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Attorneys for GOODRICH CORPORATION

BEFORE THE HEARING BOARD OF THE

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

In the Matter of

GOODRICH CORPORATION,
(Facility ID No. 11998),

Case No. 6253-1

DECLARATION OF SANDRA PEREZ IN SUPPORT OF GOODRICH CORPORATION'S PETITION FOR REGULAR VARIANCE

Hearing Date: April 30, 2024
Time: 9:30 a.m.
Place: Hearing Board Room
South Coast Air Quality
Management District
21865 Copley Drive
Diamond Bar, CA 91765

DECLARATION OF SANDRA PEREZ

I, Sandra Perez, declare as follows:

1. I am currently employed as the Environmental Health & Safety Manager for Goodrich Corporation's ("Goodrich") facility located at 11120 S. Norwalk Blvd in Santa Fe Springs, California ("Facility"). I am over the age of 18 years. I have personal knowledge of the matters set forth below and am competent to testify with respect to them.

2. I joined Goodrich in December 2023. My responsibilities as the Environmental Health & Safety Manager include assessing environmental, health, and safety impacts at the Facility and developing and implementing programs to reduce risk as well as achieve and maintain compliance. I also manage numerous environmental permits, reporting criteria, and high-risk health and safety programs. In particular, I manage the Facility's compliance with the fifty-two permits it has from the South Coast Air Quality Management District ("South Coast AQMD"). I also work closely with the Facilities, Maintenance, and Furnace Deck departments, which has provided me with an understanding of the Facility's process systems.

3. Prior to joining Goodrich, I have worked a collective eleven years in the field of environmental and occupational health in the Aerospace and Biopharmaceutical industries. I hold Bachelor of Science and Master of Science degrees in Environmental and Occupational Health from California State University Northridge.

Goodrich's Variance Petition

4. The Facility's production process includes the following high-level steps. First, the Facility receives the carbon fiber textile material, which it then prepares for the brake production process. Second, the Facility then processes the material through the furnace deck process. That process includes densification, heat treatment, and coating. Third, the Facility performs machining and hardware assembly during the machine shop process.

5. On February 23, 2024, Goodrich submitted a petition for an interim and regular variance related to the Facility's emergency flare, which is part of the equipment for the furnace deck process. In particular, Goodrich seeks relief from one of the conditions in its April 17, 2014

Permit to Operate (Permit # G30825) for the emergency flare ("Permit"). A true and correct copy of the Permit is attached as Exhibit A to this declaration.

6. The emergency flare is a backup air pollution control device for the large furnaces required by the carbon brakes manufacturing process to heat the brake materials during Goodrich's proprietary carbon densification process. A large building at the Facility houses a series of these furnaces.

7. The furnaces' air pollution control system has two components: (1) a boiler exhaust system with a scrubber and (2) a backup emergency flare. In particular, the South Coast AQMD air permits for the Facility's furnaces have conditions that require the furnaces to vent to an oil scrubber, a boiler, and a backup flare while in operation to control potential volatile organic compounds ("VOC") and toxic air contaminant ("TAC") emissions.[1] The Facility's South Coast AQMD permits to operate for its furnaces similarly require Goodrich to have the emergency flare line on standby (*see e.g.*, Permit # G71191, Permit Condition 4). Accordingly, the emergency flare must be available whenever the furnaces operate at the Facility.

8. The Facility's boilers serve as the primary pollution control devices for the furnaces, and the emergency flare serves as the backup air pollution control system. During normal operations, the onsite boilers safely combust the furnace process gas. But during an equipment malfunction or another emergency, the flare combusts process gas from the furnaces to prevent potential hazards from the process gas, such as VOCs, from venting directly into the atmosphere. Accordingly, when a boiler outage or other emergency occurs, the flare operates as the pollution control device for the furnaces, effectively reducing VOC and TAC emissions until Goodrich resolves the issue with the primary pollution control system.

