National Synchrotron Light Source II –

Nomenclature Standard

LT-ENG-RSI-STD-002

January 31, 2009 Revision 2

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BROOKHAVEN NATIONAL LABORATORY

NATIONAL SYNCHROTRON LIGHT SOURCE – II

NOMENCLATURE STANDARD

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KEY WBS ELEMENTS INFLUENCED

1.3 Accelerator Systems
1.4 Experimental Facilities
1.5 Conventional Facilities
1.6 Pre-Operations

APPROVED

Approved 23 February 2009
Original signed copy on file

BRIEF SUMMARY

The purpose of this document, the National Synchrotron Light Source II Project (NSLS-II) Nomenclature Standard is to establish the conventions used for naming of components in the facility. The nomenclature applies to operating devices in the facility that need to have a 'standard' name to support interfaces and controls. They are not the primary engineering documentation or asset management system names, although they can be related as necessary to the naming standards of those systems. This document is controlled and approved by the Project Director. The development and maintenance of the names in accordance with this standard is delegated to the Division Directors and their designees.

REVISION HISTORY

2008 February 14	Revision 1	Draft Release
2009 January 31	Revision 2	Update signatures and signature authority Revise summary and sections 1.3, 2,3 Establish SharePoint link as authority for names in section 4 Describe instantiation in sections 5 and 6

1 SCOPE

1.1 IDENTIFICATION

The NSLS-II Nomenclature Standard establishes the syntax and conventions for the naming of components utilized in the facility.

1.2 ROLE OF THE NOMENCLATURE STANDARD

This standard has been developed based on the principle that it is one of three information domains for devices to be used within the project. The project recognizes the need for 'Common Names' for the development and design of systems and components. Examples include the physics lattice names for the storage ring, or drawing names for devices like quadrupoles with particular characteristics. The Nomenclature Standard applies when these devices are configured for use in the facility.

For example many copies of a quadrupole of a particular design, based on only one set of drawings for their construction, will be deployed across the facility. As each one assumes its place in the facility, it also assumes a name conforming to the nomenclature standard which is unique to that device in its current application. At the same time, as each component is fabricated, calibrated, placed into service or maintained it begins to acquire its own history. This type of information is maintained in an asset management system (like the NSLS Equipment Information System).

The role of the nomenclature standard is to provide conventions for the unique naming of devices in operation in the facility and to support relation of the information within the other principle information domains for the facility. The syntax has been constructed to work within the rules and limitations of the EPICS (Experimental Physics and Industrial Control System) protocol, since in operations many of the devices will be actively controlled or monitored by the control system, which will utilize EPICS.

Standard assigned names for components conforming to the Nomenclature Standard ***must*** be in use for equipment which is actively controlled or monitored during operations. Equipment which is field serviceable or swappable ***should*** have a standard assigned name. Other equipment ***may*** have a standard name assigned to it when it is deemed by the equipment steward to be beneficial.

1.3 REVISIONS OF THE NOMENCLATURE STANDARD

Changes to the Nomenclature Standard will be managed in accordance with the NSLS-II Configuration Management Plan. Sections 1 through 3 of this document (The Standard) are approved by the NSLS-II project director. Implementation of the standard as outlined in sections 4 through 6 of this document is authorized by the project director. Execution of the standard is delegated to the Division directors and their designees who support the daily implementation of the Nomenclature Standard. This entails maintenance and update of the SharePoint based list of name elements (Nomenclature Names) [http://groups.nsls2.bnl.gov/acceleratorsystems/interface/Lists/Nomenclature Names/NamesbyPart.aspx] as well as inclusion of references based on names developed under this standard in other documents as appropriate (eg. drawings, specifications, statements of work). The Standard will not require review at the project level for development of the elements outlined within sections 4 through 6 of this document and the SharePoint list, as long as those changes do not alter the requirements set forth in the Standard.

2 REFERENCE DOCUMENTS

2.1 GOVERNMENT DOCUMENTS

CD-0 Approve Mission Need for NSLS-II (August 2005)
CD-1 Approve Alternative Selection and Cost Range for NSLS-II (July 2007)
CD-2 Approve Performance Baseline for NSLS-II (December 2007)
CD-3 Approve Start of Construction of NSLS-II (January 2009)

2.2 BNL DOCUMENTS

Standards Based Management System (SBMS)

2.3 NSLS-II DOCUMENTS

NSLS- II Conceptual Design Report December 2006
NSLS-II Global Requirements Document (R4) September 2008
NSLS-II Global Parameters Document (R3) September 2008
NSLS-II Preliminary Design Report November 2007
NSLS-II Storage Ring Physics Nomenclature Standard (LT-ENG-RSI-STD-001 R4 January 2009)

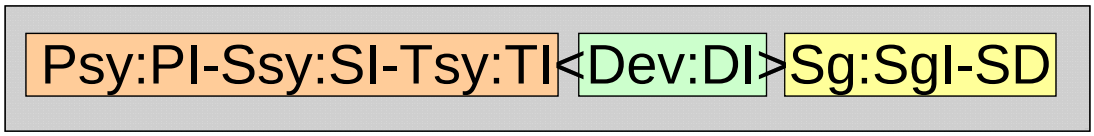
2.4 OTHER DOCUMENTS

IEEE Standard 803.1-1992, "IEEE Recommended Practice for Unique Identification in Power Plants and Related Facilities – Component Function Identifiers"

Instrumentation Society of America (ISA) Standard S5.1, "Instrumentation Symbols and Identification"

3 REQUIREMENTS

The format for the nomenclature standard is shown in figure 1.



