APIMS AEI Procedure

Instructional Guide for

Producing a Complete and

Accurate Air Force

Air Emissions Inventory

Air Force Civil Engineering Center

Compliance Technical Support Branch

250 Donald Goodrich Drive; Building #1650

San Antonio, TX 78226

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APIMS
AIR EMISSIONS INVENTORY PROCEDURE

Prepared For:

FRANK CASTANEDA, III, P.E., GS-14, DAF Air Quality Subject Matter Expert
Air Force Civil Engineer Center, Compliance Technical Support Branch (AFCEC/CZTQ)
250 Goodrich Drive; Building #1650
San Antonio, TX 78226

Prepared By:

AECOM

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1. INTRODUCTION

1.1 Understanding the Relative Risk in an Air Quality Program

Managing the Air Quality compliance program at an Air Force installation can pose a variety of challenges due to the diversity of missions supported and the limited resources at hand to support the program. Support of the Air Force mission requires the operation of a wide array of emissions sources, and as the Clean Air Act, and its various implementation rules continue to evolve, the impacts to the mission and the strain on program resources will continue to increase. An effectively executed Air Quality program must focus these limited resources on the emissions sources that pose the highest risk to the installation's ability to maintain compliance. Establishing a relative risk for each emissions source type is most easily accomplished by measuring two key contributors:

1) The risk rating for each source type increases as emission rates increase. Those sources with the highest emission rates are likely to drive the requirement for an installation to maintain an operating permit, and each operating permit inherently poses compliance risks to the mission at an installation.
2) The risk rating for each source type increases as the number of applicable requirements increases. Requirements of the Clean Air Act are not equally burdensome across all emissions source types. The applicability of New Source Performance Standards (NSPS) and National Emission Standards for Hazardous Air Pollutants (NESHAP) has significant impacts to the effort required to demonstrate compliance for each source type.

To assist Air Force Air Quality program personnel in focusing their compliance efforts on the most impactful source types, an analysis of emissions and permit data was completed. Emissions sources operating at Air Force installations can be logically grouped into 59 distinct source categories. For each of these source categories, five years of actual emissions data from air emissions inventories published in APIMS were averaged and compiled by pollutant. Additionally, based on permits decomposed in APIMS the percent of permit requirements applicable to each source category was calculated. These two data sets were combined to establish a relative risk for each source type, and the table below presents the data sorted in the order of decreasing risk.

Source Category	% of Permit Requirements	Percent of Overall Air Force Emissions							
		CO	NO_x	SO_x	PM_{10}	$PM_{2.5}$	Lead	VOC	Total HAPs
External Combustion	11.5%	47.4%	43.4%	77.3%	26.0%	28.0%	28.6%	17.4%	26.2%
Internal Combustion	18.2%	31.3%	44.8%	13.4%	20.9%	27.0%	11.6%	15.8%	13.3%
Surface Coating	7.4%	---	---	---	0.9%	1.1%	0.0%	6.1%	8.7%
Solvent Operations	6.2%	---	---	---	---	---	---	5.3%	10.1%
Fuel Dispensing	5.6%	---	---	---	---	---	---	11.5%	3.1%
Aboveground Storage Tanks	5.3%	---	---	---	---	---	---	9.5%	1.6%
Fuel Loading	4.8%	---	---	---	---	---	---	1.9%	1.3%
Hazardous Material Use	4.6%	---	---	---	0.1%	0.2%	12.5%	10.0%	13.2%
Underground Storage Tanks	4.2%	---	---	---	---	---	---	6.6%	1.2%
Aircraft Engine Testing	4.1%	15.7%	10.0%	7.7%	8.8%	9.3%	6.2%	8.6%	6.6%
Abrasive Cleaning	4.1%	---	---	---	0.2%	0.2%	0.0%	---	0.0%
Woodworking	4.0%	---	---	---	1.0%	0.8%	---	---	---
Welding	2.9%	---	---	---	0.3%	0.2%	0.1%	---	0.1%
Fire Training	2.6%	0.5%	0.4%	0.2%	0.7%	0.9%	0.2%	0.7%	0.2%
Pesticide/Herbicide Application	2.5%	---	---	---	---	---	---	0.3%	0.1%
Munitions	2.3%	1.9%	0.8%	0.7%	9.3%	9.2%	37.1%	0.8%	1.0%
Open Burn/Open Detonation	1.8%	0.2%	0.2%	0.1%	11.5%	8.8%	3.3%	0.1%	0.7%
All Other Sources	7.9%	3.0%	0.3%	0.6%	20.3%	14.3%	0.4%	5.6%	12.6%

Several key observations are apparent when looking at the information presented in the table.

- As would be expected, sources such as internal and external combustion, which have both NSPS and NESHAP requirements, are shown to pose the most risk in the Air Quality program.
- The 9 highest risk emissions source categories operate at essentially every Air Force installation.
- 4 of the 9 highest risk emissions source categories (fuel dispensing, fuel loading, above ground and underground storage tanks) revolve around the various fuel transfer activities at an installation, emphasizing the importance of an accurate understanding of the manners in which fuel moves from the point of delivery to use.
- 3 of the 9 highest risk emissions source categories (surface coating, solvent operations, and hazardous material use) are potentially impacted by data provided through the EESOH-MIS Interface, underscoring the need to have effective collaboration with the Hazmart and data stewarding personnel.

Air Program resource allocation, including operator personnel efforts to quantify operation, time spent ensuring data accuracy and completeness, and efforts to increase data quality, should be in accordance with the relative risk associated to the emissions source type.

1.2 Basic Principles of Data Quality

All facets of compliance with the Clean Air Act are dependent on the quality of data managed by the Air Program. With the understanding that most data management effort should focus on the high-risk emissions source types, some additional principles and objectives for data quality should be understood.

Precision: Often it is difficult to keep in mind that what we calculate are actually emissions estimates and not exact measurements. Similar to the analysis that would be done for determining significant figures, we should evaluate the actual accuracy of each calculation variable we utilize before blindly reporting 8 decimal places of accuracy. As the Air Force we rely primarily on emission factors published in a variety of authoritative sources. What we overlook in these publications is the confidence rating given to each factor. Most emission factor data is

compiled based on a limited number of source tests, with very specific applications. These few measurements are then averaged to provide the published factor that we utilize. Following this procedure results in emission factors that are seldom reliable below the pounds of pollutant range. The precision in measuring usage or throughput used in calculations is a similar situation, often times rounded to the nearest pound or gallon. Given the relative accuracy of these primary variables utilized in calculations, it is therefore ill-advised to report calculation results to the sixth decimal place and beyond, bearing in mind that at the sixth decimal place for a calculation of tons emitted we are quantifying grams of emissions.

Collection Data Close to the Source: The more distance between the point of operation and the point of data collection, the higher the likelihood of data collection errors. Simply put, if the operators utilize a paper log to document source operation, then compile the information from those logs into a spreadsheet once a month to provide to the Air Quality Manager, and finally the Air Quality Manager keys that information into APIMS, that leaves 3 possible points of failure where data inaccuracy can be introduced. As an Air Quality program matures, the efforts invested to improve data quality should include moving the data collection as close to the source as is possible. Ideally, operators responsible for high risk emissions source types should be trained to enter compliance data that they capture directly into APIMS.

Repeatable Data Sources: Changing the source or type of data collected for compliance demonstration, inherently carries with it the risk of introducing fluctuation into the program that erodes confidence in the data. As discussed in the AFCEC Source Guides, consistency is pivotal to a compliance program, in particular when it comes to record keeping. A best practice is to work with operators to establish a sustainable set of compliance records they can provide, and when possible find a way to utilize records they are already maintaining for purposes other than Air Quality compliance. As with all compliance activities, it is critical to establish a data source that meets all requirements specified in any operating permit or Federal rule that the installation is subject to.

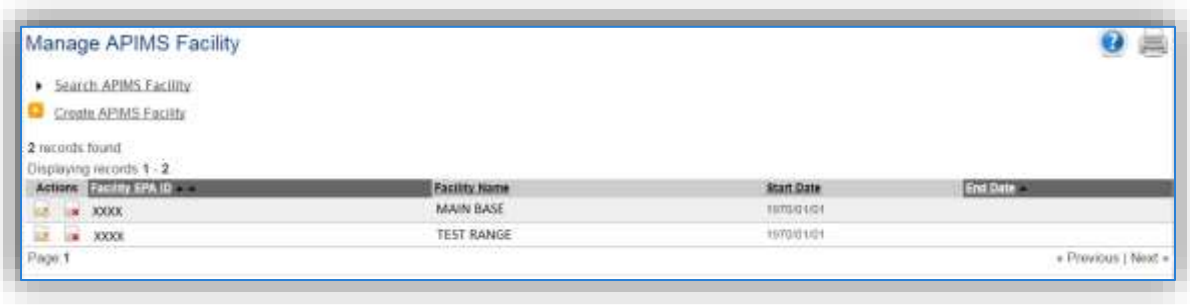
Relative comparison: At a minimum, data quality can be improved simply by comparing new data to data previously collected. In particular for high risk emissions source types, part of the emissions inventory effort each year should be to compare operating data (e.g., throughput/usage) to the operating data for the previous 2 emissions inventories, refer to Section 4 for more information. This comparison will allow for quick identification of potential data errors. If large fluctuations in operating levels have occurred, it is incumbent on the Air Quality Manager to establish an understanding of why. Fluctuations are inevitable based on mission and workload changes, but these same changes should then be reflected in the manner in which we calculate potential to emit.

2. BASIC DATA SETUP

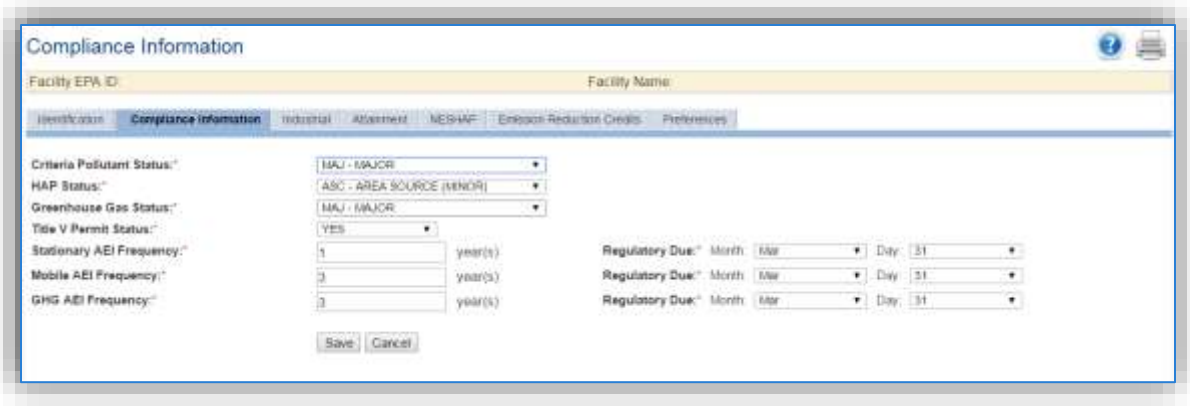
2.1 Facility

A facility is defined as a contiguous property regulated as a single stationary source. This is usually how your regulatory agency identifies your property. It is important to have the sources within APIMS structured to match your regulatory facility. This is especially critical for installations that have more than one facility. An example would be an installation that has a main base location and a geographically separated unit (GSU) or range.

In APIMS, most facility records are already configured, however it is important to review the data to ensure it reflects current information. To review the data, click on **Air Facility** under the **Setup** tab.



All the facilities for your installation should be displayed here, if they are not, click the Create APIMS Facility hyperlink. To review the data associated with the facility click the edit icon. Only the pertinent tabs will be addressed. The first tab, *Identification*, provides some basic details about the facility. The next tab, *Compliance Information* provides insight into the regulatory burden of the facility.



The Criteria Pollutant Status is determined according to the following guidelines:

1) Major Source – emits or has the potential to emit 100 tons per year or more of any criteria air pollutant or precursors to ozone (O_3) for stationary sources. (Carbon Monoxide (CO), Sulfur Oxides (SO_x), Nitrogen Oxides (NO_x), Lead, Particulate Matter (PM), Particulate Matter less than 10 microns (PM_{10}), Particulate Matter less than 2.5 microns ($PM_{2.5}$), and Volatile Organic Compounds (VOC)). Or emits or has the potential to emit 10 tons per year (tpy) of any individual hazardous air pollutant (HAP) or 25 tons per year of total HAPs.

For some of the criteria pollutants, lower thresholds exist for certain nonattainment areas. These lower thresholds include the following:

- 50 tpy of VOC and NO_x emission in "serious" O_3 nonattainment areas and in O_3 transport regions.
- 25 tpy of VOC and NO_x emissions in "severe" O_3 nonattainment areas.
- 10 tpy of VOC and NO_x emissions in "extreme" O_3 nonattainment areas.
- 50 tpy of CO emissions in "serious" CO nonattainment areas.
- 70 tpy of PM_{10} emissions in "serious" PM_{10} nonattainment areas.
- 70 tpy of $PM_{2.5}$ SO_x, NO_x, VOC, and Ammonia emissions in "serious" $PM_{2.5}$ nonattainment areas.

2) Synthetic Minor Source – this is a facility that has voluntarily limited its Potential to Emit (PTE) emissions by a federally enforceable order, rule, or permit conditions to ensure it does not exceed 100 tons per year for any criteria air pollutant for stationary sources.
3) Minor Source – this is a facility that does not have the Potential to Emit (PTE) greater than 100 tons per year of any criteria pollutant for stationary sources.

The HAP status is determined according to the following guidelines:

1) Major Source – a facility that emits or has the Potential to Emit more than 10 tons per year of any individual hazardous air pollutant (HAP) or 25 tons per year of total HAPs for all stationary sources.
2) Area Source (Minor) – a facility that does not have the potential to emit more than 10 tons per year of any individual HAP or 25 tons per year of total HAPs for stationary sources.

The Greenhouse Gas status used for reporting requirements is determined according to the following guidelines:

1) Major Source – a facility emits or has the potential to emit more than 25,000 metric tons per year of carbon dioxide equivalent (CO_2e) of Greenhouse Gases (GHGs) for stationary sources. (i.e., Carbon Dioxide, Nitrous Oxide, Methane, Hydrofluorocarbons (HFC), Perfluorocarbons (PFC), and Sulfur Hexafluoride)
2) Area Source (Minor) – a facility does not have the potential to emit more than 25,000 metric tons per year of CO_2e for stationary sources.

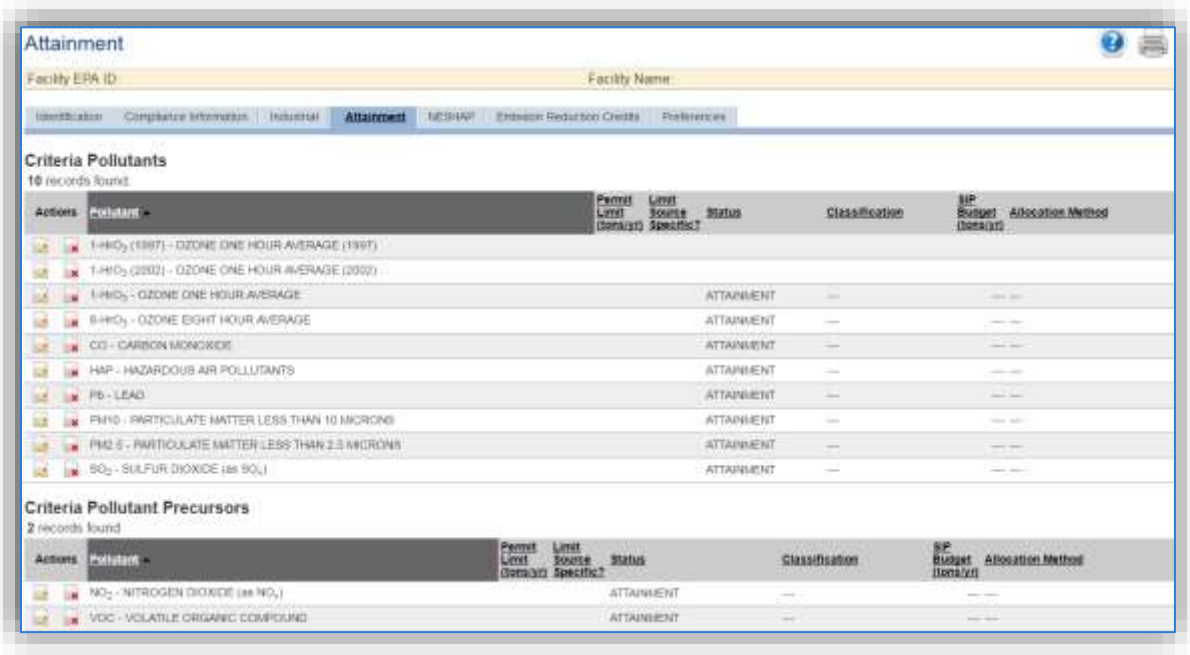
It is very important to make sure this data reflects the current facility status. As workloads change the emission and compliance profile can change. It is best to review this data on a yearly basis after the PTE and AEI are completed.

The Title V Permit Status is a very important data element and can change as permits are renewed, modified, or renegotiated with the regulatory agency. This particular data element is frequently used to roll-up to an overall Air Force Regulatory Status and reporting to congress.

The Stationary and GHG Inventories should be accomplished as required by federal, state, and local regulations. However, per AFMAN 32-7002 the frequency should not be greater than 3 years or 5 years for overseas installations.

The next important tab, *Attainment* specifies the National Ambient Air Quality Standard (NAAQS) designation status of the area in which the facility is located. This only applies to facilities that are within the EPA jurisdiction. There can be changes to an area's NAAQS designation, so it is important to review these fields and make sure the data is current. The preferred source for the current NAAQS designation is located on eDASH.

This data is maintained by AFCEC but is a good information source to know where your installation stands. If there are discrepancies between the NAAQS and the data in APIMS contact the Air Quality Subject Matter Expert.



The next tab, *NESHAP* specifies the National Emission Standards for Hazardous Air Pollutants that are applicable to the facility.

In addition to a regulatory permit there are also additional federal requirements that are regulated by one or more NESHAPs. Some of the most common NESHAPs that apply to Air Force facilities are as follows:

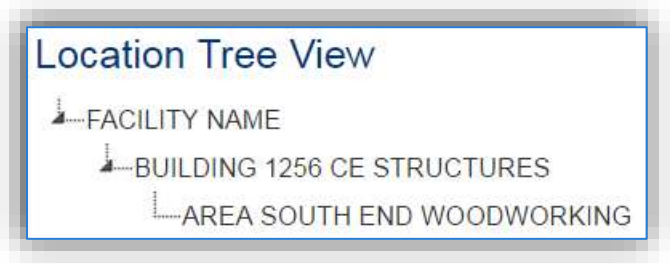
- Reciprocating Stationary Internal Combustion Engines (RICE) – all facilities that have RICE equipment are subject to this NESHAP (40 CFR 63 Subpart ZZZZ).
- Industrial, Commercial, and Institutional Boiler and Process Heaters (Major Sources) – all facilities that are designated as a major source for HAP emissions that have boilers or process heaters are subject to this NESHAP. (40 CFR 63 Subpart DDDDD)
- Boilers (Area Sources) – all facilities that are designated as a minor source for HAP emissions that have boilers are subject to this NESHAP (40 CFR 63 Subpart JJJJJJ)
- Gasoline Dispensing Facilities – all installations that are area sources operating a gasoline dispensing facility are subject to this NESHAP (40 CFR 63 Subpart CCCCCC). To properly document this NESHAP, select the Other radio button and enter GASOLINE DISPENSING FACILITIES in the Specification of Other field.

Additional NESHAPs are specific to process activities conducted at the facility.

2.2 Location

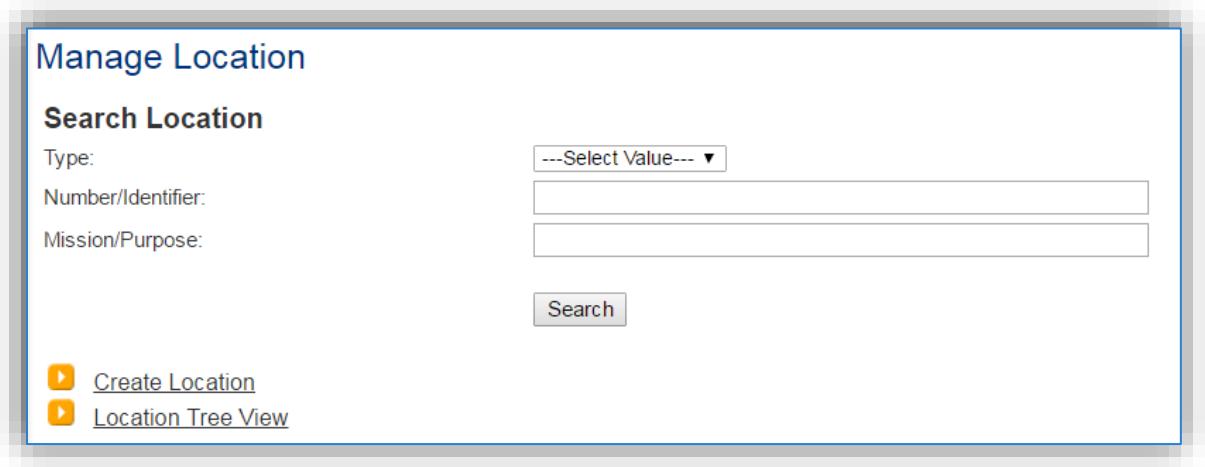
Location data is important for knowing where an emission source physically occurs in case it needs to be inspected or if the source owner needs to be contacted for pertinent information. It can then also relate to the Air Force Geographic Information System (GIS). The Location module of APIMS facilitates a location tree that will allow for varying granularity. It is recommended that the location tree is maintained at the building level of granularity, however if there are very large buildings with several sources it may be best to add another level to specify the area of the building. Additionally, if the installation has Geographically Separated Units (GSUs) these can be set up as separate root or parent locations in the same manner the main facility is configured. This allows the locations at each parent location to be easily discernable from each other.

To view the Location Tree, click on **Location** under the **Setup** tab, then click on the *Location Tree View* hyperlink on the Manage Location page.

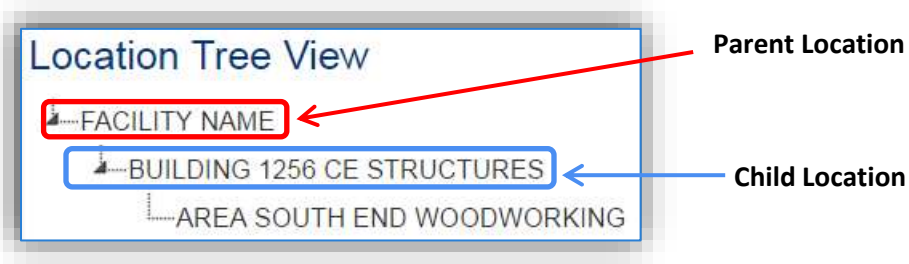


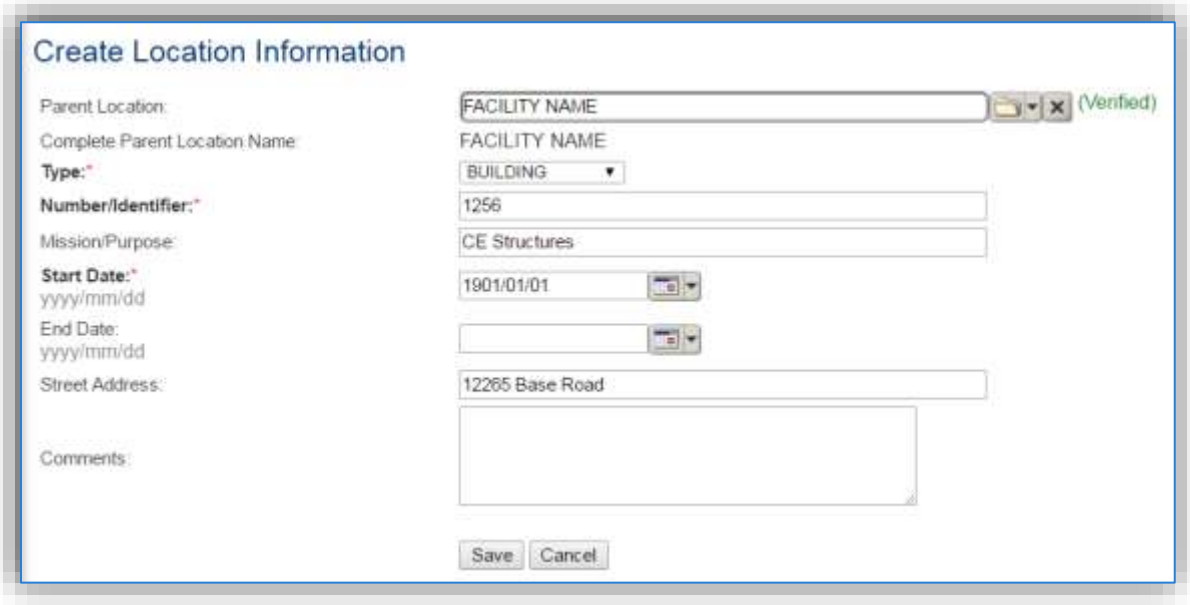
The icon can be used to expand or collapse the location tree. To view or edit a location, click on the location name.

To create a location, navigate to the Manage Location page and click the *Create Location* hyperlink.



This will navigate to the Create Location Information page. It is recommended that the highest level of location be the Facility Name. Use this facility location as the **Parent Location** for the subsequent buildings.





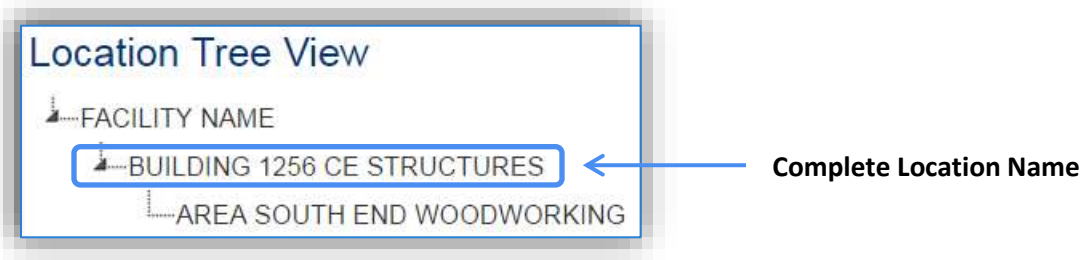
The **Type** field will help generate the complete location name. The Types available are as follows: AREA, BAY, BUILDING, FACILITY, FLOOR, HANGAR, ROOM, SAMPLE POINT, and TANK.

The **Number/Identifier** should be the building number or name the location is known by.

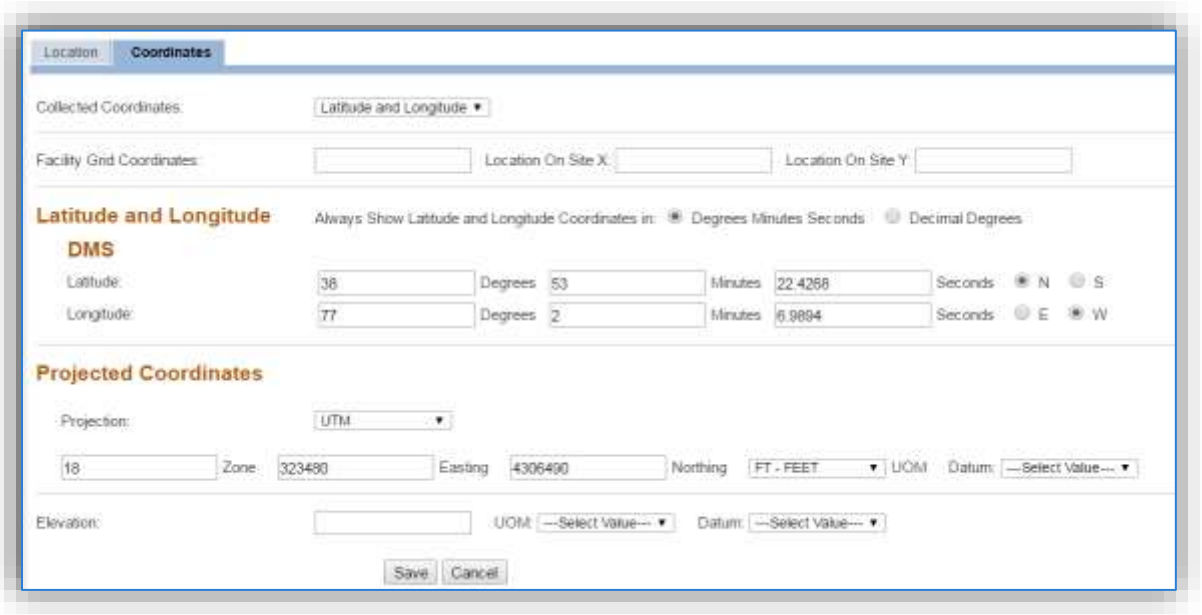
The **Mission/Purpose** should be the main activity or function performed in the building.

The **Start Date** should be the date the location became operational, if this is not known, enter 1901/01/01 as a default start date.

The complete location name will be the Type Number/Identifier Mission/Purpose, for example BUILDING 1256 CE STRUCTURES.



The next tab is the *Coordinates* tab. This tab contains data that can be used to interface with the Air Force GIS. If this data is known, it is good practice to populate this data. Usually only one of the sections is populated, Latitude and Longitude or Projected Coordinates. The Latitude and Longitude fields will adjust according to the coordinate preference selected, Degrees Minutes Seconds or Decimal Degrees.



2.3 Unique Process

The Unique Process area of APIMS is the most central data element to calculating emissions. In order to track usage data and calculate efficiently, some planning into how to set up the Unique Process record is required. Consider the following when setting up Unique Process records.

- How do I track usage for this source or group of sources?
- Is there control equipment?
- How do I need to report my emissions?
- Do I have a specific method required to calculate emissions?

These decisions are often different for each source category; therefore, the proper set up for each scenario is outlined in the specific source category chapter. Some common examples are as follows:

External Combustion

Base A: All boilers are less than 100 MMBtu/hr natural gas boilers with no controls or specific reporting requirements. Usage is tracked by the total natural gas consumption of the base.

This base should only have 1 Unique Process record for all boilers and the consumption should be the total natural gas usage for the base.

Base B: Most boilers are less than 100 MMBtu/hr natural gas boilers with no controls or specific reporting requirements. One building has two greater than 100 MMBtu/hr dual fuel boilers that have a meter at the building to track natural gas usage.

This base should have the following:

- 1 Unique Process record for the natural gas boilers
- 1 Unique Process record for the large dual fuel boilers for natural gas use
- 1 Unique Process record for the large dual fuel boiler for diesel use

The consumption for the smaller natural gas boilers would be the total base natural gas use minus the large boiler natural gas use.

Surface Coating

Base A: There are no paint booths or regulatory reporting based on surface coating activities. All paints are purchased through EESOH-MIS.

This base should have a separate process for each coating type, brush, aerosol etc. if known. This will allow for a specific transfer efficiency that best matches the activities. If this cannot be determined, then a single Unique Process for all surface coating activities should be configured.

Base B: There are 2 paint booths that have monthly reporting requirements and miscellaneous surface coating activities throughout the base. All paints are purchased through EESOH-MIS.

This base should have a separate process for each paint booth. Additionally, a separate process for each coating type (brush, aerosol, HVLP etc.) if known, or a single process for all surface coating activities conducted outside the paint booths.

Degreasers

Base A: Has a central contract for all solvent degreasers.

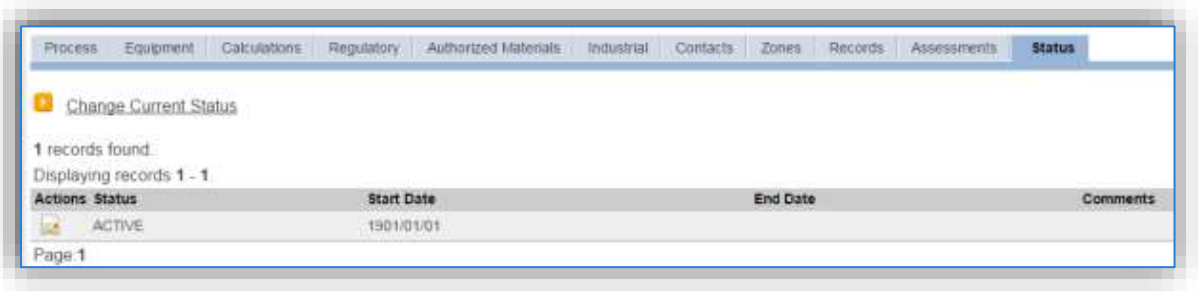
This should have a single Unique Process record that records the total solvent added minus the total solvent removed.

Base B: The solvent degreasers are handled by the shops.

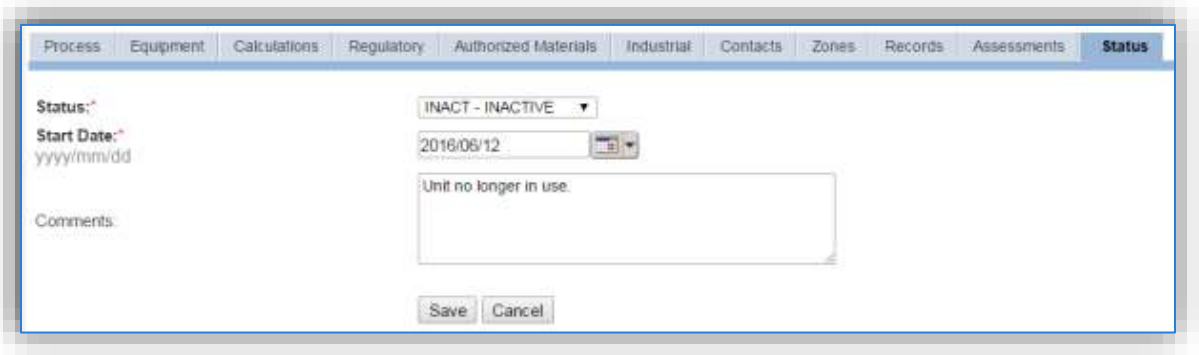
This should have a single Unique Process record for each organization. This will ensure all degreasing operations are accounted for on an annual basis.

2.3.1 Status

If the status of a unit needs to be changed, click the edit icon next to the process.



Navigate to the *Status* tab. Click the Change Current Status hyperlink.



Select the appropriate status from the **Status** dropdown (i.e., ACTIVE, REMOVED or INACTIVE).

For the **Start Date** enter the date at which the status changed.

Enter **Comments** that provide insight into why the status changed. These can be very useful for equipment inventories, permit renewals and regulatory reporting. Most regulatory agencies require reporting on unit operation status; this includes any potential time spent offline and reasons for the outage.

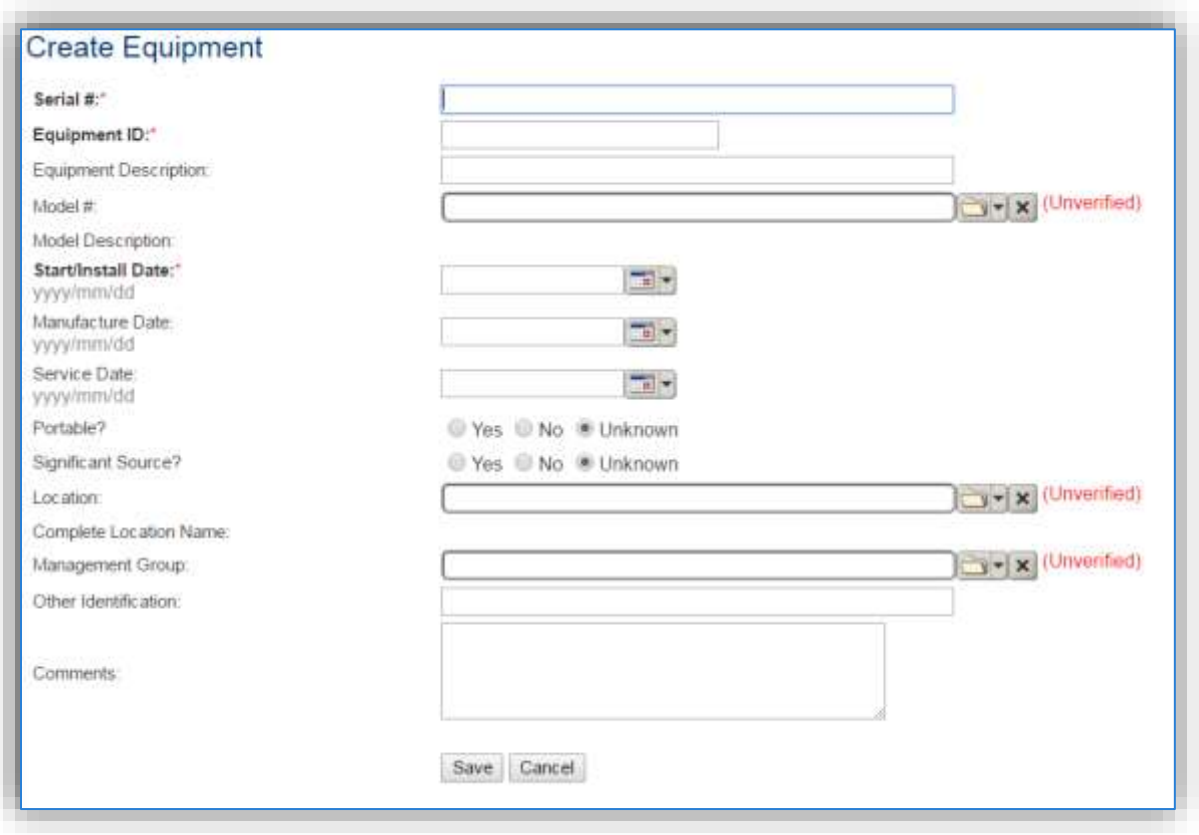
Click the **Save** button.

The emissions for a process will only be calculated for the dates the process was in an ACTIVE status. If a source is removed in the middle of a year, the emissions will only be calculated for the part of the year the source was active.

2.4 Equipment

It is important for many source categories to keep an accurate equipment inventory with the pertinent information. This section will walk through the steps to create a complete equipment record. The specific sources that require equipment records will be discussed in detail in the specific source category sections.

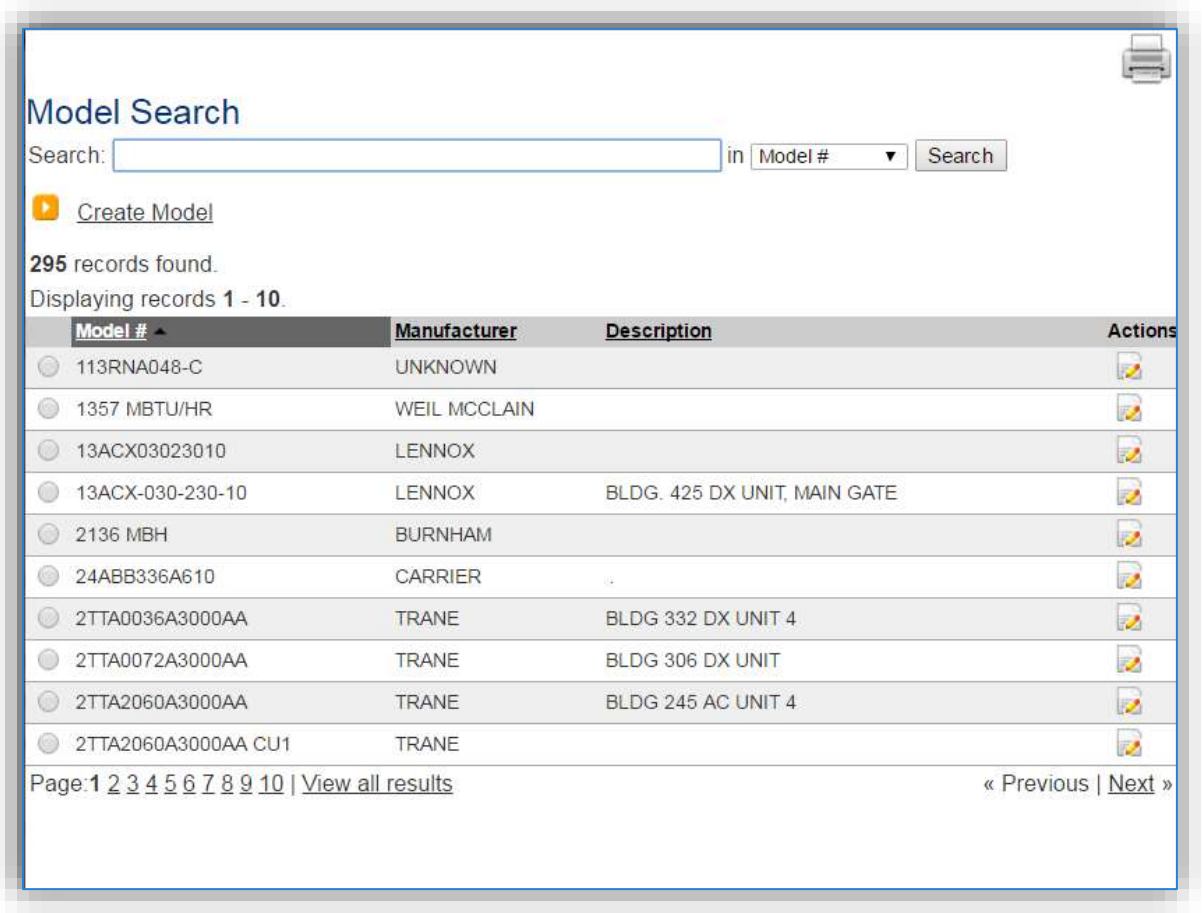
Click on **Equipment** under the **Emissions Unit** tab, click the *Create Equipment* hyperlink.



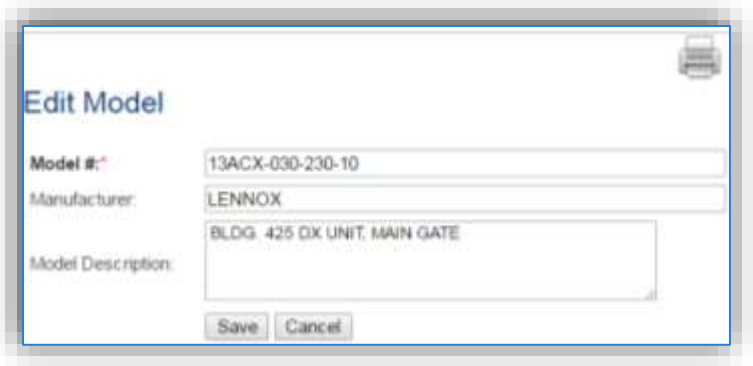
The **Serial #** field can be used to enter the serial number for the equipment. If the serial number of the equipment is not known, a standard convention can be used to easily identify the equipment.

The **Equipment ID** is intended to be used to easily identify the equipment. This is a locally established number used to identify the source. This field can be populated with the emission unit ID as identified in applicable permits, the building number or a standard convention used to easily identify the equipment.

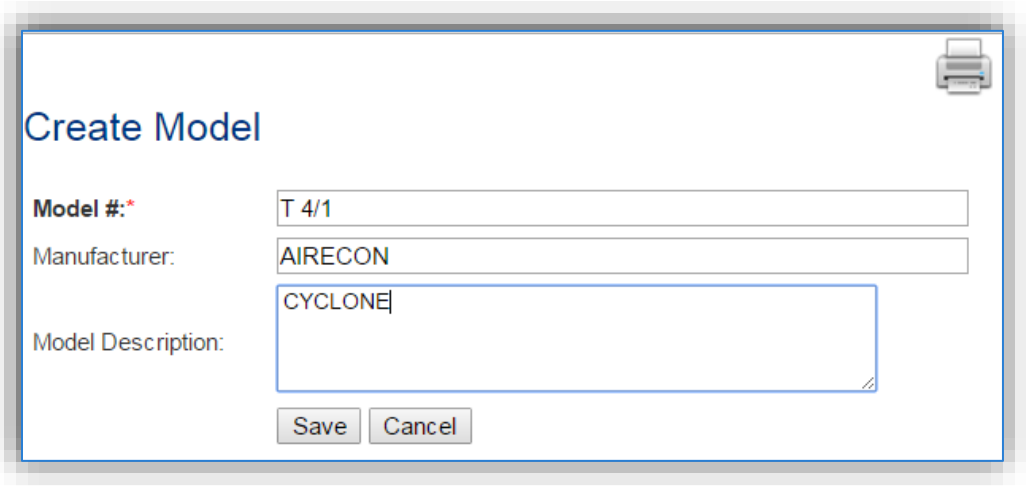
The **Model #** can be selected from the list of values (LOV) or created within the LOV popup window. Click the folder icon to open the Model Search popup.



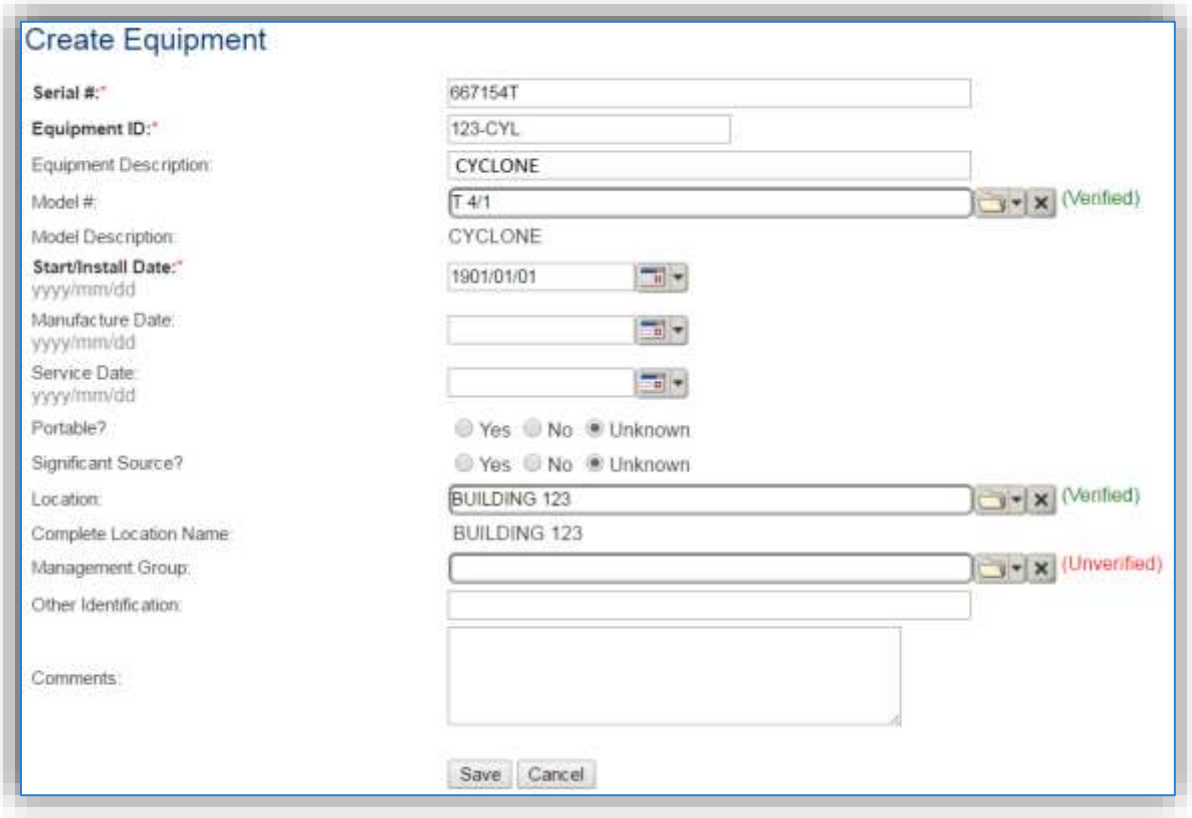
This screen manages all operations to select, edit or create a model. The search can be used to locate a specific model record. To select the model record, click the corresponding radio button. This will cause the popup window to close and will populate the **Model #** field with the selected record. To edit a model record, click the corresponding edit icon on the right side. This will open the Edit Model popup screen.



To create a new model record, click the Create Model hyperlink. This will open the Create Model popup.



Enter the actual Model # if known, if the model number is unknown a standard convention to easily identify the equipment can be used, (i.e. CYCLONE, BOOTH FILTER, etc.). Click the **Save** button to close the window.

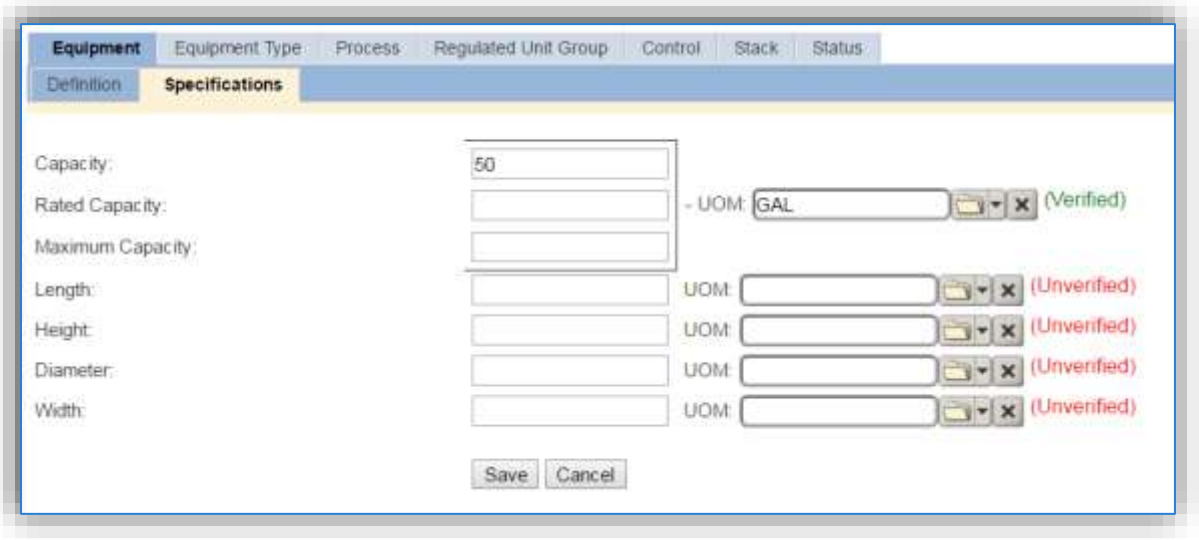


The **Start/Install Date** should be the date the equipment was installed. If that date is not known a default date of 1901/01/01 may be used. This data has significance for regulatory applicability. If the year the source was first used is known, estimation is better than the default date.

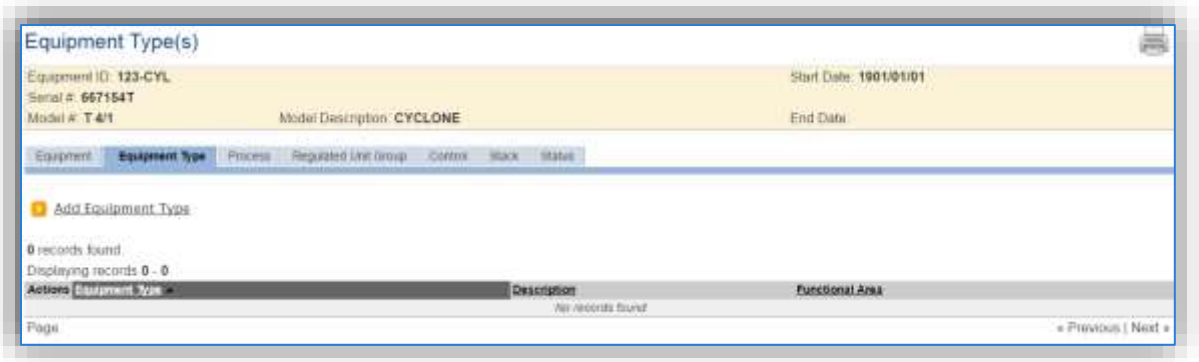
The **Location** field is very important for equipment as it can then relate to the Air Force Geographic Information System (GIS).

The *Specifications* sub tab is only important for certain types of equipment. Most control equipment will not have a specific capacity, making data entry in this tab unnecessary. However, equipment that does have a capacity, such as degreasers, should have this data populated. Knowing the size of a particular unit can be very helpful in determining if the usage reported is correct and what impact this equipment will have on overall emissions.

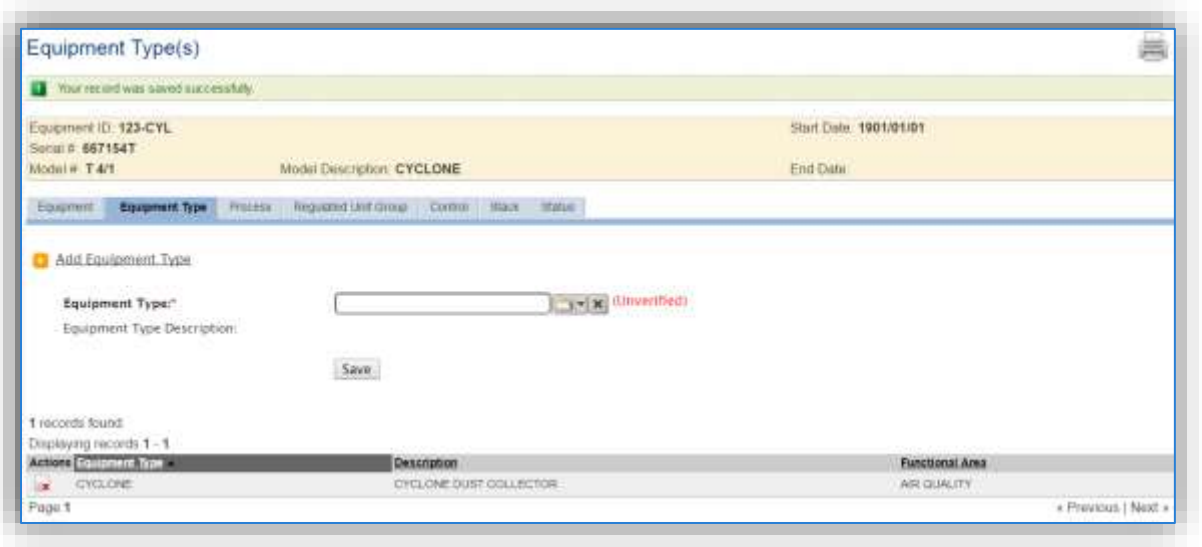
Specific details for most equipment types will be addressed in each source category section.



The *Equipment Type* tab is essential to identify which equipment fall under specific regulatory rules such as the RICE NESHAP and Boiler Maximum Achievable Control Technology (MACT). To designate an Equipment Type, click the Add Equipment Type hyperlink.



This will display the **Equipment Type** field, where the equipment type can be selected from the LOV. Below is a list of the values available and the appropriate equipment that should be designated under each type. Click the **Save** button to associate the **Equipment Type**.

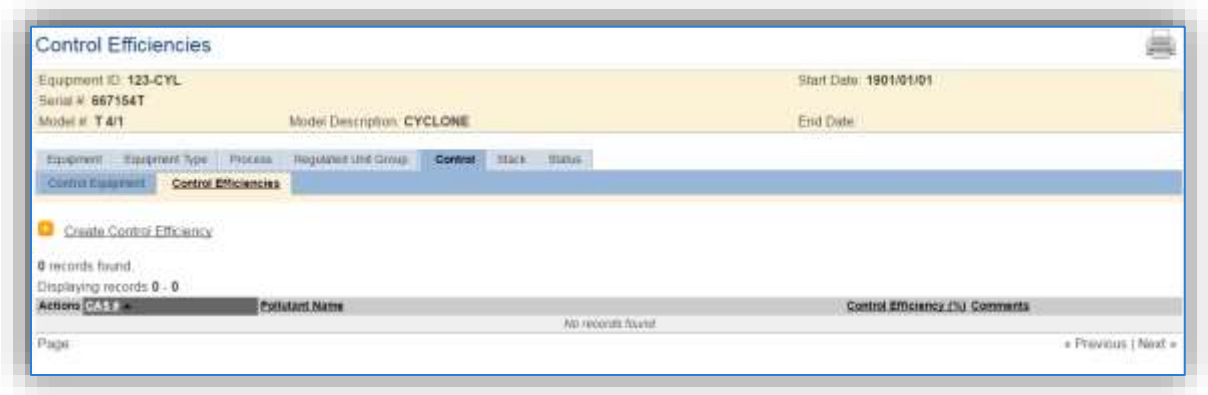


Description	Code	Examples of Equipment
Internal Combustion (ICOM)		
AIRCRAFT ARRESTING SYSTEM	AAS	This should be used for the engines on an aircraft arresting systems retractable hook cable system.
FIRE PUMP ENGINE	PUMP	This is for any engine used to support a pump. Most common are fire pumps, water pumps, engine driven chillers, or lift stations.
NON-EMERGENCY GENERATOR	NON-EMRGN	This is used for stationary generators that are not for emergency power such as load bank generators.
PORTABLE GENERATORS	PORT_GEN	This is used for emergency or back-up generators that are not in a fixed location but are portable and can be moved.
STATIONARY EMERGENCY NON-FIRE PUMP GENERATOR	STAT_GEN	This is used for all stationary generators typically used to power facilities and key equipment for power outages
External Combustion (ECOM)		
BOILER	BOILER	This is used for external combustion equipment that is used to heat water to be used in a central heating system or steam engine.
LN_BOILER	LOW NOX BOILER	This is used for external combustion equipment that is used to heat water to be used in a central heating system or steam engine with a Low NOx burner.
ULN_BOILER	ULTRA LOW NOX BOILER	This is used for external combustion equipment that is used to heat water to be used in a central heating system or steam engine with a Low NOx burner and flue gas recirculation.

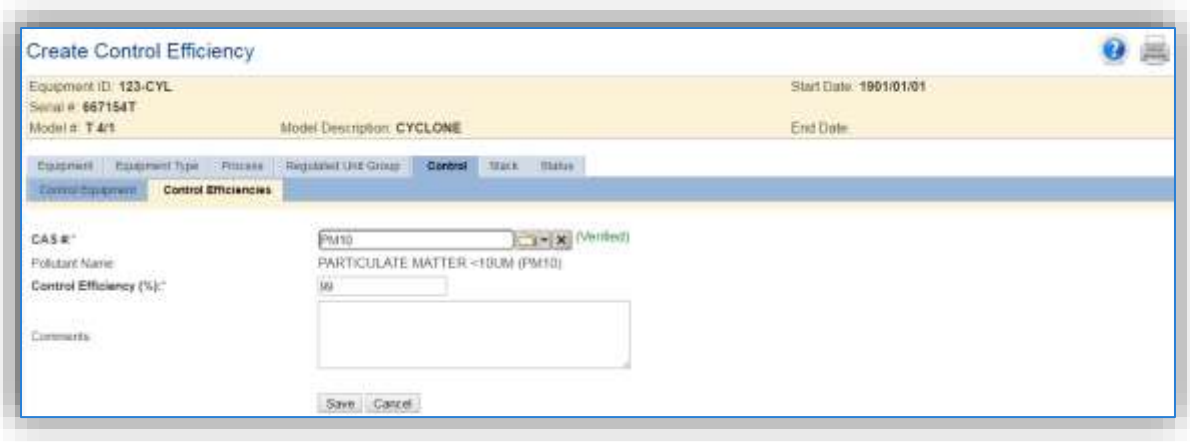
Description	Code	Examples of Equipment
FORCED AIR FURNACE	FURNACE	This is for equipment used to heat air, for process or comfort heating. This is different from a boiler as it heats air directly.
COMBINATION SYSTEM WITH HEAT AND AC IN ONE UNIT	HEAT-AC	This is for a combination heating cooling unit. This equipment should be managed through the Refrigerant Compliance module.
INFRARED HEATER	INF_HEAT	This is used for external combustion radiator heaters or heaters used for comfort heating.
Process Heaters (HEAT)		
AIR DRYER	DRYER	This is for air dryers, which are utilized mostly for moisture control operations, such as in a paint booth or with refrigeration equipment.
GAS FIRED OVEN	GAS OVEN	This is for gas fired ovens often used in curing or molding operations.
HEATING UNIT	HEATER	This should be utilized for external combustion equipment that is used for process heating, not comfort heating.
INFRARED HEATER	INF_HEAT	This is used for external combustion radiator heaters or heaters used for comfort heating.
WATER HEATER	WATER_HTR	This should be for a unit that heats water to be used in domestic applications or industrial process.
Surface Coating (SURF)		
PAINT BOOTH OPERATIONS	PAINTBOOTH	This is the paint booth and associated control devices used for spray painting operations.
Solvent Operations (DEGR)		
COLD DIP TANK	COLD_DIP	This is for degreasing operations that occur in a batch loaded, non-heated tank of solvent that does not have a spray nozzle.
PARTS WASHER	PARTSWASHER	This should be used for the water-based parts washers. All solvent parts washers should be classified as Degreasers.
SPRAY GUN CLEANER	SGCLNR	This is for spray gun cleaners, which are similar to degreasers and parts washers but specifically used for spray gun cleaning.
REMOTE RESEVOIR	R_RESERV	This is used for operations where the solvent is in a tank separate from the operation. Such as a degreaser that has a separate tank used to feed solvent.
SOLVENT DEGREASER	DEGREASER	This is only used if the degreaser does not fit into one of the more specific degreaser equipment types.
Storage Tanks (AST & UST)		
ABOVE GROUND STORAGE TANKS	AST	This is for fuel storage tanks that are above ground.

Description	Code	Examples of Equipment
UNDERGROUND STORAGE TANK	UST	This is for fuel storage tanks that are underground.
OIL/WATER SEPARATOR	OWS	This is used for devices that separate oil and suspended solids from wastewater effluents. This equipment is most likely handled by the STAR module of APIMS.
Abrasive Blasting (ABCL)		
BLAST BOOTH	BLASTBOOTH	This is for the booth that is used for abrasive blasting or corrosion control operations.
ABRASIVE BLASTING GLOVEBOX	GLOVEBOX	This is for the small box used for abrasive blasting operations.
Cooling Towers (COOL & PWCT)		
COOLING TOWER	COOL	This is for process or comfort cooling towers.
Incinerators (INCN)		
INCINERATOR	INCIN	This is used for classified waste incinerators, medical waste incinerators, and air curtain incinerators.
Metal Plating (MPLT)		
PROCESS TANKS	PCSTNK	This should be used for metal plating or anodizing tanks.
Control Equipment		
BAGHOUSE DUST COLLECTOR	BAGHOUSE	This is for baghouse dust collectors commonly found with woodworking and abrasive blasting operations.
CYCLONE DUST COLLECTOR	CYCLONE	This is for cyclone dust collectors commonly found with woodworking and abrasive blasting operations.
STACK EQUIPMENT	STACK	This is for the stack and control equipment used to control emissions emitted from a particular source.

The next key tab is the *Control* tab and the *Control Efficiencies* subtab.

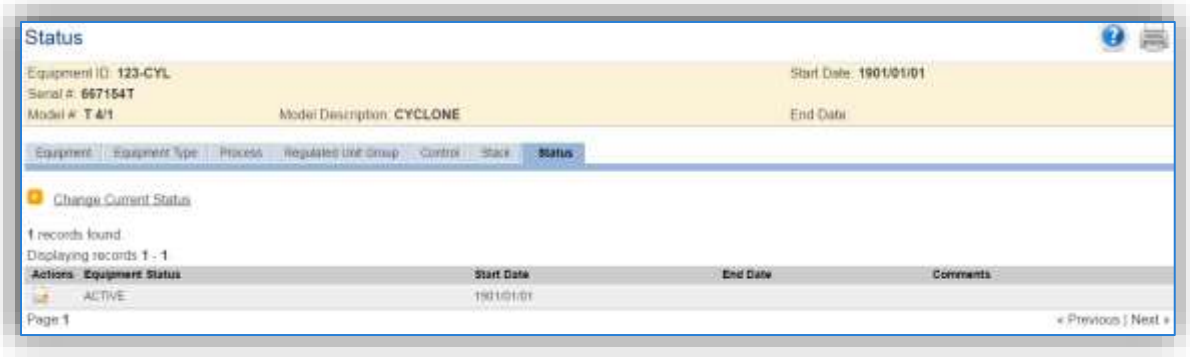


To create a control efficiency for a particular pollutant, click the Create Control Efficiency hyperlink.



Enter the pollutant CAS # in the **CAS #** field or select the pollutant from the LOV. Next enter the control efficiency for the pollutant in percent in the **Control Efficiency** field. Click the **Save** button to finalize the control efficiency. Repeat this step as needed until all the chemicals controlled by this device are accounted for.

The last significant tab is the *Status* tab.



The Status tab is critical as it can have an effect on the emissions calculations for a particular source. The statuses available are specific to each installation; however, the most common are as follows: ACTIVE, INACTIVE and REMOVED. The control efficiency will only be applied to the emissions calculations when the equipment is in an ACTIVE status.

2.5 Storage Tank

Storage tanks are managed by the STAR (Storage Tank Accounting & Reporting) module within APIMS. The creation of new tanks is the responsibility of the Storage Tank manager at the installation. All new and existing tank information should be collaborated with the Storage Tank manager. For Air Quality specific tank information, refer to the Above Ground and Under Ground Storage Tank chapters.

2.6 EESOH-MIS Interface

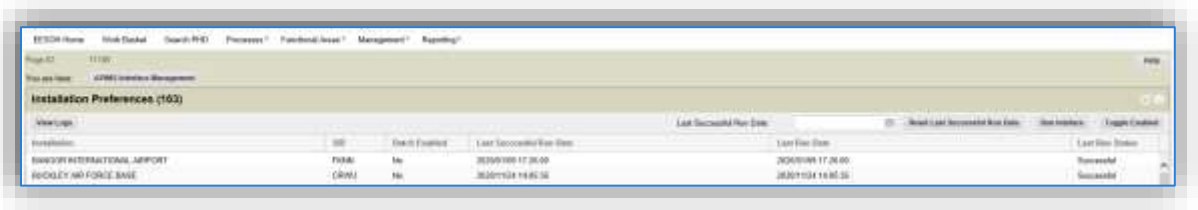
The Enterprise Environmental, Safety & Occupational Health Management Information System (EESOH-MIS) is the Air Force hazardous material management application. EESOH-MIS is the authoritative data source for Safety Data Sheets and usage information for all hazardous materials utilized on an installation. Due to the sheer amount of data required from EESOH-MIS to accurately calculate emissions from chemical use, an interface between APIMS and EESOH-MIS was developed. The EESOH-MIS interface is used to import processes, materials, and usage from EESOH-MIS. This data can then be used for the calculation of emissions from Welding, Pesticide, Laboratory Use, Miscellaneous Chemicals, Non-Destructive Inspection and Surface Coating.

EESOH-MIS and APIMS do not examine data in the same way, for instance EESOH-MIS is configured to have processes based on shops, and purchasing accounts, whereas APIMS configures processes according to sources of emissions. For this reason, APIMS uses a function called Next Higher Process to group processes that have the same emission calculation methodology. By using the Next Higher Process functionality, multiple EESOH-MIS processes can have their usage totaled and used by a single APIMS process. This single APIMS process will then have the algorithms and emissions associated with all the EESOH-MIS subprocesses reported to the single APIMS process. This streamlines data configuration in APIMS as the subprocesses do not need to have any algorithms or calculations assigned. Refer to the individual source category and emission calculation sections on how to associate algorithms and calculations, respectively.

2.6.1 Running the Interface

The EESOH-MIS Interface is initiated from the EESOH-MIS application. For most installations the interface is run on an annual basis. However, depending upon regulatory requirements at each installation it may be required to run more often.

Within EESOH-MIS navigate to the APIMS Interface Management screen by clicking the APIMS Interface Management hyperlink under the Interface Management header.



There are two different set ups for the APIMS Interface, Batch Enabled or not. Batch Enabled means that the interface will automatically run every night. The Batch Enabled flag is shown in the third column. To change the Batch Enabled flag, select the row, and click the **Toggle Enabled** button.

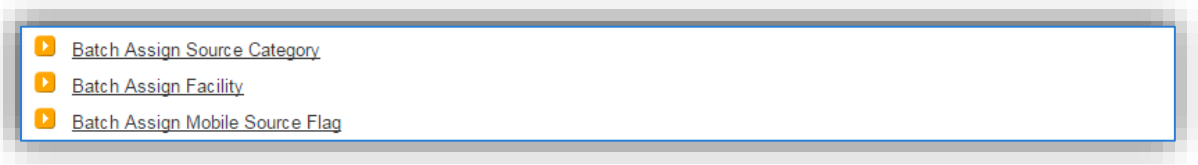
If the installation is not Batch Enabled, the interface will need to be manually run. To manually run the interface, select the row for your installation in the grid and click the **Run Interface** button. EESOH-MIS will generate the Interface files, and the automated transfer of the data will be completed at 8 PM Central Time.

2.6.2 Configuring Processes in APIMS

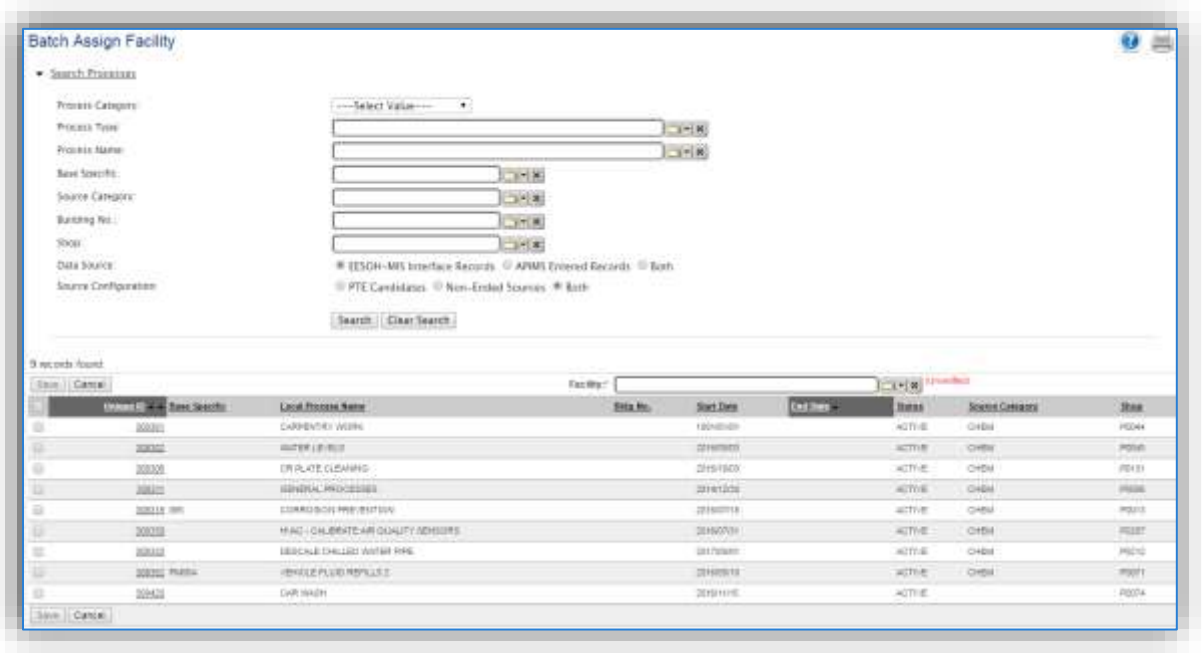
When a new process is inserted into APIMS via the EESOH-MIS interface it is missing many core data elements such as, Facility, Source Category and Mobile Flag. In addition to these required fields, the process needs to be configured to be included or excluded from emission calculations. To include in emission calculations the process should either be associated to a next higher process or have algorithms and emission calculations assigned.

2.6.2.1 Assign Facility

All processes should be assigned to a facility. To assign a facility to the imported process(es), navigate to the Unique Process module in APIMS.



Click the Batch Assign Facility hyperlink to identify the new processes imported from EESOH-MIS.

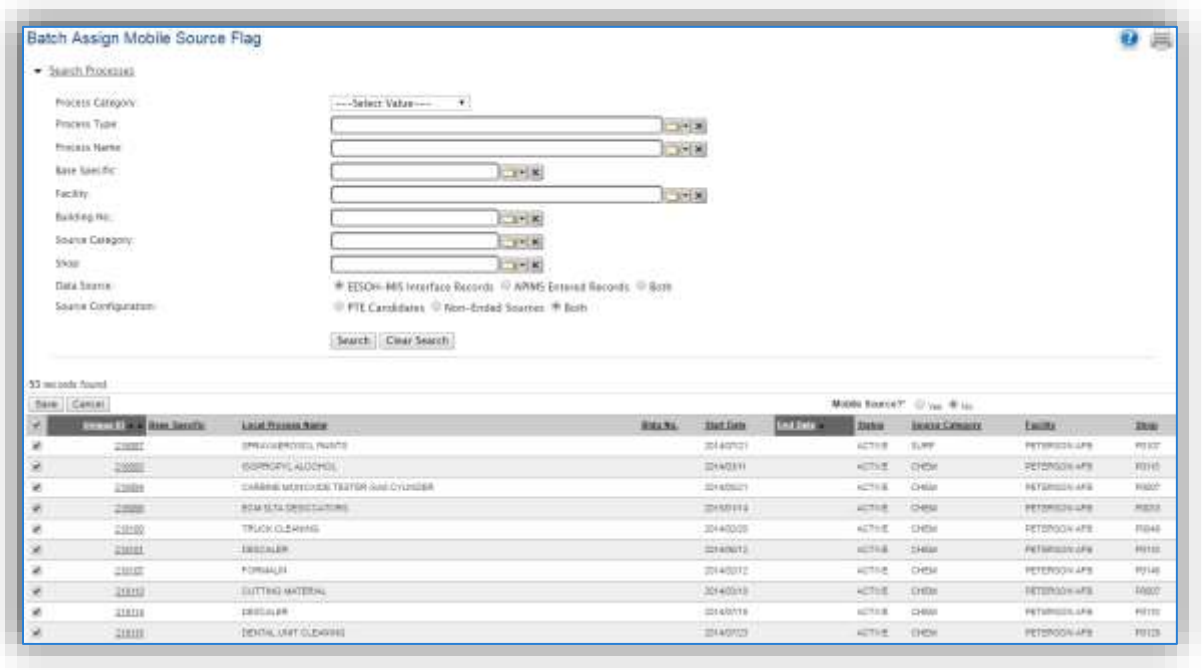


To make sure only new EESOH-MIS processes are returned in the results grid, use the **Data Source** filter to specify EESOH-MIS Interface Records. Once the grid is filtered, select the "check all" checkbox at the top of the grid. Enter the facility name in the Facility field at the top of the grid and click the **Save** button.

If there is more than one facility within the APIMS installation, as is the case with many joint bases, the facility needs to be assigned accordingly. This is best done by identifying the shops that are under each facility and selecting them in groups using the search criteria.

2.6.2.2 Assign Mobile Flag

All processes that come from EESOH-MIS are considered stationary sources. Return to the Unique Process page and click the Batch Assign Mobile Source Flag hyperlink.



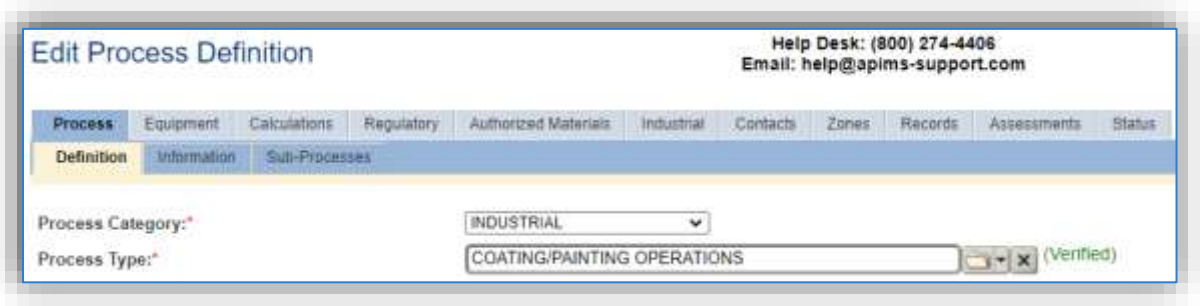
To make sure only new EESOH-MIS processes are returned in the results grid, use the **Data Source** filter to specify EESOH-MIS Interface Records. Once the grid is filtered, select the "check all" checkbox at the top of the grid. Select the **No** radio button for **Mobile Source?** at the top of the grid and click the **Save** button.

2.6.2.3 Assign Source Category

Before assigning the source category, an understanding of what activities the process captures is required. There are several pieces of information that can help determine the appropriate way to account for the usage from this process. The source categories for the processes that come from EESOH-MIS generally fall into the following source categories.

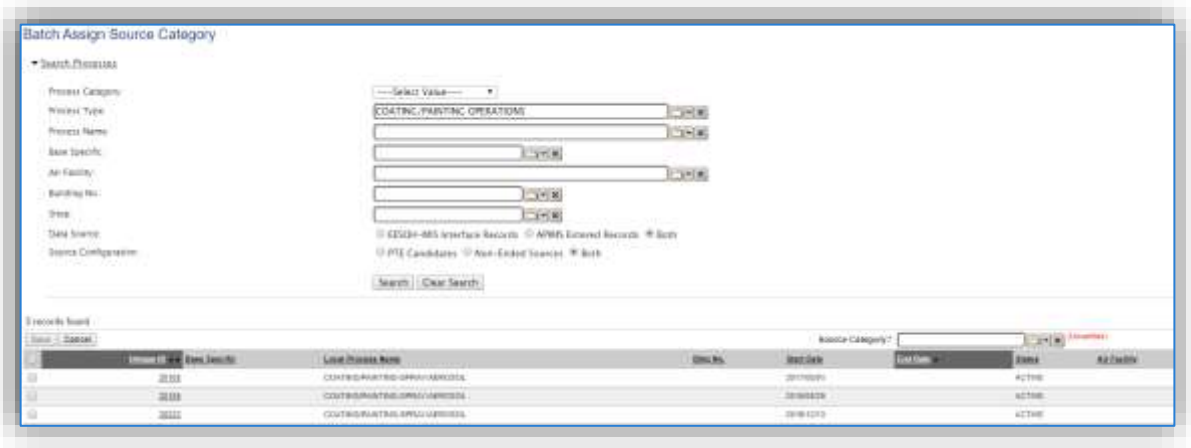
Source Category	Guidelines
CHEM	This should be all EESOH-MIS processes that do not fit in the other source categories.
LAB	This should be processes associated to analytical, medical, or research and development laboratories.
NDI	This should be processes in the Non-Destructive Inspection shop.
PEST	These should be processes for pesticide and herbicide application.
SURF	These should be processes for painting activities (including paint booths). Examples are architectural painting, line painting, and miscellaneous aerosol painting.
WELD	These should be processes that only have welding rods authorized. If other chemicals, such as welding gasses or solvent are authorized, it should be assigned to CHEM.

One valuable piece of information can be the Process Type field. When assigned correctly it can indicate the process activity as shown in the table on the next page.



Source Category	Process Type
PEST	PEST CONTROL
LAB	LABORATORY OPERATIONS
SURF	COATING/PAINTING OPERATIONS
WELD	BRAZING/SOLDERING/WELDING/CUTTING
NDI	NON-DESTRUCTIVE INSPECTION/TESTING

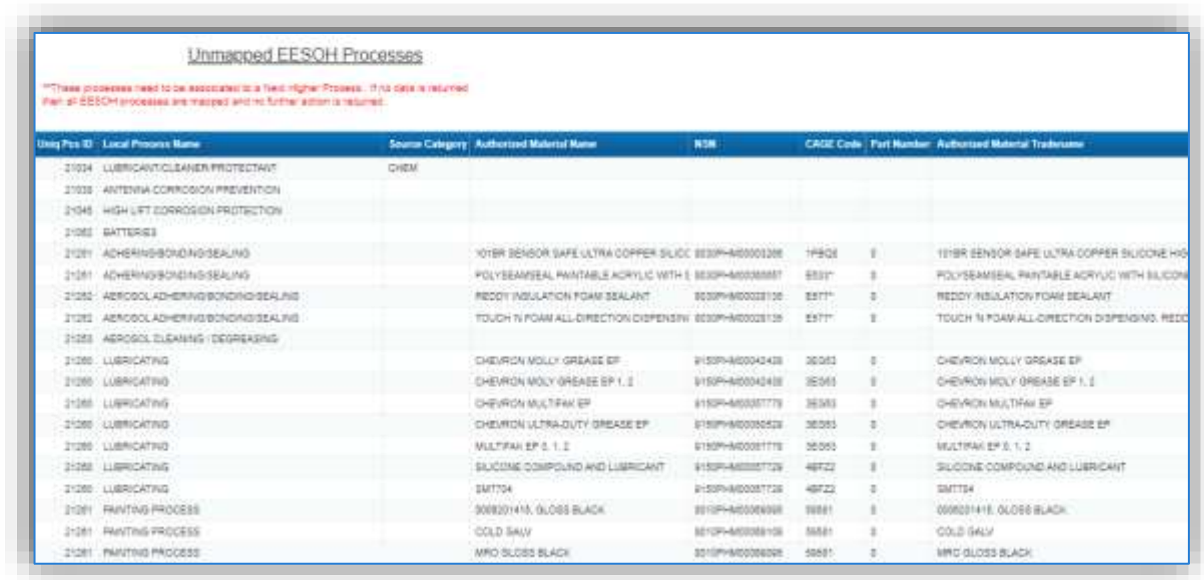
This field is also available in the Batch Assign Source Category screen and can be used to filter and assign the source category in bulk as shown below.



Another way to determine the proper source category for a process is to look at the materials that are authorized. To do this in the front end of APIMS would be very time consuming, therefore the Program Management Office has published a series of reports to help with the configuration of EESOH-MIS interface data.

The EESOH Data QA report available in Business Objects, in the PMO Reports >> Air Quality >> AEI Quality Assurance folder can be very helpful when configuring the interface. The Unmapped EESOH Processes

report will show a list of all the new processes that were inserted into APIMS via the EESOH-MIS interface. This report will show the process name, and all authorized materials.



Unmapped EESOH Processes

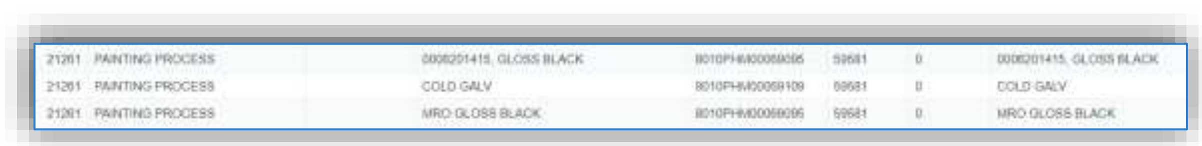
**These processes need to be associated to a Next Higher Process. If no data is returned then all EESOH processes are mapped and no further action is required.

Uniq Pcs ID	Local Process Name	Source Category	Authorized Material Name	NSN	CAGE Code	Part Number	Authorized Material Tradename
21034	LUBRICANT/CLEANER/PROTECTANT	CHEM					
21038	ANTENNA CORROSION PREVENTION						
21046	HIGH LIFT CORROSION PROTECTION						
21062	BATTERIES						
21261	ADHERING/BONDING/SEALING		101BR SENSOR SAFE ULTRA COPPER SILICC	8030PHM00001208	1PBQ8	0	101BR SENSOR SAFE ULTRA COPPER SILICONE HIG
21261	ADHERING/BONDING/SEALING		POLYSEAMSEAL PAINTABLE ACRYLIC WITH S	8030PHM00036887	E531*	0	POLYSEAMSEAL PAINTABLE ACRYLIC WITH SILICON
21262	AEROSOL ADHERING/BONDING/SEALING		REDDY INSULATION FOAM SEALANT	8030PHM00028136	E5T7*	0	REDDY INSULATION FOAM SEALANT
21262	AEROSOL ADHERING/BONDING/SEALING		TOUCH N FOAM ALL-DIRECTION DISPENSIN	8030PHM00028135	E5T7*	0	TOUCH N FOAM ALL-DIRECTION DISPENSING, REDD
21263	AEROSOL CLEANING / DEGREASING						
21260	LUBRICATING		CHEVRON MOLLY GREASE EP	9150PHM00042438	3EG53	0	CHEVRON MOLLY GREASE EP
21260	LUBRICATING		CHEVRON MOLY GREASE EP 1, 2	9150PHM00042438	3EG53	0	CHEVRON MOLY GREASE EP 1, 2
21260	LUBRICATING		CHEVRON MULTIFAK EP	9150PHM00057778	3EG53	0	CHEVRON MULTIFAK EP
21260	LUBRICATING		CHEVRON ULTRA-DUTY GREASE EP	9150PHM00050529	3EG53	0	CHEVRON ULTRA-DUTY GREASE EP
21260	LUBRICATING		MULTIFAK EP 0, 1, 2	9150PHM00057779	3EG53	0	MULTIFAK EP 0, 1, 2
21260	LUBRICATING		SILICONE COMPOUND AND LUBRICANT	9150PHM00057729	4BFZ2	0	SILICONE COMPOUND AND LUBRICANT
21260	LUBRICATING		SM7704	9150PHM00057728	4BFZ2	0	SM7704
21261	PAINTING PROCESS		0008201415, GLOSS BLACK	8010PHM00069095	59681	0	0008201415, GLOSS BLACK
21261	PAINTING PROCESS		COLD GALV	8010PHM00069109	59681	0	COLD GALV
21261	PAINTING PROCESS		MRO GLOSS BLACK	8010PHM00069095	59681	0	MRO GLOSS BLACK

As shown in the screenshot above, there are several processes that do not have the source category assigned. A few examples will be shown in detail below:

21260	LUBRICATING		CHEVRON MOLLY GREASE EP	9150PHM00042436	3EG53	0	CHEVRON MOLLY GREASE EP
21260	LUBRICATING		CHEVRON MOLY GREASE EP 1, 2	9150PHM00042438	3EG53	0	CHEVRON MOLY GREASE EP 1, 2
21260	LUBRICATING		CHEVRON MULTIFAK EP	9150PHM00057778	3EG53	0	CHEVRON MULTIFAK EP
21260	LUBRICATING		CHEVRON ULTRA-DUTY GREASE EP	9150PHM00050529	3EG53	0	CHEVRON ULTRA-DUTY GREASE EP
21260	LUBRICATING		MULTIFAK EP 0, 1, 2	9150PHM00057779	3EG53	0	MULTIFAK EP 0, 1, 2
21260	LUBRICATING		SILICONE COMPOUND AND LUBRICANT	9150PHM00057729	4BFZ2	0	SILICONE COMPOUND AND LUBRICANT
21260	LUBRICATING		SM7704	9150PHM00057728	4BFZ2	0	SM7704

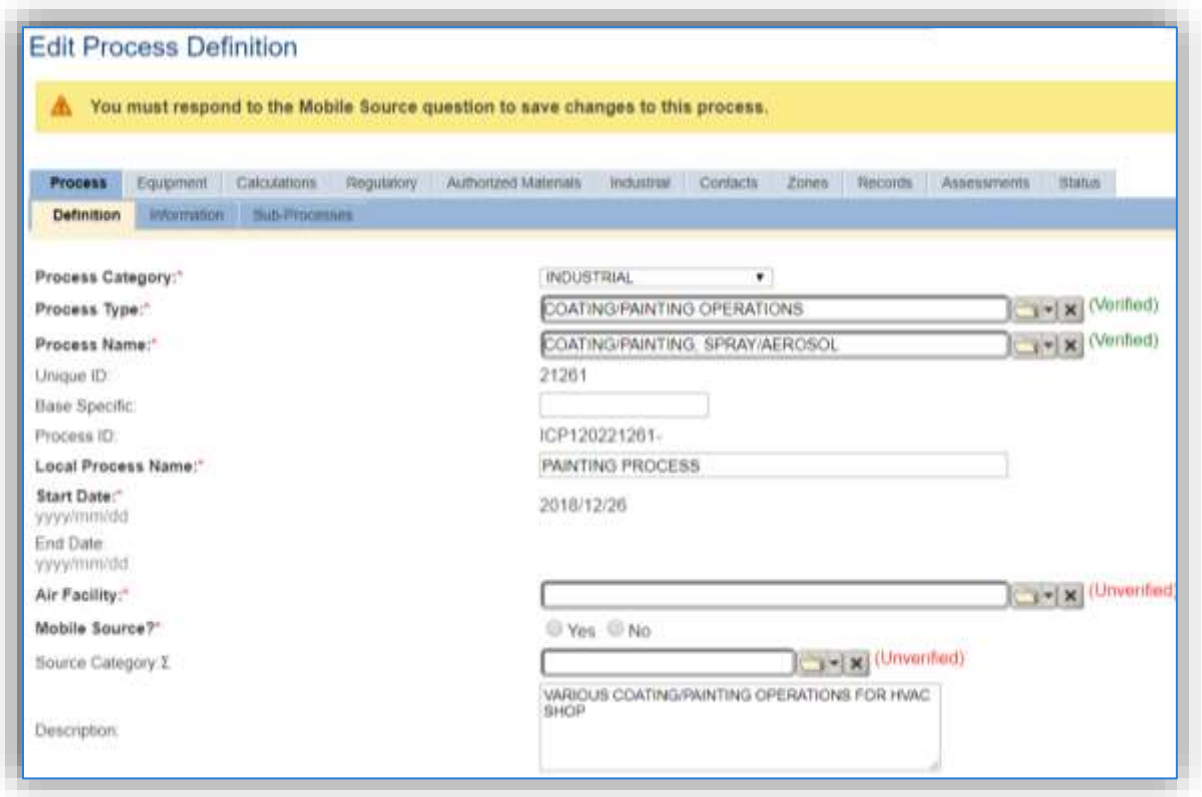
In this example, the process name is LUBRICATING, this would indicate that the materials used would all be greases and oils. Next, the authorized materials show this is an accurate process name, as all the materials are greases and lubricants. In this instance this process should have a source category of CHEM and be rolled up to the BASEWIDE MISCELLANEOUS CHEMICAL USE process.



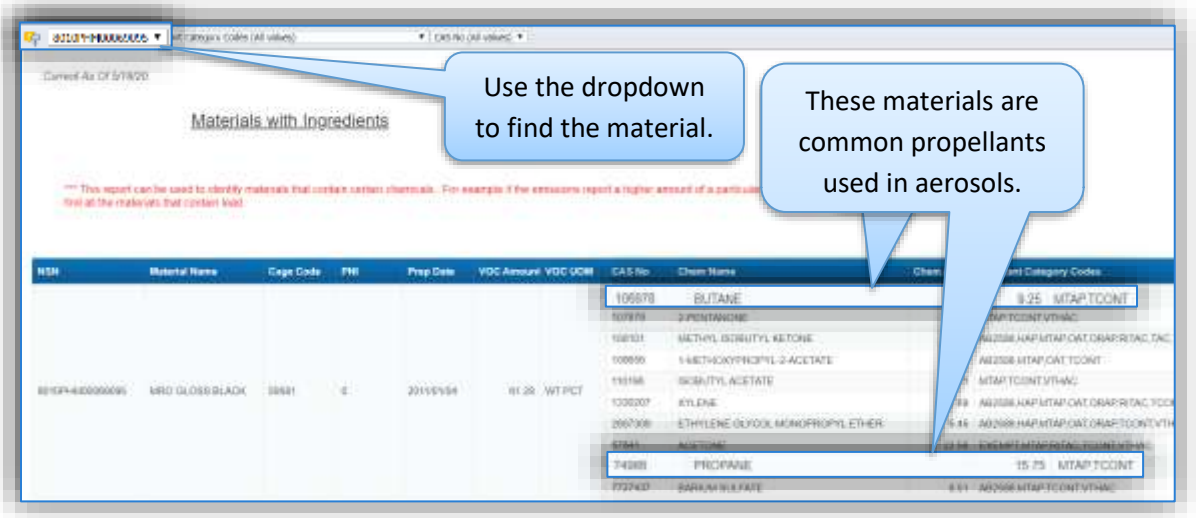
21261	PAINTING PROCESS		0008201415, GLOSS BLACK	8010PHM00069095	59681	0	0008201415, GLOSS BLACK
21261	PAINTING PROCESS		COLD GALV	8010PHM00069109	59681	0	COLD GALV
21261	PAINTING PROCESS		MRO GLOSS BLACK	8010PHM00069095	59681	0	MRO GLOSS BLACK

In this example, the process name is PAINTING PROCESS, this would indicate that the materials used would all be paints. The authorized materials confirm this is an accurate process name, as all the materials are paints. In this instance, this process should have a source category of SURF and most likely be rolled up to the BASEWIDE SURFACE COATING process. When surface coating processes are involved there are a few extra data points that need to be examined to make sure the configuration is correct. For instance,

does this occur in a paint booth, are these aerosol paints, are they brush and roller applications? It is recommended to look at the process in APIMS.



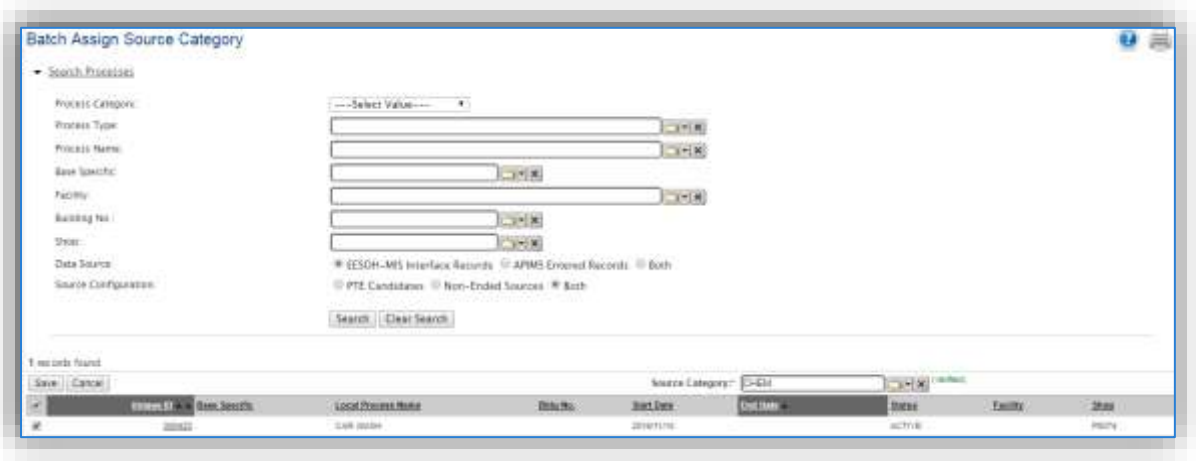
The Process Definition screen provides some additional key details about this particular process. The Description field states that this process is for coating and painting in the HVAC shop. This would indicate it is mostly small paint jobs. Further details in the Process Name field indicate these paints are most likely aerosol paints. To confirm if these materials are indeed aerosols, the Materials with Ingredients report can be used.



As shown, this material is indeed an aerosol based on the presence of propellants. Depending upon the installation set up, this material should be rolled up to a surface coating process. Some installations separate the aerosols out into a BASEWIDE AEROSOL PAINTING process, or some just have a BASEWIDE SURFACE COATING PROCESS. For more information about surface coating process configuration, refer to the Surface Coating section of this guide.

Once the appropriate source category and next higher process for each process is determined, the processes need to be properly configured in APIMS. To assign the source category for each process there are two methods. The first method allows multiple processes to be assigned at a time.

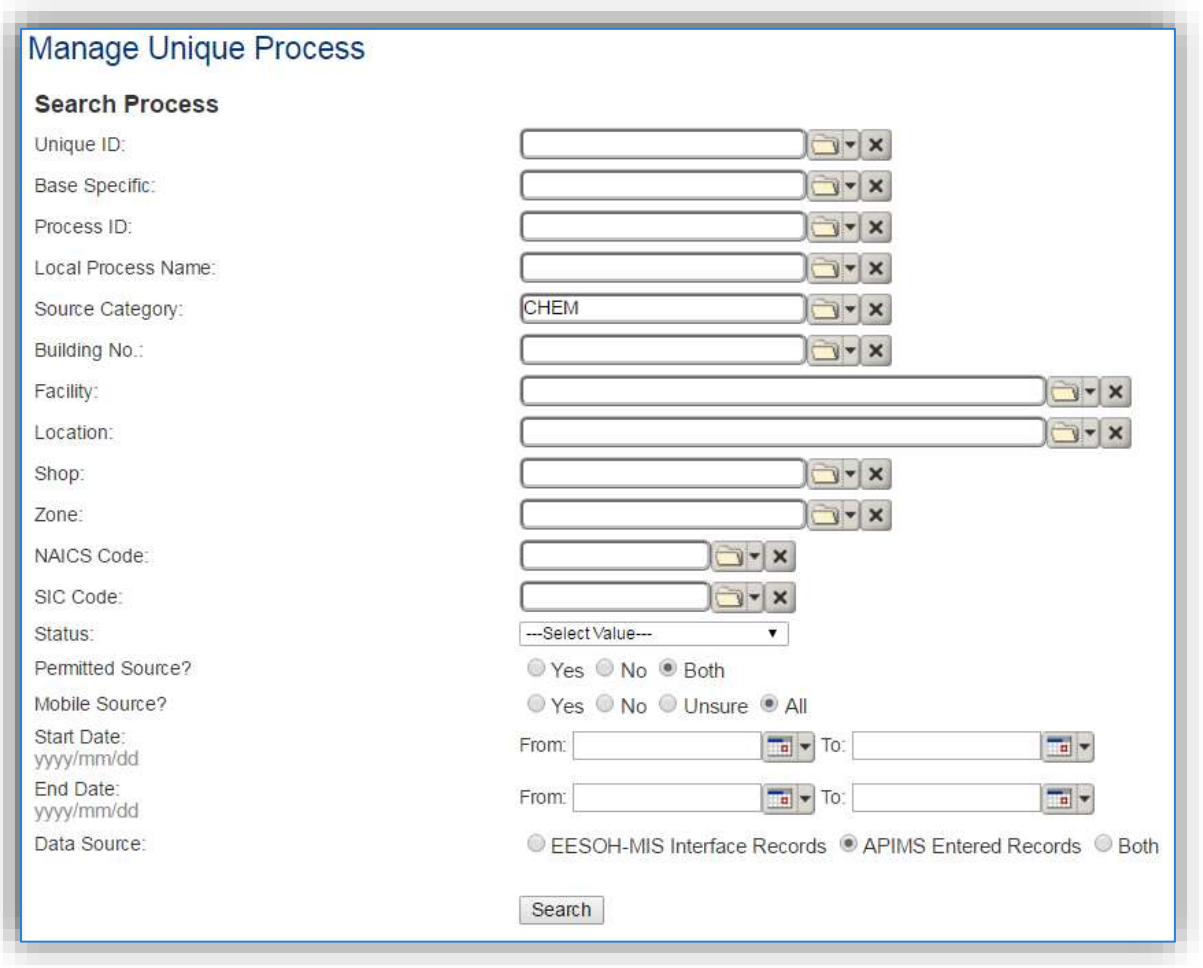
Return to the Unique Process tab; click the Batch Assign Source Category hyperlink.



To select only new EESOH-MIS processes, use the **Data Source** filter to specify EESOH-MIS Interface Records. The Process Type can also be used to filter processes. Once the grid is filtered, select the checkboxes next to the processes that fall under a specific source category. Select the Source Category from the list of values at the top of the grid and click the **Save** button. Repeat this step until all processes are assigned a source category.

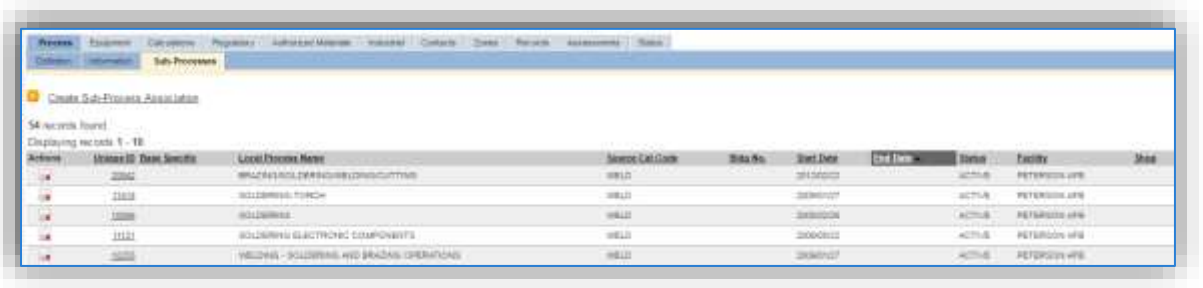
2.6.2.4 Assign Next Higher Process

The final step in configuring the new processes for use in calculations is associating each to the appropriate next higher process. Return to the Unique Process page and search for the next higher process. If the naming convention suggested in this guide is followed, searching using a Local Process Name that contains “BASEWIDE” should return the next higher processes. Another way to find the Next Higher Process would be to specify the source category and select the APIMS Entered radio button.

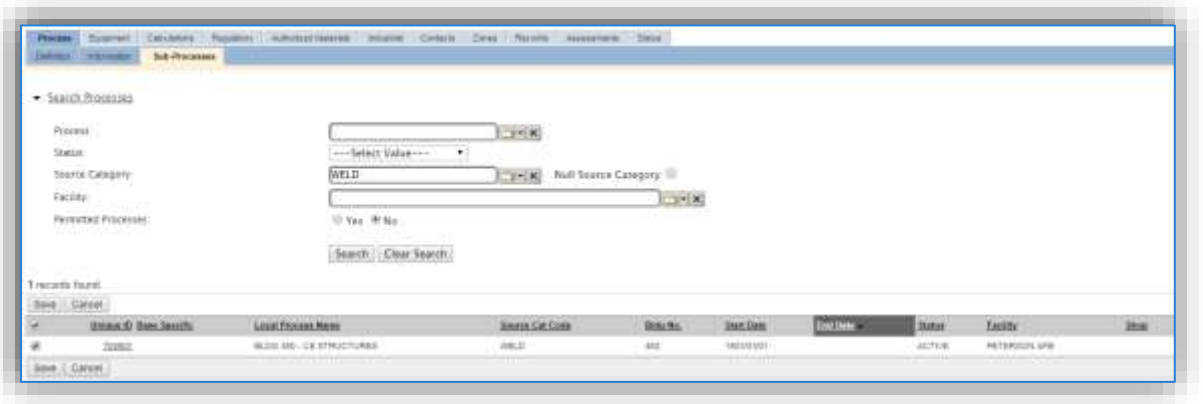


Click the edit icon next to the process to associate the new processes as sub processes of the next higher process.

Navigate to the *Sub-Processes* sub tab.



Click the Create Sub-Process Association hyperlink.



Use the Search Processes criteria to filter the process list to find the processes that should be associated to this next higher process. Select the checkboxes next to the appropriate processes and click the **Save** button to associate the process as a sub process of the next higher process. Repeat this step for each of the next higher processes.

Once all the processes listed on the Unmapped EESOH Processes report are configured, click the refresh button on the report to make sure no processes were missed. When all processes are rolled up to a next higher process this report should not contain any results.

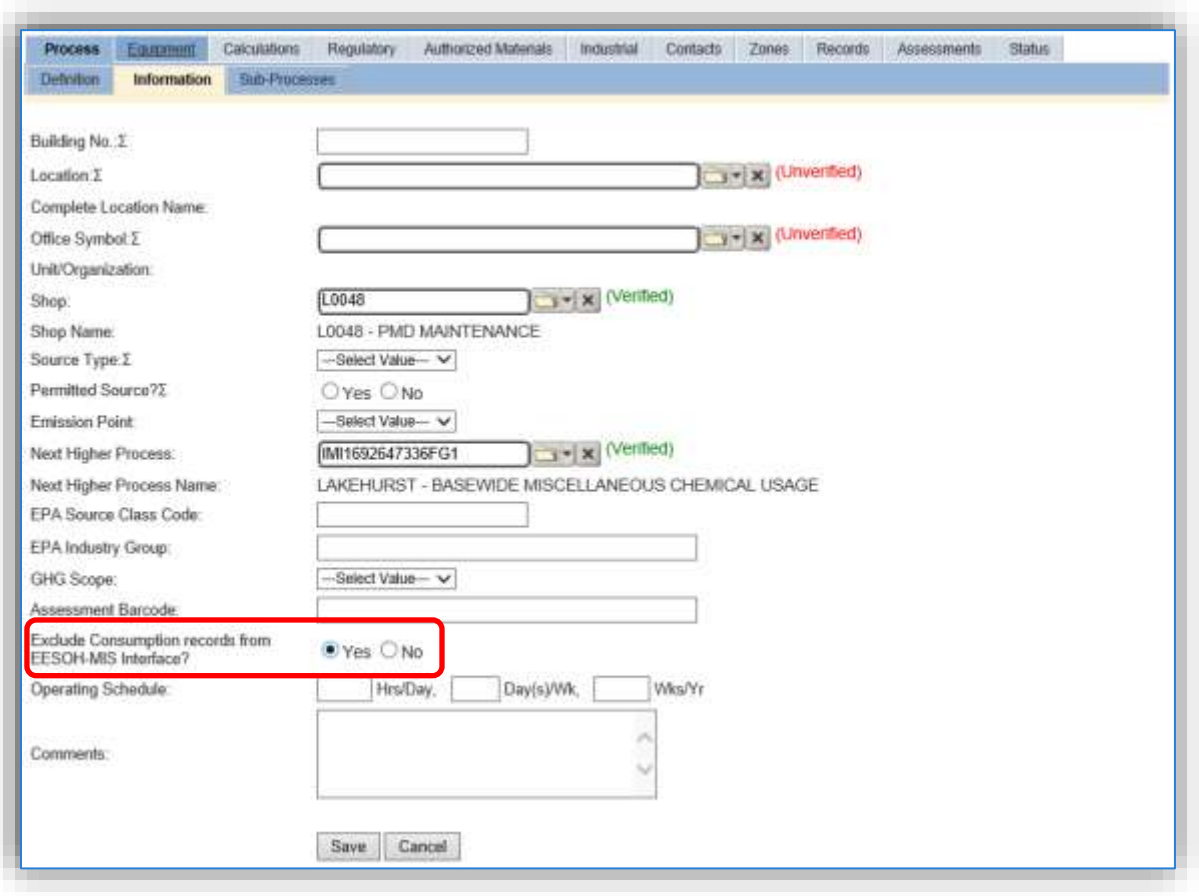
2.6.2.5 Exclude EESOH-MIS Usage

EESOH-MIS contains the material usage data for all materials that are considered hazardous materials. This can include items such as fuel, batteries, cylinder gases and other materials that may not be of a concern for emission calculations. In this case the usage data can be eliminated from coming over in the EESOH-MIS interface in future interface runs. This helps to reduce the amount of data that needs to be reviewed and processed in APIMS after each interface run. Another scenario of usage data that would not be needed in APIMS is for paint booths. In EESOH-MIS there are two different methods that are used to track consumption, consume on receipt and manual decrement.

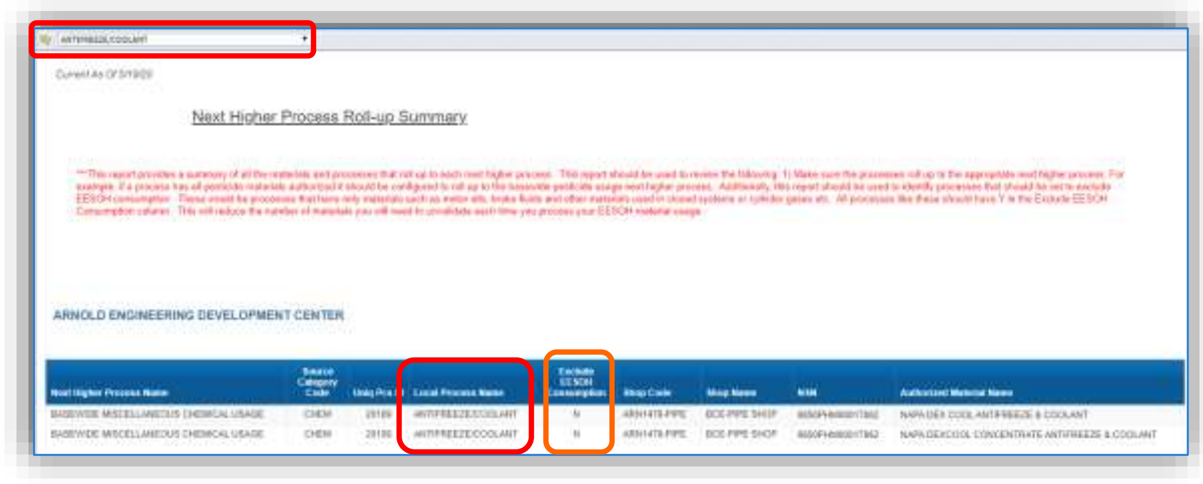
- Manual decrement means that each time the material is used a record of exactly how much is used is logged into EESOH-MIS.
- Consume on receipt means that the entire container is logged as usage when the container is issued from the Hazmart (central storage) to the Shop (location of material use).

Consume on receipt is the most common method used and can show spikes and lulls in the usage of materials. For instance, if a shop has touch up painting to maintain the shop equipment several cans of paint may all be used on the same day, when in reality those materials are used periodically as touchups are needed but the usage all shows up on the same day. These spikes in material usage can also show as spikes in monthly emissions when conducting monthly calculations. For this reason, often the EESOH-MIS usage data cannot be used for calculations and manual logs are required. This most commonly occurs with paint booths. To avoid calculating emissions from the EESOH-MIS material usage records and the manually entered records in APIMS, these usage records can be excluded from the interface.

To exclude consumption from specific processes, select the process record then click on the **Information** tab, under the **Process** tab. Click the **Yes** radio button for **Exclude Consumption records from EESOH-MIS Interface?**



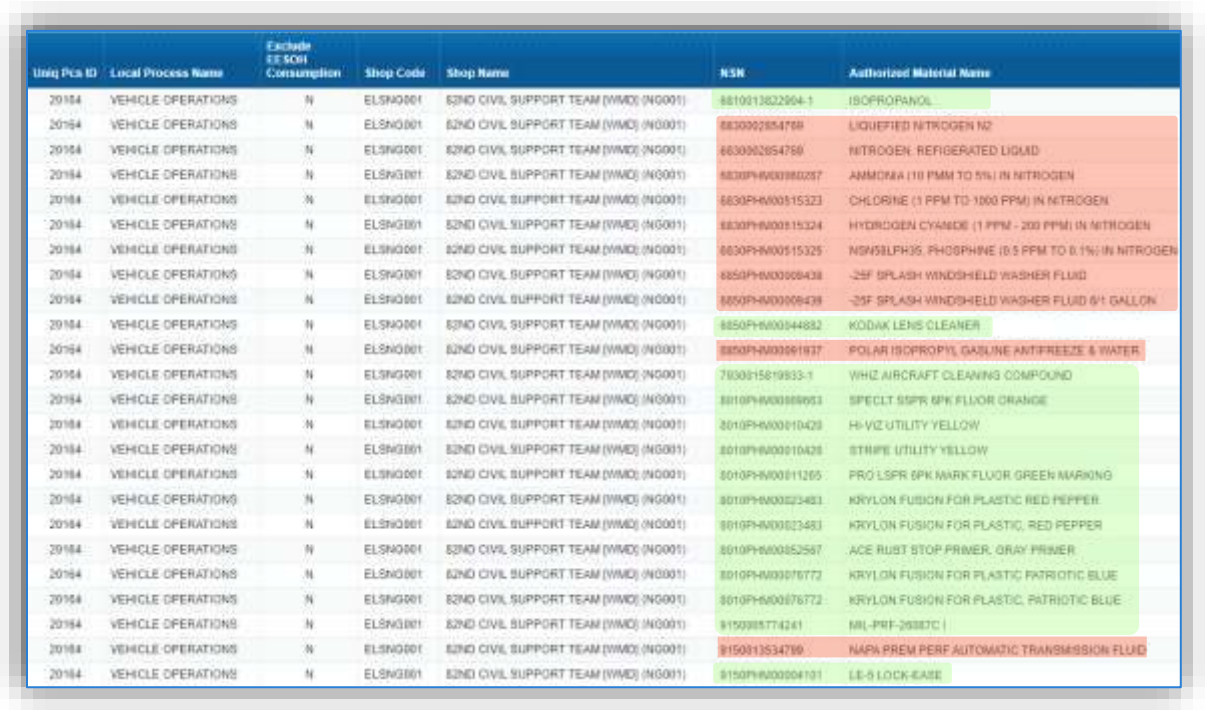
To properly identify which processes should have the consumption excluded, the Next Higher Process Roll-up Summary report can be used to view all the materials authorized to a particular process. The first step is to identify processes that may need to be excluded.



The process shown above is called “ANTIFREEZE/COOLANT” and only had antifreeze materials authorized for use. As shown the flag to exclude consumption has not been set to “Y” as it should. Antifreeze should never be included in an air emission calculation because of the way that it is used. Antifreeze is received and stored in a sealed container until it is put into a vehicle which is a closed system, meaning it does not evaporate into the air. When the antifreeze is no longer of use, it is drained from the vehicle and disposed of as hazardous waste. At no time during its lifecycle is it exposed to the air to evaporate; including the EESOH-MIS usage in an emission calculation is the equivalent of pouring the entire container on the ground and letting it sit and evaporate until completely gone.

Other examples of materials, similar to antifreeze that spend their entire lifecycle in closed systems are cylinder gases, motor fuel treatments, hydraulic fluid, brake fluid, and motor oil. All of these materials should not have the usage validated and if possible, process usage should be excluded from coming over in future interface runs.

However sometimes these materials are not easily excluded. They may be authorized to a process that has other materials that the usage should be accounted for.



Uniq Pcs ID	Local Process Name	Exclude EESOH Consumption	Shop Code	Shop Name	NSN	Authorized Material Name
20164	VEHICLE OPERATIONS	N	ELSNG001	62ND CIVIL SUPPORT TEAM (WMD) (NG001)	6810013622904-1	ISOPROPANOL
20164	VEHICLE OPERATIONS	N	ELSNG001	62ND CIVIL SUPPORT TEAM (WMD) (NG001)	6830002854768	LIQUEFIED NITROGEN N2
20164	VEHICLE OPERATIONS	N	ELSNG001	62ND CIVIL SUPPORT TEAM (WMD) (NG001)	6830002854769	NITROGEN, REFRIGERATED LIQUID
20164	VEHICLE OPERATIONS	N	ELSNG001	62ND CIVIL SUPPORT TEAM (WMD) (NG001)	6830PHM000860257	AMMONIA (10 PMM TO 5%) IN NITROGEN
20164	VEHICLE OPERATIONS	N	ELSNG001	62ND CIVIL SUPPORT TEAM (WMD) (NG001)	6830PHM000515323	CHLORINE (1 PPM TO 1000 PPM) IN NITROGEN
20164	VEHICLE OPERATIONS	N	ELSNG001	62ND CIVIL SUPPORT TEAM (WMD) (NG001)	6830PHM000515324	HYDROGEN CYANIDE (1 PPM - 200 PPM) IN NITROGEN
20164	VEHICLE OPERATIONS	N	ELSNG001	62ND CIVIL SUPPORT TEAM (WMD) (NG001)	6830PHM000515325	NSN/SILPH3S, PHOSPHINE (0.5 PPM TO 0.1%) IN NITROGEN
20164	VEHICLE OPERATIONS	N	ELSNG001	62ND CIVIL SUPPORT TEAM (WMD) (NG001)	6850PHM000008438	-25F SPLASH WINDSHIELD WASHER FLUID
20164	VEHICLE OPERATIONS	N	ELSNG001	62ND CIVIL SUPPORT TEAM (WMD) (NG001)	6850PHM000008439	-25F SPLASH WINDSHIELD WASHER FLUID 6/1 GALLON
20164	VEHICLE OPERATIONS	N	ELSNG001	62ND CIVIL SUPPORT TEAM (WMD) (NG001)	6850PHM000344832	KODAK LENS CLEANER
20164	VEHICLE OPERATIONS	N	ELSNG001	62ND CIVIL SUPPORT TEAM (WMD) (NG001)	6850PHM000661937	POLAR ISOPROPYL GASLINE ANTIFREEZE & WATER
20164	VEHICLE OPERATIONS	N	ELSNG001	62ND CIVIL SUPPORT TEAM (WMD) (NG001)	7930015819833-1	WHIZ AIRCRAFT CLEANING COMPOUND
20164	VEHICLE OPERATIONS	N	ELSNG001	62ND CIVIL SUPPORT TEAM (WMD) (NG001)	8010PHM000869953	SPECLT SSPR 6PK FLUOR ORANGE
20164	VEHICLE OPERATIONS	N	ELSNG001	62ND CIVIL SUPPORT TEAM (WMD) (NG001)	8010PHM000810420	HI-VIZ UTILITY YELLOW
20164	VEHICLE OPERATIONS	N	ELSNG001	62ND CIVIL SUPPORT TEAM (WMD) (NG001)	8010PHM000810426	STRIPE UTILITY YELLOW
20164	VEHICLE OPERATIONS	N	ELSNG001	62ND CIVIL SUPPORT TEAM (WMD) (NG001)	8010PHM000811265	PRO LSPR 6PK MARK FLUOR GREEN MARKING
20164	VEHICLE OPERATIONS	N	ELSNG001	62ND CIVIL SUPPORT TEAM (WMD) (NG001)	8010PHM000823483	KRYLON FUSION FOR PLASTIC RED PEPPER
20164	VEHICLE OPERATIONS	N	ELSNG001	62ND CIVIL SUPPORT TEAM (WMD) (NG001)	8010PHM000823483	KRYLON FUSION FOR PLASTIC, RED PEPPER
20164	VEHICLE OPERATIONS	N	ELSNG001	62ND CIVIL SUPPORT TEAM (WMD) (NG001)	8010PHM000852587	ACE RUST STOP PRIMER, GRAY PRIMER
20164	VEHICLE OPERATIONS	N	ELSNG001	62ND CIVIL SUPPORT TEAM (WMD) (NG001)	8010PHM000876772	KRYLON FUSION FOR PLASTIC PATRIOTIC BLUE
20164	VEHICLE OPERATIONS	N	ELSNG001	62ND CIVIL SUPPORT TEAM (WMD) (NG001)	8010PHM000876772	KRYLON FUSION FOR PLASTIC, PATRIOTIC BLUE
20164	VEHICLE OPERATIONS	N	ELSNG001	62ND CIVIL SUPPORT TEAM (WMD) (NG001)	9150005774241	MIL-PRF-25567C I
20164	VEHICLE OPERATIONS	N	ELSNG001	62ND CIVIL SUPPORT TEAM (WMD) (NG001)	9150013534799	NAPA PREM PERF AUTOMATIC TRANSMISSION FLUID
20164	VEHICLE OPERATIONS	N	ELSNG001	62ND CIVIL SUPPORT TEAM (WMD) (NG001)	9150PHM000004101	LE-9 LOCK-EASE

As shown above, this process contains several materials that should be included and several that should be excluded, therefore this process cannot utilize the Exclude EESOH Consumption flag. The usage must be included and excluded by utilizing the validated flag in the Consumption log.

Note: When these types of processes are encountered it is encouraged to discuss changing the process and material authorization structure in EESOH to separate the materials onto different processes that can utilize the Exclude EESOH Consumption Flag functionality in the future.

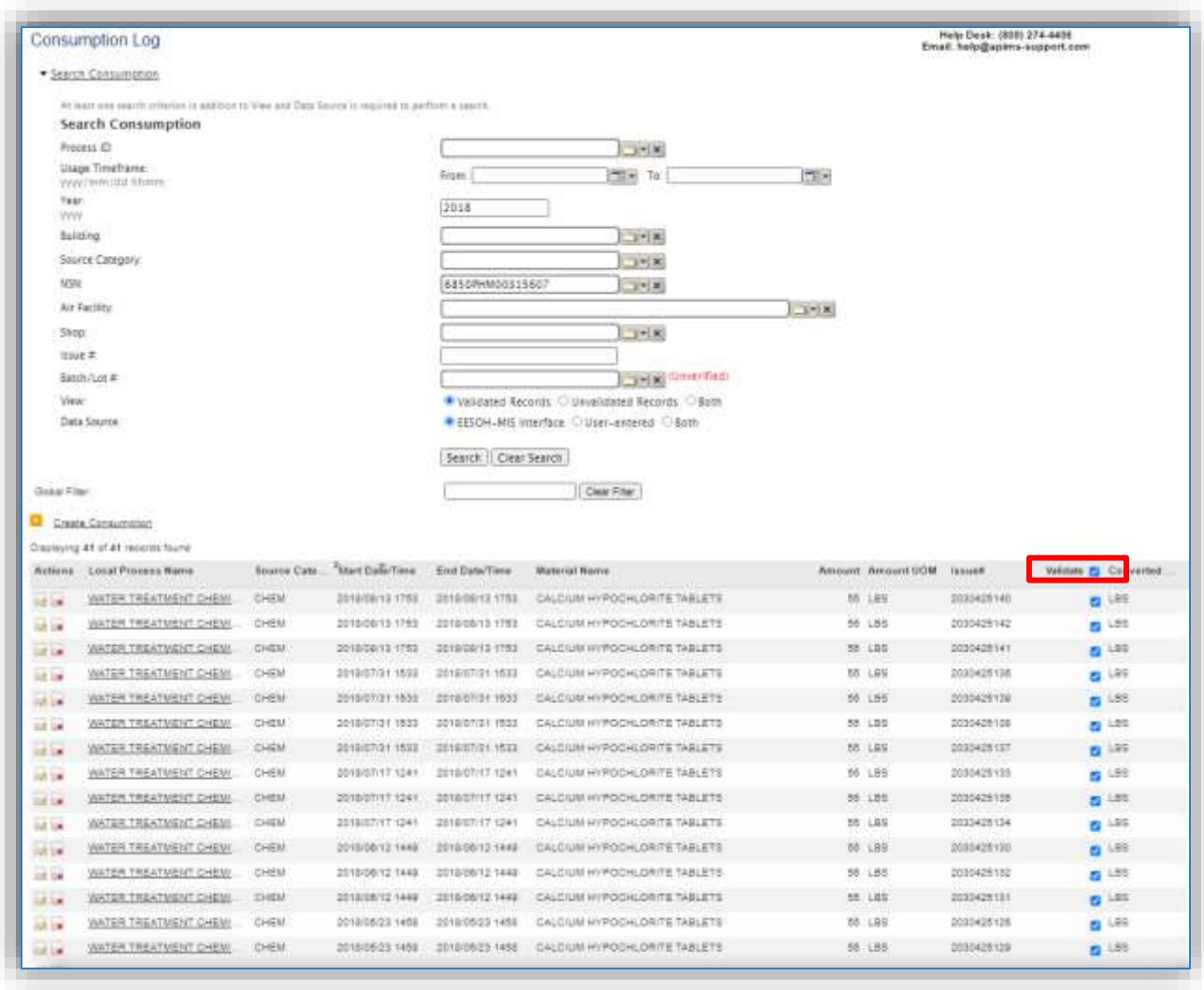
2.6.2.6 Validate Usage

The EESOH-MIS interface transfers over the usage for processes not set to be excluded. These records must be reviewed to validate/unvalidate the processes usage. Validating the correct usages can be complicated. The best way to ensure the correct usages are validated is to review the materials. Also, consider if the usage goes into a closed system such as brake fluid or transmission fluid. These products do not emit pollutants due to how they are used. For example, brake fluid and motor oil are poured into closed systems and are not exposed to the air, eliminating the possibility of evaporation/emission to the atmosphere. The Global Filter capability can be used to identify rows of these products (e.g., antifreeze, brake fluid, engine oils, hydraulic fluids etc.). Once the rows are identified, verify the box is unchecked for these rows, to ensure they are not included in the emissions calculations. Additionally, some general chemical processes do not emit air pollutants such as bagged concrete or cold patch asphalt. Again, once the rows are identified, verify the box is unchecked to not validate these rows, to ensure they are not included in the emissions calculations.

The quickest, easiest, and most thorough way to validate the usage for air emissions is to review the records using the EESOH Consumption report to view all EESOH-MIS consumption for the specified year.

Unique ID	Local Process Name	VOC Emissions (lbs)	Converted Q	Converted	Validated	NSN	Material Name
11287	CONCRETE / ASPHALT REPAIR	0	1,640.0	LBS	Y	5610PHM00009756	C1: PORTLAND CEMENT BASED CONCRETE PRODUCTS
11287	CONCRETE / ASPHALT REPAIR	0	1,600.0	LBS	Y	5610PHM00009756	C1: PORTLAND CEMENT BASED CONCRETE PRODUCTS
11287	CONCRETE / ASPHALT REPAIR	0	1,480.0	LBS	Y	5610PHM00009756	C1: PORTLAND CEMENT BASED CONCRETE PRODUCTS
11287	CONCRETE / ASPHALT REPAIR	0	1,120.0	LBS	Y	5610PHM00009756	C1: PORTLAND CEMENT BASED CONCRETE PRODUCTS
11552	WATER TREATMENT CHEMICALS		1,000.0	LBS	Y	6810PHM00058868	SODIUM BISULFATE, ANHYDROUS, TECHNICAL GRADE
11287	CONCRETE / ASPHALT REPAIR		900.0	LBS	Y	5610PHM00054890	FIVE STAR HIGHWAY PATCH / FIVE STAR HIGHWAY PATCH FR
10208	SPILL CLEANUP		750.0	LBS	Y	8135013242664	VERMICULITE, ALL GRADES- ULINE GRADES: GRADE 4, GRADE 3, GRADE 2, GRADE 1
10208	SPILL CLEANUP		750.0	LBS	Y	8135013242664	VERMICULITE, ALL GRADES- ULINE GRADES: GRADE 4, GRADE 3, GRADE 2, GRADE 1
10209	SPILL CLEANUP		750.0	LBS	Y	8135013242664	VERMICULITE, ALL GRADES- ULINE GRADES: GRADE 4, GRADE 3, GRADE 2, GRADE 1
10209	SPILL CLEANUP		750.0	LBS	Y	8135013242664	VERMICULITE, ALL GRADES- ULINE GRADES: GRADE 4, GRADE 3, GRADE 2, GRADE 1
11552	WATER TREATMENT CHEMICALS		500.0	LBS	Y	6810PHM00106237	SODIUM BICARBONATE
11552	WATER TREATMENT CHEMICALS		330.478	LBS	Y	6850PHM00104482	UNITED 756 LIFT-ZYME
11552	WATER TREATMENT CHEMICALS		330.478	LBS	Y	6850PHM00104482	UNITED 756 LIFT-ZYME
11552	WATER TREATMENT CHEMICALS		330.0	LBS	Y	6850PHM00315607	CALCIUM HYPOCHLORITE TABLETS
11552	WATER TREATMENT CHEMICALS		275.0	LBS	Y	6850PHM00315607	CALCIUM HYPOCHLORITE TABLETS
11552	WATER TREATMENT CHEMICALS		220.0	LBS	Y	6850PHM00315607	CALCIUM HYPOCHLORITE TABLETS
11552	WATER TREATMENT CHEMICALS		220.0	LBS	Y	6850PHM00315607	CALCIUM HYPOCHLORITE TABLETS
11552	WATER TREATMENT CHEMICALS		220.0	LBS	Y	6850PHM00315607	CALCIUM HYPOCHLORITE TABLETS
11552	WATER TREATMENT CHEMICALS		220.0	LBS	Y	6850PHM00315607	CALCIUM HYPOCHLORITE TABLETS
11552	WATER TREATMENT CHEMICALS		196.952	LBS	Y	6850PHM00047497	INSTANT POOL WATER CONDITIONER
11552	WATER TREATMENT CHEMICALS		165.239	LBS	Y	6850PHM00104482	UNITED 756 LIFT-ZYME
11552	WATER TREATMENT CHEMICALS		165.239	LBS	Y	6850PHM00104482	UNITED 756 LIFT-ZYME
11552	WATER TREATMENT CHEMICALS		165.0	LBS	Y	6850PHM00315607	CALCIUM HYPOCHLORITE TABLETS
11552	WATER TREATMENT CHEMICALS		165.0	LBS	Y	6850PHM00315607	CALCIUM HYPOCHLORITE TABLETS
11552	WATER TREATMENT CHEMICALS		165.0	LBS	Y	6850PHM00315607	CALCIUM HYPOCHLORITE TABLETS
11552	WATER TREATMENT CHEMICALS		165.0	LBS	Y	6850PHM00315607	CALCIUM HYPOCHLORITE TABLETS
11552	WATER TREATMENT CHEMICALS		147.7134	LBS	Y	6850PHM00318557	PINCH A PENNY LIQUID CHLORINATING PRODUCT (AKA SUNCOAST LIQUID GOLD)
11552	WATER TREATMENT CHEMICALS		110.0	LBS	Y	6850PHM00315607	CALCIUM HYPOCHLORITE TABLETS

In the example above, **all records** should be unvalidated as these materials do not emit pollutants based on how they are used. Navigate to the Consumption module and search for these records using the material NSN, usage year, and select both the **Validated Records** and **EESOH-MIS Interface** radio buttons.



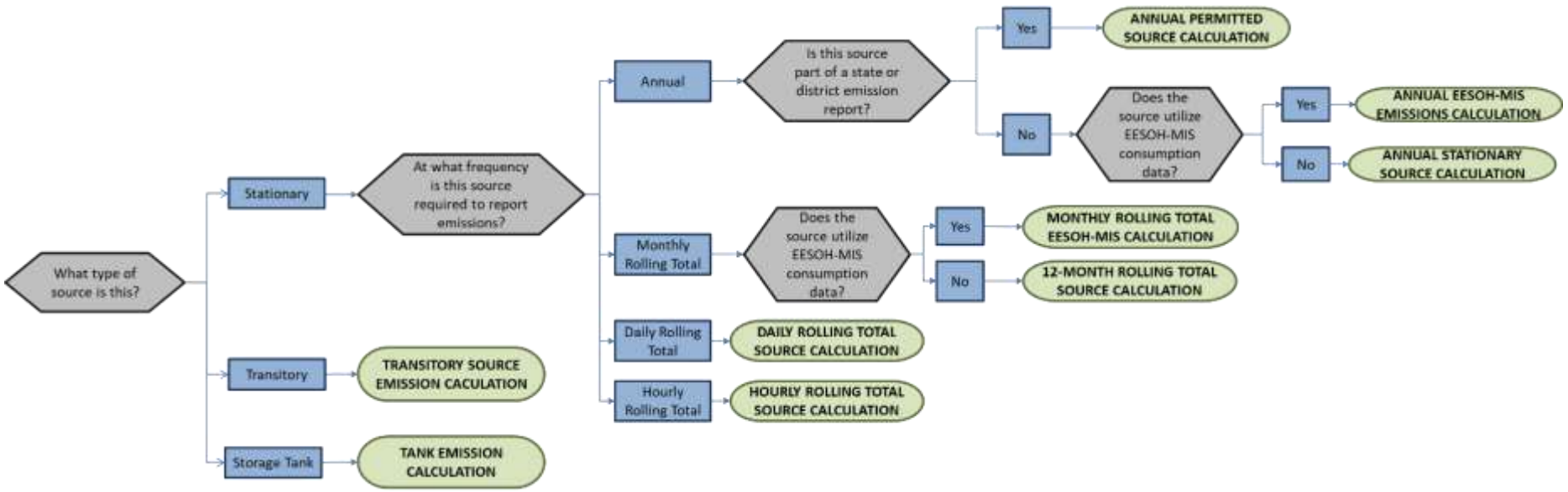
Uncheck the **Validate** box at the top of the search results grid. Then click save. Repeat this step until all materials are validated or unvalidated according to their use type.

2.7 Emissions Calculations

The Emission Calculation module in APIMS is used to calculate emissions from all sources except storage Tanks. Storage tank emission calculations are calculated using the Tank Emission Calculation module.

2.7.1 Calculation Configuration

To properly configure the stationary emission calculations for an installation several factors must be considered for each source. The flow chart on the next page can be used to determine the correct calculation for each source.

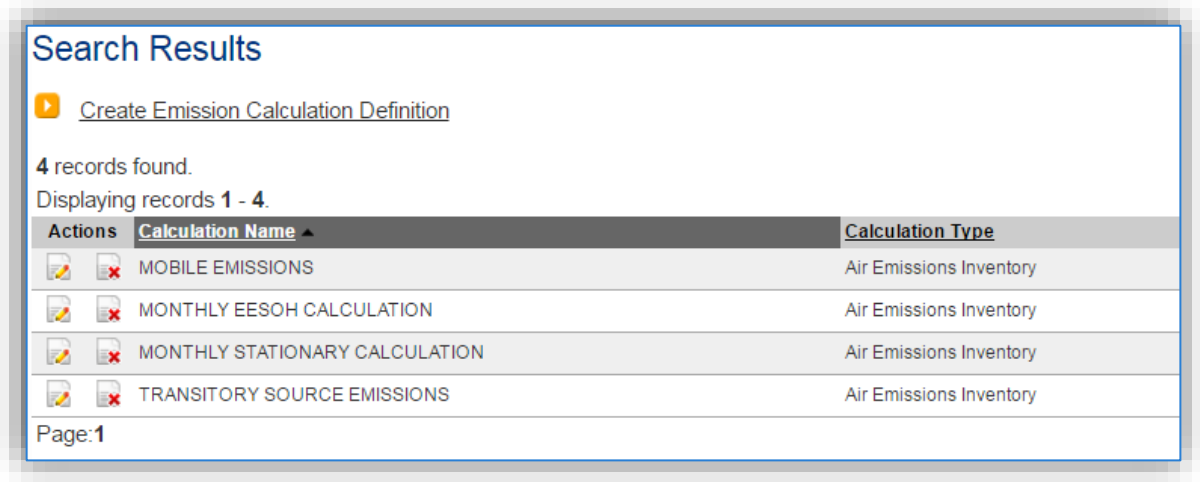

What type of source is this?
Stationary
At what frequency is this source required to report emissions?
Annual
Is this source part of a state or district emission report?
Yes
ANNUAL PERMITTED SOURCE CALCULATION
No
Does the source utilize EESOH-MIS consumption data?
Yes
ANNUAL EESOH-MIS EMISSIONS CALCULATION
No
ANNUAL STATIONARY SOURCE CALCULATION
Monthly Rolling Total
Does the source utilize EESOH-MIS consumption data?
Yes
MONTHLY ROLLING TOTAL EESOH-MIS CALCULATION
No
12-MONTH ROLLING TOTAL SOURCE CALCULATION
Daily Rolling Total
DAILY ROLLING TOTAL SOURCE CALCULATION
Hourly Rolling Total
HOURLY ROLLING TOTAL SOURCE CALCULATION
Transitory
TRANSITORY SOURCE EMISSION CACULATION
Storage Tank
TANK EMISSION CALCULATION

As this flowchart is used, there will potentially be several calculations recommended for the various sources. Only the calculations that apply to the specific sources at your installation should be configured in the Emission Calculation module. For instance, if your installation is a minor source of emissions, usually only the ANNUAL EESOH-MIS EMISSIONS CALCULATION and ANNUAL STATIONARY SOURCE CALCULATION need to be configured. However, installations that have more stringent reporting requirements will have a more complex configuration. By utilizing this flow chart and logically grouping sources, the Air Force and regulatory agency reporting requirements should be met with a minimal amount of data to maintain.

The unique combination of source, time interval and pollutant must be unique to avoid the duplication of emissions for a source. Avoid associating a process to more than one calculation if at all possible.

To configure an annual stationary source emission calculation, navigate to the Emission Calculation homepage by clicking on **Emission Calculation** under the **Calculations** tab.

To view the existing calculation configuration, click the Search button.



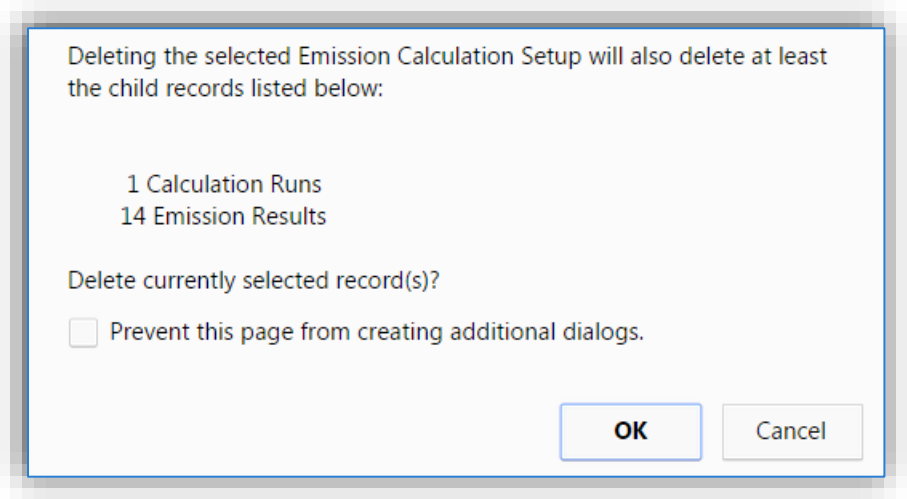
The existing emissions calculations will be displayed in the results grid. The results shown above are configured in accordance with the flowchart specified above. As new sources are configured, they only need to be associated to one of the existing calculations. However, if the search results grid appears like the example below, a data clean up and reconfiguration should be completed to streamline the emission calculations from year to year.

Do not create a new calculation for each source category or reporting period. This only leads to clutter and confusion in the database and makes emission reporting exponentially more difficult.

Example of incorrectly configured calculations

If your installation has a configuration like this, it is recommended to delete the calculations that are greater than 5 years old as they are no longer required for regulatory purposes. This way no emission results will be lost and the database can slowly be decluttered without any regulatory risk to the installation. As each new year is calculated it should utilize the recommended model.

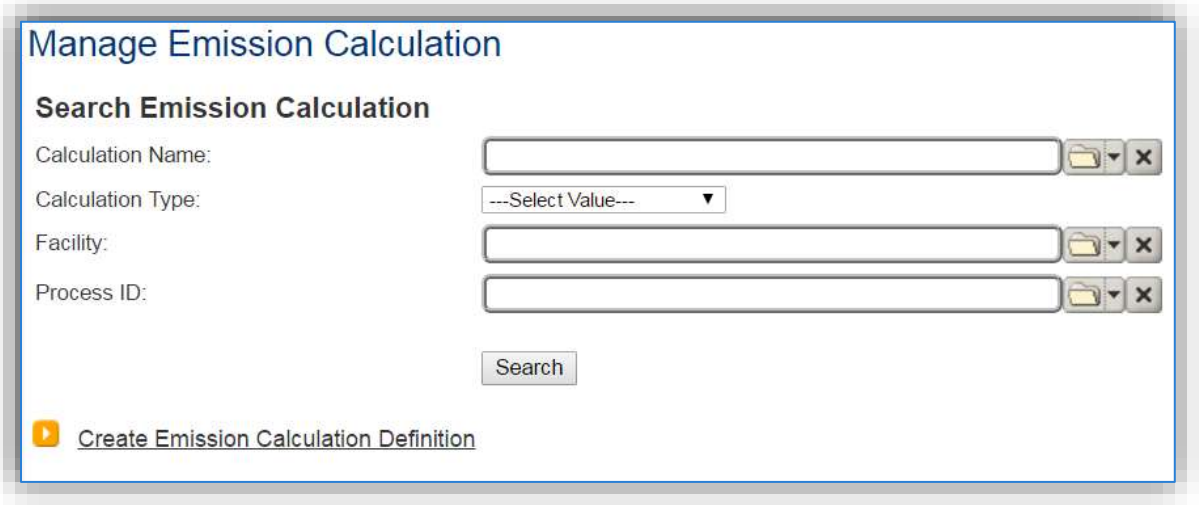
To delete a calculation, click the delete icon next to the record. This will prompt a pop-up window that displays the records that will be deleted.



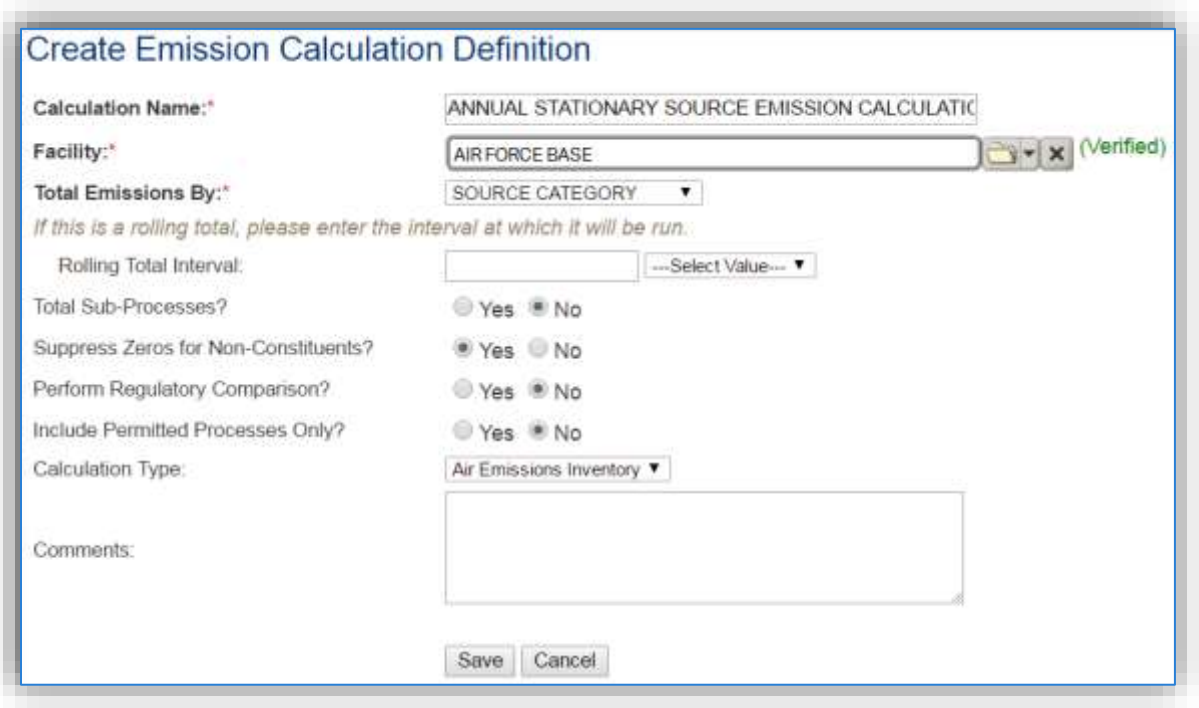
This message states that there are 14 emission results (7 criteria pollutants for 2 processes) and 1 calculation run (time period) that will be deleted. Click the **OK** button to complete the deletion.

2.7.1.1 New Calculation

If based on the flowchart logic and a review of the existing calculations a new calculation needs to be configured, click the Create Emission Calculation Definition hyperlink on the Manage Emission Calculation screen.



This will navigate you to the Create Emission Calculation Definition page. It is important to configure this data correctly prior to saving. Once the record is saved, many of these fields cannot be edited.



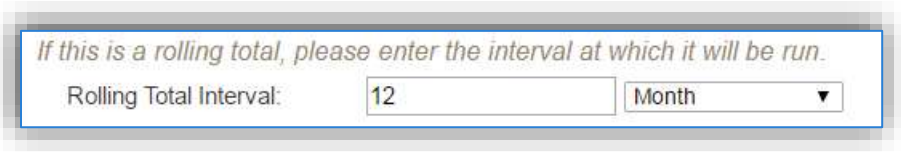
The **Calculation Name** should identify the frequency of the calculation and the group of sources included in the calculation. For example:

- ANNUAL STATIONARY SOURCES
- ANNUAL EESOH-MIS SOURCES
- ANNUAL PERMITTED SOURCES
- MONTHLY ROLLING TOTAL SOURCES
- DAILY ROLLING TOTAL SOURCES
- HOURLY ROLLING TOTAL SOURCES
- HOURLY PAINT BOOTH ROLLING TOTALS
- TRANSITORY SOURCES

The **Facility** needs to be specified. If there are multiple facilities they will each need their own set of emission calculations. Only the Unique Process records with the specified facility will be able to be associated to the calculation.

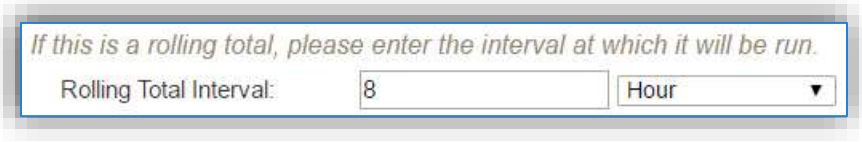
The **Total Emissions By** field is used to identify the groups of processes that are part of this calculation. These groupings can be based on source type, building number, location etc. It is recommended to select SOURCE CATEGORY in this field.

If the process is for a rolling total type calcuation, then the **Rolling Total Interval** fields must be configured. If the calculation is a 12-month rolling total calculation, the calculation will be run monthly and the rolling totals will be for the calculated month and previous 11 months of emission results (November 2015 to October 2016). To configure this type of calculation properly, enter 12 in the **Rolling total Interval** field and Month in the frequency field.



For daily rolling totals it should be as follows:

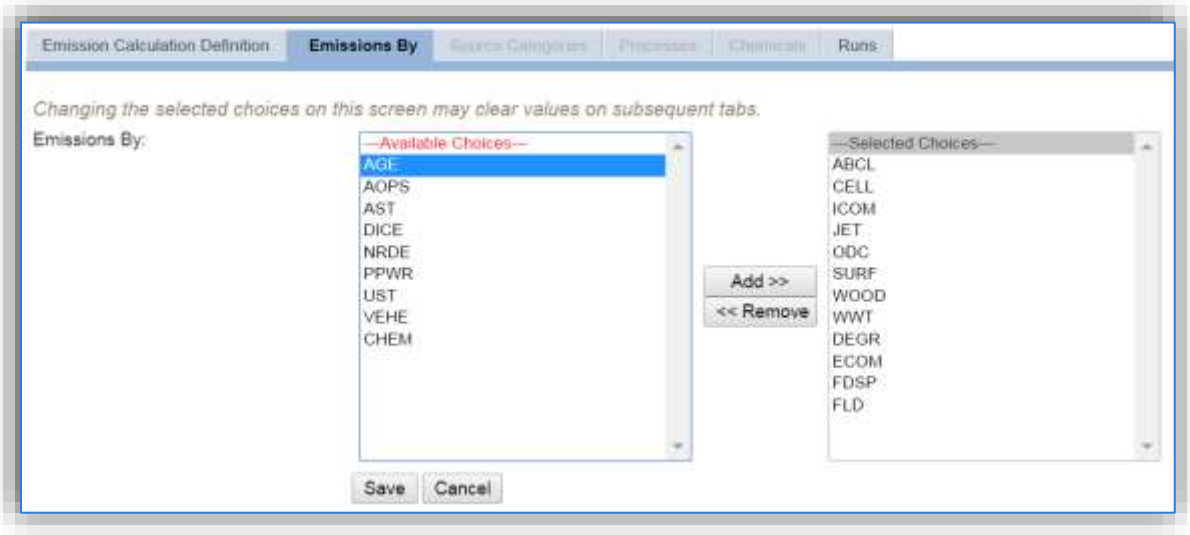
For 8 hour rolling totals:



The **Total Sub-Processes?** should only be selected as "Yes" for EESOH-MIS source calculations. This allows the consumption records for the processes inserted by the interface to be rolled-up to the Next Higher Process that groups the processes together.

The Air Emissions Inventory item should be selected in the **Calculation Type** field.

Click the **Save** button to create the calculation. The next tab is the *Emissions By* tab



This screen is used to select the type of processes that will show up on the Processes tab to be associated to the calculation.

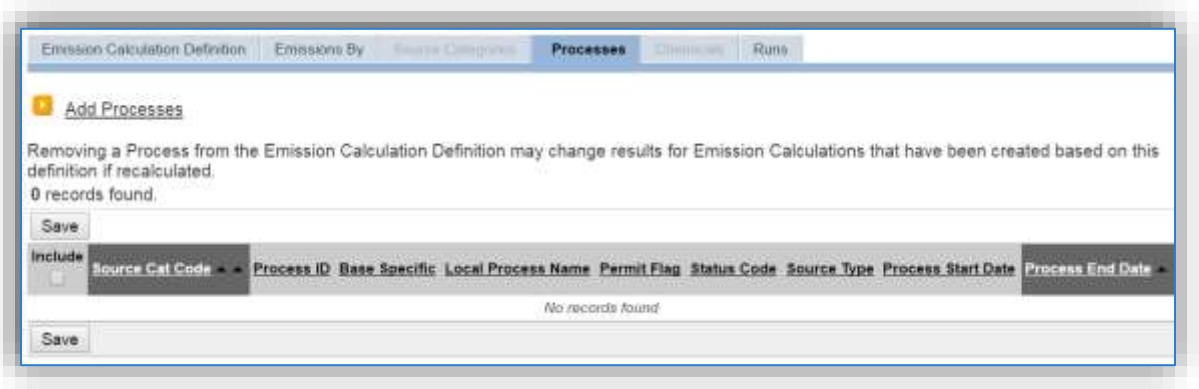
To select a source category, click on the row to highlight it. Next, click the **Add>>** button to move the record from the left box to the right box.

Only the processes that are in the source categories selected will be available to associate to the calculation.

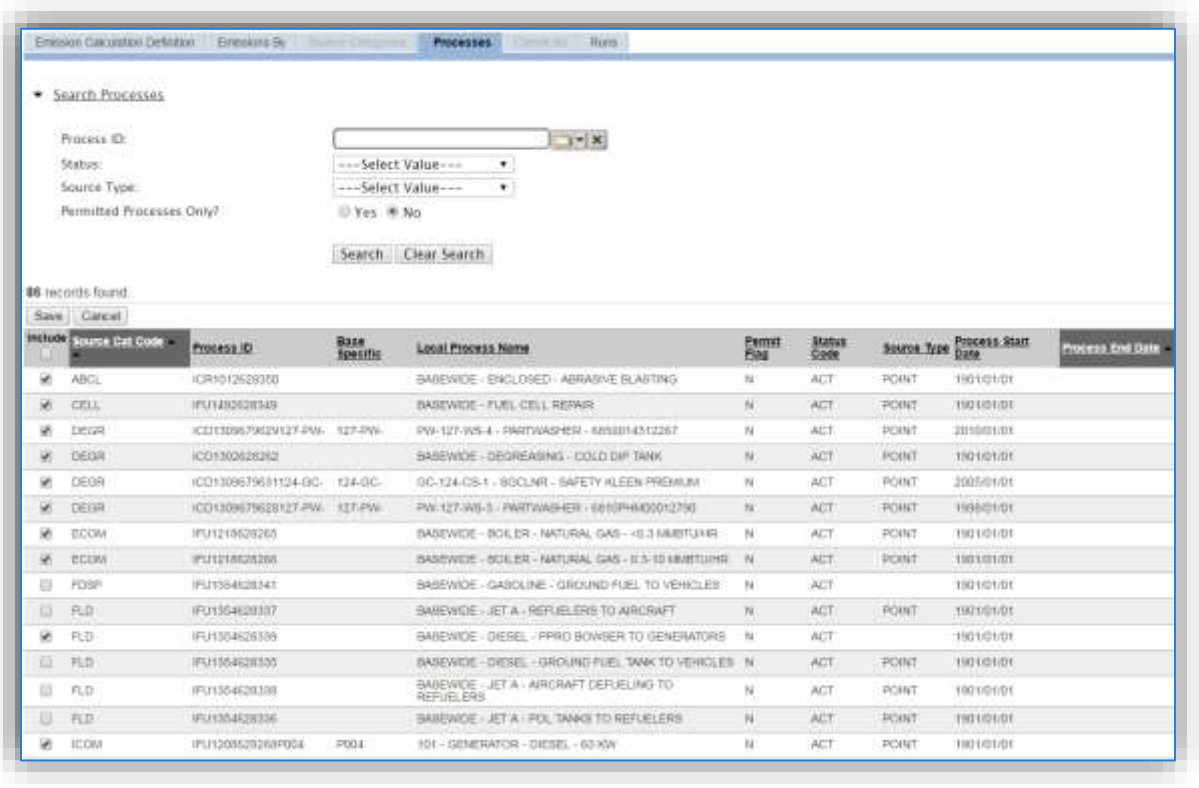
To remove an item from the right box, click on the row and highlight it. Next, click the **<<Remove** button to move the record back to the left box.

Click the **Save** button to save the selections. Once the save has completed the *Processes* tab will become activated.

The *Processes* tab is used to select the processes that should be included in this emission calculation.



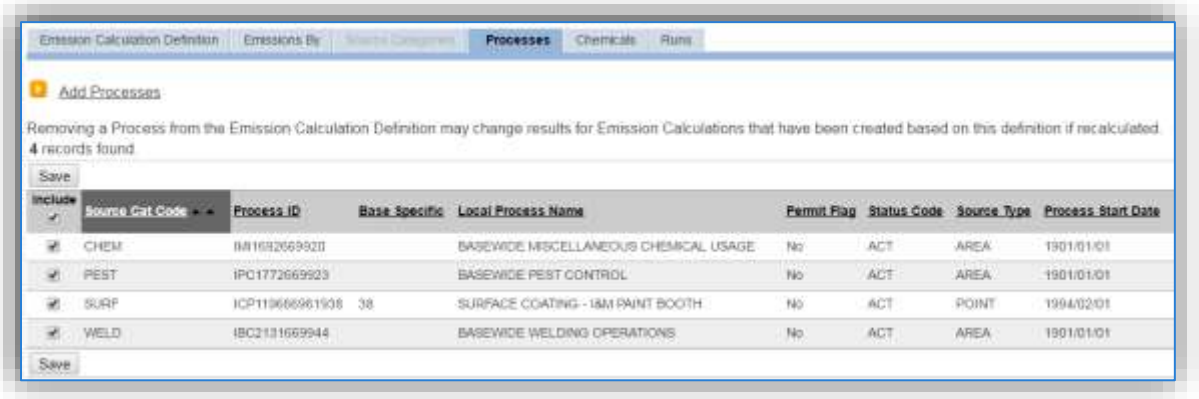
Click the Add Processes hyperlink to associate processes to the calculation.



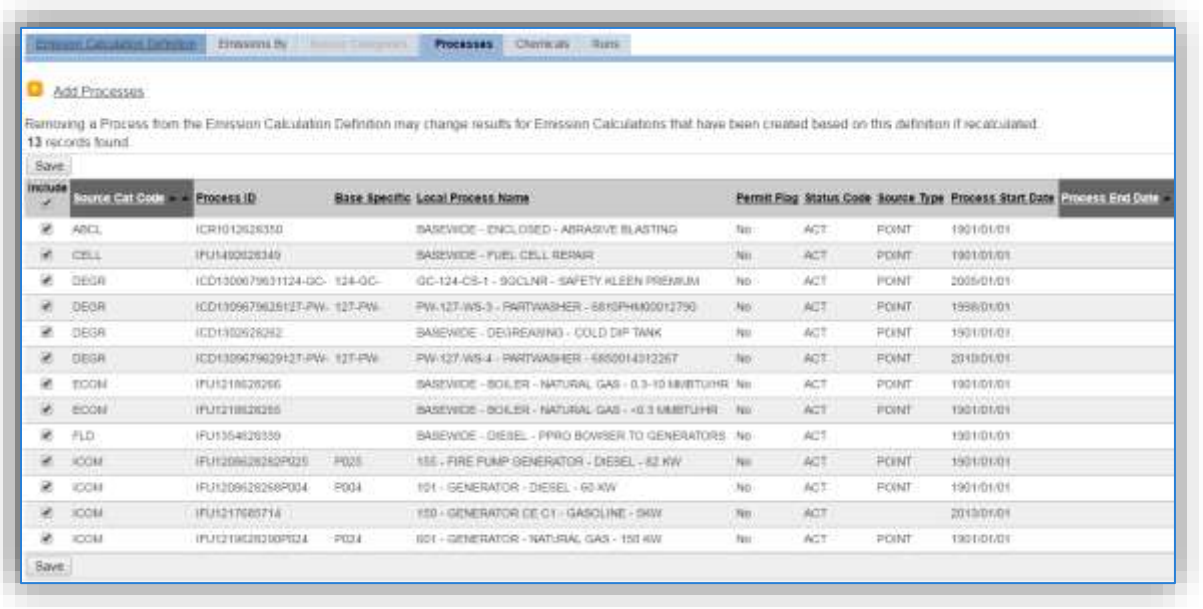
The Search Processes hyperlink can be used to expose the search fields.

Click the check boxes next to the processes that should be associated to this calculation. Click the **Save** button at the top of the grid.

Be careful to only associate stationary sources to the stationary calculation. Some sources in the Internal Combustion (ICOM), Fuel Loading (FLD) and Fuel Dispensing (FDSP) source categories may be mobile sources and should not be included in stationary source calculations.

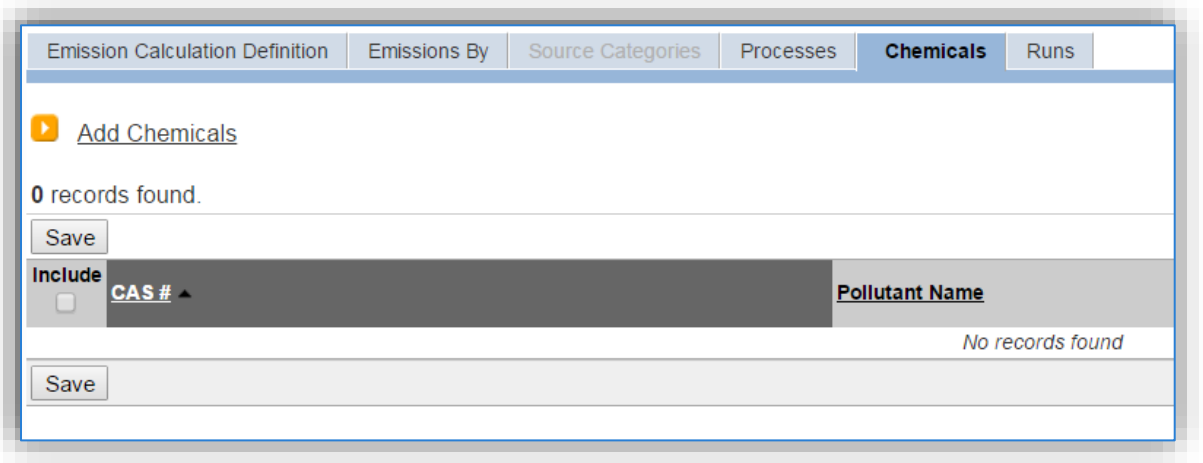


For EESOH-MIS calculations, only associate the Next Higher Processes to the calculation. Also do not include any surface coating processes that use manual logs to the EESOH-MIS calculation.

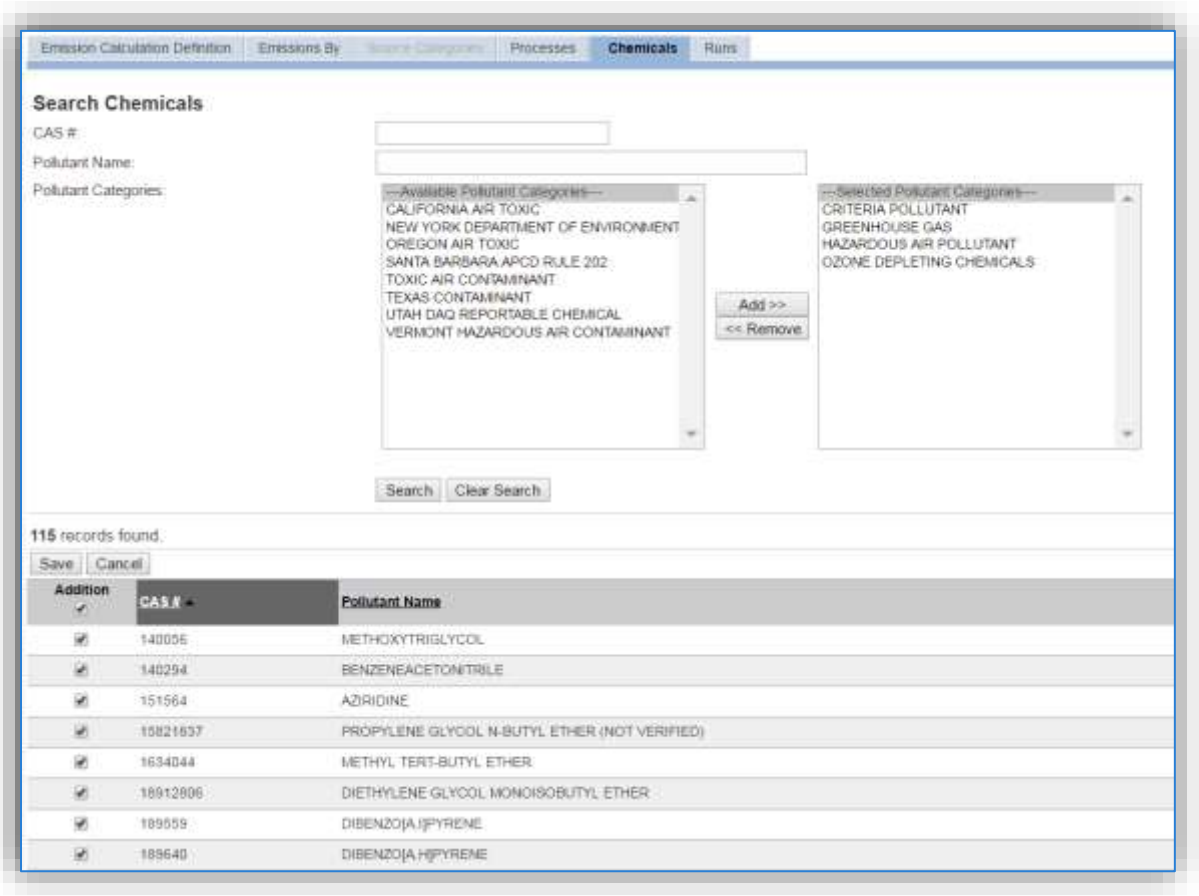


The processes that are associated to the calculation will now appear on the *Processes* tab. To remove a process, unclick the checkbox and click **Save**. The process will remain in the list without the checkbox selected and will not be part of future calculation runs.

Next, navigate to the *Chemicals* tab.



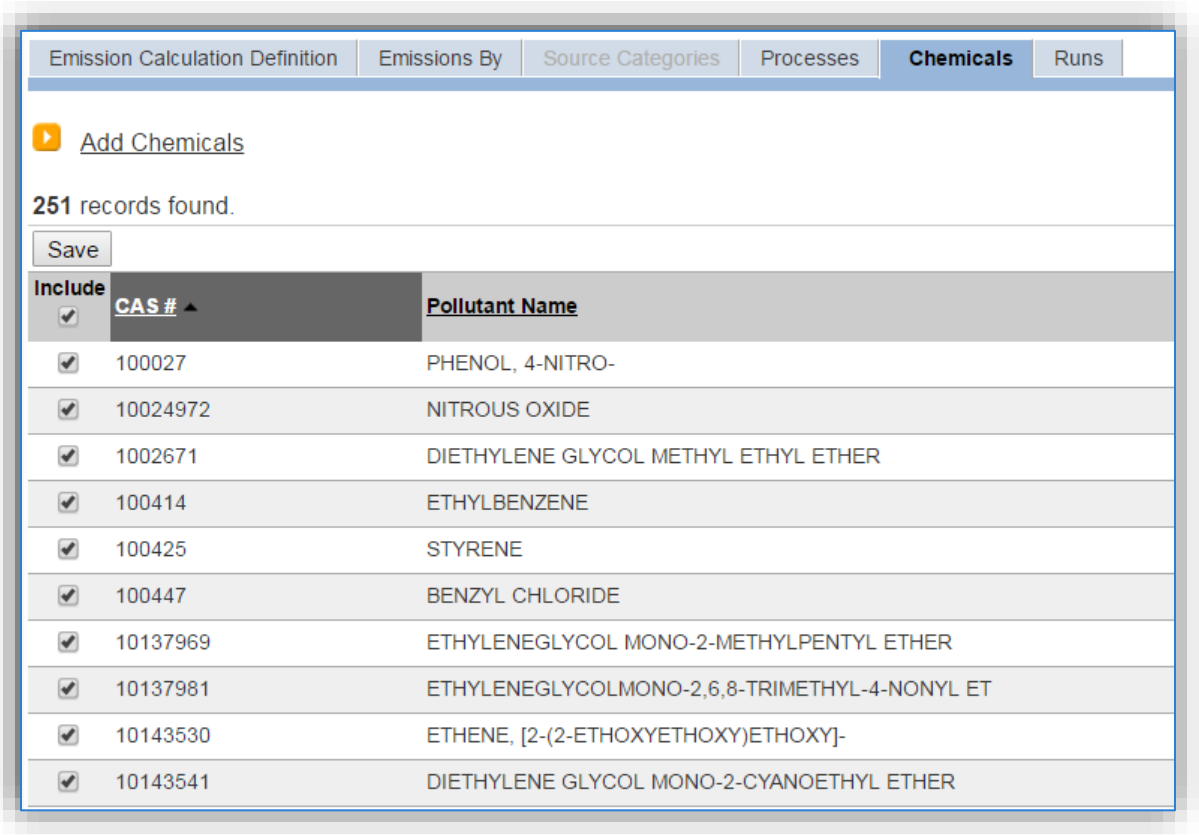
To specify which chemicals/pollutants will be calculated for in the emissions results, click the Add Chemicals hyperlink.



The Search fields can be used to filter the grid below. However to ensure that all pollutants are accounted for, it is recommended to select all available pollutants even if the pollutants are not required by the Air Force or regulatory agency. The pollutants that are reported can be more easily excluded from reports than they can be added to calculations so it is better to calculate for more than necessary.

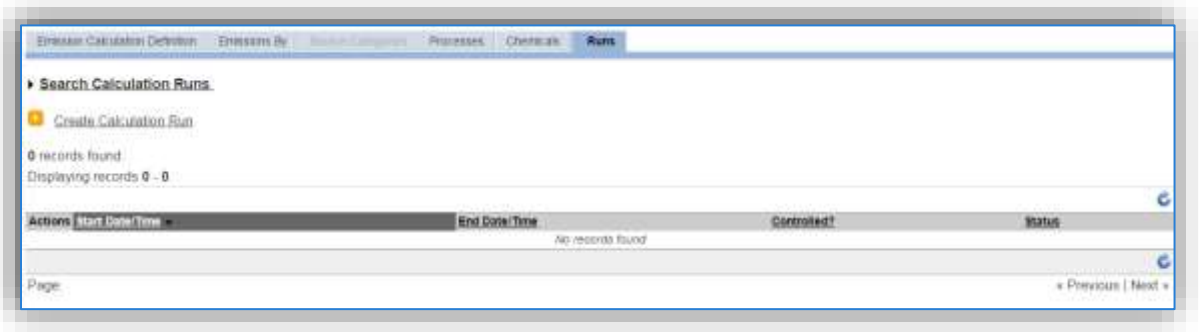
It is easier to execute the calculation for more pollutants than are required for reporting and filter the reports than it is to go back and add the pollutant to the calculation.

Once all pollutants have been selected, click the **Save** button.

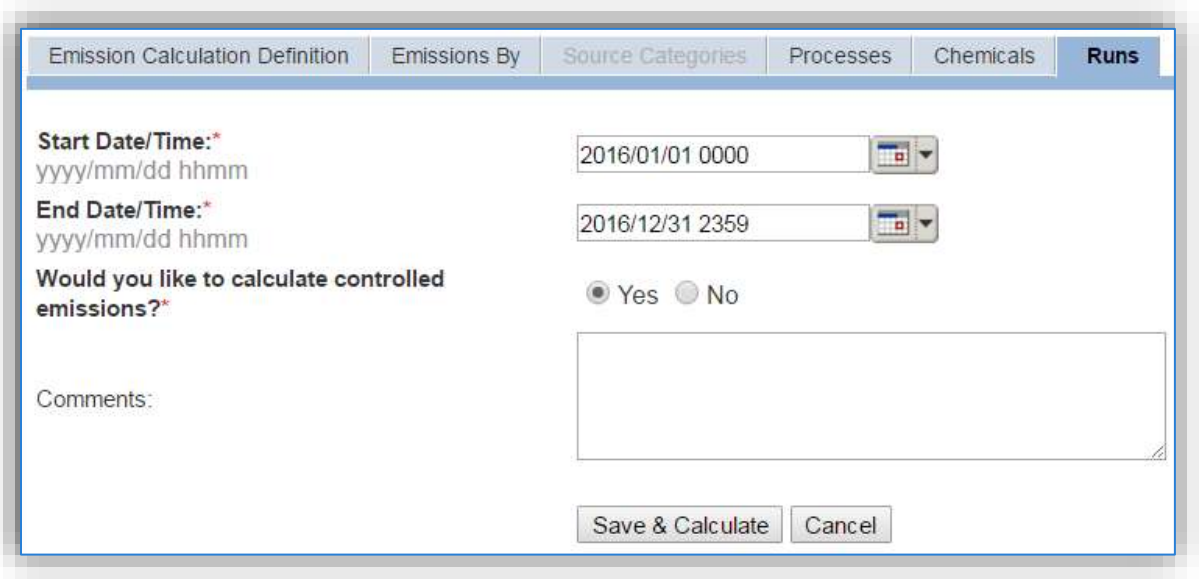


Include	CAS #	Pollutant Name
☑	100027	PHENOL, 4-NITRO-
☑	10024972	NITROUS OXIDE
☑	1002671	DIETHYLENE GLYCOL METHYL ETHYL ETHER
☑	100414	ETHYLBENZENE
☑	100425	STYRENE
☑	100447	BENZYL CHLORIDE
☑	10137969	ETHYLENEGLYCOL MONO-2-METHYLPENTYL ETHER
☑	10137981	ETHYLENEGLYCOLMONO-2,6,8-TRIMETHYL-4-NONYL ET
☑	10143530	ETHENE, [2-(2-ETHOXYETHOXY)ETHOXY]-
☑	10143541	DIETHYLENE GLYCOL MONO-2-CYANOETHYL ETHER

The last tab is the *Runs* tab, used to run the calculation for specific time periods.



