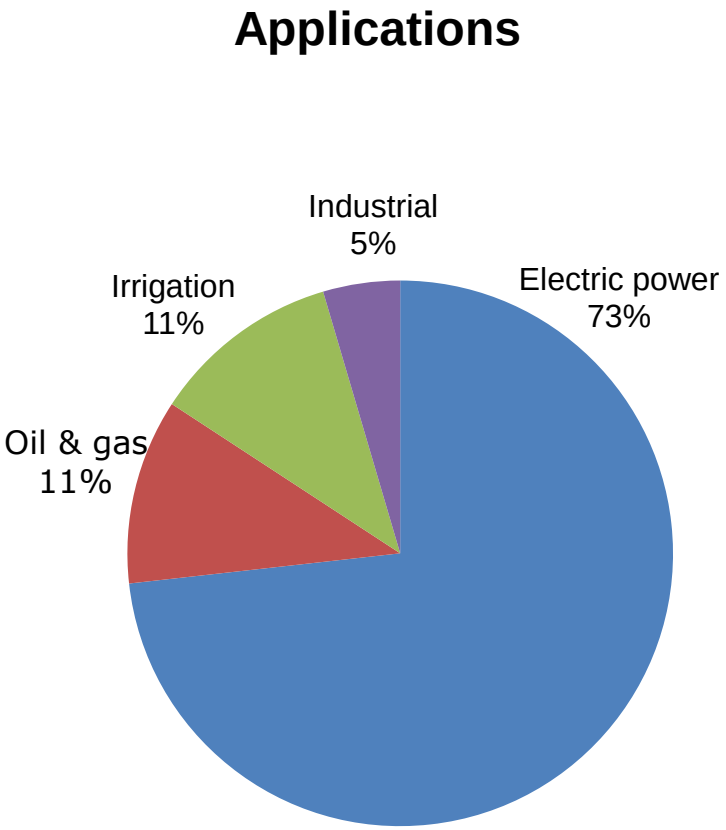
How to Comply with EPA Regulations for Stationary Reciprocating Internal Combustion Engines ("RICE")

Roy Crystal, EPA Region 1 (New England)

Webinar on New EPA Regulations for Printing Operations

December 4, 2013

Stationary Engines at a Glance



- ~1.5 million stationary engines in U.S.
  - 78% CI, 22% SI
  - ~ 900,000 used for emergency power
- Sizes range from 1 kW to >10 MW
- Main HAP emitted: formaldehyde, acetaldehyde, acrolein, methanol, and PAH
- Main criteria pollutants emitted: NOx, CO, VOC, PM

Why are Engine Emissions a Concern?

- Pollutants emitted from stationary engines are known or suspected of causing cancer and other serious health effects:
  - Aggravation of respiratory and cardiovascular disease
  - Changes in lung function and increased respiratory symptoms
  - Premature deaths in people with heart or lung disease
  - Benzene and 1,3-butadiene are known human carcinogens
  - Noncancer health effects from air toxics may include neurological, cardiovascular, liver, kidney effects, also effects on immune and reproductive systems
- NOx and VOC can react in the presence of sunlight to form ozone

EPA's Stationary Engine Regulations

- National Emission Standards for Hazardous Air Pollutants (NESHAP) for Stationary Reciprocating Internal Combustion Engines (RICE)
  - 40 CFR part 63 subpart ZZZZ
- New Source Performance Standards (NSPS) for Stationary Compression Ignition (CI) Internal Combustion Engines (ICE)
  - 40 CFR part 60 subpart IIII
- NSPS for Stationary Spark Ignition (SI) ICE
  - 40 CFR part 60 subpart JJJJ

RICE NESHAP Background

- Regulates HAP emissions from stationary RICE at both major and area sources of HAP
  - All sizes of engines are covered

- **ONLY ENGINES NOT SUBJECT**: existing emergency engines located at residential, institutional, or commercial area sources used or obligated to be available ≤15 hr/yr for emergency demand response, and not used for local reliability
- Refer to table of NAICS codes on EPA air toxics TTN website RICE webpage –
- **http://www.epa.gov/ttn/atw/icengines/imp.html**

Suggested Procedure for Determining EPA RICE Compliance Requirements

- Step-by-step procedure - not required, suggested
- Many different classes of RICE with different compliance requirements
- Develop an inventory that classifies all your RICE for key factors that determine applicable compliance requirements
- Use web tools & your inventory to determine requirements
- Call EPA or state if you get stuck

