

AB 617 COMMUNITY STEERING COMMITTEE

Wilmington, Carson, West Long Beach
November 17, 2021



AB 617 WCWLB

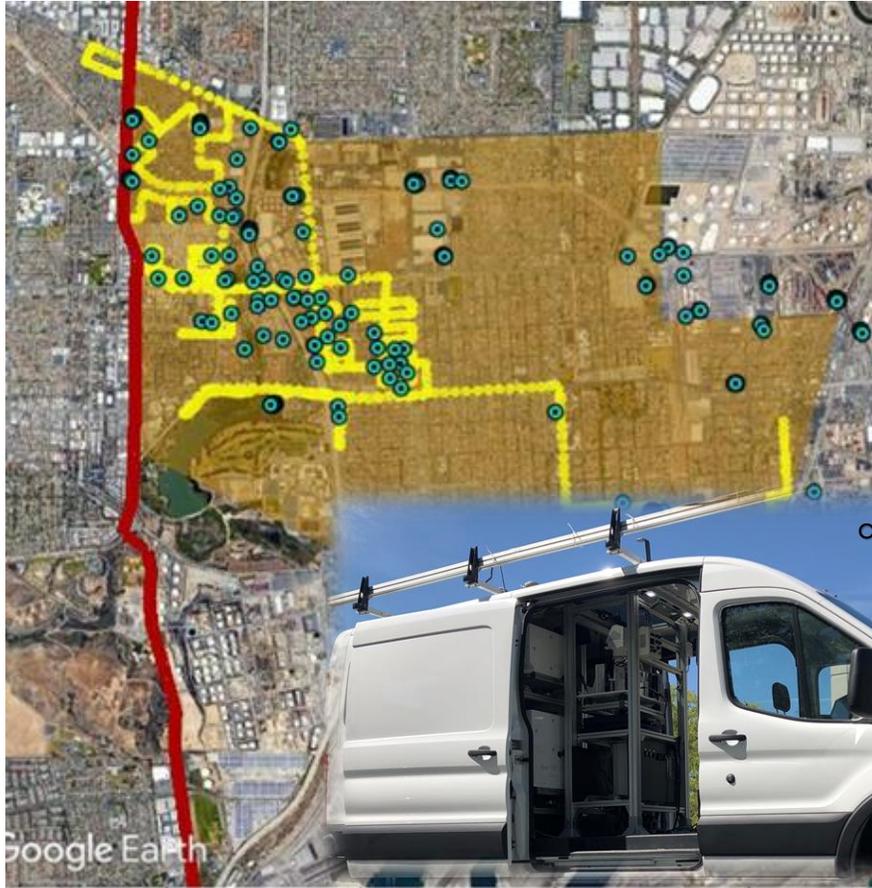
CSC Member Updates



AB 617 WCWLB

Outreach Updates





Optical Multi-Pollutant Analyzer



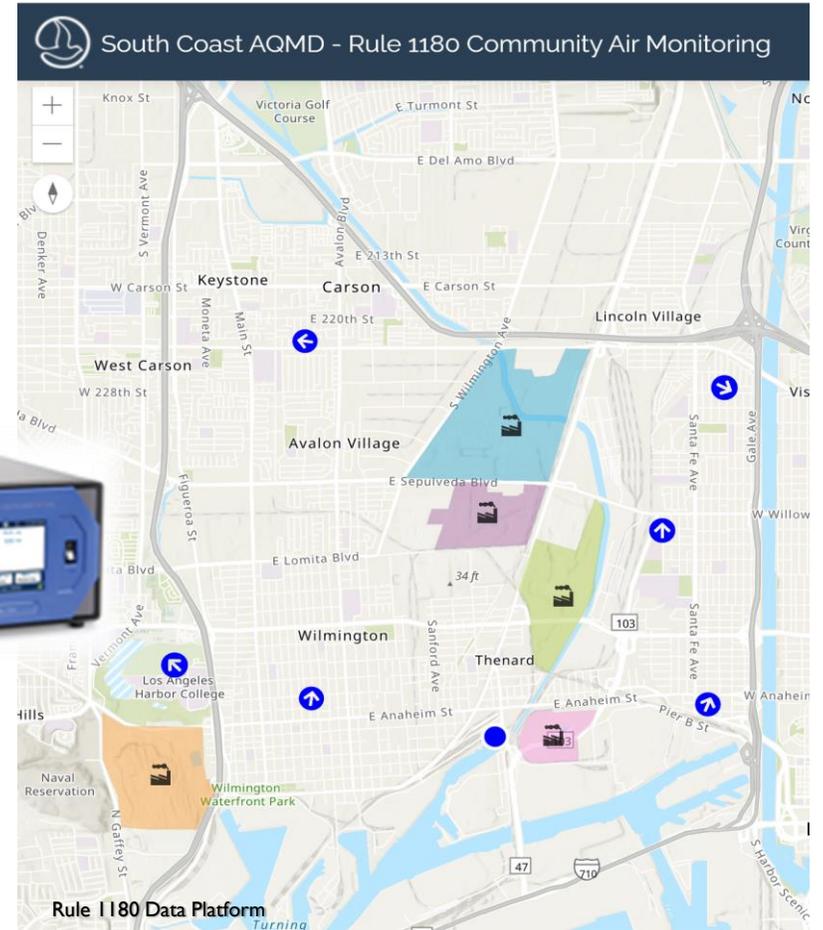
ORS Mobile Laboratory



H₂S Analyzer



Hand-held H₂S Analyzer



UPDATE ON COMMUNITY AIR MONITORING IN WCWLB

OLGA PIKELNAYA PH.D

PROGRAM SUPERVISOR



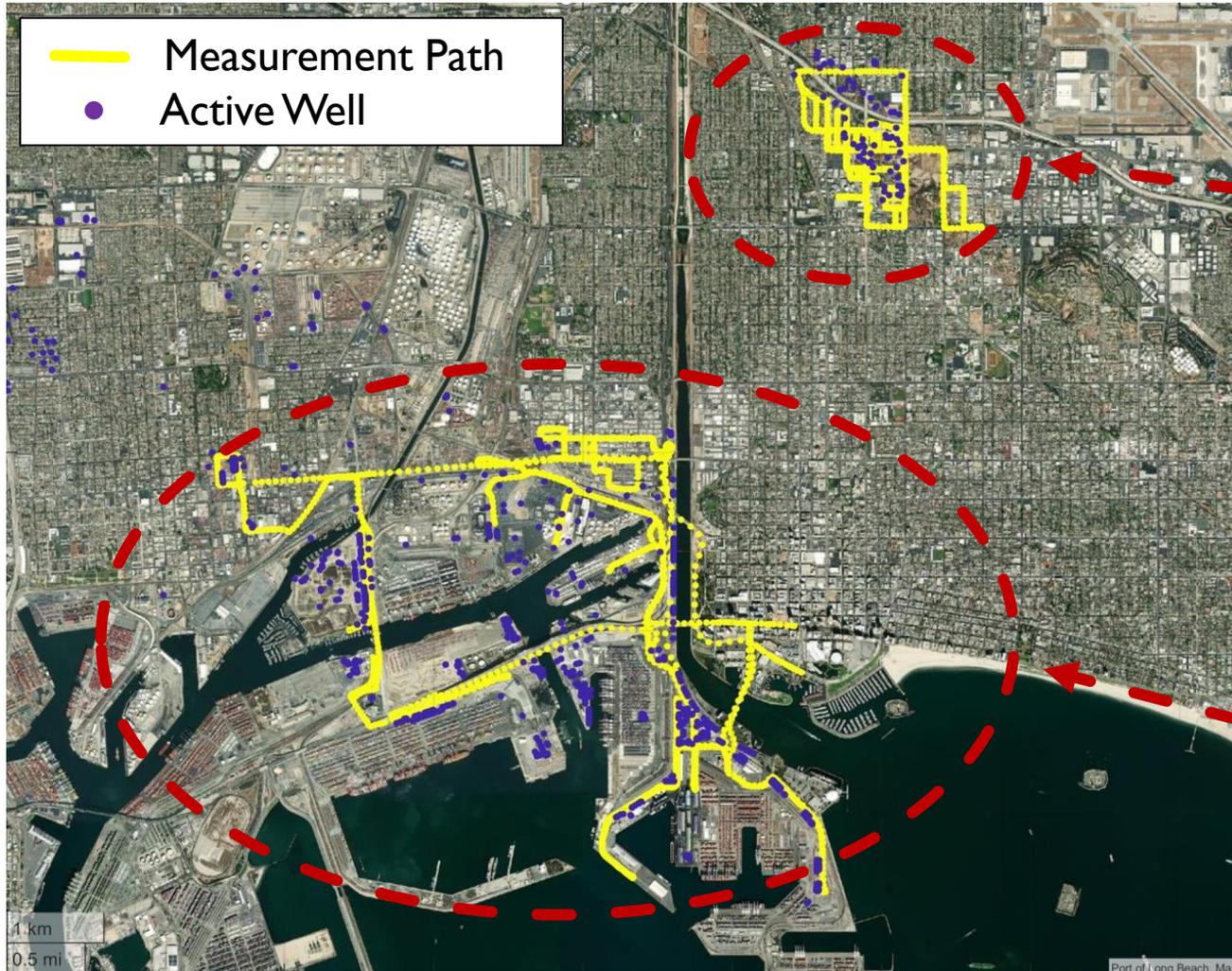
South Coast
AQMD

OUTLINE

- Air Monitoring Near Oil Wells in Community
- Refinery VOC Baseline Measurements Update
- Dominguez Channel Odor Event

MOBILE MEASUREMENTS NEAR OIL WELLS

MEASUREMENT ROUTE



North-East Region
October 6 and 7, 2021
50 Oil Wells

South-West Region
October 5 and 6, 2021
548 Oil Wells

MOBILE MONITORING NEAR OIL WELL SUMMARY OF IDENTIFIED EMISSION SOURCES

Region*	Date	Range of Total VOC Concentrations** (ppb)	Range of Benzene Concentrations** (ppb)	Location / Description
South East	October 5, 2021	< 25 - 2334	< 2 - 10	1120 Pier F Ave (Slurry Facility)
North East	October 6, 2021	< 25 - 26844	< 2 - 191	Linden and Spring (Oil Sites)
North East	October 6, 2021	< 25 - 7113	< 2 - 39	Pasadena and Spring
North East	October 6, 2021	< 25 - 598	< 2 - 4.5	E 28th and Olive (Oil Sites and Recycling Center)
North East	October 7, 2021	< 25 - 1204	< 2 - 6	Linden and Spring (Oil Sites)
North East	October 7, 2021	< 25 - 8925	< 2 - 40	E 28th and Olive (Oil Sites and Recycling Center)

- Oil wells emissions are variable in time and magnitude

*Tables shows days only when elevated VOC emissions were measured from the site.

