Honeywell - Engines, Inc
111 South 34th Street, Phoenix, AZ
Permit Number V97-008
Technical Support Document
Permit Renewal V97008 – 2.0.0.0
Issue Date: XXXXXXX

1. APPLICANT:

Honeywell Engines, Inc
111 South 34th Street
Phoenix, AZ 85034

2. PROJECT LOCATION:

The Honeywell facility is located at 111 South 34th Street, Phoenix, AZ, which lies within Maricopa County. With respect to the National Ambient Air Quality Standards (NAAQS), this location is designated as moderate nonattainment for the current 2008 ozone standard and serious nonattainment for PM_{10}. The project site is under the jurisdiction of the Maricopa County Air Quality Department (MCAQD).

3. FACILITY OVERVIEW:

Honeywell owns and operates an aircraft engine (turbine, turbofan and auxiliary power units) manufacturing facility located north of Sky Harbor Airport in Phoenix. The facility's primary Standard Industrial Classification (SIC) code is 3724, which corresponds to NAICS code 336412.

The facility consists of 102 individually numbered buildings or structures on approximately 150 acres. However, only a portion of the facility houses active operations. In the renewal application Figure 2-1 is an overall site layout diagram showing the entire facility to be on the north side of the north runway at Phoenix Sky Harbor International Airport.

4. FACILITY DESCRIPTION:

Honeywell was initially issued the current Title V Air Quality Operating Permit (Permit Number V97-008) in January 2006. The expiration date for the current permit is November 30, 2016.

Honeywell is a Title V major stationary source of air emissions, as defined in Maricopa County Air Pollution Control Regulations (MCAPCR) Rule 100, Section 200.65.c, because the facility's potential to emit (PTE) is greater than the Title V major source threshold for oxides of nitrogen (NO_x) of 100 tons per year (tpy).

The primary production operations consist of metal machining and treating, metal plating, solvent cleaning and degreasing, assembly and testing of the engines. Test facilities are comprised of dedicated jet engine test cell structures for performance and development testing of engines, or engine components. Support equipment at the facility includes boilers and air heaters, storage tanks, emergency generators, and numerous other small pieces of equipment. Air pollution control equipment generally consists of various types of dust collection devices and fume or acid scrubbers.

Chlorinated solvents and jet fuels had been used at the Facility since the early 1950s. The facility discontinued use of chlorinated solvents in the 1990s but continues to use different grades of jet fuel to supply engine testing cells located on the northern side of the site. The groundwater table beneath the facility is known to contain a free-product (hydrocarbon liquid) plume consisting of a mixture of Jet A and JP-4 jet fuels as well as some chlorinated solvents. To remediate this underground plume, a biologically-enhanced soil vapor extraction (BSVE) system was engineered and implemented on-site to remove and treat the free product and contaminated soil vapors. The BSVE system may remain in operation for the duration of the Title V permit renewal period, however, the potential also exists for the permitted soil vapor extraction portion of the system to be discontinued during the permitting timeframe. The air emission units associated with the BSVE system are addressed in this application.

5. PERMIT HISTORY:

The permit history for the Honeywell – Engines, Systems, and Services 34th Street facility is shown in Table 1.

Table 1: Permit History

Issue Date	Revision Number	Type	Reason for Revision
January, 2006	V97008 – 0.0.0.0		Initial issuance.
March, 2007	V97008 – 0.1.0.0, 0.2.0.0, 0.3.0.0	Significant	Add MeOH tank to permit. Replace shot blast rotoclones with cartridge dust collector. Add nitride process ammonia scrubber to permit. Add wastewater treatment process batch scrubber to permit. Replace B105 east and west scrubbers.
December, 2007	V97008 – 0.4.0.0	Significant	Biologically Enhanced Soil Vapor Extraction System (BSVE)
July, 2008	V97008 – 0.4.2.0	Minor	1) Change in the blow down rates for 12 scrubbers. 2) Change in the operating parameters for the AAF Rotoclones. 3) The installation of a new Blade Tip Grinder which will be located in Building 301. 4) Move of abrasive blast units and corresponding dust collectors from Building 117 to Building 110.
January 30, 2009	V97008 – 0.5.0.0	Significant	1) Increase maximum fuel flow to Test Cell 671 2) Expand pH operating range of ammonia scrubber serving the nitriding furnaces from 1 – 3 to 1.0 – 6.0.
March 20, 2009	V97008 – 0.5.1.0	Minor	Replace an abrasive blaster that uses sand as its blasting material with one that uses sodium bicarbonate.
June 25, 2010	V97008 - 0.6.0.0	Significant	Numerous changes were made to the permit and these were put into one revision. A list of these is in the “Summary of Permit Conditions Upon Revision” in this TSD.
March 14, 2011	V97008 – 1.1.0.0	Renewal	Permit Renewal and Significant Revision for changes to BSVE system.
February 14, 2012	V97008 - 1.1.1.0	Minor	Add thermal oxidizer to equipment list for AOS-4 and AOS-5 to allow for maintenance.
December 11, 2012	V97008 – 1.1.2.0	Minor	Replacement of PPA units and air injection blower for BSVE system.
May 22, 2013	V97-008 – 1.1.3.0	Minor	Facility removed paint booth and painting operations.
(withdrawn)	V97-008 – 1.1.4.0	Minor	Minor Mod to change wording for BSVE system. In a letter dated 7/2/2015 the EPA decided that based on Permit Condition 33.a.i, stating that any operating parameter range changes for the BSVE system shall be processed as a Significant Revision, the requested permit changes to conditions 33.h.i and 33.i.i require a Significant Revision..
October 13, 2015	V97-008 – 1.2.0.0	Significant	Changes to the BSVE system.
TBD	V97-008 – 2.0.0.0	Renewal	Permit renewal.

6. PROCESS DESCRIPTIONS:

The following subsections provide detailed descriptions of the existing equipment and operations at Honeywell Engines. The facility is comprised of a large number of individual emissions units subject to Title V air permitting requirements, which include:

- Abrasive Blasting
- Air Heaters
- Boilers
- Underground Storage Tanks
- Oils and Solvents Distribution Station
- Fuel Nozzle Test Stands
- Furnaces – Carburizing
- Furnaces – Heat Treating
- Thermal Spray Coating
- Hard Chrome Plating Line
- Other Metallic Plating Lines
- Component Rig Testing
- Solvent Parts Washers and Flush Booth
- Solvent Dip Cleaning Equipment
- Jet Engine Test Cells
- Emergency Generator and Fire Water Pump Engines
- BSVE System

On a typical week the production and testing operations schedule at the facility is expected to be 24 hours per day, 5 days per week. On an annual basis the operating hours are typically 24 hours per day 5 days per week and occasionally 7 days per week with 12 hour shifts on Saturdays and Sundays.

a. **Abrasive Blasting Operations:**

This process performs abrasive cleaning of parts and test equipment using particulate blast media entrained in compressed air. Abrasive blast cabinets are located in Building 129 (1 unit), Building 202 (3 units), Building 422 (6 units) at the facility, as noted in the attached Equipment List. Each blast cabinet is controlled by either small dedicated filter units, or several cabinets may be aggregated to use a single filter device. There are two emission control devices each for Buildings 422 and 301, and one each for abrasive blasting units in Buildings 103 and 202.

The blast media/compressed air mixture impinges on the part surface, and removes temperature paint, epoxy residue, oil residue, fluxes, and other compounds. Various sizes and weights of silica sand, glass beads, garnet, and other blast material, based on the process use, are used to abrasively clean the parts. Material usage for abrasive blasting occurs relatively uniformly throughout the year.

