

SACHA

NORTE

2



970.493.3700 Phone
970.493.2328 Fax
www.retec.com

MEMORANDUM

TO: Ecuador Team
FROM: Bjorn Bjorkman
DATE: 12-Dec-05

CLIENT: CVX
TASK: 19126
RE: Summary Sacha Norte 2 JI

+ ATTORNEY CLIENT PRIVILEGED WORK PRODUCT+

SUMMARY OF SACHA NORTE 2 JI

The Sacha Norte 2 JI was conducted on Thursday, Dec. 8. Sample collection was complete by end of Friday, Dec. 9 and the JI proceeded without incident. Pre-JI inspection was conducted the afternoon of Tuesday and all of Wednesday. These pre-JI inspections turned out to be highly useful. Here follow some of the key observations on this JI.

1. "Demandante" issues

- The demandante lawyer was Pablo Fajardo. The demandante perito was Francisco Viteri. Viteri was somewhat anxious to leave early Friday, but as it were we were finished with our sample collection by 3PM so he stuck around until then. All in all, he was fairly uncommunicative and volunteered little information.
- Sampling by the demandantes was limited to samples from four pits (the two inactive produced water pits, and two additional pits apparently associated with the inactive Sacha 4 well which is located on the station property. They took no samples of their own from water supplies or surface water bodies. Neither did they take any split samples whatever.
- The key points laid out by Fajardo involved the impact of discharges from pits to area drainages and creeks and thence to the nearby Jivino Rojo river. To this effect he called for sampling of the material within the four pits, but laid out no further technical evidence of impacts beyond generic statements. He did call for, and the judge conducted, interviews of three residents who claimed that discharges from the site had caused them "molestias". All three made statements that on review are difficult to understand, as it is unclear if they are referring to impacts related to discharge creeks, to the river, or from polluted water cisterns due to deposition from smoke from flares and burning at the station. We did proceed to contact one of the interviewees (Carlos Quevedo) the next day to fulfill an order of the judge to investigate the old northern discharge issue.
- A key issue raised by Fajardo was the demand that the inactive Sacha 4 well and its effects should be part of this JI as the well is located on site. This well has been inactive since 1986 (tentatively). The resolution of this issue may be of some

significance as some pits and historic discharges clearly are associated with the well and not with station operations.

2. Pre-Inspection and remote sensing issues

- It appears that the PI team was given only partial and limited access to the station. As a result there were some shortcomings in the PI report that suggest the need for some tweaking of the process. Specifically:
 - Because the PI team was denied access to the northern portion of the station, the existence of an open pit and of various remains of older installations were missed. These features were discovered by the JI team during the site inspection prior to the JI. The open pit, in particular, turned out to be a central part of the plaintiff's case. Because we did find this pit the day before the JI we were more or less ready, although we only had limited information to work with.
 - The borings conducted around the PW pits were few and hasty, due to limited permission for the PI team to remain on site. The borings were only advanced to 3 m. The JI team repeated the borings on the day prior to the JI, discovering waste below 3 m which had been missed during the PI (we drove all borings to 3.6 m corresponding to the depth of the third Geoprobe segment). This discovery allowed us to shift the locations prior to the JI to account for this material.
 - It is recommended that any needed procedures to ensure full access to the PI team be implemented. Additionally, I recommend that the PI teams call out any areas or issues NOT fully investigated in their reports, thus allowing proper consideration in JI planning.
 - The remote sensing team identified two additional areas that might be of interest. One was investigated the day prior to the JI and turned out not to be a problem. The other was not investigated, and unfortunately did turn out to be a Texaco era pit. The plaintiff did know about it unfortunately. It would be advantageous if the PI team could also attempt to investigate areas of interest noted by the remote sensing team during the PI. Supplying photo quality aerial images to the perito would also be helpful, as the missed pit was relatively evident when a 1985 photo was examined in detail later. The pit was not so evident in the PDF printouts.
- ## 3. Sampling
- This JI was sample rich. Because the station is within a heavily populated area there were 15 wells sampled during PI. All were, as usual, free from significant petroleum related contamination. During the JI we chose to resample only part of these, which still amounted to 9 wells (in addition to 2 springs also sampled during the PI).



- Because of the plaintiffs focus on the two northern pits associated with the Sacha 4 well, we asked for and conducted 7 additional borings to delineate them in order to demonstrate full containment. This resulted in 14 more soil samples than originally envisioned, in addition to a sediment sample from an old drainage ditch discovered by the JI team north of the station (this ditch was hinted at in the resident interviews).
- All delineation borings were visually clean. Groundwater was collected from 4 of the borings where sufficient water was found and was visually clean. There was no visual evidence of contamination in surface water, sediment, or consumption water.

4. Other observations

- Sacha Norte 2 appears to be a well run and maintained station and in fact I was impressed by the good current conditions. Reinjection was installed by Petroecuador only in January 2002, but seem to work well as no evidence of recent PW discharges exist (it should be noted that the produced water here is of relatively low salinity, and may be expected to have had minimal environmental effects). The flares have a condensate recovery system that also appears to eliminate the all too common problems seen from condensate spills.
- Pablo Fajardo made much in his presentation about the fact that this area contains permeable sandy soils, evidently related to previous debates about the groundwater transport pathway. We did note that in fact there are sandy layers overlying clays present, containing perched water in places. This also explains the presence of abundant natural springs nearby. This issue was ordered investigated by the judge and will need some strategic thought.
- Finally, this was my first perito trip. I cannot say enough positive about our field team who did all the heavy lifting efficiently and without complaint. I am glad about signing up for this job, and look forward to more.