California's Real Emissions Assessment Logging (REAL) Initiative: On-Road Vehicles Will Track Their Own NOx and GHG Emissions

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BEING A
UNICORN
ISN'T ABOUT
BEING
REAL
IT'S ABOUT
BEING
REAL
AWESOME

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"Real Emissions Assessment Logging" (REAL)

- On-road vehicles will track and report data characterizing their own NOx and GHG (CO_2) emissions

	Light Duty	Medium Duty	Heavy Duty
NOx Tracking	n/a	Diesel engines[2]	Diesel engines[2]
GHG Tracking	All engines[1]	All engines[1]	All engines[2]

[1] Phased in over 2019 – 2021 MYs

[2] Starting 2022 MY

- Under consideration: implementation of REAL on off-road engines

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REAL in the Regulations

- **Heavy-Duty OBD Regulation**
  - **Title 13, California Code of Regulations, Section 1971.1**
  - (h)(5.3) NOx Tracking Requirements
  - (h)(5.4)-(5.7) GHG Tracking Requirements
  - Adopted by the Board November 2018

- **OBD II Regulation (Light/Medium Duty)**
  - **Title 13, California Code of Regulations, Section 1968.2**
  - (g)(6.12) NOx Tracking Requirements
    - Adopted by the Board November 2018
  - (g)(6.3)-(6.6), (6.8)-(6.11) GHG Tracking Requirements
    - Adopted by the Board September 2015

REAL Comes in Two Flavors

- **NOx Tracking**
  - Includes engine out and tailpipe NOx mass along with several engine activity parameters
  - Puts data into a variety of bins, including recent and lifetime timeframes

- **GHG Tracking**
  - Includes broader range of engine activity parameters, hybrid-specific parameters, and active GHG technology tracking
  - No bins, only recent and lifetime timeframes

REAL: NOx Tracking

- NOx tracking data will:
  - Provide feedback on our regulatory programs
  - Improve our emissions inventory
  - Provide quick, real-world screening tool for flagging potential emissions issues
- Relies on existing technology and hardware to estimate and track NOx emissions
- Minimum NOx mass accuracy requirement:
  - +/- 20% or +/- 0.1 g/bhp-hr
  - Relative to lab on special hot-start test

NOx Data Arrays and Parameters

Parameter	Active 100 Hour Array	Stored 100 Hour Array	Lifetime Array	Lifetime Engine Activity Array
NOx mass – engine out (g)	x	x	x	n/a
NOx mass – tailpipe (g)	x	x	x	n/a
Engine output energy (kWh)	x	x	x	x
Distance traveled (km)	x	x	x	x
Engine run time (hours)	x	x	x	x
Vehicle fuel consumption (liters)	x	x	x	x

NOx Data Bins for Each Parameter in Each Array

Vehicle Speed (km/h)

% of Rated Power	0	> 0 ≤ 16	> 16 ≤ 40	> 40 ≤ 64	> 64
≤ 25%	Bin 2	Bin 3	Bin 4	Bin 5	Bin 6
> 25% ≤ 50%		Bin 7	Bin 8	Bin 9	Bin 10
> 50%		Bin 11	Bin 12	Bin 13	Bin 14

Total (Bin 1)

NTE Bin (Bin 15)

Regen Bin (Bin 16)

MIL-On Bin (Bin 17)

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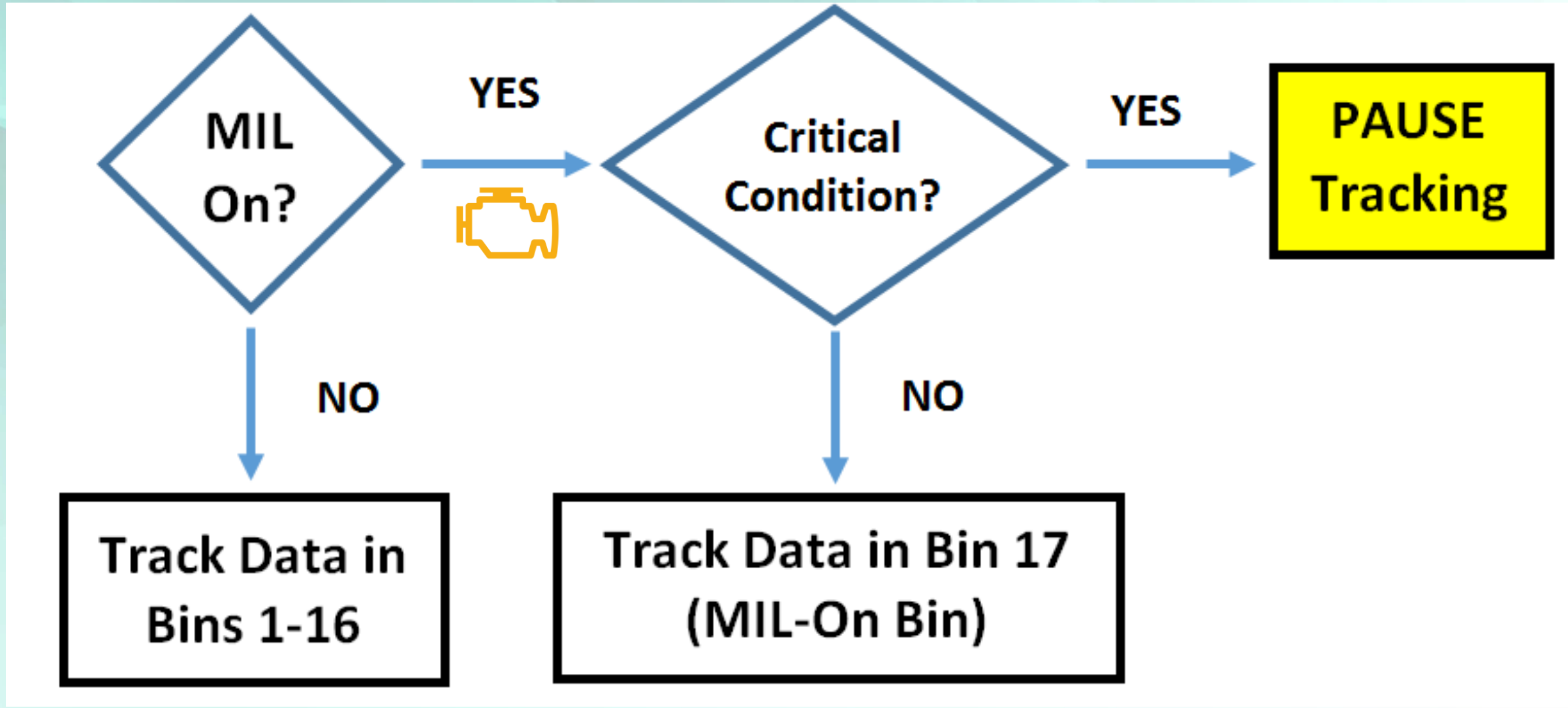
When to Pause NOx Tracking



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Thank You

CARB OBD Program Website:

www.arb.ca.gov/msprog/obdprog/obdprog.htm