

## **E-Tech International Response to TGP**

March 25, 2006

The purpose of the E-Tech report (<http://www.etechinternational.org/projects.htm>, February 27, 2006) is to assure the long-term integrity the Camisea Project pipelines, and to protect the environment and people along the pipeline route. This is fundamental to assuring the expected economic benefits to Peru. Our observations regarding the problems with the Camisea pipelines are accurate - the lack of adequate erosion control measures caused in part by the rush to maintain forward progress during the construction phase, the use of pipe with excessive internal corrosion, and the use of personnel without the necessary qualifications. We address our concept of the essential independent audit and the pipeline repair project in this second response to TGP. In addition we present our comments on the points of greatest significance raised in TGP's long response (March 2006, 86 pages) and TGP's letter response (March 2006, 4 pages) to the E-Tech report.

### **Independent Audit and Repair Project**

What is essential now is to initiate an independent audit as soon as possible. It must be carried-out by an organization that has not been involved in the project and one that will not respond to any attempt to inappropriately limit the extent of the audit or to influence the conclusions and recommendations. Peruvian civil society proposed two years ago to the government of Peru and the Inter-American Development Bank (I.A.D.B.) that the Commission for Evaluation of Environmental Impact of Holland (the MER in Dutch, <http://www.commissiemer.nl/eia/>), a Dutch governmental organization, conduct an independent audit of the Camisea Project. Conducting an independent audit is one of the terms of the I.A.D.B. project loan. Unfortunately little progress has been made on the independent audit in the last two years. The MER has a reputation for independence and integrity. Peruvian civil society agreed that the MER should conduct the audit based on this reputation. The MER requires that the government of Peru invite the organization to perform the audit to minimize conflict in case the government is not in agreement with the MER's conclusions and recommendations. The MER is not necessarily the only organization able to direct the audit. However, it must be an organization with the stature of the MER and a comparable reputation for transparency. In addition, it must be an organization able to take confidential testimony under oath. Otherwise personnel with knowledge of which transpired in the field during the construction phase will not come forward for fear of retaliation.

## Scope and Timeline of the Audit

The audit tasks listed below will be conducted in parallel. The audit will include the natural gas pipeline and the natural gas liquids (NGL) pipeline. The audit phase will last approximately six months, and will include at a minimum:

- Audit of 100 percent of the original weld radiographs. The pipelines will continue in operation during the audit of the weld radiographs.
- Audit of the studies prepared by TGP consultants and auditors (geotechnical, welding, erosion control, etcetera).
- Prepare technical opinion as to whether TGP consultant recommendations were appropriate in light of known field conditions.
- Perform comparison of what was actually done in the field with the recommendations of the consultants and auditors.
- Perform review of the continuous pipeline operating pressure graphs to verify the pipelines have been operated within permissible operating pressure limits.
- Identify the best alternatives for the pipeline repair project (where applicable).
- Analyze the pipebook to verify the foundry batch number of each pipe used in the project and to verify the date of manufacture (a thorough review of the pipebook will require approximately two months). The pipelines will continue operating during the pipebook audit.

## Scope and Timeline of the Pipeline Repair Project

- Re-weld pipe that is verified as structurally adequate (after verifying pipe certificate of quality, foundry batch number, and year of manufacture via audit of the pipebook).
- Replace pipe sections with possible structural weakness.
- Add ballast to replacement pipeline sections to secure this pipe in position in high rainfall zones.
- Perform a hydrostatic test of each repaired section – this test should include 5 km of pipe on both sides of the repaired section. The hydrostatic test program would include the following steps:
  - determine the number of test segments;
  - discontinue the pumping of NGL;
  - drain liquid hydrocarbons in the pipeline to tanks;
  - install the first manifold in the first segment;
  - install the second manifold in the second segment;
  - fill the first segment with water and pressurize;
  - make the necessary repairs at weak points;
  - transfer water from the first segment to the second (to reduce water use and to facilitate cleaning this water) and pressurize;
  - make the necessary repairs;
  - repeat testing/repair as much as is necessary to ensure the integrity of each section.

