Reporting Control Devices for Point Sources

September 15, 2025

Training Session 1

Before we begin…

- Disclaimer: This training on reporting control devices is intended for instructional purposes only. Data shown in the training are illustrative, and do not represent a real report for any facility or inventory year. None of the examples represent a complete report.
- This training does not cover examples of *all* possible control device configurations. You should always consult with the Point Source staff at EPA to discuss specific cases you may have questions about.

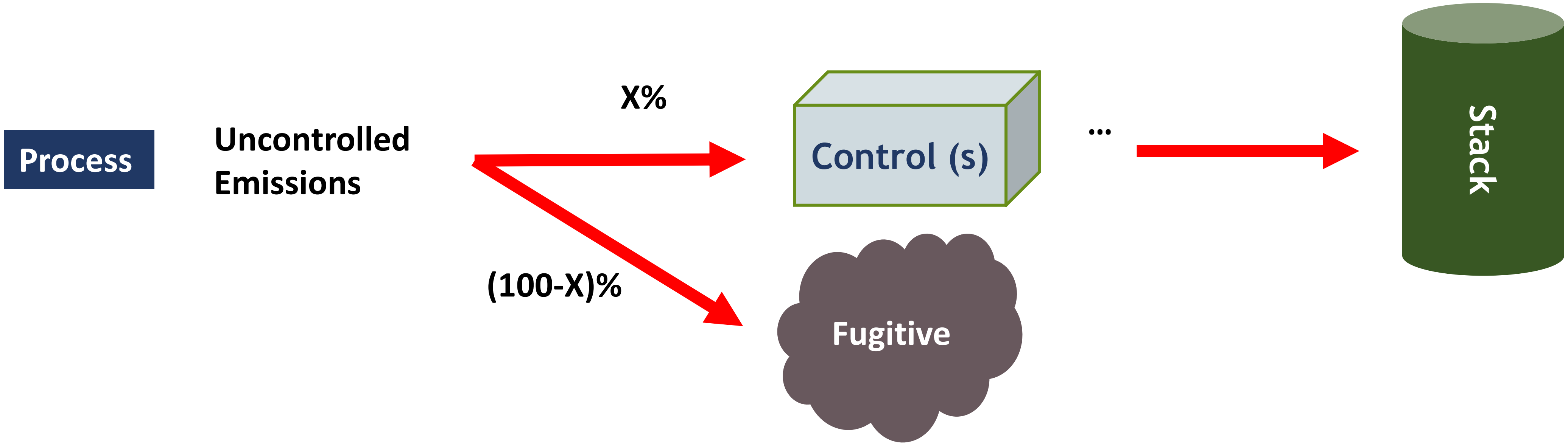
Outline of Training

- Control-related concepts and data fields
- Entering data for different control configurations
  - No control devices
  - Single control device
  - Controls in series
  - Controls in parallel
  - Complex control device configurations
- Examples of Different Control Configurations
- Questions

Control-related Concepts and Data Fields

Release Point Apportionment

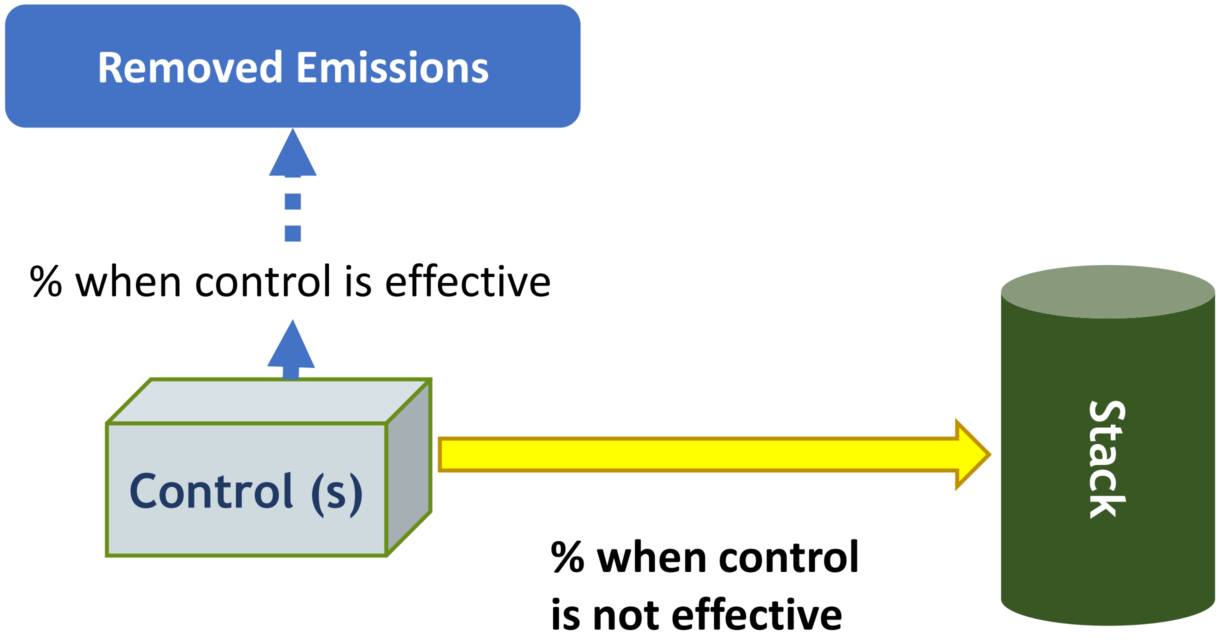
Percent release point apportionment: The average annual percent of an emissions process that is vented through a release point. The percent of emissions that are sent to a *stack release point* through controls is also referred to as "capture efficiency". **Percent captured** = Percent pollutant stream routed to the device going to "stack" type release points (X%). Percent not captured = Percent going to "fugitive" release point (100-X)%



Note that 100% of the original emissions must be assigned to one or more release points

Percent Control Device Effectiveness

Percent control effectiveness: The percentage of time or activity throughput that a control approach is operating as designed, including the capture and reduction devices. This percentage accounts for the fact that controls typically are not 100% effective because of equipment downtime, upsets and decreases in control efficiencies. This could be estimated from the amount of time the control is operational, versus down for maintenance or repairs. When the control is not effective, the pollutant is not removed from the emissions stream.

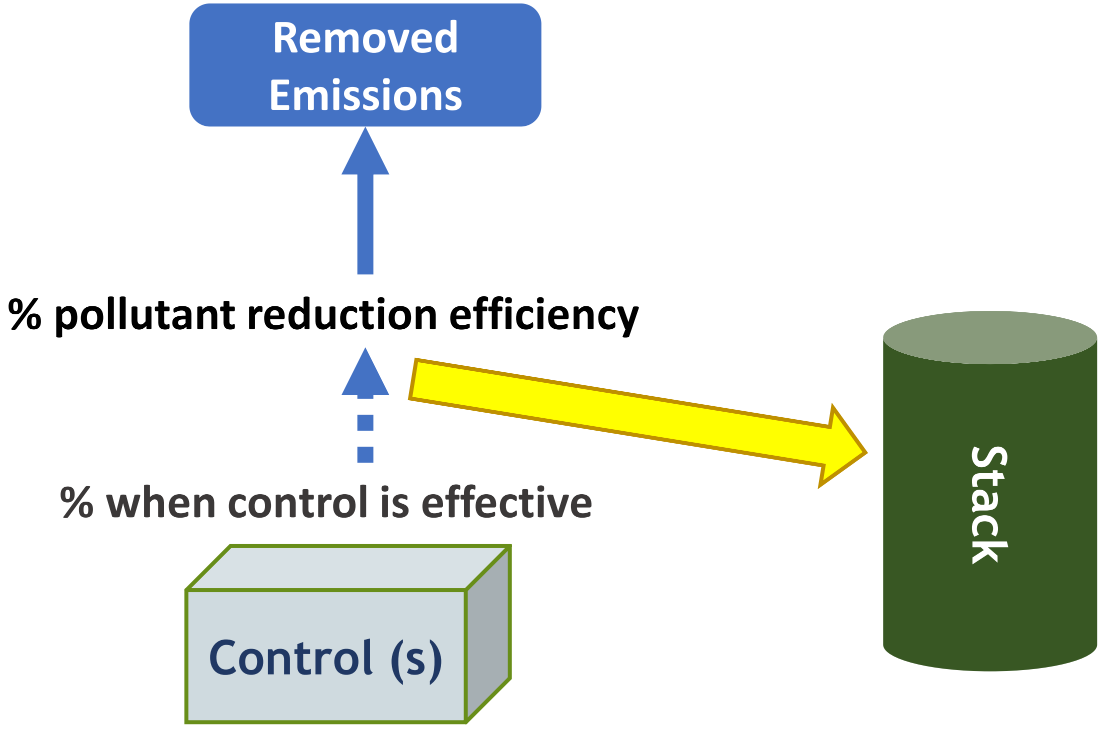


Example:
Control Effectiveness =
(2000-200)/(2000) *100 = 90%, where:

- the emissions Process or Unit ran for 2000 hours.
- the Control Scenario was operationally down for 200 hours for maintenance.

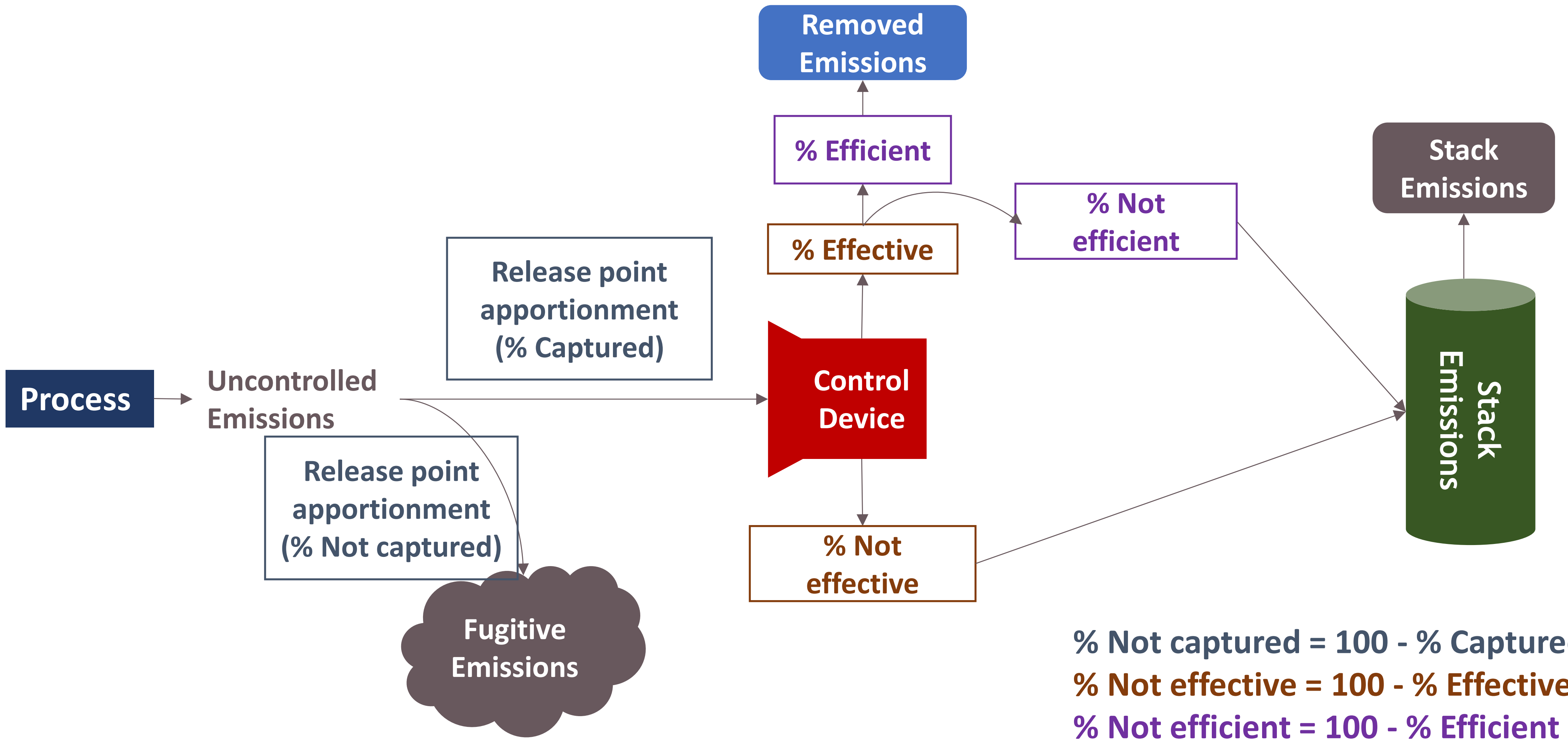
Control Percent Pollutant Reduction Efficiency

Percent Pollutant Reduction Efficiency: The percent reduction achieved for the pollutant when all control measures are operating as designed. This information could be obtained from the vendor or test data, for example.