9. Goodrich's petition seeks a variance for one of the Permit's ten conditions for the emergency flare, which limits Goodrich to operating the flare for no more than thirteen hours in a rolling twelve-month period. Goodrich has reviewed its historical records, and we have been

[1] The permits are Permit Nos. G71191-F43, G71192-F44, G71193-71, G71194-91, G71195-92, G71196-93, G71197-112, G71198-122, and G71199-152.

unable to identify the reason for the thirteen-hour limit in the Permit. However, following the interim variance hearing, South Coast AQMD staff located the Health Risk Assessment Report: Backup Flare Application No. 336586, dated June 12, 2000 ("Health Risk Assessment"), which explains the basis of the thirteen-hour limit in the Permit and is attached as Exhibit B to this declaration.

10. On March 7, 2024, the Hearing Board granted Goodrich an interim variance to operate the emergency flare until the Hearing Board could consider the matter at a regular variance hearing on April 30, 2024. Given the duration of the solenoid valve failure event in February 2024 and that the Permit's thirteen-hour operation limit is calculated based on the operation time in a rolling twelve-month period, Goodrich requires further variance relief for operations at the Facility until February 3, 2025.

February 2024 Solenoid Valve Failure Event

11. Goodrich's need for a variance arises out of an unanticipated mechanical failure event in February 2024 that caused the emergency flare to operate beyond the thirteen-hour rolling, twelve-month limit in the Permit.

12. On the night of Saturday, February 3, 2024, a Goodrich mechanic discovered that a solenoid valve failed and remained in the open position on one of the piping systems that connects the furnaces to the flare and other equipment. In particular, the solenoid valve that failed controlled the compressed air into the isolation valve actuator. The solenoid valve was stuck open, causing the isolation valve to remain open. The malfunctioning valve allowed process gas to flow into both the boiler and the emergency flare. The process gas flowing through the emergency flare line caused the flare to operate for approximately sixteen hours until the mechanic discovered the solenoid valve failed and manually closed it. However, the emergency flare functioned as intended, and it prevented the release of process gas.

13. The solenoid valve failure was an unanticipated mechanical failure that had never occurred before at the Facility. And because the solenoid valve was an unknown possible point of failure, it did not trigger the Facility's alarm system, which was designed to detect the known pathways, permit conditions, and failure conditions to the flare. Since the solenoid valve failure

event, Goodrich has redesigned its flare alarm and monitoring systems to detect any future solenoid valve failures.

Without Variance Relief, Goodrich Will Be in Violation of the Permit and South Coast AQMD Rule 203(b).

14. Without flare line operation variance relief, Goodrich will be in violation of Condition No. 3 of the Permit, which provides that the emergency flare "shall not be used more than 13 hours in any one 12-month rolling period." Ex. A. Because the February 2024 solenoid valve failure caused the emergency flare to operate for sixteen hours, Goodrich will in violation of this condition when the interim variance expires. Goodrich would violate the Permit's thirteen-hour twelve-month rolling limit with each individual operation of the flare, until February 3, 2025, when the February 2024 solenoid valve failure would roll off the twelve-month tracking period under the Permit.

15. While Goodrich's use of the flare is unpredictable, Goodrich's records demonstrate that it uses the flare for approximately ten to twenty minutes in a typical month. Goodrich thus expects that the Facility will need to use the emergency flare during the nine-month period between April 30, 2024, and February 3, 2025, but the precise timing of those events is not possible to predict.

16. Goodrich's anticipated violation of its Permit conditions will cause Goodrich to also violate South Coast AQMD Rules 203(b), which prohibits operating equipment contrary to the conditions set forth in a permit to operate.

The February 2024 Solenoid Valve Failure Event Was Due to Conditions Beyond Goodrich's Reasonable Control.

17. The February 2024 solenoid valve failure that caused the emergency flare to operate was an unavoidable equipment failure that Goodrich could not have anticipated. Based on Goodrich's internal investigation efforts, I understand that the valve at issue was within its recommended life span, and Goodrich had no notice that it would fail before it did. Further, I understand that Goodrich's standard operating procedures include testing the valves after every

production run approximately every two weeks by opening and closing the valves from the control room, which would have detected any valve failure.

The Inability to use the Flare Would Not Have a Corresponding Benefit in Reducing Air Contaminants.