Click the Create Calculation Run hyperlink.



Enter the calculation time period start date and time in the **Start Date/Time** field.

For ANNUAL calculations this is usually the first day of the calendar year 2016/01/01 0000.

For MONTHLY calculations this is the first day of the month 2016/06/01 0000.

For HOURLY calculations this is the first hour of the calculation period 2016/06/01 0800.

Enter the calculation time period end date and time in the **End Date/Time** field.

For ANNUAL calculations this is usually the last day of the calendar year 2016/12/31 2359.

For MONTHLY calculations this is the last day of the month 2016/06/30 2359.

For HOURLY calculations this is the last hour of the calculation period 2016/06/01 2359.

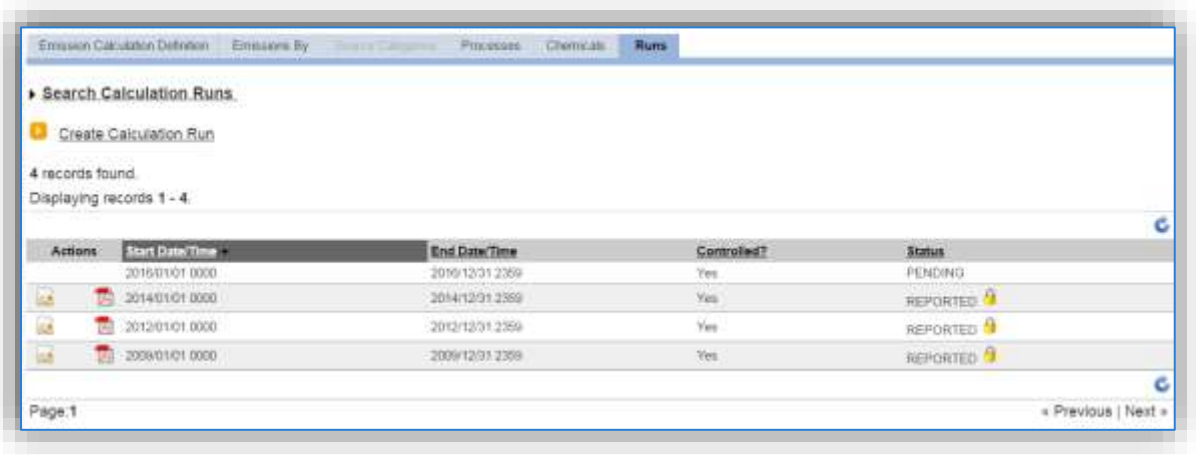
Make sure to calculate to the last minute of the time period to ensure that all the emissions for that time period are accounted for.

Usually daily and hourly calculations are only run at a set frequency. To run multiple calculation runs at once, enter the start date of the first run and the end date of the last run. APIMS will automatically generate the correct number of runs based on the calculation configuration in the Rolling Interval fields on the Emission Calculation Definition tab.

The **Would you like to calculate controlled emissions?** field is used to determine whether control efficiencies will be applied to the emissions. The control efficiencies that are configured and maintained in the equipment record associated to the process are the specific efficiencies that are applied by selecting this radio button. If the control efficiency is configured as a parameter on the Unique Process record it

will not be affected by this selection. It is recommended that the **Yes** radio button be selected for all calculation runs.

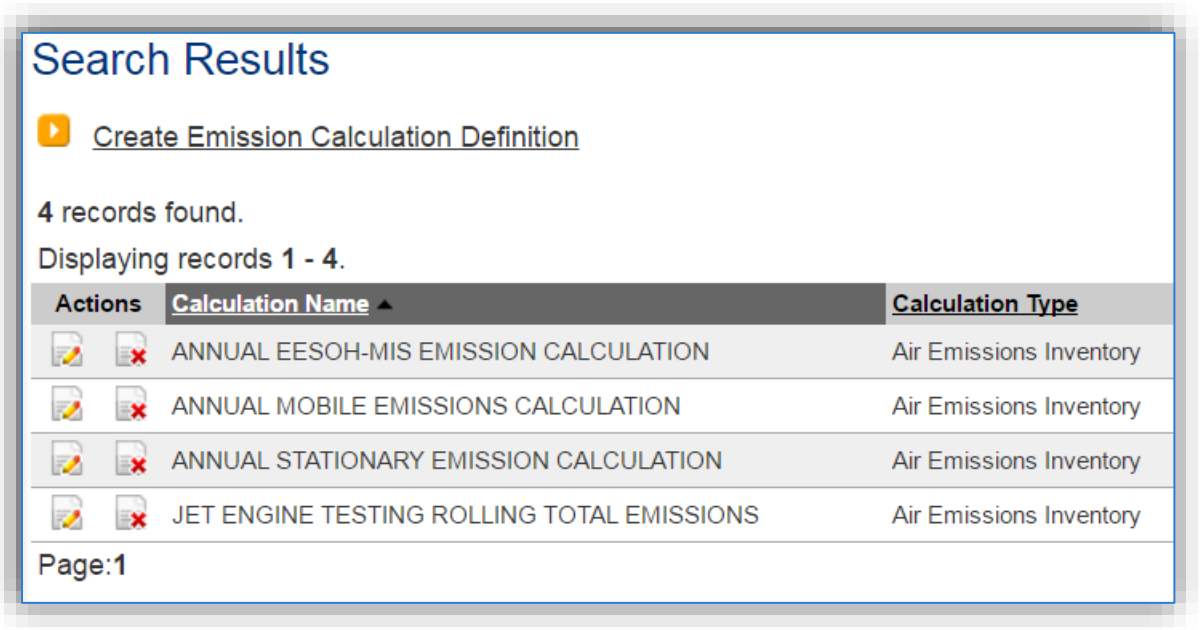
Click the **Save & Calculate** button to que up the emissions calculations. The calculation runs in APIMS sometimes take time to run depending upon the number of sources and pollutants that need to be processed.



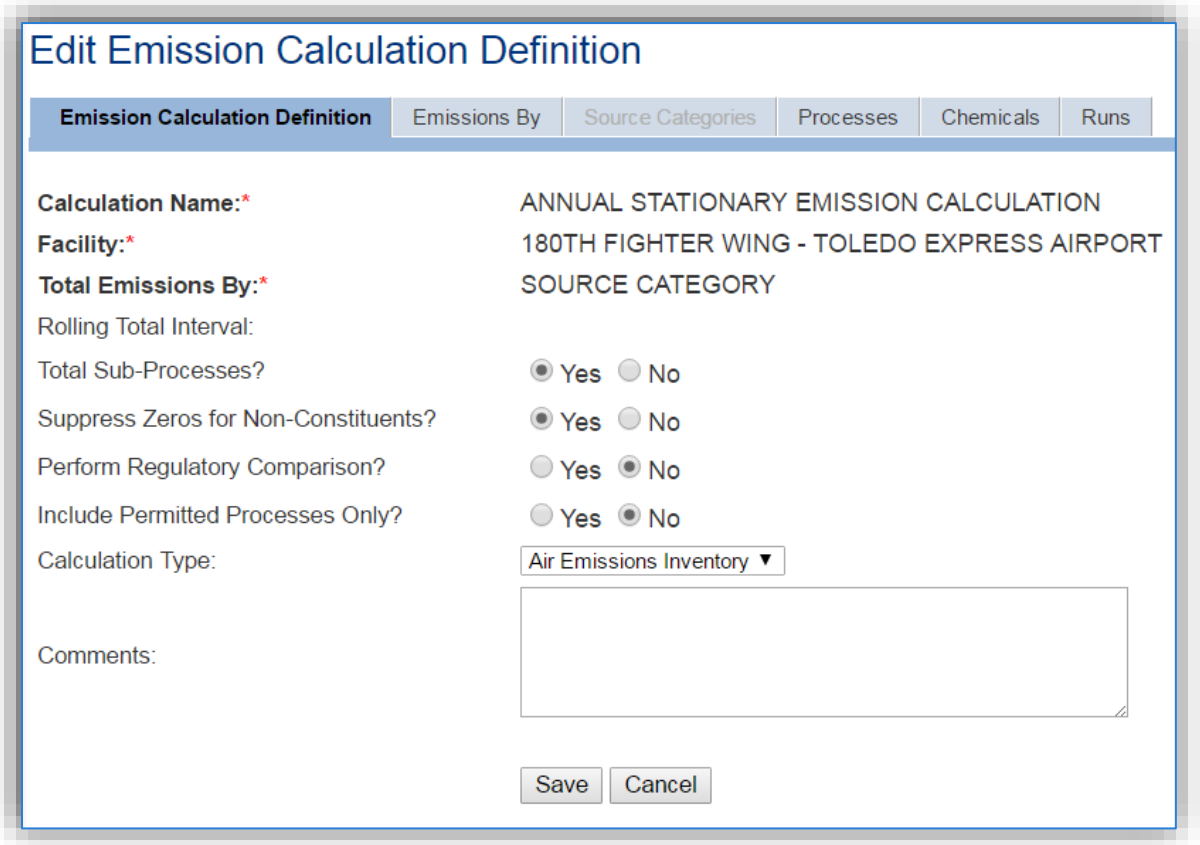
The status of the calculation will initially show PENDING. Click the refresh icon at the top of the grid to update the status.

2.7.1.2 Existing Calculation

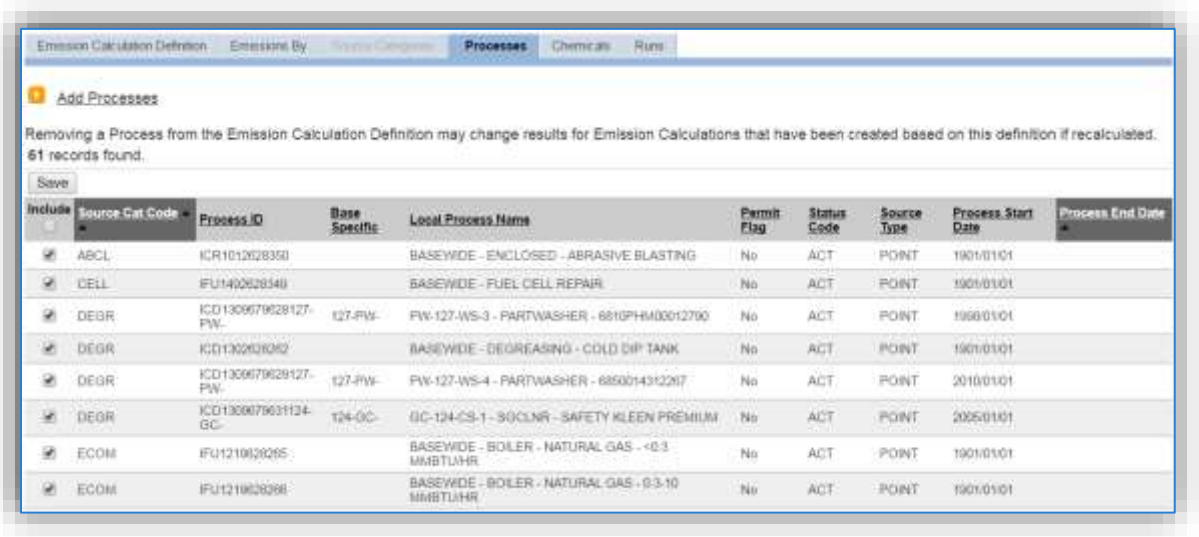
If the calculations are configured according to the recommended model, the year to year procedure is outlined in the steps below. To run the calculations for a new time period, click the edit icon next to the appropriate calculation.



This will navigate to the Edit Emission Calculation Definition screen.

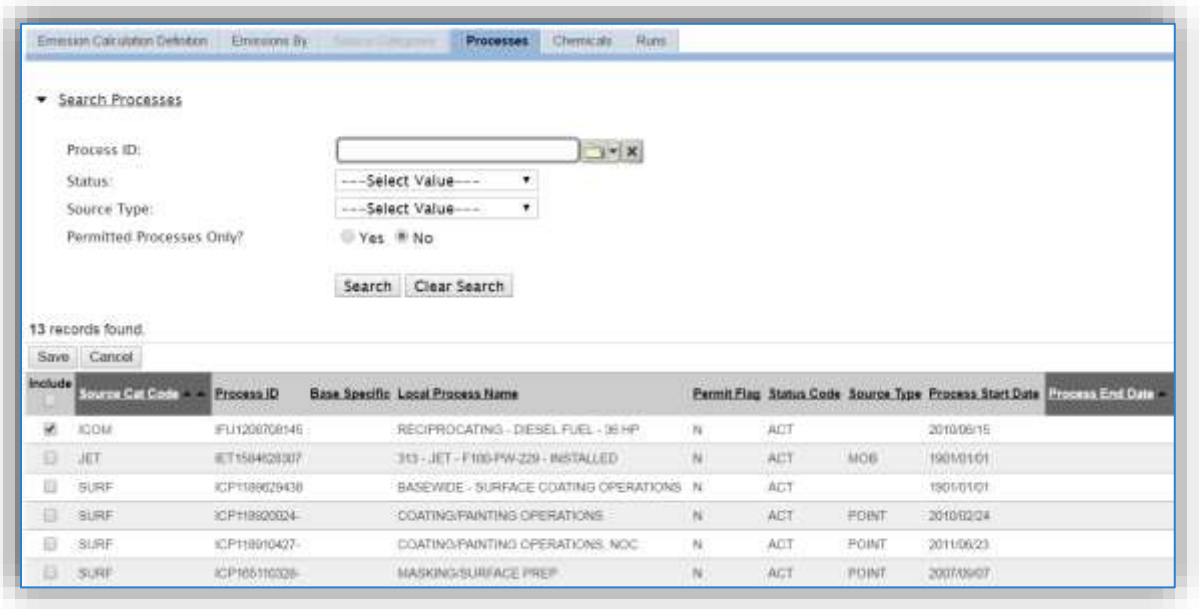


To add a new process to the calculation, click the *Processes* tab.



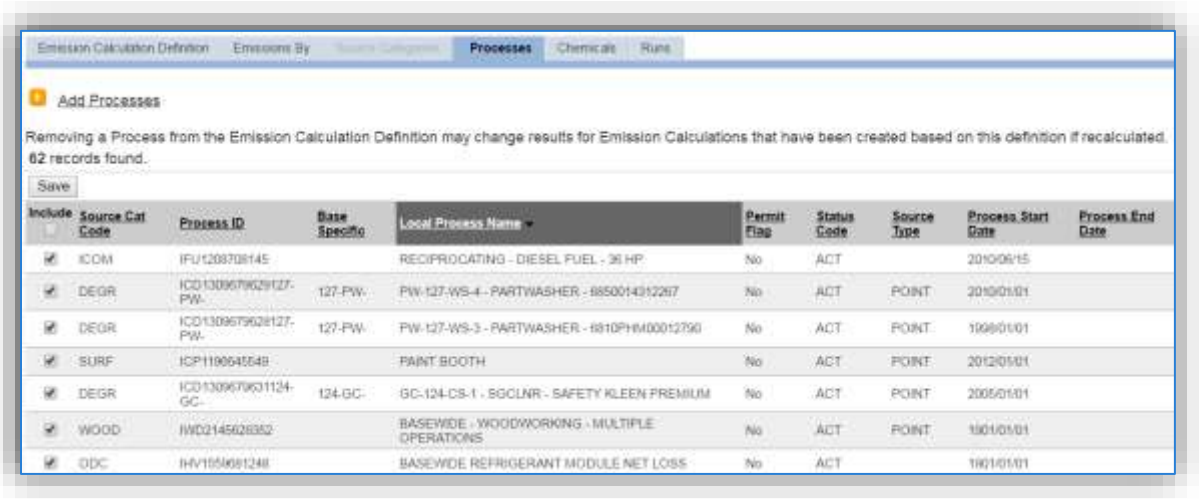
This tab will list all the processes that have ever been associated to this calculation. If the checkbox on the left side is checked it means the process is currently associated to the calculation and the emissions will be calculated for this process for all calculation runs. If the checkbox is not checked it means the process was part of previous calculation runs but will not be included in any future calculation runs.

To associate a new process, click the Add Processes hyperlink.



The Search Processes hyperlink can be used to expand the screen to include the search fields that can be used to filter the results. This results grid will show all the processes that are not already associated to the calculation. If the process you are searching for does not appear, it may be because it is part of a source category that was not selected on the *Emissions By* tab.

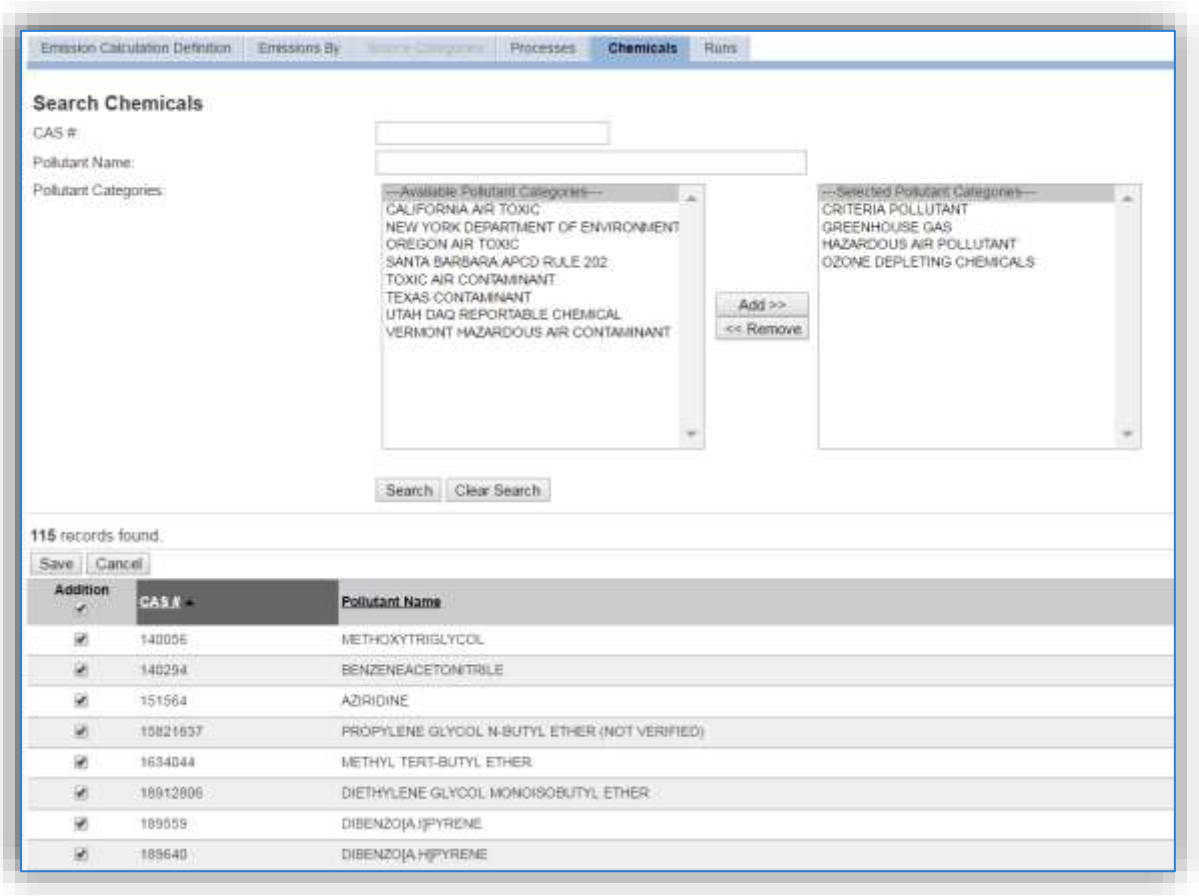
To add the process to the calculation, select the checkbox next to the process or processes. Click the Save button to complete the association.



The process or processes should now appear in the grid with the check box selected.

The next tab is the *Chemicals* tab. Add additional chemicals/pollutants to the calculation, click the Add Chemicals hyperlink.

This is an important step to complete every year as there are always new hazardous materials imported from EESOH-MIS that may have ingredients that are were not included previously.

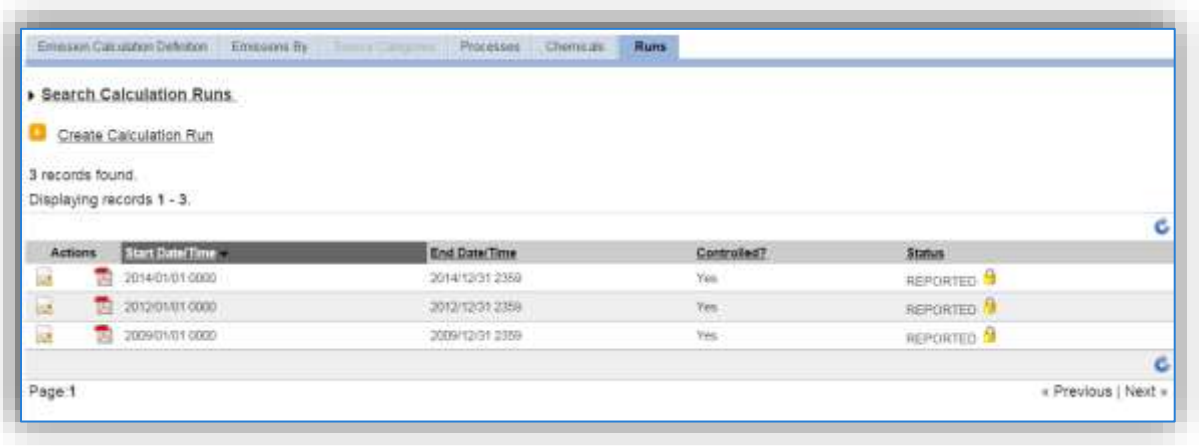


The Search fields can be used to filter the grid below. However to ensure that all pollutants are accounted for, it is recommended to select all available pollutants even if the pollutants are not required by the Air Force or regulatory agency. The pollutants that are reported can be more easily excluded from reports than they can be added to calculations so it is better to calculate for more than necessary.

It is easier to execute the calculation for more pollutants than required for reporting and filter the reports than it is to go back and add the pollutant to the calculation.

Once all pollutants have been selected, click the **Save** button.

Next, click the *Runs* tab.



This tab will show all the previous calculation runs. The Status column will show if the calculation has been reported as part of an AEI Submittal. If a calculation run is in a Reported status, it cannot be edited; however, the results and details can be viewed by clicking on the icon.

To create a new calculation run, click the Create Calculation Run hyperlink.

Enter the calculation time period start date and time in the **Start Date/Time** field.

For ANNUAL calculations this is usually the first day of the calendar year 2016/01/01 0000.

For MONTHLY calculations this is the first day of the month 2016/06/01 0000.

For HOURLY calculations this is the first hour of the calculation period 2016/06/01 0800.

Enter the calculation time period end date and time in the **End Date/Time** field.

For ANNUAL calculations this is usually the last day of the calendar year 2016/12/31 2359.

For MONTHLY calculations this is the last day of the month 2016/06/30 2359.

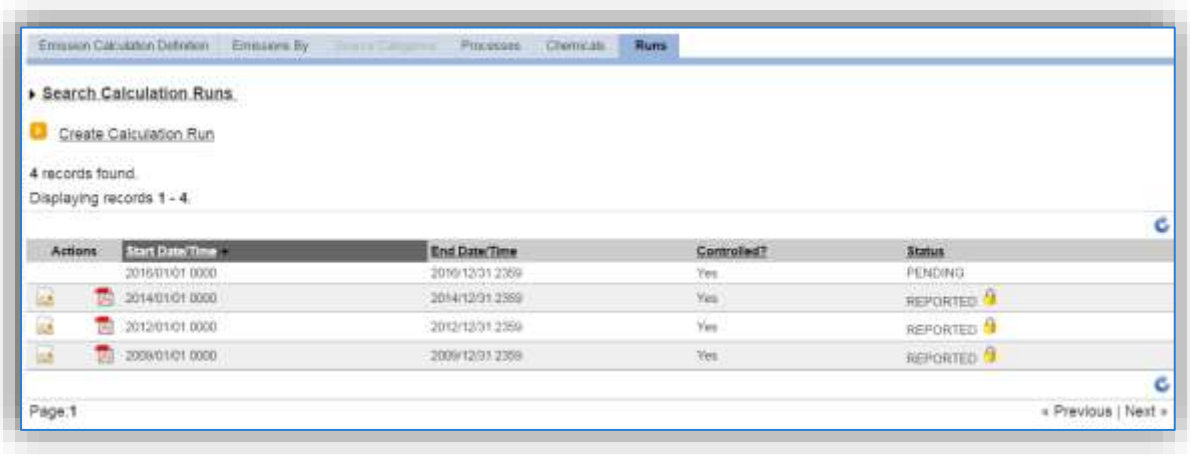
For HOURLY calculations this is the last hour of the calculation period 2016/06/01 2359.

Make sure to calculate to the last minute of the time period to ensure that all the emissions for that time period are accounted for.

Usually daily and hourly calculations are only run at a set frequency. To run multiple calculation runs at once, enter the start date of the first run and the end date of the last run. APIMS will automatically generate the correct number of runs based on the calculation configuration in the Rolling Interval fields on the Emission Calculation Definition tab.

The **Would you like to calculate controlled emissions?** field is used to determine whether control efficiencies will be applied to the emissions. These control efficiencies are configured in the equipment record associated to the process. It is recommended that the **Yes** radio button be selected for all calculation runs.

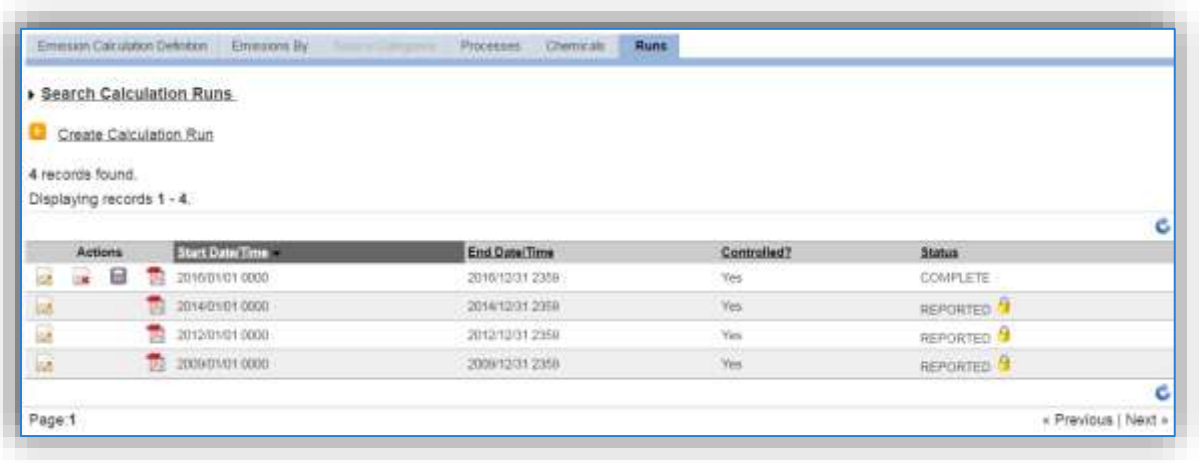
Click the **Save & Calculate** button to que up the emissions calculations. The calculation runs in APIMS sometimes take time to run depending upon the number of sources and pollutants that need to be processed.

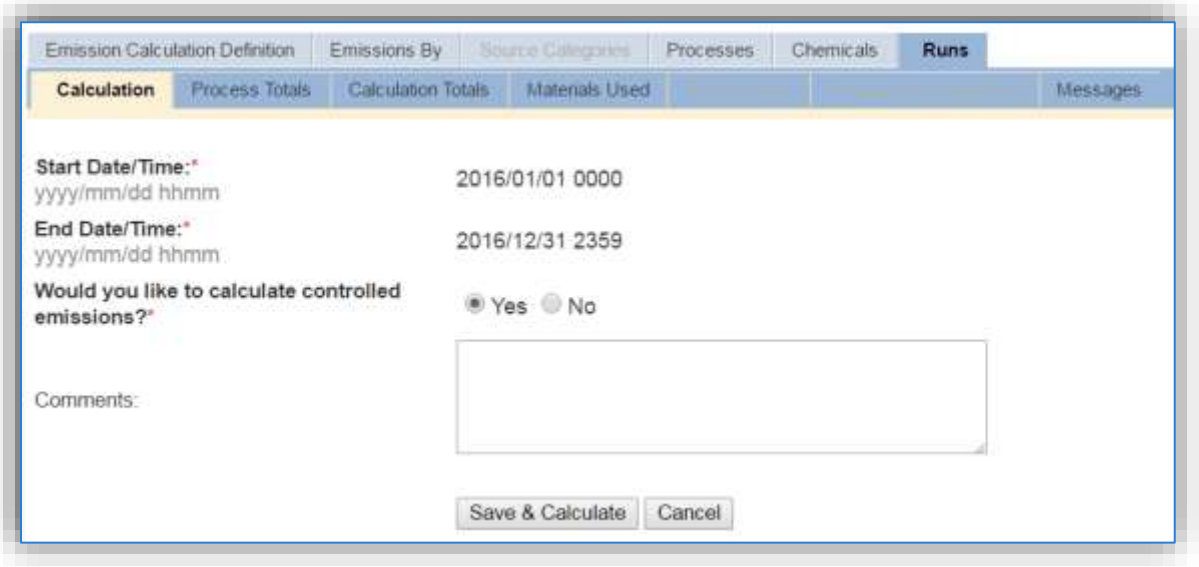


The status of the calculation will initially show PENDING. Click the refresh icon at the top of the grid to update the status.

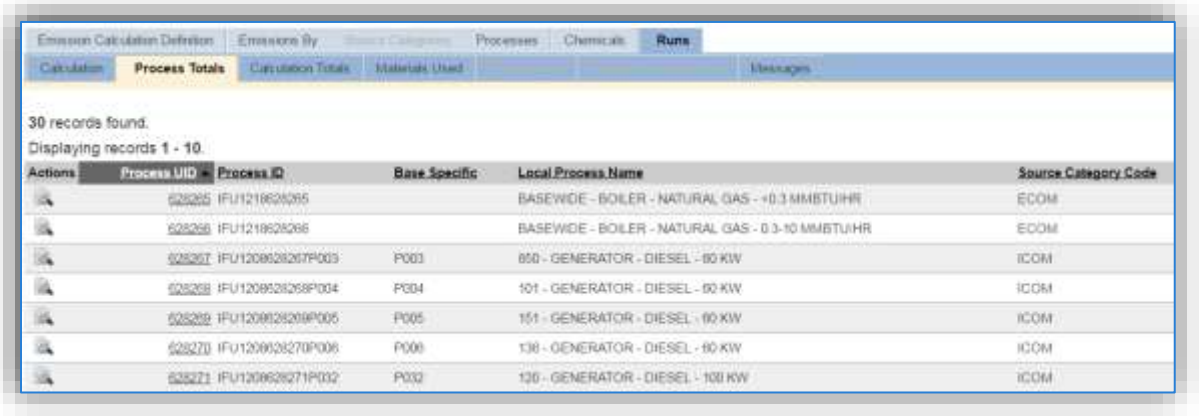
2.7.1.3 Calculation Results

To view the results of the calculations, navigate to the Runs tab and click the edit icon next to the specific time frame. Make sure the status is Complete or Reported before viewing the results; all other statuses may not show complete results.

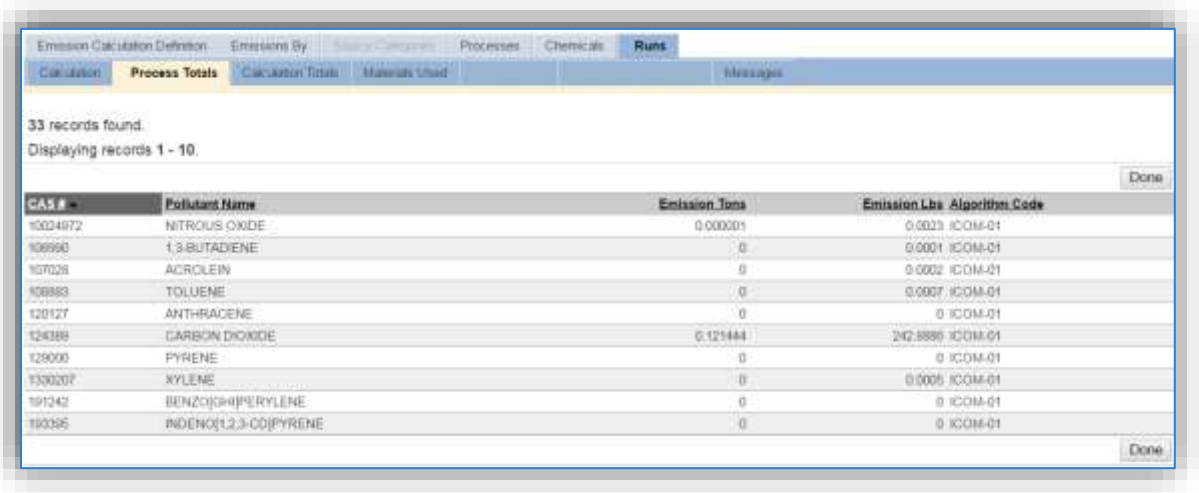




The Calculation tab shows the calculation properties, the next tabs are used to review the results of the calculation run. Click the *Process Totals* tab to view the individual process emissions.

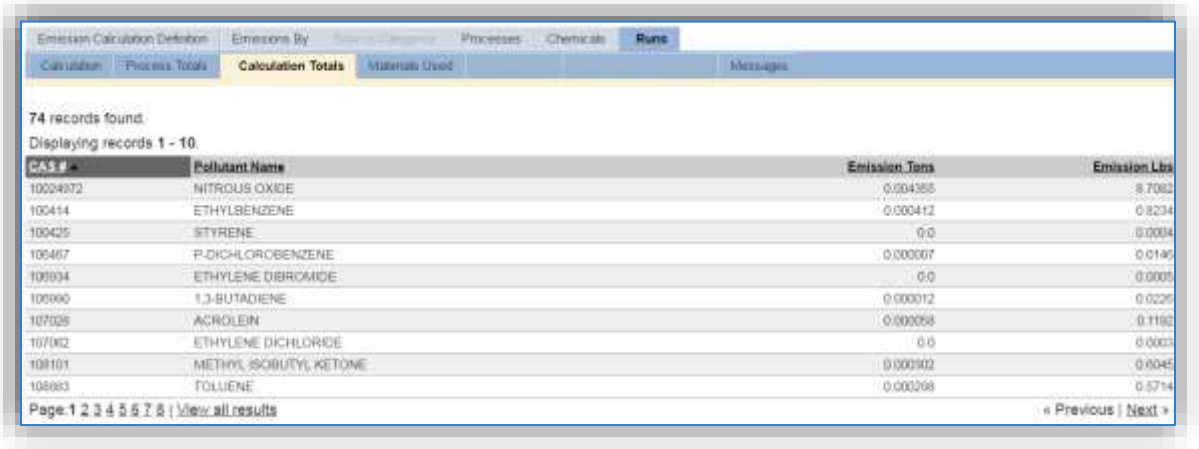


Click the view  icon next to the specific process to view the results.



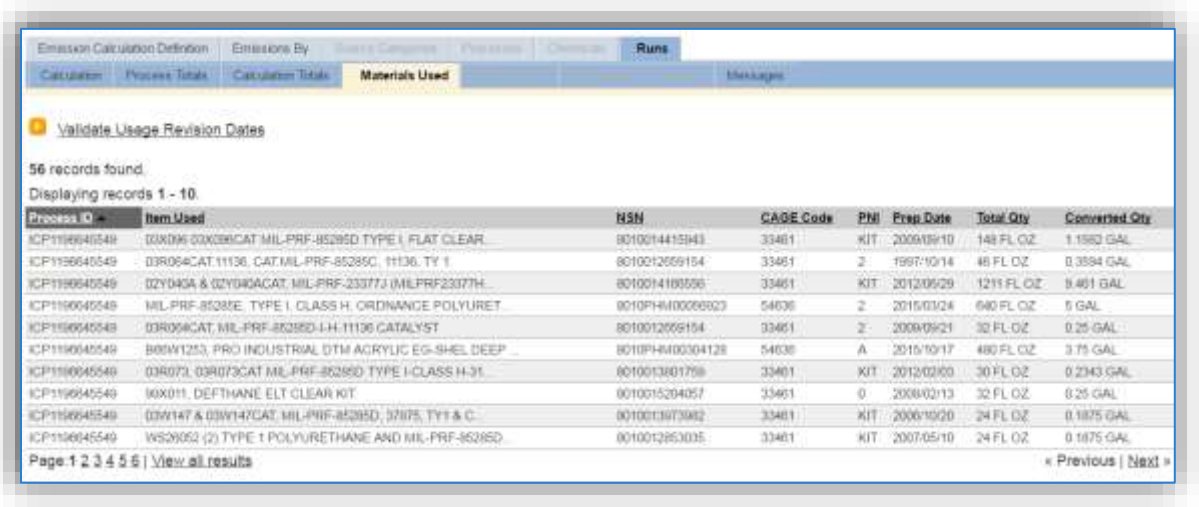
This tab can be used to help trouble shoot any unexpected emission results. It will show all the pollutants that were calculated, the total tons, total pounds and the algorithm used to calculate the emissions.

The next tab, *Calculation Totals* shows the total amount of each pollutant emitted for all the processes included in the calculation.



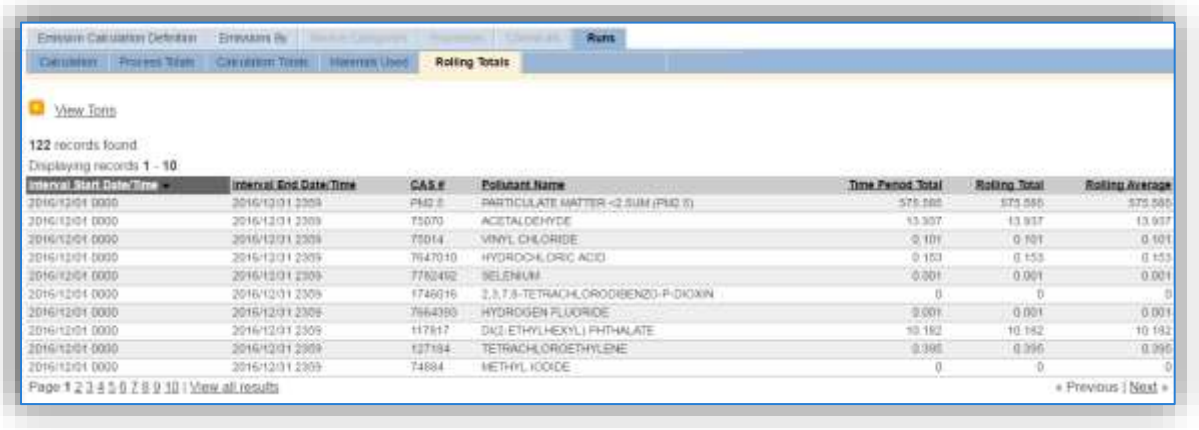
Once again, this tab can be used to review the results and look for any unexpected emissions.

The *Materials Used* tab is the next tab that can be used to troubleshoot any unexpected emissions.



As shown this tab provides a summary of all the materials used in the emissions calculations. This tab is especially useful to identify any data entry errors in the consumption log that may cause erroneous emission results.

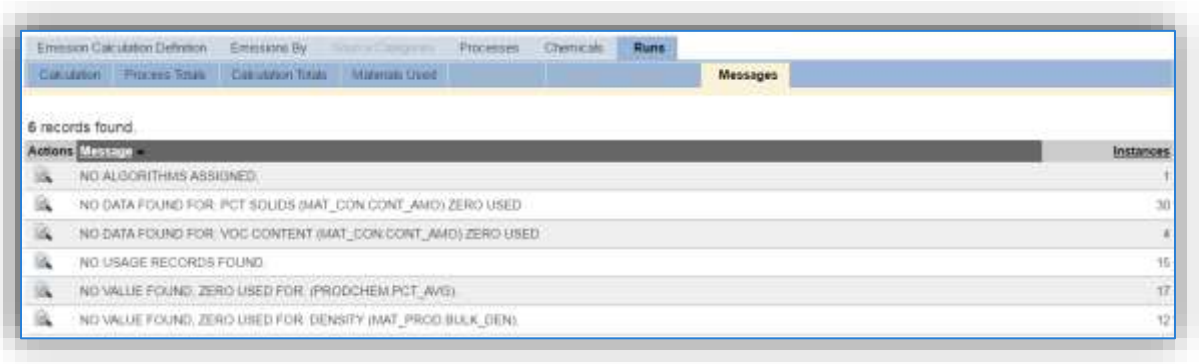
The *Rolling Totals* tab is only available for calculations configured as rolling total calculations.



This tab will display the time period specific emissions, the rolling total emissions and the rolling average emissions for all pollutants and sources.

The most important step is to review the calculation results and error messages.

The final tab is the *Messages* tab. This tab will identify any discrepancies APIMS encountered when calculating emissions.



The number of times each error occurred is detailed in the column on the right side. To view the specific errors, click the icon.

Some of the common errors and how to fix them are detailed in the following section.

- NO ALGORITHMS ASSIGNED
  - Problem – There is no Algorithm or Emission Factor set specified in the Calculations tab of the Unique Process record.
  - Solution – Go to the Unique Process record, Calculations tab and assign an Algorithm and Emission factor set. Re-run the emission calculation run.
- NO USAGE RECORDS FOUND
  - Problem – There are no usage records entered for this process and algorithm combination for the time period specified by the calculation.
  - Solution – This does not always require a fix, sometimes this error can be used to confirm processes that should not have any use during the time period. One way to resolve this error for these processes is to document that there was not supposed to be any usage. Navigate to the appropriate consumption log for the process and enter a usage record that has a usage of 0. Re-run the emission calculation run.
- NO DATA FOUND FOR:
  - Problem – A Material Product record is used in the emission calculation and a specific value is not configured. This is usually for the PCT SOLIDS, INGREDIENT PCT or VOC CONTENT on the Pollutant Content tab of the material product record.
  - Solution – This error may or may not need to be resolved for every material. The list of materials should be reviewed. If the material is one that contains VOCs or solids, the Material Product record should be found and an effort to populate the correct data should be made. **If the material was input by the EESOH-MIS interface, the EESOH-MIS Data Stewards should be contacted for the correction of the data in EESOH-MIS.** If the material is not one that would be expected to have VOCs or solids this error requires no additional action.
- NO VALUE FOUND, ZERO USED FOR:
  - Problem – This error means that a Material Product record is missing either the density or the ingredient percent.

  - Solution – If the error is for a missing density, the Material Product record should be edited to include the density. This is usually available from the SDS for the material. If the error is for the ingredient percent, this only needs to be resolved for materials that are HAPS. This information is also available from the SDS or manufacturer.
- ORA-00143
  - Problem – This is a generic error that is commonly caused by a JET process that does not have an afterburner mode. The algorithm is looking for a fuel flow rate and a time in mode that is not needed.
  - Solution – No action is required for this type of error.

2.8 Emission Inventory Submittals

The Emission Inventory Submittals module is used to generate and submit an AEI to AFCEC. The module can generate several types of AEIs, Comprehensive Stationary, GHG, MRR or Permitted Source AEI. This module is used to fulfill the requirements outlined in the Air Force Manual (AFMAN) 32-7002 Environmental Compliance and Pollution Prevention (Feb 2020) as shown below.

4.5. Air Quality Compliance - Implementation and Operation.

4.5.1. Air Emissions Inventory (AEI). The Installation Environmental Element must prepare and periodically update an AEI, using APIMS, for all installation stationary air emission sources in accordance with applicable state or local requirements promulgated per 40 CFR Part 51, Subpart A and current AF AEI guidance from AFCEC/CZ. **(T-0)**.

4.5.1.1. Regulatory-required stationary AEIs are completed at the frequency specified by federal, state and local regulations.

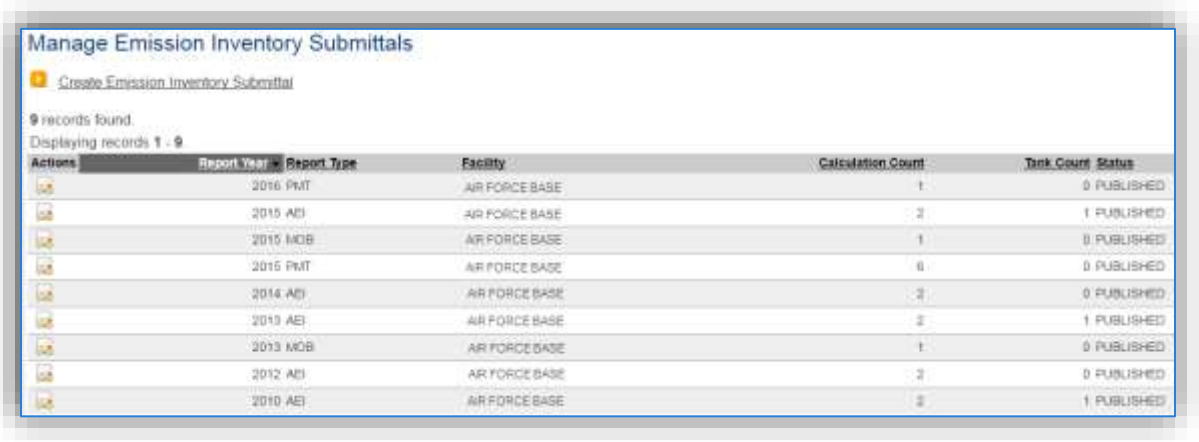
4.5.1.2. Comprehensive stationary AEIs (applicable to all installations, including overseas) include all emissions sources (i.e., both permitted and non-permitted sources). The Installation Environmental Element will annually review/validate APIMS to ensure currency of the AEI (i.e., sources and consumption data is representative of the current base conditions). **(T-1)**. A comprehensive review of all sources and associated consumption data for the AEI will be conducted at least every three years (five years for overseas and remotely located facilities) to accurately reflect current emissions. **(T-1)**.

4.5.1.3. Stationary source AEIs include all criteria pollutants, Hazardous Air Pollutants, and greenhouse gases and reflect the installation's current actual and PTE emissions. Annual regulatory emissions reports, a subset of the comprehensive AEI, are provided to federal, state and local (including Metropolitan Planning Organization or other regional) regulatory agencies as required. Greenhouse gas reporting mandated by E.O. 13834, is accomplished by SAF/IEE in conjunction with the Annual Energy Management and Resilience reporting process.

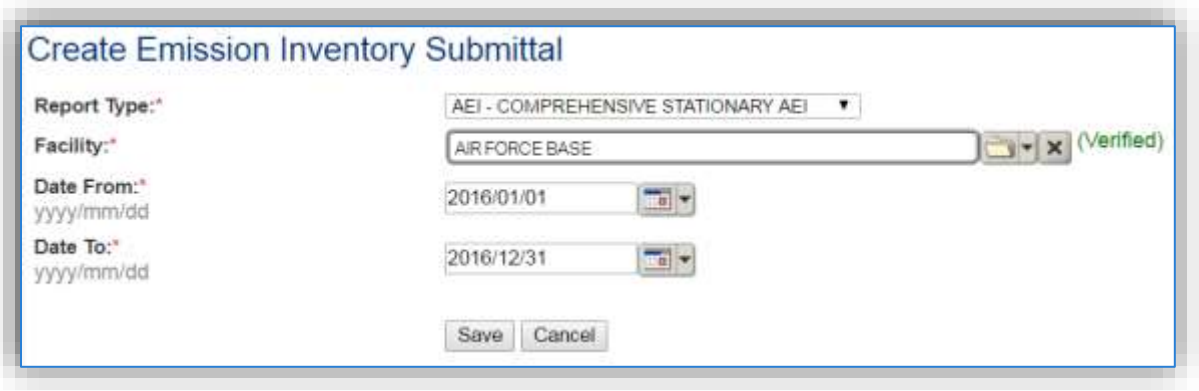
4.5.1.4. For installations that exceed the greenhouse gas reporting threshold, the Installation Environmental Element shall accomplish greenhouse gas reporting mandated by 40 CFR Part 98. **(T-0)**. Recommend other installations within 10% of the greenhouse gas reporting threshold accomplish greenhouse gas estimates in accordance with the non-directive *Guide to the Mandatory Greenhouse Gas Reporting Rule and Greenhouse Gas Tailoring Rule,* issued by AFCEC/CZ. Results will be reported to AFCEC/CZ via APIMS. **(T-1)**. Greenhouse gas reporting mandated by E.O. 13834 is accomplished by SAF/IEE in conjunction with the Annual Energy Management and Resilience reporting processes.

Once an AEI is submitted via this module it will automatically be reported to AFCEC in fulfillment of the requirement specified above. Additionally, this module can assist in the generation of an AEI to state or local regulators. If the Permitted Source AEI is generated it can then be used to generate reports that contain the data used to submit to state or local regulator.

Navigate to the Emission Inventory Submittal module of APIMS by clicking on **Emissions Inventory Submittals** under the **Calculations** tab.



The previous AEIs will be displayed in the grid. To create a new AEI, click the Create Emission Inventory Submittal hyperlink.



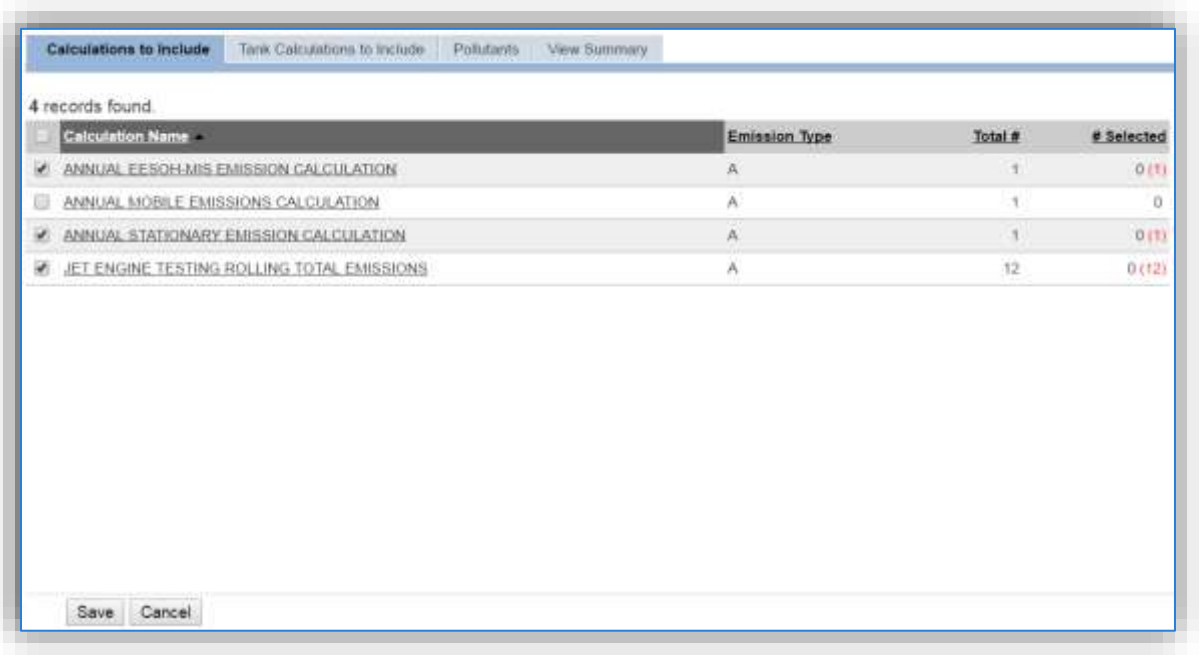
Select the appropriate **Report Type** from the drop-down. The most common type is AEI – COMPREHENSIVE STATIONARY AEI. However, if the installation has a subset of sources that must be reported to the regulatory agency this module can be used to generate that report PMT – PERMITTED SOURCE AEI.

The **Facility** should be the facility that is reporting the emissions, for most bases there will be only one option. If the installation has multiple facilities a separate submittal will need to be generated for each facility.

The **Date From** and **Date To** fields are most commonly the first and last day of the calendar year. The only exception to this is if the Report Type is Permitted and the regulatory agency has a different reporting year, for example July to June.

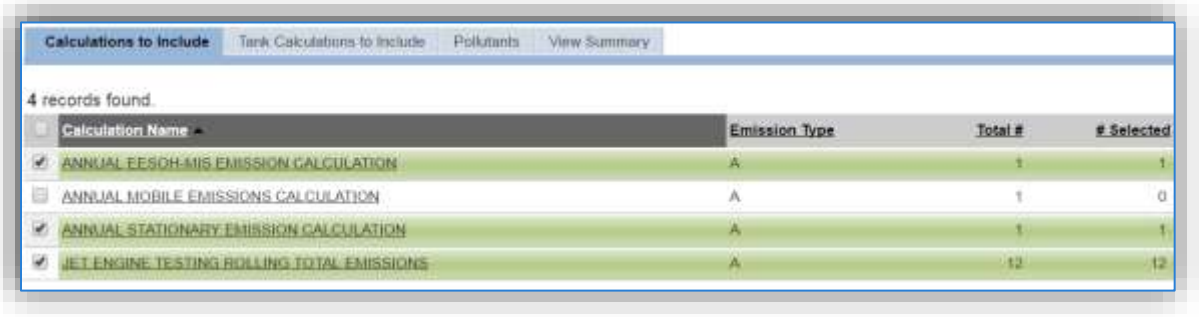
Click the **Save** button to complete the inventory submittal.

This will take you to the *Calculations to Include* tab.



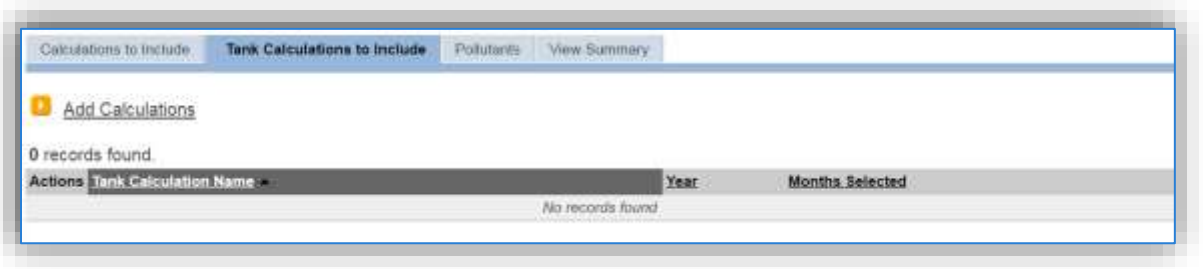
This tab will display all the emission calculations that have a calculation run during the time period specified for the inventory submittal. It is important to only include the calculations that should be part of this submittal. For example, do not include a mobile source calculation in a stationary inventory.

Click the **Save** button to complete the association. Once the calculations have been associated, they will appear with a green highlight.

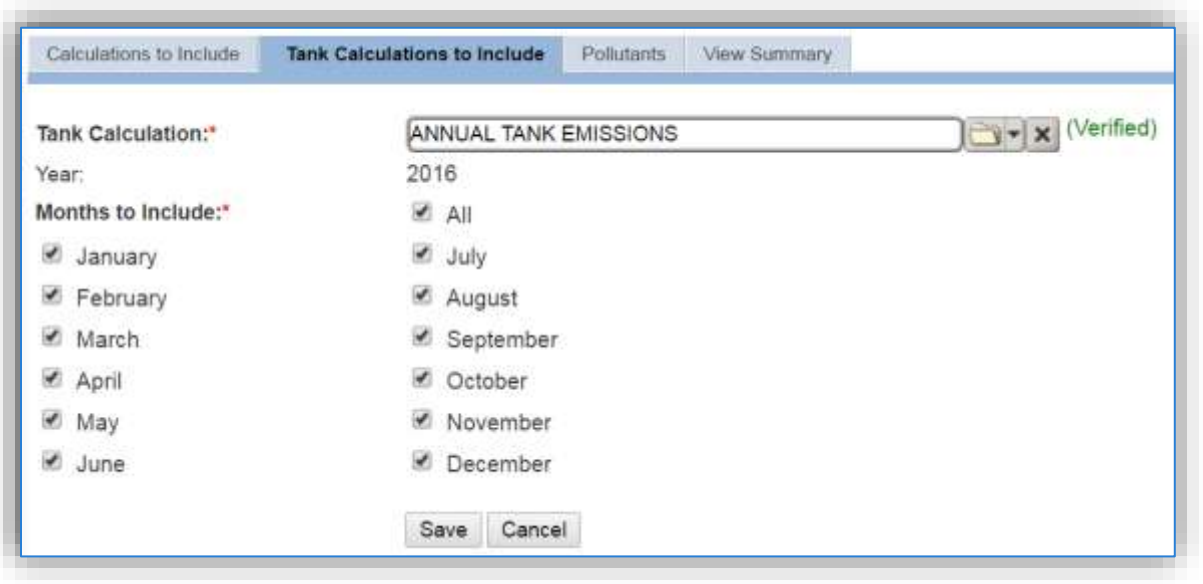


Once the calculation for the specified time period is associated to an emission inventory submittal, the emission calculation run cannot be modified unless it is disassociated from the submittal. To disassociate a calculation from the submittal, uncheck the box and click the Save button. This will then allow the errors to be corrected and the calculation rerun for the specified time period.

The next tab is the *Tank Calculations to Include.*

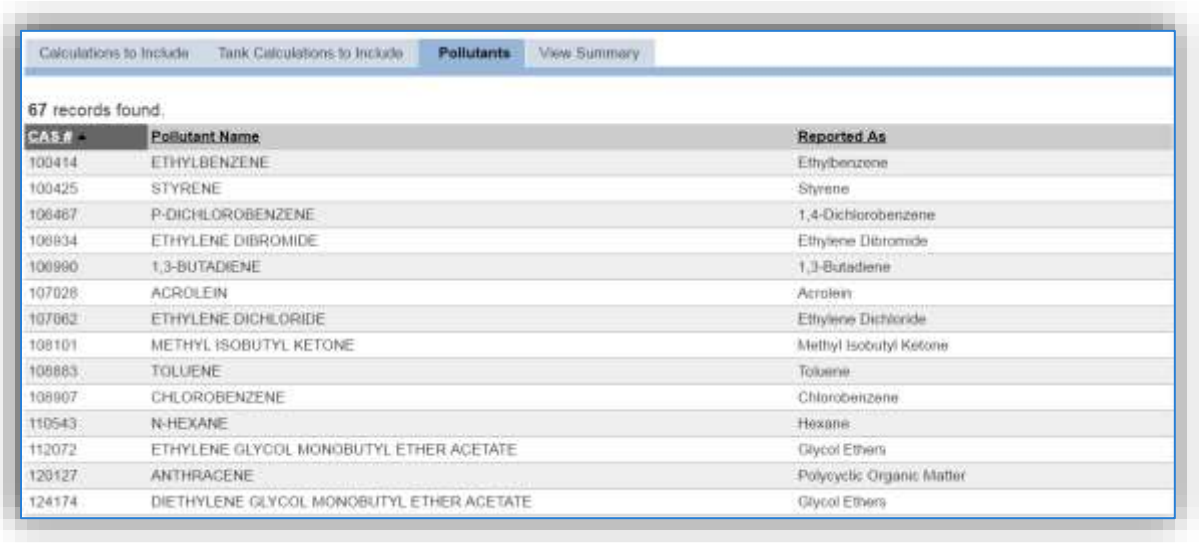


To add a tank calculation to the inventory, click the Add Calculations hyperlink.



Use the Tank Calculation field to search for the name of the tank calculation. Once the calculation name has been verified, the months to include will either automatically select or will need to be selected based on the type of tank calculation. For comprehensive stationary AEIs all the months should be selected.

The next tab is the *Pollutants* tab. This tab is read only and displays the pollutants that will be included in the inventory.

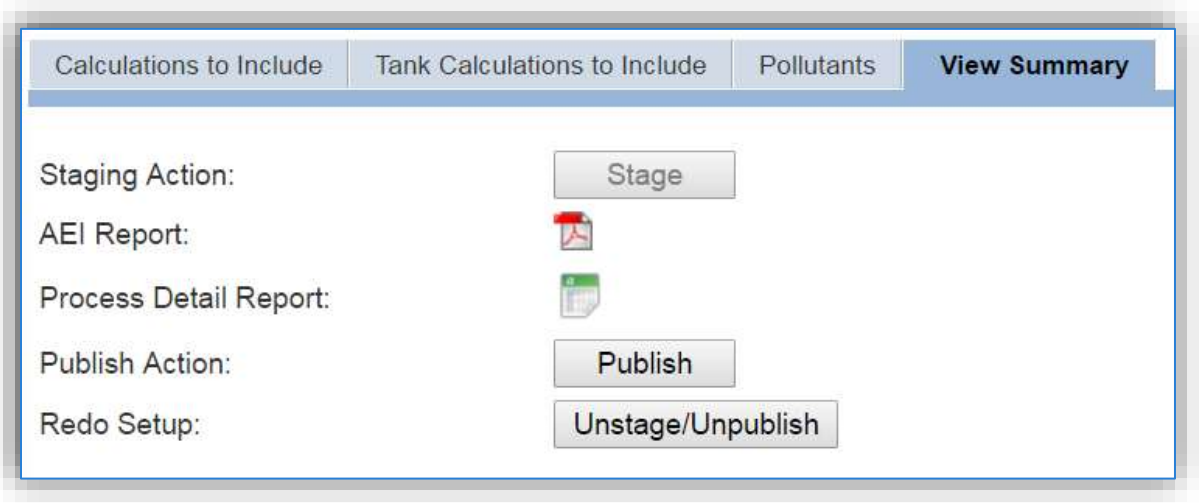


CAS #	Pollutant Name	Reported As
100414	ETHYLBENZENE	Ethylbenzene
100425	STYRENE	Styrene
106467	P-DICHLOROBENZENE	1,4-Dichlorobenzene
106934	ETHYLENE DIBROMIDE	Ethylene Dibromide
106990	1,3-BUTADIENE	1,3-Butadiene
107028	ACROLEIN	Acrolein
107062	ETHYLENE DICHLORIDE	Ethylene Dichloride
108101	METHYL ISOBUTYL KETONE	Methyl Isobutyl Ketone
108883	TOLUENE	Toluene
108907	CHLOROBENZENE	Chlorobenzene
110543	N-HEXANE	Hexane
112072	ETHYLENE GLYCOL MONOBUTYL ETHER ACETATE	Glycol Ethers
120127	ANTHRACENE	Polycyclic Organic Matter
124174	DIETHYLENE GLYCOL MONOBUTYL ETHER ACETATE	Glycol Ethers

One item to note is that the individual chemicals that are pollutants due to the pollutant group will have a different name they are reported as. For example, 112072 ETHYLENE GLYCOL MONOBUTYL ETHER ACETATE is reported as a Glycol Ether.

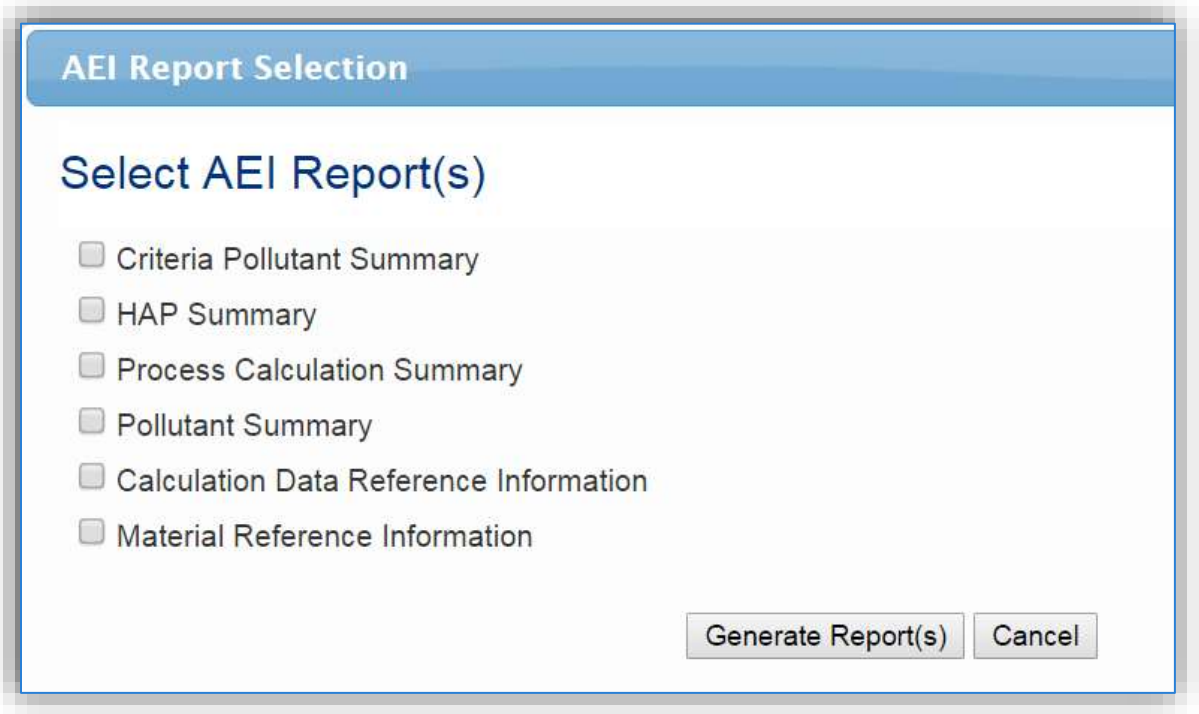
The final tab is the *View Summary* tab.

The next step to complete the inventory is to Stage the AEI. Once the **Stage** button is clicked the AEI Report will generate. This step often takes several minutes. The refresh icon can be clicked to update the status of the AEI Report.



Once the results have been verified to be accurate, click the **Publish** button to finalize the inventory. If after the inventory has been Staged or Published and corrections need to be made, the **Unstage/Unpublish** button can be used.

Click the icon to open the AEI Report Selection window.



Several reports are available to view the results of the inventory. To run the report, check the box or boxes and click the **Generate Report(s)** button. See below for examples of the reports. The Criteria Pollutant Summary report can be very useful to conduct a quick review.

A best practice is to compare the current years report to previous years reports to look for any major changes in emissions or usage. This could be due to a problem with the data used for the inventory.

Criteria Pollutant Summary

2016 CRITERIA POLLUTANT EMISSIONS

JAN-16 to DEC-16

Report Type: COMPREHENSIVE STATIONARY AEI

AIR FORCE BASE

Source Category		Tons Emitted						
Code	Name	CO	NOx	PM 10	PM 2.5	SOx	Total VOC	Total HAPs
ABCL	ABRASIVE CLEANING	-	-	0.002172	0.001995	-	-	-
AST	ABOVE GROUND STORAGE TANKS	-	-	-	-	-	1.104565	0.03483
CHEM	MISC CHEMICAL USAGE	-	-	-	-	-	0.805185	0.023958
ECOM	EXTERNAL COMBUSTION	1.96456	9.429688	0.392912	0.098228	2.789675	0.078582	0.506706
FIRE	FIRE TRAINING	0.00104	0.000365	0.000641	0.000641	0.000001	0.00162	0.000047
FLD	FUEL LOADING RACKS	-	-	-	-	-	0.32594	0.01289
ICOM	INTERNAL COMBUSTION	1.444717	5.870363	0.288049	0.288049	0.180012	0.302582	0.009037
INCN	INCINERATOR	0.001387	0.001673	0.001429	0.000949	0.00102	0.000141	0.015957
JET	JET ENGINE TESTING	0.468265	0.254851	0.05723	0.027754	0.032487	0.004158	0.003268
MUN	MUNITIONS	0.10066	0.005311	0.002721	0.002002	-	-	0.002022
OBOD	OPEN BURN/OPEN DETONATION	0.000982	0.00035	0.006236	0.001768	0.000262	0.000114	0.002804
SPRL	SPILLS/RELEASE	-	-	-	-	-	0.299315	0.004317
SURF	SURFACE COATING	-	-	0.062996	0.060697	-	0.59757	0.060602
UST	UNDERGROUND STORAGE TANK	-	-	-	-	-	0.246025	0.009642
WOOD	WOODWORKING	-	-	0.033254	0.025235	-	-	-
	Total	3.981811	15.572821	0.84894	0.506618	3.003457	3.765607	0.680983

HAP Summary

2016 HAP SUMMARY

JAN-16 to DEC-16

Report Type: COMPREHENSIVE STATIONARY AEI

AIR FORCE BASE

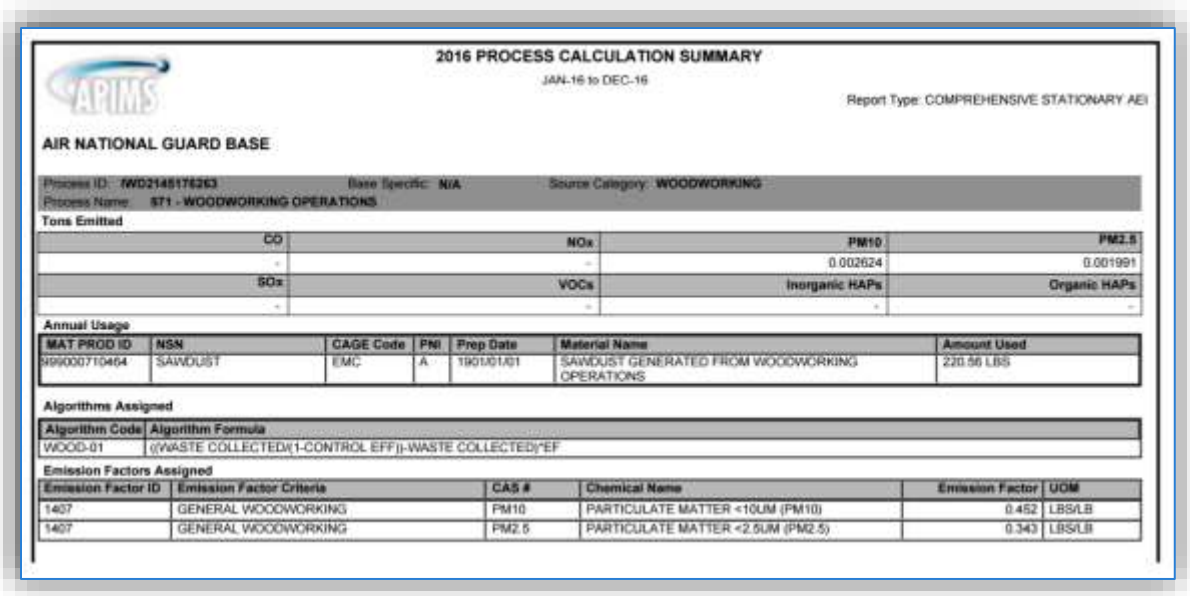
Inorganic HAPs

Cas Number	Pollutant Name	Pounds Emitted	Tons Emitted
7647-01-0	Hydrochloric Acid	177.894	0.088947
	Chromium Compounds	6.754	0.003377
	Lead Compounds	4.238	0.002119
	Nickel Compounds	3.064	0.001532
	Manganese Compounds	2.534	0.001267
	Selenium Compounds	1.73	0.000865
	Mercury Compounds	1.672	0.000836
	Arsenic Compounds	1.26	0.00063
	Cadmium Compounds	1.184	0.000592
	Antimony Compounds	0.994	0.000497
7664-39-3	Hydrogen Fluoride	0.14	0.00007
7782-50-5	Chlorine	0.098	0.000049
	Cobalt Compounds	0.04	0.00002
7723-14-0	Phosphorus	0.008	0.000004
	Beryllium Compounds	0	0
	Sub-Total	201.61	0.100805

Organic HAPs

Cas Number	Pollutant Name	Pounds Emitted	Tons Emitted
50-00-0	Formaldehyde	281.288	0.140644
75-07-0	Acetaldehyde	276.76	0.13838

Process Calculation Summary



2016 PROCESS CALCULATION SUMMARY

JAN-16 to DEC-16

Report Type: COMPREHENSIVE STATIONARY AEI

AIR NATIONAL GUARD BASE

Process ID: 1WD2145176263 Base Specific: N/A Source Category: WOODWORKING

Process Name: ST1 - WOODWORKING OPERATIONS

Tons Emitted

CO	NOx	PM10	PM2.5
-	-	0.002624	0.001991
SOx	**VOCs**	**Inorganic HAPs**	**Organic HAPs**
-	-	-	-

Annual Usage

MAT PROD ID	NSN	CAGE Code	PNI	Prep Date	Material Name	Amount Used
N99000710464	SAWDUST	EMC	A	1901/01/01	SAWDUST GENERATED FROM WOODWORKING OPERATIONS	220.56 LBS

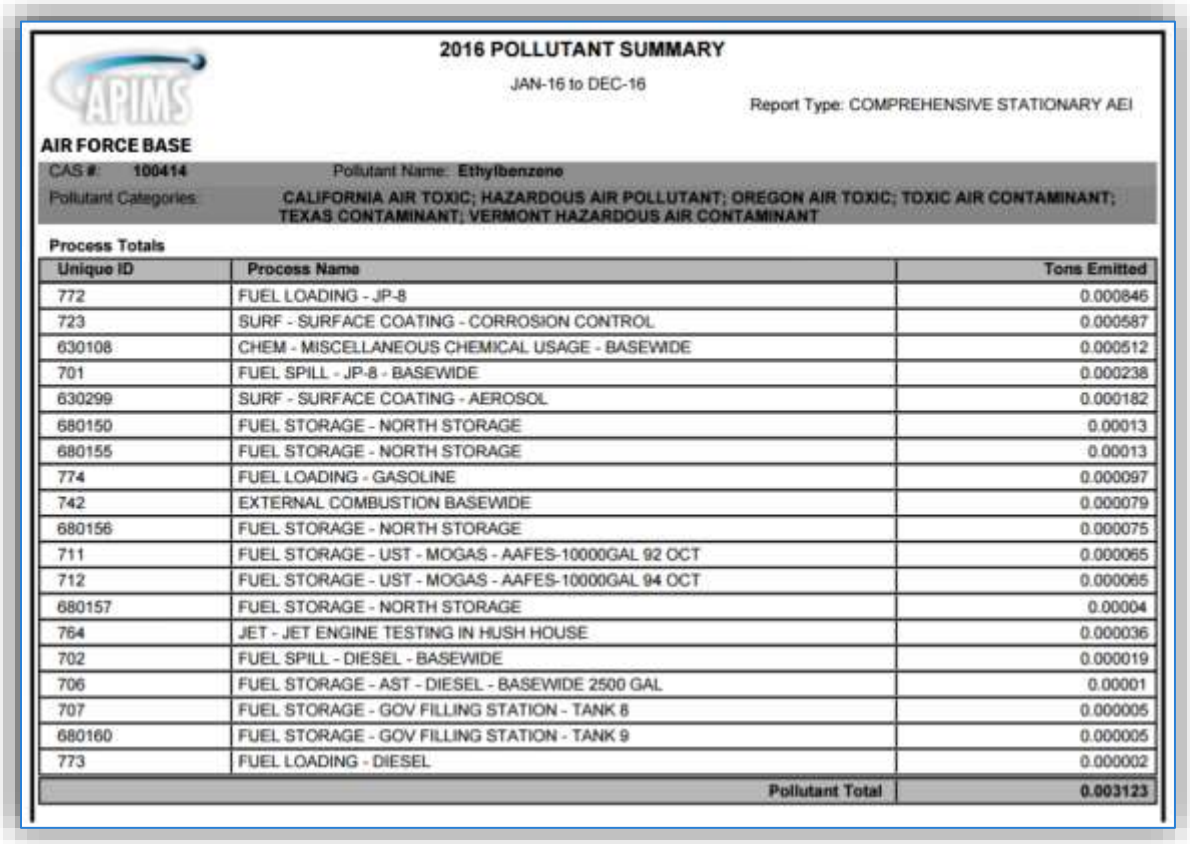
Algorithms Assigned

Algorithm Code	Algorithm Formula
WOOD-01	((WASTE COLLECTED/(1-CONTROL EFF))-WASTE COLLECTED)*EF

Emission Factors Assigned

Emission Factor ID	Emission Factor Criteria	CAS #	Chemical Name	Emission Factor	UOM
1407	GENERAL WOODWORKING	PM10	PARTICULATE MATTER <10UM (PM10)	0.452	LBS/LB
1407	GENERAL WOODWORKING	PM2.5	PARTICULATE MATTER <2.5UM (PM2.5)	0.343	LBS/LB

Pollutant Summary



2016 POLLUTANT SUMMARY

JAN-16 to DEC-16

Report Type: COMPREHENSIVE STATIONARY AEI

AIR FORCE BASE

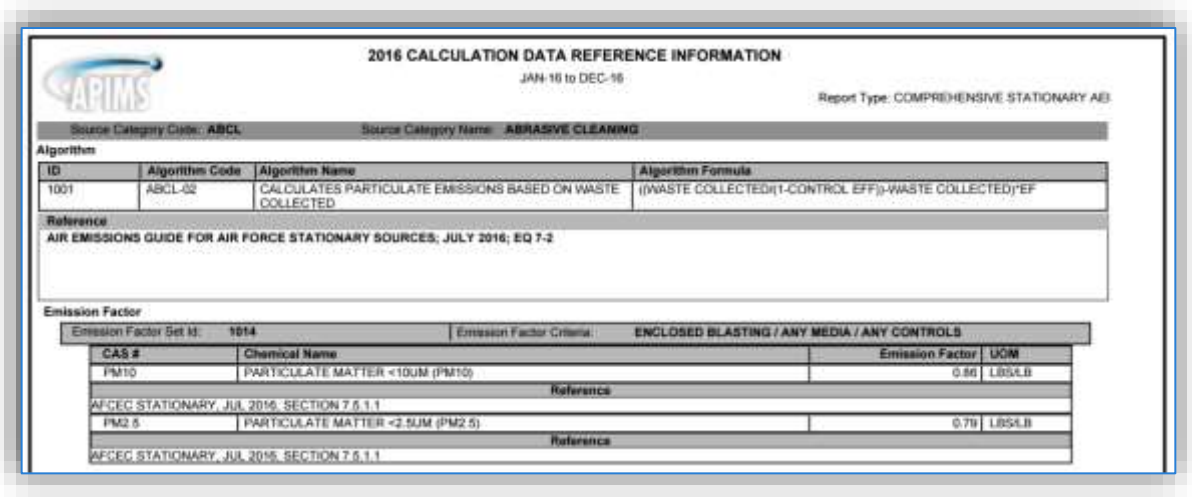
CAS #: 100414 Pollutant Name: Ethylbenzene

Pollutant Categories: CALIFORNIA AIR TOXIC; HAZARDOUS AIR POLLUTANT; OREGON AIR TOXIC; TOXIC AIR CONTAMINANT; TEXAS CONTAMINANT; VERMONT HAZARDOUS AIR CONTAMINANT

Process Totals

Unique ID	Process Name	Tons Emitted
772	FUEL LOADING - JP-8	0.000846
723	SURF - SURFACE COATING - CORROSION CONTROL	0.000587
630108	CHEM - MISCELLANEOUS CHEMICAL USAGE - BASEWIDE	0.000512
701	FUEL SPILL - JP-8 - BASEWIDE	0.000238
630299	SURF - SURFACE COATING - AEROSOL	0.000182
680150	FUEL STORAGE - NORTH STORAGE	0.00013
680155	FUEL STORAGE - NORTH STORAGE	0.00013
774	FUEL LOADING - GASOLINE	0.000097
742	EXTERNAL COMBUSTION BASEWIDE	0.000079
680156	FUEL STORAGE - NORTH STORAGE	0.000075
711	FUEL STORAGE - UST - MOGAS - AAFES-10000GAL 92 OCT	0.000065
712	FUEL STORAGE - UST - MOGAS - AAFES-10000GAL 94 OCT	0.000065
680157	FUEL STORAGE - NORTH STORAGE	0.00004
764	JET - JET ENGINE TESTING IN HUSH HOUSE	0.000036
702	FUEL SPILL - DIESEL - BASEWIDE	0.000019
706	FUEL STORAGE - AST - DIESEL - BASEWIDE 2500 GAL	0.00001
707	FUEL STORAGE - GOV FILLING STATION - TANK 8	0.000005
680160	FUEL STORAGE - GOV FILLING STATION - TANK 9	0.000005
773	FUEL LOADING - DIESEL	0.000002
	Pollutant Total	**0.003123**

Calculation Data Reference Information



2016 CALCULATION DATA REFERENCE INFORMATION

JAN-16 to DEC-16

Report Type: COMPREHENSIVE STATIONARY AEI

Source Category Code: ABCL Source Category Name: ABRASIVE CLEANING

Algorithm

ID	Algorithm Code	Algorithm Name	Algorithm Formula
1001	ABCL-02	CALCULATES PARTICULATE EMISSIONS BASED ON WASTE COLLECTED	((WASTE COLLECTED)(1-CONTROL EFF))-WASTE COLLECTED)*EF

Reference

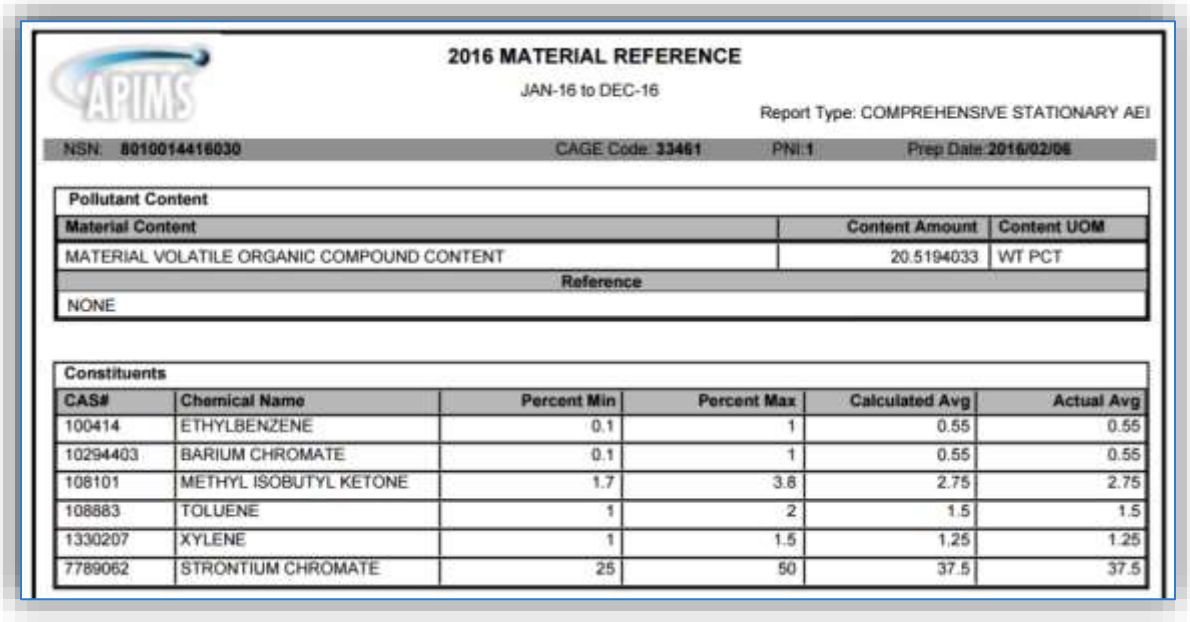
AIR EMISSIONS GUIDE FOR AIR FORCE STATIONARY SOURCES; JULY 2016; EQ 7-2

Emission Factor

Emission Factor Set Id: 1014 Emission Factor Criteria: ENCLOSED BLASTING / ANY MEDIA / ANY CONTROLS

CAS #	Chemical Name	Emission Factor	UOM
PM10	PARTICULATE MATTER <10UM (PM10)	0.86	LBS/LB
Reference			
AFCEC STATIONARY, JUL 2016, SECTION 7.5.1.1			
PM2.5	PARTICULATE MATTER <2.5UM (PM2.5)	0.79	LBS/LB
Reference			
AFCEC STATIONARY, JUL 2016, SECTION 7.5.1.1			

Material Reference Information



2016 MATERIAL REFERENCE

JAN-16 to DEC-16

Report Type: COMPREHENSIVE STATIONARY AEI

NSN: 8010014416030 CAGE Code: 33461 PNI: 1 Prep Date: 2016/02/06

Pollutant Content

Material Content	Content Amount	Content UOM
MATERIAL VOLATILE ORGANIC COMPOUND CONTENT	20.5194033	WT PCT
Reference		
NONE		

Constituents

CAS#	Chemical Name	Percent Min	Percent Max	Calculated Avg	Actual Avg
100414	ETHYLBENZENE	0.1	1	0.55	0.55
10294403	BARIUM CHROMATE	0.1	1	0.55	0.55
108101	METHYL ISOBUTYL KETONE	1.7	3.8	2.75	2.75
108883	TOLUENE	1	2	1.5	1.5
1330207	XYLENE	1	1.5	1.25	1.25
7789062	STRONTIUM CHROMATE	25	50	37.5	37.5

3. SOURCE CATEGORIES

3.1 Internal Combustion (ICOM)

3.1.1 Source Types

Internal Combustion (ICOM) engines typically found at an Air Force base include generators, pumps, aircraft arresting systems, gate barrier engines and compressors. ICOM engines are broken up into two categories: reciprocating and gas turbine. Reciprocating engines have a piston that moves inside a cylinder to compress an air/fuel mixture. The air/fuel mixture combusts and expands, pushing the piston through the cylinder. The piston returns, pushing out the exhaust gases, and the cycle is repeated. For gas turbine engines, ambient air is pressurized with a compressor. Fuel is introduced to this compressed air and is ignited. The high temperature and high-pressure air flows through a turbine where it expands, producing shaft energy that is used to drive both the compressor and the electric generator.

Reciprocating engines can also be either compression ignition (CI) or spark ignition (SI). In a compression ignition engine, the air is first compressed by the piston in the cylinder, which causes the temperature of the air to rise. Fuel is added to the heated air and combusts due to the fact that the temperature of the air is above the auto-ignition temperature of the fuel. These engines run solely on diesel fuel. In a spark ignition engine, a spark is used to light the fuel/air mixture. These engines run on gasoline or natural gas.

The size of the reciprocating engine is related to its displacement per cylinder, which is a measure of the area of the cylinder multiplied by the stroke. The stroke is the length of the linear movement of the piston in each cylinder. Additionally, a spark ignited engine may be classified as either a 4-stroke or 2-stroke. For a 4-stroke engine, the combustion cycle involves two revolutions of the crankshaft, and the cycle consists of four stages: induction stroke, compression stroke, power stroke and exhaust stroke. For a 2-stroke engine there is only one revolution of the crankshaft because the induction stroke and exhaust stroke occur concurrently.

Four and two stroke engines can also be either Lean-burn or Rich-burn. Lean-burn refers to the burning of fuel with an excess of air with a ratio ranging from 20:1 to 50:1 and are typically higher than 24:1. Rich-burn refers to engines that operate at near-stoichiometric combustion where the air/fuel ratio is nearly 16:1.

Stationary internal combustion engines are regulated by one of the following depending upon the manufacture year and type of engine.

- 40 CFR 60 Subpart IIII – Standards of Performance for Stationary Compression Ignition Internal Combustion Engines
- 40 CFR 60 Subpart JJJJ – Standards of Performance for Stationary Spark Ignition Internal Combustion Engines
- 40 CFR 63 Subpart ZZZZ – National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines

- 40 CFR 63 Subpart YYYY – National Emission Standards for Hazardous Air Pollutants for Stationary Combustion Turbines
- 40 CFR 60 Subpart GG – Standards of Performance for Stationary Gas Turbines
- 40 CFR 60 Subpart KKKK – Standards of Performance for Stationary Combustion Turbines

3.1.2 Potential Data Sources

Internal combustion equipment is usually scattered across the installation to provide emergency power to various buildings and operations. This equipment is usually managed by the Power Pro shop which is part of the Civil Engineering Unit. The Power Pro shop should have an equipment inventory list that can provide all the necessary data. Additionally, it may be necessary to contact the hospital/clinic, Base Exchange/Commissary and tenant or contractor-maintained areas. These entities may have internal combustion equipment that is not maintained by the Power Pro shop. The shops listed below are the most common shops with information regarding internal combustion equipment:

- Power Production (CEOFP)
- Hospital/Clinic
- BX/Commissary
- Tenant/Contractor
- Bioenvironmental Engineering
- Fire Department (CEF)
- Security Forces
- Design and Construction Engineering

The data elements that are needed are as follows:

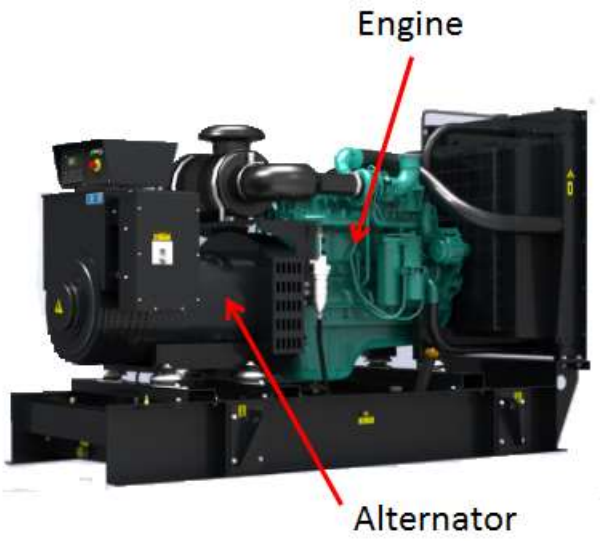
- Model Number
- Serial Number
- Date Ordered
- Install Date
- Manufacturer Name
- Manufactured Date
- Portable Y/N
- Asset Type (Real Property Installed Equipment (RPIE) or Equipment Authorized Inventory Data (EAID)
- Rated Horsepower
- Fuel Type Utilized
- Designed Load Percent
- # of cylinders
- Engine Displacement
- Crankcase ventilation
- Manufacturer Certified Level of Conformity
- Emission controls
- Fuel tank configuration (Separate, Integral or both)
- Total hours operated for testing and maintenance purposes
- Total hours operated for emergency purposes
- Total hours operated for non-emergency purposes (not including testing/maintenance)

This data should be available from the personnel maintaining the engine or the manufacturer specification sheet.

The generator set, shown below, consists of the engine and the alternator. Each component, the generator set (gen set), the engine, and the alternator can all have different ratings, name plates and manufacturers.

Generator Set

Generator Set Nameplate



Engine

Engine Plate

The engine plate often has the engine serial number, engine model number, manufacturer, manufacture date, EPA engine family, RPM, rated horsepower, and engine displacement.

The specification sheet often has additional data required.

Specifications – Engine

Base Engine	Cummins, Inc Model QSM11-G4, Turbocharged, EGR, and CAC, diesel-fueled
Displacement in^3 (L)	661.0 (10.8)
Overspeed Limit, rpm	2100 ±50
Regenerative Power, kW	30.6
Cylinder Block Configuration	Cast iron, In-line 6 cylinder
Battery Capacity	550 amps at ambient temperature of 32°F (-0°C) and above
Battery Charging Alternator	70 amps
Starting Voltage	24-volt, negative ground
Lube Oil Filter Types	Single spin-on, combination full flow and bypass filters
Standard Cooling System	125°F (52°C) ambient radiator

Power Output	**Standby**	**Prime**
Gross Engine Power Output, bhp (kWm)	470 (350)	427 (318)
BMEP at Rated Load, psi (kPa)	314 (2165)	285 (1965)
Bore, in. (mm)	4.92 (125)	4.92 (125)
Stroke, in. (mm)	5.79 (147.1)	5.79 (147.1)
Piston Speed, ft/min (m/s)	17.37 (0.88)	17.37 (0.88)
Compression Ratio	17:1	17:1
Lube Oil Capacity, qt. (L)	38.8 (36.72)	38.8 (36.72)
Fuel Flow		
Fuel Flow at Rated Load, US Gal/hr (L/hr)	75 (284)	75 (284)
Maximum Inlet Restriction, in. Hg (mm Hg)	8 (204)	8 (204)
Maximum Return Restriction, in. Hg (mm Hg)	8 (204)	8 (204)
Air Cleaner		
Maximum Air Cleaner Restriction, in. H_2O (kPa)	25.0 (6.2)	25.0 (6.2)
Exhaust		
Exhaust Flow at Rated Load, cfm (m^3/min)	2345 (66.4)	2135 (60.46)
Exhaust Temperature, °F (°C)	1011 (543.8)	955 (513)
Max Back Pressure, in. H_2O (kPa)	40.8 (10.15)	34.0 (8.46)

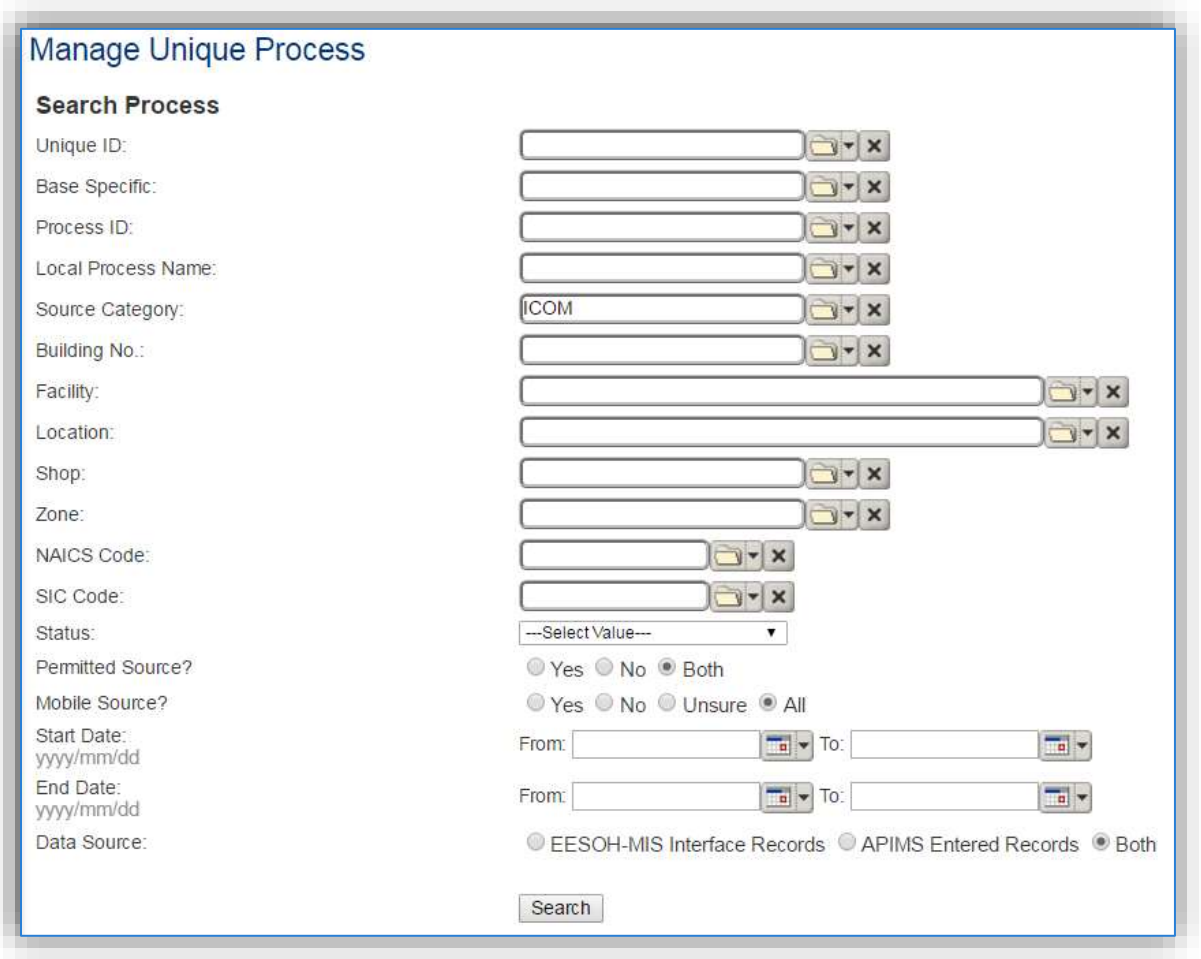
Due to the complexity of internal combustion engines, it is a best practice to go to the location of the generator set and examine the nameplates for the gen set, engine, and alternator. It is also a good practice to look at the fuel tank and the transfer switch to gather all the necessary data. Often, once the engine is located, the specification sheets can be obtained from the shop or from the manufacturer. There is no single source of data that will provide all the information required.

3.1.3 Standard Source Identification/Characterization

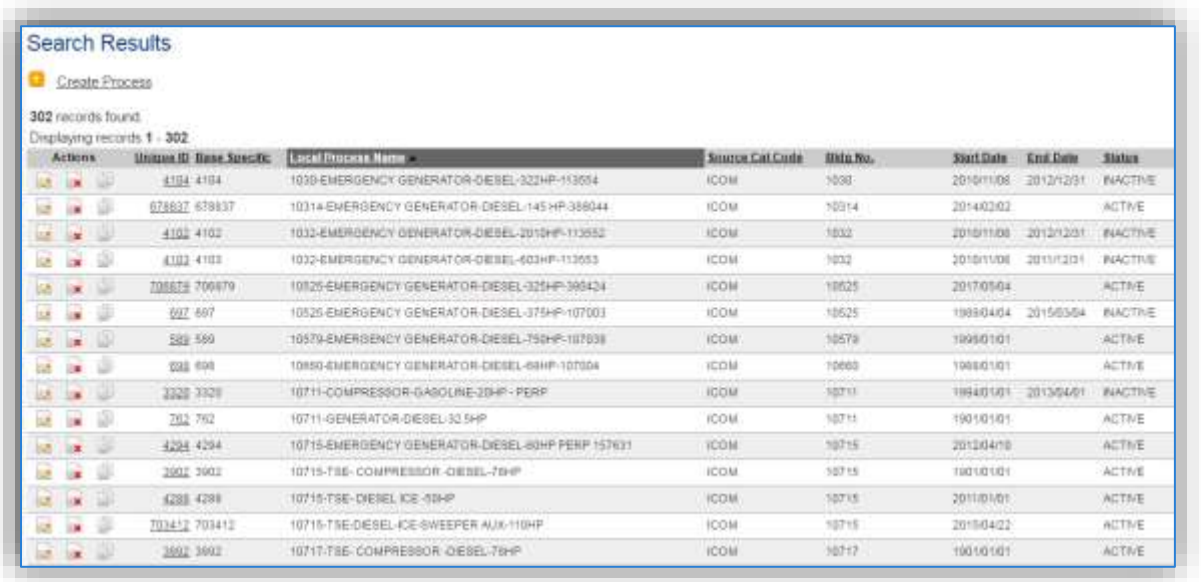
3.1.3.1 Existing Sources

It is important to review the existing sources in each source category on an annual basis at a minimum. Most regulatory agencies require an up to date source and equipment inventory.

Navigate to the Unique Process module of APIMS by clicking on **Unique Process** under the **Emission Unit** tab.



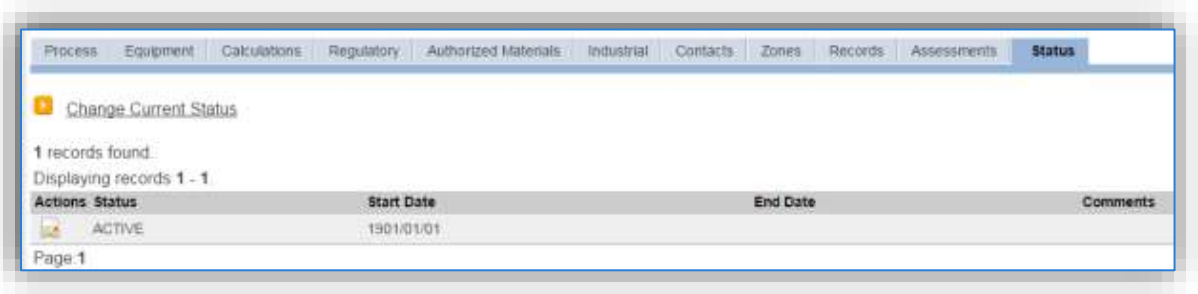
In the **Source Category** search field, type "ICOM" then select the row for INTERNAL COMBUSTION from the dropdown results. Click the **Search** button.



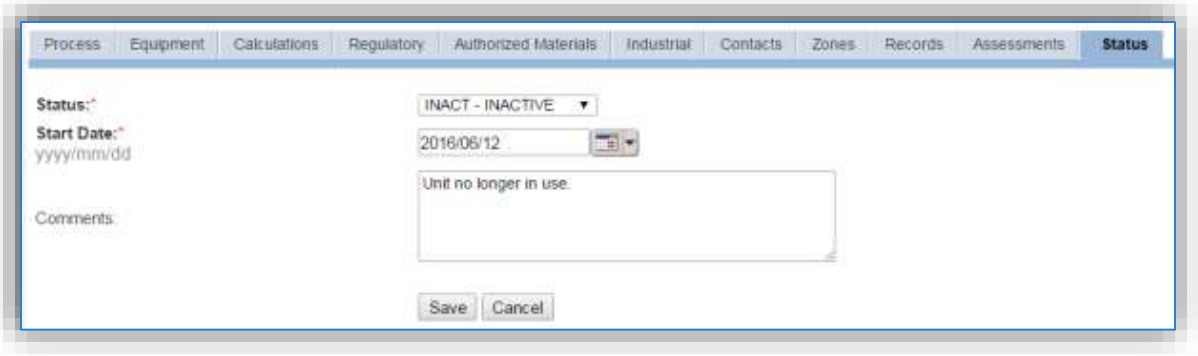
The search results grid will now display all the internal combustion processes currently in APIMS.

3.1.3.1.1 Status

If the status of a process needs to be changed, click the edit icon next to the process.



Navigate to the *Status* tab. Click the Change Current Status hyperlink.



Select the appropriate status from the **Status** dropdown (i.e., ACTIVE, REMOVED or INACTIVE).

For the **Start Date** enter the date at which the status changed.

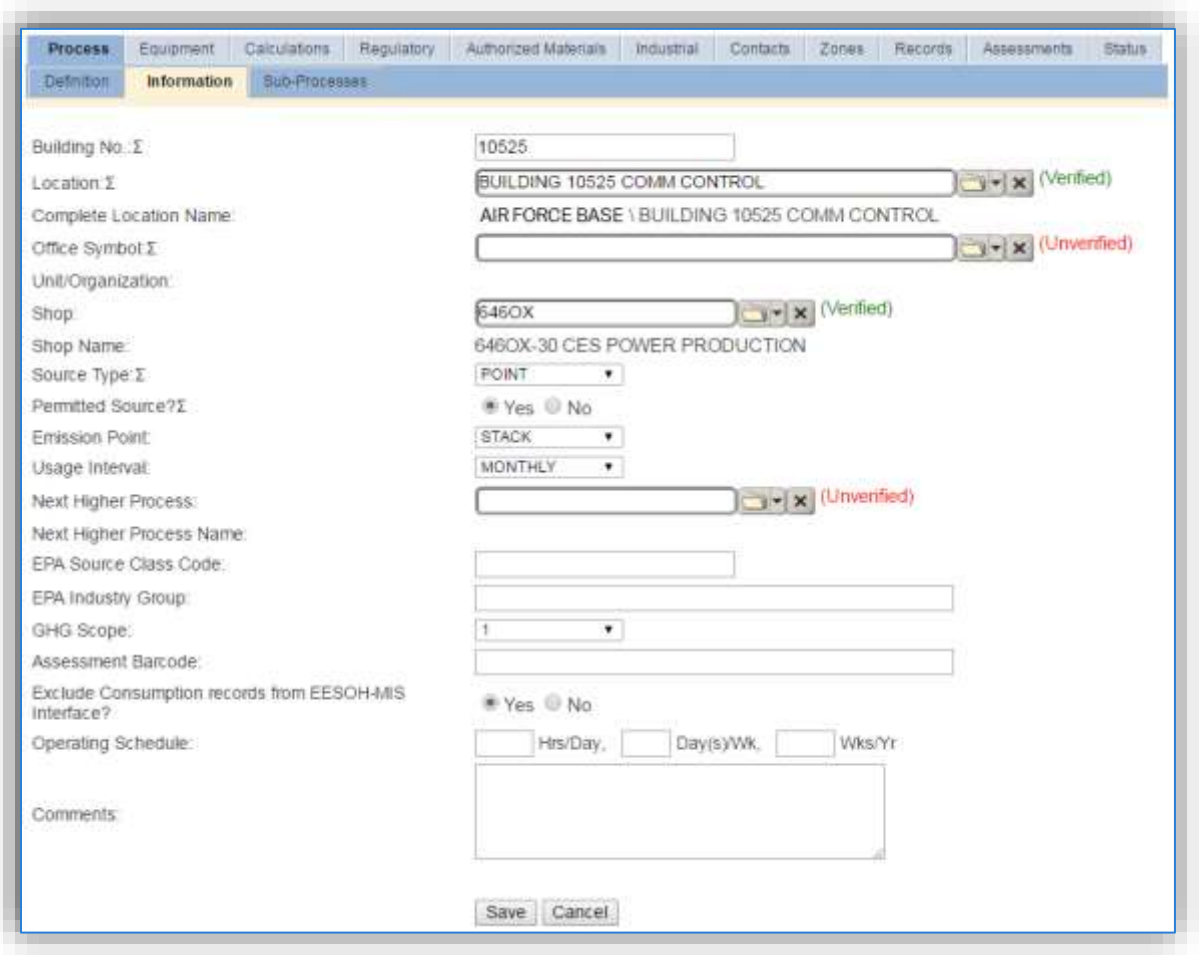
Enter **Comments** that provide insight into why the status changed. These can be very useful for equipment inventories, permit renewals and regulatory reporting. Most regulatory agencies require reporting on unit operation status; this includes any potential time spent offline, reasons for the outage.

Click the **Save** button.

The emissions for a process will only be calculated for the dates the process was in an ACTIVE status. If a source is removed in the middle of a year the emissions will only be calculated for the part of the year the source was active.

3.1.3.1.2 Information

There are basic data elements that are important to track and maintain for new and existing sources, such as location and source type. This data can be maintained in the Unique Process record on the *Information* sub tab.



The **Building No**. field can be used to specify a general location or area of the emission source, for example, EAST SIDE.

The **Location** field is very important to effectively manage the location and mission of the emission source. This documents where the source is in case it needs to be inspected or if the source owner needs to be contacted for pertinent information. For the instructions on how to create a location reference Section 2.2 Location.

The **Shop Name** field can be used to specify the shop that manages and is responsible for the maintenance of the engine. This is especially important for installations that have generators that are not managed by the facility power shop.

Internal combustion operations are categorized as POINT source in the **Source Type**.

The **Emission Point** for internal combustion equipment is usually STACK.

The **Permitted Source** flag should also be populated to accurately reflect the current regulatory status of the emission source. This flag can be an invaluable tool in roll-up reporting.

The **Usage Interval** should be designated. This source is usually documented on a MONTHLY basis. It is important to populate this field correctly as it will affect how it is documented in the AEI Throughputs module.

3.1.3.1.3 Sub-Processes

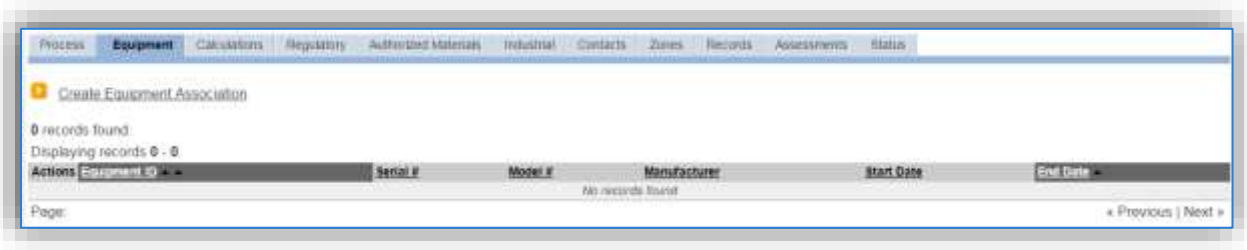
This source does not utilize this functionality.

3.1.3.1.4 Equipment

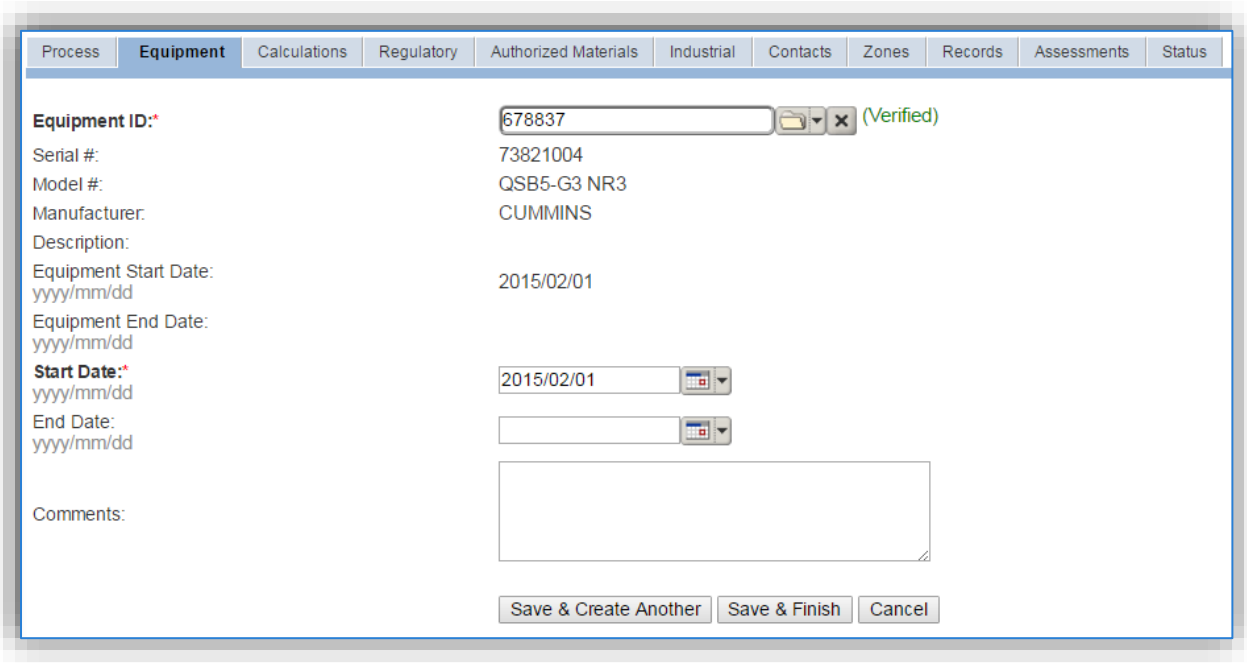
The next tab is the *Equipment* tab, to link the equipment to the process the equipment must already be entered in APIMS. If the equipment does not exist in APIMS it is recommended that the New Source Wizard module be used to create the equipment and process records. If the Facility Power shop is using the Facility Power module in APIMS, contact them for entry into the Facility Power module.

There should always be a single piece of equipment associated to each process for internal combustion. Each internal combustion unit should have its own process and equipment

The following screens should only be used to associate an existing piece of equipment to an existing process.



To link the equipment, click on the Create Equipment Association hyperlink.

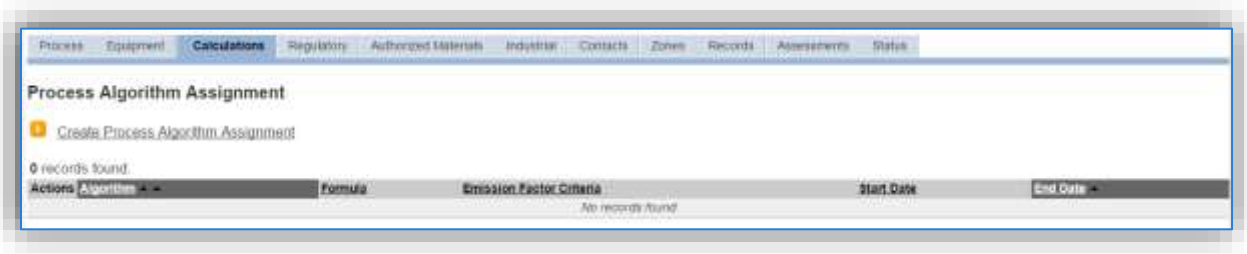


Search for the **Equipment ID** in the list of values, enter the **Start Date** and click the **Save & Finish** button.

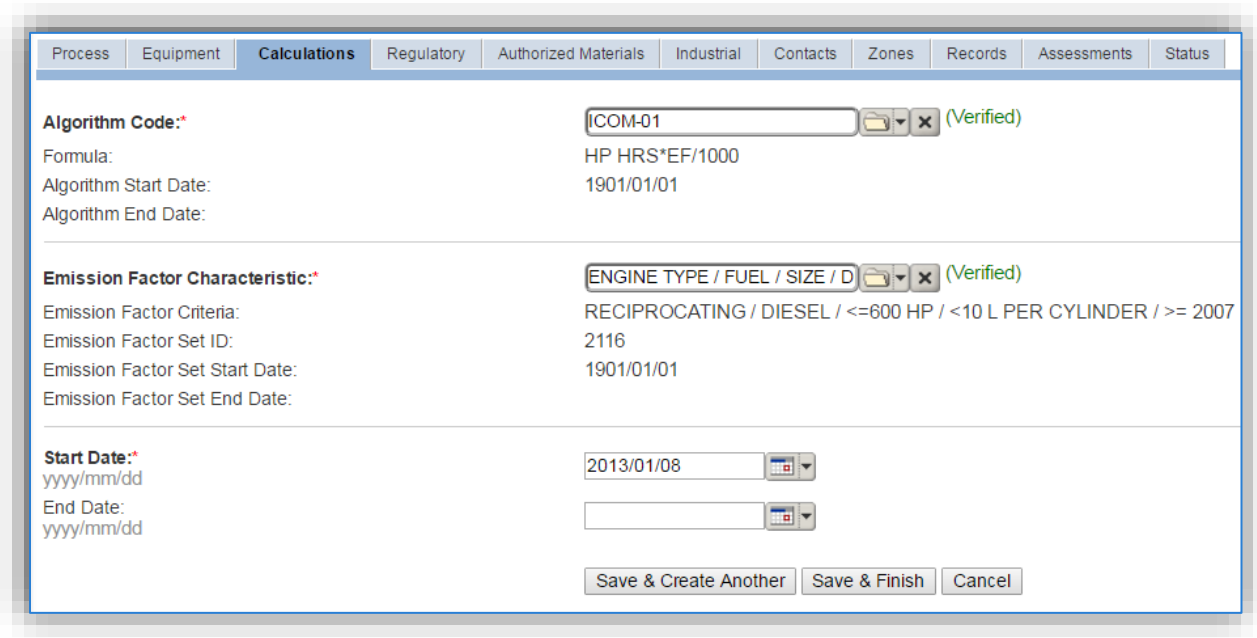
The association start date should match the equipment start date.

3.1.3.1.5 Calculations

The next tab is the *Calculations* tab.



To associate an algorithm to the process, click on the Create Process Algorithm Assignment hyperlink.



Select the **Algorithm Code** from the list of values that matches the correct scenario. Next select the correct **Emission Factor Characteristic**. Enter the **Start Date** to match the start date of the process. Click the **Save & Finish** button to save and return to the Calculations tab or the **Save & Create Another** button to include more equipment.

Use the tables on the next page to identify the correct Algorithm Code and Emission Factor Characteristic ID.

3.1.3.1.5.1 ICOM-01

Calculations Based On Hours Of Operation			Stationary Reciprocating Engines	Gasoline Fuel
All Displacement	Both NSPS Compliant and Not Required			
	All HP	Any Manufacture Date	**ICOM - 01** STATIONARY RECIPROCATING SI / GASOLINE / ALL / ALL / ALL / ALL	

Calculations Based On Hours Of Operation			Stationary Reciprocating Engines	Natural Gas
All Displacement	Both NSPS Compliant and Not Required			
	2-Stroke Lean Burn	Any Manufacture Date	**ICOM - 01** STATIONARY RECIPROCATING SI / NATRUAL GAS / ALL / 2-STROKE LEAN BURN / ALL / ALL	
	4-Stroke Lean Burn	Any Manufacture Date	**ICOM - 01** STATIONARY RECIPROCATING SI / NATRUAL GAS / ALL / 4-STROKE LEAN BURN / ALL / ALL	
	4-Stroke Rich Burn	Any Manufacture Date	**ICOM - 01** STATIONARY RECIPROCATING SI / NATRUAL GAS / ALL / 4-STROKE RICH BURN / ALL / ALL	

Calculations Based On Hours Of Operation			Stationary Turbine Engine	Natrual Gas
All Displacement	Both NSPS Compliant and Not Required			
	Lean Premix	Any Manufacture Date	**ICOM - 01** STATIONARY TURBINE SI / NATURAL GAS / ALL / LEAN PREMIX / ALL / ALL	
	Uncontrolled	Any Manufacture Date	**ICOM - 01** STATIONARY TURBINE SI / NATRUAL GAS / ALL / UNCONTROLLED / ALL / ALL	
	Water-Steam Injection	Any Manufacture Date	**ICOM - 01** STATIONARY TURBINE SI / NATRUAL GAS / ALL / WATER-STEAM INJECTION / ALL / ALL	

Calculations Based On Hours Of Operation			Stationary Turbine Engine	Diesel
All Displacement	Both NSPS Compliant and Not Required			
	Uncontrolled	Any Manufacture Date	**ICOM - 01** STATIONARY TURBINE CI / DIESEL / ALL / UNCONTROLLED / ALL / ALL	
	Water-Steam Injection	Any Manufacture Date	**ICOM - 01** STATIONARY TURBINE CI / DIESEL / ALL / WATER-STEAM INJECTION / ALL / ALL	

Calculations Based On Hours Of Operation			Stationary Turbine Engine	Landfill Gas
All Displacement	Both NSPS Compliant and Not Required			
	All HP	Any Manufacture Date	**ICOM - 01** STATIONARY TURBINE SI / LANDFILL GAS / ALL / ALL / ALL / ALL	

Calculations Based On Hours Of Operation			Stationary Turbine Engine	Digester Gas
All Displacement	Both NSPS Compliant and Not Required			
	All HP	Any Manufacture Date	**ICOM - 01** STATIONARY TURBINE SI / DIGESTER GAS / ALL / ALL / ALL / ALL	

Calculations Based On Hours Of Operation			Stationary Emergency Fire Pump Engine	Diesel Fuel
All Displacement	Required to be NSPS Compliant			
	< 11 HP	Manufacture Date Before 2011	**ICOM - 01** STATIONARY EMERGENCY FIRE PUMP CI / DIESEL / < 11 HP / ALL / NSPS / < 2011	
		Manufacture Date On/After 2011	**ICOM - 01** STATIONARY EMERGENCY FIRE PUMP CI / DIESEL / < 11 HP / ALL / NSPS / >= 2011	
	11 ≤ HP < 25	Manufacture Date Before 2011	**ICOM - 01** STATIONARY EMERGENCY FIRE PUMP CI / DIESEL / 11 <= HP < 25 / ALL / NSPS / < 2011	
		Manufacture Date On/After 2011	**ICOM - 01** STATIONARY EMERGENCY FIRE PUMP CI / DIESEL / 11 <= HP < 25 / ALL / NSPS / >= 2011	
	25 ≤ HP < 50	Manufacture Date Before 2011	**ICOM - 01** STATIONARY EMERGENCY FIRE PUMP CI / DIESEL / 25 <= HP < 50 / ALL / NSPS / < 2011	
		Manufacture Date On/After 2011	**ICOM - 01** STATIONARY EMERGENCY FIRE PUMP CI / DIESEL / 25 <= HP < 50 / ALL / NSPS / >= 2011	
	50 ≤ HP < 100	Manufacture Date Before 2011	**ICOM - 01** STATIONARY EMERGENCY FIRE PUMP CI / DIESEL / 50 <= HP < 100 / ALL / NSPS / < 2011	
		Manufacture Date On/After 2011	**ICOM - 01** STATIONARY EMERGENCY FIRE PUMP CI / DIESEL / 50 <= HP < 100 / ALL / NSPS / >= 2011	
	100 ≤ HP < 175	Manufacture Date Before 2010	**ICOM - 01** STATIONARY EMERGENCY FIRE PUMP CI / DIESEL / 100 <= HP < 175 / ALL / NSPS / < 2010	
		Manufacture Date On/After 2010	**ICOM - 01** STATIONARY EMERGENCY FIRE PUMP CI / DIESEL / 100 <= HP < 175 / ALL / NSPS / >= 2010	
	175 ≤ HP < 600	Manufacture Date Before 2009	**ICOM - 01** STATIONARY EMERGENCY FIRE PUMP CI / DIESEL / 175 <= HP < 600 / ALL / NSPS / < 2009	
		Manufacture Date On/After 2009	**ICOM - 01** STATIONARY EMERGENCY FIRE PUMP CI / DIESEL / 175 <= HP < 600 / ALL / NSPS / >= 2009	
	600 ≤ HP ≤ 750	Manufacture Date Before 2009	**ICOM - 01** STATIONARY EMERGENCY FIRE PUMP CI / DIESEL / 600 <= HP <= 750 / ALL / NSPS / < 2009	
		Manufacture Date On/After 2009	**ICOM - 01** STATIONARY EMERGENCY FIRE PUMP CI / DIESEL / 600 <= HP <= 750 / ALL / NSPS / >= 2009	
	> 750 HP	Manufacture Date Before 2008	**ICOM - 01** STATIONARY EMERGENCY FIRE PUMP CI / DIESEL / > 750 HP / ALL / NSPS / < 2008	
		Manufacture Date On/After 2008	**ICOM - 01** STATIONARY EMERGENCY FIRE PUMP CI / DIESEL / > 750 HP / ALL / NSPS / >= 2008	
	Is Not Required to Conform to NSPS			
	≤ 600 HP	Any Manufacture Date	**ICOM - 01** STATIONARY EMERGENCY FIRE PUMP CI / DIESEL / <= 600 HP / ALL / NON-NSPS / ALL	
	> 600 HP	Any Manufacture Date	**ICOM - 01** STATIONARY EMERGENCY FIRE PUMP CI / DIESEL / > 600 HP / ALL / NON-NSPS / ALL	

Calculations Based On Hours Of Operation			Stationary Emergency Non-Fire Pump Engine	Diesel Fuel
Displacement < 10L	Required to be NSPS Compliant			
	< 11 HP	Manufacture Date Before 2007	**ICOM - 01** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / < 11 HP / < 10 L / NSPS / < 2007	
		Manufacture Date During 2007	**ICOM - 01** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / < 11 HP / < 10 L / NSPS / = 2007	
		Manufacture Date On/After 2008	**ICOM - 01** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / < 11 HP / < 10 L / NSPS / >= 2008	
	11 ≤ HP < 25	Manufacture Date Before 2007	**ICOM - 01** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / 11 <= HP < 25 / < 10 L / NSPS / < 2007	
		Manufacture Date During 2007	**ICOM - 01** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / 11 <= HP < 25 / < 10 L / NSPS / = 2007	
		Manufacture Date On/After 2008	**ICOM - 01** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / 11 <= HP < 25 / < 10 L / NSPS / >= 2008	
	25 ≤ HP < 50	Manufacture Date Before 2007	**ICOM - 01** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / 25 <= HP < 50 / < 10 L / NSPS / < 2007	
		Manufacture Date During 2007	**ICOM - 01** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / 25 <= HP < 50 / < 10 L / NSPS / = 2007	
		Manufacture Date On/After 2008	**ICOM - 01** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / 25 <= HP < 50 / < 10 L / NSPS / >= 2008	
	50 ≤ HP < 100	Manufacture Date Before 2007	**ICOM - 01** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / 50 <= HP < 100 / < 10 L / NSPS / < 2007	
		Manufacture Date During 2007	**ICOM - 01** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / 50 <= HP < 100 / < 10 L / NSPS / = 2007	
		Manufacture Date On/After 2008	**ICOM - 01** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / 50 <= HP < 100 / < 10 L / NSPS / >= 2008	
	100 ≤ HP < 175	Manufacture Date Before 2007	**ICOM - 01** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / 100 <= HP < 175 / < 10 L / NSPS / < 2007	
		Manufacture Date On/After 2007	**ICOM - 01** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / 100 <= HP < 175 / < 10 L / NSPS / >= 2007	
	175 ≤ HP < 600	Manufacture Date Before 2007	**ICOM - 01** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / 175 <= HP < 600 / < 10 L / NSPS / < 2007	
		Manufacture Date On/After 2007	**ICOM - 01** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / 175 <= HP < 600 / < 10 L / NSPS / >= 2007	
	600 ≤ HP < 750	Manufacture Date Before 2007	**ICOM - 01** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / 600 <= HP < 750 / < 10 L / NSPS / < 2007	
		Manufacture Date On/After 2007	**ICOM - 01** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / 600 <= HP < 750 / < 10 L / NSPS / >= 2007	
	750 ≤ HP ≤ 3000	Manufacture Date Before 2007	**ICOM - 01** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / 750 <= HP <= 3000 / < 10 L / NSPS / < 2007	
		Manufacture Date On/After 2007	**ICOM - 01** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / 750 <= HP <= 3000 / < 10 L / NSPS / >= 2007	
	> 3000 HP	Manufacture Date Before 2007	**ICOM - 01** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / > 3000 HP / < 10 L / NSPS / < 2007	
		Manufacture Date Between 2007 & 2010	**ICOM - 01** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / > 3000 HP / < 10 L / NSPS / 2007 - 2010	
		Manufacture Date On/After 2011	**ICOM - 01** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / > 3000 HP / < 10 L / NSPS / >= 2011	
	Is Not Required to Conform to NSPS			
	≤ 600 HP	Any Manufacture Date	**ICOM - 01** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / <= 600 HP / < 10 L / NON-NSPS / ALL	
	> 600 HP	Any Manufacture Date	**ICOM - 01** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / > 600 HP / < 10 L / NON-NSPS / ALL	

Calculations Based On Hours Of Operation			Stationary Emergency Non-Fire Pump Engine	Diesel Fuel
Displacement 10 ≤ L < 15	Required to be NSPS Compliant			
	≤ 600 HP	Manufacture Date Before 2007	**ICOM - 01** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / <= 600 HP / 10 <= L < 15 / NSPS / < 2007	
		Manufacture Date Between 2007 & 2012	**ICOM - 01** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / <= 600 HP / 10 <= L < 15 / NSPS / 2007 - 2012	
		Manufacture Date On/After 2013	**ICOM - 01** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / <= 600 HP / 10 <= L < 15 / NSPS / >= 2013	
	> 600 HP	Manufacture Date Before 2007	**ICOM - 01** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / > 600 HP / 10 <= L < 15 / NSPS / < 2007	
		Manufacture Date Between 2007 & 2012	**ICOM - 01** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / > 600 HP / 10 <= L < 15 / NSPS / 2007 - 2012	
	600 < HP < 4958	Manufacture Date On/After 2013	**ICOM - 01** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / 600 < HP < 4958 / 10 <= L < 15 / NSPS/ >= 2013	
	≥ 4958 HP	Manufacture Date On/After 2013	**ICOM - 01** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / >= 4958 HP / 10 <= L < 15 / NSPS/ >= 2013	
	Is Not Required to Conform to NSPS			
	≤ 600 HP	Any Manufacture Date	**ICOM - 01** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / <= 600 HP / 10 <= L < 15 / NON-NSPS / ALL	
	> 600 HP	Any Manufacture Date	**ICOM - 01** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / > 600 HP / 10 <= L < 15 / NON-NSPS / ALL	

Calculations Based On Hours Of Operation			Stationary Emergency Non-Fire Pump Engine	Diesel Fuel
Displacement 15 ≤ L < 20	Required to be NSPS Compliant			
	≤ 600 HP	Manufacture Date Before 2007	**ICOM - 01** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / <= 600 HP / 15 <= L < 20 / NSPS / < 2007	
		Manufacture Date Between 2007 & 2013	**ICOM - 01** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / <= 600 HP / 15 <= L < 20 / NSPS / 2007 - 2013	
		Manufacture Date On/After 2014	**ICOM - 01** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / <= 600 HP / 15 <= L < 20 / NSPS / >= 2014	
	> 600 HP	Manufacture Date Before 2007	**ICOM - 01** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / > 600 HP / 15 <= L < 20 / NSPS / < 2007	
		Manufacture Date Between 2007 & 2013	**ICOM - 01** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / > 600 HP / 15 <= L < 20 / NSPS / 2007 - 2013	
	600 < HP < 2682	Manufacture Date On/After 2014	**ICOM - 01** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / 600< HP < 2682 / 15 <= L < 20/ NSPS / >= 2014	
	≥ 2682 HP	Manufacture Date On/After 2014	**ICOM - 01** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / >= 2682 HP / 15 <= L < 20/ NSPS / >= 2014	
	Is Not Required to Conform to NSPS			
	≤ 600 HP	Any Manufacture Date	**ICOM - 01** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / <= 600 HP / 15 <= L < 20 / NON-NSPS / ALL	
	> 600 HP	Any Manufacture Date	**ICOM - 01** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / > 600 HP / 15 <= L < 20 / NON-NSPS / ALL	

Calculations Based On Hours Of Operation		Stationary Emergency Non-Fire Pump Engine	Diesel Fuel
Displacement 20 ≤ L < 25	Required to be NSPS Compliant		
	≤ 600 HP	Manufacture Date Before 2007	**ICOM - 01** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / <= 600 HP / 20 <= L < 25 / NSPS / < 2007
		Manufacture Date Between 2007 & 2013	**ICOM - 01** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / <= 600 HP / 20 <= L < 25 / NSPS / 2007 - 2013
		Manufacture Date On/After 2014	**ICOM - 01** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / <= 600 HP / 20 <= L < 25 / NSPS / >= 2014
	> 600 HP	Manufacture Date Before 2007	**ICOM - 01** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / > 600 HP / 20 <= L < 25 / NSPS / < 2007
		Manufacture Date Between 2007 & 2013	**ICOM - 01** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / > 600 HP / 20 <= L < 25 / NSPS / 2007 - 2013
	600 < HP < 2682	Manufacture Date On/After 2014	**ICOM - 01** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / 600 < HP < 2682 / 20 <= L < 25/ NSPS / >= 2014
	≥ 2682 HP	Manufacture Date On/After 2014	**ICOM - 01** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / >= 2682 HP / 20 <= L < 25/ NSPS / >= 2014
	Is Not Required to Conform to NSPS		
	≤ 600 HP	Any Manufacture Date	**ICOM - 01** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / <= 600 HP / 20 <= L < 25 / NON-NSPS / ALL
	> 600 HP	Any Manufacture Date	**ICOM - 01** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / > 600 HP / 20 <= L < 25 / NON-NSPS / ALL

Calculations Based On Hours Of Operation		Stationary Emergency Non-Fire Pump Engine	Diesel Fuel
Displacement 25 ≤ L < 30	Required to be NSPS Compliant		
	≤ 600 HP	Manufacture Date Before 2007	**ICOM - 01** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / <= 600 HP / 25 <= L < 30 / NSPS / < 2007
		Manufacture Date Between 2007 & 2013	**ICOM - 01** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / <= 600 HP / 25 <= L < 30 / NSPS / 2007 - 2013
		Manufacture Date On/After 2014	**ICOM - 01** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / <= 600 HP / 25 <= L < 30 / NSPS / >= 2014
	> 600 HP	Manufacture Date Before 2007	**ICOM - 01** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / > 600 HP / 25 <= L < 30 / NSPS / < 2007
		Manufacture Date Between 2007 & 2013	**ICOM - 01** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / > 600 HP / 25 <= L < 30 / NSPS / 2007 - 2013
	600 < HP < 2682	Manufacture Date On/After 2014	**ICOM - 01** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / 600 < HP < 2682 / 25 <= L < 30/ NSPS / >= 2014
	≥ 2682 HP	Manufacture Date On/After 2014	**ICOM - 01** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / >= 2682 HP / 25 <= L < 30/ NSPS / >= 2014
	Is Not Required to Conform to NSPS		
	≤ 600 HP	Any Manufacture Date	**ICOM - 01** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / <= 600 HP / 25 <= L < 30 / NON-NSPS / ALL
	> 600 HP	Any Manufacture Date	**ICOM - 01** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / > 600 HP / 25 <= L < 30 / NON-NSPS / ALL

Calculations Based On Hours Of Operation		Stationary Non-Emergency Engine	Diesel Fuel
Displacement < 10L	Required to be NSPS Compliant		
	< 11 HP	Manufacture Date Before 2007	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / < 11 HP / < 10 L / NSPS / < 2007
		Manufacture Date During 2007	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / < 11 HP / < 10 L / NSPS / = 2007
		Manufacture Date On/After 2008	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / < 11 HP / < 10 L / NSPS / >= 2008
	11 ≤ HP < 25	Manufacture Date Before 2007	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / 11 <= HP < 25 / < 10 L / NSPS / < 2007
		Manufacture Date During 2007	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / 11 <= HP < 25 / < 10 L / NSPS / = 2007
		Manufacture Date On/After 2008	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / 11 <= HP < 25 / < 10 L / NSPS / >= 2008
	25 ≤ HP < 50	Manufacture Date Before 2007	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / 25 <= HP < 50 / < 10 L / NSPS / < 2007
		Manufacture Date During 2007	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / 25 <= HP < 50 / < 10 L / NSPS / = 2007
		Manufacture Date Between 2008 & 2012	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / 25 <= HP < 50 / < 10 L / NSPS / 2008 - 2012
		Manufacture Date On/After 2013	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / 25 <= HP < 50 / < 10 L / NSPS / >= 2013
	50 ≤ HP < 75	Manufacture Date Before 2007	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / 50 <= HP < 75 / < 10 L / NSPS / < 2007
		Manufacture Date During 2007	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / 50 <= HP < 75 / < 10 L / NSPS / = 2007
		Manufacture Date Between 2008 & 2012	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / 50 <= HP < 75 / < 10 L / NSPS / 2008 - 2012
		Manufacture Date On/After 2013	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / 50 <= HP < 75 / < 10 L / NSPS / >= 2013
	75 ≤ HP < 100	Manufacture Date Before 2007	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / 75 <= HP < 100 / < 10 L / NSPS / < 2007
		Manufacture Date During 2007	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / 75 <= HP < 100 / < 10 L / NSPS / = 2007
		Manufacture Date Between 2008 & 2011	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / 75 <= HP < 100 / < 10 L / NSPS / 2008 - 2011
		Manufacture Date Between 2012 & 2013	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / 75 <= HP < 100 / < 10 L / NSPS / 2012 - 2013
		Manufacture Date On/After 2014	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / 75 <= HP < 100 / < 10 L / NSPS / >= 2014
	100 ≤ HP < 175	Manufacture Date Before 2007	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / 100 <= HP < 175 / < 10 L / NSPS / < 2007
		Manufacture Date During 2007	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / 100 <= HP < 175 / < 10 L / NSPS / = 2007
		Manufacture Date Between 2008 & 2011	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / 100 <= HP < 175 / < 10 L / NSPS / 2008 - 2011
		Manufacture Date Between 2012 & 2013	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / 100 <= HP < 175 / < 10 L / NSPS / 2012 - 2013
		Manufacture Date On/After 2014	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / 100 <= HP < 175 / < 10 L / NSPS / >= 2014

Calculations Based On Hours Of Operation	Stationary Non-Emergency Engine	Diesel Fuel

	Required to be NSPS Compliant		
Displacement < 10L	175 ≤ HP ≤ 600	Manufacture Date Before 2007	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / 175 <= HP <= 600 / < 10 L / NSPS / < 2007
		Manufacture Date Between 2007 & 2010	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / 175 <= HP <= 600 / < 10 L / NSPS / 2007 - 2010
		Manufacture Date Between 2011 & 2013	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / 175 <= HP <= 600 / < 10 L / NSPS / 2011 - 2013
		Manufacture Date On/After 2014	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / 175 <= HP <= 600 / < 10 L / NSPS / >= 2014
	600 < HP < 750	Manufacture Date Before 2007	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / 600 < HP < 750 / < 10 L / NSPS / < 2007
		Manufacture Date Between 2007 & 2010	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / 600 < HP < 750 / < 10 L / NSPS / 2007 - 2010
		Manufacture Date Between 2011 & 2013	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / 600 < HP < 750 / < 10 L / NSPS / 2011 - 2013
		Manufacture Date On/After 2014	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / 600 < HP < 750 / < 10 L / NSPS / >= 2014
	750 ≤ HP ≤ 1200	Manufacture Date Before 2007	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / 750 <= HP <= 1200 / < 10 L / NSPS / < 2007
		Manufacture Date Between 2007 & 2010	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / 750 <= HP <= 1200 / < 10 L / NSPS / 2007 - 2010
		Manufacture Date Between 2011 & 2014	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / 750 <= HP <= 1200 / < 10 L / NSPS / 2011 - 2014
		Generator Manufacture Date On/After 2015	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / 750 <= HP <= 1200 / < 10 L / NSPS / >= 2015 GENERATORS
		Manufacture Date On/After 2015	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / 750 <= HP <= 1200 / < 10 L / NSPS / >= 2015 NON-GENERATORS
	1200 < HP ≤ 3000	Manufacture Date Before 2007	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / 1200 < HP <= 3000 HP / < 10 L / NSPS / < 2007
		Manufacture Date Between 2007 & 2010	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / 1200 < HP <= 3000 HP / < 10 L / NSPS / 2007 - 2010
		Manufacture Date Between 2011 & 2014	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / 1200 < HP <= 3000 HP / < 10 L / NSPS / 2011 - 2014
		Manufacture Date Between 2011 & 2014	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / 1200 < HP <= 3000 HP / < 10 L / NSPS / 2011 - 2014 NON-
		Generator Manufacture Date On/After 2015	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / 1200 < HP <= 3000 HP / < 10 L / NSPS / >= 2015
		Manufacture Date On/After 2015	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / 1200 < HP <= 3000 HP / < 10 L / NSPS / >= 2015 NON-
	> 3000 HP	Manufacture Date Before 2007	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / > 3000 HP / < 10 L / NSPS / < 2007
		Manufacture Date Between 2007 & 2010	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / > 3000 HP / < 10 L / NSPS / 2007 - 2010
		Manufacture Date Between 2011 & 2014	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / > 3000 HP / < 10 L / NSPS / 2011 - 2014 GENERATORS
		Manufacture Date Between 2011 & 2014	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / > 3000 HP / < 10 L / NSPS / 2011 - 2014 NON-GENERATORS
		Generator Manufacture Date On/After 2015	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / > 3000 HP / < 10 L / NSPS / >= 2015 GENERATORS
		Manufacture Date On/After 2015	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / > 3000 HP / < 10 L / NSPS / >= 2015 NON-GENERATORS

Calculations Based On Hours Of Operation			Stationary Non-Emergency Engine	Diesel Fuel
Displacement < 10L	Is Not Required to Conform to NSPS			
	≤ 600 HP	Any Manufacture Date	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / <= 600 HP / < 10 L / NON-NSPS / ALL	
	> 600 HP	Any Manufacture Date	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / > 600 HP / < 10 L / NON-NSPS / ALL	

Calculations Based On Hours Of Operation			Stationary Non-Emergency Engine	Diesel Fuel
Displacement 10 ≤ L < 15	Required to be NSPS Compliant			
	≤ 600 HP	Manufacture Date Before 2007	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / <= 600 HP / 10 <= L < 15 / NSPS / < 2007	
		Manufacture Date Between 2007 & 2012	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / <= 600 HP / 10 <= L < 15 / NSPS / 2007 - 2012	
		Manufacture Date On/After 2013	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / <= 600 HP / 10 <= L < 15 / NSPS / >= 2013	
	> 600 HP	Manufacture Date Before 2007	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / > 600 HP / 10 <= L < 15 / NSPS / < 2007	
		Manufacture Date Between 2007 & 2012	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / > 600 HP / 10 <= L < 15 / NSPS / 2007 - 2012	
	600 < HP < 4958	Manufacture Date On/After 2013	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / 600 < HP < 4958 / 10 <= L < 15 / NSPS/ >= 2013	
	≥ 4958 HP	Manufacture Date On/After 2013	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / >= 4958 HP / 10 <= L < 15 / NSPS/ >= 2013	
	Is Not Required to Conform to NSPS			
	≤ 600 HP	Any Manufacture Date	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / <= 600 HP / 10 <= L < 15 / NON-NSPS / ALL	
	> 600 HP	Any Manufacture Date	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / > 600 HP / 10 <= L < 15 / NON-NSPS / ALL	

Calculations Based On Hours Of Operation			Stationary Non-Emergency Engine	Diesel Fuel
Displacement 15 ≤ L < 20	Required to be NSPS Compliant			
	≤ 600 HP	Manufacture Date Before 2007	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / <= 600 HP / 15 <= L < 20 / NSPS / < 2007	
		Manufacture Date Between 2007 & 2013	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / <= 600 HP / 15 <= L < 20 / NSPS / 2007 - 2013	
		Manufacture Date On/After 2014	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / <= 600 HP / 15 <= L < 20 / NSPS / >= 2014	
	> 600 HP	Manufacture Date Before 2007	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / > 600 HP / 15 <= L < 20 / NSPS / < 2007	
	600 < HP < 2682	Manufacture Date Between 2007 & 2013	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / 600 < HP < 2682/ 15 <= L < 20 / NSPS / 2007 - 2013	
		Manufacture Date On/After 2014	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / 600 < HP < 2682 / 15 <= L < 20/ NSPS / >= 2014	
	2682 ≤ HP < 4425	Manufacture Date On/After 2007	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / 2682 <= HP < 4425 HP / 15 <= L < 20/ NSPS / >= 2007	
	≥ 4425 HP	Manufacture Date On/After 2007	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / >= 4425 HP / 15 <= L < 20/ NSPS / >= 2007	
	Is Not Required to Conform to NSPS			
	≤ 600 HP	Any Manufacture Date	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / <= 600 HP / 15 <= L < 20 / NON-NSPS / ALL	
	> 600 HP	Any Manufacture Date	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / > 600 HP / 15 <= L < 20 / NON-NSPS / ALL	

Calculations Based On Hours Of Operation		Stationary Non-Emergency Engine	Diesel Fuel
Displacement 20 ≤ L < 25	Required to be NSPS Compliant		
	≤ 600 HP	Manufacture Date Before 2007	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / <= 600 HP / 20 <= L < 25 / NSPS / < 2007
		Manufacture Date Between 2007 & 2013	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / <= 600 HP / 20 <= L < 25 / NSPS / 2007 - 2013
		Manufacture Date On/After 2014	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / <= 600 HP / 20 <= L < 25 / NSPS / >= 2014
	> 600 HP	Manufacture Date Before 2007	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / > 600 HP / 20 <= L < 25 / NSPS / < 2007
		Manufacture Date Between 2007 & 2013	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / > 600 HP / 20 <= L < 25 / NSPS / 2007 - 2013
	600 < HP < 2682	Manufacture Date On/After 2014	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / 600 < HP < 2682 / 20 <= L < 25/ NSPS / >= 2014
	≥ 2682 HP	Manufacture Date On/After 2014	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / >= 2682 HP / 20 <= L < 25/ NSPS / >= 2014
	Is Not Required to Conform to NSPS		
	≤ 600 HP	Any Manufacture Date	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / <= 600 HP / 20 <= L < 25 / NON-NSPS / ALL
	> 600 HP	Any Manufacture Date	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / > 600 HP / 20 <= L < 25 / NON-NSPS / ALL

Calculations Based On Hours Of Operation		Stationary Non-Emergency Engine	Diesel Fuel
Displacement 25 ≤ L < 30	Required to be NSPS Compliant		
	≤ 600 HP	Manufacture Date Before 2007	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / <= 600 HP / 25 <= L < 30 / NSPS / < 2007
		Manufacture Date Between 2007 & 2013	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / <= 600 HP / 25 <= L < 30 / NSPS / 2007 - 2013
		Manufacture Date On/After 2014	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / <= 600 HP / 25 <= L < 30 / NSPS / >= 2014
	> 600 HP	Manufacture Date Before 2007	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / > 600 HP / 25 <= L < 30 / NSPS / < 2007
		Manufacture Date Between 2007 & 2013	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / > 600 HP / 25 <= L < 30 / NSPS / 2007 - 2013
	600 < HP < 2682	Manufacture Date On/After 2014	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / 600 < HP < 2682 / 25 <= L < 30/ NSPS / >= 2014
	≥ 2682 HP	Manufacture Date On/After 2014	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / >= 2682 HP / 25 <= L < 30/ NSPS / >= 2014
	Is Not Required to Conform to NSPS		
	≤ 600 HP	Any Manufacture Date	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / <= 600 HP / 25 <= L < 30 / NON-NSPS / ALL
	> 600 HP	Any Manufacture Date	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DIESEL / > 600 HP / 25 <= L < 30 / NON-NSPS / ALL

Calculations Based On Hours Of Operation		Stationary Non-Emergency Engine	Dual Fuel
All Displacement	Both NSPS Compliant and Not Required		
	All HP	Any Manufacture Date	**ICOM - 01** STATIONARY NON-EMERGENCY CI / DUAL FUEL / ALL / ALL / ALL / ALL

3.1.3.1.5.2 ICOM-02

Calculations Based on Gallons of Liquid Fuel Consumed	Stationary Reciprocating Engines		Gasoline Fuel
All Displacement	Both NSPS Compliant and Not Required		
	All HP	Any Manufacture Date	**ICOM - 02** STATIONARY RECIPROCATING SI / GASOLINE / ALL / ALL / ALL / ALL

Calculations Based on Gallons of Liquid Fuel Consumed	Stationary Turbine Engine		Diesel
All Displacement	Both NSPS Compliant and Not Required		
	Uncontrolled	Any Manufacture Date	**ICOM - 02** STATIONARY TURBINE CI / DIESEL / ALL / UNCONTROLLED / ALL / ALL
	Water-Steam Injection	Any Manufacture Date	**ICOM - 02** STATIONARY TURBINE CI / DIESEL / ALL / WATER-STEAM INJECTION / ALL / ALL

Calculations Based On Gallons of Liquid Fuel Consumed	Stationary Emergency Fire Pump Engine		Diesel Fuel
All Displacement	Required to be NSPS Compliant		
	< 11 HP	Manufacture Date Before 2011	**ICOM - 02** STATIONARY EMERGENCY FIRE PUMP CI / DIESEL / < 11 HP / ALL / NSPS / < 2011
		Manufacture Date On/After 2011	**ICOM - 02** STATIONARY EMERGENCY FIRE PUMP CI / DIESEL / < 11 HP / ALL / NSPS / >= 2011
	11 ≤ HP < 25	Manufacture Date Before 2011	**ICOM - 02** STATIONARY EMERGENCY FIRE PUMP CI / DIESEL / 11 <= HP < 25 / ALL / NSPS / < 2011
		Manufacture Date On/After 2011	**ICOM - 02** STATIONARY EMERGENCY FIRE PUMP CI / DIESEL / 11 <= HP < 25 / ALL / NSPS / >= 2011
	25 ≤ HP < 50	Manufacture Date Before 2011	**ICOM - 02** STATIONARY EMERGENCY FIRE PUMP CI / DIESEL / 25 <= HP < 50 / ALL / NSPS / < 2011
		Manufacture Date On/After 2011	**ICOM - 02** STATIONARY EMERGENCY FIRE PUMP CI / DIESEL / 25 <= HP < 50 / ALL / NSPS / >= 2011
	50 ≤ HP < 100	Manufacture Date Before 2011	**ICOM - 02** STATIONARY EMERGENCY FIRE PUMP CI / DIESEL / 50 <= HP < 100 / ALL / NSPS / < 2011
		Manufacture Date On/After 2011	**ICOM - 02** STATIONARY EMERGENCY FIRE PUMP CI / DIESEL / 50 <= HP < 100 / ALL / NSPS / >= 2011
	100 ≤ HP < 175	Manufacture Date Before 2010	**ICOM - 02** STATIONARY EMERGENCY FIRE PUMP CI / DIESEL / 100 <= HP < 175 / ALL / NSPS / < 2010
		Manufacture Date On/After 2010	**ICOM - 02** STATIONARY EMERGENCY FIRE PUMP CI / DIESEL / 100 <= HP < 175 / ALL / NSPS / >= 2010
	175 ≤ HP < 600	Manufacture Date Before 2009	**ICOM - 02** STATIONARY EMERGENCY FIRE PUMP CI / DIESEL / 175 <= HP < 600 / ALL / NSPS / < 2009
		Manufacture Date On/After 2009	**ICOM - 02** STATIONARY EMERGENCY FIRE PUMP CI / DIESEL / 175 <= HP < 600 / ALL / NSPS / >= 2009
	600 ≤ HP ≤ 750	Manufacture Date Before 2009	**ICOM - 02** STATIONARY EMERGENCY FIRE PUMP CI / DIESEL / 600 <= HP <= 750 / ALL / NSPS / < 2009
		Manufacture Date On/After 2009	**ICOM - 02** STATIONARY EMERGENCY FIRE PUMP CI / DIESEL / 600 <= HP <= 750 / ALL / NSPS / >= 2009
	> 750 HP	Manufacture Date Before 2008	**ICOM - 02** STATIONARY EMERGENCY FIRE PUMP CI / DIESEL / > 750 HP / ALL / NSPS / < 2008
		Manufacture Date On/After 2008	**ICOM - 02** STATIONARY EMERGENCY FIRE PUMP CI / DIESEL / > 750 HP / ALL / NSPS / >= 2008
	Is Not Required to Conform to NSPS		
	≤ 600 HP	Any Manufacture Date	**ICOM - 02** STATIONARY EMERGENCY FIRE PUMP CI / DIESEL / <= 600 HP / ALL / NON-NSPS / ALL
	> 600 HP	Any Manufacture Date	**ICOM - 02** STATIONARY EMERGENCY FIRE PUMP CI / DIESEL / > 600 HP / ALL / NON-NSPS / ALL

Calculations Based On Gallons of Liquid Fuel Consumed	Stationary Emergency Non-Fire Pump Engine	Diesel Fuel

Displacement < 10L	Required to be NSPS Compliant		
	< 11 HP	Manufacture Date Before 2007	**ICOM - 02** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / < 11 HP / < 10 L / NSPS / < 2007
		Manufacture Date During 2007	**ICOM - 02** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / < 11 HP / < 10 L / NSPS / = 2007
		Manufacture Date On/After 2008	**ICOM - 02** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / < 11 HP / < 10 L / NSPS / >= 2008
	11 ≤ HP < 25	Manufacture Date Before 2007	**ICOM - 02** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / 11 <= HP < 25 / < 10 L / NSPS / < 2007
		Manufacture Date During 2007	**ICOM - 02** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / 11 <= HP < 25 / < 10 L / NSPS / = 2007
		Manufacture Date On/After 2008	**ICOM - 02** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / 11 <= HP < 25 / < 10 L / NSPS / >= 2008
	25 ≤ HP < 50	Manufacture Date Before 2007	**ICOM - 02** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / 25 <= HP < 50 / < 10 L / NSPS / < 2007
		Manufacture Date During 2007	**ICOM - 02** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / 25 <= HP < 50 / < 10 L / NSPS / = 2007
		Manufacture Date On/After 2008	**ICOM - 02** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / 25 <= HP < 50 / < 10 L / NSPS / >= 2008
	50 ≤ HP < 100	Manufacture Date Before 2007	**ICOM - 02** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / 50 <= HP < 100 / < 10 L / NSPS / < 2007
		Manufacture Date During 2007	**ICOM - 02** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / 50 <= HP < 100 / < 10 L / NSPS / = 2007
		Manufacture Date On/After 2008	**ICOM - 02** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / 50 <= HP < 100 / < 10 L / NSPS / >= 2008
	100 ≤ HP < 175	Manufacture Date Before 2007	**ICOM - 02** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / 100 <= HP < 175 / < 10 L / NSPS / < 2007
		Manufacture Date On/After 2007	**ICOM - 02** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / 100 <= HP < 175 / < 10 L / NSPS / >= 2007
	175 ≤ HP < 600	Manufacture Date Before 2007	**ICOM - 02** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / 175 <= HP < 600 / < 10 L / NSPS / < 2007
		Manufacture Date On/After 2007	**ICOM - 02** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / 175 <= HP < 600 / < 10 L / NSPS / >= 2007
	600 ≤ HP < 750	Manufacture Date Before 2007	**ICOM - 02** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / 600 <= HP < 750 / < 10 L / NSPS / < 2007
		Manufacture Date On/After 2007	**ICOM - 02** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / 600 <= HP < 750 / < 10 L / NSPS / >= 2007
	750 ≤ HP ≤ 3000	Manufacture Date Before 2007	**ICOM - 02** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / 750 <= HP <= 3000 / < 10 L / NSPS / < 2007
		Manufacture Date On/After 2007	**ICOM - 02** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / 750 <= HP <= 3000 / < 10 L / NSPS / >= 2007
	> 3000 HP	Manufacture Date Before 2007	**ICOM - 02** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / > 3000 HP / < 10 L / NSPS / < 2007
		Manufacture Date Between 2007 & 2010	**ICOM - 02** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / > 3000 HP / < 10 L / NSPS / 2007 - 2010
		Manufacture Date On/After 2011	**ICOM - 02** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / > 3000 HP / < 10 L / NSPS / >= 2011
	Is Not Required to Conform to NSPS		
	≤ 600 HP	Any Manufacture Date	**ICOM - 02** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / <= 600 HP / < 10 L / NON-NSPS / ALL
	> 600 HP	Any Manufacture Date	**ICOM - 02** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / > 600 HP / < 10 L / NON-NSPS / ALL

Calculations Based On Gallons of Liquid Fuel Consumed	Stationary Emergency Non-Fire Pump Engine		Diesel Fuel
Displacement 10 ≤ L < 15	Required to be NSPS Compliant		
	≤ 600 HP	Manufacture Date Before 2007	**ICOM - 02** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / <= 600 HP / 10 <= L < 15 / NSPS / < 2007
		Manufacture Date Between 2007 & 2012	**ICOM - 02** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / <= 600 HP / 10 <= L < 15 / NSPS / 2007 - 2012
		Manufacture Date On/After 2013	**ICOM - 02** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / <= 600 HP / 10 <= L < 15 / NSPS / >= 2013
	> 600 HP	Manufacture Date Before 2007	**ICOM - 02** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / > 600 HP / 10 <= L < 15 / NSPS / < 2007
		Manufacture Date Between 2007 & 2012	**ICOM - 02** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / > 600 HP / 10 <= L < 15 / NSPS / 2007 - 2012
	600 < HP < 4958	Manufacture Date On/After 2013	**ICOM - 02** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / 600 < HP < 4958 / 10 <= L < 15 / NSPS/ >= 2013
	≥ 4958 HP	Manufacture Date On/After 2013	**ICOM - 02** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / >= 4958 HP / 10 <= L < 15 / NSPS/ >= 2013
	Is Not Required to Conform to NSPS		
	≤ 600 HP	Any Manufacture Date	**ICOM - 02** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / <= 600 HP / 10 <= L < 15 / NON-NSPS / ALL
	> 600 HP	Any Manufacture Date	**ICOM - 02** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / > 600 HP / 10 <= L < 15 / NON-NSPS / ALL

Calculations Based On Gallons of Liquid Fuel Consumed	Stationary Emergency Non-Fire Pump Engine		Diesel Fuel
Displacement 15 ≤ L < 20	Required to be NSPS Compliant		
	≤ 600 HP	Manufacture Date Before 2007	**ICOM - 02** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / <= 600 HP / 15 <= L < 20 / NSPS / < 2007
		Manufacture Date Between 2007 & 2013	**ICOM - 02** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / <= 600 HP / 15 <= L < 20 / NSPS / 2007 - 2013
		Manufacture Date On/After 2014	**ICOM - 02** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / <= 600 HP / 15 <= L < 20 / NSPS / >= 2014
	> 600 HP	Manufacture Date Before 2007	**ICOM - 02** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / > 600 HP / 15 <= L < 20 / NSPS / < 2007
		Manufacture Date Between 2007 & 2013	**ICOM - 02** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / > 600 HP / 15 <= L < 20 / NSPS / 2007 - 2013
	600 < HP < 2682	Manufacture Date On/After 2014	**ICOM - 02** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / 600 < HP < 2682 / 15 <= L < 20/ NSPS / >= 2014
	≥ 2682 HP	Manufacture Date On/After 2014	**ICOM - 02** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / >= 2682 HP / 15 <= L < 20/ NSPS / >= 2014
	Is Not Required to Conform to NSPS		
	≤ 600 HP	Any Manufacture Date	**ICOM - 02** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / <= 600 HP / 15 <= L < 20 / NON-NSPS / ALL
	> 600 HP	Any Manufacture Date	**ICOM - 02** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / > 600 HP / 15 <= L < 20 / NON-NSPS / ALL

Calculations Based On Gallons of Liquid Fuel Consumed	Stationary Emergency Non-Fire Pump Engine	Diesel Fuel

Displacement 20 ≤ L < 25	Required to be NSPS Compliant		
	≤ 600 HP	Manufacture Date Before 2007	**ICOM - 02** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / <= 600 HP / 20 <= L < 25 / NSPS / < 2007
		Manufacture Date Between 2007 & 2013	**ICOM - 02** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / <= 600 HP / 20 <= L < 25 / NSPS / 2007 - 2013
		Manufacture Date On/After 2014	**ICOM - 02** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / <= 600 HP / 20 <= L < 25 / NSPS / >= 2014
	> 600 HP	Manufacture Date Before 2007	**ICOM - 02** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / > 600 HP / 20 <= L < 25 / NSPS / < 2007
		Manufacture Date Between 2007 & 2013	**ICOM - 02** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / > 600 HP / 20 <= L < 25 / NSPS / 2007 - 2013
	600 < HP < 2682	Manufacture Date On/After 2014	**ICOM - 02** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / 600 < HP < 2682 / 20 <= L < 25/ NSPS / >= 2014
	≥ 2682 HP	Manufacture Date On/After 2014	**ICOM - 02** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / >= 2682 HP / 20 <= L < 25/ NSPS / >= 2014
	Is Not Required to Conform to NSPS		
	≤ 600 HP	Any Manufacture Date	**ICOM - 02** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / <= 600 HP / 20 <= L < 25 / NON-NSPS / ALL
	> 600 HP	Any Manufacture Date	**ICOM - 02** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / > 600 HP / 20 <= L < 25 / NON-NSPS / ALL

Calculations Based On Gallons of Liquid Fuel Consumed	Stationary Emergency Non-Fire Pump Engine	Diesel Fuel

Displacement 25 ≤ L < 30	Required to be NSPS Compliant		
	≤ 600 HP	Manufacture Date Before 2007	**ICOM - 02** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / <= 600 HP / 25 <= L < 30 / NSPS / < 2007
		Manufacture Date Between 2007 & 2013	**ICOM - 02** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / <= 600 HP / 25 <= L < 30 / NSPS / 2007 - 2013
		Manufacture Date On/After 2014	**ICOM - 02** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / <= 600 HP / 25 <= L < 30 / NSPS / >= 2014
	> 600 HP	Manufacture Date Before 2007	**ICOM - 02** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / > 600 HP / 25 <= L < 30 / NSPS / < 2007
		Manufacture Date Between 2007 & 2013	**ICOM - 02** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / > 600 HP / 25 <= L < 30 / NSPS / 2007 - 2013
	600 < HP < 2682	Manufacture Date On/After 2014	**ICOM - 02** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / 600 < HP < 2682 / 25 <= L < 30/ NSPS / >= 2014
	≥ 2682 HP	Manufacture Date On/After 2014	**ICOM - 02** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / >= 2682 HP / 25 <= L < 30/ NSPS / >= 2014
	Is Not Required to Conform to NSPS		
	≤ 600 HP	Any Manufacture Date	**ICOM - 02** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / <= 600 HP / 25 <= L < 30 / NON-NSPS / ALL
	> 600 HP	Any Manufacture Date	**ICOM - 02** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / > 600 HP / 25 <= L < 30 / NON-NSPS / ALL

Calculations Based On Gallons of Liquid Fuel Consumed	Stationary Non-Emergency Engine	Diesel Fuel	
Displacement < 10L	Required to be NSPS Compliant		
	< 11 HP	Manufacture Date Before 2007	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / < 11 HP / < 10 L / NSPS / < 2007
		Manufacture Date During 2007	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / < 11 HP / < 10 L / NSPS / = 2007
		Manufacture Date On/After 2008	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / < 11 HP / < 10 L / NSPS / >= 2008
	11 ≤ HP < 25	Manufacture Date Before 2007	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / 11 <= HP < 25 / < 10 L / NSPS / < 2007
		Manufacture Date During 2007	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / 11 <= HP < 25 / < 10 L / NSPS / = 2007
		Manufacture Date On/After 2008	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / 11 <= HP < 25 / < 10 L / NSPS / >= 2008
	25 ≤ HP < 50	Manufacture Date Before 2007	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / 25 <= HP < 50 / < 10 L / NSPS / < 2007
		Manufacture Date During 2007	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / 25 <= HP < 50 / < 10 L / NSPS / = 2007
		Manufacture Date Between 2008 & 2012	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / 25 <= HP < 50 / < 10 L / NSPS / 2008 - 2012
		Manufacture Date On/After 2013	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / 25 <= HP < 50 / < 10 L / NSPS / >= 2013
	50 ≤ HP < 75	Manufacture Date Before 2007	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / 50 <= HP < 75 / < 10 L / NSPS / < 2007
		Manufacture Date During 2007	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / 50 <= HP < 75 / < 10 L / NSPS / = 2007
		Manufacture Date Between 2008 & 2012	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / 50 <= HP < 75 / < 10 L / NSPS / 2008 - 2012
		Manufacture Date On/After 2013	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / 50 <= HP < 75 / < 10 L / NSPS / >= 2013
	75 ≤ HP < 100	Manufacture Date Before 2007	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / 75 <= HP < 100 / < 10 L / NSPS / < 2007
		Manufacture Date During 2007	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / 75 <= HP < 100 / < 10 L / NSPS / = 2007
		Manufacture Date Between 2008 & 2011	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / 75 <= HP < 100 / < 10 L / NSPS / 2008 - 2011
		Manufacture Date Between 2012 & 2013	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / 75 <= HP < 100 / < 10 L / NSPS / 2012 - 2013
		Manufacture Date On/After 2014	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / 75 <= HP < 100 / < 10 L / NSPS / >= 2014
	100 ≤ HP < 175	Manufacture Date Before 2007	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / 100 <= HP < 175 / < 10 L / NSPS / < 2007
		Manufacture Date During 2007	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / 100 <= HP < 175 / < 10 L / NSPS / = 2007
		Manufacture Date Between 2008 & 2011	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / 100 <= HP < 175 / < 10 L / NSPS / 2008 - 2011
		Manufacture Date Between 2012 & 2013	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / 100 <= HP < 175 / < 10 L / NSPS / 2012 - 2013
		Manufacture Date On/After 2014	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / 100 <= HP < 175 / < 10 L / NSPS / >= 2014

Calculations Based On Gallons of Liquid Fuel Consumed	Stationary Non-Emergency Engine	Diesel Fuel

Displacement < 10L	Required to be NSPS Compliant		
	175 ≤ HP ≤ 600	Manufacture Date Before 2007	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / 175 <= HP <= 600 / < 10 L / NSPS / < 2007
		Manufacture Date Between 2007 & 2010	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / 175 <= HP <= 600 / < 10 L / NSPS / 2007 - 2010
		Manufacture Date Between 2011 & 2013	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / 175 <= HP <= 600 / < 10 L / NSPS / 2011 - 2013
		Manufacture Date On/After 2014	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / 175 <= HP <= 600 / < 10 L / NSPS / >= 2014
	600 < HP < 750	Manufacture Date Before 2007	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / 600 < HP < 750 / < 10 L / NSPS / < 2007
		Manufacture Date Between 2007 & 2010	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / 600 < HP < 750 / < 10 L / NSPS / 2007 - 2010
		Manufacture Date Between 2011 & 2013	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / 600 < HP < 750 / < 10 L / NSPS / 2011 - 2013
		Manufacture Date On/After 2014	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / 600 < HP < 750 / < 10 L / NSPS / >= 2014
	750 ≤ HP ≤ 1200	Manufacture Date Before 2007	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / 750 <= HP <= 1200 / < 10 L / NSPS / < 2007
		Manufacture Date Between 2007 & 2010	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / 750 <= HP <= 1200 / < 10 L / NSPS / 2007 - 2010
		Manufacture Date Between 2011 & 2014	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / 750 <= HP <= 1200 / < 10 L / NSPS / 2011 - 2014
		Generator Manufacture Date On/After 2015	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / 750 <= HP <= 1200 / < 10 L / NSPS / >= 2015 GENERATORS
		Manufacture Date On/After 2015	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / 750 <= HP <= 1200 / < 10 L / NSPS / >= 2015 NON-GENERATORS
	1200 < HP ≤ 3000	Manufacture Date Before 2007	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / 1200 < HP <= 3000 HP / < 10 L / NSPS / < 2007
		Manufacture Date Between 2007 & 2010	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / 1200 < HP <= 3000 HP / < 10 L / NSPS / 2007 - 2010
		Manufacture Date Between 2011 & 2014	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / 1200 < HP <= 3000 HP / < 10 L / NSPS / 2011 - 2014 GENERATORS
		Manufacture Date Between 2011 & 2014	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / 1200 < HP <= 3000 HP / < 10 L / NSPS / 2011 - 2014 NON-GENERATOR
		Generator Manufacture Date On/After 2015	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / 1200 < HP <= 3000 HP / < 10 L / NSPS / >= 2015 GENERATORS
		Manufacture Date On/After 2015	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / 1200 < HP <= 3000 HP / < 10 L / NSPS / >= 2015 NON-GENERATORS
	> 3000 HP	Manufacture Date Before 2007	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / > 3000 HP / < 10 L / NSPS / < 2007
		Manufacture Date Between 2007 & 2010	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / > 3000 HP / < 10 L / NSPS / 2007 - 2010
		Manufacture Date Between 2011 & 2014	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / > 3000 HP / < 10 L / NSPS / 2011 - 2014 GENERATORS
		Manufacture Date Between 2011 & 2014	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / > 3000 HP / < 10 L / NSPS / 2011 - 2014 NON-GENERATORS
		Generator Manufacture Date On/After 2015	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / > 3000 HP / < 10 L / NSPS / >= 2015 GENERATORS
		Manufacture Date On/After 2015	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / > 3000 HP / < 10 L / NSPS / >= 2015 NON-GENERATORS

Calculations Based On Gallons of Liquid Fuel Consumed		Stationary Non-Emergency Engine	Diesel Fuel
Displacement < 10L	Is Not Required to Conform to NSPS		
	≤ 600 HP	Any Manufacture Date	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / <= 600 HP / < 10 L / NON-NSPS / ALL
	> 600 HP	Any Manufacture Date	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / > 600 HP / < 10 L / NON-NSPS / ALL

Calculations Based On Gallons of Liquid Fuel Consumed		Stationary Non-Emergency Engine	Diesel Fuel
Displacement 10 ≤ L < 15	Required to be NSPS Compliant		
	≤ 600 HP	Manufacture Date Before 2007	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / <= 600 HP / 10 <= L < 15 / NSPS / < 2007
		Manufacture Date Between 2007 & 2012	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / <= 600 HP / 10 <= L < 15 / NSPS / 2007 - 2012
		Manufacture Date On/After 2013	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / <= 600 HP / 10 <= L < 15 / NSPS / >= 2013
	> 600 HP	Manufacture Date Before 2007	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / > 600 HP / 10 <= L < 15 / NSPS / < 2007
		Manufacture Date Between 2007 & 2012	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / > 600 HP / 10 <= L < 15 / NSPS / 2007 - 2012
	600 < HP < 4958	Manufacture Date On/After 2013	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / 600 < HP < 4958 / 10 <= L < 15 / NSPS/ >= 2013
	≥ 4958 HP	Manufacture Date On/After 2013	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / >= 4958 HP / 10 <= L < 15 / NSPS/ >= 2013
	Is Not Required to Conform to NSPS		
	≤ 600 HP	Any Manufacture Date	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / <= 600 HP / 10 <= L < 15 / NON-NSPS / ALL
	> 600 HP	Any Manufacture Date	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / > 600 HP / 10 <= L < 15 / NON-NSPS / ALL

Calculations Based On Gallons of Liquid Fuel Consumed		Stationary Non-Emergency Engine	Diesel Fuel
Displacement 15 ≤ L < 20	Required to be NSPS Compliant		
	≤ 600 HP	Manufacture Date Before 2007	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / <= 600 HP / 15 <= L < 20 / NSPS / < 2007
		Manufacture Date Between 2007 & 2013	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / <= 600 HP / 15 <= L < 20 / NSPS / 2007 - 2013
		Manufacture Date On/After 2014	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / <= 600 HP / 15 <= L < 20 / NSPS / >= 2014
	> 600 HP	Manufacture Date Before 2007	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / > 600 HP / 15 <= L < 20 / NSPS / < 2007
	600 < HP < 2682	Manufacture Date Between 2007 & 2013	**ICOM - 02** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / 600 < HP < 2681 / 15 <= L < 20 / NSPS / 2007 - 2013
		Manufacture Date On/After 2014	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / 600 < HP < 2682 / 15 <= L < 20/ NSPS / >= 2014
	2682 ≤ HP < 4425	Manufacture Date On/After 2007	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / 2682 <= HP < 4425 HP / 15 <= L < 20/ NSPS / >= 2007
	≥ 4425 HP	Manufacture Date On/After 2007	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / >= 4425 HP / 15 <= L < 20/ NSPS / >= 2007
	Is Not Required to Conform to NSPS		
	≤ 600 HP	Any Manufacture Date	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / <= 600 HP / 15 <= L < 20 / NON-NSPS / ALL
	> 600 HP	Any Manufacture Date	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / > 600 HP / 15 <= L < 20 / NON-NSPS / ALL

Calculations Based On Gallons of Liquid Fuel Consumed		Stationary Non-Emergency Engine	Diesel Fuel
Displacement 20 ≤ L < 25	Required to be NSPS Compliant		
	≤ 600 HP	Manufacture Date Before 2007	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / <= 600 HP / 20 <= L < 25 / NSPS / < 2007
		Manufacture Date Between 2007 & 2013	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / <= 600 HP / 20 <= L < 25 / NSPS / 2007 - 2013
		Manufacture Date On/After 2014	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / <= 600 HP / 20 <= L < 25 / NSPS / >= 2014
	> 600 HP	Manufacture Date Before 2007	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / > 600 HP / 20 <= L < 25 / NSPS / < 2007
		Manufacture Date Between 2007 & 2013	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / > 600 HP / 20 <= L < 25 / NSPS / 2007 - 2013
	600 < HP < 2682	Manufacture Date On/After 2014	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / 600 < HP < 2682 / 20 <= L < 25/ NSPS / >= 2014
	≥ 2682 HP	Manufacture Date On/After 2014	**ICOM - 02** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / >= 2682 HP / 20 <= L < 25/ NSPS / >= 2014
	Is Not Required to Conform to NSPS		
	≤ 600 HP	Any Manufacture Date	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / <= 600 HP / 20 <= L < 25 / NON-NSPS / ALL
	> 600 HP	Any Manufacture Date	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / > 600 HP / 20 <= L < 25 / NON-NSPS / ALL

Calculations Based On Gallons of Liquid Fuel Consumed		Stationary Non-Emergency Engine	Diesel Fuel
Displacement 25 ≤ L < 30	Required to be NSPS Compliant		
	≤ 600 HP	Manufacture Date Before 2007	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / <= 600 HP / 25 <= L < 30 / NSPS / < 2007
		Manufacture Date Between 2007 & 2013	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / <= 600 HP / 25 <= L < 30 / NSPS / 2007 - 2013
		Manufacture Date On/After 2014	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / <= 600 HP / 25 <= L < 30 / NSPS / >= 2014
	> 600 HP	Manufacture Date Before 2007	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / > 600 HP / 25 <= L < 30 / NSPS / < 2007
		Manufacture Date Between 2007 & 2013	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / > 600 HP / 25 <= L < 30 / NSPS / 2007 - 2013
	600 < HP < 2682	Manufacture Date On/After 2014	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / 600 < HP < 2682 / 25 <= L < 30/ NSPS / >= 2014
	≥ 2682 HP	Manufacture Date On/After 2014	**ICOM - 02** STATIONARY EMERGENCY NON-FIRE PUMP CI / DIESEL / >= 2682 HP / 25 <= L < 30/ NSPS / >= 2014
	Is Not Required to Conform to NSPS		
	≤ 600 HP	Any Manufacture Date	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / <= 600 HP / 25 <= L < 30 / NON-NSPS / ALL
	> 600 HP	Any Manufacture Date	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DIESEL / > 600 HP / 25 <= L < 30 / NON-NSPS / ALL

Calculations Based On Gallons of Liquid Fuel Consumed		Stationary Non-Emergency Engine	Dual Fuel
All Displacement	Both NSPS Compliant and Not Required		
	All HP	Any Manufacture Date	**ICOM - 02** STATIONARY NON-EMERGENCY CI / DUAL FUEL / ALL / ALL / ALL / ALL

3.1.3.1.5.3 ICOM-04

Calculations Based On Hours Of Operation			Stationary Reciprocating Engines	Natural Gas
All Displacement	Both NSPS Compliant and Not Required			
	2-Stroke Lean Burn	Any Manufacture Date	**ICOM - 04** STATIONARY RECIPROCATING SI / NATRUAL GAS / ALL / 2-STROKE LEAN BURN / ALL / ALL	
	4-Stroke Lean Burn	Any Manufacture Date	**ICOM - 04** STATIONARY RECIPROCATING SI / NATRUAL GAS / ALL / 4-STROKE LEAN BURN / ALL / ALL	
	4-Stroke Rich Burn	Any Manufacture Date	**ICOM - 04** STATIONARY RECIPROCATING SI / NATRUAL GAS / ALL / 4-STROKE RICH BURN / ALL / ALL	

Calculations Based On Hours Of Operation			Stationary Turbine Engine	Natrual Gas
All Displacement	Both NSPS Compliant and Not Required			
	Lean Premix	Any Manufacture Date	**ICOM - 04** STATIONARY TURBINE SI / NATURAL GAS / ALL / LEAN PREMIX / ALL / ALL	
	Uncontrolled	Any Manufacture Date	**ICOM - 04** STATIONARY TURBINE SI / NATRUAL GAS / ALL / UNCONTROLLED / ALL / ALL	
	Water-Steam Injection	Any Manufacture Date	**ICOM - 04** STATIONARY TURBINE SI / NATRUAL GAS / ALL / WATER-STEAM INJECTION / ALL / ALL	

Calculations Based On Hours Of Operation			Stationary Turbine Engine	Landfill Gas
All Displacement	Both NSPS Compliant and Not Required			
	All HP	Any Manufacture Date	**ICOM - 04** STATIONARY TURBINE SI / LANDFILL GAS / ALL / ALL / ALL / ALL	

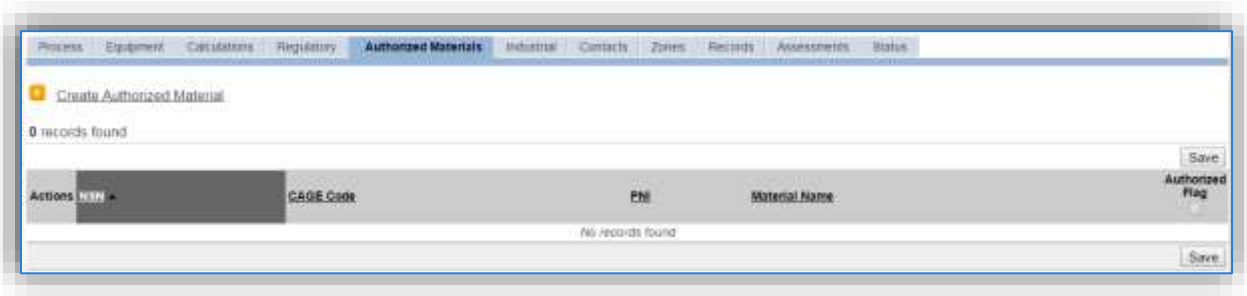
Calculations Based On Hours Of Operation			Stationary Turbine Engine	Digester Gas
All Displacement	Both NSPS Compliant and Not Required			
	All HP	Any Manufacture Date	**ICOM - 04** STATIONARY TURBINE SI / DIGESTER GAS / ALL / ALL / ALL / ALL	

If the manufacturer supplied engine specific emission factors, these should be used instead of the standard emission factor sets. Contact the APIMS data standard personnel for configuration in APIMS.