For the facility blasting cabinets, the air conveying the blast media is vented to dust collection systems. Emission control equipment for abrasive blasting operations may be either wet or dry filter dust collectors, which treat the blast chamber exhaust. The purpose of the dust collectors is to remove the heavy particles and residue by either filtration or centrifugal action. Air from the blast cabinet emission control systems may be released inside a building, or through a vent to atmosphere.

Normal operating hours for abrasive blasting vary as a function of production schedule and for the individual cabinets ranges from one hour per year to 6,240 hours per year. For purposes of potential emissions estimates, maximum operating hours for this system are assumed to be 24 hours per day, 365 days per year. No alternate operating scenarios exist for this production equipment.

b. **Air Heaters:**

Air heaters are used to heat air flowing into the engine test cells during jet engine testing, and for certain rig testing operations. The purpose of the heaters is to simulate actual engine service environments and combustion conditions. Buildings 202 and 222 each have one associated air heater, and Building 203 has three heaters, and Building 204 has four heaters. Heat input ratings range from 0.44 to 10.98 MMBtu/hr. Natural gas is used to fuel the external combustion air heaters for production of warm air. The consumption of natural gas is approximately evenly distributed across the year. No pollution control equipment is installed on the test cell/air heaters exhaust; combustion products are conveyed through the test cell stacks to the atmosphere.

Normal operating hours for the individual heaters range from zero hours to 8,760 hour per year. For purposes of potential emissions estimates, maximum operating hours for air heaters are assumed to be 24 hours per day, 365 days per year. No alternate operating scenarios exist for this process equipment.

c. **Boilers:**

At the facility, there are six operable natural-gas fired boilers distributed among several different buildings. It should be noted that four boilers listed in the prior Title V permit have been retired-in-place, and are no longer operable (Bldg. 212-Stack 4, Bldg.202-Stacks 4 and 5, Bldg. 102-Stack 13. The remaining operable boilers range in heat input rating from 0.35 to 4.11 MMBtu/hr and produce steam, hot water, and process heat for various purposes. Natural gas consumption for this equipment is evenly distributed throughout the year, with approximately 25 percent of annual consumption per calendar quarter. No pollution control equipment is associated with these boilers; combustion products are conveyed through individual stacks to the atmosphere.

Normal operating hours for the facility boilers range from five hours per year to 8,760 hours per year. For purposes of potential emissions estimates, maximum operating hours for boilers are assumed to be 24 hours per day, 365 days per year. No alternate operating scenarios exist for this process equipment.

d. **Volatile Organic Liquid (VOL) Storage Tanks:**

There are seventeen, 20,000 gallon horizontal cylindrical underground storage tanks (USTs) located onsite. Twelve USTs are located at "Fuel Farm North" which is located in Area 2 on site and five are located at “Fuel Farm South” in Area 1. All tanks are used to store and supply various grades of aviation fuels. These USTs supply the facility test cells with primarily Jet A, JP-4, JP-8 and other aviation fuels. All tanks are equipped with at least one vent and a submerged fill pipe.

The Site has one 6,000 gallon above ground storage tank (AST) near Building 422 used to store methanol that is supplied to the carburizing furnace process, and heat-treat furnaces. This tank is above ground, and is equipped with a pressure relief vent and a submerged fill pipe.

The Fuel Farm North USTs are filled via hose lines from trucks parked on the industrial area street adjoining the facility. Similarly, on the southern portion of the facility, at “Fuel Farm South” tanker trucks can fill the USTs via hose lines from a designated on-site parking spot. The USTs are connected to the facility test cells via above ground piping to supply the appropriate fuels for testing operations. There is no storage or supplemental fuel tanks located at the test cells. The individual USTs have submerged fill pipes and the required Stage 1 vapor recovery to abate the emission of vapors during fuel transfer operations.

Normal and maximum operating hours for these tanks are 24 hours per day, 365 days per year. No alternate operating scenarios exist for this process equipment.

e. **Fuel Nozzle Test Stands:**

A variety of engine fuel system components (e.g. manifold, flow divider, nozzle/atomizer, fuel control, fuel pump, etc.) are functionally tested in enclosed fuel nozzle test stands. There are seven fuel nozzle test stands at the facility. The test stands include single test stands located in Buildings 116 and 208, and five test stands in Building 211. These stands use a commonly accepted industry calibration fluid (MIL C 7202) as a surrogate for combustible fuel. The fluid is heated to operating temperature, and re-circulated during the test period from a small storage reservoir via valves, pumps and plumbing through the component-in-testing to verify design and performance specifications.

The calibration fluid is of low volatility and consumed at a very low rate due to fugitive losses from the test stand enclosure. The test stands enumerated above and listed in the attached Equipment List are vented to atmosphere, while there are others that are not vented to atmosphere and are considered insignificant sources. The calibration test fluid may be replaced as needed when its physical properties degrade such that the fluid no longer meets specifications. These test stands operate on an irregular schedule, on an as-needed basis to meet testing requirements. For purposes of potential emission estimates the highest level of fluid replacement, 0.05 gallons per test hour, is assumed to be evaporated to atmosphere.

f. **Carburizing Furnaces:**

Carburizing is a case-hardening process in which carbon is dissolved into the surface layers of a low-carbon steel part at very-high temperature sufficient to render the steel austenitic. Two carburizing furnace processes are located in Building 422. In this process, a steel part or set of parts is exposed to the carburizing environment at a temperature between 1,600 °F and 1,700 °F followed by quenching and tempering to form a martensitic microstructure. The resulting gradient in carbon content below the surface of the steel part causes a gradient in hardness, producing a strong, wear-resistant exterior surface layer. Various gas turbine engine parts, test devices, instrumentation, and general test equipment are treated in the two carburizing furnaces at the facility.

The carburizing furnace creates a carbon-rich atmosphere consisting of methane, methanol, and nitrogen. The steel parts are thoroughly cleaned before they are charged into the carburizing furnaces. A carrier gas mixture consisting of nitrogen and methanol is introduced in the furnace. Methanol is supplied from the 6,000 gallon AST located north of Building 422. A regulated amount of methane is added to control the "carbon potential" parameter of the process as needed for a given component. The hydrocarbon molecules "crack" at the elevated temperature in the furnace and the free carbon deposits in the steel. Byproducts of combustion and the carburizing furnace process that are emitted to atmosphere are hydrogen, carbon monoxide, carbon dioxide, nitrogen, and water. Upon the completion of the carburizing cycle, parts are moved to an enclosed chamber for a fan-assisted cooling in nitrogen before unloading.

Carrier gas and reactive gas consumption (i.e., methanol, nitrogen) is generally uniformly distributed throughout the year. No pollution control equipment is associated with this equipment.

Normal operating hours for the carburizing furnaces ranges to as much as 6,240 hours per year. For purposes of potential emission estimates, maximum operating hours are assumed to be 24 hours per day, 7 days per week. No alternate operating scenarios exist for this process equipment.

g. **Heat Treat Rotary Furnaces:**

There are seven heat treating furnaces (two are carburizing furnaces) at the facility. The rotary furnaces are located in Building 422 and are used to heat treat gear components and similar parts at "austentizing" temperatures (typically 1,500 °F to 1,525 °F) prior to press-quenching. The furnaces are equipped with an oxygen probe for atmosphere control and a thermocouple for temperature control. Nitrogen and methanol are injected into the furnace to maintain a reducing atmosphere during processing. An alternative operating mode would utilize natural gas for atmospheric control, rather than nitrogen and methanol. This change does not significantly affect the composition or amounts of pollutants generated by the furnace reactions.