Example:
The control device removes 95% of the pollutant.

Flow of Uncontrolled Emissions



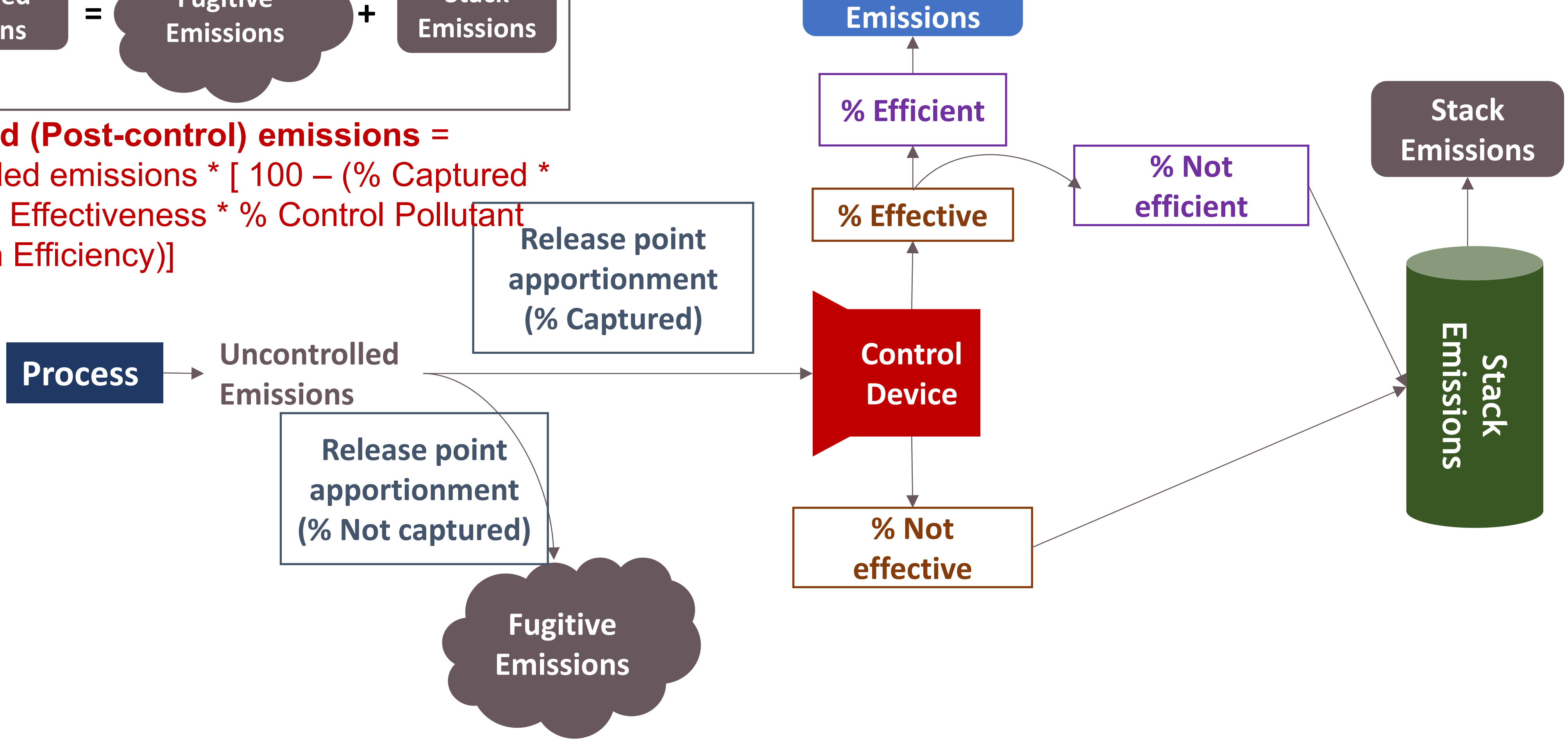
% Not captured = 100 - % Captured

% Not effective = 100 - % Effective

% Not efficient = 100 - % Efficient

Controlled (Post-Control) Emissions

Controlled (Post-control) emissions =
Uncontrolled emissions * [100 – (% Captured * % Control Effectiveness * % Control Pollutant Reduction Efficiency)]



Accounting for the Entire Emissions Stream

- Uncontrolled emissions apportioned to release points = fugitives + captured emissions (emissions apportioned to non-fugitive or stack release points)
- Captured emissions = emissions when control is effective + emissions when control is not effective
- Emissions from effective control = removed + not removed if control is not 100% efficient
- Removed emissions = uncontrolled emissions * capture * control effectiveness * control pollutant reduction efficiency
- Controlled (Post-control) Emissions = uncontrolled emissions * (1 – captured * control effectiveness * control pollutant reduction efficiency)

Reporting Control Devices

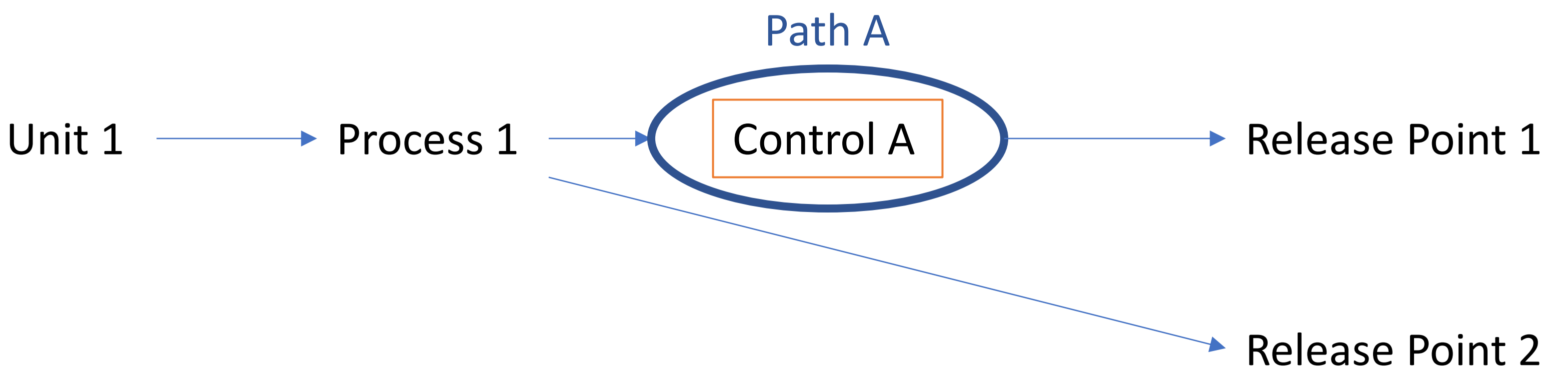
- Individual control devices are listed for the facility.
- Pollutants removed by each control device are listed with it.
- Control device configuration is defined:
  - Single
  - In series
  - In parallel
  - Combinations / Complex Configurations
- Are placed in paths individually or with other control devices to associate them between a units/processes and release points so we may track the emissions stream flow.

Paths

Path: A “container” of one or more control devices that are connected, and through which an emissions stream flows.

- ***Child* Path:** is a path contained within another path
- ***Parent* Path:** contains one or more child paths and may also contain additional control devices. A parent path can be a child path to a larger parent path
- ***Primary or Main* Path**:
  - Contains one or more control devices and/or child paths
  - Is the path ultimately associating the control devices/paths it contains from a unit/process to a release point

Simplest Example of a Path



Path Concepts

Control Path Assignment: the position that a control devices occupies within a path with respect to other control devices contained in that path. The first control device in a path is assigned 1.

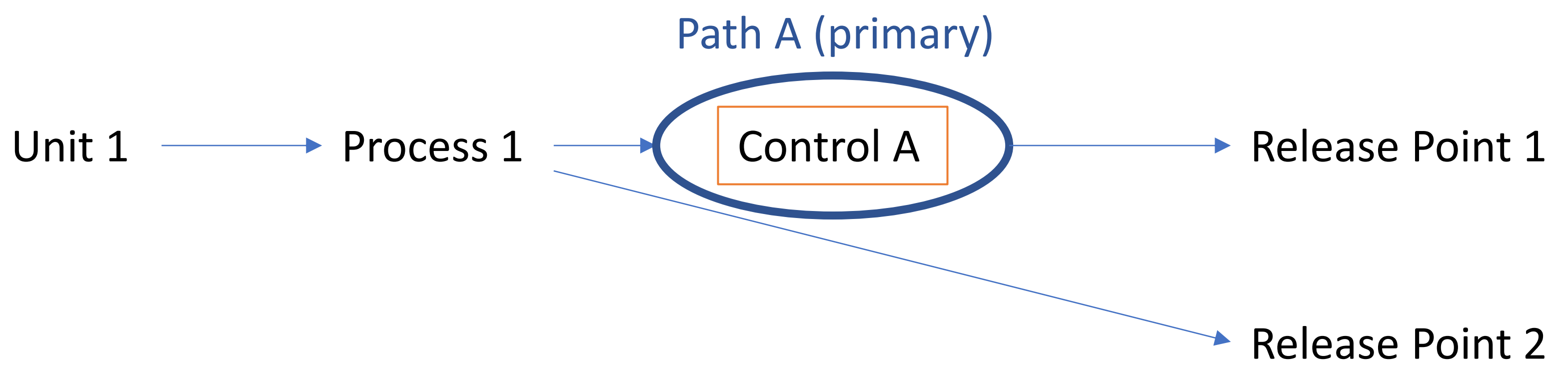
Control Apportionment: the percentage of the emissions that are being directed to the next control or path.

Path Effectiveness: The combined effectiveness of the controls in that path. Must be reported on a main or primary path.

Path Pollutant Percent Reduction Efficiency: The combined percent reduction efficiency of the pollutant for the entire path. Must be reported on a main or primary path.

Single Control Device

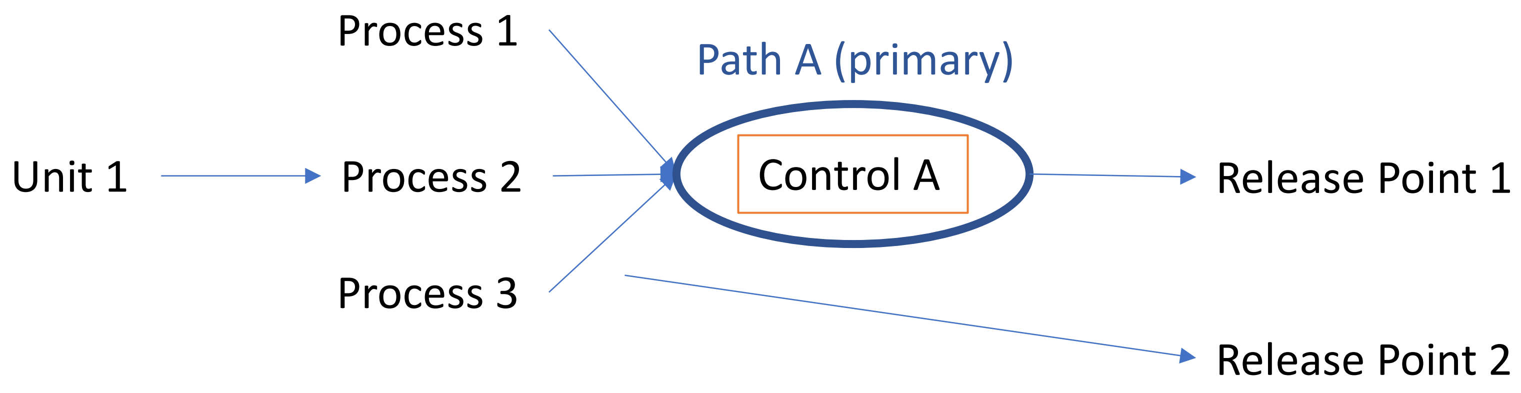
For a single control device one path is needed. The control is placed in that path. That path will be the primary path, and it will associate the process to the release point. Because there's only one control, path assignment is just equal to 1.



Information You Need: release point apportionment (% to Release Point 1 and 2), control effectiveness, pollutant reduction efficiency, path assignment = 1, control apportionment = 100%, path effectiveness = control effectiveness, path efficiency = control efficiency.