Follow-up measurements were conducted to confirm that elevated emission were no longer present

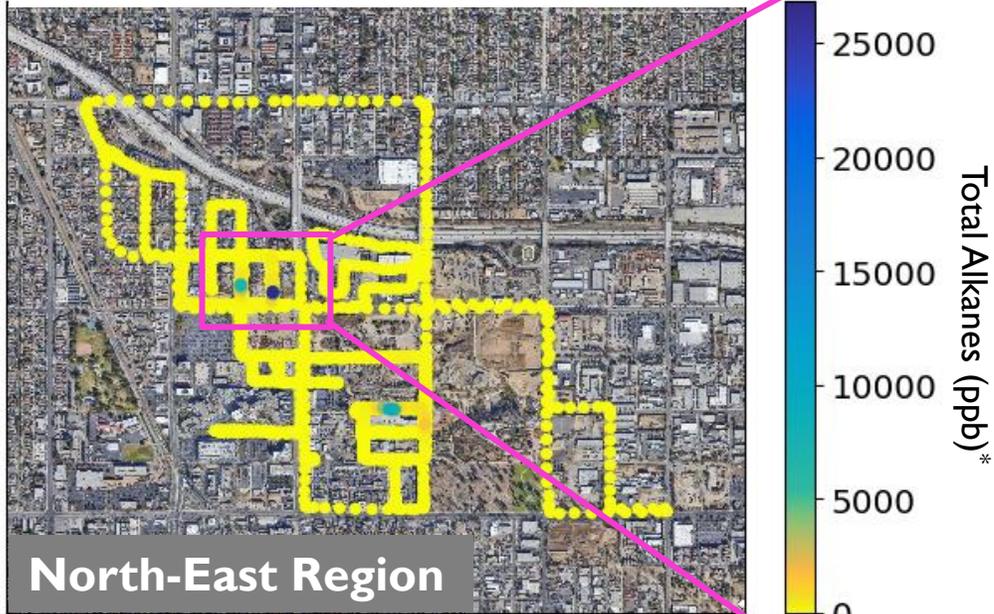
**Instantaneous reading recorded during mobile survey.

MOBILE MONITORING NEAR OIL WELL FOLLOW-UP ACTIVITIES

- Compliance staff conducted on-site inspections
- Facilities conducted repairs
- Additional follow-up mobile monitoring will be conducted in the future

LINDEN AND SPRING WELLS OCTOBER 6, 2021

Composit measurements October 6 and 7, 2021



- Elevated VOCs (Alkanes) and Benzene were observed downwind of Site 1 and Site 2
- Compliance staff conducted on-site inspections



*Instantaneous readings during mobile survey

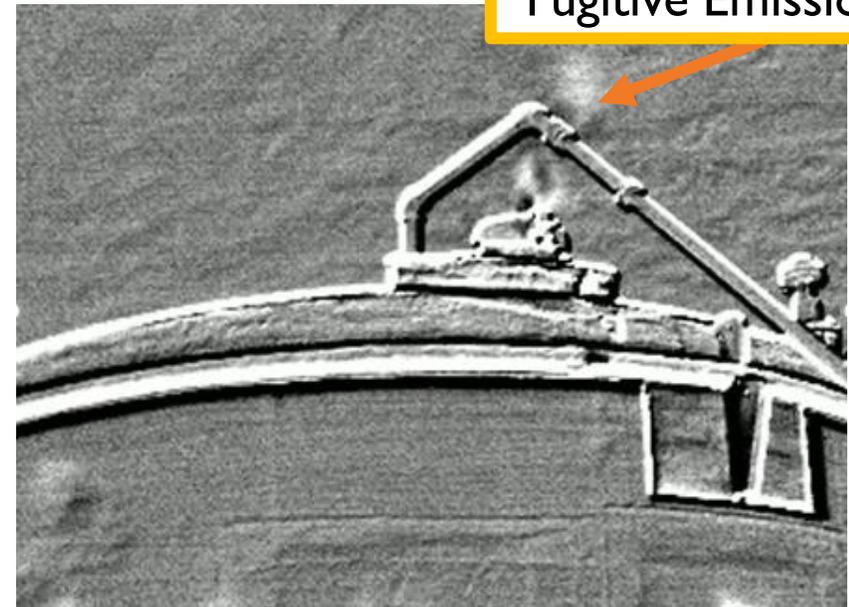
#Typical benzene range: 0.1 - 1.8 ppb

PASADENA AND SPRING WELLS

OCTOBER 6, 2021



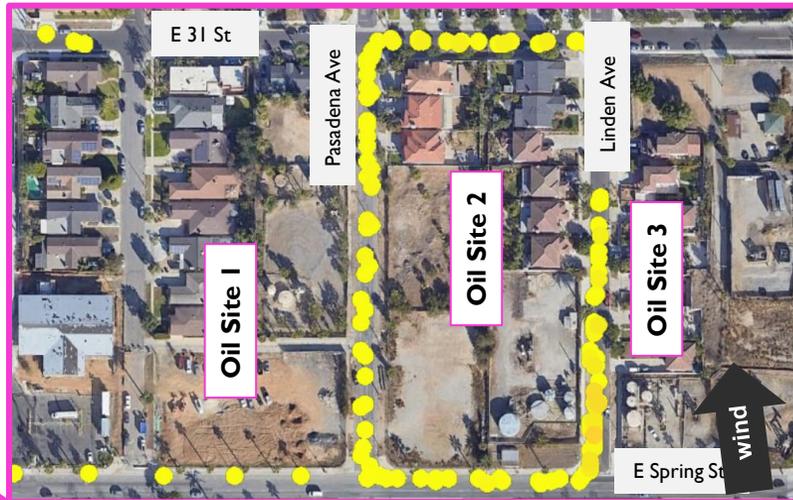
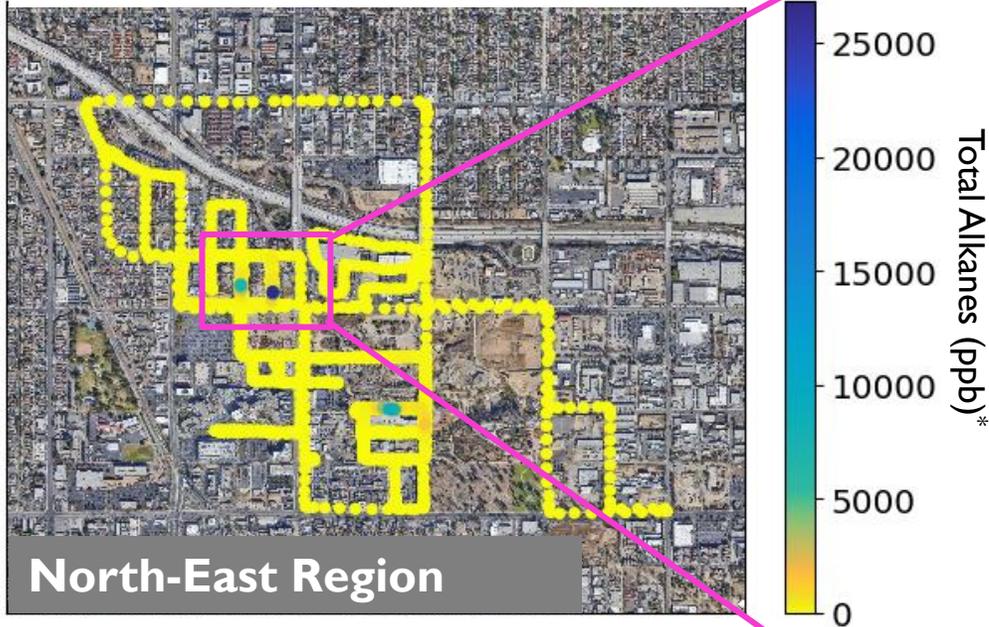
Picture of Oil Site I



FLIR video
Oil Site I

LINDEN AND SPRING WELLS OCTOBER 7, 2021

Composit measurements October 6 and 7, 2021



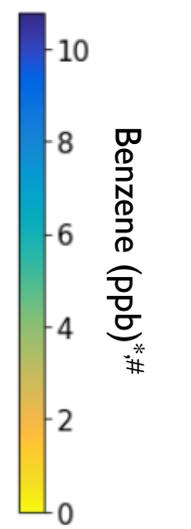
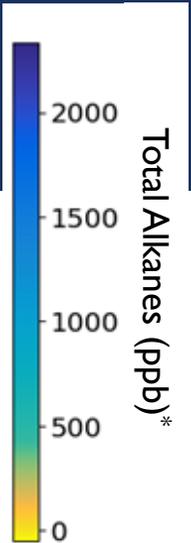
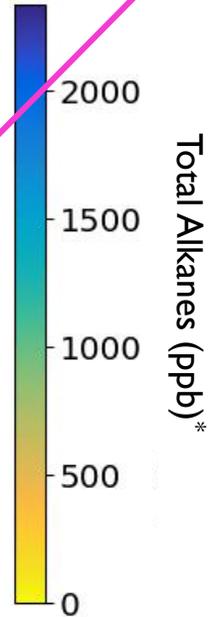
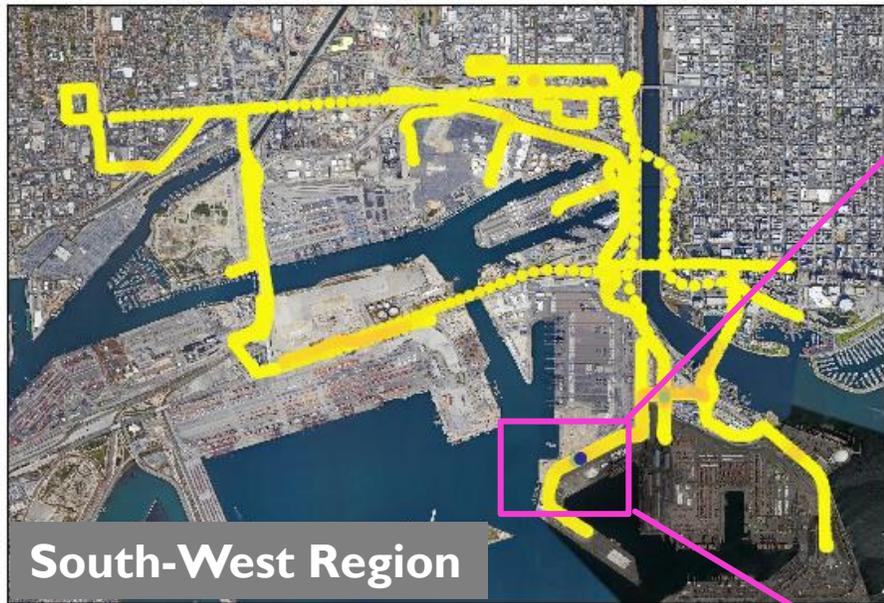
- Follow-up ORS survey on October 7, 2021 did not detect elevated emission from Site 1
- Levels of VOCs (Alkanes) and Benzene downwind of Site 2 were substantially reduced

