Sisecam Wyoming, LLC, Big Island Mine and Refinery– Trona Sampling Inspections – Sweetwater County, Wyoming
On-Site Partial Compliance Evaluations (PCE)

Inspection Dates: **Inspection Report Date**:	3/28/2023 9/20/2023
Inspection Report Prepared By:	Colin LeCortz, US EPA
Inspection Report Reviewed By:	Scott Patefield, Manager, US EPA Region 8, Enforcement and Compliance Assurance Division, Air and Toxics Enforcement Branch SCOTT PATEFIELD Digitally signed by SCOTT PATEFIELD Date: 2023.09.20 16:02:25 -06'00'
Inspectors:	• Katelyn Bergl (US EPA) • Travis Guthrie (WYDEQ)
Company Representatives:	• Tyler Schiltz • Hilary M. Huckfeldt • Mike McGrady • Craig Rood • Paul Larson Note: Other facility representatives joined during additional times during the sampling and inspection.
Mailing Address:	P.O. Box 514, Green River, Wyoming 82935
Facilities County/State Location:	Sweetwater County/ Wyoming
EPA Region:	Region 8
Specific Facility Information:	SIC: 1474 NAICS Code: 212391

Inspection Information

United States Environmental Protection Agency (EPA) conducted sampling inspections and gas chromatography- mass spectroscopy (GCMS) at the Sisecam Wyoming, LLC (Sisecam), Big Island Mine and Refinery (the facility) in southwest Wyoming as part of a regional effort to characterize volatile organic compound (VOC) emissions from trona mining and its processing into soda ash. The objective of the sampling was to evaluate the VOC and total petroleum hydrocarbon (TPH) content of the trona ore and evaluate potential emissions from the calciners that operate at the facility. The calciners operate at approximately 2,000 degrees Fahrenheit (°F) according to site personnel and seen by EPA inspectors during process reviews. At this temperature there is a potential to release entrained and form VOC's from the total petroleum hydrocarbons that may be present in the trona ore. The Title V operating permit (Permit# P0024380) contains no VOC controls for any processing unit at the facility. No federal requirements apply for calciners at trona facilities to control VOC emissions. The VOC potential to emit reported in the December 2016 BACT analysis was 101.6 tpy from Unit 6, and 208.5 tpy from Unit 7.

EPA inspectors collected 10 samples during the on-site inspection at Big Island Mine and Refinery. One sample labeled FB/TB in Table 1 below, was a trip blank that contained sodium sesquicarbonate, a clean, manufactured trona analogue. The trip blank was part of the quality assurance project plan. Two of the samples were collected from process locations after the calciner (emission unit: Unit 6). Samples were collected from processes before and after the calciner unit to reflect the broad spatial operations at the facility. Locations included samples at the following locations: mine face, conveyor belt post-mine face, trona crushers above ground, pre-calciner conveyor belt, post-calciner and dryer of Unit 6, and the post-calciner insolubles. The sampling locations are shown in Table 1 for the facility inspection on March 28, 2023. The sampling was conducted by EPA inspectors Colin

LeCortz and Katelyn Bergl, TPH sample analysis was conducted by Dr. Richard Helmich at EPA's National Enforcement Investigations Center (NEIC) laboratory in Lakewood, Colorado.

Table 1 – Sample Locations at the Facility

Date and Time (MDT)	Station Number	Station Location	Analysis	Sample Tag Number	Remarks
3/9/2023, 16:00	FB/TB	Field Blank/Trip Blank	TPH Analysis (GCMS)	NE46645	Prepared by ROH 3/8/23
3/28/2023, 10:24	S01a	Mine Face (Triplicate)	TPH Analysis (GCMS)	NE46621	Mine, pre-calciner
3/28/2023, 10:26	S01b	Mine Face (Triplicate)	TPH Analysis (GCMS)	NE46622	Mine, pre-calciner
3/28/2023, 10:26	S01c	Mine Face (Triplicate)	TPH Analysis (GCMS)	NE46630	Mine, pre-calciner
3/28/2023, 10:28	S02	Conveyor belt, post mine face	TPH Analysis (GCMS)	NE46633	Conveyor belt
3/28/2023, 12:48	S03	Crusher, above ground	TPH Analysis (GCMS)	NE46631	Crusher, above ground
3/28/2023, 13:21	S04a	Unit 6 pre-calciner	TPH Analysis (GCMS)	NE46629	Unit 6 Calciner inlet
3/28/2023, 13:23	S04b	Unit 6 pre-calciner	TPH Analysis (GCMS)	NE46632	Unit 6 Calciner inlet
3/28/2023, 13:24	S04c	Unit 6 pre-calciner	TPH Analysis (GCMS)	NE46642	Unit 6 Calciner inlet
3/28/2023, 13:44	S05	Post-calciner Unit 6	TPH Analysis (GCMS)	NE46643	Post-calciner
3/28/2023, 13:58	S06	Post-calciner, insolubles	TPH Analysis (GCMS)	NE46634	Post-calciner insolubles