The cycle times in the furnace are typically one to two hours before quenching. Furnace gases escape through an opening in the furnace door located under a fume hood which vents to atmosphere. The combustion and reaction byproducts that are emitted from the furnaces are carbon monoxide, carbon dioxide, hydrogen, and nitrogen.

The estimated usage of methanol for rotary furnaces is 30 gallons per day, supplied from the 6,000 gallon AST near Building 422. Nitrogen and methanol usage is uniformly distributed throughout the year. No pollution control equipment is associated with this process.

Normal operating hours for the rotary furnaces range up to 7,500 hours per year. For purposes of potential emissions estimates, maximum operating hours are assumed to be 24 hours per day, 365 days per year. No alternate operating scenarios exist for this process equipment.

h. **Hard Chrome Plating Line:**

There is a single chrome electroplating line at the facility, located in Building 422 and comprised of five permitted tanks. The plating process involves moving racks of parts along a series of tanks and plating baths. The baths contain acidic, caustic, hot rinse water, and chromium solutions, and are covered by fume hoods and vented to atmosphere via a dedicated chrome line wet scrubber, as listed in Table 2. Materials used in the chrome plating line consist of several chemicals listed in the renewal application Appendix A, Tables A-6 & A-7 and the Equipment List attached to the application.

In electroplating, the metal to be deposited is used as the anode to supply metal ions that deposit on the parts hanging from the cathode bar. The parts are dipped into a sequence of tanks including acid baths, alkaline baths, and hot and cold water rinses, for cleaning and pretreatment of the surface, with the plating or material in a tank containing the chromic acid solution. The parts are usually cleaned after plating, and masked prior to moving through the plating line. The dedicated chrome line scrubber, rated nominally at 25,000 cfm, meets NESHAP regulatory specifications for pollution control equipment associated with this hard chrome plating process.

Normal operating hours for all plating applications range from 1,872 hours per year to 8,760 hours per year. For purposes of potential emissions estimates, maximum operating hours are assumed to be 24 hours per day, 365 days per year. No alternate operating scenarios exist for this process equipment.

i. **Metallic Plating Operations other than Chrome:**

At the facility, black oxide, copper, nickel and silver are plated onto the surfaces of certain parts either chemically or through electroplating. These processes are performed in separate plating lines that consist of a total of 28 permitted process tanks and five “secondary process tanks”, as listed in the Equipment List. All plating operations are located in Building 422. Among these lines, the electroless nickel (Ni) plating line is subject to specific NESHAP emission control requirements. Although not required, the other plating lines have comparable emission controls.

In electroplating, the metal to be deposited is used as the anode to supply metal ions that deposit on the parts hanging from the cathode bar. In chemical plating, the parts are dipped, into tanks containing the metallic solutions to be plated and the metal is deposited by chemical reaction. The parts are usually cleaned and masked prior to moving through the plating line. The plating process involves placing the parts in a series of tanks that include acid baths, alkaline baths, hot and cold water rinses, and plating baths. Materials used in the plating line consist of many different chemicals listed in the renewal application Appendix A, Tables A-6 and A-7. The specific materials used at any one time depend upon the desired product. Scrubbers on the roof of Building 422 are the pollution control equipment associated with the metallic plating lines, as identified in the Equipment List and described in Table 2.

Table 2: Scrubbers Serving Metal Plating Lines

Equipment	Process Description
Scrubber - Chrome 92415005	Exhaust fume from hard chrome electro-plating tanks #62 (PM 94903191), #64 (PM 94903193), #68 (PM 94903197) and potentially other tanks in Building_422.
Scrubber - Cyanide 92415006	Exhaust fume from plating operations from High Speed Silver Plating Tanks #35A (PM #94903164) and #36 (PM #94903166); Silver Strike Tank #37 (PM #94903167); Copper Strike Tanks #46 (PM # 94903176) and #55 (PM #94903184); Cyanide Copper Hi-Efficiency Tanks #48 (PM #94903178) #49 (PM #94903179) and #57 (PM #94903186) in Building 422.
Scrubber - Nital Etch 92415013	Exhaust fume from a Muriatic Acid Pickle tank, a Triple Cascade Rinse tank, a Hot DI Water Rinse tank, an Electro-Alkaline Cleaner tank, and an Oakite Rustripper tank.
Scrubber - Roof West 92415019	Exhaust fume from a Chromic Acid Copper Strip tank, a Nickel Chloride Strike tank, a Triple Cascade Rinse tank, an Alkaline Strip tank, a Nitric Acid Strip, and a Dewax tank.
Scrubber - Roof East 92415020	Exhaust fume from a Muriatic pickle tank, Alkaline Copper strip, Nitric Acid strip, Triple cascade rinse, DE WAX and Nickel Chloride tank. Potential pollutants are: HCl droplet, HNO3

	droplet, Ammonium Hydroxide and Nickel
Scrubber - Nitride 92415026	Exhaust fumes from two (2) Nitriding furnaces in Building 422

Normal operating hours for plating applications range from 1,872 hours per year to 8,760 hours per year. For purposes of potential emissions estimates, maximum operating hours are assumed to be 24 hours per day, 365 days per year. No alternate operating scenarios exist for this process equipment.

j. **Component Rig Testing:**

One type of testing operation in use at the facility is termed "rig testing", in which a portion or component of an engine will be tested in a heated air stream that simulates the aircraft operating environment. This type of testing is often less expensive and faster, and often can be accomplished before a complete engine is available to test. Examples of rig testing include, but are not limited to, corrosion evaluations, and functional component tests for fan, compressor, combustor, turbine, bearing, seal or gearbox parts.

Rig testing is performed in eight test rig units that are equipped to simulate the engine environment in terms of pressure, temperature and air flow. As listed in the attached Equipment List, these units have heat input ratings ranging from 0.44 to 3.82 MMBtu/hr, and are located in Building 116. For certain rig tests, different fluids may be run through the engine parts to simulate actual operating environment.

There is no pollution control equipment associated with this process, which can be viewed as a variation on the test cell operation for complete engines. Normal operating hours for rig testing range from 0 hours to 5,000 hours per year. For purposes of potential emissions estimates, maximum operating hours are assumed to be 24 hours a day, 365 days a year. No alternate operating scenarios exist for this process equipment.

k. **Stereolithography Model-Making - Liquid Vapor Blast and Cleaning:**

In the Materials Lab, located in Building 302, prototype models of relatively small specialized parts and components are fabricated on Stereolithography machines. The surfaces of the models may be treated by a small liquid/vapor enclosed blast unit that uses garnet media as the abrasive. Particulate emissions from the blast cleaner are negligible as the unit is enclosed, and is not vented to atmosphere. The equipment is considered insignificant sources of emission and therefore not included on the equipment list. In addition, the garnet is suspended in a liquid slurry that contacts the part. This abrasive blast step creates a matte finish on the Stereolithography parts, and is applied infrequently (1-2 times a month).

