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6.6.3.35 PenstockLossCurve

Relationship between penstock head loss (in meters) and total discharge through the penstock (in cubic meters per second). One or more turbines may be connected to the same penstock.

Table 447 shows all attributes of PenstockLossCurve.

name	mult	type	description
curveStyle	01	CurveStyle	inherited from: Curve
xMultiplier	01	UnitMultiplier	inherited from: Curve
xUnit	01	UnitSymbol	inherited from: Curve
y1Multiplier	01	UnitMultiplier	inherited from: Curve
y1Unit	01	UnitSymbol	inherited from: Curve
y2Multiplier	01	UnitMultiplier	inherited from: Curve
y2Unit	01	UnitSymbol	inherited from: Curve
y3Multiplier	01	UnitMultiplier	inherited from: Curve
y3Unit	01	UnitSymbol	inherited from: Curve
aliasName	01	String	inherited from: IdentifiedObject
description	01	String	inherited from: IdentifiedObject
mRID	01	String	inherited from: IdentifiedObject
name	01	String	inherited from: IdentifiedObject

Table 447 – Attributes of Production::PenstockLossCurve

Table 448 shows all association ends of PenstockLossCurve with other classes.

mult from	name	mult to	type	description
01	HydroGeneratingUnit	11	HydroGeneratingUnit	A hydro generating unit has a penstock loss curve.
11	CurveDatas	0*	CurveData	inherited from: Curve
01	DiagramObjects	0*	DiagramObject	inherited from: IdentifiedObject
11	Names	0*	Name	inherited from: IdentifiedObject

Table 448 – Association ends of Production::PenstockLossCurve with other classes

6.6.3.36 PhotoVoltaicUnit

A photovoltaic device or an aggregation of such devices.

Table 449 shows all attributes of PhotoVoltaicUnit.

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name	mult	type	description	
maxP	01	ActivePower	inherited from: PowerElectronicsUnit	
minP	01	ActivePower	inherited from: PowerElectronicsUnit	
aggregate	01	Boolean	inherited from: Equipment	
inService	01	Boolean	inherited from: Equipment	
networkAnalysisEnabled	01	Boolean	inherited from: Equipment	
normallyInService	01	Boolean	inherited from: Equipment	
aliasName	01	String	inherited from: IdentifiedObject	
description	01	String	inherited from: IdentifiedObject	
mRID	01	String	inherited from: IdentifiedObject	
name	01	String	inherited from: IdentifiedObject	

Table 449 – Attributes of Production::PhotoVoltaicUnit

Table 450 shows all association ends of PhotoVoltaicUnit with other classes.

mult from	name	mult to	type	description
0*	PowerElectronicsConne ction	11	PowerElectronicsConne ction	inherited from: PowerElectronicsUnit
01	OperationalLimitSet	0*	OperationalLimitSet	inherited from: Equipment
11	ContingencyEquipment	0*	ContingencyEquipment	inherited from: Equipment
0*	EquipmentContainer	01	EquipmentContainer	inherited from: Equipment
01	Faults	0*	Fault	inherited from: Equipment
0*	AdditionalEquipmentCon tainer	0*	EquipmentContainer	inherited from: Equipment
0*	PSRType	01	PSRType	inherited from: PowerSystemResource
01	Controls	0*	Control	inherited from: PowerSystemResource
01	Measurements	0*	Measurement	inherited from: PowerSystemResource
11	OperatingShare	0*	OperatingShare	inherited from: PowerSystemResource
0*	ReportingGroup	0*	ReportingGroup	inherited from: PowerSystemResource
01	DiagramObjects	0*	DiagramObject	inherited from: IdentifiedObject
11	Names	0*	Name	inherited from: IdentifiedObject

Table 450 – Association ends of Production::PhotoVoltaicUnit with other classes

6.6.3.37 PowerElectronicsUnit

A generating unit or battery or aggregation that connects to the AC network using power electronics rather than rotating machines.

Table 451 shows all attributes of PowerElectronicsUnit.

