GEOLOGICAL SURVEY OF CANADA

OPEN FILE 2406

Norman Wells Pipeline monitoring sites ground temperature data file: 1989

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Energy, Mines and Resources Canada
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Ottawa, Ontario

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ABSTRACT

The Terrain Sciences Division of the Geological Survey of Canada (GSC), Department of Energy, Mines and Resources (EMR), cooperates with the Department of Indian and Northern Affairs (INAC) and Interprovincial Pipe Line Ltd. (IPL), in a project to monitor the ground thermal regime along the Norman Wells to Zama pipeline. The project forms part of a larger Permafrost and Terrain Research and Monitoring Program established to improve on impact evaluation and mitigation on the Norman Wells and future northern pipelines. The ground thermal regime study is designed to examine the effects of the construction and operation of the Norman Wells pipeline on permafrost and terrain conditions and to evaluate the approaches used to minimize terrain disturbance. The project focuses on 13 main monitoring sites representing a cross section of the terrain conditions encountered by the buried, "ambient" temperature, oil pipeline as it traverses the discontinuous permafrost zone. The monitoring sites established during the construction period are instrumented with multithermistor cables to measure pipe temperatures and ground temperatures both on and off the right-of-way to depths of 20 m. Since pipeline operation began in April 1985, additional cables have been installed to instrument 1) five thaw settlement sites drilled by IPL in 1986, 2) additional boreholes drilled at existing government monitoring locations, and 3) deep (>90 m) boreholes drilled for climate change studies along the pipeline corridor. This report is a collection of the data gathered in 1989 from all cables at the EMR/INAC monitoring sites, in total over 145 cables. The period covered includes the fifth thaw season since operation began. Average volume of oil moved from Norman Wells in 1989 was 4805 m^3/day, approximately design capacity.

RESUME

La Division de la Science des Terrains de la Commission Géologique du Canada, Ministère d'Énergie, Mines et Ressources, en collaboration avec le Ministère des Affaires Indiennes et du Nord et la compagnie Interprovincial Pipe Line Ltd. (IPL), a entrepris un projet de surveillance continue du régime thermique des sols le long de l'oléoduc Norman Wells. Le projet constitue une partie majeure du programme "Permafrost and Terrain Research and Monitoring" établi afin d'améliorer l'évaluation et la mitigation des impacts de l'oléoduc Norman Wells et de futurs oléoducs nordiques. L'étude du régime thermique vise à examiner les effects de la construction et du fonctionnement de l'oléoduc et évaluer les méthodes utiliseés pour minimiser les perturbations du terrain. L'étude se concentre sur 13 emplacements principaux représentant les différents conditions de terrain traversé par l'oléoduc enterré, tout au long de son trajet à travers la zone de pergélisol discontinu. Les stations de mesure sont équippées de câbles à thermistances multiples, installés pour mesurer la température de la surface extérieure de l'oléoduc ainsi que les températures du sol jusqu'à une profondeur de 20 m. Depuis l'ouverture de l'oléoduc en avril 1985, quelques câbles supplémentaires ont été installés dans des nouveaux trous de forage percés soit par IPL à des sites d'affaisement ou par le gouvernement pour une étude du pergélisol et des changements climatiques. Ce rapport présente les données de température recueillies en 1989 à tous les emplacements du gouvernement fédéral (un total de plus de 145 câbles). Cette année inclue la cinquième période de dégel saisonier. Le débit moyen d'huile en 1989 fut plus élevé que pendant les quatre années précédentes, environ 4800 m^3/jour, i.e. au voisinage de la capacité prévue.

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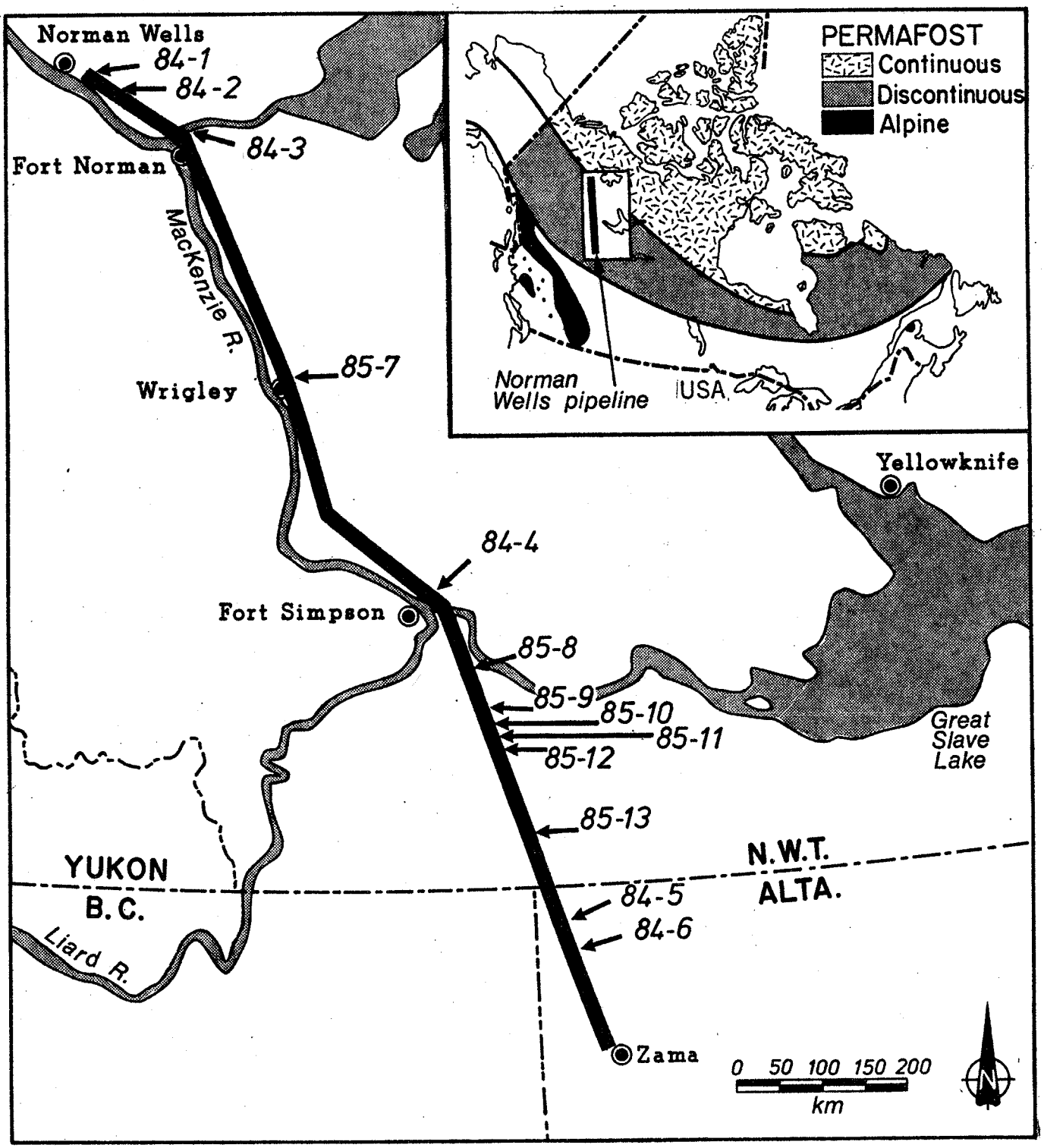
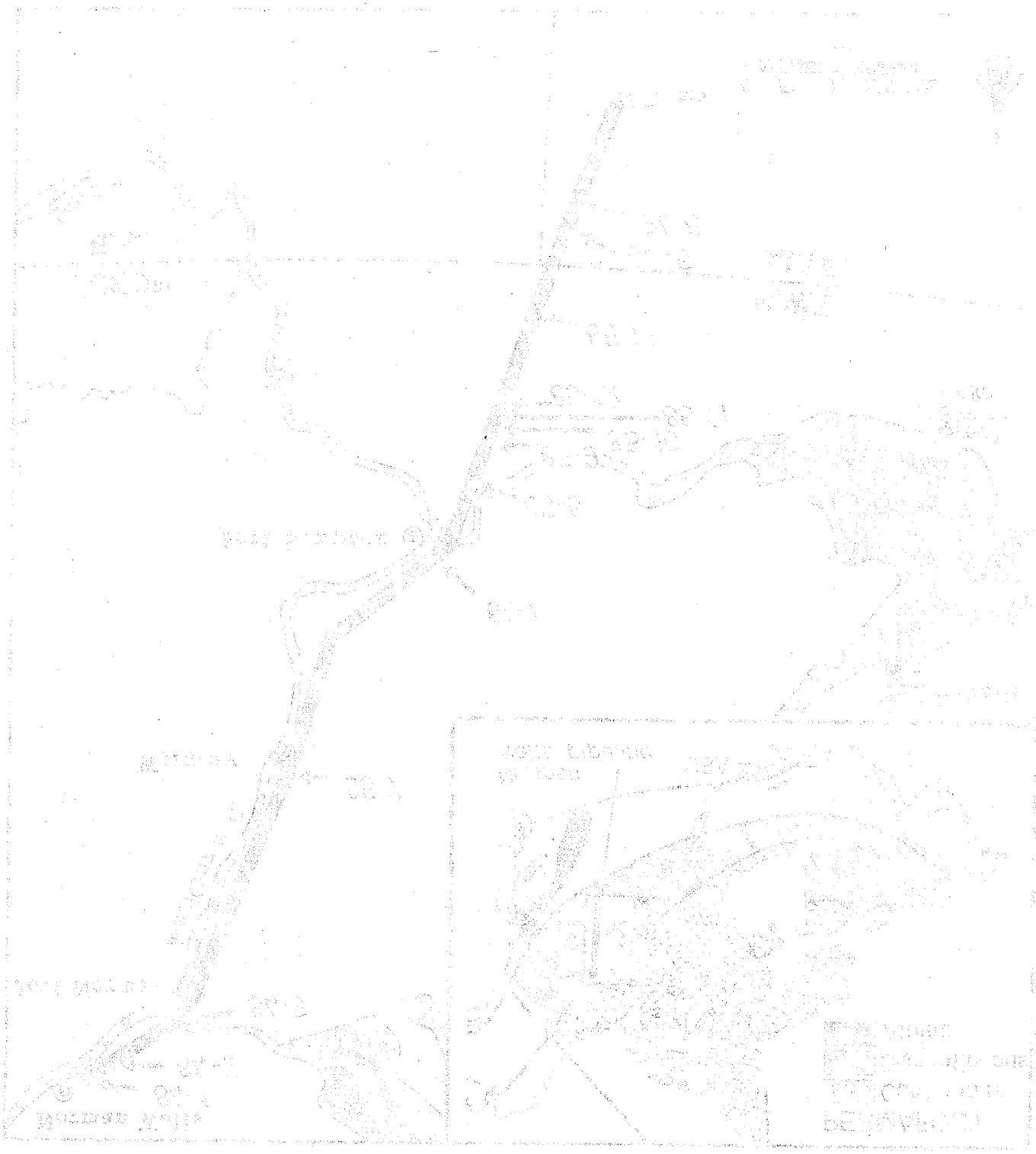
1. INTRODUCTION

The Norman Wells pipeline, the first fully buried oil pipeline in permafrost terrain, traverses the discontinuous permafrost zone of Northwestern Canada in a more or less north-south section. The 324 mm diameter pipeline, buried throughout its entire length at an average depth of 1 m, is owned by Interprovincial Pipe Line (NW) Ltd (IPL) and carries oil from Esso Resources' Norman Wells, N.W.T. oilfield expansion project south 870 km to Zama, northwestern Alberta (Figure 1). The pipeline provides Canadians with a unique opportunity to assess the impact of construction and operation of an "ambient" temperature pipeline on the ground thermal and moisture regimes, and on the stability and recovery of disturbed northern discontinuous permafrost lands. Among the key thermal concerns are ice-rich terrain, thaw settlement, differential thaw settlement across frozen/unfrozen interfaces, and thaw sensitive slopes.

The federal department of Indian and Northern Affairs (INAC) signed an Environmental Agreement with IPL in 1982, emphasizing the principle of minimum practicable environmental and land use disturbance, and establishing cooperation in monitoring and evaluating impact management. INAC, in consultation with Energy, Mines and Resources (EMR), established a Permafrost and Terrain Research and Monitoring (PTRM) Program to assess permafrost conditions, terrain stability and mitigative measures used along the alignment, in order to improve on impact evaluation and mitigation on the Norman Wells and future projects. This cooperative program developed in 1983 with IPL was reviewed by National Energy Board representatives. From 1983-1987 it was also part of overall environmental

Figure 1. Location of principal EMR/INAC ground thermal monitoring sites along the Norman Wells pipeline.





research and monitoring activities on the Norman Wells Pipeline Project under the Norman Wells Research and Monitoring Working Group, coordinated by Environment Canada.

As part of the "Permafrost, terrain and terrain stability evaluation" project of the PTRM program, the Terrain Sciences Division of the Geological Survey of Canada, EMR has undertaken thermal and geophysical studies of the short and long term modifications to the alignment area at thirteen main monitoring sites along the route (Figure 1). The sites were selected to provide a representation of the soil, permafrost and ground ice conditions throughout the discontinuous permafrost zone. An IPL geotechnical monitoring program includes monitoring pipe conditions, instrumentation of 17 wood chip insulated slopes with temperature cables and piezometres, as well as instrumentation or surveys at 4 frost heave sites and surveys at 25 thaw settlement sites (IPL, 1984, 1986, 1987 and 1988). An IPL operations monitoring program includes weekly, or more frequent, line patrols by helicopter.

The government PTRM program also involves two additional projects. The first, undertaken in cooperation with the Institute for Research in Construction of the National Research Council of Canada, involves an evaluation of wood chip insulation on selected thaw sensitive slopes and includes the instrumentation of the wood chip layer at monitoring site 84-2B for heat flow studies. The second, undertaken in cooperation with the Land Resources Research Centre of Agriculture Canada, focuses on soil thermal studies of the top 1.5 m and supplements near-surface permafrost and active layer data, air temperature and pipe temperature data. Data collected as part of the two projects is available

from the respective agencies and researchers (contact: at the National Research Council, H. Baker, 613-993-3807; and at Agriculture Canada, C. Tarnocai, 613-995-5011). Data and further information may also be obtained from the PTRM program coordinator and researcher, K.L. MacInnes, INAC, Yellowknife, 403-920-8152.

The temperature data collected by the Terrain Sciences Division project extend the existing ground thermal data base available in the area (Judge, 1973 and 1975; Taylor et al., 1982; Geotech, 1984) and also increase the number of locations in northern terrains with long term observations on permafrost stability and permafrost response to climatic change and natural or man-induced disturbances.

This open file report solely presents tables of the ground and pipe temperature data collected in 1989 from multithermistor cables at the EMR/INAC monitoring sites. A brief summary of 1989 operational conditions and climatic highlights is first provided. A description of the Norman Wells pipeline, of the ground temperature monitoring project, of the instrumentation and data base precede the data listing presentation.

Data collected during the first five years of monitoring (1984, 1985, 1986, 1987 and 1988) are tabulated in earlier open file reports (Burgess, 1986 and 1987; Burgess and Naufal, 1989 and 1990). Two major reports have recently been published dealing with the environmental and engineering considerations of the Norman Wells pipeline project (MacInnes et al., 1989), and research and monitoring results of the overall PTRM program from 1983-1988 (MacInnes et al.,

1990). Several reports and papers dealing with an analysis and discussion of the geothermal and geomorphic observations at the EMR/INAC sites have also been published. These include Burgess (1988), Burgess et al. (1986a), Burgess and Harry (1988 and 1990), Burgess and Riseborough (1989 and 1990), Riseborough (1989 and 1991) and Riseborough et al. (1988), and annual reports to the Norman Wells Pipeline Research and Monitoring Working Group [see Boreal Ecology (1989) for fifth and final annual summary report].

2. 1989 HIGHLIGHTS

The 1989 period includes the fifth season of operation of the pipeline (which has an expected life of 25/30 years) and the first year when oil flows averaged design capacity (4800 m^3/day). The summer of 1989 was the hottest on record for Northwest Territories along the Mackenzie Valley and Arctic Coast; two heat waves occurred from July 11 to 18, and from August 8 to 14. The winter of 1988-1989 was colder than the preceeding two winters. This combination resulted in a relatively small fluctuation in the mean annual temperature. During the latter part of 1988 a cooling trend in running mean annual air temperatures (based on monthly means from Atmospheric Environment Service weather stations in Norman Wells, Fort Simpson, and High Level) had become apparent. This cooling trend followed the gradual warming trend of 2-3 degrees which had persisted over the previous three years (see Burgess and Riseborough, 1990).

3. THE NORMAN WELLS PIPELINE

The detailed design, construction, and operation concepts implemented for the

Norman Wells pipeline to minimize terrain disturbance and to assure pipe integrity under potential problem conditions such as thaw settlement, frost heave and slope instability are discussed by Nixon, Stuchly and Pick (1984) and reviewed in MacInnes et al. (1989). A brief summary follows. Right-of-way (ROW) clearance, generally 25 m, and pipe laying were primarily undertaken in the winter to minimize disturbance. No permanent workpad was planned or utilized. Whenever practical the pipeline was centered in previously cleared alignments, e.g. seismic lines or former telephone lines, especially in thaw sensitive terrain; the ROW was then widened to the necessary construction width. Arctic and conventional wheel ditchers were used for trenching, except in bouldery material where caterpillars and backhoes had to be used. Ditch width with the wheel ditchers was approximately 100 cm.

A small diameter pipe, uninsulated except at a few sag bends, was selected to limit energy exchange with the environment. Pipe wall thickness was increased to provide for additional structural strength required to withstand anticipated differential settlements. Before delivery to IPL at the Norman Wells Pump Station, the oil is cooled to near $0^{\circ}C$ (in 1989, approximately $-5.5^{\circ}C$) but thereafter undergoes no further refrigeration. The oil temperature increases during the pumping process, and outgoing temperatures from the Norman Wells pump station in 1989 averaged about $-1.5^{\circ}C$ (IPL, pers. comm.). The pipeline has been described as an "ambient" temperature line. Additional pump stations are located near Wrigley (km 336) and near Fort Simpson (km 585). Oil began to fill the line in March 1985 and the National Energy Board granted leave to open on April 17, 1985. Design flow is approximately 4800 m^3/day (30,000 barrels/day). All disturbed areas in mineral soils were fertilized and reseeded. Sandbags were

piled to form the major type of diversion berm for surface erosion and drainage control (Wishart and Fooks, 1985) and wood chips were used to insulate 55 thaw-sensitive permafrost slopes (McRoberts et al., 1985).

It was anticipated (Nixon et al., 1984) for these design and construction features that the pipeline itself, being of low energy input, would not cause "significant" thawing of underlying permafrost; the clearing and construction activities, in changing surface thermal conditions, would however cause slow thawing of permafrost at many locations. Based on field observations, continuous geophysical surveys along the ROW, a borehole data bank of about 3500 boreholes, ground thermal regime modelling and thaw settlement analyses and calculations, maximum anticipated thaw depths beneath the ROW in a 25 year operation period were established at 6 to 12 m (depending on terrain type and pipeline segment). These studies also established design differential thaw settlements, i.e. differential thaw settlement beneath the pipe that could occur over a short distance across a transition in terrain conditions, at up to 0.8 m in mineral soil and up to 1.2 m in organic soil.

4. EMR/INAC GROUND TEMPERATURE MONITORING

4.1 Principal Monitoring Sites

Site Selection

The research and monitoring program focuses on 13 principal sites selected in 1983 to allow some evaluation and quantification of the thermal and environmental effects of a small, buried, uninsulated oil pipeline in warm and discontinuous

permafrost. The site selection process, undertaken in conjunction with the pipeline company and its consultants, involved an examination of 1) the surficial geology, 2) the lithological and ice log data from geotechnical boreholes along the alignment, 3) available ground thermal data, both from geotechnical boreholes along the route and other wells along the Mackenzie Valley (Judge, 1973) and 4) geophysical surveys mapping permafrost conditions (Hardy Associates, 1982). The sites, eleven in the Northwest Territories and two in northwestern Alberta, include areas of thaw sensitive terrain or of strong material contrast(e.g. frozen/unfrozen interfaces), and two slopes (one of which is insulated with wood chips). They also provide a representation of the soil, permafrost and ground ice conditions throughout the discontinuous permafrost zone. Brief site descriptions are given in Table 1. Two of the sites are joint sites, with IPL instrumentation on wood chip insulated thaw sensitive slopes and government instrumentation on adjacent level terrain.

Boreholes for temperature instrumentation were established at the sites using track-mounted drill equipment provided by IPL during the winter pipe laying activities which were spread over the consecutive winters of 1984 and 1985. At most (12) sites a thermistor string is placed around the pipe and 4 instrumented boreholes are located across the ROW along lines called thermal fences (Figure 2.).

Borehole stratigraphic logs, visual ice logs and preliminary geotechnical data collected as part of the contracted drilling program are compiled in the site establishment report (Pilon et al., 1989). This report includes a black and white stereo pair of aerial photographs and colour photos of each site. Core

TABLE 1. SITE DESCRIPTIONS

No.	NAME	KM	DESCRIPTION (at time of establishment)
84-1	**Pump Station 1.....**		**Widespread permafrost**
		0.02	Ice-rich silty clay; widespread permafrost
84-2	**Canyon Creek .....**		**Previously cleared alignment, thaw sensitive slopes, widespread permafrost.**
	A	19.0	Level location, frozen till with low ice content
	B	19.3	East-facing slope with a 1 m insulating wood chip cover
	C	19.6	Uninsulated section of west-facing slope
84-3	**Great Bear River.....**		**Joint IPL site with thaw sensitive slope**
	A	79.2	Stratigraphically complex ice-rich alluvial terrace deposits in widespread permafrost; cliff-base
	B	79.4	Cliff-top lacustrine deposits with aeolian veneer
85-7	**Table Mountain.....**		**Joint IPL site with thaw sensitive slopes**
	A	271.2	Ice-rich lacustrine plain(old seismic line)
	B	272.0	Drillpad clearing at bend on top of north facing slope, ice-rich lacustrine plain
	C	272.3	New clearing on ice-rich lacustrine plain
84-4	**Trail River.....**		**Pipeline previously traversed frozen ground**
	A	478.0	Unfrozen saturated sands/silts in dune hollow
	B	478.1	Dry sands and silts in dune crest
85-8	**Manner's Creek.....**		**Rapidly changing permafrost conditions**
	A	557.8	Thin peat with thick (10 m) permafrost
	B	558.2	Thick(2.7 m) peat with thin(4 m) permafrost
	C	558.3	Thin peat (1 m) with thin (1 m) permafrost
85-9	**Pump Station 3.....**		**Pipe previously traversed frozen section**
		583.3	Unfrozen granular soils
85-10	**Mackenzie Highway South ...**		**Unfrozen/frozen interface**
	A	588.3	Helipad clearing in unfrozen terrain
	B	588.7	Thin (3 m) permafrost with 2 m peat cover
85-11	**Moraine South**	597.4	Thin (<4 m) permafrost in helipad clearing
85-12	**Jean Marie Creek.....**		**Unfrozen/frozen interface**
	A	608.6	Thin unfrozen peat
	B	608.7	Thick ice-rich peat plateau; 4 m permafrost
85-13	**Redknife Hills.....**		**Frozen/unfrozen interface; single cables only**
	A	682.2	Frozen (6 m) terrain surrounding large fen
	B	682.4	Frozen (6 m) terrain at fen border
	C	682.6	Unfrozen terrain in fen
84-5	**Petitot River North.....**		**Degrading peat plateau**
	A	783.0	Ice-rich peat (3.5 m); (15-18 m) permafrost
	B	783.3	Very thick icy peat (7 m); 12 m permafrost
84-6	**Petitot River South.....**		**Peat plateau preceded by unfrozen fen**
		819.5	Thick (5 m) ice-rich peat; 7 m permafrost

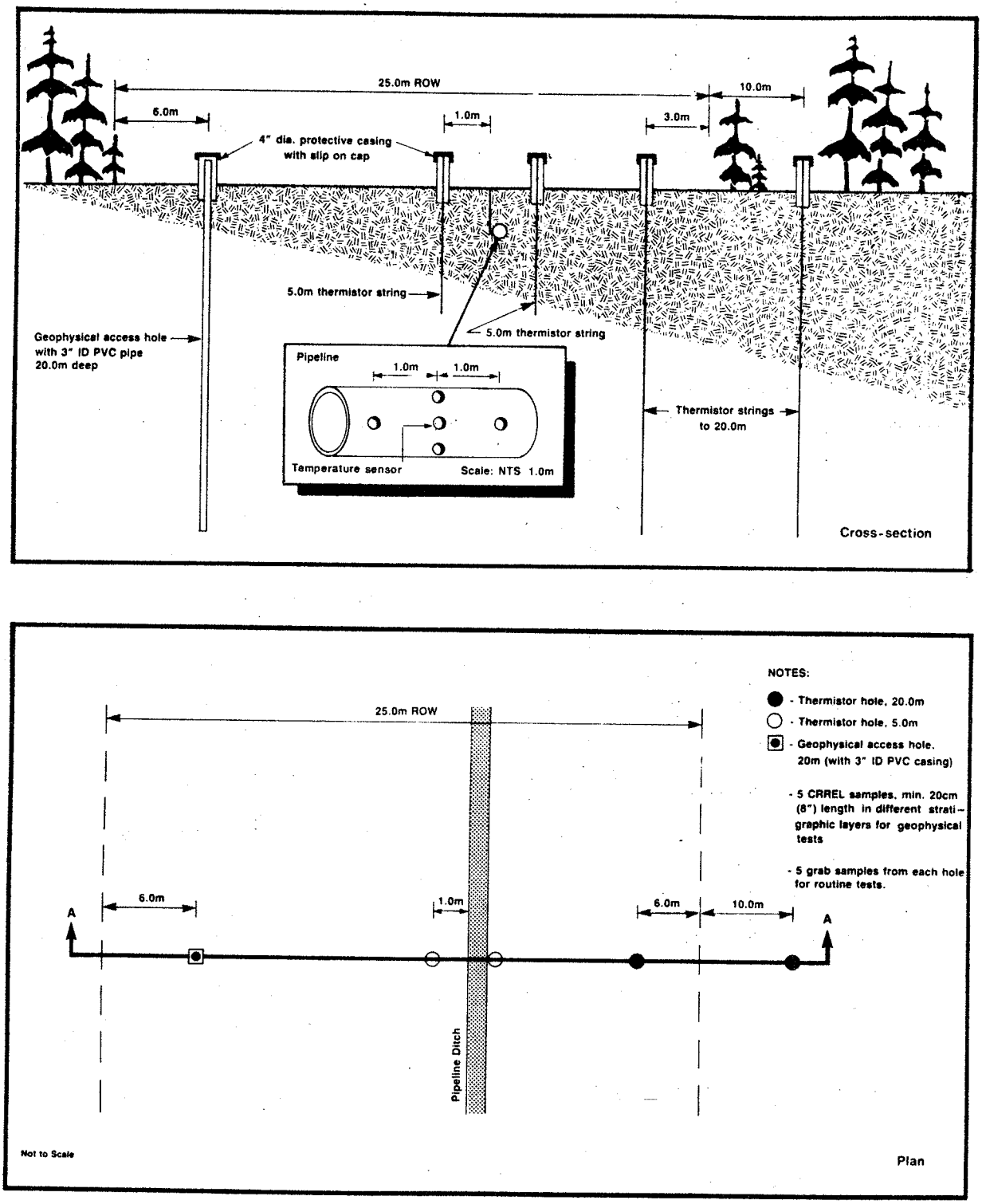
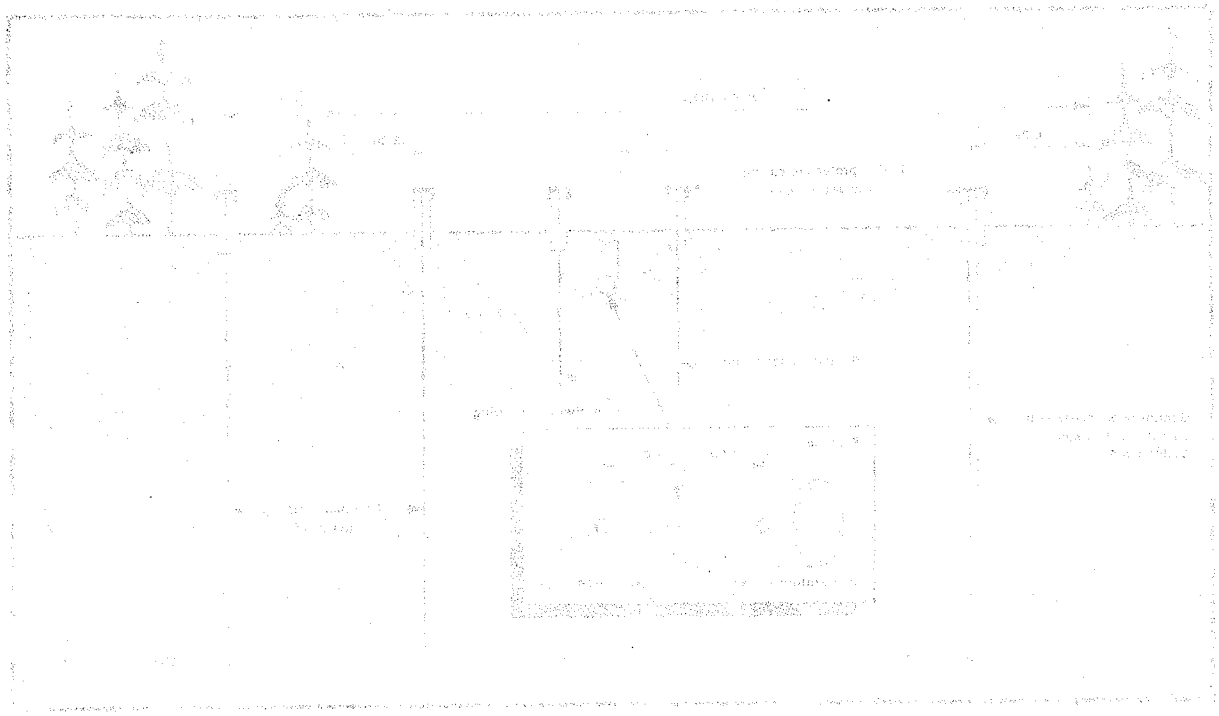
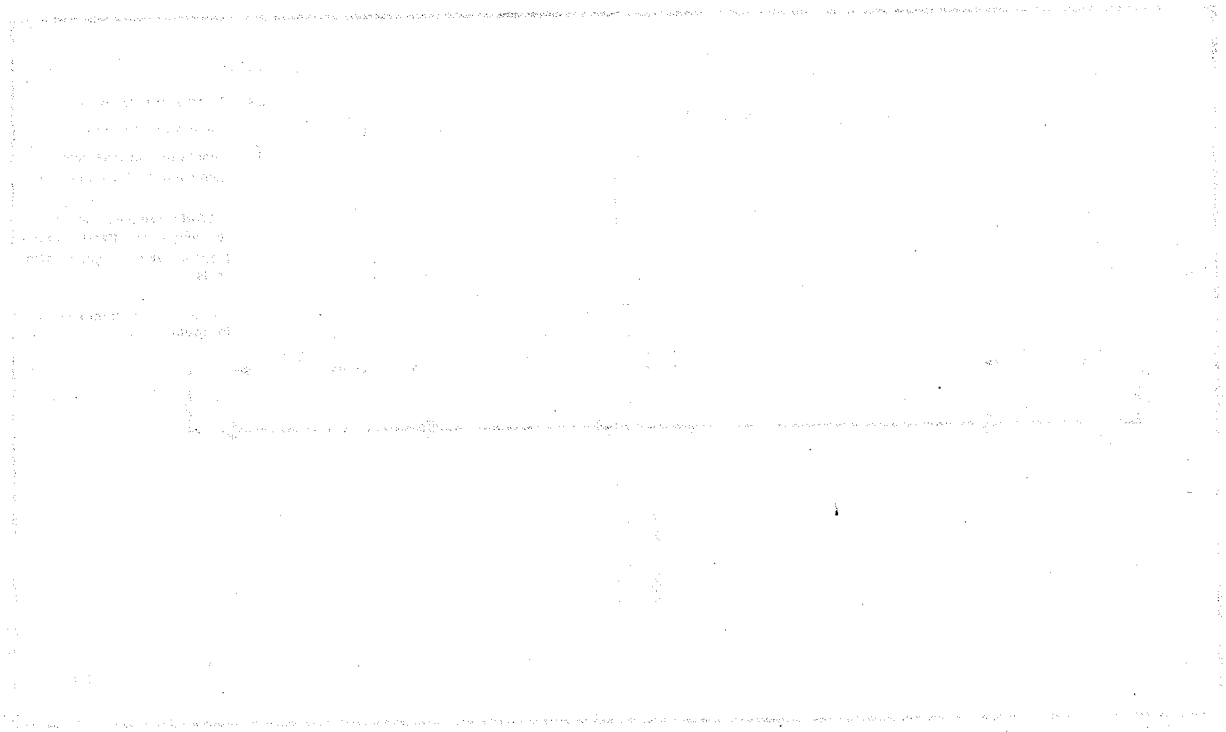


Figure 2. Example of the layout of a thermal fence: in cross-section (top) and plan view (bottom).





and chip samples were retained from the borehole drilling for physical, thermal and electrical properties measurements. An additional large diameter access hole was drilled to 20 m on the ROW and cased with 76 mm PVC for long term geophysical logging; at the 1985 sites this hole was continuously cored.

Thermal Fence Layout

Twelve of the 13 main monitoring sites have from one to three instrumented cross-sections; in total there are 23 thermal fences. Where more than one thermal fence is located at a site, fences are designated A, B, and C in a north to south sequence. At each fence five temperature sensors, located on the outside of the pipe and installed by IPL prior to trench backfilling, provide an approximate reference value for the pipe induced thermal disturbance. Two 5 m cables are located close to the pipe to examine the immediate effect on soil temperature of pipeline trenching, installation and operation. These two short cables (generally designated T1 and T2) are positioned in one of two possible configurations, either on each side of the ditch (17 fences) or at an increasing distance from the ditch on the travel side of the ROW (6 fences). Two 20 m cables, one on the ROW and the other off-ROW (generally designated T3 and T4 respectively), investigate the deeper thermal characteristics and enable a comparison of the thermal regime of the ROW and the surrounding terrain. A typical layout of a thermal fence is shown in Figure 2. Attempts were made to minimize surface disturbance off-ROW, while allowing snow-access of a track-mounted drill. In a few cases some tree removal or other ground surface disturbances, such as blading or dispersal of drill mud occurred. The thirteenth site, at Redknife Hills, consists of three cables (A,B,C) 200 m apart and paralleling the pipe.

4.2 Additional Sites and Thermal Instrumentation

Additional boreholes and temperature installations have been established along the pipeline route. Details on the sites established prior to 1988, and on their temperature instrumentation are provided in the 1987 data compilation (Burgess and Naufal, 1989). The additional temperature installations are grouped as follows:

"Climate" holes

Prior to 1988, three sites with deep boreholes (from 93 to 130 m) were established for long term study of climate change and ground temperature relationships in the Mackenzie Valley. These "climate" holes are located at 1) Kee Scarp (about 5 km north of, but within the municipality of Norman Wells), 2) Canyon Creek monitoring site 84-2A, and 3) Table Mountain monitoring site 85-7A. At Canyon Creek and Kee Scarp, automated micrometeorological stations were installed, in 1985 and 1988 respectively, by the Atmospheric Environment Service of Environment Canada (Etkin et al., 1988). A fourth site was established in 1989 at Gibson Gap, some 75 km northwest of Norman Wells; a 100 m borehole was drilled and instrumented with a temperature cable in March 1989, while an AES automated micrometeorologicacl station was installed in August 1989.

Off-ROW reference holes

While drilling the deep "climate" hole at Table Mountain in March 1986, new off-ROW reference holes were established on the west side of the ROW at each of the three thermal fences (85-7A/B/C).

Thaw settlement site cables

Boreholes drilled at five IPL thaw settlement monitoring sites in the fall of 1986 were instrumented with EMR/INAC temperature cables to depths of 10 m. The sites are located at km 95.1, 135.1, 271.9, 469.7 and 608.6.

Ditch thermistor strings

Two additional short thermistor strings were installed by IPL at six of the thermal fences (2C, 3B, 7C, 4A, 8A, 9) in the summer of 1986; one cable was positioned directly over the pipe, the other in the trench wall.

"Geophysical" Holes

Geophysical access holes, 20 m deep and cased with 76 mm PVC, were drilled at most thermal fences during construction, to allow for future downhole geophysical surveys or additional thermal data collection. In May 1989, temperature cables were installed in the geophysical boreholes at 5 thermal fences (85-7C, 85-8B, 85-10B, 85-12B, and 84-8B) to examine differences in the thermal character of the travel side and spoil side of the right-of-way. At these sites the geophysical hole is located on the travel side of the right-of-way, while the T3 cable is located on the spoil side. The cables are designated GH in the data listings.

Probes to examine heat exchange in the vicinity of the pipe

(Ditch thermal regime)

In August 1989, additional instrumentation was installed at three thermal fences (84-2A, 85-7C and 85-12B) to gain a better understanding of the thermal regime in the vicinity of the pipe. Two short probes (160 cm long) containing 8

sensors, spaced every 20 cm, were placed vertically within 50 cm of the pipe. The probes were connected to data loggers set to take three or four readings per day. Seadata loggers (discussed in the next section) were used if already in use at the site and available channels remained; otherwise an 8 channel XL-800 logger was installed and dedicated to the probe. Manual readings, if taken, are included in the data listings (probes are designated PR in the listings). Pipe thermistor strings at 85-7A, 85-7B and 85-7C and 85-12B were also connected to the Seadata logger at each site in May 1989 to allow for more frequent pipe temperature readings.

Agriculture Canada soil temperature project

In August 1986, 1.5 m soil temperature probes with seven thermistor sensors (2.5, 5, 10, 20, 50, 100, 150 cm) were installed at 13 select thermal fences to monitor the near-surface thermal regime both on and off the right-of-way. Additional details on this project are available in Tarnocai and Kroetsch (1990) and MacInnes et al. (1990). As of 1988, most of these soil probes were connected to XL-800 data loggers. In August 1987, to obtain more frequent pipe temperature data, a single thermistor sensor was installed beside the pipe (but not attached to it) and connected to a single channel TL-100 logger at 11 thermal fences (1, 2A, 3A, 7B, 7C, 4B, 8A, 10A, 12B, 13C, 5B). These single unattached sensors differ from the 5-sensor pipe temperature strings which are strapped to the pipe and were installed at the time of construction (1984 or 1985). The 5 sensor strings are those reported in this open file, and, with the exception of those thermal fences noted in the preceeding section, are not connected to data loggers. Temperature data from the TL-100 and XL-800 loggers is available from C. Tarnocai, Agriculture Canada, and is not included in this open file.

4.3 Temperature Instrumentation and Accuracy

The reader is referred to previous data compilations for a detailed description of the temperature sensors (thermistors) used in the manufacture of temperature cables, and for a discussion of the accuracy of the temperature sensors and measurement system, and of the cable installation procedure in PVC tubes generally backfilled with silicone oil.

Sensor depths

The thermistors are permanently embedded in the temperature cable and the sensor spacing along the cable thus remains constant with time. The "zero mark", i.e. "0 m" depth, on each cable was positioned relative to the ground surface at the time of cable installation (summer installation for most 1984 cables, winter for 1985 cables). Many factors such as seasonal timing, eneven terrain, disturbance around the borehole, snow or frozen ground surface conditions, introduced variation and difficulty in defining initial ground surface levels. The error in the initial positioning of the "zero mark" is thus estimated to be as much as 10 to 20 cm for some of the cables. The nominal initial depth of the sensors is that which is kept on record in the data file; and that which appears in the data listings.

The depth of a sensor with respect to the ground surface level may have changed subsequent to installation, as the ground surface was subjected to heave and, especially, settlement. The cables once installed in the borehole have not been readjusted. Such a repositioning would break the continuity of the data record, shifting the temperature-time series relative to the surrounding soil for most

4.1 Temperature Instrumentation and Accuracy

The reader is referred to previous data compilations for a detailed description of the temperature sensors (thermistors) used in the manufacture of temperature cables, and for a discussion of the accuracy of the temperature cables and measurement system, and of the cable installation procedure in PVC tubes generally backfilled with silicone oil.

