WITSML Technical Reference Guide

For WITSML v2.0

WITSML Overview	WITSML is the data exchange standard for specifying and exchanging data for wells and well-related operations and objects, such as drilling, logging and mud logging. Version 2 is a significant change in underlying technology architecture and data model design from the last published version, 1.4.1.1.
Version of standard	2.0
Abstract	Listing of all data objects, elements, and definitions generated from the UML model. For an overview of WITSML, including a list of resources, see the *WITSML Technical Usage Guide.*
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1 Attachment

Package: xsd_schemas
Notes: Attachment Schema.

1.1   Attachment

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: Created: 4/13/2015   *Last modified:* 11/5/2016
Notes: A dedicated object used to attach digital supplemental data (for example, a graphic or PDF file) to another data object. The attachment is captured as a base 64 binary type.

Attributes

Name	Type	Notes
Category	String64	Used to tell what the object is when you have multiple attachments of the same file type. E.g., if you have attached a picture of cuttings on a specific depth, you can tag it with Category="CuttingsPicture".
Content	base64Binary	The actual attachment content.
FileName	String64	A file name associated with the attachment. Note this is NOT a file path and should contain a name only.
FileType	String64	The file type. This field SHOULD be a registered mime type as cataloged at http://www.iana.org/assignments/media-types/media-types.xhtml.
Md	MeasuredDepthCoord	The along-hole measured depth represented by the attachment.
MdBit	MeasuredDepthCoord	The along-hole measured depth of the bit.
ObjectReference	DataObjectReference	A reference to an object that is defined within the context of the specified wellbore.
Param	ExtensionNameValue	Any extra numeric data. For this usage, the name attribute MUST be specified because it represents the meaning of the data. While the index attribute is mandatory, it is only significant if the same name repeats.
SubObjectReference	String64	A reference to a sub-object that is defined within the context of the object referenced by objectReference. This should only refer to recurring components of a growing object. The content is the UID of the sub-object.

Associations

Association		Notes
1..1	**From:** Attachment.Wellbore **To:** Wellbore *Association*	

Association	Notes
From: Attachment. **To:** AbstractObject *Generalization*	

2 BhaRun

Package: xsd_schemas
Notes: BhaRun Schema.

2.1 BhaRun

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015   *Last modified:* 11/5/2016
Notes: The object used to capture information about one run of the drill string into and out of the hole. The drill string configuration is described in the Tubular object. That is, one drill string configuration may be used for many runs.

Attributes

Name	Type	Notes
ActDogleg	AnglePerLengthMeasure	Actual dogleg severity.
ActDoglegMx	AnglePerLengthMeasure	Actual dogleg severity: maximum.
DTimStart	TimeStamp	Date and time that activities for this run started.
DTimStartDrilling	TimeStamp	Start on bottom: date and time.
DTimStop	TimeStamp	Date and time that activities for this run stopped.
DTimStopDrilling	TimeStamp	Stop off bottom: date and time.
NumBitRun	int	Bit run number.
NumStringRun	int	The BHA (drilling string) run number.
ObjectiveBha	String2000	Objective of the bottomhole assembly.
PlanDogleg	AnglePerLengthMeasure	Planned dogleg severity.
ReasonTrip	String2000	Reason for a trip.
StatusBha	BhaStatus	Bottomhole assembly status.

Associations

Association		Notes
0..1	**From:** BhaRun.Tubular **To:** Tubular *Association*	
	From: BhaRun. **To:** BhaStatus *Dependency*	
0..*	**From:** BhaRun.DrillingParams **To:** DrillingParams *Association*	Drilling parameters.
	From: BhaRun. **To:** AbstractObject *Generalization*	
1..1	**From:** BhaRun.Wellbore **To:** Wellbore *Association*	
	From: RigUtilization.BhaRun	

Association	Notes
0..*　**To:** BhaRun 　　　*Association*	
From: RigUtilizationTest. 1..*　**To:** BhaRun 　　　*Association*	
From: WellboreGeometrySection.BhaRun 0..*　**To:** BhaRun 　　　*Association*	
From: WellboreGeometry.BhaRun 0..*　**To:** BhaRun 　　　*Association*	

2.2 BhaStatus

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: *Created:* 4/13/2015   *Last modified:* 11/5/2016
Notes: Stage of the BHA (plan, progress, final)

Attributes

Name	Type	Notes
final		
progress		
plan		

Associations

Association	Notes
From: BhaStatus. **To:** TypeEnum *Generalization*	
From: BhaRun. **To:** BhaStatus *Dependency*	

2.3   DrillingParams

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015   *Last modified:* 11/5/2016
Notes: The bottomhole assembly drilling parameters schema, which contains statistical and calculated operations data for the run, related to depths, activities, temperature, pressure, flow rates, torque, etc.

Attributes

Name	Type	Notes
AziBottom	PlaneAngleMeasure	Azimuth at stop measured depth.
AziTop	PlaneAngleMeasure	Azimuth at start measured depth.
Comments	String2000	Comments and remarks.
CTimCirc	TimeMeasure	Time spent circulating from start of bit run.
CTimDrillRot	TimeMeasure	Time spent rotary drilling from start of bit run.
CTimDrillSlid	TimeMeasure	Time spent slide drilling from start of bit run.
CTimHold	TimeMeasure	Time spent on hold from start of bit run.
CTimReam	TimeMeasure	Time spent reaming from start of bit run.
CTimSteering	TimeMeasure	Time spent steering from start of bit run.
DistDrillRot	LengthMeasure	Distance drilled - rotating.
DistDrillSlid	LengthMeasure	Distance drilled - sliding
DistHold	LengthMeasure	Distance covered while holding angle with a steerable drilling assembly.
DistReam	LengthMeasure	Distance reamed.
DistSteering	LengthMeasure	Distance covered while actively steering with a steerable drilling assembly.
ETimOpBit	TimeMeasure	Operating time spent by bit for run. BUSINESS RULE: When reporting an actual as opposed to design, this is required.
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
FlowrateBit	VolumePerTimeMeasure	Flow rate at bit.
FlowratePumpAv	VolumePerTimeMeasure	Average mud pump flow rate.
FlowratePumpMn	VolumePerTimeMeasure	Minimum mud pump flow rate.
FlowratePumpMx	VolumePerTimeMeasure	Maximum mud pump flow rate.
HkldDn	ForceMeasure	Hookload when the string is moving down.
HkldRot	ForceMeasure	Hookload: rotating.
HkldUp	ForceMeasure	Hookload when the string is moving up.
InclMn	PlaneAngleMeasure	Minimum inclination.
InclMx	PlaneAngleMeasure	Maximum inclination.
InclStart	PlaneAngleMeasure	Inclination at start measured depth.
InclStop	PlaneAngleMeasure	Inclination at stop measured depth.

Name	Type	Notes
MdHoleStart	MeasuredDepthCoord	Measured depth at start of the run.
MdHoleStop	MeasuredDepthCoord	Measured depth at the end of the run.
MudClass	MudClass	The class of the drilling fluid.
MudSubClass	MudSubClass	Mud Subtype at event occurrence.
ObjectiveBha	String2000	Objective of bottom hole assembly.
OverPull	ForceMeasure	Overpull = HkldUp - HkldRot
PowBit	PowerMeasure	Bit hydraulic.
PresDropBit	PressureMeasure	Pressure drop in bit.
PresPumpAv	PressureMeasure	Average pump pressure.
ReasonTrip	String2000	Reason for trip.
RopAv	LengthPerTimeMeasure	Average rate of penetration through Interval.
RopMn	LengthPerTimeMeasure	Minimum rate of penetration through Interval.
RopMx	LengthPerTimeMeasure	Maximum rate of penetration through Interval.
RpmAv	AngularVelocityMeasure	Average turn rate (commonly in rpm) through Interval.
RpmAvDh	AngularVelocityMeasure	Average turn rate (commonly in rpm) downhole.
RpmMn	AngularVelocityMeasure	Minimum turn rate (commonly in rpm).
RpmMx	AngularVelocityMeasure	Maximum turn rate (commonly in rpm).
SlackOff	ForceMeasure	Slackoff = HkldRot - HkdDown.
TempMudDhMx	ThermodynamicTemperatureMeasure	Maximum mud temperature downhole during run.
TqDhAv	MomentOfForceMeasure	Average torque: downhole.
TqOffBotAv	MomentOfForceMeasure	Average torque: off bottom.
TqOnBotAv	MomentOfForceMeasure	Average Torque: on bottom.
TqOnBotMn	MomentOfForceMeasure	Minimum torque: on bottom.
TqOnBotMx	MomentOfForceMeasure	Maximum torque: on bottom.
Tubular	String64	A pointer to the tubular assembly.
uid	String64	Unique identifier for the parameters
VelNozzleAv	LengthPerTimeMeasure	Bit nozzle average velocity.
WobAv	ForceMeasure	Surface weight on bit - average through interval.
WobAvDh	ForceMeasure	Weight on bit - average downhole.
WobMn	ForceMeasure	Weight on bit - minimum.
WobMx	ForceMeasure	Weight on bit - maximum.
WtAboveJar	ForceMeasure	Weight of the string above the jars.
WtBelowJar	ForceMeasure	Weight of the string below the jars.
WtMud	MassPerVolumeMeasure	Drilling fluid density.

Associations

Association	Notes
From: DrillingParams. **To:** MudClass *Dependency*	
From: DrillingParams. **To:** MudSubClass *Dependency*	
0..* **From:** BhaRun.DrillingParams **To:** DrillingParams *Association*	Drilling parameters.
0..* **From:** OpsReport.DrillingParams **To:** DrillingParams *Association*	Average bottom hole assembly parameters for report duration or actual instances of bottom hole assembly operations.

2.4 MudSubClass

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: Created: 4/13/2015   *Last modified:* 11/5/2016
Notes: The name of a data extension.

Attributes

Name	Type	Notes
aerated mud		
air		
brackish water		
brine		
caesium formate		
diesel oil-based		
ester synthetic-based		
freshwater		
glycol mud		
gyp mud		
internal-olefin synthetic-based		
lightly treated non-dispersed		
lignite/lignosulfonate mud		
lime mud		
linear paraffin synthetic-based		
linear-alpha-olefin synthetic-based		
low solids		
low toxicity mineral oil-based		
mineral oil-based		
mist		
mixed-metal oxide mud		
native/natural mud		
natural gas		
nitrogen-aerated mud		
non-aqueous (invert emulsion) drilling fluids		
non-dispersed		
pneumatic (gaseous) drilling fluids		
polymer mud		
potassium formate		
potassium-treated mud		
salt water mud		

Name	Type	Notes
saturated salt mud		
sea water		
seawater mud		
silicate mud		
sodium formate		
spud mud		
stable foam		
stiff foam		
water-based drilling fluids		

Associations

Association	Notes
From: MudSubClass. **To:** TypeEnum *Generalization*	
From: DrillingParams. **To:** MudSubClass *Dependency*	

3 CementJob

Package: xsd_schemas
Notes: CementJob Schema.

3.1 AbstractCementJob

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/15/2015   *Last modified:* 11/5/2016
Notes: Defines common elements for both cement job designs and reports.

Attributes

Name	Type	Notes
CementEngr	String64	Cementing engineer.
Contractor	String64	Name of cementing contractor.
ETimWaitingOnCement	TimeMeasure	Duration for waiting on cement to set.
LenPipeRecipStroke	LengthMeasure	Pipe reciprocation: stroke length.
MdHole	MeasuredDepthCoord	Measured depth at the bottom of the hole.
OverPull	ForceMeasure	String-up weight during reciprocation.
PlugInterval	MdInterval	If plug used, measured depth interval between the top and base of the plug.
Reciprocating	boolean	Is the pipe being reciprocated (raised and lowered)? Values are "true" (or "1") and "false" (or "0").
RpmPipe	AngularVelocityMeasure	Pipe rotation rate (commonly in rotations per minute (RPM)).
RpmPipeRecip	AngularVelocityMeasure	Pipe reciprocation (RPM).
SlackOff	ForceMeasure	String-down weight during reciprocation.
TqInitPipeRot	MomentOfForceMeasure	Pipe rotation: initial torque.
TqPipeAv	MomentOfForceMeasure	Pipe rotation: average torque.
TqPipeMx	MomentOfForceMeasure	Pipe rotation: maximum torque.

Associations

Association	Notes
From: CementJobReport. **To:** AbstractCementJob *Generalization*	
From: CementJobDesign. **To:** AbstractCementJob *Generalization*	

3.2   AbstractCementStage

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015   *Last modified:* 11/5/2016
Notes: Defines the information that is common to the cement job stage design and reports.

Attributes

Name	Type	Notes
AnnularFlowAfter	boolean	Annular flow present after the stage was completed? Values are "true" (or "1") and "false" (or "0").
BotPlug	boolean	Bottom plug used? Values are "true" (or "1") and "false" (or "0").
BotPlugNumber	int	Amount of bottom plug used.
DiaTailPipe	LengthMeasure	Tail pipe size (diameter).
DisplacementFluidRefId	UuidString	Reference to displacement fluid properties.
ETimPresHeld	TimeMeasure	Time the pressure was held.
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
FlowrateMudCirc	VolumePerTimeMeasure	Rate the mud was circulated during the stage.
Gel10Min	PressureMeasure	Gels-10Min (in hole at start of job).
Gel10Sec	PressureMeasure	Gels-10Sec (in hole at start of job).
MdCircOut	MeasuredDepthCoord	Circulate out measured depth.
MdCoilTbg	MeasuredDepthCoord	Measured depth of coil tubing (multi-stage cement job).
MdString	MeasuredDepthCoord	Measured depth of string (multi-stage cement job).
MdTool	MeasuredDepthCoord	Measured depth of the tool (multi-stage cement job).
MixMethod	String64	Mix method.
NumStage	int	Stage number.
PillBelowPlug	boolean	Pill below plug? Values are "true" (or "1") and "false" (or "0").
PlugCatcher	boolean	Plug catcher? Values are "true" (or "1") and "false" (or "0").
PresBackPressure	PressureMeasure	Constant back pressure applied while pumping the job (can be superseded by a back pressure per pumping stage).
PresBump	PressureMeasure	Pressure plug bumped.
PresCoilTbgEnd	PressureMeasure	Pressure coiled tubing end.
PresCoilTbgStart	PressureMeasure	Pressure coiled tubing start
PresCsgEnd	PressureMeasure	Casing pressure at the end of the job.
PresCsgStart	PressureMeasure	Casing pressure at the start of the job.
PresDisplace	PressureMeasure	Final displacement pressure.
PresHeld	PressureMeasure	Pressure held to.
PresMudCirc	PressureMeasure	Mud circulation pressure.

Name	Type	Notes
PresTbgEnd	PressureMeasure	Tubing pressure at the end of the job (not coiled tubing).
PresTbgStart	PressureMeasure	Tubing pressure at the start of the job (not coiled tubing).
PvMud	DynamicViscosityMeasure	Plastic viscosity (in the hole at the start of the job).
ReciprocationOverpull	ForceMeasure	Overpull amount for reciprocation.
ReciprocationSlackoff	ForceMeasure	Slackoff for reciprocation.
SqueezeObjective	String64	Squeeze objective.
StageMdInterval	MdInterval	Measured depth interval for the cement stage.
TailPipePerf	boolean	Tail pipe perforated? Values are "true" (or "1") and "false" (or "0").
TailPipeUsed	boolean	Tail pipe used? Values are "true" (or "1") and "false" (or "0").
TempBHCT	ThermodynamicTemperatureMeasure	Bottomhole temperature: circulating.
TempBHST	ThermodynamicTemperatureMeasure	Bottomhole temperature: static.
TopPlug	boolean	Top plug used? Values are "true" (or "1") and "false" (or "0").
TypeOriginalMud	String64	Type of mud in the hole.
TypeStage	String64	Stage type.
VolCircPrior	VolumeMeasure	Total volume circulated before starting the job/stage.
VolCsgIn	VolumeMeasure	Total volume inside the casing for this stage placement.
VolCsgOut	VolumeMeasure	Total volume outside casing for this stage placement.
VolDisplaceFluid	VolumeMeasure	Volume of displacement fluid.
VolExcess	VolumeMeasure	Excess volume.
VolExcessMethod	String64	Method to estimate excess volume.
VolMudLost	VolumeMeasure	Total mud lost.
VolReturns	VolumeMeasure	Volume of returns.
WtMud	MassPerVolumeMeasure	Mud density.
YpMud	PressureMeasure	Yield point (in the hole at the start of the job).

Associations

Association		Notes
0..*	**From:** AbstractCementStage.Step **To:** CementPumpScheduleStep *Association*	Set of (Time / Rate / Back Pressure).
0..*	**From:** AbstractCementStage.EndingFluidLocation **To:** FluidLocation *Association*	
0..*	**From:** AbstractCementStage.OriginalFluidLocation **To:** FluidLocation *Association*	
	From: CementStageDesign. **To:** AbstractCementStage	

Association	Notes
Generalization	
From: CementDesignStage. **To:** AbstractCementStage *Generalization*	
From: CementStageReport. **To:** AbstractCementStage *Generalization*	

3.3 CementAdditive

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015   *Last modified:* 11/5/2016
Notes: Cement Additive Component Schema.

Attributes

Name	Type	Notes
Additive	MassMeasure	Additive amount.
DensAdd	MassPerVolumeMeasure	Additive density.
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
FormAdd	String64	Wet or dry.
NameAdd	String64	Additive name.
TypeAdd	String64	Additive type or function (e.g., retarder, visosifier, weighting agent).
uid	String64	Unique identifier for the additive.

Associations

Association		Notes
0..*	**From:** CementingFluid.CementAdditive **To:** CementAdditive *Association*	Additives can be added in slurry but also in spacers, washes, and mud.

3.4 CementDesignStage

Type: Class *Stereotype:* «XSDcomplexType»
Detail: *Created:* 11/19/2015 *Last modified:* 11/5/2016
Notes: Configuration and other information about the cement stage.

Associations

Association	Notes
From: CementDesignStage. **To:** AbstractCementStage *Generalization*	

3.5 CementingFluid

Type: Class *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015 *Last modified:* 11/5/2016
Notes: Cementing Fluid Component Schema.

Attributes

Name	Type	Notes
ClassSlurryDryBlend	String64	Slurry class.
ConsTestThickening	DimensionlessMeasure	Test thickening consistency/slurry viscosity: Bearden Consistency (Bc) 0 to 100.
DensAtPres	MassPerVolumeMeasure	Slurry density at pressure.
DensBaseFluid	MassPerVolumeMeasure	Density of base fluid.
DensConstGasFoam	MassPerVolumeMeasure	Constant gas ratio method: average density.
DensConstGasMethod	MassPerVolumeMeasure	Constant gas ratio method: average density.
DensDryBlend	MassPerVolumeMeasure	Density of dry blend.
Density	MassPerVolumeMeasure	Fluid density.
DescFluid	String64	Fluid description.
DryBlendDescription	String64	Description of dry blend.
DryBlendName	String64	Name of dry blend.
ETimComprStren1	TimeMeasure	Compressive strength time 1.
ETimComprStren2	TimeMeasure	Compressive strength time 2.
ETimThickening	TimeMeasure	Test thickening time.
ETimTransitions	TimeMeasure	The elapsed time between the development of 100lbf/100sq ft gel strength and 500lbf/100 sq ft gel strength.
ETimZeroGel	TimeMeasure	The elapsed time from initiation of the static portion of the test until the slurry attains a gel strength of 100lbf/100sq ft.
ExcessPc	VolumePerVolumeMeasure	Excess percent.
FluidIndex	PositiveLong	Fluid Index: 1: first fluid pumped (= original mud), last - 1 = tail cement, last = displacement mud.
FluidRheologicalModel	String64	Specify one of these models: Newtonian, Bingham, Power Law, and Herschel Bulkley.
FoamUsed	boolean	Foam used? Values are "true" (or "1") and "false" (or "0").
Gel10MinReading	PlaneAngleMeasure	Gel reading after 10 minutes.
Gel10MinStrength	PressureMeasure	Gel strength after 10 minutes.
Gel10SecReading	PlaneAngleMeasure	Gel reading after 10 seconds.
Gel10SecStrength	PressureMeasure	Gel strength after 10 seconds.
Gel1MinReading	PlaneAngleMeasure	Gel reading after 1 minute.
Gel1MinStrength	PressureMeasure	Gel strength after 1 minute.
K	DimensionlessMeasure	Consistency index (Power Law and Herschel Bulkley models).

MassDryBlend	MassMeasure	Mass of dry blend: the blend is made of different solid additives: the volume is not constant.
MassSackDryBlend	MassMeasure	Weight of a sack of dry blend.
N	DimensionlessMeasure	Power Law index (Power Law and Herschel Bulkley models).
PcFreeWater	VolumePerVolumeMeasure	Test free water na: = mL/250ML.
PresComprStren1	PressureMeasure	Compressive strength pressure 1.
PresComprStren2	PressureMeasure	Compressive strength pressure 2.
PresTestFluidLoss	PressureMeasure	Test fluid loss pressure.
PresTestThickening	PressureMeasure	Test thickening pressure.
Purpose	String64	Purpose description.
RatioConstGasMethodAv	VolumePerVolumeMeasure	Constant gas ratio method ratio.
RatioConstGasMethodEnd	VolumePerVolumeMeasure	Constant gas ratio method: final method ratio.
RatioConstGasMethodStart	VolumePerVolumeMeasure	Constant gas ratio method: initial method ratio.
RatioMixWater	VolumePerMassMeasure	Mix-water ratio.
SlurryPlacementInterval	MdInterval	Measured depth interval between the top and base of the slurry placement.
SolidVolumeFraction	VolumePerVolumeMeasure	Equals 1 - Porosity.
SourceWater	String64	Water source description.
TempComprStren1	ThermodynamicTemperatureMeasure	Compressive strength temperature 1.
TempComprStren2	ThermodynamicTemperatureMeasure	Compressive strength temperature 2.
TempFluidLoss	ThermodynamicTemperatureMeasure	Test fluid loss temperature.
TempFreeWater	ThermodynamicTemperatureMeasure	Test free water temperature.
TempThickening	ThermodynamicTemperatureMeasure	Test thickening temperature.
TimeFluidLoss	TimeMeasure	Test fluid loss: dehydrating test period, used to compute the API fluid loss.
TypeBaseFluid	String64	Type of base fluid: fresh water, sea water, brine, brackish water.
TypeFluid	String64	Fluid type: Mud, Wash, Spacer, Slurry.
TypeGasFoam	String64	Gas type used for foam job.
uid	String64	Unique identifier for this cementing fluid.
Viscosity	DynamicViscosityMeasure	Viscosity (if Newtonian model) or plastic viscosity (if Bingham model).
VolAPIFluidLoss	VolumeMeasure	API fluid loss = 2 * volTestFluidLoss * SQRT(30/timefluidloss).
VolCement	VolumeMeasure	Volume of cement.
VolFluid	VolumeMeasure	Fluid/slurry volume.
VolGasFoam	VolumeMeasure	Volume of gas used for foam job.
VolOther	VolumeMeasure	Other volume.

VolPumped	VolumeMeasure	Volume pumped.
VolReserved	VolumeMeasure	Volume reserved.
VolTestFluidLoss	VolumeMeasure	Test fluid loss.
VolTotSlurry	VolumeMeasure	Total Slurry Volume.
VolWater	VolumeMeasure	Volume of water.
VolYield	VolumePerMassMeasure	Slurry yield.
Yp	PressureMeasure	Yield point (Bingham and Herschel Bulkley models).

Associations

Association		Notes
0..*	**From:** CementingFluid.CementAdditive **To:** CementAdditive *Association*	Additives can be added in slurry but also in spacers, washes, and mud.
0..*	**From:** CementingFluid.Rheometer **To:** Rheometer *Association*	
0..*	**From:** CementJob. **To:** CementingFluid *Association*	Displaced Mud, washes and spacers, cements, displacement mud.

3.6 CementJob

Type: Class *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015 *Last modified:* 11/5/2016
Notes: Used to capture information about cementing operations, which are done to seal the annulus after a casing string has been run, to seal a lost circulation zone, or to set a plug to support directional drilling operations or seal a well so that it may be abandoned.

Attributes

Name	Type	Notes
CoilTubing	boolean	Is coiled tubing used? Values are "true" (or "1") and "false" (or "0").
JobConfig	String2000	Job configuration.
JobType	CementJobType	Type of cement job.
MdHole	MeasuredDepthCoord	Measured depth at bottom of hole.
MdPrevShoe	MeasuredDepthCoord	Measured depth of previous shoe.
MdSqueeze	MeasuredDepthCoord	Measured depth of squeeze.
MdStringSet	MeasuredDepthCoord	Measured depth of cement string shoe.
MdWater	LengthMeasure	Water depth if offshore. The distance from mean sea level to water bottom (seabed floor).
NameCementedString	String64	Name for the cemented string
NameCementString	String64	Name for the cementing string
NameWorkString	String64	Name for the cement work string
OffshoreJob	boolean	Offshore job? Values are "true" (or "1") and "false" (or "0").
ReturnsToSeabed	boolean	Returns to seabed? Values are "true" (or "1") and "false" (or "0").
ToolCompany	String64	Company providing the cementing tool.
TvdPrevShoe	WellVerticalDepthCoord	True vertical depth of previous shoe.
TvdStringSet	WellVerticalDepthCoord	True vertical depth of cement string shoe.
TypePlug	String64	Plug type.
TypeSqueeze	String64	Type of squeeze.
TypeTool	String64	Cement tool type.

Associations

Association		Notes
	From: CementJob. **To:** CementJobType *Dependency*	
	From: CementJob. **To:** AbstractObject *Generalization*	
0..1	**From:** CementJob.JobReport **To:** CementJobReport *Association*	Set of stages for the job (usually 1 or 2).
	From: CementJob.HoleConfig	Wellbore Geometry of annulus.

Association	Notes
0..1 **To:** WellboreGeometry *Association*	
From: CementJob.Design 0..1 **To:** CementJobDesign *Association*	
From: CementJob. 0..* **To:** CementingFluid *Association*	Displaced Mud, washes and spacers, cements, displacement mud.
From: CementJob.Wellbore 1..1 **To:** Wellbore *Association*	
From: CementJobEvaluation. **To:** CementJob *Association*	

3.7 CementJobDesign

Type: Class *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/15/2015 *Last modified:* 10/25/2016
Notes: Design and other information about the cement job

Associations

Association	Notes
From: CementJobDesign. **To:** AbstractCementJob *Generalization*	
1..*	**From:** CementJobDesign.CementDesignStage **To:** CementStageDesign *Association*	
0..1	**From:** CementJob.Design **To:** CementJobDesign *Association*	

3.8 CementJobEvaluation

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015   *Last modified:* 11/5/2016
Notes: A top-level object that is used to record the testing and evaluation of a previously performed cement job.

Attributes

Name	Type	Notes
CblBondQual	boolean	Cement bond log quality indication? Values are "true" (or "1") and "false" (or "0").
CblPres	PressureMeasure	Cement bond log under pressure.
CblRun	boolean	Cement bond log run? Values are "true" (or "1") and "false" (or "0").
CementFoundOnTool	boolean	Cement found on tool? Values are "true" (or "1") and "false" (or "0").
CementShoeCollar	boolean	Cement found between shoe and collar? Values are "true" (or "1") and "false" (or "0").
CetBondQual	boolean	Cement evaluation tool bond quality? Values are "true" (or "1") and "false" (or "0").
CetRun	boolean	Cement evaluation tool run? Values are "true" (or "1") and "false" (or "0").
ETimBeforeTest	TimeMeasure	Hours before the liner top test.
ETimCementLog	TimeMeasure	Hours before logging run after cement run.
ETimPitStart	TimeMeasure	Hours between end of cement job and the start of the pressure integrity test.
ETimTest	TimeMeasure	Elapsed tome to perform the test.
FailureMethod	String64	Method used to determine that a cement job was unsuccessful.
FormPit	ForcePerVolumeMeasure	Pressure integrity test/leak-off test formation breakdown gradient or absolute pressure.
JobRating	String64	Job rating.
LinerLap	LengthMeasure	Liner overlap length.
LinerTop	LengthMeasure	The distance to the top of the liner.
MdCementTop	MeasuredDepthCoord	Measured depth at top of cement.
MdDVTool	MeasuredDepthCoord	Measured depth to the diverter tool.
NumRemedial	int	Number of remedials.
PresTest	PressureMeasure	Test pressure.
RemedialCement	boolean	Remedial cement required? Values are "true" (or "1") and "false" (or "0").
TempSurvey	boolean	Temperature survey run? Values are "true" (or "1") and "false" (or "0").
TestNegativeEmw	MassPerVolumeMeasure	Equivalent mud weight. Negative test.
TestNegativeTool	String64	Test negative tool used for the liner top seal.
TestPositiveEmw	MassPerVolumeMeasure	Equivalent mud weight. Positive test or absolute pressure .
TestPositiveTool	String64	Test positive tool for liner top seal.

TocOK	boolean	Is the top of cement sufficient? Values are "true" (or "1") and "false" (or "0").
ToolCompanyPit	String64	Tool name for the pressure integrity test.
TopCementMethod	String64	Method to determine cement top.

Associations

Association	Notes
From: CementJobEvaluation. **To:** CementJob *Association*	
From: CementJobEvaluation. **To:** AbstractObject *Generalization*	

3.9 CementJobReport

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/15/2015   *Last modified:* 10/25/2016
Notes: The as-built report of the job after it has been done.

Attributes

Name	Type	Notes
CementDrillOut	boolean	Was the cement drilled out? Values are "true" (or "1") and "false" (or "0").
DensMeasBy	String64	Method by which density is measured.
DTimCementDrillOut	TimeStamp	Date and time that the cement was drilled out.
DTimJobEnd	TimeStamp	Date and time of the end of the cement job.
DTimJobStart	TimeStamp	Date and time of the start of the cement job.
DTimPipeRotEnd	TimeStamp	Date and time that pipe rotation started.
DTimPipeRotStart	TimeStamp	Date and time that pipe rotation started.
DTimPlugSet	TimeStamp	Date and time that cement plug was set.
DTimRecipEnd	TimeStamp	Date and time that pipe reciprocation ended.
DTimRecipStart	TimeStamp	Date and time that pipe reciprocation started.
DTimSqueeze	TimeStamp	Date and time of a squeeze.

Associations

Association		Notes
	From: CementJobReport. **To:** AbstractCementJob *Generalization*	
1..*	**From:** CementJobReport.CementReportStage **To:** CementStageReport *Association*	
0..1	**From:** CementJob.JobReport **To:** CementJobReport *Association*	Set of stages for the job (usually 1 or 2).

3.10 CementJobType

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: Created: 4/13/2015   *Last modified:* 11/5/2016
Notes: Specifies type of cement job.

Attributes

Name	Type	Notes
primary		
plug		
squeeze		
unknown		The value is not known. This value should not be used in normal situations. All reasonable attempts should be made to determine the appropriate value. Use of this value may result in rejection in some situations.

Associations

Association	Notes
From: CementJob. **To:** CementJobType *Dependency*	

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3.11 CementPumpScheduleStep

Type: Class *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015 *Last modified:* 11/5/2016
Notes: Cement Pump Schedule Component Schema, which defines the cement pumping schedule for a given step in a cement job.

Attributes

Name	Type	Notes
Comments	String2000	Comments and remarks.
ETimPump	TimeMeasure	The duration of the fluid pumping.
ETimShutdown	TimeMeasure	The duration of the shutdown event.
FluidReferenceId	UuidString	UUID feference to a fluid used in CementJob.
PresBack	PressureMeasure	Back pressure applied during the pumping stage.
RatePump	VolumePerTimeMeasure	Rate at which the fluid is pumped. 0 means it is a pause.
RatioFluidExcess	VolumePerVolumeMeasure	The ratio of excess fluid to total fluid pumped during the step.
StrokePump	int	Number of pump strokes for the fluid to be pumped (assumes the pump output is known).
uid	String64	Unique identifier for this pump schedule step.
VolPump	VolumeMeasure	Volume pumped = eTimPump * ratePump.

Associations

Association	Notes
0..* **From:** AbstractCementStage.Step **To:** CementPumpScheduleStep *Association*	Set of (Time / Rate / Back Pressure).

3.12 CementStageDesign

Type: Class *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/19/2016 *Last modified:* 11/5/2016
Notes: Configuration and other information about the cement stage.

Associations

Association	Notes
From: CementStageDesign. **To:** AbstractCementStage *Generalization*	
1..* **From:** CementJobDesign.CementDesignStage **To:** CementStageDesign *Association*	

3.13 CementStageReport

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 11/19/2015   *Last modified:* 11/5/2016
Notes: Report of key parameters for a stage of cement job.

Attributes

Name	Type	Notes
DTimDisplaceStart	TimeStamp	Date and time when displacing of cement started.
DTimMixStart	TimeStamp	Date and time when mixing of cement started.
DTimPumpEnd	TimeStamp	Date and time when pumping cement ended.
DTimPumpStart	TimeStamp	Date and time when pumping cement started.
ETimMudCirculation	TimeMeasure	Elapsed time of mud circulation before the job/stage.
FloatHeld	boolean	Float held? Values are "true" (or "1") and "false" (or "0").
FlowrateBreakDown	VolumePerTimeMeasure	Breakdown rate.
FlowrateDisplaceAv	VolumePerTimeMeasure	Average displacement rate.
FlowrateDisplaceMx	VolumePerTimeMeasure	Maximum displacement rate.
FlowrateEnd	VolumePerTimeMeasure	Final displacement pump rate.
FlowratePumpEnd	VolumePerTimeMeasure	Pump rate at the end of the job.
FlowratePumpStart	VolumePerTimeMeasure	Pump rate at the start of the job.
FlowrateSqueezeAv	VolumePerTimeMeasure	Squeeze job average rate.
FlowrateSqueezeMx	VolumePerTimeMeasure	Squeeze job maximum rate.
PlugBumped	boolean	Plug bumped? Values are "true" (or "1") and "false" (or "0").
PresBreakDown	PressureMeasure	Breakdown pressure.
PresPriorBump	PressureMeasure	Pressure before bumping plug / pressure at the end of the displacement.
PresSqueeze	PressureMeasure	Squeeze pressure left on pipe.
PresSqueezeAv	PressureMeasure	Squeeze pressure average.
PresSqueezeEnd	PressureMeasure	Squeeze pressure final.
PresSqueezeHeld	boolean	Squeeze pressure held. Values are "true" (or "1") and "false" (or "0").
SqueezeObtained	boolean	Squeeze obtained. Values are "true" (or "1") and "false" (or "0").
uid	String64	Unique identifier for this instance of CementStageReport
VisFunnelMud	TimeMeasure	Funnel viscosity in seconds (in hole at start of job/stage).

Associations

Association	Notes
From: CementStageReport. **To:** AbstractCementStage *Generalization*	

Association	Notes

1..*   **From:** CementJobReport.CementReportStage
      To: CementStageReport
      Association	

3.14 FluidLocation

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 3/14/2016   *Last modified:* 11/5/2016
Notes: Location of fluid in the wellbore.

Attributes

Name	Type	Notes
FluidReferenceId	UuidString	Reference to fluid used in the CementJob.
MDFluidBase	LengthMeasure	Measured depth of the base of the cement.
MDFluidTop	LengthMeasure	Measured depth at the top of the interval.
uid	String64	Unique identifier for this instance of FluidLocation.
Volume	VolumeMeasure	Volume of fluid at this location.

Associations

Association		Notes
1	**From:** FluidLocation.LocationType **To:** WellboreFluidLocation *Association*	
0..*	**From:** AbstractCementStage.EndingFluidLocation **To:** FluidLocation *Association*	
0..*	**From:** AbstractCementStage.OriginalFluidLocation **To:** FluidLocation *Association*	

3.15 WellboreFluidLocation

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: *Created:* 5/6/2016   *Last modified:* 11/5/2016
Notes: Specified the location where cement job fluid can be found.

Attributes

Name	Type	Notes
annulus		
deadend		
in pipe		
rat hole		

Associations

Association		Notes
	From: WellboreFluidLocation. **To:** TypeEnum *Generalization*	
1	**From:** FluidLocation.LocationType **To:** WellboreFluidLocation *Association*	

4 DrillReport

Package: xsd_schemas
Notes: DrillReport Schema.

4.1 AbstractBottomHoleTemperature

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 1/22/2016   *Last modified:* 10/25/2016
Notes: One of either circulating or static temperature

Attributes

Name	Type	Notes
BottomHoleTemperature	ThermodynamicTemperatureMeasure	Bottomhole temperature for the job or reporting period.

Associations

Association		Notes
	From: BottomHoleCirculatingTemperature. **To:** AbstractBottomHoleTemperature *Generalization*	
0..1	**From:** DrillReportLogInfo.BottomHoleTemperature **To:** AbstractBottomHoleTemperature *Association*	
	From: BottomHoleStaticTemperature. **To:** AbstractBottomHoleTemperature *Generalization*	

4.2   BottomHoleCirculatingTemperature

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 1/22/2016   *Last modified:* 11/5/2016
Notes: Circulating temperature at the bottom of the hole.

Associations

Association	Notes
From: BottomHoleCirculatingTemperature. **To:** AbstractBottomHoleTemperature *Generalization*	

4.3 BottomHoleStaticTemperature

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 1/22/2016   *Last modified:* 11/5/2016
Notes: Static temperature at the bottom of the hole.

Attributes

Name	Type	Notes
eTimStatic	TimeMeasure	Elapsed time since circulation stopped.

Associations

Association	Notes
From: BottomHoleStaticTemperature. **To:** AbstractBottomHoleTemperature *Generalization*	

4.4 DrillActivity

Type: Class *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015 *Last modified:* 11/5/2016
Notes: Operations Activity Component Schema.

Attributes

Name	Type	Notes
ActivityCode	DrillActivityCode	A code used to define rig activity.
ActivityMdInterval	MdInterval	Measured depth interval over which the activity was conducted.
ActivityTvdInterval	TvdInterval	True vertical depth interval over which the activity was conducted.
BitMdInterval	MdInterval	Range of bit measured depths over which the activity occurred.
Comments	String2000	Comments and remarks.
DetailActivity	String64	Custom string to further define an activity.
DTimEnd	TimeStamp	Date and time that activities ended.
DTimStart	TimeStamp	Date and time that activities started.
Duration	TimeMeasure	The activity duration (commonly in hours).
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
ItemState	ItemState	The item state for the data object.
Md	MeasuredDepthCoord	The measured depth to the drilling activity/operation.
Operator	String64	Operator company name.
Optimum	boolean	Is the activity optimum.? Values are "true" (or "1") and "false" (or "0").
Phase	String64	Phase refers to a large activity classification, e.g., drill surface hole.
Productive	boolean	Does activity bring closer to objective? Values are "true" (or "1") and "false" (or "0").
State	String64	Finish, interrupted, failed, etc.
StateDetailActivity	StateDetailActivity	The outcome of the detailed activity.
Tubular	String64	A pointer to the tubular object related to this activity.
Tvd	WellVerticalDepthCoord	True vertical depth to the drilling activity/operation.
TypeActivityClass	DrillActivityClassType	Classifier (planned, unplanned, downtime).
uid	String64	Unique identifier for this instance of DrillActivity.

Associations

Association		Notes
	From: DrillActivity. **To:** ItemState *Dependency*	
	From: DrillActivity. **To:** DrillActivityCode *Dependency*	
	From: DrillActivity. **To:** StateDetailActivity *Dependency*	
	From: DrillActivity. **To:** DrillActivityClassType *Dependency*	
0..*	**From:** DrillActivity.ProprietaryCode **To:** ObjectAlias *Association*	A proprietary code used to define rig activity. The name of the proprietary system should be defined in the namingSystem attribute.
0..*	**From:** DrillReport.DrillActivity **To:** DrillActivity *Association*	Activity breakdown, multiple for many activities.
0..*	**From:** OpsReport.Activity **To:** DrillActivity *Association*	Activity breakdown, multiple for many activities.

4.5 DrillActivityClassType

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: *Created:* 4/13/2015   *Last modified:* 10/25/2016
Notes: Activity classifier, e.g., planned, unplanned, downtime

Attributes

Name	Type	Notes
planned		
unplanned		
downtime		
unknown		The value is not known. Avoid using this value. All reasonable attempts should be made to determine the appropriate value. Use of this value may result in rejection in some situations.

Associations

Association	Notes
From: DrillActivityClassType. **To:** TypeEnum *Generalization*	
From: DrillActivity. **To:** DrillActivityClassType *Dependency*	

4.6 DrillActivityCode

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: Created: 4/13/2015   *Last modified:* 11/5/2016
Notes: A code to specify the drilling activity.

Attributes

Name	Type	Notes
abandonment		
abandonment -- log plugs		
abandonment -- run plugs		
abandonment -- wait on cement		
casing		
cement		
cement -- circulate		
cement -- other		
cement -- rig up		
cement -- wait on cement		
circulate		
circulate -- boulder or gravel		
circulate -- casing		
circulate -- cementing		
circulate -- circulate samples		
circulate -- coring		
circulate -- drilling		
circulate -- fishing		
circulate -- gumbo attack		
circulate -- logging		
circulate -- lost circulation		
circulate -- well control		
completion operations		
completion operations -- gravel packing		
completion operations -- logging		
completion operations -- rig up		
completion operations -- running liner		
completion operations -- tear down		
completion operations -- testing		
cond mud		
coring		

Name	Type	Notes
coring -- conventional		
coring -- flow check		
coring -- laydown barrel		
coring -- oriented		
coring -- plastic sleeve		
coring -- rig up core barrel		
coring -- sponge		
cut		
deviation survey		
deviation survey -- dir multi-shot		
deviation survey -- dir single shot		
deviation survey -- drift		
deviation survey -- gyro		
deviation survey -- MWD		
dir work		
dir work -- horizontal drilling		
dir work -- motor drilling		
dir work -- orient		
dir work -- rotary drilling		
dir work -- slant drilling		
drilling		
drilling -- casing		
drilling -- connection		
drilling -- drill cement		
drilling -- flow check		
drilling -- hole opening		
drilling -- new hole		
drilling -- sidetracking		
drilling -- under-reaming		
DST		
DST -- cased hole		
DST -- lay down tools		
DST -- open hole		
DST -- open hole closed chamber		
DST -- rig up tools		
fishing		
fishing -- BHA		

Name	Type	Notes
fishing -- casing		
fishing -- cones		
fishing -- other		
fishing -- stuck pipe		
fishing -- wireline tools		
float equip		
HSE		
HSE -- hold drill		
HSE -- incident		
HSE -- safety meeting		
mill		
mill -- cut casing or tubing		
mill -- milling		
miscellaneous		
nipple up BOP		
nipple up BOP -- diverter		
nipple up BOP -- manifold		
nipple up BOP -- other		
nipple up BOP -- PVT system		
nipple up BOP -- stack		
plug back		
plug back -- abandonment		
plug back -- kick off plug		
plug back -- lost circulation		
plug back -- wait on cement		
plug back -- well control		
pressure test		
pressure test -- BOP manifold		
pressure test -- BOP stack		
pressure test -- form integrity test		
pressure test -- form leak off test		
pressure test -- packer		
pressure test -- PIT		
reaming		
reaming -- back reaming		
reaming -- coring		
reaming -- drill		

Name	Type	Notes
reaming -- logging		
reaming -- under-reaming		
rig move		
rig move -- anchor handling		
rig move -- inter-pad move		
rig move -- inter-well move		
rig move -- jack up or down		
rig move -- other		
rig move -- position rig		
rig move -- skid rig		
rig release		
rig release -- cut casing		
rig release -- install capping assembly		
rig release -- MOB or DE-MOB		
rig repairs		
rig repairs -- drawworks		
rig repairs -- electrical		
rig repairs -- mud system		
rig repairs -- other		
rig repairs -- rotary		
rig repairs -- subsea equipment		
rig repairs -- well control equipment		
rig service		
rig service -- lubricate rig		
rig service -- test equipment		
rig up or tear down		
rig up or tear down -- rig up		
rig up or tear down -- site work		
rig up or tear down -- tear down		
run casing		
run liner		
run or pull riser		
run or pull riser -- other		
run or pull riser -- run or pull riser		
set		
slip drilling line		
squeeze cement		

Name	Type	Notes
squeeze cement -- casing repair		
squeeze cement -- casing shoe		
squeeze cement -- parted casing		
squeeze cement -- perforations DST		
stuck pipe		
surface string handling		
test completion		
testing general		
testing general -- equipment		
testing general -- flow		
tripping		
tripping -- back-reaming		
tripping -- flow check		
tripping -- short trip in		
tripping -- short trip out		
tripping -- trip in (from surface)		
tripping -- trip out (to surface)		
wait		
wait -- daylight		
wait -- environmental or regulatory		
wait -- equipment		
wait -- holiday		
wait -- ice		
wait -- on orders		
wait -- operator		
wait -- other		
wait -- partners		
wait -- service company		
wait -- weather		
well control		
well control -- mix		
well control -- shut in		
well control -- strip		
well control -- well kill		
well srvc		
well srvc -- casing repair		
well srvc -- clean well to compl		

Name	Type	Notes
fluid		
well srvc -- coiled tubing work		
well srvc -- gravel pack		
well srvc -- install or test xmas tree		
well srvc -- kill well		
well srvc -- land		
well srvc -- perforate		
well srvc -- pull completion		
well srvc -- pull suspension plugs		
well srvc -- run completion		
well srvc -- run screens		
well srvc -- sand control		
well srvc -- stimulation		
well srvc -- subsea work		
well srvc -- surface line work		
well srvc -- suspend well or pull BOPs		
well srvc -- test well		
well srvc -- wash		
well srvc -- wireline work		
well srvc -- work tubulars		
well srvc -- workstring run		
wireline logs		
wireline logs -- abandonment		
wireline logs -- evaluation		
wireline logs -- form tester		
wireline logs -- other		
wireline logs -- side wall cores		
wireline logs -- velocity		

Associations

Association	Notes
From: DrillActivityCode. **To:** TypeEnum *Generalization*	
From: DrillActivity. **To:** DrillActivityCode *Dependency*	
From: DrillReportControlIncidentInfo. **To:** DrillActivityCode *Dependency*	

4.7   DrillReport

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015   *Last modified:* 11/7/2016
Notes: Used to capture a daily drilling report focused on reporting from the operator to partners or to a governmental agency. For a similar report whose focus is service company to operator, see the OpsReport object.

Attributes

Name	Type	Notes
BitRecord	BitRecord	Information about a bit.
CreateDate	TimeStamp	The date and time the report was created. A later timestamp indicates a newer version of the report. To update values in a report, a full updated copy of the original report should be submitted.
DTimEnd	TimeStamp	Date and time that the reporting period ended. A report period is commonly 24 hours.
DTimStart	TimeStamp	Date and time that the reporting period started. A report period is commonly 24 hours.
VersionKind	OpsReportVersion	The kind of report version. For example, a preliminary version.
WellDatum	WellDatum	Defines a vertical datum used for measured depths, vertical depths, or elevations. If one of these coordinate values is included in the report, then you must specify a well datum. This requirement only applies to this report, which is generally a copy of the same information from the well object.

Associations

Association		Notes
0..1	**From:** DrillReport.WellboreInfo **To:** DrillReportWellboreInfo *Association*	General information about a wellbore. The well is represented by the original wellbore.
0..*	**From:** DrillReport.DrillActivity **To:** DrillActivity *Association*	Activity breakdown, multiple for many activities.
0..*	**From:** DrillReport.PorePressure **To:** DrillReportPorePressure *Association*	Information about the pore pressure.
0..1	**From:** DrillReport.WellAlias **To:** ObjectAlias *Association*	An alternative name of the well (in a naming system). The above well name should be included in the list of aliases so that its origin can be known.
0..*	**From:** DrillReport.WellboreAlias **To:** ObjectAlias *Association*	An alternative name of the wellbore (in a naming system). The above well name should be included in the list of aliases so that its origin can be known.

Association			Notes
0..*	**From:** DrillReport.GasReadingInfo **To:** DrillReportGasReadingInfo *Association*		General information about a gas reading.
0..*	**From:** DrillReport.PerfInfo **To:** DrillReportPerfInfo *Association*		General information about a well control incident.
0..*	**From:** DrillReport.FormTestInfo **To:** DrillReportFormTestInfo *Association*		General information about a wireline formation test.
0..*	**From:** DrillReport.StatusInfo **To:** DrillReportStatusInfo *Association*		General status information.
	From: DrillReport. **To:** AbstractObject *Generalization*		
0..*	**From:** DrillReport.LogInfo **To:** DrillReportLogInfo *Association*		General information about a log.
0..*	**From:** DrillReport.ControlIncidentInfo **To:** DrillReportControlIncidentInfo *Association*		General information about a well control incident.
1..1	**From:** DrillReport.Wellbore **To:** Wellbore *Association*		
0..1	**From:** DrillReport.ExtendedReport **To:** TimestampedCommentString *Association*		A description of what happened from the end of report to an alternative time before the end of the next report. This is intended to allow a preliminary description of what happened from the end of the report (commonly midnight) until the time of submission of a preliminary report (commonly 6:00 in the morning).
0..*	**From:** DrillReport.StratInfo **To:** DrillReportStratInfo *Association*		General information about a well control incident.
0..*	**From:** DrillReport.WellTestInfo **To:** DrillReportWellTestInfo *Association*		General information about a production well test.
	From: DrillReport. **To:** OpsReportVersion *Dependency*		
0..*	**From:** DrillReport.Fluid **To:** Fluid *Association*		One fluid record.
0..*	**From:** DrillReport.EquipFailureInfo **To:** DrillReportEquipFailureInfo *Association*		General information about equipment failure.
0..*	**From:** DrillReport.LithShowInfo **To:** DrillReportLithShowInfo *Association*		General information about the lithology and shows in an interval.

Association		Notes
0..*	**From:** DrillReport.CoreInfo **To:** DrillReportCoreInfo *Association*	General information about a core.
0..*	**From:** DrillReport.SurveyStation **To:** DrillReportSurveyStation *Association*	A survey station recorded during the report interval.

4.8 DrillReportControlIncidentInfo

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015   *Last modified:* 11/5/2016
Notes: Information about a well control incident that occurred during the drill report period.

Attributes

Name	Type	Notes
ActivityCode	DrillActivityCode	A code used to define rig activity.
Description	String2000	A description of the well control incident.
DetailActivity	String64	Custom string to further define an activity.
DiaBit	LengthMeasure	The drill bit nominal outside diameter at the time of the well control incident.
DiaCsgLast	LengthMeasure	Diameter of the last installed casing.
DTim	TimeStamp	Date and time of the well control incident.
DTimRegained	TimeStamp	The date and time at which control of the well was regained.
ETimLost	TimeMeasure	The amount of time lost because of the well control incident. Commonly specified in hours.
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
Formation	String2000	The lithological description of the geological formation at the incident depth.
IncidentType	WellControlIncidentType	The type of well control incident.
KillingType	WellKillingProcedureType	The type of procedure used to kill the well.
MdBit	MeasuredDepthCoord	The measured depth of the bit at the time of the the well control incident.
MdCsgLast	MeasuredDepthCoord	Measured depth of the last casing joint.
MdInflow	MeasuredDepthCoord	The measured depth to the well inflow entry point.
Phase	String64	Phase is large activity classification, e.g. drill surface hole.
PorePressure	MassPerVolumeMeasure	The equivalent mud weight value of the pore pressure reading.
PresMaxChoke	PressureMeasure	The maximum pressure that the choke valve can be exposed to.
PresShutInCasing	PressureMeasure	The shut in casing pressure.
PresShutInDrill	PressureMeasure	The actual pressure in the drill pipe when the rams were closed around it.
TempBottom	ThermodynamicTemperatureMeasure	The temperature at the bottom of the wellbore.
TvdInflow	WellVerticalDepthCoord	The true vertical depth to the well inflow entry point.
uid	String64	Unique identifier for this instance of DrillReportControlIncidentInfo.
VolMudGained	VolumeMeasure	The gained volume of drilling fluid due to the well kick.
WtMud	MassPerVolumeMeasure	The density of the drilling fluid at the time of the well control incident.

Associations

Association		Notes
	From: DrillReportControlIncidentInfo. **To:** DrillActivityCode *Dependency*	
	From: DrillReportControlIncidentInfo. **To:** WellControlIncidentType *Dependency*	
	From: DrillReportControlIncidentInfo. **To:** WellKillingProcedureType *Dependency*	
0..*	**From:** DrillReportControlIncidentInfo.ProprietaryCode **To:** ObjectAlias *Association*	A proprietary code used to define rig activity. The name of the proprietary system should be defined in the namingSystem attribute.
0..*	**From:** DrillReport.ControlIncidentInfo **To:** DrillReportControlIncidentInfo *Association*	General information about a well control incident.

4.9   DrillReportCoreInfo

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015   *Last modified:* 11/5/2016
Notes: General information about a core taken during the drill report period.

Attributes

Name	Type	Notes
CoreDescription	String2000	General core description.
CoredMdInterval	MdInterval	Cored interval expressed as measured depth.
CoredTvdInterval	TvdInterval	Cored interval expressed as true vertical depth.
CoreNumber	String64	Core identification number.
DTim	TimeStamp	Date and time that the core was completed.
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
InnerBarrelType	InnerBarrelType	Core inner barrel type.
LenBarrel	LengthMeasure	Length of the core barrel.
LenRecovered	LengthMeasure	Length of the core recovered.
RecoverPc	VolumePerVolumeMeasure	The relative amount of core recovered.
uid	String64	Unique identifier for this instance of DrillReportCoreInfo.

Associations

Association		Notes
	From: DrillReportCoreInfo. **To:** InnerBarrelType *Dependency*	
0..*	**From:** DrillReport.CoreInfo **To:** DrillReportCoreInfo *Association*	General information about a core.

4.10 DrillReportEquipFailureInfo

Type: Class *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015 *Last modified:* 11/5/2016
Notes: General information about equipment failure that occurred during the drill report period.

Attributes

Name	Type	Notes
Description	String2000	A description of the equipment failure.
DTim	TimeStamp	Date and time that the equipment failed.
DTimRepair	TimeStamp	The date and time at which the production equipment was repaired and ready for production.
EquipClass	String64	The classification of the equipment that failed.
ETimMissProduction	TimeMeasure	The missed production time because of the equipment failure.
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
Md	MeasuredDepthCoord	The measured depth of the operation end point where the failure happened.
Tvd	WellVerticalDepthCoord	The true vertical depth of the operation end point where failure the failure happened.
uid	String64	Unique identifier for this instance of DrillReportEquipFailureInfo.

Associations

Association		Notes
0..*	**From:** DrillReport.EquipFailureInfo **To:** DrillReportEquipFailureInfo *Association*	General information about equipment failure.

4.11 DrillReportFormTestInfo

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015   *Last modified:* 11/5/2016
Notes: General information about a wireline formation test that occurred during the drill report period.

Attributes

Name	Type	Notes
DensityHC	MassPerVolumeMeasure	The density of the hydrocarbon component of the fluid sample.
Description	String2000	A detailed description of the wireline formation test.
DominateComponent	String64	The dominate component in the fluid sample.
DTim	TimeStamp	Date and time that the wireline formation test was completed.
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
GoodSeal	boolean	Was there a good seal for the wireline formation test? Values are "true" or "1" or "false" or "0".
Md	MeasuredDepthCoord	Measured depth at which the wireline formation test was conducted.
MdSample	MeasuredDepthCoord	Measured depth where the fluid sample was taken.
PresPore	PressureMeasure	The formation pore pressure. The pressure of fluids within the pores of a reservoir, usually hydrostatic pressure, or the pressure exerted by a column of water from the formation's depth to sea level.
Tvd	WellVerticalDepthCoord	True vertical depth at which the wireline formation test was conducted.
uid	String64	Unique identifier for this instance of DrillReportFormTestInfo.
VolumeSample	VolumeMeasure	The volume of the fluid sample.

Associations

Association		Notes
0..*	**From:** DrillReport.FormTestInfo **To:** DrillReportFormTestInfo *Association*	General information about a wireline formation test.

4.12 DrillReportGasReadingInfo

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015   *Last modified:* 11/5/2016
Notes: General information about a gas reading taken during the drill report period.

Attributes

Name	Type	Notes
DTim	TimeStamp	Date and time of the gas reading.
Eth	VolumePerVolumeMeasure	Ethane (C2) concentration.
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
GasHigh	VolumePerVolumeMeasure	The highest gas reading.
GasLow	VolumePerVolumeMeasure	The lowest gas reading.
GasReadingMdInterval	MdInterval	Measured depth interval over which the gas reading was conducted.
GasReadingTvdInterval	TvdInterval	True vertical depth interval over which the gas reading was conducted.
Ibut	VolumePerVolumeMeasure	Iso-butane (iC4) concentration.
Ipent	VolumePerVolumeMeasure	Iso-pentane (iC5) concentration.
Meth	VolumePerVolumeMeasure	Methane (C1) concentration.
Nbut	VolumePerVolumeMeasure	Nor-butane (nC4) concentration.
Prop	VolumePerVolumeMeasure	Propane (C3) concentration.
ReadingType	GasPeakType	Type of gas reading.
uid	String64	Unique identifier for this instance of DrillReportGasReadingInfo.

Associations

Association		Notes
	From: DrillReportGasReadingInfo. **To:** GasPeakType *Dependency*	
0..*	**From:** DrillReport.GasReadingInfo **To:** DrillReportGasReadingInfo *Association*	General information about a gas reading.

4.13 DrillReportLithShowInfo

Type: Class *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015 *Last modified:* 11/5/2016
Notes: General information about the lithology and shows in an interval encountered during the drill report period.

Attributes

Name	Type	Notes
DTim	TimeStamp	Date and time that the well test was completed.
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
Lithology	String2000	A geological/lithological description/evaluation of the interval.
Show	String2000	A textual description of any shows in the interval.
ShowMdInterval	MdInterval	Measured depth interval over which the show appears.
ShowTvdInterval	TvdInterval	True vertical depth interval over which the show appears.
uid	String64	Unique identifier for this instance of DrillReportLithShowInfo

Associations

Association		Notes
0..*	**From:** DrillReport.LithShowInfo **To:** DrillReportLithShowInfo *Association*	General information about the lithology and shows in an interval.

4.14 DrillReportLogInfo

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015   *Last modified:* 11/5/2016
Notes: General information about a log conducted during the drill report period.

Attributes

Name	Type	Notes
DTim	TimeStamp	The date and time that the log was completed.
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
LoggedMdInterval	MdInterval	Measured depth interval from the top to the base of the interval logged.
LoggedTvdInterval	TvdInterval	True vertical depth interval from the top to the base of the interval logged.
MdTempTool	MeasuredDepthCoord	Measured depth to the temperature measurement tool.
RunNumber	String64	Log run number. For measurement while drilling, this should be the bottom hole assembly number.
ServiceCompany	String64	Name of the contractor who provided the service.
Tool	String64	A description of the logging tool.
TvdTempTool	WellVerticalDepthCoord	True vertical depth to the temperature measurement tool.
uid	String64	Unique identifier for this instance of DrillReportLogInfo.

Associations

Association		Notes
0..1	**From:** DrillReportLogInfo.BottomHoleTemperature **To:** AbstractBottomHoleTemperature *Association*	
0..*	**From:** DrillReport.LogInfo **To:** DrillReportLogInfo *Association*	General information about a log.

4.15 DrillReportPerfInfo

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015   *Last modified:* 11/5/2016
Notes: General information about a perforation interval related to the drill report period.

Attributes

Name	Type	Notes
DTimClose	TimeStamp	The date and time at which the well perforation interval is closed.
DTimOpen	TimeStamp	The date and time at which the well perforation interval is opened.
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
PerforationMdInterval	MdInterval	Measured depth interval between the top and the base of the perforations.
PerforationTvdInterval	TvdInterval	True vertical depth interval between the top and the base of the perforations.
uid	String64	Unique identifier for this instance of DrillReportPerfInfo.

Associations

Association		Notes
0..*	**From:** DrillReport.PerfInfo **To:** DrillReportPerfInfo *Association*	General information about a well control incident.

4.16 DrillReportPorePressure

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015   *Last modified:* 11/5/2016
Notes: General information about pore pressure related to the drill report period.

Attributes

Name	Type	Notes
DTim	TimeStamp	Date and time at the reading was recorded.
EquivalentMudWeight	MassPerVolumeMeasure	The equivalent mud weight value of the pore pressure reading.
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
Md	MeasuredDepthCoord	Measured depth where the readings were recorded.
ReadingKind	ReadingKind	Indicate if the reading was estimated or measured.
Tvd	WellVerticalDepthCoord	True vertical depth where the readings were recorded.
uid	String64	Unique identifier for this instance of DrillReportPorePressure.

Associations

Association		Notes
	From: DrillReportPorePressure. **To:** ReadingKind *Dependency*	
0..*	**From:** DrillReport.PorePressure **To:** DrillReportPorePressure *Association*	Information about the pore pressure.

4.17 DrillReportStatusInfo

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015   *Last modified:* 11/5/2016
Notes: General status information for the drill report period.

Attributes

Name	Type	Notes
ConditionHole	String64	Description of the hole condition.
DiaCsgLast	LengthMeasure	Diameter of the last casing joint.
DiaHole	LengthMeasure	Hole nominal inside diameter.
DiaPilot	LengthMeasure	Pilot hole nominal inside diameter.
DistDrill	LengthMeasure	Distance drilled. This should be measured along the centerline of the wellbore.
DistDrillRot	LengthMeasure	Distance drilled: rotating.
DistDrillSlid	LengthMeasure	Distance drilled: sliding.
DistHold	LengthMeasure	Distance covered while holding angle with a steerable drilling assembly.
DistReam	LengthMeasure	Distance reamed.
DistSteering	LengthMeasure	Distance covered while actively steering with a steerable drilling assembly.
DTim	TimeStamp	The date and time for which the well status is reported.
Engineer	String64	Name of the operator's drilling engineer.
ETimCirc	TimeMeasure	Time spent circulating from the start of the bit run.
ETimDrill	TimeMeasure	Drilling time.
ETimDrillRot	TimeMeasure	Time spent rotary drilling.
ETimDrillSlid	TimeMeasure	Time spent slide drilling from the start of the bit run.
ETimHold	TimeMeasure	Time spent with no directional drilling work (commonly in hours).
ETimLoc	TimeMeasure	Time the rig has been on location (commonly in days).
ETimReam	TimeMeasure	Time spent reaming from the start of the bit run.
ETimSpud	TimeMeasure	Time since the bit broke ground (commonly in days).
ETimStart	TimeMeasure	Time from the start of operations (commonly in days).
ETimSteering	TimeMeasure	Time spent steering the bottomhole assembly (commonly in hours).
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
Forecast24Hr	String2000	A summary of planned activities for the next reporting period.
Geologist	String64	Name of operator's wellsite geologist.
Maasp	PressureMeasure	Maximum allowable shut-in casing pressure.
Md	MeasuredDepthCoord	Wellbore measured depth at the end of the report period.

Name	Type	Notes
MdCsgLast	MeasuredDepthCoord	Measured depth of the last casing joint.
MdDiaHoleStart	MeasuredDepthCoord	Measured depth to the start of the current hole diameter.
MdDiaPilotPlan	MeasuredDepthCoord	The planned measured depth of the pilot hole.
MdKickoff	MeasuredDepthCoord	Measured depth to the kickoff point of the wellbore.
MdPlanned	MeasuredDepthCoord	The measured depth planned to be reached.
MdPlugTop	MeasuredDepthCoord	The measured plug back depth.
MdStrengthForm	MeasuredDepthCoord	The measured depth of the formation strength measurement.
NumAFE	String64	Authorization for expenditure (AFE) number that this cost item applies to.
NumContract	int	Number of contractor personnel on the rig.
NumOperator	int	Number of operator personnel on the rig.
NumPob	int	Total number of personnel on the rig.
NumService	int	Number of service company personnel on the rig.
PresKickTol	PressureMeasure	Kick tolerance pressure.
PresLotEmw	MassPerVolumeMeasure	Leak off test equivalent mud weight.
PresTestType	PresTestType	The type of pressure test that was run.
Rig	String64	A pointer to the rig used.
RopAv	LengthPerTimeMeasure	Average rate of penetration.
RopCurrent	LengthPerTimeMeasure	Rate of penetration at the end of the reporting period.
StrengthForm	MassPerVolumeMeasure	The measured formation strength. This should be the final measurement before the end of the report period.
Sum24Hr	String2000	A summary of the activities performed and the status of the ongoing activities.
Supervisor	String64	Name of the operator's rig supervisor.
Tubular	String64	A pointer to the tubular (assembly) used in this report period.
Tvd	WellVerticalDepthCoord	Wellbore true vertical depth at the end of the report.
TvdCsgLast	WellVerticalDepthCoord	True vertical depth of last casing joint.
TvdDiaPilotPlan	WellVerticalDepthCoord	The planned true vertical depth of the pilot hole.
TvdKickoff	MeasuredDepthCoord	True vertical depth to the kickoff point of the wellbore.
TvdLot	WellVerticalDepthCoord	True vertical depth of a leak off test point.
TvdStrengthForm	WellVerticalDepthCoord	The true vertical depth of the formation strength measurement.
TypeWellbore	WellboreType	Type of wellbore.
uid	String64	Unique identifier for this instance of DrillReportStatusInfo.
VolKickTol	VolumeMeasure	Kick tolerance volume.

Associations

Association		Notes
	From: DrillReportStatusInfo. **To:** PresTestType *Dependency*	
0..1	**From:** DrillReportStatusInfo.CostDayMud **To:** Cost *Association*	Daily Mud Cost.
0..1	**From:** DrillReportStatusInfo.ElevKelly **To:** WellElevationCoord *Association*	Elevation of the rotary kelly bushing.
0..1	**From:** DrillReportStatusInfo.CostDay **To:** Cost *Association*	Daily Cost.
0..*	**From:** DrillReportStatusInfo.ParentWellbore **To:** ObjectAlias *Association*	The name of the parent wellbore. This is the wellbore from which the current wellbore kickedoff.
0..*	**From:** DrillReport.StatusInfo **To:** DrillReportStatusInfo *Association*	General status information.

4.18 DrillReportStratInfo

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015   *Last modified:* 11/5/2016
Notes: General information about stratigraphy for the drill report period.

Attributes

Name	Type	Notes
Description	String2000	A lithological description of the geological formation at the given depth.
DTim	TimeStamp	Date and time at which a preliminary zonation was established.
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
MdTop	MeasuredDepthCoord	Measured depth at the top of the formation.
TvdTop	WellVerticalDepthCoord	True vertical depth at the top of the formation.
uid	String64	Unique identifier for this instance of DrillReportStratInfo.

Associations

Association		Notes
0..*	**From:** DrillReport.StratInfo **To:** DrillReportStratInfo *Association*	General information about a well control incident.

4.19 DrillReportSurveyStation

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015   *Last modified:* 11/5/2016
Notes: Trajectory station information for the drill report period.

Attributes

Name	Type	Notes
Azi	PlaneAngleMeasure	Hole azimuth, corrected to a well's azimuth reference.
Dls	AnglePerLengthMeasure	Dogleg severity.
DTim	TimeStamp	The date at which the directional survey took place.
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
Incl	PlaneAngleMeasure	Hole inclination, measured from vertical.
Md	MeasuredDepthCoord	Measured depth of measurement from the drill datum.
Tvd	WellVerticalDepthCoord	True vertical depth of the measurements.
uid	String64	Unique identifier for this instance of DrillReportSurveyStation.
VertSect	LengthMeasure	Distance along the vertical section of an azimuth plane.

