

J1 SUMMARY

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Subject Sacha Norte 1 JI Summary Report

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Team,

Here is a summary of the technical aspects of the Sacha Norte 1 JI. I will not discuss the legal portion of the JI, which was quite interesting, but doubtless will be discussed elsewhere. Please forward to any other individuals that should be cc'd.

A. Security, Logistics, and Safety

This inspection went through with no security issues whatsoever. There were no national level disruptions that affected us, nor were there any demonstrators directed at the JI present during or after the inspections.

I would also like to thank Alfredo and Manuel for the excellent cooperation this past week. All went smoothly, and all facilities we needed were provided promptly and efficiently, including special transport of water samples to Lago to meet holding times.

There were no safety issues or incidents to report.

B. Pre JI inspection

We confirmed the suitability of the PI soil boring locations as perimeter samples. Groundwater was encountered in five locations. No indications of impact was noted. The rest of the pre-JI inspection focused on:

- Pits: there are two abandoned pits on-site. The plaintiffs team had conducted several borings in these pit locations, so we assumed this would be a focus of the JI. As we planned on focusing on a station delineation we did not do specific pit delineation. An attempt to do so in one pit showed that no good clean point could be found even some distance away from the pit footprint, so we decided not to pursue this any further.
- Drainages: This station has had at least 3 different drainage locations for PW over the years. All lead to the same creek that flows into the Sacha River about 1/2 mile downstream of the site. This creek also is the recipient of sewage discharges. Two of these drainages drained the two historical pits (active 1973-mid 80s, and mid-80s to early 90s, respectively). The third drained the API pit system used from the early 90s to 2002 or so. We inspected the drainage. The plaintiff had been very active and we found multiple boring points. Our borings showed fairly ubiquitous impact in the 50 cm - 1.5 m depth range, with heavier impact nearest the station. We anticipated the plaintiff would push the drainage angle.
- Plant operations: This station is quite complex, with both Power Oil and waterflood operations going. We got a good tour of the station from the station operators, and in fact Alfredo obtained some daily injection reports. Turns out until 2002 the station only used river water for waterflooding, and discharged all PW to the creek from the API pit. IN 2002 the PW treatment station was built. Now, in theory all PW is treated and used for waterflooding, and river water is used only to "top off" the system and for cooling water for the Power Oil turbines. Excess freshwater is continually being discharged via canals and ditches to the creek. In case there is an excess of PW there is a new pipe that is supposed to take the water to Sacha C and thence to Sacha S for reinjection. Off the record word from some site staff indicated that at times (specially at night) PW is still being discharged.

However, during our visit the water was fresh, although it contained both noticeable sheening and detergent foam. Water is discharged from most steps in the treatment process, it seems, so the discharged water is not straight river water (and may contain biocides, polymers, and detergent). This foam and sheening can be seen downstream in the creek (photos were taken),

- It is imperative for large locations such as this that both Monday PM and all of Tuesday be fully utilized as we did here. This helps tremendously and I think is an absolute requirement for station inspections. As it was we had sufficient time to get a good picture of the site, and thus avoided surprises, specially the drainage.