18. The emergency flare is a pollution control device, and based on conversations with Goodrich's engineering and technical staff, and my own knowledge, granting or denying the interim variance would have a negligible impact on air quality. Although denying the variance would require Goodrich to halt production, which would stop all air emissions, use of the emergency flare also prevents emissions by effectively controlling VOC and TAC emissions from the process gas. As a result, Goodrich's ability to operate the emergency flare is important to control emissions and protect public health. Further, as discussed in the Declaration of Mark Ruiz in Support of Goodrich's Petition for a Regular Variance, halting Goodrich's operations would disrupt the delivery of carbon brake products to Goodrich's military and national security customers as well as result in losses for the local economies.

19. Based on conversations with Goodrich's engineering and technical staff and the Health Risk Assessment, I understand that at most, operation of the emergency flare may result in a negligible increase in NOx, Benzene, and 1,3-Butadiene emissions. The NOx emissions may occur because the Facility's two boilers have control devices for NOx that the flare does not. However, any additional NOx, Benzene, and/or 1,3-Butadiene emissions are negligible, given that excluding the February 2024 solenoid valve failure, the emergency flare records show it operates for approximately ten to twenty minutes in a typical month. The estimated emissions by the emergency flare during the variance period are 0.142 lbs. of NOx, 0.153 lbs. of Benzene, 0.032 lbs. of 1,3-Butadiene.[2]

/ / / /

/ / / /

[2] The Facility used usage records for the emergency flare from 2023 to estimate the excess hours that the flare would operate during the variance period.

20. Further, I have reviewed California Health and Safety Code section 41700, and the Facility's ability to operate the emergency flare under the requested variance is not expected to result in a violation of section 41700 (nuisance).

While the Variance Is in Effect, Goodrich Will Reduce Excess Emissions to the Maximum Extent Feasible.

21. Goodrich has implemented several actions to correct the issues that led to the delayed detection of the solenoid valve failure and further reduce the likelihood that the Facility will need to rely on the emergency flare.

22. First, on February 3, 2024, Goodrich replaced the failed solenoid valve shortly after discovering the issue.

23. Second, on February 5, 2024, Goodrich programmed additional failure alarms to all incoming boiler and flare valves to ensure the system detects any future valve failures. This will enable Goodrich's staff to act immediately to correct any issues. Goodrich staff monitor the control room twenty-four hours a day, seven days a week.

24. Third, the Facility conducted an internal investigation regarding the detection and mitigation of flare usage and has implemented the following additional actions:

- Update alarms on all the valves to instruct operators on recommended actions and possible causes for flare operation;
- Modify the flare timer programming to detect any possible pathways for process gas to enter the flare line; and
- Evaluate the Infra-Red camera as a secondary source to trigger the flare timer and alarms.

The Facility plans to implement the following additional actions in the near future:

- Establish PM frequency for physically testing the solenoid valves and update the mechanical integrity program accordingly; and
- Update programing to trigger an automatic shut down all furnaces in operation should a pathway to flare be opened during non-emergency scenarios.

While the Variance Is in Effect, Goodrich Will Monitor or Otherwise Quantify Emission Levels from the Emergency Flare and Report These Emission Levels to South Coast AQMD.

25. Goodrich monitors its control system twenty-four hours a day, seven days a week, and that system shows flow, temperature, and valve positions. These measurements allow Goodrich to monitor and quantify any emissions from the emergency flare, consistent with the conditions agreed to Goodrich and South Coast AQMD set forth in the Proposed Order Granting Regular Variance. Goodrich will report the required information to South Coast AQMD according to the schedule agreed to by the Parties.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct and that this declaration was executed on the 24th day of April, 2024, in Santa Fe Springs, California.

Sandra Perez

Exhibit A

South Coast Air Quality Management District
21865 Copley Drive, Diamond Bar, CA 91765-4178

Permit No.
G30825
A/N 499392

PERMIT TO OPERATE

This initial permit must be renewed ANNUALLY unless the equipment is moved, or changes ownership.
If the billing for the annual renewal fee (Rule 301.f) is not received by the expiration date, contact the District.

ID 11998

Legal Owner
or Operator:

GOODRICH CORPORATION
11120 S NORWALK BLVD
SANTA FE SPRINGS, CA 90670-3885

Equipment Location: 11120 S NORWALK BLVD, SANTA FE SPRINGS, CA 90670-3885

Equipment Description :

AIR POLLUTION CONTROL SYSTEM CONSISTING OF:

1. EMERGENCY FLARE, JOHN ZINK, MODEL EEF-U-3, 3" FLARE TIP, 4.4 MMBTU/HR, PROCESS GAS FIRED, WITH A PROPANE PILOT AND A LIQUID SEAL DRUM.

