

WEST AFRICAN GAS PIPELINE REGULATIONS, 2005

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IN the exercise of the powers conferred upon me by the West African Gas Pipeline Act and all other powers enabling me in that behalf, I, HON. PROF. MIKE OQUAYE, Minister for Energy for the Republic of Ghana, hereby make the following Regulations:

1. DEFINITIONS AND INTERPRETATION**Definitions**

1.1 In these Regulations, unless the context requires otherwise the following words and expressions have the following meanings:

abandoned means permanently removed from service;

AGA means American Gas Association;

ANSI means American National Standards Institute;

API means American Petroleum Institute;

Apportionment Percentages means the percentages (totalling 100.00%) applying to each State each year in the calculation of taxation payable by the Company, determined in accordance with Article V of the WAGP Treaty;

Approval to Operate means an approval granted under Regulations 5.3 or 5.4;

Approved Pipeline Development Plan means the development plan for the Pipeline System which has been approved by the Authority in accordance with Clause 18.5 of the International Project Agreement;

ASME means American Society of Mechanical Engineers;

ASNT means American Society of Nondestructive Testing;

ASTM means American Society for Testing and Materials;

Authority means the West Africa Gas Pipeline Authority established by the West Africa Gas Pipeline Treaty;

Board of Governors means the Board of Governors of the Authority appointed in accordance with Article IV of the WAGP Treaty;

British Thermal Unit means that amount of heat necessary to raise the temperature of one pound of water at 60 degrees Fahrenheit at pressure of 14.73 pounds per square inch absolute by one degree Fahrenheit;

Certificate of Compliance means a document in the form set out in Schedule 3 that is either:

- (a) executed by its chief executive officer, if given by the Company; or
- (b) the project manager of the contractor, if given by the contractor and ratified by the Company,

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that represents and warrants to the Authority that upon completion of construction the Pipeline System, or the part thereof to which the Certificate of Compliance applies, complies in all respects with these Regulations;

Committee of Ministers means the Committee of Ministers established under Article X of the WAGP Treaty;

Company means West African Gas Pipeline Company Limited;

Company Event of Default has the meaning given in the International Project Agreement;

Computational Pipeline Monitoring means a software-based monitoring tool that alerts the Operator to a possible Pipeline System operating abnormality, that may indicate a possible leak in the Pipeline System;

Covered Task means an activity, identified by the Operator, that:

- (a) is performed on the Pipeline System;
- (b) is an operations or maintenance task;
- (c) is performed as a requirement of these Regulations; and
- (d) affects the operation or integrity of the Pipeline System;

Damage Prevention Program means the program referred to in Regulations 5.15 to 5.17 below;

design pressure means the figure determined in accordance with the following formula:

$$P = \frac{(2St)}{D} \times F \times E \times T$$

where:

- P = Design pressure in Barg (Bar gauge)
- S = Yield strength in Bar
- D = Outside diameter of the pipe in Millimetres (mm)
- t = Nominal wall thickness in mm
- F = Design factor based on Location Class determined in accordance with Table 841.114 A of ASME B31.8
- E = Longitudinal joint factor determined in accordance with Table 841.115 A of ASME B31.8
- T = Temperature derating factor determined in accordance with Table 841.116 A of ASME B31.8;

DNV means Det Norske Veritas;

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Emergency Condition means any condition or situation that:

- (a) threatens the ability of the Operator safely to receive, transport or deliver Gas through the Pipeline System;
- (b) presents a danger to the environment; or
- (c) endangers the safety of people within or working on the Pipeline System or presents a physical threat to property, plant or equipment or the security, integrity or reliability of the Pipeline System,

and shall include:

- (d) gas detected inside or near a pipeline facility building;
- (e) fire located near or directly involving a pipeline facility;
- (f) explosion occurring near or directly involving a pipeline facility;
- (g) natural disaster affecting the Pipeline System; and
- (h) any other event that compromises or could compromise the integrity of the Pipeline System;

Emergency Response Plan means the plan developed by the Operator in accordance with Regulations 5.11 to 5.14 inclusive;

Environmental Impact Assessment means the environmental impact assessment and environmental management plan prepared for the purposes of the West African Gas Pipeline Project and approved by the environmental agencies having jurisdiction;

Essential Equipment means equipment, which when failing in operation or failing when called upon, will affect either the continuity of operation or the quality or quantity of gas delivery;

evaluation means a process, established and documented by the Operator, to determine an individual's ability to perform a Covered Task by any of the following:

- (a) Written examination;
- (b) Oral examination;
- (c) Work performance history review; and
- (d) Observation during:
 - (i) Performance on the job;
 - (ii) On the job training;
 - (iii) Simulations; or
 - (iv) Other forms of assessment;

exposed pipeline means a pipeline where the top of the pipe is protruding above ground for onshore pipelines or where the top of the pipe is protruding above the seabed in water less than 8 meters deep, as measured from the mean low water mark for offshore pipelines;

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Gas means any hydrocarbons or a mixture of hydrocarbons and other gases which at a temperature of sixty (60) degrees Fahrenheit and atmospheric pressure are predominantly in a gaseous state;

Hazardous Area Classification means classification of locations in which fire or explosion hazards may exist due to flammable gases or vapours, flammable liquids, combustible dust, or easily ignitable fibres;

Higher Heating Value means the number of British Thermal Units produced by the complete combustion at a constant absolute pressure of 14.73 pounds per square inch absolute of 1 standard cubic foot of Gas at a temperature of 60° Fahrenheit with excess air at the same temperature and pressure as the Gas when the products of combustion are cooled to 60° Fahrenheit and when the water formed by combustion is condensed to the liquid state;

hoop stress means the stress in a pipe wall, acting circumferentially in a plane perpendicular to the longitudinal axis of the pipe, and produced by the pressure of the fluid in the pipe, calculated by the formula:

$$Sh = PD/2t$$

Sh	=	hoop stress, Bar
P	=	internal pressure, Barg.
D	=	outside diameter of pipe, mm
t	=	nominal wall thickness, mm;

Intelligent Pig means an electronic device which is inserted into and run through a pipeline section to collect data as to the integrity or performance of the pipeline section;

Intelligent Pig Survey means a survey of the Pipeline System or part thereof using an Intelligent Pig;

IEC means International Electrotechnical Commission;

IEC Codes and Standards means the codes and standards for electrical equipment and wiring published by the IEC from time to time;

Initial Development means the Pipeline System to the extent stipulated in the initial Approved Pipeline Development Plan to be constructed at the time of the initial construction of the Pipeline System, but does not include expansions to the Pipeline System (whether contemplated in the initial Approved Pipeline Development Plan or otherwise);

International Project Agreement means the agreement dated 22 May, 2003, between the States and the Company for the development of the West African Gas Pipeline Project, as it may be amended from time to time;

ISA means Instruments Society of America;

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ISA Codes and Standards means the codes and standards for instrumentation published by the ISA from time to time;

ISO means International Organization for Standardization;

Location Class 1 means a geographic area classified as Location Class 1 in accordance with the clause entitled "Location Classes for Design and Construction" in ASME B31.8;

Location Class 2 means a geographic area classified as Location Class 2 in accordance with the clause entitled "Location Classes for Design and Construction" in ASME B31.8;

Location Class 3 means a geographic area classified as Location Class 3 in accordance with the clause entitled "Location Classes for Design and Construction" in ASME B31.8;

Location Class 4 means a geographic area classified as Location Class 4 in accordance with the clause entitled "Location Classes for Design and Construction" in ASME B31.8;

Material Safety Data Sheets means information documents published by the manufacturers of chemicals concerning their products, including the name, chemical composition, hazards, first aid measures, fire fighting measures, information regarding the proper steps to take with spills, handling and storage, personal protection to be used, physical and chemical properties, and information about stability & reactivity, toxicology, disposal and transportation;

Maximum Allowable Operating Pressure means the maximum pressure at which a pipeline or segment of a pipeline may be operated, established in accordance with Regulation 5.48;

Mechanical and Electrical Isolation Procedures means procedures developed to ensure that zero energy is present prior to work commencing on facilities or equipment;

MSS means Manufacturers Standardization Society of the Valve and Fitting Industry, Inc.;

NACE means National Association of Corrosion Engineers;

NEMA means National Electrical Manufacturers Association;

NEMA Codes and Standards means the codes and standards for electrical equipment and wiring published by NEMA from time to time;

NFPA means National Fire Protection Association;

offshore means beyond the line of ordinary low water along that portion of the coast of Africa that is in direct contact with the open seas and beyond the line marking the seaward limit of inland waters;

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Operator means the Company, or if another person is engaged by the Company to have primary responsibility for the operation of the Pipeline System, that other person;

pipe means any pipe or tubing used in the transportation of gas, including pipe-type holders;

pipeline facility means new and existing pipelines, rights-of-way, and any equipment, facility, or building used in the transportation of gas or in the treatment of gas during the course of transportation;

Pipeline Integrity Management Plan means a plan prepared and adopted by the Operator for the evaluation of the integrity of all pipeline sections through assessment and evaluation, and for the remediation of potential problems encountered through such assessment and evaluation;

Pipeline System means all parts of those physical facilities comprising the West African Gas Pipeline through which gas moves in transportation, including pipe, valves, and other appurtenance attached to pipe, compressor units, regulating and metering stations, delivery stations, and fabricated assemblies, as described in the Approved Pipeline Development Plan;

pipeline section means a continuous run of pipeline between adjacent compressor stations, between a compressor station and an R&M station, between a compressor station and a block valve, or between adjacent block valves;

qualified means that an individual has been evaluated and can:

- (a) perform assigned Covered Tasks; and
- (b) recognize and react to abnormal operating conditions. Abnormal operating condition means a condition identified by the Operator that may indicate a malfunction of a component or deviation from normal operations that may:
 - (i) indicate a condition exceeding design limits; or
 - (ii) result in a hazard to persons, property, or the environment; or
 - (iii) be a condition covered under paragraph 5.8(a) below;

Regulating and Metering stations or R&M stations means pressure regulating and measuring devices for the purposes of controlling the downstream pressure and measuring the quantity and quality of gas delivered through the station;

Regulation means these Regulations;

Right of Way has the meaning given in the West African Gas Pipeline Act;

Rules of Procedure means the Rules of Procedure established in accordance with Article VI of the WAGPTreaty;

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Safe Practices and Procedures Manual means the manual prepared by the Operator in accordance with Regulation 5.6;

Specified Minimum Yield Strength means the specified minimum yield strength as prescribed by the specification under which the pipe in question is manufactured;

Standards means the international standards and recommended practices listed in Schedule 2 (or such other standard as may be determined in accordance with Regulations 16.10 and 16.11 below);

Steering Committee means the Committee of Ministers established under the WAGP Treaty;

States means the Republic of Benin, the Republic of Ghana, the Federal Republic of Nigeria and the Republic of Togo, or any of them;

Vital Equipment means equipment which when failing in operation or failing when called upon can cause an unsafe condition of the Pipeline System or any part thereof, jeopardize life, or cause major damage to the Pipeline System or any part thereof;

WAGP Tribunal means the tribunal of that name established under the WAGP Treaty; and

West African Gas Pipeline Treaty or WAGP Treaty means the Treaty on the West African Gas Pipeline Project between (1) the Republic of Benin, (2) the Republic of Ghana, (3) the Federal Republic of Nigeria and (4) the Republic of Togo entered into on 31 January 2003.

Interpretation

1.2 In these Regulations, unless the context otherwise requires:

- (a) include means including but not limited to;
- (b) may means "is permitted to" or "is authorised to";
- (c) may not means "is not permitted to" or "is not authorised to";
- (d) shall is used in the mandatory and imperative sense;
- (e) words importing the singular include the plural and vice-versa; and
- (f) words importing the masculine gender include the feminine and vice-versa.

2. PURPOSE OF REGULATIONS

2.1 These Regulations are adopted following agreement in accordance with the International Project Agreement by the Republic of Ghana and the Company on the content of these Regulations, but without prejudice to the authority of the Minister to amend these Regulations in accordance with the powers set out in the West African Gas Pipeline Act.

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2.2 The purpose of these Regulations is to provide a consistent and enforceable code governing the design, construction, operation and maintenance of the Pipeline System which will harmonise the regulation of those matters in each of the States.

2.3 In addition to these Regulations the Operator is required to comply with the substantive laws of the Republic of Ghana as modified by the West African Gas Pipeline Act.

