INSTITUTO GEOLOGICO Y MINERO DE ESPAÑA
INSTITUTO NACIONAL DE INDUSTRIA
CENTRO DE ESTUDIO DE LA ENERGIA

SONDEO GEOTERMICO LANZAROTE - 1

INFORME FINAL

ANEXO

enadim/a
INI
empresa nacional adaro
de investigaciones mineras, s.a.

Enero 1978

ANEXO I

COMPLEMENTOS

I N D I C E

1.- PLANO DE SITUACION DE LAS OBRAS

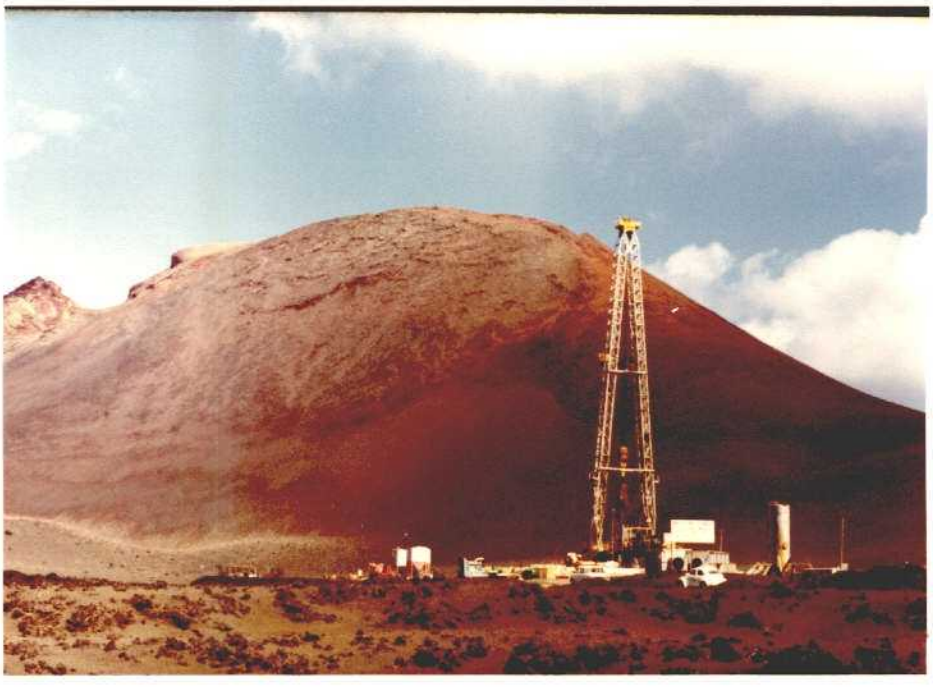
LEYENDA

- Tubería de agua
- Pista de acceso
- Punto de sondeo
- Limite del parque

MINISTERIO DE INDUSTRIA DIRECCION GENERAL DE MINAS INSTITUTO GEOLOGICO Y MINERO DE ESPAÑA			
DIBUJADO		PROYECTO DE INVESTIGACION GEOTERMICA EN LANZAROTE	Clave
FECHA			
COMPROBADO		PLANO DE SITUACION DE LAS OBRAS	Plano Nº
ESCALA	1:10.000		

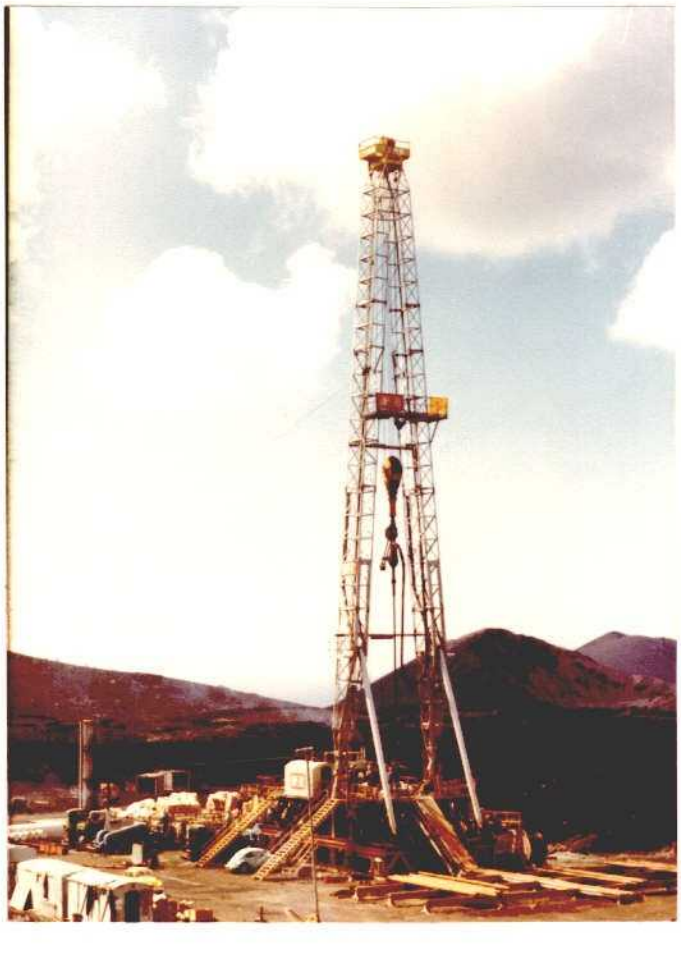
2.- FOTOGRAFIA

Vista general del sondeo Lanzarote 1



Torre de Perforación – Perforando

Vista del mastil—
Introduciendo
el tren de
perforación



Operación de añadir
una varilla al tren de
perforación

Maniobra de extracción del tren de perforación. En primer término el equipo de cementación

Personal trabajando en una maniobra con el tren de perforación

Entubación en 9 5/8" Ø

Grupo de motores del equipo de perforación

Grupos moto–bombas de lodos

Balsas o depósitos de lodos, con sus productos

Torre de refrigeración de lodo, grupo moto–bomba de "mixing" y depósito de gasoleo

Enganchando durante una maniobra de extracción

3.- RECORTES PERIODICOS

LANZAROTE

La electricidad geotérmica se obtendrá a mitad de precio que la del combustible

ARRECIFE, 28. (Crónica de nuestro corresponsal, GUILLERMO TOPHAM, por teletipo.)—La visita que ayer efectuaron a Lanzarote altas personalidades vinculadas a las cuestiones geotérmicas, cuya relación ofreceremos después, ha sido extraordinariamente importante por dos razones fundamentales. Primera, porque demuestra el interés del Gobierno en sacar adelante tan ambicioso proyecto en el que se invertirán 150 millones de pesetas, y segunda, porque en la inspección que durante varias horas efectuaron las citadas personalidades, dentro del mismo campo vivo de las prospecciones, se observó que todo marcha de acuerdo con lo previsto y dentro de un signo optimista altamente esperanzador.

LOS VISITANTES, EN LA TORRE DE SONDEO

Los visitantes fueron estos: don Pedro Fontanilla Soriano, director del Instituto Geológico y Minero; don Antonio Muñoz Torraldo, subdirector del Centro de Estudios de la Energía, al no poderse desplazar el director, señor Temboury; don José Luis Niño de Olaiz, director de la división de ingeniería del INI; don Juan Artieda, director general de "ADARO"; consejero delegado de la misma empresa, señor Ugalde; delegado provincial de Industria, don Alfredo Vigara, e ingeniero jefe provincial de Minas, don Jesús Doreste Manchado. También los acompañaba el consejero del Cabildo, don Fernando Curbelo, y personal técnico y administrativo de "SOPPETROL", que viene realizando los trabajos, dirigiéndose todos después al pie de Montaña Rasgada, en donde se halla instalada la torre.

ESPECTACULAR AVANCE EN LAS PERFORACIONES

Allí, los visitantes, provistos de cascos metálicos protectores, pasaron a la parte inferior de la torre de sondeo, de 50 metros de altura. Sobre un mapa y plano especial de Lanzarote, recibieron de los técnicos don Jerónimo Abad, don Alvaro Rodríguez y don José Sánchez Guzmán, toda clase de explicaciones sobre la historia y procesos de estas investigaciones, subrayándose el espectacular avance en las perforaciones que en poco más de una semana han pasado de los 420 a los 750 metros de profundidad.

ELECTRICIDAD A MITAD DE PRECIO QUE EN 1970

Sobre las cuestiones tratadas ayer en esta entrevista aparte pero destaquemos, como dato importante, en el caso de que el sondeo diese resultado positivo, lo que comentaba allí uno de los técnicos: "Si por suerte para todos, en Lanzarote se pudiera obtener electricidad mediante la energía geotérmica, su precio sería la mitad y hasta incluso la tercera parte de la producida en 1970 con combustibles naturales", teniendo en cuenta el ininterrumpido aumento en la cotización del petróleo a partir de 1970, podemos deducir la enorme importancia que tendría para Lanzarote producir electricidad en tales condiciones, o sea a tan reducido coste.

MANIFESTACIONES DEL DIRECTOR GENERAL

Momentos antes de que los visitantes abandonaran la zona de Montaña Rasgada, camino de El Golfo para inspeccionar la estación de bombeo, charlamos brevemente con el señor Fontanilla Soriano quien manifestó: "Estoy realmente satisfecho de lo hasta ahora realizado en estos sondeos en cuyo éxito final se halla muy interesado el Gobierno de la nación. Todo viene haciéndose de acuerdo con el plan previamente trazado y los trabajos se están efectuando con prontitud y eficacia. Son razones suficientes para sentirme sumamente satisfecho".

MAS SONDEOS SI ESTE FRUCTIFICARA

A una pregunta que formulamos al señor Fontanilla sobre la posibilidad de que se planeasen nuevos sondeos nos respondió: "Si éste fructificara, es decir, si diese un resultado positivo y se pudiese obtener electricidad con esta energía geotérmica, se realizarían otros sondeos con el fin de aumentar el potencial energético de Lanzarote con los incalculables beneficios que ello supondría para su desarrollo industrial y agrícola".

LA HUELGA DE CAMIONEROS EN LAS PALMAS Y LAS PERFORACIONES

En la corta entrevista que mantuvimos con don Pedro Fontanilla estaba también presente el director general de "Adaro", don Juan Artieda, quien, al conocer nuestra condición de informador, nos rogó dejáramos constancia en LA PROVINCIA del hecho de que si no cesaba pronto la huelga de camioneros en Las Palmas de Gran Canaria (en Lanzarote no existe esa huelga), los trabajos de sondeo habría que paralizarlos al contarse ya con muy pocas bombonas de oxígeno, elemento imprescindible para la realización

LANZAROTE

Progresan los sondeos geotérmicos

EN UNA SEMANA SE HA PASADO DE 400 A 750 METROS DE PROFUNDIDAD

ARRECIFE DE LANZAROTE, 29. (Cifra).— En el escaso espacio de una semana, se ha pasado de los 400 metros de profundidad a los 750, en los sondeos que desde el pasado agosto se están efectuando en la zona geotérmica de Lanzarote, como última fase de las investigaciones que desde 1948 se ha venido realizando, al objeto de comprobar si dicha energía puede ser aprovechada con fines industriales.

En caso de resultar positivo el sondeo, se podría obtener electricidad a la mitad o a la tercera parte del precio con que se obtenía en el año 1970, utilizando los combustibles líquidos, cuando todavía el petróleo no había adquirido las altas cotizaciones de los últimos años, lo que da idea de la trascendental importancia que ello habría de suponer para el desarrollo industrial y agrícola de Lanzarote.

Los trabajos de sondeo, promovidos y patrocinados por el «Instituto Geológico y Minero», el «Instituto Nacional de Industria» y el «Centro de Estudios de la Energía», cuentan con un presupuesto de 150 millones de pesetas y están siendo realizados por medio de una torre de 50 metros de altura, de la que se usan para perforaciones petrolíferas, a cargo de la empresa española «SOMPETROL».

Con el fin de supervisar las obras, ha visitado Arrecife el director del «Instituto Geológico y Minero», Pedro Fontanilla, quien, acompañado de otros altos cargos nacionales y durante tres horas ha inspeccionado los trabajos, manifestando a «Cifra» que se encuentra muy satisfecho de lo hasta ahora realizado de acuerdo con los planes previstos y que, en caso de que el sondeo fuera positivo y la energía geotérmica resultase aprovechable para obtener electricidad, se abrirían nuevos pozos de sondeo en otros lugares de la zona geotérmica de Lanzarote.

PLENO EXTRAORDINARIO DEL CABILDO

ARRECIFE, 29 (De nuestro corresponsal).— Según nos informan hoy Comisiones Obreras de Lanzarote, el próximo domingo, a las 11.00 horas, tendrá lugar en el Cine Atlántida de Arrecife una charla a cargo del líder de Comisiones Obreras, Marcelino Camacho. Posteriormente con asistencia también del señor Camacho tendrá lugar la elección del secretariado regional en Canarias de Comisiones Obreras.

PLENO EXTRAORDINARIO DEL CABILDO INSULAR

El sábado a las 13,00 horas en primera convocatoria, está convocado un Pleno Extraordinario del Cabildo Insular de Lanzarote para tratar diversos asuntos que quedaron pendientes en el último Pleno Ordinario por falta de quorum, también está incluído en el orden del día la solicitud de los beneficios de la amnistía solicitada por el ex-funcionario don José Díaz Medina.

FESTIVIDAD DEL SANTO ANGEL DE LA GUARDA

Recibimos atento saluda del Comisario-Jefe del Cuerpo General de Policía de Arrecife, comunicando que con motivo de la festividad del Santo Angel de la Guarda, Patrón del Cuerpo, se celebrará a las 12.45 horas, del próximo día 2, en el templo parroquial de San Ginés una misa y a continuación una copa de vino que se servirá en el Castillo de San José. Agradecemos la atenta invitación.

ELECCION DE PLENO DEL SECRETARIO INSULAR DE COMISIONES OBRERAS

En la asamblea celebrada el pasado día 27, por el Consejo Sindical de la Unión Sindical de la Federación Canaria de Comisiones Obreras en Lanzarote, se eligió el secretario general, la permanente y demás miembros que componen el Pleno del Secretariado Insular, como máximo órgano de representación y dirección de esta unión sindical, quedando constituído de la siguiente forma:

Pleno del Secretariado: Secretario general, José Domingo Hernández Alvarez; de Organización, Tomás Santiago Santiago; de Finanzas, Francisco Perdomo Arraez; de Prensa y Propaganda, Gregorio Espino Betancort; de Formación Sindical, Ramón Pérez Farray; de Asesoría Sindical, Domingo Rodríguez González; de la Juventud, Emilio Barrios Rodríguez y secretaría para mujer trabajadora, María del Pino Martín Martín. Miembros adjuntos al Pleno, Marcial Viñoly López, Francisco de León Torres, Manuel Arrocha Perera, Miguel Frahija García, Juan Regalado Méndez, Francisco Luzardo y Palmira Martín García.

La Permanente del Secretariado la forman los secretarios de Organización, Finanzas, Prensa y Propaganda, Formación Sindical y el secretario general.

ANDRES PALLARES PADILLA

LANZAROTE

¿Hay petróleo en la plataforma submarina próxima a Papagayo?

EL REY DON JUAN CARLOS LLEGARA A ARRECIFE EN HELICOPTERO

Necesidades mínimas municipales: 528 millones de pesetas

ARRECIFE, 4.— (Crónica de nuestro corresponsal, GUILLERMO TOPHAM, por teletipo).— Recordarán nuestros lectores que hace aproximadamente cinco años dimos cuenta de la llegada a Arrecife de un remolcador norteamericano de altura al objeto de dejar y recoger en este puerto al personal de una plataforma que realizaba prospecciones petrolíferas, para el Gobierno de Marruecos, a unas 45 millas al este de Arrecife. El director técnico de las operaciones, un súbdito suramericano, nos manifestó en el mismo muelle que se habían hallado indicios de petróleo, cosa que nos confirmó después otro personal, recordamos que en el restaurante "Costa Brava".

DECLARACIONES ACTUALES DE UN TECNICO

Días pasados, una persona que lleva más de 15 años trabajando en sondeos petrolíferos en distintos países, muy experta en la materia, nos dijo que por sus características le parecía que en la plataforma submarina próxima a la Playa de Papagayo podría haber "oro negro". "Tengo mucha experiencia en estas cosas y creo que podría haber allí petróleo, aunque los técnicos tienen la última palabra". Aprovechando la entrevista que días después hicimos a un técnico especializado —cuyo texto íntegro publicamos en otra página—, le preguntamos lo que nos podía decir al respecto, declarando que nada podía adelantar, pero tampoco negar ni afirmar, en lo referente a la posibilidad de que hubiese petróleo en zona próxima a Lanzarote, submarina por supuesto, en tanto no se hiciesen las investigaciones pertinentes.

AHORA, UNA NOTICIA ESPERANZADORA

Ahora, según escribió hoy en "El Día" la periodista lanzaroteña Herminia Margarita Fajardo, y a través de la nota de una agencia gubernativa marroquí publicada en una revista técnica, se dice que la plataforma "Ifni-1", del grupo "Sun-Oil", ha encontrado petróleo a unas 13 millas de Lanzarote —recuérdese que Ifni se halla frente al norte de Lanzarote— que es donde se están efectuando las prospecciones. ¿No son ya muchas las noticias "petrolíferas" siempre referidas a Lanzarote?, ¿primero a 45 millas y ahora a 13?, ¿no podría aprovecharse la presencia en la isla de personal y material de sondeos petrolíferos siquiera para hacer un estudio preliminar?. Porque descubrir en Canarias un yacimiento petrolífero submarino en estos tiempos podría ser la conquista más sensacional y provechosa del siglo.

LOS REYES SOLO PERMANECERAN UNAS HORAS

Como siempre, nadie "sabe nada" —nos referimos a esfera oficial— visita de los Reyes de España a Lanzarote aprovechando su viaje a Canarias con el presidente López Portillo. Sin embargo, hemos podido averiguar que de llevarse a efecto esa visita —es muy probable que se realice— Don Juan Carlos y Doña Sofía llegarían a Arrecife a bordo de un helicóptero, casi seguro procedente de Fuerteventura, para permanecer aquí sólo unas horas y presidir la inauguración del centro audiovisivo de los Jameos del Agua.

POCOS RECURSOS PARA MUCHAS NECESIDADES MUNICIPALES

En 528 millones de pesetas se cifra el montante de dinero que necesita el Ayuntamiento de Arrecife para atender a las obras públicas más imprescindibles sin incluir en ese importe: viviendas; enseñanza; carretera de circunvalación, etc., cantidad que ha sido solicitada a la Mancomunidad y a la comisión provincial de colaboración del Estado con las corporaciones. A juzgar por la relación que ofrecemos seguidamente podremos darnos cuenta de los graves inconvenientes con los que tropieza el Ayuntamiento para poder atenderlos, dado el muy escaso volúmen de su presupuesto. Veamos. Matadero Municipal, 2 millones de pesetas. Dragado Charco San Ginés, 17 millones. Pescadería municipal, 1.750.000. Servicios públicos. 1) Playa del Reducto, 500 mil. Parque Islas Canarias, 500 mil y Avenida del Generalísimo, 500 mil.

PAVIMENTO DE CALLES: 218 MILLONES

Cementerio municipal: capilla, 1.500.000 ptas.; sala de autopsias, 1.200.000 y 500 nichos, 4 millones; asfaltado y encintado de calles. Altavista: 52.640.400 ptas. Santa Coloma: 26.358.000. La Vega: 20.985.200. El Lomo y Valterra: 19.280.000. Charco de San Ginés: 7.116.000 y red básica 92 millones. Total, sólo en calles, más de 218 millones de pesetas.

NUEVA CASA CONSISTORIAL

Parques municipales. Altavista, 2.500.000 ptas. Santa Coloma, 5 millones, Valterra, 2 y La Vega otros 5. Policía Municipal (dependencias), 2.500.000. Alumbrado público, 126 millones. Electrificación resto municipio, 45. Castillo de San Gabriel, 1.200.000. Pabellón cubierto múltiple, 25 millones. Centros de convivencia juvenil en los barrios de Alta Vista, Santa Coloma, Valterra y La Vega, 6 millones en total. Nueva casa consistorial, 50 millones y parque móvil municipal, 7.500.000 ptas. Total: 528.035.500 ptas. ¿De dónde vamos a sacar tanto dinero? Mucho y "bueno" espera a nuestra ciudad si los organismos ya citados no nos echan una mano justa y generosa.

PLENO EXTRAORDINARIO DEL CABILDO

En el pleno extraordinario del Cabildo, celebrado ayer, se aprobó el anteproyecto extraordinario de la cooperación (1ª fase), municipal, por importe de más de 38 millones de pesetas, también la adquisición urgente de una finca en Manje, de 15.861 metros cuadrados, para ampliar la extensión de la granja agrícola. También se aprobó certificación de obras ejecutadas en el camino vecinal de Orzola a Los Jameos, por importe de más de 3 millones, y reiterar de la superioridad una pronta contestación relativa a la aplicación de los beneficios de amnistía a don José Díaz Medina, con informe adjunto de secretaría.

EN LOS SONDEOS DE LA MONTAÑA DEL FUEGO

Parece haberse encontrado vapor de agua

Hoy ha circulado el insistente rumor de que en el sondeo geotérmico que se viene efectuando en las Montañas del Fuego y a una profundidad aproximada de 1.000 metros, ha sido localizada una bolsa de agua caliente y vapor a elevada temperatura. A la hora de cerrar esta crónica (12,30 de la noche), no hemos podido corroborarlo, aunque en la Urbanización «Los Farione», hemos localizado a miembros del equipo científico del profesor Fuster Casas, quienes nos dijeron que era probable, puesto que a esa profundidad aproximadamente se esperaba encontrar las primeras manifestaciones del fenómeno geotérmico. Con las naturales reservas adelantamos esta noticia, que de confirmarse y ser positiva, el posible aprovechamiento de esta energía transformaría totalmente el futuro de Lanzarote.

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TELDE

Fiesta campera organizada por el Club de Leones

El Club de Leones de la ciudad de Telde tiene previsto celebrar esta noche, a las 9, en el futuro Club de Tenis de la carretera de La Pardilla, una fiesta campera, cuyos beneficios irán destinados entre otras actividades, a la Guardería Laboral «José López Suárez».

El acto será amenizado por dos orquestas y habrá un asadero de cerdo y barra libre. Por otra parte se ruega la asistencia con traje campero y se prohibe el uso de la corbata.

LANZAROTE

BEGOÑA RODRÍGUEZ, MISS SANTA COLOMA 1977

★ LAS PERFORACIONES GEOTERMICAS, UNA REALIDAD EN EL PROXIMO AGOSTO

ARRECIFE DE LANZAROTE, 9.— (De nuestro corresponsal, Armando de León Expósito, por télex).— En un acto que tuvo algún tiempo de retraso sobre el horario previsto, motivado por otros actos que se estaban desarrollando y por la espera de la posible llegada de algunos invitados que habían prometido venir si les era posible, ha tenido lugar la gala final con elección de Miss señorita Coloma 1977. El acto, hay que decir que resultó entretenido y altamente interesante, por la calidad de los participantes, que fueron largamente aplaudidos por el público asistente que llenó casi en su totalidad el recinto ferial.

Estupenda interpretación del Grupo de Coros y Danzas de Anetén de Tenerife, así como del humorista Cho Pacheco de La Esperanza, que también, dentro de su línea habitual, tuvo una lucida actuación.

Fue, sin duda, una de las interpretaciones más aplaudidas la del grupo coreográfico Los Bohemios, con «Fantasía Andina», y la Reina del Carnaval Tinerfeño, con su traje «Fantasía Abeja», reina que llevaba con elegancia y colorido la señorita Montserrat Carretero Casas y que su aparición en escena fue largamente aplaudida, pues lo cierto es que el colorido y artesanía de su traje eran extraordinarios. Bien en su actuación «Los Bohemios».

La ganadora del Festival de la Canción de Mallorca, Ooyu Gena, tuvo también una buena actuación. En suma, un acto que puede dársele el aprobado con broche de unas fiestas que, a partir de hoy, quedan en el recuerdo, pero en el recuerdo de lo bueno, porque lo cierto es que, en líneas generales, ha sido una de las mejores que hemos visto en esta populosa barriada.

El cierre de todo este espectáculo, lo que podemos llamar broche de oro del mismo fue el nombre de la señorita María Begoña Rodríguez, como Miss Coloma 1977, siendo impuesta la banda por el concejal delegado del barrio, señor Fajardo Fajardo, y así mismo coronada por la reina del pasado año, Nieves Alli Hernández. Presentaron Sari González y Balbino Pérez.

PERFORACIONES GEOTERMICAS

Hemos de comentar, una vez más porque vuelve, a ser realidad, las perforaciones geotérmicas que se van a hacer en la zona de la Montaña del Fuego. Ultimamente han estado en Lanzarote señores que están relacionados con el tema, por un lado el señor Rodríguez, de Enadimsa, y también los señores Navas y Choussar, de Sonpetro. Todos ellos han realizado varios contactos aquí con personas relacionadas con la iniciación de los trabajos en la Montaña del Fuego.

Esos trabajos de sondeos profundos comenzarán en el mes de agosto, al menos así se tiene previsto. Para tal fin ya se están haciendo los preparativos para poder traer la maquinaria a nuestra isla, material que, dada la categoría del trabajo, supone muchas toneladas de transporte y que comenzarán a llegar de un momento a otro.

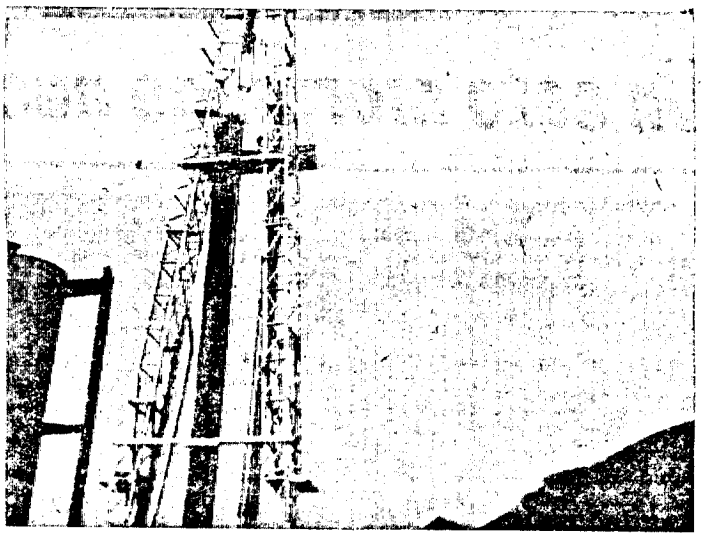
LA GOMERA

SIN RESULTADO POSITIVO

FINALIZARON LOS SONDEOS GEOTERMICOS DE LANZAROTE

* SE ESTA PROCEDIENDO AL DESMANTELAMIENTO DEL EQUIPO UTILIZADO EN LA PERFORACION

* Muestras de gases obtenidos en la investigación se han remitido a Estados Unidos e Italia



Sin que se haya obtenido resultado positivo, según la revista "Petróleo", han finalizado los trabajos de sondeo de investigación geotérmica en la isla de Lanzarote. La noticia ha sorprendido a muchos círculos oficiosos de la isla de los volcanes, que si bien conocían que los objetivos propuestos no habían sido alcanzados, ignoraban que en la actualidad se procediese al desmantelamiento del equipo "Emsco GC-500", de SONPETROL, utilizado en la perforación.

El sondeo de investigación geotérmica en Lanzarote fue iniciado el pasado 19 de agosto en uno de los extremos —concretamente el sur— del parque nacional de Timanfaya, zona de las Montañas del Fuego. Realizado por la empresa nacional Adaro para el Instituto Geológico y Minero de España, el INI y el Centro de Estudios de la Energía, alcanzó los 2.700 metros de profundidad, sin que se havan obtenido los resultados apetecidos desde un principio. Sin embargo, no se descarta que las experiencias acumuladas en los trabajos realizados sean sumamente positivas de cara a futuros sondeos que, al parecer, se realizarán una vez interpretados los datos obtenidos en las iniciales investigaciones.

Este sondeo ha sido el primero de su clase realizado en España. Se han remitido ya a centros especiales de los Estados Unidos, Italia y España muestras de gases tomadas durante la perforación, así como otra serie de datos para su análisis e interpretación. Menciona la publicación del Club Español del Petróleo que entre los datos más interesantes del sondeo figuran los relativos al conocimiento del sedimentario, que ha sido cortado en más de cien metros. En un principio se llegó a pensar que el equipo utilizado por Sonpetrol iba a ser trasladado a Libia, donde es inminente la firma de un contrato entre esta compañía y la sociedad de aquel país, Ageco, aunque los equipos que se trasladarán a la nación árabe no tienen nada que ver con la "Emsco GC-500", que fue la que terminó los trabajos en Lanzarote.

EN AGUAS CERCANAS AL SAHARA

AMPLIACION DE CONCESIONES PARA LA EXPLORACION DE HIDROCARBUROS

No se explican, en concreto, las zonas de actuación de la British Petroleum y la Phillips Petroleum

Según informa la revista "Petróleo", las empresas Phillips Petroleum y British Petroleum han conseguido añadir 8.400 kilómetros cuadrados más a su concesión para la exploración "offshore" en zonas pertenecientes a la antigua provincia española del Sahara.

Estas dos compañías extranjeras habían suscrito con anterioridad un contrato para la exploración de unos 25.000 kilómetros cuadrados, situados al sur de la nueva concesión. Phillips tiene además otras concesiones en las cercanías de Agadir.

Por la noticia escueta que publica Petróleo es de imaginar que las concesiones han sido otorgadas por el Gobierno marroquí. No se explican en concreto las zonas de actuación de las dos compañías, aunque se destaca que es en aguas cercanas a la costa del antiguo Sahara español. ¿Aguas canarias?... Es la impresión de algunos medios al respecto hace ya cierto tiempo, aunque siempre desmentida en fuentes oficiales. Lo que no cabe la menor duda es de que se trata de una zona en litigio y que se guarda el mayor silencio en torno a las localizaciones de dichas exploraciones, que ni son las primeras ni serán las últimas.

Hemos tratado de conocer la localización exacta de estos nuevos trabajos de exploración en busca de petróleo pero, quizas por tratarse ayer de un tradicional puente no pudimos localizar a las posibles fuentes informantes. Lo que esta claro es que las concesiones nuevas están aún en la costa del Sahara, más al norte de otras ya otorgadas con anterioridad, lo que no descarta la posibilidad de su situación frente a Canarias y, por supuesto, el que también se realicen exploraciones en aguas que deberían corresponder al Archipiélago.