Cable depths

The thermistors are permanently embedded in the temperature cable and the relative spacing along the cable thus remains constant with time. [illegible] 10 m depth on each cable was positioned relative to the ground surface at the time of cable installation [illegible] 1988 [illegible]. Many [illegible] such as seasonal [illegible] around the borehole, snow or frost [illegible] surface modification, [illegible] reduction and difficulty in defining initial ground surface levels. The error in the initial positioning of the "zero depth" is thus estimated to be as much as 0.3 or 0.5 m for some of the cables. The original initial depth of the sensors [illegible] which is here corrected in the data files, [illegible] [illegible].

The depth of a sensor with respect to the ground surface level may have changed subsequent to installation, if the ground surface was [illegible] [illegible]

sensors. **The user is thus cautioned that due to subsequent surface settlement at many sites, the absolute depths of many sensors will have changed from those appearing in the data listings.** Cables were generally built to the individual depth specification of each inner PVC tube and therefore installed to bottom hole. Thus re-adjustment of cable positions following surface settlement, even if desired, would generally not be possible. In cases where cable replacement has been required, the "zero mark" on the new cable was placed at the same position as the old.

Thaw settlement measurements, documented at the thermal fences by level surveys from 1984 to 1989 and summarized in Table 2, provide some indication of the range of settlement that may have occured around the temperature cable boreholes. Since the fall of 1986, the height above ground of the PVC tube containing the temperature cable, has been measured in late summer or fall to monitor the specific surface movement around the borehole. These measurements suggest that the sites can be separated into two groups: 1) those where the ground surface around the boreholes is stable with < 20 cm of settlement recorded around the boreholes (i.e. thermal fences 2A, 2B, 2C, 3B, 7C, 4A, 4B, 8A, 9, 10A, 11, 12A), and 2) those where the terrain around the boreholes is settling, although generally at different rates on and off-ROW (thermal fences 1, 3A, 7A, 7B, 8B, 8C, 10B, 12B, 5A, 5B, 6).

Cable positions relative to the existing ground surface were remeasured wherever possible in October 1988 and May 1989. This survey was undertaken to check for any errors in the initial cable installation and/or for any possible cable slippage in the boreholes. In some cases verifying the position of the "zero

TABLE 2: SURFACE SETTLEMENT RECORDED AT STUDY SITES

Fence	Observation Period	Range of Settlement* (cm) Trench Area	ROW
84-1	20/6/84 - 06/9/89	>10 - <50	0 - <70
84-2A	21/8/84 - 17/9/86	10 - 30	0 - 20
84-2B	22/8/84 - 28/8/87	0 - <40	0 - <60
84-2C	22/8/84 - 17/9/86	0 - 20	0 - 30
84-3A	22/8/84 - 22/8/87	>0 - <60	>0 - <60
84-3B	22/8/84 - 22/8/87	0 - <20	0 - <40
85-7A	26/5/85 - 27/8/87	0 - <90	0 - 40
85-7B	26/5/85 - 09/9/89	>20 - >80	0 - <60
85-7C	26/5/85 - 14/9/89	>20 - <70	>0 - <40
84-4A	24/8/84 - 15/9/86	0 - 50	0 - 20
84-4B	24/8/84 - 15/9/86	0 - 30	0 - 30
85-8A	25/5/85 - 26/8/87	0 - <50	0 - <30
85-8B	25/5/85 - 26/8/87	0 - <90	0 - <90
85-8C	25/5/85 - 26/8/87	0 - <120	0 - <100
85-9	24/5/85 - 13/9/86	0 - 20	0 - 10
85-10A	23/5/85 - 25/8/87	0 - <40	0 - <40
85-10B	23/5/85 - 25/8/87	>10 - <130	0 - 40
85-11	23/5/85 - 14/9/86	re-filled winter 86	0 - 20
85-12A	22/5/85 - 25/8/87	0 - <100	0 - <50
85-12B	22/5/85 - 15/9/89	0 - 170	0 - 80
84-5A	26/8/84 - 19/8/87	0 - <60	0 - <30
84-5B	25/8/84 - 19/8/87	0 - <50	0 - <20
84-6	25/8/84 - 19/8/87	0 - <60	0 - <30

* The range of settlement (cm) determined from the surface elevation surveys is defined by the minimum and maximum amount observed in each of two areas:

1) Trench Area: includes trench and a few meters on either side of the pipe centerline, including frozen backfill piled over centerline.

2) ROW Area: the remainder of the surveyed ROW excluding the trench area.

mark" was not possible or desirable, e.g. i) where ice plugs had formed within the silicone oil, because the protective cap preventing water from entering the inner PVC tube was either missing or had been removed, and the cable was frozen in place, ii) where the sand that was occasionally used to backfill between the outer and inner PVC tubes had been filled in over the inner PVC tube and the cable could not be moved, and iii) reluctance to damage the PVC tube installation or mechanism holding the cable in place; or mechanism not easily accessible, for example where the cable had been taped to the inner PVC at installation. Cables were not readjusted after this survey.

A list of the remeasured zero mark positions appears in Table 3. An examination of the results of this survey, in conjunction with the surface settlement data suggests that at most of the "stable" sites the positioning is within the accuracy of the installation (+/- 20 cm), and at most of the "settling sites" the offset can be accounted for by surface movement. The exceptions listed below were apparent, however, suggesting either improper initial cable installation or subsequent cable slippage if the cable was not firmly held in place.

CABLE	COMMENT
84-2A-T4	probably offset at installation
84-2B-T3	"
84-3A-T4	"
84-4A-T1 & T2	"
85-8C-T2	cable pulled up
85-9-T2 & T3	probably offset at installation; may be slippage
85-10A-T1&T2	"
85-11	initial offset/or slippage on all 4 cables
85-12A-T1	initial offset
85-12B-T3	cable was originally installed with second sensor at ground surface

Of the 16 cables listed above, 8 are "shallower" than expected, 7 are "deeper", and one was purposely offset at installation. Cable positions have also been

TABLE 3 : OCTOBER 1988 -MAY 1989 SURVEY OF CABLE ZERO MARK POSITION (CM) RELATIVE TO THE CURRENT GROUND SURFACE

SITE	CABLE NUMBER					COMMENTS
	T1	T2	T3	T4	OTHER CABLE	
84-1	ice?	ice?	ice?	+49	+27 (T5)	
84-2A	ice?	+4	ice?	-15	+7 (HT140)	T2 pulled out to +18 in winter 87/88; reset Oct.88
84-2B	+5	+5	-55	+6		
84-2C	-22	-2	-6	-13		
84-3A	ice?	was +15 now +25	ice?	-32		T2 could not be repositioned
84-3B	+15	+15	-2	-2		
85-7A	+75	ice?	+57	taped		
85-7B	ice?	+47	/	taped	+40 (HA110)	T3 PVC tube broken at ground surface
85-7C	ice?	ice?	ice?	sand	-32 (HA109)	
84-4A	-83	-82	stuck	stuck		
84-4B	/	+6	+2	+2		T1 was initially not installed to target depth
85-8A	taped	taped	sand	+11		
85-8B	taped	taped	taped	taped		
85-8C	taped	/	taped	sand		T2 cable has at times slipped or been pulled out
85-9	/	+54	-30	taped		T1 tangled with PT
85-10A	-45	+28	+30	taped		
85-10B	+13	+17	+44	+22		
85-11	+33	+30	+55	+39		
85-12A	+63	+30	+25	+20	+38 (T3A)	
85-12B	+55	+60	+10	+20		T3 not initially installed to target depth; position given for 2nd sensor
84-5A	stuck	stuck	+30	stuck		
84-5B	stuck	+5	+45	+15		
84-6	+15	+22	stuck	+45		

NOTES: "+" indicates the zero mark is above the ground surface
"-" indicates the zero mark is below the ground surface

1) sand: sand backfill over inner PVC tube, cable could not be moved
2) ice: cable did not move freely and protective cap missing from PVC; assume ice plug has formed within water contaminated silicone oil
3) taped: cable has been held in place since installation by taping to inner PVC tube; not easily accessible for removal; no signs of slippage
4) / : not measured or could not be measured, see comment for details
5) stuck: cable suspended firmly in place and therefore no attempt to remove

occasionally altered due to animal interference, e.g. bears pulling or even entirely removing a cable. It is recommended, in future cable installations in silicone filled PVC tubes, that cables be secured upon installation in such away as to avoid slippage but yet allow for removal for position verification if necessary. This verification may be particularly important in the spring following a winter cable installation where the ground surface level may have been poorly defined. Subsequent verification should however not be required.

Care should be taken i) if backfilling around an inner PVC tube to ensure that the top of the tube is not covered by sand, and ii) to ensure a protective cover remains over the inner PVC tube to avoid water contamination of the silicone oil and hence the formation of ice. Cables may then be easily removed for replacement purposes.

The thermal fence experimental design was not intended to focus on detailed studies of the near surface thermal regime (top 1.5 m) but rather to examine the changes to greater depths (up to 5 to 20 m), to follow the formation of the thaw bulb around the pipe and beneath the right-of-way, and to monitor changes in permafrost thickness and mean annual temperature changes. Where a knowledge of the shallow thermal regime at a fixed depth below a moving ground surface is desired, and hence a need for adjusting the sensor positions relative to this surface arises, the use of shallow 1.5 m rigid soil probes would be recommended. These probes may be constantly pushed back into the ground to "zero" relative to current ground surface.

4.4 1989 Data Collection

In 1989, temperature and associated data were collected during nine monthly visits at all thermal fences in the N.W.T., and less frequently for Alberta sites (Table 4). Access primarily requires helicopter travel; snowmobiles are used for some winter readings near Fort Simpson. Winter readings were primarily undertaken by INAC field staff at Norman Wells and Fort Simpson. EMR or INAC researchers were responsible for the May to September visits, including observations on overall pipeline right-of-way conditions.

Priority sites

In November 1988, a priority list of monitoring sites was established, following a review of results during annual PTRM program meetings in Yellowknife. Three levels of priority were established for data collection during field trips:

PRIORITY	SITES
1	1, 2A/B/C, 3A, 7A/B/C, 8A/B/C, 9(PT), 10B, 11(PT), 12B, 5A/B (where PT=pipe temperatures)
2	3B, 10A, 12A, 6
3	4A/B, 9, 11, 13A/B/C

Priority 1 sites were generally located in thaw-sensitive permafrost; while, priority 2 and 3 sites are primarily unfrozen and thaw stable. Readings were to be taken at priority level 1 sites on all field trips, and at level 2 sites if time allows; while readings at level 3 sites were to be given the lowest priority. The implementation of these priorities beginning in December 1988 is reflected in the absence of readings at some of the sites in the winter months.

TABLE 4: SCHEDULE OF FIELD TRIPS AND OBSERVERS - 1989

DATE	OBSERVERS[1]	COMMENTS[2]
Jan. 24-25	A. Boyer, J. Ginter	Southern data (INAC)
Feb. 1-2	D. Elliott, J. Bowen	Northern data (INAC)
Mar. 13-19	K. MacInnes, M. Burgess A. Taylor	All sites (INAC, EMR)
April 7	D. Elliott, J. Bowen	Northern data (INAC)
April 11	A. Boyer, J. Ginter	Southern data (INAC)
May 20-24	M. Burgess, V. Allen C. Tarnocai	All sites (EMR, AG CAN)
June 27-July 3	K. MacInnes, T. Lawrence P. Egginton	All sites (INAC, EMR)
Aug. 9-13	K. MacInnes, A. McRobert J. Ngai	Slopes, selected sites (INAC)
Aug. 19-23	M. Burgess, V. Allen	All sites (EMR)
Sept. 6-10	K. MacInnes, P. Kurfurst C. Tarnocai	All sites (INAC, EMR AG. CAN)
Oct. 25	J. Bowen	Northern data (INAC)
Oct. 26-27	D. Trudeau, J. Ginter	Southern data (INAC)
Dec. 13-14,20	J. Bowen	Northern data (INAC)
Dec. 27-28	D. Trudeau, J. Ginter	Southern data (INAC)

1. Observers include staff from Indian and Northern Affairs Canada (INAC) Region and Districts, Energy, Mines and Resources (EMR), Agriculture Canada (AG. CAN.), and National Research Council (NRC).

2. Northern data refers to sites from km. 0 to 79. Southern data here refers to sites from km 270 to 608. All sites refer to sites from km 0 to 819.

[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]

Loggers

Since October 1985, several thermal fences have been equipped with 64 channel automatic data loggers (SeaData model 1250B) to allow for more continuous data gathering at remote locations or sites of special interest. These loggers are located at fences 84-2A, 84-3A, 85-7A/B/C, 85-12B, 84-5B and at the climate station at Kee Scarp. In October 1988, interface units allowing manual readings on the cables during regular field trips without disconnecting from the data logger, were installed at sites 3A, 7A, 7B and 12B. Interface units were installed at sites 2A and 7C in May 1989. These units permit real time manual data acquisition during a site visit; the data also serves as a back-up should loggers malfunction or power run-short. Interface units are not installed at site 84-5B or Kee Scarp.

Data loggers are programmed to take 3 readings per day. At all the thermal fences, the loggers are connected to the EMR/INAC ground temperature cables T1 to T4; as of May 1989 at fences 85-7A/B/C and 85-12B, they are also connected to the pipe temperature string. In August 1989, 160 cm probes installed in the vicinity of the pipe at 84-2A, 85-7C and 85-12B were also connected to the Seadata loggers. Logger tape and battery changes are scheduled twice a year. Select logs (recorded at the approximate time of field visits) are added to the data files of monthly manual readings, following tape removal and data reduction. In 1989 gaps occurred in the data record i) at site 85-7C from January to May; the logger removed for servicing in October 1988 was replaced in May 1989, and ii) at site 84-5B from August to December due to damage to the data tape during processing.

4.5 Associated Data

Time domain reflectometry (TDR) surveys compliment the thermal observations and provide field data on soil moisture conditions and electrical properties to depths of 2 m at 3 locations across the thermal fence: next to the pipeline, in the centre of the ROW and off-ROW. In 1989 these geophysical surveys, discussed in more detail by A-Cubed Inc. (1985a) and Pilon, Annan and Davis (1985), were conducted in May and August at select sites, with a focus on examining the deepest probes (1.8 m) at permafrost sites. An analysis of field TDR data collected through to the fall of 1988 is presented in Patterson (1988 and 1989a).

Snow measurements were recorded at permanent snow depth markers on and off the ROW at most fences from January to March, and October to December, 1989. In March snow densities were measured using an MSC snow corer (data available from K.L. MacInnes, or INAC Water Resources, Yellowknife).

Additional laboratory investigations of the frozen core samples retained from the 1985 borehole drilling program were completed for select sites (Patterson, 1989b). Physical and thermal properties measurements undertaken prior to 1988 are published in Patterson et al. (1988), Patterson and Riseborough (1988), and A-Cubed (1985b and 1987).

Topographic surveys to monitor surface elevation changes were undertaken in September 1989 at four thermal fences: 84-1, 85-7B, 85-7C and 85-12B. Helicopter logistic support for the contractors, UMA, was provided by IPL. The

height of the inner PVC tubes (in which the temperature cables are installed at the thermal fences) was measured relative the ground surface in August 1989.

Ground probing radar surveys were undertaken in September 1989 at the Great Bear monitoring sites. Three profiles were made: across the right-of-way at 84-3A and 84-3B, and along the right-of-way down wood chip covered slope 29B located between the two thermal fences.

5. TEMPERATURE DATA LISTINGS

The EMR/INAC Norman Wells pipeline thermal data base is currently maintained by the Terrain Sciences Division, Geological Survey Canada, Energy, Mines and Resources. Maintenance of the borehole thermal instrumentation is also the responsibility of the division.

A listing of 1989 borehole temperature readings for each cable at each site is presented in Appendix A. **As discussed in section 4.3, the sensor depths listed in the tables and kept on permanent record in the files, are the nominal depths at the time of cable installation. Depths of sensors relative to the ground surface have changed due to ground settlement at approximately half of the thermal fences** (Table 3 provides some indication of this shifting). A few cables listed on page 18, were likely either offset at installation or have subsequently slipped.

The data listings are grouped by monitoring site and presented in site order along the pipeline route (Norman Wells = kilometrepost 0). The data tables

include, when available, additional information on 1) latitude, longitude, elevation (m), 2) the distance of the borehole from the pipeline centre line and the location (off versus on ROW), 3) the lithology and ice content, 4) the number and type of thermistors in the cable, and 5) comments on the installation of automatic data loggers and of replacement cables.

Pipe thermistor data are listed separately in Appendix B; the 1984 sites are listed first, followed by the 1985. The positioning of the 5 sensors on the pipe is as follows; three on the side, one on the top and one on the bottom. Users of this data should note that the depths listed in all data tables were determined from the initial burial depth of the pipe (relative to adjacent ROW surface and excluding any backfill berm) and are not necessarily the current depths, especially in subsided or eroded trench conditions or thaw-sensitive terrain. The order of presentation of the pipe temperature sensors is: top, middle, bottom, middle, middle.

Appendix C lists the 1989 readings taken on the ditch thermistor strings installed by IPL in late summer of 1986 at select fences. Appendix D lists the 1989 readings at the climate sites. Data listings from cables at IPL thaw settlement sites are included at the end of Appendix A.

The 1989 data listings have been edited to remove obvious errors in the recording of manual measurements and data from sensors suspected to have failed. A list of problem sensors appears below in Table 5.

TABLE 5 SENSORS SHOWING PROBLEMS OR SIGNS OF FAILURE

SITE	CABLE	PROBLEM
EMR/INAC INSTRUMENTATION		
84-2A	T1	sensor #10 failed as of Oct. 88
	2810 (T5)	sensor #8 not connected to logger
	2812 (T6)	sensor #8 not connected to logger
84-2B	T3	sensor #11 failed as of Oct. 89
84-2C	T3	sensor #9 failed as of Jan. 86
		sensor #11 failed as of Jan. 87
84-3A	T1	sensor #1 failed as of Aug. 87
		sensor #3 failed as of Jan. 89
	T3	sensor #3 failed as of July 88
84-3B	T1	sensor #4 failed as of April 87
		sensor #8 failed as of Oct. 85
	T3	sensor #5 never functioned
	PT	sensor #1 failed as of Oct. 84
km 95.1		sensor #10 failed as of June 87
85-7A	T3	sensor #8 failed as of Nov. 88
	T4	sensor #5 failed as of June 89
85-7C	T2	sensor #4 failed as of Nov. 88
		sensor #9 failed as of Aug. 87
	2813 (T6)	sensor #6 failed as of Nov. 89
		sensor #8 not connected to logger
85-8C	PT	sensor #2 failed as of May 89
85-10A	T2	sensor #7 failed as of Jan. 89
	PT	sesnor #1 failed as of Sept. 87
		sensor #4 failed as of Jan. 88
85-10B	T3	sensor #10 failed as of Oct. 87
85-11	T1	sensor #6 failed as of Nov. 87
	PT	sensor #3 failed as of Sept. 86
85-12A	T1	sensor #6 failed as of March 89
	T3	sensor #4 failed as of Oct. 89
85-12B	T1	sensor #8 failed as of Nov. 85
	2811 (T5)	sensor #6 failed as of Dec. 89
		sensor #8 not connected to logger
84-5A	PT	sensor #1 failed as of Oct. 88
84-5B	T1 (new)	sensors #2, 3, and 11 open on extension cable; sensors are OK, extension cable needs replacement
IPL INSTRUMENTATION (in this report)		
84-2C	113A	sensor #3 failed as of Sept. 1986
84-4A	118A	sensor #1 failed as of March 89
84-8A	115A	sensor #4 failed as of Oct. 86

6. ACKNOWLEDGEMENTS

The efforts and dedication of Kaye MacInnes (INAC) as researcher, organizer and coordinator of this program require special mention. The design of the EMR/INAC ground thermal monitoring project is principally due to the efforts of Jean Pilon and Alan Judge (both with GSC, EMR). Many organizations have helped to make the overall thermal monitoring project possible. IPL has provided much support and cooperation, and in particular contributed the drilling of the boreholes for all cables in the N.W.T., as well as the staff for installation of the pipe thermistors and varied assistance for subsequent field work. Many individuals within INAC, EMR, and IPL have provided cooperation, support and assistance in the organization and implementation of the project and in the data collection and analyses.

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APPENDIX A

GROUND TEMPERATURE CABLES DATA LISTINGS

PLEASE NOTE:

As discussed in the report (section 4.3), the sensor depths listed in the tables and kept on permanent record in the files, are the nominal depths at the time of cable installation. Depths of sensors relative to the ground surface have changed due to ground settlement at approximately half of the thermal fences.

Please refer to the text for a further discussion of sensor depths, settlement, and sensor problems/failure.

SITE 84-1: NORMAN WELLS PUMP STATION- T1
****

65 DEGREES 17.2 MINUTES NORTH 126 DEGREES 53.1 MINUTES WEST

ELEVATION 61 METRES

Z(M)	DATE 89 2 1 T(C)	DATE 89 3 13 T(C)	DATE 89 5 23 T(C)	DATE 89 6 27 T(C)	DATE 89 8 23 T(C)	DATE 89 9 6 T(C)	DATE 89 10 26 T(C)	DATE 89 12 13 T(C)
.5	-8.11	-4.11	3.48	14.74	8.51	12.73	-4.93	-4.73
1.0	-3.36	-2.56	-.47	1.76	5.55	4.90	-.03	-.57
1.5	-.38	-.97	-.58	-.40	1.65	1.75	-.03	-.15
2.0	-.22	-.41	-.57	-.48	-.29	-.22	-.16	-.18
2.5	-.42	-.48	-.62	-.59	-.53	-.49	-.44	-.41
3.0	-.42		-.51	-.49	-.46	-.43	-.39	-.36
3.5	-.52	-.51	-.55	-.52	-.53	-.51	-.49	-.46
4.0	-.65	-.64	-.65	-.62	-.64	-.61	-.61	-.58
4.5	-.75	-.73	-.70	-.69	-.70	-.69	-.69	-.67
5.0	-.74	-.72		-.68	-.68	-.67	-.67	-.67

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 0.0. EMR-84-1.
LACUSTRINE PLAIN: ICE-RICH SILTY CLAY IN
WIDESPREAD PERMAFROST.
TREES CLEARED TO 26.5 M IN WINTER 82/83.
CABLE ON R.O.W. 1.5 M W OF PIPELINE,
IN 25 MM OIL-FILLED PVC TUBE.
10 SENSOR YSI44033 (PAIRED COMMON).

SITE 84-1: NORMAN WELLS PUMP STATION- T2

****

65 DEGREES 17.2 MINUTES NORTH 126 DEGREES 53.1 MINUTES WEST

ELEVATION 61 METRES

	DATE 89 2 1	DATE 89 3 13	DATE 89 5 23	DATE 89 6 27	DATE 89 8 23	DATE 89 9 6	DATE 89 10 26	DATE 89 12 13
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
.5	-5.50	-3.26	-.20	4.35	8.71	8.05	-.25	-.93
1.0	-.30	-.65	-.25	-.18	5.05	4.51	.32	-.05
1.5	-.09	-.11	-.17	-.15	2.16	2.28	.20	-.08
2.0	-.14	-.15	-.18	-.19	-.14	-.01	-.01	-.09
2.5	-.25	-.26	-.29	-.29	-.29	-.27	-.20	-.18
3.0	-.48	-.46	-.49	-.48	-.48	-.47	-.43	-.40
3.5	-.50	-.49	-.49	-.48	-.48	-.47	-.45	-.43
4.0	-.64	-.62	-.61	-.60	-.60	-.60	-.58	-.56
4.5	-.79	-.77	-.75	-.72	-.73	-.72	-.71	-.70
5.0	-.82	-.80	-.78	-.75	-.75	-.75	-.74	-.72

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 0.0. EMR-84-1.
LACUSTRINE PLAIN: ICE-RICH SILTY CLAY IN
WIDESPREAD PERMAFROST.
TREES CLEARED TO 26.5 M IN WINTER 82/83.
CABLE ON R.O.W. 2.5 M W OF PIPELINE,
IN 25 MM OIL-FILLED PVC TUBE.
10 SENSOR YSI44033 (PAIRED COMMON).

SITE 84-1: NORMAN WELLS PUMP STATION- T3
****

65 DEGREES 17.2 MINUTES NORTH 126 DEGREES 53.1 MINUTES WEST

ELEVATION 61 METRES

	DATE 89 2 1	DATE 89 3 13	DATE 89 5 23	DATE 89 6 27	DATE 89 8 23	DATE 89 9 6	DATE 89 10 26	DATE 89 12 13
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
1.0	-5.02	-1.89	-.27	2.68	7.84	6.94	-1.98	-2.40
2.0	-2.82	-.36	-.24	-.21	1.38	1.79	-1.04	-.90
3.0	-.36	-.36	-.37	-.35	-.35	-.35	-.28	-.28
4.0	-.60	-.58	-.57	-.54	-.55	-.54	-.52	-.50
5.0	-.77	-.75	-.73	-.70	-.70		-.68	-.67
6.0	-.90	-.89	-.86	-.83	-.82	-.81	-.80	-.79
7.0	-1.16	-1.14	-1.12	-1.09	-1.08	-1.07	-1.06	-1.05
8.0	-1.29	-1.28	-1.25	-1.22	-1.21	-1.20	-1.19	-1.18
9.0	-1.43	-1.41	-1.39	-1.36	-1.35	-1.34	-1.33	-1.32
10.4	-1.56	-1.55	-1.53	-1.50	-1.49	-1.48	-1.47	-1.46

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 0.0. EMR-84-1.
LACUSTRINE PLAIN: ICE-RICH SILTY CLAY IN
WIDESPREAD PERMAFROST.
TREES CLEARED TO 26.5 M IN WINTER 82/83.
CABLE ON R.O.W. 5.8 M W OF PIPELINE,
IN 38 MM OIL-FILLED PVC TUBE.
10 SENSOR YSI44033 (PAIRED COMMON).

SITE 84-1: NORMAN WELLS PUMP STATION- T4
****

65 DEGREES 17.2 MINUTES NORTH 126 DEGREES 53.1 MINUTES WEST

ELEVATION 61 METRES

	DATE 89 2 1	DATE 89 3 13	DATE 89 5 23	DATE 89 6 27	DATE 89 8 23	DATE 89 9 6	DATE 89 10 26	DATE 89 12 13
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
1.0	-3.66	-3.87	-.58	-.15	1.57	1.73	-1.48	-.47
2.0	-1.87	-2.48	-1.25	-.90	-.55	-.48	-.74	-.38
3.0	-.86	-1.56	-1.52	-1.21	-.94	-.87	-.75	-.70
4.0	-.95	-1.24	-1.55	-1.34	-1.13	-1.08	-.97	-.91
5.0	-1.14	-1.22	-1.55	-1.45	-1.31	-1.26	-1.16	-1.11
6.0	-1.30	-1.29	-1.49	-1.48	-1.40	-1.36	-1.29	-1.25
7.0	-1.40	-1.38	-1.47	-1.49	-1.46	-1.44	-1.39	-1.37
8.0	-1.54	-1.51	-1.53	-1.54	-1.53		-1.51	-1.50
9.0	-1.64	-1.62	-1.59	-1.59	-1.60	-1.58	-1.57	-1.56
11.0	-1.70	-1.69	-1.66	-1.64	-1.64	-1.63	-1.62	-1.62
13.6	-1.74	-1.74	-1.72	-1.70	-1.70		-1.68	-1.68

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 0.0. EMR-84-1.
LACUSTRINE PLAIN: ICE-RICH SILTY CLAY IN
WIDESPREAD PERMAFROST.
TREES CLEARED TO 26.5 M IN WINTER 82/83.
CABLE OFF R.O.W. 24.1 M W OF PIPELINE,
IN 38 MM OIL-FILLED PVC TUBE.
11 SENSOR YSI44033 (PAIRED COMMON).

SITE 84-1: NORMAN WELLS PUMP STATION- T5
****

65 DEGREES 17.2 MINUTES NORTH 126 DEGREES 53.1 MINUTES WEST

ELEVATION 61 METRES

Z(M)	DATE 89 2 1 T(C)	DATE 89 3 13 T(C)	DATE 89 5 23 T(C)	DATE 89 6 27 T(C)	DATE 89 8 23 T(C)	DATE 89 9 6 T(C)	DATE 89 10 26 T(C)	DATE 89 12 13 T(C)
1.0	-.83	-1.02	-.31	-.03	2.88	2.62	-.03	-.20
2.0	-.28	-.28	-.40	-.36	-.31	-.26	-.22	-.21
3.0	-.52	-.51	-.52	-.51	-.50	-.49	-.47	-.44
4.0	-.71	-.69	-.67	-.65	-.65	-.61	-.63	-.61
6.0	-1.07	-1.06	-1.03	-1.01	-.99	-.93	-.97	-.96
8.0	-1.38	-1.37	-1.34	-1.32	-1.31	-1.25	-1.28	-1.27
10.0		-1.59	-1.56	-1.54	-1.53	-1.52	-1.51	-1.50
12.0	-1.74	-1.73	-1.71	-1.69	-1.68	-1.64	-1.66	-1.65
15.0	-1.84	-1.84	-1.82	-1.80	-1.79	-1.68	-1.78	-1.77
18.0	-1.80	-1.80	-1.79	-1.77	-1.76	-1.76	-1.75	-1.74
19.6	-1.79	-1.79	-1.78	-1.76	-1.75	-1.74	-1.74	-1.73

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 0.0. EMR-84-1.
LACUSTRINE PLAIN: ICE-RICH SILTY CLAY IN
WIDESPREAD PERMAFROST.
TREES CLEARED TO 26.5 M IN WINTER 82/83.
CABLE ON R.O.W. 7.3 M W OF PIPELINE,
IN 25 MM OIL-FILLED PVC TUBE.
11 SENSOR YSI44033 (PAIRED COMMON).

SITE 84-2A: CANYON CREEK NORTH A - T1
****

65 DEGREES 14.0 MINUTES NORTH 126 DEGREES 31.2 MINUTES WEST

ELEVATION 123 METRES

	DATE 89 1 15	DATE 89 2 12	DATE 89 3 15	DATE 89 4 15	DATE 89 5 5	DATE 89 5 23	DATE 89 6 15	DATE 89 7 3	DATE 89 8 22	DATE 89 9 7	DATE 89 10 25	DATE 89 11 15
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
.5	-3.19	-2.35	-2.99	-1.49	-.22	-.18	5.23	12.25	9.43	8.53	.40	-.34
1.0	-.43	-1.37	-.19	-1.05	-.37	-.30	.80	4.26	7.83	6.79	.73	-.02
1.5	-.09	-.33	-.79	-.61	-.30	-.28	-.20	.49	5.83	5.23	.91	.11
2.0	-.11	-.11	-.13	-.23	-.20	-.20	-.19	-.14	3.84	3.68	.89	.13
2.5	-.15	-.06	-.15	-.16	-.16	-.17	-.19	-.17	2.17	2.31	.69	.06
3.0	-.05	-.04	-.05	-.05		-.08	-.09	-.08	.67	1.14	.53	.11
3.5	-.14	-.14	-.14	-.14	-.13	-.13	-.14	-.12	.01	.00	.23	.00
4.0	-.17	-.14	-.16	-.13	-.08	-.18	-.13	-.07	.05		-.09	-.06
4.5	-.27		-.26	-.25	-.23	-.26	-.23	-.24	-.08	-.25	-.24	-.20
5.0												

DATE 89 12 15
T(C)
-1.60
-.15
-.10
-.13
-.17
-.08
-.09
-.06
-.19

TEMPERATURE RESULTS ARE OBTAINED FROM A MULTITHERMISTOR CABLE. FURTHER TEMPERATURE LOGS ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN CABLE A THERMISTORS MULTIPLES. ON PREVOIT ENTREPRENDRE D'AUTRES SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 19.0. EMR-84-2A.
MORAINIC PLAIN:FROZEN TILL WITH LOW ICE
PARTLY CLEARED IN 60'S FOR CNT LINE.
CLEARED TO 25.1 M IN WINTER 82/83.
CABLE ON R.O.W. 2 M W OF PIPELINE IN
25 MM OIL-FILLED PVC TUBE.
SEA DATA LOGGER INSTALLED 03/85.
NEW SEA DATA LOGGER INSTALLED-16/10/85.
INTERFACE UNIT AND NEW FIELD BOX
INSTALLED ON SEADATA LOGGER 23/05/89.
10 SENSOR YSI 44033 (PAIRED).

SITE 84-2A: CANYON CREEK NORTH A - T2

****

65 DEGREES 14.0 MINUTES NORTH 126 DEGREES 31.2 MINUTES WEST

ELEVATION 123 METRES

	DATE 89 1 15	DATE 89 2 12	DATE 89 3 15	DATE 89 4 15	DATE 89 5 5	DATE 89 5 23	DATE 89 6 15	DATE 89 7 3	DATE 89 8 22	DATE 89 9 7	DATE 89 10 25	DATE 89 11 15
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
.5	-6.19	-2.67	-3.57	-1.76	-.19	-.04	5.59	7.78	9.49	8.67	.07	-2.34
1.0	-1.49	-1.56	-2.15	-1.20	-.37	-.27	1.74	4.85	8.28	7.26	.88	.00
1.5	-.11	-.70	-1.20	-.79	-.39	-.34	-.20	1.04	6.46	5.79	1.06	.12
2.0	-.10	-.08	-.21	-.38	-.28	-.25	-.20	-.15	4.41	4.24	1.09	.19
2.5	-.09	-.09	-.10	-.11	-.13	-.12	-.14	-.10	2.53	2.75	.95	.19
3.0	-.11	-.09	-.11	-.13	-.14	-.15	-.16	-.14	.92	1.45	.67	.11
3.5	-.15	-.15	-.16	-.15	-.17	-.17	-.17	-.13	.00	.28	.38	.03
4.0	-.21	-.17	-.21	-.20	-.21	-.21	-.21	-.09	.05		.07	-.06
4.5	-.28	-.23	-.27	-.27	-.27	-.29	-.27	-.26		-.26	-.22	-.20
5.0	-.37	-.36	-.36	-.34	-.34	-.34	-.32	-.31		-.30	-.31	-.30

	DATE 89 12 15
Z(M)	T(C)
.5	-2.05
1.0	-.38
1.5	-.11
2.0	-.10
2.5	-.11
3.0	-.14
3.5	-.14
4.0	-.13
4.5	-.20
5.0	-.28

TEMPERATURE RESULTS ARE OBTAINED FROM A MULTITHERMISTOR CABLE. FURTHER TEMPERATURE LOGS ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN CABLE A THERMISTORS MULTIPLES. ON PREVOIT ENTREPRENDRE D'AUTRES SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 19.0. EMR-84-2A.
MORAINIC PLAIN:FROZEN TILL WITH LOW ICE
PARTLY CLEARED IN 60'S FOR CNT LINE.
CLEARED TO 25.1 M IN WINTER 82/83.
CABLE ON R.O.W. 3 M W OF PIPELINE IN
25 MM OIL-FILLED PVC TUBE.
CONNECTED TO SEADATA LOGGER 16/10/85.
INTERFACE UNIT AND NEW FIELD BOX
INSTALLED ON SEADATA LOGGER 23/05/89.
10 SENSOR YSI44033 (PAIRED).

SITE 84-2A: CANYON CREEK NORTH A - T3
****

65 DEGREES 14.0 MINUTES NORTH 126 DEGREES 31.2 MINUTES WEST

ELEVATION 123 METRES

	DATE 89 1 15	DATE 89 2 12	DATE 89 3 15	DATE 89 4 15	DATE 89 5 5	DATE 89 5 23	DATE 89 7 3	DATE 89 8 25	DATE 89 9 7	DATE 89 10 25	DATE 89 11 15	DATE 89 12 15
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
1.0	-.10	-.76	-1.42	-.89	-.43	-.34	.28	5.56	5.60	1.30	.23	-.08
2.0	-.16	-.15	-.16	-.19	-.20	-.19	-.20	1.94	2.66	1.14	.25	-.11
3.0	-.16	-.16	-.17	-.19	-.19	-.18	-.19	-.13	.18	.44	.08	-.10
4.0	-.28	-.25	-.27	-.26	-.26	-.26	-.25	-.22	-.18	-.19	-.15	-.15
6.0	-.50	-.49	-.49	-.48	-.48	-.46	-.45	-.41	-.30	-.44	-.41	-.39
8.0	-.67	-.66	-.66	-.65	-.65	-.63	-.63	-.59	-.61	-.61	-.58	-.58
10.0	-.72	-.71	-.71	-.70	-.70	-.68	-.67	-.65	-.64	-.65	-.64	-.64
12.0	-.70	-.69	-.69	-.69	-.69	-.66	-.65	-.60		-.64	-.62	-.62
15.0	-.70	-.67	-.69	-.67	-.67	-.68	-.68	-.64	-.66	-.67	-.64	-.62
18.0	-.58	-.54	-.58	-.58	-.56	-.57	-.56	-.54	-.52	-.56	-.55	-.55
19.6	-.55	-.54	-.55	-.55	-.55	-.53	-.58		-.50	-.54	-.50	-.50

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 19.0. EMR-84-2A.
MORAINIC PLAIN:FROZEN TILL WITH LOW ICE
PARTLY CLEARED IN 60'S FOR CNT LINE
CLEARED TO 25.1 M IN WINTER 82/83
CABLE ON R.O.W 6 M W OF PIPELINE IN
25MM OIL-FILLED PVC TUBE.
CONNECTED TO SEADATA LOGGER 16/10/85.
EXTENSION CABLE CHEWED - OPEN FROM
DEC. 87 TO OCT 88.
INTERFACE UNIT INSTALLED ON SEADATA
LOGGER 23/05/89 BUT CABLE ONLY CONNECTED
22/08/89. NO EXTENSION CABLE FROM 5/89
TO 8/89.
T3 CONNECTED WITH NEW EXTENSION CABLE
TO SEADATA LOGGER 22/08/89.
11 SENSOR YSI44033 (PAIRED).

SITE 84-2A: CANYON CREEK NORTH A - T4
****

65 DEGREES 14.0 MINUTES NORTH 126 DEGREES 31.2 MINUTES WEST

ELEVATION 123 METRES

Z(M)	DATE 89 1 15 T(C)	DATE 89 2 12 T(C)	DATE 89 3 15 T(C)	DATE 89 4 15 T(C)	DATE 89 5 5 T(C)	DATE 89 5 23 T(C)	DATE 89 6 15 T(C)	DATE 89 7 3 T(C)	DATE 89 8 22 T(C)	DATE 89 9 7 T(C)	DATE 89 10 25 T(C)	DATE 89 11 15 T(C)
1.0	-2.07	-.56	-.78	-.53	-.38	-.32	-.26	.03	3.45	2.73	-.56	-1.59
2.0	-.23	-.22	-.23	-.28	-.34	-.33	-.34	.15	-.16	-.11	-.09	-.38
3.0	-.42	-.41	-.39	-.38	-.39	-.41	-.42	-.24	-.39	-.37	-.35	-.34
4.0						-.50		-.48		-.49	-.48	
5.0	-.64	-.61	-.60	-.58	-.56	-.63	-.56	-.61	-.56	-.56	-.62	-.54
6.0	-.71	-.69	-.67	-.65	-.64	-.68	-.62	-.67	-.61	-.66	-.66	-.60
7.0	-.79	-.77	-.76	-.73	-.72	-.72	-.71	-.68	-.69	-.69	-.68	-.69
8.0	-.77	-.76	-.75	-.72	-.71	-.69	-.67		-.66	-.63	-.66	-.66
9.0	-.84	-.83	-.82	-.81	-.79	-.77	-.76	-.76	-.75	-.74	-.74	-.73
11.0	-.88	-.87	-.86	-.86	-.84	-.83	-.81	-.82	-.79	-.80	-.81	-.79
13.0	-.79	-.78	-.78	-.78	-.77	-.77	-.75	-.77	-.75	-.76	-.77	-.75

Z(M)	DATE 89 12 15 T(C)
1.0	-.70
2.0	-.11
3.0	-.33
4.0	
5.0	-.53
6.0	-.59
7.0	-.67
8.0	-.64
9.0	-.72
11.0	-.78
13.0	-.73

TEMPERATURE RESULTS ARE OBTAINED FROM A MULTITHERMISTOR CABLE. FURTHER TEMPERATURE LOGS ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN CABLE A THERMISTORS MULTIPLES. ON PREVOIT ENTREPRENDRE D'AUTRES SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 19.0. EMR-84-2A.
MORAINIC PLAIN:FROZEN TILL WITH LOW ICE.
PARTLY CLEARED IN 60'S FOR CNT LINE.
CLEARED TO 25.1 M IN WINTER 82/83.
CABLE OFF R.O.W 20 M W OF PIPELINE IN
38MM OIL-FILLED PVC TUBE.
CONNECTED TO SEADATA LOGGER 27/10/88.
INTERFACE UNIT AND NEW FIELD BOX
INSTALLED ON SEADATA LOGGER 23/05/89.
11 SENSOR YSI44033 (PAIRED)

SITE 84-2A: CANYON CREEK NORTH A - PR 2810/T5
****

65 DEGREES 14.0 MINUTES NORTH 126 DEGREES 31.2 MINUTES WEST

ELEVATION 123 METRES

	DATE 89 8 22	DATE 89 9 7	DATE 89 10 27	DATE 89 11 15	DATE 89 12 15
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)
.2	12.27	8.75		-1.91	-2.87
.4	10.82	8.16	11.62	-.58	-2.21
.6	11.62	6.14		-.04	-1.40
.8	10.66	4.70		-.04	-.60
1.0	4.39	3.51	.14	-.14	-.26
1.2	3.95	3.96	.32	.09	.00
1.4	3.78	3.64	.64	.73	.54
1.6					

TEMPERATURE RESULTS ARE OBTAINED FROM A MULTITHERMISTOR CABLE. FURTHER TEMPERATURE LOGS ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN CABLE A THERMISTORS MULTIPLES. ON PREVOIT ENTREPRENDRE D'AUTRES SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 19.0 EMR-84-2A.
LOCATED 10 CM FROM PIPE. PROBE CONNECTED TO SEADATA LOGGER ON T5 CHANNEL 22/08/89.
DEPTHS ARE SENSOR SPACING ON PROBE.
ZERO MARK WAS 15 CM BELOW GROUND AT INSTALLATION.
8 SENSOR YSI44033 (PAIRED).