- Carry out repairs and repeat the hydrostatic test if the first test reveals that all structural deficiencies have not been resolved.
- The repair project can be carried out in parallel with the audit in sequence from jungle zone to mountain zone to coastal plain – the repair of bad welds could be initiated two months after initiating the audit of the original weld radiographs. The estimated duration of the repair project is 6 and 8 months. This estimated timeline is based on the primary author’s knowledge of the possible extent of the deficiencies. The NGL pipeline will be out-of-service during the hydrostatic tests.
- Natural gas pipeline - Weak sections of the natural gas pipeline will be replaced if the review of the original radiographs and the condition of the pipe (determined by means of a review of pipebook and the data collected via the geometric caliper and the intelligent pig) indicate this is a necessary course of action.

### **Cost of the Audit and the Repair Project**

The overall cost of the audit and repair project is expected to be in the range of between \$50 million and \$100 million for the NGL pipeline (by U.S. experts). This estimate does not include the cost of the replacement pipe or the cost to mobilize workers. The great majority of the budget is associated with the hydrostatic tests. The specific costs are:

- Independent audit – a conservative cost estimate for the audit would be approximately \$2 million. The audit will last approximately six months.
- Hydrostatic tests - the cost per segment of tested will be in the range of \$500,000 to \$1 million. The approximate overall cost of the hydrostatic tests would be \$50 million and \$100 million, assuming there will be between 100 and 200 individual segments that will require testing.

### **Analysis of Spills**

TGP insists that the pipeline ruptures have nothing to do with the quality of the welds. On the contrary, OSINERG has identified welding flaws as the cause of second NGL pipeline break. OSINERG presented its analysis of the causes of the five ruptures in March 2006. According to the OSINERG analysis, the reasons for the NGL pipeline ruptures are:

- 1<sup>st</sup> rupture - External force (excessive load on pipeline caused by resettling of soils in the right-of-way (ROW) and lack of drainage), km 8.8, December 2004.
- 2<sup>nd</sup> rupture - Fault in the weld process (existence of a pore in the welded joint), km 222, August 2005.
- 3<sup>rd</sup> rupture - External force (geologically unstable zone), km 200, September 2005.
- 4<sup>th</sup> rupture - In investigation, km 50, November 2005.
- 5<sup>th</sup> rupture - In investigation, km 126, March 2006.

OSINERG has verified that the cause of second rupture was the inadequate quality of the weld. OSINERG is investigating the causes of fourth and fifth ruptures. E-Tech

addresses the probable causes of fourth rupture in its (February 27, 2006) report. The fifth rupture occurred in March 2006 after the publication of the E-Tech report.

TGP attempts to use the metallurgical analysis performed by the company's contractor Metallurgical Consultants, Inc. (Houston) in February 2005 to determine the cause of the first rupture, provided in Attachment 9 of TGP's long response, to assert that the third rupture that occurred in September 2005 had nothing to do with deficiencies in the pipe or the welded joint. That may be, but it is illogical to rely on a metallurgical analysis that was prepared six months before the third rupture occurred in an attempt to prove the point. In short, the rejection by TGP of problems with the welds as one of the causes of the ruptures is without foundation.

### **System of Leak Detection and Shutoff Valves**

The leak detection and shutoff valve system is grossly inadequate. The Build Own Operate Transfer (BOOT) contract between the Peruvian government and TGP states (p. 98), "*The pipelines with include strategically located shutoff valves to minimize spills in case of a rupture and spill, taking into consideration the terrain, pipe diameter, channel crossings, stability of soil, underground or aerial conditions, and the response time of the leak detection system.*"

The present system has allowed up to two hours of NGL production to spill after a rupture. The current capacity of the NGL pipeline is 50,000 barrels per day (bbl/day). Assuming the NGL pipeline was functioning at capacity when the ruptures occurred, up to two hours of production, between 4,000 and 6,000 barrels, have been spilled after a rupture. TGP states that 50 percent of the spilled product evaporates immediately and therefore the spills are not as serious as implied by the total amount of product spilled. TGP suggests that evaporation of liquid product is a healthy and safe way to dispose of the spilled product. On the contrary, it is probable that these vaporized hydrocarbon gases contributed to the fire that occurred after the fifth rupture on March 4, 2006.