System Device Signal

The name components and their stewards are given in table 1.

Naming Elements	Description	Requirements	Steward
Format and Syntax	Entire name	Figure 1 and Syntax rules in table 2	Project Director
System part	Psy:PI-Ssy:SI-Tsy:TI	Section 4.1 of the Nomenclature Standard	
Psy	Primary system		Division Director
Ssy	Secondary system		Group Leaders
Tsy	Tertiary system		Group Leaders
PI, SI and TI	System Instances		System PIC
Device part	Dev:DI	Section 4.2 of the Nomenclature Standard	
Dev	Device name		Group Leaders
DI	Device Instance		System PIC
Signal part	Sg:SgI-SD	Section 4.3 of the Nomenclature Standard	
Sg	Signal		System PIC
SgI	Signal Instance		System PIC
SgS	Signal Domain		System PIC

*PIC Person In Charge, could be engineer, physicist, CAM ….

When a name is required it must at a minimum consist of **<Dev>** (including <> delimiters), when such a name would constitute a unique identifier. Other elements must be employed as necessary to arrive at a unique identification of the component. The syntax rules for names are given in table 2.

Table 2: Syntax rules for the Nomenclature Standard.

	Syntax Rules for the Standard name format
1	Characters in names to conform with allowed EPICS conventions
	Allowed characters a-z A-Z 0-9 _ - : [ ] < > ;
2	Reserved delimiters (not to be used in name elements)
	< System<Device delimiter
	> Device>Signal delimiter
	: Preceds instance when used
	- delimiter system Primary-Secondary-Tertiary
	delimiter signal instance-domain
3	Total name length
	36 characters including delimeters
4	Name taxonomy
	Name consists of parts which consist of elements
5	Required name elements
	a. As a guide, name should include only the parts and elements needed to provide a unique identifier that meets the need for a name
	b. If a name is needed the Device part is the required minimum name.
	c. Within parts the minimum requirement is: System part Primary system name Device part Device name Signal part Signal name
	d. If the system part is used, the elements must be added in order as required to ensure unique identification of the name. Eg Primary-Secondary Allowed Primary-Tertiary *Forbidden*

Section 4 of this document contains examples of the specific name elements to be used for NSLS-II while section 5 describes the guidelines for instantiation. Section 6 provides examples to illustrate how to compose names that conform to this standard.

4 NAME ELEMENTS

This section of the Standard contains sample lists of name elements developed by the Division directors and their delegates to apply to their systems. The number of name elements in use will grow significantly as the project matures. Therefore the actual table of name elements is implemented as a SharePoint list.

This list is configured with approval on a record by record basis. The name element approval authority is delegated by the Project Director to the Division Directors, who may elect to designate members of their staff to maintain the name element list. The Standard itself is controlled at the project level since it must be enduring to be useful and will be functionally revised only when shown to be absolutely necessary.

The following sections use examples of name parts and elements to illustrate the use of the naming convention and instantiation rules. Screen shots of the SharePoint table are provided to guide the reader to the 'live' name elements.

4.1 SYSTEM ELEMENTS

This table provides a sample list of codes and descriptions for use in the system names. In the table the elements are identified as P for primary, S for secondary and T for tertiary system names. Note that some overlap of systems names occurs. For example a system supporting the entire injector (say a utilities system) does not need to have secondary names for the component systems (linac, booster …) if they are not differentiated. The nomenclature standard requires the use of a primary name element before applying a secondary name. A secondary name must be in use for a tertiary name to be applied. For this reason these codes are common unless a name will only be used as a tertiary system. The order in which they are applied will depend on the system configuration.

Name	Description	Element
AS	Accelerator Safety Systems	P
BR	Booster Ring	P
BST	Booster to Storage ring transport line	P
CF	Conventional Facilities	P
CT	Control System	P
GRF	Global RF Systems	P
ID	Insertion Devices	P
Inj	Injector	P
LBT	Linac to Booster transport line	P
LN	Linac	P
SR	Storage Ring	P
XF	Experimental Facilities	P
Al	Aluminum Process Water	S
AM	Area monitoring	S
BI	Beam Instrumentation	S
CHX	Coherent Hard X-ray Scattering	S
CSX	Coherent Soft X-ray Scattering	S
Cu	Copper Water System	S
EF	Experimental Floor	S
EPS	Equipment Protection System	S
FE	Beamline Front Ends	S