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name	mult	type	description	
maxP	01	ActivePower	Maximum active power limit. This is the maximum (nameplate) limit for the unit.	
minP	01	ActivePower	Minimum active power limit. This is the minimum (nameplate) limit for the unit.	
aggregate	01	Boolean	inherited from: Equipment	
inService	01	Boolean	inherited from: Equipment	
networkAnalysisEnabled	01	Boolean	inherited from: Equipment	
normallyInService	01	Boolean	inherited from: Equipment	
aliasName	01	String	inherited from: IdentifiedObject	
description	01	String	inherited from: IdentifiedObject	
mRID	01	String	inherited from: IdentifiedObject	
name	01	String	inherited from: IdentifiedObject	

Table 451 – Attributes of Production::PowerElectronicsUnit

Table 452 shows all association ends of PowerElectronicsUnit with other classes.

mult from	name	mult to	type	description
0*	PowerElectronicsConne ction	11	PowerElectronicsConne ction	A power electronics unit has a connection to the AC network.
01	OperationalLimitSet	0*	OperationalLimitSet	inherited from: Equipment
11	ContingencyEquipment	0*	ContingencyEquipment	inherited from: Equipment
0*	EquipmentContainer	01	EquipmentContainer	inherited from: Equipment
01	Faults	0*	Fault	inherited from: Equipment
0*	AdditionalEquipmentCon tainer	0*	EquipmentContainer	inherited from: Equipment
0*	PSRType	01	PSRType	inherited from: PowerSystemResource
01	Controls	0*	Control	inherited from: PowerSystemResource
01	Measurements	0*	Measurement	inherited from: PowerSystemResource
11	OperatingShare	0*	OperatingShare	inherited from: PowerSystemResource
0*	ReportingGroup	0*	ReportingGroup	inherited from: PowerSystemResource
01	DiagramObjects	0*	DiagramObject	inherited from: IdentifiedObject
11	Names	0*	Name	inherited from: IdentifiedObject

6.6.3.38 PowerElectronicsWindUnit

A wind generating unit that connects to the AC network with power electronics rather than rotating machines or an aggregation of such units.

Table 453 shows all attributes of PowerElectronicsWindUnit.

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name	mult	type	description	
maxP	01	ActivePower	inherited from: PowerElectronicsUnit	
minP	01	ActivePower	inherited from: PowerElectronicsUnit	
aggregate	01	Boolean	inherited from: Equipment	
inService	01	Boolean	inherited from: Equipment	
networkAnalysisEnabled	01	Boolean	inherited from: Equipment	
normallyInService	01	Boolean	inherited from: Equipment	
aliasName	01	String	inherited from: IdentifiedObject	
description	01	String	inherited from: IdentifiedObject	
mRID	01	String	inherited from: IdentifiedObject	
name	01	String	inherited from: IdentifiedObject	

Table 453 – Attributes of Production::PowerElectronicsWindUnit

Table 454 shows all association ends of PowerElectronicsWindUnit with other classes.

mult from	name	mult to	type	description
0*	PowerElectronicsConne ction	11	PowerElectronicsConne ction	inherited from: PowerElectronicsUnit
01	OperationalLimitSet	0*	OperationalLimitSet	inherited from: Equipment
11	ContingencyEquipment	0*	ContingencyEquipment	inherited from: Equipment
0*	EquipmentContainer	01	EquipmentContainer	inherited from: Equipment
01	Faults	0*	Fault	inherited from: Equipment
0*	AdditionalEquipmentCon tainer	0*	EquipmentContainer	inherited from: Equipment
0*	PSRType	01	PSRType	inherited from: PowerSystemResource
01	Controls	0*	Control	inherited from: PowerSystemResource
01	Measurements	0*	Measurement	inherited from: PowerSystemResource
11	OperatingShare	0*	OperatingShare	inherited from: PowerSystemResource
0*	ReportingGroup	0*	ReportingGroup	inherited from: PowerSystemResource
01	DiagramObjects	0*	DiagramObject	inherited from: IdentifiedObject
11	Names	0*	Name	inherited from: IdentifiedObject

Table 454 – Association ends of Production::PowerElectronicsWindUnit with other classes

6.6.3.39 Reservoir

A water storage facility within a hydro system, including: ponds, lakes, lagoons, and rivers. The storage is usually behind some type of dam.