2. EXHAUST SYSTEM WITH A COMMON BLOWER VENTING FOURTEEN CARBON CERAMIC VAPOR DEPOSITION FURNACES.

Conditions :

1. OPERATION OF THIS EQUIPMENT SHALL BE CONDUCTED IN ACCORDANCE WITH ALL DATA AND SPECIFICATIONS SUBMITTED WITH THE APPLICATION UNDER WHICH THIS PERMIT IS ISSUED UNLESS OTHERWISE NOTED BELOW.

2. THIS EQUIPMENT SHALL BE PROPERLY MAINTAINED AND KEPT IN GOOD OPERATING CONDITION AT ALL TIMES.

3. THIS EQUIPMENT SHALL NOT BE USED MORE THAN 13 HOURS IN ANY ONE 12-MONTH ROLLING PERIOD.

4. THIS EQUIPMENT SHALL BE EQUIPPED WITH A TEMPERATURE INDICATOR AND RECORDER WHICH MEASURES AND RECORDS THE EXITING FLUE GAS TEMPERATURE.

5. WHENEVER THIS EQUIPMENT IS IN OPERATION, A TEMPERATURE OF NOT LESS THAN 1400 DEGREES FAHRENHEIT SHALL BE MAINTAINED IN THE STACK AS MEASURED BY THE TEMPERATURE INDICATOR AND RECORDER.

6. THE EQUIPMENT SHALL BE EQUIPPED WITH A FLAME FAILURE ALARM WITH AN AUTOMATIC SYSTEM TO ISOLATE THE FLARE FROM THE CARBON CERAMIC VAPOR DEPOSITION FURNACE PROCESS GAS SUPPLY LINES, SHUT OFF THE BLOWER, AND NOTIFY A RESPONSIBLE PARTY OF THE SHUTDOWN.

7. THE EQUIPMENT OPERATING THERMOCOUPLE SHALL BE LOCATED IN THE FLAME BODY.

ORIGINAL

PERMIT TO OPERATE

8. THE TOTAL FLOW RATE OF PROCESS GASES FROM THE CVD FURNACES TO THIS FLARE SHALL NOT EXCEED 12,000 DRY STANDARD CUBIC FEET PER HOUR.

9. ANY BREAKDOWN OR MALFUNCTION OF THE EQUIPMENT RESULTING IN THE EMISSION OF RAW GAS SHALL BE REPORTED TO THE SCAQMD WITHIN ONE HOUR AFTER OCCURRENCE AND IMMEDIATE REMEDIAL MEASURES SHALL BE UNDERTAKEN TO CORRECT THE PROBLEM AND PREVENT FURTHER EMISSIONS INTO THE ATMOSPHERE.

10. THE EQUIPMENT OPERATOR SHALL MAINTAIN ADEQUATE RECORDS FOR THIS EQUIPMENT TO SHOW COMPLIANCE WITH CONDITION NUMBERS 3, 5, AND 8. ALL RECORDS SHALL BE PREPARED IN A MANNER THAT IS ACCEPTABLE TO THE DISTRICT, SHALL BE RETAINED ON THE PREMISES FOR AT LEAST TWO YEARS AND SHALL BE MADE AVAILABLE UPON REQUEST OF THE EXECUTIVE OFFICER OR HIS REPRESENTATIVE.

NOTICE

IN ACCORDANCE WITH RULE 206, THIS PERMIT TO OPERATE OR COPY SHALL BE POSTED ON OR WITHIN 8 METERS OF THE EQUIPMENT.

THIS PERMIT DOES NOT AUTHORIZE THE EMISSION OF AIR CONTAMINANTS IN EXCESS OF THOSE ALLOWED BY DIVISION 26 OF THE HEALTH AND SAFETY CODE OF THE STATE OF CALIFORNIA OR THE RULES OF THE AIR QUALITY MANAGEMENT DISTRICT. THIS PERMIT CANNOT BE CONSIDERED AS PERMISSION TO VIOLATE EXISTING LAWS, ORDINANCES, REGULATIONS OR STATUTES OF OTHER GOVERNMENT AGENCIES.