3. PERMIT TO SURVEY**Grant and variation of permit to survey**

3.1 Whenever a survey is required, the Company shall apply to the Authority for a permit to survey.

3.2 An application for a permit to survey under this Regulation 3 shall specify the approximate route or alternative routes proposed.

3.3 The Authority may grant to the Company a permit to survey under this Regulation 3.

3.4 The Authority may, upon application by the Company, vary the route specified in such permit to survey, but such variation shall not invalidate or make illegal any act done by the Company or its contractors, agents and employees pursuant to the permit prior to such variation, nor prejudice the rights of any person under these Regulations with reference to any act done by the Company pursuant to the permit prior to such variation.

Rights of Company under permit to survey

3.5 A permit to survey shall entitle the Company and its contractors, agents and employees to enter together with any necessary equipment or vehicles, on any land upon the route specified in the permit to survey or reasonably close to such route for the following purposes:

- (a) to survey and take levels of the land;
- (b) to dig and bore into the soil and subsoil;
- (c) to cut and remove such trees and other vegetation as may impede the purposes specified in this Regulation; and
- (d) to do all other acts necessary to ascertain the suitability of the land for the establishment of part of the Pipeline System,

and shall entitle the Company, with such persons, equipment or vehicles as aforesaid to pass over land adjacent to such route to the extent that such may be necessary or convenient for the purpose of obtaining access to land upon the route specified.

3.6 Except with prior consent of the owner or occupier, no person shall under the authority of Regulation 3.5 enter any building or upon any enclosed court or garden attached to any building, without previously having given the owner or occupier at

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least fourteen days' notice of his intention to do so, nor enter upon any cultivated land without having given such notice to the owners or occupiers thereof or having affixed such notice in some prominent position upon such land.

3.7 No person shall, under the authority of Regulation 3.5, except with the prior assent of the owners or occupiers or persons in charge thereof, enter any of the following land:

- (a) any land occupied by any burial ground or cemetery; or
- (b) any land containing any grave, grotto, area, tree or thing held to be sacred or the object of veneration.

3.8 A person acting under the authority of Regulation 3.5 shall take all reasonable steps to avoid unnecessary damage to any land entered upon and any buildings, crops or profitable trees thereon, and shall make compensation to the owners or occupiers for any damage done under such authority and not made good.

3.9 The principles and procedures for quantifying the amount of such compensation (together with procedures for resolving any disputes in respect of such compensation) shall be those applying under the prevailing laws of the Republic of Ghana.

4. DESIGN, CONSTRUCTION, INSPECTION AND TESTING OF PIPELINE SYSTEM

General

4.1 The design of the Pipeline System shall be:

- (a) such that the Pipeline System shall be suitable for the high pressure transportation of Gas; and
- (b) as set out in this Regulation 4.

Design and specification of pipeline sections

4.2 The design and specification of pipeline sections shall be as follows:

- (a) All pipeline sections shall be made of steel, and shall comply with ASME B31.8 and (where applicable) DNV-OS-F-101.
- (b) The selection of all structural materials and piping components shall comply with Appendix B of ASME B31.8.
- (c) Pipeline section components shall comply with the following Standards:
 - (i) API 6D and ASME B16.34;
 - (ii) ASME B16.5 or MSS SP-44;
 - (iii) ASME B16.9 or MSS SP-75;
 - (iv) ASME B16.11;
 - (v) ASTM A-193;
 - (vi) ASTM A-194; and
 - (vii) ASME B16.49.

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- (d) The pipe shall be manufactured in accordance with the following Standards:
- (i) API 5L;
 - (ii) ASTM A 53;
 - (iii) ASTM A 106;
 - (iv) ASTM A 135;
 - (v) ASTM A 333; and
 - (vi) ASTM A 381.
- (e) Pipeline design shall include loads for both construction and operating phases.
- (f) Each pipeline or segment of a pipeline (other than station piping such as compressor stations, manifolds, and R&M stations) shall be designed to accommodate the passage of instrumented internal inspection devices.
- (g) Each mechanical fitting shall be designed for at least the Maximum Allowable Operating Pressure of the relevant pipeline section.
- (h) Each welded branch connection made to pipeline sections in the form of a single connection, or in a header or manifold as a series of connections, shall be designed to ensure that the strength of the pipeline section is not reduced, having regard to the stresses in the remaining pipe wall due to the opening in the pipe or header, the shear stresses produced by the pressure acting on the area of the branch opening, and any external loadings due to thermal movement, weight, and vibration.
- (i) Except for branch connections and assemblies of standard pipe and fittings joined by circumferential welds, the design pressure of each component fabricated by welding, whose strength cannot be determined, shall be established in accordance with ASME BPVC Section VIII.
- (j) Each prefabricated unit that uses plate and longitudinal seams shall be designed in accordance with ASME BPVC Section VIII, except for the following:
- (A) regularly manufactured butt-welded fittings;
 - (B) pipe that has been produced and tested under the specifications listed in paragraph 4.2(d) above; and
 - (C) partial assemblies such as split rings or collars.

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- (k) Field fabricated bull plugs and swages shall not be used on pipeline sections.
- (l) Except for flat closures designed in accordance with ASME BPVC Section VIII, flat closures and fish tails may not be used on pipeline sections.
- (m) Each extruded outlet shall be suitable for the anticipated service conditions and shall be at least equal to the design strength of the pipe and other fittings in the pipeline section to which it is to be attached.
- (n) All pipeline sections shall be designed with enough flexibility to prevent thermal expansion or contraction from causing excessive stresses in the pipe or components, excessive bending or unusual loads at joints, or undesirable forces or moments at points of connection to equipment, or at anchorage or guide points.
- (o) Each pipeline or segment of a pipeline which is not buried in the ground shall be designed so that it is raised and maintained above ground on permanent supports.
- (p) In relation to all supports and anchors:
 - (i) each pipeline segment and its associated equipment shall have enough anchors or supports to:
 - (A) prevent undue strain on connected equipment;
 - (B) resist longitudinal forces caused by a bend or offset in the pipe; and
 - (C) prevent or damp out excessive vibration;
 - (ii) each exposed pipeline segment shall have enough supports or anchors to protect the exposed pipe joints from the maximum end force caused by internal pressure and any additional forces caused by temperature variation or by the weight of the pipe and its contents;
 - (iii) each support or anchor on an exposed pipeline segment shall be made of durable, non-combustible material and shall be designed and installed as follows:
 - (A) free expansion and contraction of the pipeline segment between supports or anchors may not be restricted;
 - (B) provision shall be made for the service conditions involved; and
 - (C) movement of the pipeline segment may not cause disengagement of the support equipment;

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- (iv) each support on an exposed pipeline segment operated at a stress level of 50 percent or more of the Specified Minimum Yield Strength shall comply with the following:
 - (A) a structural support may not be welded directly to the carrier pipe;
 - (B) a support may be welded to a sleeve that completely encircles the pipe; and
 - (C) if an encircling member is welded to a pipe, the weld shall be continuous and shall cover the entire circumference;
- (v) each underground pipeline segment that is connected to a relatively unyielding line or other fixed object shall have enough flexibility to provide for possible movement, or it shall have an anchor that will limit the movement of the pipeline segment; and
- (vi) except for offshore portions of the pipeline section, each underground pipeline that is being connected to new branches shall have a firm foundation for both the header and the branch to prevent detrimental lateral and vertical movement.

(q) Mitred joints shall not be used.

Design and specification of compressor stations

4.3 The design and specification of compressor stations shall be as follows:

- (a) The design factor for compressor station piping shall be 0.50.
- (b) Each compressor shall comply with API 617.
- (c) Each turbine shall comply with API 616.
- (d) Each main compressor building of a compressor station shall be located on property under the control of the Operator. Each shall be far enough away from adjacent property to minimize the possibility of fire being communicated to the compressor building from structures on adjacent property or from the compressor building to adjacent property. There shall be enough open space around the main compressor building to allow the free movement of fire-fighting equipment.
- (e) Each operating floor of a main compressor building shall have at least two separated and unobstructed exits located so as to provide a means of egress and an unobstructed passage to a place of safety. Each door latch on an exit shall be of a type, which can be readily opened from the inside without a key. Each swinging door located in an exterior wall shall be mounted to swing outward.

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- (f) Each fence around a compressor station shall have a minimum height of 2 metres and have at least two gates located so as to provide a means of egress to a place of safety, or have other facilities affording a means of exit from the area. Where applicable the main entrance shall be wide enough to permit access for fire fighting equipment. Each gate located within 60 meters of any compressor plant building shall not be locked when occupied and shall be operable from the inside without a key.
- (g) Where entrained vapours in gas may liquefy under the anticipated pressure and temperature conditions, the compressor shall be protected against the introduction of those liquids in quantities that could cause damage to the Pipeline System. Each liquid separator used to remove entrained liquids at a compressor station shall:
- (i) have a manually operable means of removing these liquids;
 - (ii) where slugs of liquid could be carried into the compressor, have either:
 - (A) automatic liquid removal facilities;
 - (B) an automatic compressor shutdown device; or
 - (C) a high liquid level alarm;
 - (iii) be manufactured in accordance with ASME BPVC Section VIII; and
 - (iv) have facilities for the disposal of liquids in accordance with local requirements.
- (h) Each compressor station shall have an automatic emergency shutdown system that meets the following requirements:
- (i) it shall be separate from the compressor station process control system;
 - (ii) it shall be able to block gas out of the station and depressurize the station piping;
 - (iii) it shall discharge gas from the blowdown piping at a location where the gas will not create a hazard, based on cold stack dispersion analysis; and
 - (iv) it shall be designed and installed to operate automatically:
 - (A) when the gas pressure in any part of the Pipeline System which is pressured by that compressor station equals the Maximum Allowable Operating Pressure of that part of the Pipeline System plus 10 percent;
 - (B) when there is a confirmed fire detection;

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- (C) when the concentration of gas in air reaches 60 percent or more of the lower explosive limit in an area that is designated unclassified or safe in terms of Hazardous Area Classification provided that electrical equipment certified for use in areas having a Hazardous Area Classification equal to or exceeding the Hazardous Area Classification of the area in which it is used, shall not be considered as a source of ignition for the purpose of these Regulations; or
- (D) when liquid slugs might be carried into the compressors;
- (v) it shall provide means for the shutdown of gas compressor station equipment and non-essential electrical facilities in the vicinity of gas headers or in the compressor building, except that:
 - (A) electrical circuits that supply emergency lighting required to assist station personnel in evacuating the compressor building and the area in the vicinity of the gas headers shall remain energized;
 - (B) electrical circuits needed to protect equipment from damage may remain energized; and
 - (C) Vital Equipment shall remain operational; and
- (vi) it shall be operable from at least two locations each of which is located:
 - (A) near the exit gates, if the station is fenced, or near emergency exits, if the station is not fenced; and
 - (B) not more than 150 meters from the limits of the compressor station.
- (i) Each compressor station shall have pressure relief or any other suitable protective devices of sufficient capacity and sensitivity to ensure that the Maximum Allowable Operating Pressure of the compressor station piping and equipment is not exceeded by more than 10 percent.
- (j) Each line that exhausts gas from the pressure relief valves of a compressor station shall extend to a location where the gas may be discharged without hazard.
- (k) Each compressor shall be equipped with the following safety equipment:
 - (i) fire detection and protection equipment;

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- (ii) an automatic device to shut down the unit before the speed of either the prime mover (other than an electrical induction or synchronous motor) or the driven unit exceeds a maximum safe speed;
 - (iii) a shutdown or alarm device that operates in the event of inadequate cooling or lubrication of the unit safety equipment;
 - (iv) a means for shutting off the fuel to any gas engine and venting the engine distribution manifold; and
 - (v) vent slots or holes in the baffles of each compartment of a muffler for a gas engine to prevent gas from being trapped in the muffler.
- (l) Each compressor station building shall be ventilated to ensure that the accumulation of gas in rooms, sumps, attics, pits or other enclosed places does not endanger employees. All enclosed work places in each compressor station building shall have fire and gas detection and protection facilities.
- (m) Each compressor station shall be designed such that the maximum sound pressure level limits for facility areas are:
- (i) absolute limit – 115 dBA;
 - (ii) general plant, work areas – 85 dBA;
 - (iii) offices, control rooms – 55 dBA; and
 - (iv) at the facility property limit – 50 dBA.