Suggested Step-by-Step Procedure

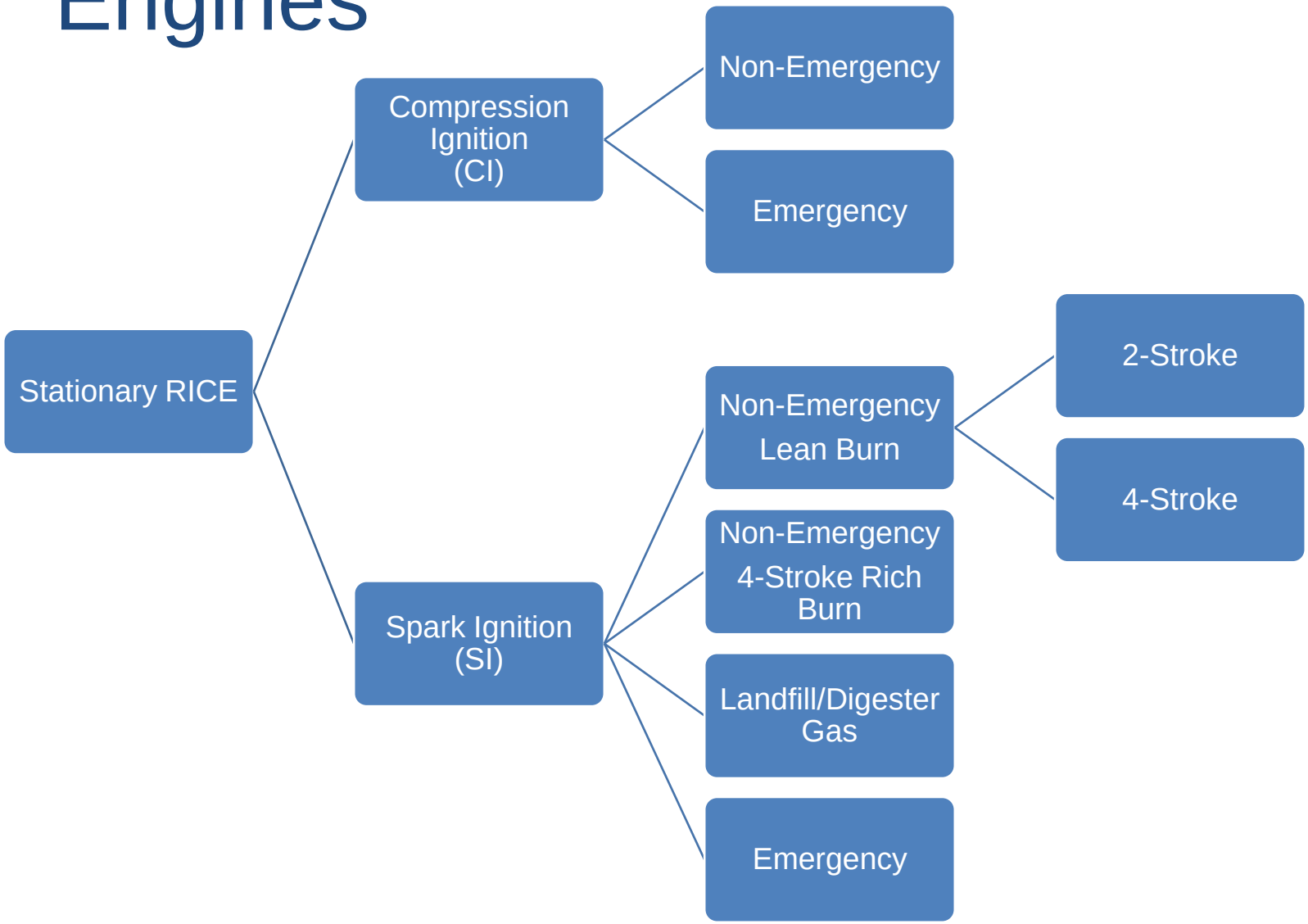
- Step 1 - Determine if your RICE are Stationary
- Step 2 – Classify Each RICE by Key Factors
- Step 3 – Determine if Your Source is Area or Major
- Step 4 – Determine if Your RICE are New or Existing
- Step 5 – Determine if Your RICE are Emergency or Non-Emergency
- Step 6 – Determine if Your Emergency RICE are Subject to RICE NESHAP
- Step 7 – Determine Compliance Requirements
- Step 8 – Review Compliance Dates & Address Any Noncompliance

Stationary vs. Mobile

- Stationary means not used in a motor vehicle and not a nonroad engine
  - Nonroad engines are:
    - Self-propelled (tractors, bulldozers)
    - Propelled while performing their function (lawnmowers)
    - Portable or transportable (has wheels, skids, carrying handles, dolly, trailer, or platform)
      - Portable nonroad becomes stationary if it stays in one location for more than 12 months, or full annual operating period if seasonal source

VS.