Name	Description	Element
HXN	Hard X-ray Nanoprobe	S
IS	Injection straight	S
IXS	Inelastic X-ray Scattering	S
LOB	Lab Office Building	S
MG	Magnet	S
MZ	Mezzanine (over storage ring)	S
OC	Operations Center	S
PCW	Process Chilled Water	S
PPS	Personnel Protection System	S
PS	Power Supply	S
PU	Process Utilities	S
RF	RF System	S
SB	Service Building	S
TS	Timing System	S
VA	Vacuum	S
XAS	X-ray Absorption Spectroscopy	S
XPD	X-ray Powder Diffraction	S
CAV	Cavity for an RF system	T

4.2 DEVICE NAMES

This table provides a sample list of codes and descriptions for the device names. The structure of the device part of the name is the least complicated of the name parts, but in practice selection of the device names themselves can be subtle. For example an RF cavity is not a device; it is (in the case of NSLS-II) classified as a tertiary system. The tuners, temperature sensors and flow monitors associated with the cavity that interact with the control system are classified as devices. Depending on how it interacts with the control system something that might otherwise be regarded as a system can be classified as a device. For example a complex assembly like a cryopump may interact with the control system as only recording an Operational or Not-Operational condition, so the cryopump could be a device.

In considering the placement of a name within the nomenclature system it is well to remember that the key rule is to maintain unambiguous names. If this rule is respected, the actual placement of the name is a secondary consideration. In practice the experience person in charge (PIC) of the equipment probably provides the best guidance for how the name should be formulated since they will need to live with the consequences of the choice.

Name	Description
3PW	3-Pole Wiggler
ABSC	crotch absorber
ABSD	distributed absorber
ABSF	flange absorber
ABSS	stick absorber
ABSW	wiggler absorber
BAKJ	bakeout heating jackets
BHS	High Stability electron Beam position monitor
BLA	Large Aperture electron Beam position monitor
BLW	non-rf bellows
BLWR	rf shielded bellows
BSA	Small Aperture electron Beam position monitor
CCG	cold cathode vacuum gauge
CER	ceramic chambers?
CHMA	aluminum chamber
CHMC	ceramic chamber instead of CER?
CHMS	stainless chamber
CRP	cryopump?
DW	Damping Wiggler
EPU	Elliptically Polarizing Undulator
FDTH	feedthru?
FIV	foreline isolation valve
FLG	flange?
FLW	water flow meter
FV	fast valve
FVS	fast valve sensor
GV	gate valve (may be used for FE and BL)

Name	Description
IP	sputter ion pump
IPC	ion pump controller
IVU	In-Vacuum Undulator
LD	leak detector
Lin	Linac (Tanks)
MP	mechanical pump (separate name for dry MP?)
Mtr	Motor
NEG	non-evaporable getter pump
NEGC	NEG pump controller
NSW	Network Switch
PIV	pump isolation valve (may be similar to RV?)
PRV	pressure relief valve
QDP	Quadrupole magnet
RAV	right angle valve
RGA	residual gas analyzer / partial pressure analyzer
RP	roughing pump (may be similar to MP)
RV	roughing valve
SGV	sector gate valve
STD	chamber stands
STP	Sextupole magnet
TC	thermocouple for temperature
TCG	thermal conductivity vacuum gauge
TMP	turbomolecular pump and turbopump station
TSP	titanium sublimation pump
TSPC	titanium sublimation pump controller
VBD	vacuum burst disc (or diaphragm)
VGC	vacuum gauge controller