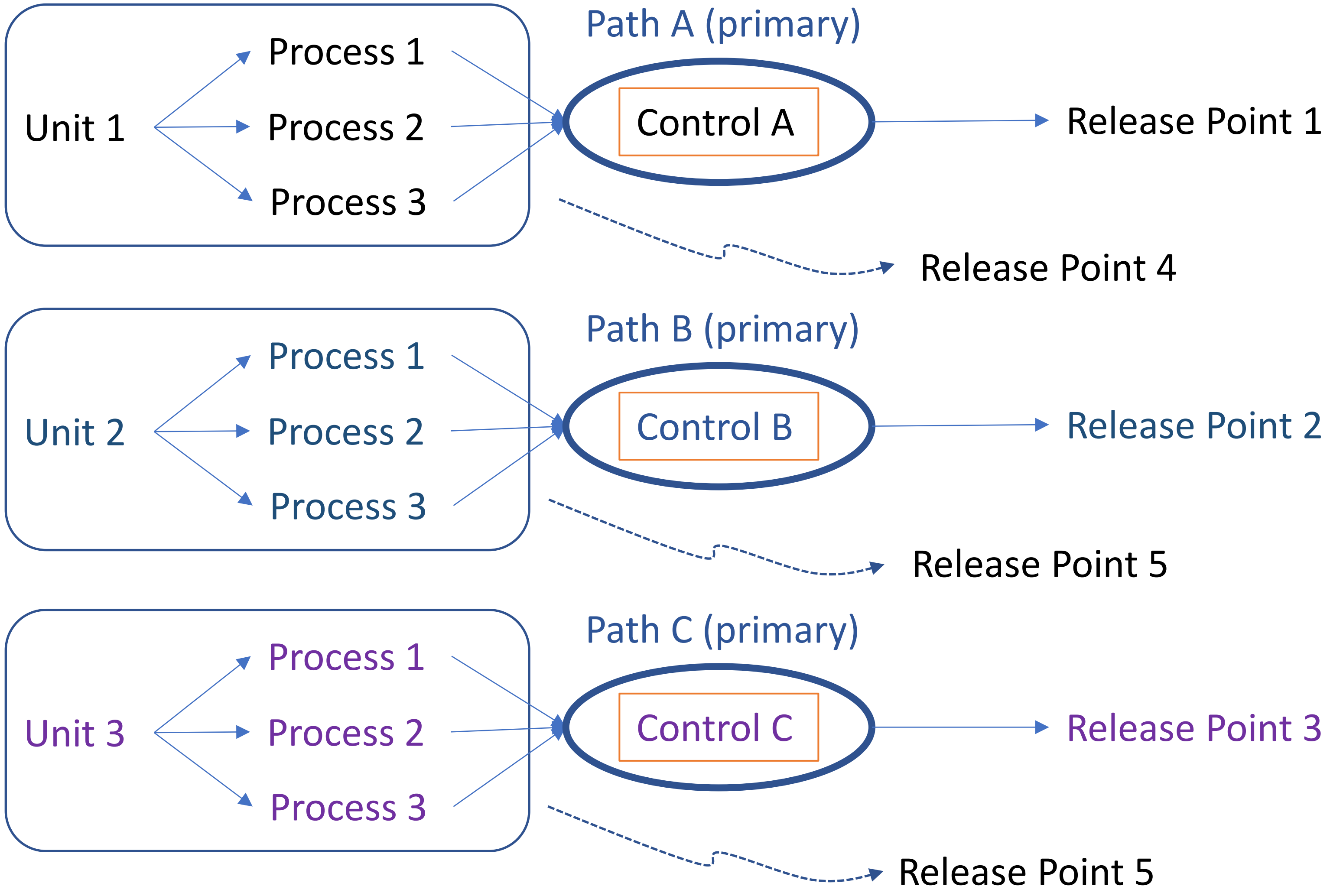
Single Control Device on Multiple Units/Processes

Note that once this path is created for a single control device, any process sending emissions to the same release point can also use that path. So, you only have to create that path once, then reuse it as needed for each process.



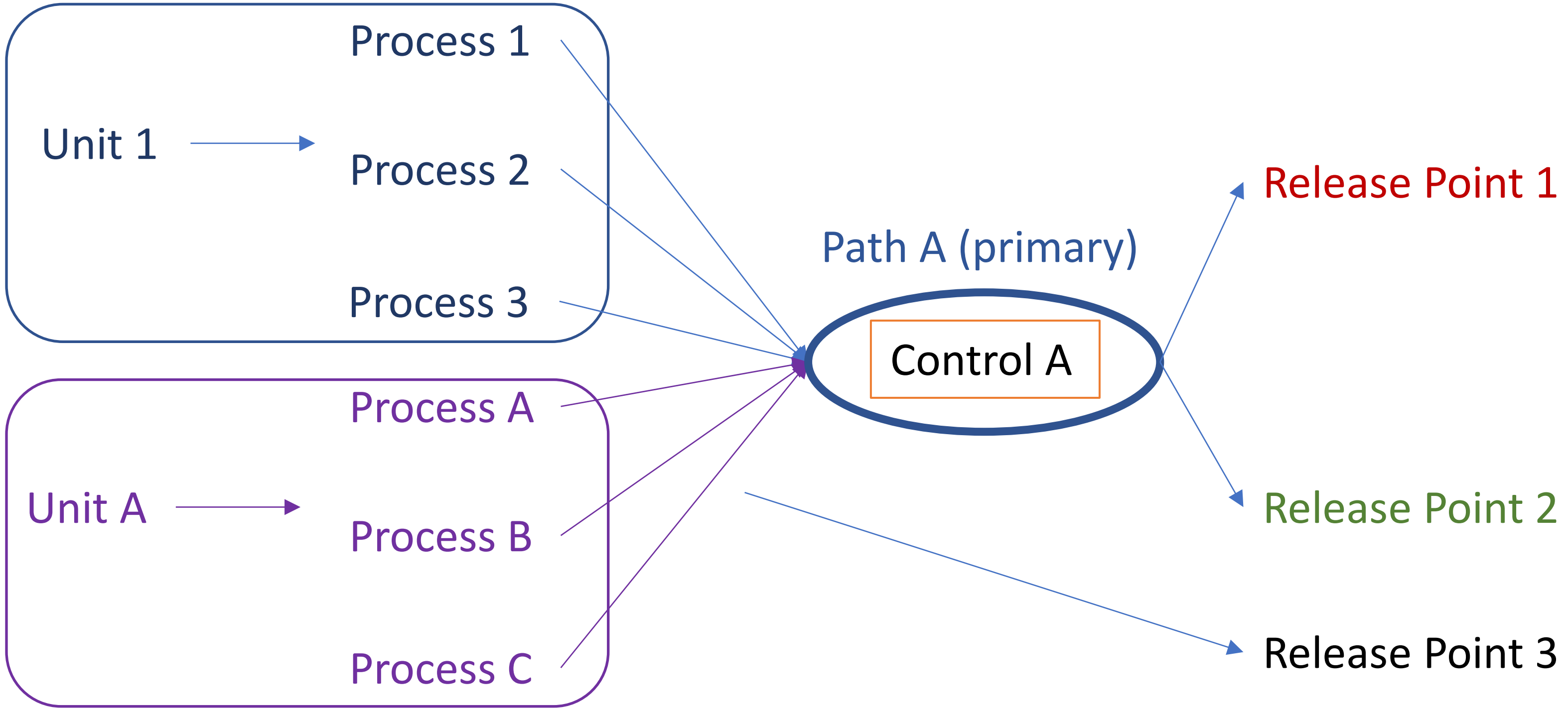
Information You Need: release point apportionment, control effectiveness, pollutant reduction efficiency, path assignment = 1, control apportionment = 100%, path effectiveness = control effectiveness, path efficiency = control efficiency.

Multiple “Single Control Devices”



The case of multiple control devices that are “single” controls between a unit/processes and release point is the same as for a single control. One path is created for each control and each path associates the unit/process with the respective release point. Path assignment = 1 and control apportionment = 100%, path effectiveness = control effectiveness, path efficiency = control efficiency, for each control device in each of its paths

Single Control Device on Multiple Units/Processes/Release Points



A path can be shared by units/processes if they all direct their emission through the control(s) in that path and also "share" release points

Information You Need: release point apportionment (% to Release Points 1,2, and 3), control effectiveness, pollutant reduction efficiency, path assignment = 1, control apportionment = 100%, path effectiveness = control effectiveness, path efficiency = control efficiency.

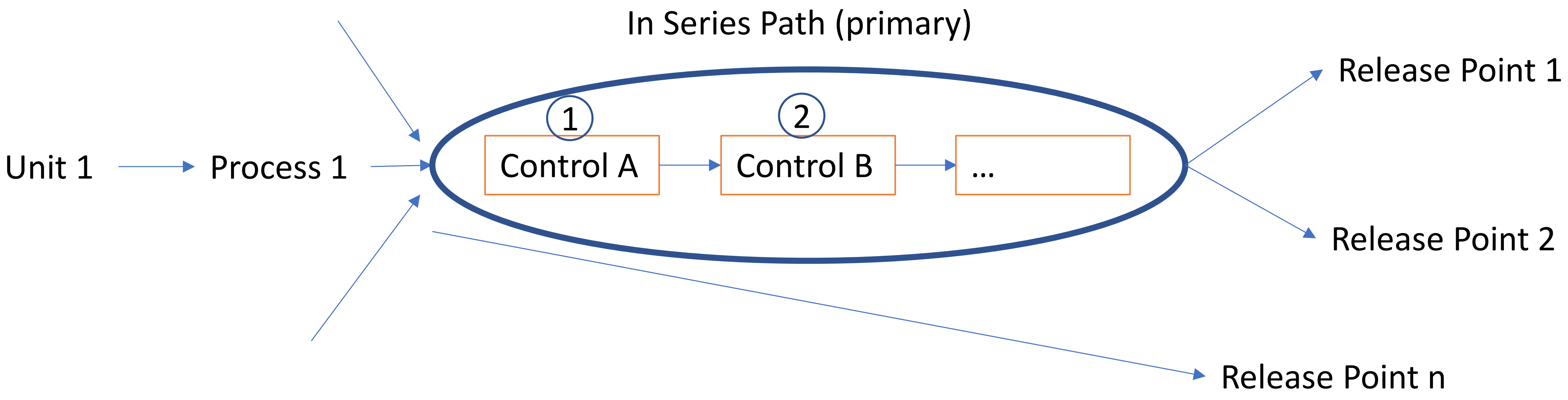
Control Path Assignment

A **Control Path Assignment** defines the order in which control devices are configured, each control or child path is given a sequence number:

- Increasing “sequence number” if in sequence
- The same “sequence number” if in parallel

Multiple Control Devices – In Series

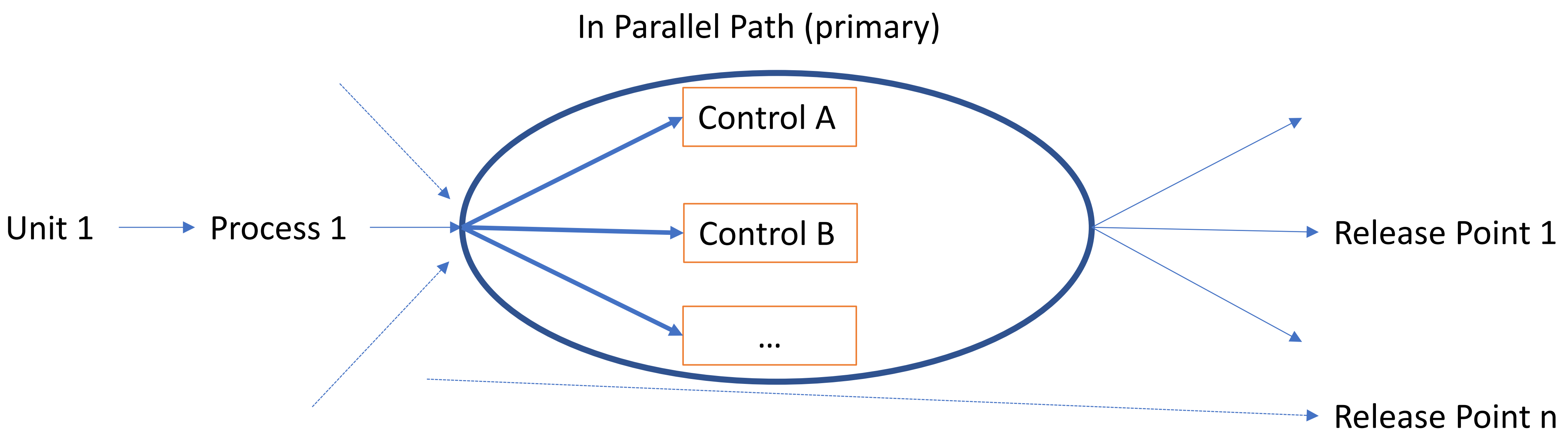
Multiple controls in series can be placed in a path and that path can be reused by many processes going to the same release point(s), if it is the primary path between each process and release point(s), as in the previous slide.