EXECUTIVE OFFICER

Dorris M. Bailey

By Dorris M.Bailey/RL01
4/17/2014

ORIGINAL

Exhibit B

E P CONSULTANTS
MANAGEMENT CONSULTING SERVICES

June 12, 2000

Mr. Amir Dejbakhsh
Air Quality Engineer II
South Coast Air Quality Management District
21865 East Copley Drive
Diamond Bar, California 91765

Subject: Health Risk Assessment Report: Backup Flare
Application No. 336586
BFGoodrich Aerospace – Carbon Products Division
Santa Fe Springs, California
SCAQMD ID No. 11998

Dear Amir:

On behalf of BFGoodrich Aerospace – Carbon Products Division (BFGoodrich), EP Consultants (EPC) is pleased to provide the results of a Tier 3 Health Risk Assessment (HRA) for the referenced backup flare. The following includes a facility description, project background, emissions summary, dispersion modeling, results, and conclusions/recommendations.

FACILITY DESCRIPTION

The BFGoodrich facility, located at 11200 Norwalk Boulevard, Santa Fe Springs, California (Facility), manufactures aircraft brake pads using a proprietary carbonization process (see Figure 1 - Site Location Map). The Facility is in an industrial area of Santa Fe Springs, bounded as follows (see Figure 2 for a vicinity zoning map):

- ***West*** – Norwalk Boulevard and homes, zoned R-1 (single family residential);
- ***South*** – vacant lot, zoned M-2 (heavy manufacturing);
- ***East*** – manufacturing facilities, zoned M-2; and,
- ***North*** – manufacturing facility, zoned M-2.

12524 Bryce Circle Cerritos California 90703-8334
Phone (562) 865-2477 Fax (562) 865-2977
epconsultants@usa.net

PROJECT BACKGROUND

On January 29, 1998 and on behalf of the Facility, IT Corporation submitted new source air permit application number 336586 to the South Coast Air Quality Management District (SCAQMD) for a backup flare. The flare is used to control emissions from 14 carbon ceramic vapor deposition (CVD) furnaces during emergency shutdown or maintenance conditions, or when an existing 800 HP boiler is not in service.

On March 20, 1998, the SCAQMD issued a Permit to Construct (P/C) for the subject flare (a copy of the P/C is included in Attachment 1). Condition 9 of the P/C requires that a flare source test be conducted to demonstrate destruction efficiency for volatile organic compounds including benzene.

The estimated cost of retrofitting the flare for the source test is prohibitively expensive, and BFGoodrich has proposed a risk assessment for uncontrolled flare emissions to demonstrate compliance with SCAQMD Rule 1401. Although a Tier 2 screening HRA was conducted by SCAQMD staff and resulted in off-site health risks exceeding Rule 1401 thresholds, BFGoodrich has conducted a more refined, Tier 3 HRA to evaluate off-site health risks.

During a meeting at the SCAQMD on April 14, 2000, it was agreed that source testing of the flare would not be required if it could be demonstrated that uncontrolled flare emissions (e.g. assuming a flare destruction efficiency of zero) would result in off-site health risks below Rule 1401 thresholds.

Because the flare permit application was submitted and deemed complete in March 1998, SCAQMD's *Risk Assessment Procedures for Rules 1401 and 212*, Attachment A (for applications deemed complete from June 1, 1990 to September 7, 1998) is the pertinent SCAQMD guidance for this HRA. Table 8 of this attachment includes cancer unit risk factors and multi-pathway adjustment factors for pollutants to be considered. The pollutants listed in this table that are expected in flare emissions are benzene and 1,3-butadiene.

The March 1998 version of Rule 1401 and associated SCAQMD guidance include cancer unit risk factors but no acute/chronic exposure levels for benzene and 1,3-butadiene. Therefore, this HRA considers only cancer risks associated with benzene and 1,3-butadiene emissions.

EMISSIONS SUMMARY

Carbon CVD furnace exhaust gases were evaluated in a boiler source test conducted on February 28, 2000, with a maximum six furnaces operating. A summary of the results, taken from an April 12, 2000 boiler source test report prepared by Total Air Analysis, Inc. (Carson, California), is provided in Attachment 2 (the complete report was provided to you during our meeting on April 14, 2000).

