Alliance for Climate Justice & Clean Energy

Assessment of ENGRO's (Respondent No. 9's) Submission to the Court in the case of Lakho S/O Beejal & Others v Province of Sindh & Others (CP No. 6908 of 2017)

The following assessment examines the submission made by ENGRO (Respondent No. 9) to CP No. 6908 2017, filed in pursuance of the Court's direction on 08/02/23 representing a 'status report' (submitted 15/03/23).

As such ENGRO have submitted a range of data this includes: **i)** data on water quality and quantity from wells around Gorano reservoir and across Thar Coal Block II **ii)** data on RO plants as mitigatory measure **iii)** details of a parallel waste and effluent management systems for power plant effluent **iv)** security plans for emergency and other contingencies **v)** reference to a tree-planting strategy to ameliorate some of the impacts of Thar Coal Block II and **vi)** a supplementary statement (paragraph VII) is made regarding the use of natural depressions for discharge of mine water (as 'fresh water lakes') as and when required (from 'time to time') but also that ENGRO has 'not taken over' this land.

The following represents an assessment of ENGRO's submission. For the present we focus on concerns around I/II/III and VI.

As a 'status report' the primary question that should be asked of this submission is its purpose. In compliance with the Court's request ENGRO's choice of data and the lack of detail suggests that this is **not an open and honest assessment of the impacts of mining and power production in Thar.** As a summary of an environmental assessment of the impact of coal activities and as a description of mitigatory practices across 2022 and early 2023, it falls short of what would be required by such a submission.

A. It lacks **transparency: i**t does not, for example, contain GPS co-ordinates for well sampling, nor do we know how the testing was conducted, by which lab and by which method. Of course whilst it is the duty of the Sindh Environmental Protection Agency to assess the data provided, it is clear that ENGRO chooses strategies that make these assessments a particularly onerous and sometimes impossible task;

B. There are severe **limitations as to the scope of the data sets provided:** water testing by ENGRO consist of a simple TDS, PH and water table level assessment, there is no testing of the substances that comprise the catch all category of TDS. Recent water test results across Thar Coal Block II (Image 1a) have highlighted how significant this omission is, with levels of toxic metals in drinking water in exceedance of both Sindh Quality Standards and WHO standards (see Image 1b), in one case 190x above the Sindh Standards for mercury in drinking water;

C. Closer examination of the limited data provided by ENGRO does, however, provide us with **a range of trends** which may not be readily apparent in the submission. As such it is clear that across Thar Coal Block II TDS is inexorably increasing across over 52% of villages where water was tested (see image 2a for a consolidated table and image 2b highlighting upward trends). All - it should be noted - are in exceedance of Sindh standards. There is **no cross-referencing** across data sets from PH levels/water table levels/TDS levels

D. ENGRO's submission does not contextualise this data nor present **contemporary (or historical) data around water management practices**: for example, we have no data on water flow rates into Gorano reservoir, nor of supplementary practices described in paragraph vi (such as the filling of Dukhar Chao), nor is there description of other water based practices such as aquifer reinjection, its regularity or flow rates. It is also important to note that ENGRO has made no attempt to place the water testing results in a historical context. No reference has been made to baseline studies of 2011, 2014 and 2016 and current deviations therefrom (e.g. the 2016 baseline indicates PH levels of 7.48-8.42, the current submission reports the majority of PH levels 14.0 upwards to 22.0. All, it should be noted, in exceedance of quality standards, see Image 3);

E. **Subsequent dynamic modelling** will inevitably be flawed, if such modelling has been conducted at all. Without examination of these trends and their entanglement with the local watershed (image 1a spotlights this watershed). Research studies have identified the limits of earlier examinations and modelling on Thar hydrology, including the EIA's conducted - it is pertinent to note that no EIA was conducted for Gorano and Dukhar Chao reservoirs. ENGRO shows a lack of concern or foresight of what the future holds. For example decommissioning plans for the reservoir are non-existent: eventually the reservoir will dry up and the residual excesses of TDS will remain deposited on the reservoir surfaces, turning the area into a salt pan subject to wind erosion and aerosol release of unknown toxins.