LA PROVINCIA — Domingo, 8 de enero, 1978

4.- PARTE DIARIO DE PERFORACION

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR / AGENTE: ADARO

RIG N.º / APARATO N.º: G. C. 500

WELL / POZO: TYA. 1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 19. 8. 77

N.º: 1 / Bis

TIME DISTRIBUTION - HOURS DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION					
REAMING	ALISANDO					
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION		5			
TRIPS	MANIOBRA					
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS					
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS						24

25 AGO. 1977

SUPPLY
SUMINISTROS

Bomba G. DENVER 7¼ x16 Gr 8 = 15.000 Pts.-
Saille de 4½ Conduccion de agua = 20.000. Pts.-

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE					
VISA					

53220

SONPETROL SONDEOS PETROLIFEROS, S. A. López de Hoyos, 13	OPERATOR AGENTE ADARO	RIG N.º APARATO N.º G·C· 500	WELL POZO LANZAROTE - 1

DAILY ATTACHEMENT
PARTE DIARIO

DAY
FECHA
20. 8. 77

N.º 3

TIME DISTRIBUTION - HOURS DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE				X	
DRILLING ACTUAL	PERFORACION	11 30				
REAMING	ALISANDO					
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION		4			
TRIPS	MANIOBRA	1/2				
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS		1			
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		12	5		X	24

25 AGO. 1977

SUPPLY
SUMINISTROS

Bomba 9-DENVER 7"x16 9x8 = 15.000.- Pts
Sarta de 4½ Conduccion Agua = 20.000 Pts.-
Drill Collers 5"/7 = 5.400 ✓
Columna de Perforacion 3½ = 15.000 ✓

TRANSPORTATION
TRANSPORTES

Tuberia de Lavado 9⅝ = 1.000 Pts-

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE	20-8-77	N. Arruza			
VISA					

60220

SONPETROL SONDEOS PETROLIFEROS, S. A. López de Hoyos, 13	OPERATOR AGENTE ADARO	RIG N.° APARATO N.° G. C. 500	WELL POZO LANZAROTE 1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 21. Agosto 1977

N.°: 3

TIME DISTRIBUTION - HOURS DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS				REMARKS OBSERVACIONES
		A	B	C	D	
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	20,45				
REAMING	ALISANDO					
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION		3,15			
TRIPS	MANIOBRA					
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE-LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS					
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		20 45	3 15			24

RECIBIDO
25 AGO. 1977

SUPPLY
SUMINISTROS

BOMBA G. DENVER 7"1/2 x 16 6x2 = 15.000.- Hs. = GAS. OIL =
Sarillas de 4"1/2 Conduccion Agua = 20.000.- Hs RECEPCION = 0
Drill collar 9"1/2 = 5.400.- CONSUMO = 2000.-
Columna Perforacion 3"1/2 = 15.000.- STOCK = 8.000.-

TRANSPORTATION
TRANSPORTES

Tuberia de Acero 9"5/8 = 1.000.- Hs

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE	21-8-77	21-8-77			
VISA	[signature]	N. Drauz			

SONPETROL SONDEOS PETROLIFEROS, S. A. López de Hoyos, 13	OPERATOR AGENTE ADARO	RIG N.° APARATO N.° G.C. 500	WELL POZO LANZ - 1

DAILY ATTACHEMENT
PARTE DIARIO

DAY
FECHA
22 AGOSTO 1977

N.° 4

TIME DISTRIBUTION - HOURS DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	2a 3c				
REAMING	ALISANDO					
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION					
TRIPS	MANIOBRA	1 3c				
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS					
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		24				24

RECIBIDO
- 1 SET 1977

SUPPLY
SUMINISTROS

= GAS-OIL =

BOMBA G. DENVER 7"1/4 x 16 G x D. = 15.000 Kgs.
Tuberías de 4"1/2 Conducción de agua = 20.000 Kgs
One Collars 9"1/2 = 5.400 Kgs
columna de perforación 3"1/2 = 15.000 Kgs

RECEPCION = 6000
CONSUMO = 2.000
STOCK = 12.000

~~TRANSPORTATION~~
~~TRANSPORTES~~

Tubería de lavado 9"5/8 = 1.000 Kgs

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE	23-8-77	23-8-77			
VISA					

6.1220

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR / AGENTE: A DARO

RIG N.º / APARATO N.º: G·C·500

WELL / POZO: LANZ - 1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 23 AGOSTO 1977

N.º: 5

TIME DISTRIBUTION - HOURS / DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS / OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	7 30				
REAMING	ALISANDO					
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION	0 15				
TRIPS	MANIOBRA	3 30				
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO		0 30			
WAITING ON CEMENT	ESPERANDO FRAGUADO			10 30		
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS		0 45		1	
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		11 15	1 15	10 30	1	24

RECIBIDO
- 1 SET. 1977

SUPPLY
SUMINISTROS

STOCK DE GAS-OIL
RECEPCION = -
CONSUMO = 2.000
STOCK = 10.000

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE	23-8-77	23-8-77			
VISA		N. Amuza	Rivas		

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR / AGENTE: ADARO

RIG N.º / APARATO N.º: G.C. 500

WELL / POZO: LANZAROTE 1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 24 AGOSTO 1977

N.º: 6

TIME DISTRIBUTION - HOURS DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	13 1/2				
REAMING	ALISANDO					
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION					
TRIPS	MANIOBRA	6				
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO	1				
WAITING ON CEMENT	ESPERANDO FRAGUADO			3 45		
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS					
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		20 1/2		3 45		24

RECIBIDO
- 1 SET 1977

SUPPLY
SUMINISTROS

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE	25-8-77				
VISA					

63/80

SONPETROL SONDEOS PETROLIFEROS, S. A. López de Hoyos, 13	OPERATOR AGENTE ADARO	RIG N.º APARATO N.º G-C-500	WELL POZO LANZAROTE 1

DAILY ATTACHEMENT
PARTE DIARIO

DAY
FECHA
25 AGOSTO 1977

N.º 7

TIME DISTRIBUTION - HOURS DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS				REMARKS OBSERVACIONES
		A	B	C	D	
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	11				
REAMING	ALISANDO	10				
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION					
TRIPS	MANIOBRA	3				
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS					
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		24				24

RECIBIDO
- 1 SET 1977

SUPPLY
SUMINISTROS

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE	25-8-77	25-8-77			
VISA					

63220

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR / AGENTE: AJARO

RIG N.º / APARATO N.º: G.C. 500

WELL / POZO: LANZAROTE-1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 26 AGOSTO 1977

N.º 8

TIME DISTRIBUTION - HOURS / DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS / OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	19 45				
REAMING	ALISANDO					
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION	1				
TRIPS	MANIOBRA	3				
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION	0 15				
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS					
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		24				24

RECIBIDO
- 1 SET. 1977

SUPPLY
SUMINISTROS

STOCK GAS-OIL
RECEPCION = 0
CONSUMO = 2000.
STOCK = 11.000

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE	26-8-77	26-8-77			
VISA					

6322

SONPETROL SONDEOS PETROLIFEROS, S. A. López de Hoyos, 13	OPERATOR AGENTE ADARO	RIG N.º APARATO N.º G.C. 500	WELL POZO LANZ. 1

DAILY ATTACHEMENT
PARTE DIARIO

DAY
FECHA
27 AGOSTO 1977

N.º 9

TIME DISTRIBUTION - HOURS DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS				REMARKS OBSERVACIONES
		A	B	C	D	
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	24				
REAMING	ALISANDO					
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION					
TRIPS	MANIOBRA					
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS					
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		24				24

SUPPLY
SUMINISTROS

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE	27 AGO 1977	27-8-77	N A		
VISA					

SONPETROL SONDEOS PETROLIFEROS, S. A. López de Hoyos, 13	OPERATOR AGENTE A D ARO	RIG N.º APARATO N.º G.C. 500	WELL POZO LANZAROTE 1

DAILY ATTACHEMENT
PARTE DIARIO

DAY
FECHA
28 - AGOSTO 1977

N.º
10

TIME DISTRIBUTION - HOURS DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS				REMARKS OBSERVACIONES
		A	B	C	D	
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	19 15				
REAMING	ALISANDO					
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION	0 30				
TRIPS	MANIOBRA	3	1			
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION	0 15				
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					- 1 SET 1977
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS					
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		23	1			24

SUPPLY
SUMINISTROS

STOCK GAS-OIL
RECEPCION = 0
CONSUMO = 2000
STOCK = 7000

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE	28. 8. 77	28. 8. 77			
VISA					

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR / AGENTE	RIG N.° / APARATO N.°	WELL / POZO
AJARO	G-C-500	LANZAROTE-1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 29. AGOSTO 1977

N.°: 11

TIME DISTRIBUTION - HOURS / DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS / OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	5				
REAMING	ALISANDO	2 45				
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION	0 30				
TRIPS	MANIOBRA	6 45				
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION	0 15				
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO	1				
WAITING ON CEMENT	ESPERANDO FRAGUADO			7 45		
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS					
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		16 45		7 45		24

RECIBIDO
1 SET 1977

SUPPLY
SUMINISTROS

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER / JEFE CAMPO	OPERATOR / AGENTE			
FECHA DATE	29. 8. 77	29-8-77			
VISA					

03220

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR / AGENTE: ADARO

RIG N.º / APARATO N.º: G·C· 500

WELL / POZO: LANZAROTE 1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 30 AGOSTO 1977

N.º 12

TIME DISTRIBUTION - HOURS DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	12 hs				
REAMING	ALISANDO	6 hs 45'				
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION	0 hs 30'				
TRIPS	MANIOBRA	4 hs 45'				
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS					
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		24 hs				24

SUPPLY
SUMINISTROS

STOCK GAS-OIL
RECEPCION = 6.000
CONSUMO = 2000
STOCK = 9.500

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE	30-8-77	30-8-77			
VISA					

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR / AGENTE: ADARO

RIG N.º / APARATO N.º: G·C· 500

WELL / POZO: LANZAROTE 1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 31 AGOSTO 1977

N.º: 13

TIME DISTRIBUTION - HOURS / DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS / OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	15H				
REAMING	ALISANDO					
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION					
TRIPS	MANIOBRA	2H				
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER ESPERA DE AGUA POR MAREA BAJA	VARIOS			6H30 → D		
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		17H30		6H30		24

SUPPLY / SUMINISTROS

STOCK GAS-OIL
RECEPCION = 0
CONSUMO = 1500
STOCK = 8.000

TRANSPORTATION / TRANSPORTES

	TOOL PUSHER / JEFE CAMPO	OPERATOR / AGENTE			
FECHA DATE	31-8-77	31-8-77			
VISA					

6.32.50

SONPETROL SONDEOS PETROLIFEROS, S. A. López de Hoyos, 13	OPERATOR AGENTE AJARO	RIG N.º APARATO N.º G-C- 500	WELL POZO LANZ- 1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 1 SEPT- 1977

N.º: 14

TIME DISTRIBUTION - HOURS DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS				REMARKS OBSERVACIONES
		A	B	C	D	
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	19				
REAMING	ALISANDO	0 45				
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION	0 15				
TRIPS	MANIOBRA	2 45	0 15			
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ~~ON~~ CEMENT	ESPERANDO FRAGUADO AGUA			0 30		
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS	0 30				
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		23 15	0 15	0 30		24

SUPPLY
SUMINISTROS

STOCK GAS-OIL
RECEPCION = 6000
CONSUMO = 1.500
STOCK = 12.500

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE					
VISA					

SONPETROL SONDEOS PETROLIFEROS, S. A. López de Hoyos, 13	OPERATOR AGENTE ADARO	RIG N.° APARATO N.° G-C 500	WELL POZO LANZ. 1

DAILY ATTACHEMENT
PARTE DIARIO

DAY
FECHA: 2 SEPT. 1977

N.°: 15

TIME DISTRIBUTION - HOURS DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	12 3/4				
REAMING	ALISANDO	2 1/4				
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION					
TRIPS	MANIOBRA	1 1/4				
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS					
FISHING	INSTRUMENTANDO	8 1/4				
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		24 1/4				24

SUPPLY
SUMINISTROS

STOCK GAS-OIL
RECEPCION = 0
CONSUMO = 1500
STOCK = 11.000

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE	2-9-77	2-9-77			
VISA					

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR / AGENTE: ADARO

RIG N.º / APARATO N.º: G.C.500

WELL / POZO: LANZAROTE 1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 3-9-77

N.º: 16

TIME DISTRIBUTION - HOURS / DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS / OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	5 30				
REAMING	ALISANDO	1 00				
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION					
TRIPS	MANIOBRA	3 00				
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION	0 30				
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO		9 00			
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS					
FISHING	INSTRUMENTANDO	12 00				
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		22 00	9 00			24

SUPPLY
SUMINISTROS

STOCK GAS-OIL 6500.l
CONSUMO 1500.l

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE	4-9-77	4/9/77			
VISA					

6-3249

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR / AGENTE: ADARO

RIG N.º / APARATO N.º: GC.500

WELL / POZO: LANZAROTE.1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 4-9-77

N.º 17

TIME DISTRIBUTION - HOURS DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION					
REAMING	ALISANDO	7 15				
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION	1 15				
TRIPS	MANIOBRA	11 15				
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO	0 30	1 15			
WAITING ON CEMENT	ESPERANDO FRAGUADO			2 30		
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS					
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		20 15	1 15	2 30		24

SUPPLY
SUMINISTROS

STOCK GAS-OIL 5500.l
CONSUMO 1000.l

TRANSPORTATION
TRANSPORTES

1 D.P 4 1/2 IF 16'6 L.F.T

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE	5-9-77	5/9/77			
VISA					

63220

SONPETROL SONDEOS PETROLIFEROS, S. A. López de Hoyos, 13	OPERATOR AGENTE ADARO	RIG N.° APARATO N.° GC. 500	WELL POZO LANZAROTE 1

DAILY ATTACHEMENT
PARTE DIARIO

DAY
FECHA
5-9-77

N.° 18

TIME DISTRIBUTION - HOURS DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS				REMARKS OBSERVACIONES
		A	B	C	D	
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION					
REAMING	ALISANDO	7 30				
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION					
TRIPS	MANIOBRA	3 H				
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO	1 30	1 H			
WAITING ON CEMENT	ESPERANDO FRAGUADO			11 H		
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS					
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		12 00	1 00	11 00		24

SUPPLY
SUMINISTROS

STOCK . GAS-OIL 16.500 l.
CONSUMO 1.000 l.
RECEPCION 12.000 l.

TRANSPORTATION
TRANSPORTES

1 GOMA DE 17½ PARA ESTABILIZADOR

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE	6-9-77				
VISA					

63220

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR / AGENTE: ADARO

RIG N.º / APARATO N.º: GC,500

WELL / POZO: LANZAROTE 1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 6-9-77

N.º 19

TIME DISTRIBUTION - HOURS / DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS / OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	15 30				
REAMING	ALISANDO	3 30				
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION	2 45				
TRIPS	MANIOBRA	2 15				
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS					
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		24 H				24

14 SET 1977

SUPPLY
SUMINISTROS

STOK GAS-OIL 15.500 l.
CONSUMO 1.000 l.

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE	7-9-77				
VISA					

69220

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR / AGENTE: ADARO

RIG N.º / APARATO N.º: G.C. 500

WELL / POZO: LANZ - 1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 7 SEPT. 1977

N.º: 20

TIME DISTRIBUTION - HOURS / DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS / OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION					
REAMING	ALISANDO	11 30				
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION					
TRIPS	MANIOBRA	5 30				
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO	2 00				
WAITING ON CEMENT	ESPERANDO FRAGUADO			5 00		
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS					
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		19 00		5 00		24

14 SET 1977

SUPPLY
SUMINISTROS

STOCK GAS-OIL
RECEPCION = 0
CONSUMO = 1000
STOCK = 14.500

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE					
VISA					

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR / AGENTE	RIG N.° / APARATO N.°	WELL / POZO
A DARO	G.C. 500	LANZAROTE - 1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 8 SEPT. 1977

N.° 21

TIME DISTRIBUTION - HOURS / DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS / OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	9 ½				
REAMING	ALISANDO	6 ½				
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION	1 ½				
TRIPS	MANIOBRA	7 ½				
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS					
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		24				24

SUPPLY
SUMINISTROS

STOCK GAS-OIL
RECEPCION = 0
CONSUMO = 1.000
STOCK = 13.000

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE	9-SEPT-77				
VISA					

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR / AGENTE: ADARO

RIG N.° / APARATO N.°: GC-500

WELL / POZO: LAN2-1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 9-SEPT-1977

N.° 22

TIME DISTRIBUTION - HOURS / DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS / OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	0 30				
REAMING	ALISANDO	2 00				
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION	3 15				
TRIPS	MANIOBRA	5 15				
LUBRICATE RIG .	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO		9 15			
WAITING ON CEMENT	ESPERANDO FRAGUADO			3 45		14 SET 1977
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS					
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		11 00	9 15	3 45		24

SUPPLY
SUMINISTROS

STOCK GAS-OIL
RECEPCION = 0
CONSUMO = 1000
STOCK = 12.500

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE	10-9-77				
VISA					

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR / AGENTE: ADARO

RIG N.º / APARATO N.º: GC. 500

WELL / POZO: LANZAROTE 1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 10-9-77

N.º 23

TIME DISTRIBUTION - HOURS / DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS / OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION					
REAMING	ALISANDO					
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION	0 45'				
TRIPS	MANIOBRA	10 15'				
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO		3 30'			
WAITING ON CEMENT	ESPERANDO FRAGUADO			7 30'		14 SET 1977
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS		2 H			
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		11	5 30'	7 30'		24

SUPPLY
SUMINISTROS

STOCK GAS-OIL 12.000 l.
CONSUMO 500 l.
RECEPCIÓN = 0

~~TRANSPORTATION~~
~~TRANSPORTES~~

PLACA DE HIERRO FABRICADA PARA ASAR TUBERIA DE 13 3/8 PESETAS = 10.000 ptas

	TOOL PUSHER / JEFE CAMPO	OPERATOR / AGENTE			
FECHA DATE	11-9-77				
VISA					

63220

SONPETROL SONDEOS PETROLIFEROS, S. A. López de Hoyos, 13	OPERATOR AGENTE AJARO	RIG N.º APARATO N.º GC-500	WELL POZO LANZ-1

DAILY ATTACHEMENT
PARTE DIARIO

DAY
FECHA
11 SEPT. 1977

N.º
24

TIME DISTRIBUTION - HOURS DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION					
REAMING	ALISANDO					
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION					
TRIPS	MANIOBRA	2/				
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					14 SET. 1977
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	~~VARIOS~~ STAND. BY.-					22 h. STAND BY.-
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		2/				24

SUPPLY
SUMINISTROS

STOCK GAS-OIL
RECEPCION = 0
CONSUMO = 500
STOCK = 11.500

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE	12-9-77				
VISA					

SONPETROL SÓNDEOS PETROLÍFEROS, S. A. López de Hoyos, 13	OPERATOR AGENTE ADARO	RIG N.° APARATO N.° G.C. 500	WELL POZO LANZ 1

DAILY ATTACHEMENT
PARTE DIARIO

DAY
FECHA
12 · SEPT. 1977

N.°
25

TIME DISTRIBUTION - HOURS DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS				REMARKS OBSERVACIONES
		A	B	C	D	
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION					
REAMING	ALISANDO					
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION					
TRIPS	MANIOBRA					
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					22 SET. 1977
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
~~OTHER~~	VARIOS STAND-BY					24 hs STAND-BY.
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS						24

SUPPLY
SUMINISTROS

STOCK. GAS-OIL
RECEPCION = 0
CONSUMO = 0
STOCK = 11.500

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE	13-9-77	N. D.			
VISA					

53220

SONPETROL SONDEOS PETROLIFEROS, S. A. López de Hoyos, 13	OPERATOR AGENTE ADARO	RIG N.° APARATO N.° G. C. 500	WELL POZO LANZAROTE-1

DAILY ATTACHEMENT
PARTE DIARIO

DAY
FECHA
13 SEPT. 1977

N.° 26

TIME DISTRIBUTION - HOURS DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS				REMARKS OBSERVACIONES
		A	B	C	D	
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION					
REAMING	ALISANDO					
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION					
TRIPS	MANIOBRA					
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					22 SET. 1977
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	~~VARIOS~~ STAND-BY					24ª STAND-BY
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS						24

SUPPLY
SUMINISTROS

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE	14-9-77	N. A			
VISA					

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR / AGENTE	RIG N.º / APARATO N.º	WELL / POZO
ADARO	G·C·500	LANZ·1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 14 SEPT. 1977

N.º 27

TIME DISTRIBUTION - HOURS DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION					
REAMING	ALISANDO					
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION					
TRIPS	MANIOBRA					
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					22 SET 1977
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	~~VARIOS~~ STAND-BY					24º STAND-BY
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS						24

SUPPLY
SUMINISTROS

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE	15-9-77	N.A.			
VISA					

SONPETROL SONDEOS PETROLIFEROS, S. A. López de Hoyos, 13	OPERATOR AGENTE ADARO	RIG N.º APARATO N.º G.C. 500	WELL POZO LANZ. 1

DAILY ATTACHEMENT
PARTE DIARIO

DAY
FECHA
15. SEPT. 1977

N.º
28

TIME DISTRIBUTION - HOURS DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION					
REAMING	ALISANDO					
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION					
TRIPS	MANIOBRA					
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					22 SET 1977
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	~~V~~ STAND-BY					24 hs STAND-BY
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS						24

SUPPLY
SUMINISTROS

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR / AGENTE: ADARO

RIG N.º / APARATO N.º: GC-500

WELL / POZO: LANZAROTE-1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 16-9-77

N.º 99

TIME DISTRIBUTION - HOURS / DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS / OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION					
REAMING	ALISANDO					
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION					
TRIPS	MANIOBRA					
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					22 SET 1977
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS					
FISHING	INSTRUMENTANDO					STAND BY 24 H
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS						24

SUPPLY
SUMINISTROS

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE	17-9-77				
VISA					

63220

SONPETROL SONDEOS PETROLIFEROS, S. A. López de Hoyos, 13	OPERATOR AGENTE ADARO	RIG N.° APARATO N.° GC. 500	WELL POZO LANZAROTE-1

DAILY ATTACHEMENT
PARTE DIARIO

DAY
FECHA
17 - 9 - 77

N.° 30

TIME DISTRIBUTION - HOURS DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS				REMARKS OBSERVACIONES
		A	B	C	D	
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION					
REAMING	ALISANDO					
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION					
TRIPS	MANIOBRA					
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					22 SET 1977
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS STAND BY					
FISHING	INSTRUMENTANDO					STAND BY 24 H
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS						24

SUPPLY
SUMINISTROS

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE	18-9-77				
VISA					

60220

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR / AGENTE: ADARO

RIG N.º / APARATO N.º: GC.500

WELL / POZO: LANZAROTE-1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 18-9-77

N.º 31

TIME DISTRIBUTION - HOURS / DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS / OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					6 HORAS DE HACER EL RATON QUE YO NO ESTOY CONFORME EN QUE SE PASE EN STAND BY, ya QUE ES DE SONPETROL
DRILLING ACTUAL	PERFORACION					
REAMING	ALISANDO					
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION					
TRIPS	MANIOBRA					
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
B. O. P.	PROBANDO B. O. P.			8H		
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS STAND BY					
FISHING	INSTRUMENTANDO					STAND BY 16H
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS						24

SUPPLY
SUMINISTROS

22 SET 1977

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE	19-9-77				
VISA					

63220

SONPETROL SONDEOS PETROLIFEROS, S. A. López de Hoyos, 13	OPERATOR AGENTE ADARO	RIG N.° APARATO N.° G-C-500	WELL POZO LANZ-1

DAILY ATTACHEMENT
PARTE DIARIO

DAY
FECHA: 19- SEPT. 1977

N.° 32

TIME DISTRIBUTION - HOURS DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					ME PARECE MUCHO
DRILLING ACTUAL	PERFORACION					EL ~~BARBER~~ TARDADO
REAMING	ALISANDO	0^{15}				27,15 HORAS EN
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION					MONTARSE LA CABEZA
TRIPS	MANIOBRA	4^{30}				DE POZO
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
~~TEST~~ B. O. P.	~~PROBANDO~~ B. O. P.			19^{15}		
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS					
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		4^{45}		19^{15}		24

RECIBIDO
26 SET. 1977

SUPPLY
SUMINISTROS

STOCK. SAS-012
RECEPCION = 0
CONSUMO = 500
STOCK = 9.000

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE	20-9-77	N. A.			
VISA					

63220

SONPETROL SONDEOS PETROLIFEROS, S. A. López de Hoyos, 13	OPERATOR AGENTE ADARO	RIG N.º APARATO N.º B.C-500	WELL POZO LANZ-1

DAILY ATTACHEMENT
PARTE DIARIO

DAY
FECHA
20 SEPT. 1977

N.º 33

TIME DISTRIBUTION - HOURS DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS				REMARKS OBSERVACIONES
		A	B	C	D	
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					FALTA UN PEON
DRILLING ACTUAL	PERFORACION	11 30				DE SUPERFICIE
REAMING	ALISANDO	5 45				DE LOS Y QUE
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION	1 00				HAY EN EL CON-
TRIPS	MANIOBRA	5 15				TRATO
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
TEST B. O. P.	PROBANDO B. O. P.	0 15				
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS		0 15			
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		23 45	0 15			24

RECIBIDO
26 SET. 1977

SUPPLY
SUMINISTROS

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE	21-9-77	N. P.			
VISA					

63220

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR AGENTE	RIG N.º APARATO N.º	WELL POZO
ADARO	G-C-500	LANZ-1

DAILY ATTACHEMENT
PARTE DIARIO

DAY FECHA: 21 SEPT. 1977

N.º 34

TIME DISTRIBUTION - HOURS DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	24				
REAMING	ALISANDO					
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION					
TRIPS	MANIOBRA					
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS					
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		24				24

SUPPLY
SUMINISTROS

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE	22-9-77				
VISA					

63229

SONPETROL SONDEOS PETROLIFEROS, S. A. López de Hoyos, 13	OPERATOR AGENTE AJARO	RIG N.º APARATO N.º G.C-500	WELL POZO LANZ-1

DAILY ATTACHEMENT
PARTE DIARIO

DAY
FECHA: 22 SEPT. 1977

N.º 35

TIME DISTRIBUTION - HOURS DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS				REMARKS OBSERVACIONES
		A	B	C	D	
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	22 15				
REAMING	ALISANDO					
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION	0 30				
TRIPS	MANIOBRA	1 15				
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS					
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		24 00				24

- 3 OCT. 1977

SUPPLY
SUMINISTROS

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE	23-9-77				
VISA					

63220

SONPETROL SONDEOS PETROLIFEROS, S. A. López de Hoyos, 13	OPERATOR AGENTE ADARO	RIG N.º APARATO N.º G.C.500	WELL POZO LANZ-1

DAILY ATTACHEMENT
PARTE DIARIO

DAY
FECHA: 23 SEPT. 1977

N.º 36

TIME DISTRIBUTION - HOURS DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	21 30				
REAMING	ALISANDO					
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION	0 30				
TRIPS	MANIOBRA	1 30				
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION	0 30				
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					- 3 OCT. 1977
OTHER	VARIOS					
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		24				24

SUPPLY
SUMINISTROS

STOCK. GAS-OIL
RECEPCION = 6000
CONSUMO = 1.000
STOCK = 15.000

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE	24-9-77	N. I.			
VISA					

SONPETROL SONDEOS PETROLIFEROS, S. A. López de Hoyos, 13	OPERATOR AGENTE ADARO	RIG N.° APARATO N.° GC-500	WELL POZO LANZAROTE 1

DAILY ATTACHEMENT
PARTE DIARIO

DAY
FECHA
24-9-77

N.° 37

TIME DISTRIBUTION - HOURS DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS				REMARKS OBSERVACIONES
		A	B	C	D	
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	24H				
REAMING	ALISANDO					
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION					
TRIPS	MANIOBRA					
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					- 3 OCT. 977
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS	1H00				Por cambio de horario -
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		25H				25

SUPPLY
SUMINISTROS

STOCK GAS-OIL 12000 .l
CONSUMO - 3.000 .l

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE	25-9-77	N. A.			
VISA					

SONPETROL SONDEOS PETROLIFEROS, S. A. López de Hoyos, 13	OPERATOR AGENTE A DARO	RIG N.° APARATO N.° G.C. 500	WELL POZO LANZ. 1

DAILY ATTACHEMENT
PARTE DIARIO

DAY
FECHA
25 SEPT. 1977

N.°
38

TIME DISTRIBUTION - HOURS DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS				REMARKS OBSERVACIONES
		A	B	C	D	
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	1 1/2				
REAMING	ALISANDO					
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION	1 0/2	2 4/2			
TRIPS	MANIOBRA	9 4/2				
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO	1 4/2				
WAITING ON CEMENT	ESPERANDO FRAGUADO			3 4/2		
DRILL STEM TEST	HACIENDO TEST.					
OTHER MEDIDA DE TEMP. CON IPRILATE	~~VARIOS~~	0 4/2	3 0/2			- 3 OCT. 1977
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		14 3/2	5 4/2	3 4/2		24

SUPPLY
SUMINISTROS

= STOCK. GAS-OIL =
RECEPCION = 0
CONSUMO = 1.000
STOCK = 11.000

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE	26-SEPT-77	N. D.			
VISA					

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR / AGENTE: ADARO

RIG N.º / APARATO N.º: G-C-500

WELL / POZO: LARA 1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 26 SEPT 1977

N.º 39

TIME DISTRIBUTION - HOURS / DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS / OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	11 hr				
REAMING	ALISANDO	8 30				
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION	0 45				
TRIPS	MANIOBRA	1 15				
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO			2 30		
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS					- 3 OCT. 1977
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		21 30		2 30		24

SUPPLY
SUMINISTROS

STOCK. GAS-OIL
RECEPCION = 6000
CONSUMO = 2.000
STOCK = 15.000

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE	27-9-77				
VISA					

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR / AGENTE: ADARO

RIG N.º / APARATO N.º: G-C-500

WELL / POZO: LANZ-1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 27 SEPT. 1977

N.º: 40

TIME DISTRIBUTION - HOURS / DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS / OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	4				
REAMING	ALISANDO					
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION	1 3/4				
TRIPS	MANIOBRA	7 00				
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO	3 1/4		8 00		
WAITING ON CEMENT	ESPERANDO FRAGUADO					-3 OCT. 1977
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS					
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		16 00		8 00		24

SUPPLY / SUMINISTROS

STOCK GAS-OIL
RECEPCION = 0
CONSUMO = 1000
STOCK = 14.000

TRANSPORTATION / TRANSPORTES

	TOOL PUSHER / JEFE CAMPO	OPERATOR / AGENTE			
FECHA DATE	28-9-77				
VISA					

63000

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR / AGENTE: ADARO

RIG N.º / APARATO N.º: G-C-500

WELL / POZO: LANZ-1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 28 SEPT. 1977

N.º: 41

TIME DISTRIBUTION - HOURS / DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS / OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION					
REAMING	ALISANDO	16 30				
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION					
TRIPS	MANIOBRA	2 00				
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO			5 30		
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS					
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		18 30		5 30		24

SUPPLY / SUMINISTROS

STOCK GAS-OIL
RECEPCION = 0
CONSUMO = 1.000
STOCK = 13.000

TRANSPORTATION / TRANSPORTES

	TOOL PUSHER / JEFE CAMPO	OPERATOR / AGENTE			
FECHA / DATE	29-09-77	N. A.			
VISA					

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR / AGENTE	RIG N.º / APARATO N.º	WELL / POZO
ADARO	G.C. 500	LANZ. 1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 29 SEPT. 1977

N.º 42

TIME DISTRIBUTION - HOURS / DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS / OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION					
REAMING	ALISANDO	17 45				
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION	0 15				RECIBIDO 6 OCT. 1977
TRIPS	MANIOBRA	5 30				
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION	0 15				
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS CAMBIAR TALADRO		0 45			
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		23 45	0 15			24

SUPPLY
SUMINISTROS

STOCK. GAS-OIL
RECEICION = 0
CONSUMO = 1.500
STOCK = 11.500

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE	30-09-77				
VISA					

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR / AGENTE: Agip

RIG N.º / APARATO N.º: GC 500

WELL / POZO: Lorca 1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 30 SEPT 1977

N.º: 43

TIME DISTRIBUTION - HOURS / DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS / OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	6 30				
REAMING	ALISANDO	17 30				
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION					
TRIPS	MANIOBRA					
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS					
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		24				24

SUPPLY / SUMINISTROS

STOCK GAS-OIL
RECEPCION = 0
CONSUMO = 2000
STOCK = 9500

TRANSPORTATION / TRANSPORTES

	TOOL PUSHER / JEFE CAMPO	OPERATOR / AGENTE			
FECHA DATE		M. H.			
VISA	Accepted				

63220

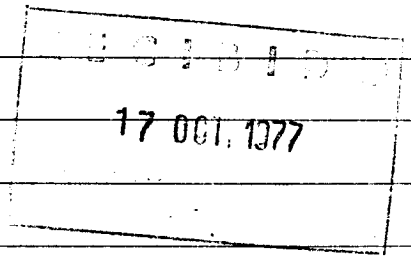
SONPETROL SONDEOS PETROLIFEROS, S. A. López de Hoyos, 13	OPERATOR AGENTE ADARO	RIG N.º APARATO N.º G-C. 500	WELL POZO ZARZ-1

DAILY ATTACHEMENT
PARTE DIARIO

DAY
FECHA: 1 Octubre 1977

N.º 44

TIME DISTRIBUTION - HOURS DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	4 45				
REAMING	ALISANDO					
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION	0 15				
TRIPS	MANIOBRA	4 00				
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION	0 15				
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO	0 45				
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS MONTAR B.O.P.			14		
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		10 00		14		24



SUPPLY
SUMINISTROS

STOCK GAS-OIL
RECEPCION = 0
CONSUMO = 1000
STOCK = 8.500

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE					
VISA					

SONPETROL SONDEOS PETROLIFEROS, S. A. López de Hoyos, 13	OPERATOR AGENTE ADARO	RIG N.° APARATO N.° G.C.500	WELL POZO LANZ-1

DAILY ATTACHEMENT
PARTE DIARIO

DAY
FECHA: 2 Octubre 1977

N.° 45

TIME DISTRIBUTION - HOURS DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					ESTOY MUY SATISFECHO
DRILLING ACTUAL	PERFORACION					POR EL TIEMPO TARDADO
REAMING	ALISANDO	5ª 00				EN DESMONTAR Y MONTAR LA CABEZA DE LA
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION	1ª 00				GEOTERMICA
TRIPS	MANIOBRA	4ª 00				
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO	0 15				
WAITING ON CEMENT	ESPERANDO FRAGUADO			5ª 45		
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS MONTAR BOP			8		
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		10 15		13 45		24

RECIBIDO
17 OCT. 1977

SUPPLY
SUMINISTROS

STOCK- GAS-OIL
RECEPCION = 0
CONSUMO = 1.560
STOCK = 7.000

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	~~OPERATOR~~ AGENTE			
FECHA DATE					
VISA					

63220

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR / AGENTE: ADARO

RIG N.º / APARATO N.º: G-C-500

WELL / POZO: LANZ-1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 3 OCTUBRE-1977

N.º 46

TIME DISTRIBUTION - HOURS / DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS / OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION					
REAMING	ALISANDO	24				
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION					
TRIPS	MANIOBRA					
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS					
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		24				24

RECIBIDO
17 OCT. 1977

SUPPLY
SUMINISTROS

STOCK GAS-OIL
RECEPCION = 6000
CONSUMO = 2000
STOCK = 11.000

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE					
VISA					

60220

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR / AGENTE: ADARO

RIG N.º / APARATO N.º: G.C. 500

WELL / POZO: LARA 1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 4 Octubre 1977

N.º 47

TIME DISTRIBUTION - HOURS / DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS / OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	20 45				
REAMING	ALISANDO	3 15				
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION					
TRIPS	MANIOBRA					
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS					
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		24 00				24

RECIBIDO
17 OCT. 1977

SUPPLY
SUMINISTROS

STOCK- GAS-OIL
RECEPCION = 0
CONSUMO = 2000
STOCK = 15.000

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE					
VISA					

D.322

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR / AGENTE: ADARO

RIG N.º / APARATO N.º: GC-500

WELL / POZO: LANZ - 1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 5 - Octubre 1977

N.º 16

TIME DISTRIBUTION - HOURS / DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS / OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	24 hs				
REAMING	ALISANDO					
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION					
TRIPS	MANIOBRA					
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. [illegible]					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS					
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		24 hs				24

RECIBIDO
17 OCT. 1977

SUPPLY / SUMINISTROS

Stock Gas-oil
Recepcion = 0
Consumo = 2000
Stock = 13.000

TRANSPORTATION / TRANSPORTES

	TOOL PUSHER / JEFE CAMPO	OPERATOR / AGENTE			
FECHA DATE					
VISA					

63220

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR / AGENTE: ADARO

RIG N.° / APARATO N.°: G.C. 500

WELL / POZO: LANZAROTE 1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 6 octubre 1977

N.° 49

TIME DISTRIBUTION - HOURS / DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS / OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	8 00				
REAMING	ALISANDO	0 15				
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION	3 00				
TRIPS	MANIOBRA	11 15				
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION	0 15				
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS MEDIR TEMPERAT.		1 15			
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		22 45	1 15			24

RECIBIDO
17 OCT. 1977

SUPPLY
SUMINISTROS

STOCK. GAS-OIL
RECEPCION = 0
CONSUMO = 2000
STOCK = 11.000

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE					
VISA					

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR AGENTE	RIG N.° APARATO N.°	WELL POZO
ADARO	G.C. 500	LANZ-1

DAILY ATTACHEMENT
PARTE DIARIO

DAY FECHA: 7 Octubre 1977

N.° 50

TIME DISTRIBUTION - HOURS DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	18:00				
REAMING	ALISANDO					
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION					
TRIPS	MANIOBRA	5:00				
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO				1:-	
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS					
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		23:-			1:-	24

RECIBIDO
17 OCT. 1977

SUPPLY
SUMINISTROS

STOCK GAS-OIL
RECEPCION = 0
CONSUMO = 2000
STOCK = 9.000

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE					
VISA					

63220

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR / AGENTE	RIG N.° / APARATO N.°	WELL / POZO
ADARO	G-C- 500	LANZ-1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 8 octubre 1977