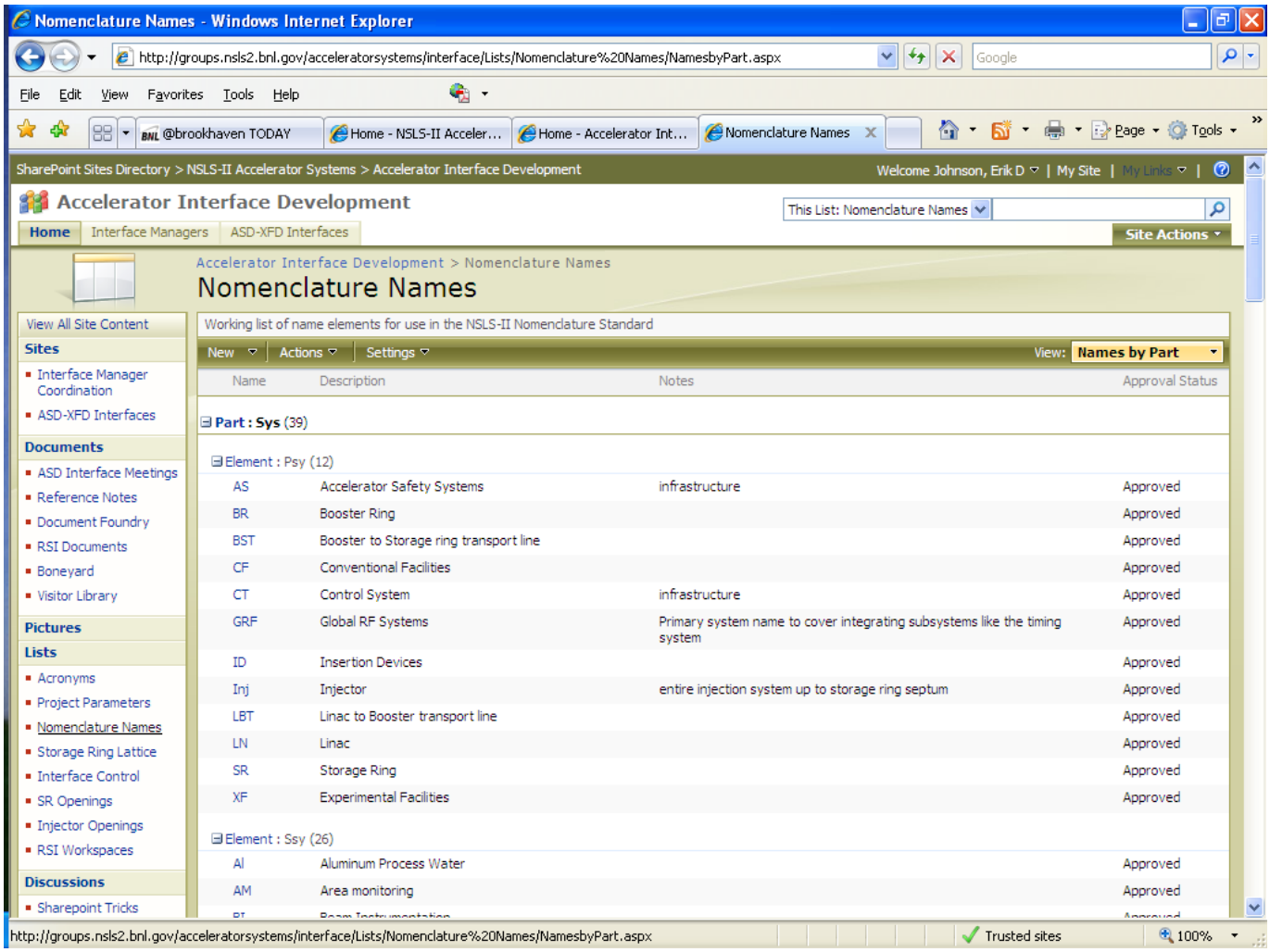
4.3 SIGNAL ELEMENTS

This table provides a sample list of codes and descriptions for use in the signal names. In the table the elements are identified as being either the Signal or the Signal Domain (usually analog or digital).

Name	Description	Element
CCWL	At Counter Clockwise Limit / Not at Counter Clockwise Limit	Domain
Cls	Open / Close	Domain
COUT	Controller output	Domain
CV	Constant Velocity / Not Constant Velocity	Domain
CWL	At Clockwise Limit / Not At Clockwise Limit	Domain
Dwn	Up / Down	Domain
Flt	Normal / Fault	Domain
Go	Stop / Go	Domain
In	In / Out	Domain
Lim	At limit / not at limit	Domain
Mv	Moving / Stopped	Domain
NCCWL	At Counter Clockwise Limit / Not at Counter Clockwise Limit	Domain
NCV	Constant Velocity / Not Constant Velocity	Domain
NCWL	At Clockwise Limit / Not At Clockwise Limit	Domain
Nlim	At limit / not at limit	Domain
NMv	Moving / Stopped	Domain
NOK	OK / Not OK	Domain
NOP	Operational / Not Operational	Domain
Norm	Normal / Fault	Domain
Off	On / Off	Domain
OK	OK / Not OK	Domain
On	On / Off	Domain
Opn	Open / Close	Domain
Ops	Operational / Not Operational	Domain
Out	In / Out	Domain
RB	Readback	Domain
SP	Setpoint	Domain
Stp	Stop / Go	Domain
Up	Up / Down	Domain
E	Voltage	Signal
F	Flow	Signal
I	Current	Signal
K	Time	Signal
L	Level	Signal
P	Pressure	Signal
Pos	Position	Signal
S	Speed	Signal
Sw	Switch	Signal
T	Temperature	Signal
V	Vibration	Signal
W	Weight or Force	Signal