Information You Need: release point apportionment, control effectiveness, pollutant reduction efficiency, *path assignment* (position of control in the sequence; control A=1, Control B=2,…), control apportionment = 100%. Path efficiency and effectiveness are a combination of the efficiency and effectiveness of the individual controls. Consult your SLT for appropriate calculation method to use. See slides 33-38.

Multiple Control Devices – In Parallel

Multiple control devices in parallel can be placed in on path and that path can be reused if it is the primary path, so long as it associates units/processes with the same release point(s).



Information You Need: release point apportionment, control effectiveness, pollutant reduction efficiency, path assignment (position of control in the sequence, if parallel, all controls have the same sequence number), control apportionment (e.g. 33% per control). Path efficiency and effectiveness are a combination of the efficiency and effectiveness of the individual controls. Consult your SLT for appropriate calculation method to use. See slides 33 to 38.

Control Apportionment

Flow of emissions from one control device to the next will be tracked via the **Control Apportionment**

- % of the emissions are routed to the next control or path.
- 100% of the emissions are tracked, a control apportionment percentage < 100% for a control device means that some emission are also being routed to another control device or path.
- Are entered when entering control path assignment data.

Release Point Apportionment (revisited)

- Different than control apportionment
- Total uncontrolled emissions generated at the unit/process must be accounted for in terms of where they were ultimately released:
  - Different types of release points
    - Stack (captured)
    - Fugitive
  - 100% of the original emissions must be assigned to one or more release points

Percent Path Effectiveness

- *Required* on main paths (those associated with a release point apportionment)
- If only one control device is in the path, it is equal to the percent control effectiveness for that control.
- Depends control device configuration (in sequence, parallel, a combination):
  - In series: the multiplication of % control effectiveness,
  - In parallel: the average or weighted average of control device effectiveness.
- Consult your SLT on the best way to represent path effectiveness, especially if you have a complex control configuration.
- Entered in the screen for each path.

Path Pollutant Percent Reduction Efficiency

- *Required* on main paths (those associated with a release point apportionment)
- If there is only one control device, then it is the same as the control percent reduction efficiency.
- If there are more than one control device reducing the same pollutant, it is a combination of the reduction efficiency of all those devices.
- Depends control device configuration (in sequence, parallel, a combination).
- Consult your SLT on the best way to represent path effectiveness, especially if you have a complex control configuration.

Steps to Enter Data

General Data Entry Steps for Control Devices and Paths

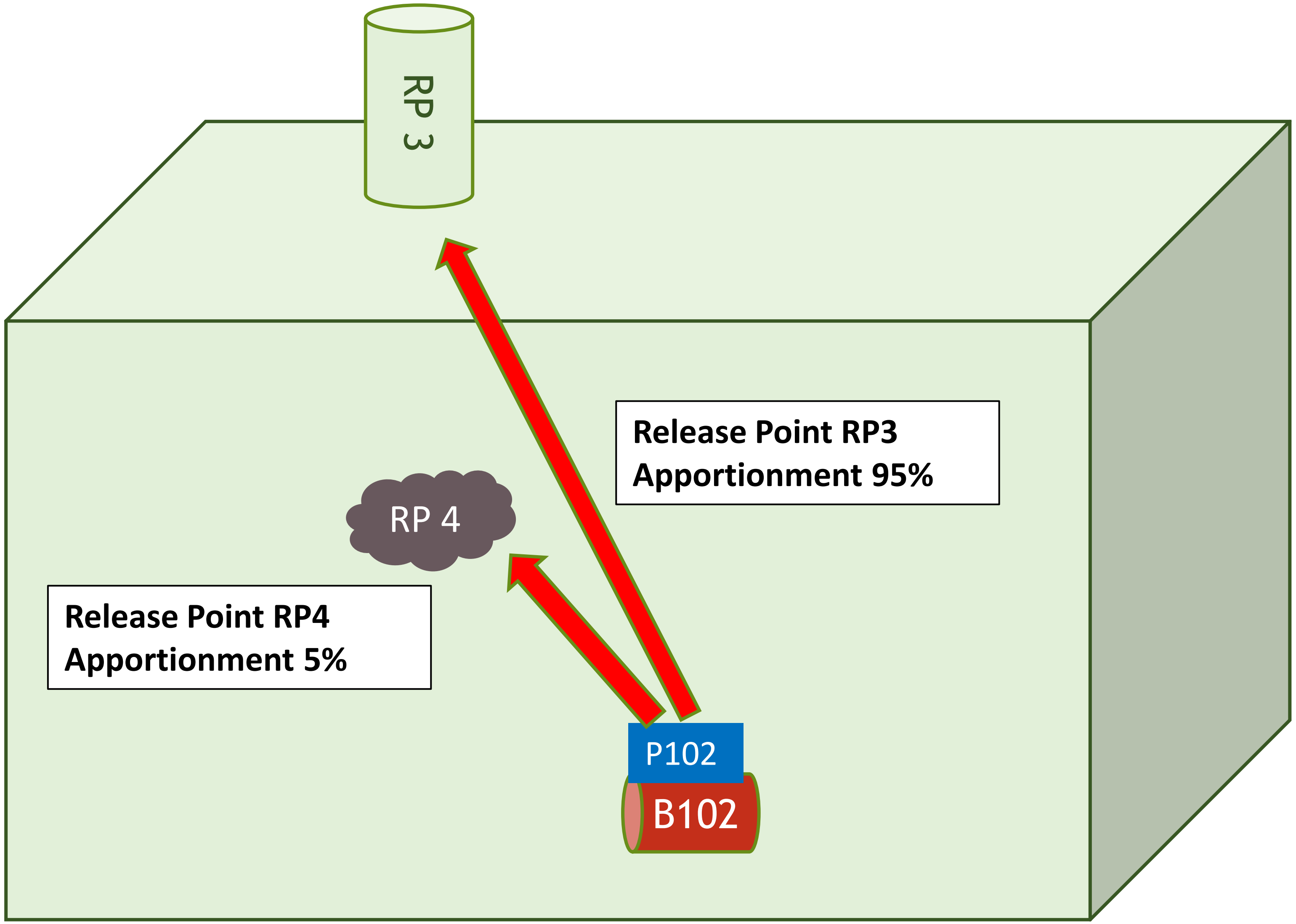
1. Ensure unit/process and release point data are available first.
2. Enter control device data: effectiveness, pollutant and % pollutant reduction efficiency
3. Place the control into a path: assignment (sequence #), control apportionment
   - Control into path
   - Child path into parent path
   - Controls and/or children paths into a primary path
   - Associated efficiency and effectiveness
4. Apportion emissions from the process to the release point (release point apportionment)

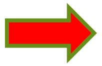
Considerations to Keep in Mind

Please don’t re-label or delete controls that existed in a previous year report, instead, mark them as “Permanently Shut Down” or your inventory in EPA will be out of sync.

Examples of Different Configurations

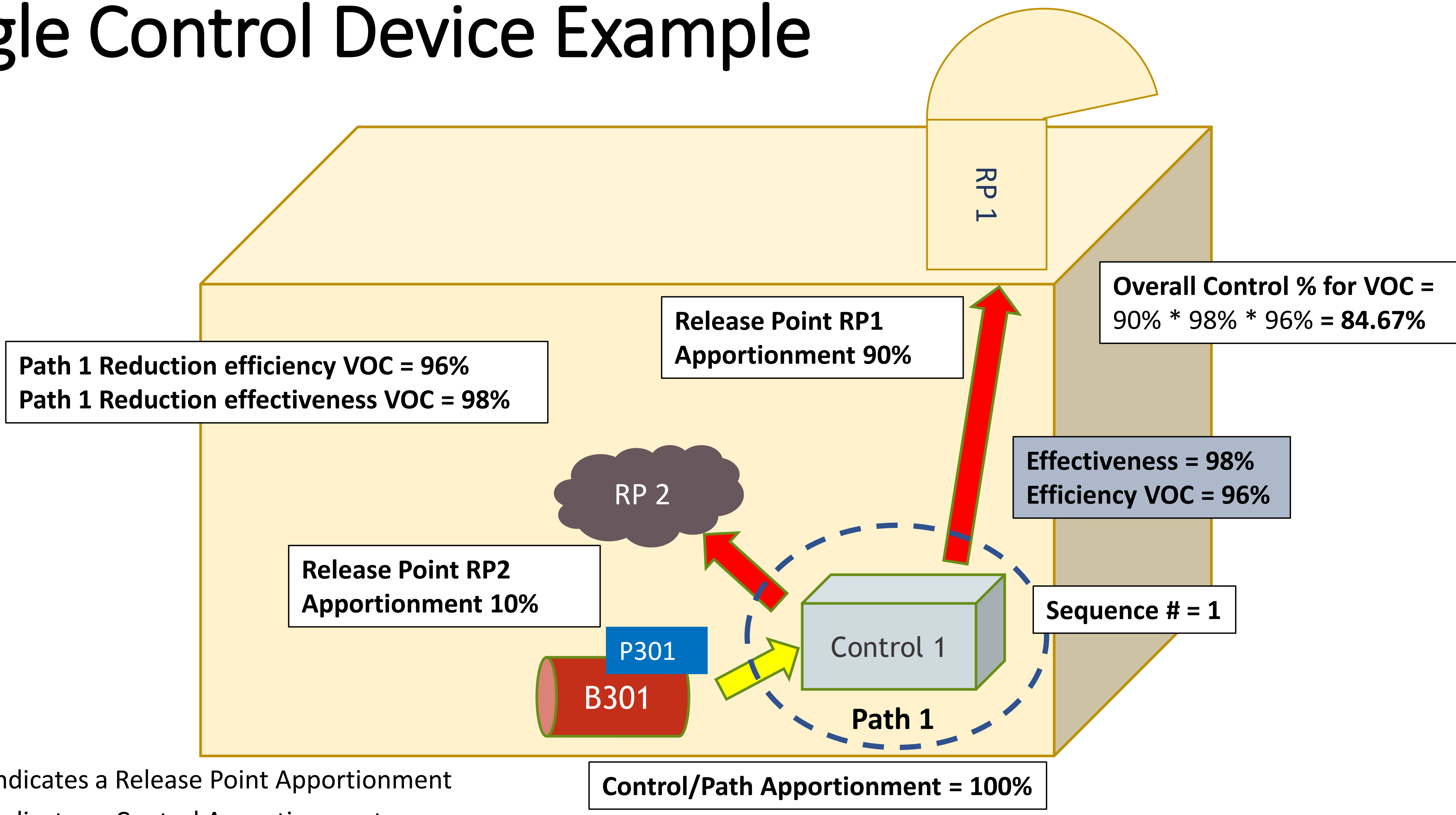
No Control Device Example





Indicates a Release Point Apportionment

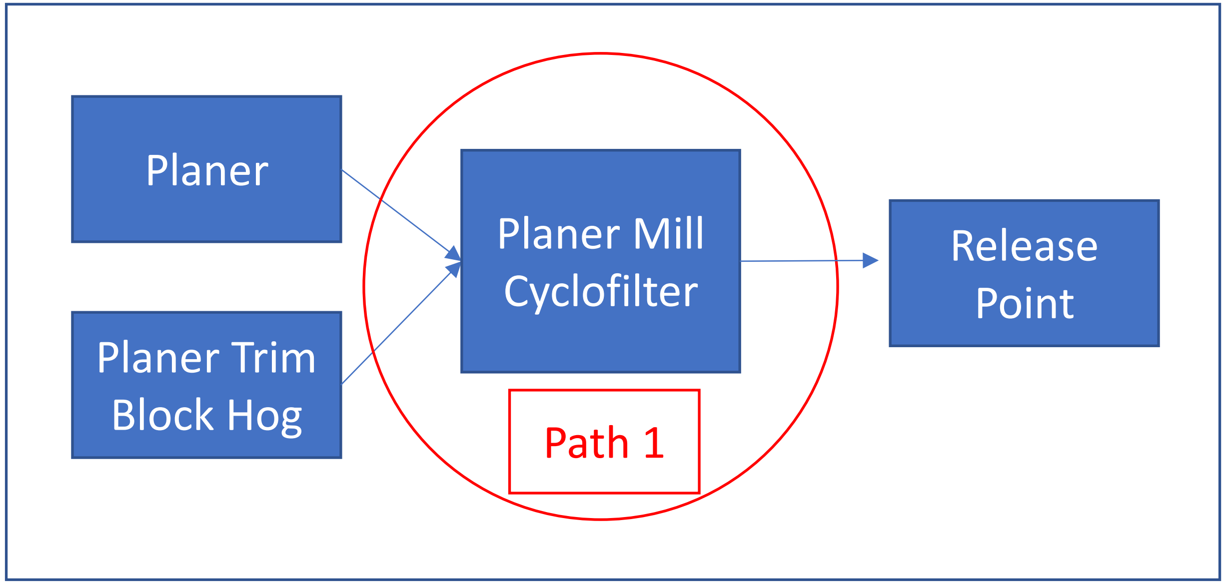
Single Control Device Example



Indicates a Release Point Apportionment

Indicates a Control Apportionment

Example of Two Processes Sharing a Path



In this example we have two processes sending emissions into the Planer Mill Cyclofilter. Path 1 can be the primary path for the single control and can be used for both processes. Path 1 goes from the processes to the release point.

