



Powering Today. Protecting Tomorrow.

**Covanta Essex Company**

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January 7, 2021

Mr. Jeffrey Meyer  
Manager  
Division of Air Enforcement  
Bureau of Air Compliance and Enforcement – Northern  
7 Ridgedale Avenue  
Cedar Knolls, NJ 07927

Subject: Condition (d) of Phase I, Section B of Administrative Consent Order EA ID# 200001-07736

Mr. Meyer;

The Administrative Consent Order (“ACO”) entered into by Covanta Essex Company (“Essex”) with the Commissioner of the New Jersey Department of Environmental Protection (“Department”) included condition (d) of Phase I of Section B Compliance Schedule and several sub-conditions as follows:

“i) Procedures to increase education and outreach to all customers and haulers via direct communications with responsible entities and printed messaging on all invoice bills regarding acceptable/prohibited waste types.”

“ii) Specific procedures to address iodinated wastes including methodologies to identify potential generators/sources of these wastes, development of proactive steps to ensure these wastes are not included in the waste streams coming to the facility and inspection/interception protocols to ensure these waste types are not processed through the facility. As a potential measure for enhancing COVANTA’s iodine waste inspection/interception protocols, Iodine monitors shall be evaluated for their potential effectiveness to monitor vapor phase iodine. The evaluation shall be submitted to the Bureau of Air Monitoring within thirty (30) calendar days of the effective date of this ACO. If the Department deems that the monitors are effective in monitoring vapor phase iodine, the monitors shall be installed, in accordance with Department review and approval, within 60 calendar days of such approval.”

“iii) Installation of Digital Cameras at appropriate locations throughout the facility to monitor waste streams being tipped in the transfer house and being conveyed into the boilers. The Digital Cameras should have recording capability and data retention that can record for 30 days.”

“iv) Additional dedicated training to employees responsible for 1) monitoring truck deliveries and unloading and 2) operating the grapples used to mix waste in the pit and transfer waste from the pit to the feed hopper for each boiler, to train the employees to identify inappropriate waste material.”

“v) Enhanced employee training program to ensure compliance with COVANTA’s Solid Waste and Air Permits, applicable Best Management Practices, and procedures for identifying and preventing iodine from entering the Facility.”

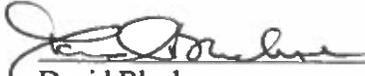
The attached report is provided to the Department to fulfill this condition of the ACO. Condition (d)ii includes a sub-condition requiring an evaluation of iodine monitors. That evaluation was submitted to the Department on November 6, 2020 with Department comments received on December 9, 2020. Those comments are under review by Covanta Essex and our third party consultant Tetra Tech Canada, Inc.

Sincerely,

A handwritten signature in black ink, appearing to read "David Blackmore".

David Blackmore  
Facility Manager

*"I certify under penalty of law that I have personally examined and am familiar with the information submitted in this letter and all attached documents and, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant civil and criminal penalties, including the possibility of fine or imprisonment or both, for submitting false, inaccurate, or incomplete information."*

  
\_\_\_\_\_  
David Blackmore  
Facility Manager

1/7/21  
\_\_\_\_\_  
Date

**COVANTA ESSEX COMPANY Response to  
Condition (d) of Phase I of Section B Compliance Schedule**

**1.0 Introduction**

The New Jersey Department of Environmental Protection (“Department”) has required COVANTA ESSEX COMPANY to provide a written report detailing efforts to prevent delivery of iodinated waste to Covanta Essex and procedures and training at Covanta Essex to prevent processing of any iodinated waste delivered to Covanta Essex and deposited in the tipping floor area. Condition d) establishes that;

“COVANTA shall hire an independent waste operations consultant to review and develop new protocols or supplement as necessary, COVANTA’s existing waste receipt, inspection and handling protocols. Protocols shall include but are not limited to items listed below under Phase I d)i through v.”

The specific subconditions of condition (d) of Phase I of Section B Compliance Schedule are addressed herein and include;

“i) Procedures to increase education and outreach to all customers and haulers via direct communications with responsible entities and printed messaging on all invoice bills regarding acceptable/prohibited waste types.”

“ii) Specific procedures to address iodinated wastes including methodologies to identify potential generators/sources of these wastes, development of proactive steps to ensure these wastes are not included in the waste streams coming to the facility and inspection/interception protocols to ensure these waste types are not processed through the facility.”

“iii) Installation of Digital Cameras at appropriate locations throughout the facility to monitor waste streams being tipped in the transfer house and being conveyed into the boilers. The Digital Cameras should have recording capability and data retention that can record for 30 days.”

“iv) Additional dedicated training to employees responsible for 1) monitoring truck deliveries and unloading and 2) operating the grapples used to mix waste in the pit and transfer waste from the pit to the feed hopper for each boiler, to train the employees to identify inappropriate waste material.”

“v) Enhanced employee training program to ensure compliance with COVANTA’s Solid Waste and Air Permits, applicable Best Management Practices, and procedures for identifying and preventing iodine from entering the Facility.”

Each of these subconditions are individually addressed including both existing efforts at Covanta Essex and new and/or supplemental efforts proposed by the independent waste operations consultant, Tetra Tech Canada, Inc. (Tetra Tech), required by condition d). Tetra Tech is the independent contractor hired to develop new protocols or supplements, as necessary, to Covanta’s existing waste receipt, inspection and handling protocols. The detailed report prepared by Tetra Tech is included as Attachment 1 to this report.

## 2.0 Background

Covanta Essex (the Facility) experienced events in 2019 and early 2020 where a colored plume was recorded as opacity at or above the Operating Permit limit of 10% as a 6-minute block average. The plume was described as having a pink color with varying degrees of intensity. Colored plumes have infrequently been observed at other facilities and have been correlated to iodine due to its known chemical and physical properties including;

- Pure iodine exists as a black crystalline solid with a melting point of 113.7 °C and a boiling point of 184.3 °C; and
- It forms a purple vapor when present at certain concentrations whether in pure form or as a chemical component of another substance.

The estimated amount of iodine in waste that caused those plumes ranged from a feed rate of 110 to 610 pounds per hour. The actual amount of iodinated waste and its iodine concentration is not known, however, a range has been estimated using several references from commercially available sources and one iodinated compound used by Troy Chemical (generator of iodinated waste that was the cause of the purple plume events). The estimated amount of iodinated waste is relevant when considering if an iodinated waste delivered to the pit could be reasonably discovered by operators using visual inspection techniques.

Reference				Nominal amount of product as pounds to generate I <sub>2</sub> in flue gas (a)	
Item	Product	Iodine (as I) as weight % in product	Packaging as weight %	110 pph of I <sub>2</sub> in flue gas	610 pph of I <sub>2</sub> in flue gas
1	Betadine iodine	69	20	400	2,200
2		69	60	800	4,400
3	Levothyroxine sodium tablets	64	60	860	4,800
4	Potassium iodide	77	60	720	4,000
5	IPBC (b)	45	90	490	2,700

(a) Product as pounds per hour (pph) includes packaging

(b) 3-Iodo-2-propynyl butylcarbamate (IPBC) used by Troy Chemical to manufacture a fungicide because of its antimicrobial properties was identified by Covanta as a potential source using NJ Community Right to Know website.

Items 1 thru 4 are examples of an iodinated consumer packaged product that can be disposed as a nonhazardous waste. The packaging factor represents the paper, plastic and cardboard associated with consumer-packaged products. The estimated amount of iodinated waste to create 110 to 610 pounds per hour of I<sub>2</sub> in flue gas (including the packaging) would be between 400 to 4,800 pounds (0.2 to 2.4 tons) in a nominal one-hour period. A single grapple holds between 10 and 12 tons (20,000 to 24,000 pounds) of waste. The nominal MSW charging rate is 35 tons per hour with waste having a nominal 45 minute residence time on the grate. Therefore, depending upon how the waste was mixed in the pit the entire amount of iodinated waste estimated to form a plume could be in one or several grapple loads. This observation is consistent with our experience in that most plumes are less than an hour in duration, however, a few have lasted

longer. Item 5 is a chemical reported by Troy Chemical in their Community Right To Know Survey. The packaging estimate is based on a visual assessment of the last purple plume event where deliveries of empty packaging material containing residual IPBC were observed. The estimated amount for a plume (490 to 2,700 pounds) is similar to other rates and would be a small fraction of a single grapple.

The following summary references relevant sections of the ACO and outlines actions specific to those sections as follows: (1) existing actions undertaken by Covanta Essex; (2) additional or supplemental actions undertaken by Covanta Essex; and (3) supplemental actions recommended by Tetra Tech.

### **3.0 Condition d) i addressing procedures to increase education and outreach to all customers and haulers via direct communications with responsible entities and printed messaging on all invoice bills regarding acceptable/prohibited waste types.**

#### **3.1 Existing Actions by Covanta Essex**

**3.1.1 Distribution of Flyers:** Since 2015, Covanta Essex has been educating haulers, their customers and other generators that iodinated waste is not acceptable at Covanta Essex and that this waste should not be delivered to Covanta Essex. Covanta Essex distributed informational flyers (Attachment 2) to the Essex County Utility Authority (ECUA) at least annually which ECUA included in their billing invoices to all Essex county haulers to alert them of the problem created by the presence of iodine in waste delivered to Covanta Essex. Flyers were also sent to all the commercial haulers and the Department of Sanitation of New York (DSNY) at least annually that deliver waste to Covanta Essex.

**3.1.2 Hospital Outreach:** Throughout 2019 and 2020 Covanta Essex reached out to hospitals that are known to deliver waste to the facility:

- St. Barnabas Medical Center, Livingston NJ
- Clara Mass Medical Center, Belleville, NJ
- Beth Israel Medical Center, Newark, NJ
- St. Michael's Medical Center, Newark, NJ
- UMDNJ Hospital, Newark, NJ
- East Orange General Hospital, East Orange NJ
- VA Medical Center, East Orange, NJ

#### **3.1.3 Essex County Solid Waste Advisory Committee (SWAC) Outreach:**

3.1.3.1 In January 2020, during an ECUA SWAC Meeting, Covanta Essex updated municipalities on our purple plume prevention project status. During the meeting, Covanta Essex specifically solicited route information where commercial stops are incorporated into municipal routes. Most of the Essex county municipalities responded and this information was used in the "Virtual Drive-By" procedure discussed in Section 4.2 below.

3.1.3.2 A website link has been created by Covanta Essex that lists all waste types that are prohibited from being accepted at Covanta Essex including waste that contains iodine. This link was shared with the ECUA SWAC on December 29, 2020 and has been distributed by the ECUA SWAC to its members via email. The link address is <https://info.covanta.com/prohibited-wastes>.

#### **3.1.4 Troy Chemical Outreach:**

Covanta Essex used the “Virtual Drive-By” procedure discussed in Section 4.2 to identify Interstate Waste Services (IWS) as the waste hauler for Troy Chemical who was identified as the source of the iodinated waste after the April 7, 2020 purple plume event. Covanta Essex has reached out to Troy Chemical numerous times since then to inform them that IPBC and any other iodine containing compounds in their waste are not acceptable to be delivered to Covanta Essex. Troy Chemical has not responded to Covanta Essex. After receiving no response, Covanta Essex contacted IWS and instructed them to divert all waste from Troy Chemical to another disposal location.

### **3.2 Supplemental Actions by Covanta Essex**

**Outreach via Covanta Invoicing:** Covanta Essex has created new invoice templates for its non-Essex County commercial waste haulers and other haulers that are billed directly by Covanta which include the above referenced website link for prohibited waste types. These will be used for future billing cycles in 2021 once they are finalized. The link address is listed in section 3.1.3.2 above.

### **3.3 Supplemental Actions Proposed by Tetra Tech**

The report prepared by Tetra Tech referenced in Section 1.0 above, has recommended the following actions to meet the requirements of condition d)i of the ACO.

“To thoroughly investigate the nature of the waste generated by Troy, its form (liquid, solid), potential quantities and why it was disposed. This would be best done by meeting with representatives of the company and having a de-brief of the operations and material. The main goal of this research is to establish whether all the purple plume events could have been because of their operation.”

Covanta Essex will continue efforts to establish a meeting with Troy Chemical.

**4.0 Condition d) ii addressing specific procedures to address iodinated wastes including methodologies to identify potential generators/sources of these wastes, development of proactive steps to ensure these wastes are not included in the waste streams coming to the facility and inspection/interception protocols to ensure these waste types are not processed through the facility.**

Covanta Essex has undertaken several steps to prevent delivery of iodinated waste to the facility, as further described below.

## 4.1 Existing Actions by Covanta Essex

**4.1.1 Development of Purple Plume Prevention Plan:** On December 20, 2019, Covanta Essex submitted a Purple Plume Prevention Plan to NJDEP (Attachment 3) outlining planned efforts to eliminate the occurrence of purple plumes. This was the basis of the requirements included in the final ACO issued by NJDEP.

### 4.1.2 Development of Virtual Drive-By Procedure:

Covanta Essex has developed a detailed procedure to identify potential generators/sources of iodinated wastes in the facility's service area. These steps are summarized below:

Step	Action	Output	Covanta Essex Responsibility
1	Conduct Virtual Drive-By using Google Maps and going street by street and documenting: <ul style="list-style-type: none"> <li>• the location (town, city)</li> <li>• business name and type</li> <li>• website address</li> <li>• contact information</li> <li>• list of products that may contain iodine.</li> </ul>	List of businesses that potentially use iodine in their operation. Business types may include: <ul style="list-style-type: none"> <li>• Large scale chemical companies;</li> <li>• Hospitals/Medical Labs</li> <li>• Printing companies</li> <li>• Veterinary clinics</li> <li>• College chemistry labs</li> <li>• Research facilities</li> <li>• Photography studios</li> </ul>	Covanta support staff
2	Identify businesses that have waste delivered to Covanta Essex	Smaller pool of companies/haulers to investigate	Business Manager
3a	Contact hauler/generator to confirm that they delivered iodine-containing waste. If confirmed, then develop a plan to re-route source to a transfer station, ban their deliveries, or remove the iodine material from their waste stream	Confirmation of source	Business Manager
3b	Use the New Jersey's Community Right To Know database to check the inventory of target businesses for iodinated compounds	Confirmation of iodine-containing compounds on site	Environmental Specialist
4	Distribute flyers to customers/haulers	Educate waste generators/sources	Business Manager

5	Update waste screening protocols and train Covanta business units in screening non-residential waste approvals for targeted businesses and iodine containing wastes	Updated waste approvals	Covanta Business Units/Environmental Specialist
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### 4.1.3 Implementation of Virtual Drive-By Procedure

Following the procedures summarized in Section 4.2 above, Troy Chemical was identified as the source of iodinated waste responsible for purple plume events from May 30, 2018 through April 7, 2020.

