ISP Study on Thermal Oxidizers in Plastic Bag Industry

Summary: From interview with two RTO vendors on top of the previous interviews with four vendors from past work-order 33 ex post efforts, it appears that for the following three industries - bakeries (food processing), aerospace, and automotive - RTO is the current ISP. For the plastics bag manufacturing industry, RTO had not become ISP as of the (insert date of study), however, evidence suggested that RTO was likely to be ISP in a year and a sunset date should be considered soon.

Initial Interview with Industry Expert regarding Thermal Oxidizers

Contacts: Gulf Coast Environmental: XXXX XXXX (30 year expert in TO technology) phone xxxxxxxxxxxx

1) What technology are you seeing take at least 50% of the market share where the market allows multiple technologies?
    a. Mainly production facilities
    b. RTO technology is around 50% - 60% of the market
    c. Other technologies can only use Direct Fired Oxidizers, although not efficient the process dictates that technology
2) Incremental Cost between RTO and other technologies with and average system using say 7500 scfm. All technologies being skid mounted, delivered and installed, complying with AQMD <20 PPM, < X lbs /month, and meet best available control
    a. Direct Fired units are around $180k (highest operating cost)
    b. Recuperative TO around $300K (higher Operating cost)
    c. Regenerative TO around $375k to $400k (lowest Operating cost)
3) Are there any higher level efficiency technologies that can be used?
    a. RCO technology. RCO = RTO + catalyst. Not much to gain from efficiency as RTO is most efficient already, but rather the heat recovery is far less. RTO's operate at 1400 – 1500 degrees F where the RCO has a catalyst bed installed to allow the system to achieve the same destruction efficiency at a lower temperature. These systems are more costly but operate at even 50% less fuel than the RTO's

One additional interview and a follow up interview CS conducted with the industry experts

Ad West: XXXXXX XXXXXXXX (35 year expert) phone # xxxxxxxxxxxx
Gulf Coast Environmental: XXXX XXXX (30 year expert in TO technology) phone xxxxxxxxxxxx

1) Regarding New Construction projects, what percentage of RTO technologies are you seeing within the market in those cases where the market allows multiple technology selections?
    a. Gulf Coast Environmental:
        i. Cannot retrofit an oxidizer to a new technology, all jobs are essentially newly constructed
        ii. The answer is still industry driven. i.e. for Oil & Gas Industry the upstream, midstream and downstream market sectors are too varied,
        iii. Automotive/Aerospace/Semiconductors (typically are easy to abate) uses large rotary concentrators in a hybrid system with an RTO to destroy the VOCs; when it cycles from valve to valve (every 90 seconds) there are airflow disruptions (and can work only on certain compounds (for large 50k scfm flows)

iv. Sometimes with small flows (5k scfm or less) they need to add air before combusting. ISP is much more varied here: It can be anything, including scrubbing, flares, TRO, RTO, concentrators, hybrid concentrators w/ RTOs, COs, RCOs, others)
v. Catalytics (COs or RCOs) are on an island all to themselves. Cuts the operating temperature way down but can only operate 4-7years, at which point the catalyst needs to be replaced.
vi. Bakeries (ethanol in VOC stream); RTO is ISP for bakeries.
vii. Plastic and fiberglass? Makes it more complicated. It will often clog system and other issues arise.
viii. Other industries (including pharmaceuticals where flows are around the 27,000 scfm level), in general desire the improved efficiency of RTOs since they really caught on during the 1980's, but need to be addressed on a case-by-case basis.

b. Ad West:
   i. RTO's have been the choice for 10 (since 2003) years because they can adapt to any temperature for destruction and any chemistry
   ii. Since decisions are driven by capital cost, some bids are passed up because competition is low bidding TO's rather than using the correct technology that is best for the customer
   iii. (No definitive response)

Incremental Cost of the technologies

c. Ad West: TROs are ~$30k less than RTO's for 3,000 scfm systems. Although anyone can manufacture new Thermal Oxidizers they can rework older equipment making their initial cost cheaper than newer constructed model TOs, therefore, the incremental cost can be skewed
d. Gulf Coast Environmental: The cost are ~75K less than for RTO's with average 7500 scfm systems, and even less for smaller scfm systems

2) What is available in the industry for higher efficiencies:
   a. Both agree that RCO (Regenerative Catalytic Oxidizers) is more efficient but selected based on evaluating fuel cost and process due to having to change the catalyst every two-seven years.

RTO market share survey that CS performed for WO33 G301

In summary, the vendors said that in the past few years across many industries, RTOs have become much more prevalent, and that for high-volume, high-run-hour operations, RTOs would be the standard. Important parameters for the chemical processing sector are summarized below:

COMPANY INTERVIEW	IMPORTANT PARAMETERS	CUSTOMIZED SYSTEM	COMPANY RECOMMEMDED SYSTEM
Pollution Systems	Flow rate, fuel, temperature	All systems are always custom	RTO not standard
Ad West	Fuel, VOC flow, evaluate chemistry, run time	+ Flameless design + Butterfly valves to Poppet Valves + Chambers	RTO
EPCON Ind. Sys.	Fuel, Flow, Temperature	All systems are custom manufactured	RTO
Gulf Coast Environmental Sys.	Control CFM Saves on fuel Sense pressure reduction	All systems are custom manufactured	RTO only makes sense

Additional information on industry applications where RTO may be preferred solution is available at http://www.gasco.net.au/RTOs.htm.