Associations

Association		Notes
0..*	**From:** DrillReportSurveyStation.Location **To:** AbstractWellLocation *Association*	The 2D coordinates of the item. Note that within the context of trajectory, the "original" coordinates are inherently local coordinates as defined above.
0..*	**From:** DrillReport.SurveyStation **To:** DrillReportSurveyStation *Association*	A survey station recorded during the report interval.

4.20 DrillReportWellboreInfo

Type: Class *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015 *Last modified:* 11/5/2016
Notes: General information about a wellbore for a drill report period.

Attributes

Name	Type	Notes
DateDrillComplete	date	The date when the drilling activity was completed.
DrillContractor	String64	The name of the drilling contractor company.
DTimPreSpud	TimeStamp	Date and time at which the well was predrilled. This is when the well drilling equipment begin to bore into the earth's surface for the purpose of drilling a well.
DTimSpud	TimeStamp	Date and time at which the well was spudded. This is when the well drilling equipment began to bore into the earth's surface for the purpose of drilling a well.
Operator	String64	The name of the drilling Operator company responsible for the well being drilled (the company for whom the well is being drilled).

Associations

Association		Notes
0..*	**From:** DrillReportWellboreInfo.RigAlias **To:** ObjectAlias *Association*	A name of the fixed or movable facility being used to drill the wellbore.
0..1	**From:** DrillReport.WellboreInfo **To:** DrillReportWellboreInfo *Association*	General information about a wellbore. The well is represented by the original wellbore.

4.21 DrillReportWellTestInfo

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015   *Last modified:* 11/5/2016
Notes: General information about a production well test conducted during the drill report period.

Attributes

Name	Type	Notes
CarbonDioxide	MassPerMassMeasure	The relative amount of CO2 gas.
Chloride	MassPerMassMeasure	The relative amount of chloride in the produced water.
ChokeOrificeSize	LengthMeasure	The diameter of the choke opening.
DensityGas	MassPerVolumeMeasure	The density of the produced gas.
DensityOil	MassPerVolumeMeasure	The density of the produced oil.
DensityWater	MassPerVolumeMeasure	The density of the produced water.
DTim	TimeStamp	Date and time that the well test was completed.
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
FlowRateGas	VolumePerTimeMeasure	The maximum rate at which gas was produced.
FlowRateOil	VolumePerTimeMeasure	The maximum rate at which oil was produced.
FlowRateWater	VolumePerTimeMeasure	The maximum rate at which water was produced.
GasOilRatio	VolumePerVolumeMeasure	The ratio of the volume of gas to the volume of oil.
HydrogenSulfide	MassPerMassMeasure	The relative amount of H2S gas.
PresBottom	PressureMeasure	The final bottomhole pressure.
PresFlowing	PressureMeasure	The final flowing pressure.
PresShutIn	PressureMeasure	The final shut-in pressure.
TestMdInterval	MdInterval	Test interval expressed as a measured depth.
TestNumber	int	The number of the well test.
TestTvdInterval	TvdInterval	Test interval expressed as a true vertical depth.
TestType	WellTestType	The type of well test.
uid	String64	Unique identifier for this instance of DrillReportWellTestInfo.
VolGasTotal	VolumeMeasure	The total amount of gas produced. This includes gas that was disposed of (e.g., burned).
VolOilStored	VolumeMeasure	The total amount of produced oil that was stored.
VolOilTotal	VolumeMeasure	The total amount of oil produced. This includes oil that was disposed of (e.g., burned).
VolWaterTotal	VolumeMeasure	The total amount of water produced. This includes water that was disposed of.
WaterOilRatio	VolumePerVolumeMeasure	The relative amount of water per amount of oil.

Associations

Association		Notes
	From: DrillReportWellTestInfo. **To:** WellTestType *Dependency*	
0..*	**From:** DrillReport.WellTestInfo **To:** DrillReportWellTestInfo *Association*	General information about a production well test.

4.22 GasPeakType

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: *Created:* 4/13/2015   *Last modified:* 11/5/2016
Notes: Type of gas reading.

Attributes

Name	Type	Notes
circulating background gas		
connection gas		
drilling background gas		
drilling gas peak		
flow check gas		
no readings		
other		
shut down gas		
trip gas		
unknown		The value is not known. Avoid using this value. All reasonable attempts should be made to determine the appropriate value. Use of this value may result in rejection in some situations.

Associations

Association	Notes
From: GasPeakType. **To:** TypeEnum *Generalization*	
From: DrillReportGasReadingInfo. **To:** GasPeakType *Dependency*	

4.23 InnerBarrelType

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: Created: 4/13/2015   *Last modified:* 10/25/2016
Notes: Core inner barrel type.

Attributes

Name	Type	Notes
undifferentiated		A pipe that is located inside a core barrel to hold the core sample.
aluminum		An inner core barrel made of aluminium.
gel		An inner core barrel that that seals off the core sample using gel as the sealing material.
fiberglass		An inner core barrel made of glass fiber reinforced plastic.
unknown		The value is not known. Avoid using this value. All reasonable attempts should be made to determine the appropriate value. Use of this value may result in rejection in some situations.

Associations

Association	Notes
From: InnerBarrelType. **To:** TypeEnum *Generalization*	
From: DrillReportCoreInfo. **To:** InnerBarrelType *Dependency*	

4.24 ItemState

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: *Created:* 4/13/2015   *Last modified:* 10/25/2016
Notes: These values represent the state of a WITSML object.

Attributes

Name	Type	Notes
actual		Actual data measured or entered at the well site.
model		Model data used for "what if" calculations.
plan		A planned object. That is, one which is expected to be executed in the future.
unknown		The value is not known. Avoid using this value. All reasonable attempts should be made to determine the appropriate value. Use of this value may result in rejection in some situations.

Associations

Association	Notes
From: ItemState. **To:** TypeEnum *Generalization*	
From: DrillActivity. **To:** ItemState *Dependency*	

4.25 OpsReportVersion

Type: Enumeration *Stereotype:* «Enumeration»
Detail: *Created:* 4/13/2015 *Last modified:* 11/5/2016
Notes: Version of the report, e.g., preliminary, normal, final, etc.

Attributes

Name	Type	Notes
preliminary		A report that has not yet been approved by the drilling operator. This report is normally issued at the beginning of the work day (e.g., 6:00 am).
normal		A daily status report that has been approved by the drilling operator.
final		A report that represents the final definitive status for the well. This report is typically issued some period of time (e.g., 6 months) after drilling has concluded.
unknown		The value is not known. Avoid using this value. All reasonable attempts should be made to determine the appropriate value. Use of this value may result in rejection in some situations.

Associations

Association	Notes
From: OpsReportVersion. **To:** TypeEnum *Generalization*	
From: DrillReport. **To:** OpsReportVersion *Dependency*	

4.26 PresTestType

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: *Created:* 4/13/2015   *Last modified:* 11/5/2016
Notes: Specifies the types of pressure test(s) conducted during a drilling report period.

Attributes

Name	Type	Notes
leak off test		A leakoff test (LOT) is usually conducted immediately after drilling below a new casing shoe. The test indicates the strength of the wellbore at the casing seat, typically considered one of the weakest points in any interval. The data gathered during the LOT is used to prevent lost circulations while drilling. During the test, the well is shut in and fluid is pumped into the wellbore gradually to increase the pressure on the formation.
formation integrity test		To avoid breaking down the formation, many operators perform a formation integrity test (FIT) at the casing seat to determine if the wellbore will tolerate the maximum mud weight anticipated while drilling the interval. If the casing seat holds pressure that is equivalent to the prescribed mud density, the test is considered successful and drilling resumes.
unknown		The value is not known. Avoid using this value. All reasonable attempts should be made to determine the appropriate value. Use of this value may result in rejection in some situations.

Associations

Association	Notes
From: PresTestType. **To:** TypeEnum *Generalization*	
From: DrillReportStatusInfo. **To:** PresTestType *Dependency*	

4.27 ReadingKind

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: *Created:* 4/13/2015   *Last modified:* 11/5/2016
Notes: Specifies if the reading was measured or estimated.

Attributes

Name	Type	Notes
measured		The reading was measured.
estimated		The reading was estimated.
unknown		The value is not known. Avoid using this value. All reasonable attempts should be made to determine the appropriate value. Use of this value may result in rejection in some situations.

Associations

Association	Notes
From: ReadingKind. **To:** TypeEnum *Generalization*	
From: DrillReportPorePressure. **To:** ReadingKind *Dependency*	

4.28 Rheometer

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015   *Last modified:* 11/5/2016
Notes: Rheometer readings taken during a drill report period. A rheometer is viscosimeter use for some fluid measurements, particularly when solid suspension properties are needed.

Attributes

Name	Type	Notes
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
PresRheom	PressureMeasure	Rheometer pressure.
TempRheom	ThermodynamicTemperatureMeasure	Rheometer temperature.
uid	String64	Unique identifier for this instance of Rheometer.

Associations

Association		Notes
0..*	**From:** Rheometer.Viscosity **To:** RheometerViscosity *Association*	
0..*	**From:** CementingFluid.Rheometer **To:** Rheometer *Association*	
0..*	**From:** Fluid.Rheometer **To:** Rheometer *Association*	

4.29 StateDetailActivity

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: Created: 4/13/2015   Last modified: 11/5/2016
Notes: Specifies the state of a drilling activity (DrillActivity).

Attributes

Name	Type	Notes
injury		Personnel injury in connection with drilling and/or drilling related operations.
operation failed		Operation failed to achieve objective.
kick		Formation fluid invading the wellbore.
circulation loss		Circulation lost to the formation.
mud loss		Circulation impossible due to plugging or failure of equipment.
stuck equipment		Equipment got stuck in the hole.
equipment failure		Equipment failure occurred.
equipment hang		Operations had to be aborted due to an equipment issue
success		Operation achieved the objective.
unknown		The value is not known. Avoid using this value. All reasonable attempts should be made to determine the appropriate value. Use of this value may result in rejection in some situations.

Associations

Association	Notes
From: StateDetailActivity. **To:** TypeEnum *Generalization*	
From: DrillActivity. **To:** StateDetailActivity *Dependency*	

4.30 TimestampedCommentString

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: Created: 4/13/2015   *Last modified:* 10/25/2016
Notes: A timestamped textual description.

Attributes

Name	Type	Notes
dTim	TimeStamp	The timestamp of the time-qualified comment.

Associations

Association		Notes
	From: TimestampedCommentString. **To:** String2000 *Generalization*	
0..1	**From:** DrillReport.ExtendedReport **To:** TimestampedCommentString *Association*	A description of what happened from the end of report to an alternative time before the end of the next report. This is intended to allow a preliminary description of what happened from the end of the report (commonly midnight) until the time of submission of a preliminary report (commonly 6:00 in the morning).

4.31 WellControlIncidentType

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: Created: 4/13/2015   *Last modified:* 11/5/2016
Notes: Specifies the type of a well control incident.

Attributes

Name	Type	Notes
shallow gas kick		Shallow gas is flowing incidentally into a well being drilled.
water kick		Water is flowing incidentally into a well being drilled.
oil kick		Crude oil is flowing incidentally into a well being drilled.
gas kick		Gas is flowing incidentally into a well being drilled.
unknown		The value is not known. Avoid using this value. All reasonable attempts should be made to determine the appropriate value. Use of this value may result in rejection in some situations.

Associations

Association	Notes
From: WellControlIncidentType. **To:** TypeEnum *Generalization*	
From: DrillReportControlIncidentInfo. **To:** WellControlIncidentType *Dependency*	

4.32 WellKillingProcedureType

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: *Created:* 4/13/2015   *Last modified:* 11/5/2016
Notes: Specifies the type of procedure used to stop (kill) the flow of formation fluids into a well. A well-killing procedure may be planned or unplanned. The particular situation determines what type of procedure is used.

Attributes

Name	Type	Notes
drillers method		Prescribes circulating the kick fluids out of the well and then circulating a higher density kill mud into the well through a kill line with an adjustable choke.
wait and weight		Prescribes circulating heavier kill mud while a constant downhole pressure is maintained by pressure relief through a choke.
bullheading		Prescribes pumping kill-weight fluid down the tubing and forcing the wellbore fluids back into the formation through the perforations.
lubricate and bleed		Prescribes this process: 1) Pump a volume of killing fluid corresponding to half the volume of the well tubing into the well. 2) Observe the well for 30 to 60 minutes and wait for the tubing head pressure to drop. 3) Pump additional killing fluid into the well. 4) When the wellhead pressure drops below 200 psi above observed tubing head pressure, bleed off gas from the tubing at high rate.
forward circulation		Prescribes circulating drilling fluid down the tubing, through a circulation device (or out the end of a workstring/coiled tubing) and up the annulus.
reverse circulation		Prescribes circulating a drilling fluid down the completion annulus, workstring annulus, or pipe annulus and taking returns up the tubing, workstring, or pipe.
unknown		The value is not known. Avoid using this value. All reasonable attempts should be made to determine the appropriate value. Use of this value may result in rejection in some situations.

Associations

Association	Notes
From: WellKillingProcedureType. **To:** TypeEnum *Generalization*	
From: DrillReportControlIncidentInfo. **To:** WellKillingProcedureType *Dependency*	

4.33 WellTestType

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: *Created:* 4/13/2015   *Last modified:* 11/5/2016
Notes: Specifies the type of well test conducted.

Attributes

Name	Type	Notes
drill stem test		Determines the productive capacity, pressure, permeability or extent (or a combination of these) of a hydrocarbon reservoir, with the drill string still in the hole.
production test		Determines the daily rate of oil, gas, and water production from a (potential) reservoir.
unknown		The value is not known. Avoid using this value. All reasonable attempts should be made to determine the appropriate value. Use of this value may result in rejection in some situations.

Associations

Association	Notes
From: WellTestType. **To:** TypeEnum *Generalization*	
From: DrillReportWellTestInfo. **To:** WellTestType *Dependency*	

5 FluidsReport

Package: xsd_schemas
Notes: FluidsReport Schema.

5.1 Fluid

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: Created: 4/13/2015   Last modified: 11/5/2016
Notes: Fluid component schema.

Attributes

Name	Type	Notes
AlkalinityP1	VolumeMeasure	Mud alkalinity P1 from alternate alkalinity method (volume in ml of 0.02N acid to reach the phenolphthalein endpoint).
AlkalinityP2	VolumeMeasure	Mud alkalinity P2 from alternate alkalinity method (volume in ml of 0.02N acid to titrate, the reagent mixture to the phenolphthalein endpoint).
Asg	MassPerMassMeasure	Average specific gravity of solids.
AverageCuttingSize	LengthMeasure	Average size of the drill cuttings.
BaritePc	VolumePerVolumeMeasure	Barite content percent.
BrineDensity	MassPerVolumeMeasure	Density of water phase of NAF.
BrinePc	VolumePerVolumeMeasure	Percent brine content.
Calcium	MassPerVolumeMeasure	Calcium content.
CalciumChloride	MassPerVolumeMeasure	Calcium chloride content.
CalciumChloridePc	VolumePerVolumeMeasure	Calcium chloride percent.
Carbonate	MassPerVolumeMeasure	Carbonate content.
Chloride	MassPerVolumeMeasure	Chloride content.
Comments	String2000	Comments and remarks.
Company	String64	Name of company.
Density	MassPerVolumeMeasure	Fluid density.
DTim	TimeStamp	The time when fluid readings were recorded.
Ecd	MassPerVolumeMeasure	Equivalent circulating density where fluid reading was recorded.
ElectStab	ElectricPotentialDifferenceMeasure	Measurement of the emulsion stability and oil-wetting capability in oil-based muds.
Engineer	String64	Engineer name
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
FilterCakeHthp	LengthMeasure	High temperature high pressure (HTHP) filter cake thickness.

Name	Type	Notes
FilterCakeLtlp	LengthMeasure	Filter cake thickness at low (normal) temperature and pressure.
FiltrateHthp	VolumeMeasure	High temperature high pressure (HTHP) filtrate (volume per 30 min).
FiltrateLtlp	VolumeMeasure	API water loss (low temperature and pressure mud filtrate measurement) (volume per 30 min).
Gel10Min	PressureMeasure	Ten-minute gels.
Gel10Sec	PressureMeasure	Ten-second gels.
Gel30Min	PressureMeasure	Thirty-minute gels.
HardnessCa	MassPerMassMeasure	Total calcium hardness.
Iron	MassPerVolumeMeasure	Iron content.
KickToleranceIntensity	MassPerVolumeMeasure	Assumed kick density for calculation of kick tolerance where the fluid reading was recorded.
KickToleranceVolume	VolumeMeasure	Assumed kick volume for calculation of kick tolerance based on the kick intensity where the fluid reading was recorded.
Lcm	MassPerVolumeMeasure	Lost circulation material.
Lime	MassPerVolumeMeasure	Lime content.
LocationSample	String64	Sample location.
Magnesium	MassPerVolumeMeasure	Magnesium content.
Mbt	GenericMeasure	Cation exchange capacity (CEC) of the mud sample as measured by methylene blue titration (MBT). NOTE: This is temporarily set to be a GenericMeasure with no unit validation, pending addition of CEC units to the Energistics UoM spec.
Md	MeasuredDepthCoord	The measured depth where the fluid readings were recorded.
MetalRecovered	MassMeasure	Metal recovered from the wellbore.
Mf	VolumeMeasure	Methyl orange alkalinity of filtrate.
MudClass	MudClass	The class of the drilling fluid.
OilCtg	MassPerMassMeasure	Oil on cuttings.
OilCtgDry	MassPerVolumeMeasure	Oil on dried cuttings.
OilGrease	MassPerVolumeMeasure	Oil and grease content.
OilPc	VolumePerVolumeMeasure	Percent oil content from retort.
Ph	double	Mud pH.
Pm	VolumeMeasure	Phenolphthalein alkalinity of whole mud.
PmFiltrate	VolumeMeasure	Phenolphthalein alkalinity of mud filtrate.
Polymer	VolumePerVolumeMeasure	Polymers present in the mud system.
PolyType	String64	Type of polymers present in the mud system.
Potassium	MassPerVolumeMeasure	Potassium content.
PresBopRating	PressureMeasure	Maximum pressure rating of the blow out preventer.

Name	Type	Notes
PresHthp	PressureMeasure	High temperature high pressure (HTHP) pressure.
Pv	DynamicViscosityMeasure	Plastic viscosity.
Salt	MassPerVolumeMeasure	Salt content.
SaltPc	VolumePerVolumeMeasure	Salt percent.
SandPc	VolumePerVolumeMeasure	Sand content percent.
SodiumChloride	MassPerVolumeMeasure	Sodium chloride content.
SodiumChloridePc	VolumePerVolumeMeasure	Sodium chloride percent.
SolCorPc	VolumePerVolumeMeasure	Solids corrected for chloride content percent.
SolidsCalcPc	VolumePerVolumeMeasure	Percent calculated solids content.
SolidsHiGrav	MassPerVolumeMeasure	Solids high gravity content.
SolidsHiGravPc	VolumePerVolumeMeasure	Solids high gravity percent.
SolidsLowGrav	MassPerVolumeMeasure	Solids low gravity content.
SolidsLowGravPc	VolumePerVolumeMeasure	Low gravity solids percent.
SolidsPc	VolumePerVolumeMeasure	Solids percentage from retort.
Sulfide	MassPerVolumeMeasure	Sulfide content.
Tct	ThermodynamicTemperatureMeasure	True crystallization temperature.
TempFlowLine	ThermodynamicTemperatureMeasure	Flow line temperature measurement where the fluid reading was recorded.
TempHthp	ThermodynamicTemperatureMeasure	High temperature high pressure (HTHP) temperature.
TempPh	ThermodynamicTemperatureMeasure	Mud pH measurement temperature.
TempVis	ThermodynamicTemperatureMeasure	Funnel viscosity temperature.
Turbidity	double	Turbidity units to measure the cloudiness or haziness of a fluid.
Tvd	WellVerticalDepthCoord	The true vertical depth where the fluid readings were recorded.
Type	String64	Description for the type of fluid.
uid	String64	Unique identifier for this instance of Fluid.
VisFunnel	TimeMeasure	Funnel viscosity in seconds.
WaterPc	VolumePerVolumeMeasure	Water content percent.
WaterPhaseSalinity	MassPerVolumeMeasure	A factor showing the activity level of salt in oil-based mud.
WholeMudCalcium	MassPerVolumeMeasure	Calcium content in the whole mud sample, including oil and water phases.
WholeMudChloride	MassPerVolumeMeasure	Chloride content in the whole mud sample, including oil and water phases.
Yp	PressureMeasure	Yield point (Bingham and Herschel Bulkley models).

Name	Type	Notes
ZincOxide	MassPerVolumeMeasure	Zinc oxide content.

Associations

Association		Notes
0..*	**From:** Fluid.Rheometer **To:** Rheometer *Association*	
0..*	**From:** FluidsReport.Fluid **To:** Fluid *Association*	A Fluid record.
0..*	**From:** DrillReport.Fluid **To:** Fluid *Association*	One fluid record.
0..*	**From:** OpsReport.Fluid **To:** Fluid *Association*	One fluid record.

5.2 FluidsReport

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015   *Last modified:* 11/5/2016
Notes: Used to capture an analysis of the drilling mud.

Attributes

Name	Type	Notes
DTim	TimeStamp	Date and time the information is related to.
Md	MeasuredDepthCoord	Along-hole measured depth of measurement from the drill datum.
NumReport	int	Fluids report number.
Tvd	WellVerticalDepthCoord	Vertical depth of the measurements.

Associations

Association		Notes
1..1	**From:** FluidsReport.Wellbore **To:** Wellbore *Association*	
0..*	**From:** FluidsReport.Fluid **To:** Fluid *Association*	A Fluid record.
	From: FluidsReport. **To:** AbstractObject *Generalization*	

5.3 MudClass

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: Created: 4/13/2015   Last modified: 11/5/2016
Notes: Specifies the class of a drilling fluid.

Attributes

Name	Type	Notes
oil-based		
water-based		
other		A drilling fluid in which neither water nor oil is the continuous phase.
pneumatic		A drilling fluid which is gas-based.

Associations

Association	Notes
From: MudClass. **To:** TypeEnum *Generalization*	
From: DrillingParams. **To:** MudClass *Dependency*	

5.4 RheometerViscosity

Type: Class *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/15/2015 *Last modified:* 10/25/2016
Notes: Viscosity reading of the rheometer

Attributes

Name	Type	Notes
Speed	AngularVelocityMeasure	Rotational speed of the rheometer, typically in RPM.
uid	String64	Unique identifier for this instance of RheometerViscosity.
Viscosity	double	The raw reading from a rheometer. This could be , but is not necessarily, a viscosity.

Associations

Association	Notes
0..* **From:** Rheometer.Viscosity **To:** RheometerViscosity *Association*	

6 Log

Package: xsd_schemas
Notes: Log Schema.

6.1 AbstractIndexValue

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/15/2015   *Last modified:* 11/7/2016
Notes: Generic representation of pass, depth, or time values. Each derived element provides specialized implementation for specific content types or for optimization of the representation.

Associations

Association	Notes
From: PassIndexedDepth. **To:** AbstractIndexValue *Generalization*	
From: TimeIndexValue. **To:** AbstractIndexValue *Generalization*	
From: DepthIndexValue. **To:** AbstractIndexValue *Generalization*	

6.2 AbstractLogDataContext

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 5/4/2015   *Last modified:* 11/7/2016
Notes: Defines a constraint against the data points in the log's channel. Each time the log is realized, only the data points satisfying this constraint are included.

Associations

Association		Notes
	From: IndexRangeContext. **To:** AbstractLogDataContext *Generalization*	
0..1	**From:** ChannelSet.DataContext **To:** AbstractLogDataContext *Association*	The LogDataContext for this log. If the DataContext is NULL, then it is assumed to include all data points for all included channels.
	From: ChannelValueContext. **To:** AbstractLogDataContext *Generalization*	
	From: ObjectContext. **To:** AbstractLogDataContext *Generalization*	

6.3 Channel

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/15/2015   *Last modified:* 11/7/2016
Notes: A channel object. It corresponds roughly to the LogCurveInfo structure in WITSML1411, and directly corresponds to the ChannelMetadataRecord structure in ETP. In historian terminology, a channel corresponds directly to a tag.
Channels are the fundamental unit of organization for WITSML logs.

Attributes

Name	Type	Notes
DataType	EtpDataType	The underlying ETP data type of the value.
GrowingStatus	ChannelStatus	The status of a channel with respect to creating new measurements. Statuses include: **Active:** A channel is actively producing data points. **Inactive:** A channel is offline or not currently producing, but may begin producing again in the future. **Closed:** A channel will never produce points again. The rules for when a channel is to be closed will vary some for different kinds of channels. For example, time-based surface channels may remain open for the entire life of the drilling operation, whereas depth-based wireline channels are closed at the end of the wireline job
Mnemonic	String64	The mnemonic name for this channel. Mnemonics are not unique within a store.
Source	String64	Source of the data in the channel. Enter the contractor name who conducted the log.
Uom	UnitOfMeasureExt	The underlying unit of measure of the value.

Associations

Association		Notes
0..*	**From:** Channel.PointMetadata **To:** PointMetadata *Association*	
	From: Channel. **To:** AbstractObject *Generalization*	
0..1	**From:** Channel. **To:** Wellbore *Association*	
	From: Channel. **To:** ChannelStatus *Dependency*	
0..*	**From:** Channel.DerivedFrom **To:** Channel *Association*	For derived channels, a list of the source channels which went into the derivation. For example, if you create a composite GR channel from several separate measured channels, this would point to those channels.

Association		Notes
		Note, that these references are for provenance only. The derived data must be store independently on the server for a derived channel.
1	**From:** Channel.LogChannelMetadata **To:** LogChannelMetadata *Association*	
0..1	**From:** Channel.Parent **To:** AbstractObject *Association*	The containing data object for the channel set. For example, for a Log, this could be either the wellbore for the log or a LoggingRun
1..*	**From:** Channel.Index **To:** ChannelIndex *Association*	
0..*	**From:** Channel.AxisDefinition **To:** LogChannelAxis *Association*	Indicates that the curve is an array curve (i.e., multi-valued samples), and provides meta data by which an axis of the array can be understood.
	From: Channel. **To:** EtpDataType *Dependency*	
0..1	**From:** Chromatograph.Channel **To:** Channel *Association*	
1..*	**From:** ChannelSet.Channel **To:** Channel *Association*	
1	**From:** GasPeak.Channel **To:** Channel *Association*	
0..*	**From:** Channel.DerivedFrom **To:** Channel *Association*	For derived channels, a list of the source channels which went into the derivation. For example, if you create a composite GR channel from several separate measured channels, this would point to those channels. Note, that these references are for provenance only. The derived data must be store independently on the server for a derived channel.
1	**From:** GasInMud.Channel **To:** Channel *Association*	

6.4 ChannelData

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/15/2015   *Last modified:* 10/25/2016
Notes: Contains the bulk data for the log, either as a base64-encoded string or as a reference to an external file.

Attributes

Name	Type	Notes
Data	string	The data blob in JSON form. This attribute lets you embed the bulk data in a single file with the xml, to avoid the issues that arise when splitting data across multiple files. BUSINESS RULE: Either this element or the FileUri element must be present.
FileUri	anyURI	The URI of a file containing the bulk data. If this field is non-null, then the data field is ignored. For files written to disk, this should normally contain a simple file name in relative URI form. For example, if an application writes a log file to disk, it might write the xml as abc.xml, and the bulk data as abc.avro. In this case, the value of this element would be './abc.avro'. BUSINESS RULE: Either this element or the Data element must be present.

Associations

Association		Notes
0..1	**From:** ChannelSet.Data **To:** ChannelData *Association*	

6.5 ChannelDerivation

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: Created: 5/5/2015   *Last modified:* 11/7/2016
Notes: Specifies the source of data in a channel.

Attributes

Name	Type	Notes
raw		Raw measured data, directly from sensors.
simulated		Simulated.
spliced		Derived by splicing values from two or more other channels.
sampled		Derived by sampling values from one or more other channels.
model		Based on some modeled results of values in another one or more channels.

Associations

Association	Notes
From: ChannelDerivation. **To:** TypeEnum *Generalization*	
From: ChannelSetMetadata. **To:** ChannelDerivation *Dependency*	

6.6   ChannelIndex

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/15/2015   *Last modified:* 11/7/2016
Notes: A read-only class that is the union of those channel indexes that are shared by all channels in the channel set.

Attributes

Name	Type	Notes
DatumReference	String64	For depth indexes, this contains the UID of the datum, in a channel's Well object, to which all of the index values are referenced.
Direction	IndexDirection	The direction of the index, either increasing or decreasing. Index direction may not change within the life of a channel.
IndexType	ChannelIndexType	The type of index (time, depth, etc.).
Mnemonic	String64	The mnemonic for the index.
Uom	UnitOfMeasureExt	The unit of measure of the index. Must be one of the units allowed for the specified IndexType (i.e., time or distance).

Associations

Association	Notes
From: ChannelIndex. **To:** IndexDirection *Dependency*	
From: ChannelIndex. **To:** ChannelIndexType *Dependency*	
From: Channel.Index 1..* **To:** ChannelIndex *Association*	
From: ChannelSet.Index 1..* **To:** ChannelIndex *Association*	One or more indexes for the channel. The first is required, and is referred to as the primary index. All channels in the channel set must be based on a 'compatible' index (all time or all depth) and the same datum.

6.7   ChannelIndexType

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: *Created:* 4/15/2015   *Last modified:* 11/5/2016
Notes: Specifies the type of index used by the channel.

Attributes

Name	Type	Notes
measured depth		Measured depth.
true vertical depth		True vertical depth.
pass indexed depth		An index value that includes pass, direction, and depth values This can only refer to measured depths.
date time		Date with time.
elapsed time		Time that has elapsed
temperature		Temperature.
pressure		Pressure.

Associations

Association	Notes
From: ChannelIndex. **To:** ChannelIndexType *Dependency*	

6.8 ChannelSet

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/15/2015   *Last modified:* 11/7/2016
Notes: A grouping of channels with a compatible index, for some purpose. Each channel has its own
index. A 'compatible' index simply means that all of the channels are either in time or in depth
using a common datum.

Associations

Association		Notes
1..*	**From:** ChannelSet.Channel **To:** Channel *Association*	
0..1	**From:** ChannelSet.Wellbore **To:** Wellbore *Association*	
0..1	**From:** ChannelSet.Data **To:** ChannelData *Association*	
0..1	**From:** ChannelSet.DataContext **To:** AbstractLogDataContext *Association*	The LogDataContext for this log. If the DataContext is NULL, then it is assumed to include all data points for all included channels.
	From: ChannelSet. **To:** AbstractObject *Generalization*	
1	**From:** ChannelSet.ChannelSetMetadata **To:** ChannelSetMetadata *Association*	
1..*	**From:** ChannelSet.Index **To:** ChannelIndex *Association*	One or more indexes for the channel. The first is required, and is referred to as the primary index. All channels in the channel set must be based on a 'compatible' index (all time or all depth) and the same datum.
1..*	**From:** Log.ChannelSet **To:** ChannelSet *Association*	An array of channel sets that comprise this log. A log must have at least one channel set, and may have more than one. The channel set is evaluated in such a way that the channels in the log is a UNION of all of the channels in the array of channel sets. That is to say, the result is also a set, no channel can appear more than once in a given log.

6.9 ChannelSetMetadata

Type: Class   *Stereotype:* «XSDgroup»
Detail: *Created:* 3/4/2016   *Last modified:* 11/7/2016
Notes: Common metadata across all channel objects.

Attributes

Name	Type	Notes
ChannelClass	PropertyKind	A mandatory value categorizing a log channel. The classification system used in WITSML is the one from the PWLS group.
ChannelState	ChannelState	Defines where the channel gets its data from, e.g., calculated from another source, or from archive, or raw real-time, etc.
Derivation	ChannelDerivation	Indicates that the channel is derived from one or more other channels.
EndIndex	AbstractIndexValue	When the log header defines the direction as: 1. "Increasing", the endIndex is the ending (maximum) index value at which the last non-null data point is located. "Decreasing", the endIndex is the ending (minimum) index value at which the last non-null data point is located.
LoggingCompanyCode	String64	The RP66 organization code assigned to a logging company. The list is available at http://www.energistics.org/geosciences/geology-standards/rp66-organization-codes
LoggingCompanyName	String64	Name of the logging company.
LoggingMethod	LoggingMethod	Defines where the log channel gets its data from: LWD, MWD, wireline; or whether it is computed, etc.
NominalHoleSize	LengthMeasureExt	The nominal hole size (typically the bit size) at the time the measurement tool was in the hole. The size is "nominal" to indicate that this is not the result of a caliper reading or other direct measurement of the hole size, but is just a name used to refer to the diameter. When more than one diameter holes are being drilled at the same time (e.g., where a reamer is behind the bit), this diameter is the one that was seen by the sensor that produced a particular log channel.
PassNumber	String64	The nominal pass number for the channel. No precise meaning is declared for this attribute but it is so commonly used that it must be included. The value here should match a wireline pass number for logging data.
RunNumber	String64	The nominal run number for the channel. No precise meaning is declared for this attribute but it is so commonly used that it must be included.

Name	Type	Notes
		The value here should match a bit run number for LWD data and a wireline run number for logging data.
StartIndex	AbstractIndexValue	When the log header defines the direction as: 2. "Increasing", the startIndex is the starting (minimum) index value at which the first non-null data point is located. "Decreasing", the startIndex is the starting (maximum) index value at which the first non-null data point is located.
TimeDepth	String64	Use to indicate if this is a time or depth log.
ToolClass	String64	A value categorizing a logging tool. The classification system used in WITSML is the one from the PWLS group.
ToolName	String64	Name of the logging tool as given by the logging contractor.

Associations

Association	Notes
From: ChannelSetMetadata. **To:** ChannelDerivation *Dependency*	
From: ChannelSetMetadata. **To:** ChannelClassKindExt *Dependency*	
From: ChannelSetMetadata. **To:** ChannelState *Dependency*	
From: ChannelSetMetadata. **To:** LoggingMethod *Dependency*	
1 **From:** Log.ChannelSetMetadata **To:** ChannelSetMetadata *Association*	
1 **From:** ChannelSet.ChannelSetMetadata **To:** ChannelSetMetadata *Association*	

6.10 ChannelState

Type: Enumeration *Stereotype:* «Enumeration»
Detail: Created: 3/4/2016 *Last modified:* 11/7/2016
Notes: Specifies the source of the data values in the channel, e.g., calculated from another source, or from archive, or raw real-time, etc.

Attributes

Name	Type	Notes
calculated		Calculated from measurements
final		Considered final and not subject to change
memory		Sensor data is recorded into downhole memory of a tool, rather than transmitting in "real time" to surface.
processed		Results of calculations based on measurements
real time		Measurements at the actual time.

Associations

Association	Notes
From: ChannelState. **To:** TypeEnum *Generalization*	
From: ChannelSetMetadata. **To:** ChannelState *Dependency*	

6.11 ChannelStatus

Type: Enumeration   *Stereotype:*
Detail: *Created:* 4/28/2015   *Last modified:* 11/7/2016
Notes: Specifies the status of the channel (growing object): active, inactive, closed

Attributes

Name	Type	Notes
active		Actively producing data points.
closed		Closed and will never produce new data points.
inactive		Currently inactive but may produce data points in the future.

Associations

Association	Notes
From: ChannelStatus. **To:** TypeEnum *Generalization*	
From: ShowEvaluation. **To:** ChannelStatus *Dependency*	
From: Trajectory. **To:** ChannelStatus *Dependency*	
From: Channel. **To:** ChannelStatus *Dependency*	
From: InterpretedGeology. **To:** ChannelStatus *Dependency*	
From: CuttingsGeology. **To:** ChannelStatus *Dependency*	
From: WellboreGeometry. **To:** ChannelStatus *Dependency*	

6.12 ChannelValueContext

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 5/4/2015   *Last modified:* 11/7/2016
Notes: Describes the data for the log in terms of the value of a given channel.

Attributes

Name	Type	Notes
ChannelReference	DataObjectReference	The channel refers to another Energistics data object.
DataValue	string	A free-form format to specify the data value.

Associations

Association	Notes
From: ChannelValueContext. **To:** AbstractLogDataContext *Generalization*	

6.13 DepthIndexValue

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/15/2015   *Last modified:* 10/25/2016
Notes: Qualifies the index as depth.

Attributes

Name	Type	Notes
Depth	float	Used to specify the channel start and end index.

Associations

Association	Notes
From: DepthIndexValue. **To:** AbstractIndexValue *Generalization*	

6.14 EtpDataType

Type: Enumeration *Stereotype:*
Detail: Created: 3/4/2016 *Last modified:* 11/7/2016
Notes: Specifies the type of data contained in a channel to facilitate data transfer using the Energistics
Transfer Protocol (ETP).

Attributes

Name	Type	Notes
boolean		True or false values.
bytes		Integer data value (nominally a one-byte value). The value must conform to the format of the xsd:dateTime data type (minInclusive=-128 and maxInclusive=127).
double		Double-precision floating-point value (nominally an 8-byte value). The value must conform to the format of the xsd:double data type.
float		Single-precision floating-point value (nominally a 4-byte value). The value must conform to the format of the xsd:float data type
int		Integer data value (nominally a 4-byte value). The value must conform to the format of the xsd:int data type.
long		Long integer data value (nominally an 8-byte value). The value must conform to the format of the xsd:long data type.
null		No value or the value is null.
string		Character string data. The value must conform to the format of the xsd:string data type. The maximum length of a value is determined by individual servers.
vector		An array of doubles.

Associations

Association	Notes
From: EtpDataType. **To:** TypeEnum *Generalization*	
From: PointMetadata. **To:** EtpDataType *Dependency*	
From: Channel. **To:** EtpDataType *Dependency*	

6.15 IndexDirection

Type: Enumeration *Stereotype:* «Enumeration»
Detail: *Created:* 6/30/2015 *Last modified:* 11/7/2016
Notes: Specifies the direction of the index, whether decreasing or increasing.

Attributes

Name	Type	Notes
decreasing		The sort order of the data row index values. For a "decreasing" direction, the index value of consecutive data nodes are descending.
increasing		The sort order of the data row index values. For an "increasing" direction, the index value of consecutive data nodes are ascending.

Associations

Association	Notes
From: ChannelIndex. **To:** IndexDirection *Dependency*	

6.16 IndexRangeContext

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 5/4/2015   *Last modified:* 11/7/2016
Notes: Describes the data context for a log in terms of a starting and ending index. When this context is used, each realization of the log includes all data points from the log's channel set that follow between the specified start and end index.

Attributes

Name	Type	Notes
EndIndex	AbstractIndexValue	When the log header defines the direction as: 3. "Increasing", the startIndex is the starting (minimum) index value at which the first non-null data point is located. "Decreasing", the startIndex is the starting (maximum) index value at which the first non-null data point is located.
StartIndex	AbstractIndexValue	When the log header defines the direction as: 4. "Increasing", the endIndex is the ending (maximum) index value at which the last non-null data point is located. "Decreasing", the endIndex is the ending (minimum) index value at which the last non-null data point is located.

Associations

Association	Notes
From: IndexRangeContext. **To:** AbstractLogDataContext *Generalization*	

6.17 Log

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/14/2015   *Last modified:* 11/7/2016
Notes: Primarily a container for one or more channel sets (ChannelSet). In WITSML v2.+, most of the log information is now at the channel set level. The concept of multiple channel sets in a single log is significant change from WITSML v1.4.1.1, where each log represented exactly one group of curves and their data. For more information about log organization and how it works, see the *WITSML Technical Usage Guide*.

Associations

Association		Notes
1	**From:** Log.ChannelSetMetadata **To:** ChannelSetMetadata *Association*	
1	**From:** Log.Wellbore **To:** Wellbore *Association*	Reference to the the wellbore of the log this depth registration image section belongs.
1..*	**From:** Log.ChannelSet **To:** ChannelSet *Association*	An array of channel sets that comprise this log. A log must have at least one channel set, and may have more than one. The channel set is evaluated in such a way that the channels in the log is a UNION of all of the channels in the array of channel sets. That is to say, the result is also a set, no channel can appear more than once in a given log.
	From: Log. **To:** AbstractObject *Generalization*	
1..*	**From:** StimJobLogCatalog.JobLog **To:** Log *Association*	
0..*	**From:** StimJobStage.StimStageLog **To:** Log *Association*	
0..*	**From:** MudLogReport.RelatedLogs **To:** Log *Association*	
	From: DepthRegLogSection. **To:** Log *Dependency*	Reference to the the log which represents this log section.

6.18 LogChannelAxis

Type: Class *Stereotype:* «XSDcomplexType»
Detail: *Created:* 3/3/2016 *Last modified:* 11/7/2016
Notes: Metadata by which the array structure of a compound value is defined. It defines one axis of an array type used in a log channel.

Attributes

Name	Type	Notes
AxisCount	PositiveLong	The count of elements along this axis of the array.
AxisName	String64	The name of the array axis.
AxisPropertyKind	String64	The property type by which the array axis is classified. Like "measured depth" or "elapsed time".
AxisSpacing	double	The increment to be used to fill out the list of the log channel axis index values.
AxisStart	double	Value of the initial entry in the list of axis index values.
AxisUom	UnitOfMeasureExt	A string representing the units of measure of the axis values.
uid	String64	A unique identifier for an instance of a log channel axis

Associations

Association	Notes
0..* **From:** Channel.AxisDefinition **To:** LogChannelAxis *Association*	Indicates that the curve is an array curve (i.e., multi-valued samples), and provides meta data by which an axis of the array can be understood.

6.19 LogChannelMetadata

Type: Class *Stereotype:* «XSDgroup»
Detail: *Created:* 11/1/2016 *Last modified:* 11/1/2016
Notes: Common metadata across all channel objects

Attributes

Name	Type	Notes
ChannelClass	PropertyKind	A mandatory value categorizing a log channel. The classification system used in WITSML is the one from the PWLS group. NOTE: This should turn into an extensible enumeration before WITSML is released.
ChannelState	ChannelState	Defines where the channel gets its data from, e.g., calculated from another source, or from archive, or raw real-time, etc.
Derivation	ChannelDerivation	Indicates that the channel is derived from one or more other channels
EndIndex	AbstractIndexValue	When the log header defines the direction as "Increasing", the endIndex is the ending (maximum) index value at which the last non-null data point is located. When the log header defines the direction as Decreasing, the endIndex is the ending (minimum) index value at which the last non-null data point is located.
LoggingCompanyCode	String64	The RP66 organization code assigned to a logging company. The list is available at http://www.energistics.org/geosciences/geology-standards/rp66-organization-codes
LoggingCompanyName	String64	Name of the logging company.
LoggingMethod	LoggingMethod	Defines where the log channel gets its data from: LWD, MWD, wireline; or whether it is computed, etc.
NominalHoleSize	LengthMeasureExt	The nominal hole size at the time the measurement tool was in the hole. The size is "nominal" to indicate that this is not the result of a caliper reading or other direct measurement of the hoe size, but is just a name used to refer to the diameter. This is normally the bit size. In a case where there are more than one diameter hole being drilled at the same time (like where a reamer is behind the bit) this diameter is the one which was seen by the sensor which produced a particular log channel.
PassNumber	String64	The nominal pass number for the channel. No precise meaning is declared for this attribute but it is so commonly used that it must be included. The value here should match a wireline pass number for logging data.

RunNumber	String64	The nominal run number for the channel. No precise meaning is declared for this attribute but it is so commonly used that it must be included. The value here should match a bit run number for LWD data and a wireline run number for logging data.
StartIndex	AbstractIndexValue	When the log header defines the direction as "Increasing", the startIndex is the starting (minimum) index value at which the first non-null data point is located. When the log header defines the direction as "Decreasing", the startIndex is the starting (maximum) index value at which the first non-null data point is located.
TimeDepth	String64	Is this a time or depth log?
ToolClass	String64	A value categorizing a logging tool. The classification system used in WITSML is the one from the PWLS group. NOTE: This should turn into an extensible enumeration before WITSML is released
ToolName	String64	Name of the logging tool as given by the logging contractor.

Associations

Association	Notes
1	**From:** Channel.LogChannelMetadata **To:** LogChannelMetadata *Association*	

6.20 LoggingMethod

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: Created: 2/17/2016   *Last modified:* 11/7/2016
Notes: Specifies the method of logging used to record or produce the data in the log.

Attributes

Name	Type	Notes
computed		The log is a result of computed analyses from various sources.
distributed		The log is derived from various different systems.
LWD		The data of the log is a result of logging-while-drilling.
mixed		The data is derived from multiple logging methods.
MWD		The data of the log is a result of measurement-while-drilling.
surface		The data is recorded on the surface or in real time.
wireline		The data is derived as a function of wellbore depth.

Associations

Association	Notes
From: LoggingMethod. **To:** TypeEnum *Generalization*	
From: ChannelSetMetadata. **To:** LoggingMethod *Dependency*	

6.21 ObjectContext

Type: Class *Stereotype:* «XSDcomplexType»
Detail: *Created:* 5/4/2015 *Last modified:* 11/7/2016
Notes: Specifies the range of index values for a log by reference to another object (or sub-object) which contains the index range as part of its data.

Attributes

Name	Type	Notes
ObjectReference	DataObjectReference	The context object points to another Energistics data object.
SubObjectReference	String64	If the reference is to a sub-object in a growing object (e.g., a WellboreGeometry section), then this must contain the UID of the growing part.

Associations

Association	Notes
From: ObjectContext. **To:** AbstractLogDataContext *Generalization*	

6.22 PassIndexedDepth

Type: Class *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/15/2015 *Last modified:* 10/25/2016
Notes: Qualifies depth based on pass, direction and depth

Attributes

Name	Type	Notes
Depth	float	The measured depth of the point.
Direction	int	0 = down (increasing depth) 1= up (decreasing depth) Changes each time the logging tool direction changes. When a log starts from the bottom, start with pass = 0, direction = 1. When you get to the top of the interval and start down again, change the pass.
Pass	int	The pass number. Increase the pass number each time the tool direction changes twice.

Associations

Association	Notes
From: PassIndexedDepth. **To:** AbstractIndexValue *Generalization*	

6.23 PointMetadata

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 3/4/2016   *Last modified:* 11/7/2016
Notes: Used to declare that data points in a specific WITSML log channel may contain value attributes (e.g., quality identifiers). This declaration is independent from the possibility that ETP may have sent ValueAttributes in real time.

If an instance of PointMetadata is present for a Channel, then the value for that point is represented as an array in the bulk data string.

Attributes

Name	Type	Notes
Description	String2000	Free format description of the point metadata.
EtpDataType	EtpDataType	The underlying ETP data type of the point metadata.
Name	String64	The name of the point metadata.

Associations

Association		Notes
	From: PointMetadata. **To:** EtpDataType *Dependency*	
0..*	**From:** Channel.PointMetadata **To:** PointMetadata *Association*	

6.24 TimeIndexValue

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/15/2015   *Last modified:* 11/7/2016
Notes: Qualifies an index based on time.

Attributes

Name	Type	Notes
Time	TimeStamp	Used to specify the channel start and end index.

Associations

Association	Notes
From: TimeIndexValue. **To:** AbstractIndexValue *Generalization*	

7 DepthRegImage

Package: xsd_schemas
Notes: Depth registry image schemas.
Schemas for the set of data objects for raster well log depth registration (DepthRegImage), which provides a common, industry-standard depth calibration (registration) format that improves on and replaces existing proprietary standards. These data objects allow service companies, data vendors, and customers to more readily associate depth registration information with the correct raster log and move well logs and registration information between software systems.

7.1 BackupScaleType

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: *Created:* 2/25/2016   *Last modified:* 11/7/2016
Notes: Backup scale types.

Attributes

Name	Type	Notes
x10		
offscale left/right		
other		

Associations

Association	Notes
From: BackupScaleType. **To:** TypeEnum *Generalization*	
From: DepthRegTrackCurve. **To:** BackupScaleType *Dependency*	

7.2   CalibrationPointRole

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: *Created:* 2/25/2016   *Last modified:* 10/25/2016
Notes: The role of a calibration point in a log depth registration.

Attributes

Name	Type	Notes
left edge	abstractTypeEnum	Denotes the calibration being made on the left edge of the image.
right edge	abstractTypeEnum	Denotes the calibration being made on the right edge of the image.
fraction	abstractTypeEnum	Denotes an intermediate point from the left edge to the right edge.
other	abstractTypeEnum	The value is not known. Avoid using this value. All reasonable attempts should be made to determine the appropriate value. Use of this value may result in rejection in some situations.

Associations

Association	Notes
From: CalibrationPointRole. **To:** TypeEnum *Generalization*	
From: DepthRegCalibrationPoint. **To:** CalibrationPointRole *Dependency*	

7.3   DepthRegCalibrationPoint

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 2/25/2016   *Last modified:* 11/7/2016
Notes: A mapping of pixel positions on the log image to rectified or depth-registered positions on the log image. Specifically, pixels along the depth track are tagged with the matching measured depth for that position.

Attributes

Name	Type	Notes
Comment	String2000	Comments about the log section.
CurveName	String64	Facilitates searching for logs based on curve type.
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
Fraction	DimensionlessMeasure	An intermediate point from the left edge to the right edge. Required when CalibrationPointRole is "fraction"; otherwise, not allowed otherwise.) Used to extrapolate the rectified position of a track boundary that has wandered off the edge of the image.
Index	GenericMeasure	The index (depth or time) for the calibration point. The UOM value must be consistent with the indexType.
Role	CalibrationPointRole	The horizontal position on the grid that the calibration point represents.
Track	String64	A pointer to the track containing the point.
uid	String64	Unique identifier for the calibration point.

Associations

	Association	Notes
1	**From:** DepthRegCalibrationPoint.Point **To:** DepthRegPoint *Association*	The position on the image of the calibration point
	From: DepthRegCalibrationPoint. **To:** CalibrationPointRole *Dependency*	
0..*	**From:** DepthRegCalibrationPoint.Parameter **To:** DepthRegParameter *Association*	Parameters associated with the calibration point.
	From: DepthRegLogSection. **To:** DepthRegCalibrationPoint *Dependency*	

7.4 DepthRegImage

Type: Class *Stereotype:* «XSDcomplexType»
Detail: *Created:* 2/25/2016 *Last modified:* 10/25/2016
Notes: Information about the composition, layout, and depth registration of a digital image of a well log, typically a scanned image of a paper well log document.

Attributes

Name	Type	Notes
AlternateSection	DepthRegLogRect	Provides a positional reference for sections of the image file not included in other elements of this object.
Checksum	MessageDigestType	Image file checksum.
FileName	String64	Reference to the file containing the image content.
FileNameType	FileNameType	Mimetype of image file content.
FileSize	DigitalStorageMeasure	Size of image file, in bytes.
HeaderSection	DepthRegLogRect	Log header information extracted from the well log image header section. Also contains X, Y coordinates and positional data with respect to the header section location within the log image file.
ImageBoundary	DepthRegRectangle	The bounding rectangle of the image
ImagePixelHeight	NonNegativeLong	Image file height, in pixels.
ImagePixelWidth	NonNegativeLong	Image file width, in pixels.
LogSection	DepthRegLogSection	Provides log name, log type, curve scale and other information about each log section of the image file. Most importantly, this section contains the depth registration elements (CalibrationPoint) necessary for depth calibrating well log sections.
Mimetype	MimeType	Mimetype of image file content.
uid	String64	Unique identifier for the registration image.
Version	String64	File version.

Associations

Association		Notes
	From: DepthRegImage. **To:** AbstractObject *Generalization*	
	From: DepthRegImage. **To:** MessageDigestType *Dependency*	
	From: DepthRegImage. **To:** FileNameType *Dependency*	
	From: DepthRegImage. **To:** DepthRegLogRect *Dependency*	
1	**From:** DepthRegImage.Wellbore **To:** Wellbore	Reference to the the wellbore this depth registration image belongs.

Association	Notes
Association	
From: DepthRegImage. **To:** DepthRegLogSection *Dependency*	
From: DepthRegImage. **To:** DepthRegRectangle *Dependency*	
From: DepthRegImage. **To:** MimeType *Dependency*	
From: DepthRegImage. **To:** DepthRegLogRect *Dependency*	

7.5　DepthRegLogRect

Type:　Class　*Stereotype:* «XSDcomplexType»
Detail:　*Created:* 2/25/2016　*Last modified:* 10/25/2016
Notes:　A region of an image containing a log rectangle.

Attributes

Name	Type	Notes
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
Name	String64	The name of a rectangular section.
Type	LogRectangleType	A region of an image containing a log section image.
uid	String64	Unique identifier for the log section.

Associations

Association		Notes
0..1	**From:** DepthRegLogRect.Position **To:** DepthRegRectangle *Association*	The bounding box of the log section image.
	From: DepthRegLogRect. **To:** LogRectangleType *Dependency*	
	From: DepthRegImage. **To:** DepthRegLogRect *Dependency*	
	From: DepthRegImage. **To:** DepthRegLogRect *Dependency*	

7.6 DepthRegLogSection

Type: Class *Stereotype:* «XSDcomplexType»
Detail: Created: 2/25/2016 *Last modified:* 11/7/2016
Notes: Defines the description and coordinates of a well log section, the curves on the log. An important XSDelement to note is log:refNameString; it is a reference to the actual log/data (in a WITSML server) that this raster image represents; this object does not contain the log data.

Attributes

Name	Type	Notes
CalibrationPoint	DepthRegCalibrationPoint	Generally this associates an X, Y value pair with a depth value from the log section.
Comment	String2000	Comments about the calibration.
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
IndexReference	WellboreDatumReference	The origin for vertical coordinates on the original log. If this is not specified, information about the datum should be specified in a comment.
IndexType	LogIndexType	Primary index type. For date-time indexes, any specified index values should be defined as a time offset (e.g., in seconds) from the creationDate of the well log.
IndexUom	String64	Index UOM of the original log.
Log	Log	The ID of the log being referred to by this section.
LogMatrix	String64	Log matrix assumed for porosity computations.
LogSectionName	String64	Name of a log section; used to distinguish log sections of the same type.
LogSectionRect	DepthRegRectangle	The bounding rectangle of this log section.
LogSectionSequenceNumber	NonNegativeLong	Zero-based index in the log sections, in order of appearance.
LogSectionType	LogSectionType	Type of log section.
LowerCurveScaleRect	DepthRegRectangle	Boundaries of the lower curve scale (or horizontal scale) section for this log section.
MaxInterval	GenericMeasure	Maximum of the range of the index values. '@uom' must be consistent with '//indexType'.
MinInterval	GenericMeasure	Minimum of the range of theindex values. '@uom' must be consistent with '//indexType'.
ScaleDenominator	GenericMeasure	The denominator of the index (depth or time) scale of the original log, e. g. "100 ft". '@uom' must be consistent with '//indexType'.
ScaleNumerator	LengthMeasure	The numerator of the index (depth or time) scale of the original log, e. g. "5 in".
uid	String64	Unique identifier for the log section.
UpperCurveScaleRect	DepthRegRectangle	Boundaries of the upper curve scale (or horizontal scale) section for this log section.
VerticalLabel	String2000	Vertical log scale label (e.g., "1 IN/100 F").
VerticalRatio	String2000	Second term of the vertical scale ratio (e.g., "240" for a 5-inch-per-100-foot log section).

Name	Type	Notes
WhiteSpace	DepthRegRectangle	Defines blank space occurring within a log section in an image.

Associations

Association		Notes
	From: DepthRegLogSection. **To:** DepthRegRectangle *Dependency*	
	From: DepthRegLogSection. **To:** DepthRegRectangle *Dependency*	
0..*	**From:** DepthRegLogSection.Parameter **To:** DepthRegParameter *Association*	Parameters associated with the log section.
0..*	**From:** DepthRegLogSection.Track **To:** DepthRegTrack *Association*	Defines the position of the tracks within this section.
	From: DepthRegLogSection. **To:** DepthRegCalibrationPoint *Dependency*	
	From: DepthRegLogSection. **To:** LogIndexType *Dependency*	
	From: DepthRegLogSection. **To:** Log *Dependency*	Reference to the the log which represents this log section.
	From: DepthRegLogSection. **To:** WellboreDatumReference *Dependency*	
	From: DepthRegLogSection. **To:** DepthRegRectangle *Dependency*	
	From: DepthRegLogSection. **To:** DepthRegRectangle *Dependency*	
	From: DepthRegLogSection. **To:** LogSectionType *Dependency*	
	From: DepthRegImage. **To:** DepthRegLogSection *Dependency*	

7.7 DepthRegParameter

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 2/25/2016   *Last modified:* 11/7/2016
Notes: Specifies parameters associated with the log section and includes top and bottom indexes, a description string, and mnemonic.

Attributes

Name	Type	Notes
BottomIndex	GenericMeasure	The lower limit of a vertical region for which the parameter value is applicable. '@uom' must be consistent with '//indexType'.
Description	String2000	A description or definition for the mnemonic; required when ../dictionary is absent.
Dictionary	String64	The name or identifier of the controlling dictionary.
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
Mnemonic	String64	A dictionary-controlled mnemonic.
TopIndex	GenericMeasure	The upper limit of a vertical region for which the parameter value is applicable. '@uom' must be consistent with '//indexType'.
uid	String64	Unique identifier for the parameter.
Value	GenericMeasure	The value assigned to the parameter. The unit of measure should be consistent with the property implied by 'mnemonic' in 'dictionary'. If the value is unitless, then use a unit of 'Euc'.

Associations

Association		Notes
0..*	**From:** DepthRegLogSection.Parameter **To:** DepthRegParameter *Association*	Parameters associated with the log section.
0..*	**From:** DepthRegCalibrationPoint.Parameter **To:** DepthRegParameter *Association*	Parameters associated with the calibration point.

7.8 DepthRegPoint

Type: Class *Stereotype:* «XSDcomplexType»
Detail: *Created:* 2/25/2016 *Last modified:* 10/25/2016
Notes: The position of a pixel of an image, in x-y coordinates.

Attributes

Name	Type	Notes
X	NonNegativeLong	The x pixel position of a point.
Y	NonNegativeLong	The y pixel position of a point.

Associations

	Association	Notes
	From: DepthRegRectangle. **To:** DepthRegPoint *Dependency*	
	From: DepthRegRectangle. **To:** DepthRegPoint *Dependency*	
1	**From:** DepthRegCalibrationPoint.Point **To:** DepthRegPoint *Association*	The position on the image of the calibration point
	From: DepthRegRectangle. **To:** DepthRegPoint *Dependency*	
	From: DepthRegRectangle. **To:** DepthRegPoint *Dependency*	

7.9 DepthRegRectangle

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 2/25/2016   *Last modified:* 11/7/2016
Notes: Uses 4 corner points (Ul, Ur, Ll, Lr) to define the position (pixel) of a rectangular area of an image, using x-y coordinates. Most objects point to this object because most are rectangles, and use this schema to define each rectangle.

Attributes

Name	Type	Notes
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
Ll	DepthRegPoint	The lower left point of a rectangular region.
Lr	DepthRegPoint	The lower right point of a rectangular region.
uid	String64	Unique identifier for the rectangular area.
Ul	DepthRegPoint	The upper left point of a rectangular region.
Ur	DepthRegPoint	The upper right point of a rectangular region.

Associations

Association		Notes
	From: DepthRegRectangle. **To:** DepthRegPoint *Dependency*	
	From: DepthRegRectangle. **To:** DepthRegPoint *Dependency*	
	From: DepthRegRectangle. **To:** DepthRegPoint *Dependency*	
	From: DepthRegRectangle. **To:** DepthRegPoint *Dependency*	
	From: DepthRegLogSection. **To:** DepthRegRectangle *Dependency*	
	From: DepthRegLogSection. **To:** DepthRegRectangle *Dependency*	
0..1	**From:** DepthRegLogRect.Position **To:** DepthRegRectangle *Association*	The bounding box of the log section image.
	From: DepthRegImage. **To:** DepthRegRectangle *Dependency*	
	From: DepthRegLogSection. **To:** DepthRegRectangle *Dependency*	
	From: DepthRegLogSection. **To:** DepthRegRectangle *Dependency*	

7.10 DepthRegTrack

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 2/25/2016   *Last modified:* 11/7/2016
Notes: Horizontal track layout of the rectified log image that identifies the rectangle for a single log track.

Attributes

Name	Type	Notes
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
LeftEdge	NonNegativeLong	The position of the left edge of the track.
Name	String64	A label associated with the track.
RightEdge	NonNegativeLong	The position of the right edge of the track.
TrackCurveScaleRect	DepthRegRectangle	Coordinates of rectangle representing the track.
Type	LogTrackType	The kind of track.
uid	String64	Unique identifier for the track.

Associations

Association		Notes
	From: DepthRegTrack. **To:** LogTrackType *Dependency*	
0..*	**From:** DepthRegTrack.AssociatedCurve **To:** DepthRegTrackCurve *Association*	One or more curves specified in this track.
0..*	**From:** DepthRegLogSection.Track **To:** DepthRegTrack *Association*	Defines the position of the tracks within this section.

7.11 DepthRegTrackCurve

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 2/25/2016   *Last modified:* 11/7/2016
Notes: Descriptions of the actual curve, including elements such as line weight, color, and style, within a log track.

Attributes

Name	Type	Notes
CurveBackupScaleType	BackupScaleType	Scale of the backup curve
CurveInfo	String64	Curve mnemonic
CurveLeftScaleValue	double	Scale value on the left axis
CurveRightScaleValue	double	Scale value on the right axis
CurveScaleRect	DepthRegRectangle	Coordinates of rectangle representing the area describing the scale.
CurveScaleType	ScaleType	Scale linearity
CurveUnit	TypeEnum	Unit of data represented
Description	String2000	Details of the line
LineColor	String64	Color of this line
LineStyle	LineStyle	Image line style
LineWeight	String64	Description of line graveness
uid	String64	Unique identifier for the curve.

Associations

Association		Notes
	From: DepthRegTrackCurve. **To:** ScaleType *Dependency*	
	From: DepthRegTrackCurve. **To:** LineStyle *Dependency*	
	From: DepthRegTrackCurve. **To:** BackupScaleType *Dependency*	
0..*	**From:** DepthRegTrack.AssociatedCurve **To:** DepthRegTrackCurve *Association*	One or more curves specified in this track.

7.12 FileNameType

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: *Created:* 2/25/2016   *Last modified:* 11/7/2016
Notes: Specifies the type of file referenced.

Attributes

Name	Type	Notes
file name	abstractTypeEnum	The file name of the image.
path name	abstractTypeEnum	The path where the file is located.
universal resource locator	abstractTypeEnum	A string of characters used to identify a resource.
other	abstractTypeEnum	The value is not known. Avoid using this value. All reasonable attempts should be made to determine the appropriate value. Use of this value may result in rejection in some situations.

Associations

Association	Notes
From: FileNameType. **To:** TypeEnum *Generalization*	
From: DepthRegImage. **To:** FileNameType *Dependency*	

7.13 LineStyle

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: Created: 2/25/2016   *Last modified:* 11/7/2016
Notes: Specifies the style of line used to define the DepthRegTrackCurve.

Attributes

Name	Type	Notes
dashed		
solid		
dotted		
short dashed		
long dashed		

Associations

Association	Notes
From: LineStyle. **To:** TypeEnum *Generalization*	
From: DepthRegTrackCurve. **To:** LineStyle *Dependency*	

7.14 LogRectangleType

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: *Created:* 2/25/2016   *Last modified:* 11/7/2016
Notes: Specifies the type of content from the original log defined by the rectangle.

Attributes

Name	Type	Notes
header	abstractTypeEnum	Denotes rectangle bounds a header section
alternate		

Associations

Association	Notes
From: LogRectangleType. **To:** TypeEnum *Generalization*	
From: DepthRegLogRect. **To:** LogRectangleType *Dependency*	

7.15 LogSectionType

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: Created: 2/25/2016   *Last modified:* 11/7/2016
Notes: Specifies the type of log section.

Attributes

Name	Type	Notes
main	abstractTypeEnum	
repeat	abstractTypeEnum	An interval of log that has been recorded for a second time.
calibration	abstractTypeEnum	
tie in	abstractTypeEnum	
going in hole	abstractTypeEnum	
other	abstractTypeEnum	The value is not known. Avoid using this value. All reasonable attempts should be made to determine the appropriate value. Use of this value may result in rejection in some situations.

Associations

Association	Notes
From: LogSectionType. **To:** TypeEnum *Generalization*	
From: DepthRegLogSection. **To:** LogSectionType *Dependency*	

7.16 LogTrackType

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: *Created:* 2/25/2016   *Last modified:* 11/7/2016
Notes: Specifies the kinds of track.

Attributes

Name	Type	Notes
curves		
data		
depth	abstractTypeEnum	The index used by the track is depth
traces		
other	abstractTypeEnum	The index used by the track is something other than depth.

Associations

Association	Notes
From: LogTrackType. **To:** TypeEnum *Generalization*	
From: DepthRegTrack. **To:** LogTrackType *Dependency*	

7.17 MessageDigestType

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: Created: 2/25/2016   *Last modified:* 11/7/2016
Notes: Specifies message digest types.

Attributes

Name	Type	Notes
MD5		See IETF RFC 1321 (http://www.ietf.org/rfc/rfc1321.txt)
SHA1		See IETF RFC 3174 (http://www.ietf.org/rfc/rfc3174.txt).
other		

Associations

Association	Notes
From: MessageDigestType. **To:** TypeEnum *Generalization*	
From: DepthRegImage. **To:** MessageDigestType *Dependency*	

7.18 MimeType

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: Created: 2/25/2016   *Last modified:* 11/7/2016
Notes: Specifies the list of mimetypes.

Attributes

Name	Type	Notes
image/tiff	abstractTypeEnum	The image format is Tagged Image File Format.
image/gif	abstractTypeEnum	The image format is Graphic Interchange Format.
image/png	abstractTypeEnum	The image format is Portable Network Graphics.
image/xml+svg	abstractTypeEnum	The image format is xml with scalable vector graphics.
other	abstractTypeEnum	The value is not known. Avoid using this value. All reasonable attempts should be made to determine the appropriate value. Use of this value may result in rejection in some situations.

Associations

Association	Notes
From: MimeType. **To:** TypeEnum *Generalization*	
From: DepthRegImage. **To:** MimeType *Dependency*	

7.19 ScaleType

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: *Created:* 2/25/2016   *Last modified:* 11/7/2016
Notes: Specifies the main line scale types.

Attributes

Name	Type	Notes
linear		
logarithmic		

Associations

Association	Notes
From: ScaleType. **To:** TypeEnum *Generalization*	
From: DepthRegTrackCurve. **To:** ScaleType *Dependency*	

8 OpsReport

Package: xsd_schemas
Notes: OpsReport Schema

8.1 AbstractItemWtOrVolPerUnit

Type: Class *Stereotype:* «XSDcomplexType»
Detail: Created: 8/12/2016 *Last modified:* 10/25/2016
Notes: Item weight or volume per unit.

Associations

Association	Notes
From: ItemVolPerUnit. **To:** AbstractItemWtOrVolPerUnit *Generalization*	
From: ItemWtPerUnit. **To:** AbstractItemWtOrVolPerUnit *Generalization*	

8.2   AnchorState

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 11/3/2016   *Last modified:* 11/3/2016
Notes:

Attributes

Name	Type	Notes
AnchorAngle	PlaneAngleMeasure	Angle of the anchor or mooring line.
AnchorName	String64	The anchor number within a mooring system, or name if a name is used instead.
AnchorTension	ForceMeasure	Tension on the mooring line represented by the named anchor.
Description	String2000	Free-test description of the state of this anchor or mooring line.