Paths

Path ID	Sequence Number	Control or Child Path Assignment	Assigned Control or Child Path Apportionment
Path 1	1	Planer Mill Cyclofilter	100%

Release Points

Unit ID	Process ID	Path ID	Release Point ID	Release Point Apportionment
Planer	Process 1	Path 1	Stack 1	100%
Planer Trim Block Hog	Process 2	Path 1	Stack 1	100%

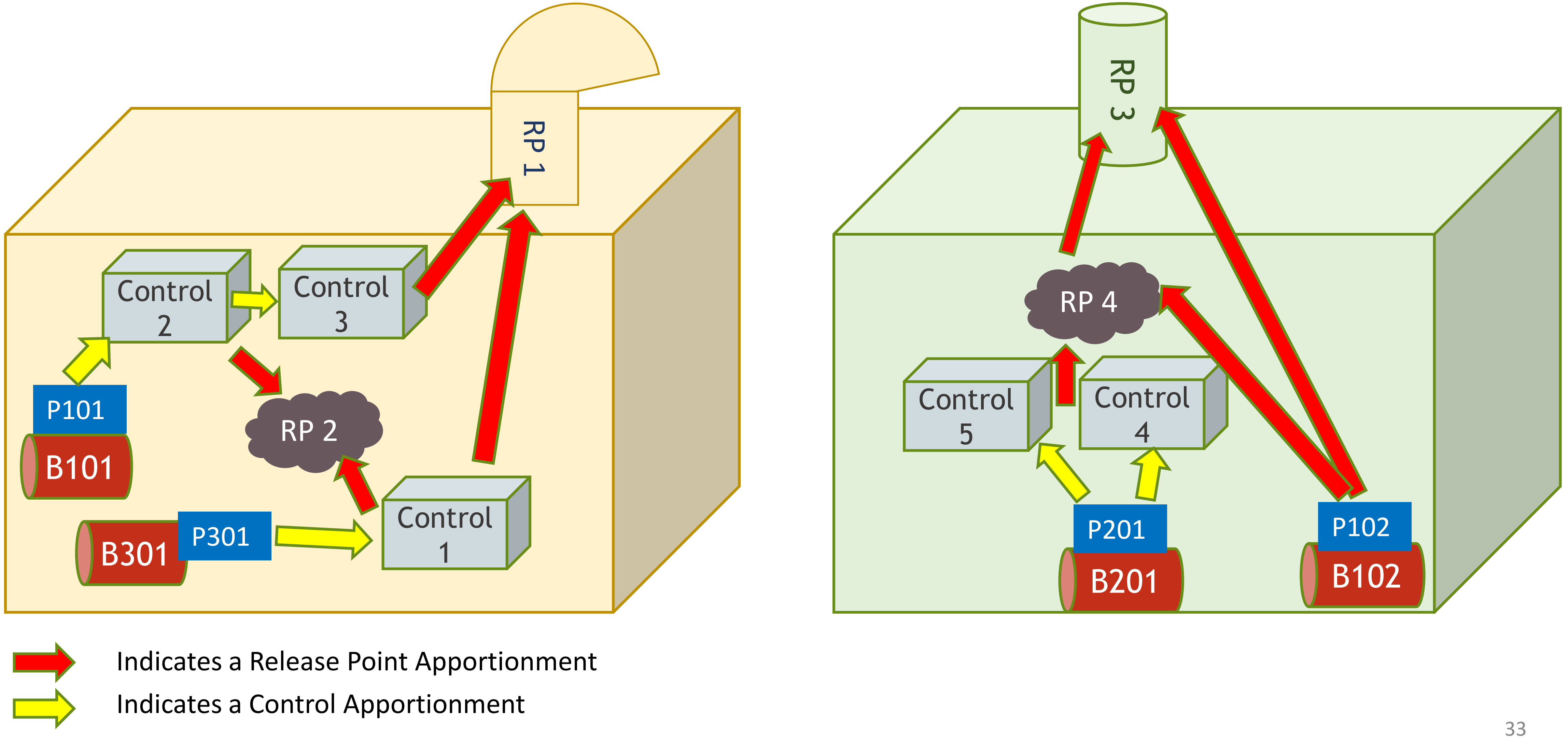
Pause for Single Control Device Q&A

If you only have one control device or single control device configurations in your facility, this concludes your training.

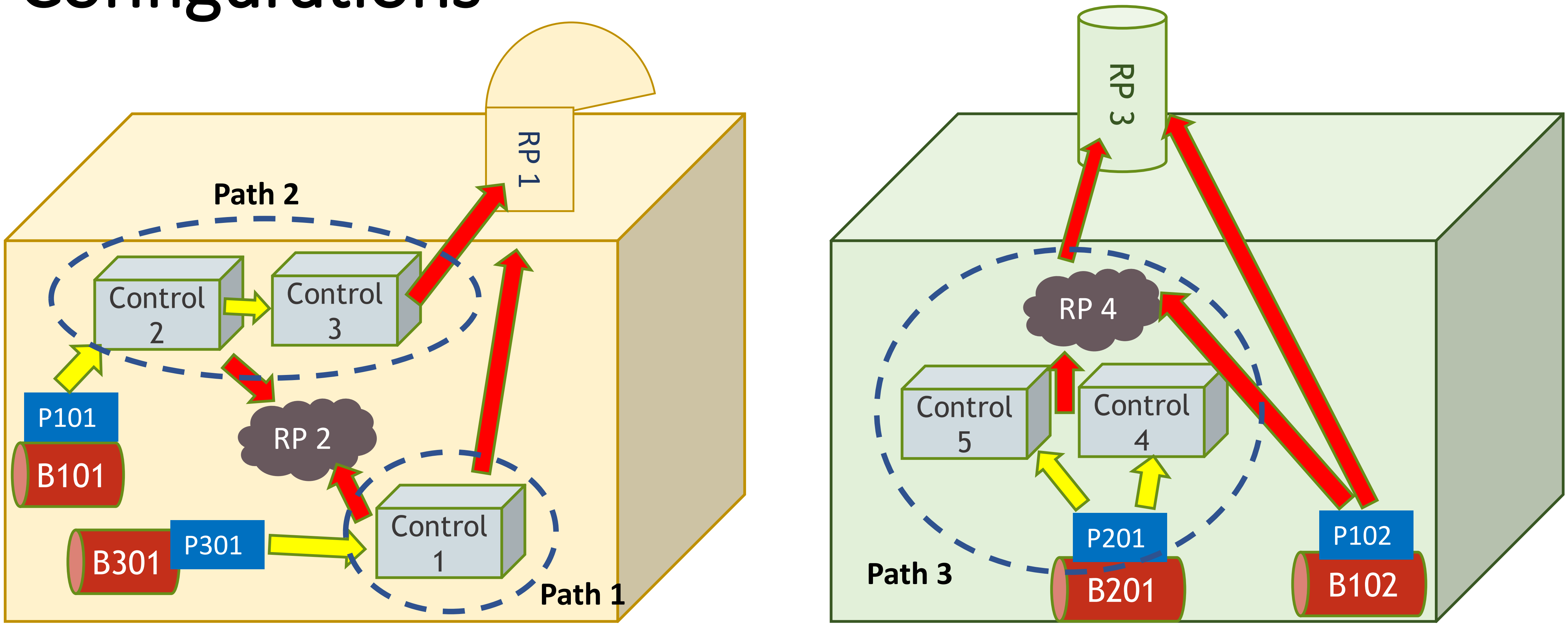
You are welcome to stay, and/or you may also refer to the remaining slides for further details.

The rest of the training is for reporters whose facilities have multiple controls.

Example Facility with Many Configurations



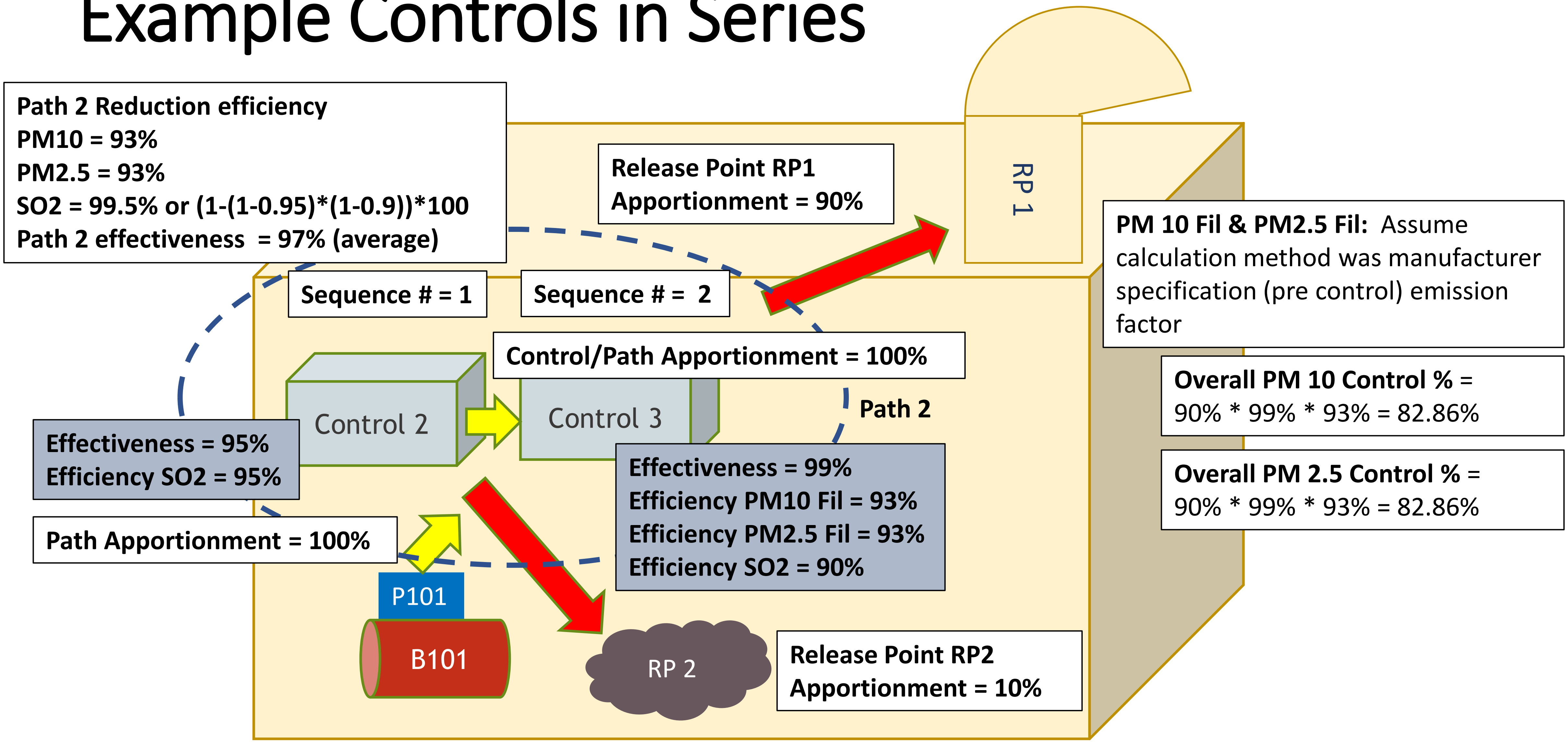
Example of Paths for a Facility with Many Configurations