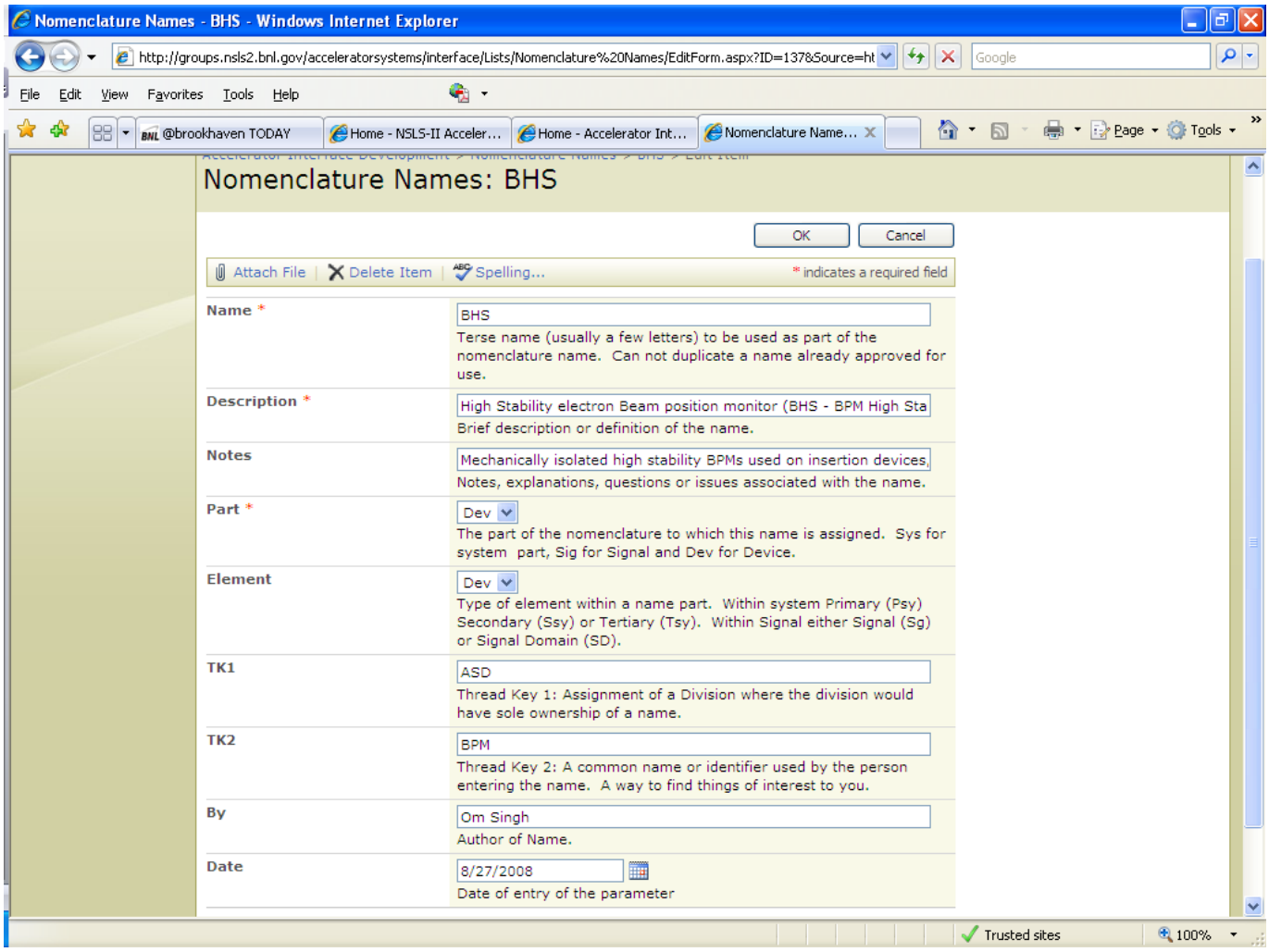
4.4 SHAREPOINT LIST

Screen shots of the current SharePoint Nomenclature Names interfaces are provided to assist the reader in interacting with the 'live' name list. The first is a copy of the screen showing the name list grouped by part. Note that the full web address is visible in the URL address bar. The names in the tables in sections 4.1, 4.2 and 4.3 were directly copied from this table from the 'All Items' view, which presents the data as a spreadsheet.



The list can be invoked by touching the 'Nomenclature Names' entry under 'Lists' on the quick launch bar at the left of the screen. This view groups the names by part. Groups can be expanded or collapsed by touching the + or – boxes on the view. As shown above all elements are expanded and only the System names including the primary system (Psy) and part of the secondary (Ssy) names are visible. Touching an entry offers options including viewing the details for the entry or editing the entry.

This screen shot is the view which is presented when an entry is to be created or edited. Annotation is provided for each field on the entry form to guide the creation of a new record (name). In addition to the data fields that are usually seen on the summary pages thread keys are available that can be used for providing custom cuts or 'views' through the data base that are of interest. The system also allows for the attachment of files, so if a particular entry requires further explanation this is a method to introduce more metadata to the name record.



5 INSTANTIATION

Instantiation is the method whereby any device and its signals are ultimately uniquely identified. This uniqueness is the absolute minimum requirement that must result from a nomenclature system. Within the framework of this standard tremendous latitude is afforded regarding the details of the instance scheme because the name parts are separated by fixed delimiters. What this means in principle is that arbitrary combinations of letters and numbers can be employed. The particular scheme that is used for a device or a family of devices will ideally support an intuitive understanding of the meaning of the name.

The following guidance should be strongly considered in the application of instantiation to the name parts.