*Instantaneous readings during mobile survey

#Typical benzene range: 0.1 - 1.8 ppb

PIER F SLURRY FACILITY OCTOBER 5, 2021

Composit measurements October 5 and 6, 2021

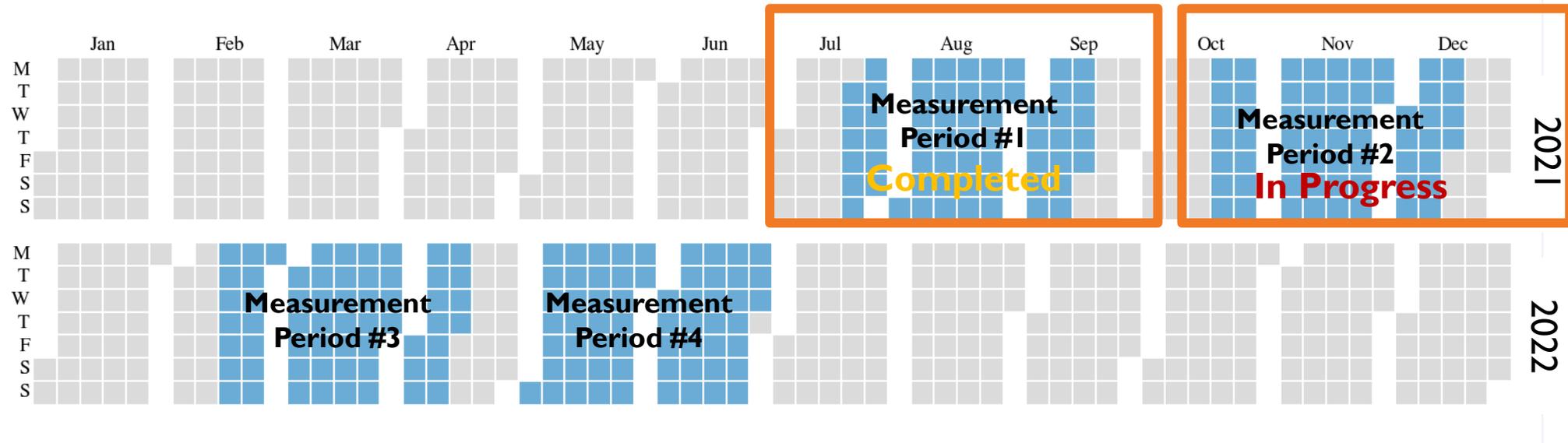


Note: Concentration scales are different from the previous slides

*Instantaneous readings during mobile survey
#Typical benzene range: 0.1 - 1.8 ppb

- Elevated VOCs (Alkanes) and Benzene were observed downwind of Slurry facility
- Compliance staff conducted on-site inspections
- Follow-up ORS survey on October 6, 2021 did not detect elevated emission

BASELINE REFINERY EMISSIONS: STATUS UPDATE



- Four 2-month measurement periods distributed over July 2021 through June 2022
 - Minimum of 23 days of measurements, 4-5 days of measurement days per refinery
 - Detailed analysis of measurements completed so far, and comparison with historical trend is in progress

REPORT ODORS TO SOUTH COAST AQMD

**There are
3 ways
to file:**



Call 1-800-CUT-SMOG
(1-800-288-7664)



Visit www.AQMD.gov/Complaints



Download the South Coast AQMD
app and select “1-800-CUT-SMOG”

CARSON H₂S ODOR EVENT AFFECTED AREA

- **Rule 1180 Fenceline and Community Air Monitoring**

Continuous real-time measurements of VOCs, H₂S and other air pollutants

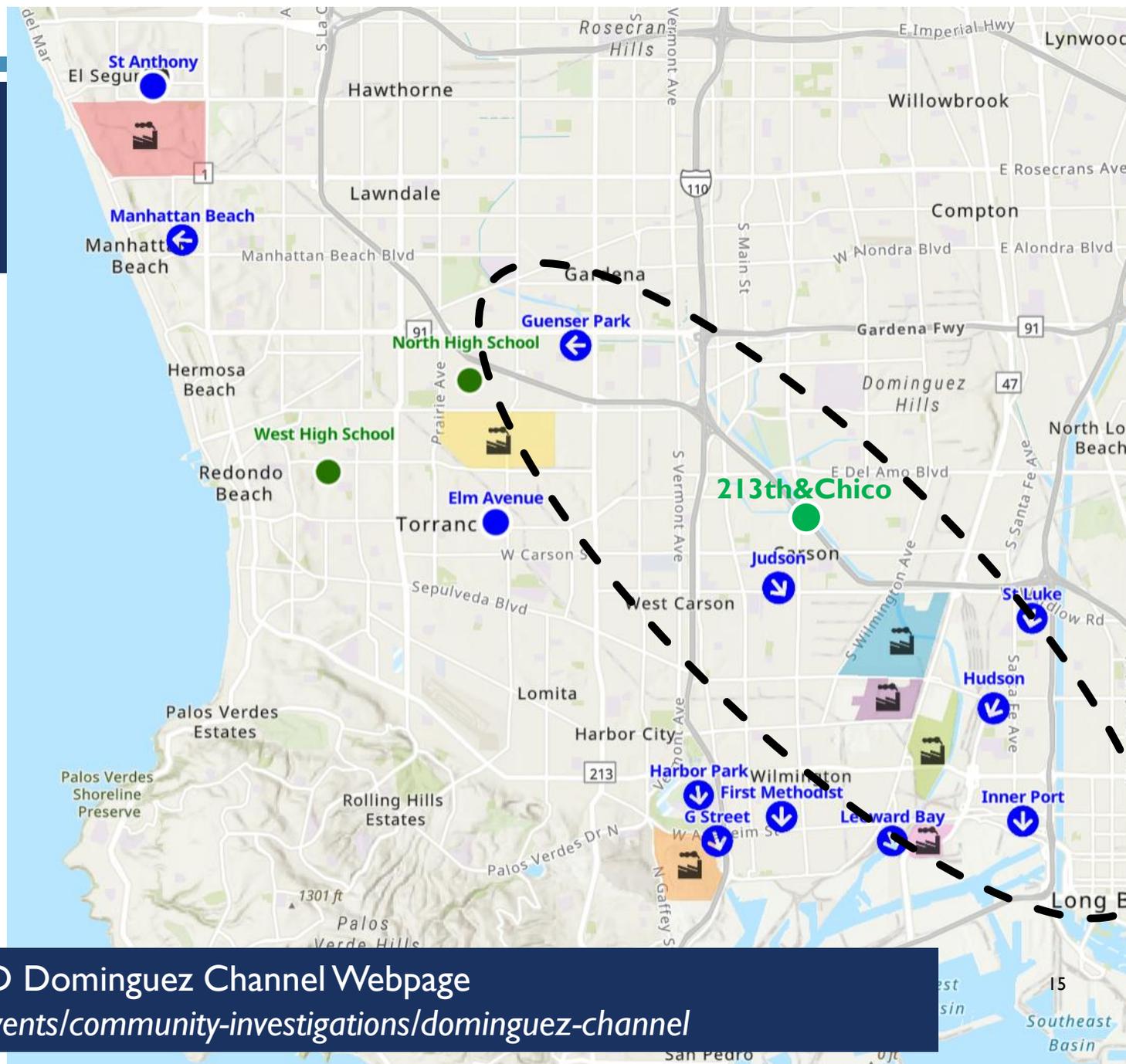
Automatic email notifications in case of increased air pollution levels

<https://xappprod.aqmd.gov/Rule1180CommunityAirMonitoring/>

- **New Air Monitoring Site (213th&Chico)**

Located near E 213th Street and the Dominguez channel

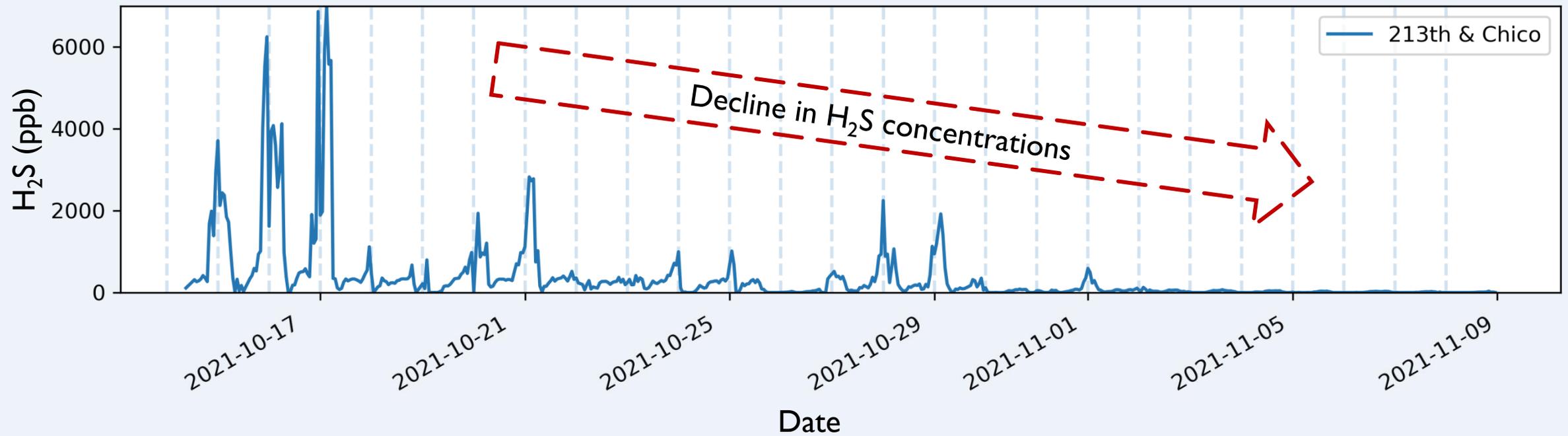
Continuous real-time measurements of H₂S
Measurements started on October 14, 2021



South Coast AQMD Dominguez Channel Webpage

<https://www.aqmd.gov/home/news-events/community-investigations/dominguez-channel>