It is evident that the 1) location of the valves is not optimal, and/or 2) there are insufficient valves. This is totally unacceptable, represents a latent danger for people living near the pipeline ROW, and demonstrates that the system of leak detection and shutoff valves needs immediate improvement. The audit must include an analysis of the present leak detection and shutoff system and must recommend specific steps to improve the operation of this system.

### **Role of Consultants and Inspectors in the Camisea Project**

TGP states the company contracted with several international consultants who were in charge of technical design and supervision in the field. TGP makes reference repeatedly to these consultants and inspectors, including Gulf Interstate, HydroCanada, Tecnicontrol, Domas, Walsh, and the I.A.D.B. consultants Stone & Webster and URS, in an attempt to validate the quality of the work (the list of supervisory consultants is provided in Attachment 7 of the March 2006 TGP response). The logic seems to be that if TGP contracted with well-known international consultants, the project, by the simple

fact that TGP contracted with these consultants, must be constructed adequately. This is a mistaken assumption. TGP was in control of this process and incorporated, or failed to incorporate, the designs and recommendations of the consultants based on its own set of criteria. A fundamental purpose of the independent audit will be to understand the role of these consultants, as well as the original designs and recommendations submitted to TGP by these consultants, and what was in fact constructed by Techint and TGP in the field.

The E-Tech response to each of the five issues that TGP addresses in the March 2006 letter response to the February 27, 2006 E-Tech report are provided in the following paragraphs.

**1. The subject of the consequences of TGP’s rush during construction:**

E-Tech affirmation:	Situation according to the TGP response:
<p><i>The fundamental conclusion of this report is that the principal concern of the consortium building the pipelines was to complete the Project within the timeline established by the Peruvian government. Each day of delay beyond the target completion date would have resulted in fines that could have risen to as much as \$90 million.</i></p>	<p><i>Like in any Engineering, Procurement and Construction contract, in the Camisea contract the parties agreed upon a term for the completion of works according to the feasibility studies prepared before the execution of the contract. Both the constructor Techint and TGP worked to comply with the terms so agreed, according to the construction schedules and the quality standards. The schedules for the execution of works were neither improvised nor aimed at avoiding the payment of penalties. On the contrary, they were the result of evaluations and were prepared according to the experience of the constructor.</i></p>

The rush displayed by Techint is widely documented in the monthly reports of the environmental consultant URS. URS was under contract to the I.A.D.B. during the construction phase. The monthly reports are available on the Camisea Project webpage ([www.camisea.com.pe](http://www.camisea.com.pe)).

URS monthly reports - January 2003, February 2003, March 2003, April 2003, May 2003, June 2003: *The delay in the implementation of erosion control measures is a repeated deficiency that is inconsistent with the PMA (environmental management plan) and the environmental specifications of TGP. It is to be expected that at this point in the construction phase that Techint is familiar with these practices. Most of the deficiencies observed during January (2003) relate to lack of implementation of the erosion and sedimentation control in swampy areas (bofedales). This seems to be the result of the inability on the part of Techint to give proper attention to environmental controls in sequence with the construction work, reflected in the delay in the installation of erosion control measures. This is a chronic problem that was present prior to the suspension of work for year-end celebrations.*

*In the jungle sector, heavy rains and run-off have exceeded the capacity of existing control measures and created new concerns that will have to be corrected immediately when climatic conditions improve. TGP must continue with the identification and prioritization of the problem areas that must be repaired, and to ensure they are corrected adequately as soon as possible as work is reinitiated in this sector. The probable causes for the delay in the installation and the maintenance of erosion control measures include:*

- *Inability of the erosion control crews to maintain the pace of the other construction activities.*
- *Emphasis by Techint in the advance of the installation of the pipelines over other important responsibilities.*
- *Insufficient supervision on the part of TGP to assure the erosion control measures are being carried-out (by Techint).*