Associations

Association		Notes
0..*	**From:** RigResponse.AnchorState **To:** AnchorState *Association*	The response of the mooring system represented by the OpsReport. There is one AnchorState for each anchor or mooring line.

8.3   BeaufortScaleIntegerCode

Type: Class   *Stereotype:* «XSDsimpleType»
Detail: *Created:* 4/13/2015   *Last modified:* 11/7/2016
Notes: An estimated wind strength based on the Beaufort Wind Scale. Values range from 0 (calm) to 12 (hurricane).

8.4 DayCost

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: Created: 4/13/2015   *Last modified:* 11/7/2016
Notes: Day Cost SchemaSchema. Captures daily cost information for the object (cost item) to which it is attached.

Attributes

Name	Type	Notes
CostAmount	Cost	Cost for the item for this record.
CostClass	String64	Cost class code.
CostCode	String64	Cost code.
CostGroup	String64	Cost group code.
CostItemDescription	String64	Description of the cost item.
CostPerItem	Cost	Cost of each cost item, assume same currency.
CostSubCode	String64	Cost subcode.
Estimated	boolean	Is this an estimated cost? Values are "true" (or "1") and "false" (or "0").
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
IsCarryOver	boolean	Is this item carried from day to day? Values are "true" (or "1") and "false" (or "0").
IsRental	boolean	Is this item a rental? Values are "true" (or "1") and "false" (or "0").
ItemKind	UomEnum	The kind of cost item specified (e.g., rig dayrate, joints casing).
ItemSize	double	Size of one cost item.
NameTag	NameTag	An identification tag for the item. A serial number is a type of identification tag; however, some tags contain many pieces of information. This element only identifies the tag and does not describe the contents.
NameVendor	String64	Name of the vendor.
NumAFE	String64	AFE number that this cost item applies to.
NumInvoice	String64	Invoice number for cost item; the bill is sent to the operator.
NumPO	String64	Purchase order number provided by the operator.
NumSerial	String64	Serial number.
NumTicket	String64	The field ticket number issued by the service company on location.
NumVendor	String64	Vendor number.
Pool	String64	Name of pool/reservoir that this cost item can be accounted to.
QtyItem	int	Number of cost items used that day, e.g., 1 rig dayrate, 30 joints of casing.
uid	String64	Unique identifier for this instance of DayCost

Associations

Association		Notes
0..*	**From:** WellCMLedger.Cost **To:** DayCost *Association*	The job or event cost detail.
0..*	**From:** OpsReport.DayCost **To:** DayCost *Association*	Cost item for the report interval.

8.5   Hse

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: Created: 4/13/2015   *Last modified:* 11/7/2016
Notes: Operations Health, Safety and Environment Schema. Captures data related to HSE events (e.g., tests, inspections, meetings, and drills), test values (e.g., pressure tested to), and/or incidents (e.g., discharges, non-compliance notices received, etc.).

Attributes

Name	Type	Notes
Comments	String2000	Comments and remarks.
DaysIncFree	TimeMeasure	Incident free duration (commonly in days).
FluidDischarged	VolumeMeasure	Daily whole mud discarded.
LastAbandonDrill	TimeStamp	Last abandonment drill.
LastBopDrill	TimeStamp	Last blow out preventer drill.
LastBopPresTest	TimeStamp	Last blow out preventer pressure test.
LastCsgPresTest	TimeStamp	Last casing pressure test date and time.
LastDiverterDrill	TimeStamp	Last diverter drill.
LastFireBoatDrill	TimeStamp	Last fire or life boat drill.
LastRigInspection	TimeStamp	Last rig inspection/check.
LastSafetyInspection	TimeStamp	Last safety inspection.
LastSafetyMeeting	TimeStamp	Last safety meeting.
LastTripDrill	TimeStamp	Last trip drill.
NextBopPresTest	TimeStamp	Next blow out preventer pressure test.
NonComplianceIssued	boolean	Inspection non-compliance notice served? Values are "true" (or "1") and "false" (or "0").
NumStopCards	int	Number of health, safety and environment incidents reported.
PresAnnular	PressureMeasure	Blow out preventer annular preventer pressure tested to.
PresChokeLine	PressureMeasure	Choke line pressure tested to.
PresChokeMan	PressureMeasure	Choke line manifold pressure tested to.
PresDiverter	PressureMeasure	Blow out preventer diverter pressure tested to.
PresKellyHose	PressureMeasure	Kelly hose pressure tested to.
PresLastCsg	PressureMeasure	Last casing pressure test pressure.
PresRams	PressureMeasure	Blow out preventer ram pressure tested to.
PresStdPipe	PressureMeasure	Standpipe manifold pressure tested to.
RegAgencyInsp	boolean	Governmental regulatory inspection agency inspection? Values are "true" (or "1") and "false" (or "0").
VolCtgDischarged	VolumeMeasure	Volume of cuttings discharged.
VolOilCtgDischarge	VolumeMeasure	Oil on cuttings daily discharge.
WasteDischarged	VolumeMeasure	Volume of sanitary waste discharged.

Associations

Association		Notes
0..*	**From:** Hse.Incident **To:** Incident *Association*	Incident report occurrences description.
0..1	**From:** OpsReport.Hse **To:** Hse *Association*	Health, safety and environmental information.

8.6 Incident

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: Created: 4/13/2015   *Last modified:* 11/7/2016
Notes: Operations HSE Schema. Captures data for a specific incident.

Attributes

Name	Type	Notes
CauseDesc	String2000	Cause description.
CostLossGross	Cost	Gross estimate of the cost incurred due to the incident.
DescAccident	String2000	Accident description.
DescLocation	String64	Location description.
DTim	TimeStamp	Date and time the information is related to.
ETimLostGross	TimeMeasure	Number of hours lost due to the incident.
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
IsNearMiss	boolean	Near miss incident occurrence? Values are "true" (or "1") and "false" (or "0").
NumFatality	int	Number of personnel killed due to the incident.
NumMajorInjury	int	Number of personnel with major injuries.
NumMinorInjury	int	Number of personnel with minor injuries.
RemedialActionDesc	String2000	Remedial action description.
Reporter	String64	Name of the person who prepared the incident report.
ResponsibleCompany	String64	Name of the company that caused the incident.
uid	String64	Unique identifier for this instance of Incident

Associations

Association		Notes
0..*	**From:** Hse.Incident **To:** Incident *Association*	Incident report occurrences description.

8.7 Inventory

Type: Class *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015 *Last modified:* 11/7/2016
Notes: Inventory Component Schema.

Attributes

Name	Type	Notes
CostItem	Cost	Cost for the product for the report interval.
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
ItemWtOrVolPerUnit	AbstractItemWtOrVolPerUnit	Item weight or volume per unit.
Name	String64	Name or type of inventory item.
PricePerUnit	Cost	Price per item unit, assume same currency for all items.
QtyAdjustment	int	Daily quantity adjustment/correction.
QtyOnLocation	int	Amount of the item remaining on location after all adjustments for the report interval.
QtyReceived	int	Quantity received at the site.
QtyReturned	int	Quantity returned to base from site.
QtyStart	int	Start quantity for report interval.
QtyUsed	int	Quantity used for the report interval.
uid	String64	Unique identifier for this instance of Inventory.

Associations

Association		Notes
0..*	**From:** OpsReport.MudInventory **To:** Inventory *Association*	Mud inventory item and cost for the report interval.
0..*	**From:** OpsReport.BulkInventory **To:** Inventory *Association*	Bulk item usage and cost.

8.8   ItemVolPerUnit

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 8/12/2016   *Last modified:* 10/25/2016
Notes: Item volume per unit.

Attributes

Name	Type	Notes
ItemVolPerUnit	VolumeMeasure	Item volume per unit.

Associations

Association	Notes
From: ItemVolPerUnit. **To:** AbstractItemWtOrVolPerUnit *Generalization*	

8.9   ItemWtPerUnit

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 8/12/2016   *Last modified:* 10/25/2016
Notes: Item weight per unit.

Attributes

Name	Type	Notes
ItemWtPerUnit	MassMeasure	Item weight per unit.

Associations

Association	Notes
From: ItemWtPerUnit. **To:** AbstractItemWtOrVolPerUnit *Generalization*	

8.10 MudLosses

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015   *Last modified:* 11/7/2016
Notes: Operations Mud Losses Schema.Captures volumes of mud lost for specific activities or onsite locations and total volumes for surface and down hole.

Attributes

Name	Type	Notes
VolLostAbandonHole	VolumeMeasure	Mud volume lost downhole during abandonment.
VolLostBhdCsgHole	VolumeMeasure	Mud volume lost downhole behind casing.
VolLostCircHole	VolumeMeasure	Mud volume lost downhole while circulating.
VolLostCmtHole	VolumeMeasure	Mud volume lost downhole while cementing.
VolLostCsgHole	VolumeMeasure	Mud volume lost downhole while running casing.
VolLostMudCleanerSurf	VolumeMeasure	Volume of mud lost in mud cleaning equipment (at surface).
VolLostOtherHole	VolumeMeasure	Mud volume lost downhole from other location.
VolLostOtherSurf	VolumeMeasure	Surface volume lost other location.
VolLostPitsSurf	VolumeMeasure	Volume of mud lost in pit room (at surface).
VolLostShakerSurf	VolumeMeasure	Volume of mud lost at shakers (at surface).
VolLostTrippingSurf	VolumeMeasure	Volume of mud lost while tripping (at surface).
VolTotMudLostHole	VolumeMeasure	Total volume of mud lost downhole.
VolTotMudLostSurf	VolumeMeasure	Total volume of mud lost at surface.

Associations

Association		Notes
0..1	**From:** MudVolume.MudLosses **To:** MudLosses *Association*	

8.11 MudVolume

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015   *Last modified:* 11/7/2016
Notes: Operations Mud Volume Component Schema.

Attributes

Name	Type	Notes
VolMudBuilt	VolumeMeasure	Volume of mud built.
VolMudCasing	VolumeMeasure	Volume of mud contained in casing annulus.
VolMudDumped	VolumeMeasure	Volume of mud dumped.
VolMudHole	VolumeMeasure	Volume of mud contained in the openhole annulus.
VolMudReceived	VolumeMeasure	Volume of mud received from mud warehouse.
VolMudReturned	VolumeMeasure	Volume of mud returned to mud warehouse.
VolMudRiser	VolumeMeasure	Volume of mud contained in riser section annulus.
VolMudString	VolumeMeasure	Volume of mud contained within active string.
VolTotMudEnd	VolumeMeasure	Total volume of mud at the end of the report interval (including pits and hole).
VolTotMudStart	VolumeMeasure	Total volume of mud at start of report interval (including pits and hole).

Associations

Association		Notes
0..1	**From:** MudVolume.MudLosses **To:** MudLosses *Association*	
0..1	**From:** OpsReport.MudVolume **To:** MudVolume *Association*	Description of mud built, received, etc.

8.12 OpsReport

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015   *Last modified:* 11/7/2016
Notes: Used to capture a daily drilling report focused on reporting from the service company to the operator. For a similar object whose focus is operator to partner or to governmental agency, see DrillReport. This object is uniquely identified within the context of one wellbore object.

Attributes

Name	Type	Notes
ConditionHole	String64	Hole condition description.
CostDay	Cost	Daily cost.
CostDayMud	Cost	Daily mud cost.
DiaCsgLast	LengthMeasure	Diameter of the last casing installed.
DiaHole	LengthMeasure	Hole diameter.
DistDrill	LengthMeasure	Distance drilled since the previous report.
DistDrillRot	LengthMeasure	Distance drilled: rotating.
DistDrillSlid	LengthMeasure	Distance drilled: sliding.
DistHold	LengthMeasure	Distance covered while holding angle with a steerable drilling assembly.
DistReam	LengthMeasure	Distance reamed.
DistSteering	LengthMeasure	Distance covered while actively steering with a steerable drilling assembly.
DTim	TimeStamp	Date and time the information is related to.
Engineer	String64	Name of the engineer.
ETimCirc	TimeMeasure	Time spent circulating from start of the bit run.
ETimDrill	TimeMeasure	Drilling time.
ETimDrillRot	TimeMeasure	Time spent rotary drilling for the report interval.
ETimDrillSlid	TimeMeasure	Time spent slide drilling from start of the bit run.
ETimHold	TimeMeasure	Time spent with no directional drilling work (commonly in hours).
ETimLoc	TimeMeasure	Time the rig has been on location (commonly in days).
ETimReam	TimeMeasure	Time spent reaming from start of the bit run.
ETimSpud	TimeMeasure	Time since the bit broke ground (commonly in days).
ETimStart	TimeMeasure	Time from the start of operations (commonly in days).
ETimSteering	TimeMeasure	Time spent steering the bottomhole assembly (commonly in hours).
Forecast24Hr	String2000	Forecast of activities for the next 24 hrs.
Geologist	String64	Name of the operator's wellsite geologist.
Lithology	String64	Description of the lithology for the interval.
Maasp	PressureMeasure	Maximum allowable shut-in casing pressure.

Name	Type	Notes
MdCsgLast	MeasuredDepthCoord	Measured depth of last casing.
MdPlanned	MeasuredDepthCoord	Measured depth of plan for this day number.
MdReport	MeasuredDepthCoord	The measured depth of the wellbore.
NameFormation	String64	Name of the formation.
NumAFE	String64	Authorization for expenditure (AFE) number that this cost item applies to.
NumContract	int	Number of contractor personnel on board the rig.
NumOperator	int	Number of operator personnel on board the rig.
NumPob	int	Total number of personnel on board the rig.
NumService	int	Number of service company personnel on board the rig.
PresKickTol	PressureMeasure	Kick tolerance pressure.
PresLotEmw	MassPerVolumeMeasure	Leak off test equivalent mud weight.
Rig	String64	A pointer to the rig used in this reporting period.
RopAv	LengthPerTimeMeasure	Average rate of penetration through the interval.
RopCurrent	LengthPerTimeMeasure	Rate of penetration at report time.
StatusCurrent	String2000	Current status description.
Sum24Hr	String2000	Summary of the operations and events for the reporting period (the previous 24 hours).
Supervisor	String64	Name of the operator's rig supervisor.
Tubular	String64	A pointer to the tubular assembly (as specified in the Tubular object) used in this report period.
TvdCsgLast	WellVerticalDepthCoord	True vertical depth of the last casing installed.
TvdLot	WellVerticalDepthCoord	True vertical depth of the leak-off test point.
TvdReport	WellVerticalDepthCoord	True vertical depth of the wellbore.
VolKickTol	VolumeMeasure	Kick tolerance volume.

Associations

Association		Notes
1..1	**From:** OpsReport.Wellbore **To:** Wellbore *Association*	
	From: OpsReport. **To:** AbstractObject *Generalization*	
0..1	**From:** OpsReport.WbGeometry **To:** WellboreGeometry *Association*	Record of actual hole geometry at report time.
0..*	**From:** OpsReport.PumpOp **To:** PumpOp *Association*	
0..*	**From:** OpsReport.MudInventory **To:** Inventory *Association*	Mud inventory item and cost for the report interval.
0..*	**From:** OpsReport.SupportCraft **To:** SupportCraft	Support craft object container element.

Association		Notes
	Association	
0..1	**From:** OpsReport.Hse **To:** Hse *Association*	Health, safety and environmental information.
0..1	**From:** OpsReport.RigResponse **To:** RigResponse *Association*	Average rig response readings for the day.
0..1	**From:** OpsReport.MudVolume **To:** MudVolume *Association*	Description of mud built, received, etc.
0..*	**From:** OpsReport.ShakerOp **To:** ShakerOp *Association*	Container element for shaker operation elements.
0..*	**From:** OpsReport.Weather **To:** Weather *Association*	Meteorlogical readings for the day.
0..*	**From:** OpsReport.DayCost **To:** DayCost *Association*	Cost item for the report interval.
0..*	**From:** OpsReport.Activity **To:** DrillActivity *Association*	Activity breakdown, multiple for many activities.
0..*	**From:** OpsReport.PitVolume **To:** PitVolume *Association*	
0..*	**From:** OpsReport.Personnel **To:** Personnel *Association*	Personnel Records
0..*	**From:** OpsReport.TrajectoryStation **To:** TrajectoryStation *Association*	Survey station recorded during the report interval.
0..*	**From:** OpsReport.BulkInventory **To:** Inventory *Association*	Bulk item usage and cost.
0..*	**From:** OpsReport.Scr **To:** Scr *Association*	Slow circulation rate pressure test for well control operations.
0..*	**From:** OpsReport.Fluid **To:** Fluid *Association*	One fluid record.
0..*	**From:** OpsReport.DrillingParams **To:** DrillingParams *Association*	Average bottom hole assembly parameters for report duration or actual instances of bottom hole assembly operations.

8.13 Personnel

Type: Class *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015 *Last modified:* 11/7/2016
Notes: Operations Personnel Component Schema. List each company on the rig at the time of the report and key information about each company, for example, name, type of service, and number of personnel.

Attributes

Name	Type	Notes
Company	String64	Name of the company.
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
NumPeople	int	Number of people on board for that company.
TotalTime	TimeMeasure	Total time worked by the company (commonly in hours).
TypeService	String64	Service provided by the company.
uid	String64	Unique identifier for this instance of Personnel.

Associations

Association		Notes
0..*	**From:** OpsReport.Personnel **To:** Personnel *Association*	Personnel Records

8.14 PitVolume

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015   *Last modified:* 11/7/2016
Notes: Pit Volume Component Schema.

Attributes

Name	Type	Notes
DensFluid	MassPerVolumeMeasure	Density of fluid in the pit.
DescFluid	String64	Description of the fluid in the pit.
DTim	TimeStamp	Date and time the information is related to.
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
Pit	int	This is a pointer to the corresponding pit on the rig containing the volume being described.
uid	String64	Unique identifier for this instance of PitVolume.
VisFunnel	TimeMeasure	Funnel viscosity (in seconds).
VolPit	VolumeMeasure	Volume of fluid in the pit.

Associations

Association	Notes
0..* **From:** OpsReport.PitVolume **To:** PitVolume *Association*	

8.15 PumpOp

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: Created: 4/13/2015   *Last modified:* 11/7/2016
Notes: Operations Pump Component Schema.

Attributes

Name	Type	Notes
DTim	TimeStamp	Date and time the information is related to.
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
IdLiner	LengthMeasure	Liner inside diameter.
LenStroke	LengthMeasure	Stroke length.
MdBit	MeasuredDepthCoord	Along-hole measured depth of the measurement from the drill datum.
PcEfficiency	PowerPerPowerMeasure	Pump efficiency.
Pressure	PressureMeasure	Pump pressure recorded.
Pump	int	A pointer to the corresponding pump on the rig.
PumpOutput	VolumePerTimeMeasure	Pump output (included for efficiency).
RateStroke	AngularVelocityMeasure	Pump rate (strokes per minute).
TypeOperation	PumpOpType	Type of pump operation.
uid	String64	Unique identifier for this instance of PumpOp.

Associations

Association		Notes
	From: PumpOp. **To:** PumpOpType *Dependency*	
0..*	**From:** OpsReport.PumpOp **To:** PumpOp *Association*	

8.16 PumpOpType

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: *Created:* 4/13/2015   *Last modified:* 11/7/2016
Notes: Specifies type of well operation being conducted while this pump was in use.

Attributes

Name	Type	Notes
drilling		
reaming		
circulating		
slow pump		
unknown		The value is not known. Avoid using this value. All reasonable attempts should be made to determine the appropriate value. Use of this value may result in rejection in some situations.

Associations

Association	Notes
From: PumpOpType. **To:** TypeEnum *Generalization*	
From: PumpOp. **To:** PumpOpType *Dependency*	

8.17 RigResponse

Type: Class *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015 *Last modified:* 11/7/2016
Notes: Operations Rig Response Component Schema.

Attributes

Name	Type	Notes
BallJointAngle	PlaneAngleMeasure	Angle between the riser and the blowout preventer (BOP) at the flex joint.
BallJointDirection	PlaneAngleMeasure	Direction of the ball joint.
DispRig	LengthMeasure	Vessel displacement (in water).
GuideBaseAngle	PlaneAngleMeasure	Direction of the guide base.
LoadLeg1	ForceMeasure	Load carried by one leg of a jackup rig.
LoadLeg2	ForceMeasure	Load carried by the second leg of a jackup rig.
LoadLeg3	ForceMeasure	Load carried by the third leg of a jackup rig.
LoadLeg4	ForceMeasure	Load carried by the fourth leg of a jackup rig.
MeanDraft	LengthMeasure	Mean draft at mid-section of the vessel.
OffsetRig	LengthMeasure	Horizontal displacement of the rig relative to the wellhead.
PenetrationLeg1	LengthMeasure	Penetration of the first leg into the seabed.
PenetrationLeg2	LengthMeasure	Penetration of the second leg into the seabed.
PenetrationLeg3	LengthMeasure	Penetration of the third leg into the seabed.
PenetrationLeg4	LengthMeasure	Penetration of the fourth leg into the seabed.
RigHeading	PlaneAngleMeasure	Direction, relative to true north, to which the rig is facing.
RigHeave	LengthMeasure	Maximum amplitude of the vertical motion of the rig.
RigPitchAngle	PlaneAngleMeasure	Measure of the fore-aft rotational movement of the rig due to the combined effects of wind and waves; measured as the angle from horizontal.
RigRollAngle	PlaneAngleMeasure	Measure of the side-to-side rotational movement of the rig due to the combined effects of wind and waves; measured as the angle from vertical.
RiserAngle	PlaneAngleMeasure	Angle of the marine riser with the vertical.
RiserDirection	PlaneAngleMeasure	Direction of the marine riser.
RiserTension	ForceMeasure	Tension of the marine riser.
TotalDeckLoad	ForceMeasure	Total deck load.
VariableDeckLoad	ForceMeasure	Current temporary load on the rig deck.

Associations

Association	Notes

Association		Notes
0..*	**From:** RigResponse.AnchorState **To:** AnchorState *Association*	The response of the mooring system represented by the OpsReport. There is one AnchorState for each anchor or mooring line.
0..1	**From:** OpsReport.RigResponse **To:** RigResponse *Association*	Average rig response readings for the day.

8.18 Scr

Type: Class *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015 *Last modified:* 11/7/2016
Notes: Operations Slow Circulation Rates (SCR) Component Schema.

Attributes

Name	Type	Notes
DTim	TimeStamp	Date and time the information is related to.
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
MdBit	MeasuredDepthCoord	Along hole measured depth of measurement from the drill datum.
PresRecorded	PressureMeasure	Recorded pump pressure for the stroke rate.
Pump	int	A pointer to the corresponding pump on the rig.
RateStroke	AngularVelocityMeasure	Pump stroke rate.
TypeScr	ScrType	Type of slow circulation rate.
uid	String64	Unique identifier for this instance of Scr

Associations

Association		Notes
0..*	**From:** OpsReport.Scr **To:** Scr *Association*	Slow circulation rate pressure test for well control operations.

8.19 ScrType

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: *Created:* 4/13/2015   *Last modified:* 11/7/2016
Notes: Specifies the type of slow circulation rate.

Attributes

Name	Type	Notes
string annulus		
string kill line		
string choke line		
unknown		The value is not known. Avoid using this value. All reasonable attempts should be made to determine the appropriate value. Use of this value may result in rejection in some situations.

Associations

Association	Notes
From: ScrType. **To:** TypeEnum *Generalization*	

8.20 ShakerOp

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015   *Last modified:* 11/7/2016
Notes: Operations Shaker Component Schema.

Attributes

Name	Type	Notes
DTim	TimeStamp	Date and time the information is related to.
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
HoursRun	TimeMeasure	Hours run the shaker has run for this operation.
MdHole	MeasuredDepthCoord	Hole measured depth at the time of measurement.
PcScreenCovered	AreaPerAreaMeasure	Percent of screen covered by cuttings.
Shaker	String64	A pointer to the shaker that is characterized by this report.
uid	String64	Unique identifier for this instance of ShakerOp

Associations

Association		Notes
0..1	**From:** ShakerOp.ShakerScreen **To:** ShakerScreen *Association*	Set of shaker screen records for the operation.
0..*	**From:** OpsReport.ShakerOp **To:** ShakerOp *Association*	Container element for shaker operation elements.

8.21 ShakerScreen

Type: Class *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015 *Last modified:* 11/7/2016
Notes: Operations Shaker Screen Component Schema.

Attributes

Name	Type	Notes
CutPoint	LengthMeasure	Shaker screen cut point, which is the maximum size cuttings that will pass through the screen.
DTimEnd	TimeStamp	Date and time activities were completed.
DTimStart	TimeStamp	Date and time that activities started.
Manufacturer	String64	Manufacturer or supplier of the item.
MeshX	LengthMeasure	Mesh size in the X direction.
MeshY	LengthMeasure	Mesh size in the Y direction.
Model	String64	Manufacturers designated model.
NumDeck	int	Deck number the mesh is installed on.

Associations

Association		Notes
0..1	**From:** ShakerOp.ShakerScreen **To:** ShakerScreen *Association*	Set of shaker screen records for the operation.

8.22 SupportCraft

Type: Class *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015 *Last modified:* 11/7/2016
Notes: Operations Support Craft Component Schema.

Attributes

Name	Type	Notes
Comments	String2000	Comments and remarks.
DTimArrived	TimeStamp	Date and time when the vehicle arrived at the rig site.
DTimDeparted	TimeStamp	Date and time when the vehicle departed from the rig site.
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
Name	String64	Human-recognizable context for the support craft.
TypeSupportCraft	SupportCraftType	Type of support craft (e.g., barge, helicopter, tug boat, etc.)
uid	String64	Unique identifier for this instance of SupportCraft.

Associations

Association		Notes
	From: SupportCraft. **To:** SupportCraftType *Dependency*	
0..*	**From:** OpsReport.SupportCraft **To:** SupportCraft *Association*	Support craft object container element.

8.23 SupportCraftType

Type: Enumeration   *Stereotype:*
Detail: *Created:* 9/3/2015   *Last modified:* 11/7/2016
Notes: Specifies the type of support craft.

Attributes

Name	Type	Notes
barge		
standby boat		
helicopter		
supply boat		
truck		
crew vehicle		
tug boat		

Associations

Association	Notes
From: SupportCraftType. **To:** TypeEnum *Generalization*	
From: SupportCraft. **To:** SupportCraftType *Dependency*	

8.24 Weather

Type: Class *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015 *Last modified:* 11/7/2016
Notes: Operations Weather Component Schema.

Attributes

Name	Type	Notes
Agency	String64	Name of company that supplied the weather data.
AmtPrecip	LengthMeasure	Amount of precipitation.
AziCurrentSea	PlaneAngleMeasure	Azimuth of current.
AziWave	PlaneAngleMeasure	The direction from which the waves are coming, measured from true north.
AziWind	PlaneAngleMeasure	The direction from which the wind is blowing, measured from true north.
BarometricPressure	PressureMeasure	Atmospheric pressure.
BeaufortScaleNumber	BeaufortScaleIntegerCode	The Beaufort wind force scale is a system used to estimate and report wind speeds when no measuring apparatus is available. It was invented in the early 19th century by Admiral Sir Francis Beaufort of the British Navy as a way to interpret winds from conditions. Values range from 0 (calm) to 12 (hurricane force).
CeilingCloud	LengthMeasure	Height of cloud cover.
Comments	String2000	Comments and remarks.
CoverCloud	String64	Description of cloud cover.
CurrentSea	LengthPerTimeMeasure	The speed of the ocean current.
DTim	TimeStamp	Date and time the information is related to.
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
HtWave	LengthMeasure	Average height of the waves.
MaxWave	LengthMeasure	The maximum wave height.
PeriodWave	TimeMeasure	The elapsed time between the passing of two wave tops.
SignificantWave	LengthMeasure	An average of the higher 1/3 of the wave heights passing during a sample period (typically 20 to 30 minutes).
Tempsea	ThermodynamicTemperatureMeasure	Sea temperature.
TempSurfaceMn	ThermodynamicTemperatureMeasure	Minimum temperature above ground. Temperature of the atmosphere.
TempSurfaceMx	ThermodynamicTemperatureMeasure	Maximum temperature above ground.
TempWindChill	ThermodynamicTemperatureMeasure	A measure of the combined chilling effect of wind and low temperature on living things, also named chill factor, e.g., according to the US weather service table, an air temperature of 30 degF with a 10 mph corresponds to a windchill of 22 degF.

Name	Type	Notes
TypePrecip	String64	Type of precipitation.
uid	String64	Unique identifier for this instance of Weather
VelWind	LengthPerTimeMeasure	Wind speed.
Visibility	LengthMeasure	Horizontal visibility.

Associations

Association		Notes
0..*	**From:** OpsReport.Weather **To:** Weather *Association*	Meteorlogical readings for the day.

9 Rig

Package: xsd_schemas
Notes: Rig Schema.

9.1 Bop

Type: Class *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015 *Last modified:* 11/7/2016
Notes: Rig blowout preventer (BOP) schema.

Attributes

Name	Type	Notes
Accumulator	String64	Type of accumulator/description.
CapAccFluid	VolumeMeasure	Accumulator fluid capacity.
DescControlManifold	String2000	Description of the control system.
DiaDiverter	LengthMeasure	Diameter of the diverter.
DTimInstall	TimeStamp	Date and time the BOP was installed.
DTimRemove	TimeStamp	Date and time of the BOP was removed.
IdBoosterLine	LengthMeasure	Inner diameter of the booster line.
IdChkLine	LengthMeasure	Inner diameter of the choke line.
IdKillLine	LengthMeasure	Inner diameter of the kill line.
IdSurfLine	LengthMeasure	Inner diameter of the surface line.
LenBoosterLine	LengthMeasure	Length of the booster line along the riser.
LenChkLine	LengthMeasure	Length of the choke line along the riser.
LenKillLine	LengthMeasure	Length of the kill line.
LenSurfLine	LengthMeasure	Length of the surface line the along riser.
Manufacturer	String64	Manufacturer or supplier of the item.
Model	String64	Manufacturer's designated model.
NameTag	NameTag	An identification tag for the blowout preventer. A serial number is a type of identification tag; however, some tags contain many pieces of information.This element only identifies the tag and does not describe the contents.
OdBoosterLine	LengthMeasure	Outer diameter of the booster line.
OdChkLine	LengthMeasure	Outer diameter of the choke line.
OdKillLine	LengthMeasure	Outer diameter of the kill line.
OdSurfLine	LengthMeasure	Outer diameter of the surface line.
PresAccOpRating	PressureMeasure	Accumulator operating pressure rating.
PresAccPreCharge	PressureMeasure	Accumulator pre-charge pressure.
PresBopRating	PressureMeasure	Maximum pressure rating of the blowout preventer.

Name	Type	Notes
PresChokeManifold	PressureMeasure	Choke manifold pressure.
PresWorkDiverter	PressureMeasure	Working rating pressure of the component.
RotBop	boolean	Is this a rotating blowout preventer? Values are "true" (or "1") and "false" (or "0").
SizeBopSys	LengthMeasure	Maximum tubulars passable through the blowout preventer.
SizeConnectionBop	LengthMeasure	Size of the connection to the blowout preventer.
TypeChokeManifold	String64	Type of choke manifold.
TypeConnectionBop	String64	Type of connection to the blowout preventer.
TypeControlManifold	String64	The blowout preventer control system.
TypeDiverter	String64	Diverter description.
VolAccPreCharge	VolumeMeasure	Accumulator pre-charge volume

Associations

Association		Notes
0..*	**From:** Bop.BopComponent **To:** BopComponent *Association*	Container element for Blow Out Preventer component schema elements.
0..1	**From:** RigUtilization.Bop **To:** Bop *Association*	Blow out preventer description and components.

9.2   BopComponent

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015   *Last modified:* 11/7/2016
Notes: Blowout Preventer Component Schema.

Attributes

Name	Type	Notes
DescComp	String64	Description of the component.
DiaCloseMn	LengthMeasure	Minimum diameter of the component it will seal.
DiaCloseMx	LengthMeasure	Maximum diameter of the component it will seal.
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
IdPassThru	LengthMeasure	Inner diameter that tubulars can pass through.
IsVariable	boolean	Is ram bore variable or single size? Defaults to false. Values are "true" (or "1") and "false" (or "0").
Nomenclature	String64	Arrangement nomenclature for the blowout preventer stack (e.g., S, R, A).
PresWork	PressureMeasure	Working rating pressure of the component.
TypeBopComp	BopType	Type of ram or preventer.
uid	String64	Unique identifier for this instance of BopComponent

Associations

Association		Notes
	From: BopComponent. **To:** BopType *Dependency*	
0..*	**From:** Bop.BopComponent **To:** BopComponent *Association*	Container element for Blow Out Preventer component schema elements.

9.3   BopType

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: *Created:* 4/13/2015   *Last modified:* 10/25/2016
Notes: Specifies the type of blowout preventer.

Attributes

Name	Type	Notes
annular preventer		
shear ram		
blind ram		
pipe ram		
drilling spool		
flexible joint		
connector		

Associations

Association	Notes
From: BopType. **To:** TypeEnum *Generalization*	
From: BopComponent. **To:** BopType *Dependency*	

9.4   Centrifuge

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015   *Last modified:* 11/7/2016
Notes: Rig Centrifuge Schema.

Attributes

Name	Type	Notes
CapFlow	VolumePerTimeMeasure	Maximum pump rate at which the unit efficiently operates.
DTimInstall	TimeStamp	Date and time the centrifuge was installed.
DTimRemove	TimeStamp	Date and time the centrifuge was removed.
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
Manufacturer	String64	Manufacturer or supplier of the item.
Model	String64	Manufacturer's designated model.
NameTag	NameTag	An identification tag for the centrifuge. A serial number is a type of identification tag; however, some tags contain many pieces of information.This element only identifies the tag and does not describe the contents.
Owner	String64	Contractor/owner.
Type	String64	Description for the type of object.
uid	String64	Unique identifier for this instance of Centrifuge.

Associations

Association	Notes
0..* **From:** RigUtilization.Centrifuge **To:** Centrifuge *Association*	Mud cleaning centrifuge equipment for the rig.

9.5 Degasser

Type: Class *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015 *Last modified:* 11/7/2016
Notes: Rig Degasser Schema.

Attributes

Name	Type	Notes
AreaSeparatorFlow	AreaMeasure	Flow area of the separator.
CapBlowdown	VolumePerTimeMeasure	Gas vent rate at which the vent line pressure drop exceeds the hydrostatic head because of the mud seal.
CapFlow	VolumePerTimeMeasure	Maximum pump rate at which the unit efficiently operates.
CapGasSep	VolumePerTimeMeasure	Safe gas-separating capacity.
DTimInstall	TimeStamp	Date and time the degasser was installed.
DTimRemove	TimeStamp	Date and time the degasser was removed.
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
Height	LengthMeasure	Height of the separator.
HtMudSeal	LengthMeasure	Depth of trip-tank fluid level to provide back pressure against the separator flow.
Id	LengthMeasure	Internal diameter of the object.
IdInlet	LengthMeasure	Internal diameter of the inlet line.
IdVentLine	LengthMeasure	Internal diameter of the vent line.
Len	LengthMeasure	Length of the separator.
LenVentLine	LengthMeasure	Length of the vent line.
Manufacturer	String64	Manufacturer or supplier of the item.
Model	String64	Manufacturer's designated model.
NameTag	NameTag	An identification tag for the degasser. A serial number is a type of identification tag; however, some tags contain many pieces of information.This element only identifies the tag and does not describe the contents.
Owner	String64	Contractor/owner.
PresRating	PressureMeasure	Pressure rating of the item.
TempRating	ThermodynamicTemperatureMeasure	Temperature rating of the separator.
Type	String64	Description for the type of object.
uid	String64	Unique identifier for this instance of degasser

Associations

Association	Notes
0..* **From:** RigUtilization.Degasser **To:** Degasser *Association*	Mud de-gasser equipment for the rig.

9.6 DerrickType

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: Created: 4/13/2015   *Last modified:* 10/25/2016
Notes: Specifies the type of drilling derrick.

Attributes

Name	Type	Notes
double		2-stand capacity derrick.
quadruple		4-stand capacity derrick.
slant		Slant derrick.
triple		3-stand capacity derrick.

Associations

Association	Notes
From: DerrickType. **To:** TypeEnum *Generalization*	
From: Rig. **To:** DerrickType *Dependency*	

9.7 DrawWorksType

Type: Enumeration *Stereotype:* «Enumeration»
Detail: *Created:* 4/13/2015 *Last modified:* 10/25/2016
Notes: Specifies the type of draw works.

Attributes

Name	Type	Notes
mechanical		
standard electric		
diesel electric		
ram rig		

Associations

Association	Notes
From: DrawWorksType. **To:** TypeEnum *Generalization*	
From: RigUtilization. **To:** DrawWorksType *Dependency*	

9.8   DriveType

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: *Created:* 4/13/2015   *Last modified:* 10/25/2016
Notes: Specifies the type of work-string drive (rotary system).

Attributes

Name	Type	Notes
coiled tubing		Coiled tubing rig
rotary kelly drive		Kelly drive system
top drive		Top Drive

Associations

Association	Notes
From: DriveType. **To:** TypeEnum *Generalization*	
From: RigUtilization. **To:** DriveType *Dependency*	

9.9 Hydrocyclone

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015   *Last modified:* 11/7/2016
Notes: Rig Hydrocyclones Schema. A hydrocyclone is a cone-shaped device for separating fluids and the solids dispersed in fluids.

Attributes

Name	Type	Notes
DescCone	String64	Cone description.
DTimInstall	TimeStamp	Date and time the hydroclone was installed.
DTimRemove	TimeStamp	Removal date and time the hydroclone was removed.
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
Manufacturer	String64	Manufacturer or supplier of the item.
Model	String64	Manufacturer's designated model.
NameTag	NameTag	An identification tag for the hydrocyclone. A serial number is a type of identification tag; however, some tags contain many pieces of information. This element only identifies the tag and does not describe the contents.
Owner	String64	Contractor/owner.
Type	String64	Description of the type of object.
uid	String64	Unique identifier for this instance of Hydrocyclone.

Associations

Association		Notes
0..*	**From:** RigUtilization.Hydrocyclone **To:** Hydrocyclone *Association*	Mud cleaning hydrocyclone equipment for the rig.

9.10 MudPump

Type: Class *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015 *Last modified:* 11/7/2016
Notes: Rig Mud Pump Schema.

Attributes

Name	Type	Notes
Displacement	VolumeMeasure	Pump displacement.
DTimInstall	TimeStamp	Date and time the pump was installed.
DTimRemove	TimeStamp	Date and time the pump was removed.
Eff	PowerPerPowerMeasure	Efficiency of the pump.
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
IdLiner	LengthMeasure	Inner diameter of the pump liner.
Index	int	Relative pump number. One-based.
LenStroke	LengthMeasure	Stroke length.
Manufacturer	String64	Manufacturer or supplier of the item.
Model	String64	Manufacturer's designated model.
NameTag	NameTag	An identification tag for the pump. A serial number is a type of identification tag; however, some tags contain many pieces of information.This element onlyidentifies the tag and does not describe the contents.
NumCyl	int	Number of cylinders (3 = single acting, 2 = double acting)
OdRod	LengthMeasure	Rod outer diameter.
Owner	String64	Contractor/owner.
PowHydMx	PowerMeasure	Maximum hydraulics horsepower.
PowMechMx	PowerMeasure	Maximum mechanical power.
PresDamp	PressureMeasure	Pulsation dampener pressure.
PresMx	PressureMeasure	Maximum pump pressure.
PumpAction	PumpActionIntegerCode	Pump action. 1 = single acting, 2 = double acting.
SpmMx	AngularVelocityMeasure	Maximum speed.
TypePump	PumpType	Pump type reference list.
uid	String64	Unique identifier for this instance of MudPump.
VolDamp	VolumeMeasure	Pulsation dampener volume.

Associations

Association	Notes
From: MudPump. **To:** PumpType *Dependency*	

Association	Notes
From: RigUtilization.Pump 0..* **To:** MudPump *Association*	Drilling fluid (mud/cement) pumping units for the rig.

9.11 Pit

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015   *Last modified:* 11/7/2016
Notes: Rig Pit Schema.

Attributes

Name	Type	Notes
CapMx	VolumeMeasure	Maximum pit capacity.
DTimInstall	TimeStamp	Date and time the pit was installed.
DTimRemove	TimeStamp	Date and time the pit was removed.
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
Index	int	Relative pit number of all pits on the rig. One-based.
IsActive	boolean	Flag to indicate if the pit is part of the active system. Values are "true" (or "1") and "false" (or "0").
NameTag	NameTag	An identification tag for the pit. A serial number is a type of identification tag; however, some tags contain many pieces of information. This element only identifies the tag and does not describe the contents.
Owner	String64	Contractor/owner.
TypePit	PitType	The type of pit.
uid	String64	Unique identifier for this instance of pit

Associations

Association		Notes
	From: Pit. **To:** PitType *Dependency*	
0..*	**From:** RigUtilization.Pit **To:** Pit *Association*	Pit equipment for the rig.

9.12 PitType

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: Created: 4/13/2015   *Last modified:* 10/25/2016
Notes: Specfies the type of pit.

Attributes

Name	Type	Notes
bulk		
chemical		
drilling		
mix		
mud cleaning		
sand trap		
slug		The pit in the active pit system located immediately downstream of the shale shakers, whose primary purpose is to allow the settling and disposal of the larger drilled cuttings not removed by the shale shakers. It is also called a settling tank".
storage		
surge tank		
trip tank		
unknown		The value is not known. Avoid using this value. All reasonable attempts should be made to determine the appropriate value. Use of this value may result in rejection in some situations.

Associations

Association	Notes
From: PitType. **To:** TypeEnum *Generalization*	
From: Pit. **To:** PitType *Dependency*	

9.13 PumpActionIntegerCode

Type: Class *Stereotype:* «XSDsimpleType»
Detail: *Created:* 4/13/2015 *Last modified:* 10/25/2016
Notes: Pump Action: 1 = single acting, 2 = double acting.

9.14 PumpType

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: *Created:* 4/13/2015   *Last modified:* 10/25/2016
Notes: Specifies the type of pump.

Attributes

Name	Type	Notes
centrifugal		Centrifugal mud pump.
duplex		Duplex mud mump, two cylinders.
triplex		Triplex mud pump, three cylinders.
unknown		The value is not known. Avoid using this value. All reasonable attempts should be made to determine the appropriate value. Use of this value may result in rejection in some situations.

Associations

Association	Notes
From: PumpType. **To:** TypeEnum *Generalization*	
From: MudPump. **To:** PumpType *Dependency*	

9.15 Rig

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 10/18/2016   *Last modified:* 11/8/2016
Notes: Rig Schema. Used to capture information unique to a drilling rig. For information about the usage of a rig in a specific operation, see the RigUtilization object.

Attributes

Name	Type	Notes
Approvals	String64	Rig approvals/certification.
CapWindDerrick	LengthPerTimeMeasure	Derrick wind capacity.
ClassRig	String64	Classification of the rig.
EmailAddress	String64	Email address of the contact person.
FaxNumber	String64	Fax number on the rig.
HtDerrick	LengthMeasure	Height of the derrick.
IsOffshore	boolean	Flag to indicate that the rig is an offshore rig (drill ship, semi-submersible, jack-up, platform, TADU). Values are "true" (or "1") and "false" (or "0").
Manufacturer	String64	The company that manufactured the rig.
NameContact	String64	Name of the contact person.
NumCranes	int	Number of cranes on the rig.
Owner	String64	The name of the company that owns the rig.
RatingDerrick	ForceMeasure	Derrick rating.
RatingDrillDepth	LengthMeasure	Maximum hole depth rating for the rig.
RatingWaterDepth	LengthMeasure	Maximum water depth rating for the rig.
Registration	String64	Rig registration location.
TelNumber	String64	Telephone number on the rig.
TypeDerrick	DerrickType	Derrick type.
TypeRig	RigType	The type of rig (e.g., semi-submersible, jack-up, etc.)
YearEntService	gYear	The year the rig entered service.

Associations

Association	Notes
From: Rig. **To:** RigType *Dependency*	
From: Rig. **To:** DerrickType *Dependency*	
From: Rig. **To:** AbstractObject *Generalization*	
From: RigUtilization.Rig 1 **To:** Rig	

Association	Notes
Association	

9.16 RigType

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: *Created:* 4/13/2015   *Last modified:* 10/25/2016
Notes: Specifies the type of drilling rig.

Attributes

Name	Type	Notes
barge		Barge rig.
coiled tubing		Coiled tubing rig.
floater		Floating rig.
jackup		Jackup rig.
land		Land rig.
platform		Fixed platform.
semi-submersible		Semi-submersible rig.

Associations

Association	Notes
From: RigType. **To:** TypeEnum *Generalization*	
From: Rig. **To:** RigType *Dependency*	

9.17 RigUtilization

Type: Class *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015 *Last modified:* 11/7/2016
Notes: Rig Utilization Schema. Used to capture information related to the usage of a specific rig. For information unique to the rig itself, see the Rig object.

Attributes

Name	Type	Notes
AirGap	LengthMeasure	Air gap from the rig floor to the ground or mean sea level, depending on the rig location.
Azimuthing	boolean	Are the thrusters azimuth? Values are "true" (or "1") and "false" (or "0").
BunksPerRoom	int	Number of bunks per room.
CapBulkCement	VolumeMeasure	Capacity of bulk cement.
CapBulkMud	VolumeMeasure	Bulk/dry mud storage capacity.
CapDrillWater	VolumeMeasure	Drill water capacity.
CapFuel	VolumeMeasure	Fuel capacity.
CapLiquidMud	VolumeMeasure	Liquid mud storage capacity.
CapPotableWater	VolumeMeasure	Potable water capacity.
CementUnit	String64	Name of the cement unit on the rig.
Datum	String64	Datum for location reference.
DescBrake	String64	Rig brake description.
DescRotSystem	String64	Description of rotating system.
EndHoleDepth	LengthMeasure	Measured depth of the wellbore when operations performed with this rig ended.
EndOperationTime	TimeStamp	End time of the operation in which the rig was used.
Flares	String64	Description of flare(s).
Gantry	String64	Description of the gantry.
Generator	String64	Description of the electrical power generating system.
HeaveMx	LengthMeasure	Maximum allowable heave.
MainEngine	String64	Power system.
MoorType	String64	Mooring type.
MotionCompensationMn	ForceMeasure	Minimum motion compensation.
MotionCompensationMx	ForceMeasure	Maximum motion compensation.
MotorDrawWorks	String64	Description of the draw works motor.
NumAnch	int	Number of anchors.
NumBlockLines	int	Number of block lines.
NumBunks	int	Number of beds available on the rig.
NumGuideTens	int	Number of guideline tensioners.
NumRiserTens	int	Number of riser tensioners.

Name	Type	Notes
NumThrusters	int	Number of thrusters.
PipeHandlingSystem	String64	Name of pipe-handling system.
PowerDrawWorks	PowerMeasure	Draw works horse power.
RatingBlock	ForceMeasure	Rating for the block.
RatingDrawWorks	ForceMeasure	Weight rating of the draw works.
RatingHkld	ForceMeasure	Maximum weight rating of the hook as configured for this rig usage.
RatingRotSystem	ForceMeasure	Work string rotational torque rating.
RatingSwivel	ForceMeasure	Maximum swivel rating.
RatingTqRotSys	MomentOfForceMeasure	Work string rotational torque rating.
RiserAngleLimit	PlaneAngleMeasure	Riser angle limit.
RotSizeOpening	LengthMeasure	Rotary size opening.
RotSystem	DriveType	Work string drive type.
ScrSystem	String64	Description of slow circulation rates (SCR) system.
SizeDrillLine	LengthMeasure	Drill line diameter.
StartHoleDepth	LengthMeasure	Measured depth of the wellbore when operations performed with this rig started.
StartOperationTime	TimeStamp	Start time of the operation in which the rig was used.
StrokeMotionCompensation	LengthMeasure	Length of motion compensation provided by equipment.
TypeDrawWorks	DrawWorksType	Draw works type.
TypeHook	String64	Type of hook installed for this rig usage.
TypeSwivel	String64	Type of swivel.
VarDeckLdMx	ForceMeasure	Variable deck load maximum (offshore rigs only).
VdlStorm	ForceMeasure	Variable deck load storm rating (offshore rigs only).
WtBlock	ForceMeasure	Weight of the block.

Associations

Association		Notes
0..*	**From:** RigUtilization.BhaRun **To:** BhaRun *Association*	
1	**From:** RigUtilization.Wellbore **To:** Wellbore *Association*	
0..*	**From:** RigUtilization.Centrifuge **To:** Centrifuge *Association*	Mud cleaning centrifuge equipment for the rig.
	From: RigUtilization. **To:** AbstractObject *Generalization*	
0..1	**From:** RigUtilization.SurfaceEquipment **To:** SurfaceEquipment *Association*	Coiled tubing specific equipment configuration.
	From: RigUtilization.Bop	Blow out preventer description and

Association		Notes
0..1	**To:** Bop *Association*	components.
	From: RigUtilization. **To:** DrawWorksType *Dependency*	
0..*	**From:** RigUtilization.Pump **To:** MudPump *Association*	Drilling fluid (mud/cement) pumping units for the rig.
1	**From:** RigUtilization.Rig **To:** Rig *Association*	
0..*	**From:** RigUtilization.Pit **To:** Pit *Association*	Pit equipment for the rig.
0..*	**From:** RigUtilization.Shaker **To:** Shaker *Association*	
0..*	**From:** RigUtilization.Hydrocyclone **To:** Hydrocyclone *Association*	Mud cleaning hydrocyclone equipment for the rig.
	From: RigUtilization. **To:** DriveType *Dependency*	
0..*	**From:** RigUtilization.Degasser **To:** Degasser *Association*	Mud de-gasser equipment for the rig.
1	**From:** RigUtilizationTest. **To:** RigUtilization *Association*	

9.18 Shaker

Type: Class *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015 *Last modified:* 11/7/2016
Notes: Rig Shaker Schema.

Attributes

Name	Type	Notes
CapFlow	VolumePerTimeMeasure	Maximum pump rate at which the unit efficiently operates.
DTimInstall	TimeStamp	Date and time the shaker was installed.
DTimRemove	TimeStamp	Date and time the shaker was removed.
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
LocationShaker	String64	Shaker location on the rig.
Manufacturer	String64	Manufacturer or supplier of the item.
Model	String64	Manufacturer's designated model.
MudCleaner	boolean	Is part of mud-cleaning assembly as opposed to discrete shale shaker? Values are "true" (or "1") and "false" (or "0").
Name	String64	Human-recognizable context for the shaker.
NameTag	NameTag	An identification tag for the shaker. A serial number is a type of identification tag; however, some tags contain many pieces of information. This element only identifies the tag and does not describe the contents. .
NumCascLevel	int	Number of cascade levels.
NumDecks	int	Number of decks.
Owner	String64	Contractor/owner.
SizeMeshMn	LengthMeasure	Minimum mesh size.
Type	String64	Description for the type of object.
uid	String64	Unique identifier for this instance of Shaker.

Associations

Association	Notes
0..* **From:** RigUtilization.Shaker **To:** Shaker *Association*	

9.19 SurfaceEquipment

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015   *Last modified:* 11/7/2016
Notes: Rig Surface Equipment Schema.

Attributes

Name	Type	Notes
CtWrapType	String64	Coiled tubing: the coiled tubing wrap type.
Description	String2000	Description of item and details.
HtFlange	LengthMeasure	Height of the flange.
HtInjStk	LengthMeasure	Coiled tubing: The length of tubing from the end of the coil reel to the rotary kelly bushing. This length includes the tubing in the hole and the tubing on the reel. This measurement takes into account the 20 or so feet of tubing that is being straightened and pushed through the injector head.
HtSurfaceIron	LengthMeasure	Height of the surface iron.
HtTopStk	LengthMeasure	Top drive: The distance that the mud travels from the end of the standpipe hose to the drill pipe connection at the bottom of the top drive. We are measuring the distance that the mud will flow through the top drive.For the top drive. The distance that the mud travels from the end of the standpipe hose to the drill pipe connection at the bottom of the top drive. This is the measurement of the distance that the mud flows through the top drive.
IdDischargeLine	LengthMeasure	Coiled tubing: inner diameter of the pump discharge line.
IdHose	LengthMeasure	Inner diameter of the kelly hose.
IdKelly	LengthMeasure	Inner diameter of the kelly bushing.
IdStandpipe	LengthMeasure	Inner diameter of the standpipe.
IdSurfaceIron	LengthMeasure	Inner diameter of the surface iron.
IdSwivel	LengthMeasure	Inner diameter of the swivel.
IdTopStk	LengthMeasure	Top drive: inner diameter of the top stack.
InjStkUp	boolean	Coiled tubing: Does it have an injector stack up? Values are "true" (or "1") and "false" (or "0").
LenDischargeLine	LengthMeasure	Coiled tubing: length of the pump discharge line.
LenHose	LengthMeasure	Length of the kelly hose.
LenKelly	LengthMeasure	Length of the kelly bushing.
LenReel	LengthMeasure	Coiled tubing: length of the coiled tubing remaining on the reel.
LenStandpipe	LengthMeasure	Length of the standpipe.
LenSurfaceIron	LengthMeasure	Length of the surface iron.
LenSwivel	LengthMeasure	Length of the swivel.

Name	Type	Notes
LenUmbilical	LengthMeasure	Coiled tubing: length of the umbilical.
OdCore	LengthMeasure	Coiled tubing: outside diameter of the reel core that the coiled tubing is wrapped around.
OdReel	LengthMeasure	Coiled tubing: outside diameter of the coiled tubing reel.
OdUmbilical	LengthMeasure	Coiled tubing: outer diameter of the umbilical.
PresRating	PressureMeasure	Pressure rating of the item.
TypeSurfEquip	SurfEquipType	Surface equipment type (IADC1-4, Custom, Coiled Tubing).
UmbInside	boolean	Coiled tubing: Umbilical inside, true/false flag to account for the wireline inside the coiled tubing. With this pressure loss calculation, you can calculate for the strings used for logging, wireline coring, etc. Values are "true" (or "1") and "false" (or "0").
UseHose	boolean	Use kelly hose geometry? Values are "true" (or "1") and "false" (or "0").
UseInjStack	boolean	Use injector stack height? Values are "true" (or "1") and "false" (or "0").
UseKelly	boolean	Use kelly geometry? Values are "true" (or "1") and "false" (or "0").
UsePumpDischarge	boolean	Use pump discharge line? Values are "true" (or "1") and "false" (or "0").
UseStandpipe	boolean	Use standpipe geometry? Values are "true" (or "1") and "false" (or "0").
UseSurfaceIron	boolean	Use surface iron description? Values are "true" (or "1") and "false" (or "0").
UseSwivel	boolean	Use swivel geometry? Values are "true" (or "1") and "false" (or "0").
UseTopStack	boolean	Use top stack height? Values are "true" (or "1") and "false" (or "0").
WidReelWrap	LengthMeasure	Coiled tubing: width of the reel core. This is the inside dimension.

Associations

Association		Notes
	From: SurfaceEquipment. **To:** SurfEquipType *Dependency*	
0..1	**From:** RigUtilization.SurfaceEquipment **To:** SurfaceEquipment *Association*	Coiled tubing specific equipment configuration.

9.20 SurfEquipType

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: Created: 4/13/2015   *Last modified:* 10/25/2016
Notes: Specifies the type of surface equipment.

Attributes

Name	Type	Notes
IADC		
custom		
coiled tubing		
unknown		The value is not known. Avoid using this value. All reasonable attempts should be made to determine the appropriate value. Use of this value may result in rejection in some situations.

Associations

Association	Notes
From: SurfEquipType. **To:** TypeEnum *Generalization*	
From: SurfaceEquipment. **To:** SurfEquipType *Dependency*	

10 Risk

Package: xsd_schemas
Notes: Risk Schema.

10.1 LevelIntegerCode

Type: Class *Stereotype:* «XSDsimpleType»
Detail: *Created:* 4/13/2015 *Last modified:* 10/25/2016
Notes: Integer level code from 1 through 8.

Associations

Association	Notes
From: Risk. **To:** LevelIntegerCode *Dependency*	
From: Risk. **To:** LevelIntegerCode *Dependency*	

10.2 Risk

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015   *Last modified:* 11/7/2016
Notes: Risk Schema. Used to provide a central location for capturing risk information about the well design and other well-related data objects.

Attributes

Name	Type	Notes
AffectedPersonnel	RiskAffectedPersonnel	The personnel affected by the risk.
Category	RiskCategory	The category of risk.
Contingency	String2000	Plan of action if the risk materializes.
Details	String2000	Complete description of the risk.
DiaHole	LengthMeasure	Hole diameter.
DTimEnd	TimeStamp	Date and time that activities (related to the risk) were completed.
DTimStart	TimeStamp	Date and time that activities (related to the risk) started.
ExtendCategory	String64	Custom string to further categorize the risk.
Identification	String2000	Details for identifying the risk.
MdBitEnd	MeasuredDepthCoord	Measured depth of the bit at the end of the activity.
MdBitStart	MeasuredDepthCoord	Measured depth of the bit at the start of the activity.
MdHoleEnd	MeasuredDepthCoord	Measured Depth at the end of the activity.
MdHoleStart	MeasuredDepthCoord	Measured Depth at the start of the activity.
Mitigation	String2000	Plan of action to ensure the risk does not materialize.
ProbabilityLevel	LevelIntegerCode	Probability level of the risk occurring. Values of 1 through 5, with 1 being the lowest probability.
SeverityLevel	LevelIntegerCode	Severity level of the risk. Values of 1 through 5, with 1 being the lowest risk level.
SubCategory	RiskSubCategory	The sub category of risk.
Summary	String2000	Summary description of the risk.
TvdHoleEnd	WellVerticalDepthCoord	True vertical depth at the end of the activity.
TvdHoleStart	WellVerticalDepthCoord	True vertical depth at the start of the activity.
Type	RiskType	The type of risk.

Associations

Association	Notes
From: Risk. **To:** RiskAffectedPersonnel *Dependency*	
From: Risk. **To:** RiskType *Dependency*	
From: Risk.	

Association		Notes
	To: AbstractObject *Generalization*	
	From: Risk. **To:** LevelIntegerCode *Dependency*	
	From: Risk. **To:** LevelIntegerCode *Dependency*	
1..1	**From:** Risk.Wellbore **To:** Wellbore *Association*	
	From: Risk. **To:** RiskSubCategory *Dependency*	
0..*	**From:** Risk.ObjectReference **To:** DataObjectReference *Association*	A reference to an object that is defined within the context of a wellbore.
	From: Risk. **To:** RiskCategory *Dependency*	

10.3 RiskAffectedPersonnel

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: Created: 4/13/2015   *Last modified:* 10/25/2016
Notes: Personnel affected by a risk.

Attributes

Name	Type	Notes
cementer		
company man		
contractor		
directional driller		
driller		
drilling engineer		
drilling superintendent		
drilling team		
facility engineer		
field service manager		
foreman		
general service supervisor		
geologist		
member		
mud engineer		
mud logger		
MWD or LWD engineer		measurement while drilling or logging while drilling
perform engineer		
petrophysicist		
production engineer		
remotely operated vehicle engineer		
safety manager		
sales engineer		
service supervisor		
technical support		
tool pusher		
wireline engineer		

Associations

Association	Notes
From: RiskAffectedPersonnel. **To:** TypeEnum *Generalization*	

Association	Notes
From: Risk. **To:** RiskAffectedPersonnel *Dependency*	

10.4 RiskCategory

Type: Enumeration *Stereotype:* «Enumeration»
Detail: *Created:* 4/13/2015 *Last modified:* 11/7/2016
Notes: Specifies the category of risk.

Attributes

Name	Type	Notes
hydraulics		
mechanical		
time related		Specifies the category of risk.
wellbore stability		
directional drilling		
bit		
equipment failure		
completion		
casing		
other		
HSE		health, safety and environmental

Associations

Association	Notes
From: RiskCategory. **To:** TypeEnum *Generalization*	
From: Risk. **To:** RiskCategory *Dependency*	

10.5 RiskSubCategory

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: *Created:* 4/13/2015   *Last modified:* 11/7/2016
Notes: Specifies the sub-category of risk, in relation to value of Risk Category.

Attributes

Name	Type	Notes
gas kick		
shallow water influx		
other influx or kicks		
loss circulation		
poor hole cleaning		
good hole cleaning at high ROP		Rate of Penetration
high mud weight		High mud weight (i.e., greater than 10 parts per US gallon).
special additives needed		
gumbo problems		
high ECD - rheology related		
excessive circulation		Greater than 2 hours.
performing a kill		
mud weight change		Greater than 0.5 parts per US gallon.
excessive pipe cement scaling		
pit gain or loss		Greater than ten barrles.
mud stability problems		
shallow gas flow		
twist off		
stuck pipe		Greater than 30 minutes.
wireline stuck in hole		
stick and slip		
vibration - axial		
vibration - torsional		
vibration - transverse		
vibration unknown or rough drilling		
uneven wear of BHA		
uneven wear of drillstring		
excessive torque		
excessive drag		
reaming greater than 2 hours		Greater than 2 hours.
washouts		

Name	Type	Notes
tight hole or overPull		
failed inspections or fatigue wear		
mechanical		
drilling greater than 1000 feet/day		Greater than 1000 feet per day.
drilling greater than 2000 feet/day		Greater than 2000 feet per day.
drilling less than 20 feet/day		Less than 20 feet per day.
trips greater than 24 hours		Greater than 24 hours.
excessive time for BHA makeup		Bottom Hole Assembly
waiting on decisions		
waiting on weather		
waiting on tools		
sloughing or packoffs		
ballooning		
fracture problems		
unstable zones		
formation integrity test		
leak-off test		
tectonics		
pore pressure		
breakouts		
bed parallel		
wellbore stability		
excessive doglegs		
sidetrack		
BHA change for directional		Bottom Hole Assembly
wrong total flow area		
well collision - actual		
well collision - technical		
geosteering		
abnormal tendency changes		
resurveying		
in-field referencing (IFR) actions		
bit or BHA performance		Bottom Hole Assembly
drilling optimization		
bit balling		
lost cones or broken cutters		
excessive bit wear or gauge		

Name	Type	Notes
low rate of bit penetration		
high rate of bit penetration		
downhole tool		
surface system		
motor or rotary steerable system failure		
topdrive failure		
hoisting equipment failure		
circulating equipment failure		
electrical system failure		
blow out preventer events		
surface instrumentation problems		
rig communications		
completion equipment failure		
miscellaneous rig equipment		
tool or equipment failure		
squeeze jobs		
casing surge losses		
stuck casing or completion		
shoe failures		
early cement setup		
casing collapse		
milling		
excessive casing wear or cuttings		
excessive formation damage or skin		
casing rotation or reciprocation rqd		
broaching		
completion or casing		
stratigraphy		
fishing		
junk in hole		
delay due to political unrest		
rig move		
gas hydrates		
pending analysis		
riser disconnect		
other		

Name	Type	Notes
personnel		
environmental		
automotive		
asset		
information		
time		
HSE		health, safety and environmental

Associations

Association	Notes
From: RiskSubCategory. **To:** TypeEnum *Generalization*	
From: Risk. **To:** RiskSubCategory *Dependency*	

10.6 RiskType

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: *Created:* 4/13/2015   *Last modified:* 11/7/2016
Notes: Specifies the type of risk.

Attributes

Name	Type	Notes
risk		
event		
near miss		
best practice		
lessons learned		
other		

Associations

Association	Notes
From: RiskType. **To:** TypeEnum *Generalization*	
From: Risk. **To:** RiskType *Dependency*	

11 StimJob

Package: xsd_schemas
Notes: Stimulation Job (StimJob) Schema.

11.1 ISO13503_2CrushTestData

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 8/24/2015   *Last modified:* 11/7/2016
Notes: Crush test data point.

Attributes

Name	Type	Notes
Fines	MassPerMassMeasure	Mass percentage of fines after being exposed to stress.
Stress	PressureMeasure	Stress measured at a point during a crush test.
uid	String64	Unique identifier for this instance of ISO13503_2CrushTestData.

Associations

Association	Notes
0..* **From:** StimISO13503_2Properties.CrushTestData **To:** ISO13503_2CrushTestData *Association*	

11.2 ISO13503_2SieveAnalysisData

Type: Class *Stereotype:* «XSDcomplexType»
Detail: *Created:* 3/14/2016 *Last modified:* 11/7/2016
Notes: Proppant properties on percent retained and sieve number. Data from this ISO anaylsis.

Attributes

Name	Type	Notes
PercentRetained	MassPerMassMeasure	The percentage of mass retained in the sieve.
SieveNumber	NonNegativeLong	ASTM US Standard mesh opening size used in the sieve analysis test. To indicate "Pan", use "0".
uid	String64	Unique identifier for this instance of ISO13503_2SieveAnalysisData.

Associations

Association		Notes
0..*	**From:** StimISO13503_2Properties.SieveAnalysisData **To:** ISO13503_2SieveAnalysisData *Association*	

11.3 PIDXCommodityCode

Type: Enumeration *Stereotype:* «Enumeration»
Detail: Created: 9/24/2015 *Last modified:* 11/7/2016
Notes: UNSPSC (Segment 71) commodity code from oil and gas extraction and production
enhancement services family. For more information, see http://www.pidx.org/.

Attributes

Name	Type	Notes
71131001		
71131002		
71131003		
71131004		
71131005		
71131006		
71131007		
71131008		
71131009		
71131010		
71131011		
71131012		
71131013		
71131014		
71131015		
71131016		
71131018		
71131019		

Associations

Association	Notes
From: PIDXCommodityCode. **To:** TypeEnum *Generalization*	
From: StimJob. **To:** PIDXCommodityCode *Dependency*	

11.4 ProppantAgentKind

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: *Created:* 9/24/2015   *Last modified:* 11/7/2016
Notes: Specifies the type of proppant agent: ceramic, resin, sand, etc.

Attributes

Name	Type	Notes
ceramic		
resin coated ceramic		
resin coated sand		
sand		

Associations

Association	Notes
From: ProppantAgentKind. **To:** TypeEnum *Generalization*	
From: StimProppantAgent. **To:** ProppantAgentKind *Dependency*	

11.5 StimAdditive

Type: Class *Stereotype:* «XSDcomplexType»
Detail: *Created:* 8/24/2015 *Last modified:* 11/7/2016
Notes: Provides generic attributes associated with defining an additive used for stimulation.

Attributes

Name	Type	Notes
AdditiveKind	StimAdditiveKind	Additive type or function from the enumeration 'StimAdditiveKind'.
SupplierCode	String2000	A code used to identify the supplier of the additive.
Type	String2000	The type of additive that is used, which can represent a suppliers description or type of AdditiveKind. For example, 5% HCl could be the type when AdditiveKind=acid.

Associations

Association	Notes
From: StimAdditive. **To:** StimAdditiveKind *Dependency*	
From: StimAdditive. **To:** StimMaterial *Generalization*	

11.6 StimAdditiveKind

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: *Created:* 9/24/2015   *Last modified:* 11/7/2016
Notes: Specifies the type of stimulation additive added to the fluid used in the stim job.