The inspection team adhered to the following approach to collect trona samples:

1) On 3/28/2023, at approximately 8:45 am, the EPA met with Travis Guthrie, WYDEQ and multiple Sisecam representatives to discuss inspection scope, and safety. Sisecam representatives confirmed that sampling trona ore and refined product was permitted to be conducted by EPA inspectors.
2) EPA inspectors chose sampling locations along the entire facility process from the mine face to the finished product.
3) When a sampling location was selected, EPA inspectors used new, sealed jars and scoops to collect the samples. Scoops were discarded after use to eliminate sample cross contamination. Sample jars were new, unused and had a certificate of cleanliness.
4) Only EPA inspectors collected each sample and maintained the samples in their possession at all times.

5) A NEIC Chain of Custody Record form was used to document the samples collected. See copy at Appendix A.
6) Each sample collected had a NEIC tag filled out and affixed to each jar with information that matched the Chain of Custody Record.
7) The lidded sample jars and sample tag were then placed into a tamper-evident bags and sealed.
8) At the end of the inspection, the jars were placed on ice in a locked cooler. The locked cooler was driven to NEIC on 3/29/23 and released to Richard Helmich at NEIC. Ice was present in the cooler was upon release to NEIC, and the cooler was placed in a walk-in refrigerator at 4 degrees Celsius (°C) for storage.
9) Richard Helmich verified each bag's seal was maintained upon sample receipt on 3/30/2023.
10) The summary of GCMS analysis results are in Table 2.

EPA inspectors made the following notes of Sisecam representatives who took co-located samples:

1) Sisecam representatives retrieved samples in bags that were not tamperproof.
2) Sisecam representatives used their bare hands to transfer samples from different locations into their sample bags.

GCMS Testing Information

The samples taken from the facility were tested at the National Enforcement Investigations Center laboratory, in Lakewood, Colorado. The analysis results are summarized in Table 2. NEIC prepared a Quality Assurance Project Plan (QAPP) that detailed the TPH extraction method, GCMS analysis, and results to be reported that was approved by NEIC on July 10, 2023 (See Appendix B). NEIC issued a report detailing the test methods and TPH content from the samples (See Appendix C).

The results covered TPH in a carbon chain range of approximately C6 through C32+. The samples appeared to contain primarily diesel and heavier hydrocarbon compounds, which is outside of the VOC range.

Field Notes

EPA and WYDEQ inspectors arrived at the facility at 8:45 am where a safety video was reviewed. Facility representatives Tyler Schiltz and Hilary M. Huckfeldt met the inspectors after the safety video where the inspection and sampling that was planned was discussed. Facility representatives gave verbal permissions for sample to be collected along the process line at the facility. WYDEQ inspector Travis Guthrie was onsite to also conduct a full compliance evaluation of the facility, which occurred in conjunction with this EPA's sampling project.

The inspectors then proceeded to receive mine-safety personal protective equipment and enter the elevator into the mine at approximately 9:45 am. The mine is located approximately 850 feet below the surface, and uses "long bed" room and pillar mining to extract trona ore from underground. Inspectors were informed that this facility is the shallowest trona mine, and most others in Sweetwater county, WY operate mines greater than twice the depth of the Sisecam facility.

The mine, which commenced operations in 1962, operates 365 days per year, 24 hours in the day. It has an approximate maximum throughput of 16,000 tons of trona ore per day, which is processed into approximately 8,000 tons of soda ash per day. In 2022, the facility processed 4.37 million tons of trona ore into 2.7 million tons of soda ash, according to facility records reviewed onsite.

Once below ground in the mine, the inspectors and facility representatives loaded into vehicles to travel to the mine face; where mining was actively occurring. The facility has 4 active mine faces. The simplified underground process is as follows: Each mechanical miner can remove 30 tons per minute of trona ore into carts to transmit the ore to a conveyor belt. The conveyor belt routes the trona ore to elevators that lift the trona ore to the surface for further processing.

The inspectors took the first samples at the mine face. Three samples were collected from the same area (within 5 feet of each other sample), called a triplicate sample. The mine face was noted as station number S01. The triplicate samples were collected at 10:24 am, 10:26 am and 10:28 am, respectively. Those stations were denoted as S01a, S01b, and S01c to uniquely identify the individual triplicate samples.

The next samples were taken approximately 200 yards away from the mine face on the conveyor belt that leads to the elevators. This underground location along the conveyor belt in the mine was noted as station number S02. Sample S02 was collected at 10:56 am.

