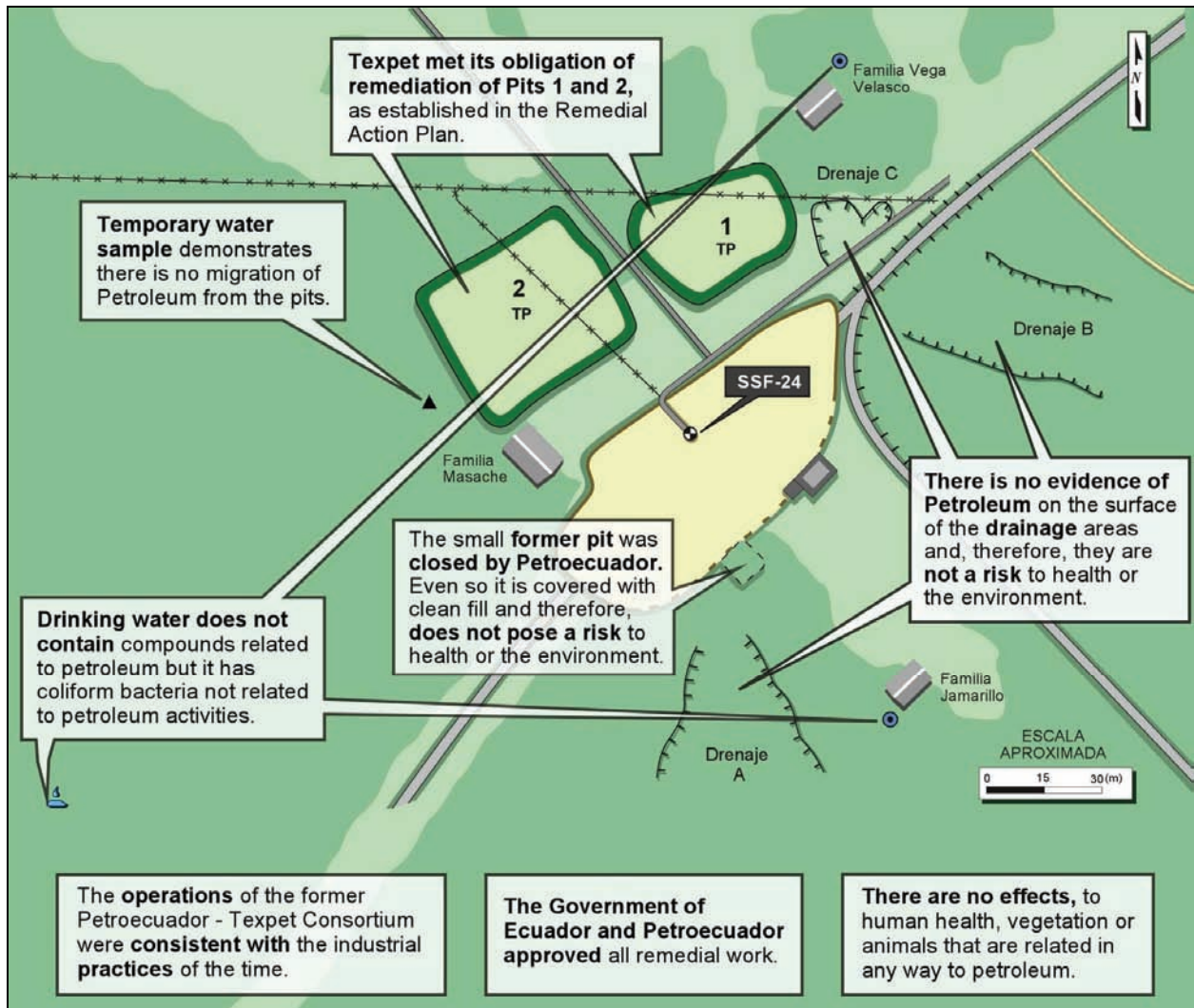


**Expert Report, Engineer Ernesto Baca, P.E.**  
**Judicial Inspection of the Shushufindi 24 Well Site**

**María Aguinda et al. vs. ChevronTexaco Corporation**  
**Juicio No. 002-2003, Corte Superior de Justicia, Nueva Loja, Ecuador**

*EXECUTIVE SUMMARY*

**Summary Illustration of the Judicial Inspection Conclusions**



## **Shushufindi 24 (SSF-24) Judicial Inspection**

The active Shushufindi 24 (SSF-24) well site is located at approximately 350 m to the southwest of the Shushufindi Southwest Station or at about 11 Kms to the south of the city of Shushufindi. The SSF-24 well site is located in the southern part of the Shushufindi field, on the main road, between wells SSF-26 and SSF-35. The platform is about 0.4 hectares in area. At this site there are two remediated pits, the old Pit 1 is located to the north and the old Pit 2 to the northwest of the wellhead. The 2 pits were included as part of the Remediation Action Plan (RAP) in 1995. In the vicinity of the platform there are three houses: Mr. Masache's, Mrs. Vega Velasco's, and Mrs. Jamarillo's. The Vega Velasco and Jamarillo families obtain their supply water from domestic wells and Mr. Masache from a spring.