Design and specification of R&M stations

4.4 The design and specification of the R&M stations shall be as follows:

- (a) The design factor for R&M station piping shall be 0.50;
- (b) The R&M station and equipment shall be designed in accordance with the standards for measurement set out in Regulations 5.41 to 5.45;
- (c) Each pipeline segment in an R&M station that is connected to a gas source so that the Maximum Allowable Operating Pressure of that pipeline segment could be exceeded as the result of pressure control failure (or any other type of failure) shall have pressure relieving or pressure limiting devices that meet the following requirements:
 - (i) each pressure relief or pressure limiting device shall:
 - (A) be constructed of materials such that the operation of the device will not be impaired by corrosion;
 - (B) have valves and valve seats that are designed not to stick in a position that will make the device inoperative;

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- (C) be designed and installed so that it can be readily operated to determine if the valve is free, can be tested to determine the pressure at which it will operate and can be tested for leakage when in the closed position;
 - (D) have support made of non-combustible material;
 - (E) have discharge stacks, vents, or outlet ports designed to prevent accumulation of liquids and located where gas can be discharged into the atmosphere without undue hazard;
 - (F) be designed and installed so that the size of the openings, pipe, and fittings located between the system to be protected and the pressure relieving device, and the size of the vent line, are adequate to prevent hammering of the valve and to prevent impairment of relief capacity;
 - (G) be designed and installed to prevent any single incident such as an explosion in a vault or damage by a vehicle from affecting the operation of both the overpressure protective device and the regulator; and
 - (H) be designed to prevent unauthorized operation of any stop or isolating valve that will make the pressure relief valve or pressure limiting device inoperative;
- (ii) each pressure relief station or pressure limiting station installed to protect a pipeline or a facility shall have enough capacity, and shall be set to operate, to ensure that:
- (A) in a low pressure system, the pressure will not cause the unsafe operation of any connected and properly adjusted gas utilization equipment; and
 - (B) the pressure does not exceed the lower of (i) the Maximum Allowable Operating Pressure of that pipeline segment plus 10 percent and (ii) the pressure that produces a hoop stress of 75 per cent of the Specified Minimum Yield Strength of that pipeline segment;
- (iii) when more than one pressure regulating or compressor station feeds into a pipeline segment, relief valves or other protective devices shall be installed at each station to ensure that the failure of the largest capacity regulator or compressor, or any single run of regulators or compressors in that station, will not impose pressures on any part of the pipeline segment in excess of the Maximum Allowable Operating Pressure of that pipeline segment; and

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(iv) relief valves or other pressure limiting devices shall be installed at or near each R&M station in a low pressure system, with a capacity to limit the maximum pressure in the main to a pressure that will not exceed the safe operating pressure for any connected and properly adjusted gas utilization equipment.

(d) Each R&M station shall be designed such that the maximum sound pressure level limits for facility areas are:

- (i) absolute limit – 115 dBA;
- (ii) general plant, work areas – 85 dBA;
- (iii) offices, control rooms – 55 dBA; and
- (iv) at the facility property limit – 50 dBA.

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(e) Each R&M station shall be designed with facilities so that it is well protected against lightning strike.

Prohibited Materials

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4.5 The following materials shall not be used in components of pipeline sections, compressor stations or R&M stations which carry hydrocarbons:

- (a) cast or ductile iron materials;
- (b) copper, brass or alloy materials;
- (c) asbestos;
- (d) polychlorinated biphenyls; and
- (e) thermoplastic or thermosetting plastic materials.

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Construction

4.6 The Pipeline System shall be constructed so as to comply with the design and specification requirements of these Regulations.

4.7 The procedures and specifications for construction of the Pipeline System or any part thereof shall be as follows:

- (a) The construction shall meet the specifications of ASME B31.8 and shall be carried out in accordance with existing environment laws.
- (b) All pipe shall be transported in accordance with the following Standards:
 - (i) API RP 5L1; and
 - (ii) API RP 5LW.
- (c) The weldability of steel pipe materials shall be tested in accordance with API 1104.

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- (d) Where a type of construction is specified for pipeline in the proximity of main roads and railroads and their mode of crossing is specified, the pipeline shall be constructed in accordance with those specifications.
- (e) The minimum depth of burial of the pipeline shall be as follows:
 - (i) onshore, 0.9 metres;
 - (ii) navigable rivers, 1.5 metres;
 - (iii) roads and railroad crossings, 1.5 metres below top of road or railroad and 1.2 metres below the bottom of drainage ditch or as required by the local authority or rail operator;
 - (iv) in rocky areas, 0.6 metres; and
 - (v) offshore, 0.9 meter in water depths up to 8 metres.
- (f) There shall be a minimum clearance of 0.25 metres between the pipeline and any other underground structure or other pipeline.
- (g) The inspection by the Operator of the pipeline construction materials and its appurtenances, welding, ditching, stringing and the general installation shall be carried out in accordance with ASME B31.8.
- (h) All buildings shall be made of non-combustible materials and shall conform to the requirements of these Regulations and local building codes.
- (i) Railway and highway crossings shall be constructed in accordance with API RP 1102.

4.8 The Operator shall maintain records detailing any material developments relating to the construction of the Pipeline System, including material technical problems, material interruptions of construction or material labour problems and a description of any steps being taken to address such developments.

4.9 The Operator shall also maintain records of the following:

- (a) total number of girth welds;
- (b) number of welds non-destructively tested including the number rejected and disposition of the rejected welds;
- (c) amount, location, size and type of pipe installed;
- (d) the location of each buried utility crossing;
- (e) crossings of public roads, railroads, waterways, and foreign pipelines;
- (f) the location of each overhead crossing;
- (g) the location of each valve and corrosion test station; and
- (h) the location of cathodic protection equipment.

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Inspection and testing

4.10 The inspection and testing of pipeline sections, compressor stations and R&M stations shall be carried out as follows:

- (a) Other than for emergency repairs, the Operator shall, on completion of the construction of pipeline sections, give the Authority not less than seven (7) days notice of its intention to commence testing of the pipeline.
- (b) The quality of welding shall be inspected visually and by non-destructive testing. Non-destructive testing may consist of radiographic examination, ultra-sonic testing, magnetic particle testing, or other acceptable methods.
- (c) The following minimum number of field butt welds shall be selected for examination:
 - (i) 100% of welds in Location Class 1;
 - (ii) 100% of welds in Location Class 2;
 - (iii) 100% of welds in Location Class 3;
 - (iv) 100% of welds in Location Class 4;
 - (v) 100% of the welds in offshore pipeline segments, hydrocarbon piping in compressor and R&M stations, and at major navigable river crossings, major highway crossings, and rail crossings (and all tie-in welds not subjected to a pressure test shall be examined); and
 - (vi) 10% of welds in non-hydrocarbon piping.
- (d) Each weld so selected shall be examined over its entire circumference or else the equivalent length of welds shall be examined, if the Operator chooses to examine only a part of the circumference of each.
- (e) All inspected welds which do not meet the standards of API 1104 shall be repaired and re-inspected.
- (f) When radiographic inspection is employed, a procedure meeting the requirements of API 1104 shall be followed and the inspection shall be performed by a radiographic inspector qualified to ASNT SNT-TC-1A Level II certification or ISO 9712 Level II certification.
- (g) Welding shall be performed by a welder who has been qualified in accordance with API 1104 or ASME BPVC Section IX and using a qualified welding procedure that will produce welds meeting

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requirements of this Regulation. The quality of the test welds used to qualify the procedure shall be determined by destructive testing.

- (h) Each welding procedure shall be recorded in detail, including the results of the qualifying tests. This record shall be retained whenever the procedure is used.
- (i) A welder whose qualification is based on non-destructive testing may not weld compressor and R&M station piping and components or offshore pipelines.
- (j) No welder may weld with a particular welding process unless, within the preceding 6 calendar months, he has engaged in welding with that process.
- (k) A qualified welder may not weld on pipe unless:
 - (i) within the preceding 6 calendar months the welder has had one weld tested and found acceptable under API 1104; or
 - (ii) within the preceding 15 calendar months the welder has re-qualified under paragraph 4.10(g) above.
- (l) All hydrostatic testing shall be conducted as follows:
 - (i) Pressure tests shall be conducted in such manner as to ensure the protection of life, property and the environment.
 - (ii) Any in-line pressure vessel or a pre-fabricated manifold on pipeline sections shall be tested according to the manufacturer's specifications.
 - (iii) The pressure and temperature recording instruments to be used for testing shall be check calibrated within 1 week of the test. Calibration shall be:
 - (A) traceable to a recognized International Standard;
 - (B) carried out prior to the test; and
 - (C) carried out immediately after the test to verify that no drift has occurred during the test.
 - (iv) The accuracy of the pressure recording instrument used for the test shall be within manufacturer's specifications but shall have an accuracy equal to or better than $\pm 2\%$ of full scale.
 - (v) The chart record of the test shall be continuous and legible and the test results, records of pre-test and post-test calibrations, and any remedial action taken as a result of this test shall be submitted to the Authority within thirty calendar days following their occurrence.

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- (vi) Except with the permission of the Authority, the duration of pressure tests:
- (A) shall not be less than: (i) 24 hours of continuous testing after temperature stabilisation without leaks and material failures for onshore buried piping; and (ii) not less than 8 hours of continuous testing after temperature stabilisation for onshore exposed piping, offshore piping, compressor station piping and R&M station piping; and
 - (B) may be less than 8 hours of continuous testing but not less than 1 hour in the case of buried pipelines of not more than 100m in length, and all surface running pipelines.
- (vii) Buried pipelines in Location Class 1 and Location Class 2 and offshore pipelines shall be hydrostatically tested to a pressure of not less than 1.25 times the Maximum Allowable Operating Pressure of that pipeline. Buried pipelines in Location Class 3 and Location Class 4 shall be hydrostatically tested to a pressure of not less than 1.4 times the Maximum Allowable Operating Pressure of that pipeline.
- (viii) Compressor station piping and R&M station piping shall be tested up to a pressure of not less than 1.4 times the Maximum Allowable Operating Pressure of that piping.
- (ix) Unless otherwise authorized by the Authority:
- (A) the actual test pressure throughout the duration of test shall not exceed 95 per cent of the Specified Minimum Yield Strength of the pipe material and the test equipment shall appropriately be pre-set not to produce pressures greater than 95% of the Specified Minimum Yield Strength; and
 - (B) the test medium shall be water, with appropriate corrosion inhibitors, biocide and oxygen scavengers; and upon completion of testing, the test medium shall be removed from the pipeline and managed according to current country legal requirements including, but not limited to, permitted discharge to the receiving medium as provided for in the Environmental Impact Assessment.

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- (x) The hydrostatic test shall be documented and the hydrostatic test records shall be retained for the life of the pipeline segment. In addition, the Operator shall prepare a document for each test section which shall include the following:
- (A) a summary of the successful test;
 - (B) a record of the actual testing procedure used;
 - (C) all calculations relating to the test;
 - (D) a pipeline profile showing elevations, test sites and the length of the relevant test section noting all instrument and injection locations;
 - (E) signed pressure and temperature recording charts;
 - (F) deadweight test log;
 - (G) any relevant instrument certificates of calibration including certification dates; and
 - (H) any problems encountered and the method of solution of such problems.
- (xi) Valves shall be left open during testing, and fittings on the pipeline shall not, during the test, be subjected to a pressure greater than the manufacturer's test pressure rating. Check valves, if used, shall have the clappers pinned open during the test.

Further requirements

4.11 The design and specification of electrical equipment, instrumentation, safety systems and fire protection systems for the Pipeline System shall be as follows:

- (a) Electrical equipment and wiring shall conform to IEC Codes and Standards.
- (b) Instrumentation shall conform to one of ISA Codes and Standards, IEC Codes and Standards or NEMA Codes and Standards.
- (c) Safety systems shall conform to API RP 14C where applicable.
- (d) Fire detection and protection equipment shall comply with NFPA 20.
- (e) Fire detection and protection equipment and safety equipment shall not be prevented by the operation of the emergency shutdown system from operating as they are designed to operate.

5. OPERATION AND MAINTENANCE**Approval to Operate**

5.1 The Operator shall not commence operation of the Pipeline System, or of additional facilities installed as part of the Pipeline System, or resume operation of the Pipeline System or part thereof following a discontinuance of operation, without an Approval to Operate.