The inspectors and facility representatives traveled back to the elevator and went to a meeting room at the facility to learn additional information about the above ground process units. The above ground trona processing consists of ore is brought up from the mine in the elevator, the ore enters a crusher, the crushed trona ore then is conveyed to the calciners where it is heated to 2,000 °F to drive off impurities and to convert the trona ore's bicarbonate component into sodium carbonate. The ore is then disolved in water where the insolubles drop out. Water usage at the facility is about 800 million gallons per year, which includes evaporation through dryer stacks. The insoluble tailings are routed to an evaporation pond and then returned to the mine over time. The aqueous sodium carbonate solution (commonly referred to as liquor) is then heated in a dryer where soda ash crystals form and can be routed to sales.

Calciner Unit 6 and Unit 7 have a maximum processing capacity of about 240 ton/hr and 380 tons/hr of trona ore, respectively. Calciner Unit 6 is a process unit that includes both the calciner and dryer all in one process, while calciner Unit 7 is just a calciner. Samples were only taken from Unit 6 on 3/28/2023 due to time limitations caused by the large size of the facility and time required to travel between each process step. The time limitation prohibited collecting additional sampling during the inspection; however, each calciner receives trona from the same mine. Therefore samples from Unit 7 would not be expected to yield significantly different results compared those collected at Unit 6. A live view of the calciner temperatures indicated that Unit 6 was operating at 2261°F and Unit 7 was operating at 2284°F. The only emissions controls in use at the calciners were electrostatic precipitators to control particulate matter.

At 12:48 pm, sample S03 was collected at the crusher above ground after the ore was lifted via elevator above ground.

A second set of triplicate samples, S04a, S04b and S04c, was collected on the conveyor belt leading into Unit 6 calciner. These samples were taken at 1:21 pm, 1:23 pm and 1:24 pm directly from the moving conveyor belt.

At 1:44 pm a sample of finished soda ash product, S05, was collected from Unit 6 post calciner and drier.

At 1:58 pm, sample S06 was collected from the post calciner insoluble outlet line. Sample S06 was wet insoluble solids that settle out of the liquor when the trona ore is dissolved.

EPA and WYDEQ inspectors then drove around the facility grounds to review sources of potential particulate matter emissions. The facility walkthrough ended at 2:49 pm.

WYDEQ inspector Travis Guthrie then discussed permit terms related to his full compliance evaluation that was completed in conjunction with EPA's sampling project.

Both EPA and WYDEQ inspectors left the facility at 3:58 pm after discussion of the permit terms and the full compliance evaluation.

Additional sources of emissions:

DECA plant: Sisecam operates the DECA plant which recovers sodium carbonate decahydrate from the evaporation ponds from earlier production. Liquor entrained with previously generated insoluble solids is removed from the evaporation ponds and reprocessed at the DECA plant. The DECA plant processes 876,000 tons of sodium carbonate decahydrate into 271,700 tons of soda ash. EPA inspectors did not assess or inspect this process unit.

ENG007: Sisecam operates a Solar Titan 250 Turbine/Heat Recovery Steam Generator for on-site power. EPA inspectors did not assess or inspect this unit.

Seeking Sisecam Review and Input

The EPA sent a request for additional information for further compliance evaluation on 4/19/2022 and Sisecam responded on 4/25/2023. The following information was requested, and Sisecam responses are italicized:

- Provide the calciner emission calculations for Unit 6 and Unit 7 used to determine BACT economic feasibility.

The most recent BACT evaluation completed for the Big Island Unit 6 and Unit 7 calciners was prepared as part of the Production Improvement Projects PSD application, submitted through IMPACT (A0003723) in December 2016. The Calciner emission calculations were included as Appendix C in that application. A portion of Appendix C is in the OneDrive folder, and the complete appendix is also available in OpenAir for EPA's reference. The Calciner emissions were used in the BACT control cost calculations for the economic feasibility evaluation, Appendix D, Attachment A, Tables A1-3.1 through 3.7 and Tables A2-3.1 through 3.7. Those portions of Appendix D is in the OneDrive folder, and the entire appendix is available in OpenAir for EPA's reference.

Note: Documents discussed above were provided by Sisecam as an email attachment.

- Does trona ore come in direct contact with the calciner burner or is it shielded? If it is shielded what is the interface temperature?

There is no shield – the heat from the flame goes into the calciner and comes in direct contact with the ore in both calciners.

- Would the calciner exhaust include any potential emissions from the trona ore exhaust? Or does the calciner exhaust separately from the process stream/trona ore? Please provide an internal schematic or photos of each calciner if those are more helpful or easier to show.

The gas exhaust and trona ore exhaust are part of the same exhaust stream that goes through the ESP, and exits through the calciner stack to the atmosphere. P&IDs showing the gas flow from the burner into the kiln are provided in the OneDrive folder for Unit 6 and Unit 7 calciners.

Note: Documents discussed above were provided by Sisecam as an email attachment.

- Have either Unit 6 or Unit 7 calciners been modified since 2018?