- Using the purple plume event dates between January 1, 2015 to December 11, 2019, deliveries on dates that matched any purple plume event + 1 day before were identified.
- A list of haulers and waste origins was developed and organized by frequency of deliveries during these periods. The data set analyzed included ~ 420,000 lines of data. This identified Interstate Waste Services (IWS) as the waste hauler for Troy Chemical who was later identified as the source of the iodinated waste following the April 7, 2020 purple plume event.
- Generators with the highest delivery frequency were compared with business types associated with iodinated waste generation. Customer deliveries were also identified by day of the week and compared to events since 2015 (i.e., during the past 5 years).
- Data analysis identified customers that delivered on Mondays and Wednesdays, when almost 60% of the purple plume events occurred.
  - Hospital loads were ruled out as a potential source of the iodine based on delivery dates that did not match the purple plume event dates and because hospital loads are fed to the boilers within ~2 hours of delivery.
  - Haulers and select municipalities with the highest number of deliveries were added to the list of hauler loads to be flagged at the scale house for targeted inspections. This list already included Type 27 waste and hospital waste.
  - Covanta Essex specifically solicited route information including where commercial stops are incorporated into municipal routes.
- For each municipality that includes commercial waste customers, Covanta Essex data analysts undertook a Virtual Drive-By data analysis. This involved identifying businesses using Google Maps. Data analysts zoomed in on each street until building names were visible and performed a search of businesses in each quadrant to determine if any could be potential users of iodinated materials that could end up in their waste. This included photographers, dental supply stores, medical offices, print services, contrast media users, chemical companies, food suppliers, and food colorant users.
- The list of additional potential generators of iodinated waste was expanded to include Passaic County and New York City.
- Results from all prevention related steps listed above including the Virtual Drive By and NJ Community Right to Know survey data was corroborated with detailed waste delivery records from the day prior to and the day of the purple plume event and video footage of

trucks dumping on tipping floor prior to the event to identify Troy Chemical as the source of iodine in waste following the April 7, 2020 purple plume event. Deliveries from Troy Chemical were also correlated with purple plume events from May 30, 2018 up to the April 7, 2020 event.

#### **4.1.4 Increased Hospital Load Inspections:**

Since November 2019, all MSW loads received from hospitals are subject to inspection to check for iodine containing material in the waste. The procedure includes pictures of typical items that may be found in hospital waste that could contain iodine to educate and train tipping floor operators. In a letter dated November 5, 2019 to NJDEP, Covanta Essex submitted its Hospital Waste Load inspection procedure and form to identify loads of iodinated waste received at the facility. (Attachment 4)

#### **4.2 Supplemental Actions by Covanta Essex**

##### **4.2.1 Distribution of Flyers to Businesses Identified in Virtual Drive-By**

Flyer to be distributed to identified local businesses to educate on iodine containing materials, and Covanta will offer assistance to interpret any reagent SDS sheets.

4.2.2 Modify Covanta Material Characterization Forms for Type 27 waste approvals to flag iodine content in the waste as unacceptable.

4.2.3 Update Covanta Essex solid waste inspection throwdown form used to inspect a minimum of 10% of all waste loads per day to include iodine containing waste as an unacceptable waste.

#### **4.3 Supplemental Actions Proposed by Tetra Tech**

The report prepared by Tetra Tech referenced in Section 1.0 above, has recommended the following efforts to meet the requirements of condition d)ii of the ACO listed above.

2. To further review other potential sources of iodinated waste in the facility's New Jersey service area. Once a list has been established to further review if there are any companies that may be generating waste from the iodinated products that could potentially send their iodinated waste to the Essex facility. If there is any potential for this to occur from the waste generated by these companies the waste haulers servicing these companies should divert the waste to other disposal options. It should be noted that the users of the iodinated products (such as the fungicide IPBC) could dispose iodinated waste to the Essex facility.
6. To on a yearly basis review the plume elimination/mitigation measures or procedures to assess whether further improvements or enhancements could be made.

Covanta Essex will implement activities to complete both item # 2 and # 6 above.

**5.0 Condition d)iii addressing installation of Digital Cameras at appropriate locations throughout the facility to monitor waste streams being tipped in the transfer house and being conveyed into the boilers. The Digital Cameras should have recording capability and data retention that can record for 30 days.**

**5.1 Existing Actions by Covanta Essex**

**High Definition (HD) Cameras:** In 2018, Covanta Essex installed 10 HD digital cameras on the tipping floor. These originally included 2 cameras with additional pan, tilt and zoom (PTZ) capability. In 2019, after the increase in purple plume events, two of 10 HD digital cameras in the overhead location in front of Bays 2 and 13 were replaced with the PTZ cameras for a total of 4 of 10 cameras. This PTZ capability allows for greater visual observation of loads. All recorded video footage by the cameras is stored and available for review for 40 days. (Attachment 5)

**5.2 Supplemental Actions by Covanta Essex**

Covanta Essex plans to also install 7 additional HD digital cameras on the East Wall of the tipping floor, 4 additional HD digital cameras on the North side of the refuse pit, 3 additional HD digital cameras on the South side of the refuse pit, and 3 new HD digital cameras over each of the three boiler feed chute hoppers, which will replace the current analog cameras over the hoppers, as part of the planned fire system upgrade to be installed early this year. (Attachment 5)

**5.3 Supplemental Actions Proposed by Tetra Tech**

“5. The effective coverage of the cameras shall be evaluated per a plan developed by Covanta and Tetra Tech. The plan shall consider procedures to evaluate the visual coverage of the tipping floor and bunker to confirm that waste in quantities that could cause a plume could be identified by the camera for subsequent evaluation. The plan should also include training of employees on proper use of the cameras.”

Covanta Essex will implement activities to complete item 5 above.

**6.0 Condition d)iv addressing additional dedicated training to employees responsible for 1) monitoring truck deliveries and unloading and 2) operating the grapples used to mix waste in the pit and transfer waste from the pit to the feed hopper for each boiler, to train the employees to identify inappropriate waste material.**

**6.1 Existing Actions by Covanta Essex**

**6.1.1 Existing Training on monitoring truck deliveries and unloading**

As required by the Title V Operating Permit for the Covanta Essex facility, under OS Summary, Ref. # 128, the facility maintains an operating manual, called the Environmental Compliance Operating Manual (ECOM), that addresses 11 elements of municipal waste combustor unit

operation which includes a section on procedures for receiving, handling and feeding MSW as one of the 11 elements. A training program is conducted annually to review all sections of the ECOM and is provided by the Environmental Specialist to all Covanta Essex employees who have responsibilities affecting the operation of the facility, including, but not limited to chief facility operators, shift supervisors, control room operators, ash handlers, maintenance personnel and crane/load handlers. Section 3 of the ECOM covers types of waste that are acceptable and unacceptable at the facility, including waste with iodine, and required procedures for inspecting waste loads on the tipping floor, handling any unacceptable waste that is identified on the tipping floor, and management of the refuse pit by the refuse crane operators.

In August 2019, additional training was provided to tipping floor attendants and refuse crane operators on completing inspections focused on MSW loads from hospitals on both the tipping floor and within the refuse pit. Training was also provided to shift supervisors and other management staff. The training sign in sheets are attached. (Attachment 6)

Additionally, in the July 12, 2019 submission to NJDEP, in response to the request for information regarding the purple plume event on June 19, 2019, Covanta Essex provided its procedure detailing response steps to be taken during a purple plume event. This procedure was provided to Control Room Operators as part of their training on response steps to be taken during a purple plume event (Attachment 7).

## **6.2 Supplemental Actions by Covanta Essex**

Additional training on the use of the digital cameras referenced in Section 5.0 will be provided to all tipping floor attendants.

## **6.3 Supplemental Actions Proposed by Tetra Tech**

- “4. To develop a plan that evaluates the feasibility of deliberately staged or random drills. The plan should consider practical limitations that consider quantity of iodinated waste that could cause a plume, safely loading of surrogate waste, and safe visual assessment by employees on the tipping floor. The purpose of the plan is to evaluate training of employees to visualize identify and separate iodinated waste.”

Covanta Essex will implement activities to complete item 4 above.

## **7.0 Condition d)v addressing an enhanced employee training program to ensure compliance with COVANTA’s Solid Waste and Air Permits, applicable Best Management Practices, and procedures for identifying and preventing iodine from entering the Facility.**

### **7.1 Existing Efforts by Covanta Essex**

As stated in section 6.1.1 above, annual training of the ECOM is provided to all Covanta Essex employees who have responsibilities affecting the operation of the facility, including, but not limited to chief facility operators, shift supervisors, control room operators, ash handlers, maintenance personnel and crane/load handlers. This is a requirement of the Title V Operating

Permit for Covanta Essex. The ECOM includes a section on procedures for receiving, handling and feeding MSW as one of the 11 required elements of the manual.

## 7.2 Supplemental Efforts by Covanta Essex

Enhanced employee training will also include training for designated Covanta Essex employees on data collection and analysis to identify generators of iodinated waste from the facility's service area to prevent iodinated wastes from being delivered to the facility. The procedure on how this is done is listed in section 4.1.2.

Training will also be provided on how to conduct a detailed data analysis to identify the source of iodinated waste in the event of a purple plume event to re-direct the waste and to prevent future recurrences (listed below).

Step	Process Step	Person Responsible	Step Output
1	Purple plume event occurs (with or without an exceedance of the opacity limit)	NA	NA
2	Review opacity and SO2 CEMS data	Environmental Specialist/CRO/Plant Engineer (if applicable)	Confirm that the event is in fact a purple plume
3	Interview the crane operators and tipping floor attendants to determine where they were feeding that day; which part of the pit did the waste come from?	Operations Manager with Site Environmental Specialist	Outlining timeframe when potentially responsible load could have been received
4	Use timeframe information to collect data (from scale management software) on loads that arrived in that time period	Scalehouse operator/Site Environmental Specialist	List of haulers that could have brought in potentially iodinated waste
5	Review tipping floor & hopper camera footage - if applicable	Environmental Specialist	Visual identification of potentially iodinated waste receipts
6	Contact relevant Covanta business units to identify any approved Type 27 wastes that were delivered within timeframe	Environmental Specialist/Site profile waste coordinator (if applicable)	Potential list of iodinated waste generators
7	Contact haulers from applicable time period(s)	Business Manager	Routes for specific trucks and what businesses/customers they serviced

<b>Step</b>	<b>Process Step</b>	<b>Person Responsible</b>	<b>Step Output</b>
8	Conduct virtual drive-bys	Plant Engineer/Regional Covanta personnel	List of businesses that match the known iodine suppliers (see attached flyer)
9	Identify large-scale chemical companies/dairy farms/etc. in the area	Business Manager	Smaller pool of companies/haulers to investigate
10	Use the State's Community Right to Know database to check the inventory for iodinated compounds	Environmental Specialist	Confirmation that there are iodine-containing compounds on site
11	Contact hauler/generator to confirm that they delivered iodine-containing waste	Business Manager	Confirmation of potential source(s)
12	Develop a plan to re-route source to a transfer station, ban their deliveries, or remove the iodine material from their waste stream	Business Manager	Iodine source won't be on site and lead to additional purple plume events

# Attachments

## **List of Attachments**

1. Technical Memo prepared by Tetra Tech Canada, Inc. titled Covanta Essex Facility Compliance Review
2. Informational Flyer distributed by Covanta Essex to ECUA, DSNY and commercial haulers informing them of effects of iodine in waste delivered to the Covanta Essex facility. Both the original flyer that was distributed starting in 2015 and the most recent flyer used since 2019 are attached.
3. Covanta Essex Hospital Waste Load and Type 27 inspection procedure and form
4. Diagrams showing the layout of the existing HD digital cameras currently installed on the tipping floor and the future layout for the new HD digital cameras being installed on both the tipping floor and in the refuse pit as part of the fire system upgrade.
5. Sign in sheets for training that was provided to Covanta Essex staff on completing inspections focused on MSW loads from hospitals.
6. Purple Plume Response procedures provided to Control Room Operators on response steps to be taken during a purple plume event.

# Attachment 1



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<b>To:</b>	Jack Bernardino, Covanta	<b>Date:</b>	January 7, 2021
<b>Cc:</b>	Patricia Earls	<b>Memo No.:</b>	
<b>From:</b>	Peter Klaassen	<b>File:</b>	704-SWM.ONMB03111-01
<b>Subject:</b>	Covanta Essex Facility Compliance Review		

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## 1.0 INTRODUCTION

Tetra Tech Canada Inc. (Tetra Tech) has been retained to provide an independent review of the emission issues identified at the Covanta Essex facility located at 183 Raymond Blvd in Newark, NJ. Specifically, the emission issues appear to be related to the potential combustion of iodinated waste, resulting in an increase in opacity and a purple plume being emitted from the stack. New Jersey Department of Environment (NJ DEP) issued an Administrative Consent Order (ACO) NEA2000001-07736 outlining the requirements of Covanta Essex for the independent consultative review.

To conform with the requirements set out in the ACO, Tetra Tech has been requested to provide such an independent review of the existing waste receiving, inspection and handling protocols and make recommendations to either replace, add, or modify the protocols where determined. The scope of work has been outlined as follows:

- Review the provided documentation listed below of the Essex plant and undertake a virtual site visit. Due to timing, Tetra Tech undertook two virtual tours.
- Review the current training programs of all employees including when waste is delivered and deposited into the feed pit, the use of the grapple crane and how to identify potentially problematic wastes.
- Research internal and external Best Practices and assess whether the current procedures can be improved.
- Review the potential use of iodine detectors.
- Review the use of camera monitors for the tipping floor and waste pit, in particular their applicability to post analyze activity in both areas in the case of an incident.
- Develop a report that will address the current procedure(s) and potentially make recommendations to improve respective abatement procedures.

## 2.0 REVIEW

### 2.1 Background

The Essex County Resource Recovery Facility is a large municipal waste combustor that produces high temperature, high pressure (superheated) steam from the combustion of solid waste. The steam is utilized to generate electricity at the facility for sale to PJM interconnect (Pennsylvania, Jersey, Maryland) and for in-plant use. The current Solid Waste Facility Permit for the operation of a thermal destruction facility by Covanta Essex Company is a permit renewal from the original issue date of November 17, 1995.

The facility is authorized to accept and process the following waste types:

- Type ID 10 – Municipal Waste (household, commercial and institutional);
- Type ID 23 – Vegetative Waste (except for large quantities of easily discernible yard wastes such as grass clippings, leaves, tree trimmings, bushes, and shrubs, as described in the facility's Title V Air Pollution Control Operating Permit);
- Type ID 25 – Animal and Food Processing Waste (except for full truckloads of dead animals); and
- Type ID 27 – Dry Industrial Waste (except for asbestos and asbestos containing wastes, dry non-hazardous pesticides, contaminated soils, and any other hazardous waste as defined in N.J.A.C. 7:26G-1).

The following are the prohibited waste types:

- Type ID 12 – Dry Sewage Sludge;
- Type ID 13 – Bulky Wastes;
- Type ID 72 – Bulk Liquid and Semi-Liquids;
- Type ID 73 – Septic Tank Clean-out Wastes;
- Type ID 74 – Liquid Sewage Sludge; and
- Regulated Medical Waste.

The facility is authorized to operate twenty-four (24) hours per day, seven (7) days per week. Solid waste is delivered to the site twenty-four (24) hours per day, Monday to Saturday. Approximately 14,000 tons of solid waste can be stored in the facility's refuse storage pit.

The facility is permitted to process up to 985,500 tons of solid waste per year. The facility's rate at which it can process solid waste is further limited to a maximum steam production rate of 110% of the maximum demonstrated municipal waste combustor unit load, or at a rate not to exceed 990,000 pounds of steam per boiler over a four hour period of time (approx. 247,500 pounds per hour per boiler).

Each of the three (3) identical combustors (boilers) contain the following combustion equipment: a charging hopper (fed by overhead crane), feed chute, ram feeder, roller grates, primary and secondary air systems, auxiliary fuel oil burners and flues and ducts. The facility's air pollution control system includes a carbon injection system (control of mercury emissions), dry scrubbers (removal of acid gases), fabric filter baghouse (removal of particulate matter), and a selective non-catalytic reduction system coupled with Covanta LN™ Technology (to limit NOx emissions).

The facility has a continuous emissions monitoring system (CEMS) which monitors the following parameters: carbon dioxide, oxygen, sulfur dioxide, carbon monoxide, nitrogen oxides, and opacity.