Attributes

Name	Type	Notes
acid		
activator		
biocide		
breaker		
breaker aid		
buffer		
clay stabilizer		
corrosion inhibitor		
corrosion inhibitor aid		
crosslinker		
delaying agent		
fibers		
fluid loss additive		
foamer		
friction reducer		
gelling agent		
iron control additive		
mutual solvent		
salt		
stabilizer		
surfactant		

Associations

Association	Notes
From: StimAdditiveKind. **To:** TypeEnum *Generalization*	
From: StimAdditive. **To:** StimAdditiveKind *Dependency*	

11.7 StimEvent

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: Created: 8/24/2015   *Last modified:* 11/7/2016
Notes: Provides a mechanism to capture general events that occurred during a stage of a stimulation job.

Attributes

Name	Type	Notes
Comment	String2000	A short description of the event.
DTim	TimeStamp	Date and time of this event.
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
Number	PositiveLong	Event number.
NumStep	PositiveLong	Step number. Use it to reference an existing job step entry.
uid	String64	Unique identifier for this instance of StimEvent.

Associations

Association	Notes
0..* **From:** StimJobStage.JobEvent **To:** StimEvent *Association*	

11.8 StimFetTest

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 8/24/2015   *Last modified:* 11/7/2016
Notes: A diagnostic test that determines fluid efficiency. Fluid efficiency test (FET).

Attributes

Name	Type	Notes
AnalysisMethod	StimFetTestAnalysisMethod	An analysis method used for this FET.
DTimEnd	TimeStamp	End time for the FET.
DTimStart	TimeStamp	Start time for the FET.
EndPdlDuration	TimeMeasure	The end of the pressure-dependent leak-off portion of the FET.
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
FluidEfficiency	VolumePerVolumeMeasure	A measurement, derived from a data frac, of the efficiency of a particular fluid in creating fracture area on a particular formation at a set of conditions.
FractureCloseDuration	TimeMeasure	The time at which the fracture effectively closes without proppant in place.
FractureClosePres	PressureMeasure	The pressure at which the fracture effectively closes without proppant in place.
FractureExtensionPres	PressureMeasure	The fracture pressure limit for an unfractured formation is the fracture initiation pressure. This is typically considered the upper bound for the minimum horizontal stress or closure pressure. A step-rate test is used to determine the fracture extension pressure.
FractureGradient	ForcePerVolumeMeasure	The fracture gradient.
FractureLength	LengthMeasure	The length of the fracture tip to tip; fracture half length is the length of one wing of a fracture from the wellbore to the tip.
FractureWidth	LengthMeasure	The width of a fracture at the wellbore. Hydraulic frac width is generated by frac fluid viscosity and/or pump rate (i.e., horsepower).
NetPres	PressureMeasure	The difference between the fracture extension pressure and the pressure that exists in the fracture.
PdlCoef	DimensionlessMeasure	The pressure dependent leak-off coefficient.
PorePres	PressureMeasure	The pressure of the liquids in the formation pores.
PseudoRadialPres	PressureMeasure	The Horner plot is used to determine if pseudo-radial flow developed during pressure decline. If a semi-log straight line is observed and the line can be extrapolated to a reasonable value of reservoir pressure, then radial or pseudo-radial flow may be affecting the decline behavior. This suggests that the fracture is already closed and that data beyond the point of influence need not be considered in the evaluation of closure.

ResidualPermeability	PermeabilityRockMeasure	That permeability which remains after a fractured formation has closed, allowing the the formation fracture face to be pressurized before the fracture is mechanically reopened.
uid	String64	Unique identifier for this instance of StimFetTest.

Associations

Association		Notes
	From: StimFetTest. **To:** StimFetTestAnalysisMethod *Dependency*	
0..*	**From:** StimJobDiagnosticSession.FluidEfficiencyTest **To:** StimFetTest *Association*	

11.9 StimFetTestAnalysisMethod

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: Created: 9/24/2015   *Last modified:* 11/7/2016
Notes: Specifies the types of stimulation FET analysis methods.

Attributes

Name	Type	Notes
average		
delta pressure over g-time		
delta pressure over linear time		
delta pressure over radial time		
gdk 2-d		
horner		
linear		
log-log		
nolte		
other		
pdl coefficient		
perkins and kern 2-d		
radial 2-d		
square root		
third-party software		
unknown		

Associations

Association	Notes
From: StimFetTestAnalysisMethod. **To:** TypeEnum *Generalization*	
From: StimFetTest. **To:** StimFetTestAnalysisMethod *Dependency*	

11.10 StimFlowPath

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 8/24/2015   *Last modified:* 11/7/2016
Notes: The fluid flow path for used when pumping a stage in a stimulation job.

Attributes

Name	Type	Notes
AvgPmaxPacPres	PressureMeasure	PMax prediction allows the tool assembly to be designed with expected pressures. It determines maximum allowable surface pressure and is typically calculated as a single number by which the pressure relief valves are set. This variable is the average of all the pmax pressures calculated for this flow path.
AvgPmaxWeaklinkPres	PressureMeasure	Average allowable pressure for the zone of interest with respect to the bottomhole assembly during the stimulation services.
BreakDownPres	PressureMeasure	The pressure at which the formation broke.
BridgePlugMD	MeasuredDepthCoord	The measured depth of a bridge plug.
FractureGradient	ForcePerVolumeMeasure	The formation fracture gradient for this treatment interval.
FrictionFactorOpenHole	DimensionlessMeasure	The friction factor used to compute openhole pressure loss.
FrictionFactorPipe	DimensionlessMeasure	The friction factor for the pipe, tubing, and/or casing.
Kind	StimFlowPathType	The type of flow path.
MaxPmaxPacPres	PressureMeasure	PMax prediction allows the tool assembly to be designed with expected pressures. It determines maximum allowable surface pressure and is typically calculated as a single number by which the pressure relief valves are set. This variable is the maximum of all the pmax pressures calculated for this flow path.
MaxPmaxWeaklinkPres	PressureMeasure	Maximum allowable pressure for the zone of interest with respect to the bottomhole assembly during the stimulation services.
PackerMD	MeasuredDepthCoord	The measured depth of a packer.
TubingBottomMD	MeasuredDepthCoord	The maximum measured depth of the tubing used for treatment of a stage.

Associations

Association		Notes
0..*	**From:** StimFlowPath.Tubular **To:** StimTubular *Association*	
	From: StimFlowPath. **To:** StimFlowPathType *Dependency*	
	From: StimJobStage.FlowPath	

Association	Notes
0..1 **To:** StimFlowPath *Association*	

11.11 StimFlowPathType

Type: Enumeration   *Stereotype:*
Detail: *Created:* 5/25/2016   *Last modified:* 11/7/2016
Notes: Specifies the type of flow paths used in a stimulation job.

Attributes

Name	Type	Notes
annulus		Fluid is conducted through the annulus.
casing		Fluid is conducted through the casing (no tubing present).
drill pipe		Fluid is conducted through the drill pipe.
open hole		Fluid is conducted through the open hole.
tubing		Fluid is conducted through tubing.
tubing and annulus		Fluid is conducted through tubing and the annulus.
unknown		The value is not known. Avoid using this value. All reasonable attempts should be made to determine the appropriate value. Use of this value may result in rejection in some situations.

Associations

Association	Notes
From: StimFlowPath. **To:** StimFlowPathType *Dependency*	

11.12 StimFluid

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 8/24/2015   *Last modified:* 11/7/2016
Notes: The characteristics and recipe of the stimulation fluid without proppant.

Attributes

Name	Type	Notes
Density	MassPerVolumeMeasure	The density of the fluid.
Description	String2000	The description of the fluid.
FluidTemp	ThermodynamicTemperatureMeasure	The temperature of the fluid at surface.
GelStrength10Min	PressureMeasure	The shear stress measured at low shear rate after a mud has set quiescently for 10 minutes.
GelStrength10Sec	PressureMeasure	The shear stress measured at low shear rate after a mud has set quiescently for 10 seconds.
IsKillFluid	boolean	Is the fluid a kill fluid? Values are "true" (or "1") and "false" (or "0").
Kind	StimFluidKind	The fluid types.
Name	String2000	The name of the fluid.
PH	DimensionlessMeasure	The pH of the fluid.
Purpose	String2000	The purpose of the fluid.
SpecificGravity	DimensionlessMeasure	The specific gravity of the fluid at surface.
Subtype	StimFluidSubtype	The fluid subtypes.
Supplier	String2000	The supplier of the fluid.
Viscosity	DynamicViscosityMeasure	Viscosity of stimulation fluid.
Volume	VolumeMeasure	Volume of fluid.

Associations

Association		Notes
0..*	**From:** StimFluid.AdditiveConcentration **To:** StimMaterialQuantity *Association*	An amount of material used per volume of fluid specified in FluidConcentrationVolume.
	From: StimFluid. **To:** StimFluidSubtype *Dependency*	
	From: StimFluid. **To:** StimFluidKind *Dependency*	
0..1	**From:** StimJobStep.Fluid **To:** StimFluid *Association*	

11.13 StimFluidKind

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: *Created:* 3/18/2016   *Last modified:* 11/7/2016
Notes: Specifies the fluid type.

Attributes

Name	Type	Notes
acid-based		A fluid in which the primary fluid medium of mixing and transport is acidic (substance which reacts with a base; aqueous acids have a pH less than 7).
gas		A carrier medium in which gas is the primary medium of mixing and transport.
oil-based		A fluid in which oil is the primary fluid medium of mixing and transport.
water-based		

Associations

Association	Notes
From: StimFluidKind. **To:** TypeEnum *Generalization*	
From: StimFluid. **To:** StimFluidKind *Dependency*	

11.14 StimFluidSubtype

Type: Enumeration *Stereotype:* «Enumeration»
Detail: Created: 9/24/2015 *Last modified:* 11/7/2016
Notes: Specifies the secondary qualifier for fluid type, e.g., acid, base, condensate, etc.

Attributes

Name	Type	Notes
acid		
base		
carbon dioxide		
carbon dioxide and nitrogen		
carbon dioxide and water		
condensate		
cross-linked gel		
crude oil		
diesel		
foam		
fracturing oil		
fresh water		
gelled acid		
gelled condensate		
gelled crude		
gelled diesel		
gelled oil		
gelled salt water		
hot condensate		
hot fresh water		
hot oil		
hot salt water		
hybrid		
linear gel		
liquefied petroleum gas		
nitrogen		
oil		
other		
produced water		
salt water		
slick water		

Associations

Association	Notes
From: StimFluidSubtype. **To:** TypeEnum *Generalization*	
From: StimFluid. **To:** StimFluidSubtype *Dependency*	

11.15 StimISO13503_2Properties

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 8/24/2015   *Last modified:* 11/7/2016
Notes: ISO13503-2 properties.

Attributes

Name	Type	Notes
AbsoluteDensity	MassPerVolumeMeasure	The density the material would have if no intra-granular porosity is present. (e.g. Boyle's Law porosimetry).
AcidSolubility	MassPerMassMeasure	The solubility of a proppant in 12:3 HCl:HF for 30 minutes at 150°F is an indication of the amount of soluble materials (i.e. carbonates, feldspars, iron oxides, clays, etc) present in the proppant.
ApparentDensity	MassPerVolumeMeasure	Apparent density excludes extra-granular porosity by placing a known mass in a volume of fluid and determining how much of the fluid is displaced (Archimedes).
BulkDensity	MassPerVolumeMeasure	Bulk density includes both the proppant and the porosity. This is measured by filling a known volume with dry proppant and measuring the weight.
ClustersPercent	DimensionlessMeasure	Percentage of undesirable agglomerated discrete proppant particles which typically occurs more with inefficiently processed natural sand proppants as opposed to manufactured ceramic proppants. ISO 13503-2 and API RP19C limit the mass of clusters to less than 1%.
KValue	double	Crush test classification indicating the highest stress level at which a proppant generated no more than 10% crushed material rounded down to the nearest 1,000 psi during a crush test. For example, a value of 14 means '14K' which is 14000 psi.
LossOnIgnition	DimensionlessMeasure	A mass loss (gravimetric) test method applied to coated proppants only, which determines the mass of resin coating applied to a natural sand or manufactured proppant by means of thorough combustion of the flammable resin from the nonflammable proppant. Reported as a % of original mass.
MeanParticleDiameter	LengthMeasure	The mean diameter of particles in a sample of proppant.
MedianParticleDiameter	LengthMeasure	The median diameter of particles in a sample of proppant.
Roundness	double	Krumbein Roundness Shape Factor that is a measure of the relative sharpness of grain corners or of grain curvature. Krumbein and Sloss (1963) are the most widely used method of determining shape factors.
SpecificGravity	double	Not formally part of ISO 13503.2 properties, the specific gravity is the apparent density of the proppant divided by the density of water.

Name	Type	Notes
Sphericity	double	Krumbein Sphericity Shape Factor that is a measure of how closely a proppant particle approaches the shape of a sphere. Krumbein and Sloss (1963) are the most widely used method of determining shape factors.
Turbidity	double	A measure of water clarity, how much the material suspended in water decreases the passage of light through the water. Unit of measure may be Nephelometric Turbidity Unit (NTU), but may vary based upon the detector geometry.
uid	String64	Unique identifier for this instance of StimISO13503_2Properties.

Associations

Association		Notes
0..*	**From:** StimISO13503_2Properties.SieveAnalysisData **To:** ISO13503_2SieveAnalysisData *Association*	
0..*	**From:** StimISO13503_2Properties.CrushTestData **To:** ISO13503_2CrushTestData *Association*	
0..*	**From:** StimProppantAgent.ISO13503_2Properties **To:** StimISO13503_2Properties *Association*	

11.16 StimISO13503_5Point

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 8/24/2015   *Last modified:* 11/7/2016
Notes: A stress, conductivity, permeability, and temperature data point.

Attributes

Name	Type	Notes
Conductivity	PermeabilityLengthMeasure	The conductivity under stress.
Permeability	PermeabilityRockMeasure	The permeability under stress.
Stress	PressureMeasure	The amount of stress applied.
Temperature	ThermodynamicTemperatureMeasure	The temperature at the time measurements were taken.
uid	String64	Unique identifier for this instance of StimISO13503_5Point

Associations

Association		Notes
0..*	**From:** StimProppantAgent.ISO13503_5Point **To:** StimISO13503_5Point *Association*	

11.17 StimJob

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: Created: 8/24/2015   *Last modified:* 11/7/2016
Notes: Parent object (transferrable object) for all the information about one stimulation job. A stimulation job has multiple stages, and each stage has multiple steps.

Attributes

Name	Type	Notes
AvgJobPres	PressureMeasure	Average pressure encountered during treatment of all stages.
BottomholeStaticTemperature	ThermodynamicTemperatureMeasure	Bottomhole static temperature for the job.
CustomerName	String2000	Customer or company name.
DTimArrival	TimeStamp	Date and time at which the stimulation contractor arrives on location.
DTimEnd	TimeStamp	Ending date and time of the stimulation job.
DTimStart	TimeStamp	Start date and time of the stimulation job.
FlowBackPres	PressureMeasure	Pressure recorded on fluid returning to surface.
FlowBackRate	VolumePerTimeMeasure	Rate recorded on fluid returning to surface.
FlowBackVolume	VolumeMeasure	Volume recorded on fluid returning to surface.
FluidEfficiency	VolumePerVolumeMeasure	Percentage of fluid volume in the fracture at the end of pumping.
HhpOrdered	PowerMeasure	Hydraulic horsepower ordered for the stimulation job.
HhpUsed	PowerMeasure	Hydraulic horsepower actually used for the stimulation job.
JobPerforationClusters	StimPerforationClusterSet	Perforation clusters existing before starting the job.
Kind	String2000	Type of well stimulation job.
MaxFluidRate	VolumePerTimeMeasure	Maximum job fluid pumping rate encountered during treatment of all stages.
MaxJobPres	PressureMeasure	Maximum pressure encountered during the job.
PIDXCommodityCode	PIDXCommodityCode	UNSPSC (Segment 71) commodity code from the oil and gas extraction and production enhancement services family.
ServiceCompany	String2000	Name of the well stimulation contractor.
StageCount	NonNegativeLong	Number of stages treated during the stimulation service.
Supervisor	String64	Name of the service company supervisor.
TotalJobVolume	VolumeMeasure	Total volume pumped for all stages.
TotalProppantInFormation	MassMeasure	The total mass of proppant placed in the formation for the entire job.
TotalProppantUsed	MassMeasure	The name and amount of a proppant used during some time period in a performance enhancement job.
TotalPumpTime	TimeMeasure	The total pumping time.

TreatingBottomholeTemperature	ThermodynamicTemperatureMeasure	Expected or calculated bottomhole treating temperature for the job.

Associations

Association		Notes
1	**From:** StimJob.MaterialCatalog **To:** StimJobMaterialCatalog *Association*	
	From: StimJob. **To:** StimPerforationClusterSet *Dependency*	
1	**From:** StimJob.Wellbore **To:** Wellbore *Association*	
0..*	**From:** StimJob.MaterialUsed **To:** StimMaterialQuantity *Association*	This is the total quantities of materials pumped—water, proppant and additives—over just the entire job.
	From: StimJob. **To:** Citation *Dependency*	
0..*	**From:** StimJob.JobStage **To:** StimJobStage *Association*	
	From: StimJob. **To:** AbstractObject *Generalization*	
0..*	**From:** StimJob.LogCatalog **To:** StimJobLogCatalog *Association*	Low frequency log data. To be referenced from stages.
	From: StimJob. **To:** PIDXCommodityCode *Dependency*	

11.18 StimJobDiagnosticSession

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 8/24/2015   *Last modified:* 11/7/2016
Notes: A pumping diagnostics session.

Attributes

Name	Type	Notes
AvgBottomholeTreatmentPres	PressureMeasure	Average bottomhole treatment pressure.
AvgBottomholeTreatmentRate	VolumePerTimeMeasure	Average bottomhole treatment flow rate.
BaseFluidVol	VolumeMeasure	Base fluid volume entering equipment.
BottomholeHydrostaticPres	PressureMeasure	Bottomhole hydrostatic pressure.
BottomholeTemperature	ThermodynamicTemperatureMeasure	Static bottomhole temperature.
BubblePointPres	PressureMeasure	The pressure at which gas begins to break out of an under saturated oil and form a free gas phase in the matrix or a gas cap.
ChokeSize	LengthMeasure	The size of the choke used during a flow back test.
Description	String2000	A description of the session.
DTimFractureClose	TimeStamp	The date and time when the fluid in the fracture is completely leaked off into the formation and the fracture closes on its faces.
DTimPumpOff	TimeStamp	The date and time pumping ended.
DTimPumpOn	TimeStamp	The date and time pumping began.
DTimWellShutin	TimeStamp	The date and time at which a well ceases flowing and the valves are closed.
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
FluidCompressibility	IsothermalCompressibilityMeasure	The volume change of a fluid when pressure is applied.
FluidDensity	MassPerVolumeMeasure	The density of the fluid.
FluidEfficiency	VolumePerVolumeMeasure	A measurement, derived from a data frac, of the efficiency of a particular fluid in creating fracture area on a particular formation at a set of conditions.
FluidKprimeFactor	DimensionlessMeasure	The consistency index K is the shear stress or viscosity of the fluid at one sec-1 shear rate. An increasing K raises the effective viscosity.
FluidNprimeFactor	DimensionlessMeasure	Power law component. As 'n' decreases from 1, the fluid becomes more shear thinning. Reducing 'n' produces more non-Newtonian behavior.
FluidSpecificHeat	SpecificHeatCapacityMeasure	The heat required to raise one unit mass of a substance by one degree.
FluidThermalConductivity	ThermalConductivityMeasure	In physics, thermal conductivity is the property of a material describing its ability to conduct heat. It appears primarily in Fourier's Law for heat conduction. Thermal conductivity is measured in watts per kelvin-meter. Multiplied by a temperature difference (in kelvins) and an area (in square meters), and divided by a

Name	Type	Notes
		thickness (in meters), the thermal conductivity predicts the rate of energy loss (in watts) through a piece of material.
FluidThermalExpansionCoefficient	VolumetricThermalExpansionMeasure	Dimensional response to temperature change is expressed by its coefficient of thermal expansion. When the temperature of a substance changes, the energy that is stored in the intermolecular bonds between atoms also changes. When the stored energy increases, so does the length of the molecular bonds. As a result, solids typically expand in response to heating and contract on cooling. The degree of expansion divided by the change in temperature is called the material's coefficient of thermal expansion and generally varies with temperature.
FoamQuality	VolumePerVolumeMeasure	Foam quality percentage of foam for the job during the stimulation services.
FractureClosePres	PressureMeasure	The pressure when the fracture width becomes zero.
FrictionPres	PressureMeasure	The pressure loss due to fluid friction with the pipe while a fluid is being pumped.
InitialShutinPres	PressureMeasure	Initial shutin pressure.
MdBottomhole	MeasuredDepthCoord	The measured depth of the bottom of the hole.
MdMidPerforation	MeasuredDepthCoord	The measured depth of the middle perforation.
MdSurface	MeasuredDepthCoord	The measured depth of the wellbore to its injection point.
Name	String64	The name of the session.
Number	NonNegativeLong	The number of this pumping diagnostics session.
PercentPad	VolumePerVolumeMeasure	The volume of the pad divided by the (volume of the pad + the volume of the proppant laden fluid).
PorePres	PressureMeasure	The pressure of the liquids in the formation pores.
PumpDuration	TimeMeasure	The time between the shutin time and the pump on time.
ReservoirTotalCompressibility	IsothermalCompressibilityMeasure	The volume change of a reservoir material when pressure is applied.
StageNumber	NonNegativeLong	The number of a stage associated with this diagnostics session.
SurfaceFluidTemperature	ThermodynamicTemperatureMeasure	Temperature of the fluid at the surface.
SurfaceTemperature	ThermodynamicTemperatureMeasure	The constant earth temperature at a given depth specific to a region.
TemperatureCorrectionApplied	boolean	Are the calculations corrected for temperature? A value of "true" (or "1") indicates that the calculations were corrected for temperature. A value of "false" (or "0") or not given indicates otherwise.
TvdMidPerforation	WellVerticalDepthCoord	The true vertical depth of the middle perforation.
uid	String64	Unique identifier for this instance of StimJobDiagnosticSession.
WellboreVolume	VolumeMeasure	The volume of fluid in the wellbore.

Associations

Association		Notes
0..*	**From:** StimJobDiagnosticSession.PumpFlowBackTest **To:** StimPumpFlowBackTest *Association*	
0..*	**From:** StimJobDiagnosticSession.FluidEfficiencyTest **To:** StimFetTest *Association*	
0..*	**From:** StimJobDiagnosticSession.StepDownTest **To:** StimStepDownTest *Association*	
0..*	**From:** StimJobDiagnosticSession.StepRateTest **To:** StimStepTest *Association*	
0..*	**From:** StimJobStage.PdatSession **To:** StimJobDiagnosticSession *Association*	

11.19 StimJobDiversion

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 10/12/2015   *Last modified:* 11/7/2016
Notes: Captures the high-level description of the diversion method used in the stimulation job.

Attributes

Name	Type	Notes
Contractor	String2000	Name of the diversion contractor.
ElementSpacing	LengthMeasure	Spacing between packer elements.
Method	StimJobDiversionMethod	The diversion method used.
ToolDescription	String2000	A supplier description of the diversion tool, such as its commercial name.

Associations

Association		Notes
	From: StimJobDiversion. **To:** StimJobDiversionMethod *Dependency*	
0..1	**From:** StimJobStage.Diversion **To:** StimJobDiversion *Association*	

11.20 StimJobDiversionMethod

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: *Created:* 10/9/2015   *Last modified:* 11/7/2016
Notes: Specifies the type of diversion used during a stimulation job.

Attributes

Name	Type	Notes
ball sealer		
bands		
chemical		
fibers		
other		
packer		
solid particle		
straddle packer		

Associations

Association	Notes
From: StimJobDiversionMethod. **To:** TypeEnum *Generalization*	
From: StimJobDiversion. **To:** StimJobDiversionMethod *Dependency*	

11.21 StimJobLogCatalog

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 9/22/2015   *Last modified:* 11/7/2016
Notes: A group of logs from a stimulation job, one log per stage.

Associations

Association	Notes
1..* **From:** StimJobLogCatalog.JobLog **To:** Log *Association*	
0..* **From:** StimJob.LogCatalog **To:** StimJobLogCatalog *Association*	Low frequency log data. To be referenced from stages.

11.22 StimJobMaterialCatalog

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 8/24/2015   *Last modified:* 11/7/2016
Notes: A listing of materials for a particular job. Any stage of the stim job can reference material(s) in the catalog, which eliminates the need to repeat the materials for each stage.

Attributes

Name	Type	Notes
Additives	StimAdditive	List of additives in the catalog.
ProppantAgents	StimProppantAgent	List of proppant agents in the catalog.

Associations

Association		Notes
	From: StimJobMaterialCatalog. **To:** StimMaterial *Dependency*	
1	**From:** StimJob.MaterialCatalog **To:** StimJobMaterialCatalog *Association*	

11.23 StimJobStage

Type: Class *Stereotype:* «XSDcomplexType»
Detail: *Created:* 8/24/2015 *Last modified:* 11/7/2016
Notes: Stage treated during a stimulation job.

Attributes

Name	Type	Notes
AvgBaseFluidReturnVolumeRate	VolumePerTimeMeasure	Average base fluid pumping rate of all steps for stage treatment.
AvgBHStaticTemperature	ThermodynamicTemperatureMeasure	The average static temperature of the wellbore injection point(s) or formation at equilibrium (steady state) with no fluid or tool movement, allowing for equilibrium conditions at the wellbore injection point; (BHST: bottom hole static temperature.
AvgBHTreatingTemperature	ThermodynamicTemperatureMeasure	The average measured or calculated temperature of the wellbore during the treating with well fluid injection or circulation of the wellbore at the point of interest. Point of interest is generally the injection point or region of interest for the test or treatment.
AvgBottomholePumpedVolumeRate	VolumePerTimeMeasure	Average bottomhole treatment flow rate.
AvgConductivity	LengthPerTimeMeasure	Average conductivity of a fracture created during the treatment supported by proppant during the stimulation services Hydraulic conductivity, symbolically represented as K, is a property of vascular plants, soil or rock, that describes the ease with which water can move through pore spaces or fractures. It depends on the intrinsic permeability of the material and on the degree of saturation. Saturated hydraulic conductivity, Ksat, describes water movement through saturated media.
AvgFractureWidth	LengthMeasure	Average fracture width created during the treatment of the stage.
AvgHydraulicPower	PowerMeasure	Average hydraulic horse power used.
AvgPresAnnulus	PressureMeasure	The average annulus pressure for any step for the stage treatment.
AvgPresCasing	PressureMeasure	The average casing pressure of any step for the stage treatment.
AvgPresSurface	PressureMeasure	The average pressure for treating the stage across all steps.
AvgPresTubing	PressureMeasure	The average tubing pressure of any step for the stage treatment.
AvgProppantConcBottomhole	MassPerVolumeMeasure	The average proppant concentration at the bottom of the hole.
AvgProppantConcSurface	MassPerVolumeMeasure	The average proppant concentration on the surface.
AvgSlurryReturnVolumeRate	VolumePerTimeMeasure	The average slurry return rate of all steps for the stage treatment.
BreakDownPres	PressureMeasure	The pressure at which the formation fractures and accepts injected fluid.

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Name	Type	Notes
ClosureDuration	TimeMeasure	Delta time recorded for the closure of the fracture to occur during the stage treatment.
ClosurePres	PressureMeasure	An analysis parameter used in hydraulic fracture design to indicate the pressure at which the fracture effectively closes without proppant in place.
DTimEnd	TimeStamp	Ending date and time for the stage treatment.
DTimStart	TimeStamp	Starting date and time for the stage treatment.
FormationBreakLengthPerDay	LengthMeasure	The length of formation broken per day.
FormationName	String2000	The name of the formation being stimulated.
FormationProppantMass	MassMeasure	The weight of proppant placed in the formation.
FractureGradientFinal	ForcePerVolumeMeasure	The formation fracture gradient for the stage after treatment.
FractureGradientInitial	ForcePerVolumeMeasure	The formation fracture gradient for stage before treatment.
FractureHeight	LengthMeasure	The height of the fracture.
FractureLength	LengthMeasure	The length of the fracture created after treating the stage.
FrictionPressure	PressureMeasure	Friction pressure loss.
HhpOrderedCO2	PowerMeasure	Carbon dioxide hydraulic horsepower ordered for the stage.
HhpOrderedFluid	PowerMeasure	Fluid hydraulic horsepower ordered for the stage.
HhpUsedCO2	PowerMeasure	Carbon dioxide hydraulic horsepower actually used for the stage.
HhpUsedFluid	PowerMeasure	Fluid hydraulic horsepower actually used for the stage.
InitialShutinPres	PowerMeasure	The initial shut-in pressure.
MaxFluidVolumeRateAnnulus	VolumePerTimeMeasure	Maximum annulus fluid pumping rate of any step while treating the stage.
MaxFluidVolumeRateCasing	VolumePerTimeMeasure	Maximum casing fluid pumping rate of any step while treating the stage.
MaxFluidVolumeRateTubing	VolumePerTimeMeasure	Maximum tubing fluid pumping rate of any step while treating the stage.
MaxHydraulicPower	PowerMeasure	Maximum hydraulic horse power used for the stage.
MaxPresAnnulus	PressureMeasure	The highest annulus pressure of any step while treating the stage.
MaxPresCasing	PressureMeasure	The highest casing pressure of any step while treating the stage.
MaxPresSurface	PressureMeasure	Maximum surface pressure during treatment of the stage.
MaxPresTubing	PressureMeasure	The highest tubing pressure of any step while treating the stage.
MaxProppantConcBottomhole	MassPerVolumeMeasure	The maximum proppant concentration at the bottom of the wellbore.
MaxProppantConcSurface	MassPerVolumeMeasure	The maximum proppant concentration on the surface.
MdFormationBottom	MeasuredDepthCoord	Measured depth of the bottom of the formation.
MdFormationTop	MeasuredDepthCoord	Measured depth of the top of the formation.

Name	Type	Notes
MdOpenHoleBottom	MeasuredDepthCoord	Measured depth of the bottom open hole.
MdOpenHoleTop	MeasuredDepthCoord	Measured depth of the top open hole.
NetPres	PressureMeasure	The difference between the pressure which holds a fracture closed (minimal principal stress) and that pressure which is necessary to open the fracture.
Number	PositiveLong	The number associated with the stage.
OpenHoleDiameter	LengthMeasure	The diameter of the open hole.
OpenHoleName	String2000	A name for the open hole. To be used for open hole completions.
PercentPad	VolumePerVolumeMeasure	The percentage of volume pumped used for the pad.
PercentProppantPumped	VolumePerVolumeMeasure	Total proppant mass used as a percent of the design mass.
PerfBallCount	NonNegativeLong	Total number of perforation balls used while treating the stage.
PerfBallSize	LengthMeasure	The size of the perforation balls used while treating the stage
PerfProppantConc	MassPerVolumeMeasure	The proppant concentration at the perforations.
ProppantHeight	LengthMeasure	The proppant height.
ScreenedOut	boolean	Did screen out occur? True ("true" or "1") indicates that screen out occurred. False ("false" or "0") or not given indicates otherwise.
ScreenOutPres	PressureMeasure	The screen out pressure.
StagePerforationClusters	StimPerforationClusterSet	Perforations added just before treating the stage.
TechnologyType	String64	Text describing the technology used while pumping the stage.
TotalProppantInFormation	MassMeasure	The total amount of proppant in the formation relative to the current stage.
TotalPumpTime	TimeMeasure	The total pumping time for the treatment of the stage.
TotalVolume	VolumeMeasure	The total volume pumped for all steps while treating the stage.
TvdFormationBottom	WellVerticalDepthCoord	True vertical depth of the bottom of the formation.
TvdFormationTop	WellVerticalDepthCoord	True vertical depth of the top of the formation.
TvdOpenHoleBottom	WellVerticalDepthCoord	True vertical depth of the bottom open hole.
TvdOpenHoleTop	WellVerticalDepthCoord	True vertical depth of the top open hole.
uid	String64	Unique identifier for this instance of StimJobStage.
VolumeBody	VolumeMeasure	The volume pumped for the body portion of the stage treatment.
VolumeFlush	VolumeMeasure	Volume pumped during flush portion of stage treatment.
VolumePad	VolumeMeasure	Volume pumped for pad portion of stage treatment.
WaterSource	String2000	Water source for fluid pumped during stage.
WellboreProppantMass	MassMeasure	The weight of proppant left in the wellbore after pumping has stopped.

Associations

Association		Notes
0..*	**From:** StimJobStage.JobStep **To:** StimJobStep *Association*	
0..*	**From:** StimJobStage.PdatSession **To:** StimJobDiagnosticSession *Association*	
0..*	**From:** StimJobStage.JobEvent **To:** StimEvent *Association*	
0..1	**From:** StimJobStage.FlowPath **To:** StimFlowPath *Association*	
0..*	**From:** StimJobStage.MaxMaterialUsageRate **To:** StimMaterialQuantity *Association*	
0..*	**From:** StimJobStage.StimStageLog **To:** Log *Association*	
0..1	**From:** StimJobStage.Diversion **To:** StimJobDiversion *Association*	
	From: StimJobStage. **To:** AbstractObject *Generalization*	
0..*	**From:** StimJobStage.MaterialUsed **To:** StimMaterialQuantity *Association*	This is the total quantities of materials pumped—water, proppant and additives—over just this stage only.
0..*	**From:** StimJobStage.ReservoirInterval **To:** StimReservoirInterval *Association*	
0..*	**From:** StimJobStage.ShutInPres **To:** StimShutInPressure *Association*	
	From: StimJobStage. **To:** StimPerforationClusterSet *Dependency*	
0..*	**From:** StimJob.JobStage **To:** StimJobStage *Association*	

11.24 StimJobStep

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 8/24/2015   *Last modified:* 11/7/2016
Notes: A step in the treatment of a stage for a stimulation job.

Attributes

Name	Type	Notes
AvgBaseFluidQuality	VolumePerVolumeMeasure	Base quality percentage of foam.
AvgCO2BaseFluidQuality	VolumePerVolumeMeasure	Base quality carbon dioxide percent of foam.
AvgHydraulicPower	PowerMeasure	Average hydraulic horse power used.
AvgInternalPhaseFraction	VolumePerVolumeMeasure	Internal gas phase percentage of the foam.
AvgMaterialUsedRate	StimMaterialQuantity	Average material used per minute entering the flow stream.
AvgMaterialUseRateBottomhole	StimMaterialQuantity	Average material amount used (pumped) per minute at bottomhole.
AvgN2BaseFluidQuality	VolumePerVolumeMeasure	Base quality nitrogen percentage of foam.
AvgPresBottomhole	PressureMeasure	Average bottomhole pressure.
AvgPresSurface	PressureMeasure	Average surface pressure.
AvgPropConc	MassPerVolumeMeasure	Average proppant concentration at the wellhead. ppa: pounds proppant added per volume measure kgpa: kilograms proppant added per volume measure
AvgProppantConcBottomhole	MassPerVolumeMeasure	The average proppant concentration at bottomhole.
AvgProppantConcSurface	MassPerVolumeMeasure	The average proppant concentration at the surface.
AvgSlurryPropConc	MassPerVolumeMeasure	Average proppant concentration exiting the equipment.
AvgSlurryRate	VolumePerTimeMeasure	Average slurry return rate.
AvgTemperature	ThermodynamicTemperatureMeasure	Average fluid temperature.
AvgVolumeRateWellhead	VolumePerTimeMeasure	Average volume per minute at the wellhead.
BallsRecovered	NonNegativeLong	Balls recovered during execution of the step.
BallsUsed	NonNegativeLong	Balls used during execution of the step.
BaseFluidBypassVol	VolumeMeasure	Base fluid volume recorded after equipment set to bypass.
BaseFluidVol	VolumeMeasure	Base fluid volume entering the equipment.
Description	String2000	A short description of the step.
DTimEnd	TimeStamp	Date and time the step ended.
DTimStart	TimeStamp	Date and time the step started.
EndDirtyMaterialRate	VolumePerTimeMeasure	Ending dirty fluid pump volume per minute.
EndMaterialUsedRate	StimMaterialQuantity	Ending quantity of material used per minute entering the flow stream.

Name	Type	Notes
EndMaterialUsedRateBottomhole	StimMaterialQuantity	Ending quantity of material used per minute at bottomhole.
EndPresBottomhole	PressureMeasure	Final bottomhole pressure.
EndPresSurface	PressureMeasure	Final surface pressure.
EndProppantConcBottomhole	MassPerVolumeMeasure	The final proppant concentration at bottomhole.
EndProppantConcSurface	MassPerVolumeMeasure	The final proppant concentration at the surface.
EndRateSurfaceCO2	VolumePerTimeMeasure	Final CO2 pump rate in volume per time at the surface.
EndStdRateSurfaceN2	VolumePerTimeMeasure	Final nitrogen pump rate in volume per time at the surface.
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
FluidVolBase	VolumeMeasure	The step volume of the base step.
FluidVolCirculated	VolumeMeasure	Fluid volume circulated.
FluidVolPumped	VolumeMeasure	Fluid volume pumped.
FluidVolReturned	VolumeMeasure	Fluid volume returned.
FluidVolSlurry	VolumeMeasure	The volume of the slurry (dirty) step.
FluidVolSqueezed	VolumeMeasure	Fluid volume squeezed.
FluidVolWashed	VolumeMeasure	Fluid volume washed.
FractureGradientFinal	ForcePerVolumeMeasure	The fracture gradient when the step ends.
FractureGradientInitial	ForcePerVolumeMeasure	The fracture gradient before starting the step.
FrictionFactor	DimensionlessMeasure	Numeric value used to scale a calculated rheological friction.
Kind	String2000	The type of step.
MaxHydraulicPower	PowerMeasure	Maximum hydraulic power used during the step.
MaxPresSurface	PressureMeasure	Maximum pumping pressure on surface.
MaxProppantConcBottomhole	MassPerVolumeMeasure	Maximum proppant concentration at bottomhole during the stimulation step.
MaxProppantConcSurface	MassPerVolumeMeasure	Maximum proppant concentration at the wellhead.
MaxSlurryPropConc	MassPerVolumeMeasure	Maximum proppant concentration exiting the equipment.
MaxVolumeRateWellhead	VolumePerTimeMeasure	Maximum volume per minute at the wellhead.
PipeFrictionPressure	PressureMeasure	The friction pressure contribution from pipes.
PumpTime	TimeMeasure	Total pumping time for the step.
StartDirtyMaterialRate	VolumePerTimeMeasure	Starting dirty fluid volume per minute.
StartMaterialUsedRate	StimMaterialQuantity	Starting quantity of material used per minute entering the flow stream.
StartMaterialUsedRateBottomHole	StimMaterialQuantity	Starting quantity of material used per minute at bottomhole.
StartPresBottomhole	PressureMeasure	Starting bottomhole pressure.
StartPresSurface	PressureMeasure	Starting surface pressure.
StartProppantConcBottomhole	MassPerVolumeMeasure	The beginning proppant concentration at bottomhole.
StartProppantConcSurface	MassPerVolumeMeasure	The beginning proppant concentration at the surface.

Name	Type	Notes
StepName	String2000	A human readable name for the step.
StepNumber	PositiveLong	Step number.
uid	String64	Unique identifier for this instance of StimJobStep.
WellheadVol	VolumeMeasure	Slurry volume entering the well.

Associations

Association		Notes
0..1	**From:** StimJobStep.Fluid **To:** StimFluid *Association*	
0..*	**From:** StimJobStep.MaterialUsed **To:** StimMaterialQuantity *Association*	This is the total quantities of materials pumped—water, proppant and additives—over just this step.
0..*	**From:** StimJobStep.MaxMaterialUsedRate **To:** StimMaterialQuantity *Association*	
0..*	**From:** StimJobStage.JobStep **To:** StimJobStep *Association*	

11.25 StimMaterial

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: Created: 8/24/2015   *Last modified:* 11/7/2016
Notes: Materials as a concept refers to the materials left in the well or consumed in the process of making the stimulation; it does not refer the carrier fluid.

Attributes

Name	Type	Notes
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
Kind	StimMaterialKind	The material kind.
Name	String2000	The name of the material.
Supplier	String2000	The name of the material supplier.
uid	String64	Unique identifier for this instance of StimMaterial.

Associations

Association	Notes
From: StimMaterial. **To:** StimMaterialKind *Dependency*	
From: StimAdditive. **To:** StimMaterial *Generalization*	
From: StimProppantAgent. **To:** StimMaterial *Generalization*	
From: StimJobMaterialCatalog. **To:** StimMaterial *Dependency*	

11.26 StimMaterialKind

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: *Created:* 9/24/2015   *Last modified:* 11/7/2016
Notes: Specifies the type of stimulation material.

Attributes

Name	Type	Notes
additive		
brine		
CO2		
gel		
N2		
other		
proppant agent		
water		

Associations

Association	Notes
From: StimMaterialKind. **To:** TypeEnum *Generalization*	
From: StimMaterial. **To:** StimMaterialKind *Dependency*	

11.27 StimMaterialQuantity

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 8/24/2015   *Last modified:* 11/7/2016
Notes: Stimulation material used.

Attributes

Name	Type	Notes
Density	MassPerVolumeMeasure	The density of material used.
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
Mass	MassMeasure	The mass of material used. This should be used without specifying any of the other material measures (e.g. volume, standard volume, etc.).
MassFlowRate	MassPerTimeMeasure	Rate at which mass of material is flowing.
MaterialReference	String64	Material ID is equal to AbstractStimMaterial.RefId. This is a reference to the UID of the StimMaterial in the StimJobMaterialCatalog.
StdVolume	VolumeMeasure	The standard volume of material used. Standard volume is the volume measured under the same conditions. This should be used without specifying any of the other material measures (e.g., mass, volume, etc.).
uid	String64	Unique identifier for this instance of StimMaterialQuantity
Volume	VolumeMeasure	The volume of material used. This should be used without specifying any of the other material measures (e.g. mass, standard volume, etc.).
VolumeConcentration	VolumePerVolumeMeasure	The volume per volume measure of material used. This should be used without specifying any of the other material measures (e.g. mass, density, standard volume, etc.).
VolumetricFlowRate	VolumePerTimeMeasure	Rate at which the volume of material is flowing.

Associations

Association		Notes
0..*	**From:** StimJob.MaterialUsed **To:** StimMaterialQuantity *Association*	This is the total quantities of materials pumped—water, proppant and additives— over just the entire job.
0..*	**From:** StimJobStage.MaxMaterialUsageRate **To:** StimMaterialQuantity *Association*	
0..*	**From:** StimJobStep.MaterialUsed **To:** StimMaterialQuantity *Association*	This is the total quantities of materials pumped—water, proppant and additives— over just this step.
0..*	**From:** StimFluid.AdditiveConcentration **To:** StimMaterialQuantity *Association*	An amount of material used per volume of fluid specified in FluidConcentrationVolume.
	From: StimJobStage.MaterialUsed	This is the total quantities of materials

Association		Notes
0..*	**To:** StimMaterialQuantity *Association*	pumped—water, proppant and additives—over just this stage only.
0..*	**From:** StimJobStep.MaxMaterialUsedRate **To:** StimMaterialQuantity *Association*	

11.28 StimPerforationCluster

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 8/24/2015   *Last modified:* 11/7/2016
Notes: Information about a set of perforations. The assumption is that all perforations within a given set are created with the same device or method.

Attributes

Name	Type	Notes
DensityPerforation	ReciprocalLengthMeasure	The number of perforation holes per length across the treatment interval. Used to describe but not limited to the configuration of perforating guns or the placement of perforations (holes, slots, openings, etc.) in the wellbore, and is often abbreviated to spf (shots per foot).
DischargeCoefficient	double	A coefficient used in the equation for calculation of pressure drop across a perforation set.
FrictionFactor	double	The friction factor of each perforation set.
FrictionPres	PressureMeasure	The friction pressure for the perforation set.
MdPerforatedInterval	MdInterval	Measured depths of the top and base perforation.
PerforationCount	NonNegativeLong	The number of perforations in this interval.
PhasingPerforation	PlaneAngleMeasure	The radial distribution of successive perforations around the wellbore axis. Radial distribution is commonly available in 0, 180 120, 90 and 60 degree phasing.
Size	LengthMeasure	The size of the perforations.
TvdPerforatedInterval	TvdInterval	True vertical depth of the top and base perforation.
Type	String64	The type of perforation and/or how the perforation was created.

Associations

Association		Notes
	From: StimPerforationCluster. **To:** AbstractObject *Generalization*	
1..*	**From:** StimPerforationClusterSet.StimPerforationCluster **To:** StimPerforationCluster *Association*	

11.29 StimPerforationClusterSet

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 9/22/2015   *Last modified:* 11/7/2016
Notes: Provides mechanism for combining perforation clusters into a group. This could be used to specify the set of existing perforations present in a well before starting a stimulation job, for example, for a re-frac job.

Associations

Association	Notes
1..* **From:** StimPerforationClusterSet.StimPerforationCluster **To:** StimPerforationCluster *Association*	
From: StimJob. **To:** StimPerforationClusterSet *Dependency*	
From: StimJobStage. **To:** StimPerforationClusterSet *Dependency*	

11.30 StimPressureFlowRate

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 8/24/2015   *Last modified:* 11/7/2016
Notes: In an injection step test, the injection rate at a particular pressure.

Attributes

Name	Type	Notes
BottomholeRate	VolumePerTimeMeasure	The flow of the fluid at the bottomhole.
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
Pressure	PressureMeasure	The pressure of the step test.
uid	String64	Unique identifier for this instance of StimPressureFlowRate.

Associations

Association	Notes
0..* **From:** StimStepTest.PresMeasurement **To:** StimPressureFlowRate *Association*	

11.31 StimProppantAgent

Type: Class *Stereotype:* «XSDcomplexType»
Detail: *Created:* 8/24/2015 *Last modified:* 11/7/2016
Notes: Captures a description of a proppant used in a stimulation job.

Attributes

Name	Type	Notes
FrictionCoefficientLaminar	double	Laminar flow friction coefficient.
FrictionCoefficientTurbulent	double	Turbulent flow friction coefficient.
MassAbsorptionCoefficient	AreaPerMassMeasure	Characterizes how easily radiation passes through a material. This can be used to compute the concentration of proppant in a slurry using a densitometer.
MeshSizeHigh	NonNegativeLong	High value of sieve mesh size: for 40/70 sand, this value is 70.
MeshSizeLow	NonNegativeLong	Low value of sieve mesh size: for 40/70 sand, this value is 40.
ProppantAgentKind	ProppantAgentKind	Proppant type or function.
UnconfinedCompressiveStrength	PressureMeasure	The unconfined compressive strength of the proppant.

Associations

Association		Notes
0..*	**From:** StimProppantAgent.ISO13503_2Properties **To:** StimISO13503_2Properties *Association*	
	From: StimProppantAgent. **To:** ProppantAgentKind *Dependency*	
	From: StimProppantAgent. **To:** StimMaterial *Generalization*	
0..*	**From:** StimProppantAgent.ISO13503_5Point **To:** StimISO13503_5Point *Association*	

11.32 StimPumpFlowBackTest

Type: Class *Stereotype:* «XSDcomplexType»
Detail: *Created:* 8/24/2015 *Last modified:* 11/7/2016
Notes: Diagnostic test involving flowing a well back after treatment.

Attributes

Name	Type	Notes
DTimEnd	TimeStamp	End time for the test.
DTimStart	TimeStamp	Start time for the test.
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
FlowBackVolume	VolumeMeasure	Total volume recovered during a flow back test.
FractureCloseDuration	TimeMeasure	The time required for the fracture width to become zero.
FractureClosePres	PressureMeasure	The pressure when the fracture width becomes zero.
PresCasing	PressureMeasure	Casing pressure.
PresTubing	PressureMeasure	Tubing pressure.
uid	String64	Unique identifier for this instance of StimPumpFlowBackTest.

Associations

Association	Notes
0..* **From:** StimPumpFlowBackTest.Step **To:** StimPumpFlowBackTestStep *Association*	
0..* **From:** StimJobDiagnosticSession.PumpFlowBackTest **To:** StimPumpFlowBackTest *Association*	

11.33 StimPumpFlowBackTestStep

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 8/24/2015   *Last modified:* 11/7/2016
Notes: In a step-down pump diagnostics test, this object contains all the data for a particular step in that test.

Attributes

Name	Type	Notes
BottomholeRate	VolumePerTimeMeasure	Bottomhole flow rate for the specific step.
DTim	TimeStamp	Time stamp of the pressure measurement.
EntryFriction	PressureMeasure	Calculated entry friction accounting for perforation and near wellbore restrictions for the specific step.
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
FlowbackVolume	VolumeMeasure	Volume of flowback since the start of the test.
FlowbackVolumeRate	VolumePerTimeMeasure	Flowback rate.
NearWellboreFriction	PressureMeasure	Calculated near-wellbore friction loss.
Number	NonNegativeLong	The number of the step. Identifies the step within the step down test.
PerfFriction	PressureMeasure	Calculated perforation friction for the specific step.
PipeFriction	PressureMeasure	Calculated pipe friction for the specific step.
Pres	PressureMeasure	Surface pressure measured for the specific step.
SurfaceRate	VolumePerTimeMeasure	Surface rate entering the well for the specific step.
uid	String64	Unique identifier for this instance of StimPumpFlowBackTestStep.

Associations

Association		Notes
0..*	**From:** StimPumpFlowBackTest.Step **To:** StimPumpFlowBackTestStep *Association*	

11.34 StimReservoirInterval

Type: Class *Stereotype:* «XSDcomplexType»
Detail: *Created:* 8/24/2015 *Last modified:* 11/7/2016
Notes: Description of a reservoir interval.

Attributes

Name	Type	Notes
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
FormationPermeability	PermeabilityRockMeasure	Permeability of the formation.
FormationPorosity	VolumePerVolumeMeasure	Porosity of the formation.
GrossPayMdInterval	MdInterval	Measured depth of the bottom of the formation.
GrossPayThickness	LengthMeasure	The total thickness of the interval being treated, whether or not it is productive.
LithFormationPermeability	PermeabilityRockMeasure	Formation permeability, a measurement of the ability of a fluid to flow through a rock. Commonly measured in milliDarcys (1m2 = 0.000000000000986923 Darcy).
LithMdInterval	MdInterval	Lithology measured depth interval.
LithName	String2000	A name for the formation lithology.
LithNetPayThickness	LengthMeasure	Net pay is computed. It is the thickness of rock that can deliver hydrocarbons to the wellbore formation.
LithPoissonsRatio	DimensionlessMeasure	The ratio of the relative contraction strain, or transverse strain (normal to the applied load), divided by the relative extension strain, or axial strain (in the direction of the applied load).
LithPorePres	PressureMeasure	Refers to the pressure of fluids held within a soil or rock, in gaps between particles' formation porosity.
LithYoungsModulus	PressureMeasure	Young's modulus (E) is a measure of the stiffness of an isotropic elastic material. It is also known as the Young modulus, modulus of elasticity, elastic modulus (though Young's modulus is actually one of several elastic moduli such as the bulk modulus and the shear modulus) or tensile modulus. It is defined as the ratio of the uniaxial stress over the uniaxial strain.
NameFormation	String2000	Name of the formation.
NetPayFluidCompressibility	IsothermalCompressibility Measure	The volume change of the fluid in the net pay when pressure is applied.
NetPayFluidViscosity	DynamicViscosityMeasure	With respect to the net pay, a measurement of the internal resistance of a fluid to flow against itself. Expressed as the ratio of shear stress to shear rate.
NetPayFormationPermeability	PermeabilityRockMeasure	The permeability of the net pay of the formation.
NetPayFormationPorosity	VolumePerVolumeMeasure	The porosity of the net pay formation.
NetPayName	String2000	The name used for the net pay zone.

Name	Type	Notes
NetPayPorePres	PressureMeasure	The pore pressure of the net pay.
NetPayThickness	LengthMeasure	The thickness of the most productive part of the interval. Net pay is a subset of the gross.
uid	String64	Unique identifier for this instance of StimReservoirInterval

Associations

Association		Notes
0..*	**From:** StimJobStage.ReservoirInterval **To:** StimReservoirInterval *Association*	

11.35 StimShutInPressure

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 8/24/2015   *Last modified:* 11/7/2016
Notes: A pressure measurement taken at a certain time after the well has been shut in.

Attributes

Name	Type	Notes
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
Pressure	PressureMeasure	The shut-in pressure.
TimeAfterShutin	TimeMeasure	The time span after shut in at which the pressure was measured.
uid	String64	Unique identifier for this instance of StimShutInPressure.

Associations

Association	Notes
0..* **From:** StimJobStage.ShutInPres **To:** StimShutInPressure *Association*	

11.36 StimStepDownTest

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 8/24/2015   *Last modified:* 11/7/2016
Notes: Diagnostic test involving flowing a well back after treatment.

Attributes

Name	Type	Notes
BottomholeFluidDensity	MassPerVolumeMeasure	The density of the fluid at the bottom of the hole adjusting for bottomhole temperature and pressure during the step-down test.
DiameterEntryHole	LengthMeasure	Diameter of the injection point or perforation.
DischargeCoefficient	DimensionlessMeasure	A coefficient used in the equation for calculation of the pressure drop across a perforation set.
EffectivePerfs	NonNegativeLong	The number of perforations in the interval being tested that are calculated to be open to injection, which is determined during the step-down test.
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
InitialShutinPres	PressureMeasure	The initial shutin pressure.
PerforationCount	NonNegativeLong	The number of perforations in the interval being tested.
Step	StimPumpFlowBackTestStep	The data related to a particular step in the step-down test.
uid	String64	Unique identifier for this instance of StimStepDownTest

Associations

Association	Notes
0..* **From:** StimJobDiagnosticSession.StepDownTest **To:** StimStepDownTest *Association*	

11.37 StimStepTest

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 8/24/2015   *Last modified:* 11/7/2016
Notes: An injection test, plotted pressure against injection rate, where a curve deflection and change of slope indicates the fracture breakdown pressure.

Attributes

Name	Type	Notes
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
FractureExtensionPres	PressureMeasure	The pressure necessary to extend the fracture once initiated. The fracture extension pressure may rise slightly with increasing fracture length and/or height because of friction pressure drop down the length of the fracture.
uid	String64	Unique identifier for this instance of StimStepTest.

Associations

Association		Notes
0..*	**From:** StimStepTest.PresMeasurement **To:** StimPressureFlowRate *Association*	
0..*	**From:** StimJobDiagnosticSession.StepRateTest **To:** StimStepTest *Association*	

11.38 StimTubular

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 8/24/2015   *Last modified:* 11/7/2016
Notes: In a production enhancement job, this item constitutes the data for a tubular in the hole.

Attributes

Name	Type	Notes
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
Id	LengthMeasure	The inside diameter of the tubular used.
Od	LengthMeasure	The outside diameter of the tubular used.
TubularMdInterval	MdInterval	Measured depth interval over which the tubular was used.
TubularTvdInterval	TvdInterval	True vertical depth interval over which the tubular was used.
Type	String64	The type of tubular (e.g., casing, tubing, liner, packer, open hole, other).
uid	String64	Unique identifier for this instance of StimTubular.
VolumeFactor	VolumePerLengthMeasure	The volume per length of the tubular.
Weight	MassPerLengthMeasure	The weight per length of the tubular.

Associations

Association	Notes
0..* **From:** StimFlowPath.Tubular **To:** StimTubular *Association*	

12 SurveyProgram

Package: xsd_schemas
Notes: SurveyProgram Schema.

12.1 SurveyProgram

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015   *Last modified:* 11/8/2016
Notes: Captures information about the nature, range, and sequence of directional surveying tools run in a wellbore for the management of positional uncertainty. This object is uniquely identified within the context of one wellbore object.

Attributes

Name	Type	Notes
Engineer	String64	Name of the engineer.
Final	String64	Is program final or intermediate/preliminary?
SurveyVer	NonNegativeLong	Survey version number, incremented every time the program is modified.

Associations

Association		Notes
0..*	**From:** SurveyProgram.SurveySection **To:** SurveySection *Association*	Survey section object.
	From: SurveyProgram. **To:** AbstractObject *Generalization*	
1..1	**From:** SurveyProgram.Wellbore **To:** Wellbore *Association*	

12.2 SurveySection

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015   *Last modified:* 11/7/2016
Notes: Survey Section Component Schema.

Attributes

Name	Type	Notes
Comments	String2000	Comments and remarks.
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
FrequencyMx	LengthMeasure	Maximum allowable depth frequency for survey stations for this survey run.
ItemState	ExistenceKind	The item state for the data object.
MdInterval	MdInterval	
ModelError	String64	Error model used to calculate the ellipses of uncertainty.
Name	String64	Name of the survey program section.
NameSurveyCompany	String64	Company who will run or has run the survey tool.
NameTool	String64	Name of survey tool used in this section.
Overwrite	boolean	Higher index trajectory takes precedence over overlapping section of previous trajectory? Values are "true" (or "1") and "false" (or "0"). Normally, this is true.
Sequence	NonNegativeLong	Order in which the program sections are or were executed.
TypeTool	String64	Type of tool used.
uid	String64	Unique identifier of this instance of SurveySection.

Associations

Association		Notes
0..*	**From:** SurveyProgram.SurveySection **To:** SurveySection *Association*	Survey section object.

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13 Trajectory

Package: xsd_schemas
Notes: Trajectory Schema.

13.1 AziRef

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: Created: 4/13/2015   Last modified: 10/31/2016
Notes: Reference to the azimuth of the trajectory

Attributes

Name	Type	Notes
magnetic north		The north direction as defined by Magnetic North Pole at the time of the measurement. The Magnetic North Pole is the direction that a magnet points to when freely rotating.
grid north		The north direction is defined by the coordinate grid in the projection coordinate system.
true north		The north direction as defined by the true North Pole. The true North Pole is an average of the actual measured north axis, which is the axis of rotation of the earth.
unknown		The value is not known. Avoid using this value. All reasonable attempts should be made to determine the appropriate value. Use of this value may result in rejection in some situations.

Associations

Association	Notes
From: AziRef. **To:** TypeEnum *Generalization*	
From: Target. **To:** AziRef *Dependency*	
From: Trajectory. **To:** AziRef *Dependency*	

13.2 part_TrajectoryStation

Type: Class   *Stereotype:* «XSDtopLevelElement»
Detail: *Created:* 9/3/2015   *Last modified:* 11/7/2016
Notes: Wrapper for sending individual stations using ETP.

Associations

Association	Notes
From: part_TrajectoryStation. **To:** TrajectoryStation *Generalization*	

13.3 RefWellboreTrajectoryStation

Type: Class *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015 *Last modified:* 10/25/2016
Notes: A reference to a trajectoryStation in a wellbore. The trajectoryStation may be defined within the context of another wellbore. This value represents a foreign key from one element to another.

Attributes

Name	Type	Notes
StationReference	String64	A pointer to the trajectoryStation within the parent trajectory. StationReference is a special case where WITSML only uses a UID for the pointer.The natural identity of a station is its physical characteristics (e.g., md).
TrajectoryParent	String64	A pointer to the trajectory within the parent wellbore. This trajectory contains the trajectoryStation.
WellboreParent	String64	A pointer to the wellbore that contains the trajectory. WellboreParent is not needed unless the trajectory is outside the context of a common parent wellbore.

Associations

Association		Notes
0..1	**From:** TrajectoryStation.SourceStation **To:** RefWellboreTrajectoryStation *Association*	A pointer to the trajectoryStation from which this station was derived. The trajectoryStation may be in another wellbore.

13.4 StnTrajCorUsed

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015   *Last modified:* 11/7/2016
Notes: Captures information about corrections applied to a trajectory station.

Attributes

Name	Type	Notes
DirSensorOffset	LengthMeasure	Offset relative to the bit.
GravAxialAccelCor	LinearAccelerationMeasure	Calculated gravitational field strength correction.
GravTran1AccelCor	LinearAccelerationMeasure	The correction applied to a cross-axial (direction 1) component of the Earth's gravitational field.
GravTran2AccelCor	LinearAccelerationMeasure	The correction applied to a cross-axial (direction 2) component of the Earth's gravitational field.
MagAxialDrlstrCor	MagneticFluxDensityMeasure	Axial magnetic drill string correction.
MagAxialMSACor	MagneticFluxDensityMeasure	Axial magnetic correction due to a multi-station analysis process.
MagTran1DrlstrCor	MagneticFluxDensityMeasure	Cross-axial (direction 1) magnetic correction.
MagTran1MSACor	MagneticFluxDensityMeasure	Cross-axial (direction 1) magnetic correction due to a multi-station analysis process.
MagTran2DrlstrCor	MagneticFluxDensityMeasure	Cross-axial (direction 2) magnetic correction.
MagTran2MSACor	MagneticFluxDensityMeasure	Cross-axial (direction 2) magnetic correction due to a multi-station analysis process.
SagAziCor	PlaneAngleMeasure	Calculated cosag correction to the azimuth.
SagIncCor	PlaneAngleMeasure	Calculated sag correction to the inclination.
StnGridConUsed	PlaneAngleMeasure	Magnetic declination used to correct a Magnetic North referenced azimuth to a True North azimuth. Magnetic declination angles are measured positive clockwise from True North to Magnetic North (or negative in the anti-clockwise direction). To convert a Magnetic azimuth to a True North azimuth, the magnetic declination should be added.
StnMagDeclUsed	PlaneAngleMeasure	Magnetic declination used to correct a Magnetic North referenced azimuth to a True North azimuth. Magnetic declination angles are measured positive clockwise from True North to Magnetic North (or negative in the anti-clockwise direction). To convert a Magnetic azimuth to a True North azimuth, the magnetic declination should be added.

Associations

Association		Notes
0..1	**From:** TrajectoryStation.CorUsed **To:** StnTrajCorUsed *Association*	Applies only to measured magnetic stations.

13.5 StnTrajMatrixCov

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015   *Last modified:* 11/7/2016
Notes: Captures validation information for a covariance matrix.

Attributes

Name	Type	Notes
BiasE	LengthMeasure	Bias east.
BiasN	LengthMeasure	Bias north.
BiasVert	LengthMeasure	Bias vertical. The coordinate system is set up in a right-handed configuration, which makes the vertical direction increasing (i.e., positive) downwards.
VarianceEE	AreaMeasure	Covariance east east.
VarianceEVert	AreaMeasure	Crossvariance east vertical.
VarianceNE	AreaMeasure	Crossvariance north east.
VarianceNN	AreaMeasure	Covariance north north.
VarianceNVert	AreaMeasure	Crossvariance north vertical.
VarianceVertVert	AreaMeasure	Covariance vertical vertical.

Associations

Association		Notes
0..1	**From:** TrajectoryStation.MatrixCov **To:** StnTrajMatrixCov *Association*	Covariance matrix for error model.

13.6 StnTrajRawData

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015   *Last modified:* 11/7/2016
Notes: Captures raw data for a trajectory station.

Attributes

Name	Type	Notes
GravAxialRaw	LinearAccelerationMeasure	Uncorrected gravitational field strength measured in the axial direction.
GravTran1Raw	LinearAccelerationMeasure	Uncorrected gravitational field strength measured in the transverse direction.
GravTran2Raw	LinearAccelerationMeasure	Uncorrected gravitational field strength measured in the transverse direction, approximately normal to tran1.
MagAxialRaw	MagneticFluxDensityMeasure	Uncorrected magnetic field strength measured in the axial direction.
MagTran1Raw	MagneticFluxDensityMeasure	Uncorrected magnetic field strength measured in the transverse direction.
MagTran2Raw	MagneticFluxDensityMeasure	Uncorrected magnetic field strength measured in the transverse direction, approximately normal to tran1.

Associations

Association		Notes
0..1	**From:** TrajectoryStation.RawData **To:** StnTrajRawData *Association*	Applies only to measured magnetic stations.

13.7 StnTrajValid

Type: Class *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015 *Last modified:* 11/7/2016
Notes: Captures validation information for a survey.

Attributes

Name	Type	Notes
GravTotalFieldCalc	LinearAccelerationMeasure	Calculated total gravitational field.
MagDipAngleCalc	PlaneAngleMeasure	Calculated magnetic dip (inclination), the angle between the horizontal and the geomagnetic field (positive down, res .001).
MagTotalFieldCalc	MagneticFluxDensityMeasure	Calculated total intensity of the geomagnetic field as sum of BGGM, IFR and local field.

Associations

Association		Notes
0..1	**From:** TrajectoryStation.Valid **To:** StnTrajValid *Association*	Applies only to measured magnetic stations.

13.8 Trajectory

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015   *Last modified:* 10/25/2016
Notes: The trajectory object is used to capture information about a directional survey in a wellbore. It contains many trajectory stations to capture the information about individual survey points. This object is uniquely identified within the context of one wellbore object.

Attributes

Name	Type	Notes
AziRef	AziRef	Specifies the definition of north. While this is optional because of legacy data, it is strongly recommended that this always be specified.
AziVertSect	PlaneAngleMeasure	Azimuth used for vertical section plot/computations.
Definitive	boolean	True ("true" or "1") indicates that this trajectory is definitive for this wellbore. False ("false" or "0") or not given indicates otherwise. There can only be one trajectory per wellbore with definitive=true and it must define the geometry of the whole wellbore (surface to bottom). The definitive trajectory may represent a composite of information in many other trajectories. A query requesting a subset of the possible information can provide a simplistic view of the geometry of the wellbore.
DispEwVertSectOrig	LengthMeasure	Origin east-west used for vertical section plot/computations.
DispNsVertSectOrig	LengthMeasure	Origin north-south used for vertical section plot/computations.
DTimTrajEnd	TimeStamp	End date and time of trajectory station measurements. Note that this is NOT a server query parameter.
DTimTrajStart	TimeStamp	Start date and time of trajectory station measurements. Note that this is NOT a server query parameter.
FinalTraj	boolean	Is trajectory a final or intermediate/preliminary? Values are "true" (or "1") and "false" (or "0").
GridConUsed	PlaneAngleMeasure	Magnetic declination (convergence) used to correct a Magnetic North referenced azimuth to a True North azimuth. Magnetic declination angles are measured positive clockwise from True North to Magnetic North (or negative in the anti-clockwise direction). To convert a Magnetic azimuth to a True North azimuth, the magnetic declination should be added. Starting value if stations have individual values.
GrowingStatus	ChannelStatus	Describes the growing status of the trajectory,

Name	Type	Notes
		whether active, inactive or closed
MagDeclUsed	PlaneAngleMeasure	Magnetic declination used to correct a Magnetic North referenced azimuth to a True North azimuth. Magnetic declination angles are measured positive clockwise from True North to Magnetic North (or negative in the anti-clockwise direction). To convert a Magnetic azimuth to a True North azimuth, the magnetic declination should be added. Starting value if stations have individual values.
MdMn	MeasuredDepthCoord	Minimum measured depth of this object. This is an API "structural-range" query parameter for growing objects. See the relevant API specification for the query behavior related to this element.
MdMx	MeasuredDepthCoord	Maximum measured depth of this object. This is an API "structural-range" query parameter for growing objects. See the relevant API specification for the query behavior related to this element.
Memory	boolean	Is trajectory a result of a memory dump from a tool? Values are "true" (or "1") and "false" (or "0").
ServiceCompany	String64	Name of contractor who provided the service.