SITE 84-2A: CANYON CREEK NORTH A - PR 2812/T6
****

65 DEGREES 14.0 MINUTES NORTH 126 DEGREES 31.2 MINUTES WEST

ELEVATION 123 METRES

	DATE	DATE	DATE	DATE	DATE
	89 8 22	89 9 7	89 10 27	89 11 15	89 12 15
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)
.2	12.50	8.97		-1.98	-2.84
.4	11.36	8.50	6.32	-.71	-2.46
.6	12.57	6.61		-.33	-1.69
.8	8.70	5.58	-.38	-.02	-.42
1.0	5.85	4.93	.33	.17	.03
1.2	4.92	4.45	.22	-.10	-.30
1.4	4.29	3.77	.31	-.05	-.22
1.6					

TEMPERATURE RESULTS ARE OBTAINED FROM A MULTITHERMISTOR CABLE. FURTHER TEMPERATURE LOGS ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN CABLE A THERMISTORS MULTIPLES. ON PREVOIT ENTREPRENDRE D'AUTRES SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 19.0 EMR-84-2A LOCATED 35 CM FROM PIPE. PROBE CONNECTED TO SEADATA LOGGER ON T6 CHANNEL 22/08/89.
DEPTHS ARE SENSOR SPACING ON PROBE.
ZERO MARK WAS 15 CM BELOW GROUND AT INSTALLATION.
8 SENSOR YSI44033 (PAIRED).

SITE 84-2B: CANYON CREEK NORTH B - T1/HT190
****

65 DEGREES 14.0 MINUTES NORTH 126 DEGREES 31.0 MINUTES WEST

ELEVATION 110 METRES

	DATE 89 2 2	DATE 89 3 14	DATE 89 4 7	DATE 89 5 23	DATE 89 7 3	DATE 89 8 22	DATE 89 9 7	DATE 89 10 25	DATE 89 12 14
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
.5	-4.63	-4.03	-4.00	.01	.72	3.83	3.44	-.05	-2.35
1.0	-.44	-.97	-1.63	-.39	-.30	-.24	-.23	-.20	-.19
1.5	-.20	-.37	-.91	-.48	-.37	-.30	-.28	-.23	-.21
2.0	-.16	-.19	-.41	-.47	-.38	-.27	-.23	-.17	-.16
2.5	-.18	-.20	-.29	-.48	-.41	-.30	-.25	-.18	-.17
3.0	-.21	-.22	-.24	-.43	-.41	-.33	-.29	-.22	-.20
3.5	-.36	-.36	-.37	-.48	-.50	-.45	-.43	-.37	-.35
4.0	-.47	-.46	-.45	-.52	-.54	-.52	-.51	-.47	-.45
4.5	-.52	-.51	-.50	-.53	-.55	-.55	-.54	-.51	-.50
5.0	-.63	-.62	-.60	-.60	-.61	-.61	-.61	-.60	-.59

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 19.3. EMR-84-2B
STEEP EAST-FACING ICE-RICH SLOPE WITH
WOODCHIP COVER. CNT CLEARING IN 60'S.
HAND CLEARED TO 21.4 M IN WINTER 84.
CABLE ON R.O.W. 1 M W OF PIPELINE IN
25MM OIL-FILLED PVC TUBE.
CABLE HT190 REPLACED CABLE T1 ON
JULY 10/88.
10 SENSOR YSI44033 (PAIRED).

SITE 84-2B: CANYON CREEK NORTH B - T2
****

65 DEGREES 14.0 MINUTES NORTH 126 DEGREES 31.0 MINUTES WEST

ELEVATION 110 METRES

	DATE 89 2 2	DATE 89 3 14	DATE 89 4 7	DATE 89 5 23	DATE 89 7 3	DATE 89 8 22	DATE 89 9 7	DATE 89 10 25	DATE 89 12 14
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
.5	-3.02	-2.58	-2.92	-.26	-.21	.01	.09	-.19	-.94
1.0	-.30	-1.06	-1.60	-.59	-.45	-.40	-.36	-.32	-.29
1.5	-.32	-.62	-1.00	-.68	-.53	-.47	-.43	-.40	-.35
2.0	-.34	-.42	-.59	-.68	-.56	-.51	-.47	-.42	-.38
2.5	-.32	-.32	-.38	-.57	-.51	-.47	-.43	-.39	-.35
3.0	-.45	-.45	-.47	-.61	-.61	-.58	-.55	-.51	-.47
3.5	-.48	-.47	-.47	-.56	-.58	-.57	-.55	-.52	-.48
4.0	-.52	-.50	-.49	-.54		-.57	-.54	-.53	-.50
4.5	-.65	-.64	-.63	-.65	-.67	-.68	-.66	-.66	-.63
5.0	-.77	-.76	-.74	-.74	-.73	-.75	-.74	-.75	-.74

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 19.3. EMR-84-2B
STEEP EAST-FACING ICE-RICH SLOPE WITH
WOODCHIP COVER. CNT CLEARING IN 60'S.
HAND CLEARED TO 21.4 M IN WINTER 84.
CABLE ON R.O.W. 2 M W OF PIPELINE IN
25MM OIL-FILLED PVC TUBE.
10 SENSOR YSI44033 (PAIRED).

SITE 84-2B: CANYON CREEK NORTH B - T3
****

65 DEGREES 14.0 MINUTES NORTH 126 DEGREES 31.0 MINUTES WEST

ELEVATION 110 METRES

Z(M)	DATE 89 2 2 T(C)	DATE 89 3 14 T(C)	DATE 89 4 7 T(C)	DATE 89 5 23 T(C)	DATE 89 7 3 T(C)	DATE 89 8 22 T(C)	DATE 89 9 7 T(C)	DATE 89 10 25 T(C)	DATE 89 12 14 T(C)
1.0	-.37	-1.29	-1.96	-.80	-.58	-.52	-.45	-.38	-.35
2.0	-.43	-.55	-.79	-.92	-.75	-.68	-.61	-.55	-.51
3.0	-.64		-.65	-.85	-.81	-.81	-.76	-.72	-.69
4.0	-.68	-.80		-.72	-.75	-.77	-.74	-.71	-.69
6.0	-.82	-.82	-.81	-.80	-.80	-.83	-.81	-.80	-.79
8.0	-.90	-.88	-.94	-.88	-.86	-.88	-.85	-.86	-.85
10.0	-.95		-.94	-.93	-.91	-.93	-.91	-.91	-.90
12.0	-1.00	-.99	-.98	-.99	-.98	-.99	-.97	-.97	-.96
15.0	-.98	-.95	-.91	-.97	-.96	-.97	-.96	-.96	-.95
18.0	-.83	-.83	-.83	-.82	-.80	-.82	-.80	-.81	-.80
20.5	-.85	-.81		-.86	-.85	-.88	-.87		

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 19.3. EMR-84-2B
STEEP EAST-FACING ICE-RICH SLOPE WITH
WOODCHIP COVER. CNT CLEARING IN 60'S.
HAND CLEARED TO 21.4 M IN WINTER 84.
CABLE ON R.O.W 4.3 M W OF PIPELINE IN
25MM OIL-FILLED PVC TUBE.
DISCONNECTED T3 FROM NRC LOGGER 23/05/89
11 SENSOR YSI44033 (PAIRED).

SITE 84-2B: CANYON CREEK NORTH B - T4
****

65 DEGREES 14.0 MINUTES NORTH 126 DEGREES 31.0 MINUTES WEST

ELEVATION 110 METRES

Z(M)	DATE 89 2 2 T(C)	DATE 89 3 14 T(C)	DATE 89 4 7 T(C)	DATE 89 8 22 T(C)	DATE 89 9 7 T(C)	DATE 89 10 25 T(C)	DATE 89 12 14 T(C)
1.0	-3.74	-4.41	-5.19	1.26	1.18	-.30	-1.14
2.0	-1.02	-2.72	-3.46	-1.00	-.81	-.58	-.49
3.0	-.99		-2.27	-1.51	-1.35	-1.09	-.92
4.0	-1.30		-1.67	-1.74	-1.62	-1.41	-1.25
6.0	-1.62	-1.54	-1.52	-1.76	-1.21	-1.62	-1.53
8.0	-1.65	-1.60	-1.56	-1.62	-1.58	-1.62	-1.53
10.0	-1.61		-1.56	-1.55		-1.52	-1.50
12.0	-1.51	-1.49	-1.48	-1.46	-1.43	-1.43	-1.42
15.0	-1.35	-1.35	-1.34	-1.34	-1.32	-1.31	-1.30
18.0	-1.10	-1.10	-1.09	-1.11	-1.09	-1.09	-1.08
20.6	-.92	-.91	-.91	-.92	-.90	-.91	-.90

TEMPERATURE RESULTS ARE OBTAINED FROM A MULTITHERMISTOR CABLE. FURTHER TEMPERATURE LOGS ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN CABLE A THERMISTORS MULTIPLES. ON PREVOIT ENTREPRENDRE D'AUTRES SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 19.3. EMR-84-2B
STEEP EAST-FACING ICE-RICH SLOPE WITH WOODCHIP COVER. CNT CLEARING IN 60'S. HAND CLEARED TO 21.4 M IN WINTER 84. CABLE OFF R.O.W. 23.3 M W OF PIPELINE IN 25MM OIL-FILLED PVC TUBE. DISCONNECTED T4 FROM NRC LOGGER ON 23/05/89.
11 SENSOR YSI44033 (PAIRED).

SITE 84-2C: CANYON CREEK SOUTH C - T1
****

65 DEGREES 13.6 MINUTES NORTH 126 DEGREES 30.5 MINUTES WEST

ELEVATION 119 METRES

	DATE 89 2 2	DATE 89 3 14	DATE 89 5 23	DATE 89 7 2	DATE 89 8 22	DATE 89 9 7	DATE 89 10 25	DATE 89 12 14
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
.5	-3.67	-3.43	-.31	7.70	10.92	9.58	1.00	-.59
1.0	-1.15	-2.08	-.51	4.60	9.62	8.46	1.76	.09
1.5	-.08	-.63	-.56	.29	7.52	7.15	2.55	.48
2.0	.09	-.12	-.34	-.24	5.23	5.71	3.15	.92
2.5	.20	-.06	-.14	-.14	3.15	4.14	3.33	1.24
3.0	.31	.05	-.05	-.05	1.79	2.84	3.17	1.46
3.5	.29	.05	-.05		1.01	1.90	2.72	1.41
4.0	.21	.01	-.08	-.07	.53	1.19	2.15	1.23
4.5	.18	.04	-.03	-.03	.28	.68	1.56	1.04
5.0	-.05	-.06	-.07	-.07	-.07	-.06	.29	.41

TEMPERATURE RESULTS ARE OBTAINED FROM A MULTITHERMISTOR CABLE. FURTHER TEMPERATURE LOGS ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN CABLE A THERMISTORS MULTIPLES. ON PREVOIT ENTREPRENDRE D'AUTRES SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 19.6. EMR-84-2C
STEEP WEST-FACING ICE-RICH SLOPE WITH EROSION CONTROL BERM UPSLOPE OF THERMAL INSTRUMENTATION. CNT LINE CLEARING IN 60'S. HELIPAD DOWNSLOPE CLEARED IN 70'S HAND CLEARED TO 21.7M IN JAN. 84.
CABLE ON R.O.W. 1 M E OF PIPELINE IN 25MM OIL-FILLED PVC TUBE.
10 SENSOR YSI44033 (PAIRED).

SITE 84-2C: CANYON CREEK SOUTH C - T2
****

65 DEGREES 13.6 MINUTES NORTH 126 DEGREES 30.5 MINUTES WEST

ELEVATION 119 METRES

	DATE 89 2 2	DATE 89 3 14	DATE 89 5 23	DATE 89 7 2	DATE 89 8 22	DATE 89 9 7	DATE 89 10 25	DATE 89 12 14
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
.5	-4.61	-3.86	.58	9.81	11.92	11.12	.40	-1.35
1.0	-2.00	-2.65	-.40	6.87	11.67	10.37	1.87	-.07
1.5	-.12	-1.33	-.55	3.43	10.27	9.38	2.69	.29
2.0	.09	-.09	-.40	-.11	7.95	7.90	3.53	.81
2.5	.16	-.07	-.17	-.10	5.35	6.04	3.82	1.16
3.0	.28	.01	-.08	-.07	3.29	4.30	3.73	1.46
3.5	.27	.01	-.10	-.09	1.78	2.77	3.22	1.49
4.0	.22	-.01	-.12	-.11	1.02	1.85	2.66	1.38
4.5	.13	-.05	-.13	-.13	.49	1.08	1.99	1.16
5.0	-.03	-.10	-.13	-.10	-.06	.10	.70	.61

TEMPERATURE RESULTS ARE OBTAINED FROM A MULTITHERMISTOR CABLE. FURTHER TEMPERATURE LOGS ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN CABLE A THERMISTORS MULTIPLES. ON PREVOIT ENTREPRENDRE D'AUTRES SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 19.6. EMR-84-2C
STEEP WEST-FACING ICE-RICH SLOPE WITH EROSION CONTROL BERM UPSLOPE OF THERMAL INSTRUMENTATION. CNT LINE CLEARING IN 60'S. HELIPAD DOWNSLOPE CLEARED IN 70'S HAND CLEARED TO 21.7M IN JAN. 84.
CABLE ON R.O.W. 2 M E OF PIPELINE IN 25MM OIL-FILLED PVC TUBE.
10 SENSOR YSI44033 (PAIRED).

SITE 84-2C: CANYON CREEK SOUTH C - T3
****

65 DEGREES 13.6 MINUTES NORTH 126 DEGREES 30.5 MINUTES WEST

ELEVATION 119 METRES

	DATE 89 2 2	DATE 89 3 14	DATE 89 5 23	DATE 89 7 2	DATE 89 8 22	DATE 89 9 7	DATE 89 10 25	DATE 89 12 14
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
1.0	-2.42	-2.58	-.40	7.09	11.94	10.83	2.33	-.42
2.0	.03	-.14	-.40	-.05	8.18	8.33	4.06	.75
3.0	.27		-.01	.00	3.60	4.61	3.96	1.47
4.0	.07	-.11	-.18	-.16	1.12	1.90	2.51	1.18
6.0	-.19	-.20	-.19	-.17	-.21	-.19	-.18	.04
8.0	-.43	-.42	-.41	-.39	-.40	-.38	-.38	-.36
10.0	-.73	-.73	-.73	-.71	-.75	-.74	-.77	-.80
12.0	-.83	-.83	-.82	-.80	-.81	-.80	-.80	-.79
15.0								
18.0	-1.05	-1.05	-1.05	-1.04	-1.06	-1.04	-1.06	-1.07
19.4								

TEMPERATURE RESULTS ARE OBTAINED FROM A MULTITHERMISTOR CABLE. FURTHER TEMPERATURE LOGS ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN CABLE A THERMISTORS MULTIPLES. ON PREVOIT ENTREPRENDRE D'AUTRES SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 19.6. EMR-84-2C.
STEEP WEST-FACING ICE-RICH SLOPE WITH EROSION CONTROL BERM UPSLOPE OF THERMAL INSTRUMENTATION. CNT LINE CLEARING IN 60'S. HELIPAD DOWNSLOPE CLEARED IN 70'S HAND CLEARED TO 21.7M IN JAN. 84.
CABLE ON R.O.W. 4.5 M E OF PIPELINE IN 25MM OIL-FILLED PVC TUBE.
15.0 M AND 19.4 M SENSORS REMOVED AS OF 01/86 AND 01/87, RESPECTIVELY, BECAUSE OF SLOW DRIFT.
11 SENSOR YSI44033 (PAIRED).

SITE 84-2C: CANYON CREEK SOUTH C - T4
****

65 DEGREES 13.6 MINUTES NORTH 126 DEGREES 30.5 MINUTES WEST

ELEVATION 119 METRES

Z(M)	DATE 89 2 2 T(C)	DATE 89 3 14 T(C)	DATE 89 5 23 T(C)	DATE 89 7 2 T(C)	DATE 89 8 22 T(C)	DATE 89 9 7 T(C)	DATE 89 10 25 T(C)	DATE 89 12 14 T(C)
1.0	-.76	-.91	-.50	-.18	3.09	2.79	-.02	-.07
2.0	-.22	-.32	-.69	-.56	-.30	-.05	-.05	-.07
3.0	-.59	-.57	-.81	-.76	-.72	-.61	-.52	-.47
4.0	-.82	-.78	-.85	-.86	-.86	-.79	-.74	-.70
6.0	-.98	-.95	-.91	-.90	-.93	-.90	-.88	-.86
8.0	-1.07	-1.05	-1.02	-.99	-1.02	-.99	-.98	-.97
10.0	-1.06	-1.04	-1.03	-1.01	-1.02	-1.00	-.99	-.98
12.0	-1.04	-1.04	-1.02	-1.01	-1.03	-1.00	-1.00	-.99
15.0	-1.03	-1.04	-1.03	-1.02	-1.03	-1.01	-1.01	-1.01
18.0	-1.00	-1.00	-.99	-.98	-1.00	-.98	-.98	-.97
20.0	-.93	-.92	-.92	-.90	-.92	-.90	-.90	-.90

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 19.6. EMR-84 2C
STEEP WEST-FACING ICE-RICH SLOPE WITH
EROSION CONTROL BERM UPSLOPE OF THERMAL
INSTRUMENTATION. CNT LINE CLEARING IN
60'S. HELIPAD DOWNSLOPE CLEARED IN 70'S
HAND CLEARED TO 21.7M IN JAN. 84.
CABLE OFF R.O.W.18 M E OF PIPELINE IN
38MM OIL-FILLED PVC TUBE.
11 SENSOR YSI44033 (PAIRED)

SITE 84-3A: GREAT BEAR RIVER A - T1
****

64 DEGREES 54.4 MINUTES NORTH 125 DEGREES 34.3 MINUTES WEST

ELEVATION 70 METRES

	DATE 89 1 15	DATE 89 2 2	DATE 89 3 15	DATE 89 4 15	DATE 89 5 22	DATE 89 6 15	DATE 89 7 2	DATE 89 8 22	DATE 89 9 7	DATE 89 10 15	DATE 89 11 15	DATE 89 12 15
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
.5												
1.0	-1.15	-2.12	-2.38	-1.26	-.34	-.09	-.13	5.48	5.41	.86	-.42	-.07
1.5												
2.0	-.36	-.31	-.30	-.62	-.52	-.47	-.45	-.39	-.28	-.36	-.34	-.31
2.5	-.43	-.39	-.38	-.47	-.50	-.47	-.48	-.28	-.31	-.39	-.38	-.32
3.0	-.49	-.47	-.44	-.47	-.48	-.47	-.45	-.41	-.42	-.39	-.39	-.37
3.5	-.62	-.57	-.55	-.58	-.58	-.58	-.56	-.54	-.54	-.55	-.55	-.51
4.0	-.78	-.74	-.72	-.73	-.73	-.71	-.73	-.60	-.61	-.71	-.70	-.67
4.7	-.77	-.73	-.70	-.71	-.69	-.69	-.71	-.66	-.67	-.67	-.67	-.65

TEMPERATURE RESULTS ARE OBTAINED FROM A MULTITHERMISTOR CABLE. FURTHER TEMPERATURE LOGS ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN CABLE A THERMISTORS MULTIPLES. ON PREVOIT ENTREPRENDRE D'AUTRES SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 79.2. EMR-84-3A
STRATIGRAPHICALLY COMPLEX,ICE-RICH ALLUVIAL DEPOSITS. MAJOR NORTH-FACING SLOPE.
CLEARED TO 43.6M IN JAN. 84.
CABLE ON R.O.W. 1.5 M W OF PIPELINE IN 25MM OIL-FILLED PVC TUBE.
SEA DATA LOGGER INSTALLED-11/10/85.
INTERFACE UNIT INSTALLED 28/10/88.
9 SENSOR YSI44033 (PAIRED).

SITE 84-3A: GREAT BEAR RIVER A - T2

****

64 DEGREES 54.4 MINUTES NORTH 125 DEGREES 34.3 MINUTES WEST

ELEVATION 70 METRES

	DATE 89 1 15	DATE 89 2 2	DATE 89 3 15	DATE 89 4 15	DATE 89 5 22	DATE 89 6 15	DATE 89 7 2	DATE 89 8 22	DATE 89 9 7	DATE 89 10 15	DATE 89 11 15	DATE 89 12 15
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
.5	-4.96	.72	-4.46	-1.25	-.04	1.68	3.68	9.86	9.36	-1.81	-5.64	-1.25
1.0	-.15	-.64	-1.54	-1.33	-.47	-.34	-.16	2.83	3.60	.65	-.15	-.09
1.5	-.30	-.24	-.28	-1.00	-.58	-.47	-.39	-.34	-.31	-.22	-.23	-.20
2.0	-.41	-.36	-.35	-.65	-.58	-.51	-.40	-.42	-.31	-.38	-.37	-.34
2.5	-.49	-.45	-.43	-.53	-.57	-.54	-.50	-.50	-.48	-.45	-.44	-.39
3.0	-.51	-.47	-.45	-.49	-.53	-.51	-.44	-.50	-.49	-.47	-.45	-.42
3.5	-.69	-.64	-.62	-.64	-.67	-.65	-.58	-.65	-.64	-.62	-.61	-.59
4.0	-.76	-.72	-.70	-.70	-.70	-.70	-.71	-.70	-.69	-.66	-.67	-.62
4.7	-.88	-.83	-.81	-.82	-.79	-.79	-.76	-.79	-.79	-.78	-.78	-.75

TEMPERATURE RESULTS ARE OBTAINED FROM A MULTITHERMISTOR CABLE. FURTHER TEMPERATURE LOGS ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN CABLE A THERMISTORS MULTIPLES. ON PREVOIT ENTREPRENDRE D'AUTRES SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 79.2. EMR-84-3A
STRATIGRAPHICALLY COMPLEX. ICE-RICH ALLUVIAL DEPOSITS. MAJOR NORTH-FACING SLOPE.
CLEARED TO 43.6M IN JAN. 84.
CABLE ON R.O.W. 2.5 M W OF PIPELINE IN 25MM OIL-FILLED PVC TUBE.
SEA DATA LOGGER INSTALLED-11/10/85.
INTERFACE UNIT INSTALLED 28/10/88.
9 SENSOR YSI44033 (PAIRED).

SITE 84-3A: GREAT BEAR RIVER A - T3

****

64 DEGREES 54.4 MINUTES NORTH 125 DEGREES 34.3 MINUTES WEST

ELEVATION 70 METRES

	DATE 89 1 15	DATE 89 2 2	DATE 89 3 15	DATE 89 4 15	DATE 89 5 22	DATE 89 6 15	DATE 89 7 2	DATE 89 8 22	DATE 89 9 7	DATE 89 10 15	DATE 89 11 15	DATE 89 12 15
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
1.0	-1.01	-1.35	-1.60	-1.23	-.48	-.39	-.28	3.37	3.19	.26	-.65	-.17
2.0	-.37	-.31	-.32	-.43	-.57	-.55	-.50	-.28	-.33	-.34	-.33	-.27
3.0												
4.0	-.76	-.72	-.70	-.71	-.73	-.76	-.75	-.72	-.67	-.67	-.67	-.62
6.0	-1.08	-1.03	-1.01	-1.00	-.97	-.99	-.95	-.88	-.89	-.93	-.95	-.89
8.0	-1.25	-1.21	-1.20	-1.19	-1.15	-1.15	-1.14	-1.12	-1.12	-1.11	-1.11	-1.06
10.0	-1.44	-1.41	-1.40	-1.39	-1.35	-1.34	-1.33	-1.32	-1.31	-1.28	-1.29	-1.23
12.0	-1.60	-1.57	-1.56	-1.55	-1.52	-1.50	-1.43		-1.38	-1.45	-1.47	-1.42
15.0	-1.74	-1.68	-1.68	-1.70	-1.65	-1.66	-1.66	-1.64	-1.64	-1.60	-1.61	-1.56
18.0	-1.80	-1.78	-1.77		-1.75	-1.74	-1.72	-1.70	-1.70	-1.69	-1.69	-1.64
22.1	-1.87	-1.81	-1.81		-1.79	-1.81	-1.77	-1.70	-1.69	-1.74	-1.78	-1.70

TEMPERATURE RESULTS ARE OBTAINED FROM A MULTITHERMISTOR CABLE. FURTHER TEMPERATURE LOGS ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN CABLE A THERMISTORS MULTIPLES. ON PREVOIT ENTREPRENDRE D'AUTRES SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 79.2. EMR-84-3A
STRATIGRAPHICALLY COMPLEX. ICE-RICH ALLUVIAL DEPOSITS. MAJOR NORTH-FACING SLOPE.
CLEARED TO 43.6M IN JAN. 84.
CABLE ON R.O.W. 4.8 M W OF PIPELINE IN 25MM OIL-FILLED PVC TUBE.
SEA DATA LOGGER INSTALLED-11/10/85.
INTERFACE UNIT INSTALLED 28/10/88.
11 SENSOR YSI44033 (PAIRED).

SITE 84-3A: GREAT BEAR RIVER A - T4
****

64 DEGREES 54.4 MINUTES NORTH 125 DEGREES 34.3 MINUTES WEST

ELEVATION 70 METRES

	DATE 89 1 15	DATE 89 2 2	DATE 89 3 15	DATE 89 4 15	DATE 89 5 22	DATE 89 6 15	DATE 89 7 15	DATE 89 8 15	DATE 89 9 15	DATE 89 10 15	DATE 89 11 15	DATE 89 12 15
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
.5	-6.74	-7.11	-5.74	-5.41	-1.43	-.98	-.64	-.45	-.36	-1.61	-3.38	-1.93
1.0	-5.70	-5.83	-5.07	-5.04	-2.01	-1.53	-1.12	-.87	-.73	-1.58	-3.31	-1.75
1.5	-4.75	-4.94	-4.43	-4.60	-2.54	-1.98	-1.44	-1.23	-.82	-1.25	-2.85	-1.29
2.0	-3.89	-4.09	-3.86	-4.18	-2.80	-2.26	-1.80	-1.51	-1.33	-1.21	-2.29	-1.14
2.5	-2.64	-2.92	-3.52	-3.86	-2.98	-2.46	-1.97	-1.70	-1.54	-1.39	-1.61	-1.22
3.0	-2.04	-2.38	-3.19	-3.56	-3.04	-2.57	-2.10	-1.85	-1.70	-1.55	-1.48	-1.37
4.0	-1.55	-1.76	-2.56	-2.95	-2.86	-2.58	-2.23	-1.99	-1.83	-1.69	-1.58	-1.48
5.0	-1.74	-1.77	-2.31	-2.68	-2.78	-2.57	-2.35	-2.18	-2.05	-1.93	-1.85	-1.70
6.0	-1.58	-1.54	-1.86	-2.16	-2.33	-2.31	-2.16	-2.03	-1.91	-1.80	-1.70	-1.60
7.0	-1.89	-1.83	-1.98		-2.37	-2.42	-2.35	-2.26	-2.19	-2.09	-2.00	-1.92
8.0	-1.92	-1.84	-1.92		-2.24	-2.31	-2.16	-2.15	-1.89	-2.05	-1.99	-1.83

TEMPERATURE RESULTS ARE OBTAINED FROM A MULTITHERMISTOR CABLE. FURTHER TEMPERATURE LOGS ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN CABLE A THERMISTORS MULTIPLES. ON PREVOIT ENTREPRENDRE D'AUTRES SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 79.2. EMR-84-3A
STATIGRAPHICALLY COMPLEX. ICE-RICH ALLUVIAL DEPOSITS. MAJOR NORTH-FACING SLOPE.
CLEARED TO 46.3M IN JAN. 84.
CABLE OFF R.O.W. 22.5 M W OF PIPELINE IN 38MM OIL-FILLED PVC TUBE.
SEA DATA LOGGER INSTALLED - 11/10/85.
INTERFACE UNIT INSTALLED 28/10/88.
11 SENSOR YSI44033 (PAIRED)

SITE 84-3B: GREAT BEAR RIVER B - T1

****

64 DEGREES 54.4 MINUTES NORTH 125 DEGREES 34.5 MINUTES WEST

ELEVATION 93 METRES

	DATE 89 2 2	DATE 89 3 14	DATE 89 5 22	DATE 89 7 2	DATE 89 8 22	DATE 89 9 7	DATE 89 10 25	DATE 89 12 20
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
.5	-6.17	-5.69	2.12	6.97	9.48	8.79	-1.13	-3.34
1.0	-.58	-1.96	-.13	2.56	7.55	6.42	.52	-.09
1.5	-.88	-.90	-.96	-.94	4.26	3.53	-.33	-1.02
2.0								
2.5	-.10	-.10	-.10	-.08	.40	.63	.13	-.09
3.0	-.28	-.30	-.33	-.30	-.32	-.31	-.29	-.27
3.5	-.54	-.55	-.56	-.44	-.58	-.53	-.55	-.52
4.0								
5.0	-.78	-.78	-.77	-.76	-.78	-.78	-.79	-.79
6.3	-.87	-.87	-.86	-.86	-.89	-.88	-.90	-.91

TEMPERATURE RESULTS ARE OBTAINED FROM A MULTITHERMISTOR CABLE. FURTHER TEMPERATURE LOGS ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN CABLE A THERMISTORS MULTIPLES. ON PREVOIT ENTREPRENDRE D'AUTRES SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 79.4. EMR-84-3B
ICE-RICH LACUSTRINE DEPOSITS OVERLAIN BY VENEER OF AEOLIAN DEPOSITS. CLIFF TOP. HAND CLEARED TO 16.3M IN JAN. 84. CABLE ON R.O.W. 2 M W OF PIPELINE IN 25MM OIL-FILLED PVC TUBE.
10 SENSOR YSI44033 (PAIRED).

SITE 84-3B: GREAT BEAR RIVER B - T2

****

64 DEGREES 54.4 MINUTES NORTH 125 DEGREES 34.5 MINUTES WEST

ELEVATION 93 METRES

Z(M)	DATE 89 2 2 T(C)	DATE 89 3 14 T(C)	DATE 89 5 22 T(C)	DATE 89 7 2 T(C)	DATE 89 8 22 T(C)	DATE 89 9 7 T(C)	DATE 89 10 25 T(C)	DATE 89 12 20 T(C)
.5	-8.23	-6.59	3.31	7.15	9.13	8.58	-1.50	-4.65
1.0	-1.56	-2.29	-.19	2.90	7.13	6.09	.34	-.23
1.5	-.09	-.12	-.15	-.10	4.86	4.21	.47	-.09
2.0	-.12	-.12	-.12	-.09	2.45	2.31	.30	-.13
2.5	-.14	-.15	-.15	-.13	.18	.45	.03	-.13
3.0	-.22	-.22	-.24	-.23	-.25	-.22	-.20	-.19
3.5	-.27	-.27	-.29	-.28	-.31	-.27	-.25	-.23
4.0	-.35	-.35	-.37	-.35	-.37	-.36	-.33	-.31
5.0	-.50	-.50	-.50	-.49	-.51	-.50	-.49	-.48
6.3	-.78	-.77	-.76	-.80	-.80	-.76	-.76	-.75

TEMPERATURE RESULTS ARE OBTAINED FROM A MULTITHERMISTOR CABLE. FURTHER TEMPERATURE LOGS ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN CABLE A THERMISTORS MULTIPLES. ON PREVOIT ENTREPRENDRE D'AUTRES SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 79.4. EMR-84-3B
ICE-RICH LACUSTRINE DEPOSITS OVERLAIN BY VENEER OF AEOLIAN DEPOSITS. CLIFF TOP. HAND CLEARED TO 16.3M IN JAN. 84.
CABLE ON R.O.W. 3 M W OF PIPELINE IN 25MM OIL-FILLED PVC TUBE.
10 SENSOR YSI44033 (PAIRED).

SITE 84-3B: GREAT BEAR RIVER B - T3
****

64 DEGREES 54.4 MINUTES NORTH 125 DEGREES 34.5 MINUTES WEST

ELEVATION 93 METRES

	DATE 89 2 2	DATE 89 3 14	DATE 89 5 22	DATE 89 7 2	DATE 89 8 22	DATE 89 9 7	DATE 89 10 25	DATE 89 12 20
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
1.0	-.60	-1.74	-.18	.90	4.51	4.03	.21	-.09
2.0	-.07	-.07	-.08	-.08	-.13	.17	-.01	-.07
3.0	-.23	-.23	-.30	-.29	-.33	-.27	-.23	-.22
4.0	-.40	-.39	-.46	-.46	-.48	-.43	-.40	-.37
6.0								
8.0	-1.17	-1.16	-1.14	-1.13	-1.22	-1.13	-1.13	-1.12
10.0	-1.38	-1.38	-1.35	-1.33	-1.37	-1.33	-1.33	-1.31
12.0	-1.49	-1.49	-1.47	-1.45	-1.48	-1.44	-1.44	-1.42
15.0	-1.58	-1.57	-1.56	-1.55	-1.57	-1.54	-1.54	-1.53
18.0	-1.62	-1.62	-1.61	-1.60	-1.62	-1.60	-1.60	-1.59
21.4	-1.53		-1.52		-1.53	-1.51	-1.52	-1.50

TEMPERATURE RESULTS ARE OBTAINED FROM A MULTITHERMISTOR CABLE. FURTHER TEMPERATURE LOGS ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN CABLE A THERMISTORS MULTIPLES. ON PREVOIT ENTREPRENDRE D'AUTRES SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 79.4. EMR-84-3B
ICE-RICH LACUSTRINE DEPOSITS OVERLAIN BY VENEER OF AEOLIAN DEPOSITS. CLIFF TOP. HAND CLEARED TO 16.3M IN JAN. 84. CABLE ON R.O.W. 5 M W OF PIPELINE IN 25MM OIL-FILLED PVC TUBE.
11 SENSOR YSI44033 (PAIRED).

SITE 84-3B: GREAT BEAR RIVER B - T4

****

64 DEGREES 54.4 MINUTES NORTH 125 DEGREES 34.5 MINUTES WEST

ELEVATION 93 METRES

Z(M)	DATE 89 2 2 T(C)	DATE 89 3 14 T(C)	DATE 89 5 22 T(C)	DATE 89 7 2 T(C)	DATE 89 8 22 T(C)	DATE 89 9 7 T(C)	DATE 89 10 25 T(C)	DATE 89 12 20 T(C)
1.0	-4.54	-4.91	-1.72	-.67	-.31	-.22		
2.0	-3.12	-4.01	-2.34	-1.35	-.81	-.68	-.55	-.51
3.0	-2.24	-3.35	-2.74	-1.81	-1.24	-1.10		
4.0	-1.66	-2.73	-2.87	-2.09	-1.57	-1.43	-1.21	-1.05
6.0	-1.58	-1.83	-2.42	-2.30	-2.07	-1.97	-1.12	
8.0	-1.77	-1.75	-1.95	-2.04		-2.00	-1.91	-1.80
10.0	-1.86	-1.83	-1.82	-1.84		-1.90		
12.0	-1.81	-1.80	-1.77	-1.77		-1.78		
15.0	-1.74	-1.74	-1.73	-1.72		-1.71	-1.72	-1.71
18.0	-1.53	-1.54	-1.53	-1.52		-1.53	-1.53	-1.52
20.9	-1.47	-1.48	-1.48			-1.47	-1.48	-1.48

TEMPERATURE RESULTS ARE OBTAINED FROM A MULTITHERMISTOR CABLE. FURTHER TEMPERATURE LOGS ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN CABLE A THERMISTORS MULTIPLES. ON PREVOIT ENTREPRENDRE D'AUTRES SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 79.4. EMR-84-3B
ICE-RICH LACUSTRINE DEPOSITS OVERLAIN BY VENEER OF AEOLIAN DEPOSITS. CLIFF TOP. HAND CLEARED TO 16.3M IN JAN. 84. CABLE OFF R.O.W. 23 M W OF PIPELINE IN 25 MM OIL-FILLED PVC TUBE.
11 SENSOR YSI44033 (PAIRED).

SITE KM 95.1(OLD 4B-T2)

****

0 DEGREES .0 MINUTES NORTH 0 DEGREES .0 MINUTES WEST

ELEVATION 110 METRES

Z(M)	DATE 89 3 15 T(C)	DATE 89 5 22 T(C)	DATE 89 6 28 T(C)	DATE 89 8 11 T(C)	DATE 89 9 8 T(C)
.5	-1.23	-.07	2.79	12.42	5.58
1.0	-.11	-.07	-.03	8.55	6.70
1.5	-.05	-.04	-.04	5.36	4.95
2.0	-.01	.00	.01	2.10	2.68
2.5	-.11	-.09	-.09	-.08	.23
3.0	-.13	-.12	-.11	-.10	-.07
3.5	-.31	-.30	-.29	-.28	-.28
4.0	-.30	-.28	-.27	-.26	
4.5	-.41	-.40	-.37	-.38	-.38
5.5					

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 95.2
THERMOKARST POND TO SOUTH OF NEW CABLE,
ON EAST SIDE OF R.O.W. ENCOMPASSING
TRENCH.
GROUND FROZEN BELOW 1.5M.
38MM P.V.C. PIPE INFILLED WITH SILICONE.
THERMISTOR STRING 84-4B-T2 INSTALLED.
CABLE LOCATED 1.5M W OF PIPELINE.
10 SENSOR YSI44032 (PAIRED).

SITE KM 135 - CABLE HA127

****

0 DEGREES .0 MINUTES NORTH 0 DEGREES .0 MINUTES WEST

ELEVATION 130 METRES

	DATE 89 3 15	DATE 89 5 22	DATE 89 7 2	DATE 89 8 11	DATE 89 9 8
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)
.5	-.02	-.02	-.01	4.58	4.28
1.0	-.09	-.09	-.08	2.18	2.47
2.0	-.32	-.32	-.31	-.30	-.25
3.0	-.43	-.41	-.40	-.40	-.37
4.0	-.51	-.48	-.47	-.46	-.46
5.0	-.56	-.54	-.53	-.52	-.52
6.0	-.61	-.59	-.58		-.56
7.0		-.66	-.65	-.64	-.64
8.0	-.76	-.74	-.72	-.72	-.72
9.0	-.70	-.69	-.66	-.67	-.67
10.0		-.68	-.67	-.68	-.67

TEMPERATURE RESULTS ARE OBTAINED FROM A MULTITHERMISTOR CABLE. FURTHER TEMPERATURE LOGS ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN CABLE A THERMISTORS MULTIPLES. ON PREVOIT ENTREPRENDRE D'AUTRES SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 135.1 EMR-86-135KM
UNFROZEN POCKET, NEGATIVE ROACH,
APPROX. 30 M BETWEEN CABLES.
GROUND FROZEN BELOW 1.5M.
38MM PVC PIPE INFILLED WITH SILICONE.
CABLE LOCATED 1.4M E OF PIPELINE.
11 SENSOR YSI44033 (PAIRED).