N.° 51

TIME DISTRIBUTION - HOURS / DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS / OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	10 00				
REAMING	ALISANDO					
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION	2 30				
TRIPS	MANIOBRA	8 15				
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION	0 15				
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	~~VARIOS~~ TERMOGRAFIA CAMBIO DE TRICONO	2 30	0 30			
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		23 30	0 30			24

RECIBIDO
21 OCT. 1977

SUPPLY
SUMINISTROS

STOCK- GAS-OIL
RECEPCION = 0
CONSUMO = 2000
STOCK = 7000

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE					
VISA					

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR / AGENTE: ADARO

RIG N.º / APARATO N.º: G-C. 500

WELL / POZO: LANZ-1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 9 Octubre 1977

N.º: 52

TIME DISTRIBUTION - HOURS / DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS / OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	24				
REAMING	ALISANDO					
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION					
TRIPS	MANIOBRA					
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS					
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		24				24

RECIBIDO
21 OCT. 1977

SUPPLY
SUMINISTROS

STOCK. GAS-OIL
RECEPCION = 0
CONSUMO = 2000
STOCK = 5.000-

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE					
VISA					

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR / AGENTE: ADARO

RIG N.º / APARATO N.º: G-C-500

WELL / POZO: LANZAROTE-1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 10 Octubre 1977

N.º 53

TIME DISTRIBUTION - HOURS DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	21 30				
REAMING	ALISANDO					
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION	0 30				
TRIPS	MANIOBRA	1 45				
LUBRICATE RIG .	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION	0 15				
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS					
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		24				24

RECIBIDO
21 Oct. 1977

SUPPLY
SUMINISTROS

STOCK GAS-OIL
RECEPCION = 6.000
CONSUMO = 2.000
STOCK = 9.000

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR ~~AGENTE~~			
FECHA DATE					
VISA					

63220

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR / AGENTE: ADARO

RIG N.º / APARATO N.º: G-C-500

WELL / POZO: Lanz-1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 11 Octubre 1977

N.º: 54

TIME DISTRIBUTION - HOURS DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	9				
REAMING	ALISANDO					
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION	1 HS				
TRIPS	MANIOBRA	6 HS				
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS TERMOGRAFIA	6 30				
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		24				24

RECIBIDO
21 OCT. 1977

SUPPLY
SUMINISTROS

STOCK GAS-OIL
RECEPCION = 6.000
CONSUMO = 2000
STOCK = 13.000

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE					
VISA					

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR / AGENTE: ADARO

RIG N.º / APARATO N.º: G-C-500

WELL / POZO: LANZAROTE-1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 12 Octubre 1977

N.º 55

TIME DISTRIBUTION - HOURS / DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS / OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	24hs				
REAMING	ALISANDO					
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION					
TRIPS	MANIOBRA					
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS					
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		24hs				24

RECIBIDO
21 Oct. 1977

SUPPLY
SUMINISTROS

STOCK GAS-OIL
RECEPCION = 0
CONSUMO = 2.000
STOCK = 11.000

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE					
VISA					

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR / AGENTE	RIG N.° / APARATO N.°	WELL / POZO
ADAIRO	G-C-500	LANZ-1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 13 Octubre 1977

N.°: 56

TIME DISTRIBUTION - HOURS / DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS / OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	24				
REAMING	ALISANDO					
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION					
TRIPS	MANIOBRA					
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS					
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		24				24

RECIBIDO
21 OCT. 1977

SUPPLY
SUMINISTROS

STOCK. GAS-OIL
RECEPCION = 0
CONSUMO = 2000
STOCK = 9.000

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE					
VISA		N. A			

63220

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR / AGENTE	RIG N.° / APARATO N.°	WELL / POZO
ADARO	G.C. 500	LANZ. 1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 14 octubre 1977

N.° 57

TIME DISTRIBUTION - HOURS / DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS / OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	24				
REAMING	ALISANDO					
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION					
TRIPS	MANIOBRA					
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS					
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		24				24

RECIBIDO
21 OCT. 1977

SUPPLY
SUMINISTROS

STOCK GAS-OIL
RECEPCIÓN = 6000
CONSUMO = 2000
STOCK = 13000

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER / JEFE CAMPO	OPERATOR / AGENTE			
FECHA DATE					
VISA					

6920

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR / AGENTE: ADARO

RIG N.º / APARATO N.º: G. C - 500

WELL / POZO: LARZ - 1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 15 - 10 - 77

N.º: 58

TIME DISTRIBUTION - HOURS / DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS / OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	10 00				
REAMING	ALISANDO	1 30				
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION	2 15				
TRIPS	MANIOBRA	10 00				
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION	0 15				
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS					
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		24 00				24

RECIBIDO
21 OCT. 1977

SUPPLY / SUMINISTROS

STOCK- SAS-012
RECEPCION = 0
CONSUMO = 2.000
STOCK - = 11.000

TRANSPORTATION / TRANSPORTES

	TOOL PUSHER / JEFE CAMPO	OPERATOR / AGENTE			
FECHA DATE					
VISA					

SONPETROL SONDEOS PETROLIFEROS S. A. Orense, 32	OPERATOR AGENTE ADARO	RIG. N.° APARATO N.° G.C. 500	WELL POZO L 2 1

DAILY ATTACHEMENT
PARTE DIARIO

DAY
FECHA: 16- Oct- 77

N.° 59

TIME DISTRIBUTION - HOURS DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS				REMARKS OBSERVACIONES
		A	B	C	D	
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION					
REAMING	ALISANDO					
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION		2h00			
TRIPS	MANIOBRA	0h15				
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE				0h30	
REPAIR RIG	REPARANDO					
~~CORING~~ Montar cabeza cementacion	~~TOMANDO TESTIGO~~		1h00			RECIBIDO 25 OCT. 1977
WIRE LINE LOGGING	S. E. P.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO		12h30			
WAITING ON CEMENT	ESPERANDO FRAGUADO			6h30		
DRILL STEM TEST	HACIENDO TEST					
~~OTHER~~ Preparar para entubar	VARIOS		1h15			
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		0h15	16h45	6h30	0h30	24

SUPPLY
SUMINISTROS

Stock Gasoil
Recepcion = 0
Consumo = 2.000
Stock = 9.000

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE					
VISA		N. A.			

SONPETROL SONDEOS PETROLIFEROS, S. A. López de Hoyos, 13	OPERATOR AGENTE A.D.2.R.D.	RIG N.° APARATO N.° G-C. 500	WELL POZO LANZ-1

DAILY ATTACHEMENT
PARTE DIARIO

DAY
FECHA
17-10-77

N.°
60

TIME DISTRIBUTION - HOURS DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS				REMARKS OBSERVACIONES
		A	B	C	D	
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION					
REAMING	ALISANDO					
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION					
TRIPS	MANIOBRA					
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					RECIBIDO 25 OCT. 1977
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO			24		
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS					
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS				24		24

SUPPLY
SUMINISTROS

STOCK GAS-oil
RECEPCION = 6000
CONSUMO = 1.500
Stock = 13.500

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE					
VISA					

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR AGENTE	RIG N.° APARATO N.°	WELL POZO
ADARO	G.C. 500	Lanz - 1

DAILY ATTACHEMENT
PARTE DIARIO

DAY FECHA: 18 - 10 - 77

N.° 61

TIME DISTRIBUTION - HOURS DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION					
REAMING	ALISANDO					
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION					
TRIPS	MANIOBRA					
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
TEST B. O. P.	~~REPARANDO~~ B. O. P.			2 1/2		
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO			2 1/2		
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS					
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS				24		24

RECIBIDO
25 OCT. 1977

SUPPLY
SUMINISTROS

STOCK GOS-OIL
RECEPCION = 0
CONSUMO = 1000
STOCK = 12.500

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE					
VISA					

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR / AGENTE: ADARO

RIG N.° / APARATO N.°: G-C-500

WELL / POZO: Laiz-1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 19-10-77

N.°: 62

TIME DISTRIBUTION - HOURS / DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS / OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION					
REAMING	ALISANDO	5 1/2				
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION					
TRIPS	MANIOBRA	8 1/2				
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
~~TEST~~ B. O. P.	~~RECIBIDO~~ B. O. P.			10 30		
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					RECIBIDO 25 OCT. 1977
WIRE LINE LOGGING	S. P.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS					
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		13 30		10 30		24

SUPPLY
SUMINISTROS

STOCK GAS-OIL
RECEPCION = 0
CONSUMO = 2000
STOCK = 10.500

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE		~~N. A.~~			
VISA					

83220

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR / AGENTE	RIG N.° / APARATO N.°	WELL / POZO
ADARO	G.C. 500	LANZ-1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 20 - 10 - 77

N.°: 63

TIME DISTRIBUTION - HOURS DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	12				
REAMING	ALISANDO	11 1/2				
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION	0 1/2				
TRIPS	MANIOBRA					
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS					
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		24				24

RECIBIDO
27 OCT. 1977

SUPPLY
SUMINISTROS

STOCK. GAS-OIL
RECEPCION = 0
CONSUMO = 2000
STOCK = 8.500

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE					
VISA					

SONPETROL SONDEOS PETROLIFEROS, S. A. López de Hoyos, 13	OPERATOR AGENTE A DARO	RIG N.° APARATO N.° G.C. 500	WELL POZO LANZ - 1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 21 - 10 - 77

N.°: 64

TIME DISTRIBUTION - HOURS DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	16h15				
REAMING	ALISANDO					
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION	1h00				
TRIPS	MANIOBRA	6h30				
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION	0h15				
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					RECIBIDO 27 OCT. 1977
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS		0h15			Cambio Tricono
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		23h45	0h15			24

SUPPLY
SUMINISTROS

STOCK. GAS-OIL
RECEPCION = 0
CONSUMO = 2.000
STOCK = 6.500

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE					
VISA					

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR / AGENTE: ADARO

RIG N.° / APARATO N.°: A. C. 500

WELL / POZO: LAWZ-1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 22-10-77

N.°: 65

TIME DISTRIBUTION - HOURS / DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS / OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	24				
REAMING	ALISANDO					
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION					
TRIPS	MANIOBRA					
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS					
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		24				24

RECIBIDO
27 OCT. 1977

SUPPLY
SUMINISTROS

STOCK. GAS-OIL
RECEPCIÓN = 0
CONSUMO = 1500
STOCK = 5-000

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE	23-10-77	N.A.			
VISA					

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR / AGENTE: ADARO

RIG N.º / APARATO N.º: G-C-500

WELL / POZO: LANZ-1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 23-10-77

N.º: 66

TIME DISTRIBUTION - HOURS / DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS / OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	19 30				
REAMING	ALISANDO					
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION	0 30				
TRIPS	MANIOBRA	1				
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION	2 15				
TEST B. O. P.	PROBANDO B. O. P.			0 45		
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS					
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		23 15		0 45		24

RECIBIDO
27 OCT. 1977

SUPPLY
SUMINISTROS

STOCK. GAS-OIL
RECEPCION = 0
CONSUMO = 1.500
STOCK = 3.500

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE
FECHA DATE	24-10-77	
VISA		N. P.

SONPETROL SONDEOS PETROLIFEROS, S. A. López de Hoyos, 13	OPERATOR AGENTE ADARO	RIG N.° APARATO N.° G.C. 500	WELL POZO LAMZ. 1

DAILY ATTACHEMENT
PARTE DIARIO

DAY
FECHA
24 - 10 - 77

N.°
67

TIME DISTRIBUTION - HOURS DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS				REMARKS OBSERVACIONES
		A	B	C	D	
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	24				
REAMING	ALISANDO					
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION					
TRIPS	MANIOBRA					
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					RECIBIDO 27 OCT. 1977
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS					
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		24				24

SUPPLY
SUMINISTROS

STOCK GAS-OIL
RECEPCION = 0
CONSUMO = 12.000
STOCK = 13.500

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE					
VISA					

63220

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR / AGENTE: ADARO

RIG N.° / APARATO N.°: C.C. 500

WELL / POZO: LANZ - 1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 25 - 10 - 77

N.° 68

TIME DISTRIBUTION - HOURS / DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS / OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	10 30				
REAMING	ALISANDO	0 30				
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION	1 30				
TRIPS	MANIOBRA	8 00				
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION	0 15				
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS TEMPERATURA		3 15			
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		20 45	3 15			24

RECIBIDO
27 OCT. 1977

SUPPLY
SUMINISTROS

STOCK GAS-OIL
RECEPCION = 0
CONSUMO = 1.500
STOCK = 12.000

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE
FECHA DATE	26-10-77	
VISA		

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR / AGENTE	RIG N.º / APARATO N.º	WELL / POZO
ADARO	G.C. 500	LANZ. 1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 26 - 10 - 77

N.º: LANZ - 69

TIME DISTRIBUTION - HOURS / DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS / OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	24				
REAMING	ALISANDO					
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION					
TRIPS	MANIOBRA					
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS					
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		24				24

RECIBIDO
- 2 NOV. 1977

SUPPLY
SUMINISTROS

STOCK GAS-OIL
RECEPCION = 0
CONSUMO = 1.500
STOCK = 10.500

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER / JEFE CAMPO	OPERATOR / AGENTE			
FECHA DATE					
VISA					

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR / AGENTE: ADARO

RIG N.° / APARATO N.°: G.C. 500

WELL / POZO: LANZ-1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 27-10-77

N.°: 70

TIME DISTRIBUTION - HOURS / DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS / OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	22 30				
REAMING	ALISANDO					
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION	0 30				
TRIPS	MANIOBRA					
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION	1 00				
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E."					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS					
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		24				24

RECIBIDO
- 2 NOV. 1977

SUPPLY
SUMINISTROS

STOCK GAS-OIL
RECEPCION = 0
CONSUMO = 2.000
STOCK = 8 500

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE					
VISA					

SONPETROL SONDEOS PETROLIFEROS, S. A. López de Hoyos, 13	OPERATOR AGENTE ADARO	RIG N.º APARATO N.º G-C. 500	WELL POZO LANZ-1

DAILY ATTACHEMENT
PARTE DIARIO

DAY
FECHA
28-10-77

N.º
71

TIME DISTRIBUTION - HOURS DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS				REMARKS OBSERVACIONES
		A	B	C	D	
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	21h				
REAMING	ALISANDO					
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION	0 15				
TRIPS	MANIOBRA	1 15				
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION	1h				
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO				0 30	
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS					
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		23 30			0 30	24

RECIBIDO
- 2 NOV. 1977

SUPPLY
SUMINISTROS

STOCK GAS-OIL
RECEPCION = 6000
CONSUMO = 2000
STOCK = 12.500

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE	29-10-77				
VISA					

SONPETROL SONDEOS PETROLIFEROS, S. A. López de Hoyos, 13	OPERATOR AGENTE ADARO	RIG N.º APARATO N.º GC. 500	WELL POZO LANZAROTE 1

DAILY ATTACHEMENT
PARTE DIARIO

DAY
FECHA
29-10-77

N.º 72

TIME DISTRIBUTION - HOURS DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS				REMARKS OBSERVACIONES
		A	B	C	D	
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	17 30				
REAMING	ALISANDO					
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION	0 30				
TRIPS	MANIOBRA	5 30				
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION	0 15				
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS		0 15			
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		23 45	0 15			24

RECIBIDO
- 2 NOV. 1977

SUPPLY
SUMINISTROS

STOCK GAS-OIL 10 500. lts
CONSUMO 1 500. lts

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE	30-10-77	N. D.			
VISA					

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR / AGENTE: ADARO

RIG N.° / APARATO N.°: 6C 500

WELL / POZO: LAM2 1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 30 - 10 - 77

N.°: 73

TIME DISTRIBUTION - HOURS / DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS / OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	21h				
REAMING	ALISANDO	0h45				
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION					
TRIPS	MANIOBRA	2h15				
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS					
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		24				24

SUPPLY / SUMINISTROS

STOCK GAS-OIL
RECEPCION = 0
CONSUMO = 2.000
STOCK = 9.000

TRANSPORTATION / TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE		16.12			
VISA					

63220

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR / AGENTE: ADARO

RIG N.º / APARATO N.º: GC.500

WELL / POZO: LANZAROTE.1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 31-10-77

N.º 74

TIME DISTRIBUTION - HOURS / DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS / OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	24				
REAMING	ALISANDO					
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION					
TRIPS	MANIOBRA					
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS					
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		24				24

RECIBIDO
- 2 NOV. 1977

SUPPLY
SUMINISTROS

STOCK GAS-OIL 13.500 l.
CONSUMO 1.500 l.
RECEPCION 6.000 l.

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE	1-11-77				
VISA					

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR / AGENTE: ADARO

RIG N.° / APARATO N.°: G-C-500

WELL / POZO: LANZ. 1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 1 Noviembre 1977

N.° 7

TIME DISTRIBUTION - HOURS DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	22 1/2				
REAMING	ALISANDO					
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION	0 30				
TRIPS	MANIOBRA					
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION	1 1/2				
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS					
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		24				24

RECIBIDO
- 2 NOV 1977

SUPPLY
SUMINISTROS

STOCK GAS-OIL
RECEPCION = 0
CONSUMO = 1.500
STOCK = 12.000

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE					
VISA					

63220

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR / AGENTE	RIG N.° / APARATO N.°	WELL / POZO
ASARO	G.C. 500	Lorz. 1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 2 Noviembre 1977

N.° 76

TIME DISTRIBUTION - HOURS / DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS / OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	10 15				
REAMING	ALISANDO	1 15				
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION	1 30				
TRIPS	MANIOBRA	7 15				
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION	0 15				
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
~~OTHER~~	~~OTROS~~ TEMPERATURA		3 00			
FISHING	INSTRUMENTANDO SQUEEZ	1 30				
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		21 00	3 00			24

SUPPLY
SUMINISTROS

STOCK. GAS-OIL
RECEPCION = 0
CONSUMO = 1.500
STOCK = 10.500

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE	3-11-77				
VISA					

63220

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR / AGENTE	RIG N.° / APARATO N.°	WELL / POZO
ADARO	G-C. 500	LANZ. 1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 3-11-77

N.°: 77

TIME DISTRIBUTION - HOURS / DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS / OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	24				
REAMING	ALISANDO					
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION					
TRIPS	MANIOBRA					
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS					
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		24				24

SUPPLY
SUMINISTROS

STOCK - GAS-OIL
RECEPCION = 0
CONSUMO = 2000
STOCK = 8.500

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER / JEFE CAMPO	OPERATOR / AGENTE			
FECHA DATE					
VISA					

60220

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR / AGENTE	RIG N.º / APARATO N.º	WELL / POZO
ADARO	GC-500	LANZ-1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 4-11-77

N.º 78

TIME DISTRIBUTION - HOURS / DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS / OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	22º				
REAMING	ALISANDO					
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION	2º				
TRIPS	MANIOBRA					
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS					
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		24				24

SUPPLY
SUMINISTROS

STOG. GAS-oil
RECEPTION = 6000
CONSUMO = 2.000
STOCK = 12.500

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE	5-11-77				
VISA					

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR / AGENTE: ADARO

RIG N.º / APARATO N.º: GC-500

WELL / POZO: LANZAROTE-1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 5-11-77

N.º 79

TIME DISTRIBUTION - HOURS / DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS / OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	11 15				
REAMING	ALISANDO	1 H				
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION					
TRIPS	MANIOBRA	8 15				
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION	0 30				
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS TERMOGRAFIA		3 H			
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		21 H	3 H			24

SUPPLY
SUMINISTROS

STOCK- GAS-OIL 10.500 l
CONSUMO 2.000 l

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE	6-11-77				
VISA					

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR / AGENTE	RIG N.º / APARATO N.º	WELL / POZO
ADARO	G.C. 500	LANZ-1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 6-11-77

N.º: 80

TIME DISTRIBUTION - HOURS / DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS / OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	24				
REAMING	ALISANDO					
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION					
TRIPS	MANIOBRA					
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS					
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		24				24

SUPPLY
SUMINISTROS

STOCK GAS-OIL
RECEPCION = 0
CONSUMO = 2000
STOCK = 8.500

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER / JEFE CAMPO	OPERATOR / AGENTE			
FECHA DATE	7-11-77				
VISA					

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR / AGENTE: ADARO

RIG N.º / APARATO N.º: G-C. 500

WELL / POZO: LANZ. 1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 7- XI- 77

N.º 81

TIME DISTRIBUTION - HOURS / DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS / OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	16 30				
REAMING	ALISANDO					
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION	0 30				
TRIPS	MANIOBRA	6 30	0 15			
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION	0 15				
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS					
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		23 45	0 15			24

SUPPLY
SUMINISTROS

STOCK GAS-OIL
RECEPCIÓN = 0
CONSUMO = 2.000
STOCK = 6.500

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE					
VISA		N. A.			

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR / AGENTE: ADARO

RIG N.º / APARATO N.º: G.C. 500

WELL / POZO: LANZ - 1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 8 - 11 - 77

N.º: 82

TIME DISTRIBUTION - HOURS / DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS / OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	22.00				
REAMING	ALISANDO					
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION	2.00				
TRIPS	MANIOBRA					
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS					
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		24.00				24

SUPPLY
SUMINISTROS

STOCK GAS-OIL
RECEPCION = 6000
CONSUMO = 2000
STOCK = 10500

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE
FECHA DATE	9-11-77	
VISA		

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR / AGENTE: ADARO

RIG N.° / APARATO N.°: G-C-500

WELL / POZO: LANZ-1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 9-11-77

N.° 83

TIME DISTRIBUTION - HOURS / DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS / OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	10 45				
REAMING	ALISANDO					
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION					
TRIPS	MANIOBRA	7 30				
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION	0 30				
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
~~OTHER~~ TERMOGRAFIA	~~VARIOS~~		5 15			
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		18 45	5 15			24

SUPPLY
SUMINISTROS

STOCK GAS-OIL
RECEPCION = 0
CONSUMO = 2000
STOCK = 8.500

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE	10-11-77	N. D			
VISA					

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR / AGENTE: ADARO

RIG N.º / APARATO N.º: G-C-500

WELL / POZO: LANZ - 1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 10-11-77

N.º: 84

TIME DISTRIBUTION - HOURS / DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS / OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	24hs				
REAMING	ALISANDO					
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION					
TRIPS	MANIOBRA					
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
TEST B. O. P.	PROBANDO B. O. P.					
CUT. OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS					
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		24hs				24

SUPPLY
SUMINISTROS

STOCK GAS-OIL
RECEPCION = 0
CONSUMO = 1.500
STOCK = 13.000

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE	11-11-77				
VISA					

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR / AGENTE: ADARO

RIG N.º / APARATO N.º: G-C-500

WELL / POZO: LANZ. 1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 11-8-77

N.º 85

TIME DISTRIBUTION - HOURS / DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS / OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	23 45				
REAMING	ALISANDO					
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION					
TRIPS	MANIOBRA					
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
~~OTHER~~ POR SARTA MIXTA	VARIOS				0 15	
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		23 45			0 15	24

SUPPLY
SUMINISTROS

STOCK GAS-OIL 11.000 lts.
CONSUMO 2.000 lts.

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
DATE	12-11-77	A. D.			

63290

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR / AGENTE: ADARO

RIG N.º / APARATO N.º: GC.500

WELL / POZO: LANZAROTE.1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 12-11-77

N.º 86

TIME DISTRIBUTION - HOURS / DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS / OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	10 15				
REAMING	ALISANDO	2 H				
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION					
TRIPS	MANIOBRA	7 H				
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION	0 30				
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	~~REPARANDO~~ POR SARTA MIXTA				0 15	
CORING	TOMANDO TESTIGO					
~~WIRE LINE~~ LOGGING	~~SONDE~~ EN ESPERA DE ORDENES			1 H		
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS TERMOGRAFIA		3 H			
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		19 45	3 H	1 H	0 15	24

SUPPLY / SUMINISTROS

STOCK GAS-OIL 9.500 l.
CONSUMO 1.500 l.

TRANSPORTATION / TRANSPORTES

	TOOL PUSHER / JEFE CAMPO	OPERATOR / AGENTE			
FECHA DATE	13-11-77				
FIRMA					

SONPETROL
ONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR / AGENTE: ADARO

RIG N.º / APARATO N.º: GC. 500

WELL / POZO: LANZAROTE 1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 13-11-77

N.º 87

TIME DISTRIBUTION - HOURS DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS OBSERVACIONES
S UP & R DOWN	MONTAJE DESMONTAJE					
LLING ACTUAL	PERFORACION	23 45				
AMING	ALISANDO					
NDITIONING MUD CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION					
PS	MANIOBRA					
BRICATE RIG	LUBRIFICANDO					
VIATION SURVEY	TOMANDO DESVIACION					
ST B. O. P.	PROBANDO B. O. P.					
T-OFF LLING LINE	CORTANDO EL CABLE					
AIR RIG	REPARANDO					
RING	TOMANDO TESTIGO					
RE LINE GGING	S. P. E.					
NNING CASING CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
ITING ON MENT	ESPERANDO FRAGUADO					
LL STEM TEST	HACIENDO TEST.					
~~HER~~ OR SARTA MIXTA	VARIOS				0 15	
IING	INSTRUMENTANDO					
MPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		23 45			0 15	24

PPLY / MINISTROS

STOCK GAS-OIL 7500 l

CONSUMO 8000 l

NSPORTATION / NSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
A DATE	14-11-77	A. J.			

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR / AGENTE: ADARO

RIG N.° / APARATO N.°: GC-500

WELL / POZO: LANZAROTE 1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 14-11-77

N.° 88

TIME DISTRIBUTION - HOURS / DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS / OBSERVACIONES
UP & R DOWN	MONTAJE DESMONTAJE					
LLING ACTUAL	PERFORACION	23 30				
MING	ALISANDO					
NDITIONING MUD IRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION					
PS	MANIOBRA					
RICATE RIG	LUBRIFICANDO					
VIATION SURVEY	TOMANDO DESVIACION					
T B. O. P.	PROBANDO B. O. P.					
T OFF LLING LINE	CORTANDO EL CABLE					
AIR RIG	REPARANDO					
RING	TOMANDO TESTIGO					
RE LINE GGING	S. P. E.					
NNING CASING CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
ITING ON MENT	ESPERANDO FRAGUADO					
L STEM TEST	HACIENDO TEST.					
HER	~~VARIOS~~ POR SARTA MIXTA				0 30	
ING	INSTRUMENTANDO					
APLETION WORK	PONIENDO EN PRODUCCION					
OTAL HOURS - TOTAL HORAS		23 30			0 30	24

RECIBIDO
24 NOV 1977

PLY / MINISTROS

STOCK	GAS-OIL	11.500 L
CONSUMO		3000 L
RECEPCION		6000 L

NSPORTATION / NSPORTES

DATE	TOOL PUSHER / JEFE CAMPO	OPERATOR / AGENTE			
	15-11-74				

11

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR / AGENTE: ADARO

RIG N.º / APARATO N.º: G.C. 500

WELL / POZO: LANZ-1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 15-11-77

N.º 89

TIME DISTRIBUTION - HOURS DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS OBSERVACIONES
G UP & EAR DOWN	MONTAJE DESMONTAJE					
RILLING ACTUAL	PERFORACION	4 15				
EAMING	ALISANDO					
ONDITIONING MUD CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION	1 45				
IPS	MANIOBRA	13 30				
UBRICATE RIG	LUBRIFICANDO					
EVIATION SURVEY	TOMANDO DESVIACION	0 30				
EST B. O. P.	PROBANDO B. O. P.					
UT OFF RILLING LINE	CORTANDO EL CABLE					
EPAIR RIG	REPARANDO				1 30	
ORING	TOMANDO TESTIGO					
IRE LINE OGGING	S. P. E.					
UNNING CASING CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
AITING ON EMENT	ESPERANDO FRAGUADO					
RILL STEM TEST	HACIENDO TEST.					
THER	~~VARIOS~~ MONTAR CAMPANA		1 15			
SHING	INSTRUMENTANDO	1 15				
OMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		21 15	1 15		1 30	24

RECIBIDO
25 NOV. 1977

SUPPLY
SUMINISTROS

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
DATE CHA	16-11-77	N. A.			
SA					

63220

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR / AGENTE: ADARO

RIG N.º / APARATO N.º: G.C. 50

WELL / POZO: LANZAROTE 1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 16-11-71

N.º 90

TIME DISTRIBUTION - HOURS / DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS / OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					ESTA FACTURACION NO ES
DRILLING ACTUAL	PERFORACION					CONFORME POR ORDEN DE
REAMING	ALISANDO					LA DIRECCION DE ADARO
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION					Y SE TENDRA QUE REVISAR
TRIPS	MANIOBRA	6 30				Y DECIDIRLA ENTRE ADARO
LUBRICATE RIG	LUBRIFICANDO					Y SONPETROL EN NINGUN
DEVIATION SURVEY	TOMANDO DESVIACION					
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO				0 45	TRES HORAS SON
CORING	TOMANDO TESTIGO			1 45		CONFORME EN TARIFA
WIRE LINE LOGGING	S. P. E.					1 POR TERMINAR DE
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					SACAR PEZ
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS				0 30	
FISHING	INSTRUMENTANDO	1 00				
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		7 30		1 45	0 45	24

SUPPLY
SUMINISTROS

STOCK GAS-OIL
RECEPCION = 0
CONSUMO = 1.500
STOCK = 7.000

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE	16-11-71				
VISA					

60220

SONPETROL SONDEOS PETROLIFEROS, S. A. López de Hoyos, 13	OPERATOR AGENTE ADARO	RIG N.º APARATO N.º G-C-500	WELL POZO LAHZ-1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 17-11-77

N.º: 91

TIME DISTRIBUTION - HOURS DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS OBSERVACIONES
G UP & AR DOWN	MONTAJE DESMONTAJE					ESTA FACTURACION NO ES
RILLING ACTUAL	PERFORACION					CONFORME POR ORDEN DE
AMING	ALISANDO					LA DIRECCION DE ADARO
ONDITIONING MUD CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION	2 H 45'				Y SE TENDRA QUE REVISAR
IPS	MANIOBRA	9 H 45'				Y DECIDIRA ENTRE ADARO
BRICATE RIG	LUBRIFICANDO					Y SONPETROL EN MADRID
EVIATION SURVEY	TOMANDO DESVIACION					
ST B. O. P.	PROBANDO B. O. P.					
JT OFF RILLING LINE	CORTANDO EL CABLE					
EPAIR RIG	REPARANDO					
ORING	TOMANDO TESTIGO					
IRE LINE OGGING	S. P. E.					
UNNING CASING CEMENTING	BAJANDO TUBERIA Y CEMENTANDO	1 H				
AITING ON MENT	ESPERANDO FRAGUADO					
ILL STEM TEST	HACIENDO TEST.					
THER	VARIOS SARTA MIXTA				0 H	
HING	INSTRUMENTANDO	10 H				
MPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		23 H 45'			0 H	24

PPLY / MINISTROS

STOCK- GAS-OIL
RECEPCION = 6000
CONSUMO = 1.500
STOCK = 12.500

NSPORTATION / NSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
DATE	18-11-77				

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR / AGENTE	RIG N.º / APARATO N.º	WELL / POZO
ADARO	G.C. 500	LANZ-1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 18-11-77

N.º: 92

TIME DISTRIBUTION - HOURS / DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS / OBSERVACIONES
G UP & EAR DOWN	MONTAJE DESMONTAJE					ESTA FACTURACION NO ES
RILLING ACTUAL	PERFORACION					CONFORME POR ORDEN DE
EAMING	ALISANDO					LA DIRECCION DE ADARO
ONDITIONING MUD CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION					Y SE TENDRA QUE REVISAR
RIPS	MANIOBRA	10 45				Y DECIDIRLA ENTRE ADARO
UBRICATE RIG	LUBRIFICANDO					Y SONPETROL EN MADRID
EVIATION SURVEY	TOMANDO DESVIACION					
EST B. O. P.	~~PROBANDO B.O.P.~~ DESTAPONAR FRESA	1 00				
UT OFF RILLING LINE	CORTANDO EL CABLE					
EPAIR RIG	REPARANDO				6 45	
ORING	TOMANDO TESTIGO					
VIRE LINE OGGING	~~SAME~~ REVISAR D.C		3 30			
UNNING CASING CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
/AITING ON EMENT	ESPERANDO FRAGUADO			2 00		
RILL STEM TEST	HACIENDO TEST.					
THER	VARIOS					
HING	INSTRUMENTANDO					
MPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		11 45	3 30	2 00	6 45	24

PPLY
MINISTROS

STOCK GAS-OIL
RECEPCION = 0
CONSUMO = 1.500
STOCK = 11.000

NSPORTATION
NSPORTES

	TOOL PUSHER / JEFE CAMPO	OPERATOR / AGENTE			
DATE	19-N-77				

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR / AGENTE: ADARO

RIG N.º / APARATO N.º: G.C. 500

WELL / POZO: LANZAROTE 1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 19-11-77

N.º 93

TIME DISTRIBUTION - HOURS / DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS / OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					ESTA FACTURACION NO ES
DRILLING ACTUAL	PERFORACION					CONFORME POR ORDEN DE
REAMING	ALISANDO	16 15				LA DIRECCION DE ADARO
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION	0 45				Y SE TENDRA QUE REVISAR
TRIPS	MANIOBRA	4 30				Y DECIDIRA ENTRE ADARO
LUBRICATE RIG	LUBRIFICANDO					Y SONPETROL EN MADRID
DEVIATION SURVEY	TOMANDO DESVIACION					
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO				2 15	
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	~~VARIOS~~ SARTA MIXTA				0 15	
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		21 30			2 30	24

SUPPLY
SUMINISTROS

STOCK GAS-OIL 9000.l
CONSUMO 2000.l

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE	20-11-77				
VISA					

63220

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR / AGENTE: ADARO

RIG N.º / APARATO N.º: G-C-500

WELL / POZO: LANZ-1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 20-11-77

N.º 94

TIME DISTRIBUTION - HOURS / DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS / OBSERVACIONES
G UP & EAR DOWN	MONTAJE DESMONTAJE					ESTA FACTURACION NO ES
RILLING ACTUAL	PERFORACION	2 00				CONFORME POR ORDEN DE
EAMING	ALISANDO	12 15				LA DIRECCION DE ADARO y
ONDITIONING MUD CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION	1 30				SE TENDRA QUE REVISAR y
RIPS	MANIOBRA	8 15				DECIDIRLA ENTRE ADARO
UBRICATE RIG	LUBRIFICANDO					y SONPETROL EN MADRID
EVIATION SURVEY	TOMANDO DESVIACION					
EST B. O. P.	PROBANDO B. O. P.					
UT OFF RILLING LINE	CORTANDO EL CABLE					SON 8 1/2 EN TRIFA
EPAIR RIG	REPARANDO					1 ADARO QUE ESTOY
ORING	TOMANDO TESTIGO					CONFORME POR SER
VIRE LINE OGGING	S. P. E.					BAJADA DE TRICONO y
UNNING CASING CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					PERFORACION
VAITING ON EMENT	ESPERANDO FRAGUADO					
RILL STEM TEST	HACIENDO TEST.					
THER	VARIOS					
HING	INSTRUMENTANDO					
OMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		24				24

RECIBIDO
25 NOV. 1977

JPPLY
JMINISTROS

STOCK GAS-OIL
RECEPCIÓN = 0
CONSUMO = 1.500
STOCK = 7.500

ANSPORTATION
ANSPORTES

IA DATE	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
	21-11-77	N. A			

63220

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR / AGENTE: AJARO

RIG N.º / APARATO N.º: G. C. 500

WELL / POZO: LANZ-1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 21-11-77

N.º 95

TIME DISTRIBUTION - HOURS / DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS / OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	23 45				
REAMING	ALISANDO					
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION					
TRIPS	MANIOBRA					
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	~~VARIOS~~ SONDA MIXTA				0 15	
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		23 45			0 15	24

RECIBIDO
25 NOV. 1977

SUPPLY / SUMINISTROS

STOCK - GAS-OIL
RECEPCION = 0
CONSUMO = 1500
STOCK = 6.000

TRANSPORTATION / TRANSPORTES

	TOOL PUSHER / JEFE CAMPO	OPERATOR / AGENTE			
CHA DATE	22-11-77				
SA					

63220

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR / AGENTE: [illegible]

RIG N.º / APARATO N.º: C. C. 500

WELL / POZO: [illegible]

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 27 - 11 - 77

N.º: 96

TIME DISTRIBUTION - HOURS DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	10 20				
REAMING	ALISANDO	9 20				
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION	0 45				
TRIPS	MANIOBRA	7 00				
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION	0 30				
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE				0 15	
REPAIR RIG	REPARANDO				0 30	
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	SEE TERMOGRAFIA		4 00			
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS					
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		19 15	4 00		0 45	24

SUPPLY
SUMINISTROS

STOCK GAS-OIL
RECEPTION = 6000
CONSUM = 2000
STOCK = 10000

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE	27-11-77	[illegible]			
VISA	[illegible]				

63220

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR / AGENTE	RIG N.º / APARATO N.º	WELL / POZO
ADARO	G-C. 500	LANZ. 1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 23-11-77

N.º 97

TIME DISTRIBUTION - HOURS / DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS / OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	23 45				
REAMING	ALISANDO					
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION					
TRIPS	MANIOBRA					
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
~~WIRE LINE~~ LOGGING	~~Sonic~~ SONDA MIXTA				01 15	
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS					
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		23 45			01 15	24

RECEIVED
30 NOV. 1977

SUPPLY
SUMINISTROS

STOCK. GAS-OIL
RECEPCION = 0
CONSUMO = 2000
STOCK = 8000

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER / JEFE CAMPO	OPERATOR / AGENTE			
CHA DATE	24-11-77	N. A			
SA					

6229

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR / AGENTE: ADARO

RIG N.º / APARATO N.º: G.C.-500

WELL / POZO: LANZ-1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 24-11-77

N.º 98

TIME DISTRIBUTION - HOURS / DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS / OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	23 1/2				
REAMING	ALISANDO					
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION					
TRIPS	MANIOBRA					
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO				0 1/2	
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	~~VARIOS~~ SARTA MIXTA				0 1/2	
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		23 1/2			0 1/2	24

RECIBIDO
30 NOV. 1977

SUPPLY / SUMINISTROS

STOCK - GAS-OIL
RECEPCION = 6.000
CONSUMO = 2.000
STOCK = 12.000

TRANSPORTATION / TRANSPORTES

	TOOL PUSHER / JEFE CAMPO	OPERATOR / AGENTE			
FECHA DATE	25-11-77	N.T.			