The reported inlet parameters for the boiler are representative of the maximum process gas inlet conditions for the flare. Assuming up to 13 hours of operation for the flare for any rolling 12-month period, benzene and 1,3-butadiene mass emission rates were determined as follows:

Compound	Maximum Emission Rate		
	Pounds/Hour	Pounds/Year	Micrograms/Second *
Benzene	8.80	114	1,640
1,3-Butadiene	4.58	59.5	857

* Annual average.

DISPERSION MODELING

Model Selection and Options

The USEPA's Industrial Source Complex Source Term 3 (ISCST3) model, version 99155, was used for dispersion modeling. ISCST3 is a Gaussian distribution model that calculates the concentration of a gas from a continuous source based on a gas emission rate; source stack parameters including exhaust temperature, velocity, and diameter; meteorological conditions and vicinity topographic features; heights and locations of sources and receptors; and hourly temporal profiles for sources emissions and receptors. The following model options were selected for this HRA:

- Urban dispersion coefficients;
- No dry or wet deposition;
- Final plume rise;
- No stack-tip downwash;
- No building downwash;
- Buoyancy-induced dispersion;
- Calms processing routine; and,
- Receptors on flat terrain.

Input Parameters

Flare input parameters were obtained from the BFGoodrich Facility engineering department, as follows:

Parameter	Model Input
Source type	Point source, no stack cap
Emission rate	See source strength calculations below
Stack height	21.3 meters (70 feet)
Exhaust temperature	505.4°K (450°F)
Stack diameter	0.102 meter (4 inches)
Exhaust flowrate	Not required (27,000 standard cubic feet/hour)
Exhaust velocity	44.4 meters/second (146 feet/second)

Meteorological Data

Preprocessed hourly surface meteorological data were obtained from the SCAQMD for Pico Rivera (1981; Surface Station No. 53134). These data were used for modeling, along with Los Angeles World Airport (Station No. 91919) upper air data for 1981, also obtained from the SCAQMD.

Source Strength Calculations

To obtain model outputs in a format compatible with the Surf© plotting program (version 4.15, Golden Software Inc., 1990), source strengths were used in the ISCST3 model rather than actual emission rates for benzene and 1,3-butadiene. The method used for calculating source strengths is described below.

Cancer risk is determined by the following:

$$MICR_j = \sum_i \left[LEA_j \times \chi_i \times U_i \times MP_i \right] \qquad \text{(Equation 1)}$$

where:

i = pollutant (either benzene or 1,3-butadiene);

j = exposure scenario (either residential or worker);

$MICR_j$ = maximum individual cancer risk per million for scenario j;

LEA_j = lifetime exposure adjustment factor for scenario k (no units);

χ_i = ground-level concentration for pollutant i at a given receptor location (generated by the ISCST3 model, micrograms/cubic meter);

U_i = unit risk factor for pollutant i, (micrograms/cubic meter)$^{-1}$; and,

MP_i = multi-pathway adjustment factor for pollutant i (no units).

ISCST3 calculates χ_i at receptor locations based on the following equation:

$$\chi_i = (Q_i/(2\pi\sigma_y\sigma_z V)) \times e^{-0.5(y/\sigma_y)^2} \times \left[e^{-0.5[(z-H)/\sigma_z]^2} + e^{-0.5[(z+H)/\sigma_z]^2}\right]$$

$$= Q_i \times f(x,y,z,\sigma_y,\sigma_z,V,H) \qquad \text{(Equation 2)}$$

where:

x,y,z = Cartesian coordinates of receptor location (meters);

Q_i = emission rate for pollutant i (micrograms/second);

σ_y = standard deviation of plume concentration distribution in the horizontal direction (meters);

σ_z = standard deviation of plume concentration distribution in the vertical direction (meters);

V = wind speed affecting the plume (meters/second); and,

H = height of final plume centerline (meters).