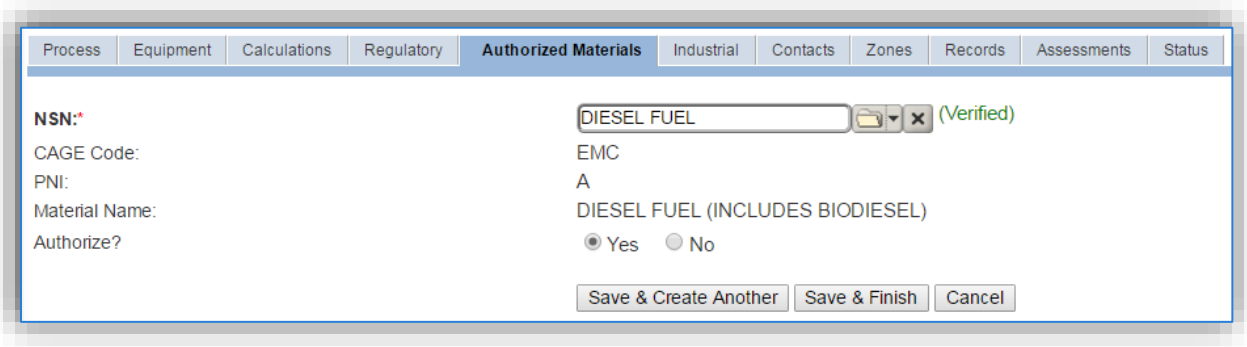
If your permit or regulatory agency requires a different type of calculation, contact the Air Force Air Quality Subject Matter Expert for approval of the alternative method.

3.1.3.1.6 Materials

The last step in setting up the Unique Process record is to add the fuel as the authorized material on the *Authorized Materials* tab.



To authorize a material for the process, click on the Create Authorized Material hyperlink.



Select the fuel used from the list of values. Next select "Yes" to **Authorize** the material, then click the **Save & Finish** button.

3.1.3.2 New Sources

3.1.3.2.1 Data Collection Sheet

The form on the next page is a printable guide that can be taken out to the location of the source and used to gather all the necessary information from the shop personnel. It can then be used as a guide to help configure the data in APIMS when you return to your office.

It is also recommended to take pictures of the name plates and unit while in the field if possible.

Location: _____

Location Description: _____

Unit ID: _____ Asset Type: _____

Unit Description: _____

_____

Engine Details:

Manufacturer: _____

Model: _____

Serial: _____

Fuel: _____

Displacement: _____ Cylinders: _____

Rated hp: _____ RPM: _____

Ignition Type: _____

CEMS? ☐ CPMS? ☐ Hour Meter? ☐

Manufacture Date: _____

Order Date: _____

Install Date: _____

Reconstruction Date: _____

Usage Tracking Method: _____

Crankcase Ventilation: _____

Battery Install Date: _____

Engine Family: _____

Alternator Details:

Manufacturer: _____

Model: _____

Serial: _____

Rated KW: _____

Amps: _____ Phase: _____

Frequency: _____

Voltage: _____

Power Factor: _____

Switch Details:

Manufacturer: _____

Model: _____

Serial: _____

Amps: _____ Poles: _____

Bypass Capable? ☐

Switch Type: _____

Integral Tank Details:

Tank ID: _____

Position: _____

Volume: _____

Length: _____ Diameter: _____

Separate Tank Details:

Tank ID: _____

Position: _____

Volume: _____

Length: _____ Diameter: _____

Details Collected at the Shop:

Priority: _____ Real Property ID: _____

NSPS Applicable: _____ NESHAP Exempt: _____

Max Demand Load: _____ Inspection Anchor Date: _____

Authorization Letter: ☐	One-line Diagram: ☐	Facility Schematics: ☐
Technical Data Sheet: ☐	O & M Manuals: ☐	Connection Diagrams: ☐
Approved Design: ☐	As-Built Drawings: ☐	MOA(s): ☐

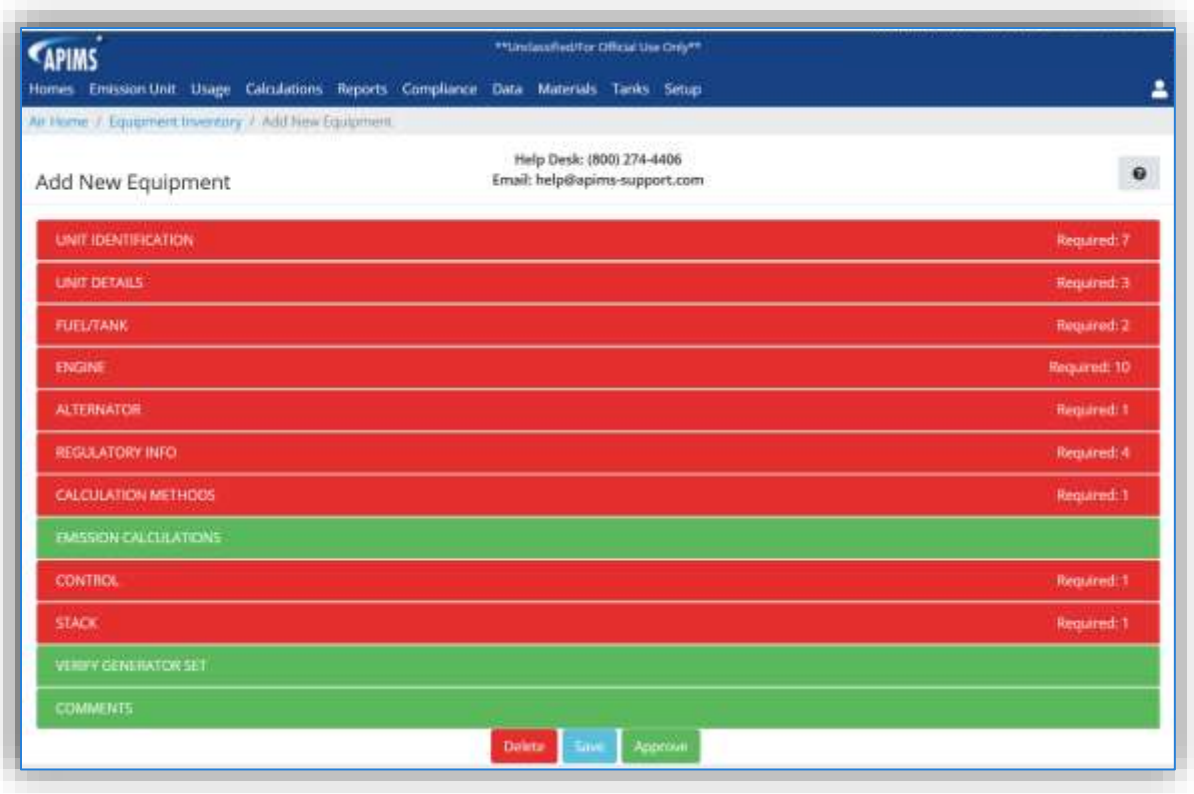
Additional Comments:

3.1.3.2.2 New Source Configuration

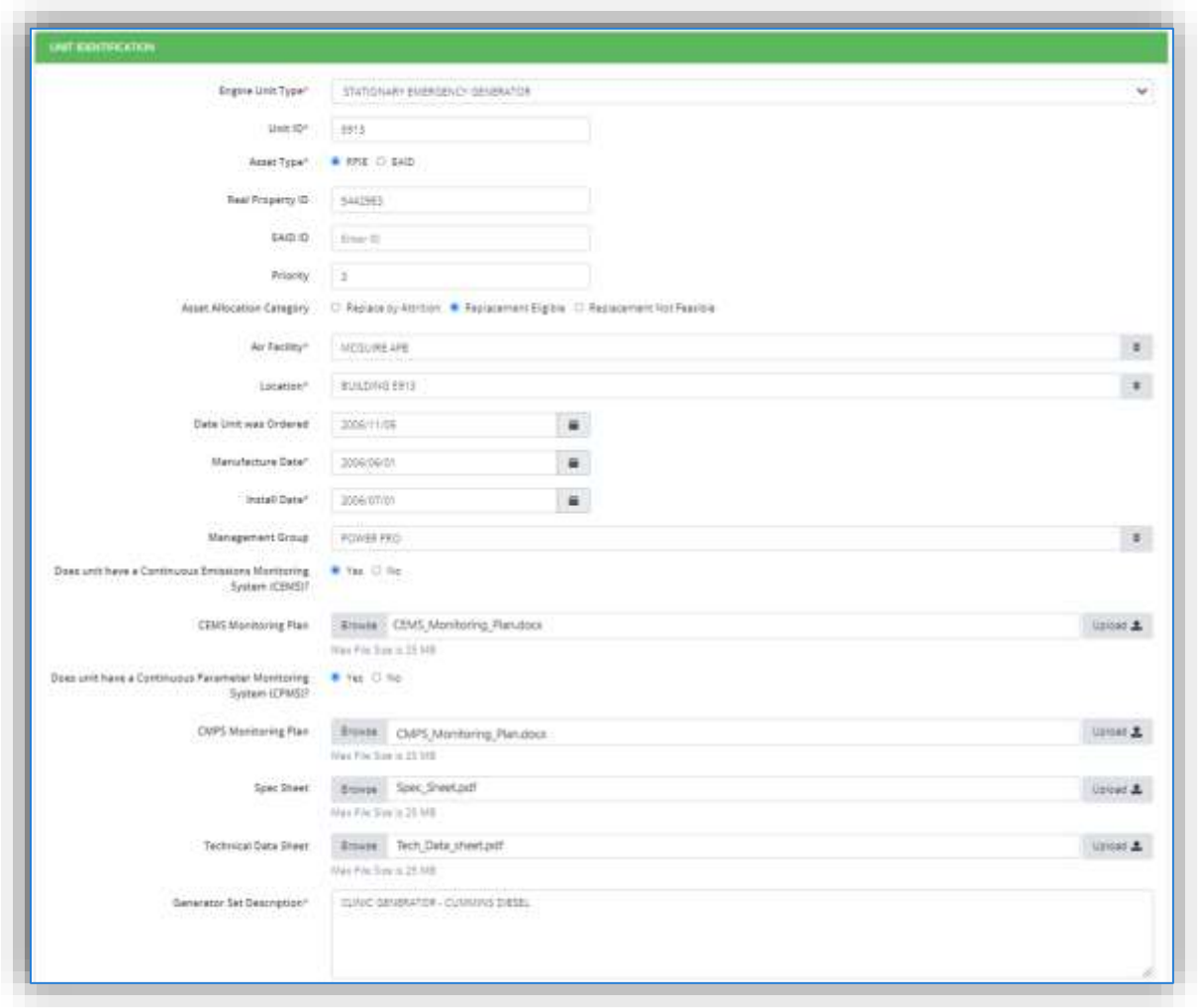
3.1.3.2.2.1 *New Source Wizard*

For installations that have not implemented the Facility Power module in APIMS, this is the proper configuration of data. In order to properly document this emission source in APIMS, there will need to be a unique record for each engine.

Click on **Engine New Source Wizard** under the **Emission Unit** tab.



All the modules highlighted in red will need data populated to properly configure the engine in APIMS. Click the UNIT IDENTIFICATION hyperlink to view the data entry fields.



Select the **Engine Unit Type** that best fits the unit type from the list of values provided below:

- AIRCRAFT ARRESTING SYSTEM – These units are used to rewind the cable used to rapidly decelerate an aircraft as it lands.
- PORTABLE GENERATOR – This is a unit that can be moved from site to site and does not reside in any single location for 12 months or more.
- PUMP ENGINE – These are units used to pump water such as during a fire.
- STATIONARY EMERGENCY GENERATOR – These are units that provide backup power but do not power a moving vehicle or piece of equipment.
- STATIONARY NON-EMERGENCY GENERATOR – These are units that provide main power but do not power a moving vehicle or piece of equipment.
- TACTICAL SUPPORT EQUIPMENT – This defined as equipment that is used in combat, combat support, combat service support, tactical or relief operations or training for such operations.

Enter the **Unit ID** that is used by the Facility Power shop or by the shop that maintains the engine.

Select the **Asset Type**, either RPIE (Real Property Installed Equipment) or EAID (Equipment Authorization Inventory Data). EAID units are usually mobile units.

Depending upon the value selected in the **Asset Type** field, enter the associated ID in the **Real Property ID** or **EAID ID** fields.

Enter the **Priority**, this a number utilized by the Facility Power shop to track the order they resort power in the case of a basewide power outage. If this number is not known, either leave blank or contact the Facility Power shop for the information.

Select the **Asset Allocation Category**, if known, this is also a field utilized and maintained by the Facility Power shop.

Select the **Air Facility** name that is responsible for the unit.

Select the **Location** of the unit from the drop down, this is usually the building number closest to the engine.

If available, enter the **Date Unit was Ordered** to match the date the engine was ordered from the manufacturer. This is very important to enter accurately as it can have regulatory implications.

Enter the **Manufacture Date** to match the date the engine was manufactured. This can often be found on the name plate on the engine. This is very important to enter accurately as it can have regulatory implications.

Enter the **Install Date** for the engine, this is very important to enter accurately as it can have regulatory implications.

Select the **Management Group** from the available list to indicate the group responsible for maintaining the engine. For most engines this will be Power Pro.

Specify if the unit has a **Continuous Emissions Monitoring System (CEMS)** by selecting the appropriate radio button. If the unit does have a CEMS, the **CEMS Monitoring Plan** can be uploaded as a file attachment.

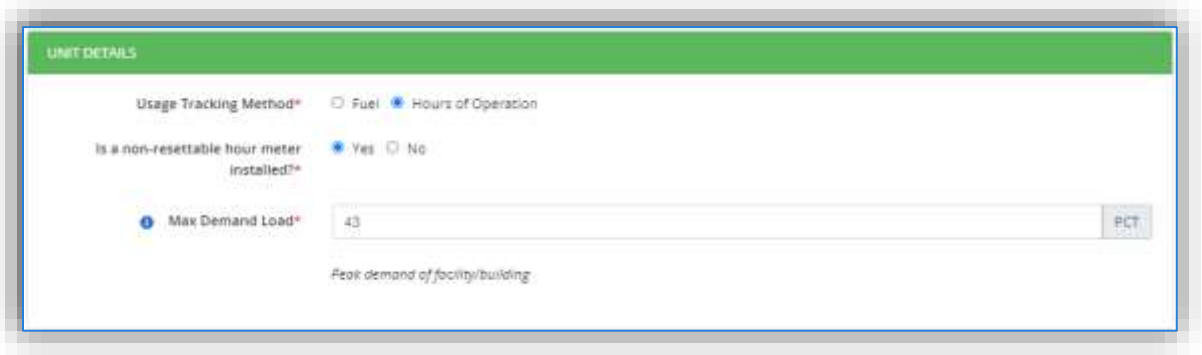
Specify if the unit has a **Continuous Parameter Monitoring System (CPMS)** by selecting the appropriate radio button. If the unit does have CPMS, the **CMPS Monitoring Plan** can be uploaded as a file attachment.

The next fields allow for the engine **Spec Sheet** and the **Technical Data Sheet** to be uploaded as file attachments. This is very useful information and it is important to upload these files as they can serve as a reference to all engine specifications. To upload these documents, use the Browse button to navigate out to the file saved on your computer. Once the file name appears it will still need to be uploaded, by clicking the Upload button after the data has been saved.

Enter the **Generator Set Description** to further identify the unit. This could be a combination of location and engine manufacturer, such as CLINIC GENERATOR – CUMMINS DIESEL.

Once these fields are populated it is a good practice to scroll to the bottom and click the Save button. This will then allow you to return to the file upload fields and click the Upload button.

The next section is the UNIT DETAILS section; click the hyperlink to expand section to view the data fields.



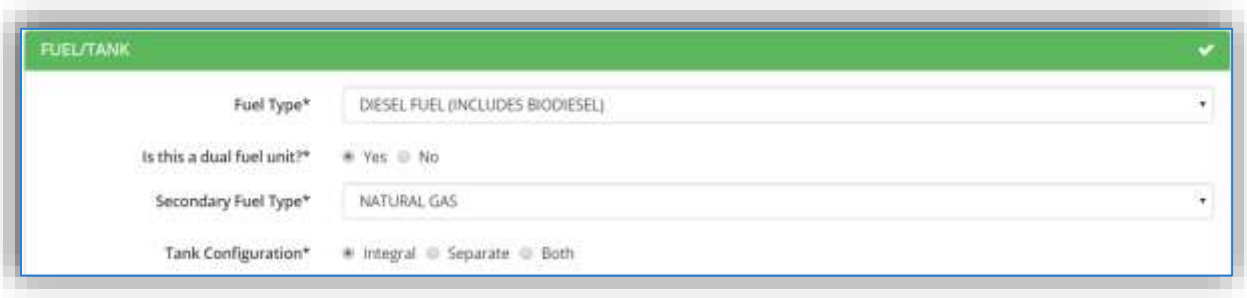
The **Usage Tracking Method** fields are used to determine how the engine usage is tracked. The most common and recommended method is **Hours of Operation**.

This selection will affect how the usage information is tracked and which algorithms and emission factors will be used for emissions calculations.

The next field indicates whether the engine has a **non-resettable hour meter installed**. This is required by law for all emergency engines with a manufacturer date newer than 2007.

The **Max Demand Load** field is also very important as it can be used to accurately calculate emissions. Many engines are sized to have a max power output that is greater than the highest level of power required by the item being powered. For example, a 60 hp emergency generator is attached to a building to provide backup power, however the total maximum amount of power the building requires to run is only 45 hp. Therefore, in this case the Max Demand Load would be 45/60=75%. This is only if there is not a load balancer. Very rarely is this number ever 100%. Air Force Instruction for Electrical System, Power Plants and Generators, AFI 32-1062 addresses specific generator sizing guidelines. Additionally, the Design and Construction Engineering group can be contacted.

The next section is the FUEL/TANK section; click the hyperlink to expand section to view the data fields.

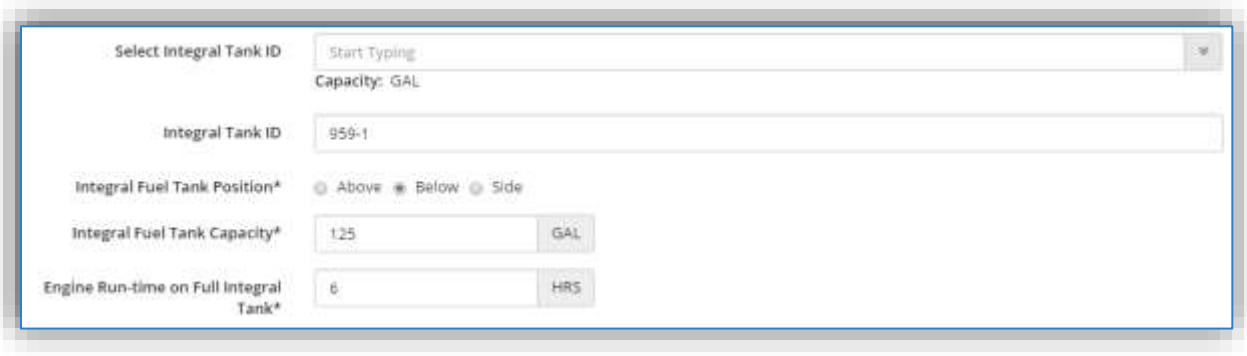


Select the **Fuel Type** stored in the associated fuel tank.

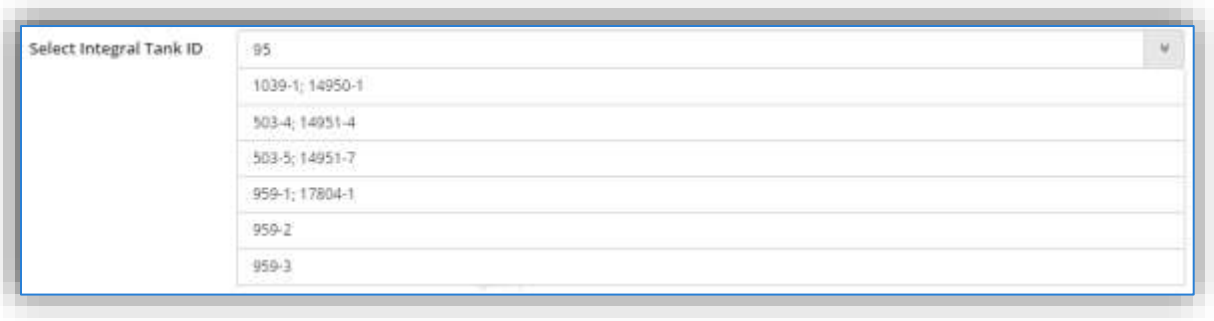
The next field, **Is this a dual fuel unit?** can be used to specify if the unit runs on a primary fuel and a backup fuel. If Yes is selected, another field will be shown that allows the **Secondary Fuel Type** to be specified.

The **Tank Configuration** field is used to specify if the fuel tank is built into the unit (Integral) if it is located separate from the unit (Separate) or if there are both types of tanks (Both).

If Integral is selected, the fields below will be displayed.



If the tank is already configured in APIMS, it can be selected from the **Select Integral Tank ID** list of values by typing the tank ID and selecting the correct record as it appears in a list below the field as shown.



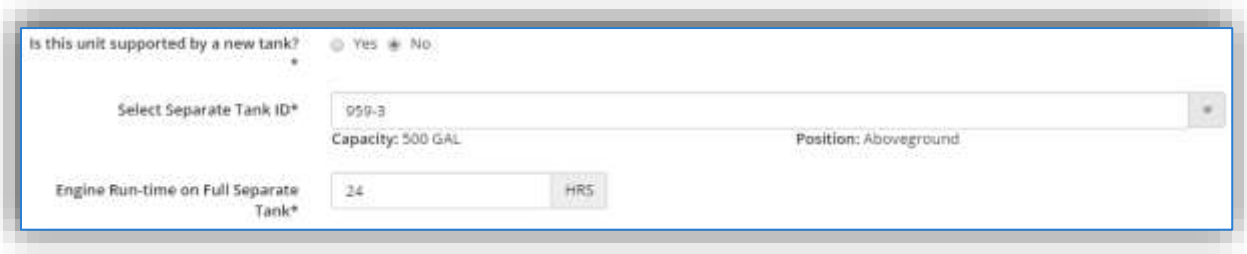
If the tank is not already configured in APIMS, then populate the **Integral Tank ID** text field. This ID should be the building number or identifier that can be used by base personnel to easily identify the tank. APIMS will then create the tank in the STAR module based on the information provided in these screens.

The **Integral Fuel Tank Position** field needs to be specified as either Above, Below or Side.

The **Integral Fuel Tank Capacity** should be specified to be the total internal volume of the tank in gallons.

The **Engine Run-time on Full Integral Tank** field should be entered as the number of hours the generator can run on a full tank.

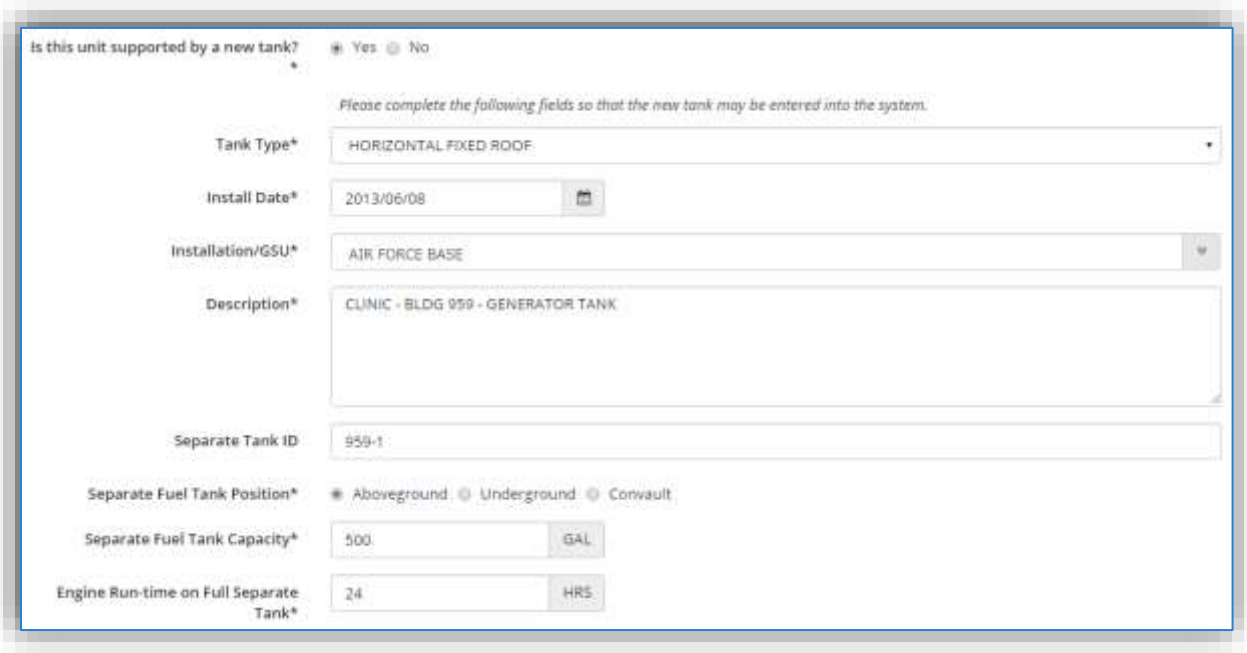
If Separate (not integral) is selected and the tank is already configured in the STAR module of APIMS the following fields will be displayed.



Populate the **Select Separate Tank ID** field by either typing the ID and selecting from the list or using the icon to select the tank from the Tank Search pop-up window.

The **Engine Run-time on Full Separate Tank** field should be entered as the number of hours the generator can run on a full tank.

If Separate (not integral) is selected and the tank is not configured in the STAR module of APIMS the following fields will be displayed.



The Tank Type needs to be selected from the list of values (DOMED EXT. FLOATING ROOF, EXTERNAL FLOATING ROOF, HORIZONTAL FIXED ROOF, INTERNAL FLOATING ROOF, and VERTICAL FIXED ROOF). The most common type of tank is HORIZONTAL FIXED ROOF.

The Install Date should be entered as the date the tank was first put in place and installed at the current location.

The **Installation/GSU** should be the installation that manages the storage tank. This may be different from the Facility specified in the previous screen as Air Quality Facilities and Storage Tank Installations may be defined differently.

The **Description** field should be used to describe where the tank is located and the main purpose for the tank.

The **Separate Tank ID** should be the building number or identifier that can be used by base personnel to easily identify the tank. APIMS will then create the tank in the STAR module based on the information provided in these screens.

The **Separate Fuel Tank Position** field needs to be specified as Aboveground, Underground or Convault.

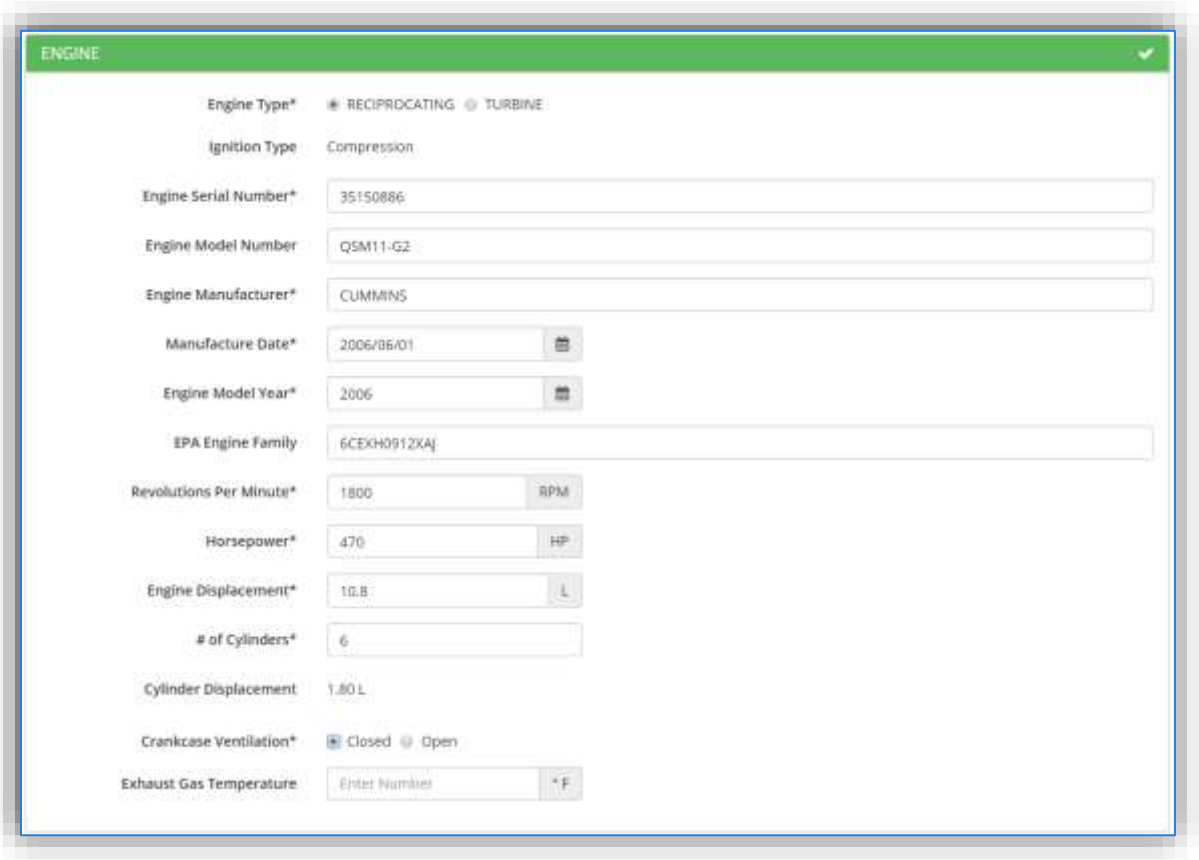
The **Separate Fuel Tank Capacity** should be specified to be the total internal volume of the tank in gallons.

The **Engine Run-time on Full Separate Tank** field should be entered as the number of hours the generator can run on a full tank.

The next section is the ENGINE section; click the hyperlink to expand section to view the data fields. Engine manufacturers often have important information included in the model number if you know how to read it. This also varies from manufacturer to manufacturer. For a complete list of codes and information that can be obtained from the model number for the most common manufacturers, refer to Appendix A.

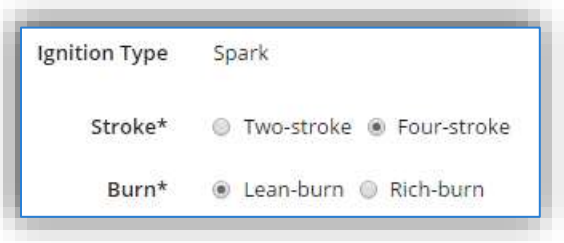
The first field specifies the **Engine Type**, reciprocating or turbine. The selection on this field will determine the fields that appear below.

If the engine is a RECIPROCATING engine the following fields will appear.



The **Ignition Type** will automatically populate as **Compression** if the fuel specified in the fuel section was DIESEL, JP-10, JP-7, JP-5, or JP-8. If the fuel specified was DIGESTER GAS, GASOLINE, LANDFILL GAS, LPG, or NATURAL GAS the Ignition Type will automatically populate as **Spark**.

If the Ignition Type is Spark, additional fields will appear as shown below.



Spark ignition engines can be either Two-stroke or Four-stroke depending upon the revolutions of the crankshaft.

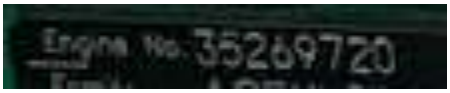
Four and two stroke engines can also be either Lean-burn or Rich-burn. Lean-burn refers to the burning of fuel with an excess of air with a ratio ranging from 20:1 to 50:1 and are typically higher than 24:1. Rich-burn refers to engines that operate at near-stoichiometric combustion where the air/fuel ratio is nearly 16:1. If this is not known, refer to manufacturer documentation.

The data for the following fields can be found on the engine plate and engine specification. This is not to be confused with the plate that is found on the generator set. This information is specific to the engine and should not be the generator set information. Often the manufacturer of the engine is different from the generator set manufacturer.

Refer to Appendix 4 for Engine Manufacturer Specific Information and Guidance for help.

Engine

Engine Plate



Serial: 35269720

The **Engine Serial Number** field is very important as it uniquely identifies the engine. This is not to be confused with the serial number of the generator set. This number should be on the engine nameplate attached to the engine.

Model: QSM11-G4 NR3

The **Engine Model Number** field is very important as it correctly identifies the engine. Most manufacturer model numbers are coded with important information regarding the engine. This model number can also be used to obtain specification sheets and technical data sheets.

Manufacturer: Cummins

The **Engine Manufacturer** field is very important as it identifies the manufacturer of the engine. This is not to be confused with the manufacturer of the generator set. This information should be on the engine nameplate attached to the engine.

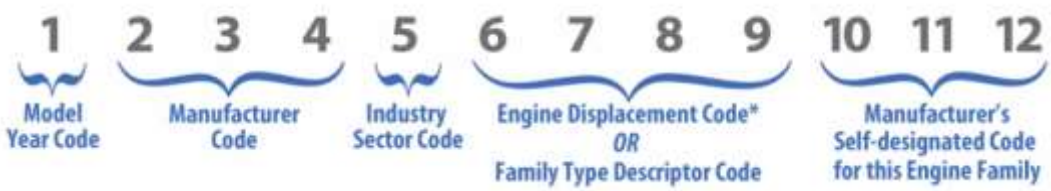
Manufacture Date: 04/01/10

The **Manufacture Date** must be recorded accurately as it has regulatory significance as to the requirements imposed on the engine. Most of these regulations differ from year to year based on the manufacture date. This date should also be included on the engine name plate.

The **Engine Model Year** should also be recorded accurately as it is the method used by manufacturers to track the engine certifications.

Engine Family: ACEXL0661AAH

The **EPA Engine Family** can be obtained from the engine name plate. This is used by the EPA to identify a group of engines for certification and compliance purposes. The typical naming convention is as follows:



RPM: 1800

The **Revolutions Per Minute** is a measure of the frequency of rotation, specifically the number of rotations around a fixed axis in one minute. This data point is important to the Facility Power user community as it is part of the Authorization Inventory. It can also be used to determine the output frequency of the engine and is used to certify the engine.

Rated hp: 470

The **Horsepower** of the engine should be the maximum mechanical power that an engine can put out or generate. This is usually in expressed in either hp or kw. This should not be electrical output of the generator.

Displacement: 10.8 L

The **Engine Displacement** is the total volume of all the cylinders of an engine. This is usually expressed in liters (L) and should be displayed on the engine name plate or specification sheet. This is a very important data point as it can impact how emissions are calculated.

Cylinders: 6

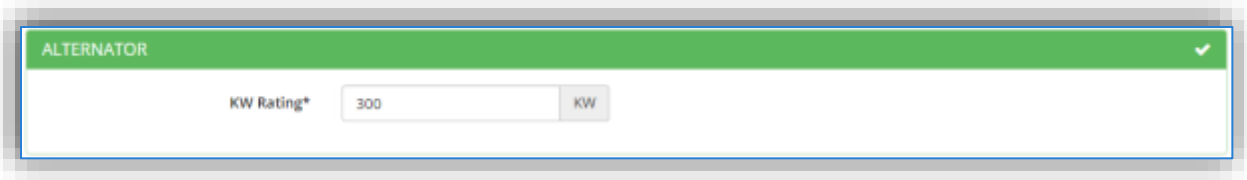
The **# of Cylinders** is an important indicator of the size of the engine. This value is also used on combination with the Engine Displacement field to auto-calculate the **Cylinder Displacement** field.

Exhaust coming off engine is routed to main exhaust.

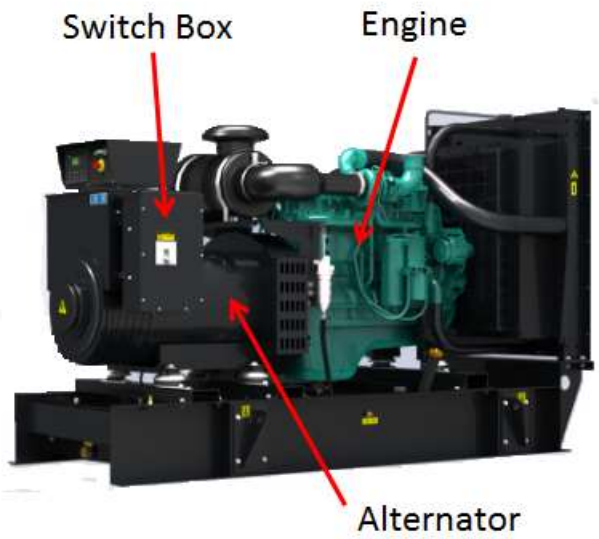
Crankcase Ventilation: Closed

The **Crankcase Ventilation** field is used to determine compliance with 40 CFR 89.112(e) which dictates that crankcase emissions may not be discharged to the ambient atmosphere unless they are permanently routed into the exhaust and included in exhaust emission measurements. This applies to all Tier 2 engines and later models unless turbochargers, pumps, blowers, or superchargers are employed for air induction.

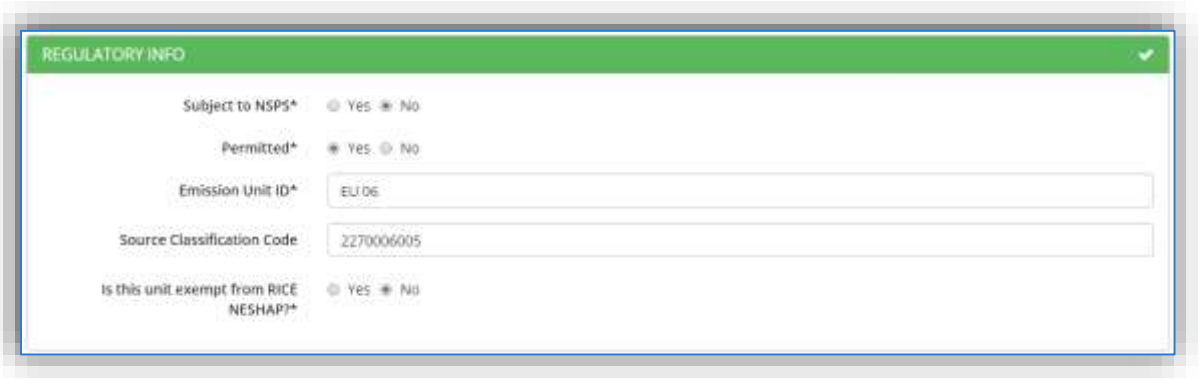
The next section is the ALTERNATOR section; click the hyperlink to expand section to view the data fields.



The **KW Rating** of the alternator can be obtained from the engine plate or specification sheet. This is not necessarily the same as the KW rating of the generator set or engine.



The next section is the REGULATORY INFO section; click the hyperlink to expand section to view the data fields.



The first field selects whether the engine is **Subject to NSPS** or otherwise known as the New Source Performance Standards. The NSPS regulations for compression ignition engines are detailed in 40 CFR Part 60 Subpart IIII. The NSPS regulations for spark ignition engines are detailed in 40 CFR Part 60 Subpart JJJJ. For additional guidance reference the United States Air Force Compliance Guide for Stationary Internal Combustion Engines; National Emission Standards for Hazardous Air Pollutants and New Source Performance Standards based on the engine size and date of manufacture.

The **Permitted** flag should also be populated to accurately reflect the current regulatory status of the emission source. This flag can be an invaluable tool in roll-up reporting.

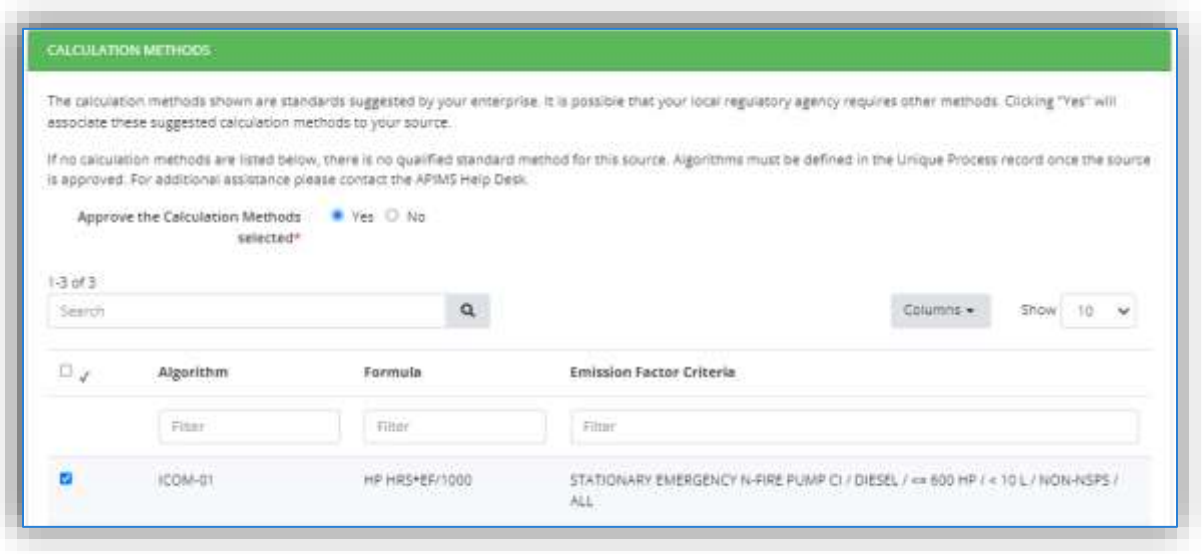
The **Emission Unit ID** field can be used to enter a standard convention identifier that will best help identify the source. If the source is permitted, enter the emission unit ID as designated in the permit.

The **EPA Source Class Code** is a process level EPA code that describes the equipment and/or operation that is the source of the emissions. Source Classification Codes for internal combustion engines are:

Process Type	SCC
Internal Combustion Engines, Commercial/Institutional, Distillate Oil (Diesel), Reciprocating	20300101
Internal Combustion Engines, Commercial/Institutional, Distillate Oil (Diesel), Turbine	20300102
Internal Combustion Engines, Commercial/Institutional, Natural Gas, Reciprocating	20300201
Internal Combustion Engines, Commercial/Institutional, Natural Gas, Turbine	20300202
Internal Combustion Engines, Commercial/Institutional, Gasoline, Reciprocating	20300301
Internal Combustion Engines, Commercial/Institutional, Digester Gas, Turbine	20300701
Internal Combustion Engines, Commercial/Institutional, Landfill Gas, Turbine	20300801
Internal Combustion Engines, Commercial/Institutional, Landfill Gas, Reciprocating	20300802
Internal Combustion Engines, Commercial/Institutional, Gas (LPG), Propane: Reciprocating	20301001
Internal Combustion Engines, Commercial/Institutional, Gas (LPG), Butane: Reciprocating	20301002

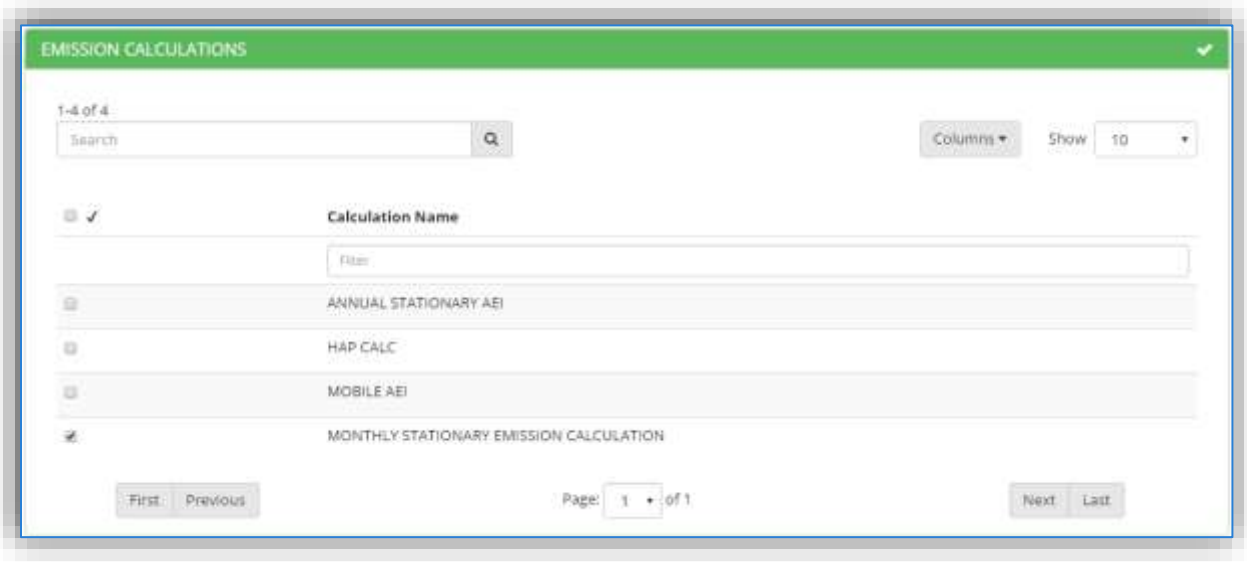
The **Is this unit exempt from RICE NESHAP?** Flag should be flagged according to the guidelines provided in the United States Stationary Internal Combustion Engine Guide.

The next section is the CALCULATION METHODS section; click the hyperlink to expand section to view the data fields. Once the fields are expanded, APIMS will display the Processing icon while it processes the data entered in the previous sections to suggest an appropriate algorithm and emission factor set.



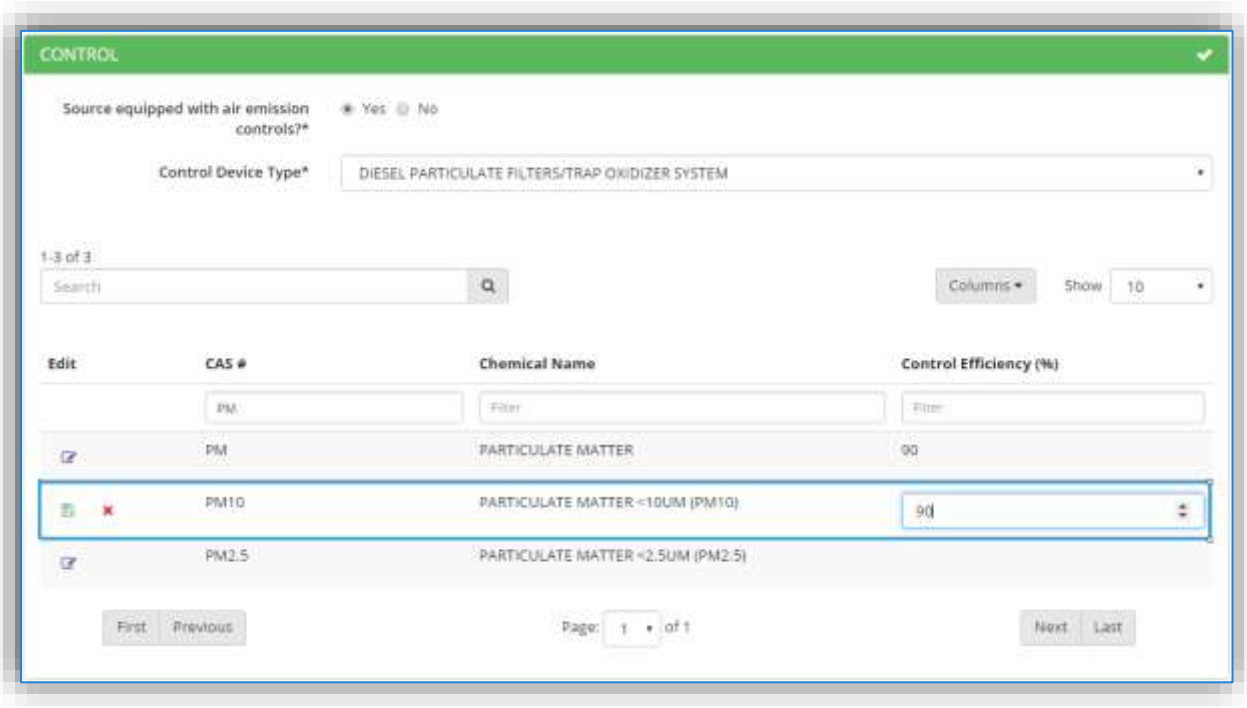
The suggested calculation methodology will be displayed in the grid. If this is the desired algorithm and emission factor set, select "Yes" in the **Approve the calculation Methods presented** field.

The next section is the EMISSION CALCULATIONS section; click the hyperlink to expand section to view.



The emission calculations that are currently configured in the Emission Calculation module of APIMS will be displayed in the grid. Select the appropriate calculation for this source by checking the corresponding box.

The next section is the CONTROL section; click the hyperlink to expand section to view.



The fields that are displayed are dependent upon the selection in the **Source equipped with air emission controls** field. If "No" is selected no additional fields will be displayed. However, if "Yes" is selected the Control Device Type field will be displayed.

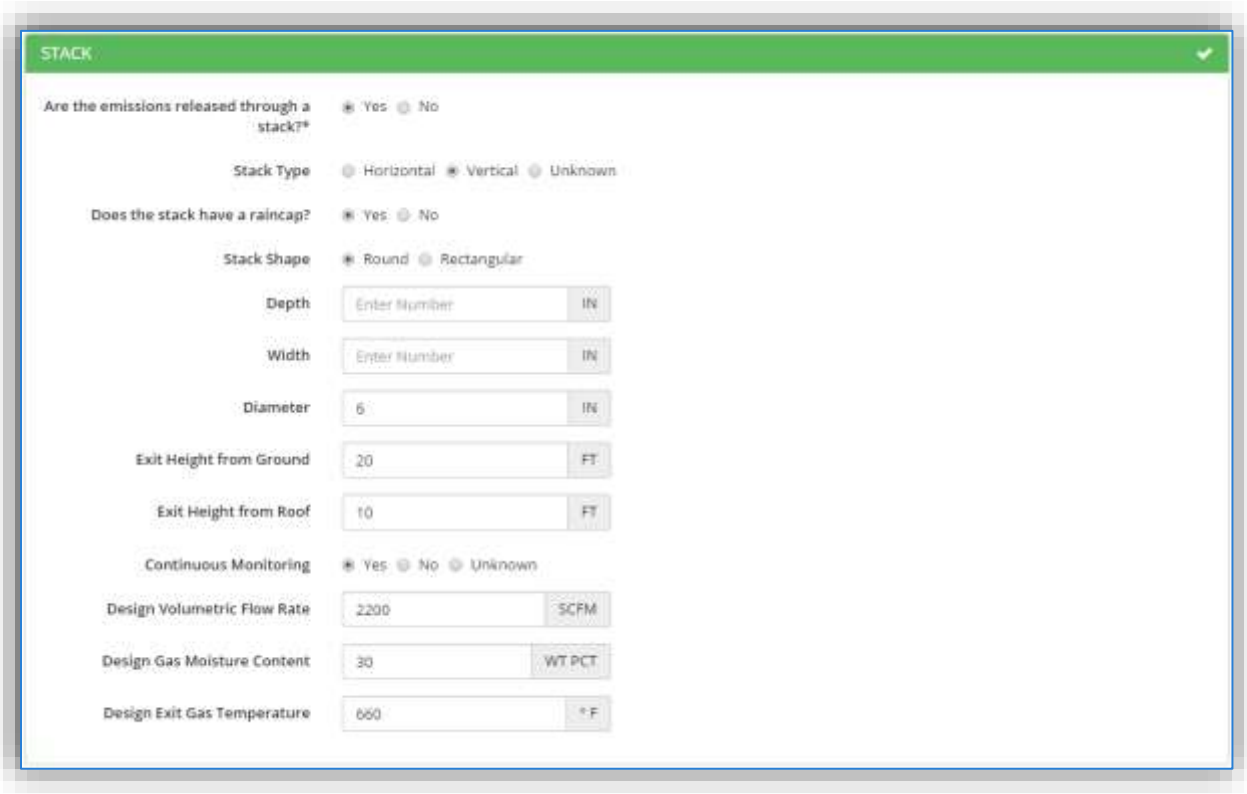
The Control Device Type will display a list of possible controls (DIESEL PARTICULATE FILTERS/TRAP OXIDIZER SYSTEM, OXIDATION CATALYST, RETARDED TIMING, SELECTIVE CATALYTIC REDUCTION, and TURBOCHARGER).

Newer engines that use manufacturer specified emission factor sets should not use this tab as the controls are already accounted for in the manufacturer specified emission factors.

The grid below will then populate with all the chemicals that are currently being calculated for based on the emission factor set selected in the previous section. To filter this list down the CAS # or Chemical Name fields at the top of the grid can be used. For example, PM is typed into the CAS# field to limit the results grid to only show the pollutants that have PM in the CAS #.

To enter the control efficiency, click the icon next to the pollutant, this will then display the field under the Control Efficiency (%) column. Type the percent control efficiency; then click the button on the left side. Repeat these steps for all the controlled pollutants.

The next section is the STACK section; click the hyperlink to expand section to view.



The fields that are displayed are dependent upon the selection in the **Are the emissions released through a stack?** field. If "No" is selected no additional fields will be displayed. However, if "Yes" is selected several stack dimension and information fields will be displayed.

Select the appropriate Stack Type radio button. If "Vertical" is selected, the **Does the stack have a raincap?** field will be displayed. Select the appropriate answer.

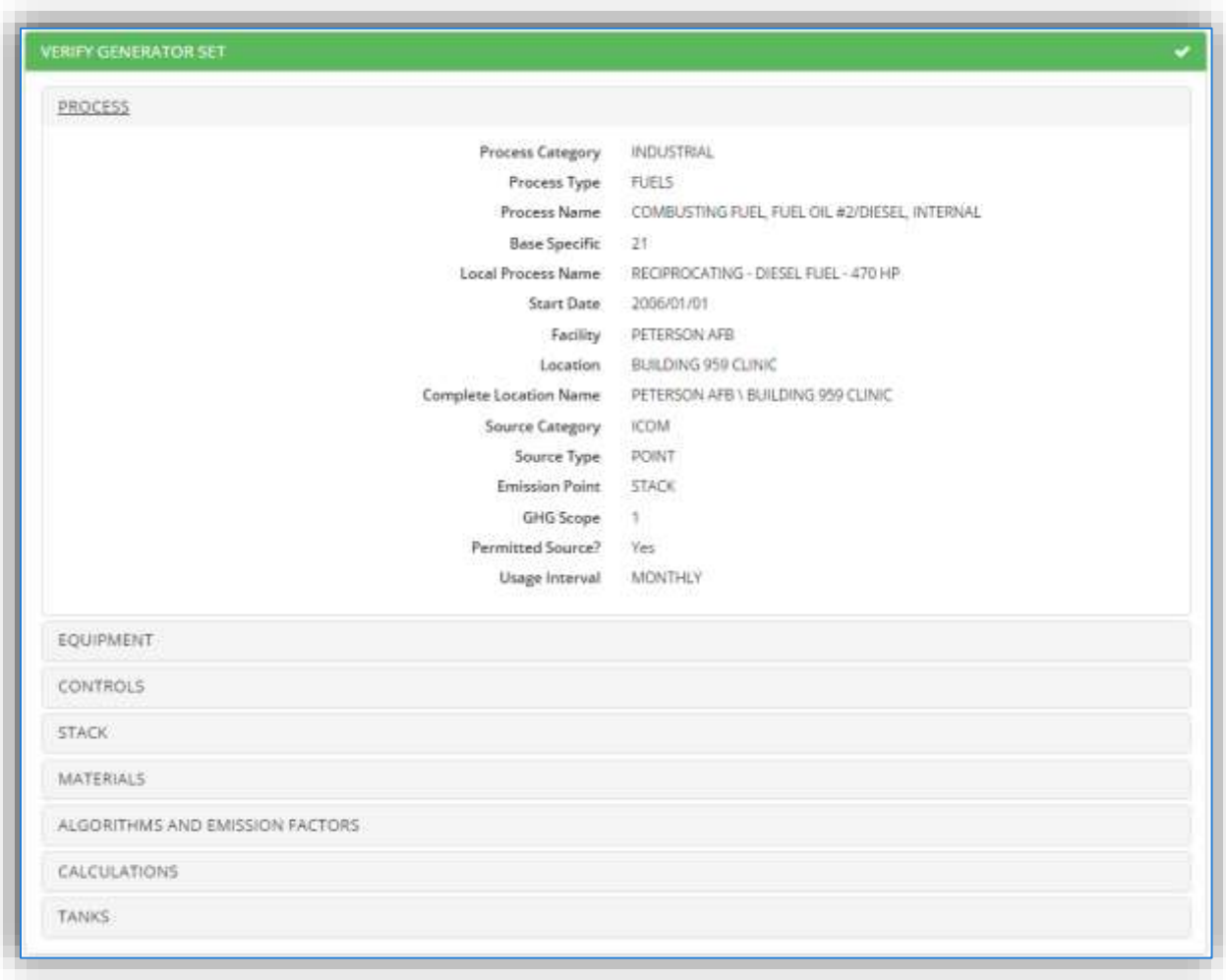
If "Round" is selected in the **Stack Shape** field, then the **Diameter** field should be populated. If "Rectangular" is selected, then the **Depth** and **Width** fields should be populated.

The **Exit Height from Ground** and **Exit Height from Roof** should also be populated in feet.

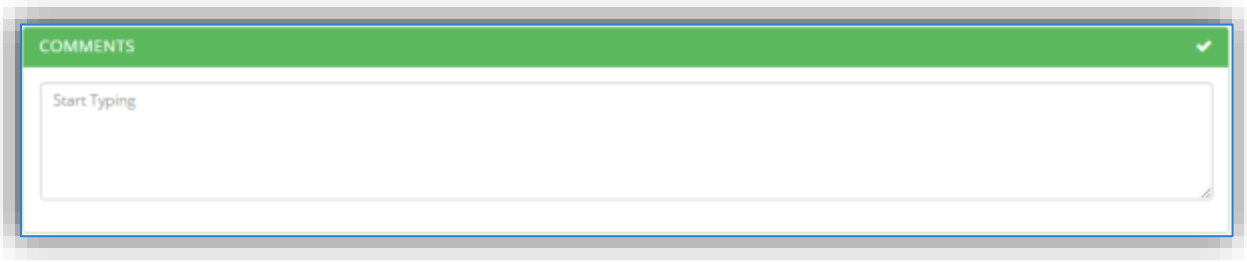
Select the appropriate value in the **Continuous Monitoring** field as it applies to the stack, not the engine.

If known, the **Design Volumetric Flow Rate**, **Design Gas Moisture Content** and **Design Exit Gas Temperature** should be populated.

At this point all the tabs should be green. Proceed to the VERIFY GENERATOR SET section to review the information. Click the section titles to expand the selection to view the data.



The final section is the COMMENTS section. This displays a single field that can be used to document any additional information regarding the source.

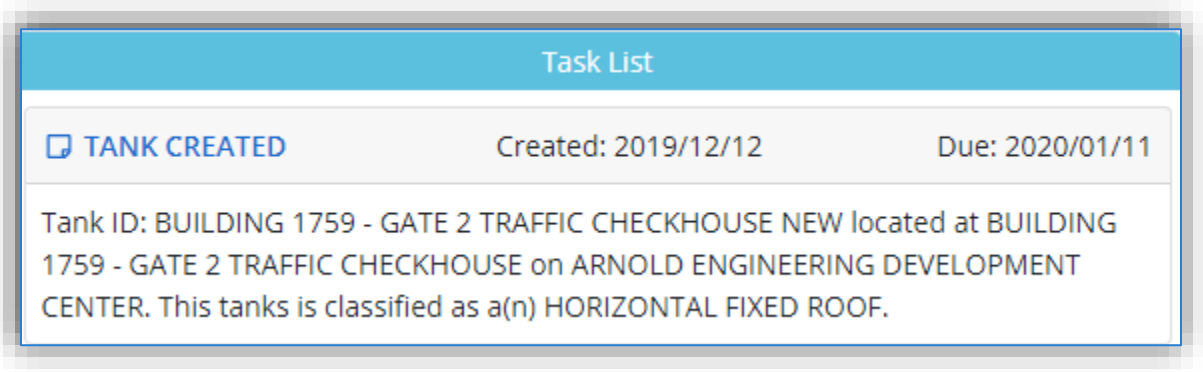


The last step is to click the Approve button to save and complete the data configuration in APIMS.

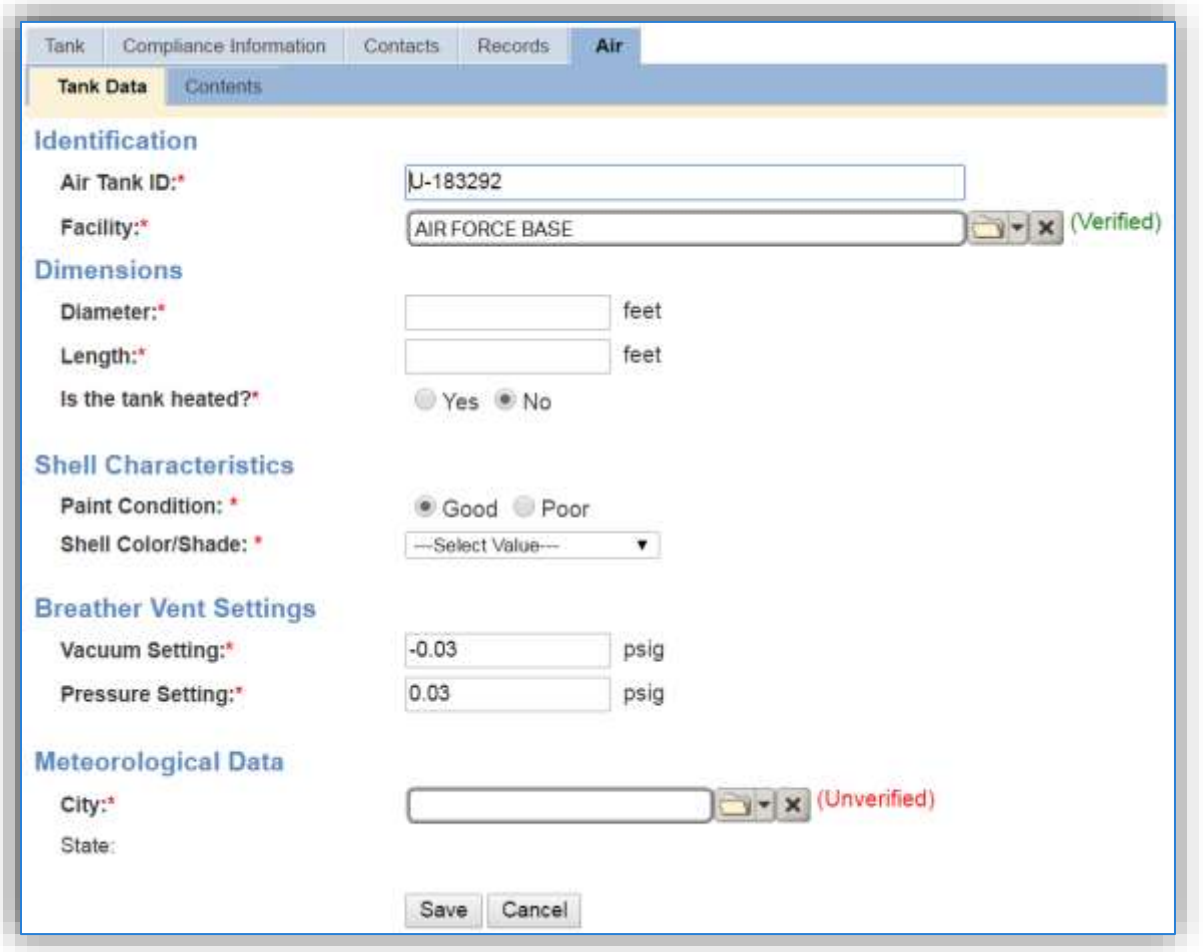
The equipment and process records will be completely configured in APIMS.

If the engine uses a storage tank that was not previously configured in STAR, a Task will appear in the workbasket to notify the Tanks Manager and Air Quality Manager a new tank has been created and additional data configuration is required.

If necessary, a storage tank record will also be created, and a task will appear in the Task section of the workbasket.



This record will not be complete and will require additional data configuration. To complete the tank configuration, click on the TANK CREATED link.



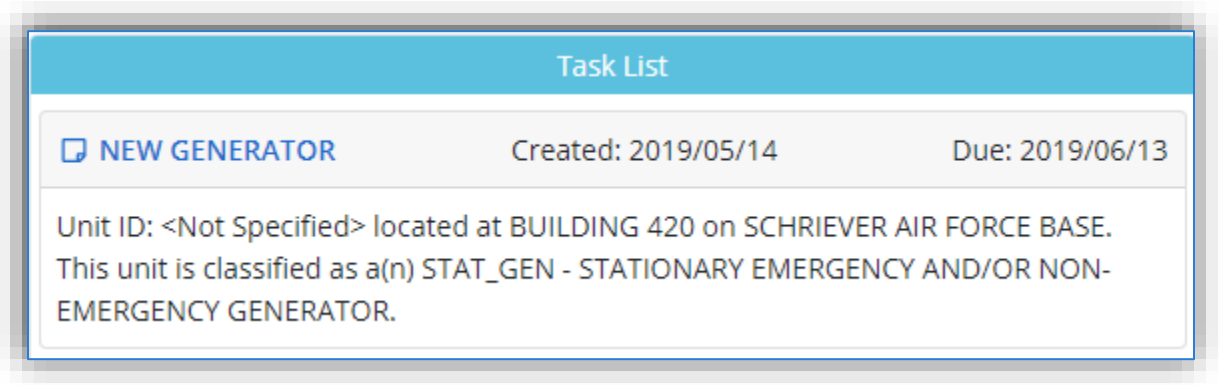
This will open the *Air* tab of the storage tank record. Some fields will already be populated based on the data entered during the generator configuration. The remaining fields that are in bold with a red asterisk * are required to complete the data configuration. For more information on entering these

fields reference Section 3.6 Aboveground Storage Tanks (AST). Once the data is entered, click the **Save** button.

The workbasket will display any incomplete generator entries in the Tasks section. Completed engine entries will appear in the Notifications section.

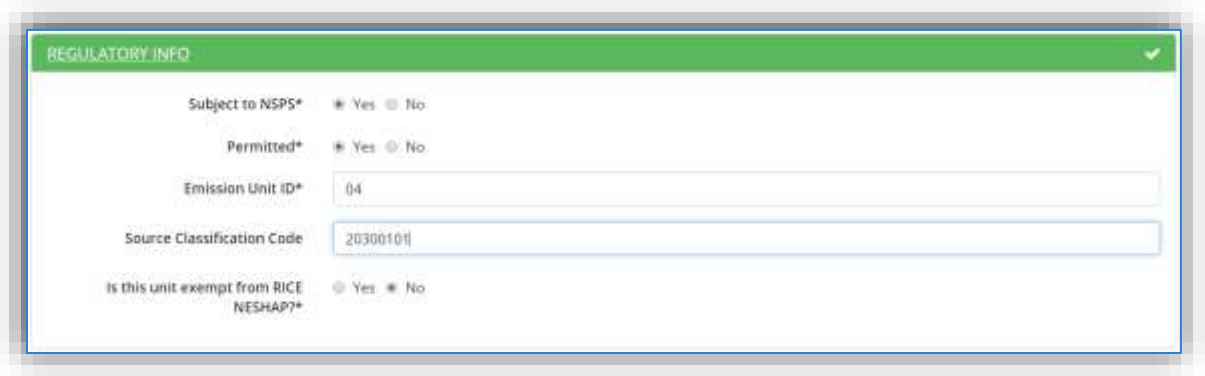
3.1.3.2.2.2 *Facility Power Module*

For installations that have implemented the Facility Power module in APIMS each new engine will be created by the engine owner, which is usually the Power Pro shop. Once the engine has been configured in the Facility Power module of APIMS a workbasket notification will appear for the Air Admin on the APIMS home page.



Click the NEW GENERATOR link. This will open the Add New Equipment screen in the Facility Power module.

The tabs highlighted in RED need additional data configured. The others have been completed by Facility Power. Click the REGULATORY INFO section.



The first field selects whether the engine is **Subject to NSPS** or otherwise known as the New Source Performance Standards. The NSPS regulations for compression ignition engines are detailed in 40 CFR Part 60 Subpart IIII. The NSPS regulations for spark ignition engines are detailed in 40 CFR Part 60 Subpart JJJJ. For additional guidance reference the United States Stationary Internal Combustion Engine Guide.

The **Permitted** flag should also be populated to accurately reflect the current regulatory status of the emission source. This flag can be an invaluable tool in roll-up reporting.

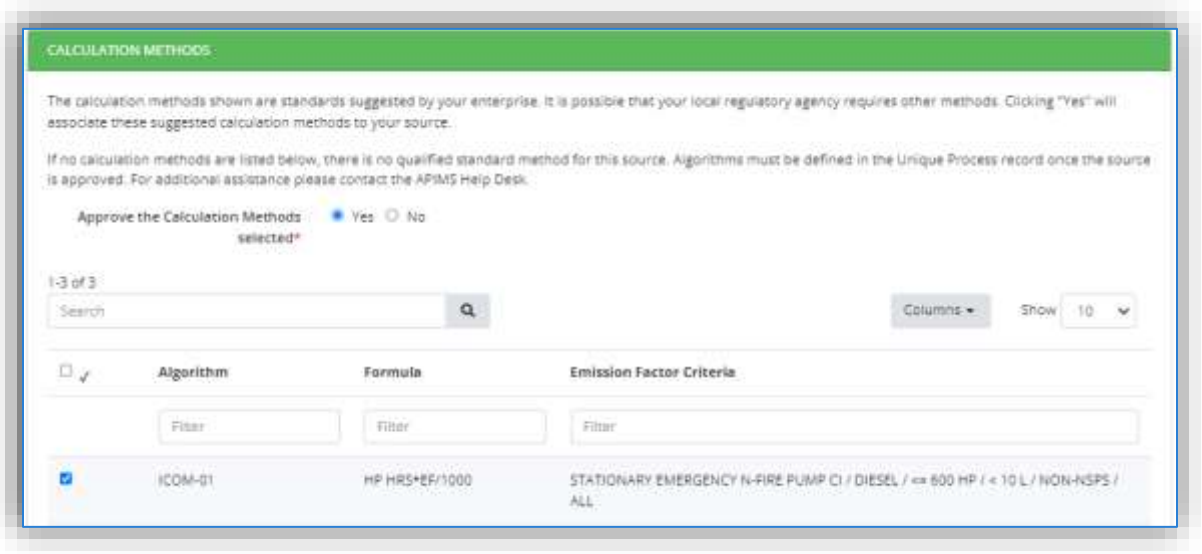
The **Emission Unit ID** field can be used to enter a standard convention identifier that will best help identify the source. If the source is permitted, enter the emission unit ID as designated in the permit.

The **EPA Source Class Code** is a process level EPA code that describes the equipment and/or operation that is the source of the emissions. Source Classification Codes for internal combustion engines are:

Process Type	SCC
Internal Combustion Engines, Commercial/Institutional, Distillate Oil (Diesel), Reciprocating	20300101
Internal Combustion Engines, Commercial/Institutional, Distillate Oil (Diesel), Turbine	20300102
Internal Combustion Engines, Commercial/Institutional, Natural Gas, Reciprocating	20300201
Internal Combustion Engines, Commercial/Institutional, Natural Gas, Turbine	20300202
Internal Combustion Engines, Commercial/Institutional, Gasoline, Reciprocating	20300301
Internal Combustion Engines, Commercial/Institutional, Digester Gas, Turbine	20300701
Internal Combustion Engines, Commercial/Institutional, Landfill Gas, Turbine	20300801
Internal Combustion Engines, Commercial/Institutional, Landfill Gas, Reciprocating	20300802
Internal Combustion Engines, Commercial/Institutional, Gas (LPG), Propane: Reciprocating	20301001
Internal Combustion Engines, Commercial/Institutional, Gas (LPG), Butane: Reciprocating	20301002

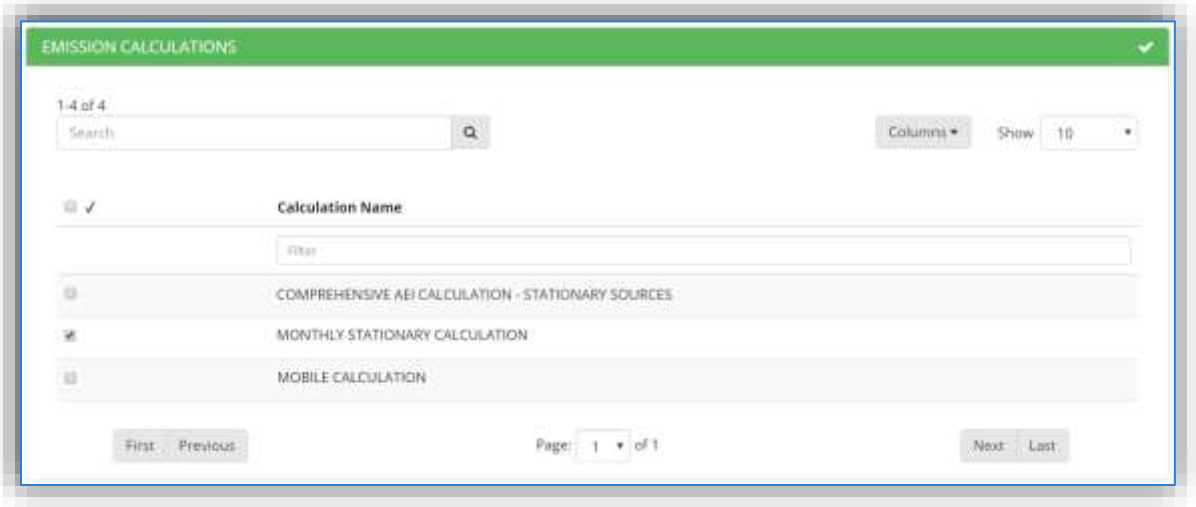
The **Is this unit exempt from RICE NESHAP?** Flag should be flagged according to the guidelines provided in the United States Stationary Internal Combustion Engine Guide.

The next section is the CALCULATION METHODS section; click the hyperlink to expand section to view the data fields. Once the fields are expanded, APIMS will display the Processing icon while it processes the data entered in the previous sections to suggest an appropriate algorithm and emission factor set.



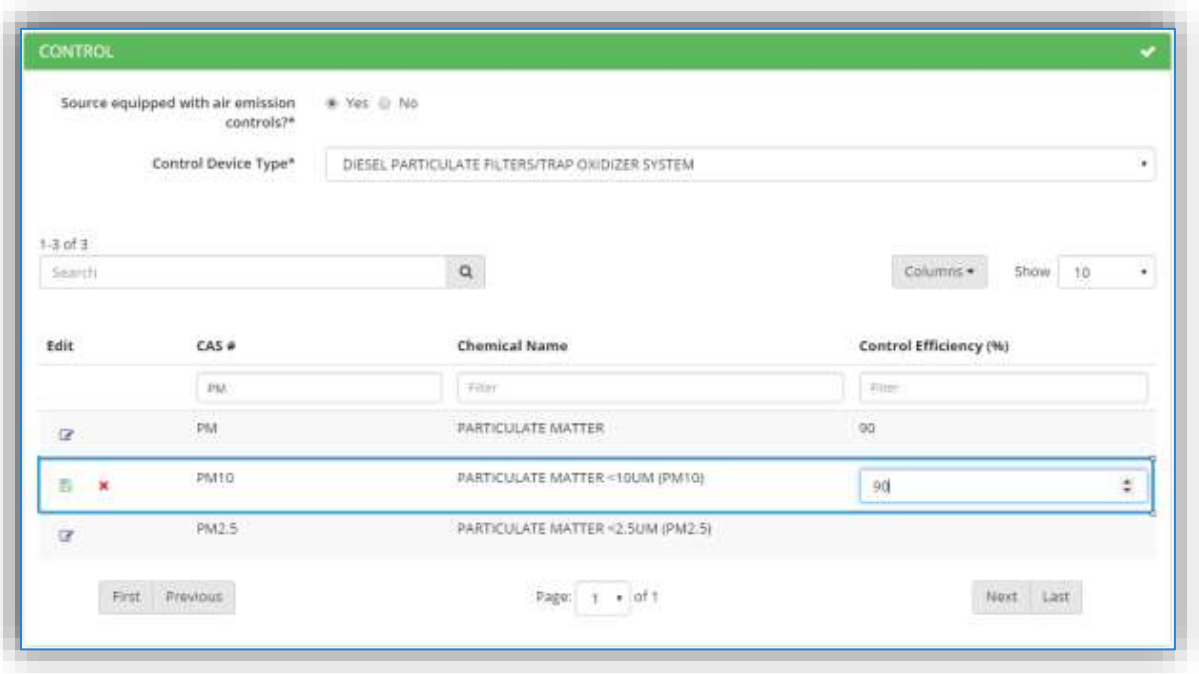
The suggested calculation methodology will be displayed in the grid. If this is the desired algorithm and emission factor set, select "Yes" in the **Approve the calculation Methods presented** field.

The next section is the EMISSION CALCULATIONS section; click the hyperlink to expand section to view.



The emission calculations that are currently configured in the Emission Calculation module of APIMS will be displayed in the grid. Select the appropriate calculation for this source by checking the corresponding box.

The next section is the CONTROL section; click the hyperlink to expand section to view.



The fields that are displayed are dependent upon the selection in the **Source equipped with air emission controls** field. If "No" is selected no additional fields will be displayed. However, if "Yes" is selected the Control Device Type field will be displayed.

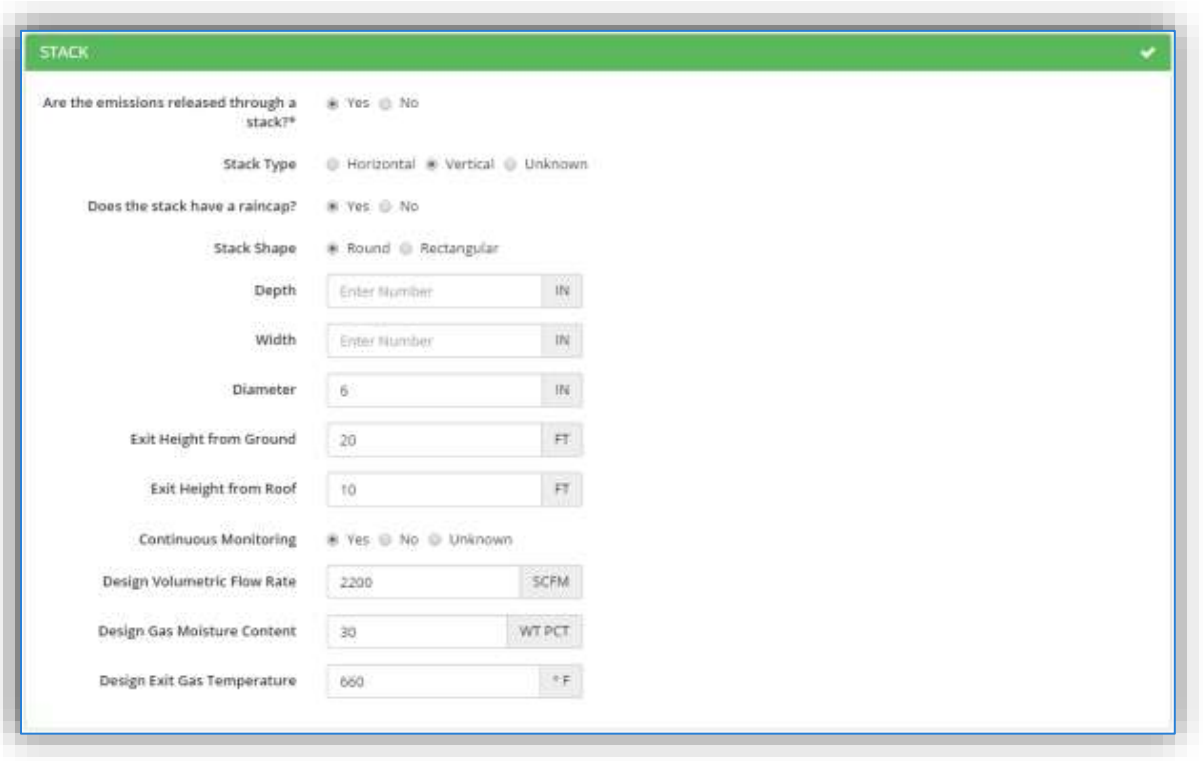
The Control Device Type will display a list of possible controls (DIESEL PARTICULATE FILTERS/TRAP OXIDIZER SYSTEM, OXIDATION CATALYST, RETARDED TIMING, SELECTIVE CATALYTIC REDUCTION, and TURBOCHARGER).

Newer engines that use manufacturer specified emission factor sets should not use this tab as the controls are already accounted for in the manufacturer specified emission factors.

The grid below will then populate with all the chemicals that are currently being calculated for based on the emission factor set selected in the previous section. To filter this list down the CAS # or Chemical Name fields at the top of the grid can be used. For example, PM is typed into the CAS# field to limit the results grid to only show the pollutants that have PM in the CAS #.

To enter the control efficiency, click the icon next to the pollutant, this will then display the field under the Control Efficiency (%) column. Type the percent control efficiency; then click the button on the left side. Repeat these steps for all the controlled pollutants.

The next section is the STACK section; click the hyperlink to expand section to view.



The fields that are displayed are dependent upon the selection in the **Are the emissions released through a stack?** field. If "No" is selected no additional fields will be displayed. However, if "Yes" is selected several stack dimension and information fields will be displayed.

Select the appropriate Stack Type radio button. If "Vertical" is selected, the **Does the stack have a raincap?** field will be displayed. Select the appropriate answer.

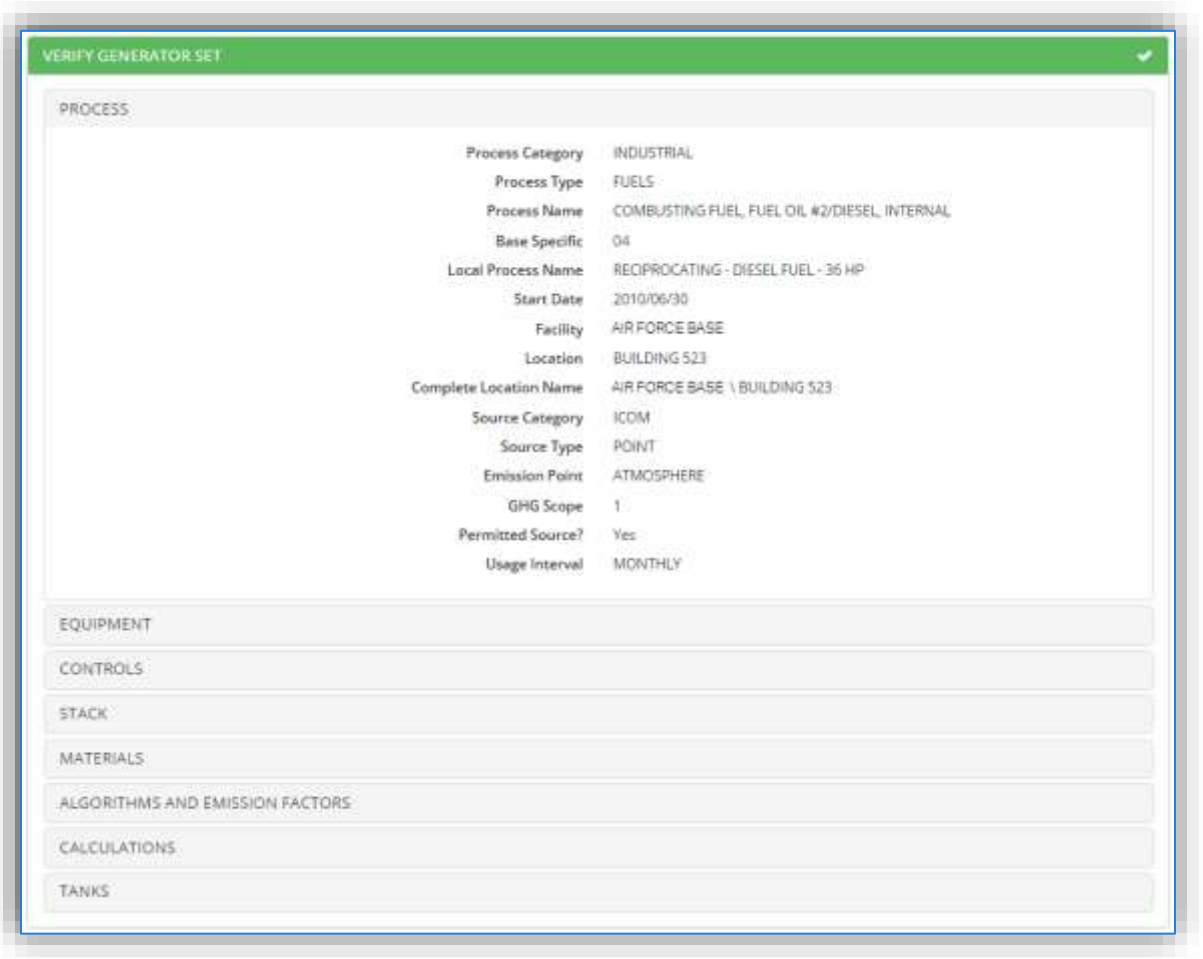
If "Round" is selected in the **Stack Shape** field, then the **Diameter** field should be populated. If "Rectangular" is selected, then the **Depth** and **Width** fields should be populated.

The **Exit Height from Ground** and **Exit Height from Roof** should also be populated in feet.

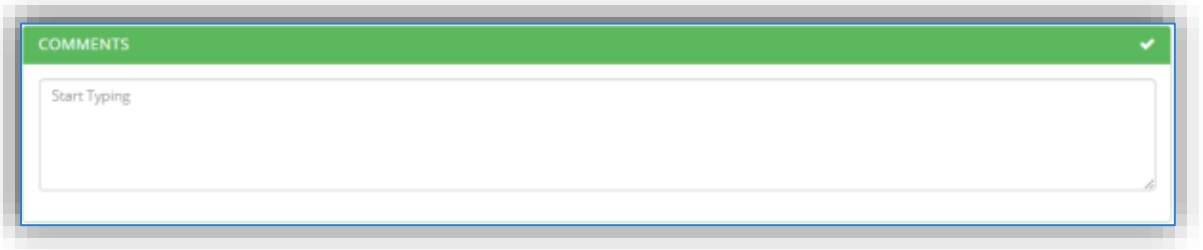
Select the appropriate value in the **Continuous Monitoring** field as it applies to the stack, not the engine.

If known, the **Design Volumetric Flow Rate**, **Design Gas Moisture Content** and **Design Exit Gas Temperature** should be populated.

At this point all the tabs should be green. Proceed to the VERIFY GENERATOR SET section to review the information. Click the section titles to expand the selection to view the data.



The final section is the COMMENTS section. This displays a single field that can be used to document any additional information regarding the source.



The last step is to click the Approve button to save and complete the data configuration in APIMS. This will return you to the APIMS home page.

The equipment and process records will be completely configured in APIMS and a notification will appear in the workbasket.

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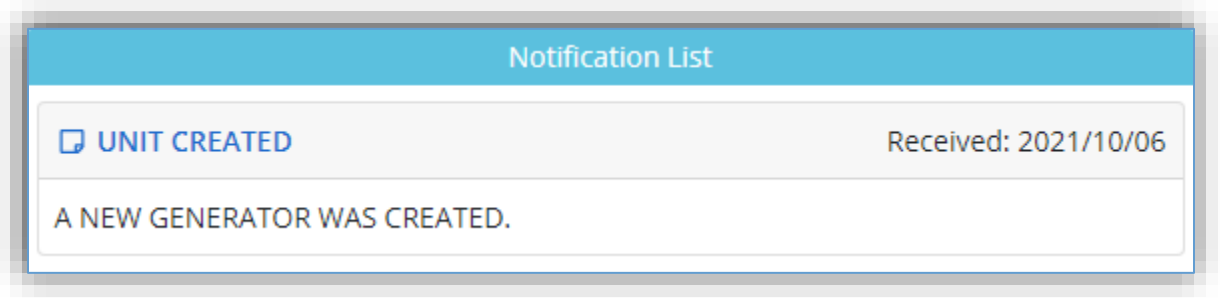
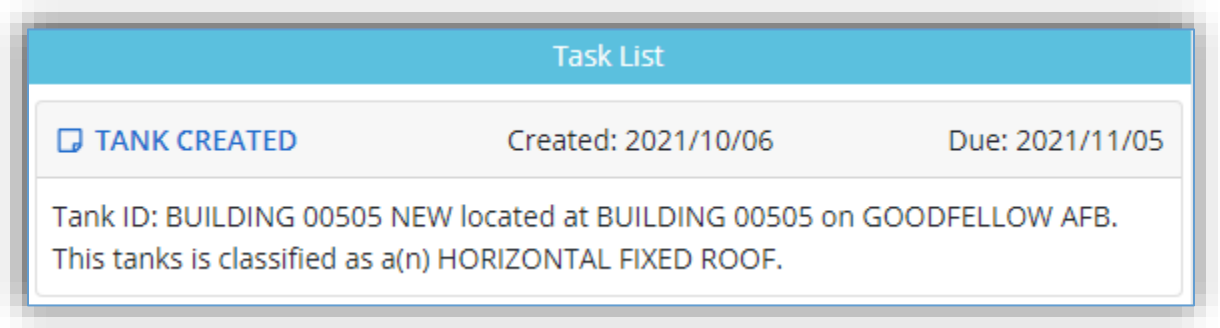
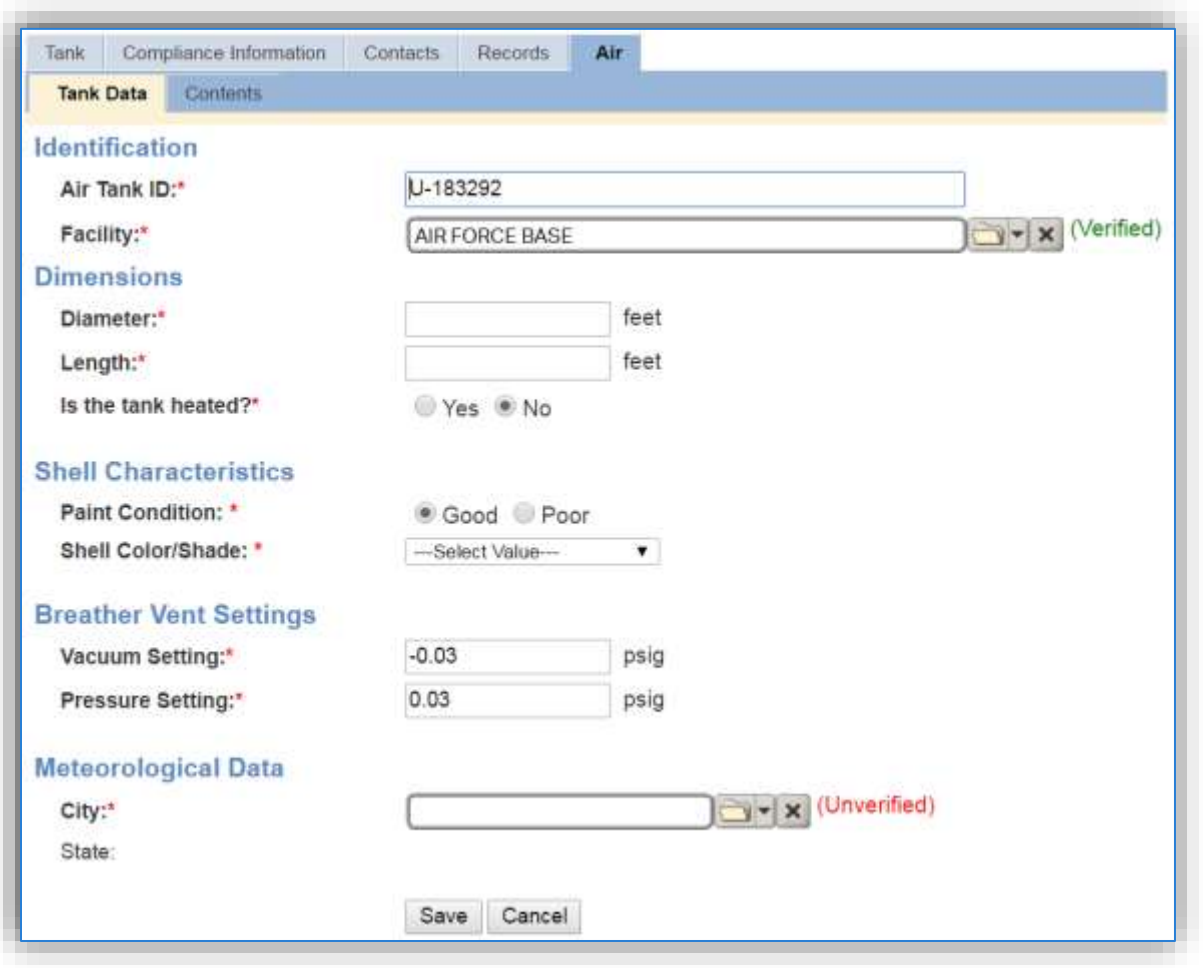


To view the configured equipment record, click the UNIT CREATED link to view the generator.

If necessary, a storage tank record will also be created, and a task will appear in the Task section of the workbasket.

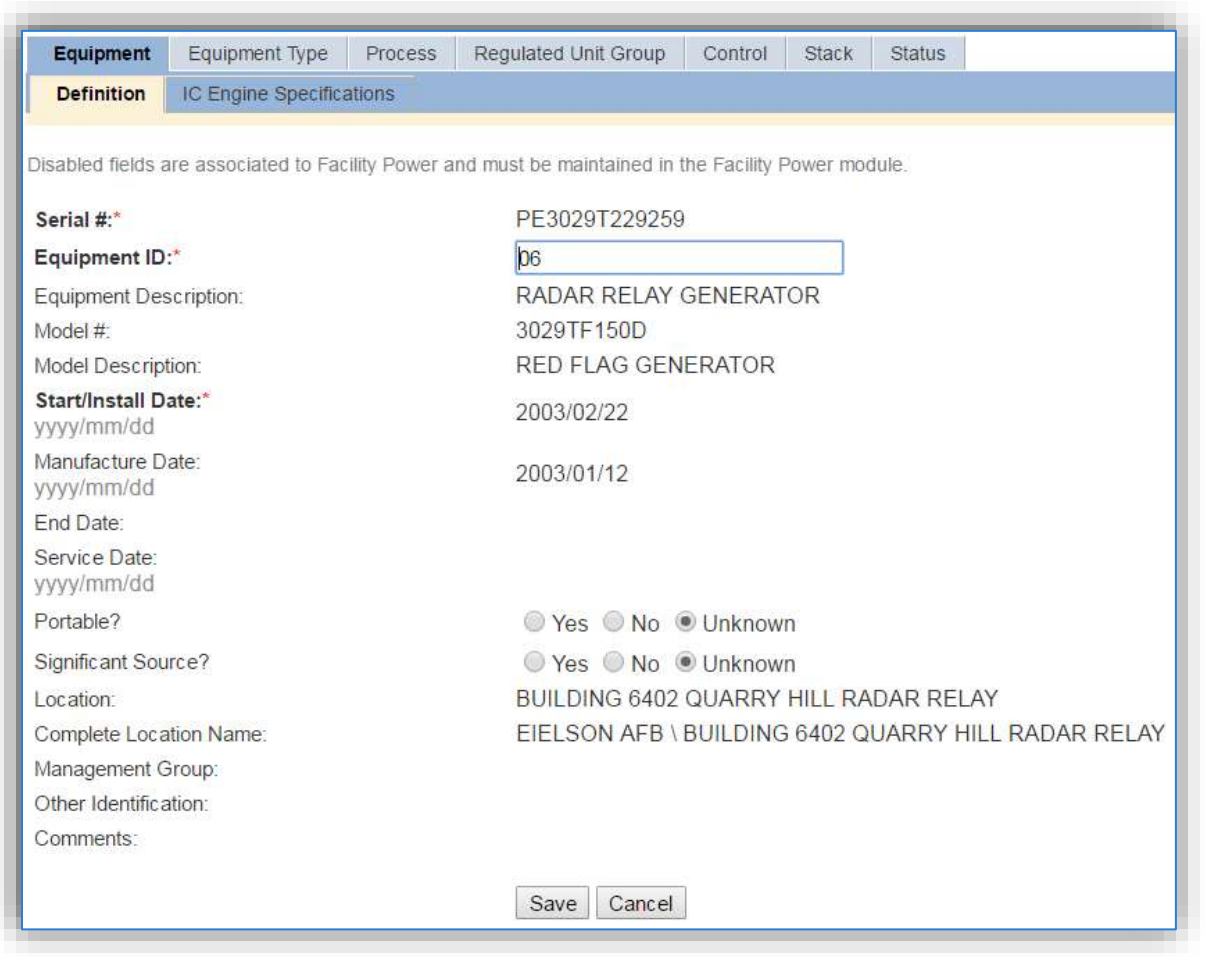


This record will not be complete and will require additional data configuration. To complete the tank configuration, click on the TANK CREATED link.



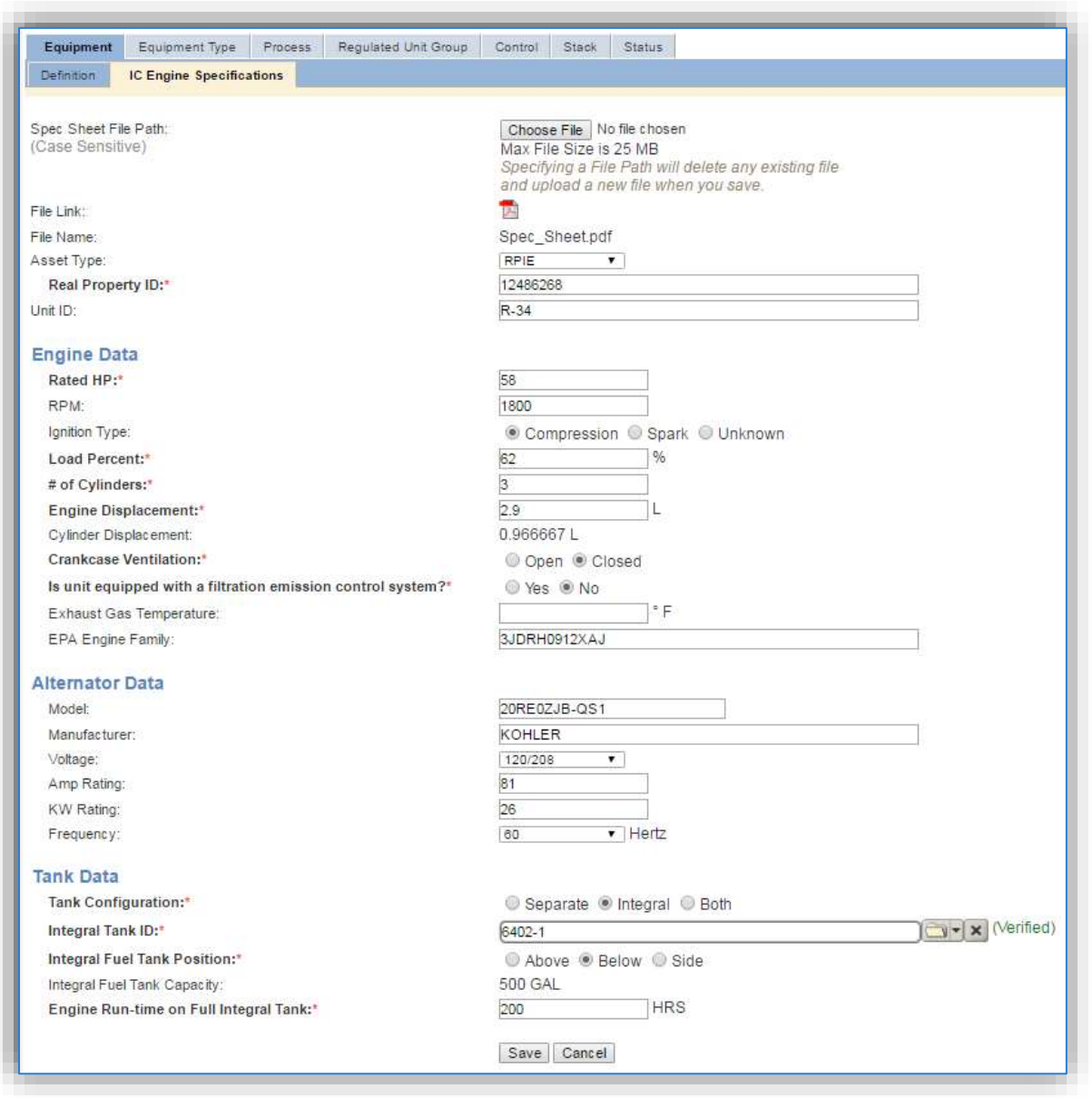
This will open the *Air* tab of the storage tank record. Some fields will already be populated based on the data entered during the generator configuration. The remaining fields that are in bold with a red asterisk * are required to complete the data configuration. For more information on entering these fields reference Section 3.6 Aboveground Storage Tanks (AST). Once the data is entered, click the **Save** button.

The workbasket will display any incomplete generator entries in the Tasks section. Completed engine entries will appear in the Notifications section. When Facility Power creates a new unit, most details will be entered; however, there is some Air Quality specific information that will be required to complete the record.



The only field that can be edited in in this module is the Equipment ID, all other fields are maintained in the Facility Power module. This is the value entered in the wizard as the Emission Unit ID.

The next sub tab is the IC Engine Specifications tab.



Most of this data was populated when the unit was created, however there are additional fields that will need to be populated to complete the record.

The **Asset Type** should be populated to indicate if the engine is an RPIE (Real Property Installed Equipment) or an EAID (Equipment Authorized Inventory Data) owned unit. RPIE generators support mission-critical functions where controlled shut-down or delayed power restoration is unacceptable. They may be authorized for missions requiring immediate power restoration, uninterrupted power, or support for emergency systems. RPIE engines are in a fixed location and are not portable. EAID units are portable generators (trailer-mount or skid-mount) that are used for POL/Fuel functions that include: hydrant fueling systems, bulk fuel storage areas, non-hydrant operating storage areas, and vehicle fueling stations. EAID units are also portable generators that may be authorized for mission-essential functions where delayed power restoration is acceptable.

EAID Engines should be configured in APIMS but are not required/should not be have any calculations associated with their usage/consumption.

The only field that can be edited on this screen is the **Equipment ID,** as the other fields are owned by the Facility Power module. If any of these fields are not correct, contact the installation Engine Admin.

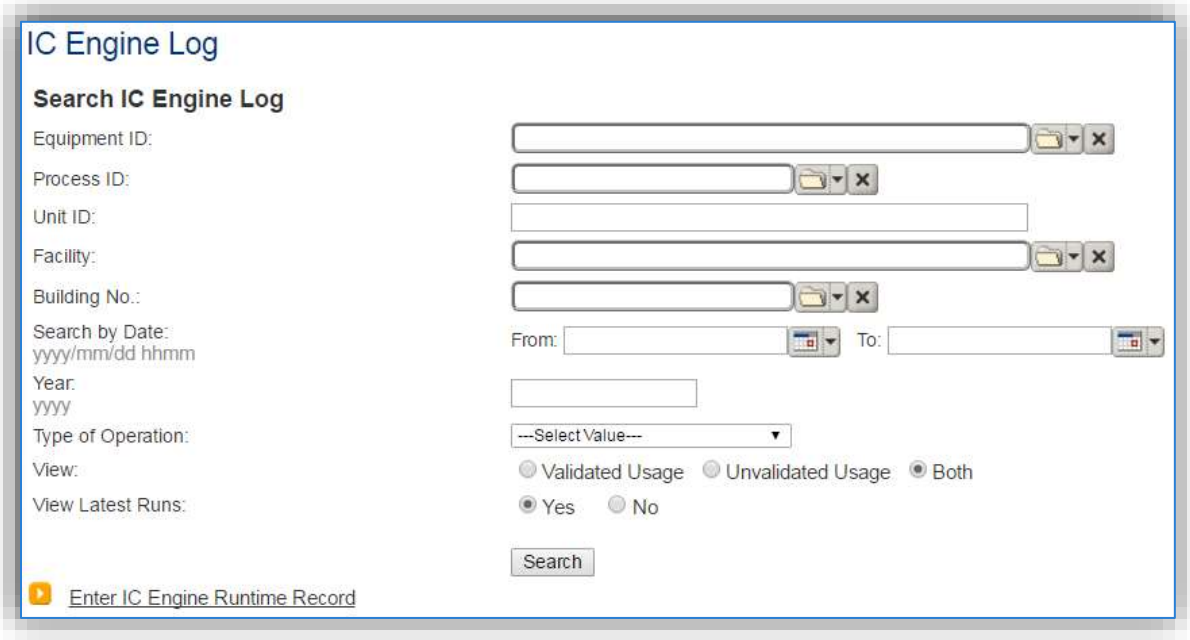
3.1.4 Year-to-Year Maintenance

3.1.4.1 Usage

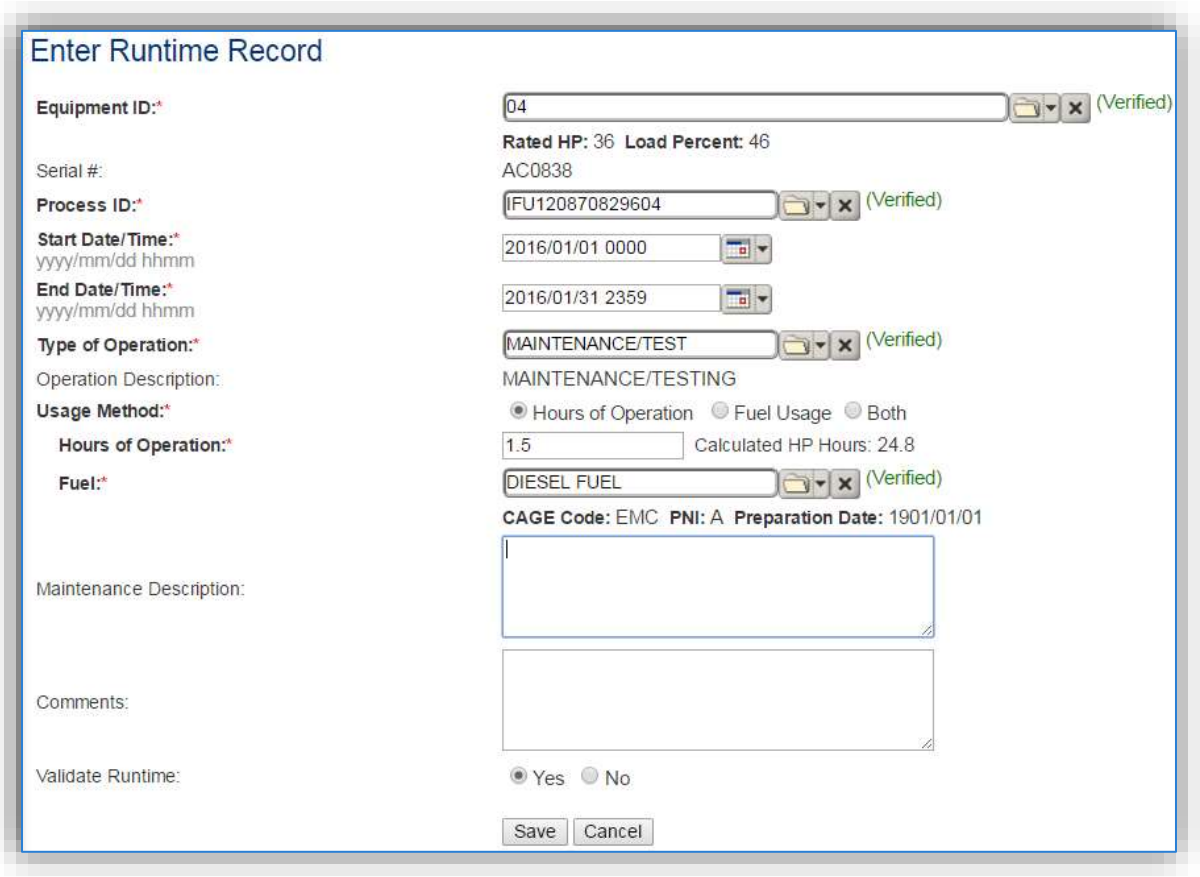
3.1.4.1.1 IC Engine Log

The consumption for internal combustion sources will need to be tracked monthly. To correctly document the monthly usage for this emission source the consumption should be entered in the IC Engine log.

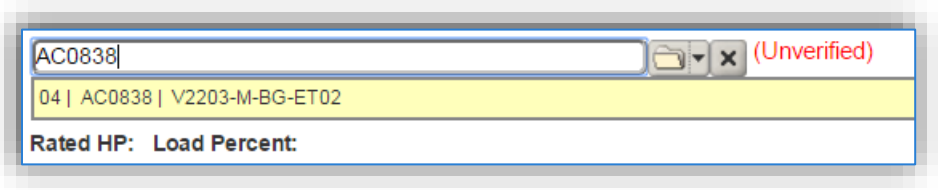
This module is only to be used if the Facility Power module has not been implemented. Otherwise there is the risk of double counting the operation of an engine.



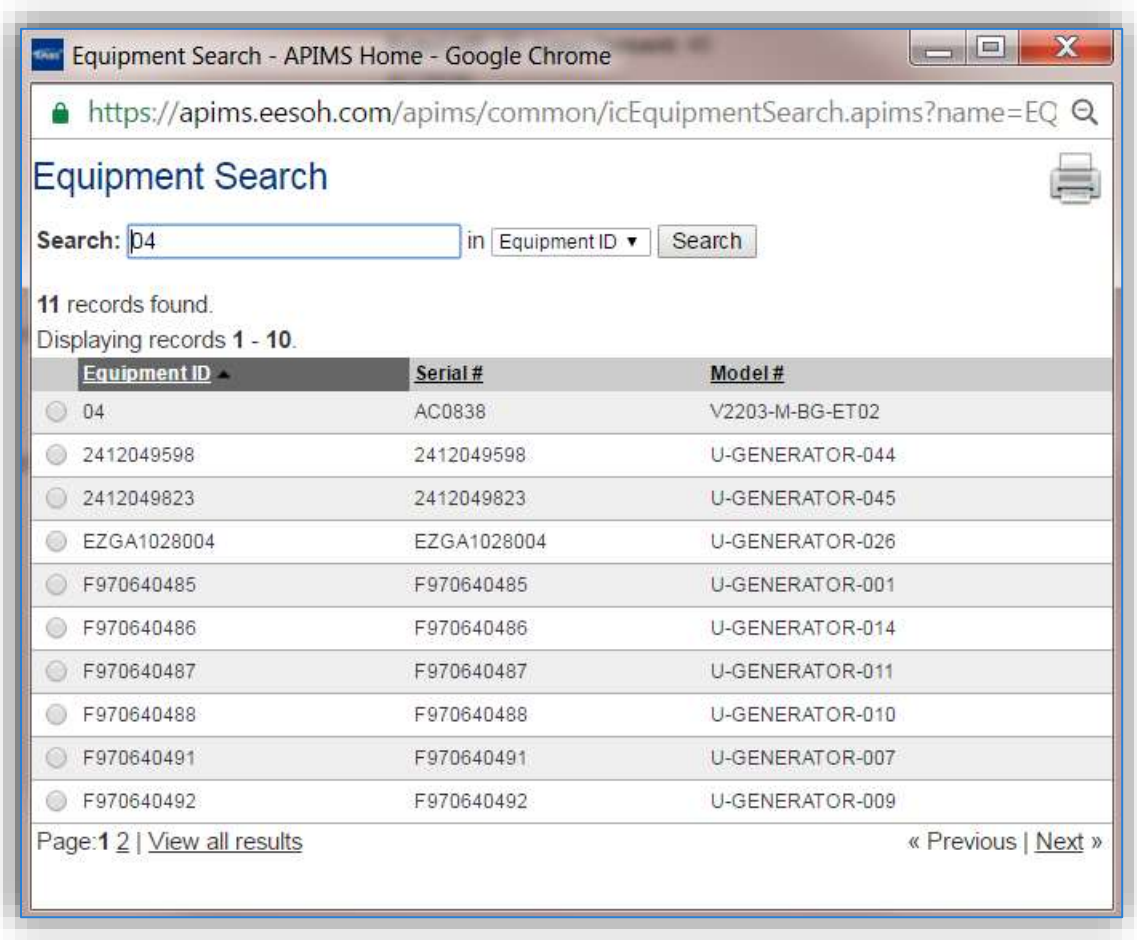
To enter a new runtime record, click on **IC Engine Log** under the **Usage** tab, and then click the Enter IC Engine Runtime Record hyperlink in the bottom left corner of the page.



Enter or search for the **Equipment ID** by either typing in the Equipment ID, Serial number or Model number and selecting from the list that appears.



Or if the equipment is not found, click on the folder  icon to open a search pop-up window.



Select the radio button next to the correct equipment record. This will automatically close the pop-up window and return you to the Enter Runtime Record screen.

Once the **Equipment ID** has been verified, the Rated HP, Load Percent and Serial # and **Process ID** will auto-populate.

The **Start Date/Time** and **End Date/Time** should be entered as the first and last day of the month.

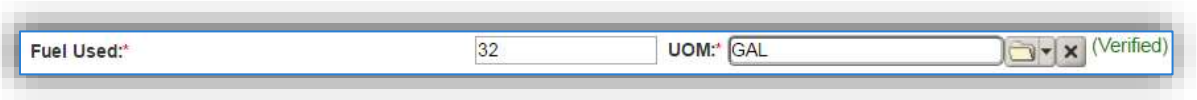
The **Type of Operation** should be selected from the list of values (MAINTENANCE/TEST, EMERGENCY, BLACK START, NON-EMERGENCY).

The Type of Operation is critical to tracking compliance with the various regulatory rules stated in 40 CFR 60 Subpart IIII, 40 CFR 60 Subpart JJJJ and 40 CFR 63 Subpart ZZZZ.

The **Usage Method** should be selected according to how the engine run is measured. For most engines this will be Hours of Operation.

If **Hours of Operation** is selected as the **Usage Method,** then the **Hours of Operation** field will be displayed. Enter the hours the engine actual ran, not the time it took to complete the maintenance and testing. Once the hours of operation are entered, APIMS will calculate the **Calculated HP Hours** according to the Hours of Operation, Load Percent and Rated HP.

If **Fuel Usage** is selected as the **Usage Method,** then the **Fuel Used** and **UOM** fields will appear.



Enter the total gallons of fuel used during the engine operation.

The last steps are to select "Yes" in the **Validate Runtime** field and click the **Save** button.

Repeat this step for all the engines and engine operation types. If the unit did not operate during the month but was still an active source, enter a consumption record with zero usage and a comment as to why it did not operate to track negative documentation. This type of documentation ensures that all equipment is accounted for from year to year and can be used to account for differences in AEI reporting from year to year.

3.1.4.1.2 Facility Power Module

If your installation has implemented the Facility Power module in APIMS then all engine run times will be recorded by the personnel conducting maintenance and testing. Each time a generator is run for maintenance and testing as well as all emergency hours are automatically incorporated into the Air Quality portion of APIMS and will be included in the calculations for the corresponding processes.

3.1.4.2 Emissions Calculation

To correctly calculate emissions this emission source should be included in a **Stationary Source Calculation** depending upon the designation of the engine. All stationary engines and portable engines that have been in the same location for 12 months should be included in the stationary calculation. All portable engines that have not been on the same location for 12 months do not require calculations. Reference Section 2.7 Emissions Calculations for additional instructions and details.

3.2 External Combustion (ECOM)

3.2.1 Source Types

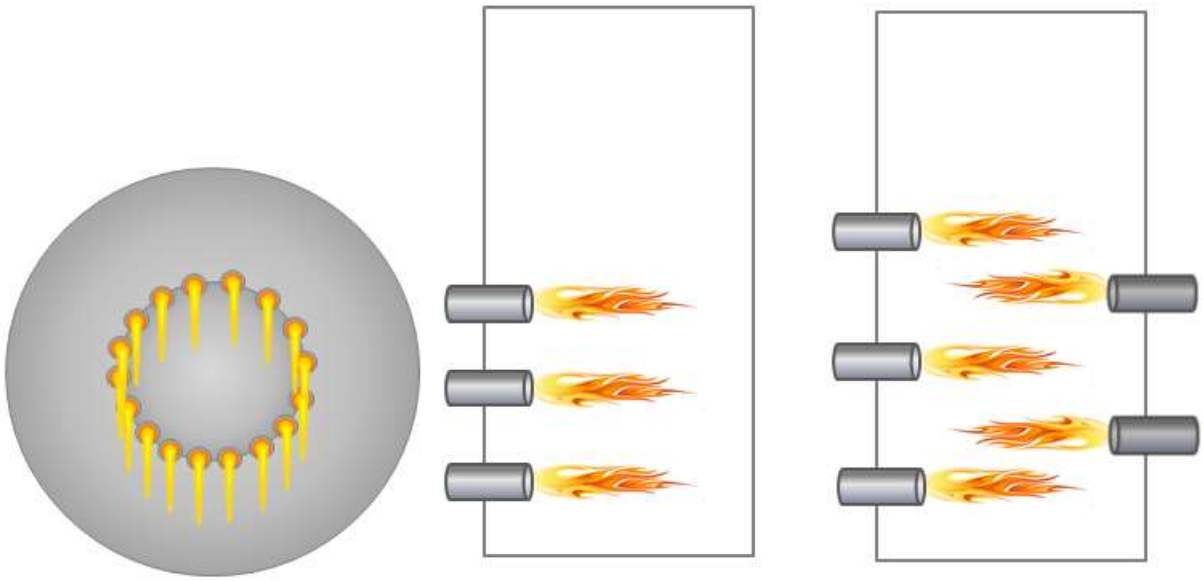
This source category includes external combustion equipment such as furnaces and boilers. Furnaces heat an area by warming air while boilers utilize water and may produce enough steam to generate electricity. Emissions from external combustion sources will vary depending on several factors including the boiler configuration, the size of the combustor, the firing configuration, the fuel type, the control devices used, and a variety of different design configurations.

Boilers are usually classified into four categories based on their size (heat input) and application: Utility, Industrial, Commercial, and Residential. The size is defined as the maximum heat input capacity, which is the measure of the source's maximum heat value it is capable of combusting. Utility boilers are typically the largest boilers and utilize steam for electricity generation. The Air Force does not currently have any boilers in this category. Industrial boilers can produce electricity, or they may generate process steam. The process steam may be used for heat generation or the captured condensate may be used as a solvent or feedstock. Both commercial and residential boilers are considerably smaller than utility and industrial boilers and are used exclusively for comfort heat generation. The main difference between commercial and residential boiler types is that the commercial boilers are significantly larger than residential boilers since they are used to heat larger (commercial) spaces. The boiler types and their respective heat inputs are given in the table below.

Boiler Type	Size (Heat Input)
Industrial – Heavy	≥100 to 250 MMBtu/hr
Industrial – Light	≥10 to <100 MMBtu/hr
Commercial/Institutional	≥0.3 to <10 MMBtu/hr
Residential	<0.3 MMBtu/hr

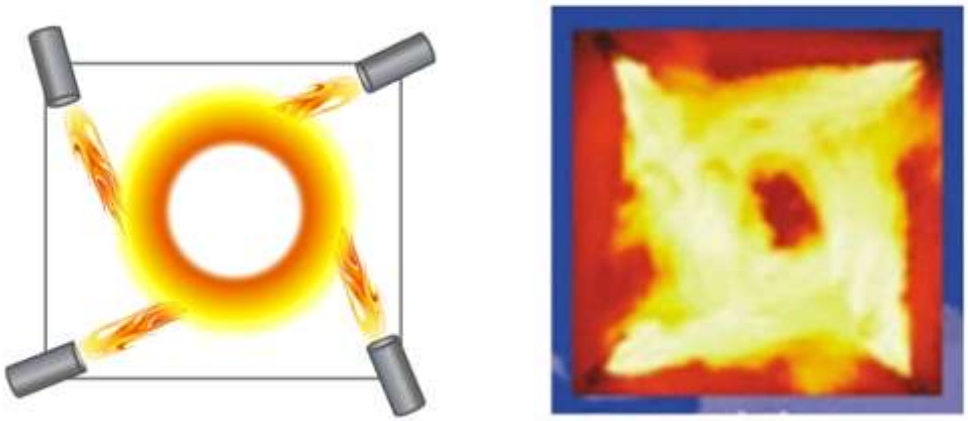
Boilers usually use natural gas, diesel, or coal as the fuel. Some boilers are defined as dual fuel boilers; this means that the boiler is configured to operate mainly on one fuel with a backup fuel available. The most common example is a natural gas fired boiler with a diesel backup. In addition to the size of the boiler and the fuel combusted, the burner configurations and control devices need to be considered.

Natural gas boilers may be either wall-fired or tangential-fired. Wall-Fired boilers have burners mounted in the boiler walls, producing discrete flames in the furnace. Burners may be mounted in a single boiler wall or in two opposing walls.



Wall Fired Burner Configurations

Tangentially Fired Boilers have stacked groups of burners and air registers at the four corners of the furnace. Fuel and air are injected to create a single rotating fireball in the center of the furnace, rather than the discrete flames produced by burners in the wall-fired boilers.

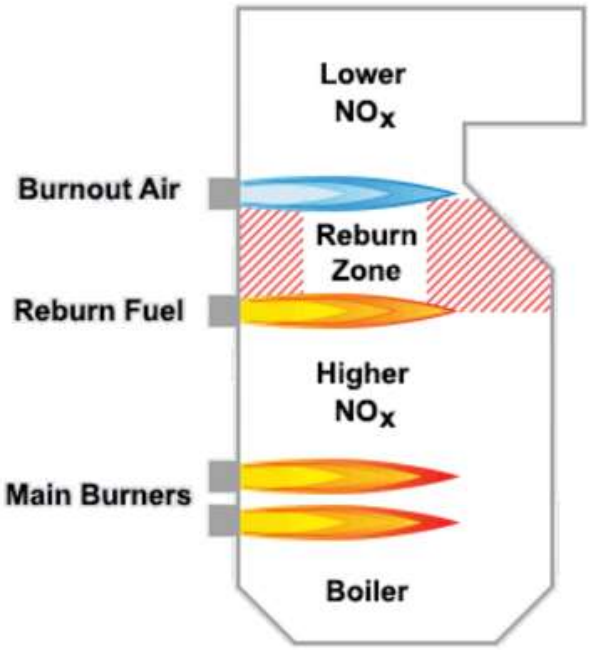


Tangential-Fired Burner Configuration

In addition to the burner configuration there are additional controls that can affect how the boiler operates. Such as a Low NOx Burner (LNB) or Flue Gas Recirculator (FGR) that are built into the boiler and a Baghouse (BGH), Electrostatic Precipitator (ESP), Multi-Cyclone (MCL), Multi-Cyclone with Fly-Ash Reinjection (MCL with FAR) and Scrubbers (SCB) that are external to the boiler.

Low NOx burners integrate staged combustion into the burner. A typical low NOx burner creates a fuel-rich primary combustion zone. The reducing conditions in this zone promote the reduction of the fuel NOx,

while limited combustion air lowers the flame temperature, minimizing the production of thermal NOx. Combustion is completed in a lower-temperature, fuel-lean zone.

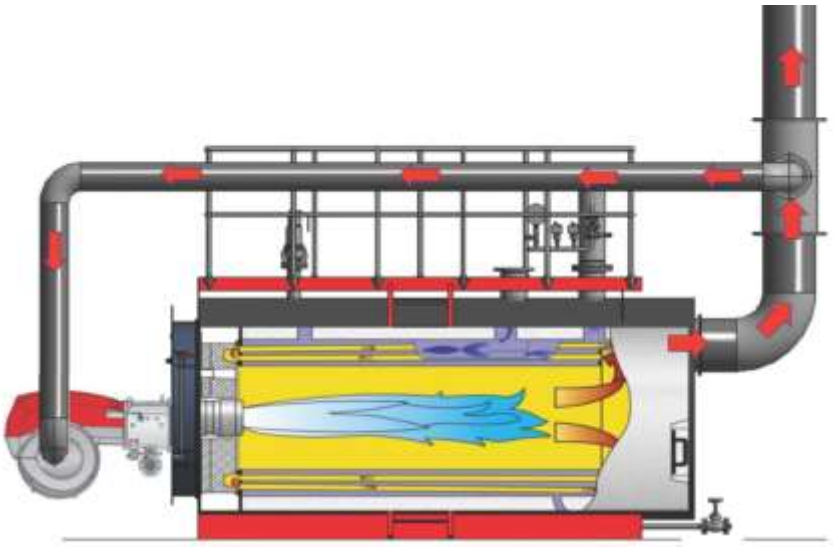


Low NOx burner technology is applicable to most wall-fired and tangentially fired boilers. It is not applicable to stokers, which have no burners, or to cyclones, which must maintain rigidly defined combustion conditions for proper slagging. Because low NOx burners produce longer flames, they may be inappropriate for retrofit on smaller furnaces.

Installation of low NOx burners may be accompanied by increased emissions of CO and hydrocarbons, in the case of coal, by increased unburned carbon. The image below illustrates how a boiler with a Low NOx burner and Flue Gas Recirculator might look.

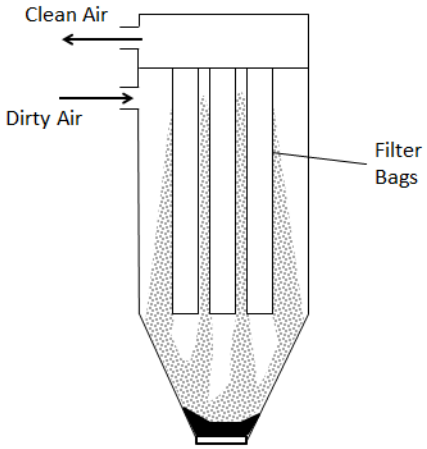
External View of Boiler with Low NOx Burner and Flue Gas Recirculator

Flue gas Recirculation involves recycling of up to about 20 percent of the cooled flue gas back to the combustion zone. FGR lowers peak flame temperature primarily by adding a large mass of cool, inert gas to the fuel-air mixture. FGR also lowers the oxygen concentration of the flame. Because FGR reduces thermal NOx formation and only has a small effect on fuel NOx levels, its principal applicability is to oil and gas fired boilers.



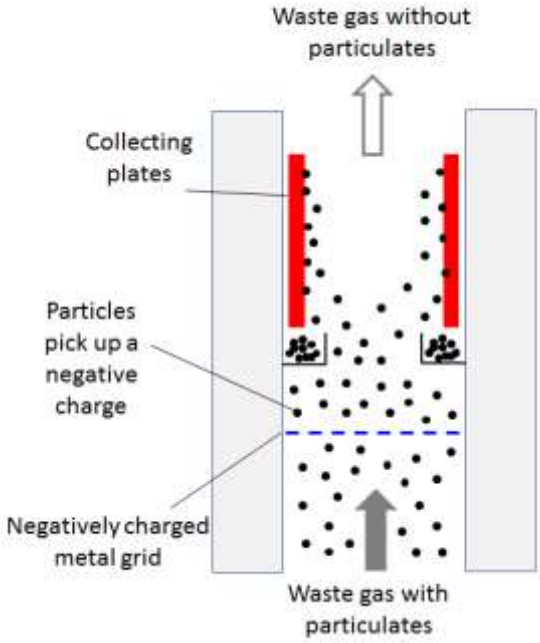
Boiler with Flue Gas Recirculation

Baghouses are a separate unit from the boiler but are attached to the exhaust stack through piping. A baghouse uses a series of fabric filters to separate particulate matter from gases. Flue gas enters the baghouse and passes through fabric bags that act as thick filters utilizing the particulate matter captured to improve efficiency. The particulate matter then collects on the filter packs allowing the clean air to exit through the top of the bags. During cleaning cycles, the collected material is allowed to fall to the bottom of the baghouse and captured for disposal. This type of control only controls the emissions of PM, PM_{10}, $PM_{2.5}$ although additional controls for other pollutants have been installed in the baghouse in some control situations.



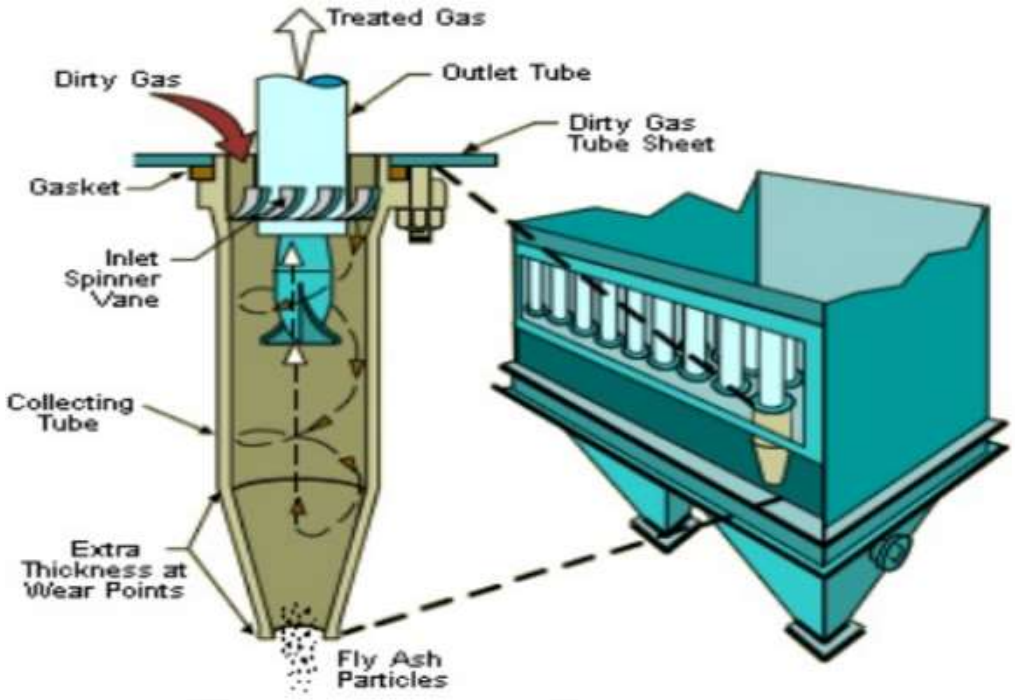
Baghouse

Electrostatic Precipitation is a control device that uses an induced electrostatic charge to remove particulates. The flue gas passes ionizing electrodes which come into contact with the particulate matter and imparts an electrical charge. As the charged particles pass near the plates the particles collect on the plates and are removed from the gas due to electrostatic forces. The plates are then rapped, vibrated, or washed with water to dislodge the particles, which fall into a hopper to be disposed. Originally invented to control wet particulate matter (sulfuric acid mists) the electrostatic precipitator is now commonly used to control emissions of PM, PM_{10} and $PM_{2.5}$ with a very high efficiency even for very small particulate matter.



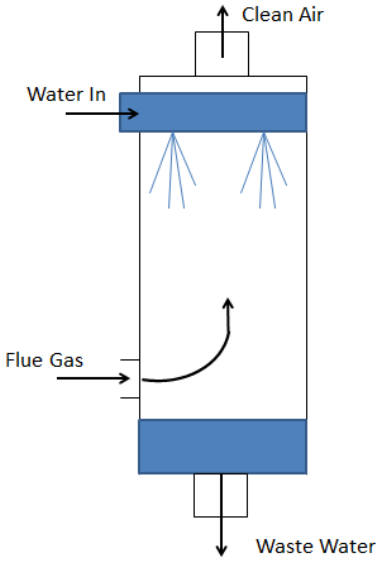
Electrostatic Precipitator

Multi-Cyclone control devices are used to control the emissions of PM, PM_{10} and $PM_{2.5}$. Flue gas enters into a cylindrical or conical chamber and leaves through a central opening. The cyclone then uses inertia to remove particles from the gas stream. The incoming gas is forced into circular motion down the cyclone near the inner surface of the cyclone tube. At the bottom of the cyclone, the gas turns and spirals up through the center of the tube and out of the top of the cyclone. Particles in the gas stream are forced toward the cyclone walls by the centrifugal force of the spinning gas but are opposed by the fluid drag force of the gas traveling through and out of the cyclone. For large particles, the inertial momentum overcomes the fluid drag force so that the particles reach the cyclone walls and are collected. Gravity also causes the larger particles that reach the cyclone walls to travel down into the bottom hopper. A multiple tube cyclone increases the efficiency of particulate removal. See the diagram below for an illustration of a multi-cyclone.



A Multi-cyclone with Fly-Ash Reinjection is a two-stage control of particulate emissions. The multi-cyclone is operated as explained above, however the fly ash particles that are collected at the bottom of the cyclone are then pneumatically pumped back into the boiler. This type of control is usually only associated with a spreader stoker boiler that combusts coal. The fly ash has a high enough carbon content to make reburning feasible.

In a scrubber, flue gas enters through an inlet at the bottom of the column. Liquid enters through a nozzle or pipe at the top. As the gas flows up through the scrubber it is contacted by the water flowing down. Particulates are either formed into droplets or are forced against the wall much like in a cyclone and drop to the bottom. In addition to the particulate removal, acidic gases react with the water to become salts that also fall out to the bottom.



Boilers can burn various types of fuel such as natural gas, diesel, and coal. Each fuel is detailed below.

Natural gas boilers are by far the most common type of boiler used by the Air Force. They can be used for industrial processes, steam and heat production, residential and commercial space heating, and electric power generation. Utility and large industrial boilers with a heat input greater than 100 MMBtu/hr are usually field erected, meaning they are assembled in place. Smaller boilers, less than 100 MMBtu/hr are often package units that are constructed off site and shipped to the location.

Fuel oil boilers include boilers that burn residual oil and distillate oil. Residual oils contain significant amounts of ash, nitrogen, and sulfur, and are primarily used in utility, industrial, and large commercial applications. Distillate oils are used mainly in domestic and small commercial applications and include kerosene and diesel fuels. Most fuel oil boilers in the Air Force burn No. 2 diesel fuel.

Coal-fired boilers are only utilized at a few installations in the Air Force.

Liquified Petroleum Gas (LPG) fired boilers usually consist of butane or propane and are used in small commercial and industrial boilers. These boilers operate in a similar manner to the natural gas fired boilers.

Waste oil includes crankcase oils from automobiles and trucks, used industrial lubricating oils and other used industrial oils (i.e., heat transfer fluids), as well as a minimal amount of oil considered contaminated. After being discarded, the physical properties of these oils changes as the components break down and the oil is contaminated with the materials that are brought into contact with the discarded oils. Only boilers that are designed to burn No. 6 residual fuel oil can be used to burn waste oil.

Digester gas formed from the breakdown of organic matter is often thermally destroyed to decrease the emissions of methane (CH_4). Most often the gas is combusted by flare, however they can be used in boilers, turbines, and internal combustion engines.

3.2.2 Potential Data Sources

External combustion equipment is usually scattered all across the installation to provide comfort heating to all buildings. These boilers are usually managed by the HVAC shop which is part of the Civil Engineer unit. The HVAC shop should have an equipment inventory list that can provide the boiler type, size and fuel burned. They may also have the amount of fuel used for each boiler. If the HVAC shop does not have the consumption, it may be obtained through the Base Supply Fuels Maintenance office. Additionally, it may be necessary to contact the fuel supplier to determine the metal content, sulfur weight percent, or other pertinent fuel data used for the calculation of emissions. The shops listed below are the most common shops with information regarding external combustion equipment:

- HVAC (CEO)
- Base Supply Fuels Management (LGRF)
- Energy Manager (CENPE)
- Hospitals/Clinics
- Facility managers

The data elements that are needed are as follows:

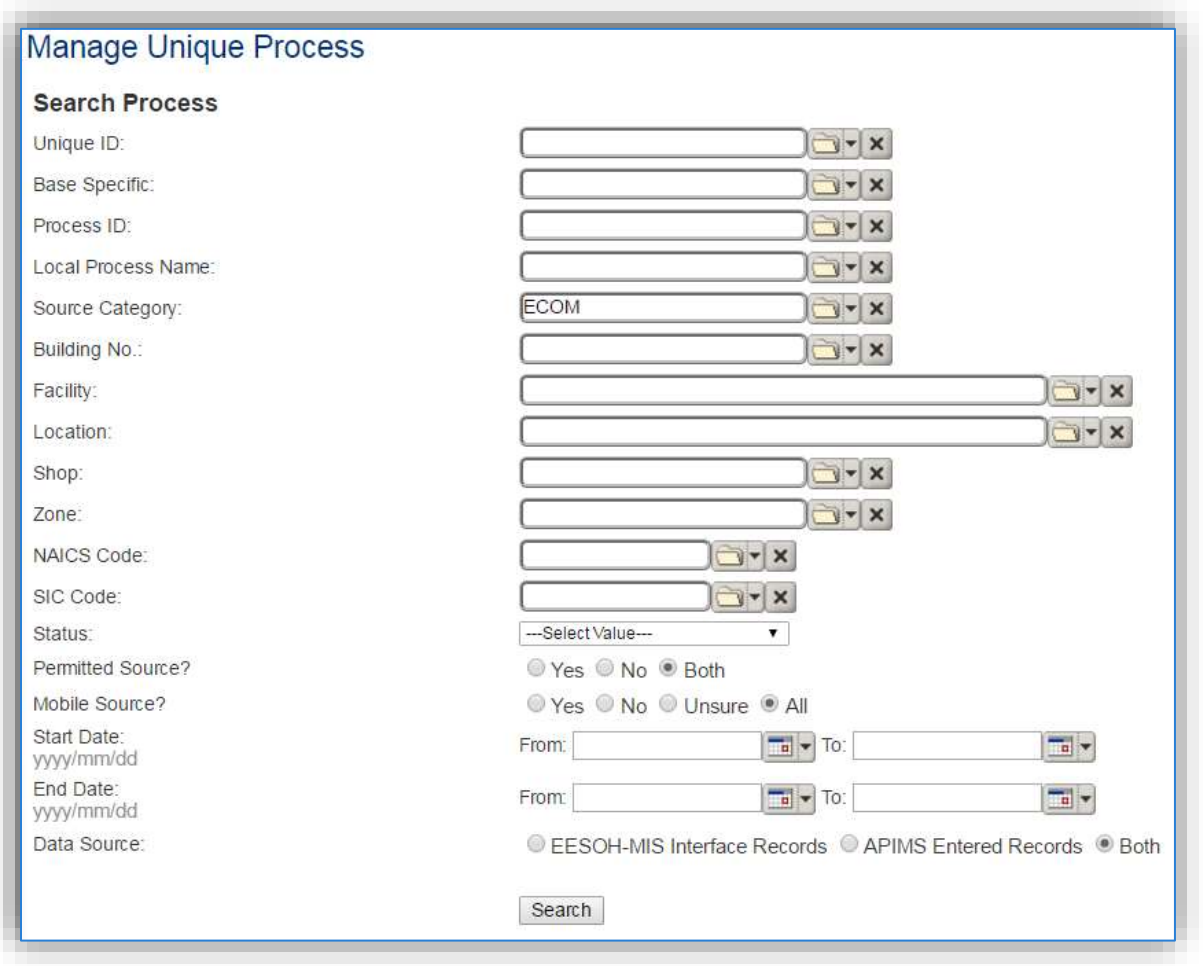
- Type of fuel combusted.
- Total amount of fuel combusted in pounds, gallons or cubic feet depending upon the fuel type.
- Size of boiler (heat input)
- Firing Configuration (e.g., Wall Fired, Tangential, Spreader Stoker, Fluidized Bed etc.)
- Controls (e.g., LNB, FGR, MCL, ESP etc.)

3.2.3 Standard Source Identification/Characterization

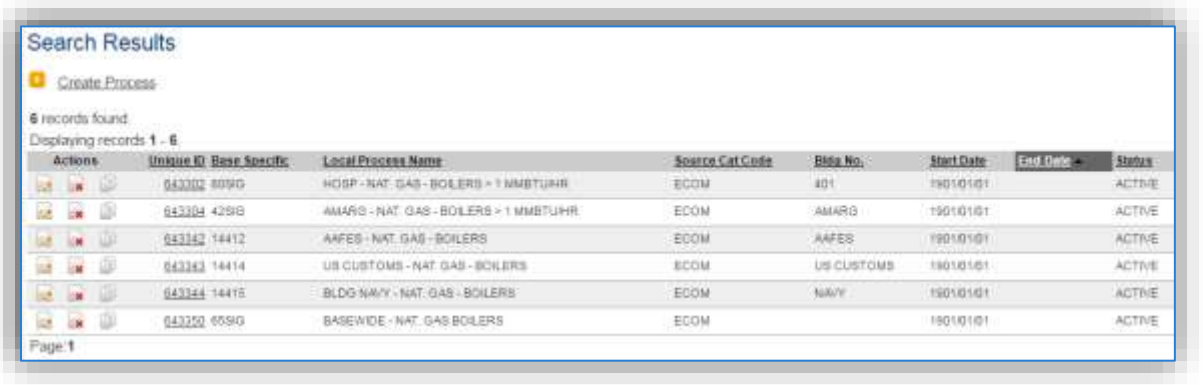
3.2.3.1 Existing Sources

It is important to review the existing sources in each source category on an annual basis at a minimum. Most regulatory agencies require an up to date source and equipment inventory.

Navigate to the Unique Process module of APIMS by clicking on **Unique Process** under the **Emission Unit** tab. In the **Source Category** search field, type “ECOM” then select the row for EXTERNAL COMBUSTION from the dropdown results. Click the **Search** button.

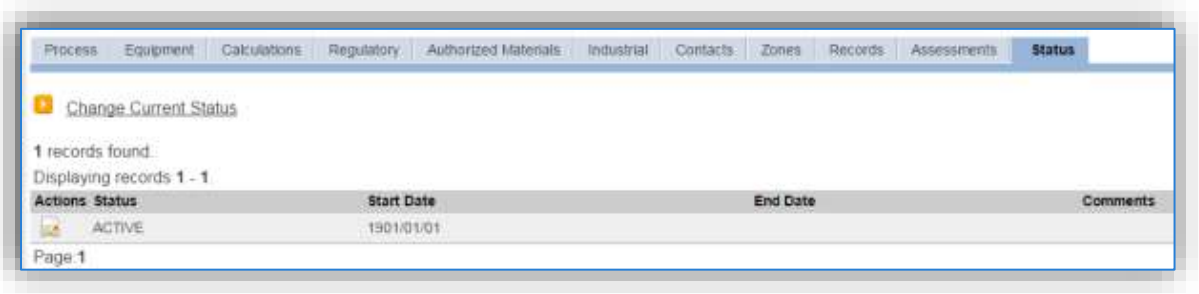


The search results grid will now display all the external combustion processes currently in APIMS.

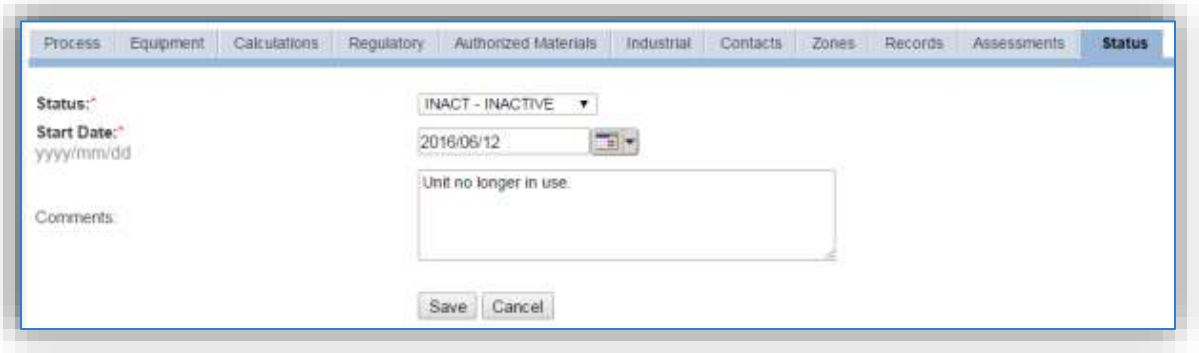


3.2.3.1.1 Status

If the status of a process needs to be changed, click the edit  icon next to the process.



Navigate to the *Status* tab. Click the Change Current Status hyperlink.



Select the appropriate status from the **Status** dropdown (i.e., ACTIVE, REMOVED or INACTIVE).

For the **Start Date** enter the date at which the status changed.

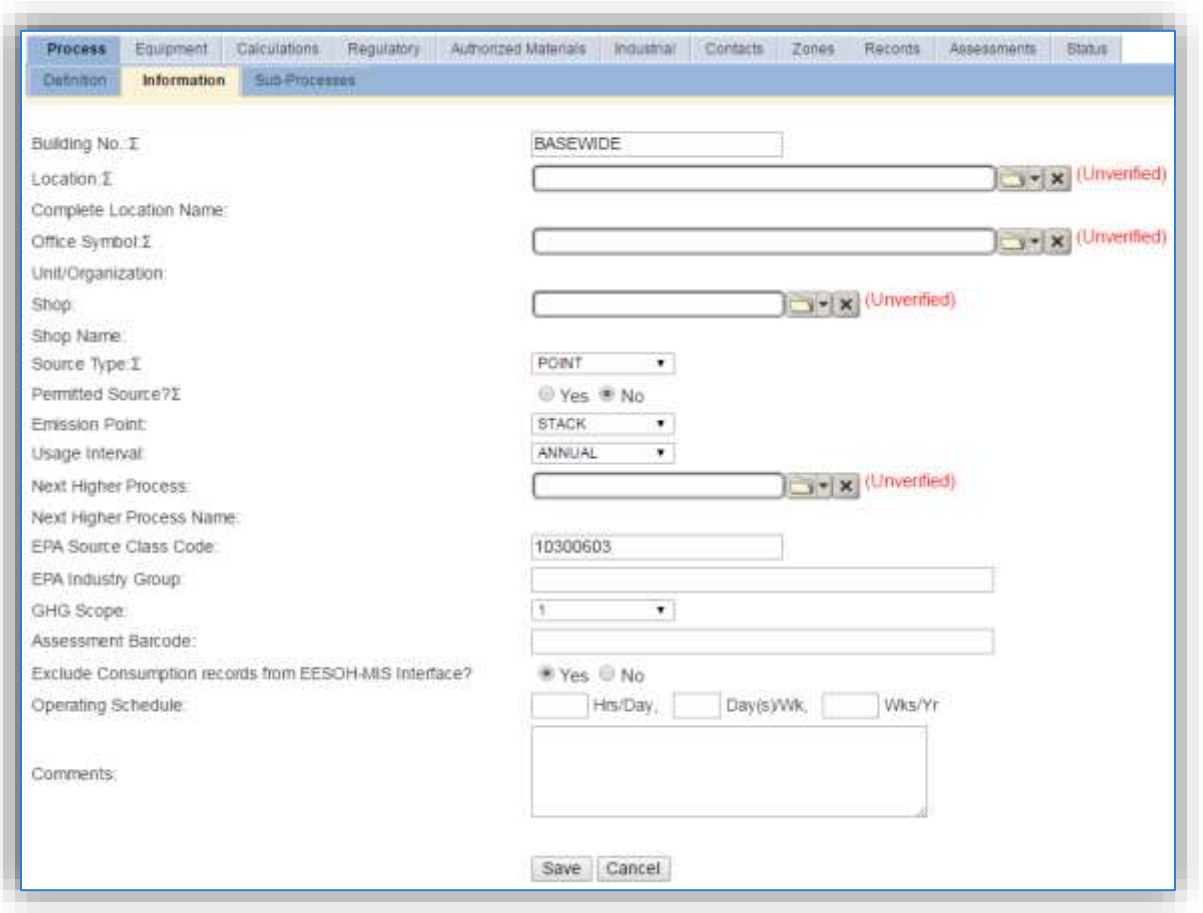
Enter **Comments** that provide insight into why the status changed. These can be very useful for equipment inventories, permit renewals and regulatory reporting. Most regulatory agencies require reporting on unit operation status; this includes any potential time spent offline, reasons for the outage.

Click the **Save** button.

The emissions for a process will only be calculated for the dates the process was in an ACTIVE status. If a source is removed in the middle of a year the emissions will only be calculated for the part of the year the source was active.

3.2.3.1.2 Information

There are basic data elements that are important to track and maintain for new and existing sources, such as location and source type. This data can be maintained in the Unique Process record on the *Information* sub tab.



The **Building No**. field can be used to specify a general location or area of the emission source. For instance, if this is for multiple boilers spread across the installation, specify BASEWIDE.

The **Location** field is very important to effectively manage the location and mission of the emission source. This is especially important for boilers that are metered and not managed as part of a bigger group of boilers. This documents where the source is located, in case it needs to be inspected or if the source owner needs to be contacted for pertinent information. For the instructions on how to create a location reference Section 2.2 Location.

External combustion operations are categorized as POINT source in the **Source Type**.

The **Emission Point** for external combustion equipment is usually STACK.

The **Permitted Source** flag should also be populated to accurately reflect the current regulatory status of the emission source. This flag can be an invaluable tool in roll-up reporting. If some boilers are permitted and others are not it is wise to configure the boilers so that the permitted equipment is not associated to the same process as the non-permitted equipment.

The **Usage Interval** should be designated. This source is usually documented on an ANNUAL basis but may be a different interval if it is a permitted source. It is important to populate this field correctly as it will affect how it is documented in the AEI Throughputs module.

The **EPA Source Class Code** is a process level EPA code that describes the equipment and/or operation that is the source of the emissions. Source Classification Codes for external combustion operations are:

Process Type	SCC
Natural Gas Boiler, ≥ 100 MMBtu/hr, Electric Generation	10100601
Natural Gas Boiler, > 100 MMBtu/hr, Industrial	10200601
Natural Gas Boiler, > 100 MMBtu/hr, Commercial/Institutional	10300601
Natural Gas Boiler, < 100 MMBtu/hr, Wall Fired, Electric Generation	10100602
Natural Gas Boiler, 10-100 MMBtu/hr, Industrial	10200602
Natural Gas Boiler, < 10 MMBtu/hr, Industrial	10200603
Natural Gas Boiler, 10-100 MMBtu/hr, Commercial/Institutional	10300602
Natural Gas Boiler, < 10 MMBtu/hr, Commercial/Institutional	10300603
Natural Gas Boiler, Tangential Fired, Electric Generation	10100604
Natural Gas Boiler, Cogeneration, Industrial	10200604
No. 6 Oil Boiler, Industrial	10200401
Residual Oil Boiler, 10-100 MMBtu/hr, Industrial	10200402
Residual Oil Boiler, < 10 MMBtu/hr, Industrial	10200403
Distillate No. 1 and No. 2 Oil Boiler, Industrial	10200501
Distillate Oil Boiler, 10-100 MMBtu/hr, Industrial	10200502
Distillate Oil Boiler, < 10 MMBtu/hr, Industrial	10200503
No. 4 Oil Boiler, Commercial/Institutional	10300504
Distillate No. 1 and No. 2 Oil Boiler, Commercial/Institutional	10300501
Distillate Oil Boiler, 10-100 MMBtu/hr, Commercial/Institutional	10300502
Distillate Oil, < 10 MMBtu/hr, Commercial/Institutional	10300503
Liquified Petroleum Gas, Butane Boiler, Industrial	10201001
Liquified Petroleum Gas, Propane Boiler, Industrial	10201002
Liquified Petroleum Gas, Propane Boiler, Commercial/Institutional	10301002
Liquid Waste, Waste Oil Boiler, Electric Generation	10101302
Liquid Waste, Waste Oil Boiler, Industrial	10201302
Liquid Waste, Waste Oil Boiler, Commercial/Institutional	10301302

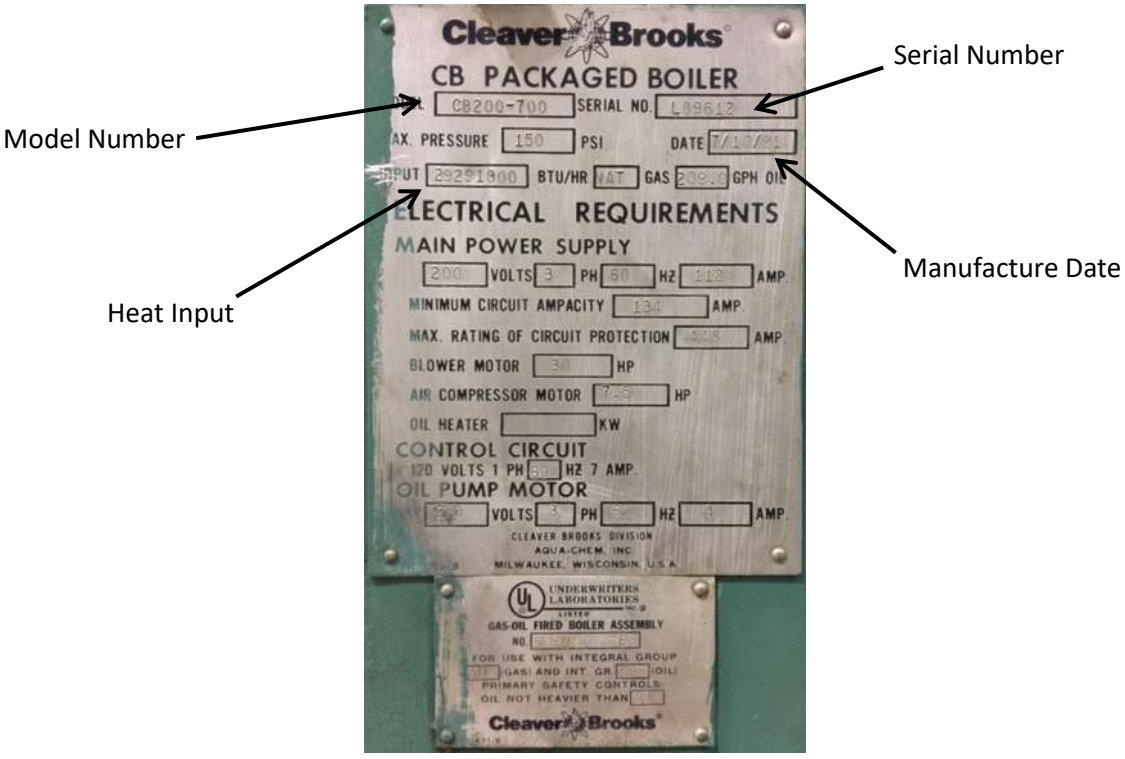
3.2.3.1.3 Sub-Processes

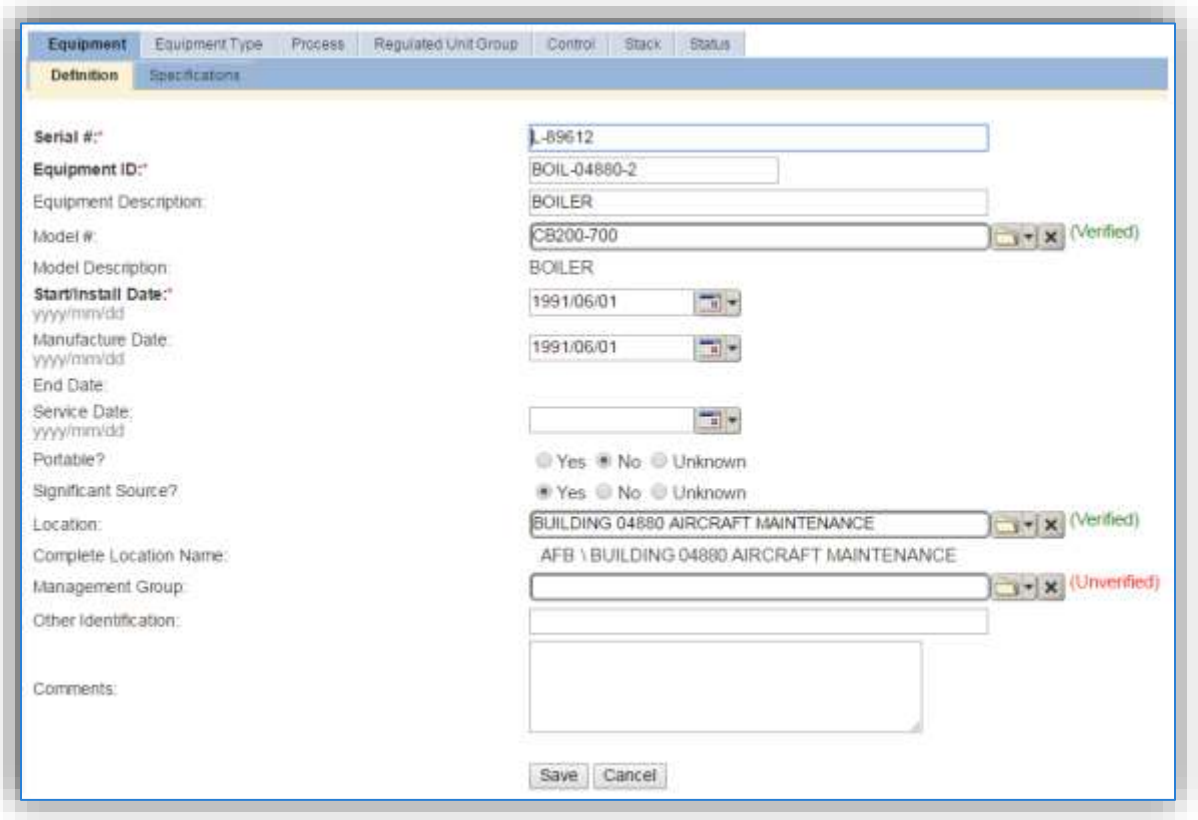
This source does not utilize this functionality.

3.2.3.1.4 Equipment

The next tab is the *Equipment* tab. This is completely dependent upon how your installation is regulated by the regulatory agencies. For installations that are required to track individual boilers this tab can be used to associate the boilers to the process. If there is no regulatory requirement by the local regulatory agency, then this tab does not need to be configured. To link the equipment to the process the equipment must already be entered in APIMS.

The first tab in the Equipment record should be configured with the actual model and serial number of the boiler. These can be found on the boiler plate attached to the boiler. A sample boiler plate is shown below.

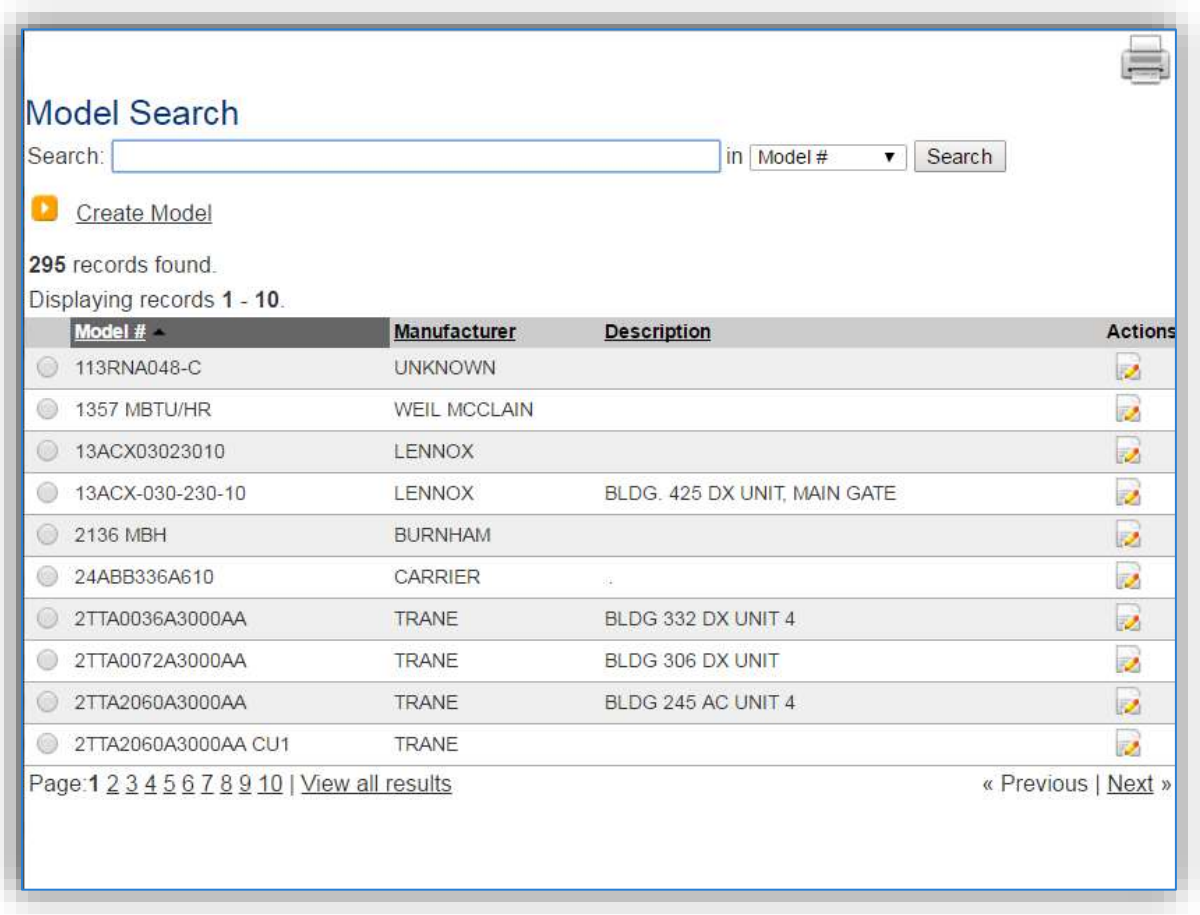




The **Serial #** field should be used to enter the serial number from the boiler plate.

The **Equipment ID** is intended to be used to easily identify the equipment. This field can be populated with the emission unit ID as identified in any applicable permits, the building number or a standard convention used to easily identify the equipment.

The **Model #** can be selected from the list of values (LOV) or created within the LOV popup window. Click the folder icon to open the Model Search popup.



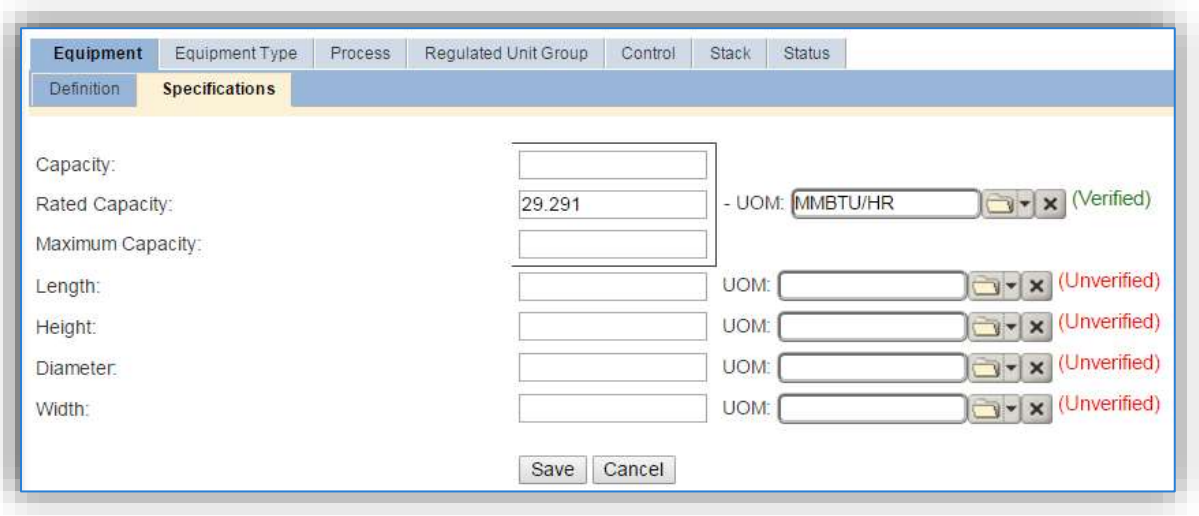
The search can be used to locate a specific model record. To select the model record, click the corresponding radio button. This will cause the popup window to close and will populate the **Model #** field with the selected record. If the model number is not available in the list it will need to be created. Reference the Equipment section on how to create a Model record.