The permittee shall maintain a daily record of wastes received. Those records are to be maintained at the facility for a period of five (5) years.

## 2.2 The Issue

Since May 2018 the Essex plant has experienced a total of 19 events tied to the purple plumes (Appendix XX). Three (3) of these events occurred in 2018, 14 occurred in 2019 and two (2) occurred in 2020. Of the 2019 events, four (4) occurred at the same time from different boilers. This implies that iodinated waste was most likely delivered 15 times over the 2018 to 2020 timespan.

The event triggers several reactions:

- Opacity exceeded the threshold limit of 10%. This event occurred over a range of times from 30 seconds to over 2 hours.
- Carbon monoxide (CO) readings increased.
- Sulfur dioxide (SO<sub>2</sub>) readings dropped.
- A purple plume could be seen coming from the stack. This plume has been seen both by commuters and from neighbours.

From the Covanta letter dated December 7, 2020, to Jeffrey Meyer (2.3.13), it is estimated that 0.2% to 0.9% of municipal solid waste (MSW) by weight of iodine may be enough to spike the opacity reading. This means that a load of 50 kg to 277 kg of iodine in one hour could be enough material to cause an event. Per the analysis of Green Toxicology LLC (2.3.11) most of the events were single spikes implying that the iodinated material may have been in one or more containers fed at the same time. In some cases, the spikes occurred over a several hours suggesting that the waste may have been distributed across the pit. As noted above, four of the occurrences happened on the same day with different boilers, also implying that the waste may have been distributed in the pit. Based on this it is assumed that the source of the iodine was from one major source.

## 2.3 Document Review

The following section details the results of the review of information as presented to Tetra Tech. The order of presentation follows the list as shown in the Introduction.

The following items were provided by Covanta Essex:

- Solid Waste Facility Permit RRF110001 for the Resource Recovery Facility – Mass Burn Incinerator located in the City of Newark; County of Essex dated February 23, 2016.
- Waste Flow Control Plan dated April 2015.
- September 26, 2019 photos of Inspection Form, load on tip floor and empty Povidone-Iodine bottle with residue.
- Essex Hospital and Type 27 Load Inspection Form dated November 27, 2019.
- Essex Purple Plume Data Analysis Process dated December 4, 2019.

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- Covanta Essex Purple Plume Management Plan from December 10, 2019 Meeting.
  - Waste Inspection Customer List for Scalehouse.
  - Essex Hospital Loads Inspection Log from January 2 to February 29, 2020.
  - Essex Flagging and Load Inspection Procedure for Potential Iodine-Containing Waste.
  - Troy Chemical Communication Log starting January 23 and ending April 14, 2020.
  - Troy Metal Processing Fluids Products Brochure.
  - Troy Metal Processing Fluids Product Data Sheet for Troyshield FX40.
  - Essex Hospital Loads Inspection Log from April 2020.
  - Cycle Times Updated May 6, 2020.
  - Iodine Emissions to Ambient Air from Essex Facility Report from Green Toxicology LLC.
  - Covanta Essex 1 page Flyer.
  - Essex Site Plan Drawing AR-C001 Rev.F dated May 31, 2018.
  - Covanta Essex Company Response Letter to NJDEP dated July 12, 2019.
  - Covanta Essex Company Response to Additional Request for Information dated November 5, 2019.
  - Covanta Essex Company Draft Purple Plume Prevention Plan submitted to NJDEP on December 20, 2019.
  - Draft Meeting Notes for February 21, 2020.
  - Covanta Essex Company ACO Requirement.

### 2.3.1 Waste Flow Control Plan dated April 2015

This waste flow control plan is found within Covanta's Operations and Maintenance Manual Volume IX – Chapter 3.

On-site traffic control is maintained to provide orderly vehicular movement on the facility grounds. The control of prohibited waste is a multi-layered approach incorporating the cooperation of customers, haulers and Covanta Essex. One mechanism is through the guidance of the Essex County Solid Waste Management Plan. To minimize prohibited waste from entering the facility, a Haulers Handbook has been developed. This handbook has been sent to all registered haulers utilizing the facility.

#### Comments:

- There are random tipping floor visual inspections being done to ensure the waste delivery vehicle is properly registered. All inspections are recorded on the Waste Flow Control and Litter Plan form.
- If prohibited waste is identified, it will be separated or isolated as required. Tipping floor personnel will initiate action to ensure proper handling of the material.
- If a visual inspection spots an unidentified industrial container in the refuse pit, it can be removed with the overhead crane.

### 2.3.2 September 26, 2019 Photos and Inspection Form

A Covanta Essex Hospital Load Inspection Form was completed on September 26, 2019 with the hauler, truck number and stage ticket identified.

Comments:

- The inspector of this load was able to spot and remove a bottle of iodine from the load shown on the tipping floor. The empty bottle was photographed and is 10% Povidone-Iodine Solution with some residue at the bottom of the bottle.
- The above mentioned inspection form became the Hospital and Type 27 Load Inspection Form on November 27, 2019, which added Type 27 and more types of Iodine Waste.

### 2.3.3 Essex Purple Plume Data Analysis Process dated December 4, 2019

This document is a 17-slide presentation and included the operations manager, environmental coordinator, operations analyst, accountant – truck/facility data, business/area asset manager, chemical expert and a process engineer for data analysis. Dates that match any purple plume event are highlighted. Customers were flagged as possible purple plume contributors. A heat map was created to determine which days of the week they delivered most frequently. It was found that 60% of the purple plumes occurred on a Monday or Wednesday.

Comments:

- From this data research, it was determined that Interstate Waste Services picks up directly from a company called Troy Chemical. Covanta Essex has been in contact with chemical companies in Essex County whose garbage is picked up by the Town and non-commercial haulers.
- Flyers will be distributed to all local businesses to inform them about this iodine type product or anything containing red dye #3. This is a very good data analysis and research finding sources of this iodine creating this purple plume.

### 2.3.4 Essex Purple Plume Management Plan from December 10, 2019 Meeting

On December 10, 2019, there was a meeting with Covanta Essex and the New Jersey Department of Environmental Protection (NJDEP). A slide presentation summarizes the events of this meeting. The purpose of this meeting was for Covanta Essex to provide responses to questions asked by NJDEP.

Comments:

- Opacity spikes tied to the purple plumes are presumably due to the iodine in MSW delivered to the facility. Part of the solution is to prevent the delivery of this type of waste.
- The other part of the solution would be to contact/reach out to generators and haulers about refusing delivery of iodine, Essex facility to continue with type 10 and 27 inspection and hospital waste inspections, and manage any collected iodine waste.

### 2.3.5 Waste Inspection Customer List for Scalehouse created January 21, 2020

Covanta Essex facility operators have flagged certain customers as “waste inspection needed” on their loop ticket.

Comments:

- This flagged list makes it easier for scale house and tipping floor operators to be aware of the potential customers that could deliver the iodine that could generate this purple plume.

### 2.3.6 Essex Hospital Loads Inspection Logs

These inspection logs began on January 2 and ended on February 29, 2020. There were approximately 350 entries or hospital loads over the 50 days. Nine of these days/entries are highlighted.

Comments:

- These highlighted loads came from Interstate Waste Services (IWS) and their origin from St. Michaels in Newark. That works out to about 2.5% of the total loads.

### 2.3.7 Flagging and Load Inspection Procedure for Potential Iodine Containing Waste

This Covanta Essex Procedure for Flagging and Inspection of Type 27 Waste loads (iodine containing waste) was developed on January 23, 2020. There are four known haulers that the scale house must flag. These loads are typically compactor loads that contain 100% hospital waste. Haulers delivering Type 10 and Type 27 waste will also be flagged.

Comments:

- Once these loads are flagged by the scale house operator, this will prompt a visual waste inspection on the tipping floor. The tipping floor operator will complete the Covanta Essex Hospital Load Inspection Form. The operator is looking for any containers of iodine containing material or any medications which contain iodine.
- The customer, hauler and Essex County will be notified of the material observed.

### 2.3.8 Troy Chemical Communication Log

This spreadsheet logs all the calls made to Troy Chemical in Newark from January 23 to April 14, 2020.

Comments:

- Messages were left with Troy Chemical. No call back has been received.

### 2.3.9 Troy Metal Processing Fluids Products Brochure and Product Data Sheet

The brochure lists all of the products (bactericides/fungicides/additives) that Troy's Metal Processing Fluid Additives Division offers. This brochure lists the product names, their active ingredient and the use-level in dilute. The Troyshield FX40 was highlighted for the Iodo-propynyl-butylcarbamate (IPBC). Troy Corporation provided the Product Data sheet for the Troyshield FX40.

Comments:

- The active substance in this liquid fungicide for metalworking fluid applications is "3-iodo-2-propynyl butyl carbamate" or IPBC. The product data sheet also lists the shipping container sizes and weights.

### **2.3.10 Cycle Times Updated May 6, 2020**

This spreadsheet and charts record the quantity of trucks and trailers that empty their loads onto the tipping floor on an hourly basis. These loads were recorded for April 14, 15 and 16, and May 1, 4 and 6, 2020.

Comments:

- The chart indicates average truck and trailer time every hour for the days indicated.

### **2.3.11 Iodine Emissions to Ambient Air Report from Green Toxicology LLC**

This report dated June 25, 2020 was written by Edmund Crouch from Green Toxicology to Brain Bahor and Gary Pierce of Covanta. He has evaluated the levels of iodine emissions required to cause the measured increases in opacity based on stack gas characteristics.

Comments:

- A total of 15 emission events were modelled with opacity measured over several hours.

### **2.3.12 Covanta Essex One Page Flyer**

This is a simple handout that asks the audience “what is the purple plume?” with the answer being visible evidence that iodine is in the waste stream. This flyer asks to keep the iodine out of the waste stream and lists Jack Bernardino’s contact information.

Comments:

- Jack Bernardino is the business manager for the Essex plant. Simple and effective means to spread the news about iodine.

### **2.3.13 Covanta Essex Company Report on Iodine at Lancaster**

This is a report sent to Jeffery Meyer of the Bureau of Air Compliance and Enforcement – Northern as per the requirements laid out in the ACO (Phase II of Section B). The report details how the purple plume is formed and an estimate of the feed rate of iodinated materials. The Lancaster plant is a municipal waste combustor operated by Covanta Lancaster, Inc and has experienced some purple plume events.

Comments:

- Well laid out analysis useful for this report.

### **2.3.14 Covanta Essex Company Response Letter to NJDEP dated July 12, 2019**

This is a report sent to the Bureau of Air & Environmental Quality Enforcement in response to the request for information on the opacity exceedance on June 19, 2019 (Case #19-06-19-1242-25). This response lists the equipment involved, cause, duration and off-site impacts of the subject incident. This report documents the steps taken to minimize emissions caused by the incident, records of the waste received, operation records, estimated amount of iodine introduced, the estimated concentration and mass emission rates, from Covanta. The attachments included are the Response Steps for a Purple Plume Event, daily records of received waste, boiler operational data, opacity data, and events logged.

Comments:

- Well laid out and detailed response to the authorities.

### **2.3.15 Covanta Essex Company Onsite Training for Hospital Waste Inspections**

This is a log of all of the Covanta participants that received the training on August 14, 2019. Additional training was provided to 10 members of the operations staff responsible for waste inspections and waste feeding to the boilers including refuse crane operators and tipping floor attendants between August 20 and August 22, 2020.

Comments:

- With one instructor and participants indicate all on site were trained on inspections.

### **2.3.16 Covanta Essex Company Response to ADDITIONAL Request for Information**

This is a response to NJDEP dated November 5, 2019 that was sent to the Bureau of Air & Environmental Quality Enforcement in response to the request for additional information based on the Covanta response of July 12, 2019 as indicated above in Section 2.3.14. The NJDEP requested more information about sulfuric acid (H<sub>2</sub>SO<sub>4</sub>). Included as attachments is a Plan to Minimize the Presence of Iodine in Incoming Waste Loads, Hospital Loads Inspection Procedure and a brochure explaining the purple plume.

Comments:

- Well laid out response to the authorities.

### **2.3.17 Covanta Essex Company Draft Purple Plume Prevention Plan**

This is a report sent to the NJDEP via email and certified mail on December 20, 2019. The purpose of the letter was to present a draft form of the proposed strategy to address the five (5) specific action items identified by the DEP. Included in the letter was the Agenda and Action Items presented during a meeting between Covanta and NJDEP on December 10, 2019.

Comments:

- The response is well laid out and detailed. Covanta lists out an Action, Purpose, Goal and Scope for each action item.

### **2.3.18 Draft Meeting Notes for February 21, 2020 Meeting**

This is a draft meeting minutes of the meeting between Covanta Essex and the NJDEP at the Trenton office. Two issues were identified to be very important to the NJDEP: Lancaster test results and the relationship with ICC, amongst other issues discussed.

Comments:

- Looks like a good discussion was had by all parties. NJDEP acknowledged that Covanta went above and beyond the letter and understood the iodine as being an acceptable waste. Next steps were identified.

### **2.3.19 Covanta Essex Company ACO Requirements**

This is a spreadsheet that outlines the ACO Task Assignments for NJDEP progress report, specifying the required due date and the actual completion dates of the identified action items.

Comments:

- Well laid out plan. Most of the action items have been completed with others as ongoing. Covanta has paid the penalty cited in the violations.

### **2.3.20 Covanta Essex Company Draft Report Condition (d)ii of Phase I, Section B of Administrative Consent Order (ACO) EA ID# 200001-07736 dated November 6, 2020**

This is a report sent to the Department to fulfill the subject condition of the ACO. This report summarizes an evaluation to determine if there is a monitor that would provide continuous, accurate and reliable analysis of vapour phase iodine in an industrial environment in the event that iodine gas was generated from the received waste in the tipping floor and pit area.

Comments:

- Well laid out analysis useful for this report.

### **2.3.21 Covanta Essex Company Report on Iodine at Lancaster**

This is a report that was submitted to the NJDEP on December 7, 2020 pursuant to the requirements under condition c) of Phase II, Section B of the ACO.

Comments:

- Covanta Essex firmly believes that effective plume mitigation begins with the effective waste management strategies that would prevent delivery of iodinated waste to the facility. Continuous and accurate monitoring of iodine is not considered practical and effective. There is a high likelihood of monitored data resulting in false readings due to the presence of other gases.

### **2.3.22 Purple Plume Source Identification Process**

This spreadsheet lists the 12 process steps identified, the person responsible for implementation, and the step output process. Lastly, the second tab lists the 5 preventative measures to avoid a purple plume.

Comments:

- Well laid out analysis useful for this report.

### **2.3.23 Covanta Essex Company Report Detailing Efforts Made at Facility dated December 7, 2020**

This is a report sent to NJDEP Division of Air Enforcement, Bureau of Air Compliance and Enforcement to address Condition 9 (c) of Phase II, Section B of the Administrative Consent Order EA ID# 200001-07736. This report includes opacity results.

Comments:

- Well laid out analysis useful for this report.

### **2.3.24 Procedure to Identify Sources of Iodinated Waste After a Purple Plume Event**

Four steps are identified in this draft procedure: gather emissions data; gather operations data; identify potential generators and divert iodine-containing waste.

Comments:

- Good document.

### **2.3.25 Covanta Essex Company Draft Progress Report #2**

This is a report to address Item #17 of the ACO. It discusses the status of permitting and planning approvals, work at the site and progress to date with activities planned.

Comments:

- Well laid out analysis useful for this report.

### **2.3.26 Existing Efforts by Covanta Essex to Eliminate Purple Plumes**

This internal report outlines the previous additional steps taken by Covanta Essex to eliminate purple plumes.