F. Paragraph vi in the submission is a representation of an **egregious pattern of behaviour by ENGRO** where community rights are unilaterally held in abeyance. The assumption is that natural depressions carry no value for local communities and flooding them 'from time to time' *without notice* has no impact on ecology, lives and livelihood. It is emblematic of ENGRO's practices across both mining and power production;

G. It remains clear that despite ENGRO's claimed 'best practices' of waste disposal and management that there is a pattern t**o effluent discharge** along the boundaries of Block II. Recent water quality reports by communities have indicated exceedances of industrial quality standards for mercury (image 5a & 5b highlights the location and extent of this effluent discharge, Image 5c to the mercury toxicity of discharges). These have significant impacts on the lives of people and animals in the locality. Importantly Image 5c also points to the quality of **reinjection water** into the aquifer system as part of water management practices noted in Paragraph E, above. Reinjection water crosses numerous industrial limits. Results of wider testing (Image 1) indicate the spread of this, and other, toxic water into drinking sources across Block II. None of this data is available in ENGRO's submission.

H. ENGRO has provided no information on the status of the **RO plants** that it highlights in its status report, one assumes as part of its environmental management plan. It is clear from communication with local communities that a proportion of these plants are inoperable. There is no data on water quantity provided, on declined water recovery, on membrane fouling/scaling, on the plant efficiency monitoring program and importantly on reject/concentrate disposal. The latter has not been elucidated at any stage of their operations and remains a significant omission. The more fundamental question is whether this provision is sufficient for the needs of communities around Block II. Clearly where recourse to other contaminated water sources are made, it indicates the lack of access to RO plant water.

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Image Set 1: Water Quality Testing, Thar Block II (June 2022)