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5.2 In applying to the Authority for an Approval to Operate, the Operator shall provide to the Authority:

- (a) in the case of an Approval to Operate the Initial Development for the first time, detailed commissioning and start-up plans for the Initial Development, a copy of the full operation and maintenance plan for the Pipeline System, and a full manpower plan for the Operating Period;
- (b) in the case of an Approval to Operate additional facilities subsequent to the Initial Development for the first time, detailed commissioning and start-up plans for the additional facilities and a copy of the revised operation and maintenance plan for the Pipeline System, taking into account the additional facilities;
- (c) in the case of an Approval to Operate upon resumption of operation following a discontinuance of operation of the Pipeline System or any part thereof, start-up plans for the relevant part of the Pipeline System and a copy of the current operation and maintenance plan for the entire Pipeline System; and
- (d) in each of those cases, a copy of the Pipeline Licence granted under the West African Gas Pipeline Act.

5.3 The Authority shall grant an Approval to Operate upon receipt of the materials referred to in Regulation 5.2 together with a Certificate of Compliance in respect of the Initial Development or the additional facilities or that part of the Pipeline System in respect of which operation is to be resumed, as the case may be, given by the Company or by a contractor on behalf of the Company.

5.4 The Authority shall respond in writing within 21 days of receipt of a request from the Operator for an Approval to Operate, either advising of its approval to operate the Pipeline System or the additional facilities or else advising what matters it requires to be satisfied before giving its approval. If the Authority does not respond in writing within 21 days of receipt of a request from the Operator the Approval to Operate shall be deemed given on the 22nd day following receipt by the Authority of the request.

Operation and Maintenance Procedures

5.5 The Operator shall, to the extent reasonably practical, continuously monitor the operation of the Pipeline System. Computational Pipeline Monitoring shall not be used to monitor the Pipeline System. No part of the Pipeline System shall be operated outside of its normal operating design parameters except for the purpose of testing.

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5.6 Prior to commencement of operation of the Pipeline System, the Operator shall prepare a Safe Practices and Procedures Manual containing written procedures for conducting operation and maintenance activities in respect of such pipeline as well as procedures for handling abnormal operations. The Operator shall review and if applicable update this manual at intervals not exceeding 15 months, but at least once every calendar year. Copies of the Safe Practices and Procedures Manual shall be made available at all locations where operation and maintenance activities are conducted in respect of the Pipeline System.

5.7 The Safe Practices and Procedures Manual shall include procedures designed to ensure that operation and maintenance activities in respect of the Pipeline System are incident and injury free and that these activities are carried out in such a way that the soundness and fitness for purpose for which the Pipeline System has been designed will not be compromised, and will not present a hazard to persons, environmental damage, or damage to property. The following matters, if applicable, shall be addressed in the Safe Practices and Procedures Manual:

- (a) the start-up, operation, maintenance and repair of the Pipeline System in accordance with these Regulations;
- (b) pigging operations;
- (c) remotely operated vehicle operations;
- (d) a formal written procedure used to control types of work which are potentially hazardous, non-routine, or not related to the normal operation of the Pipeline System;
- (e) procedures to ensure that zero energy is present prior to work commencing on facilities or equipment;
- (f) corrosion control in accordance with the operation and maintenance requirements;
- (g) construction records, maps, and operating history which should be made available to appropriate operating personnel;
- (h) the collection of data needed for reporting incidents in a timely and effective manner;
- (i) starting up and shutting down any part of the Pipeline System in a manner designed to ensure operation within the Maximum Allowable Operating Pressure limits;
- (j) a maintenance program covering all pipeline facilities and equipment;
- (k) isolating units or sections of pipe and for purging before returning to service;
- (l) the periodical review of work done by operating personnel to determine the effectiveness, and adequacy of the procedures used in

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normal operation and maintenance and modifying the procedures when deficiencies are found;

- (m) precautions in excavated trenches to protect personnel from the hazards of unsafe accumulations of vapour or gas, and the availability when needed at the excavation emergency rescue equipment, including breathing apparatus and a rescue harness and line; and
- (n) the monitoring of emissions as set out in the Environmental Impact Assessment.

5.8 The Safe Practices and Procedures Manual shall also include procedures for the following to provide safety when operating design limits have been exceeded or when an abnormal operation has occurred:

- (a) response to, investigation of, and correction of the cause of:
 - (i) unintended closure of valves or shutdown;
 - (ii) increase or decrease in pressure or flow rate outside normal operating limits;
 - (iii) loss of communications;
 - (iv) operation of any safety device; and
 - (v) any other foreseeable malfunction of a component, deviation from normal operation, or personnel error, which may result in a hazard to persons, environmental damage or damage to property.
- (b) the verification of variations from normal operation after abnormal operation has ended at sufficient critical locations in the system to determine continued integrity and safe operation;
- (c) the notification to the relevant responsible Operator personnel when notice of an abnormal operation is received; and
- (d) the periodical review of the response of operating personnel to determine the effectiveness of the procedures controlling abnormal operation and taking corrective action where deficiencies are found.

Training

5.9 The Operator shall establish and conduct a training program, which shall:

- (a) provide operating and maintenance personnel with an understanding of, and the necessary skills and proficiency to carry out, each element of the Safe Practices and Procedures Manual appropriate to the relevant personnel; and

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- (b) include pertinent policies, procedures, job methods and materials, tools and equipment involved, how to recognize safety-related conditions, and the procedures for reporting safety-related conditions.

5.10 The Operator shall keep records of the training program including descriptions of the training organised, the dates on which such training took place and a list of attendees for the relevant training.

Emergency Response Plan

5.11 The Operator shall prepare written procedures to minimize the hazard resulting from an Emergency Condition, including:

- (a) procedures for the receipt, notification and clarification of notices of an Emergency Condition;
- (b) procedures for a prompt and effective response to a notice of an Emergency Condition;
- (c) procedures relating to the availability of personnel, equipment, tools, and materials, as needed at the scene of an Emergency Condition (including the arrangements that need to be made to assure the availability of personnel, equipment, tools and materials depending on the type of Emergency Condition, and the assignment of responsibilities for coordinating, directing and performing emergency response functions);
- (d) description of the actions that may be required by the first employee arriving at the scene in order to protect people and property;
- (e) provisions for emergency shutdown and pressure reduction in any section of the Pipeline System necessary to minimize hazards to human health, property or the environment;
- (f) provisions for locating and making safe any actual or potential hazard; and
- (g) procedures for the safe restoration of service to the relevant parts of the Pipeline System affected by the incident, after proper corrective measures have been taken, including:
 - (i) purging and re-pressurizing of the relevant parts of Pipeline System; and
 - (ii) resurvey of the area involved in a leak incident to locate any additional leaks.

5.12 The Emergency Response Plan shall comply with NFPA 600.

5.13 The Operator shall:

- (a) furnish its personnel who are responsible for emergency response action with a copy of the Emergency Response Plan;

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- (b) review and if applicable update the Emergency Response Plan at least once every calendar year or at the end of any Emergency Condition;
- (c) train the appropriate operating personnel to ensure that they are knowledgeable of the emergency response procedures and verify that the training is effective;
- (d) conduct site specific drills or desktop exercises on a quarterly basis;
- (e) train operating personnel in the use of fire-fighting and emergency response equipment;
- (f) maintain records relating to the training;
- (g) review operating personnel activities to determine whether the procedures were followed effectively and in a timely manner in each incident and, where required, amend the procedures as indicated by the experience and lessons learned from the incident; and
- (h) designate a location to be an incident control centre for the communication, co-ordination and management of emergency response activities.

5.14 The Operator shall establish and maintain liaison with appropriate fire, police, and other public officials to:

- (a) establish the responsibility and resources of each government organization that may respond to a gas pipeline incident;
- (b) acquaint the officials with the Operator's ability in responding to a gas pipeline incident;
- (c) plan how the Operator and the relevant officials can engage in mutual assistance to minimize hazards to life or property including procedures for notification; and
- (d) subject to the participation of the relevant State Authorities, conduct at least one major exercise per calendar year in respect of the Pipeline System involving operating personnel and appropriate fire, police and public officials.

Damage Prevention Program

5.15 The Operator shall prepare a Damage Prevention Program to prevent damage to the Pipeline System by excavation activities performed by third parties. For the purpose of this Regulation and Regulation 5.16, "excavation activities" include excavation, blasting, boring, tunnelling, backfilling, the removal of above ground structures by either explosive or mechanical means, or other earth moving operations.

5.16 The Damage Prevention Program shall include:

- (a) the identity, on a current basis, of persons who normally engage in excavation activities in the area in which the pipeline is located; and

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- (b) provisions for notification to the public in the vicinity of the pipeline and for actual notification to the persons identified in paragraph (a) above as often as needed to make them aware of the existence and purpose of the Damage Prevention Program, and how to learn the location of underground pipelines before excavation activities are begun;
- (c) description of a method of receiving and recording notifications of planned excavation activities;
- (d) the type of temporary markings to be provided and how to identify the markings to be provided to those persons who give notice of their intent to excavate in the area of the Operator's buried pipelines; and
- (e) provisions for temporary marking of buried pipelines in the area of excavation activity before, as far as practical, the activity begins.

5.17 The Damage Prevention Program need not extend to pipelines located off-shore or to which access is physically controlled by the Operator.

Repairs

5.18 Any repairs to the Pipeline System shall be carried out in accordance with:

- (a) the safety provisions contained in API RP 1111; and
- (b) good pipeline practice.

5.19 Repaired sections of the Pipeline System shall be pressure tested in the same manner as those sections were pressure tested initially. Replacement pipe may be pre-tested prior to installing in the pipeline. The tie-in welds shall be non-destructively tested.

5.20 The Operator shall ensure that sufficient spares and repair parts are available to ensure timely and effective repairs, to the extent which would reasonably be expected of a prudent operator. Spare parts should include suitable clamps, flanges and valves.

Pipeline Patrol

5.21 The Operator shall have a patrol program to observe surface conditions on and adjacent to the pipeline right-of-way for indications of leaks, construction activity and other factors affecting the safety and operation of the Pipeline System.

5.22 The required frequency of patrols is determined by the size of the line, the operating pressures, the class location, terrain, weather, ocean currents, significant changes in beach profile, and other relevant factors, but intervals between patrols may not be longer than as prescribed in the following table:

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Location Class of Line	Maximum interval between patrols at highway and railroad crossings	At all other places
1 and 2	7 months; but at least twice each calendar year	15 months; but at least once each calendar year
3 and 4	4 months; but at least four times each calendar year	7 months; but at least twice each calendar year

Leakage Surveys

5.23 Subject to Regulation 5.24, the Operator shall conduct leakage surveys of the pipeline at intervals not exceeding 15 months, but at least once each calendar year.

5.24 If gas without an odor or odorant is to be transported through the Pipeline System, the Operator shall conduct leakage surveys using gas detector equipment in Location Class 3, at intervals not exceeding 7 months, but at least twice each calendar year.

Pipeline Markers

5.25 Except as provided in Regulation 5.27, a pipeline line marker shall be placed and maintained as close as practical over each buried pipeline, and:

- (a) at each crossing of a public road and railroad;
- (b) at each navigable river crossing;
- (c) at each change of direction; and
- (d) wherever necessary to identify the location of the pipeline or main to reduce the possibility of damage or interference.

5.26 Where practical, markers shall be located so that the line of sight between markers is not impeded.

5.27 No pipeline line markers are required for the Pipeline System:

- (a) where located offshore;
- (b) in Class 3 locations where a Damage Prevention Program is in effect; and

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(c) in Class 3 locations where placement of a line marker is impractical.

5.28 Line markers for the Pipeline System shall be placed and maintained along each section of the Pipeline System that is located above ground in an area accessible to the public, including the beach front at the tide line.

5.29 The following shall be written legibly on a background of sharply contrasting colour on each line marker:

(a) the word "Warning," "Caution," or "Danger" followed by the words "High Pressure Natural Gas Pipeline", shall be in letters at least 3 centimetres high with 5/8 centimetre stroke;

(b) the name of the Operator and the telephone number (including country code, where applicable, and the area code) where a responsible employee can be reached at all times; and

(c) the pipeline chainage.

5.30 The marker warnings shall be written in French, English and the local language if applicable.

Inspection and testing

5.31 The Operator shall inspect and test all Vital Equipment, including safety shutdown initiating devices, pressure relieving devices and associated control systems at intervals not exceeding 6 months, to determine that it functions properly and that it is:

(a) in good mechanical and/or electrical condition;

(b) set to function at the correct set point; and

(c) properly installed and protected from dirt, liquids, or other conditions that might impair proper operation.