HOURLY H₂S MEASUREMENTS AT 213TH & CHICO

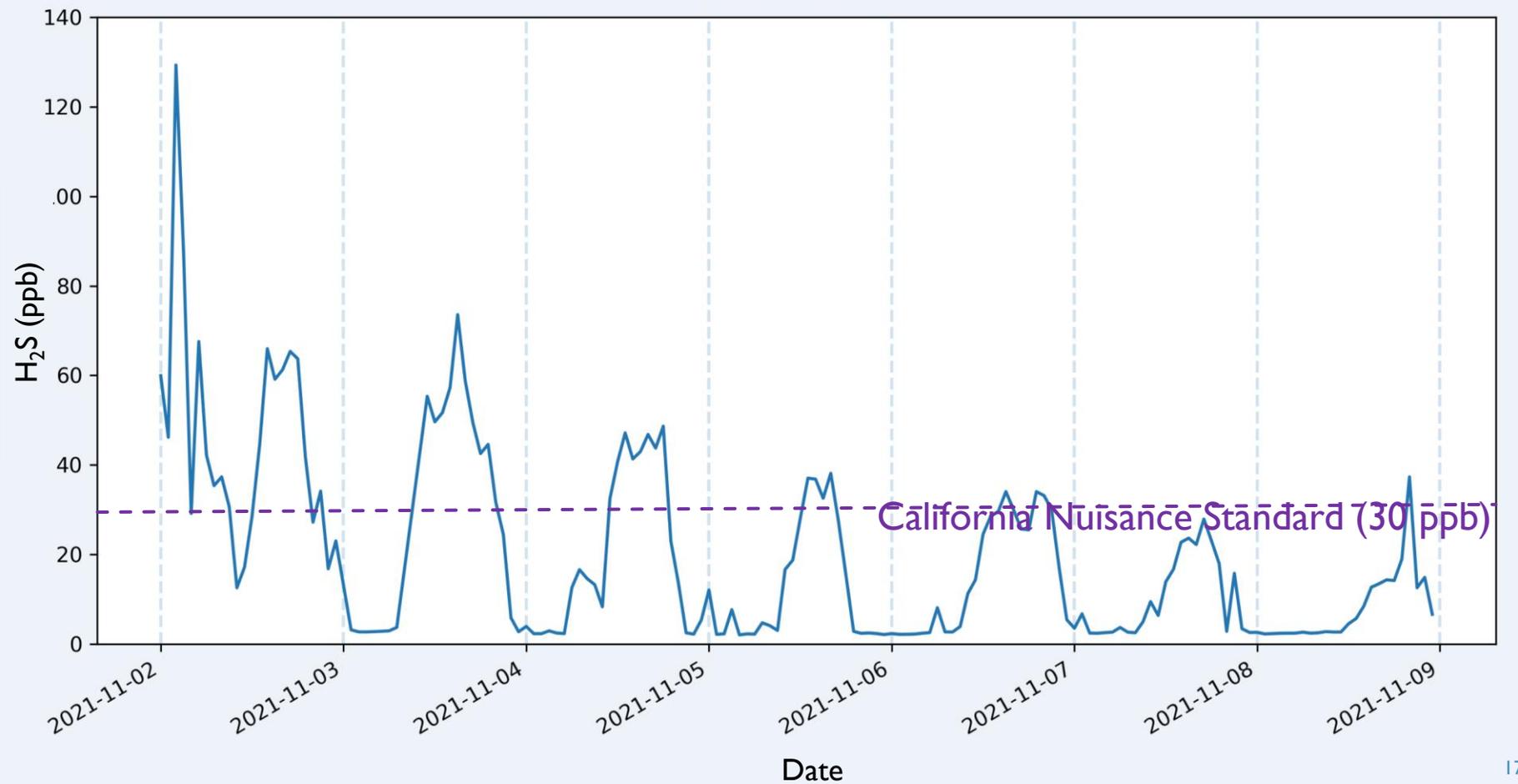


HOURLY H₂S MEASUREMENTS AT 213TH & CHICO

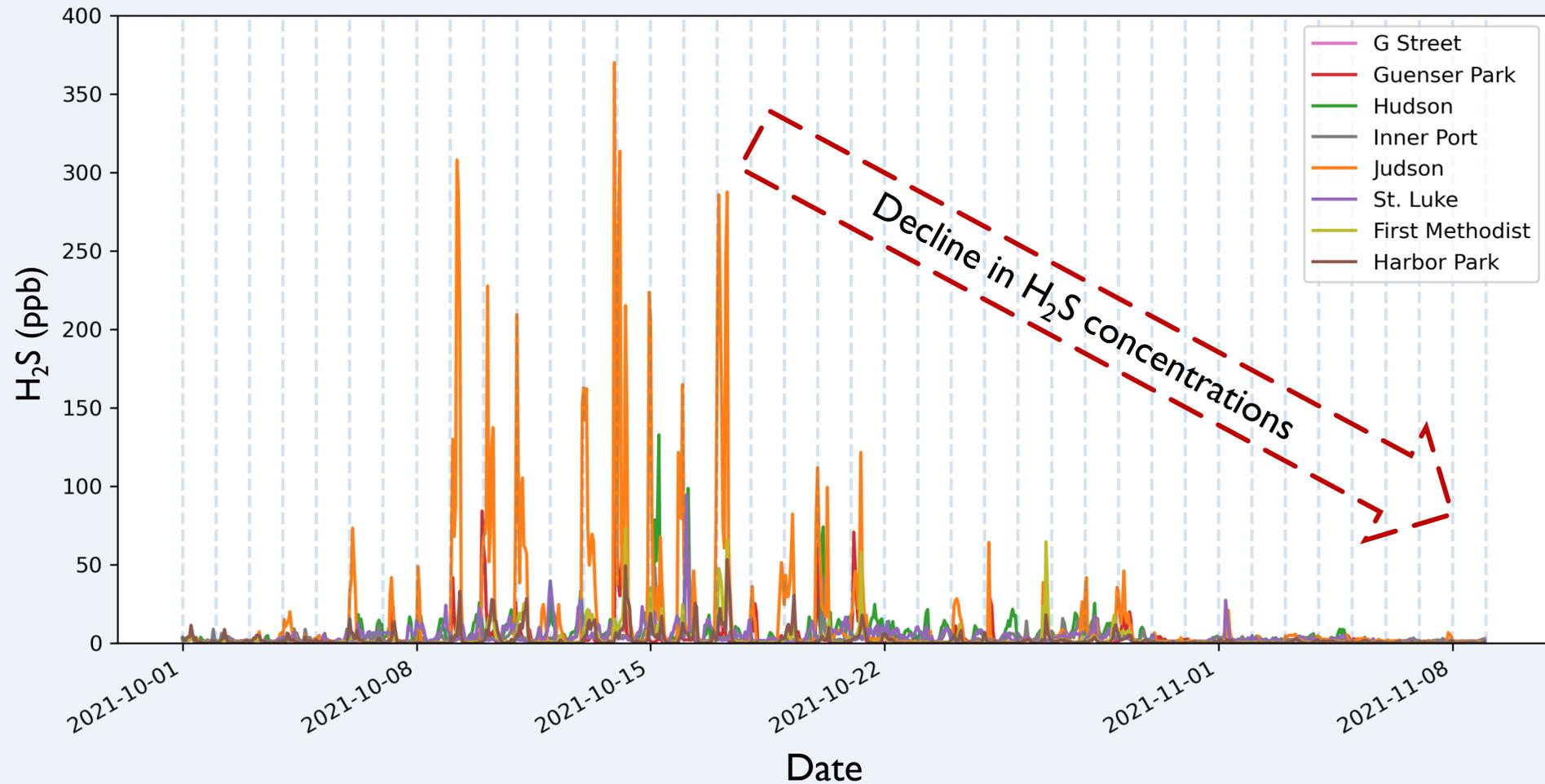
H₂S (ppb)