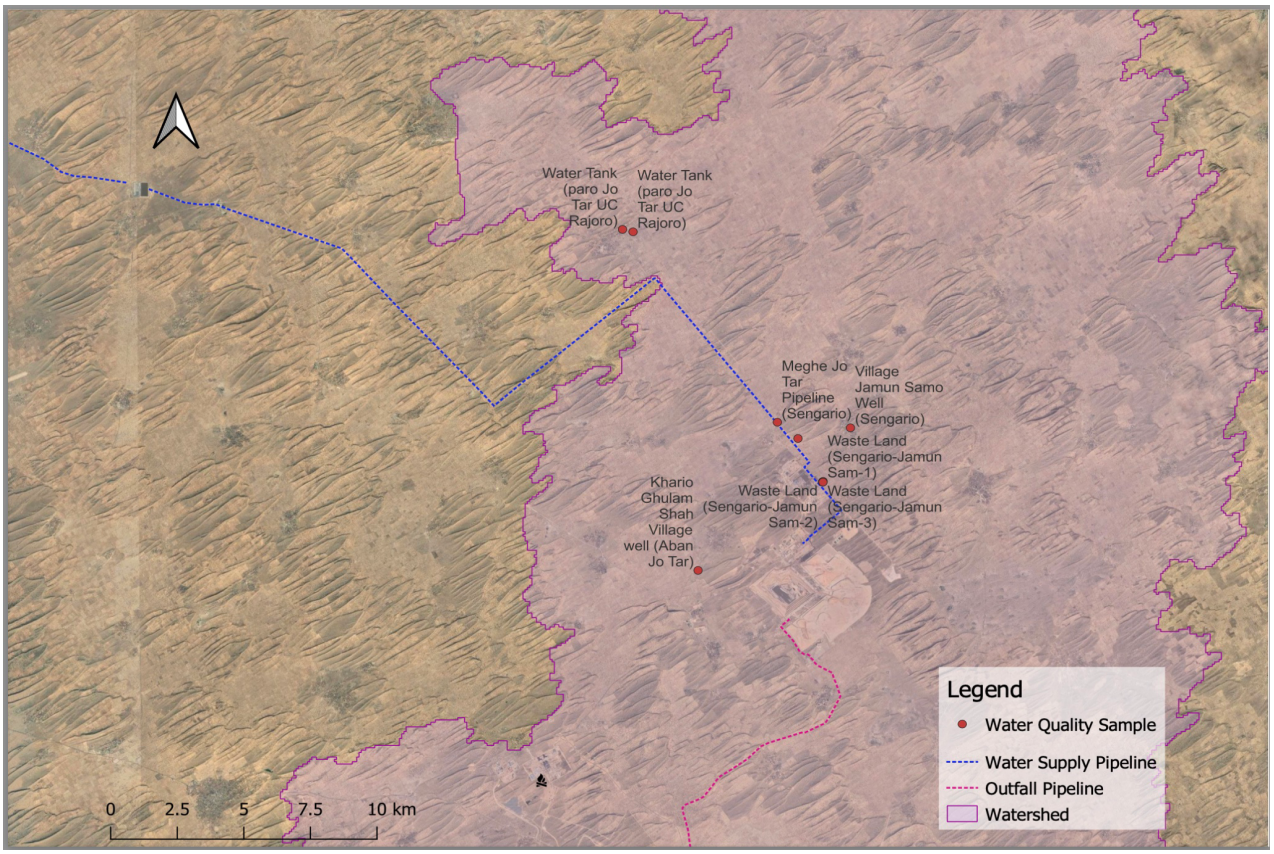

Image 1a: GPS Mapping of Water Test Sites

Parameter	Chloride	Fluoride	TDS	Arsenic	Mercury	Lead
SEPA LImits for Drinking Water Quality	<250 mg/l	<1.5 mg/l	<1000 mg/l	<0.010 mg/l	<0.001 mg/l	<0.050 mg/l
Khario Ghulam Shah Village Well (Aban Jo Tar)	420	1.4	1217	0.004	0.060	0.070
Village Jamun Samo Well (Sengario)	1582	2.1	3110	0.026	0.019	0.075
Amra Well Bhitra (Sengario)	1366	3.3	2720	0.025	0.047	0.079
Water Tank - Paro Jo Tar - UC Rajoro	3165	2.0	4850	0.010	0.190	0.390
Water Tank - Meghe Jo Tar - UC Rajoro	899	6.0	2030	0.014	0.094	0.150

Water Testing conducted in June 2022

Image 1b: Water Quality Test Results (Drinking Water Standards)

Image Set 2: TDS Consolidated & Trends (Across 2022)

Image 2a represents a consolidation of TDS data shared by ENGRO. The deeper shaded areas highlight higher TDS concentrations. Image 2b allows us to discern shifts and trends in TDS quantities, upwards in eleven villages out of twenty one (over 52% of sites tested): ***Avan Jo Tar, Bitra, Jaman Samoo, Jiando Dars, Kharo Jani, Mango Bheel, Ranjho Noon, Seengharo, Sehri Dars, Taly Ji Thani, Tahryo Halepoto.*** The rest remain relatively consistent over this period of time and some results show a downward trend. Some outlier results remain questionable - for example Meghwar go Dhars, which register a significantly lower level of TDS from across the watershed.

ENGRO has failed to demonstrate an understanding of these trends, their consequences and the introduction of any mitigation practices. No modelling has been conducted and an appreciation of the Thar watershed remains absent.

	Date											
Village Name	January	February	March	April	May	June	July	August	Septemb..	October	November	December