Table 455 shows all attributes of Reservoir.

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name	mult	type	description
activeStorageCapacity	01	Volume	Storage volume between the full supply level and the normal minimum operating level.
energyStorageRating	01	Float	The reservoir's energy storage rating in energy for given head conditions.
fullSupplyLevel	01	WaterLevel	Full supply level, above which water will spill. This can be the spillway crest level or the top of closed gates.
grossCapacity	01	Volume	Total capacity of reservoir.
normalMinOperateLevel	01	WaterLevel	Normal minimum operating level below which the penstocks will draw air.
riverOutletWorks	01	String	River outlet works for riparian right releases or other purposes.
spillTravelDelay	01	Seconds	The spillway water travel delay to the next downstream reservoir.
spillwayCapacity	01	Float	The flow capacity of the spillway in cubic meters per second.
spillwayCrestLength	01	Length	The length of the spillway crest.
spillwayCrestLevel	01	WaterLevel	Spillway crest level above which water will spill.
spillWayGateType	01	String	Type of spillway gate, including parameters.
aliasName	01	String	inherited from: IdentifiedObject
description	01	String	inherited from: IdentifiedObject
mRID	01	String	inherited from: IdentifiedObject
name	01	String	inherited from: IdentifiedObject

Table 456 shows all association ends of Reservoir with other classes.

Table 456 – Association ends of Production::Reservoir with other classes

mult from	name	mult to	type	description
01	SpillsIntoReservoirs	0*	Reservoir	A reservoir may spill into a downstream reservoir.
01	HydroPowerPlants	0*	HydroPowerPlant	Generators discharge water to or pumps are supplied water from a downstream reservoir.
11	UpstreamFromHydroPo werPlants	0*	HydroPowerPlant	Generators are supplied water from or pumps discharge water to an upstream reservoir.
11	InflowForecasts	0*	InflowForecast	A reservoir may have a "natural" inflow forecast.
11	LevelVsVolumeCurves	0*	LevelVsVolumeCurve	A reservoir may have a level versus volume relationship.
11	TargetLevelSchedule	01	TargetLevelSchedule	A reservoir may have a water level target schedule.
0*	SpillsFromReservoir	01	Reservoir	A reservoir may spill into a downstream reservoir.
0*	PSRType	01	PSRType	inherited from: PowerSystemResource
01	Controls	0*	Control	inherited from: PowerSystemResource
01	Measurements	0*	Measurement	inherited from: PowerSystemResource
11	OperatingShare	0*	OperatingShare	inherited from: PowerSystemResource

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mult from	name	mult to	type	description
0*	ReportingGroup	0*	ReportingGroup	inherited from: PowerSystemResource
01	DiagramObjects	0*	DiagramObject	inherited from: IdentifiedObject
11	Names	0*	Name	inherited from: IdentifiedObject

6.6.3.40 ShutdownCurve

Relationship between the rate in gross active power/minute (Y-axis) at which a unit should be shutdown and its present gross MW output (X-axis).

Table 457 shows all attributes of ShutdownCurve.

name	mult	type	description
shutdownCost	01	Money	Fixed shutdown cost.
shutdownDate	01	DateTime	The date and time of the most recent generating unit shutdown.
curveStyle	01	CurveStyle	inherited from: Curve
xMultiplier	01	UnitMultiplier	inherited from: Curve
xUnit	01	UnitSymbol	inherited from: Curve
y1Multiplier	01	UnitMultiplier	inherited from: Curve
y1Unit	01	UnitSymbol	inherited from: Curve
y2Multiplier	01	UnitMultiplier	inherited from: Curve
y2Unit	01	UnitSymbol	inherited from: Curve
y3Multiplier	01	UnitMultiplier	inherited from: Curve
y3Unit	01	UnitSymbol	inherited from: Curve
aliasName	01	String	inherited from: IdentifiedObject
description	01	String	inherited from: IdentifiedObject
mRID	01	String	inherited from: IdentifiedObject
name	01	String	inherited from: IdentifiedObject

Table 457 – Attributes of Production::ShutdownCurve

Table 458 shows all association ends of ShutdownCurve with other classes.

