

The Result of Water Analysis surrounding the Nickel Mining Sites and the Nickel Processing Plants
(Dates of Water Sampling: April 29 and 30, 2012 in Palawan / May 8 and 10, 2012 in Surigao del Norte)

Sampling Location No	1	2	3	4	5	6	7	8	9	10	11	12	13
Date of Sampling	4/29/2012	4/29/2012	4/30/2012	4/30/2012	4/30/2012	4/30/2012	5/8/2012	5/10/2012	5/10/2012	5/10/2012	5/10/2012	5/10/2012	5/10/2012
Time of Sampling	9:32:44	13:47:34	9:09:11	10:38:31	10:59:52	11:11:49	14:45:20	10:54:11	11:09:59	11:23:07	12:50:46	13:28:53	13:56:15
Location of Sampling	Togupon River	puddles within the RT mining site	Togupon River	The upper end of estuarine basin where the Togupon River flows into	The middle of estuarine basin where the Togupon River flows into	The estuary of the Tuba River where Togpon River merges into	Mouth of the Hayanggabon River (Brgy. Hayanggabon)	Brgy. Hayanggabon (Waterwork for laundry, bath etc. prepared by PGMC)	Brgy. Hayanggabon (Drinking Water)	Brgy. Hayanggabon (Creek in front of the location No. 9)	Brgy. Cagdianao (Resettlement site of Mamanwa) (Water tank for drinking, laundry, bath etc. prepared by TMC)	Water to be able to get in front of resettlement site of Mamanwa (Drinking, laundry, bath etc.) (Brgy. Cagdianao)	Mouth of the Taganito River (Brgy. Taganito)
Latitude and Longitude	N8 33.158 E117 24.816	N8 35.197 E117 24.589	N8 33.158 E117 24.816	N8 32.281 E117 24.785	N8 32.051 E117 24.657	N8 31.880 E117 24.619	N9 32.408 E125 50.247	N9 32.370 E125 50.369	N9 32.286 E125 50.361	N9 32.287 E125 50.362	N9 30.813 E125 52.460	N9 30.751 E125 52.271	N9 32.412 E125 49.481
Result of examination by simple detector tube for hexavalent chromium (mg/L)	Trace	0.1	Trace	Trace	0	0	0.1	0.05	0.1	0.05	0.1	0.05	0.2 - 0.3
pH (examination paper)	8	8	8	8	8	8	8	8	7.5	8	8	7.5	8
EC (Labo)(microS/cm)				24030	69850	69500	16850						31600
pH (Labo)	7.6	8.2	7.6	7.7	7.8	7.8	7.7	7.3	6.7	7.1	8.0	7.3	7.8

<The results of analysis on metal> (Unit: µg/L)

Cr	39.6	128.2	36.4	21.8	1.8	2.9	105.2	26.6	71.3	36.6	52.5	35.1	140.7
Ni	46.0	53.9	39.7	26.8	5.4	6.5	18.5	29.3	35.3	20.2	95.1	38.9	332.9
Zn	28.4	4.9	0.0	45.2	0.0	0.0	0.0	253.2	0.0	6.6	2.7	0.0	3.5
B	19	6	18	1052	3844	3653	604	5	5	5	5	5	1245
Mn	634.3	12.1	616.2	349.4	44.4	62.5	197.1	7.4	48.2	0.4	19.4	559.9	
Cu	1.0	0.1	0.6	1.9	0.0	0.1	0.4	0.2	0.3	0.8	4.6	0.1	3.5
As	0.1	0.0	0.1	0.0	0.7	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cd	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Pb	0.0	0.0	0.0	5.5	0.0	2.7	0.0	0.6	0.4	0.9	0.5	0.0	0.0
Hg	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.1
Fe	157.8	115.9	125.8	223.6	75.7	106.5	217.0	14.5	0.0	105.9	4.3	31.1	2608.7
Co	3.0	1.2	2.6	2.2	0.9	1.0	4.3	0.2	0.0	1.0	0.1	1.9	26.8
U	0.1	0.0	0.1	0.6	1.7	1.6	0.3	0.0	0.0	0.0	0.0	0.0	0.8

<The results of analysis on metal> (Unit: mg/L)

Cr	0.040	0.128	0.036	0.022	0.002	0.003	0.105	0.027	0.071	0.037	0.053	0.035	0.140	0.05	0.05	0.01	0.02	0.05	Cr
Ni	0.046	0.054	0.040	0.027	0.005	0.007	0.019	0.029	0.035	0.020	0.095	0.039	0.333			0.01	0.02		Ni
Zn	0.028	0.005	<0.001	0.045	<0.001	<0.001	<0.001	0.253	<0.001	0.007	0.003	<0.001	0.003	1	1				Zn
B	0.019	0.006	0.018	1.05	3.84	3.65	0.604	0.005	0.005	0.005	0.005	0.005	1.24	1	1				B
Mn	0.634	0.012	0.616	0.349	0.044	0.062	0.197	0.007	0.001	0.048	0.000	0.019	0.560		0.05	0.01	0.4		Mn
Cu	0.001	<0.001	0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	0.005	<0.001	0.004	1		2		Cu
As	<0.001	<0.001	<0.001	<0.001	0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.01	0.01			As
Cd	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.01	0.003		0.003		Cd
Pb	<0.001	<0.001	<0.001	0.006	<0.001	0.003	<0.001	0.001	<0.001	0.001	<0.001	<0.001	<0.001	0.01	0.01		0.01		Pb
Hg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0005	0.0005		0.001		Hg
Fe	0.158	0.116	0.126	0.224	0.076	0.106	0.217	0.014	<0.001	0.106	0.004	0.031	2.61		0.3				Fe
Co	0.003	0.001	0.003	0.002	0.001	0.001	0.004	0.000	0.000	0.001	0.000	0.002	0.027						Co
U	<0.001	<0.001	<0.001	0.001	0.002	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001			0.002	0.015		U

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

- The analysis by simple detector tube for hexavalent chromium are parallel to the analysis of total chromium by ICP-MS, or Inductively Coupled Plasma Mass Spectrometer, at the laboratory in Japan.
- It may imply the relation with the precipitation or rainfall that less hexavalent chromium was found in the Togupon river than the ones found in the previous researches (ex. October 2011, and February 2012). As we have pointed out, more rainfall could accelerate the overflow of the water from tailing dams and the liqation and outflow of hexavalent chromium from low grade ore piled up in the mining site / the CBNC's site.
- It is very important that the contamination of hexavalent chromium has been found surrounding the Taganito nickel mining site in Claver, Surigao del Norte. For the fact could increase the possibility of the general principle that the mining exploitation working of laterite peculiar to the tropical region inevitably brings about the contamination of hexavalent chromium anywhere, not only in the area surrounding the Rio Tuba Nickel mining site and the Coral Bay nickel processing plants' site in Palawan.
- The drinking waters, namely No. 9, No. 11, and No. 12, contained hexavalent chromium for which the standards concerning the protection of the human health are established. And the water samples of No.9 and No. 11 exceeded the Japanese environmental standards and the Japanese Water Supply Act's standards. Therefore, any immediate countermeasures must be taken. Further, these water samples exceeded the control target value for Nickel under the Japanese Water Supply Act. It should be also remarked that the water sample of No. 8 included highly-concentrated Zinc, although it didn't exceed any standards. In either case, the water of No. 9, No. 11, and No. 12 must be suspension of use as drinking water.
- The water samples of the Togupon River and of the Taganito River exceeded the environmental standards for baron, which was contained in seawater. Thus, it is no problem.

Note 1: The results of analysis on metal is the results of examination 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.