Indicates a Release Point Apportionment

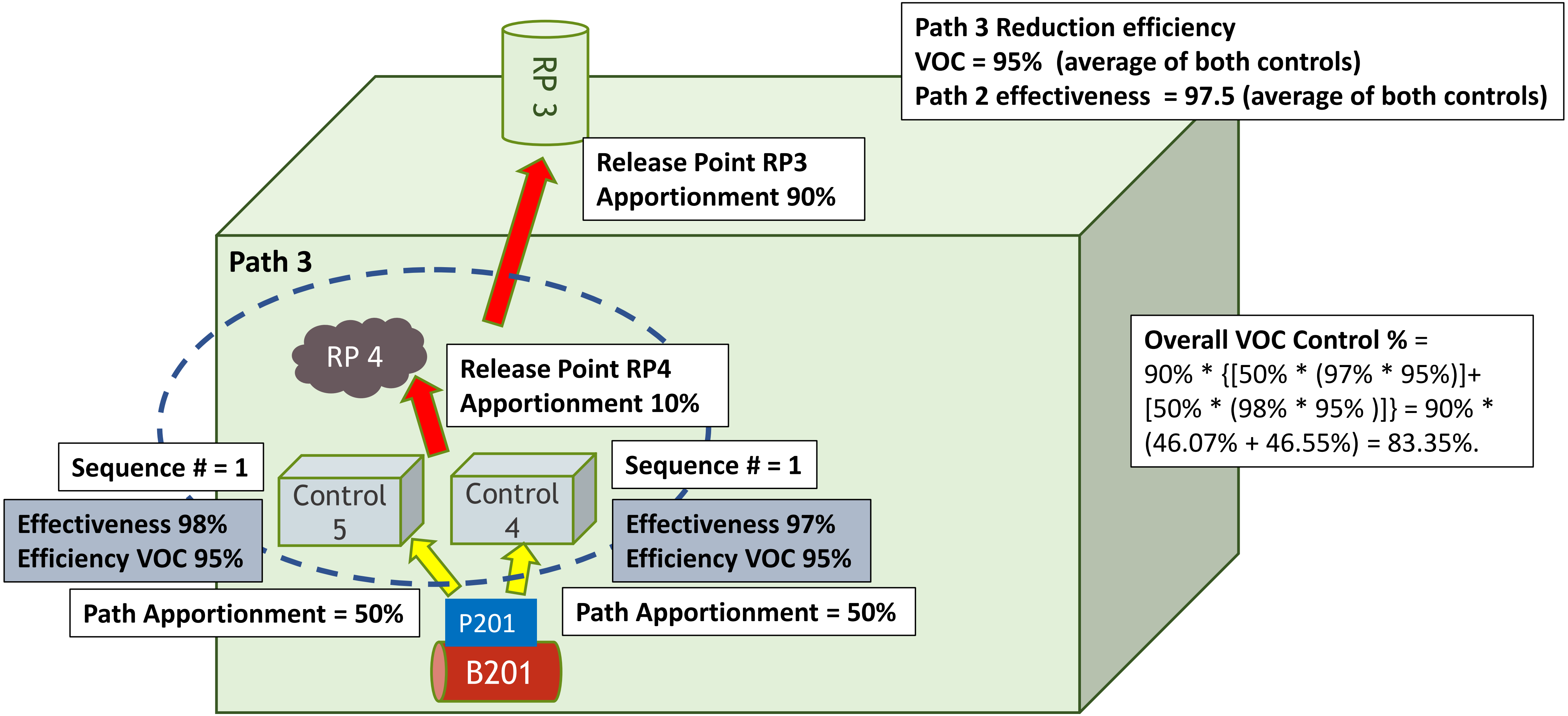
Indicates a Control Apportionment

Example Controls in Series



SO2: Assume calculation method was pre-control plus control efficiency, then must *assume the presence of both controls.*

Example Controls in Parallel



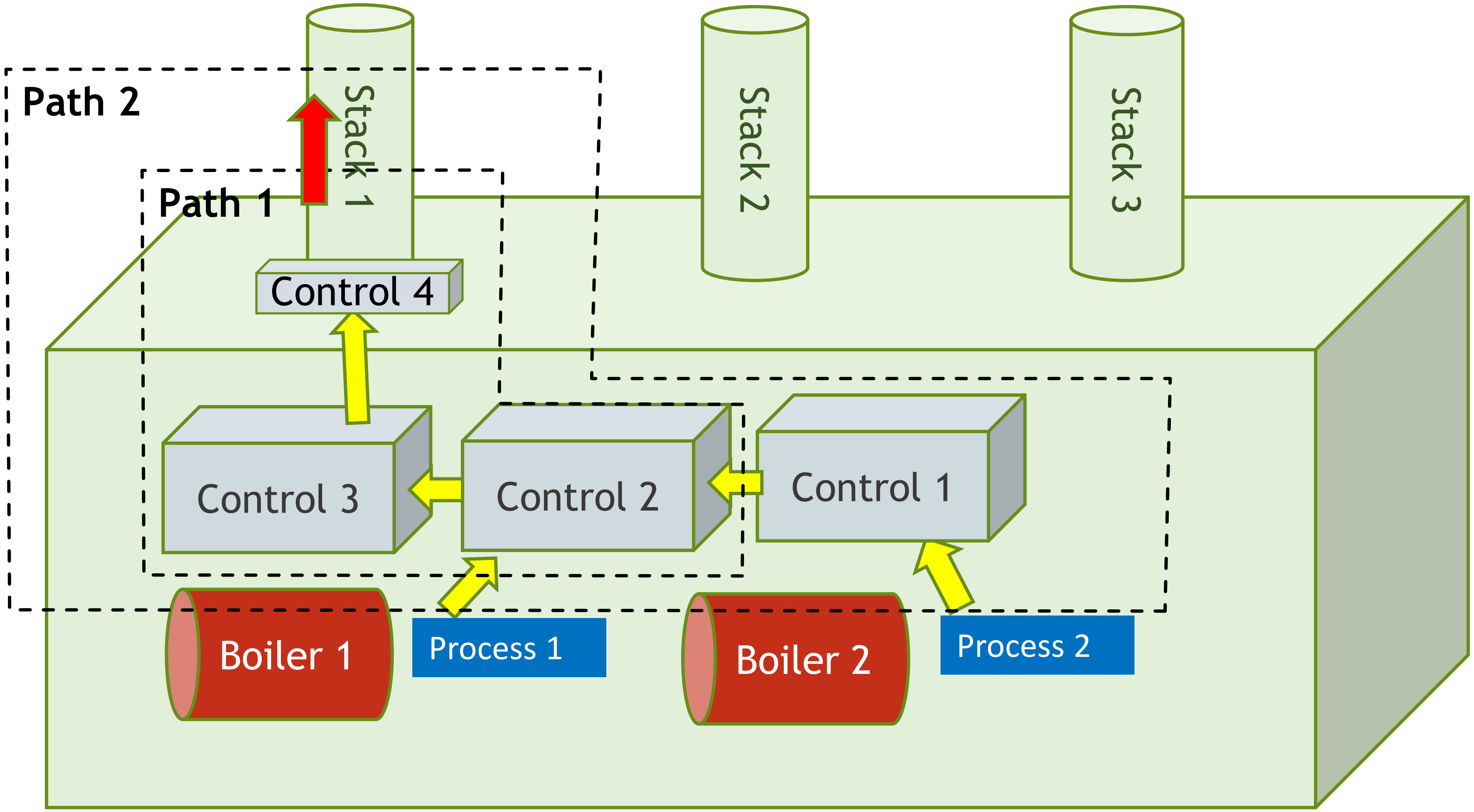
Overall Pollutant Control % for Multiple Controls

For more than one control for the *same* pollutant, then your overall control % may be:

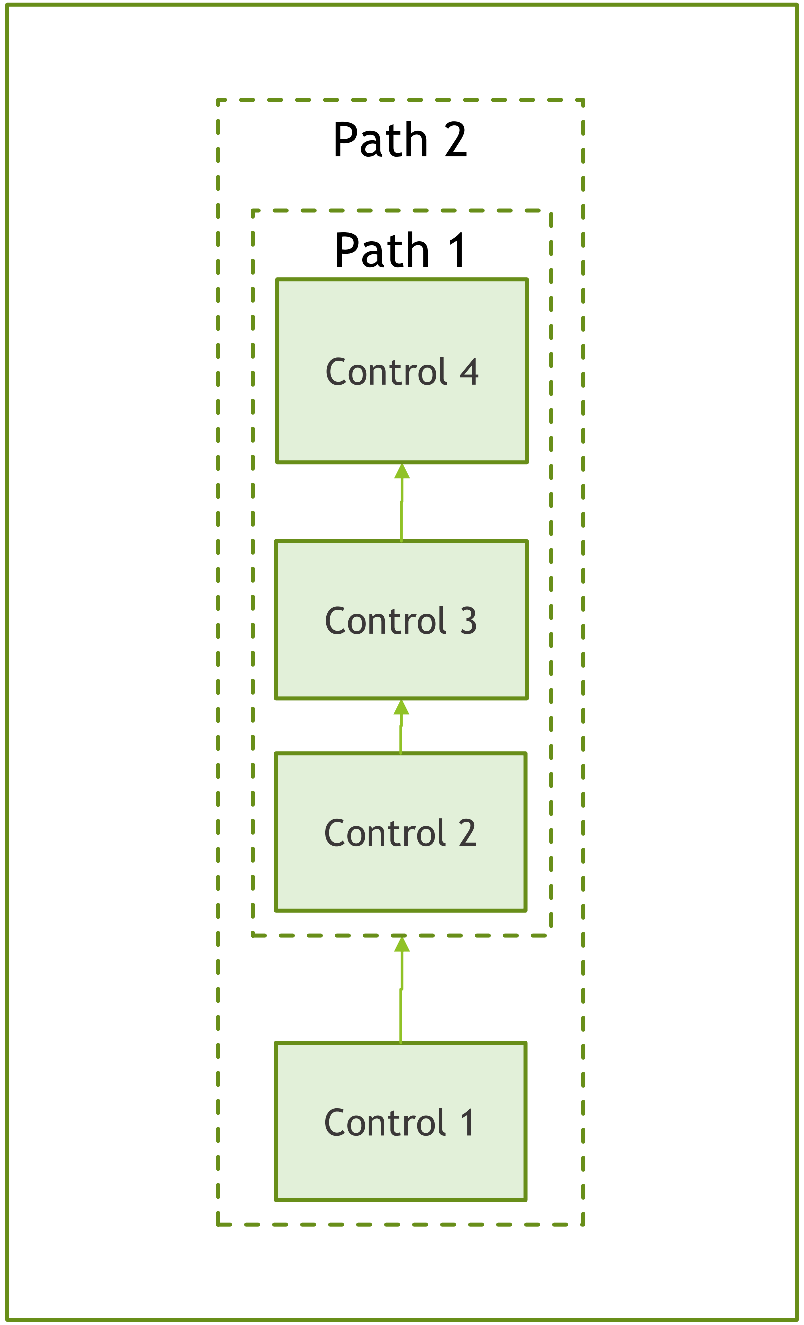
- **In series for same pollutant:** capture % * average effectiveness * [1- ((1-control1 pollutant reduction efficiency)*(1-control2 pollutant reduction efficiency) *…)]
- **In parallel for same pollutant:** (overall controlled emissions 1 + overall controlled emissions 2+…)
- **Complex controls configuration for same pollutant,** estimate (discuss with your SLT):
  - For example, (controlled emissions in series + controlled emissions in parallel)/uncontrolled emissions,
  - For example, average, weighted average, depending on the control device configuration
- Ensure you have used calculation methods that do not include controls (e.g. EPA factor no control device).

Examples of More Complex Control Device Configurations

In Series



Control devices 1, 2, 3, and 4 are set up in sequence. Boiler and Process 2 send emissions to control 1. Boiler and process 1 send emissions to control 2. Path 1 is the primary path between Boiler and Process 1 to Stack 1. Path 2 is the primary path between boiler and process 2 and stack 1. Path 1 is a “child” path of Path 2. Path 2 is a “primary” path.