6000
4000
2000
0

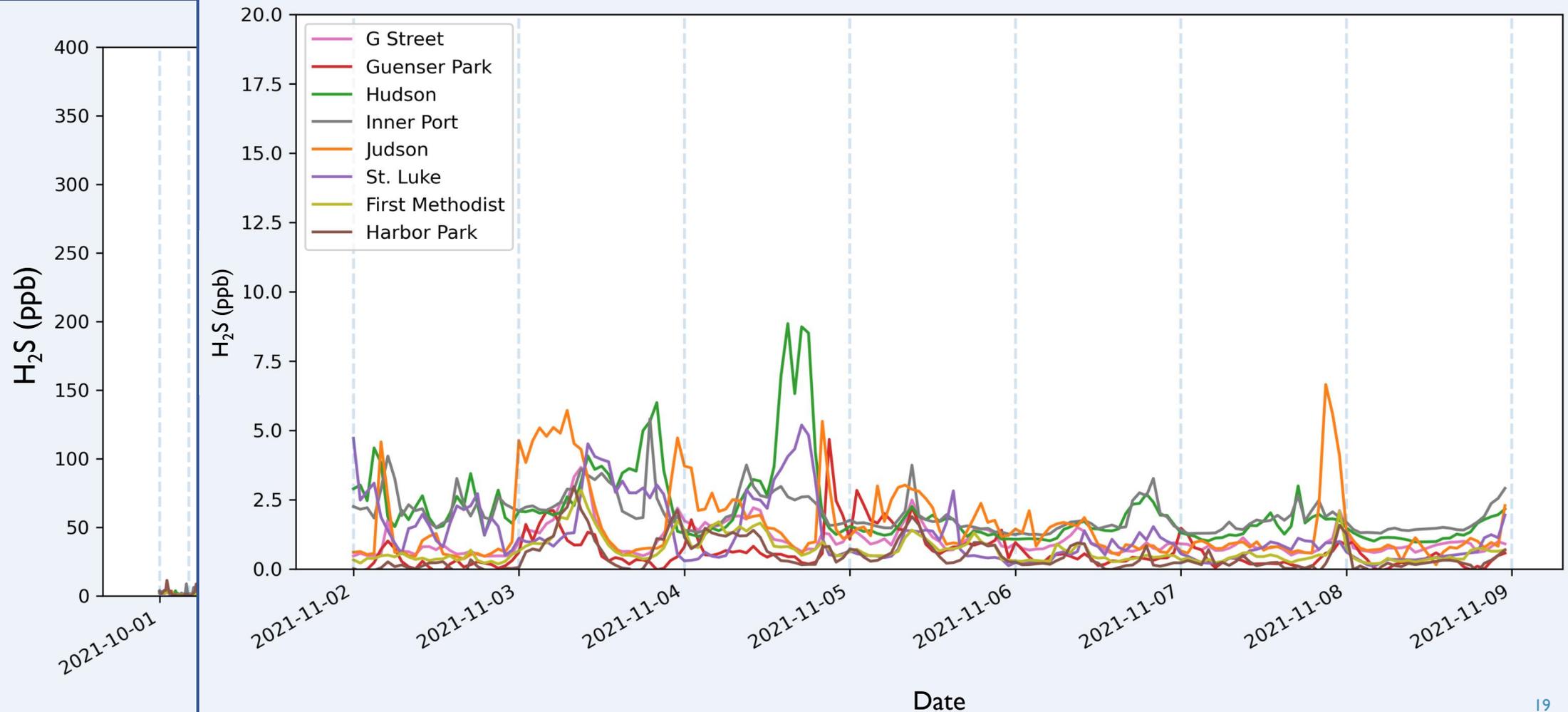
2021-10-17



HOURLY H₂S MEASUREMENTS AT COMMUNITY AIR MONITORING SITES

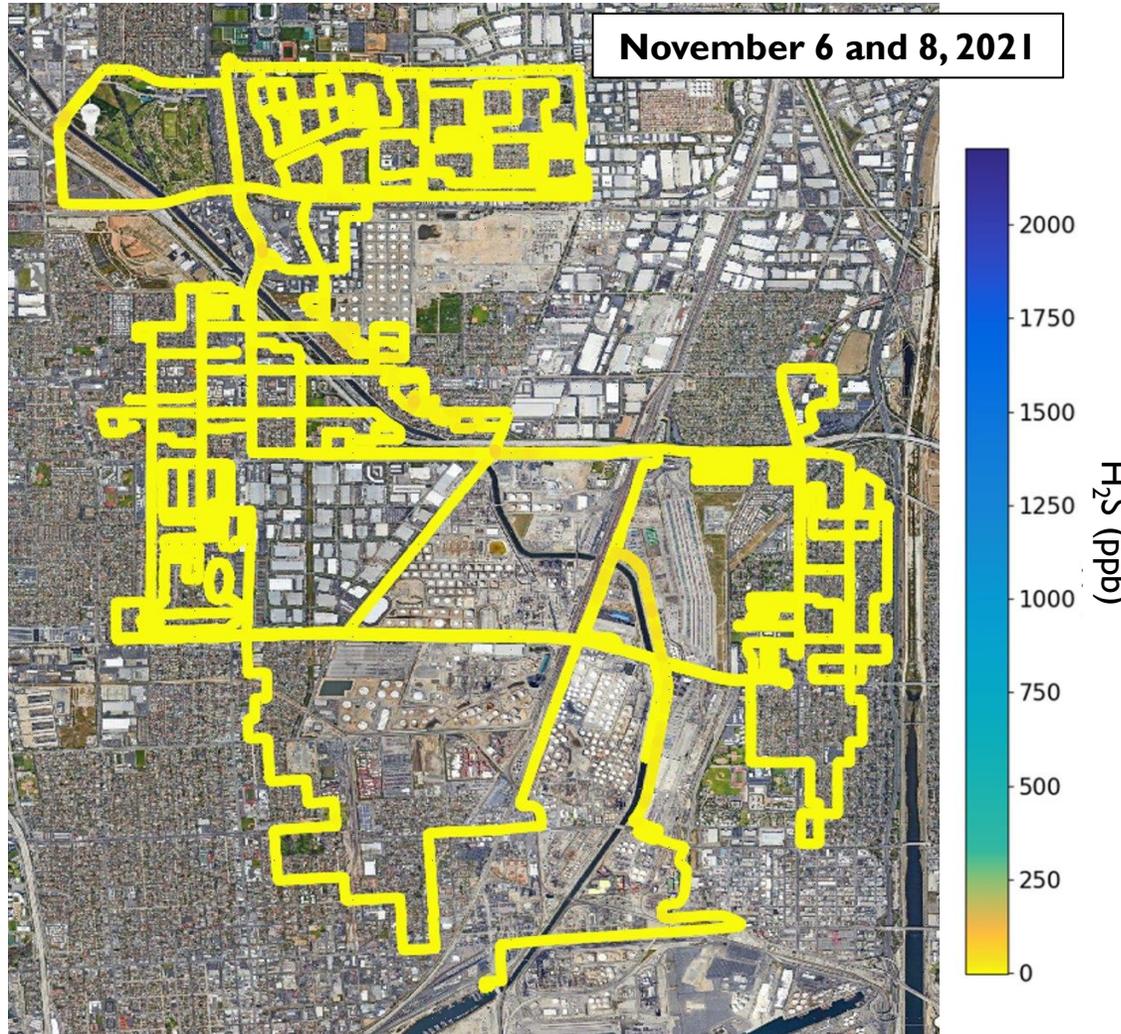
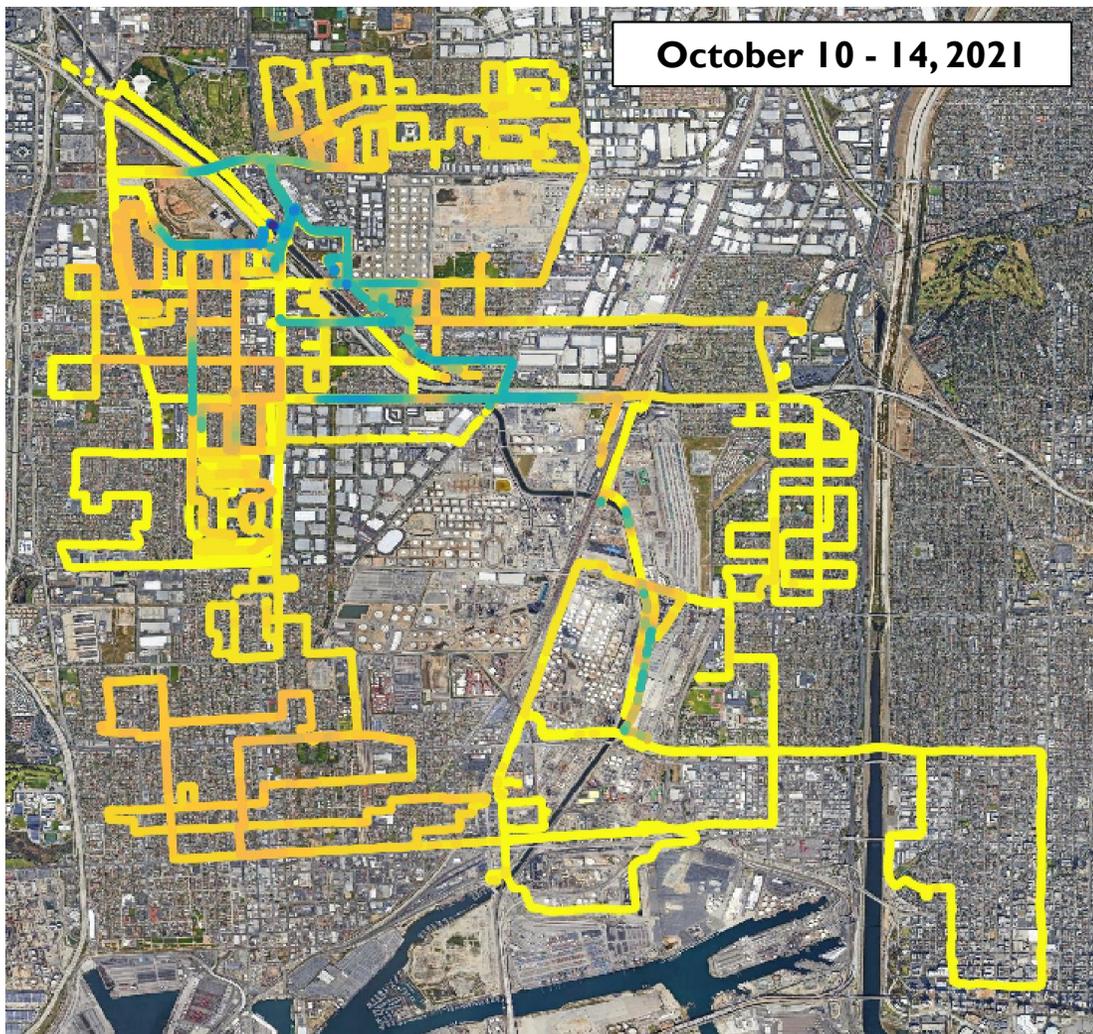