SITE KM 135 - CABLE HA128

****

0 DEGREES .0 MINUTES NORTH 0 DEGREES .0 MINUTES WEST

ELEVATION 130 METRES

Z(M)	DATE 89 3 15 T(C)	DATE 89 5 22 T(C)	DATE 89 7 2 T(C)	DATE 89 8 11 T(C)	DATE 89 9 8 T(C)
.5	.00	.11	3.48	10.35	8.12
1.0	.03	-.09	.00	7.00	6.97
2.0	.22	.05	.23	2.88	4.78
3.0	.27	.09	.13	.94	2.82
4.0	.22	.09	.08	.52	1.46
5.0	.02	-.04	-.05		.50
6.0	-.02	-.01	-.01		.17
7.0	-.22	-.20	-.18		-.15
8.0	-.15	-.14	-.12		-.09
9.0	-.16	-.16	-.14		-.10
10.0	-.21	-.20	-.18		-.17

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 135.1 EMR-86-135KM
UNFROZEN POCKET, NEGATIVE ROACH,
APPROX. 30 M BETWEEN CABLES.
GROUND UNFROZEN TO 6.5M.
38MM PVC PIPE INFILLED WITH SILICONE.
CABLE LOCATED 1.3M E OF PIPELINE.
11 SENSOR YSI44033 (PAIRED).

SITE 85-7A: TABLE MOUNTAIN A - CABLE T1
****

63 DEGREES 36.9 MINUTES NORTH 123 DEGREES 38.8 MINUTES WEST

ELEVATION 255 METRES

	DATE 89 1 24	DATE 89 2 15	DATE 89 3 15	DATE 89 4 11	DATE 89 5 22	DATE 89 6 28	DATE 89 7 15	DATE 89 8 21	DATE 89 9 8	DATE 89 10 15	DATE 89 11 15	DATE 89 12 27
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
.5	-20.0	-13.0	-10.2	.01	18.04	21.54	11.64	14.30	24.13	-9.69	-20.7	-12.7
1.0	-6.40	-4.27	-3.81	-1.21	1.29	10.62	13.65	11.34	8.33	-3.12	-12.8	-4.99
1.5	-2.87	-1.51	-1.14	-1.00	-.20	.70	3.16	4.90	4.89	-.38	-4.86	-1.86
2.0	-.24		-.19	-.25	-.28	-.23	.39	1.63	2.58	1.55	-.72	-.20
2.5	-.18		-.20	-.18	-.22	-.21		-.18	.49	.89	.40	-.13
3.0	-.35		-.32	-.29	-.32	-.32		-.32	-.32	.26	.25	-.23
3.5	-.82		-.83	-.79	-.82	-.81		-.81	-.83	-.48	-.47	-.76
4.0	-.44	-.37	-.42	-.39	-.40	-.38	-.33	-.37	-.38	-.34	-.36	-.35
4.5	-.61	-.61	-.59	-.57	-.57	-.56	-.58	-.55	-.56	-.59	-.59	-.53
5.0	-.61	-.62	-.60	-.58	-.58	-.57	-.59	-.56	-.57	-.60	-.61	-.55

TEMPERATURE RESULTS ARE OBTAINED FROM A MULTITHERMISTOR CABLE. FURTHER TEMPERATURE LOGS ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN CABLE A THERMISTORS MULTIPLES. ON PREVOIT ENTREPRENDRE D'AUTRES SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 271.2. EMR-85-7A
ICE-RICH LACUSTRINE PLAIN WITH THICK PERMAFROST (>20M). PREVIOUSLY CLEARED 6-12M WIDE. CABLE ON R.O.W. 2.2 M W OF PIPELINE IN 25MM OIL-FILLED PVC TUBE.
SEA DATA LOGGER INSTALLED - OCT. 12/85
INTERFACE UNIT INSTALLED ON SEADATA LOGGER 25/10/88.
10 SENSOR YSI44033 (PAIRED).

SITE 85-7A: TABLE MOUNTAIN A - CABLE T2

****

63 DEGREES 36.9 MINUTES NORTH 123 DEGREES 38.8 MINUTES WEST

ELEVATION 255 METRES

	DATE 89 1 24	DATE 89 2 15	DATE 89 3 15	DATE 89 4 11	DATE 89 5 22	DATE 89 6 28	DATE 89 7 15	DATE 89 8 21	DATE 89 9 15	DATE 89 10 15	DATE 89 11 15	DATE 89 12 27
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
.5	-7.69	-5.64	-5.09	-1.49	1.59	10.06	15.81	12.47	3.97	-4.02	-7.40	-1.81
1.0	-.43	-.48	-1.12	-1.21	1.42	3.34	3.39	4.94	4.19	.92	-.39	-.17
1.5	-.09	-.11	-.12	-.13	.16		5.08	1.71	1.83	.63	.03	-.06
2.0	-.05	.01	-.07	-.05	-.06	-.04	.05	.05	.64	.40	.12	.03
2.5	-.22	-.27	-.22	-.21	-.21	-.20	-.23	-.19	-.20	-.16	-.19	-.15
3.0	-.35	-.38	-.34	-.32	-.32	-.31	-.36	-.30	-.36	-.36	-.36	-.25
3.5	-.49	-.50	-.48	-.47	-.46	-.45	-.47	-.44	-.48	-.48	-.49	-.41
4.0	-.47	-.49	-.47	-.45	-.45	-.43	-.44	-.43	-.45	-.45	-.47	-.42
4.5	-.53	-.55	-.52	-.51	-.51	-.50	-.53	-.49	-.53	-.54	-.55	-.48
5.0	-.60	-.64	-.60	-.59	-.59	-.57	-.61	-.56	-.62	-.62	-.64	-.56

TEMPERATURE RESULTS ARE OBTAINED FROM A MULTITHERMISTOR CABLE. FURTHER TEMPERATURE LOGS ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN CABLE A THERMISTORS MULTIPLES. ON PREVOIT ENTREPRENDRE D'AUTRES SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 271.2. EMR-85-7A ICE-RICH LACUSTRINE PLAIN WITH THICK PERMAFROST (>20M). PREVIOUSLY CLEARED 6-12M WIDE. CABLE ON R.O.W. 1.5 M E OF PIPELINE IN 25 MM OIL-FILLED PVC TUBE. SEA DATA LOGGER INSTALLED - OCT. 12/85 INTERFACE UNIT INSTALLED ON SEADATA LOGGER 25/10/88.
10 SENSOR YSI44033 (PAIRED).

SITE 85-7A: TABLE MOUNTAIN A - CABLE T3
****

63 DEGREES 36.9 MINUTES NORTH 123 DEGREES 38.8 MINUTES WEST

ELEVATION 255 METRES

	DATE 89 1 24	DATE 89 2 15	DATE 89 3 15	DATE 89 4 11	DATE 89 5 22	DATE 89 6 28	DATE 89 7 15	DATE 89 8 21	DATE 89 9 8	DATE 89 10 15	DATE 89 11 15	DATE 89 12 27
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
1.0	-.83	-.28	-.51	-.50	-.11	.52	.80	2.98	2.69	-.84	-3.76	-.24
2.0	-.30	-.34	-.30	-.30	-.31	-.31	-.36	-.31	-.31	-.36	-.36	-.29
3.0	-.51	-.51	-.52	-.50	-.50	-.49	-.50	-.48	-.49	-.49	-.49	-.47
4.0	-.64	-.65	-.65	-.63	-.63	-.62	-.64	-.61	-.61	-.64	-.64	-.60
6.0	-.66	-.67	-.66	-.65	-.65	-.64	-.67	-.63	-.64	-.67	-.67	-.63
8.0	-.74	-.76	-.74	-.73	-.73	-.72	-.76	-.71	-.73	-.76	-.76	-.71
10.0	-.77	-.78	-.78	-.77	-.77	-.76	-.78	-.76	-.77	-.78	-.79	-.76
12.0												
14.0	-.77	-.78	-.77	-.77	-.77	-.76	-.79	-.79	-.77	-.79	-.79	-.77
17.0	-.70	-.70	-.72	-.71	-.71	-.70	-.70	-.71	-.70	-.70	-.70	-.70
20.0	-.71	-.73	-.72	-.71	-.71	-.71	-.75	-.71	-.71	-.76	-.76	-.72

TEMPERATURE RESULTS ARE OBTAINED FROM A MULTITHERMISTOR CABLE. FURTHER TEMPERATURE LOGS ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN CABLE A THERMISTORS MULTIPLES. ON PREVOIT ENTREPRENDRE D'AUTRES SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 271.2. EMR-85-7A
ICE-RICH LACUSTRINE PLAIN WITH THICK PERMAFROST (>20M). PREVIOUSLY CLEARED 6-12M WIDE. CABLE ON R.O.W. 6.5 M E OF PIPELINE IN 25MM OIL-FILLED PVC TUBE.
SEA DATA LOGGER INSTALLED OCT 12/85
INTERFACE UNIT INSTALLED ON SEADATA LOGGER 25/10/88.
11 SENSOR YSI44033 (PAIRED).

SITE 85-7A: TABLE MOUNTAIN A - CABLE T4

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63 DEGREES 36.9 MINUTES NORTH 123 DEGREES 38.8 MINUTES WEST

ELEVATION 255 METRES

	DATE 89 1 24	DATE 89 2 15	DATE 89 3 15	DATE 89 4 11	DATE 89 5 22	DATE 89 6 28	DATE 89 7 15	DATE 89 8 21	DATE 89 9 8	DATE 89 10 15	DATE 89 11 15	DATE 89 12 27
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
1.0	-1.39	-1.05	-1.26	-1.62	-.57	.63	.88	1.42	.76	-.56	-2.31	-.77
2.0	-.49	-.44	-.50	-.66	-.67	-.60	-.58	-.56	-.54	-.50	-.48	-.47
3.0	-.57	-.55	-.57	-.56	-.60	-.59	-.61	-.61	-.60	-.60	-.59	-.57
4.0	-.66	-.65	-.65	-.64	-.65	-.64	-.66	-.65	-.65	-.66	-.66	-.64
6.0	-.81	-.79	-.81	-.80	-.80							
8.0	-.89	-.86	-.89	-.86	-.88	-.86	-.87	-.92	-.87	-.87	-.87	-.86
10.0	-.92	-.90	-.92	-.91	-.92	-.91	-.93	-.92	-.92	-.92	-.92	-.91
12.0	-.86	-.86	-.86	-.85	-.85	-.84	-.87	-.84	-.85	-.87	-.87	-.85
14.0	-.88	-.83	-.88	-.86	-.87	-.86	-.84	-.86	-.86	-.84	-.84	-.86
17.0	-.80	-.78	-.81	-.80	-.80	-.79	-.79	-.79	-.80	-.79	-.79	-.79
20.0	-.72	-.69	-.71	-.70	-.71	-.70	-.71	-.70	-.70	-.71	-.71	-.71

TEMPERATURE RESULTS ARE OBTAINED FROM A MULTITHERMISTOR CABLE. FURTHER TEMPERATURE LOGS ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN CABLE A THERMISTORS MULTIPLES. ON PREVOIT ENTREPRENDRE D'AUTRES SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 271.2. EMR-85-7A
ICE-RICH LACUSTRINE PLAIN WITH THICK PERMAFROST (>20M). PREVIOUSLY CLEARED 6-12M WIDE. CABLE OFF R.O.W. 14.5 M E OF PIPELINE IN 25MM OIL-FILLED PVC TUBE
SEA DATA LOGGER INSTALLED OCT. 12/85
INTERFACE UNIT INSTALLED ON SEADATA LOGGER 25/10/88.
11 SENSOR YSI44033 (PAIRED).

SITE 85-7B: TABLE MOUNTAIN B - CABLE T1
****

63 DEGREES 36.6 MINUTES NORTH 123 DEGREES 38.1 MINUTES WEST

ELEVATION 265 METRES

	DATE 89 1 24	DATE 89 2 15	DATE 89 3 15	DATE 89 4 11	DATE 89 5 22	DATE 89 6 15	DATE 89 7 2	DATE 89 8 21	DATE 89 9 8	DATE 89 10 15	DATE 89 11 15	DATE 89 12 27
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
.5	-20.9	-9.15	-9.41	-2.84	10.51	5.24	19.84	17.04	24.38	-9.66	-21.2	-13.0
1.0	-3.71	-1.89	-2.70	-1.28	.23	7.20	7.93	11.92	9.31	-5.22	-11.3	-2.34
1.5	-.44	-.60	-.98	-.90	-.35	-.10	1.39	8.86	7.19	.47	-.77	-.18
2.0	-.18	-.17	-.18	-.19	-.19	-.09	-.15	5.17	4.59	1.71	.26	-.08
2.5	-.15	-.15	-.16	-.16	-.16	-.13	-.13	2.56	2.63	1.27	.24	-.06
3.0	-.19	-.20	-.19	-.20	-.20	-.20	-.18	.50	.90	.62	.08	-.09
3.5	-.30	-.30	-.29	-.28	-.28	-.27	-.26	-.23	-.23	-.14	-.14	-.15
4.0	-.52	-.51	-.50	-.50	-.48	-.48	-.45	-.42	-.44	-.45	-.44	-.38
4.5	-.60	-.60	-.58	-.58	-.57	-.56	-.57	-.51	-.53	-.54	-.54	-.49
5.0		-.65	-.63	-.62	-.60	-.60	-.58	-.55	-.57	-.59	-.59	-.55

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 272.0. EMR-85-7B
THICK PERMAFROST, ICE-RICH (>20M).
PREVIOUSLY HELIPAD CLEARING.
CABLE ON R.O.W. 2.1 M W OF PIPELINE IN
25MM OIL-FILLED PVC TUBE.
SEA DATA LOGGER INSTALLED OCT. 8/85
NEW INTERFACE UNIT INSTALLED ON SEADATA
LOGGER 26/10/88.
10 SENSOR YSI44033 (PAIRED).

SITE 85-7B: TABLE MOUNTAIN B - CABLE T2
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63 DEGREES 36.6 MINUTES NORTH 123 DEGREES 38.1 MINUTES WEST

ELEVATION 265 METRES

	DATE 89 1 24	DATE 89 2 15	DATE 89 3 15	DATE 89 4 11	DATE 89 5 22	DATE 89 6 15	DATE 89 7 2	DATE 89 8 21	DATE 89 9 8	DATE 89 10 15	DATE 89 11 15	DATE 89 12 27
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
.5	-10.3	-6.95	-4.62	-1.89	1.61	7.18	12.47	14.77	16.55	-6.00	-6.85	-3.67
1.0	-3.25	-2.90	-1.98	-1.59	-.24	2.38	5.85	11.43	9.40	.02	-2.72	-.97
1.5	-1.26	-.76	-.47	-.65	-.26	-.20	.01	8.71	7.74	2.54	-.21	-.04
2.0	-.15	-.17	-.15	-.19	-.18	-.20	-.15	6.01	5.91	3.04	.97	.15
2.5	-.01	-.04	-.01	-.04	-.02	-.04	.01	3.93	4.34	2.72	1.12	.30
3.0	-.11	-.11	-.11	-.11	-.13	-.14	-.12	1.77	2.36	1.80	.79	.13
3.5	-.08	-.11	-.11	-.14	-.14	-.15	-.12	.17	.86	.93	.45	.07
4.0	-.30	-.30	-.31	-.30	-.30	-.30	-.28	-.26	-.03	-.10	-.05	-.09
4.5	-.42	-.42	-.39	-.39	-.38	-.38	-.36	-.34	-.35	-.37	-.34	-.27
5.0		-.58	-.55	-.55	-.54	-.54	-.51	-.48	-.49	-.53	-.51	-.47

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 272.0. EMR-85-7B
THICK PERMAFROST, ICE-RICH (>20M).
PREVIOUSLY HELIPAD CLEARING.
CABLE ON R.O.W. 1.4 M E OF PIPELINE IN
25MM OIL-FILLED PVC TUBE.
SEA DATA LOGGER INSTALLED OCT. 8/85.
NEW INTERFACE UNIT INSTALLED ON SEADATA
LOGGER 26/10/88.
10 SENSOR YSI44033 (PAIRED).

SITE 85-7B: TABLE MOUNTAIN B - CABLE T3
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63 DEGREES 36.6 MINUTES NORTH 123 DEGREES 38.1 MINUTES WEST

ELEVATION 265 METRES

	DATE 89 1 24	DATE 89 2 15	DATE 89 3 15	DATE 89 4 11	DATE 89 5 22	DATE 89 6 15	DATE 89 7 15	DATE 89 8 21	DATE 89 9 8	DATE 89 10 15	DATE 89 11 15	DATE 89 12 27
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
1.0	-4.01	-2.59	-3.76	-1.75	.58	5.50	14.36	11.40	7.31	-.71	-.95	-1.27
2.0	-.19	-.09	-.12	-.13	-.11	-.10	-.02	5.10	4.67	1.98	.53	.05
3.0	-.12	-.14	-.15	-.15	-.17	-.17	-.15	.40	.87	.83	.26	-.04
4.0	-.40	-.38	-.39	-.37	-.37	-.36	-.33	-.29	-.32	-.28	-.23	-.22
6.0	-.75	-.72	-.74	-.71	-.72	-.70	-.65		-.61	-.67	-.67	-.67
8.0	-.88	-.87	-.87	-.87	-.86	-.86	-.78	-.79	-.81	-.84	-.84	-.83
10.0	-.99	-.98	-.99	-.98	-.98	-.97	-.95	-.91	-.97	-.95	-.97	-.95
12.0	-1.11	-1.11	-1.11	-1.10	-1.10	-1.04	-1.08		-1.05	-1.09	-1.09	-1.08
14.0	-1.08	-1.06	-1.07	-1.05	-1.07	-1.05	-1.04	-1.02	-1.04	-1.05	-1.05	-1.05
17.0		-1.12	-1.14	-1.12	-1.14	-1.11	-1.10	-1.08	-1.10	-1.11	-1.12	-1.12
20.0		-1.01	-1.03	-1.01	-1.03	-.95	-.99		-.93	-1.01	-1.01	-1.02

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 272.0. EMR-85-7B
THICK PERMAFROST, ICE-RICH (>20M).
PREVIOUSLY HELIPAD CLEARING.
CABLE ON R.O.W. 9 M E OF PIPELINE IN
25MM OIL-FILLED PVC TUBE.
SEA DATA LOGGER INSTALLED OCT. 8/85.
NEW INTERFACE UNIT INSTALLED ON SEADATA
LOGGER 26/10/88.
11 SENSOR YSI44033 (PAIRED).

SITE 85-7B: TABLE MOUNTAIN B - CABLE T4
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63 DEGREES 36.6 MINUTES NORTH 123 DEGREES 38.1 MINUTES WEST

ELEVATION 265 METRES

	DATE 89 1 24	DATE 89 2 15	DATE 89 3 15	DATE 89 4 11	DATE 89 5 22	DATE 89 6 15	DATE 89 7 2	DATE 89 8 21	DATE 89 9 8	DATE 89 10 15	DATE 89 11 15	DATE 89 12 27
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
1.0	-2.72	-3.11	-3.77	-3.52	-.60	-.09	.13	3.46	2.92	-1.01	-1.83	-.70
2.0	-.74	-.56	-1.33	-2.14	-1.40	-1.20	-1.08	-.75	-.68	-.58	-.54	-.47
3.0	-.86	-.84	-.92	-1.25	-1.46	-1.39	-1.31	-1.14	-1.11	-1.04	-.99	-.91
4.0	-1.00	-.98	-.98	-1.03	-1.25	-1.27	-1.26	-1.19	-1.19	-1.15	-1.11	-1.05
6.0	-1.20	-1.19	-1.18	-1.16	-1.18	-1.20	-1.21	-1.23	-1.26	-1.26	-1.25	-1.23
8.0	-1.28	-1.28	-1.27	-1.26	-1.25	-1.26	-1.24	-1.23	-1.26	-1.28	-1.29	-1.27
10.0	-1.26	-1.27	-1.26	-1.26	-1.25	-1.25	-1.23	-1.19	-1.22	-1.26	-1.27	-1.24
12.0	-1.33	-1.34	-1.34	-1.33	-1.32	-1.33	-1.31	-1.27	-1.30	-1.33	-1.33	-1.32
14.0	-1.28	-1.27	-1.28	-1.27	-1.28	-1.26	-1.26	-1.23	-1.25	-1.26	-1.27	-1.26
17.0		-1.22	-1.23	-1.21	-1.23	-1.21	-1.20	-1.18	-1.19	-1.21	-1.21	-1.20
20.0		-1.21	-1.20	-1.21	-1.20	-1.20	-1.18	-1.16	-1.18	-1.20	-1.21	-1.19

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 272.0. EMR-85-7B
THICK PERMAFROST, ICE-RICH (>20M).
PREVIOUSLY HELIPAD CLEARING.
CABLE OFF R.O.W. 20.8 M E OF PIPELINE
IN 25MM OIL-FILLED PVC TUBE.
SEA DATA LOGGER INSTALLED OCT. 8/85.
NEW INTERFACE UNIT INSTALLED ON SEADATA
LOGGER 26/10/88.
11 SENSOR YSI44033 (PAIRED).

SITE 85-7B: TABLE MTN - HA110

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63 DEGREES 36.6 MINUTES NORTH 123 DEGREES 38.1 MINUTES WEST

ELEVATION 265 METRES

	DATE 89 1 24	DATE 89 3 15	DATE 89 4 11	DATE 89 5 22	DATE 89 7 2	DATE 89 8 21	DATE 89 9 8	DATE 89 10 27	DATE 89 12 27
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
1.0	-3.42	-3.96	-2.90	-.80	-.34	1.08	1.19	-1.61	-.75
2.0	-.54	-.97	-1.77	-1.22	-.97	-.70	-.65	-.54	-.39
4.0	-.96	-.95	-1.19	-1.07	-1.10	-1.05	-1.04	-1.00	-.84
6.0	-1.17	-1.16		-1.14	-1.16	-1.15	-1.17	-1.18	-1.06
8.0	-1.23	-1.27		-1.22	-1.20	-1.18	-1.21	-1.22	-1.14
10.0	-1.22	-1.23		-1.22	-1.20	-1.18	-1.19	-1.21	-1.12
12.0	-1.21			-1.21	-1.19	-1.17	-1.21	-1.19	-1.10
14.0	-1.30	-1.30		-1.29	-1.28	-1.26	-1.27	-1.29	-1.22
16.0	-1.17	-1.18		-1.17	-1.15	-1.14	-1.14	-1.16	-1.07
18.0	-1.17	-1.19		-1.18	-1.16	-1.15	-1.15	-1.17	-1.08
20.0	-1.17	-1.18		-1.17	-1.15	-1.14	-1.15	-1.16	-1.07

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 272.0
NEW OFF-ROW HOLE, WEST SIDE.
44033 PAIRED CABLE.

SITE 85-7B: TABLE MOUNTAIN - HA129
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63 DEGREES 36.6 MINUTES NORTH 123 DEGREES 38.1 MINUTES WEST

ELEVATION 265 METRES

	DATE 89 1 24	DATE 89 3 15	DATE 89 4 11	DATE 89 5 22	DATE 89 7 2	DATE 89 8 21	DATE 89 9 8	DATE 89 10 27	DATE 89 12 27
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
.5	-3.15	-2.61	-2.27	-.28	4.54	10.46	8.24	-.34	-.34
1.0	-1.26	-.83	-1.20	-.28	-.11	6.89	5.99	1.04	-.02
2.0	-.07	-.09	-.31	-.11	-.12	1.48	1.93	.74	-.03
3.0	-.35	-.35		-.35	-.35	-.32	-.32	-.23	-.20
4.0	-.62	-.61		-.58	-.57	-.54	-.55	-.55	-.51
5.0	-.79	-.78		-.75		-.70	-.71	-.71	
6.0	-.92	-.91		-.89	-.86	-.83	-.84	-.83	-.82
7.0	-1.08	-1.07		-1.05	-1.02	-.99	-1.00	-1.00	-.98
8.0	-1.15	-1.15		-1.13	-1.10	-1.07	-1.08	-1.08	-1.06
9.0	-1.13	-1.12		-1.10	-1.09	-1.06	-1.07	-1.07	-1.05
10.0	-1.26	-1.26		-1.24	-1.24	-1.19	-1.20	-1.20	-1.19

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 272.0. EMR-86-HA129
CABLE IS LOCATED 20M SOUTH OF
FENCE, 1.2M W OF PIPELINE.
GROUND FROZEN BELOW 1.0M.
38MM PVC PIPE INFILLED WITH SILICONE.
SILT OVERLYING CLAY
11 SENSOR YSI44033 (PAIRED).

SITE 85-7B: TABLE MOUNTAIN - HA132
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63 DEGREES 36.6 MINUTES NORTH 123 DEGREES 38.1 MINUTES WEST

ELEVATION 265 METRES

	DATE 89 1 24	DATE 89 3 15	DATE 89 4 11	DATE 89 5 22	DATE 89 7 2	DATE 89 8 21	DATE 89 9 8	DATE 89 10 27	DATE 89 12 27
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
.5	-4.20	-2.57	-1.95	-.32	4.64	11.33	10.32	1.01	-.08
1.0	-2.41	-.69		-.27	-.11	8.72	7.95	1.99	.36
2.0	-.01	-.11		-.12	-.10	4.05	4.80	1.92	.38
3.0	-.02	-.10		-.10	-.09	1.16	2.03	.79	.15
4.0	-.18	-.21		-.23	-.22	-.22	-.02	-.30	-.24
5.0	-.36	-.36		-.35	-.34	-.34	-.31	-.42	-.39
6.0	-.55	-.55		-.54	-.53	-.53	-.50	-.57	-.57
7.0	-.64	-.78		-.77	-.75	-.75	-.73	-.80	-.78
8.0	-.74	-.75		-.74	-.72	-.72	-.70	-.76	-.74
9.0	-.82	-.82		-.81	-.80	-.79	-.78	-.83	-.81
10.0	-.87	-.87		-.86	-.84	-.85	-.83	-.87	-.86

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 272.0. EMR-86-HA132
CABLE IS LOCATED 5M NORTH OF FENCE
1.2M E OF PIPELINE.
GROUND UNFROZEN TO 4.0M.
38MM PVC PIPE INFILLED WITH SILICONE.
50MM SILT OVERLYING CLAY
11 SENSOR YSI44033 (PAIRED).

SITE 85-7C: TABLE MOUNTAIN C - CABLE T1
****

63 DEGREES 36.4 MINUTES NORTH 123 DEGREES 38.0 MINUTES WEST

ELEVATION 259 METRES

	DATE 89 1 24	DATE 89 3 15	DATE 89 4 11	DATE 89 5 21	DATE 89 6 15	DATE 89 7 2	DATE 89 7 15	DATE 89 8 21	DATE 89 9 8	DATE 89 10 15	DATE 89 11 15	DATE 89 12 15
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
.5	-7.00	-5.74	-1.52	4.24	7.93	10.30	15.62	12.07	10.22	-1.56	-5.98	-5.78
1.0	-4.66	-2.72	-2.20	-.32	.13	2.84	5.63	9.09	7.71	.36	-2.72	-1.34
1.5	-1.29	-.74	-1.37	-.43	-.33		.01	5.75	5.43	1.91	-.90	-.11
2.0	-.10	-.11	-.49	-.24	-.23	-.22	-.08	2.64	3.15	1.58	.05	-.11
2.5	-.18	-.20		-.22	-.25	-.24	-.21	-.07	.59	.63	-.08	-.15
3.0	-.38	-.37		-.37	-.39	-.37	-.38	-.29	-.33	-.30	-.26	-.26
3.5	-.49	-.47		-.45	-.47	-.44	-.47	-.45	-.44	-.45	-.42	-.38
4.0	-.56	-.55		-.51	-.44		-.43	-.50	-.49	-.44	-.43	-.39
4.5	-.76	-.74		-.72	-.72		-.72	-.70	-.69	-.72	-.70	-.66
5.0	-.80	-.80		-.78	-.62	-.77	-.61	-.77	-.76	-.60	-.60	-.55

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 272.3. EMR-85-7C
THICK PERMAFROST (>20M). ICE-RICH
LACUSTRINE PLAIN.
CABLE ON R.O.W. 2.1 M W OF PIPELINE IN
25MM OIL-FILLED PVC TUBE.
3 PVC CAPS SWITCHED TO 7B.
SEADATA LOGGER REMOVED FOR EXAMINATION
ON 25/10/88.
NEW LOGGER INSTALLED 21/05/89.
INTERFACE UNIT AND NEW FIELD BOX
INSTALLED ON LOGGER 21/05/89.
10 SENSOR YSI44033 (PAIRED).

SITE 85-7C: TABLE MOUNTAIN C - CABLE T2

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63 DEGREES 36.4 MINUTES NORTH 123 DEGREES 38.0 MINUTES WEST

ELEVATION 259 METRES

	DATE 89 3 15	DATE 89 4 11	DATE 89 5 21	DATE 89 6 15	DATE 89 7 2	DATE 89 8 21	DATE 89 9 8	DATE 89 10 15	DATE 89 11 15	DATE 89 12 15
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
.5	-5.34	-2.13	3.61	8.67	9.75	11.87	8.93	-2.39	-5.47	-5.80
1.0	-2.80	-2.02	-.37	3.18	5.06	9.14	7.53	.69	-1.61	-1.00
1.5	-.73	-.83	-.36	-.03		5.96	5.41	1.97	-.13	-.04
2.0	-.43	-.25	-.66	-.55	-.71	2.24	2.34	.60		
2.5	-.17		-.19	-.17	-.19	.14	.89	.71	.01	-.08
3.0	-.23		-.29	-.31	-.30	-.31	-.27	-.14	-.14	-.16
3.5	-.49		-.47	-.41	-.47	-.45	-.44	-.38	-.32	-.28
4.0			-.60	-.58		-.59	-.58	-.56	-.51	-.50
4.5										
5.0	-.71		-.75	-.75	-.74	-.75	-.72	-.72	-.72	-.70

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 272.3. EMR-85-7C
THICK PERMAFROST (>20M). ICE-RICH
LACUSTRINE PLAIN.
CABLE ON R.O.W. 1.25 M E OF PIPELINE IN
25MM OIL-FILLED PVC TUBE.
SEADATA LOGGER REMOVED FOR EXAMINATION
ON 25/10/88.
NEW LOGGER INSTALLED 21/05/89.
INTERFACE UNIT AND NEW FIELD BOX
INSTALLED ON LOGGER 21/05/89.
10 SENSOR YSI44033 (PAIRED).

SITE 85-7C: TABLE MOUNTAIN C - CABLE T3
****

63 DEGREES 36.4 MINUTES NORTH 123 DEGREES 38.0 MINUTES WEST

ELEVATION 259 METRES

	DATE 89 1 24	DATE 89 3 15	DATE 89 4 11	DATE 89 5 21	DATE 89 6 15	DATE 89 7 2	DATE 89 8 21	DATE 89 9 8	DATE 89 10 15	DATE 89 11 15	DATE 89 12 15
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
1.0	-4.87	-4.54	-3.39	-.35	-.03	.87	4.23	4.13	-1.93	-1.55	-.58
2.0	-.16	-.87	-1.80	-.90	-.72	-.59	-.25	-.14	-.09	-.09	-.09
3.0	-.48	-.47	-.74	-.79	-.76		-.67	-.60	-.54	-.48	-.44
4.0	-.72	-.70	-.75	-.74	-.77	-.78	-.77	-.73	-.73	-.70	-.67
6.0		-.99	-.97	-.96	-.97	-.93	-.96	-.95	-.95	-.93	-.93
8.0	-1.09		-1.03	-1.06				-1.01	-1.04	-1.03	-1.00
10.0	-1.07	-1.07	-.99	-1.05		-1.04	-1.04	-1.03			
12.0	-1.02	-1.03	-.93	-1.02	-1.00		-1.01	-1.00	-.99	-.98	-.98
14.0		-1.05	-.94	-1.04	-1.03		-1.04	-.98	-1.03	-1.03	-1.01
17.0	-1.03			-.95	-.93	-.94	-.95	-.94	-.93	-.93	-.93
20.0	-.91	-.88		-.86	-.86	-.85	-.88		-.86	-.86	-.84

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 272.3. EMR-85-7C
THICK PERMAFROST (>20M). ICE-RICH
LACUSTRINE PLAIN.
CABLE ON R.O.W. 7 M E OF PIPELINE IN
25MM OIL-FILLED PVC TUBE.
SEADATA LOGGER REMOVED FOR EXAMINATION
ON 25/10/88.
NEW LOGGER INSTALLED 21/05/89.
INTERFACE UNIT AND NEW FIELD BOX
INSTALLED ON LOGGER 21/05/89.
11 SENSOR YSI44033 (PAIRED).

SITE 85-7C: TABLE MOUNTAIN C - CABLE T4

****

63 DEGREES 36.4 MINUTES NORTH 123 DEGREES 38.0 MINUTES WEST

ELEVATION 259 METRES

	DATE 89 1 24	DATE 89 3 15	DATE 89 4 11	DATE 89 5 21	DATE 89 6 15	DATE 89 7 2	DATE 89 8 21	DATE 89 9 8	DATE 89 10 15	DATE 89 11 15	DATE 89 12 15
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
1.0	-4.46	-3.46	-3.76	-.99	-.44	-.47	.74	.60	-.21	-1.05	-1.44
2.0	-.64	-1.67	-2.59	-1.42	-1.19	-1.06	-.77	-.68	-.59	-.53	-.49
3.0	-.85	-1.07		-1.45	-1.22		-1.13	-1.06	-1.08	-1.04	-.97
4.0	-1.00	-1.01		-1.25	-1.33	-1.24	-1.19	-1.15	-.98	-.89	-.82
6.0	-1.08	-1.06		-1.06	-1.04			-1.10	-1.10	-1.09	-1.05
8.0	-1.15	-1.14		-1.12	-1.14	-1.12	-1.12	-1.12	-1.15	-1.15	-1.14
10.0	-1.15	-1.14		-1.13	-1.15	-1.13	-1.12	-1.12	-1.15	-1.15	-1.14
12.0	-1.18	-1.17		-1.16	-1.15	-1.17	-1.16	-1.15	-1.19	-1.19	-1.16
14.0	-1.08	-1.07		-1.06	-1.09			-1.09	-1.10	-1.10	-1.09
17.0	-.98	-.97		-.96	-.99	-.97	-.97	-.96	-1.00	-1.01	-1.00
20.0	-.93	-.92		-.91	-.95	-.92	-.86	-.92	-.95	-.95	-.94

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 272.3. EMR-85-7C
THICK PERMAFROST (>20M). ICE-RICH
LACUSTRINE PLAIN.
CABLE OFF R.O.W. 19.5 M E OF PIPELINE
IN 25MM OIL-FILLED PVC TUBE.
SEADATA LOGGER REMOVED FOR EXAMINATION
ON 25/10/88.
NEW LOGGER INSTALLED 21/05/89.
INTERFACE UNIT AND NEW FIELD BOX
INSTALLED ON LOGGER 21/05/89.
11 SENSOR YSI44033 (PAIRED).

SITE 85-7C: TABLE MTN - HA109

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63 DEGREES 36.4 MINUTES NORTH 123 DEGREES 38.0 MINUTES WEST

ELEVATION 259 METRES

	DATE 89 1 24	DATE 89 3 15	DATE 89 5 21	DATE 89 7 2	DATE 89 8 21	DATE 89 9 8	DATE 89 10 27	DATE 89 12 27
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
1.0	-.14	-.16	-.17	-.22	1.52	2.12	.33	-.13
2.0	-.28	-.26	-.26	-.24	-.26	-.24	-.24	-.23
4.0	-.59	-.58	-.56	-.53	-.55	-.54	-.55	-.56
6.0	-.81	-.79	-.78	-.75	-.76	-.75	-.76	-.78
8.0	-.85	-.83	-.82	-.79	-.81	-.80	-.80	-.81
10.0	-.97	-.96	-.95	-.93	-.94	-.93	-.93	-.94
12.0	-.90	-.88	-.87	-.85	-.86	-.85	-.86	-.87
14.0	-.93	-.92	-.91	-.89	-.91	-.89	-.90	-.91
16.0	-.89	-.89	-.88	-.86	-.87	-.86	-.88	-.97
18.0	-.80	-.79	-.79	-.77	-.79	-.77	-.77	-.79
20.0	-.83	-.82	-.81	-.80	-.81	-.80	-.81	-.82

TEMPERATURE RESULTS ARE OBTAINED FROM A MULTITHERMISTOR CABLE. FURTHER TEMPERATURE LOGS ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN CABLE A THERMISTORS MULTIPLES. ON PREVOIT ENTREPRENDRE D'AUTRES SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 272.3
NEW OFF-ROW HOLE, WEST SIDE.
44033 PAIRED CABLE.

SITE 85-7C: TABLE MOUNTAIN C - GH
****

63 DEGREES 36.4 MINUTES NORTH 123 DEGREES 38.0 MINUTES WEST

ELEVATION 259 METRES

Z(M)	DATE 89 7 2 T(C)	DATE 89 8 21 T(C)
.5	5.74	9.55
1.5	-.34	1.54
2.5	-.40	-.34
3.5	-.56	-.52
5.5	-.83	-.77
7.5	-.94	-.88
9.5	-.91	-.85
11.5	-.98	-.92
14.5	-.83	-.78
17.5	-.85	-.79
20.0	-.82	-.75

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 272.3. EMR-85-7C
INSTALLED OLD 84-5B-T4 CABLE IN
GEOPHYSICAL 21/05/89.
11 SENSOR YSI44032 (PAIRED).

SITE 85-7C: TABLE MOUNTAIN C - PR 2813/T6
****

63 DEGREES 36.4 MINUTES NORTH 123 DEGREES 38.0 MINUTES WEST

ELEVATION 259 METRES

Z(M)	DATE 89 8 21 T(C)	DATE 89 9 8 T(C)	DATE 89 10 15 T(C)	DATE 89 11 15 T(C)	DATE 89 12 27 T(C)
.2	11.93	9.34	-.21	-.70	-1.05
.4	10.70	8.65	1.91	.18	-.33
.6	9.52	7.62	2.21	.32	-.04
.8	8.04	6.38	2.54	.31	-.42
1.0	6.57	5.63	2.33	.37	-.05
1.2	5.40	4.83	2.06		
1.4	4.34	3.99	1.91	.20	-.21
1.6					

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 272.3. EMR-85-7C.
LOCATED 15 CM FROM PIPE TOWARDS T2.
CONNECTED TO SEADATA LOGGER ON T6
CHANNEL 21/08/89. LOCATED 2.2 M
NORTH OF FENCE.
8 SENSOR YSI44033 (PAIRED).

SITE KM 470.0 - HA131

****

0 DEGREES .0 MINUTES NORTH 0 DEGREES .0 MINUTES WEST

ELEVATION 255 METRES

Z(M)	DATE 89 3 16 T(C)	DATE 89 5 21 T(C)	DATE 89 6 29 T(C)	DATE 89 8 10 T(C)	DATE 89 9 9 T(C)
.5	-1.34	-.10	4.74	10.38	7.64
1.0	.22	.14	2.61	7.90	7.81
2.0	.89	.50	1.13	4.80	6.01
3.0	1.33	.84	.85	2.81	4.14
4.0	1.65	1.15	.99	1.62	2.51
5.0	1.72	1.31	1.16	1.23	1.66
6.0	1.64	1.37	1.24	1.17	1.30
7.0	1.43	1.30	1.21	1.12	1.13
8.0	1.31	1.27	1.24	1.16	1.15
9.0	1.14	1.16	1.15	1.11	1.09
10.0	1.04	1.08	1.09		1.06

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 470.0. EMR-86-HA131
GROUND UNFROZEN TO 10 M.
CABLE LOCATED 1.5 M W OF PIPELINE.
38 MM PVC PIPE INFILLED WITH SILICONE.
11 SENSOR YSI44033 (PAIRED).