The TGP response is inconsistent with the monthly observations of URS. TGP p. 9, *“The soil movement is typical of any pipe work. In every case, after installation of the pipe, the necessary protection works were performed to supply stability to the installation following the operation codes in force (ASME B 31.8 and B.31.4) and the recommendations of the geotechnical consultants “LTDA Ingenieros Consultores Colombia” among others that were consulted for specific issues and which detailed information is included in TGP’s files, all of them have large experience.”*

The pressure to advance pipeline construction to the detriment of erosion control is evident in the monthly reports of URS. As stated in the E-Tech report (p. 21), it is simply not possible to open a pipeline ROW through rugged and steep jungle sections of the route without installing strong retaining walls immediately. The lack of execution on the part of TGP in the construction of erosion control measures at the right time continues being a factor in ongoing pipeline ruptures.

TGP excuses itself from all responsibility for the ruptures. TGP p. 45, *“The external loads were analyzed and the corrective measures were adopted. The unexpected landslides were not considered in the installation design. The pipes are computed to absorb inner pressure plus the usual load efforts in the area. In crossings with special characteristics, specific computation is carried out considering additional efforts. The safety coefficient to be taken into account according to the standards includes these additional efforts. As it was mentioned before, particular issues have a specific study.”*

Reality is the answer to TGP’s logic. The consortium time and again insists that all work was performed using state-of-the-art standards, placing emphasis on the fact that the consortium contracted with well-known international consultants with expertise in geotechnical engineering, welding, and pipeline rupture analysis. What matters is what actually happened in the field during the construction phase. The field supervisors did what they chose to do in this project in the opinion of the principal author of the E-Tech report. The principal author (Carlos Salazar) was in the field for more than a year on

this project under contract to Techint and observed all aspects of field construction practices. As noted, a fundamental aspect of the independent audit will be to carry-out a detailed comparison of the studies and recommendations of the TGP consultants and what was actually constructed in the field.

Reality is that there have been five ruptures in only fifteen months. It is almost unprecedented to have a single rupture in the initial phase of operations of a pipeline, much less five ruptures. It is convenient to identify difficult terrain and environmental conditions as the root cause of the ruptures. The reality is that TGP made the decision to ignore what was obviously going to be the negative result of its haste, as the IADB consultant URS made clear in 2003. If TGP had announced during the project bidding phase in 2000 that there would be a multitude of ruptures in the first stage of pipeline operations due to the inherent challenges of the terrain, it would never have won the bid for auto-classifying itself as incapable. All the short-cuts that TGP took during the construction phase have their price, and Peru is paying that price now.

**2. The issue of welders and welding inspectors without suitable qualifications:**

E-Tech affirmation:	Situation according to the TGP response:
<p><i>The principal problems with the field welding were: 1) welders without proper certifications, “2) welds made by welders without experience given promotions in the field from welder’s helpers to welder during the project without formal training.</i></p> <p>..</p>	<p><i>All welders working on the Camisea Project were qualified in accordance with the requirements of the applicable norms, and were also trained at the welding school organized by the contractor. In order to pass the qualification test it was necessary to know how to weld adequately in conformance with the norms already mentioned. Also, the welds are evaluated radiographically to confirm conformance with the applicable norm. All documentation regarding the process of welder qualification is available at TGP.</i></p>

E-Tech agrees with TGP that at the outset all the welders went to the welding school established by Techint in Pisco prior to the initiation of field work. The welding school was closed as soon as field work began. This welding school had many deficiencies:

- Not all the welding inspectors had the necessary level of experience to perform weld inspections, as some had been students in the inspector training course taught by Colombian welding specialists. Later these inspectors appeared in Pisco to supervise weld inspection, without having passed the welding inspectors course.
- There was preference given to foreign welders. In many cases these welders were assisted by the instructors, who gave them a passing score regardless of whether their skill level was adequate. This did not happen with the Peruvian welders, as they were disqualified precipitously and not given an opportunity to contest the disqualification. E-Tech has witnesses who can testify to these events as long as there are guarantees of complete confidentiality.

