by ensuring wastewater quality before discharge into the public watershed. ANTAM expects that through these efforts, we can maintain the quality and quantity of water as shared resources with the local community surrounding Our operational areas. [303-2]

Di setiap unit bisnis, efluen akan diproses melalui kolam penampungan dan resirkulasi, kolam pengendap, atau Instalasi Pengolahan Air Limbah (IPAL). Hal itu dilakukan untuk memastikan aliran limbah tetap aman bagi lingkungan dan tidak mengganggu masyarakat sekitar. Pemantauan juga dilakukan secara berkala baik oleh internal ANTAM maupun instansi eksternal yang bekerja sama dengan laboratorium terakreditasi, agar kualitas efluen yang dialirkan kembali ke lingkungan sesuai dengan standar baku mutu lingkungan. [303-2]

In each Business Unit, effluent will be processed through storage and recirculation ponds, sedimentation ponds, or Wastewater Treatment Plants (IPAL). The process ensures that the waste stream remains safe for the environment and does not disrupt the surrounding community. Monitoring is also conducted regularly by both internal and external agencies in collaboration with accredited laboratories. The quality of effluent is following environmental quality standards. [303-2]

Berikut ini upaya pengelolaan air limbah yang dilakukan di unit bisnis dan informasi badan air penerima aliran efluen setelah proses pengelolaan dan pemantauan lingkungan: [303-2][303-4]

The following are wastewater management efforts in Business Units and information of water bodies effluent flow after the environmental management and monitoring process: [303-2][303-4]



Unit Bisnis Business Unit	Pengelolaan Air Limbah Waste Water Management	Badan Air Tujuan Pembuangan Discharge Destination
UBP Nikel Sulawesi Tenggara Southeast Sulawesi Nickel Mining Business Unit	Dua kolam penampungan dan resirkulasi yang berfungsi untuk menampung dan mengolah air limbah dari pabrik pengolahan maupun proses pendinginan slag Two settling and recirculation ponds serve to collect and treat wastewater from the mill and the slag cooling process	Laut Ocean
UBP Nikel Maluku Utara North Maluku Nickel Mining Business Unit	Enam kolam pengendap six sedimentation pond	Laut Ocean Sungai River
UBP Emas Gold Mining Business Unit	Dua IPAL yakni IPAL Tambang dan IPAL Cikaret untuk mengolah air limbah Two waste water treatment plant of Tambang and waste water treatment plant of Cikaret to manage the waste water	Sungai Cikaniki & Cikaret River Cikaniki & Cikaret River
UBPP Logam Mulia Precious Metals Processing and Refinery Business Unit	Satu IPAL (<i>zero discharge</i>) One waste water treatment (<i>zero discharge</i>)	Kali Sunter Sunter River
UBP Bauksit Kalimantan Barat West Kalimantan Bauxite Business Unit	Satu kolam pengendap yang terdiri dari 14 kompartemen untuk memaksimalkan sistem gravitasi pengendapan lumpur Sedimentation pond with 14 compartments to maximize the siltation of gravity system	Sungai Beganjing Beganjing River

Jumlah Air yang Dialirkan ke Badan Air Umum [303-4]
Amount of Water Discharged to Public Watershed [303-4]

Jumlah Air yang Dialirkan Base on Discharge Destination	Seluruh Area (Megaliter) All Area (Mega liter)
Berdasarkan Tujuan Pembuangan Base on Discharge Destination	Laut Sea 3.402,20 Sungai River 4.887,97
Total	
Berdasarkan <i>Freshwater</i> atau <i>Other Water</i> Base on Freshwater or Other Water	<i>Freshwater</i> ($\leq 1,000$ mg/L <i>Total Dissolved Solids</i>) 8.290,17 <i>Non-freshwater</i> ($> 1,000$ mg/L <i>Total Dissolved Solids</i>) 0

Jumlah Air yang Dialirkan ke Badan Air Umum Berdasarkan Unit, Jenis, dan Metode Pembuangan [303-4]
Total Water Discharged to Public Watershed based on Unit, Type and Disposal Method [303-4]

Unit Bisnis Business Unit	Nama Outlet Outlet Name	Tujuan Pelepasan Discharge Destination	Volume dari IPAL ke Badan Air (ribu m3) Volume from WWTP to Water Body (thousand m3)		
			2018	2019	2020
UBP Nikel Sulawesi Tenggara Southeast Sulawesi Nickel Mining Business Unit	Kolam Pengendap Bea Cukai Bea Cukai Settling Pond	Laut Ocean	4.948	2.625	3.223
UBP Nikel Maluku Utara North Maluku Nickel Mining Business Unit	Kolam Pengendap Pakal AT-01 Pakal AT-01's Settling Pond	Laut Ocean	84,7	33,4	61
	Kolam Pengendap Pakal AT-02 Pakal AT-02's Settling Pond	Laut Ocean	25,1	21,3	10,6
	Kolam Pengendap Pakal AT-03 Pakal AT-03's Settling Pond	Sungai River	-	-	14,01