SITE KM 470.0 - HA130

****

0 DEGREES .0 MINUTES NORTH 0 DEGREES .0 MINUTES WEST

ELEVATION 255 METRES

	DATE 89 3 16	DATE 89 5 21	DATE 89 6 29	DATE 89 8 10	DATE 89 9 9
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)
.5	-1.84	.05	6.55	11.78	5.73
1.0	-.28	-.14	1.45	7.62	6.73
2.0	-.03	-.03	.27	3.55	4.26
3.0	-.05	-.06	-.04	.35	1.58
4.0	-.10	-.10	-.09	-.09	-.09
5.0	-.28	-.29	-.26	-.27	-.26
6.0	-.19	-.19	-.18	-.19	-.19
7.0	.03	.02	.05	.03	.04
8.0	.16	.15	.17	.15	.17
9.0	.28	.27	.30	.28	.30
10.0	.35	.35	.37		.38

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 470.0. EMR-86-HA130
GROUND FROZEN BELOW 1.8 M.
CABLE LOCATED 1.2 M W OF PIPELINE.
38 MM PVC PIPE INFILLED WITH SILICONE.
11 SENSOR YSI44033 (PAIRED).

SITE 84-4A: TRAIL RIVER A - CABLE T1 (NEW)
****

62 DEGREES 5.1 MINUTES NORTH 121 DEGREES 59.3 MINUTES WEST

ELEVATION 153 METRES

	DATE 89 3 16	DATE 89 5 21	DATE 89 6 29	DATE 89 8 10	DATE 89 9 9
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)
1.0	.35	.16	1.13	7.01	7.92
2.0	1.06	.74	.78	4.09	5.60
3.0	.78	1.24	1.15		3.57
4.0	1.80	1.46	1.39		2.58
6.0	1.65				1.66
8.0	2.07	1.93	1.88	1.76	1.81
10.0	2.14	2.12	2.10	2.06	2.04
12.0	2.18	2.21	2.22	2.20	2.19
15.0	2.29	2.30	2.32	2.32	2.32
18.0	2.52	2.52	2.54	2.53	2.53
20.0	2.52	2.53	2.55	2.55	2.54

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 478.0. EMR-84-4A
DUNE HOLLOW. UNFROZEN SATURATED SANDS
AND SILTS WITH HIGH WATER TABLE.
CLEARED TO 24.1M IN WINTER 82/83.
BLADED. HOLLOWS SAND FILLED.
CABLE ON R.O.W. 4.5 M W OF PIPELINE IN
25MM OIL-FILLED PVC TUBE.
10 SENSOR YSI44033 (PAIRED).
CABLE TO FULL DEPTH IN HOLE.

SITE 84-4A: TRAIL RIVER A - CABLE T2

****

62 DEGREES 5.1 MINUTES NORTH 121 DEGREES 59.3 MINUTES WEST

ELEVATION 153 METRES

	DATE 89 3 16	DATE 89 5 21	DATE 89 6 29	DATE 89 8 10	DATE 89 9 9
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)
1.0	.25	.10	.12	3.19	4.71
2.0	.93	.61	.47	1.70	3.00
3.0	1.66	1.18	1.01	1.27	1.99
4.0	2.11	1.58	1.40	1.33	1.67
6.0	2.34	1.92	1.76	1.62	1.62
8.0	2.33	2.18	2.10	1.98	1.92
10.0	2.20	2.23	2.23	2.18	2.13
12.0	2.12	2.17	2.21	2.19	
15.0	2.24	2.26	2.29	2.29	2.29
18.0	2.44	2.45	2.47	2.46	2.47
20.0	2.56	2.57	2.59	2.58	2.58

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 478.0. EMR-84-4A
DUNE HOLLOW. UNFROZEN SATURATED SANDS
AND SILTS WITH HIGH WATER TABLE.
CLEARED TO 24.1M IN WINTER 82/83.
BLADED. HOLLOWS SAND FILLED.
CABLE OFF R.O.W. 20.5 M W OF PIPELINE
IN 25MM OIL-FILLED PVC TUBE.
10 SENSOR YSI44033 (PAIRED)

SITE 84-4A: TRAIL RIVER A - CABLE T3
****

62 DEGREES 5.1 MINUTES NORTH 121 DEGREES 59.3 MINUTES WEST

ELEVATION 153 METRES

	DATE 89 3 16	DATE 89 5 21	DATE 89 6 29	DATE 89 8 10	DATE 89 9 9
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)
.5	-.09	-.06	3.93	10.50	9.51
1.0	.25	.10	2.12	8.30	8.48
1.5	.59	.35	1.24	6.31	7.22
2.0	.94	.63	4.06	4.80	6.01
2.5	1.29	.93	1.03	3.57	4.82
3.0	1.52	1.13	1.10	2.57	3.69
3.5	1.68	1.35	1.31	2.16	3.18
4.0	1.75	1.44	1.10	1.88	2.75
4.5	1.77	1.51	1.46	1.70	2.38
5.0	1.86	1.64	1.59	1.71	2.23

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 478.0. EMR-84-4A
DUNE HOLLOW. UNFROZEN SATURATED SANDS
AND SILTS WITH HIGH WATER TABLE.
CLEARED TO 24.1M IN WINTER 82/83
BLADED. HOLLOWS SAND-FILLED.
CABLE ON R.O.W. 1.0 M W OF PIPELINE IN
25MM OIL-FILLED PVC TUBE.
11 SENSOR YSI44033 (PAIRED).

SITE 84-4A: TRAIL RIVER A - CABLE T4

****

62 DEGREES 5.1 MINUTES NORTH 121 DEGREES 59.3 MINUTES WEST

ELEVATION 153 METRES

	DATE 89 3 16	DATE 89 5 21	DATE 89 6 29	DATE 89 8 10	DATE 89 9 9
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)
.5	-.82	-.10	2.98	10.77	9.97
1.0	.07	-.01	.66	8.59	9.13
1.5	.41	.23	.62	6.88	8.03
2.0	.91	.66	.79	5.34	6.82
2.5	1.07	.78	.79	3.77	5.32
3.0	1.40	1.10	1.06	2.83	4.26
3.5	1.55	1.26	1.19	2.26	3.51
4.0	1.60	1.34	1.27	1.95	3.01
4.5	1.69	1.47	1.40	1.82	2.65
5.0	1.75	1.57	1.51	1.79	2.41

TEMPERATURE RESULTS ARE OBTAINED FROM A MULTITHERMISTOR CABLE. FURTHER TEMPERATURE LOGS ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN CABLE A THERMISTORS MULTIPLES. ON PREVOIT ENTREPRENDRE D'AUTRES SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 478.0. EMR-84-4A
DUNE HOLLOW. UNFROZEN SATURATED SANDS AND SILTS WITH HIGH WATER TABLE.
CLEARED TO 24.1M IN WINTER 82/83
BLADED. HOLLOWS SAND-FILLED.
CABLE ON R.O.W. 2.3 M E OF PIPELINE IN 25MM OIL-FILLED PVC TUBE.
11 SENSOR YSI44033 (PAIRED).

SITE 84-4B: TRAIL RIVER B - T1 (NEW)
****

62 DEGREES 5.2 MINUTES NORTH 121 DEGREES 59.3 MINUTES WEST

ELEVATION 165 METRES

	DATE 89 3 16	DATE 89 5 21	DATE 89 6 29	DATE 89 8 10	DATE 89 9 9
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)
1.0	-2.30	.08	9.81	14.65	12.19
3.0	1.88	1.14	1.27		5.48
5.0	2.70	2.22	1.98	1.95	2.28
7.0	2.53	2.32	2.19	2.02	2.03

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 478.1. EMR-84-4B
DUNE CREST. UNFROZEN DRY SANDS AND
SILTS WITH LOW WATER TABLE.
CLEARED TO 24.5 M IN WINTER 82/83.
BLADED AND DUNE CREST LOWERED ^1 M.
CABLE ON R.O.W. 5 M W OF PIPELINE IN
25MM OIL-FILLED PVC TUBE.
11 SENSOR YSI44033 (PAIRED).
ONLY 4 SENSORS AS OF FEB.85 WITH
NEW DEPTHS OF APPROX. 1,4,7&9 M.

SITE 84-4B: TRAIL RIVER B - CABLE T2
****

62 DEGREES 5.2 MINUTES NORTH 121 DEGREES 59.3 MINUTES WEST

ELEVATION 165 METRES

	DATE 89 3 16	DATE 89 5 21	DATE 89 6 29	DATE 89 8 10	DATE 89 9 9
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)
.5	-2.89	1.60	10.71	14.77	11.57
1.0	-.94	-.05	7.35	11.71	10.68
1.5	.19	.05	5.11	9.68	9.95
2.0	.65	.27	3.67	8.14	9.22
2.5	1.15	.63	2.70	6.81	8.32
3.0	1.54	.90	2.04	5.54	7.30
3.5	1.97	1.25	1.75	4.65	6.35
4.0	2.26	1.49	1.61	3.87	5.45
4.5	2.37	1.61	1.51	3.09	4.49
5.5	2.71	1.98	1.77	2.80	3.96

TEMPERATURE RESULTS ARE OBTAINED FROM A MULTITHERMISTOR CABLE. FURTHER TEMPERATURE LOGS ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN CABLE A THERMISTORS MULTIPLES. ON PREVOIT ENTREPRENDRE D'AUTRES SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 478.1. EMR-84-4B
DUNE CREST. UNFROZEN DRY SANDS AND SILTS WITH LOW WATER TABLE.
CLEARED TO 24.5 M IN WINTER 82/83.
BLADED AND DUNE CREST LOWERED ^ 1 M.
CABLE ON R.O.W. 1.5 M W OF PIPELINE IN 25MM OIL-FILLED PVC TUBE.
10 SENSOR YSI44032 (PAIRED).

SITE 84-4B: TRAIL RIVER B - CABLE T3
****

62 DEGREES 5.2 MINUTES NORTH 121 DEGREES 59.3 MINUTES WEST

ELEVATION 165 METRES

	DATE 89 3 16	DATE 89 5 21	DATE 89 6 29	DATE 89 8 10	DATE 89 9 9
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)
.5	-5.42	5.66	15.04	19.94	11.54
1.0	-3.36	1.54	12.43	16.71	12.96
1.5	-1.60	-.10	9.28	13.81	12.27
2.0	.11	.00	6.62	11.38	11.34
2.5	.61	.22	4.63	9.36	10.25
3.0	1.14	.58	3.34	7.75	9.16
3.5	1.52	.83	2.32	6.19	7.89
4.0	1.94	1.17	1.89	5.13	6.87
4.5	2.28	1.48	1.70	4.26	5.90
5.5	2.67	1.87	1.67	3.02	4.28

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 478.1. EMR-84-4B
DUNE CREST. UNFROZEN DRY SANDS AND
SILTS WITH LOW WATER TABLE.
CLEARED TO 24.5 M IN WINTER 82/83.
BLADED AND DUNE CREST LOWERED ^ 1 M.
CABLE ON R.O.W. 1 M E OF PIPELINE IN
25MM OIL-FILLED PVC TUBE.
10 SENSOR YSI44033 (PAIRED).

SITE 84-4B: TRAIL RIVER B - T4/HT136

****

62 DEGREES 5.2 MINUTES NORTH 121 DEGREES 59.3 MINUTES WEST

ELEVATION 165 METRES

	DATE 89 3 16	DATE 89 5 21	DATE 89 6 29	DATE 89 8 10	DATE 89 9 9
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)
1.0	-6.57	.00	5.65	9.95	9.29
2.0	-1.71	-.33	.45	2.67	7.03
3.0	.39	.02	.04	1.43	4.86
4.0	1.26	.67	.57	1.17	3.19
6.0	2.07	1.47	1.25	1.52	1.63
8.0	2.19	1.85	1.67	1.69	1.51
10.0	1.92	1.85	1.78	1.76	1.63
12.0	1.74	1.79	1.80	1.75	1.73
15.0	1.61	1.69	1.74	1.85	1.74
18.0	1.75	1.79	1.83	1.78	1.86
20.0	1.75	1.76	1.78		1.79

TEMPERATURE RESULTS ARE OBTAINED FROM A MULTITHERMISTOR CABLE. FURTHER TEMPERATURE LOGS ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN CABLE A THERMISTORS MULTIPLES. ON PREVOIT ENTREPRENDRE D'AUTRES SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 478.1. EMR-84-4B
DUNE CREST. UNFROZEN DRY SANDS
AND SILTS WITH LOW WATER TABLE.
CLEARED TO 24.5M IN WINTER 82/83.
BLADED, AND DUNE CREST LOWERED ^ 1 M.
CABLE AT EDGE OF R.O.W. 15.5 M E OF
PIPELINE IN 25MM OIL-FILLED PVC TUBE.
T4 CABLE REPLACED BY HT136 IN MAY 87.
11 SENSOR YSI44033 (PAIRED).

SITE 85-8A: MANNERS CREEK A - CABLE T1
****

61 DEGREES 36.4 MINUTES NORTH 121 DEGREES 5.6 MINUTES WEST

ELEVATION 191 METRES

Z(M)	DATE 89 1 24 T(C)	DATE 89 3 16 T(C)	DATE 89 5 24 T(C)	DATE 89 6 29 T(C)	DATE 89 9 9 T(C)	DATE 89 10 30 T(C)	DATE 89 12 28 T(C)
.5	-.45	-.56	-.05	.64	7.54	1.81	-.12
1.0	.06	-.06	-.06	.13	6.31	2.13	.32
1.5	.13	-.03	-.01	.59	5.08	2.07	.41
2.0	.15	.02	.03	.54	3.72	1.75	.41
2.5	.07	-.02	-.02	.27	2.11	1.16	.29
3.0	-.02	-.05	-.06	-.01	.71	.56	.13
3.5	-.11	-.11	-.11	-.09	-.09	-.05	-.04
4.0	-.23	-.24	-.23	-.21	-.21	-.19	-.19
4.5	-.22	-.23	-.22	-.20	-.20	-.20	-.20
5.0	-.24	-.24	-.24	-.22	-.23	-.24	-.24

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 557.8. EMR-85-8A
THIN PEAT WITH THICK (10M) PERMAFROST.
NO PREVIOUS CLEARING.
CABLE ON R.O.W. 1.0 M W OF PIPELINE IN
25MM OIL-FILLED PVC TUBE.
10 SENSOR YSI44033 (PAIRED).

SITE 85-8A: MANNERS CREEK A - CABLE T2

****

61 DEGREES 36.4 MINUTES NORTH 121 DEGREES 5.6 MINUTES WEST

ELEVATION 191 METRES

	DATE 89 1 24	DATE 89 3 16	DATE 89 5 24	DATE 89 6 29	DATE 89 9 9	DATE 89 10 30	DATE 89 12 28
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
.5	-.89	-1.15	.03	6.20	8.80	1.57	-.14
1.0	.14	-.05	-.05	2.39	7.67	2.39	.43
1.5	.19	-.03	.00	1.53	6.46		.55
2.0	.15	-.04	-.01	1.47	4.99	2.16	.49
2.5	.10	-.05	-.03	.70	3.40		.37
3.0	.07	-.02	-.02	.34	2.03	1.12	.29
3.5	-.03	-.06	-.06	.02	.64	.51	.13
4.0	-.11	-.11	-.10	-.06	-.06	-.03	-.02
4.5	-.20	-.20	-.19	-.16	-.17	-.17	-.15
5.0	-.23	-.23	-.23	-.18	-.19	-.20	-.19

TEMPERATURE RESULTS ARE OBTAINED FROM A MULTITHERMISTOR CABLE. FURTHER TEMPERATURE LOGS ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN CABLE A THERMISTORS MULTIPLES. ON PREVOIT ENTREPRENDRE D'AUTRES SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 557.8. EMR-85-8A
THIN PEAT WITH THICK(10M) PERMAFROST.
NO PREVIOUS CLEARING.
CABLE ON R.O.W 1.6 M E OF PIPELINE IN 25MM OIL-FILLED PVC TUBE.
10 SENSOR YSI44033 (PAIRED).

SITE 85-8A: MANNERS CREEK A - CABLE T3
****

61 DEGREES 36.4 MINUTES NORTH 121 DEGREES 5.6 MINUTES WEST

ELEVATION 191 METRES

	DATE 89 1 24	DATE 89 3 16	DATE 89 5 24	DATE 89 6 29	DATE 89 9 9	DATE 89 12 28
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
1.0	-.12	-.41	-.09	-.06	2.44	-.09
2.0	-.08	-.07	-.07	-.05	-.03	-.06
3.0	-.15	-.14	-.14		-.18	-.12
4.0	-.31	-.30	-.30	-.27	-.28	-.28
6.0	-.31	-.30	-.30	-.29	-.29	
8.0	-.28	-.28	-.28	-.26	-.27	-.27
10.0	-.27	-.26	-.26	-.25	-.25	-.26
12.0	-.11	-.11	-.11	-.09	-.10	-.11
14.0	.00	-.01	-.01	.02	.01	-.01
17.0	.38	.35	.37	.39	.38	.38
20.0	.59	.60	.60	.62	.61	.59

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 557.8. EMR-85-8A
THIN PEAT WITH THICK (10M) PERMAFROST.
NO PREVIOUS CLEARING.
CABLE ON R.O.W. 9.7 M E OF PIPELINE IN
25MM OIL-FILLED PVC TUBE.
11 SENSOR YSI44033 (PAIRED).

SITE 85-8A: MANNERS CREEK A - CABLE T4
****

61 DEGREES 36.4 MINUTES NORTH 121 DEGREES 5.6 MINUTES WEST

ELEVATION 191 METRES

	DATE 89 1 24	DATE 89 3 16	DATE 89 5 24	DATE 89 6 29	DATE 89 9 9	DATE 89 12 28
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
1.0	-1.71	-.97	-.14	-.09	.16	-1.37
2.0	-.24	-.22	-.22	-.20	-.19	-.21
3.0	-.26	-.25	-.25	-.23	-.23	-.23
4.0	-.28	-.27	-.27	-.25	-.25	-.26
6.0	-.28	-.29	-.28	-.26	-.26	-.27
8.0	-.28	-.27	-.27	-.25	-.26	-.29
10.0	-.17	-.16	-.17	-.15	-.16	-.17
12.0	-.02	-.02	-.02		-.01	-.03
14.0	.13	.12	.12		.13	.13
17.0	.45	.45	.45	.46	.46	.45
20.0	.75	.75	.76	.77	.76	.74

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 557.8. EMR-85-8A
THIN PEAT WITH THICK (10M) PERMAFROST.
NO PREVIOUS CLEARING.
CABLE OFF R.O.W. 22.4 M W OF PIPELINE
IN 25MM OIL-FILLED PVC TUBE.
11 SENSOR YSI44033 (PAIRED).

SITE 85-8B: MANNERS CREEK B - CABLE T1
****

61 DEGREES 36.2 MINUTES NORTH 121 DEGREES 5.4 MINUTES WEST

ELEVATION 190 METRES

	DATE 89 1 24	DATE 89 3 16	DATE 89 5 24	DATE 89 6 29	DATE 89 9 9	DATE 89 10 30	DATE 89 12 28
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
.5	-1.55	-1.12	-.14	-.08	.81	-.10	-.78
1.0	-.04	-.05	-.04	-.02	-.03	-.02	-.03
1.5	-.18	-.18	-.17	-.16	-.17	-.16	-.16
2.0	-.05	-.08	-.07	-.03	-.05	-.05	-.03
2.5	-.11	-.14	-.13	-.10	-.11	-.11	
3.0	-.04	-.05	-.04	-.03	-.03	-.03	-.03
3.5	-.08	-.10	-.09	-.07	-.08	-.07	-.07
4.0	-.05		-.07	-.04	-.05	-.05	-.10
4.5	-.06	-.08	-.08	-.07	-.07	-.06	-.07
5.0	.04	.02	.03	.05	.04	.03	.05

TEMPERATURE RESULTS ARE OBTAINED FROM A MULTITHERMISTOR CABLE. FURTHER TEMPERATURE LOGS ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN CABLE A THERMISTORS MULTIPLES. ON PREVOIT ENTREPRENDRE D'AUTRES SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 558.2. EMR-85-8B
THICK PEAT WITH THIN (4M) PERMAFROST.
NO PREVIOUS CLEARING.
CABLE ON R.O.W. 1.6 M W OF PIPELINE IN 25MM OIL-FILLED PVC TUBE.
10 SENSOR YSI44033 (PAIRED).

SITE 85-8B: MANNERS CREEK B - CABLE T2

****

61 DEGREES 36.2 MINUTES NORTH 121 DEGREES 5.4 MINUTES WEST

ELEVATION 190 METRES

	DATE 89 1 24	DATE 89 3 16	DATE 89 5 24	DATE 89 6 29	DATE 89 9 9	DATE 89 10 30	DATE 89 12 28
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
.5	-11.3	-3.77	.50	5.31	6.17	-4.01	-7.27
1.0	-5.73	-.74	-.19	-.12	2.01	-.90	-2.71
1.5	-.88	-.11	-.10	.03	1.28	.73	-.24
2.0	.06	-.05	.00	.69	1.86	.99	.27
2.5	.02	-.01	.00	.06	.50	.34	
3.0	-.17	-.19	-.21	-.23	-.31	-.38	-.46
3.5	-.08	-.10	-.10	-.08	-.07		-.07
4.0	-.12	-.13	-.13	-.12	-.11	-.14	-.12
4.5	-.03	-.06	-.05	-.04	-.04	-.05	-.05
5.0	-.02	-.03	-.03	-.02	-.01	-.03	-.02

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 558.2. EMR-85-8B
THICK PEAT WITH THIN (4M) PERMAFROST.
NO PREVIOUS CLEARING.
CABLE ON R.O.W. .95 M E OF PIPELINE IN
25MM OIL-FILLED PVC TUBE.
10 SENSOR YSI44033 (PAIRED).

SITE 85-8B: MANNERS CREEK B - CABLE T3
****

61 DEGREES 36.2 MINUTES NORTH 121 DEGREES 5.4 MINUTES WEST

ELEVATION 190 METRES

	DATE 89 1 24	DATE 89 3 16	DATE 89 5 24	DATE 89 6 29	DATE 89 9 9	DATE 89 10 30	DATE 89 12 28
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
1.0	-2.25	-.52	-.23	-.18	1.08	-.19	-.72
2.0	-.23	-.24	-.23	-.21	-.22	-.23	-.23
3.0	-.11		-.11	-.09	-.11		-.12
4.0	.00	-.02	-.01	.01	.00	-.02	-.01
6.0	.11	.10	.11	.12	.11	.11	
8.0	.25	.24	.24	.26	.26	.25	.25
10.0	.47	.46	.47	.48		.47	.47
12.0	.63	.61	.62	.64		.63	
14.0	.79	.78	.78	.79	.78	.78	.79
17.0	1.11	1.10	1.10	1.12	1.11	1.09	1.10
20.0	1.42	1.40	1.38	1.39	1.37	1.34	1.34

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 558.2. EMR-85-8B
THICK PEAT WITH THIN (4M) PERMAFROST.
NO PREVIOUS CLEARING.
CABLE ON R.O.W. 7.5 M E OF PIPELINE IN
25MM OIL-FILLED PVC TUBE.
11 SENSOR YSI44033 (PAIRED).

SITE 85-8B: MANNERS CREEK B - CABLE T4
****

61 DEGREES 36.2 MINUTES NORTH 121 DEGREES 5.4 MINUTES WEST

ELEVATION 190 METRES

	DATE 89 1 24	DATE 89 3 16	DATE 89 5 24	DATE 89 6 29	DATE 89 9 9	DATE 89 12 28
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
1.0	-6.07	-2.12	-.23	-.06	4.09	-4.15
2.0	-1.65	-.50	-.16	-.14	-.12	-1.12
3.0	-1.06	-.21	-.11	-.09	-.09	-.63
4.0	-.16	-.07	-.04	-.03	-.03	-.06
6.0	.12	.10	.11	.12	.12	.11
8.0	.27	.26	.27	.27	.27	.26
10.0	.52	.50	.52	.53	.52	.50
12.0	.69	.67	.68	.69	.70	.69
14.0	.86	.84	.85	.86	.85	.85
17.0	1.10	1.09	1.09	1.10	1.10	1.10
20.0	1.42	1.39	1.40	1.42	1.42	1.38

TEMPERATURE RESULTS ARE OBTAINED FROM A MULTITHERMISTOR CABLE. FURTHER TEMPERATURE LOGS ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN CABLE A THERMISTORS MULTIPLES. ON PREVOIT ENTREPRENDRE D'AUTRES SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 558.2. EMR-85-8B
THICK PEAT WITH THIN (4M) PERMAFROST.
NO PREVIOUS CLEARING.
CABLE OFF R.O.W. 19 M E OF PIPELINE IN 38MM OIL-FILLED PVC TUBE.
11 SENSOR YSI44033 (PAIRED).

SITE 85-8B: MANNERS CREEK B - GH
****

61 DEGREES 36.2 MINUTES NORTH 121 DEGREES 5.4 MINUTES WEST

ELEVATION 190 METRES

Z(M)	DATE 89 6 29 T(C)	DATE 89 9 9 T(C)	DATE 89 10 30 T(C)
1.0	-.17	-.14	.09
2.0	-.12	-.09	-.07
3.0	.05	.03	.01
4.0	.06	.06	.03
6.0	.14	.12	.09
8.0	.31	.31	.27
10.0	.28	.29	.25
12.0	.75	.77	.76
15.0	.81	.93	.91
18.0	1.16	1.17	1.16
20.5	1.43	1.44	1.42

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 558.2. EMR-85-8B
OLD CABLE 84-5B-T3 INSTALLED IN
GEOPHYSICAL HOLE 24/05/89.
11 SENSOR YSI44032 (PAIRED).

SITE 85-8C: MANNERS CREEK C - CABLE T1

****

61 DEGREES 36.0 MINUTES NORTH 121 DEGREES 5.3 MINUTES WEST

ELEVATION 190 METRES

	DATE 89 1 24	DATE 89 3 16	DATE 89 5 24	DATE 89 6 29	DATE 89 8 20	DATE 89 9 9	DATE 89 10 30	DATE 89 12 28
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
.5	-8.33	-4.34	1.39	9.59	12.61	8.28	-4.06	-6.74
1.0	-1.72	-.92	-.27	.06	7.58	5.94	.08	-1.35
1.5	-.21	-.13	-.08	-.08	1.31	2.10		-.04
2.0	-.15	-.15	-.14	-.13	.55	.84	.46	.02
2.5	-.11	-.11	-.11	-.10	-.07	.19		
3.0	-.14	-.14	-.14	-.12	-.13	-.12	-.09	-.10
3.5	-.01	-.02	-.01	.00	-.01	.01	.00	.01
4.0	-.06	-.06	-.06	-.04	-.03	-.02	.02	.03
4.5	.02	.01	.01	.03	.05	.08	.18	.22
5.0	.11	.10	.10	.11	.14	.18		.36

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 558.3. EMR-85-8C
THIN PEAT WITH THIN (4M) PERMAFROST.
NO PREVIOUS CLEARING.
CABLE ON R.O.W. 1.2 M W OF PIPELINE IN
25MM OIL-FILLED PVC TUBE.
10 SENSOR YSI44033 (PAIRED).

SITE 85-8C: MANNERS CREEK C - CABLE T2

****

61 DEGREES 36.0 MINUTES NORTH 121 DEGREES 5.3 MINUTES WEST

ELEVATION 190 METRES

	DATE 89 1 24	DATE 89 3 16	DATE 89 9 9	DATE 89 10 30	DATE 89 12 28
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)
.5	-.85	-.72	9.67	-3.57	-2.15
1.0	.09	-.02	9.42	1.16	.08
1.5	.19	.05	6.41	1.86	.29
2.0	.16	.05	4.93	1.91	.50
2.5	.02	-.02	2.96	1.35	.35
3.0	-.12	-.11	1.13	.66	.14
3.5	-.03	-.03	.19	.11	.04
4.0	-.09	-.10	-.15	-.11	-.09
4.5	.00	.01	.00	.00	.02
5.0	.15	.15	.14	.17	.19

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 558.3. EMR-85-8C
THIN PEAT WITH THIN (4M) PERMAFROST.
NO PREVIOUS CLEARING.
CABLE ON R.O.W. 1.45 M E OF PIPELINE IN
25MM OIL-FILLED PVC TUBE.
10 SENSOR YSI44033 (PAIRED).

SITE 85-8C: MANNERS CREEK C - CABLE T3

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61 DEGREES 36.0 MINUTES NORTH 121 DEGREES 5.3 MINUTES WEST

ELEVATION 190 METRES

	DATE 89 1 24	DATE 89 3 16	DATE 89 5 24	DATE 89 6 29	DATE 89 8 20	DATE 89 9 9	DATE 89 10 30	DATE 89 12 28
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
1.0	-1.92	-.75	-.15	-.10	1.86	2.23	-.07	-1.13
2.0	-.11	-.09	-.08	-.07	-.08	-.07	-.05	-.07
3.0	-.14	-.15	-.13	-.12	-.13	-.16	-.12	-.13
4.0	-.10	-.11	-.10	-.07	-.10	-.09	-.09	-.10
6.0	.10		.09	.11	.09	.10		.10
8.0	.32	.31	.32	.33	.32	.33	.33	.32
10.0	.60	.58	.59	.60	.59	.60	.61	.61
12.0	.75	.74	.74	.77	.75	.75		.75
14.0	.97	.96	.96	.98	.96	.97	.97	.97
17.0	1.33	1.32	1.32	1.34	1.32	1.33	1.34	1.33
20.0	1.67	1.66	1.66	1.67	1.67	1.67	1.67	1.66

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 558.3. EMR-85-8C
THIN PEAT WITH THIN (4M) PERMAFROST.
NO PREVIOUS CLEARING.
CABLE ON R.O.W. 8.55 M E OF PIPELINE IN
25MM OIL-FILLED PVC TUBE.
11 SENSOR YSI44033 (PAIRED).

SITE 85-8C: MANNERS CREEK C - CABLE T4
****

61 DEGREES 36.0 MINUTES NORTH 121 DEGREES 5.3 MINUTES WEST

ELEVATION 190 METRES

	DATE 89 1 24	DATE 89 3 16	DATE 89 5 24	DATE 89 6 29	DATE 89 8 20	DATE 89 9 9	DATE 89 10 30	DATE 89 12 28
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
1.0	-.73	-.19	-.13	-.12	-.07	.00	-.10	-.28
2.0	-.22	-.24	-.23	-.21	-.23	-.22	-.20	-.23
3.0	-.15	-.16	-.16	-.14	-.15		-.13	-.16
4.0	-.05	-.06	-.06	-.04	-.05	-.05	-.05	-.06
6.0	.10	.08	.09	.11	.08	.05	.09	.09
8.0	.24	.21	.22	.25	.22	.23	.23	.21
10.0	.41	.39	.40	.41	.40	.40	.41	
12.0	.64	.62	.63	.64	.63	.64		.63
14.0	.77	.76	.76	.78	.76	.77	.78	.76
17.0		1.24	1.25	1.28	1.25	1.26		1.26
20.0	1.45	1.42	1.42	1.44	1.42	1.42	1.42	1.40

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 558.3. EMR-85-8C
THIN PEAT WITH THIN (4M) PERMAFROST.
NO PREVIOUS CLEARING.
CABLE OFF R.O.W. 20 M E OF PIPELINE IN
25MM OIL-FILLED PVC TUBE.
11 SENSOR YSI44033 (PAIRED).

SITE 85-9: PUMP STATION 3 - T1

****

61 DEGREES 23.7 MINUTES NORTH 120 DEGREES 54.0 MINUTES WEST

ELEVATION 223 METRES

	DATE 89 3 16	DATE 89 5 24	DATE 89 6 29	DATE 89 8 9	DATE 89 9 9
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)
.5	-3.33	.52	10.65	15.54	9.78
1.0	-1.17	-.16	8.64	12.47	10.40
1.5	-.03	.06	6.38	10.56	9.88
2.0	.77	.54	5.06	8.87	9.15
2.5	1.30	.88	3.70	7.30	8.18
3.0	1.72	1.20	2.92	6.13	7.32
3.5	2.05	1.47	2.40	5.10	6.41
4.0	2.32	1.70	2.14	4.29	5.58
4.5	2.59	1.95	2.11	3.75	4.93
5.0	2.77	2.14	2.14	3.34	4.38

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 583.3. EMR-85-9
FROST-FREE GRANULAR SOILS.
PIPE PREVIOUSLY TRAVERSED LONG STRETCH
OF FROZEN GROUND.
NO PREVIOUS CLEARING.
CABLE ON R.O.W. 2.2 M W OF PIPELINE IN
25MM OIL-FILLED PVC TUBE.
10 SENSOR YSI44033 (PAIRED).

SITE 85-9: PUMP STATION 3 - T2

****

61 DEGREES 23.7 MINUTES NORTH 120 DEGREES 54.0 MINUTES WEST

ELEVATION 223 METRES

	DATE 89 3 16	DATE 89 5 24	DATE 89 6 29	DATE 89 8 9	DATE 89 9 9
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)
.5	-6.06	12.67	27.70	30.27	19.98
1.0	-1.40	1.53	11.42	15.14	9.99
1.5	.12	.04	9.57	12.56	10.47
2.0	.70	.50	7.26	10.33	9.81
2.5	.60	.27	4.85	8.03	8.39
3.0	1.60	1.13	4.12	7.21	8.09
3.5	1.99	1.44	3.26	6.10	7.25
4.0	2.28	1.67	2.72	5.12	6.36
4.5	2.56	1.92	2.43	4.34	5.56
5.0	2.78	2.14	2.34	3.83	4.93

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 583.3. EMR-85-9
FROST-FREE GRANULAR SOILS.
PIPE PREVIOUSLY TRAVERSED LONG STRETCH
OF FROZEN GROUND.
NO PREVIOUS CLEARING.
CABLE ON R.O.W. 1.9 M E OF PIPELINE IN
25MM OIL-FILLED PVC TUBE.
10 SENSOR YSI44033 (PAIRED).

SITE 85-9: PUMP STATION 3 - T3

****

61 DEGREES 23.7 MINUTES NORTH 120 DEGREES 54.0 MINUTES WEST

ELEVATION 223 METRES

Z(M)	DATE 89 3 16 T(C)	DATE 89 5 24 T(C)	DATE 89 6 29 T(C)	DATE 89 8 9 T(C)	DATE 89 9 9 T(C)
1.0	.82	2.08	8.09	10.84	10.25
2.0	1.77	1.47	4.76	7.54	8.38
3.0	2.40	1.78	3.15	5.37	6.53
4.0	2.91	2.24	2.61	4.01	5.05
6.0	3.22		2.56	2.87	3.37
8.0	3.17	2.90	2.77	2.72	2.85
10.0	2.85	2.79	2.73	2.66	2.66
12.0	2.44	2.49	2.49	2.46	2.44
14.0	2.47	2.55	2.58	2.59	2.58
17.0	2.38	2.43	2.46	2.48	2.50
20.0	2.53	2.55	2.58	2.58	2.59

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 583.3. EMR-85-9
FROST-FREE GRANULAR SOILS.
PIPE PREVIOUSLY TRAVERSED LONG STRETCH
OF FROZEN GROUND.
NO PREVIOUS CLEARING.
CABLE ON R.O.W. 6 M E OF PIPELINE IN
25MM OIL-FILLED PVC TUBE.
11 SENSOR YSI44033 (PAIRED).

SITE 85-9: PUMP STATION 3 - T4

****

61 DEGREES 23.7 MINUTES NORTH 120 DEGREES 54.0 MINUTES WEST

ELEVATION 223 METRES

	DATE 89 3 16	DATE 89 5 24	DATE 89 6 29	DATE 89 8 9	DATE 89 9 9
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)
1.0	.01	-.04	7.13	9.51	8.71
2.0	1.04	.46	3.72	6.16	6.90
3.0	1.81	1.08	2.16	4.13	5.24
4.0	2.30	1.55	1.72	2.93	3.93
6.0	2.77	2.21	2.01	2.16	2.56
8.0	2.77	2.49	2.34	2.23	2.29
10.0	2.57	2.51	2.45	2.36	2.33
12.0	2.36	2.41	2.42	2.38	2.35
14.0	2.24	2.33	2.36	2.36	2.35
17.0	2.21	2.26	2.29	2.31	2.33
20.0	2.29	2.31	2.33	2.34	2.31

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 583.3. EMR-85-9
FROST-FREE GRANULAR SOILS.
PIPE PREVIOUSLY TRAVERSED LONG STRETCH
OF FROZEN GROUND.
NO PREVIOUS CLEARING.
CABLE OFF R.O.W 18.6 M E OF PIPELINE IN
25MM OIL-FILLED PVC TUBE.
11 SENSOR YSI44033 (PAIRED).

SITE 85-10A: MACKENZIE HWY S - T1
****

61 DEGREES 21.6 MINUTES NORTH 120 DEGREES 52.2 MINUTES WEST

ELEVATION 244 METRES

	DATE 89 1 25	DATE 89 3 16	DATE 89 5 24	DATE 89 6 29	DATE 89 8 20	DATE 89 9 9	DATE 89 10 30	DATE 89 12 28
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
.5	.15	.88	1.06	7.30	10.76	9.63	4.22	1.78
1.0	2.40	1.54	1.41	5.91	9.35	9.06	5.66	3.18
1.5	2.87	2.07	1.71	4.76	7.96	8.26	6.10	3.76
2.0	3.11	2.30	1.79	3.77	6.66	7.27	6.03	3.97
2.5	3.40	2.60	2.02	3.22	5.73	6.44	5.90	4.20
3.0	3.59	2.83	2.21	2.93	5.06	5.77	5.69	4.32
3.5	3.67	2.97	2.35	2.72	4.45	5.11	5.38	4.35
4.0	3.60	2.98	2.37	2.51	3.86	4.45	4.92	4.22
4.5	3.51	2.94	2.37	2.37	3.35	3.84	4.45	4.01
5.0	3.66	3.17	2.64	2.57	3.28	3.70	4.35	4.12

TEMPERATURE RESULTS ARE OBTAINED FROM A MULTITHERMISTOR CABLE. FURTHER TEMPERATURE LOGS ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN CABLE A THERMISTORS MULTIPLES. ON PREVOIT ENTREPRENDRE D'AUTRES SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 588.3. EMR-85-10A
THIN PEAT OVER UNFROZEN TILL AND SHALLOW BEDROCK. HELIPAD CLEARING.
CABLE ON R.O.W. 2 M E OF PIPELINE IN 25MM OIL-FILLED PVC TUBE.
10 SENSOR YSI44033 (PAIRED).

SITE 85-10A: MACKENZIE HWY S - T2
****

61 DEGREES 21.6 MINUTES NORTH 120 DEGREES 52.2 MINUTES WEST

ELEVATION 244 METRES

Z(M)	DATE 89 1 25 T(C)	DATE 89 3 16 T(C)	DATE 89 5 24 T(C)	DATE 89 6 29 T(C)	DATE 89 8 20 T(C)	DATE 89 9 9 T(C)	DATE 89 12 28 T(C)
.5	-4.03	-3.81	3.32	12.15	13.04	9.56	-4.49
1.0	.70	.28	.65	8.58	12.03	10.31	.55
1.5	2.09		1.57	7.03	10.79	10.04	.67
2.0	2.74	1.97	1.91	5.64	9.26	9.24	3.15
2.5	3.17	2.39	2.02	4.50	7.77	8.24	3.84
3.0	3.38	2.59	2.13	3.62	6.49	7.18	4.13
3.5							
4.0	3.49		2.19	2.71	4.72	5.41	4.21
4.5	3.55	2.88	2.31	2.51	4.11	4.74	4.25
5.0	3.68	3.09	2.54	2.64	3.79	4.33	4.37

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 588.3. EMR-85-10A
THIN PEAT OVER UNFROZEN TILL AND
SHALLOW BEDROCK. HELIPAD CLEARING.
CABLE ON R.O.W. 1.5 M W OF PIPELINE IN
25MM OIL-FILLED PVC TUBE.
10 SENSOR YSI44033 (PAIRED).