HOURLY H₂S MEASUREMENTS AT COMMUNITY AIR MONITORING SITES



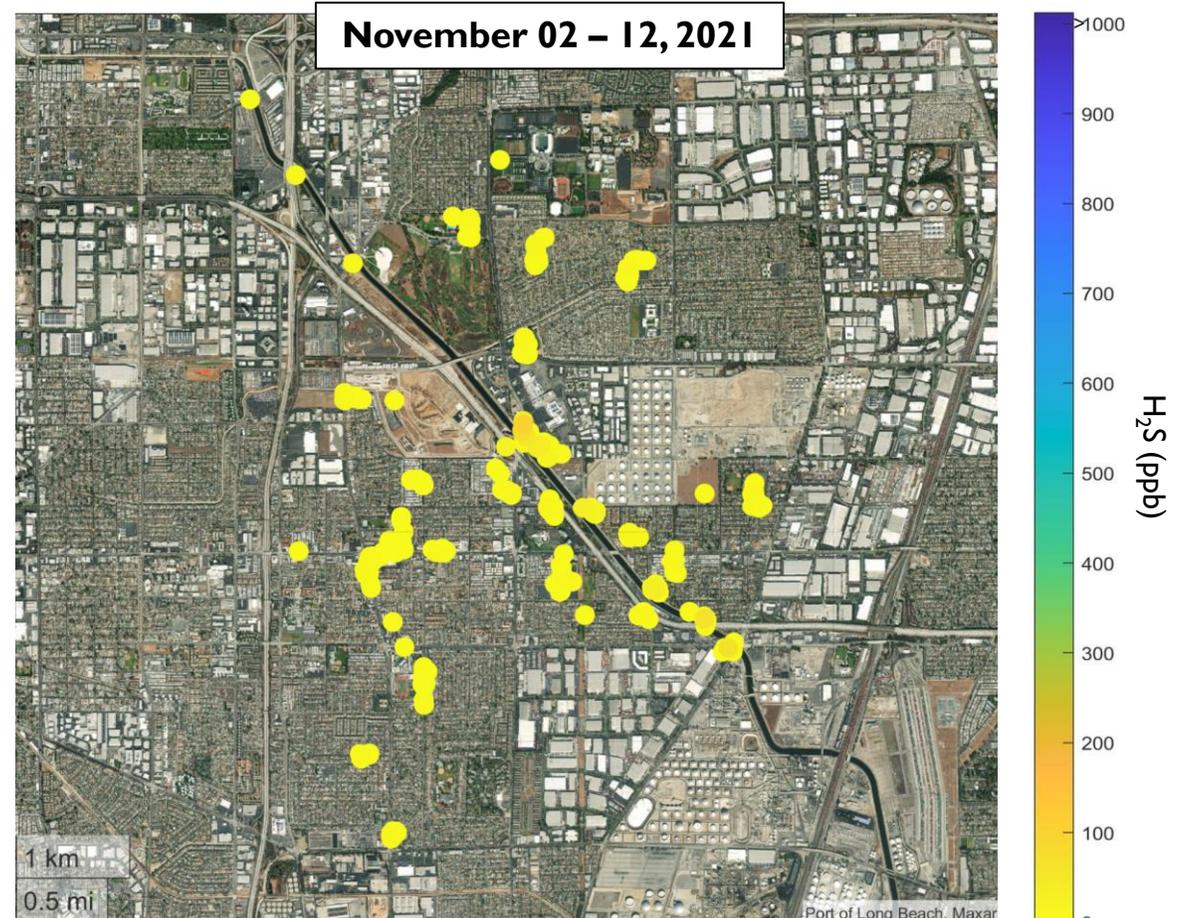
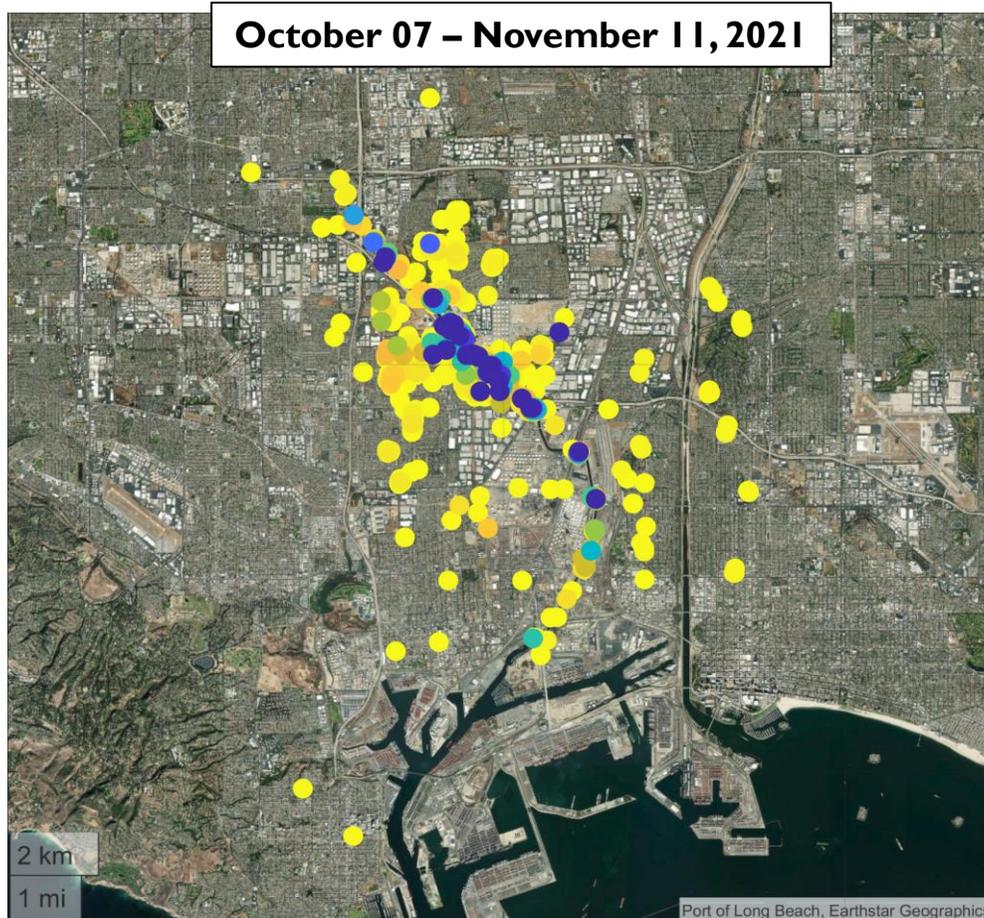


H₂S MOBILE MEASUREMENTS





HAND-HELD H₂S ANALYZER MEASUREMENTS



- Over 2,800 individual Jerome readings collected

Note: Concentration scale is different from the previous slide

DISCUSSION

- Comments, Suggestions, Questions

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RULE 1109.1
***EMISSIONS OF OXIDES OF NITROGEN
FROM PETROLEUM REFINERIES
AND RELATED OPERATIONS***

RULE 429.1
***STARTUP AND SHUTDOWN PROVISIONS
AT PETROLEUM REFINERIES AND
RELATED OPERATIONS***

RULE 1304
EXEMPTIONS

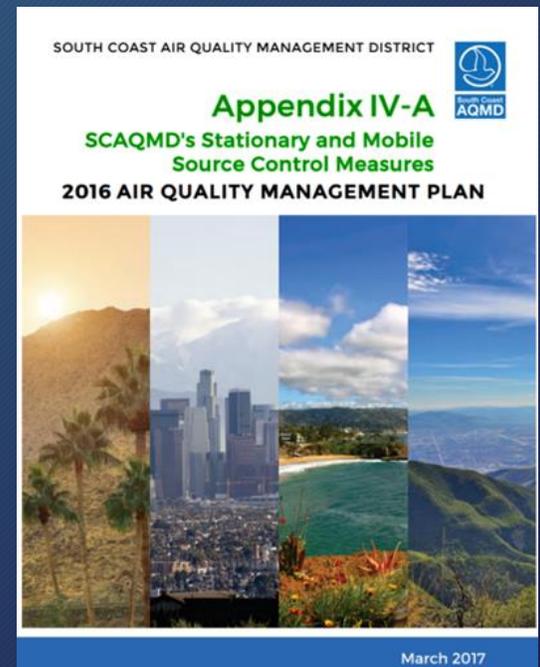
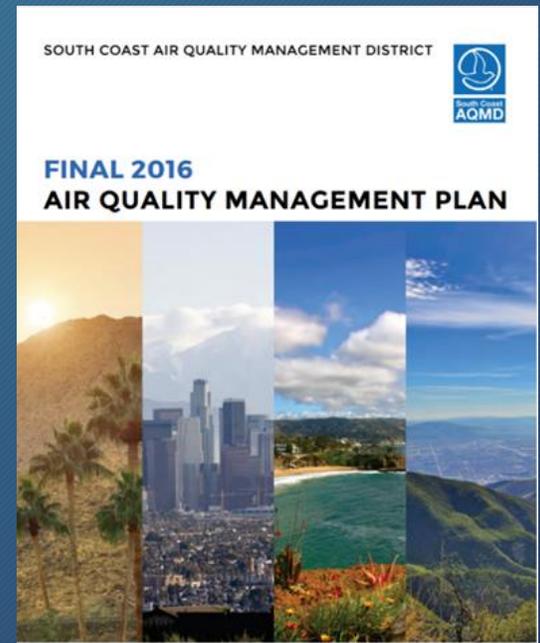
RULE 2005
NEW SOURCE REVIEW FOR RECLAIM

Wilmington, Carson, West Long Beach Community Update

November 17, 2021

Background

- 2016 Air Quality Management Plan
 - Adopted Resolution called for 5 tons per day NO_x reduction from transitioning RECLAIM to a command-and-control regulatory structure
- 2017 – AB 617
 - Applicable to facilities in the state greenhouse gas cap-and-trade program
 - Requires the highest priority for implementation will be for those sources that “have not modified emissions-related permit conditions the greatest period of time”
- Rule 1109.1 is critical for South Coast AQMD to meet:
 - Requirements under state and federal law
 - Commitment under AB 617 and CERP to achieve a 50% reduction for communities of WCWLB



Compliance with the WCWLB CERP

25

- Final Community Emission Reduction Plan (CERP) approved in September 2019
- CERP for Wilmington, Carson, West Long Beach include goals for emission reductions from refinery equipment, flaring, storage tanks
- One goal targets 50% reduction in NOx emissions with implementation of Rule 1109.1
 - Equates to 3-4 tons per day NOx reduction by 2030
- Rule 1109.1 anticipates overall 7.7 – 7.9 tons per day reduction from full implementation
- Reductions from WCWLB refineries ~4.5 tons per day NOx reduction so CERP goal will be satisfied



Affected Facilities

26

- Applies to 16 facilities
- 11 facilities are located in the communities of WCWLB
- Establishes NO_x limits for nearly 300 pieces of combustion equipment



9 Petroleum Refineries

- Chevron
- Marathon (Carson)
- Marathon (Wilmington)
- Marathon – Calciner
- Marathon – Sulfur Recovery Plant
- Phillips 66 (Carson)
- Phillips 66 (Wilmington)
- Torrance Refining Company
- Ultramar (Valero)



3 Small Refineries

Asphalt Refineries

- Lunday-Thagard DBA World Oil Refining
- Valero Wilmington Asphalt Plant

Biodiesel Refinery

- Alt Air Paramount



4 Related Operations

Hydrogen Plants

- Air Liquide Large Industries
- Air Products and Chemicals (Carson & Wilmington)