Preparation of the Stereolithography models also includes dip cleaning and rinsing of the prototype parts in a specialized solvent (tripropyleneglycol methyl ether, or TPM). Models are cleaned in the TPM tank after fabrication, followed by a tap water rinse. Spent TPM and rinse water is handled and disposed as a possibly hazardous waste by a contractor. Emissions from this bench-top process are small, and limited to fugitive evaporative losses of the TPM cleaning solvent (97.5% HAP content), which are included in the renewal application Appendix A, Table A-10. As a bench-top, non-production operation with small emissions, the Stereolithography equipment and activities warrant designation as Insignificant.

l. **Solvent Parts Washers and Flush Booths:**

Cleaning of various components and engine hardware is accomplished using various types of parts washers, and enclosed "flush cleaning" booths. There are fifteen such units at the Engines facility: one each in Buildings 110, 112, 422, 206, and 129, two each in Building 202, and eight booths in Building 301. These units generally contain Safety-Kleen products, acetone, or Stoddard solvents.

The flush-cleaning booths are sealed compartments when in use, and the solvent may be flushed or sprayed onto the part for cleaning. For spray cleaning, the solvents are applied by high-volume, low-pressure (HVLP) nozzle(s), which are designed and operated to meet the requirements in MCAQD Rule 331. There are integral remote tanks that contain and store the circulating solvent for each booth. Several parts washers are conventional sink-type units, with integral remote tanks and a hand-held flush nozzle. These units are open during use, and closed with a sealed lid when not in use.

Fuel and oil contaminants as well as carbon will accumulate in the solvent during repeated cleaning processes. Contaminated solvent is collected and removed from the site by a contractor. Solvent usage is distributed approximately uniformly throughout the year. There is no pollution control equipment associated with this type of cleaning unit.

Normal operating hours range from 35 hours per year to 2,080 hours per year. For purposes of potential emissions estimates, maximum solvent usage is scaled from actual levels to the equivalent of operating 24 hours per day, 365 days per year. No alternate operating scenarios exist for this process equipment.

m. **Solvent Dip Cleaning Equipment:**
The most widespread cleaning technique at the facility is the use of dip cleaning tanks. There are approximately eighty identified and permitted solvent dip cleaning units of various sizes at the facility. At the time of this application, nearly all of these units are located in Buildings 103 (64 cleaners) and Building 403 (6 cleaners), a single cleaner in Buildings 116, 302, and 422, three in Building 402 and four in Building 301. These dip cleaners utilize one of several brands of Stoddard solvent. These dip cleaners have lids which are closed when parts are not being introduced or removed. Solvent use is equally distributed throughout the year. Other than the closed lid, and other measures to reduce evaporation as required under MCAQD Rule 331, there is no add-on pollution control equipment associated with these cleaners. For purposes of potential emissions estimates, maximum solvent usage is scaled from actual levels to the equivalent of operating 24 hours per day, 365 days per year. No alternate operating scenarios exist for this process equipment.

n. **Jet Engine Test Cells:**
One of the largest contributors to emissions for the Engines facility is operation of fifty three Test Cells used to test the performance of completed engines. In general, this testing involves stationary operation of various models of jet turbine engines and auxiliary power unit (APU) engines through specified test sequences designed to verify the engine performance specifications and durability. In addition, the engines must satisfy the requirements of various regulatory agencies such as the FAA, CAA and military service units, and customer performance criteria. The Test Cells are specialized structures with engine mounting fixtures, air handling to provide ambient air intake and exhaust, instrumentation and controls, and sound dampening construction.

For a test, an engine is installed in the test cell fixture, and operated in an environment that simulates a specified surrounding air flow and temperature regime. Aviation fuels such as Jet A, JP-4, JP-5, JP-8, and DF-2 as well as diesel fuel (No. 2 distillate) and natural gas are used to fuel the engines. Normally, the fuel is supplied directly from an underground storage tanks at the facility. On infrequent occasions a test cell may test an engine operating on a different fuel that is delivered to that test cell in drums. In addition, an air heater may be used to pre-heat the ambient air flowing through a test cell. This air flow and the products of combustion are exhausted through test cell stacks to the atmosphere. No pollution control equipment is associated with the process.

Eight existing test cells have been altered or modified in a manner that has triggered new source review emission limitations. For these eight test cells (some with dual test stands), the number and duration of engine tests during any 12-month period is limited to 1,000 hours per year in the existing permit to keep annual emissions of these modified test cells below Rule 241 BACT thresholds. Each of the other test cells utilized for engine testing is normally operated from two hours per year to 1,560 hours per year. For purposes of potential emissions estimates, maximum annual operating hours for cells without modifications are assumed to be no more than 6,135 hours per year, to account for a minimum required set up time between tests. There are no add-on emission controls on the test cells, as engine testing equipment is generally exempt from emission control standards.

o. **Biologically-Enhanced Soil Vapor Extraction (BSVE):**
The BSVE system at the Honeywell facility has been in operation since mid-2009. Over fifty injection/extraction wells are connected to the BSVE system and can supply the soil vapor that is treated. The well-field covers an area that includes parts of the Honeywell facility property and the adjacent North Airfield. The process description provided in this section includes all of the currently

installed BSVE equipment. With the exception of periodic maintenance shut-downs of the system, the BSVE system is assumed to operate 24 hours per day, 7 days per week.

Equipment Description - The BSVE system currently consists of a 3,300-standard cubic feet per minute (scfm) vapor treatment system connected to more than 50 injection/extraction wells as described above using a blower and piping system. The BSVE system consists of the following equipment:

- Air injection blower (2);
- Air/liquid separator (1);
- Vapor extraction air filter (1);
- Vapor extraction blowers (2);
- Thermal oxidizer (1);
- Scrubber (1);
- Caustic feed pump (1);
- Heat exchanger (1);
- Demister (1);
- Cooling tower (1);
- Booster blower (1);
- Granulated Activated Carbon (VGAC) vessels (3); and
- Potassium Permanganate Adsorber (PPA) vessels (2)

BSVE Process Description - A generalized flow diagram for the BSVE treatment and emission control system is provided in the renewal application Figure 2-23. Collected soil vapor is filtered prior to entering the soil vapor treatment system to capture entrained particulate matter (PM). If necessary, the vapor is then blended with ambient air. The soil vapor then enters the applicable emissions control devices, which is dependent on the operating scenario under which the BSVE system is currently operating, as described below. The treated air exiting the BSVE system is vented to the atmosphere through a single 2 foot-diameter stack. However, when the total inlet process vapor flow is less than or equal to 3,300 scfm, the stack is modified using a conical restriction or similar device to achieve an 18-inch diameter. The stack height is approximately 44 feet above ground. The exhaust flow rate of gases from the stack is approximately 3,600 actual cubic feet per minute (acfm) when operating under AOS-1, and could be up to 5,900 acfm when operating under AOS-4 or AOS-5.

Honeywell currently is permitted for five alternate operating scenarios for the BSVE system. However, two of the scenarios are no longer expected to be used and are not included in this renewal. These scenarios are AOS-2 and AOS-3. Only scenarios which have the potential to be used in the future are included in this process description and permit renewal. The BSVE system is currently operating under AOS-4, based on the treatment progress criteria identified in the facility permit.

The operating scenarios are as follows:

BSVE Alternate Operating Scenario 1 - AOS-1 is the operating scenario that was implemented initially for the BSVE system and has a maximum treatment capacity of 3,300 scfm of extracted soil vapor. In AOS-1, the extracted soil vapor is treated in a thermal oxidizer unit (SCC# 10300603) to destroy methane, jet fuel components, and chlorinated volatile organic compounds (CVOCs). During oxidizer start-up, and as needed to maintain the minimum operating temperature, natural gas is added as a supplemental fuel to the oxidizer. Oxidizer temperature is controlled in a range to achieve greater than 99 percent destruction efficiency for VOCs. During combustion, chlorinated and fluorinated VOCs in the soil vapor are chemically converted to form hydrochloric acid (HCl) and hydrofluoric acid (HF), respectively. These acid gases, to the extent they may be generated, are then removed in a caustic scrubber system downstream from the oxidizer.