Jumlah Air yang Dialirkan ke Badan Air Umum Berdasarkan Unit, Jenis, dan Metode Pembuangan [303-4]
Total Water Discharged to Public Watershed based on Unit, Type and Disposal Method [303-4]

Unit Bisnis Business Unit	Nama Outlet Outlet Name	Tujuan Pelepasan Discharge Destination	Volume dari IPAL ke Badan Air (ribu m ³) Volume from WWTP to Water Body (thousand m ³)		
			2018	2019	2020
	Kolam Pengendap Tj. Buli AT-02 Tj. Buli AT-02's Settling Pond	Laut Ocean	115,2	35,38	40,6
	Kolam Pengendap Tj. Buli AT-03 Tj. Buli AT-03's Settling Pond	Laut Ocean	37,6	17,4	19,6
	Kolam Pengendap Tj Buli AT-04 Tj. Buli AT-04's Settling Pond	Laut Ocean	7,7	17,59	47,4
UBP Emas Gold Mining Business Unit	IPAL Tambang Mine WWTP	Sungai Cikaniki Cikaniki River	647	660	3.056
	IPAL Cikaret Cikaret WWTP	Sungai Cikaret Cikaret River	913,10	883,38	1.694
UBPP Logam Mulia* Precious Metals Processing and Refinery Business Unit	IPAL WWTP	Kali Sunter Sunter River	0	0	0
UBP Bauxit Kalimantan Barat West Kalimantan Bauxite Business Unit	Kolam Pengendap Settling Pond	Sungai Beganjing Beganjing River	0	47	123,96
Jumlah Total			6.778,4	4.341	8.290,17

*Nihil Pengaliran | *Zero Discharge

Tabel Hasil Pengukuran Kualitas Air Limbah | Table of Wastewater Quality Measurement Results

Unit Bisnis Business Unit	Parameter	Satuan Unit	Baku Mutu Lingkungan* Environmental Quality Standard	Hasil Pengukuran Tertinggi Highest Measurement Result		
				2018	2019	2020
UBP Nikel Sulawesi Tenggara Southeast Sulawesi Nickel Mining Business Unit	pH		6-9	8,85	8,90	8,89
	TSS	mg/L	100/200	24	75	20
	Cr6+	mg/L	0,1	0,066	0,0638	0,0276
	Cu	mg/L	2	0,054	0,010	0,01
	Cd	mg/L	0,05	0,003	0,0034	0,003
	Zn	mg/L	5	0,033	0,165	0,0417
	Pb	mg/L	0,1	0,002	0,0484	0,0451
	Ni	mg/L	0,5	0,07	0,1142	0,07
	Cr total	mg/L	0,5	0,25	0,085	0,0613
	Fe	mg/L	5	0,369	0,723	0,3211
Co	mg/L	0,4	0,056	0,056	0,0679	



Tabel Hasil Pengukuran Kualitas Air Limbah | Table of Wastewater Quality Measurement Results

Unit Bisnis Business Unit	Parameter	Satuan Unit	Baku Mutu Lingkungan* Environmental Quality Standard	Hasil Pengukuran Tertinggi Highest Measurement Result		
				2018	2019	2020
UBP Nikel Maluku Utara North Maluku Nickel Mining Business Unit	pH		6-9	8	8	7,97
	TSS	mg/L	200	90	100	15
	Cr6+	mg/L	0,1	0,064	0,1	0,03
	Cu	mg/L	2	0,005	0,005	0,005
	Cd	mg/L	0,05	0,0003	0,0013	0,01
	Zn	mg/L	5	0,019	0,049	0,01
	Pb	mg/L	0,1	0,009	0,055	0,027
	Ni	mg/L	0,5	0,46	0,49	0,065
	Cr total	mg/L	0,5	0,183	0,405	0,085
	Fe	mg/L	5	3,78	1,18	0,28
	Co	mg/L	0,4	0,008	0,036	0,001
UBP Emas Gold Mining Business Unit	pH		6-9	8,6	8,63	8,48
	TSS	mg/L	200	173,3	120,5	27,2
	CN-	mg/L	0,5	0,33	0,35	0,05
	Hg	mg/L	0,005	0,003	0,002	0,001
	As	mg/L	0,5	0,0323	0,0323	0
	Cd	mg/L	0,1	0,0087	0,0087	0
	Zn	mg/L	5	0,11	0,005	0,21
	Cu	mg/L	2	1,66	1,13	0,39
	Pb	mg/L	1	0,0591	0,0591	0,02
	Cr	mg/L	1	0,02	0,2	0,04
	Ni	mg/L	0,5	0,0113	0,15	0
UBPP Logam Mulia Precious Metals Processing and Refinery Business Unit	pH		6-9	8	8	8
	TDS	mg/L	1000	4	11	4
	BOD	mg/L	75	6	7	14
	COD	mg/L	100	32	32	68
UBP Bauksit Kalimantan Barat West Kalimantan Bauxite Business Unit	pH		6-9	7,12	6,98	7,21
	TSS	mg/L	200	22,6	35	7,7
	Fe	mg/L	5	2,3	1,8	4,64
	Mn	mg/L	2	0,038	<0,001	0,531