Comments:

- Concise and well presented.

### **2.3.27 After Purple Plume Identification Process Flow Diagram**

This draft photo/document outlines the steps to be taken to identify the source of iodine after a purple plume event occurs.

Comments:

- Good process flow diagram.

## **2.4 Virtual Tour and Meetings**

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Due to Covid-19 Tetra Tech undertook two virtual tours on December 2 and December 9, 2020 with the use of MS Teams. Jack Bernardino of Covanta carried a cell phone with video and audio capabilities and two-way dialogue could be done with both Jack and the people that we interviewed. The visit proved to be very useful as it demonstrated the variance of traffic flow, and how the activity on the tipping floor and pit varied from day to day. Key observances:

- Activities in the scale house were professional and garnered respect from the incoming drivers.
- Examples of hospital loads were observed and with subsequent paperwork alerting the tipping floor operators to undertake inspection of the waste as it was off loaded.

- Numerous bays were used for offloading for the duration of the tipping floor visit. This limited the amount of inspection that could be done by the tipping floor operators.
- Visibility of the pit is via camera coverage and crane operator window view.
- On first visit entry to the pit was limited as several bay doors were shut due to heavy waste import.
- The visit was at the tail end of shutdown and some repair activities were still ongoing.
- Good communications were observed between the tipping floor operators, the pit operator and the control room.
- Procedures for the iodine prevention plan were on display at all locations and were simple and clear. Operators that were interviewed understood what needed to be done regarding iodine.

As a supplement to the virtual visits, Tetra Tech has undertaken four virtual conference calls with Covanta staff to further review the events, protocols, procedures and other mitigation measures.

## 3.0 ANALYSIS

The reduction or elimination of purple plume events is tied to three major steps:

- I. Prevent the iodinated material from being delivered to Essex.
- II. Detect iodinated material within building if possible, to prevent loading to the boilers.
- III. If a purple plume event occurs, mitigate the impact and back trace the potential sources of iodinated waste.

Covanta is taking this problem seriously and has instituted numerous action plans to mitigate the purple plume issue. These include:

- Developing a protocol and providing training to all staff regarding how to identify the presence of iodinated waste on the tipping floor and in the pit. Potential iodine container pictures are on display to show what they may look like. At the outset Covanta assumed that the iodinated waste could have come from medical operations such as hospitals, clinics, doctors' offices and veterinary clinics. For this reason, all loads that are known to come from these locations require a visual inspection carried out by the tipping floor operators. The protocol includes raking the waste as thinly as possible so that most of the waste is visible.
- Undertaking a rigorous review of potential iodinated waste sources. This included communication with the regular waste haulers to understand the collection areas and potential routes (mainly New Jersey and New York) and then assessing what companies and medical facilities could potentially be generating iodinated waste. In the last purple plume incident on April 7, 2020, this type of research led to the discovery of Troy Chemical Co (Troy) located at 1 Avenue L in Newark New Jersey. This company manufactures a fungicide called 3-iodo-2-propynyl butyl carbamate (IPBC). This material comes in liquid and solid form in totes, drums (steel, plastic and fiber), boxes and jugs. The powder form is white, similar to salt or sugar and non-distinguishable from other white powders. In this case the hauler of the waste was Interstate Waste Services (IWS) who regularly picks up waste at the Troy industrial site. It is now believed that waste from the Troy site was responsible for most if not all the purple plume incidents. When Covanta made this assessment IWS was informed that it could no longer deliver any waste from Troy to the Essex facility and since that time there have not been any further purple plume events.
- Covanta currently uses 13 remote monitoring cameras on the tipping floor and two in the waste pit. Of these 5 of the cameras have a recording function which stores video shots of the offloading areas of the central tipping

floor for 30 days. The cameras located in the pit area currently are used to monitor the feed chutes and two cameras that scan the pit area. Covanta currently plans to install two more cameras in the pit area and another four cameras in the tipping floor area. All new cameras will have the 30-day recording function to allow post analysis in the case of another purple plume event.

- Covanta has developed a protocol for the operation of the boilers in the event of a purple plume. This protocol has most recently been updated to reflect potential mitigation measures during a plume event. At the outset it was suggested that lime be injected during the plume event, but this has been seen to be irrelevant to plume mitigation. As noted in Section 2.2, it appears that SO<sub>2</sub> reacts with iodine and Covanta is investigating whether Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub> (sodium thiosulfate) could be injected to reduce the impact of a plume event.
- Covanta has submitted a report to NJ DEP that outlines its investigation of iodine detectors. In this report Covanta assessed that interference from other gases such as NO<sub>x</sub> may create false readings thereby generating more alarms from non-iodinated sources than potential iodinated sources. NJ DEP has requested that Covanta further investigate whether there are instruments that can focus on the detection of vapour phase iodine and Tetra Tech is currently assisting Covanta in this investigation.

Through the various initiatives described above Covanta has undertaken and will furthermore take measures that addresses the three steps (I, II, III). The company has also indicated that it is interested to undertake further measures as recommended by Tetra Tech.

**Covanta Actions to Date:**

	Description of Action	Status	Follow Up Actions
1	Implemented additional inspections of MSW received from hospitals to ensure that no iodine containing material was in the waste. Hospitals were selected based on frequent use of povidone iodine as a disinfectant. Procedure was developed and pictures were posted of typical items that may be found in hospital waste for tipping floor operators.	Complete	
2	Submitted a Purple Plume Prevention Plan to NJDEP on December 20, 2019 outlining planned efforts to eliminate Purple plumes. This was the basis of the requirements included in the final ACO issued by NJDEP.	Complete	
3	Outreach to generators: <ul style="list-style-type: none"> <li>▪ Targeted outreach based on data analysis                             <ul style="list-style-type: none"> <li>– A review of all waste deliveries the day prior to and the day of all purple plume events at the Essex facility since 2015 was conducted.</li> <li>– Data set of ~ 420,000 lines of data was analyzed. List of haulers and waste origins was developed organized by frequency of deliveries during these periods.</li> <li>– Haulers and some municipalities with the highest number of deliveries were added to the list of hauler loads to be flagged at the scale house for targeted inspections This list already included Type 27 profiled waste and hospital waste.</li> <li>– Frequency of identified customers was also identified by day of the week and compared to events during the past 5 years.</li> <li>– One Essex County hauler was identified for delivering ~ 270 loads on Wednesdays during these periods. They also deliver from several large hospitals in Essex County.</li> <li>– Two other haulers have been identified that also have high deliveries on Mondays.</li> </ul> </li> <li>▪ Direct contact with generators and haulers where possible</li> </ul>		

	Description of Action	Status	Follow Up Actions
	<ul style="list-style-type: none"> <li>- January 2020 Essex County SWAC Meeting – updated municipalities on purple plume project status. Solicited route information where commercial stops are incorporated into municipal routes.                             <ul style="list-style-type: none"> <li>• For each municipality that includes commercial waste customers, a search of the town businesses is underway using Google Maps by zooming in on each street until building names are visible and then performing a search of businesses in each quadrant to determine if any could be using iodine that could end up in their trash (a.k.a Virtual Drive-by).</li> </ul> </li> <li>- Contact with Essex County haulers identified based on data analysis.</li> <li>- The list of other potential generators of iodinated waste in Essex County and Passaic County was expanded to include industries that involve products containing iodine including contrast media, chemical companies, food suppliers, and food colorants.</li> </ul>		
4	Identified source of iodine in waste after April 7, 2020 purple plume event as Troy Chemical based on review of all waste deliveries the day prior to and the day of the event to identify the hauler and video footage of trucks dumping on tipping floor.	Complete	
5	Installed 10 HD digital cameras on the tipping floor in 2018. These originally included 2 cameras with additional pan, tilt, and zoom (PTZ) capability. In 2019, after the increase in purple plume events, two of the HD digital cameras in the overhead location in front of Bays 2 and 13 were replaced with the PTZ cameras for a total of 4 of the 10 cameras with PTZ capability to allow for greater visual observation of loads with the cameras. All cameras record video footage which is available for review for 40 days.	Ongoing	Further cameras being installed

## 4.0 CONCLUSION

Tetra Tech has thoroughly reviewed the probable cause of purple plume events, how Covanta has reacted to these events and developed protocols/procedures to prevent or mitigate further events. Tetra Tech believes that the steps taken by Covanta are progressive and appear at this time to have either prevented or decreased the amount of iodinated waste that is combusted at the Essex facility.

With the elimination of waste derived from the Troy company, it is possible that Covanta may see little or no more purple plume events. Regardless, Tetra Tech is recommending the following added steps to further reduce the risk of purple plume events.

1. To thoroughly investigate the nature of the waste generated by Troy, its form (liquid, solid), potential quantities and why it was disposed. This would be best done by meeting with representatives of the company and having a de-brief of the operations and material. The main goal of this research is to establish whether all the purple plume events could have been because of their operation.
2. To further review other potential sources of iodinated waste in the facility's New Jersey service area. Once a list has been established to further review if there are any companies that may be generating waste from the iodinated products that could potentially send their iodinated waste to the Essex facility. If there is any potential for this to occur from the waste generated by these companies the waste haulers servicing these companies

should divert the waste to other disposal options. It should be noted that the users of the iodinated products (such as the fungicide IPBC) could dispose iodinated waste to the Essex facility.

3. To further review the potential use of detectors to sense iodine vapour. It is recommended that the potential detectors be tested for iodine, iodinated products, and other potential sources of interference such as NOx. It should be noted that iodinated products such as IPBC may not be detected by an iodine detector. It is noted that this review is currently being undertaken by the facility.
4. To develop a plan that evaluates the feasibility of deliberately staged or random drills. The plan should consider practical limitations that consider quantity of iodinated waste that could cause a plume, safely loading of surrogate waste, and safe visual assessment by employees on the tipping floor. The purpose of the plan is to evaluate training of employees to visualize identify and separate iodinated waste.
5. The effective coverage of the cameras shall be evaluated per a plan developed by Covanta and Tetra Tech. The plan shall consider procedures to evaluate the visual coverage of the tipping floor and bunker to confirm that waste in quantities that could cause a plume could be identified by the camera for subsequent evaluation. The plan should also include training of employees on proper use of the cameras.
6. To on a yearly basis review the plume elimination/mitigation measures or procedures to assess whether further improvements or enhancements could be made.

## 5.0 LIMITATIONS OF REPORT

This report and its contents are intended for the sole use of Covanta Essex and their agents. Tetra Tech Canada Inc. (Tetra Tech) does not accept any responsibility for the accuracy of any of the data, the analysis, or the recommendations contained or referenced in the report when the report is used or relied upon by any Party other than Covanta Essex, or for any Project other than the proposed development at the subject site. Any such unauthorized use of this report is at the sole risk of the user. Use of this document is subject to the Limitations on the Use of this Document attached in the Appendix or Contractual Terms and Conditions executed by both parties.

## 6.0 CLOSURE

We trust this technical memo meets your present requirements. If you have any questions or comments, please contact the undersigned.

Respectfully Submitted,  
Tetra Tech Canada Inc.

  
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Attachments: Appendix A: Essex Purple Plume Events  
Appendix B: Limitations on the Use of This Document

## APPENDIX A

### ESSEX PURPLE PLUME EVENTS

**Covanta Essex Company Purple Plume Exceedance Events 2018-2020**

Date	Day of Week	Boiler	Parameter	Exceedance		Avg Period	No. of Periods	Max Reading	Limit	Cause
				Start Time	End Time					
30-05-18	Wed	2	Opacity	16:30	16:42	6-min	2	11.00%	10%	Purple plume
04-09-18	Tue	1	Opacity	15:24	15:54	6-min	5	23.00%	10%	Purple plume
06-12-18	Thu	3	Opacity	15:12	15:30	6-min	3	18.00%	10%	Purple plume
			CO	12:00	16:00	4-hr	1	106 ppm	100 ppm	
14-01-19	Mon	3	Opacity	16:18	16:36	6-min	3	23.00%	10%	Purple plume
14-01-19	Mon	2	Opacity	16:18	18:06	6-min	5	16.00%	10%	Purple plume
28-01-19	Mon	3	Opacity	17:18	18:30	6-min	10	27.00%	10%	Purple plume
02-05-19	Thu	2	Opacity	16:06	16:12	6-min	3	12.00%	10%	Purple plume
03-06-19	Mon	2	Opacity	19:30	21:12	6-min	10	41.00%	10%	Purple plume
03-06-19	Mon	3	Opacity	19:00	19:30	6-min	4	21.00%	10%	Purple plume
16-06-19	Sun	1	Opacity	4:12	4:24	6-min	2	12.00%	10%	Purple plume
19-06-19	Wed	2	Opacity	12:18	14:30	6-min	22	50.00%	10%	Purple plume
19-06-19	Wed	3	Opacity	12:24	14:06	6-min	17	39.00%	10%	Purple plume
24-06-19	Mon	2	Opacity	1:24	1:42	6-min	3	13.00%	10%	Purple plume
24-06-19	Mon	1	Opacity	5:12	5:30	6-min	3	38.00%	10%	Purple plume
07-08-19	Wed	3	Opacity	9:48	10:12	6-min	4	12.00%	10%	Purple plume
20-09-19	Fri	3	Opacity	18:12	18:24	6-min	2	12.00%	10%	Purple plume
10-10-19	Thu	1	Opacity	14:48	15:24	6-min	6	33.00%	10%	Purple plume
05-02-20	Wed	1	Opacity	19:00	19:06	6-min	1	12.00%	10%	Purple plume
07-04-20	Tue	1	Opacity	13:30	13:54	6-min	4	17.00%	10%	Purple plume

## APPENDIX B

### LIMITATIONS ON THE USE OF THIS DOCUMENT

# LIMITATIONS ON USE OF THIS DOCUMENT

## GEOENVIRONMENTAL

### 1.1 USE OF DOCUMENT AND OWNERSHIP

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consistent with the level of skill ordinarily exercised by members of the profession currently practicing under similar conditions in the jurisdiction in which the services are provided. Professional judgment has been applied in developing the conclusions and/or recommendations provided in this Professional Document. No warranty or guarantee, express or implied, is made concerning the test results, comments, recommendations, or any other portion of the Professional Document.

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### 1.7 NOTIFICATION OF AUTHORITIES

In certain instances, the discovery of hazardous substances or conditions and materials may require that regulatory agencies and other persons be informed and the client agrees that notification to such bodies or persons as required may be done by TETRA TECH in its reasonably exercised discretion.

# Attachment 2

# COVANTA

Powering Today. Protecting Tomorrow.

Dear Medical Facility:

We here at Covanta Essex Company, Essex County's disposal facility located in Newark, NJ, have asked your waste hauler to reach out to you on our behalf.

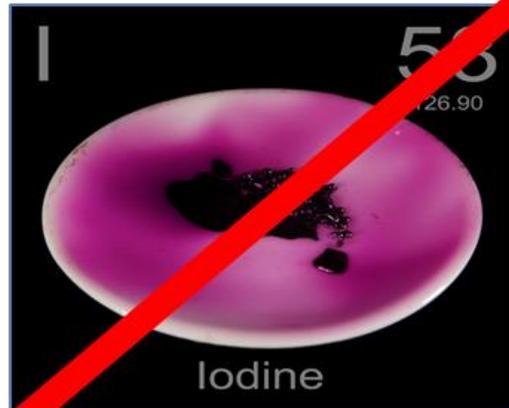
Here at Covanta Essex Company, we take the solid waste that you send us, after you're done recycling, and convert the material into clean, renewable electricity for this region.