Village Hajamro	14,895	10,352	12,460	14,805	13,580	15,836	13,350	6,490	9,368	9,368	14,170	14,542
Ranjho Noon	10,772	11,719	13,133	14,250	13,520	13,512	13,310	13,306	13,320	13,330	13,953	14,086
Kharo Jani	8,621	9,230	9,576	10,980	10,470	10,350	9,700	9,392	9,250	9,433	9,426	9,444
Village Gorano	12,423	7,313	9,837	10,859	11,820	12,169	12,391	12,443	12,810	12,810	11,210	11,611
Sonal Bah	9,687	10,472	10,579	10,510	4,630	4,844	8,070	8,050	7,960	8,345	8,380	8,566
Senhri Dars (Old)	9,100	9,468	9,270	10,003	10,240	9,310	10,160	9,451	9,530	9,847	10,029	10,385
Mango Bheel	8,547	9,457	9,457	9,880	10,260	9,800	10,230	9,974	9,840	9,984	9,886	10,239
Bitra	7,991	8,837	9,620	9,720	9,610	9,338	9,320	9,330	9,430	9,507	9,740	9,860
Seengharo	8,679	8,943	9,436	9,520	9,230	9,492	9,500	9,440	9,490	9,681	9,980	10,593
Kohli G Dhani	10,725	6,235	7,169	9,502	10,712	10,925	11,083	985	6,640	6,640	10,437	10,735
Jiando Dars	7,974	8,921	9,158	9,280	9,420	10,359	9,364	9,180	9,180	9,314	9,518	9,722
Taly Ji Thani	8,142	8,380	8,532	9,258	9,030	9,010	9,160	8,984	9,190	9,090	10,246	9,384
Shiv Jo Tar	9,209	7,246	8,216	8,830	8,720	8,863	8,910	6,030	8,200	8,200	8,860	8,886
Avan Jo Tar	5,484	7,451	7,451	8,540	7,860	8,056	7,990	7,802	7,380	7,222	7,555	7,671
Bhave Jo Tar	5,978	6,090	6,259	6,260	3,140	3,210	3,240	3,235	3,310	3,180	3,215	3,305
Tharyo Halepota	5,106	5,652	5,792	6,100	6,210	6,360	6,440	6,333	6,430	6,404	6,585	6,663
Jaman Samoon	4,825	5,492	5,520	5,730	5,630	5,680	6,030	5,755	5,890	6,040	8,860	9,102
Kumbharyo	5,574	4,435	3,945	4,530	4,580	4,652	4,940	4,911	4,730	4,840	4,905	5,015
Village Cotton	5,551	4,108	4,380	4,410	5,010	5,390	5,610	4,930	5,105	5,105	5,203	5,301
Village Bard	2,549	1,699	1,720	2,060	2,100	2,170	2,300	2,580	2,312	2,312	2,330	2,393
Mehgwar g Dhani	280	280	290	300	270	290	290		320	320	260	285