Therefore, by creating an ISCST3 input file with Q_i and previously discussed source parameters, the ISCST model provides an output file with χ_i values at various receptor locations. To generate an output file with direct $MICR_j$ values, Q_i were represented by source strengths ($SS_{i,j}$, cubic meters/second):

$$SS_{i,j} = Q_i \times LEA_j \times U_i \times MP_i \qquad \text{(Equation 3)}$$

Combining equations (2) and (3) and summing pollutants, the $MICR_j$ was obtained:

$$f(x,y,z,\sigma_y,\sigma_z,V,H) \times \sum_i SS_{i,j} = \sum_i \left[\chi_i \times LEA_j \times U_i \times MP_i\right] = MICR_j$$

Therefore, by using the $SS_{i,j}$ summation in place of Q_i in the ISCST3 model input file, the output file provided total $MICR_j$ results for each receptor location. Source strength calculation results are summarized below (1 = benzene, 2 = 1,3-butadiene):

Parameter	Units	Residential Scenario	Worker Scenario
Q_1	micrograms/second	1,640	1,640
Q_2	micrograms/second	857	857
U_1	(micrograms/cubic meter)$^{-1}$	2.9×10^{-5}	2.9×10^{-5}
U_2	(micrograms/cubic meter)$^{-1}$	1.7×10^{-4}	1.7×10^{-4}
MP_1	dimensionless	1.0	1.0
MP_2	dimensionless	1.0	1.0
LEA_j	dimensionless	1.0 *	0.130 **
SS_1	cubic meters/second	0.0476	0.00618
SS_2	cubic meters/second	0.146	0.0189
$\sum_{i=1}^{2} SS_{i,j}$	cubic meters/second	0.194	0.0251

* Based on exposure for 24 hours/day, 365 days/year, and 70 years.

** Based on exposure for 8 hours/day, 250 days/year, and 40 years.

Receptor Analysis

The ISCST3 model input file specified receptor locations in a Cartesian rectangular grid with the flare point source as the origin. Initially, a coarse receptor grid was

used with 25-meter spacing and receptor points ranging from 425 meters north to 350 meters south of the origin and 325 meters west to 425 meters east of the origin. Based on the highest annual average results obtained from the coarse grid runs, refined grid model runs were completed with one-meter spacing and receptor points ranging 10 meters in each direction from the coarse grid maxima.

RESULTS

A diskette with ISCST3 modeling input and output files is included in Attachment 3. The following files are included:

- ***BFGRES1.**** – residential scenario, coarse grid (25 meter), input/output files;
- ***BFGRES2.**** – residential scenario, refined grid (1 meter), input/output files;
- ***BFGWORK1.**** – worker scenario, coarse grid (25 meter), input/output files;
- ***BFGWORK2.**** – worker scenario, refined grid (1 meter), input/output files; and,
- ***PICORIV.ASC*** – meteorological data file as obtained from the SCAQMD.

For the residential scenario, the maximum annual average off-site cancer risk was 0.949×10^{-6} at 102 meters west and 96 meters north of the flare point source origin. For the worker scenario, the maximum annual average off-site cancer risk was 0.422×10^{-6} at 66 meters east and 79 meters south of the flare point source origin.

The maximum exposed individual (MEI) locations for residential and worker scenarios are identified on Figure 2 as the MEI_R and MEI_W, respectively. Figures 3 and 4 include Surf©-generated plots of the cancer risk isopleths for residential and worker scenarios, respectively.

CONCLUSIONS AND RECOMMENDATIONS

Based on this analysis, it appears that the flare can operate for up to 13 hours per rolling 12-month period without exceeding a calculated cancer risk of 1.0×10^{-6} at any off-site residential or worker receptor. This analysis is conservative because it assumes no destruction of benzene or 1,3-butadiene by the flare. It is therefore

recommended that the SCAQMD (1) accept this analysis in lieu of source testing to demonstrate compliance with Rule 1401, and (2) issue a Permit to Operate for the flare with an operating limit of 13 hours per rolling 12-month period.

On behalf of BFGoodrich, EPC appreciates your attention to this HRA submittal. If you have any questions or comments, please call either of us at (562) 865-2477.