We're taking this opportunity to communicate with you today to ask for your assistance. As the operator or owner of a medical facility (e.g. hospital, nursing home, doctor's office, etc.), we'd like to remind you to ensure that medical waste is not mixed with your regular solid waste.

Thank you for your cooperation and attention to this matter.

If you have any questions, please contact your waste hauler or Covanta Energy ([JBernardino@covanta.com](mailto:JBernardino@covanta.com)).

Please visit us at [www.covanta.com](http://www.covanta.com) to learn how you, your refuse hauler, and Covanta Energy are working together to handle this region's solid waste.



# What is the Purple Plume?

*Visible evidence that iodine is in the waste stream*

## WE NEED YOUR HELP!!

Please Keep Iodine Out of the Waste Stream



We need your help in preventing iodine from getting into the waste that you deliver to the Covanta Essex Energy-from-Waste facility. Combustion of iodine can lead to the discharge of unwanted, visible Pink/Purple plumes from the facility stack.

If you have waste that contains iodine, please contact [Jack Bernardino](mailto:Jack.Bernardino@covanta.com) at 732-956-1436.

**Covanta Essex thanks you  
for your cooperation!**

183 Raymond Blvd  
Newark, NJ 07105



**COVANTA**

# Attachment 3

**VIA E-MAIL AND CERTIFIED MAIL**

December 20, 2019

Richelle B. Wormley, Director  
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New Jersey Department of Environmental Protection  
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P.O. Box 420  
Trenton, New Jersey 08625-0420  
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Michael Hastry, Director  
Division of Waste Enforcement, Pesticides and  
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New Jersey Department of Environmental Protection  
9 Ewing Street, Mail Code 09-03  
P.O. Box 420  
Trenton, New Jersey 08625-0420  
[michael.hastry@dep.nj.gov](mailto:michael.hastry@dep.nj.gov)

**Re: Covanta Essex Company – Draft Purple Plume Prevention Plan**

Dear Ms. Wormley and Mr. Hastry:

On behalf of Covanta Essex Company (“Covanta”), I am writing in furtherance of our meeting on December 10<sup>th</sup> to discuss Covanta’s ongoing efforts to prevent purple (iodinated) plumes at the Essex County Resource Recovery Facility (“Facility”) located at 183 Raymond Boulevard in Newark. Covanta understands and appreciates the concerns expressed by the Ironbound Community Corporation and the New Jersey Department of Environmental Protection (“DEP”) regarding these atypical visible emissions, and we are committed to finding a solution to prevent their occurrence.

As explained in the presentation that we shared with you last week, a copy of which is attached, a plume with a pink to purple color is caused when sufficient quantities of iodine are present in municipal solid waste and/or other nonhazardous waste (Type 10 and 27) that is combusted in the Facility’s boilers. Covanta has been working rigorously to develop a two-pronged solution to prevent the occurrence of purple plumes: (1) develop a robust set of plans and procedures to prevent delivery of iodinated waste to the Facility in the first instance, and (2) in the event that iodinated waste nevertheless makes its way into the boilers, to have a system in place to reduce iodine emissions and thus minimize the formation of a purple plume.

The purpose of this letter is to present in DRAFT form our proposed strategy to address the five (5) specific action items identified by DEP for inclusion in Covanta’s Purple Plume Prevention Plan:

1. Review and evaluate efforts made to date/planned to identify potential generators/sources of iodinated waste to prevent further deliveries of such waste to the Facility.
2. Review and evaluate the effectiveness of waste acceptance practices and other Best Management Practices (BMP) to screen/manage waste once it arrives at the Facility.
3. Evaluate potential human health risks associated with purple plume emissions.
4. Review and evaluate Covanta's community outreach practices in general, as well as upon occurrence of a purple plume event.
5. Review and evaluate the safety and efficacy of the proposed purple plume mitigation system

In response to DEP's request, Covanta will secure the services of independent contractors to review past and present efforts to prevent purple plume events, results obtained to date, and other ideas for consideration. Purple plumes are not acceptable to us and we welcome all efforts to prevent delivery of iodinated waste to the Facility.

Covanta's proposed approaches to the five action items, further detailed in Covanta's Purple Plume Prevention Plan attached, are as follows:

- The attached responses to action items 1 and 2 identify a wide range of efforts already implemented by the Facility to identify potential sources of iodinated waste, to prevent delivery of such waste to the Facility, and to detect the presence of iodinated waste on the Facility's tipping floor to keep it from reaching the boilers. Those efforts are continuing; however, to date we have not identified a generator of iodinated waste that can be linked to the plume events at the facility. We are also installing high resolution digital cameras that will record all waste charged to a boiler. If a purple plume should develop, those cameras and back up files would assist in identifying the nature of the waste and potential identification of the source (hauler/generator). Other technology-based solutions under consideration include iodine monitors in the pit area.
- The response to action item 3 will include 2 parts with Part 1 being an assessment of ground level impacts of iodine and Part 2 being an assessment of established iodine exposure standards. Part 1 will be based on a recently completed facility-wide risk screening assessment completed in connection with the Facility's Title V operating permit renewal. That report -- "Air Quality Evaluation and Modeling Report, Hazardous Air Pollutants Risk Assessment" -- was submitted to DEP on October 4, 2018. The report includes ambient impacts determined from dispersion modeling using the U.S. Environmental Protection Agency AERMOD model, and was designed to correlate facility operating conditions with short term and long term ground level impacts. The results from Part 1 will be compared to established iodine exposure standards and will serve as the foundation for a timely and complete evaluation of potential human health risks associated with purple plumes.
- The Facility's response to action item 4 identifies all recent community outreach efforts. With regard to purple plume events, Covanta has engaged with local and regional media including the *Star-Ledger*, *Newark Patch*, *News 12 NJ* and *CBS 2 New York* to educate the public and explain the events. The facility also created an educational flyer/poster used for outreach to customers, haulers and hospitals that explains the type of waste that may contain iodine and provides

contact information to discuss alternative disposal options. We will be formulating a plan for alerting the local community in the event of a purple plume. In the meantime, the annual Open Public Meeting for the Facility occurred at the Blueprint Café (369 Raymond Boulevard, Newark), on December 18, 2019, during which we responded to questions from the public based on currently available information.

- In response to action item 5, the Facility has been actively involved in the development of a possible purple plume prevention technology. A test skid for one boiler (unit) is currently scheduled for delivery in the January-February time frame with testing scheduled to occur sometime in the 1<sup>st</sup> quarter of 2020. Testing would be limited to demonstrating that the injection of sodium thiosulfate solution promotes the formation of sulfur dioxide, which in turn reacts with iodine to prevent a plume from developing. This mitigation technology is in the development phase and would only be used when a plume is developing; it would not be in operation on a continuous basis. Implementation on all 3 combustion units at the Facility would occur only following a complete evaluation of the technology, and subject to any necessary DEP approvals.

We are evaluating qualified independent contractors so that we can implement their review as soon as we arrive at a final plan. We expect that each action item may require its own contractor or contractors and that each action will also have its own implementation schedule. The plan is to implement each as soon as possible.

We look forward to your feedback on this draft action plan however that does not mean that we have stopped researching the issues. Efforts on each of the five action items are continuing and will continue as we wait for your response. We are available to discuss at your convenience.

If you have any questions, please contact Patricia Earls at 973-817-7322 or [pearls@covanta.com](mailto:pearls@covanta.com).

Sincerely,



David Blackmore  
Facility Manager

Cc: Anthony Fontana, Solid Waste Permitting  
([anthony.fontana@dep.nj.gov](mailto:anthony.fontana@dep.nj.gov))  
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Brian Bahor, Covanta  
Jack Bernardino, Covanta  
Patricia Earls, Covanta

**DRAFT**  
**Covanta Essex Purple Plume Prevention Plan**

Action Item	Action
1	Review and evaluate efforts made to date/planned to identify potential generators/sources of iodinated waste to prevent further deliveries of such waste to the Facility.
2	Review and evaluate the effectiveness of waste acceptance practices and other Best Management Practices (BMP's) to screen/manage waste once it arrives at the Facility.
3	Evaluate potential human health risks associated with purple plume emissions.
4	Review and evaluate Covanta's community outreach practices in general, as well as upon occurrence of a purple plume.
5	Review and evaluate the safety and efficacy of the proposed purple plume mitigation system.

## **DRAFT Action Item # 1**

### **1.0 Action**

Review and evaluate efforts made to date/planned to identify potential generators/sources of iodinated waste to prevent further deliveries of such waste to the Facility.

#### **1.1 Purpose**

An independent contractor will review past and ongoing efforts to identify generators who could be the source of iodinated waste causing colored plumes.

#### **1.2 Goal**

Prevent further deliveries of iodinated waste.

#### **1.3 Scope of contractor review**

##### **1.3.1 Background**

Table 1 summarizes the outreach and inspection plan including a brief summary of efforts to date by Covanta Essex to investigate generators and haulers and inspections at Covanta Essex. This plan is an evolving work-in-progress and is updated to include lessons learned and new information and ideas.

##### **1.3.2 Scope of contractor review**

The independent contractor will review efforts outlined in Table A to identify and contact generators and to inspect deliveries of hospital waste and other non-hazardous waste known as Type 10 & 27. Contractor's review should consider any new ideas or approaches that would improve that outreach effort to prevent deliveries and/or activities at site to inspect waste deliveries.

## Table A Outreach and Inspection Plan for Iodine Bearing Waste

### A.1 Purpose

To minimize or eliminate the presence of iodine in the MSW that is received and processed at the Facility, the following actions have been and continue to be implemented by Covanta Essex:

### A.2 Outreach to generators

Direct contact with generators and haulers where possible

Goal	Activity
Inform haulers and customers that iodine in waste is not acceptable	A flyer in English and Spanish has been distributed to the Essex County Utility Authority (ECUA) and has been included in their billings to all Essex County haulers
	That same flyer was mailed to all the commercial haulers that deliver waste to the Facility
	That same flyer has also been sent to the Department of Sanitation of New York (DSNY)
	Covanta hosted its annual Hauler Day at the Facility on 11/21/19 and the flyer was also handed out to drivers on the tipping floor that day.
Transfer Station waste	Transfer stations in Paterson and Totowa owned by Covanta affiliates separate out hospital waste from other waste and divert this waste to landfill to minimize amount of this waste sent to the Facility.
Direct outreach by phone to hospitals that have waste delivered to the Facility. Major hospitals include;	<ul style="list-style-type: none"> <li>• St. Barnabas Medical Center, Livingston, NJ</li> <li>• Clara Maass Medical Center, Belleville, NJ</li> <li>• Beth Israel Medical Center, Newark, NJ</li> <li>• St. Michael's Medical Center, Newark, NJ</li> <li>• UMDNJ Hospital, Newark, NJ</li> <li>• East Orange General Hospital, East Orange, NJ</li> <li>• VA Medical Center, East Orange, NJ</li> </ul>
Contacted Interstate Waste Services (IWS), the hauler for:	<ul style="list-style-type: none"> <li>• St. Barnabas Medical Center, Livingston, NJ</li> <li>• Clara Maass Medical Center, Belleville, NJ</li> <li>• Beth Israel Medical Center, Newark, NJ</li> </ul>
	IWS is to distribute our iodine flyer to the hospitals
Other hospitals	Attempting to reach out to others – but identifying responsible party for handling and disposal of waste is not always clear. With the help of the Essex County SWAC, we have enlisted the services of their consultant, Mr. Wayne DeFeo, to assist in contacting hospitals in Essex County that have waste delivered to the Facility.
Findings to date	One empty bottle and one small packet of povidone iodine solution from UMDNJ from tipping floor inspection

Identify other sources of iodinated waste.

Goal	Activity
Identify other generators beyond hospitals	Evaluating generators in Essex County, Passaic County and New York City
	Medical service providers including dental offices, veterinary hospitals and offices, urgent care facilities, surgery centers, dialysis centers, doctor's offices, and X-ray contrast media producers
	Adding chemical companies and food manufacturers
	Compare waste delivery schedule with past plume events

### A.3 Facility Inspections

#### A.3.1 Hospital Waste Inspections

Goal	Activity
Prevent iodinated waste from hospitals from being mixed in the pit	Haulers have to identify loads from hospitals on the Origin and Disposal form that is presented to the scale house. The name of the hospital is specified on the form and this is noted on the stage ticket by the scale house operator
	Tipping floor inspections of loads with stage ticket marked "Hospital"
	Waste is pushed into the pit ONLY after the load is inspected and cleared for acceptance

#### A.3.2 Other Type 10 and Type 27 Waste Inspections

Goal	Activity
Prevent iodinated waste from industrial or commercial generators from being mixed in the pit (a)	Haulers have to identify Type 27 loads on the Origin and Disposal form that is presented to the scale house. The stage ticket is marked "Type 27" by the scale house operator
	Tipping floor inspections are performed on these loads on the tipping floor.
	Waste is pushed into the pit ONLY after the load is inspected and cleared for acceptance
	A review of customers delivering waste to the Facility either the day before or the day of a purple plume event for the last 5 years was performed to determine if there was any pattern that might indicate a potential source of iodine. A list of customers was generated and will now also be the target of detailed inspections. These customers include both Type 10 and Type 27 waste types. This is in addition to the normal inspections which is performed on 10% of the incoming trucks per day.

- (a) Iodine has many uses including as an additive to nutrition products, and a wide range of medical, agricultural, and industrial applications. The leading application of iodine is in the production of X-ray contrast media (22%). Another application of iodine is in polarizing film in liquid crystal display (LCD) screens, where iodine is incorporated as a polyiodide (I<sub>3</sub><sup>-</sup> or I<sub>5</sub><sup>-</sup>). Potassium iodide is used in iodine tablets to be taken during nuclear accidents to protect the thyroid against exposure to radioactive iodine. Iodine based biocides are often used in paints as an in-can preservative as well as to prevent mold growth after application. Other applications include pharmaceuticals, disinfectant iodophors and povidone-iodine, fluoride derivatives, heat stabilization of nylon, or as process enabler in polymerization of plastics or other processes requiring chemical synthesis. An additional use of iodine is in Red Dye #3 which is a dye used in various food products and printing ink. Red dye #3 contains 58% iodine.

**DRAFT Action Item # 2**

**2.0 Action**

**Review and evaluate the effectiveness of waste acceptance practices and other Best Management Practices (BMP) to screen/manage waste once it arrives at the Facility**

**2.1 Purpose**

**Evaluate existing practices to investigate content of trucks delivered to the facility.**

**2.2 Goal**

**If an iodinated waste is delivered to the facility, prevent it from being combusted.**

**2.3 Scope of contractor review**

**Review existing practices and procedures. Review must consider health and safety of personnel on site while facility is conducting normal business practices.**

### DRAFT Action Item # 3

#### 3.0 Action

Evaluate potential human health risks associated with purple plumes.

#### 3.1 Purpose

An independent contractor will review results from the recent dispersion modeling report to determine the ground level impacts of iodine and possible health impacts.

#### 3.2 Goal

Estimate the ground level impact of iodine and how it compares with documented health-based standards.

#### 3.3 Scope of contractor review

##### 3.3.1 Background

Covanta recently completed a facility-wide risk screening assessment in connection with the Facility's Title V operating permit renewal. That report -- "Air Quality Evaluation and Modeling Report, Hazardous Air Pollutants Risk Assessment" -- was submitted to DEP on October 4, 2018. This report is described as a second-level risk screening assessment which determined ambient impacts from dispersion modeling from application of U.S. Environmental Protection Agency's AERMOD model. Second-level screening is a more rigorous evaluation as compared to first-level screening which uses dispersion look-up tables and DEP's risk screening spreadsheet.

