

The Result of Water Analysis surrounding the Nickel Mining Sites and the Nickel Processing Plants in Taganito, Surigao del Norte in May 2018
(Dates of Water Sampling: May 23 and 34, 2018)

Sea Water (brackish water)	Well Water	Spring Water
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Sampling Location No.	1	2	3	4	5	6	7	8
Date of Sampling	2018/05/23	2018/05/23	2018/05/23	2018/05/23	2018/05/24	2018/05/24	2018/05/24	2018/05/24
Time of Sampling	10:12:44	10:30:37	15:13:27	15:53:40	11:33:43	11:44:58	12:21:49	13:55:32
Location of Sampling	Mouth of the Taganito River (Brgy. Taganito)	Mouth of the Hayanggabon River (Brgy. Hayanggabon)	Spring Water which around 30 households Mamanwa people in the resettlement site (relocated from Sitio Kapandan, Brgy. Urbiztondo) have been using for drinking and domestic purpose for around 2 years. It is located near the sea. (Brgy. Cagdianao)	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)	Well water in a house to be used only for domestic purpose, but not for drinking (Brgy. Taganito)	Water by the SDMP program for Taganito Consumer Cooperative (Brgy. Taganito)	Mouth of the Taganito River (Brgy. Taganito)	Mouth of the Hayanggabon River (Brgy. Hayanggabon)
Latitude and Longitude	N9 32.565 E125 49.501	N9 32.352 E125 50.235	N9 30.871 E125 52.609	N9 30.868 E125 52.148			N9 32.565 E125 49.501	N9 32.352 E125 50.235
Result of on-the-spot examination by simple detector tube for hexavalent chromium (mg/L)	0.15	Trace	0.075	Trace	ND	ND	0.2	ND
pH	6.7	6.5	6.7	6.5	7.8	4.7-5.0	7	6.4

<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
Cr	156	64.3	87.6	21.3	0.4	0.1	186	58.4
Ni	28.4	11.5	84.6	54.9	3.0	0.4	36.4	10.1
Zn	0.0	4.6	0.6	0.4	2.3	6.8	0.0	0.0
B	1050	648	11	8	135	47	1398	642
Mn	17.5	2087	0.6	1.4	204	0.4	21.3	2177
Cu	0.0	1.4	0.0	0.7	0.8	1.0	0.0	0.0
As	0.3	0.3	0.0	0.0	0.4	0.1	0.2	0.3
Se	1.2	1.4	0.1	0.1	0.1	0.0	0.9	0.8
Cd	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pb	0.1	0.3	0.1	0.0	0.1	6.4	0.1	0.0
Hg	0.2	1.8	0.0	0.0	0.0	0.0	0.1	1.2
Fe	53.7	848	5.7	2.4	768	0.0	64.5	1415
Co	1.0	2.0	0.1	0.2	0.1	0.0	1.2	1.9
U	0.5	0.5	0.0	0.0	0.0	0.0	0.6	0.5
Na	2600000	1030000	4750	1830	81400	3310	3290000	1010000
Ca	93200	639000	883	368	34400	989	148000	655000

(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	
0.212	0.05	0.05			Cr
0.48			0.01		Ni
0.350		1			Zn
4500	1	1			B
0.020		0.05	0.01	0.4	Mn
0.150		1			Cu
1.2	0.01	0.01		0.01	As
0.155	0.01	0.01		0.01	Se
0.07	0.01	0.003			Cd
0.0027	0.01	0.001			Pb
0.00014	0.0005	0.0005			Hg
0.030		0.3			Fe
0.0012					Co
3.2			0.002		U

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)

- The amount of hexavalent chromium detected by simple detector tube on the spot is parallel well to the amount of total chromium detected by ICP/MS, or Inductively Coupled Plasma Mass Spectrometer, at the laboratory in Japan. This has been also repeatedly proved in the area contaminated with hexavalent chromium in Palawan, where Coral Bay Nickel Co. and Rio Tuba Nickel Mining Co. are operating. In addition, it has been proved in this same area when we conducted the survey in February 2013 and May 2012. However, the result of "ND" by simple detector tube in the location No. 8 might be affected by turbidity or coloring in the sample water.
- We showed the results of examination 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 sea water is around 12,000 mg/L (12,000,000 µg/L).
- Hexavalent chromium was detected in five (5) samples, except No. 4 to No. 6, and all the five (5) samples exceeded the Japanese environmental standards and the Japanese Water Supply Act (0.05mg/L). In addition, Nickel is over the Control Target under the Japanese Water Supply Act (0.01mg/L) in the water samples of No.1 to No. 4, No. 7 and No. 8.
- In particular, the relevant companies need to take immediate measures against such water contamination in the location of No. 3 and No. 4, given that the local community has been using those spring water for drinking.
- 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.

Note 1: The results of examination on metal by ICP-MS, or Inductively Coupled Plasma Mass Spectrometer, at the laboratory in Japan.

Note 2: The results of examination by simple detector tube for hexavalent chromium are the results of the on-the-spot examination.