C. Sampling Program

- The perito was Jose Robalino. Cooperation was good, and he was friendly, except for a couple of items noted below.
- As expected, the plaintiffs took two cores from each old pit, and sampled water also. We took one representative core from each pit, located in the geographic center. Both pits contained the usual degraded HC impact. In the older pit, impacted soil was found all the way to 3.6 m.
- Note that the plaintiffs made a big deal in the JI of the fact that our perimeter sampling is useless, and that the judge ought to order that sampling had to be done in the sources, i.e. the pits, and not outside. They acted thoroughly uninterested in our perimeter sampling to make this point.
- Our perimeter sampling went well and nothing was noted in the eight cores. We took TGW from 3 locations. WE did not take water from two locations, in one case because the boring was done manually and I considered it inadvisable to collect TGW from a manual boring; the second because the water did not clarify in a timely manner and could not be sampled in adequate quality. In both cases the samples were up- or crossgradient to the source areas, and nearby domestic wells were available and were sampled.
- We did take both surface (0-30) and subsurface (3-3.60) in the perimeter locations contrary to the SOP, in part to counter the allegations that we "dilute our samples".
- I cut back a bit on the domestic well sampling program. Because of the high number of samples forced on us by the sediment sampling program, I decided to eliminate four domestic wells. These were located either far away and upgradient (one location), or across the creek and behind locations we did sample.
- Drainage sampling: Originally we had planned to do only 2 SW samples (upstream and downstream of the site). The plaintiff made a huge deal of the contamination found in the creek "floodplain", and called for 7 samples along the creek (starting in the drainage ditch that used to drain the older of the two pits). They indicated they would seek deep cores to demonstrate the existence of old layers of contamination that presumably date from Texaco days. They made a classic demonstration boring during the JI.
- Note that the plaintiff emphasized that they would be sampling soil adjacent to the creek, not sediment from the current creek bed. Robalino called the samples "soil from the primary terrace".
- I decided (after consulting with John) that we would need to design our own drainage program to characterize the issues raised by the plaintiff and to allow us to evaluate their data. Splitting samples was rejected because they would be doing their "worst layer" sampling strategy. We settled on a program of five more or less co-located borings, plus an upstream boring. They all ended up co-located because the locations chosen by the plaintiffs actually were very good and I would have chosen pretty much the same spots. I also decided to collect both surface layer and a subsurface composite of impacted soil/sediment. My hope is that the surface layer will give us indication of some of the recent spills known to have occurred in this drainage.
- Their borings showed some impact in all borings, but much less further downstream. Our borings, in a few cases a foot away showed similar impact, but generally less which is good, as it shows residual impacts are localized and discontinuous. The worst posts were nearest the station. The upstream location unfortunately appears clean. Also, there was no evidence of surface issues in any sample.
- We also increased our SW sampling to include the discharge point, and all 3 upgradient tributaries plus downstream. Because of the sheens/foam, the diesel spill (see below) and a truck cleaning area in an upgradient tributary, there may be something found in the water. As it happens, the large diesel spill and the truck cleaning area show that ongoing releases are occurring, which is a lucky break. We have good photo evidence.

- The plaintiff also did collect water from their sediment boring next to the station. This was a dirty spot, not to mention that the diesel spill was happening at the time.
- All in all, we ended up taking a large number of samples (although slightly less than Sa N 2, I think). This was a large location, and I think our sampling program was the minimum credible sampling extent given the need to meet both our own objectives and to respond to the plaintiffs sampling strategy. I guess I am maintaining my profligate sampling reputation, but I'd rather have a few more samples to allow a stronger report.

D. The spill

By remarkable coincidence, just as we were embarking on the sediment sampling, sheening started to increase, and eventually free product (diesel) was seen coming down the drainage ditch from the station. Upon investigation this turned out to be due to a break in the hose used by a tanker truck loading the station diesel tank. The amount spilled is not known, but certainly was much larger than the "8 gallons or so" claimed by the station operator. The diesel was washed into the drainage ditch when it started to drain. The culvert nearest the spill point was seen to contain a thick layer of free product.

The spill was seen and discussed by everybody, including Pedro Alvarez and Robalino. The station manager was dismissive, and said it's just a little thing. At one point Robalino indicated to Pedro that "there are too many coincidences", presumably referring to Lago Central, and suggested we might have arranged this spill to "impress the judge". On hearing this I went and extracted from the site guards the license plate and name of the trucker that caused this problem, in case we need it to counter such allegations. The plaintiff, I found out, has also taken this information. Be aware of this situation for the future.

By the next day there was still evidence of diesel in the creek.. We took all our surface water at more or less the same time, to get a snapshot. It is possible that some HC will show up in the samples.

E. Other Issues

- No samples were split on either side
- Pedro Alvarez stayed around Wednesday and most of Thursday, and observed all aspects of the sampling.
- One problem was that at first Robalino would only offer up one shadow, which seriously threatened to crimp our sampling program. We got around it by trying to do parallel nearby borings so the shadow could work two at the same time, and also helping to transport the shadows to and from locations to speed things up. We further argued with Robalino that if he would get us a second shadow, things would speed up our sampling and we would further give him the GPS coordinated for the sample location. He reluctantly agreed.
- The plaintiffs were done by end of Thursday. They did return Friday for the express purpose of shadowing us.
- My only concern, perhaps worth some discussion, is that the lithology from our manual borings and from their manual borings are in some cases remarkably different even though they are just a foot or two away from each other. This discrepancy worries me a little.
- As usual the Entrix field team (Fernando, Jose, Gaby, Albino, Franklin, and Juan) did a fabulous job, working tirelessly and uncomplainingly late into the night.
- Also, as usual, I am glad to have the continuing opportunity to work on this very interesting case.

Please contact me if you have any questions.

Thanks,
BJORN

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