The **Start/Install Date** should be the date the equipment was installed. If that data is not known a default date of 1901/01/01 may be used.

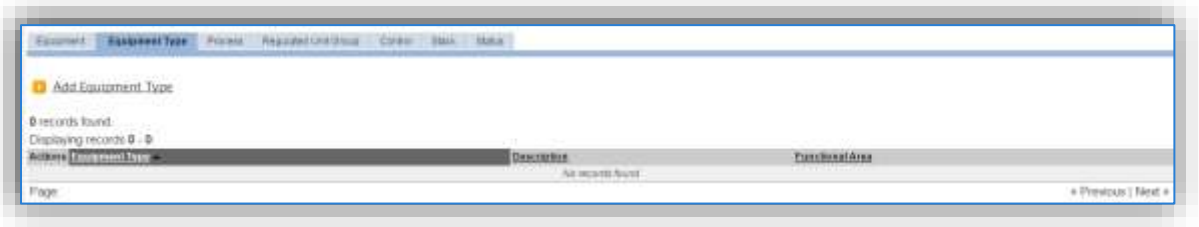
The Manufacture Date should be accurately populated for all boilers as it can have an impact on the regulations that apply to the unit. Sometimes the manufacture date is provided on the boiler plate.

The **Location** field is very important for equipment as it can then relate to the Air Force geographic information system (GIS). For the instructions on how to create a location reference Section 2.2 Location.

The *Specifications* sub tab is important for boilers as the capacity of the boiler can dictate the emission factor set and boiler classification. This field is often used for enterprise Air Force reporting as well.



The *Equipment Type* tab is essential to identify which equipment fall under specific regulatory rules such as the Boiler MACT. In the *Equipment Type* tab, it is possible to designate an Equipment Type by clicking the Add Equipment Type hyperlink.

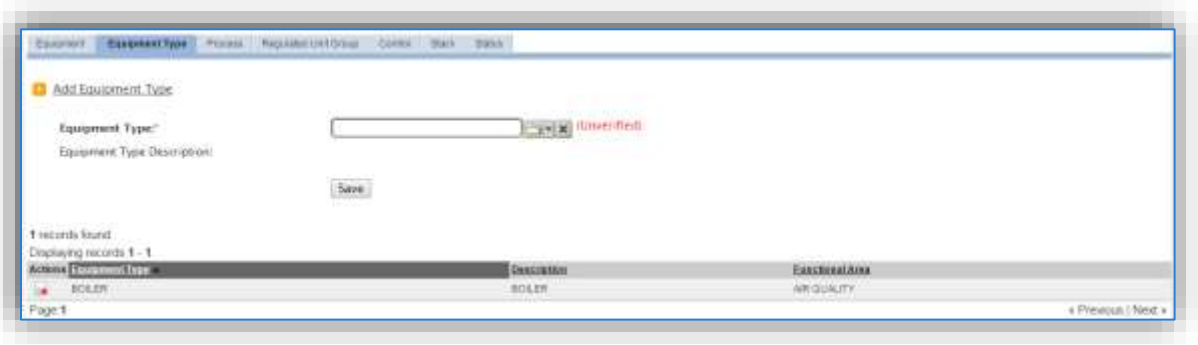


This will display the **Equipment Type** module, where the equipment type can be selected from the LOV. Below is a list of the values available and the appropriate equipment that should be designated under each type.

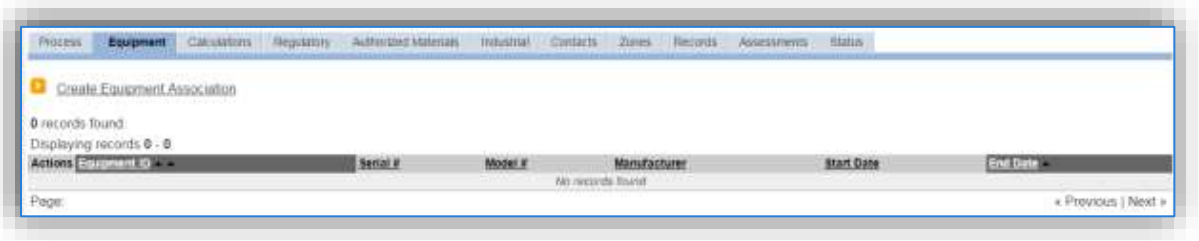
Code	Description	Examples of Equipment
BOILER	BOILER	This is used for external combustion equipment that is used to heat water to be used in a central heating system or steam engine.
FURNACE	FORCED AIR FURNACE	This is for equipment used to heat air, for process or comfort heating. This is different from a boiler as it heats air directly.
HEAT-AC	COMBINATION SYSTEM WITH HEAT AND AC IN ONE UNIT	This is for a combination heating cooling unit. This equipment should be managed through the Refrigerant Compliance module.

INF_HEAT	INFRARED HEATER	This is used for external combustion radiator heaters or heaters used for comfort heating.
LN_BOILER	LOW NOX BOILER	This is used for external combustion equipment fitted with a low NOx burner that is used to heat water to be used in a central heating system or steam engine.
LN_WTR_HTR	LOW NOX WATER HEATER	This is used for external combustion equipment that is used equipped with a low NOx burner to heat water to be used outside the heater upon demand.
STEAMGEN	STEAM GENERATOR	This is used for external combustion that is used to heat water to be used in a turbine to generate electricity
ULN_BOILER	ULTRA LOW NOX BOILER	This is used for external combustion equipment fitted with a low NOx burner and Flue Gas Recirculator that is used to heat water to be used in a central heating system or steam engine.
WATER_HTR	WATER HEATER	This is used for external combustion equipment that is used to heat water to be used in a outside the heater upon demand.

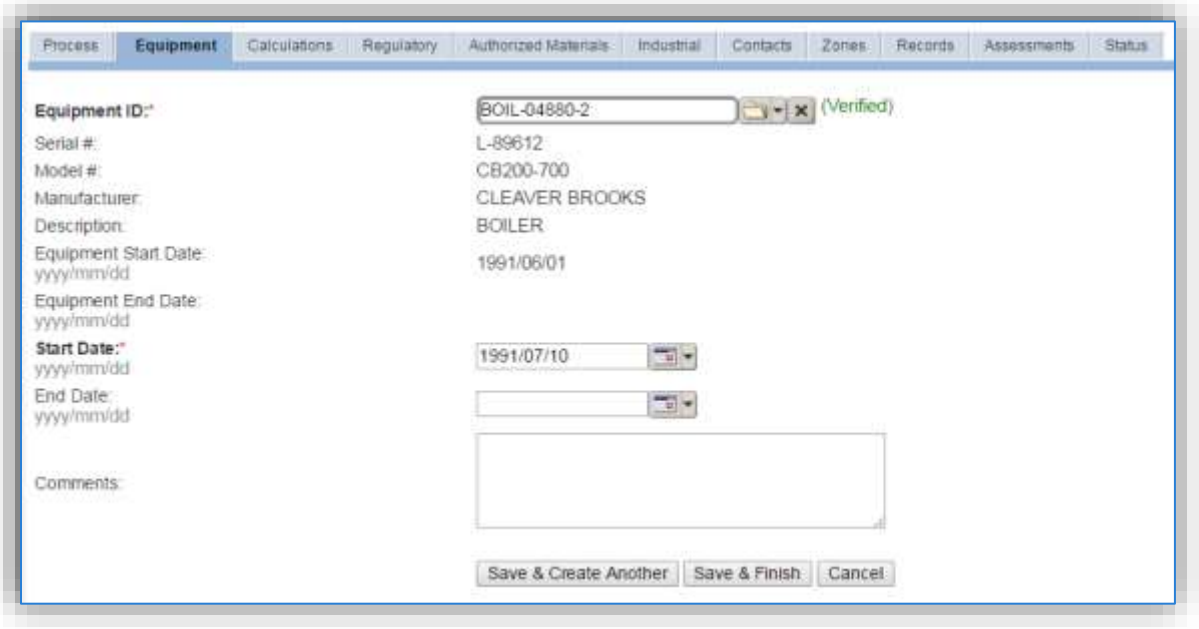
Click the **Save** button to associate the **Equipment Type**.



The Control tab is only needed for boilers that have an external control that is not already accounted for in the emission factors. Usually Low NOx burners and Flue Gas Recirculators are accounted for in the emission factor sets. Additionally, if boilers do have an external control they should not be grouped in a process with other boilers as the control efficiency will not be applied correctly. For information on how to configure a control efficiency reference Section 2.4 Equipment.



To link the equipment, click on the Create Equipment Association hyperlink.

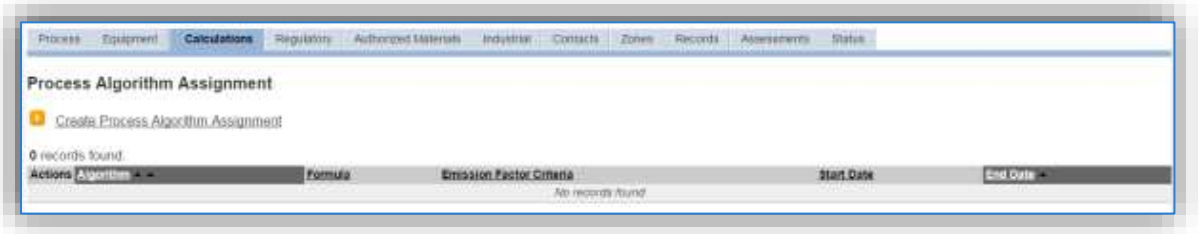


Search for the **Equipment ID** in the list of values, enter the **Start Date** and click the **Save & Finish** button.

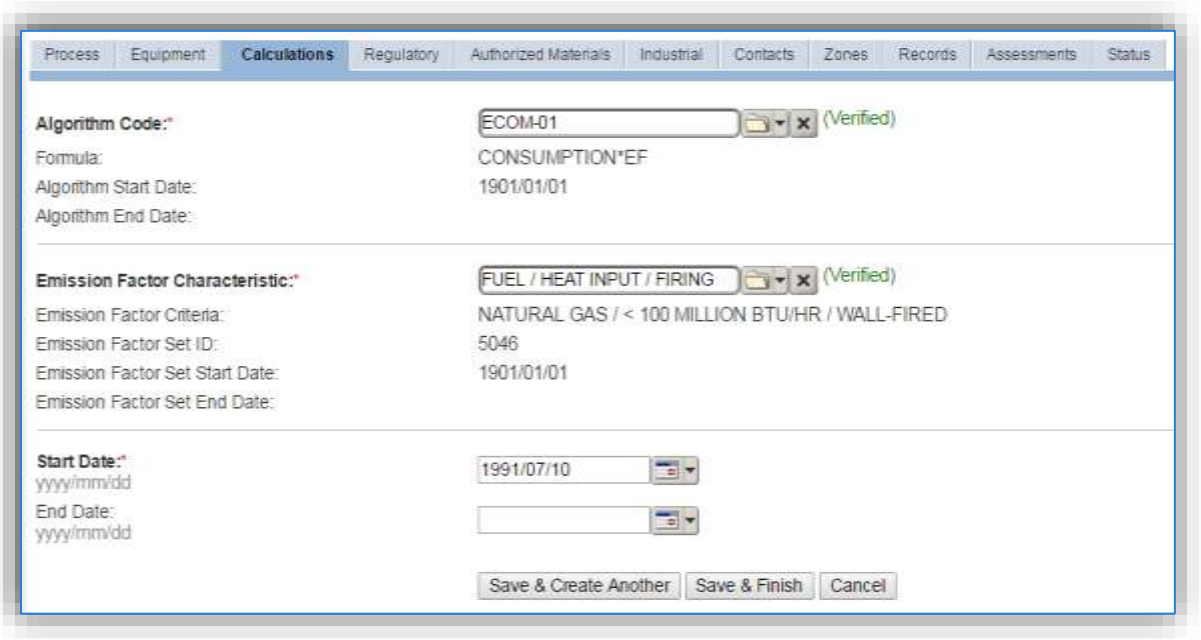
If the process is for a group of boilers, multiple boilers can be associated on this tab by using the **Save & Create Another** button.

3.2.3.1.5 Calculations

The next tab is the *Calculations* tab.

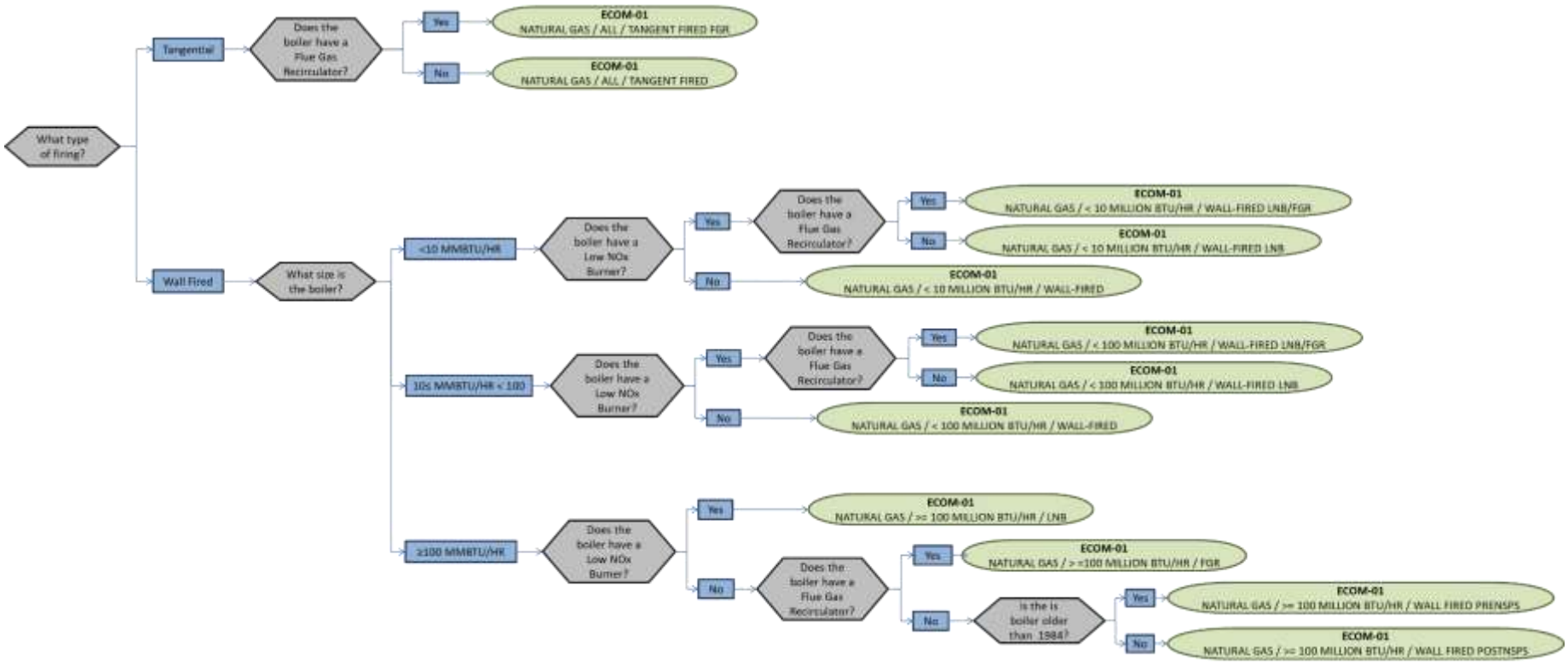


To associate an algorithm to the process, click on the Create Process Algorithm Assignment hyperlink.

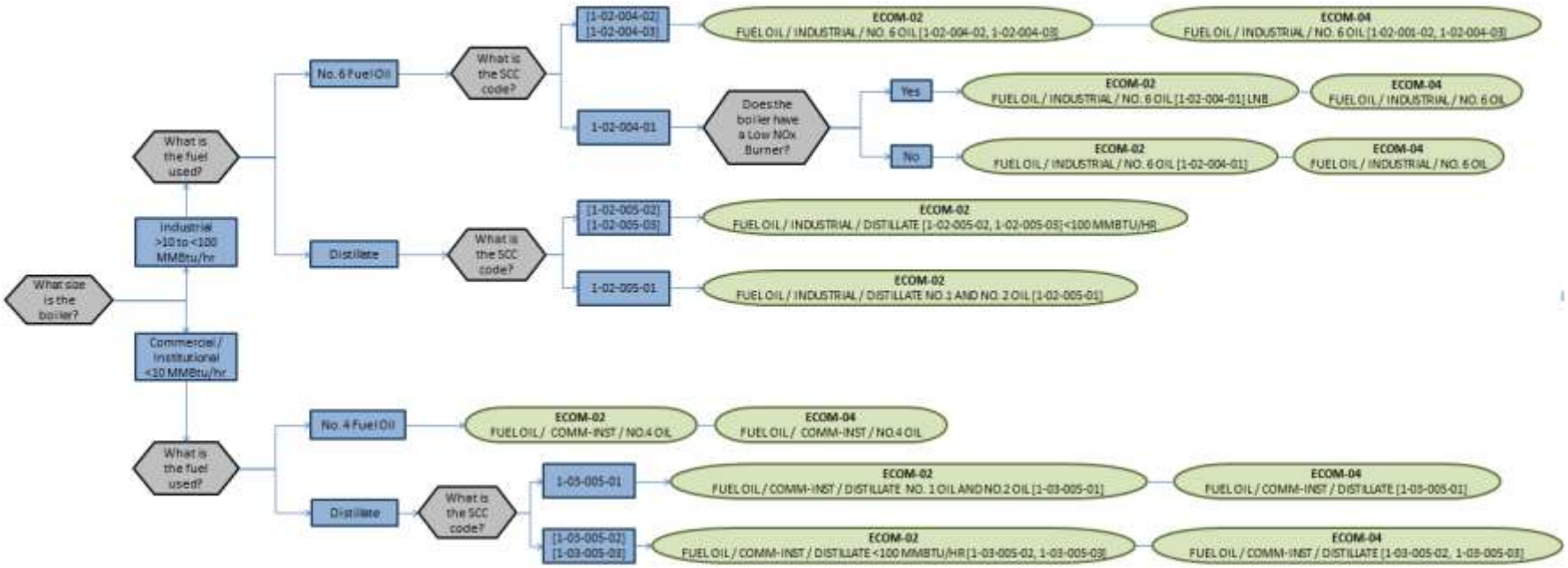


Select the **Algorithm Code** from the list of values that matches the correct scenario. Next select the **Emission Factor Characteristic** available. Enter the **Start Date** to match the start date of the process. Click the **Save & Finish** button to save and return to the Calculations tab or the **Save & Create Another** button to include more equipment. Use the flowchart below to find the correct Algorithm Code and Emission Factor set.

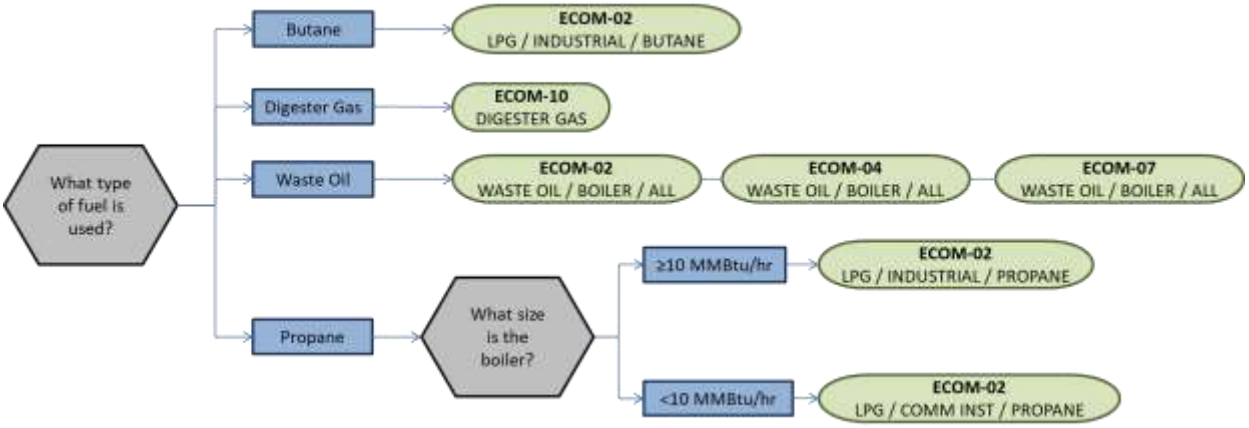
3.2.3.1.5.1 *Natural Gas*



3.2.3.1.5.2 *Fuel Oil*



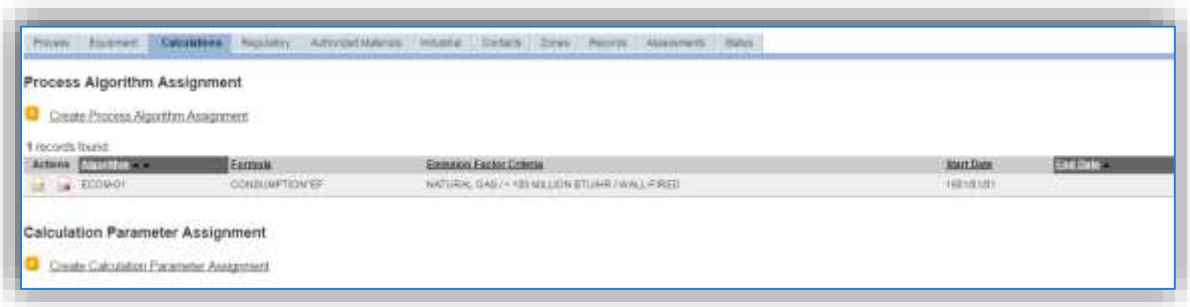
3.2.3.1.5.3 *Liquified Petroleum Gas (LPG), Waste Oil and Digester Gas*



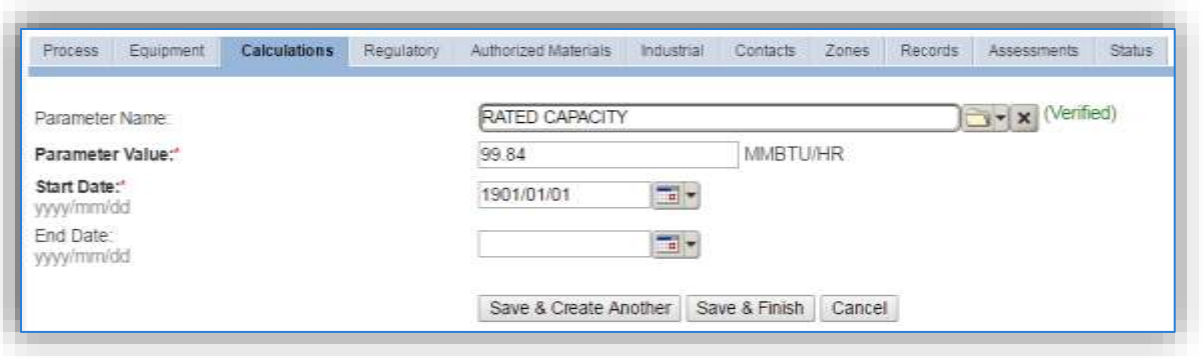
If your permit or regulatory agency requires a different type of calculation, contact the Air Force Air Quality Subject Matter Expert for approval of the alternative method.

The next step on this tab is to enter the Calculation Parameters required to complete the Potential To Emit (PTE) calculations.

The calculations for actual emissions do not require parameters; however, the RATED CAPACITY is required to complete any PTE calculations.



To add a calculation parameter to the process, click on the Create Calculation Parameter Assignment hyperlink.



Select the **Parameter Name**, RATED CAPACITY from the list of values.

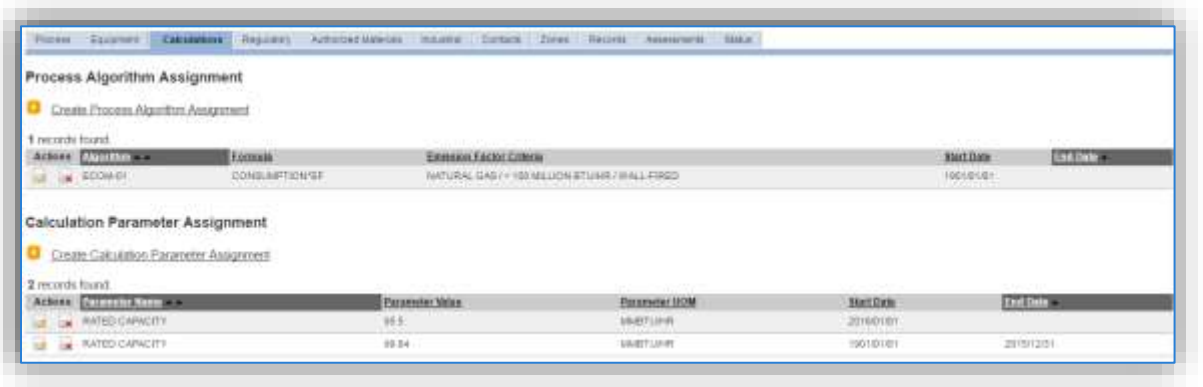
Enter the rated capacity (heat input) of the boiler, or if this is for multiple boilers enter the total rated capacity of all the boilers in the **Parameter Value** field.

Enter the **Start Date** for the parameter, this date should match the start date of the algorithm or use 1901/01/01 as a default.

Click the **Save & Finish** button.

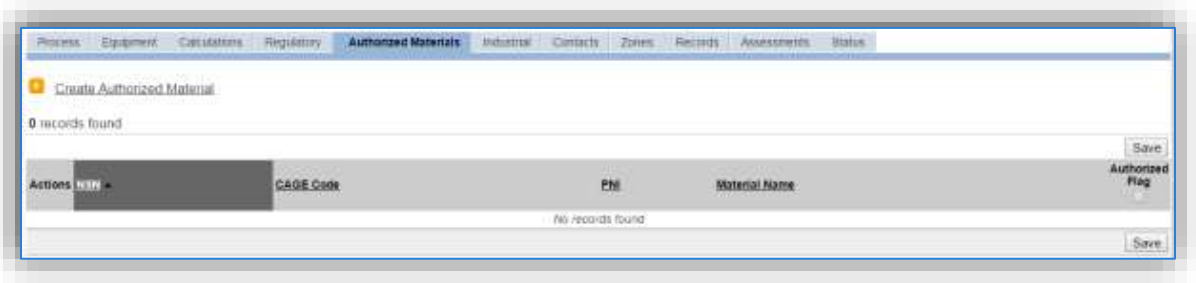
If this parameter is for multiple boilers, this parameter should be reviewed annually and the RATED CAPACITY should be adjusted as boilers are added and removed. In this case, DO NOT DELETE or EDIT the parameter value. Instead end date the previous year and create a new parameter record for the current year.

An example of an end dated parameter is shown below.

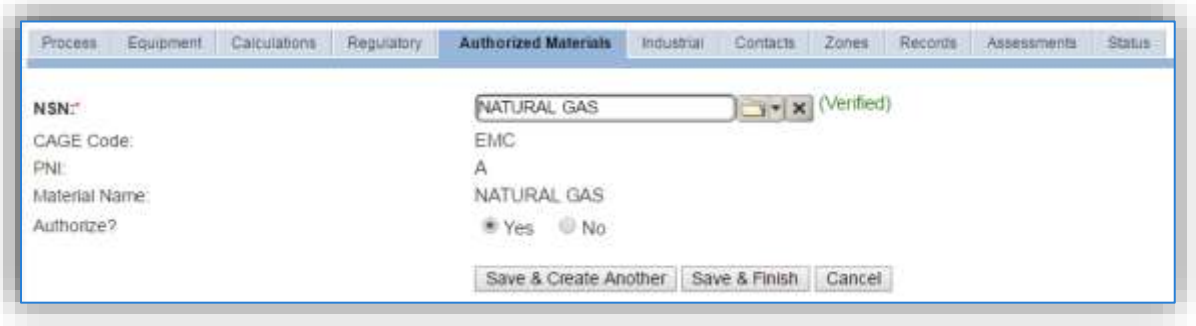


3.2.3.1.6 Materials

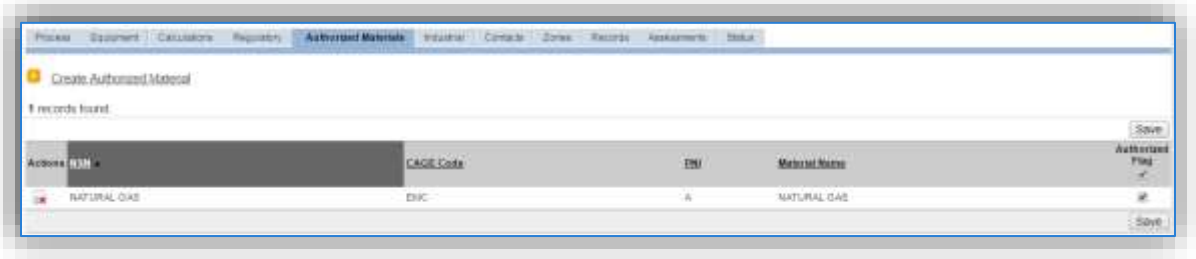
The last step in setting up the Unique Process record is to add the fuel as the authorized material on the *Authorized Materials* tab.



To authorize a material for the process, click on the Create Authorized Material hyperlink.



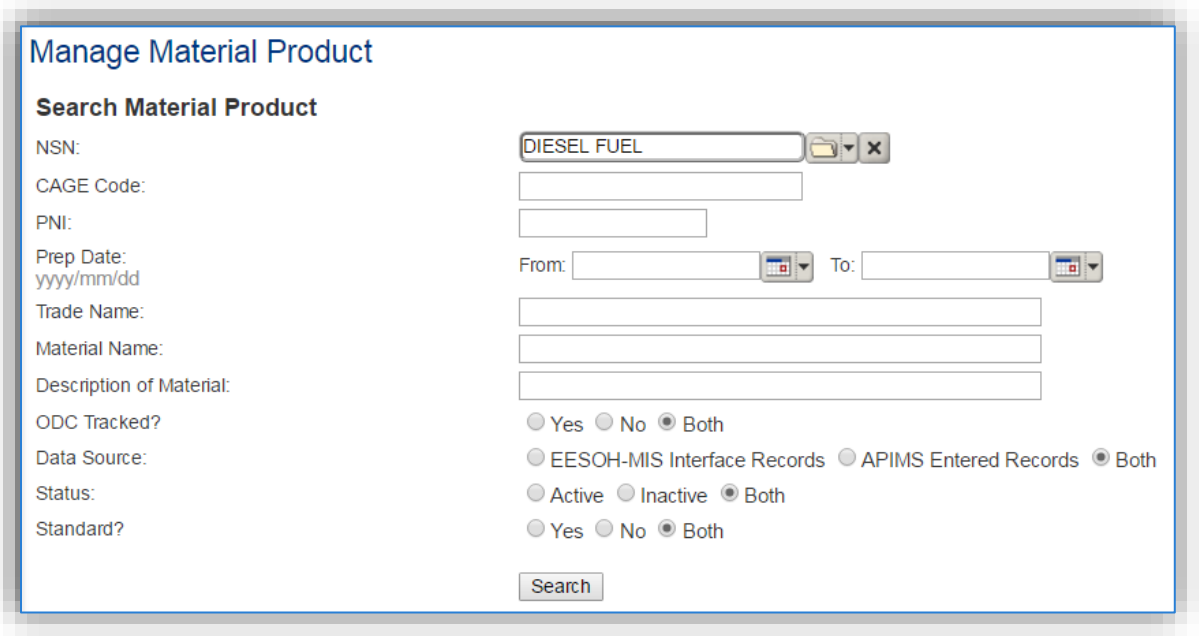
Select the fuel used from the list of values. Next select "Yes" to **Authorize** the material, then click the **Save & Finish** button.



Fuel material records used in external combustion have additional data requirements depending upon the algorithms used. Reference the table below to determine the data requirements for each algorithm.

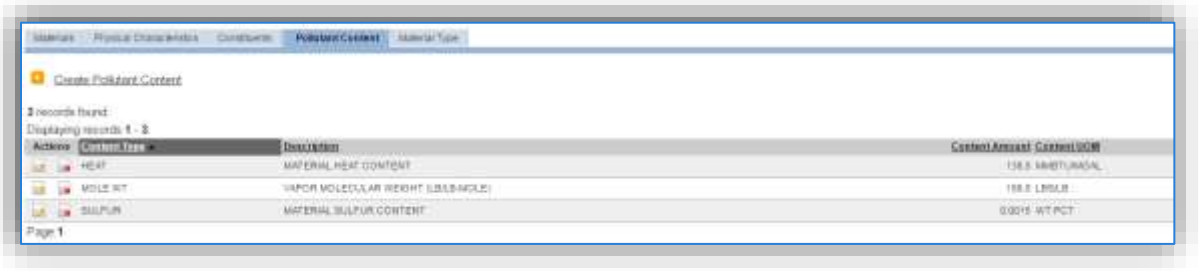
Algorithm	Size / Configuration	Fuel(s)	Data Requirement
ECOM-04	Industrial	Fuel Oil - No. 6	Material Sulfur Content
	Commercial - Institutional	Fuel Oil - No. 4	
	Commercial – Institutional	Distillate	
	All	Waste Oil	
ECOM-07	All	Waste Oil	Material Ash Content
ECOM-08 (PTE)	All	All Fuels	Heat Content
ECOM-09 (PTE)	All	All Fuels	Heat Content
ECOM-09 (PTE)	All	All Fuels	Sulfur Content

To review the material record, navigate to Material Product module. Use the search fields to filter the results to find the material record.



Once the search criteria, such as **NSN** has been entered, click the **Search** button.

To view the material record details, click the edit icon next to the material record. Once in the material record navigate to the *Pollutant Content* tab.



It is recommended to use the values provided by the AFCEC Stationary Source Guide in Table 2-2 for Material Heat Content and Table 3-2 for Material Sulfur Content as, provided below.

Table 2-2. Typical Fuel Heating Values

Fuel Type	High Heating Value (Btu/unit fuel)
CNG	1.03E-03 MMBtu/ft^3
Fuel Oil -No. 6	1.50E-01 MMBtu/gal
Fuel Oil -No. 5	1.40E-01 MMBtu/gal
Fuel Oil -No. 4	1.46E-01 MMBtu/gal
Fuel Oil -No. 1	1.39E-01 MMBtu/gal
Fuel Oil -No. 2/Distillate/ Diesel	1.38E-01 MMBtu/gal
Coal - Bituminous	24.93 MMBtu/ton
Coal - Subbituminous	17.25 MMBtu/ton
Coal - Anthracite	25.09 MMBtu/ton
Coal - Lignite	14.21 MMBtu/ton
LPG	9.20E-02 MMBtu/gal
Waste Oil	1.38E-01 MMBtu/gal
Landfill Gas	4.85E-04 MMBtu/ft^3
Digester Gas[1]	6.55E-04 MMBtu/ft^3

Table 3-2. Data for Common Fuels Used in Stationary ICOM Engines

Fuel Type	Heating Value (Btu/Unit Fuel)[1]	Sulfur Content (wt. %)[2]
Diesel	138,000 Btu/gal	0.0015(3)
MOGAS	125,000 Btu/gal	0.02
CNG	1,026 Btu/ft^3	0.0007
LPG	92,000 Btu/gal	Negligible
Landfill Gas	485 Btu/ft^3	0.00469(4)
Digester Gas	655 Btu/ft^3	---

1. SOURCE Table C-1 of "Title 40-Protection of the Environment, Chapter I-Environmental Protection Agency, Subchapter C-Air Programs, Part 98-Mandatory Greenhouse Gas Reporting, Subpart C- General Stationary Fuel Combustion Sources," U.S. Environmental Protection Agency.
2. SOURCE: (unless otherwise stated): "Household Vehicles Energy Use: Latest Data & Trends," Energy Information Administration (EIA), Office of Energy Markets and End Use, U.S. Department of Energy, November 2005.
3. SOURCE: "Regulatory Announcement: Clean Air Nonroad Diesel Rule," U.S. Environmental Protection Agency (EPA), Office of Transportation and Air Quality, May 2004.
4. SOURCE: This value assumes a typical sulfur compound concentration of 46.9 ppmv as given in "Section 2.4-"Municipal Solid Waste Landfills," Compilation of Air Pollutant Emission Factors - Volume I: Stationary Point and Area Sources, Fifth Edition, U.S. Environmental Protection Agency, November 1998.

"---" – Indicates No Data Available

3.2.3.2 New Sources

3.2.3.2.1 Data Collection Sheet

The form on the next page is a printable guide that can be taken out to the location of the source and used to gather all the necessary information from the shop personnel. It can then be used as a guide to help configure the data in APIMS when you return to your office.

It is also recommended to take pictures of the name plate while in the field if possible.

External Combustion Data Collection Worksheet

GENERAL INFORMATION

Building Number_____ Mission/Purpose_____

Shop Name/Function_____ Management Organization_____

Coordinates: Latitude: _____ Longitude: _____

UTM: _____ Zone _____ Easting _____ Northing ☐ Feet ☐ Meters

Is this source in any of your permits? ☐ Yes ☐ No

If yes, does it have an emission unit number or other designation? _____

EQUIPMENT INFORMATION

For each boiler, collect the following information:

Manufacturer _____ Heat Input _____ MMBtu/hr
Model Number _____ Serial Number _____
Manufacture Date _____ Installation Date _____

What are the specific properties of the unit? (check all that apply)

☐ Low NOx Burner ☐ Wall Fired ☐ Other External Control Device
☐ Flue Gas Recirculator ☐ Tangential Fired Specify _____

USAGE INFORMATION

How is fuel usage tracked?

☐ Meter for individual unit ☐ Meter for group of units ☐ Basewide fuel use

What is the fuel or fuels used?

☐ Natural Gas ☐ Heating Oil/No. 6 Fuel Oil ☐ Butane
☐ Diesel/No. 2 Fuel Oil ☐ Waste Oil ☐ Digester Gas
☐ Kerosene/No. 4 Fuel Oil ☐ Propane

How often is the usage tracked? ☐ Monthly ☐ Annually

Total Fuel Used _____MMCUFT
Total Fuel Used _____ GAL

3.2.3.2.2 New Source Configuration

In order to properly document this emission source in APIMS the installation needs to evaluate the following:

- How is usage tracked for the boilers?
- What size boilers does my installation have?
- What fuel is used by my boiler?
- Do any of my boilers have controls?
- Are any of the boilers permitted?
- Do any of my boilers have meters installed?

The basic driving forces for source configuration are if the boilers calculate emissions using the same methodology and emission factors and if the usage is tracked as a single number.

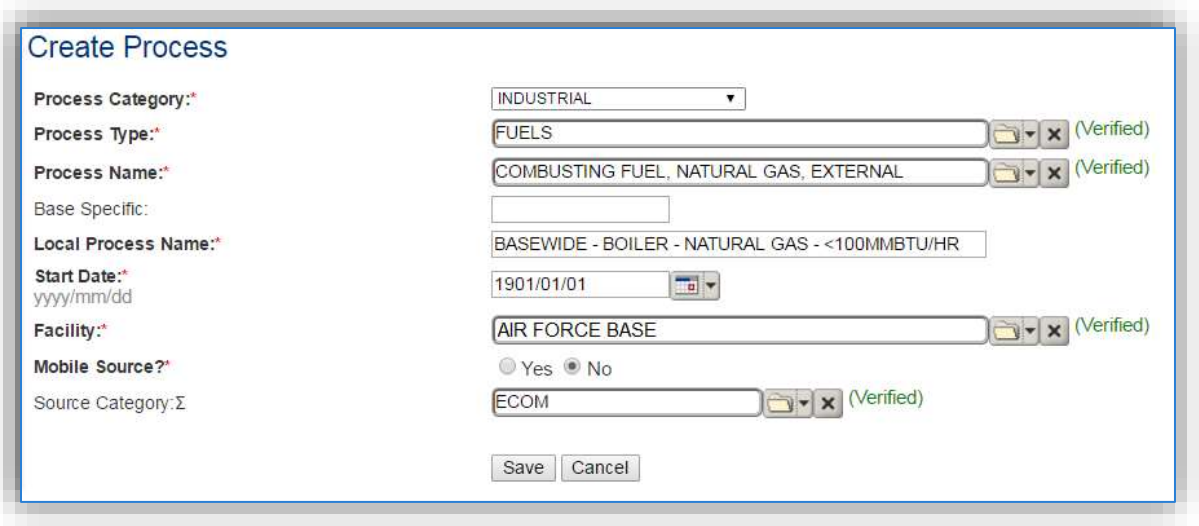
The most common scenario for an installation is to have all-natural gas fired boilers, no permit requirements or metered units and a single natural gas usage for the entire installation. In this scenario refer to the next section 3.2.3.2.2.1 Installations without Metered Boilers.

For all other scenarios reference sections 3.2.3.2.2.2 Installations with Metered Boilers or 3.2.3.2.2.3 Dual Fuel Boilers.

3.2.3.2.2.1 *Installations without Metered Boilers*

In order to properly document this emission source in APIMS, there will need to be at a minimum a Unique Process record for each fuel type and size classification of boiler. For example, all-natural gas boilers that are less than 100 MMBtu/hr will be configured as a single process.

Navigate to the Unique Process module in APIMS and click the Create New Process hyperlink.



Process Category	Process Type	Process Name	Process ID
INDUSTRIAL	FUELS	COMBUSTING FUEL, FUEL OIL #2/DIESEL, EXTERNAL	1207
		COMBUSTING FUEL, FUEL OIL #4/KEROSENE, EXTERNAL	1209
		COMBUSTING FUEL, FUEL OIL #6/HEATING OIL, EXTERNAL	1210
		COMBUSTING FUEL, ISOBUTANE	1211
		COMBUSTING FUEL, NATURAL GAS, EXTERNAL	1218
		COMBUSTING FUEL, PROPANE (LPG), EXTERNAL	1220
		COMBUSTING WASTE OIL, EXTERNAL	1223
		FUELS, NOC	1501

Use the table above to determine the appropriate **Process Category**, **Process Type** and **Process Name**.

The **Local Process Name** should be in a standard naming convention for all sources that helps to quickly identify, what the process is, fuel used and size. Examples of process names are as follows:

- BASEWIDE – BOILERS – FUEL OIL – <100 MMBTU/HR
- BASEWIDE – FURNACE – NATURAL GAS – <100 MMBTU/HR

The **Start Date** should be the date the first unit became operational, if there is no possible way to determine the actual start date then use 1901/01/01 as a default start date.

The **Facility** name should be the facility that is responsible for the source or sources.

The **Mobile Source?** flag should be "NO" as this is considered a stationary source.

All external combustion sources are assigned to the ECOM **Source Category**.

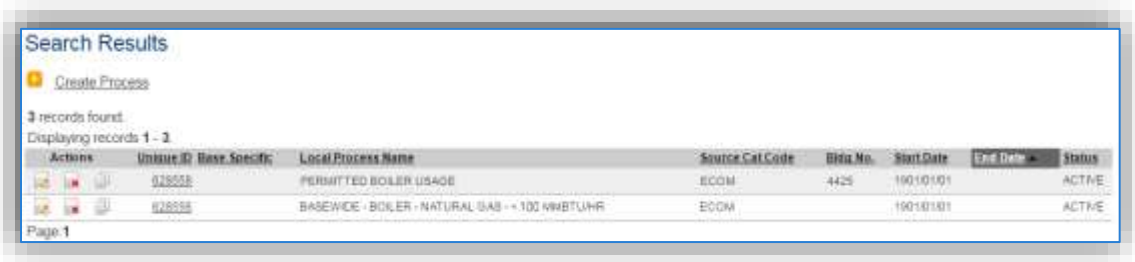
For the population of all other tabs, refer to the Existing Sources sections.

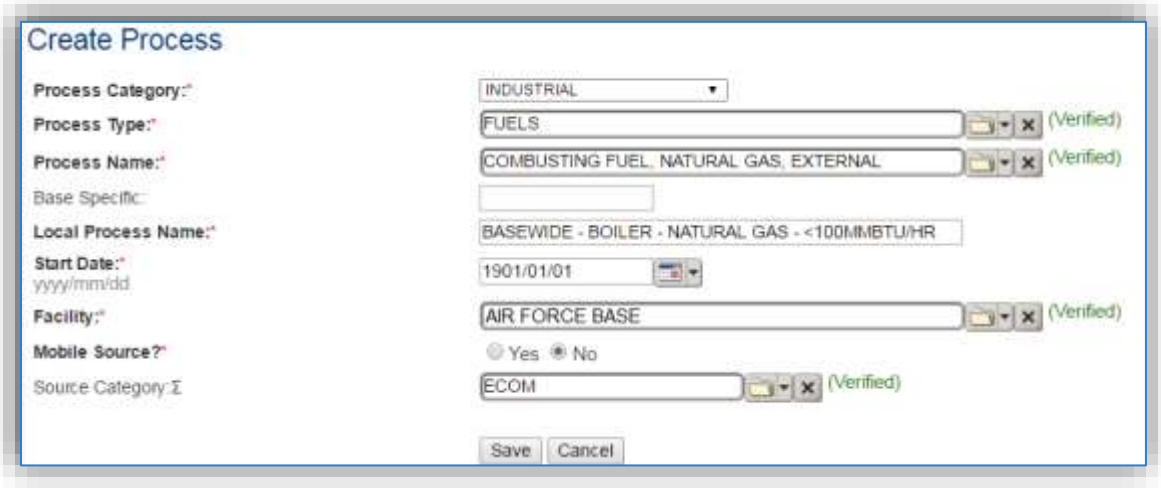
3.2.3.2.2.2 *Installations with Metered Boilers*

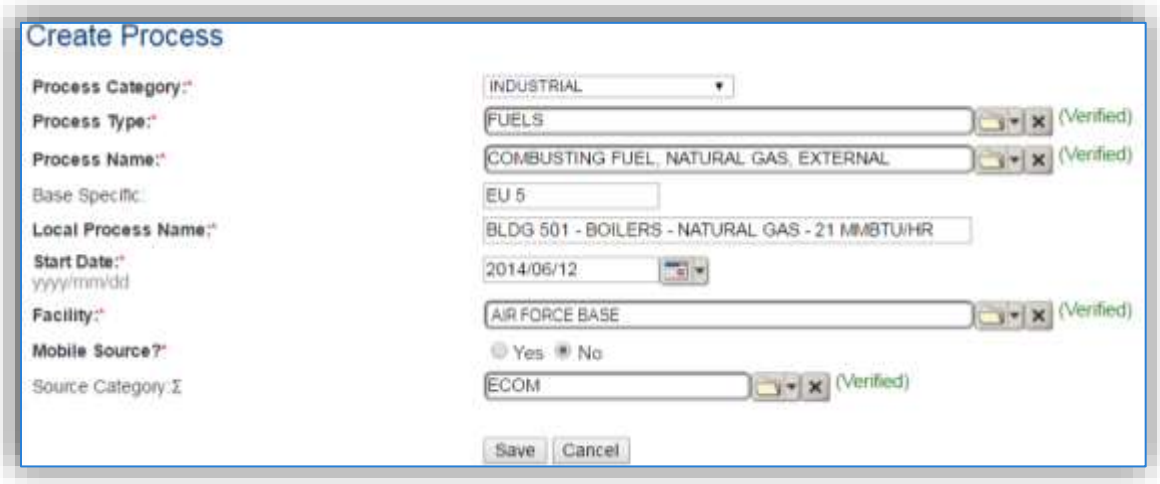
In order to properly document this emission source in APIMS, there will need to be at a minimum a Unique Process record for each fuel type, size classification and usage group. For example, if most boilers on the installation are less than 100 MMBtu/hr natural gas boilers but there is a building that has two boilers that have shared usage meter. In this scenario there would need to be the following processes configured:

- A process for the natural gas boilers that are not metered
- A process for the two metered boilers

Navigate to the Unique Process module in APIMS and click the Create New Process hyperlink.







Process Category	Process Type	Process Name	Process ID
INDUSTRIAL	FUELS	COMBUSTING FUEL, FUEL OIL #2/DIESEL, EXTERNAL	1207
		COMBUSTING FUEL, FUEL OIL #4/KEROSENE, EXTERNAL	1209
		COMBUSTING FUEL, FUEL OIL #6/HEATING OIL, EXTERNAL	1210
		COMBUSTING FUEL, ISOBUTANE	1211
		COMBUSTING FUEL, NATURAL GAS, EXTERNAL	1218
		COMBUSTING FUEL, PROPANE (LPG), EXTERNAL	1220
		COMBUSTING WASTE OIL, EXTERNAL	1223
		FUELS, NOC	1501

Use the table above to determine the appropriate **Process Category**, **Process Type** and **Process Name**.

The **Local Process Name** should be in a standard naming convention for all sources that helps to quickly identify, what the process is, fuel used and size. Examples of process names are as follows:

- BLDG 501 – BOILERS – NATURAL GAS – 21 MMBTU/HR
- BLDG 223 – BOILER – DIESEL – 0.875 MMBTU/HR

The **Start Date** should be the date the unit became operational, if there is no possible way to determine the actual start date then use 1901/01/01 as a default start date. This date is very important as it can have regulatory implications.

The **Facility** name should be the facility that is responsible for the source or sources.

The **Mobile Source?** flag should be "NO" as this is considered a stationary source.

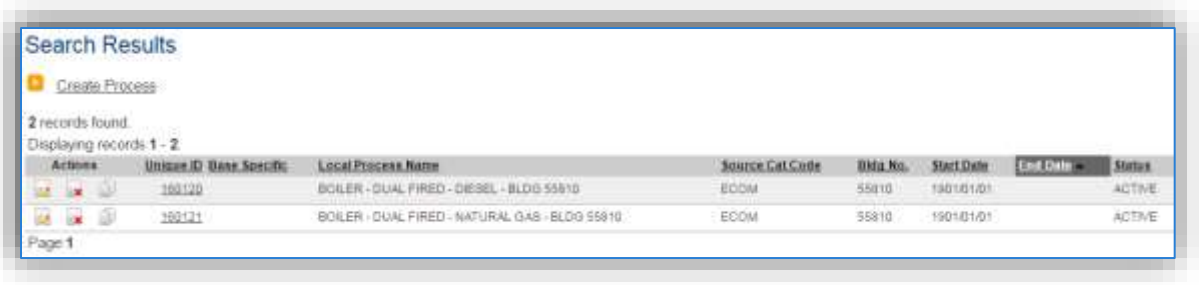
All external combustion sources are assigned to the ECOM **Source Category**.

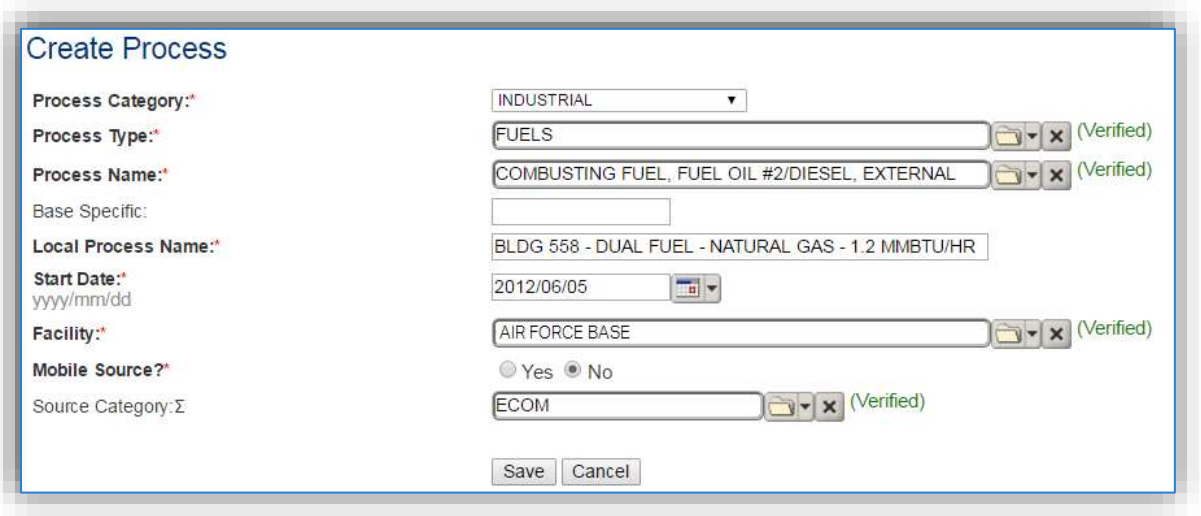
For the population of all other tabs, refer to the Existing Sources sections.

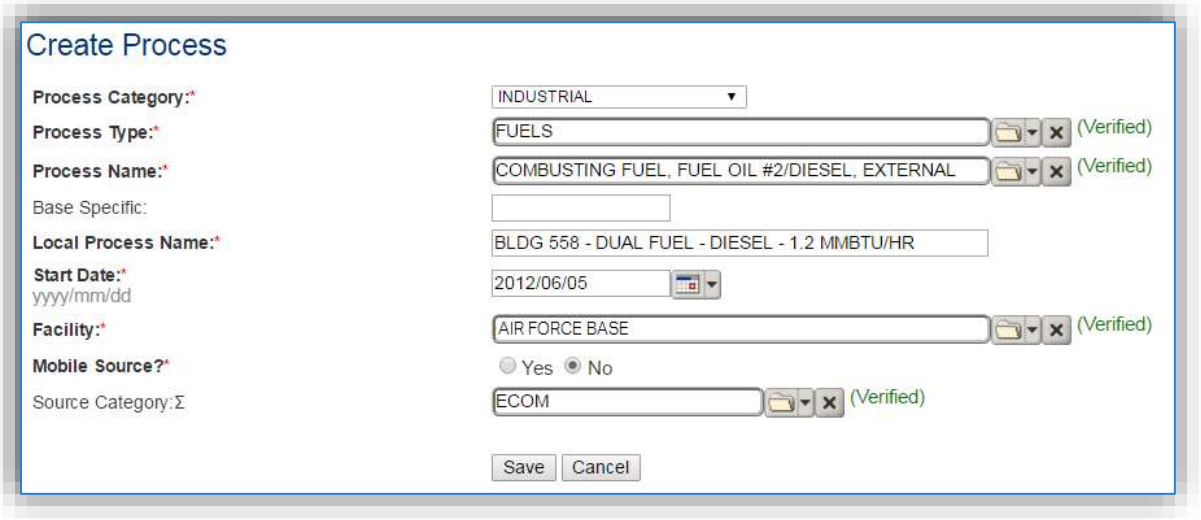
3.2.3.2.2.3 *Dual Fuel Boilers*

For dual fuel boilers a process for each fuel used will need to be configured. The emission factors used for natural gas are different from the emission factors used for diesel therefore there will need to be two different usage records and two different calculation methodologies, which requires two processes.

Navigate to the Unique Process module in APIMS and click the Create New Process hyperlink.







Process Category	Process Type	Process Name	Process ID
INDUSTRIAL	FUELS	COMBUSTING FUEL, FUEL OIL #2/DIESEL, EXTERNAL	1207
		COMBUSTING FUEL, FUEL OIL #4/KEROSENE, EXTERNAL	1209
		COMBUSTING FUEL, FUEL OIL #6/HEATING OIL, EXTERNAL	1210
		COMBUSTING FUEL, ISOBUTANE	1211
		COMBUSTING FUEL, NATURAL GAS, EXTERNAL	1218
		COMBUSTING FUEL, PROPANE (LPG), EXTERNAL	1220
		COMBUSTING WASTE OIL, EXTERNAL	1223
		FUELS, NOC	1501

Use the table above to determine the appropriate **Process Category**, **Process Type** and **Process Name**.

The **Base Specific** field can be used to enter a standard convention identifier that will best help identify the source. If the source is permitted, enter the emission unit ID as designated in the permit.

The **Local Process Name** should be in a standard naming convention for all sources that helps to quickly identify, what the process is, where it is, fuel used and size. Examples of process names are as follows:

- BOILER – DUAL FUEL – DIESEL – BLDG 12
- BOILER – DUAL FUEL – NG – BLDG 12

The **Start Date** should be the date the unit became operational, if there is no possible way to determine the actual start date then use 1901/01/01 as a default start date. This date can have regulatory implications with the NSPS for boilers.

The **Facility** name should be the facility that is responsible for the source or sources.

The **Mobile Source?** flag should be "NO" as this is considered a stationary source.

All external combustion sources are assigned to the ECOM **Source Category**.

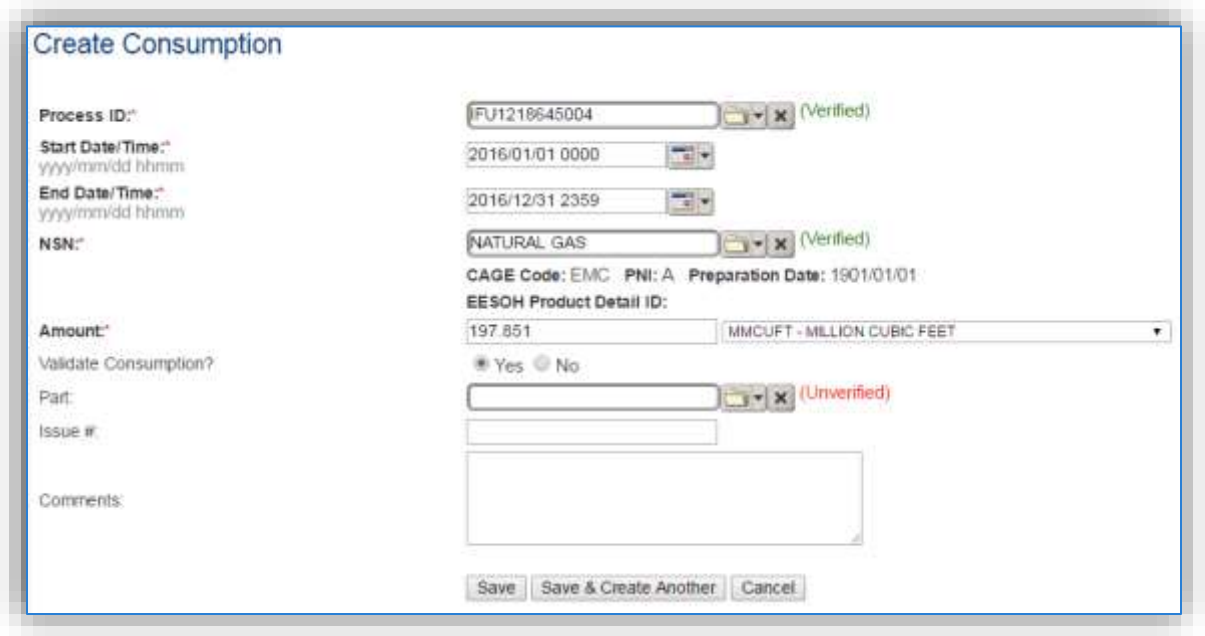
For the population of all other tabs, refer to the Existing Sources sections.

3.2.4 Year-to-Year Maintenance

3.2.4.1 Usage

The consumption for external combustion sources will need to be tracked annually or more frequently if required by a regulatory agency. To correctly document the Usage for this emission source the consumption should be entered in the Consumption log.

Navigate to the Consumption module and click the Create Consumption hyperlink.



The consumption record should span the entire reporting period as shown above.

The material (**NSN**) should be the type of fuel used.

The **Amount** should be the total amount of fuel used, if this is for multiple boilers it needs to be the total amount of fuel used by all the boilers.

Make sure to select "Yes" to validate the consumption. If the consumption is not validated it will not be included in the emissions calculation.

Repeat this step for all the external combustion processes.

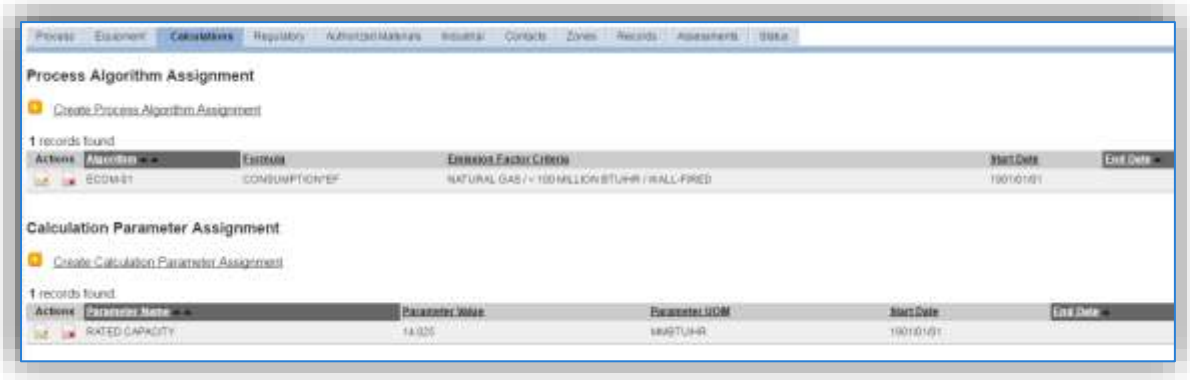
If the unit did not operate during the year but was still an active source, enter a consumption record with zero usage and a comment as to why it did not operate. This type of documentation ensures that all equipment is accounted for from year to year and can be used to account for differences in AEI reporting from year to year.

3.2.4.2 Parameters

The RATED CAPACITY parameter should be reviewed and updated every year. This is especially important for processes that have multiple boilers associated. As boilers are added and removed from the installation the total rated capacity of all the boilers will fluctuate.

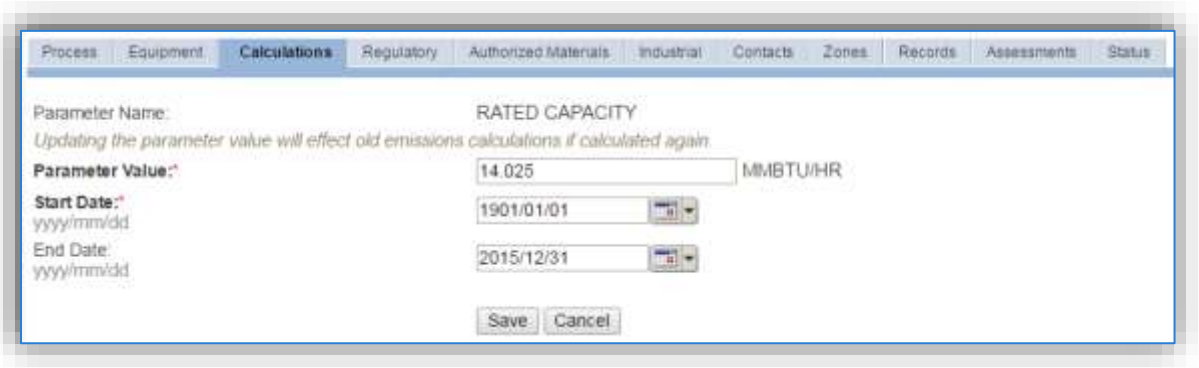
The calculations for actual emissions do not require parameters; however, the RATED CAPACITY is required to complete any PTE calculations.

To review the RATED CAPACITY parameter, navigate to the *Calculations* tab of the Unique Process record.

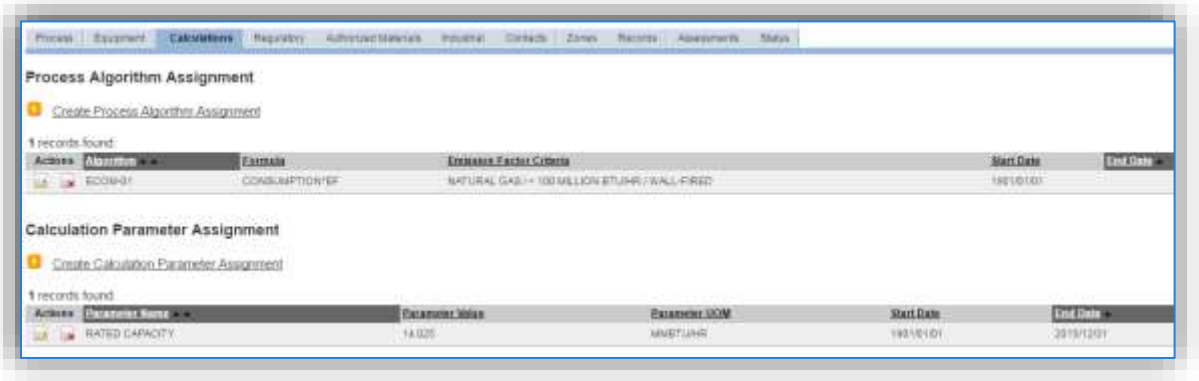


If this parameter needs to be adjusted, DO NOT DELETE or EDIT the parameter value. Instead end date the previous year and create a new parameter record for the current year.

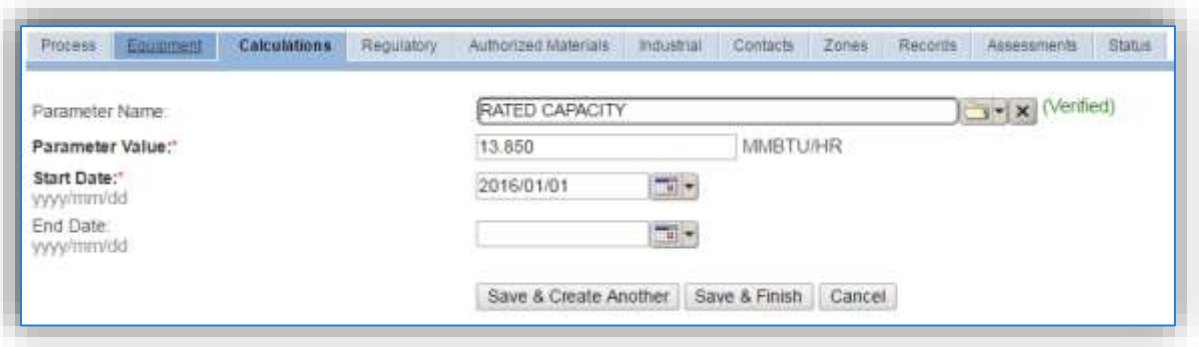
To end date the current parameter, click the corresponding edit icon.



Enter the last day of the year as the end date. Click the **Save** button.



The next step is to create a new parameter with the current RATED CAPACITY of the boilers. Click the Create Calculation Parameter Assignment hyperlink.

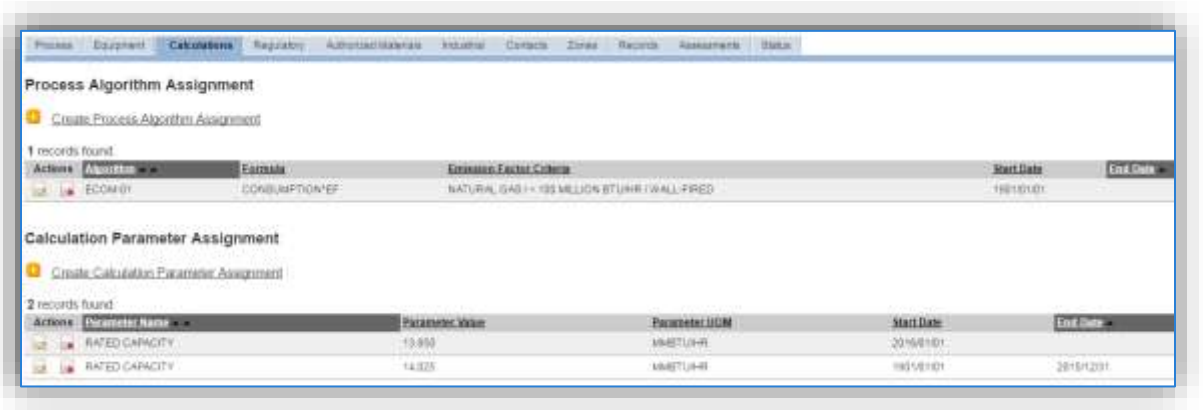


Select the **Parameter Name**, RATED CAPACITY from the list of values.

Enter the rated capacity (heat input) of the boiler, or if this is for multiple boilers enter the total rated capacity of all the boilers in the **Parameter Value** field.

Enter the **Start Date** for the parameter; this date should the first day of the calendar year.

Click the **Save & Finish** button.



3.2.4.3 Emissions Calculation

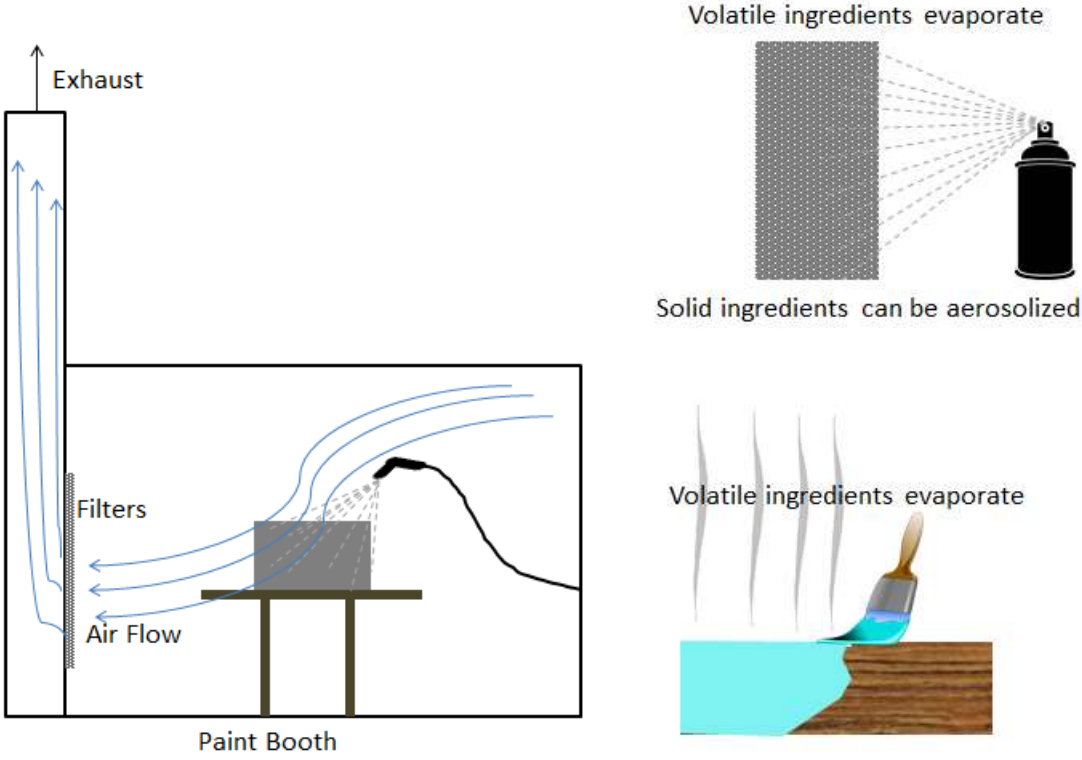
To correctly calculate emissions this emission source should be included in a **Stationary Source Calculation**. Reference Section 2.7 Emissions Calculation for additional instructions and details.

3.3 Surface Coating (SURF)

3.3.1 Source Types

Surface coating operations are conducted on all Air Force Installations and involve a wide range of coating materials and application processes. Surface coating operations are defined as those that involve the application of paints, primers, thinners, stains, varnishes, shellacs, glazes, etc. in liquid or powder form to a substrate for decorative and/or protective purposes. These materials typically contain solvents that are emitted to the air as they evaporate. Conventional coatings contain a minimum of 30% solvents by volume but can commonly contain as much as 70% to 85% solvents by volume. Coatings with 30% solvent by volume or less are referred to as low solvent or "high solid" coatings. These coatings reduce the amount of VOC emissions but will increase the emissions of PM from overspray.

Emissions from surface coating operations are dependent on the operation type, application method, and presence of an emissions control device. Coating applications include conventional spraying, airless spraying, air assisted airless spray, electrostatic spray, roller coating, dip coating, flow coating and brush coating. With the exception of touch-up painting, coating operations involving spray applications (e.g. conventional spraying, electrostatic spraying, airless spraying, etc.) are conducted either in a paint booth or hangar. A typical spray booth/hangar is equipped with a ventilation system that draws air either across or downward onto the object being coated, and through a PM/inorganic HAP control device, such as a dry filter system or water-wash system. After passing through the PM/inorganic HAP control device, the air is either vented directly into the atmosphere or is vented to a VOC/organic HAP control device such as a carbon absorption system or an incinerator.



There are various NESHAPs applicable to surface coating outlined in the bullets below:

- 40 CFR 63 Subpart GG, National Emission Standards for Aerospace Manufacturing and Rework Facilities; outlines those standards for aerospace vehicles and components that are considered major sources. This NESHAP applies to any method of surface coating when the item being treated is an aerospace vehicle or component.
- 40 CFR 63 Subpart MMMM, National Emission Standards for Hazardous Air Pollutants for Surface Coating of Miscellaneous Metal Parts and Products; applies to the coating of metal components.
- 40 CFR 63 Subpart PPPP, National Emission Standards for Hazardous Air Pollutants for Surface Coating of Plastic Parts and Products; applies to the coating of plastic components.

3.3.2 Potential Data Sources

Surface coating materials are considered hazardous materials and are typically procured through the Enterprise Environment, Safety, and Occupational Health Management Information System (EESOH-MIS), which is the authoritative data source for the Air Force. There are a few approaches to best handle the information that can be obtained from EESOH-MIS. It is important to work with the Hazardous Materials Management personnel to configure the best approach for the installation.

The best method for collecting usage data for activities not conducted in a paint booth or hangar is to segregate different surface coating application types (aerosol, brush, etc.) into distinct processes. The processes should also only have the materials that are used with painting (e.g. paints, thinners, primers etc.) authorized and not all the materials used in the shop.

The next option for collecting usage data for activities not conducted in a paint booth or hangar is to segregate the materials that are used with painting (e.g. paints, thinners, primers etc.) and the rest of the materials used in the shop.

The best method for collecting usage data for activities conducted in a paint booth or hangar is to utilize manual paint logs that record the material, actual amount, and date/time the material was used. EESOH-MIS often does not track material usage to this level of granularity, it usually is configured to “consume on receipt.” This method only tracks the container to the shop level and reports the entire container as usage on that day, not the actual amount used during that day or subsequent days. This type of log is often required by permits or other regulations. If this option is used the processes in EESOH-MIS that track the purchases of these materials will need to be identified so the consumption can be excluded from the interface.

The next option for collecting usage data for activities conducted in a paint booth or hangar is to identify the processes in EESOH-MIS that are authorized for the materials used in the paint booth and group them together as sub-processes to an APIMS process.

The most common shops that have surface coating operations fall under the following office symbols:

- Aircraft Structural Maintenance (MXS)
- CE Vertical Structures

- CE Pavements and Equipments
- Corrosion Control (MXS)
- Vehicle Maintenance (LGRV)
- Repair and Reclamation
- Aerospace Ground Equipment (MXMG)

For all operations that are conducted in a paint booth or hangar the control equipment information will need to be collected. The equipment information needed is the control type and control efficiency. This information should be available from product literature provided by the manufacturer. If this information is not readily available it is recommended that the booth or hangar is inspected to determine the exact control equipment and contact the manufacturer directly to gather this information.

The material information is also essential to the surface coating emissions calculations. For all usage information that is imported from EESOH-MIS there should also be material records that contain most if not all the required information. For manual paint logs, the Safety Data Sheets will need to be obtained. Most shops maintain Hazard Communication folders that contain all the Safety Data Sheets for materials used. If the Safety Data Sheets are not available in the shop, most are available on manufacturer websites. All materials will need the following information populated in APIMS.

- Product Name
- Density
- Ingredient Name and % by weight
- VOC content
- % Solids (thinners and solvents will not need this info)
- Mix Ratio (if the paint logs specify the total amount of the kit used and not component specific amounts)

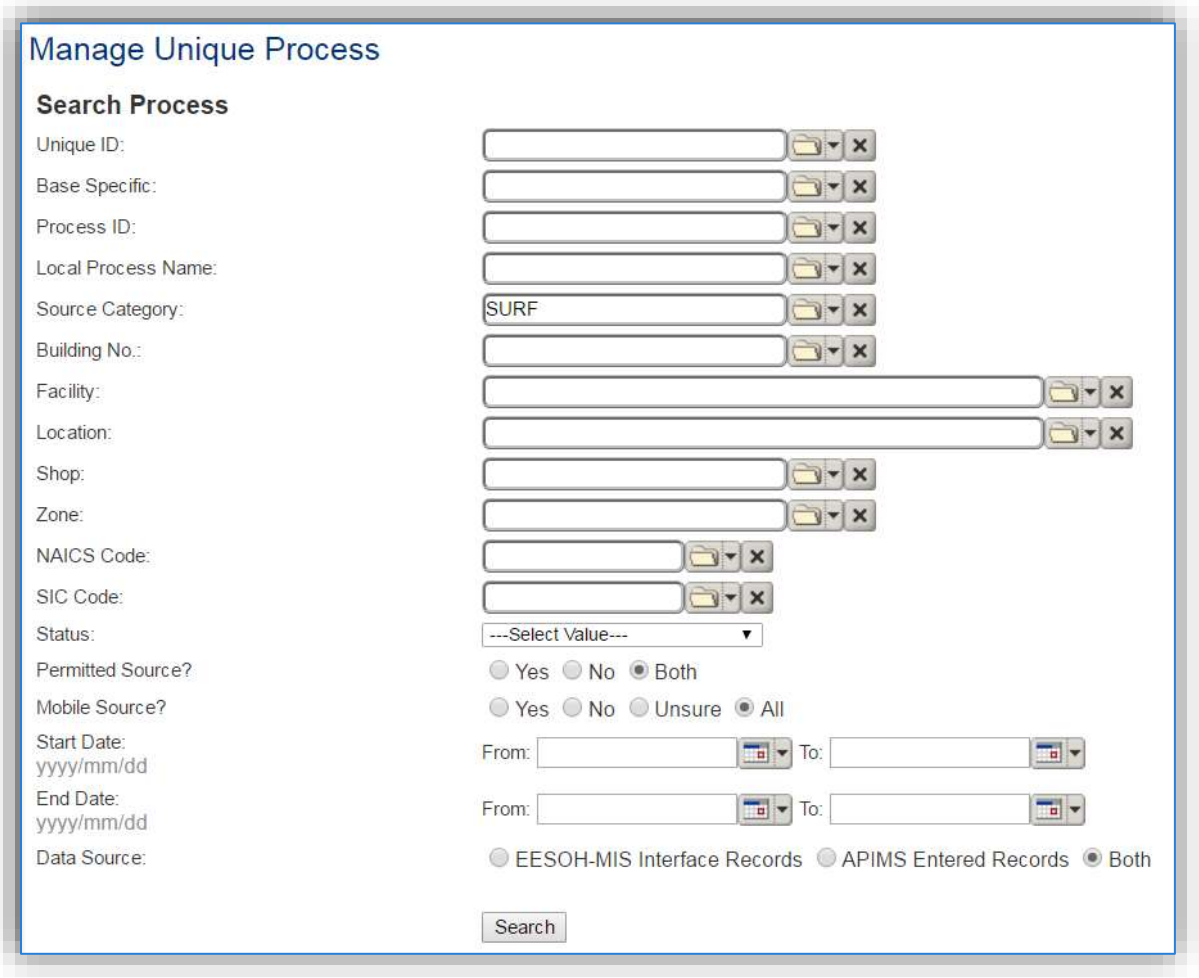
The EESOH-MIS interface will populate most of this data, however if the VOC or % solids is not readily available on the SDS it may not be entered into EESOH-MIS. Since the EESOH-MIS interface inserts so many material records at one time it is not feasible to review each record for completeness, therefore it is recommended to initially assume the data required is present and run the initial calculations. Once the calculations have been run, there is a tab that will provide error messages that will identify all the records that are missing VOC, % Solids or ingredient information. Refer to Section 2.7 Emission Calculations for details on the calculation error messages. For those materials that the VOC can be calculated based on the ingredients, a general knowledge of chemistry will be required. If the VOC or % Solids cannot be obtained from the SDS or the manufacturer, the Air Emissions Guide for Air Force Stationary Sources provides estimated values in Table 22-1.

3.3.3 Standard Source Identification/Characterization

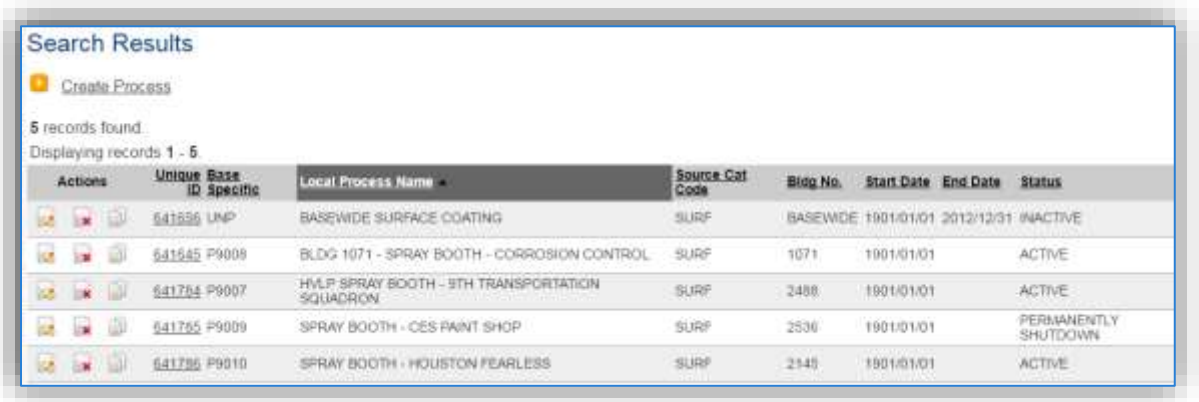
3.3.3.1 Existing Sources

It is important to review the existing sources in each source category on an annual basis at a minimum. Most regulatory agencies require an up to date source and equipment inventory.

Navigate to the Unique Process module of APIMS by clicking on **Unique Process** under the **Emission Unit** tab. In the **Source Category** search field, type "SURF" then select the row for Surface Coating from the dropdown results. Click the Search button.

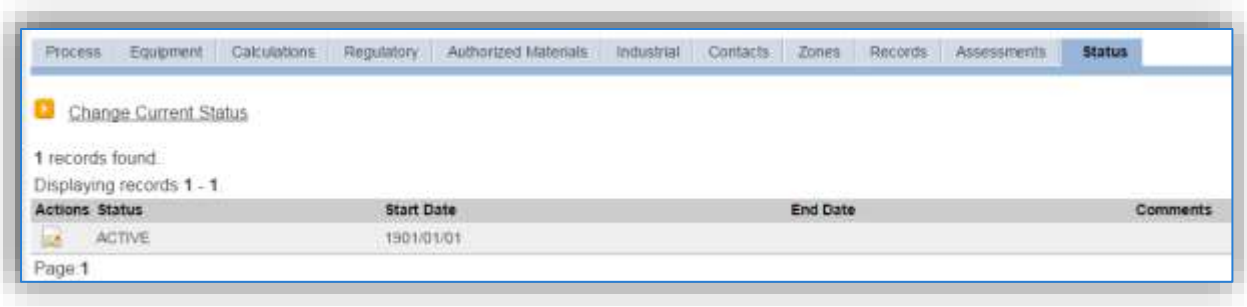


The search results grid will now display all the surface coating material use processes currently in APIMS. To further filter out the EESOH-MIS processes, use the APIMS Entered Records radio button on the Data Source field in the Search criteria. This will then only display the Next Higher Process.

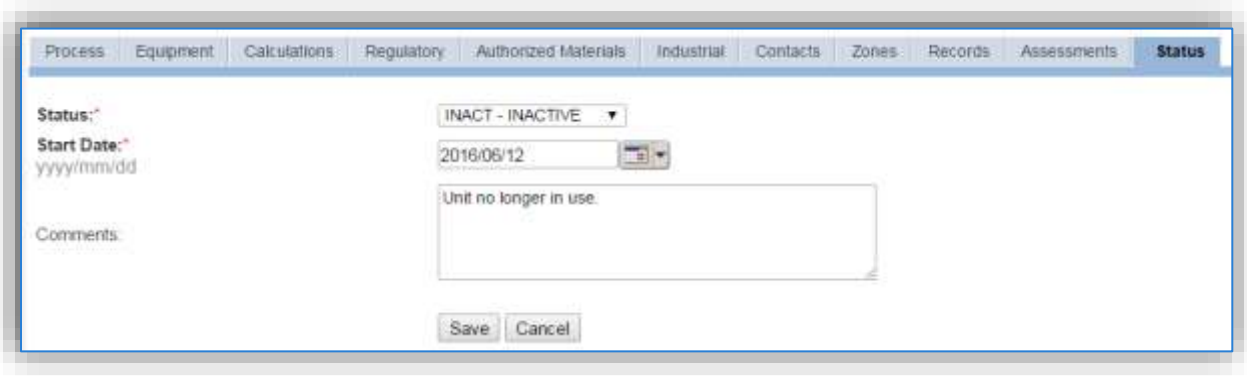


3.3.3.1.1 Status

If the status of a process needs to be changed, click the edit icon next to the process. If this is a process that was entered into APIMS via the EESOH-MIS interface, the process status must be altered in EESOH-MIS.



Navigate to the *Status* tab. Click the Change Current Status hyperlink.



Select the appropriate status from the **Status** dropdown (i.e., ACTIVE, REMOVED or INACTIVE).

For the **Start Date** enter the date at which the status changed.

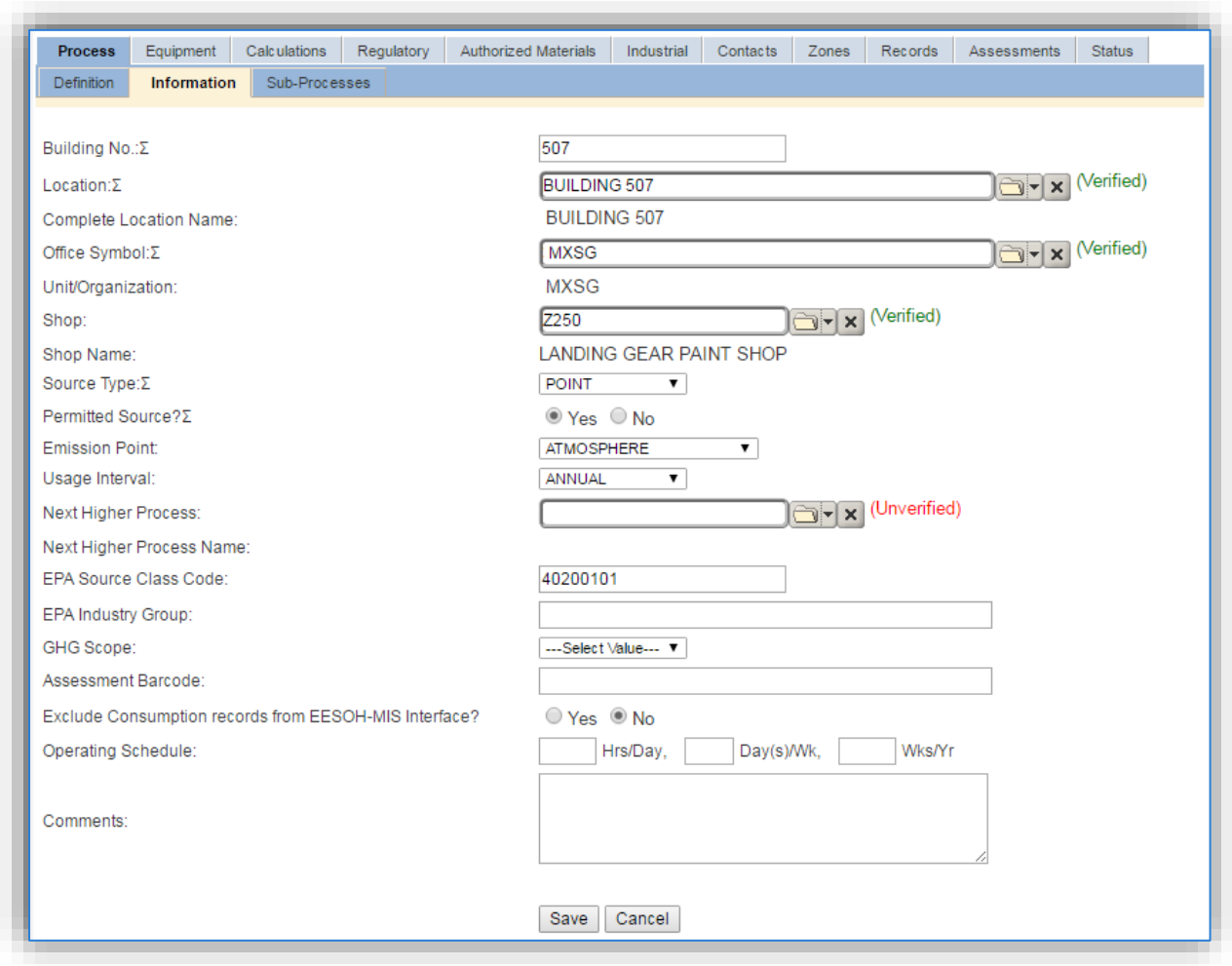
Enter **Comments** that provide insight into why the status changed. These can be very useful for equipment inventories, permit renewals and regulatory reporting. Most regulatory agencies require reporting on unit operation status; this includes any potential time spent offline, reasons for the outage.

Click the **Save** button.

The emissions for a process will only be calculated for the dates the process was in an ACTIVE status. If a source is removed in the middle of a year the emissions will only be calculated for the part of the year the source was active.

3.3.3.1.2 Information

There are basic data elements that are important to track and maintain for new and existing sources, such as location and source type. This data can be maintained in the Unique Process record on the *Information* sub tab.



The **Building No**. field can be used to specify a general location or area of the emission source.

The **Location** field is very important to effectively manage the location and mission of the emission source. This information will be important for knowing where the source is, in case it needs to be inspected or if the source owner needs to be contact for pertinent information. For the instructions on how to create a location, reference Section 2.2 Location.

The **Shop** is important as it establishes the personnel that are utilizing the equipment on a regular basis and will be the best source of information regarding the unit.

Surface coating operations conducted in a paint booth should be designated as POINT in the **Source Type** field. Operations conducted outside a paint booth should be designated as AREA in the **Source Type** field.

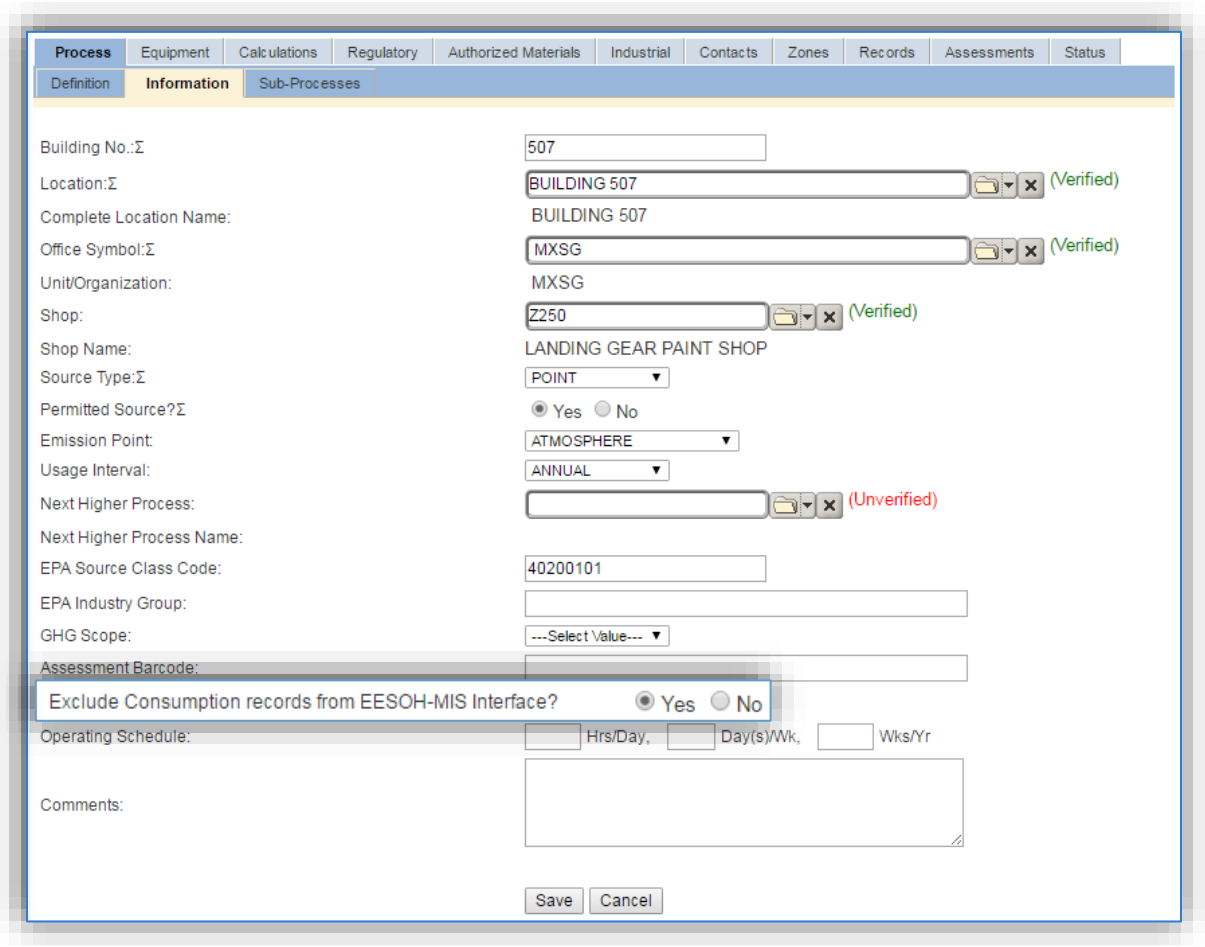
The **Emission Point** should be ATMOSPHERE for operations conducted outside a paint booth. The **Emission Point** should be STACK for operations conducted in a paint booth.

The **Permitted Source** flag should also be populated to accurately reflect the current regulatory status of the emission source. This flag can be an invaluable tool in roll-up reporting.

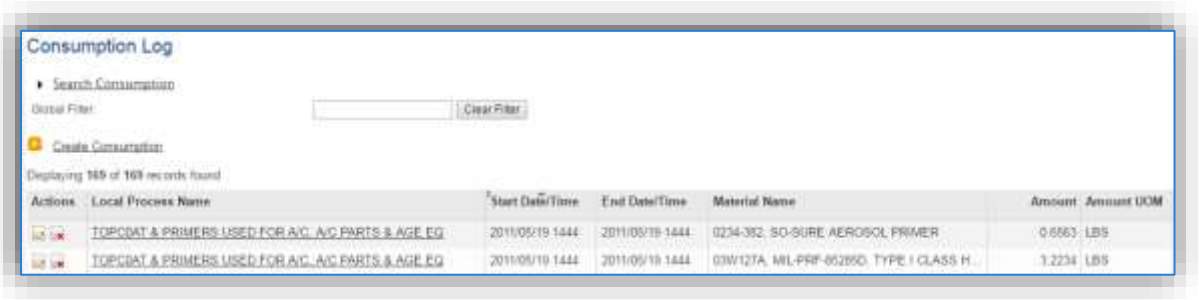
The **Usage Interval** should be designated. This source is usually documented on a MONTHLY basis especially for operations conducted in a paint booth. It is important to populate this field correctly as it will affect how it is documented in the AEI Throughputs module.

3.3.3.1.2.1 *Paint Booths with Manual Logs*

For the Paint Booth processes that will use manual paint logs, it is important to identify the EESOH-MIS processes that are used to supply paints to the booth. Those processes should be linked as sub-processes to record the relationship between the processes; however, an additional step is required to make sure the consumption is not double counted. In each sub-process associated to the paint booth process, navigate to the *Information* sub tab. As shown in the screen below, the Exclude Consumption records from EESOH-MIS Interface? should be "YES." This will ensure in all future runs of the EESOH-MIS interface the usage data for these processes will not be imported.



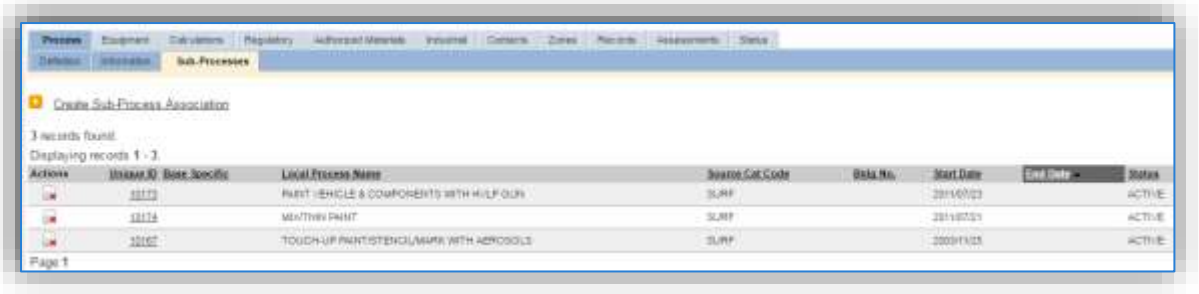
The final step is to delete the existing consumption records for these processes in the consumption log.



To delete a record, click the icon next to the row. These extra steps are only required on the initial configuration of these processes.

3.3.3.1.3 Sub-Processes

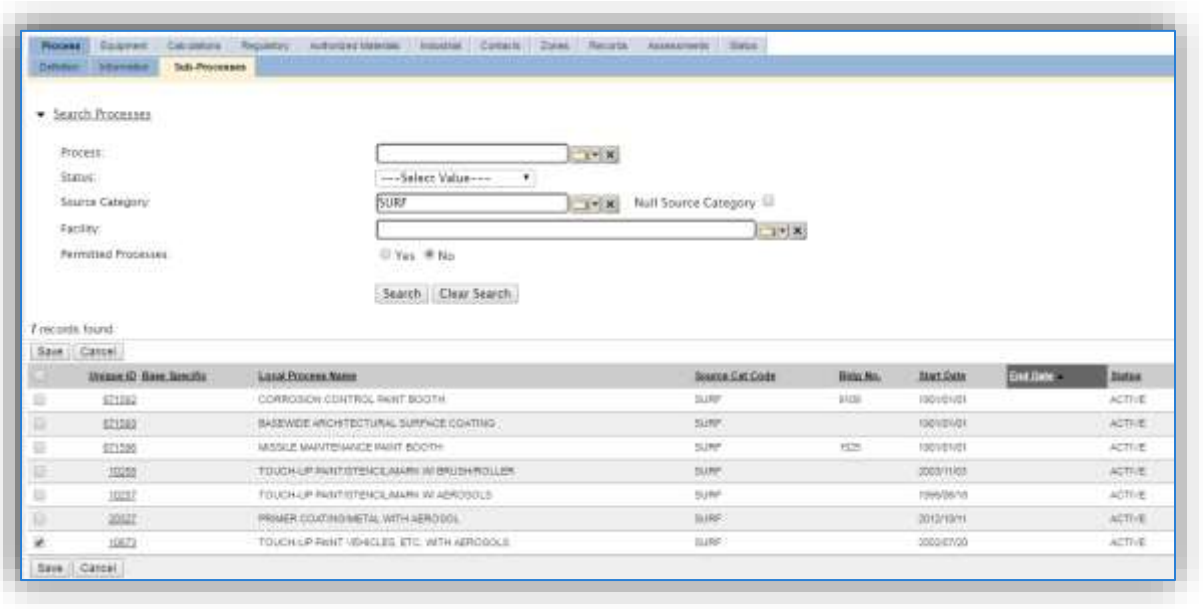
For Next Higher Process and paint booth process configuration, navigate to the *Sub-Processes* sub tab.



This sub tab is used to specify which processes should have their consumption rolled up to this next higher process. This list should only include EESOH-MIS processes that match the next higher process, specific guidance shown below.

Next Higher Process	Sub-Process Criteria
Basewide by application type	• Painting operations not conducted in a paint booth. • Surface coating materials authorized. • Application type matches next higher process application type.
Basewide all application types	• Painting operations not conducted in a paint booth. • Surface coating materials authorized.
Paint Booth	• Painting operations conducted in the paint booth specified in the next higher process.

To add a process or processes, click the Create Sub-Process Association hyperlink.

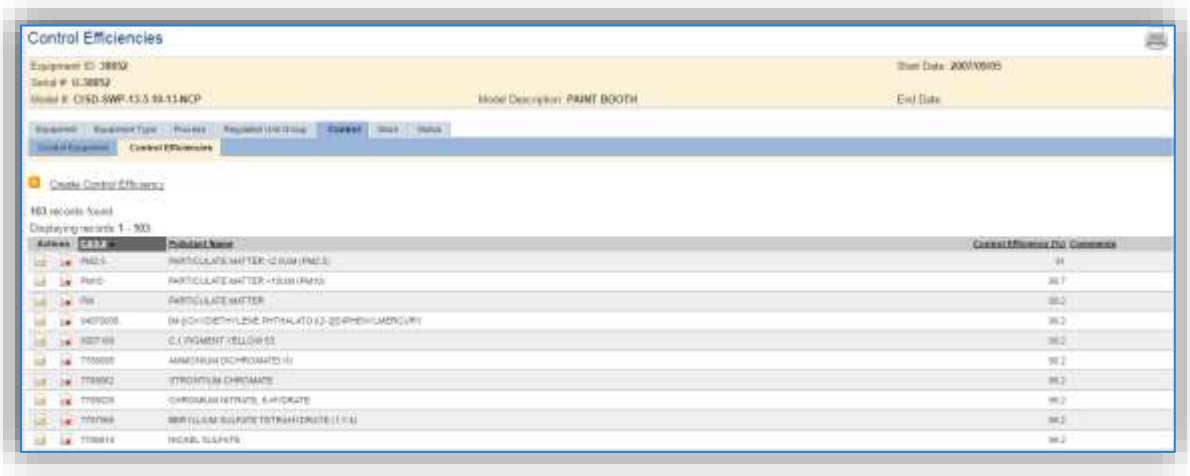


Use the Search Processes fields to refine the search to find only the surface coating processes. Select the checkbox next to the appropriate process(es), then click the **Save** button.

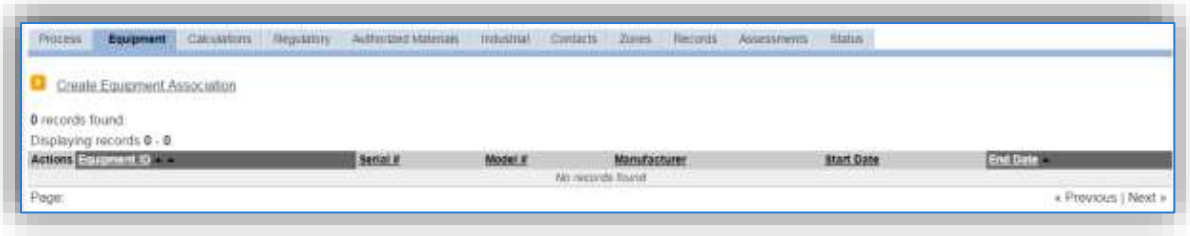
3.3.3.1.4 Equipment

The next tab is the *Equipment* tab. This is especially important for surface coating processes as the calculation in APIMS uses the control efficiency on the equipment associated to the process to accurately calculate emissions. To link the equipment to the process the equipment must already be entered in APIMS.

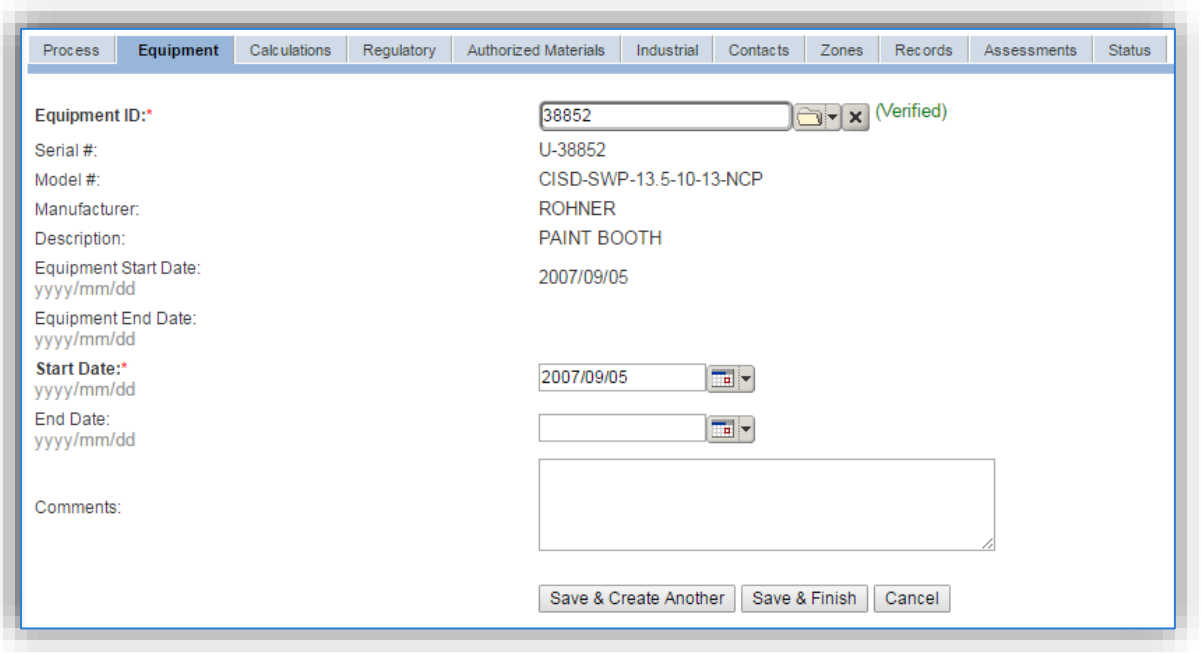
In the *Control* tab of the equipment record, the control efficiency for the device needs to be created for PM, PM_{10}, $PM_{2.5}$ and particulate HAPs if the paint booth has a fabric filter or waterfall filter. Additionally, if the booth also has a carbon filter the control efficiency will need to be created for VOC and organic HAPs. Refer to Section 2.4 Equipment for specifics on how to properly document equipment in APIMS.



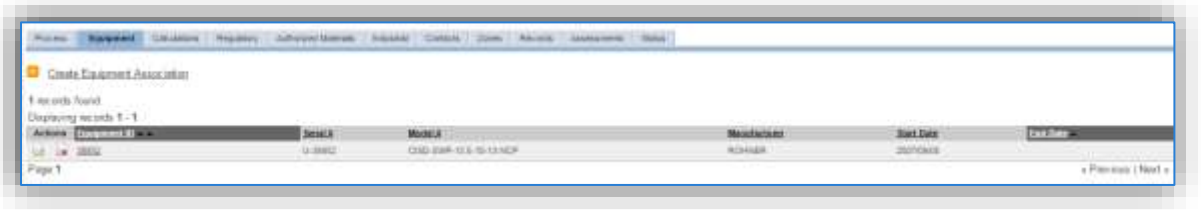
Navigate to the *Equipment* tab of the Unique Process record.



To link the equipment, click on the Create Equipment Association hyperlink.

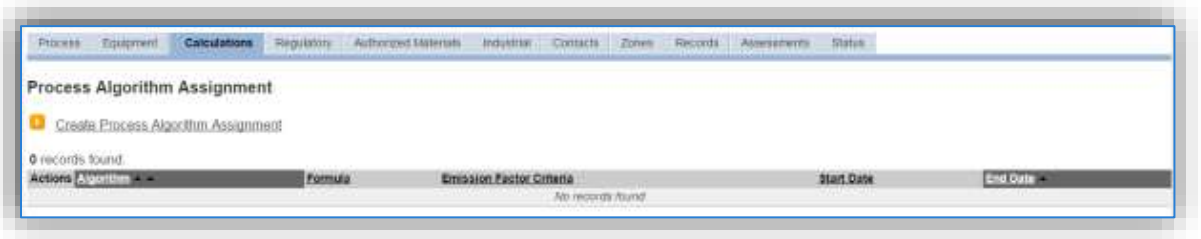


Search for the **Equipment ID** in the list of values, enter the start date and click the **Save & Finish** button.

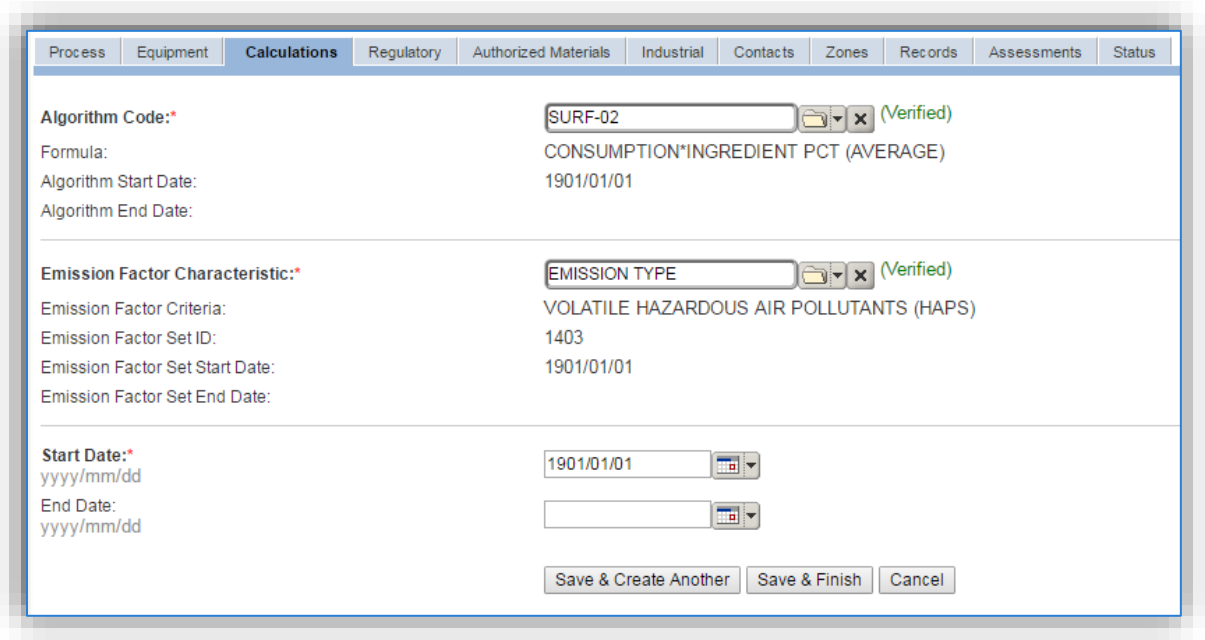


3.3.3.1.5 Calculations

The next tab is the *Calculations* tab.

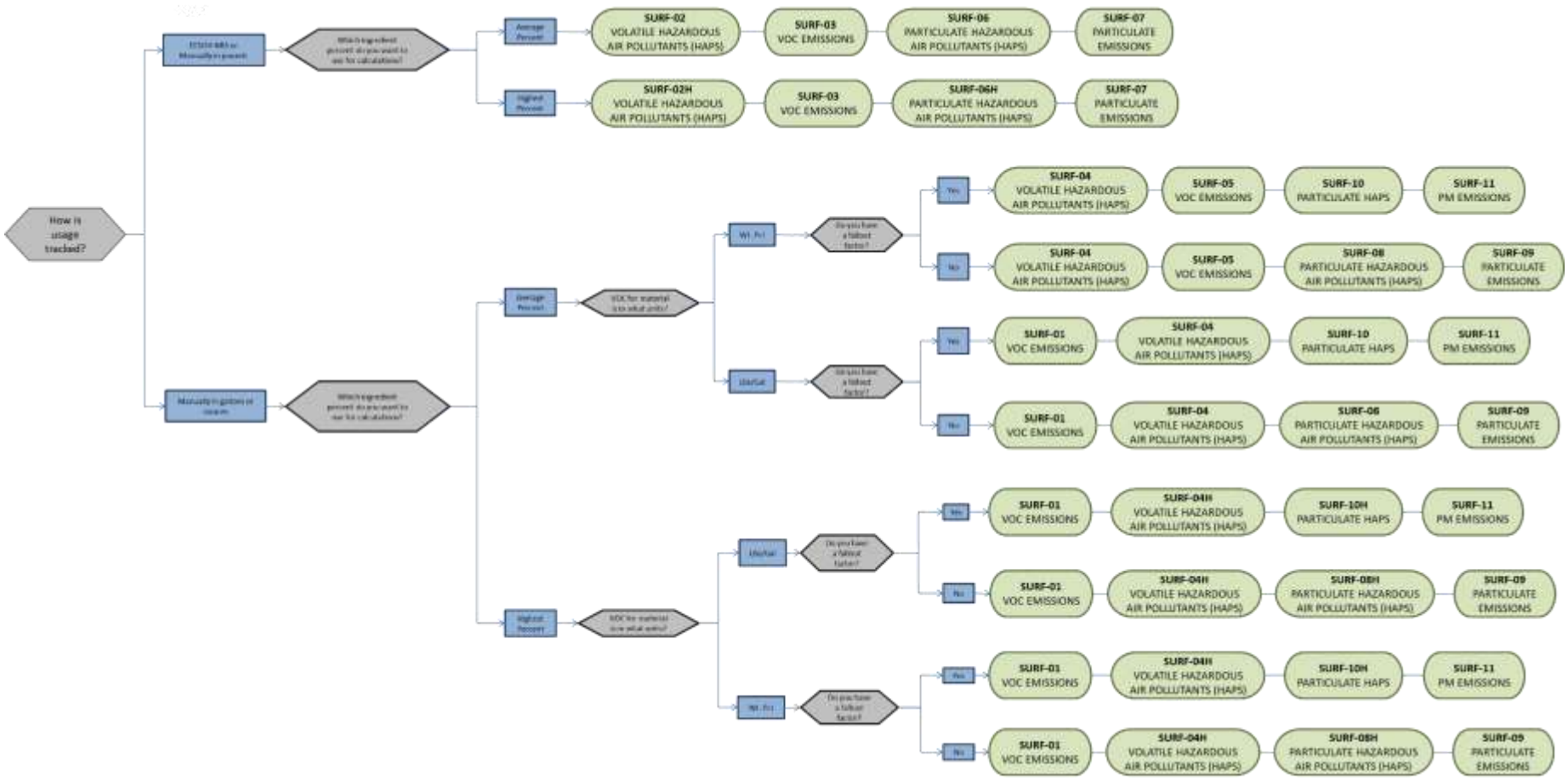


To associate an algorithm to the process, click on the Create Process Algorithm Assignment hyperlink.



Select the **Algorithm Code** from the list of values that matches the correct scenario. Next select the **Emission Factor Characteristic** available. Enter the **Start Date** to match the start date of the process. Click the **Save & Create Another** button to associate another algorithm or click **Save & Finish** button to save and return to the Calculations tab. Use the flowchart below to find the correct Algorithm Code and Emission Factor set.

Surface coating emissions are calculated utilizing the material VOC, the material solids content and a mass balance based on volatile and particulate HAP ingredients. Therefore, there are 4 algorithms that need to be associated to each surface coating process.

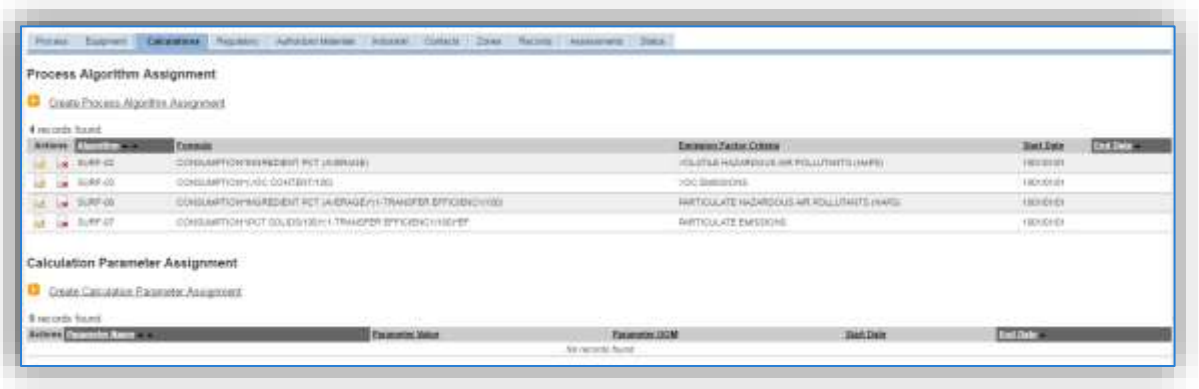

How is usage tracked?
SURF-02 VOLATILE HAZARDOUS AIR POLLUTANTS (HAPS)
SURF-03 VOC EMISSIONS
SURF-06 PARTICULATE HAZARDOUS AIR POLLUTANTS (HAPS)
SURF-07 PARTICULATE EMISSIONS
SURF-02H VOLATILE HAZARDOUS AIR POLLUTANTS (HAPS)
SURF-03 VOC EMISSIONS
SURF-06H PARTICULATE HAZARDOUS AIR POLLUTANTS (HAPS)
SURF-07 PARTICULATE EMISSIONS
SURF-04 VOLATILE HAZARDOUS AIR POLLUTANTS (HAPS)
SURF-05 VOC EMISSIONS
SURF-10 PARTICULATE HAPS
SURF-11 PM EMISSIONS
SURF-04 VOLATILE HAZARDOUS AIR POLLUTANTS (HAPS)
SURF-05 VOC EMISSIONS
SURF-08 PARTICULATE HAZARDOUS AIR POLLUTANTS (HAPS)
SURF-09 PARTICULATE EMISSIONS
SURF-01 VOC EMISSIONS
SURF-04 VOLATILE HAZARDOUS AIR POLLUTANTS (HAPS)
SURF-10 PARTICULATE HAPS
SURF-11 PM EMISSIONS
SURF-01 VOC EMISSIONS
SURF-04 VOLATILE HAZARDOUS AIR POLLUTANTS (HAPS)
SURF-06 PARTICULATE HAZARDOUS AIR POLLUTANTS (HAPS)
SURF-09 PARTICULATE EMISSIONS
SURF-01 VOC EMISSIONS
SURF-04H VOLATILE HAZARDOUS AIR POLLUTANTS (HAPS)
SURF-10H PARTICULATE HAPS
SURF-11 PM EMISSIONS
SURF-01 VOC EMISSIONS
SURF-04H VOLATILE HAZARDOUS AIR POLLUTANTS (HAPS)
SURF-08H PARTICULATE HAZARDOUS AIR POLLUTANTS (HAPS)
SURF-09 PARTICULATE EMISSIONS
SURF-01 VOC EMISSIONS
SURF-04H VOLATILE HAZARDOUS AIR POLLUTANTS (HAPS)
SURF-10H PARTICULATE HAPS
SURF-11 PM EMISSIONS
SURF-01 VOC EMISSIONS
SURF-04H VOLATILE HAZARDOUS AIR POLLUTANTS (HAPS)
SURF-08H PARTICULATE HAZARDOUS AIR POLLUTANTS (HAPS)
SURF-09 PARTICULATE EMISSIONS

If your permit or regulatory agency requires a different type of calculation, contact the Air Force Air Quality Subject Matter Expert for approval of the alternative method.

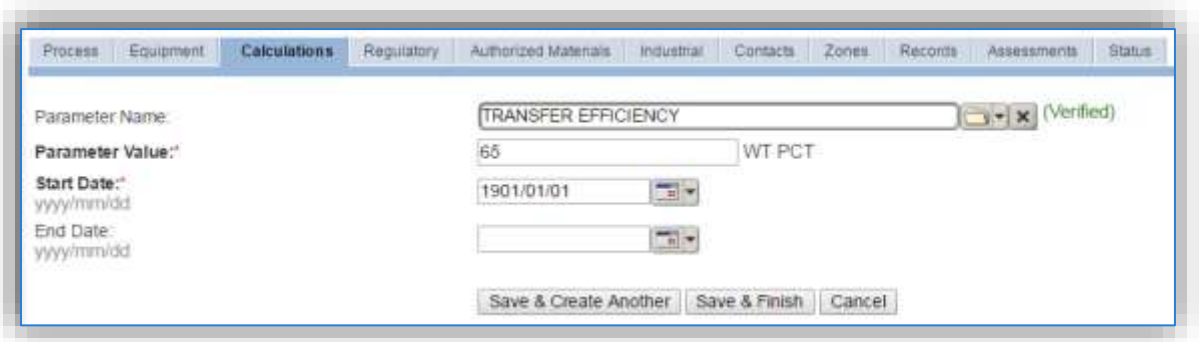
The next step on this tab is to enter the Calculation Parameters required to complete the calculations. If the process is using any of the following algorithms the corresponding parameters are required for calculations:

Algorithm Code	Parameter(s)
SURF-06	TRANSFER EFFICIENCY
SURF-06H	TRANSFER EFFICIENCY
SURF-07	TRANSFER EFFICIENCY
SURF-08	TRANSFER EFFICIENCY
SURF-08H	TRANSFER EFFICIENCY
SURF-09	TRANSFER EFFICIENCY
SURF-10	TRANSFER EFFICIENCY & FALLOUT FACTOR
SURF-10H	TRANSFER EFFICIENCY & FALLOUT FACTOR
SURF-11	TRANSFER EFFICIENCY & FALLOUT FACTOR

To add a calculation parameter to the process, click on the Create Calculation Parameter Assignment hyperlink.



To add a calculation parameter to the process, click on the Create Calculation Parameter Assignment hyperlink.



Select the **Parameter Name**, either TRANSFER EFFICIENCY or FALLOUT FACTOR from the list of values.

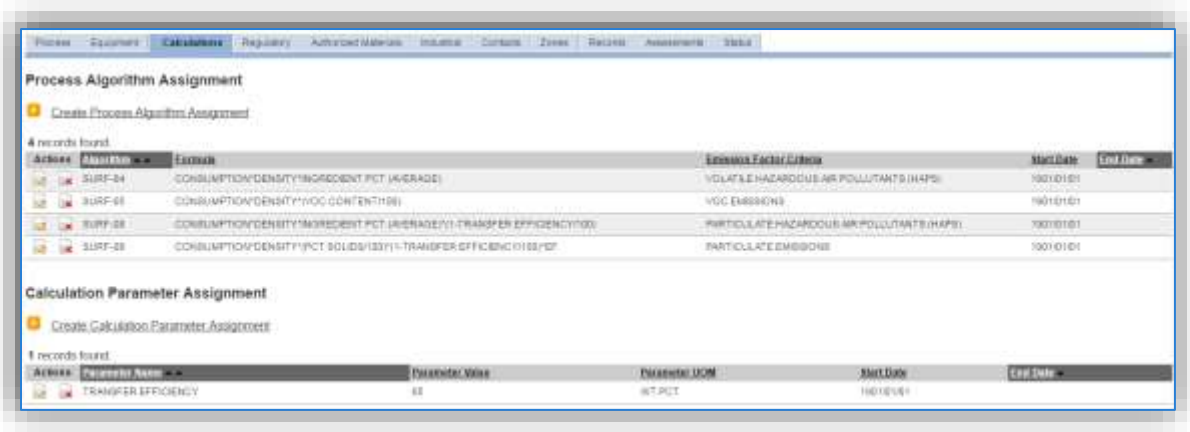
Enter the transfer efficiency percent in the **Parameter Value** field. The TRANSFER EFFICIENCY parameter value is dependent upon the application type. If the process is for multiple application types, use a transfer efficiency of 65%, which is based on a standard distribution of application types and transfer efficiencies. Specific transfer efficiencies are listed below:

Coating Application Method	Typical Transfer Efficiency (%)
Air Atomizing	30
Airless	40
Air-Assisted Airless	45
High Volume, Low Pressure (HVLP)	65
Electrostatic	65
Dip Coating	85
Flow Coating	85
Electrodeposition	95
Brush Coating	99

The FALLOUT FACTOR parameter value is usually specified by the regulatory agency.

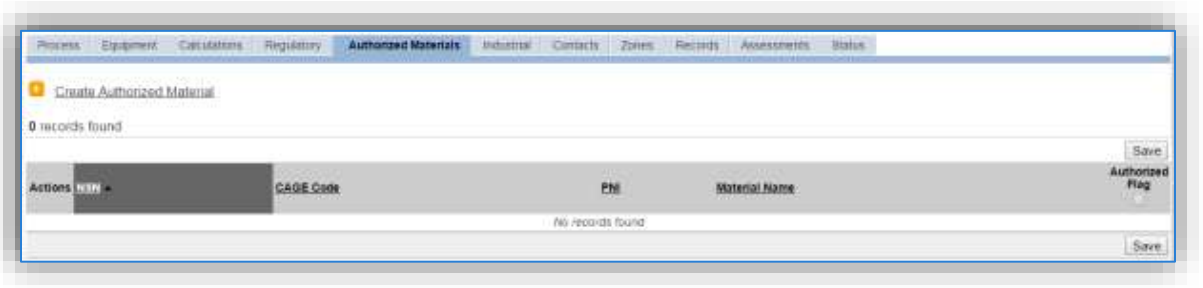
Enter the **Start Date** for the parameter, this date should match the start date of the algorithm or use 1901/01/01 as a default.

Click the **Save & Finish** button.

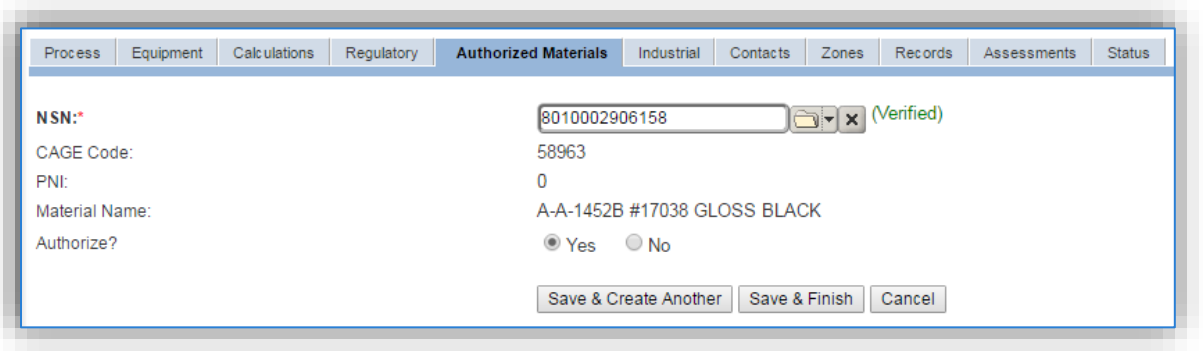


3.3.3.1.6 Materials

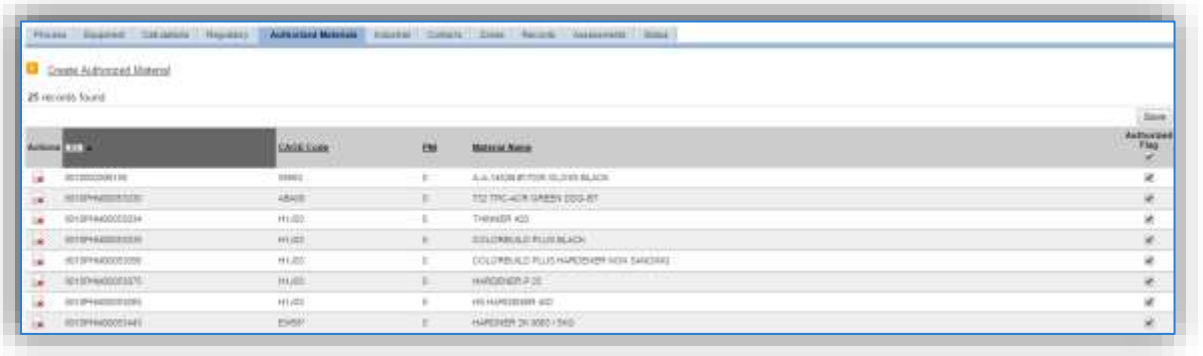
The last step in setting up the Unique Process record is to setup the authorized materials on the *Authorized Materials* tab. This step is only required for processes that use manual logs to track usage in APIMS. All processes that use the consumption data from EESOH-MIS are configured at the sub-process level by the interface.



To authorize a material for the process, click on the Create Authorized Material hyperlink.

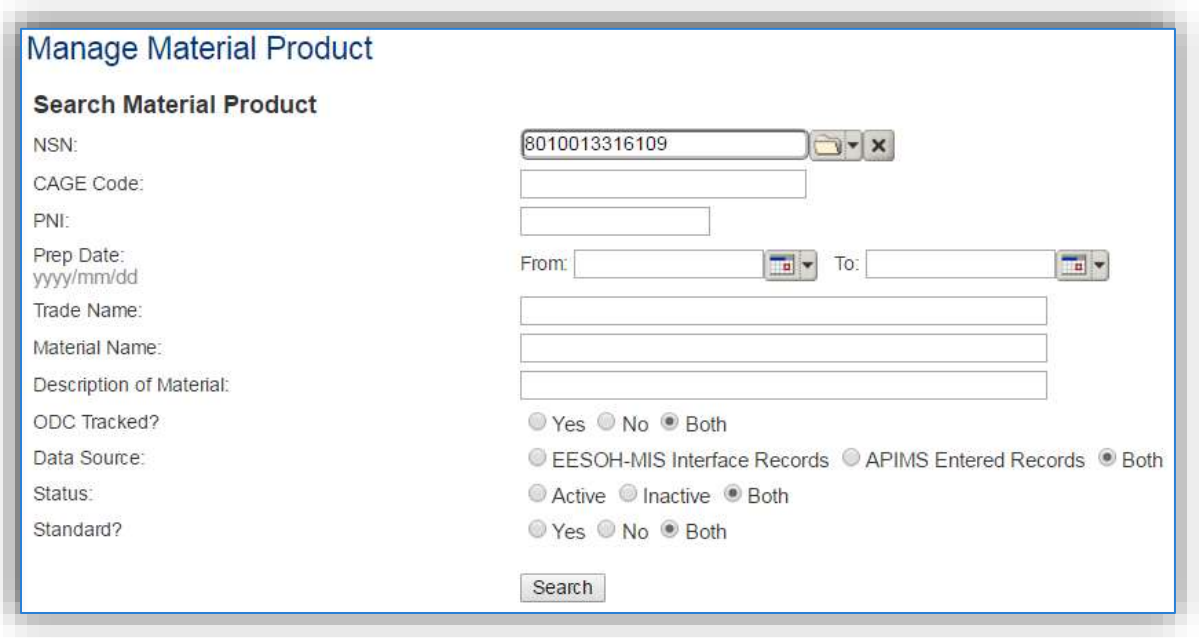


Select the material record from the list of values, using the **NSN** or Material Name. If the material is not available the material record will need to be created. Next select "Yes" to **Authorize** the material, then click the **Save & Finish** or **Save & Create Another** button. Repeat this step for all materials used by the process.

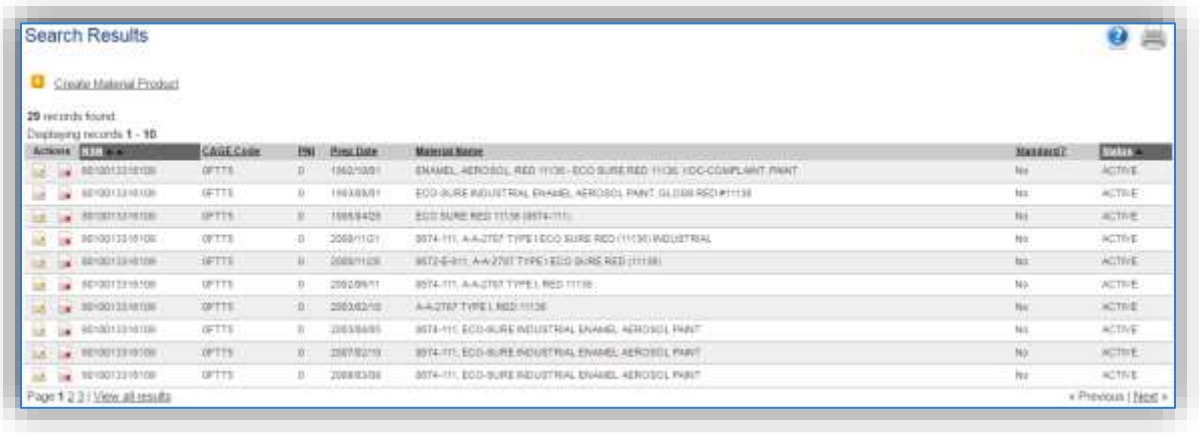


For material records used in surface coating, several data elements must be populated. To review the material record, navigate to Material Product module.

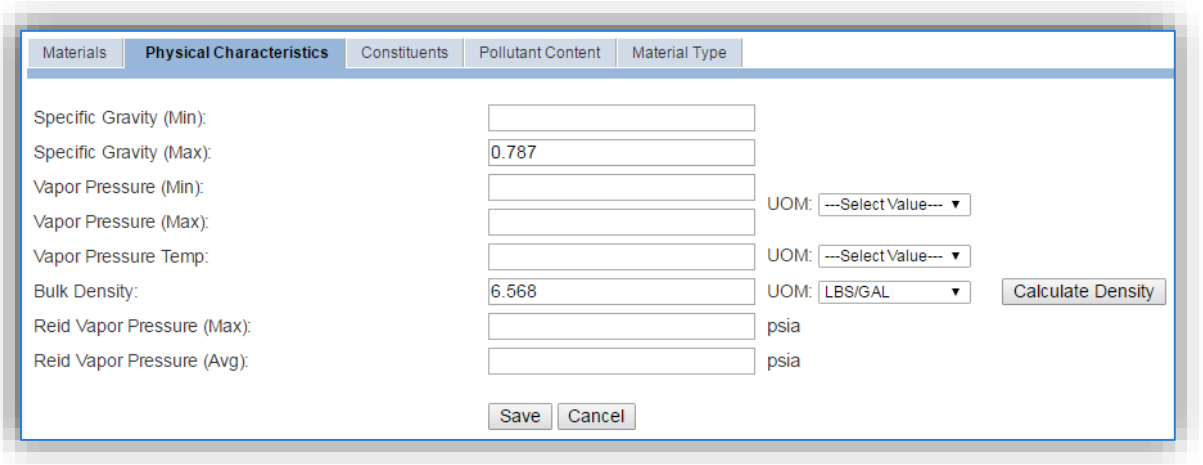
Use the search fields to filter the results to find the material record.



Once the search criteria, such as NSN has been entered, click the Search button.

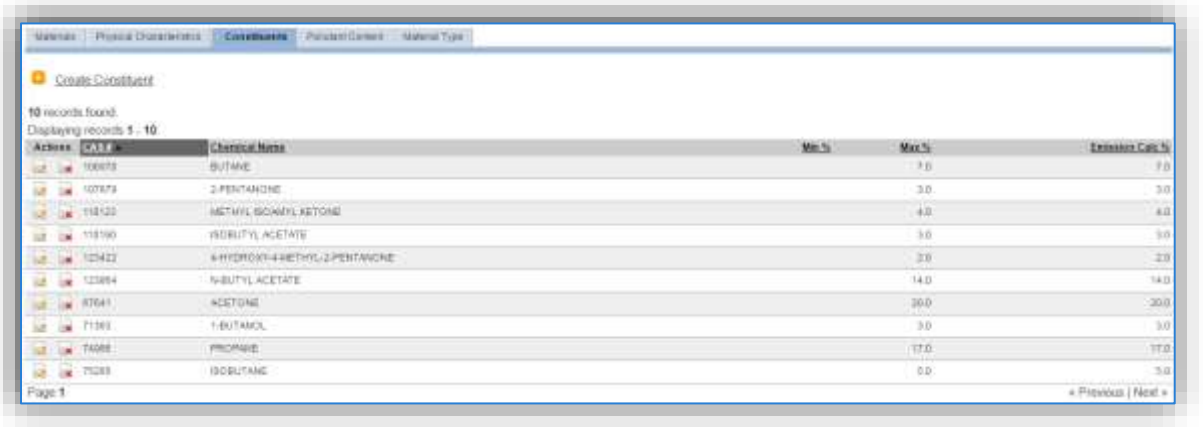


To view the material record details, click the edit  icon next to the material record. Once in the material record navigate to the *Physical Characteristics* tab.



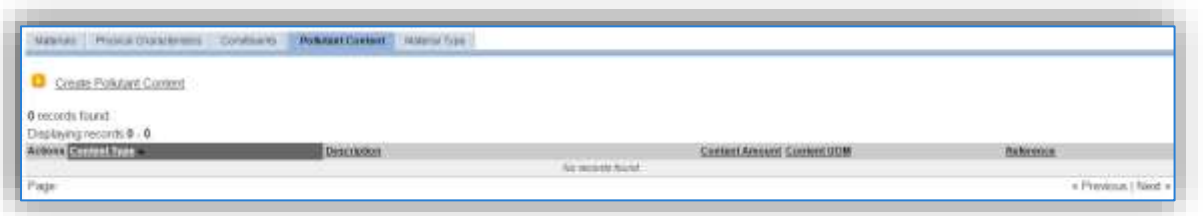
As shown above the **Bulk Density** must be populated in LBS/GAL if the usage is entered in volumetric units.

Next is the *Constituents* tab that will contain all the ingredient information used in the mass balance HAP calculations.

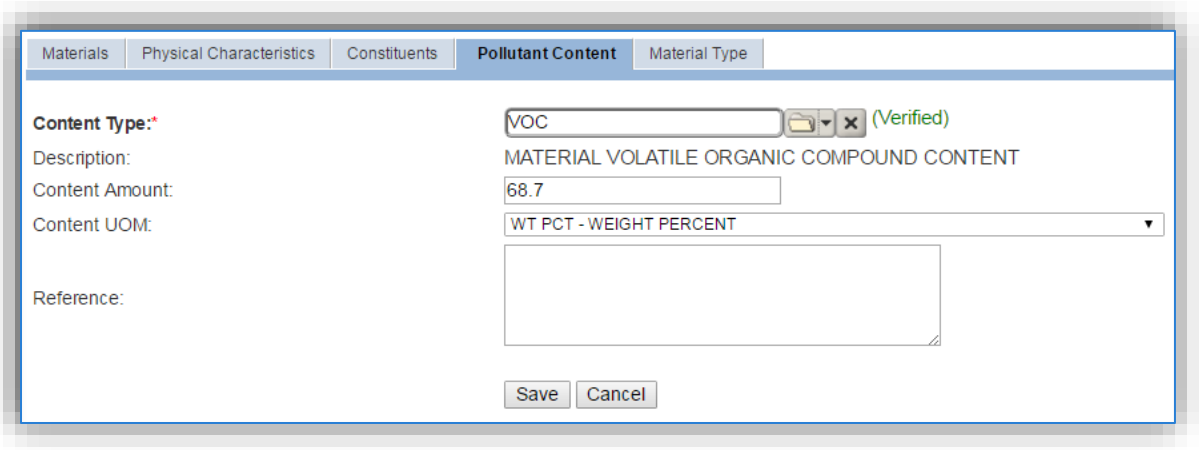


On this tab, make sure all the ingredients for the material are entered and have an **Emission Calc %**. The **Emission Calc %** field is utilized in the calculation of HAPs on the algorithms that use the average ingredient percent. If the highest ingredient percent algorithm is utilized the **Max %** field must be populated.

Next, navigate to the *Pollutant Content* tab.



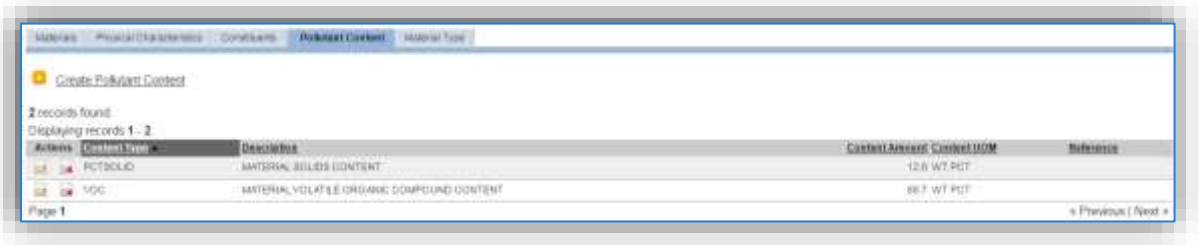
Click on the Create Pollutant hyperlink to add the Material Volatile Organic Compound Content or the Material Solids Content.



Enter VOC or PCT SOLID in the **Content Type** field and select the associated value.

Enter the VOC content of the material in LBS/GAL or WT PCT depending upon the algorithm utilized or enter the PCT SOLID in WT PCT in the **Content Amount** and **Content UOM** fields.

Click the Save button to return to the *Pollutant Content* tab.



The VOC value is required for the algorithm that calculates the total VOC emissions from surface coating.

The PCT SOLID value is required for the algorithm that calculates the PM, PM_{10} and $PM_{2.5}$ emissions from surface coating.

3.3.3.2 New Sources

3.3.3.2.1 Data Collection Sheet

The form on the next page is a printable guide that can be taken out to the location of the source and used to gather all the necessary information from the shop personnel. It can then be used as a guide to help configure the data in APIMS when you return to your office.

Surface Coating Data Collection Worksheet

GENERAL INFORMATION

Building Number_____ Mission/Purpose _____
Shop Name/Function_____ Management Organization_____
Coordinates - Latitude: _____ Longitude: _____
UTM: _____ Zone _____ Easting _____Northing ☐ Feet ☐ Meters
Is this source in any of your permits? ☐ Yes ☐ No
If yes, does it have an emission unit number or other designation? _____

EQUIPMENT INFORMATION

What type of surface coating is conducted?

- ☐ Enclosed Paint Booth
- ☐ Unenclosed, All application types
- ☐ Unenclosed, Brush and Roller
- ☐ Unenclosed, Aerosol
- ☐ Unenclosed, Other – Specify:_____

Is there a control device or devices? ☐ Yes ☐ No
If yes, list the control devices with their pollutant control efficiencies

Manufacturer _____

Model Number_____ Serial Number _____

Control _____ Efficiencies_____

Control _____ Efficiencies_____

If possible collect a copy of the spec sheet that specifies the control efficiency and pollutants controlled.

USAGE INFORMATION

Does this shop require manual paint logs for regulatory purposes? ☐ Yes ☐ No
If yes,

- Does the shop track individual kit part usage or total kit as used? ☐ Kit Parts ☐ Total Kit
- Collect the manual paint logs along with all product Safety Data Sheets.

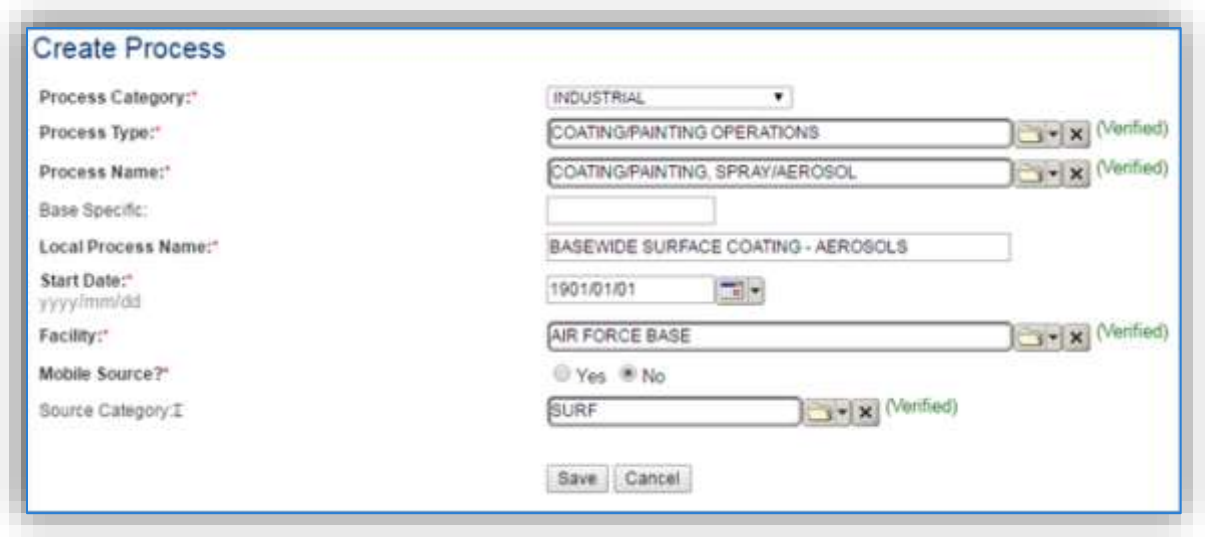
If no, are the materials purchased through EESOH-MIS? ☐ Yes ☐ No

If Yes, specify the shop and process designation in EESOH-MIS.
Shop Code _____ Process Code/Name _____

3.3.3.2.2 New Source Configuration

In order to properly document this emission source in APIMS, there will need to be at least one Unique Process record. If the EESOH-MIS processes are configured to have each application type segregated into separate processes, a next higher process for each application type needs to be configured. If the surface coating processes are not segregated by application type then a single next higher process will need to be configured. For the surface coating activities that occur in paint booths a process for each paint booth will need to be configured.

Navigate to the Unique Process module in APIMS and click the Create New Process hyperlink.



Process Category	Process Type	Process Name	Process ID
INDUSTRIAL	COATING/PAINTING OPERATIONS	COATING, POWDER	ICP1175
INDUSTRIAL	COATING/PAINTING OPERATIONS	COATING/PAINTING OPERATIONS, NOC	ICP1189
INDUSTRIAL	COATING/PAINTING OPERATIONS	COATING/PAINTING, AIRBRUSHING	ICP1190
INDUSTRIAL	COATING/PAINTING OPERATIONS	COATING/PAINTING, AIRLESS SPRAYING	ICP1191
INDUSTRIAL	COATING/PAINTING OPERATIONS	COATING/PAINTING, BRUSH/ROLLER	ICP1192
INDUSTRIAL	COATING/PAINTING OPERATIONS	COATING/PAINTING, DIP	ICP1194
INDUSTRIAL	COATING/PAINTING OPERATIONS	COATING/PAINTING, MULTIPLE OPERATIONS	ICP1196
INDUSTRIAL	COATING/PAINTING OPERATIONS	COATING/PAINTING, SPRAY - ELECTROSTATIC AUTOMATIC	ICP1198
INDUSTRIAL	COATING/PAINTING OPERATIONS	COATING/PAINTING, SPRAY - ELECTROSTATIC MANUAL	ICP1199

Process Category	Process Type	Process Name	Process ID
INDUSTRIAL	COATING/PAINTING OPERATIONS	COATING/PAINTING, SPRAY – HVLP GUN	ICP1200
INDUSTRIAL	COATING/PAINTING OPERATIONS	COATING/PAINTING, SPRAY – STANDARD GUN	ICP1201
INDUSTRIAL	COATING/PAINTING OPERATIONS	COATING/PAINTING, SPRAY/AEROSOL	ICP1202
The following codes should only be used by bases subject to the Aerospace NESHAP			
INDUSTRIAL	COATING/PAINTING OPERATIONS	COATING/PAINTING, AEROSPACE NESHAP – SPRAY	ICP2164
INDUSTRIAL	COATING/PAINTING OPERATIONS	COATING/PAINTING, AEROSPACE NESHAP – NON-SPRAY	ICP2165
INDUSTRIAL	COATING/PAINTING OPERATIONS	COATING/PAINTING, FACILITIES/BUILDINGS – SPRAY	ICP2166
INDUSTRIAL	COATING/PAINTING OPERATIONS	COATING/PAINTING, FACILITIES/BUILDINGS – NON-SPRAY	ICP2167
INDUSTRIAL	COATING/PAINTING OPERATIONS	COATING/PAINTING, AEROSPACE NESHAP - SPRAY	ICP2168
INDUSTRIAL	COATING/PAINTING OPERATIONS	COATING/PAINTING, GROUND SUPPORT EQUIPMENT – NON-SPRAY	ICP2169
INDUSTRIAL	COATING/PAINTING OPERATIONS	COATING/PAINTING, MOTOR VEHICLES – SPRAY	ICP2170
INDUSTRIAL	COATING/PAINTING OPERATIONS	COATING/PAINTING, MOTOR VEHICLES – NON-SPRAY	ICP2171
INDUSTRIAL	COATING/PAINTING OPERATIONS	COATING/PAINTING, MISC METAL PARTS, NON-AEROSPACE NESHAP - SPRAY	ICP2172
INDUSTRIAL	COATING/PAINTING OPERATIONS	COATING/PAINTING, MISC METAL PARTS, NON-AEROSAPCE NESHAP – NON-SPRAY	ICP2173
INDUSTRIAL	COATING/PAINTING OPERATIONS	COATING/PAINTING, MISC NON-METAL PARTS, NON-AEROSPACE NESHAP – SPRAY	ICP2174
INDUSTRIAL	COATING/PAINTING OPERATIONS	COATING/PAINTING, MISC NON-METAL PARTS, NON-AEROSPACE NESHAP – NON-SPRAY	ICP2175
INDUSTRIAL	COATING/PAINTING OPERATIONS	COATING/PAINTING, AEROSPACE NESHAP EXEMPT (AVIONICS, INCOMPLETE ASSEMBLIES) - SPRAY	ICP2176
INDUSTRIAL	COATING/PAINTING OPERATIONS	COATING/PAINTING, AEROSPACE NESHAP EXEMPT (AVIONICS, INCOMPLETE ASSEMBLIES) – NON-SPRAY	ICP2177

Use the table above to determine the appropriate **Process Category**, **Process Type** and **Process Name**. The codes that are specified for installations subject to the Aerospace NESHAP allow for the separation of regulated and non-regulated painting operations based on the object being painted.

The **Base Specific** field can be used to enter a standard convention identifier that will best help identify the source. If the source is permitted, enter the emission unit ID as designated in the permit.

The **Local Process Name** should be in a standard naming convention for all sources that helps to quickly identify what the process is, where it is and any other unique attribute. Examples of process names for each type of surface coating process can be found below.

Next higher process by application type:

- BASEWIDE SURFACE COATING – AEROSOLS
- BASEWIDE SURFACE COATING – BRUSH/ROLLER

General next higher process:

- BASEWIDE SURFACE COATING – ALL APPLICATIONS

Paint booth process:

- BLDG 159 – VEHICLE MAINT – PAINT BOOTH
- BLDG 7 – 508TH MXS AGE – PAINT BOOTH

The **Start Date** should be the date the unit became operational, if this date is not known, enter 1901/01/01 as a default start date.

The **Facility Name** should be the facility that is responsible for the source or sources.

The **Mobile Source?** flag should be "NO" as this is considered a stationary source.

All surface coating activities are stationary sources that are assigned to the SURF **Source Category**.

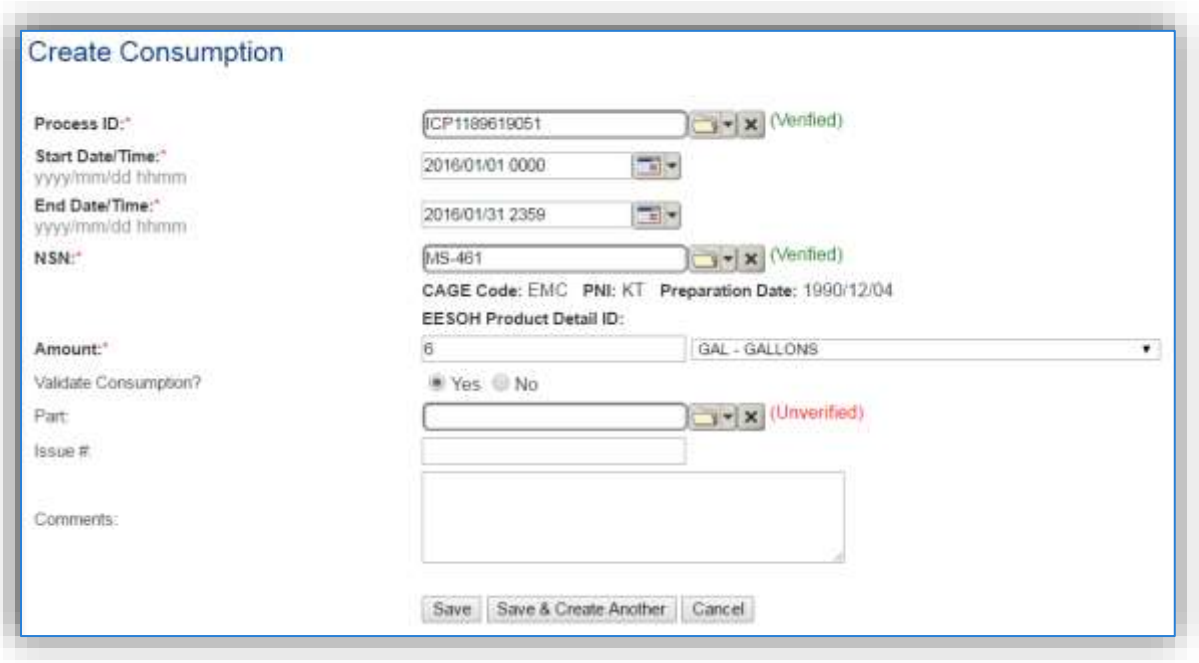
For the population of all other tabs, refer to the Existing Sources sections.

3.3.4 Year-to-Year Maintenance

3.3.4.1 Usage

The consumption for surface coating sources usually needs to be tracked monthly unless a different reporting period is required by a regulatory agency. To correctly document the usage for this emission source the consumption should be entered in the Consumption module for the paint booths using manual paint logs.

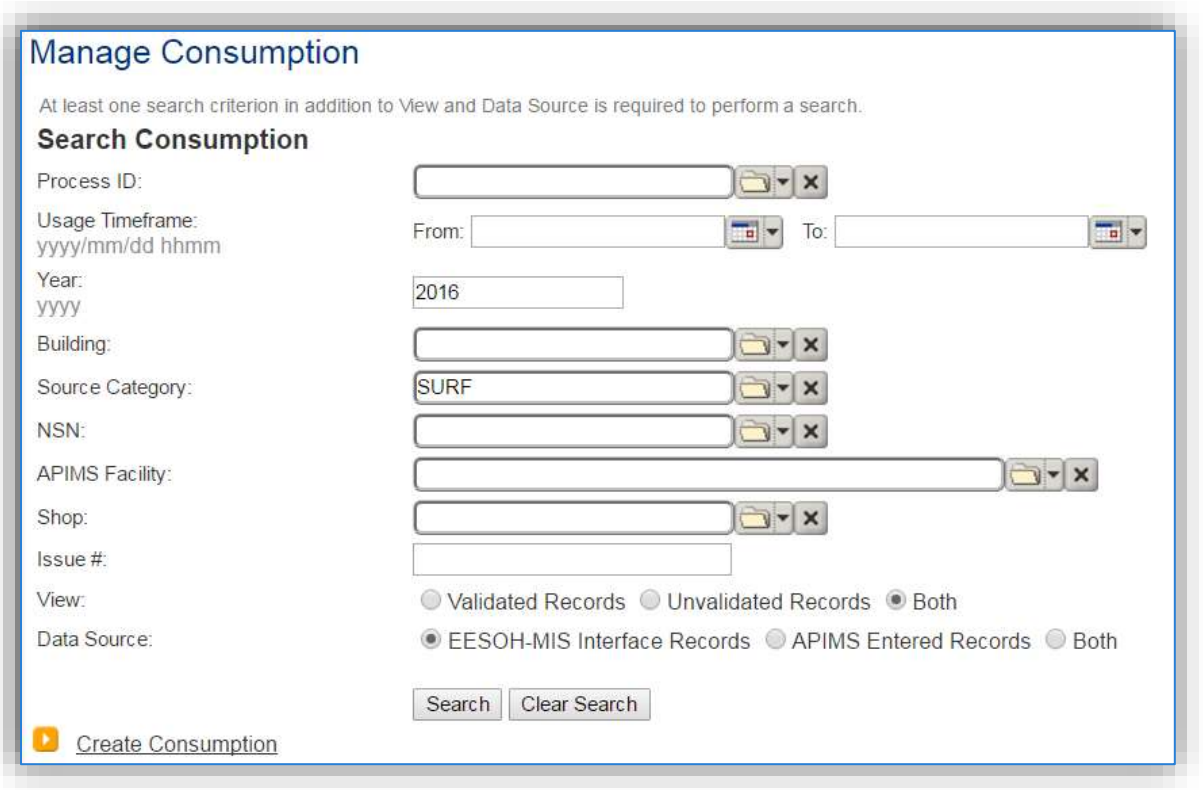
Navigate to the Consumption module and click the Create Consumption hyperlink.



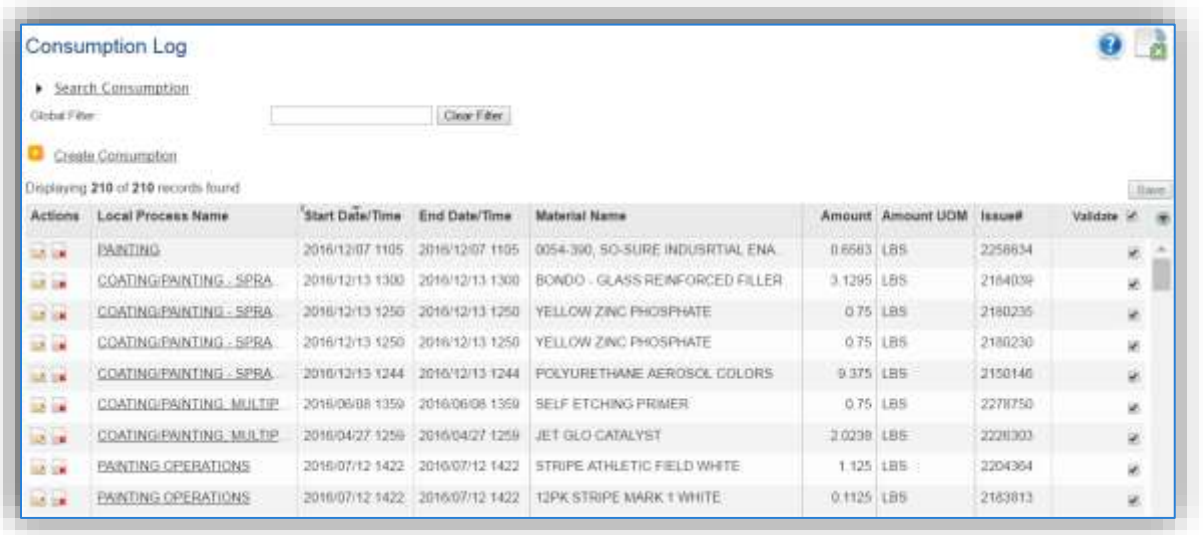
The consumption record should span the entire reporting period as shown above. The **Amount** should be recorded in gallons or pounds depending upon the algorithm selected. Make sure to select "Yes" to **Validate Consumption**. If the consumption is not validated it will not be included in the emissions calculation. Click the **Save** button or **Save & Create Another** button to add additional consumption records. Repeat these steps for all the different materials used during the reporting period.

If the unit did not operate during the year but was still an active source, enter a consumption record with zero usage and a comment as to why it did not operate. This type of documentation ensures that all equipment is accounted for from year to year and can be used to account for differences in AEI reporting from year to year.

For the Next Higher Process configuration, the consumption is already imported from the EESOH-MIS interface, however it is not validated. The consumption must be validated in the Consumption log.



Use the search criteria to narrow the search results. It is suggested to use the Source Category, Data Source and Year or Usage Timeframe to filter the results.



Check the checkbox next to each material then click **Save** to validate the consumption. Only consumption that is validated will be included in emissions calculations. The simplest use case for validating rows is to start by checking the top box in the grid to validate all rows present. After all boxes are checked, click **Save**.

3.3.4.2 Emissions Calculations

If the process utilizes EESOH-MIS data then it should be included in the **EESOH-MIS Calculation**, otherwise this emission source should be included in a **Stationary Source Calculation** that calculates controlled emissions. Reference Section 2.7 Emissions Calculations for additional instructions and details.

3.4 Solvent Operations (DEGR, CLN, GSOL, FCLN, HCLN, SGUN)

3.4.1 Source Types

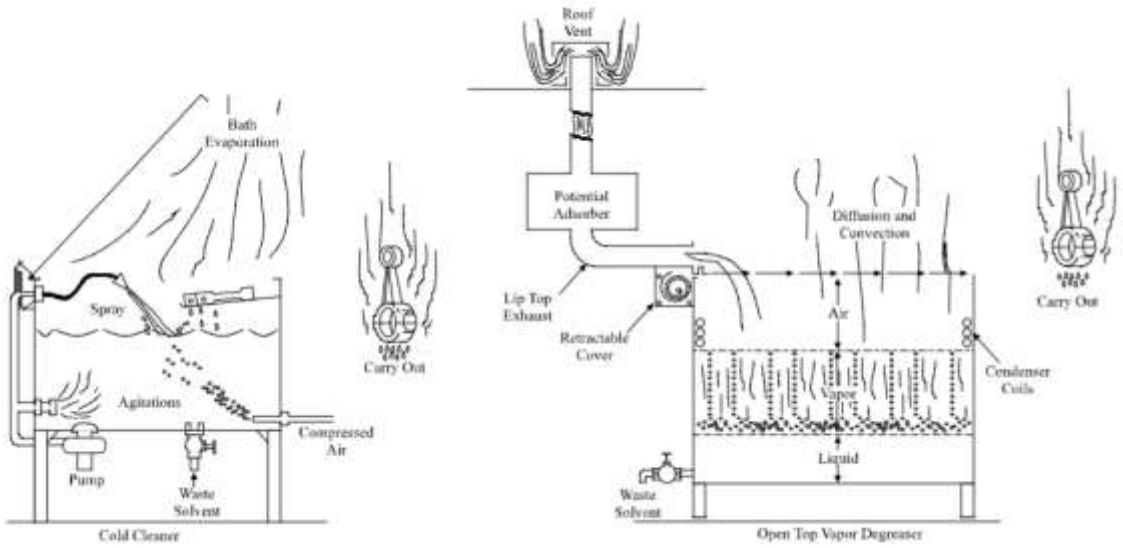
Solvent operations include several specific source types: Degreasing (DEGR), Cleaning (CLN), General Solvent Use (GSOL), Flush Cleaning (FCLN), Hand Wipe Cleaning (HCLN), and Spray Gun Cleaning (SGUN). Most installations do not have the regulatory reporting requirements that would require their chemical and solvent use to be broken down to this level of granularity; however, installations that are subject to the Aerospace NESHAP regulations may find this useful. The following paragraphs will describe in detail the types of sources that fall into the above-mentioned source categories.

3.4.1.1 Degreasing (DEGR)

Degreasing solvent operations are commonly used by Air Force maintenance organizations to remove grease, oils, lubricants, soils, waxes, carbon deposits, fluxes, tars, and other contaminants from a variety of parts and equipment, that include aircraft, automobiles and Aerospace Ground Equipment (AGE). At Air Force installations these solvent operations are usually conducted in batch cold or batch vapor cleaning machines. Cold cleaning machines use liquid, non-boiling solvent, while vapor cleaning machines boil liquid solvent to generate solvent vapor to clean parts.

In cold cleaners the parts are usually cleaned manually and then placed in the tank to soak until adequately clean. The solvent is allowed to drain from the parts before removing. The cover of the machine is intended to be securely closed whenever the parts are not being handled to minimize emissions from evaporation.

In vapor cleaners the solvent is heated to a temperature that is at or above the solvent's boiling point. As the solvent boils, the denser solvent vapors rise and displace the air within the tank. Coolant is circulated in condensing coils at the top of the tank, creating a controlled vapor zone. Parts are lowered into the vapor zone and are cleaned when the solvent vapors condense onto the surface of the parts. Cleaning is often enhanced by either spraying the parts with the hot solvent or by immersing the parts in the solvent. Most are equipped with a lip-mounted ventilation system that carries solvent vapors away from the operating personnel. The vapors may then be passed through a control device prior to being vented into the atmosphere. The next figure illustrates these two cleaning methods.



3.4.1.2 Cleaning (CLN)

Most Air Force Bases offer some sort of dry-cleaning service that is in some instances performed on-base. Dry cleaning involves the cleaning of fabrics with a variety of solvents. Depending upon the type of solvent used, the emissions may be VOCs and/or organic HAPs. The most common of theses solvents is perchloroethylene. Emissions result from the evaporation of the solvent which occurs during the operation of the machine. These emissions may or may not be vented. Control devices may also be applied, such as, refrigerated condensers and carbon adsorbers. After separating out the water, the solvent is captured by a refrigerated condenser and placed back into the solvent supply tank. Carbon absorbers are used to capture the solvent, after which the solvent can be desorbed using steam. The water and solvent are then separated, and the solvent is returned to the solvent tank.

3.4.1.3 General Solvent Use (GSOL)

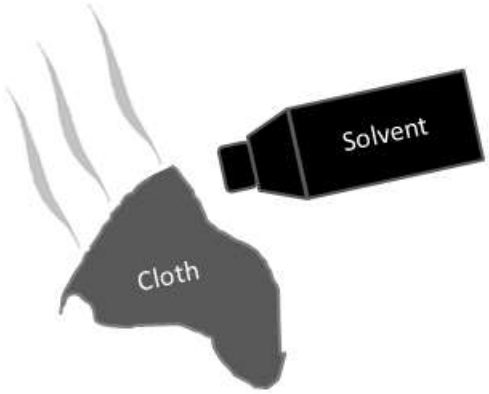
This is used for solvents that do not fall into the other solvent categories. Separating activities that use solvents from general chemical use is important for installations that fall under the Aerospace NESHAP that regulates the types of solvents that may be used and the specific work practices that must be employed when handling these solvents. Emissions of VOCs and organic HAPs result from the evaporation of solvent during use.

3.4.1.4 Flush Cleaning (FCLN)

Flush Cleaning operations are regulated by the Aerospace NESHAP and separating these materials from other source categories is essential to ensuring compliance with the Aerospace NESHAP. Flush cleaning is defined as the removal of contaminants such as dirt, grease, oil, and coatings from an aerospace vehicle or component or coating equipment by passing solvent over, into or through the item being cleaned. The solvent may simply be poured into the item being cleaned and then drained, or be assisted by air or hydraulic pressure, or by pumping. Emissions of VOCs and organic HAPs result from the evaporation of solvent during use.

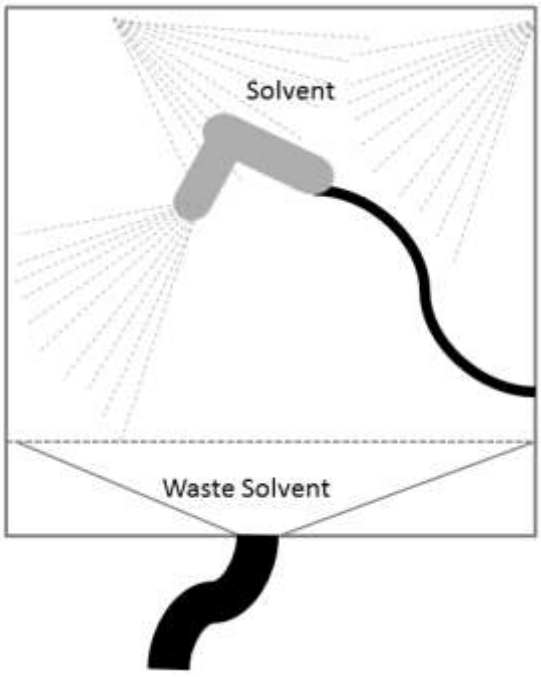
3.4.1.5 Hand Wipe Cleaning (HCLN)

Hand Wipe Cleaning operations are regulated by the Aerospace NESHAP. Separating these materials from other source categories is essential to ensuring compliance with the Aerospace NESHAP. Hand wipe cleaning is defined as the removal of contaminants such as dirt, grease, oil, and coatings from an aerospace vehicle or component by physically rubbing it with a material such as a rag, paper, or cotton swab that has been moistened with a cleaning solvent. Emissions of VOCs and organic HAPs result from the evaporation of solvent during use.



3.4.1.6 Spray Gun Cleaning (SGUN)

Spray Gun Cleaning operations are regulated by the Aerospace NESHAP. Separating these materials from other source categories is essential to ensuring compliance with the Aerospace NESHAP. Spray gun cleaning is conducted in an enclosed system that is closed at all times except when inserting or removing the spray gun. The solvent is then forced through the spray gun to remove the paint or coating material in the spray gun. Emissions of VOCs and organic HAPs result from the evaporation of solvent during use.



3.4.2 Potential Data Sources

3.4.2.1 Degreasing (DEGR)

Degreasing solvents are considered hazardous materials and are typically procured in one of two ways. The first is to have an independent contractor that services the various degreasers on base. The contractor usually comes once a quarter and collects the waste solvent and refills the degreaser tank with new solvent to the level required. Some provide a report that documents the amount of solvent added to each degreaser while others provide a total amount of solvent for the entire base. The other way solvent is procured is through the Hazardous Materials Management System (EESOH-MIS). It is important to work with the Hazardous Materials Management personnel to configure the processes and material authorizations to separate the degreasers and degreasing solvents from other material and activities. The data required for degreasing processes is the net loss of solvent. This is the amount of new solvent added minus the amount of waste solvent collected. The specific solvent used and the Safety Data Sheet (SDS) for the solvent that should include the following information:

- Product Name
- Density
- Ingredient Name and % by weight
- VOC content

For all usage information that is imported from EESOH-MIS there should also be material records that contain most if not all the required information. For manually entered usage, the Safety Data Sheets will need to be obtained. Most shops maintain Hazard Communication folders that contain all the Safety Data Sheets for materials used. If the Safety Data Sheets are not available in the shop, most are available on manufacturer websites or bioenvironmental engineering office.