Associations

Association		Notes
	From: Trajectory. **To:** ChannelStatus *Dependency*	
1..1	**From:** Trajectory.Wellbore **To:** Wellbore *Association*	
0..1	**From:** Trajectory.ParentTrajectory **To:** Trajectory *Association*	If a trajectory is tied into another trajectory, a pointer to the parent trajectory. The trajectory may be in another wellbore.
	From: Trajectory. **To:** AziRef *Dependency*	
	From: Trajectory. **To:** AbstractObject *Generalization*	
0..*	**From:** Trajectory.TrajectoryStation **To:** TrajectoryStation *Association*	Container element for trajectory station elements. This is an API "data-node" query parameter for growing objects. See the relevant API specification for the query behavior related to this element.
0..1	**From:** Trajectory.ParentTrajectory **To:** Trajectory	If a trajectory is tied into another trajectory, a pointer to the parent trajectory.

Association	Notes
Association	The trajectory may be in another wellbore.
0..1 **From:** WellboreMarker.Trajectory **To:** Trajectory *Association*	Reference to the directional survey used to convert the marker's MD to TVD. Even though the field is optional, it should be thought of as mandatory for any marker with a TVD (because one would have been used to make the conversion). Because this information is often lost or the survey is unavailable in the context of a data transfer the field is left as optional.

13.9 TrajectoryStation

Type: Class *Stereotype:* «XSDcomplexType»
Detail: Created: 4/13/2015 *Last modified:* 10/25/2016
Notes: WITSML - Trajectory Station Component Schema

Attributes

Name	Type	Notes
AxialMagInterferenceCorUsed	boolean	Was an Axial Magnetic Interference (AMI) correction applied to the azimuth value? Values are "true" (or "1") and "false" (or "0"). Most of the BHAs used to drill wells include an MWD tool. An MWD is a magnetic survey tool and as such suffer from magnetic interferences from a wide variety of sources. Magnetic interferences can be categorized into axial and radial type interferences. Axial interferences are mainly the result of magnetic poles from the drill string steel components located below and above the MWD tool. Radial interferences are numerous. Therefore, there is a risk that magXAxialCorUsed includes both Axial and radial corrections.
Azi	PlaneAngleMeasure	Hole azimuth. Corrected to wells azimuth reference.
CalcAlgorithm	TrajStnCalcAlgorithm	The type of algorithm used in the position calculation.
CosagCorUsed	boolean	WWas a Cosag Correction applied to the azimuth values? Values are "true" (or "1") and "false" (or "0"). The BHA Sag Correction is the same as the Sag Correction except it includes the horizontal misalignment (Cosag).
DipAngleUncert	PlaneAngleMeasure	Survey tool dip uncertainty.
DispEw	LengthMeasure	East-west offset, positive to the East. This is relative to wellLocation with a North axis orientation of aziRef. If a displacement with respect to a different point is desired then define a localCRS and specify local coordinates in location.
DispNs	LengthMeasure	North-south offset, positive to the North. This is relative to wellLocation with a North axis orientation of aziRef. If a displacement with respect to a different point is desired then define a localCRS and specify local coordinates in location.
Dls	AnglePerLengthMeasure	Dogleg severity.
DTimStn	TimeStamp	Date and time the station was measured or

Name	Type	Notes
		created.
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
GeoModelUsed	String64	Gravitational model used.
GravAccelCorUsed	boolean	Was an accelerometer alignment correction applied to survey computation? Values are "true" (or "1") and "false" (or "0").
GravTotalFieldReference	LinearAccelerationMeasure	Gravitational field theoretical/reference value.
GravTotalUncert	LinearAccelerationMeasure	Survey tool gravity uncertainty.
Gtf	PlaneAngleMeasure	Toolface angle (gravity).
Incl	PlaneAngleMeasure	Hole inclination, measured from vertical.
InfieldRefCorUsed	boolean	Was an In Field Referencing (IFR) correction applied to the azimuth value? Values are "true" (or "1") and "false" (or "0"). An IFR survey measures the strength and direction of the Earth's magnetic field over the area of interest. By taking a geomagnetic modelled values away from these field survey results, we are left with a local crustal correction, which since it is assumed geological in nature, only varies over geological timescales. For MWD survey operations, these corrections are applied in addition to the geomagnetic model to provide accurate knowledge of the local magnetic field and hence to improve the accuracy of MWD magnetic azimuth measurements.
InHoleRefCorUsed	boolean	Was an In Hole Referencing (IHR) correction applied to the inclination and/or azimuth values? Values are "true" (or "1") and "false" (or "0"). In-Hole Referencing essentially involves comparing gyro surveys to MWD surveys in a tangent section of a well. Once a small part of a tangent section has been drilled and surveyed using an MWD tool, then an open hole (OH) gyro is run. By comparing the Gyro surveys to the MWD surveys a correction can be calculated for the MWD. This correction is then assumed as valid for the rest of the tangent section allowing to have a near gyro accuracy for the whole section, therefore reducing the ellipse of uncertainty (EOU) size.
InterpolatedInfieldRefCorUsed	boolean	Was an Interpolated In Field Referencing (IIFR) correction applied to the azimuth value? Values are "true" (or "1") and "false" (or "0"). Interpolated In Field Referencing measures the diurnal Earth magnetic field variations resulting from electrical currents in the ionosphere and effects of magnetic

Name	Type	Notes
		storms hitting the Earth. It increases again the accuracy of the magnetic azimuth measurement.
MagDipAngleReference	PlaneAngleMeasure	Magnetic dip angle theoretical/reference value.
MagDrlstrCorUsed	boolean	Was a drillstring magnetism correction applied to survey computation? Values are "true" (or "1") and "false" (or "0").
MagModelUsed	String64	Geomagnetic model used.
MagModelValid	String64	Current valid interval for the geomagnetic model used.
MagTotalFieldReference	MagneticFluxDensityMeasure	Geomagnetic field theoretical/reference value.
MagTotalUncert	MagneticFluxDensityMeasure	Survey tool magnetic uncertainty.
MagXAxialCorUsed	boolean	Was a magnetometer alignment correction applied to survey computation? Values are "true" (or "1") and "false" (or "0").
ManuallyEntered	boolean	Indicates whether the trajectory station information was manually entered by a human.
Md	MeasuredDepthCoord	Measured depth of measurement from the drill datum. This is an API "node-index" query parameter for growing objects. See the relevant API specification for the query behavior related to this element.
MdDelta	LengthMeasure	Delta measured depth from previous station.
MSACorUsed	boolean	Was a correction applied to the survey due to a Multi-Station Analysis process? Values are "true" (or "1") and "false" (or "0").
Mtf	PlaneAngleMeasure	Toolface angle (magnetic).
RateBuild	AnglePerLengthMeasure	Build Rate, radius of curvature computation.
RateTurn	AnglePerLengthMeasure	Turn rate, radius of curvature computation.
SagCorUsed	boolean	Was a bottom hole assembly sag correction applied to the survey computation? Values are "true" (or "1") and "false" (or "0").
StatusTrajStation	TrajStationStatus	Status of the station.
Target	String64	A pointer to the intended target of this station.
Tvd	WellVerticalDepthCoord	Vertical depth of the measurements.
TvdDelta	LengthMeasure	Delta true vertical depth from previous station.
TypeSurveyTool	TypeSurveyTool	The type of tool used for the measurements.
TypeTrajStation	TrajStationType	Type of survey station.
uid	String64	A unique identifier for an instance of a trajectory station.
VertSect	LengthMeasure	Distance along vertical section azimuth plane.

Associations

Association	Notes

Association		Notes
0..1	**From:** TrajectoryStation.CorUsed **To:** StnTrajCorUsed *Association*	Applies only to measured magnetic stations.
0..*	**From:** TrajectoryStation.Location **To:** AbstractWellLocation *Association*	The 2D coordinates of the item. Note that within the context of trajectory, the "original" coordinates are inherently local coordinates as defined above.
	From: TrajectoryStation. **To:** TrajStnCalcAlgorithm *Dependency*	
0..1	**From:** TrajectoryStation.MatrixCov **To:** StnTrajMatrixCov *Association*	Covariance matrix for error model.
0..1	**From:** TrajectoryStation.RawData **To:** StnTrajRawData *Association*	Applies only to measured magnetic stations.
	From: TrajectoryStation. **To:** TrajStationType *Dependency*	
0..1	**From:** TrajectoryStation.IscwsaToolErrorModel **To:** ToolErrorModel *Association*	
0..1	**From:** TrajectoryStation.Valid **To:** StnTrajValid *Association*	Applies only to measured magnetic stations.
0..1	**From:** TrajectoryStation.SourceStation **To:** RefWellboreTrajectoryStation *Association*	A pointer to the trajectoryStation from which this station was derived. The trajectoryStation may be in another wellbore.
	From: TrajectoryStation. **To:** TrajStationStatus *Dependency*	
	From: TrajectoryStation. **To:** TypeSurveyTool *Dependency*	
	From: part_TrajectoryStation. **To:** TrajectoryStation *Generalization*	
0..*	**From:** OpsReport.TrajectoryStation **To:** TrajectoryStation *Association*	Survey station recorded during the report interval.
0..*	**From:** Trajectory.TrajectoryStation **To:** TrajectoryStation *Association*	Container element for trajectory station elements. This is an API "data-node" query parameter for growing objects. See the relevant API specification for the query behavior related to this element.

13.10 TrajStationStatus

Type: Enumeration *Stereotype:* «Enumeration»
Detail: *Created:* 4/13/2015 *Last modified:* 11/7/2016
Notes: Specifies the status of a trajectory station.

Attributes

Name	Type	Notes
open		Has not been validated; does not influence position computation for stations below it.
rejected		The quality is not ok; does not influence position computation for stations below it.
position		Validated and in-use.

Associations

Association	Notes
From: TrajStationStatus. **To:** TypeEnum *Generalization*	
From: TrajectoryStation. **To:** TrajStationStatus *Dependency*	

13.11 TrajStationType

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: *Created:* 4/13/2015   *Last modified:* 11/7/2016
Notes: Specifies the type of directional survey station.

Attributes

Name	Type	Notes
azimuth on plane		Section terminates at a given azimuth on a given plane target; requires target ID.
buildrate to delta-MD		Section follows a given build rate to a specified delta measured depth.
buildrate to INCL		Section follows a given build rate to a specified inclination.
buildrate to MD		Section follows a given build rate to a specified measured depth.
buildrate and turnrate to AZI		Section follows a given build rate and turn rate to a specified azimuth.
buildrate and turnrate to delta-MD		Section follows a given build rate and turn rate to a specified delta measured depth.
buildrate and turnrate to INCL		Section follows a given build rate and turn rate to a specified inclination.
buildrate and turnrate to INCL and AZI		Section follows a given build rate and turn rate to a specified inclination and azimuth.
buildrate and turnrate to MD		Section follows a given build rate and turn rate to a specified measured depth.
buildrate and turnrate to TVD		Section follows a given build rate and turn rate to a specified TVD.
buildrate TVD		Section follows a given build rate to a specified TVD.
casing MD		Measured depth casing point; can also be inserted within actual survey stations.
casing TVD		TVD casing point; can also be inserted within actual survey stations.
DLS		Section follows a given dogleg severity.
DLS to AZI and MD		Section follows a given dogleg severity to a specified measured depth and azimuth.
DLS to AZI-TVD		Section follows a given dogleg severity until a specified TVD and azimuth.
DLS to INCL		Section follows a given dogleg severity until a specified inclination.
DLS to INCL and AZI		Section follows a given dogleg severity to a specified inclination and azimuth.
DLS to INCL and MD		Section follows a given dogleg severity to a specified measured depth and inclination.
DLS to INCL and TVD		Section follows a given dogleg severity until a specified TVD and inclination.
DLS to NS		Section follows a given dogleg severity for a given north, south distance.
DLS and toolface to AZI		Section follows a given toolface angle and dogleg severity to a specified azimuth.
DLS and toolface to delta-MD		Section follows a given toolface angle and dogleg

Name	Type	Notes
		severity to a specified delta measured depth.
DLS and toolface to INCL		Section follows a given toolface angle and dogleg severity to a specified inclination.
DLS and toolface to INCL-AZI		Section follows a given toolface angle and dogleg severity to a specified inclination and azimuth.
DLS and toolface to MD		Section follows a given toolface angle and dogleg severity to a specified measured depth.
DLS and toolface to TVD		Section follows a given toolface angle and dogleg severity to a specified TVD.
formation MD		Measured depth formation; can be inserted within actual survey stations also .
formation TVD		TVD formation; can be inserted within actual survey stations also.
hold to delta-MD		Section holds angle and azimuth to a specified delta measured depth.
hold to MD		Section holds angle and azimuth to a specified measured depth.
hold to TVD		Section holds angle and azimuth to a specified TVD.
INCL AZI and TVD		Section follows a continuous curve to a specified inclination, azimuth and true vertical depth.
interpolated		Derived by interpolating between stations with entered values (either planned or surveyed).
marker MD		Measured depth marker; can be inserted within actual survey stations also.
marker TVD		TVD marker; can be inserted within actual survey stations also.
MD and INCL		An old style drift indicator by Totco / inclination-only survey.
MD INCL and AZI		A normal MWD / gyro survey.
N E and TVD		A point on a computed trajectory with northing, easting and true vertical depth.
NS EW and TVD		Specified as TVD, NS, EW; could be used for point or drilling target (non-geological target).
target center		Specified as TVD, NS, EW of target center; requires target ID association.
target offset		Specified as TVD, NS, EW of target offset; requires target ID association.
tie in point		Tie-in point for the survey.
turnrate to AZI		Section follows a given turn rate to an azimuth.
turnrate to delta-MD		Section follows a given turn rate to a given delta measured depth.
turnrate to MD		Section follows a given turn rate to a given measured depth.
turnrate to TVD		Section follows a given turn rate to a given TVD.
unknown		The value is not known. Avoid using this value. All reasonable attempts should be made to determine the appropriate value. Use of this value may result in rejection in some situations.

Associations

Association	Notes
From: TrajStationType. **To:** TypeEnum *Generalization*	
From: TrajectoryStation. **To:** TrajStationType *Dependency*	

13.12 TrajStnCalcAlgorithm

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: *Created:* 4/13/2015   *Last modified:* 11/7/2016
Notes: Specifies the trajectory station calculation algorithm.

Attributes

Name	Type	Notes
average angle		
balanced tangential		
constant tool face		
custom		
inertial		
minimum curvature		
radius of curvature		
tangential		

Associations

Association	Notes
From: TrajStnCalcAlgorithm. **To:** TypeEnum *Generalization*	
From: TrajectoryStation. **To:** TrajStnCalcAlgorithm *Dependency*	

13.13 TypeSurveyTool

Type: Enumeration *Stereotype:* «Enumeration»
Detail: *Created:* 4/13/2015 *Last modified:* 11/8/2016
Notes: Specifies values for the type of directional survey tool; a very generic classification.

Attributes

Name	Type	Notes
gyroscopic inertial		
gyroscopic MWD		
gyroscopic north seeking		
magnetic multiple-shot		
magnetic MWD		
magnetic single-shot		

Associations

Association	Notes
From: TypeSurveyTool. **To:** TypeEnum *Generalization*	
From: TrajectoryStation. **To:** TypeSurveyTool *Dependency*	

14 ToolErrorModel

Package: xsd_schemas
Notes: Tool Error Model Schema.

14.1 AuthorizationStatus

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: *Created:* 4/13/2015   *Last modified:* 11/7/2016
Notes: Specifies the status of the current tool error model.

Attributes

Name	Type	Notes
draft		Not yet approved.
authorized		Approved for use.
superseded		Obsolete; a newer version is available.
withdrawn		No longer approved in this or any other version.

Associations

Association	Notes
From: AuthorizationStatus. **To:** TypeEnum *Generalization*	
From: IscwsaAuthorizationData. **To:** AuthorizationStatus *Dependency*	

14.2 ErrorModelMisalignmentMode

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: *Created:* 4/13/2015   *Last modified:* 11/7/2016
Notes: Specifies the various misalignment maths.

Attributes

Name	Type	Notes
unknown		
1		Alternative 1 as described in SPE 90408.
2		Alternative 2 as described in SPE 90408.
3		Alternative 3 as described in SPE 90408.

Associations

Association	Notes
From: ErrorModelMisalignmentMode. **To:** TypeEnum *Generalization*	
From: IscwsaModelParameters. **To:** ErrorModelMisalignmentMode *Dependency*	

14.3 ErrorPropagationMode

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: *Created:* 4/13/2015   *Last modified:* 11/7/2016
Notes: Specifies the codes for the various propagation modes.

Attributes

Name	Type	Notes
B		Bias.
R		Random.
S		Systematic.
W		Well.
G		Global.

Associations

Association	Notes
From: ErrorPropagationMode. **To:** TypeEnum *Generalization*	
From: IscwsaErrorTermValue. **To:** ErrorPropagationMode *Dependency*	

14.4 IscwsaAuthorizationData

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015   *Last modified:* 11/7/2016
Notes: Authorization state of some entity. The main goal of the Industry Steering Committee on Wellbore Survey Accuracy (ISCWSA) is to to produce and maintain standards for the industry relating to wellbore survey accuracy.

Attributes

Name	Type	Notes
Author	String64	Person responsible for the information.
Authority	String64	Person or collective body responsible for authorizing the information.
Comment	String2000	A comment about the object. This should include information regarding the derivation of the information.
Source	String64	Source from which the information is derived.
Status	AuthorizationStatus	Authorization state of the information.
Version	String64	Version name or number.

Associations

Association		Notes
	From: IscwsaAuthorizationData. **To:** AuthorizationStatus *Dependency*	
0..1	**From:** ToolErrorTermSet.Authorization **To:** IscwsaAuthorizationData *Association*	The definitive source for this set of error terms.
0..1	**From:** ToolErrorModel.Authorization **To:** IscwsaAuthorizationData *Association*	The definitive source, authority, status and version of this model.

14.5 IscwsaErrorTermValue

Type: Class *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015 *Last modified:* 11/7/2016
Notes: The instantiation of an error term in an error model.The content of this element (a number) is the variance scaling factor of the term in the model.

Attributes

Name	Type	Notes
Bias	double	The mean or expected value of the variance.
Comment	String2000	A textual comment about this error term value.
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
Prop	ErrorPropagationMode	The propagation mode for this term in this model.
Term	String64	A pointer to the errorTerm represented by this value. This term must exist in the toolErrorTermSet referenced by the parent of this node. The same term may only be referenced once in the model.
uid	String64	Unique identifier for this instance of IscwsaErrorTermValue.

Associations

Association		Notes
	From: IscwsaErrorTermValue. **To:** ErrorPropagationMode *Dependency*	
1..1	**From:** IscwsaErrorTermValue.Value **To:** MeasureOrQuantity *Association*	The value of the error term in this model. The unit of measure must be in the set allowed by the measure class of the referenced error term.
1..*	**From:** ToolErrorModel.ErrorTermValue **To:** IscwsaErrorTermValue *Association*	Value for an error term that is part of the model.

14.6 IscwsaModelParameters

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015   *Last modified:* 10/25/2016
Notes: Various parameters controlling the generation of the survey variance.

Attributes

Name	Type	Notes
GyroInitialization	PlaneAngleMeasure	Inclination at which gyro initialization occurs.
GyroReinitializationDistance	LengthMeasure	Maximum length of continuous survey before re-initialization.
GyroRunningSpeed	LengthPerTimeMeasure	Speed at which the tool traverses the wellbore during a continuous survey.
MisalignmentMode	ErrorModelMisalignmentMode	Choice of mathmatical modelling of misalignment.
NoiseReductionFactor	double	Factor applied to random noise error terms, depending on the mode of gyro initialization. Values must be greater than zero and less than or equal to 1.
Switching	boolean	True if the survey tool is rotated at inclinations greater than 90 degrees.

Associations

Association		Notes
	From: IscwsaModelParameters. **To:** ErrorModelMisalignmentMode *Dependency*	
0..1	**From:** ToolErrorModel.ModelParameters **To:** IscwsaModelParameters *Association*	Values related to the tool running conditions that influence the variance generation.

14.7 IscwsaSurveyToolOperatingCondition

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015   *Last modified:* 11/7/2016
Notes: Describes the survey acquisition context in which an error model is valid as a sequence of constraints.

Attributes

Name	Type	Notes
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
Max	GenericMeasure	The greatest value the constraint may take.
Min	GenericMeasure	The least value the constraint may take.
Parameter	String64	A particular constraint.
uid	String64	Unique identifier for this instance of IscwsaSurveyToolOperatingCondition.
Value	String64	A fixed value that the constraint must take.

Associations

Association		Notes
0..*	**From:** ToolErrorModel.OperatingCondition **To:** IscwsaSurveyToolOperatingCondition *Association*	The operating condition for this tool. If it is not specified, then "stationary" should be assumed.

14.8 IscwsaSurveyToolOperatingInterval

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015   *Last modified:* 10/25/2016
Notes: Inclination interval for a particular operating mode.
Intervals may overlap to suppress mode flip-flopping, but should cover
the entire valid range of the tool.

Attributes

Name	Type	Notes
End	PlaneAngleMeasure	Inclination at which the mode terminates.
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
Mode	SurveyToolOperatingMode	Tool operating mode over this interval.
SampleRate	TimeMeasure	Time between survey samples for continuous surveys.
Speed	LengthPerTimeMeasure	Running speed for continuous surveys.
Start	PlaneAngleMeasure	Inclination at which the mode begins.
uid	String64	Unique identifier for this instance of IscwsaSurveyToolOperatingInterval.

Associations

Association		Notes
	From: IscwsaSurveyToolOperatingInterval. **To:** SurveyToolOperatingMode *Dependency*	
0..*	**From:** ToolErrorModel.OperatingInterval **To:** IscwsaSurveyToolOperatingInterval *Association*	The operating interval for this tool. If not specified then stationary should be assumed.

14.9 MeasureOrQuantity

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015   *Last modified:* 11/7/2016
Notes: A measure with a UOM or a quantity (without a UOM). This should not be used except in situations where the underlying class of data is captured elsewhere, e.g., in a measure class.

Attributes

Name	Type	Notes
uom	UomEnum	A measure with a UOM or a quantity (without a UOM). This should not be used except in situations where the underlying class of data is captured elsewhere, e.g., in a measure class.

Associations

Association		Notes
	From: MeasureOrQuantity. **To:** AbstractMeasure *Generalization*	
1..1	**From:** IscwsaErrorTermValue.Value **To:** MeasureOrQuantity *Association*	The value of the error term in this model. The unit of measure must be in the set allowed by the measure class of the referenced error term.

14.10 SurveyToolOperatingMode

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: *Created:* 4/13/2015   *Last modified:* 11/7/2016
Notes: Specifies the codes for the ISCWSA survey tool operating modes.

Attributes

Name	Type	Notes
continuous xy		
continuous xyz		
continuous z		
unknown		
stationary		Tool is operating in a stationary mode.

Associations

Association	Notes
From: SurveyToolOperatingMode. **To:** TypeEnum *Generalization*	
From: IscwsaErrorTerm. **To:** SurveyToolOperatingMode *Dependency*	
From: IscwsaSurveyToolOperatingInterval. **To:** SurveyToolOperatingMode *Dependency*	

14.11 ToolErrorModel

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015   *Last modified:* 11/7/2016
Notes: Used to define a surveying tool error model. This object is globally unique.

Attributes

Name	Type	Notes
TypeSurveyTool	TypeSurveyTool	The type of tool used for the measurements. This is the same list as defined for a trajectoryStation.
UseErrorTermSet	String64	Reference to the toolErrorTermSet object that contains the error terms used in this model.

Associations

Association		Notes
0..1	**From:** ToolErrorModel.ModelParameters **To:** IscwsaModelParameters *Association*	Values related to the tool running conditions that influence the variance generation.
0..1	**From:** ToolErrorModel.Authorization **To:** IscwsaAuthorizationData *Association*	The definitive source, authority, status and version of this model.
0..*	**From:** ToolErrorModel.OperatingInterval **To:** IscwsaSurveyToolOperatingInterval *Association*	The operating interval for this tool. If not specified then stationary should be assumed.
1..*	**From:** ToolErrorModel.ErrorTermValue **To:** IscwsaErrorTermValue *Association*	Value for an error term that is part of the model.
	From: ToolErrorModel. **To:** AbstractObject *Generalization*	
0..*	**From:** ToolErrorModel.OperatingCondition **To:** IscwsaSurveyToolOperatingCondition *Association*	The operating condition for this tool. If it is not specified, then "stationary" should be assumed.
0..1	**From:** TrajectoryStation.IscwsaToolErrorModel **To:** ToolErrorModel *Association*	

15 ToolErrorTermSet

Package: xsd_schemas
Notes: Tool Error Term Set Schema.

15.1 AbstractIscwsaErrorCoefficient

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: Created: 5/6/2016   Last modified: 11/7/2016
Notes: Describes the survey measurement or value that the error term applies to.

Attributes

Name	Type	Notes
uid	String64	Unique identifier for this instance of AbstractIscwsaErrorCoefficient.

Associations

Association		Notes
	From: Depth. **To:** AbstractIscwsaErrorCoefficient *Generalization*	
1..*	**From:** IscwsaErrorCoefficient. **To:** AbstractIscwsaErrorCoefficient *Association*	
	From: Azi. **To:** AbstractIscwsaErrorCoefficient *Generalization*	
	From: Tvd. **To:** AbstractIscwsaErrorCoefficient *Generalization*	
	From: Inc. **To:** AbstractIscwsaErrorCoefficient *Generalization*	

15.2 Azi

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 5/6/2016   *Last modified:* 11/7/2016
Notes: Describes what survey measurement or value the error term applies to.

Attributes

Name	Type	Notes
Azi	String2000	Hole azimuth. Corrected to the well's azimuth reference.

Associations

Association	Notes
From: Azi. **To:** AbstractIscwsaErrorCoefficient *Generalization*	

15.3 Depth

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 5/6/2016   *Last modified:* 11/7/2016
Notes: Describes what survey measurement or value the error term applies to.

Attributes

Name	Type	Notes
Depth	String2000	The measured depth of the point.

Associations

Association	Notes
From: Depth. **To:** AbstractIscwsaErrorCoefficient *Generalization*	

15.4 ErrorTermSource

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: *Created:* 4/13/2015   *Last modified:* 11/7/2016
Notes: Specifies the codes for the various classes of error sources.

Attributes

Name	Type	Notes
sensor		Errors arising from sensors in the survey tool.
azimuth reference		Errors arising from the adoption of a particular reference azimuth.
magnetic		Errors arising from external magnetic field influences.
alignment		Errors arising from the misalignment of the tool relative to the borehole.
misalignment		Specifies the codes for the various classes of error source.
depth		Errors arising from the measurement of depth.
reference		Errors arising from the measurement of depth.
unknown		The value is not known. Avoid using this value. All reasonable attempts should be made to determine the appropriate value. Use of this value may result in rejection in some situations.

Associations

Association	Notes
From: ErrorTermSource. **To:** TypeEnum *Generalization*	
From: IscwsaErrorTerm. **To:** ErrorTermSource *Dependency*	

15.5 Inc

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 5/6/2016   *Last modified:* 11/7/2016
Notes: Describes what survey measurement or value the error term applies to.

Attributes

Name	Type	Notes
Inc	String2000	Inclination, measured deviation from vertical.

Associations

Association	Notes
From: Inc. **To:** AbstractIscwsaErrorCoefficient *Generalization*	

15.6 IscwsaErrorCoefficient

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015   *Last modified:* 10/25/2016
Notes: Describes what survey measurement or value the error term applies to.

Attributes

Name	Type	Notes
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
uid	String64	Unique identifier for this instance of IscwsaErrorCoefficient.

Associations

Association	Notes
1..* **From:** IscwsaErrorCoefficient. **To:** AbstractIscwsaErrorCoefficient *Association*	
1..* **From:** IscwsaErrorTerm.ErrorCoefficient **To:** IscwsaErrorCoefficient *Association*	Describes what measurement(s) the error variance(s) apply to.

15.7 IscwsaErrorTerm

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015   *Last modified:* 11/7/2016
Notes: Captures the reference error terms that are included in error models using ErrorTermValues.

Attributes

Name	Type	Notes
Description	String2000	Human-readable name for the term. It may be presented in application software, e.g., "MWD: X-Acceleromter Bias with Z-Axis Corr."
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
Label	String64	Human-readable name for the term, may be presented in application software. E.g., "MWD: X-Acceleromter Bias with Z-Axis Corr."
MeasureClass	MeasureClass	The kind of quantity that the term represents. This constrains the unit that can be used for any errorTermValues.
Name	String64	This is the unique mnemonic for this term, e.g., "ABIX" or "DECR".
OperatingMode	SurveyToolOperatingMode	Operating mode that is valid for this error term. In the absence of this element assume "stationary".
Type	ErrorTermSource	The class of the error source.
uid	String64	Unique identifier for this instance of IscwsaErrorTerm.

Associations

Association		Notes
1..*	**From:** IscwsaErrorTerm.ErrorCoefficient **To:** IscwsaErrorCoefficient *Association*	Describes what measurement(s) the error variance(s) apply to.
	From: IscwsaErrorTerm. **To:** ErrorTermSource *Dependency*	
	From: IscwsaErrorTerm. **To:** SurveyToolOperatingMode *Dependency*	
0..*	**From:** ToolErrorTermSet.ErrorTerm **To:** IscwsaErrorTerm *Association*	Defines an error term.

15.8 IscwsaNameAndDescription

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015   *Last modified:* 11/7/2016
Notes: A generic type which captures a name and a description of something.
The semantics of the something is defined by the parent element.

Attributes

Name	Type	Notes
Description	String2000	A textual description of the item.
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
Name	String64	The name of the item.
uid	String64	Unique identifier for this instance of IscwsaNameAndDescription.

Associations

Association		Notes
0..*	**From:** IscwsaNomenclature.Function **To:** IscwsaNameAndDescription *Association*	Mathematical function used to generate error term values from parameters. Each function name must be unique within the context of this nomenclature.
0..*	**From:** IscwsaNomenclature.Parameter **To:** IscwsaNameAndDescription *Association*	Variable names used within a function. Each parameter name must be unique within the context of this nomenclature.

15.9 IscwsaNomenclature

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015   *Last modified:* 11/7/2016
Notes: A nomenclature for the description of error terms.

Associations

Association		Notes
0..*	**From:** IscwsaNomenclature.Constant **To:** IscwsaNomenclatureConstant *Association*	Numerical constant used by functions. Each constant name must be unique within the context of this nomenclature.
0..*	**From:** IscwsaNomenclature.Function **To:** IscwsaNameAndDescription *Association*	Mathematical function used to generate error term values from parameters. Each function name must be unique within the context of this nomenclature.
0..*	**From:** IscwsaNomenclature.Parameter **To:** IscwsaNameAndDescription *Association*	Variable names used within a function. Each parameter name must be unique within the context of this nomenclature.
0..1	**From:** ToolErrorTermSet.Nomenclature **To:** IscwsaNomenclature *Association*	Defines the nomenclature used in the error terms.

15.10 IscwsaNomenclatureConstant

Type: Class *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015 *Last modified:* 10/25/2016
Notes: A nomenclature constant.

Attributes

Name	Type	Notes
Description	String2000	A textual description of the constant.
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
Name	String64	The name of the constant.
uid	String64	Unique identifier for this instance of IscwsaNomenclatureConstant.
Unit	UomEnum	The unit of measure of the constant. This value must match an acronym from the Energistics unit of measure dictionary.
Value	double	The value of the constant.

Associations

Association		Notes
0..*	**From:** IscwsaNomenclature.Constant **To:** IscwsaNomenclatureConstant *Association*	Numerical constant used by functions. Each constant name must be unique within the context of this nomenclature.

15.11 ToolErrorTermSet

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015   *Last modified:* 11/7/2016
Notes: Captures a set of surveying tool error terms which may be used in a toolErrorModel. This object is globally unique.

Associations

Association		Notes
0..1	**From:** ToolErrorTermSet.Nomenclature **To:** IscwsaNomenclature *Association*	Defines the nomenclature used in the error terms.
0..1	**From:** ToolErrorTermSet.Authorization **To:** IscwsaAuthorizationData *Association*	The definitive source for this set of error terms.
	From: ToolErrorTermSet. **To:** AbstractObject *Generalization*	
0..*	**From:** ToolErrorTermSet.ErrorTerm **To:** IscwsaErrorTerm *Association*	Defines an error term.

15.12 Tvd

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 5/6/2016   *Last modified:* 10/25/2016
Notes: Describes what survey measurement or value the error term applies to.

Attributes

Name	Type	Notes
Tvd	String2000	The true vertical depth covered by the tool error term set.

Associations

Association	Notes
From: Tvd. **To:** AbstractIscwsaErrorCoefficient *Generalization*	

16 Tubular

Package: xsd_schemas
Notes: Tubular Schema. Used to capture information about the configuration of a drill string. For information about a use of this configuration, See the BhaRun object . This object is uniquely identified within the context of one wellbore object.

16.1 AbstractRotarySteerableTool

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 2/25/2016   *Last modified:* 11/8/2016
Notes: Choice placeholder in a rotary steerable tool.

Associations

Association		Notes
1	**From:** RotarySteerableTool. **To:** AbstractRotarySteerableTool *Association*	
	From: BendOffset. **To:** AbstractRotarySteerableTool *Generalization*	
	From: BendAngle. **To:** AbstractRotarySteerableTool *Generalization*	

16.2 BearingType

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: Created: 4/13/2015   *Last modified:* 11/8/2016
Notes: Specifies the bearing type of a motor.

Attributes

Name	Type	Notes
oil seal		
mud lube		
other		
unknown		The value is not known. Avoid using this value. All reasonable attempts should be made to determine the appropriate value. Use of this value may result in rejection in some situations.

Associations

Association	Notes
From: BearingType. **To:** TypeEnum *Generalization*	
From: Motor. **To:** BearingType *Dependency*	

16.3 Bend

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015   *Last modified:* 11/8/2016
Notes: Tubular Bend Component Schema.

Attributes

Name	Type	Notes
Angle	PlaneAngleMeasure	Angle of the bend.
DistBendBot	LengthMeasure	Distance of the bend from the bottom of the component.
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
uid	String64	Unique identifier for this instance of Bend.

Associations

Association		Notes
0..1	**From:** Bend.ExtensionAny **To:** CustomData *Association*	Extensions to the schema using an xsd:any construct.
0..*	**From:** TubularComponent.Bend **To:** Bend *Association*	Bend object.

16.4 BendAngle

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 2/25/2016   *Last modified:* 11/8/2016
Notes: Used with point-the-bit type of rotary steerable system tools; describes the angle of the bit.

Attributes

Name	Type	Notes
BendAngle	PlaneAngleMeasure	The angle of the bend.

Associations

Association	Notes
From: BendAngle. **To:** AbstractRotarySteerableTool *Generalization*	

16.5 BendOffset

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 2/25/2016   *Last modified:* 11/8/2016
Notes: Used with point-the-bit type of rotary steerable system tools; describes the angle of the bit.

Attributes

Name	Type	Notes
BendOffset	LengthMeasure	Offset distance from the bottom connection to the bend.

Associations

Association	Notes
From: BendOffset. **To:** AbstractRotarySteerableTool *Generalization*	

16.6 BitDullCode

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: Created: 4/13/2015   Last modified: 11/8/2016
Notes: Specifies the reason a drill bit was declared inoperable; these codes were originally defined by the IADC.

Attributes

Name	Type	Notes
BC		Broken Cone
BT		Broken teeth/cutters
BU		Balled Up
CC		Cracked Cone
CD		Cone Dragged
CI		Cone Interference
CR		Cored
CT		Chipped Teeth
ER		Erosion
FC		Flat Crested Wear
HC		Heat Checking
JD		Junk Damage
LC		Lost Nozzle
LN		Lost Nozzle
LT		Lost Teeth/Cutters
NO		No Dull/No Other Wear
OC		Off-Center Wear
PB		Pinched Bit
PN		Plugged Nozzle
RG		Rounded Gauge
RO		Ring Out
SD		Shirttail Damage
SS		Self-Sharpening Wear
TR		Tracking
WO		WashOut on Bit
WT		Worn Teeth/Cutters
unknown		The value is not known. This value should not be used in normal situations. All reasonable attempts should be made to determine the appropriate value. Use of this value may result in rejection in some situations.

Associations

Association	Notes
From: BitDullCode. **To:** TypeEnum *Generalization*	
From: BitRecord. **To:** BitDullCode *Dependency*	
From: BitRecord. **To:** BitDullCode *Dependency*	

16.7 BitReasonPulled

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: *Created:* 4/13/2015   *Last modified:* 11/8/2016
Notes: Specifies the reason for pulling a drill bit from the wellbore, these codes were originally defined by the IADC.

Attributes

Name	Type	Notes
BHA		Change Bottom Hole Assembly
CM		Condition Mud
CP		Core Point
DMF		Downhole Motor Failure
DP		Drill Plug
DST		Drill Stem Test
DTF		Downhole Tool Failure
FM		Formation Change
HP		Hole Problems
HR		Hours on Bit
LOG		Run Logs
PP		Pump Pressure
PR		Penetration Rate
RIG		Rig Repairs
TD		Total Depth/Casing Depth
TQ		Torque
TW		Twist Off
WC		Weather Conditions
unknown		The value is not known. This value should not be used in normal situations. All reasonable attempts should be made to determine the appropriate value. Use of this value may result in rejection in some situations.

Associations

Association	Notes
From: BitReasonPulled. **To:** TypeEnum *Generalization*	
From: BitRecord. **To:** BitReasonPulled *Dependency*	
From: BitRecord. **To:** BitReasonPulled *Dependency*	

16.8 BitRecord

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015   *Last modified:* 11/8/2016
Notes: Bit Record Component Schema. Captures information that describes the bit and problems with the bit. Many of the problems are classified using IADC codes that are specified as enumerated lists in WITSML.

Attributes

Name	Type	Notes
BitClass	String64	N = new, U = used.
CodeIADC	String64	IADC bit code.
CodeMfg	String64	The manufacturer's code for the bit.
CondFinalBearing	IadcBearingWearCode	Final condition of the bit bearings (integer 0-8 or E, F, N or X).
CondFinalDull	BitDullCode	Final dull condition from the IADC bit-wear 2-character codes.
CondFinalGauge	String64	Final condition of the bit gauge in 1/16 of a inch. I = in gauge, else number of 16ths out of gauge.
CondFinalInner	IadcIntegerCode	Final condition of the inner tooth rows (inner 2/3 of bit) (0-8).
CondFinalLocation	String64	Final conditions for row and cone numbers for items that need location information (e.g., cracked cone, lost cone, etc).
CondFinalOther	String64	Other final comments on bit condition from the IADC list (BitDullCode enumerated list).
CondFinalOuter	IadcIntegerCode	Final condition of the outer tooth rows (outer 1/3 of bit) (0-8).
CondFinalReason	BitReasonPulled	Final reason the bit was pulled from IADC codes (BitReasonPulled enumerated list).
CondInitBearing	IadcBearingWearCode	Initial condition of the bit bearings (integer 0-8 or E, F, N or X).
CondInitDull	BitDullCode	Initial dull condition from the IADC bit-wear 2-character codes.
CondInitGauge	String64	Initial condition of the bit gauge in 1/16 of an inch. I = in gauge, else the number of 16ths out of gauge.
CondInitInner	IadcIntegerCode	Initial condition of the inner tooth rows (inner 2/3 of the bit) (0-8).
CondInitLocation	String64	Initial row and cone numbers for items that need location information (e.g., cracked cone, lost cone, etc).
CondInitOther	String64	Other comments on initial bit condition from the IADC list (BitDullCode enumerated list).
CondInitOuter	IadcIntegerCode	Initial condition of the outer tooth rows (outer 1/3 of bit) (0-8).
CondInitReason	BitReasonPulled	Initial reason the bit was pulled from IADC codes (BitReasonPulled enumerated list).
DiaBit	LengthMeasure	Diameter of the drilled hole.
DiaPassThru	LengthMeasure	Minimum hole or tubing diameter that the bit will pass through (for bi-center bits).
DiaPilot	LengthMeasure	Diameter of the pilot bit (for bi-center bits).

Name	Type	Notes
Drive	String64	Bit drive type (motor, rotary table, etc.).
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
Manufacturer	String64	Manufacturer or supplier of the item.
NumBit	String64	Bit number and rerun number, e.g., "4.1" for the first rerun of bit 4.
TypeBit	BitType	Type of bit.
uid	String64	Unique identifier for this instance of BitRecord.

Associations

Association		Notes
	From: BitRecord. **To:** IadcBearingWearCode *Dependency*	
	From: BitRecord. **To:** IadcIntegerCode *Dependency*	
	From: BitRecord. **To:** IadcBearingWearCode *Dependency*	
0..1	**From:** BitRecord.ExtensionAny **To:** CustomData *Association*	Extensions to the schema using an xsd:any construct.
	From: BitRecord. **To:** BitType *Dependency*	
	From: BitRecord. **To:** IadcIntegerCode *Dependency*	
	From: BitRecord. **To:** BitReasonPulled *Dependency*	
0..1	**From:** BitRecord.Cost **To:** Cost *Association*	Bit cost in local currency.
	From: BitRecord. **To:** BitReasonPulled *Dependency*	
	From: BitRecord. **To:** IadcIntegerCode *Dependency*	
	From: BitRecord. **To:** BitDullCode *Dependency*	
	From: BitRecord. **To:** IadcIntegerCode *Dependency*	
	From: BitRecord. **To:** BitDullCode *Dependency*	
	From: TubularComponent.BitRecord	

Association	Notes
0..1 **To:** BitRecord *Association*	

16.9 BitType

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: *Created:* 4/13/2015   *Last modified:* 11/8/2016
Notes: Specifies the values that represent the type of drill or core bit.

Attributes

Name	Type	Notes
diamond		Diamond bit.
diamond core		Diamond core bit.
insert roller cone		Insert roller cone bit.
PDC		Polycrystalline diamond compact fixed-cutter bit.
PDC core		Polycrystalline diamond compact core bit.
roller cone		Milled-tooth roller-cone bit.
unknown		The value is not known. Avoid using this value. All reasonable attempts should be made to determine the appropriate value. Use of this value may result in rejection in some situations.

Associations

Association	Notes
From: BitType. **To:** TypeEnum *Generalization*	
From: BitRecord. **To:** BitType *Dependency*	

16.10 BladeShapeType

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: *Created:* 4/13/2015   *Last modified:* 10/25/2016
Notes: Blade shape of the stabilizer: melon, spiral, straight, etc.

Attributes

Name	Type	Notes
dynamic		
melon		
spiral		
straight		
variable		
unknown		The value is not known. This value should not be used in normal situations. All reasonable attempts should be made to determine the appropriate value. Use of this value may result in rejection in some situations.

Associations

Association	Notes
From: BladeShapeType. **To:** TypeEnum *Generalization*	
From: Stabilizer. **To:** BladeShapeType *Dependency*	

16.11 BladeType

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: *Created:* 4/13/2015   *Last modified:* 11/8/2016
Notes: Specifies the blade type of the stabilizer.

Attributes

Name	Type	Notes
clamp-on		
integral		
sleeve		
welded		
unknown		The value is not known. Avoid using this value. All reasonable attempts should be made to determine the appropriate value. Use of this value may result in rejection in some situations.

Associations

Association	Notes
From: BladeType. **To:** TypeEnum *Generalization*	
From: Stabilizer. **To:** BladeType *Dependency*	

16.12 BoxPinConfig

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: Created: 4/13/2015   *Last modified:* 11/8/2016
Notes: Specifies values that represent the type of box and pin configuration.

Attributes

Name	Type	Notes
bottom box		
top box		
top pin		
bottom pin top box		
bottom pin		
unknown		The value is not known. Avoid using this value. All reasonable attempts should be made to determine the appropriate value. Use of this value may result in rejection in some situations.

Associations

Association	Notes
From: BoxPinConfig. **To:** TypeEnum *Generalization*	
From: TubularComponent. **To:** BoxPinConfig *Dependency*	

16.13 Connection

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015   *Last modified:* 11/8/2016
Notes: Tubular Connection Component Schema. Describes dimensions and properties of a connection between tubulars.

Attributes

Name	Type	Notes
CriticalCrossSection	AreaMeasure	For bending stiffness ratio.
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
Id	LengthMeasure	Inside diameter of the connection.
Len	LengthMeasure	Length of the item.
Od	LengthMeasure	Outside diameter of the body of the item.
Position	ConnectionPosition	Where connected.
PresLeak	PressureMeasure	Leak pressure rating.
SizeThread	LengthMeasure	Thread size.
TensYield	PressureMeasure	Yield stress of steel: worn stress.
TqMakeup	MomentOfForceMeasure	Make-up torque.
TqYield	MomentOfForceMeasure	Torque at which yield occurs.
TypeThread	String64	Thread type from API RP7G, 5CT.
uid	String64	Unique identifier for this instance of Connection.

Associations

Association		Notes
0..1	**From:** Connection.ExtensionAny **To:** CustomData *Association*	Extensions to the schema using an xsd:any construct.
	From: Connection. **To:** ConnectionPosition *Dependency*	
0..*	**From:** TubularComponent.Connection **To:** Connection *Association*	Connection object.
	From: EquipmentConnection. **To:** Connection *Generalization*	

16.14 ConnectionPosition

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: *Created:* 4/13/2015   *Last modified:* 11/8/2016
Notes: Specifies the position of a connection.

Attributes

Name	Type	Notes
both		The connection is the same at both ends of the component.
bottom		This connection is only at the bottom of the component.
top		This connection is only at the top of the component.
unknown		The value is not known. Avoid using this value. All reasonable attempts should be made to determine the appropriate value. Use of this value may result in rejection in some situations.

Associations

Association	Notes
From: ConnectionPosition. **To:** TypeEnum *Generalization*	
From: Connection. **To:** ConnectionPosition *Dependency*	

16.15 DeflectionMethod

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: *Created:* 4/13/2015   *Last modified:* 11/8/2016
Notes: Specifies the method used to direct the deviation of the trajectory in directional drilling.

Attributes

Name	Type	Notes
hybrid		Rotary steerable system that changes the trajectory of a wellbore using both point-the-bit and push-the-bit methods.
point bit		Rotary steerable system that changes the trajectory of a wellbore by tilting the bit to point it in the desired direction.
push bit		Rotary steerable system that changes the trajectory of a wellbore by inducing a side force to push the bit in the desired direction.

Associations

Association	Notes
From: DeflectionMethod. **To:** TypeEnum *Generalization*	
From: RotarySteerableTool. **To:** DeflectionMethod *Dependency*	

16.16 HoleOpener

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015   *Last modified:* 11/8/2016
Notes: Hole Opener Component Schema. Describes the hole-opener tool (often called a 'reamer') used on the tubular string.

Attributes

Name	Type	Notes
DiaHoleOpener	LengthMeasure	Diameter of the reamer.
Manufacturer	String64	Manufacturer or supplier of the tool.
NumCutter	int	Number of cutters on the tool.
TypeHoleOpener	HoleOpenerType	Under reamer or fixed blade.

Associations

	Association	Notes
	From: HoleOpener. **To:** HoleOpenerType *Dependency*	
0..1	**From:** HoleOpener.ExtensionAny **To:** CustomData *Association*	Extensions to the schema using an xsd:any construct.
0..1	**From:** TubularComponent.HoleOpener **To:** HoleOpener *Association*	Hole opener object.

16.17 HoleOpenerType

Type: Enumeration *Stereotype:* «Enumeration»
Detail: *Created:* 4/13/2015 *Last modified:* 11/8/2016
Notes: Specifies the types of hole openers.

Attributes

Name	Type	Notes
under-reamer		
fixed blade		
unknown		The value is not known. Avoid using this value. All reasonable attempts should be made to determine the appropriate value. Use of this value may result in rejection in some situations.

Associations

Association	Notes
From: HoleOpenerType. **To:** TypeEnum *Generalization*	
From: HoleOpener. **To:** HoleOpenerType *Dependency*	

16.18 IadcBearingWearCode

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: Created: 2/25/2016   *Last modified:* 11/8/2016
Notes: Specifies the condition codes for the bearing wear.

Attributes

Name	Type	Notes
0		
1		
2		
3		
4		
5		
6		
7		
8		
E		
F		
N		
X		

Associations

Association	Notes
From: BitRecord. **To:** IadcBearingWearCode *Dependency*	
From: BitRecord. **To:** IadcBearingWearCode *Dependency*	

16.19 IadcIntegerCode

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: Created: 2/25/2016   *Last modified:* 11/8/2016
Notes: Specifies the IADC integer codes for the inner or outer tooth rows.

Attributes

Name	Type	Notes
0		
1		
2		
3		
4		
5		
6		
7		
8		

Associations

Association	Notes
From: BitRecord. **To:** IadcIntegerCode *Dependency*	
From: BitRecord. **To:** IadcIntegerCode *Dependency*	
From: BitRecord. **To:** IadcIntegerCode *Dependency*	
From: BitRecord. **To:** IadcIntegerCode *Dependency*	

16.20 Jar

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015   *Last modified:* 11/8/2016
Notes: WITSML - Tubular Jar Component Schema. Captures information about jars, which are mechanical or hydraulic devices used in the drill stem to deliver an impact load to another component of the drill stem, especially when that component is stuck.

Attributes

Name	Type	Notes
ForDownSet	ForceMeasure	Down set force.
ForDownTrip	ForceMeasure	Down trip force.
ForPmpOpen	ForceMeasure	Pump open force.
ForSealFric	ForceMeasure	Seal friction force.
ForUpSet	ForceMeasure	Up set force.
ForUpTrip	ForceMeasure	Up trip force.
JarAction	JarAction	The jar action.
TypeJar	JarType	The kind of jar.

Associations

Association		Notes
	From: Jar. **To:** JarAction *Dependency*	
0..1	**From:** Jar.ExtensionAny **To:** CustomData *Association*	Extensions to the schema using an xsd:any construct.
	From: Jar. **To:** JarType *Dependency*	
0..1	**From:** TubularComponent.Jar **To:** Jar *Association*	Jar object.

16.21 JarAction

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: *Created:* 4/13/2015   *Last modified:* 11/8/2016
Notes: Specifies the type of jar action.

Attributes

Name	Type	Notes
up		
down		
both		
vibrating		
unknown		The value is not known. Avoid using this value. All reasonable attempts should be made to determine the appropriate value. Use of this value may result in rejection in some situations.

Associations

Association	Notes
From: JarAction. **To:** TypeEnum *Generalization*	
From: Jar. **To:** JarAction *Dependency*	

16.22 JarType

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: *Created:* 4/13/2015   *Last modified:* 11/8/2016
Notes: Specifies the type of jar.

Attributes

Name	Type	Notes
mechanical		
hydraulic		
hydro mechanical		
unknown		The value is not known. Avoid using this value. All reasonable attempts should be made to determine the appropriate value. Use of this value may result in rejection in some situations.

Associations

Association	Notes
From: JarType. **To:** TypeEnum *Generalization*	
From: Jar. **To:** JarType *Dependency*	

16.23 MaterialType

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: Created: 4/13/2015   *Last modified:* 11/8/2016
Notes: Specifies the primary type of material that a component is made of.

Attributes

Name	Type	Notes
aluminum		
beryllium copper		
chrome alloy		
composite		
other		
non-magnetic steel		
plastic		
steel		
steel alloy		
titanium		
unknown		The value is not known. Avoid using this value. All reasonable attempts should be made to determine the appropriate value. Use of this value may result in rejection in some situations.

Associations

Association	Notes
From: MaterialType. **To:** TypeEnum *Generalization*	
From: TubularComponent. **To:** MaterialType *Dependency*	

16.24 MeasurementType

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: *Created:* 4/13/2015   *Last modified:* 11/8/2016
Notes: Specifies the type of sensor in a tubular string. The source (except for "CH density porosity", "CH neutron porosity", "OH density porosity" and "OH neutron porosity") of the values and the descriptions is the POSC V2.2 "well log trace class" standard instance values, which are documented as "A classification of well log traces based on specification of a range of characteristics. Traces may be classed according to the type of physical characteristic they are meant to measure."

Attributes

Name	Type	Notes
acceleration		Output from an accelerometer on a logging tool.
acoustic caliper		A well log that uses an acoustic device to measure hole diameter.
acoustic casing collar locator		The signal measured by an acoustic device at the location of casing collars and other features (e.g., perforations).
acoustic impedance		Seismic velocity multiplied by density.
acoustic porosity		Porosity calculated from an acoustic log.
acoustic velocity		The velocity of an acoustic wave.
acoustic wave matrix travel time		The time it takes for an acoustic wave to traverse a fixed distance of a given material or matrix. In this case the material or matrix is a specific, zero-porosity rock, e.g., sandstone, limestone or dolomite.
acoustic wave travel time		The time it takes for an acoustic wave to traverse a fixed distance.
amplitude		Any measurement of the maximum departure of a wave from an average value.
amplitude of acoustic wave		The extent of departure of an acoustic wave measured from the mean position.
amplitude of E-M wave		The extent of departure of an electromagnetic wave measured from the mean position.
amplitude ratio		The ratio of two amplitudes.
area		A particular extent of space or surface.
attenuation		The amount of reduction in the amplitude of a wave.
attenuation of acoustic wave		The amount of reduction in the amplitude of an acoustic wave.
attenuation of E-M wave		The amount of reduction in the amplitude of an electromagnetic wave.
auxiliary		A general classification for measurements, which are very specialized and not normally accessed by petrophysicists.
average porosity		The pore volume of a rock averaged using various well log or core porosity measurements.
azimuth		In the horizontal plane, it is the clockwise angle of departure from magnetic north (while looking down

Name	Type	Notes
		hole).
barite mud correction		A trace that has been corrected for the effects of barite in the borehole fluid.
bed thickness correction		A trace that has been corrected for bed thickness effects.
bit size		The diameter of the drill bit used to drill the hole.
blocked		A well log trace that has been edited to reflect sharp bed boundaries. The trace has a square wave appearance.
borehole environment correction		A trace that has been corrected for the effects of the borehole environment, e.g., borehole size.
borehole fluid correction		A trace that has been corrected for the effects of borehole fluid; e.g., a mud cake correction.
borehole size correction		A trace that has been corrected for the effects of borehole size.
bromide mud correction		A trace that has been corrected for the effects of bromide in the borehole fluid.
bulk compressibility		The relative compressibility of a material.
bulk density		The measured density of a rock with the pore volume filled with fluid. The pore fluid is generally assumed to be water.
bulk volume		A quantity-per-unit volume.
bulk volume gas		The quantity of gas present in a unit volume of rock. The product of gas saturation and total porosity.
bulk volume hydrocarbon		The quantity of hydrocarbon present in a unit volume of rock. The product of hydrocarbon saturation and total porosity.
bulk volume oil		The quantity of oil present in a unit volume of rock. The product of oil saturation and total porosity.
bulk volume water		The quantity of formation water present in a unit volume of rock. The product of water saturation and total porosity.
C/O ratio		The ratio of the carbon measurement to the oxygen measurement.
caliper		A well log used to record hole diameter (open or cased).
cased hole correction		A trace that has been corrected for the effects of being recorded in a cased hole, e.g., corrected for casing weight and thickness.
casing collar locator		The signal measured by a device at the location of casing collars and other features (e.g., perforations).
casing correction		A trace that has been corrected for the effects of casing; this includes things such as casing weight, thickness and diameter.
casing diameter correction		A trace that has been corrected for the effects of casing diameter.
casing inspection		Any of the measurements made for the purpose of determining the properties of the well casing.
casing thickness correction		A trace that has been corrected for the effects of casing thickness.

Name	Type	Notes
casing weight correction		A trace that has been corrected for the effects of casing weight.
cement correction		A trace that has been corrected for the effects of the cement surrounding the casing; this includes cement thickness, density and type.
cement density correction		A trace that has been corrected for the effects of cement density.
cement evaluation		Any of the measurements made to determine the presence and quality of the cement bond to casing or to formation.
cement thickness correction		A trace that has been corrected for the effects of cement thickness.
cement type correction		A trace that has been corrected for the effects of the type of cement used.
CH density porosity		
CH dolomite density porosity		Porosity calculated from the bulk density measurement of a cased hole density log using a dolomite matrix density.
CH dolomite neutron porosity		Porosity calculated from a cased hole neutron log using a dolomite matrix.
CH limestone density porosity		Porosity calculated from the bulk density measurement of a cased hole density log using a limestone matrix density.
CH limestone neutron porosity		Porosity calculated from a cased-hole neutron log using a limestone matrix.
CH neutron porosity		
CH sandstone density porosity		Porosity calculated from the bulk density measurement of a cased-hole density log using a sandstone matrix density.
CH sandstone neutron porosity		Porosity calculated from an openhole neutron log using a sandstone matrix.
compressional wave dolomite porosity		Porosity calculated from a compressional wave acoustic log using a dolomite matrix.
compressional wave limestone porosity		Porosity calculated from a compressional wave acoustic log using a limestone matrix
compressional wave matrix travel time		The time it takes for a compressional acoustic wave to traverse a fixed distance of a given material or matrix. In this case the material or matrix is a specific, zero porosity rock, e.g. sandstone, limestone or dolomite.
compressional wave sandstone porosity		Porosity calculated from a compressional wave acoustic log using a sandstone matrix.
compressional wave travel time		The time it takes for a compressional acoustic wave to traverse a fixed distance.
conductivity		The property of a medium (solid or fluid) that allows the medium to conduct a form of energy; e.g., electrical conductivity or thermal conductivity.
conductivity from attenuation		Conductivity calculated from the attenuation of an electromagnetic wave. Generally recorded from a LWD resistivity tool.
conductivity from phase shift		Conductivity calculated from the phase shift of an electromagnetic wave. Generally recorded from a LWD resistivity tool.

Name	Type	Notes
connate water conductivity		The conductivity of the water entrapped in the interstices of the rock.
connate water resistivity		The resistivity of the water entrapped in the interstices of the rock.
conventional core porosity		Porosity from a measurement made on a conventional core.
core matrix density		The density of a rock matrix measured on a core sample.
core permeability		The permeability derived from a core.
core porosity		Porosity from a core measurement.
corrected		A trace that has had corrections applied; e.g. environmental corrections.
count rate		The rate of occurrences; e.g. the far counts from a density tool..
count rate ratio		The ratio of two count rates.
cross plot porosity		The pore volume of a rock calculated from cross plotting two or more well log porosity measurements.
decay time		The time it takes for a population to decay, generally expressed as a half life.
deep conductivity		The conductivity that represents a measurement made several feet into the formation; generally considered a measurement of the undisturbed formation.
deep induction conductivity		The conductivity, measured by an induction log, which represents a measurement made several feet into the formation; generally considered a measurement of the undisturbed formation.
deep induction resistivity		The resistivity, measured by an induction log, which represents a measurement made several feet into the formation; generally considered a measurement of the undisturbed formation.
deep laterolog conductivity		The conductivity, measured by a laterolog, which represents a measurement made several feet into the formation; generally considered a measurement of the undisturbed formation.
deep laterolog resistivity		The resistivity, measured by a laterolog, which represents a measurement made several feet into the formation; generally considered a measurement of the undisturbed formation.
deep resistivity		The resistivity, which represents a measurement made several feet into the formation; generally considered a measurement of the undisturbed formation.
density		Mass per unit Volume; well logging units are usually gm/cc.
density porosity		Porosity calculated using the bulk density measurement from a density log.
depth		The distance to a point in a wellbore.
depth adjusted		The process of depth correcting a trace by depth matching it to a reference trace.
depth derived from velocity		The depth calculated from velocity information.

Name	Type	Notes
deviation		Departure of a borehole from vertical. Also, the angle measured between the tool axis and vertical.
dielectric		Relative permittivity.
diffusion correction		A trace that has been corrected for the effects of diffusion.
dip		The angle that a structural surface, e.g. a bedding or fault plane, makes with the horizontal, measured perpendicular to the strike of the structure.
dipmeter		Any of a number of measurements produced by a tool designed to measure formation dip and borehole characteristics through direct and indirect measurements.
dipmeter conductivity		The conductivity, measured by a dipmeter, which represents a measurement made approximately one to two feet into the formation; generally considered to measure the formation where it contains fluids that are comprised primarily of mud filtrate.
dipmeter resistivity		The resistivity, measured by a dipmeter, which represents a measurement made approximately one to two feet into the formation; generally considered to measure the formation where it contains fluids that are comprised primarily of mud filtrate.
dolomite acoustic porosity		Porosity calculated from an acoustic log using a dolomite matrix.
dolomite density porosity		Porosity calculated from the bulk density measurement of a density log using a dolomite matrix density.
dolomite neutron porosity		Porosity calculated from a neutron log using a dolomite matrix.
edited		A well log trace which has been corrected or adjusted through an editing process.
effective porosity		The interconnected pore volume occupied by free fluids.
electric current		The flow of electric charge.
electric potential		The difference in electrical energy between two systems.
electromagnetic wave matrix travel time		The time it takes for an electromagnetic wave to traverse a fixed distance of a given material or matrix. In this case the material or matrix is a specific, zero porosity rock, e.g. sandstone, limestone or dolomite.
electromagnetic wave travel time		The time it takes for an electromagnetic wave to traverse a fixed distance.
element		The elemental composition, generally in weight percent, of a formation as calculated from information obtained from a geochemical logging pass; e.g., weight percent of Al, Si, Ca, Fe, etc.
elemental ratio		The ratio of two different elemental measurements; e.g. K/U.
enhanced		A well log trace that has been filtered to improve its value; e.g. inverse filtering for better resolution.

Name	Type	Notes
filtered		A well log trace which has had a filter applied to it.
flowmeter		A logging tool to measure the rate and/or direction of fluid flow in a wellbore.
fluid density		The quantity per unit volume of fluid.
fluid velocity		The velocity of a flowing fluid.
fluid viscosity		The amount of a fluid resistance to flow.
flushed zone conductivity		The conductivity of the zone immediately behind the mud cake and which is considered to be flushed by mud filtrate, i.e., it is considered to have all mobile formation fluids displaced from it.
flushed zone resistivity		The resistivity of the zone immediately behind the mud cake and which is considered to be flushed by mud filtrate, i.e., it is considered to have all mobile formation fluids displaced from it.
flushed zone saturation		The fraction or percentage of pore volume of rock occupied by drilling mud or mud filtrate in the flushed zone.
force		Energy exerted or brought to bear.
formation density correction		A trace that has been corrected for formation density effects.
formation properties correction		A trace that has been corrected for formation properties; e.g., salinity.
formation salinity correction		A trace that has been corrected for the salinity effects from the water in the formation.
formation saturation correction		A trace that has been corrected for formation saturation effects.
formation volume factor correction		A trace that has been corrected for the effects of the hydrocarbon formation volume factor.
formation water density correction		A trace that has been corrected for the effects of the density of the formation water.
formation water saturation correction		A trace that has been corrected for water saturation effects.
free fluid index		The percent of the bulk volume occupied by fluids that are free to flow as measured by the nuclear magnetism log.
friction effect correction		A trace that has been corrected for the effects of friction.
gamma ray		The measurement of naturally occurring gamma ray radiation being released by radioisotopes in clay or other minerals in the formation.
gamma ray minus uranium		The measurement of the naturally occurring gamma radiation less the radiation attributed to uranium.
gas saturation		The fraction or percentage of pore volume of rock occupied by gas.
gradiomanometer		The measurement of the average density of fluids in a wellbore.
high frequency conductivity		A measurement of the conductivity of the formation, by a high frequency electromagnetic tool, within the first few cubic inches of the borehole wall.

Name	Type	Notes
high frequency electromagnetic		High frequency electromagnetic measurements, e.g. from a dielectric logging tool.
high frequency electromagnetic porosity		Porosity calculated using a high frequency electromagnetic measurement as input.
high frequency E-M phase shift		The amount of change in the phase of a high frequency electromagnetic wave.
high frequency resistivity		A measurement of the resistivity of the formation, by a high frequency electromagnetic tool, within the first few cubic inches of the borehole wall.
hydrocarbon correction		A trace that has been corrected for the effects of hydrocarbons.
hydrocarbon density correction		A trace that has been corrected for the effects of hydrocarbon density.
hydrocarbon gravity correction		A trace that has been corrected for the effects of hydrocarbon gravity.
hydrocarbon saturation		The fraction or percentage of pore volume of rock occupied by hydrocarbon.
hydrocarbon viscosity correction		A trace that has been corrected for the effects of hydrocarbon viscosity.
image		The likeness of an object produced by an electrical device.
interpretation variable		A variable in a well log interpretation equation.
iron mud correction		A trace that has been corrected for the effects of iron in the borehole fluid.
joined		A well log trace that has had two or more runs spliced together to make a single trace.
KCl mud correction		A trace that has been corrected for the effects of KCl in the borehole fluid.
length		A measured distance or dimension.
limestone acoustic porosity		Porosity calculated from an acoustic log using a limestone matrix.
limestone density porosity		Porosity calculated from the bulk density measurement of a density log using a limestone matrix density.
limestone neutron porosity		Porosity calculated from a neutron log using a limestone matrix.
lithology correction		A trace that has been corrected for lithology effects.
log derived permeability		The permeability derived from a well log.
log matrix density		The density of a rock matrix used with, or derived from, the bulk density from a well log. The matrix is assumed to have zero porosity.
magnetic casing collar locator		The signal measured by a magnetic device at the location of casing collars and other features (e.g., perforations).
matrix density		The density of a rock matrix. In this case, the matrix is assumed to have zero porosity.
matrix travel time		The time it takes for an electromagnetic or acoustic wave to traverse a fixed distance of a given material or matrix. In this case the material or matrix is a specific, zero porosity rock, e.g. sandstone, limestone or dolomite.