Final treatment steps in AOS-1 use a minimum of two vapor-phase granulated activated carbon (VGAC) units and two potassium permanganate adsorbent (PPA) units to remove the low concentration levels of petroleum hydrocarbon and chlorinated VOCs that may remain after combustion. In particular, the PPA units are included for capture of vinyl chloride, if present, since vinyl chloride will not be adsorbed on the VGAC. Spent VGAC and PPA adsorbents are not regenerated on site but are replaced as necessary. Prior to entering the VGAC units, the cooled gases exiting the scrubber are reheated in a booster blower to lower the relative humidity of the air stream to allow more efficient activated carbon utilization. The treated vapors are then discharged to ambient air via a 24-inch diameter stack fitted with a reducer to decrease the exit diameter to 18 inches.

BSVE Alternate Operating Scenario 4 - AOS-4 has a maximum capacity of 5,300 scfm of incoming soil vapor based on current permit conditions. In AOS-4, the thermal oxidizer, scrubber and associated equipment used in AOS-1 are no longer in use. The extracted soil vapor is treated in three VGAC units followed by two PPA units. Prior to entering the VGAC units, the gases are cooled in the heat exchanger and then reheated in a booster blower to lower the relative humidity of the air stream to allow more efficient activated carbon utilization. Downstream of the VGAC and PPA units, treated air/vapor is discharged to ambient air via a 24-inch diameter stack. (Note: This stack was fitted with a reducer to decrease the exit diameter to 18 inches when the BSVE system operated under AOS-1 conditions, i.e., 3,300 scfm or less).

BSVE Alternate Operating Scenario 5 - AOS-5 has a maximum capacity of 5,300 scfm of incoming soil vapor based on current permit conditions. In AOS-5, the PPA units used in AOS-4 are no longer in use due the absence of vinyl chloride in the soil vapor. The extracted soil vapor is treated in three VGAC units. Prior to entering the VGAC units, the cooled gases exiting the scrubber are reheated in a booster blower to lower the relative humidity of the air stream to allow more efficient activated carbon utilization. The treated vapors are then discharged to ambient air via a 24-inch diameter stack fitted with a reducer to decrease the exit diameter to 18 inches when the BSVE system is operating under AOS-1 conditions (i.e., 3,300 scfm or less).

As a consequence of the continued reduction in contaminant concentrations observed during monthly inlet sampling activities, the switch in operation from AOS-1 to AOS-4 occurred on August 31, 2015, in accordance with current operating permit conditions. Honeywell anticipates that AOS-4 will be utilized for the remaining stage of the remediation process and does not anticipate the need to return to AOS-1. However, the operating scenario will remain in the permit.

BSVE System Equipment Description - The following describes each piece of equipment associated with the BSVE system. Different combinations of the equipment comprise the BSVE system configuration in the different Operating Scenarios described above and in the attached equipment lists.

Air/Liquid Separator – The air/liquid separator is a vessel that allows entrained moisture droplets to separate by centrifugal motion from the vapor stream. The air/liquid separator is not a control device, and the vapor stream to be treated exits the separator and passes through the particulate filter.

Particulate Filter – The vapor extraction particulate filter is a high-efficiency fabric filtration device that removes particulate matter (PM) in the inlet soil gas stream.

Vapor Extraction Blowers – The vapor extraction blowers extract the soil gases including volatile organic compounds (VOCs) and methane from the subsurface, via the extraction wells. The blowers convey these vapors through the system train for treatment.

Thermal Oxidizer (AOS-1 only) – The thermal oxidizer treats the soil gases in a high temperature chamber (1,400 to 1,800 ^{o}F), to combust organic constituents in the gas stream. The primary pollutants from the thermal oxidizer are acid gases, NO_x, CO, and undestroyed VOCs. Additionally, thermal oxidizer effluent can contain PM, sulfur dioxide (SO_2), low molecular weight non-VOC hydrocarbons (methane or ethane), and high-molecular-weight compounds (for example, polychlorinated dibenzo-p-dioxins and dibenzofurans [PCDD/PCDF]). The BSVE thermal oxidizer also uses supplemental fuel (natural gas) and a combustion air blower during initial startup and to maintain the operating temperature of the oxidizer. The treated stream exiting the oxidizer directly enters the wet scrubbers.

Based on vendor information, the thermal oxidizer has a minimum guaranteed VOC destruction efficiency of 99 percent. Stack testing of the BSVE system is used to determine the actual VOC emission rate and destruction efficiency, and to verify compliance with permit limits.

Scrubber (AOS-1 only) – Emission control of acid gases is provided in the BSVE system by a spray tower scrubber. Circulating water that may contain injected alkaline reagent is sprayed by a bank of nozzles down the tower as the exhaust gases pass upward. Acid gases are absorbed/neutralized by the scrubbing liquid. The scrubber exit gas stream is routed through the VGAC vessels via the heat exchanger, demister, and booster blower.

Based on vendor information, the spray tower scrubber has a minimum guaranteed acid gas removal efficiency of 99 percent. Stack testing of the system is used to determine the actual acid gas emission rate and verify compliance with permit limits.

Caustic Feed Pump – The caustic feed pump supplies the scrubber with the caustic solution necessary to maintain the pH in the circulating scrubber liquor for proper operation. The caustic feed pump is not a control device, and does not directly interact with the vapor stream.

Heat Exchanger – The heat exchanger removes additional heat from the treated gas stream and lowers the water vapor-bearing capacity of the vapor stream. The heat exchanger is not a control device, and the gas stream from the heat exchanger exit is routed through the demister.

Demister – The demister removes condensed water droplets in the treated vapor stream as a result of condensation in the heat exchanger. The demister has the benefit of removing aerosol droplets that are a component of PM emissions. From the demister, the treated stream enters the booster blower(s).

Booster Blower – The booster blower conveys the treated stream through the VGAC and PPA vessels. The booster blower is not a control device and does not add or remove air from the vapor stream. The booster blower discharges to the VGAC units.

Vapor Phase Granular Activated Carbon Units – The VGAC units are designed to remove trace amounts of VOCs (excluding vinyl chloride) that are not combusted in the thermal oxidizer by adsorption onto the porous carbon surface. The treated stream exiting the VGAC vessels is routed to the PPA vessels (unless modified as described for AOS-5).

Information from carbon vendors indicates that VOC removal rates range from 80 percent to more than 99 percent efficiency depending on the compound (except for vinyl chloride which is not adsorbed) in a single carbon adsorption unit. Stack testing of the system is used to determine the actual removal efficiency and VOC emission rate, and to verify compliance with permit limits.

Potassium Permanganate (PPA) Vessels – The PPA vessels are designed to remove trace amounts of vinyl chloride that may remain in the treated gases downstream of the thermal oxidizer and/or VGAC units. Information from the vendors for the PPA technology indicates 99 percent removal efficiency for vinyl chloride in a single PPA unit. The PPA vessels discharge to the stack.

Air Injection Blowers – The air injection blowers are not part of the vapor treatment train, but represent the “bioenhanced” function of the overall BSVE process. These blowers supply oxygen to the subsurface zone, via injection wells, to enhance aerobic biodegradation of hydrocarbon molecules. The injection blowers are rated for a cumulative flow of 3,300 scfm). In accordance with MCAQD Rule 200 §308.1c the air injection blowers are an insignificant source.