- The person whose signature appears on the welder certification tests is Mr. Daniel Fernandez, head of quality control for Techint. Mr. Fernandez has a high level of welding and weld radiography experience. He is a respected professional.
- With regard to the field qualification of welders (all welders were field qualified after construction began – the welding school had been closed), these qualification tests were supervised by inspectors without experience and not even a minimal knowledge of the applicable welding standard, American Petroleum Institute (API) 1104. These inspectors did not sign the welding qualification certificate. Mr. Fernandez signed the certificates. It is not clear how Mr. Fernandez was able to be present at widely dispersed base camps (jungle, mountain, coast) to witness all the certification tests. He was not seen in the field. The certificates were sent to him to be signed. The certificates were also signed by the quality control managers at each base camp (Mr. Pablo Santamauro among others). Generally these gentlemen were not present during the welder qualification tests. They simply signed the certificates.

It is true that all the welds were radiographed as required by the applicable standard. The concern is that these radiographs were interpreted improperly by inexperienced personnel without the qualifications necessary to interpret radiographs. TGP includes the certificate of a Peruvian welder as an example of the company’s welder certification program. One objective of the audit will be to understand how long each welder worked on the project, which welder received a certificate from the welding school in Pisco, and which welders received their certificates in the field after the school was closed.

**3. The issue of the use of pipe left over from other projects:**

E-Tech affirmation:	Situation according to the TGP response:
<p><i>According to the author’s estimate, at least half the pipe used in the Camisea Project is pipe left over from other projects.</i></p>	<p><i>All tubes used in the pipelines, both the gas pipeline and the NGL pipeline, provided by Tenaris for the Camisea Project, were new and were fabricated specifically for the project, using the highest international standard. All documentation is archived at TGP and available for review.</i></p> <p><i>The fabrication process and the application of the external protective coating were inspected by the constructor, using the firm Moody’s International to carry out the supervision/inspection of the fabrication process.</i></p>

The ultimate arbiter of the history of each piece of pipe installed in the pipelines is the pipebook. The reality is that a significant part of this pipe arrived at the construction site without protection of the pipe tips and with internal corrosion. Nevertheless, the use of pipe left over from other projects, or the use of pipe that has been stored outdoors for a long period of time following fabrication without adequate protection, is not prohibited by

the applicable codes (ASME B31.4 and ASME B31.8). What is prohibited by these codes is the use of pipe with excessive internal corrosion. The outdoor exposure originated corrosion that resulted in pipe wall thickness less than the acceptable limits defined in the codes. Excessive internal corrosion is the fundamental problem. Whether the reason for this corrosion is that the pipe was left over from other projects, or was exposed to the elements for a long period without suitable internal protection at a Tenaris facility, is a subject of contractual significance only.

TGP provides a number of certificates from Tenaris-Confab (Brazil) in the company's response to E-Tech (see Attachment 2) to verify that all pipe used in the project was new and of good quality. However, we do not know if the pipe that is identified in Attachment 2 is in fact the same pipe that was used in the project. Therefore a fundamental step of the audit will be a detailed review of the pipebook, to identify the history and field modifications made to each installed piece of pipe.

For example, TGP includes in Attachment 2 a certificate of authorization of shipment for 1,784 pieces of 14-inch pipe with a factory inspection date of January 28, 2002. Below are two photos of 14-inch pipe in the ROW of the Camisea Project taken on June 22, 2003. The pipe sections in the photos do not necessarily belong to the shipment authorization provided in Attachment 2. However, a year-and-a-half had passed since the date of the shipment authorization. As can be seen in the photos, the pipes are coated with a triple layer of polyethylene, as indicated by TGP. However the internal portion of the pipe is not protected in any way and both pipes are sitting in mud and water. The key issue is the lack of internal protection for a significant part of the pipe used in the project. This pipe had been exposed outdoors for a long period of time before arriving at the site. The fundamental technical issue is the degree of internal corrosion in the pipes that were installed, not who was the manufacturer or where these tubes were stored before arriving at the site.