Catatan:

* Acuan Baku Mutu:

- UBP Emas, berdasarkan:
 - Kepmen LH No.202 Tahun 2004 tentang Baku Mutu Air Limbah bagi Usaha dan/Kegiatan Pertambangan Bijih Emas dan atau Tembaga
- UBP Nikel Sulawesi Tenggara dan UBP Nikel Maluku Utara, berdasarkan:
 - Permen LH No.9 tahun 2006 tentang Baku Mutu Air Limbah bagi Usaha dan/Kegiatan Pertambangan Bijih Nikel
- UBP Bauksit, berdasarkan:
 - Permen LH No.34 Tahun 2009 tentang Baku Mutu Air Limbah bagi Usaha dan/Kegiatan Pertambangan Bijih Bauksit
- UBPP Logam Mulia berdasarkan:
 - Peraturan Gubernur Provinsi Daerah Khusus Ibukota Jakarta No.69 tahun 2013 tentang Baku Mutu Limbah Bagi Kegiatan dan/atau Usaha.

Note:

* Quality Standard Reference:

- Gold Mining Business Unit, based on:
 - Decree of the Minister of Environment No.202 of 2004 on Wastewater Quality Standards for Gold and or Copper Ore Mining Businesses and/or Activities Southeast Sulawesi Nickel Mining Business Unit and North Maluku Nickel Mining Business Unit, based on:
- Regulation of the Minister of Environment No. 9/2006 on Wastewater Quality Standards for Nickel Ore Mining Businesses and/or Activities Bauxite Mining Business Unit, based on:
 - Regulation of the Minister of Environment No. 34/2009 on Wastewater Quality Standards for Bauxite Ore Mining Businesses and/or Activities Precious Metal Processing and Refinery Business Unit based on:
- Regulation of the Governor of the Special Capital Region of Jakarta No. 69 of 2013 on Waste Quality Standards for Activities and/or Businesses.



8.120 MI

Jumlah air baku yang dikonsumsi tahun 2020 [303-5]
Amount of raw water consumption in 2020 [303-5]

62,37 %

Air yang digunakan oleh ANTAM untuk proses produksi dan operasional adalah air hasil resirkulasi dan daur ulang, dengan total air yang dire sirkulasi mencapai 13.459 Megaliter of the water used for production and operational processes is re-circulated and recycled water, which amounted to 13.459 Mega liters.

Dalam proses operasional, ANTAM menggunakan air yang berasal dari air permukaan, air tanah, air kolam endapan, dan air daur ulang limbah. Khusus air daur ulang limbah digunakan kembali untuk proses produksi.

ANTAM uses water derived from surface water, groundwater, sediment pond water, and waste recycled water in the operational process. Specifically, the recycled waste water is reused for the production process.

Volume dan Penggunaan Air Hasil Daur Ulang | Volume and Recycled Water Usage

Unit Bisnis Business Unit	Sumber Air Water Source	Tujuan Sirkulasi Recirculation Purpose	Volume (ribu m ³) Volume (thousand m ³)		
			2018	2019	2020
UBP Nikel Sulawesi Tenggara Southeast Sulawesi Nickel Mining Business Unit	Cekdam Bea Cukai Checkdam of Bea Cukai	Operasional Pabrik dan Proses Pendinginan Slag Plant Operational and Slag Cooling Process	13.126	6.376	7.881
UBP Nikel Maluku Utara North Maluku Nickel Mining Business Unit	Cekdam AT01 Pakal Checkdam of AT01 Pakal		2,92	2,92	2,92
UBP Emas Gold Mining Business Unit	Instalasi Pengolahan Air Limbah (IPAL) Tambang Mine Waste Water Treatment Plant (WWTP)	Air Bahan Baku Pabrik Raw Water for Production Plant	1.449,33	1.044,94	1.542,93
		Air Backfilling Backfilling Water	165,45	73,96	218,77
		Air Pengeboran Tambang Mining Drilling Water	490,46	365,96	36,92
		Air Limbah Tailing Pabrik Plant Tailings Waste Water	707,01	277,14	771,47
UBPP Logam Mulia Precious Metals Processing and Refinery Business Unit	Instalasi Pengolahan Air Limbah (IPAL) & Pemurnian Perak Waste Water Treatment Plant (WWTP) & Silver Refinery	Proses Leaching Klorida Chloride Leaching Process	N/A	N/A	N/A
		Spent Electrolyte Pemurnian Perak Spent Electrolyte of Silver Purification	0,188	102	572
		Mineral Dressing	0	0	0
UBP Bauksit Kalimantan Barat West Kalimantan Bauxite Mining Business Unit	Washing Plant	Proses Pencucian Bijih Bauksit The Process of Washing Bauxite Ore	934	5.178	2.433
TOTAL			17.063,67	13.420,92	13.459