The most common shops that have degreasing operations fall under the following office symbols:

- Aerospace Ground Equipment (MXMG)
- Aircraft Structural Maintenance (MXS)
- Vehicle Maintenance & Allied Trades (LGRV)
- Auto Hobby Shop
- Wheel and Tire Shop (MXS)
- Security Forces Armory (SFS)
- HVAC
- Golf Course Maintenance
- Power Pro
- CE Horizontal

3.4.2.2 Cleaning (CLN)

Dry cleaning solvents are considered hazardous materials and are typically procured through the Hazardous Materials Management System (EESOH-MIS). It is important to work with the Hazardous Materials Management personnel to configure the processes and material authorizations to separate the dry-cleaning solvents from other material and activities. The data required for dry cleaning processes is

the net loss of solvent. This is the amount of new solvent added minus the amount of waste solvent collected. The specific solvent used and the SDS for the solvent should include the following information:

- Product Name
- Density
- Ingredient Name and % by weight
- VOC content

Since the usage information that is most likely imported from EESOH-MIS there should also be material records that contain most if not all the required information.

The most common shops that have degreasing operations fall under the following office symbols:

- Dry Cleaning Service

3.4.2.3 General Solvent Use (GSOL)

Solvents are considered hazardous materials and are typically procured through the Hazardous Materials Management System (EESOH-MIS). It is important to work with the Hazardous Materials Management personnel to configure the processes and material authorizations to separate the solvents from other materials and activities. The data required for solvent use processes is the net loss of solvent. This is the amount of new solvent added minus the amount of waste solvent collected if any. Additionally, the specific solvent used and the SDS for the solvent should include the following information:

- Product Name
- Density
- Ingredient Name and % by weight
- VOC content

Since the usage information that is most likely imported from EESOH-MIS there should also be material records that contain most if not all the required information.

The most common shops that have general solvent operations fall under the following office symbols:

- Aerospace Ground Equipment (MXMG)
- Aircraft Structural Maintenance (MXS)
- Vehicle Maintenance & Allied Trades (LGRV)
- Auto Hobby Shop
- Wheel and Tire Shop (MXS)
- CE Horizontal
- CE Vertical

3.4.2.4 Flush Cleaning (FCLN)

Flush cleaning solvents are considered hazardous materials and are typically procured through the Hazardous Materials Management System (EESOH-MIS). It is important to work with the Hazardous Materials Management personnel to configure the processes and material authorizations to separate the solvents used in flush cleaning activities from other materials and activities. The data required for solvent use processes is the net loss of solvent. This is the amount of new solvent added minus the amount of waste solvent collected, if any. Additionally, the specific solvent used and the SDS for the solvent should include the following information:

- Product Name
- Density
- Ingredient Name and % by weight
- VOC content

Since the usage information that is most likely imported from EESOH-MIS there should also be material records that contain most if not all the required information.

The most common shops that have flush cleaning operations fall under the following office symbols:

- Aerospace Ground Equipment (MXMG)
- Aircraft Structural Maintenance (MXS)
- Vehicle Maintenance & Allied Trades (LGRV)
- Corrosion Control
- Wheel and Tire Shop (MXS)

3.4.2.5 Hand Wipe Cleaning (HCLN)

Hand wipe cleaning solvents are considered hazardous materials and are typically procured through the Hazardous Materials Management System (EESOH-MIS). It is important to work with the Hazardous Materials Management personnel to configure the processes and material authorizations to separate the solvents used in hand wipe cleaning operations from other materials and activities. The data required for solvent use processes is the net loss of solvent. This is the amount of new solvent added minus the amount of waste solvent collected if any. Additionally, the specific solvent used and the SDS for the solvent should include the following information:

- Product Name
- Density
- Ingredient Name and % by weight
- VOC content

Since the usage information that is most likely imported from EESOH-MIS there should also be material records that contain most if not all the required information.

The most common shops that have hand wipe cleaning operations fall under the following office symbols:

- Aerospace Ground Equipment (MXMG)

- Aircraft Structural Maintenance (MXS)
- Vehicle Maintenance & Allied Trades (LGRV)
- Corrosion Control
- Wheel and Tire Shop (MXS)

3.4.2.6 Spray Gun Cleaning (SGUN)

Spray gun cleaning solvents are considered hazardous materials and are typically procured through the Hazardous Materials Management System (EESOH-MIS). It is important to work with the Hazardous Materials Management personnel to configure the processes and material authorizations to separate the solvents used in spray gun cleaning operations from other materials and activities. The data required for solvent use processes is the net loss of solvent. This is the amount of new solvent added minus the amount of waste solvent collected if any. Additionally, the specific solvent used and the SDS for the solvent should include the following information:

- Product Name
- Density
- Ingredient Name and % by weight
- VOC content

Since the usage information that is most likely imported from EESOH-MIS there should also be material records that contain most if not all the required information.

The most common shops that have spray gun cleaning operations fall under the following office symbols:

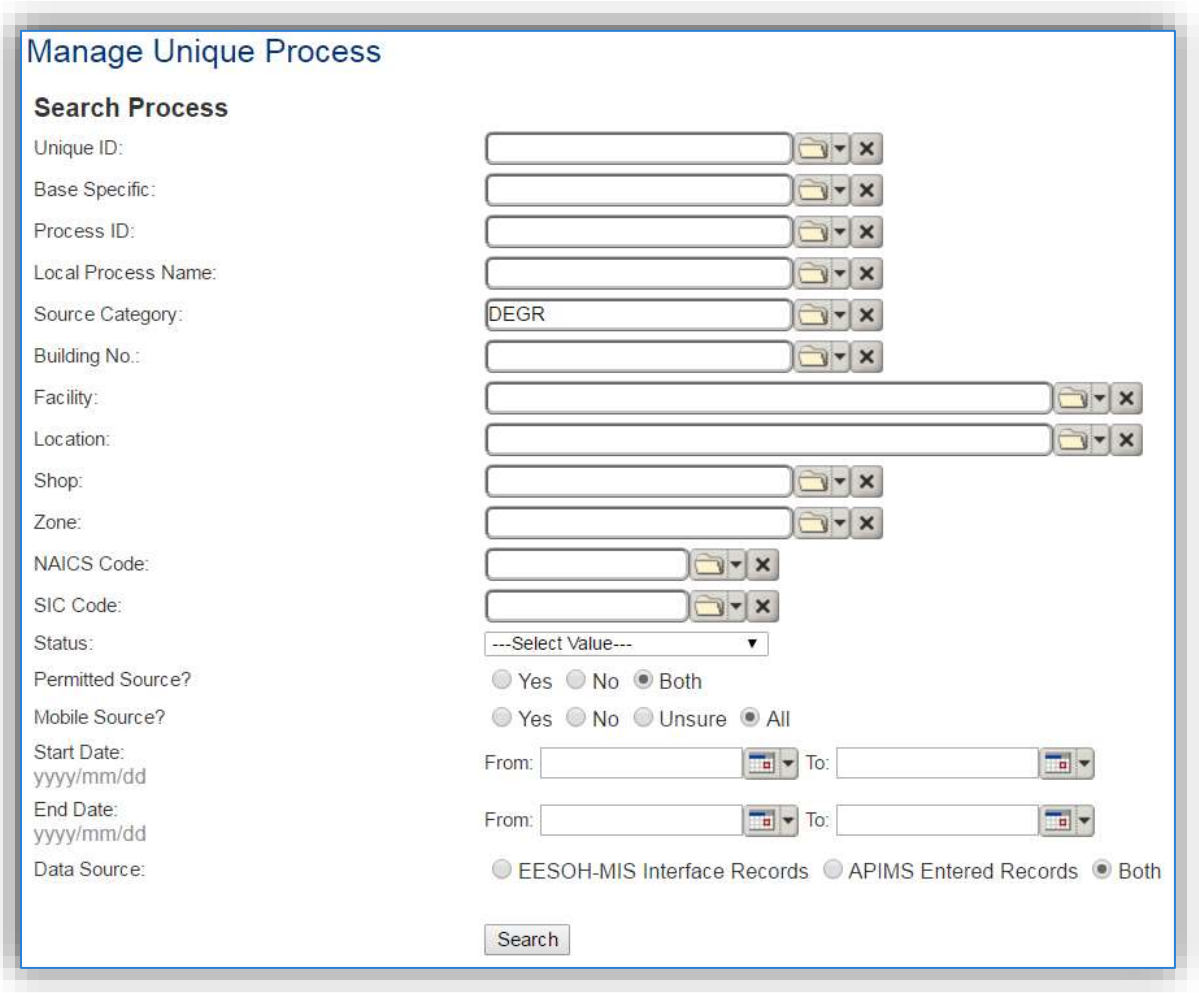
- Aircraft Structural Maintenance (MXS)
- CE Vertical Structures
- CE Horizontal
- Corrosion Control (MXS)
- Vehicle Maintenance (LGRV)
- Repair and Reclamation
- Aerospace Ground Equipment (MXMG)

3.4.3 Standard Source Identification/Characterization

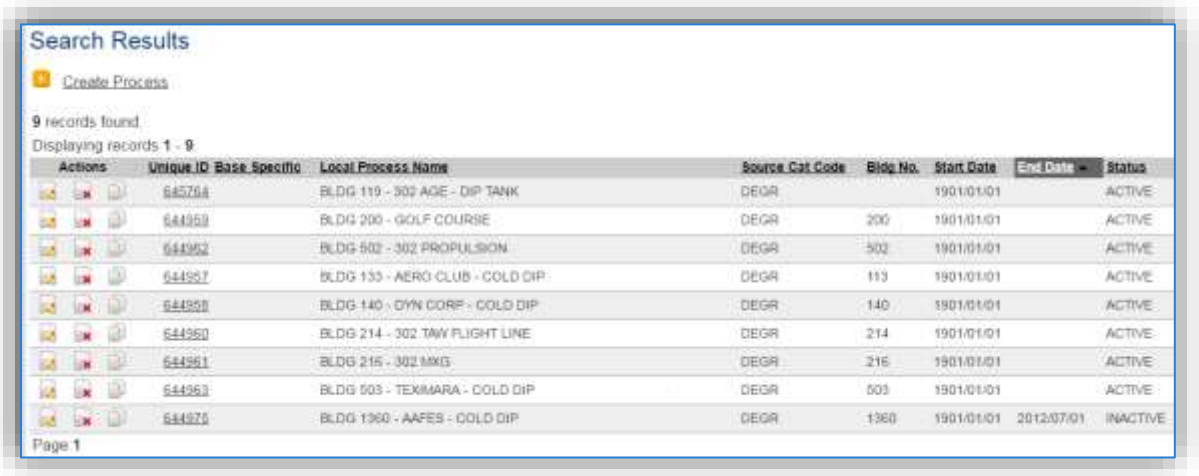
3.4.3.1 Existing Sources

It is important to review the existing sources in each source category on an annual basis at a minimum. Most regulatory agencies require an up to date source and equipment inventory.

Navigate to the Unique Process module of APIMS by clicking on **Unique Process** under the **Emission Unit** tab. In the **Source Category** search field, type “DEGR” or “CLN” or “GSOL” or “FCLN” or “HCLN” or “SGUN” then select the row for the source category from the dropdown results. Click the Search button.

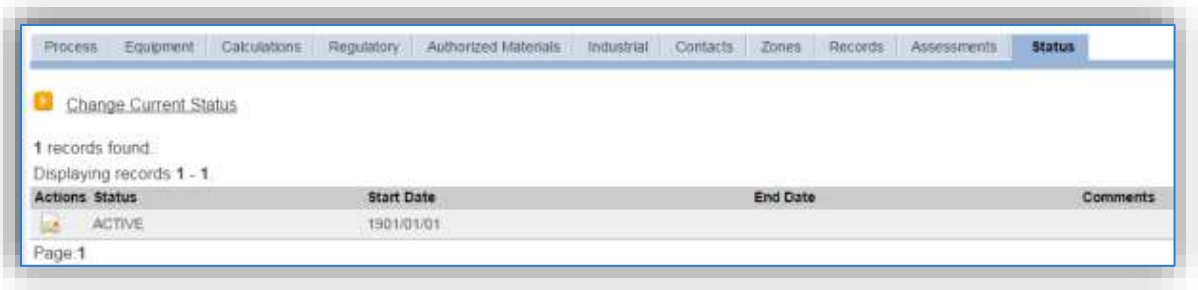


The search results grid will now display all the solvent use processes currently in APIMS.

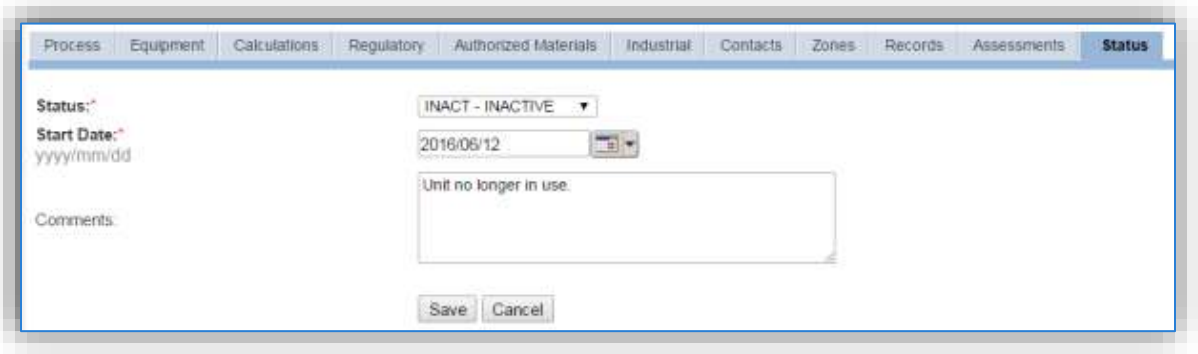


3.4.3.1.1 Status

If the status of a process needs to be changed, click the edit icon next to the process. If this is a process that was entered into APIMS via the EESOH-MIS interface, the process status must be altered in EESOH-MIS.



Navigate to the *Status* tab. Click the Change Current Status hyperlink.



Select the appropriate status from the **Status** dropdown (i.e., ACTIVE, REMOVED or INACTIVE).

For the **Start Date** enter the date at which the status changed.

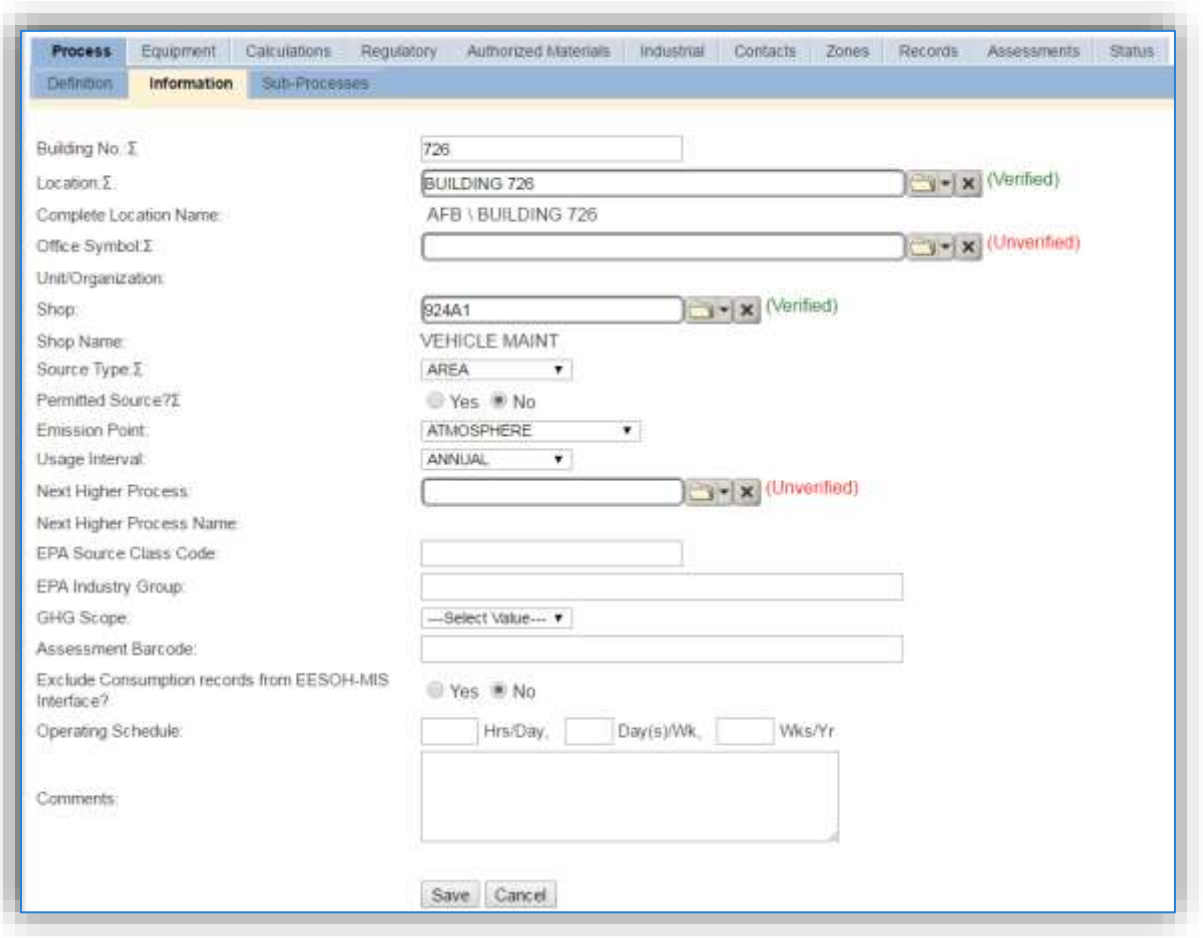
Enter **Comments** that provide insight into why the status changed. These can be very useful for equipment inventories, permit renewals and regulatory reporting. Most regulatory agencies require reporting on unit operation status; this includes any potential time spent offline and reasons for the outage.

Click the **Save** button.

The emissions for a process will only be calculated for the dates the process was in an ACTIVE status. If a source is removed in the middle of a year, the emissions will only be calculated for the part of the year the source was active.

3.4.3.1.2 Information

There are basic data elements that are important to track and maintain for new and existing sources, such as location and source type. This data can be maintained in the Unique Process record on the *Information* sub tab.



The **Building No**. field can be used to specify a general location or area of the emission source. For instance, if this is for multiple degreasers spread across the installation, specify BASEWIDE.

The **Location** field is very important to effectively manage the location and mission of the emission source. This information will be important for knowing where the source is, in case it needs to be inspected or if the source owner needs to be contact for pertinent information. For the instructions on how to create a location reference Section 2.2 Location.

The **Shop** is important as it establishes the personnel that are utilizing the equipment on a regular basis and will be the best source of information regarding the unit.

Solvent operations are categorized as an AREA sources in the **Source Type**.

The **Emission Point** would be ATMOSPHERE.

The **Permitted Source** flag should also be populated to accurately reflect the current regulatory status of the emission source. This flag can be an invaluable tool in roll-up reporting.

The **Usage Interval** should be designated. This source is usually documented on an ANNUAL basis but may be required to be on a different schedule if it is a permitted source. It is important to populate this field correctly as it will affect how it is documented in the AEI Throughputs module.

3.4.3.1.3 Sub-Processes

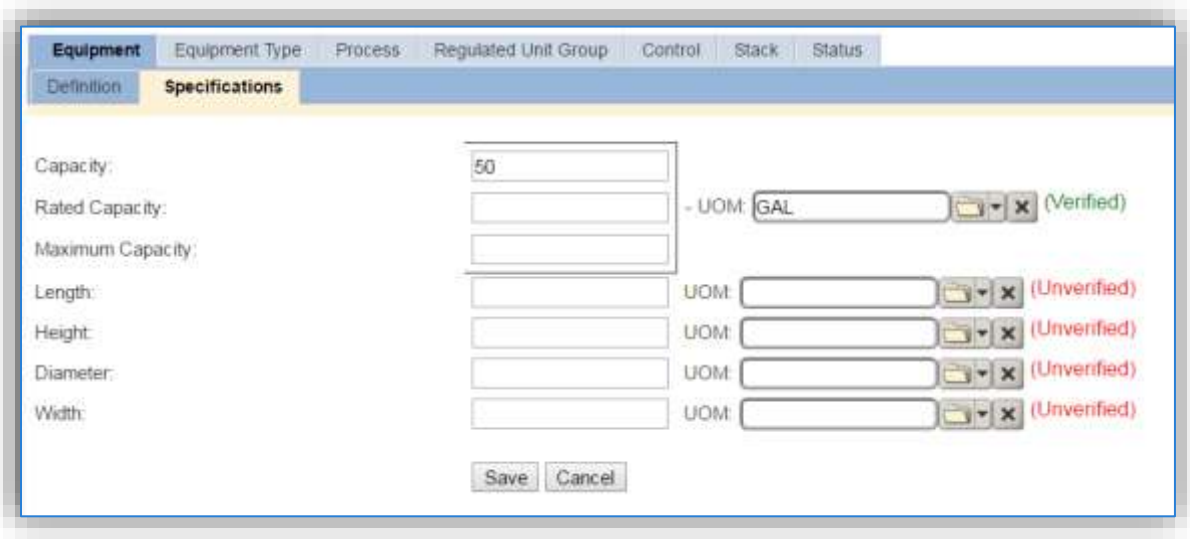
This source does not utilize this functionality.

3.4.3.1.4 Equipment

The next tab is the *Equipment* tab.

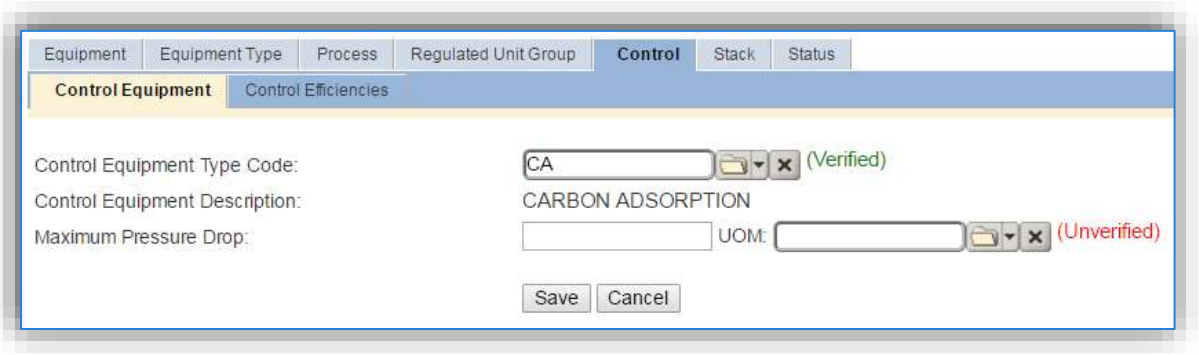
This is only used if the actual degreasers are also tracked for permit or inventory purposes. Also, if the degreaser has a specific control device, this tab should be configured.

The equipment records should have the following attributes populated. The Specifications subtab of the Equipment record should have the total volume entered in the Capacity field.



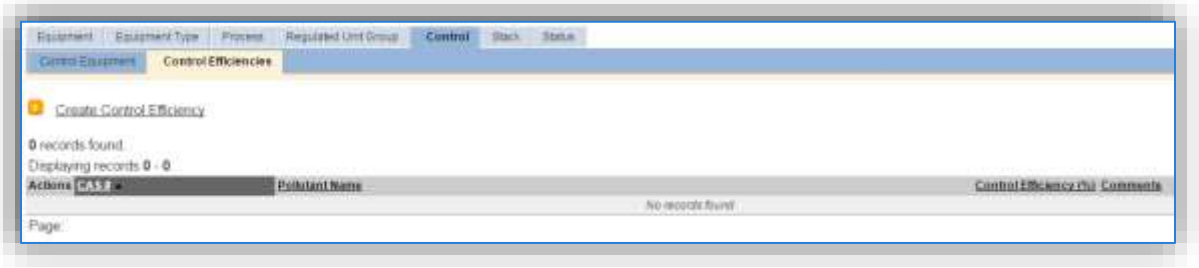
Knowing the size of a particular unit can be very helpful in determining if the usage reported is correct and what impact this equipment will have on overall emissions.

In the *Control* tab of the equipment record, the control efficiency for the device needs to be created for VOC and volatile HAPs if the degreaser has a carbon capture.



The *Control Equipment* subtab specifies the type of control equipment. Select the type from the list of values. Click the **Save** button.

Next, navigate to the *Control Efficiencies* subtab.

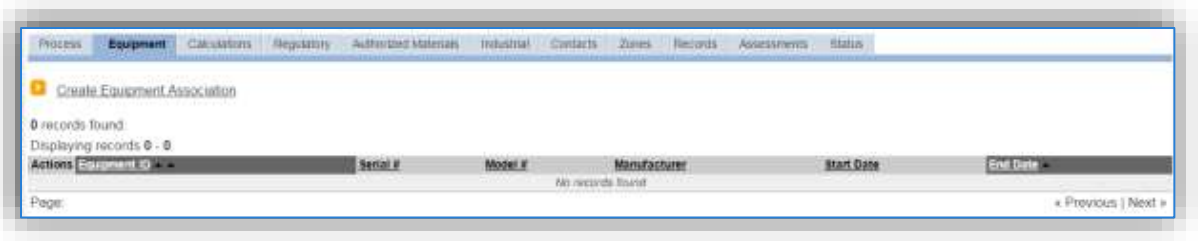


To create a control efficiency for a particular pollutant, click the Create Control Efficiency hyperlink.

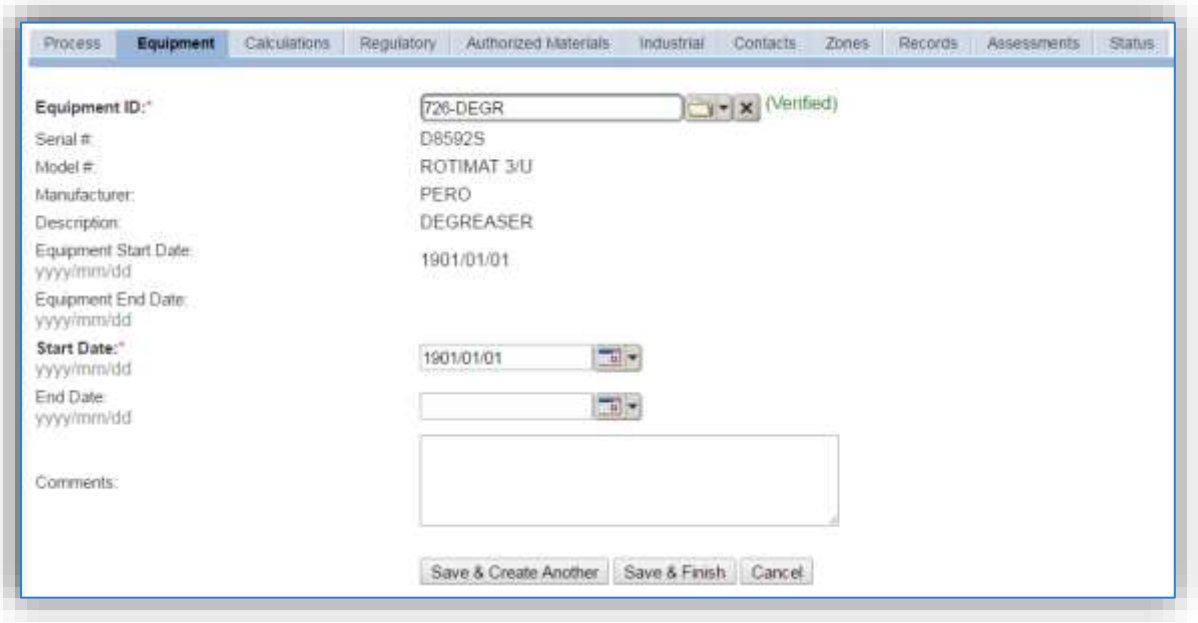
Enter the pollutant CAS # in the **CAS #** field or select the pollutant from the LOV. Next enter the control efficiency for the pollutant in percent in the **Control Efficiency** field. Click the **Save** button to finalize the control efficiency. Repeat this step as needed until all the chemicals controlled by this device are accounted for.

Navigate to the *Equipment* tab of the Unique Process record.

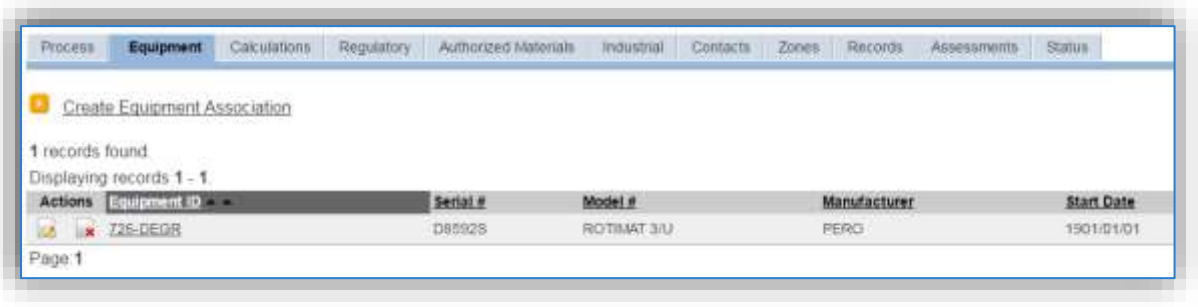
To link the equipment to the process the equipment must already be entered in APIMS.



To link the equipment, click on the Create Equipment Association hyperlink.



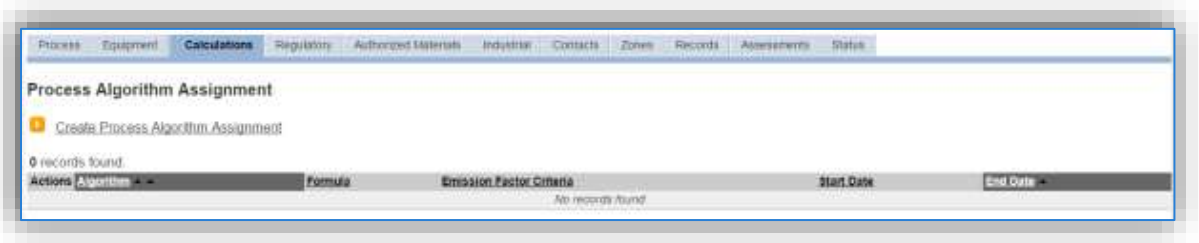
Search for the **Equipment ID** in the list of values, enter the **Start Date** and click the **Save & Finish** button.



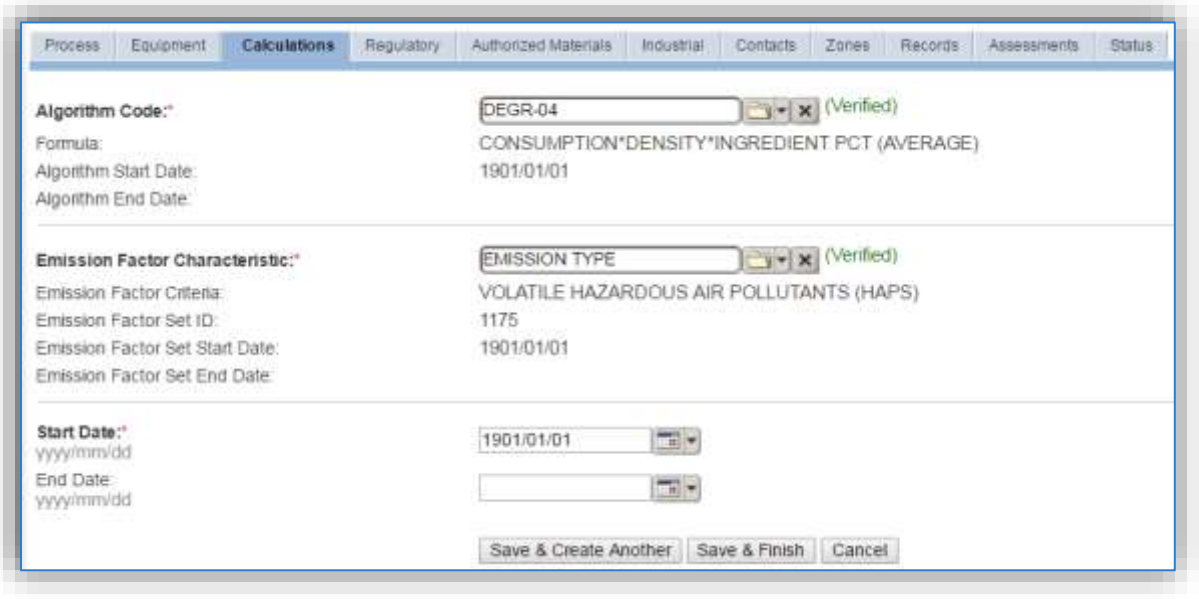
The screen above shows a completed equipment association.

3.4.3.1.5 Calculations

The next tab is the *Calculations* tab.



To associate an algorithm to the process, click on the Create Process Algorithm Assignment hyperlink.



For solvent operations there is only one standard calculation methodology recommended by the Air Force. Emissions are calculated utilizing the material VOC and a mass balance approach based on ingredients. If your permit requires a different type of calculation, contact the Air Force Air Quality Subject Matter Expert for approval of the alternative method.

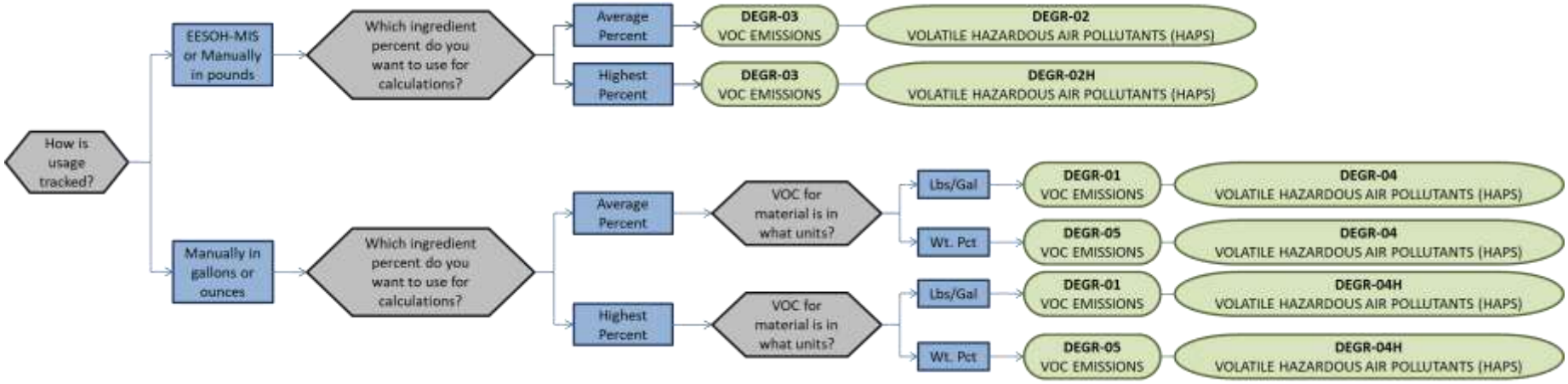
Select the **Algorithm Code** from the list of values. Next select the **Emission Factor Characteristic** that most closely matches the activity. Enter the **Start Date** to match the start date of the process.

For the solvent mass balance approach, there are **two algorithms** that need to be associated to each solvent use process. The algorithms depend upon using manually tracked consumption or EESOH-MIS consumption. Additionally, there is a choice of using the average ingredient percent or the most conservative method of using the maximum ingredient percent. The average ingredient percent is the recommended method.

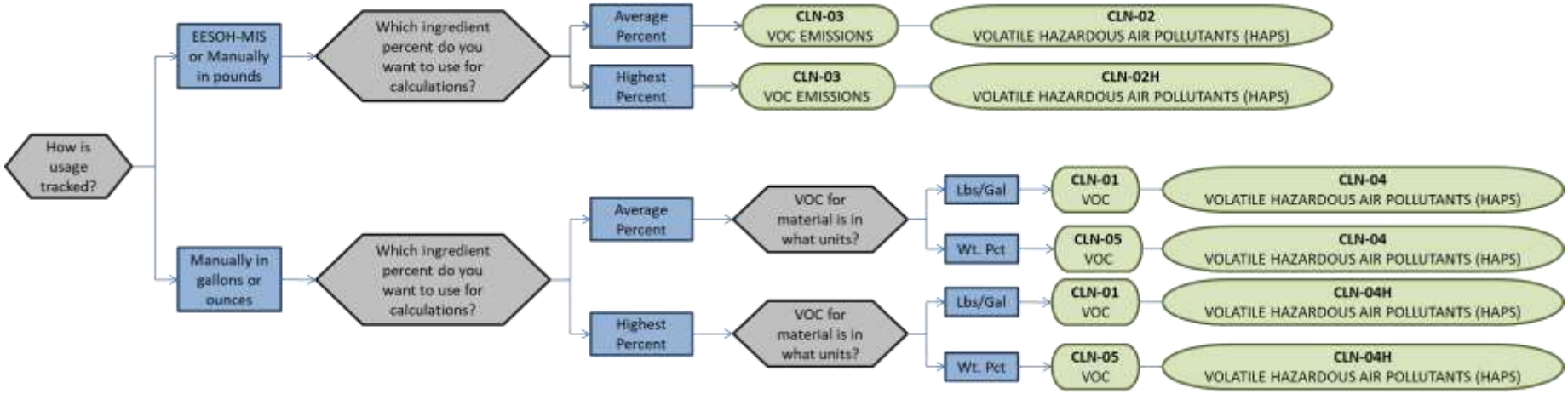
If your permit or regulatory agency requires a different type of calculation, contact the Air Force Air Quality Subject Matter Expert for approval of the alternative method.

Use the flowcharts below to find the correct Algorithm Code and Emission Factor Characteristic.

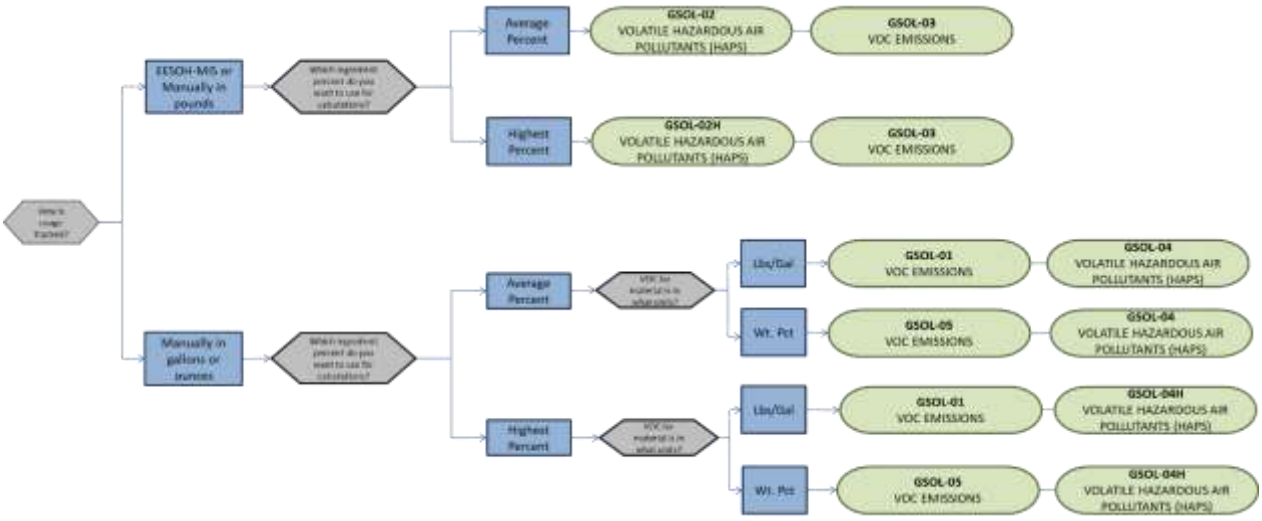
3.4.3.1.5.1 *Degreasing (DEGR)*



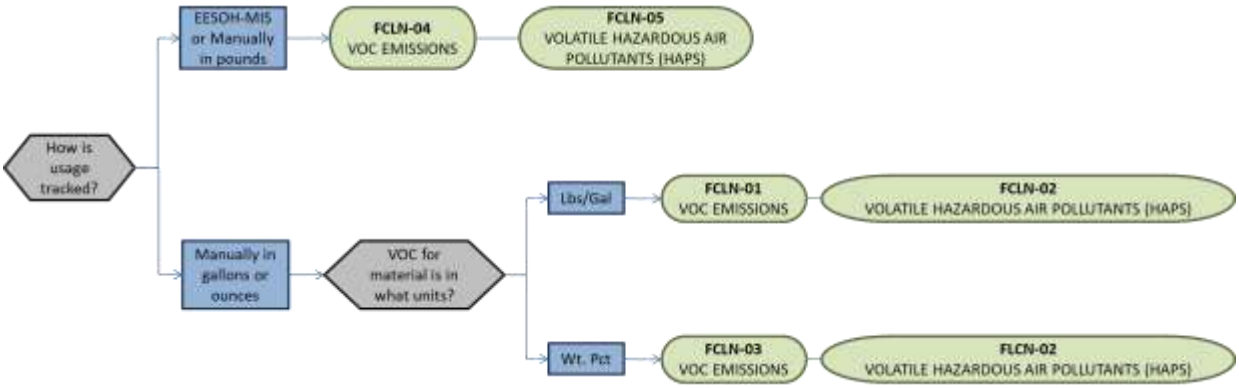
3.4.3.1.5.2 *Cleaning (CLN)*



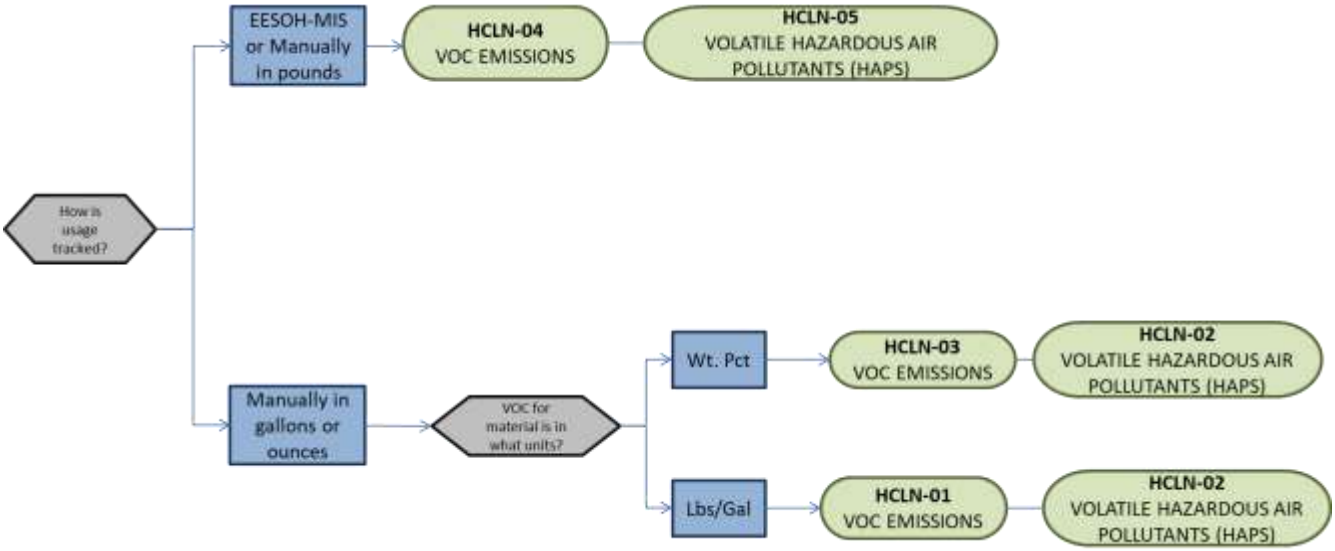
3.4.3.1.5.3 General Solvent Use (GSOL)



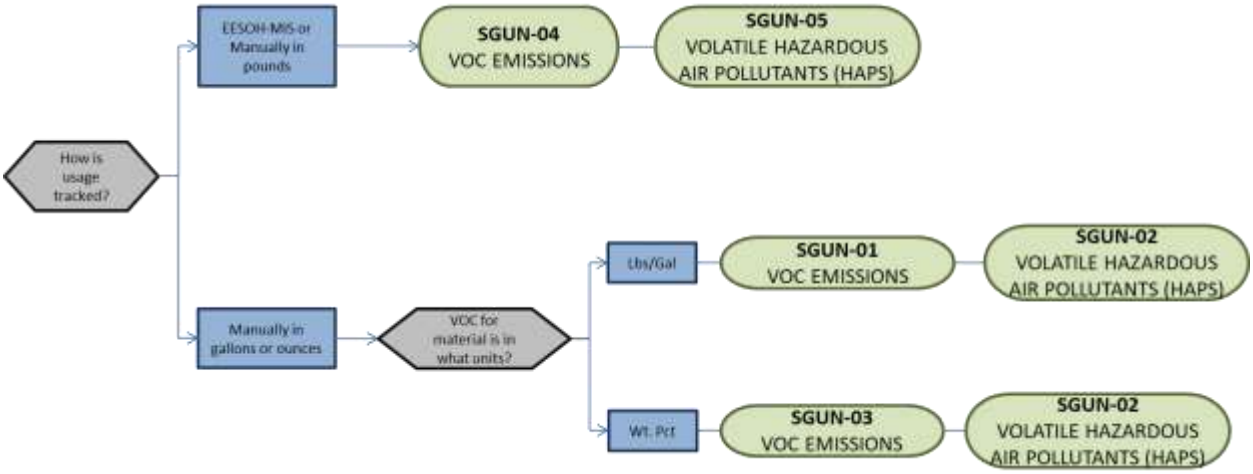
3.4.3.1.5.4 Flush Cleaning (FCLN)



3.4.3.1.5.5 Hand Wipe Cleaning (HCLN)

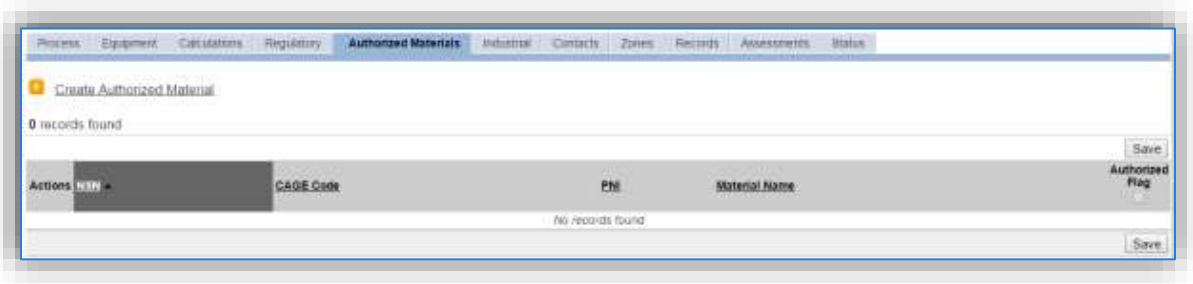


3.4.3.1.5.6 Spray Gun Cleaning (SGUN)

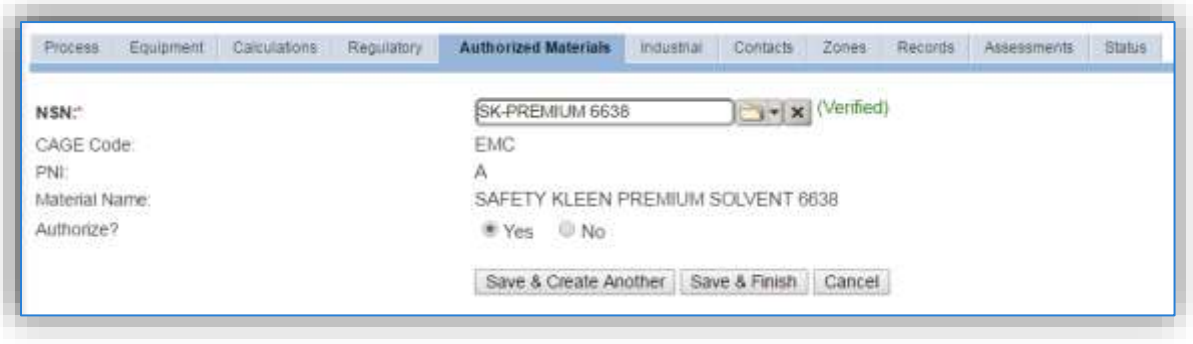


3.4.3.1.6 Materials

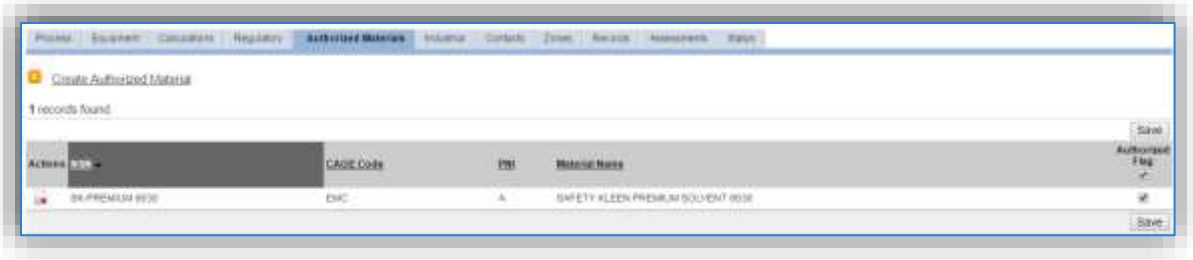
The last step in setting up the Unique Process record is to include the authorized materials on the *Authorized Materials* tab. This step is only required for processes that use manual logs to track usage in APIMS. All processes that use the consumption data from EESOH-MIS are configured by the interface.



To authorize a material for the process, click on the Create Authorized Material hyperlink.



Select the material record from the list of values, using the **NSN** or Material Name. If the material is not available the material record will need to be created. Next select "Yes" to **Authorize** the material, then **Save & Finish** or **Save & Create Another** to repeat this step for all materials used by the process.



3.4.3.2 New Sources

3.4.3.2.1 Data Collection Sheet

The form on the next page is a printable guide that can be taken out to the location of the source and used to gather all the necessary information from the shop personnel. It can then be used as a guide to help configure the data in APIMS when you return to your office.

Solvent Data Collection Worksheet

GENERAL INFORMATION

Building Number_____ Mission/Purpose_____
Shop Name/Function_____ Management Organization_____
Coordinates: Latitude: _____ Longitude: _____
UTM _____ Zone _____ Easting _____ Northing ☐ Feet ☐ Meters

Is this source in any of your permits? ☐ Yes ☐ No
If yes, does it have an emission unit number or other designation? _____

What type of solvent usage is conducted?

- ☐ Degreaser
- ☐ Dry Cleaning
- ☐ General Solvent Use
- ☐ Flush Cleaning
- ☐ Hand Wipe Cleaning
- ☐ Spray Gun Cleaning

EQUIPMENT INFORMATION

If tracking specific degreaser, collect the following equipment information:
Manufacturer _____

Model Number_____ Serial Number _____

USAGE INFORMATION

Are the solvents purchased through EESOH-MIS? ☐ Yes ☐ No

If Yes

Specify the shop and process designation in EESOH-MIS.
Shop Code _____ Process Code/Name _____

Is there a waste stream in EESOH-MIS that tracks the waste solvent collected?
If Yes, specify the Waste Site and Waste Stream.
Waste Site_____ Waste Stream_____

If No

Does this shop obtain solvent records from the service contractor? ☐ Yes ☐ No
If yes, collect the solvent reports along with all product Safety Data Sheets for the solvents used.
Solvent Name: _____

$$Solvent\ Usage = Solvent\ Added - Waste\ Solvent\ Collected$$

Solvent Usage = _____ Gallons

If no, contact the service contractor to get accurate records.

3.4.3.2.2 New Source Configuration

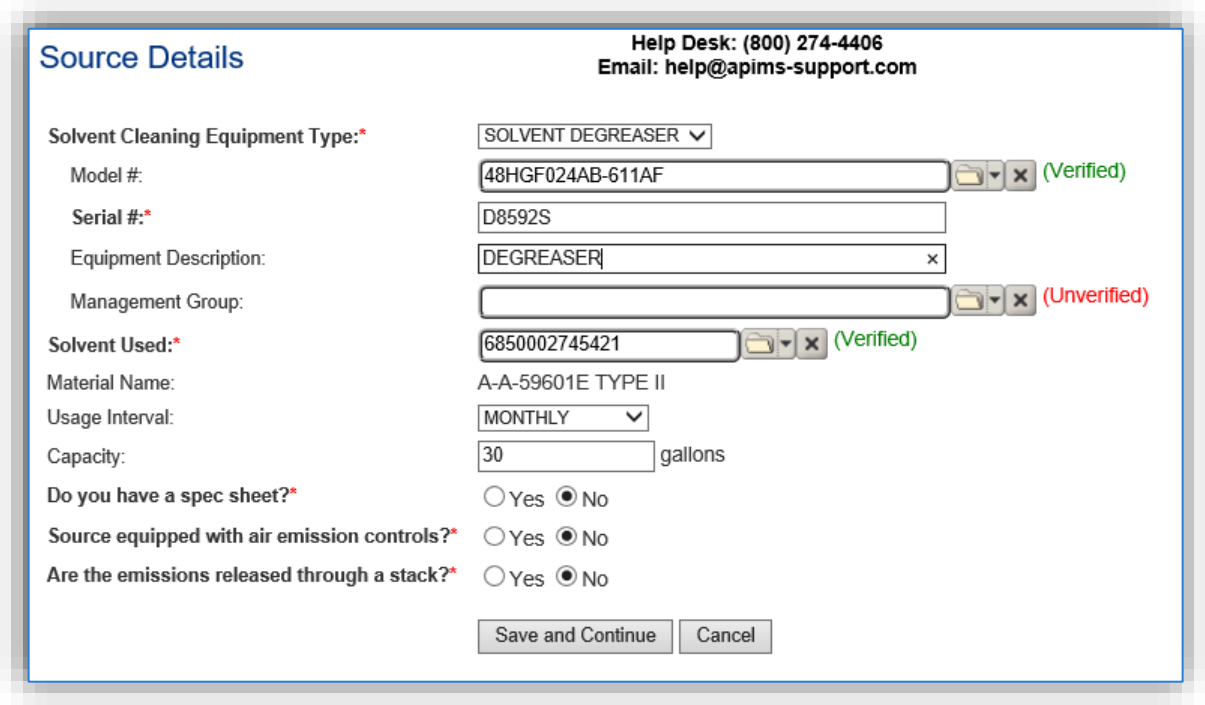
3.4.3.2.2.1 *Degreasing (DEGR)*

There are a few ways to properly document these emission sources in APIMS depending upon how the usage is tracked for each type of source. If the EESOH-MIS processes are configured properly to provide segregation of the various solvent operations then they can be configured to calculate emissions. If the solvent is not procured through EESOH-MIS but is obtained from a contactor then at least one Unique Process record will need to be configured.

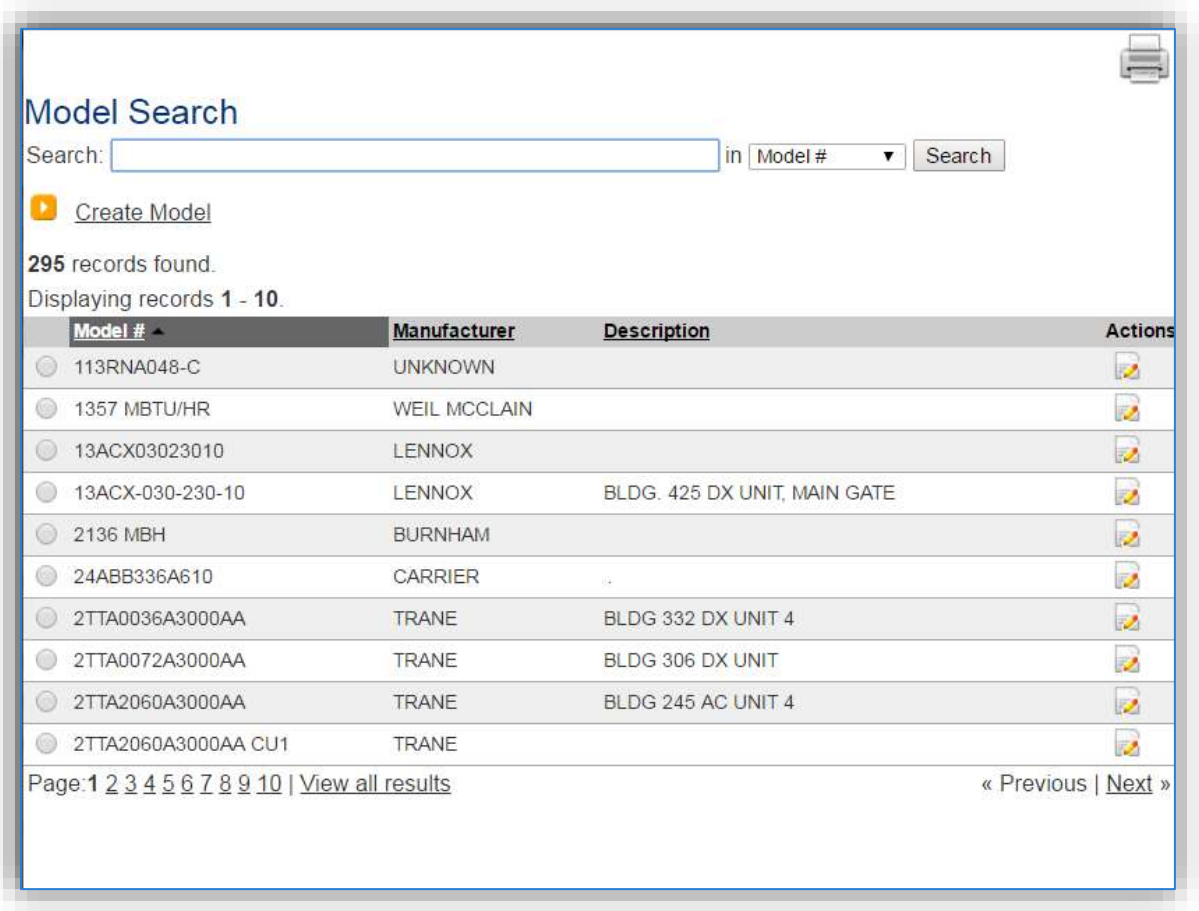
3.4.3.2.2.1.1 *Manually Tracked Solvent Degreaser*

Navigate to the **Solvent Cleaning New Source Wizard** module in APIMS under the **Emission Unit** tab.

Select the type of solvent cleaning equipment from the dropdown list (COLD DIP TANK, SOLVENT DEGREASER, SPRAY GUN CLEANER, REMOTE RESERVIOR and PARTS WASHER).

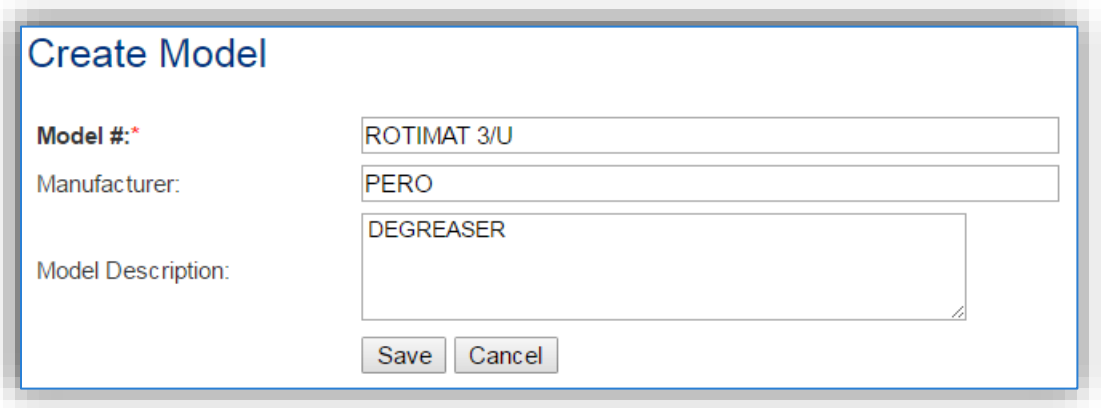


The **Model #** can be selected from the list of values (LOV) or created within the LOV popup window. Click the folder icon to open the Model Search popup.

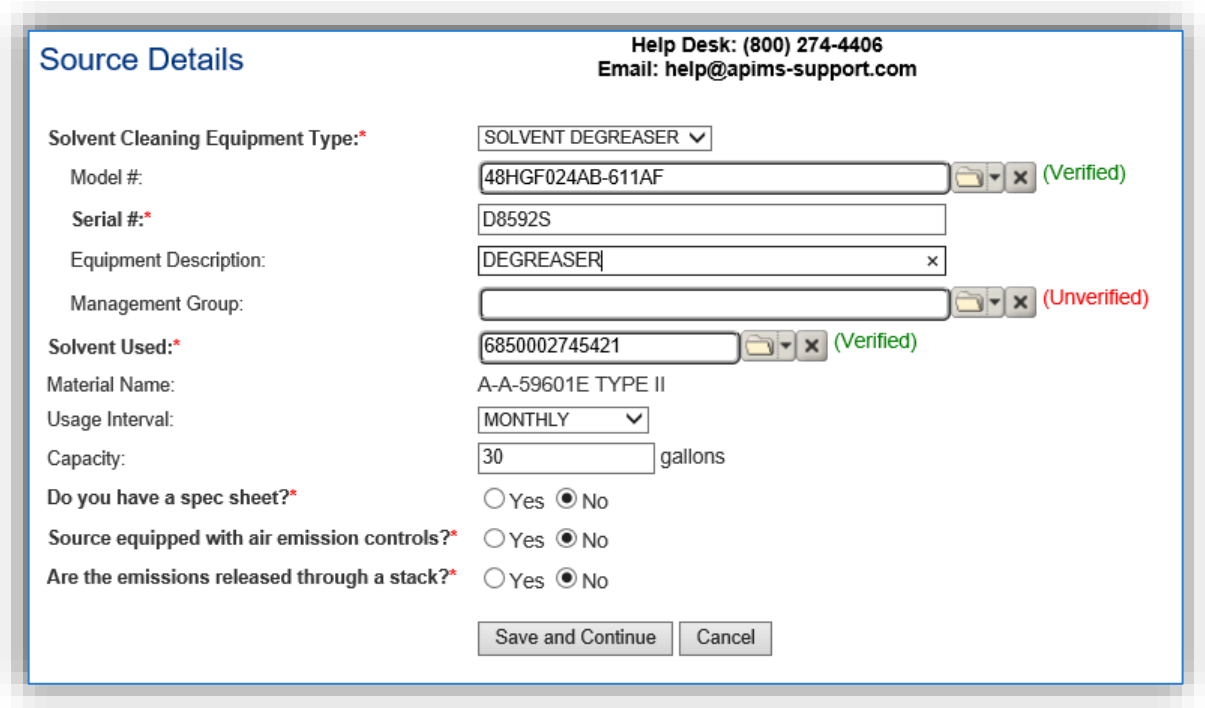


This screen manages all operations to select, edit or create a model. The search can be used to locate a specific model record. To select the model record, click the corresponding radio button. This will cause the popup window to close and will populate the **Model #** field with the selected record.

To create a new model record, click the Create Model hyperlink. This will open the Create Model popup.



Enter the actual **Model #** if known, if the model number is unknown, a standard convention to easily identify the equipment can be used, (i.e. DEGR, DIP TANK etc.). Click the **Save** button to close the window.



The **Serial #** field can be used to enter the serial number for the equipment. If the serial number of the equipment is not known, a standard convention can be used to easily identify the equipment.

The **Equipment Description** is intended to be used to easily identify the equipment, such as degreaser or cold dip tank.

The **Solvent Used** field should be used to identify the solvent used by NSN and/or material name.

The **Usage Interval** should be designated. This source is usually documented on an Annual basis but may be different if it is a permitted source. It is important to populate this field correctly as it will affect how it is documented in the AEI Throughputs module.

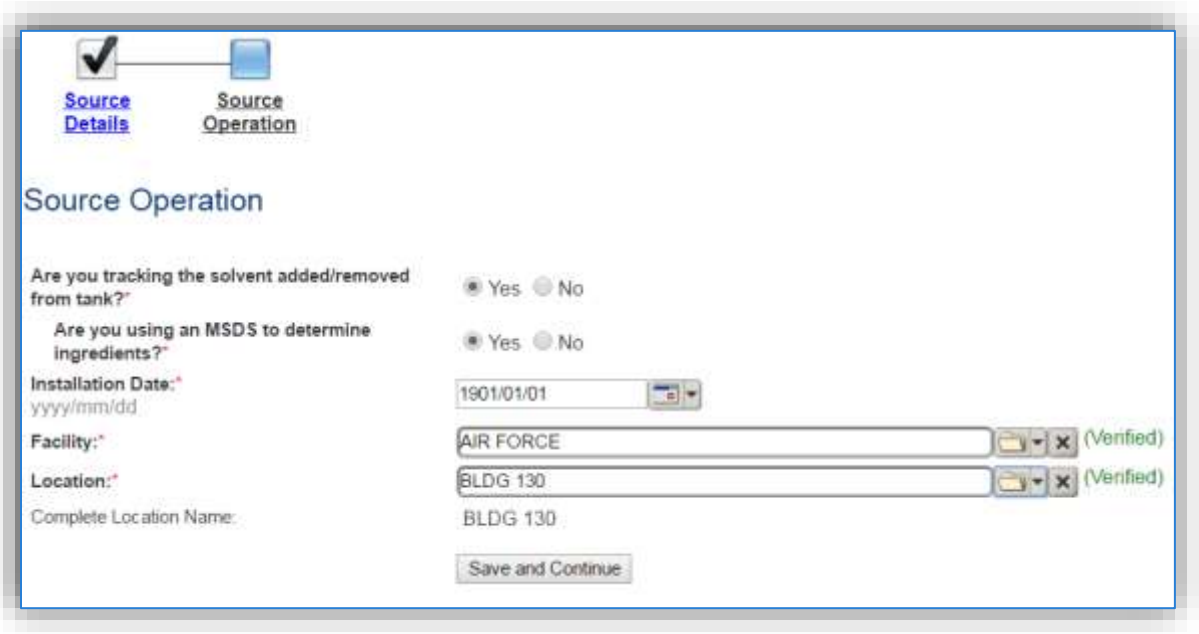
The **Capacity** field should be the total amount of solvent that is contained in the degreaser, including the remote reservoir if applicable.

Select the appropriate radio button to indicate if there is a specification sheet for the equipment. If the Yes radio button is selected a document upload field will appear.

Select the radio button to indicate if the degreaser has air emissions controls. Most degreasers do not have emission controls.

Select the radio button to indicate if the degreaser emissions are released through a stack. The most common degreasers do not have a stack.

Click the **Save and Continue** button.



Select the tracking method, to accurately track this emission source the solvent added and removed should be tracked.

The next question indicates if there is a Safety Data Sheet for solvent. If the answer is NO, it will prompt you to indicate if the VOC for the solvent is tracked in LBS/GAL or Weight (%).

The **Installation Date** should be the date the unit became operational, if this date is not known, enter 1901/01/01 as a default start date.

Select the **Facility** from the list of values. Click the **Save and Continue** button.

The **Location** field is very important to effectively manage the location of the emission source. This information will be important for knowing where the source is, in case it needs to be inspected or if the source owner needs to be contact for pertinent information.

Click the **Save and Continue** button.

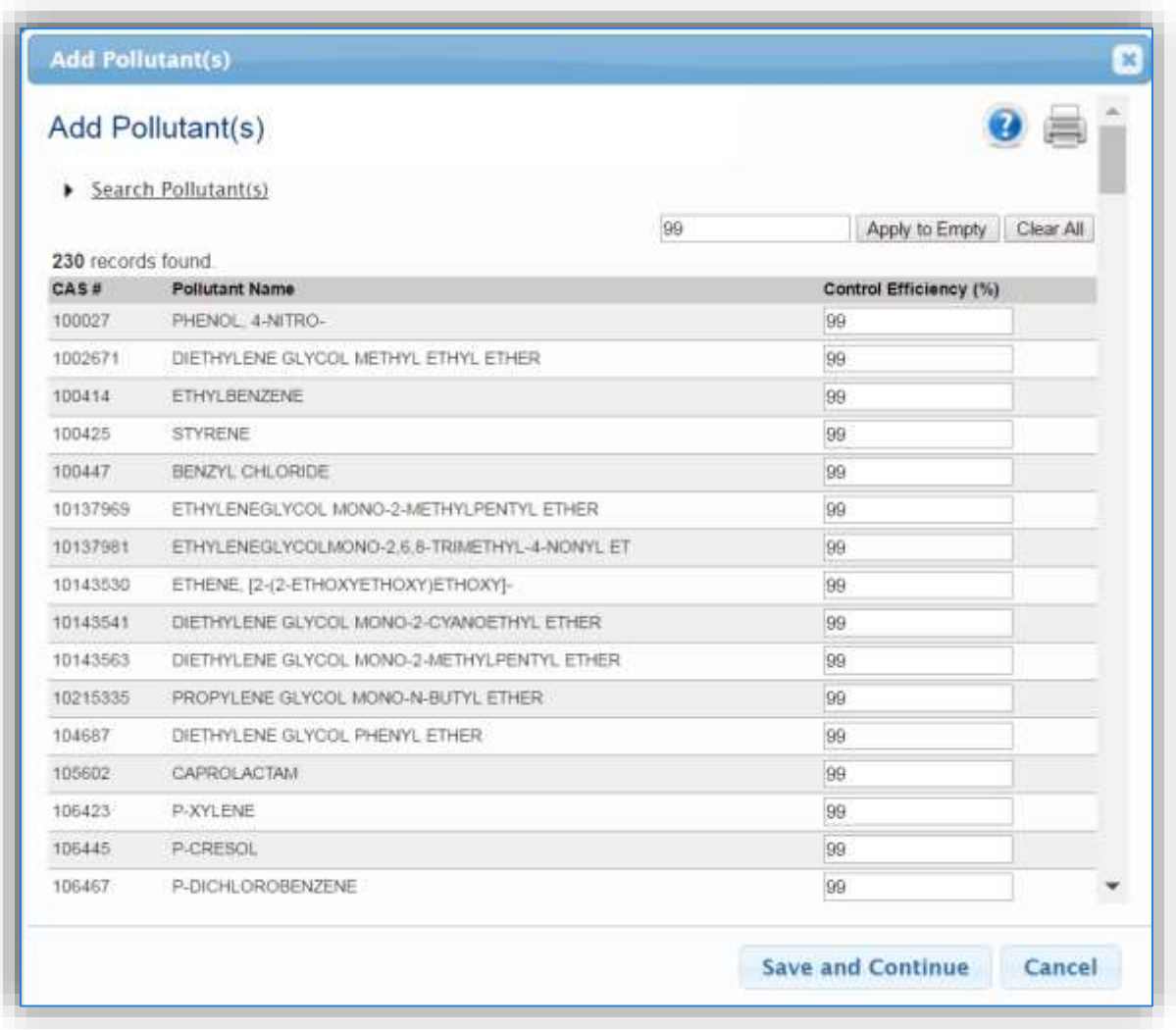
The **Permitted?** flag should also be populated to accurately reflect the current regulatory status of the emission source. This flag can be an invaluable tool in roll-up reporting.

The **Emission Unit ID** field can be used to enter a standard convention identifier that will best help identify the source. If the source is permitted, enter the emission unit ID as designated in the permit.

This control page will only appear only if the source is specified to be equipped with air emission controls on the Source Details page.

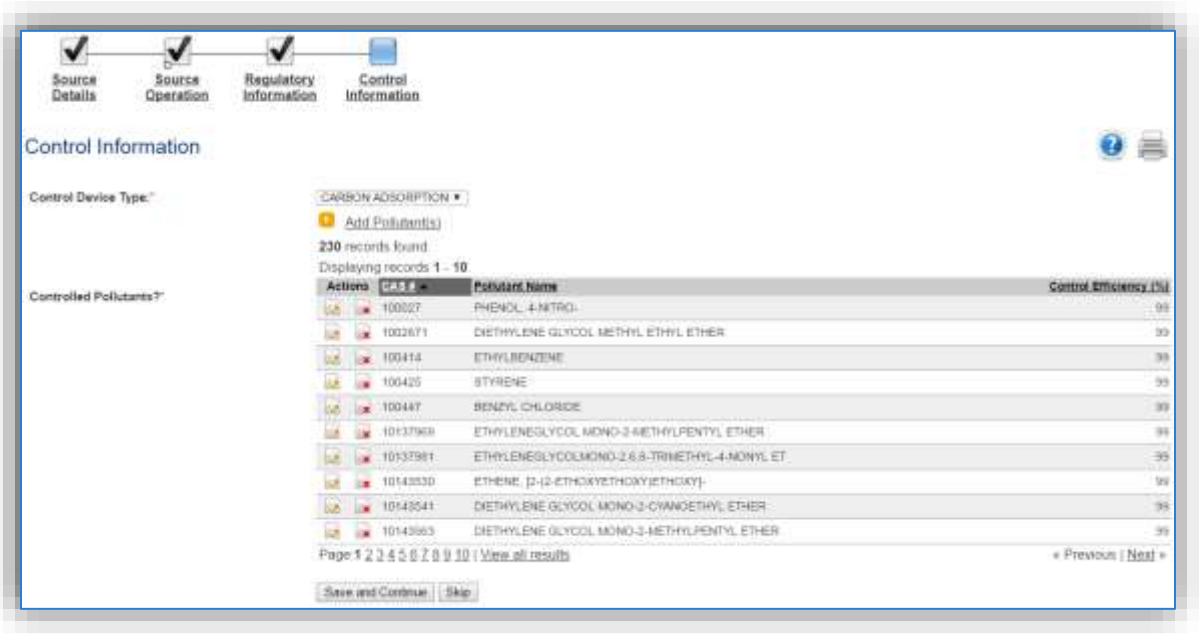
Select **Control Device Type** utilized by the equipment: CARBON ADSORPTION, COVER/ENCLOSED, or HIGH FREEBOARD.

Click the Add Pollutant(s) hyperlink to configure the control efficiency.

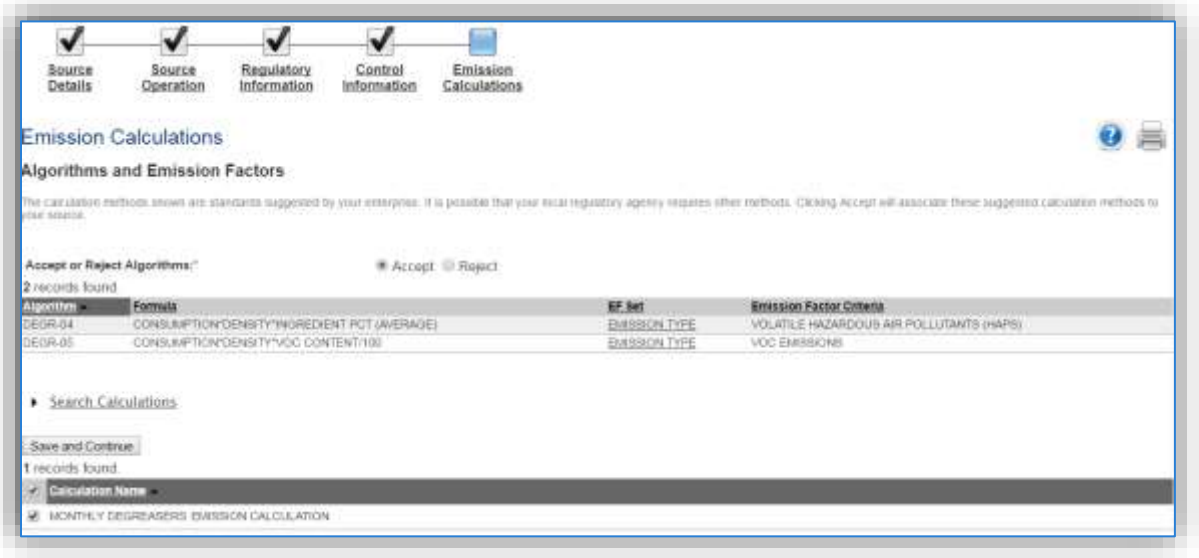


The pollutants for solvent degreasing will appear in the grid automatically; however, the Search Pollutant(s) area can be used to refine the list of pollutants.

Enter the control efficiency for each of the pollutants in the **Control Efficiency** column, or if the control efficiency is the same for all pollutants, enter the efficiency in the field at the top of the grid and click the **Apply to Empty** button. This will populate the specified control efficiency for all rows in the grid. Click the **Save and Continue** to associate the control efficiencies to the equipment.

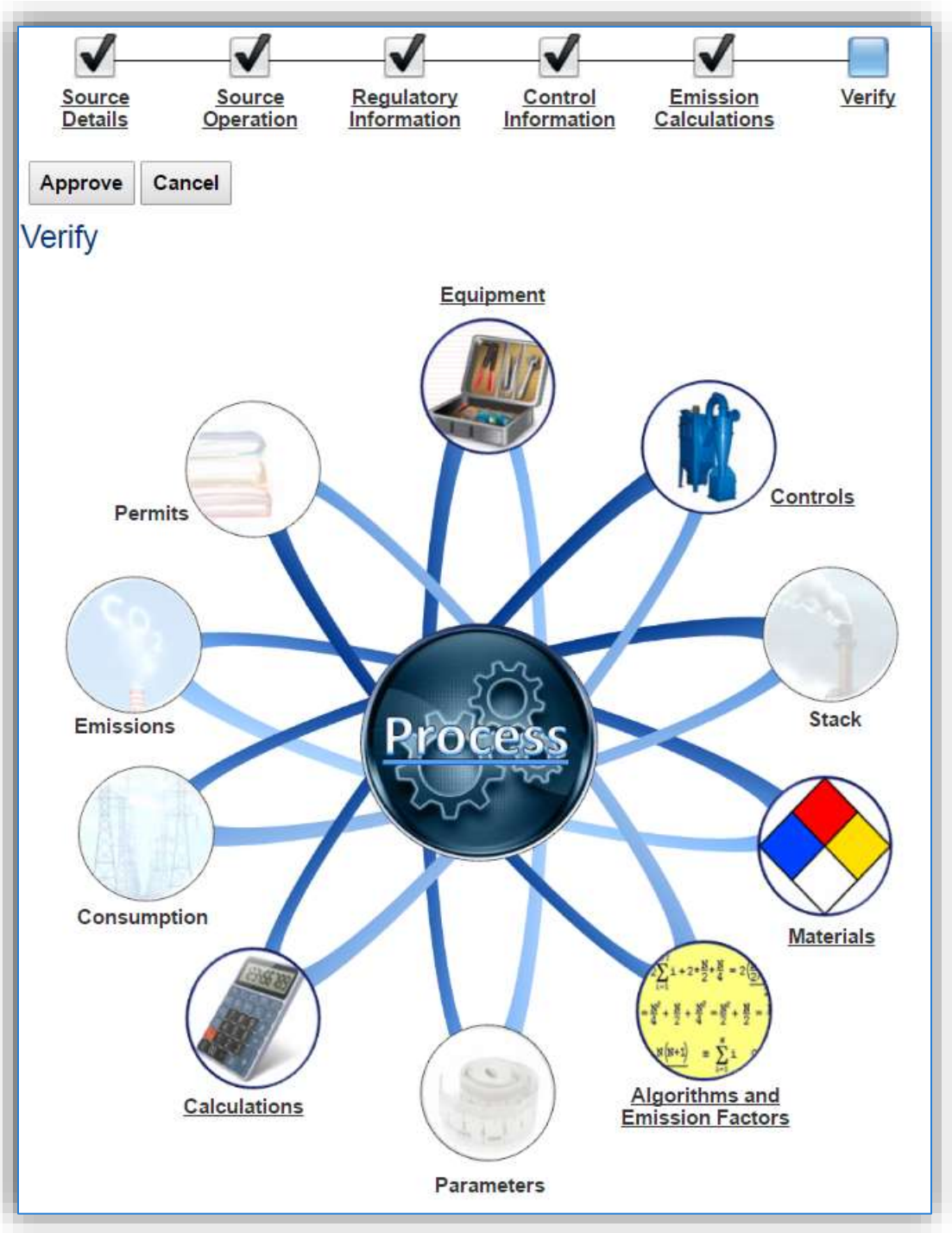


Click the **Save and Continue** button to proceed.



The final step is Emission Calculations where you choose to **Accept or Reject Algorithms**, the algorithm is based on the usage method selected and the media used.

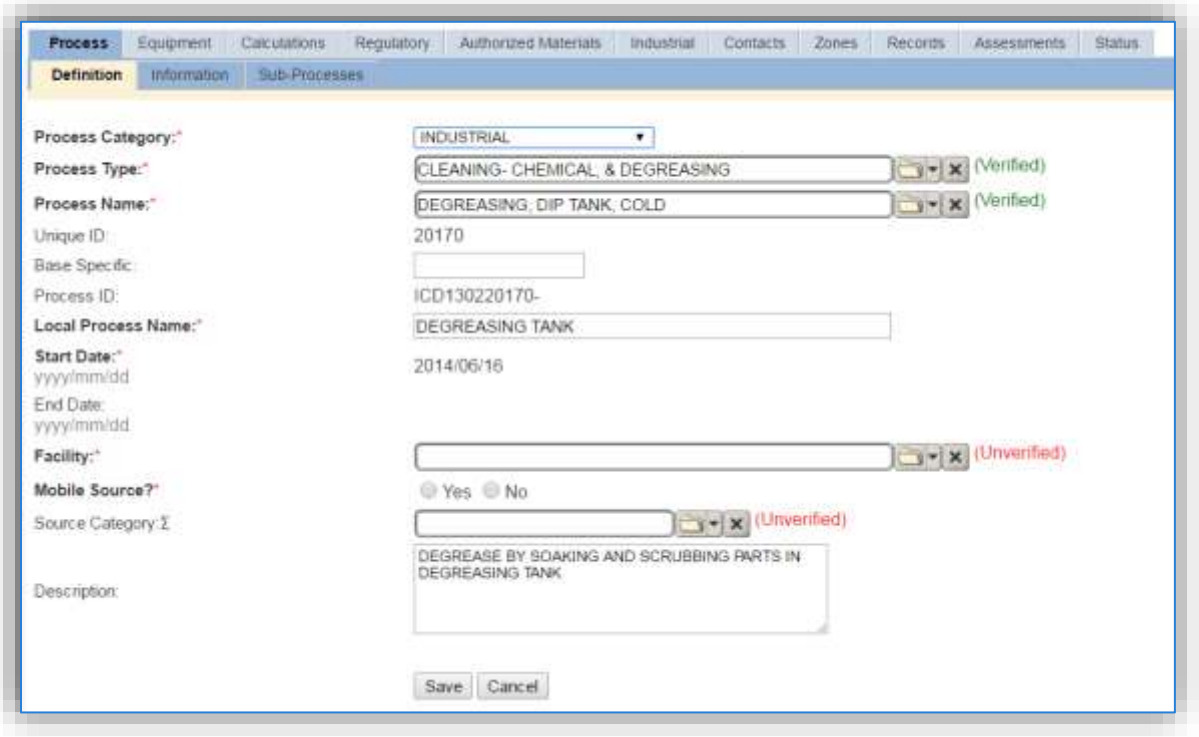
The Emission Calculation also appears, one or more calculations will appear, select the checkbox or checkboxes next to the calculation this process should be added to. Click the **Save and Continue** button once those steps have been completed.



This is the process summary. The details behind the Calculations, Equipment, Algorithms and Emission Factors, Materials and Controls can be viewed by clicking on the hyperlink or picture. Click the **Approve** button to finalize the new source configuration process.

3.4.3.2.2.1.2 *EESOH-MIS Imported Process*

If the process was imported into APIMS via the EESOH-MIS interface it will be in the Unique Process module. For more information on identifying these processes refer to Section 2.6 EESOH-MIS Interface.



For processes imported via the EESOH-MIS interface some of the key fields will already be populated, however additional fields are still required in APIMS. If you change the data in these fields (Process Category, Process Type, Process Name, Local Process Name, Description) it will remain that way until the next time the interface is run. At that point the data in those fields will be overwritten to match the values in EESOH-MIS. Therefore, if changes need to be made to these fields they must be completed in EESOH-MIS.

The **Base Specific** field can be used to enter a standard convention identifier that will best help identify the source. If the source is permitted, enter the emission unit ID as designated in the permit.

The **Local Process Name** should be in a standard naming convention for all sources that helps to quickly identify, what the process is, where it is and any other unique attribute. For example, Location/Shop – Type of Solvent Use – Solvent (BLDG 726 – COLD DIP TANK – PD680, VEHICLE MAINT – OPEN TOP VAPOR – ENSOLV)

The **Start Date** should be the date the unit became operational, if this date is not known, enter 1901/01/01 as a default start date.

The **Facility** should be the facility that is responsible for the source.

The **Mobile Source?** flag should be "NO" as this is considered as stationary source.

All degreaser operations are assigned to DEGR in the **Source Category** field.

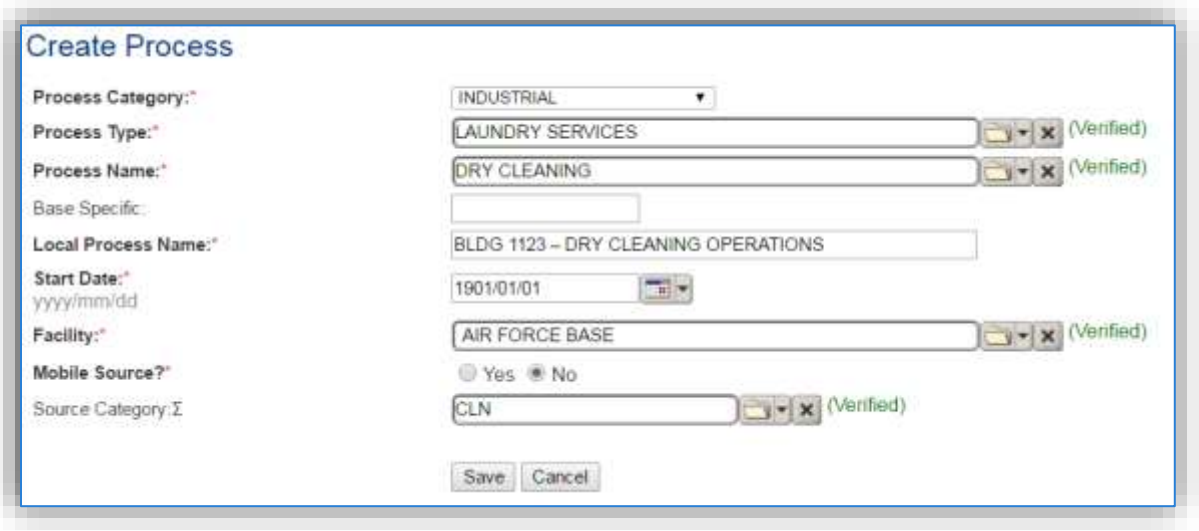
For the population of all other tabs, refer to the Existing Sources sections.

3.4.3.2.2.2 *Cleaning (CLN)*

There are a few ways to properly document these emission sources in APIMS depending upon how the usage is tracked for each type of source. If the EESOH-MIS processes are configured properly to provide segregation of the various solvent operations then they can be configured to calculate emissions. If the solvent is not procured through EESOH-MIS but is obtained from a contactor then at least one Unique Process record will need to be configured.

3.4.3.2.2.2.1 *Manually Tracked Solvent Cleaning*

Navigate to the Unique Process module in APIMS and click the Create New Process hyperlink.

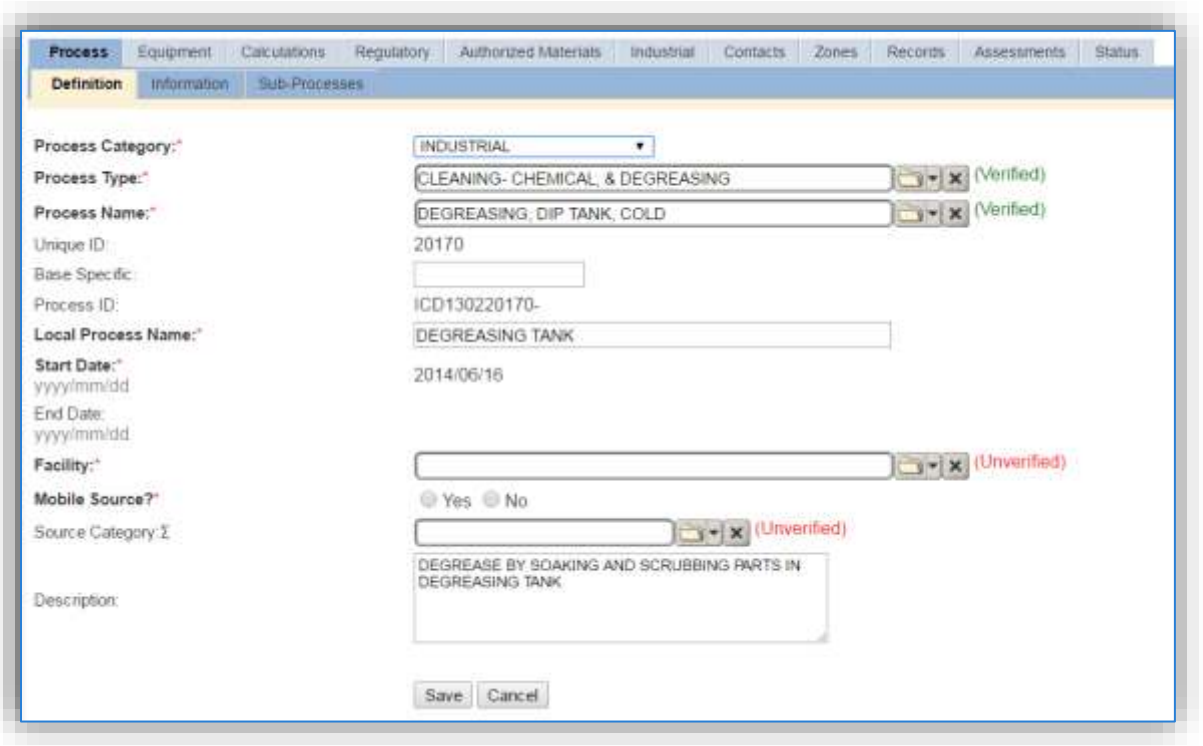


Process Category	Process Type	Process Name	Process ID
INDUSTRIAL	LAUNDRY SERVICES	DRY CLEANING	ILS1383

For new process configuration use the table above to determine the appropriate **Process Category**, **Process Type**, and **Process Name**.

3.4.3.2.2.2.2 *EESOH-MIS Imported Process*

For EESOH-MIS imported processes, navigate to the Unique Process module, and use the search functionality to identify the process(es). For more details on how to identify EESOH-MIS imported processes refer to Section 2.6 EESOH-MIS Interface.



For processes imported via the EESOH-MIS interface some of the key fields will be already be populated, however additional fields are still required in APIMS. If you change the data in these fields (**Process Category**, **Process Type**, **Process Name**, **Local Process Name**, **Description**) it will remain that way until the next time the interface is run. At that point the data in those fields will be overwritten to match the values in EESOH-MIS. Therefore, if changes need to be made to these fields they must be completed in EESOH-MIS.

The **Local Process Name** should be in a standard naming convention for all sources that helps to quickly identify, what the process is, where it is and any other unique attribute. For example, Location/Shop – Type of Solvent Use – Solvent (BLDG 1123 – DRY CLEANING OPERATIONS).

The **Start Date** should be the date the unit became operational, if this date is not known, enter 1901/01/01 as a default start date.

The **Facility** should be the facility that is responsible for the source.

The **Mobile Source?** flag should be "NO" as this is considered as stationary source.

All dry-cleaning operations are assigned to the CLN **Source Category**.

For the population of all other tabs, refer to the Existing Sources sections.

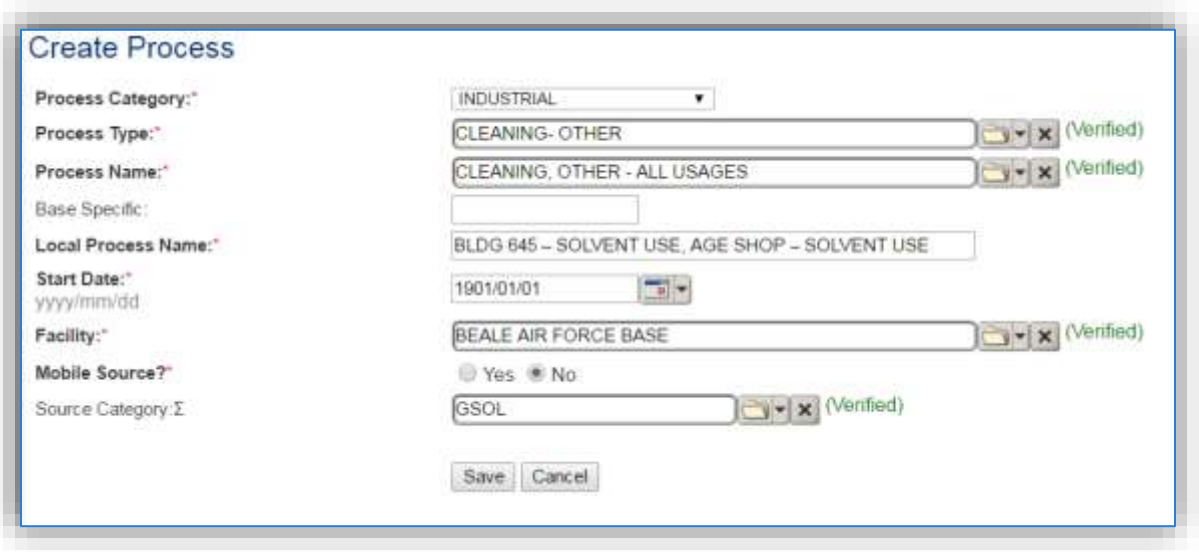
3.4.3.2.2.3 *General Solvent Use (GSOL)*

There are a few ways to properly document these emission sources in APIMS depending upon how the usage is tracked for each type of source. If the EESOH-MIS processes are configured properly to provide

segregation of the various solvent operations then they can be configured to calculate emissions. If the solvent is not procured through EESOH-MIS but is obtained from a contactor then at least one Unique Process record will need to be configured.

3.4.3.2.2.3.1 *Manually Tracked General Solvent Use*

Navigate to the Unique Process module in APIMS and click the Create New Process hyperlink.

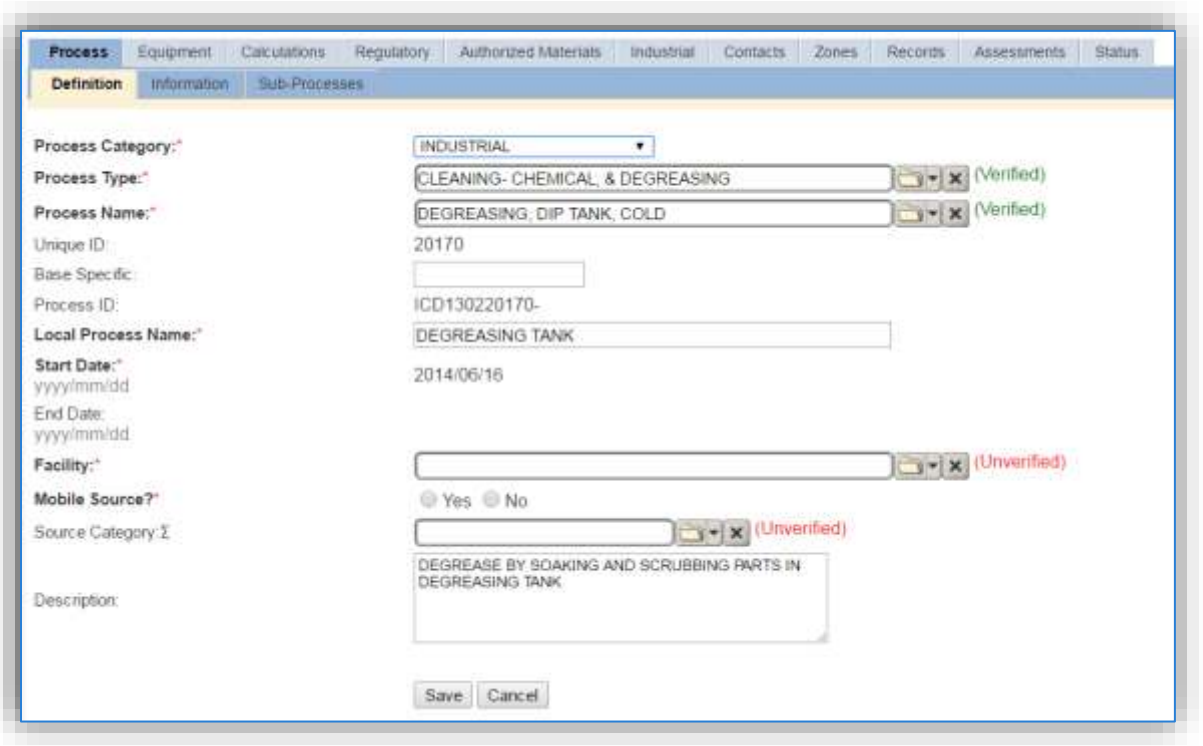


Process Category	Process Type	Process Name	Process ID
INDUSTRIAL	CLEANING, OTHER	CLEANING, OTHER – ALL USAGES	ICO1153
INDUSTRIAL	CLEANING, OTHER	CLEANING, OTHER – MULTIPLE OPERATIONS	ICO1161
INDUSTRIAL	CLEANING – CHEMICAL & DEGREASING	CLEANING, CHEMICAL	ICD1150
INDUSTRIAL	CLEANING – CHEMICAL & DEGREASING	CLEANING, CHEMICAL, MULTIPLE OPERATIONS	ICD1152

For new process configuration use the table above to determine the appropriate **Process Category**, **Process Type**, and **Process Name**.

3.4.3.2.2.3.2 *EESOH-MIS Imported Process*

For EESOH-MIS imported processes, navigate to the Unique Process module and use the search functionality to identify the process(es). For more details on how to identify EESOH-MIS imported processes refer to Section 2.6 EESOH-MIS Interface.



For processes imported via the EESOH-MIS interface some of the key fields will be already be populated, however additional fields are still required in APIMS. If you change the data in these fields (**Process Category**, **Process Type**, **Process Name**, **Local Process Name**, **Description**) it will remain that way until the next time the interface is run. At that point the data in those fields will be overwritten to match the values in EESOH-MIS. Therefore, if changes need to be made to these fields they must be completed in EESOH-MIS.

The **Base Specific** field can be used to enter a standard convention identifier that will best help identify the source. If the source is permitted, enter the emission unit ID as designated in the permit.

The **Local Process Name** should be in a standard naming convention for all sources that helps to quickly identify, what the process is, where it is and any other unique attribute. For example, Location/Shop – Type of Solvent Use – Solvent (BLDG 645 – SOLVENT USE, AGE SHOP – SOLVENT USE).

The **Start Date** should be the date the unit became operational, if this date is not known, enter 1901/01/01 as a default start date.

The **Facility Name** should be the facility that is responsible for the source.

The **Mobile Source?** flag should be "NO" as this is considered as stationary source.

All general solvent operations are assigned to the GSOL **Source Category**.

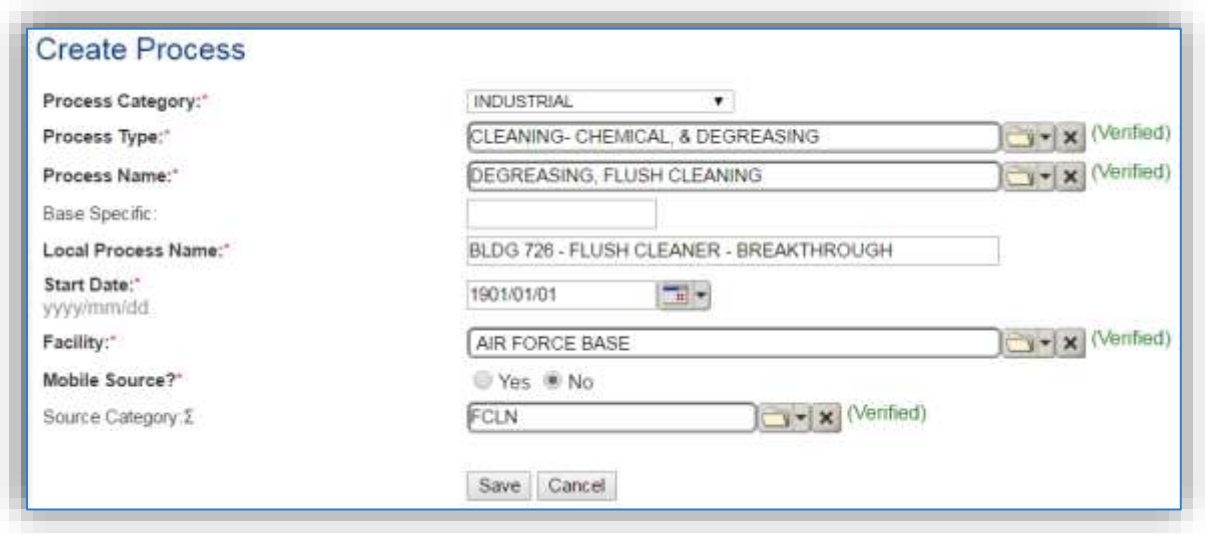
For the population of all other tabs, refer to the Existing Sources sections.

3.4.3.2.2.4 *Flush Cleaning (FCLN)*

There are a few ways to properly document these emission sources in APIMS depending upon how the usage is tracked for each type of source. If the EESOH-MIS processes are configured properly to provide segregation of the various solvent operations then they can be configured to calculate emissions. If the solvent is not procured through EESOH-MIS but is obtained from a contactor then at least one Unique Process record will need to be configured.

3.4.3.2.2.4.1 *Manually Tracked Flush Cleaning*

Navigate to the Unique Process module in APIMS and click the Create New Process hyperlink.

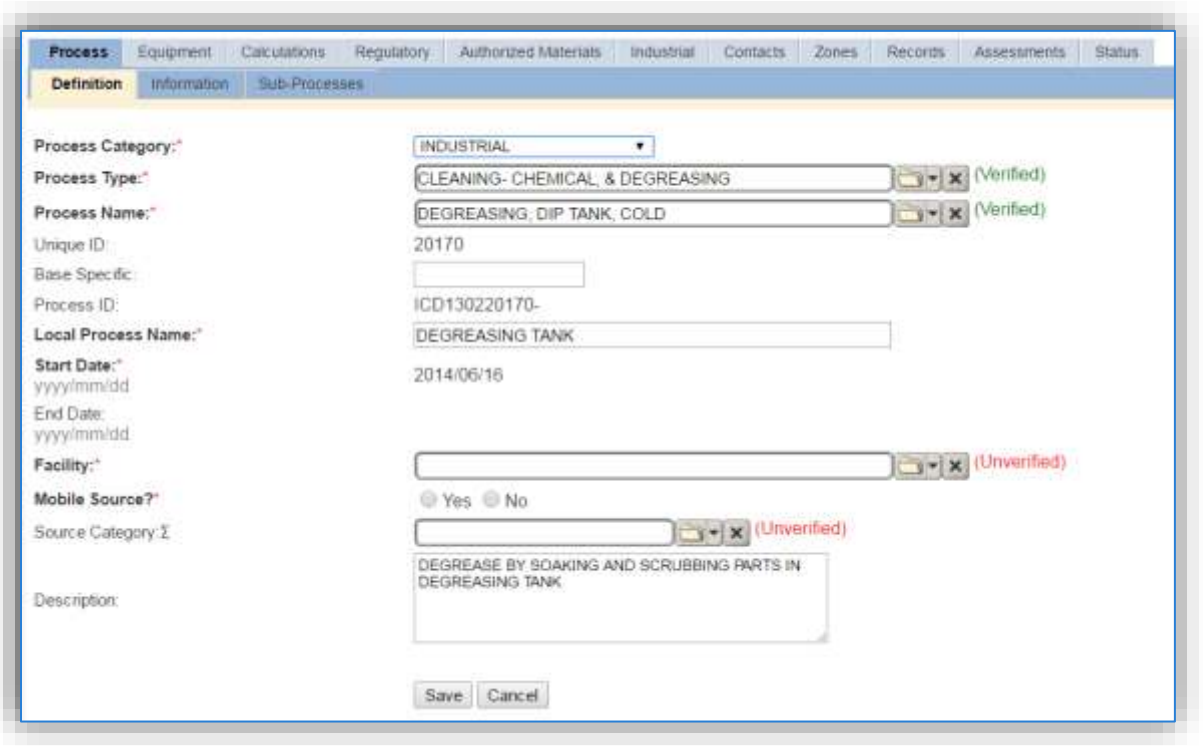


Process Category	Process Type	Process Name	Process ID
INDUSTRIAL	CLEANING – CHEMICAL & DEGREASING	CLEANING/WASHING, FLUSH CLEANING	ICD1170
INDUSTRIAL	CLEANING – CHEMICAL & DEGREASING	DEGREASING, FLUSH CLEANING	ICD1305

For new process configuration use the table above to determine the appropriate **Process Category**, **Process Type**, and **Process Name**.

3.4.3.2.2.4.2 *EESOH-MIS Imported Process*

For EESOH-MIS imported processes, navigate to the Unique Process module and use the search functionality to identify the process(es). For more details on how to identify EESOH-MIS imported processes refer to Section 2.6 EESOH-MIS Interface.



For processes imported via the EESOH-MIS interface some of the key fields will be already be populated, however additional fields are still required in APIMS. If you change the data in these fields (**Process Category**, **Process Type**, **Process Name**, **Local Process Name**, **Description**) it will remain that way until the next time the interface is run. At that point the data in those fields will be overwritten to match the values in EESOH-MIS. Therefore, if changes need to be made to these fields they must be completed in EESOH-MIS.

The **Base Specific** field can be used to enter a standard convention identifier that will best help identify the source. If the source is permitted, enter the emission unit ID as designated in the permit.

The **Local Process Name** should be in a standard naming convention for all sources that helps to quickly identify, what the process is, where it is and any other unique attribute. For example, Location/Shop – Type of Solvent Use – Solvent (BLDG 158 – FLUSH CLEANING – BREAKTHROUGH, WHEEL & TIRE – FLUSH CLEANING – MIL-PRF-680).

The **Start Date** should be the date the unit became operational, if this date is not known, enter 1901/01/01 as a default start date.

The **Facility Name** should be the facility that is responsible for the source.

The **Mobile Source?** flag should be "NO" as this is considered as stationary source.

All flush cleaning operations are assigned to the FCLN **Source Category**.

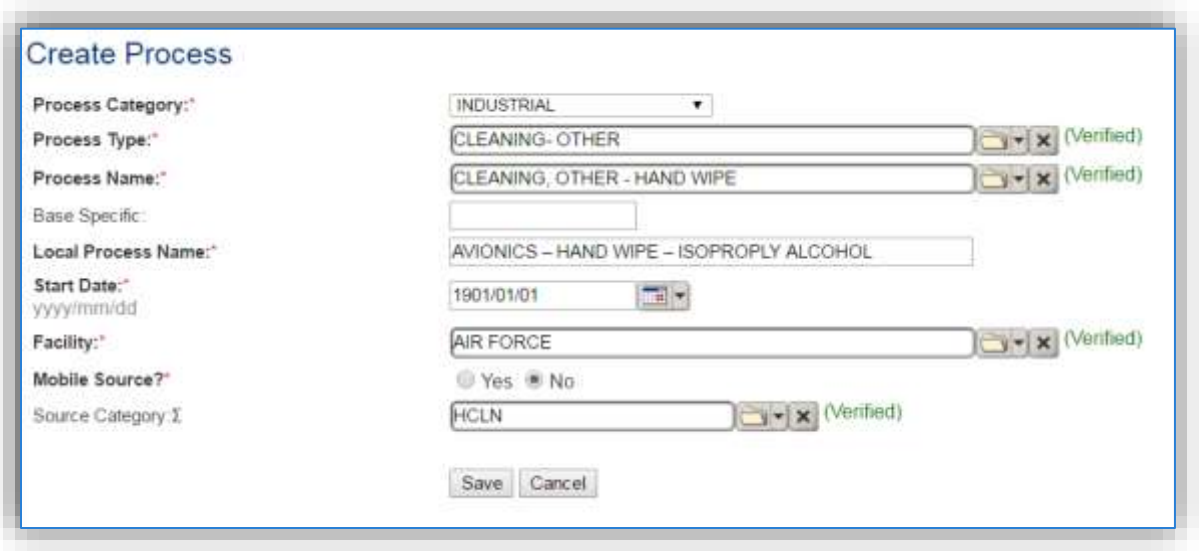
For the population of all other tabs, refer to the Existing Sources sections.

3.4.3.2.2.5 *Hand Wipe Cleaning (HCLN)*

There are a few ways to properly document these emission sources in APIMS depending upon how the usage is tracked for each type of source. If the EESOH-MIS processes are configured properly to provide segregation of the various solvent operations then they can be configured to calculate emissions. If the solvent is not procured through EESOH-MIS but is obtained from a contactor then at least one Unique Process record will need to be configured.

3.4.3.2.2.5.1 *Manually Tracked Hand Wipe Cleaning*

Navigate to the Unique Process module in APIMS and click the Create New Process hyperlink.

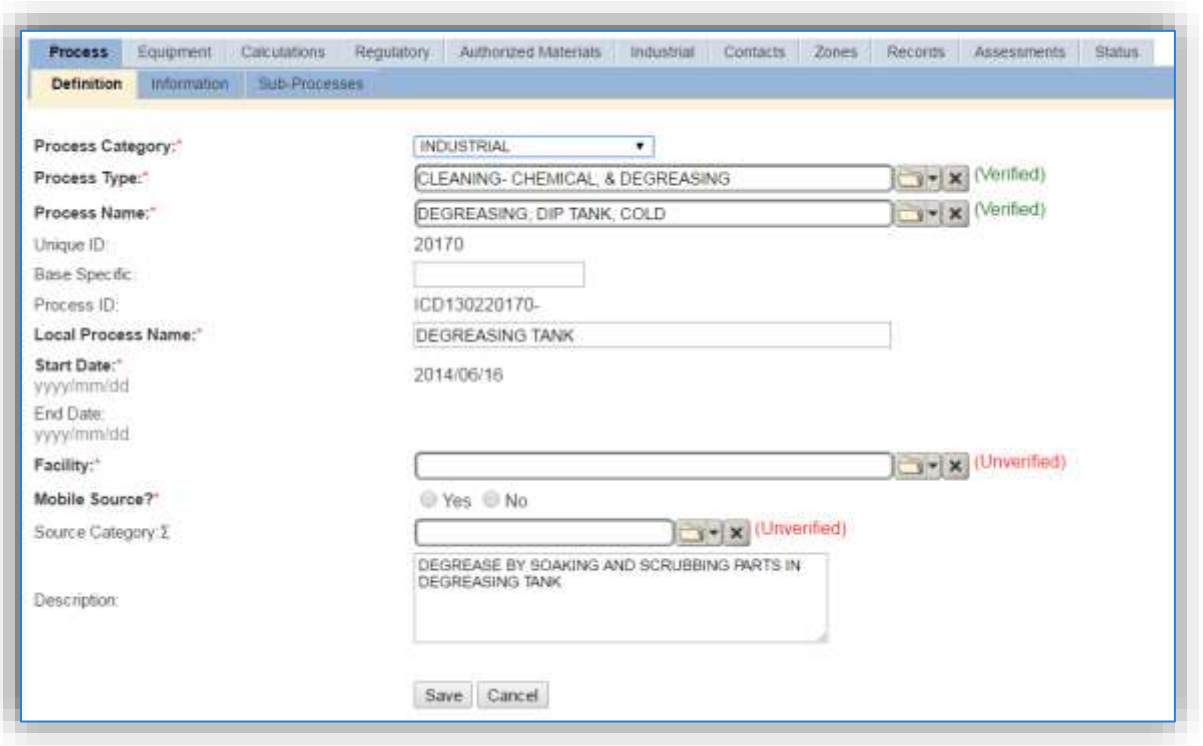


Process Category	Process Type	Process Name	Process ID
INDUSTRIAL	CLEANING, OTHER	CLEANING, OTHER – HAND WIPE	ICO1157
INDUSTRIAL	CLEANING – CHEMICAL & DEGREASING	CLEANING, CHEMICAL, MANUAL WIPING	ICD1151
INDUSTRIAL	CLEANING – CHEMICAL & DEGREASING	DEGREASING, WIPE CLEANING	ICD1315

For new process configuration use the table above to determine the appropriate **Process Category**, **Process Type**, and **Process Name**.

3.4.3.2.2.5.2 *EESOH-MIS Imported Process*

For EESOH-MIS imported processes, navigate to the Unique Process module and use the search functionality to identify the process(es). For more details on how to identify EESOH-MIS imported processes refer to Section 2.6 EESOH-MIS Interface.



For processes imported via the EESOH-MIS interface some of the key fields will be already be populated, however additional fields are still required in APIMS. If you change the data in these fields (**Process Category**, **Process Type**, **Process Name**, **Local Process Name**, **Description**) it will remain that way until the next time the interface is run. At that point the data in those fields will be overwritten to match the values in EESOH-MIS. Therefore, if changes need to be made to these fields they must be completed in EESOH-MIS.

The **Base Specific** field can be used to enter a standard convention identifier that will best help identify the source. If the source is permitted, enter the emission unit ID as designated in the permit.

The **Local Process Name** should be in a standard naming convention for all sources that helps to quickly identify, what the process is, where it is and any other unique attribute. For example, Location/Shop – Type of Solvent Use – Solvent (AVIONICS – HAND WIPE – ISOPROPLY ALCOHOL, BLDG 245 – HAND WIPE).

The **Start Date** should be the date the unit became operational, if this date is not known, enter 1901/01/01 as a default start date.

The **Facility Name** should be the facility that is responsible for the source.

The **Mobile Source?** flag should be "NO" as this is considered as stationary source.

All hand wipe cleaning operations are assigned to the HCLN **Source Category**.

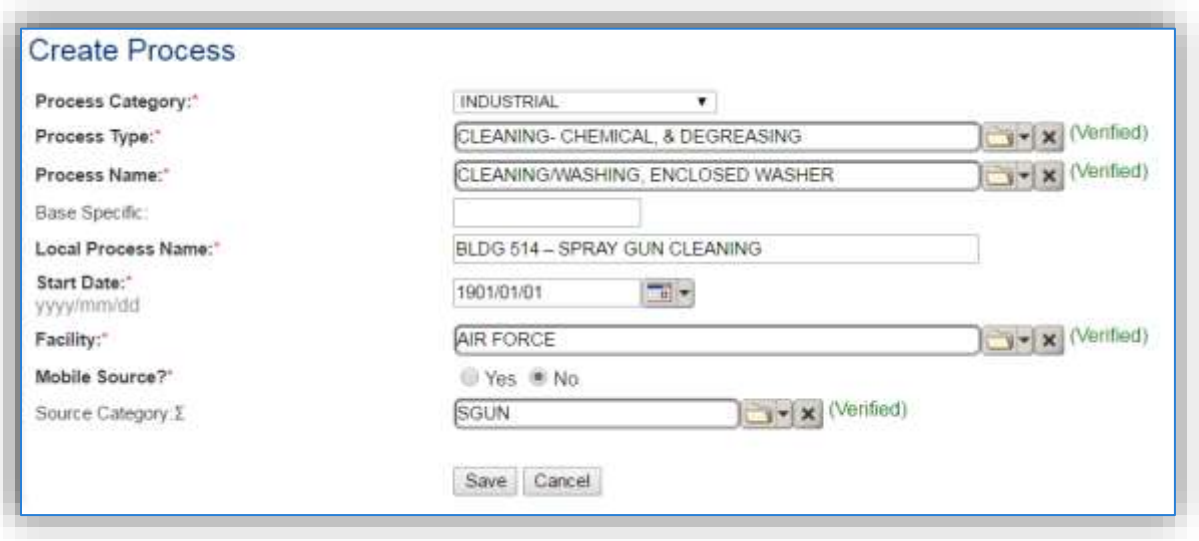
For the population of all other tabs, refer to the Existing Sources sections.

3.4.3.2.2.6 *Spray Gun Cleaning (SGUN)*

There are a few ways to properly document these emission sources in APIMS depending upon how the usage is tracked for each type of source. If the EESOH-MIS processes are configured properly to provide segregation of the various solvent operations then they can be configured to calculate emissions. If the solvent is not procured through EESOH-MIS but is obtained from a contactor then at least one Unique Process record will need to be configured.

3.4.3.2.2.6.1 *Manually Tracked Spray Gun Cleaning*

Navigate to the Unique Process module in APIMS and click the Create New Process hyperlink.

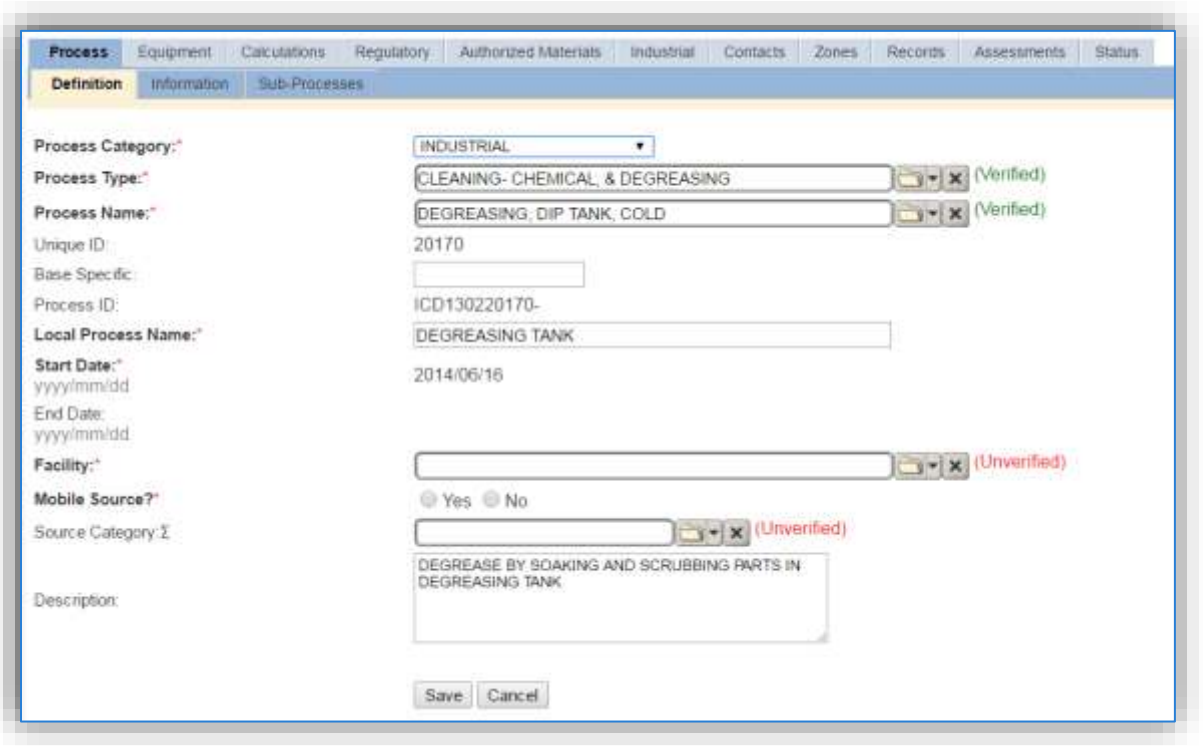


Process Category	Process Type	Process Name	Process ID
INDUSTRIAL	CLEANING – CHEMICAL & DEGREASING	CLEANING/WASHING, ENCLOSED WASHER	ICD1169
INDUSTRIAL	CLEANING, OTHER	CLEANING, OTHER – GUN	ICO1154

For new process configuration use the table above to determine the appropriate **Process Category**, **Process Type**, and **Process Name**.

3.4.3.2.2.6.2 *EESOH-MIS Imported Process*

For EESOH-MIS imported processes, navigate to the Unique Process module and use the search functionality to identify the process(es). For more details on how to identify EESOH-MIS imported processes refer to Section 2.6 EESOH-MIS Interface.



For processes imported via the EESOH-MIS interface some of the key fields will be already be populated, however additional fields are still required in APIMS. If you change the data in these fields (**Process Category**, **Process Type**, **Process Name**, **Local Process Name**, **Description**) it will remain that way until the next time the interface is run. At that point the data in those fields will be overwritten to match the values in EESOH-MIS. Therefore, if changes need to be made to these fields they must be completed in EESOH-MIS.

The **Base Specific** field can be used to enter a standard convention identifier that will best help identify the source. If the source is permitted, enter the emission unit ID as designated in the permit.

The **Local Process Name** should be in a standard naming convention for all sources that helps to quickly identify, what the process is, where it is and any other unique attribute. For example, Location/Shop – Type of Solvent Use – Solvent (BLDG 514 – SPRAY GUN CLEANING, LANDING GEAR – SPRAY GUN CLEANING)

The **Start Date** should be the date the unit became operational, if this date is not known, enter 1901/01/01 as a default start date.

The **Facility** should be the facility that is responsible for the source.

The **Mobile Source?** flag should be "NO" as this is considered as stationary source.

All spray gun cleaning operations are assigned to the SGUN **Source Category**.

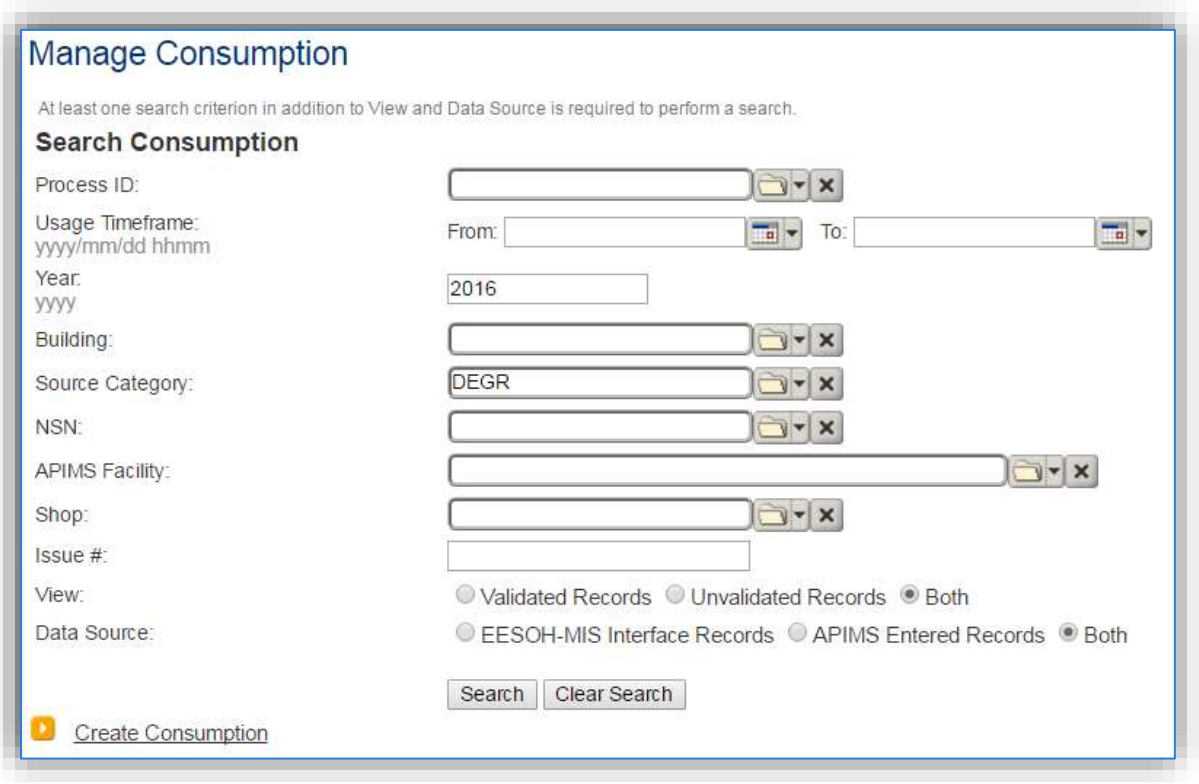
3.4.4 Year-to-Year Maintenance

3.4.4.1 Usage

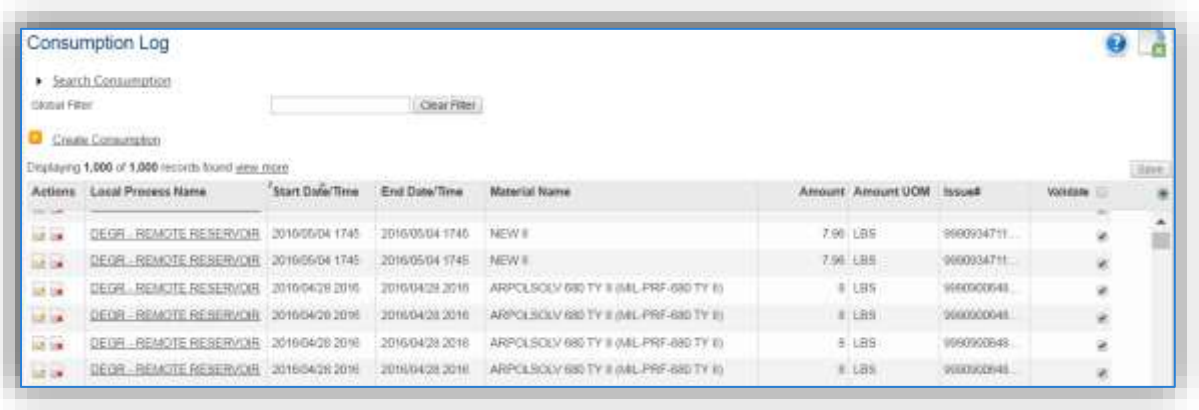
The consumption for solvent operations usually needs to be tracked annually or as required by a regulatory agency. The most common method is to use the usage data that is imported from the EESOH-MIS interface. However, if using manual logs to document the solvent usage, the consumption should be entered in the Consumption log.

3.4.4.1.1 EESOH-MIS Tracked Usage

For the consumption already imported from the EESOH-MIS interface run, the consumption must be validated in the Consumption log for it to be included in the emissions calculations.

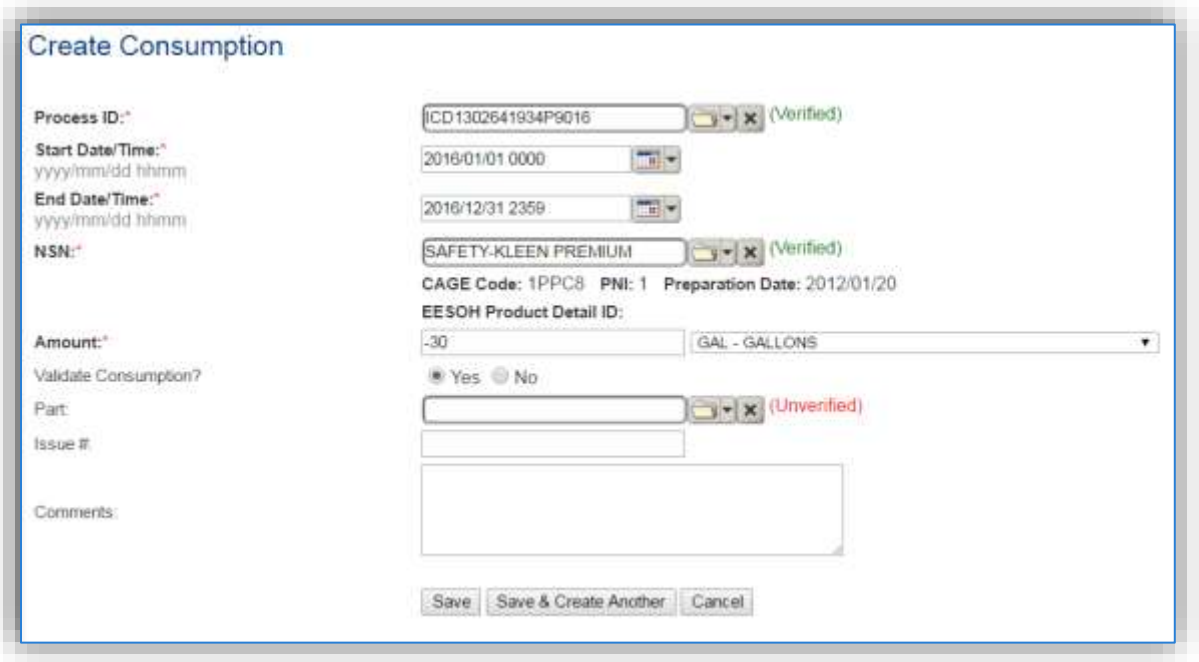


Use the search criteria to narrow the search results. It is suggested to use the Source Category, Data Source and Year or Usage Timeframe to filter the results.



Check the checkbox next to each material then click **Save** to validate the consumption. Only consumption that is validated will be included in emissions calculations. The simplest use case for validating rows is to start by checking the top box in the grid to validate all rows present. After all boxes are checked, click **Save**.

This method will assume all the solvent purchased is emitted, which is a conservative overestimation as most solvent processes generate waste solvent that is then disposed of as hazardous waste. It is possible to locate the waste stream in EESOH-MIS to account for the waste solvent. To accurately account for the waste solvent a negative usage record will need to be entered in APIMS. Work with the Hazardous Materials management group to determine the total amount of waste solvent collected during the year.



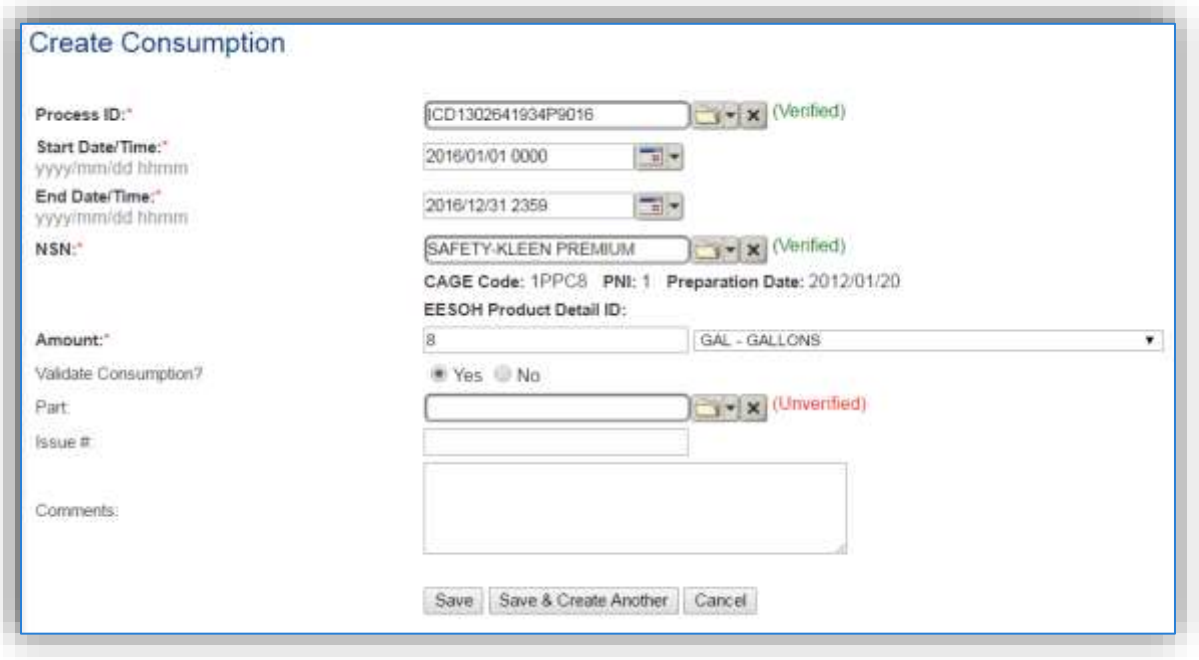
3.4.4.1.2 Manually Tracked Usage

If the solvent is not procured through EESOH-MIS but is provided by an independent contractor the usage should be entered in the Consumption log based on contractor reports or invoices. These reports/invoices

usually provide the amount of solvent added and the amount of waste solvent collected. To accurately input the usage the amount of waste solvent collected should be subtracted from the amount of solvent added.

$$Solvent\ Usage = Solvent\ Added - Waste\ Solvent\ Collected$$

Navigate to the Consumption module and click the Create Consumption hyperlink.



The consumption record should span the entire reporting period as shown above. The material should be the solvent and the amount should be Solvent Usage as calculated using the formula above. Make sure to select "Yes" to validate the consumption. If the consumption is not validated it will not be included in the emissions calculation.

3.4.4.2 Emissions Calculation

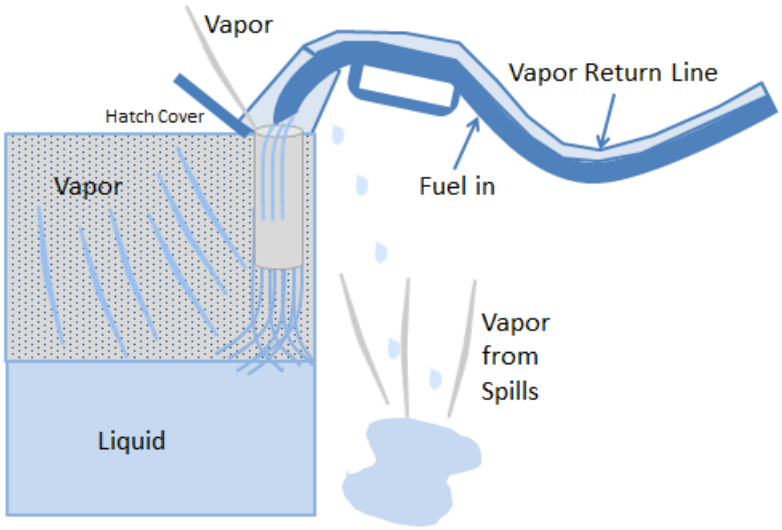
If the process utilizes EESOH-MIS data then it should be included in the **EESOH-MIS Calculation**, otherwise this emission source should be included in a **Stationary Source Calculation** that calculates controlled emissions. Reference Section 2.7 Emissions Calculations for additional instructions and details.

3.5 Fuel Dispensing (FDSP)

3.5.1 Source Types

Fuel Dispensing refers to the refueling of vehicles at fuel service stations. At Air Force installations there are usually one or more fuel service stations. One is usually commercially run by AAFES and the other is a fuel service station for military fleet vehicles. At most installations the AAFES station has been disaggregated from the base and therefore should not be included in the Air Force AEI, however if the Title V permit does not allow for this disaggregation then the AAFES station emissions may be included.

The emissions from fuel service stations are the result of vapors displaced as fuel is added to the fuel tank of the vehicle. The amount of vapor released to the atmosphere is a function of the gas and fuel tank temperatures, the vapor pressure of the fuel, the dispensing rate, and the presence of vapor emission control devices. Additionally, emissions may result from incidental spills that occur during the refueling process. As the fuel is spilled, it will then evaporate and create additional emissions. The vapor that is emitted into the atmosphere is composed of both Volatile Organic Compounds (VOCs) and Hazardous Air Pollutants (HAPs). Some refueling stations utilized a control device, Stage II Vapor Recovery; this control device will capture some of the vapor that has been displaced from the fuel tank and return it to the source tank. The diagram below illustrates the emissions that can occur during fuel dispensing operations.



As the liquid is poured into the tank, vapor is generated. Additionally as the liquid level goes up the vapor space gets smaller and causes the pressure to increase. Some of the vapor returns to the source tank through the Stage II Vapor Recovery, some may escape to the atmosphere.

Overall there are three separate activities that are part of the fuel dispensing operation.

1) The filling of underground storage tanks
2) The fueling of motor vehicles

3) Resulting fuel spills that occur during fueling

The first activity, filling of storage tanks, is calculated as part of the emissions associated with the storage tank in the UST or AST source categories.

The second activity, the fueling of motor vehicles, is the emission of vapors that are displaced from the vehicle gas tank as it is filled. These emissions are accounted for in the VEHE source category, unless these emissions are specified as stationary source emissions by the regulatory agency.

The third activity, fuel spills, is accounted for in this source category, FDSP. This is not to be used for significant spills that are the result of a fuel transfer incident that requires the notification of the spill to the installation Environmental Management or Hazardous Materials Response Team. Significant spills are accounted for as transient sources in the Spills and Releases (SPRL) source category.

3.5.2 Potential Data Sources

The most common areas that have fuel dispensing operations are the commercially run AAFES stations and the military fueling station for fleet vehicles.

- LRS (Military Fleet Vehicle Refueling)
- AAFES Station

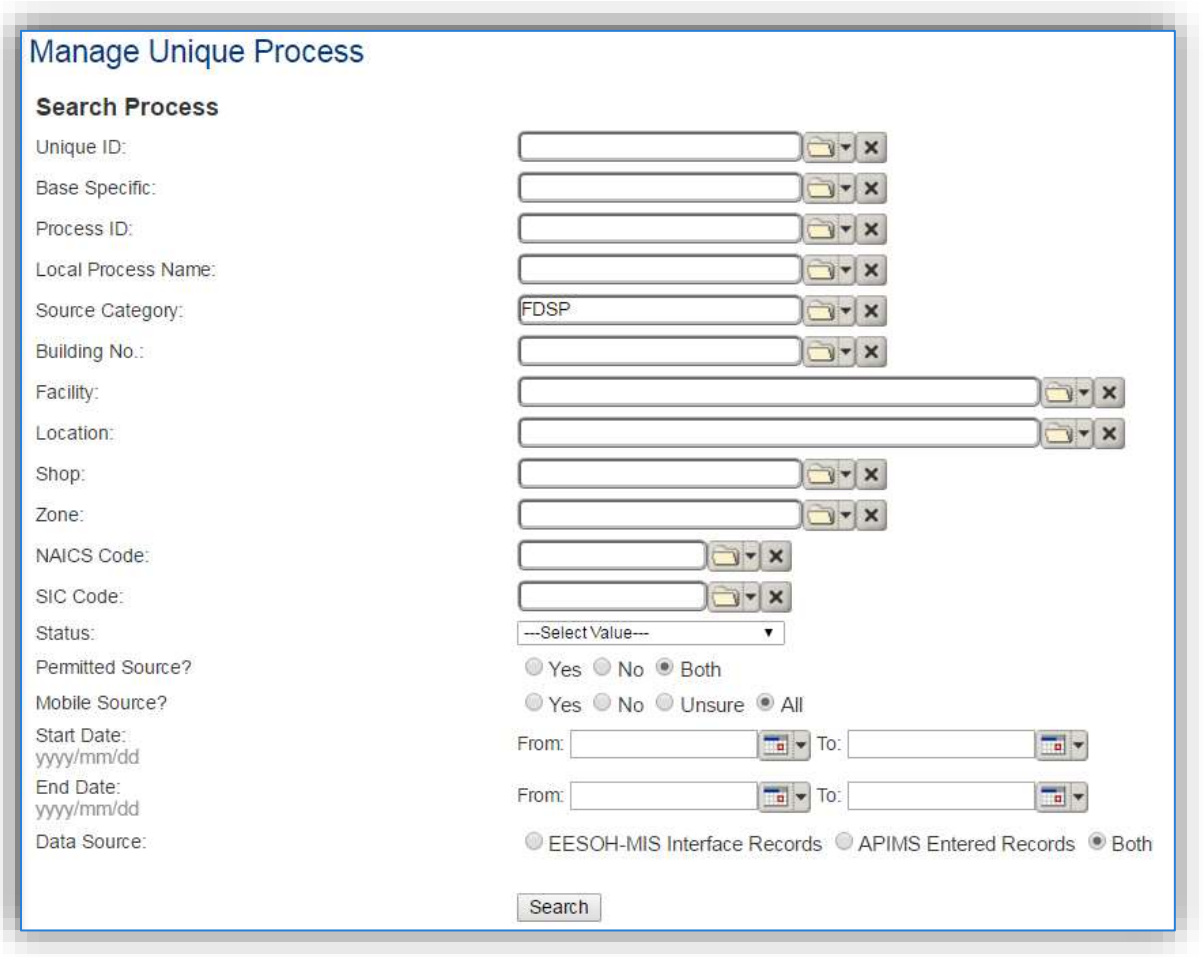
The data that needs to be collected is the total amount of gasoline that is dispensed. If the total amount of gasoline dispensed is not known, then they total tank throughputs can be assumed to be the same as the amount dispensed.

3.5.3 Standard Source Identification/Characterization

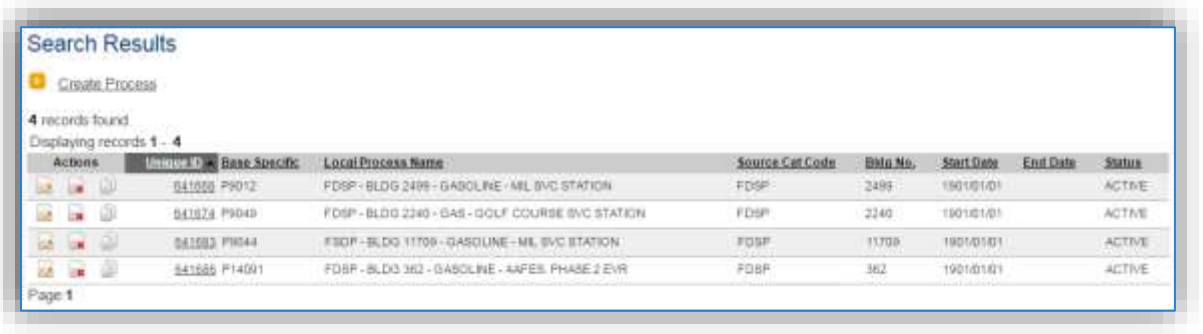
3.5.3.1 Existing Sources

It is important to review the existing dispensing activities in each source category on an annual basis at a minimum. Most regulatory agencies require an up to date source and equipment inventory.

Navigate to the Unique Process module of APIMS by clicking **Unique Process** under the **Emission Unit** tab.



In the **Source Category** search field, type "FDSP" then select the row for Fuel Dispensing from the dropdown results. Click the Search button at the bottom of the module window.

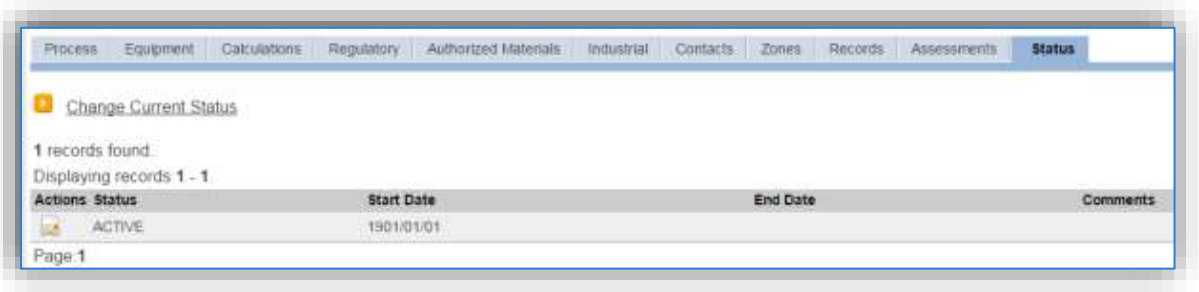


The search results grid will now display all the fuel dispensing processes currently in APIMS.

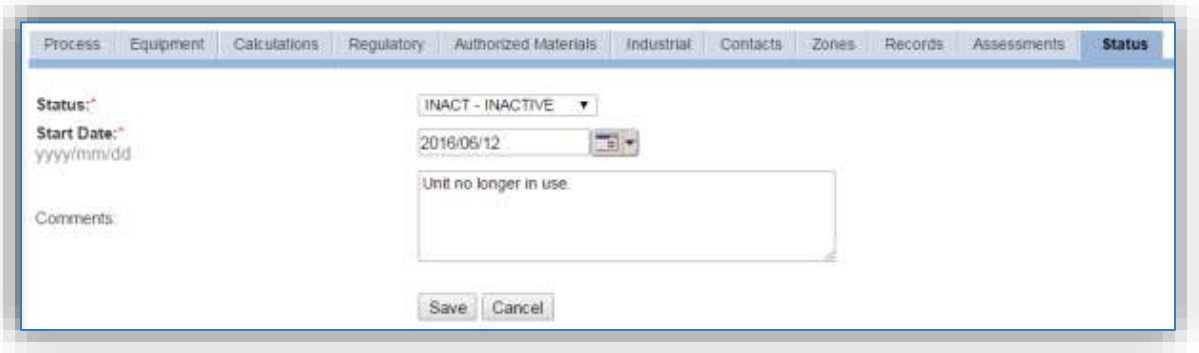
The **Local Process Name**, **Base Specific** and **Bldg No.** can all be used to identify a specific source. This list should be reviewed to make sure the source is configured in a way that it is easy to identify and locate. The status of each source should also be reviewed and kept current.

3.5.3.1.1 Status

If the status of a unit needs to be changed, click the edit icon next to the process. Navigate to the *Status* tab.



Navigate to the *Status* tab. Click the Change Current Status hyperlink.



Select the appropriate status from the **Status** dropdown (i.e., ACTIVE, REMOVED or INACTIVE).

For the **Start Date** enter the date at which the status changed.

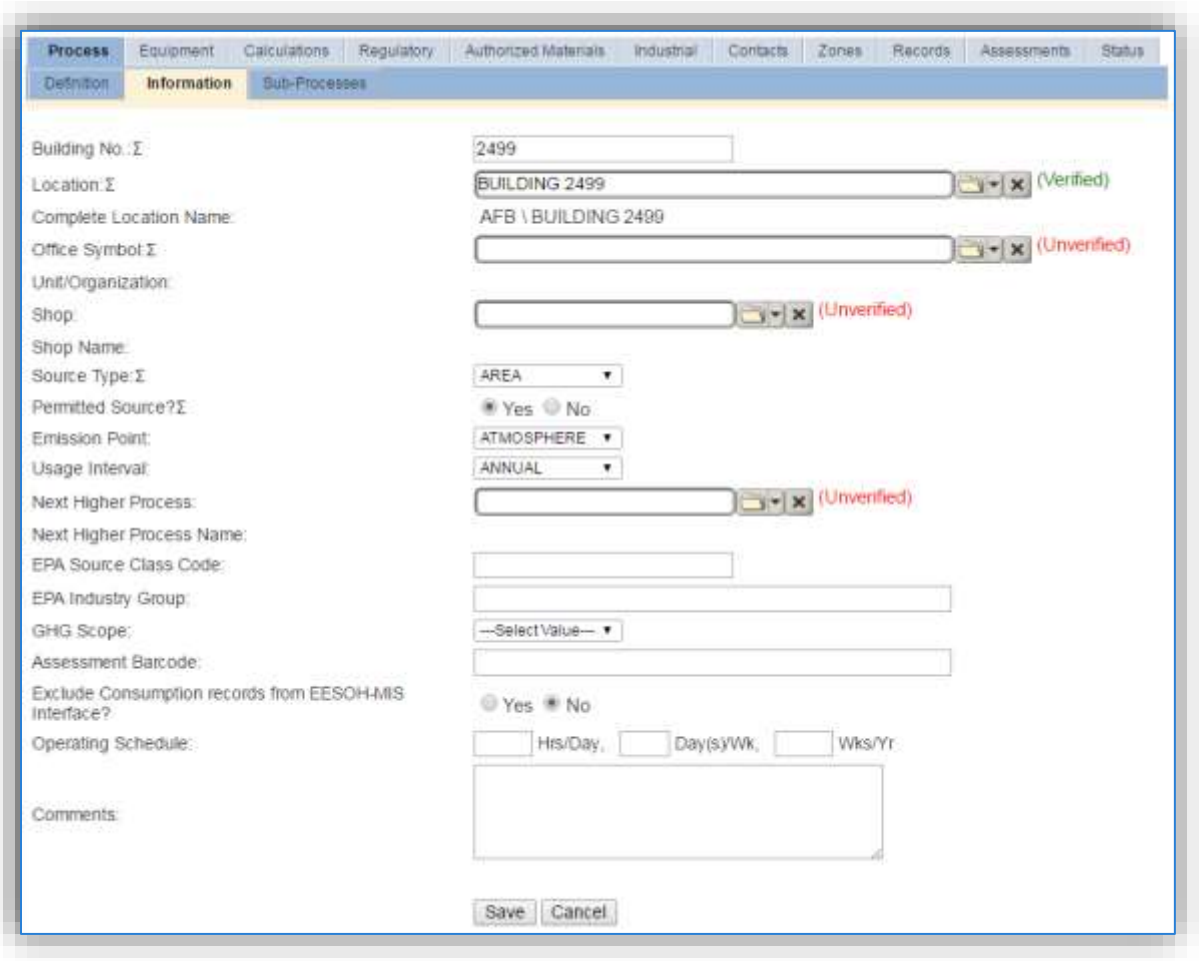
Enter **Comments** that provide insight into why the status changed. These can be very useful for equipment inventories, permit renewals and regulatory reporting. Most regulatory agencies require reporting on unit operation status; this includes any potential time spent offline, reasons for the outage.

Click the **Save** button.

The emissions for a process will only be calculated for the dates the process was in an ACTIVE status. If a source is removed in the middle of a year, the emissions will only be calculated for the part of the year the source was active.

3.5.3.1.2 Information

There are basic data elements that are important to track and maintain for new and existing sources, such as location and source type. This data can be maintained in the Unique Process record on the *Information* sub tab.



The **Building No**. field can be used to specify a general location or area of the emission source.

The **Location** field is very important to effectively manage the location and mission of the emission source. This information will be important for knowing where the source is, in case it needs to be inspected or if the source owner needs to be contact for pertinent information. For the instructions on how to create a location, reference Section 2.2 Location.

Fuel loading operations are categorized as AREA source in the **Source Type**.

The **Emission Point** would be ATMOSPHERE.

The **Permitted Source** flag should also be populated to accurately reflect the current regulatory status of the emission source. This flag can be an invaluable tool in roll-up reporting.

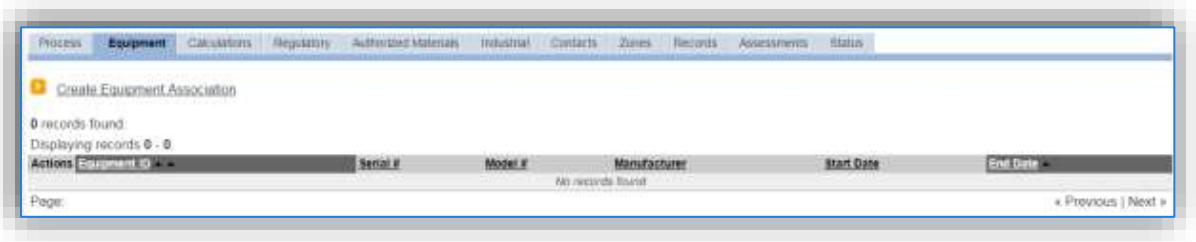
The **Usage Interval** should be designated. This source is usually documented on an Annual basis. However, if it is a permitted source, reporting intervals may be different. It is important to populate this field correctly as it will affect how it is documented in the AEI Throughputs module.

3.5.3.1.3 Sub-Processes

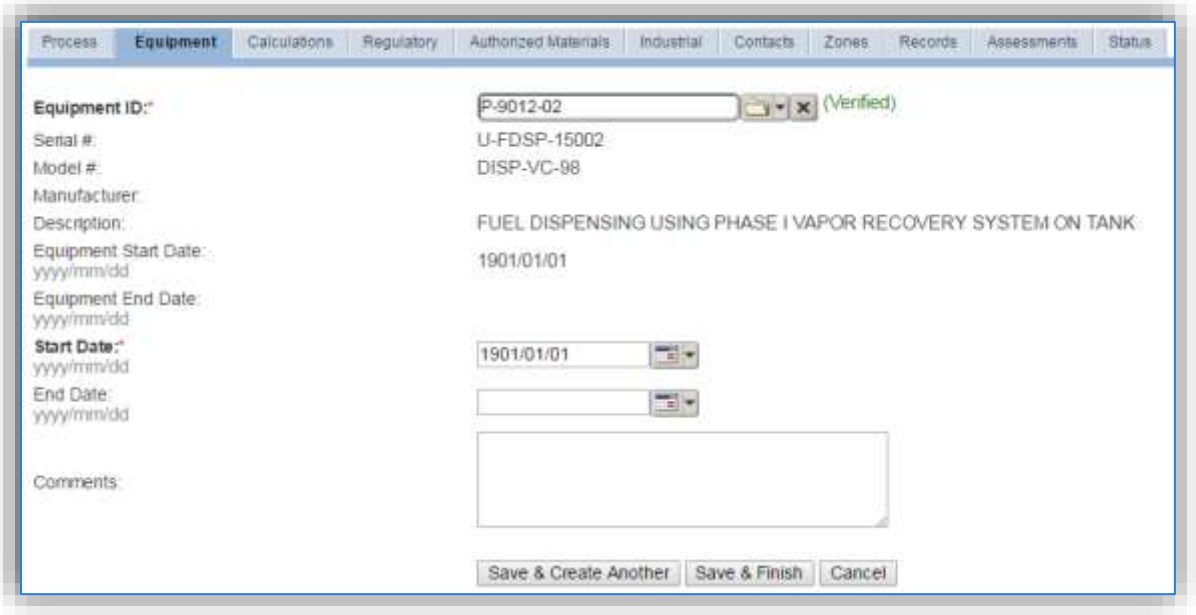
This source does not utilize this functionality.

3.5.3.1.4 Equipment

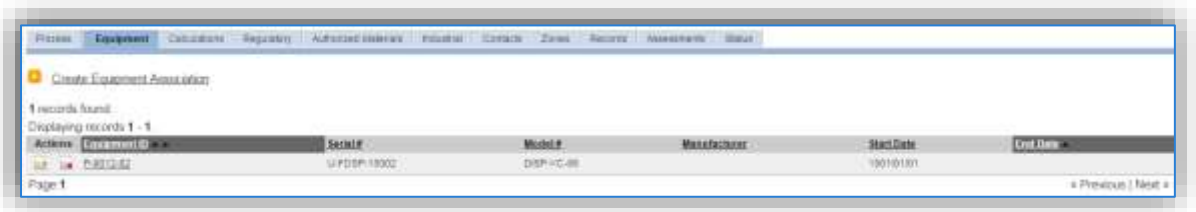
The next tab is the *Equipment* tab. This is only applicable if the activity has a vapor recovery unit that is tracked in APIMS. To link the equipment to the process the equipment must already be entered in APIMS. Refer to the Equipment section for specifics on how to properly document equipment in APIMS.



To link the equipment, click on the Create Equipment Association hyperlink.

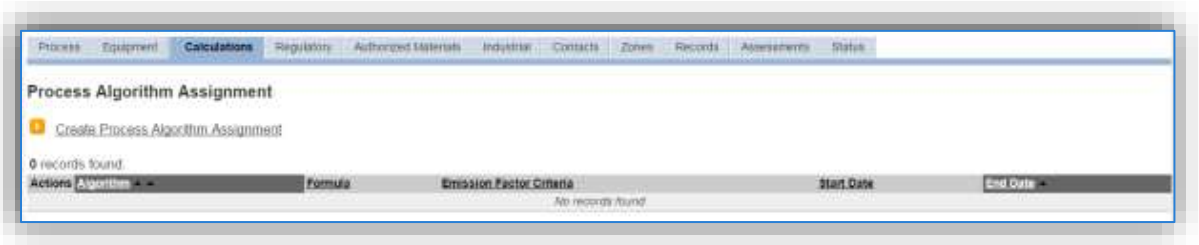


Search for the **Equipment ID** in the list of values, enter the start date and click the Save & Finish button.

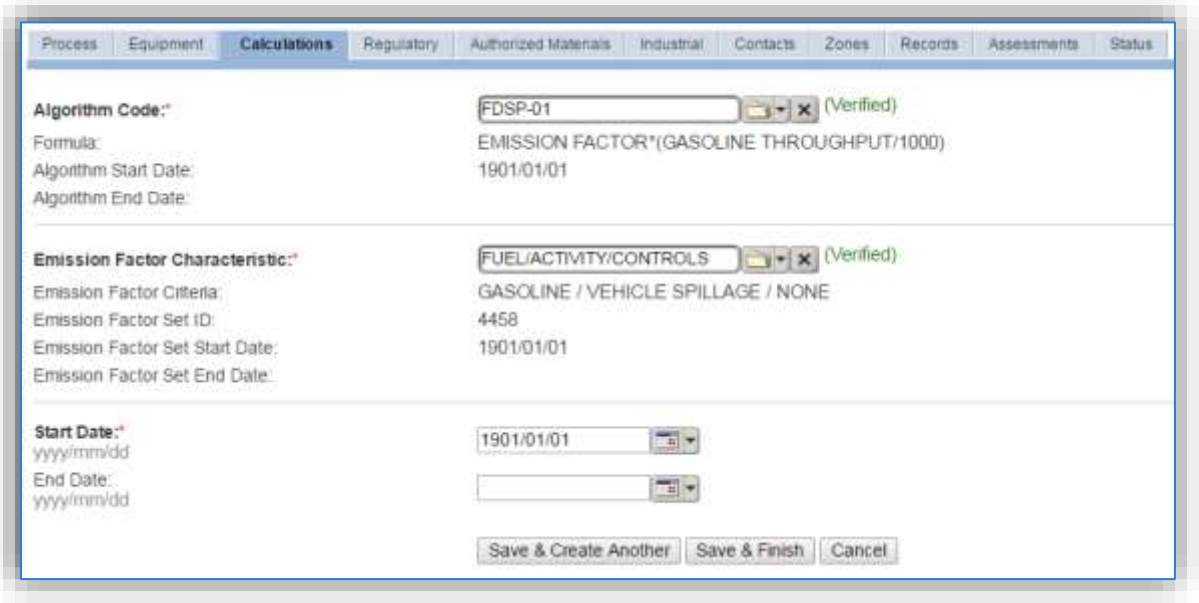


3.5.3.1.5 Calculation

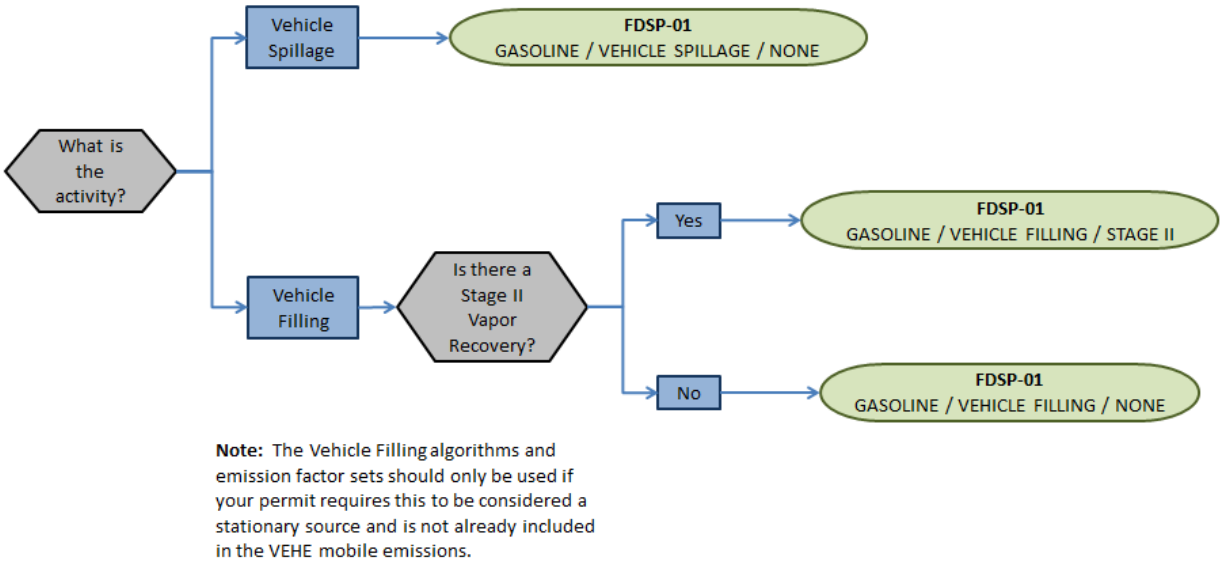
The next tab is the *Calculations* tab.



To associate an algorithm to the process, click on the Create Process Algorithm Assignment hyperlink.



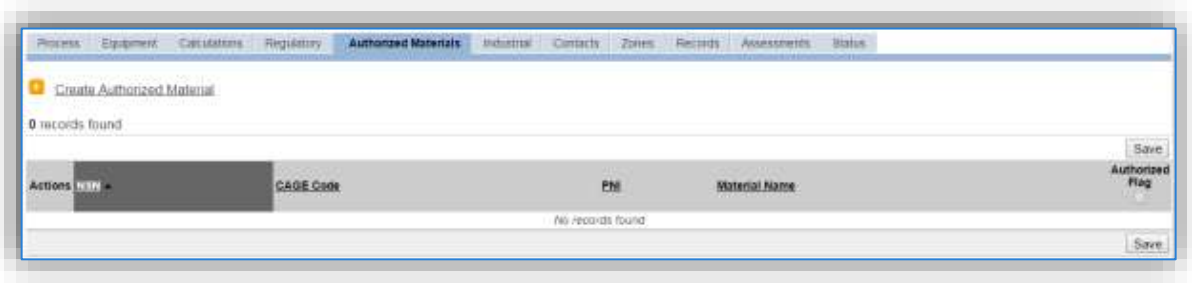
Select the **Algorithm Codes** from the list of values that matches the correct scenario. Next select the **Emission Factor Characteristic** available. Enter the **Start Date** to match the start date of the process. Click the **Save & Finish** button to save and return to the Calculations tab. Use the flowchart below to find the correct Algorithm Code and Emission Factor Characteristic.



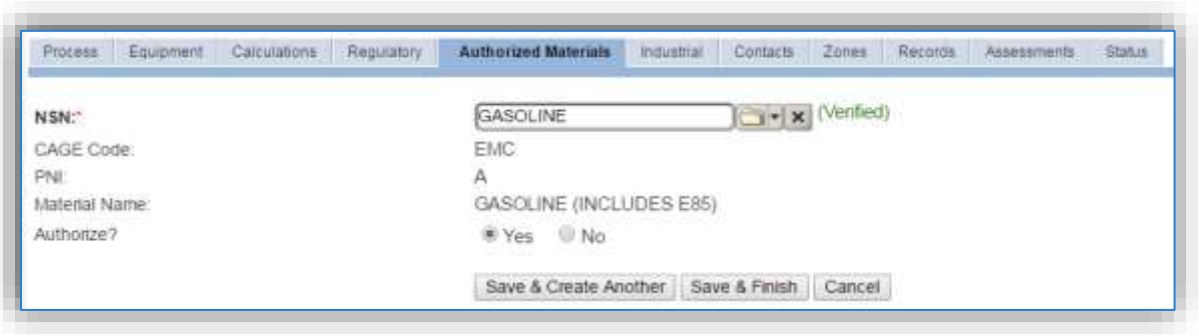
If the permit specifies that the emissions caused by the vapor displacement in the vehicle fuel tank are stationary sources and are not included in the VEHE emission calculation then there will need to be two algorithms associated. The first one to account for the fuel that is spilled during filling and one to account for the vapor displaced during vehicle filling. If your permit requires a different type of calculation, contact the Air Force Air Quality Subject Matter Expert for approval of the alternative method.

3.5.3.1.6 Materials

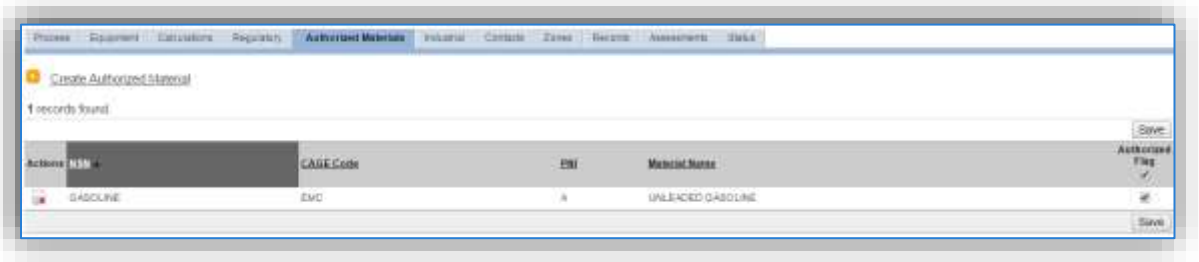
The last step in setting up the Unique Process record is to the authorized materials on the *Authorized Materials* tab.



To authorize a material for the process, click on the Create Authorized Material hyperlink.



Select the fuel transferred from the list of values as shown above. Next select "Yes" to **Authorize** the material, then click the **Save & Finish** button.



3.5.3.2 New Sources

3.5.3.2.1 Data Collection Sheet

The form on the next page is a printable guide that can be taken out to the location of the source and used to gather all the necessary information from the shop personnel. It can then be used as a guide to help configure the data in APIMS when you return to your office.

Fuel Dispensing Data Collection Worksheet

GENERAL INFORMATION

Building Number_____ Mission/Purpose_____

Shop Name/Function_____ Management Organization_____

Coordinates: Latitude: _____ Longitude: _____

UTM: _____ Zone _____ Easting _____ Northing ☐ Feet ☐ Meters

Is this source in any of your permits? ☐ Yes ☐ No

If yes, does it have an emission unit number or other designation? _____

EQUIPMENT INFORMATION

Is there Stage II Vapor Recovery? ☐ Yes ☐ No

Manufacturer _____

Model Number_____ Serial Number _____

USAGE INFORMATION

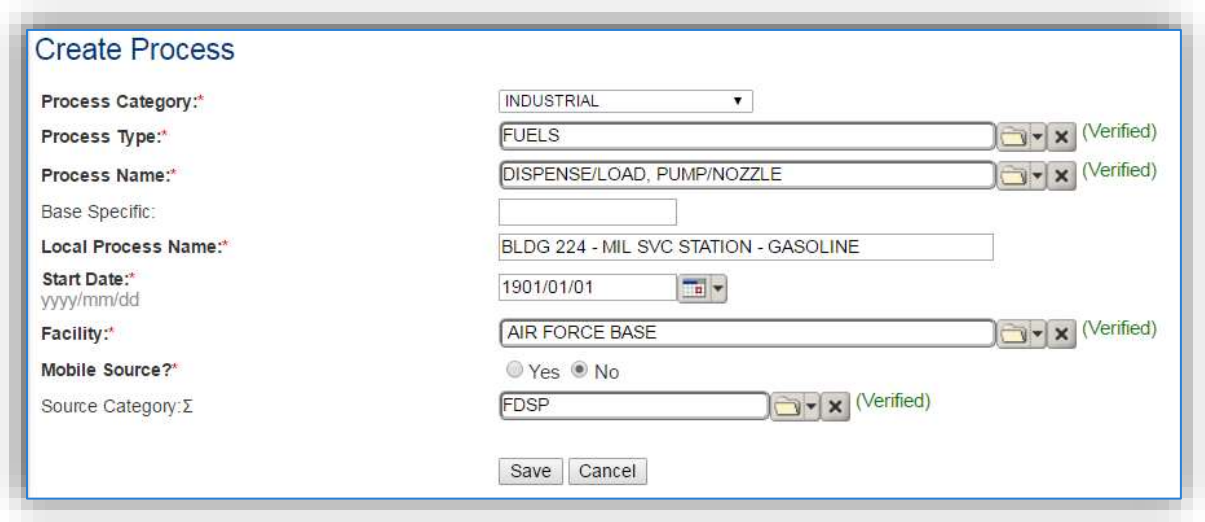
Does your permit consider vehicle refueling a stationary source? ☐ Yes ☐ No

What is the annual amount of fuel transferred in gallons? _____

3.5.3.2.2 New Source Configuration

In order to properly document this emission source in APIMS, there will need to be a Unique Process record for each service station.

Navigate to the Unique Process module in APIMS and click the Create New Process hyperlink.



Process Category	Process Type	Process Name	Process ID
INDUSTRIAL	FUELS	DISPENSE/LOAD, POUR	IFU1353
INDUSTRIAL	FUELS	DISPENSE/LOAD, PUMP/NOZZLE	IFU1354
INDUSTRIAL	FUELS	DISPENSE/LOAD, RACK/ARM	IFU1355
INDUSTRIAL	FUELS	FUELS DISTRIBUTION	IFU1499

Use the table above to determine the appropriate **Process Category**, **Process Type** and **Process Name**.

The **Base Specific** field can be used to enter a standard convention identifier that will best help identify the source. If the source is permitted, enter the emission unit ID as designated in the permit.

The **Local Process Name** should be in a standard naming convention for all sources that helps to quickly identify the location, station type, fuel type and any other unique attribute. For example, AAFES SVC STATION - GASOLINE.

The **Start Date** should be the date the unit became operational, if this date is not known, enter 1901/01/01 as a default start date.

The **Facility Name** should be the facility that is responsible for the source.

The **Mobile Source?** flag should be "NO" as this is considered as stationary source.

All fuel dispensing processes are assigned to the FDSP **Source Category**.