How EPA Regulations Classify Engines



Classify Each RICE by Key Factors

- CI or SI
- SI - 2 or 4-stroke, lean or rich burn, etc.
- Horsepower
- Date constructed/reconstructed
- Annual hours of use in emergency/non-emergency situations
- Annual hours of use for maintenance/testing
- Contract obligations and annual hours of use for emergency demand response, financial arrangement for local system reliability, peak shaving

Determine if Your Source is Area or Major

- Major – Facility-wide potential to emit ≥ 10 tons/year single Hazardous Air Pollutant (HAP) or ≥ 25 tons/year combined HAPs
- Area – not major

Determine if Your RICE are New or Existing

- RICE NESHAP - >500 hp at major source – existing if construction commenced before December 19, 2002
- RICE NESHAP - ≤ 500 HP at major source, and all HP at area source – existing if construction commenced before June 12, 2006
- Construction date for RICE NESHAP – entered into contractual obligation for on-site installation of engine
- Construction date for CI & SI NSPS – date ordered

  (7/11/2005 for CI NSPS and 6/12/2006 for SI NSPS)

Emergency Engine Operational Limitations

- Emergency engine operation limited to:
  - Unlimited use for emergencies (e.g., power outage, fire, flood)
  - 100 hr/yr for maintenance/testing and emergency demand response
  - 50 hr/yr of the 100 hr/yr allocation can be used for:
    - non-emergency situations if no financial arrangement
    - local reliability as part of a financial arrangement with another entity if specific criteria met (existing RICE at area sources of HAP only)
    - peak shaving until May 3, 2014 (existing RICE at area sources of HAP only) if part of a peak shaving (load management) program with the local distribution system operator and the power is provided only to the facility or to support the local distribution system

RICE NESHAP Area Source Emergency Engine Requirements

- Management practices to maintain engine
  - Change oil/filter, inspect air cleaner or spark plugs, inspect hoses/belts on prescribed schedule
  - May use oil analysis program instead of prescribed oil change frequency
- Operate/maintain engine and control device per manufacturer's instructions or owner-developed plan
- Install non-resettable hour meter and record hours of operation
- Keep records of maintenance
- Notifications not required
- Electronic reporting and ultra low sulfur diesel if used for emergency demand response or local reliability

Determine if Your RICE are Emergency or Non-Emergency

- Note that following 2013 amendments emergency RICE definition now includes up to 100 hours of annual use for combination of maintenance/testing and EDR
- Use engine too much (time limits) – sources may become subject to RICE NESHAP non-emergency engine requirements!

Key Dates – RICE NESHAP

- Initial applicability notifications for engines subject to notification requirements were due by:
  - August 31, 2010 for existing CI RICE
  - February 16, 2011 for existing SI RICE

- Compliance dates:
  - June 15, 2007
    - Existing RICE >500 HP at major sources (except non-emergency CI >500 HP at major sources)
  - **May 3, 2013**
    - Existing CI RICE (except emergency CI >500 HP at major sources)
  - **October 19, 2013**
    - Existing SI RICE ≤500 HP at major sources and all HP at area sources
  - Upon startup for new engines

Stationary CI ICE NSPS

CI NSPS Owner/Operator Compliance Requirements

- 2007 model year and later with displacement <30 liters/cylinder*
  - purchase certified engine
  - Install, configure, operate and maintain engine per manufacturer's instructions or manufacturer-approved procedures
    - Owner/operator performance testing not required
  - If operate differently than manufacturer's recommendations, must do performance test to show compliance

* For CI fire pump engine, 2008-2011 model year and later (depending on engine size)

CI NSPS Monitoring/Recordkeeping/Reporting

Engine Type	Requirement
Emergency Engines	•Non-resettable hour meter and records of operation if engine does not meet non-emergency engine standards
Equipped with diesel particulate filter (DPF)	•Backpressure monitor and records of corrective actions
Non-emergency >3,000 HP or with displacement >10 liters/cylinder and Pre-2007 model year >175 HP that are not certified	•Submit initial notification •Keep records of notifications and engine maintenance •If certified, keep records of documentation of engine certification •If not certified, keep records of compliance demonstrations