SITE 85-10A: MACKENZIE HWY S - T3
****

61 DEGREES 21.6 MINUTES NORTH 120 DEGREES 52.2 MINUTES WEST

ELEVATION 244 METRES

	DATE 89 1 25	DATE 89 3 16	DATE 89 5 24	DATE 89 6 29	DATE 89 8 20	DATE 89 9 9	DATE 89 10 30	DATE 89 12 28
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
1.0	-1.09	.03	.13	6.57	10.05	8.55	2.09	-.21
2.0	2.03	1.35	.96	3.91	7.19	7.32	5.06	2.90
3.0	2.81	1.76	1.50	2.57	5.10	5.72	5.11	3.55
4.0	2.71	1.98	1.39	1.70	3.37	3.99	4.91	3.23
6.0	3.24	2.84	2.39	2.27	2.76	3.08	3.68	3.63
8.0	2.92	2.76	2.47	2.35	2.40	2.55	2.97	3.20
10.0	2.61	2.60	2.48	2.41	2.34	2.39	2.58	2.83
12.0	2.22	2.27	2.28	2.24	2.19	2.20	2.26	2.44
14.0	2.08	2.15	2.22	2.23	2.21	2.21	2.20	2.26
17.0	1.93	1.98	2.06	2.10	2.11	2.12	2.42	2.16
20.0	1.88	1.90	1.97	2.04	2.03	2.04	2.04	2.08

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 588.3. EMR-85-10A
THIN PEAT OVER UNFROZEN TILL AND
SHALLOW BEDROCK. HELIPAD CLEARING.
CABLE ON R.O.W. 6 M W OF PIPELINE IN
25MM OIL-FILLED PVC TUBE.
11 SENSOR YSI44033 (PAIRED).
PVC CASING SHORTENED.

SITE 85-10A: MACKENZIE HWY S - T4

****

61 DEGREES 21.6 MINUTES NORTH 120 DEGREES 52.2 MINUTES WEST

ELEVATION 244 METRES

	DATE 89 1 25	DATE 89 3 16	DATE 89 5 24	DATE 89 6 29	DATE 89 8 20	DATE 89 9 9	DATE 89 10 30	DATE 89 12 28
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
1.0	1.27	.59	.42	.50	4.65	5.27	3.73	1.71
2.0	1.27	.63	.27	.26	2.22	3.20	1.61	1.74
3.0	2.21	1.63	1.24	1.15	2.01	2.75		2.65
4.0	2.32	1.88	1.50	1.39	1.68	2.14	2.86	2.68
6.0	2.32	2.12	1.84	1.74	1.67	1.81	2.30	2.52
8.0	2.11	2.08	1.93	1.85	1.74	1.77	1.98	2.25
10.0	1.97	2.03	1.99	1.96	1.87	1.86	1.91	2.10
12.0	1.75	1.82	1.86	1.87	1.81	1.81	1.80	1.90
14.0	1.75	1.82	1.88	1.90	1.89	1.89	1.87	1.91
17.0	1.72	1.76	1.81	1.85	1.86	1.87	1.86	1.88
20.0	1.77	1.78	1.82	1.82	1.86	1.88	1.88	1.90

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 588.3. EMR-85-10A
THIN PEAT OVER UNFROZEN TILL AND
SHALLOW BEDROCK. HELIPAD CLEARING.
CABLE OFF R.O.W. 19 M W OF PIPELINE IN
25MM OIL-FILLED PVC TUBE.
11 SENSOR YSI44033 (PAIRED).

SITE 85-10B: MACKENZIE HWY S. B - T1
****

61 DEGREES 21.3 MINUTES NORTH 120 DEGREES 52.0 MINUTES WEST

ELEVATION 244 METRES

	DATE 89 1 25	DATE 89 3 16	DATE 89 5 24	DATE 89 6 29	DATE 89 8 20	DATE 89 9 9	DATE 89 10 30	DATE 89 12 28
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
.5	-3.20	-1.58	3.45	13.15	14.65	10.66	-1.57	-2.45
1.0	-.10	.27	1.85	7.89	12.76	10.78	2.82	1.30
1.5	1.74	1.20	1.03	3.72	8.31	8.66	5.08	2.85
2.0	1.99	1.45	1.13	1.90	4.99	5.79	4.82	3.12
2.5	2.00	1.54	1.21	1.35	2.99	3.64	3.96	3.00
3.0	1.89	1.47	1.15	1.20	2.39	2.96	3.47	2.83
3.5	1.86	1.50	1.20	1.20	2.01	2.47	3.08	2.70
4.0	1.72	1.43	1.16	1.13	1.67	2.05	2.64	2.52
4.5	1.53	1.29	1.05	1.00	1.36	1.65	2.22	2.21
5.0	1.56	1.38	1.16	1.10	1.33	1.56	2.09	2.14

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 588.7. EMR-85-10B
VERY THIN PERMAFROST (FROZEN PEAT)
OVER UNFROZEN TILL.
NO PREVIOUS CLEARING.
CABLE ON R.O.W. 1.7 M E OF PIPELINE IN
25MM OIL-FILLED PVC TUBE.
10 SENSOR YSI44033 (PAIRED).

SITE 85-10B: MACKENZIE HWY S. B - T2
****

61 DEGREES 21.3 MINUTES NORTH 120 DEGREES 52.0 MINUTES WEST

ELEVATION 244 METRES

Z(M)	DATE 89 1 25 T(C)	DATE 89 3 16 T(C)	DATE 89 5 24 T(C)	DATE 89 6 29 T(C)	DATE 89 8 20 T(C)	DATE 89 9 9 T(C)	DATE 89 10 30 T(C)	DATE 89 12 28 T(C)
.5	-4.06	-1.97	.67	13.00	14.74	11.40	.45	-2.86
1.0	.25	.72	1.02	8.26	13.03	11.33	3.01	1.20
1.5	2.08	1.60	1.42	4.47	8.49	9.16	5.20	3.09
2.0	2.38	1.84	1.51	2.57	5.20	6.19	5.26	3.51
2.5	2.23	1.77	1.41	1.65	3.10	3.79	4.12	3.23
3.0	2.29	1.59	1.24	1.32	2.38	2.96		2.94
3.5	2.00	1.65	1.33	1.33	2.07	2.53	3.15	2.87
4.0	1.84	1.52	1.22	1.19	1.67	2.06	2.67	2.58
4.5	1.68	1.44	1.18	1.13	1.45	1.75	2.33	2.37
5.0	1.57	1.38	1.14	1.08	1.28	1.51	2.04	2.17

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 588.7. EMR-85-10B
VERY THIN PERMAFROST (FROZEN PEAT)
OVER UNFROZEN TILL.
NO PREVIOUS CLEARING.
CABLE ON R.O.W. 1.0 M W OF PIPELINE IN
25MM OIL-FILLED PVC TUBE.
10 SENSOR YSI44033 (PAIRED).

SITE 85-10B: MACKENZIE HWY S. B - T3
****

61 DEGREES 21.3 MINUTES NORTH 120 DEGREES 52.0 MINUTES WEST

ELEVATION 244 METRES

	DATE 89 1 25	DATE 89 3 16	DATE 89 5 24	DATE 89 6 29	DATE 89 8 20	DATE 89 9 9	DATE 89 10 30	DATE 89 12 28
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
.5	-5.28	-4.29	4.91	19.70	12.66	13.62	-5.33	-4.04
1.0	-.68	-.46	.07	7.69	14.01	10.34	.50	-1.61
1.5	.59	.37	.35	2.10	8.51	8.14		1.02
2.0	.46	.12	-.06	.36	4.56	5.18	3.42	1.28
2.5	1.06	.74	.55	.60	2.72	3.40	3.19	1.90
3.5	1.20	.96	.78	.75	1.44	1.86	2.35	1.93
4.5	1.17	1.01	.87	.83	1.08	1.33		1.76
5.5	1.09	.99	.88	.85	.93	1.08	1.44	1.55
6.5	.88	.84	.76	.74	.74	.83	1.07	1.24
8.5								
10.5	.70	.87	.89	.91	.89	.90	.90	.96

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 588.7. EMR-85-10B
VERY THIN PERMAFROST (FROZEN PEAT)
OVER UNFROZEN TILL.
NO PREVIOUS CLEARING.
CABLE ON R.O.W. 6.8 M W OF PIPELINE IN
25MM OIL-FILLED PVC TUBE.
11 SENSOR YSI44033 (PAIRED).
PVC TUBE SHORTENED.

SITE 85-10B: MACKENZIE HWY S. B - T4
****

61 DEGREES 21.3 MINUTES NORTH 120 DEGREES 52.0 MINUTES WEST

ELEVATION 244 METRES

	DATE 89 1 25	DATE 89 3 16	DATE 89 5 24	DATE 89 6 29	DATE 89 8 20	DATE 89 9 9	DATE 89 10 30	DATE 89 12 28
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
.5	-6.21	-2.36	1.46	5.67	9.83	6.99	-1.13	-2.52
1.0	-2.75	-.47	-.17	-.10	.71	1.65	-.11	-.99
1.5	-1.45	-.10	-.06	-.04	-.05	.01	-.04	-.07
2.0	-.49	-.05	-.05	-.02	-.04	-.03	-.02	-.06
2.5	-.02	.01	.02	.04	.00	.00	.04	.04
3.5	.20	.19	.18	.20	.17	.19	.23	
4.5	.39	.38	.37	.38	.36	.37	.41	.43
5.5	.47	.46	.45	.46	.44	.44	.47	.50
6.5	.50	.49	.49	.50	.48	.48	.51	.54
8.5	.62	.61	.63	.65	.62	.62	.63	.64
10.5	.73	.73	.74	.76	.75	.76	.75	.76

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 588.7. EMR-85-10B
VERY THIN PERMAFROST (FROZEN PEAT)
OVER UNFROZEN TILL.
NO PREVIOUS CLEARING.
CABLE OFF R.O.W. 17.3 M W OF PIPELINE
IN 25MM OIL-FILLED PVC TUBE.
11 SENSOR YSI44033 (PAIRED).

SITE 85-10B: MACKENZIE HWY S. B - GH
****

61 DEGREES 21.3 MINUTES NORTH 120 DEGREES 52.0 MINUTES WEST

ELEVATION 244 METRES

Z(M)	DATE 89 6 29 T(C)	DATE 89 8 20 T(C)	DATE 89 9 9 T(C)
.5	.67	4.18	3.14
1.0	.05	.03	.03
1.5	.12	.10	.10
2.0	.02		.00
2.5	.11	.09	.09
3.0	.20	.18	.20
3.5	.18	.20	.19
4.0	.33	.32	.33
4.5	.35	.33	.34
5.7	.35	.37	.38

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 588.7. EMR-85-10B
INSTALLED OLD 84-5B-T2 CABLE IN
GEOPHYSICAL HOLE 24/05/89.
10 SENSOR YSI44032 (PAIRED).

SITE 85-11: MORAINE SOUTH - CABLE T1
****

61 DEGREES 16.9 MINUTES NORTH 120 DEGREES 48.4 MINUTES WEST

ELEVATION 251 METRES

Z(M)	DATE 89 3 17 T(C)	DATE 89 5 24 T(C)	DATE 89 6 30 T(C)	DATE 89 8 9 T(C)	DATE 89 9 9 T(C)
.5		3.63	12.29	17.35	8.84
1.0	-.08	.01	7.83	12.10	10.75
1.5	.78	.80		9.97	10.12
2.0	1.32	1.18	4.56	8.52	9.33
2.5	1.60	1.27	3.36	6.90	8.13
3.0					
3.5	2.11	1.58	2.26	4.62	6.04
4.0	2.18	1.61	1.69	3.76	5.08
4.5	2.33	1.75	1.88	3.20	4.36
5.0	2.38	1.83	1.82	2.76	3.76

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 597.4. EMR-85-11
THIN PERMAFROST (4M).
PREVIOUS HELIPAD CLEARING.
CABLE ON R.O.W. 1.5 M E OF PIPELINE IN
25MM OIL-FILLED PVC TUBE.
OLD HELIPAD ON EAST SIDE OF FENCE.
10 SENSOR YSI44033 (PAIRED).

SITE 85-11: MORAINE SOUTH - CABLE T2
****

61 DEGREES 16.9 MINUTES NORTH 120 DEGREES 48.4 MINUTES WEST

ELEVATION 251 METRES

Z(M)	DATE 89 3 17 T(C)	DATE 89 5 24 T(C)	DATE 89 6 30 T(C)	DATE 89 8 9 T(C)	DATE 89 9 9 T(C)
.5	-1.48	1.37	11.32	15.62	10.71
1.0	.43	1.23	9.11	11.99	11.16
1.5	1.22	1.43	6.96	9.92	10.23
2.0	1.70	1.58	5.46	8.40	9.27
2.5	1.92	1.57	3.99	6.76	7.95
3.0	2.06	1.57	3.07	5.52	6.82
3.5	2.27	1.70	2.51	4.55	5.82
4.0	2.39	1.79	2.18	3.78	4.95
4.5	2.50	1.90	2.03	3.22	4.25
5.0	2.53	1.94	1.93	2.79	3.67

TEMPERATURE RESULTS ARE OBTAINED FROM A MULTITHERMISTOR CABLE. FURTHER TEMPERATURE LOGS ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN CABLE A THERMISTORS MULTIPLES. ON PREVOIT ENTREPRENDRE D'AUTRES SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 597.4. EMR-85-11
THIN PERMAFROST (4M).
PREVIOUS HELIPAD CLEARING
CABLE ON R.O.W. .75 M W OF PIPELINE IN 25MM OIL-FILLED PVC TUBE.
10 SENSOR YSI44033 (PAIRED).

SITE 85-11: MORAINE SOUTH - CABLE T3
****

61 DEGREES 16.9 MINUTES NORTH 120 DEGREES 48.4 MINUTES WEST

ELEVATION 251 METRES

	DATE 89 3 17	DATE 89 5 24	DATE 89 6 30	DATE 89 8 9	DATE 89 9 9
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)
.5	-4.60	9.25	25.48	27.41	16.48
1.0	-1.19	.33	9.58	12.28	9.08
1.5	.20	.30	7.46	9.60	9.13
2.0	.86	.58	5.66	8.20	8.37
3.0	1.60	1.05	3.21	5.64	6.57
4.0	2.14	1.49	2.24	4.06	5.08
5.0	2.35	1.72	1.86	2.96	3.80
6.0	2.52	1.98	1.88	2.42	3.02
8.0	2.40	2.09	1.96	1.98	2.19
10.0	1.99	1.89	1.82	1.75	1.77
12.0	1.70	1.73	1.72	1.69	1.67

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 597.4. EMR-85-11
THIN PERMAFROST (4M).
PREVIOUS HELIPAD CLEARING.
CABLE ON R.O.W. 7.1 M W OF PIPELINE IN
25MM OIL-FILED PVC TUBE.
11 SENSOR YSI44033 (PAIRED).

SITE 85-11: MORAINE SOUTH - CABLE T4
****

61 DEGREES 16.9 MINUTES NORTH 120 DEGREES 48.4 MINUTES WEST

ELEVATION 251 METRES

Z(M)	DATE 89 3 17 T(C)	DATE 89 5 24 T(C)	DATE 89 6 30 T(C)	DATE 89 8 9 T(C)	DATE 89 9 9 T(C)
.5	-3.04	5.94	18.54	23.49	12.20
1.0	-.78	-.23	4.12	9.06	6.82
1.5	-.06	-.12	1.02	5.79	5.79
2.0	.09	-.01	.46	3.79	4.67
3.0	.37	.24	.30	1.68	2.82
4.0	.58	.43	.43	.96	1.78
5.0	.81	.68	.66	.82	1.27
6.0	.82	.72	.70	.75	.95
8.0	.91	.87	.86	.84	.86
10.0	1.02	1.04	1.05	1.03	1.03
12.0	1.11	1.14	1.17	1.17	1.16

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 597.4. EMR-85-11
THIN PERMAFROST (4M).
PREVIOUS HELIPAD CLEARING.
CABLE OFF R.O.W. 22.9 M W OF PIPELINE
IN 25MM OIL-FILLED PVC TUBE.
11 SENSOR YSI44033 (PAIRED).

SITE 85-12A: JEAN MARIE CR A - T1

****

61 DEGREES 11.6 MINUTES NORTH 120 DEGREES 42.2 MINUTES WEST

ELEVATION 298 METRES

	DATE 89 1 25	DATE 89 3 17	DATE 89 5 24	DATE 89 6 30	DATE 89 8 20	DATE 89 9 9	DATE 89 10 30	DATE 89 12 28
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
.5	-6.12	-4.53	7.82	22.04	13.18	14.44	-4.85	-4.80
1.0	-4.19	-.86	-.04	11.50	15.04	11.71	1.04	-1.26
1.5	.45	.50	.79	9.00	12.76	11.10	4.20	1.86
2.0	1.88	1.24	1.22	6.83	10.56	10.01	5.82	3.04
2.5	2.43	1.67	1.40	4.93	8.42	8.65	6.16	3.58
3.0	2.53							
3.5	2.90	2.11	1.61	3.06	5.83	6.56	5.89	4.02
4.0	2.87	2.14	1.59	2.44	4.77	5.50	5.43	3.95
4.5	3.14	2.46	1.90	2.35	4.23	4.93	5.26	4.17
5.0	3.16	2.51	1.96	2.16	3.66	4.32	4.86	1.02

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES À PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 608.6. EMR-85-12A
THIN, UNFROZEN PEAT PLATEAU.
NO PREVIOUS CLEARING.
CABLE ON R.O.W. 1.3 M E OF PIPELINE IN
25MM OIL-FILLED PVC TUBE.
10 SENSOR YSI44033 (PAIRED).

SITE 85-12A: JEAN MARIE CR A - T2

****

61 DEGREES 11.6 MINUTES NORTH 120 DEGREES 42.2 MINUTES WEST

ELEVATION 298 METRES

	DATE 89 1 25	DATE 89 3 17	DATE 89 5 24	DATE 89 6 30	DATE 89 8 20	DATE 89 9 9	DATE 89 10 30	DATE 89 12 28
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
.5	-6.89	-2.53	7.74	13.22	13.26	8.91	-2.61	-4.95
1.0	-1.14	.17	3.60	9.57	12.97	10.72	1.93	.25
1.5	1.74	1.41	2.41	7.54	11.11	10.29		2.72
2.0	2.48	1.77	1.87	5.55	8.95	9.02	6.17	3.68
2.5	2.85	2.08	1.80	4.29	7.39	7.91	6.27	4.03
3.0	3.00	2.23	1.79	3.40	6.16	6.85	6.04	4.14
3.5	3.14	2.40	1.88	2.87	5.22	5.97	5.77	4.24
4.0	3.16		1.91	2.36	4.38	4.08	5.33	4.20
4.5	3.18	2.55	1.99	2.25	3.80	4.45	4.95	4.14
5.0	3.19	2.62	2.08	2.20	3.40	3.97	4.64	4.10

TEMPERATURE RESULTS ARE OBTAINED FROM A MULTITHERMISTOR CABLE. FURTHER TEMPERATURE LOGS ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN CABLE A THERMISTORS MULTIPLES. ON PREVOIT ENTREPRENDRE D'AUTRES SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 608.6. EMR-85-12A
THIN, UNFROZEN PEAT PLATEAU.
NO PREVIOUS CLEARING.
CABLE ON R.O.W. .8 M W OF PIPELINE IN 25MM OIL-FILLED PVC TUBE.
10 SENSOR YSI44033 (PAIRED).

SITE 85-12A: JEAN MARIE CR A - T3A
****

61 DEGREES 11.6 MINUTES NORTH 120 DEGREES 42.2 MINUTES WEST

ELEVATION 298 METRES

Z(M)	DATE 89 1 25 T(C)	DATE 89 3 17 T(C)	DATE 89 5 24 T(C)	DATE 89 6 30 T(C)	DATE 89 8 20 T(C)	DATE 89 9 9 T(C)	DATE 89 12 28 T(C)
1.0	-1.86	-1.03	2.05	4.51	9.57	7.62	-1.21
2.0	-.11	.75	1.54	2.45	5.37	5.93	.99
3.0	2.24	2.04	1.92	2.23	4.11	4.78	2.67
4.0	2.33	2.42	2.03	2.02	3.09	3.60	2.75
5.0	3.00	2.66	2.24	2.13	2.64	2.99	3.36
6.0	3.02	2.76	2.42	2.29	2.46	2.68	3.27
8.0	2.55	2.48	2.31	2.21	2.16	2.22	2.71
10.0	2.24	2.27	2.21	2.17	2.09	2.11	2.38
12.0	2.02	2.08	2.10	2.10	2.05	2.05	2.18
14.0	1.86	1.91	1.97	1.99	1.97	1.97	2.30
16.4	1.73	1.76	1.81	1.84	1.85	1.86	1.86

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 608.5. EMR-85-12A
THIN,UNFROZEN PEAT PLATEAU.
NO PREVIOUS CLEARING.
CABLE ON R.O.W. 5.9 M W OF PIPELINE IN
38MM OIL-FILLED PVC TUBE.
11 SENSOR YSI44033 (PAIRED).

SITE 85-12A: JEAN MARIE CR A - T4

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61 DEGREES 11.6 MINUTES NORTH 120 DEGREES 42.2 MINUTES WEST

ELEVATION 298 METRES

	DATE	DATE	DATE	DATE	DATE	DATE	DATE	DATE
	89 1 25	89 3 17	89 5 24	89 6 30	89 8 20	89 9 9	89 10 30	89 12 28
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
.5	-2.22	-2.74	.65	11.70	11.77	7.22	.54	-.68
1.0	-.89	-1.26	.01	4.11	7.53	6.31	.10	-.99
1.5	-.89	-.53	.21	2.38	5.62	5.38		-.87
2.0	-.44	-.35	.40	1.50	4.15	4.45	1.60	-.18
3.0	.56	.46	.31	.50	1.84	2.44	2.34	
4.0	1.34	1.01	.76	.73	1.35	1.78	2.17	1.70
5.0	1.51	1.24	.99	.93	1.15	1.40	2.16	1.74
6.0	1.45	1.27	1.08	1.02	1.05	1.18	1.55	
8.0	1.29	1.25	1.17	1.14	1.08	1.11	1.25	1.39
10.0	1.17	1.19	1.19	1.18	1.12	1.13	1.17	1.27
12.0	1.11	1.14	1.17	1.19	1.15	1.17	1.16	1.22

TEMPERATURE RESULTS ARE OBTAINED FROM A MULTITHERMISTOR CABLE. FURTHER TEMPERATURE LOGS ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN CABLE A THERMISTORS MULTIPLES. ON PREVOIT ENTREPRENDRE D'AUTRES SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 608.6. EMR-85-12A
THIN, UNFROZEN PEAT PLATEAU.
NO PREVIOUS CLEARING.
CABLE OFF R.O.W. 17.9 M W OF PIPELINE
IN 38MM OIL-FILLED PVC TUBE.
11 SENSOR YSI44033 (PAIRED).

SITE 85-12A: JEAN MARIE CR A - T3/HA135
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61 DEGREES 11.6 MINUTES NORTH 120 DEGREES 42.2 MINUTES WEST

ELEVATION 298 METRES

	DATE 89 1 25	DATE 89 3 17	DATE 89 5 24	DATE 89 6 30	DATE 89 8 20	DATE 89 9 9	DATE 89 10 30	DATE 89 12 28
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
.5	-1.14	-1.04	5.60	12.40	14.28	10.28	1.07	-.95
1.0	1.15	.59	1.36	8.42	11.61	10.18	4.13	1.60
1.5	1.75	1.04	.91	6.54	9.90	9.36	5.52	2.73
2.0	2.38	1.43	1.04	4.79	8.02	8.05		
2.5	2.56	1.78	1.25	3.47	6.48	7.00	5.76	3.62
3.0	2.85	2.10	1.51	2.28	4.51	5.20	5.19	3.81
4.0	2.92	2.28	1.70	1.85	3.24	3.83	4.40	3.72
5.0	2.79	2.31	1.82	1.76	2.54	2.98	3.69	3.48
6.0	2.63	2.32	1.94	1.82	2.14	2.44	3.05	3.18
7.0	2.28	2.10	1.84	1.72	1.80	1.96	2.43	2.69

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 608.6. EMR-85-12A
THIN, UNFROZEN PEAT PLATEAU.
NO PREVIOUS CLEARING.
CABLE ON R.O.W. 6.9M W OF PIPELINE (IN
LINE WITH "FENCE") IN 25MM OIL-FILLED
PVC TUBE.
10 SENSOR YSI44033 (PAIRED).

SITE 85-12B: JEAN MARIE CR B - CABLE T1

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61 DEGREES 11.4 MINUTES NORTH 120 DEGREES 42.2 MINUTES WEST

ELEVATION 300 METRES

	DATE 89 1 25	DATE 89 2 15	DATE 89 3 17	DATE 89 4 15	DATE 89 5 20	DATE 89 6 30	DATE 89 7 15	DATE 89 8 20	DATE 89 9 9	DATE 89 10 15	DATE 89 11 15	DATE 89 12 28
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
.5	-12.5	-19.9	-6.94	-2.78	12.07	27.71	11.16	11.08	16.82	-11.3	-13.6	-11.5
1.0	-5.86	-9.53	-2.24	.02	-.06	2.34	7.46	13.08	8.50	-3.29	-5.91	-4.78
1.5	-1.00	-2.62	-.16	-.04	.00	.97	3.83	7.68	6.28	.98	-1.48	-.59
2.0	-.06	-1.33	-.04	-.04	-.02	.22	.63	2.34	2.63	1.68	-.09	.06
2.5	-.10	-.11	-.11	-.09	-.10	-.08	-.08	-.09	-.07	-.08	-.09	-.07
3.0	-.15	-.19	-.17	-.17	-.16	-.14	-.16	-.16	-.15	-.17	-.19	-.15
3.5	-.09	-.06	-.10	-.04	-.10	-.08	-.03	-.09	-.08	-.04	-.05	-.09
4.0												
4.5	-.17	-.20	-.18	-.19	-.17	-.16	-.17	-.16	-.16	-.17	-.20	-.17
5.0	-.11	-.15	-.12	-.14	-.11	-.10	-.13	-.11	-.11	-.14	-.15	-.12

TEMPERATURE RESULTS ARE OBTAINED FROM A MULTITHERMISTOR CABLE. FURTHER TEMPERATURE LOGS ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN CABLE A THERMISTORS MULTIPLES. ON PREVOIT ENTREPRENDRE D'AUTRES SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 608.7. EMR-85-12B
THICK ICE-RICH PEAT PLATEAU.
NO PREVIOUS CLEARING.
CABLE ON R.O.W. 1.5 M E OF PIPELINE IN 25MM OIL-FILLED PVC TUBE.
SEADATA LOGGER INSTALLED WITH INTERFACE UNIT 23/10/88.
10 SENSOR YSI44033 (PAIRED).

SITE 85-12B: JEAN MARIE CR B - CABLE T2
****

61 DEGREES 11.4 MINUTES NORTH 120 DEGREES 42.2 MINUTES WEST

ELEVATION 300 METRES

	DATE 89 1 25	DATE 89 2 15	DATE 89 3 17	DATE 89 4 15	DATE 89 5 20	DATE 89 6 30	DATE 89 7 15	DATE 89 8 20	DATE 89 9 9	DATE 89 10 15	DATE 89 11 15	DATE 89 12 28
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
.5	-14.0	-19.8	-7.57	-3.34	14.54		10.87	10.74		-10.9	-13.5	-11.4
1.0	-8.24	-12.0	-3.66	-.26	.39		11.82	11.93		-8.01	-10.4	-7.50
1.5	-1.49	-2.53	-.43	-.14	-.08		6.15	8.83		-.75	-3.29	-2.10
2.0	-.21	-1.72	.05	.13	.88		3.77	6.01		1.57	-1.17	-.10
2.5	-.10	-.14	-.10	-.11	-.07	.23	.48	1.56	1.92	1.44	-.03	.25
3.0	-.18	-.21	-.18	-.19	-.17	-.15	-.17	-.16	-.15	-.16	-.16	-.13
3.5	-.14	-.16	-.15	-.15	-.14	-.12	-.13	-.10	-.13	-.13	-.15	-.13
4.0	-.18	-.21	-.18	-.20	-.17	-.16	-.17	-.16	-.15	-.19	-.20	-.16
4.5	-.11	-.15	-.11	-.14	-.11		-.11	-.10	-.10	-.13	-.14	-.10
5.0	-.13	-.15	-.13	-.14	-.13	-.11	-.14	-.13	-.12	-.15	-.16	-.13

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 608.7. EMR-85-12B
THICK ICE-RICH PEAT PLATEAU.
NO PREVIOUS CLEARING.
CABLE ON R.O.W. .8 M W OF PIPELINE IN
25MM OIL-FILLED PVC TUBE.
SEADATA LOGGER INSTALLED WITH INTERFACE
UNIT 23/10/88.
10 SENSOR YSI44033 (PAIRED).

SITE 85-12B: JEAN MARIE CR B - CABLE T3
****

61 DEGREES 11.4 MINUTES NORTH 120 DEGREES 42.2 MINUTES WEST

ELEVATION 300 METRES

	DATE 89 1 25	DATE 89 2 15	DATE 89 3 17	DATE 89 4 15	DATE 89 5 20	DATE 89 6 30	DATE 89 7 15	DATE 89 8 20	DATE 89 9 9	DATE 89 10 15	DATE 89 11 15	DATE 89 12 28
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
.0	-11.3	-21.5	-10.2	-2.42	13.67	27.89	13.87	10.55	17.17	-13.6	-18.6	-10.6
1.0	-.06	-.06	-.10	-.22	-.12	.03	-.06	.00	.11	.05	-.08	-.05
2.0	-.10	-.09	-.11	-.06	-.11	-.08	-.05	-.11	-.10	-.06	-.08	-.10
3.0	-.15	-.16	-.16	-.15	-.16	-.09	-.10	-.14	-.12	-.14	-.16	-.14
4.0	-.17	-.20	-.17	-.19	-.16	-.14	-.17	-.16	-.15	-.19	-.20	-.16
6.0	.02	.00	.01	.02	.01	.03	.03	.02	.02	.01	.00	.02
8.0	.17	.17	.17	.18	.18	.20	.20	.18	.19	.18	.15	.17
10.0	-.03	.24	-.07	.25	-.07	-.03	.28	-.06	-.04	.25	.24	-.10
12.5	.47	.45	.46	.46	.47	.48	.47	.47	.48	.46	.45	.47
17.2	.76	.74	.76	.75	.76	.80	.80	.82	.88	.76	.74	.76

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 608.7. EMR-85-12B
THICK ICE-RICH PEAT PLATEAU.
NO PREVIOUS CLEARING.
CABLE ON R.O.W. 5.9 M W OF PIPELINE IN
25MM OIL-FILLED PVC TUBE.
SEADATA LOGGER INSTALLED WITH INTERFACE
UNIT 23/10/88.
10 SENSOR YSI44033 (PAIRED).

SITE 85-12B: JEAN MARIE CR B - CABLE T4
****

61 DEGREES 11.4 MINUTES NORTH 120 DEGREES 42.2 MINUTES WEST

ELEVATION 300 METRES

	DATE 89 1 25	DATE 89 2 15	DATE 89 3 17	DATE 89 4 15	DATE 89 5 20	DATE 89 6 30	DATE 89 7 15	DATE 89 8 20	DATE 89 9 9	DATE 89 10 15	DATE 89 11 15	DATE 89 12 28
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
.5	-8.18	-7.96	-4.53	-.04	3.73	9.08	12.95	11.54	6.37	-1.04	-4.64	-3.09
1.0	-2.46	-3.10	-1.65	-.70	-.27	-.16	-.10	.60	.49	-.56	-1.70	-1.02
1.5	-.86	-1.38	-.56	-.58	-.27	-.20	-.17	-.17	-.15	-.15	-.50	-.19
2.0	-.12	-.13	-.19	-.27	-.18	-.12	-.10	-.12	-.10	-.10	-.11	-.10
2.5	-.11	-.13	-.12	-.13	-.14	-.11	-.11	-.12	-.11	-.11	-.13	-.10
3.5	-.07	-.09	-.07	-.08	-.07	-.05	-.05	-.06	-.06	-.08	-.09	-.10
4.5	.05	.02	.04	.05	.05	.06	.05	.05	.05	.03	.02	.04
5.5	.16	.15	.18	.18	.18	.20	.19	.19	.20	.17	.15	
6.5	.19	.18	.20	.19	.20	.21	.20	.20	.21	.19	.18	.20
8.0	.41	.40	.42	.41	.42	.44	.42	.43	.43	.41	.40	.42
9.7	.43	.41	.43	.43	.43	.45	.45	.44	.45	.43	.41	.43

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 608.7. EMR-85-12B
THICK ICE-RICH PEAT PLATEAU.
NO PREVIOUS CLEARING.
CABLE OFF R.O.W. 17.9 M W OF PIPELINE
25MM OIL-FILLED PVC TUBE.
SEADATA LOGGER INSTALLED WITH INTERFACE
UNIT 23/10/88.
11 SENSOR YSI44033 (PAIRED).

SITE 85-12B JEAN MARIE CREEK B - HA133
****

61 DEGREES 11.4 MINUTES NORTH 120 DEGREES 42.2 MINUTES WEST

ELEVATION 300 METRES

Z(M)	DATE 89 1 25 T(C)	DATE 89 3 17 T(C)	DATE 89 5 20 T(C)	DATE 89 6 30 T(C)	DATE 89 8 20 T(C)	DATE 89 9 9 T(C)	DATE 89 10 30 T(C)	DATE 89 12 28 T(C)
.0	-8.06	-4.84	15.35	32.04	11.68	19.48	-2.81	-5.80
.2	-4.28	-2.64	1.03	10.58	12.87	9.03	-1.14	-3.68
.7	.29	.31	.42	5.37	9.16	8.10	3.15	.86
1.2	1.71	1.18	.81	2.70	6.42	6.75	4.54	2.38
1.7	2.06	1.42	.98	1.96	5.24	5.88	4.75	2.80
2.2	2.11	1.48	1.01	1.47	4.14	4.88	4.48	2.86
2.7	2.37	1.76	1.28	1.46	3.55	4.28	4.37	3.09
3.7	2.15	1.59	1.04		1.88	2.38	2.76	
4.7	2.01	1.58	1.15	1.00	1.61	2.02	2.66	2.34
5.7	1.80	1.52	1.18	1.04	1.20	1.43	2.13	1.95

TEMPERATURE RESULTS ARE OBTAINED FROM A MULTITHERMISTOR CABLE. FURTHER TEMPERATURE LOGS ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN CABLE A THERMISTORS MULTIPLES. ON PREVOIT ENTREPRENDRE D'AUTRES SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 608.7. EMR-85-12B.
CABLE IS IN UNFROZEN FEN JUST NORTH OF PEAT PLATEAU.
10 SENSORS YSI44033 (PAIRED).

SITE 85-12B JEAN MARIE CREEK B - HA134
****

61 DEGREES 11.4 MINUTES NORTH 120 DEGREES 42.2 MINUTES WEST

ELEVATION 300 METRES

	DATE 89 1 25	DATE 89 3 17	DATE 89 5 20	DATE 89 6 30	DATE 89 8 20	DATE 89 9 9	DATE 89 10 30	DATE 89 12 28
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
.5	-5.19	-5.10	2.58	11.22	12.03	11.82	-4.72	-6.48
1.0	-2.10	-2.16	-.03	.51	9.93	6.53	-1.50	-3.70
1.5	-.33	-.23	-.11	.09	3.22	2.55	.12	-.85
2.0	-.08	-.06	-.06	.07	.65	.70	.45	.11
2.5	-.04	-.03	-.03	-.01	.01	.11	.20	.08
3.5	-.16	-.15	-.15	-.13	-.14	-.12	-.14	-.14
4.5	-.12	-.12	-.12	-.10	-.11	-.10	-.12	-.10
5.5	-.08	-.08	-.08	-.06	-.07	-.06	-.08	-.07
6.5	.03	.03	.03	.05	.03	.04	.02	.02
7.4	.06	.06	.07	.08	.07	.08	.06	.06

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 608.7. EMR-85-12B.
HA134 IS ON EDGE OF PEAT PLATEAU ONLY
2M NORTH OF FENCE.
10 SENSORS YSI44033 (PAIRED).

SITE 85-12B: JEAN MARIE CR B - HT196
****

61 DEGREES 11.4 MINUTES NORTH 120 DEGREES 42.2 MINUTES WEST

ELEVATION 300 METRES

Z(M)	DATE 89 5 24 T(C)	DATE 89 6 30 T(C)	DATE 89 8 20 T(C)
1.0	-.23	-.12	.45
2.0	-.20	-.15	-.14
3.0	-.18	-.16	-.17
4.0	-.17	-.15	-.17
6.0	-.09	-.07	-.09
8.0	.02	.04	.05
10.0	.22	.24	.22
12.0	.30	.32	.31
10.0	.14	.15	.13
7.0	-.13	-.12	-.13
5.0	-.20	-.19	-.20

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 608.7. EMR-85-12B
NEW CABLE HT196 INSTALLED IN
GEOPHYSICAL HOLE 20/05/89.
LOCATED ON TRAVEL SIDE.
11 SENSOR YSI44033 (PAIRED).

SITE 85-12B: JEAN MARIE CR B - PR 2811/T5

****

61 DEGREES 11.4 MINUTES NORTH 120 DEGREES 42.2 MINUTES WEST

ELEVATION 300 METRES

Z(M)	DATE 89 8 20 T(C)	DATE 89 9 9 T(C)	DATE 89 10 15 T(C)	DATE 89 11 15 T(C)	DATE 89 12 28 T(C)
.2	13.42	8.98	2.12	.59	.20
.4	11.91	9.66	4.27	1.92	1.18
.6	10.79	9.43	5.98	3.19	
.8	10.09	8.89	6.75	3.86	2.68
1.0	8.02	7.23	5.22	2.52	1.72
1.2	5.35	4.71	3.14	.70	
1.4	3.21	2.87	2.00	.85	
1.6					

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 608.7. EMR-85-12B
LOCATED 15 CM FROM SIDE OF PIPE
TOWARDS T2. CONNECTED TO SEADATA
LOGGER ON CHANNEL T5 20/08/89.
ONLY SEVEN SENSORS READING.
8 SENSOR YSI44033 (PAIRED).

SITE 85-12B: JEAN MARIE CR B - PR 2808
****

61 DEGREES 11.4 MINUTES NORTH 120 DEGREES 42.2 MINUTES WEST

ELEVATION 300 METRES

DATE 89 8 20	
Z(M)	T(C)
.2	12.90
.4	11.30
.6	9.60
.8	8.20
1.0	6.80
1.2	5.30
1.4	3.50
1.6	1.50

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 608.7. EMR-85-12B
LOCATED 40 CM FROM SIDE OF PIPE +/-
IN SLUMPED DITCH WALL. CONNECTED
TO XL-800 LOGGER 20/08/89.
8 SENSOR YSI44033 (PAIRED).