The lifters in the Unit 7 calciner have been replaced, but no modifications have occurred on the Unit 6 calciner since 2018.

- Provide the most recent fuel gas analyses available used as feed stock for each calciner.

Please find the March 1st gas analysis in the OneDrive folder.

Note: Documents discussed above were provided by Sisecam as an email attachment.

- Provide the manufacturer recommended maintenance and servicing for each calciner.

The manufacturer recommends daily, weekly, monthly, and annual preventative maintenance work and inspections to monitor the ongoing condition of the calciner. The frequency of the preventative maintenance work and inspections are specific to each calciner component. Lubrication checks are recommended on a daily basis and weekly basis. Inspections to the overall drive train, calciner shell, and insulation system are recommended weekly and monthly. Internal inspections are recommended annually to assess the internal condition of the shell and the product lifters. External inspections are also recommended annually on the rotating drive components. Both Unit 6 and Unit 7 calciners are very similar pieces of equipment. As such, the maintenance recommendations are analogous for both units.

- Provide results of any stack testing conducted on the calciners since January 1, 2018 and now, if possible.

Annual stack tests on Unit 6 (6ES10) and Unit 7 (7ES10) calciners have occurred since 2018, which can be found in the OneDrive folder.

Note: Documents discussed above were provided by Sisecam as an email attachment.

Table 2 – Sampling Results

Station Number	Sample Tag Number	Results (weight%)	Results (mg/kg)	TPH per year (tons)*
FB/TB	NE46645	0.0007	7	NA
S01a	NE46621	0.0334	334	1950
S01b	NE46622	0.0307	307	1790
S01c	NE46630	0.0075	75	438
S02	NE46633	0.0081	81	473
S03	NE46631	0.0060	60	350
S04a	NE46629	0.0142	142	829
S04b	NE46632	0.0053	53	310
S04c	NE46642	0.0100	100	584
S05	NE46643	0.0006	6	17.5
S06	NE46634	0.0381	381	1110

*Extrapolated using the following equation for S01a through S04c:

$$For\ S01a\text{:}\ \frac{334\ mg}{kg}\cdot\frac{0.000002205\ lbs}{mg}\cdot\frac{kg}{0.001102\ ton}\cdot\frac{16{,}000\ ton}{day}\cdot\frac{365\ day}{year}\cdot\frac{ton}{2000\ lbs}=1{,}950\ {}^{ton}/_{year}\ total\ petroleum\ hydrocarbons$$

*Extrapolated using the following equation for S05 and S06:

$$For\ S06\text{:}\ \frac{381\ mg}{kg}\cdot\frac{0.000002205\ lbs}{mg}\cdot\frac{kg}{0.001102\ ton}\cdot\frac{8{,}000\ ton}{day}\cdot\frac{365\ day}{year}\cdot\frac{ton}{2000\ lbs}=1110\ {}^{ton}/_{year}\ total\ petroleum\ hydrocarbons$$

Appendix A – NEIC Chain of Custody Record

ENVIRONMENTAL PROTECTION AGENCY
Office of Enforcement and Compliance Monitoring

NATIONAL ENFORCEMENT INVESTIGATIONS CENTER
Building 53, Box 25227, Denver Federal Center
Denver, Colorado 80225

CHAIN OF CUSTODY RECORD

PROJ. NO.: VP1497 | PROJECT NAME: Trona Facility

SAMPLERS: (Signature) (Colin LaCorte) (Katelyn Bergl)

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	DIC Analysis	TAG NUMBERS	SAMPLE TAG VERIFICATION	REMARKS
FB/TB	3/8/23	16:00		✓	Field Blank [Trip Blank	1	X	NE 466345		Prepared by BOH 3/8/23 16:00
S01a	3/29/23	10:24		✓	Mine Face Triplicate	1	X	NE 46621		Mine: Precalciner
S01b	3/29/23	10:26		✓	Mine Face Triplicate	1	X	NE 46622		Mine: Precalciner
S01c	3/29/23	10:28		✓	Mine Face Triplicate	1	X	NE 46630		Mine Precalciner
S02	3/29/23	10:56		✓	Conveyer Belt post Mine Face	1	X	NE 46633		Conveyer Belt
S03	3/8/23	12:40		✓	Crusher above ground	1	X	NE 46631		Crusher above ground
S04a	3/29/23	1:21		✓	Unit 6 Precalciner	1	X	NE 46629		Unit 6 Calciner inlet
S04b	3/29/23	1:23		✓	Unit 6 Precalciner	1	X	NE 46632		Unit 6 Calciner inlet
S04c	3/29/23	1:24		✓	Unit 6 Precalciner	1	X	NE 46642		Unit 6 Calciner inlet
S05	3/29/23	1:44		✓	Post Calciner Unit 6	1	X	NE 466443		Post Calciner
S06	3/29/23	1:58		✓	Post Calciner Insolubles	1	X	NE 46634		Post Calciner Insoluble