5.32 The Operator shall inspect and test all Essential Equipment at intervals not exceeding 15 months to determine that it functions properly and that it is:

(a) in good mechanical and/or electrical condition;

(b) set to function at the correct set point; and

(c) properly installed and protected from dirt, liquids, or other conditions that might impair proper operation.

5.33 Any defective equipment found that does not meet the requirements set out in Regulations 5.31 and 5.32 shall be promptly repaired or replaced, and details of testing, inspection and any remedial actions taken shall be recorded and retained for as long as the equipment involved remains in service.

Cathodic Protection Inspection

5.34 The Operator shall test the Pipeline System at least once each calendar year, but with intervals not exceeding 15 months, to determine whether the cathodic protection meets the requirements of Regulations 6.12 to 6.14.

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5.35 The Operator shall inspect each cathodic protection rectifier or other impressed current power source 6 times each calendar year, but with intervals not exceeding 3 months, to ensure that it is operating properly.

5.36 The Operator shall check electrically for proper performance six times each calendar year each reverse current switch, each diode, and each interference bond whose failure would jeopardize structure protection, but with intervals not exceeding 3 months. The Operator shall check each other interference bond at least once each calendar year, but with intervals not exceeding 15 months.

5.37 The Operator shall take prompt remedial action to correct any deficiencies revealed by an inspection.

Valve Maintenance

5.38 The Operator shall inspect each valve critical to the safe operation of the pipeline and shall carry out a partial stroke test at intervals not exceeding 15 months, but at least once each calendar year. The Operator shall record the results of such inspection in accordance with Regulations 12.1 and 12.2 below. The Operator shall maintain valves in accordance with valve manufacturer's recommendations.

Blowdown

5.39 The Operator shall not discharge gas from blowdown piping where it will create a hazard to public health or safety.

Operator Qualification Program

5.40 The Operator shall prepare and comply with a written Operator Qualification Program for its personnel that shall include provisions to:

- (a) identify Covered Tasks;
- (b) ensure through evaluation that individuals performing Covered Tasks are qualified for such tasks;
- (c) allow individuals that are not qualified pursuant to the Regulations to perform a Covered Task if directed and observed by an individual that is qualified;
- (d) evaluate an individual if the Operator has reason to believe that the individual's performance of a Covered Task contributed to an incident;
- (e) evaluate an individual if the Operator has reason to believe that the individual is no longer qualified to perform a Covered Task;
- (f) communicate changes that affect Covered Tasks to individuals performing those Covered Tasks; and
- (g) identify those Covered Tasks and the intervals at which evaluation of the individual's qualifications is needed.

*WEST AFRICAN GAS PIPELINE REGULATIONS, 2005***Measurement**

5.41 The gas flow rate, totals and quantities of gas delivered during any period shall be calculated by the Operator in accordance with ISO 5167, or other equivalent internationally recognised standards. Volumes shall be corrected for temperature and density as provided in ISO 6976 at base conditions of 14.73 psia (1.01560 bar) and 60°F (°C). Corrections of volumes for deviation from Boyle's Law shall be made in accordance with the procedures published in the AGA Report No. 8.

5.42 The flowing temperature of the Gas shall be determined by means of a temperature averaging device, flow computer, or a recording thermometer of standard manufacture. Volumes shall be corrected for each degree of variation in the average temperature from 60°F (°C) in accordance with ISO 5167.

5.43 For reporting purposes:

- (a) calorific values shall be converted to British Thermal Units at standard conditions of 14.73 psia (1.01560 bar) and 60°F (°C);
- (b) analysis of Gas with gas chromatographs shall comply with the standards set forth in ASTM D 1945;
- (c) collecting and handling of Gas samples shall follow standards set forth in ISO 10715; and
- (d) the Higher Heating Value of the gas shall be determined in accordance with ISO 6976.

5.44 The accuracy of all measuring instruments shall be tested by the Operator at least once every calendar month and the period between any two calibrations of any such equipment shall not exceed 42 Days. For the purposes of measurement and meter calibration the atmospheric pressure shall be assumed to be constant at an absolute pressure of 14.73 psia (1.01560 bar).

5.45 The reading of instruments at the R&M station and collection and processing of data shall be carried out by the Operator. The Operator shall procure that the data used to determine invoiced quantities will be retained for a period of 24 months from the end of the calendar year to which they relate (unless there is a dispute, in which case such records shall be retained until the resolution of the dispute).

5.46 Unless otherwise specified, records of calibrations and tests conducted under this Regulation 5 shall be retained for inspection for a period of not less than 3 years.

Safe Work Practice Procedures

5.47 The Operator shall develop Safe Work Practice Procedures that will include the following elements:

- (a) prohibited actions, items and substances, for which purpose:

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- (i) prohibited actions shall include actions that are prohibited such as reporting to work under the influence of alcohol or drugs; horseplay; gambling; fighting; sleeping while on duty; running (except in case of emergency);
- (ii) prohibited items shall include weapons; "strike anywhere" matches; lighters with exposed flint mechanisms; and
- (iii) prohibited substances shall include illegal drugs and alcohol;
- (b) smoking – smoke only in approved locations;
- (c) warning signs and tags – tags and signs are to be observed and not to be removed;
- (d) water safety – use of life jackets and proper method for transferring to/from watercraft and procedures for loading/unloading materials from watercraft;
- (e) fire prevention – including use and periodic inspection of fire extinguishing equipment;
- (f) entering attended/unattended facilities – requirements of contact person in charge, when entering attended facilities, to state the business purpose of the visit and give names of all personnel in visiting party; and when entering unattended facilities, to contact the control centre, state the business purpose of the visit and give names of all personnel in visiting party;
- (g) visitors to the Operator's facilities – visitors' to comply with the Operator's safety procedures and to wear necessary personal protective equipment;
- (h) motor vehicle operation – Operator owned/leased/rented vehicles to be used for Operator business only; policy on use for employee commuting; list of vehicle driver's responsibilities;
- (i) lockout/tagout procedures – procedures for isolating equipment before maintenance is performed on the equipment;
- (j) hot work permits – procedure for obtaining a hot work permit and when a hot work permit is required;
- (k) confined space entry procedures – procedure for entering a confined space including the definition of confined space and the procedure for testing before entering;
- (l) excavation safety – process to determine the type of soil; when shoring is required; types of shoring; requirements for means of ingress/egress; requirements for monitoring atmosphere inside the excavation;
- (m) electrical safety – requirements for work on electrical equipment to be performed only by qualified personnel, to include defining when

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and what type of special personal protective equipment is required; requirement for employees who work on electrical equipment to be trained in CPR and first aid;

- (n) personal protective equipment – types of personal protective equipment and when each should be used; procedures for the care and maintenance of the personal protective equipment and how to properly fit the equipment to the employee; prescription of employee training requirements, when noise protection is required and types of noise protection equipment;
- (o) handling hazardous materials and substances – employee training in how to access and use Material Safety Data Sheets; employee training in the proper type of personal protective equipment to be used for any hazardous materials and substances that may be encountered in carrying out their normal assignments;
- (p) aircraft safety – procedure pertaining only to chartered aircraft, if applicable. (for commercial flights, employee requirement to follow the safety rules of the carrier operating the commercial flight); employee training to follow the charter pilot's instructions and the proper methods for entering and exiting the various types of aircraft that may be used by the Operator;
- (q) first aid and CPR – employee training in how and when to administer first aid, cardiopulmonary resuscitation (CPR); employee training in how to contact emergency services for assistance; employee familiarity with the location of first aid kits and how to replenish supplies; and
- (r) diving operations – ensuring that all diving operations are carried out so that as far as is reasonably practical all persons involved in diving operations are not exposed to health or safety risks.

Maximum Allowable Operating Pressure

5.48 The Maximum Allowable Operating Pressure shall not exceed the least of the following:

- (a) The internal design pressure of the pipeline, valves, flanges, and fittings; and
- (b) The hydrostatic test pressure of the pipeline divided by the appropriate factor listed in Table 841.322 (f) in ASME B31.8.

6. CATHODIC PROTECTION AND CORROSION CONTROL**Corrosion Control Records**

6.1 The Operator shall maintain records and maps/alignment drawings to show the location of cathodically protected piping, cathodic protection facilities, pipe-to-

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soil test stations, galvanic anodes, rectifiers, ground beds, and neighbouring structures bonded to the cathodic protection system. Records or maps showing a stated number of anodes, installed in a stated manner or spacing, need not show specific distances to each buried anode.

6.2 Each record or map/alignment drawings required by Regulation 6.1 shall be retained for as long as the pipeline remains in service.

6.3 The Operator shall maintain a record of each test, survey, or inspection required by this Regulation in sufficient detail to demonstrate the adequacy of the corrosion control measures or that a corrosive condition does not exist, and shall retain all such records for at least 5 years, except that records related to Intelligent Pig Surveys and repair of corroded pipelines shall be retained for as long as the pipeline remains in service.

6.4 The Operator shall record cathodic protection readings in trend format and shall retain all such recordings for inspection for the lifetime of the Pipeline System.

External Corrosion Control

6.5 The design for the cathodic protection of the Pipeline System and its components shall be in accordance with the specifications and procedures prescribed in NACE RP0169.

6.6 Where the Pipeline System is buried or submerged it shall be protected against external corrosion, including the following:

- (a) it shall have an external protective coating meeting the requirements of Regulation 6.8; and
- (b) it shall have a cathodic protection system designed to protect the Pipeline System in accordance with this Regulation and installed and placed in operation during pipeline construction.

6.7 Whenever the Operator has knowledge that any buried portion of the Pipeline System is exposed, the exposed portion shall be examined for evidence of external corrosion if the pipe is bare or if the coating is deteriorated. If external corrosion is found that requires remedial action, the Operator shall investigate circumferentially and longitudinally beyond the exposed portion (by visual examination, indirect method, or both) to determine whether additional corrosion requiring remedial action exists in the vicinity of the exposed section.

6.8 Each external protective coating, whether conductive or insulating, applied for the purpose of external corrosion control shall:

- (a) be applied on a properly prepared surface;
- (b) have sufficient adhesion to the metal surface to effectively resist underfilm migration of moisture;
- (c) be sufficiently ductile to resist cracking;

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(d) have sufficient strength to resist damage due to handling and soil stress;
and

(e) have properties compatible with any supplemental cathodic protection.

6.9 Each external protective coating which is an electrically insulating type shall also have low moisture absorption and high electrical resistance.

6.10 Each external protective coating shall be:

(a) inspected prior to lowering the pipe into the ditch and backfilling, and any damage to the coating shall be repaired;

(b) protected from damage resulting from adverse ditch conditions or damage from supporting blocks; and

(c) If practical, inspected at intervals not exceeding 5 years using close interval potential survey or direct current voltage gradient or comparable testing procedures.

6.11 If coated pipe is installed by boring, driving, drilling or other similar method, precautions shall be taken to minimize damage to the coating during installation, and any damage detected shall be protected using appropriate cathodic protection.

6.12 Each cathodic protection system required by this Regulation shall provide a level of cathodic protection that complies with NACE RP0169. NACE RP0190 shall be followed for the protection of joints, valves, and fittings on metallic underground or submerged pipelines and piping systems.

6.13 If amphoteric metals (metals of different anodic potential than the remainder of the pipeline) are included in a buried or submerged pipeline:

(a) the amphoteric metals shall be electrically isolated from the remainder of the pipeline and cathodically protected; or

(b) the entire buried or submerged pipeline shall be cathodically protected at a cathodic potential that meets the requirements of NACE RP0169.

6.14 The amount of cathodic protection shall be controlled so as not to damage the protective coating or the pipe.

6.15 Each buried or submerged pipeline shall be electrically isolated from other underground metallic structures, unless the pipeline and the other structures are electrically interconnected and cathodically protected as a single unit.

6.16 Insulating devices shall be installed where electrical isolation of a portion of a pipeline is necessary to facilitate the application of corrosion control.

6.17 Cased crossings shall not be used.

6.18 An insulating device may not be installed in an area where a combustible atmosphere is anticipated unless precautions are taken to prevent arcing.

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6.19 Where a pipeline is located in close proximity to electrical transmission tower footings, ground cables or counterpoise, or in other areas where fault currents or unusual risk of lightning may be anticipated, it shall be provided with protection against damage due to fault currents or lightning, and protective measures shall also be taken at insulating devices.