The report was designed to correlate facility operating conditions with short term and long term ambient impacts. The results provide the ability to estimate ambient level iodine concentrations for comparison with established iodine exposure standards.

##### 3.3.2 Scope of contractor review

The response to action item 3 will include 2 parts with Part 1 being an assessment of ground level impacts of iodine and Part 2 being an assessment of established iodine exposure standards. Part 1 will be based on the recently completed facility-wide risk screening assessment "Air Quality Evaluation and Modeling Report, Hazardous Air Pollutants Risk Assessment" completed in connection with the Facility's Title V operating permit renewal.

Part 2 will include a survey of recognized exposure standards for iodine for comparison with estimate ground level impacts.

**DRAFT Action Item # 4**

4.0 Review and evaluate Covanta’s community outreach practices in general, as well as upon occurrence of a purple plume.

4.1 Purpose

Ensure effectiveness of community outreach practices, including timely communication in the event of a purple plume.

4.2 Goal

Covanta, along with Corporate Outreach and Communication resources will continue to plan community outreach activities as has been done historically. In addition, Covanta will investigate methodologies for communicating relevant operational information, including incidents involving a purple plume, to the community.

4.3 Scope

Develop outreach activities and present options on an immediate notification in the event of a purple plume.

4.3.1 Background

Community Outreach is typically targeted at developing long term, meaningful relationships with various members and groups within the community. Covanta has participated in a number of events to support various initiatives and address issues within its community.

Historically, operational information, whether routine or a deviation have not been communicated to the community directly, unless triggered as part of a specific incident with possible immediate impacts to the community or environment.

4.3.2 Scope of Contractor Review – general community outreach

An Agency with expertise in Marketing and Communications will review the Facility’s outreach activities and communication actions including options on an immediate notification in the event of a plume.

Goal	Activity
Plan Community Outreach Activities	Follow past practice to develop an outreach strategy appropriate for the facility stakeholders and local community.
Investigate Communication Methodologies	Determine what information and what timeframe is appropriate to communicate to the community.
	Investigate communication technologies appropriate for large scale communication of information.

Examples of previous outreach activities in 2018 and 2019 that would be reviewed to determine appropriateness for 2020 include:

- 1.0 Meet periodically with stakeholders:
  - Essex County Utilities Authority
  - Essex County Executive
  - City of Newark
  - Ironbound Community Corporation
  - Ironbound Business District
  - Newark Board of Education
- 2.0 Member Essex County Solid Waste Advisory Committee
- 3.0 Member Newark Regional Business Partnership
- 4.0 Accept Pharmaceutical Takeback:
  - Newark Police
  - Essex County
  - New Jersey Field Office DEA
- 5.0 Board member and Participant in NJ Clean Communities Program (includes litter cleanup at Valisburg Park)
- 6.0 Food Drive to benefit Pierre Toussaint Food Pantry Newark
- 7.0 Event Sponsor
  - Millburn Township Earth Day
  - Essex County Parks Earth Day
  - Holiday Lights at Turtleback Zoo
  - Giraffe Exhibit at Turtleback Zoo
- 8.0 Coordinate with Go Green Initiative pilot in Newark City School District. Provide support for Sustainable Jersey School Certification
- 9.0 Sustainable Jersey Sponsor
- 10.0 Donated reusable water bottles to Miller Street School for field trip and to teach about waste reduction
- 11.0 Conduct tours for visitors from NJIT, Rutgers, other community groups
- 12.0 Host Annual Open House
- 13.0 Sponsor 4E-waste collection events (1 in Ironbound)
- 14.0 Install Rain Garden at St. Benedict's School in Newark
- 15.0 Newark Sustainability Summit Participant
- 16.0 Hosted a 4-week summer program for Boys and Girls Club
- 17.0 Publish Quarterly Newsletter to the Community & Stakeholders

#### 4.3.3 Scope of Contractor Review – community outreach for an event

An Agency with expertise in Marketing and Communications will review Covanta’s proposed outreach activities and communication actions including options on an immediate notification in the event of a plume.

Goal	Activity
Evaluate Outreach and Communication Plan	Engage an Agency with Marketing and Communications expertise to review Covanta Essex’s proposed outreach activities and communication actions, which will include an option for notification in the event of a plume.

## DRAFT: Action Item # 5

### 5.0 Review and evaluate the safety and efficacy of the proposed purple plume prevention system

#### 5.1 Purpose

An independent contractor will review the plan to use sodium thiosulfate to prevent a purple plume. Note that the addition of sodium thiosulfate is proposed only during a purple plume event and would not be in continuous operation.

#### 5.2 Goal

Evaluate viability of sodium thiosulfate and other possible options for preventing the plume.

#### 5.3 Scope of contractor review

##### 5.3.1 Background

A colored plume with a pink to purple color is due to iodine in municipal solid waste and/or other nonhazardous waste (Type 10 and 27) that is combusted in a municipal waste combustor (MWC) at the Facility. Iodine is converted to a component of flue gas including  $I_2$  which is the form that promotes a pinkish/purplish plume. Control of  $I_2$  requires mitigation technology in an addition to the existing air pollution control systems. The proposed sodium thiosulfate (ST) system would only inject a ST solution when needed, it would not be in continuous operation.

ST prevention was initially used at a hazardous waste incinerator in Ohio where it is added to a wet scrubber only when iodinated waste is incinerated. That facility has the advantage of knowing when iodinated waste is being combusted because such waste is accepted for disposal as part of that company's normal business. In contrast, Covanta does not purposefully accept iodinated waste for disposal and any delivery of iodine occurs as a constituent of MSW. Application of ST at a MWC was initially evaluated at Covanta's sister facility in Lancaster, PA as a "proof of concept" that ST would breakdown and form  $SO_2$  which is known to react with  $I_2$ . Initial efforts at the Covanta Lancaster facility have demonstrated the potential for ST as a prevention strategy however there are significant design differences between the Covanta Lancaster and Covanta Newark facilities including the equipment (grate, furnace and boiler), MSW quantity and origin and flue gas residence time and temperature through the system. We are not assuming that the ST prevention technology information from Covanta Lancaster translates directly to the Newark Facility and are therefore proposing to implement ST technology on one unit to confirm its potential as an  $I_2$  mitigation technology.

Covanta has conducted R&D tests to evaluate the optimum injection location however that is a work in progress. Covanta is also using three consultants affiliated with universities to evaluate the basic ST prevention strategy and other issues that may impact its effectiveness.

##### 5.3.2 Scope of contractor review

Independent contractors have already been involved in various aspects of the prevention design and optimization. The new independent contractor will be tasked to review the entire strategy and to consider alternative solutions. The scope of the contractor's review will include but not be limited to general mitigation chemistry, ST injection strategy and alternative prevention strategies.

# AGENDA

Covanta Essex Purple Plume Management Plan  
December 10, 2019 Meeting  
Covanta Essex and NJDEP

## **Purpose - provide responses to questions posed by NJDEP -**

- What actions Covanta has taken to date to identify source(s) of iodine
- Describe why SO<sub>2</sub> levels drop to near zero right before and during purple plume events. Is the SO<sub>2</sub> being converted to sulfuric acid for example?
- Can Covanta quantify how much iodine would be needed to generate a purple plume for about 3 hours (e.g. June 2019 event)?
- Background info on sodium thiosulfate contemplated for mitigation of purple plumes. What type of emissions are produced?

## **Goals:**

- Identify underlying knowledge about iodine plume – its origin and mitigation
- Identify steps to prevent and mitigate purple plumes from iodinated waste
- Solicit NJDEP feedback on mitigation with generators

# Covanta Essex : Purple plume management strategy

## **Situation:**

Opacity exceedances correlated with purple plumes are presumably due to iodine in MSW delivered to the facility

## **Remedy:** A two part solution

Part 1: Prevent delivery of iodinated waste to Covanta Essex

Refer to handout “Outreach and Inspection Plan for Iodine Bearing Waste Covanta Essex County Resource Recovery Facility (ECRRF)

Part 2 : Evaluate plume mitigation technology

- a. Theory and Research
- b. Field program results
- c. Next steps

# Part 1: Outreach as purple plume management strategy

## **Purpose of outreach plan**

To minimize or eliminate the presence of iodine in the MSW that is received and processed at the Essex County Resource Recovery Facility (ECRRF), the following actions have been and continue to be implemented by Covanta Essex Company.

## **Plan Outline**

### **1.0 Outreach to generators**

- Direct contact with generators and haulers where possible

### **2.0 Inspections**

- Other Type 10 and 27 Waste Inspections
- Hospital Waste Inspections

### **3.0 Other**

- Managing any collected iodine Waste
- Technology Upgrades

# Part 1: Outreach as purple plume management strategy

## 1.0 Outreach to generators - Direct contact with generators and haulers where possible

Goal	Activity
Inform haulers and customers that iodine in waste is not acceptable	<p>A flyer in English and Spanish has been distributed to the Essex County Utility Authority (ECUA) which has been included in their billings to all Essex county haulers</p> <p>That same flyer was mailed to all the commercial haulers that deliver waste to the ECRRF</p> <p>That same flyer was also sent to the Department of Sanitation of New York (DSNY)</p> <p>Covanta hosted its annual Hauler Day at the Essex facility on 11/21/19 and the flyer was also handed out to drivers on the tipping floor that day.</p>
Transfer Station waste	<p>Covanta owned transfer stations in Paterson and Totowa separate out hospital waste from other waste and divert this waste to landfill to minimize amount of this waste sent to ECRRF.</p>
Direct outreach by phone to hospitals that have waste delivered to Covanta Essex. Major hospitals include;	<ul style="list-style-type: none"> <li>• St. Barnabas Medical Center, Livingston, NJ</li> <li>• Clara Maass Medical Center, Belleville, NJ</li> <li>• Beth Israel Medical Center, Newark, NJ</li> <li>• St. Michael's Medical Center, Newark, NJ</li> <li>• UMDNJ Hospital, Newark, NJ</li> <li>• East Orange General Hospital, East Orange, NJ</li> <li>• VA Medical Center, East Orange, NJ</li> </ul>
Contacted Interstate Waste Services (IWS), the hauler for;	<ul style="list-style-type: none"> <li>• St. Barnabas Medical Center, Livingston, NJ</li> <li>• Clara Maass Medical Center, Belleville, NJ</li> <li>• Beth Israel Medical Center, Newark, NJ</li> </ul>
Other hospitals	<p>IWS is to distribute our iodine flyer to the hospitals</p> <p>Attempting to reach out to others – but identifying responsible party for handling and disposal of waste is not always clear.</p> <p>With the help of the Essex County SWAC, we have enlisted the services of their consultant, Mr. Wayne DeFeo, to assist in contacting hospitals in Essex County that have waste delivered to the ECRRF.</p>
Findings to date	<p>One empty bottle and one small packet of povidone iodine solution from UMDNJ from tipping floor inspection</p>

# Part 1: Outreach as purple plume management strategy

## 2.0 Inspections

### 2.1 Hospital Waste Inspections

Goal	Activity
Prevent iodinated waste from hospitals from being mixed in the pit	Haulers have to identify loads from hospitals on the Origin and Disposal form that is presented to the scale house. The name of the hospital is specified and this is noted on the stage ticket by the scale house operator
	Tipping floor inspections of loads with stage ticket marked “Hospital”
	Waste is pushed into the pit ONLY after the load is inspected and cleared for acceptance

### 2.2 Other Type 10 and 27 Waste Inspections

Goal	Activity
Prevent iodinated waste from industrial or commercial generators from being mixed in the pit (a)	Haulers have to identify Type 27 loads on the Origin and Disposal form that is presented to the scale house. The stage ticket is marked “Type 27” by the scale house operator
	Tipping floor inspections are performed on these loads on the tipping floor.
	Waste is pushed into the pit ONLY after the load is inspected and cleared for acceptance
	A review of customers delivering waste to the Essex facility either the day before or the day of a purple plume event for the last 5 years was performed to determine if there was any pattern that might indicate a potential source of iodine. A list of customers was generated and will now also be the target of detailed inspections. These customers include both Type 10 and Type 27 waste types.
	Based on research on other uses of iodine, we’ve notified commercial haulers to note customers that manufacture X-ray contrast solution, film and food products.

# Part 1: Outreach as purple plume management strategy

## 2.2 Continued

- (a) Possible sources of iodine from medical, agricultural, and industrial applications include; 1) iodine is in the production of X-ray contrast media, 2) polarizing film in liquid crystal display (LCD) screens, 3) Potassium iodide is used in iodine tablets to be taken during nuclear accidents, 4) Iodine based biocides are often used in paints as an in-can preservative as well as to prevent mold growth after application, 5) pharmaceuticals, disinfectant iodophors and povidone-iodine, fluoride derivatives, heat stabilization of nylon, or as process enabler in polymerization of plastics or other processes requiring chemical synthesis and 6) Red Dye #3 which is a dye used in various food products and printing ink. Red dye #3 contains 58% iodine.

## 3.0 Other

### 3.1 Managing any collected iodine Iodine Waste

- Iochem Coporation, the largest producer of medical grade iodine in North America, has offered to take any recovered iodine in BULK quantities for free at their facility in Oklahoma. They will consider smaller quantities in bottles depending on the quantity.
- In the event that Covanta identifies hospitals or other sources that need assistance with disposal of any expired iodine containing material, this can be an alternative for disposal of that material in an environmentally sound way.

### 3.2 Technology Upgrades

Goal	Activity
Hi definition cameras on tipping bay and hoppers	Installed one camera over Bay 2 on tipping floor with high definition zoom capability to provide an additional tool to see waste in tipping bays. Can also record footage for review after a purple plume event. Plan is to install additional cameras on tipping floor and over boiler feed hoppers.