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
(Colin LaCorte)	3/29/23 3:40pm				
	3/29/23 3:40pm				

Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks
			3/30/23 17:15	Received on ice. Stored in Walkin Cooler. A

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

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Appendix B – NEIC Quality Assurance Project Plant

United States Environmental Protection Agency
Office of Enforcement and Compliance Assurance
Office of Criminal Enforcement, Forensics and Training

National Enforcement Investigations Center

NEIC

NEICVP1497P01

NEIC QUALITY ASSURANCE PROJECT PLAN

Trona Facility
Green River, Wyoming
NEIC Project No. VP1497

Inspection Dates: March 28, 2023

[redacted]
Project Manager/Analytical Project Manager, NEIC

Approvals:

[redacted]
Laboratory Quality Representative, NEIC

[redacted]
Acting Laboratory Branch Manager, NEIC

This NEIC QAPP has been reviewed and approved and constitutes the minimum requirements for personnel engaged in laboratory activities. If substantive changes to the laboratory analysis and objectives occur, this will be documented on the task schedule or in an amendment to this QAPP by the analytical project manager or designee.

NATIONAL ENFORCEMENT INVESTIGATIONS CENTER
P.O. Box 25227
Building 25, Denver Federal Center
Denver, Colorado 80225

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TABLES

NEIC QUALITY ASSURANCE PROJECT PLAN (QAPP)

PROJECT SCOPE OF WORK

U.S. Environmental Protection Agency (EPA) Region 8 (Region 8) requested EPA's National Enforcement Investigations Center (NEIC) to conduct laboratory analysis of samples collected from the Sisecam Big Island Trona mine and processing facility. The samples were collected as part of an EPA Region 8 inspection. The facility is located at 254 County Road 4 in Green River, Wyoming. The source and handler identification information for the facility is listed in **Table 1.** The NEIC laboratory is quantitatively analyzing eleven samples collected during the Clean Air Act (CAA) inspection. The 11 samples collected during the inspection were grab samples. The analytical objective for this case is to determine the concentration of organic compounds in the 9 to 30 carbon range, C9 – C30; however, all hydrocarbons that elute will be estimated. This laboratory only QAPP details the laboratory phase performed by NEIC. EPA Region 8 contact for the Sisecam Big Island Trona mine and processing facility project is [redacted]

Table 1. FEDERAL ENVIRONMENTAL STATUTES AND PERMIT REQUIREMENTS

Media	Source ID	Regulatory Status	Permit No.	Inspection Focus
Clean Air Act (CAA)	WY0000005603700001	• Title V permit • Major source	P0024380	• Air emissions, and volatile organic compounds (VOCs) analysis by the NEIC laboratory on samples of trona ore and soda ash product.

PROJECT SCHEDULE

Dates for the laboratory are based on the collection of 11 samples and quantitative analysis for total petroleum hydrocarbons (gasoline, diesel, and mineral oil, and motor oil range) by gas chromatography mass spectrometry. (**Table 2**)

Table 2. PROJECT TASK SCHEDULE

Tasks (T), Milestones (M), and Deliverables (D)	Start Date	Target Completion Date	NEIC Personnel
Draft QAPP preparation *(T)*	April 5, 2023	July 3, 2023	[redacted]
Finalize QAPP *(M)*	June 30 ,2023	July 5, 2023	[redacted]
Kickoff meeting *(M)*		May 15, 2023	[redacted]
Sample description and phase separation/photography/LIMS entry *(T)*	April 6, 2023	April 6, 2023	[redacted]
Sample preparation following SW-846 Method 3511 Organic Compounds in Water by Microextraction (T):	July 6, 2023	July 21, 2023	[redacted]
Organic Compound Analysis, NEICPROC/00-049 (T):	July 6, 2023	July 21, 2023	[redacted]
Draft report *(T)*:	July 24, 2023	July 28, 2023	[redacted]

Table 2. PROJECT TASK SCHEDULE			
Tasks (T), Milestones (M), and Deliverables (D)	**Start Date**	**Target Completion Date**	**NEIC Personnel**
Data Review (T):	July 31, 2023	August 4, 2023	[redacted]
Report/project review (laboratory activities reviewer) *(T)*:	August 14, 2023	August 18, 2023	[redacted]
Final report *(D)*:	August 21, 2023	August 25, 2023	[redacted]
Project closeout tasks	TBD	TBD	[redacted]

DISTRIBUTION LIST

Table 3 summarizes the QAPP distribution list.