- Where a common naming convention or a specialized organization of a system has been established and formally captured, the elements of that instantiation convention should be employed in composing names that conform to this standard. In some instances a direct one-for-one translation is possible. In others a regular transcription of the elements of the common naming convention into the naming standard is required. A prime example is in the naming of storage ring elements which is largely based on the magnetic lattice symmetry. Although the convention is somewhat idiosyncratic, it is captured and carefully described in a reference document; NSLS-II Storage Ring Physics Nomenclature Standard (LT-ENG-RSI-STD-001 R4 January 2009). A detailed description of this transcription is provided as an example in section 6 of this document.

- Absent a predefined convention, sequential instantiation working in the direction of propagation of a system should be used. An example would be a beamline where the valves would be numbered starting with the closest one to the storage ring being number 1, the next being number 2 and so forth.

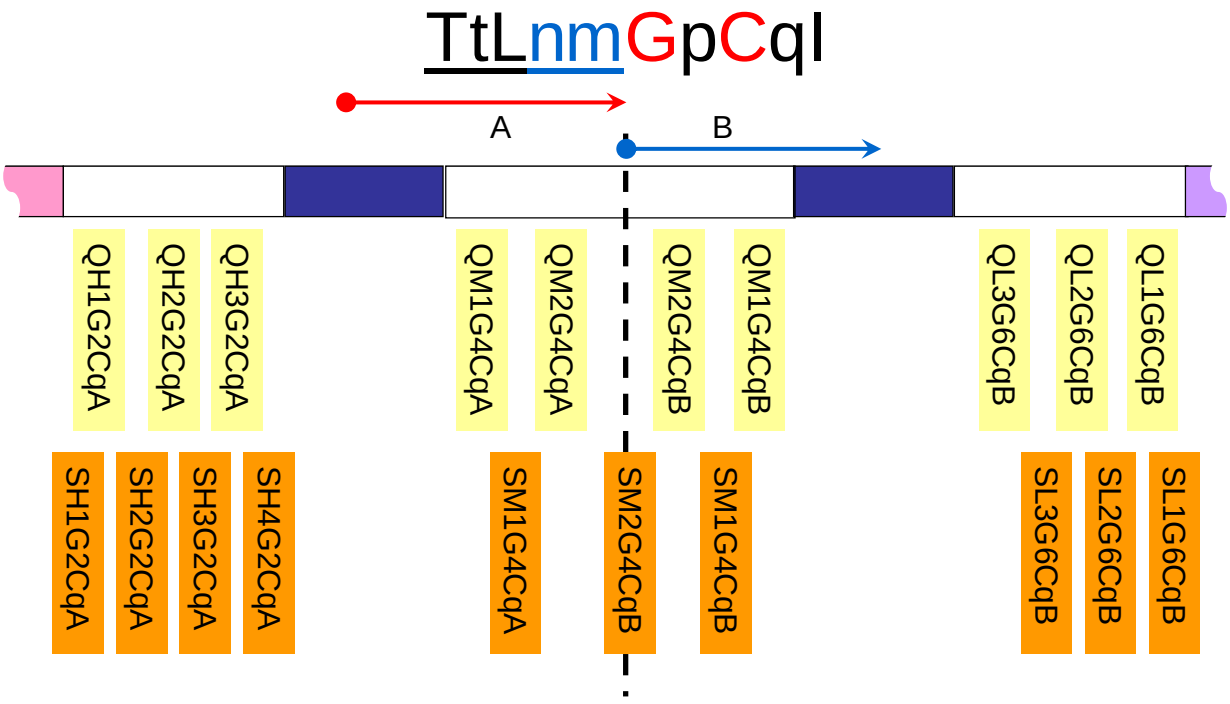
- Where the topology of a system lends itself to an array instantiation (say two beamlines originating from the same source point) a concatenated letter and number instance can be used. For example A1 for the first instance of the device on the A (or outside) branch and B1 for a comparable device on the branch located clockwise from the A branch.

- Where new devices are introduced to a system after the instantiation configuration has been developed and in use, renumbering of entire system is strongly discouraged. For example introduction of a new valve in a beamline between the first and second instance would become instance 1A. If it occurred on the A line of the beamline which has A1 and A2 components the new component would have an instance A1A.

6 COMPOSITION OF NAMES

This section provides examples of the application of the rules and guidelines provided in this standard for the composition of names that can be utilized by the NSLS-II control system. The transcription of the Lattice element names described in the Storage Ring Physics Nomenclature Standard into names that conform to this standard illustrates many of the key concepts. While it may seem complicated it is actually quite regular. The lattice naming system is a 'Common Name' or working convention that is convenient for the accelerator physicists who designed and analyzed the storage ring lattice. For the balance of this discussion it is referred to as the *physics convention*.

The instantiation of the elements of the lattice under the *physics convention* makes sense to the cognoscente, but it at first glance seems rather pathological to a casual observer. It is represented for the main magnets in a High Beta cell of the August 14 2008 lattice in the following schematic.



Where **Tt** represents the element type, **L** is the Girder Indicator, and **I** is the symmetry index. The instantiation of the elements is represented by *nm* for the elements, *p* for the girder, and *q* for the cell. The letters **G** and **C** are used as fixed delimiters for the Girder (or group) and the Cell respectively. The element types are generally single letters for the more standard components (Bends, Correctors, Quads, Sextupoles) but the option is held out for two characters for less frequently used elements (DEcapoles, OcTapoles, Skew Quads), or to distinguish between functionally identical but physically different elements (B1 for 35 mm aperture dipoles, B2 for 90 mm aperture dipoles).