## Part 2: Plume mitigation technology – theory and research -

### Background:

- Iodine is known to generate a pink/purple plume when it is present as diatomic iodine - I<sub>2</sub>
- Observations at Covanta Essex and elsewhere have identified a unique characteristic of iodine where it reacts with SO<sub>2</sub>
- The primary chemical reaction under consideration;



- Equation 1 establishes that iodine (I<sub>2</sub>) reacts with SO<sub>2</sub> on a 1:1 molar basis
- Equation 1 explains why SO<sub>2</sub> goes to “zero” when a purple plume develops (see following slide of Oct 10<sup>th</sup> event as an example)
- If H<sub>2</sub>SO<sub>4</sub> was generated, it would be removed by the semi dry scrubber system
- Hydrogen iodide (HI) is a very reactive gas (similar to HCl) and would dissolve quickly in water and react with calcium hydroxide

### Additional research;

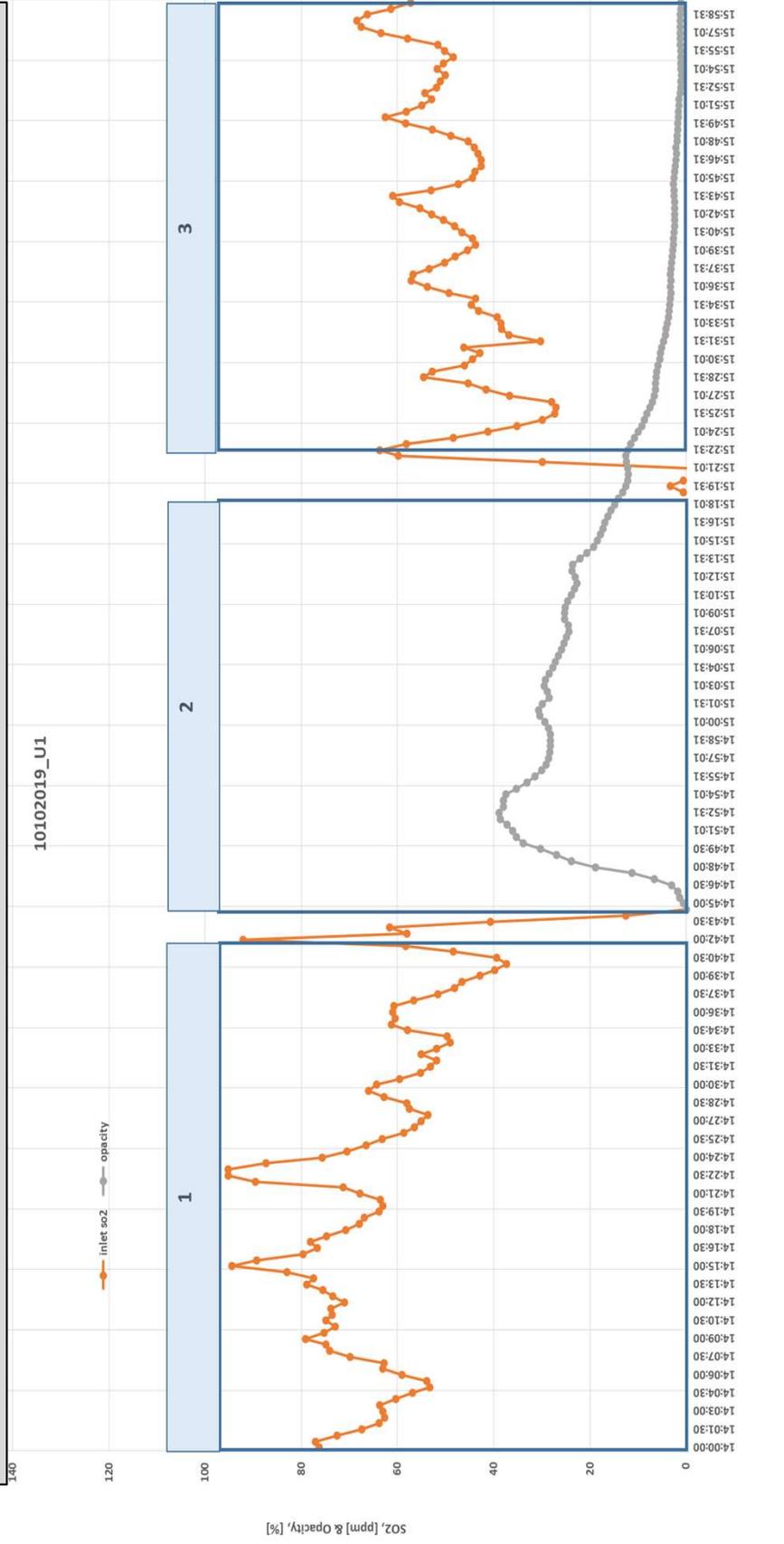
1. Utilization of corporate resources and independent 3rd parties to research;
  - Potential causes of colored plumes
  - Potential mitigation technology/chemistry for colored plumes
  - Iodine behavior
2. Effectiveness of sodium thiosulfate at Covanta Lancaster

# Part 2: Plume mitigation technology

## – October 10, 2019 as example of SO<sub>2</sub> and I<sub>2</sub> reaction -

### Observations

- Average SO<sub>2</sub> concentration pre and post plume is ~ 40 to 50 ppmdv7
- SO<sub>2</sub> during plume is zero



# Part 2: Evaluation of June 19, 2019 Opacity event

CEM time	OPACITY DATA				Average
	L1	L2	L3	Average	
12:12	0	2	1	1	18.5
12:18	0	12	3	5	
12:24	0	27	13	13	
12:30	1	34	20	18	18.5
12:36	1	25	15	14	
12:42	1	32	16	16	
12:48	2	50	21	24	
12:54	3	39	39	27	
13:00	6	27	35	23	
13:06	6	23	32	20	
13:12	7	22	25	18	
13:18	8	18	22	16	
13:24	7	16	18	14	
13:30	7	16	15	13	
13:36	7	15	16	13	
13:42	5	15	16	12	
13:48	4	12	15	10	
13:52	4	11	18	11	
14:00	3	13	17	11	
14:06	3	17	10	10	
14:12	3	17	10	10	
14:18	2	26	9	12	
14:24	2	17	9	9	
14:30	2	12	10	8	
AVG	3.5	20.8	16.9	13.7	

## Overview

- All 3 MWC units had elevated opacity readings and pink or purple colored plume
- Unit 2 and 3 had opacity above the opacity limit of 10 % as a 6-minute average
- The maximum 1-hour average opacity was estimated to be 18.5 % and correlated to 30 ppm of I<sub>2</sub> at actual stack conditions
- 30 ppm of stack I<sub>2</sub> was initially estimated to create a maximum 1-hour ground level concentration of 0.0045 ppm when using dispersion modeling results from a recent air toxics analysis (March 2019).
- Ambient impacts were below NJ DOH workplace references for I<sub>2</sub> (OSHA, NIOSH and ACGIH)
- Current estimate of average I<sub>2</sub> was ~ 18 ppm, actual concentration, during maximum hour
- I<sub>2</sub> behavior is being researched

# Covanta Essex : Essex test plan

## Background

- Sodium thiosulfate (ST) is used at a hazardous waste incinerator in Ohio where it is added to a wet scrubber
- Application of ST at a municipal waste combustor at Covanta Lancaster was novel idea that was based on adding SO<sub>2</sub> to facilitate reduction of I<sub>2</sub>
- Grate/furnace design of Covanta Lancaster and Covanta Essex are different (see next slide)
- Covanta Lancaster has semi dry scrubbing technology, somewhat similar to Covanta Essex however details are different
- “full scale” R&D test has demonstrated the potential to mitigate purple plumes though not conclusive. Questions remain which is the driving force behind additional test program.

## ST strategy

- Chemical reaction:  $Na_2S_2O_3 + 2HCl \rightleftharpoons 2NaCl + S + SO_2 + H_2O$
- Store ST as 30 weight % solution
- Inject only when necessary

## Covanta Essex Plan

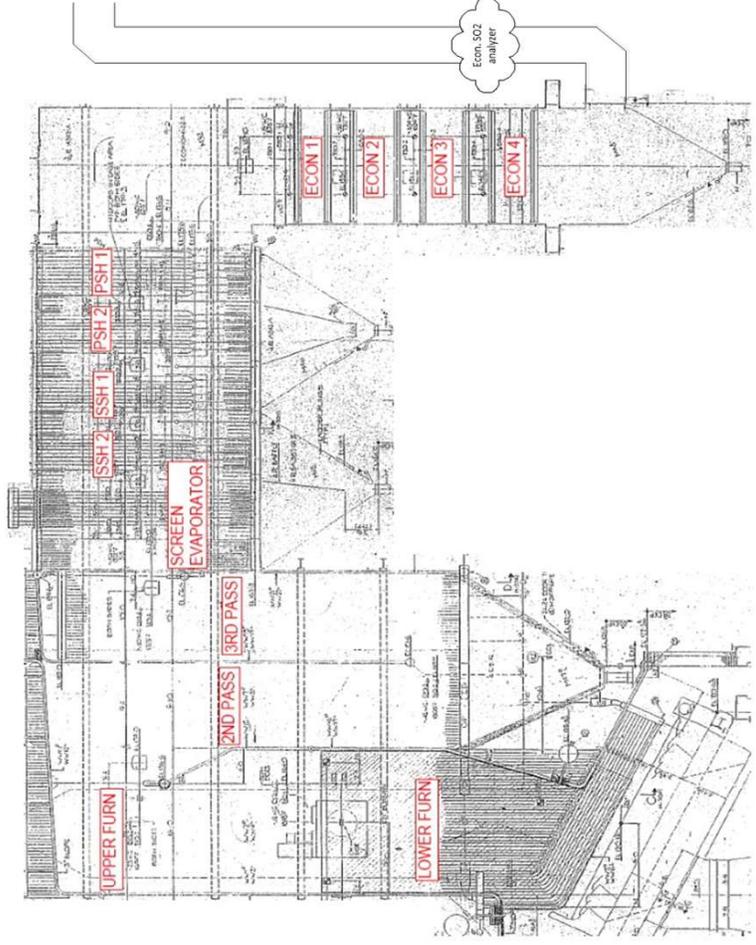
- Deliver test skid (pumps, valves, etc.) in Q1 2020.
- Conduct demonstration test in Q1 or early Q2 2020 to understand effectiveness in converting ST to SO<sub>2</sub>
- Continue to learn from other ongoing efforts at Covanta Lancaster.

# Grate/furnace/boiler: Covanta Lancaster and Essex

Different design, waste and operating conditions create different flue gas velocities, residence time and temperature profile through unit – therefore separate evaluation required

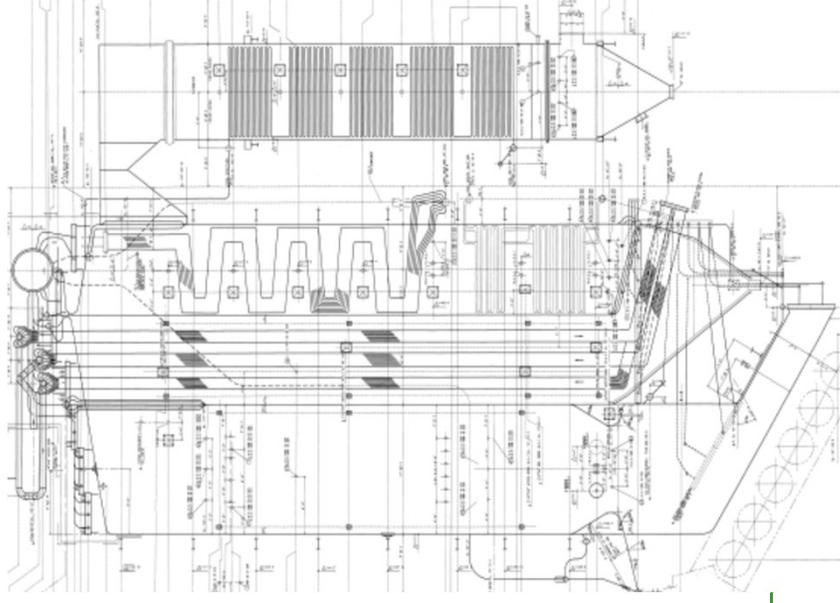
## Covanta Lancaster

- Martin Gmbh grate/furnace/boiler
- Three units, each rated at nominal 400 TPD



## Covanta Essex

- DBA roller grate/furnace/boiler
- Three units, each rated at nominal 933 TPD



# Covanta Essex : Summary and Conclusions

## Summary

- A 2-part program is being implemented to prevent purple plumes at Covanta Essex;
  1. Outreach efforts to prevent deliveries of iodinated waste to Covanta Essex.
  2. Evaluation of mitigation technology to control an opacity event if iodinated waste is delivered and combusted.
- Outreach efforts to waste generators, haulers and others have been underway and are being expanded.
- Mitigation technology is under investigation where injection of sodium thiosulfate is used to remove iodine from flue gas
- Deliver test skid (pumps, valves, etc.) in Q1 2020.
- Conduct demonstration test in Q1 or early Q2 2020 to understand effectiveness in converting ST to SO<sub>2</sub>
- Additional research is being conducted in parallel thru independent 3<sup>rd</sup> parties on causes and control of colored plumes

## Conclusions

- Existing outreach and communication is being expanded but at present we have not identified any sources of waste that could cause the colored plumes
- Sodium thiosulfate is being evaluated as a mitigation technology however implementation at Covanta Essex requires a field test program to evaluate its effectiveness.

# Attachment 4

# COVANTA ESSEX HOSPITAL LOAD INSPECTION PROCEDURE

## 1. FLAGGING LOADS AT SCALEHOUSE

- a. Haulers delivering from hospitals in Essex County will be identifying loads from hospitals on the O&D forms going forward. The current known haulers are but not limited to:
  - i. Interstate Waste Services (IWS)
  - ii. T. Farese
  - iii. LT Roselle; and
  - iv. Giordano Company
- b. These loads are typically compactor loads that contain 100% hospital waste.
- c. The scalehouse operator is to make a note on the stage ticket that the load is from a hospital by marking "Hospital" on the ticket for the tipping floor operator.
- d. The scalehouse operator will notify the tipping floor operators by radio on Channel 6 either directly or with the help of the security guard that a hospital load is en route to the tipping floor.

## 2. WASTE INSPECTIONS ON THE TIPPING FLOOR

- a. Once a notification is received from the scale house or the "Hospital" notation is observed on the stage ticket at the North entrance door, the tipping floor operator will have Bay #4 cleared if there is waste in the bay so that the hospital load can be dumped into Bay #4 for a closer inspection. Hold the truck at the door until Bay 4 is ready to receive the load.
- b. Once the load is dumped into Bay 4 and the truck has left the bay and it is safe to do so, the tipping floor operator will walk over to Bay 4 for a closer visual inspection of the load. The ***"Covanta Essex Hospital Load Inspection Form"*** (attached) will be used to document the inspection. To provide for the operator's safety, no loads are to be dumped in Bay 3 or Bay 5 during the inspection.
- c. A visual inspection of the load will be conducted to determine if there are any containers of iodine containing material or any medications which contain iodine. The operator will use the visual aids provided for examples of this material to determine if it is visibly present in the load.
  - i. The inspector will conduct a visual inspection only and will not handle the load or the materials directly.
  - ii. The inspector may use a long handled tool such as a fire hook to move materials as needed.
- d. If nothing is observed that appears to contain iodine, the operator will note that the load is acceptable on the inspection form and the load can be pushed into the refuse pit.