Table 3. QAPP DISTRIBUTION LIST	
(Name/Title/Affiliation)	**Role**
NEIC CONTACTS:	
[redacted] Chemist/EPA-NEIC	Analytical project manager (APM), and laboratory analyst
[redacted] Chemist/EPA-NEIC	Laboratory data package reviewer
[redacted] Chemist/EPA-NEIC	Laboratory activities reviewer
[redacted] Acting Laboratory Branch Manager/EPA-NEIC	APM supervisor
[redacted] Microscopy and X-ray Section Supervisor/EPA-NEIC	Laboratory team members' supervisor
[redacted] Laboratory Branch Quality Representative/EPA-NEIC	Laboratory quality assurance
[redacted] Acting Laboratory Branch Manager/EPA-NEIC	Technical editor
REGIONAL AND OTHER CONTACTS:	
[redacted] CAA Inspector/EPA Region 8	Regional field team member

Laboratory Analysis Objective, Quality Objectives, Plan, and Task Assignments

Preparatory and analysis methods were selected to assist with obtaining data to achieve data quality objectives for evaluating compliance with the CAA and the facility's Title V permit. The data quality objectives for this investigation are to analyze raw trona ore and finished products made from trona ore for total hydrocarbon concentration. Samples of raw trona ore, finish products, and by-products were collected for quantitative analysis of total hydrocarbon concentration. Analytical results are expected to be reported in the following units: total hydrocarbon concentration in weight percent (wt%) and milligram per kilogram (mg/kg). Samples of raw trona ore, trona ore products, and by-products were collected and will be analyzed to determine the total hydrocarbon concentration. Samples were collected by Region 8 CAA inspector [redacted]) during an inspection of the facility. Following sample collection, Inspector [redacted] drove the samples to the NEIC laboratory in Denver, Colorado, and transferred custody of the samples to NEIC chemist [redacted].

The analytical methods selected for this project (**Table 4**) were chosen based on the investigation objectives provided by the customer. Eleven samples were collected from six stations, including a field/trip blank provided by [redacted]. Two stations had triplicate samples collected. The field/trip blank consisted of a sample of sodium sesquicarbonate.

The samples will be analyzed for total hydrocarbon concentration using gas chromatography with mass spectrometry (GCMS). Samples will be dissolved in water. The sample solution will be extracted using an appropriate solvent using SW-846 Method 3511 as guidance. The resulting extracts will be analyzed for the total hydrocarbon concentration using SW-846 Method 8015D and the Organic Compound Analysis, NEICPROC/00-045 as guidance. (**Table 4**) All modifications to the methodology will be documented in the project file.

Table 4. ANTICIPATED ANALYTICAL OBJECTIVE, TECHNIQUE, METHOD, AND RESPONSIBLE CHEMIST

Objective, Technique, and Method[1, 2]	NEIC Personnel
Volatile organic compounds: Organic Compound Analysis, NEICPROC/00-049 **Preparatory method:** SW-846 Method 3511 Organic Compounds in Water by Microextraction **Hold time and preservative:** None	**Analyst:** [redacted] **Reviewer:** [redacted]
Overall laboratory activities reviewer: [redacted]	

[1] Data review/validation/verification and project review: Technical and administrative reviews of the project file, including all data packages, reports, and associated documentation, will be conducted as described in NEIC operating procedures.
[2] Laboratory QC replicates will be analyzed for each matrix and/or analytical protocol by subsampling a sample and repeating, in its entirety, the analytical sequence for each subsample, as necessary.

Sample Handling and Custody

All activities of NEIC personnel will be performed in accordance with the NEIC quality system. NEIC personnel will follow appropriate chain of custody; quality assurance/quality control (QA/QC); and standard procedures for sampling, measurements, and sample handling according to the current versions of the applicable NEIC operating procedures listed in "Applicable Operating Procedures." Sample handling activities will be documented in the laboratory logbooks or equivalent electronic records.

Following the laboratory planning session, the APM will develop a finalized task schedule for the laboratory team to track individual tasks and deadlines. A laboratory report summarizing the analytical findings will be submitted to EPA Region 8 upon completion of data package and laboratory activities reviews. Laboratory results that have been through data package review will be provided verbally to the customer before the finalized laboratory report is provided to expedite the customer's report writing process.

APPLICABLE NEIC OPERATING PROCEDURES

NEIC personnel will follow operating and safety requirements outlined in the applicable procedures listed in **Table 5** for all laboratory work performed.