Name	Type	Notes
measured depth		The distance measured along the path of a wellbore.
mechanical caliper		A well log which uses a mechanical device to measure hole diameter.
mechanical casing collar locator		The signal measured by a mechanical device at the location of casing collars and other features (e.g., perforations).
medium conductivity		The conductivity which represents a measurement made approximately two to three feet into the formation; generally considered to measure the formation where it contain fluids which are a mixture of mud filtrate, connate water and possibly hydrocarbons.
medium induction conductivity		The conductivity, made by an induction log, which represents a measurement made approximately two to three feet into the formation.
medium induction resistivity		The resistivity, made by an induction log, which represents a measurement made approximately two to three feet into the formation.
medium laterolog conductivity		The conductivity, measured by a laterolog, which represents a measurement made approximately two to three feet into the formation.
medium laterolog resistivity		The resistivity, measured by a laterolog, which represents a measurement made approximately two to three feet into the formation.
medium resistivity		The resistivity which represents a measurement made approximately two to three feet into the formation; generally considered to measure the formation where it contain fluids which are a mixture of mud filtrate, connate water and possibly hydrocarbons.
micro conductivity		A measurement of the conductivity of the formation within the first few cubic inches of the borehole wall.
micro inverse conductivity		A conductivity measurement made by a micro log tool which measures within the first few cubic inches of the borehole wall.
micro inverse resistivity		A resistivity measurement made by a micro log tool which measures within the first few cubic inches of the borehole wall.
micro laterolog conductivity		A measurement of the conductivity of the formation, by a laterolog, within the first few cubic inches of the borehole wall.
micro laterolog resistivity		A measurement of the resistivity of the formation, by a laterolog, within the first few cubic inches of the borehole wall.
micro normal conductivity		A conductivity measurement made by a micro log tool which measures within the first few cubic inches of the borehole wall.
micro normal resistivity		A resistivity measurement made by a micro log tool which measures within the first few cubic inches of the borehole wall.
micro resistivity		A measurement of the resistivity of the formation within the first few cubic inches of the borehole

Name	Type	Notes
		wall.
micro spherically focused conductivity		A measurement of the conductivity of the formation, by a spherically focused tool, within the first few cubic inches of the borehole wall.
micro spherically focused resistivity		A measurement of the resistivity of the formation, by a spherically focused tool, within the first few cubic inches of the borehole wall.
mineral		The mineral composition, generally in weight percent, of a formation as calculated from elemental information obtained from a geochemical logging pass; e.g., weight percent of dolomite, calcite, illite, quartzite, etc.
mud cake conductivity		The conductivity of the filter cake, the residue deposited on the borehole wall as mud loses filtrate into porous and permeable rock.
mud cake correction		A trace which has been corrected for the effects of mud cake; e.g., mud cake thickness and/or density.
mud cake density correction		A trace which has been corrected for the effects of mud cake density.
mud cake resistivity		The resistivity of the filter cake, the residue deposited on the borehole wall as mud loses filtrate into porous and permeable rock.
mud cake resistivity correction		A trace which has been corrected for the effects of mud cake resistivity.
mud cake thickness correction		A trace which has been corrected for the effects of mud cake thickness.
mud composition correction		A trace which has been corrected for the effects of borehole fluid composition; e.g., a correction for KCl in the borehole fluid.
mud conductivity		The conductivity of the continuous phase liquid used for the drilling of the well.
mud filtrate conductivity		The conductivity of the effluent of the continuous phase liquid of the drilling mud which permeates porous and permeable rock.
mud filtrate correction		A trace which has been corrected for the effects of mud filtrate. This includes things such as filtrate salinity.
mud filtrate density correction		A trace which has been corrected for the effects of mud filtrate density.
mud filtrate resistivity		The resistivity of the effluent of the continuous phase liquid of the drilling mud which permeates porous and permeable rock.
mud filtrate resistivity correction		A trace which has been corrected for the effects of mud filtrate resistivity.
mud filtrate salinity correction		A trace which has been corrected for the effects of mud filtrate salinity.
mud resistivity		The resistivity of the continuous phase liquid used for the drilling of the well.
mud salinity correction		A trace which has been corrected for the effects of salinity in the borehole fluid.
mud viscosity correction		A trace which has been corrected for the effects of the viscosity of the borehole fluid.
mud weight correction		A trace which has been corrected for the effects of

Name	Type	Notes
		weighting the borehole fluid.
neutron die away time		The time it takes for a neutron population to die away to half value.
neutron porosity		Porosity from a neutron log.
nuclear caliper		A well log which uses a nuclear device to measure hole diameter.
nuclear magnetic decay time		The decay time of a nuclear magnetic signal.
nuclear magnetism log permeability		The permeability derived from a nuclear magnetism log.
nuclear magnetism porosity		Porosity calculated using the measurements from a nuclear magnetism logging pass.
OH density porosity		
OH dolomite density porosity		Porosity calculated from the bulk density measurement of an open hole density log using a dolomite matrix density.
OH dolomite neutron porosity		Porosity calculated from an open hole neutron log using a dolomite matrix.
OH limestone density porosity		Porosity calculated from the bulk density measurement of an open hole density log using a limestone matrix density.
OH limestone neutron porosity		Porosity calculated from an open hole neutron log using a limestone matrix.
OH neutron porosity		
OH sandstone density porosity		Porosity calculated from the bulk density measurement of an open hole density log using a sandstone matrix density.
OH sandstone neutron porosity		Porosity calculated from an open hole neutron log using a sandstone matrix.
oil based mud correction		A trace which has been corrected for the effects of oil based borehole fluid.
oil saturation		The fraction or percentage of pore volume of rock occupied by oil.
perforating		The procedure for introducing holes through casing into a formation so that formation fluids can enter into the casing.
permeability		The permeability of the surrounding formation.
phase shift		A change or variation according to a harmonic law from a standard position or instant of starting.
photoelectric absorption		The effect measured by the density log and produced by the process of a photon colliding with an atom, and then being completely absorbed and its total energy used to eject one of the orbital electrons from those surrounding the nucleus.
photoelectric absorption correction		The correction that is to be made to the photoelectric absorption curve.
physical measurement correction		A trace which has been corrected for various physical measurement effects; e.g. spreading loss.
plane angle		An angle formed by two intersecting lines.
porosity		The total pore volume occupied by fluid in a rock. Includes isolated nonconnecting pores and volume occupied by absorbed, immobile fluid.

Name	Type	Notes
porosity correction		A trace which has been corrected for porosity effects.
potassium		The measurement of gamma radiation emitted by potassium.
pressure		The force or thrust exerted upon a surface divided by the area of the surface.
pressure correction		A trace which has been corrected for the effects of pressure in the borehole.
processed		A well log trace which has been processed in some way; e.g., depth adjusted or environmentally corrected.
pulsed neutron porosity		Porosity calculated from a pulsed neutron log.
quality		Degree of excellence.
ratio		A relationship between two values usually expressed as a fraction.
raw		A well log trace which has not had any processing. In other words, a trace which has not been depth adjusted or environmentally corrected.
relative bearing		While looking down hole, it is the clockwise angle from the upper side of the sonde to the reference pad or electrode.
resistivity		The property measuring the resistance to flow of an electrical current.
resistivity factor correction		A trace which has been corrected for resistivity factor effects.
resistivity from attenuation		Resistivity calculated from the attenuation of an electromagnetic wave. Generally recorded from a LWD resistivity tool.
resistivity from phase shift		Resistivity calculated from the phase shift of an electromagnetic wave. Generally recorded from a LWD resistivity tool.
resistivity phase shift		The amount of change in the phase of an electrical wave.
resistivity ratio		The ratio of two resistivity values.
salinity		The concentration of ions in solution.
sampling		To take a sample of or from something.
sandstone acoustic porosity		Porosity calculated from an acoustic log using a sandstone matrix.
sandstone density porosity		Porosity calculated from the bulk density measurement of a density log using a sandstone matrix density.
sandstone neutron porosity		Porosity calculated from a neutron log using a sandstone matrix.
saturation		The fraction or percentage of the pore volume of a rock.
shale volume		An estimate of the amount of shale present in the formation. Frequently calculated from a gamma ray or SP curve.
shallow conductivity		The conductivity which represents a measurement made approximately one to two feet into the formation; generally considered to measure the formation where it contains fluids which are

Name	Type	Notes
		comprised primarily of mud filtrate.
shallow induction conductivity		The conductivity, measured by an induction log, which represents a measurement made approximately one to two feet into the formation; generally considered to measure the formation where it contains fluids which are comprised primarily of mud filtrate.
shallow induction resistivity		The resistivity, measured by an induction log, which represents a measurement made approximately one to two feet into the formation; generally considered to measure the formation where it contains fluids which are comprised primarily of mud filtrate.
shallow laterolog conductivity		The conductivity, measured by a laterolog, which represents a measurement made approximately one to two feet into the formation; generally considered to measure the formation where it contains fluids which are comprised primarily of mud filtrate.
shallow laterolog resistivity		The resistivity, measured by a laterolog, which represents a measurement made approximately one to two feet into the formation; generally considered to measure the formation where it contains fluids which are comprised primarily of mud filtrate.
shallow resistivity		The resistivity which represents a measurement made approximately one to two feet into the formation; generally considered to measure the formation where it contains fluids which are comprised primarily of mud filtrate.
shear wave dolomite porosity		Porosity calculated from a shear wave acoustic log using a dolomite matrix.
shear wave limestone porosity		Porosity calculated from a shear wave acoustic log using a limestone matrix.
shear wave matrix travel time		The time it takes for a shear acoustic wave to traverse a fixed distance of a given material or matrix. In this case the material or matrix is a specific, zero porosity rock, e.g. sandstone, limestone or dolomite.
shear wave sandstone porosity		Porosity calculated from a shear wave acoustic log using a sandstone matrix.
shear wave travel time		The time it takes for a shear acoustic wave to traverse a fixed distance.
shifted		A well log trace which has had its original values shifted by some factor; e.g., added or multiplied by a constant.
sidewall core porosity		Porosity from a measurement made on a sidewall core.
sigma		The macroscopic capture cross section, i.e. the effective cross-sectional area per unit volume for the capture of neutrons.
sigma formation		The macroscopic capture cross section, i.e. the effective cross-sectional area per unit volume, of

Name	Type	Notes
		the formation for the capture of neutrons.
sigma gas		The macroscopic capture cross section, i.e. the effective cross-sectional area per unit volume, of gas for the capture of neutrons.
sigma hydrocarbon		The macroscopic capture cross section, i.e. the effective cross-sectional area per unit volume, of hydrocarbon for the capture of neutrons.
sigma matrix		The macroscopic capture cross section, i.e. the effective cross-sectional area per unit volume, of the rock matrix for the capture of neutrons.
sigma oil		The macroscopic capture cross section, i.e. the effective cross-sectional area per unit volume, of oil for the capture of neutrons.
sigma water		The macroscopic capture cross section, i.e. the effective cross-sectional area per unit volume, of water for the capture of neutrons.
slippage velocity correction		A trace which has been corrected for slippage velocity.
smoothed		A well log trace which has been filtered to smooth, or average the trace.
spectral gamma ray		The measurement of all the naturally occurring gamma radiation separated by energy windows.
spherically focused conductivity		The conductivity, measured by a spherically focused log, which represents the resistivity approximately one to two feet into the formation.
spherically focused resistivity		The resistivity, measured by a spherically focused log, which represents the resistivity approximately one to two feet into the formation.
spontaneous potential		The difference in potential (DC Voltage) between a moveable electrode in the borehole and a distant reference electrode usually at the surface.
spreading loss correction		A trace which has been corrected for the effects of spreading loss.
synthetic well log trace		A well log trace which has been artificially created, as opposed to an actual measurement, from associated measurements or information.
temperature		A temperature measurement.
temperature correction		A trace which has been corrected for the effects of the temperature in the borehole.
tension		The tension on the wireline cable while logging.
Th/K ratio		The ratio of the Thorium measurement to the Potassium measurement.
thorium		The measurement of gamma radiation emitted by thorium.
time		A measured or measurable period.
tool diameter correction		A trace which has been corrected for the tool diameter.
tool eccentricity correction		A trace which has been corrected for the effects of the tool not being centered in the borehole.
total gamma ray		The measurement of all the naturally occurring gamma radiation.
total porosity		The total pore volume occupied by fluid in a rock.

Name	Type	Notes
tracer survey		A well log used for the purpose of monitoring a traceable material; e.g. a radioactive isotope.
travel time		The time it takes for an acoustic or electromagnetic wave to traverse a specific distance.
true conductivity		The conductivity of fluid-filled rock where fluid distributions and saturations are representative of those in the uninvaded, undisturbed part of the formation.
true resistivity		The resistivity of fluid-filled rock where fluid distributions and saturations are representative of those in the uninvaded, undisturbed part of the formation.
true vertical depth		The distance along a straight, vertical path. Usually computed from a measured depth and deviation information.
tube wave dolomite porosity		Porosity calculated from a tube wave acoustic log using a dolomite matrix.
tube wave limestone porosity		Porosity calculated from a tube wave acoustic log using a limestone matrix.
tube wave matrix travel time		The time it takes for a acoustic tube wave to traverse a fixed distance of a given material or matrix. In this case the material or matrix is a specific, zero porosity rock, e.g. sandstone, limestone or dolomite.
tube wave sandstone porosity		Porosity calculated from a tube wave acoustic log using a sandstone matrix.
tube wave travel time		The time it takes for a tube acoustic wave to traverse a fixed distance.
uranium		The measurement of gamma radiation emitted by uranium.
velocity		directional speed
volume		cubic capacity
water based fluid correction		A trace which has been corrected for the effects of the components in a water based borehole fluid system; e.g., a correction for KCL in the mud.
water holdup correction		A trace which has been corrected for water holdup.
water saturated conductivity		The conductivity of rock completely saturated with connate water.
water saturated resistivity		The resistivity of rock completely saturated with connate water.
water saturation		The fraction or percentage of pore volume of rock occupied by water.
unknown		The value is not known. This value should not be used in normal situations. All reasonable attempts should be made to determine the appropriate value. Use of this value may result in rejection in some situations.

Associations

Association	Notes

Association	Notes
From: MeasurementType. **To:** TypeEnum *Generalization*	
From: Sensor. **To:** MeasurementType *Dependency*	

16.25 Motor

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015   *Last modified:* 11/8/2016
Notes: Tubular Motor Component Schema. Used to capture properties about a motor used in a tubular string.

Attributes

Name	Type	Notes
BendSettingsMn	PlaneAngleMeasure	Minimum bend angle setting.
BendSettingsMx	PlaneAngleMeasure	Maximum bend angle setting.
ClearanceBearBox	LengthMeasure	Clearance inside bearing box.
DiaNozzle	LengthMeasure	Nozzle diameter.
DiaRotorNozzle	LengthMeasure	Diameter of rotor at nozzle.
DumpValve	boolean	Is dump valve present? Values are "true" (or "1") and "false" (or "0").
FlowrateMn	VolumePerTimeMeasure	Minimum flow rate.
FlowrateMx	VolumePerTimeMeasure	Maximum flow rate.
LobesRotor	int	Number of rotor lobes.
LobesStator	int	Number of stator lobes.
OffsetTool	LengthMeasure	Tool offset from bottom.
PresLossFact	double	Pressure loss factor.
Rotatable	boolean	Is motor rotatable? Values are "true" (or "1") and "false" (or "0").
RotorCatcher	boolean	Is rotor catcher present? Values are "true" (or "1") and "false" (or "0").
TempOpMx	ThermodynamicTemperatureMeasure	Maximum operating temperature.
TypeBearing	BearingType	Type of bearing.

Associations

Association		Notes
	From: Motor. **To:** BearingType *Dependency*	
0..1	**From:** Motor.ExtensionAny **To:** CustomData *Association*	Extensions to the schema using an xsd:any construct.
0..1	**From:** TubularComponent.Motor **To:** Motor *Association*	Motor object.

16.26 MwdTool

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015   *Last modified:* 11/8/2016
Notes: Tubular MWD Tool Component Schema. Used to capture operating parameters of the MWD tool.

Attributes

Name	Type	Notes
FlowrateMn	VolumePerTimeMeasure	Minimum flow rate.
FlowrateMx	VolumePerTimeMeasure	Maximum flow rate.
IdEquv	LengthMeasure	Equivalent inner diameter.
TempMx	ThermodynamicTemperatureMeasure	Maximum Temperature.

Associations

Association		Notes
0..*	**From:** MwdTool.Sensor **To:** Sensor *Association*	
0..1	**From:** MwdTool.ExtensionAny **To:** CustomData *Association*	Extensions to the schema using an xsd:any construct.
0..1	**From:** TubularComponent.MwdTool **To:** MwdTool *Association*	MWD (measurement while drilling) tool object.

16.27 Nozzle

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: Created: 4/13/2015   *Last modified:* 11/8/2016
Notes: Nozzle Component Schema.

Attributes

Name	Type	Notes
DiaNozzle	LengthMeasure	Nozzle diameter.
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
Index	int	Index if this is an indexed object.
Len	LengthMeasure	Length of the nozzle.
Orientation	String64	Nozzle orientation.
TypeNozzle	NozzleType	Nozzle type.
uid	String64	Unique identifier for this instance of Nozzle

Associations

Association		Notes
0..1	**From:** Nozzle.ExtensionAny **To:** CustomData *Association*	Extensions to the schema using an xsd:any construct.
	From: Nozzle. **To:** NozzleType *Dependency*	
0..*	**From:** TubularComponent.Nozzle **To:** Nozzle *Association*	

16.28 NozzleType

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: *Created:* 4/13/2015   *Last modified:* 11/8/2016
Notes: Specifies the type of nozzle.

Attributes

Name	Type	Notes
extended		
normal		
unknown		The value is not known. Avoid using this value. All reasonable attempts should be made to determine the appropriate value. Use of this value may result in rejection in some situations.

Associations

Association	Notes
From: NozzleType. **To:** TypeEnum *Generalization*	
From: Nozzle. **To:** NozzleType *Dependency*	

16.29 RotarySteerableTool

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015   *Last modified:* 11/8/2016
Notes: Rotary Steerable Tool Component Schema. Captures size and performance information about the rotary steerable tool used in the tubular string.

Attributes

Name	Type	Notes
ClosePadOd	LengthMeasure	Outside diameter of the tool when the pads are closed.
DeflectionMethod	DeflectionMethod	Method used to direct the deviation of the trajectory: point bit or push bit.
DownLinkFlowRateMn	VolumePerTimeMeasure	Minimum flow rate for programming the tool.
DownLinkFlowRateMx	VolumePerTimeMeasure	Maximum flow rate for programming the tool.
FlowRateMn	VolumePerTimeMeasure	Minimum flow rate for tool operation.
FlowRateMx	VolumePerTimeMeasure	Maximum flow rate for tool operation.
HoleSizeMn	LengthMeasure	Minimum size of the hole in which the tool can operate.
HoleSizeMx	LengthMeasure	Maximum size of the hole in which the tool can operate.
OpenPadOd	LengthMeasure	Outside diameter of the tool when the pads are activated.
OperatingSpeed	AngularVelocityMeasure	Suggested operating speed.
PadCount	int	The number of contact pads.
PadLen	LengthMeasure	Length of the contact pad.
PadOffset	LengthMeasure	Offset from the bottom of the pad to the bottom connector.
PadWidth	LengthMeasure	Width of the contact pad.
PressLossFact	double	Pressure drop across the tool.
SpeedMx	AngularVelocityMeasure	Maximum rotation speed.
WobMx	ForceMeasure	Maximum weight on the bit.

Associations

Association		Notes
1	**From:** RotarySteerableTool. **To:** AbstractRotarySteerableTool *Association*	
0..*	**From:** RotarySteerableTool.Sensor **To:** Sensor *Association*	
0..1	**From:** RotarySteerableTool.ExtensionAny **To:** CustomData *Association*	Extensions to the schema using an xsd:any construct.
	From: RotarySteerableTool. **To:** DeflectionMethod *Dependency*	
	From: TubularComponent.RotarySteerableTool	Rotary Steerable Tool.

Association	Notes
0..1 **To:** RotarySteerableTool *Association*	

16.30 Sensor

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015   *Last modified:* 11/8/2016
Notes: Tubular Sensor Component Schema.

Attributes

Name	Type	Notes
Comments	String2000	Comments and remarks.
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
OffsetBot	LengthMeasure	Offset from the bottom of the MWD tool.
TypeMeasurement	MeasurementType	Type from POSC.
uid	String64	Unique identifier for this instance of Sensor.

Associations

Association		Notes
0..1	**From:** Sensor.ExtensionAny **To:** CustomData *Association*	Extensions to the schema using an xsd:any construct.
	From: Sensor. **To:** MeasurementType *Dependency*	
0..*	**From:** MwdTool.Sensor **To:** Sensor *Association*	
0..*	**From:** RotarySteerableTool.Sensor **To:** Sensor *Association*	

16.31 Stabilizer

Type: Class *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015 *Last modified:* 11/8/2016
Notes: Tubular Stablizer Component Schema. Captures dimension and operation information about stabilizers used in the tubular string.

Attributes

Name	Type	Notes
DistBladeBot	LengthMeasure	Distance of the blade bottom from the bottom of the component.
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
FactFric	double	Friction factor.
LenBlade	LengthMeasure	Length of the blade.
LenBladeGauge	LengthMeasure	Gauge Length of the blade. That is, the length of the blade measured at the OdBladeMx.
OdBladeMn	LengthMeasure	Minimum outer diameter of the blade.
OdBladeMx	LengthMeasure	Maximum outer diameter of the blade.
ShapeBlade	BladeShapeType	Blade shape.
TypeBlade	BladeType	Blade type.
uid	String64	Unique identifier for this instance of Stabilizer.

Associations

	Association	Notes
	From: Stabilizer. **To:** BladeType *Dependency*	
0..1	**From:** Stabilizer.ExtensionAny **To:** CustomData *Association*	Extensions to the schema using an xsd:any construct.
	From: Stabilizer. **To:** BladeShapeType *Dependency*	
0..*	**From:** TubularComponent.Stabilizer **To:** Stabilizer *Association*	Stabilizer object.

16.32 Tubular

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015   *Last modified:* 11/8/2016
Notes: Used to capture information about the configuration of a drill string. For information about a use of this configuration, See the BhaRun object . This object is uniquely identified within the context of one wellbore object.

Attributes

Name	Type	Notes
DiaHoleAssy	LengthMeasure	Maximum hole size generated by the assembly.
SourceNuclear	boolean	Is nuclear tool present? Values are "true" (or "1") and "false" (or "0").
TypeTubularAssy	TubularAssembly	Type of tubular assembly.
ValveFloat	boolean	Is float valve present? Values are "true" (or "1") and "false" (or "0").

Associations

Association		Notes
	From: Tubular. **To:** TubularAssembly *Dependency*	
1..1	**From:** Tubular.Wellbore **To:** Wellbore *Association*	
0..*	**From:** Tubular.TubularComponent **To:** TubularComponent *Association*	Container element for the tubular component elements.
	From: Tubular. **To:** AbstractObject *Generalization*	
0..1	**From:** BhaRun.Tubular **To:** Tubular *Association*	

16.33 TubularAssembly

Type: Enumeration *Stereotype:* «Enumeration»
Detail: *Created:* 4/13/2015 *Last modified:* 11/8/2016
Notes: Specifies the type (or purpose) of the tubular assembly.

Attributes

Name	Type	Notes
drilling		
directional drilling		
fishing		
condition mud		
tubing conveyed logging		
cementing		
casing		
clean out		
completion or testing		
coring		
hole opening or underreaming		
milling or dressing or cutting		
wiper or check or reaming		
unknown		The value is not known. Avoid using this value. All reasonable attempts should be made to determine the appropriate value. Use of this value may result in rejection in some situations.

Associations

Association	Notes
From: TubularAssembly. **To:** TypeEnum *Generalization*	
From: Tubular. **To:** TubularAssembly *Dependency*	

16.34 TubularComponent

Type: Class *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015 *Last modified:* 11/8/2016
Notes: Tubular Component Schema. Captures the order of the components in the XML instance,which is significant. The components are listed in the order in which they enter the hole. That is, the first component is the bit.

Attributes

Name	Type	Notes
AreaNozzleFlow	AreaMeasure	Total area of nozzles.
AxialStiffness	ForcePerLengthMeasure	Axial stiffness of tubular.
BendStiffness	ForcePerLengthMeasure	Bending stiffness of tubular.
ClassService	String64	Service class.
ConfigCon	BoxPinConfig	Box/Pin configuration.
Description	String2000	Description of item and details.
Disp	VolumeMeasure	Closed end displacement.
DoglegMx	AnglePerLengthMeasure	Maximum dogleg severity.
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
Grade	String64	Material grade for the tubular section.
Id	LengthMeasure	Internal diameter of object.
IdFishneck	LengthMeasure	Fish neck inside diameter.
Len	LengthMeasure	Length of the item.
LenFishneck	LengthMeasure	Fish neck length.
LenJointAv	LengthMeasure	Average length of the joint for this string.
Model	String64	Component name from manufacturer.
NameTag	NameTag	An identification tag for the component tool. A serial number is a type of identification tag; however, some tags contain many pieces of information. This element only identifies the tag; it does not describe the contents.
NumJointStand	int	Number of joints per stand of tubulars.
Od	LengthMeasure	Outside diameter of the body of the item.
OdDrift	LengthMeasure	Minimum pass through diameter.
OdFishneck	LengthMeasure	Fish neck outside diameter.
OdMx	LengthMeasure	Maximum outside diameter.
PresBurst	PressureMeasure	Burst pressure.
PresCollapse	PressureMeasure	Collapse pressure.
Sequence	int	The sequence within which the components entered the hole. That is, a sequence number of 1 entered first, 2 entered next, etc.
StressFatigue	PressureMeasure	Fatigue endurance limit.

TensYield	PressureMeasure	Yield stress of steel - worn stress.
ThickWall	LengthMeasure	Wall thickness.
TorsionalStiffness	ForcePerLengthMeasure	Torsional stiffness of tubular.
TqYield	MomentOfForceMeasure	Torque at which yield occurs.
TypeMaterial	MaterialType	Type of material.
TypeTubularComponent	TubularComponentType	Connection whose type is tubular
uid	String64	Unique identifier for this instance of TubularComponent
Vendor	String64	Name of vendor.
WearWall	LengthPerLengthMeasure	Wall thickness wear (commonly in percent).
WtPerLen	MassPerLengthMeasure	Weight per unit length.

Associations

Association		Notes
0..1	**From:** TubularComponent.HoleOpener **To:** HoleOpener *Association*	Hole opener object.
0..*	**From:** TubularComponent.Connection **To:** Connection *Association*	Connection object.
0..*	**From:** TubularComponent.Stabilizer **To:** Stabilizer *Association*	Stabilizer object.
0..1	**From:** TubularComponent.RotarySteerableTool **To:** RotarySteerableTool *Association*	Rotary Steerable Tool.
0..1	**From:** TubularComponent.Jar **To:** Jar *Association*	Jar object.
0..1	**From:** TubularComponent.MwdTool **To:** MwdTool *Association*	MWD (measurement while drilling) tool object.
	From: TubularComponent. **To:** BoxPinConfig *Dependency*	
0..1	**From:** TubularComponent.ExtensionAny **To:** CustomData *Association*	Extensions to the schema using an xsd:any construct.
0..*	**From:** TubularComponent.Bend **To:** Bend *Association*	Bend object.
0..*	**From:** TubularComponent.Nozzle **To:** Nozzle *Association*	
	From: TubularComponent. **To:** TubularComponentType *Dependency*	
	From: TubularComponent. **To:** MaterialType *Dependency*	
	From: TubularComponent.BitRecord	

Association		Notes
0..1	**To:** BitRecord *Association*	
0..1	**From:** TubularComponent.Motor **To:** Motor *Association*	Motor object.
0..*	**From:** Tubular.TubularComponent **To:** TubularComponent *Association*	Container element for the tubular component elements.

16.35 TubularComponentType

Type: Enumeration   *Stereotype:*
Detail: *Created:* 9/15/2015   *Last modified:* 11/8/2016
Notes: Specifies the types of components that can be used in a tubular string. These are used to specify the type of component and multiple components are used to define a tubular string (Tubular).

Attributes

Name	Type	Notes
accelerator		
adjustable kickoff		
bit core diamond		
bit core PDC		
bit diamond fixed cut		
bit hole opener		
bit insert roller cone		
bit mill tooth roller cone		
bit PDC fixed cutter		
bit under reamer		
bridge plug		
bull plug		
bullnose		
casing		
casing crossover		
casing cutter		
casing head		
casing inflatable packer		
casing shoe screw-in		
catch assembly		
coiled tubing in hole		
coiled tubing on coil		
core barrel		
core orientation barrel		
die collar		
die collar LH		
directional guidance system		
drill collar		
drill collar short		
drill pipe		
drill pipe compressive		

Name	Type	Notes
drill pipe LH		
drill stem test BHA		
drive pipe		
dual catch assembly		
extension bowl overshot		
extension sub-overshot		
float collar		
float shoe		
flow head		
guide shoe		
hanger casing subsea		
hanger casing surface		
hanger liner		
hanger mud line		
hanger tubing		
heavy weight drill pipe		
heavy weight drill pipe LH		
jar		
junk basket		
junk basket reverse circulation		
kelly		
keyseat wiper tool		
landing float collar		
lead impression block		
liner		
logging while drilling tool		
magnet		
mill casing cutting		
mill dress		
mill flat bottom		
mill hollow		
mill packer picker assembly		
mill pilot		
mill polish		
mill section		
mill taper		
mill washover		
mill watermelon		

Name	Type	Notes
millout extension		
motor		
motor instrumented		
motor steerable		
mule shoe		
multilateral hanger running tool		
MWD hang off sub		
MWD pulser		
non-magnetic collar		
non-magnetic stabilizer		
other		
overshot		
overshot LH		
oversize lip guide overshot		
packer		
packer retrieve TT squeeze		
packer RTTS		
packer storm valve RTTS		
pipe cutter		
polished bore receptacle		
ported stinger		
prepacked screens		
reamer		
reversing tool		
riser high pressure		
riser marine		
riser production		
rotary steering tool		
running tool		
safety joint		
safety joint LH		
scab liner bit guide		
scraper		
scratchers		
slotted liner		
spear		
stabilizer		
stabilizer inline		

Name	Type	Notes
stabilizer near bit		
stabilizer near bit roller reamer		
stabilizer non-rotating		
stabilizer steerable		
stabilizer string		
stabilizer string roller reamer		
stabilizer turbo back		
stabilizer variable blade		
stage cement collar		
sub-bar catcher		
sub-bent		
sub-bit		
sub-bumper		
sub-catcher		
sub-circulation		
sub-cone		
sub-crossover		
sub-dart		
sub-filter		
sub-float		
sub-jetting		
sub-junk		
sub-orienting		
sub-ported		
sub-pressure relief		
sub-pump out		
sub-restrictor		
sub-saver		
sub-shock		
sub-side entry		
sub-stop		
surface pipe		
taper tap		
taper tap LH		
thruster		
tieback polished bore receptacle		
tieback stinger		
tubing		

Name	Type	Notes
tubing-conveyed perforating gun		
turbine		
unknown		
washover pipe		
whipstock		
whipstock anchor		

Associations

Association	Notes
From: TubularComponent. **To:** TubularComponentType *Dependency*	

17 Well

Package: xsd_schemas
Notes: Well Schema. Used to capture the general information about a well. This might sometimes be called a "well header". All information that is the same for all [wellbores] (sidetracks) is contained in the well object.

17.1 AbstractWellLocation

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015   *Last modified:* 11/8/2016
Notes: Location Schema. This is a location that is expressed in terms of 2D coordinates. So that the location can be understood, the coordinate reference system (CRS) must be known. The survey location is given by a pair of tagged values. The pairs may be: (1) latitude/longitude, (2) easting/northing, (3) westing/southing, (4) projectedX/projectedY, or (5) localX/localY. The appropriate pair must be chosen for the data.

Attributes

Name	Type	Notes
Description	String2000	A comment, generally given to help the reader interpret the coordinates if the CRS and the chosen pair do not make them clear.
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
Original	boolean	Flag indicating (if that Is this pair of values the original data given for the location? Values are "true" or "1". Or, if the pair of values was calculated from an original pair of values, set to "false" (or "0") or leave blank.
uid	String64	A unique identifier for a well location.

Associations

Association		Notes
0..*	**From:** TrajectoryStation.Location **To:** AbstractWellLocation *Association*	The 2D coordinates of the item. Note that within the context of trajectory, the "original" coordinates are inherently local coordinates as defined above.
0..*	**From:** TargetSection.Location **To:** AbstractWellLocation *Association*	The 2D coordinates of the item at the start of the section. This is redundant information and can be computed by starting at the section origin and applying the sequence of angleArcs and lenRadius.
	From: ProjectedWellLocation. **To:** AbstractWellLocation *Generalization*	
0..*	**From:** Target.Location **To:** AbstractWellLocation	The 2D coordinates of the item at the start of the

Association		Notes
	Association	section. The location object is mandatory for the first section starting point.
0..*	**From:** Well.WellLocation **To:** AbstractWellLocation *Association*	Additional 2D coordinates of the well surface point in one or more coordinate reference systems. This is where the well crosses ground level on land and crosses the platform offshore.
1..*	**From:** ReferencePoint.Location **To:** AbstractWellLocation *Association*	Two dimensional coordinates that locate the point.
	From: GeodeticWellLocation. **To:** AbstractWellLocation *Generalization*	
0..1	**From:** WellDatum.HorizontalLocation **To:** AbstractWellLocation *Association*	The horizontal location of the point being used as a well datum. This may be used when the point is not directly above or below the well point location. For example, a well being drilled from a platform may have its location at the entrance into the sea floor, while the well datum may be located on the drilling rig. Or the well datum may be a kickoff point, that is not directly under the well surface point.
0..*	**From:** DrillReportSurveyStation.Location **To:** AbstractWellLocation *Association*	The 2D coordinates of the item. Note that within the context of trajectory, the "original" coordinates are inherently local coordinates as defined above.

17.2 DistanceEastWest

Type: Class *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015 *Last modified:* 11/8/2016
Notes: The distance to a one-minute boundary on the east or west of a point. USA Public Land Survey System.

Attributes

Name	Type	Notes
reference	EastOrWest	East or west direction.
uom	LengthUom	The unit of measure of the east-west distance.

Associations

Association		Notes
	From: DistanceEastWest. **To:** AbstractMeasure *Generalization*	
0..1	**From:** PublicLandSurveySystem.FootageEW **To:** DistanceEastWest *Association*	Distance inside of the boundary line of the specified section. East specifies the distance from the east boundary line.

17.3 DistanceNorthSouth

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015   *Last modified:* 11/8/2016
Notes: The distance to a one-minute boundary on the north or south of a point. USA Public Land Survey System

Attributes

Name	Type	Notes
reference	NorthOrSouth	North or south direction.
uom	LengthUom	The unit of measure of the north-south distance.

Associations

Association		Notes
	From: DistanceNorthSouth. **To:** AbstractMeasure *Generalization*	
0..1	**From:** PublicLandSurveySystem.FootageNS **To:** DistanceNorthSouth *Association*	Distance inside of the boundary line of the specified section. North specifies the distance from the north boundary line.

17.4 EastOrWest

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: *Created:* 4/13/2015   *Last modified:* 11/8/2016
Notes: Specifies east or west direction.

Attributes

Name	Type	Notes
east		East of something.
west		West of something.
unknown		The value is not known. Avoid using this value. All reasonable attempts should be made to determine the appropriate value. Use of this value may result in rejection in some situations.

Associations

Association	Notes
From: EastOrWest. **To:** TypeEnum *Generalization*	
From: PublicLandSurveySystem. **To:** EastOrWest *Dependency*	

17.5 ElevCodeEnum

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: Created: 4/13/2015   *Last modified:* 11/8/2016
Notes: Specifies values for the type of local or permanent reference datum for vertical gravity-based (i.e., elevation and vertical depth) and measured depth coordinates within the context of a well. This list includes local points (e.g., kelly bushing) used as a datum and vertical reference datums (e.g., mean sea level).

Attributes

Name	Type	Notes
CF		Casing flange: A flange affixed to the top of the casing string used to attach production equipment.
CV		Crown valve.
DF		Derrick floor.
GL		Ground level.
KB		Kelly bushing.
RB		Rotary bushing.
RT		Rotary table.
SF		Sea floor.
LAT		Lowest astronomical tide (LAT). The lowest tide level over the duration of the National Tidal Datum Epoch (19 years).
SL		Mean sea level: a tidal datum. The arithmetic mean of hourly heights observed over the National Tidal Datum Epoch (19 years).
MHHW		Mean higher high water: a tidal datum. The average of the higher high water height of each tidal day observed over the National Tidal Datum Epoch (19 years).
MHW		Mean high water: a tidal datum. The average of all the high water heights observed over the National Tidal Datum Epoch (19 years).
MLLW		Mean lower low water: a tidal datum. The average of the lower low water height of each tidal day observed over the National Tidal Datum Epoch (19 years).
MLW		Mean low water: a tidal datum. The average of all the low water heights observed over the National Tidal Datum Epoch (19 years).
MTL		Mean tide level: a tidal datum. The arithmetic mean of mean high water and mean low water. Same as the half-tide level.
KO		Kickoff point.
unknown		The value is not known. Avoid using this value. All reasonable attempts should be made to determine the appropriate value. Use of this value may result in rejection in some situations.

Associations

Association	Notes
From: ElevCodeEnum. **To:** TypeEnum *Generalization*	

17.6 GeodeticWellLocation

Type: Class *Stereotype:* «XSDcomplexType»
Detail: *Created:* 12/27/2015 *Last modified:* 11/8/2016
Notes: Location of the well by latitude and longitude.

Attributes

Name	Type	Notes
Latitude	PlaneAngleMeasure	The latitude with north being positive.
Longitude	PlaneAngleMeasure	The longitude with east being positive.

Associations

Association		Notes
1	**From:** GeodeticWellLocation.Crs **To:** AbstractGeodeticCrs *Association*	
	From: GeodeticWellLocation. **To:** AbstractWellLocation *Generalization*	

17.7 NorthOrSouth

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: *Created:* 4/13/2015   *Last modified:* 11/8/2016
Notes: Specifies the north or south direction.

Attributes

Name	Type	Notes
north		North of something.
south		South of something.
unknown		The value is not known. Avoid using this value. All reasonable attempts should be made to determine the appropriate value. Use of this value may result in rejection in some situations.

Associations

Association	Notes
From: NorthOrSouth. **To:** TypeEnum *Generalization*	
From: PublicLandSurveySystem. **To:** NorthOrSouth *Dependency*	

17.8 PrincipalMeridian

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: *Created:* 4/13/2015   *Last modified:* 11/8/2016
Notes: Specifies values for the principal meridians for the United States Public Land Surveys.

Attributes

Name	Type	Notes
1st Principal Meridian		Indiana, Ohio
2nd Principal Meridian		Indiana
3rd Principal Meridian		Illinois
4th Principal Meridian		Illinois, Wisconsin
5th Principal Meridian		Iowa, Missouri, Arkansas
6th Principal Meridian		Kansas, Nebraska
Black Hills Meridian		South Dakota
Boise Meridian		Idaho
Chickasaw Meridian		Mississippi
Choctaw Meridian		Mississippi
Cimarron Meridian		Texas
Copper River Meridian		Alaska
Fairbanks Meridian		Alaska
Gila and Salt River Meridian		Arizona
Humboldt Meridian		California
Huntsville Meridian		Alabama
Indian Meridian		Oklahome
Kateel River Meridian		Alaska
Lousiana Meridian		Lousiana
Michigan Meridian		Michigan
Montana Meridian		Montana
Mount Diablo Meridian		California
Navajo Meridian		Arizona portion of Navajo nation
New Mexico Meridian		New Mexico
Saint Helena Meridian		Louisiana
Saint Stephens Meridian		Alabama
Salt Lake Meridian		Utah
San Bernardo Meridian		California
Seward Meridian		Alaska
Tallahassee Meridian		Floridia
Uintah Meridian		Utah
Umiat Meridian		Alaska

Name	Type	Notes
Ute Meridian		Colorado
Washington Meridian		Mississippi
Williamette Meridian		Washington
Wind River Meridian		Wyoming
unknown		The value is not known. Avoid using this value. All reasonable attempts should be made to determine the appropriate value. Use of this value may result in rejection in some situations.

Associations

Association	Notes
From: PrincipalMeridian. **To:** TypeEnum *Generalization*	
From: PublicLandSurveySystem. **To:** PrincipalMeridian *Dependency*	

17.9 ProjectedWellLocation

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 12/27/2015   *Last modified:* 11/8/2016
Notes: Projected location of the well.

Attributes

Name	Type	Notes
Coordinate1	double	The first coordinate based on a projected coordinate reference system.
Coordinate2	double	The second coordinate based on a projected coordinate reference system.

Associations

Association		Notes
	From: ProjectedWellLocation. **To:** AbstractWellLocation *Generalization*	
1	**From:** ProjectedWellLocation.Crs **To:** AbstractProjectedCrs *Association*	

17.10 PublicLandSurveySystem

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015   *Last modified:* 10/25/2016
Notes: Land survey system that describes the well by range, township, section, etc.

Attributes

Name	Type	Notes
PrincipalMeridian	PrincipalMeridian	Principal meridian for this location.
QuarterSection	PublicLandSurveySystem QuarterSection	The location of the well within the section, with the primary component listed first. Spot location will be made from a combinationof the following codes: NE, NW, SW, SE, N2, S2, E2, W2, C (center quarter), LTxx (where xx represents a two digit lot designation), TRzz (where zz represents a one or two character trac designation). Free format allows for entries such as NESW (southwest quarter of northeast quarter), E2NESE (southeast quarter of northeast quarter of east half), CNE (northeast quarter of center quarter), etc.
QuarterTownship	PublicLandSurveySystem QuarterTownship	Quarter township.
Range	int	Range number.
RangeDir	EastOrWest	Range direction.
Section	SectionNumber	Section number.
Township	int	Township number.
TownshipDir	NorthOrSouth	Township direction.

Associations

Association		Notes
	From: PublicLandSurveySystem. **To:** EastOrWest *Dependency*	
	From: PublicLandSurveySystem. **To:** PrincipalMeridian *Dependency*	
	From: PublicLandSurveySystem. **To:** PublicLandSurveySystemQuarterTownship *Dependency*	
0..1	**From:** PublicLandSurveySystem.FootageEW **To:** DistanceEastWest *Association*	Distance inside of the boundary line of the specified section. East specifies the distance from the east boundary line.
	From: PublicLandSurveySystem. **To:** NorthOrSouth *Dependency*	
	From: PublicLandSurveySystem. **To:** SectionNumber	

Association		Notes
	Dependency	
	From: PublicLandSurveySystem. **To:** PublicLandSurveySystemQuarterSection *Dependency*	
0..1	**From:** PublicLandSurveySystem.FootageNS **To:** DistanceNorthSouth *Association*	Distance inside of the boundary line of the specified section. North specifies the distance from the north boundary line.
0..1	**From:** Well.WellPublicLandSurveySystemLocation **To:** PublicLandSurveySystem *Association*	Township, section, range, quarter, and footage calls for USA Public Land Survey System.

17.11 PublicLandSurveySystemQuarterSection

Type: Class   *Stereotype:* «XSDsimpleType»
Detail: *Created:* 4/13/2015   *Last modified:* 11/8/2016
Notes: Some combination of NE, NW, SW, SE, N2, S2, E2, W2, C, TRxx, LTnn. USA Public Land
Survey System.

Associations

Association	Notes
From: PublicLandSurveySystemQuarterSection. **To:** String64 *Generalization*	
From: PublicLandSurveySystem. **To:** PublicLandSurveySystemQuarterSection *Dependency*	

17.12 PublicLandSurveySystemQuarterTownship

Type: Class   *Stereotype:* «XSDsimpleType»
Detail: *Created:* 4/13/2015   *Last modified:* 10/25/2016
Notes: Designates a particular quarter of a township. USA Public Land Survey System.

Associations

Association	Notes
From: PublicLandSurveySystemQuarterTownship. **To:** String64 *Generalization*	
From: PublicLandSurveySystem. **To:** PublicLandSurveySystemQuarterTownship *Dependency*	

17.13 ReferencePoint

Type: Class *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015 *Last modified:* 11/8/2016
Notes: Reference Point Component Schema.

Attributes

Name	Type	Notes
Description	String2000	A textual description of the point.
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
MeasuredDepth	MeasuredDepthCoord	The measured depth coordinate of this reference point. Value is positive when moving toward the bottomhole from the measured depth datum. Provide a value for this when the reference is "downhole", such as an ocean-bottom template, or when the reference point is also used as a vertical well datum. The measured depth value can be used to determine if the reference pointand a vertical well datum are at the same point.
Name	String64	Human-recognizable context for the point.
Type	String64	The kind of point. For example, 'well reference point', 'platform reference point', 'sea surface', 'sea bottom'.
uid	String64	A unique identifier for an instance of a ReferencePoint.

Associations

Association		Notes
1..*	**From:** ReferencePoint.Location **To:** AbstractWellLocation *Association*	Two dimensional coordinates that locate the point.
0..1	**From:** ReferencePoint.Elevation **To:** WellElevationCoord *Association*	The gravity based elevation coordinate of this point as measured from a datum. Positive moving upward from the elevation datum.
0..*	**From:** Well.ReferencePoint **To:** ReferencePoint *Association*	Defines a reference point within the context of the well.

17.14 RefWellbore

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015   *Last modified:* 11/8/2016
Notes: Data that represents a foreign key to a wellbore. The wellbore may be defined within the context of another well.

Attributes

Name	Type	Notes
WellboreReference	String64	A pointer the wellbore with which there is a relationship.
WellParent	String64	A pointer to the well that contains the wellboreReference. This is not needed unless the referenced wellbore is outside the context of a common parent well.

Associations

Association	Notes
From: WellDatum.Wellbore 0..1 **To:** RefWellbore *Association*	A pointer to the wellbore that contains the reference datum. This should be specified if a measured depth is given.

17.15 RefWellboreRig

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015   *Last modified:* 11/8/2016
Notes: A reference to a rig within a wellbore. The wellbore may be defined within the context of another well. This value represents a foreign key from one node to another.

Attributes

Name	Type	Notes
RigReference	String64	A pointer to the rig with which there is a relationship.
WellboreParent	String64	A pointer to the wellbore that contains the rigReference. This is not needed unless the referenced rig is outside the context of a common parent wellbore.
WellParent	String64	A pointer to the well that contains the wellboreParent. This is not needed unless the referenced wellbore is outside the context of a common parent well.

Associations

Association		Notes
0..1	**From:** WellDatum.Rig **To:** RefWellboreRig *Association*	A pointer to the rig that contains the device used as a reference datum. The rig may be associated with a wellbore in another well (e.g., pattern drilling using a rig on a track).

17.16 SectionNumber

Type: Class   *Stereotype:* «XSDsimpleType»
Detail: *Created:* 4/13/2015   *Last modified:* 10/25/2016
Notes: Sections are numbered "1" through "36." Irregular sections may be designated with a single value after a decimal point. USA Public Land Survey System.

Associations

Association	Notes
From: SectionNumber. **To:** String64 *Generalization*	
From: PublicLandSurveySystem. **To:** SectionNumber *Dependency*	

17.17 Well

Type: Class *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015 *Last modified:* 11/8/2016
Notes: Used to capture the general information about a well. Sometimes called a "well header". Contains all information that is the same for all wellbores (sidetracks).

Attributes

Name	Type	Notes
Block	String64	Block name in which the well is located.
Country	String64	Country in which the well is located.
County	String64	County in which the well is located.
DirectionWell	WellDirection	POSC well direction. The direction of the flow of the fluids in a well facility (generally, injected or produced, or some combination).
District	String64	Geo-political district name.
DTimLicense	TimeStamp	Date and time the license was issued.
DTimPa	TimeStamp	Date and time at which the well was plugged and abandoned.
DTimSpud	TimeStamp	Date and time at which the well was spudded.
Field	String64	Name of the field in which the well is located.
FluidWell	WellFluid	POSC well fluid. The type of fluid being produced from or injected into a well facility.
GeographicLocationWGS84	GeodeticWellLocation	The latitude (in coordinate1) and longitude (in coordinate2) of the well location in the WGS84 coordinate system (equivalent to EPSG:4326). Units are in decimal degrees. Coordinate 1 and 2 refer to the ProjectedWellLocation.
NameLegal	String64	Legal name of the well.
NumAPI	String64	American Petroleum Institute well number.
NumGovt	String64	Government assigned well number.
NumLicense	String64	License number of the well.
Operator	String64	Operator company name.
OperatorDiv	String64	Division of the operator company.
OriginalOperator	String64	Original operator of the well. This may be different than the current operator.
PcInterest	DimensionlessMeasure	Interest for operator. Commonly in percent.
PurposeWell	WellPurpose	POSC well purpose.
Region	String64	Geo-political region in which the well is located.
State	String64	State or province in which the well is located.
StatusWell	WellStatus	POSC well status.
TimeZone	TimeZone	The time zone in which the well is located. It is the deviation in hours and minutes from UTC. This should be the normal time zone at the well and not a seasonally-adjusted value, such as daylight

		savings time.
WaterDepth	LengthMeasure	Depth of water (not land rigs).

Associations

Association		Notes
	From: Well. **To:** AbstractObject *Generalization*	
	From: Well. **To:** WellPurpose *Dependency*	
0..1	**From:** Well.WellheadElevation **To:** WellElevationCoord *Association*	Elevation of wellhead relative to a wellDatum.
0..1	**From:** Well.GroundElevation **To:** WellElevationCoord *Association*	Elevation of ground level (land rigs).
	From: Well. **To:** WellDirection *Dependency*	
0..*	**From:** Well.WellLocation **To:** AbstractWellLocation *Association*	Additional 2D coordinates of the well surface point in one or more coordinate reference systems. This is where the well crosses ground level on land and crosses the platform offshore.
0..*	**From:** Well.ReferencePoint **To:** ReferencePoint *Association*	Defines a reference point within the context of the well.
	From: Well. **To:** WellFluid *Dependency*	
0..1	**From:** Well.WellPublicLandSurveySystemLocation **To:** PublicLandSurveySystem *Association*	Township, section, range, quarter, and footage calls for USA Public Land Survey System.
0..*	**From:** Well.WellDatum **To:** WellDatum *Association*	
	From: Well. **To:** WellStatus *Dependency*	
1..1	**From:** WellCompletion.Well **To:** Well *Association*	
1..1	**From:** DownholeComponent.Well **To:** Well *Association*	
1..1	**From:** Wellbore.Well **To:** Well *Association*	

17.18 WellDatum

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015   *Last modified:* 10/25/2016
Notes: Defines the vertical datums associated with elevation, vertical depth and measured depth coordinates within the context of a well.

Attributes

Name	Type	Notes
Code	WellboreDatumReference	The code value that represents the type of reference datum. This may represent a point on a device (e.g., kelly bushing) or it may represent a vertical reference datum (e.g., mean sea level).
Comment	String2000	A contextual description of the well reference datum.
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
Kind	String64	Because various activities may use different points as measurement datums, it is useful to characterize the point based on its usage. A well reference datum may have more than one such characterization. For example, it may be the datum used by the driller and logger for measuring their depths. Example usage values would be 'permanent','driller', 'logger' 'WRP' (well reference point) and 'SRP' (site reference point).
MeasuredDepth	MeasuredDepthCoord	The measured depth coordinate of this reference datum as measured from another datum. The measured depth datum should either be the same as the elevation datum or it should be relatable to the elevation datum through other datums. Positive moving toward the bottomhole from the measured depth datum. This should be given when a local reference is "downhole", such as a kickoff point or ocean bottom template, and the borehole may not be vertical. If a depth is given, then an elevation should also be given.
Name	String64	The human-understandable contextual name of the reference datum.
uid	String64	A unique identifier for an instance of a well datum.

Associations

Association		Notes
0..1	**From:** WellDatum.Wellbore **To:** RefWellbore *Association*	A pointer to the wellbore that contains the reference datum. This should be specified if a measured depth is given.

Association		Notes
0..1	**From:** WellDatum.Elevation **To:** WellElevationCoord *Association*	The gravity based elevation coordinate of this reference datum as measured from another datum. Positive moving upward from the elevation datum. An elevation should be given unless this is a vertical reference datum (e.g., sea level).
0..1	**From:** WellDatum.Rig **To:** RefWellboreRig *Association*	A pointer to the rig that contains the device used as a reference datum. The rig may be associated with a wellbore in another well (e.g., pattern drilling using a rig on a track).
	From: WellDatum. **To:** WellboreDatumReference *Dependency*	
0..1	**From:** WellDatum.HorizontalLocation **To:** AbstractWellLocation *Association*	The horizontal location of the point being used as a well datum. This may be used when the point is not directly above or below the well point location. For example, a well being drilled from a platform may have its location at the entrance into the sea floor, while the well datum may be located on the drilling rig. Or the well datum may be a kickoff point, that is not directly under the well surface point.
	From: WellDatum.Crs **To:** AbstractVerticalCrs *Association*	
0..*	**From:** Well.WellDatum **To:** WellDatum *Association*	

17.19 WellDirection

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: *Created:* 4/13/2015   *Last modified:* 11/8/2016
Notes: Specifies values for the direction of flow of the fluids in a well facility (generally, injected or produced, or some combination).

Attributes

Name	Type	Notes
huff-n-puff		The well facility alternately injects (usually a steam or hot fluid) and produces.
injector		The well facility is injecting fluids into the subsurface.
producer		The well facility is producing fluids from the subsurface.
uncertain		The flow direction of the fluids is variable, but not on a regular basis as is the case with the huff-n-puff flow.
unknown		The value is not known. This value should not be used in normal situations. All reasonable attempts should be made to determine the appropriate value. Use of this value may result in rejection in some situations.

Associations

Association	Notes
From: WellDirection. **To:** TypeEnum *Generalization*	
From: Well. **To:** WellDirection *Dependency*	

17.20 WellElevationCoord

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015   *Last modified:* 11/8/2016
Notes: A vertical (gravity-based) elevation coordinate within the context of a well. Positive moving upward from the reference datum. All coordinates with the same datum (and same UOM) can be considered to be in the same coordinate reference system (CRS) and are thus directly comparable.

Attributes

Name	Type	Notes
datum	String64	Defines the vertical datums associated with elevation, vertical depth, and measured depth coordinates.
uom	LengthUom	The unit of measure by which the datum is expressed.

Associations

Association		Notes
	From: WellElevationCoord. **To:** AbstractMeasure *Generalization*	
0..1	**From:** Well.WellheadElevation **To:** WellElevationCoord *Association*	Elevation of wellhead relative to a wellDatum.
0..1	**From:** DrillReportStatusInfo.ElevKelly **To:** WellElevationCoord *Association*	Elevation of the rotary kelly bushing.
0..1	**From:** Well.GroundElevation **To:** WellElevationCoord *Association*	Elevation of ground level (land rigs).
0..1	**From:** WellDatum.Elevation **To:** WellElevationCoord *Association*	The gravity based elevation coordinate of this reference datum as measured from another datum. Positive moving upward from the elevation datum. An elevation should be given unless this is a vertical reference datum (e.g., sea level).
0..1	**From:** ReferencePoint.Elevation **To:** WellElevationCoord *Association*	The gravity based elevation coordinate of this point as measured from a datum. Positive moving upward from the elevation datum.

17.21 WellFluid

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: *Created:* 4/13/2015   *Last modified:* 11/8/2016
Notes: Specifies values for the type of fluid being produced from or injected into a well facility.

Attributes

Name	Type	Notes
air		This is generally an injected fluid.
condensate		Liquid hydrocarbons produced with natural gas that are separated from the gas by cooling and various other means. Condensate generally has an API gravity of 50 degrees to 120 degrees and is water white, straw, or bluish in color. It is the liquid recovery from a well classified as a gas well. It is generally dissolved in the gaseous state under reservoir conditions but separates as a liquid either in passing up the hole or at the surface. These hydrocarbons, from associated and non-associated gas well gas, normally are recovered from lease separators or field facilities by mechanical separation.
dry		The well facility is classified as a dry well. It has not been, nor will it be used to produce or inject any fluids.
gas		The well is classified as a gas well, producing or injecting a hydrocarbon gas. The gas is generally methane but may have a mixture of other gases also.
gas-water		The well facility is classified as producing both gas and water. USe this classification when the produced stream flow is a mixture of gas and water. When a facility produces gas and water in separate streams, classify it twice, as gas and as water.
non HC gas		The well produces or injects non-hydrocarbon gases. Typical other gases would be helium and carbon dioxide.
non HC gas -- CO2		Carbon dioxide gas.
oil		The liquid hydrocarbon generally referred to as crude oil.
oil-gas		The well facility is classified as producing both gas and oil. Use this classification when the produced stream flow is a mixture of oil and gas. When a facility produces oil and gas in separate streams, classify it twice, as oil and as gas.
oil-water		The well facility is classified as producing both oil and water. Use this classification when the produced stream flow is a mixture of oil and water. When a facility produces oil and water in separate streams, classify it twice, as oil and as water.
steam		The gaseous state of water. This is generally an

Name	Type	Notes
		injected fluid, but it is possible that some hydrothermal wells produce steam.
water		The well is classified as a water well without distinguishing between brine or fresh water.
water -- brine		The well facility is classified as producing or injecting salt water.
water -- fresh water		The well facility is classified as producing fresh water that is capable of use for drinking or crop irrigation.
unknown		The value is not known. Avoid using this value. All reasonable attempts should be made to determine the appropriate value. Use of this value may result in rejection in some situations.

Associations

Association	Notes
From: WellFluid. **To:** TypeEnum *Generalization*	
From: Well. **To:** WellFluid *Dependency*	

17.22 WellPurpose

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: *Created:* 4/13/2015   *Last modified:* 11/8/2016
Notes: Specifies values that represent the classification of a well or wellbore by the purpose for which it was initially drilled.

Attributes

Name	Type	Notes
appraisal		A well drilled into a formation shown to be potentially productive of oil or gas by an earlier well for the purpose of obtaining more information about the reservoir. Also known as a delineation well.
appraisal -- confirmation appraisal		An appraisal well, generally drilled in a location interpreted to be in the reservoir, whose purpose is to confirm the interpretation.
appraisal -- exploratory appraisal		An appraisal well, generally drilled in an area unknown to be part of the reservoir, whose purpose is to determine the extent of the reservoir.
exploration		An exploratory well drilled in an unproved area to test for a new field, a new pay, a deeper reservoir, or a shallower reservoir. Also known as a wildcat.
exploration -- deeper-pool wildcat		An exploratory well drilled to search for additional pools of hydrocarbon near known pools of hydrocarbon but at deeper stratigraphic levels than known pools.
exploration -- new-field wildcat		An exploratory well drilled to search for an occurrence of hydrocarbon at a relatively considerable distance outside the limits of known pools of hydrocarbon, as those limits were understood at the time.
exploration -- new-pool wildcat		An exploratory well drilled to search for additional pools of hydrocarbon near and at the same stratigraphic level as known pools.
exploration -- outpost wildcat		An exploratory well drilled to search for additional pools of hydrocarbon or to extend the limits of a known pool by searching in the same interval at some distance from a known pool.
exploration -- shallower-pool wildcat		An exploratory well drilled to search for additional pools of hydrocarbon near but at a shallower stratigraphic levels than known pools.
development		A well drilled in a zone in an area already proved productive.
development -- infill development		A development well drilled to fill in between established wells, usually as part of a drilling program to reduce the spacing between wells to increase production.
development -- injector		A development well drilled with the intent of injecting fluids into the reservoir for the purpose of improving reservoir production.
development -- producer		A development well drilled with the intent of producing fluids.

Name	Type	Notes
fluid storage		A well drilled for storing fluids - generally either hydrocarbons or waste disposal.
fluid storage -- gas storage		A well drilled with the intent of injecting gas into the reservoir rock as a storage facility.
general srvc		A well drilled with the intent of providing a general service as opposed to producing or injecting fluids. Examples of such services are geologic tests, pressure relief (for blowouts), and monitoring and observation.
general srvc -- borehole re-acquisition		A service well drilled to intersect another well below the surface for the purpose of extending the life of a well whose surface borehole has been lost or damaged.
general srvc -- observation		A service well drilled for the purpose of monitoring fluids in a reservoir, or observing some other subsurface phenomena. Also called a monitor well.
general srvc -- relief		A service well drilled with the specific purpose to provide communication at some point below the surface to another well that is out of control.
general srvc -- research		A well drilled with the purpose of obtaining information on the stratigraphy, on drilling practices, for logging tests, or other such purpose. It is not expected to find economic reserves of hydrocarbons.
general srvc -- research -- drill test		A research well drilled to test the suitablity of a particular type of equipment or drilling practice.
general srvc -- research -- strat test		A research well drilled for the purpose of gathering geologic information on the stratigraphy of an area. A C.O.S.T. well would be included in this category.
general srvc -- waste disposal		A service well drilled for the purpose of injection of sewage, industrial waste, or other waste fluids into the subsurface for disposal.
mineral		A non-oil and gas well drilled for the purpose of locating and/or extracting a mineral from the subsurface, usually through the injection and/or extraction of mineral-bearing fluids.
unknown		The value is not known. Avoid using this value. All reasonable attempts should be made to determine the appropriate value. Use of this value may result in rejection in some situations.

Associations

Association	Notes
From: WellPurpose. **To:** TypeEnum *Generalization*	
From: Well. **To:** WellPurpose *Dependency*	
From: Wellbore. **To:** WellPurpose *Dependency*	

18 Wellbore

Package: xsd_schemas
Notes: Wellbore Schema. To maximize operational efficiency and increase subsurface access, a well may contain multiple wellbores, which are the actual boreholes that comprise the well. A wellbore represents the path from surface to a unique bottomhole.

18.1 Wellbore

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015   *Last modified:* 11/8/2016
Notes: Used to capture the general information about a wellbore. This information is sometimes called a "wellbore header". A wellbore represents the path from surface to a unique bottomhole location. The wellbore object is uniquely identified within the context of one well object.

Attributes

Name	Type	Notes
AchievedTD	boolean	True ("true" of "1") indicates that the wellbore has acheieved total depth. That is, drilling has completed. False ("false" or "0") indicates otherwise. Not given indicates that it is not known whether total depth has been reached.
DayTarget	TimeMeasure	Target days for drilling wellbore.
DTimKickoff	TimeStamp	Date and time of wellbore kickoff.
IsActive	boolean	True (="1" or "true") indicates that the wellbore is active. False (="0" or "false") indicates otherwise. It is the servers responsibility to set this value based on its available internal data (e.g., what objects are changing).
Md	MeasuredDepthCoord	The measured depth of the borehole. If status is plugged, indicates the maximum depth reached before plugging. It is recommended that this value be updated about every 10 minutes by an assigned raw data provider at a site.
MdBit	MeasuredDepthCoord	The measured depth of the bit. If isActive=false then this value is not relevant. It is recommended that this value be updated about every 10 minutes by an assigned raw data provider at a site.
MdKickoff	MeasuredDepthCoord	Kickoff measured depth of the wellbore.
MdPlanned	MeasuredDepthCoord	Planned measured depth for the wellbore total depth.
MdSubSeaPlanned	MeasuredDepthCoord	Planned measured for the wellbore total depth - with respect to seabed.
Number	String64	Operator borehole number.
NumGovt	String64	Government assigned number.

Name	Type	Notes
PurposeWellbore	WellPurpose	POSC wellbore purpose.
Shape	WellboreShape	POSC wellbore trajectory shape.
StatusWellbore	WellStatus	POSC wellbore status.
SuffixAPI	String64	API suffix.
Tvd	WellVerticalDepthCoord	The true vertical depth of the borehole. If status is plugged, indicates the maximum depth reached before plugging. It is recommended that this value be updated about every 10 minutes by an assigned raw data provider at a site.
TvdBit	WellVerticalDepthCoord	The true vertical depth of the bit. If isActive=false then this value is not relevant. It is recommended that this value be updated about every 10 minutes by an assigned raw data provider at a site.
TvdKickoff	WellVerticalDepthCoord	Kickoff true vertical depth of the wellbore.
TvdPlanned	WellVerticalDepthCoord	Planned true vertical depth for the wellbore total depth.
TvdSubSeaPlanned	WellVerticalDepthCoord	Planned true vertical depth for the wellbore total depth - with respect to seabed.
TypeWellbore	WellboreType	Type of wellbore.

Associations

Association		Notes
	From: Wellbore. **To:** AbstractObject *Generalization*	
	From: Wellbore. **To:** WellPurpose *Dependency*	
1..1	**From:** Wellbore.Well **To:** Well *Association*	
	From: Wellbore. **To:** WellboreType *Dependency*	
	From: Wellbore. **To:** WellStatus *Dependency*	
	From: Wellbore. **To:** WellboreShape *Dependency*	
0..1	**From:** Wellbore.ParentWellbore **To:** Wellbore *Association*	This is a pointer to the parent wellbore. No parent = starts from top.
1..1	**From:** Attachment.Wellbore **To:** Wellbore *Association*	
1..1	**From:** OpsReport.Wellbore **To:** Wellbore *Association*	

Association			Notes
1..1	**From:** StimJob.ReferenceWellbore **To:** Wellbore *Association*		
1..1	**From:** WellboreCompletion.ReferenceWellbore **To:** Wellbore *Association*		
1..1	**From:** FluidsReport.Wellbore **To:** Wellbore *Association*		
1	**From:** RigUtilization.Wellbore **To:** Wellbore *Association*		
	From: ShowEvaluation. **To:** Wellbore *Association*		
1	**From:** StimJob.Wellbore **To:** Wellbore *Association*		
0..1	**From:** Channel. **To:** Wellbore *Association*		
0..1	**From:** WellboreMarker.Wellbore **To:** Wellbore *Association*		
1..1	**From:** ConvCore.ReferenceWellbore **To:** Wellbore *Association*		
	From: InterpretedGeology. **To:** Wellbore *Association*		
1..1	**From:** SidewallCore.ReferenceWellbore **To:** Wellbore *Association*		
1	**From:** Log.Wellbore **To:** Wellbore *Association*		Reference to the the wellbore of the log this depth registration image section belongs.
1..1	**From:** Tubular.Wellbore **To:** Wellbore *Association*		
1	**From:** DepthRegImage.Wellbore **To:** Wellbore *Association*		Reference to the the wellbore this depth registration image belongs.
1..1	**From:** WellCMLedger.Wellbore **To:** Wellbore *Association*		
0..1	**From:** ChannelSet.Wellbore **To:** Wellbore *Association*		
1..1	**From:** Trajectory.Wellbore **To:** Wellbore *Association*		
1	**From:** RigUtilizationTest. **To:** Wellbore *Association*		

Association		Notes
1..1	**From:** DownholeString.ReferenceWellbore **To:** Wellbore *Association*	
0..1	**From:** Wellbore.ParentWellbore **To:** Wellbore *Association*	This is a pointer to the parent wellbore. No parent = starts from top.
1	**From:** WellboreGeology.Wellbore **To:** Wellbore *Association*	
1..1	**From:** BhaRun.Wellbore **To:** Wellbore *Association*	
1..1	**From:** CementJob.Wellbore **To:** Wellbore *Association*	
0..1	**From:** WellboreMarkerSet.Wellbore **To:** Wellbore *Association*	
1..1	**From:** SurveyProgram.Wellbore **To:** Wellbore *Association*	
1..1	**From:** WellboreGeometry.Wellbore **To:** Wellbore *Association*	
1..1	**From:** DrillReport.Wellbore **To:** Wellbore *Association*	
1	**From:** MudLogReport.Wellbore **To:** Wellbore *Association*	
	From: CuttingsGeology. **To:** Wellbore *Association*	
1..1	**From:** BoreholeString.ReferenceWellbore **To:** Wellbore *Association*	
1..1	**From:** Risk.Wellbore **To:** Wellbore *Association*	
1..1	**From:** Target.Wellbore **To:** Wellbore *Association*	

18.2 WellboreShape

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: *Created:* 4/13/2015   *Last modified:* 11/8/2016
Notes: Specifies values to represent the classification of a wellbore based on its shape. The source of the values and the descriptions is the POSC V2.2 "facility class" standard instance values in classification system "POSC wellbore trajectory shape".

Attributes

Name	Type	Notes
build and hold		A wellbore configuration where the inclination is increased to some terminal angle of inclination and maintained at that angle to the specified target.
deviated		A wellbore that significantly departs from vertical with respect to the surface location.
double kickoff		Incorporates two tangential (constant, non-zero inclination) sections, the second of which must be at a higher inclination than the first.
horizontal		A wellbore whose path deviates from the vertical by at least 75 degrees.
S-shaped		A wellbore drilled with a vertical segment, a deviated segment, and a return toward a vertical segment.
vertical		A wellbore that is nearly vertical with respect to the surface location.
unknown		The value is not known. Avoid using this value. All reasonable attempts should be made to determine the appropriate value. Use of this value may result in rejection in some situations.

Associations

Association	Notes
From: WellboreShape. **To:** TypeEnum *Generalization*	
From: Wellbore. **To:** WellboreShape *Dependency*	

18.3 WellboreType

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: *Created:* 4/13/2015   *Last modified:* 11/8/2016
Notes: Specifies the values for the classification of a wellbore with respect to its parent well/wellbore.