SITE 85-13: REDKNIFE HILLS - A
****

60 DEGREES 34.1 MINUTES NORTH 120 DEGREES 17.2 MINUTES WEST

ELEVATION 634 METRES

	DATE 89 3 17	DATE 89 5 20	DATE 89 6 30	DATE 89 8 19	DATE 89 9 10
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)
1.0	-1.26	-.15	.44	3.34	2.59
2.0	-.14	-.14	-.10	-.12	-.12
3.0	-.10	-.10	-.08	-.09	-.09
4.0	-.02	-.03	.00	-.03	-.02
6.0	.01	.00		.00	.03
8.0	.12	.11	.14	.11	.13
10.0	.27	.27		.27	.28
12.0	.34	.34	.35	.35	.37
14.0	.38	.38	.41	.40	
17.0	.58	.58	.60	.59	.60
20.0	.69	.69	.71	.70	.71

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 682.2. EMR-85-13A
THIN FROZEN TERRAIN SURROUNDING FEN.
NO PREVIOUS CLEARING.
CABLE ON R.O.W. 3 M E OF PIPELINE IN
25MM OIL-FILLED PVC TUBE.
11 SENSOR YSI44033

SITE 85-13: REDKNIFE HILLS - B
****

60 DEGREES 34.0 MINUTES NORTH 120 DEGREES 17.1 MINUTES WEST

ELEVATION 634 METRES

	DATE	DATE	DATE	DATE	DATE
	89 3 17	89 5 20	89 6 30	89 8 19	89 9 10
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)
.5	-5.16	8.30	16.61	27.32	8.41
1.0	-2.06	3.25	3.95	11.29	6.08
1.5	-.13	-.01	1.31	5.44	4.69
2.0	-.03	-.07	.84	3.47	3.37
2.5	-.06	-.09	.38	1.98	2.23
3.5	-.03	-.04	-.01	-.02	.01
4.5	-.03	-.03	-.01	-.03	-.01
5.5	-.14	-.14	-.11	-.13	-.11
6.5	.03	.03	.06	.06	.09
8.5	.24	.24	.27	.26	.28
10.5	.40	.40	.43	.42	.44

TEMPERATURE RESULTS ARE OBTAINED FROM A MULTITHERMISTOR CABLE. FURTHER TEMPERATURE LOGS ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN CABLE A THERMISTORS MULTIPLES. ON PREVOIT ENTREPRENDRE D'AUTRES SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 682.4. EMR-85-13B
FROZEN TERRAIN AROUND FEN.
NO PREVIOUS CLEARING.
CABLE ON R.O.W. 4 M E OF PIPELINE IN 25MM OIL-FILLED PVC TUBE.
11 SENSOR YSI44033

SITE 85-13: REDKNIFE HILLS - C
****

60 DEGREES 33.8 MINUTES NORTH 120 DEGREES 17.0 MINUTES WEST

ELEVATION 634 METRES

	DATE 89 3 17	DATE 89 5 20	DATE 89 6 30	DATE 89 8 19	DATE 89 9 10
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)
.5	-1.56	3.11	10.51	14.96	8.12
1.0	-.31	.53	5.38	10.99	8.74
1.5	.11	.99	3.19	8.01	8.12
2.0	1.24	1.62	2.39	5.60	6.40
2.5	2.16	2.16	2.36	3.98	4.71
3.0	2.59	2.68	2.72	3.39	3.87
3.5	3.00	2.95	2.86	3.20	3.54
4.0	3.24	2.99	2.90	3.10	3.35
4.5	3.26	3.12	3.03	3.12	3.31

TEMPERATURE RESULTS ARE OBTAINED FROM A MULTITHERMISTOR CABLE. FURTHER TEMPERATURE LOGS ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN CABLE A THERMISTORS MULTIPLES. ON PREVOIT ENTREPRENDRE D'AUTRES SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 682.6. EMR-85-13C
FENCE IS LOCATED INSIDE FEN.
NO PREVIOUS CLEARING.
CABLE ON R.O.W. 4 M E OF PIPELINE IN 38MM OIL-FILLED PVC TUBE.
9 SENSOR YSI44033

SITE 84-5A: PETITOT RIVER NORTH A - T1

****

59 DEGREES 45.0 MINUTES NORTH 119 DEGREES 30.0 MINUTES WEST

ELEVATION 552 METRES

	DATE	DATE	DATE	DATE	DATE
	89 3 17	89 5 20	89 6 30	89 8 19	89 9 10
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)
.5	-7.81	6.14	28.52	30.58	15.06
1.0	-1.92	.64	7.81	13.64	6.50
1.5	-.06	-.06	.19	7.65	5.90
2.0	-.04	-.04	-.03	.57	1.11
2.5	-.08	-.08	-.06	-.07	-.06
3.0	-.15	-.15	-.13	-.14	-.13
3.5	-.11	-.11	-.10	-.10	-.10
4.0	-.16	-.17	-.15	-.16	-.15
4.5	-.13	-.14	-.12	-.13	-.12
5.2	-.20	-.20	-.18	-.19	-.18

TEMPERATURE RESULTS ARE OBTAINED FROM A MULTITHERMISTOR CABLE. FURTHER TEMPERATURE LOGS ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN CABLE A THERMISTORS MULTIPLES. ON PREVOIT ENTREPRENDRE D'AUTRES SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 783.0. EMR-84-5A
ICE-RICH PEAT 3.5 M THICK.
MACHINE-CLEARED TO 25.0M IN WINTER 82/83.
CABLE ON R.O.W. 1.3 M E OF PIPELINE IN
25MM OIL-FILLED PVC TUBE.
10 SENSOR YSI44032 (PAIRED).

SITE 84-5A: PETITOT RIVER NORTH A - T2
****

59 DEGREES 45.0 MINUTES NORTH 119 DEGREES 30.0 MINUTES WEST

ELEVATION 552 METRES

	DATE 89 3 17	DATE 89 5 20	DATE 89 6 30	DATE 89 8 19	DATE 89 9 10
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)
.5	-.22	-.03	.01	7.86	6.92
1.0	.07	.06	.17	3.38	4.00
1.5	-.04	-.04	.01	.81	1.19
2.0	-.05	-.05	-.04	-.05	-.02
2.5	-.10	-.11	-.09	-.10	-.06
3.0	-.15	-.15	-.13	-.15	-.11
3.5	-.16	-.16	-.14	-.15	
4.0	-.13	-.14	-.12	-.13	
4.5	-.12	-.12	-.10	-.11	-.09
5.6	-.11		-.09	-.10	-.10

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 783.0. EMR-84-5A
ICE-RICH PEAT 3.5M THICK.
MACHINE-CLEARED TO 25M IN WINTER 82/83.
CABLE ON R.O.W. 2.3 M W OF PIPELINE IN
25MM OIL-FILLED PVC TUBE.
10 SENSOR YSI44032 (PAIRED).

SITE 84-5A: PETITOT RIVER NORTH A - T3
****

59 DEGREES 45.0 MINUTES NORTH 119 DEGREES 30.0 MINUTES WEST

ELEVATION 552 METRES

	DATE 89 3 17	DATE 89 5 20	DATE 89 6 30	DATE 89 8 19	DATE 89 9 10
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)
1.0	-.08	-.03	5.41	10.36	7.20
2.0	.02	.02	.04	.03	.06
3.0	-.06	-.06	-.04	-.06	-.06
4.0	-.04	-.07	-.05	-.06	-.06
6.0	-.21	-.21	-.19	-.20	-.20
8.0	-.15	-.15	-.13	-.15	-.17
10.0	-.17	-.18	-.17	-.18	-.18
12.0	-.11	-.11	-.09	-.10	-.11
15.0	-.09	-.09	-.07	-.08	-.08
18.0	.03	.03	.07	.03	.06
20.6			.13		.10

TEMPERATURE RESULTS ARE OBTAINED FROM A MULTITHERMISTOR CABLE. FURTHER TEMPERATURE LOGS ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN CABLE A THERMISTORS MULTIPLES. ON PREVOIT ENTREPRENDRE D'AUTRES SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 783.0. EMR-84-5A
ICE-RICH PEAT 3.5 M THICK.
MACHINE-CLEARED TO 25M IN WINTER 82/83.
CABLE ON R.O.W. 4.6 M W OF PIPELINE IN
25MM OIL-FILLED PVC TUBE.
11 SENSOR YSI44032 (PAIRED).

SITE 84-5A: PETITOT RIVER NORTH A - T4

59 DEGREES 45.0 MINUTES NORTH 119 DEGREES 30.0 MINUTES WEST

ELEVATION 552 METRES

Z(M)	DATE 89 3 17 T(C)	DATE 89 5 20 T(C)	DATE 89 6 30 T(C)	DATE 89 8 19 T(C)	DATE 89 9 10 T(C)
1.0	.00	.00	.05	6.06	4.11
2.0	-.13	-.13	-.09	-.08	-.06
3.0	-.17	-.18	-.15	-.16	-.16
4.0	-.17	-.18	-.14	-.16	-.15
6.0	-.21	-.21	-.18	-.20	-.20
8.0	-.17	-.18	-.15	-.16	-.18
10.0	-.15	-.15	-.13	-.14	-.14
12.0	-.13	-.13	-.11	-.12	-.11
15.0	-.05	-.05	-.03	-.04	-.04
18.0	-.01	-.01	.01	.00	-.02
20.6	.10	.10	.12	.11	.10

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 783.0. EMR-84-5A
ICE-RICH PEAT 3.5 M THICK.
MACHINE-CLEARED TO 25M IN WINTER 82/83.
CABLE OFF R.O.W. 21.6 M W OF PIPELINE
IN 25MM OIL-FILLED PVC TUBE.
11 SENSOR YSI44032 (PAIRED).

SITE 84-5B: PETITOT RIVER NORTH B - T1(NEW)
****

59 DEGREES 45.0 MINUTES NORTH 119 DEGREES 30.0 MINUTES WEST

ELEVATION 552 METRES

	DATE 89 1 20	DATE 89 2 15	DATE 89 3 15	DATE 89 4 15	DATE 89 5 12	DATE 89 5 20	DATE 89 6 30	DATE 89 7 15	DATE 89 8 19
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
.5	-4.67	-8.07	-2.63	-1.81	3.14	3.35	8.55	17.67	21.07
1.0									11.50
1.5									5.54
2.0	.02	-.02	-.05	-.02	-.02	.00	.35	.56	1.05
2.5	-.16	-.15	-.13	-.13	-.11	-.18	-.11	-.11	-.15
3.0	-.19	-.19	-.20	-.19	-.17	-.13	-.16	-.16	-.14
3.5	-.21	-.21	-.20	-.17	-.20	-.18	-.19	-.20	-.17
4.0	-.22	-.23	-.23	-.22	-.25	-.20	-.23	-.21	-.18
4.5	-.28	-.28	-.27	-.27	-.28	-.23	-.28	-.28	-.24
5.0	-.27	-.28	-.27	-.26	-.27	-.24	-.26	-.26	-.23
5.5									-.19

TEMPERATURE RESULTS ARE OBTAINED FROM A MULTITHERMISTOR CABLE. FURTHER TEMPERATURE LOGS ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN CABLE A THERMISTORS MULTIPLES. ON PREVOIT ENTREPRENDRE D'AUTRES SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 783.2. EMR-84-5B
VERY THICK ICY PEAT (7M).
MACHINE CLEARED TO 26M IN WINTER 82/83
CABLE ON R.O.W. 1.3M E OF PIPELINE IN
25MM OIL-FILLED PVC TUBE.'
NEW CABLE INSTALLED IN OCTOBER/86.
11 SENSOR YSI44033 (PAIRED)

SITE 84-5B: PETITOT RIVER NORTH B - T2(NEW)
****

59 DEGREES 45.0 MINUTES NORTH 119 DEGREES 30.0 MINUTES WEST

ELEVATION 552 METRES

	DATE 89 1 20	DATE 89 2 15	DATE 89 3 15	DATE 89 4 15	DATE 89 5 12	DATE 89 5 20	DATE 89 6 30	DATE 89 7 15	DATE 89 8 19
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
.5	-1.51	-2.31	-.81	-.17	-.04	.06	3.45	9.70	12.57
1.0	-.01	-.05	-.05	-.02	-.02	.00	.17	2.81	6.90
1.5	-.04	-.06	-.09	-.08	-.08	-.03	.06	.77	2.66
2.0	-.10	-.10	-.09	-.09	-.09	-.01	-.05	-.02	.27
2.5	-.14	-.15	-.16	-.14	-.14	-.07	-.13	-.14	-.09
3.0	-.17	-.17	-.16	-.17	-.15	-.11	-.16	-.15	-.12
3.5	-.22	-.23	-.23	-.19	-.16	-.16	-.20	-.20	-.18
4.0	-.23	-.22	-.21	-.17	-.21	-.18	-.20	-.22	-.19
4.5	-.25	-.26	-.26	-.25	-.20	-.18	-.22	-.25	-.21
5.0	-.23	-.23	-.22	-.21	-.21	-.17	-.23	-.22	-.19
5.7	-.22	-.22	-.21	-.21	-.21	-.18	-.21	-.21	-.18

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 783.2. EMR-84-5B
VERY THICK ICY PEAT (7M).
MACHINE CLEARED TO 26M IN WINTER 82/83
CABLE ON R.O.W. 2.3M W OF PIPELINE IN
25MM OIL-FILLED PVC TUBE.
NEW CABLE INSTALLED IN OCTOBER 1986.
11 SENSOR YSI44033 (PAIRED)

SITE 84-5B: PETITOT RIVER NORTH B -T3(NEW)
****

59 DEGREES 45.0 MINUTES NORTH 119 DEGREES 30.0 MINUTES WEST

ELEVATION 552 METRES

	DATE 89 1 20	DATE 89 2 15	DATE 89 3 15	DATE 89 4 15	DATE 89 5 12	DATE 89 5 20	DATE 89 6 30	DATE 89 7 15	DATE 89 8 19
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
1.0	-.13	-2.27	-.42	-.11	-.05	-.02	.81	5.39	8.18
2.0	-.19	-.19	-.19	-.19	-.17	-.14	-.17	-.16	-.11
3.0	-.23	-.22	-.23	-.25	-.22	-.20	-.21	-.22	-.18
4.0	-.25	-.25	-.25	-.23	-.25	-.20	-.23	-.23	-.18
6.0	-.28	-.27	-.27	-.27	-.28	-.24	-.28	-.27	-.22
8.0	-.20	-.21	-.21	-.19	-.21	-.17	-.19	-.20	-.15
10.0	-.14	-.10	-.11	-.11	-.11	-.07	-.11	-.10	-.06
12.0	-.03	-.04	-.04	-.04	-.03	.01	-.05	-.03	.02
15.0	.06	.06	.07	.06	.07	.10	.07	.07	.11
18.0	.17	.17	.17	.15	.15	.20	.17	.15	.22
20.5	.26	.26	.26	.28	.26	.30	.26	.28	.31

TEMPERATURE RESULTS ARE OBTAINED FROM A MULTITHERMISTOR CABLE. FURTHER TEMPERATURE LOGS ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN CABLE A THERMISTORS MULTIPLES. ON PREVOIT ENTREPRENDRE D'AUTRES SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 783.2. EMR-84-5B
VERY THICK ICY PEAT (7M).
MACHINE CLEARED TO 26M IN WINTER 82/83.
CABLE ON R.O.W. 5.8M W OF PIPELINE IN 25MM OIL-FILLED PVC TUBE.
NEW CABLE INSTALLED IN OCTOBER 1986.
11 SENSOR YSI44033 (PAIRED).

SITE 84-5B: PETITOT RIVER NORTH B - T4(NEW)
****

59 DEGREES 45.0 MINUTES NORTH 119 DEGREES 30.0 MINUTES WEST

ELEVATION 552 METRES

	DATE 89 1 20	DATE 89 2 15	DATE 89 3 15	DATE 89 4 15	DATE 89 5 12	DATE 89 5 20	DATE 89 6 30	DATE 89 7 15	DATE 89 8 19
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
1.0	-.77	-1.03	-.58	-.20	-.17	-.12	-.16	-.13	2.75
2.0	-.15	-.25	-.14	-.14	-.13	-.09	-.13	-.11	-.07
3.0	-.28	-.28	-.26	-.27	-.26	-.23	-.26	-.27	-.22
4.0	-.32	-.32	-.33	-.32	-.32	-.29	-.32	-.31	-.27
6.0	-.27	-.27	-.26	-.26	-.27	-.23	-.26	-.26	-.24
8.0	-.16	-.15	-.16	-.15	-.16	-.11	-.15	-.14	-.10
10.0	-.25	-.23	-.21	-.21	-.23	-.18	-.21	-.22	-.16
12.0	-.02	-.02	-.03	-.03	-.03	.00	-.02	-.02	-.01
15.0	-.05	-.04	-.03	-.04	-.03	.02	-.03	-.03	.05
18.0	.10	.09	.09	.09	.09	.13	.11	.11	.14
20.5	.19	.19	.19	.19	.19	.21	.19	.19	.20

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 783.2. EMR-84-5B
VERY THICK ICY PEAT (7M).
MACHINE CLEARED TO 26M IN WINTER 82/83.
CABLE OFF R.O.W. 20.8M W OF PIPELINE IN
38MM OIL-FILLED PVC TUBE.
NEW CABLE INSTALLED IN OCTOBER 1986.
11 SENSOR YSI44033 (PAIRED).

SITE 84-5B: PETITOT RIVER NORTH B - HT197
****

59 DEGREES 45.0 MINUTES NORTH 119 DEGREES 30.0 MINUTES WEST

ELEVATION 552 METRES

	DATE 89 6 30	DATE 89 8 19	DATE 89 9 10
Z(M)	T(C)	T(C)	T(C)
1.0	-.03	-.04	-.04
2.0	-.07	-.09	-.07
3.0	-.12	-.13	-.11
4.0	-.09	-.11	-.09
6.0	-.06	-.06	-.04
8.0	-.05	-.06	-.06
10.0	-.04	-.06	-.05
12.0	-.01	-.01	.02
15.0	.11	.04	.05
18.0	.27	.25	.27
20.0	.35	.34	.35

TEMPERATURE RESULTS ARE OBTAINED FROM A MULTITHERMISTOR CABLE. FURTHER TEMPERATURE LOGS ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN CABLE A THERMISTORS MULTIPLES. ON PREVOIT ENTREPRENDRE D'AUTRES SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 783.2. EMR-84-5B
NEW CABLE HT197 INSTALLED IN
GEOPHYSICAL HOLE 20/05/89.
LOCATED ON TRAVEL SIDE.
11 SENSOR YSI44033 (PAIRED).

SITE 84-6: PETITOT RIVER SOUTH - T1

****

59 DEGREES 27.0 MINUTES NORTH 119 DEGREES 15.0 MINUTES WEST

ELEVATION 575 METRES

	DATE 89 3 17	DATE 89 5 20	DATE 89 6 30	DATE 89 8 19	DATE 89 9 10
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)
.5	-1.90	.87	6.55	13.42	6.52
1.0	-.22	-.03	5.47	5.25	4.09
1.5	.06	.06	.65	1.67	2.25
2.0	-.03	-.03	-.01	.13	1.06
2.5	-.16	-.15	-.14	-.14	-.18
3.0	-.16	-.17	-.15	-.16	
3.5	-.18	-.18	-.17	-.18	
4.0	-.06	-.09	-.05	-.06	
4.5	-.08	-.09	-.07	-.08	
5.5	-.11	-.11	-.09	-.10	-.05

TEMPERATURE RESULTS ARE OBTAINED FROM A MULTITHERMISTOR CABLE. FURTHER TEMPERATURE LOGS ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN CABLE A THERMISTORS MULTIPLES. ON PREVOIT ENTREPRENDRE D'AUTRES SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 819.5 EMR-84-6
THICK AND VERY ICE-RICH PEAT (5M).
MACHINE CLEARED TO 25M IN WINTER 82/83.
CABLE ON R.O.W. 1.2 M E OF PIPELINE IN
25MM OIL-FILLED PVC TUBE.
10 SENSOR YSI44032 (PAIRED).

SITE 84-6: PETITOT RIVER SOUTH - T2

****

59 DEGREES 27.0 MINUTES NORTH 119 DEGREES 15.0 MINUTES WEST

ELEVATION 575 METRES

	DATE 89 3 17	DATE 89 5 20	DATE 89 6 30	DATE 89 8 19	DATE 89 9 10
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)
.5	-3.09	.33	5.04	10.73	4.14
1.0	-.17	-.03	.00	.33	.63
1.5	-.09	-.08	-.06	-.08	-.04
2.0	-.09	-.08	-.05	-.06	-.06
2.5	-.10	-.10	-.08	-.09	-.09
3.0	-.22	-.22	-.20	-.21	-.21
3.5	-.11	-.11	-.09	-.10	-.10
4.0	-.17	-.17	-.15	-.16	
4.5	-.20	-.20	-.18	-.19	-.20
5.4	-.08	-.08	-.06	-.07	-.08

TEMPERATURE RESULTS ARE OBTAINED FROM A MULTITHERMISTOR CABLE. FURTHER TEMPERATURE LOGS ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN CABLE A THERMISTORS MULTIPLES. ON PREVOIT ENTREPRENDRE D'AUTRES SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 819.5 EMR-84-6
THICK AND VERY ICE-RICH PEAT (5M).
MACHINE CLEARED TO 25M IN WINTER 82/83.
CABLE ON R.O.W. 2 M W OF PIPELINE IN
25MM OIL-FILLED PVC TUBE.
10 SENSOR YSI44032 (PAIRED).

SITE 84-6: PETITOT RIVER SOUTH - T3
****

59 DEGREES 27.0 MINUTES NORTH 119 DEGREES 15.0 MINUTES WEST

ELEVATION 575 METRES

	DATE 89 3 17	DATE 89 5 20	DATE 89 6 30	DATE 89 8 19	DATE 89 9 10
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)
1.0	-.07	-.07	-.04	-.07	-.06
2.0	-.16	-.16	-.13	-.15	-.14
3.0	-.14	-.14	-.11	-.14	-.14
4.0	-.06	-.06	-.04	-.06	-.06
6.0	-.09	-.09	-.07	-.09	-.08
8.0	.01	.01	.03	.01	.02
10.0	.09	.08	.11	.09	.08
12.0	.29	.28	.30	.29	.30
15.0	.45	.45	.47	.45	.45
18.0	.58	.58	.60	.58	.61

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 819.5 EMR-84-6
THICK AND VERY ICE-RICH PEAT (5M).
MACHINE CLEARED TO 25M IN WINTER 82/83.
CABLE ON R.O.W. 4 M W OF PIPELINE IN
25MM OIL-FILLED PVC TUBE.
11 SENSOR YSI44032 (PAIRED).

SITE 84-6: PETITOT RIVER SOUTH - T4

****

59 DEGREES 27.0 MINUTES NORTH 119 DEGREES 15.0 MINUTES WEST

ELEVATION 575 METRES

	DATE 89 3 17	DATE 89 5 20	DATE 89 6 30	DATE 89 8 19	DATE 89 9 10
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)
1.0	.06	.11	.27	1.59	1.40
2.0	-.07	-.07	-.05	-.06	-.08
3.0	-.14	-.14	-.11	-.13	-.16
4.0	-.11	-.11	-.09	-.10	-.12
6.0	-.02	-.03	.00	-.02	.03
8.0	.05	.04	.07	.05	-.01
10.0	.09	.09	.11	.09	.06
12.0	.23	.22	.24	.23	.27
15.0	.48	.48	.50	.48	.53
18.0	.53	.53	.55	.53	.60
20.7	.65	.65	.67	.65	.66

TEMPERATURE RESULTS ARE OBTAINED FROM A MULTITHERMISTOR CABLE. FURTHER TEMPERATURE LOGS ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN CABLE A THERMISTORS MULTIPLES. ON PREVOIT ENTREPRENDRE D'AUTRES SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 819.5 EMR-84-6
THICK AND VERY ICE-RICH PEAT (5M).
MACHINE-CLEARED TO 25M IN WINTER 82/83.
CABLE OFF R.O.W. 20 M W OF PIPELINE IN
38MM OIL-FILLED PVC TUBE.
11 SENSOR YSI44032 (PAIRED).

APPENDIX B

PIPE TEMPERATURE SENSORS DATA LISTINGS

Site Number	Site Name	Pipe Sensor Identification Label
84-1	Norman Wells Pump Station	PT1-1
84-2A	Canyon Creek North A	PT1-3
84-2B	Canyon Creek North B	PT1-4
84-2C	Canyon Creek South C	PT1-5
84-3A	Great Bear River A	EMR11
84-3B	Great Bear River B	PT1-10
84-4A	Trail River A	EMR1
84-4B	Trail River B	PT1-9
84-5A	Petitot River North A	EMR4
84-5B	Petitot River North B	EMR5
84-6	Petitot River South	EMR6
85-7A	Table Mountain A	85-EPT 1
85-7B	Table Mountain B	85-EPT 3
85-7C	Table Mountain C	85-EPT 2
85-8A	Manners Creek A	85-EPT 8
85-8B	Manners Creek B	85-EPT 7
85-8C	Manners Creek C	85-EPT 12
85-9	Pump Station 3	85-EPT 9
85-10A	Mackenzie Highway South A	85-EPT 4
85-10B	Mackenzie Highway South B	85-EPT 5
85-11	Moraine South	85-EPT 11
85-12A	Jean Marie Creek A	85-EPT 6
85-12B	Jean Marie Creek B	85-EPT 10

NORMAN WELLS PUMP STATION - PT1-1

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65 DEGREES 17.2 MINUTES NORTH 126 DEGREES 53.1 MINUTES WEST

ELEVATION 61 METRES

	DATE 89 2 1	DATE 89 3 13	DATE 89 5 23	DATE 89 6 27	DATE 89 8 23	DATE 89 9 6	DATE 89 10 26	DATE 89 12 13
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
.900	-2.55	-1.70	-1.27	-.28	.51	-.07	-1.20	-1.33
1.050	-2.23	-1.46	-1.47	-.18	-.23	-1.22	-1.44	-1.47
1.200	-2.66	-1.32	-1.36	-.55	-.18	-1.17	-1.35	-1.16
1.051	-2.32	-1.50	-1.50	-.11	-.08	-.98	-1.41	-1.45
1.052	-2.01	-1.70	-1.41	-.14	.05	-1.29	-1.37	-1.63

TEMPERATURE RESULTS ARE OBTAINED FROM A MULTITHERMISTOR CABLE. FURTHER TEMPERATURE LOGS ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN CABLE A THERMISTORS MULTIPLES. ON PREVOIT ENTREPRENDRE D'AUTRES SONDAGES DE LA TEMPERATURE DE CE PUITS.

KM0.02. EMR-84-1. PIPE THERMISTORS.
DEPTH OF COVER: 0.90 M
5 ATKINS SENSORS
SENSOR POSITIONS UNCERTAIN AS OF OCT. 84.
JULY 87 - PIPE CONDITIONS UNSTABLE. PRESSURE DECREASING. CHILLER CHANGE
TWO-DAY SHUTDOWN FROM MAY 25-27, 1988.
BRIEF SHUTDOWN 29/06/89.
LINE SHUTDOWN AUGUST 1989.

CANYON CREEK NORTH A - PT1-3

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65 DEGREES 14.0 MINUTES NORTH 126 DEGREES 31.2 MINUTES WEST

ELEVATION 123 METRES

	DATE 89 2 2	DATE 89 3 14	DATE 89 4 7	DATE 89 5 23	DATE 89 7 3	DATE 89 8 22	DATE 89 9 7	DATE 89 10 25	DATE 89 12 14
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
.950	-1.07	-1.41	-1.68	-.22	1.04	1.40	2.96	.26	-.12
1.100	-.91	-1.29	-1.58	-.22	.75	1.67	2.93	.30	-.02
1.250	-.80	-1.18	-1.48	-.25	.58	1.40	2.83	.31	-.01
1.101	-.99	-1.34	-1.62	-.23	.77	1.67	2.95	.29	-.02
1.102	-.96	-1.33	-1.61	-.24	.84	1.67	2.98	.27	-.04

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

KM 18.97. EMR-84-2A. PIPE THERMISTORS.
DEPTH OF COVER 0.95 M.
TWO-DAY SHUTDOWN FROM MAY 25-27, 1988.
NEW INTERFACE UNIT INSTALLED ON SEADATA
LOGGER ON 23/05/89.
BRIEF SHUTDOWN 29/06/89.
LINE DOWN AUGUST 1989.
NEW PIPE LOGGER INSTALLED 07/09/89.
5 ATKINS SENSORS.

CANYON CREEK NORTH B - PT1-4

****

65 DEGREES 14.0 MINUTES NORTH 126 DEGREES 31.0 MINUTES WEST

ELEVATION 110 METRES

	DATE 89 2 2	DATE 89 3 14	DATE 89 4 7	DATE 89 5 23	DATE 89 7 3	DATE 89 8 22	DATE 89 9 7	DATE 89 10 25
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
1.000	-.71	-1.13	-1.47	-.22	.64	4.87	2.57	.32
1.150	-.70	-1.13	-1.45	-.26	.72	5.11	2.66	.35
1.300	-.65	-1.11	-1.41	-.31	.50	4.81	2.21	.31
1.151	-.71	-1.14	-1.45	.19	.95	5.26	2.89	.51
1.152	-.67	-1.11	-1.43	-.21	.34	4.82	2.44	.30

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

KM 19.27. EMR-84-2B. PIPE THERMISTORS.
DEPTH OF COVER 1.0 M.
5 ATKINS SENSORS.
TWO-DAY SHUTDOWN FROM MAY 25-27, 1988.
BRIEF SHUTDOWN 29/06/89.
LINE DOWN AUGUST 1989.

CANYON CREEK SOUTH C - PT1-5

****

65 DEGREES 13.6 MINUTES NORTH 126 DEGREES 30.5 MINUTES WEST

ELEVATION 119 METRES

	DATE	DATE	DATE	DATE	DATE	DATE	DATE	DATE
	89 2 2	89 3 14	89 5 23	89 7 2	89 8 22	89 9 7	89 10 25	89 12 14
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
.950	-1.25	-1.55	-.28	1.28	11.11	3.25	.33	-.06
1.100	-1.03	-1.43	-.31	1.06	10.37	3.16	.39	.00
1.250	-.78	-1.25	-.34	.84	10.20	3.07	.45	.03
1.101	-.95	-1.39	-.31	.78	10.11	3.20	.41	.03
1.102	-1.07	-1.46	-.33	.99	9.90	3.11	.34	-.03

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

KM 19.55. EMR-84-2C. PIPE THERMISTORS.
DEPTH OF COVER 0.95 M.
5 ATKINS SENSORS.
TWO-DAY SHUTDOWN FROM MAY 25-27, 1988.
BRIEF SHUTDOWN 29/06/89.
LINE DOWN AUGUST 1989.

GREAT BEAR RIVER A - EMR11

****

64 DEGREES 54.4 MINUTES NORTH 125 DEGREES 34.3 MINUTES WEST

ELEVATION 70 METRES

	DATE 89 2 2	DATE 89 3 14	DATE 89 5 22	DATE 89 7 2	DATE 89 8 22	DATE 89 9 7	DATE 89 10 25	DATE 89 12 20
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
.900	-.73	-1.24	-.07	2.82	8.98	6.94	1.19	.13
1.050	-.79	-1.39	-.17	2.29	8.59	6.65	1.15	.11
1.200	-.40	-1.01	-.16	1.85	8.84	6.40	1.17	.12
1.051	-.56	-1.18	-.16	2.21	8.83	6.60	1.14	.10
1.052	-.72	-1.22	-.06	2.27	8.79	6.70	1.28	.22

TEMPERATURE RESULTS ARE OBTAINED FROM A MULTITHERMISTOR CABLE. FURTHER TEMPERATURE LOGS ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN CABLE A THERMISTORS MULTIPLES. ON PREVOIT ENTREPRENDRE D'AUTRES SONDAGES DE LA TEMPERATURE DE CE PUITS.

KM 79.2 EMR-84-3A. PIPE THERMISTORS.
DEPTH OF COVER: 0.90 M.
5 ATKINS SENSORS.
TWO-DAY SHUTDOWN FROM MAY 25-27, 1988.
BRIEF SHUTDOWN 29/06/89.
LINE DOWN AUGUST 1989

GREAT BEAR RIVER B - PT1-10

****

64 DEGREES 54.4 MINUTES NORTH 125 DEGREES 34.5 MINUTES WEST

ELEVATION 93 METRES

Z(M)	DATE 89 2 2 T(C)	DATE 89 3 14 T(C)	DATE 89 5 22 T(C)	DATE 89 7 2 T(C)	DATE 89 8 22 T(C)	DATE 89 9 7 T(C)	DATE 89 10 25 T(C)
.850							
1.000	-.52	-1.25	.05	2.47	11.57	6.78	1.30
1.100	-.15	-.79	-.01	1.89	11.34	6.35	1.28
1.001	-.33	-1.05	.00	2.18	11.53	6.53	1.29
1.002	-.42	-1.11	.00	2.28	11.70	6.64	1.26

TEMPERATURE RESULTS ARE OBTAINED FROM A MULTITHERMISTOR CABLE. FURTHER TEMPERATURE LOGS ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN CABLE A THERMISTORS MULTIPLES. ON PREVOIT ENTREPRENDRE D'AUTRES SONDAGES DE LA TEMPERATURE DE CE PUITS.

KM 79.4 EMR-84-3B. PIPE THERMISTORS.
DEPTH OF COVER: 0.85 M.
5 ATKINS SENSORS.
TWO-DAY SHUTDOWN FROM MAY 25-27, 1988.
BRIEF SHUTDOWN 29/06/89.
LINE DOWN AUGUST 1989.

TRAIL RIVER A - EMR1

****

62 DEGREES 5.1 MINUTES NORTH 121 DEGREES 59.3 MINUTES WEST

ELEVATION 153 METRES

	DATE 89 3 16	DATE 89 5 21	DATE 89 6 29	DATE 89 8 10	DATE 89 9 9
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)
.900	-.10	.13	5.04	9.72	8.53
1.050	-.01	.13	4.87	9.62	8.50
1.200	.02	.11	4.49	9.35	8.45
1.051	.04	.15	4.69	9.54	8.54
1.052	-.02	.11	4.83	9.58	8.47

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

KM 478.0. EMR-84-4A
DEPTH OF COVER 0.90 M.
5 ATKINS SENSORS.
TWO-DAY SHUTDOWN FROM MAY 25-27, 1988.
BRIEF SHUTDOWN 29/06/89.

TRAIL RIVER B - PT1-9

****

62 DEGREES 5.2 MINUTES NORTH 121 DEGREES 59.3 MINUTES WEST

ELEVATION 165 METRES

	DATE
	89 5 21
Z(M)	T(C)
.900	.22
1.050	.23
1.200	.22
1.051	.25
1.052	.20

TEMPERATURE RESULTS ARE OBTAINED FROM A MULTITHERMISTOR CABLE. FURTHER TEMPERATURE LOGS ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN CABLE A THERMISTORS MULTIPLES. ON PREVOIT ENTREPRENDRE D'AUTRES SONDAGES DE LA TEMPERATURE DE CE PUITS.

KM 478.8. EMR-84-4B. PIPE THERMISTORS.
DEPTH OF COVER: 0.90 M.
5 ATKINS SENSORS.
TWO-DAY SHUTDOWN FROM MAY 25-27, 1988.
BRIEF SHUTDOWN 29/06/89.

PETITOT RIVER NORTH A - EMR4

****

59 DEGREES 45.0 MINUTES NORTH 119 DEGREES 30.0 MINUTES WEST

ELEVATION 552 METRES

	DATE 89 3 17	DATE 89 5 20	DATE 89 6 30	DATE 89 8 19	DATE 89 9 10
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)
.770					
.920	.73	1.26	5.40	8.43	7.61
1.070	.42	.93	5.15	8.25	7.34
.921	.71	1.21	5.49	8.60	7.68
.922	.64	1.13	5.39	8.52	7.59

TEMPERATURE RESULTS ARE OBTAINED FROM A MULTITHERMISTOR CABLE. FURTHER TEMPERATURE LOGS ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN CABLE A THERMISTORS MULTIPLES. ON PREVOIT ENTREPRENDRE D'AUTRES SONDAGES DE LA TEMPERATURE DE CE PUITS.

KM 783.0. EMR-84-5A. PIPE THERMISTORS.
DEPTH OF COVER: 0.77 M.
5 ATKINS SENSORS.
TWO-DAY SHUTDOWN FROM MAY 25-27, 1988.
BRIEF SHUTDOWN 29/06/89.

PETITOT RIVER NORTH B - EMR5

****

0 DEGREES .0 MINUTES NORTH 0 DEGREES .0 MINUTES WEST

ELEVATION 0 METRES

	DATE 89 3 17	DATE 89 5 20	DATE 89 6 30	DATE 89 8 19	DATE 89 9 10
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)
.850	.62	1.10	5.47	8.68	7.68
1.000	.80	1.28	5.52	8.61	7.74
1.100	.78	1.27	5.44	8.52	7.65
1.001	.53	1.03	5.23	8.32	7.42
1.002	.69	1.18	5.42	8.57	7.63

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

KM 783.3. EMR-84-5B. PIPE THERMISTORS.
DEPTH OF COVER: 0.85 M.
5 ATKINS SENSORS.
TWO-DAY SHUTDOWN FROM MAY 25-27, 1988.
BRIEF SHUTDOWN 29/06/89.

PETITOT RIVER SOUTH - EMR6

****

59 DEGREES 27.0 MINUTES NORTH 119 DEGREES 15.0 MINUTES WEST

ELEVATION 575 METRES

	DATE 89 3 17	DATE 89 5 20	DATE 89 6 30	DATE 89 8 19	DATE 89 9 10
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)
.800	.71	1.35	5.20	8.31	7.43
.950	.80	1.44	5.15	8.16	7.49
1.100	.60	1.23	4.87	8.31	7.13
.951	.72	1.34	4.96	8.17	7.22
.952	.81	1.47	5.10	7.88	7.35

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

KM 819.5. EMR-84-6. PIPE THERMISTORS.
DEPTH OF COVER 0.80 M.
5 ATKINS SENSORS.
TWO-DAY SHUTDOWN FROM MAY 25-27, 1988.
BRIEF SHUTDOWN 29/06/89.

TABLE MOUNTAIN A - 85-EPT 1
****

63 DEGREES 36.9 MINUTES NORTH 123 DEGREES 38.8 MINUTES WEST

ELEVATION 255 METRES

	DATE 89 1 24	DATE 89 3 15	DATE 89 4 11	DATE 89 5 22	DATE 89 6 28	DATE 89 7 15	DATE 89 8 21	DATE 89 9 8	DATE 89 10 15	DATE 89 11 15	DATE 89 12 27
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
.900	.01	-.27	-.38	-.15	-.01	3.05	6.89	6.00	2.50	.79	.30
1.050	-.05	-.52	-.48	-.14	.68	3.74	7.18	6.21	2.49	.79	.28
1.200	.01	-.21	-.28	-.14	.02	2.81	6.30	5.75	2.47	.77	.28
1.051	-.03	-.17	-.25	-.18	-.10	2.78	6.71	5.85	2.49	.76	.26
1.052	.01	-.25	-.37	-.16	.00	2.95	6.83	5.93	2.50	.76	.27

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

KM 271.2. EMR-85-7A. PIPE THERMISTORS.
DEPTH OF COVER: 0.90 M
TWO-DAY SHUTDOWN FROM MAY 25-27, 1988.
PT CONNECTED TO SEADATA LOGGER INTER-
FACE UNIT AT T5 POSITION 22/05/89.
5 YSI44033 THERMISTORS.
BRIEF SHUTDOWN 29/06/89.

TABLE MOUNTAIN B - 85-EPT 3
****

63 DEGREES 36.6 MINUTES NORTH 123 DEGREES 38.1 MINUTES WEST

ELEVATION 265 METRES

	DATE 89 1 24	DATE 89 3 15	DATE 89 4 11	DATE 89 5 22	DATE 89 6 15	DATE 89 7 2	DATE 89 8 21	DATE 89 9 8	DATE 89 10 15	DATE 89 11 15	DATE 89 12 27
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
.900	-.09	-.35	-.63	-.14	.35	.93	7.03	6.10	2.55	.79	.22
1.050	-.01	-.24	-.51	-.12	.00	.61	6.83	6.00	2.59	.85	.29
1.200	.00	-.20	-.46	-.14	-.14	.62	6.73	5.90	2.60	.85	.15
1.051	.00	-.21	-.48	-.13	-.13	.53	6.87	5.99	2.60	.83	.28
1.052	-.02		-.49	-.11	.12	.80	7.00	6.08	2.59	.83	

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

KM 272.0. EMR-85-7B. PIPE THERMISTORS.
DEPTH OF COVER: 0.90 M
TWO-DAY SHUTDOWN FROM MAY 25-27, 1988.
PT CONNECTED TO SEADATA LOGGER INTER-
FACE UNIT AT T5 POSITION 22/05/89.
YSI44033 THERMISTORS.
BRIEF SHUTDOWN 29/06/89.

TABLE MOUNTAIN C - 85-EPT 2
****

63 DEGREES 36.4 MINUTES NORTH 123 DEGREES 38.0 MINUTES WEST

ELEVATION 259 METRES

	DATE 89 1 24	DATE 89 3 15	DATE 89 4 11	DATE 89 5 21	DATE 89 6 15	DATE 89 7 2	DATE 89 8 21	DATE 89 9 8	DATE 89 10 15	DATE 89 11 15	DATE 89 12 15
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
.900	-.31	-.50	-.29	-.07	1.00	1.34	7.03	6.28	2.50	.49	.07
1.050	-.27	-.61	-.59	-.19	.17	.76	6.78	6.05	2.50	.46	.06
1.200	-.27	-.26	-.38	-.19	-.14	.34	6.47	5.83	2.47	.42	-.03
1.051	-.10	-.45	-.64	-.15	.14	.69	6.82	6.04	2.56	.53	.11
1.052	-.17	-.47	-.52	-.09	.30		6.94	6.10	2.60	.57	.15

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

KM 272.3. EMR-85-7C. PIPE THERMISTORS.
DEPTH OF COVER: 0.90 M
TWO-DAY SHUTDOWN FROM MAY 25-27, 1988.
PT STRINGS CONNECTED TO SEADATA LOGGER
INTERFACE UNIT AT T5 POSITION
21/05/89.
5 YSI44033 THERMISTORS.
BRIEF SHUTDOWN 29/06/89.