Table 5. APPLICABLE NEIC STANDARD OPERATING PROCEDURES	
NEIC Procedure Name	**Procedure No.[1]**
General Operating Procedures	
Quality:	
Evidence Management	NEICPROC/00-059
Proficiency Testing and Competency Evaluation	NEICPROC/17-001
Project Acceptance and Delivery	NEICPROC/10-004
Project File Management	NEICPROC/00-074
Quality Management Plan	NEICPLAN/01-001
Records Management	NEICPROC/00-061
Report Development, Review, and Control	NEICPROC/00-067
Training[2]	NEICPROC/00-014
Waste Management	NEICPROC/00-076
Selection, Verification, and Validation of Methods	NEICGUID/00-005
Control of Supplies Used in Measurement	NEICPROC/00-020
Equipment Inventory, Maintenance, Calibration, and Verification[3]	NEICPROC/00-018
Estimation of Measurement Uncertainty	NEICPROC/07-004
Laboratory Branch Project Planning and Coordination	NEICPROC/00-022
Laboratory Data and Data Package Review	NEICPROC/00-066
Safety:	
Chemical Hygiene Plan	NEICPLAN/00-001
Safety and Health Management System	NEICMANL/15-001
Environmental Management System:	
Environmental Management	NEICPLCY/00-006
Analytical Operating Procedures	
Calibration, Verification, and Maintenance of Laboratory Balances, Scales, and Weights	NEICPROC/99-003
Gas Chromatograph (GC) Systems: Maintenance, Operation, and Performance Verification	NEICPROC/00-054
Mass Spectrometers and Associated Equipment Maintenance, Operation, and Performance Verification	NEICPROC/01-001
Organic Compound Analysis	NEICPROC/00-049
Physical Description/Phase Separation	NEICPROC/00-045
Subsampling, Including Drying and Grinding	NEICPROC/00-065
Volatile Organic Analysis by Gas Chromatography/Mass Spectrometry,	NEICPROC/00-002

[1] The current version of each procedure, at the time of the investigation and analysis, will be followed unless noted otherwise.
[2] All personnel training records are kept on file, and personnel qualifications for performing work on this project are verified by supervisors and quality staff.
[3] Instrumentation calibration and repair, along with the required documentation, will follow the requirements found in this procedure, along with instrument-specific procedures/manuals.

HEALTH AND SAFETY MANAGEMENT

As part of the project planning process, the project team has considered actual and potential environmental impacts resulting from the field and laboratory activities and will minimize these impacts.

Appendix C– NEIC TPH Report

United States Environmental Protection Agency
Office of Enforcement and Compliance Assurance
Office of Criminal Enforcement, Forensics and Training

National Enforcement Investigations Center

NEIC

NEICVP1497E01

NEIC CIVIL INVESTIGATION REPORT
Sisecam Wyoming LLC, Big Island Mine and Refinery
Green River, Wyoming

Investigation Dates:
March 28, 2023
[redacted]

Authorized for Release by:
[redacted]

Report Prepared for:
[redacted]
EPA Region 8
1595 Wynkoop Street
Denver, Colorado 80202

NATIONAL ENFORCEMENT INVESTIGATIONS CENTER
P.O. Box 25227
Building 25, Denver Federal Center
Denver, Colorado 80225

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CONTENTS

TABLES

APPENDICES (*NEIC-created documents)

This Contents page shows all the sections contained in this report and provides a clear indication of the end of this report.

INVESTIGATION OVERVIEW

PROJECT OBJECTIVE

The U.S. Environmental Protection Agency (EPA) Region 8 (R8) requested EPA's National Enforcement Investigations Center (NEIC) assistance to analyze samples collected from the Sisecam Wyoming LLC, Big Island Trona mine and processing facility (facility). The facility is located at 254 County Road 4 in Green River, Wyoming.

The NEIC laboratory quantitatively analyzed eleven grab samples collected during EPA R8's Clean Air Act (CAA) inspection. The analytical objective for this case was to determine the concentration of total petroleum hydrocarbons (TPH) in each sample. The EPA R8 contact for this project is Clean Air Act (CAA) inspector [redacted]).

Table 1 lists the project team members.

Table 1. PROJECT TEAM MEMBERS		
Team Member	**Organization**	**Project Role**
[redacted]	NEIC	Analytical Project Manager (APM)
REGIONAL AND OTHER CONTACTS		
[redacted]	EPA Region 8	Field sample collector, inspector

LABORATORY ACTIVITIES SUMMARY

The samples were driven from Green River, Wyoming, and delivered to the NEIC laboratory in Denver, Colorado, by [redacted] on March 30, 2023. [redacted] accepted custody of the samples from [redacted] upon arrival at the NEIC laboratory. The samples were photographed upon receipt, and the information on the chain of custody was verified with the sample tags. After check-in, the samples were stored in a walk-in cooler at 4 degrees Celsius (°C)

All environmental measurement activities were performed in accordance with the NEIC quality system. All laboratory measurements described in this report are within the scope of NEIC's ISO/IEC 17025 accreditation issued by the ANSI National Accreditation Board (certificate No. FT-0303).