Attributes

Name	Type	Notes
bypass		The original wellbore had to be abandoned before its final usage. This wellbore is being drilled as a different wellbore, but one which has the same target as the one that was abandoned.
initial		This is the first wellbore that has been drilled, or attempted, in a given well.
redrill		The wellbore is being redrilled.
reentry		The wellbore is being reentered after a period of abandonment.
respud		The wellbore is part of an existing regulatory well. The original borehole did not reach the target depth. This borehole required the well to be respudded (drilled from a different surface position).
sidetrack		The wellbore is a deviation from a given wellbore that produces a different borehole from the others, and whose bottomhole differs from any previously existing wellbore bottomholes.
unknown		The value is not known. Avoid using this value. All reasonable attempts should be made to determine the appropriate value. Use of this value may result in rejection in some situations.

Associations

Association	Notes
From: WellboreType. **To:** TypeEnum *Generalization*	
From: Wellbore. **To:** WellboreType *Dependency*	

19 WellboreGeometry

Package: xsd_schemas
Notes: Wellbore Geometry Schema. Captures information about the configuration of the permanently installed components in a wellbore. It does not define the transient drilling strings (see the <u>Tubular</u> object) or the hanging production components (see the <u>Completion</u> object).

19.1 HoleCasingType

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: *Created:* 4/13/2015   *Last modified:* 11/8/2016
Notes: Specifies values for the types of hole casing.

Attributes

Name	Type	Notes
blow out preventer		
casing		
conductor		
curved conductor		
liner		
open hole		
riser		
tubing		

Associations

Association	Notes
From: HoleCasingType. **To:** TypeEnum *Generalization*	
From: WellboreGeometrySection. **To:** HoleCasingType *Dependency*	

19.2 part_WellboreGeometrySection

Type: Class *Stereotype:* «XSDtopLevelElement»
Detail: *Created:* 9/3/2015 *Last modified:* 11/8/2016
Notes: Wrapper for sending individual sections using ETP.

Associations

Association	Notes
From: part_WellboreGeometrySection. **To:** WellboreGeometrySection *Generalization*	Wrapper for sending individual sections over ETP.

19.3 WellboreGeometry

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015   *Last modified:* 11/8/2016
Notes: Used to capture information about the configuration of the permanently installed components in a wellbore. This object is uniquely identified within the context of one wellbore object.

Attributes

Name	Type	Notes
DepthWaterMean	LengthMeasure	Water depth.
GapAir	LengthMeasure	Air gap.
GrowingStatus	ChannelStatus	Describes the growing status of the wellbore geometry, whether active, inactive or closed.
MdBase	MeasuredDepthCoord	Measured depth at bottom, at the time this report was made.

Associations

Association		Notes
	From: WellboreGeometry. **To:** AbstractObject *Generalization*	
0..*	**From:** WellboreGeometry.WellboreGeometrySection **To:** WellboreGeometrySection *Association*	Wellbore geometry section object.
1..1	**From:** WellboreGeometry.Wellbore **To:** Wellbore *Association*	
	From: WellboreGeometry. **To:** ChannelStatus *Dependency*	
0..*	**From:** WellboreGeometry.BhaRun **To:** BhaRun *Association*	
0..1	**From:** OpsReport.WbGeometry **To:** WellboreGeometry *Association*	Record of actual hole geometry at report time.
0..1	**From:** CementJob.HoleConfig **To:** WellboreGeometry *Association*	Wellbore Geometry of annulus.

19.4 WellboreGeometrySection

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015   *Last modified:* 11/8/2016
Notes: Wellbore Geometry Component Schema. Defines the "fixed" components in a wellbore. It does not define the "transient" drilling strings or the "hanging" production components.

Attributes

Name	Type	Notes
Citation	Citation	An ISO 19115 EIP-derived set of metadata attached to ensure the traceability of the WellGeometrySection.
CurveConductor	boolean	Curved conductor? Values are "true" (or "1") and "false" (or "0").
DiaDrift	LengthMeasure	The drift diameter is the inside diameter (ID) that the pipe manufacturer guarantees per specifications. Note that the nominal inside diameter is not the same as the drift diameter, but is always slightly larger. The drift diameter is used by the well planner to determine what size tools or casing strings can later be run through the casing, whereas the nominal inside diameter is used for fluid volume calculations, such as mud circulating times and cement slurry placement calculations. Source: www.glossary.oilfield.slb.com
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
FactFric	double	Friction factor.
Grade	String64	Material grade for the tubular section.
IdSection	LengthMeasure	Inner diameter.
OdSection	LengthMeasure	Outer diameter. Only for casings and risers.
SectionMdInterval	MdInterval	Measured depth interval for this wellbore geometry section.
SectionTvdInterval	TvdInterval	True vertical depth interval for this wellbore geometry section.
TypeHoleCasing	HoleCasingType	Type of fixed component.
uid	String64	Unique identifier of this WbGeometrySection within the WbGeometry object.
WtPerLen	MassPerLengthMeasure	Weight per unit length for casing sections.

Associations

Association		Notes
	From: WellboreGeometrySection. **To:** HoleCasingType *Dependency*	
0..*	**From:** WellboreGeometrySection.BhaRun **To:** BhaRun *Association*	
	From: part_WellboreGeometrySection. **To:** WellboreGeometrySection	Wrapper for sending individual sections over ETP.

Association		Notes
	Generalization	
0..*	**From:** WellboreGeometry.WellboreGeometrySection **To:** WellboreGeometrySection *Association*	Wellbore geometry section object.

20 WellboreGeology

Package: xsd_schemas

Notes: This WellboreGeology data object is new in WITSML v2.0. The WITSML v1.4.1 Mud Log data object has been reorganized into the Wellbore Geology data object and the Mud Log Report data object.
Contains the description and/or interpretation of the geology along a wellbore. Can contain cuttings lithologies, interpreted lithologies, and/or show evaluations. This is a top-level object.

Provides modeling of data for different levels of geological description and interpretation conducting by wellsite geologists or mud loggers.

20.1 CuttingsGeology

Type: Class   *Stereotype:* «XSDcomplexType»

Detail: *Created:* 10/22/2015   *Last modified:* 11/7/2016

Notes: Container for Cuttings Lithology items. The mud logger at the wellsite takes regular samples of drilled cuttings while the well is being drilled and examines the cuttings to determine the rock types (lithologies) present in each sample. The cuttings samples will typically contain a mix of different lithologies in each sample because there may have been multiple rock types that were drilled within the sample depth interval and there can also be mixing of cuttings as they travel up the wellbore and are collected on the shakers. CuttingsGeology therefore will typically contain multiple lithology elements for each interval so that the percentages of each lithology in the sample along with the more detailed geological description can be recorded.

Attributes

Name	Type	Notes
GrowingStatus	ChannelStatus	Describes the growing status of the cuttings, whether active, inactive or closed
MdInterval	MdInterval	[maintained by the server] The interval which contains the minimum and maximum measured depths for all cuttings intervals in this cuttings geology.

Associations

Association		Notes
0..*	**From:** CuttingsGeology.CuttingsInterval **To:** CuttingsGeologyInterval *Association*	
	From: CuttingsGeology. **To:** ChannelStatus *Dependency*	
	From: CuttingsGeology. **To:** AbstractObject *Generalization*	
	From: CuttingsGeology. **To:** Wellbore *Association*	
	From: WellboreGeology.CuttingsIntervalSet	

Association	Notes
0..1 **To:** CuttingsGeology *Association*	

20.2 CuttingsGeologyInterval

Type: Class *Stereotype:* «XSDcomplexType»
Detail: *Created:* 10/22/2015 *Last modified:* 11/7/2016
Notes: A depth range along the wellbore containing one or more lithology types and information about how the cuttings were sampled.

Attributes

Name	Type	Notes
Calcite	VolumePerVolumeMeasure	Calcimetry calcite percentage.
CalcStab	VolumePerVolumeMeasure	Calcimetry stabilized percentage.
Cec	DimensionlessMeasure	Cuttings cationic exchange capacity. Temporarily calling this a DimensionlessMeasure.
Citation	Citation	An ISO 19115 EIP-derived set of metadata attached to ensure the traceability of the CuttingsGeologyInterval.
CleaningMethod	String64	Sample treatment: cleaning method.
DensBulk	MassPerVolumeMeasure	Sample bulk density for the interval.
DensShale	MassPerVolumeMeasure	Shale density for the interval.
Dolomite	VolumePerVolumeMeasure	Calcimetry dolomite percentage.
DryingMethod	String64	Sample treatment: drying method.
MdInterval	MdInterval	The measured depth interval that is represented by the cuttings described in this instance.
Qft	IlluminanceMeasure	Fluorescence as measured using a device licensed for the Quantitative Fluorescence Technique.
SizeMax	LengthMeasure	Maximum size.
SizeMin	LengthMeasure	Minimum size.
uid	String64	Unique identifier for this instance of CuttingsGeologyInterval.

Associations

Association	Notes
0..* **From:** CuttingsGeologyInterval.CuttingsIntervalLithology **To:** CuttingsIntervalLithology *Association*	
From: CuttingsGeologyInterval. **To:** AbstractObject *Generalization*	
0..* **From:** CuttingsGeology.CuttingsInterval **To:** CuttingsGeologyInterval *Association*	
From: part_CuttingsInterval. **To:** CuttingsGeologyInterval *Generalization*	

20.3 CuttingsIntervalLithology

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 2/8/2016   *Last modified:* 11/7/2016
Notes: The description of a single rock type in this interval. Can include one or more CuttingsIntervalShow objects for hydrocarbon show evaluation of the individual lithology.

Attributes

Name	Type	Notes
Citation	Citation	An ISO 19115 EIP-derived set of metadata attached to ensure the traceability of the CuttingsIntervalLithology.
CodeLith	String64	An optional custom lithology encoding scheme. If used, it is recommended that the scheme follows the NPD required usage. With the numeric values noted in the enum tables, which was the original intent for this item. The NPD Coding System assigns a digital code to the main lithologies as per the Norwegian Blue Book data standards. The code was then derived by lithology = (main lithology * 10) + cement + (modifier / 100). Example: Calcite cemented silty micaceous sandstone: (33 * 10) + 1 + (21 / 100) gives a numeric code of 331.21. However, the NPD is also working through Energistics/Caesar to potentially change this usage.) This scheme should not be used for mnemonics, because those vary by operator, and if an abbreviation is required, a local look-up table should be used by the rendering client, based on Lithology Type.
Color	String64	STRUCTURED DESCRIPTION USAGE. Lithology color description, from Shell 1995 4.3.3.1 and 4.3.3.2 colors with the addition of: frosted. e.g., black, blue, brown, buff, green, grey, olive, orange, pink, purple, red, translucent, frosted, white, yellow; modified by: dark, light, moderate, medium, mottled, variegated, slight, weak, strong, and vivid.
Compaction	String64	STRUCTURED DESCRIPTION USAGE. Lithology compaction from Shell 1995 4.3.1.5, which includes: not compacted, slightly compacted, compacted, strongly compacted, friable, indurated, hard.
Hardness	String64	STRUCTURED DESCRIPTION USAGE. Mineral hardness. Typically, this element is rarely used because mineral hardness is not typically recorded. What typically is recorded is compaction. However, this element is retained for use defined as per Mohs scale of mineral hardness.
Kind	LithologyKindExt	The geological name for the type of lithology from the enum table listing a subset of the

Name	Type	Notes
		OneGeology/CGI defined formation types.
LithPc	VolumePerVolumeMeasure	Lithology percent. Represents the portion of the sampled interval this lithology type relates to. The total of the lithologies within an interval should add up to 100 percent. If LithologySource in geology is: 5. "interpreted" only 100% is allowed. 6. "core" or "cuttings" then recommended usage is that the creating application uses blocks of 10%. i.e. 10, 20, 30, 40, 50, 60, 70, 80, 90, 100. Ideally the input application should enforce a total of 100% for each defined depth interval. If the total for a depth interval does not add up to 100%, then use the "undifferentiated" code to fill out to 100%.
MatrixCement	MatrixCementKind	STRUCTURED DESCRIPTION USAGE. Lithology matrix/cement description. Terms will be as defined in the enumeration table. e.g., "calcite" (Common) "dolomite", "ankerite" (e.g., North Sea HPHT reservoirs such as Elgin and Franklin have almost pure ankerite cementation) "siderite" (Sherwood sandstones, southern UK typical Siderite cements), "quartz" (grain-to-grain contact cementation or secondary quartz deposition), "kaolinite", "illite" (e.g., Village Fields North Sea), "smectite","chlorite" (Teg, Algeria.).
Permeability	String64	STRUCTURED DESCRIPTION USAGE. Lithology permeability description from Shell 4.3.2.5. In the future, these values would benefit from quantification, e.g., tight, slightly, fairly, highly.
PorosityFabric	String64	STRUCTURED DESCRIPTION USAGE. Visible porosity fabric description from after Shell 4.3.2.1 and 4.3.2.2: intergranular (particle size greater than 20m), fine interparticle (particle size less than 20m), intercrystalline, intragranular, intraskeletal, intracrystalline, mouldic, fenestral, shelter, framework, stylolitic, replacement, solution, vuggy, channel, cavernous.
PorosityVisible	String64	STRUCTURED DESCRIPTION USAGE. Lithology visible porosity description. Defined after BakerHughes definitions, as opposed to Shell, which has no linkage to actual numeric estimates. The theoretical maximum porosity for a clastic rock is about 26%, which is normally much reduced by other factors. When estimating porosities use: more than 15% "good"; 10 to 15% "fair"; 5 to 10% "poor"; less than

Name	Type	Notes
		5% "trace"; 0 "none".
Roundness	String64	STRUCTURED DESCRIPTION USAGE. Lithology roundness description from Shell 4.3.1.3. Roundness refers to modal size class: very angular, angular, subangular, subrounded, rounded, well rounded.
SizeGrain	String64	STRUCTURED DESCRIPTION USAGE. Lithology grain size description. Defined from Shell 4.3.1.1.(Wentworth) modified to remove the ambiguous term pelite. Size ranges in millimeter (or micrometer) and inches. LT 256 mm LT 10.1 in "boulder" 64-256 mm 2.5–10.1 in "cobble"; 32–64 mm 1.26–2.5 in "very coarse gravel" 16–32 mm 0.63–1.26 in "coarse gravel" 8–16 mm 0.31–0.63 in "medium gravel" 4–8 mm 0.157–0.31 in "fine gravel" 2–4 mm 0.079–0.157 in "very fine gravel" 1–2 mm 0.039–0.079 in "very coarse sand" 0.5–1 mm 0.020–0.039 in "coarse sand" 0.25–0.5 mm 0.010–0.020 in "medium sand" 125–250 um 0.0049–0.010 in "fine sand" 62.5–125 um .0025–0.0049 in "very fine sand" 3.90625–62.5 um 0.00015–0.0025 in "silt" LT 3.90625 um LT 0.00015 in "clay" LT 1 um LT 0.000039 in "colloid"
Sorting	String64	STRUCTURED DESCRIPTION USAGE. Lithology sorting description from Shell 4.3.1.2 Sorting: very poorly sorted, unsorted, poorly sorted, poorly to moderately well sorted, moderately well sorted, well sorted, very well sorted, unimodally sorted, bimodally sorted.
Sphericity	String64	STRUCTURED DESCRIPTION USAGE. Lithology sphericity description for the modal size class of grains in the sample, defined as per Shell 4.3.1.4 Sphericity: very elongated, elongated, slightly elongated, slightly spherical, spherical, very spherical.
Texture	String64	STRUCTURED DESCRIPTION USAGE. Lithology matrix texture description from Shell 1995 4.3.2.6: crystalline, (often "feather-edge" appearance on breaking), friable, dull, earthy, chalky, (particle size less than 20m; often exhibits capillary imbibition) visibly particulate, granular, sucrosic, (often exhibits capillary imbibition). Examples: compact interlocking, particulate, (Gradational textures are quite common.) chalky matrix with sucrosic patches, (Composite textures also occur).
uid	String64	Unique identifier for this instance of CuttingsIntervalLithology.

Associations

Association	Notes
From: CuttingsIntervalLithology. **To:** MatrixCementKind *Dependency*	
From: CuttingsIntervalLithology. **To:** LithologyKindExt *Dependency*	
0..* **From:** CuttingsIntervalLithology.Qualifier **To:** LithologyQualifier *Association*	
0..* **From:** CuttingsIntervalLithology.Shows **To:** CuttingsIntervalShow *Association*	
0..* **From:** CuttingsGeologyInterval.CuttingsIntervalLithology **To:** CuttingsIntervalLithology *Association*	

20.4 CuttingsIntervalShow

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 2/8/2016   *Last modified:* 11/7/2016
Notes: A set of measurements or observations on cuttings samples describing the evaluation of a hydrocarbon show based on observation of hydrocarbon staining and fluorescence. For information on procedures for show evaluation, see the WITSML Technical Usage Guide.

Attributes

Name	Type	Notes
Citation	Citation	An ISO 19115 EIP-derived set of metadata attached to ensure the traceability of the CuttingsIntervalShow.
CutColor	String64	Cut color.
CutFlorColor	String64	Cut fluorescence color.
CutFlorForm	ShowLevel	Cut fluorescence form.
CutFlorLevel	ShowFluorescence	Cut fluorescence level.
CutFlorSpeed	ShowSpeed	Cut fluorescence speed.
CutFlorStrength	String64	Cut fluorescence strength.
CutForm	ShowLevel	Cut formulation.
CutLevel	String64	Cut level (faint, bright, etc.).
CutSpeed	ShowSpeed	Cut speed.
CutStrength	String64	Cut strength.
CuttingFluid	String64	Description of the cutting solvent used to treat the cuttings.
ImpregnatedLitho	String64	Impregnated lithology.
NatFlorColor	String64	Natural fluorescence color.
NatFlorDesc	String64	Natural fluorescence description.
NatFlorLevel	ShowFluorescence	Natural fluorescence level.
NatFlorPc	AreaPerAreaMeasure	Natural fluorescence (commonly in percent).
Odor	String64	Description of any hydrocarbon type odors smelled.
ResidueColor	String64	Residue color.
ShowRating	ShowRating	Show Rating.
StainColor	String64	Visible stain color.
StainDistr	String64	Visible stain distribution.
StainPc	AreaPerAreaMeasure	Visible stain (commonly in percent).
uid	String64	Unique identifier for this instance of CuttingsIntervalShow.

Associations

Association	Notes
From: CuttingsIntervalShow. **To:** ShowLevel *Dependency*	

Association	Notes
From: CuttingsIntervalShow. **To:** ShowSpeed *Dependency*	
From: CuttingsIntervalShow. **To:** ShowLevel *Dependency*	
From: CuttingsIntervalShow. **To:** ShowFluorescence *Dependency*	
From: CuttingsIntervalShow. **To:** ShowRating *Dependency*	
From: CuttingsIntervalShow. **To:** ShowSpeed *Dependency*	
From: CuttingsIntervalShow. **To:** ShowFluorescence *Dependency*	
From: CuttingsIntervalLithology.Shows 0..* **To:** CuttingsIntervalShow *Association*	

20.5 GeochronologicalUnit

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: Created: 8/2/2016   *Last modified:* 11/7/2016
Notes: A unit of geological time that can be used as part of an interpretation of a geology sequence. Use it for major units of geological time such as "Paleozoic", "Mesozoic" or for more detailed time intervals such as "Permian", "Triassic", "Jurassic", etc.

Attributes

Name	Type	Notes
authority	String64	Person or collective body responsible for authorizing the information.
kind	GeochronologicalRank	Defines the time spans in geochronology.

Associations

Association	Notes
From: GeochronologicalUnit. **To:** String64 *Generalization*	
From: GeochronologicalUnit. **To:** GeochronologicalRank *Dependency*	
From: WellboreMarker. **To:** GeochronologicalUnit *Dependency*	

20.6 InterpretedGeology

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 2/8/2016   *Last modified:* 11/7/2016
Notes: A container object for zero or more InterpretedGeologyInterval objects. The container references a specific wellbore, a depth interval, a growing object status, and a collection of interpreted geology intervals.
These values are manually entered per sample by the wellsite geologist or mud logger as an interpretation of the actual lithology sequence along the length of the wellbore by correlating the percentage lithologies observed in the cuttings samples along with other data (typically the drill rate and gamma ray curves), to estimate the location of the boundaries between the different lithology types. This analysis creates a sequence of individual lithologies along the wellbore. Therefore, InterpretedGeology typically contains a single lithology element for each interval that captures the detailed geological description of the lithology.

Attributes

Name	Type	Notes
GrowingStatus	ChannelStatus	Describes the growing status of the interpreted geology. Valid values: active, inactive or closed.
MdInterval	MdInterval	[maintained by the server] The interval that contains the minimum and maximum measured depths for all interpreted intervals in this interpreted geology.

Associations

Association		Notes
0..*	**From:** InterpretedGeology.GeologicIntervalInterpreted **To:** InterpretedGeologyInterval *Association*	
	From: InterpretedGeology. **To:** AbstractObject *Generalization*	
	From: InterpretedGeology. **To:** Wellbore *Association*	
	From: InterpretedGeology. **To:** ChannelStatus *Dependency*	
0..1	**From:** WellboreGeology.InterpretedGeologyIntervalSet **To:** InterpretedGeology *Association*	

20.7 InterpretedGeologyInterval

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 2/8/2016   *Last modified:* 11/7/2016
Notes: Represents a depth interval along the wellbore which contains a single interpreted lithology type.
It can be used to:

- carry information about geochronology and lithostratigraphy

- create a pre-well geological prognosis with chronostratigraphic, lithostratigraphic, and lithology entries.

InterpretedGeologyInterval can be sent as an ETP channel data in a part_InterpretedGeologyInterval wrapper.

Attributes

Name	Type	Notes
Citation	Citation	An ISO 19115 EIP-derived set of metadata attached to ensure the traceability of the InterpretedGeologyInterval.
GeochronologicalUnit	GeochronologicalUnit	The name of a Geochronology, with the "kind" attribute specifying the geochronological time span.
LithostratigraphicUnit	LithostratigraphicUnit	Specifies the unit of lithostratigraphy.
MdInterval	MdInterval	The measured depth interval which is described by this interpreted geology.
uid	String64	Unique identifier for this instance of InterpretedGeologyInterval.

Associations

Association		Notes
0..1	**From:** InterpretedGeologyInterval.InterpretedLithology **To:** InterpretedIntervalLithology *Association*	
	From: InterpretedGeologyInterval. **To:** AbstractObject *Generalization*	
0..*	**From:** InterpretedGeology.GeologicIntervalInterpreted **To:** InterpretedGeologyInterval *Association*	
	From: part_InterpretedGeologyInterval. **To:** InterpretedGeologyInterval *Generalization*	

20.8 InterpretedIntervalLithology

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 2/8/2016   *Last modified:* 11/7/2016
Notes: The description of a single rock type that is used within InterpretedGeologyInterval. There can only be one of these in each InterpretedGeologyInterval.

Attributes

Name	Type	Notes
Citation	Citation	An ISO 19115 EIP-derived set of metadata attached to ensure the traceability of the InterpretedIntervalLithology
CodeLith	String64	An optional custom lithology encoding scheme. If used, it is recommended that the scheme follows the NPD required usage. With the numeric values noted in the enum tables, which was the original intent for this item. The NPD Coding System assigns a digital code to the main lithologies as per the Norwegian Blue Book data standards. The code was then derived by lithology = (main lithology * 10) + cement + (modifier / 100). Example: Calcite cemented silty micaceous sandstone: (33 * 10) + 1 + (21 / 100) gives a numeric code of 331.21. However, the NPD is also working through Energistics/Caesar to potentially change this usage.) This scheme should not be used for mnemonics, because those vary by operator, and if an abbreviation is required, a local look-up table should be used by the rendering client, based on Lithology Type.
Color	String64	STRUCTURED DESCRIPTION USAGE. Lithology color description, from Shell 1995 4.3.3.1 and 4.3.3.2 Colors with the addition of: frosted. e.g., black, blue, brown, buff, green, grey, olive, orange, pink, purple, red, translucent, frosted, white, yellow; modified by: dark, light, moderate, medium, mottled, variegated, slight, weak, strong, and vivid.
Compaction	String64	STRUCTURED DESCRIPTION USAGE. Lithology compaction from Shell 1995 4.3.1.5, which includes: not compacted, slightly compacted, compacted, strongly compacted, friable, indurated, hard.
Hardness	String64	STRUCTURED DESCRIPTION USAGE. Mineral hardness. Typically, this element is rarely used because mineral hardness is not typically recorded. What typically is recorded is compaction. However, this element is retained for use defined as per Mohs scale of mineral hardness.
Kind	LithologyKindExt	The geological name for the type of lithology from the enum table listing a subset of the OneGeology /

Name	Type	Notes
		CGI defined formation types.
MatrixCement	MatrixCementKind	STRUCTURED DESCRIPTION USAGE. Lithology matrix/cement description. Terms will be as defined in the enumeration table. e.g., "calcite" (Common) "dolomite", "ankerite" (e.g., North Sea HPHT reservoirs such as Elgin and Franklin have almost pure ankerite cementation) "siderite" (Sherwood sandstones, southern UK typical Siderite cements), "quartz" (grain-to-grain contact cementation or secondary quartz deposition), "kaolinite", "illite" (e.g., Village Fields North Sea), "smectite","chlorite" (Teg, Algeria.).
Permeability	String64	STRUCTURED DESCRIPTION USAGE. Lithology permeability description from Shell 4.3.2.5. In the future, these values would benefit from quantification, e.g., tight, slightly, fairly, highly.
PorosityFabric	String64	STRUCTURED DESCRIPTION USAGE. Visible porosity fabric description from after Shell 4.3.2.1 and 4.3.2.2: intergranular (particle size greater than 20m), fine interparticle (particle size less than 20m), intercrystalline, intragranular, intraskeletal, intracrystalline, mouldic, fenestral, shelter, framework, stylolitic, replacement, solution, vuggy, channel, cavernous.
PorosityVisible	String64	STRUCTURED DESCRIPTION USAGE. Lithology visible porosity description. Defined after BakerHughes definitions, as opposed to Shell, which has no linkage to actual numeric estimates.
Roundness	String64	STRUCTURED DESCRIPTION USAGE. Lithology roundness description from Shell 4.3.1.3. Roundness refers to modal size class: very angular, angular, subangular, subrounded, rounded, well rounded.
SizeGrain	String64	STRUCTURED DESCRIPTION USAGE. Lithology grain size description. Defined from Shell 4.3.1.1. (Wentworth) modified to remove the ambiguous term pelite. Size ranges in millimeter (or micrometer) and inches. LT 256 mm LT 10.1 in "boulder" 64-256 mm 2.5–10.1 in "cobble"; 32–64 mm 1.26–2.5 in "very coarse gravel" 16–32 mm 0.63–1.26 in "coarse gravel" 8–16 mm 0.31–0.63 in "medium gravel" 4–8 mm 0.157–0.31 in "fine gravel" 2–4 mm 0.079–0.157 in "very fine gravel" 1–2 mm 0.039–0.079 in "very coarse sand" 0.5–1 mm 0.020–0.039 in "coarse sand" 0.25–0.5 mm 0.010–0.020 in "medium sand" 125–250 um 0.0049–0.010 in "fine sand"

Name	Type	Notes
		62.5–125 um .0025–0.0049 in "very fine sand" 3.90625–62.5 um 0.00015–0.0025 in "silt" LT 3.90625 um LT 0.00015 in "clay" LT 1 um LT 0.000039 in "colloid"
Sorting	String64	STRUCTURED DESCRIPTION USAGE. Lithology sorting description from Shell 4.3.1.2 Sorting: very poorly sorted, unsorted, poorly sorted, poorly to moderately well sorted, moderately well sorted, well sorted, very well sorted, unimodally sorted, bimodally sorted.
Sphericity	String64	STRUCTURED DESCRIPTION USAGE. Lithology sphericity description for the modal size class of grains in the sample, defined as per Shell 4.3.1.4 Sphericity: very elongated, elongated, slightly elongated, slightly spherical, spherical, very spherical.
Texture	String64	STRUCTURED DESCRIPTION USAGE. Lithology matrix texture description from Shell 1995 4.3.2.6: crystalline, (often "feather-edge" appearance on breaking), friable, dull, earthy, chalky, (particle size less than 20m; often exhibits capillary imbibition) visibly particulate, granular, sucrosic, (often exhibits capillary imbibition). Examples: compact interlocking, particulate, (Gradational textures are quite common.) chalky matrix with sucrosic patches, (Composite textures also occur).
uid	String64	Unique identifier for this instance of InterpretedIntervalLithology.

Associations

Association		Notes
	From: InterpretedIntervalLithology. **To:** LithologyKindExt *Dependency*	
0..*	**From:** InterpretedIntervalLithology.Qualifier **To:** LithologyQualifier *Association*	*Needs Documentation*
0..1	**From:** InterpretedGeologyInterval.InterpretedLithology **To:** InterpretedIntervalLithology *Association*	

20.9 LithologyQualifier

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 2/8/2016   *Last modified:* 11/7/2016
Notes: A description of minerals or accessories that constitute a fractional part of a CuttingsIntervalLithology.

Attributes

Name	Type	Notes
Abundance	VolumePerVolumeMeasure	The relative abundance of the qualifier estimated based on a "visual area" by inspecting the cuttings spread out on the shaker table before washing, or in the sample tray after washing. This represents the upper bound of the observed range, and is in the following increments at the upper bound: 1 = less than or equal to 1% 2 = greater than 1% and less than 2% 5 = greater than or equal to 2% and less than 5% and then in 5% increments, 10 (=5-10%), 15 (=10-15%) up to 100 (=95-100%). The end user can then elect to either display the %, or map them to an operator-specific term or coding, e.g., 1 less than or equal to 1% = rare trace, or occasional, or very sparse, etc., depending on the end users' terminology. i.e. 1 less then or equal to 1%=Rare Trace, or occasional, or very sparse etc., depending on the the end users' terminology.)
Description	String2000	A textual description of the qualifier.
Kind	LithologyQualifierKindExt	The type of qualifier.
MdInterval	MdInterval	The measured depth interval represented by the qualifier. This must be within the range of the parent geologic interval. If MdInterval is not given then the qualifier is deemed to exist over the entire depth range of the parent geologyInterval.
uid	String64	Unique identifier for this instance of LithologyQualifier

Associations

Association		Notes
	From: LithologyQualifier. **To:** LithologyQualifierKindExt *Dependency*	
0..*	**From:** CuttingsIntervalLithology.Qualifier **To:** LithologyQualifier *Association*	
0..*	**From:** InterpretedIntervalLithology.Qualifier **To:** LithologyQualifier *Association*	*Needs Documentation*

20.10 LithostratigraphicUnit

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 2/8/2016   *Last modified:* 11/7/2016
Notes: The name of a lithostratigraphy, with the "kind" attribute specifying the lithostratigraphic unit-hierarchy (group, formation, member or bed). The entry at each level is free text for the local lithostratigraphy at that level in the hierarchy. If a single hierarchy is defined, it is assumed this is at the formation level in the hierarchy and kind=formation should be used for the entry.
Used to hold information about the stratigraphic units that an interpreted lithology may belong to. These are based primarily on the differences between rock types rather than their specific age. For example, in the Grand Canyon, some of the major lithostratigraphic units are the "Navajo", "Kayenta", "Wingate", "Chinle" and "Moenkopi" formations, each of which is represented by a particular set of rock properties or characteristics.

Attributes

Name	Type	Notes
authority	String64	Person or collective body responsible for authorizing the information.
kind	LithostratigraphicRank	Specifies the lithostratigraphic unit-hierarchy (group, formation, member or bed).

Associations

Association	Notes
From: LithostratigraphicUnit. **To:** LithostratigraphicRank *Dependency*	
From: LithostratigraphicUnit. **To:** String64 *Generalization*	
From: WellboreMarker. **To:** LithostratigraphicUnit *Dependency*	

20.11 part_CuttingsInterval

Type: Class *Stereotype:* «XSDtopLevelElement»
Detail: *Created:* 2/10/2016 *Last modified:* 11/7/2016
Notes: Wrapper for sending individual intervals using ETP.

Associations

Association	Notes
From: part_CuttingsInterval. **To:** CuttingsGeologyInterval *Generalization*	

20.12 part_EvaluatedIntervalShow

Type: Class   *Stereotype:* «XSDtopLevelElement»
Detail: *Created:* 2/10/2016   *Last modified:* 11/7/2016
Notes: Wrapper for sending individual evaluated interval shows using ETP.

Associations

Association	Notes
From: part_EvaluatedIntervalShow. **To:** ShowEvaluationInterval *Generalization*	

20.13 part_InterpretedGeologyInterval

Type: Class   *Stereotype:* «XSDtopLevelElement»
Detail: *Created:* 2/10/2016   *Last modified:* 11/7/2016
Notes: Wrapper for sending individual interpreted geology intervals using ETP.

Associations

Association	Notes
From: part_InterpretedGeologyInterval. **To:** InterpretedGeologyInterval *Generalization*	

20.14 ShowEvaluation

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 2/8/2016   *Last modified:* 11/7/2016
Notes: A container object for zero or more ShowEvaluationInterval objects. The container references a specific wellbore, a depth interval, a growing object status, and a collection of show evaluation intervals.
In a similar way to the InterpretedGeology, these are manually entered by the wellsite geologist or mud logger as an interpretation of the hydrocarbon show along the wellbore, based on the raw readings from one or more show analyses of individual show tests on cuttings samples.

Attributes

Name	Type	Notes
GrowingStatus	ChannelStatus	Describes the growing status of the show evaluation intervals. Valid values: active, inactive or closed.
MdInterval	MdInterval	[maintained by the server] The interval that contains the minimum and maximum measured depths for all show intervals in this show evaluation.

Associations

Association		Notes
	From: ShowEvaluation. **To:** ChannelStatus *Dependency*	
0..*	**From:** ShowEvaluation.EvaluatedIntervalShow **To:** ShowEvaluationInterval *Association*	
	From: ShowEvaluation. **To:** Wellbore *Association*	
	From: ShowEvaluation. **To:** AbstractObject *Generalization*	
0..1	**From:** WellboreGeology.ShowIntervalSet **To:** ShowEvaluation *Association*	

20.15 ShowEvaluationInterval

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 2/10/2016   *Last modified:* 11/7/2016
Notes: An interpretation of the overall hydrocarbon show derived from analysis of individual show tests on cuttings samples. An interval in the wellbore for which data is manually entered by the wellsite geologist or mud logger as an interpretation of the hydrocarbon show along the wellbore, based on the raw readings from one or more show analyses of individual show tests on cuttings samples.
ShowEvaluationInterval can be sent as an ETP channel data in a part_EvaluatedIntervalShow wrapper.

Attributes

Name	Type	Notes
Citation	Citation	An ISO 19115 EIP-derived set of metadata attached to ensure the traceability of the ShowEvaluationInterval
MdInterval	MdInterval	The measured depth interval over which the show is evaluated.
ShowFluid	ShowFluid	Gas or oil exhibited at the show interval.
ShowRating	ShowRating	Quality of the fluid showing at this interval.
uid	String64	Unique identifier for this instance of ShowEvaluationInterval.

Associations

Association		Notes
	From: ShowEvaluationInterval. **To:** AbstractObject *Generalization*	
	From: ShowEvaluationInterval. **To:** ShowFluid *Dependency*	
	From: ShowEvaluationInterval. **To:** ShowRating *Dependency*	
0..*	**From:** ShowEvaluation.EvaluatedIntervalShow **To:** ShowEvaluationInterval *Association*	
	From: part_EvaluatedIntervalShow. **To:** ShowEvaluationInterval *Generalization*	

20.16 ShowFluid

Type: Enumeration *Stereotype:*
Detail: *Created:* 2/10/2016 *Last modified:* 11/7/2016
Notes: Specifies the type of fluid analyzed in this interval.

Attributes

Name	Type	Notes
gas		
oil		

Associations

Association	Notes
From: ShowFluid. **To:** TypeEnum *Generalization*	
From: ShowEvaluationInterval. **To:** ShowFluid *Dependency*	

20.17 ShowFluorescence

Type: Enumeration *Stereotype:*
Detail: Created: 2/8/2016 *Last modified:* 11/7/2016
Notes: Specifies the intensity and color of the show.

Attributes

Name	Type	Notes
faint		
bright		
none		
unknown		The value is not known. Avoid using this value. All reasonable attempts should be made to determine the appropriate value. Use of this value may result in rejection in some situations.

Associations

Association	Notes
From: ShowFluorescence. **To:** TypeEnum *Generalization*	
From: CuttingsIntervalShow. **To:** ShowFluorescence *Dependency*	
From: CuttingsIntervalShow. **To:** ShowFluorescence *Dependency*	

20.18 ShowLevel

Type: Enumeration   *Stereotype:*
Detail: *Created:* 2/8/2016   *Last modified:* 11/7/2016
Notes: Specifies another qualifier for the show: blooming or streaming.

Attributes

Name	Type	Notes
blooming		
streaming		
unknown		The value is not known. Avoid using this value. All reasonable attempts should be made to determine the appropriate value. Use of this value may result in rejection in some situations.

Associations

Association	Notes
From: ShowLevel. **To:** TypeEnum *Generalization*	
From: CuttingsIntervalShow. **To:** ShowLevel *Dependency*	
From: CuttingsIntervalShow. **To:** ShowLevel *Dependency*	

20.19 ShowRating

Type: Enumeration   *Stereotype:*
Detail: Created: 2/8/2016   *Last modified:* 11/7/2016
Notes: Specifies the quality of the fluid showing at this interval.

Attributes

Name	Type	Notes
none		
very poor		
poor		
fair		
good		
very good		
unknown		The value is not known. Avoid using this value. All reasonable attempts should be made to determine the appropriate value. Use of this value may result in rejection in some situations.

Associations

Association	Notes
From: ShowRating. **To:** TypeEnum *Generalization*	
From: ShowEvaluationInterval. **To:** ShowRating *Dependency*	
From: CuttingsIntervalShow. **To:** ShowRating *Dependency*	

20.20 ShowSpeed

Type: Enumeration   *Stereotype:*
Detail: *Created:* 2/8/2016   *Last modified:* 11/7/2016
Notes: Specifies an indication of both the solubility of the oil and the permeability of the show. The speed can vary from instantaneous to very slow.

Attributes

Name	Type	Notes
slow		
moderately fast		
fast		
instantaneous		
none		
unknown		The value is not known. Avoid using this value. All reasonable attempts should be made to determine the appropriate value. Use of this value may result in rejection in some situations.

Associations

Association	Notes
From: ShowSpeed. **To:** TypeEnum *Generalization*	
From: CuttingsIntervalShow. **To:** ShowSpeed *Dependency*	
From: CuttingsIntervalShow. **To:** ShowSpeed *Dependency*	

20.21 WellboreGeology

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 2/10/2016   *Last modified:* 11/7/2016
Notes: The transferrable class of the WellboreGeology object.

Attributes

Name	Type	Notes
MdInterval	MdInterval	[maintained by the server] The interval that contains the minimum and maximum measured depths for all wellbore geology types under this wellbore geology entry.

Associations

Association		Notes
0..1	**From:** WellboreGeology.InterpretedGeologyIntervalSet **To:** InterpretedGeology *Association*	
0..1	**From:** WellboreGeology.CuttingsIntervalSet **To:** CuttingsGeology *Association*	
	From: WellboreGeology. **To:** AbstractObject *Generalization*	
1	**From:** WellboreGeology.Wellbore **To:** Wellbore *Association*	
0..1	**From:** WellboreGeology.ShowIntervalSet **To:** ShowEvaluation *Association*	
0..1	**From:** MudLogReport.WellboreGeology **To:** WellboreGeology *Association*	Reference to the related WellboreGeology. BUSINESS RULE: The WellboreGeology must be within the same wellbore as the MudLogReport Interval.

21 MudLogReport

Package: xsd_schemas

Notes: The mud log report (MudLogReport) data object can be used to create a report of geological, hydrocarbon evaluation, and drilling parameters observed while drilling a wellbore. The report represents the activities typically performed by mudlogging or wellsite geological personnel at a drilling location. The data from this object can be used to generate the graphical mud log or wellsite geology log that is the service product from these wellsite operations.

The mud log report object uses the objects from wellbore geology object (described above) to carry the detail of specific intervals of cuttings geology, interpreted geology, and hydrocarbon show but, the mud log report object also adds the capability to describe other associated data including:

- Information about the service company and its personnel
- Gas readings (mud gas, gas peaks)
- Chromatographic analysis of gas content
- Drilling parameters
- Links to other wellbore information, such as drilling reports and log data

The mud log report is a growing object. As drilling progresses along the wellbore, new instances of the mud log report interval are generated and added to the object. These intervals may be transferred in real-time via ETP using the part_MudLogReportInterval object.

21.1 Chromatograph

Type: Class   *Stereotype:* «XSDcomplexType»

Detail: *Created:* 2/29/2016   *Last modified:* 11/7/2016

Notes: Analysis done to determine the components in a show.

Attributes

Name	Type	Notes
Acetylene	VolumePerVolumeMeasure	Acetylene.
ChromatographMdInterval	MdInterval	Measured interval related to the chromatograph results.
ChromatographType	String64	Chromatograph type.
ChromReportTime	TimeStamp	Chromatograph integrator report time; format may be variable due to recording equipment.
Co2Av	VolumePerVolumeMeasure	Carbon Dioxide ppm (average).
Co2Mn	VolumePerVolumeMeasure	Carbon Dioxide ppm (minimum).
Co2Mx	VolumePerVolumeMeasure	Carbon Dioxide ppm (maximum).
DateTimeGasSampleProcessed	TimeStamp	The date and time at which the gas sample was processed.
EpentAv	VolumePerVolumeMeasure	neo-Pentane (eC5) ppm (average).

Name	Type	Notes
EpentMn	VolumePerVolumeMeasure	neo-Pentane (eC5) ppm (minimum).
EpentMx	VolumePerVolumeMeasure	neo-Pentane (eC5) ppm (maximum).
EthAv	VolumePerVolumeMeasure	Ethane (C2) ppm (average).
EthMn	VolumePerVolumeMeasure	Ethane (C2) ppm (minimum).
EthMx	VolumePerVolumeMeasure	Ethane (C2) ppm (maximum).
ETimChromCycle	TimeMeasure	Chromatograph cycle time. Commonly in seconds.
H2sAv	VolumePerVolumeMeasure	Hydrogen Sulfide (average) ppm.
H2sMn	VolumePerVolumeMeasure	Hydrogen Sulfide (minimum) ppm.
H2sMx	VolumePerVolumeMeasure	Hydrogen Sulfide (maximum) ppm.
IbutAv	VolumePerVolumeMeasure	iso-Butane (iC4) ppm (average).
IbutMn	VolumePerVolumeMeasure	iso-Butane (iC4) ppm (minimum).
IbutMx	VolumePerVolumeMeasure	iso-Butane (iC4) ppm (maximum).
IhexAv	VolumePerVolumeMeasure	iso-Hexane (iC6) ppm (average).
IhexMn	VolumePerVolumeMeasure	iso-Hexane (iC6) ppm (minimum).
IhexMx	VolumePerVolumeMeasure	iso-Hexane (iC6) ppm (maximum).
IpentAv	VolumePerVolumeMeasure	iso-Pentane (iC5) ppm (average).
IpentMn	VolumePerVolumeMeasure	iso-Pentane (iC5) ppm (minimum).
IpentMx	VolumePerVolumeMeasure	iso-Pentane (iC5) ppm (maximum).
MethAv	VolumePerVolumeMeasure	Methane (C1) ppm (average).
MethMn	VolumePerVolumeMeasure	Methane (C1) ppm (minimum).
MethMx	VolumePerVolumeMeasure	Methane (C1) ppm (maximum).
MudWeightIn	MassPerVolumeMeasure	Mud density in (active pits).
MudWeightOut	MassPerVolumeMeasure	Mud density out (flowline).
NbutAv	VolumePerVolumeMeasure	nor-Butane (nC4) ppm (average).
NbutMn	VolumePerVolumeMeasure	nor-Butane (nC4) ppm (minimum).
NbutMx	VolumePerVolumeMeasure	nor-Butane (nC4) ppm (maximum).
NhexAv	VolumePerVolumeMeasure	nor-Hexane (nC6) ppm (average).
NhexMn	VolumePerVolumeMeasur	nor-Hexane (nC6) ppm (minimum).

Name	Type	Notes
	e	
NhexMx	VolumePerVolumeMeasure	nor-Hexane (nC6) ppm (maximum).
NpentAv	VolumePerVolumeMeasure	nor-Pentane (nC5) ppm (average).
NpentMn	VolumePerVolumeMeasure	nor-Pentane (nC5) ppm (minimum).
NpentMx	VolumePerVolumeMeasure	nor-Pentane (nC5) ppm (maximum).
PropAv	VolumePerVolumeMeasure	Propane (C3) ppm (average).
PropMn	VolumePerVolumeMeasure	Propane (C3) ppm (minimum).
PropMx	VolumePerVolumeMeasure	Propane (C3) ppm (maximum).

Associations

Association	Notes
0..1	**From:** Chromatograph.Channel **To:** Channel *Association*	
0..1	**From:** MudlogReportInterval.Chromatograph **To:** Chromatograph *Association*	

21.2 ConcentrationParameterKind

Type: Enumeration   *Stereotype:*
Detail: Created: 9/29/2016   *Last modified:* 11/8/2016
Notes: Specifies the values for mud log parameters that are measured in units of concentration.

Attributes

Name	Type	Notes
cuttings gas		The cuttings gas concentration averaged over the interval.

Associations

Association	Notes
From: MudLogConcentrationParameter. **To:** ConcentrationParameterKind *Association*	

21.3 DrillingParameters

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 3/1/2016   *Last modified:* 10/25/2016
Notes: Information regarding drilling: ROP, WOB, torque, etc.

Attributes

Name	Type	Notes
AverageDrillingCoefficient	DxcStatistics	Average drilling exponent through the interval.
AverageEcdAtTd	EcdStatistics	Average effective circulating density at TD through the interval.
AverageMudDensity	MudDensityStatistics	Average mud density through the interval.
AverageTorque	TorqueStatistics	Average torque through the interval.
AverageTorqueCurrent	TorqueCurrentStatistics	Average torque current through the interval. This is the raw measurement from which the average torque can be calculated.
AverageTurnRate	RpmStatistics	Average turn rate through the interval (commonly in rpm).
AverageWeightOnBit	WobStatistics	Surface weight on bit: average through the interval.
Rop	RopStatistics	Rate of penetration through the interval.

Associations

Association		Notes
0..*	**From:** MudlogReportInterval.DrillingParameters **To:** DrillingParameters *Association*	

21.4 DxcStatistics

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 8/1/2016   *Last modified:* 11/7/2016
Notes: Information on corrected drilling exponents.

Attributes

Name	Type	Notes
Average	DimensionlessMeasure	Corrected drilling exponent calculated for the interval.
Channel	Channel	Log channel from which the drilling coefficient statistics were calculated.

21.5 EcdStatistics

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 8/1/2016   *Last modified:* 11/7/2016
Notes: Information on equivalent circulating density statistics.

Attributes

Name	Type	Notes
Average	MassPerVolumeMeasure	Average equivalent circulating density at TD through the interval.
Channel	Channel	Log channel from which the equivalent circulating density at TD statistics were calculated.

21.6 ForceParameterKind

Type: Enumeration   *Stereotype:*
Detail: Created: 9/29/2016   *Last modified:* 11/8/2016
Notes: Specifies the values for mud log parameters that are measured in units of force.

Attributes

Name	Type	Notes
overpull on connection		Additional hookload recorded in excess of static drill string weight when making a connection.
overpull on trip		Additional hookload recorded in excess of static drill string weight when making a trip.

Associations

Association	Notes
From: MudLogForceParameter. **To:** ForceParameterKind *Association*	

21.7 GasInMud

Type: Class *Stereotype:* «XSDcomplexType»
Detail: *Created:* 3/1/2016 *Last modified:* 11/7/2016
Notes: Information on amount of gas in the mud.

Attributes

Name	Type	Notes
Average	VolumePerVolumeMeasure	Average percentage of gas in the mud.
Maximum	VolumePerVolumeMeasure	Maximum percentage of gas in the mud.

Associations

Association		Notes
1	**From:** GasInMud.Channel **To:** Channel *Association*	
0..1	**From:** MudGas.GasInMud **To:** GasInMud *Association*	

21.8 GasPeak

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 3/1/2016   *Last modified:* 11/7/2016
Notes: Readings at maximum gas production.

Attributes

Name	Type	Notes
AverageGas	VolumePerVolumeMeasure	Average total gas.
BackgroundGas	VolumePerVolumeMeasure	Background gas reading.
MdPeak	LengthMeasure	Measured depth at which the gas reading was taken.
PeakGas	VolumePerVolumeMeasure	Peak gas reading.
PeakType	GasPeakType	Type of gas peak

Associations

Association		Notes
1	**From:** GasPeak.Channel **To:** Channel *Association*	
0..*	**From:** MudGas.GasPeak **To:** GasPeak *Association*	

21.9 MudDensityStatistics

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 8/1/2016   *Last modified:* 11/7/2016
Notes: Mud density readings at average or channel.

Attributes

Name	Type	Notes
Average	MassPerVolumeMeasure	Average mud density through the interval.
Channel	Channel	Log channel from which the mud density statistics were calculated.

21.10 MudGas

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 3/1/2016   *Last modified:* 11/7/2016
Notes: Information on gas in the mud and gas peak.

Associations

Association		Notes
0..1	**From:** MudGas.GasInMud **To:** GasInMud *Association*	
0..*	**From:** MudGas.GasPeak **To:** GasPeak *Association*	
0..*	**From:** MudlogReportInterval.MudGas **To:** MudGas *Association*	

21.11 MudLogConcentrationParameter

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 9/29/2016   *Last modified:* 10/25/2016
Notes:

Attributes

Name	Type	Notes
Value	VolumePerVolumeMeasureExt	

Associations

Association	Notes
From: MudLogConcentrationParameter. **To:** MudLogParameter *Generalization*	
From: MudLogConcentrationParameter. **To:** ConcentrationParameterKind *Association*	

21.12 MudLogForceParameter

Type: Class *Stereotype:* «XSDcomplexType»
Detail: *Created:* 9/29/2016 *Last modified:* 10/25/2016
Notes:

Attributes

Name	Type	Notes
Value	ForceMeasureExt	

Associations

Association	Notes
From: MudLogForceParameter. **To:** MudLogParameter *Generalization*	
From: MudLogForceParameter. **To:** ForceParameterKind *Association*	

21.13 MudLogParameter

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: Created: 3/17/2016   *Last modified:* 11/7/2016
Notes: Information around the mud log: type, time taken, top and bottom depth, pressure gradient, etc.

Attributes

Name	Type	Notes
Citation	Citation	An ISO 19115 EIP-derived set of metadata attached to ensure the traceability of the MudLogParameter.
Comments	String2000	Description or secondary qualifier pertaining to MudlogParameter or to Value attribute.
MdInterval	MdInterval	Measured depth interval that is the focus of this parameter.
uid	String64	Unique identifier for this instance of MudLogParameter.

Associations

Association		Notes
	From: MudLogConcentrationParameter. **To:** MudLogParameter *Generalization*	
	From: MudLogForceParameter. **To:** MudLogParameter *Generalization*	
0..*	**From:** MudLogReport.Parameter **To:** MudLogParameter *Association*	
	From: MudLogPressureParameter. **To:** MudLogParameter *Generalization*	
	From: MudLogStringParameter. **To:** MudLogParameter *Generalization*	
	From: MudLogPressureGradientParameter. **To:** MudLogParameter *Generalization*	

21.14 MudLogPressureGradientParameter

Type: Class *Stereotype:* «XSDcomplexType»
Detail: *Created:* 9/29/2016 *Last modified:* 11/8/2016
Notes: Describes the kind and value of mud log parameters that are expressed in units of pressure gradient.

Attributes

Name	Type	Notes
Value	ForcePerVolumeMeasure Ext	The value of the parameter in pressure gradient units.

Associations

Association	Notes
From: MudLogPressureGradientParameter. **To:** PressureGradientParameterKind *Association*	
From: MudLogPressureGradientParameter. **To:** MudLogParameter *Generalization*	

21.15 MudLogPressureParameter

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 9/29/2016   *Last modified:* 11/8/2016
Notes: Describes the kind and value of mud log parameters that are expressed in units of pressure.

Attributes

Name	Type	Notes
Value	PressureMeasureExt	The value of the parameter in pressure units.

Associations

Association	Notes
From: MudLogPressureParameter. **To:** PressureParameterKind *Association*	
From: MudLogPressureParameter. **To:** MudLogParameter *Generalization*	

21.16 MudLogReport

Type: Class *Stereotype:* «XSDcomplexType»
Detail: Created: 2/29/2016 *Last modified:* 11/7/2016
Notes: Details of wellbore geology intervals, drilling parameters, chromatograph, mud gas, etc., data within an MD interval.

Attributes

Name	Type	Notes
GrowingStatus	ChannelStatus	The growing state of the mudlog,. Valid Values: active, inactive or closed.
MudLogCompany	String64	Name of the company recording the information.
MudLogEngineers	String2000	Concatenated names of the mudloggers constructing the log.
MudLogGeologists	String2000	Concatenated names of the geologists constructing the log.
ReportMdInterval	MdInterval	[maintained by the server] The interval between the minimum and maximum measured depths contained in this MudLog report.

Associations

Association		Notes
0..*	**From:** MudLogReport.Parameter **To:** MudLogParameter *Association*	
	From: MudLogReport. **To:** AbstractObject *Generalization*	
0..*	**From:** MudLogReport.RelatedLogs **To:** Log *Association*	
0..1	**From:** MudLogReport.WellboreGeology **To:** WellboreGeology *Association*	Reference to the related WellboreGeology. BUSINESS RULE: The WellboreGeology must be within the same wellbore as the MudLogReport Interval.
0..*	**From:** MudLogReport.MudlogIntervals **To:** MudlogReportInterval *Association*	
1	**From:** MudLogReport.Wellbore **To:** Wellbore *Association*	

21.17 MudlogReportInterval

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 2/29/2016   *Last modified:* 11/7/2016
Notes: The interval at which the report on the mud log was taken, detailing cuttings, interpreted geology, and show evaluation.

Attributes

Name	Type	Notes
CuttingsGeologyInterval	CuttingsGeologyInterval	The cuttings geology interval that is part of this mud log report.
InterpretedGeologyInterval	InterpretedGeologyInterval	The interpreted geology interval that is part of this mud log report.
MdInterval	MdInterval	Measured depth interval.
ShowEvaluationInterval	ShowEvaluationInterval	The show evaluation interval that is part of this mud log report.
uid	String64	Unique identifier for this instance of MudLogReportInterval.

Associations

Association		Notes
0..1	**From:** MudlogReportInterval.Chromatograph **To:** Chromatograph *Association*	
0..*	**From:** MudlogReportInterval.DrillingParameters **To:** DrillingParameters *Association*	
0..*	**From:** MudlogReportInterval.MudGas **To:** MudGas *Association*	
	From: part_MudLogReportInterval. **To:** MudlogReportInterval *Generalization*	
0..*	**From:** MudLogReport.MudlogIntervals **To:** MudlogReportInterval *Association*	

21.18 MudLogStringParameter

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: Created: 9/29/2016   *Last modified:* 11/8/2016
Notes: Stores the values of parameters that are described by character strings.

Attributes

Name	Type	Notes
Value	String64	The value of the parameter as a character string.

Associations

Association	Notes
From: MudLogStringParameter. **To:** MudLogParameter *Generalization*	
From: MudLogStringParameter. **To:** MudLogStringParameterKind *Association*	

21.19 MudLogStringParameterKind

Type: Enumeration   *Stereotype:*
Detail: *Created:* 9/29/2016   *Last modified:* 11/8/2016
Notes: Specifies values for mud log parameters that are described by character strings.

Attributes

Name	Type	Notes
bit parameters		
bit type comment		
casing point comment		
chromatograph comment		
circulation system comment		
core interval comment		
drilling data comment		
gas peaks comment		
gas ratio comment		
general engineering comment		
lithlog comment		
LWD comment		
marker or formation top comment		
midnight depth date		
mud check comment		
mud data comment		
mudlog comment		
pressure data comment		
shale density comment		
short trip comment		
show report comment		
sidewall core comment		
sliding Interval		
steam still results comment		
survey comment		
temperature data comment		
temperature trend comment		
unknown		
wireline log comment		

Associations

Association	Notes

Association	Notes
From: MudLogStringParameter. **To:** MudLogStringParameterKind *Association*	

21.20 part_MudLogReportInterval

Type: Class *Stereotype:* «XSDtopLevelElement»
Detail: *Created:* 8/2/2016 *Last modified:* 11/7/2016
Notes: Wrapper for sending individual MudLogReportIntervals using ETP.

Associations

Association	Notes
From: part_MudLogReportInterval. **To:** MudlogReportInterval *Generalization*	

21.21 PressureGradientParameterKind

Type: Enumeration   *Stereotype:*
Detail: *Created:* 9/29/2016   *Last modified:* 11/8/2016
Notes: Specifies values for mud log parameters that are measured in units of pressure gradient.

Attributes

Name	Type	Notes
direct pore pressure gradient measurement		
fracture pressure gradient estimate		
kick pressure gradient		
lost returns		
overburden gradient		
pore pressure gradient estimate		

Associations

Association	Notes
From: MudLogPressureGradientParameter. **To:** PressureGradientParameterKind *Association*	

21.22 PressureParameterKind

Type: Enumeration *Stereotype:*
Detail: *Created:* 9/29/2016 *Last modified:* 11/8/2016
Notes: Specifies values for mud log parameters that are measured in units of pressure.

Attributes

Name	Type	Notes
direct fracture pressure measurement		
pore pressure estimate while drilling		

Associations

Association	Notes
From: MudLogPressureParameter. **To:** PressureParameterKind *Association*	

21.23 RopStatistics

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 2/29/2016   *Last modified:* 11/7/2016
Notes: Measurements on minimum, average and maximum rates of penetration (ROP) and the channel from which this data was calculated.

Attributes

Name	Type	Notes
Average	LengthPerTimeMeasure	Average rate of penetration through the interval.
Channel	Channel	Log channel from which the ROP statistics were calculated.
Maximum	LengthPerTimeMeasure	Maximum rate of penetration through the interval.
Minimum	LengthPerTimeMeasure	Minimum rate of penetration through the interval.

21.24 RpmStatistics

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 8/1/2016   *Last modified:* 11/7/2016
Notes: Measurement of the average turn rate and the channel from which the data was calculated.

Attributes

Name	Type	Notes
Average	AngularVelocityMeasure	Average bit turn rate through the interval.
Channel	Channel	Log channel from which the turn rate statistics were calculated.

21.25 TorqueCurrentStatistics

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 8/1/2016   *Last modified:* 11/7/2016
Notes: Measurement of the average electric current and the channel from which the data was calculated.

Attributes

Name	Type	Notes
Average	ElectricCurrentMeasure	Average electric current through the interval
Channel	Channel	Log channel from which the electric current statistics were calculated.

21.26 TorqueStatistics

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 8/1/2016   *Last modified:* 11/7/2016
Notes: Measurement of average torque and the channel from which the data was calculated.

Attributes

Name	Type	Notes
Average	MomentOfForceMeasure	Average torque through the interval.
Channel	Channel	Log channel from which the torque statistics were calculated.

21.27 WobStatistics

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 8/1/2016   *Last modified:* 11/7/2016
Notes: Measurement of average weight on bit and channel from which the data was calculated.

Attributes

Name	Type	Notes
Average	ForceMeasure	Average weight on bit through the interval.
Channel	Channel	Log channel from which the WOB statistics were calculated.

22 WellboreMarkers

Package: xsd_schemas
Notes: WellboreMarkers Schema. The WellboreMarkers object (which was Formation Marker in WITSML v1.4.1) is used to capture information about geologic formations that were encountered in a wellbore. This data is typically captured during drilling using logging while drilling (LWD) tools.

22.1 WellboreMarker

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: Created: 8/3/2015   Last modified: 11/8/2016
Notes: Used to capture information about a geologic formation that was encountered in a wellbore. This object is uniquely identified within the context of one wellbore object.

Attributes

Name	Type	Notes
ChronostratigraphicTop	GeochronologicalUnit	The name of a geochronology for this marker, with the "kind" attribute specifying the geochronological time span.
DipAngle	PlaneAngleMeasure	Angle of dip with respect to horizontal.
DipDirection	PlaneAngleMeasure	Interpreted downdip direction.
LithostratigraphicTop	LithostratigraphicUnit	Specifies the unit of lithostratigraphy.
Md	MeasuredDepthCoord	Logged measured depth at the top of marker.
Tvd	WellVerticalDepthCoord	Logged true vertical depth at top of marker.

Associations

Association		Notes
	From: WellboreMarker. **To:** AbstractObject *Generalization*	
0..1	**From:** WellboreMarker.Wellbore **To:** Wellbore *Association*	
0..1	**From:** WellboreMarker.Trajectory **To:** Trajectory *Association*	Reference to the directional survey used to convert the marker's MD to TVD. Even though the field is optional, it should be thought of as mandatory for any marker with a TVD (because one would have been used to make the conversion). Because this information is often lost or the survey is unavailable in the context of a data transfer the field is left as optional.
	From: WellboreMarker. **To:** LithostratigraphicUnit *Dependency*	

Association	Notes
From: WellboreMarker. **To:** GeochronologicalUnit *Dependency*	

0..*   **From:** WellboreMarkerSet.FormationMarker
        To: WellboreMarker
        Association	

22.2 WellboreMarkerSet

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 9/24/2015   *Last modified:* 11/8/2016
Notes: A collection of wellbore markers.

Attributes

Name	Type	Notes
MarkerSetInterval	MdInterval	Measured depth interval that contains the shallowest and deepest formation markers. This is computed by the server and is read only.

Associations

Association		Notes
0..1	**From:** WellboreMarkerSet.Wellbore **To:** Wellbore *Association*	
	From: WellboreMarkerSet. **To:** AbstractObject *Generalization*	
0..*	**From:** WellboreMarkerSet.FormationMarker **To:** WellboreMarker *Association*	

23 WellCompletion

Package: xsd_schemas
Notes: WellCompletion Schema. A top-level object that works with other objects to report flow paths from reservoir to surface.

23.1 CompletionStatus

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: *Created:* 5/4/2016   *Last modified:* 11/8/2016
Notes: Specifies the values of the status of a wellbore completion.

Attributes

Name	Type	Notes
active		
inactive		
permanently abandoned		
planned		
suspended		
temporarily abandoned		
testing		

Associations

Association	Notes
From: WellCompletion. **To:** CompletionStatus *Dependency*	
From: WellboreCompletion. **To:** CompletionStatus *Dependency*	
From: CompletionStatusHistory. **To:** CompletionStatus *Dependency*	

23.2 CompletionStatusHistory

Type: Class *Stereotype:* «XSDcomplexType»
Detail: *Created:* 11/6/2015 *Last modified:* 11/8/2016
Notes: Information on the collection of Completion StatusHistory.

Attributes

Name	Type	Notes
Comment	String2000	Comments or remarks on the status.
EndDate	TimeStamp	The end date of the status.
PerforationMdInterval	MdInterval	Measured depth interval between the top and the base of the perforations.
StartDate	TimeStamp	The start date of the status.
Status	CompletionStatus	Completion status.
uid	String64	Unique identifier for this instance of CompletionStatusHistory.

Associations

Association		Notes
	From: CompletionStatusHistory. **To:** CompletionStatus *Dependency*	
0..*	**From:** WellCompletion.StatusHistory **To:** CompletionStatusHistory *Association*	
0..*	**From:** WellboreCompletion.StatusHistory **To:** CompletionStatusHistory *Association*	

23.3 WellCompletion

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 11/6/2015   *Last modified:* 11/8/2016
Notes: Information regarding a wellhead stream with one or more wellbore completions (completed zones) in the well.

Attributes

Name	Type	Notes
CurrentStatus	CompletionStatus	Status (active, planned, suspended, testing, etc.) of the well completion.
E_P_RightsID	String64	Documents exploration and production rights.
EffectiveDate	TimeStamp	Field date.
ExpiredDate	TimeStamp	Expiration date.
FieldCode	String64	Field code.
FieldID	String64	Field ID.
FieldType	String64	Field type.
StatusDate	TimeStamp	Timestamp for when this status was established.

Associations

Association		Notes
1..1	**From:** WellCompletion.Well **To:** Well *Association*	
	From: WellCompletion. **To:** CompletionStatus *Dependency*	
	From: WellCompletion. **To:** AbstractObject *Generalization*	
0..*	**From:** WellCompletion.StatusHistory **To:** CompletionStatusHistory *Association*	
1	**From:** WellboreCompletion.WellCompletion **To:** WellCompletion *Association*	

24 WellboreCompletion

Package: xsd_schemas
Notes: WellboreCompletion Schema. Each individual wellbore completion data object represents a completion (i.e., open to flow) interval along a wellbore. Meaning "this section of wellbore is open to flow".

24.1 ContactIntervalSet

Type: Class *Stereotype:* «XSDcomplexType»
Detail: *Created:* 11/6/2015 *Last modified:* 11/8/2016
Notes: Information on a collection of contact intervals. Contains one or more "xxxInterval" objects, each representing the details of a single physical connection between well and reservoir, e.g., the perforation details, depth, reservoir connected. Meaning: this is the physical nature of a connection from reservoir to wellbore.

Associations

Association	Notes
0..*	**From:** ContactIntervalSet.OpenHoleInterval **To:** OpenHoleInterval *Association*	cs_openHole interval
0..*	**From:** ContactIntervalSet.PerforationSetInterval **To:** PerforationSetInterval *Association*	perforation interval
0..*	**From:** ContactIntervalSet.GravelPackInterval **To:** GravelPackInterval *Association*	gravelPack interval
0..*	**From:** ContactIntervalSet.SlotsInterval **To:** SlotsInterval *Association*	cs_slots interval
0..1	**From:** WellboreCompletion.ContactIntervalSet **To:** ContactIntervalSet *Association*	A collection of contact interval information

24.2 GravelPackInterval

Type: Class *Stereotype:* «XSDcomplexType»
Detail: *Created:* 11/6/2015 *Last modified:* 11/8/2016
Notes: The location/interval of the gravel pack, including its history.

Attributes

Name	Type	Notes
DownholeStringReferenceId	String64	Reference to the downhole string that denotes the interval of the gravel pack.
EventHistory	EventInfo	The contactInterval event information.
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
GeologyFeatureReferenceId	String64	Reference to a geology feature.
GravelPackMdInterval	MdInterval	Gravel packed measured depth interval for this completion.
GravelPackTvdInterval	TvdInterval	Gravel packed true vertical depth interval for this completion.
uid	String64	Unique identifier for this instance of GravelPackInterval.

Associations

Association		Notes
0..*	**From:** GravelPackInterval.StatusHistory **To:** IntervalStatusHistory *Association*	The contactInterval history information
0..*	**From:** ContactIntervalSet.GravelPackInterval **To:** GravelPackInterval *Association*	gravelPack interval

24.3 IntervalStatusHistory

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 11/6/2015   *Last modified:* 11/8/2016
Notes: Information on the status history in the interval.