Table 458 – Association end	of Production::ShutdownCurve	with other classes
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mult from	name	mult to	type	description
01	ThermalGeneratingUnit	11	ThermalGeneratingUnit	A thermal generating unit may have a shutdown curve.
11	CurveDatas	0*	CurveData	inherited from: Curve
01	DiagramObjects	0*	DiagramObject	inherited from: IdentifiedObject
11	Names	0*	Name	inherited from: IdentifiedObject

6.6.3.41 SolarGeneratingUnit

A solar thermal generating unit, connected to the grid by means of a rotating machine. This class does not represent photovoltaic (PV) generation.

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Table 459 shows all attributes of SolarGeneratingUnit.

name	mult	type	description
allocSpinResP	01	ActivePower	inherited from: GeneratingUnit
autoCntrlMarginP	01	ActivePower	inherited from: GeneratingUnit
baseP	01	ActivePower	inherited from: GeneratingUnit
controlDeadband	01	ActivePower	inherited from: GeneratingUnit
controlPulseHigh	01	Seconds	inherited from: GeneratingUnit
controlPulseLow	01	Seconds	inherited from: GeneratingUnit
controlResponseRate	01	ActivePowerChangeRate	inherited from: GeneratingUnit
efficiency	01	PerCent	inherited from: GeneratingUnit
genControlMode	01	GeneratorControlMode	inherited from: GeneratingUnit
genControlSource	01	GeneratorControlSource	inherited from: GeneratingUnit
governorMPL	01	PU	inherited from: GeneratingUnit
governorSCD	01	PerCent	inherited from: GeneratingUnit
highControlLimit	01	ActivePower	inherited from: GeneratingUnit
initialP	01	ActivePower	inherited from: GeneratingUnit
longPF	01	Float	inherited from: GeneratingUnit
lowControlLimit	01	ActivePower	inherited from: GeneratingUnit
lowerRampRate	01	ActivePowerChangeRate	inherited from: GeneratingUnit
maxEconomicP	01	ActivePower	inherited from: GeneratingUnit
maximumAllowableSpinn ingReserve	01	ActivePower	inherited from: GeneratingUnit
maxOperatingP	01	ActivePower	inherited from: GeneratingUnit
minEconomicP	01	ActivePower	inherited from: GeneratingUnit
minimumOffTime	01	Seconds	inherited from: GeneratingUnit
minOperatingP	01	ActivePower	inherited from: GeneratingUnit
modelDetail	01	Classification	inherited from: GeneratingUnit
nominalP	01	ActivePower	inherited from: GeneratingUnit
normalPF	01	Float	inherited from: GeneratingUnit
penaltyFactor	01	Float	inherited from: GeneratingUnit
raiseRampRate	01	ActivePowerChangeRate	inherited from: GeneratingUnit
ratedGrossMaxP	01	ActivePower	inherited from: GeneratingUnit
ratedGrossMinP	01	ActivePower	inherited from: GeneratingUnit
ratedNetMaxP	01	ActivePower	inherited from: GeneratingUnit
shortPF	01	Float	inherited from: GeneratingUnit
startupCost	01	Money	inherited from: GeneratingUnit
startupTime	01	Seconds	inherited from: GeneratingUnit
tieLinePF	01	Float	inherited from: GeneratingUnit
totalEfficiency	01	PerCent	inherited from: GeneratingUnit
variableCost	01	Money	inherited from: GeneratingUnit
aggregate	01	Boolean	inherited from: Equipment
inService	01	Boolean	inherited from: Equipment
networkAnalysisEnabled	01	Boolean	inherited from: Equipment

Table 459 – Attributes of Production::SolarGeneratingUnit

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name	mult	type	description
normallyInService	01	Boolean	inherited from: Equipment
aliasName	01	String	inherited from: IdentifiedObject
description	01	String	inherited from: IdentifiedObject
mRID	01	String	inherited from: IdentifiedObject
name	01	String	inherited from: IdentifiedObject

Table 460 shows all association ends of SolarGeneratingUnit with other classes.