[redacted] quantitatively analyzed the samples for TPH. Samples were prepared following SW-846 Method 3511 Organic Compounds in Water by Microextraction as guidance and analyzed following Organic Compound Analysis, NEICPROC/00-049. Instead of 40-milliliter (mL) volatile organic analysis vials, 20-mL head space vials were used. Sample aliquots were first suspended or dissolved in water, then extracted using 2 mL of dichloromethane (DCM). The DCM extract was not dried with sodium sulfate prior to analysis. No internal standards nor surrogates were used. Calibration was performed by spiking artificial trona (sodium sesquicarbonate) with DCM solutions containing gasoline, diesel, and 30W oil. Additional detailed information may be found in the project files.

Table 2 summarizes the analytical methods followed, as well as the analysts and dates of the analyses. Data quality summaries, including uncertainty measurements for all laboratory measurements are maintained in the project file.

Table 2. ANALYTICAL OBJECTIVE, TECHNIQUE, AND METHOD; ANALYST; AND DATE PERFORMED			
Analytical Objective, Technique, and Method[1]	**NEIC Analyst**	**Samples Analyzed by Method (Station No.)**	**Date(s) Performed**
Analytical Objective: • Quantitate total petroleum hydrocarbons in trona ore and products. **Technique:** • Gas chromatography and Mass Spectrometry **Preparation Method:** • SW-846 Method 3511 Organic Compounds in Water by Microextraction **Analysis Method:** • Organic Compound Analysis, NEICPROC/00-049	[redacted]	FB/TB S01a S01b S01c S02 S03 S04a S04b S04c S05 S06	July 17-August 14, 2023
[1] Data quality summaries, including uncertainty measurements, for all laboratory measurements are maintained in the project file.			

ANALYTICAL RESULTS

Table 3 summarizes the analytical results.

Table 3. SUMMARY OF ANALYTICAL RESULTS					
Station No.	**Sample Location/ Description of Sample Location[1]**	**Appendix B Photo Nos.**	**Laboratory Sample Physical Description**	**Total Petroleum Hydrocarbons**	
				(wt%[2])	**(mg/kg[3])**
FB/TB	Field Blank/Trip Blank	DSC_0054.JPG	White, Grains, Dry, Solid	< QL[4]	< QL
S01a	Mine Face Triplicate	DSC_0064.JPG DSC_0065.JPG	Brown, Granules, Aggregate, Dry, Solid	$0.0334_{n=10}$[5]	$334_{n=10}$
S01b	Mine Face Triplicate	DSC_0056.JPG DSC_0057.JPG	Brown, Granules, Aggregate, Dry, Solid	$0.0307_{n=5}$	$307_{n=5}$
S01c	Mine Face Triplicate	DSC_0068.JPG DSC_0069.JPG	Brown, Granules, Aggregate, Dry, Solid	$0.0075_{n=5}$	$75_{n=5}$
S02	Conveyor Belt Post Mine Face	DSC_0072.JPG DSC_0073.JPG	Brown, Granules,	$0.0081_{n=5}$	$81_{n=5}$

Table 3. SUMMARY OF ANALYTICAL RESULTS					
Station No.	Sample Location/ Description of Sample Location[1]	Appendix B Photo Nos.	Laboratory Sample Physical Description	Total Petroleum Hydrocarbons	
				(wt%[2])	(mg/kg[3])
			Aggregate, Dry, Solid		
S03	Crusher above ground	DSC_0060.JPG DSC_0061.JPG	Brown, Granules, Aggregate, Dry, Solid	$0.0060_{n=5}$	$60_{n=5}$
S04a	Unit 6 Precalciner	DSC_0049.JPG DSC_0050.JPG	Brown, Granules, Aggregate, Dry, Solid	$0.0142_{n=5}$	$142_{n=5}$
S04b	Unit 6 Precalciner	DSC_0080.JPG DSC_0081.JPG	Brown, Granules, Aggregate, Dry, Solid	$0.0053_{n=5}$	$53_{n=5}$
S04c	Unit 6 Precalciner	DSC_0084.JPG DSC_0085.JPG	Brown, Granules, Aggregate, Dry, Solid	$0.0100_{n=5}$	$100_{n=5}$
S05	Post Calciner Unit 6	DSC_0087.JPG DSC_0088.JPG	White, Grains, Dry, Solid	< QL	< QL
S06	Post Calciner Insolubles	DSC_0076.JPG DSC_0077.JPG	Liquid Phase: Brown, cloudy, non-viscous liquid Solid Phase: Brown, wet paste	$0.0381_{n=5}$	$381_{n=5}$

[1] Chain of custody and sample tags do not match. Crosswalk table provided in email from [redacted].
[2] wt%: gram per gram weight percent
[3] mg/kg: milligrams per kilogram
[4] < QL: Less than the quantitation limit, 0.001 wt% or 10 $^{mg}/_{kg}$.
[5] n=#: Result is the average of # of replicate measurements.

Laboratory observations, method modifications, and other project information are documented in the project file. A copy of the chain of custody record is provided in **Appendix A**. Pertinent photographs from the laboratory activities are provided in **Appendix B**. Additional photos are maintained in the project file.