**Photos of 14-Inch NGL Pipe, Right-of-Way Camisea Project, June 22, 2003**



#### 4. The issue of excessive pipe corrosion:

E-Tech affirmation:	Situation according to the TGP response:
<p><i>These tubes were stored outside in Ecuador and Brazil before being sent to Peru. This exposure to the element resulted in the tubes arriving in Peru with excessive corrosion . . .</i></p>	<p><i>None of the tubes pertained to other projects nor were they stored in Ecuador or Brazil. Storage in Brazil or Argentina corresponds to normal storage after fabrication until shipment to the site of transfer.</i></p> <p><i>The tubes utilized did not have problems with corrosion upon arrival in Peru because they were protected by Tenaris, in the factory, according to the specifications of Techint/TGP, with an (external) triple-layer polyethylene treatment.</i></p>

TGP has no option but to deny that left-over pipe was used in the project. The BOOT contract (p. 29) contains an explicit prohibition against the use of left-over pipe. This example underscores the necessity of an audit that is outside the control of actors like TGP that could possibly be harmed by the results. The possibility exists that nature is not the only guilty party in this case. The purpose of the independent audit will be to define with transparency the deficiencies, the reasons for the deficiencies, and the steps necessary to repair the pipelines to assure a reliable working lifetime of 20 to 30 years without ruptures.

The TGP statement that these pipes were protected and did not show signs of internal corrosion is false. All new pipe leaving a pipe manufacturing plant is equipped with polyethylene end protectors or metallic end caps. Significant quantities of pipe with no end protectors were observed by several Peruvian engineers working in the field during the project. In addition to the main author, E-Tech has two witnesses at the level of field engineer who will testify to the lack of pipe end protectors (testimony will be provided under acceptable criteria of confidentiality and security). In certain cases these pipes had damaged bevels (tapered ends), as these bevels were repaired by personnel without experience using inadequate tools.

TGP insists in its response that each pipe manufactured by Tenaris has a triple layer of external protection, in answer to the observation by E-Tech that a large quantity of pipe arrived with excessive corrosion. The E-Tech report does not mention or criticize the system of external triple layer protection used by Tenaris. The external system of protection is appropriate. Our concern has always been the degree of internal corrosion in a significant portion of the pipe used on the project.

TGP must maintain a file of the history of each piece of pipe and any field modifications performed on this pipe prior to installation. This document is called the “pipebook” (or paybook). The original Techint pipebook includes the date of manufacture of each piece of pipe used in the project. An incomplete summary of a single page of the pipebook is presented by TGP in Attachment 6 of its response to E-Tech. Attachment 6

is a very small part of the pipebook. President Ricardo Markous of TGP committed in the Camisea meeting sponsored by the I.A.D.B. in Washington, DC on February 27, 2006 to make the original pipebook available to the E-Tech authors. TGP indicates (p. 19) in the company’s response that the pipebook is available for review at the offices of TGP (in Lima). We are available to travel to Lima to review the pipebook in the offices of TGP. This review of the pipebook will be a key part of the first stage of the independent audit and will take approximately two months to complete.

**5. The issue of irregularities in the hydrostatic tests:**

E-Tech affirmation:	Situation according to the TGP response:
<p><i>Although in some cases the hydrostatic tests were conducted correctly, in other cases there were serious deficiencies and irregularities . . .</i></p>	<p><i>All hydrostatic tests were carried-out in complete conformance with the applicable norm. In all cases the tests were conducted by personnel highly qualified for such work, with extensive experience; the measuring and test instruments used to carry out the hydrostatic tests were audited to assure these instruments were ready for use during the tests. The calibration sheets for these instruments are properly catalogued and archived in the hydrostatic test certifications, which are available to whoever wishes to verify them.</i></p>

E-Tech agrees that the hydrostatic test procedures that were used are in accordance with the applicable codes. The issue is that they were not properly applied. It is not sufficient to simply fill-in a checklist. It is necessary to demonstrate that the hydrostatic tests were properly conducted using qualified personnel. The use of personnel trained to install fiber optic cable or to take radiographs, as E-Tech noted in our first response to TGP on March 4, 2006, in our opinion is far from using personnel with “ample and demonstrable” experience to carry out this task.