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR / AGENTE: ADARO

RIG N.º / APARATO N.º: G-C-500

WELL / POZO: LARZ-1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 25-11-77

N.º 99

TIME DISTRIBUTION - HOURS / DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS / OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	7 30				
REAMING	ALISANDO	0 30				
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION	1 30				
TRIPS	MANIOBRA	6 45				
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION	0 30				
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
~~CORING~~	TOMANDO ~~TESTIGO~~ TERMOGRAFIA		6 45			RECIBIDO 30 NOV. 1977
~~WIRE LINE LOGGING~~	~~SURVEY~~ SONDA MIXTA				1 30	
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS					
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		15 45	6 45		1 30	24

SUPPLY / SUMINISTROS

STOCK- GAS-oil
RECEPCIÓN = 0
CONSUMO = 2000
STOCK = 10.000

TRANSPORTATION / TRANSPORTES

	TOOL PUSHER / JEFE CAMPO	OPERATOR / AGENTE
FECHA DATE	26-11-77	N. A.
VISA		

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR / AGENTE: ADARO

RIG N.º / APARATO N.º: G.C.500

WELL / POZO: LANZAROTE 1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 26-11-77

N.º 100

TIME DISTRIBUTION - HOURS DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	21 H				
REAMING	ALISANDO					
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION					
TRIPS	MANIOBRA					
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO				2 45	
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
~~OTHER~~ SARTA	~~VARIOS~~ MIXTA				0 15	
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		21 H			3 H	24

RECIBIDO
30 NOV. 1977

SUPPLY
SUMINISTROS

STOCK	GAS-OIL	8500 .l
CONSUMO		1500 .l
RECEPCION		- 0

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE	27-11-77				
FIRMA					

63220

SONPETROL SONDEOS PETROLIFEROS, S. A. López de Hoyos, 13	OPERATOR AGENTE ADARO	RIG N.º APARATO N.º G.C.500	WELL POZO LANZAROTE.1

DAILY ATTACHEMENT
PARTE DIARIO

DAY
FECHA
27-11-77

N.º 101

TIME DISTRIBUTION - HOURS DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS				REMARKS OBSERVACIONES
		A	B	C	D	
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	20 30				
REAMING	ALISANDO					
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION					
TRIPS	MANIOBRA					
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO				3 H	
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
~~OTHER~~ POR SARTA	~~VARIOS~~ MIXTA				0 30	
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		20 30			3 30	24

RECIBIDO
30 NOV. 1977

SUPPLY
SUMINISTROS

STOCK GAS-OIL	6500. l
RECEPCIÓN	0
CONSUMO	2000. l

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE	28-11-77				
FIRMA					

63220

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR / AGENTE: ADARO

RIG N.º / APARATO N.º: G.c. 500

WELL / POZO: LANZ-1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 28. 11 - 77

N.º: 102

TIME DISTRIBUTION - HOURS / DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS / OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	23 1/2				
REAMING	ALISANDO					
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION					
TRIPS	MANIOBRA					
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	~~VARIOS~~ SARTA MIXTA				0 1/2	
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		23 1/2			0 1/2	24

RECIBIDO
= 2 DIC. 1977

SUPPLY
SUMINISTROS

STOCK. GAS. OIL
RECEPCION = 0
CONSUMO = 2000
STOCK = 4.500

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE	28-11-77				
FIRMA					

63220

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR / AGENTE: ASARO

RIG N.º / APARATO N.º: G-C-500

WELL / POZO: Lanz-1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 29-11-77

N.º: 103

TIME DISTRIBUTION - HOURS DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	20				
REAMING	ALISANDO					
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION	0 30				
TRIPS	MANIOBRA	2 30				
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION	0 30				
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	~~SONDE~~ SONDA MIXTA				0 30	
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS					
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		23 30			0 30	24

RECIBI
2 DIC. 1977

SUPPLY
SUMINISTROS

STOCK - GAS-OIL
RECEPCION = 6.000
CONSUMO = 2.000
STOCK = 8.500

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE	30-11-77				
VISA					

63220

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR / AGENTE: ADARO

RIG N.º / APARATO N.º: G·C·500

WELL / POZO: LANZ·1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 30-11-77

N.º: 104

TIME DISTRIBUTION - HOURS / DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS / OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	17^00				
REAMING	ALISANDO	0^15				
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION	1^30				
TRIPS	MANIOBRA	4^45				
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
~~OTHER~~ CAMBIO DE TRICONO Y BASKET SUB	~~VARIOS~~		0^30			
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		23^30	0^30			24

RECIBIDO
- 6 DIC. 1977

SUPPLY / SUMINISTROS

STOCK GAS-OIL
RECEPTION = 0
CONSUMO = 2000
STOCK = 6500

TRANSPORTATION / TRANSPORTES

	TOOL PUSHER / JEFE CAMPO	OPERATOR / AGENTE
FECHA DATE	1-12-77	
VISA		

63220

SONPETROL SONDEOS PETROLIFEROS, S. A. López de Hoyos, 13	OPERATOR AGENTE ADARO	RIG N.° APARATO N.° G-C-500	WELL POZO LANZ-1

DAILY ATTACHEMENT
PARTE DIARIO

DAY
FECHA
1-12-77

N.°
105

TIME DISTRIBUTION - HOURS DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS				REMARKS OBSERVACIONES
		A	B	C	D	
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	23½				
REAMING	ALISANDO					
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION					
TRIPS	MANIOBRA					
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	~~VARIOS~~ SARTA MIXTA				½	
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS						24

RECIBIDO
-9 DIC. 1977

SUPPLY
SUMINISTROS

STOCK - GAS. OIL
RECEIVED = 0
CONSUMO = 2000
STOCK =

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE	9-12-77				
FIRMA					

63220

SONPETROL SONDEOS PETROLIFEROS, S. A. López de Hoyos, 13	OPERATOR AGENTE ADARO	RIG N.º APARATO N.º G-C-500	WELL POZO LANZ-1

DAILY ATTACHEMENT
PARTE DIARIO

DAY
FECHA
2-12-78

N.º
106

TIME DISTRIBUTION - HOURS DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS				REMARKS OBSERVACIONES
		A	B	C	D	
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	23½				
REAMING	ALISANDO					
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION					
TRIPS	MANIOBRA					
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER SARTA MIXTA	~~PARTOS~~				½	
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS						24

SUPPLY
SUMINISTROS

STOCK GAS-OIL
RECEPCION = 6000
CONSUMO = 2000
STOCK = 8-500

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE	3-10-77				
FIRMA					

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR / AGENTE: ADARO

RIG N.º / APARATO N.º: G.C.500

WELL / POZO: LANZAROTE.1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 3-12-77

N.º 107

TIME DISTRIBUTION - HOURS / DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS / OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	24				SON 24 H
REAMING	ALISANDO					
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION					
TRIPS	MANIOBRA					
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	SOBRE ~~VARIOS~~ MIXTA					
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		24				24

RECIBIDO
- 9 DIC. 1977

SUPPLY
SUMINISTROS

STOCK GAS-OIL 6500. lts
CONSUMO 2000. lts
RECEPCION - 0

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE	4-12-77	N. H			
VISA					

63220

SONPETROL
SONDEOS PETROLIFEROS, S. A.
López de Hoyos, 13

OPERATOR / AGENTE: AJARO

RIG N.º / APARATO N.º: G·C·500

WELL / POZO: LANZ. 1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 4-12-77

N.º: 108

TIME DISTRIBUTION - HOURS / DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS / OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	23 45				
REAMING	ALISANDO					
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION					
TRIPS	MANIOBRA					
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	SARTA ~~VARIOS~~ MIXTA				0 15	
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		23 45			0 15	24

RECIBI
- 9 DIC. 1977

SUPPLY
SUMINISTROS

STOCK. GAS-OIL
RECEPCION = -
CONSUMO = 2000
STOCK = 4.500

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR ~~AGENTE~~			
FECHA DATE	5-12-77	N. A.			
VISA					

63220

SONPETROL SONDEOS PETROLIFEROS, S. A. López de Hoyos, 13	OPERATOR AGENTE ADARO	RIG N.º APARATO N.º G-C. 5-00	WELL POZO Lanz · 1

DAILY ATTACHEMENT
PARTE DIARIO

DAY
FECHA
5- 12- 77

N.º
109

TIME DISTRIBUTION - HOURS DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS OBSERVACIONES
RIG UP & TEAR DOWN	MONTAJE DESMONTAJE					
DRILLING ACTUAL	PERFORACION	4 15				
REAMING	ALISANDO					
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION	2 45				
TRIPS	MANIOBRA	10 15				
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION	0 30				
TEST B. O. P.	PROBANDO B. O. P.					
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO				0 15	
CORING	~~TOMANDO TESTIGO~~ TERMOGRAFIA		3 30			RECIBIDO 12 DIC. 1977
WIRE LINE LOGGING	~~S.P.~~ CORTAR CABLE				2 00	
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	~~VARIOS~~ SARTA MIXTA				0 30	
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		17 45	3 30		2 45	24

SUPPLY
SUMINISTROS

STOCK · GAS-oil
RECEPCION = 0
CONSUMO = 2.000
STOCK = 2.500

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE	6-12-77				
VISA					

63220

SONPETROL
SONDEOS PETROLIFEROS S. A.
López de Hoyos, 13

OPERATOR / AGENTE: ADARO

RIG N.º / APARATO N.º: G-C-500

WELL / POZO: LANZ. 1

DAILY ATTACHEMENT
PARTE DIARIO

DAY / FECHA: 6 - 12 - 77

N.º: 110

TIME DISTRIBUTION - HOURS / DISTRIBUCION DEL TIEMPO - HORAS		TARIFS - TARIFAS A	B	C	D	REMARKS / OBSERVACIONES
~~RIG UP &~~ TEAR DOWN	~~MONTAJE~~ DESMONTAJE				5[00]	Fazpait Desmontaje
DRILLING ACTUAL	PERFORACION					
REAMING	ALISANDO					
CONDITIONING MUD & CIRCULATING	ACONDICIONAMIENTO LODO Y CIRCULACION					
TRIPS	MANIOBRA	8[45]				
LUBRICATE RIG	LUBRIFICANDO					
DEVIATION SURVEY	TOMANDO DESVIACION					
~~TEST~~ B. O. P. DESMONTAR	~~PROBANDO~~ B. O. P.			10[15]		
CUT OFF DRILLING LINE	CORTANDO EL CABLE					
REPAIR RIG	REPARANDO					
CORING	TOMANDO TESTIGO					
WIRE LINE LOGGING	S. P. E.					
RUNNING CASING & CEMENTING	BAJANDO TUBERIA Y CEMENTANDO					
WAITING ON CEMENT	ESPERANDO FRAGUADO					
DRILL STEM TEST	HACIENDO TEST.					
OTHER	VARIOS					
FISHING	INSTRUMENTANDO					
COMPLETION WORK	PONIENDO EN PRODUCCION					
TOTAL HOURS - TOTAL HORAS		8[45]		10[15]	5[00]	24

RECIBIDO
12 DIC. 1977

SUPPLY
SUMINISTROS

STOCK GAS-OIL
RECEPCION = 0
CONSUMO = 1500
STOCK = 1.000

TRANSPORTATION
TRANSPORTES

	TOOL PUSHER JEFE CAMPO	OPERATOR AGENTE			
FECHA DATE	7-12-77				
FIRMA					

111

5.- CUADRO DE RENDIMIENTOS DE TRICONOS

PERFORMANCES DES OUTILS — SMITH TOOL

PAGE 1 DE OF

OPERATEUR/COMPANY ADARO
ENTREPRENEUR CONTRACTOR SONPETROL
CHANIER/FIELD
PUITS/WELL LANZAROTE 1

APPAREIL/RIG TYPE Emsco 500
POMPES/PUMPS 7114
POMPES/PUMPS 7114 SVMARE 8

DC ... X ... X
... X ... X
SHOCK SUB :
HEVI WATE
DP 4 1/2

STABILISATION
BIT ... m
SPACER ... m
STRING ... m
STRING ... m
STRING ... m

CHEF DE CHANTIER TOOL PUSHER
MTR/SONDEUR
FOREUR DRILLER
FOREUR DRILLER

N° ORDRE RUN N.	DATE	DIAM OUTIL SIZE	MARQUE MAKE	TYPE	DIAM DUSE JET SIZE	N° DE SERIE SERIAL N°	REFORAGE HEURES REANING HOURS	PROFONDEUR DEPTH DE IN	PROFONDEUR DEPTH A OUT	METRES FORES FEET DRILLED	DUREE HOURS	m/h f/h	DEVIATION	PARAMETRES PARAMETERS POIDS/MT WEIGHT/lbs	TPM RPM	PRESSION PRESSURE	DEBIT GPM	USURE WEAR D% T	USURE WEAR R mm Bearing	USURE WEAR diam mm GAUGE	NOTES/TERRAIN NOTES/FORMATION
1	30.8.77	17½	SMITH	4JS	/	BR531	12H	0	204,70	204,70	172,15		1°	8/14T	70/110	0	1500	T4	2	2	Basalte
2	1.9.77	17½	SMITH	4JS	/	CA849	18H	204,70	309.	104,30	49.30		0.30	8/10	90/110	0	1200	T5	2	4	"
1	1.9.77	17½	SMITH	4JS	/	BR531	14H	309	309,40	0,40	0 30			6/8	90/110	0	1200				"
3	8.9.77	17½	SMITH	4JS	/	CE798	4H30	309,40	350	50,60	8 30			6/8	90	0	1200	T1	0	0	"
4	19.9.77	12¼	REED	S216	/	NPL387	3H	350	370	20,00	7 30			4/5	80		1600				"
5	20.9.77	12¼	SMITH	5JS	/	RE474	24H	370	722	352,00	112 30		0°15'	5/12	90	15	1800	30	R/13	3	
6	29.9	12¼	SMITH	5JS	/	NE768	44"	722	845	123	7 045		0°45'	10/12	80/100	20	1700	45	40	3	
4	7.10	12¼	REED	S21C	/	NPL387	/	845	869,30	24,30	10 45		0°45'	8	120	20	1700	85	100	7	
7	8.10	12¼	SMITH	4JS	/	HV250		869,30	1220	350,70	146 30		7°	8/10	100	20	1700		100	2	
8	12.10	8½	Security	M4L	/	2936	8 15	1220	1240	20	13		2°	5/7	90	22	1200	30	40	3	
9	21.10	8½	SMITH	F5	/	449HH	/	1240	1437	197	84 45		1°45'	12	60/70	32	1200	20	60	3	

PERFORMANCES DES OUTILS — SMITH TOOL

OPERATEUR/COMPANY ADARO
ENTREPRENEUR CONTRACTOR SONPÉTROL
CHANIER/FIELD
PUITS/WELL LANZAROTE1

APPAREIL/RIG TYPE Emsco 500
POMPES/PUMPS 7114
POMPES/PUMPS 7114 SNMAREP

DC ... X ... X
... X ... X
SHOCK SUB :
HEVI WATE
DP 4 1/2 FH - 4 1/2 IF

STABILISATION
BIT ... m
SPACER ... m
STRING ... m
STRING ... m
STRING ... m

CHEF DE CHANTIER TOOL PUSHER
MTR/SONDEUR
FOREUR DRILLER
FOREUR DRILLER

N° ORDRE / RUN N.	DATE	DIAM OUTIL / SIZE	MARQUE / MAKE	TYPE	DIAM DUSE / JET SIZE	N° DE SERIE / SERIAL N°	REFORAGE HEURES / REANING HOURS	PROFONDEUR DEPTH DE IN	PROFONDEUR DEPTH A OUT	METRES FORES / FEET DRILLED	DUREE / HOURS	m/h / f/h	DEVIATION	PARAMETRES PARAMETERS POIDS/MT WEIGHT/lbs	TPM RPM	PRESSION PRESSURE	DEBIT GPM	USURE WEAR D% T	USURE WEAR R mm Bearing	USURE WEAR diam mm GAUGE	NOTES/TERRAIN / NOTES/FORMATION
10	25.10.77	8 1/2	SMITH	F5	/	645 HH		1437	1676,50	239,50	94H		1°30'	10/12	60	42	1200	80	100	5	
11	30.10.77	8 1/2	SMITH	F5	/	499 HH		1676,50	1862	185,50	72H15		1°30'	10/12	70	40	1200	30	70	3	
12	2.11.77	8 1/2	SMITH	F5	/	452 HH		1862	2027,50	165,50	89H		1°	10/12	70	40	1200	30	50	3	
13	7.11.77	8 1/2	SMITH	F5	/	500 HH		2027,50	2178,70	151,20	97H		1°	10/12	70	45	1400	30	40	2	
14	12.11.77	8 1/2	SMITH	F7	/	434 HC		2178,70	2284,20	105,50	60H30			10/12	70	57	1400	-	-	-	
15/14	20.11.77	8 1/2	SECURITY	H77	—	313662		2284,20	2348,20	64,60	35H30		0°45'	10/12	70	50	1500	60	30	1	
X14	26.11.77	8 1/2	SMITH	F7	—	434 HC	2e Vie	2348,30	2442,00	198,70	114H		0°45'	13/14	70	50	1500	60	60	2	
16/15	26.11.77	8 1/2	SMITH	F7		252 HC		2442	2599,30	157,30	81H30		0°45'	13/14	70	55	1500	70/80	20	1	
17/16	1.12.77	8 1/2	SMITH	F7		256 HC		2599,30	2702,40	103,10	116H30		0°45'	13/14	70	60	1650	40	50	2	

6.- INFORME DE ENTUBADO 13 3/8 Y 9 5/8

RAPPORT DE TUBAGE

Sondage LANZAROTE Appareil Emsco 500

Date de l'opération 9 sept 1977

ETAT DU PUITS.

Diamètre du puits 17 1/2" Déviation maxima 1° à 124 m

Cote du sommet du trou réduit ou profondeur du puits 350 m

Diamètre de la dernière colonne 20" Sabot à 18,50 m

Cote du sommet de la plus haute zone à protéger Totalité m

Propriétés de la boue : d = / V = / El = / C = / PH = /

Pertes de boue pendant le forage Totale m³ à 190 m

TUBAGE - Diamètre 13 3/8"

Composition générale de la colonne

Grade	Epaisseur	Longueur	Nb. tubes	Volume intérieur
N80	12,19 m/m	339,88 m.	26	78,08 lt

TOTAUX

Centreurs - Nb. 3 placés de 340 à 175 m - Espacement moyen /

Gratteurs - Nb. / placés de / à / m - Espacement moyen /

Type du sabot a lille

Type de l'anneau a lille Placé a 1 tubes au-dessus du sabot

Equipement spécial de cimentation 3 ondulelles a 180 m

Opération de tubage

Tubage commencé le 9 sept 77 à 19 h

Tubage terminé le 9 sept 77 à 22 h

Remplissages à / tubes

Circulation à / m

Temps total de Tubage 3 h

Cadence moyenne 9 tubes/h

Mise en place du tubage

Longueur totale de la colonne 348,52 m

Longueur au-dessus de la table 2,60 m

Cote du sabot 345,92 m

Poids colonne av. cimentation 32 T

Poids colonne ap. cimentation 51 T

Indication du MD après prise ciment 50 T

Colonne posée sur spool à 28 T

A Tiznamojaya le 9 septembre 1977

Rivas

Société: ADARO Sondage: LANZAROTE Périmètre: Iles Canaries

Tubage 13 3/8 68 lbs N80 effectué le 9 sept 77

COMPOSITION DE LA COLONNE

N°	Ep.	Grade	Long. du tube	Long. totale	Observations
	12,19	N80	5,00		Table au marches
			13,29	18,29	
			13,22	31,51	
			13,19	44,70	
			13,10	57,80	
			13,29	71,09	
			13,22	84,31	
			13,07	97,38	
			13,22	110,60	
			12,88	123,48	
			13,20	136,68	
			12,80	149,48	
			12,23	161,71	
			12,52	174,23	1 centreur
			12,96	187,19	3 ombrelles
			13,19	200,38	
			13,10	213,48	1 centreur
			13,21	226,69	
			12,91	239,50	
			13,17	252,77	
			13,18	265,95	
			13,16	279,11	
			13,25	292,36	

N°	Ep.	Grade	Long. du tube	Long. totale	Observations
			13,17	305,53	
			13,10	318,63	
			13,11	331,74	
			0,46	332,20	anneau
			13,14	345,34	1 centreur
			0,58	345,92	sabot

Table de manoeuvre = 7,60

Hauteur sol à la table = 3m 55

RAPPORT DE TUBAGE

Sondage LANZAROTE 1 Appareil Zinco 500

Date de l'opération 16 octobre 1977

ETAT DU PUITS.

Diamètre du puits 12 1/4" Déviation maxima 0°45 m

Cote du sommet du trou réduit ou profondeur du puits 1220 m

Diamètre de la dernière colonne 13 3/8" Sabot à 345,92 m

Cote du sommet de la plus haute zone à protéger Totalité m

Propriétés de la boue : d = 1,10 V = 52 El = 75 C = 6 PH = 10

Pertes de boue pendant le forage variable m3 à m

TUBAGE - Diamètre 9 5/8"

Composition générale de la colonne

Grade	Epaisseur	Longueur	Nb. tubes	Volume intérieur
N 80	11,99	1207,91	97.	38,19 lt.

TOTAUX

Centreurs - Nb. 9 placés de 1200 à 50 m - Espacement moyen Variable

Gratteurs - Nb. / placés de / à / m - Espacement moyen /

Type du sabot Halliburton a lille

Type de l'anneau a lille Placé 1 tubes au-dessus du sabot /

Equipement spécial de cimentation /

Opération de tubage

Tubage commencé le 16.10.77 à 7 30 h

Tubage terminé le 16.10.77 à 19 h

Remplissages à / tubes

Circulation à / m

Temps total de Tubage 11 30 h

Cadence moyenne 9 tubes/h

Mise en place du tubage

Longueur totale de la colonne 1215,28 m

Longueur au-dessus de la table 1,85 m

Cote du sabot 1214,28 m

Poids colonne av. cimentation 60 T

Poids colonne ap. cimentation T

Indication du MD après prise ciment T

Colonne posée sur spool à T

A Timanfaya, le 17 oct 19 77

Rivital.

(1

Société : ADARO Sondage : Lanzarote 1 Périmètre : Iles Canaries

Tubage 9 5/8" 47 lbs N80 effectué le 16 octobre 1977

COMPOSITION DE LA COLONNE

N°	Ep.	Grade	Long. du tube	Long. totale	Observations
	11,99	N80	5,37		Tableau manchon
			12,82	18,19	
			12,80	30,99	
			12,07	43,06	
			11,46	54,52	
			11,34	65,86	
			12,27	78,13	
			12,56	90,69	
			11,59	102,28	
			12,38	114,66	
			12,84	127,50	
			12,29	139,79	
			12,84	152,63	
			12,19	164,82	
			12,94	177,76	
			12,46	190,22	
			12,24	202,46	
			12,68	215,14	
			10,96	226,10	
			12,25	238,35	
			12,67	251,02	
			12,66	263,68	
			13,01	276,69	

1 centreurs de 50 m à 400 m

N°	Ep.	Grade	Long. du tube	Long. totale	Observations
			12,55	289,24	
			13,01	302,25	
			12,30	314,55	
			12,73	327,28	
			12,57	339,85	
			12,47	352,32	
			12,85	365,17	
			11,67	376,84	
			12,41	389,25	
			11,71	400,96	
			12,56	413,52	
			12,33	425,85	
			12,24	438,09	
			12,05	450,14	
			12,45	462,59	
			12,48	475,07	
			12,77	487,84	
			12,79	500,63	
			12,25	512,88	
			12,91	525,79	
			12,68	538,47	
			12,30	550,77	
			12,40	563,17	

(2)

Société : ADARO Sondage : Lanzarote 1 Périmètre : Iles Canaries

Tubage 9 5/8" 47 lbs N80 effectué le 16 octobre 1977

COMPOSITION DE LA COLONNE

N°	Ep.	Grade	Long. du tube	Long. totale	Observations	N°	Ep.	Grade	Long. du tube	Long. totale	Observations
	11,99	N80	12,53	575,70					12,35	866,24	
			12,40	588,10					11,31	877,55	
			13.04	601,14					12,35	889,90	
			12,36	613,50					11,83	901,73	
			12,87	626,37					11,05	912,78	
			13,17	639,54					12,28	925,06	
			12,39	651,93					12,86	937,92	
			12,78	664,71					12,67	950,59	
			12,90	677,61					12,96	963,55	
			12,21	689,82					12,55	976,10	
			12,58	702,40					12,56	988,66	
			12,50	714,90					12,39	1001,05	
			12,53	727,43					11,96	1013,01	
			12,43	739,86					13.00	1026,01	
			12,02	751,88					12,10	1038,11	
			12,90	764,78					12,53	1050,64	
			13.02	777,80					12,14	1062,78	
			13,20	791,00					13,15	1075,93	
			12,49	803,49					12,31	1088,24	
			12,23	815,72					12,80	1101,04	
			13,38	829,10					12,86	1113,90	
			11,86	840,96					11,52	1125,42	
			12,93	853,89					12,42	1137,84	

(3)

Société : ADARO Sondage : Lanzarote 1 Périmètre : Iles Canaries

Tubage 9 5/8" 47 lbs N80 effectué le 16 octobre 77

COMPOSITION DE LA COLONNE

N°	Ep.	Grade	Long. du tube	Long. totale	Observations	N°	Ep.	Grade	Long. du tube	Long. totale	Observations
	11,99	N80	12,30	1150,14							
			12,78	1162,92							
			12,50	1175,42							
			12,98	1188,40							
			13,11	1201,51	1 centreur						
			0,47	1201,98							
			11,60	1213,58	1 centreur						
			0,70	1214,28							

7.- INFORME DE CEMENTACION EN 13 3/8 Y 9 5/8

RAPPORT DE CIMENTATION

Sondage LANZAROTE Appareil Emsco 500

Date de l'opération 9 sept 1977

CIMENTATION.

Opération exécutée par Halliburton

Matériel mis en œuvre Unité de cimentation HT 400

Circulé de $0^{H}25$ h à $0^{H}38$ h. soit 13 min. - Pression maxi / kg/cm3

Gratté de / h à / h, soit / min. - Frottements maxi / T.

Nombre approximatif de manœuvres /

Pertes de ~~boue~~ eau pendant les opérations ci-dessus Totale ~~m3~~

1er étage

Cimenté avec 15 T. de ciment

Additionné de /

Densité du laitier 1,75

Fabrication du laitier commencée à $0^{H}38$ h

Temps total de fabrication du laitier 32' #

Commencé à réfouler le ciment à $1^{H}10$ h

avec 2,6 m3 ~~boue~~/eau

Temps total de refoulement 50' #

Pression finale 0 kg/cm2

A-coup de pression 70 kg/cm2

Pertes de boue pendant le refoulement / m3

(estimation)

Pression relâchée de la colonne après 5' #

Thermométrie effectuée après / h

Top du ciment derrière le tubage / m

Zone contaminée de / à / m

Colonne posée sur spool après 14 h

Essai colonne à / kg/cm2

Résultat de cet essai /

2e étage

Perforations effectuées à /

Manchon spécial ouvert / minutes

après la première cimentation

Circulé / minutes

Cimenté avec 25 T. de ciment

Densité du laitier 1,75

Refoulé avec / m3 boue/eau en / mn

Fermé le manchon sp. à une P de / kg/cm2

Thermométrie effectuée après / h

Top du ciment derrière tubage / m

Zone contaminée de / à / m

Autres opérations Injecté par gravité dans espace annulaire ; sans résultat — Cimentation avec matériaux divers — OK.

Essai colonne à / kg/cm2

Résultat de cet essai /

OBSERVATIONS :

Opérations conduites par ARAUZO Préconisées et Vérifiées par VIDAL

A Timanfaya le 9 sept 19 77

Vidal

RAPPORT DE CIMENTATION

Sondage LANZAROTE 1 Appareil Emsco 500

Date de l'opération 16 octobre 77

CIMENTATION.

Opération exécutée par Halliburton

Matériel mis en œuvre Unité de cimentation HT 400

Circulé de 19 h à 21 h. soit 120 min. - Pression maxi ~~....~~ kg/cm3

Gratté de ..... h à ..... h, soit ..... min. - Frottements maxi ..... T.

Nombre approximatif de manœuvres ~~....~~

Pertes de boue pendant les opérations ci-dessus Totale ~~m3~~

1er étage

Cimenté avec 60 T. de ciment

Additionné de 2 a 3% de bentonite

Densité du laitier 1,68 - 1,90

Fabrication du laitier commencée à 21H30 h

Temps total de fabrication du laitier 1H10 h

Commencé à réfouler le ciment à 22H43 h

avec 45,800 m3 ~~boue~~/eau

Temps total de refoulement 0H50 h

Pression finale kg/cm2

A-coup de pression kg/cm2

Pertes de boue pendant le refoulement m3

(estimation)

Pression relâchée de la colonne après ..... h

Thermométrie effectuée après ..... h

Top du ciment derrière le tubage ..... m

Zone contaminée de ..... à ..... m

Colonne ~~posée sur appui~~ lachee après 3.6 h

Essai colonne à kg/cm2

Résultat de cet essai .....

2e étage

Perforations effectuées à .....

Manchon spécial ouvert ..... minutes

après la première cimentation

Circulé ..... minutes

Cimenté avec ..... T. de ciment

Densité du laitier .....

Refoulé avec ..... m3 boue/eau en ..... mn

Fermé le manchon sp. à une P/de kg/cm2

Thermométrie effectuée après ..... h

Top du ciment derrière tubage ..... m

Zone contaminée de ..... à ..... m

Autres opérations .....

Essai colonne à kg/cm2

Résultat de cet essai .....

OBSERVATIONS : Falsification laitier avec eau salée a 31 g. par lt.

Opérations conduites par ARAUZO Vérifiées par VIDAL

A Tiaraufaya Le 17 oct 19 77

Rivaf.

8.- COLUMNA DE SONDEO

EVALUACION DEL CAMPO GEOTERMICO DE LA MONTAÑA DE FUEGO (LANZAROTE)

COLUMNA DE SONDEO

	Fecha	Nombre
Dibujado	15-7-77	R. Garrido
Comprobado		
id. s. normas		

Escala 1/200

INI empresa nacional adaro de investigaciones mineras, s.a.

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INSTITUTO GEOLOGICO Y MINERO DE ESPAÑA INSTITUTO NACIONAL DE INDUSTRIA CENTRO DE ESTUDIOS DE LA ENERGIA	PROYECTO: EVALUACION DEL CAMPO GEOTERMICO DE LA MONTAÑA DE FUEGO —LANZAROTE—
EMPRESA OPERADORA: E.N.A.D.I.M.S.A.	SONDEO: LANZAROTE - 1
	COORDENADAS X: 586.350 Lam. 10° 05' 15" W; Y: 455.225 Lam. 28° 59' 10" N; Z: 205 m; Según Plano 1:10.000 Rest. Fot.
CONTROL GEOLOGICO: E.N.A.D.I.M.S.A.	PROFUNDIDAD DE m. a m.