Table 460 – Association	ends of Production Solar	SeneratingUnit with other classes
		Seneralingonit with other classes

mult from	name	mult to	type	description
01	RotatingMachine	0*	RotatingMachine	inherited from: GeneratingUnit
11	GenUnitOpCostCurves	0*	GenUnitOpCostCurve	inherited from: GeneratingUnit
11	GenUnitOpSchedule	01	GenUnitOpSchedule	inherited from: GeneratingUnit
11	ControlAreaGeneratingU nit	0*	ControlAreaGeneratingU nit	inherited from: GeneratingUnit
11	GrossToNetActivePower Curves	0*	GrossToNetActivePower Curve	inherited from: GeneratingUnit
01	OperationalLimitSet	0*	OperationalLimitSet	inherited from: Equipment
11	ContingencyEquipment	0*	ContingencyEquipment	inherited from: Equipment
0*	EquipmentContainer	01	EquipmentContainer	inherited from: Equipment
01	Faults	0*	Fault	inherited from: Equipment
0*	AdditionalEquipmentCon tainer	0*	EquipmentContainer	inherited from: Equipment
0*	PSRType	01	PSRType	inherited from: PowerSystemResource
01	Controls	0*	Control	inherited from: PowerSystemResource
01	Measurements	0*	Measurement	inherited from: PowerSystemResource
11	OperatingShare	0*	OperatingShare	inherited from: PowerSystemResource
0*	ReportingGroup	0*	ReportingGroup	inherited from: PowerSystemResource
01	DiagramObjects	0*	DiagramObject	inherited from: IdentifiedObject
11	Names	0*	Name	inherited from: IdentifiedObject

6.6.3.42 StartIgnFuelCurve

The quantity of ignition fuel (Y-axis) used to restart and repay the auxiliary power consumed versus the number of hours (X-axis) the unit was off line.

Table 461 shows all attributes of StartIgnFuelCurve.

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name	mult	type	description
ignitionFuelType	01	FuelType	Type of ignition fuel.
curveStyle	01	CurveStyle	inherited from: Curve
xMultiplier	01	UnitMultiplier	inherited from: Curve
xUnit	01	UnitSymbol	inherited from: Curve
y1Multiplier	01	UnitMultiplier	inherited from: Curve
y1Unit	01	UnitSymbol	inherited from: Curve
y2Multiplier	01	UnitMultiplier	inherited from: Curve
y2Unit	01	UnitSymbol	inherited from: Curve
y3Multiplier	01	UnitMultiplier	inherited from: Curve
y3Unit	01	UnitSymbol	inherited from: Curve
aliasName	01	String	inherited from: IdentifiedObject
description	01	String	inherited from: IdentifiedObject
mRID	01	String	inherited from: IdentifiedObject
name	01	String	inherited from: IdentifiedObject

Table 461 – Attributes of Production::StartIgnFuelCurve

Table 462 shows all association ends of StartIgnFuelCurve with other classes.

mult from	name	mult to	type	description
01	StartupModel	11	StartupModel	The unit's startup model may have a startup ignition fuel curve.
11	CurveDatas	0*	CurveData	inherited from: Curve
01	DiagramObjects	0*	DiagramObject	inherited from: IdentifiedObject
11	Names	0*	Name	inherited from: IdentifiedObject

6.6.3.43 StartMainFuelCurve

The quantity of main fuel (Y-axis) used to restart and repay the auxiliary power consumed versus the number of hours (X-axis) the unit was off line.

Table 463 shows all attributes of StartMainFuelCurve.

Table 463 – Attributes of Production::StartMainFuelCurv

name	mult	type	description
mainFuelType	01	FuelType	Type of main fuel.
curveStyle	01	CurveStyle	inherited from: Curve
xMultiplier	01	UnitMultiplier	inherited from: Curve
xUnit	01	UnitSymbol	inherited from: Curve
y1Multiplier	01	UnitMultiplier	inherited from: Curve
y1Unit	01	UnitSymbol	inherited from: Curve
y2Multiplier	01	UnitMultiplier	inherited from: Curve
y2Unit	01	UnitSymbol	inherited from: Curve

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name	mult	type	description
y3Multiplier	01	UnitMultiplier	inherited from: Curve
y3Unit	01	UnitSymbol	inherited from: Curve
aliasName	01	String	inherited from: IdentifiedObject
description	01	String	inherited from: IdentifiedObject
mRID	01	String	inherited from: IdentifiedObject
name	01	String	inherited from: IdentifiedObject

Table 464 shows all association ends of StartMainFuelCurve with other classes.