Attributes

Name	Type	Notes
AllocationFactor	NonNegativeFraction	Defines the proportional amount of fluid from the well completion that is flowing through this interval within a wellbore.
Comment	String2000	Comments and remarks about the interval over this period of time.
EndDate	TimeStamp	The end date of status and allocation factor.
PhysicalStatus	PhysicalStatus	The physical status of an interval (e.g., open, closed, proposed).
StartDate	TimeStamp	The start date of the status and allocation factor.
StatusMdInterval	MdInterval	Measured depth interval over which this status is valid for the given time frame.
uid	String64	Unique identifier for this instance of IntervalStatusHistory.

Associations

Association		Notes
	From: IntervalStatusHistory. **To:** PhysicalStatus *Dependency*	
0..*	**From:** SlotsInterval.StatusHistory **To:** IntervalStatusHistory *Association*	The contactInterval history information
0..*	**From:** OpenHoleInterval.StatusHistory **To:** IntervalStatusHistory *Association*	The contactInterval history information
0..*	**From:** GravelPackInterval.StatusHistory **To:** IntervalStatusHistory *Association*	The contactInterval history information

24.4 NonNegativeFraction

Type: Class   *Stereotype:* «XSDsimpleType»
Detail: *Created:* 11/6/2015   *Last modified:* 11/8/2016
Notes: A floating point value between zero (inclusive) and one (inclusive).

24.5 OpenHoleInterval

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 11/6/2015   *Last modified:* 11/8/2016
Notes: The location/interval of the open hole and its history.

Attributes

Name	Type	Notes
BoreholeStringReferenceId	String64	Reference to a borehole (the as-drilled hole through the earth).
EventHistory	EventInfo	The OpenHoleInterval event information.
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
GeologyFeatureReferenceId	String64	Reference to a geology feature.
OpenHoleMdInterval	MdInterval	Openhole measured depth interval for this completion.
OpenHoleTvdInterval	TvdInterval	Openhole true vertical depth interval for this completion.
uid	String64	Unique identifier for this instance of OpenHoleInterval.

Associations

Association		Notes
0..*	**From:** OpenHoleInterval.StatusHistory **To:** IntervalStatusHistory *Association*	The contactInterval history information
0..*	**From:** ContactIntervalSet.OpenHoleInterval **To:** OpenHoleInterval *Association*	cs_openHole interval

24.6 PerforationSetInterval

Type: Class *Stereotype:* «XSDcomplexType»
Detail: *Created:* 11/6/2015 *Last modified:* 11/8/2016
Notes: The location/interval of the perforation set and its history.

Attributes

Name	Type	Notes
EventHistory	EventInfo	The PerforationSetInterval event information.
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
GeologyFeatureReferenceId	String64	Reference to a geology feature.
PerforationSetMdInterval	MdInterval	Overall measured depth interval for this perforation set.
PerforationSetReferenceId	String64	Reference to a perforation set.
PerforationSetTvdInterval	TvdInterval	Overall true vertical depth interval for this perforation set.
uid	String64	Unique identifier for this instance of PerforationSetInterval.

Associations

Association		Notes
0..*	**From:** PerforationSetInterval.PerforationStatusHistory **To:** PerforationStatusHistory *Association*	The contactInterval history information
0..*	**From:** ContactIntervalSet.PerforationSetInterval **To:** PerforationSetInterval *Association*	perforation interval

24.7 PerforationStatus

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: *Created:* 5/4/2016   *Last modified:* 11/8/2016
Notes: Specifies the set of values for the status of a perforation.

Attributes

Name	Type	Notes
open		
proposed		
squeezed		

Associations

Association	Notes
From: PerforationStatusHistory. **To:** PerforationStatus *Dependency*	

24.8 PerforationStatusHistory

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 11/6/2015   *Last modified:* 11/8/2016
Notes: Information on the collection of perforation status history.

Attributes

Name	Type	Notes
AllocationFactor	NonNegativeFraction	Defines the proportional amount of fluid from the well completion that is flowing through this interval within a wellbore.
Comment	String2000	Remarks and comments about the status.
EndDate	TimeStamp	The end date of the status.
PerforationMdInterval	MdInterval	Overall measured depth interval for this perforated interval.
PerforationStatus	PerforationStatus	Perforation status.
PerforationTvdInterval	TvdInterval	Overall true vertical depth interval for this perforated interval.
StartDate	TimeStamp	The start date of the status.
uid	String64	Unique identifier for this instance of PerforationStatusHistory.

Associations

Association		Notes
	From: PerforationStatusHistory. **To:** PerforationStatus *Dependency*	
0..*	**From:** PerforationSetInterval.PerforationStatusHistory **To:** PerforationStatusHistory *Association*	The contactInterval history information

24.9 PhysicalStatus

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: *Created:* 5/4/2016   *Last modified:* 11/8/2016
Notes: Specifies the values for the physical status of an interval.

Attributes

Name	Type	Notes
closed		
open		
proposed		

Associations

Association	Notes
From: IntervalStatusHistory. **To:** PhysicalStatus *Dependency*	

24.10 SlotsInterval

Type: Class *Stereotype:* «XSDcomplexType»
Detail: *Created:* 11/6/2015 *Last modified:* 11/8/2016
Notes: The location/interval of the slots and the history.

Attributes

Name	Type	Notes
EventHistory	EventInfo	The SlotsInterval event information.
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
GeologyFeatureRefID	String64	Reference to a geology feature.
SlottedMdInterval	MdInterval	Slotted measured depth interval for this completion.
SlottedTvdInterval	TvdInterval	Slotted true vertical depth interval for this completion.
StringEquipmentReferenceId	String64	Reference to an equipment string, which is the equipment (e.g., tubing, gravel pack screens, etc.) that compose the completion.
uid	String64	Unique identifier for this instance of SlotsInterval.

Associations

Association		Notes
0..*	**From:** SlotsInterval.StatusHistory **To:** IntervalStatusHistory *Association*	The contactInterval history information
0..*	**From:** ContactIntervalSet.SlotsInterval **To:** SlotsInterval *Association*	cs_slots interval

24.11 WellboreCompletion

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 11/6/2015   *Last modified:* 11/8/2016
Notes: The transferrable class of the WellboreCompletion object. Each individual wellbore completion data object represents a completion (i.e., open to flow) interval along a wellbore. Meaning "this section of wellbore is open to flow".

Attributes

Name	Type	Notes
CompletionMdInterval	MdInterval	Overall measured depth interval for this wellbore completion.
CompletionTvdInterval	TvdInterval	Overall true vertical depth interval for this wellbore completion.
CurrentStatus	CompletionStatus	Status (active, planned, suspended, testing, etc.) of the wellbore completion
EventHistory	EventInfo	The WellboreCompletion event information.
NameWellCompletion	String64	Human-recognizable context for the well completion that contains the completion.
StatusDate	TimeStamp	Date for when the status was established.
SuffixAPI	String64	API suffix.
WellboreCompletionAlias	String64	Preferred alias name.
WellboreCompletionDate	TimeStamp	Completion date.
WellboreCompletionNo	String64	CompletionNo, etc. API14.

Associations

Association		Notes
0..1	**From:** WellboreCompletion.ContactIntervalSet **To:** ContactIntervalSet *Association*	A collection of contact interval information
1..1	**From:** WellboreCompletion.ReferenceWellbore **To:** Wellbore *Association*	
	From: WellboreCompletion. **To:** AbstractObject *Generalization*	
	From: WellboreCompletion. **To:** CompletionStatus *Dependency*	
1	**From:** WellboreCompletion.WellCompletion **To:** WellCompletion *Association*	
0..*	**From:** WellboreCompletion.StatusHistory **To:** CompletionStatusHistory *Association*	

25 DownholeComponent

Package: xsd_schemas
Notes: DownholeComponent Schema. Captures all information about the physical completion, all of the well equipment data.

25.1 AbstractConnectionType

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 5/3/2016   *Last modified:* 11/8/2016
Notes: The choice of connection type.

Associations

Association		Notes
	From: CasingConnectionType. **To:** AbstractConnectionType *Generalization*	
	From: TubingConnectionType. **To:** AbstractConnectionType *Generalization*	
	From: RodConnectionType. **To:** AbstractConnectionType *Generalization*	
0..1	**From:** EquipmentConnection.ConnectionType **To:** AbstractConnectionType *Association*	
	From: OtherConnectionType. **To:** AbstractConnectionType *Generalization*	

25.2 AbstractUidString

Type: Class *Stereotype:* «XSDsimpleType»
Detail: *Created:* 11/6/2015 *Last modified:* 10/25/2016
Notes:

Associations

Association	Notes
From: AbstractUidString. **To:** String64 *Generalization*	

25.3 Assembly

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 11/6/2015   *Last modified:* 11/8/2016
Notes: Container element for assemblies, or a collection of all assembly information.

Associations

Association		Notes
0..*	**From:** Assembly.Part **To:** StringEquipment *Association*	
0..1	**From:** StringEquipment.Assembly **To:** Assembly *Association*	Describes the assembly connected.

25.4 Borehole

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 11/6/2015   *Last modified:* 11/8/2016
Notes: Information on the borehole.

Attributes

Name	Type	Notes
BoreholeDiameter	LengthMeasure	Borehole diameter.
DescriptionPermanent	String2000	The description of this equipment to be permanently kept.
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
MdInterval	MdInterval	Measured depth interval for the borehole.
Name	String64	The name of the borehole.
TvdInterval	TvdInterval	True vertical depth interval for the borehole.
TypeBorehole	BoreholeType	Type of borehole. etc. cavern, cavity, normal borehole, under ream, etc.
uid	String64	Unique identifier for this instance of Borehole.

Associations

Association		Notes
	From: Borehole. **To:** BoreholeType *Dependency*	
0..1	**From:** Borehole.EquipmentEventHistory **To:** EventInfo *Association*	Event reference pointing to the eventledger.
0..*	**From:** BoreholeString.Borehole **To:** Borehole *Association*	The collection of boreholes

25.5 BoreholeString

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 11/6/2015   *Last modified:* 11/8/2016
Notes: A section of a borehole. Used to define the drilled hole that corresponds to the wellbore. A collection of contiguous and non-overlapping borehole sections is allowed. Each section has depth range, diameter, and kind.

Attributes

Name	Type	Notes
Name	String64	The name of the borehole string.
uid	String64	Unique identifier for this instance of BoreholeString.

Associations

Association		Notes
0..1	**From:** BoreholeString.Accessories **To:** StringAccessory *Association*	The borehole accessories.
0..*	**From:** BoreholeString.GeologyFeature **To:** GeologyFeature *Association*	Geology feature information
0..*	**From:** BoreholeString.Borehole **To:** Borehole *Association*	The collection of boreholes
1..1	**From:** BoreholeString.ReferenceWellbore **To:** Wellbore *Association*	
1..*	**From:** BoreholeStringSet.BoreholeString **To:** BoreholeString *Association*	Borehole string

25.6 BoreholeStringSet

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 11/6/2015   *Last modified:* 11/8/2016
Notes: Borehole string container element, or a collection of all borehole strings.

Associations

Association		Notes
1..*	**From:** BoreholeStringSet.BoreholeString **To:** BoreholeString *Association*	Borehole string
0..1	**From:** DownholeComponent.BoreholeStringSet **To:** BoreholeStringSet *Association*	This section contains bore hole string information including flow interval

25.7 BoreholeType

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: *Created:* 5/3/2016   *Last modified:* 11/8/2016
Notes: Specifies the values for the type of borehole.

Attributes

Name	Type	Notes
cavern		
cavity		
normalborehole		
underream		

Associations

Association	Notes
From: Borehole. **To:** BoreholeType *Dependency*	

25.8 CasingConnectionType

Type: Class *Stereotype:* «XSDcomplexType»
Detail: *Created:* 5/3/2016 *Last modified:* 11/8/2016
Notes: Container element for casing connections or collection of all casing connections information.

Attributes

Name	Type	Notes
CasingConnectionType	CasingConnectionTypes	Connection of type casing.

Associations

Association	Notes
From: CasingConnectionType. **To:** AbstractConnectionType *Generalization*	
From: CasingConnectionType. **To:** CasingConnectionTypes *Dependency*	

25.9 CasingConnectionTypes

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: *Created:* 5/3/2016   *Last modified:* 11/8/2016
Notes: Specifies the values for connection type of casing.

Attributes

Name	Type	Notes
landed		
self-sealing-threaded		
welded		

Associations

Association	Notes
From: CasingConnectionType. **To:** CasingConnectionTypes *Dependency*	

25.10 Coating

Type: Enumeration *Stereotype:* «Enumeration»
Detail: *Created:* 5/3/2016 *Last modified:* 11/8/2016
Notes: Specifies the values for the type of inside or outside coating of this piece of equipment.

Attributes

Name	Type	Notes
bare		
carbonnitrided		
carburized		
carburized-hardened		
cementlined		
chrome		
chrome-plated		
chromeplated-grooved		
chromeplated-heavy		
corrosion coating		
dblgalv		
duolin20wr		
duoline		
duoline10		
duoline20		
epdm		
fiberglass-lined		
galvanized		
hardened		
hard-lined		
ins		
ipc		
ipc-epoxy		
ipc-epxthk		
ipc-epxthn		
ipc-nylon		
ipc-rwrap		
ipc-s505		
ipc-s650		
ipc-tk70		
ipc-tk75		
lp		

Name	Type	Notes
moly		
mtr		
n/a		
nickel-carbide		
nickel-plated		
nitrided		
nitrile		
pap		
pelined		
phosphate		
phosphorus		
plastic		
plunger-lubricant		
polished-rodliner		
polypropylene		
ppw/nitrl		
pvclined		
rodguide-1		
rodguide-2		
rodguide-2.		
rodguide-3		
rodguide-4		
rodguide-5		
rodguide-6		
rodguide-7		
rodguide-fx		
rodguide-so		
rodguide-so1		
rodguide-so2		
rodguide-so3		
rodguide-so4		
rodguide-so5		
rodguide-so6		
rodguide-so8		
rodguide-sp		
spray-metal		
spray-metal-monel		
spraymetal-monel		

Name	Type	Notes
spraymetal-nickel		
spraymetal-od/nickelplated-id		
spraymetal-steel		
spraymetal-thick		
sslined		
teflon		
teflon-red		
teflon-tan		
teflon-yellow		
thermo		
tk-4		
tk-99		
tuffr		
tungsten plated		
zincplated		

25.11 ConnectionFormType

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: *Created:* 5/3/2016   *Last modified:* 11/8/2016
Notes: Specifies the values for the type of equipment-to-equipment connection.

Attributes

Name	Type	Notes
box		
flange		
mandrel		
pin		
welded		

Associations

Association	Notes
From: EquipmentConnection. **To:** ConnectionFormType *Dependency*	

25.12 DownholeComponent

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 11/6/2015   *Last modified:* 11/8/2016
Notes: General downhole equipment information.

Attributes

Name	Type	Notes
EndDate	TimeStamp	The date the equipment was removed.
StartDate	TimeStamp	The date this equipment was installed.

Associations

Association		Notes
1..1	**From:** DownholeComponent.Well **To:** Well *Association*	
0..1	**From:** DownholeComponent.WellHead **To:** DownholeString *Association*	This section contains wellhead information, and is composed of string equipment
	From: DownholeComponent. **To:** AbstractObject *Generalization*	
0..1	**From:** DownholeComponent.BoreholeStringSet **To:** BoreholeStringSet *Association*	This section contains bore hole string information including flow interval
0..1	**From:** DownholeComponent.DownholeStringSet **To:** DownholeStringSet *Association*	The linear downhole string equipment
0..1	**From:** DownholeComponent.PerforationSets **To:** PerforationSets *Association*	A collection of contact interval information
0..1	**From:** DownholeComponent.EquipmentSet **To:** EquipmentSet *Association*	A collection of equipment / component

25.13 DownholeString

Type: Class *Stereotype:* «XSDcomplexType»
Detail: *Created:* 11/6/2015 *Last modified:* 11/8/2016
Notes: A section of the downhole component equipment. Strings in the completion including casing, tubing, and rod strings .A completion may have multiple sets of strings, which may be nested each inside another, or run in parallel as in dual string completions; all strings are contained in a parent wellbore. Each string is composed of equipment, and may also contain accessories and/or assemblies.

Attributes

Name	Type	Notes
AxisOffset	LengthMeasure	The distance from a sibling string.
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
Name	String64	The name of the downhole string.
ParentStringsName	String64	The name of parent string.
StringInstallDate	TimeStamp	The install date of the downhole string.
StringMdInterval	MdInterval	Measured depth interval between the top and the base of the downhole string.
StringType	DownholeStringType	The type of string defined in the enumeration DownholeStringType.
SubStringType	SubStringType	The type of substring which can be SurfaceCasing, IntermediaCasing or ProductionCasing.
uid	String64	Unique identifier for this instance of DownholeString.

Associations

Association		Notes
0..1	**From:** DownholeString.StringEquipmentSet **To:** StringEquipmentSet *Association*	the list of equipment in the string. each equipment is liner connected and carry the rest of weight
1..1	**From:** DownholeString.ReferenceWellbore **To:** Wellbore *Association*	
	From: DownholeString. **To:** SubStringType *Dependency*	
0..1	**From:** DownholeString.ExtensionAny **To:** CustomData *Association*	Extensions to the schema using an xsd:any construct.
0..1	**From:** DownholeString.ParentString **To:** DownholeString *Association*	
	From: DownholeString. **To:** DownholeStringType *Dependency*	
0..1	**From:** DownholeString.Accessories **To:** StringAccessory	the accessories equipment of the string. It locates in the downhole string, but it is not

Association		Notes
	Association	equipment which liner connected in string (from top to down), and it is not carraying the weight of string
0..1	**From:** DownholeComponent.WellHead **To:** DownholeString *Association*	This section contains wellhead information, and is composed of string equipment
1..*	**From:** DownholeStringSet.DownholeString **To:** DownholeString *Association*	Information about a single downhole string.
0..1	**From:** DownholeString.ParentString **To:** DownholeString *Association*	

25.14 DownholeStringSet

Type: Class *Stereotype:* «XSDcomplexType»
Detail: *Created:* 11/6/2015 *Last modified:* 10/25/2016
Notes: Information on a collection of downhole strings

Associations

Association		Notes
1..*	**From:** DownholeStringSet.DownholeString **To:** DownholeString *Association*	Information about a single downhole string.
0..1	**From:** DownholeComponent.DownholeStringSet **To:** DownholeStringSet *Association*	The linear downhole string equipment

25.15 DownholeStringType

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: Created: 5/4/2016   *Last modified:* 11/8/2016
Notes: Specifies the values for the type of downhole strings.

Attributes

Name	Type	Notes
casing		
others		
rod		
tubing		
wellhead		

Associations

Association	Notes
From: DownholeString. **To:** DownholeStringType *Dependency*	

25.16 Equipment

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 11/6/2015   *Last modified:* 11/8/2016
Notes: Information on a piece of equipment. Each kind of equipment in the set has a type (what it is) and attributes common across all instances of that type of equipment. The String Equipment then references these common attributes.

Attributes

Name	Type	Notes
BrandName	String64	The equipment's brand name.
CatalogId	String64	Catalog where equipment can be found.
CatalogName	String64	Name of equipment as found in the catalog.
CoatingLinerApplied	boolean	Flag indicating whether equipment has a coating.
Description	String2000	The description of this equipment.
DescriptionPermanent	String2000	The description of this equipment to be permanently kept.
Drift	LengthMeasure	The drift diameter is the minimum inside diameter of pipe through which another tool or string can be pulled.
EquipmentName	String64	The name of the piece of equipment.
EquipmentType	EquipmentTypeExt	The equipment type etc. bridge plug, bull plug. capillary tubing.
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
Grade	GradeType	Grade level of this piece of material.
Id	LengthMeasure	The inside diameter of this equipment.
InsideCoating	Coating	Equipment's inner coating based on enumeration value.
IsSerialized	boolean	A flag that indicates the equipment has a serial number.
MajorId	LengthMeasure	The major inside diameter of this equipment.
MajorOd	LengthMeasure	The major outside diameter of this equipment.
Manufacturer	String64	Manufacturer of this equipment.
Material	String64	Material that the equipment is made from.
MaxId	LengthMeasure	The maximum inside diameter of this equipment.
MaxOd	LengthMeasure	The maximum outside diameter of this equipment.
MinId	LengthMeasure	The minimum inside diameter of this equipment.
MinOd	LengthMeasure	The minimum outside diameter of this equipment.
MinorId	LengthMeasure	The minor inside diameter of this equipment.
MinorOd	LengthMeasure	The minor outside diameter of this equipment.
Model	String64	The model of the equipment.
ModelType	String64	The equipment's model type.
NameService	String64	Sweet or sour service.

Name	Type	Notes
NominalSize	LengthMeasure	The nominal size of this equipment.
Od	LengthMeasure	The outside diameter of this equipment.
OutsideCoating	Coating	Equipment's outside coating based on enumeration value.
PartNo	String64	Number that identifies this part.
Remark	String2000	Remarks about this equipment property.
SerialNumber	String64	Serial number.
Series	String64	Series number.
SurfaceCondition	String64	Surface condition.
uid	String64	Unique identifier for this instance of Equipment.
UnitLength	LengthMeasure	The length of this equipment.
UnitWeight	MassPerLengthMeasure	The weight per length of this equipment.

Associations

Association		Notes
0..*	**From:** Equipment.HoleAsManufactured **To:** PerfHole *Association*	Describes the hole in equipment.
0..1	**From:** Equipment.ExtensionAny **To:** CustomData *Association*	Extensions to the schema using an xsd:any construct.
0..*	**From:** Equipment.Property **To:** ExtPropNameValue *Association*	Property description
0..*	**From:** Equipment.SlotAsManufactured **To:** PerfSlot *Association*	Describes the slot in equipment.
1..*	**From:** EquipmentSet.Equipment **To:** Equipment *Association*	

25.17 EquipmentConnection

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 11/6/2015   *Last modified:* 11/8/2016
Notes: Information detailing the connection between two components.

Attributes

Name	Type	Notes
ConnectionForm	ConnectionFormType	The form of connection: box or pin.
ConnectionUpset	String64	Connection upset.
RadialOffset	LengthMeasure	Measurement of radial offset.
stringEquipmentReferenceUid	String64	Reference to the string equipment.

Associations

Association	Notes
From: EquipmentConnection. **To:** Connection *Generalization*	
0..1 **From:** EquipmentConnection.ConnectionType **To:** AbstractConnectionType *Association*	
From: EquipmentConnection. **To:** ConnectionFormType *Dependency*	
0..* **From:** StringEquipment.ConnectionNext **To:** EquipmentConnection *Association*	Describes the next component connected.

25.18 EquipmentSet

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 11/6/2015   *Last modified:* 11/8/2016
Notes: Information on the collection of equipment.

Associations

Association	Notes
1..*	**From:** EquipmentSet.Equipment **To:** Equipment *Association*	
0..1	**From:** DownholeComponent.EquipmentSet **To:** EquipmentSet *Association*	A collection of equipment / component

25.19 EquipmentType

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: Created: 5/3/2016   *Last modified:* 11/8/2016
Notes: Specifies the values for type of equipment.

Attributes

Name	Type	Notes
bridge plug		
bull plug		
capillary tubing		
casing crossover		
casing hanger		
casing head		
casing liner-expandable		
casing shoe		
casing spool		
casing/casing liner		
cement (behind casing)		
cement basket		
cement retainer		
cement squeeze		
cement stage tool		
chemical injection mandrel		
chemical injection valve		
corrosion coupon carrier		
dip tube		
downhole choke		
downhole sensor		
ESP assembly		
ESP bolt on discharge		
ESP bolt on intake		
ESP bolt on motor base		
ESP bolt on motor head		
ESP cable		
ESP gas handler		
ESP gas separator		
ESP lower pigtail		
ESP motor		
ESP motor base centralizer		

Name	Type	Notes
ESP motor flat cable		
ESP motor shroud		
ESP promotor		
ESP pump		
ESP pump discharge sensor sub		
ESP seal		
expansion joint		
external cementing port		
fill		
fish		
float collar		
float shoe/guide shoe		
gas anchor		
gas lift mandrel		
gas lift valve		
gravel pack screen		
hydraulic pump		
injection mandrel		
injection valve		
junk in wellbore		
landing collar		
liner entry guide		
liner hanger		
mule shoe		
notched collar		
on-off tool		
overshot		
packer		
packer plug		
packer-multiple strings		
packoff (tubing)		
pcp-flex shaft intake		
pcp-gear reducer (subsurface)		
pcp-no turn tool/torque anchor		
pcp-rotor		
pcp-stator		
pcp-tag bar		
plug - cement		

Name	Type	Notes
plug - mud		
plunger lift ball		
plunger lift bottom hole bumper assembly		
plunger lift bumper spring		
plunger lift collar stop		
plunger lift plunger		
polished rod		
polished rod liner		
ported collar		
profile nipple		
profile nipple plug		
pump-out plug		
sand screen-tubing		
sand separator		
screen liner/insert		
seal assembly		
seal bore extension		
seat nipple/shoe		
shear tool		
sliding sleeve		
steam cup mandrel		
steam deflectors		
strainer nipple		
subsurface safety valve		
sucker rod		
sucker rod backoff coupling		
sucker rod pump-insert		
sucker rod pump-jacket		
sucker rod pump-tubing pump barrel		
sucker rod pump-tubing pump plunger		
sucker rod sub		
sucker rod-continuous		
sucker rod-ribbon		
sucker rod-sinker bar		
tcp gun		
tubing		
tubing (coiled)		

Name	Type	Notes
tubing anchor/catcher		
tubing crossover		
tubing drain		
tubing hanger		
tubing head (spool)		
tubing purge check valve		
tubing sub		
wellbore notes		
whipstock		
wireline re-entry guide (bell collar)		
y-tool		

Associations

Association	Notes
From: EquipmentTypeExt. **To:** EquipmentType *Generalization*	

25.20 EquipmentTypeExt

Type: Class   *Stereotype:* «XSDunion»
Detail: *Created:* 2/8/2016   *Last modified:* 11/8/2016
Notes: An extension of possible equipment types.

Associations

Association	Notes
From: EquipmentTypeExt. **To:** EnumExtensionPattern *Generalization*	
From: EquipmentTypeExt. **To:** EquipmentType *Generalization*	

25.21 EventInfo

Type: Class *Stereotype:* «XSDcomplexType»
Detail: *Created:* 11/6/2015 *Last modified:* 11/8/2016
Notes: Event information type.

Attributes

Name	Type	Notes
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.

Associations

Association		Notes
0..1	**From:** EventInfo.EndEvent **To:** EventRefInfo *Association*	The referencing event when the even was end
0..1	**From:** EventInfo.BeginEvent **To:** EventRefInfo *Association*	The referencing event was initailized
0..1	**From:** Borehole.EquipmentEventHistory **To:** EventInfo *Association*	Event reference pointing to the eventledger.
0..1	**From:** PerforationSet.EventHistory **To:** EventInfo *Association*	

25.22 EventRefInfo

Type: Class *Stereotype:* «XSDcomplexType»
Detail: *Created:* 11/6/2015 *Last modified:* 11/8/2016
Notes: Event reference information.

Attributes

Name	Type	Notes
EventDate	TimeStamp	Install/pull date.
EventReferenceId	String64	The referencing eventledger ID.

Associations

Association		Notes
0..1	**From:** EventInfo.EndEvent **To:** EventRefInfo *Association*	The referencing event when the even was end
0..1	**From:** EventInfo.BeginEvent **To:** EventRefInfo *Association*	The referencing event was initailized

25.23 ExtPropNameValue

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 11/6/2015   *Last modified:* 11/8/2016
Notes: Name-value extensions for the equipment property.

Attributes

Name	Type	Notes
Name	String64	A string representing the name of property.
uid	String64	Unique identifier for this instance of ExtPropNameValue.
Value	String2000	A value string representing the units of measure of the value.

Associations

Association		Notes
0..*	**From:** Equipment.Property **To:** ExtPropNameValue *Association*	Property description

25.24 GeologyFeature

Type: Class *Stereotype:* «XSDcomplexType»
Detail: *Created:* 11/6/2015 *Last modified:* 10/25/2016
Notes: Geology features found in the location of the borehole string.

Attributes

Name	Type	Notes
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
FeatureMdInterval	MdInterval	Measured depth interval for this feature.
FeatureTvdInterval	TvdInterval	True vertical depth interval for this feature.
GeologyType	GeologyType	Aquifer or reservoir.
Name	String64	Name of the feature.
uid	String64	Unique identifier for this instance of GeologyFeature.

Associations

Association		Notes
	From: GeologyFeature. **To:** GeologyType *Dependency*	
0..*	**From:** BoreholeString.GeologyFeature **To:** GeologyFeature *Association*	Geology feature information

25.25 GeologyType

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: *Created:* 5/4/2016   *Last modified:* 11/8/2016
Notes: Specifies the values for type of geology.

Attributes

Name	Type	Notes
aquifer		
reservoir		

Associations

Association	Notes
From: GeologyFeature. **To:** GeologyType *Dependency*	

25.26 GradeType

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: *Created:* 5/3/2016   *Last modified:* 11/8/2016
Notes: Specifies the values for the grade level of this piece of equipment.

Attributes

Name	Type	Notes
13CR		
13CR- 80		
13CR- 85		
13CR- 95		
13CR-110		
35		
45		
46		
50		
620C		
75		
750N		
75A		
780M		
95		
960M		
970N		
A53		
A53A		
A53B		
Armco-95		
B		
C		
C-110		
C-75		
C-90		
C-95		
D		
DE		
DER		
DR		
DWR		

Name	Type	Notes
E		
E-75		
EL		
F-25		
FG		
FS-80		
FSS-95		
G		
G-105		
GT-80S		
H2S-90		
H2S-95		
H-40		
HC-95		
HCK-55		
HCL-80		
HCN-80		
HCP-110		
HCQ-125		
HO-70		
HS		
J-20		
J-55		
K		
K-40		
K-55		
KD		
KD-63		
L-80		
LS-140		
LS-50		
LS-65		
M-65		
M-90		
M-95		
MAV-50		
MD-56		
MMS		

Name	Type	Notes
N-105		
N-23		
N-30		
N-40		
N-54		
N-75		
N-78		
N-80		
N-90		
N-96		
N-97		
P-105		
P-110		
PCP 900		
PCP 1000		
PCP 1500		
PCP 2500		
PH-6		
Plus		
Q-125		
QT-1000		
QT-1200		
QT-700		
QT-800		
QT-900		
S		
S-135		
S-59		
S-60		
S-67		
S-80		
S-87		
S-88		
S-95		
SC-90		
SE		
SER		
SM		

Name	Type	Notes
SOO-95		
Stainless		
SWR		
T		
T-66		
T-95		
T-D61		
T-D63		
T-K65		
UHS		
Unknown		
USS-125		
USS-140		
USS-50		
USS-95		
V-150		
WC-50		
X		
X-140		
X-42		
X-46		
X-52		
X-56		
X-60		
X-70		
X-95		
XD		

25.27 ObjectSequence

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 11/6/2015   *Last modified:* 11/8/2016
Notes: Defines a sequence number with an optional description attribute.

Attributes

Name	Type	Notes
description	String2000	The description of this object sequence.

Associations

Association		Notes
1..1	**From:** MemberObject.Sequence3 **To:** ObjectSequence *Association*	Defines tertiary numeric ordering of this object within the group. The meaning of this order will be defined by the groupType. A value for sequence3 can only be given if a value is given for sequence2.
1..1	**From:** MemberObject.Sequence2 **To:** ObjectSequence *Association*	Defines secondary numeric ordering of this object within the group. The meaning of this order will be defined by the groupType. A value for sequence2 can only be given if a value is given for sequence1.
1..1	**From:** MemberObject.Sequence1 **To:** ObjectSequence *Association*	Defines primary numeric ordering of this object within the group. The meaning of this order will be defined by the groupType.
0..1	**From:** StringEquipment.OrderOfObject **To:** ObjectSequence *Association*	Defines a sequence number and with an optional description attribute

25.28 OtherConnectionType

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: Created: 5/3/2016   *Last modified:* 11/8/2016
Notes: Allows you to enter a connection type other than the ones in the standard list.

Attributes

Name	Type	Notes
OtherConnectionType	OtherConnectionTypes	Connection type other than rod, casing or tubing.

Associations

Association	Notes
From: OtherConnectionType. **To:** OtherConnectionTypes *Dependency*	
From: OtherConnectionType. **To:** AbstractConnectionType *Generalization*	

25.29 OtherConnectionTypes

Type: Enumeration *Stereotype:* «Enumeration»
Detail: *Created:* 5/3/2016 *Last modified:* 11/8/2016
Notes: Specifies the values for other types of connections.

Attributes

Name	Type	Notes
cemented-in-place		
dogscompressionfit-sealed		

Associations

Association	Notes
From: OtherConnectionType. **To:** OtherConnectionTypes *Dependency*	

25.30 PerfHole

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 11/6/2015   *Last modified:* 11/8/2016
Notes: Information on the perforated hole.

Attributes

Name	Type	Notes
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
HoleAngle	PlaneAngleMeasure	The angle of the holes.
HoleCount	int	The number of holes.
HoleDensity	ReciprocalLengthMeasure	The density of the holes.
HoleDiameter	LengthMeasure	The diameter of the hole.
HolePattern	String64	The pattern of the holes.
MdInterval	MdInterval	Measured depth interval for the perforation hole.
Remarks	String2000	Remarks and comments about this perforated hole.
TvdInterval	TvdInterval	The true vertical depth that describes the hole.
uid	String64	Unique identifier for this instance of PerfHole.

Associations

Association		Notes
0..*	**From:** Equipment.HoleAsManufactured **To:** PerfHole *Association*	Describes the hole in equipment.

25.31 PerforationSet

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 11/6/2015   *Last modified:* 11/8/2016
Notes: Information regarding a collection of perforations.

Attributes

Name	Type	Notes
BoreholeStringReferenceId	String64	Reference to the borehole that contains the perf set.
CrushDamageRatio	String64	The ratio value of crash damage.
CrushZoneDiameter	LengthMeasure	The diameter of the crushed zone.
DischargeCoefficient	double	A coefficient used in the equation for calculation of pressure drop across a perforation set.
DownholeStringReferenceId	String64	Reference to the downhole string.
FrictionFactor	double	The friction factor of each perforation set.
FrictionPres	PressureMeasure	The friction pressure for the perforation set.
HoleAngle	PlaneAngleMeasure	The angle of the holes.
HoleCount	int	The number of holes.
HoleDensity	ReciprocalLengthMeasure	The density of the holes.
HoleDiameter	LengthMeasure	The diameter of the perf holes.
HolePattern	String64	The pattern of the holes.
MdInterval	MdInterval	Measured depth interval for the entire perforation set.
PerforationDate	TimeStamp	The original perforation date.
PerforationPenetration	LengthMeasure	The penetration length of perforation.
PerforationTool	PerforationToolType	The type of perforation tool.
PermanentRemarks	String2000	Remarks regarding this perforation set.
TvdInterval	TvdInterval	The true vertical depth of the entire perforation set.
uid	String64	Unique identifier for this instance of PerforationSet.

Associations

Association		Notes
	From: PerforationSet. **To:** PerforationToolType *Dependency*	
0..1	**From:** PerforationSet.EventHistory **To:** EventInfo *Association*	
1..*	**From:** PerforationSets.PerforationSet **To:** PerforationSet *Association*	Contact interval type

25.32 PerforationSets

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 11/6/2015   *Last modified:* 11/8/2016
Notes: Information on the collection of perforation sets.

Associations

Association		Notes
1..*	**From:** PerforationSets.PerforationSet **To:** PerforationSet *Association*	Contact interval type
0..1	**From:** DownholeComponent.PerforationSets **To:** PerforationSets *Association*	A collection of contact interval information

25.33 PerforationToolType

Type: Enumeration *Stereotype:* «Enumeration»
Detail: *Created:* 5/4/2016 *Last modified:* 11/8/2016
Notes: Species the values for the type of perforation tool used to create the perfs.

Attributes

Name	Type	Notes
casing gun		
coiled tubing jet tool		
drilled		
mandrel		
n/a		
slots-machine cut		
slots-undercut		
strip gun		
tcp gun		
through tubing gun		

Associations

Association	Notes
From: PerforationSet. **To:** PerforationToolType *Dependency*	

25.34 PerfSlot

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 11/6/2015   *Last modified:* 11/8/2016
Notes: Information on slot resulting from a perforation.

Attributes

Name	Type	Notes
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
Remarks	String2000	Remarks and comments about this perforation slot.
SlotCenterDistance	LengthMeasure	Distance from center point.
SlotCount	int	The number of the slots.
SlotHeight	LengthMeasure	The height of slot.
SlotWidth	LengthMeasure	The width of the slot.
uid	String64	Unique identifier for this instance of PerfSlot.

Associations

Association		Notes
0..*	**From:** Equipment.SlotAsManufactured **To:** PerfSlot *Association*	Describes the slot in equipment.

25.35 ReferenceContainer

Type: Class *Stereotype:* «XSDcomplexType»
Detail: *Created:* 11/6/2015 *Last modified:* 11/8/2016
Notes: Information on containing or contained components.

Attributes

Name	Type	Notes
AccesoryEquipmentReferenceId	String64	Reference to the equipment for this accessory.
Comment	String2000	Comment or remarks on this container reference.
EquipmentReferenceId	String64	Equipment reference ID.
StringReferenceId	String64	DownholeString reference ID.
uid	String64	Unique identifier for this instance of ReferenceContainer.

Associations

Association		Notes
0..*	**From:** StringEquipment.OutsideComponent **To:** ReferenceContainer *Association*	The list of components outside of this piece of equipment
0..*	**From:** StringEquipment.InsideComponent **To:** ReferenceContainer *Association*	The list of components contained in the equipment

25.36 RodConnectionType

Type: Class *Stereotype:* «XSDcomplexType»
Detail: *Created:* 5/3/2016 *Last modified:* 10/25/2016
Notes: A type of rod connection, e.g., latched, threaded, welded, etc.

Attributes

Name	Type	Notes
RodConnectionType	RodConnectionTypes	Connection whose type is rod.

Associations

Association	Notes
From: RodConnectionType. **To:** AbstractConnectionType *Generalization*	
From: RodConnectionType. **To:** RodConnectionTypes *Dependency*	

25.37 RodConnectionTypes

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: *Created:* 5/3/2016   *Last modified:* 11/8/2016
Notes: Specifies the values for the connection type of rod.

Attributes

Name	Type	Notes
eating nipple-cup		
latched		
seating nipple-mechanical		
slipfit sealed		
threaded		
welded		

Associations

Association	Notes
From: RodConnectionType. **To:** RodConnectionTypes *Dependency*	

25.38 StringAccessory

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 11/6/2015   *Last modified:* 11/8/2016
Notes: StringAccessories contain the stringequipment's decorative components. An accessory is the stringEquipment or Strings' decorative component. An accessory is NOT directly screwed to the string. This part DOES NOT carry the weight of the rest of the String as opposed to the stringEquipment, which does. An Accessory is UNLIKE an Assembly on which the stringEquipment is built out of.

Associations

Association		Notes
1..*	**From:** StringAccessory.Accessory **To:** StringEquipment *Association*	Information on a single accessory.
0..1	**From:** BoreholeString.Accessories **To:** StringAccessory *Association*	The borehole accessories.
0..1	**From:** DownholeString.Accessories **To:** StringAccessory *Association*	the accessories equipment of the string. It locates in the downhole string, but it is not equipment which liner connected in string (from top to down), and it is not carraying the weight of string

25.39 StringEquipment

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 11/6/2015   *Last modified:* 11/8/2016
Notes: Information regarding equipment that composes (makes up) a string.

Attributes

Name	Type	Notes
Count	int	The count number of the same equipment. The default is 1. In some cases, multiple pieces group into one component.
EquipmentEventHistory	EventInfo	History of events related to this equipment.
equipmentReferenceUid	String64	Reference to a piece of equipment.
EquipmentType	EquipmentTypeExt	The type of the equipment. See enumerated values.
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
HasScratchers	boolean	Flag indicating scratchers have been added to the equipment.
HeatRating	ThermodynamicTemperatureMeasure	Heat rating.
IsCentralized	boolean	Flag indicating equipment is centralized.
IsLinetoSurface	boolean	Flag indicating the equipment has a line connected to the surface.
Length	LengthMeasure	The total length of the equipment. This is NOT length per unit. This is the length of unit stored at equipmentset's equipment information section.
MdInterval	MdInterval	Measured depth interval in which the equipment is installed in the string.
Name	String2000	The name of the equipment.
ObjectCondition	String64	Object condition at installation.
OutsideString	boolean	Flag indicating whether this component is inside the string or not .
PerforationSetRefId	String64	Reference to the perforated hole in the equipment after a perforation event.
PermanentRemarks	String2000	Remarks on the equipment stored permanently.
PresBurst	PressureMeasure	Burst pressure.
PresCollapse	PressureMeasure	Collapse pressure.
PresRating	PressureMeasure	Pressure rating.
PreviousRunDays	TimeMeasure	The days that the equipment has run.
RunNo	String64	The well run number.
Status	String64	The status of the piece of equipment.
SurfaceCondition	String64	Object surface condition.
TensileMax	ForceMeasure	Max tensile strength.
TvdInterval	TvdInterval	True vertical depth interval in which the equipment is installed in the string.
uid	String64	Unique identifier for this instance of

Name	Type	Notes
		StringEquipment.
UsageComment	String2000	Remarks on the usage of this equipment.

Associations

Association		Notes
0..*	**From:** StringEquipment.OutsideComponent **To:** ReferenceContainer *Association*	The list of components outside of this piece of equipment
0..*	**From:** StringEquipment.InsideComponent **To:** ReferenceContainer *Association*	The list of components contained in the equipment
0..1	**From:** StringEquipment.Assembly **To:** Assembly *Association*	Describes the assembly connected.
0..*	**From:** StringEquipment.ConnectionNext **To:** EquipmentConnection *Association*	Describes the next component connected.
0..1	**From:** StringEquipment.OrderOfObject **To:** ObjectSequence *Association*	Defines a sequence number and with an optional description attribute
1..*	**From:** StringEquipmentSet.StringEquipment **To:** StringEquipment *Association*	Information on a single piece of equipment. the equipment id must exist in equipmentSet
1..*	**From:** StringAccessory.Accessory **To:** StringEquipment *Association*	Information on a single accessory.
0..*	**From:** Assembly.Part **To:** StringEquipment *Association*	

25.40 StringEquipmentSet

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 11/6/2015   *Last modified:* 11/8/2016
Notes: Information on collection of set of equipment included in the string.

Associations

Association		Notes
1..*	**From:** StringEquipmentSet.StringEquipment **To:** StringEquipment *Association*	Information on a single piece of equipment. the equipment id must exist in equipmentSet
0..1	**From:** DownholeString.StringEquipmentSet **To:** StringEquipmentSet *Association*	the list of equipment in the string. each equipment is liner connected and carry the rest of weight

25.41 SubStringType

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: *Created:* 5/4/2016   *Last modified:* 11/8/2016
Notes: Specifies the values to further qualify a string type.

Attributes

Name	Type	Notes
abandoned junk/fish		
capillary string (inside tubing)		
capillary string (tubing/casing annulus)		
conductor casing		
drill string		
flowline		
geological objects		
inner liner		
intermediate casing		
production casing		
production liner		
protective casing		
surface casing		
wellbore notes		
y-tool string		

Associations

Association	Notes
From: DownholeString. **To:** SubStringType *Dependency*	

25.42 TubingConnectionType

Type: Class *Stereotype:* «XSDcomplexType»
Detail: *Created:* 5/3/2016 *Last modified:* 11/8/2016
Notes: Container element for tubing connection types or collection of tubing connection types.

Attributes

Name	Type	Notes
TubingConnectionType	TubingConnectionTypes	Tubing connection type.

Associations

Association	Notes
From: TubingConnectionType. **To:** TubingConnectionTypes *Dependency*	
From: TubingConnectionType. **To:** AbstractConnectionType *Generalization*	

25.43 TubingConnectionTypes

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: Created: 5/3/2016   *Last modified:* 11/8/2016
Notes: Specifies the values for the connection types of tubing.

Attributes

Name	Type	Notes
dogscompressionfit-notsealed		
landed		
latched		
radial		
selfsealing-threaded		
slipfit-sealed		
threaded		
unknown		The value is not known. This value should not be used in normal situations. All reasonable attempts should be made to determine the appropriate value. Use of this value may result in rejection in some situations.

Associations

Association	Notes
From: TubingConnectionType. **To:** TubingConnectionTypes *Dependency*	

26 WellCMLedger

Package: xsd_schemas
Notes: WellCMLedger Schema. The "event ledger" concept is this: each time an activity associated with a well happens, that event is recorded in the ledger. This collection of event history is what makes it possible to support the completion use cases (snapshot in time or the cumulative history of a completion).

26.1 AbstractEventExtension

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 11/6/2015   *Last modified:* 11/8/2016
Notes: Event extension schema.

Associations

Association	Notes
From: CementExtension. **To:** AbstractEventExtension *Generalization*	
From: PerforatingExtension. **To:** AbstractEventExtension *Generalization*	
From: BHPExtension. **To:** AbstractEventExtension *Generalization*	
From: CleanFillExtension. **To:** AbstractEventExtension *Generalization*	
From: DirectionalSurveyExtension. **To:** AbstractEventExtension *Generalization*	
From: WaitingOnExtension. **To:** AbstractEventExtension *Generalization*	
From: LostCirculationExtension. **To:** AbstractEventExtension *Generalization*	
From: AcidizefracExtension. **To:** AbstractEventExtension *Generalization*	
From: FluidReportExtension. **To:** AbstractEventExtension *Generalization*	
From: DownholeExtension. **To:** AbstractEventExtension *Generalization*	
From: JobExtension. **To:** AbstractEventExtension *Generalization*	
From: PressureTestExtension.	

Association		Notes
	To: AbstractEventExtension *Generalization*	
0..*	**From:** WellCMLedger.EventExtension **To:** AbstractEventExtension *Association*	Event extensions

26.2 AcidizefracExtension

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 11/6/2015   *Last modified:* 11/8/2016
Notes: Information on fractionation event.

Attributes

Name	Type	Notes
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
StimJobID	String64	Reference to a StimJob.

Associations

Association		Notes
0..1	**From:** AcidizefracExtension.ExtensionAny **To:** CustomData *Association*	Extensions to the schema using an xsd:any construct.
	From: AcidizefracExtension. **To:** AbstractEventExtension *Generalization*	

26.3 BHPExtension

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 11/6/2015   *Last modified:* 10/25/2016
Notes: Information on bottom hole pressure during this event.

Attributes

Name	Type	Notes
BHPRefID	String64	Reference to bottom hole pressure
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.

Associations

Association		Notes
	From: BHPExtension. **To:** AbstractEventExtension *Generalization*	
0..1	**From:** BHPExtension.ExtensionAny **To:** CustomData *Association*	Extensions to the schema using an xsd:any construct.

26.4 BoreholeStringReference

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 11/6/2015   *Last modified:* 10/25/2016
Notes: Reference to a borehole string identifier

Attributes

Name	Type	Notes
boreholeStringReferenceId	String64	Reference to borehole String
StringEquipmentReferenceId	String64	Reference to string equipment

Associations

Association	Notes
From: DownholeComponentReference.BoreholeStringReference 0..* **To:** BoreholeStringReference *Association*	

26.5 CementExtension

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 11/6/2015   *Last modified:* 10/25/2016
Notes: Information on cement job event.

Attributes

Name	Type	Notes
CementJobRefID	String64	unique id of cementJob
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.

Associations

Association		Notes
	From: CementExtension. **To:** AbstractEventExtension *Generalization*	
0..1	**From:** CementExtension.ExtensionAny **To:** CustomData *Association*	Extensions to the schema using an xsd:any construct.

26.6 CleanFillExtension

Type: Class *Stereotype:* «XSDcomplexType»
Detail: *Created:* 11/6/2015 *Last modified:* 10/25/2016
Notes: Information on clean fill event.

Attributes

Name	Type	Notes
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
FillCleaningMethod	String64	method of fill and cleaning
ToolSize	LengthMeasure	the size of the tool

Associations

Association		Notes
	From: CleanFillExtension. **To:** AbstractEventExtension *Generalization*	
0..1	**From:** CleanFillExtension.ExtensionAny **To:** CustomData *Association*	Extensions to the schema using an xsd:any construct.

26.7 DirectionalSurveyExtension

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 11/6/2015   *Last modified:* 10/25/2016
Notes: Information on directional survey event.

Attributes

Name	Type	Notes
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
TrajectoryRefID	String64	Reference to trajectory

Associations

Association		Notes
0..1	**From:** DirectionalSurveyExtension.ExtensionAny **To:** CustomData *Association*	Extensions to the schema using an xsd:any construct.
	From: DirectionalSurveyExtension. **To:** AbstractEventExtension *Generalization*	

26.8 DownholeComponentReference

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 11/6/2015   *Last modified:* 10/25/2016
Notes: Reference to a downhole component identifier

Attributes

Name	Type	Notes
PerforationSetReferenceId	String64	Reference to perforation set
StringEquipmentReferenceId	String64	Reference to string equipment

Associations

Association	Notes
From: DownholeComponentReference.BoreholeStringReference 0..* **To:** BoreholeStringReference *Association*	
From: DownholeComponentReference.DownholeStringsReference 0..* **To:** DownholeStringReference *Association*	
From: WellCMLedger.DownholeComponentReference 0..1 **To:** DownholeComponentReference *Association*	this is to associate with verb(Event) and noun (downholeEquipment). to refer to the whole downholeComponent using downholeComponentExtension.

26.9 DownholeExtension

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 11/6/2015   *Last modified:* 10/25/2016
Notes: Information on downhole related to this event.

Attributes

Name	Type	Notes
DownholeComponentRefID	String64	Reference to downhole component
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.

Associations

Association		Notes
0..1	**From:** DownholeExtension.ExtensionAny **To:** CustomData *Association*	Extensions to the schema using an xsd:any construct.
	From: DownholeExtension. **To:** AbstractEventExtension *Generalization*	

26.10 DownholeStringReference

Type: Class *Stereotype:* «XSDcomplexType»
Detail: *Created:* 11/6/2015 *Last modified:* 10/25/2016
Notes: Refernce to a downhole string identifier

Attributes

Name	Type	Notes
downholeStringReferenceId	String64	Reference to downhole string
StringEquipmentReferenceId	String64	Reference to string equipment

Associations

Association	Notes
From: DownholeComponentReference.DownholeStringsReference 0..* **To:** DownholeStringReference *Association*	

26.11 EventClassType

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: Created: 4/29/2016   *Last modified:* 10/25/2016
Notes: Qualifies the type of event: daily report, job, npt, etc.

Attributes

Name	Type	Notes
daily cost		
daily report		
failure (downhole equipment only)		
job		
job plan (phases)		
mud attributes		
npt (lost time event)		
time log (time measure)		

Associations

Association	Notes
From: EventClassType. **To:** TypeEnum *Generalization*	
From: EventType. **To:** EventClassType *Dependency*	

26.12 EventType

Type: Class *Stereotype:* «XSDcomplexType»
Detail: *Created:* 11/6/2015 *Last modified:* 10/25/2016
Notes: The type of the referencing event

Attributes

Name	Type	Notes
Class	EventClassType	The type of the event (job, daily report, etc.)

Associations

Association		Notes
	From: EventType. **To:** EventClassType *Dependency*	
	From: EventType. **To:** String64 *Generalization*	
0..1	**From:** WellCMLedger.EventType **To:** EventType *Association*	

26.13 FluidReportExtension

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 11/6/2015   *Last modified:* 10/25/2016
Notes: Information on fluid report event.

Attributes

Name	Type	Notes
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
FluidReportRefID	String64	Reference to the fluid report

Associations

Association		Notes
	From: FluidReportExtension. **To:** AbstractEventExtension *Generalization*	
0..1	**From:** FluidReportExtension.ExtensionAny **To:** CustomData *Association*	Extensions to the schema using an xsd:any construct.

26.14 JobExtension

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 11/6/2015   *Last modified:* 10/25/2016
Notes: Information on the job event.

Attributes

Name	Type	Notes
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
JobReason	String2000	Comment on the reason for the job
JobStatus	String64	Status of job
PrimaryMotivationForJob	String64	The primary reason for doing this job.

Associations

Association		Notes
	From: JobExtension. **To:** AbstractEventExtension *Generalization*	
0..1	**From:** JobExtension.ExtensionAny **To:** CustomData *Association*	Extensions to the schema using an xsd:any construct.

26.15 LogIndexType

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: *Created:* 11/6/2015   *Last modified:* 10/25/2016
Notes: These values represent the type of data used as an index value for a log.

Attributes

Name	Type	Notes
date time		Log is indexed on date with time.
elapsed time		Log is indexed on time.
length		Log is indexed on length (not a depth).
measured depth		Log index is a measured depth index.
vertical depth		Log index is a vertical depth depth index .
other		Any other index type for a log.
unknown		The value is not known. Avoid using this value. All reasonable attempts should be made to determine the appropriate value. Use of this value may result in rejection in some situations.

Associations

Association	Notes
From: LogIndexType. **To:** TypeEnum *Generalization*	
From: DepthRegLogSection. **To:** LogIndexType *Dependency*	
From: MemberObject. **To:** LogIndexType *Dependency*	

26.16 LostCirculationExtension

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 11/6/2015   *Last modified:* 10/25/2016
Notes: Information on lost circulation event.

Attributes

Name	Type	Notes
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
VolumeLost	VolumeMeasure	Volume lost

Associations

Association		Notes
	From: LostCirculationExtension. **To:** AbstractEventExtension *Generalization*	
0..1	**From:** LostCirculationExtension.ExtensionAny **To:** CustomData *Association*	Extensions to the schema using an xsd:any construct.

26.17 MemberObject

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 11/6/2015   *Last modified:* 10/25/2016
Notes: Defines a member of an objectGroup.

Attributes

Name	Type	Notes
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
IndexType	LogIndexType	For a log object, this specifies the kind of the index curve for the log. This is only relevant for a systematically growing object.
MnemonicList	string	A comma delimited list of log curve mnemonics. Each mnemonic should only occur once in the list. If not specified then the group applies to all curves in the log.
RangeDateTimeMax	TimeStamp	The maximum log date-time index value that applies to this group. The significance of this range is defined by the groupType.
RangeDateTimeMin	TimeStamp	The minimum log date-time index value that applies to this group. The significance of this range is defined by the groupType.
RangeMax	GenericMeasure	The maximum growing-object index value that applies to this group. The significance of this range is defined by the groupType.
RangeMin	GenericMeasure	The minimum growing-object index value that applies to this group. The significance of this range is defined by the groupType.
ReferenceDateTime	TimeStamp	A date and time related to this group. This does not necessarily represent an actual index within a growing-object. The significance of this time is defined by the groupType.
ReferenceDepth	MeasuredDepthCoord	A measured depth related to this group. This does not necessarily represent an actual depth within a growing-object. The significance of this depth is defined by the groupType.
uid	String64	Unique identifier for this instance of MemberObject

Associations

Association		Notes
1..1	**From:** MemberObject.Sequence3 **To:** ObjectSequence *Association*	Defines tertiary numeric ordering of this object within the group. The meaning of this order will be defined by the groupType. A value for sequence3 can only be given if a value is given for sequence2.
1..1	**From:** MemberObject.Sequence2 **To:** ObjectSequence *Association*	Defines secondary numeric ordering of this object within the group. The meaning of this order will be defined by the groupType. A value for sequence2 can only be given if a value is given for sequence1.
1..1	**From:** MemberObject.ObjectReference **To:** DataObjectReference *Association*	A reference to an object that is defined within the context of the specified wellbore.
1..1	**From:** MemberObject.Sequence1 **To:** ObjectSequence *Association*	Defines primary numeric ordering of this object within the group. The meaning of this order will be defined by the groupType.
	From: MemberObject. **To:** LogIndexType *Dependency*	
0..*	**From:** Participant.Participant **To:** MemberObject *Association*	A collection of involved participants.

26.18 Participant

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 11/6/2015   *Last modified:* 10/25/2016
Notes: Information on WITSML objects used.

Attributes

Name	Type	Notes
ExtNameValues	ExtensionNameValue	Extensions to the schema based on a name-value construct.

Associations

Association		Notes
0..*	**From:** Participant.Participant **To:** MemberObject *Association*	A collection of involved participants.
0..1	**From:** WellCMLedger.Participant **To:** Participant *Association*	Participant points to the involved witsmlobjects.

26.19 PerfConveyanceMethod

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: *Created:* 4/29/2016   *Last modified:* 10/25/2016
Notes: Information on how perforation is conveyed: slick line, wireline, tubing

Attributes

Name	Type	Notes
slick line		
tubing conveyed		
wireline		
unknown		The value is not known. Avoid using this value. All reasonable attempts should be made to determine the appropriate value. Use of this value may result in rejection in some situations.

Associations

Association	Notes
From: Perforating. **To:** PerfConveyanceMethod *Dependency*	

26.20 PerforatingExtension

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 11/6/2015   *Last modified:* 10/25/2016
Notes: Information on the perforating event.

Attributes

Name	Type	Notes
PerforationSetRefID	String64	The perforationSet reference ID.

Associations

Association		Notes
	From: PerforatingExtension. **To:** AbstractEventExtension *Generalization*	
0..*	**From:** PerforatingExtension.Perforating **To:** Perforating *Association*	Information on perforating event.
0..1	**From:** PerforatingExtension.ExtensionAny **To:** CustomData *Association*	Extensions to the schema using an xsd:any construct.

26.21 PressureTestExtension

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 11/6/2015   *Last modified:* 10/25/2016
Notes: Information on pressure test event.

Attributes

Name	Type	Notes
AnnulusPressure	PressureMeasure	Annulus pressure
CirculatingPosition	String64	Circulating position
DiaOrificeSize	LengthMeasure	Orifice Size
DTimeNextTestDate	TimeStamp	Next Test Date
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
FlowrateRateBled	VolumePerTimeMeasure	Rate Bled
FluidBledType	String64	Fluid bled type
IdentifierJob	String64	String Being Tested
IsSuccess	boolean	True if successful
MaxPressureDuration	PressureMeasure	Maximum pressure held during test
OrientationMethod	String64	Description of orientaton method
Str10Reference	String64	Reference #
TestFluidType	String64	Test fluid type
TestSubType	String64	Test sub type
TestType	String64	Test type
UidAssembly	String64	Well (Assembly)
VolumeBled	VolumeMeasure	Volume Bled
VolumeLost	VolumeMeasure	Volume Lost
VolumePumped	VolumeMeasure	Volume Pumped
WellPressureUsed	String64	Well pressure used

Associations

Association		Notes
0..1	**From:** PressureTestExtension.ExtensionAny **To:** CustomData *Association*	Extensions to the schema using an xsd:any construct.
	From: PressureTestExtension. **To:** AbstractEventExtension *Generalization*	

26.22 WaitingOnExtension

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 11/6/2015   *Last modified:* 10/25/2016
Notes: Information on waiting event.

Attributes

Name	Type	Notes
BusinessOrgWaitingOn	String64	Business organization waiting on
ChargeTypeCode	String64	Code for charge type
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
IsNoChargeToProducer	boolean	Flag indicating whether producer is charged or not
SubCategory	String64	Sub category

Associations

Association		Notes
	From: WaitingOnExtension. **To:** AbstractEventExtension *Generalization*	
0..1	**From:** WaitingOnExtension.ExtensionAny **To:** CustomData *Association*	Extensions to the schema using an xsd:any construct.

26.23 WellCMLedger

Type: Class *Stereotype:* «XSDcomplexType»
Detail: *Created:* 11/6/2015 *Last modified:* 10/25/2016
Notes: Information regarding details of Jobs & Events

Attributes

Name	Type	Notes
ActivityCode	DrillActivityCode	Activity code
BusinessAssociate	String64	Service company or business
Comment	String2000	Comment on this ledger
Contact	String64	Contact name or person to get in touch with. Might not necessarily be the person responsible.
Description	String2000	Description of this ledger
DTimEnd	TimeStamp	Date and time that activities were completed.
DTimStart	TimeStamp	Date and time that activities started.
Duration	TimeMeasure	The activity duration (commonly in hours).
EventOrder	int	Order number of event.
IsPlan	boolean	True if planned.
MdInterval	MdInterval	Measured depth interval for this activity.
Nonproductive	boolean	True if event is not productive.
ParentEventID	String64	Parent event reference id.
Phase	String64	Phase (large activity classification) e.g. Drill Surface Hole.
PreventiveMaintenance	boolean	True of event is for preventive maintenance
ResponsiblePerson	String64	Name or information about person responsible who is implementing the service or job.
RigID	String64	Rig reference id.
Trouble	boolean	True if event implies is in-trouble
Type	EventType	Comment on type of this event, either referring to a job type or an activity type e.g. a safety meeting.
Unplanned	boolean	True if there is no planning infomation for this activity.
WorkOrderID	String64	Extension event for work order id.

Associations

Association		Notes
0..1	**From:** WellCMLedger.EventType **To:** EventType *Association*	
0..*	**From:** WellCMLedger.Cost **To:** DayCost *Association*	The job or event cost detail.
1..1	**From:** WellCMLedger.Wellbore **To:** Wellbore *Association*	

Association		Notes
0..*	**From:** WellCMLedger.EventExtension **To:** AbstractEventExtension *Association*	Event extensions
0..1	**From:** WellCMLedger.DownholeComponentReference **To:** DownholeComponentReference *Association*	This is to associate with verb(Event) and noun (downholeEquipment). to refer to the whole downholeComponent using downholeComponentExtension.
0..1	**From:** WellCMLedger.Participant **To:** Participant *Association*	Participant points to the involved witsmlobjects
	From: WellCMLedger. **To:** AbstractObject *Generalization*	

27 WitsmlCommon

Package: xsd_schemas
Notes: Common data object types for WITSML.

27.1 Cost

Type: Class *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015 *Last modified:* 10/25/2016
Notes: The price of an item, with a currency indication.

Attributes

Name	Type	Notes
currency	String64	Currency used for this Cost.

Associations

Association		Notes
0..1	**From:** DrillReportStatusInfo.CostDayMud **To:** Cost *Association*	Daily Mud Cost.
0..1	**From:** DrillReportStatusInfo.CostDay **To:** Cost *Association*	Daily Cost.
0..1	**From:** BitRecord.Cost **To:** Cost *Association*	Bit cost in local currency.

27.2 MeasuredDepthCoord

Type: Class   *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015   *Last modified:* 11/8/2016
Notes: A measured depth coordinate in a wellbore. Positive moving from the reference datum toward the bottomhole. All coordinates with the same datum (and same UOM) can be considered to be in the same coordinate reference system (CRS) and are thus directly comparable.

Attributes

Name	Type	Notes
datum	String64	Defines the vertical datums associated with elevation, vertical depth, and measured depth coordinates.
uom	LengthUom	Unit of measure used by this measured depth coordinate.

Associations

Association	Notes
From: MeasuredDepthCoord. **To:** AbstractMeasure *Generalization*	

27.3 NameTag

Type: Class *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015 *Last modified:* 11/8/2016
Notes: WITSML - Equipment NameTag Schema.

Attributes

Name	Type	Notes
Comment	String2000	A comment or remark about the tag.
ExtensionNameValue	ExtensionNameValue	Extensions to the schema based on a name-value construct.
InstallationCompany	String64	The name of the company that installed the tag.
InstallationDate	TimeStamp	When the tag was installed in or on the item.
Location	NameTagLocation	An indicator of where the tag is attached to the item. This is used to assist the user in finding where an identifier is located on an item. This optional field also helps to differentiate where an identifier is located when multiple identifiers exist on an item. Most downhole components have a box (female thread) and pin (male thread) end as well as a pipe body in between the ends. Where multiple identifiers are used on an item, it is convenient to have a reference as to which end, or somewhere in the middle, an identifier may be closer to. Some items may have an identifier on a non-standard location, such as on the arm of a hole opener. 'other', by exclusion, tells a user to look elsewhere than on the body or near the ends of an item. Most non-downhole tools use either 'body', 'other' or not specified because the location tends to lose value with smaller or non threaded items.
MountingCode	String64	Reference to a manufacturer's or installer's installation description, code, or method.
Name	String64	The physical identification string of the equipment tag.
NumberingScheme	NameTagNumberingScheme	The format or encoding specification of the equipment tag. The tag may contain different pieces of information and knowledge of that information is inherent in the specification. The "identification string" is a mandatory part of the information in a tag.
Technology	NameTagTechnology	Identifies the general type of identifier on an item. If multiple identifiers exist on an item, a separate description set for each identifier should be created. For example, a joint of casing may have a barcode label on it along with a painted-on code and an RFID tag attached or embedded into the coupling. The barcode label may in turn be an RFID-equipped label. This particular scenario would require populating five nameTags to fully describe and decode all the possible identifiers as follows: 'tagged' - RFID tag embedded in the

Name	Type	Notes
		coupling, 'label' - Serial number printed on the label, 'tagged' - RFID tag embedded into the label, 'label' - Barcode printed on the label, 'painted'- Mill number painted on the pipe body.
uid	String64	Unique identifier for this instance of NameTag.

Associations

Association	Notes
From: NameTag. **To:** NameTagLocation *Dependency*	
From: NameTag. **To:** NameTagNumberingScheme *Dependency*	
From: NameTag. **To:** NameTagTechnology *Dependency*	

27.4 NameTagLocation

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: *Created:* 4/13/2015   *Last modified:* 11/8/2016
Notes: Specifies the values for the locations where an equipment tag might be found.

Attributes

Name	Type	Notes
body		
box		
other		
pin		

Associations

Association	Notes
From: NameTagLocation. **To:** TypeEnum *Generalization*	
From: NameTag. **To:** NameTagLocation *Dependency*	

27.5 NameTagNumberingScheme

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: *Created:* 4/13/2015   *Last modified:* 11/8/2016
Notes: Specifies the values of the specifications for creating equipment tags.

Attributes

Name	Type	Notes
ANSI/AIM-BC10		
ANSI/AIM-BC2		
ANSI/AIM-BC6		
EAN.UCC		
EPC64		
EPC96		
F2F		
MFM		
MSRCID		
serial number		

Associations

Association	Notes
From: NameTagNumberingScheme. **To:** TypeEnum *Generalization*	
From: NameTag. **To:** NameTagNumberingScheme *Dependency*	

27.6 NameTagTechnology

Type: Enumeration   *Stereotype:* «Enumeration»
Detail: *Created:* 4/13/2015   *Last modified:* 11/8/2016
Notes: Specifies the values for the mechanisms for attaching an equipment tag to an item.

Attributes

Name	Type	Notes
intrinsic		
labeled		
painted		
stamped		
tagged		
temporary		

Associations

Association	Notes
From: NameTagTechnology. **To:** TypeEnum *Generalization*	
From: NameTag. **To:** NameTagTechnology *Dependency*	

27.7 WellVerticalDepthCoord

Type: Class *Stereotype:* «XSDcomplexType»
Detail: *Created:* 4/13/2015 *Last modified:* 11/8/2016
Notes: A vertical (gravity-based) depth coordinate within the context of a well. Positive moving downward from the reference datum. All coordinates with the same datum (and same UOM) can be considered to be in the same coordinate reference system (CRS) and are thus directly comparable.

Attributes

Name	Type	Notes
datum	String64	Defines the vertical datums associated with elevation, vertical depth and measured depth coordinates
uom	LengthUom	Unit of measure used by this vertical depth coordinate

Associations

Association	Notes
From: WellVerticalDepthCoord. **To:** AbstractMeasure *Generalization*	