6.20 Each onshore pipeline under cathodic protection required by this Regulation shall have sufficient test stations or other contact points for electrical measurement to determine the adequacy of the cathodic protection:

- (a) each test lead wire shall be connected to the pipeline so as to remain mechanically secure and electrically conductive;
- (b) each test lead wire shall be attached to the pipeline so as to minimize stress concentration on the pipe;
- (c) each bared test lead wire and bared metallic area at point of connection to the pipeline shall be coated with an electrical insulating material compatible with the pipe coating and the insulation on the wire; and
- (d) each test point shall be identified with a marker post.

6.21 The Operator shall maintain a continuing program to minimize the detrimental effects of stray currents.

6.22 Each impressed current type cathodic protection system or galvanic anode system shall be designed and installed so as to minimize any adverse effects on existing adjacent underground metallic structures. Sacrificial galvanic anodes shall be designed to provide a minimum design life greater than the design life of the Pipeline System.

6.23 Anodes shall be designed to provide a minimum maintenance life for the offshore portion of the Pipeline System of 40 years.

Internal Corrosion Control

6.24 Corrosive gas may not be transported in the Pipeline System.

6.25 Whenever any pipe is removed from the Pipeline System for any reason, the internal surface shall be inspected for evidence of corrosion. If internal corrosion is found:

- (a) the adjacent pipe shall be investigated to determine the extent of internal corrosion; and
- (b) steps shall be taken to minimize the internal corrosion.

6.26 Corrosion coupons or other suitable means shall be used to determine the effectiveness of the steps taken to minimize internal corrosion. Each coupon or other means of monitoring internal corrosion shall be checked two times each calendar year, but with intervals not exceeding 7 months.

*WEST AFRICAN GAS PIPELINE REGULATIONS, 2005***Atmospheric Corrosion Control**

6.27 The Operator shall, at intervals not exceeding 1 year, inspect each pipeline segment that is exposed to the atmosphere and take remedial action whenever necessary to maintain protection against atmospheric corrosion.

6.28 Each aboveground part of the Pipeline System that is exposed to the atmosphere shall be either painted, coated or jacketed with a material suitable for the prevention of atmospheric corrosion except where the Operator can demonstrate by test, investigation, or experience in the area of application that a corrosive atmosphere does not exist.

6.29 Each aboveground part of the Pipeline System shall be visually inspected at least annually and if atmospheric corrosion is found, cleaned and either painted, coated or jacketed the areas of atmospheric corrosion on the pipeline with a material suitable for the prevention of atmospheric corrosion.

Repair of Corroded Pipe

6.30 Each segment of pipeline with general corrosion and with a remaining wall thickness less than that required for the Maximum Allowable Operating Pressure of the pipeline shall be replaced or the operating pressure reduced commensurate with the strength of the pipe based on actual remaining wall thickness. However, corroded pipe may be repaired by a method that reliable engineering tests and analyses show can permanently restore the serviceability of the pipe. Corrosion pitting so closely grouped as to affect the overall strength of the pipe is considered general corrosion for the purpose of this Regulation.

6.31 Each segment of a pipeline with localized corrosion pitting to a degree where leakage might result shall be replaced or repaired, or the operating pressure shall be reduced commensurate with the strength of the pipe, based on the actual remaining wall thickness in the pits.

6.32 Under Regulations 6.30 and 6.31, the strength of pipe based on actual remaining wall thickness may be determined by the procedure in ASME B31G.

Pipeline Integrity Management Plan

6.33 The Operator shall prepare and submit to the Authority a Pipeline Integrity Management Plan which is consistent with internationally recognised industry standards and good practice applicable to high pressure Natural Gas pipelines.

6.34 The Pipeline Integrity Management Plan shall periodically be reviewed and updated in accordance with internationally recognised industry standards and good practice applicable to high pressure Natural Gas pipelines, and a copy of the revised Pipeline Integrity Management Plan shall be provided to the Authority on each occasion that it is updated.

*WEST AFRICAN GAS PIPELINE REGULATIONS, 2005***Intelligent Pig Survey**

6.35 An Intelligent Pig Survey shall be performed on the main line piping for monitoring internal and external corrosion within five years after the pipeline is first placed in operation. Lateral lines will not be pigged unless corrosion control records indicate a need for an Intelligent Pig Survey. Future Intelligent Pig Surveys of the main line will be performed as deemed necessary based on the Pipeline Integrity Management Plan.

7. PIPELINE SYSTEM PERMITS

7.1 No person shall conduct work or install facilities within the Right of Way unless that person has obtained a permit from the Operator.

7.2 The Operator shall establish procedures and conditions for granting permits under Regulation 7.1.

7.3 The Operator shall grant to public utilities and public infrastructure projects a permit under Regulation 7.1 following provision by the applicant of an indemnity in form and substance acceptable to the Operator.

8. DANGEROUS CONDUCT**General**

8.1 No person shall engage in any activities in the Right of Way which constitute or might give rise to a threat to public health or safety or which may cause damage to the Pipeline System.

Notice to Cease Activities

8.2 The Authority may give a notice requiring any person engaging in any activities in the Right of Way to cease such activities which constitute or might give rise to a threat to public health or safety or which may cause damage to the Pipeline System. A notice given under this Regulation shall specify the activities to which the notice relates.

8.3 The Authority may at any time by further notice withdraw or modify a notice given under Regulation 8.2.

8.4 A copy of all notices given under Regulations 8.2 or 8.3 shall be given to the Operator unless the person to whom the notice was given was the Operator.

8.5 A person to whom a notice is given in accordance with Regulation 8.2 shall cease the activities to which the notice relates until such time as the notice is withdrawn (or modified in respect of the activities in question) by the Authority, the Board of Governors, the Committee of Ministers or the WAGP Tribunal.

*WEST AFRICAN GAS PIPELINE REGULATIONS, 2005***Hearing**

8.6 A person to whom a notice is given in accordance with Regulation 8.2, or the Operator, may by written notice request the Authority to conduct a hearing to determine whether the circumstances warrant the withdrawal or modification of a notice given under Regulation 8.2. Where a request is received by the Authority under this Regulation, the Authority shall treat the request with urgency and shall conduct a hearing within 72 hours of receipt of the request. The Authority shall provide to the Operator a copy of any request for a hearing received under this Regulation.

Judicial Orders

8.7 The Authority may make application to a court of competent jurisdiction in any of the States for such orders and other relief as are necessary to compel compliance by any person with a notice given under Regulation 8.2.

9. INVESTIGATION OF FAILURES**General**

9.1 The Operator shall establish procedures for analyzing accidents and failures, including the selection of samples of the failed facility or equipment for laboratory examination, where appropriate, for the purpose of determining the causes of the failure and minimizing the possibility of a recurrence.

9.2 The Operator shall:

- (a) compile data on all failures and leaks for use in continuing surveillance; and
- (b) prepare a detailed analysis, especially of repeated occurrences when the analysis could be useful in minimizing a recurrence of the failure.

Response to Incident

9.3 If a detailed analysis is to be made, rapid response will be necessary for gathering information and preserving the integrity of any specimens collected.

Incident Data Collection

9.4 When a detailed analysis is to be prepared, a person at the scene of the incident should be designated to coordinate the investigation. Such person will be responsible for:

- (a) acting as a coordinator for all field investigative personnel;
- (b) maintaining a log of the personnel, equipment and witnesses;
- (c) recording in chronological order the events as they take place;
- (d) ensuring that photographs are taken of the incident and surrounding areas;
- (e) ensuring the notification of all appropriate governmental authorities; and
- (f) ensuring the preservation of evidence.

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Investigation Team

9.5 When a detailed analysis is to be prepared, the Operator shall designate a fully qualified investigation team. The investigation team should be qualified either by training or experience in the proper procedures for investigation of an incident. The investigation should include the following:

- (a) determination of the probable cause of the incident;
- (b) evaluation of the initial response to the incident;
- (c) the need for system improvements if necessary; and
- (d) the need for improvements in response, management and investigation of incidents.

Specimens

9.6 The Operator will prepare a procedure for the selection, collection, preservation, labelling and handling of specimens. Procedures for collecting metallurgical specimens should include precautions against changing the granular structure in the areas of investigatory interest (e.g., avoid heat effects from cutting and outside forces due to tools and equipment). When corrosion may be involved, procedures may be necessary for proper sampling and handling of soil and ground water specimens. Procedures controlling the cutting, cleaning, lifting, identifying and shipping of pipe specimens should be considered for preservation of valuable evidence on the pipe surface, and on any tear surfaces fracture faces, including making cuts far enough from the failure to avoid damaging critical areas of the specimen.

9.7 The number of specimens that need to be collected at the failure site may vary depending on the type and number of tests anticipated. A series of independent or destructive tests may require multiple specimens. If there is a need to confirm the pipe materials specifications, then additional pipe specimens should be obtained near the failure, but in an area of the piping where the physical properties and characteristics are unaffected by the failure itself. Other investigatory procedures may be utilized to confirm pipe material specifications.

Testing and Analysis of Specimens

9.8 Recognized standard destructive and non-destructive techniques are the preferred means to examine test specimens. The testing methods used should be suited to the particular material being tested, and be pertinent to the failure investigation.

9.9 Analysis and data on failures should be compiled and reviewed. The need for continuing surveillance of pipeline facilities should be determined based upon the above analysis.

10. DISCONTINUATION, ABANDONMENT AND RESUMPTION OF OPERATION OF PIPELINE SYSTEM

10.1 In the event that the Operator wishes to abandon, or discontinue or resume operation of, the Pipeline System or any part thereof, the Operator shall apply in

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writing to the Authority giving not less than 6 months written notice of its desire, stating the date on which the Operator wishes to abandon or discontinue or resume operations of the Pipeline System or the relevant part thereof. An application given under this Regulation shall be accompanied with:

- (a) the reasons for the discontinuation, abandonment or resumption of operation of the Pipeline System or part thereof;
- (b) in the case of a partial discontinuation or abandonment or resumption of operation, two copies of a plan of the Pipeline System clearly showing the part thereof to be abandoned or in which the operation is to be discontinued or resumed;
- (c) the method proposed to be used for the discontinuation, abandonment or resumption of operations; and

in the event of the abandonment or discontinuation of the Pipeline System or part thereof only:

- (d) a costed plan for the abandonment or discontinuation of the Pipeline System or relevant part thereof at the time the Operator then contemplates the Pipeline System or part thereof will be abandoned or discontinued; and
- (e) evidence of the Operator's or the Company's financial ability to carry out the abandonment or discontinuation in accordance with that costed plan.

10.2 The Authority shall approve the application of the Company under Regulation 10.1 provided the application and the proposals of the Company are consistent with internationally recognised industry standards and good practice applicable to the abandonment of high pressure Natural Gas pipelines and with the International Project Agreement.

10.3 Upon discontinuation or abandonment of the Pipeline System or part thereof, the Operator shall ensure that the Pipeline System or the part thereof being discontinued or abandoned is made safe, and the relevant part of the Pipeline System shall unless otherwise agreed by the Authority be:

- (a) disconnected from all other facilities connected to it, including other pipelines, meter stations, ancillary facilities and appurtenances; and
- (b) purged of petroleum liquid or gas by using water or inert material, filled with seawater or fresh water or a non-flammable inert substance and sealed in accordance with internationally recognised industry standards and good practice applicable to the abandonment of high pressure Natural Gas pipelines.

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10.4 Until such time as the part of the Pipeline System beneath it is abandoned, the right of way shall continue to be maintained and clearly identified.

10.5 If part of the Pipeline System is removed following approval by the Authority of an application by the Operator under Regulation 10.1, the Operator shall carry out remedial work to return the area to its original condition after the relevant part has been removed including:

- (i) the Right of Way covering that part of the Pipeline System: and
- (ii) any disturbed land area in the vicinity of that part of the Pipeline System.