The structure of the *physics convention* name does not order the elements from the largest scale component or subsystem to the smallest (as required by this standard). It also has instance information (symmetry) that is useful for its intended purpose that is not usually found in a sequential instancing scheme. Within this standard it can be included as part of the instance for the name.

Consider composing the name for the readback of the magnetic field of the first sextupole located in cell 12 of the storage ring. It would be the one on the left of the schematic on the previous page.

In the *physics convention* **TtLnmGpCqI** for this specific magnet is

SH1G2C12A

indicating the **S**extupole closest to the **H**igh beta straight which is the first (**1**) sextupole on **G**irder **2** of **C**ell **12** and possessing the **A** symmetry index (locating it somewhere down-beam of ID center to the center of the M girder). To transcribe to the Nomenclature Standard name we need to map the physics convention name elements and add the information for the signal (a readback).

The *Nomenclature Standard* name is of the form **Psy:PI-Ssy:SI-Tsy:TI<Dev:DI>Sg:SgI-SD**

comprised of the following name parts **System< Device >Signal**

which for this example composes as **SR:C12-MG:G02A<STP:H1>Fld:RB**

where in this case the Primary system (Psy) is the storage ring, which is designated as **SR** (from the sample names in section 4.1). We take the primary system instance (PI) of the storage ring to be **C12** (Cell 12), the most coarse division of the storage ring. The secondary system (Ssy) for this example is a magnet, **MG** from the same table. The secondary system instance (SI) is related to the next level of granularity of the physical system, in this case described as **G02A** indicating Girder 2 and including the symmetry index **A** from the physics convention, which is helpful point of reference for the users of the name. In this case there is no tertiary subsystem, so it is omitted from the System Part of the name.

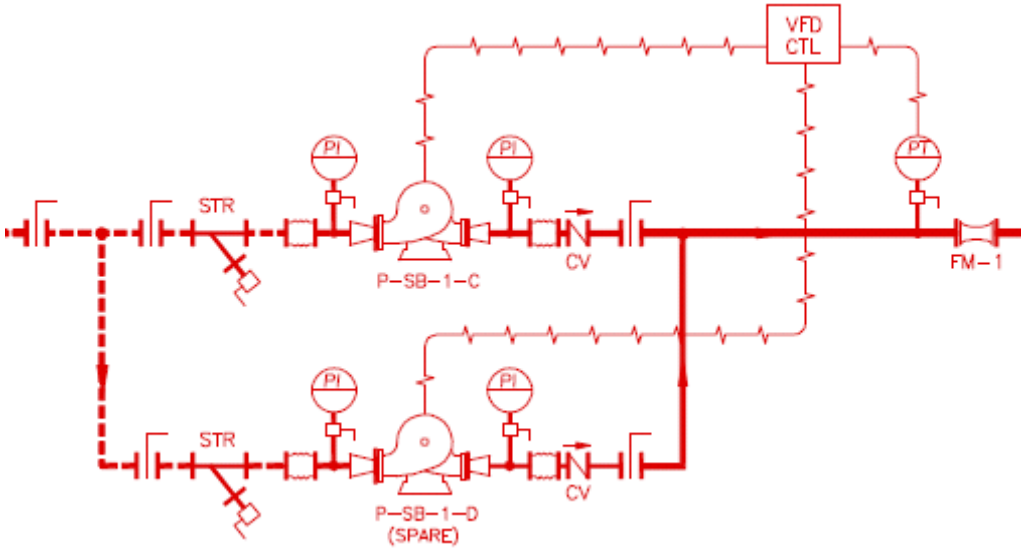
The device name (Dev) is **STP** indicating a sextupole magnet (from the device table in section 4.2). The device instance (DI) is extracted from the physics convention as **H1**, again retaining a helpful point of reference for the users of the name.

The signal part of the name is not an element of the *physics convention*, but for this example the Signal (Sg) is **Fld** (magnetic field) and the Signal Instance (SgI) is **RB** indicating a readback. Another instance could be **SP** (SetPoint) of the magnet field.