**COVANTA ESSEX PROCEDURE FOR FLAGGING AND INSPECTION OF WASTE LOADS FROM  
HOSPITALS**

**Page 2**

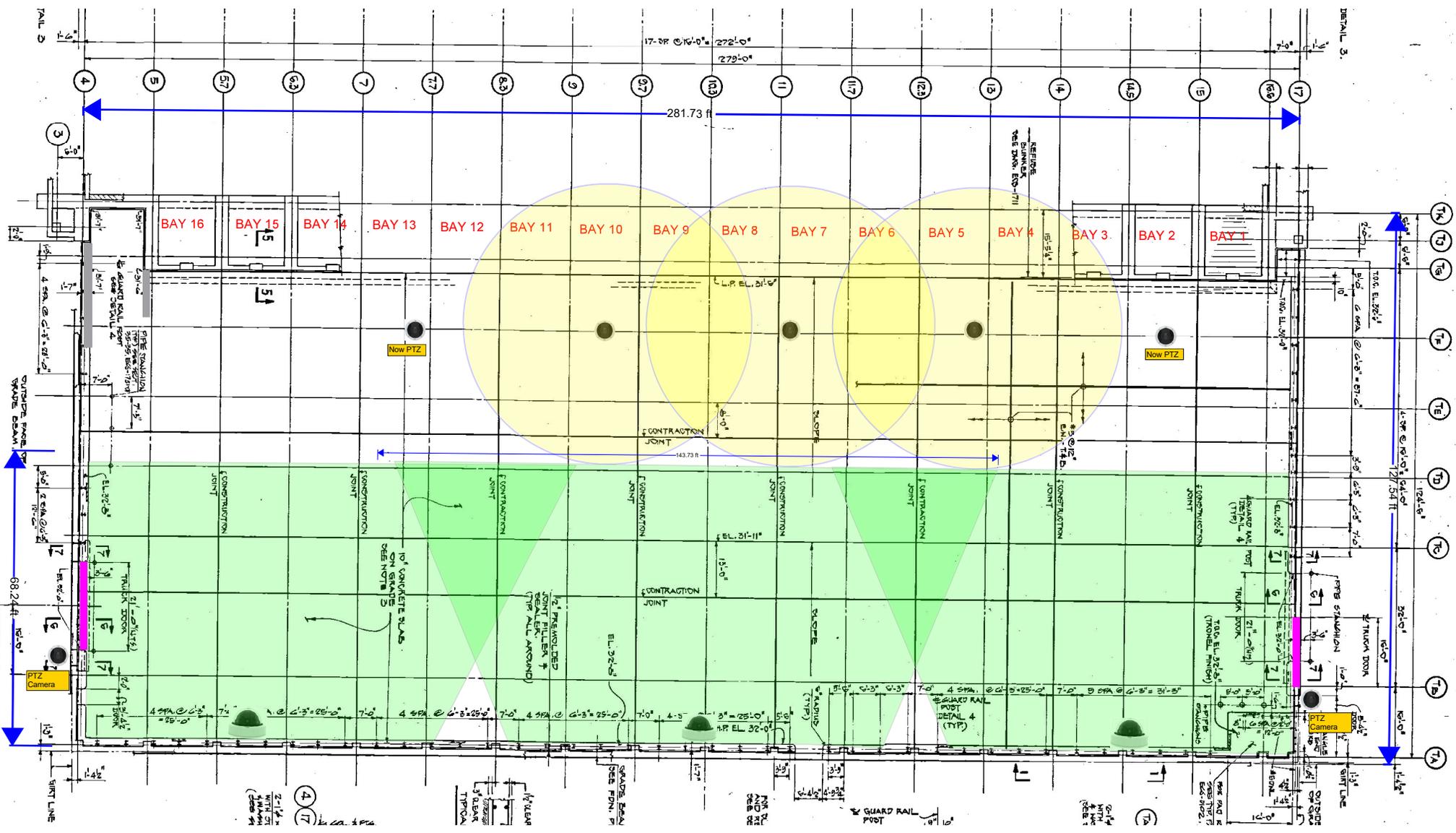
- e. If material is identified that may contain iodine, the operator will note this on the inspection form and will contact the Shift Supervisor, Chief Engineer, and/or Environmental Specialist for further instructions. The load is to be left in Bay 4 until the material can be examined by one of the above supervisors.
- f. If it is determined that the material does appear to contain iodine, the material will be isolated in the unacceptable waste container on the tipping floor for alternate disposal.
- g. The customer, hauler, and Essex County will be notified of the material observed in the compactor.

**COVANTA ESSEX HOSPITAL LOAD INSPECTION FORM**

BAY ASSIGNMENT: 2 3 4 5 6 7 8 9 10 11 12 13 14 15															CIRCLE BAY # ASSIGNED
INSPECTOR:					VEHICLE DATA:					COMPANY VEHICLE # _____					
DATE:					TYPE OF VEHICLE		NJDEP Decal #								
TIME:					TRUCK					License Plate #					
HAULER:					COMPACTOR / ROLL-OFF (circle one)										
					STAGE TICKET #										
					UNACCEPTABLE WASTE TYPES AND IDENTIFIERS										
IODINE WASTE: LIQUID IODINE _____ ANTISEPTIC IODINE _____ BETADINE MATERIAL _____ MEDICATIONS W/IODINE _____ PROVODINE IODINE _____ OTHER _____															
OVERALL RESULTS: ACCEPTABLE LOAD _____ UNACCEPTABLE LOAD _____															
COMMENTS:															
PICTURE TAKEN: YES _____ NO _____															
<b>FOR REJECTED LOADS CONTACT ONE OF THE FOLLOWING INDIVIDUALS IMMEDIATELY UPON REJECTION:</b>															
1) SHIFT SUPERVISOR ON DUTY															
2) ENVIRONMENTAL SPECIALIST															
2) OPERATIONS MANAGER															
*NOTE: CONTACT IN THE ORDER LISTED / CHECK BOX OF THE INDIVIDUAL THAT WAS CONTACTED															

# Attachment 5

**GROUND FLOOR PLAN AT EL. 32'-0"**



DETAIL 3.

TA TB TC TD TE TF TG TH TI TJ TK TL TM TN TO TP TQ TR TS TT TU TV TW TX TY TZ

3' CONC. SLAB

4 17  
2'-1 1/2" x 2'-1 1/2" x 1/2" W/ 4 #4 @ 12" ON CENTER  
SEE PLAN

1/2" VIEW  
1/2" TRUCK  
1/2" TRUCK

GRADE BEAM  
SEE FDN. P.

FORM TO BE  
SEE PLAN

GUARD RAIL  
100'

5'-14" W/ 4 #4 @ 12" ON CENTER  
SEE PLAN

PER PLAN  
SEE PLAN

OUTSIDE  
TRUCK DOOR

- 17
- 16.6
- 15
- 14.5
- 14
- 13
- 12.3
- 11.7
- 11
- 10.2
- 9.7
- 9
- 8.3
- 7.7
- 7
- 6.3
- 5.7
- 5
- 4

CM-01-01

CM-01-02

CM-01-03

CM-01-04

CM-01-05

CM-01-06

CM-01-07

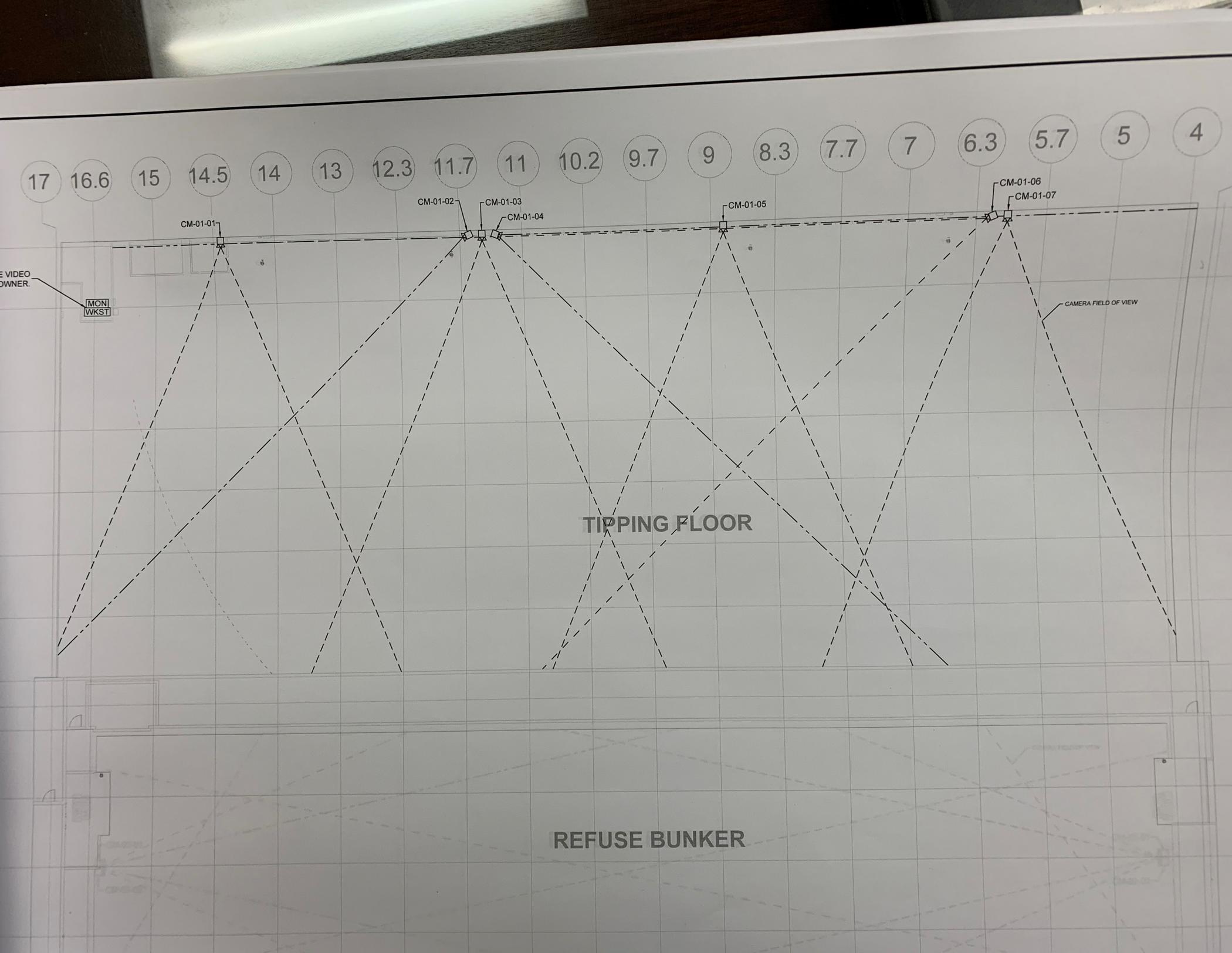
E VIDEO  
OWNER.

MON  
WKST

CAMERA FIELD OF VIEW

TIPPING FLOOR

REFUSE BUNKER



TIPPING FLOOR

REFUSE BUNKER

BOILER AREA

CAMERA FIELD OF VIEW

WKST  
MON

MON  
WKST

CM-03-01

CM-03-02

CM-03-04

CM-03-03

CHARGING  
HOPPER  
CM-03-05  
VIEWING  
STRAIGHT  
DOWN

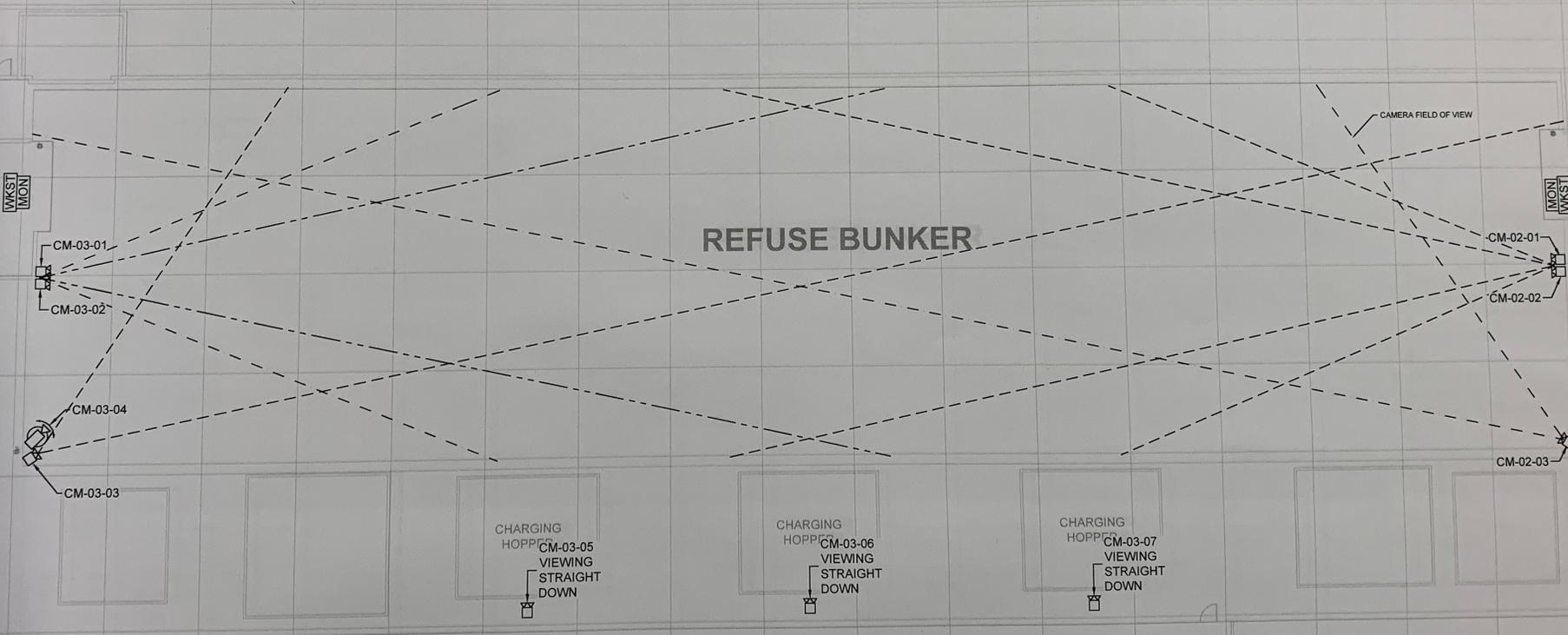
CHARGING  
HOPPER  
CM-03-06  
VIEWING  
STRAIGHT  
DOWN

CHARGING  
HOPPER  
CM-03-07  
VIEWING  
STRAIGHT  
DOWN

CM-02-01

CM-02-02

CM-02-03



# Attachment 6





# Attachment 7

# Response Steps for a Purple Plume Event

An alarm to alert the operator that a purple plume event may be happening has been added to Citect. The alarm is based on inlet SO<sub>2</sub> dropping to a very low level compared to where it was several minutes earlier. This alarm will clear when inlet SO<sub>2</sub> increases to a more normal level. The alarm will only function when the affected controller is in AUTO. This may occur shortly before or at the same time that opacity levels begin to spike.

The following response steps should be taken when this alarm comes in or when a visible observation of a purple plume is made:

1. When the alarm comes in on Citect for a purple plume indicated by a rapid decrease in inlet SO<sub>2</sub>, pull up the control screen for purple plume in Citect for the affected boiler.
2. Pull up the trend screen on Citect called "Purple Plume" for the affected boiler to verify a rapid decrease in SO<sub>2</sub> and increase in opacity.
3. Check stack camera to get a visual observation of a purple plume if possible.
4. If alarm is verified by step 2 and/or step 3 above, decrease furnace draft to a setpoint of -0.1. Reduce the steam flow setpoint by 20 klb/hr until opacity begins to decrease.
5. Do not increase lime slurry flow. Reduce lime slurry flow until the event is over.
6. Report any opacity exceedance to NJDEP Hotline within 15 minutes of the end of the first 6 minute averaging period that is above the 10% limit. When the event is over, another call must be made to the Hotline to follow up on the previous notification with the updated exceedance information.

Note: Based on the trends from some of the past events, inlet SO<sub>2</sub> has been seen to increase after a few minutes, only to drop back to near zero several minutes later and/or to be jumping up and down at a level below where it was prior to the event. This is most likely due to more than one pocket of the source of the iodine in the fuel stream. Therefore, at the present time the alarm has been implemented, but control logic has not.

Purple Plume Opacity Decision Tree

**Purple Plume Alarm in Citect**

- Based on inlet SO2 dropping to a very low level compared to where it was several minutes earlier.
- Only functions when the affected controller is in AUTO.

Purple Plume Alarm is Triggered in Citect?

Yes

No

Pull up the control screen for purple plume in Citect for the affected boiler.  
Pull up trend on Citect called "Purple Plume" for Boiler that is alarming. Determine if inlet SO2 is rapidly decreasing and opacity is increasing indicating a real purple plume event

Treat event like any other opacity spike

Check stack camera to get a visual observation of plume if possible.

Can purple plume be verified in either of the above steps?

No

Treat event like any other opacity spike

Yes

- Decrease furnace draft to a setpoint of -0.1.
- Reduce the steam flow setpoint by 20 klb/hr until opacity begins to decrease.
- Reduce lime slurry flow. Do not increase slurry flow.
- Report any exceedance to NJDEP Hotline.