Very truly yours,

EP CONSULTANTS

Hari Gupta, P.E., R.E.A.
Associate

Anu Sood, P.E., C.P.P., R.E.A.
Principal

Enclosures:

Figure 1	Site Location Map
Figure 2	Vicinity Zoning Map and MEI Locations
Figure 3	Surf© Plot for Residential Scenario
Figure 4	Surf© Plot for Worker Scenario
Attachment 1	Flare Permit to Construct
Attachment 2	Emissions Summary from Boiler Source Test
Attachment 3	Diskette with Modeling Files

cc: Mr. David Castillo, BFGoodrich

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CO STARTING
   TITLEONE  BFGoodrich Flare HRA - Worker Refined
   MODELOPT  NOSTD  URBAN  CONC
   AVERTIME  1  ANNUAL
   POLLUTID  Concentration
   RUNORNOT  RUN
** EVENTFIL  EVENT-Benz-buta
   ERRORFIL  ERRORSW2.OUT
CO FINISHED
SO STARTING
   LOCATION  1   POINT  0.0  0.0   0.0
**                          1    2    3    4    5    6    7    8
   EMISFACT  1  HROFDY  1.0  1.0  1.0  1.0  1.0  1.0  1.0  1.0
**                         9   10   11   12   13   14   15   16
   EMISFACT  1  HROFDY  1.0  1.0  1.0  1.0  1.0  1.0  1.0  1.0
**                        17   18   19   20   21   22   23   24
   EMISFACT  1  HROFDY  1.0  1.0  1.0  1.0  1.0  1.0  1.0  1.0
** Point Source       QS      HS    TS      VS     DS
** Parameters:      ------   ----  ----   ----    ---
   SRCPARAM  1    2.51E-02  21.3  505.4  44.44   0.102

 * SRCGROUP  SOURC1   1
SO FINISHED
RE STARTING
   GRIDCART  CG1  STA
             XYINC  65  21  1  65  21  1
   GRIDCART  CG1  END
RE FINISHED
ME STARTING
   INPUTFIL  picoriv.ASC
   ANEMHGHT  10.000 METERS
   SURFDATA  53134  1981  Pico Rivera
   UAIRDATA  91919  1981  LAX
   STARTEND  1981 1  1  1  1981  12  31  24
ME FINISHED
OU STARTING
   RECTABLE  ALLAVE  FIRST
**   PLOTFILE   1  ALL  1ST 3HR.sfr
   PLOTFILE  ANNUAL  SOURC1  BFGWORK2.sfr
OU FINISHED
```

```
CO STARTING
   TITLEONE  BFGoodrich Flare HRA - Residential Coarse
   MODELOPT  NOSTD  URBAN  CONC
   AVERTIME  1  ANNUAL
   POLLUTID  Concentration
   RUNORNOT  RUN
** EVENTFIL  EVENT-Benz-buta
   ERRORFIL  ERRORSR1.OUT
CO FINISHED
SO STARTING
   LOCATION  1   POINT  0.0  0.0   0.0
**                          1    2    3    4    5    6    7    8
   EMISFACT  1  HROFDY  1.0  1.0  1.0  1.0  1.0  1.0  1.0  1.0
**                         9   10   11   12   13   14   15   16
   EMISFACT  1  HROFDY  1.0  1.0  1.0  1.0  1.0  1.0  1.0  1.0
**                        17   18   19   20   21   22   23   24
   EMISFACT  1  HROFDY  1.0  1.0  1.0  1.0  1.0  1.0  1.0  1.0
** Point Source        QS       HS    TS       VS     DS
** Parameters:        ----     ----  ----     ----    ---
   SRCPARAM  1    1.94E-01  21.3  505.4  44.44    0.102

   SRCGROUP  SOURC1   1
S  FINISHED
RE STARTING
   GRIDCART  CG1  STA
             XYINC  -425  32  25  -325  31  25
   GRIDCART  CG1  END
RE FINISHED
ME STARTING
   INPUTFIL  picoriv.ASC
   ANEMHGHT  10.000 METERS
   SURFDATA  53134  1981  Pico Rivera
   UAIRDATA  91919  1981  LAX
   STARTEND  1981 1  1  1  1981  12  31  24
ME FINISHED
OU STARTING
   RECTABLE  ALLAVE  FIRST
**   PLOTFILE   1  ALL  1ST 3HR.sfr
   PLOTFILE  ANNUAL  SOURC1  BFGRES1.sfr
OU FINISHED
```

g/sec