11. REPORTING**Normal operations**

11.1 The Operator shall provide to the Authority a report in respect of each six month period ending on 30th June and 31st December each calendar year during which a pipeline licence granted under the West African Gas Pipeline Act remains in force, setting out:

- (a) the Reserved Capacity during the period in question, and any changes to the Reserved Capacity, broken down by delivery point;
- (b) the names and addresses of all Shippers which held Reserved Capacity during the period in question;
- (c) the date of any new Gas Transportation Agreement entered into during the period of question, the name of the Shipper and the date for commencement of reservation of Reserved Capacity under that agreement;
- (d) the date upon which any Gas Transportation Agreement is terminated during the period in question, the name of the Shipper and the quantity of Reserved Capacity to which the agreement related;
- (e) the actual reservation charges and all other amounts charged to Shippers during the period in question, broken down by Shipper;
- (f) actual deliveries for the period in question, broken down by month and delivery point;
- (g) the average composition of Gas delivered each month during the period in question;
- (h) the duration and dates of any period during which Gas was unable to be delivered through the Pipeline System due to force majeure or maintenance, and the extent to which the Pipeline System was non-operational during such periods;
- (i) the total number of man hours worked by persons engaged in the construction, operation or maintenance of the Pipeline System,

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- including personnel engaged by the Operator and contractors and sub-contractors;
- (j) the total number and relevant details of any lost time injuries arising during the period in question;
 - (k) the total lost time arising from injuries or accidents for the period in question, including any cases carried over from previous periods and details of any potentially serious accidents or incidents even if not involving lost time;
 - (l) the manner in which the Company has complied with Clauses 28.1 to 28.6 inclusive of the International Project Agreement;
 - (m) the insurances effected by the Company of the types required under Clauses 27.1 and 27.2 of the International Project Agreement;
 - (n) details of foreign exchange transactions conducted by the Company in the Republic of Ghana or involving the currency of the Republic of Ghana; and
 - (o) such other matters as the Authority may direct in writing to be included in a Report given under this Regulation.

11.2 A report required under Regulation 11.1 shall be provided to the Authority within 2 months following the end of the six month period to which the report relates.

Construction

11.3 The Operator shall provide to the Authority a report in respect of each month during which construction of the Pipeline System or any part thereof (whether as part of the Initial Development, or subsequently) takes place, setting out:

- (a) the progress in construction during the month to which the report relates; and
- (b) any events which have occurred or delays which have arisen in the month which the Operator considers will likely cause timetables for the construction work which have previously been advised to the Authority not to be met.

11.4 A report required under Regulation 11.3 shall be provided to the Authority by the last day of the month following the month to which the report relates.

11.5 Reports required under Regulation 11.3 shall be provided in addition to reports required under Regulation 11.1.

Emergency Conditions

11.6 If an Emergency Condition occurs, the Operator shall:

- (a) immediately notify the Authority of that Emergency Condition; and

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- (b) within seven days send a written report to the Authority detailing the nature and cause of the Emergency Condition and of the injuries sustained by any person and any damage caused to plant, property or the environment.

11.7 Reports required under Regulation 11.6 shall be provided in addition to reports required under Regulations 11.1 and 11.3.

Confidentiality of information

11.8 Information contained in reports given to the Authority under this Regulation 11 which the Company in good faith claims to be commercially sensitive or in the nature of a trade secret shall be kept confidential by the Authority, except to the extent that the Authority is required under the WAGPTreaty, the International Project Agreement or the West African Gas Pipeline Act or by the order of any competent court to disclose information.

12. RECORD KEEPING

12.1 The Operator shall prepare and retain records as listed below:

Other Records	Frequency	Retention Time
Uprating	Following such	Permanent
Valve inspections	Every year (15 months)	Permanent
Pressure limiting devices	Every year (15 months)	Permanent
Fire fighting equipment	Monthly	24 months
Operator qualification (i.e. identification of qualified individual(s); identification of the Covered Tasks the individual is qualified to perform; date(s) of current qualification; and qualification methods.)	Every year	Qualification records must be retained for as long as the individual is performing the Covered Task. Records of prior qualification and records of individuals no longer performing Covered Tasks shall be retained for five years.
Welder qualification tests	Following the occurrence	5 years
Weld procedure qualification	Following the occurrence	For as long as in use
Nondestructive testing of welds	Following the occurrence	Permanent
Hydrostatic test records (as required under paragraph 1.8(k)(x))	Following the occurrence	Permanent

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Design and construction	Following the occurrence	Permanent
Records of tests made during construction	Following the occurrence	Permanent
Every repair to pipe	Following the occurrence	Permanent
Every leak discovered	Following the occurrence	Permanent
Every leak repaired	Following the occurrence	Permanent
Pipe repair (i.e. reason for repair, and if pipe is replaced, pipe specification for the replacement pipe, hydrostatic test record, non-destructive tests results for tie-in welds.)	Following the occurrence	Permanent
Pipelines under cathodic protection	Every year 6 months	Permanent
Cathodic protection Rectifiers	Six times/year (3 months)	Permanent
Exposed/buried pipe (external)	Whenever exposed	Permanent
Internal surface of pipe	Whenever exposed	Permanent
Coating inspection	After construction and every 5 years	Permanent
Critical cathodic protection bonds	Six times/year (3 months)	Permanent
Non Critical cathodic protection bonds	Every year (15 months)	Permanent
Atmospheric corrosion	Every year	Permanent
Maps, records, showing location of cathodically protected pipe, cathodic protection facilities and neighbouring structures bonded to the cathodic protection system	Following the occurrence	Permanent
Intelligent Pig Survey	Initially within 5 years of completion of construction. Subsequently based on Pipeline Integrity Management Plan.	Permanent
Tests of Vital Equipment	Twice a year (7.5 months)	Permanent
Tests of Essential Equipment	Every year (15 months)	Permanent

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Numbers in () indicate the maximum interval between inspections.

12.2 The Operator shall also keep copies of the latest edition including supplements and/or amendments to the following documents:

- (a) Safe Practices and Procedures Manual;
- (b) Emergency Response Plan;
- (c) Damage Prevention Program; and
- (d) Operator Qualification Program.

13. ACCESS FOR THE AUTHORITY

13.1 Authorized officers or employees of the Authority, and agents authorized by the Authority, are authorised, upon presenting a valid authorisation signed by the Director-General of the Authority, to enter upon, inspect, and examine the records and properties of the Company and/or the Operator, to the extent such records and properties are relevant to determining the compliance of the Company or the Operator with these Regulations or the West African Gas Pipeline Act or the equivalent regulations or legislation in other States; provided that inspection of unmanned facilities shall be subject to reasonable advance notification to the Operator.

13.2 All persons who carry out an inspection in accordance with Regulation 13.1 shall comply with the safety requirements on the site, including the Safe Work Practice Procedures.

14. PENALTIES

Liability to penalties

14.1 The actions that will render any person, including the Company, liable to penalties imposed under these Regulations are:

- (a) A violation by that person of any of these Regulations;
- (b) Conspiring with or procuring any other person to violate these Regulations;
- (c) Obstructing, or aiding or abetting another person to obstruct, members of the Authority, its personnel or consultants engaged by the Authority from performing their duties under these Regulations or the International Project Agreement; or
- (d) Providing information that is required to be submitted under these Regulations knowing it to be false, or knowingly falsifying any documents submitted or issued under these Regulations.

14.2 In addition to the contraventions listed in Regulation 14.1, the Company will be liable to penalties under these Regulations if a Company Event of Default occurs in relation to the actions or omissions listed in Schedule 2.

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14.3 If a person that has been engaged to operate or manage the Pipeline System on behalf of the Company is liable for penalties imposed under these Regulations, the Company may also be liable for penalties.

14.4 Where a corporation or other legal entity is the person in violation of the Regulations, the managing director or chief operating officer may be subject to the same penalties as the legal entity.

14.5 Each day that a violation of these Regulations continues shall constitute a separate violation; provided that if the violation in question is an event which does not continue or is a Company Event of Default that is not capable of remedy then only a single violation shall have occurred.

14.6 If a person is liable to a penalty hereunder in accordance with paragraphs (b), (c) or (d) of Regulation 14.1 then each act of conspiracy or event of obstruction, aiding, abetting or provision of false information or falsification of documents shall constitute a separate violation.

14.7 Subject to Regulation 14.8, if the Company is liable to a penalty under Regulation 14.2, then:

- (a) If the act or omission is capable of remedy, each day for which the act or omission in question continues shall render the Company liable to an additional penalty; and
- (b) If the act or omission is not capable of remedy, the Company shall be liable to a single penalty hereunder,

14.8 If the dispute resolution procedures in the International Project Agreement are invoked to determine whether the act or omission constitutes a Company Event of Default then for the purposes of Regulation 14.2 no penalty may be imposed on the Company until the final determination of the dispute. If the final outcome of the dispute resolution procedure is a finding that the act or omission in question was a Company Event of Default then penalties may be imposed with effect from the day on which the act or omission first occurred, and (in the case of an act or omission which continued and was capable of remedy) thereafter until the act or omission was remedied.

Amount of penalties

14.9 The penalty which may be imposed pursuant to Regulation 14.1 is an amount not exceeding US\$10,000.00 in respect of each separate violation.

14.10 The penalty which may be imposed pursuant to Regulation 14.2 is an amount not exceeding the greater of:

- (a) US\$10,000.00 in respect of each separate violation; or
- (b) three times the monetary value to the Company of any gain made by the Company from committing the Company Event of Default which

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constituted the violation; provided that a penalty may only be imposed pursuant to this paragraph (b) once in respect of the gain made by the Company for each separate Company Event of Default irrespective of the period over which the Company Event of Default in question continued.

14.11 The maximum penalties stipulated under Regulations 14.9 and 14.10 are single penalties applicable to the entire Pipeline System and all of the States.

Authority may impose penalties

14.12 The Authority may, if it is satisfied that the events referred to in Regulations 14.1 or 14.2 have occurred, following a hearing conducted in accordance with Regulation 14.13, impose penalties in accordance with Regulations 14.1 or 14.2.

Hearing

14.13 If the Authority considers, or if a State asserts, that an event referred to in Regulations 14.1 or 14.2 has occurred, and for which a penalty should be assessed and imposed, it shall conduct a hearing in accordance with Regulation 15 for the purpose determining:

- (a) whether the evidence presented establishes that it is more probable than not that a violation has occurred;
- (b) the extent and duration of the violation;
- (c) the persons who are to be subject to penalties; and
- (d) the amount of the penalty that should be imposed for the violation.

14.14 A person charged with a violation may waive its right to a hearing, or its right to a hearing on whether or not a violation has occurred, and any person who does so shall have the fact that he waived his right to a hearing brought to account as a consideration in the setting of the penalty, if any, which is imposed.

Defences

14.15 Where a person is charged under Regulation 14.4, it is a defence if the person charged establishes that it is more probable than not that:

- (a) The violation was committed without the person's knowledge, consent, or authority; and
- (b) The person exercised all due diligence which would reasonably be expected of a person in his position to prevent or stop the violation.

Assessment of Penalties

14.16 Any penalty imposed by the Authority shall be proportional to the seriousness of the violation and history of offending.

14.17 The following matters shall be considered by the Authority and shall be

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relevant in determining the amount of any penalty imposed by the Authority:

- (a) That all or part of the requirement for a hearing was waived;
- (b) That the person charged co-operated in the investigation;
- (c) The likelihood of re-offending, including whether any individuals involved in the violation remain employed by the person charged and whether operating procedures have been changed to reduce such likelihood;
- (d) That the person charged establishes that he took all reasonable steps to comply with the Regulation in question; and
- (e) The practicality of complying with the Regulation in the circumstances of the contravention.

Assessment of Costs

14.18 Where a violation of the Regulations is established, the Authority may in addition to penalties impose an order for payment of non-budgeted costs reasonably incurred by the Authority in conducting the hearing, provided that such costs shall not exceed ten per cent of the penalty imposed.

Payment of penalties

14.19 A person upon whom a penalty is imposed under these Regulations shall make payment thereof in US dollars into a Penalty Payment Account established by the Authority.

14.20 All amounts paid into the Penalty Payment Account shall following receipt thereof be paid to the consolidated revenue of each of the States in the Apportionment Percentages of each State as at the date of the event to which the penalty relates.

14.21 The Authority may make application to a court of competent jurisdiction in any of the States for such orders and other relief as are necessary to compel payment of penalties imposed under these Regulations.

Payment of costs

14.22 Where the Authority imposes an order for payment of costs in accordance with Regulation 14.18, the person upon whom the costs order is imposed shall make payment thereof in US dollars into a Costs Account established by the Authority.

14.23 All amounts paid into the Costs Account may be retained by the Authority and used by it for the purposes of administering these Regulations.