FECHA	LOG DE DETRITUS %	LODOS W: Peso gr/cm³ V: Viscosidad (S) F: Filtrado (ml) T: Temperatura °C	AVANCE (min/m) Y DATOS TECNICOS	PROFUNDIDAD	LITOLOGIA	GASES A: Vapor B: CO_2 C: SH_2	DESCRIPCION LITOLOGICA

9.- INFORME PREVIO FINAL SOBRE LOS RESULTADOS DEL SONDEO

Borredor de un informe

ANALISIS DEL POTENTIAL GEOTERMICO DEL CAMPO GEOTERMICO DE LA MONTAÑA DEL FUEGO (LANZAROTE, CANARIAS)

EVALUATION OF THE MONTAÑA DEL FUEGO GEOTHERMAL AREA (LANZAROTE , CANARIAS)

Argenteuil - December 20 1977

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I - INTRODUCTION

The purpose of this report is a complete re-evaluation of all available information concerning the geology, the geophysics and the geochemistry of the Montaña del Fuego hyperthermal area on the island of Lanzarote (Canarias) and their geothermal interpretation, in the light of the results of the Lanzarote No. 1 geothermal borehole and in view of the eventual continuation of geothermal exploration on the island of Lanzarote.

The failure of the Lanzarote # 1 geothermal borehole to encounter any abnormal temperature gradients, which might have indicated the presence of a geothermal system on one hand and , on the other hand the fact that a geochemical study of the gases in the hyperthermal area of the Montaña del Fuego indicated that these gases are dry and that no geothermal aquifer can exist in the volcanic chimneys below this hyperthermal area , implicate the necessity of a complete revision of the hitherto assumed model for the geothermal geology of the Montana del Fuego area.

This re-evaluation leads to the conclusion that the Montaña del Fuego geothermal area is essentially restricted to the pronounced hyperthermal anomaly between the southern rim of the Montaña del Fuego crater and the Islota de Hilario ; that this area appears to be characterized by a network of NW-SE and E-W striking fracture or fissure zones, along which hot gases, mainly composed of nitrogen and with only 2-3 percent of superheated steam and traces of carbon-dioxyde rise to the surface ; that this geothermal system is not related with any deep or shallow geothermal aquifer and that this area finally appears to be underlain by a dry hot rock type of geothermal field, in the form of still active volcanic plugs, dykes or a magma-chamber, i.e. that there is no possibility to find a conventional vapor or water dominated geothermal field.

At the other hand it is not to be excluded a priori that there can be a marginal vapor or water dominated field around the dry hot rock of the central hyperthermal area and it may be that the Montaña del Fuego area offers an excellent opportunity to test simple devices for the recovery of the energy contained in the large volumes of hot rock at depth.

2 - PREVIOUS WORK

A considerable volume of geological, volcanological, geophysical and geochemical work has been carried out prior to the implementation of the Lanzarote geothermal project and prior to the drilling of the Lanzarote No. 1 geothermal borehole. It would appear superfluous to repeat at this point a summary of this work.

The work carried out prior to the drilling of the Lanzarote # 1 borehole lead to the conclusion :

(a) that the Mesozoic sedimentary basement appears to be underlying the more or less tabular basalts and tuffs of Series I of the volcanic complex of Lanzarote. These sediments were considered the principal objective of geothermal exploration, i.e. the prospective geothermal aquifer, with porosity and permeability of the sediments en hanced by fracturing.

(b) that the impervious cover of the prospective geothermal aquifer is constituted by the impervious lower part of Series I of the volcanic complex.

(c) that the presence of a heat source at depth was indicated by the abundant surface indications, mainly composed of superheated steam, diluted by varying amounts of air.

It appeared therefore that the three basic conditions for the existence of a geothermal field were present : an aquiferous reservoir, a caprock and a heat-source.

In view of the assumed high cost of eventual additional and complementary surveys it was considered that finally only a deep geothermal testwell could determine whether a deep aquifer susceptible of producing geothermal fluids , existed.

Although incomplete, the previous work therefore appeared to justify the drilling of this deep borehole.

3 - LANZAROTE # 1 DEEP TEST

The Lanzarote # 1 deep geothermal testwell was spudded in on August

19 1977 and was abandoned as a dry test on December 8 1977 at a total depth of 2.702 meters, in Upper Cretaceous full-marine sediments.

This deep geothermal borehole was located between the Montaña Rajada and the Tremesana, slightly southwest of the western end of an area of surface temperature anomalies, some 300 meters south of the intersection of a WSW-NNE striking fractures zone and an assumed N-S fracture or fault-zone.

The location was based on a series of assumptions which appeared to be supported by the available information. The resulting model consisted of : a more or less uniformly fractured, pervious and porous sedimentary basement, functioning as the geothermal aquifer with the heat transport assured by convection currents ; an impervious series constisting of the lower part of Series I of the volcanic complex , assumed to consist essentially of more or less welded tuffs ; and a heat source at relatively shallow depth, consisting of igneous rocks in fusion.

The high temperature anomalies on the surface in the Montaña del Fuego are in this model essentially due to leaks of superheated steam along cracks in the impervious caprock towards the surface and diluted or contaminated by atmospheric air sucked into this system. The model therefore implicates the presence of relatively high temperature gradients in the more or less impervious lower part of the Series I of the volcanic complex.

With this model in mind a large region in the Montaña del Fuego geothermal area and to the southwest of it was thought to be underlain by the high temperature geothermal aquifer. The first geothermal testwell, Lanzarote # 1, was thus sited some 3 kilometers to the SW of the principal surface thermal anomalies, some 200-300 meters to the south of the intersection of a major WSW-ENE fracture system with a N-S fracture zone.

An additional, logistical reason for siting the well at this particular location was, that this site did not interfere with the touristic activities of the Montaña de Fuego National Park.

31 - Geology

The Lanzarote # 1 deep geothermal testwell has penetrated following section :

0- 40m	fresh looking olivine basalt flows and scories	Series III-IV
40- 175m	olivine basalt flows and scories with some weathering and occasional intercalated paleosols.	Series II ?
175- 340m	alternation of olivine basalt flows and pyroclastics, with intercalated paleosols.	
340- 910m	greenish colored pyroclastics, tuffs, occasionally argillaceous, with some intercalations of olivine basalts. These intercalations are particularly abundant between 690 830m. From 840 to 910m marine tuffs with Foraminifera (Age : Lower Miocene-Oligocene).	
910- 950m	polygenic tuffs.	
950- 1818m	augite basalts, more or less alterated, alternating with pyroclastics. The pyroclastic intercalations are more or less argillaceous. Locally streaks of very fresh looking basalts with little augite, which possibly represent dykes.	
1818- 2556m	trachitic tuffs, welded, with occasionally some lavas.	
2556- 2598m	trachitic tuffs.	Series I
2598- 2702m (TD)	multicolored marls and marly limestones, with some silicifications, marly mudstones with microfossils indicating Upper Cretaceous age.	Upper Cret.

This is only a preliminary summary of the lithology and stratigraphy of this borehole. Detailed studies of the samples are presently in course.

This borehole has been extremely useful in provinding a first complete section of the Series I of the volcanic complex of the island of Lanzarote, and in proving the presence of a prevolcanic Mesozoic marine sedimentary series of Upper Cretaceous age at the top. This sedimentary series appears to be very similar to the upper part of the pre-volcanic sedimentary series outcropping on the nearby island of Fuertaventura.

The great thickness of this volcanic complex, 2598 meters , appears to indicate a very substantial subsidence, whereas the presence of subaerial soil-weathering at various levels in a series composed in great part of submarine tuffs, emphasizes the oscillating character of these vertical movements.

There is also clear evidence that the section is traversed by numerous dykes.

The borehole did reach the Mesozoic sedimentary "basement", underlying the Tertiary to recent volcanic complex at a depth of 2598 meters below RT , i.e. at a depth which very well agrees with the depth indicated by marine seismic surveys east and west off the island of Lanzarote.

The Cretaceous prevolcanic sediments in the Lanzarote # 1 well are marly-calcareous, with partly silicified fossils.

32 - Geothermal phenomena

During the drilling of the Lanzarote # 1 borehole no phenomena, directly indicating hydrothermal activity within the section , were encountered, except locally small concentrations of pyrite and the possible presence of opaline type concretions in some tuffs.

No hydrothermal alterations were encountered in the pervious part of the section, neither in the more or less impervious parts of the lower part of the section of this borehole, in Series I. Only below 2200 meters depth are there locally a few quartz veins. These quarz veins however appear much older than the recent magmatic activity on the island.

33 - Thermometry

Temperature measurements with the Kuster temperature gauge were taken as often as the drilling operations allowed.

Unfortunately the extrapolated equilibrated formation temperatures throughout the section remained very low. In the upper part of the section this is undoubtedly due to the invasion of sea-water into all porous and permeable rocks and the cooling effect of its percolation.

Only in the lower part of the Series I were gradients encountered slightly in excess of 5°C per 100 meters, against a normal gradient of 3°C per 100 meters.

Equilibrated formation temperatures in the lower part of Series I of the volcanic complex , i.e. in a more or less impervious sequence are as follows :

Depth	Equilibration formation temperature	Gradient
1000 m	39°C	
1440m	41°C	0.45°C/100m
1700m	45°C	1.40°C/100m
1860m	53°C	5.50°C/100m
1960m	56°8 C	3 °C/100m
2080m	63°3 C	5.40°C/100m
2170m	68°C	5.20°C/100m
2350m	77°C	5 °C/100m

For a supposed geothermal area such formation temperatures in an assumed caprock series are extremely low and appear to exclude that any geothermal aquifer is present at an economical depth at this location, below this caprock series, i,e. in the prospective aquifer supposedly constituted by the unpenetrated part of the underlying Mesozoic sedimentary "basement".

Between 1000 and 1800m depth these measurements are still in a more or less porous and permeable series, where the cooling effect of percolating seawater may have played an important role. Below 1800 meters depth the measurements are in an impervious medium where the cooling effect of the seawater has been eliminated. Belween 1000 and 1700 meters depth the getohermal gradient is between 0.45°C and 1.4°C per 100 meters.

Between 1800 and 2350 meters the average gradient is on the order of 5°C per 100 meters These figures represent geothermal gradients 1.4 to 1.8 times the average normal gradient of 3°C per 100 meters. Geothermal areas are usually characterized by a geothermal gradient in their impervious caprock series up to 10 times the normal gradient and occasionally even more.

There are indications from shallow waterwells on the island of Lanzarote that this figure of 5°C per 100 meters may be the average regional gradient for the island, i.e. slightly over normal.

34 - Geochemistry

Due to the fact that numerous additives had to be mixed with the drilling fluid during the drilling operations, in order to control its physical properties, it has been impractible to check on any constituents of the

filtrate of the drilling fluid, except for its silica content.

The silica content of the seawater used in the makeup of the drilling fluid has been repeatedly determined and is on the order of 6 ppm. As a rule, in the parts of the section where no important circulation losses occured the silica content of the drilling fluid is on the order of 20-25 ppm, due to the fact that some amorphous silica from the volcanics enters into solution. Between 700 and 850 meters depth however, i.e. in a zone of frequent partial circulation losses, the silica content of the filtrate suddenly jumped to 100-120 ppm. At the same time the filtrate almost doubled in volume. This appears to indicate that formation water was entering the borehole and was making up probably up to 50 percent of the filtrate. According to the temperature measurement the infiltrating waters are of low temperature the formation temperature not exceeding 37.8°C. The silica content of the formation water has values somewhat in excess of 120 ppm, which corresponds approximately with the amorphous silica equilibrium at 37°8 C in saline waters circulating in volcanic glass tuffs.

It was initially assumed that this silica content might have been due to a high temperature equilibrium, but this was undoubtedly incorrect.

As soon as the lost circulation zone was passed, below 850 meters, the silica content of the filtrate returned to ± 25 ppm and the volume of the filtrate to the values prior to 700 meters depth.

There is therefore apparently no evidence that high silica content geothermal waters are leaking from a geothermal aquifer in the area.

No influx of high silica waters was encountered in the interval between 1000 and 1800 meters depth, where frequent circulation losses indicate a more or less porous and permeable formation. This is certainly due to the fact that at most times this formation fluid is in equilibrium with the drilling fluid and cannot easily enter the borehole.

There have been no indications whatsoever that any gas entered the drilling fluid from the formation.

35 - Interpretation

The study of the results of the Lanzarote # 1 borehole leads to the conclusion that the model which was at the base of the Lanzarote # 1 borehole location is not correct and has to be modified.

As a matter of fact no indications were found of any geothermal type of incrustations , deposits of minerals or alterations, which may

have acted as self-sealants. Neither were encountered any high temperatures in the entire section of the borehole. Recorded temperatures correspond to very low gradients in the more or less porous and permeable upper part of Series I and to slightly abnormal gradients in the impervious lower part of Series I.

No gases were encountered in drilling which could shed some light on eventual geothermal fluids.

Even the influx of relatively high silica waters between 700 and 850 meters depth cannot be interpreted as a positive indication.

Taking into account the low gradients encountered in the Lanzarote # 1 well below 1800 meters depth, in impervious vitreous tuffs of the Series I, there appears to be little chance that anywhere within the next several thousands of meters below total depth of this well temperatures will be encountered which come close to the 310°C, registered in surface manifestations between the Islota de Hilario and the southern crater-rim of the Montaña del Fuego. This also means that it is unlikely that a uniformly fractured, geothermal aquifer, allowing convection currents could exist below the volcanic complex, in the Mesozoic sedimentary "basement". As a matter of fact the Upper Cretaceous sedimentary basement between 2598 meters and 2702 meters (TD) does not show any indication of permeability or porosity.

The absence of any highly abnormal heatflow in the section penetrated by this borehole appears to preclude the possibility of a regional, shallow magma chamber which could have acted as shallow heatsource for a widespread geothermal field.

It therefore would seem that the model on which the drilling of the Lanzarote # 1 well was based, will have to be modified. In this revised model it may have to be assumed that the heat source is much more localized below the area with high surface temperatures and that a prospective geothermal field will be much more restricted in size, than originally anticipated.

It also appears unlikely that any of the nearby fracture systems, as f.i. those in the Montaña Rajada, will have any important hydrothermal systems within themselves with high temperature fluids. As a matter of fact in that case it is likely that at least part of the section in Lanzarote # 1 would have shown higher dry rock temperatures.

However with the geological , geophysical and particularly with the only partial geochemical information available at the time of the siting of the Lanzarote # 1 borehole, it would have been rather difficult to choose between the various possible models. The model finally adopted at that time for the Lanzarote # 1 location was very attractive. The revised model will have to explain the failure of the Lanzarote # 1 well to find any high temperatures.

The Lanzarote # 1 geothermal borehole thus appears to have shown that there is no indication at depth for a regional high heatflow, which is suggested by the temperatures in shallow boreholes and shallow waterwells, and that the thermal anomalies of the Montaña del Fuego may be connected directly with the feeding channels of the 18th and 19th century volcanic eruptions.

The Series I of the volcanic complex on Lanzarote is much thicker than had been anticipated in some reports and bottoms at 2598 meters (RT .) i. e, ± 2398 meters below SL. This is approximately the level where the top of the Mesozoic sedimentary "basement" should have been encountered according to marine seismic surveys east and west of the island of Lanzarote.

4 - RE-EVALUATION

The failure of the Lanzarote # 1 geothermal testwell to find the prospective geothermal aquifer in the pre-volcanic Mesozoic sedimentary "basement" and to encounter any high temperatures, makes it necessary to proceed with a re-evaluation of the geothermal possibilities of the island of Lanzarote.

It should be pointed out from the outset that except for the slightly anomalous geothermal gradient, the Lanzarote # 1 geothermal testwell has not provided any indications for the existence of geothermal systems in that area.

41 - Geology

The surface geology of the Montana del Fuego hyperthermal area has been investigated in considerable detail and it seems rather doubtful that anything meaningful could be added in the framework of this report.

A number of open fractures and fissures are very clearly exposed on the surface in this area and most of the geothermal manifestations are situated on these fracture zones or the intersection of several of these fissure systems.

There does not appear to be direct evidence that any of these fracture systems has recently been associated with vertical or horizontal displacements. The main direction of these fracture zones is WSW-ENE and

N-S to SSE-NNW or SSW-NNE. These fractures usually effect the volcanics of Series IV, i.e. the products of the 18th and 19th century eruptions, but also the older series. As a matter of fact much of the hot gas seepages are located on fissures in the older volcanics : Islota de Hilario, southern rim of the Montaña del Fuego crater.

The model suggested by ARANA SAAVEDRA, RODRIGUEZ BADIOLA and ORTIZ RAMIZ (1977) does not appear to conform with the subsurface geology as indicated by the Lanzarote # 1 borehole.

In the area where the Lanzarote # 1 well was drilled there is hitherto no indication that an extensive fractured aquifer underlies the volcanic complex, and the first 200 meters of the prevolcanic Upper Cretaceous sediments are definitely exempt of permeability and porosity.

Within the Montaña del Fuego hyperthermal area there is no surface evidence for any of the hydrothermal alterations or incrustations so characteristic for other geothermal areas. Nowhere is there a trace of the usual spots of kaolinized volcanic rocks, of silicifications etc. The only phenomena associated with the seeping hot gases are strongly oxydized and brightly red colored spots.

There are however locally remnants of a post-volcanic fumerolic activity, which has since long completely subseded.

The characteristic white colored incurstations are probably in great part composed of gypsum and magnesium salts, mobilized by shallow capillary circulating atmospheric waters. There is no evidence that they have anything to do with the hyperthermal phenomena. As a matter of fact these gypsiferous incrustations are known also outside the hyperthermal area and are common on the flancs of many of the lapilli cones on the island.

This absence of any recent hydrothermal alteration on the surface appears to be rather significant. It is an indications that water or steam have very little contributed in recent years to the surface manifestations.

42 - Geophysics

421 - Gravity

A gravity survey was carried out over the entire island of Lanzarote. This gravity survey very probably reflects the overall, deep structure of the island.

The Bouguer gravity map clearly indicates two gravity lows of less than 150 mgal , one in the west and the other in the northeast of the island, whereas the central part of the island appears to be characterized by a gravity high of over 215 mgal.

This gravity picture, together with the offshore seismic profiles, appears to indicate that the central gravity high , the San Bartolome block, constitutes a horst type structure, separated by a N-S faultzone from the down-thrown Famara block to the east and by a NE-SW striking faultzone from the downthrown Montana del Fuego block to the west.

The Montaña del Fuego geothermal area and more specifically the area characterized by well pronounced temperature anomalies, is characrized by a gravity low, with a minimum value of 132 mgls, against average values for this block up to and over 150 mgals and up to and over 175 mgals on the raised San Bartolome block.

At present it is not clear at all what this gravity minimum means. As a matter of fact some geothermal fields are characterized by gravity maxima, as f. i. the Broadlands field in New Zealand. Others like the Geysers in northern California are gravity minima.

It is definitely not correct that the minimum values of the Montaña del Fuego geothermal area are of the same order of magnitude as the gravity lows in other geothermal fields. Particularly in volcanic provinces it is extremely difficult to interprete gravity values in a geothermal sense and it usually does not become possible to give a reasonable interpretation before a number of wells have been drilled.

It is however not excluded that this gravity low may be due to the mobilisation of magma in pipes, dykes or in a magma-chamber below the principal thermal anomaly. It may be rather interesting to carry out detailed gravity over the thermal anomalies.

422 - Seismic

4221 - Marine reflection seismic

Marine seismic reflection profiles have been shot east and west of the island of Lanzarote. They appear to indicate that the top of a mainly Mesozoic sedimentary series, known from petroleum exploration drilling in the Tarfaya province of Morocco and in the former Spanish Sahara, is to be found at approximately 2500 meters below sealevel, off the coast of Lanzarote island, both to the east and the west. There were therefore reasons to assume that these sediments would also be encountered

at depth on the island of Lanzarote. As a matter of fact inclusions of calcareous sediments have been found in volcanic bombs on the flancs of the Pico Partido volcano, northeast of the Montaña del Fuego geothermal area.

Heavily tectonized, pre-volcanic Mesozoic sediements cut by numerous dykes are outcropping on the island of Fuertaventura. Their thickness appears to be several thousands of meters.

The outcome of the Lanzarote # 1 well definitely confirms the figures for the top of the Mesozoic sedimentary "basement" indicated by the offshore seismic surveys, having encountered the top of the Upper Cretaceous marly-calcareous sedimentary series at a depth of 2598 meters i. e. ± 2398 meters below SL.

Reflection seismic surveys on land, with the great thickness of volcanic rocks, appears to be out of question and it is doubtful if refraction would give any useful results.

4222 - Seismic noise

A seismic noise survey was carried out in the Montaña del Fuego geothermal area, between the Montaña del Golfo in the west and the Montaña del Fuego in the east.

The network of this survey is not as dense as would have been desirable, due to difficulties in access in many areas, i.e. the areas covered with 18th or 19th century lava-flows.

The seismic noise survey by ARANA SAAVEDRA, RODRIGUEZ BADIOLA and ORTIZ RAMIS (1977) appears to show rather clearly a strong anomaly, particularly in the 8 Hz frequency covering the entire area of surface temperature anomalies, between the Montaña Rajada and the Montaña del Fuego within the 20 dB contour, whereas the Islota de Hilario and the Montaña del Fuego crater fall within the 40 dB anomaly.

Seismic noisesurveys have been used in recent years extensively in geothermal exploration, in the first place because they are relatively inexpensive. Its true usefulness however still has to be proven. As a rule areas without seismic noise or with very little anomalies only, usually appear to be of little interest for geothermal exploration. The presence of highly anomalous areas however does not automatically mean a geothermal field. However together with the pronounced temperature anomalies in the area between the Montaña Rajada and the Montana del Fuego theanomaly within the 20 dB contour appeared to be meaningful and might

have indicated the presence of geothermal fluids in the subsurface.

ARANA SAAVEDRA, RODROGUEZ BADIOLA and ORTIC RAMIS (1977) claim in addition that they have calculated the depth at which this seismic noise occurs and these depths appear to conform with the seismic top of the Mesozoic sedimentary series. In the light of the outcome of the Lanzarote # 1 deep geothermal borehole it would appear rather doubtful that such seismic noise could originate at 2500 m below sealevel. There is not the slightest indication of the presence of any geothermal fluid, no boiling, no gases and no abnormal temperatures.

It is rather difficult to separate geothermal ground-noise from unrelated noise-factors. Usually it is assumed that surface geothermal activity produces noise with frequencies above 8 Hz, whereas lower frequencies, down to about 1 Hz are postulated to be due to deeper water convection.

It therefore appears doubtful that this seismic noise originates at that great depth. However, the seismic noise anomalies appear to coincide with the most pronounced surface temperature anomalies . In view of the fact that the gas-geochemistry rules out the presence of any geothermal aquifer below the Montana del Fuego hyperthermal area, the interpretation of this seismic noise survey appears to be rather ambiguous.

423 - Electric resistivity

An electric resistivity survey was carried out in the Montana del Fuego area. Due to the high resistivity of surface layers the injection of electrical current has been rendered rather difficult. The results of this survey are therefore rather poor and penetration at depth was nearly impossible. The low resistivities encountered probably reflect only very superficial phenomena. This survey has been of little help in understanding the Montaña del Fuego geothermal area.

The porous and permeable character of the volcanics on the surface, the fact that the water-table is st sealevel, and most water is seawater, make that the first few hundred meters are very resistent (up to 20 000 ohm. m)

It appears extremely doubtful if better results could have been obtained with more sophisticated electric resistivity methods and with others than the Schlumberger configuration (f. i. Wenner).

As this resistivity survey only gave information on the first few hundred meters it did not contribute at all in unraveling the structure of the Montaña del Fuego area or in locating the high temperature areas at depth.

424 - Thermometry

Extremely detailed surface temperature measurements were carried out in the Montaña del Fuego geothermal area by ARANA SAAVEDRA, ORTIZ RAMIS and YUGUERRO in recent years and by D. TOMAS CORDON as early as 1948.

Many of these localities were revisited. Surface temperatures in the Montaña del Fuego geothermal area, i.e. the area with high temperature anomalies between the Montaña Rajada and the Montaña del Fuego range from a few degrees off the annual average of 20°C to 311°C. Particularly in the area between the Islota de Hilario and the southern rim of the Montaña del Fuego crater, temperatures near the surface at numerous localities reach 100°C, 200°C or more.

It appears now perfectly clear that these high surface temperatures are due to seepages of mainly non-condensable gases along fractures or fault-zones and not to conduction. As a matter of fact, shallow temperature holes drilled in the close vicinity of these fractures hardly show any degree of abnormality.

There are indications that some geothermal fluids may reach the surface along fracture zones in the prolongation of those known in the highly anomalous hyperthermal area, though temperatures are only a few degrees off the annual average.

It has been noted that many of the strongest temperature anomalies as f. i. those of the Islota de Hilario and the crater rim of the Montaña del Fuego are not in volcanics of the historic series but in pyroclastics of series III.

It had hitherto been assumed that these small seepages of geothermal gases constitute a leakage from a deep geothermal aquifer, i.e. the fractured, porous and permeable Mesozoic sedimentary complex underlying the volcanic complex at approximately 2500 meters below sea-level. In view of the results of the Lanzarote # 1 borehole this working hypothesis now appears rather improbable.

As a matter of fact, the geothermal gradient, measured in the Lanzarote # 1 well in the impervious part of Series I of the volcanic complex is on the order of 5°C per 100 meters. Temperatures giving rise to a geothermal field would have to be over 200°C. At 2350 meters depth a formation temperature of only 77°C was measured. It is highly unlikely that thermal conductivity will increase with depth, so that a temperature of 200°C could not be reached before several thousands of meters deeper.

The results of the temperature measurements in the Lanzarote # 1

borehole therefore seem to rule out the model of a deep geothermal aquifer in the pre-volcanic sedimentary series, of a relatively large heat-source and of a caprock formed by the impervious lower part of Series I of the volcanic complex.

At present it would appear that the locally very high surface temperatures in the Montana del Fuego hyperthermal area are due to hot dry gases rising to the surface along fissures and cracks in the series IV and principally in series III pyroclastics.

The heat source therefore also would appear to be smaller in size than assumed previously, not in the form of a large magma-chamber, but in the form of one or more active pipes, dykes or a relatively small magma chamber, which have not cooled down yet or are being reactivated.

43 - Geochemistry

Due to the very peculiar character of the surface manifestations in the Montaña del Fuego geothermal area and due to the absence of any hot or cold springs , very little hydrogeochemistry has been carried out in this area. On the maps there figures one surface spring : the Fuente de Crisante o Miraderos, northeast of the Montaña del Fuego geothermal area. This is not a true spring. Under normal conditions some water drips from a paleosol in pyroclastics on the flank of a volcanic cone.

As a matter of fact ARANA SAAVEDRA , GARCIA and PANICHI investigated the characteristics of the geothermal fluids of the Montaña del Fuego area and the isotope composition of some condensate samples (1974). Very recently F. TONANI sampled and analyzed the condesable and non-condensable gases of the gas seepages in the Montaña del Fuego geothermal area.

ARANA SAAVEDRA and GARCIA appeared to have proven that the hot gases seeping from fractures in the Montaña del Fuego geothermal area are in part constituted by superheated steam. They have equally established the presence of carbon-dioxyde, of chlorine and sulphur . Their determinations were essentially in the condensable part of the effluent gases and do not concern the non-condensable gases.

ARANA SAAVEDRA and GARCIA indicate that the superheated steam reacts with the rocks it traverses resulting in incrustations. Analysis of the water soluble part of these incrustations indicate that they are essentially composed of calcium-chloride, calcium-sulfate and magnesium-sulfate with traces of sodium and potassium chloride.

These white incrustations would cause near the surface sealing of cracks and fissures. There is not the slightest evidence that they are of hydrothermal origin.

A field study of the hot gases of the Montana del Fuego hyperthermal area by F.TONANI in December 1977 has established that the hot gases of the Montana del Fuego only contain a few percent of superheated steam and only traces of carbon-dioxyde and that probably most of the gas is constituted by nitrogen.

431 - Isotope analysis

ARANA SAAVEDRA and PANICHI (1974) have determined the isotope composition of condensate samples from the Montana del Fuego geothermal area. These isotope analysis appear to show a pattern very similar to other geothermal fields. ARANA and PANICHI came to the conclusion that the geothermal fluids, mostly steam, have been at depth in contact with limestones. The ^{18}O enrichment of the steam samples from Lanzarote is among the highest known in geothermal fields (16.9 °/oo). Unfortunately only 2-3 percent of the gases in the Montana del Fuego area are superheated steam and thus a geothermal aquifer at depth is excluded. In addition the prevolcanic carbonate rocks do not constitute a geothermal aquifer. This appears to indicate that the isotope pattern of the condensate of the Montana del Fuego gases has nothing to do with steam leaking from a calcareous aquifer.

At this moment it is not possible to interprete this pattern. It appears sure however that the 2-3 percent of superheated steam in the hot gases could very easily originate from the atmosphere, i.e. could represent rainwater, which has only circulated at shallow depth, but is heated by hot gases.

432 - Gas analysis

From December 4 to 10 1977 an investigation of the hot gases of the Montana del Fuego area was carried out in the field by F. TONANI, The collected samples are being analysed in various laboratories in the USA , Belgium and Italy.

The field observations and measurements however are sufficiently significant to change completely all previously assumed models for the hyperthermal area of the Montaña del Fuego and have a direct bearing on the geothermal possibilities of the island of Lanzarote. They have shown that :

(1) contrary to the previous assumptions, on which the Lanzarote geothermal project was based, the hot gases contain only 2-3 percent of steam.
(2) the hot gases contain in addition only traces of carbon-dioxyde, i.e. less than 0.1 percent.
(3) the hot gases, near the surface are nearly entirely composed of atmospheric air, resulting in an oxygen content corresponding with

the air.

(4) the hot gases at shallow depth (11-12 meters) do not contain even the slightest trace of oxygen, but still show between 2 and 3 percent vapor and less than 0.1 percent carbon-dioxyde.
(5) it is probable that the bulk of the hot gases at shallow depth is consisting of nitrogen, with small quantities of rare gases.
(6) the temperatures of the hot gases are between 100°C and 311°C.
(7) at 1m50 depth the hot gases are essentially composed of hot air, but at 12 meters depth there is no more oxygen and part of the assumed nitrogen could be of volcanic origin.
(8) it is not sure yet how deep the hot air circulates downward in the volcanic pipes and in how far the oxygen content is reduced to zero by oxydation processes.

These observations definitely rule out the possibility of a geothermal aquifer at any depth below the geothermal area of the Montaña del Fuego, i.e. the possibility of a conventional geothermal field.

The eventual proportion of magmatic gases in these hot gases is being determined in the laboratory.

44 - Synthesis

Previous and new information reviewed for this report appear to indicate that the model which was built up for the Montaña del Fuego area prior to the drilling of the Lanzarote # 1 deep geothermal testwell will have to be revised drastically.

With the information available prior to this borehole, this model, involving a considerable heatflow over a large area, a very deep, more or less uniformly fractured geothermal aquifer in the prevolcanic sedimentary series, with convection currents and a preferential leakage of geothermal fluid to the surface in the Montaña del Fuego hyperthermal area, appeared to be an entirely plausible and very attractive interpretation.

In reviewing this information in the light of the Lanzarote # 1 borehole, it now appears that the arguments for this model, derived from gravity and seismic noise surveys, are rather weak :geothermal fields are not systematically characterized by gravity highs, particularly in volcanic areas, whereas the pattern of seismic noise does not necessarily indicate a very deep geothermal aquifer over a large area. Both surveys now appear ambiguous in their possible interpretation.

The temperature surveys carried out in the Montaña del Fuego geothermal on the surface and in very shallow bores, clearly indicate the high

heatflow to the surface not to be due to conduction, but due to geothermal gases which were thought to be composed mainly of superheated steam, leaking from a confined geothermal aquifer and towards the surface diluted by air.

The temperature measurements in the Lanzarote # 1 borehole indicate a geothermal gradient on the order of 5°C per 100 meters in the impervious lower portion of the Series I of the volcanic complex. This definitely appears to exclude the presence of a widespread deep geothermal aquifer in the pre-volcanic sedimentary series as this should have shown up by high gradients in the impervious part of Series I.

The Lanzarote geothermal project was based originally on a very attractive working hypothesis which was apparently supported by previous, although incomplete studies. The hyperthermal phenomena of the Montaña del Fuego area were considered essentially as composed of superheated steam at depth, diluted and contaminated by air towards the surface in porous and permeable pyroclastics. All this appeared to be confirmed by a study of the oxygen isotopes of the condensable part of the gases.

Earlier interpretations of these phenomena by CERON and CALAMAI (1970) and by BRUN (1908) which indicated that the gases consisted essentially of air or air and nitrogen, were disregarded. It now becomes clear that they were quite a lot closer to the truth.

Even after only the preliminary results of the geochemical field study of the hot gases of the Montaña del Fuego area by F. TONANI it became clear that all previous models have become obsolete. At present it appears certain that below the Montaña del Fuego there cannot exist a geothermal aquifer, but that the hyperthermal anomaly is entirely due to very deep convective circulation of dry gases, essentially composed of atmospheric air, very probably mixed with volcanic gases. The principal component, whether of atmospheric origin or partly of magmatic origin is probably nitrogen.

These preliminary results will have to be confirmed by the detailed laboratory analysis of the collected gas samples, but this will change little in the general implications : the composition of the hot gases in the Montaña del Fuego area definitely rule out the presence of a geothermal aquifer below this area.

The previous interpretations of the available data have perhaps been too much influenced by a vague feeling that the high surface temperatures should indicate a large geothermal field.

Recent gravity measurements on the island of Lanzarote and marine seismic appear to indicate that the island is affected by two major faults, one running roughly N-S and the other NNE-SSW, separating the island in a central raised block, characterized by the San Bartolome gravity high, the western subsided block with the Montaña del Fuego minimum and the eastern block with the Famara minimum.

These faults do not appear to show up on the surface and there is no evidence that they have been active in recent times. There are no records of repeated earthquakes along these lines, which could have been provoked by such movements. The only important earthquakes are those preceding and accompaning the 1730-1736 and the 1824 eruptions.

In the Montaña del Fuego hyperthermal area there is a system of WSW-ENE and N-S to NNE-SSW intersecting fracture zones, which are of volcano-tectonic origin. These fractures do show up on the surface at various localities and there appears to be evidence that these fractures may extend to the western seashore.