In 1996, Texpet remediated the 2 pits jointly using the process of soil washing. The remedial work was started February 17, 1996 in the two pits. Verification samples of the remediation were obtained on July 15, 1996 for Pit 1 and on July 12, 1996 for Pit 2. The soil samples resulted in non-detected values (<5 mg/L) for TPH as TCLP, the method agreed upon by the remediation Contract. The remedial activities were completed with the re-vegetation in August 6, 1996 for Pit 1 and the previous day for Pit 2. The Government of Ecuador approved the remediation of the two pits in SSF-24 on November 22, 1996 (see Appendix F of the Sacha 65 report presented to the Court on April 1, 2005). Likewise, the Government of Ecuador approved the remediation of all the sites within the RAP, including SSF-24, on September 30, 1998 (see Appendix B of the Shushufindi 4 report presented to the Court on October 25, 2005).

During the SSF-24 Judicial Inspection, conducted October 26, 2005, 16 soils samples and 5 water samples were collected. Specifically, samples were collected from the 2 remediated pits to confirm the effectiveness of the remediation; as well as the cover of the pits, the perimeter around the pits and the water used for consumption to confirm that there is no risk to health. Additionally, Engineer Luis Villacreces' sampling team collected samples from a small pit that was closed by Petroecuador after July 1995, which was not included in the RAP, and in three drainage areas to the south, east and north of the platform. ChevronTexaco's sampling team also collected additional samples from various points for their use. All samples obtained from SSF-24 by my team show a good remediation of Pits 1 and 2 by Texpet. Furthermore, due to the absence of harmful concentrations of the toxic components of petroleum, there is no risk to human health, vegetation or animals caused by the petroleum industry that exists at this location. Documents created by the plaintiffs in 1999 and submitted to the Court affirm that the pits were well remediated and that Mr. Masache was in agreement with the remediation of the pits at SSF-24 (see Appendix E.1).

## **Important Conclusions**

The main conclusions from the Judicial Inspection of the SSF-24 well site are detailed in this report and can be found summarized below:

- **Texpet met its remediation obligations in relation to the SSF-24 well site.**

According to the 1995 Contract and the RAP, Texpet had to remediate Pits 1 and 2 in SSF-24, which was completed in August 1996. The Government of Ecuador and Petroecuador approved the remediation of the pits by issuing the Acta of November 22, 1996 (see Appendix F of my Sacha 65 report presented to the Court on April 1, 2005). The Final Acta approved the compliance of the remediation in all of the sites within the Concession area within the RAP on

September 30, 1998 (see Appendix B of my Shushufindi 4 report presented to the Court on October 25, 2005).

- **Practices used by Texpet to build its pits are consistent with the international practices of the time.**

Drilling of well SSF-24 was completed in October 9, 1972 and oil production started in that same month. The pits were built before 1975 (see Figure 5). From that time until today earthen pits were not forbidden in Ecuador, the USA, or any other Latin American country, what's more, it was a common practice for the disposal of residuals from petroleum activities that continue to this day in many countries including Ecuador. In February 1992, long after Texpet constructed the pits in the Concession, the Environmental Regulations for Hydrocarbon Activities in Ecuador were issued in Decree 621, where guidelines were provided for the construction and use of pits. Based on this information, it is clear that Texpet constructed the pits at SSF-24 according to practices of general application and worldwide acceptance of the time, and even today is a recommended practice in Latin America and other countries. Ecuador adopted similar criteria to those of the international community, establishing that, lining of earthen pits in oil fields be done with low permeability clay, which exactly coincides with the characteristics of the clayey soils in the Oriente Region of Ecuador.

- **There is no evidence of migration of petroleum crude from the pits**

Four soil samples were obtained from perimeter points around Pits 1 and 2 (see samples SB3, SB4, SB5 and SB6 in Tables 3A, 3B, 4A and 4B; and Figure 13). All analyses resulted in soils free of petroleum related compounds. The traces of petroleum found in the remediated pits were the expected results due to their highly degraded condition. The degraded petroleum does not contain any toxic compounds, it does not dissolve, volatilize, or mobilize and thus it does not cause a risk to human health, vegetation or animals (see Appendix F and Tables 2A, 2B, 3A, 3B, 4A and 4B). There were no traces of any petroleum compounds detected in the temporary groundwater well taken next to the pit, thus demonstrating that there was no migration of petroleum through the soil matrix. The only parameters that exceeded the evaluation criteria in that groundwater sample were fecal and total coliforms, which are not related to the petroleum operations (see sample TGW6 in Table 4A).