Appeals

14.24 A person found by the Authority to be in violation of these Regulations or upon whom a penalty is imposed under these Regulations shall have the right to have

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the decision of the Authority finding that person to be in violation or to impose a penalty reviewed by the Board of Governors or the WAGP Tribunal in accordance with the Rules of Procedure.

15. HEARINGS OF THE AUTHORITY AND APPEALS**Requirement for a hearing**

15.1 If the Authority proposes to impose a penalty under Regulation 14, or receives a request under Regulation 8.6, it shall conduct a hearing in respect of that action in accordance with the Rules of Procedure.

Appeals

15.2 Any person who is aggrieved with any finding or action of the Authority arising from a hearing conducted under Regulation 15.1, including the imposition of a penalty, may appeal the decision of the person presiding over the hearing to the Board of Governors or if dissatisfied to the WAGP Tribunal in accordance with the Rules of Procedure.

15.3 The Company or any of the States may seek review of a decision of the Board of Governors by the Committee of Ministers in accordance with Article IV of the WAGP Treaty and the Rules of Procedure.

15.4 The Company or any of the States may seek review of a decision of the Committee of Ministers by the WAGP Tribunal in accordance with Article IV of the WAGP Treaty and the Rules of Procedure.

15.5 If the determination of the Board of Governors (or the Committee of Ministers if there is an appeal to it from the decision of the Board of Governors) or the WAGP Tribunal in any appeal is that the decision of the person presiding over the hearing appealed from is not sustained in whole or in part, and the Authority shall comply with and implement such determination and revise its decision consistent with such determination.

Rules of Procedure to apply

15.6 The Rules of Procedure shall govern and apply to the conduct of any hearing of the Authority in accordance with Regulation 15.1 and any appeal from a decision of the Authority conducted in accordance with Regulation 15.2.

Subpoenas

15.7 Subject to the Constitution, the courts of the Republic of Ghana have jurisdiction and power to compel the compliance by any person with a subpoena issued by the Authority or the WAGP Tribunal in respect of any person or property located within the Republic of Ghana.

*WEST AFRICAN GAS PIPELINE REGULATIONS, 2005***16. MISCELLANEOUS****Deemed Approval**

16.1 All drawings, plans, designs and other technical documents made or prepared by the Operator in connection with the Pipeline System, and any plans for the fabrication or construction of the Pipeline System, which have been approved by the Steering Committee or its delegates prior to the establishment and empowerment of the Authority are deemed to have been duly approved by the Authority.

16.2 All actions taken by the Steering Committee or its delegates prior to the establishment and empowerment of the Authority which are functions of the Authority, are deemed to have been duly taken by the Authority.

16.3 Any drawings, plans, designs and other technical documents made or prepared by the Operator in connection with the Pipeline System, and any plans for the fabrication or construction of the Pipeline System, which have been approved by the Authority or its delegates (or deemed to have been so approved by operation of Regulation 16.1) prior to the entry into force of these Regulations, the approval of which is provided for in these Regulations, are deemed to have been approved under these Regulations.

16.4 All actions taken by the Authority (or deemed to have been so taken by operation of Regulation 16.2) prior to the entry into force of these Regulations, which are actions provided for in these Regulations, are deemed to have been duly taken under these Regulations.

Standards

16.5 In the Regulations, all references to Standards are references to the versions of those Standards which are set out in Schedule 1 (as it may be amended in accordance with Regulations 16.6 and 16.7).

16.6 If requested in writing by the Company, the Authority may by written notice to the Company amend Schedule 1 in accordance with the request of the Company, and Schedule 2 shall thereupon be amended accordingly.

16.7 Where Schedule 1 is amended in accordance with Regulation 16.6 the Schedule as so amended may specify that different parts of different versions of a Standard may apply, but in the absence of such a specification the entire newly specified version of the Standard shall apply in lieu of the previously specified version.

16.8 Upon receipt of a notice from the Authority under Regulation 16.6, the Company shall publish the amended Schedule 1, and provide a copy thereof to all Shippers.

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16.9 Where Schedule 1 is amended in accordance with Regulation 16.6, the new version of the Standard in question shall apply to all construction and operation activities in respect of the Pipeline System which occur on or after the day which is six (6) calendar months after the date of the notice given under Regulation 16.6, but shall not apply to earlier activities.

16.10 The Authority may by prior written agreement with WAPCo agree that the Standard to apply to a particular construction or operation or other activity shall be a Standard other than that stipulated in these Regulations, provided the agreed Standard is at least equivalent to the one included in the Regulations.

16.11 Notwithstanding the earlier provisions of these Regulations, where the Authority so agrees the Standard which shall apply to a particular construction or operation or other activity shall be the Standard which is agreed in writing by the Authority as applying to that construction or operation or other activity, to the extent so agreed in writing.

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Schedule 1
STANDARDS

The following versions of the Standards specified in these Regulations shall apply:

Standard	Subject	Version
AGA Report No. 8	Compressibility Factors of Natural Gas and Other Related Hydrocarbon Gases	Nov 2003
API 5L	Specification for Line Pipe	Mar 2004
API 6D	Specification for Pipeline Valves	Jan 2002
API 616	Gas Turbines for the Petroleum, Chemical, and Gas Industry Services	Aug 1998
API 617	Axial and Centrifugal Compressors and Expander-compressors for Petroleum, Chemical and Gas Industry Services	Jun 2003
API 1104	Welding Pipelines and Related Facilities	Oct 2001
API RP 5L1	Recommended Practice for Railroad Transportation of Line Pipe	Jul 2002
API RP 5LW	Recommended Practice for Transportation of Line Pipe on Barges and Marine Vessels	Dec 1996
API RP 14C	Recommended Practice for Analysis, Design, Installation, and Testing of Basic Surface Safety Systems for Offshore Production Platforms	Mar 2001
API RP 1102	Fuel Pipelines Crossing Railways and Highways	Jul 2002
API RP 1111	Design, Construction, Operation, and Maintenance of Offshore Hydrocarbon Pipelines (Limit State Design)	Jul 1999
ASME B16.5	Pipe Flanges & Flanged Fittings NPS ½ Through NPS 24 Metric/Inch Standard	Nov 2003
ASME B16.9	Factory-Made Wrought Butt-welding Fittings	Jan 2003
ASME B16.11	Forged Fittings, Socket-Welding and Threaded	2002
ASME B16.34	Valves - Flanged, Threaded, and Welding End	Addenda A, Nov 1998

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ASME B16.49	Factory-Made Wrought Buttwelding Induction Bends for Transportation and Distribution Systems	Jan 2000
ASME B31G	Manual for Determining the Remaining Strength of Corroded Pipelines: a Supplement to B31, Code - Pressure Piping	Jan 1991
ASME B31.8	Gas Transmission and Distribution Piping Systems	2003
ASME BPVC Section VIII	Boiler and Pressure Vessel Code Section VIII - Rules for Construction of Pressure Vessels (Divisions 1 and 2)	1998
ASME BPVC Section IX	Boiler and Pressure Vessel Code Section IX - Welding and Brazing Qualifications	1998
ASNT SNT-TC-1A Level II certification	Recommended Practice No. SNT-TC-1A	Jan 2001
ASTMA 53	Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless	A 53M Oct 2002
ASTMA 106	Standard Specification for Seamless Carbon Steel Pipe for High-Temperature Service	Dec 2002
ASTMA 135	Standard Specification for Electric-Resistance-Welded Steel Pipe	Mar 2001
ASTMA 193	Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service	A 193M Feb 2004
ASTMA 194	Standard Specification for Carbon and Alloy Steel Nuts for Bolts for High Pressure or High Temperature Service, or Both	A 194M Oct 2003
ASTMA 333	Standard Specification for Seamless and Welded Steel Pipe for Low-Temperature Service	A 333M Mar 2004
ASTMA 381	Standard Specification for Metal-Arc-Welded Steel Pipe for Use With High-Pressure Transmission Systems	2001
ASTMD 1945	Standard Test Method for Analysis of Natural Gas by Gas Chromatography	May 2003
DNV-OS-F-101	Submarine Pipeline Systems	Jan 2003
IEC Codes and Standards		As at 1 Apr 2004

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ISA Codes and Standards		As at 1 Apr 2004
ISO 5167	Measurement of fluid flow by means of pressure differential devices inserted in circular cross-section conduits running full	2003
ISO 6976	Natural gas - Calculation of calorific values, density, relative density and Wobbe Index from composition	1995 / Cor 3:1999
ISO 9712 Level II certification	Non-Destructive Testing – Qualification and Certification of Personnel	May 1999
ISO 10715	Natural Gas - Sampling Guidelines	1997
MSS SP-44	Steel Pipeline Flanges	2001
MSS SP-75	Specification for High Test Wrought Butt Welding Fittings	Jan 1998
NACERP0169	Control of External Corrosion on Underground or Submerged Metallic Piping Systems	Apr 2002
NACERP0190	External protective coatings for joints, fittings, and valves on metallic underground or submerged pipelines and piping systems	1995
NEMA Codes and Standards		As at 1 Apr 2004
NFPA 20	Standard for the Installation of Stationary Pumps for Fire Protection	2003
NFPA 600	Standard on Industrial Fire Brigades	2000

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SCHEDULE 2

COMPANY EVENTS OF DEFAULT

IPA Clause	Action or Omission
9.4(g)	Failure to make payments to the Authority in contravention of Clause 9.4(g) of the International Project Agreement
10.2, 10.3, 10.4, 10.6	Failure to permit, or interfering or obstructing the conduct of, audits or inspections in contravention of Clauses 10.2, 10.3, 10.4 or 10.6 of the International Project Agreement
15.6	Failure to notify the calculation of Real Tariffs and Reservation Charges in contravention of Clause 15.6 of the International Project Agreement
21.5	Failure to grant, or interference with the enjoyment of, rights to jointly occupy the Company's permanent rights of way in contravention of Clause 21.5 of the International Project Agreement
24.1	Failure to expand the Pipeline System in contravention of Clause 24.1 of the International Project Agreement
26.3	Failure to enter into Gas Transportation Agreements with any prospective Shipper on the terms set out in and subject to the Access Code in contravention of Clause 26.3 of the International Project Agreement
26.9	Failure to make a copy of the Access Code available to any person who desires a copy in contravention of Clause 26.9 of the International Project Agreement
27.1, 27.2	Failure to maintain insurances in contravention of Clauses 27.1 or 27.2 of the International Project Agreement
28.1	Failure to engage only Local Businesses in respect of reserved opportunities in contravention of Clause 28.1 of the International Project Agreement
28.2	Failure to invite Local Businesses to qualify for international tenders called by the Company in contravention of Clause 28.2 of the International Project Agreement
28.3	Failure to procure at least 15% (by value) of the goods and services used in the construction of the Pipeline System from Local Businesses in contravention of Clause 28.3 of the International Project Agreement
28.4	Failure to give preference in its procurement activities and recruitment

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to Local Businesses or individuals who are citizens of a State or citizens of another ECOWAS State in contravention of Clause 28.4 of the International Project Agreement

28.5 Failure to implement a technical and managerial training programme for its employees from the ECOWAS States in contravention of Clause 28.5 of the International Project Agreement

28.6 Failure to use reasonable endeavours to implement the manpower and succession plan in contravention of Clause 28.6 of the International Project Agreement

[Signature of Chief Executive Officer (Project Manager)]

[Date]

[Date]

With a view to the Certificate of Compliance is given by Contractor

I, [Full name] as the chief executive officer of the West African Gas Pipeline Company (Company) do hereby certify and affirm the correctness of the above representation and warranty made on behalf of the Company.

[Signature of Chief Executive Officer]

[Date]

[Date]

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SCHEDULE 3

FORM OF CERTIFICATE OF COMPLIANCE

Certificate of Compliance

I, [full name] of [address], being the [chief executive officer / project manager of name of entity], having made all reasonable inquiry, do represent and warrant to the Western African Gas Pipeline Authority that the [West African Gas Pipeline / stipulate portion of Pipeline System] complies in all respects with the requirements of Regulation 4 (Design, Construction, Inspection and Testing of Pipeline System) of the WAGP Regulations.

[Signature of Chief Executive Officer / Project Manager]

[Title]

[Date]

Ratification if Certificate of Compliance is given by Contractor

I, [full name] as the chief executive officer of the West African Gas Pipeline Company (Company) do hereby ratify and affirm the correctness of the above representation and warranty made on behalf of the Company.

[Signature of Chief Executive Officer]

[Title]

[Date]

Date of Gazette notification: 24th June, 2005.