Stationary SI ICE NSPS

SI NSPS Owner/Operator Compliance Requirements

- Non-certified engines:
  - Applies to both emergency & non-emergency engines
  - Maintenance plan
  - Performance testing
    - 25<HP≤500 – initial test
    - >500 HP - initial test and subsequent every 8,760 hours or 3 years, whichever is first
    - Conduct within 10% of peak (or highest achievable) load

- Monitoring/recordkeeping/reporting includes:
  - Non-resettable hour meter and records of operation for emergency engines
  - Documentation of certification
  - Records of engine maintenance
  - Initial notification for non-certified engines >500 HP
  - Results of performance testing within 60 days of test

Determine Compliance Requirements

- Refer to 2013 Melanie King Powerpoints - posted on EPA Region 1 RICE & national RICE webpages
- e-CFR is current
- Region 1 RICE webpage recently up-dated to include new tables with revised compliance requirements
- National RICE webpage recently revamped; more user-friendly; new tools
- EPA online tools have been up-dated (Regulation Navigation Tools for RICE NESHAP & NSPS)
- Area source printers with emergency engines & no financial arrangements for RICE use - straightforward

Review Compliance Dates & Address Any Noncompliance

- Engines with emission limits will often need to install controls and have notification requirements
- Submit overdue initial notifications ASAP - due 8/31/2010 for existing non-emergency CI RICE and 2/16/2011 for existing non-emergency SI RICE
- By RICE NESHAP compliance dates (5/3/13 CI, 10/19/13 SI) non-emergency engines must have controls installed & meet all other compliance requirements; stack test due 180 days after

23

Compliance Extensions

- One year compliance extensions to install controls – due dates 1/3/13 for CI; 6/21/13 for SI (120 days before compliance dates)
- Can submit request after these dates if can show need arose within 120 days due to circumstances beyond control
- Latest possible compliance extension date is one year after compliance date (5/3/14 for CI, 10/19/14 for SI)

24

Useful EPA RICE Webpages

For information on RICE NESHAP and NSPS Rules:

http://www.epa.gov/region1/rice/

http://www.epa.gov/ttn/atw/icengines/

Need More Help or Info?

Roy Crystal, Region 1 RICE Assistance Lead
Crystal.roy@epa.gov, 617-918-1745

Susan Lancey, Region 1 Air Toxics Coordinator
(contact for RICE applicability determinations)
Lancey.Susan@epa.gov, 617-918-1656

Regional RICE Contacts
for Other EPA Regions – direct your questions to RICE contact for the region where the engine is -
http://www.epa.gov/ttn/atw/rice/EPARegionalRICEcontacts.pdf

RICE NESHAP Non-Emergency Engines

- Existing compression ignition (CI) diesel engines, construction commenced before 6/12/06, greater than 300 hp at area source of HAP
  - Initial notification to EPA was due August 31, 2010
  - May 3, 2013
    - Install crankcase ventilation system
    - Only use Ultra Low Sulfur Diesel (15 ppm sulfur)
    - Must meet carbon monoxide (CO) emission limit which may require catalytic system installation
    - Monitoring of catalyst performance required for engines > 500 hp
    - Keep records
  - October 30, 2013
    - Initial testing required to show compliance
    - Subsequent testing for engines over 500 hp (3 years or 8,760 hours of operation whichever comes first)

Emission Standards: Existing Non-Emergency RICE at Area Sources

HP	Engine Subcategory				
	Non-emergency				
	CI	SI 2SLB	SI 4S in remote areas	SI 4S not in remote areas	SI LFG/DG
≤300	Change oil/filter & inspect air cleaner every 1,000 hours or annually; inspect hoses/belts every 500 hours or annually	Change oil/filter, inspect spark plugs, & inspect hoses/ belts every 4,320 hours or annually	Change oil/ filter, inspect spark plugs, & inspect hoses/belts every 1,440 hours of operation or annually		Change oil/ filter, inspect spark plugs, & inspect hoses/ belts every 1,440 hours of operation or annually
300-500	49 ppm CO or 70% CO reduction				
>500	23 ppm CO or 70% CO reduction		Change oil/ filter, inspect spark plugs, & inspect hoses/belts every 2,160 hours of operation or annually	If engine used >24 hrs/yr: 4SLB: Install oxidation catalyst 4SRB: Install NSCR	