Image 2a: TDS Consolidated Data

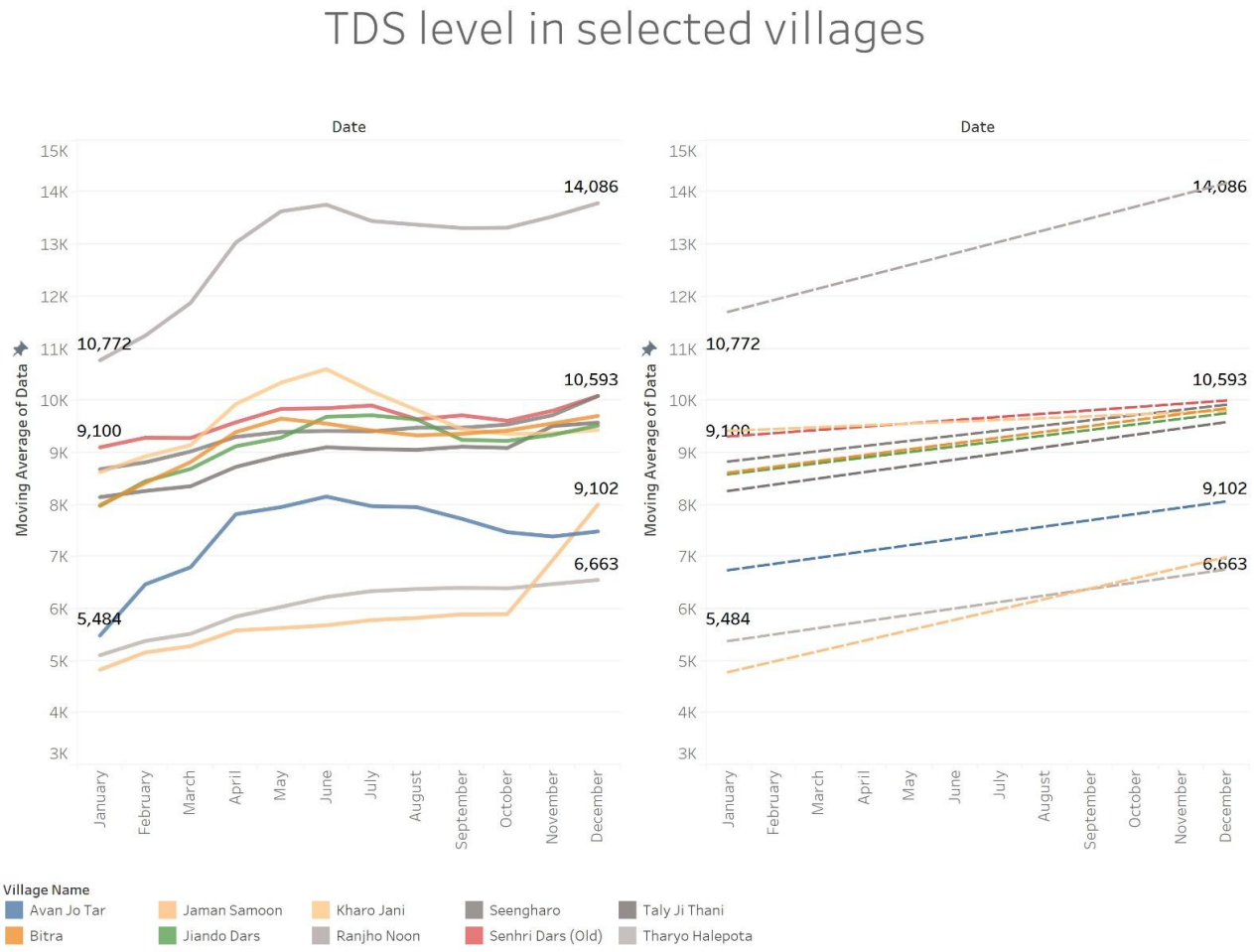

Image 2b: TDS Trends

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Image 3: Consolidated PH Levels

	Date							
Village Name	January	March	April	June	July	August	November	December
Jiando Dars	21.08	23.10	23.20	22.90	23.40	22.50	22.10	22.10
Sonal Bah	22.78	22.80	22.70	15.20	23.20	22.40	22.50	22.90
Ranjho Noon	23.21	22.50	22.80	22.50	22.90	22.30	23.70	23.80
Mango Bheel	22.70	22.50	22.50	22.60	22.60	22.30	22.90	22.70
Kharo Jani	22.55	22.10	22.40	22.20	22.30	22.20	22.00	22.20
Seengharo	22.31	21.64	22.40	22.50	22.40	22.50	22.50	22.60
Tharyo Halepota	15.22	15.20	15.80	15.50	15.00	15.20	15.40	15.70
Senhri Dars (Old)	14.58	14.80	14.90	14.90	15.00	14.60	15.70	15.70
Bitra	14.56	14.80	14.90	14.70	15.40	14.60	14.80	15.00
Taly Ji Thani	14.63	14.70	15.00	14.70	15.00	14.40	15.20	15.20
Avan Jo Tar	14.97	14.60	15.10	14.70	14.90	14.70	14.80	14.80
Bhave Jo Tar	13.73	14.30	14.70	7.30	7.40	7.10	8.10	8.00
Jaman Samoon	7.59	7.90	7.50	7.60	7.60	7.70	7.70	7.80
Kumbharyo	13.88	7.40	7.40	7.30	7.30	7.10	7.10	7.10

Image 4a, 4b & 4c: Thar Coal Block II Power Plants (4a), Mining (4b), Water Quality Table for Industrial Discharges (4c).

Image 4a illustrates effluent release (dark areas to the east of the traversing road) by power plants onto privately owned land. Image 4b provides a zoom out context of the location of mining and power production *(both drawn from Google Earth)*. Image 4c is a table which highlights the exceedances of Industrial Quality Standards of mercury in the identified wasteland. It is to be noted that it also includes tests of water quality from the reinjection site at Meghe Jo Tar, indicative of the quality of water that is being injected into the underground aquifer.

Image 4a

Image 4b

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Parameter	Chloride	Fluoride	TDS	Arsenic	Mercury	Lead
SEPA LImits for Municipal & Liquid Industrial Effluents	<1000 mg/l	<10 mg/l	<3500 mg/l	<1.0 mg/l	<0.01 mg/l	<0.50 mg/l
Waste Land (Sengario - Jamun Samo-1	349	1.5	729	0.005	0.028	0.031
Waste Land (Sengario - Jamun Samo-2	305	1.2	656	0.0045	0.019	0.033
Waste Land (Sengario - Jamun Samo-3)	283	1.4	674	0.01	0.009	0.078
Meghe Jo Tar Pipeline (Sengario)	3465	8.0	9240	0.090	0.095	0.330

Water Testing conducted in June 2022 (see Image 1 for geographical locations)

Image 4c: Water Quality Test Results (Industrial Standards)

This assessment was a collaborative exercise on behalf of ACJCE by international and local academics, scientific, legal and environmental experts (April 4th 2023).