Numerical Example of Controls in Series and their Paths

Controls

Control ID	% Effectiveness	Pollutant	% Efficiency	Overall % Reduction
Control 1	95%	VOC	80%	76%
Control 1	-	CO	95%	90%
Control 2	90%	PM10-PRI	90%	81%
Control 2	-	PM-CON	100%	90%
Control 3	90%	NOX	90%	81%
Control 4	90%	SO2	90%	81%

Paths

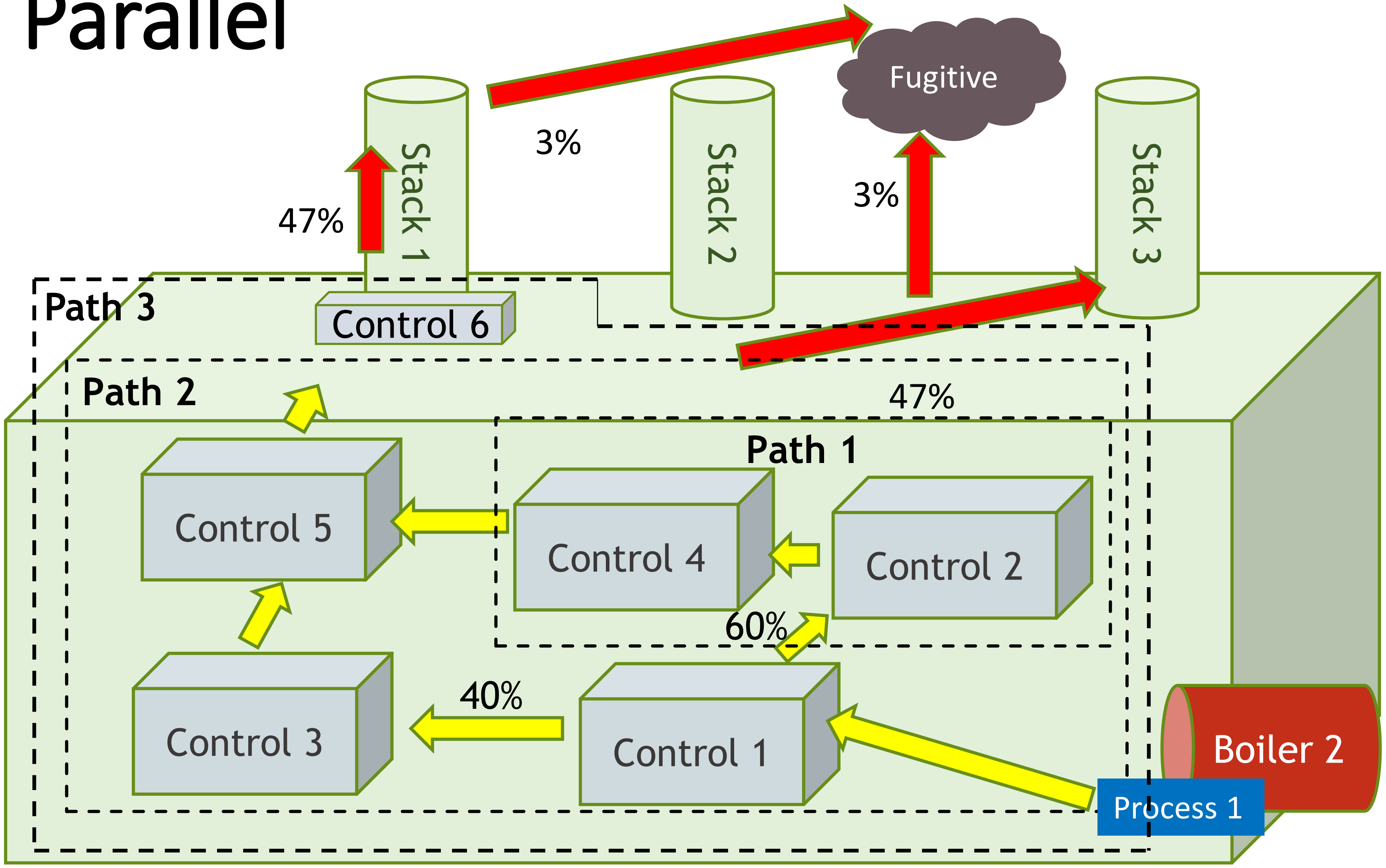
Path ID	Sequence Number	Assignment (Control or Path)	Apportionment (Control or Path)
Path 1	1	Control 2	100%
Path 1	2	Control 3	100%
Path 1	3	Control 4	100%
Path 2	1	Control 1	100%
Path 2	2	Path 1	100%

In this example we assume 100% of emissions are routed to the release point (% capture = 100%, no fugitives).

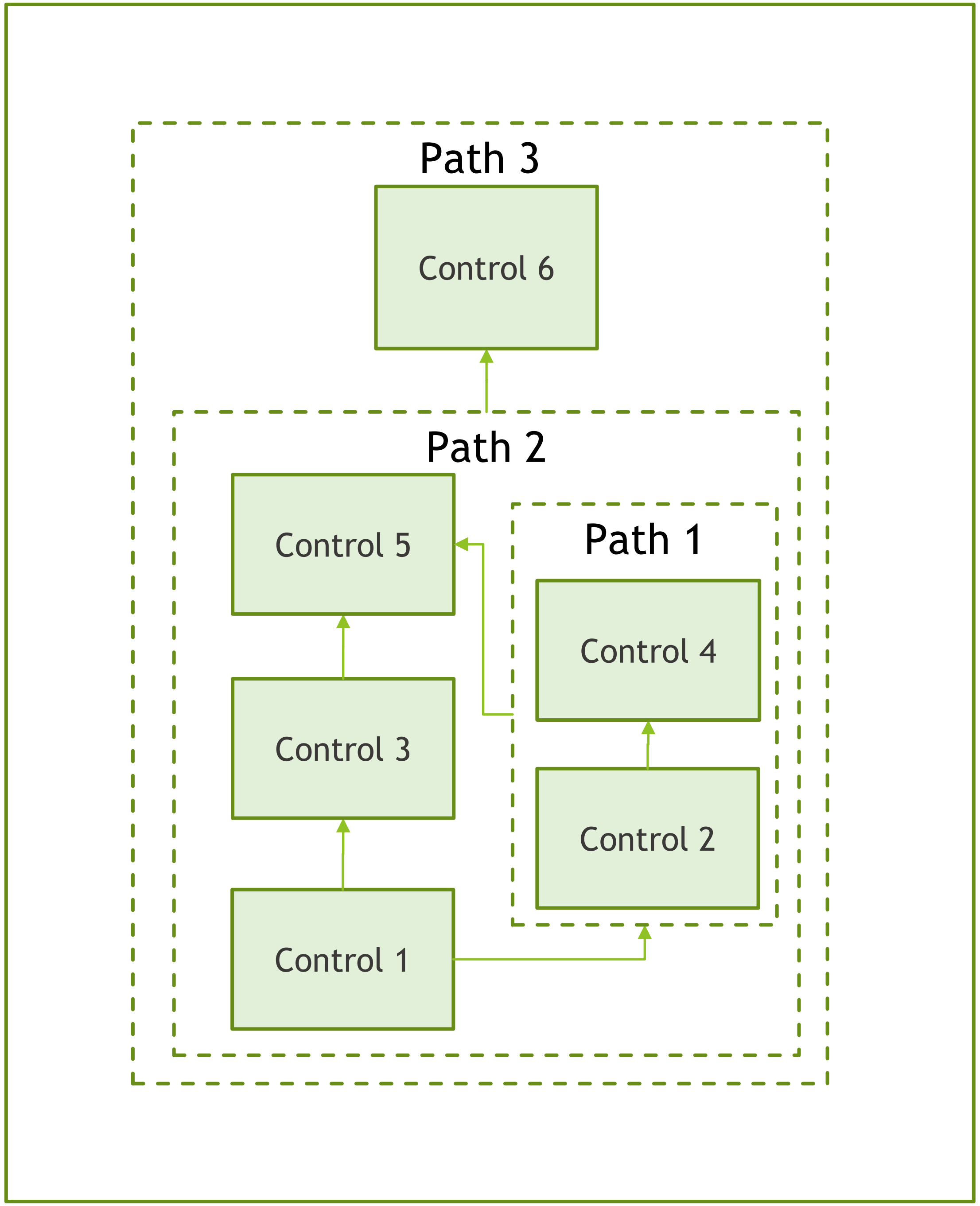
Release Points

Unit ID	Process ID	Path ID	Release Point ID	Release Point Apportionment
Boiler 1	Process 1	Path 1	Stack 1	100%
Boiler 2	Process 2	Path 2	Stack 1	100%

In Parallel



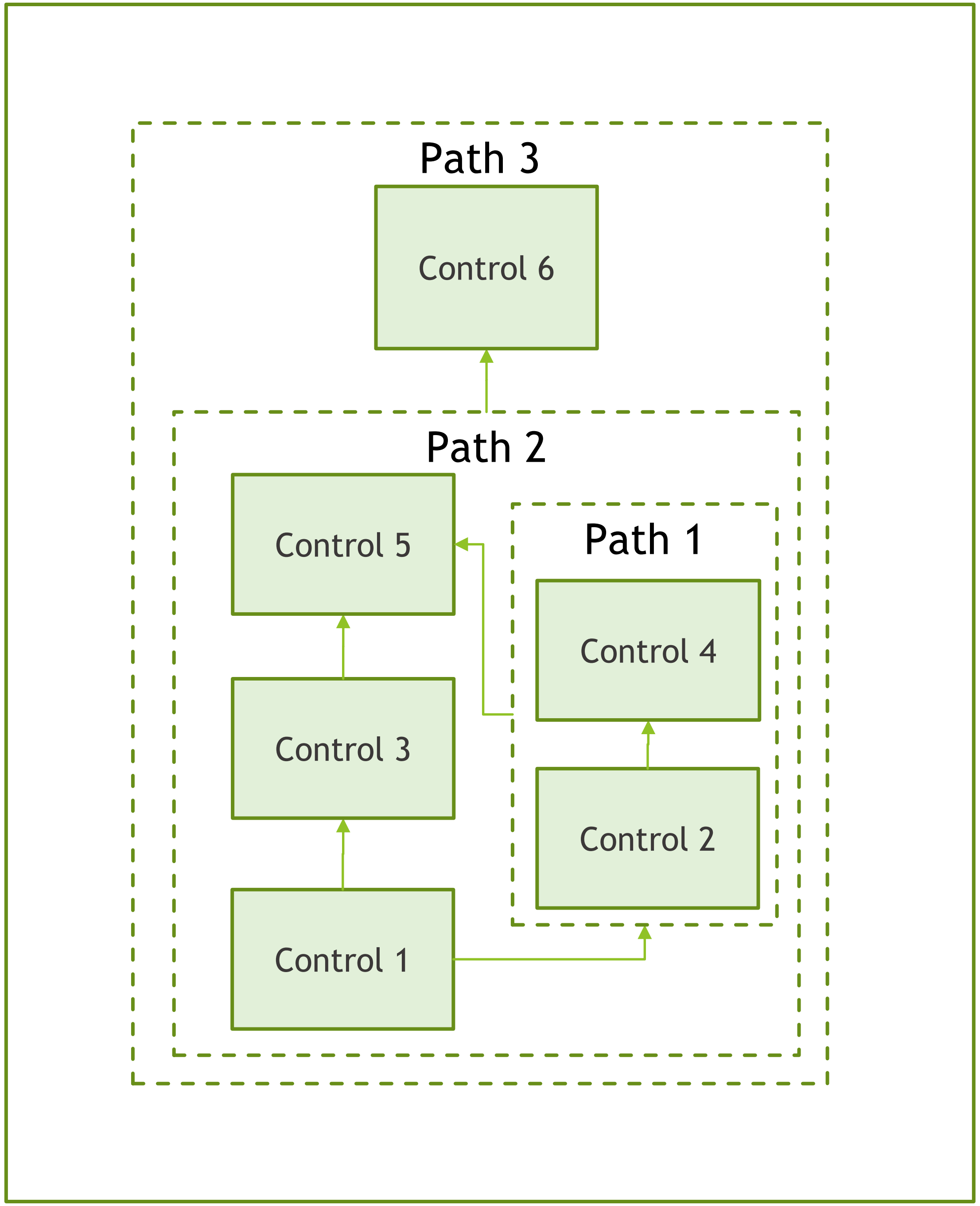
Path 1 is a child path of Path 2. Path 2 is a "primary path" between the process and Stack 3. Path 2 is a child path of Path 3. Path 3 is a "primary path" between the process and Stack 1.