Cooling Tower – The BSVE system cooling tower provides cooling water for the heat exchanger and is otherwise used to control the temperature of the process vapor stream. The cooling water does not come into contact with the vapor stream in the heat exchanger, and the cooling tower is not a control device. The BSVE cooling tower is an insignificant source.

7. INSIGNIFICANT SOURCES AND ACTIVITIES:

The following is a list of sources and activities proposed to be insignificant at the Honeywell Engines facility. A number of these are not specifically listed in the "Insignificant Activities" provided in Rule 100 §200.63 of the Maricopa County Air Pollution Control Regulations. However, these facility-specific sources and activities meet the definition of Insignificant Activity in Rule 100 §200.63 of the regulations.

Honeywell considers these Facility-Specific Sources as Insignificant:

- Paint Booths – The site no longer has any paint booths.
- Flame Spray – The site has a non-manufacturing area where thermal sensitive paints are applied to test components and these coatings change color during testing depending on the heat distribution of the part. This activity uses less than one gallon per day and is proposed to be deemed insignificant per County Rule 100 §200.63 – Insignificant Activities.
- Laser Drill Activities – Lasers are used to drill tiny holes into parts for air flow-through. After discussion with Maricopa County in November and December 2008, the activity was deemed insignificant per County Rule 100 §200.63, Miscellaneous category 5.
- Blade Tip Grinders – The site uses grinding machines called Blade Tip Grinders for the trimming of the circumference edge and corner of Rotor and Fan Blades. This machine removes not more than 80 thousandths of an inch of material to ensure they meet FAA tolerances. As an extra measure of housekeeping, the grinders vent to dust collectors. Even without the dust collectors, and with a hypothetical full-time operating schedule, these grinders have potential to emit much less than several hundred pounds per year of PM. The combined reduction due to inherent part-time schedule and the dust collectors are proposed to qualify these units as insignificant.
- Stereolithography liquid blast surface treatment – Small prototyping of component models that may have a matte finish surface treatment applied using a slurry blast system. The media contains garnet abrasive suspended in liquid slurry that is impinged on the part. These small bench-top units, and similar test part polishing steps performed in enclosed blasting cabinets, are proposed to be deemed insignificant.
- Fuel Nozzle Test Stands - A variety of engine fuel system components (e.g. manifold, flow divider, nozzle/atomizer, fuel control, fuel pump, etc.) are functionally tested in enclosed fuel nozzle test stands. These stands use a commonly accepted industry calibration fluid (MIL C 7202) as a surrogate for combustible fuel. The fluid is heated to operating temperature, and re-circulated during the test period. The calibration fluid is of low volatility and consumed at a very low rate due to fugitive losses from the test stand enclosure. Several of these test stands for inclusion in the permit are (single test stands located in Buildings 116 and 208, and 5 test stands in Building 211) are vented to atmosphere. However, there are similar nozzle test stands that are not vented to atmosphere and are proposed to be considered insignificant sources.
- Oils/solvents fill station – A covered material distribution structure is located at the facility at which small quantities of lubrication oils, solvents and other liquid materials are dispensed to truck mounted or hand-held containers. The facility houses small storage tanks (<250 gallons) of bulk oils, lubricants, additives, and some solvents. These materials are used throughout the production and testing operations. Emissions from the material transfers are not separately quantified at this location. However, emissions from material usage are accounted for by site-wide material consumption records. The fill station emissions alone, depending on the material, are either insignificant or accounted for elsewhere for the facility.
- Emergency Wet Scrubber at WWTP - An existing wet scrubber at the facility waste water treatment plant serving a batch treatment process. The scrubber (No. 924015025) may operate in an emergency only if abnormally high chlorine is detected in the building interior. It exhausts interior air through a wetted media to remove soluble gases. The operation of this unit is infrequent and unpredictable, and overall emissions are negligible.
- Cooling Towers - The cooling towers at the Engines facility primarily serve building HVAC systems, so are considered exempt emission sources. Small cooling towers that in part serve process cooling or condensers have been analyzed, and have emissions that are within insignificant levels as defined in County Rule 100 §200.63.

- 3D Prototype Printer Systems – New 3D printers now operate at the Engines facility, to create parts used for prototyping and testing. These may generate either plastic or metal alloy parts. Emissions from these devices are negligible, and are not vented to the atmosphere.

Honeywell Considers these BSVE Specific Sources as Insignificant:

- BSVE Cooling Tower – A relatively small cooling tower is used in the BSVE system to provide cooled heat transfer water. According to manufacturer data for the cooling tower (Marley Cooling Technologies Model AV61031), it has a water circulation rate of 231 gallons per minute and a drift rate (emission of aerosol droplets as a percent of the circulation flow) of 0.005 percent. County Rule 100 §200.63 states that a cooling tower is insignificant if it meets the following two conditions: (1) the circulation rate is less than 10,000 gpm and (2) the cooling tower is not used to cool process water, water from barometric jets, or water from barometric condensers. Therefore, in accordance with County Rule 200 § 309.1c, it is proposed that this cooling tower be determined to be insignificant.
- Air Injection – BSVE air injection blowers supply oxygen into the subsurface to enhance the natural biodegradation of contaminants in the subsurface. The air injected into the subsurface is targeted within the estimated radius of influence of the extraction wells. Emissions from the air injection system have been determined to be negligible, and air injection is therefore an insignificant activity.
- BSVE Free Liquid Storage – The current BSVE design also includes provisions to recover free-product liquids, as necessary, from three wells located on the Facility and wells located on the Sky Harbor North Airfield. Long-term free-product recovery is expected to be less than 1 gallon per day, per well. Free product will be recovered using pneumatic submersible skimmer pumps installed in the wells. On the Honeywell Facility, the free liquid product will be stored in closed 55-gallon drums. On the North Airfield, free product will be piped back to a central collection container located away from the North Airfield. Although free product storage is included in this application due to storage of fuel products elsewhere at the facility, emissions from filling of the small drums were not calculated for this activity. Emissions will be negligible because the vapor pressure of jet fuel (the predominant recovered liquid) is <1.5 pounds per square inch absolute (psia). Therefore, it is proposed that this liquid storage and transfer activity be deemed insignificant.

General Sources Honeywell Considers Insignificant:

- Natural-gas fired equipment with an input rating less than 300,000 Btu/hr. Such equipment may include gas-fired space heaters, water heaters, and equipment used solely for heating buildings or for producing hot water for personal use. (total input capacity must be less than 2,000,000 Btu/hr)
- Non-vapor cleaning machines (degreaser) or dip-tank having a liquid surface area of 1 square foot or less, or having a maximum capacity of 1 gallon or less.
- Manually-operated equipment and related activities for buffing, carving, cutting, drilling, machining, routing, sanding, sawing, surface grinding or turning, and associated venting hoods.
- Chemical Laboratories – including lab equipment used exclusively for chemical and physical analysis.
- Pressurized, unvented storage and piping for natural gas, carbon dioxide, butane, propane, or liquefied petroleum gas.
- Storage and handling of unheated organic materials with:
    - An initial boiling point of 150 ^{o}C or greater;
    - A vapor pressure of no more than 5 mmHg (0.1 psia).
- Chemical or petroleum storage tanks or containers that hold 250 gallons or less and would have emissions of a regulated air pollutant.