In the Lanzarote # 1 borehole the top of the pre-volcanic sedimentary basement, very similar to the one outcropping on the island of Fuerteventura, was encountered at a depth of 2598m below RT , i.e. $\pm$ 2398m below sealevel. Within the impervious part of the borehole section a geothermal gradient of 5°C per 100 m was measured. This fact excludes the possibility of a high temperature geothermal aquifer at any reasonable depth in the area of this well.

It is therefore more likely that the hyperthermal anomaly of the Montaña del Fuego is due to a rather local heatsource contained in the volcanic pipes or dykes in that area, which fed this Quaternary center of repeated eruptions, or in a deeper magma chamber, with cooling or still active basaltic magma.

This single or multiple heatsource appears to cause a deep convection of gases : hot gases of magmatic origin rising from great depth and mixing with air entering the porous and permeable upper part of the volcanic complex. Practically no steam or water are involved in this geothermal system, as indicated by the gas analysis in the field and the small vapor content of the hot gases near the surface is probably entirely due to rainwater.

There is evidence on the island of Lanzarote that below sealevel, much of the permeable and porous part of the volcanic series is impregnated by seawater, undoubtedly with an amorphous silica content corresponding with its temperature.

The model sketched in this report therefore should explain why this generalized deep aquifer does apparently not exist anymore below

the Montana del Fuego area, particularly in view of the fact that the last volcanic eruptions in the area in the 19th century were accompanied by violent eruptions of superheated seawater (f. i. Volcan Nuevo near Tinguaton).

It would appear that the vigorous eruptions in the 18th and 19th century in the principal eruption center, i. e. the Montaña del Fuego area, may have ejected much of the water contained in the aquifers in the volcanic complex, plugged up most of the feeding channels along which the seawter could again penetrate into this area, i. e. may have very considerably lowered the deep water table and probably temporarily exhausted the entire water-supply. Since the last eruptions in the 19th century there has been no time yet for the water to return to the area, if some of the channels would have remained open.

The Montana del Fuego hyperthermal area therefore is underlain by a dry hot rock "geothermal field" of a particular type.

The consequence of this new model is that the exploration objective in the Montaña del Fuego area ceases to be constituted by fractured permeable pre-volcanic sediments over a large area, but the dry hot rock below the Montaña del Fuego hyperthermal area, heated by deep gas convection.

In addition there would appear to be a possibility that beyond the more or less impermeabilized volcanic pipes of the Montaña del Fuego area, from which all water has been ejected during the eruptions, there may exist a marginal area where the saline aquifers in the volcanic series are in close contact and heated by lateral conduction, so that the Montaña del Fuego hyperthermal area may be surrounded by a marginal area where these aquifers attain sufficiently high tempertaures that they can be used for electric power generation. It should be pointed out however that there is no surface evidence for such conditions and that the Lanzarote # 1 borehole at $\pm$ 3 km from the Montana del Fuego hyperthermal area, does not show any indications of such a marginal area of geothermal aquifers, surrounding the dry hot rock field of the Montana del Fuego.

I t would appear that this model of a marginal area with conventional geothermal possibilities, surrounding the dry hot rock system of the Montana del Fuego, lends itself well to be investigated by MT-5-EX magneto-telluric. The presence of high temperature geothermal fluids in such a hydrothermal system could be checked by a network of MT-5-EX stations at distances of approximately 500 meters.

The Montana del Fuego hyperthermal area with its dry hot rock geothermal possibilities could be investigated by a series of shallow slimholes in order to determine the locations where large size boreholes should be drilled in which heatexchangers for closed circuit steam generation can be lowered.

5 - CONCLUSIONS

The information reviewed in this report leads to the following conclusions :

(a) the Lanzarote # 1 borehole is located outside the Montana del Fuego geothermal area and only shows a slightly abnormal geothermal gradient, which may well correspond with the regional gradient for gradient for the island of Lanzarote.

(b) the Montaña del Fuego hyperthermal area between the Islota de Hilario and the southern rim of the Montana del Fuego crater constitutes a hot dry rock geothermal type of field with a convection system involving hot dry gases.

(c) an eventual geothermal exploration objective in the Montaña del Fuego area is not constituted by steam in fractures but by the large amount of heat which can be tapped underground by closed or open heat-exchange systems.

(d) an additional geothermal exploration objective may exist in an area close around the Montaña del Fuego hot dry rock system, where there are possibly geothermal aquifers within the volcanic complex in contact with dry and impervious hot rocks.

These conclusions are based on preliminary information and assumptions, which have to be confirmed by detailed chemical laboratory studies.

6 - RECOMMENDATIONS

It appears therefore that three questions have to be solved before eventually any additional deep drilling should be carried out on the island of Lanzarote :

(a) the heat source below the Montaña del Fuego : what is its size, are there one or more still active volcanic pipes or dykes, or is there one deep magma chamber ?

(b) what is the extension of the hot dry rock geothermal system below the Montana del Fuego hyperthermal area and what temperatures can be expected at depth ?

(c) what is the total amount of energy which could be recovered from this dry hot rock system by lowering the temperature from 300° to 200°C ?

(d) is there a marginal geothermally heated aquifer around the Montana del Fuego pipes, in the fractured parts of the volcanic complex ?

In order to solve these questions and prior to starting in the design of the heatexchangers by which the heat of the dry hot rock system can be reco

vered, it is therefore recommended that the exploratory investigations of the Montaña del Fuego be completed by :

(I) A series of shallow (300-400m) slimholes in the Montaña del Fuego area , to be drilled with air, in order to determine the areas of maximum heatflow.

(II) A MT-5-EX magneto-telluric survey of the Montaña del Fuego hyperthernal area and the surrounding region in order to determine whether there are indications for a deep hot geothermal aquifer in the marginal area around this geothermal area.

(III) Geophysical work : gravity, seismic refraction or MT-5-EX magneto-telluric, in order to determine the location,size,and eventual depth of a magma chamber, active pipe or dyke below the Montana del Fuego area.

It is further recommended that studies be made of the feasibility of installing simple downhole heat-exhcnagers, which can be lowered into boreholes for the production of non-corrosive steam in a closed system. It would appear that the high temperatures at very shallow depth over a wide area may make such a system possible.

A. ten Dam

10.- INFORME GEOQUIMICO - GEOTERMICO DE EVALUACION DE MANIFESTACIONES TERMICA EN LA MONTAÑA DE JUEGO (CAMPAÑA DE GASES)

SOCIÉTÉ de PROSPECTION et d'ÉTUDES GÉOTHERMIQUES
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GEOCHEMICAL-GEOTHERMAL EVALUATION OF THERMAL MANIFESTATIONS IN THE MONTANAS DE FUEGO, LANZAROTE, CANARY ISLANDS.

F. B. TONANI

INTRODUCTION

At the beginning of December 1977, one week field-work was carried out.

Such constituents as H_2O, SO_2, as well as CO_2, O_2, H_2O, have been determined in the field. Samples have been collected, and sent to a commercial chemical laboratory with special experience in geothermal analyses for fundamental analysis. More samples have been given to five different scientific laboratories, for as various purposes as cross-check analyses, X-ray study of saline deposits, and such special determinations as 40 Ar/36Ar, rare athmospheric gases, possibly 3He/4He.

The present report has been prepared relying on the field data and laboratory fundamental analysis. Data and discussions from the previous reports and scientific papers have been examined.

In this connection, the documents passed on to the present writer have been assumed to cover the essentials, (See List of References) and no further inquiry was made in the literature.

OBJECTIVES

The specific goal set to the field mission was to collect gas samples and to carry out appropriate field analyses, so as to find out the chemical nature of hot gases escaping from Islote Hilario in the Montañas de Fuego.

Also, the distribution of flow of specific gases should be outlined, as far as it would be feasible within the frame of the mission, and an interpretation of the obtained data and the entailed geothermal consequences should be given.

RESULTS

The gas that occurs at the most apparent manifestation, i.e., at the Islote Hilario, consists of nitrogen (about 97%) with small amounts of water vapor (about 35 mg/lt or 2% by volume)

and carbon dioxide (0.05-0.5% by vol.). Widely fluctuating and sporadic methane (90 ppm detected once), and maybe hydrogen up to 10 ppm, appear to accompany the nitrogen gas.

Air with variable amounts of nitrogen gas occurs at the other hot ground spots in the surrounding area.

Hot gases stream through the hot ground at the summital fumarole sites, on the crater rim of the Montaña de Fuego itself. They consist of nearly pure air that carries variable amounts of hydrogen (25-100 ppm).

CONCLUSIONS

Nitrogen gas is known to originate ultimately from low temperature environment. It may have its source in mildly warm aquifers at depth, or it may consist of athmospheric air deprived of its oxygen content by reaction with hot, reducing rock material.

Hydrogen in the hydrogen-carrying air is likely to result from the interaction of water with rocks at high temperature, or maybe, it is seeping into the system from underlying magmatic chamber(s).

In either case, however, the heating of the bulk of the gas results from its being physically in contact with the hot rock of the volcanic 'chimney' or fissure on its way to the surface. The investigated 'system' appears to be presently sealed off, or to have extremely limited exchange with its country aquifers, in contrast with apparent emission of water and steam during eruption at sites in the same broad area.

Presently accessible manifestations do not supply any direct evidence that heat was transferred in large amount to neighboring aquifers, resulting in the existence of the thermal reservoirs.

A fairly shallow hot-dry rock body is likely to exist, and possibly also a relatively shallow magma chamber. It is, however, quite open to question whether the latter may consist of a body extending horizontally from the volcanic centers, or may be a vertical, chimney-or fissure- shaped body.

Previous investigations pointed to high geothermal gradients (5 times normal) down to the water table. Heat might be transferred from the hot-dry rock to the surrounding ground water, resulting in streams of warm water that spread over the water table, and producing broad geothermal anomalies, as opposed to the pinpoint emission of hot gas at the Islote Hilario. The size of the hot-dry rock resource has been calculated based on

this model, and is put at some tentative 10,000 MW. years.

There is no firm evidence in favor of geothermal resources that entail comparatively broad geothermal aquifers, such as Ahuachapan in El Salvador, as opposed to local hot-dry rock bodies.

RECOMMENDATIONS

1. Deep exploratory drilling appears to be premature on the basis of presently available information.

2. The following recommendations refer essentially to the need for geochemical data.

a) In evaluating geothermal gradient data, water movement must be allowed for, and therefore, its study is prerequisite in a large majority of cases.

b) Existing water wells, as well as sites where the water table could easily be attained, should be studied all over the island, with the aim to gather data on water-movement, mixing, contamination by steam and/or gas, as well as on its heat budget. The obtained pattern will also supply necessary information in order to properly plan drilling in the inner areas where the water is not in easy reach.

c) The limitedness of the number of sampling points either for water or for gases may be turned around by repeatedly sampling each point. Time series are generally as effective sources of information as extensive surveys carried out at once.

d) In the previous connection, useful data may be obtained from studies at sea, that might cost-justify also independently of geothermal exploration and/or might be available.

e) Monitoring stations may be of use in volcanic surveillance as well as for geothermal exploration, at the surface or in drill-holes.

3. Prospects for hot-dry rock and/or magma chamber type geothermal resource seem reasonable. Unfortunately, this resource is hardly known to date, both with regard to exploration-evaluation procedures and to the needed technology for development.

Therefore, sheer industrial exploration and development could hardly be recommended for such resource at the present time, and in a low investment area. However, there is little doubt

about the fact that the Lanzarote Island seems the ideal location for R & D projects with a view at the worldwide development of hot-dry rock and magma chamber-type resources.

The size of the hot-dry rock resource has been tentatively assessed, with a view at showing the potential for co-ordinate use of geochemical with geological-geophysical information.

The present result, to the effect that the geothermal resource may be sub-commercial, is by no means definitive. The economic-engineering aspects may be better understood, and the studies referred to in Section 2 above need to be completed, in order to either accept or reject or adjust the underlying geothermal model.

OBSERVATIONAL RESULTS

Field Methods

Field determination of H_2S, CO_2 and O_2 have been carried out by appropriate techniques, making use of the colorimetric detector tubes manufactured by Draeger. Unfortunaly, methane and hydrogen could not be determined, as the detector broke down during transportation and could not be utilized.

Laboratory Methods

Samples have been collected either in pyrex containers with Torion valves (a trade name for valves manufactured by Sovirel, France), or in specially-made sampling tubes sealed with silicone rubber septa. Analysis of the fundamental constituents was made by gas chromatography at Amtech, San Diego. Cross-check samples have been sent to the Department of Analytical Chenistry, University of Brussels (Ivan Elskens).

Regarding samples from Islote Hilario, site 8A, mass spectometric and gas chromatographic analysis are under way at the Scripps Institution of Oceanography by John Wehlan, as well as at the Laboratorio di Geochimica e Cronologia Assoluta by Giorgio Ferrara, and at the Istituto Internazionale di Ricerche Geochimiche by Costanzo Panichi. Additional data may result from this work which might elucidate the origin of the nitrogen gas encountered at site 8A.

Special care in determining the oxygen-to-nitrogen ratios was requested from the chemical laboratory, as, on the basis of the field data, it was expected to be especially meaningful.

Comments

Failure of both available hand-pumps for field-analysis and sampling has resulted in some defective field data. The trouble was detected, and cross-check examinations carried out. Some of the data, obtained before the trouble became apparent, might, however, be too low. (See starred data in Table I and III). Sampling quality is not affected.

There appears to be a discrepancy between field and laboratory data for carbon dioxide (See Table III), in that some comparatively high contents of CO_2 have not been confirmed in laboratory analysis. The discrepancy appears unlikely to depend on analytical errors on either side; therefore, it may suggest that the samples have lost their carbon dioxide before analysis, during the exceedingly long

storage and transport time (i.e. two months). When cross-check analyses from different containers become available, this point will hopefully be clarified. For the time being, we accept field data, inasmuch as the sample is definitively more reliable, while the analyses procedure is about as dependable as the laboratory procedure.

Results of Field an Laboratory Analysis

The whole of the significant results obtained with the present study are reported in Table III, where one final field value and one final laboratory value are taken for each datum. For reference, individual field data and sample numbers are given in Table I, and the same sample numbers are used in Table II, where laboratory analyses are reported. Samples missing in Table II have been sent to other laboratories and analyses are under way. Discrepant data for carbon dioxide are decided upon, as indicated in the previous section, by accepting field data. Hydrogen sulfide and sulfur dioxide have been sought for and found absent (less than a fraction of a ppm). All samples but a few contained less than 12 ppm H_2 and less than 20 ppm He.

Composition of the Gas at Islote Hilario

The hot gas escaping from the coarse scoria at Islote Hilario is about 99% nitrogen, after water is removed. Some allowance should be made for the fact that argon was not determined, and the analyses will be corrected for argon when the data will be available.

Sample #3 of December 5, 1977 contains about 90 ppm methane. As contamination by methane is highly unlikely under the circumstance, rare fluctuations in the local methane content, independently of the bulk composition of the gas stream, are assumed to take place.
Field data also point to significant changes in the content of carbon dioxide. The peak value for carbon dioxide (0.7%) occurred precisely the same day that the #3 sample containing 90 ppm methane was collected. As the other samples collected the same day are out for cross-check analysis, confirmation or rejection of correlation between pulses of methane and carbon dioxide is expected when the cross-check analysis will be completed.

Distribution of the Hot Gas Stream at Islote Hilario

Samples have been taken and analyses carried out of gases streaming nearby site 8A at 1-1.5 m. depth in the ground. Sites 8A-1, 8A-2 and 8A-3 were respectively less than one, about five, and fifteen metres apart from Site 8A. The above mentioned sites

TABLE I(1)

Field Work Date, 1977

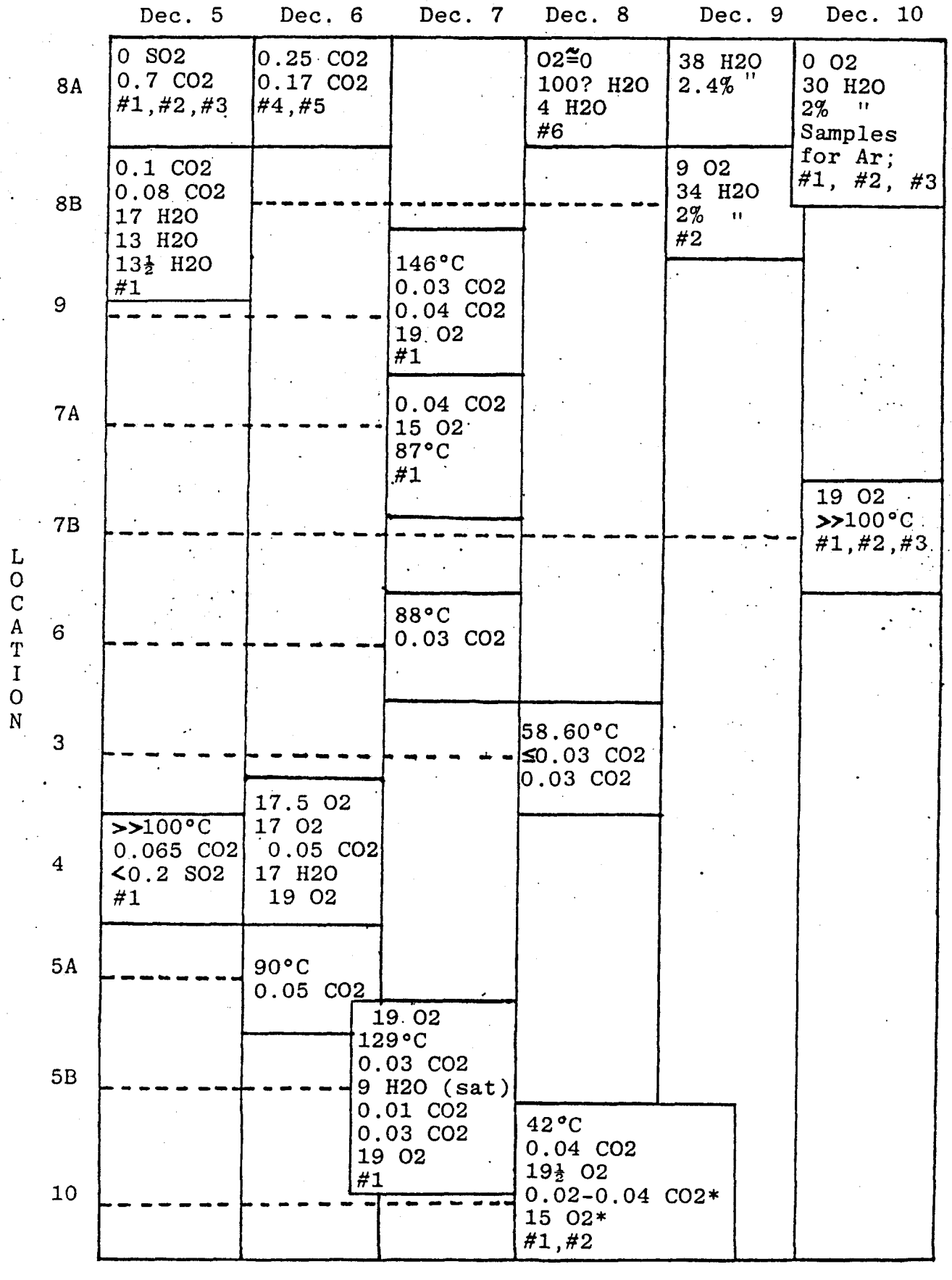


TABLE II

SAMPLE		CO2 % Vol	OXYGEN % Vol	NITROGEN % Vol	TEMP. °C
LOC	9, #1 7 X11 1977 *	0.05	19.0	81.5	146
LOC	5, #1 7 X11 77 *	0:03	19.0	81.1	90
LANZAROTE LOC	10, #1 8 Dec 77 *	0.04	20.2	79.7	42
LANZAROTE LOC	10, #2 8 X11 77 *	0.03	19.4	80.5	45
LANZAROTE	8B, #2 9 X11 77 *	0.04	19.4	80.6	-
-	8A, #5 6 X11 77 *	0.07	5.4	94.5	>300
LANZAROTE	8A, #4 5 X11 77 *	0.09	0.6	99.3	>300
LANZAROTE 3:05	8A-1, #1 8 X11 77 *1	0.05	17.3	82.6	247
LANZAROTE	8A-2, #1 8 X11 77 *	0.07	16.8	83.1	290
LANZAROTE	8A-3, #1 8 X11 77 *	0.02	17.5	82.5	282
LANZAROTE	8A, #3 5 X11 77 *2	0.09	0.71	99.2	>300
LANZAROTE	7B, #1 10 X11 77 *3	0.04	19.5	80.6	>100
LANZAROTE	7B, #3 10 X11 77 *4	0.03	21.0	79.0	>100
LANZAROTE	7B, #2 10 X11 77 *4	0.04	21.0	79.0	>100
	8A, #6	Sample Broke			

* He <20ppm Vol, H2 <12ppm Vol, CH4 <20ppm Vol
*1 " , H2 Trace 12 , "
*2 " , H2 108ppm Vol, "
*3 " , H2 108ppm Vol, CH4 90ppm Vol
*4 " , H2 24ppm Vol, CH4 20ppm Vol

(1)

Explanatory note to Tables I, II, and III-B

SO2 is expressed in ppm (parts per million), O2 and CO2 in per cent by volume (%). H2O is given in mg/liter as well as in per cent by volume.

Table I reports all field data on two entries, DATE OF COLLECTION (columns) and LOCATION (rows). Reported data include collected samples.
Sample identification is as follows :

#1 in box 5 Dec.(date)-8A (location) indicates a sample labeled as 8A #1 sample of Dec.5, 1977.

Samples for argon (see Dec.10) are labeled AR plus usual ID.

Starred data on Dec.8 are possibly erroneous as a consequence of equipment failure.
The H2O data in box 5B and Dec.7, 9 mg/liter does not represent sample composition. The sampling line had not been pre-heated and condensation took place before the water detector tube. The result, 9 mg/lt. or 0.012 % vol. matches saturation at 9-10 C : does not give information on the gas but is a good cross-check of the analytical technique.

Temperature in large excess of 100 C at 7B, Dec.10th, was estimated because water would violently vaporize from the iron tube when it was poured on it to cool it down after it was withdrawn from the ground.

Table II reports laboratory analyses. Some of the samples appearing in Table I do not appear here : they were sent to laboratories other than Amtech which have not yet responded.

Table III-B reports field (field) and laboratory (lab) data for sampling sites at location 8A.

ERRATA CORRIGE : Table III referred to in the TEXT has not been prepared as the consequence of the difficulty of presenting both field data and laboratory data in the same table. Table III-A should have contained the data for locations 3, 4, 5, 6, 7, 8, 9, and 10, but was not actually prepared. Table III-B regarding sampling sites 8A-1, 8A-2 and 8A-3 of location 8 was prepared instead.

LABORATORY DATA were originally given as absolute concentration in the carrier gas. They have been re-calculated so as to sum up to 100 that is, after removal of gas carrier. In this way argon has been ignored.

TABLE III-B - Location #8, distribution of component in near surface flow

D a t e	December 8,1977	December 9, 1977	December 10, 1977
Site			
8A-1	temp. 247°C 0.08 CO2 field 0.05 CO2 lab 17.3 O2 lab 82 6 N2 lab	14.5 O2 field	20.0 O2 field
8A-2	temp. 290°C 0.05 CO2 field 0.07 CO2 lab 16.8 O2 lab 83.1 N2 lab	8.5 O2 field	17.0 O2 field
8A-3	temp. 282°C 0.05 CO2 field 0.02 CO2 lab 17.5 O2 lab 82.5 N2 lab	11.0 O2 field	19.0 O2 field

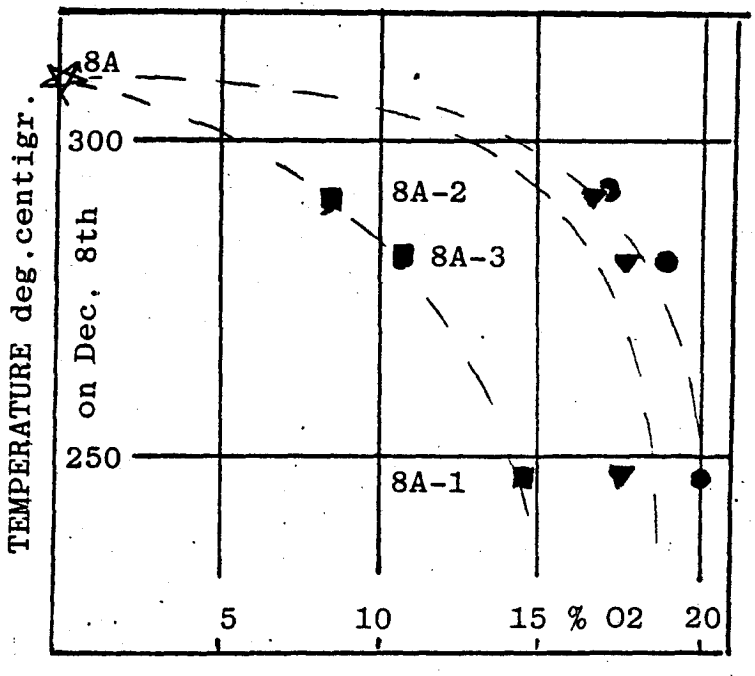
were selected based on shallow (10 cm. depth) ground temperature distribution nearby site 8A, along what appeared to be a hotter strip of ground. Field and laboratory data are reported in Table III-B for these sites.

The graph of figure 1 referring to the data of Table III-B points to a relationship between oxygen content and temperature of the gas. The data point to the following conditions. Firstly, the obtained results as a whole point out that the gas becomes richer in air as it gets closer to the surface, even in the immediate vicinity of Site 8A, which is a hole deep in excess of 10 m. giving out nearly pure nitrogen. Secondly, it appears that the content of air fluctuates. Thirdly, differences in air content are either unrelated to temperature, or relate in such a way that even the diluting air has got to be hot air.

Let us comment on the second point, i.e., fluctuations with time. Unfortunately, the field values obtained concurrently with sampling on December 8th were undependable as the consequence of pump breakdown (see previous section on Methods). Thus, we can compare laboratory-only values for December 8th, with field-only values for the 9th and the 10th, and have no cross-check on possible discrepancy between laboratory and field data collected simultaneously. Are the consistently lower field values on December 9th reliable? Field notes indicate that, by December 9th and 10th, pump failure had been found out and a different outfit utilized. Unfortunately, however, by that time, as a consequence of the trouble-shooting work carried out on the previous day, we were running out of oxygen detecting tubes, to the point that we were using one tube for two-three determinations in a row and therefore had given up running parallel air tests each time. However, the high oxygen values obtained since then at other locations, the agreement between field determination on the 10th of December with the same outfit and laboratory data on the 8th of December samples, all support the view that the spare outfit worked properly. We may therefore conclude that the field data on December 9th are to be accepted, and that the near surface composition fluctuates between almost pure and less than 50% air.

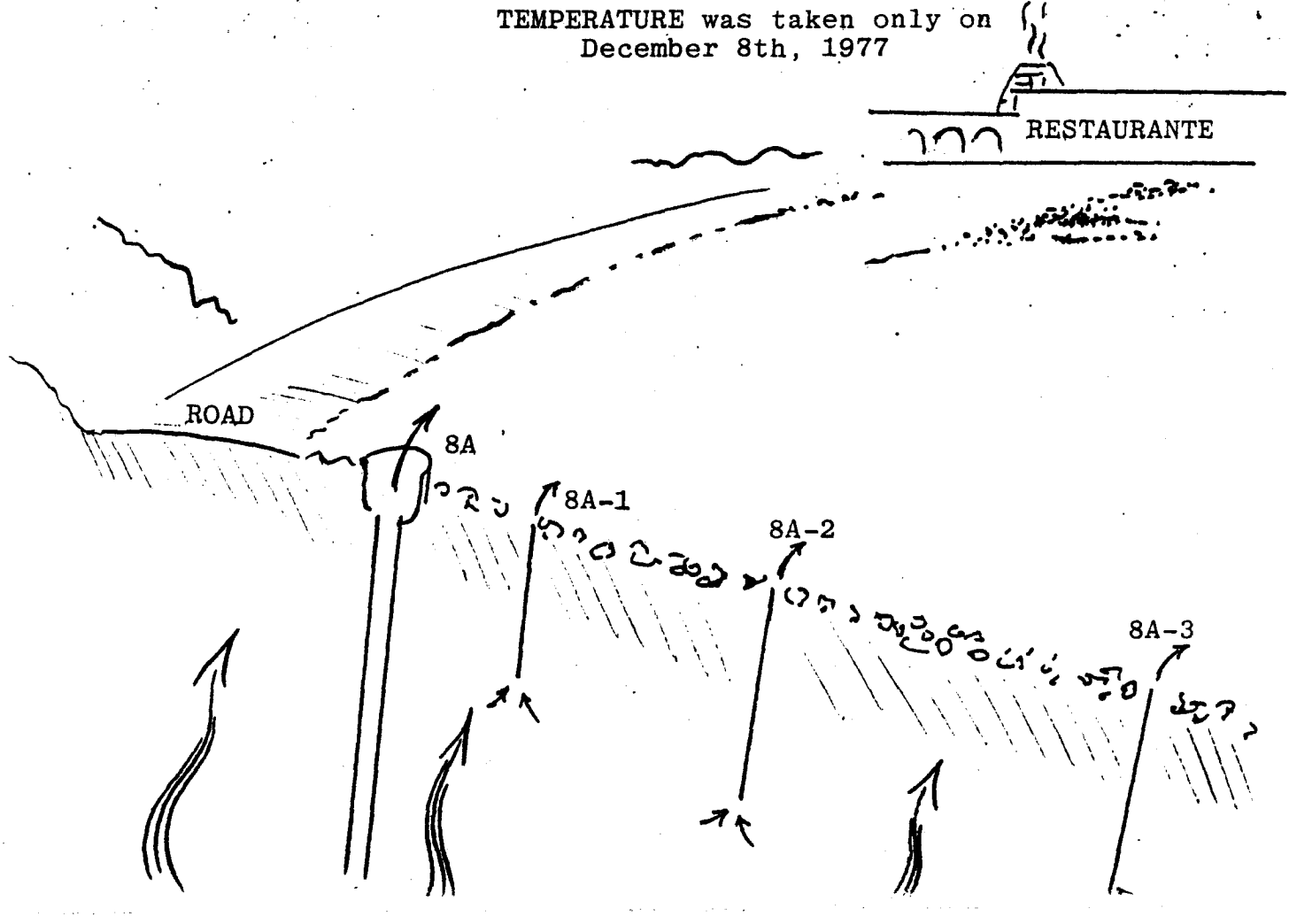
Sampling sites in excess of five hundred metres away from location 8, had been selected at hot ground spots on the 1730 lavas, such as sites #3, #4 and #5. Site #9 is a hornito and/or splatter cone only a few hundred metres from location 8. All of them gave air with only a slight excess of nitrogen. This excess nitrogen may be interpreted either to be about 5% nitrogen gas admixed with hot air, or to result from some removal of oxygen from the air in contact with hot rock. Let us comment that neither alternative is conflicting with the possibility that the nitrogen gas at Islote Hilario does not originate by mere de-oxygenation of air and may have, all or in part, a different geochemical origin. The latter problem might be elucidated by more complete chemical and isotopic investigations of the Islote Hilario nitrogen gas.

Figure 1 : Near surface structure of the hot gas stream at Islote de Hilario. Air appears to enter the system and heat up before mixing, or further heating takes place after mixing. Nearly pure nitrogen issues at 8A, with puffs of methane, carbon dioxide.



▼ Dec.8,1977 lab. data only
■ Dec.9,1977 field data only
● Dec 10,1977 -ditto-

TEMPERATURE was taken only on December 8th, 1977



Composition of gas at the summit of the Montaña de Fuego.

Also the hot gas streaming through the ground by the summit of the Montaña de Fuego is air with a slight excess nitrogen, that is, either slightly depleted of its oxygen or with admixed nitrogen. It also contains, however, 25-100 ppm hydrogen. As the highest hydrogen value among the three samples taken occurs along with the comparatively largest nitrogen excess, we may suspect that either greater depletion of oxygen or larger admixtures of nitrogen accompany the addition of hydrogen to the mixture.

The only other hint to the presence of free hydrogen in the investigated gases is a possible trace, or about 10 ppm hydrogen, in one of the samples at location 8, and namely, sample 8A-1, one of the shallow samples discussed earlier. Hydrogen is likely to be widespread in the study area under as low concentration as a few ppm. Especially high concentration may result from such processes as high temperature water-rock reaction. Moreover, hydrogen may be thought to escape from the underlying magma chamber, according to the views held by several volcanologists.

Composition of gas and saline crust at Montaña Rajada

Location 10 in the sampling map was indicated as Montaña Rajada, a name that does not appear on the 1:10,000 sampling map. Three warm to hot vents have been examined, samples of gas have been taken from two of them and a sample of white saline crusts was taken inside one warm vent.

Study of the latter sample by X-ray diffraction indicated that the bulk of the crust is tenardite, the anhydrous sodium sulfate Na_2SO_4 (data by N. Coradossi, Istituto di Mineralogia Petrografia e Geochimica, Firenze.) Other salts in minor amount seem to be present as scattered crystals over the surface of the crust, coatings and so forth. Some of these features were destroyed on transportation, work is under way to obtain some additional information. The streaming gas at this location appears to be just air within the precision and sensitivity of the analytical techniques.

Summary of Facts and Some Conclusions

By and large, three types of hot gas have been recognized, and a fourth one may be inferred as possible in the study area:

(1) Air heats up in contact with rocks and undergoes some concurrent depletion of oxygen, a well known fact for a fairly large number of similar occurrences.

(2) Nearly pure nitrogen is released to the atmosphere at Islote Hilario. As of presently, its origin cannot be fully understood. It might consist of either oxygen-depleted air or

nitrogen formed in the reducing subsurface environment, either directly from scattered organic matter, and by reduction of nitrates in underground water.

(3) Hydrogen, of possibly deep origin, escapes at the summit of the Montaña de Fuego as admixtures in a stream of hot air slightly depleted in oxygen.