TGP presents a copy the calibration certificate for one of the pressure gauges that Techint used in the hydrostatic tests (Attachment 5 - certificate of calibration of pressure gauge of piston and weights - National Service of Metrología de Indecopi), that are provided in Attachments 4 and 8 (certificate of hydrostatic test approval - Section NGL 1 and Section NGL 29). The concept behind Attachment 5 seems to be to demonstrate that Techint properly conducted all calibrations necessary to assure the validity the hydrostatic tests provided in Attachments 4 and 8. The date of calibration for the pressure gauge in Attachment 5 is January 12, 2004. However, the date indicated for the hydrostatic test of section NGL 1 is August 12, 2003 and for section NGL 29 it is May 7, 2003. We do not understand how a pressure gauge calibration done in 2004 could serve some purpose relative to two hydrostatic tests conducted in 2003. A

detailed review of all the calibrations done by Indecopi to instruments used by Techint must be an integral part of the independent audit.

We must point-out that there were many more instruments that required calibration certification, not only the pressure gauge in Attachment 5. The independent audit will have to verify that all the instruments used in all the hydrostatic tests were properly certified at the time of the tests, and also, that all these tests were supervised by OSINERG.

TGP indicates in their answer to E-Tech that the Peruvian norm does not establish any specific value for the hydrostatic test. This it is not the case. The Regulation for the Environmental Protection of Hydrocarbon Activities dated November 12, 1993, Supreme Decree N° 046-93-EM, states *“oil and gas pipelines will have to be put under a hydrostatic test pressure no less than 150% of the normal operating pressure prior to being put in operation.”* The BOOT contract (p. 98) that was signed TGP by says *“oil and gas pipelines will have to be put under a hydrostatic test pressure no less than 150% of normal operating pressure prior to being put in operation.”*

TGP insists that there is no need to repeat the hydrostatic tests because they were properly performed the first time. This perspective is illogical. The first time the hydrostatic tests were performed the five pipeline ruptures had not yet occurred. The original purpose was to verify the integrity of each section of the pipeline(s) prior to putting these pipelines in operation. Now the purpose is to accurately determine the location of weak points for repair and/or replacement. The purpose is different. The best method for determining weak points is the hydrostatic test. The testing program that TGP already has begun using an intelligent pig, a geometric caliper, inertial georeference device, and the longitudinal magnetic flux equipment will hopefully provide useful data. The geometric caliper will be useful for locating bends or other flaws that have been caused by use of the technique of holding pipe ends together by force (in difficult sections) to make welding possible. However, it would be far better if these tests took place under the supervision of a legitimately independent auditor to ensure transparency.

TGP indicates the results of its tests will be ready by the end of 2006. How many additional ruptures will occur before the end of 2006? The main objective of TGP seems to be to avoid stopping the flow of NGL product instead of dedicating the necessary time, considered by E-Tech to be on the order of several months, to a second round of hydrostatic tests and repairs. A second round of hydrostatic tests must be an essential part of the repair program.

### **Role that of E-Tech Author in the construction of the pipelines**

The main author of the report of E-Tech, Carlos Salazar, left the Camisea Project on his own volition as he was not in agreement with the practices of TGP. He worked in the jungle and mountain sections of the project. He is an engineer inspector and auditor of pipeline and pressure vessel welds. He was engineer inspector for pipe installation for

Camisea Techint from February 2002 to June 2003. His responsibilities included the supervision of in-line welding and special crossing welding, supervision of the qualification of welders in accordance with API 1104 and AWS, and supervision of the radiographic interpretation of welding joints. He is qualified to give his professional opinion in all areas related to piping, the opening of the ROW, trenching, special crossings, lowering of pipe (into trench), and filling and revegetation of the ROW. What TGP has alleged with respect to the reasons Mr. Salazar terminated his involvement in the project, the zones where he worked, and the extent of his knowledge, is false.

**Conclusion**

The purpose of the E-Tech report is to assure the integrity of the natural gas and NGL pipelines throughout the useful life of the Camisea Project. This is fundamental to assure the expected economic benefits to Peru and to protect the people and the environment along the route. There is an urgent need to initiate an independent audit and repair project as soon possible.

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