- Emissions units, operations or activities that handles or stores no more than 12,000 gallons of a liquid with a vapor pressure less than 1.5 psia. There are a number of 10,000 gallon underground storage tanks at the facility for aviation fuels that are in this category.
- Equipment with a capacity of no more than 4.200 gallons used exclusively to store oil with a specific gravity of 0.8762 or higher (30^{o} API or lower).
- Cooling towers having a circulation rate of less than 10,000 gallons per minute, and which are not used to cool process water.
- Brazing, soldering, welding, or cutting torch equipment used in manufacturing and construction activities and with the potential to emit hazardous air pollutant (HAP) metals, provided the emissions of HAPs do not exceed 0.5 tons per year.
- Individual flanges, valves, pump seals, pressure relief valves, and other individual components not in VOC service that have the potential for leaks.
- Equipment using water, water and soap or detergent, or a suspension of abrasives in water for purposes of cleaning or finishing.
- Use of material applied from aerosol cans for facility/vehicle maintenance and part touch-up.
- Acetylene, butane, and propane torches.
- Equipment used for portable steam cleaning.
- Blast-cleaning equipment using a suspension of abrasive in water and any exhaust system or collector serving them exclusively.
- Production of hot/chilled water for on-site use.
- General vehicle maintenance and servicing activities.
- Storage cabinets for flammable products.
- Activities associated with the construction, repair, and maintenance of paved or open areas, including street sweepers, vacuum trucks, and vehicles related to the control of fugitive emissions of such roads or open areas.
- Employee car and plant operations and maintenance light truck traffic on paved and unpaved public and private roadways.

Honeywell considers the following sources and activities as Trival:
The following is a list of general activities which will occur at Honeywell, which fall under the definition of "Trivial Activities" based on Rule 100 §200.127 to the Maricopa County Air Pollution Control Regulations:

- Portable internal combustion (IC) engines used for grounds keeping, plant maintenance, and landscaping purposes.
- Electric generating unit ancillary equipment such as transformers, switchgear, and inter-connections.
- Ventilation units used for human comfort that do not exhaust air pollutants into the ambient air from any manufacturing/industrial or commercial process.
- Consumer use of office equipment and products, not including printers or businesses primarily involved in photographic reproduction.
- Bathroom/toilet vent emissions.
- Tobacco smoking rooms and areas.
- Consumer use of paper trimmers/binders.
- Janitorial services and consumer use of janitorial products.

- Plant maintenance and upkeep activities (e.g., grounds keeping, general repairs, cleaning, painting, welding, brazing, soldering, plumbing, re-tarring roofs, installing insulation, and paving and sealing parking lots) provided these activities are not the source's primary business activity (Cleaning and painting activities qualify if they are not subject to VOC or HAP control requirements).
- Repair or maintenance shop activities not related to the source's primary business activity (excluding emissions from surface coating or degreasing activities).
- Housekeeping activities and associated products used for cleaning purposes, including collecting spilled and accumulated materials at the source, including operation of fixed vacuum cleaning systems specifically for such purposes.
- Lubricating and hydraulic system reservoirs and vents.
- Portable electric generators that can be moved by hand from one location to another.
- Air compressors and pneumatically operated equipment including hand tools.
- Fire suppression systems.
- Street and parking lot striping.
- Batteries and battery charging stations.
- Garbage and waste wood handling including processing of recyclable materials, bailing, and compacting.

8. PERMIT RENEWAL:

Honeywell's renewal application includes recent and near-future facility changes that affect the current Equipment List. The Equipment List and processes described in this application represent an overall reduction in the number of sources at the facility. In addition, normal operations at the Engines facility involve relocation or different uses of equipment in certain categories. As examples, solvent cleaning dip tanks and small abrasive blast units may be relocated to meet specific project purposes, and cleaning solvent or blasting agent used in a specific piece of equipment may change. In this manner, the detailed layout of this equipment can vary over time. However, the changes do not change their emission characteristics. Such changes would be documented by the Engines facility by a logging process. The actual and estimated maximum emissions attributed to these sources are calculated using material balances, based on facility-wide material usage and waste recovery quantities, which is the method used in this application.

9. EMISSIONS:

Emissions of regulated pollutants from the equipment and activities at the Honeywell Engines facility have been quantified conservatively, based on the procedures and assumptions described in this section. For most sources, the procedures used for this application match the techniques applied to prepare the annual emissions inventory. In some cases, such as the release of acids from plating operations, a more detailed and somewhat less conservative mass-transfer model is used. As outlined in this section, some methodologies are better-suited to estimation of annual potential to emit for sources that do not operate continuously, or for material usage activities.

Detailed calculations for maximum anticipated emissions, which incorporate the voluntary operational limits, are provided in the spreadsheet tables contained in Appendix A of the renewal application. The detailed emission calculations pertaining to the BSVE system are provided in the renewal application Appendix E and incorporate operational limits and control efficiencies specified in the current operating permit.

Overview of Emissions Inventory:

This Title V renewal application provides pollutant emission information for existing sources at the Honeywell Engines facility. Emissions of NO_x, CO, VOCs, PM, PM_{10}, $PM_{2.5}$ and HAPs were calculated for each source. Although there is neither an established major source threshold nor regulatory requirements for $PM_{2.5}$ in current regulations, the calculated emissions for $PM_{2.5}$ are presented in the inventory for informational purposes. Knowledge of $PM_{2.5}$ emissions may also support the analysis of applicable future EPA regulations, if any, pursuant to the $PM_{2.5}$ standard.

The emission inventory was compiled using information from a review of Honeywell records, information contained in the 2013 and 2014 calendar year site-wide emission inventory, an on-site survey of the equipment, and interviews with facility personnel. The specific information utilized comprised, in part, of operating stationary equipment rosters including corresponding control devices, facility and equipment operating schedules, fuel transfer and consumption data, 2015 analytical data for the BSVE system and when available, historic (2013 and 2014) material usage for VOC-containing products.

The emissions inventory was submitted in the form of an Excel workbook and other spreadsheets to analyze facility data and calculate air emissions. The references for the emissions characteristics and emissions factors for these spreadsheets are:

- AP-42, Fifth Edition, Volume I – Stationary Point and Area Sources, U.S. Environmental Protection Agency (U.S. EPA), as presented on the EPA/TTN website, accessed March– April 2015.
- EPA Document; Locating and Estimating Air Emissions from Sources of Polycyclic Organic Matter, Table 4.11.2-1 PAH Emission Concentrations in Aircraft Turbine Engine Exhaust for HAP calculations, July 1998.
- Diffusion Model Used from Estimating Releases and Waste Treatment Efficiencies for the Toxic Chemical Release Inventory Form, EPA-506/4-88-002, December 1987.

Normal Honeywell Engines facility operations occur over approximately 6,864 hr/yr, which equates to 24 hours per day, 5 days per week for 52 weeks per year, plus an additional 12 hours per weekend, and 52 weekends per year. For sources having emissions based on time-in-operation, the emission calculations for potential to emit (PTE) scale up the actual operating schedule calculations to a “maximum potential” basis of 8,760 hours per year. The operating schedule specifications for each source category are incorporated in the Appendix A calculations.

For sources not included under the voluntary operational limitations, PTE was conservatively calculated based on scaling actual emissions or material usage from the 6,864 hour/year operating schedule up to 8,760 hours of operation. For sources subject to the operational limits (e.g., annual operating schedule or fuel consumption) the application of the relevant limit was the basis for calculating maximum annual emissions. The spreadsheets included in the renewal application Appendix A and the Appendix E tables for the BSVE system provide detailed emission estimation calculations for each source.