- **No traces of generalized petroleum contamination were found in the surrounding areas of the SSF-24 well site.**

The soil and groundwater samples collected from the area surrounding the SSF-24 well platform, just as mentioned in the previous paragraph, were practically free of petroleum related compounds. The concentrations of all compounds were much below the evaluation criteria. The evaluation criteria used to arrive at the previous conclusions, are equal to or stricter than the Ecuadorian criteria at the time of the Petroecuador — Texpet Consortium (see Appendix K of the Sacha 14 report presented to the Court on July 4, 2005).

- **The water sources have not been affected by petroleum.**

There are 3 houses around the SSF-24 well site: one of them uses a spring and the other two use water wells as their water sources. All of the petroleum related compound concentrations were found at non detectable values or at much lower concentrations than the evaluation

criteria, which meet the drinking water standards established by Ecuador's Decree 2144, the guidelines of the World Health Organization (WHO), and the U.S. Environmental Protection Agency (USEPA) at the time of Texpet's remediation project (see Tables 4A and 4B; and Figure 13). The water contains high levels of fecal and total coliform bacteria, as has been observed in other places in the Oriente Region, which can represent a potential health risk.

- **There is *no risk* to health or the environment related to petroleum in SSF-24.**

Although the pits in SSF-24 were remediated and the Government of Ecuador and Petroecuador approved such action, the possible risk to health that could be caused by present conditions was analyzed. There were no toxic compounds related to petroleum that exceed the evaluation criteria in soils or water collected from SSF-24 during the Judicial Inspection of October 26, 2005. Therefore, there is no risk to human health, animals, or the vegetation due to the residual petroleum in the remediated pits. The residual petroleum found in the two remediated pits of the SSF-24 well site is highly degraded (see Appendix F), and does not contain harmful concentrations of toxic components. Petroleum in a high degree of degradation does not dissolve in water, does not volatilize, or move, and therefore does not represent a risk to health or the environment. Furthermore, all of the points containing residual petroleum are covered with soil free of compounds related to petroleum (see Figures 15 and 16). The existence of clean soil on the surface means that there cannot be direct contact of people with such compounds, and therefore, there is no risk to health.

### **Evaluation Criteria**

In order to compare the results obtained during the Judicial Inspection on SSF-24, *Ecuadorian* norms in effect at the time of remediation were used, as well as those norms and international criteria included and approved by the Remedial Action Plan (RAP) by the Ecuadorian Government, since there was a lack of applicable Ecuadorian regulations during that time. From this point on in this report any mention of the "*evaluation criteria*" should be understood as the following norms, listed in order of application priority:

- i) Decree 2144, for the protection of drinking water;
- ii) Decree 621, for limits of discharge water to surface water bodies and standards for the construction and use of pits;
- iii) Decree 2982, for general procedures for the closure of pits and discharge of production water;
- iv) Regulation from other oil producing countries from those times (Argentina, Brazil, Colombia, Mexico, Peru, Venezuela, and in the USA the states of Louisiana, Texas, Michigan, Oklahoma and California) to supplement the Ecuadorian norms and evaluate its consistency with norms in use by the international community regarding pit remediation;
- v) Guidelines from the World Health Organization (WHO) and the U.S. Environmental Protection Agency (USEPA) for water quality criteria for the protection of domestic drinking water and the American Institute of Petroleum (API) for the remediation of pits and petroleum affected soils;

- vi) Risk based criteria for BTEX (benzene, ethylbenzene, toluene, and total xylenes) and PAHs (Polycyclic Aromatic Hydrocarbons) for which regulations or guidelines previously identified did not provide numerical criteria. Calculations were based on the risk limits from WHO and the methodology specified by the USEPA in 1996; and
- vii) For the analysis of the concentrations of heavy metals, in addition to the criteria specified previously, measured concentrations were also compared to levels of heavy metals of natural background in non-impacted soils and thus able to detect the existence of any impact.

In any case, when more than a single value is considered as a criterion from the abovementioned sources, the strictest norm in effect at the time of the Texpet remediation project (1995-1998) was selected. For more details, see Appendices J and K of my Sacha 14 report presented to the Court July 4, 2005.

It is worth noting that for the current evaluation, following the fundamental principal of the right of non-retroactivity of the law, no reference is made to Decree 1215, nor to its successor, Decree 3516 (3399), since these were issued in 2001 and 2002 respectively, more than 3 years after the Government of Ecuador and their delegates issued the Final Acta accepting Texpet's remedial action in Ecuador (see Appendix B of the Shushufindi 4 report presented to the Court October 25, 2005).