Table 464 –	Association ends	of Production StartMain	FuelCurve with	other classes
	Association chas			

mult from	name	mult to	type	description
01	StartupModel	11	StartupModel	The unit's startup model may have a startup main fuel curve.
11	CurveDatas	0*	CurveData	inherited from: Curve
01	DiagramObjects	0*	DiagramObject	inherited from: IdentifiedObject
11	Names	0*	Name	inherited from: IdentifiedObject

6.6.3.44 StartRampCurve

Rate in gross active power per minute (Y-axis) at which a unit can be loaded versus the number of hours (X-axis) the unit was off line.

Table 465 shows all attributes of StartRampCurve.

name	mult	type	description
hotStandbyRamp	01	ActivePowerChangeRate	The startup ramp rate in gross for a unit that is on hot standby.
curveStyle	01	CurveStyle	inherited from: Curve
xMultiplier	01	UnitMultiplier	inherited from: Curve
xUnit	01	UnitSymbol	inherited from: Curve
y1Multiplier	01	UnitMultiplier	inherited from: Curve
y1Unit	01	UnitSymbol	inherited from: Curve
y2Multiplier	01	UnitMultiplier	inherited from: Curve
y2Unit	01	UnitSymbol	inherited from: Curve
y3Multiplier	01	UnitMultiplier	inherited from: Curve
y3Unit	01	UnitSymbol	inherited from: Curve
aliasName	01	String	inherited from: IdentifiedObject
description	01	String	inherited from: IdentifiedObject
mRID	01	String	inherited from: IdentifiedObject
name	01	String	inherited from: IdentifiedObject

Table 465 – Attributes of Production::StartRampCurve

Table 466 shows all association ends of StartRampCurve with other classes.

mult from	name	mult to	type	description
01	StartupModel	11	StartupModel	The unit's startup model may have a startup ramp curve.
11	CurveDatas	0*	CurveData	inherited from: Curve
01	DiagramObjects	0*	DiagramObject	inherited from: IdentifiedObject
11	Names	0*	Name	inherited from: IdentifiedObject

Table 466 – Association ends of Production::StartRampCurve with other classes

6.6.3.45 StartupModel

Unit start up characteristics depending on how long the unit has been off line.

Table 467 shows all attributes of StartupModel.

name	mult	type	description
fixedMaintCost	01	CostRate	Fixed maintenance cost.
hotStandbyHeat	01	HeatRate	The amount of heat input per time unit required for hot standby operation.
incrementalMaintCost	01	CostPerEnergyUnit	Incremental maintenance cost.
minimumDownTime	01	Hours	The minimum number of hours the unit must be down before restart.
minimumRunTime	01	Hours	The minimum number of hours the unit must be operating before being allowed to shut down.
riskFactorCost	01	Money	The opportunity cost associated with the return in monetary unit. This represents the restart's "share" of the unit depreciation and risk of an event which would damage the unit.
startupCost	01	Money	Total miscellaneous start up costs.
startupDate	01	DateTime	The date and time of the most recent generating unit startup.
startupPriority	01	Integer	Startup priority within control area where lower numbers indicate higher priorities. More than one unit in an area may be assigned the same priority.
stbyAuxP	01	ActivePower	The unit's auxiliary active power consumption to maintain standby mode.
aliasName	01	String	inherited from: IdentifiedObject
description	01	String	inherited from: IdentifiedObject
mRID	01	String	inherited from: IdentifiedObject
name	01	String	inherited from: IdentifiedObject

Table 467 – Attributes of Production::StartupModel

Table 468 shows all association ends of StartupModel with other classes.