The units and activities that Honeywell considers to be significant sources of emissions at the Honeywell Engines facility include:

- External combustion sources with heat input rating above 300,000 Btu/hr:
  - larger boilers and water heaters;
  - air heaters for engine testing;
  - heated component test rigs; and,
  - natural gas fired test cells.
- Internal combustion, liquid-fuel jet engine test cells;
- Underground storage tanks for aviation fuels and methanol;
- Plating operations including hard chrome electroplating and other metal plating;
- Product uses at work stations, painting in booths);
- Abrasive blasting units (with ECS);
- Fuel nozzle test stands that are vented to atmosphere;

- Rotary heat treat furnaces;
- Carburizing furnaces; and
- BSVE treatment system and applicable control units.

Summary of Maximum Annual Emissions:
There are multiple individual sources belonging to each emission unit category. The emission calculations for individual source are listed in the renewal application Appendix A tables and the Appendix E tables for the BSVE system. Based on the facility operating schedule and operational limits that will be continued in the renewed Operating Permit, emissions of the criteria pollutant NO_x is above the Major Source threshold for Title V (Class 1) permitting. Table 3 provides a summary of facility-wide annual emissions for each criteria pollutant, and total HAPs. Based on the conservative calculations in this application, the single HAP and/or combined HAPs emissions do not exceed the current Operating Permit facility-wide emission limits of 9.0 tons or 22.5 tons, respectively, in Table 18.1, of the current Operating Permit.

Detailed emission calculations as well as procedures used may be found in the Honeywell renewal application.

Table 3: Summary of Honeywell Potential Emissions

Activity	Potential Annual Emissions (tons/yr)							
	CO	**NO_x**	**PM**	**PM_{10}**	**$PM_{2.5}$**	**SO_2**	**VOCs**	**HAPs**
External/Internal Combustion Sources								
Natural Gas Boilers	4.6	4.1	0.41	0.41	0.41	0.03	0.30	0.10
Air Heaters	15.6	15.5	1.41	1.41	1.41	0.11	1.02	0.35
Test Rigs	2.99	3.56	0.27	0.27	0.27	0.02	0.20	0.07
Test Cells (Natural Gas)	0.017	0.067	0.0014	0.0014	0.0014	7.15E-4	4.42E-4	2.64E-4
Test Cells (Distillate Fuel)	2.87	766	10.4	10.4	10.4	28.7	0.36	0.93
Fuel Storage/Transfer								
Horizontal/Cylindrical Tanks	-	-	-	-	-	-	2.7	0.75
Operational Sources								
Plating Other than Chrome	-	-	-	-	-	-	-	1.84E-4
Chromium Electroplating	-	-	0.074	0.074	0.074	-	-	0.074
Abrasive Blasting	-	-	26.8	26.8	26.8	-	-	-
Solvent – Dip Cleaning	-	-	-	-	-	-	1.32	-
Solvent Use – Other than Dip Cleaning	-	-	-	-	-	-	4.31	0.027
Carburizing and Rotary Furnaces	33.7	-	-	-	-	-	-	-
Fuel Nozzle Test Stands	-	-	-	-	-	-	6.70	-
BSVE (For AOS-4 or AOS-5)	-	-	-	-	-	-	9.36	0.02
Total	**59.7**	**789.1**	**39.4**	**39.4**	**39.4**	**28.9**	**26.2**	**2.3**

10. REGULATORY APPLICABILITY:
The Honeywell Engines, Systems, and Services facility is a Title V major stationary source of air emissions, and there is no change in regulatory applicability associated with this renewal.

Title 40 of the Code of Federal Regulations (40 CFR), Parts 50 through 98 implement the statutory provisions in the Clean Air Act, and subsequent amendments. The United States Environmental Protection Agency (EPA) delegates the authority to administer and enforce many of these regulations to individual states and agencies such as the MCAQD. In such cases, the delegated agency may write equivalent or more stringent requirements into their own rules, or can adopt the federal requirements by reference. However, the underlying federal requirements generally remain applicable, and may constitute "federally-enforceable" requirements.

The Honeywell Engines facility is primarily regulated by a variety of MCAQD rules that stipulate Reasonably Available Control Technology (RACT) for different categories of emissions units present at the site. These rules are contained in Maricopa County Air Pollution Control Regulations, primarily in Regulation III Control of Air Contaminants. In addition, some Engines facility operations are subject to federal requirements that are derived from regulations contained in subparts of Title 40 of the Code of Federal Regulations. The following sections identify the applicable federal and county regulations. More details may be found in the renewal application.

Federal Applicability:

40 CFR 60, Subpart A – General Provisions

40 CFR 60, Subpart Kb - Standards of Performance for Volatile Organic Liquid Storage Vessels for Which Construction, Reconstruction, or Modification Commenced after July 23, 1984

National Emission Standards for Hazardous Air Pollutants (NESHAPs) and Maximum Achievable Control Technology (MACT) Standards (40 CFR Parts 61 and 63)

40 CFR Part 61, Subpart M: National Emission Standards for Asbestos

40 CFR Part 63, Subpart N: National Emission Standards for Hazardous Air Pollutants from Hard Chromium Electroplating

40 CFR Part 63, Subpart ZZZZ: National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines (ICE.

40 CFR Part 63, Subpart GGGGG: National Emission Standards for Hazardous Air Pollutants: Site Remediation

40 CFR Part 63, Subpart PPPPP: National Emission Standards for Hazardous Air Pollutants for Engine Test Cells/Standards

40 CFR Part 63, Subpart XXXXXX: National Emission Standards for Hazardous Air Pollutants: Area Source Standards for Plating and Polishing Operations

Compliance Assurance Monitoring Program (40 CFR Part 64)

Accidental Release Prevention Program / Risk Management Plans (40 CFR Part 68)

Stratospheric Ozone Protection Regulations (40 CFR Part 82, Subpart F)

Mandatory Greenhouse Gas Reporting (40 CFR Part 98, Subparts A and B)

Greenhouse Gas Tailoring Rule (40 CFR Parts 51, 52, 70, et al.)

Maricopa County Applicability:

Rule 100 – General Provisions and Definitions

Rule 130 – Emergency Provisions

Rule 140 – Excess Emissions

Rule 200 – Permit Requirements

Rule 210 – Title V Permit Provisions

Rule 240 – Permits for New Major Sources and Major Modifications to Existing Major Sources

Rule 241 – Minor New Source Review (NSR)

Rule 270 – Performance Tests

Rule 280 – Fees

Rule 300 – Visible Emissions

Rule 312 – Abrasive Blasting

Rule 320 – Odors and Gaseous Air Contaminants

Rule 330 – Volatile Organic Compounds

Rule 323 – Fuel Burning Equipment

Rule 331 – Solvent Cleaning

Rule 348 – Aerospace Manufacturing and Rework Operations

Rule 360 – New Source Performance Standards (NSPS)

Rule 370 – Federal Hazardous Air Pollutant Program

Maricopa County Rules in State Implementation Plan (SIP)

11. MODELING ANALYSIS:

No modeling was necessary for this renewal.

12. CONCLUSION

Based on the information supplied by Honeywell, and on the analyses conducted by the MCAQD, the MCAQD has concluded that the requested permit renewal is consistent with Federal, State, and County regulations and rules, and will not cause or contribute to a violation of any federal ambient air quality standard, and will not cause additional adverse air quality impacts.

MCAQD proposes to issue the Permit Renewal, V97008 – 2.0.0.0 subject to the proposed permit conditions.