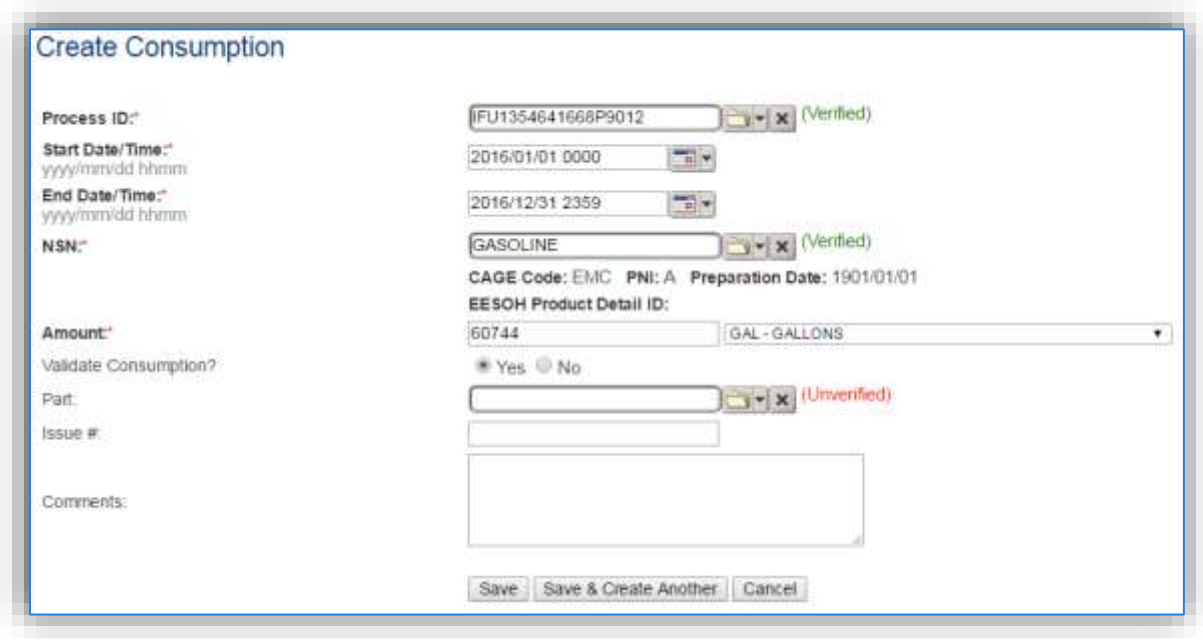
For the population of all other tabs, refer to the Existing Sources sections.

3.5.4 Year-to-Year Maintenance

3.5.4.1 Usage

The consumption for fuel dispensing sources will need to be tracked annually or more frequently if required by a regulatory agency. To correctly document the annual usage for this emission source the consumption should be entered in the Consumption log.

Navigate to the Consumption module and click the Create Consumption hyperlink.



The consumption record should span the entire reporting period as shown above. The material should be the fuel transferred and the amount should be the amount of fuel transferred in gallons. Make sure to select "Yes" to validate the consumption. If the consumption is not validated it will not be included in the emissions calculation.

3.5.4.2 Emissions Calculation

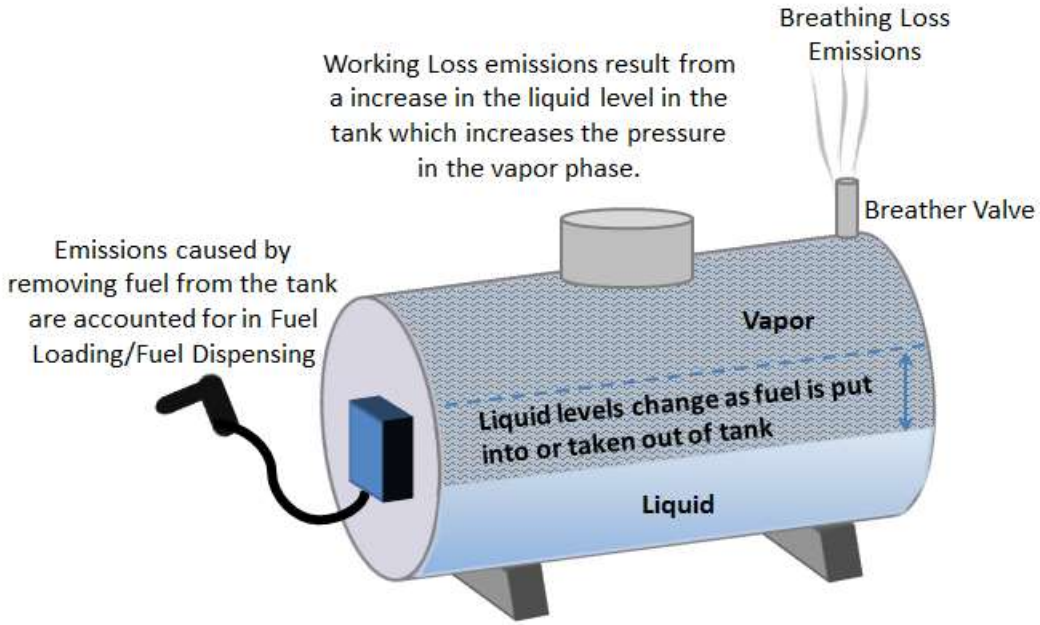
To correctly calculate emissions this emission source should be included in the **Stationary Source Calculation**. Refer to Section 2.7 Emissions Calculations for additional instructions and details.

3.6 Aboveground Storage Tanks (AST)

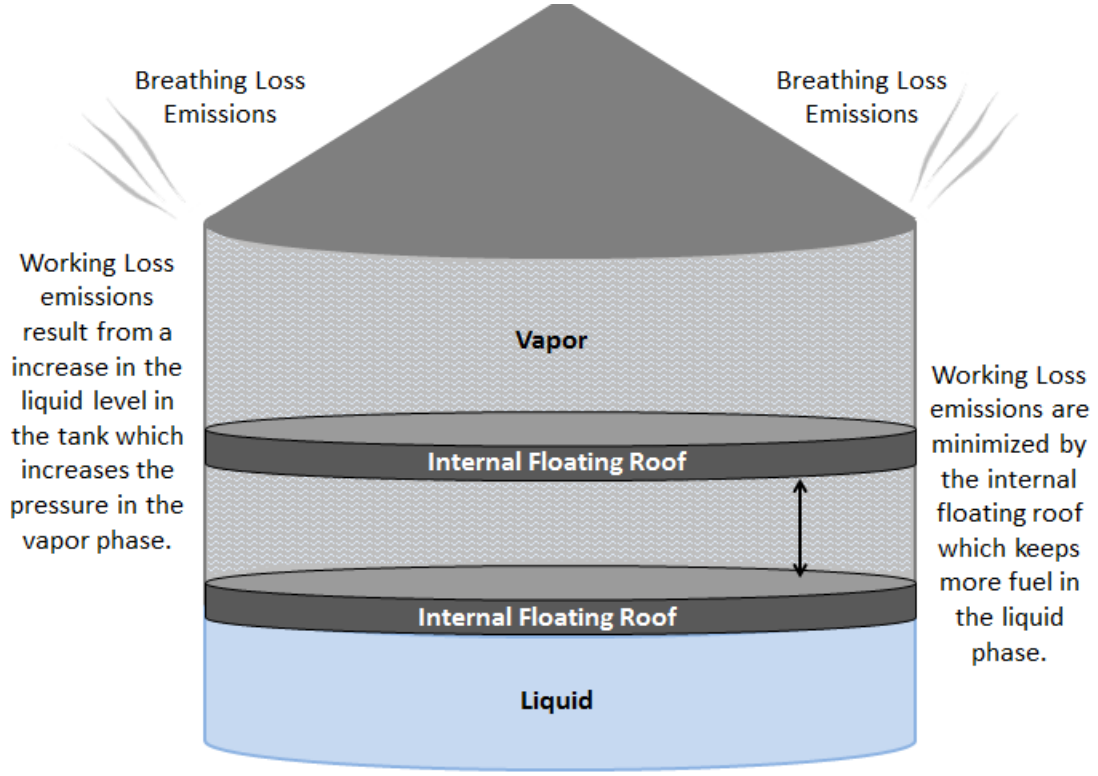
3.6.1 Source Types

Storage tanks can be found on almost all Air Force installations and are used for the storage of materials, including fuels such as JP-8, Jet A, automotive gasoline (MOGAS) and diesel, asphalt, or solvents. The storage tanks may contain anywhere from a few hundred to over a million gallons of material. Above ground storage tanks are defined as having more than 90% of their volume above the ground surface. There are several types of storage tanks, such as horizontal fixed roof, internal floating roof, external floating roof, vertical fixed roof, and domed external fixed roof. The most common types found on Air Force installations are horizontal fixed roof and internal floating roof tanks. The roof design of each storage tank will have a significant effect on the amount of vapor released into the atmosphere.

Emissions from storage tanks are generated as the vapor escapes from the higher-pressure environment inside the tank to the lower pressure of the outside atmosphere. The compounds generally stored are composed of VOCs and HAPs which are released to the atmosphere as the vapor escapes or is vented to regulate the pressure inside the tank.



Fixed roof tanks have breather valves that open in order to equalize the pressure when an imbalance occurs due to the changes in temperature. As the outside temperature increases the vapor expands and more liquid goes into the vapor phase, causing an increase in pressure. As the pressure increases vapor is release to keep the tank pressure at equilibrium with the atmospheric pressure. This is known as breathing loss or storage loss. Working losses are those emissions that result from the filling of the storage tanks. As the liquid level increases it causes an increase in the pressure of the vapor phase which creates an imbalance in the tank pressure and the atmospheric pressure. The breather valve is then opened to relieve the built-up pressure and bring the tank back to equilibrium. Some tanks may be fitted with a control device to recirculate and/or condense the vapors and capture much of the release.



Floating roof tanks have a roof that floats on top of the liquid level. By having a roof that floats on top of the liquid it minimizes the amount of liquid that evaporates by allowing the volume to change within the tank. However, some emissions do occur when the liquid level raises the floating roof high enough to create in increase in pressure in the tank. The vapor is then vented to reestablish equilibrium.

3.6.2 Potential Data Sources

A number of industrial areas around each installation may maintain storage tanks. Each installation has a Storage Tanks Manager; this may be their only duty or may be combined with Water Quality or Air Quality. The Air Force Storage Tank Accounting and Reporting (STAR) system should be configured with all the tanks located on the installation. STAR is a module within APIMS thus enabling the Air Quality Manager to view all the tanks and their specific properties, such as tank type, capacity, and location. However, Air Quality has additional data requirements regarding storage tanks such as dimensions and shell characteristics so some data collection may be required. These additional data requirements may be able to be obtained from the Storage Tank Manager or from the following shops:

- Fuels Management Flight (LGRF)
- Base Supply Fuels Management
- Civil Engineering Liquid Fuels
- AAFES Station
- DLA

For Air Quality purposes the emissions from tanks smaller than 200 gallons are too insignificant to account for, therefore only tanks with a capacity of greater than 200 gallons should be configured for emissions calculations.

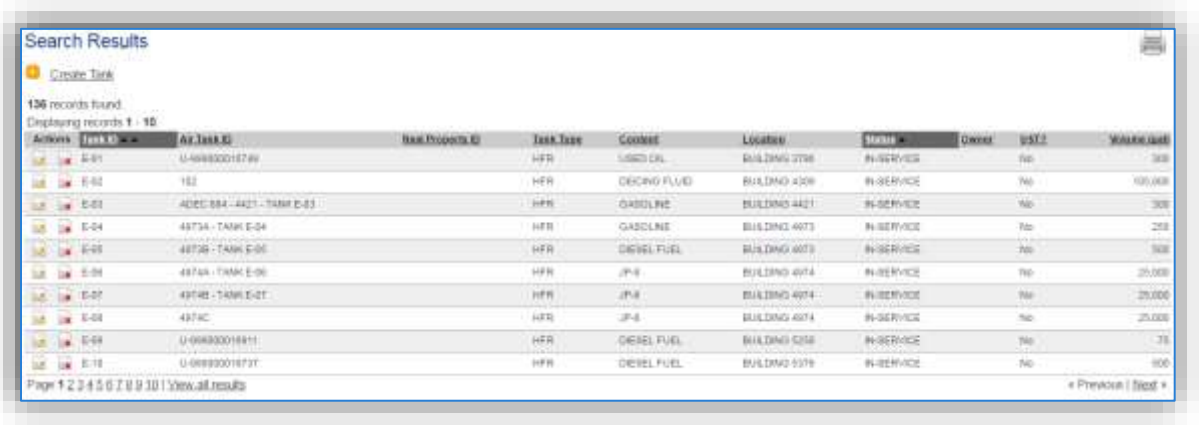
3.6.3 Standard Source Identification/Characterization

3.6.3.1 Existing Sources

It is important to review the existing sources in each source category on an annual basis at a minimum. Most regulatory agencies require an up to date source and equipment inventory.

Navigate to the Storage Tank module of APIMS. Use any of the Search criteria to narrow the search to a specific tank or group of tanks. To view all aboveground tanks select the ABOVEGROUND radio button and click the **Search** button.

The search results grid will now display all the aboveground storage tanks currently in APIMS.

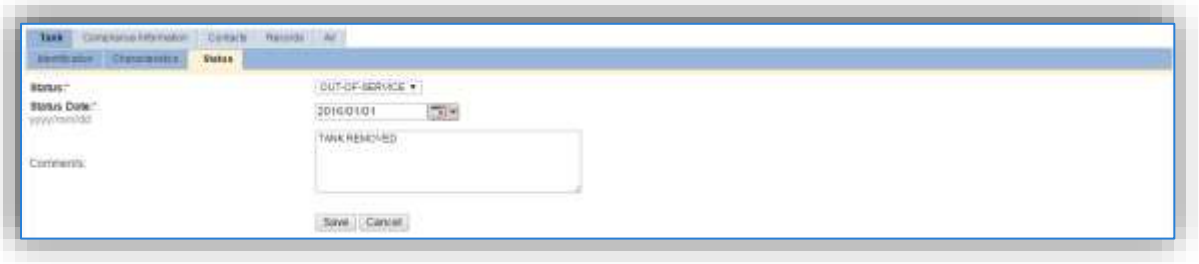


The **Tank ID** is how the Storage Tank Manager identifies the tank and the **Air Tank ID** is how the Air Quality Manager identifies the tank. The **Tank Type** indicates the type of tank for example; HFR is a horizontal fixed roof tank. Additional information about the tank is shown including the **Content**, **Location**, **Status**, and **Volume**. This list should be reviewed to make sure the source is configured in a way that it is easy to identify and locate. The status of each source should also be reviewed and kept current; this will require coordination with the Storage Tank Manager.

3.6.3.1.1 Status

If the status of a unit needs to be changed, it must be completed by a person with the Storage Tank Manager role in APIMS. If you have that role, click the edit icon next to the tank.

Navigate to the *Status* sub tab. Click the Change Current Status hyperlink.



Select the appropriate status from the **Status** dropdown (i.e., IN-SERVICE or OUT-OF-SERVICE).

For the **Start Date** enter the date at which the status changed.

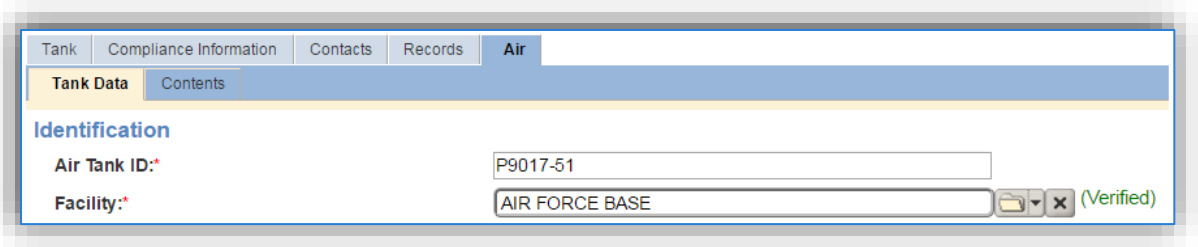
Enter **Comments** that provide insight into why the status changed. These can be very useful for equipment inventories, permit renewals and regulatory reporting. Most regulatory agencies require reporting on unit operation status; this includes any potential time empty and possible causes or reasons for emptying the tank.

Click the **Save** button.

The emissions for a storage tank will only be calculated for the dates the tank was in an IN-SERVICE status. If a source is removed in the middle of a year, the emissions will only be calculated for the part of the year the source was active.

3.6.3.1.2 Air – Tank Data

There are basic data elements that are important to track and maintain for new and existing sources, such as the tank dimensions, shell characteristics and breather vent settings. This data can be maintained in the Storage Tank record on the *Air* tab *Tank Data* sub tab.

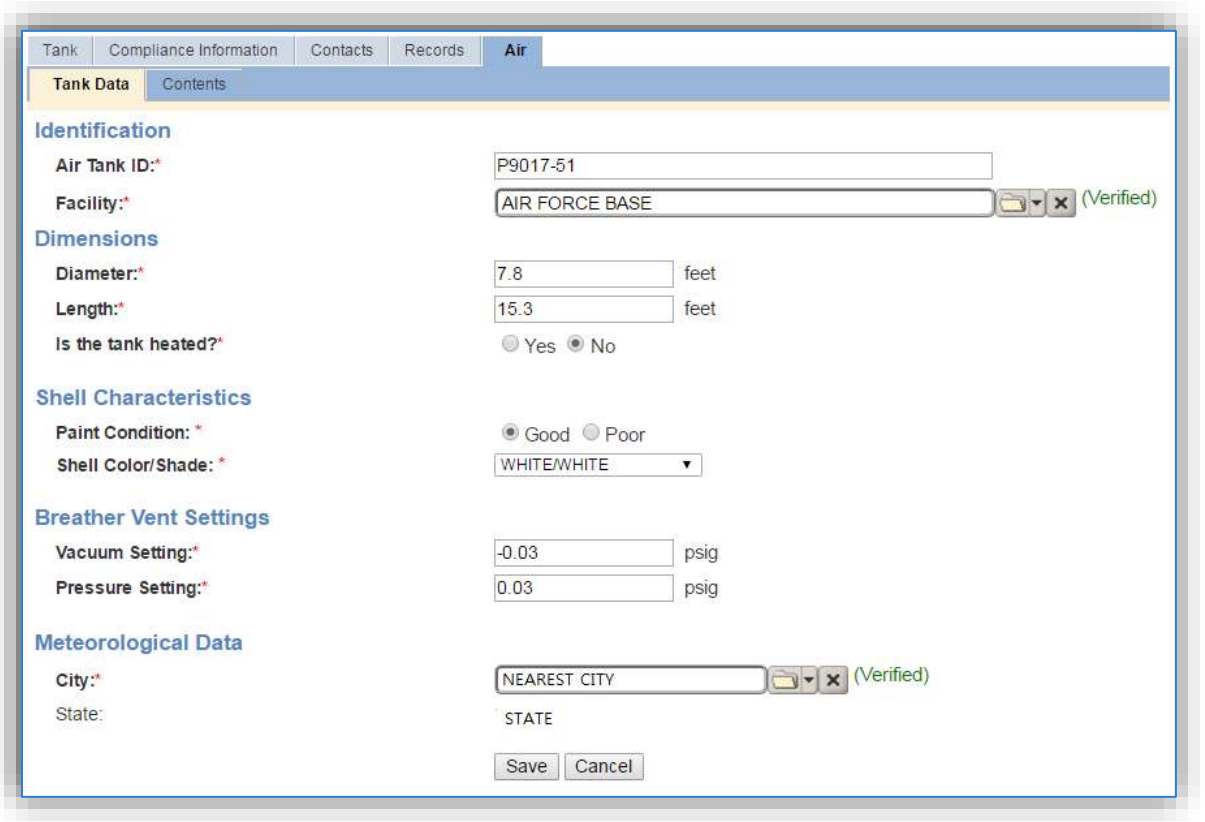


The **Air Tank ID** field can be used to enter a standard convention identifier that will best help identify the source. If the source is permitted, enter the emission unit ID as designated in the permit.

The **Facility Name** should be the facility that is responsible for the source.

3.6.3.1.2.1 *Horizontal Fixed Roof*

The fields on the screen are dependent upon the tank type. The screen below displays the screen for a horizontal fixed roof tank.



The **Diameter** should be entered as the diameter in feet of the inner tank where the fuel is stored, not the shell diameter.

The **Length** should be the length in feet of the inner tank where the fuel is stored, not the shell length.

Select the correct answer to the **Is the tank heated?** Note that most tanks should be flagged "No" as they are not usually heated.

The **Paint Condition** should indicate how the paint on the exterior of the tank is holding up. For example, if the paint is missing in some spots or flaking off, select Poor.

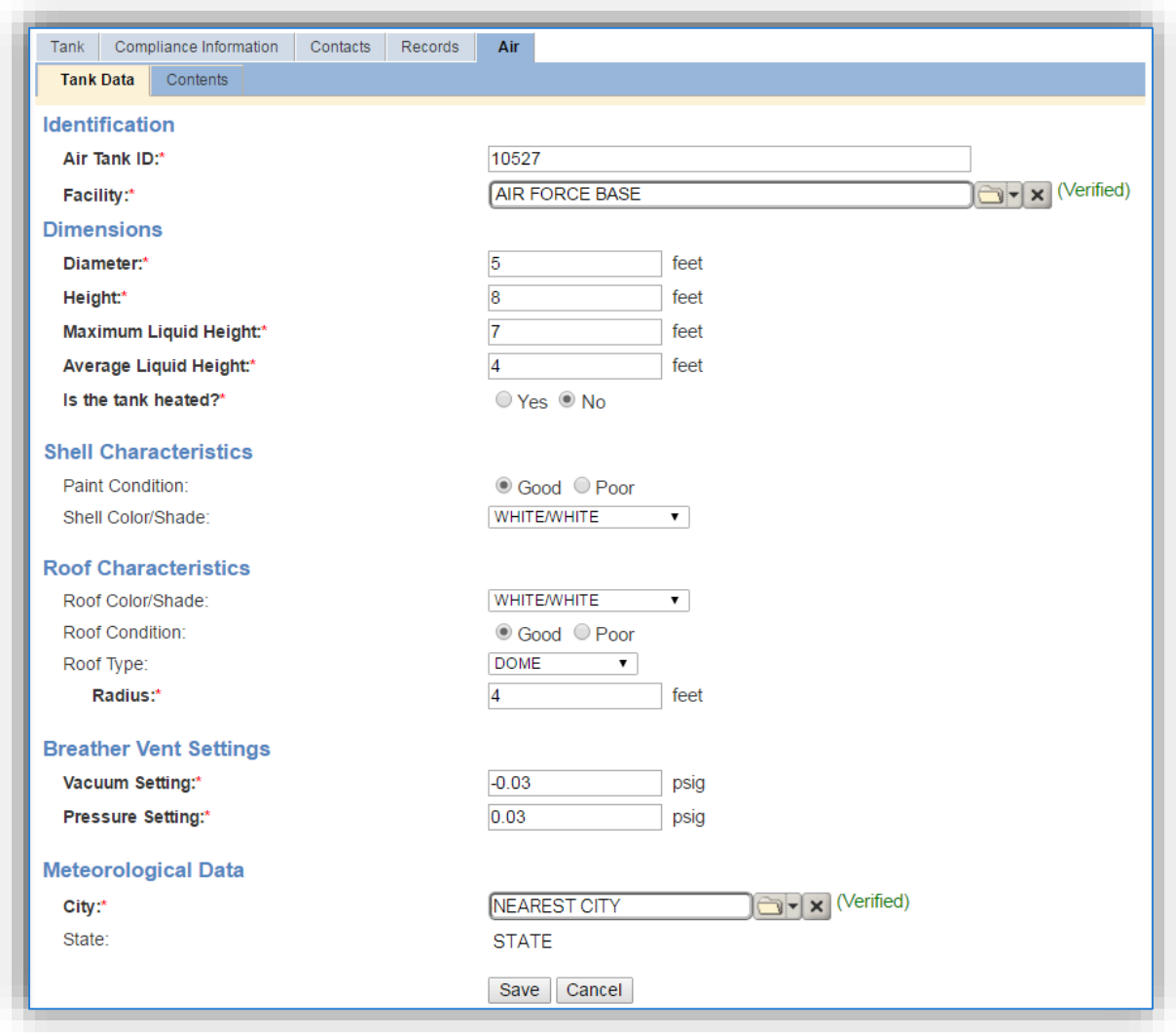
The **Shell Color/Shade** should be selected to the closest available value. This field can affect the emissions calculations as paint color can affect how the sun or temperature affects the vapor pressure inside the tank. Most tanks are WHITE/WHITE.

The **Vacuum Setting** and **Pressure Setting** automatically default to the values used in the EPA Tanks 4.0.9D program. If these settings are known they can be altered to the actual values, otherwise utilize the default values.

The **City** selected should be the closest geographical location provided in the list. This will be used to model the atmospheric temperature used in emissions calculations.

3.6.3.1.2.2 *Vertical Fixed Roof*

The fields on the screen are dependent upon the tank type. The screen below displays the screen for a vertical fixed roof tank.



The **Diameter** should be entered as the diameter in feet of the inner tank where the fuel is stored, not the shell diameter.

The **Height** should be the height in feet of the inner tank where the fuel is stored, not the shell height.

The **Maximum Liquid Height** should be the height in feet that is the maximum level the liquid is allowed to reach in the tank. Tanks cannot be completely filled with liquid and must allow some room for vapor.

The **Average Liquid Height** should be the height in feed that is the level the tank is maintained at most often; this should be less than the Maximum Liquid Height.

Select the correct answer to the **Is the tank heated?** Note that most tanks should be flagged “No” as they are not usually heated.

The **Paint Condition** should indicate how the paint on the exterior of the tank is holding up. For example, if the paint is missing in some spots or flaking off, select Poor.

The **Shell Color/Shade** should be selected to the closest available value. This field can affect the emissions calculations as paint color can affect how the sun or temperature affects the vapor pressure inside the tank. Most tanks are WHITE/WHITE.

The **Roof Color/Shade** should be selected to the closest available value. This field can affect the emissions calculations as paint color can affect how the sun or temperature affects the vapor pressure inside the tank. The roof color may differ from the shell color and can have a significant impact on emissions for this type of tank. Most tanks are WHITE/WHITE.

The **Roof Condition** should indicate how the paint on the exterior of the tank roof is holding up. For example, if the paint is missing in some spots or flaking off, select Poor.

The **Roof Type** should be selected from the list of CONE or DOME.

If the **Roof Type** is CONE, the **Slope** and **Roof Height** will need to be specified.

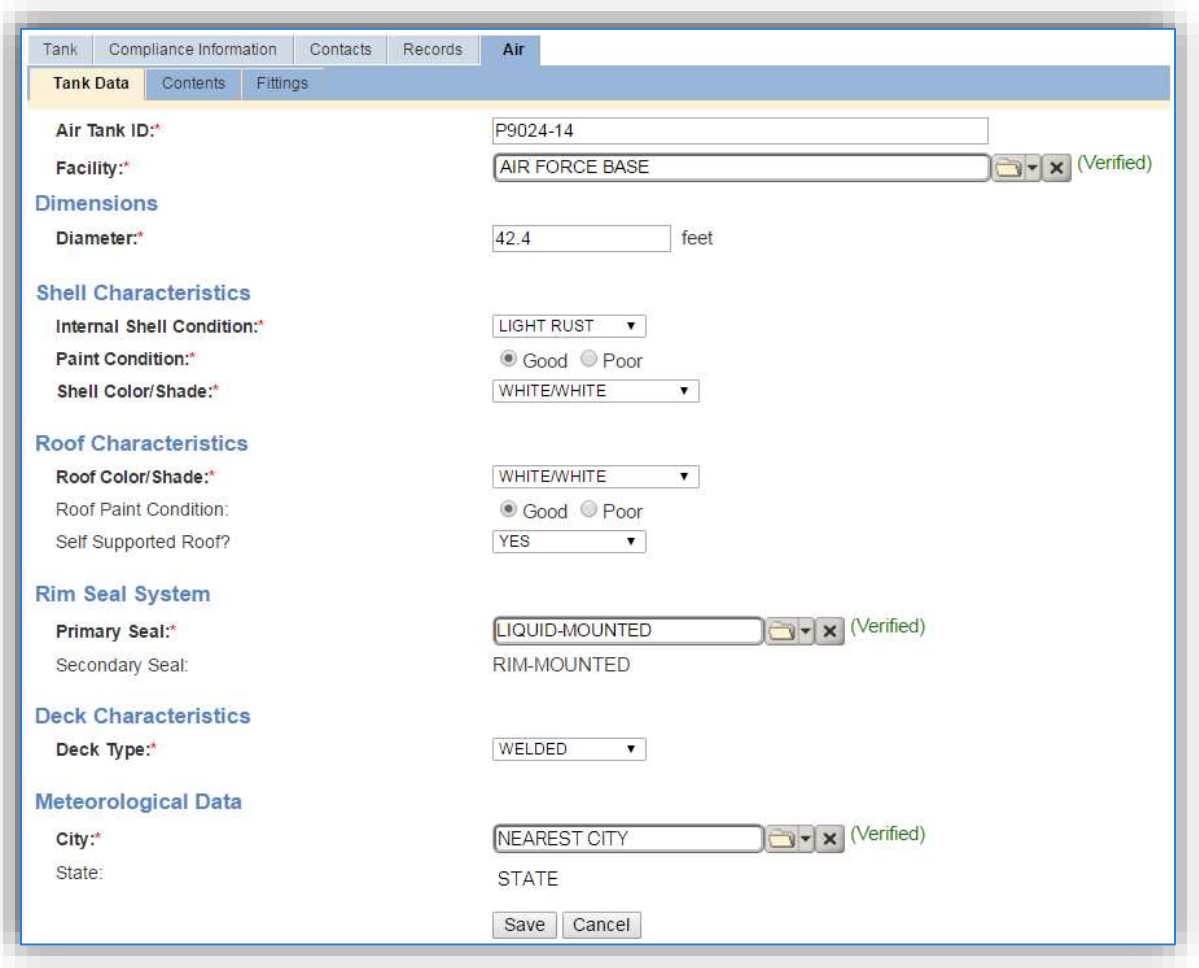
If the **Roof Type** is DOME, the **Radius** will need to be specified.

The **Vacuum Setting** and **Pressure Setting** automatically default to the values used by common industrial applications. If these settings are known they can be altered to the actual values, otherwise utilize the default values.

The **City** selected should be the closest geographical location provided in the list. This will be used to model the atmospheric temperature used in emissions calculations.

3.6.3.1.2.3 *Internal Floating Roof*

The fields on the screen are dependent upon the tank type. The screen below displays the screen for an internal floating roof tank.



The **Diameter** should be entered as the diameter in feet of the inner tank where the fuel is stored, not the shell diameter.

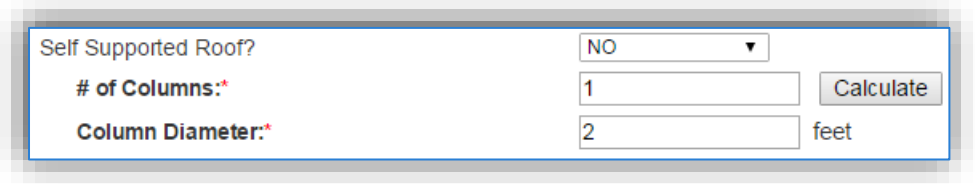
The **Internal Shell Condition** should indicate if the internal shell has LIGHT RUST, DENSE RUST or a GUNITE LINING.

The **Paint Condition** should indicate how the paint on the exterior of the tank is holding up. For example, if the paint is missing in some spots or flaking off, select Poor.

The **Shell Color/Shade** should be selected to the closest available value. This field can affect the emissions calculations as paint color can affect how the sun or temperature affects the vapor pressure inside the tank. Most tanks are WHITE/WHITE.

The **Roof Color/Shade** should be selected to the closest available value. This field can affect the emissions calculations as paint color can affect how the sun or temperature affects the vapor pressure inside the tank. The roof color may differ from the shell color and can have a significant impact on emissions for this type of tank. Most tanks are WHITE/WHITE.

The **Roof Paint Condition** should indicate how the paint on the exterior of the tank roof is holding up. For example, if the paint is missing in some spots or flaking off, select Poor.



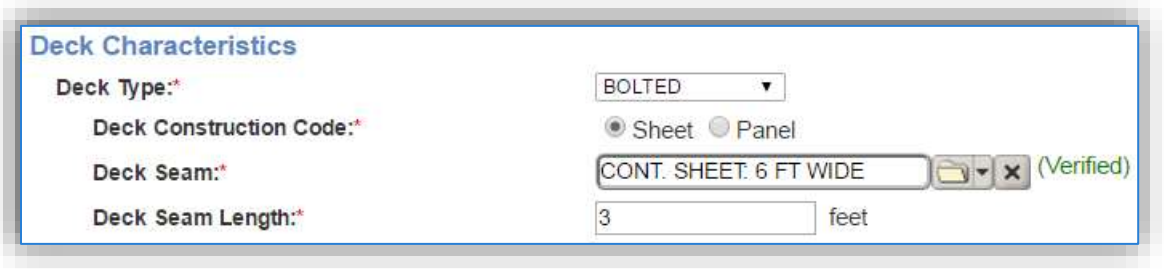
Indicate if the floating roof is a **Self-Supported Roof**. If it is not, the **# of Columns** and the **Column Diameter** must be specified. A **Calculate** button can be used to determine the number of columns if unknown.

Floating roof tanks have a **Primary Seal** and **Secondary Seal** that must be specified as it can affect the emissions calculations.

The **Roof Type** should be selected from the list of CONE or DOME.

The **Vacuum Setting** and **Pressure Setting** automatically default to the values used by common industrial applications. If these settings are known they can be altered to the actual values, otherwise utilize the default values.

The **Deck Type** should be specified to be either BOLTED or WELDED. If the value selected is BOLTED additional fields will be displayed as shown below.



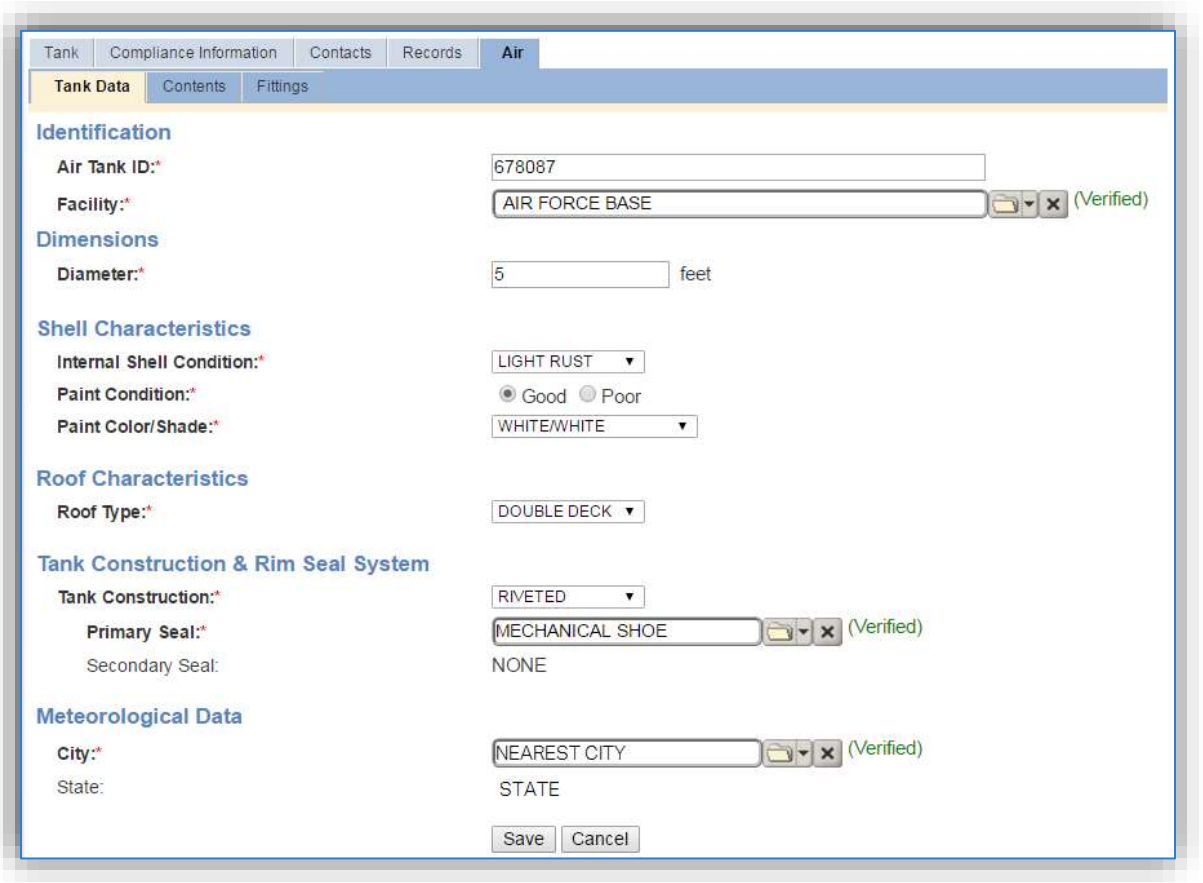
The **Deck Construction Code** should be selected as either SHEET or PANEL.

The **Deck Seam** and **Deck Seam Length** should be specified according to tank specifications.

The **City** selected should be the closest geographical location provided in the list. This will be used to model the atmospheric temperature used in emissions calculations.

3.6.3.1.2.4 *External Floating Roof*

The fields on the screen are dependent upon the tank type. The screen below displays the screen for an external floating roof tank.



The **Diameter** should be entered as the diameter in feet of the inner tank where the fuel is stored, not the shell diameter.

The **Internal Shell Condition** should indicate if the internal shell has LIGHT RUST, DENSE RUST or a GUNITE LINING.

The **Paint Condition** should indicate how the paint on the exterior of the tank is holding up. For example, if the paint is missing in some spots or flaking off, select Poor.

The **Paint Color/Shade** should be selected to the closest available value. This field can affect the emissions calculations as paint color can affect how the sun or temperature affects the vapor pressure inside the tank. Most tanks are WHITE/WHITE.

The **Roof Type** needs to be specified as DOUBLE DECK or PONTOON according to tank specifications.

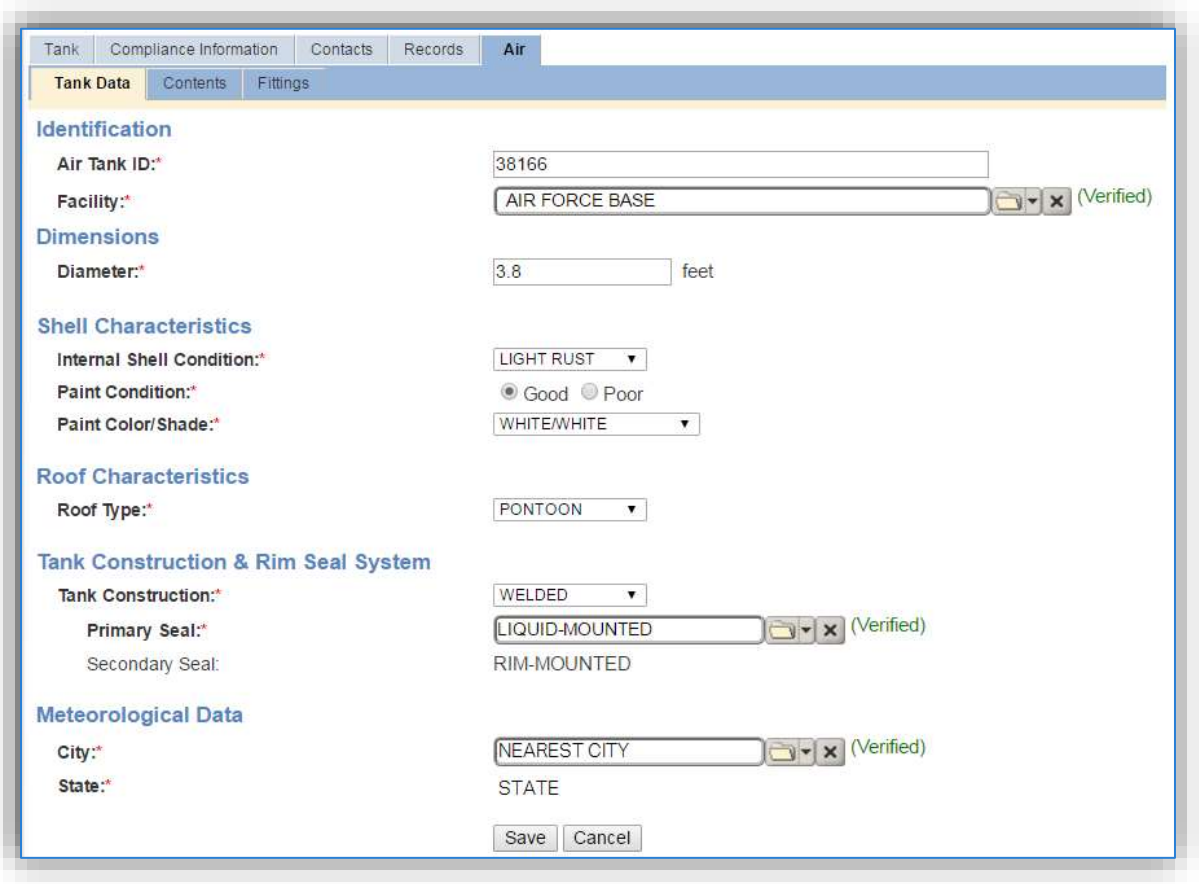
The **Tank Construction** needs to be specified as RIVETED or WELDED according to tank specifications.

Floating roof tanks have a **Primary Seal** and **Secondary Seal** that must be specified as it can affect the emissions calculations.

The **City** selected should be the closest geographical location provided in the list. This will be used to model the atmospheric temperature used in emissions calculations.

3.6.3.1.2.5 *Domed External Floating Roof*

The fields on the screen are dependent upon the tank type. The screen below displays the screen for a domed external floating roof tank.



The **Diameter** should be entered as the diameter in feet of the inner tank where the fuel is stored, not the shell diameter.

The **Internal Shell Condition** should indicate if the internal shell has LIGHT RUST, DENSE RUST or a GUNITE LINING.

The **Paint Condition** should indicate how the paint on the exterior of the tank is holding up. For example, if the paint is missing in some spots or flaking off, select Poor.

The **Paint Color/Shade** should be selected to the closest available value. This field can affect the emissions calculations as paint color can affect how the sun or temperature affects the vapor pressure inside the tank. Most tanks are WHITE/WHITE.

The **Roof Type** needs to be specified as DOUBLE DECK or PONTOON according to tank specifications.

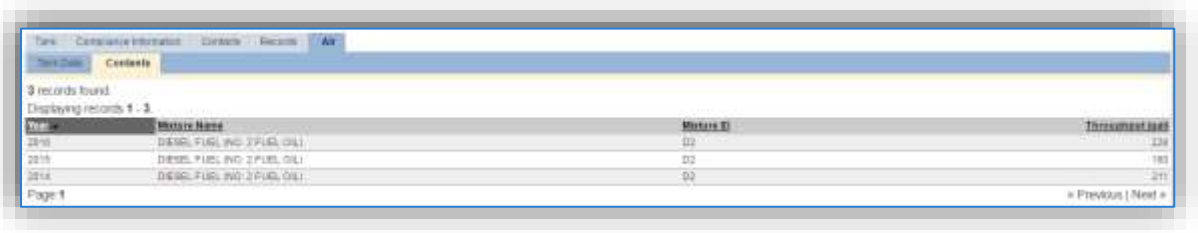
The **Tank Construction** needs to be specified as RIVITED or WELDED according to tank specifications.

Floating roof tanks have a **Primary Seal** and **Secondary Seal** that must be specified as it can affect the emissions calculations.

The **City** selected should be the closest geographical location provided in the list. This will be used to model the atmospheric temperature used in emissions calculations.

3.6.3.1.3 Air – Contents

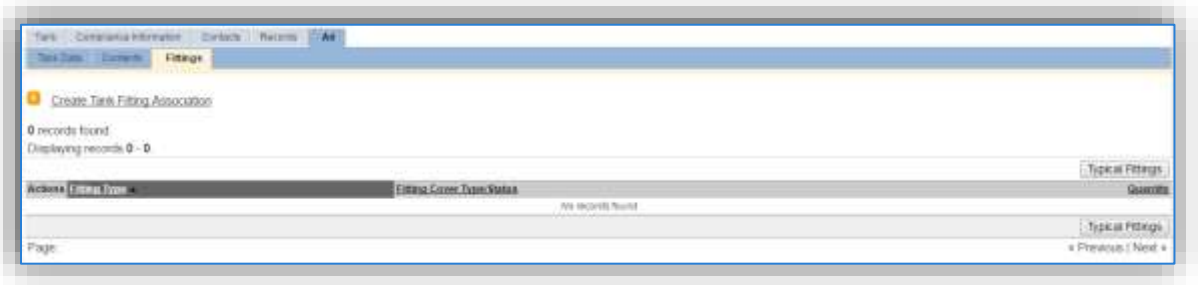
The Contents sub tab is a read-only tab that shows the Tank Usage history for the tank.



The **Year**, **Mixture Name**, **Mixture ID,** and **Throughput** can be reviewed.

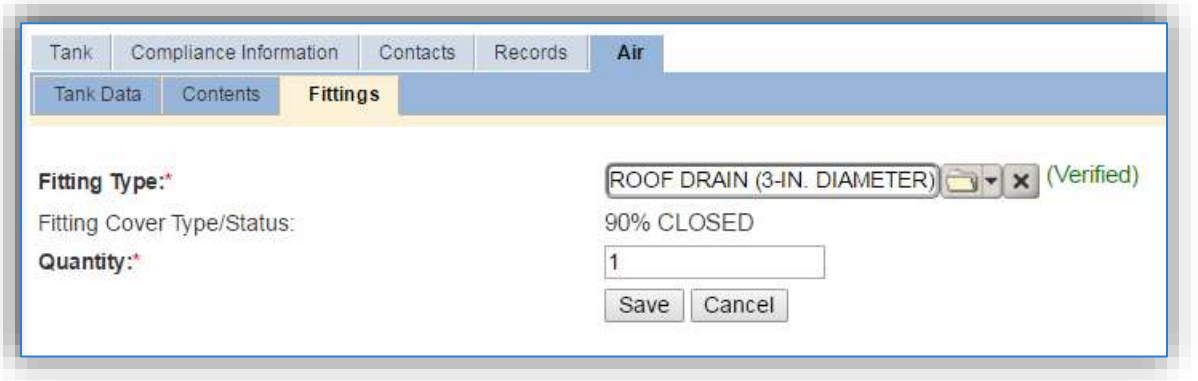
3.6.3.1.4 Air – Fittings

Some tank types (Internal Floating Roof, External Floating Roof and Domed External Floating Roof) have an additional tab that can be used to specify fittings.



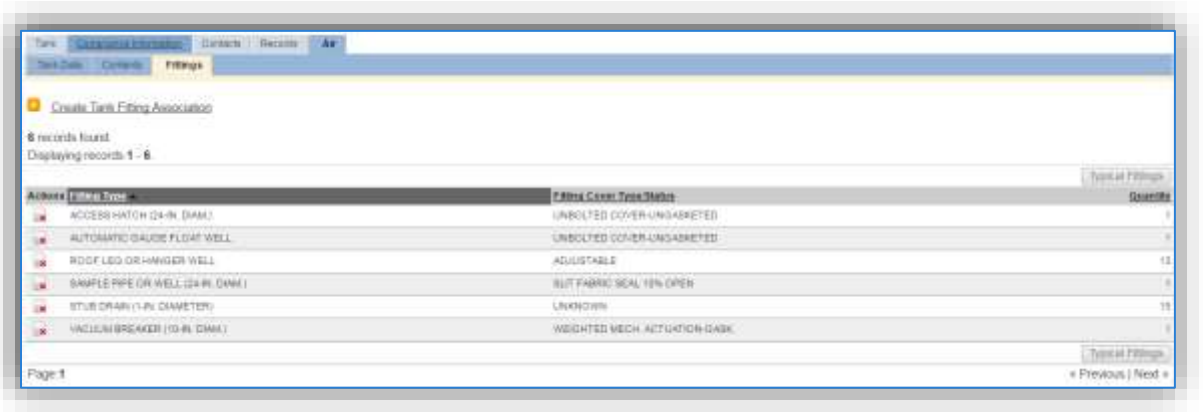
If the specific tank fittings are unknown, the Typical Fittings button can be used to associate the fittings that are normally associated to this tank as specified in the EPA Tanks 4.0.9D program.

To add a specific tank fitting, click the Create Tank Fitting Association hyperlink.



Select the **Fitting Type** from the list of values according to the tank specifications.

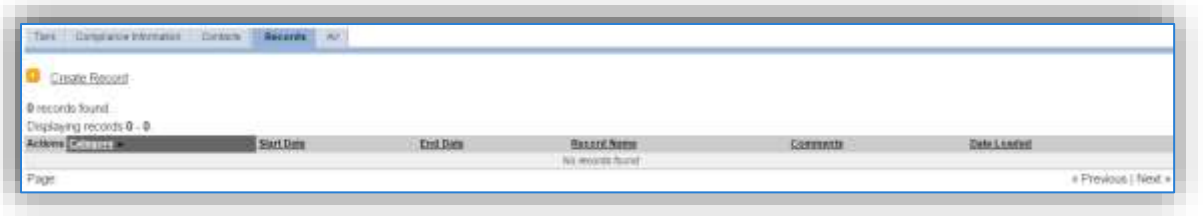
Enter the total number of this type of fitting in the Quantity field. Click the **Save** button.



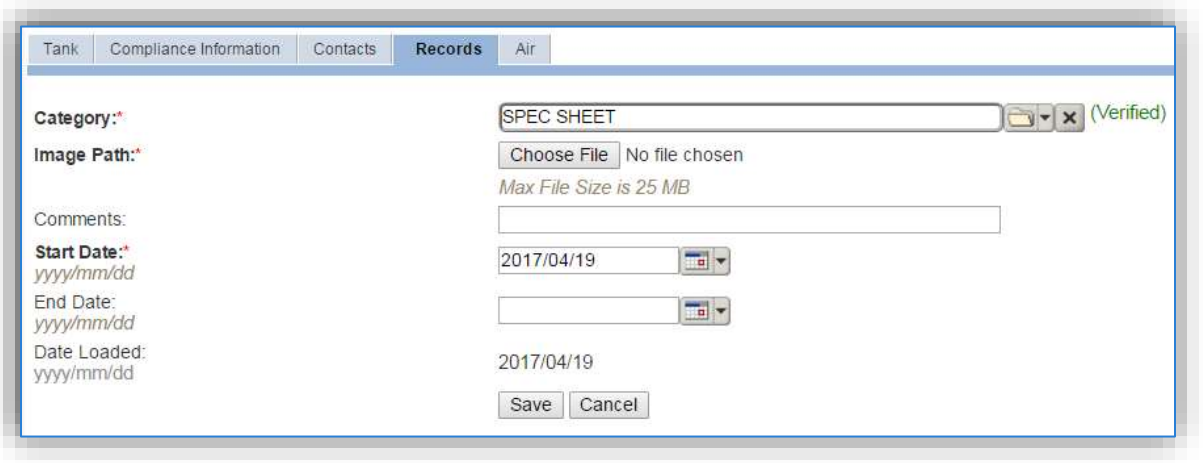
Repeat the above steps for each type of tank fitting.

3.6.3.1.5 Records

The *Records* tab can be used to upload any pertinent information about the tank. This can be especially useful to upload tank specifications or repairs that may affect the tank configuration.

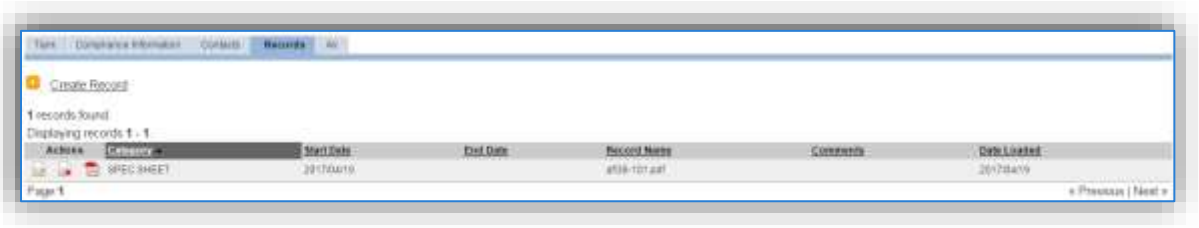


To add a document, click the Create Record hyperlink.



Select the type of document from the Category list of values, most commonly Schematic or Spec Sheet for this type of source.

Choose the file, using the Choose File button to open a file browser window. Click the **Save** button.



3.6.3.2 New Source Configuration

3.6.3.2.1 Data Collection Sheet

The input form on the two pages is a printable guide that can be taken out to the location of the source and used to gather all the necessary information from the shop personnel. It can then be used as a guide to help configure the data in APIMS when you return to your office.

Aboveground Storage Data Collection Worksheet

GENERAL INFORMATION

Building Number_____ Mission/Purpose_____

Shop Name/Function_____ Management Organization_____

Coordinates: Latitude: _____Longitude: _____

UTM: _____Zone _____Easting _____Northing ☐ Feet ☐ Meters

Is this source in any of your permits? ☐ Yes ☐ No

If yes, does it have an emission unit number or other designation? _____

EQUIPMENT INFORMATION

What is the Storage Tank Type?

- ☐ Horizontal Fixed Roof (HFR)
- ☐ Vertical Fixed Roof (VFR)
- ☐ Internal Floating Roof (IFR)
- ☐ External Floating Roof (EFR)
- ☐ Domed External Floating Roof (DEFR)

Horizontal Fixed Roof

Is the tank heated? ☐ Yes ☐ No

Diameter _____feet Length _____feet

What is the shell paint condition? ☐ Good ☐ Poor

What is the shell color/shade?

- ☐ White/White
- ☐ Aluminum/Diffuse
- ☐ Gray/Medium
- ☐ Aluminum/Specular
- ☐ Gray/Light
- ☐ Red/Primer

Vertical Fixed Roof

Is the tank heated? ☐ Yes ☐ No

Diameter _____feet Height _____feet

Max Liquid Height _____feet Average Liquid Height _____feet

What is the shell paint condition? ☐ Good ☐ Poor

What is the shell color/shade?

- ☐ White/White
- ☐ Aluminum/Diffuse
- ☐ Gray/Medium
- ☐ Aluminum/Specular
- ☐ Gray/Light
- ☐ Red/Primer

What is the roof paint condition? ☐ Good ☐ Poor

What is the roof color/shade?

- ☐ White/White
- ☐ Aluminum/Diffuse
- ☐ Gray/Medium
- ☐ Aluminum/Specular
- ☐ Gray/Light
- ☐ Red/Primer

What is the roof type? ☐ Dome ☐ Cone

Radius _____ Slope _____

Roof Height _____

Internal Floating Roof

Diameter _____ feet

What is the internal shell condition? ☐ Light Rust ☐ Dense Rust ☐ Gunite Lining

What is the shell color/shade?

☐ White/White ☐ Aluminum/Diffuse ☐ Gray/Medium

☐ Aluminum/Specular ☐ Gray/Light ☐ Red/Primer

What is the roof paint condition? ☐ Good ☐ Poor

What is the roof color/shade?

☐ White/White ☐ Aluminum/Diffuse ☐ Gray/Medium

☐ Aluminum/Specular ☐ Gray/Light ☐ Red/Primer

Is the roof self-supported? ☐ Yes ☐ No

# of Columns _____ Column Diameter _____

What is the Primary Seal? _____

What is the Secondary Seal? _____

Specify the Deck Type ☐ BOLTED ☐ WELDED

Specify the Deck Construction Code

☐ SHEET ☐ PANEL (Deck Seam _____ Deck Seam Length _____)

External Floating Roof & Domed External Floating Roof

Diameter _____ feet

What is the internal shell condition? ☐ Light Rust ☐ Dense Rust ☐ Gunite Lining

What is the shell color/shade?

☐ White/White ☐ Aluminum/Diffuse ☐ Gray/Medium

☐ Aluminum/Specular ☐ Gray/Light ☐ Red/Primer

What is the paint condition? ☐ Good ☐ Poor

What is the roof type? ☐ Double Deck ☐ Pontoon

What is the tank construction? ☐ Riveted ☐ Welded

What is the Primary Seal? _____

What is the Secondary Seal? _____

USAGE INFORMATION

What type of fuel is stored in this tank? _____

What is the tank throughput?

Yearly Total _____ (gallons) or Tank Turnovers _____

Monthly Totals (gallons)

January _____	May _____	September _____
February _____	June _____	October _____
March _____	July _____	November _____
April _____	August _____	December _____

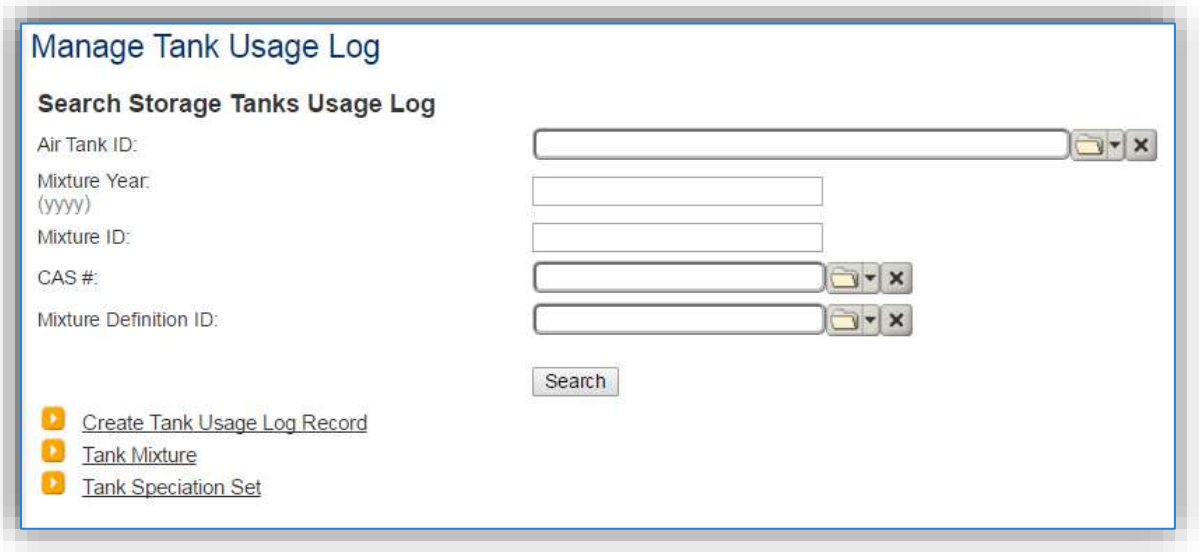
3.6.3.2.2 New Source Configuration

Contact the Storage Tank Manager for configuration of a new storage tank in the STAR module of APIMS.

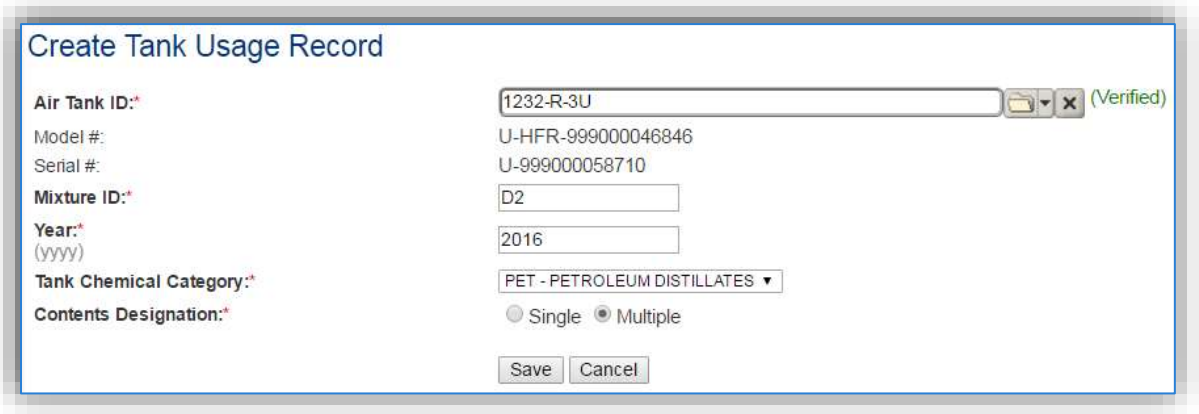
3.6.4 Year-to-Year Maintenance

3.6.4.1 Usage

The throughput for storage tanks will need to be tracked annually or more frequently if required by a regulatory agency. To correctly document the usage for this emission source the throughput should be entered in the Tank Usage Log. Navigate to the Tank Usage Log module in APIMS.



Click the Create Tank Usage Log Record hyperlink.



Enter the **Air Tank ID** or search for the specific tank using the list of values. This will automatically populate the **Model #** and **Serial #** fields.

The **Mixture ID** is a designation used to quickly identify the contents of the tank. The most commonly used Mixture ID values are as follows: D2 for Diesel (No. 2 Fuel Oil), G for Gasoline, J8 for JP-8, JA for Jet A, BD for Bio-Diesel.

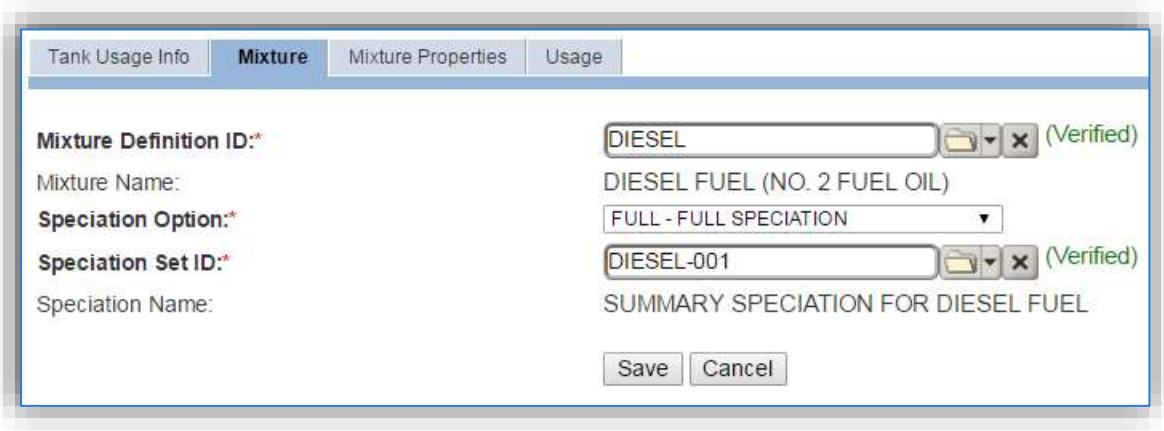
The **Year** should be the calendar year for the throughput.

The **Tank Chemical Category** should be entered according to the contents of the tank, which is most commonly a type of fuel. All fuels or refined petroleum stocks such as, gasoline, bio-diesel, diesel, JP-A and JET A are in the **PET – PETROLEUM DISTILLATES** category. The crude oils category should only be used for unrefined petroleum stocks. The organic liquids category should include all other organic compounds and mixtures.

The **Contents Designation** is used to indicate if liquid stored in the tank consists of a single component or a mixture of components. Petroleum distillates and crude oil are **MULTIPLE** component liquids.

Click the **Save** button.

The next tab is the *Mixture* tab. This tab specifies the fuel mixture and the emission speciation to be used.



Select the Mixture Definition ID from the list of values that most closely matches the fuel in the tank. There are ten default fuel mixtures populated in APIMS available for use.

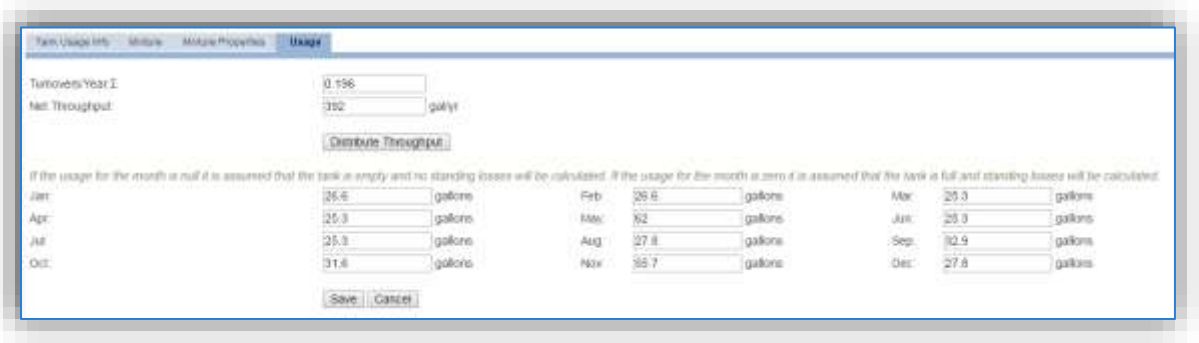
Select the Speciation Option of Full Speciation, Partial Speciation or Vapor Weight Speciation. The Air Force recommends selecting FULL – FULL SPECIATION.

- Full Speciation will provide the emissions for all the chemical components identified in the liquid. Partial Speciation will provide the emissions for only specified chemicals in the liquid.
- Vapor Weight Speciation is only used when the total vapor weight for chemicals is needed in the emissions report.

The Speciation Set ID should be used to identify the specific fuel speciation from the list of values. There are fifteen standard speciation profiles available for use. Below are the most common, with the recommended speciation for each mixture in bold.

Mixture Definition ID	Mixture Name	Speciation ID	Speciation Name
DIESEL	DIESEL FUEL (NO. 2 FUEL OIL)	DIESEL-001	**SUMMARY SPECIATION FOR DIESEL FUEL**
DIESEL	DIESEL FUEL (NO. 2 FUEL OIL)	DIESEL-002	EPA TANKS SPECIATION FOR DIESEL FUEL
GASOLINE	GASOLINE	GASOLINE-001	**SUMMARY SPECIATION FOR GASOLINE FUEL OIL**
GASOLINE	GASOLINE	GASOLINE-002	EPA TANKS SPECIATION FOR GASOLINE
GASOLINE	GASOLINE	GASOLINE-003	EPA TANKS FOR GASOLINE OXYGENATED WITH MTBE
GASOLINE	GASOLINE	GASOLINE-004	EPA TANKS SPECIATION FOR GASOLINE REFORMULATED WITH MTBE
GASOLINE	GASOLINE	GASOLINE-005	EPA TANKS SPECATIONS FOR GASOLINE OXYGENATED WITH ETHANOL
JET A	JET KEROSENE (JET A)	JETA-001	**EPA TANKS SPECIATION FOR JET KEROSENE**
JP-8	JP-8	JP8-001	**SUMMARY SPECIATION FOR JP-8**

The next tab is the *Usage* tab.



There are two ways to track usage using this usage log.

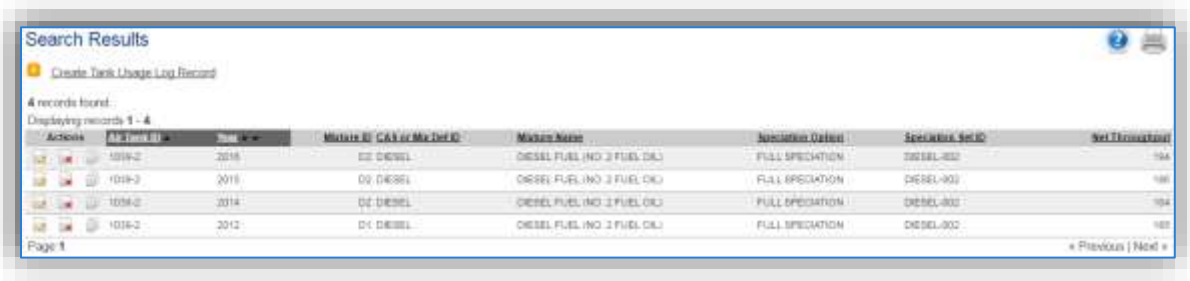
If the throughput is tracked monthly, enter the monthly throughput for each month in gallons in the appropriate field. Once the throughput is saved, the **Net Throughput** and **Turnovers/Year** will be calculated.

If the throughput is tracked annually, enter the total throughput in the **Net Throughput** field. Once the throughput is saved, the **Turnovers/Year** and the monthly throughputs will be calculated.

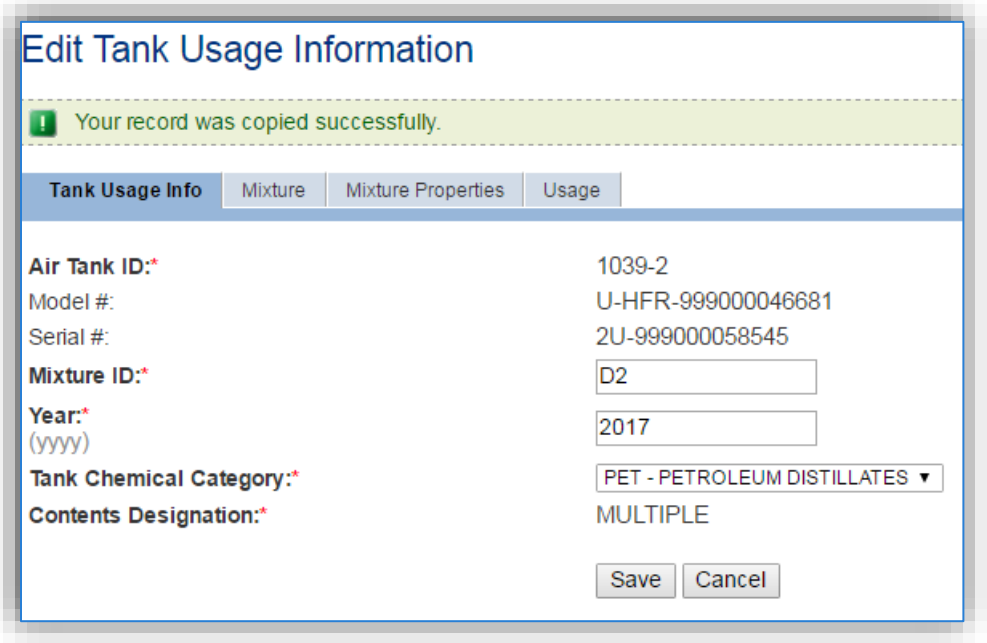
If the installation is in an area that has a designated ozone season, the throughputs should be entered monthly.

A blank usage field will calculate as if the tank is empty, a zero-usage entry will calculate as if the tank is full and still has breathing losses.

Once a single usage record has been created for a specific tank, if the tank contents and speciation profile have not changed from the previous year the copy icon can be utilized to create the next year's throughput record. Search for the specific tank, then click the copy icon next to the most recent year's row.



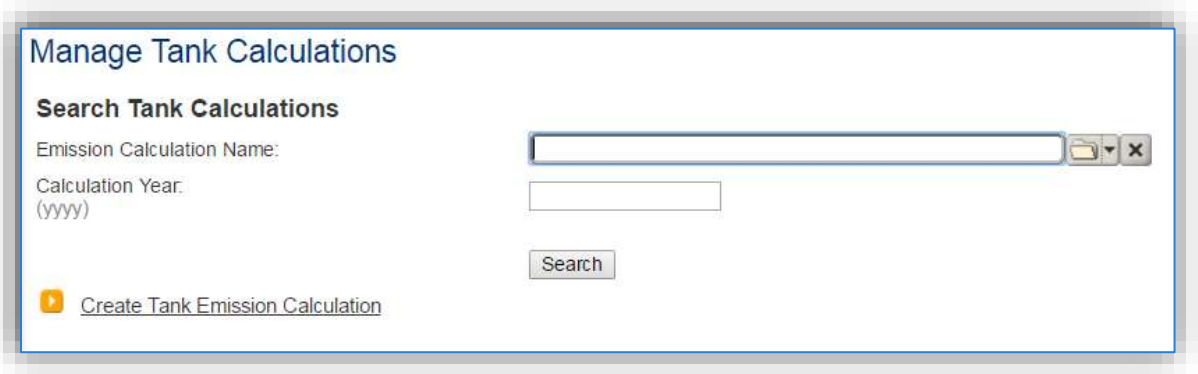
Search for the specific tank, then click the copy icon next to the most recent year's row.



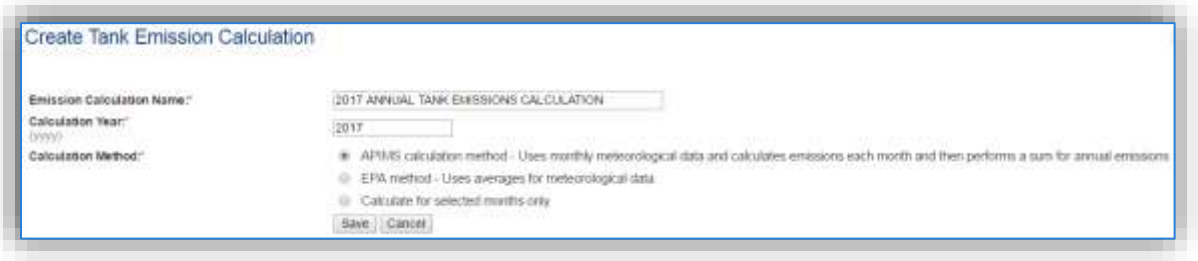
As shown above the values are auto-populated based on the previous year's values for the *Tank Usage Info*, *Mixture* and *Mixture Properties* tabs. Navigate to the *Usage* tab to enter the current year's throughputs.

3.6.4.2 Emissions Calculation

The emissions calculations for storage tanks are not completed in the Emission Calculation area used by the other source categories, but has its own emissions calculation module. A new calculation for each calendar year needs to be created. Navigate to the Tank Emission Calculation module in APIMS.



Click the Create Tank Emission Calculation hyperlink to create a tank emission calculation.



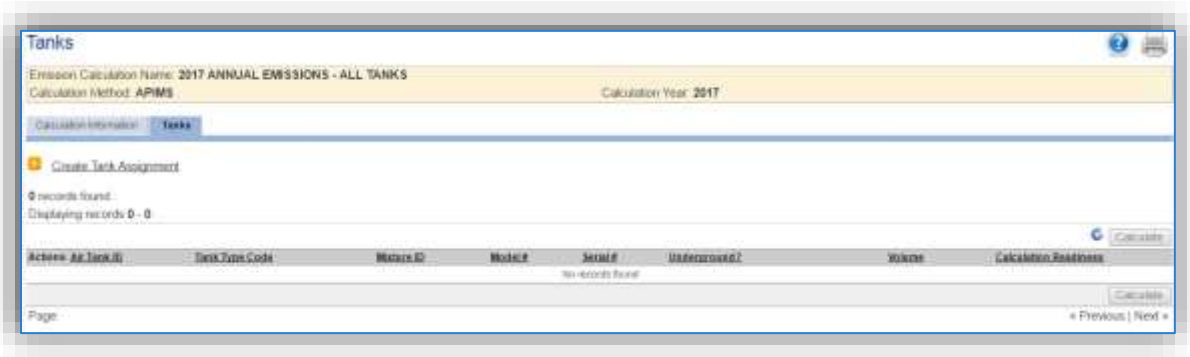
The **Emission Calculation Name** should be a name that clearly identifies the calculation. For example, specify the year, the facility and the tanks that are included. Specifically, if there are tanks that are reported separately, they should be in a separate calculation. Possible names are:

- 2017 ANNUAL EMISSIONS – ALL TANKS
- 2017 – GSU TANKS
- 2017 – PERMITTED TANKS MONTHLY EMISSIONS

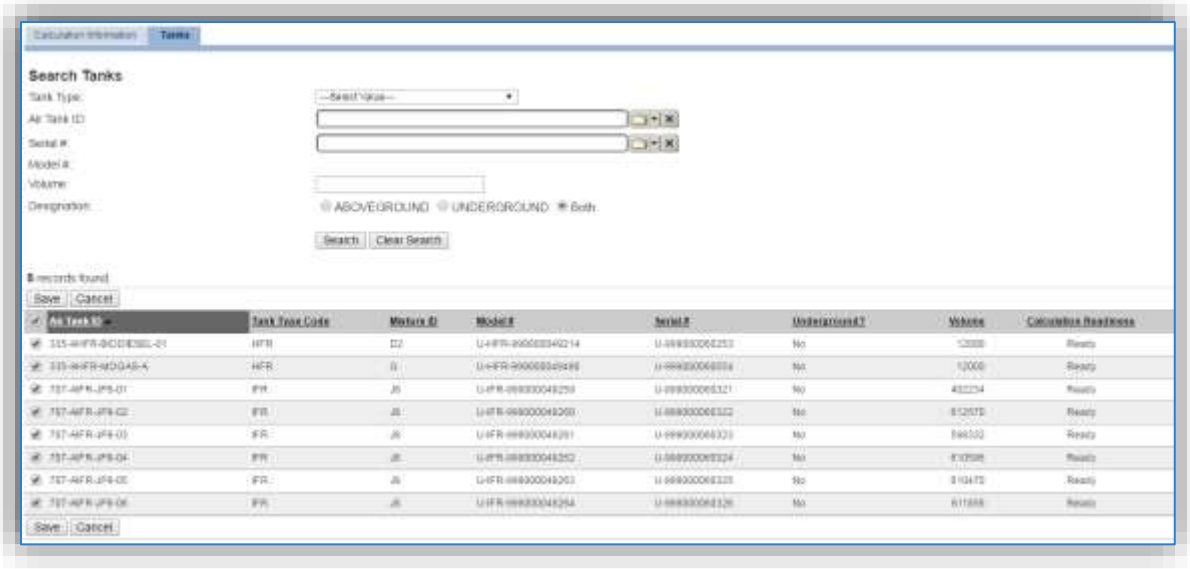
The **Calculation Year** should be the calendar year for the emissions.

The **Calculation Method** should be selected according to your preferences. The APIMS calculation method is the recommended method for annual calculations as it takes into account the specific meteorological data for the specified location, instead of a national average. For monthly calculations, utilize the Calculate for selected monthly only, and then select All.

Next navigate to the *Tanks* tab to specify which tanks should be included in the calculation.

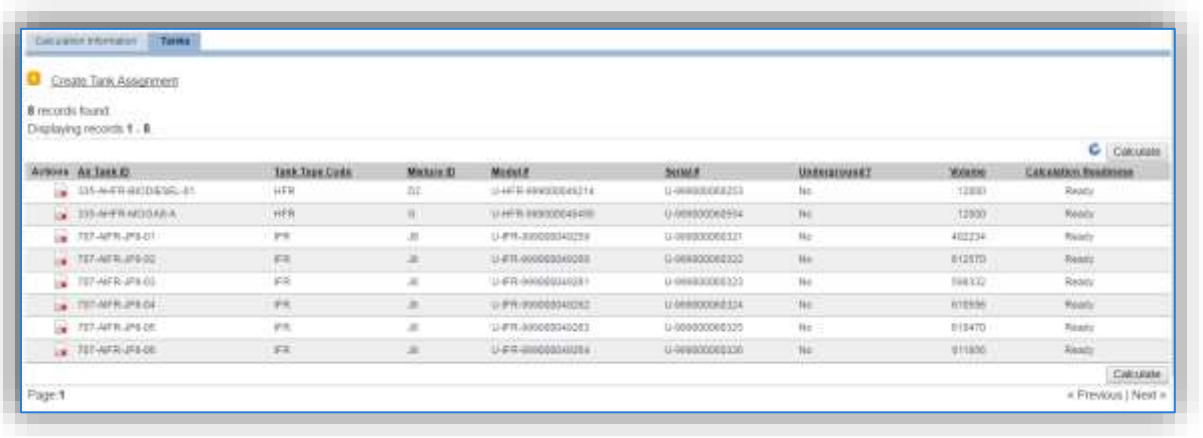


Click the Create Tank Assignment hyperlink to associate a tank.

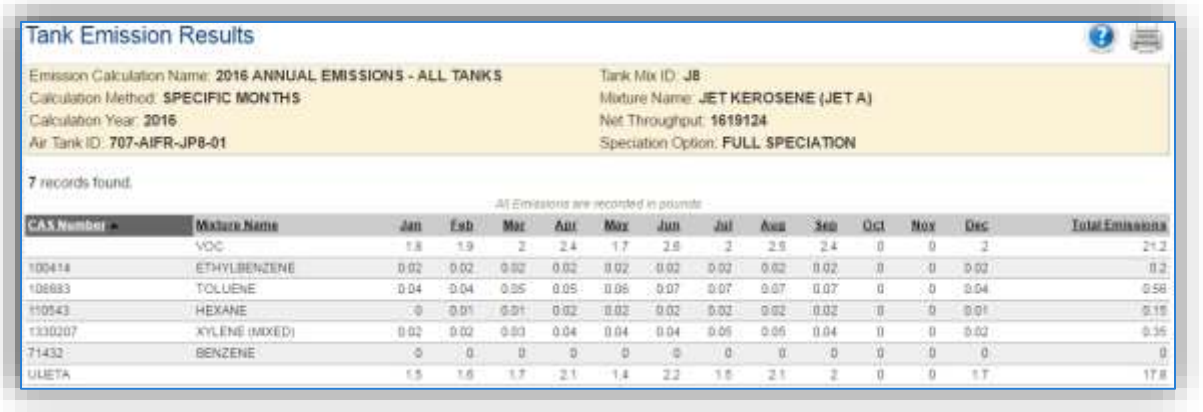


A list of all the tanks that have usage recorded for the specified year will be listed in the results grid. Check the box next to each tank that needs to be associated to the calculation, click **Save**.

If the Calculation Readiness column does not specify "Ready" it means the storage tank record or usage record is missing data needed to complete calculations.



The last step is to click the **Calculate** button, this will schedule the calculation run and may take several minutes before results ready. The refresh icon can be clicked to update the results of the calculation. Once the calculation is completed for a tank an icon will appear on the left side of the Actions column. To view the emission results for the tank, click the icon. This will open a Tank Emission Results window as shown below which can be reviewed as the final step.

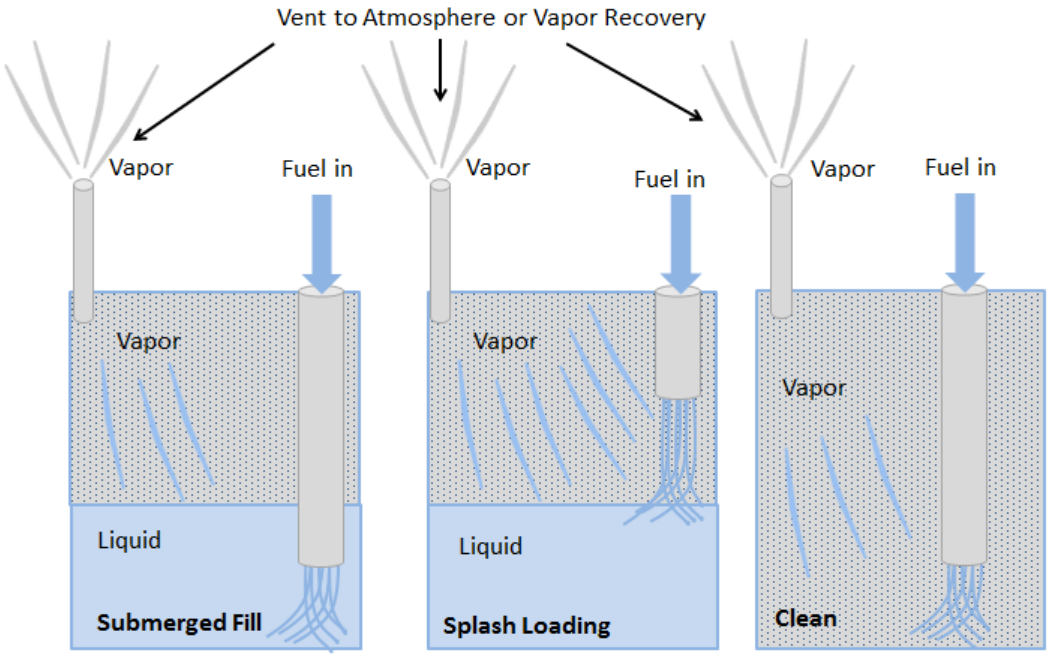


3.7 Fuel Loading (FLD)

3.7.1 Source Types

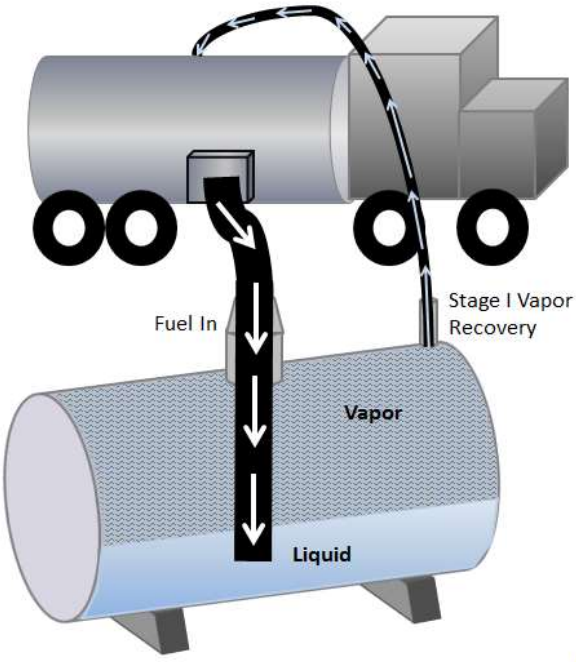
At Air Force installations fuel is transferred from large storage tanks into tanker trucks at fuel loading docks, also known as racks or fills stands. The tanker trucks distribute fuel to aircraft, tanks at fuel dispensing centers, non-road or stationary equipment, or smaller tanks. Fuel transfer activities include the transfer of liquid fuel from bulk storage to outlets such as fuel service stations or smaller tanks and the subsequent dispensing of fuel into aircraft and stationary internal and external combustion engines and non-road engines and equipment.

The primary source of evaporative emissions from fuel transfer is due to vapor displacement during fuel loading. These loading losses occur as the volume occupied by organic vapors in "empty" cargo tanks is supplanted by the liquid fuel loaded into the tank. The organic vapors are formed in the tank headspace through evaporation of residual product from previous loads, vapors transferred to the tank in vapor balance systems as product is being unloaded, and vapors generated in the tank as the new product is being loaded. The loading method used in the fuel transfer process has a significant effect on the amount of vapor emissions generated during the transfer activity. There are two main fuel loading methods: splash loading and submerged loading. The splash loading method involves the lowering of the fill pipe into the tank above the liquid level. The loading of the fuel using the splash method results in significant turbulence, which increases the amount of vapor released into the atmosphere. The submerged pipe method extents the fill pipe below the liquid level almost to the bottom of the storage tank. This minimizes the turbulence greatly reducing the vapor emissions.



As the liquid is poured into the tank, vapor is generated. Additionally as the liquid level goes up the vapor space gets smaller and causes the pressure to increase. This causes the vapor to escape through the fill tube or vent.

Often fuel transfers have controls such as vapor recovery or vapor balance systems utilized to minimize the amount of vapor released to the atmosphere. An example of a vapor balance system is shown below.



Vapor Recovery units can help reduce vapor losses by first capturing the vapors then controlling the captured vapors. Each stage has different control efficiencies, known as the capture efficiency and the control efficiency. The tables below show typical capture and control efficiencies.

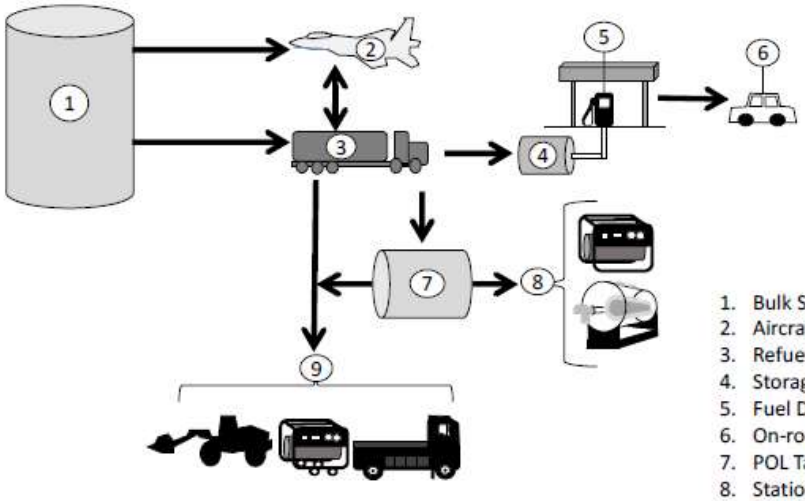
Typical Capture Efficiencies

Fuel Truck Capture System	Capture Efficiency (%)
Untested	70.0
EPA standards (NSPS Subpart XX leak test)	98.7
MACT-level annual leak test	99.2
Trucks with installed blower system	100.0

Typical Control Efficiencies

Fuel Truck Capture System	Capture Efficiency (%)
Flares – Compounds ≤ 3 Carbon atoms	99.0
Flares – Other Organic Compounds	98.0
Thermal Oxidizers	99.0
Carbon Systems	98.0
Vapor Recovery Units	100.0

It is important to understand how fuel is moved around the base to understand the transactions that are calculated in the AST, UST, FDSP and VEHE source categories versus the FLD source category. The diagram below illustrates the various ways fuel is transferred around a typical base. The following table specifies where each transfer should be tracked and calculated.



1. Bulk Storage Tank
2. Aircraft
3. Refueling Truck
4. Storage Tank at Service Station
5. Fuel Dispensing Nozzle
6. On-road Vehicle
7. POL Tank
8. Stationary ICOM & ECOM
9. Non-road & Ground Support Equipment, and Mobile Generators

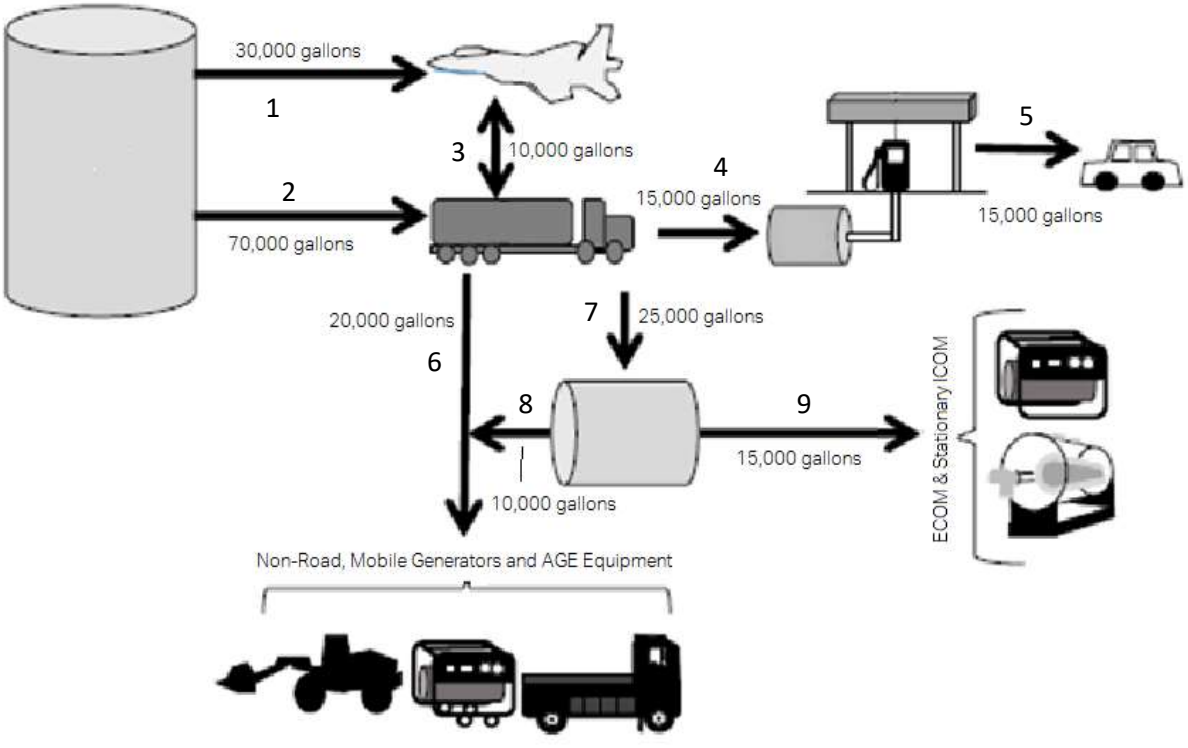
Fuel Source	Fuel Destination	Source Category	Source Type	Notes
Bulk Storage Tank	Aircraft	FLD	Mobile	Do not calculate
Bulk Storage Tank	Tanker Truck	FLD	Mobile	Do not calculate
Tanker Truck	Aircraft	FLD	Mobile	Do not calculate
Tanker Truck	Service Station Tank	UST	Stationary	
Service Station Tank	On-Road Vehicle	VEHE and FDSP	Mobile	The vapor displacement emissions created by this are included in the Vehicle Emissions factors, however if regulators specify these need to be accounted for separately as stationary emissions FDSP should be used. Additionally, emissions from fuel that may be spilled is accounted for using FDSP.
Tanker Truck	Storage Tank	AST or UST	Stationary	If the tank is less than 3 ft diameter and 5 ft length, use FLD for breathing and working losses.
Tanker Truck	Equipment (AGE or Non-Road)	FLD	Mobile	Do not calculate
Tanker Truck	Stationary Generators	FLD	Stationary	
Storage Tank	Equipment (AGE or Non-Road)	FLD	Mobile	Do not calculate
Storage Tank	Stationary Generators or Boilers	FLD	Stationary	

3.7.2 Potential Data Sources

A number of industrial areas around each installation may maintain storage tanks. The first step in gathering the correct usage data is to understand how the different types of fuel are moved around the base The simplest method is to sketch out a diagram similar to the one provided in the previous section, but with the specific details of your installation. Often the storage tank throughput will also be the fuel loading usage. The tanker truck throughputs and storage tank throughputs may be able to be obtained from the Storage Tank Manager or from the following shops:

- Fuels Management Flight (LGRF)
- Base Supply Fuels Management – Purple HUB database
- Civil Engineering Liquid Fuels
- AAFES Station
- DLA

Often the total amount of fuel that goes from a bulk storage tank to a tanker may be known, but the tanker then distributes the amount around the base with no exact accounting of how much went to each smaller storage tank. In this case, it is best to determine all the storage tanks that use that same fuel and then prorate the usage compared to the size of the tank.



Fuel Loading Usage Records

1. **Bulk Storage to Aircraft – 30,000 gallons**
2. **Bulk Storage to Tanker Truck – 70,000 gallons**

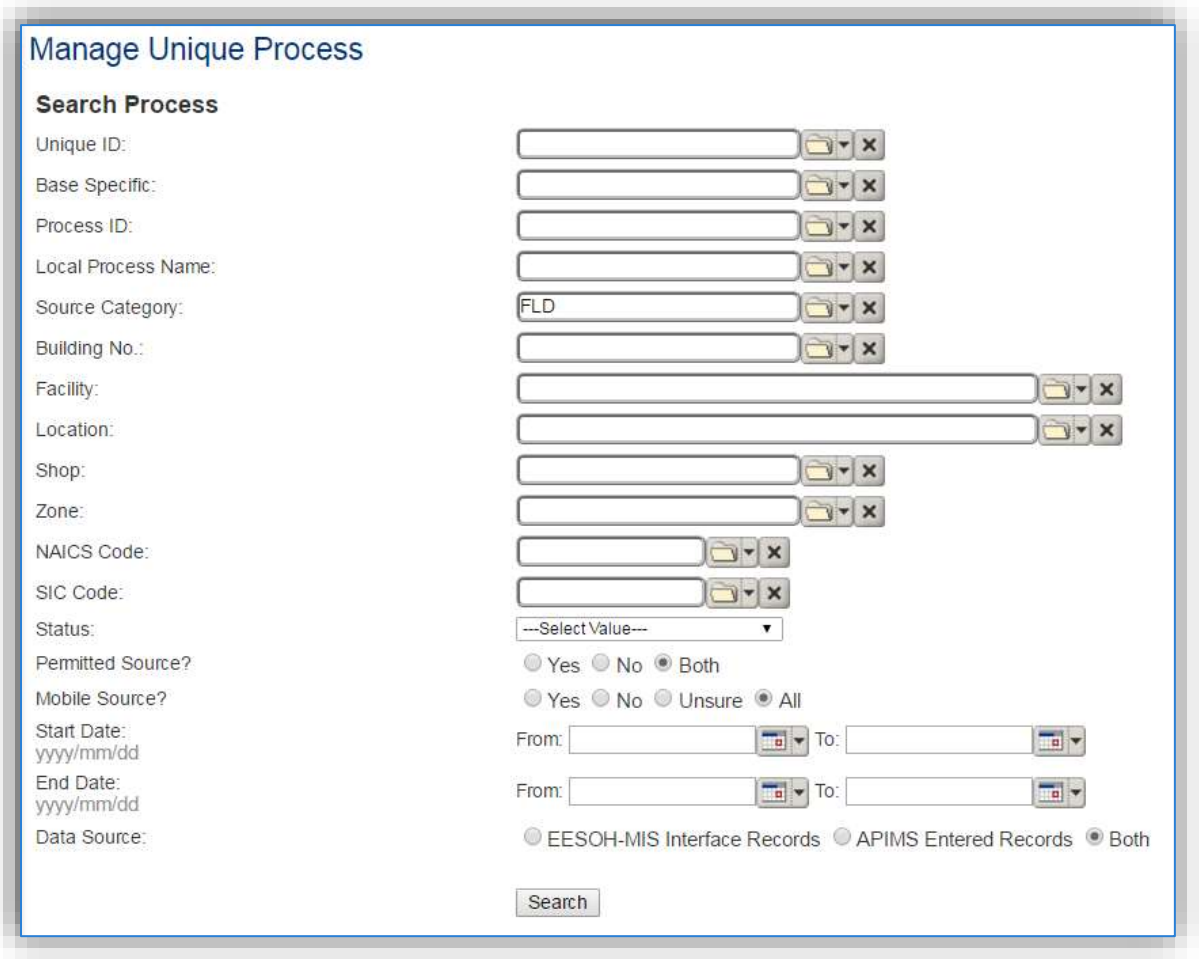
3. **Tanker Truck to Aircraft – 10,000 gallons**
4. *This is calculated as part of the UST calculation - Tanker Truck to Storage Tank – 15,000 gallons*
5. *This is calculated as part of the VEHE calculation - Storage Tank to Vehicle – 15,000 gallons*
6. **Tanker Truck to Mobile Equipment – 20,000 gallons**
7. *This is calculated as part of the AST calculation - Tanker Truck to Storage Tank – 25,000 gallons*
8. **Storage Tank to Mobile Equipment – 10,000 gallons**
9. **Storage Tank to ECOM and Stationary ICOM – 15,000 gallons**

3.7.3 Standard Source Identification/Characterization

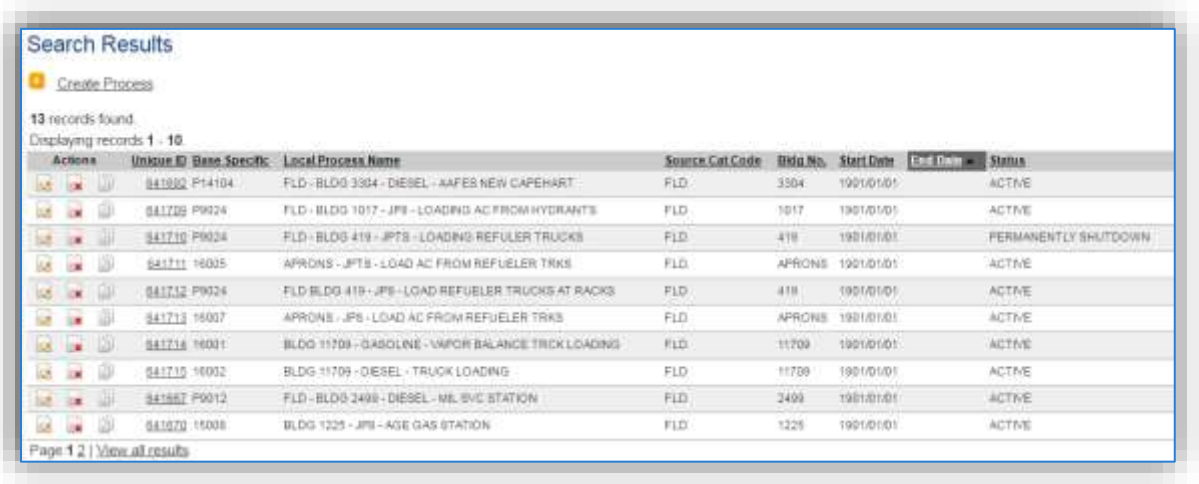
3.7.3.1 Existing Sources

It is important to review the existing sources in each source category on an annual basis at a minimum. Most regulatory agencies require an up to date source and equipment inventory.

Navigate to the Unique Process module of APIMS by clicking **Unique Process** under the **Emission Unit** tab. In the **Source Category** search field, type "FLD" then select the row for Fuel Loading Racks from the dropdown results. Click the Search button.



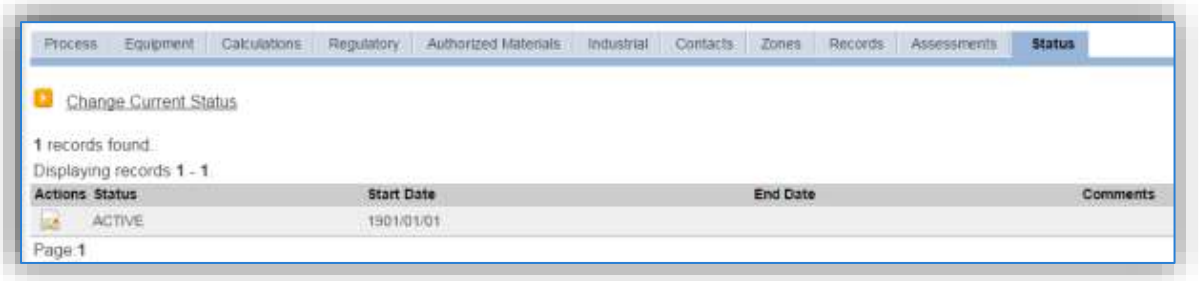
The search results grid will now display all the fuel loading processes currently in APIMS.



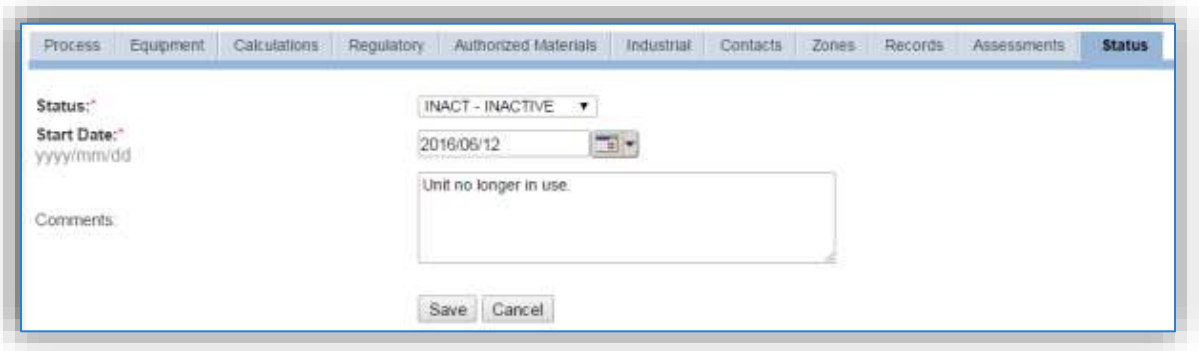
The **Local Process Name**, **Base Specific** and **Bldg No**. can all be used to identify a specific source. This list should be reviewed to make sure the source is configured in a way that it is easy to identify and locate. The status of each source should also be reviewed and kept current.

3.7.3.1.1 Status

If the status of a unit needs to be changed, click the edit icon next to the process.



Navigate to the *Status* tab. Click the Change Current Status hyperlink.



Select the appropriate status from the **Status** dropdown (i.e., ACTIVE, REMOVED or INACTIVE).

For the **Start Date** enter the date at which the status changed.

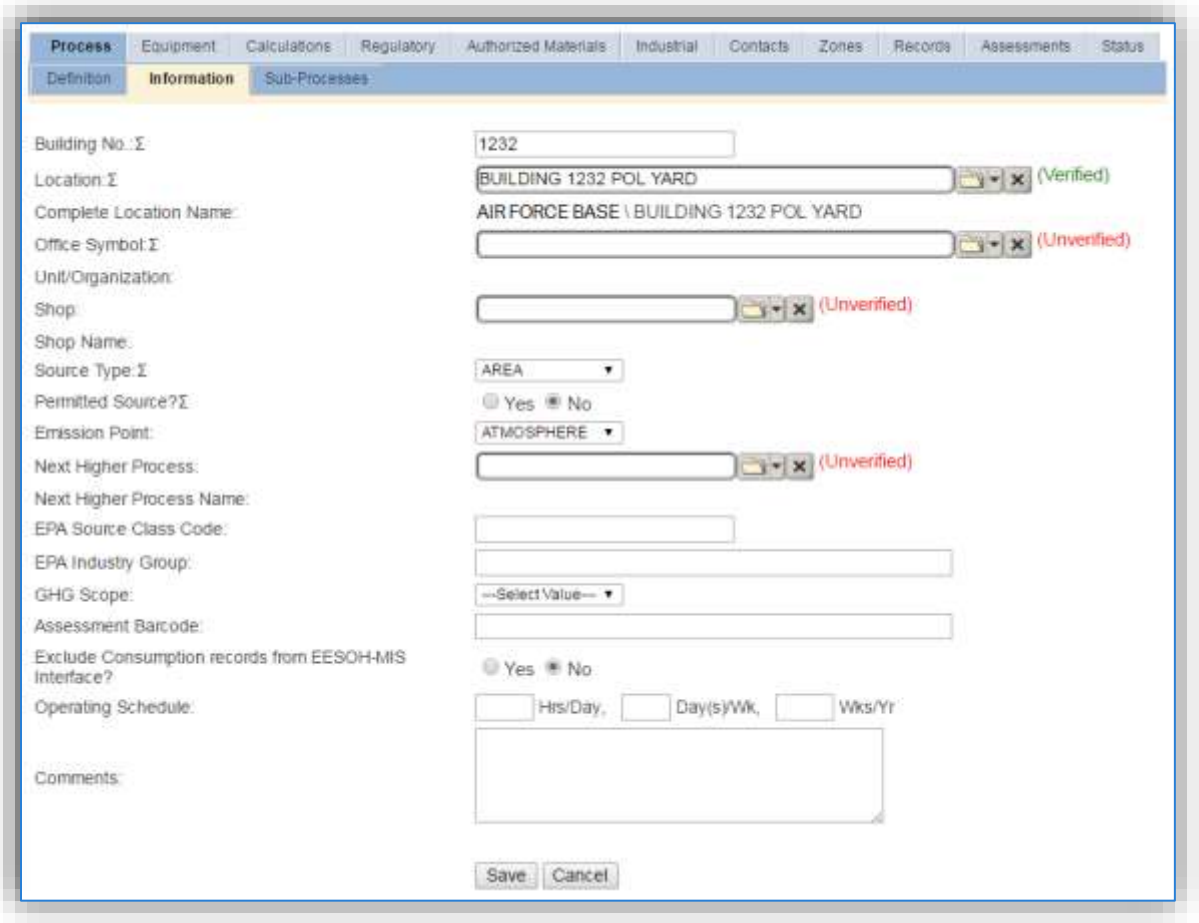
Enter **Comments** that provide insight into why the status changed. These can be very useful for equipment inventories, permit renewals and regulatory reporting. Most regulatory agencies require reporting on unit operation status; this includes any potential time spent offline, and/or reasons for the outage.

Click the **Save** button.

The emissions for a process will only be calculated for the dates the process was in an ACTIVE status. If a source is removed in the middle of a year, the emissions will only be calculated for the part of the year the source was active.

3.7.3.1.2 Information

There are basic data elements that are important to track and maintain for new and existing sources, such as location and source type. This data can be maintained in the Unique Process record on the *Information* sub tab.



The **Building No**. field can be used to specify a general location or area of the emission source.

The **Location** field is very important to effectively manage the location and mission of the emission source. This information will be important for knowing where the source is, in case it needs to be inspected or if the source owner needs to be contact for pertinent information. For the instructions on how to create a location, reference Section 2.2 Location.

Fuel loading operations are categorized as AREA source in the **Source Type**.

The **Emission Point** would be ATMOSPHERE.

The **Permitted Source** flag should also be populated to accurately reflect the current regulatory status of the emission source. This flag can be an invaluable tool in roll-up reporting.

The **Usage Interval** field will only be viewable for stationary sources. For stationary sources this should be designated, this source is usually documented on an Annual basis however may be different if it is a permitted source. It is important to populate this field correctly as it will affect how it is documented in the AEI Throughputs module.

3.7.3.1.3 Sub-Processes

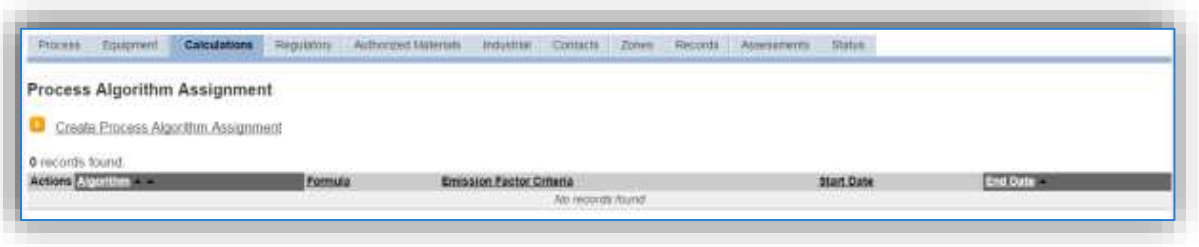
This source does not utilize this functionality.

3.7.3.1.4 Equipment

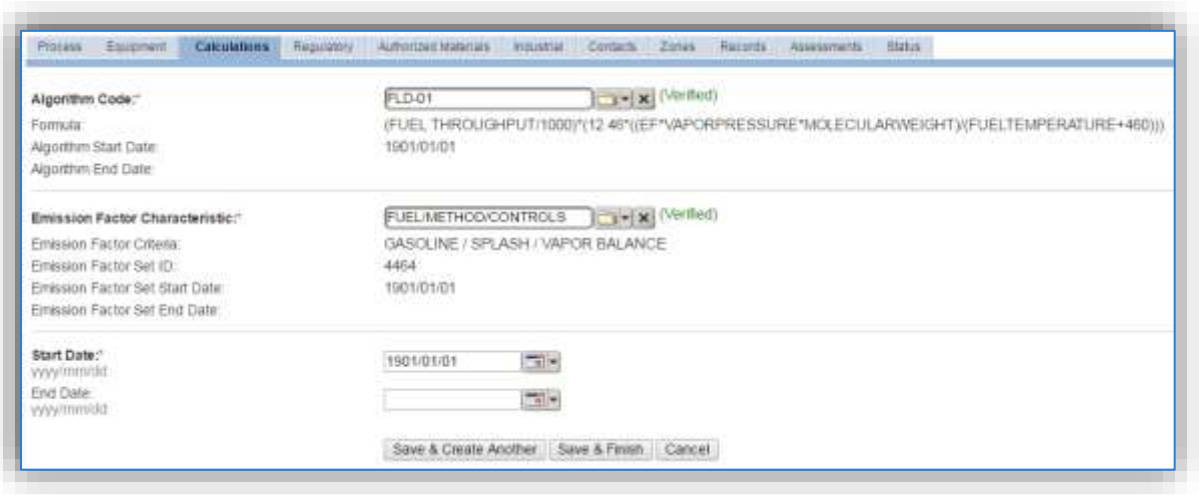
This source does not utilize this functionality.

3.7.3.1.5 Calculation

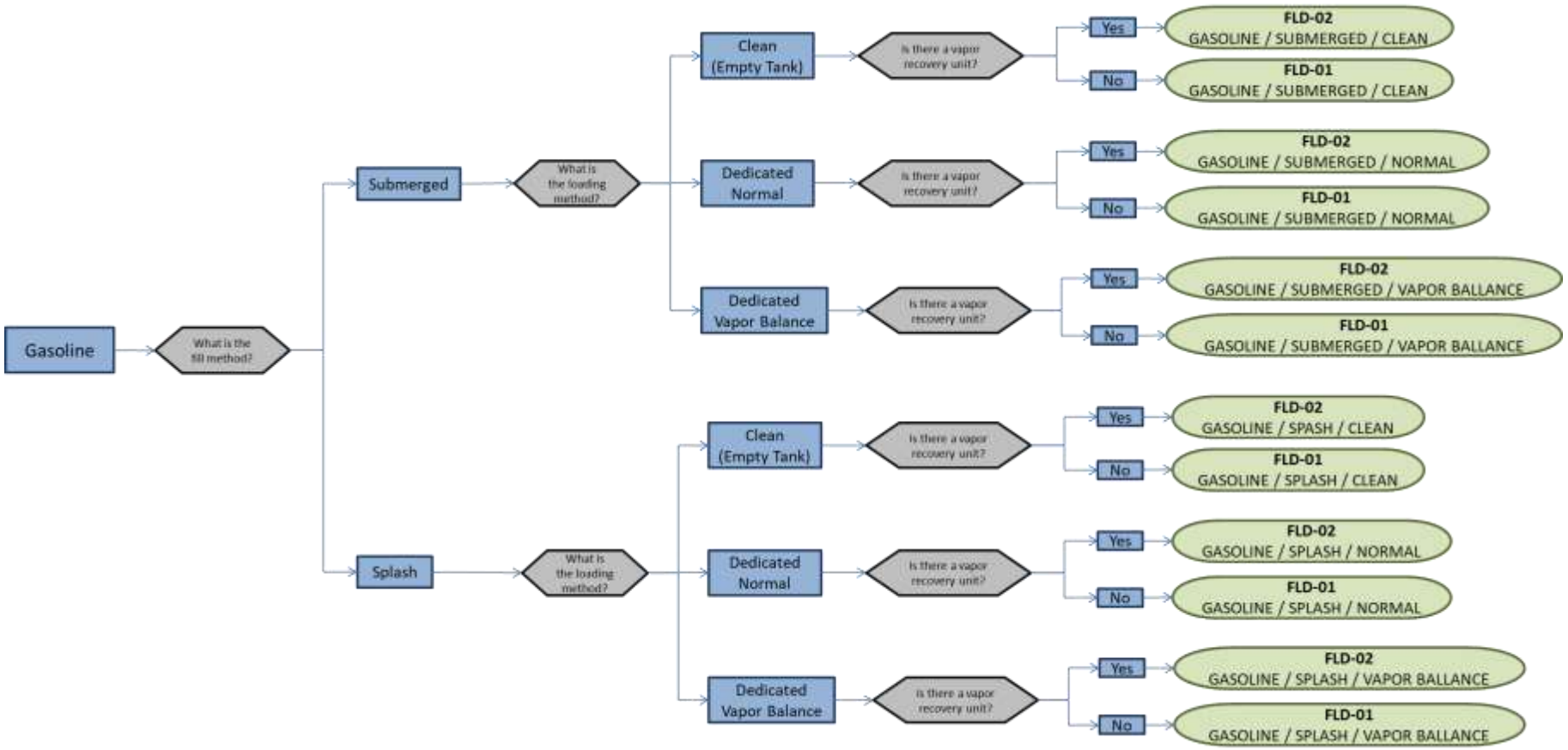
The next tab is the *Calculations* tab.

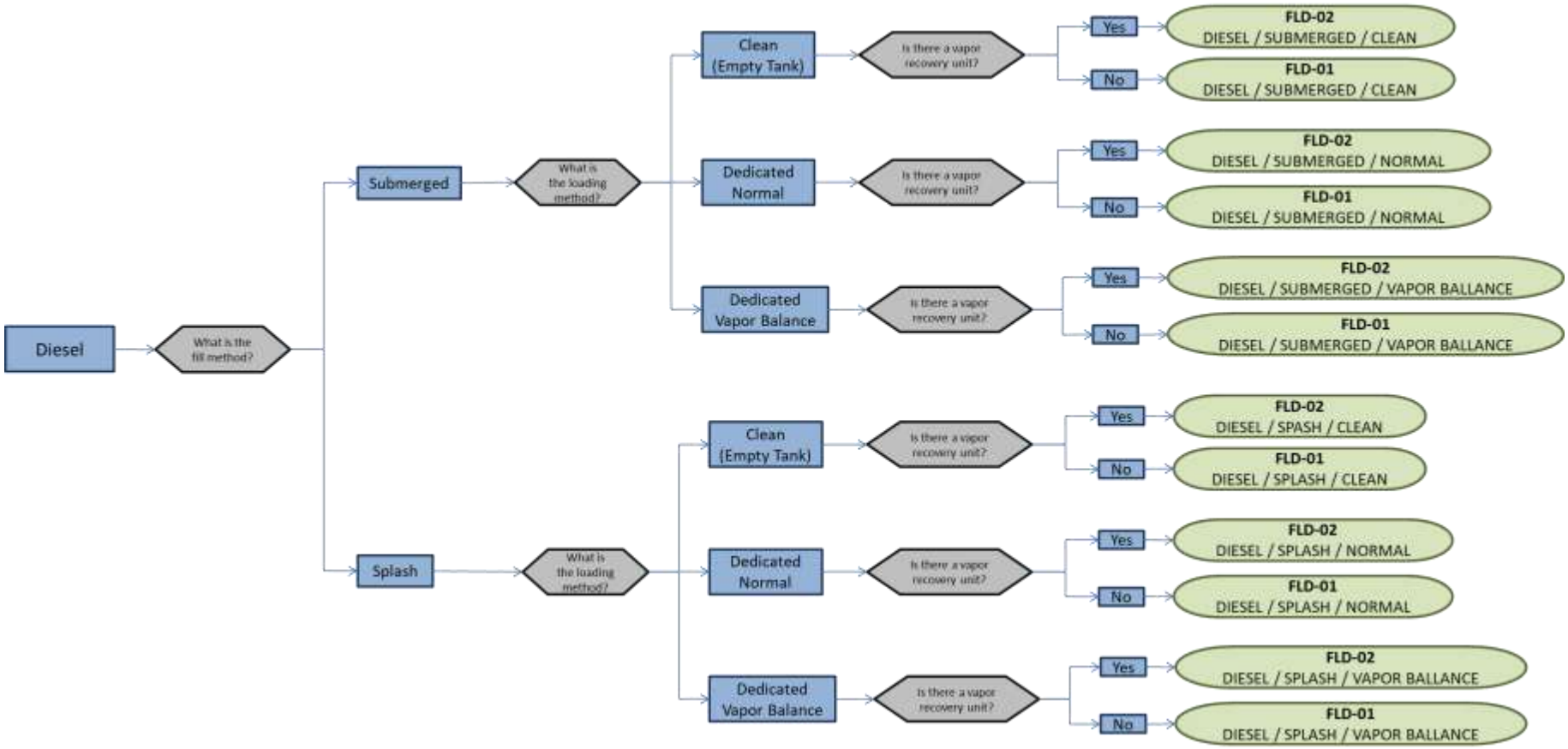


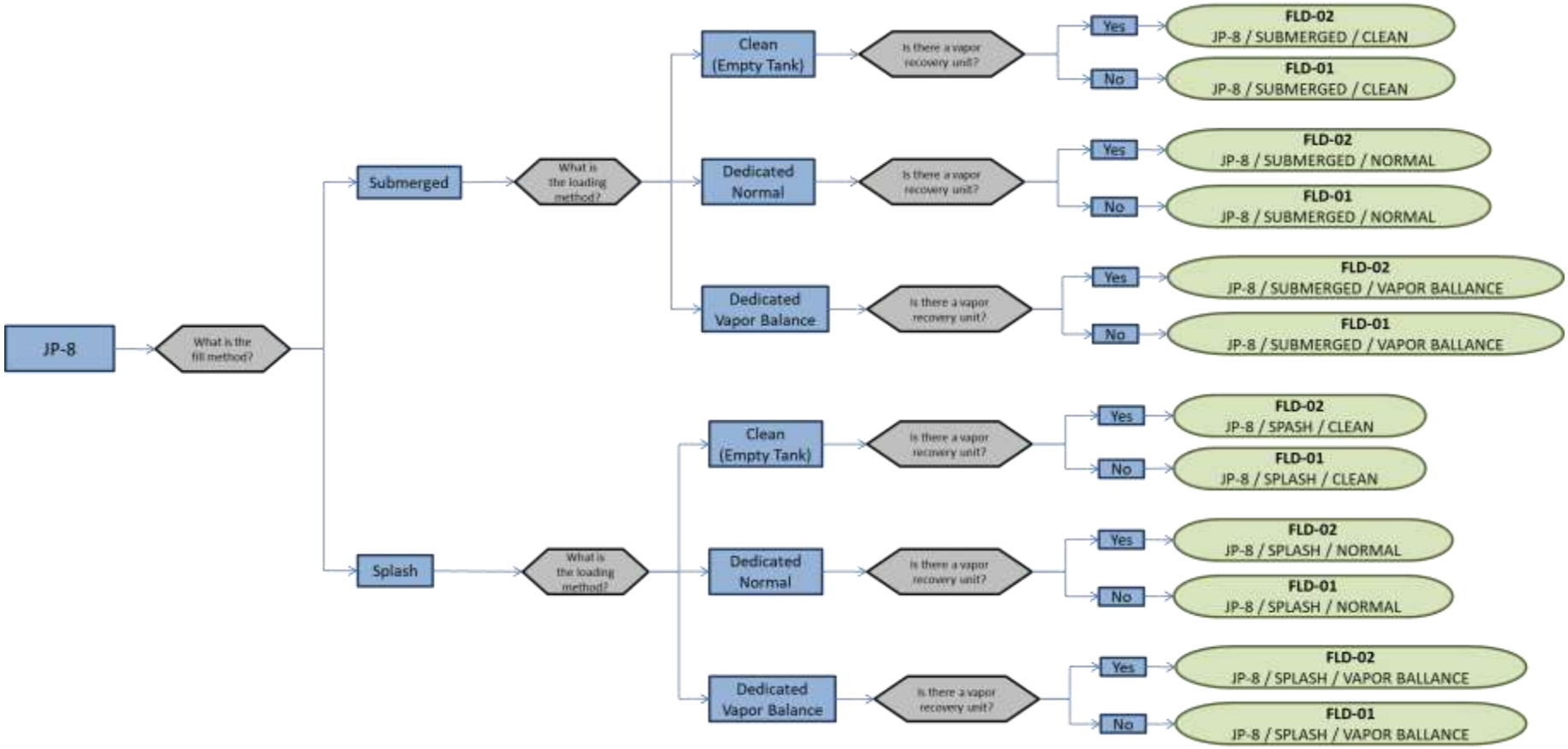
To associate an algorithm to the process, click on the Create Process Algorithm Assignment hyperlink.



Select the **Algorithm Code** from the list of values that matches the correct scenario. Next select the **Emission Factor Characteristic** available. Enter the **Start Date** to match the start date of the process. Click the Save & Create Another button to associate another algorithm or click Save & Finish button to save and return to the Calculations tab. Use the flowchart below to find the correct Algorithm Code and Emission Factor Characteristic.

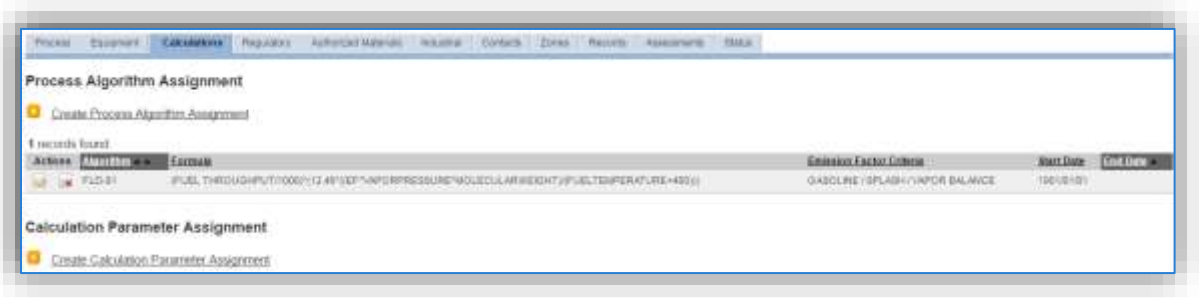

Gasoline
What is the fill method?
Submerged
What is the loading method?
Clean (Empty Tank)
Is there a vapor recovery unit?
Yes
FLD-02
GASOLINE / SUBMERGED / CLEAN
No
FLD-01
GASOLINE / SUBMERGED / CLEAN
Dedicated Normal
Is there a vapor recovery unit?
Yes
FLD-02
GASOLINE / SUBMERGED / NORMAL
No
FLD-01
GASOLINE / SUBMERGED / NORMAL
Dedicated Vapor Balance
Is there a vapor recovery unit?
Yes
FLD-02
GASOLINE / SUBMERGED / VAPOR BALLANCE
No
FLD-01
GASOLINE / SUBMERGED / VAPOR BALLANCE
Splash
What is the loading method?
Clean (Empty Tank)
Is there a vapor recovery unit?
Yes
FLD-02
GASOLINE / SPASH / CLEAN
No
FLD-01
GASOLINE / SPLASH / CLEAN
Dedicated Normal
Is there a vapor recovery unit?
Yes
FLD-02
GASOLINE / SPLASH / NORMAL
No
FLD-01
GASOLINE / SPLASH / NORMAL
Dedicated Vapor Balance
Is there a vapor recovery unit?
Yes
FLD-02
GASOLINE / SPLASH / VAPOR BALLANCE
No
FLD-01
GASOLINE / SPLASH / VAPOR BALLANCE


Diesel
What is the fill method?
Submerged
What is the loading method?
Clean (Empty Tank)
Is there a vapor recovery unit?
Yes
FLD-02
DIESEL / SUBMERGED / CLEAN
No
FLD-01
DIESEL / SUBMERGED / CLEAN
Dedicated Normal
Is there a vapor recovery unit?
Yes
FLD-02
DIESEL / SUBMERGED / NORMAL
No
FLD-01
DIESEL / SUBMERGED / NORMAL
Dedicated Vapor Balance
Is there a vapor recovery unit?
Yes
FLD-02
DIESEL / SUBMERGED / VAPOR BALLANCE
No
FLD-01
DIESEL / SUBMERGED / VAPOR BALLANCE
Splash
What is the loading method?
Clean (Empty Tank)
Is there a vapor recovery unit?
Yes
FLD-02
DIESEL / SPASH / CLEAN
No
FLD-01
DIESEL / SPLASH / CLEAN
Dedicated Normal
Is there a vapor recovery unit?
Yes
FLD-02
DIESEL / SPLASH / NORMAL
No
FLD-01
DIESEL / SPLASH / NORMAL
Dedicated Vapor Balance
Is there a vapor recovery unit?
Yes
FLD-02
DIESEL / SPLASH / VAPOR BALLANCE
No
FLD-01
DIESEL / SPLASH / VAPOR BALLANCE

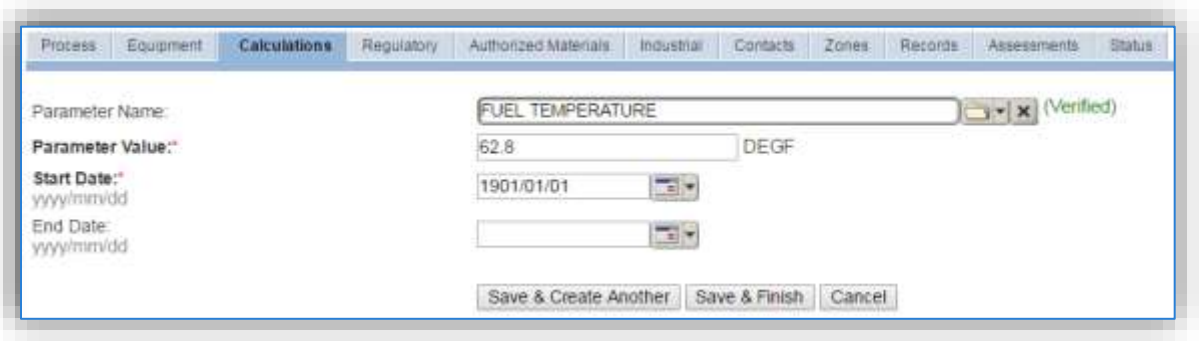

JP-8
What is the fill method?
Submerged
What is the loading method?
Clean (Empty Tank)
Is there a vapor recovery unit?
Yes
FLD-02
JP-8 / SUBMERGED / CLEAN
No
FLD-01
JP-8 / SUBMERGED / CLEAN
Dedicated Normal
Is there a vapor recovery unit?
Yes
FLD-02
JP-8 / SUBMERGED / NORMAL
No
FLD-01
JP-8 / SUBMERGED / NORMAL
Dedicated Vapor Balance
Is there a vapor recovery unit?
Yes
FLD-02
JP-8 / SUBMERGED / VAPOR BALLANCE
No
FLD-01
JP-8 / SUBMERGED / VAPOR BALLANCE
Splash
What is the loading method?
Clean (Empty Tank)
Is there a vapor recovery unit?
Yes
FLD-02
JP-8 / SPASH / CLEAN
No
FLD-01
JP-8 / SPLASH / CLEAN
Dedicated Normal
Is there a vapor recovery unit?
Yes
FLD-02
JP-8 / SPLASH / NORMAL
No
FLD-01
JP-8 / SPLASH / NORMAL
Dedicated Vapor Balance
Is there a vapor recovery unit?
Yes
FLD-02
JP-8 / SPLASH / VAPOR BALLANCE
No
FLD-01
JP-8 / SPLASH / VAPOR BALLANCE

If your permit or regulatory agency requires a different type of calculation, contact the Air Force Air Quality Subject Matter Expert for approval of the alternative method.

The next step on this tab is to enter the Calculation Parameters required to complete the calculations. The algorithms require VAPOR PRESSURE, MOLECULAR WEIGHT and FUEL TEMPERATURE to calculate the emissions. The FUEL TEMPERATURE is input as a calculation parameter.



To add a calculation parameter to the process, click on the Create Calculation Parameter Assignment hyperlink.



Select the **Parameter Name**, FUEL TEMPERATURE from the list of values.

Enter the fuel temperature in the **Parameter Value** field. If the fuel temperature is not known, it can be assumed to be about the same as the annual average ambient temperature at the base. If the average annual temperature at the base is not known an assumed value of 68°F can be used.

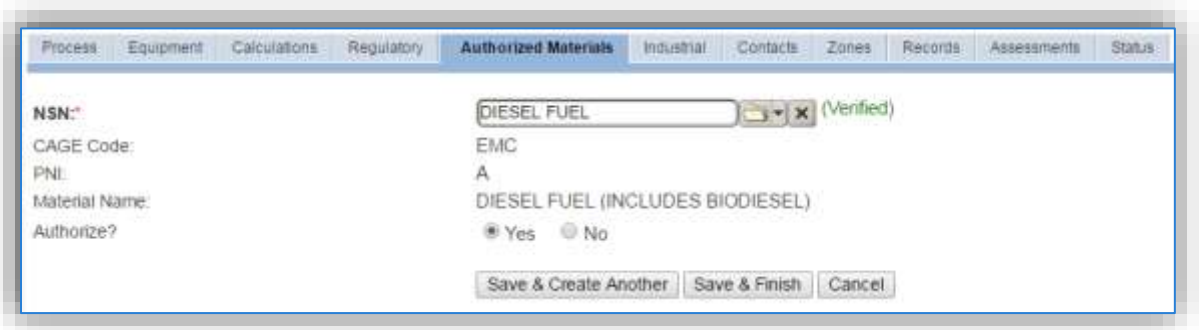
Enter the **Start Date** for the parameter, this date should match the start date of the algorithm or use 1901/01/01 as a default.

Click the **Save & Finish** button.

3.7.3.1.6 Materials

The last step in setting up the Unique Process record is to the authorized materials on the *Authorized Materials* tab.

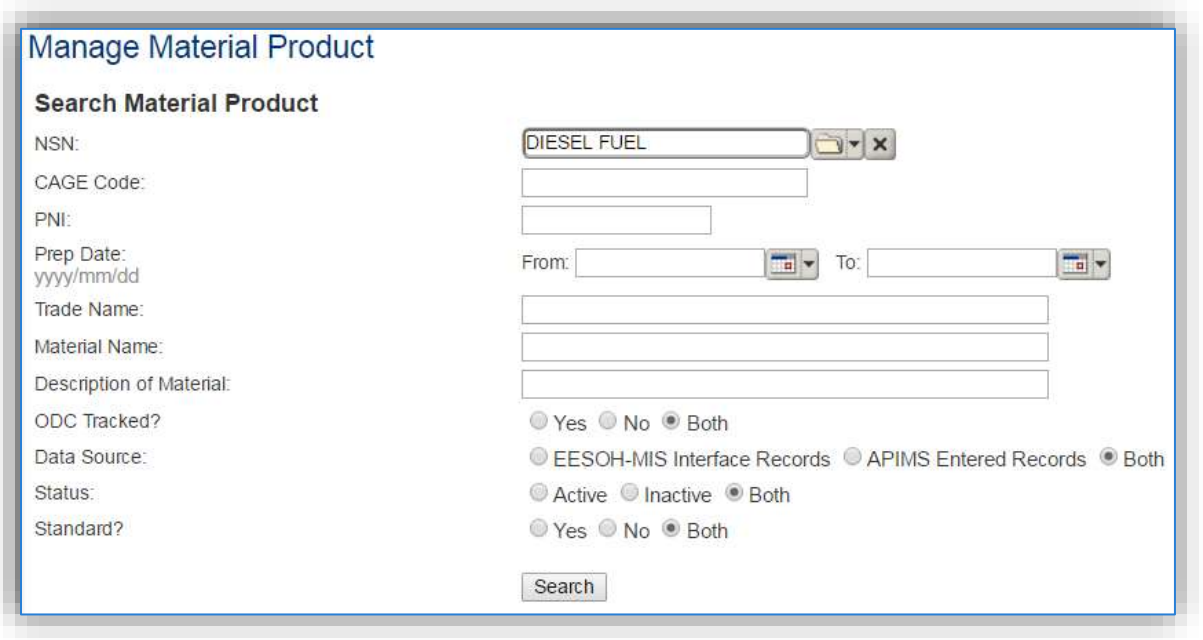
To authorize a material for the process, click on the Create Authorized Material hyperlink.



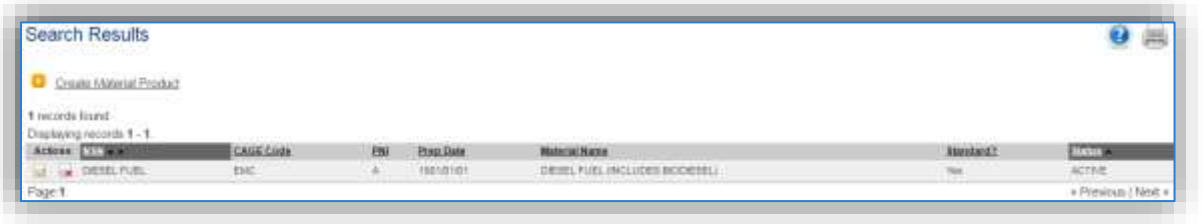
Select the fuel transferred from the list of values as shown above. Next select "Yes" to **Authorize** the material, then **Save & Finish**.

The fuel material product records that are associated to the process are required to have the MOLECULAR WEIGHT and VAPOR PRESSURE values populated on the *Pollutant Content* tab.

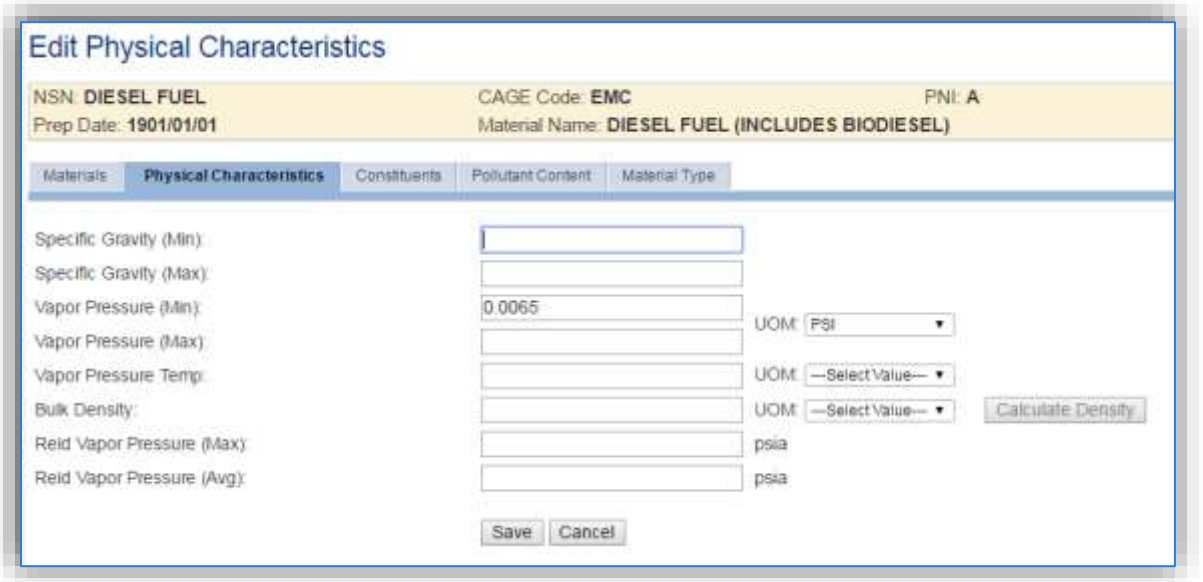
The standard fuel material records already have these values populated. To view the properties, navigate to the Manage Material Product page.



Type the name of the fuel (DIESEL, GASOLINE or JP-8) in the NSN field and click **Search**.



Click the edit icon to open the record and view the material properties. Click on the *Physical Characteristics* tab to view the VAPOR PRESSURE required for the emissions calculation.

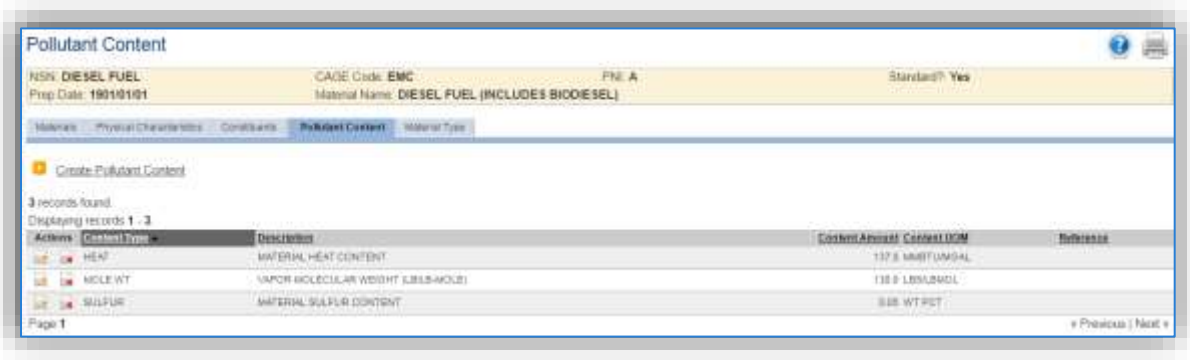


As shown above the **Vapor Pressure (Min)** field must be populated with the vapor pressure in PSI for the algorithm to accurately calculate emissions. If this value is not populated, find and enter the correct value for the fuel using the table provided below. This table can be found in the AFCEC Stationary Source Guide, Chapter 6, Table 6-2.

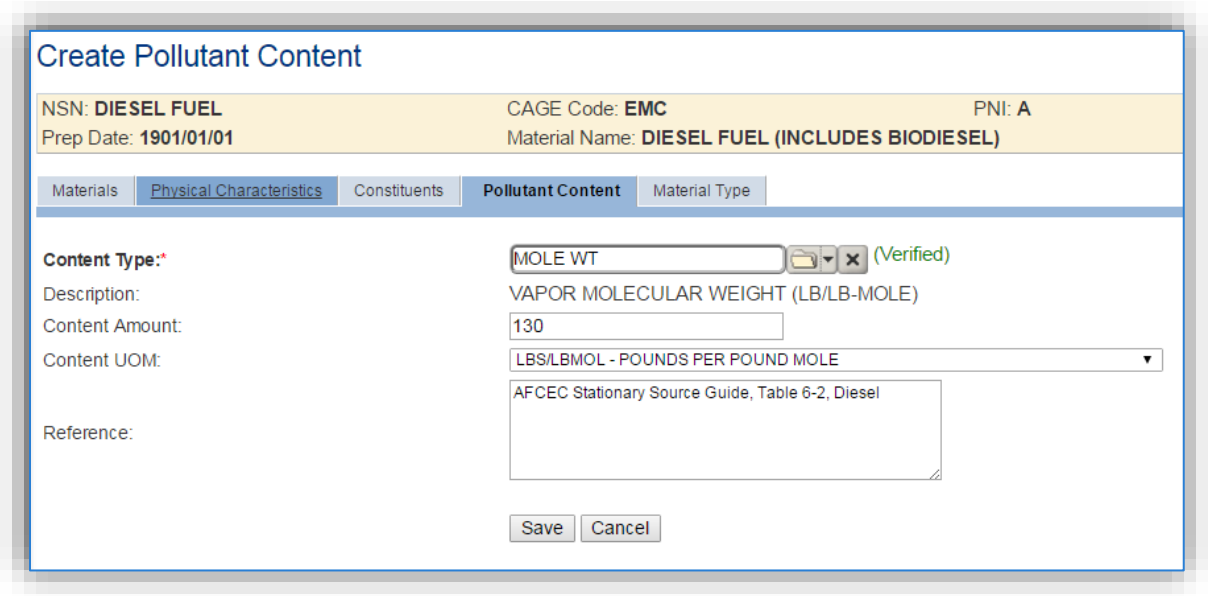
Petroleum Liquid	Vapor Molecular Weight (lb/lb-Mol)	True Vapor Pressure (psia)						
		40°F	50°F	60°F	70°F	80°F	90°F	100°F
Crude Oil RVP 5[(1)]	50	1.80	2.30	2.80	3.40	4.00	4.80	5.70
Gas RVP 6	69	1.90	2.37	2.93	3.60	4.38	5.29	6.35
Gas RVP 7	68	2.30	2.90	3.50	4.30	5.20	6.20	7.40
Gas RVP 7.8	68	2.59	3.21	3.94	4.79	5.79	6.96	8.30
Gas RVP 8	68	2.67	3.30	4.04	4.92	5.94	7.13	8.50
Gas RVP 8.3	68	2.79	3.44	4.22	5.13	6.19	7.42	8.83
Gas RVP 9	67	3.06	3.77	4.61	5.59	6.74	8.06	9.58
Gas RVP 10	66	3.40	4.20	5.20	6.20	7.40	8.80	10.50
Gas RVP 11	65	3.87	4.75	5.77	6.96	8.34	9.92	11.74
Gas RVP 11.5	65	4.09	5.00	6.07	7.31	8.75	10.41	12.29
Gas RVP 12	64	4.29	5.24	6.36	7.65	9.15	10.86	12.82
Gas RVP 13	62	4.70	5.70	6.90	8.30	9.90	11.70	13.80
Gas RVP 13.5	62	4.93	6.01	7.26	8.71	10.38	12.29	14.46
Gas RVP 15	60	5.58	6.77	8.16	9.77	11.61	13.71	16.09
Diesel	130	3.10E-03	4.50E-03	6.50E-03	9.00E-03	1.20E-02	1.60E-02	2.20E-02
JP-8/Jet A[(2)]	130	1.58E-02	2.19E-02	3.01E-02	4.08E-02	5.48E-02	7.27E-02	9.54E-02

Usually the True Vapor Pressure at 60°F is the value used.

Next to view the MOLECULAR WEIGHT, click on the *Pollutant Content* tab.



As shown, the VAPOR MOLECULAR WEIGHT (LB/LB-MOLE) is entered as a Pollutant Content. This value can also be found in the AFCEC Stationary Source Guide, Chapter 6, Table 6-2 as provided above. To add this value, click on the Create Pollutant Content hyperlink.



Select VAPOR MOLECULAR WEIGHT (LB/LB-MOLE) from the **Content Type** list of values.

Enter the **Content Amount** according to Table 6-2, select LBS/LBMOL from the **Content UOM** field.

It is a good practice to populate the **Reference** field to accurately track the data source for reporting or compliance.

Click **Save**.

3.7.3.2 New Sources

3.7.3.2.1 Data Collection Sheet

The form on the next page is a printable guide that can be taken out to the location of the source and used to gather all the necessary information from the shop personnel. It can then be used as a guide to help configure the data in APIMS when you return to your office.

Fuel Transfer Data Collection Worksheet

GENERAL INFORMATION

Building Number_____ Mission/Purpose_____
Shop Name/Function_____ Management Organization_____
Coordinates: Latitude: _____ Longitude: _____
UTM: _____ Zone _____ Easting _____ Northing ☐ Feet ☐ Meters
Is this source in any of your permits? ☐ Yes ☐ No
If yes, does it have an emission unit number or other designation? _____

EQUIPMENT INFORMATION

Is there a vapor recovery unit? ☐ Yes ☐ No
If yes, what is the capture efficiency? _____
What is the control efficiency? _____

What type of capture system is used?

- ☐ Untested – 70%
- ☐ EPA standards – 98.7%
- ☐ MACT-level annual leak test – 99.2%
- ☐ Trucks with installed blower system – 100.0

What type of control system is used?

- ☐ Flares – Compounds ≤ 3 Carbon atoms – 99%
- ☐ Flares – Other Organic Compounds – 98%
- ☐ Thermal Oxidizers – 99.0%
- ☐ Carbon Systems – 98.0%
- ☐ Vapor Recovery Units – 100.0%

Does the destination tank have a vapor balance system? ☐ Yes ☐ No

What type of loading is happening?

- ☐ Submerged Fill
- ☐ Splash Loading
- ☐ Clean (Empty)

USAGE INFORMATION

What is the fuel being transferred?

☐ Gasoline ☐ Diesel ☐ JP-8

Where is the fuel coming from?

- ☐ Bulk Storage
- ☐ Tanker Truck
- ☐ Storage Tank

Where is the fuel going to?

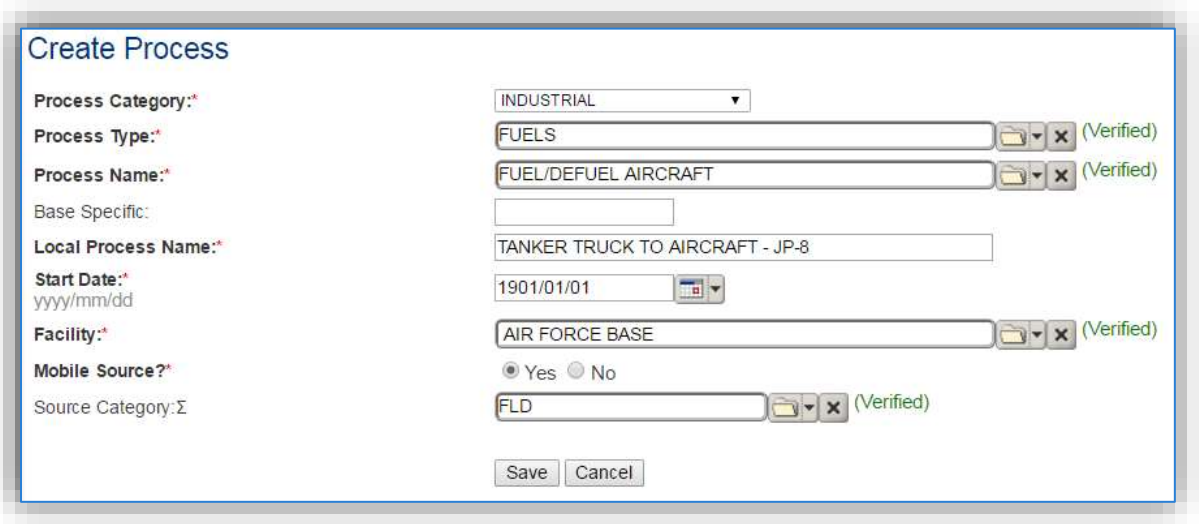
- ☐ Aircraft
- ☐ Tanker Truck
- ☐ Mobile Equipment
- ☐ Stationary ICOM and ECOM Equipment

What is the annual amount of fuel transferred in gallons? _____

3.7.3.2.2 New Source Configuration

In order to properly document this emission source in APIMS, there will need to be a Unique Process record for each type of fuel transfer.

Navigate to the Unique Process module in APIMS and click the Create New Process hyperlink.



Process Category	Process Type	Process Name	Process ID
INDUSTRIAL	FUELS	DISPENSE/LOAD, POUR	IFU1353
INDUSTRIAL	FUELS	DISPENSE/LOAD, PUMP/NOZZLE	IFU1354
INDUSTRIAL	FUELS	DISPENSE/LOAD, RACK/ARM	IFU1355
INDUSTRIAL	FUELS	FUEL/DEFUEL AIRCRAFT	IFU1496
INDUSTRIAL	FUELS	FUELING/DEFUELING, NON-AIRCRAFT	IFU1498

Use the table above to determine the appropriate **Process Category**, **Process Type** and **Process Name**.

The **Base Specific** field can be used to enter a standard convention identifier that will best help identify the source. If the source is permitted, enter the emission unit ID as designated in the permit.

The **Local Process Name** should be in a standard naming convention for all sources that helps to quickly identify the fuel source, fuel destination and fuel type and any other unique attribute. For example, BULK STORAGE TO TANKER TRUCK – DIESEL.

The **Start Date** should be the date the unit became operational, if this date is not known, enter 1901/01/01 as a default start date.

The **Facility** Name should be the facility name that is responsible for the source.

The **Mobile Source?** flag should be "NO" for fuel with a stationary source as the fuel destination.

All fuel loading processes are assigned to the FLD **Source Category**.

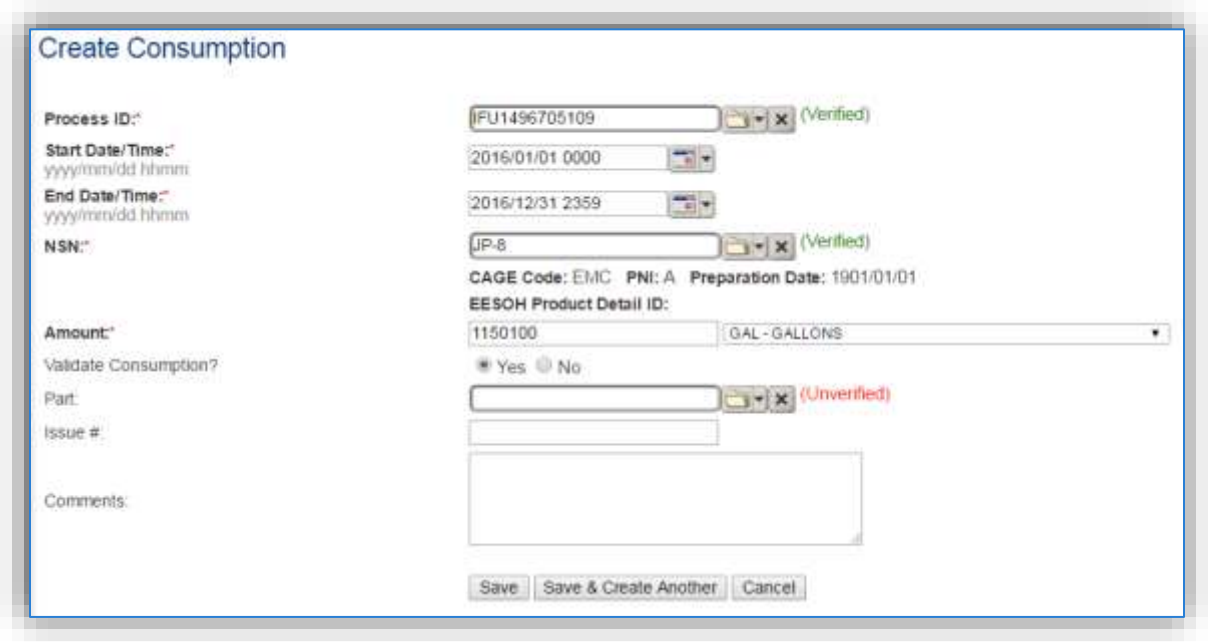
For the population of all other tabs, refer to the Existing Sources sections.

3.7.4 Year-to-Year Maintenance

3.7.4.1 Usage

The consumption for fuel loading sources will need to be tracked annually or more frequently if required by a regulatory agency. To correctly document the annual usage for this emission source the consumption should be entered in the Consumption log.

Navigate to the Consumption module and click the Create Consumption hyperlink.



The consumption record should span the entire reporting period as shown above. The material should be the fuel transferred and the amount should be the amount of fuel transferred in gallons. Make sure to select "Yes" to validate the consumption. If the consumption is not validated it will not be included in the emissions calculation. Repeat this step for all the different media used.

3.7.4.2 Emissions Calculation

To correctly calculate emissions this emission source should be included the **Stationary Source Calculation**. For example, if the fuel is going into a mobile source, the fuel loading process should be mobile, and the emissions are not calculated. If the fuel is going into a stationary source, the fuel loading process should be stationary, and the emissions calculated as part of the Stationary AEI. Reference Section 2.7 Emissions Calculations for additional instructions and details.

3.8 Hazardous Material Use (CHEM, LAB, SEAD)

3.8.1 Source Types

Hazardous material use includes the use of general chemicals, laboratory chemical, sealants and adhesives. While these are different source categories in APIMS they are all handled in a similar manner so are grouped together in a single chapter. Hazardous material use includes a wide variety of items that are not specifically addressed in any other section of this document. The chemicals that fall into these categories are typically items commercially purchased in small quantities, such as household cleaners, adhesives, or sealants, but may also include lab chemicals. Though most general chemicals are typically exempt from regulatory considerations under federal, state, and local air pollution control agency air quality regulations, these agencies should be consulted prior to excluding the sources comprising this category. These sources are however part of the Air Force Air Emission Inventory.

The primary pollutants of concern for these sources are VOC and organic HAPs due to vapor displacement as the product evaporates. As a result, some organic chemical products, and most inorganic chemical products have extremely low vapor pressures (e.g., <0.1 mmHg), are usually not addressed in an air emissions inventories, and are considered insignificant. Examples include heavy lubricants/oils, greases, hydraulic fluids, glycol deicers, and non-solvent aqueous cleaners.

3.8.1.1 Miscellaneous Chemical Use (CHEM)

Any hazardous materials that are not included in any other source category should be included as miscellaneous chemical usage. These materials range from office cleaning supplies to materials used in various industrial shops.

3.8.1.2 Laboratory (LAB)

Chemical laboratories are commonly found at Air Force installations and are typically used for analytical, medical, and/or research purposes. A large variety of chemicals are used in these laboratories including solvents, acids/bases, and other various reagents. Typically, air emissions occur as the chemical reagents are used or prepared underneath a fume hood. Some fume hoods vent the air through a filter, which recovers emitted pollutants to allow for their disposal while other fume hoods vent pollutants directly into the atmosphere.

3.8.1.3 Sealants and Adhesives (SEAD)

Sealants and adhesives are used to bond two substrates together. They are used in a variety of applications including, but not limited to, the manufacture or repair of aircraft and aircraft parts, engines, HVAC systems, and on-road vehicles. The primary difference between sealants and adhesives is that sealants are more commonly used as a bonding agent between two substrates with different physical properties. This is due to the fact that sealants are not as strong as an adhesive but are more elastic, allow for more flexibility between substrates with different thermal coefficients of expansion. Sealants are often used to seal small openings and are effective in waterproofing processes. In the aerospace industry, sealants are commonly used for sealing fuel tanks, or repairing aircraft airframes or windshields. Sealants may also be exploited for their electrical conductivity or thermal and acoustical insulation properties. There are many types of sealants ranging from relatively high strength resin to low strength waxes and putties such as silicone. Adhesives may be categorized as either reactive or non-reactive. Reactive

adhesives are those that harden through chemical reaction while non-reactive adhesives do not. Reactive adhesives may be either multi-part, which require the mixing of two compounds that chemically react and harden or single-part which harden through chemical reactions with heat, radiation, or moisture. Non-reactive adhesives include solvent based drying adhesives that harden as the solvent evaporates. Segregating sealant and adhesive use from general chemical use is not required at all installations; however, for installations that must comply with the Aerospace NESHAP or other permit regulations it is important. Some sealants and adhesives are considered specialty coatings and thus have specific VOC and HAP content limits as specified in 40 CFR Part 63.745 Table 1.

Emissions from hazardous material use are estimated by using a material mass balance approach. The product of the total volume of the chemical used and the weight percent of the pollutant of interest is taken to calculate the emissions of pollutants.

3.8.2 Potential Data Sources

Hazardous materials are typically procured through the Hazardous Materials Management System (EESOH-MIS). There are a few approaches to best handle the information that can be obtained from EESOH-MIS. It is important to work with the Hazardous Materials Management personnel to configure the best approach for the installation.

If separating the laboratory chemicals or sealants and adhesives from general chemical use, it is important to set up the processes in EESOH-MIS to have separate processes for these specific material groups. For instance, all sealants and adhesives used in the shop should be on their own process and not mixed with other general chemicals. All activities that occur in a laboratory or within a particular fume hood should be segregated into their own processes.

3.8.2.1 Miscellaneous Chemical Use (CHEM)

General chemical use occurs in all areas of an installation, including office areas and dormitories so no specific shops can be identified. However, the specific shops that may conduct laboratory operations or sealant and adhesive operations are identified below:

3.8.2.2 Laboratory (LAB)

Laboratory activities are usually isolated from other industrial operations. Not all installations will have a laboratory; however, some may have an entire portion of the base that is dedicated to research labs. Some common labs are as follows:

- Air Force Research Lab (AFRL)
- Medical Labs (Histopathology, Microbiology, Clinical Pathology, Cytopathology)
- Fuels Management Lab

3.8.2.3 Sealants and Adhesives (SEAD)

Sealant and adhesive use usually occurs in industrial settings and of often used in vehicle and aircraft repair. Therefore, the most common shops that use sealants and adhesives are as follows:

- Aircraft Structural Maintenance (MXS)
- Vehicle Maintenance (LGRV)

For all operations that are conducted in a fume hood with a control filter, the control equipment information will need to be collected. The equipment information needed is the control type, and control efficiency. This information should be available from product literature provided by the manufacturer. If this information is not readily available it is recommended that the fume hood is inspected to determine the exact control equipment and contact the manufacturer directly to gather this information.

The material information is also essential to the hazardous chemical emissions calculations. For all usage information that is imported from EESOH-MIS there should also be material records that contain most if not all the required information. For manual logs, the Safety Data Sheets will need to be obtained. Most shops maintain Hazard Communication folders that contain all the Safety Data Sheets for materials used. If the Safety Data Sheets are not available in the shop, most are available on manufacturer websites. All materials will need the following information populated in APIMS.

- Product Name
- Density
- Ingredient Name and % by weight
- VOC content
- Mix Ratio (if the logs specify the total amount of the kit used and not component specific amounts)

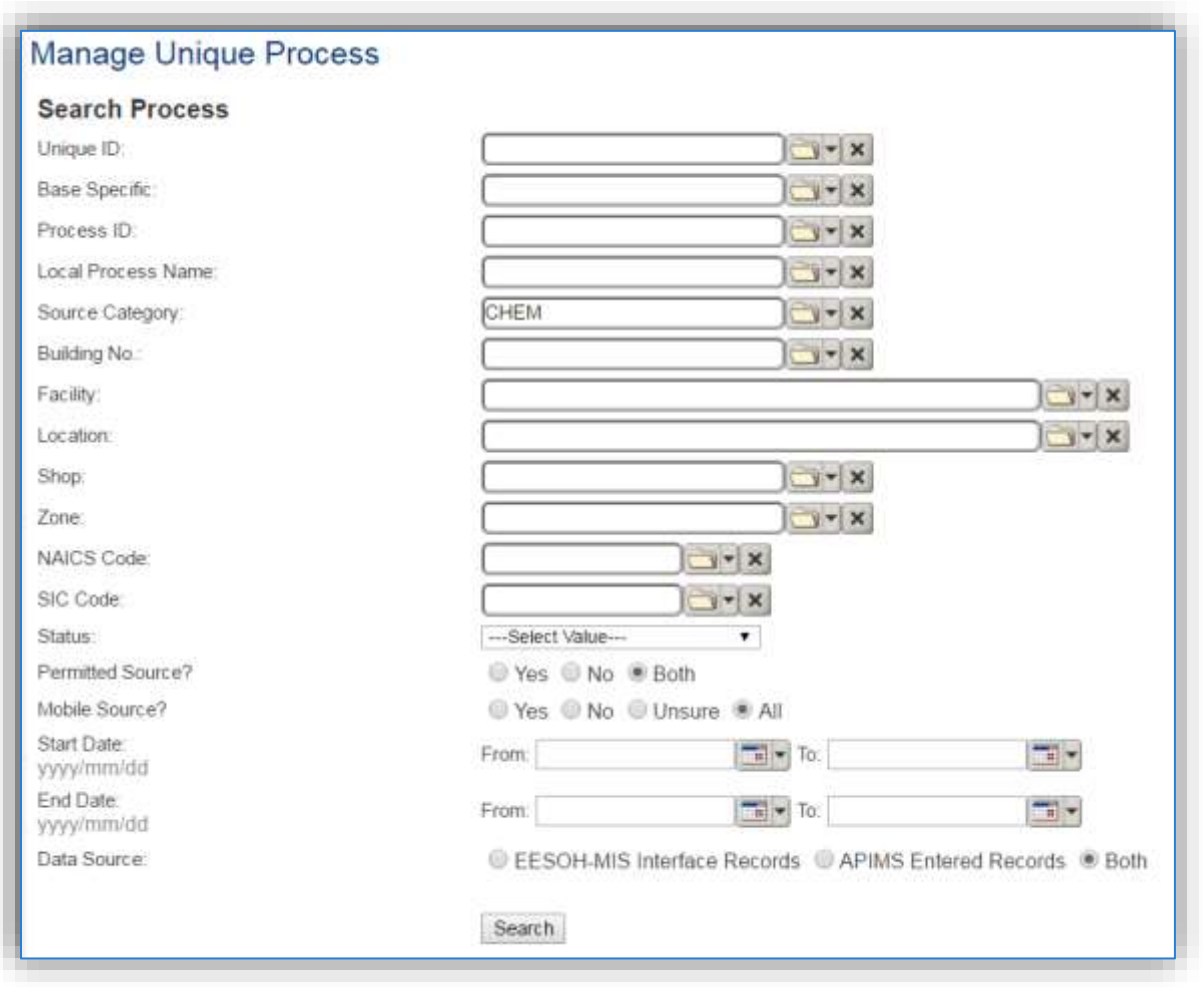
The EESOH-MIS interface will populate most of this data, however if the VOC is not readily available on the SDS it may not be entered into EESOH-MIS. Since the EESOH-MIS interface inserts so many material records at one time it is not feasible to review each record for completeness, therefore it is recommended to initially assume the data required is present and run the initial calculations. Once the calculations have been run, there is a tab that will provide error messages that will identify all the records that are missing VOC or ingredient information. Refer to Section 2.7 Emissions Calculations for details on the calculation error messages. For these materials the VOC can be calculated based on the ingredients, which requires a general knowledge of chemistry. If the VOC cannot be obtained from the SDS or the manufacturer the Air Emissions Guide for Air Force Stationary Sources provides estimated values in Table 22-1.

3.8.3 Standard Source Identification/Characterization

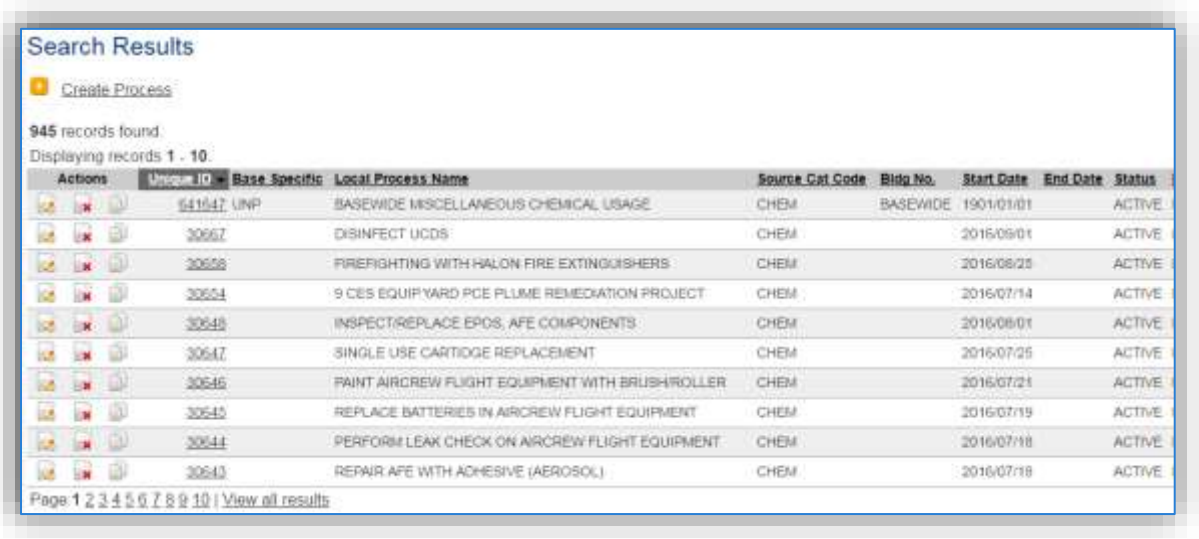
3.8.3.1 Existing Sources

It is important to review the existing sources in each source category on an annual basis at a minimum. Most regulatory agencies require an up to date source and equipment inventory.

Navigate to the Unique Process module of APIMS by clicking on **Unique Process** under the **Emission Unit** tab. In the **Source Category** search field, type “CHEM” or “LAB” or “SEAD” then select the row for the source category from the dropdown results. Click the Search button.

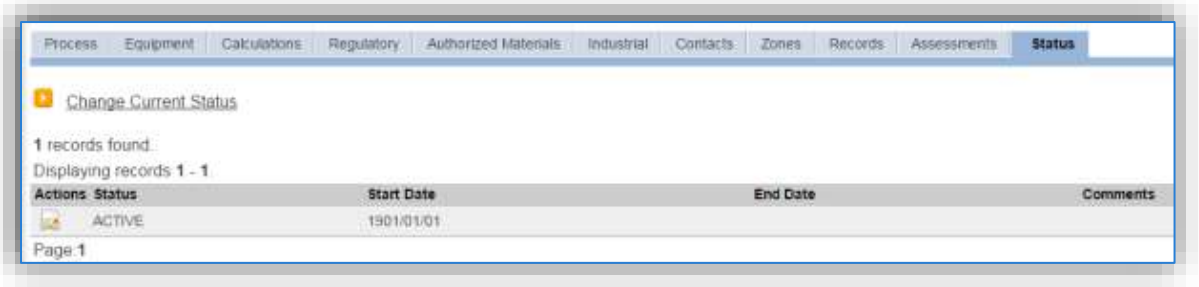


The search results grid will now display all the miscellaneous chemical, laboratory chemical or sealant and Adhesive material use processes currently in APIMS. To further filter out the EESOH-MIS processes, use the APIMS Entered Records radio button on the Data Source field in the Search criteria. This will then only display the Next Higher Process. A Next Higher Process is a process that has other processes associated to it as child records. These child record processes will have the consumption records, but the Next Higher Process will roll up the consumption and apply the calculation methodology specified for the Next Higher Process. This is a more efficient way of handling multiple processes that can be treated as a single emission source. This is most useful when dealing with processes that are imported from EESOH-MIS where the process segregation is driven by shops and purchasing codes and not emission sources.

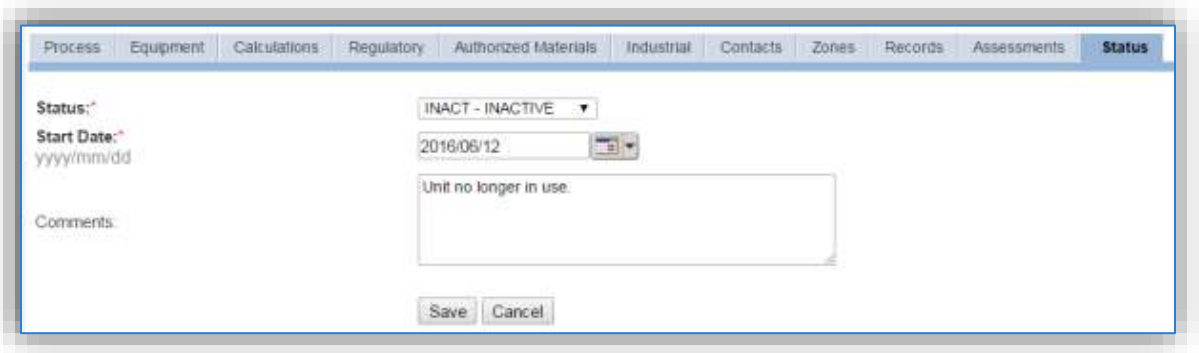


3.8.3.1.1 Status

If the status of a process needs to be changed, click the edit icon next to the process. If this is a process that was entered into APIMS via the EESOH-MIS interface, the process status must be altered in EESOH-MIS.



Navigate to the *Status* tab. Click the Change Current Status hyperlink.



Select the appropriate status from the **Status** dropdown (i.e., ACTIVE, REMOVED or INACTIVE).

For the **Start Date** enter the date at which the status changed.

