

The Result of Water Analysis surrounding the Nickel Mining Sites and the Nickel Processing Plants in Taganito, Claver, Surigao del Norte in December 2018
(Dates of Water Sampling: December 12 and 13, 2018)

Sampling Location No.	1	2	3	4	5	6	7	8
Date of Sampling	2018/12/12	2018/12/12	2018/12/12	2018/12/13	2018/12/13	2018/12/13	2018/12/13	2018/12/13
Time of Sampling	14:46:40	15:17:59	15:38:53	11:37:25	11:47:33	12:05:49	12:25:08	12:51:30
Location of Sampling	The drinking water program by consumers' cooperation in Taganito (Social Development Management Program=SDMP)	The mouth of Taganito River (Brgy. Taganito)	The mouth of Hayanggabon River (Brgy. Hayanggabon)	Water to be able to get along the road near the resettlement site of Mamanwa and to be used for drinking and domestic purpose (Brgy. Cagdianao)	Water to be able to get near the left side from the entrance of the resettlement site for the Mamanwa people (but outside of the resettlement) (Brgy. Cagdianao)	Water to be able to get down the road from the entrance of the resettlement site for the Mamanwa people (but outside of the resettlement) (Brgy. Cagdianao)	The mouth of Hayanggabon River (Brgy. Hayanggabon)	The mouth of Taganito River (Brgy. Taganito)
Latitude and Longitude	N9 32.607 E125 49.399	N9 32.565 E125 49.504	N9 32.353 E125 50.235	N9 30.781 E125 52.295	N9 30.784 E125 52.293	N9 30.866 E125 52.147	N9 32.353 E125 50.235	N9 32.565 E125 49.504
Result of on-the-spot examination by simple detector tube for hexavalent chromium (mg/L)	反応なし	0.1	0.075	0.08	1	0.04	Trace	0.15
pH	6.7	8.23	7.79	7.03	6.4	8.08	7.78	8.17



The gate of Taganito Mining Corporation (TMC)	The gate of Taganito HPAL Nickel Corporation
N9 32.609 E125 49.110	N9 32.237 E125 49.794

<The results of examination on metals by ICP-MS, or Inductively Coupled Plasma Mass Spectrometer, at the laboratory in Japan> (Unit: μg/L)

ug/L	1	2	3	4	5	6	7	8	(Average concentration in the sea water)	Japanese Environmental Standards (Cr=Cr6+) mg/L	Japanese Water Supply Act (Cr=Cr6+) mg/L	Control Target under the Japanese Water Supply Act mg/L	WHO Guidelines for drinking-water quality (Cr=Total Cr) mg/L
Cr	0.0	105	206	65.8	589	29.5	284	159	0.212	0.05	0.05		
Ni	0.0	38.5	30.0	49.5	59.6	24.7	46.0	21.3	0.48			0.01	
Zn	376	14.3	4.9	2.3	1.0	1.7	2.5	7.2	0.350		1		
B	49.0	159	183	6.7	6.7	7.1	529	274	4500	1	1		
Mn	0.4	24.8	648	1.2	10.3	0.9	830	21.6	0.020		0.05	0.01	0.4
Cu	2.4	0.7	0.9	0.3	0.0	0.1	0.8	1.2	0.150		1		
As	0.1	0.3	0.2	0.0	0.0	0.0	0.7	0.4	1.2	0.01	0.01		0.01
Se	0.0	0.3	0.5	0.1	0.5	0.2	0.7	0.4	0.155	0.01	0.01		0.01
Cd	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.07	0.01	0.003		
Pb	0.2	0.1	0.1	0.1	0.1	0.2	0.2	0.3	0.0027	0.01	0.01		
Hg	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.00014	0.0005	0.0005		
Fe	1.4	222	2510	5.2	0.7	2.0	3790	117	0.030		0.3		
Co	0.0	2.4	3.6	0.0	0.1	0.1	4.2	1.6	0.0012				
U	0.0	0.1	0.1	0.0	0.0	0.0	0.4	0.2	3.2			0.002	
Na	4840	334000	270000	1650	2290	1520	1180000	617000					
Ca	569	35400	224000	559	1060	403	315000	50400					

Comments
 (by Mr. Junichi Ohnuma, Former Lecturer of Kinjo-gakuin University / Former Lecturer of Chubu University / Former Principal Investigator of Environmental Investigation Center in Aichi Prefecture)

- 1) In the previous analysis of water in this area, the results of examinations by simple detector tube for hexavalent chromium are parallel well to the result of examinations by ICP-MS, or Inductively Coupled Plasma Mass Spectrometer, at the laboratory in Japan. This result was repeatedly confirmed in the field of Coral Bay Nickel Corporation (CBNC), in which contaminated the hexavalent chromium. This result was shown in the previous surveys (May 2018, February 2018, and May 2012). However, the reason why the No. 7 is Trace might have some interference.
- 2) We showed the results of examinations on Sodium (Na) and Calcium (Ca), too, this time, in order to indicate the mixing rate between the river water and the seawater. The Na⁺'s concentration in the seawater is around 12,000 mg/L (12,000,000 μg/L).
- 3) Hexavalent chromium was detected in 7 samples except No. 1 and exceeded the Japanese Environmental Standards and Japanese Water Supply Act (0.05mg/L) in No. 2, 3, 4, 5, (7), 8. Furthermore, the concentration level of nickel exceeded the Control Target under the Japanese Water Supply Act (0.01mg/L) in No. 2-8.
- 4) Especially, No. 4 and 5 are from springs which residents use for drinking, so immediate measures are required.
- 5) These results have proved that serious contamination by hexavalent chromium has been occurring in shallow underground water, which the local community is using for domestic and/or drinking purposes, in the whole area of Taganito, Surigao del Norte. In addition, given that the same kind of contamination has been proved in Rio Tuba, Palawan, the hypothesis could be build up that open-pit mining of laterite in the tropics would universally cause the contamination by hexavalent chromium. In any case, the appropriate measures must be established and implemented as quickly as possible in Palawan as well as Surigao del Norte, as there are concerns over the health damage of the local communities and the destruction of ecosystem in bays and coastal areas. If any appropriate measures could not be established, it should be taken into account to suspend or stop the projects.
- 6) Although the nickel development projects in Rio Tuba, Palawan, have been promoted mainly by Japanese companies, the projects in Taganito, Surigao del Norte, have been promoted not only by Japanese companies, but also the other countries' companies, such as China. In order to ensure any regulation for the development, it is necessary that the governance for environmental conservation is decisively implemented by the Philippines government, which the international society could also put some pressure on or could have cooperation with.