(4) Fluctuations observed at the Islote Hilario point to the probable existance of methane-rich gas, probably also containing more carbon dioxide than the nitrogen-rich gas. Water and carbon dioxide occur in minor amounts regardless of the bulk gas composition, except for the hint to the existence of methane-carbon dioxide gas. Water in the gas matches saturation at such mild temperature as 20-30 °C, being 20-40 mg/liter H20 or 2.5-5.0% in volume. Most of the studied gas can be considered as dry gas, inasmuch as its temperature exceeds by far the saturation temperature, and its content of H20 is not evidence per se of geothermal steam. The observed amount of water is only 3 to]0 times the absolute humidity of environment air under 30% relative humidity, a difference that compares with the difference between wet and clear days. This means that, in discussing the possible origin of water vapor in the studied manifestation, water from original air moisture and from cold to warm groundwater may well make up for a sizeable fraction of the total, and could hardly be disregarded.

Carbon dioxide varies from atmospheric value (0.03) to in excess of 0.5%. The higher value may be a reflexion of some admixture of methane bearing gas rather than of the nitrogen gas itself. Methane-gas of some sort seems to exist as a separate source gas among the source gases of the studied manifestation. It is worth noting that time variations are an effective way to detect the individual source gases in such gas streams as the one occurring at Islote Hilario. In fact composition changes with time, due to changing proportions among the different sources. Wide changes of this sort can be brought about by only slight changes in pressure that are almost certain to occur and make the merging of different streams detectable.

Comparison of Present with Previous Data

The water content of the gas as determined in the present study compares closely with that formerly found by García (Reference V. Araña Saavedra and A. García Luis). These authors find 11 mg/lt in the outside atmosphere as compared to values ranging from 19 to 60 in the hot gas. Among the samples taken in the course of this study those from location 8 correspond most closely to samples A and B, of Araña and García, 200 - 300 °C, which contain 21 - 22 and 36 - 39 mgH20/lt. Our values for location 8 are around 35, for location 4 the value is 17 mgH20/lt, see Tables I and III; the agreement is therefore fairly good.

Our results are instead definitely different for carbon dioxide. The only reported value was 600 mg/lt C02 in a condensate, or 1.4 x 10 exp (-2). The gas in equilibrium with that solution should have had about 50% carbon dioxide. Neither our laboratory values nor our field data support such possibility. The present direct determination of carbon dioxide in the gas phase appears more reliable that the indirect determination based on the condensate analysis. A change in composition with time cannot be ruled out, however, it appears that if puffs of C02-rich gas occur, they must be rather rare and we had better refer to the low values persistently encountered during the present work.

It appears from previous reports and papers that the repeatedly expressed opinion by several scientists that the bulk of the gas was either water vapor or carbon dioxide, originated from the mentioned data by García jointly with the observation reported by Araña, García, Ortiz and Yuguero, to the effect that wood and paper take fire nearby the surface while they would not burn in the deeper and hotter parts of the pits. This phenomenon is consistent as well with the 99% nitrogen gas we have encountered. Moreover, there seems to be little evidence from either analysis, or direct observation in the field, to support the view that the bulk of the gas be water vapor and/or carbon dioxide.

Isotopic data

The isotopic composition of the nitrogen molecules will probably shed some light on the process of formation of the hot gas. Nitrogen may result from air deprived of its oxygen as well as it may be the product of such chemical reaction as take place during the transformation of organic matter in subsurface waters and sediments, including the reduction of nitrates. A mixed origin is most likely and chemical study of the gas for other rare gases is recommended. Exotic alternatives, such as the possibility that nitrogen gas is released from the Earth's mantle, deserve attention on scientific ground, and doubtless, Lanzarote appears one among several meaningful test sites. With a view at geothermal development, however, the impact of such data on decision making per se may not cost-justify such investigations. This point will be discussed somewhat more extensively in a later section.

A isotopic study had been conducted on the small amount of water vapor that accompanies the nitrogen gas by Araña and Panichi. Results are significant, inasmuch they are so extreme, that there is little alternative in interpretation, which is indeed a very favorable and uncommon situation. Due to reports hinting to the possibility that the gas contain substantial amounts of steam, a condensing device specially designed for obtaining representative samples of the condensate from high temperature fumaroles was taken to Lanzarote. The amount of water in the gas, however, was actually close to the estimate by García, and very small. The difficulty of producing a representative sample did not fit the time frame of the mission, considering that more urgently

needed information had to be gathered before repeating work that had been done once before. Moreover, the isotopic data are not likely to change whoever's mind regarding the geothermal resource at Lanzarote, as it simply proves that there may be moderately hot limestone (an estimated 200 °C compared to 300 °C of the gas stream) at depth, where the Islote Hilario 'system' may have its roots, and that steam may be seeping in down there.

As for the specifics of the water isotopic data, some time was spent on their evaluation. This was done because the isotopic data appeared to have been considered a very important, and indeed unique, source of information during the preliminary study, and questions on the subject had been asked during the de-briefing meeting in Madrid.

Unfortunately, any evaluation of isotopic data from so small concentration of water vapor in hot gas would have to rely heavily on some knowledge of the actual temperature of condensation, which has not been reported in the specific case. On the other hand, adequate temperature control cannot be assumed without having some idea of the collection device that was utilized, under the circumstance. Therefore, no reliable evaluation can be made. It is worth noting that enrichment of heavy isotopes in the condensate could indeed result from condensation of the studied gas at, say, 20-30 °C.

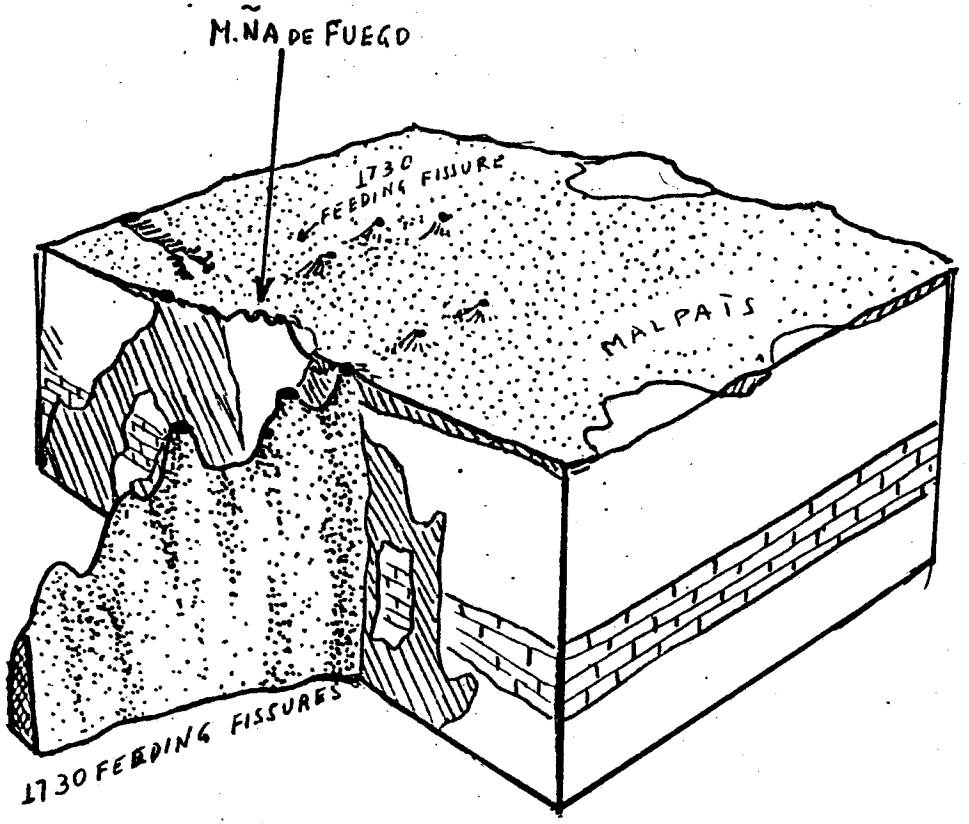


Figure 2 : Geologic evidence for heat source . Hot plugs, fissure-filling magma chamber are likely to occur in the fissure system that fed recent volcanic activity. Vents at the surface point to two appr. E-W lines, connected by a broad offset zone where the M. de Fuego is also located. On the foreground, broad feeding fissure shown as if filled up. Side of block, cut across offset zone. Surface of block, aligned vents. Other side of block shows strata of limestone. Left and right side of block as shown point to the fact that both proposed geologic models correspond with different views of the same system.
The question is : is the heat source concentrated in the offset zone, or does it extend sidewise beneath the calcareous reservoir.
FISSURE FILLING AS REPRESENTED IS UNREALISTIC : indicates the volume that is probably criss-crossed by a great number of dikes.

OUTLINE OF GEOTHERMAL GEOLOGY

Introduction

The present section is aimed at giving an overview of the information that was made available to me through the documents, as well as the discussions with the geological staff, especially Dr. A. Tend Dam and Dr. L. Guzman. This information is partly re-evaluated here in the light of the findings on the nature of the hot gas at Islote Hilario. In fact, it appears hardly questionable that there is a hot-dry rock, probably a 'system'consisting of one or more plugs and dikes, and that such system is thoroughly sealed off from surrounding aquifers. The lack of limited amount of hydrothermal alterations suggests that this system was never exposed to heavy water circulation for long periods of time, relative to the time scale of these processes, i.e. hundreds or thousands of years. As gas convection is very easy, it does not take a large thickness of rock to produce the observed offects, if there is any reasonable permeability. It must be kept in mind, however, that while the kind of observed circulation at Islote Hilario is fairly common in volcanic structures, its size is definitely uncommon, and maybe unique if referred to non-eruptive conditions; therefore, the product of thickness by permeability must be fairly exceptional.

The Heat Source

The most likely heat source is magma or its solidification products left behind by the 1730 eruption in the form of dikes and plugs and hot rubble in volcanic chimneys. Moreover, magma has risen again in about the same fissure system in 1824. However, this does not physically change the expected heat source. It is however reminiscent of the fact that magma chambers or their fingering upwards are a prospective and hardly predictable heat source.

Figure 2 is a block picture of this study area. Fissures that fed the 1730 eruption are shown in three different ways. Firstly, on the surface of the block, as they show up on the surface, i.e., as rows of aligned volcanic vents. Secondly, on the left side of the block, in the form of a cross-section through the Montañas de Fuego, that is, through the offset zone that seems to link the two main fissures, and that was probably the main path of the magma to the surface. Thirdly, one of the two feeding fissures is shown in the foreground as if the intruded zone were carved out from the block of older volcanic materials. Let us notice that this figure, representing it as a solid volume of intruded material, is quite unrealistic, as the feeding zone should be seen as an intricate and narrowly woven network of dikes and plugged chimneys. Eventually, the right side of the block picture points out that the geology outside the narrow feeding area is represented by the model proposed by Arana and Fuster. Here too the picture has no claim of being realistic.

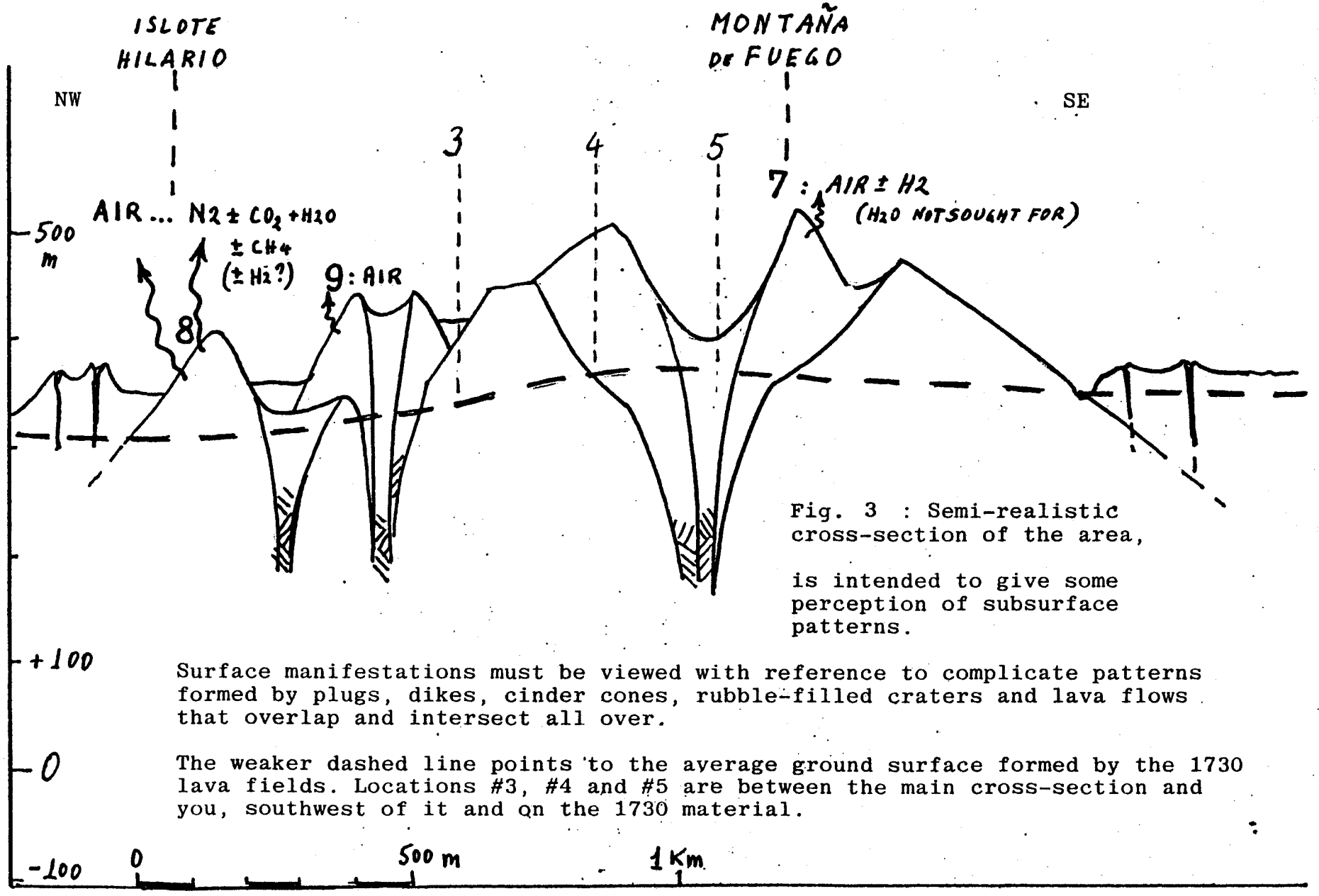


Fig. 3 : Semi-realistic cross-section of the area,

is intended to give some perception of subsurface patterns.

Surface manifestations must be viewed with reference to complicate patterns formed by plugs, dikes, cinder cones, rubble-filled craters and lava flows that overlap and intersect all over.

The weaker dashed line points to the average ground surface formed by the 1730 lava fields. Locations #3, #4 and #5 are between the main cross-section and you, southwest of it and on the 1730 material.

It serves the limited purpose of pointing out that the geologic models proposed so far, which emphasize either a hot, dry plug-structure, or a hot calcareous aquifer, refer to coexisting features rather than to conflicting alternatives. Differences do not regard geology, but the assumed heat source, i.e., temperature distribution in the subsurface. The heat source may be either a narrow body, dry-hot rock or magma chamber, or a zone extending sidewise from the volcanic channel(s). The latter case may originate in two ways: out of sheer geometry and depth of the magma chamber, and out of long lasting heat flow from the volcanic channels and fissures outwards, to their surroundings. Volcanic history is an important source of information in this respect, which makes volcanological-petrographic study an important part of geothermal exploration in such areas. Direct observation, mainly thermal manifestations and heat flow measurements, also contribute information regarding the heat source. As they depend very much on permeability, however, let us discuss this first.

Permeability Distribution at Depth

In geothermal exploration, 'distribution of permeability at depth' is a somewhat more complicated expression for 'reservoir and cap-rock'. Referring to v olcanic areas, and namely in the present case, using it may be a sound precaution against being misled in several ways, such as identifying rock with formation in cap- and reservoir-rock, and assuming orderly layered structures.

Figure 3 is a close-up view of that part of the cross-section through the Montañas de Fuego, which is barely visible in Figure 2. It has little claim of faithfully representing the geology. Its purpose is to give some perception of the pattern of boundaries among successive volcanic cones and calderas, lava flows and chimneys, that is likely to exist beneath such an area as the Montañas de Fuego. This pattern is rather intricate and highly irregular, and is in control of permeability. Attempts to give geothermal evaluations, and in the first place attempts to interpret the information carried by thermal manifestations, i.e., conductive heat flow as well as gas, steam and water flow, must be developed in this geologic framework.

Direct Evidence of a Heat Source: Thermal Manifestations

In the view of this section, the expression 'thermal manifestations of a heat source' is used in broad sense, including geothermal gradients as well as hot water, steam and hot gases.

The manifestations occuring at Lanzarote include an overall geothermal high geothermic gradient of 5 hfu's, Arãna and Fuster, a specifically anomalous area on this background with an estimated]0 hfu's possibly relating to the Montañas de Fuego 'system' (Afonso et al.), and the streams of hot gas in the Montañas de Fuego, especially the stream of nearly pure nitrogen at in excess of 300 °C at the Islote Hilario. These, along with some geological features, are represented in Figure 5. At the Islote Hilario, in

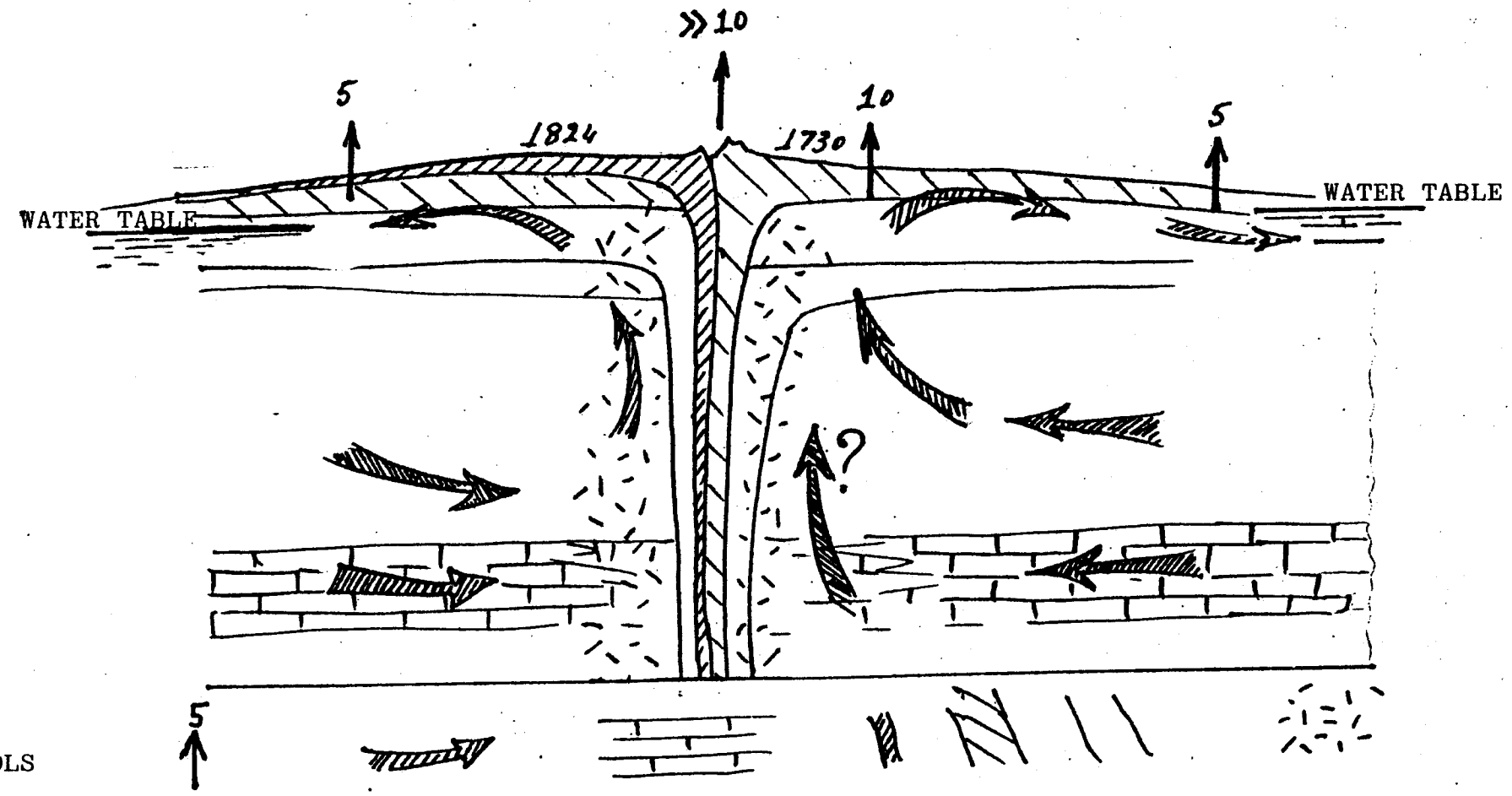


Figure 4 : Graphic expression of conditions presiding over geothermal gradient.

This drawing shows that deep water may circulate outside a sealed off hot zone, the resulting warm water may spread over the water table, and in this way a narrow hot source may produce a broad geothermal anomaly having little relation to the heat source itself.
As a consequence, some understanding of water circulation is prerequisite to interprete geothermal gradient patterns. Geochemistry contributes significantly to such understanding.

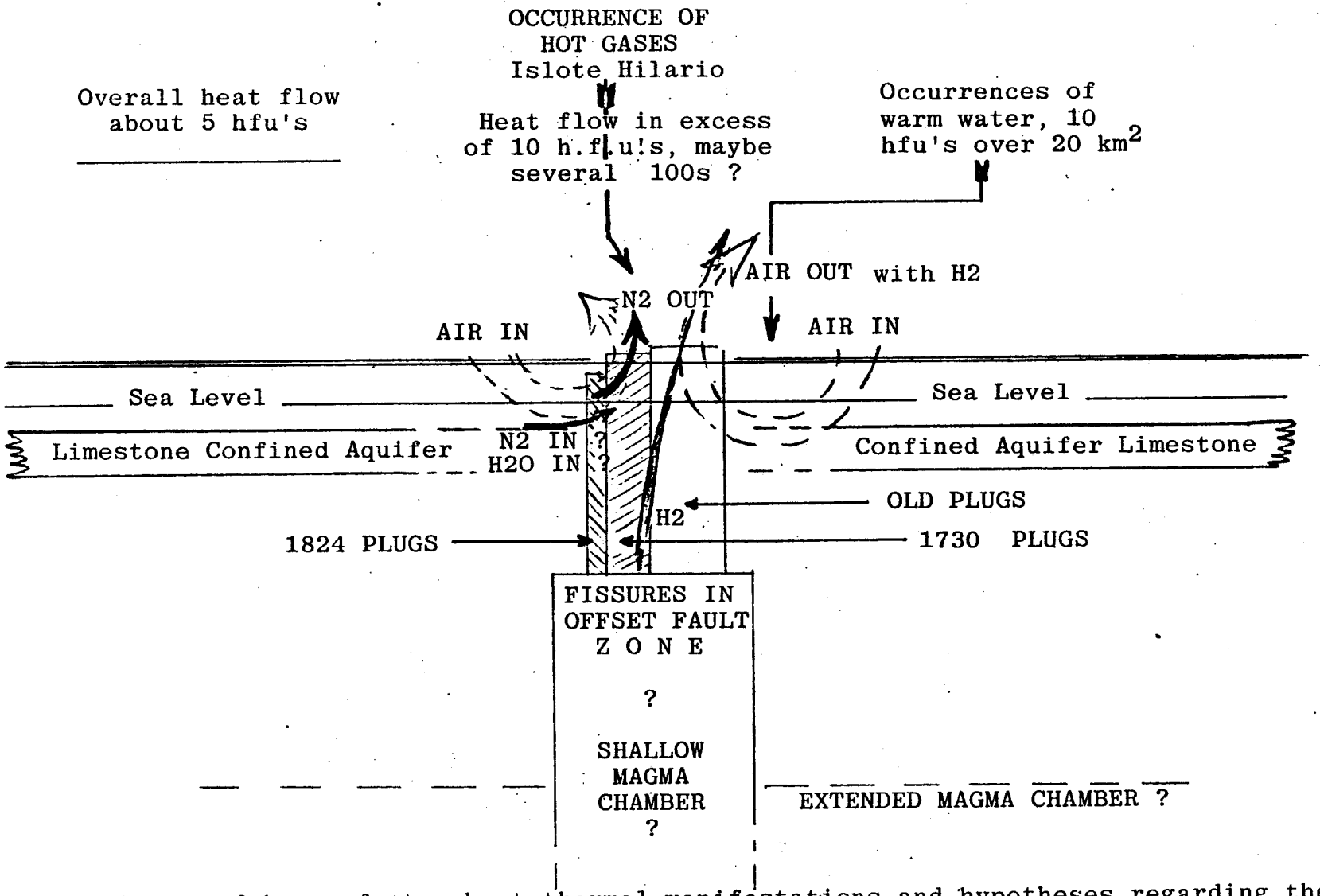


Figure 5 : SYNOPSIS of known facts about thermal manifestations and hypotheses regarding their origin, for the Lanzarote Island, in schematic form, based on present data and previous reports

that some essential initial conditions are fairly well-known, and namely, the initial temperature and time for the cooling process. As the initial temperature must have been somewhere between 1000 and 800 °C, and the present temperature is around in excess of 300 °C, say 400 °C, we see that the system finds itself at its half-life time since start, possibly at /3 life. This allows for calculating with reasonable accuracy the size of the heat source and, therefore, the theoretical geothermal resource in form of a hot-dry rock body.

The underlying assumption is that, whatever the complications might be, the cooling process is not far from an exponential decrease of temperature and heat flow (See Figure 7). True, this is a crude approximation, but we will be discussing the average temperature of the hot-rock body and, by the same token, time-dependence may be assumed to be broadly exponential.

Some of the actual conditions should be dealt with by treating the actual process as the juxtaposition or addition of a finite number of exponential elementary processes. Some special conditions might not yield to this treatment, but we can just take it as an approximation: after all, we will be dealing with the initial section of the cooling process as if it were linearly dependent on time (See Figure 7), and this approximation may well suit a non-exponential, as well as an exponential, process.

In this connection, it is worthwhile observing that the present discussion is one among several ways to express some concepts on how to make use of the geochemical information obtained during the present work. We are just showing how the information on the nature of the heat source obtained by geochemical means, plus the information on the overall heat flow, plus the assumption that there is no extensive geothermal source at depth and the heat originates from a narrow hot-dry rock body in the middle of Lanzarote, pave the way for a fairly accurate estimate of the prospective geothermal resources related to the hot-dry rock at Lanzarote, and its economic value.

It is obvious that actual evaluation and assessment of its economic significance will require engineers and economists respectively to take into account a number of data at hand, as well as a number of possible scenarios, in order to come up with a sufficiently accurate and firm conclusion that will serve as a basis in actual decision making. The present calculations are simply a way to point to possible results, which have been brought within reach by determining the probable nature of the heat source. In actuality, the intensity of the overall heat source resulting from the general geothermal gradient will also have to be evaluated before one can actually assess the prospects for either geothermal resource. . In the present calculation an about normal geothermal

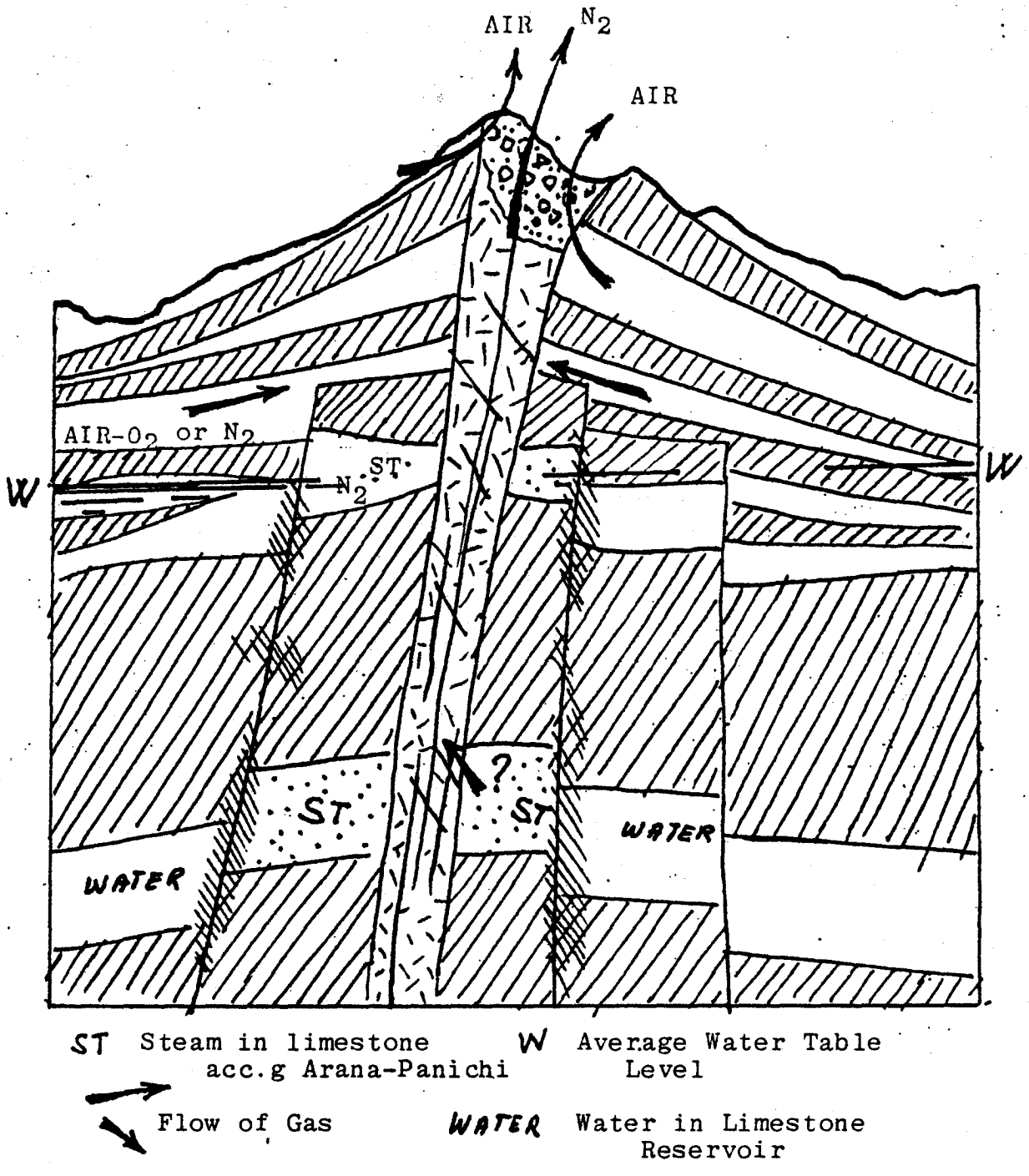


Figure 6 : If it assumed that the nitrogen gas at Islote Hilario originates from air, which is depleted of its oxygen on flowing through hot volcanic rocks, some model of permeability must be assumed that would account for the flow of that gas along quite isolated channel (e.g. fractures in volcanic plug) after a long lasting underground travel.
The present figure also points to possible models of the way nitrogen resulting from chemical reactions in deep water could get into the 'system'. It also indicates that somewhat similar model has to be assumed if Arana and Panichi's interpretation of the origin of water vapor in the nitrogen gas and air is accepted.

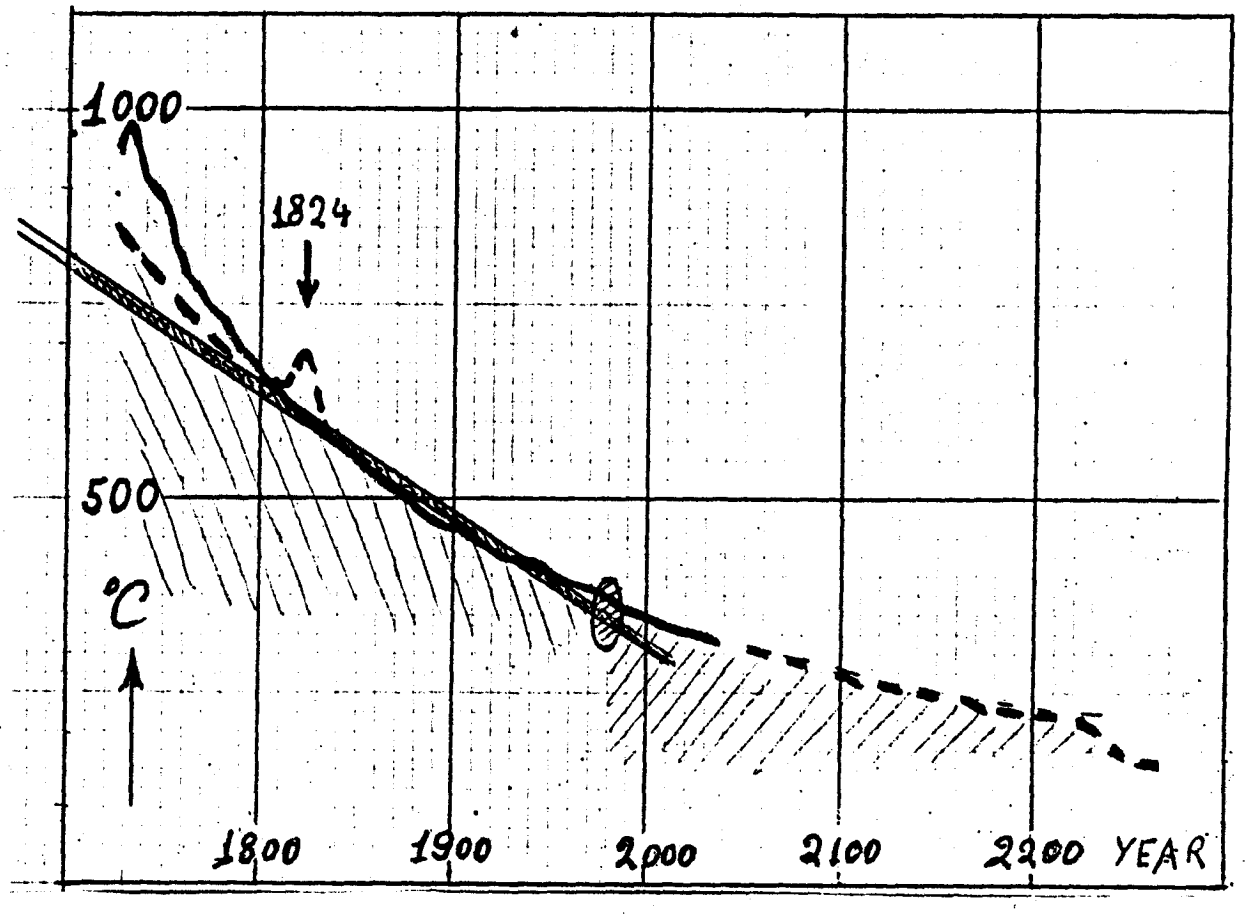


Figure 7 : STRAIGHTLINE A : simplified model used in calculating the average temperature and entailed heat losses between 1730 and present time. IRREGULAR CURVE B : what is imagined the actual cooling process must have looked like. In actuality (dashed line) after the initial fast cooling process under steam and air flow an approximately exponential negative process corresponding to present day conditions has probably set in. ABSCISSAE : time ; ORDINATE : temperature at some undefined point, or average temperature over some undefined rock body. Owing to this definition, (a) ordinate is also proportional to heat loss rate, (b) the impact of the 1824 eruption on the represented quantity is all but arbitrarily evaluated.