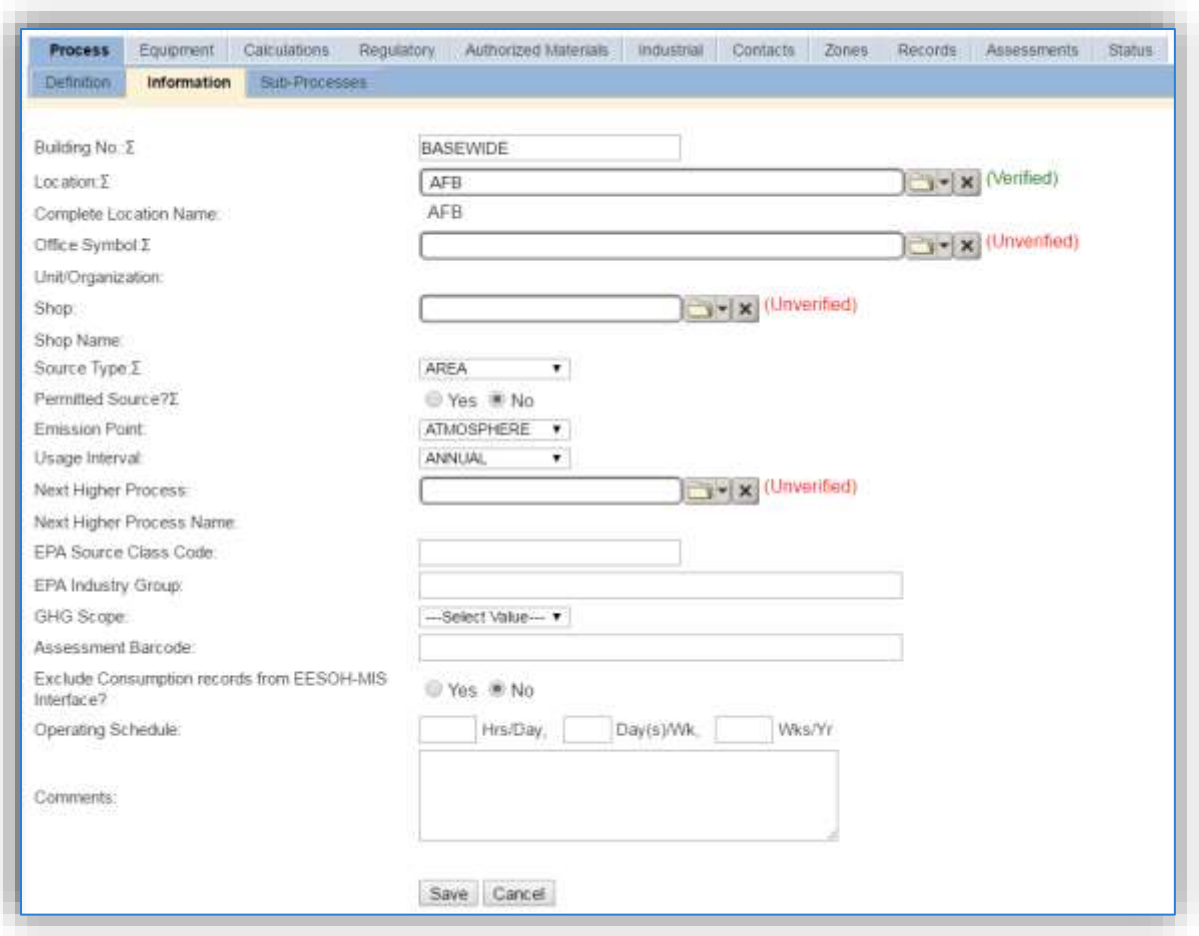
Enter **Comments** that provide insight into why the status changed. These can be very useful for equipment inventories, permit renewals and regulatory reporting. Most regulatory agencies require reporting on unit operation status; this includes any potential time spent offline, reasons for the outage.

Click the **Save** button.

The emissions for a process will only be calculated for the dates the process was in an ACTIVE status. If a source is removed in the middle of a year, the emissions will only be calculated for the part of the year the source was active.

3.8.3.1.2 Information

For new and existing sources there are basic data elements that are important to track and maintain for new and existing sources, such as location and source type. This data can be maintained in the Unique Process record on the *Information* sub tab.



The **Building No**. field can be used to specify a general location or area of the emission source. For instance, if this if for multiple areas spread across the installation, specify BASEWIDE.

The **Location** field is very important to effectively manage the location of the emission source. If this is a next higher process for basewide emissions, the Location should just be the base name. If it is a specific laboratory or shop then this information will be important for knowing where the source is, in case it needs to be inspected or the source owner needs to be contact for pertinent information.

Laboratory operations conducted in a fume hood should be designated as POINT in the **Source Type** field. All other operations should be designated as AREA in the **Source Type** field.

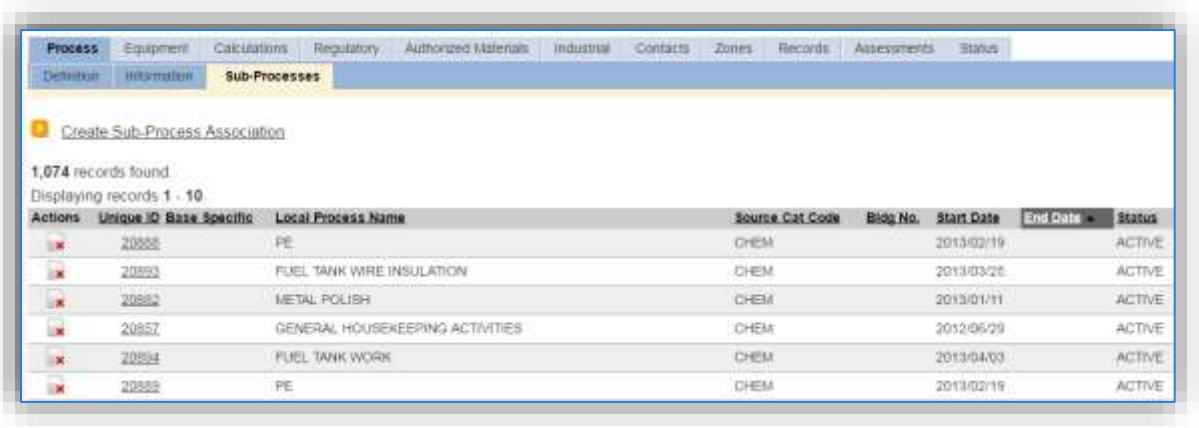
The **Emission Point** should be ATMOSPHERE for all operations.

The **Permitted Source** flag should also be populated to accurately reflect the current regulatory status of the emission source. This flag can be an invaluable tool in roll-up reporting.

The **Usage Interval** should be designated, this source is usually documented on an ANNUAL basis unless specified differently by a regulatory requirement. It is important to populate this field correctly as it will affect how it is documented in the AEI Throughputs module.

3.8.3.1.3 Sub-Processes

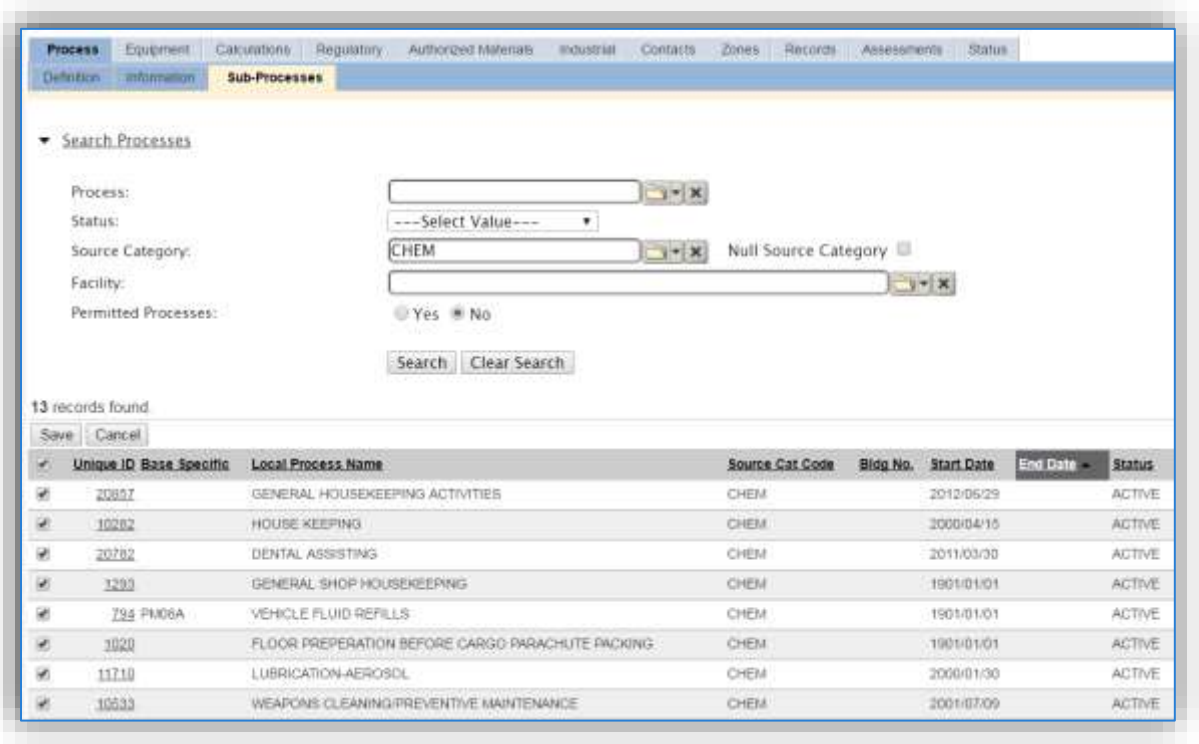
For Next Higher Process configuration, navigate to the *Sub-Processes* sub tab.



This sub tab is used to specify which processes should have their consumption rolled up to this next higher process. This list should only include EESOH-MIS processes that match the next higher process, specific guidance shown below.

Next Higher Process	Sub-Process Criteria
Basewide Chemical Use	• All processes and materials not accounted for in other categories.
Basewide Sealant and Adhesive Use	• Only Sealant and Adhesive materials authorized.
Basewide Laboratory Use	• Only chemicals used in a laboratory setting.
Laboratory	• Laboratory chemicals used in the laboratory specified in the next higher process.

To add a process or processes, click the Create Sub-Process Association hyperlink.



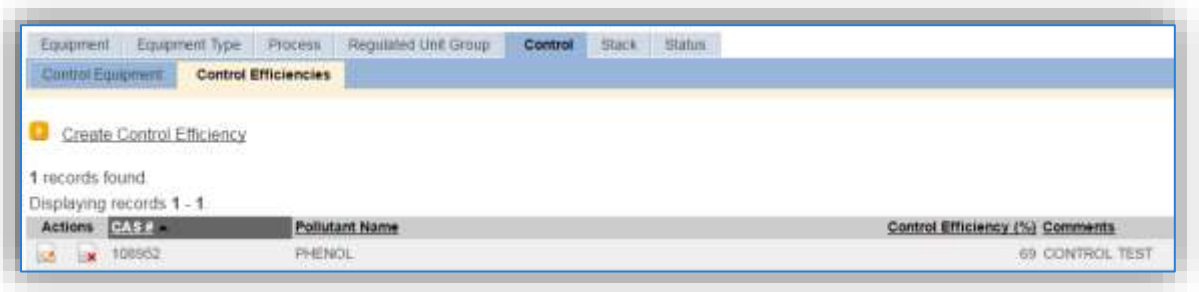
Use the Search Processes fields to refine the search to find only the CHEM, LAB or SEAD processes. Select the checkbox next to the appropriate process(es), then click the **Save** button.

3.8.3.1.4 Equipment

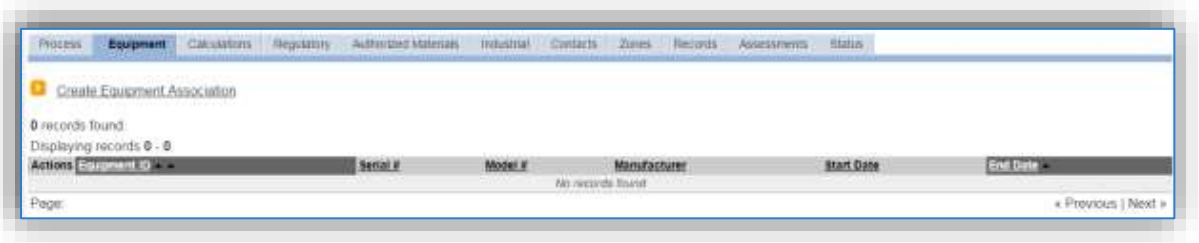
The next tab is the *Equipment* tab.

This is only applicable for laboratory processes that are conducted in a fume hood equipped with an emission control.

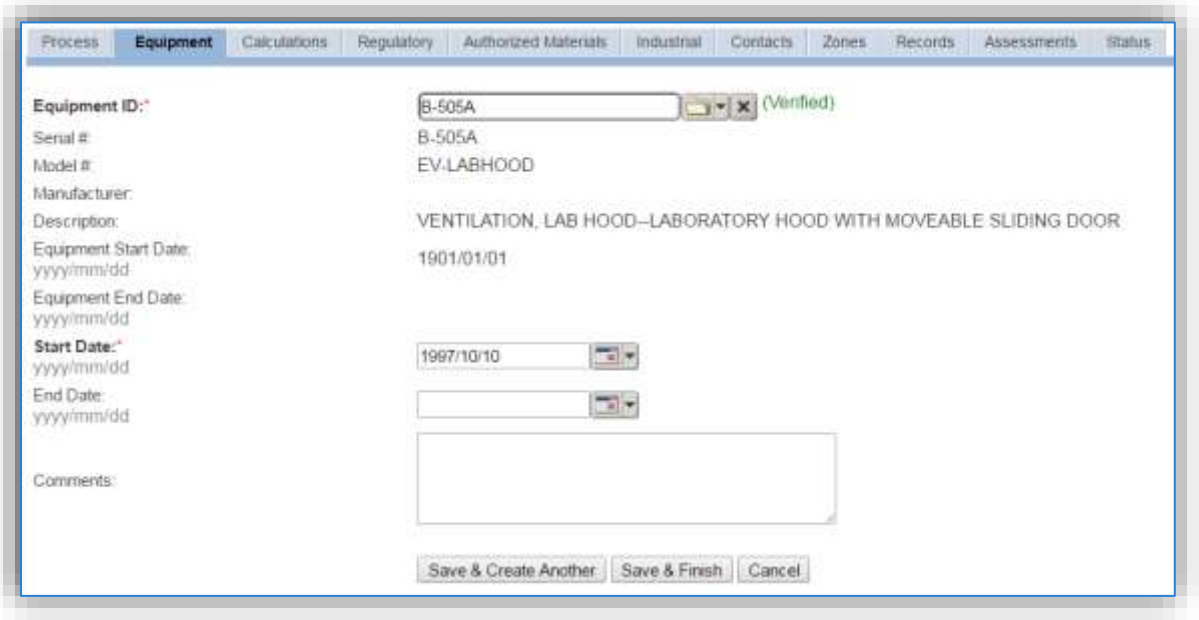
In the control tab of the equipment record, the control efficiency for the device needs to be created applicable chemicals. APIMS uses the control efficiency on the equipment associated to the process to accurately calculate emission. To link the equipment to the process the equipment must already be entered in APIMS. Refer to the Equipment section for specifics on how to properly document equipment in APIMS.



To link the equipment, click on the Create Equipment Association hyperlink.

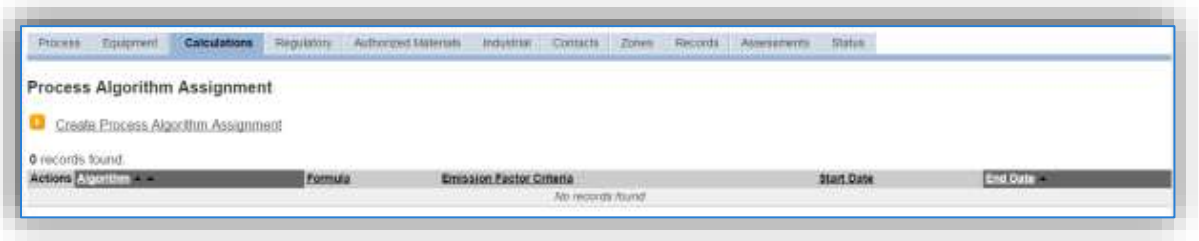


Search for the **Equipment ID** in the list of values, enter the start date and click the **Save & Finish** button.

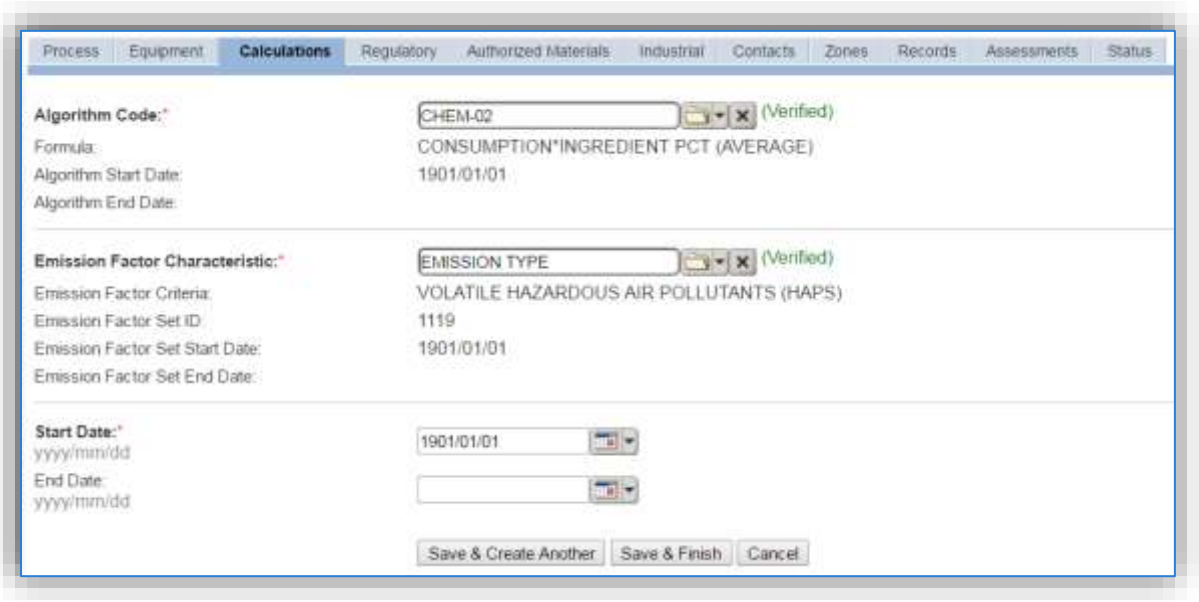


3.8.3.1.5 Calculations

The next tab is the *Calculations* tab.



To associate an algorithm to the process, click on the Create Process Algorithm Assignment hyperlink.

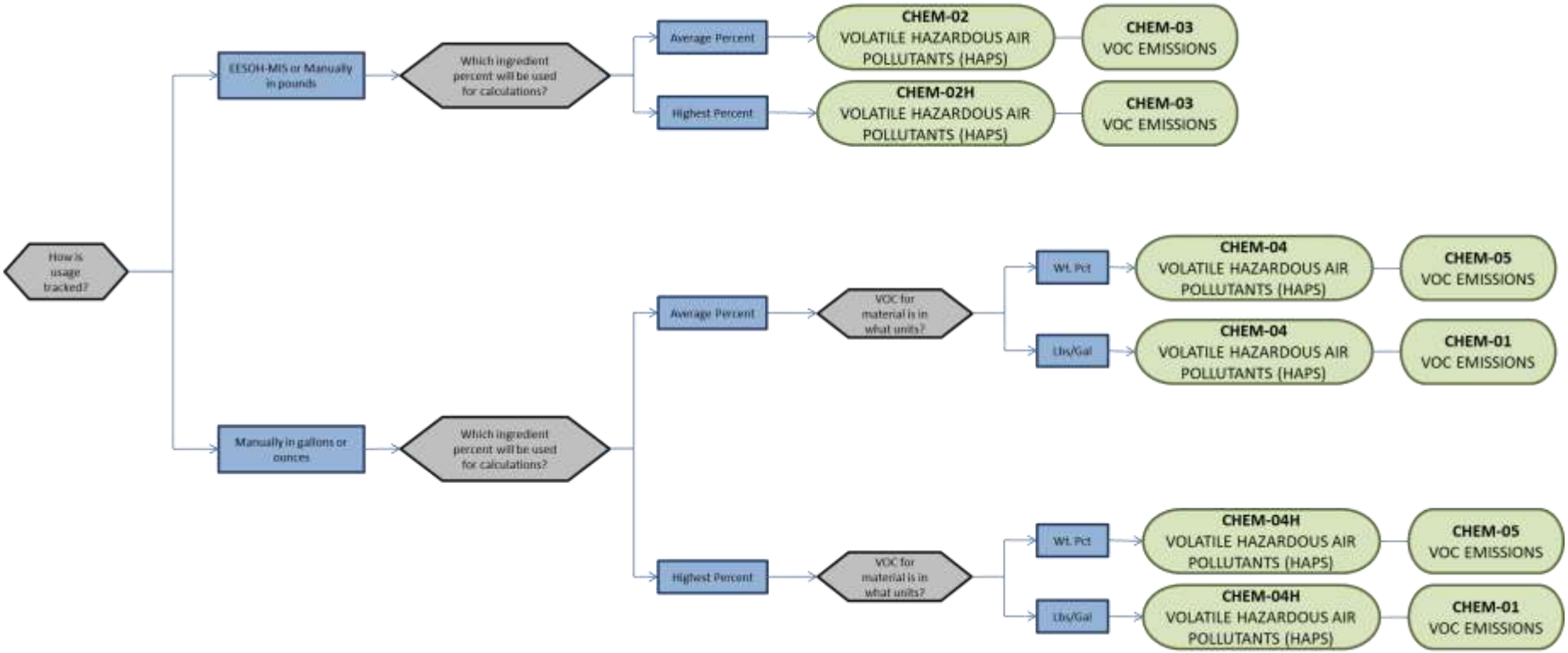


Select the **Algorithm Codes** from the list of values that matches the correct scenario. Next select the **Emission Factor Characteristic** available. Enter the **Start Date** to match the start date of the process. Click the **Save & Create Another** button to associate another algorithm or click **Save & Finish** button to save and return to the Calculations tab.

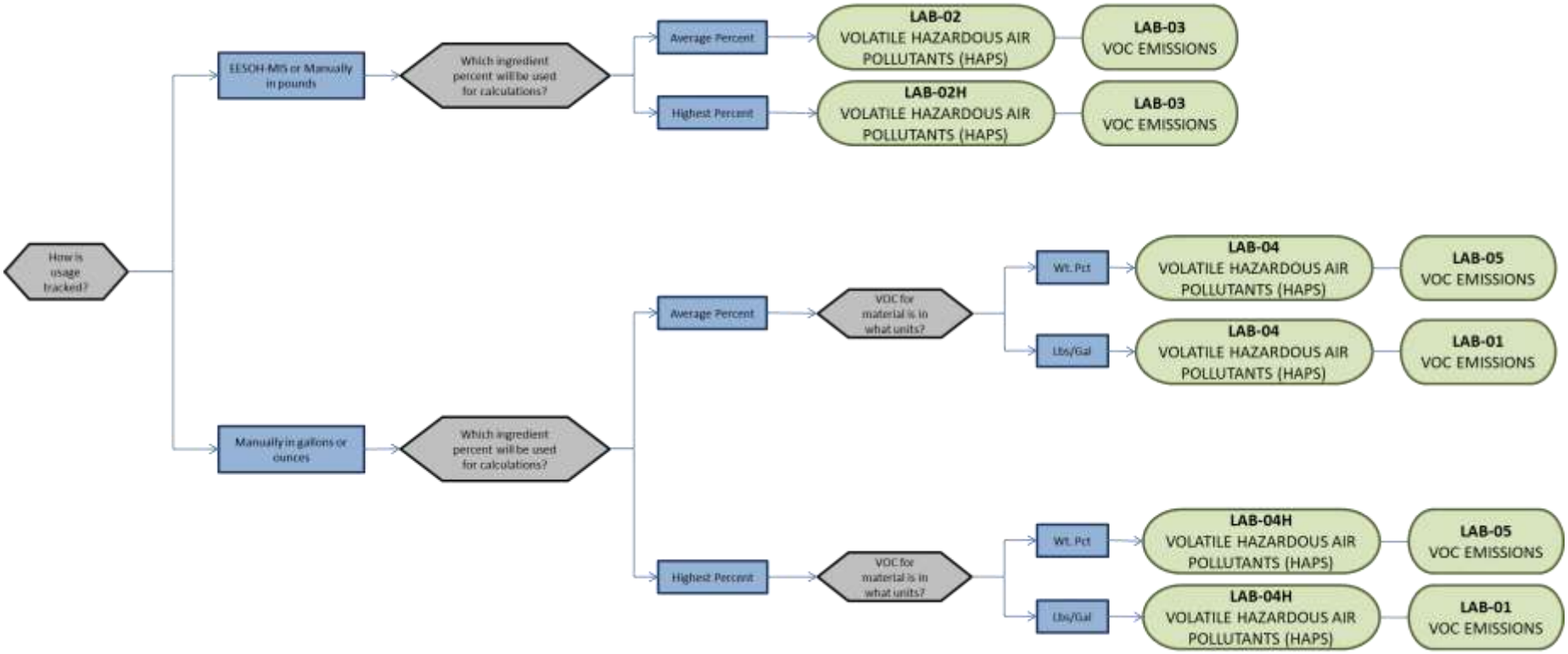
Hazardous material emissions are calculated utilizing the material VOC and a mass balance based on ingredients. Therefore, there are TWO ALGORITHMS that need to be associated to each hazardous material use process.

Use the flowchart below to find the correct Algorithm Code and Emission Factor Characteristic.

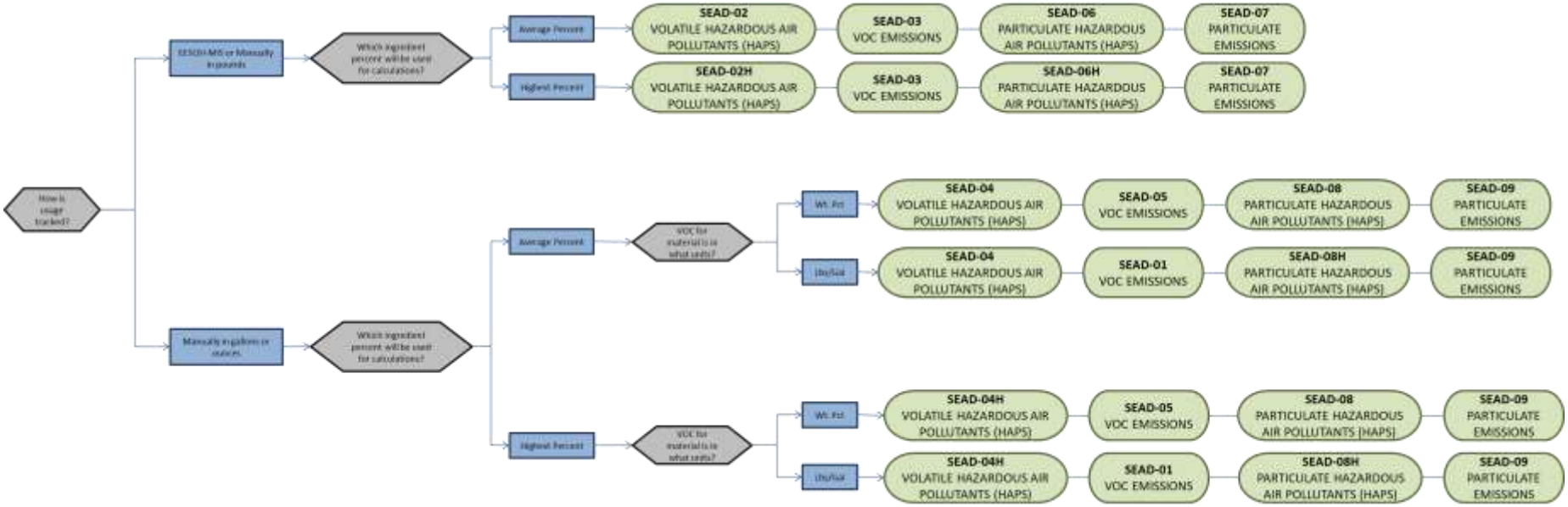
3.8.3.1.5.1 *Miscellaneous Chemical Use*



3.8.3.1.5.2 *Laboratory*



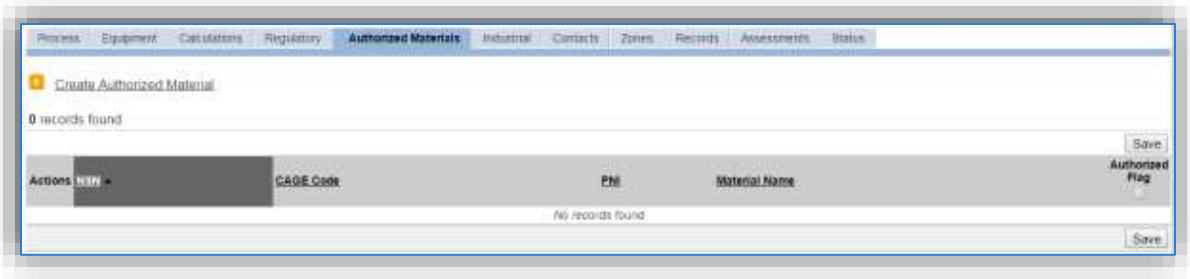
3.8.3.1.5.3 *Sealants and Adhesives*



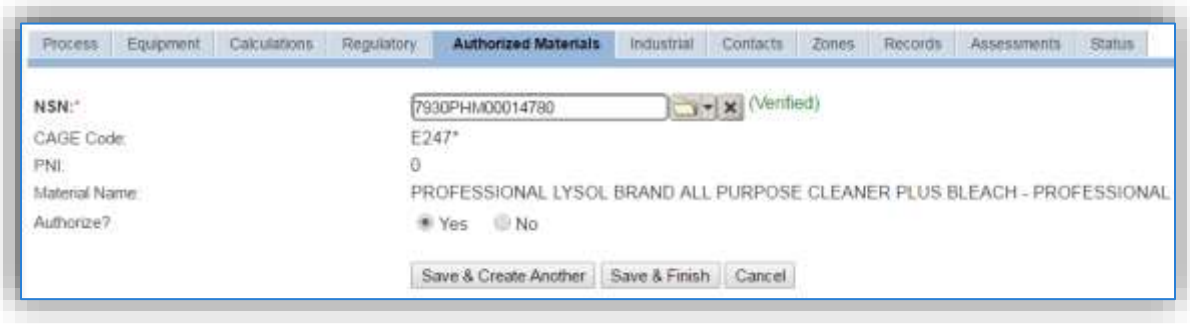
If your permit requires a different type of calculation, contact the Air Force Air Quality Subject Matter Expert for approval of the alternative method.

3.8.3.1.6 Materials

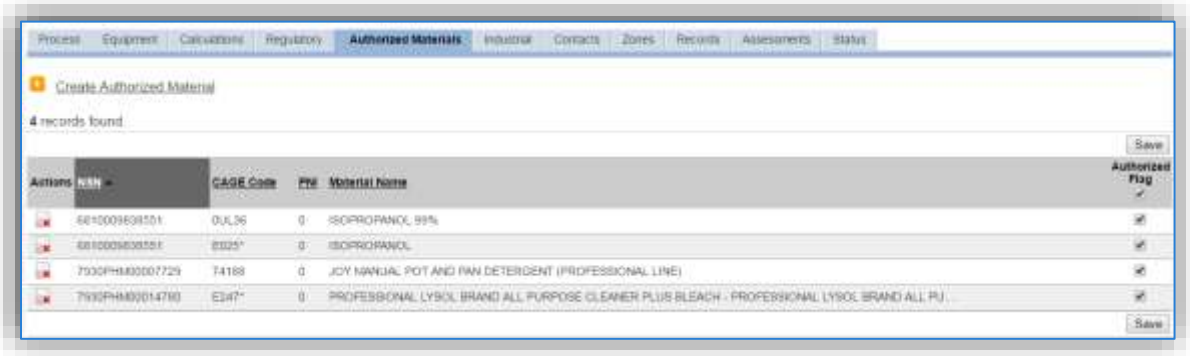
The last step in setting up the Unique Process record is to authorize materials on the *Authorized Materials* tab. This step is only required for processes that use manual logs to track usage in APIMS. All processes that use the consumption data from EESOH-MIS are configured at the sub-process level by the interface.



To authorize a material for the process, click on the Create Authorized Material hyperlink.



Select the material record from the list of values, using the **NSN** (National Stock Number) or **Material Name**. If the material is not available the material record will need to be created. Next select "Yes" to **Authorize** the material, then **Save & Finish** or **Save & Create Another**. Repeat this step for all materials used by the process.



3.8.3.2 New Sources

3.8.3.2.1 Data Collection Sheet

The form on the next page is a printable guide that can be taken out to the location of the source and used to gather all the necessary information from the shop personnel. It can then be used as a guide to help configure the data in APIMS when you return to your office.

Hazardous Material Data Collection Worksheet

GENERAL INFORMATION

Building Number_____ Shop Name/Function_____

Management Organization_____

GIS Location _____

Is this source in any of your permits? ☐ Yes ☐ No

If yes, does it have an emission unit number or other designation? _____

USAGE INFORMATION

Are the hazardous materials purchased through EESOH-MIS? ☐ Yes ☐ No

If Yes, specify the shop and process designation in EESOH-MIS
Shop Code _____ Process Code/Name _____

If No, do you know the total amount of materials purchased in the last year? ☐ Yes ☐ No

If yes, do you have usage records? ☐ Yes ☐ No

If yes, collect the usage records.

If no, ask the shop personnel to estimate how often they purchase hazardous materials, what types and how much purchased each time? (The fields below provide a guideline of information that must be collected for each material.

Material Name _____

Amount Used _____ ☐ Lbs ☐ Gal

Frequency_____

Do they have Safety Data Sheets for the materials used? ☐ Yes ☐ No

If yes, collect copies.

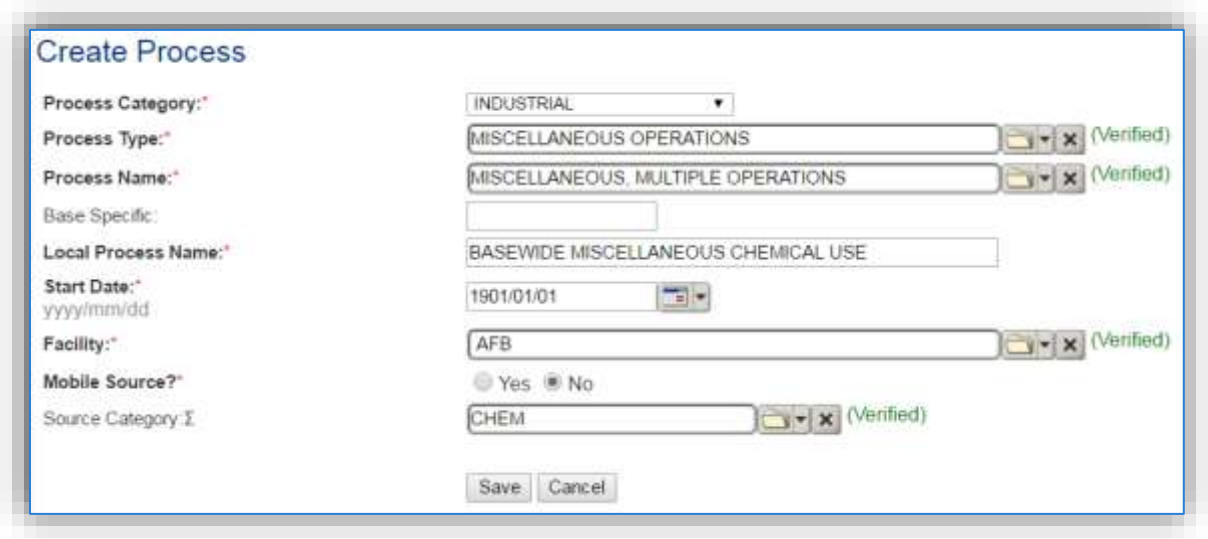
If no, collect the name and manufacturer of the product. This can be used to contact the manufacturer to obtain a Safety Data Sheet.

3.8.3.2.2 New Source Configuration

In order to properly document these emission sources in APIMS, there will need to be at least one Unique Process record. If the EESOH-MIS processes are configured to have laboratory chemicals and/or sealants and adhesive use segregated into separate processes, a next higher process for each needs to be configured. If the hazardous material processes are not segregated by type then only a single next higher process will need to be configured. For the laboratory chemical activities that occur in fume hoods a process for each fume hood will need to be configured.

3.8.3.2.2.1 *Miscellaneous Chemical Use (CHEM)*

Navigate to the Unique Process module in APIMS and click the Create New Process hyperlink.



Process Category	Process Type	Process Name	Process ID
INDUSTRIAL	MISCELLANEOUS OPERATIONS	MISCELLANEOUS, MULTIPLE OPERATIONS	IMI1692

Use the table above to determine the appropriate **Process Category**, **Process Type** and **Process Name**.

The **Base Specific** field can be used to enter a standard convention identifier that will best help identify the source. If the source is permitted, enter the emission unit ID as designated in the permit.

The **Local Process Name** should be in a standard naming convention for all sources that helps to quickly identify, what the process is, where it is and any other unique attribute. For example, BASEWIDE MISCELLANEOUS CHEMICAL USE.

The **Start Date** should be the date the unit became operational, if this date is not known, enter 1901/01/01 as a default start date.

The **Facility Name** should be the facility that is responsible for the source or sources.

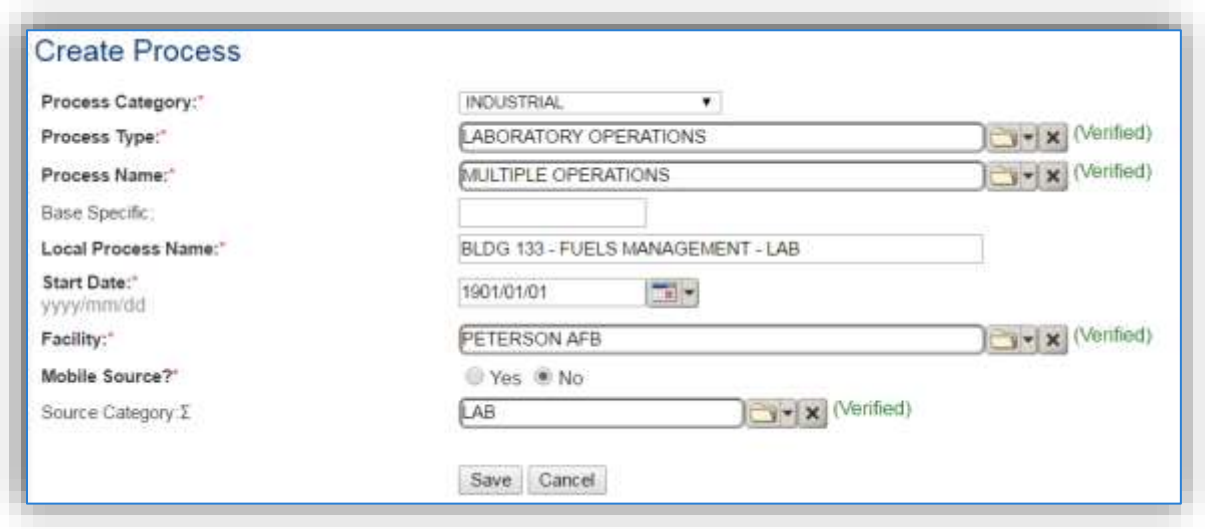
The **Mobile Source?** flag should be “NO” as this is considered as stationary source.

All hazardous material use activities are assigned to the CHEM **Source Category**.

For the population of all other tabs, refer to the Existing Sources sections.

3.8.3.2.2.2 *Laboratory (LAB)*

Navigate to the Unique Process module in APIMS and click the Create New Process hyperlink.



Process Category	Process Type	Process Name	Process ID
INDUSTRIAL	LABORATORY OPERATIONS	ANALYSIS, BIOLOGICAL	ILO1040
INDUSTRIAL	LABORATORY OPERATIONS	ANALYSIS, CHEMICAL	ILO1041
INDUSTRIAL	LABORATORY OPERATIONS	ANALYSIS, ENVIRONMENTAL OR OCCUPATIONAL	ILO1042
INDUSTRIAL	LABORATORY OPERATIONS	DESTRUCTIVE TESTING	ILO1347
INDUSTRIAL	LABORATORY OPERATIONS	DRUG TESTING	ILO1381
INDUSTRIAL	LABORATORY OPERATIONS	LABORATORY OPERATIONS, NOC	ILO1594
INDUSTRIAL	LABORATORY OPERATIONS	MULTIPLE OPERATIONS	ILO1710
INDUSTRIAL	LABORATORY OPERATIONS	PROPULSION LABORATORY	ILO1834
INDUSTRIAL	LABORATORY OPERATIONS	PROTOCOL RESEARCH	ILO1839
INDUSTRIAL	LABORATORY OPERATIONS	RADIATION RESEARCH	ILO1834
INDUSTRIAL	LABORATORY OPERATIONS	RADIOLOGICAL ANAYLISIS	ILO1847
INDUSTRIAL	LABORATORY OPERATIONS	RESEARCH AND DEVELOPMENT	ILO1865

Use the table above to determine the appropriate **Process Category**, **Process Type** and **Process Name**.

The **Base Specific** field can be used to enter a standard convention identifier that will best help identify the source. If the source is permitted, enter the emission unit ID as designated in the permit.

The **Local Process Name** should be in a standard naming convention for all sources that helps to quickly identify, what the process is, where it is and any other unique attribute. For example, BASEWIDE LABORATORY CHEMICAL USE for next higher process configuration or BLDG 133 – FUELS MANAGEMENT – LAB for shop specific process configuration.

The **Start Date** should be the date the unit became operational, if this date is not known, enter 1901/01/01 as a default start date.

The **Facility Name** should be the facility that is responsible for the source or sources.

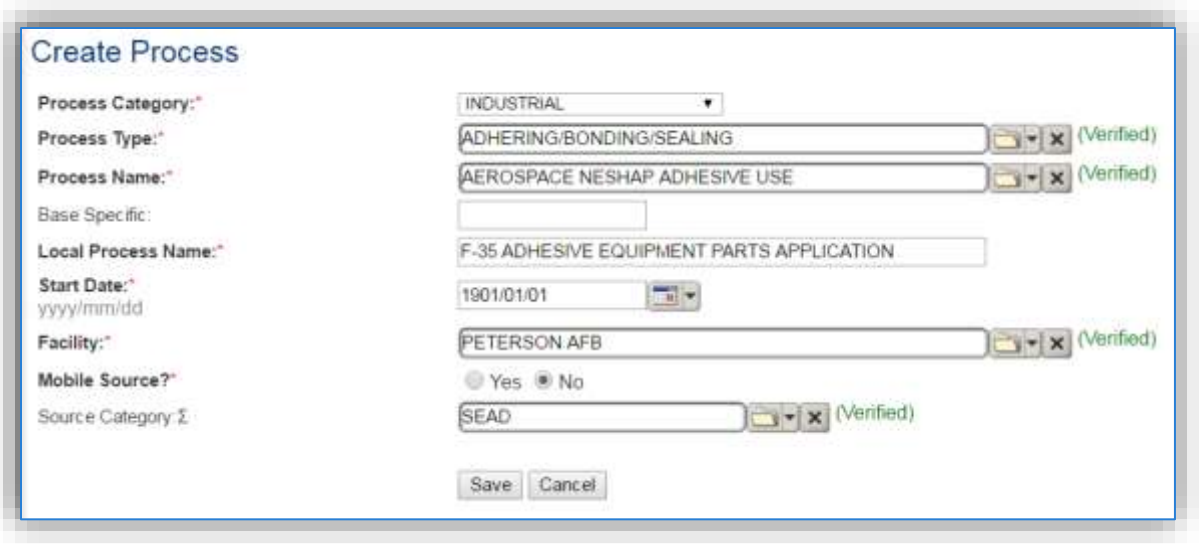
The **Mobile Source?** flag should be "NO" as this is considered as stationary source.

All laboratory material use activities are assigned to the LAB **Source Category**.

For the population of all other tabs, refer to the Existing Sources sections.

3.8.3.2.2.3 *Sealants and Adhesives (SEAD)*

Navigate to the Unique Process module in APIMS and click the Create New Process hyperlink.



Process Category	Process Type	Process Name	Process ID
INDUSTRIAL	ADHERING/BONDING/SEALING	ADHERING/BONDING/SEALING – AEROSOL	IAB1021
INDUSTRIAL	ADHERING/BONDING/SEALING	ADHERING/BONDING/SEALING – ALL USAGES	IAB1022
INDUSTRIAL	ADHERING/BONDING/SEALING	ADHERING/BONDING/SEALING – BRUSH/DOBBING	IAB1023
INDUSTRIAL	ADHERING/BONDING/SEALING	ADHERING/BONDING/SEALING - GUN	IAB1024
INDUSTRIAL	ADHERING/BONDING/SEALING	ADHERING/BONDING/SEALING – HAND TOOL	IAB1025
INDUSTRIAL	ADHERING/BONDING/SEALING	ADHERING/BONDING/SEALING – HAND WIPE	IAB1026
INDUSTRIAL	ADHERING/BONDING/SEALING	ADHERING/BONDING/SEALING – SQUEEZE TUBE	IAB1027
INDUSTRIAL	ADHERING/BONDING/SEALING	AEROSPACE NESHAP ADHESIVE USE	IAB2160
INDUSTRIAL	ADHERING/BONDING/SEALING	AEROSPACE NESHAP SEALING/DESEALING OPERATIONS	IAB2161

Use the table above to determine the appropriate **Process Category**, **Process Type** and **Process Name**.

The **Base Specific** field can be used to enter a standard convention identifier that will best help identify the source. If the source is permitted, enter the emission unit ID as designated in the permit.

The **Local Process Name** should be in a standard naming convention for all sources that helps to quickly identify, what the process is, where it is and any other unique attribute. For example, BASEWIDE SEALANT AND ADHESIVE USE for next higher process configuration or F-35 ADHESIVE EQUIPMENT PARTS APPLICATION for shop specific configuration.

The **Start Date** should be the date the unit became operational, if this date is not known, enter 1901/01/01 as a default start date.

The **Facility Name** should be the facility that is responsible for the source or sources.

The **Mobile Source?** flag should be "NO" as this is considered as stationary source.

All sealant and adhesive material use activities are assigned to the SEAD **Source Category**.

For the population of all other tabs, refer to the Existing Sources sections.

3.8.4 Year-to-Year Maintenance

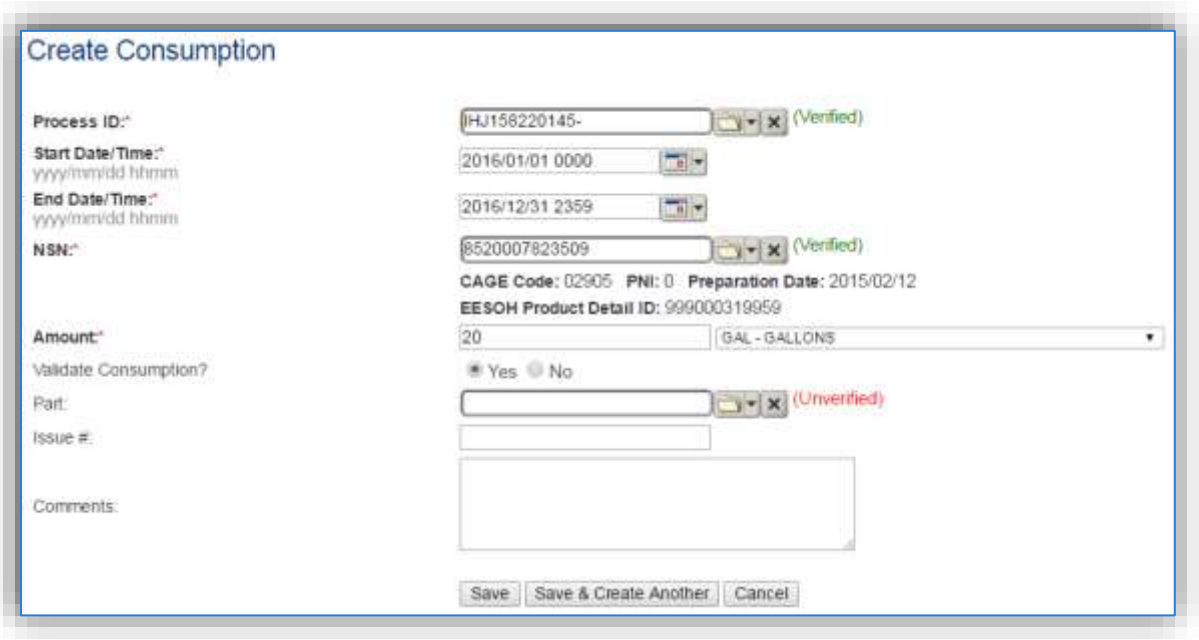
3.8.4.1 Usage

The consumption for miscellaneous chemical use will need to be tracked annually or more frequently if required by a regulatory agency. The most common method is to use the usage data that is imported from the EESOH-MIS interface. This approach is outlined in the Next Higher Process section below. However, if using manual logs to document the chemical usage, refer to the next section to correctly document the usage for this emission source.

3.8.4.1.1 Shop Specific Process

The consumption for miscellaneous chemical use will need to be tracked annually or more frequently if required by a regulatory agency. To correctly document the annual usage for this emission source the consumption should be entered in the Consumption log.

Navigate to the Consumption module and click the Create Consumption hyperlink.

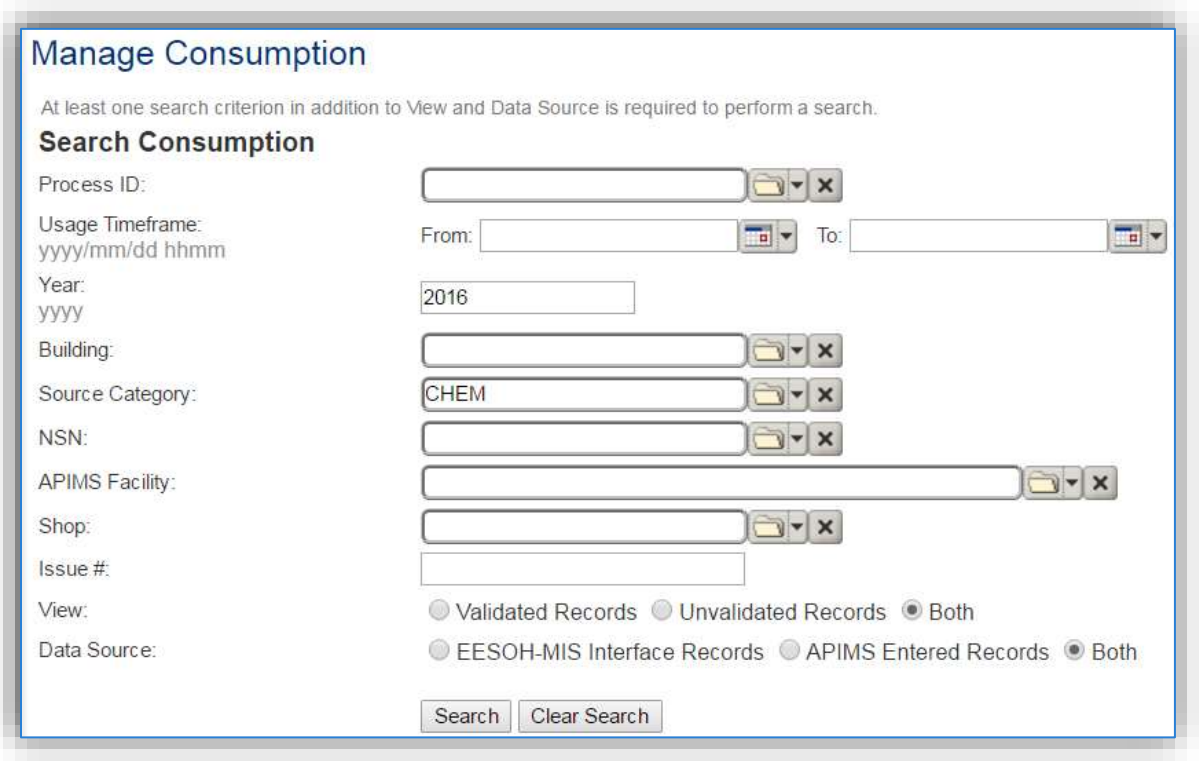


The consumption record should span the entire reporting period as shown above. The **Amount** should be recorded in gallons or pounds depending upon the algorithm selected. Make sure to select "Yes" to **Validate Consumption**. If the consumption is not validated it will not be included in the emissions calculation. Repeat this step for all the different materials used during the reporting period.

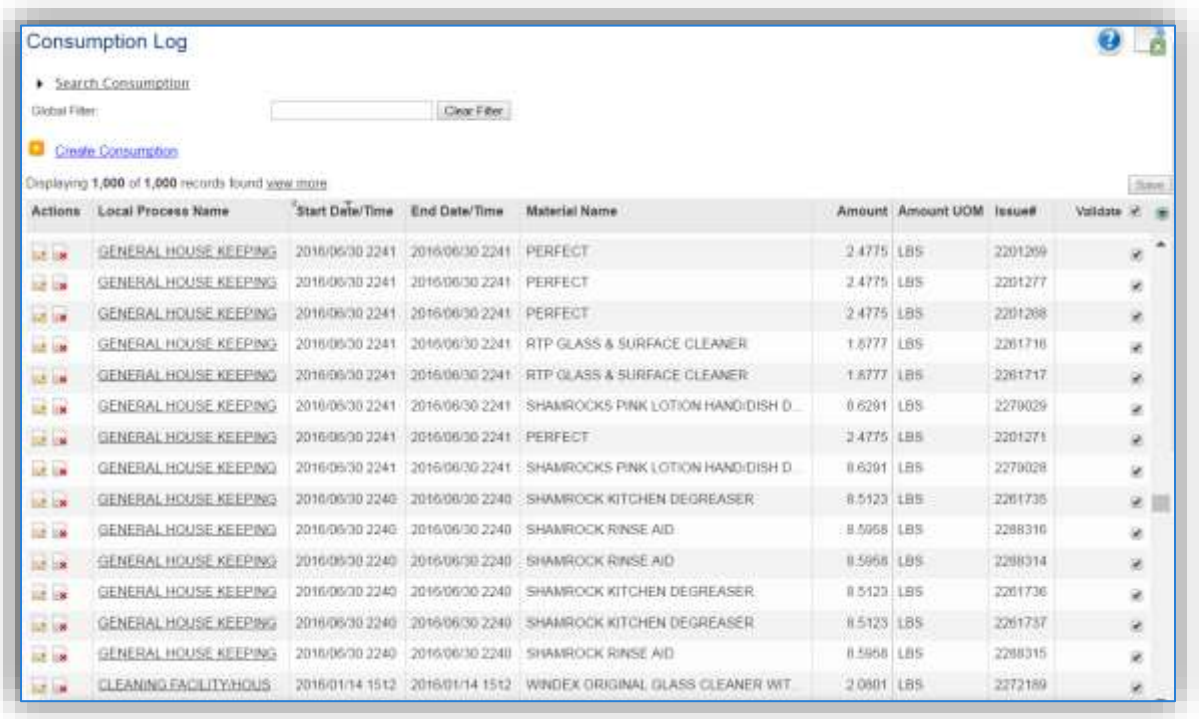
3.8.4.1.2 Next Higher Process

For the Next Higher Process configuration, the consumption is already imported from the EESOH-MIS interface, however it is not validated. The consumption must be validated in the Consumption log.

For the Next Higher Process configuration, the consumption is imported from the EESOH-MIS interface during each interface run, however it is not validated. The consumption must be validated in the Consumption log.



Use the search criteria to narrow the search results. It is suggested to use the Source Category, Data Source and Year or Usage Timeframe to filter the results.



Check the checkbox next to each material then click **Save** to validate the consumption. Only consumption that is validated will be included in emissions calculations. The simplest use case for validating rows is to

start by checking the top box in the grid to validate all rows present. After all boxes are checked, click **Save**.

Some general chemical processes that include materials such as heavy lubricants/oils, greases, hydraulic fluids, glycol deicers, and non-solvent aqueous cleaners. These products do not emit pollutants due to how they are used. For example, brake fluid and motor oil are poured into closed systems and are not exposed to the air, eliminating the possibility of evaporation/emission to the atmosphere. The Global Filter capability can be used to identify rows of these products (e.g., antifreeze, brake fluid, engine oils, hydraulic fluids etc.). Once the rows are identified, uncheck the box to not validate these rows, to ensure they are not included in the emissions calculations.

3.8.4.2 Emissions Calculation

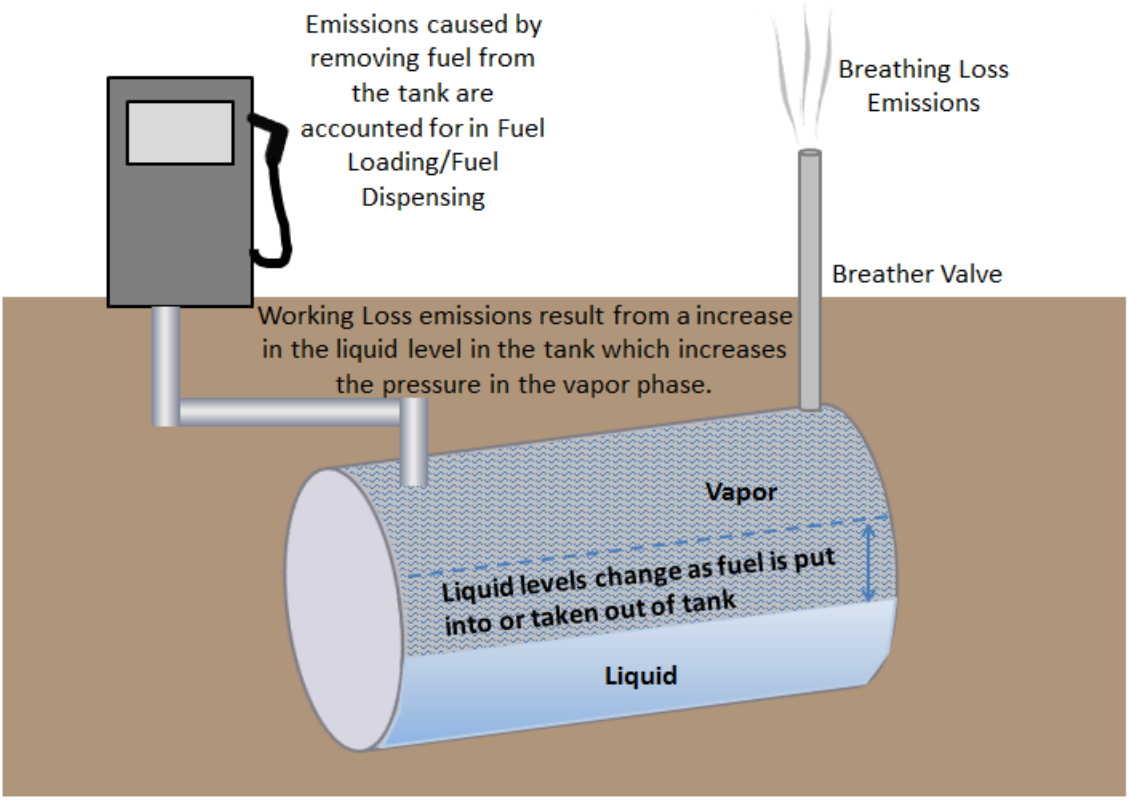
If the process utilizes EESOH-MIS data then it should be included in the **EESOH-MIS Calculation**, otherwise this emission source should be included in a **Stationary Source Calculation** that calculates controlled emissions. Reference Section 2.7 Emissions Calculations for additional instructions and details.

3.9 Underground Storage Tanks (UST)

3.9.1 Source Types

Storage tanks can be found on almost all Air Force installations and are used for the storage of materials, including fuels such as JP-8, Jet A, automotive gasoline (MOGAS) and diesel, asphalt, or solvents. The storage tanks may contain anywhere from a few hundred to over a million gallons of material. underground storage tanks are defined as a tank or piping system that has 10% or more of its combined volume underground. In general, there are several types of storage tanks, such as horizontal fixed roof, internal floating roof, external floating roof, vertical fixed roof, and domed external fixed roof. However, all underground storage tanks are horizontal fixed roof tanks.

Emissions from storage tanks are generated as the vapor escapes from the higher-pressure environment inside the tank to the lower pressure of the outside atmosphere. The compounds generally stored are composed of VOCs and HAPs which are released to the atmosphere as the liquid evaporates and the vapor escapes or is vented to regulate the pressure inside the tank.



Fixed roof tanks have breather valves that open in order to equalize the pressure when an imbalance occurs due to the changes in temperature. As the outside temperature increases, the inside temperature increases, and the vapor expands causing an increase in pressure. As the pressure increases vapor is released to keep the tank pressure at equilibrium with the atmospheric pressure. This is known as breathing loss or storage loss. Working losses are those emissions that result from the filling of the storage tanks. As the liquid level increases it causes an increase in the pressure in the vapor phase which creates

an imbalance in the tank pressure and the atmospheric pressure. The breather valve is then opened to relieve the built-up pressure and bring the tank back to equilibrium.

3.9.2 Potential Data Sources

A number of industrial areas around each installation may maintain storage tanks. Each installation has a Storage Tanks Manager; this may be their only duty or may be combined with Water Quality or Air Quality. The Air Force Storage Tank Accounting and Reporting (STAR) system should be configured with all the tanks located on the installation. STAR is a module within APIMS thus enabling the Air Quality Manager to view all the tanks and their specific properties, such as tank type, capacity, and location. However, Air Quality has additional data requirements regarding storage tanks such as dimensions and shell characteristics so some data collection may be required. These additional data requirements may be available from the Storage Tank Manager or from the following shops:

- Fuels Management Flight (LGRF)
- Base Supply Fuels Management
- Civil Engineer Liquid Fuels
- AAFES Station
- DLA

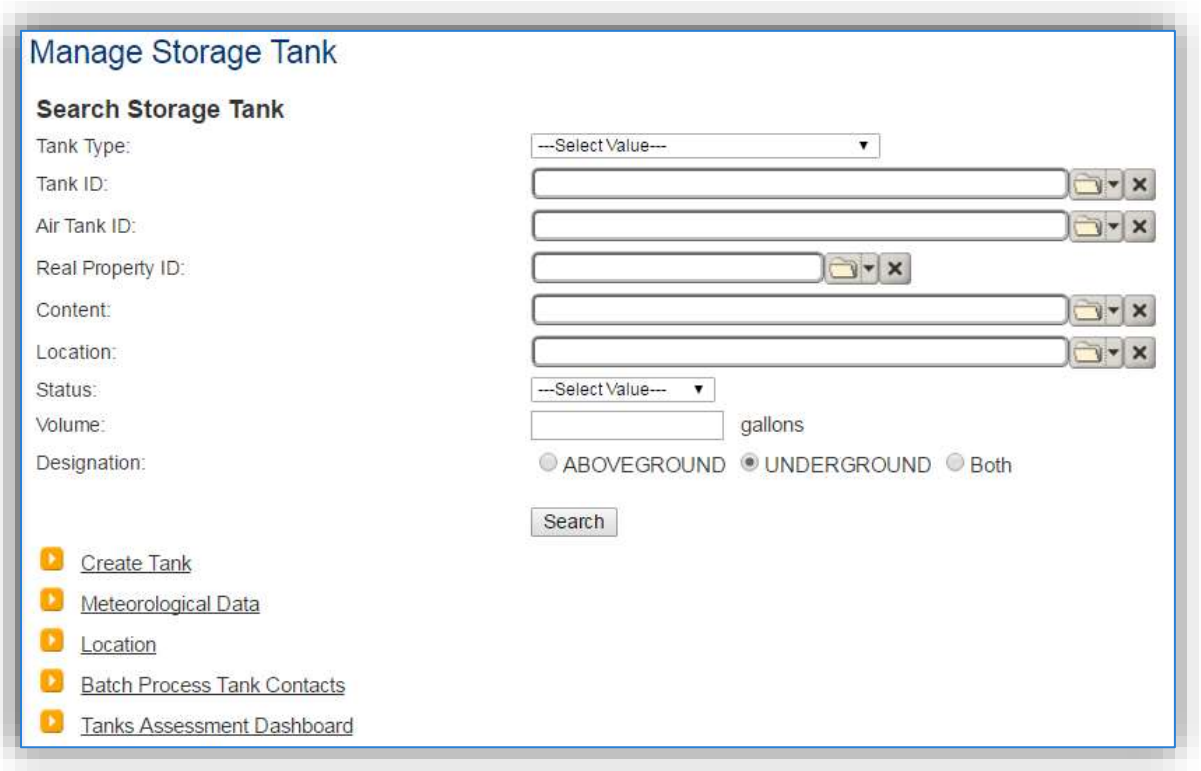
For Air Quality purposes the emissions from tanks smaller than 200 gallons are considered too insignificant to account for. Therefore, only tanks with a capacity of greater than 200 gallons should be configured for emissions calculations.

3.9.3 Standard Source Identification/Characterization

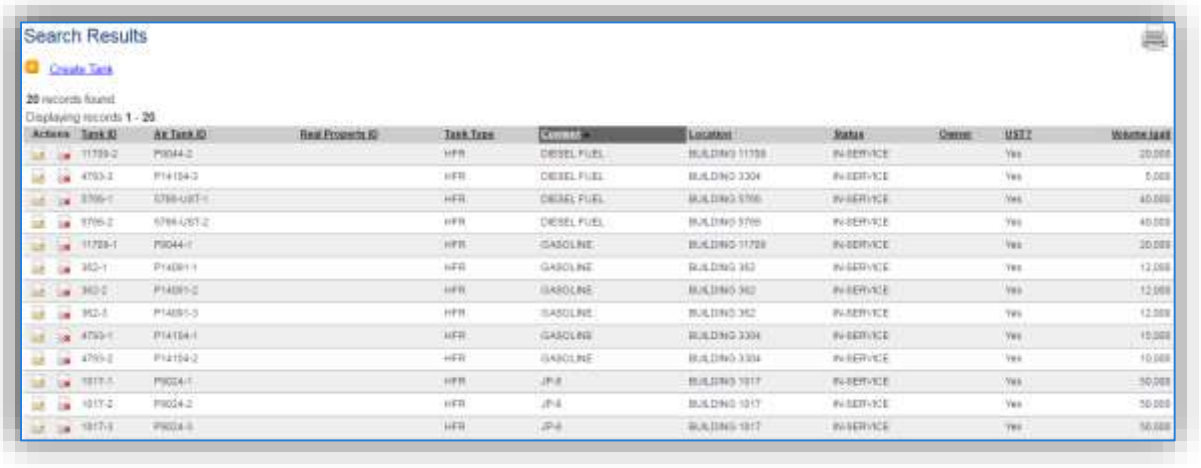
3.9.3.1 Existing Sources

It is important to review the existing sources in each source category on an annual basis at a minimum. Most regulatory agencies require an up to date source and equipment inventory.

Navigate to the Storage Tank module of APIMS by clicking **Storage Tank** under the **Tanks** tab. Use any of the Search criteria to narrow the search to a specific tank or group of tanks. To view just the underground tanks, select the Underground radio button and click the Search button.



The search results grid will now display all the underground storage tanks currently in APIMS.

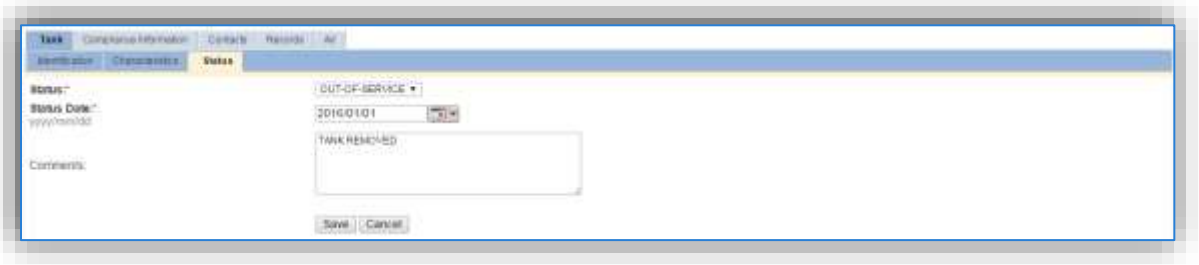


The **Tank ID** is how the Storage Tank Manager identifies the tank and the **Air Tank ID** is how the Air Quality Manager identifies the tank. The **Tank Type** indicates the type of tank for example; HFR is a horizontal fixed roof tank. Additional information about the tank is shown including the **Content**, **Location**, **Status**, and **Volume**. This list should be reviewed to make sure the source is configured in a way that it is easy to identify and locate. The status of each source should also be reviewed and kept current; this will require coordination with the Storage Tank Manager.

3.9.3.1.1 Status

If the status of a unit needs to be changed, it must be completed by a person with the Storage Tank Manager role in APIMS. If you have that role, click the edit icon next to the tank.

Navigate to the *Status* sub tab. Click the Change Current Status hyperlink.



Select the appropriate status from the **Status** dropdown (i.e., IN-SERVICE or OUT-OF-SERVICE).

For the **Start Date** enter the date at which the status changed.

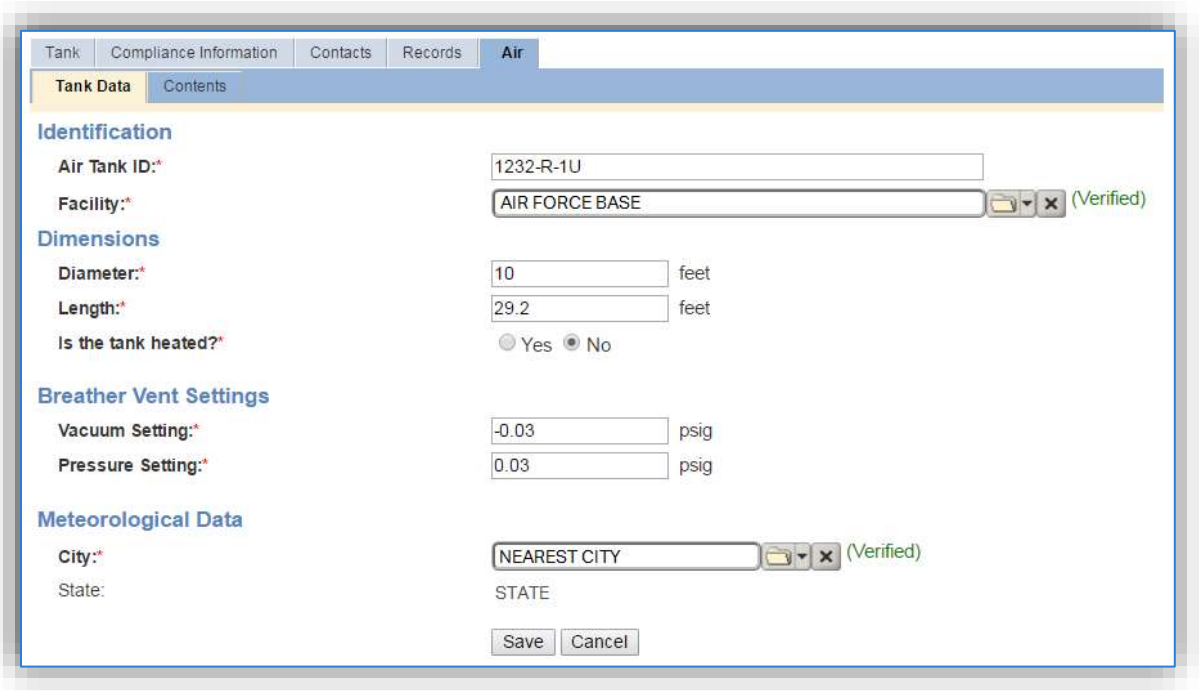
Enter **Comments** that provide insight into why the status changed. These can be very useful for equipment inventories, permit renewals and regulatory reporting. Most regulatory agencies require reporting on unit operation status; this includes any potential time spent offline and reasons for the outage.

Click the **Save** button.

The emissions for a process will only be calculated for the dates the process was in an ACTIVE status. If a source is removed in the middle of a year, the emissions will only be calculated for the part of the year the source was active.

3.9.3.1.2 Air – Tank Data

There are basic data elements that are important to track and maintain for new and existing sources, such as the tank dimensions, shell characteristics and breather vent settings. This data can be maintained in the Storage Tank record on the *Air* tab *Tank Data* sub tab.



The **Air Tank ID** field can be used to enter a standard convention identifier that will best help identify the source. If the source is permitted, enter the emission unit ID as designated in the permit.

The **Facility** should be the facility name that is responsible for the source.

The **Diameter** should be entered as the diameter in feet of the inner tank where the fuel is stored, not the shell diameter.

The **Length** should be the length in feet of the inner tank where the fuel is stored, not the shell length.

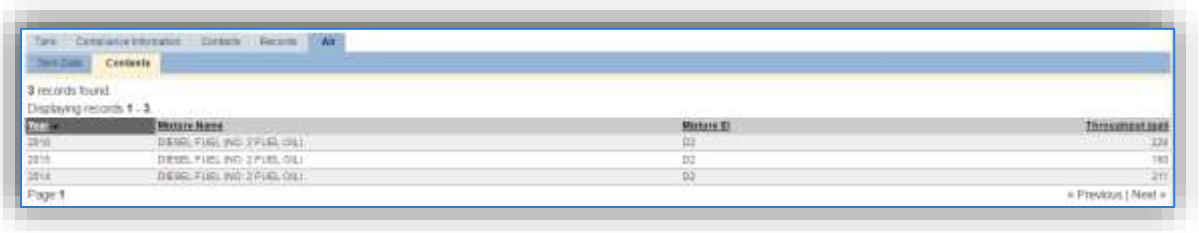
Select the correct answer to the **Is the tank heated?** Note that most tanks should be flagged "No" as they are not usually heated.

The **Vacuum Setting** and **Pressure Setting** automatically default to the values used in the EPA Tanks 4.0.9D program. If these settings are known they can be altered to the actual values, otherwise utilize the default values.

The **City** selected should be the closest geographical location provided in the list. This will be used to model the atmospheric temperature used in emissions calculations.

3.9.3.1.3 Air – Contents

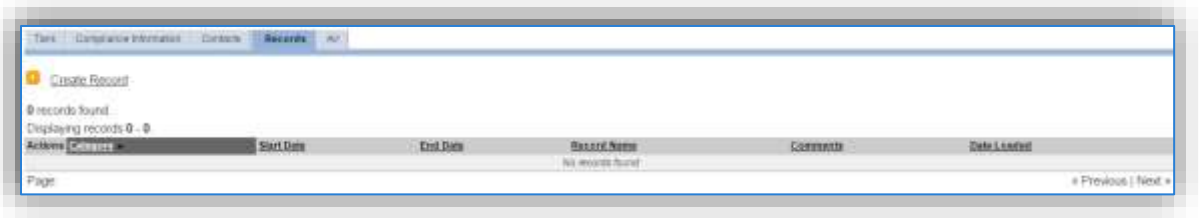
The Contents sub tab is a read-only tab that shows the Tank Usage history for the tank.



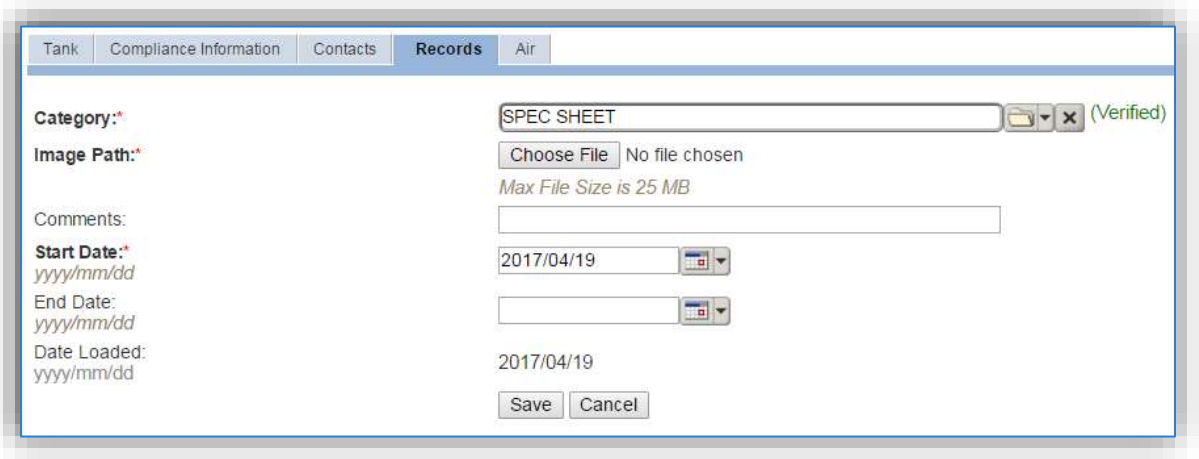
The **Year**, **Mixture Name**, **Mixture ID,** and **Throughput** can be reviewed.

3.9.3.1.4 Records

The *Records* tab can be used to upload any pertinent information about the tank. This can be especially useful to upload tank specifications or repairs that may affect the tank configuration.

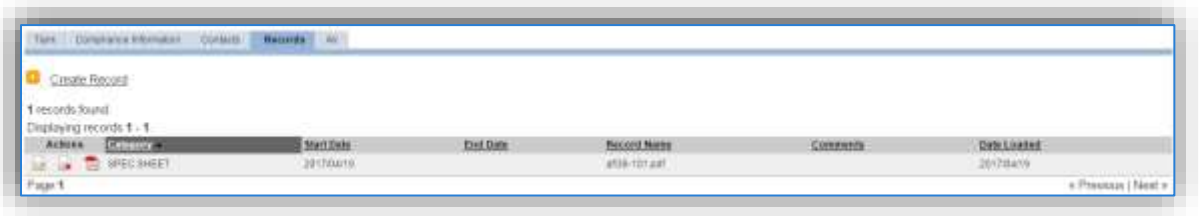


To add a document, click the Create Record hyperlink.



Select the type of document from the **Category** list of values, most commonly Schematic or Spec Sheet are selected for this type of source.

Choose the file, using the **Choose File** button to open a file browser window. Click the **Save** button.



To view the document, click the pdf icon.

3.9.3.2 New Sources

3.9.3.2.1 Data Collection Sheet

The form on the next page is a printable guide that can be taken out to the location of the source and used to gather all the necessary information from the shop personnel. It can then be used as a guide to help configure the data in APIMS when you return to your office.

Underground Storage Data Collection Worksheet

GENERAL INFORMATION

Building Number_____ Mission/Purpose_____

Shop Name/Function_____ Management Organization_____

Coordinates: Latitude: _____ Longitude: _____

UTM: _____ Zone _____ Easting _____ Northing ☐ Feet ☐ Meters

Is this source in any of your permits? ☐ Yes ☐ No

If yes, does it have an emission unit number or other designation? _____

EQUIPMENT INFORMATION

Is the tank heated? ☐ Yes ☐ No

Diameter _____ feet Length _____ feet

USAGE INFORMATION

What type of fuel is stored in this tank? _____

What is the tank throughput?
Yearly Total _____ (gallons) or Tank Turnovers _____

Monthly Totals (gallons)

January _____	May _____	September _____
February _____	June _____	October _____
March _____	July _____	November _____
April _____	August _____	December _____

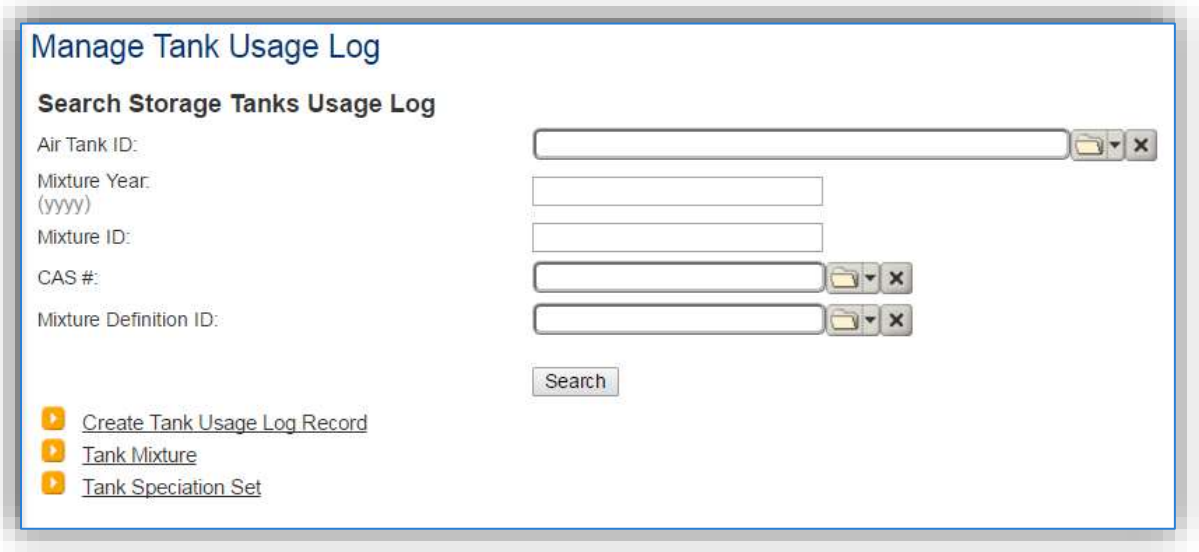
3.9.3.2.2 New Source Configuration

Contact the Storage Tank Manager for configuration of a new storage tank in the STAR module of APIMS.

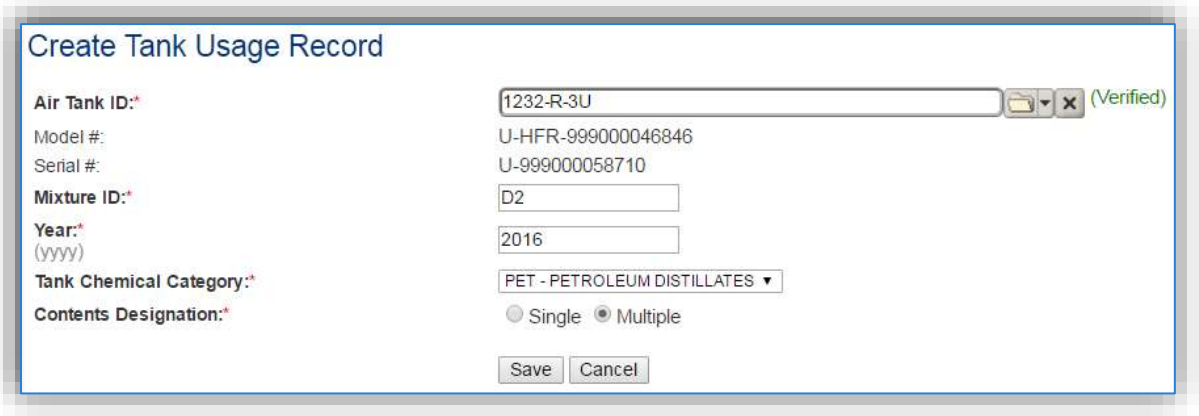
3.9.4 Year-to-Year Maintenance

3.9.4.1 Usage

The throughput for storage tanks will need to be tracked annually or more frequently if required by a regulatory agency. To correctly document the usage for this emission source the throughput should be entered in the Tank Usage Log. Navigate to the Tank Usage Log module in APIMS.



Click the Create Tank Usage Log Record hyperlink.



Enter the **Air Tank ID** or search for the specific tank using the list of values. This will automatically populate the Model # and Serial # fields.

The **Mixture ID** is a designation used to quickly identify the contents of the tank. The most commonly used Mixture ID values are as follows: D2 for Diesel (No. 2 Fuel Oil), G for Gasoline, J8 for JP-8, BD for Bio-Diesel.

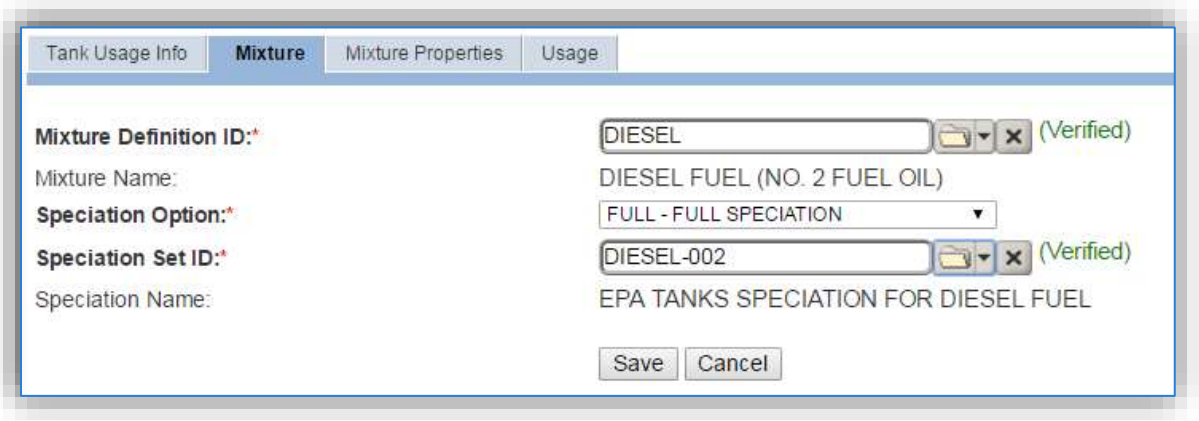
The **Year** should be the calendar year for the throughput.

The **Tank Chemical Category** should be entered according to the contents of the tank, which is most commonly fuel. All fuels or refined petroleum stocks such as, gasoline, bio-diesel, diesel, JP-A and JET A are in the **PET – PETROLEUM DISTILLATES** category. The crude oils category should only be used for unrefined petroleum stocks. The organic liquids category should include all other organic compounds and mixtures.

The **Contents Designation** is used to indicate if liquid stored in the tank consists of a single component or a mixture of components. Petroleum distillates and crude oil are **MULTIPLE** component liquids.

Click the **Save** button.

The next tab is the *Mixture* tab. This tab specifies the fuel mixture and the emission speciation to be used.



Select the **Mixture Definition ID** from the list of values that most closely matches the fuel in the tank. There are ten default fuel mixtures populated in APIMS available for use.

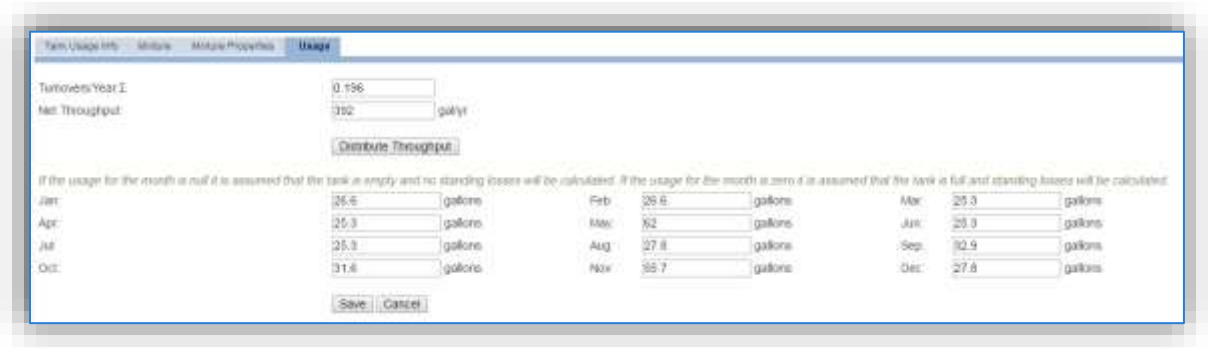
Select the **Speciation Option** of Full Speciation, Partial Speciation or Vapor Weight Speciation. The Air Force recommends selecting FULL – FULL SPECIATION.

- FULL SPECIATION will provide the emissions for all the chemical components identified in the liquid. PARTIAL SPECIATION will provide the emissions for only specified chemicals in the liquid.
- VAPOR WEIGHT SPECIATION is only used when the total vapor weight for chemicals is needed in the emissions report.

The **Speciation Set ID** should be used to identify the specific fuel speciation from the list of values. There are fifteen standard speciation profiles available for use. Below are the most common, with the recommended speciation for each mixture in bold.

Mixture Definition ID	Mixture Name	Speciation ID	Speciation Name
DIESEL	DIESEL FUEL (NO. 2 FUEL OIL)	DIESEL-001	SUMMARY SPECIATION FOR DIESEL FUEL
DIESEL	DIESEL FUEL (NO. 2 FUEL OIL)	DIESEL-002	**EPA TANKS SPECIATION FOR DIESEL FUEL**
GASOLINE	GASOLINE	GASOLINE-001	SUMMARY SPECIATION FOR GASOLINE FUEL OIL
GASOLINE	GASOLINE	GASOLINE-002	**EPA TANKS SPECIATION FOR GASOLINE**
GASOLINE	GASOLINE	GASOLINE-003	EPA TANKS FOR GASOLINE OXYGENATED WITH MTBE
GASOLINE	GASOLINE	GASOLINE-004	EPA TANKS SPECIATION FOR GASOLINE REFORMULATED WITH MTBE
GASOLINE	GASOLINE	GASOLINE-005	EPA TANKS SPECATIONS FOR GASOLINE OXYGENATED WITH ETHANOL
JET A	JET KEROSENE (JET A)	JETA-001	**EPA TANKS SPECIATION FOR JET KEROSENE**
JP-8	JP-8	JP8-001	**SUMMARY SPECIATION FOR JP-8**

The next tab is the *Usage* tab.



There are two ways to track usage using this usage log.

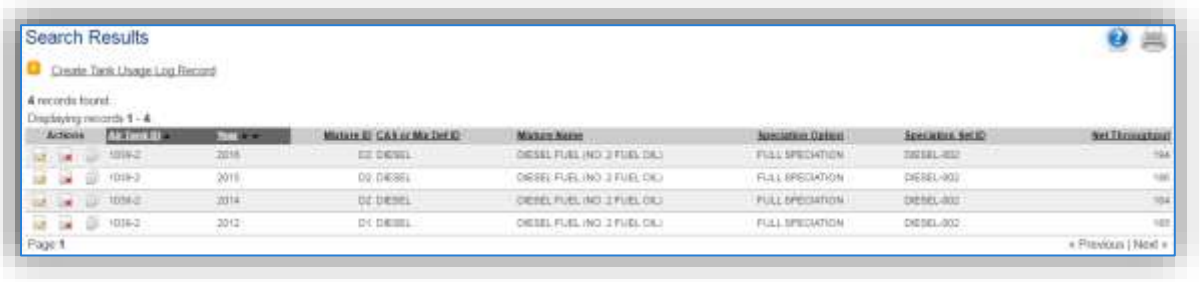
If the throughput is tracked monthly, enter the monthly throughput for each month in gallons in the appropriate field. Once the throughput is saved, the **Net Throughput** and **Turnovers/Year** will be calculated.

If the installation is in an area that has a designated ozone season, the throughput should be entered monthly.

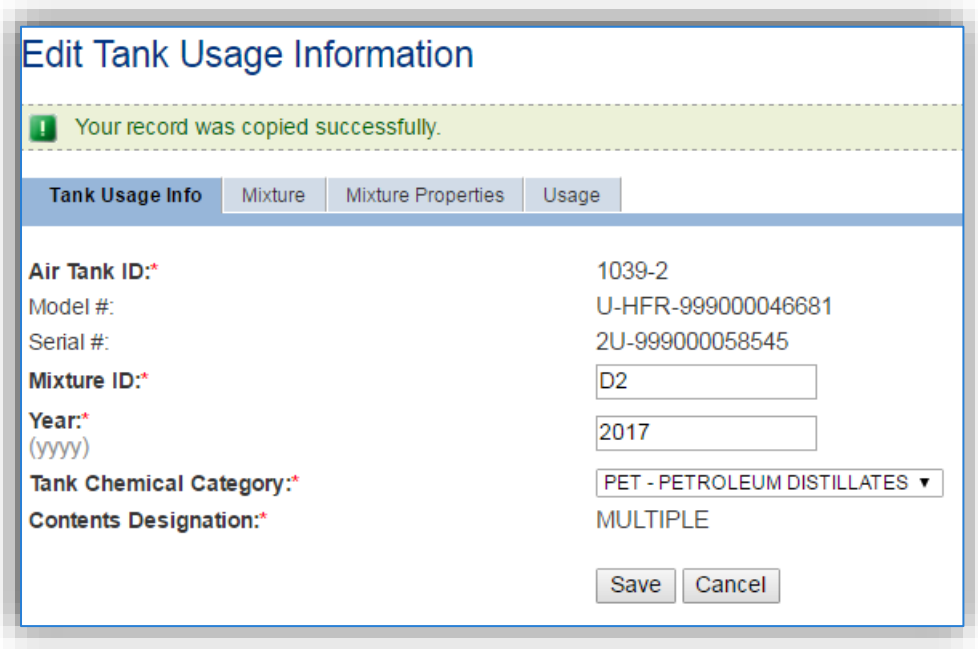
If the throughput is tracked annually, enter the total throughput in the **Net Throughput** field. Once the throughput is saved, the **Turnovers/Year** and the monthly throughputs will be calculated.

Once a single usage record has been created for a specific tank, if the tank contents and speciation profile have not changed from the previous year the copy icon can be utilized to create the next year's

throughput record. Search for the specific tank, then click the copy icon next to the most recent year's row.



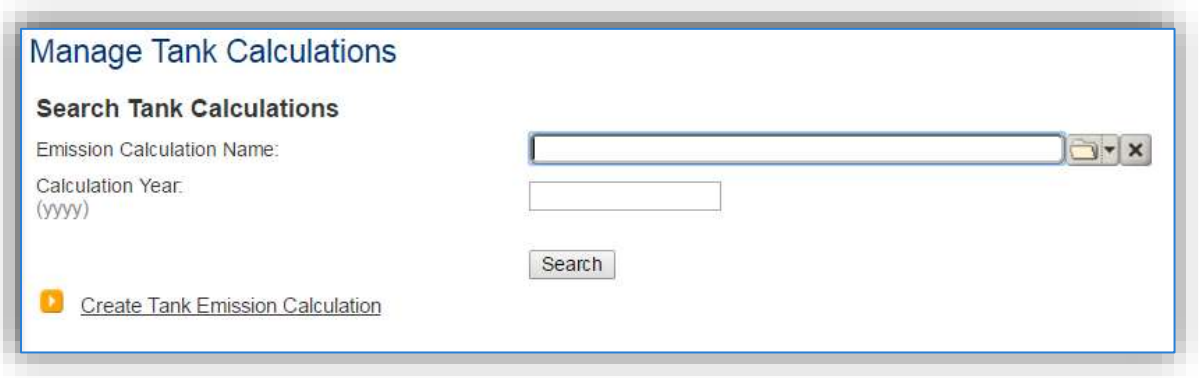
Search for the specific tank, then click the copy icon next to the most recent year's row.



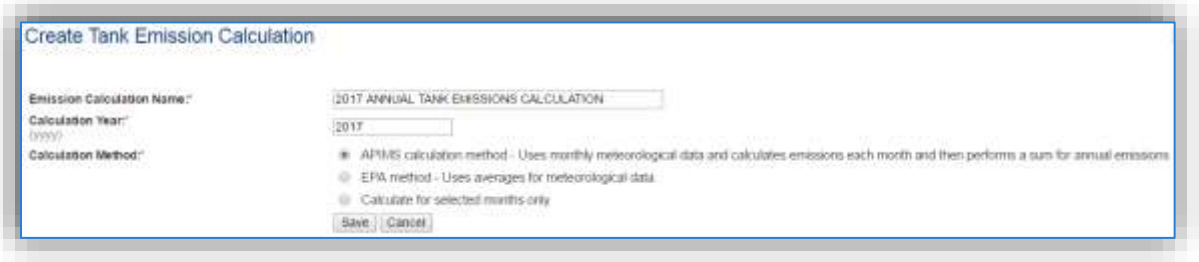
As shown above the values are auto-populated based on the previous year's values for the *Tank Usage Info*, *Mixture* and *Mixture Properties* tabs. Navigate to the *Usage* tab to enter the current year's throughputs.

3.9.4.2 Emissions Calculation

The emissions calculations for storage tanks are not completed in the Emission Calculation area used by the other source categories but has a specific emissions calculation module. A new calculation for each calendar year needs to be created. Navigate to the Tank Emission Calculation module in APIMS.



Click the Create Tank Emission Calculation hyperlink to create a tank emission calculation.



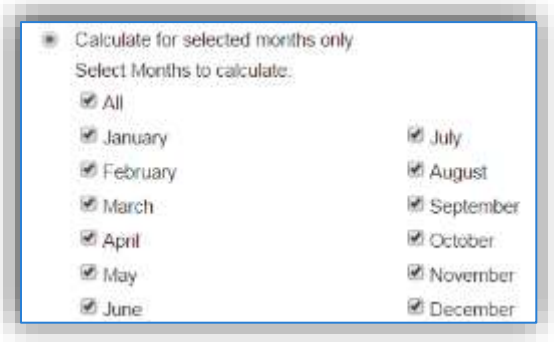
The **Emission Calculation Name** should be a name that clearly identifies the calculation. For example, specify the year, the facility and the tanks that are included. Specifically, if there are tanks that are reported separately, they should be in a separate calculation. Possible names are:

- 2017 ANNUAL EMISSIONS – ALL TANKS
- 2017 – GSU TANKS
- 2017 – PERMITTED TANKS MONTHLY EMISSIONS

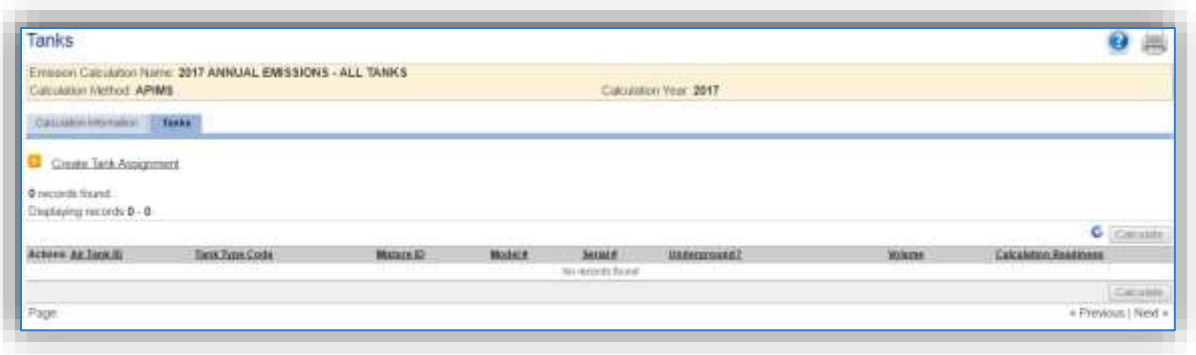
The **Calculation Year** should be the calendar year for the emissions.

The **Calculation Method** should be selected according to your preferences. The APIMS calculation method is the recommended method for annual calculations as it takes into account the specific meteorological data for the specified location, instead of a national average.

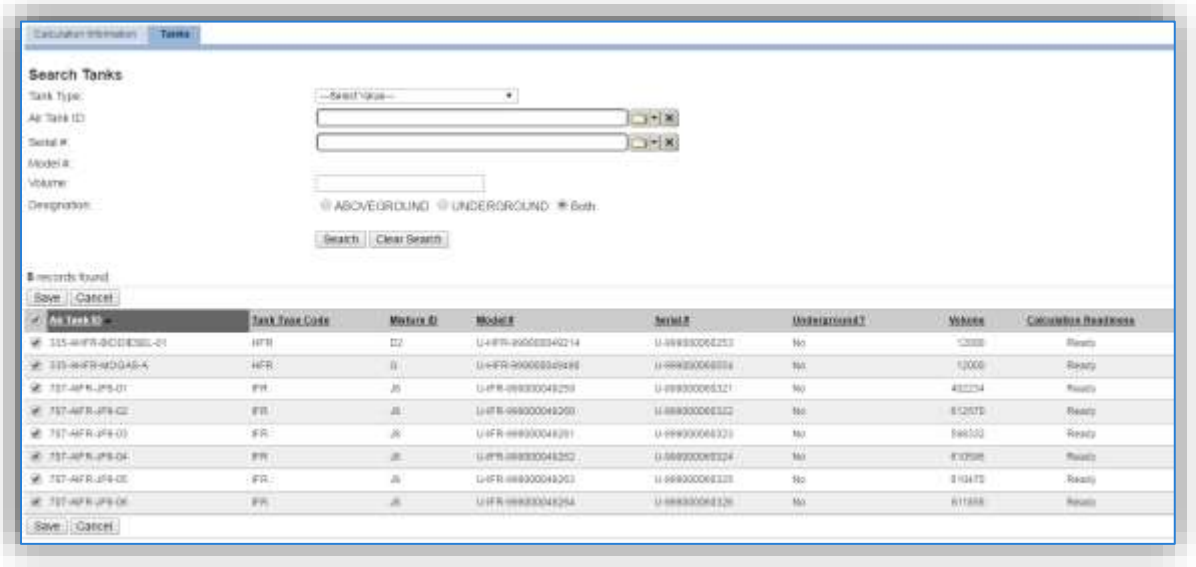
For monthly calculations, utilize the Calculate for selected monthly only, and then select All.



Next navigate to the *Tanks* tab to specify which tanks should be included in the calculation.

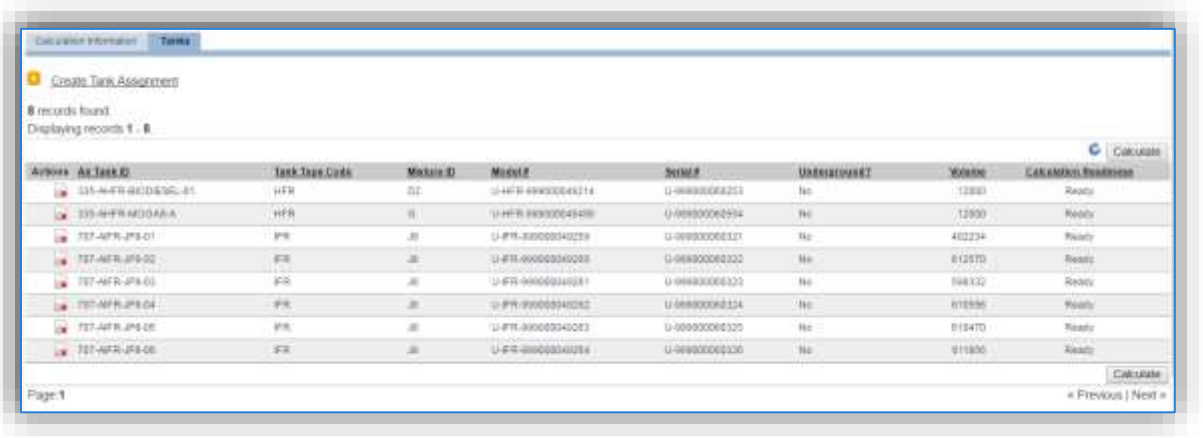


Click the Create Tank Assignment hyperlink to associate a tank.

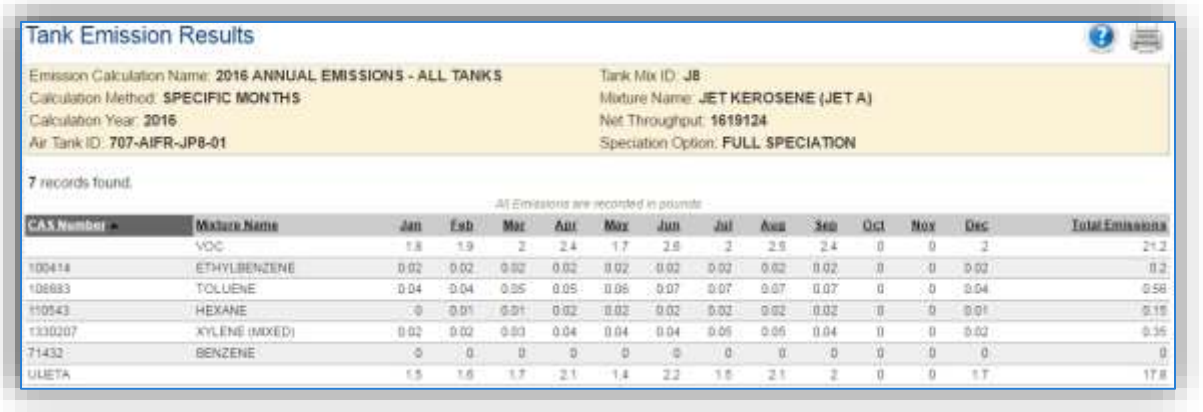


A list of all the tanks that have usage recorded for the specified year will be listed in the results grid. Check the box next to each tank that needs to be associated to the calculation, click **Save**.

If the Calculation Readiness column does not specify "Ready" it means the storage tank record or usage record is missing data needed to complete calculations.



The last step is to click the **Calculate** button; this will schedule the calculation run and may take several minutes before results are ready. The refresh icon can be clicked to update the results of the calculation. Once the calculation is completed for a tank an icon will appear on the left side of the Actions column. To view the emission results for this tank, click the icon. This will open a Tank Emission Results window as shown below.

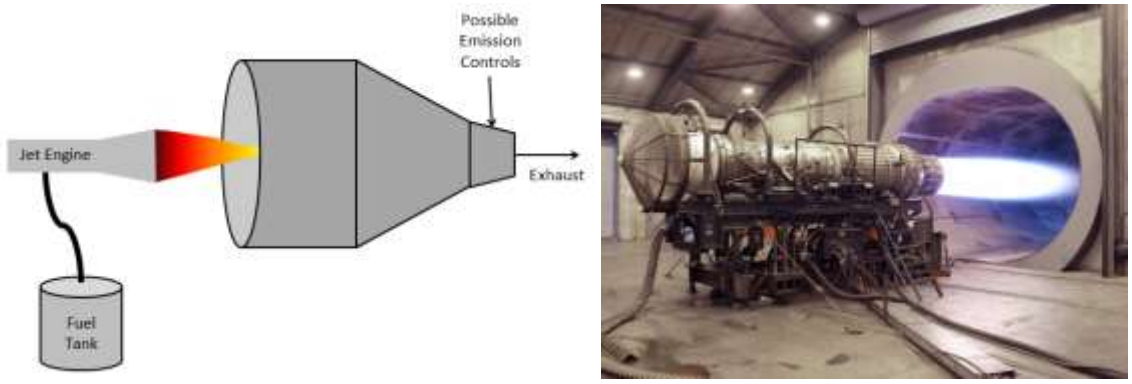


3.10 Aircraft Engine Testing (JET)

3.10.1 Source Types

Aircraft engine testing is performed at many Air Force installations on both a routine and as needed basis. Testing is necessary to ensure proper engine operation prior to flight, especially after any maintenance is performed. Testing is usually conducted in an enclosed test cell, though some installations perform limited engine testing on the aircraft or on test stands mounted in the open. If the engine is removed from the aircraft and placed in a test stand during testing the source is considered a stationary source. If the engine is installed on the aircraft during the testing it is considered a mobile source and is not typically required to be reported. However, some regulatory agencies differ on the delineation between stationary and mobile sources. Regardless, only off engine testing is reported with JET as the source category.

The emissions that result from aircraft engine testing are criteria pollutants, HAPs and GHGs due to the combustion of jet fuel. It is possible to have an emission control device, however it is usually not economical, and emissions can be managed by limiting the number of tests conducted.



NESHAPs from engine test cells/stands located at major sources of HAPs are outlined in 40 CFR 63 Subpart PPPPP, National Emission Standards for Hazardous Air Pollutants for Engine Test Cell/Stands.

3.10.2 Potential Data Sources

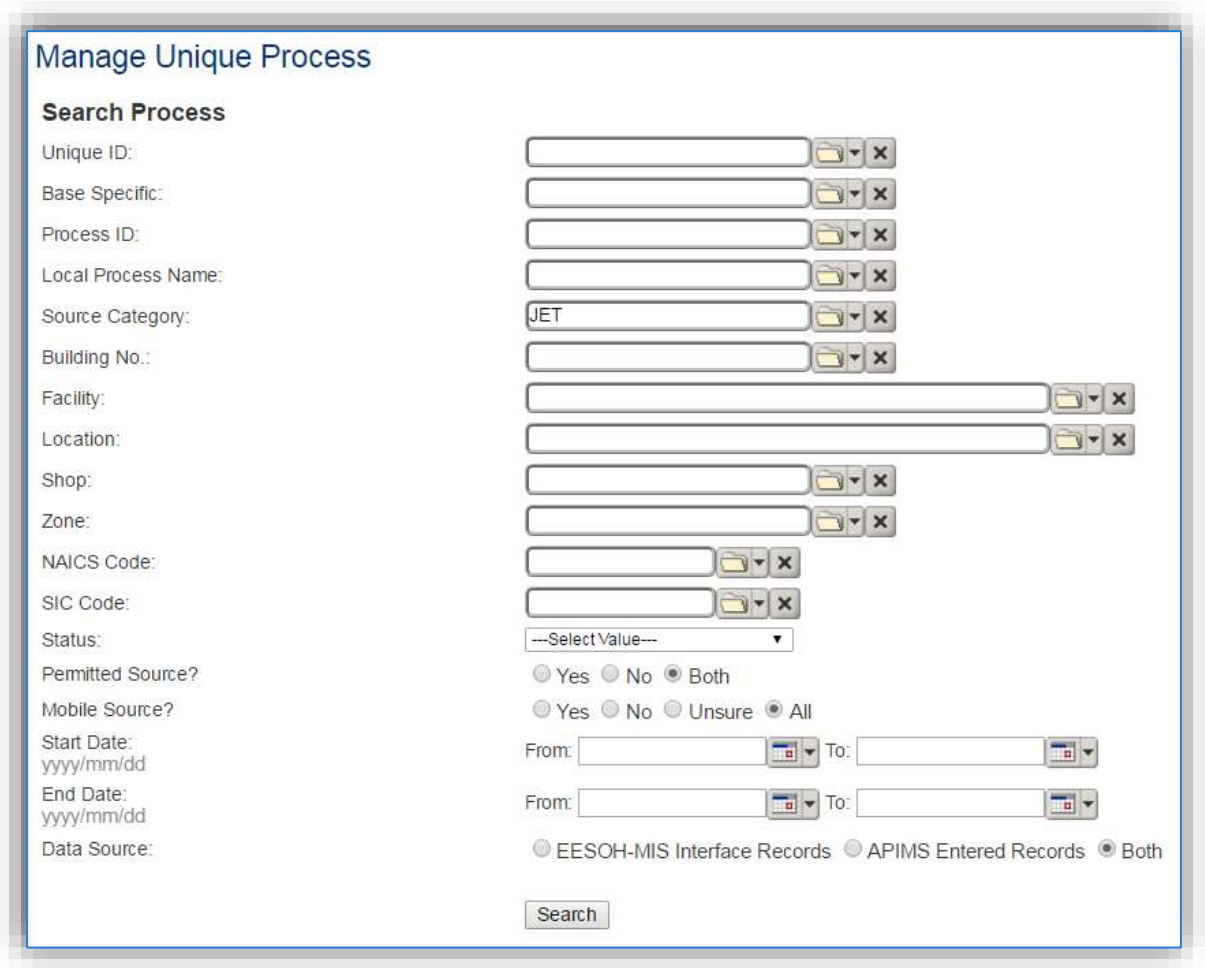
Most aircraft engine testing is conducted according to technical orders that specify the exact engine operation required to adequately test the maintenance prior to operating the engine on an aircraft. These technical orders often specify the modes the engine must run at and the length of time for each mode. Alternately, some aircraft engine testing for newer model aircraft is done electronically, where a computer runs the engine at various modes for various amounts of time. The best method to calculate the emissions from the engine testing is to determine the total number of minutes in each mode for each type of engine test. Once these test profiles are determined, the number of each type of test conducted can be input for the usage data. This data is usually available from the Propulsion Shop.

3.10.3 Standard Source Identification/Characterization

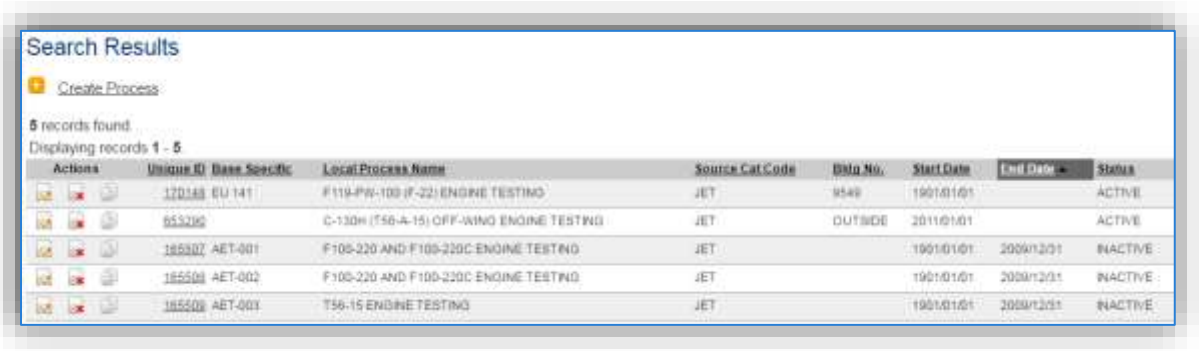
3.10.3.1 Existing Sources

It is important to review the existing sources in each source category on an annual basis at a minimum. Most regulatory agencies require an up to date source and equipment inventory.

Navigate to the Unique Process module of APIMS by clicking **Unique Process** under the **Emission Unit** tab. In the **Source Category** search field, type "JET" then select the row for Jet Engine Testing from the dropdown results. Click the Search button.



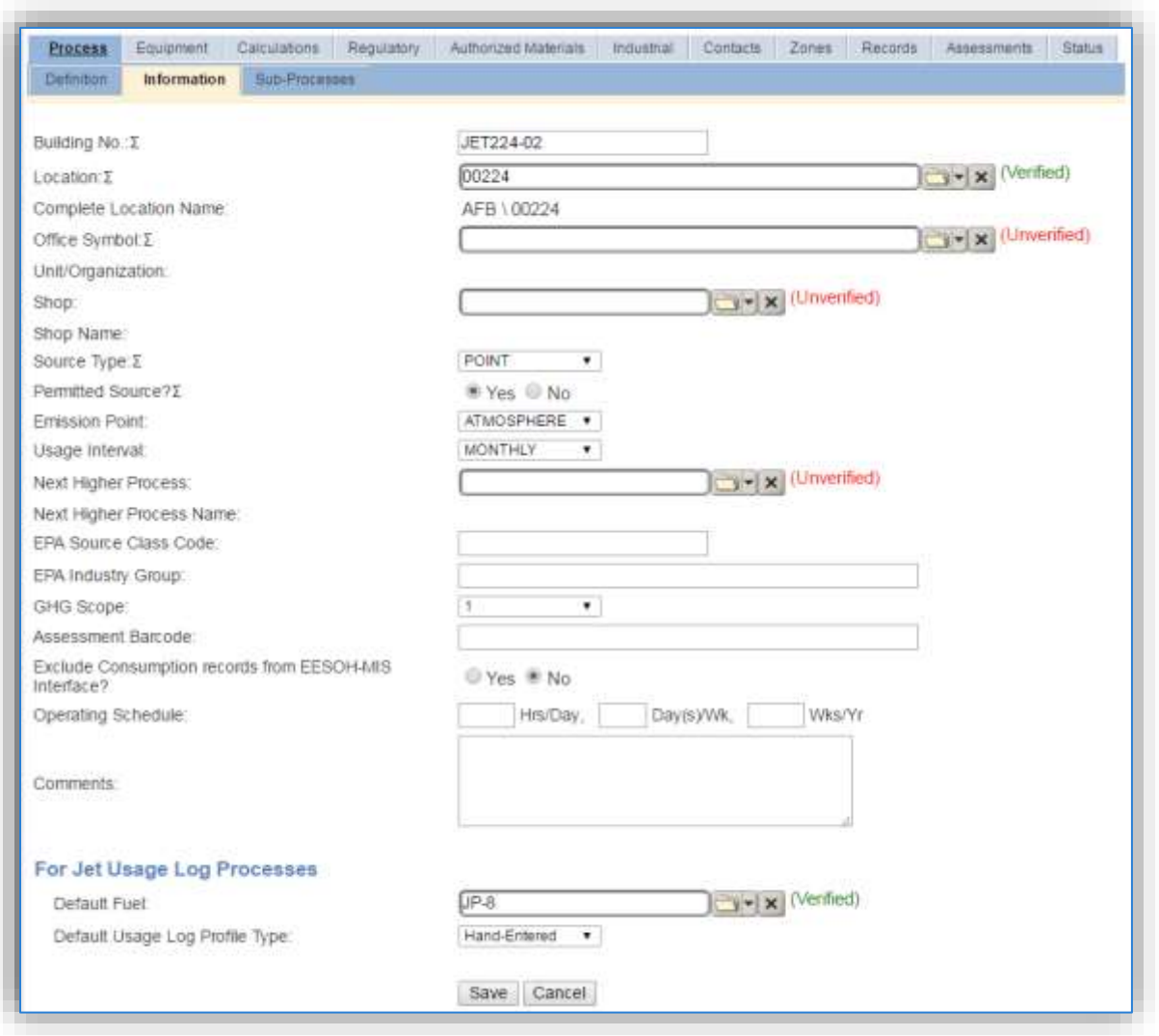
The search results grid will now display all the aircraft engine test processes currently in APIMS.



The **Local Process Name**, **Base Specific** and **Bldg No**. can all be used to identify a specific source. This list should be reviewed to make sure the source is configured in a way that it is easy to identify and locate. The status of each source should also be reviewed and kept current.

3.10.3.1.1 Information

There are basic data elements that are important to track and maintain for new and existing sources, such as location and source type. This data can be maintained in the Unique Process record on the *Information* sub tab.



The **Building No**. field can be used to specify a general location or area of the emission source. For instance, Hush House.

The **Location** field is very important to effectively manage the location and mission of the emission source. This information will be important for knowing where the source is, in case it needs to be inspected or if the source owner needs to be contact for pertinent information. For instructions on how to create a location, reference Section 2.2 Location.

The **Shop** is important as it establishes the personnel that are utilizing the equipment on a regular basis and will be the best source of information regarding the unit.

Aircraft engine testing operations are categorized as a POINT source when the engine has been removed from the aircraft and a mobile (MOB) source when the engine is still installed on the aircraft. This should be selected in the **Source Type** field.

The **Emission Point** is ATMOSPHERE for all aircraft engine testing operations.

The **Permitted Source** flag should also be populated to accurately reflect the current regulatory status of the emission source. This flag can be an invaluable tool in roll-up reporting.

The **Usage Interval** should be designated. This source is usually documented on an Annual basis but may have a different interval if it is a permitted source. It is important to populate this field correctly as it will affect how it is documented in the AEI Throughputs module.

The **EPA Source Class Code** is a process level EPA code that describes the equipment and/or operation that is the source of the emissions. Source Classification Code for aircraft engine testing is 20400110.

The **Default Fuel** must be populated to utilize the Jet Engine Testing log in APIMS. The most common types of fuels are JET A and JP-8.

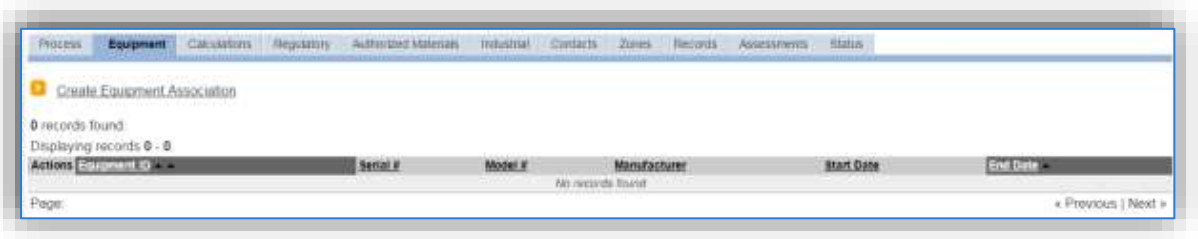
The **Default Usage Log Profile Type** is used to configure the Jet Engine Testing log in APIMS. The options are Hand-Entered, Percent Based and Time-Specific. The Hand-Entered method uses the total time in minutes for each mode. The Percent-Based method utilizes a pre-defined profile that specifies the percent of the total time the engine spent in each mode. The Time-Specific method uses a pre-defined profile of the number of minutes the engine spends in each mode for a single test run, and then specifies the total number of the test runs.

3.10.3.1.2 Sub-Processes

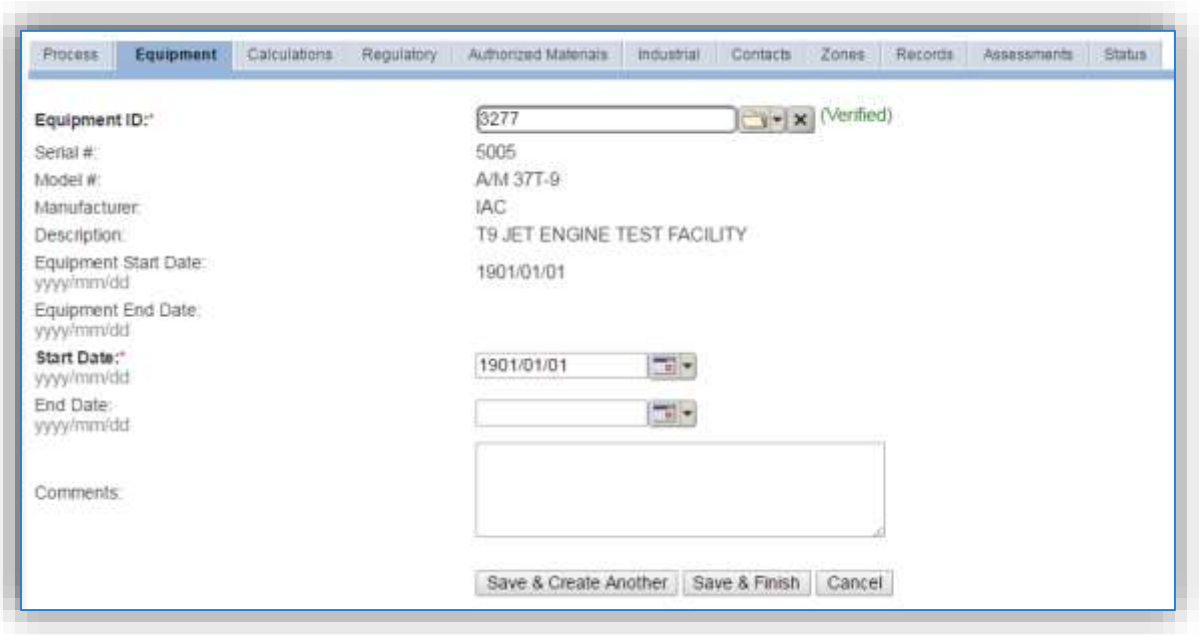
This source does not utilize this functionality.

3.10.3.1.3 Equipment

The next tab is the *Equipment* tab. This is optional for aircraft engine testing processes. To link the equipment to the process the equipment must already be entered in APIMS.



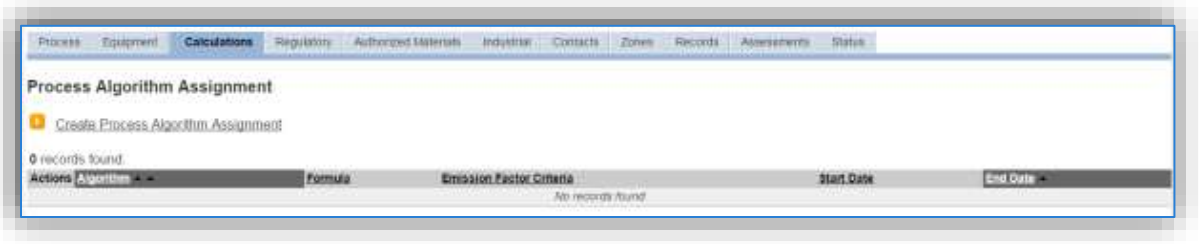
To link the equipment, click on the Create Equipment Association hyperlink.



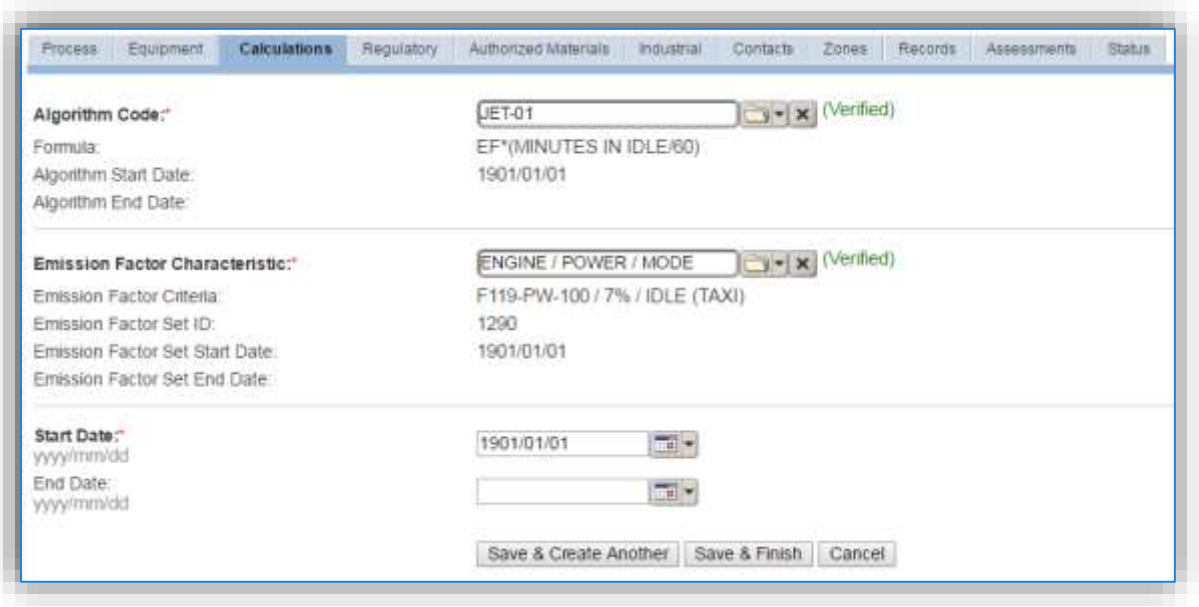
Search for the **Equipment ID** in the list of values, enter the start date and click the **Save & Finish button**.

3.10.3.1.4 Calculations

The next tab is the *Calculations* tab.



To associate an algorithm to the process, click on the Create Process Algorithm Assignment hyperlink.



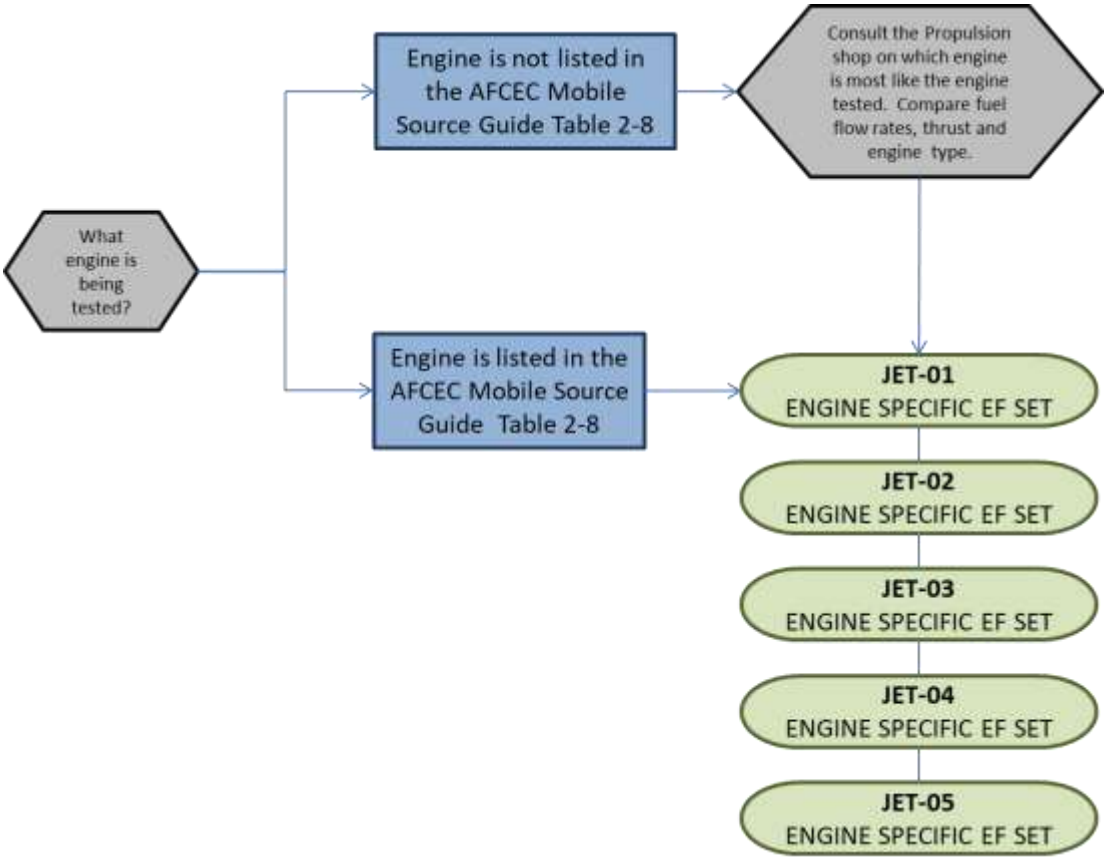
For aircraft engine testing there is one standard calculation methodology recommended by the Air Force. This calculation methodology utilizes the Jet Engine Test usage module in APIMS. There is a separate algorithm for each engine mode (e.g. idle, intermediate, approach, military, and afterburner). The emission factor sets are engine and mode specific, however if the engine that is tested is not in the list of emission factor sets, the Propulsion shop should be consulted to select a surrogate engine that does appear in the list. The surrogate engine should be a similar type of engine (e.g. turbofan, etc.), it should have similar thrust and fuel flow rates. The thrust settings and fuel flow rates for each mode can be found in the AFCEC Stationary Source Guide Table 4-1 as shown below.

Table 4-1. Aircraft Engine Emission Factors for Aircraft Engine Testing (cont.)

Aircraft Engine	Power Setting	Percent Thrust/hp	Fuel Flow Rate (lb/hr)	Emission Factors (lb/1000lb fuel)							
				NO_X	SO_X [a]	CO	VOC	HAPs	PM_{10}	$PM_{2.5}$	CO_2e [b]
F117-PW-100	Idle (Taxi)	4%	> 0, < 2812	3.76	1.07	22.70	0.37	0.291	10.67	8.75	3214.59
	Approach	31%	> 2812, ≤ 7527	15.49	1.07	0.51	0.05	0.019	5.53	5.10	3214.59
	Intermediate	68%	> 7527, ≤ 12157	32.72	1.07	0.32	0.04	0.012	2.31	1.42	3214.59
	Takeoff	---	> 12157	35.04 (S)	1.07	0.32 (S)	0.01 (S)	0.013 (C)	0.06 (S)	0.05 (S)	3214.59

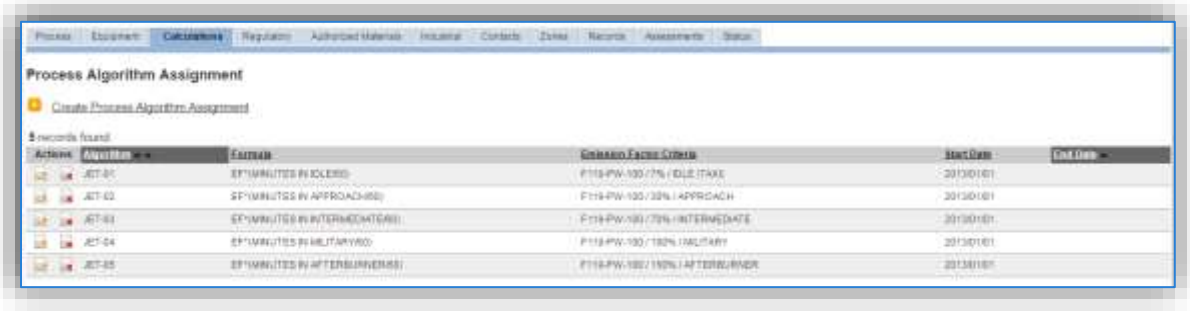
Notes: c(3) - F117-PW-100 is the military designation of the PW2040 engine, d(1) - HAPs at Takeoff setting only, d(16) - All remaining pollutants at Takeoff setting, k(5)

Select the **Algorithm Codes** and the **Emission Factor Characteristics** for the engine or surrogate engine. Use the flowchart below to find the correct Algorithm Code and Emission Factor Characteristic. Enter the **Start Date** to match the start date of the process.

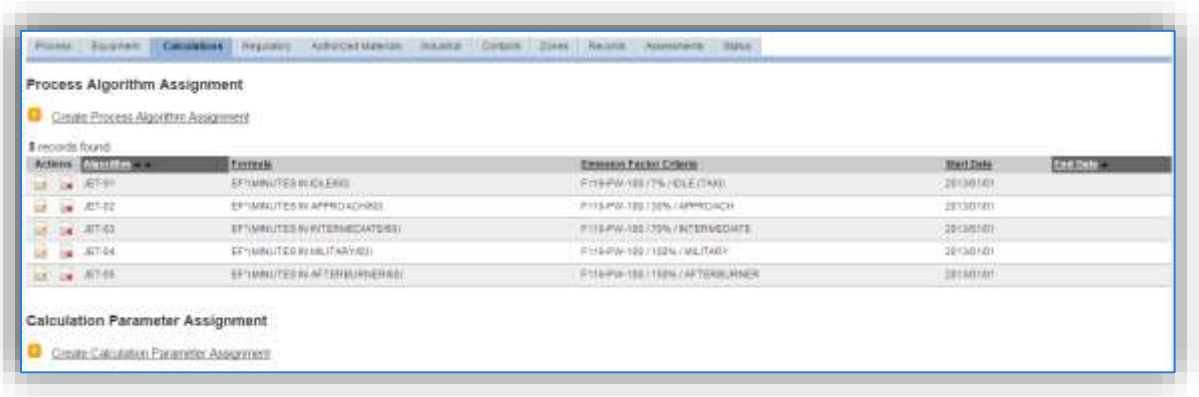


The SOx factor included in the standard emission factor sets utilizes the national average sulfur content for JP-8.

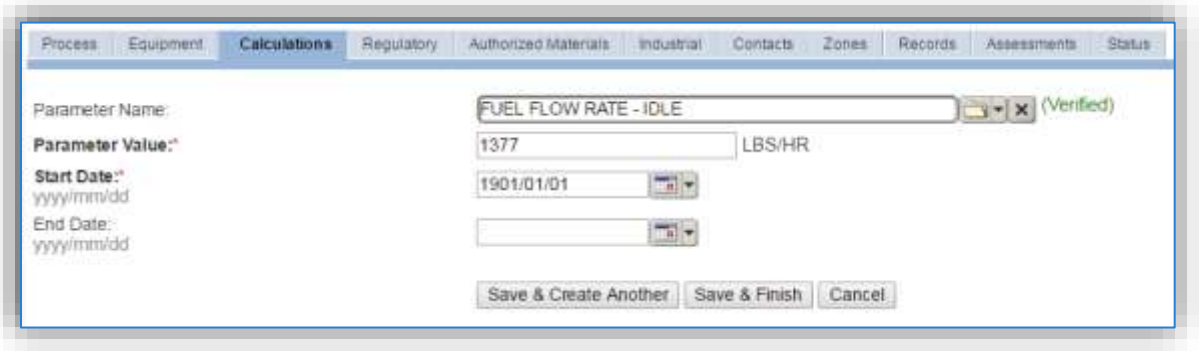
If your permit requires a different type of calculation, contact the Air Force Air Quality Subject Matter Expert for approval of the alternative method.



The next step on this tab is to enter the Calculation Parameters required to complete the calculations. The FUEL FLOW RATE is used by the Jet Engine Testing module to calculate the total fuel used for an engine test if the fuel use is not manually entered.



To add a calculation parameter to the process, click on the Create Calculation Parameter Assignment hyperlink.



Select the **Parameter Name** from the list of values, there will be a different parameter name for each mode.

Enter the fuel flow rate in the **Parameter Value** field. The fuel flow rates can be found in the AFCEC Stationary Source Guide Table 4-1, as shown below.

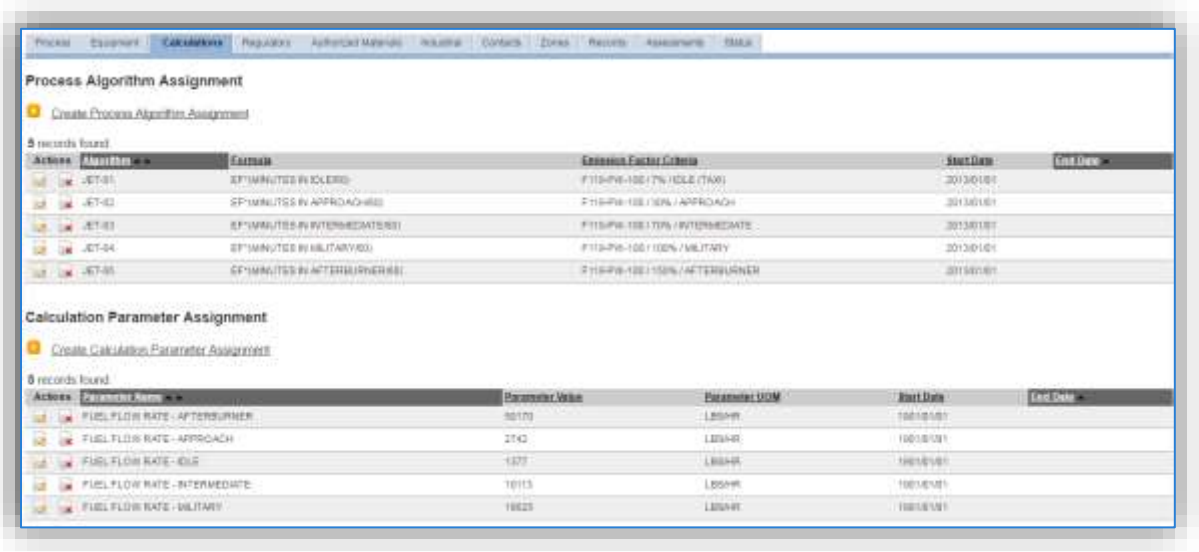
Table 4-1. Aircraft Engine Emission Factors for Aircraft Engine Testing (cont.)

Aircraft Engine	Power Setting	Percent Thrust/hp	Fuel Flow Rate (lb/hr)	Emission Factors (lb/1000lb fuel)							
				NO_X	SO_X[a]	CO	VOC	HAPs	PM_{10}	$PM_{2.5}$	CO_2e[b]
F117-PW-100	Idle (Taxi)	4%	> 0, < 2812	3.76	1.07	22.70	0.37	0.291	10.67	8.75	3214.59
	Approach	31%	> 2812, < 7527	15.49	1.07	0.51	0.05	0.019	5.53	5.10	3214.59
	Intermediate	68%	> 7527, < 12157	32.72	1.07	0.32	0.04	0.012	2.31	1.42	3214.59
	Takeoff	---	> 12157	35.04 (S)	1.07	0.32 (S)	0.01 (S)	0.013 (C)	0.06 (S)	0.05 (S)	3214.59

Notes: c(3) - F117-PW-100 is the military designation of the PW2040 engine, d(1) - HAPs at Takeoff setting only, d(16) - All remaining pollutants at Takeoff setting, k(5)

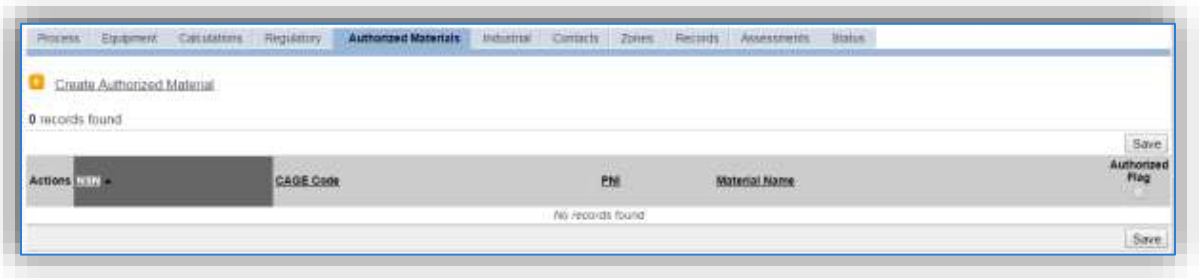
Enter the **Start Date** for the parameter, this date should match the start date of the algorithm or use 1901/01/01 as a default.

Click the **Save & Create Another** button to add another parameter. Repeat this step until there is a fuel flow rate entered for each engine mode as shown below.

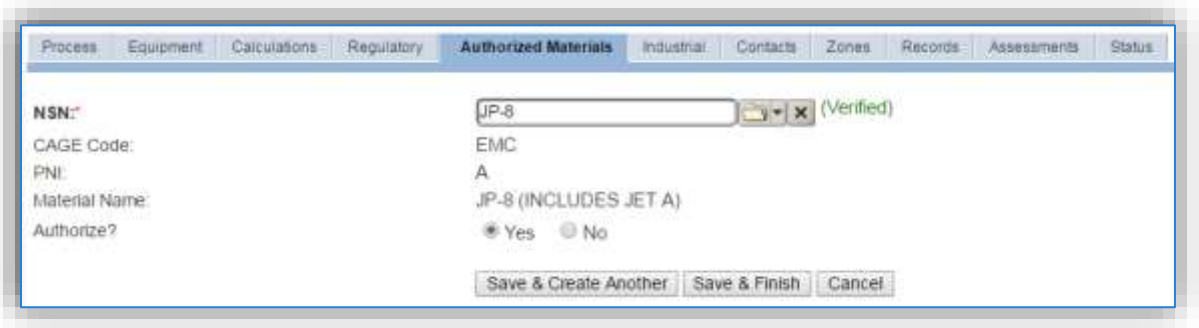


3.10.3.1.5 Materials

The last step in setting up the Unique Process record is to add the fuel as the authorized material on the *Authorized Materials* tab.



To authorize a material for the process, click on the Create Authorized Material hyperlink.



Select the fuel used from the list of values; most aircraft engines use JP-8 or JET A as shown above. Next select “Yes” to **Authorize** the material, then **Save & Finish**.

3.10.3.2 New Sources

3.10.3.2.1 Data Collection Sheet

The form on the next page is a printable guide that can be taken out to the location of the source and used to gather all the necessary information from the shop personnel. It can then be used as a guide to help configure the data in APIMS when you return to your office.

Aircraft Engine Test Data Collection Worksheet

GENERAL INFORMATION

Building Number_____ Mission/Purpose_____
Shop Name/Function_____ Management Organization_____
Coordinates: Latitude: _____ Longitude: _____
UTM: _____ Zone _____ Easting _____ Northing ☐ Feet ☐ Meters
Is this source in any of your permits? ☐ Yes ☐ No
If yes, does it have an emission unit number or other designation? _____
What type of testing is conducted?

☐ On-Wing
☐ Off-Wing
☐ Enclosed (Hush House)
☐ Unenclosed (Runway)

USAGE INFORMATION

What airframes and engines are tested? (e.g. F-22 – F119-PW-100)

_____

Test Profile Name _____
Time in each mode in minutes
Idle _____ Approach _____ Intermediate _____
Military _____ Afterburner _____
Total Number of Test Conducted _____
Total Fuel Used _____

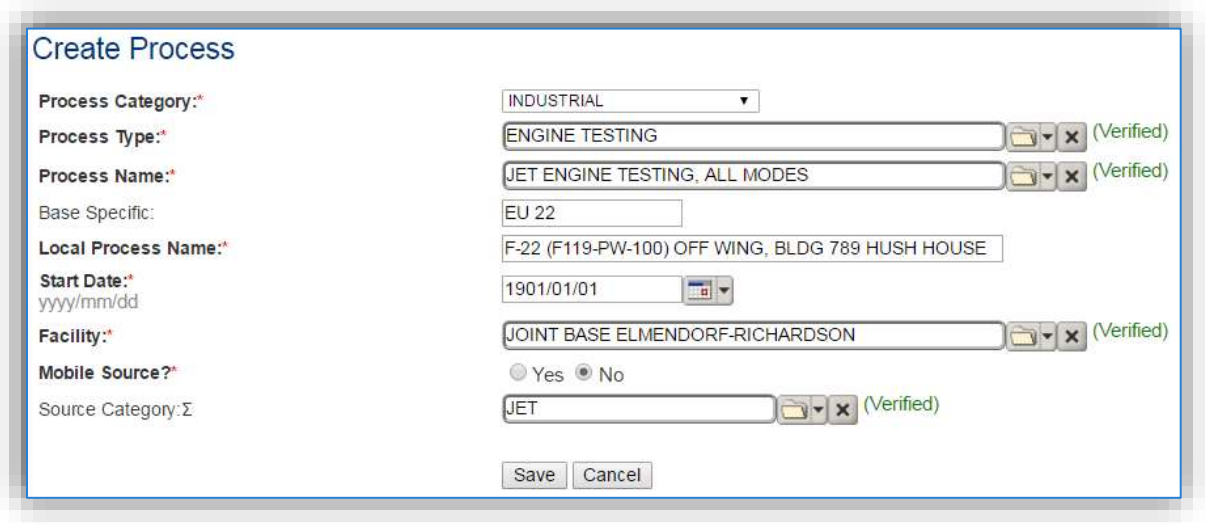
Test Profile Name _____
Time in each mode in minutes
Idle _____ Approach _____ Intermediate _____
Military _____ Afterburner _____
Total Number of Test Conducted _____
Total Fuel Used _____

Test Profile Name _____
Time in each mode in minutes
Idle _____ Approach _____ Intermediate _____
Military _____ Afterburner _____
Total Number of Test Conducted _____
Total Fuel Used _____

3.10.3.2.2 New Source Configuration

In order to properly document this emission source in APIMS, there will need to be a Unique Process record for each type of engine tested.

Navigate to the Unique Process module in APIMS and click the Create New Process hyperlink.



Process Category	Process Type	Process Name	Process ID
INDUSTRIAL	ENGINE TESTING	JET ENGINE TESTING, ALL MODES	IET1584

Use the table above to determine the appropriate **Process Category**, **Process Type** and **Process Name**.

The **Base Specific** field can be used to enter a standard convention identifier that will best help identify the source. If the source is permitted, enter the emission unit ID as designated in the permit.

The **Local Process Name** should be in a standard naming convention for all sources that helps to quickly identify the airframe and engine, if it is on or off wing and where it is and any other unique attribute. For example, C-130 (T56-A-15), ON WING, HANGAR 2.

The **Start Date** should be the date the unit became operational, if this date is not known, enter 1901/01/01 as a default start date.

The **Facility Name** should be the facility that is responsible for the source.

The **Mobile Source?** flag should be "NO" for all off wing engine testing and "YES" for all on wing engine testing.

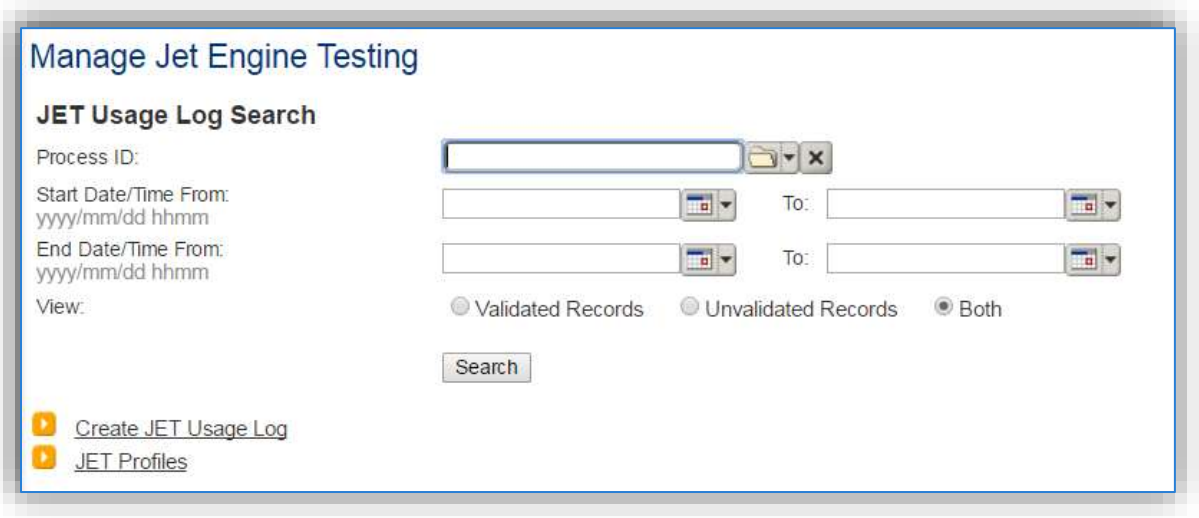
All aircraft engine testing processes are assigned to the JET **Source Category**.

For the population of all other tabs, refer to the Existing Sources sections.

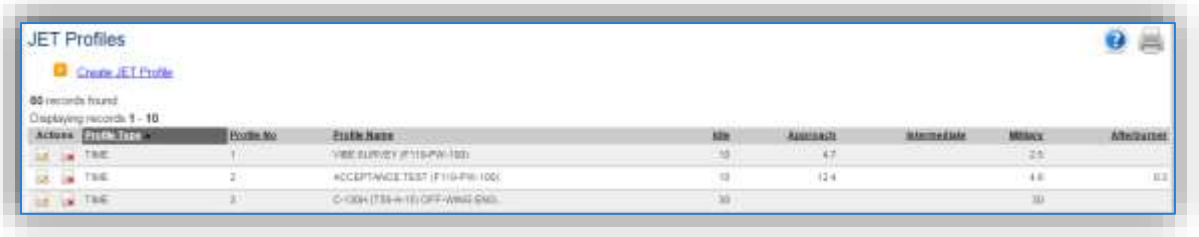
3.10.4 Year-to-Year Maintenance

3.10.4.1 Usage

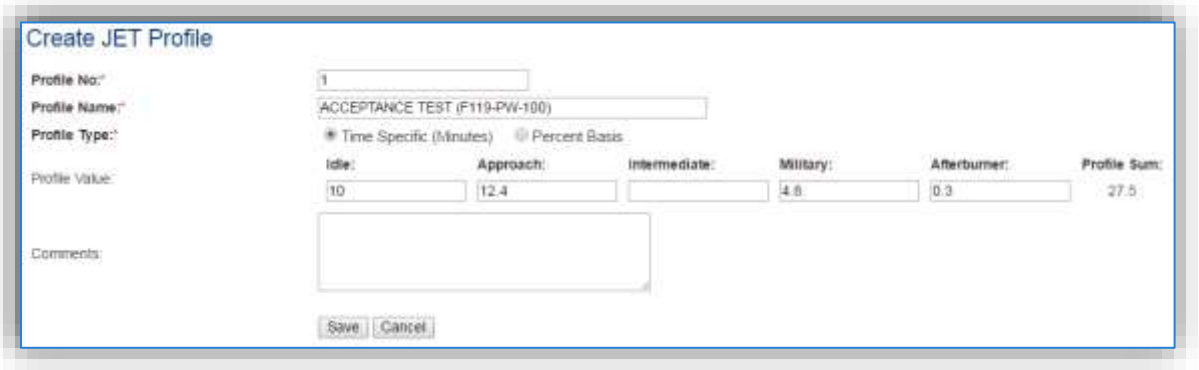
The consumption for aircraft engine testing will need to be tracked annually or more frequently if required by a regulatory agency. To correctly document the annual usage for this emission source the consumption should be entered in the Jet Engine Test log. Navigate to the Jet Engine Testing module in APIMS.



The preferred method for tracking usage in APIMS is the Time Specific profile type. To use this or the Percent Based method, a profile must be configured. Click the JET Profiles hyperlink. This will display any existing profiles. To create a profile, click the Create JET Profile hyperlink.



The existing profiles will be displayed in a grid. To create a new profile, click the Create JET Profile hyperlink.



The **Profile No.** should be a number that can be used to easily identify this particular profile. Any combination of numbers and letters can be used in this field. Examples are to simply designate it with a number in order with the other profiles 1, 2… or to give it a more meaningful identifier such as F-22 AT to indicate the Acceptance Test for the F-22 engines.

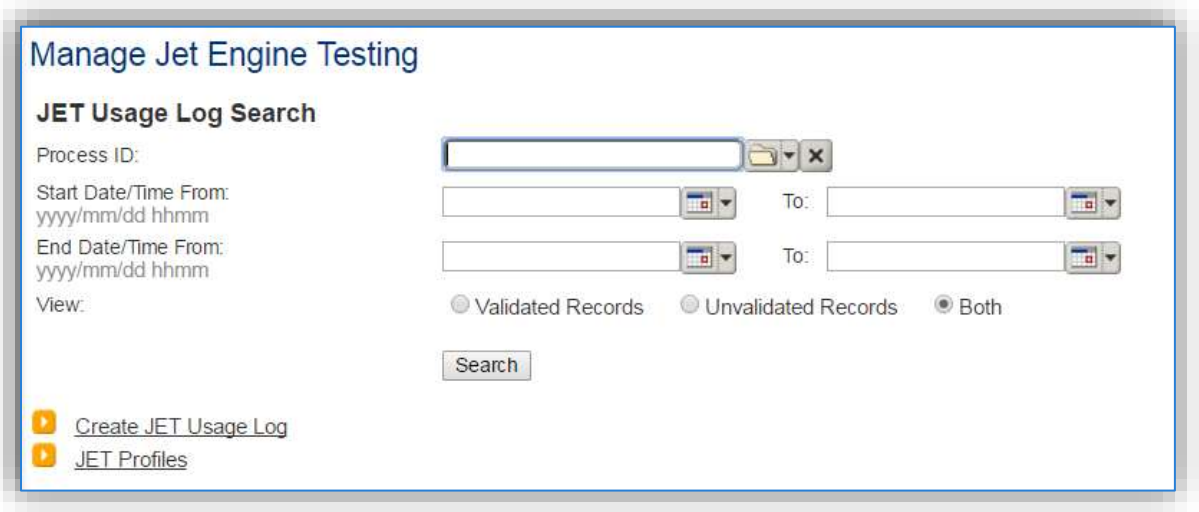
The **Profile Name** should match the name given to the test as it is specified in the Technical Order along with the engine. Common test names are Acceptance Test, Vibe Test etc.

The **Profile Type** should be Time Specific if documenting the actual minutes spent in each mode. This is usually for tests that are run for a set amount of time. Percent Basis should be used if the test is run for varying time lengths but with the same percentage of time spent in each mode regardless of the total time.

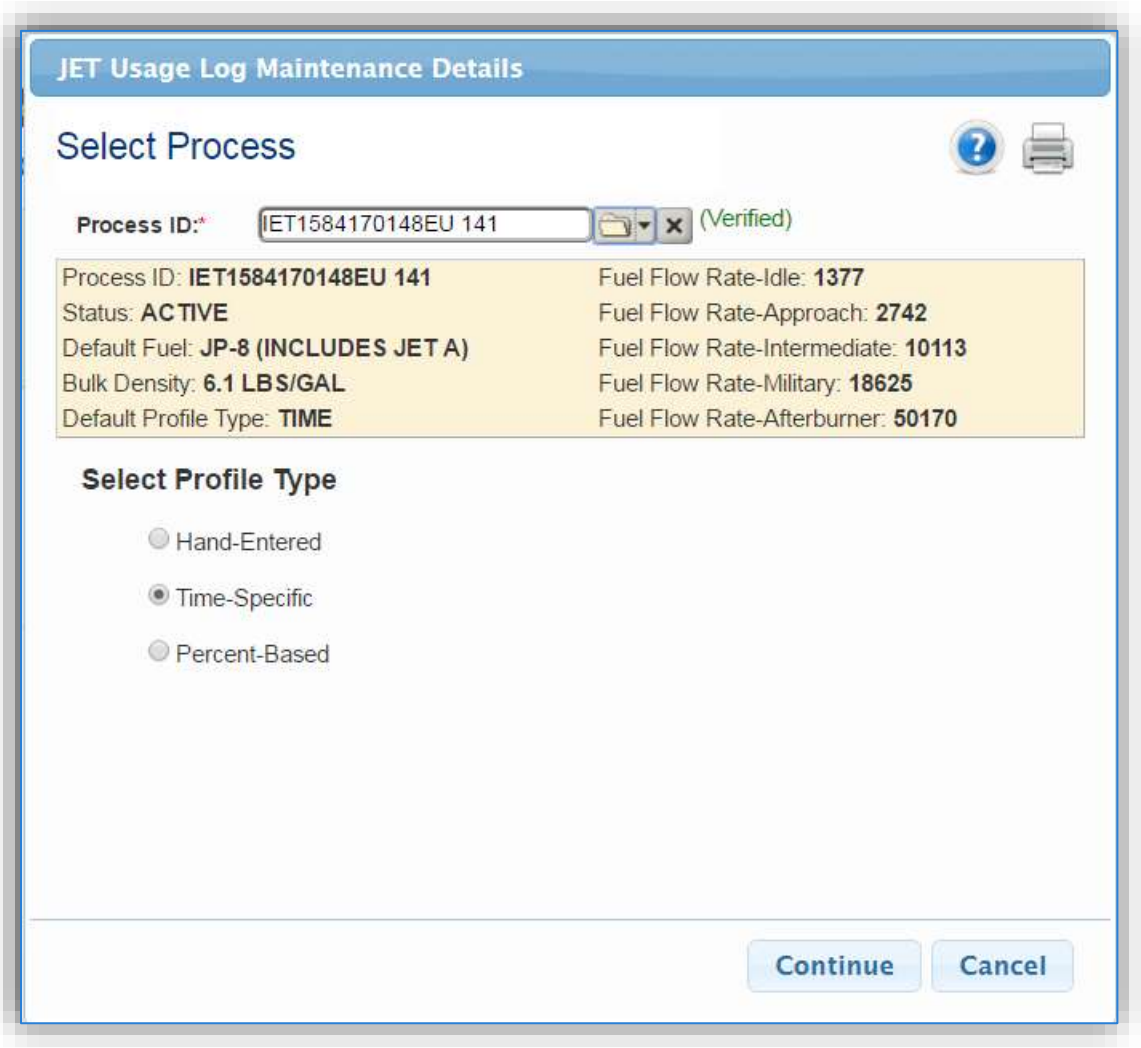
The **Profile Value** for each mode should be either the minutes spent in each mode or the percent of the total test time spent in each mode, depending upon the **Profile Type** designation. If the engine does not operate in a particular mode during a test, that field can be left blank.

The **Comments** field can be used as a reference back to the Technical Order that provides the guidelines for this particular test or for any other relevant comments.

Click **Save** and return to the Manage Jet Engine Testing screen.



To create a new usage log, click the Create JET Usage Log hyperlink.

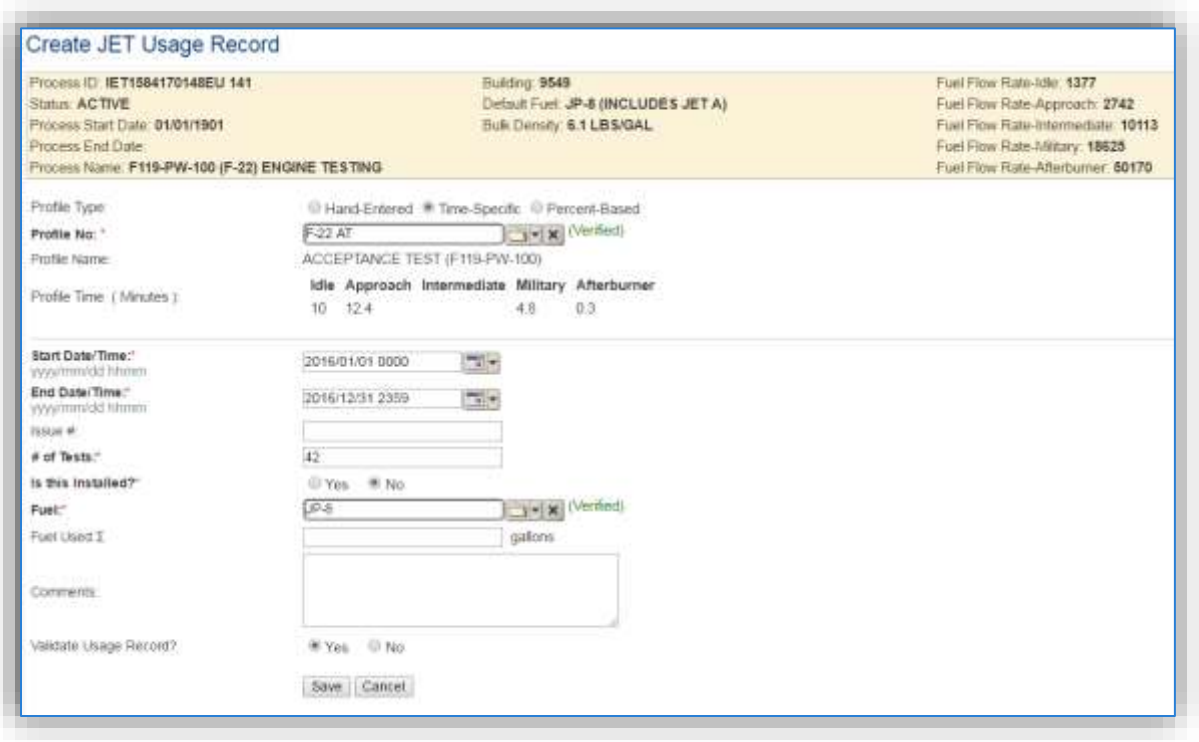


Select the **Process ID** from the list of values. Once the Process ID is verified the other fields in the banner will automatically populate.

The **Profile Type** will default to the **Default Profile Type** as set in the Information tab of the Unique Process record.

Once the **Profile Type** is selected, click the **Continue** button.

3.10.4.1.1 Time Specific



The **Profile Type** will default to the value selected on the previous screen. The fields displayed on the screen will vary depending upon the Profile Type selected.

Select the **Profile No.** that matches the tests to be documented for this process. Once the profile is verified the **Profile Time (Minutes)** will automatically populate as specified in the profile.

Enter the **Start Date/Time** and the **End Date/Time**. This can be for a range of dates or can be set to document a specific test date and time.

Enter the total number of test conducted during the specified timeframe for this type of engine and profile in the **# of Tests** field.

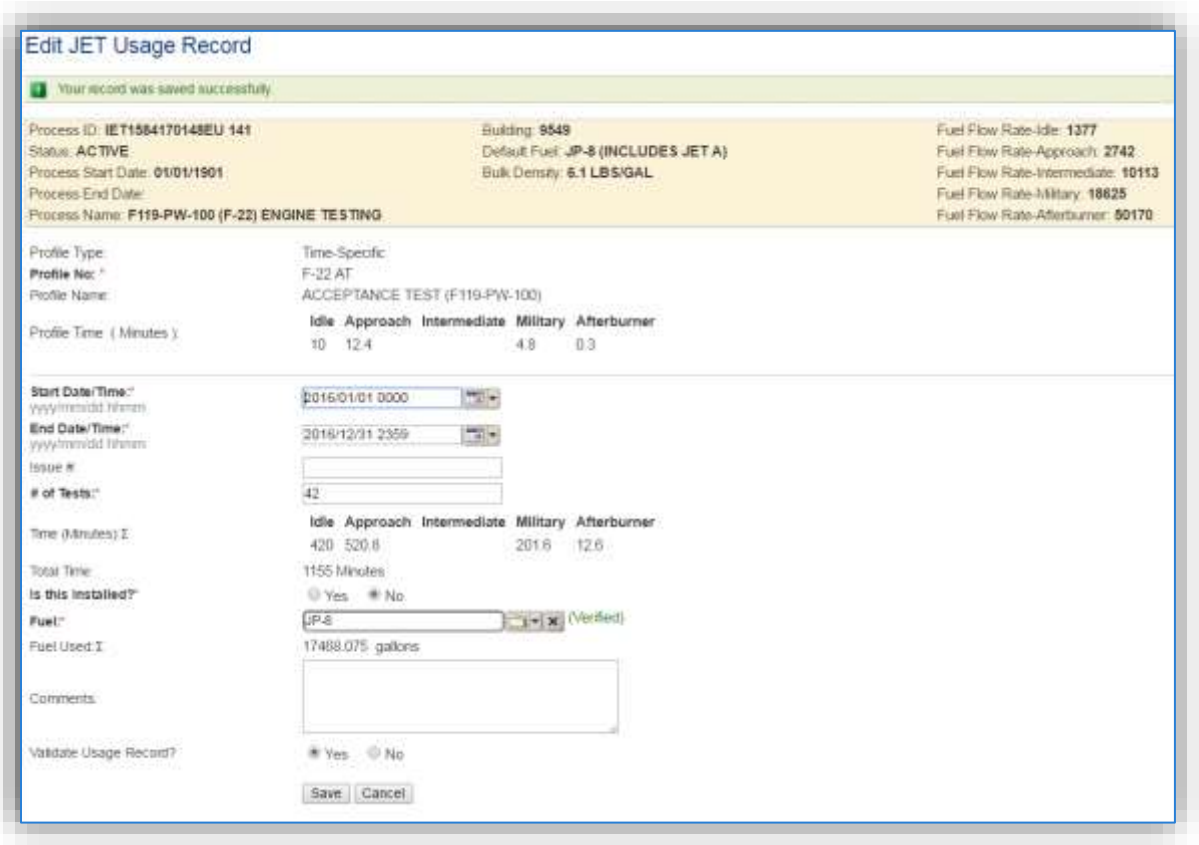
The **Is this Installed?** flag should be set to "No" for off wing testing and "Yes" for on wing testing.

The **Fuel** field will automatically populate to match the Default Fuel as specified on the Information tab of the Unique Process record.

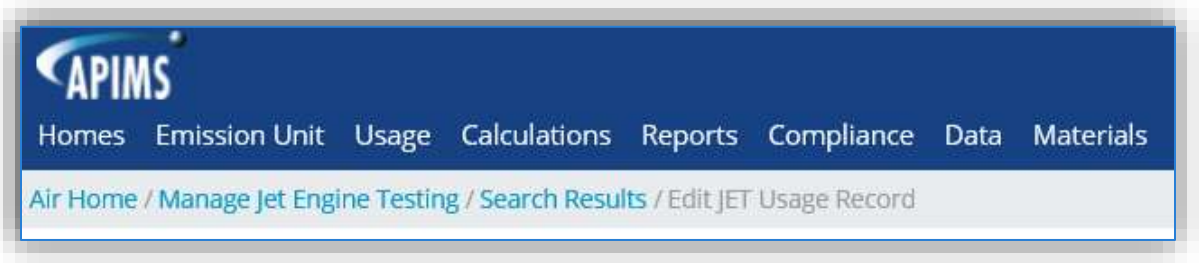
The **Fuel Used** can be specified manually if the exact amount of fuel used during the test is known. Otherwise the fuel used will be calculated using the time in mode along with the fuel flow rate for that mode.

The last step is to set the **Validate Usage Record?** flag. If the consumption is not validated it will not be included in the emissions calculation.

Click the **Save** button.

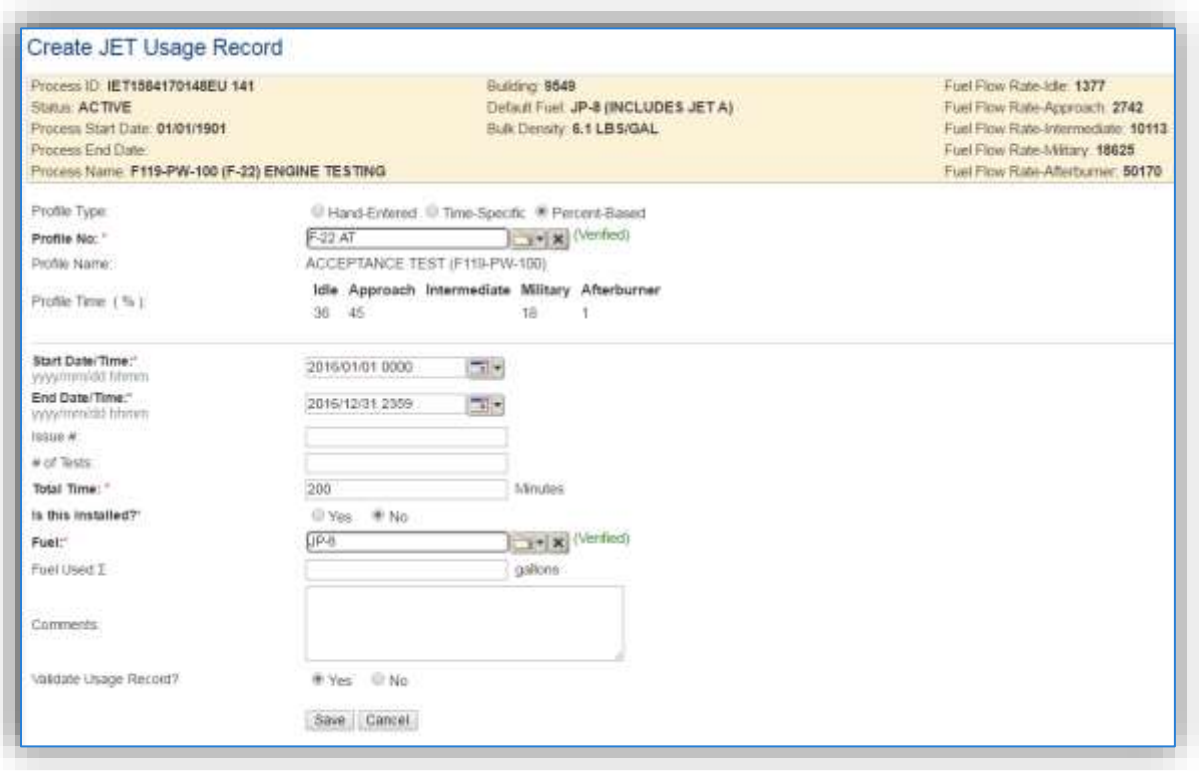


As indicated in the screen the record has been saved successfully. Also, the Fuel Used has now been calculated.



Use the links on the breadcrumbs line to return to the Search Results page.

3.10.4.1.2 Percent Based



The **Profile Type** will default to the value selected on the previous screen. The fields displayed on the screen will vary depending upon the Profile Type selected.