Sulfuric Acid Plant

- Eco Services Operations

Rule 1109.1 Rulemaking Public Process

27



**Initiated Rule
Development
February 2018**



**25 Working
Group
Meetings**



**100+ Individual
Stakeholder
Meetings**



**Two Community
Meetings for AB
617 Carson,
Wilmington, and
West Long Beach
Community**



**One Public
Workshop**

About Rule 1109.1

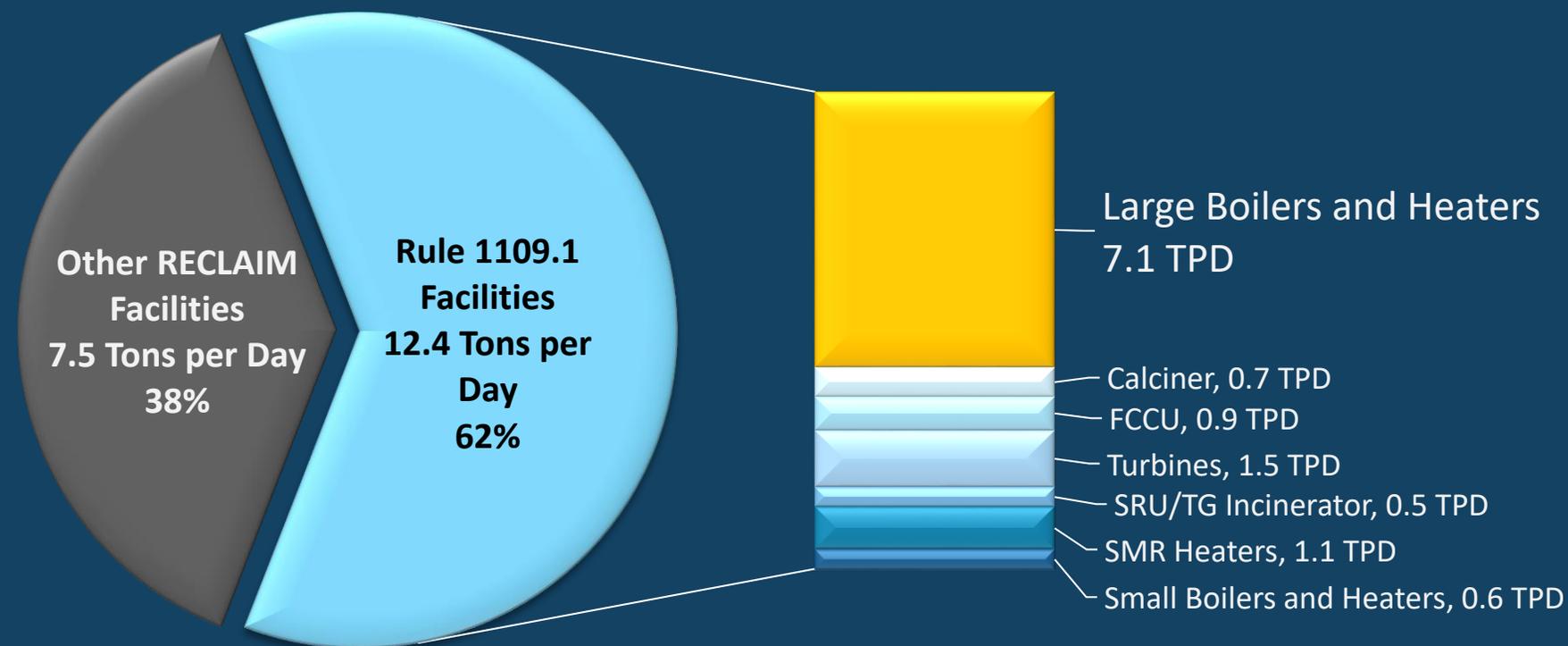
28

- South Coast AQMD Governing Board adopted Rule 1109.1 on November 5, 2021
- Rule 1109.1 is an industry-specific rule that sets BARCT NO_x standards for nearly 300 units at refineries and facilities with operations related to refineries
- Unlike RECLAIM, Rule 1109.1 does NOT allow facilities to purchase “emission credits” to meet emission reduction requirements
- Allows for two alternative compliance pathways for facilities with six or more pieces of equipment:
 - **B-Plan:** Focuses on individual pieces of equipment at BARCT or alternative BARCT limits
 - **B-Cap:** Establishes a facility-wide emission target with an additional 10% reduction as an environmental benefit
- At full implementation, Rule 1109.1 will significantly reduce NO_x emissions:
 - 7.7 to 7.9 tons per day (tpd) reduced
 - ~75% of the emission reductions by 2027

Rule 1109.1 - 2017 Baseline Emissions (Tons per Day or TPD)

29

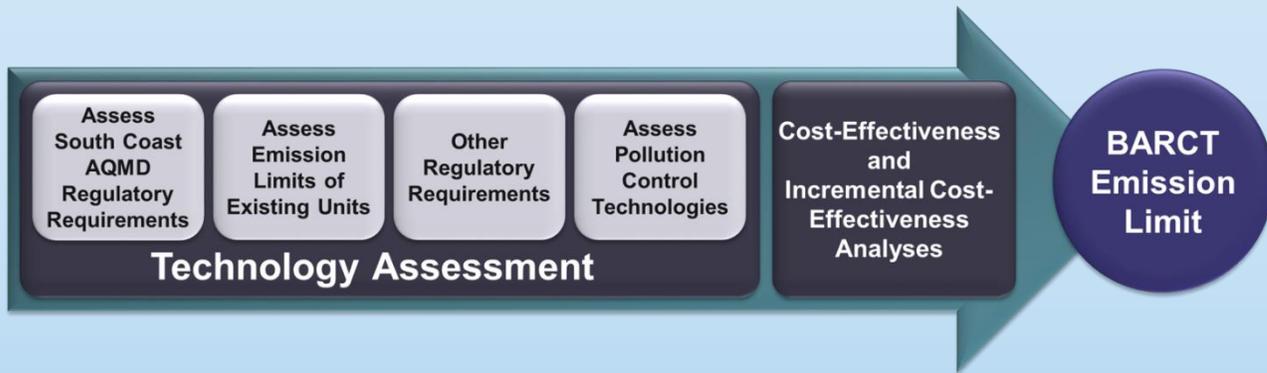
- Rule 1109.1 facilities represent 62% of the NO_x emissions in RECLAIM
- NO_x Emissions from large boilers and heaters (≥40 MMBtu/hour) represent 57% of the emissions from Rule 1109.1 combustion equipment



2017 RECLAIM NO_x Emissions
19.9 tons per day

Rule 1109.1 BARCT Assessment

30



- BARCT NOx limit established using a methodical approach that meets state law
- BARCT is defined in the California Health and Safety Code §40406 as
;“...an emission limitation that is based on the maximum degree of reduction achievable by each class or category of source, taking into account environmental, energy, and economic impacts.”

- NOx limits are designed to achieve maximum reductions taking into account economic impacts
- Staff uses a cost-effectiveness threshold of \$50,000/ton of NOx reduced
- Incremental cost-effectiveness is the incremental cost over the incremental reductions for the next more stringent NOx limit
 - >>\$50,000 indication that next more stringent NOx limit does not achieve substantially more reductions

Core Requirements

- Operators must meet NOx limits in Table 1
- If the conditional requirements can be met, operators can meet Table 2 “conditional NOx limits” in lieu of Table 1 limits
- Conditional NOx limits were developed to acknowledge achieving Table 1 NOx limits for some units have:
 - A high cost-effectiveness due to high capital cost and/or low emission reduction potential
- Incorporating the conditional NOx limits reduced the average cost-effectiveness to near or below \$50,000 per ton of NOx reduced for each class and category (BARCT)

TABLE 1: NOx AND CO CONCENTRATION LIMITS

Unit	NOx (ppmv)	CO (ppmv)	O ₂ Correction (%)	Rolling Averaging Time ¹
Boilers <40 MMBtu/hour	Pursuant to subparagraphs (d)(2)(A) and (d)(2)(B)	400	3	24-hour
Boilers ≥40 MMBtu/hour	5	400	3	24-hour
FCCU	2	500	3	365-day
	5			7-day
Flares	20	400	3	2-hour
Gas Turbines fueled with Natural Gas	2	130	15	24-hour
Gas Turbines fueled with Gaseous Fuel other than Natural Gas	3	130	15	24-hour
Petroleum Coke Calciner	5	2,000	3	365-day
	10			7-day
Process Heaters <40 MMBtu/hour	Pursuant to subparagraphs (c)			
Process Heaters ≥40 MMBtu/hour				
SMR Heaters				
SMR Heaters with Gas Turbine				
SRU/TG Incinerators				
Sulfuric Acid Furnaces				
Vapor Incinerators				

TABLE 2: CONDITIONAL NOx AND CO CONCENTRATION LIMITS

Unit	NOx (ppmv)	CO (ppmv)	O ₂ Correction (%)	Rolling Averaging Time ¹
Boilers >110 MMBtu/hour	7.5	400	3	24-hour
FCCUs	8	500	3	365-day
	16			7-day
Gas Turbines fueled with Natural Gas	2.5	130	15	24-hour
Process Heaters ≥40 – ≤110 MMBtu/hour	18	400	3	24-hour
Process Heaters >110 MMBtu/hour	22	400	3	24-hour
SMR Heaters	7.5	400	3	24-hour
Vapor Incinerators	40	400	3	24-hour

Requirements for Large Boilers and Heaters (≥ 40 MMBtu/Hour)

Unit	Table 1 NOx Limit (ppmv)	Table 2 Conditional NOx Limit (ppmv)
Boilers 40 – 110 MMBtu/hour	5 ppm	None
Boilers >110 MMBtu/hour		7.5
Process Heaters 40 – 110 MMBtu/hour		18
Process Heaters >110 MMBtu/hour		22

* Emission reductions range based on units identified as possibly meeting Table 2

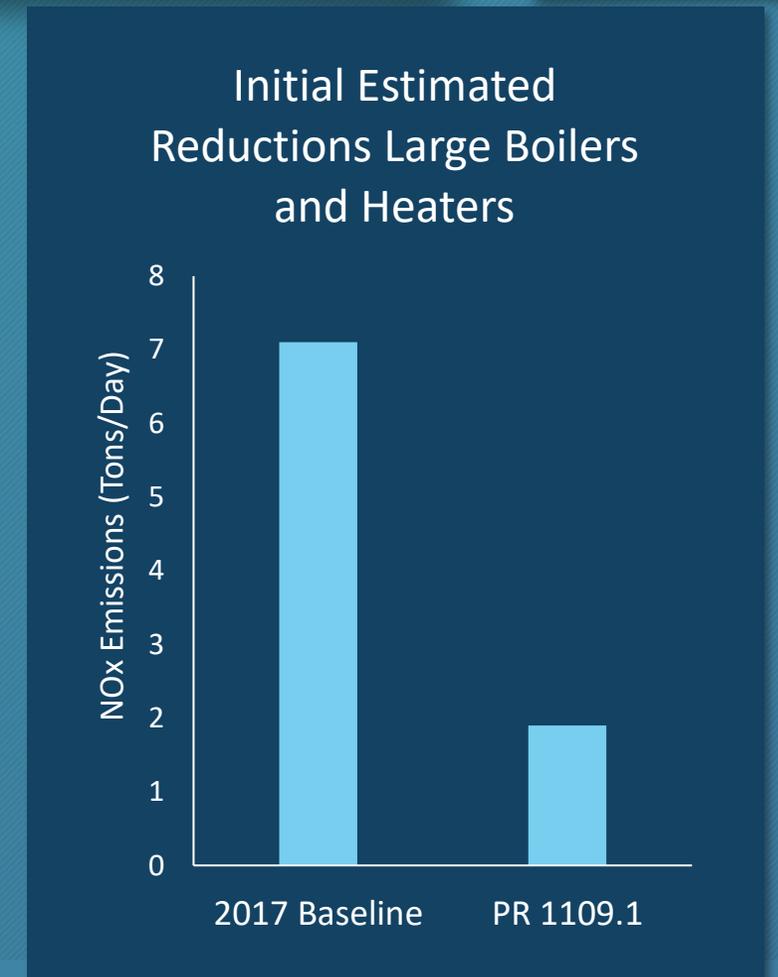


Table 2 Conditional NOx Limits

Unit	NOx (ppmv)	CO (ppmv)	O2 Correction (%)	Rolling Averaging Time ¹
Boilers >110 MMBtu/hour	7.5	400	3	24-hour
FCCU	8	500	3	365-day
	16			7-day
Gas Turbines fueled with Natural Gas	2.5	130	15	24-hour
Process Heaters 40 – 110 MMBtu/hour	18	400	3	24-hour
Process Heaters >110 MMBtu/hour	22	400	3	24-hour
SMR Heaters	7.5	400	3	24-hour
Vapor Incinerators	40	400	3	2-hour

Conditions for Using Table 2 NOx Limits

- Operators cannot use Conditional Limits if:
 - Permit to Construct issued on or after December 4, 2015 for post combustion controls
 - Potential NOx reductions is greater than:
 - 10 tons per year for boilers or process heaters 40 and 110 MMBtu/hour
 - 20 tons per year for boilers and process heaters ≥ 110 MMBtu/hour
 - Unit currently has permit limit or is currently performing at or below the applicable Table 1 NOx limit
 - Unit will be decommissioned
- Operators must submit a permit application by July 1, 2022 and meet Table 2 limit 18 months after Permit to Construct is issued
- Rule 1109.1 includes provisions for “pre-qualified” units – early permit submittal is not required for pre-qualified units