MANNERS CREEK A - 85 EPT8

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61 DEGREES 36.4 MINUTES NORTH 121 DEGREES 5.6 MINUTES WEST

ELEVATION 191 METRES

	DATE 89 1 24	DATE 89 3 16	DATE 89 5 24	DATE 89 6 29	DATE 89 8 20	DATE 89 9 9	DATE 89 10 30	DATE 89 12 28
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
.900	.77	.14	.71	5.49	9.90	8.77	3.70	1.24
1.050	.90	.26	.85	5.48	9.98	8.87	3.90	1.45
1.200	.82	.20	.77	5.23	9.59	8.58	3.69	1.37
1.051	.84	.20	.79	5.38	9.85	8.71	3.80	1.36
1.052	.81	.18	.75	5.39	9.99	8.79	3.81	1.36

TEMPERATURE RESULTS ARE OBTAINED FROM A MULTITHERMISTOR CABLE. FURTHER TEMPERATURE LOGS ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN CABLE A THERMISTORS MULTIPLES. ON PREVOIT ENTREPRENDRE D'AUTRES SONDAGES DE LA TEMPERATURE DE CE PUITS.

KM 557.8. EMR-85-8A
DEPTH OF COVER 0.90 M.
5 YSI44033 THERMISTORS.
TWO-DAY SHUTDOWN FROM MAY 25-27, 1988.
BRIEF SHUTDOWN 29/06/89.

MANNERS CREEK B - 85 EPT7

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61 DEGREES 36.2 MINUTES NORTH 121 DEGREES 5.4 MINUTES WEST

ELEVATION 190 METRES

	DATE 89 1 24	DATE 89 3 16	DATE 89 5 24	DATE 89 6 29	DATE 89 8 20	DATE 89 9 9	DATE 89 10 30	DATE 89 12 28
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
.900	.08	-.64	-.18	5.76	8.50	7.63	2.66	.21
1.050	.84	.20	.78	5.41	9.41	8.64	3.80	1.36
1.200	.74	.11	.66	5.41	8.93	8.24	3.55	1.18
1.051	.79	.16	.73	5.35	9.41	8.60	3.72	1.29
1.052	.90	.23	.80	5.46	9.54	8.64	3.76	1.35

TEMPERATURE RESULTS ARE OBTAINED FROM A MULTITHERMISTOR CABLE. FURTHER TEMPERATURE LOGS ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN CABLE A THERMISTORS MULTIPLES. ON PREVOIT ENTREPRENDRE D'AUTRES SONDAGES DE LA TEMPERATURE DE CE PUITS.

KM 558.2. EMR-85-8B. PIPE THERMISTORS.
DEPTH OF COVER 0.90 M
5 YSI44033 THERMISTORS.
TWO-DAY SHUTDOWN FROM MAY 25-27, 1988.
BRIEF SHUTDOWN 29/06/89.

MANNERS CREEK C - 85 EPT12

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61 DEGREES 36.0 MINUTES NORTH 121 DEGREES 5.3 MINUTES WEST

ELEVATION 190 METRES

	DATE	DATE	DATE	DATE	DATE	DATE	DATE
	89 3 16	89 5 24	89 6 29	89 8 20	89 9 9	89 10 30	89 12 28
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
.900	.29	.84	5.89	10.02	9.01	3.82	1.46
1.050	.17						1.22
1.200	.05	.25	3.48	6.61	6.19	2.58	.81
1.051	.21	.50	3.86	7.07	6.61	2.95	1.08
1.052	.31	.87	5.64	9.83	8.87	3.89	1.49

TEMPERATURE RESULTS ARE OBTAINED FROM A MULTITHERMISTOR CABLE. FURTHER TEMPERATURE LOGS ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN CABLE A THERMISTORS MULTIPLES. ON PREVOIT ENTREPRENDRE D'AUTRES SONDAGES DE LA TEMPERATURE DE CE PUITS.

KM 558.3. EMR-85-8C. PIPE THERMISTORS.
DEPTH OF COVER: 0.90 M.
5 YSI44033 THERMISTORS.
TWO-DAY SHUTDOWN FROM MAY 25-27, 1988.
BRIEF SHUTDOWN 29/06/89.

PUMP STATION 3 - 85 EPT9

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61 DEGREES 23.7 MINUTES NORTH 120 DEGREES 54.0 MINUTES WEST

ELEVATION 223 METRES

	DATE 89 1 25	DATE 89 3 16	DATE 89 5 24	DATE 89 6 29	DATE 89 8 9	DATE 89 9 9	DATE 89 10 30	DATE 89 12 28
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
.900	1.04	.55	1.03	6.25	9.41	8.91	4.04	1.71
1.050	1.23	.67	1.15	6.09	9.23	8.92	4.24	1.85
1.200	1.26	.66	1.15	5.93	9.08	8.85	4.27	1.86
1.051	1.17	.65	1.15	6.13	9.29	8.91	4.21	1.83
1.052	1.14	.56	1.05	5.92	9.05	8.74	4.09	1.71

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

KM 583.3. EMR-85-9. PIPE THERMISTORS.
DEPTH OF COVER: 0.90 M.
5 YSI44033 THERMISTORS.
TWO-DAY SHUTDOWN FROM MAY 25-27, 1988.
BRIEF SHUTDOWN 29/06/89.

MACKENZIE HIGHWAY SOUTH A - 85 EPT4

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61 DEGREES 21.6 MINUTES NORTH 120 DEGREES 52.2 MINUTES WEST

ELEVATION 244 METRES

	DATE 89 1 25	DATE 89 3 16	DATE 89 5 24	DATE 89 6 29	DATE 89 8 20	DATE 89 9 9	DATE 89 12 28
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
.950							
1.101	3.00	2.92	3.03	7.77	12.88	10.67	
1.250	3.18	3.06	3.20	7.84	13.02	10.98	5.32
1.102							
1.100	3.13	3.05	3.16	7.91	13.09	10.92	5.11

TEMPERATURE RESULTS ARE OBTAINED FROM A MULTITHERMISTOR CABLE. FURTHER TEMPERATURE LOGS ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN CABLE A THERMISTORS MULTIPLES. ON PREVOIT ENTREPRENDRE D'AUTRES SONDAGES DE LA TEMPERATURE DE CE PUITS.

KM 588.3. EMR-85-10A
DEPTH OF COVER: 0.95 M.
5 YSI44033 THERMISTORS.
TWO-DAY SHUTDOWN FROM MAY 25-27, 1988.
BRIEF SHUTDOWN 29/06/89.

MACKENZIE HIGHWAY SOUTH B - 85 EPT5

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61 DEGREES 21.3 MINUTES NORTH 120 DEGREES 52.0 MINUTES WEST

ELEVATION 244 METRES

	DATE 89 1 25	DATE 89 3 16	DATE 89 5 24	DATE 89 6 29	DATE 89 8 20	DATE 89 9 9	DATE 89 10 30	DATE 89 12 28
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
.950	.45	.09	.28	4.60	8.86	6.37	2.51	-.14
1.101	2.81	2.60	3.00	7.52	12.58	10.46		4.61
1.250	3.24	3.11	3.51	7.92	13.07	11.04	7.85	5.42
1.102	3.21	3.11	3.50	7.97	13.24	11.10	7.88	5.48
1.100	3.24	3.13	3.55	8.04	13.32	11.19	7.95	5.54

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

KM 588.7. EMR-85-10B. PIPE THERMISTORS.
DEPTH OF COVER: 0.95 M.
5 YSI44033 THERMISTORS.
TWO-DAY SHUTDOWN FROM MAY 25-27, 1988.
BRIEF SHUTDOWN 29/06/89.
SENSOR #1 MAY BE PULLING AWAY FROM PIPE
AS OF SEPTEMBER 1988.

MORAINE SOUTH - 85 EPT11

****

61 DEGREES 16.9 MINUTES NORTH 120 DEGREES 48.4 MINUTES WEST

ELEVATION 251 METRES

	DATE 89 1 25	DATE 89 3 17	DATE 89 5 24	DATE 89 6 30	DATE 89 8 9	DATE 89 9 9	DATE 89 10 30	DATE 89 12 28
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
.950	2.30	2.25	3.33	8.08	11.11	10.84	6.86	4.38
1.101	1.04	.94	1.88	6.45	9.42	9.27	5.43	2.97
1.250								
1.102	1.40	1.25	2.10	6.64	9.58	9.38	5.57	2.36
1.100	2.35	2.23	3.14	7.72	10.73	10.55	6.84	4.33

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

KM 597.4. EMR-85-11. PIPE THERMISTORS.
DEPTH OF COVER: 0.95 M.
5 YSI44033 THERMISTORS.
TWO-DAY SHUTDOWN FROM MAY 25-27, 1988.
BRIEF SHUTDOWN 29/06/89.

JEAN MARIE CREEK A - 85 EPT6

****

61 DEGREES 11.6 MINUTES NORTH 120 DEGREES 42.2 MINUTES WEST

ELEVATION 298 METRES

	DATE 89 1 25	DATE 89 3 17	DATE 89 5 24	DATE 89 6 30	DATE 89 8 20	DATE 89 9 9	DATE 89 10 30	DATE 89 12 28
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
.950	1.88	1.74	2.98	7.65	11.35	9.87	5.51	2.88
1.101	2.27	2.09	3.10	7.84	11.87	10.69	6.59	4.06
1.250	2.40	2.15	3.07	7.71	11.75	10.66	6.65	4.13
1.102	2.24	2.08	3.13	7.85	11.88	10.69	6.54	4.01
1.100	2.00	1.76	2.73	7.48	11.43	10.26	6.14	3.60

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

KM 608.6. EMR-85-12A. PIPE THERMISTORS.
DEPTH OF COVER: 0.95 M.
5 YSI344033 THERMISTORS.
TWO-DAY SHUTDOWN FROM MAY 25-27, 1988.
BRIEF SHUTDOWN 29/06/89.

JEAN MARIE CREEK B - 85 EPT10

****

61 DEGREES 11.4 MINUTES NORTH 120 DEGREES 42.2 MINUTES WEST

ELEVATION 300 METRES

	DATE 89 1 25	DATE 89 3 17	DATE 89 5 20	DATE 89 6 30	DATE 89 7 15	DATE 89 8 20	DATE 89 9 9	DATE 89 10 15	DATE 89 11 15	DATE 89 12 28
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
.950	2.18	2.11	3.21	8.19	9.14	11.84	10.66	7.47	5.22	4.02
1.101	2.22	2.10	2.73	7.80	8.90	11.62	10.52	7.62	5.26	4.03
1.250	2.15		2.62	7.56	8.68	11.45	10.39	7.52	5.18	3.97
1.102	2.29	2.14	2.78	7.90	8.97	11.78	10.66	7.68	5.34	4.10
1.100	2.22	2.10	2.78	7.85	8.95	11.71	10.58	7.64	5.28	4.06

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

KM 608.7. EMR-85-12B. PIPE THERMISTORS.
DEPTH OF COVER: 0.95 M.
TWO-DAY SHUTDOWN FROM MAY 25-27, 1988.
PT CONNECTED TO SEADATA LOGGER INTER-
FACE UNIT AT T6 POSITION 20/05/89.
5 YSI44033 THERMISTORS.
BRIEF SHUTDOWN 29/06/89.

APPENDIX C

DITCH THERMISTOR STRINGS DATA LISTINGS

SITE 85-8A: MANNERS CREEK A - DT115B

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61 DEGREES 36.4 MINUTES NORTH 121 DEGREES 5.6 MINUTES WEST

ELEVATION 191 METRES

	DATE 89 1 24	DATE 89 3 16	DATE 89 5 24	DATE 89 6 29	DATE 89 8 20	DATE 89 9 9	DATE 89 10 30	DATE 89 12 28
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
.37	-1.7	-1.3	-.3	3.5	11.0	8.1	1.6	-.4
.57	-.6	-.7	-.2	2.3	9.9	7.8	1.6	.2
.77	.0	-.3	-.2	2.2	9.3	7.6	1.8	.5
.97	.2	-.1	-.1	2.2	8.8	7.3	2.2	.7
1.17	.2	-.1	.1	3.3	8.3	7.0	2.9	.7

TEMPERATURE RESULTS ARE OBTAINED FROM A MULTITHERMISTOR CABLE. FURTHER TEMPERATURE LOGS ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN CABLE A THERMISTORS MULTIPLES. ON PREVOIT ENTREPRENDRE D'AUTRES SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 557.8. EMR-85-8A
WOODEN DOWEL IN TRENCH WALL.
DITCH THERMISTOR IS LOCATED 10.4M NORTH OF THERMAL FENCE EMR-85-8A.
SURFACE CONDITIONS - ORGANICS WITH SILTY SAND - VERY MOIST TO WET - MUCH TALL GRASS.
5 SENSOR ATKINS.
AUG 87: INSTALLED TL-100 LOGGER NEARBY.

SITE 85-8A: MANNERS CREEK A - DT115A
****

61 DEGREES 36.4 MINUTES NORTH 121 DEGREES 5.6 MINUTES WEST

ELEVATION 191 METRES

	DATE 89 1 24	DATE 89 3 16	DATE 89 5 24	DATE 89 6 29	DATE 89 8 20	DATE 89 9 9	DATE 89 10 30	DATE 89 12 28
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
.36	-1.6	-1.2	-.2	5.4	11.3	8.6	1.8	-.4
.51	-.9	-.9	-.2	4.9	10.8	8.6	1.7	.1
.66	-.2	-.5	-.2	4.0	10.4	8.6	1.7	.6
.81								

TEMPERATURE RESULTS ARE OBTAINED FROM A MULTITHERMISTOR CABLE. FURTHER TEMPERATURE LOGS ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN CABLE A THERMISTORS MULTIPLES. ON PREVOIT ENTREPRENDRE D'AUTRES SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 557.8. EMR-85-8A
WOODEN DOWEL DIRECTLY ABOVE PIPE.
DITCH THERMISTOR IS LOCATED 10.4M NORTH OF THERMAL FENCE EMR-85-8A
SURFACE CONDITIONS - ORGANICS WITH SILTY SAND - VERY MOIST TO WET - MUCH TALL GRASS.
4 SENSOR ATKINS.
AUG 87: INSTALLED TL-100 LOGGER NEARBY.

SITE 85-9: PUMP STATION 3 - DT116A
****

61 DEGREES 23.7 MINUTES NORTH 120 DEGREES 54.0 MINUTES WEST

ELEVATION 223 METRES

	DATE 89 1 25	DATE 89 3 16	DATE 89 5 24	DATE 89 6 29	DATE 89 8 9	DATE 89 8 22	DATE 89 9 9
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
.00	-1.2	-1.0	4.0	11.4	16.0	24.5	8.6
.15	-.4	-.6	2.5	11.7	15.0	15.9	9.5
.30	.1	-.3	.6	9.4	13.4		9.7
.45	.4	.1	.4	8.2	11.6	13.2	9.4

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 583.3. EMR-85-9
WOODEN DOWEL DIRECTLY ABOVE PIPE.
DITCH THERMISTOR IS LOCATED 1.8M NORTH
OF THERMAL FENCE EMR-85-9.
SURFACE CONDITIONS - DRY,SILTY,SAND -
GOOD TALL GRASS COVER.
REPOSITIONNED SEPT 28/87.
NEW DEPTHS: .25,.40,.55,.70
4 SENSOR ATKINS.

SITE 85-9: PUMP STATION 3 - DT116B

****

61 DEGREES 23.7 MINUTES NORTH 120 DEGREES 54.0 MINUTES WEST

ELEVATION 223 METRES

	DATE 89 1 25	DATE 89 3 16	DATE 89 5 24	DATE 89 6 29	DATE 89 8 9	DATE 89 8 22	DATE 89 9 9
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
.35	-1.4	-.8	1.8	10.7	14.8	13.3	8.5
.55	-.5	-.8	-.2	9.8	13.4	14.8	9.5
.75	.5	-.1	-.1	9.1	11.8	14.2	9.7
.95	.1	.2	.2	8.1	10.7	13.5	9.5
1.15	1.2	.5	.5	7.2	9.9	12.0	9.2

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 583.3. EMR-85-9
WOODEN DOWEL IN TRENCH WALL
DITCH THERMISTOR IS LOCATED 1.8M NORTH
OF THERMAL FENCE EMR-85-9.
SURFACE CONDITIONS - DRY,SILTY,SAND -
GOOD TALL GRASS COVER.
REPOSITIONNED SEPT 28/87.
NEW DEPTHS: .26,.41,.56,.71,.86
5 SENSOR ATKINS.

SITE 85-7C: TABLE MOUNTAIN C - DT114B

****

63 DEGREES 36.4 MINUTES NORTH 123 DEGREES 38.0 MINUTES WEST

ELEVATION 259 METRES

Z(M)	DATE 89 5 21 T(C)	DATE 89 7 2 T(C)	DATE 89 9 8 T(C)	DATE 89 10 27 T(C)	DATE 89 12 27 T(C)
.22	8.0	18.3	22.0	-5.5	2.2
.42	-.4	6.4	8.2	-.5	4.0
.62	-.3	4.9	8.4	.3	5.1
.82	-.6	2.3	7.6	.5	6.0
1.02	-.6	-.3	6.6	.9	6.9

TEMPERATURE RESULTS ARE OBTAINED FROM A MULTITHERMISTOR CABLE. FURTHER TEMPERATURE LOGS ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN CABLE A THERMISTORS MULTIPLES. ON PREVOIT ENTREPRENDRE D'AUTRES SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 272.3. EMR-85-7C
WOODEN DOWEL IN TRENCH WALL.
DITCH THERMISTOR IS LOCATED 26M NORTH OF THERMAL FENCE EMR-85-7C.
SURFACE CONDITIONS - MINOR SUNKEN DITCH WITH GENTLY FLOWING WATER.
5 SENSOR ATKINS.

SITE 85-7C: TABLE MOUNTAIN C - DT114A
****

63 DEGREES 36.4 MINUTES NORTH 123 DEGREES 38.0 MINUTES WEST

ELEVATION 259 METRES

	DATE 89 5 21	DATE 89 7 2	DATE 89 9 8	DATE 89 10 27	DATE 89 12 27
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)
.19	4.3	14.6	20.7	-2.6	-1.3
.34	.0	5.3	8.7	-2.1	.4
.49	3.9	8.5	14.8	-.2	1.2
.64	-.3	4.0	8.1	.5	2.3

TEMPERATURE RESULTS ARE OBTAINED FROM A MULTITHERMISTOR CABLE. FURTHER TEMPERATURE LOGS ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN CABLE A THERMISTORS MULTIPLES. ON PREVOIT ENTREPRENDRE D'AUTRES SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 272.3. EMR-85-7C
WOODEN DOWEL DIRECTLY ABOVE PIPE.
DITCH THERMISTOR IS LOCATED 26M NORTH OF THERMAL FENCE EMR-85-7C.
SURFACE CONDITIONS - MINOR SUNKEN DITCH WITH GENTLY FLOWING WATER.
4 SENSOR ATKINS.

APPENDIX D

DEEP "CLIMATE" SITES DATA LISTINGS

GIBSON GAP - HT222

****

65 DEGREES 46.0 MINUTES NORTH 127 DEGREES 55.0 MINUTES WEST

ELEVATION 229 METRES

	DATE 89 3 14	DATE 89 3 30	DATE 89 5 10	DATE 89 8 13	DATE 89 9 30
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)
1.0	-.66	-2.18	-.68	-.25	-.17
2.5	-.41	-.44	-.71	-.55	-.52
5.0	-.63	-.64	-.63	-.65	-.64
10.0	-.86	-.88	-.88		-.87
15.0	-1.06	-1.08	-1.08	-1.08	-1.06
20.0	-1.22	-1.23	-1.24	-1.23	-1.22
25.0	-1.21	-1.23	-1.24	-1.23	-1.22
30.0	-1.22	-1.23	-1.23	-1.23	-1.21
35.0	-1.10	-1.11	-1.12	-1.11	-1.10
40.0	-.93	-.94	-.95	-.94	-.93
45.0	-.74	-.75	-.76	-.76	-.74

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

GIBSON GAP 70 KM N OF NORMAN WELLS
DEEP CLIMATE HOLE. 100 M GROUND TEMP.
SITE DRILLED AND INSTRUMENTED AT NEW
AES-EMR CLIMATE STATION IN MID-MARCH.
TWO CABLES WITH THERMISTORS SPACED AT
1M, 2.5M, AND 5M INTERVALS.
11 SENSOR YSI44033 (PAIRED).

GIBSON GAP - HT221

****

65 DEGREES 46.0 MINUTES NORTH 127 DEGREES 55.0 MINUTES WEST

ELEVATION 229 METRES

	DATE 89 3 14	DATE 89 3 30	DATE 89 5 10	DATE 89 8 13	DATE 89 9 30
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)
50.0	-.22	-.54	-.58	-.58	-.57
55.0	-.11	-.21	-.39	-.40	-.38
60.0	-.06	-.06	-.06	-.08	-.09
65.0	.00	-.01	-.02	-.02	-.01
70.0	.31	.28	.28	.27	.29
75.0	.53	.54	.56	.73	.74
80.0	.81	.82	.83	.94	.95
85.0	1.21	1.23	1.18	1.26	1.27
90.0	1.39	1.32	1.34	1.41	1.42
95.0	1.62	1.62	1.61	1.63	1.65
100.0	1.73	1.72	1.72	1.72	1.73

TEMPERATURE RESULTS ARE OBTAINED FROM A MULTITHERMISTOR CABLE. FURTHER TEMPERATURE LOGS ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN CABLE A THERMISTORS MULTIPLES. ON PREVOIT ENTREPRENDRE D'AUTRES SONDAGES DE LA TEMPERATURE DE CE PUITS.

GIBSON GAP 70 KM N OF NORMAN WELLS DEEP CLIMATE HOLE. 100 M GROUND TEMP. SITE DRILLED AND INSTRUMENTED AT NEW AES-EMR CLIMATE STATION IN MID MARCH. TWO CABLES WITH THERMISTORS SPACED AT 1M, 2.5M, AND 5M INTERVALS. 11 SENSOR YSI44033 (PAIRED).

KEE SCARP - HT139

****

65 DEGREES 18.6 MINUTES NORTH 126 DEGREES 43.8 MINUTES WEST

ELEVATION 365 METRES

	DATE 89 1 15	DATE 89 2 10	DATE 89 3 15	DATE 89 4 15	DATE 89 5 10	DATE 89 5 23	DATE 89 6 15	DATE 89 7 15	DATE 89 8 15	DATE 89 8 22	DATE 89 9 15	DATE 89 10 15
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
50.0	.41	.42	.41	.42	.42	.41	.42					
55.0	.36	.36	.37	.37	.38	.37	.36					
60.0	.46	.47	.46	.46	.47	.47	.47				.47	.46
65.0	.42	.44	.43	.43	.43	.44	.43	.44	.44	.44	.44	.43
70.0	.47	.48	.48	.48	.48	.48	.48	.49	.49	.48	.48	.47
75.0	.54	.56	.58	.56	.56	.56	.56	.57		.62	.56	.55
80.0	.64	.65	.64	.65	.65	.65	.65	.66	.66	.66	.65	.65
85.0	.74	.74	.74	.74	.74	.75	.74	.74	.76	.74	.74	.74
90.0	.74	.74	.73	.74	.74	.73	.74	.75	.74	.74	.74	.73
95.0	.78	.80	.79	.80	.80	.81	.81	.81	.81	.81	.81	.81
100.0	.83	.85	.83	.83	.83	.85	.84	.84		.85	.83	.83

	DATE 89 11 15	DATE 89 12 15
Z(M)	T(C)	T(C)
50.0		
55.0		
60.0	.46	.47
65.0	.43	.43
70.0	.47	.48
75.0	.55	.55
80.0	.64	.64
85.0	.74	.75
90.0	.73	.73
95.0	.79	.81
100.0	.83	.82

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

CLIMATE HOLE DRILLED IN MARCH 1987
ON TOP OF KEE SCARP RIDGE.
6.3 KM NE OF NORMAN WELLS.
CABLE INSTALLED ON SEADATA LOGGER 08/88.
11 SENSORS YSI44033 (PAIRED).

KEE SCARP - HT152

****

65 DEGREES 18.6 MINUTES NORTH 126 DEGREES 43.8 MINUTES WEST

ELEVATION 365 METRES

	DATE 89 3 13	DATE 89 5 23	DATE 89 8 22
Z(M)	T(C)	T(C)	T(C)
105.0	1.04	1.04	1.06
110.0	1.10	1.09	1.11
115.0	1.24	1.24	1.26
120.0	1.32	1.32	1.33
125.0	1.51	1.51	1.52
128.0	1.58	1.57	1.58

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

CLIMATE HOLE DRILLED IN MARCH 1987
ON TOP OF KEE SCARP RIDGE.
6.3 KM NE OF NORMAN WELLS.
6 SENSORS YSI44033 (PAIRED).

KEE SCARP - HT137

****

65 DEGREES 18.6 MINUTES NORTH 126 DEGREES 43.8 MINUTES WEST

ELEVATION 365 METRES

	DATE
	89 5 23
Z(M)	T(C)
1.0	-.38
2.5	-.33
5.0	.32
10.0	.88
15.0	.85
20.0	.64
25.0	.51
30.0	.35
35.0	.43
40.0	.36
45.0	.44

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

CLIMATE HOLE DRILLED IN MARCH 1987
ON TOP OF KEE SCARP RIDGE.
6.3 KM NE OF NORMAN WELLS.
CABLE INSTALLED ON AES LOGGER 08/88.
11 SENSORS YSI44033 (PAIRED).

SITE 84-2A CANYON CREEK NORTH A - HT138
****

65 DEGREES 14.1 MINUTES NORTH 126 DEGREES 31.3 MINUTES WEST

ELEVATION 123 METRES

	DATE 89 2 2	DATE 89 3 14	DATE 89 4 7	DATE 89 5 23	DATE 89 7 3	DATE 89 8 22	DATE 89 9 7	DATE 89 10 25
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
50.0	1.03	1.04	1.08	1.06	1.05	1.08	1.08	1.07
55.0	1.34	1.37	1.38	1.35	1.37	1.40	1.42	1.37
60.0	1.47	1.38	1.35	1.43	1.41	1.38	1.39	1.37
65.0	1.71	1.64	1.59	1.67	1.64	1.68	1.65	1.61
70.0	1.94	1.90	1.90	1.92	1.91	1.90	1.95	1.90
75.0	2.22	2.21	2.20	2.22	2.20	2.21	2.22	2.19
80.0	2.48	2.47	2.47	2.46	2.49	2.49	2.50	2.47
85.0	2.75	2.76	2.78	2.76	2.78	2.78	2.77	2.76
90.0	2.92	2.88		2.91	2.88	2.88	2.89	2.85
95.0	3.08	3.06	3.05	3.09	3.05	3.06	3.05	3.04
100.0	3.31	3.31	3.32	3.32	3.33	3.31	3.32	3.30

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 19.0. EMR-84-2A.
CLIMATE HOLE OFF ROW SOUTH OF THERMAL
FENCE.
DRILLED IN MARCH 1987.
11 SENSORS YSI44033 (PAIRED).

SITE 84-2A CANYON CREEK NORTH A - HT153
****

65 DEGREES 14.1 MINUTES NORTH 126 DEGREES 31.3 MINUTES WEST

ELEVATION 123 METRES

	DATE 89 2 2	DATE 89 3 14	DATE 89 4 7	DATE 89 5 23	DATE 89 7 3	DATE 89 8 22	DATE 89 9 7	DATE 89 10 25	DATE 89 12 14
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
105.0	3.53	3.52	3.53	3.55	3.55	3.50	3.52	3.53	3.51
110.0	3.74	3.72	3.72	3.71	3.73	3.70	3.73	3.73	3.73
115.0	4.15	4.14	4.15	4.14	4.16	4.14	4.15	4.14	4.14
120.0	4.32	4.32	4.32	4.32	4.33	4.31	4.33	4.31	4.32
125.0	4.66	4.66	4.66	4.65	4.66	4.64	4.66	4.64	4.64
128.0	4.82	4.82	4.82	4.82	4.83	4.82	4.83	4.82	4.82

TEMPERATURE RESULTS ARE OBTAINED FROM A MULTITHERMISTOR CABLE. FURTHER TEMPERATURE LOGS ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN CABLE A THERMISTORS MULTIPLES. ON PREVOIT ENTREPRENDRE D'AUTRES SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 19.0. EMR-84-2A.
CLIMATE HOLE OFF ROW SOUTH OF THERMAL FENCE.
DRILLED IN MARCH 1987.
6 SENSORS YSI44033 (PAIRED).

SITE 84-4A: TRAIL RIVER A - DT118A
****

62 DEGREES 5.1 MINUTES NORTH 121 DEGREES 59.3 MINUTES WEST

ELEVATION 153 METRES

	DATE 89 3 16	DATE 89 5 21	DATE 89 6 29	DATE 89 8 10	DATE 89 9 9
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)
.11					
.36	-2.4	.4	8.6	13.8	9.9
.61	-1.5	-.1	7.0	11.9	9.8

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 478.0. EMR-84-4A
WOODEN DOWEL DIRECTLY ABOVE PIPE.
DITCH THERMISTOR IS LOCATED 4.1M SOUTH
OF THERMAL FENCE EMR-84-4A.
SURFACE CONDITIONS - MINOR SUNKEN DITCH
DRY SAND - GOOD GRASS COVER.
4 SENSOR ATKINS.

SITE 84-4A: TRAIL RIVER A - DT118B

****

62 DEGREES 5.1 MINUTES NORTH 121 DEGREES 59.3 MINUTES WEST

ELEVATION 153 METRES

	DATE 89 3 16	DATE 89 5 21	DATE 89 6 29	DATE 89 8 10	DATE 89 9 9
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)
.15	-3.2	2.2	10.3	15.0	8.4
.35	-2.4	.0	8.6	13.8	9.6
.55	-1.7	-.1	7.1	12.2	9.7
.75	-1.0	-.1	5.6	10.9	9.3
.95	-.3	-.1	4.5	9.8	8.9

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 478.0. EMR-84-4A
WOODEN DOWEL IN TRENCH WALL.
DITCH THERMISTOR IS LOCATED 4.1M SOUTH
OF THERMAL FENCE EMR-84-4A.
SURFACE CONDITIONS - MINOR SUNKEN DITCH
DRY SAND - GOOD GRASS COVER.
5 SENSOR ATKINS.

SITE 85-7A: TABLE MTN A - HA108
****

63 DEGREES 36.9 MINUTES NORTH 123 DEGREES 38.8 MINUTES WEST

ELEVATION 255 METRES

	DATE 89 1 24	DATE 89 3 15	DATE 89 4 11	DATE 89 5 22	DATE 89 6 28	DATE 89 8 21	DATE 89 9 8	DATE 89 12 27
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
1.0	-.10	-.15	-.83	-.37	-.30		1.53	.26
2.0	-.38	-.38	-.53	-.44	-.44	-.64	-.41	-.32
4.0	-.75	-.76	-.85	-.73	-.71	-.84	-.73	-.71
6.0	-.87	-.88	-.96	-.86	-.83	-.91	-.84	-.83
8.0	-.92	-.94	-1.01	-.92	-.91	-.96	-.91	-.90
10.0	-.84	-.85	-.92	-.83	-.82	-.86	-.83	-.81
12.0	-.89	-.90	-.96	-.89	-.88	-.91	-.87	-.87
14.0	-.83	-.85	-.90	-.85	-.83	-.86	-.83	-.83
16.0	-.76	-.78	-.82	-.77	-.75	-.78	-.76	-.75
18.0	-.64	-.66	-.70	-.66	-.64	-.66	-.64	-.65
20.0		-.59	-.63	-.58	-.56	-.59		

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 271.2
NEW OFF-ROW DEEP HOLE, WEST SIDE.
44033 PAIRED CABLE.

SITE 85-7A: TABLE MTN - HA111

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63 DEGREES 36.9 MINUTES NORTH 123 DEGREES 38.8 MINUTES WEST

ELEVATION 255 METRES

	DATE 89 1 24	DATE 89 3 15	DATE 89 4 11	DATE 89 5 22	DATE 89 6 28	DATE 89 8 21	DATE 89 9 8	DATE 89 12 27
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
20.0	-.78	-.80	-1.05	-.80	-.76	-.86	-.78	-.77
28.0	-.54	-.59	-.67	-.56	-.54	-.63	-.55	-.55
36.0	-.32	-.24	-.54	-.37	-.21	-.30	-.22	-.22
44.0	.13	.11	.03	.12	.13	.08	.13	.13
52.0	.51	.48		.49	.50	.46	.49	.50
60.0	.88	.86		.86	.87	.83	.87	.87
68.0	1.12	1.10		1.08	1.13	1.08		1.12
76.0	1.39	1.37		1.37	1.39	1.36		1.38
84.0	1.70	1.67		1.67	1.69	1.66	1.67	1.69
92.0	1.75	1.71	1.66	1.71	1.73	1.69	1.72	1.72
100.0	2.19	2.17	2.10	2.17	2.19	2.16	2.18	2.18

TEMPERATURE RESULTS ARE OBTAINED FROM A MULTITHERMISTOR CABLE. FURTHER TEMPERATURE LOGS ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN CABLE A THERMISTORS MULTIPLES. ON PREVOIT ENTREPRENDRE D'AUTRES SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 271.2
NEW OFF-ROW DEEP CLIMATE HOLE, WEST SIDE.
44033 PAIRED CABLE. PVC INSTALLED TO 93 M.

SITE 84-3B: GREAT BEAR RIVER B - DT117B

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64 DEGREES 54.4 MINUTES NORTH 125 DEGREES 34.5 MINUTES WEST

ELEVATION 93 METRES

	DATE 89 3 14	DATE 89 5 22	DATE 89 7 2	DATE 89 8 22	DATE 89 9 7	DATE 89 10 25	DATE 89 12 20
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
.29	-4.4	2.5	7.9	12.3	9.0	.0	-3.5
.49	-3.7	-.2	5.8	11.7	7.9	.4	-1.9
.69	-2.5	-.2	4.0	10.9	7.0	.8	-.4
.89	-1.5	-.3	2.0	9.9	6.0	.7	-.6
1.09	-.7	-.3	.1	9.0	5.2	.8	-.1

TEMPERATURE RESULTS ARE OBTAINED FROM A MULTITHERMISTOR CABLE. FURTHER TEMPERATURE LOGS ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN CABLE A THERMISTORS MULTIPLES. ON PREVOIT ENTREPRENDRE D'AUTRES SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 79.40. EMR-84-3B
WOODEN DOWEL IN TRENCH WALL.
DITCH THERMISTOR IS LOCATED 9.6M SOUTH OF THERMAL FENCE ENR-84-3B.
SURFACE CONDITIONS - LEVEL,VERY MOIST, SILTY SAND - GOOD GRASS COVER.
5 SENSOR ATKINS.

SITE 84-3B: GREAT BEAR RIVER B - DT117A
****

64 DEGREES 54.4 MINUTES NORTH 125 DEGREES 34.5 MINUTES WEST

ELEVATION 93 METRES

	DATE 89 3 14	DATE 89 5 22	DATE 89 7 2	DATE 89 8 22	DATE 89 9 7	DATE 89 10 25	DATE 89 12 20
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
.12	-4.7	3.5	9.3	15.4	9.6	-.3	-4.5
.37	-4.1	-.2	6.3	12.2	8.5	.5	-1.9

TEMPERATURE RESULTS ARE OBTAINED FROM A MULTITHERMISTOR CABLE. FURTHER TEMPERATURE LOGS ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN CABLE A THERMISTORS MULTIPLES. ON PREVOIT ENTREPRENDRE D'AUTRES SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 79.40. EMR-84-3B
WOODEN DOWEL DIRECTLY ABOVE PIPE.
DITCH THERMISTOR IS LOCATED 9.6M
SOUTH OF THERMAL FENCE EMR-84-3B
SURFACE CONDITIONS - LEVEL,VERY MOIST,
SILTY SAND - GOOD GRASS COVER.
2 SENSOR ATKINS.

SITE 84-2C: CANYON CREEK SOUTH C - DT113A
****

65 DEGREES 13.6 MINUTES NORTH 126 DEGREES 30.5 MINUTES WEST

ELEVATION 119 METRES

	DATE 89 7 2	DATE 89 9 7	DATE 89 10 25	DATE 89 12 14
Z(M)	T(C)	T(C)	T(C)	T(C)
.08	8.5	12.5	-7.4	-6.3
.33	9.5	9.5	-.1	-3.5
.58				
.83	5.6	7.1		-1.7

TEMPERATURE RESULTS ARE OBTAINED
FROM A MULTITHERMISTOR CABLE.
FURTHER TEMPERATURE LOGS
ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN
CABLE A THERMISTORS MULTIPLES.
ON PREVOIT ENTREPRENDRE D'AUTRES
SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 19.55. EMR-84-2C
WOODEN DOWEL DIRECTLY ABOVE PIPE.
DITCH THERMISTOR IS LOCATED 1.5M NORTH
OF THERMAL FENCE EMR-84-2C.
SURFACE CONDITIONS - DRY GRAVEL
MOUND - NO VEGETATION
4 SENSOR ATKINS.

SITE 84-2C: CANYON CREEK SOUTH C - DT113B
****

65 DEGREES 13.6 MINUTES NORTH 126 DEGREES 30.5 MINUTES WEST

ELEVATION 119 METRES

Z(M)	DATE 89 7 2 T(C)	DATE 89 9 7 T(C)	DATE 89 10 25 T(C)	DATE 89 12 14 T(C)
.16	4.9	5.8	-7.9	-8.8
.36	9.3	9.5	-.1	-2.8
.56	8.2	8.8	.1	-2.1
.76	6.9	8.1	.3	-1.5
.96	5.5	7.1	.5	-.9

TEMPERATURE RESULTS ARE OBTAINED FROM A MULTITHERMISTOR CABLE. FURTHER TEMPERATURE LOGS ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN CABLE A THERMISTORS MULTIPLES. ON PREVOIT ENTREPRENDRE D'AUTRES SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW-ZAMA PIPELINE KM 19.55. EMR-84-2C
WOODEN DOWEL IN TRENCH WALL.
DITCH THERMISTOR IS LOCATED 1.5M NORTH
OF THERMAL FENCE EMR-84-2C.
SURFACE CONDITIONS - DRY GRAVEL
MOUND - NO VEGETATION.
5 SENSOR ATKINS.

SITE 84-2A CANYON CREEK NORTH A - HT140
****

65 DEGREES 14.0 MINUTES NORTH 126 DEGREES 31.2 MINUTES WEST

ELEVATION 123 METRES

	DATE 89 2 2	DATE 89 3 14	DATE 89 4 7	DATE 89 5 23	DATE 89 7 3	DATE 89 8 22	DATE 89 9 7	DATE 89 10 25	DATE 89 12 14
Z(M)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)	T(C)
1.0	-.04	-.08	-.22	-.12	-.10	2.47	2.14	.01	-.03
2.5	-.24	-.24	-.24	-.23	-.23	-.25	2.63	-.21	-.19
5.0	-.45	-.45	-.44	-.43	-.42	-.43	-.40	-.41	-.40
10.0	-.52	-.53	-.52	-.52	-.51	-.53	-.51	-.51	-.51
15.0	-.25	-.26	-.26	-.25	-.25	-.27	-.25	-.26	-.26
20.0	-.30	-.31	-.31	-.30	-.30	-.31	-.30	-.31	-.31
25.0	.02	.01	.01	.02	.02	.01	.02	.01	.01
30.0	.09	.09	.09	.09	.10	.09	.10	.09	.09
35.0	.30	.30	.30	.30	.31	.30	.31	.30	.30
40.0	.49	.49	.49	.49	.49	.49	.50	.48	.48
45.0	.71	.70	.71	.71	.71	.70	.72	.71	.71

TEMPERATURE RESULTS ARE OBTAINED FROM A MULTITHERMISTOR CABLE. FURTHER TEMPERATURE LOGS ARE EXPECTED FOR THIS HOLE.

TEMPERATURES OBTENUES A PARTIR D'UN CABLE A THERMISTORS MULTIPLES. ON PREVOIT ENTREPRENDRE D'AUTRES SONDAGES DE LA TEMPERATURE DE CE PUITS.

NW - ZAMA PIPELINE KM 19.0. EMR-84-2A.
CLIMATE HOLE OFF ROW SOUTH OF THERMAL FENCE.
DRILLED IN MARCH 1987.
11 SENSORS YSI44033 (PAIRED).