\\\\\\ area proportional to past heat loss,

////// area proportional to geothermal resource left,

according to the model calculation given in the text.

flow is assumed, for the island without the Montañas de Fuego hot spot.

For the sake of clarity, Figure 7 has been prepared, with the aim to compare the linear cooling process assumed in the calculation with the exponential process and with some, though arbitrarily chosen, processes. The latter process has been devised in Figure 7 to include early cooling at a rate higher than present day, under conditions of molten magma and steam flow through the volcanic vents, as well as over fumarole fields. In fact, there is not much factual evidence of past hydrothermal activity. The curve, as drawn, points to several transitions to slower and slower cooling processes, until the present stage is reached, with comparatively limited cooling by the effect of dry gas circulation and a quite sizeable conductive heat transfer to the surrounding waters. Whatever difference of opinion there may be over the details, it would be hard to question the fact that the process is generally losing intensity with both time and decreasing temperature, and that its later stages approach some exponential decrease of temperature tending to equilibrium asintotically.

The heat flow over an area a few hundred metres wide is as much as in excess of 10,000 hfu's, reflecting conditions that correspond with those presiding over the upwards heat transfer from many volcanic vents and fumarole fields at the quiescent, cooling-down stages between paroxisms. 10 hfu's has been estimated by Afonso et al. for some 20 sqkm. around the active area, and 5 hfu over the island of Lanzarote as a whole.

If the active area at Islote Hilario is assumed to be about 0.1 sqkm, the estimated heat flow is in excess of 1,000 hfu.sqkm , possibly twice as much if the gas itself is taken into account. But, the present calculation is more uncertain than a factor of two, and only orders of magnitude will be retained.

10 hfu's over 20 sqkm totals 200 hfu.sqkm , and 4 hfu's in excess of the normal terrestrial heat flow (the estimated heat flow being 5 hfu's, see Araña and Fuster) over 750-800 sqkm amounts to at least 3,000 hfu.sqkm. The situation depicted by the figures above is not unusual. In Italy, Kamchatka and in New Zealand similar calculations have led to similar results, that is, the total heat flow at a few active hydrothermal areas equals the overall heat flow over the whole of the mildly active areas of the same geologic region.

The graph of Figure 7 points to the fact that the average temperature in the past 200 years must have been around 600 °C, as the initial leg of whatever cooling curve is not far from a straight line. The average rate of cooling must have been the

same multiple of the present rate, as the difference of temperature in the past to the present difference of temperature, that is, 600/300, or 600/400, assuming that the outside temperature is 0, and that the 'system' temperature is at least 300, maybe 400 °C. Therefore, the average rate of cooling during the past 200 years was 1.5 to 2.0 times the present rate.

The present rate of cooling, that is, the heat flow from the hot zone, ranges from a minimum of 1,200 hfu.sqkm, if only the direct losses from the envisioned body of hot-dry rock are considered, to a maximum of 4,200 hfu.sqkm, if the heat carried by the warm water observed on the top of the ground-water at Lanzarote is also assumed to come from the same hot-dry rock body. We shall take the latter figure, inasmuch as we are not discussing the most likely conditions, which we are not yet able to determine, but the alternate model by virtue of which the hot-dry rock body revealed by the thermal manifestations at Islote Hilario would be the sole geothermal resources at the Lanzarote Island.

This last model presents the least geothermal resource to be envisaged, whose existence is virtually proven. Therefore, we are evaluating the minimum resource in the form of a hot-dry rock body that possibly exists at Lanzarote, not the geothermal resource of Lanzarote at large, which may include a broad geothermal reservoir, as suggested by Arana et al.

One hfu.sqkm amounts to

$$30 \text{ cal/sqcm.year} \times 10^{10} \text{ sqcm/sqkm}$$

or

3x10exp.11 cal/year, i.e., 30x10 exp. 8 kcal/year.

The average heat flow during the past 200 years has been from 1.5 to 2.0 times 4,200 hfu.sqkm, or, approximately, 6 to 8 thousand hfu.sqkm, or about

2x10exp.12 kcal/year

that is, a total loss of energy of 4x10exp.14 kcal over 200 years.

As this amounts to the total volume of hot-dry rock, its estimate offers the opportunity to cross-check the on-going reasoning by comparing that volume with the geologic facts. Rock specific heat is about 300/kcal/m^3 C, and the average temperature drop was about 800-300 to 800-400, that is. 500 to 400 C, average 459. It must be noticed, however, that the initial heat loss at

the extremely high rate shown in Figure 7 is not included in our computation, and, therefore, we must take as the initial temperature a reduced value, in agreement with the assumed linear drop of the temperature with time, no matter how arbitrary the latter is. Therefore, we obtain:

$$\frac{4\times10^{14} \text{ kcal}}{300 \text{ kcal/m}^3 \text{ C.} \ 450 \text{ C}} = 3\times10^{9} \text{ m}^3$$

as opposed to about 3×10^{5} m^3 (10 m radius x 1,000 m depth) assumed by Afonso at al.

This value matches a vertical body of hot rock 3 km deep and 1 sqkm cross-section, and is perfectly consistent with the expectation from geologic observation for the vertical extent of the cooling column of hot-rock and its cross-section area.

The amount of thermal energy left in the hot rock body could be quickly estimated based on the observation that the cooling process has gone as far as its half, or one /third. life. However, we may also calculate the residual thermal energy based on its volume and the last usable temperature. If the latter is set at 200 °C, the available drop in temperature is 100-200 °C, that,with the previously indicated value of specific heat, gives:

$$300 \text{ kcal/m}^3\text{°C} \ .(100 \text{ to } 200 \text{ °C}).4.10^{9} \text{ m}^3$$

or

$$1.2\times10^{14} \text{ to } 2.4\times10^{14} \text{ kcal or about } 2\times10^{14}$$

In terms of theoretically harnessable energy, assuming 10% thermodynamic rendment and 10% recovery, totalling 1%, we obtain $0.01\times 2\times10^{11}$ kwh, or 2×10^{9} kwh, which represents 10 MW electric power for a few ten years, or a few 100 MW. year.

The obtained result suggests that the resource may or may not be commercial, depending on the cost of development.
We have used somewhat realistic figures for what is nowadays believed to be possible recovery from hot-dry rock systems. However, this is a not yet existing technology, and indeed, an infant theory as well. Some geologic factors may bring about differences of several times, and maybe order of magnitude in the estimate. For example, the observed losses may actually refer to the upper section of the hot rock body

only, and the lower section below the expected impervious formation overlying the limestone layer may not be involved in the process. The rock body would then be wider, and the energy content of its lower section would add up with the calculated one. And, more generally, deeper than assumed sections could get involved with water circulation in the dry-hot body once exploitation were initiated.

One interesting point with the present kind of hot-dry rock resource is that it is sealed off by its surroundings, but it is probably permeable by vertical fracturing inside.

Thus, a sizeable geothermal resource of the hot-dry rock type is likely to exist at Lanzarote, but its evaluation and development cannot be taken lightly. Current risk is high, and some appropriate study, duly proportioned to the most likely size of the resource, will have to be carried out in order to make it an asset.

Walnut Creek - April 22 1978

F. TONANI

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APPENDIX

SCHEMATIC OUTLINE OF CALCULATION OF GEOTHERMAL RESOURCES AS HOT-DRY ROCK

1. ESTIMATED features of the system by GEOCHEMISTRY: the 'system' that feeds hot nitrogen and air to the Islote Hilario manifestations is a body of hot-dry rock sealed off by its surrounding waters.

2. ESTIMATED present temperature in excess of 300 °C, i.e. 300-400 °C.

3. ASSUMPTION A: The temperature above is not far from the average temperature of the considered 'system'. Assumption A is actually an operational definition of the system, much as 'feeds the thermal manifestations' is.

   The two definitions above are likely to coincide; the 'system' thus defined may not amount to the whole resource.

4. ESTIMATED initial temperature of about 1,000 °C.
   ASSUMPTION B: The on-going cooling process is not the same, and is likely to be not as fast as the initial cooling process when molten magma and permeability to water and syeam were available.

5. ESTIMATED virtual temperature (See Figure 7) for the on-going cooling process.

6. ASSUMPTION C: The on-going cooling process is approximately exponential negative vs. time, so that the half-life of the process can be defined.

7. ESTIMATED final temperature (average environment temperature) in the surroundings of the considered 'system'.

8. CONSEQUENCE OF ASSUMPTIONS A& C: The rate of cooling has been in proportion with the difference in temperature between the system and environment, for a given process.

9. CONCLUSION #1 :Estimates #2 and #5, under assumptions A and C (Assumption #2 is marginal, and regards estimate #5), involve that the 'system' defined by the same assumptions and the condition 'feeds Islote Hilario hot gas' is at its about half-life time since 1736, for the present temperature is somewhat beyond mid-way between initial and final temperature.

10. ESTIMATE of difference of temperature between the 'system' and its environment: initial(virtual) 750
present 250-350

11. ASSUMPTION D, a mere numerical approximation: the initial leg of the exponetial cooling curve is approximated by a straight line (See Figure 7).

12. ESTIMATE of average temperature difference between 'system' and its surroundings since 1730 : 500-550

ESTIMATE of ratio of average cooling rate (heat losses) since 1730 and present rate, conductive 1.4-2.2

13. ESTIMATE of present heat losses occurring at Lanzarote:
(a) at the Islote Hilario, est.d 10,000 hfu times est.d 0.1 sqkm (needs to be checked; surface area must be checked) 1,000 hfu.sqm
(b) some 10 hfu over 20 sqkm. (See Afonso et al.) 200 ditto
(c) some 5hfu over the whole island (See Arana and Fuster), i.e. some 3.5 excess heat flow times some 750 sqkm, or about 2,600 ditto

Total heat flow 3,800 ditto

14. ASSUMPTION E: The whole of the excess heat flow over normal at Lanzarote originates from a unique source, the hot-dry rock body(or bodies) in the Montañas de Fuego (See Figure 5, for example).

Comment on ASSUMPTION E: ASSUMPTION E does not mean support or final acceptance of the implied geothermal model(the hot-dry rock feeding Islote Hilario with hot gas is the only geothermal resource). The calculation will be pursued under ASSUMPTION E. However, giving it up will not change the order of the magnitude of the calculated resource, the ratio being about 3.

From this point on the calculation is just arithmetics and no further critical assumption is made(See text). For the sake of clarity, the rest of the calculation is summarized here,

however;

3,800 hfu.sqkm present rate

7,600 ditto average rate over the past 200 yrs.

1.5×10^{6} hfu.sqkm.yrs total energy loss
1 hfuxsqkm = 3x10exp. 8 kcal/year

4.5×10^{14} kcal, total loss of energy from the system in its first half-life period.

The drop of temperature (See ASSUMPTION A) generated by such loss of energy is about 500 °C (800-300), and we may calculate the total rock volume involved:

3×10^{9} m^3

and as the present temperature is known under ASSUMPTION A, the size of the resource can be calculated under the usual assumptions regarding the retrieval of thermal energy from dry-rock systems and the rendment in power production. The latter part of the calculation, however, is reported only inasmuch as it completes the reasoning for the reader's comfort, but it is an engineering matter which is beyond the scope of the present report. It may be commented, however, that little is known about hot-dry rock systems, and that predictions are likely to be shaky anyhow.

11.- ESTUDIO MICROPALEONTOLOGICO DE UNAS MUESTRAS FOSILIFERAS DEL SONDEO DE LANZAROTE

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MADRID - CERRO DE LOS ANGELES
TELEFONO 231 56 01

27 de Diciembre de 1977

INFORME N.° 1.241

ESTUDIO MICROPALEONTOLOGICO DE UNAS MUESTRAS FOSILIFERAS DEL SONDEO DE LANZAROTE.

Se estudió un total de 43 muestras (25 levigados y 18 láminas transparentes) procedentes del detritus de perforación del sondeo ("cuttings") por medio de foraminíferos, nanoplancton y microfacies.

Damos a continuación, por separado, los resultados de los tres métodos de estudio.

A) Levigados (foraminíferos)

898 y 902 m.

Residuos de levigación con microfauna sustancialmente

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igual en las dos muestras, muy rica, con numerosos foraminíferos bentónicos y los planctónicos siguientes:

Globigerina tripartita Koch
Globigerina venezuelana Hedberg
Globigerina sellii (Borsetti)
Globorotaloides suteri Bolli
Catapsydrax unicavus Bolli, Loeblich y Tappan
Globigerina ciperoensis Bolli
Globigerina cf. postcretacea (Myatliuk)
Globorotalia opima nana (Bolli)
Globorotalia cf. opima opima Bolli
Globorotalia siakensis Leroy
Globorotalia obesa Bolli
Globigerinoides quadrilobatus primordius, Blow y Banner
Globigerina woodi Jenkins
Globigerina ampliapertura euapertura (Jenkins)
Globigerina cf. yeguaensis Weinzierl y Applin
Globorotalia cf. permicra Blow y Banner
Globigerina cf. praebulloides Blow

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Ateniéndose a los cuadros de distribución de foraminíferos planctónicos de Stainforth, Lamb et al.(1975) esta asociación pertenece a la parte media de la Zona de Globigerina ciperoensis (Oligoceno superior).

Destacamos la presencia de Globigerinoides quadrilobatus primordius, cuya aparición, según ciertos autores, coincidiría con el principio del Mioceno (p.e. Baroz y Bizón, 1974, Bizon et al., 1974, para el Mediterráneo oriental), pero,para otros, está fuera de dudas su extensión estratigráfica en el Oligoceno, hasta muy cerca del nivel de extinción de Globorotalia opima. El estudio de secciones continuas ha demostrado la evolución desde escasos y pequeños ejemplares de la subespecie primordius, en el Oligoceno superior, a la explosión de los Globigerinoides del tipo triloba y sacculifer en el Mioceno inferior.

En nuestro caso, Globigerinoides primordius es también muy escaso, ya que hemos encontrado solamente

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3 ejemplares sobre un total de cerca de 100.000 foraminíferos.

Recordamos, finalmente, que, en términos de datación absoluta, a las dos muestras en estudio puede asignarse una edad de 24-25 millones de años antes de nuestros días.

Muestras de 2124 a 2176 m.

La muestra 2124 es aparentemente estéril.

De la 2130 a la 2138 se encuentran foraminíferos relativamente escasos (elgunas decenas en la totalidad del residuo) y falta de formas pequeñas. Este último hecho, y la escasez de ejemplares, puede deberse a problemas de lavado, realizado a pie de sonda.

Desde la 2140 a la 2176 los foraminíferos son todavía más escasos, y con aspecto de contaminación en un depósito estéril.

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Junto con especies bentónicas representadas por los géneros Gyroidina, Eponides, Valvulina, Pararotalia, Nonion, hemos podido reconocer las siguientes especies - - planctónicas:

Globigerina ampliapertura
Globigerina cf. tripartita
Globigerina cf. sellii
Globigerina venezuelana
Catapsydrax "ex grege" dissimilis
Globorotaloides suteri

que indica un Oligoceno (quizás medio-inferior).

2612 m.

Radiolarios de forma subesférica y lenticular. Escasos foraminíferos bentónicos, cuyo mal estado de conservación dificulta la clasificación. Sólo se reconoce alguna Bulimina . No se observan Globorotalia ni Globi-

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gerina, con excepción de un fragmento de este último género, no clasificable específicamente.

Restos subesféricos recristalizados que no permiten asegurar si se trata de Radiolarios o de Foraminíferos tipo "Globigerinatheca" u "Orbulinoides" . Creemos que esta segunda posibilidad sea bastante remota, ya que los dos últimos géneros aparecen en el Eoceno medio, mientras, a la vista de los resultados del estudio de las muestras de 2598-2604 m. (ver Microfacies"), estas parecen pertenecer, con mayor probabilidad, a un Paleoceno medio-superior.

2626 m.

Radiolarios de formas variadas. Escasos foraminíferos bentónicos, en mal estado. De planctónicos , se observa solamente un globigerínido aplastado. Alguna forma esférica, como en la muestra anterior.

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2636 m.

Abundantes Radiolarios. Escasos foraminíferos bentónicos (arenáceas de organización primitiva, Eponides, Cibicides, Lenticulina) y un ejemplar de Globorotalia cf. pseudobulloides (especie que se encuentra en el Paleoceno superior y medio).

2648 m.

Radiolarios, y numerosos foraminíferos bentónicos, representados por formas arenosas de organización primitiva y los géneros Dorothia, Spiroplectammina, Nodosaria, Dentalina, Lenticulina, Pseudonosaria, Rectoglandulina, (Polymorphínidos), Aragonia, Bulimina, Bolivina, Allomorphina, Nonion, Pullenia, Gavelinella, Eponides, Gyroidinoides, Gyroidina, Cibicides, Rotalia.

Entre los planctónicos, bastante frecuentes, se reconocen:

Globigerina triloculinoides Plummer
Globorotalia pseudobulloides (Plummer)

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Globigerina cf. velascoensis (Cushman)
Globorotalia inconstans (Subbotina)
Globigerina spiralis Bolli
Globorotalia uncinata Bolli
Globorotalia angulata (White)

Hay que observar que los ejemplares de G. angulata tienen un caracter primitivo y que los de G. inconstans presentan, a veces, un aspecto de evolución hacia G. angulata. Estas características están de acuerdo con las formas de transición de la linea G. pseudobulloides- G. angulata observada por Bolli (1957) y con la evolución de G. varianta - G. incostans - G. angulata confirmada por Hillebrandt (1962).

Dichas observaciones, junto con la distribución - vertical de las otras especies, según las biozonas de Stainforth, Lamb et al. (1975), nos permite atribuir la muestra de 2648 m. al intervalo comprendido entre - la parte superior de la Zona de Globorotalia uncinata y parte inferior de la Zona de Globorotalia angulata , es decir, al Paleoceno medio, piso Montiense.

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En términos de edad absoluta, estaríamos entre los 60-61 millones de años antes de nuestros dias.

2656 m.

Radiolarios abundantes. Foraminíferos bentónicos - también bastante abundantes, con un conjunto de especies parecido al de la muestra 2648. Escasos planctónicos.

2670 m.

Radiolarios abundantes. Foraminíferos bentónicos algo frecuentes, aproximadamente con las mismas especies - de las muestras 2648 y 2656, pero con mayor frecuencia - de las formas de concha arenosa. Foraminíferos planctónicos muy escasos; no se observa Globigerina triloculinoides ni Globorotalia pseudobulloides, sino solamente algún pequeño ejemplar de Globorotalia inconstans y Globorotalia cf. spiralis.

2684 m.

Algún Radiolario y escasos Ostrácodos. Foraminíferos

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bentónicos con discreta representación de Spiroplectammina, Ammodiscus, Nodosaria, Dentalina, Lenticulina, Bulimina, Bolivina, Nonion, Gavelinella (?), Eponides, Cibicides, Rotalia (?).Planctónicos muy escasos, con algún pequeño ejemplar de Globigerina, indeterminable especificamente, Globorotalia cf. velascoensis y Globorotalia angulata. Varios restos orgánicos están recubiertos por una capita, probablemente fosfática.

2698 m.

Radiolarios y frecuentes foraminíferos bentónicos representados en su mayoría por especies vistas en las muestras anteriores. Entre los planctónicos, se observa Globorotalia inconstans, Globorotalia pseudobulloides, Globigerina triloculinoides, Globigerina cf. spiralis, Globigerina velascoensis.

2702 m.

Radiolarios bastante abundantes y discreta representación de foraminíferos bentónicos. Entre los

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planctónicos, escasos, se clasifica:

Globigerina triloculinoides Plummer
Globorotalia pseudobulloides (Plummer)
Globorotalia cf. angulata (White)
Globigerina cf. spiralis Bolli
Globorotalia inconstans (Subbotina)

Esta muestra, igual que la de 2648 m., pertenece al Paleoceno medio (Montiense), y el conjunto micro - faunístico se correlaciona bastante bien con la Zona B del Paleoceno de Hillebrandt (1972) de la cuenca de - Salzburg. La única diferencia está en que G. angulata aparece en la Zona C (inmediatamente superior) de dicho autor, pero se trata, en nuestro caso, de formas que consideramos "ancestrales" de la típica G. angulata.

B) Microfacies

Entre las cotas 2598 y 2604 m. se cortaron formaciones sedimentarias duras y por tanto susceptibles -

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de confeccionar con los detrítus, láminas transparentes. En lineas generales,se trata de micritas,a veces puras, otras con ligero aporte detrítico de cuarzo, casi siem - pre de tamaño pequeño próximo al silt, angular, y muy de sigualmente distribuido. Existen pasadas muy silicificadas en cuarzo de tamaño micro y criptocristalino, con algo - de colofana (pequeños oolitos y fragmentos óseos) y tra- zas de circón. También se observan micritas oolíticas,no apreciándose en estos últimos la estructura concéntrica, debido a su recristalización.

La microfauna se encuentra a veces silicificada, y se compone principalmente de:

Radiolarios
Globorotalia cf. simulatilis
G. tipo simulatitis-occlusa
Globigerina triloculinoides
Chiloguembelina sp.
Heterohelícidos

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Globorotalia simulatilis, según las biozonas de Stainforth, Lamb, et alias 1975, va de la parte superior del Paleoceno medio (Zona de Globorotalia pusilla) hasta la parte inferior de la zona de Globorotalia velascoensis (Paleoceno superior).

Globigerina triloculinoides, según la distribución vertical de los sutores citados anteriormente, empieza en el Paleoceno inferior (zona de Globorotalia pseudobulloides) y se extingue en el Paleoceno superior (zona de Globorotalia pseudomenardii).

La edad de esta muestra, queda incluida, por tanto, entre la parte alta del Paleoceno medio y la parte baja del Paleoceno superior, o sea Montiense superior - Thanetiense.

C) Nanoplancton

Muestra 898 m.

Ejemplares relativamente bien conservados. Se observan:

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Sphenolithus sp.
Coccolithus pelagicus
Triquetrorhabdulus sp.
Coccolithus aff. bisectus
Coccolithus bisectus
Coccolithus neoganamation
Discoaster deflandrei

Muestra 902 m.

Ejemplares bastante bien conservados, y abundantes.

Coccolithus pelagicus
" neogammation
" bisectus
" scissurus
" eopelagicus
" aff. bisectus
Sphenolithus sp.
" moriformis

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Discoaster deflandrei
Zygrablithus bijugatus
Discolithina sp.
Triquetrorhabdulus sp.

Estas asociaciones corresponden al Oligoceno superior o Mioceno inferior muy muy bajo. (Zonas NP-25 a NN-1).

Muestras 2612 a 2702

Nanoplancton calcáreo muy escaso y mal conservado. No aparece ningún discoasterido, ni siquiera las formas primitivas.

Las formas significativas contenidas en estas muestras:

- Chiasmolithus danicus, Fasciculithus tympaniformis y Heliolithus kleinpelli

permiten datarlas como Montiense medio a inferior (Zonas NP-6 hasta la muestra 2656 y NP-5 las muestras 2698 y 2702).

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1972) podemos decir que el paquete de terrenos comprendido entre los 898 y 2702 metros abarca un periodo de tiempo que va desde los 24 a los 61 millones de años - antes de nuestros días.

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12.- ESTUDIO PETROGRAFICO DE 40 MUESTRAS PROCEDENTES DEL SONDEO DE LANZAROTE

ESTUDIO PETROGRAFICO DE 40 MUESTRAS PROCEDENTES DEL SONDEO DE LANZAROTE (CANARIAS).

De las 40 muestras estudiadas del sondeo de Lanzarote, la mayoría corresponden a basaltos melanocráticos de composición alcalina. Algunas de ellas son de orígen piroclástico.

La clasificación más precisa de estas rocas resulta difícil y complicada debido a la escasa cristalinidad de la mesostasis, a su grado de alteración y a la diversidad con la que pueden aparecer los distintos fragmentos dentro de una misma lámina. Es recomendable y necesario para su mejor conocimiento el efectuar análisis químicos sin los cuales la determinación exacta resulta imposible de realizar, cosa que ocurre en todas las rocas volcánicas en general y más aún en este caso particular.

Encontramos basaltos de distintos tipos según la composición mineralógica de los fenocristales que presenta: con piroxeno (muestras 956, 1183, 1204, 1216, 1374, 1380, 1714, 1750, 1795, 1800, 1818-B y 2198); con piroxeno y olivino (muestra 1240), con olivino como fenocristal único (muestras 2064 y 2076), con piroxeno y anfíbol (muestras 1078, 2222, 2430, 2526, 2556 y 2562).

Todas ellas presentan características comunes predominando los tipos muy oscuros, con gran proporción de minerales máficos y con escaso contenido en plagioclasa. La presencia

de biotita, anfíbol barquerikítico, el piroxeno titanado o - egirínico y esfena,entre otras propiedades,nos definen su carácter alcalino.

Los basaltos en los que existe clinopiroxeno augítico - como único fenocristal tienen textura porfídica con la parte microcristalina.

Los fenocristales de augita presentan formas idiomórficas, normalmente maclados,con zonado oscilatorio y en ocasiones en "reloj de arena". También se observan con suave pleocroismo de pardo claro a rosa (titanífera) por lo general, - aunque la muestra 2198 contiene algunos fragmentos de tonos verdosos (carácter egirínico).

La matriz microcristalina aparece ceolitizada y en ella se distinguen claramente plaquitas de piroxeno, granillos de opaco y escaso vidrio. La aparición de plagioclasa es casual o muy escasa (1714), cuando se encuentra, es en pequeños cristales en la pasta.

Son frecuentes los rellenos fisurales y sobre todo de - cavidades y amígdalas de carbonatos, ceolitas y un mineral - microlaminar difícil de identificar al microscopio, cuya presencia es común en todo la columna y del que sería conveniente realizar estudios por difracción de Rayos X. Estas amígdalas son más abundantes en las muestras números 956, 1800 y 2198.

Los constituyentes accesorios en cantidades menores son: mineral de hierro y apatito acicular o prismático.

El basalto augítico-olivínico (muestra 1240) es del tipo ancaramita; contiene estos dos componentes como fenocristales, siendo superior la proporción de augita a la del olivino; a veces estos minerales tienden a la textura glomeroporfídica.

La augita está en estado fresco, se encuentra en cristales euhédricos, maclados y a menudo zonados y de coloración rosada más acentuada en los bordes.

El olivino se observa parcialmente transformado a crisotilo según bordes y fracturas. Es de destacar que en las muestras en las que existe olivino, tanto en ésta como en las que veremos a continuación, este componente no se altera a iddingsita sino a minerales serpentínicos.

Respecto a la mesostasis, es de carácter microcristalino, en ella se aprecian augita prismática en secciones longitudinales, opaco y ceolitas, éstas últimas muy abundantes como relleno de vesículas y ocupando posiciones intersticiales. El opaco, ocasionalmente puede aparecer también formando parte de los fenocristales.

A los basaltos olivínicos tipo oceanita pertenecen las rocas números 2064 y 2076.

La primera se presenta bastante alterada, con textura porfídica residual y pasta microcristalina. Los fenocristales son exclusivamente de olivino del que sólo se conservan escasos núcleos en estado fresco, el resto aparece sustituído pseudomórficamente por un agregado de crisotilo.

La mesostasis está formada por augita, opaco y biotita de coloración rojiza e intercristalina con el piroxeno monoclínico.

Los constituyentes accesorios son: carbonatos y mineral de hierro. Los carbonatos rellenan amígdalas y fracturas. Algunos fragmentos tienen la matriz criptocristalina de color pardo y contienen mayor número de cavidades rellenas de un mineral microlaminar y fibroso, posiblemente arcilloso. En estos fragmentos aparece augita egirínica como fenocristal muy localizado.

La segunda de estas rocas (2076) se observa en estado más fresco conservándose casi todo el olivino, su alteración a crisotilo está relegada a los bordes. La matriz presenta mayor grado de cristalinidad y en ella las láminas biotíticas son muy abundantes apareciendo incluso como microfenocristal e incluyendo piroxeno.

En los basaltos piroxénico-anfibólicos los fenocristales de augita son mucho más numerosos que los de anfíbol.

La augita aparece con frecuencia maclada y ocasionalmente zonada con tintes verdosos. El anfíbol presenta fuerte pleocroismo de incoloro-amarillo a rojo intenso, probablemente se trata de un tipo barquerikítico.

La pasta, en general, es criptocristalina en proceso de desvitrificación, con piroxenos tabulares y ceolitas visibles. El mineral opaco es abundante y aparece diseminado en la matriz.

Los microlitos de plagioclasa suelen ser frecuentes en algunos fragmentos de la muestra 2430 mientras que en las otras muestras su aparición es casual o accesoria.

La presencia de carbonatos es común, aparecen rellenando vacuolas, intersticios y fracturillas.

Otro componente, en cantidades muy pequeñas es la esfena.

La muestra 2562 contiene gran proporción de carbonatos y esporádicos ex-cristales alterados a ceolitas que pudieron haber correspondido a algún feldespatoide.

La muestra 788 pertenece a un basalto o plagiobasalto (según las zonas) doleríticó en estado bastante fresco. Está formada por fenocristales de clinopiroxeno, más escasos de plagioclasa y localmente algunos de olivino en una matriz holocristalina de carácter ofítico y subofítico, dependiendo del área, constituída por placas de plagioclasa maclada polisintéticamente y pequeños cristales de piroxeno, opaco muy escaso, mineral de arcilla y raros carbonatos.

El clinopiroxeno es augita de tonos pardo-rosados (titanífera) y a veces presenta maclado.

Las muestras 998 y 1982 parecen corresponder a traquibasaltos. Su carácter textural es porfídico con matriz microcristalina y fluidal algunos fragmentos de la segunda.

La primera de ellas presenta augita y escasa biotita ro

jiza como fenocristal en una matriz constituída por microlitos de plagioclasa y diminutos granillos de piroxeno y opaco.

Existen algunos excristales con formas exagonales y rellenos de ceolitas que pudieron haber sido feldespatoides pero que su estado de alteración actual no nos permite asegurarlo con certeza.

También aparecen en esta roca pequeños cristales muy localizados de posible perouskita incluidos normalmente en el piroxeno o asociados al mineral opaco.

Otros accesorios en cantidades variables son carbonatos, apatito y esfena. Los carbonatos, como en todas estas rocas que estamos estudiando, se encuentran como relleno de vacuolas e intersticios.

La muestra 1982 presenta escasos fenocristales de augita egirínica en una pasta en la que la plagioclasa aparece transformada a carbonatos y ceolitas. La biotita aquí se encuentra también como componente accesorio junto con opaco y mineral de hierro.

Existen un grupo de muestras (830, 832, 836, 848, 850, 870 y 874) de composición basáltica y textura predominantemente colofórmica que están formadas por una pasta fundamentalmente parda oscura pero que varía a colores rojizos e incluso verdosos, parcialmente desvitrificada (palagonita, clorofacita, substancias cloríticas, etc.) con carbonatos y ceolitas visibles. Abundan las cavidades rellenas de un material microcristalino imposible de identificar al microscopio, carbona-

tos y ceolitas.

En algunos casos (una de las dos láminas de siglas 830 y la 848) se observa abundante plagioclasa tabular en cuyos intersticios se dispone el material arcilloso, aunque en el resto de las muestras el feldespato es inapreciable prácticamente.

Se han observado fenocristales de augita de aparición muy esporádica.

No se descarta la posibilidad de que estas rocas sean productos piroclásticos (cenizas o tobas). El estado de alteración que las afecta puede ser debido a una hidratación del vidrio en contacto con vapor de agua a unas condiciones de volcanismo submarino.

Los minerales accesorios comunes son opaco y esfena muy rara.

Las rocas de procedencia piroclástica corresponden a tobas basálticas (muestras 911-912, 1026, 1096, 1362, 1448, 2206) existiendo gran variedad entre los trozos que componen una misma lámina delgada, algunos de los cuales parecen pertenercer a rocas lávicas.

Predominan los fenoclastos cristalinos de augita titanífera o egirínica y raros de anfíbol tipo hornblenda-barquerikita (1362 y 911-912 muy raro) sobre los líticos basálticos (2206), en general los clastos son escasos, de pequeño tamaño y seriados (1448).

La matriz varía de criptocristalina a microcristalina según los distintos fragmentos y las rocas, predominando este último tipo en las muestras 1362 y 1448.

En los casos en los que la pasta es criptocristalina, aparece en proceso de desvitrificación a ceolitas fundamentalmente. Cuando el grado de cristalinidad es superior se pueden diferenciar cristalitos de piroxeno con formas prismáticas longitudinales, opaco y ceolitas y carbonatos intersticiales.

La aparición de plagioclasa es esporádica, normalmente forma parte de la matriz y muy rara como microfenocristal (1026).

Otros accesorios comunes son: opaco, apatito, clorita, esfena y óxidos y/o hidróxidos de hierro. También aparecen en algunos casos con relativa frecuencia (2206) el mineral micro laminar arcilloso.

La muestra 2098 es una toba poligénica con textura porfidoclástica. La unidad fragmentaria es muy abundante y aparece constituída por clastos líticos de pequeño tamaño de composición basáltica y traquibasáltica y en una proporción similar los cristalinos de augita y aislados de anfíbol. Todos estos clastos aparecen cementados por abundantes carbonatos microcristalinos. Los accesorios son: opaco, clorita y mineral de hierro.

La muestra 1818-M es una roca que destaca del resto por su composición más leucocrática. Su grado de alteración es muy elevado, conservándose únicamente el apatito y el opaco

de la paragénesis ígnea original.

El feldespato aparece sustituído por mineral de ceolita, este mineral se encuentra de forma característica, con estructura esferulítica radial, que parece heredada de la roca primaria.

Los fenocristales del mineral ferromagnesiano están reemplazados por carbonatos conservándose los bordes idiomórficos prismáticos.

Junto con el apatito, otros accesorios son: opaco y mineral de hierro.

Podría tratarse de una roca subvolcánica o filoniana cuyo estado de alteración actual no nos permite clasificarla.