New SCRs should meet Table 1 NOx Limit

Units with large potential reductions should meet Table 1 NOx Limit

Unit already achieving Table 1 NOx Limit

Unit will be shutdown

Rule 1109.1 Potential Emission Reductions

- Rule 1109.1 will potentially reduce 7.7 – 7.9 tpd of NOx
- Estimated to achieve over 70% reduction in NOx emissions from boiler and process heater categories
 - Percent reductions vary based on emission reduction potential, some units already achieving low emissions
 - SCR can achieve 95% NOx Reductions for uncontrolled units
 - 41 boilers and process heaters currently have SCRs installed
 - Emission reduction estimates account for potential eligibility to meet Table 2 conditional limits

Equipment Type	2017 NOx Baseline Emissions (tpd)	Potential NOx Emission Reductions (tpd)
Boilers & Process Heaters ≥40 MMBtu/hr	7.1	5.0 – 5.2 ⁽¹⁾
Coke Calciner	0.71	0.68
SMR Heaters	1.1	0.6
Gas Turbine	1.4	0.4
FCCU	0.83	0.4
Boilers & Process Heaters <40 MMBtu/hr	0.64	0.32 ⁽²⁾
SRU/TG Incinerator	0.43	0.1
Vapor Incinerators	0.05	0.02
Sulfuric Acid Plants	0.1	0
Total	12.4	7.7 – 7.9

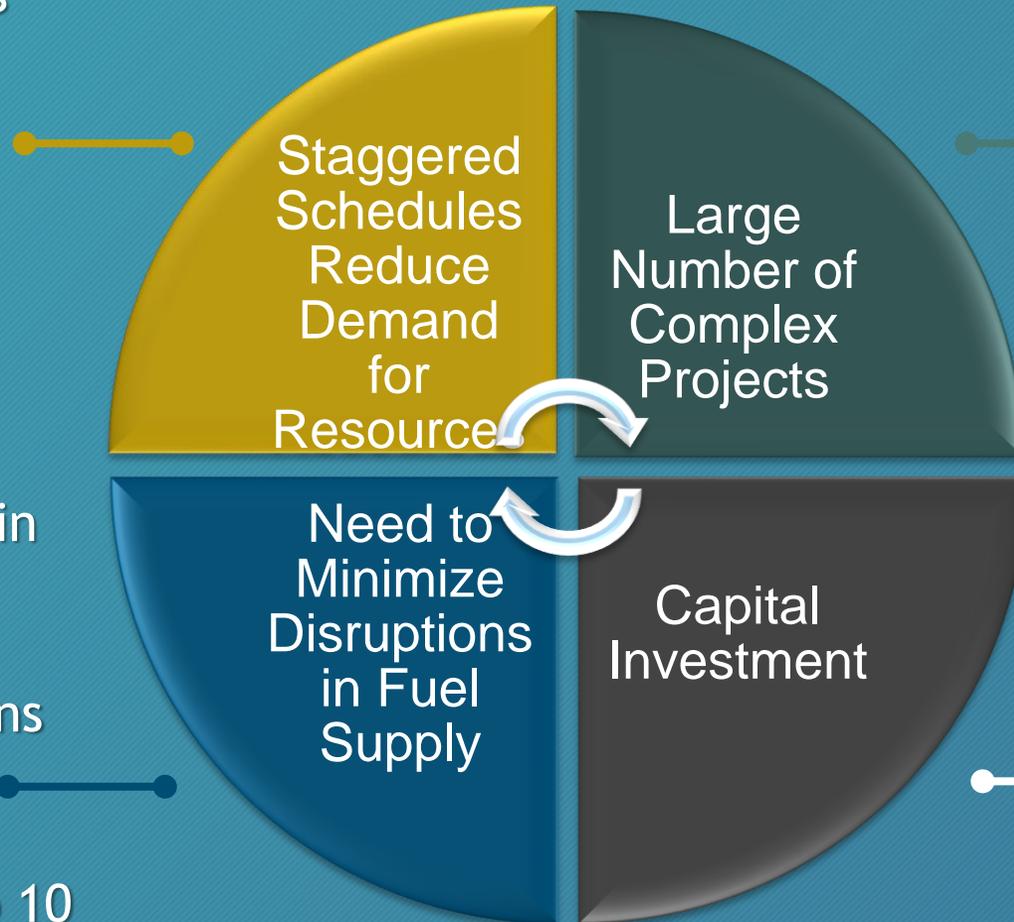
¹ Estimated reductions based on units anticipated to meet conditional limits

² Includes projected NOx emission reductions from end-of-life burner replacement and emerging technologies

Rule 1109.1 Implementation Considerations

- Refineries competing for same pool of skilled labor, equipment manufacturers, source testing companies, etc.

- Integrating projects in refinery turnaround schedules minimizes fuel supply disruptions
- Most turnaround schedules are 3 to 5 years, a few are 9 to 10 years



- ~90 new or upgraded selective catalytic reduction (SCR) projects
- SCR projects customized and require complex engineering
- Challenging to integrate within existing facility structure

- Capital costs for each project \$10 to \$70 million
- Cost per petroleum refinery ranges from \$179 million to \$1 billion

B-Plan and B-CAP Requirements

36

- The B-Plan and B-Cap would be implemented through an implementation schedule called an I-Plan
- B-Plan and B-Cap provides options to achieve BARCT in the aggregate
- Both alternative compliance options requires each unit to have an enforceable permit limit
 - Some permit limits will be higher than Table 1 limits, however the higher emission limits will have to be offset by lower limits



- B-Plan is a BARCT equivalent *concentration* plan
- Allows operators to select a NOx concentration limits that are equivalent BARCT in aggregate



- B-Cap is a BARCT equivalent *mass cap*
- Requires operators to accept a NOx emission limit for each unit
- Allows facilities to take credit for equipment shutdowns and throughput reductions

NOx Emission Targets for B-Cap and B-Plan



TABLE 1: NOx AND CO EMISSION LIMITS

Unit	NOx (ppmv)	CO (ppmv)	O2 Correction (%)	Rolling Averaging Time ¹
Boilers <40 MMBtu/hour	Pursuant to paragraph (d)(3)	400	3	24-hour
Boilers ≥40 MMBtu/hour	5	400	3	24-hour
FCCU	2	500	3	365-day
	5			7-day
Flares	20	400	3	2-hour
Gas Turbines fueled with Natural Gas	2	130	15	24-hour

TABLE 2: CONDITIONAL NOx AND CO EMISSION LIMITS

Unit	NOx (ppmv)	CO (ppmv)	O2 Correction (%)	Rolling Averaging Time ¹	
Petroleum Coke Calc	Boilers >110 MMBtu/hour	7.5	400	3	24-hour
	Process Heaters <40 MMBtu/hour	8	500	3	365-day
Process Heaters ≥40 MMBtu/hour	Gas Turbines fueled with Natural Gas	2.5	130	15	24-hour
	Process Heaters 40 – 10 MMBtu/hour	18	400	3	24-hour
SMR Heaters with Turbine	Process Heaters >110 MMBtu/hour	22	400	3	24-hour
	SMR Heaters	7.5	400	3	24-hour
Sulfuric Acid Furnace Vapor Incinerator	40	400	3	24-hour	

¹ Averaging times apply to units operating a certified CEMS and shall be calculated pursuant to Attachment A of this rule. Requirements, including averaging times, for units without CEMS are specified in subdivision (k).

B-Plan
 Aggregate NOx concentration limits must meet Emission Target



B-Cap
 Facility-wide emissions must meet Emission Target + 10% Environmental Benefit



Emission Targets for all facilities based on NOx limits in Table 1 and Table 2

B-Plan and B-Cap are designed to achieve Facility-Specific Emission Targets that are Based on Table 1 and Table 2 NOx Limits

Alternative Implementation Schedule (I-Plan)

38



- I-Plan is a phased implementation schedule
- Allows operators to tailor the implementation schedule to meet NOx limits to minimize operational disruptions

- I-Plans are needed due to the complexity and number of projects required to achieve Rule 1109.1 limits
- The flexibility in the I-Plans allows the facilities to install the NOx emission reduction projects during schedule maintenance to help minimize downtime and additional cost
- I-Plans are designed to achieve early emission reductions and allow longer implementation periods for the units that have longer maintenance schedules

I-Plan Options

- Rule 1109.1 includes five I-Plan Options
- Some I-Plans are limited to the type of BARCT Compliance Plan
- I-Plan Option 2 and 3 have an additional condition that the facility must be achieving a NO_x emission rate less than 0.02 pound per million BTU of heat input

I-Plan Options	Provision	Phase I	Phase II	Phase III
Option 1 for B-Plan or Table 1 or 2	Targets	80%	100%	
	Submit Permit Application	Jan 1, 2023	Jan 1, 2031	
Option 2 B-Plan ¹	Targets	65%	100%	
	Submit Permit Application	July 1, 2024	Jan 1, 2030	
Option 3 B-Plan or B-Cap ^{1,2}	Targets	40%	100%	
	Submit Permit Application	July 1, 2025	July 1, 2029	
Option 4 B-Cap Only ²	Targets	50%	80%	100%
	Submit Permit Application	N/A	Jan 1, 2025	Jan 1, 2028
Option 5 for B-Plan or Table 1 or 2	Targets	50%	70%	100%
	Submit Permit Application	Jan 1, 2023	Jan 1, 2025	July 1, 2028

Socioeconomic Impact Analysis

40

- Socioeconomic Impact Assessment and 3rd Party Reviews released September 7, 2021
 - Total cost estimated to be \$2.34 billion (net present value)
 - Estimated average annual costs of \$132.5 million per year
 - Documents can be viewed here:
<http://www.aqmd.gov/home/rules-compliance/rules/scaqmd-rule-book/proposed-rules/rule-1109-1>
- Local price of gasoline is projected to increase by less than one cent per gallon
- Average annual regional job impacts are projected increase by 213 jobs per year
 - In general, job gains are in the construction sector
 - Job gains from construction is expected to outweigh any negative impacts on affected industries
- Monetized public health benefits estimated to be \$2.63B (net present value)
 - Benefits include approximately 370 premature deaths avoided, 6,200 asthma attacks avoided, and 21,400 work loss days avoided

Rule 1109.1 Staff Contacts

41

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NEXT STEPS

Future Announcements

- Newsletters or emails
- Continue CERP implementation

Future Meeting

- Tentatively 1st Quarter 2022 (virtual)
- AQ Priority Updates & Agenda Topics
 - What would you like to hear about?

Public Comment

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