While explaining the transcription takes a page or more of text, once the rules are understood parsing names is fairly straightforward with any number of tools. For reference the field readback names for the magnets in the schematic on the previous page are listed below:

Girder 2	Girder 4	Girder 6
SR:C12-MG:G02A<STP:H1>Fld:SP	SR:C12-MG:G04A<QDP:M1>Fld:SP	SR:C12-MG:G06B<QDP:L3>Fld:SP
SR:C12-MG:G02A<QDP:H1>Fld:SP	SR:C12-MG:G04A<STP:M1>Fld:SP	SR:C12-MG:G06B<STP:L3>Fld:SP
SR:C12-MG:G02A<STP:H2>Fld:SP	SR:C12-MG:G04A<QDP:M2>Fld:SP	SR:C12-MG:G06B<QDP:L2>Fld:SP
SR:C12-MG:G02A<QDP:H2>Fld:SP	SR:C12-MG:G04B<STP:2H>Fld:SP	SR:C12-MG:G06B<STP:L2>Fld:SP
SR:C12-MG:G02A<STP:H3>Fld:SP	SR:C12-MG:G04B<QDP:M2>Fld:SP	SR:C12-MG:G06B<QDP:L1>Fld:SP
SR:C12-MG:G02A<QDP:H3>Fld:SP	SR:C12-MG:G04B<STP:M1>Fld:SP	SR:C12-MG:G06B<STP:L1>Fld:SP
SR:C12-MG:G02A<STP:H4>Fld:SP	SR:C12-MG:G04B<QDP:M1>Fld:SP	

For process utilities the 'Common Name' conventions are embedded in the drawing sets which usually include a legend describing the symbols used for a particular drawing set. A small section of the flow diagram for an Aluminum process water system is included here to illustrate the composition of *Nomenclature Standard* names for this type of system.



The pumps (P) in this diagram are located in service building 1 (SB-1) which serves the first pentant of the storage ring. They move water from left to right on this diagram, drawing water into the suction side (left) of the pump and expelling it on the discharge (right) side. As drawn the C pump is 'on-line' and the D pump is in place as a hot spare, ready to be brought on line should pump C fail or need to be turned off for maintenance. These pumps have Variable Frequency Drive (VFD) motors that adjust the speed of the pump motor in operation to maintain a desired discharge pressure as measured by the pressure transducer (PT) at the right of the diagram. The box labeled VFD CNT is a schematic representation of this control loop. The actual implementation would be shown on a different diagram that would indicate the actual control hardware and signals. For the purposes of illustration we describe some of the required signals and introduce a simple spreadsheet as a name composition tool.

Examples	Description
SR-PU-Al:1<Pmp:C>	The C instance of a pump of the 1 (first pentant) Aluminum Process Utility system of the Storage ring (Device identifier only, no signal name part)
SR-PU-Al:1<PT:1>P:1-RB	Pressure readback from Pressure Transducer 1 on the Aluminum Process Utility system for pentant 1 of the storage ring (what is the pressure in the system?)
SR-PU-Al:1<Pmp:C>VFD:1-COUT	VFD controller output voltage for Pump C of the Aluminum Process Utility System for Pentant 1 of the Storage Ring (Set the Variable Frequency Drive speed)
SR-PU-Al:1<Pmp:C>VFD:1-Ops	VFD Operation Status for Pump C of the Aluminum Process Utility System for Pentant 1 of the Storage Ring (is Pump C running?)
SR-PU-Al:1<Pmp:D>VFD:1-NOP	VFD Operation Status (Not Operational) for Pump D of the Aluminum Process Utility System for Pentant 1 of the Storage Ring (is Pump D off?)

The example names were composed by examining the schematic and substituting component names from the Nomenclature Names table. The rules described in earlier sections of the *Nomenclature Standard* are utilized. The system part of the name is composed from the least granular element (the Storage ring) to the next (Process Utilities) to the specific utility, in this case the Aluminum system. For this situation the only system that requires an instance is the Tertiary system since there are five of them, one located in each service building. In this particular example the flow diagram relates to service building 1, so the instance for the Aluminum system is just the number 1. It could be instanced as SB1 if the users of the name felt that would help in understanding the name. As composed for this example the system name is common and is **SR-PU-Al:1** .

For the example three devices were used, two pumps and a pressure transducer. The pumps were distinguished on the diagram by instances C and D. There is only one Pressure Transducer so it was given the instance 1.

To quickly compose these names a simple excel spreadsheet tool was used that is shown below. One simply enters the name elements and the name parts are composed and a candidate name is constructed. Delimiters are included automatically if they are required. The tool also checks the length of the name to make sure it is within the 36 character limit imposed by the EPICS name standard. The composition of the VFD controller output that sets the motor rotational speed is shown.

Name Composition Tool

	System									
Reqd		Opt		Opt		Opt		Opt		Opt
Psy	:	PI	-	Ssy	:	SI	-	Tsy	:	TI
SR			-	PU			-	Al	:	1

Don't include delimiters, there are added automatically

	Device			
	Reqd		Opt	
<	Dev	:	DI	>
<	Pmp	:	C	>

System	SR-PU-Al:1
Device	<Pmp:C>
Signal	VFD:1-COUT

Enter elements for candidate devices

	Signal			
Reqd		Opt		Opt
Sg	:	SgI	-	SD
VFD	:	1	-	COUT

Enter elements for candidate signals

Full Name	*Length*	27

Count of the number of characters for the candidate name (36 or less allowed)

SR-PU-Al:1<Pmp:C>VFD:1-COUT

This is the full name

As names are composed for a system it may be helpful to create a table as shown on the previous page. If a degenerate name is ever proposed (one that is already in use) the reasoning behind the composition of the name could be useful in resolving the conflict.