Numerical Example of Controls in Parallel and Series

Controls

Control ID	% Effectiveness	Pollutant	% Efficiency	Overall % Reduction
Control 1	95%	VOC	80%	68%
Control 2	90%	PM10-PRI	90%	81%
Control 2	-	PM-CON	100%	90%
Control 3	90%	CO	95%	86%
Control 4	95%	NOX	99%	75%
Control 5	90%	Pb	95%	81%
Control 6	98%	SO2	97%	95%



Controls in Parallel and Series Paths and Release Points

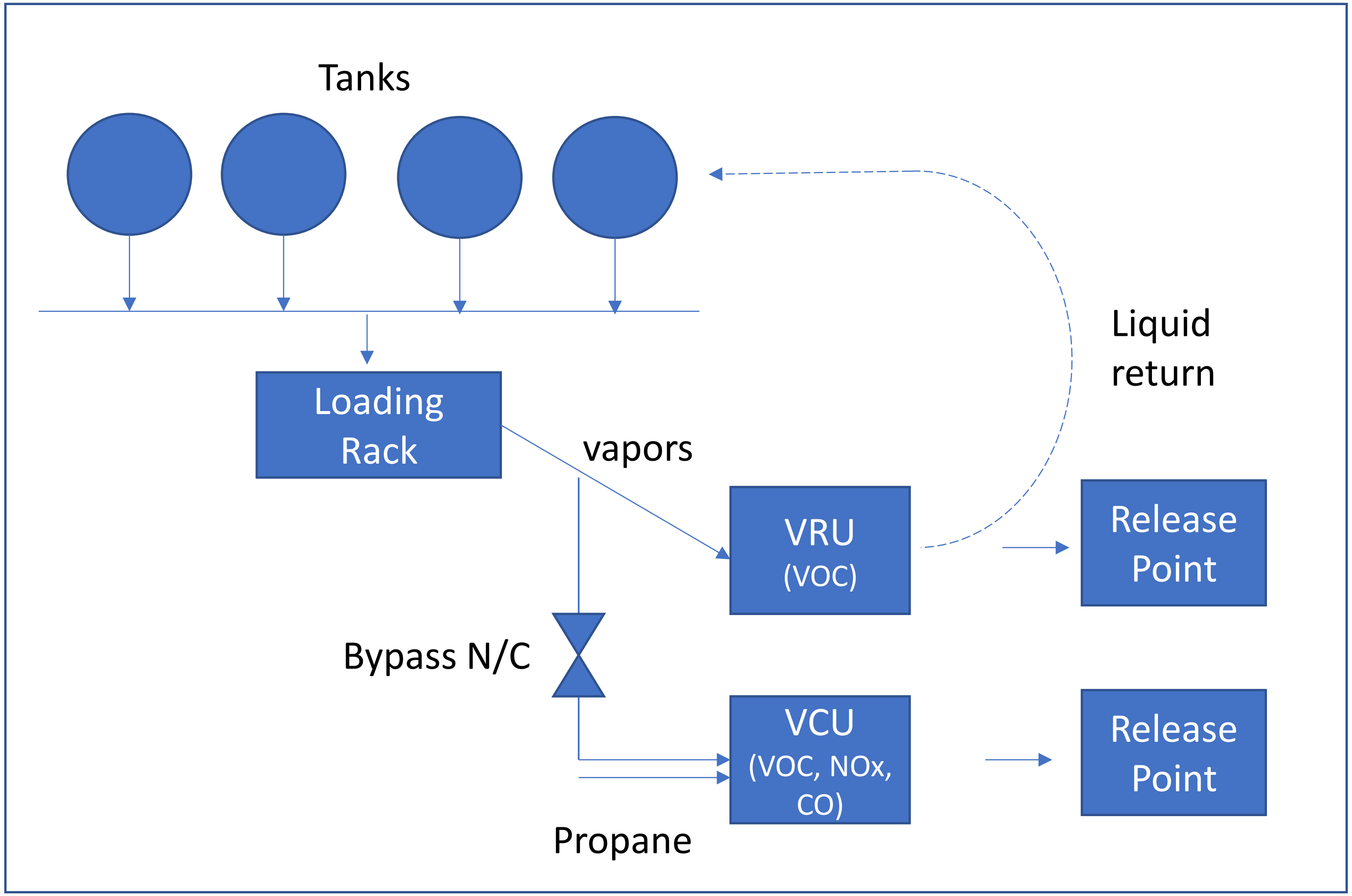
Paths

Path ID	Sequence Number	Assignment (Control or Path)	Apportionment (Control or Path)
Path 1	1	Control 2	100%
Path 1	2	Control 4	100%
Path 2	1	Control 1	100%
Path 2	2	Control 3	40%
Path 2	2	Path 1	60%
Path 2	3	Control 5	100%
Path 3	1	Path 2	100%
Path 3	2	Control 6	100%

Release Points

Unit ID	Process ID	Path ID	Release Point ID	Release Point Apportionment
Boiler 2	Process 1	Path 2	Stack 3	47%
Boiler 2	Process 1	Path 3	Stack 1	47%
Boiler 2	Process 1	Path 2	Fugitive	3%
Boiler 2	Process 1	Path 3	Fugitive	3%

Example with a Back-Up Process

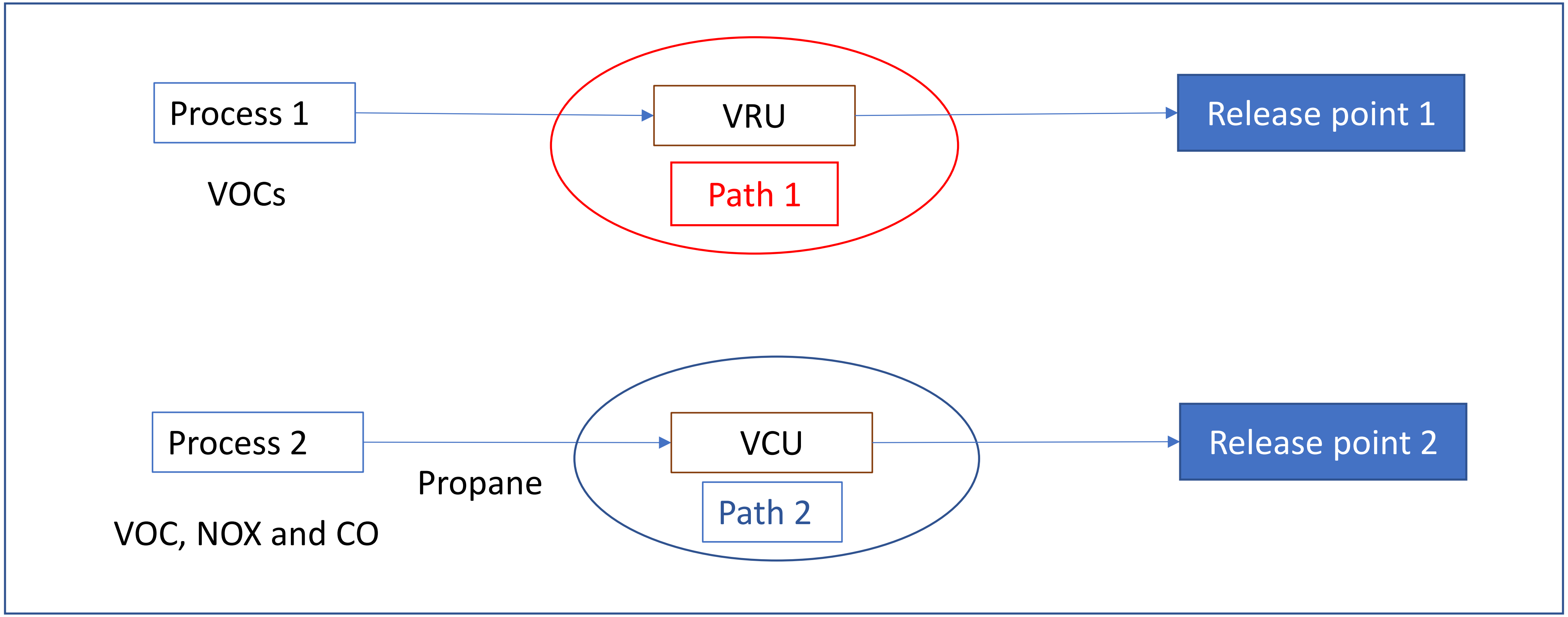


1. The emissions only go to the VCU when the VRU is not working, per permit. The VCU is a backup to the VRU and was only used about 1% of 2019 or about 100 hours.

2. Only one runs at a time, taking 100% of the inlet/emissions.

3. Two different release points. A vent off the VRU, the VCU is a stack/flare.

4. Gasoline vapor is only emissions off the loading rack. So VCU emissions are VOCs. Because we use propane in the VRC it has VOC and NOx/CO.



Process 1 (VOC)

Path 1:
VRU sequence 1

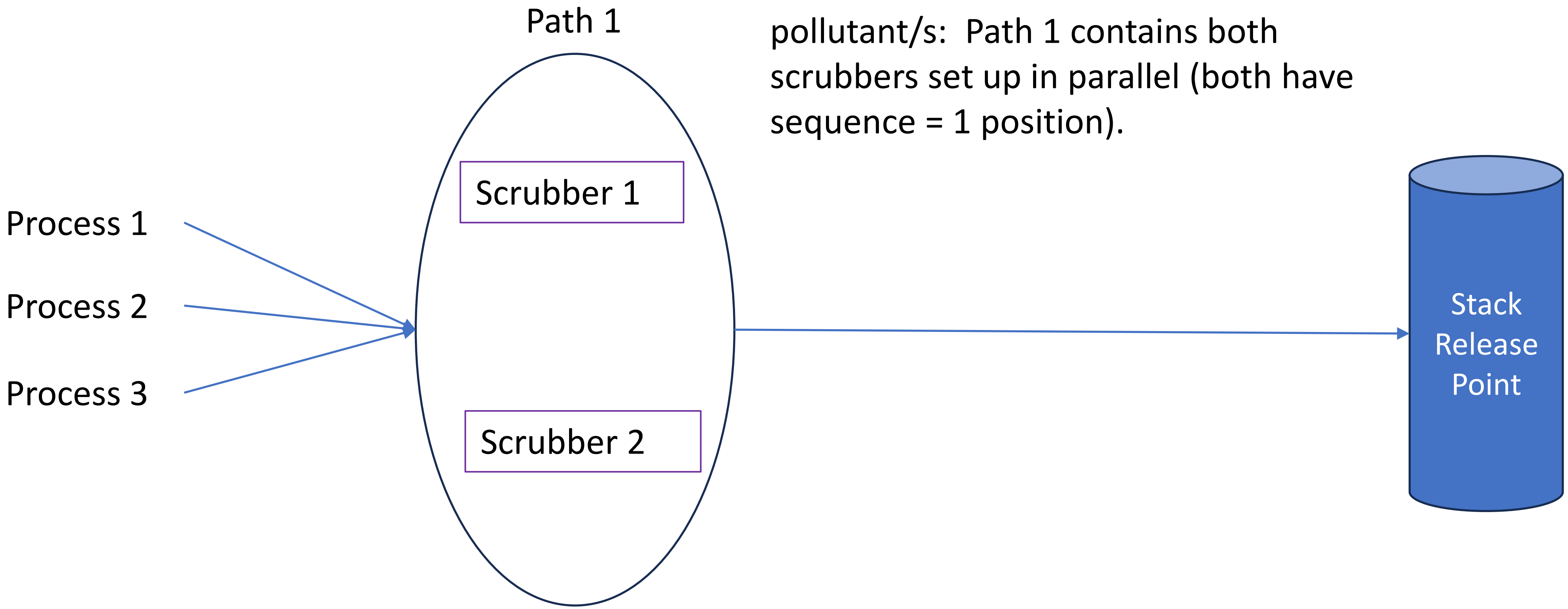
If individual control capture isn't 100% then rel apportionment should be adjusted to reflect % going to fugitives.

Process 2 (VOC, NOX and CO)

Path 2
VCU Sequence 1

Recall VCU is a "backup" for the first process. When the VRU is offline, the VCU is running.

Example with Two Scrubbers



If both scrubbers remove the same pollutant/s: Path 1 contains both scrubbers set up in parallel (both have sequence = 1 position).

We have three processes that feed two scrubbers and one common stack. Only two out of three processes operate at a time and only one scrubber is in service. Emission Factors for each scrubber may be different. How is this set up?

Steps Option 1

- Enter processes as normal, with their operating hours in operating details.
- Enter two control devices, one per scrubber in parallel and assuming an equal 50% split of the air stream between them, and enter individual values for the:
  - control efficiencies (% removal of pollutant/s) - e.g. 99% for 1, and 95% for 2, and
  - effectiveness (% the device operates as intended) – e.g. scrubber 1 operates 39% of the time, scrubber 2 operates 59% of the time.
- Put both controls in a path as running in parallel and enter path values: **Path efficiency:** Weighted avg **efficiency** = % time Scrubber 1 is working * (efficiency 1) + % time Scrubber 2 is working * (efficiency 2) – e.g. 39% * 99% + 59% * 95% = 38.61% + 56.05% = 94.66%
- **Path Effectiveness** = Average effectiveness of both scrubbers. There may be some fugitive emissions if one or both scrubbers. – e.g. 99% * 95% = 94.05%

Steps Option 2

- Enter processes as normal, with their operating hours in operating details.
- Enter two control devices, one per scrubber in parallel and assuming the percentage of the air stream (for the entire year) going to each is the percentage of time it is operating (e.g. 40% for 1 and 60% for 2 noting that 2% would be fugitives in this example), and enter individual values for the:
  - control efficiencies (% removal of pollutant/s) - e.g. 99% for scrubber 1, and 95% for scrubber 2, and
  - effectiveness (% the device operates as intended) – e.g. 98%
- Put both controls in a path as running in parallel and enter path values: **Path efficiency:** Weighted avg **efficiency** = % time Scrubber 1 is working * (efficiency 1) + % time Scrubber 2 is working * (efficiency 2) – e.g. 39% * 99% + 59% * 95% = 38.61% + 56.05% = 94.66%
- **Path Effectiveness** = Average effectiveness of both scrubbers. There may be some fugitive emissions if one or both scrubbers. – e.g. 99% * 95% = 94.05%

How to Get Help

If you have are trying to sort out how a specific control configuration should be entered for the NEI, send a diagram even if hand drawn showing the unit(s), process(es) and control devices you are working with to EPA at NEI_Help@epa.gov . We will help you determine how best to enter the data.

Questions