Select the **Profile No.** that matches the tests to be documented for this process. Once the profile is verified the **Profile Time (%)** will automatically populate as specified in the profile.

Enter the **Start Date/Time** and the **End Date/Time**. This can be for a range of dates or can be set to document a specific test date and time.

Enter the total number of tests conducted during the specified timeframe for this type of engine and profile in the **# of Tests** field.

Enter the total number of minutes the engine was run for this type of testing in the **Total Time** field.

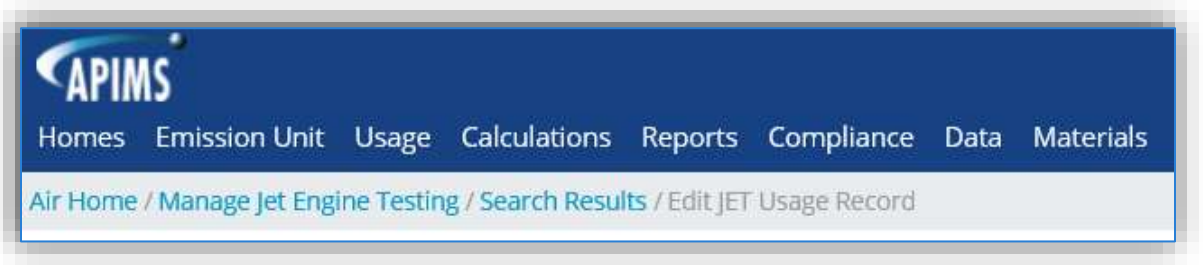
The **Is this Installed?** flag should be set to “No” for off wing testing and “Yes” for on wing testing.

The **Fuel** field will automatically populate to match the Default Fuel as specified on the Information tab of the Unique Process record.

The **Fuel Used** can be specified manually if the exact amount of fuel used during the test is known. Otherwise the fuel used will be calculated using the time in mode along with the fuel flow rate for that mode.

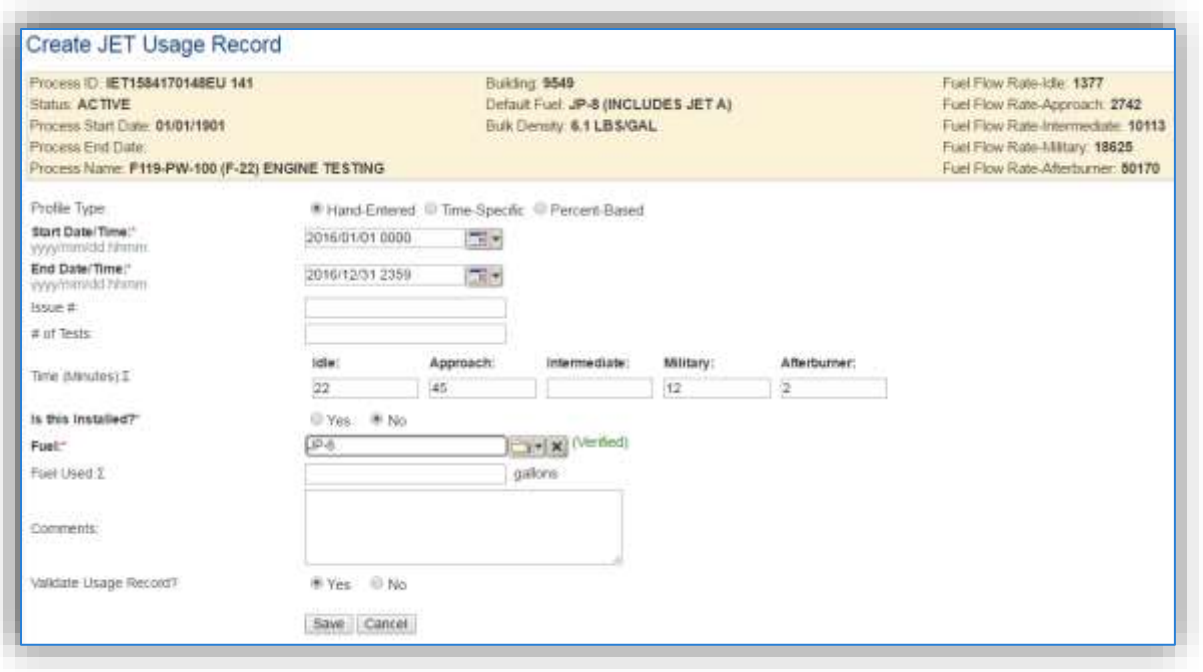
The last step is to set the **Validate Usage Record?** flag. If the consumption is not validated it will not be included in the emissions calculation.

Click the **Save** button. The screen will display a banner indicating the record has been saved successfully. Also, the Fuel Used has now been calculated.



Use the links on the breadcrumbs line to return to the Search Results page.

3.10.4.1.3 Hand Entered



Enter the **Start Date/Time** and the **End Date/Time**. This can be for a range of dates or can be set to document a specific test date and time.

Enter the total minutes spent in each mode in the **Time (Minutes)** fields.

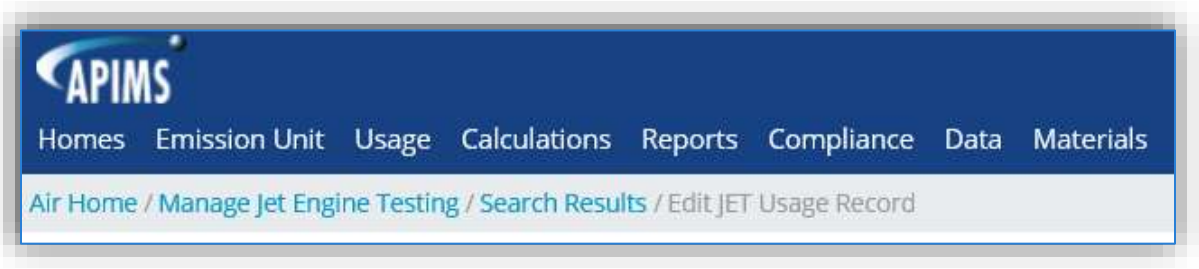
The **Is this Installed?** flag should be set to “No” for off wing testing and “Yes” for on wing testing.

The **Fuel** field will automatically populate to match the Default Fuel as specified on the Information tab of the Unique Process record.

The **Fuel Used** can be specified manually if the exact amount of fuel used during the test is known. Otherwise the fuel used will be calculated using the time in mode along with the fuel flow rate for that mode.

The last step is to set the **Validate Usage Record?** flag. If the consumption is not validated it will not be included in the emissions calculation.

Click the **Save** button. The screen will display a banner indicating the record has been saved successfully. Also, the Fuel Used has now been calculated.



Use the links on the breadcrumbs line to return to the Search Results page.

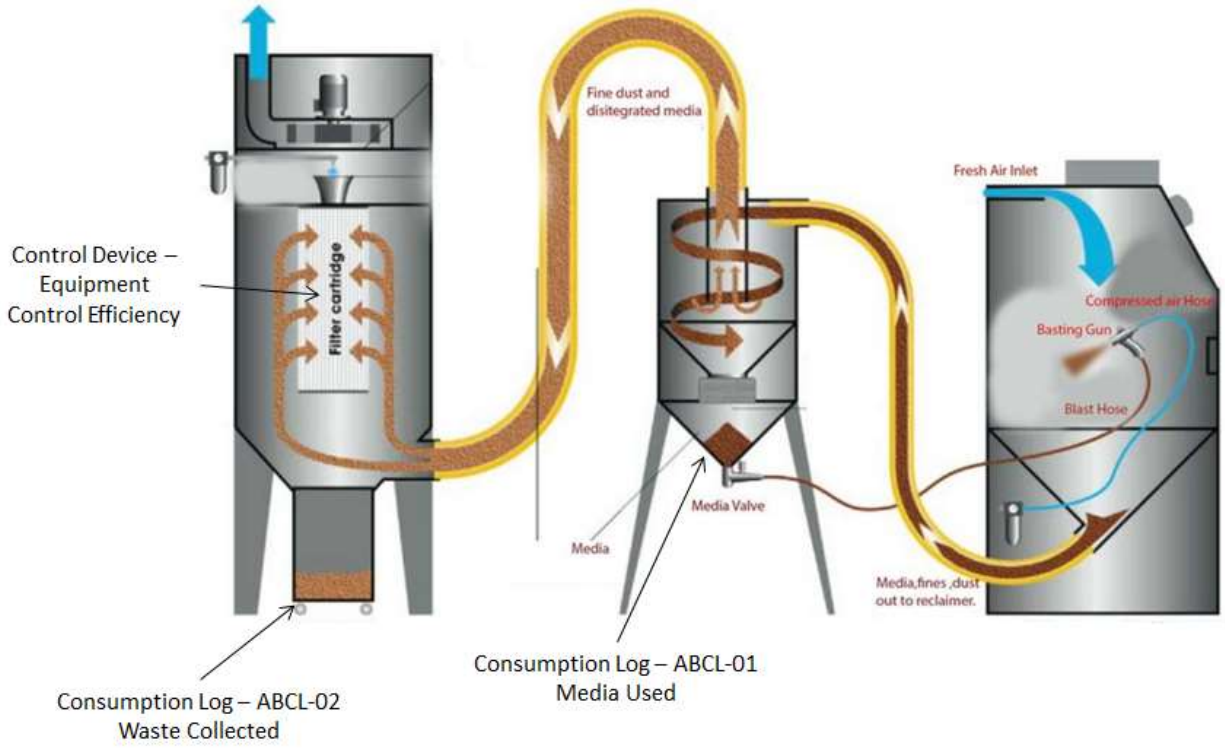
3.10.4.2 Emissions Calculations

To correctly calculate emissions this emission source the processes should only be included in a **Stationary Source Calculations**. Off wing testing is a stationary source and on wing testing is not calculated. Reference Section 2.7 Emissions Calculations for additional instructions and details.

3.11 Abrasive Cleaning (ABCL)

3.11.1 Source Types

This source category includes all equipment that may release emissions from abrasive blasting operations. Abrasive blasting operations involve the use of a hard, abrasive material (e.g. sand, garnet, or glass beads) being projected with high intensity onto a surface in order to remove paint and/or corrosion from an object. A high-pressure pneumatic gun is used to blast the abrasive media at the equipment being stripped. Blasting operations generally occur in a glove box, blasting cabinet, booth or hangar depending upon the size of the item being blasted. Emissions of PM, PM10, PM2.5 and inorganic particulate Hazardous Air Pollutants (HAPs) are caused by the material that makes up the coating (paint and primer) that is exhausted from the blasting operations. The exhaust from these blasting operations is usually vented to a control system, such as a fabric filter (often called a baghouse). A cyclone separator may precede the fabric filter in the collection system to separate the larger blast media from the smaller particulate in the exhaust stream as shown in the following figure. The large beads are then recycled to the blasting system while the smaller particulate is vented to the baghouse where it is captured and collected in a bin for disposal. Other common control devices are vacuum blasters, drapes, water curtains, wet blasting, and reclaim systems.



3.11.2 Potential Data Sources

A number of industrial areas around each installation may operate abrasive cleaning sources. Since the primary purpose of abrasive cleaning is to prepare a surface for coating application, the starting point for

identifying new/existing abrasive cleaning sources is to conduct shop surveys where active surface coating operations occur. The shops listed below are the most common shops operating abrasive cleaning sources:

- Corrosion Control (MXS)
- Vehicle Maintenance (LGRV)
- Repair and Reclamation (MXMT)
- Aircraft Structural Maintenance (MXMF)
- Aerospace Ground Equipment (MXMG)

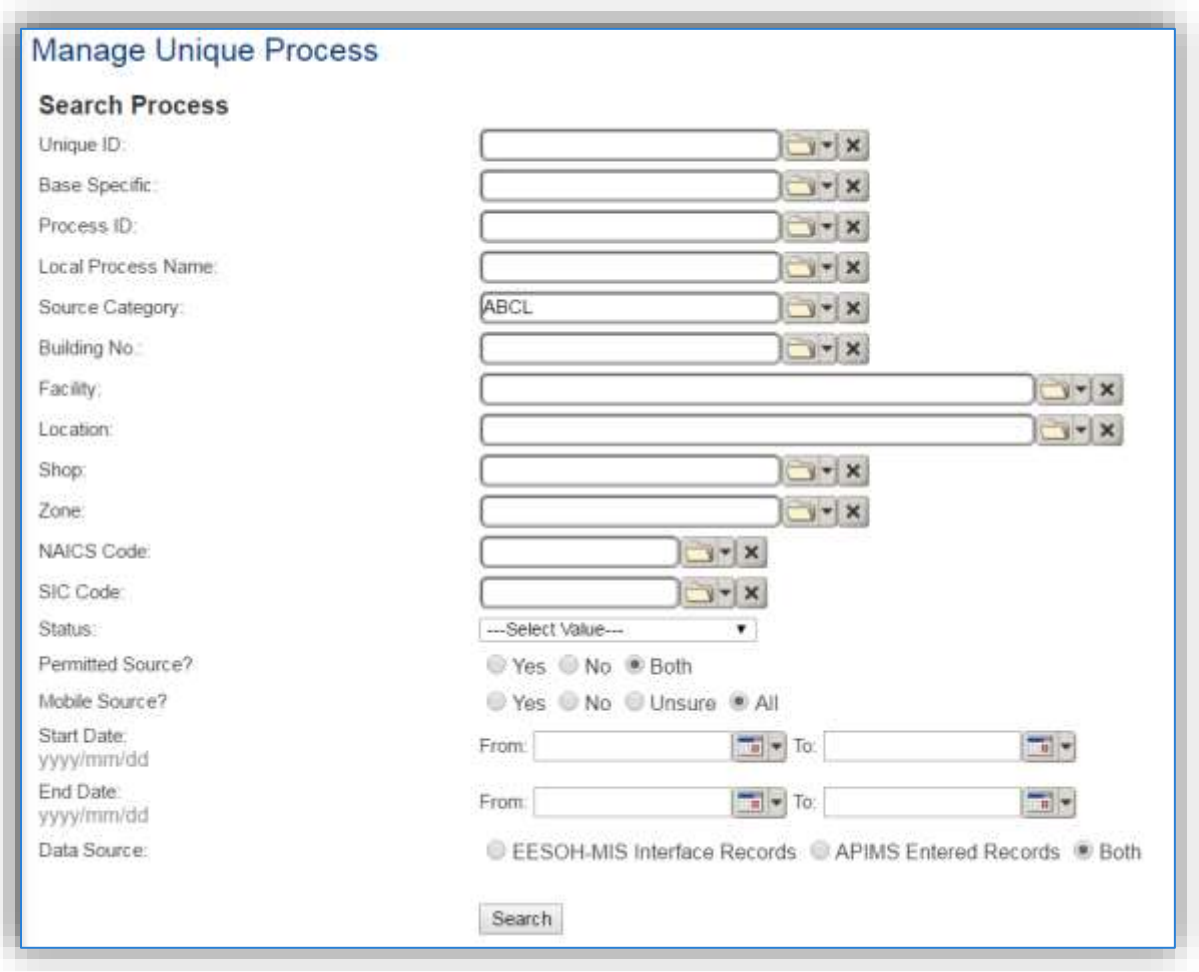
There are two methods to track usage for abrasive blasting operations; the first is the amount of blast media used, the second is the amount of waste collected by the control device. In this situation the data to collect would be the total pounds of waste generated or collected during the year. If this data is not available it can be estimated by gathering the number of times the waste bin was emptied during the year and the size of the waste bin. If the amount of media collected is only known in volume, (i.e., gallons) the density of the media can be obtained from the manufacturer with the product of the two values equaling the weight. If the total number of times the waste bin was emptied is not known, an estimate of how often the waste bin is emptied will suffice. The other data element that will be required is the control efficiency of the cyclone or baghouse. The control efficiency can range from 50% to 96% or higher.

3.11.3 Standard Source Identification/Characterization

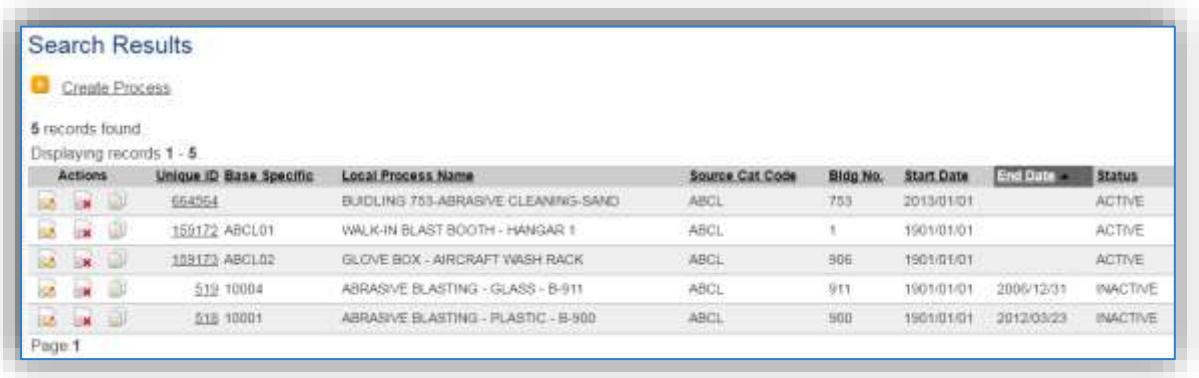
3.11.3.1 Existing Sources

It is important to review the existing sources in each source category on an annual basis at a minimum. Most regulatory agencies require an up to date source and equipment inventory.

Navigate to the Unique Process module of APIMS by clicking **Unique Process** under the **Emission Unit** tab.



In the **Source Category** search field, type "ABCL" then select the row for Abrasive Cleaning from the dropdown results. Click the **Search** button.

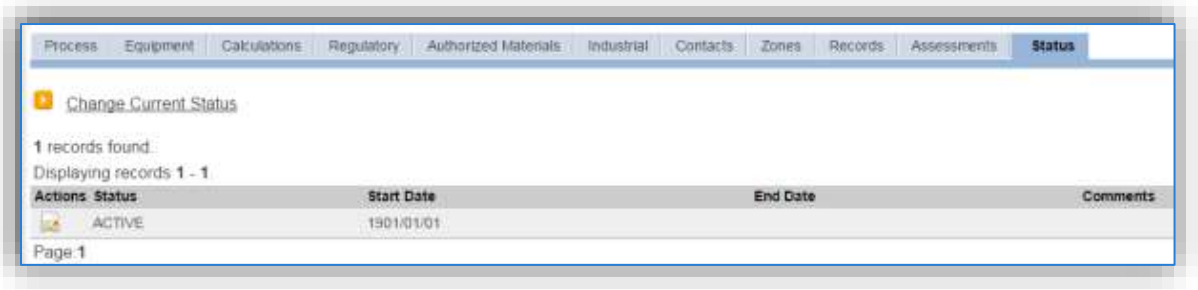


The search results grid will now display all the abrasive cleaning processes currently in APIMS.

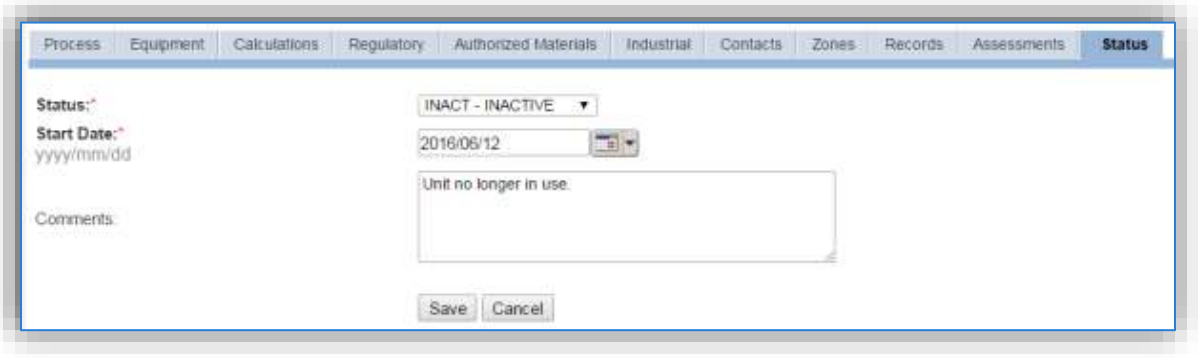
The **Local Process Name**, **Base Specific** and **Bldg No**. can all be used to identify a specific source. This list should be reviewed to make sure the source is configured in a way that it is easy to identify and locate. The status of each source should also be reviewed and kept current.

3.11.3.1.1 Status

If the status of a unit needs to be changed, click the edit icon next to the process. Navigate to the *Status* tab.



Click the Change Current Status hyperlink.



Select the appropriate status from the **Status** dropdown (i.e., ACTIVE, REMOVED or INACTIVE).

For the **Start Date** enter the date at which the status changed.

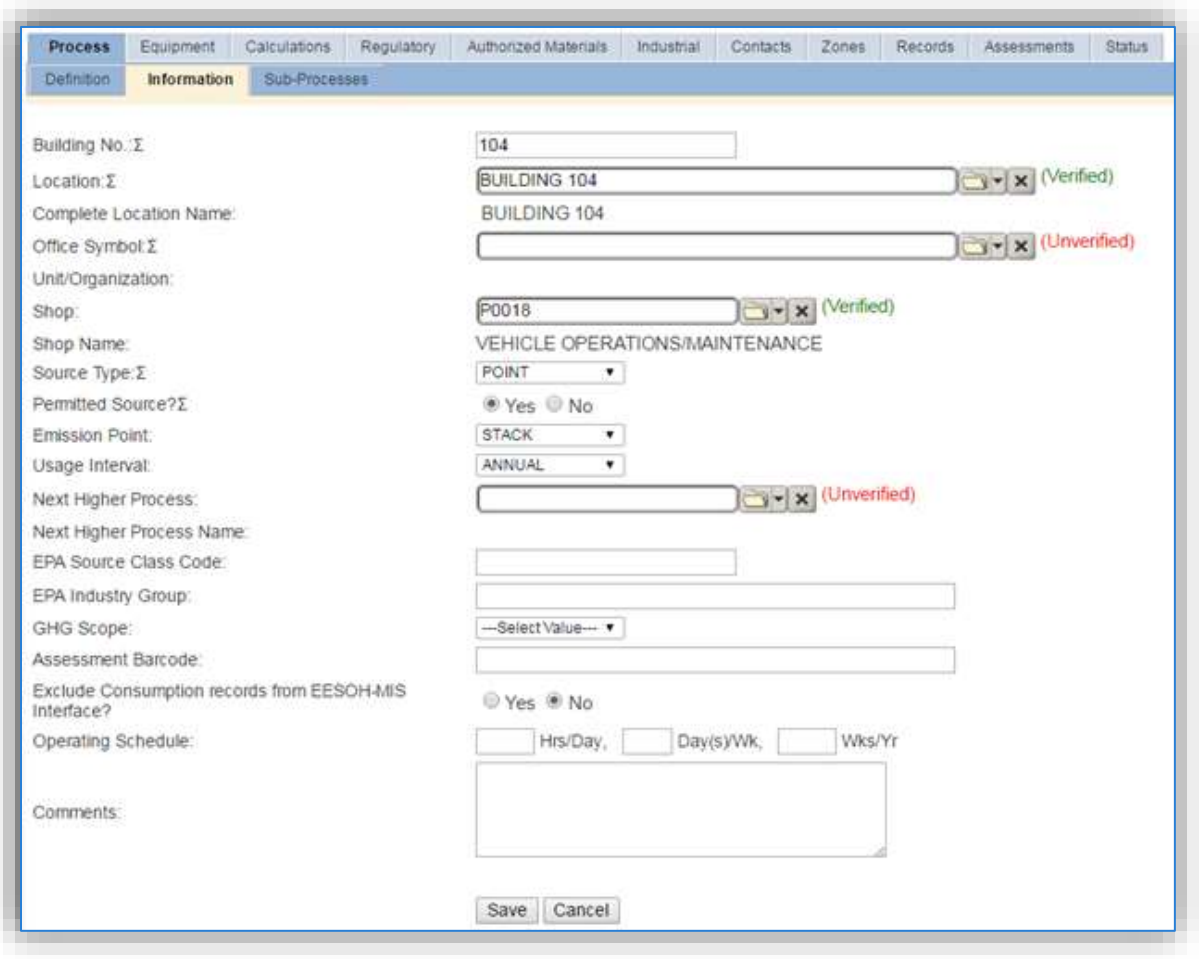
Enter **Comments** that provide insight into why the status changed. These can be very useful for equipment inventories, permit renewals and regulatory reporting. Most regulatory agencies require reporting on unit operation status; this includes any potential time spent offline and reasons for the outage.

Click the **Save** button.

The emissions for a process will only be calculated for the dates the process was in an ACTIVE status. If a source is removed in the middle of a year, the emissions will only be calculated for the part of the year the source was active.

3.11.3.1.2 Information

There are basic data elements that are important to track and maintain for new and existing sources, such as location and source type. This data can be maintained in the Unique Process record on the *Information* sub tab.



The **Building No**. field can be used to specify a general location or area of the emission source, for example, EAST SIDE.

The **Location** field is very important to effectively manage the location and mission of the emission source. This documents where the source is located, in case it needs to be inspected or if the source owner needs to be contacted for pertinent information. For the instructions on how to create a location reference Section 2.2 Location.

The **Shop** is important as it establishes the personnel that are utilizing the equipment on a regular basis and will be the best source of information regarding the unit.

Abrasive blasting operations are categorized as POINT source in the **Source Type**, if a control device is used or if an inside source is released form a single location. If the blasting is conducted outside or simply released to the general area it should be FUG in the **Source Type** to indicate it is a Fugitive source.

If the blasting is conducted in a controlled environment the **Emission Point** would be STACK, otherwise it should be ATMOSPHERE.

The **Permitted Source** flag should also be populated to accurately reflect the current regulatory status of the emission source. This flag can be an invaluable tool in roll-up reporting.

The **Usage Interval** should be designated. This source is usually documented on an Annual basis but may be different if it is a permitted source. It is important to populate this field correctly as it will affect how it is documented in the AEI Throughputs module.

The **EPA Source Class Code** is a process level EPA code that describes the equipment and/or operation that is the source of the emissions. Source Classification Codes for abrasive blasting operations are:

Process Type	SCC
General	30900201
Sand	30900202
Slag	30900203
Garnet	30900204
Steel Grit	30900205
Walnut Shell	30900206
Shot	30900207

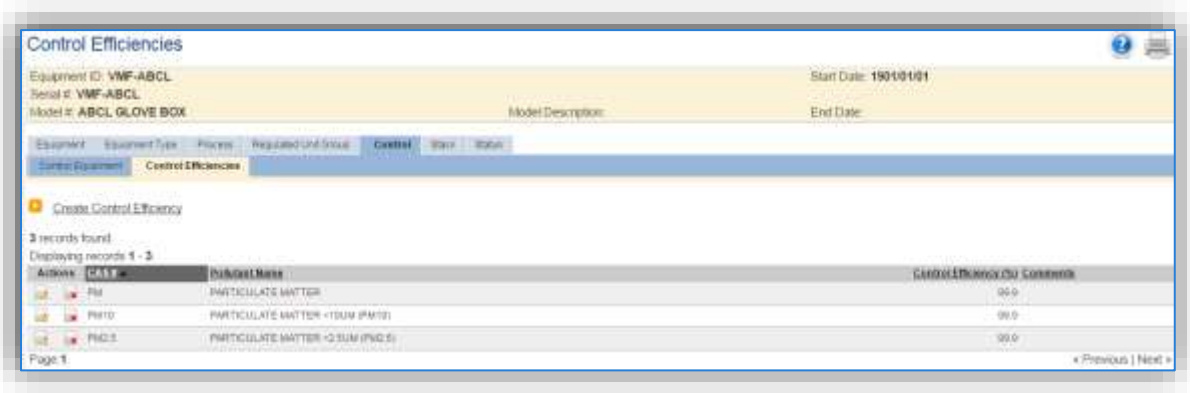
3.11.3.1.3 Sub-Processes

This source does not utilize this functionality.

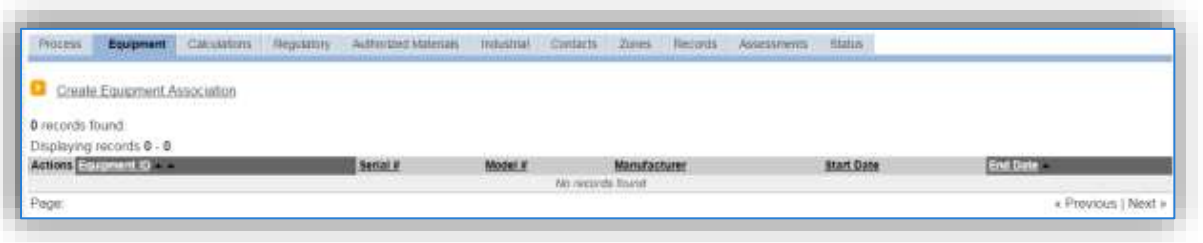
3.11.3.1.4 Equipment

The next tab is the *Equipment* tab. This is especially important for abrasive blasting processes as the calculation in APIMS uses the control efficiency on the equipment associated to the process to accurately calculate emissions. To link the equipment to the process the equipment must already be entered in APIMS.

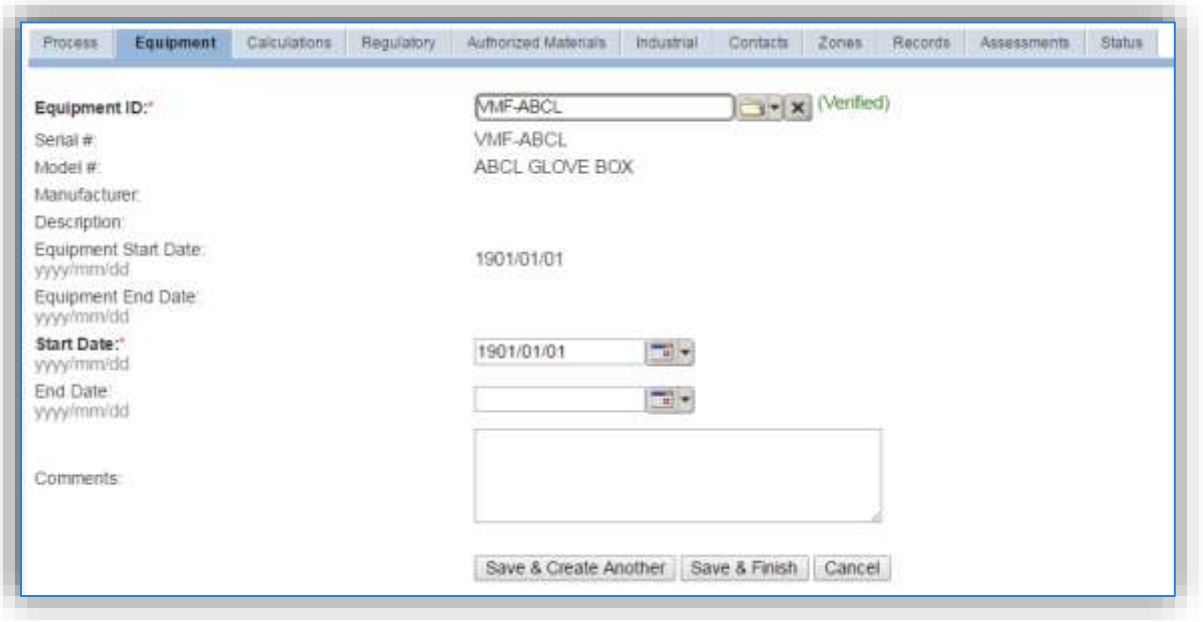
In the control tab of the equipment record, the control efficiency for the device needs to be created for PM, PM_{10} and $PM_{2.5}$, as shown in the equipment screen below. Refer to the Equipment section for specifics on how to properly document equipment in APIMS.



To link the equipment, click on the Create Equipment Association hyperlink.

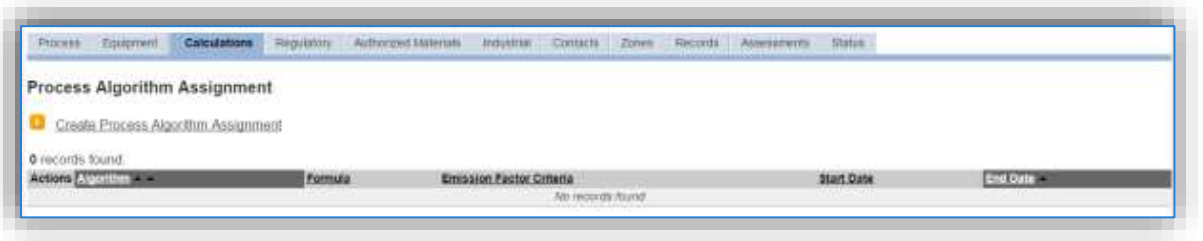


Search for the **Equipment ID** in the list of values, enter the start date and click the Save & Finish button.

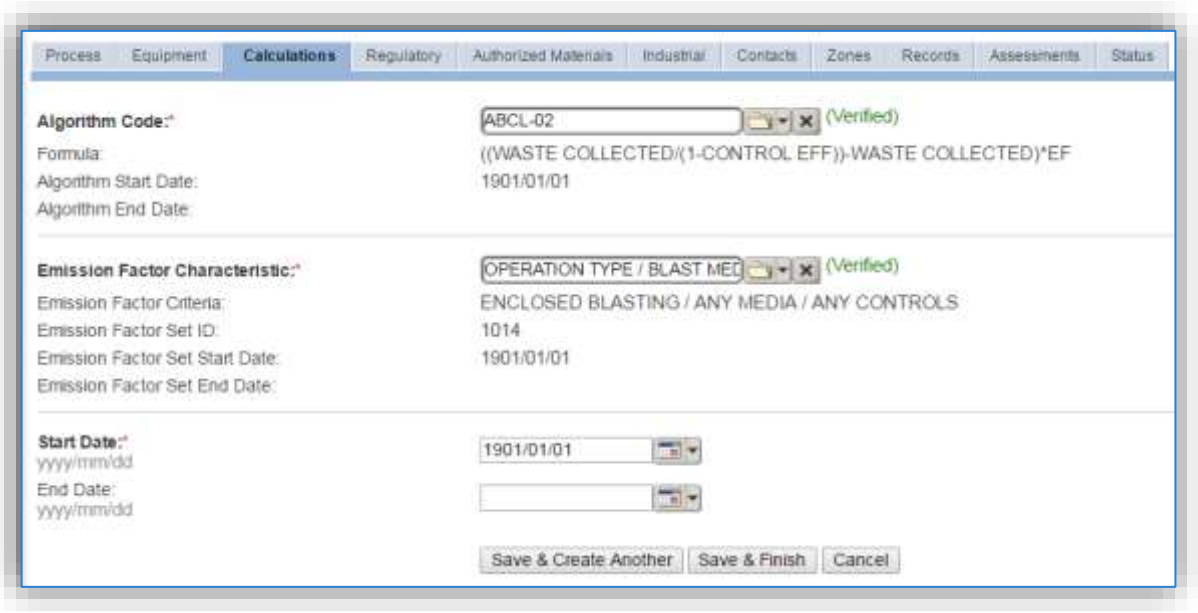


3.11.3.1.5 Calculations

The next tab is the *Calculations* tab.



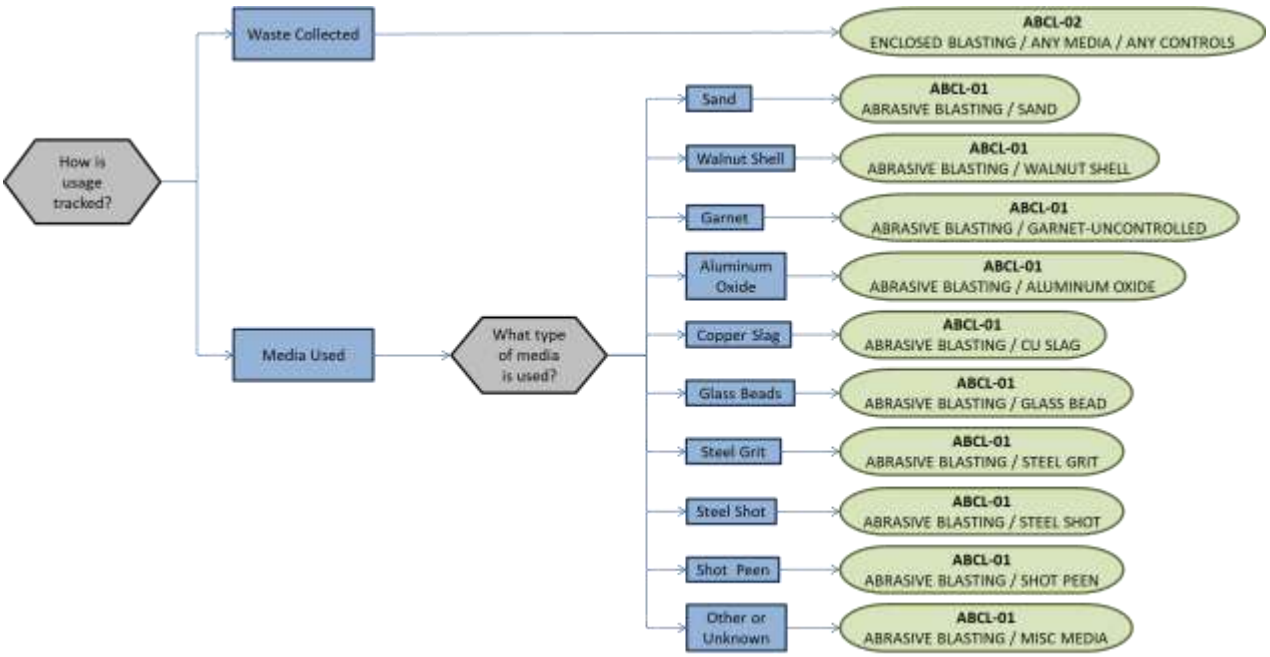
To associate an algorithm to the process, click on the Create Process Algorithm Assignment hyperlink.



Select the **Algorithm Code** and the **Emission Factor Characteristic** that most closely matches the activity. Use the flowchart below to find the correct Algorithm Code and Emission Factor Characteristic. Enter the **Start Date** to match the start date of the process.

For abrasive blasting processes there are two standard calculation methodologies recommended by the Air Force. The first method, ABCL-01 is used when the total media used is the data available. The second method, ABCL-02 is used when the total waste collected is the data available.

Use the flowchart below to find the correct Algorithm Code and Emission Factor Characteristic.

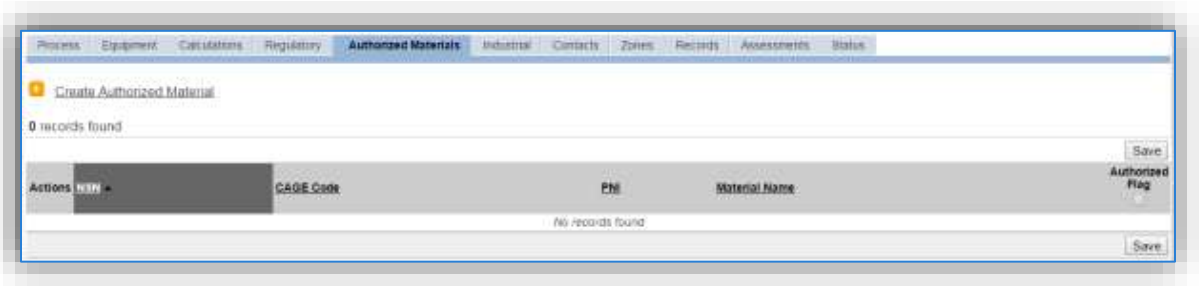


If utilizing the ABCL-01 ABRASIVE BLASTING / GARNET-FABRIC FILTER calculation methodology, an equipment record of the fabric filter should not be linked to the process as the control efficiency will be double counted; once in the emission factors and then again against the results.

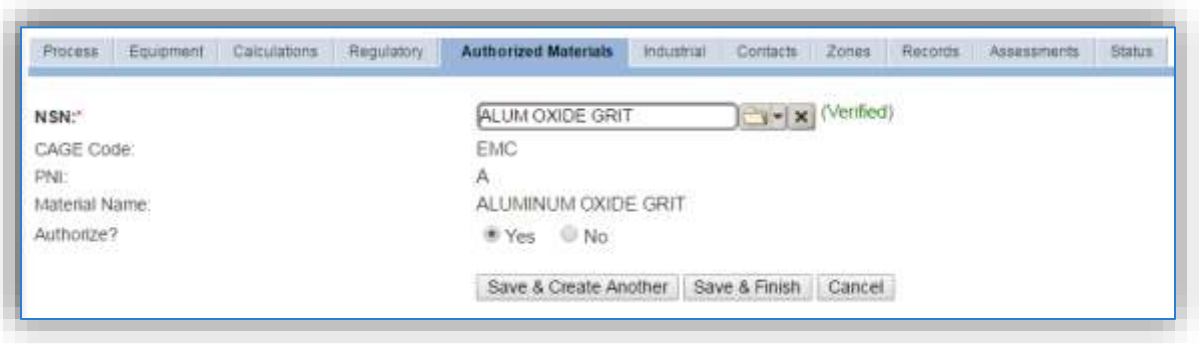
If your permit requires a different type of calculation, contact the Air Force Air Quality Subject Matter Expert for approval of the alternative method.

3.11.3.1.6 Materials

The last step in setting up the Unique Process record is to add SAWDUST as the authorized material on the *Authorized Materials* tab.



To authorize a material for the process, click on the Create Authorized Material hyperlink.



Select the media used from the list of values. If the blast media is not available the material record will need to be created. Next select "Yes" to **Authorize** the material, then **Save & Finish**.

3.11.3.2 New Sources

3.11.3.2.1 Data Collection Sheet

The form on the next page is a printable guide that can be taken out to the location of the source and used to gather all the necessary information from the shop personnel. It can then be used as a guide to help configure the data in APIMS when you return to your office.

Abrasive Blasting / Abrasive Cleaning Data Collection Worksheet

GENERAL INFORMATION

Building Number_____ Mission/Purpose_____
Shop Name/Function_____ Management Organization_____
Coordinates: Latitude: _____ Longitude: _____
UTM: _____ Zone _____ Easting _____ Northing ☐ Feet ☐ Meters
Is this source in any of your permits? ☐ Yes ☐ No
If yes, does it have an emission unit number or other designation? _____

EQUIPMENT INFORMATION

What type of blasting operation is conducted?

- ☐ Enclosed Blast Booth
- ☐ Enclosed Glovebox
- ☐ Unenclosed

For enclosed operations, collect the following equipment information:
Manufacturer _____

Model Number_____ Serial Number _____

Is there a filter? ☐ Yes ☐ No

If yes, is there a spec sheet that specifies the control efficiency of PM, PM10 and PM2.5?

USAGE INFORMATION

What type of blast media is used? _____

How does the shop measure blast media?
☐ Waste Collected ☐ Media Added

If waste collected is tracked, do they have records that show how much waste is collected during the year?_____

If not do they know how often the waste is collected? What container is used for waste collection? How big is the container?_____

If media usage is tracked, do they procure it through EESOH-MIS? ☐ Yes ☐ No

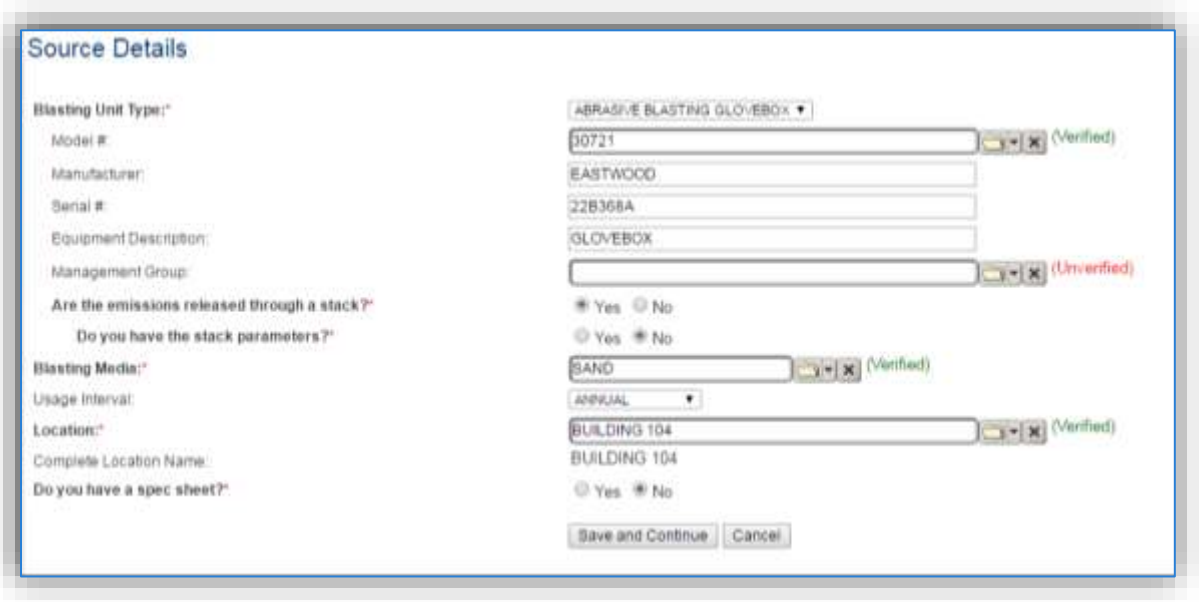
If Yes, specify the shop and process designation in EESOH-MIS
Shop Code _____ Process Code/Name _____

3.11.3.2.2 New Source Configuration

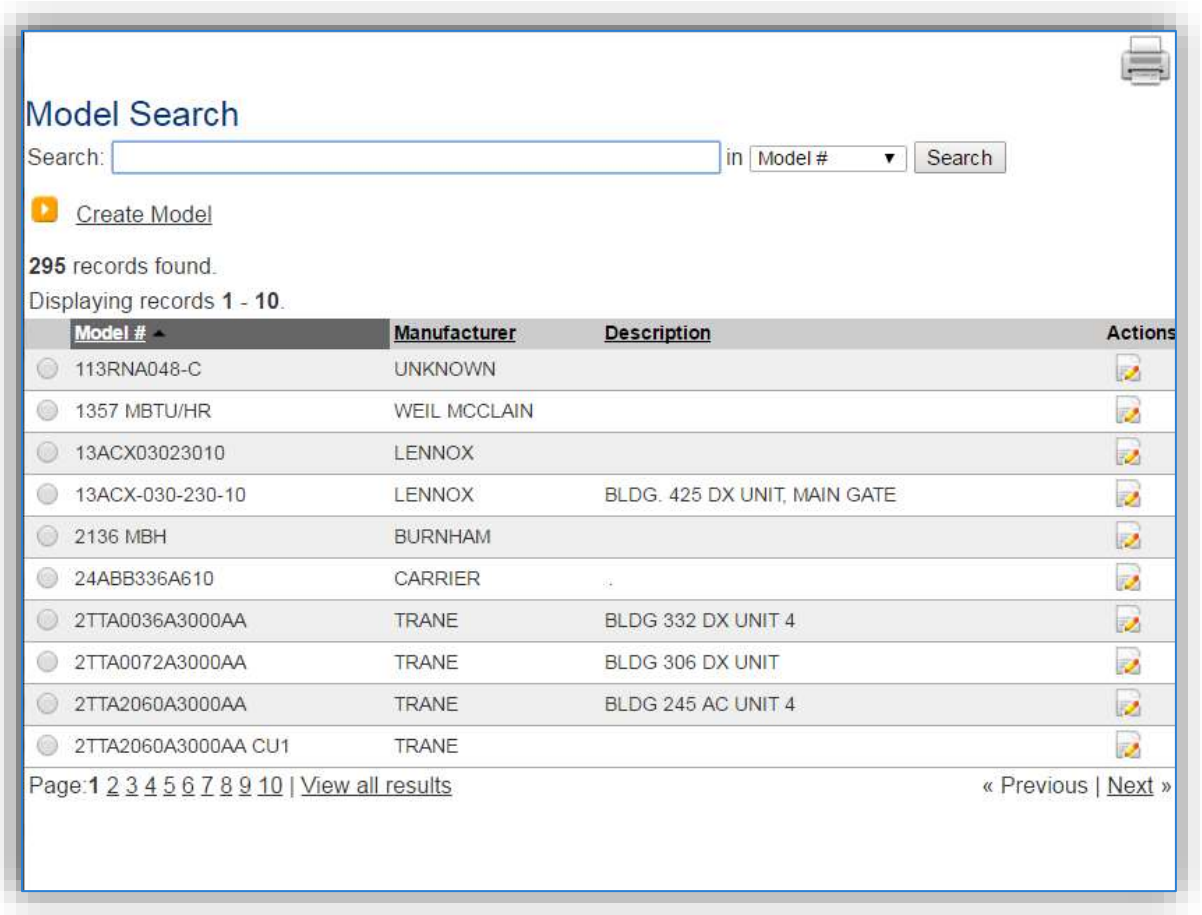
In order to properly document this emission source in APIMS, there will need to be a Unique Process record for each abrasive blasting operation.

Navigate to the **Blasting New Source Wizard** module in APIMS by clicking on **Blasting NSW** under the **Emission Unit** tab..

Select the type of blasting unit from the dropdown list (BLAST BOOTH, ABRASIVE BLASTING GLOVEBOX, UNENCLOSED BLASTING).

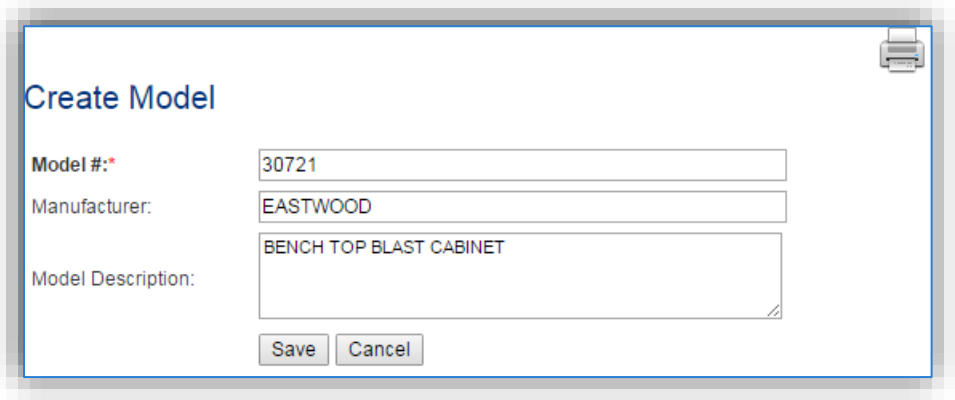


The **Model #** can be selected from the list of values (LOV) or created within the LOV popup window. Click the folder icon  to open the Model Search popup.



This screen manages all operations to select, edit or create a model. The search can be used to locate a specific model record. To select the model record, click the corresponding radio button. This will cause the popup window to close and will populate the **Model #** field with the selected record.

To create a new model record, click the Create Model hyperlink. This will open the Create Model popup.



Enter the actual Model # if known, if the model number is unknown as standard convention to easily identify the equipment can be used, (i.e. ABCL, GLOVEBOX etc.). Click the **Save** button to close the window.

The **Serial #** field can be used to enter the serial number for the equipment. If the serial number of the equipment is not known, a standard convention can be used to easily identify the equipment.

The **Equipment Description** is intended to be used to easily identify the equipment, such as Glovebox or Blast Booth.

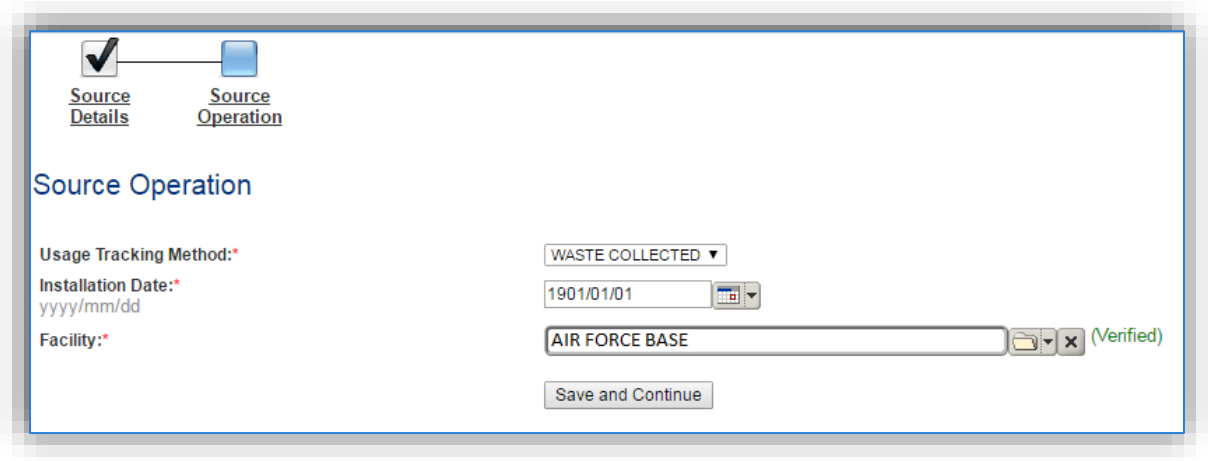
If the blasting equipment has emission controls, it is most likely that the emissions are released through a stack.

The **Blasting Media** field should be used to identify the blast media used, such as glass beads or sand.

The **Usage Interval** should be designated. This source is usually documented on an Annual basis but may be different if it is a permitted source. It is important to populate this field correctly as it will affect how it is documented in the AEI Throughputs module.

The **Location field** is very important to effectively manage the location of the emission source. This information will be important for knowing where the source is, in case it needs to be inspected or if the source owner needs to be contact for pertinent information.

Select the appropriate radio button to indicate if there is a specification sheet for the equipment. Click **Save and Continue**.



Select the **Usage Tracking Method**, either MEDIA USED or WASTE COLLECTED.

The **Start Date** should be the date the unit became operational, if this date is not known, enter 1901/01/01 as a default start date.

Select the **Facility** from the list of values, click **Save and Continue**.

The **Permitted Source** flag should also be populated to accurately reflect the current regulatory status of the emission source. This flag can be an invaluable tool in roll-up reporting.

The **Base Specific** field can be used to enter a standard convention identifier that will help to best identify the source. If the source is permitted, enter the emission unit ID as designated in the permit.

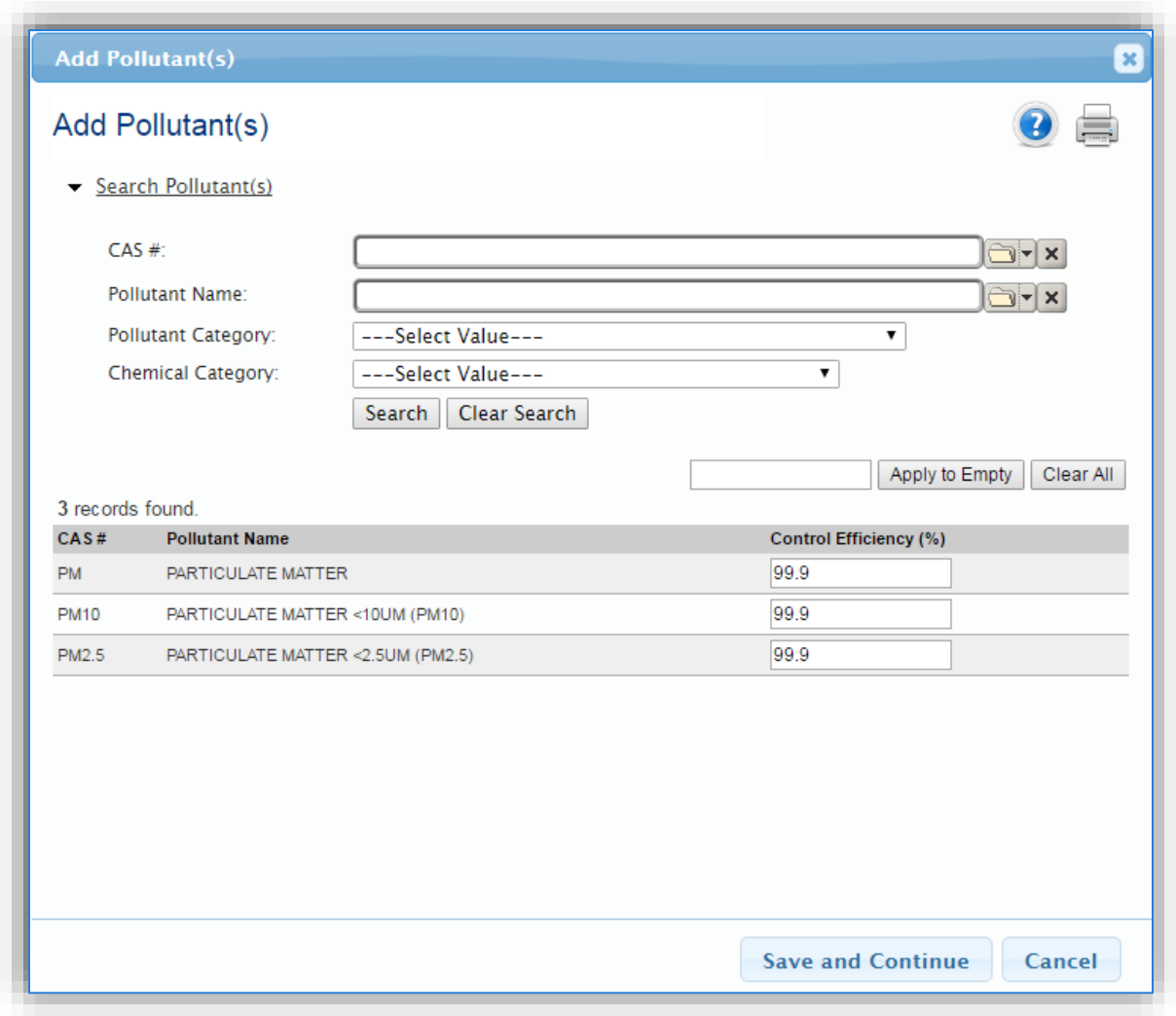
The **EPA Source Class Code** is a process level EPA code that describes the equipment and/or operation that is the source of the emissions. Source Classification Codes for abrasive blasting operations are:

Process Type	SCC
General	30900201
Sand	30900202
Slag	30900203
Garnet	30900204
Steel Grit	30900205
Walnut Shell	30900206
Shot	30900207

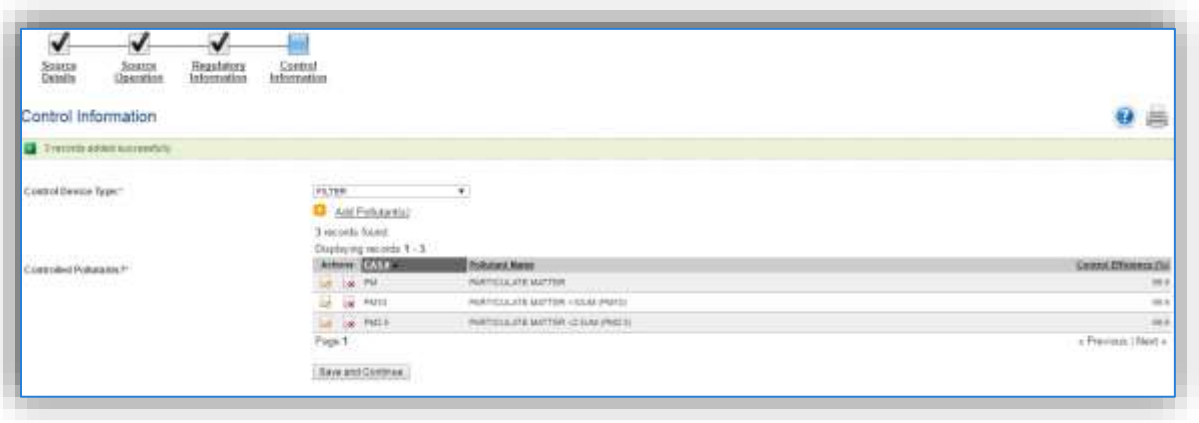
Select **Control Device Type** utilized by the equipment: BAGHOUSE, CYCLONE, DRAPE, DUST ENCLOSURE, ELECTROSTATIC PRECIPITATOR, FILTER, VACUUM BLASTER, WATER CURTAIN or WET BLASTING.

Click the Add Pollutant(s) hyperlink to configure the control efficiency.

The pollutants for abrasive blasting will appear in the grid automatically; however, the Search Pollutant(s) area can be used to refine the list of pollutants.



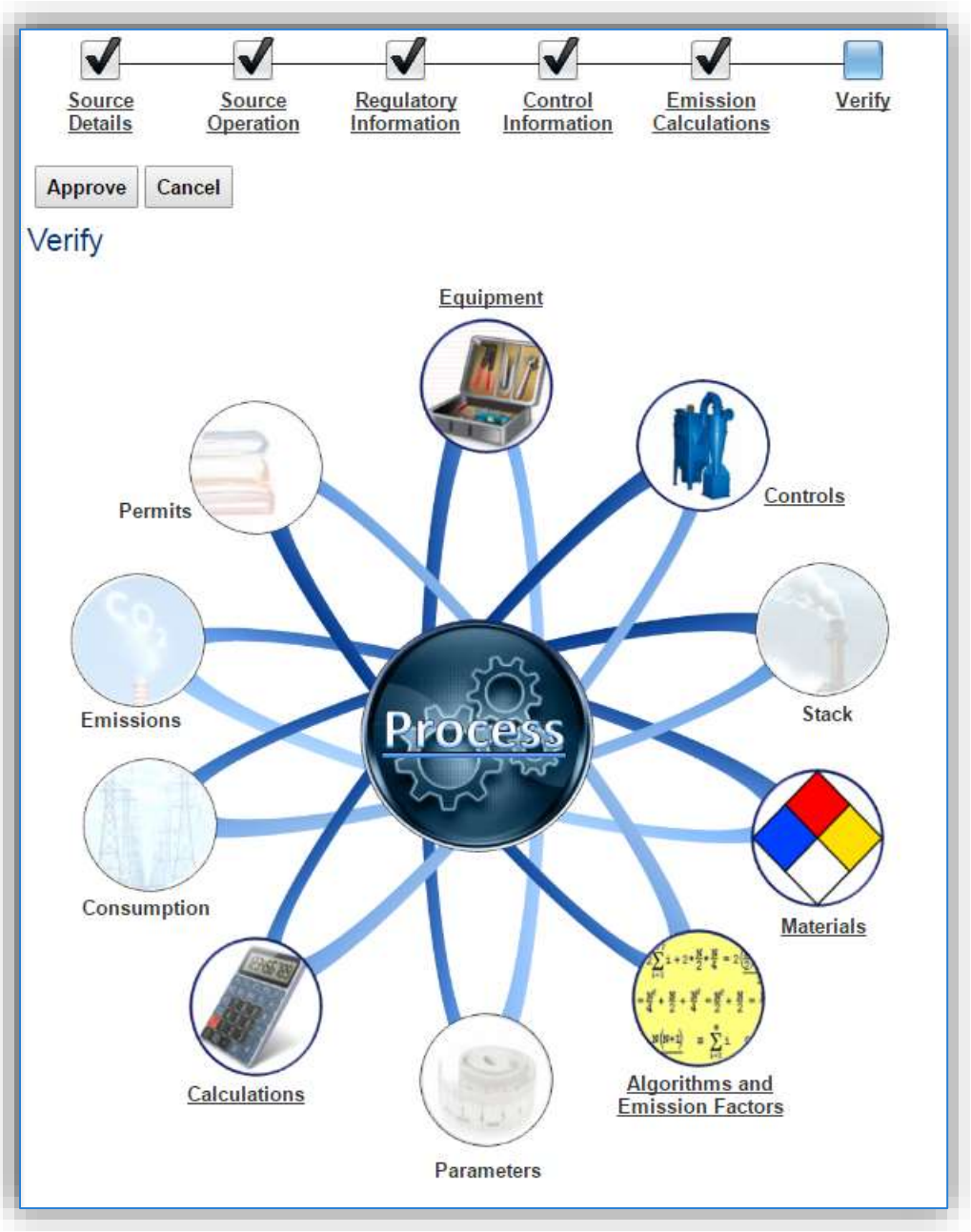
Enter the control efficiency for each of the pollutants in the **Control Efficiency** column, or if the control efficiency is the same for all pollutants, enter the efficiency in the field at the top of the grid and click the Apply to Empty button. This will populate the specified control efficiency for all rows in the grid. Click the **Save and Continue** to associate the control efficiencies to the equipment.



Click the **Save and Continue** button to proceed.

The final step is Emission Calculations where you choose to **Accept or Reject Algorithms**, the algorithm is based on the usage method selected and the media used.

The Emission Calculation also appears, one or more calculations will appear, select the checkbox or checkboxes next to the calculation this process should be added to. Click **Save and Continue** once those steps have been completed.



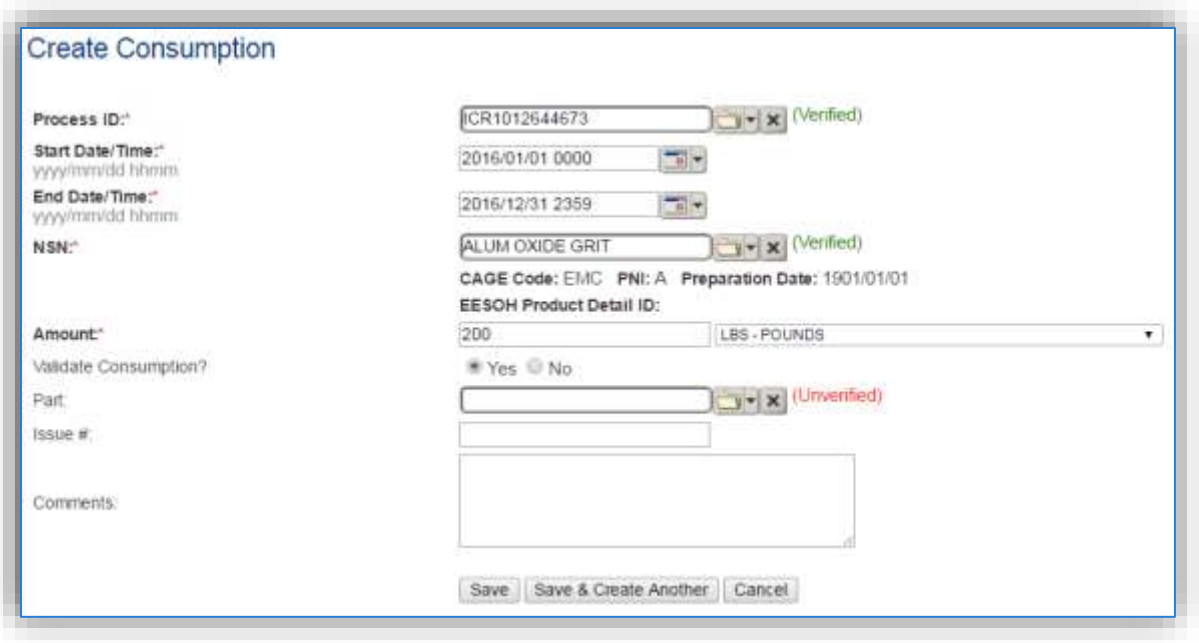
This is the process summary. The details behind the Calculations, Equipment, Algorithms and Emission Factors, Materials and Controls can be viewed by clicking on the hyperlink or picture. Click the **Approve** button to finalize the new source configuration process.

3.11.4 Year-to-Year Maintenance

3.11.4.1 Usage

The consumption for abrasive blasting sources will need to be tracked annually or more frequently if required by a regulatory agency. To correctly document the annual usage for this emission source the consumption should be entered in the Consumption log.

Navigate to the Consumption module and click the Create Consumption hyperlink.



The consumption record should span the entire reporting period as shown above. The material should be the blast media used and the amount should be the amount of media used for ABCL-01 or waste collected for ABCL-02 in pounds. Make sure to select "Yes" to validate the consumption. If the consumption is not validated it will not be included in the emissions calculation. Repeat this step for all the different media used.

3.11.4.2 Emissions Calculation

To correctly calculate emissions this emission source should be included in a **Stationary Source Calculation** that calculates controlled emissions. Reference Section 2.7 Emissions Calculations for additional instructions and details.

3.12 Woodworking (WOOD)

3.12.1 Source Types

This source category includes all emission sources that generate small wood waste particles (shavings, sander dust, sawdust etc.) by any kind of mechanical manipulation of wood, bark, or wood byproducts. Common woodworking operations include sawing, planing, chipping, shaping, molding, turning on a lathe and sanding. Most installations have a Wood Hobby, Packing & Crating or Civil Engineer Structures shop that may generate this type of emissions. Another sign of a woodworking operation is a cyclone or baghouse attached to the outside of a building.

The images below show an example of a belt sander. As can be seen if there is a dust control system there will be a hose coming off the sander or other woodworking equipment. This hose or tube will then empty into a bin or bag. These hoses usually use a vacuum to pull the dust, however as shown in the picture below there is also sometimes a cyclone that pulls the dust into the collection drum. This picture is not the only type of woodworking equipment, it is just one example.

3.12.2 Potential Data Sources

There are several areas on a typical installation that may conduct woodworking operations. Any area that conducts construction operations using wood, such as crates, pallets, furniture etc. The most common shops that have woodworking operations fall under the following office symbols:

- Wood Hobby
- Packing & Crating
- Carpentry (MXG)
- Civil Engineer Structures Shop

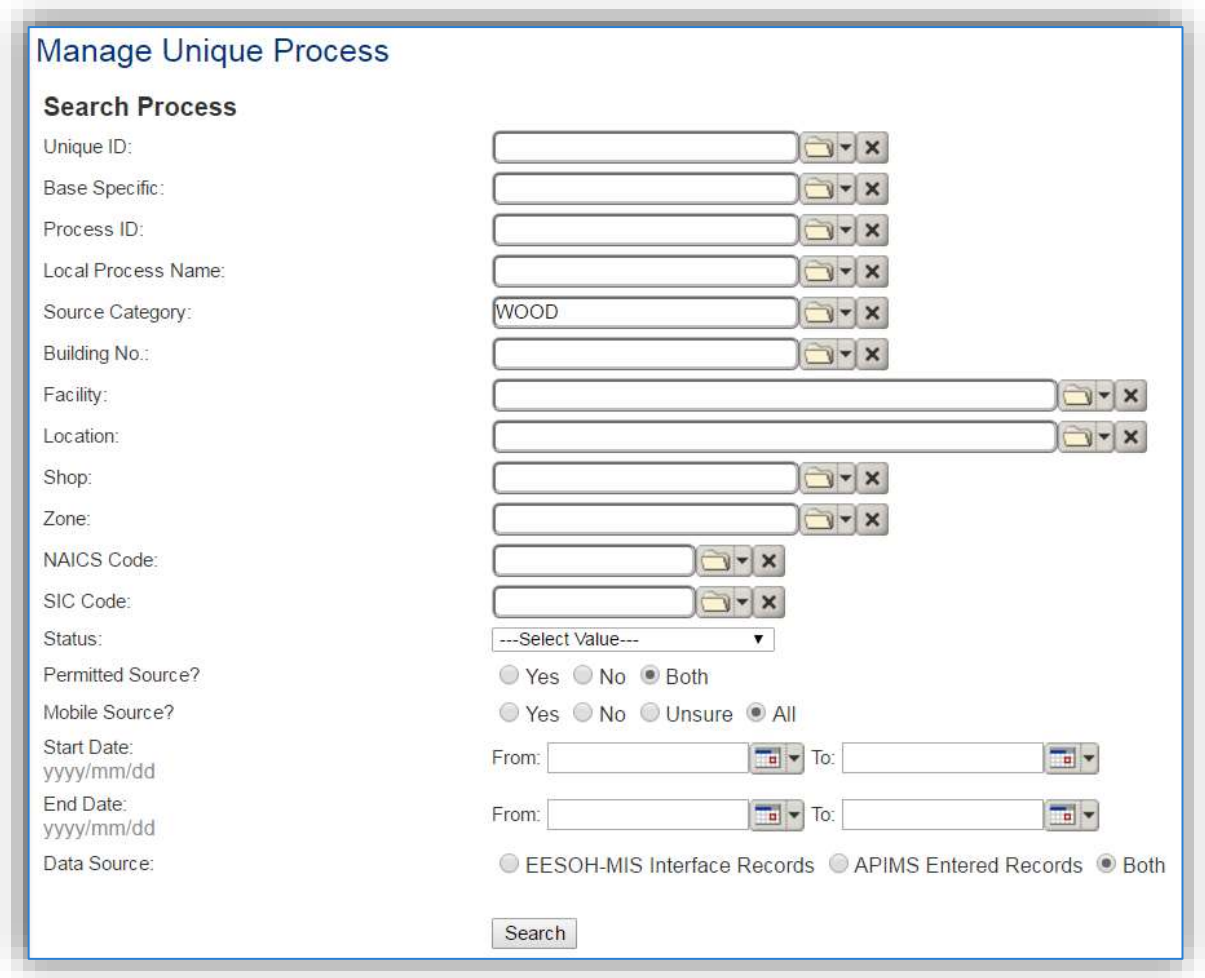
Most woodworking operations have a cyclone or baghouse control device to capture the wood waste into a bin or drum. In this situation the data to collect would be the total pounds of waste generated or collected during the year. If this data is not available it can be estimated by gathering the number of times the waste bin was emptied during the year and the size of the waste bin. If the amount of sawdust collected is only known in volume, (i.e., gallons) the density of the sawdust can be found in Table 26-2 of the AFCEC Stationary Source Guide. If the total number of times the waste bin was emptied is not known, an estimate of how often the waste bin is emptied will suffice. If the shop cannot estimate the frequency at which the waste bin is emptied, assume once per quarter. The other data element that will be required is the control efficiency of the cyclone or baghouse. The control efficiency is usually around 98% or higher.

3.12.3 Standard Source Identification/Characterization

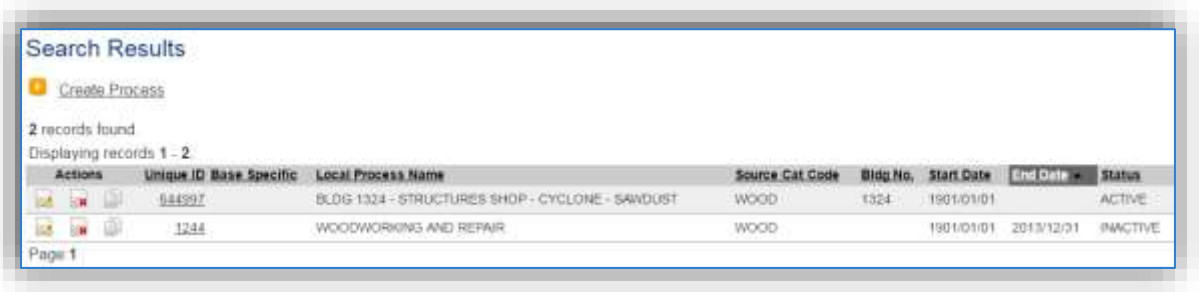
3.12.3.1 Existing Sources

It is important to review the existing sources in each source category on an annual basis at a minimum. Most regulatory agencies require an up to date source and equipment inventory.

Navigate to the Unique Process module of APIMS.



In the **Source Category** search field, type "WOOD" then select the row for Woodworking from the dropdown results. Click the **Search** button.

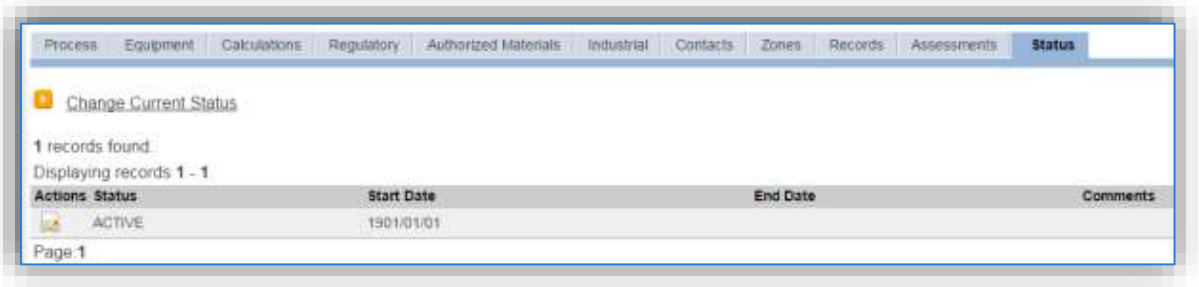


The search results grid will now display all the woodworking processes currently in APIMS.

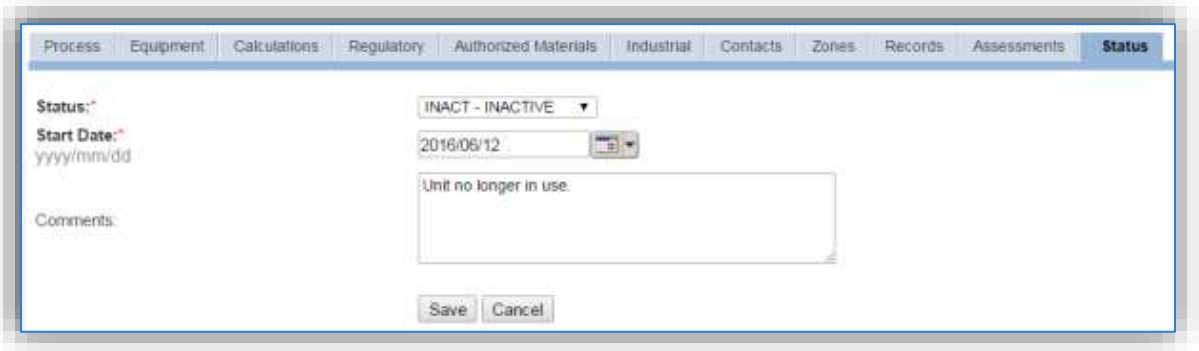
The **Local Process Name**, **Base Specific** and **Bldg No**. can all be used to identify a specific source. This list should be reviewed to make sure the source is configured in a way that it is easy to identify and locate. The status of each source should also be reviewed and kept current.

3.12.3.1.1 Status

If the status of a unit needs to be changed, click the edit icon next to the process. Navigate to the *Status* tab.



Click the Change Current Status hyperlink.



Select the appropriate status from the **Status** dropdown (i.e., ACTIVE, REMOVED or INACTIVE).

For the **Start Date** enter the date at which the status changed.

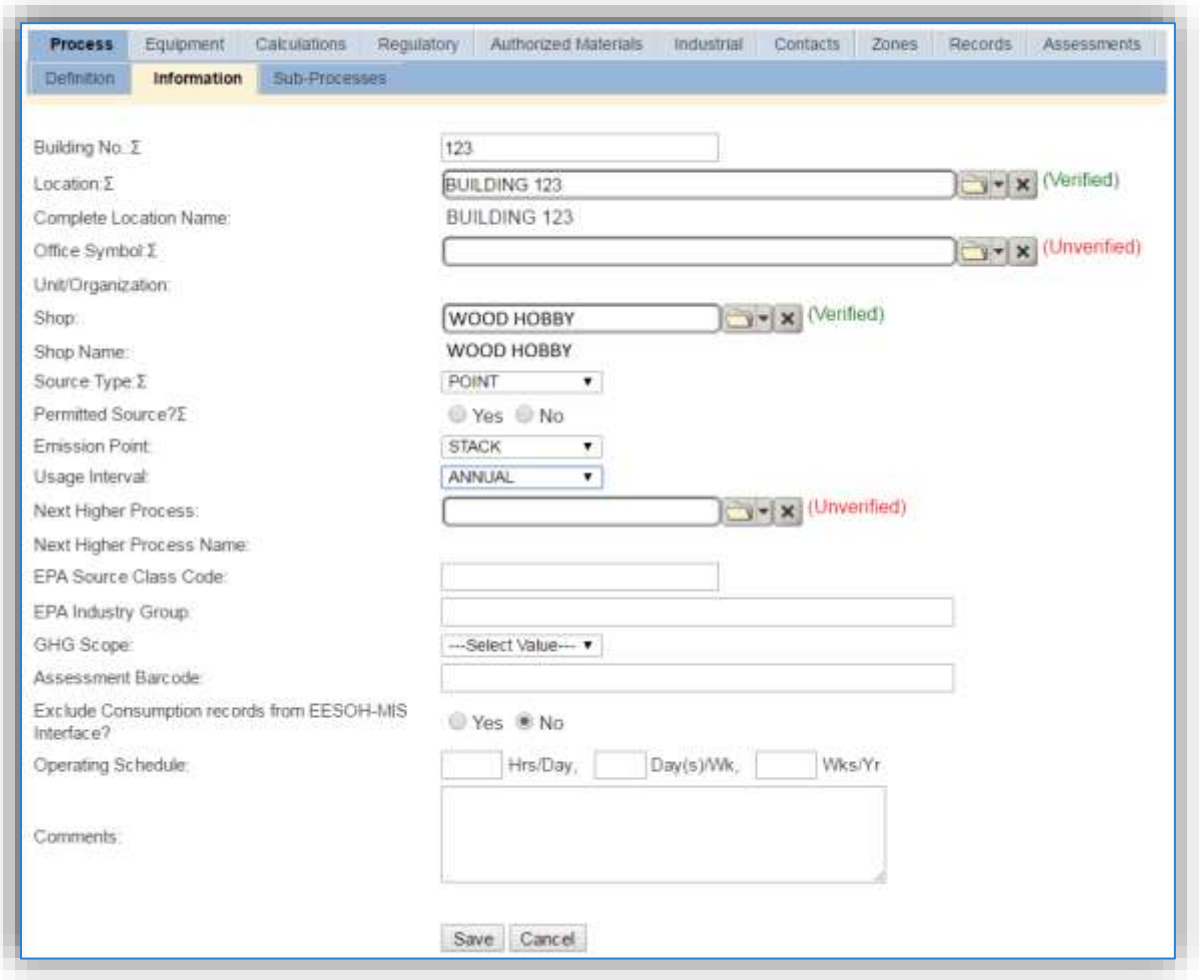
Enter **Comments** that provide insight into why the status changed. These can be very useful for equipment inventories, permit renewals and regulatory reporting. Most regulatory agencies require reporting on unit operation status; this includes any potential time spent offline and reasons for the outage.

Click the **Save** button.

The emissions for a process will only be calculated for the dates the process was in an ACTIVE status. If a source is removed in the middle of a year, the emissions will only be calculated for the part of the year the source was active.

3.12.3.1.2 Information

There are basic data elements that are important to track and maintain for new and existing sources, such as location and source type. This data can be maintained in the Unique Process record on the *Information* sub tab.



The **Building No**. field can be used to specify the building number or general location or area of the emission source, for example, EAST SIDE.

The **Location** field is very important to effectively manage the location and mission of the emission source. This documents where the source is located, in case it needs to be inspected or if the source owner needs to be contacted for pertinent information. For the instructions on how to create a location reference Section 2.2 Location.

The **Shop** is important as it establishes the personnel that are utilizing the equipment on a regular basis and will be the best source of information regarding the unit.

Woodworking operations are categorized as a point source in the **Source Type**, since a ventilation system is typically employed. In most cases, the airborne dust is captured by a ventilation system and control device. Typically, the control device used is a sanding booth with particulate filters, a cyclone, a baghouse (fabric filter), or a cyclone and baghouse in series. The dust captured by the control device is collected in a bin or other container that is emptied when full. This also means that the **Emission Point** would be a STACK.

The **Permitted Source** flag should also be populated to accurately reflect the current regulatory status of the emission source. This flag can be an invaluable tool in roll-up reporting.

The **Usage Interval** should be designated. This source is usually documented on an Annual basis but may be different if it is a permitted source. It is important to populate this field correctly as it will affect how it is documented in the AEI Throughputs module.

The **EPA Source Class Code** is a process level EPA code that describes the equipment and/or operation that is the source of the emissions. Source Classification Codes for woodworking operations is 30703099.

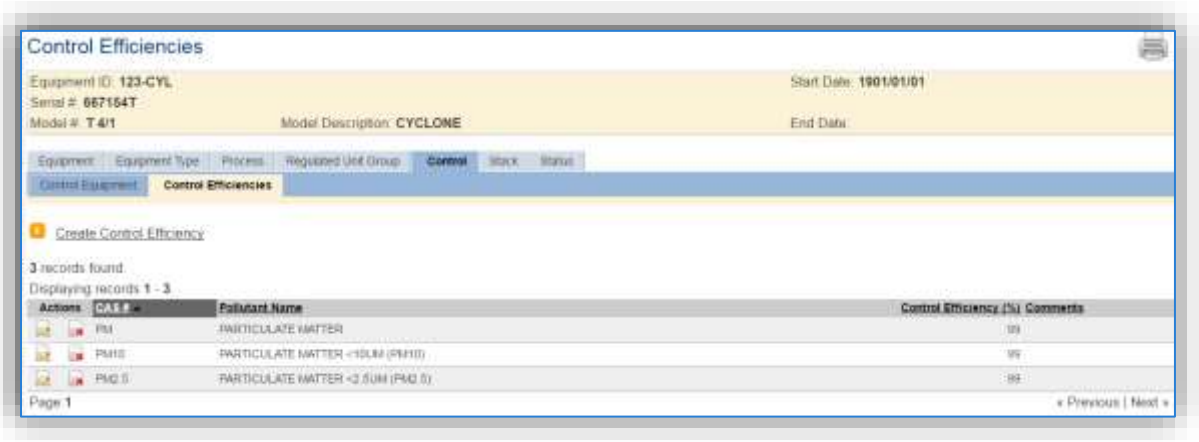
3.12.3.1.3 Sub-Processes

This source does not utilize this functionality.

3.12.3.1.4 Equipment

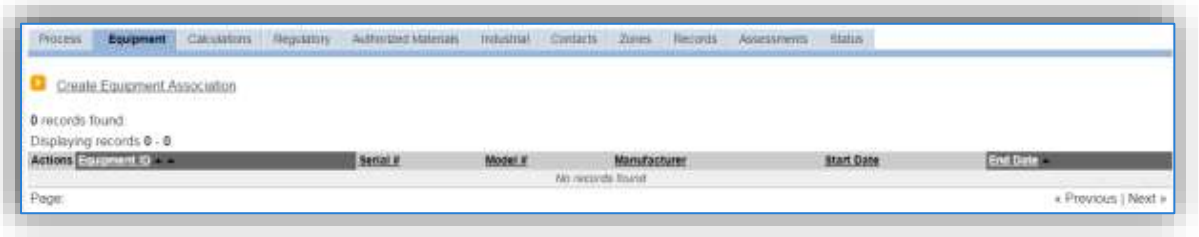
The next tab is the *Equipment* tab. This is especially important for woodworking processes as the calculation in APIMS uses the control efficiency on the equipment associated to the process to accurately calculate emissions. To link the equipment to the process, the equipment must already be entered in APIMS.

In the control tab of the equipment record, the control efficiency for the device needs to be created for PM, PM10 and PM2.5, as shown in the equipment screen below.

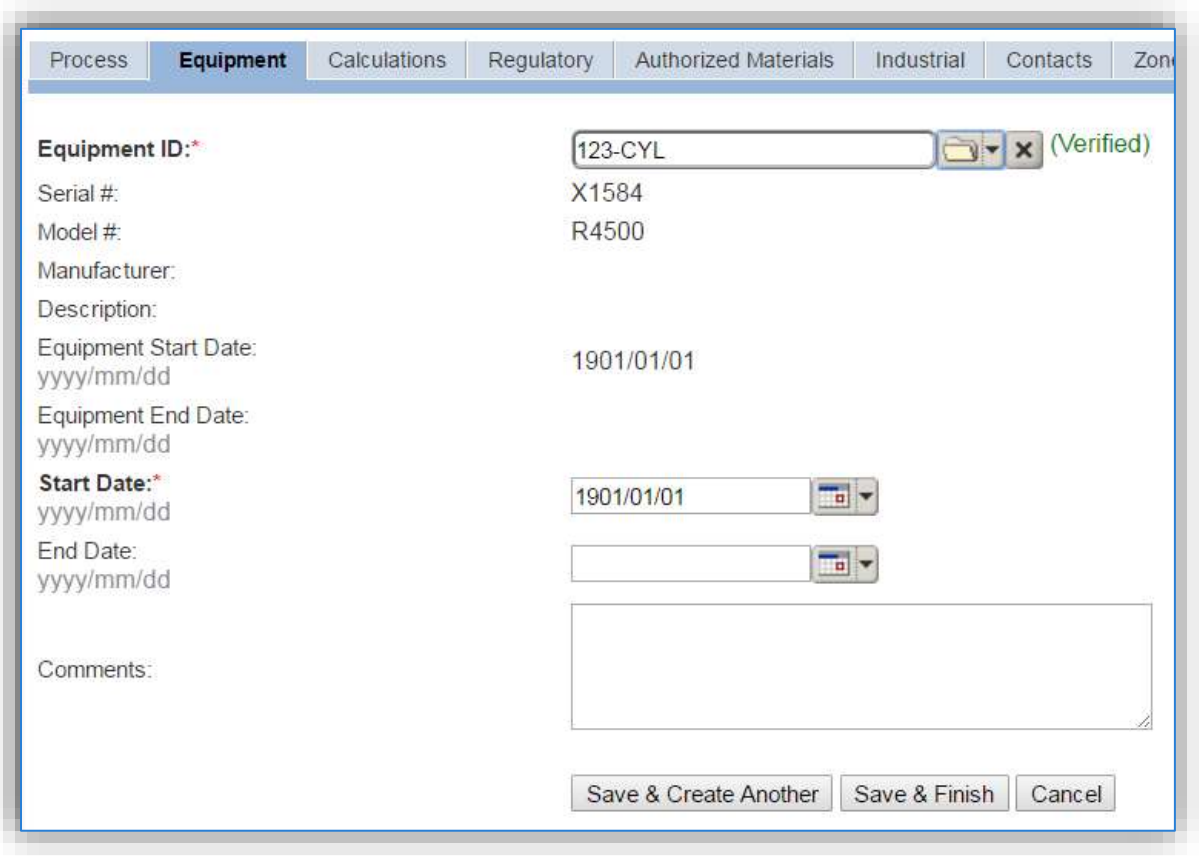


Refer to the Equipment section for specifics on how to properly document equipment in APIMS.

Navigate to the *Equipment* tab of the Unique Process record.



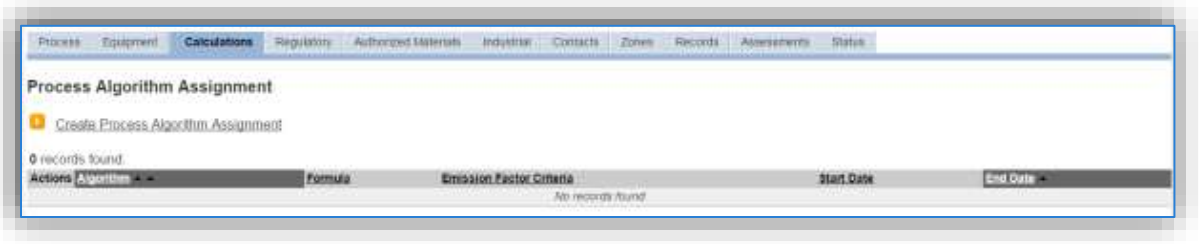
To link the equipment, click on the Create Equipment Association hyperlink.



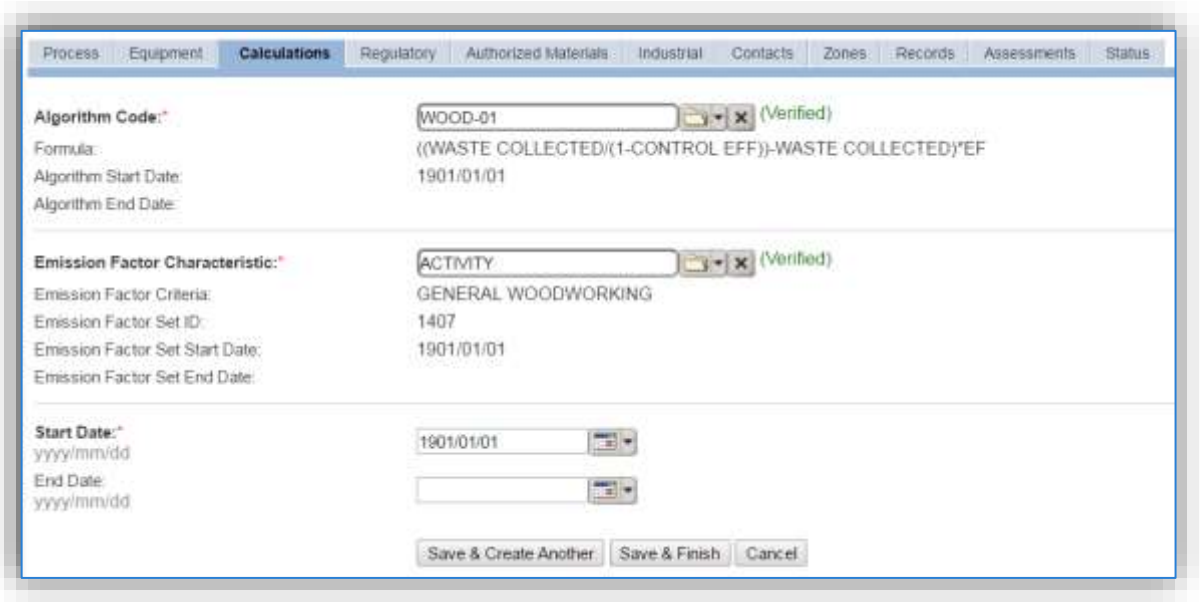
Search for the **Equipment ID** in the list of values, enter the start date and click the **Save & Finish** button.

3.12.3.1.5 Calculations

The next tab is the *Calculations* tab.



To associate an algorithm to the process, click on the Create Process Algorithm Assignment hyperlink.

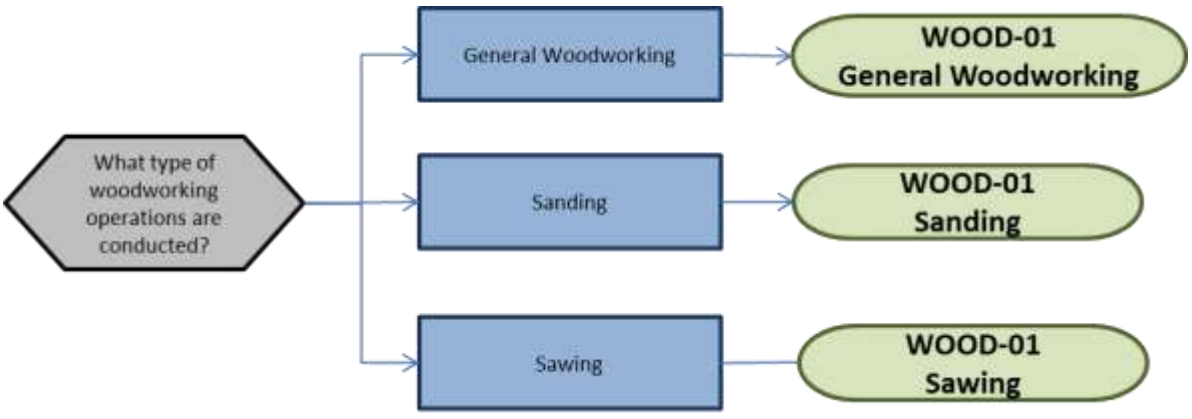


For woodworking processes there is only one standard calculation methodology recommended by the Air Force. This calculation is based on the amount of waste collected in pounds and the control efficiency of the equipment.

If your permit requires a different type of calculation, contact the Air Force Air Quality Subject Matter Expert for approval of the alternative method.

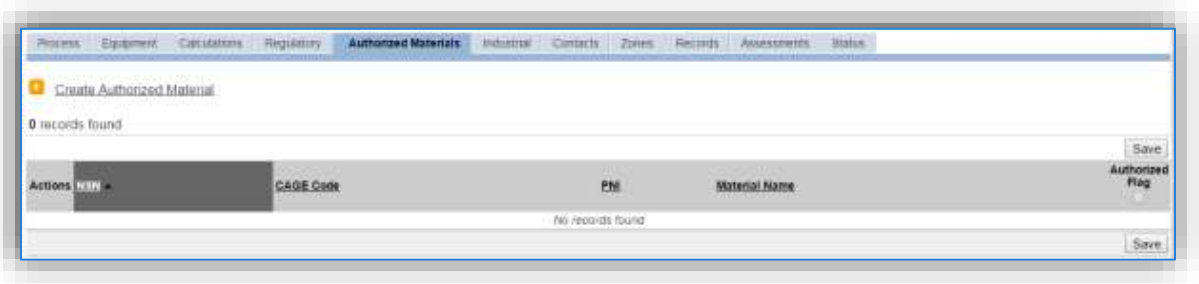
Select the **Algorithm Code** and the **Emission Factor Characteristic** that most closely matches the activity. Use the flowchart below to find the correct Algorithm Code and Emission Factor Characteristic. Enter the **Start Date** to match the start date of the process.

Use the flowchart below to find the correct Algorithm Code and Emission Factor Characteristic.

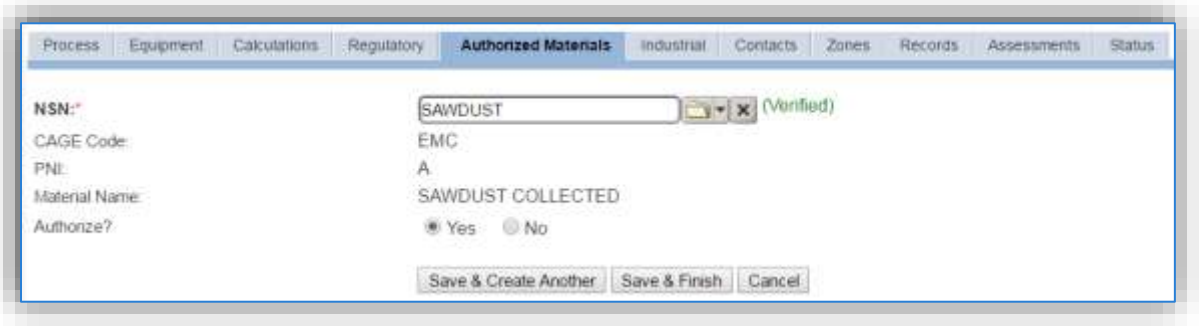


3.12.3.1.6 Materials

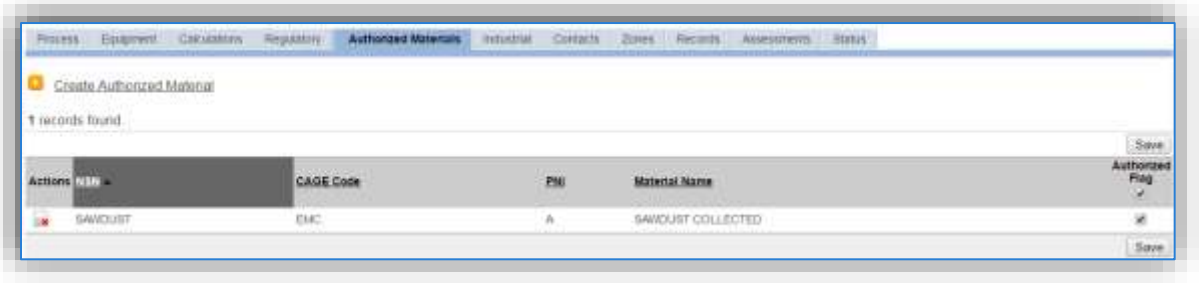
The last step in setting up the Unique Process record is to add SAWDUST as the authorized material on the *Authorized Materials* tab.



To authorize a material for the process, click on the Create Authorized Material hyperlink.



Select SAWDUST from the list of values. If SAWDUST is not available the material record will need to be created. Next select "Yes" to **Authorize** the material, then Save & Finish.



3.12.3.2 New Sources

3.12.3.2.1 Data Collection Sheet

The form on the next page is a printable guide that can be taken out to the location of the source and used to gather all the necessary information from the shop personnel. It can then be used as a guide to help configure the data in APIMS when you return to your office.

Woodworking Data Collection Worksheet

GENERAL INFORMATION

Building Number_____ Shop Name/Function_____

Management Organization_____

GIS Location _____

Is this source in any of your permits? ☐ Yes ☐ No

If yes, does it have an emission unit number or other designation? _____

EQUIPMENT INFORMATION

What type of woodworking operation is conducted?

- ☐ Sanding
- ☐ Sawing
- ☐ Miscellaneous or Other

For enclosed operations, collect the following equipment information:
Manufacturer _____

Model Number_____ Serial Number _____

Is there a filter? ☐ Yes ☐ No

If yes, is there a spec sheet that specifies the control efficiency of PM, PM10 and PM2.5?

USAGE INFORMATION

Are the total pounds of waste generated/collected known? ☐ Yes ☐ No
If yes, collect amount_____

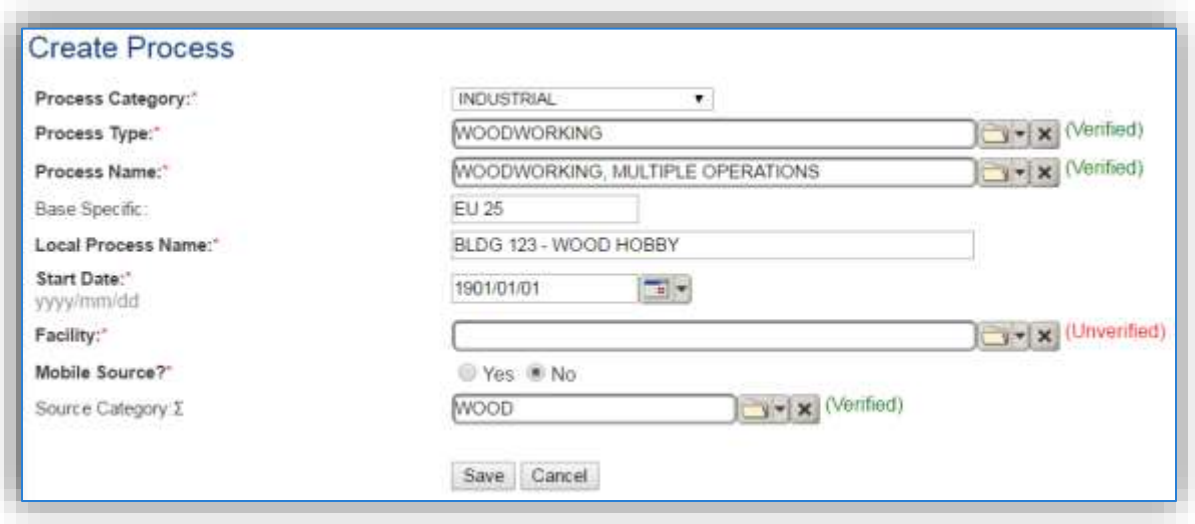
If no, does the shop know how often the waste bin is emptied? ☐ Yes ☐ No
If yes, how often (an estimate may be used if actual number is not known) _____
What is the size of the waste bin?_____ ☐ Pounds ☐ Gallons

If no, ask the shop personnel if once per quarter is an accurate assumption.

3.12.3.2.2 New Source Configuration

In order to properly document this emission source in APIMS, there will need to be a Unique Process record for each woodworking operation.

Navigate to the Unique Process module in APIMS and click the Create New Process hyperlink.



Process Category	Process Type	Process Name	Process ID
INDUSTRIAL	WOODWORKING	LATHES	IWD1602
INDUSTRIAL	WOODWORKING	MORTISING/ROUTING	IWD1708
INDUSTRIAL	WOODWORKING	SANDING, BELT	IWD1888
INDUSTRIAL	WOODWORKING	SANDING, DISK	IWD1889
INDUSTRIAL	WOODWORKING	SANDING, DRUM	IWD1890
INDUSTRIAL	WOODWORKING	SANDING, HAND	IWD1891
INDUSTRIAL	WOODWORKING	SAWING	IWD1898
INDUSTRIAL	WOODWORKING	WOODWORKING HOBBIES	IWD2144
INDUSTRIAL	WOODWORKING	WOODWORKING, MULTIPLE OPERATIONS	IWD2145
INDUSTRIAL	WOODWORKING	WOODWORKING, NOC	IWD2146

Use the table above to determine the appropriate **Process Category**, **Process Type** and **Process Name**. If you are not sure of the exact operation or if there are multiple woodworking activities happening at the same source, select Woodworking, Multiple Operations.

The **Base Specific** field can be used to enter a standard convention identifier that will best help identify the source. If the source is permitted, enter the emission unit ID as designated in the permit.

The **Local Process Name** should be in a standard naming convention for all sources that helps to quickly identify, what the process is, where it is and any other unique attribute. For example, BLDG 123 - WOOD HOBBY.

The **Start Date** should be the date the unit became operational, if this date is not known, enter 1901/01/01 as a default start date.

The **Facility** should be the facility name that is responsible for the source.

The **Mobile Source?** flag should be "NO" as this is considered as stationary source.

All woodworking emission units are assigned to the WOOD **Source Category**.

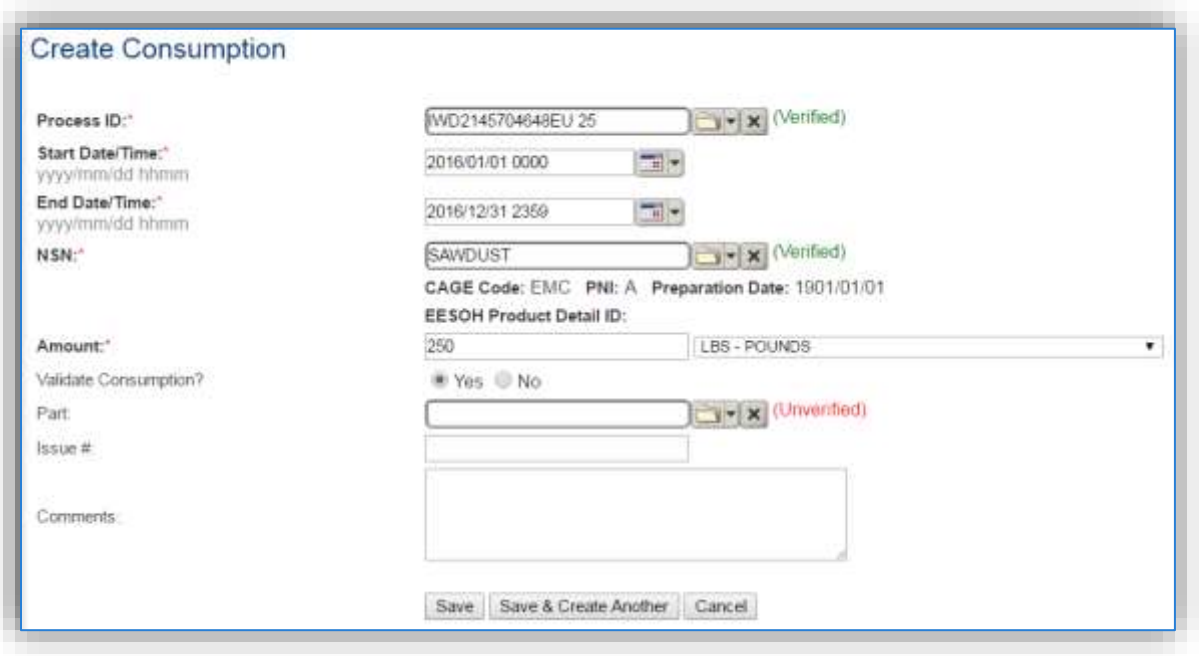
For the population of all other tabs, refer to the Existing Sources sections.

3.12.4 Year-to-Year Maintenance

3.12.4.1 Usage

The consumption for woodworking sources will need to be tracked annually or more frequently if required by a regulatory agency. To correctly document the annual usage for this emission source the consumption should be entered in the Consumption log.

Navigate to the Consumption module and click the Create Consumption hyperlink.



The consumption record should span the entire reporting period as shown above. The material should be SAWDUST and the amount should be the amount of waste collected in pounds. Make sure to select "Yes" to validate the consumption. If the consumption is not validated it will not be included in the emissions calculation.

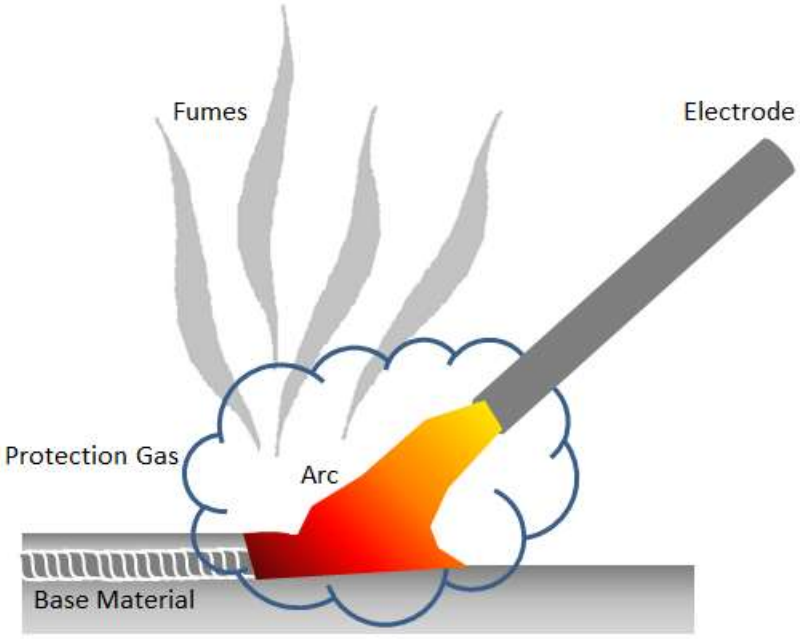
3.12.4.2 Emissions Calculations

To correctly calculate emissions this emission source should be included in a **Stationary Source Calculation** that calculates controlled emissions. Reference Section 2.7 Emissions Calculations for additional instructions and details.

3.13 Welding (WELD)

3.13.1 Source Types

Welding operations are common in all maintenance, transportation and Civil Engineering shops. Welding is defined as the process by which items are joined by melting the parts at the point of contact while simultaneously introducing molten metal from a consumable electrode that forms a strong bond once cooled. There are several types of welding operations with electric arc being the most common. Electric arc welding is also the welding operation with the most potential for emissions, and the only type that has emission factors issued by the EPA. As such, the emissions from the electric arc welding are usually the only ones included in an AEI. Emissions from welding operations result in the release of particulates (PM, PM_{10}, $PM_{2.5}$ and inorganic metallic HAPs). The picture below provides a rough illustration of welding processes.



3.13.2 Potential Data Sources

Welding rods are generally considered hazardous materials and are typically procured through the Hazardous Materials Management System (EESOH-MIS). The best method for collecting usage data is through the EESOH-MIS to APIMS interface. To do this it is important to work with the Hazardous Materials Management personnel to segregate welding rods into a distinct process. The EESOH-MIS process should track only the welding rods and not any other materials in the shop. If the welding rods are authorized to a process that is also authorized for other materials such as solvents the process cannot be accounted for under the WELD source category and must be calculated under the CHEM source category. If the welding rods are a separate process in EESOH-MIS, the process, material and consumption data will automatically populate in APIMS.

When welding rods are not tracked in EESOH-MIS or they are not their own process, the total amount in pounds of welding rods used during welding operations is needed. If the actual amount of welding rods used is not available an estimate of how many rods are used during each welding activity and the frequency of the activity can be used to determine the approximate amount. If that information cannot be determined, an estimate of how many rods and how often they are purchased can be used to extrapolate the amount used during the time period. This process usually is only required to be tracked on an annual basis.

Emissions from welding operations are generally minimal so the most focus should be spent gathering data from shops that conduct welding operations on a regular basis. Shops that only occasionally weld simply will not produce enough emissions to warrant the time spent gathering data. The most common shops that have significant welding operations are as follows:

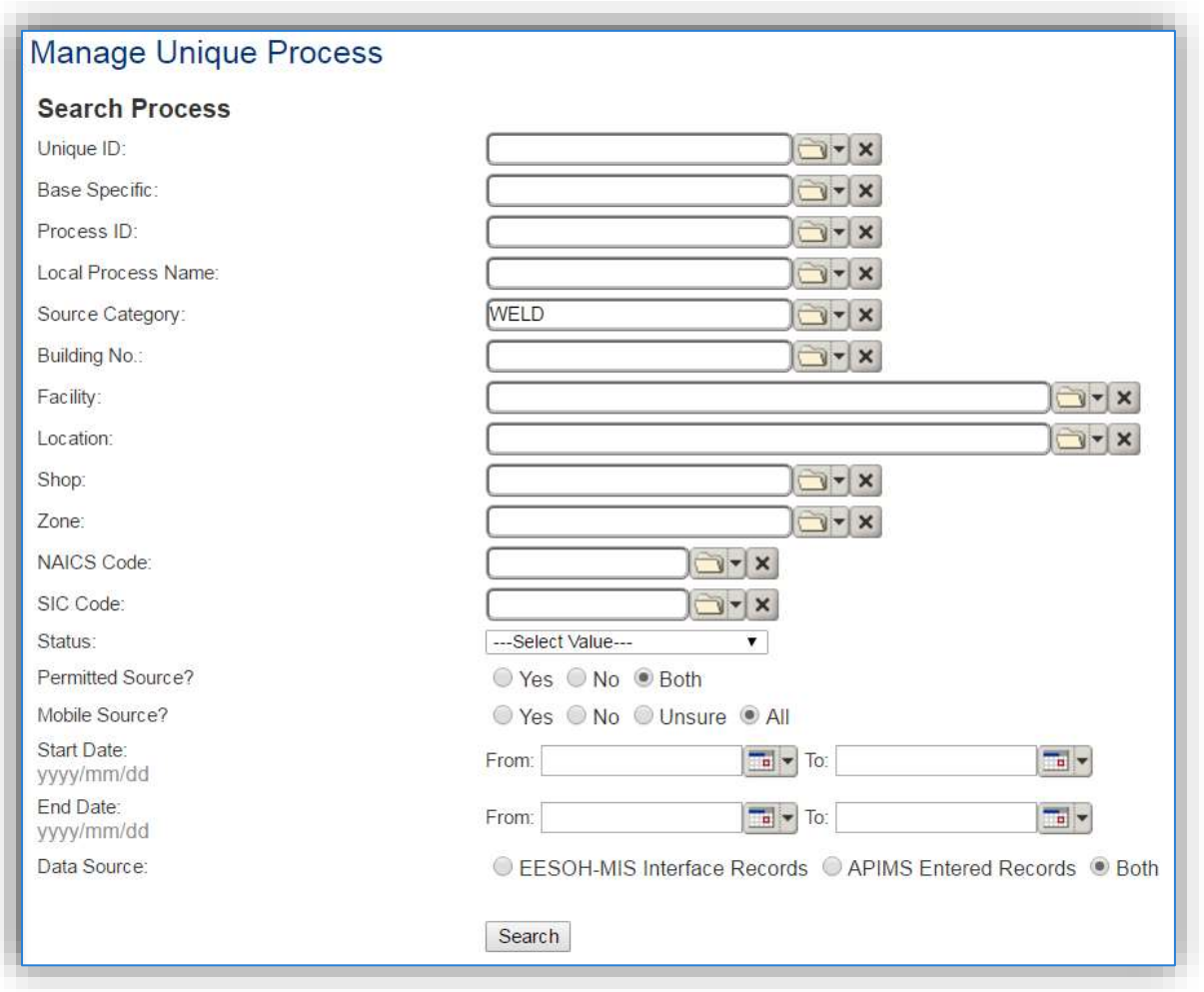
- Transportation Shop
- Force Support Auto Repair/Hobby Shop
- Civil Engineer Structural Shop
- Aircraft Maintenance Shops
- AMXS structural repair
- PMEL
- EMXS Radar

3.13.3 Standard Source Identification/Characterization

3.13.3.1 Existing Sources

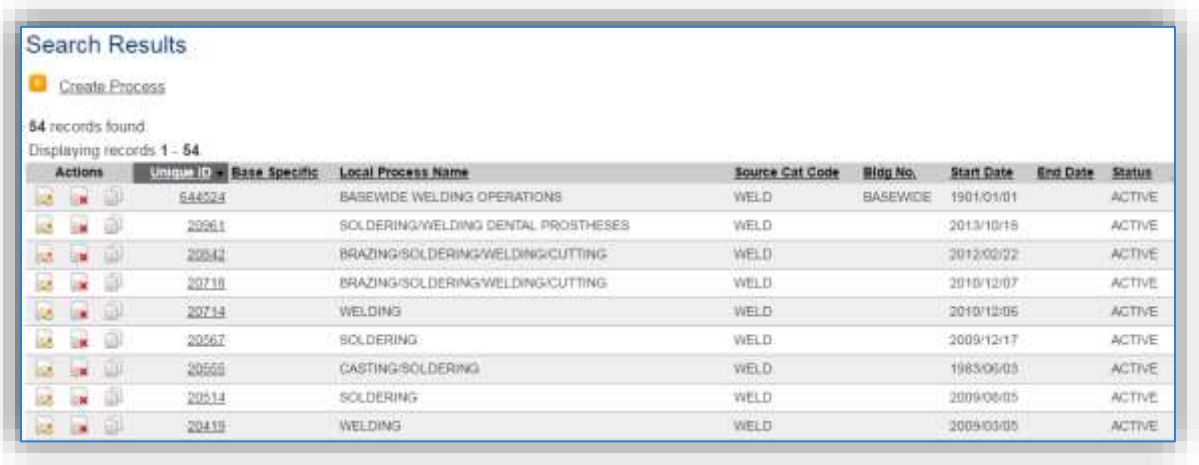
It is important to review the existing sources in each source category on an annual basis at a minimum. Most regulatory agencies require an up to date source and equipment inventory.

Navigate to the Unique Process module of APIMS by clicking **Unique Process** under the **Emission Unit** tab.



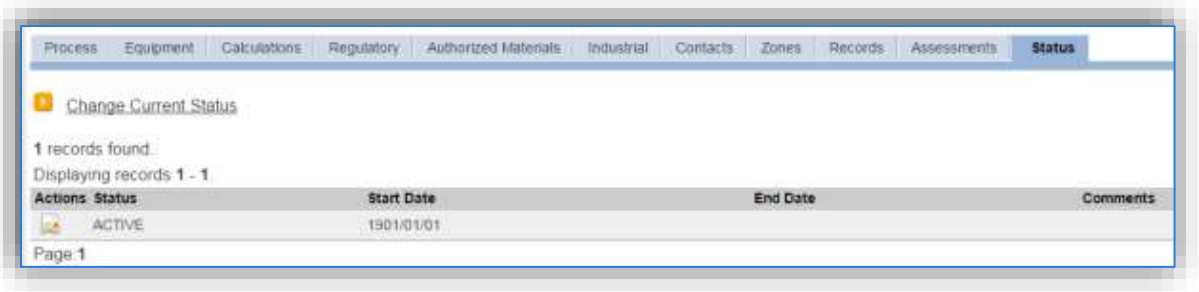
In the **Source Category** search field, type "WELD" then select the row for Welding/Soldering/Cutting from the dropdown results. Click the **Search** button.

The search results grid will now display all the welding processes currently in APIMS. To further filter out the EESOH-MIS processes, use the APIMS Entered Records radio button on the Data Source field in the Search criteria. This will then only display the Next Higher Process associated with welding.

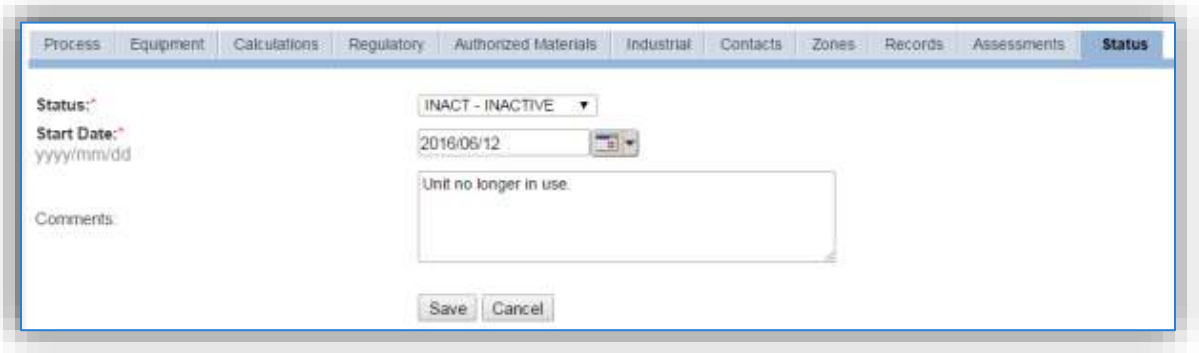


3.13.3.1.1 Status

If the status of a process needs to be changed, click the edit icon next to the process. If this is a process that was entered into APIMS via the EESOH-MIS interface, the process status must be altered in EESOH-MIS.



Navigate to the *Status* tab. Click the Change Current Status hyperlink.



Select the appropriate status from the **Status** dropdown (i.e., ACTIVE, REMOVED or INACTIVE).

For the **Start Date** enter the date at which the status changed.

Enter **Comments** that provide insight into why the status changed. These can be very useful for equipment inventories, permit renewals and regulatory reporting. Most regulatory agencies require

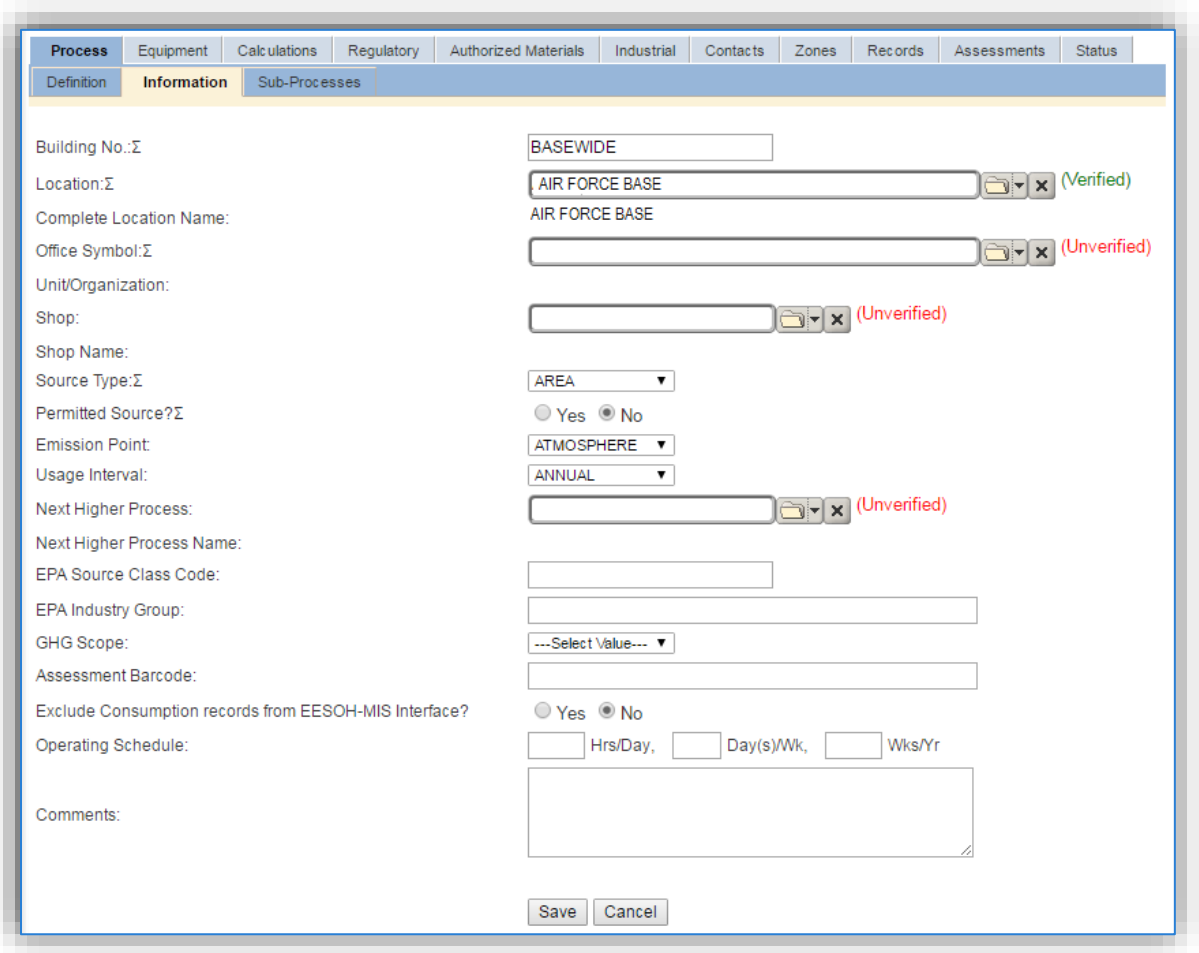
reporting on unit operation status; this includes any potential time spent offline and reasons for the outage.

Click the **Save** button.

The emissions for a process will only be calculated for the dates the process was in an ACTIVE status. If a source is removed in the middle of a year, the emissions will only be calculated for the part of the year the source was active.

3.13.3.1.2 Information

There are basic data elements that are important to track and maintain for new and existing sources, such as location and source type. This data can be maintained in the Unique Process record on the *Information* sub tab.



The **Building No**. field can be used to specify a general location or area of the emission source, for example, BASEWIDE.

The **Location** field can be used to identify the location and mission of the emission source. This documents where the source is located, in case it needs to be inspected or if the source owner needs to be contacted

for pertinent information. For welding processes that are next higher processes or processes that account for all the welding activities on a base, the base name should be used as the Location. For the instructions on how to create a location reference Section 2.2 Location.

Welding operations are categorized as an AREA source in the **Source Type**.

The **Emission Point** should be ATMOSPHERE.

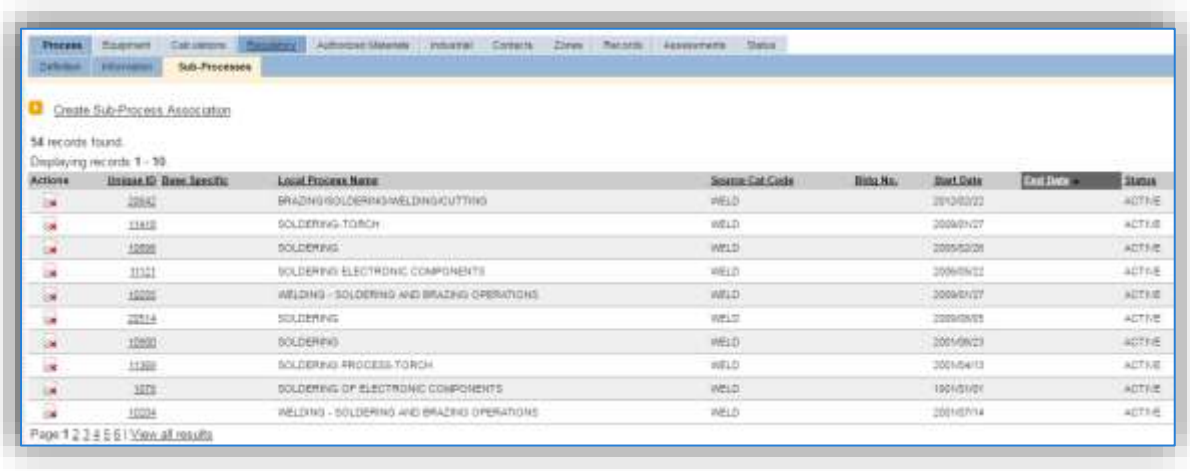
The **Permitted Source** flag should also be populated to accurately reflect the current regulatory status of the emission source. This flag can be an invaluable tool in roll-up reporting.

The **Usage Interval** should be designated. This source is usually documented on an Annual basis but may be different if it is a permitted source. It is important to populate this field correctly as it will affect how it is documented in the AEI Throughputs module.

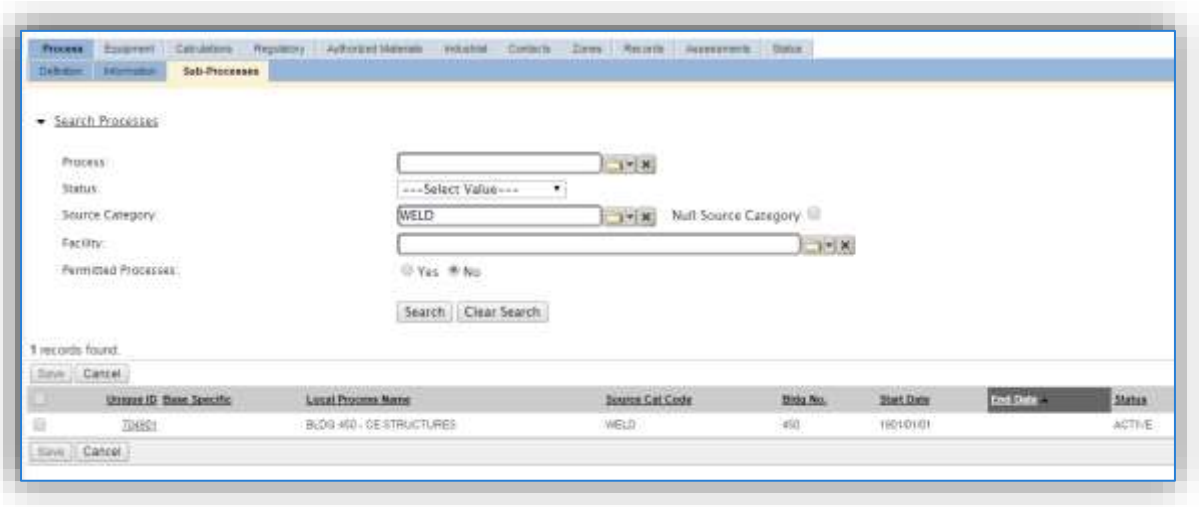
The **EPA Source Class Code** is a process level EPA code that describes the equipment and/or operation that is the source of the emissions. Source Classification Codes for welding operations is 30900500.

3.13.3.1.3 Sub-Processes

For Next Higher Process configuration, navigate to the *Sub-Processes* sub tab.



This sub tab is used to specify which processes should have their consumption rolled up to this next higher process. This list should only include the welding processes that were imported from EESOH-MIS and the data composed of only welding rods authorized, if other chemicals are authorized to the process, do not associate them to this welding process. To add a process, click the Create Sub-Process Association hyperlink.



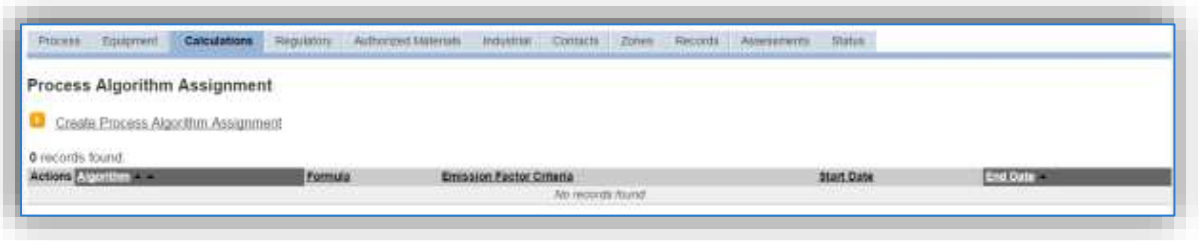
Use the Search Processes fields to refine the search to only the welding processes. Select the checkbox next to the appropriate process(es), then click the **Save** button.

3.13.3.1.4 Equipment

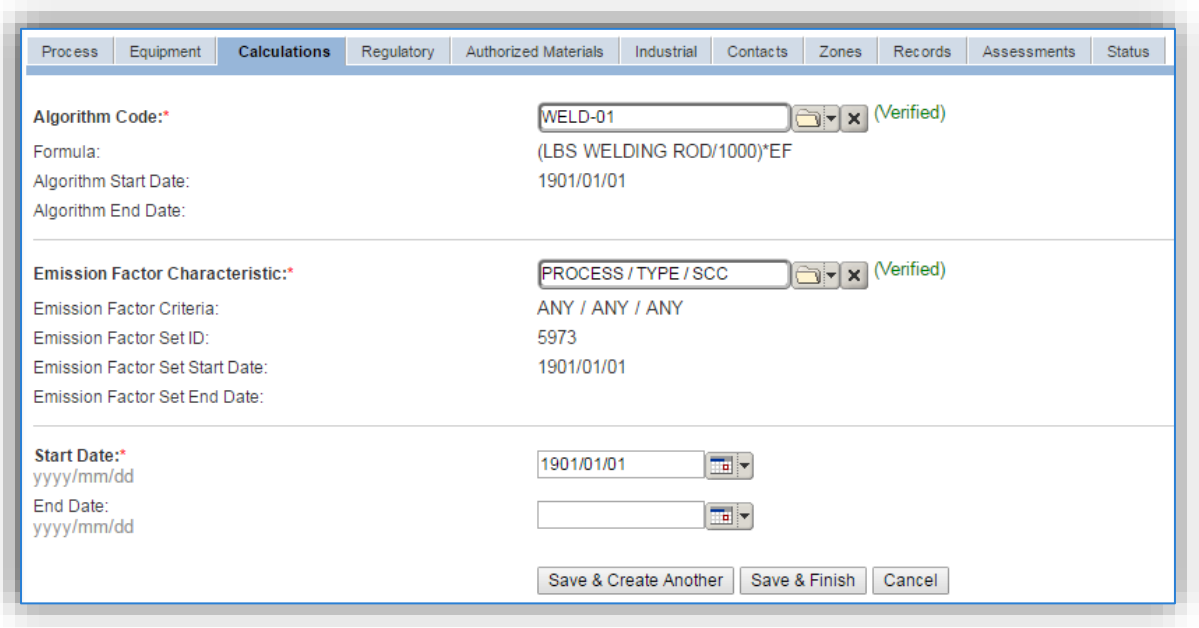
This source does not utilize this functionality.

3.13.3.1.5 Calculations

The next tab is the *Calculations* tab.



To associate an algorithm to the process, click on the Create Process Algorithm Assignment hyperlink.



For welding processes there is only one standard calculation methodology recommended by the Air Force. This calculation is based on the amount of welding rods used in pounds and the EPA provided emission factors for electric arc welding assuming the worst-case scenario for emissions of each pollutant. If your permit requires a different type of calculation, contact the Air Force Air Quality Subject Matter Expert for approval of the alternative method.

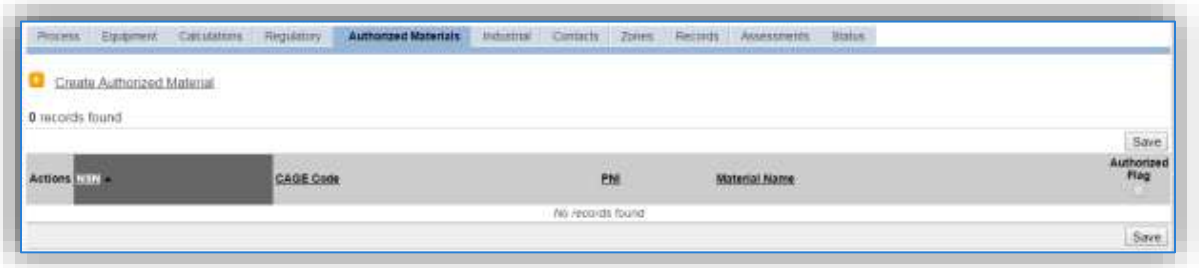
Select the **Algorithm Code** WELD-01 from the list of values. Next select the **Emission Factor Characteristic** available. Enter the **Start Date** to match the start date of the process.

Algorithm Code	Emission Factor Characteristic
WELD-01	ANY / ANY / ANY

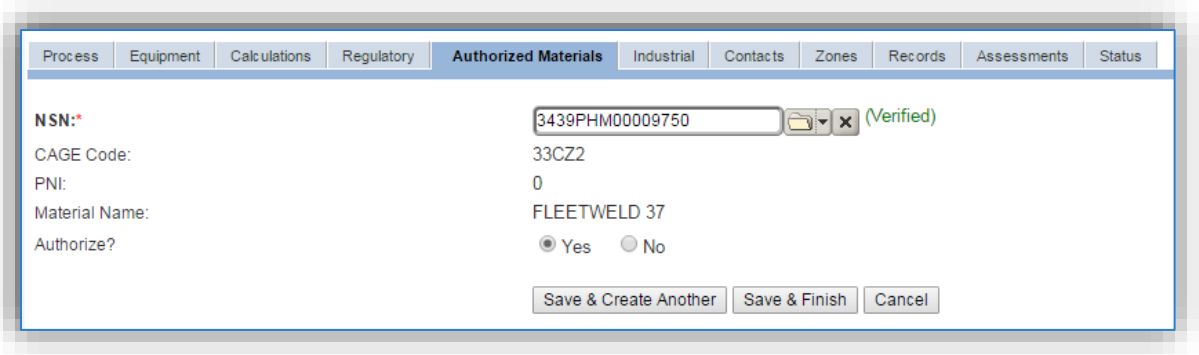
If your permit requires a different type of calculation, contact the Air Force Air Quality Subject Matter Expert for approval of the alternative method.

3.13.3.1.6 Materials

The last step in setting up the Unique Process record is to add SAWDUST as the authorized material on the *Authorized Materials* tab.

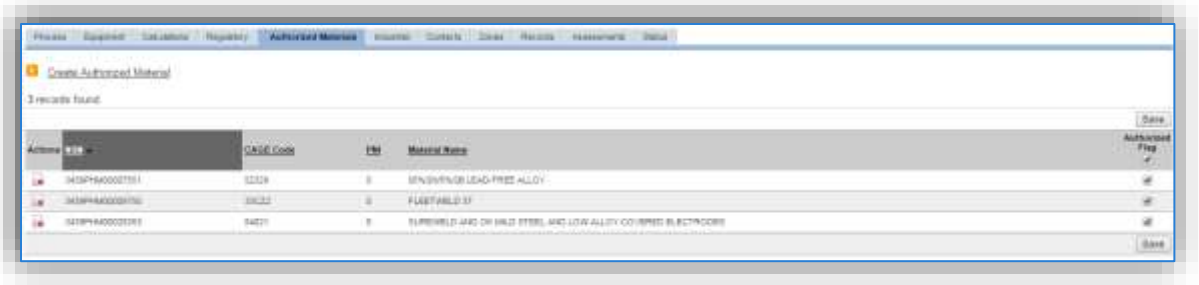


To authorize a material for the process, click on the Create Authorized Material hyperlink.



Select the material record from the list of values, using the **NSN** or **Material Name**. If SAWDUST is not available the material record will need to be created. Next select "Yes" to **Authorize** the material, then **Save & Finish**. Repeat this step for all materials used by the process.

For the next higher process this step is not required as the materials are authorized at the sub processes and are automatically imported by the EESOH-MIS interface.



3.13.3.2 New Sources

3.13.3.2.1 Data Collection Sheet

The form on the next page is a printable guide that can be taken out to the location of the source and used to gather all the necessary information from the shop personnel. It can then be used as a guide to help configure the data in APIMS when you return to your office.

Welding Data Collection Worksheet

GENERAL INFORMATION

Building Number_____ Mission/Purpose_____

Shop Name/Function_____ Management Organization_____

Coordinates: Latitude: _____ Longitude: _____

UTM: _____ Zone _____ Easting _____ Northing ☐ Feet ☐ Meters

Is this source in any of your permits? ☐ Yes ☐ No

If yes, does it have an emission unit number or other designation? _____

USAGE INFORMATION

Are the welding rods/electrodes purchased through EESOH-MIS? ☐ Yes ☐ No

If Yes, specify the shop and process designation in EESOH-MIS
Shop Code _____ Process Code/Name _____

If No, do you know the total amount of welding rods purchased in the last year? ☐ Yes ☐ No

If yes, document amount in pounds_____

If no, ask the shop personnel to estimate how often they weld and how many rods they use each time?

Amount Used (lbs) _____

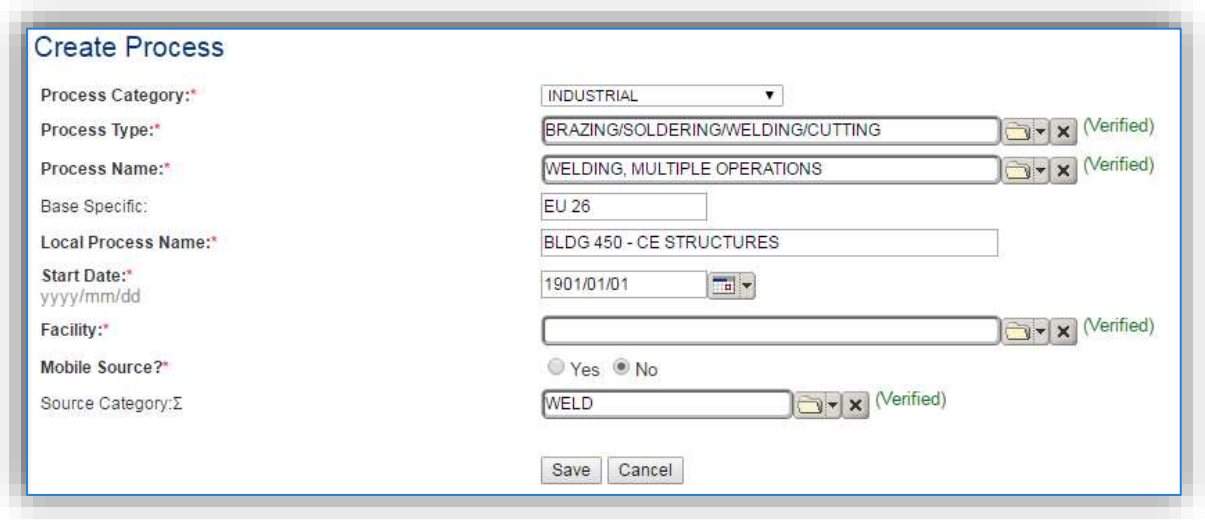
Frequency_____

3.13.3.2.2 New Source Configuration

In order to properly document this emission source in APIMS, there will need to be at least one Unique Process record. If the EESOH-MIS processes are configured correctly to have welding rods separated from other chemicals, a next higher process needs to be configured. If the data is not configured that way then a welding process can be configured for each shop that conducts welding activities or a single process that tracks all welding activities basewide.

3.13.3.2.2.1 *Shop Specific Process*

Navigate to the Unique Process module in APIMS and click the Create New Process hyperlink.



Process Category	Process Type	Process Name	Process ID
INDUSTRIAL	BRAZING/SOLDERING/WELDING/CUTTING	WELDING, MULTIPLE OPERATIONS	IWD1890

Use the values in the table above for the **Process Category**, **Process Type** and **Process Name**.

The **Base Specific** field can be used to enter a standard convention identifier that will best help identify the source. If the source is permitted, enter the emission unit ID as designated in the permit.

The **Local Process Name** should be in a standard naming convention for all sources that helps to quickly identify, what the process is, where it is and any other unique attribute. For example, BLDG 123 – CE STRUCTURES.

The **Start Date** should be the date the unit became operational. If this date is not known, enter 1901/01/01 as a default start date.

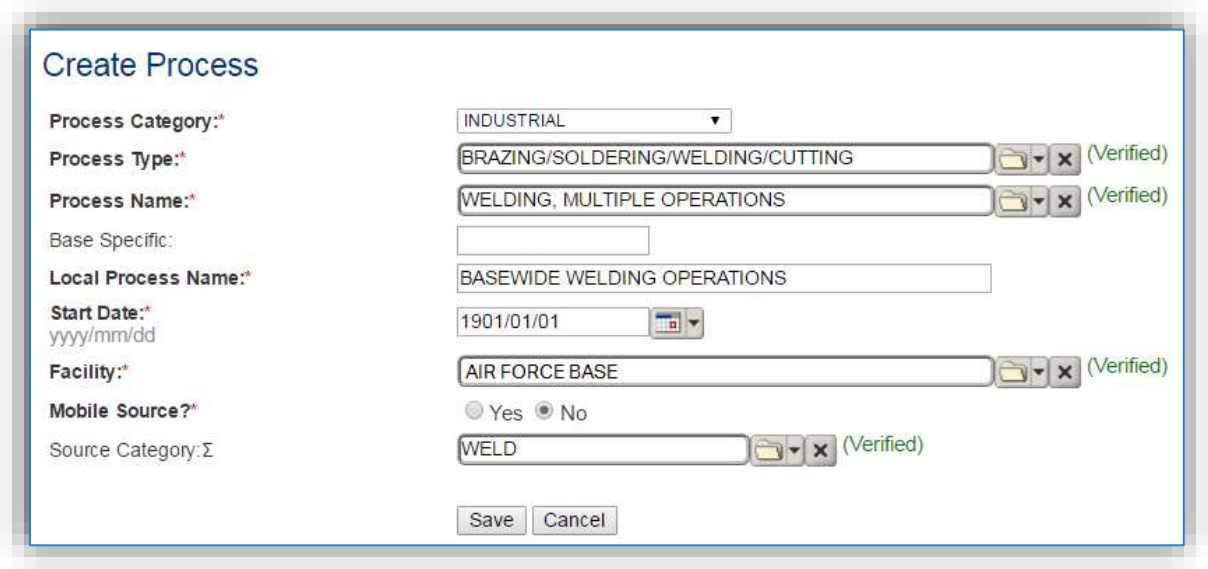
The **Facility should** be the facility name that is responsible for the source or sources.

All welding activities are stationary sources that are assigned to the WELD **Source Category**.

For the population of all other tabs, refer to the Existing Sources sections.

3.13.3.2.2.2 Next Higher Process

Navigate to the Unique Process module in APIMS and click the Create New Process hyperlink.



Process Category	Process Type	Process Name	Process ID
INDUSTRIAL	BRAZING/SOLDERING/WELDING/CUTTING	WELDING, MULTIPLE OPERATIONS	IWD1890

Use the values in the table above for the **Process Category**, **Process Type** and **Process Name**.

The **Base Specific** field can be used to enter a standard convention identifier that will best help identify the source. If the source is permitted, enter the emission unit ID as designated in the permit.

The **Local Process Name** should be in a standard naming convention for all sources that helps to quickly identify what the process is for example, BASEWIDE WELDING OPERATIONS.

The **Start Date** should be the date the unit became operational, if this date is not known, enter 1901/01/01 as a default start date.

The **Facility** should be the facility name that is responsible for the source or sources.

The **Mobile Source?** flag should be "NO" as this is considered as a stationary source.

All welding activities are assigned to the WELD **Source Category**.

For the population of all other tabs, refer to the Existing Sources sections.

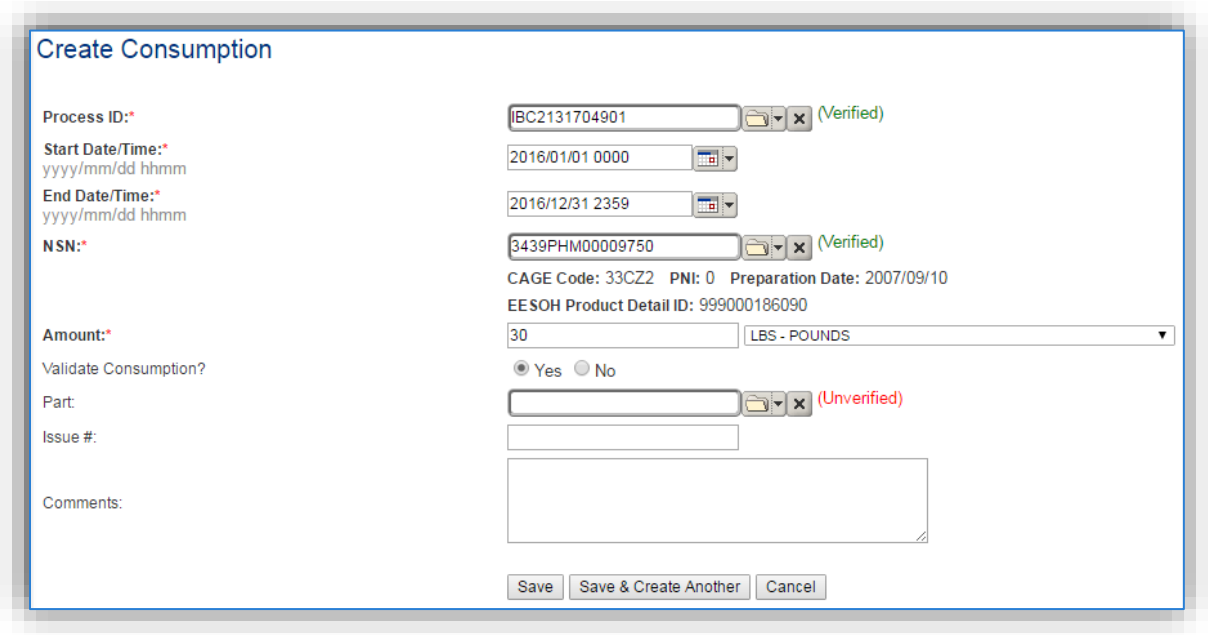
3.13.4 Year-to-Year Maintenance

3.13.4.1 Usage

3.13.4.1.1 Shop Specific Process

The consumption for welding sources will need to be tracked annually or more frequently if required by a regulatory agency. To correctly document the annual usage for this emission source the consumption should be entered in the Consumption log.

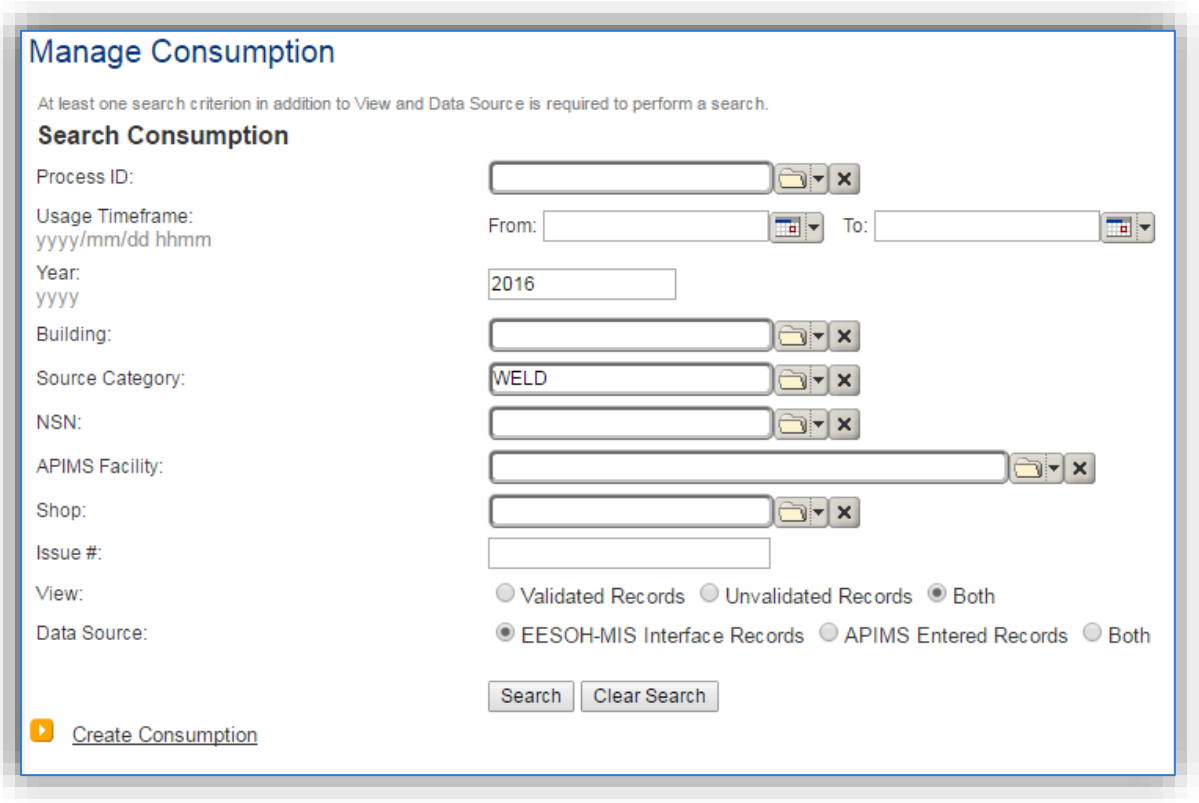
Navigate to the Consumption module and click the Create Consumption hyperlink.



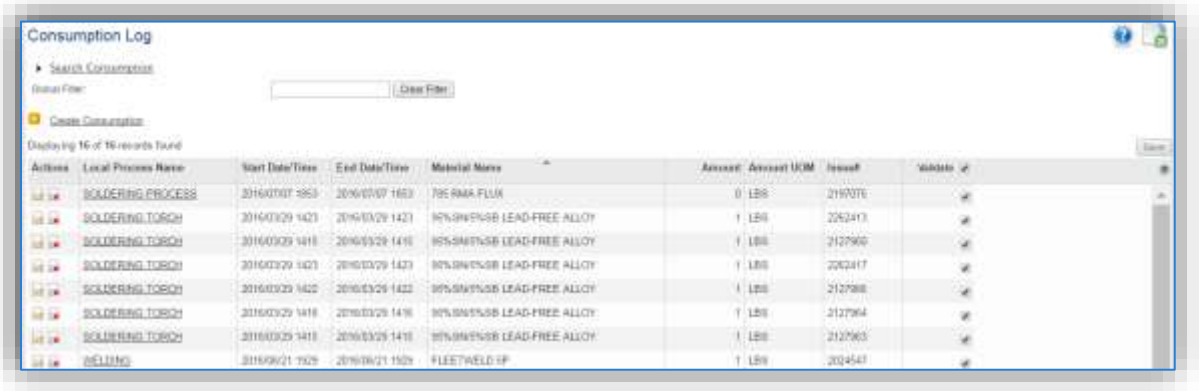
The consumption record should span the entire reporting period as shown above. The **Amount** should be recorded in pounds. Make sure to select "Yes" to **Validate Consumption**. If the consumption is not validated it will not be included in the emissions calculation. Repeat this step for all the different materials used during the reporting period.

3.13.4.1.2 Next Higher Process

For the Next Higher Process configuration, the consumption is already imported from the EESOH-MIS interface, however it is not validated. The consumption must be validated in the Consumption log.



Use the search criteria to narrow the search results. It is suggested to use the Source Category, Data Source and Year or Usage Timeframe to filter the results.



Check the checkbox next to each material then click **Save** to validate the consumption. Only consumption that is validated will be included in emissions calculations.

3.13.4.2 Emissions Calculations

If the process utilizes EESOH-MIS data then it should be included in the **EESOH-MIS Calculation**, otherwise this emission source should be included in a **Stationary Source Calculation** that calculates controlled emissions. Reference Section 2.7 Emissions Calculations for additional instructions and details.

3.14 Fire Training (FIRE)

3.14.1 Source Types

This source category includes the activities related to the training of military fire fighters. Most fire training is centralized to the Fire Training Academy although many bases also have training facilities at a smaller scale used for periodic refresher training. This training is performed in live fire training pits, which usually include a mock-up metal structure, such as an aircraft, vehicle, or building. These activities involve the use of live fires fueled by liquid propane, JP-8, JP-4 or Tekflame to create a realistic fire scenario. Additionally, fire fighter training may also involve the burning of wooden pallets or hay to sustain fires for the appropriate amount of time needed for training. The emissions produced during this caused by the open combustion of the fuel and the burning of the material (i.e. wood, hay). The pollutants emitted are both criteria pollutants and HAPs.

3.14.2 Potential Data Sources

The most common shops that conduct fire training exercises fall under the following office symbol:

- Fire Protection Flight (CES)

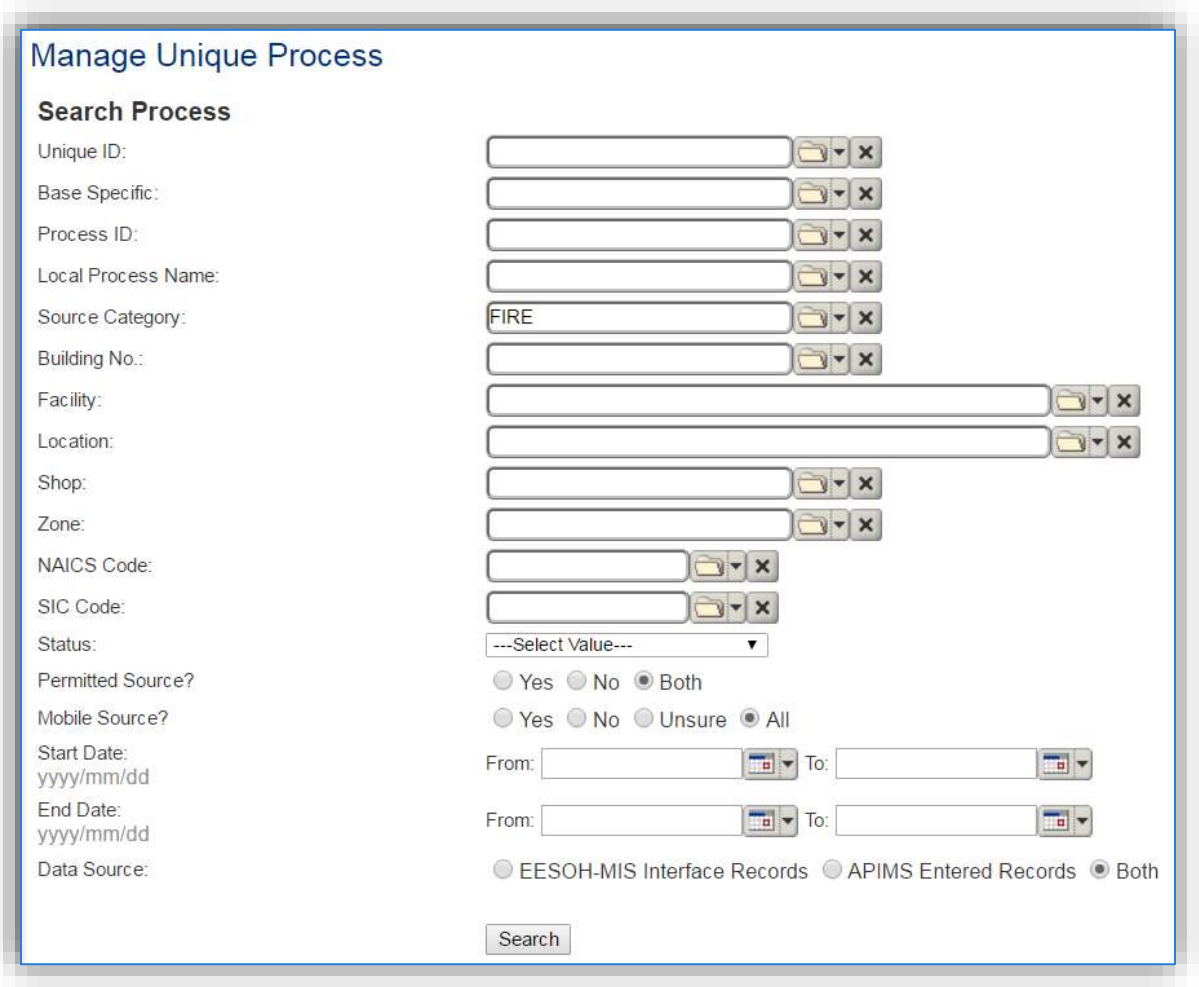
There are two different quantities tracked to calculate the emissions from fire training. The first is the quantity of liquid fuel (e.g. JP-8, LPG etc.) used in gallons; the second is the amount of solid fuel, which is the pounds of wood or hay burned. These amounts are usually readily available, especially the amount of fuel used. The amount of material burned can be estimated if the actual amount is not known. Emissions from fire training are usually conducted on a periodic basis and are therefore tracked on an annual basis, unless otherwise specified by permits or regulations.

3.14.3 Standard Source Characterization

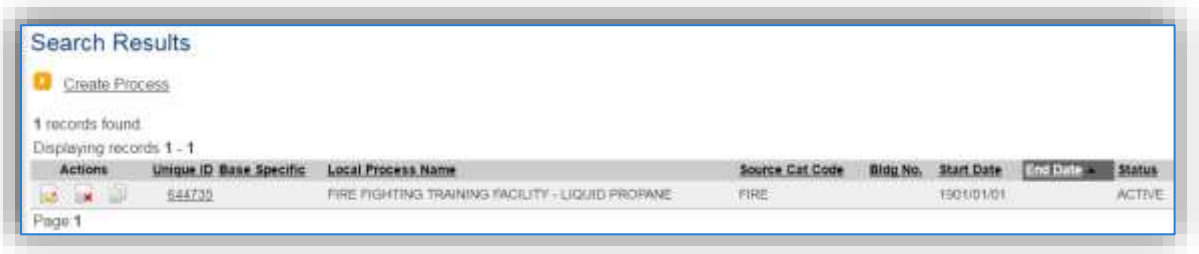
3.14.3.1 Existing Sources

It is important to review the existing sources in each source category on an annual basis at a minimum. Most regulatory agencies require an up to date source and equipment inventory.

Navigate to the Unique Process module of APIMS.



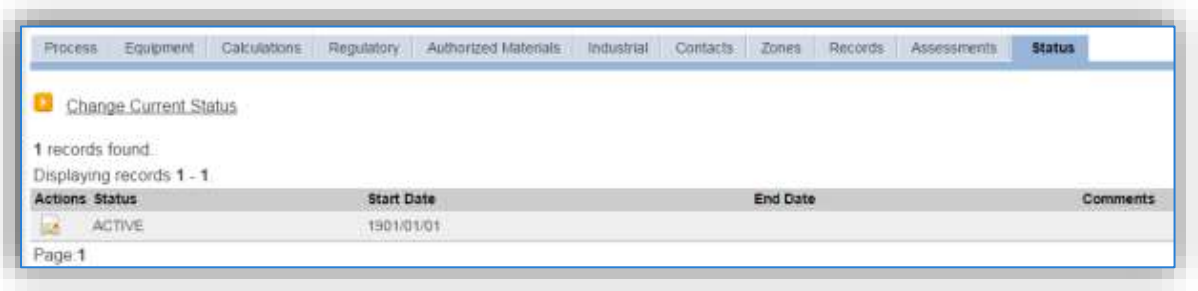
In the **Source Category** search field, type "FIRE" then select the row for Fire Training from the dropdown results. Click the **Search** button.



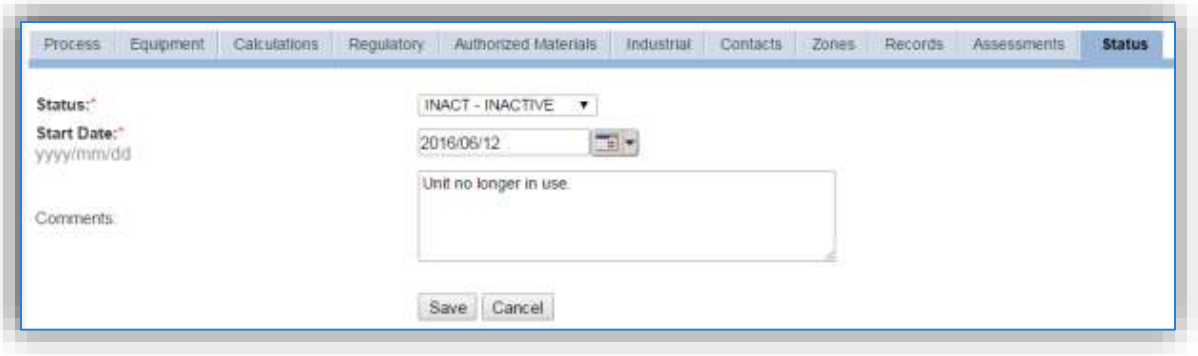
The search results grid will now display all the fire training processes currently in APIMS.

3.14.3.1.1 Status

If the status of a process needs to be changed, click the edit icon next to the process.



Navigate to the *Status* tab. Click the Change Current Status hyperlink.



Select the appropriate status from the **Status** dropdown (i.e., ACTIVE, REMOVED or INACTIVE).

For the **Start Date** enter the date at which the status changed.

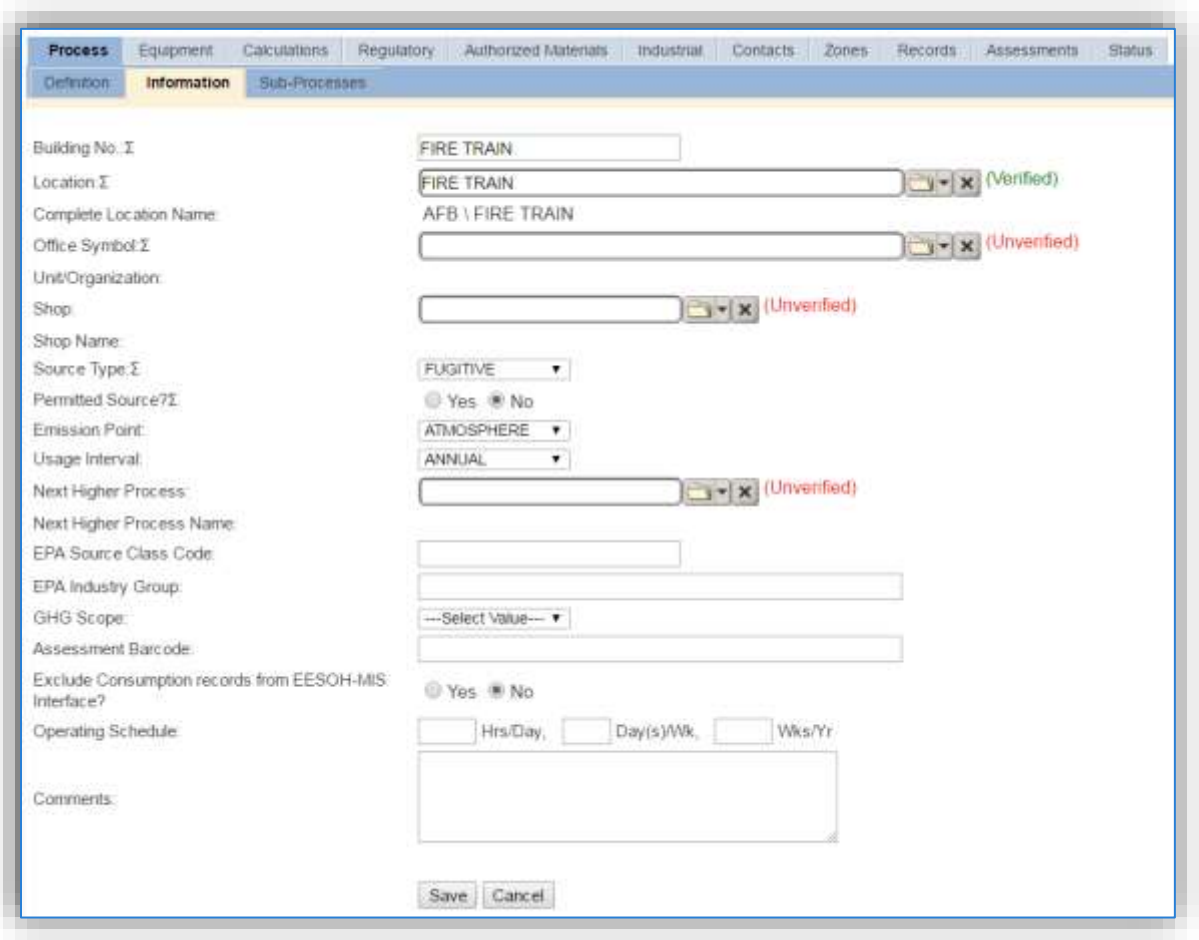
Enter **Comments** that provide insight into why the status changed. These can be very useful for equipment inventories, permit renewals and regulatory reporting. Most regulatory agencies require reporting on unit operation status; this includes any potential time spent offline and reasons for the outage.

Click the **Save** button.

The emissions for a process will only be calculated for the dates the process was in an ACTIVE status. If a source is removed in the middle of a year, the emissions will only be calculated for the part of the year the source was active.

3.14.3.1.2 Information

There are basic data elements that are important to track and maintain for new and existing sources, such as location and source type. This data can be maintained in the Unique Process record on the *Information* sub tab.



The **Building No**. field can be used to specify a general location or area of the emission source, for example, FIRE TRAIN.

The **Location** field is very important to effectively manage the location and mission of the emission source. This documents where the source is located, in case it needs to be inspected or if the source owner needs to be contacted for pertinent information. For the instructions on how to create a location reference Section 2.2 Location.

Fire training operations are categorized as a FUGITIVE source in the **Source Type**. Since these activities are conducted in an open-air pit the **Emission Point** would be ATMOSPHERE.

The **Permitted Source** flag should also be populated to accurately reflect the current regulatory status of the emission source. This flag can be an invaluable tool in roll-up reporting.

The **Usage Interval** should be designated; this source is usually documented on an ANNUAL basis but may be different if it is a permitted source. It is important to populate this field correctly as it will affect how it is documented in the AEI Throughputs module.

The **EPA Source Class Code** is a process level EPA code that describes the equipment and/or operation that is the source of the emissions. Source Classification Codes for firefighting training is 2810035000.

3.14.3.1.3 Sub-Processes

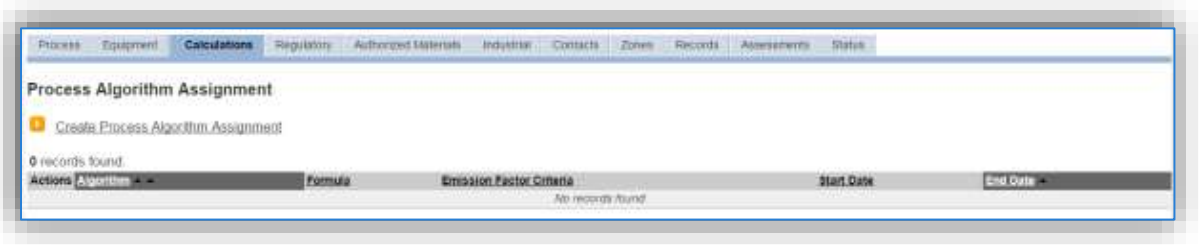
This source does not utilize this functionality.

3.14.3.1.4 Equipment

This source does not utilize this functionality.

3.14.3.1.5 Calculations

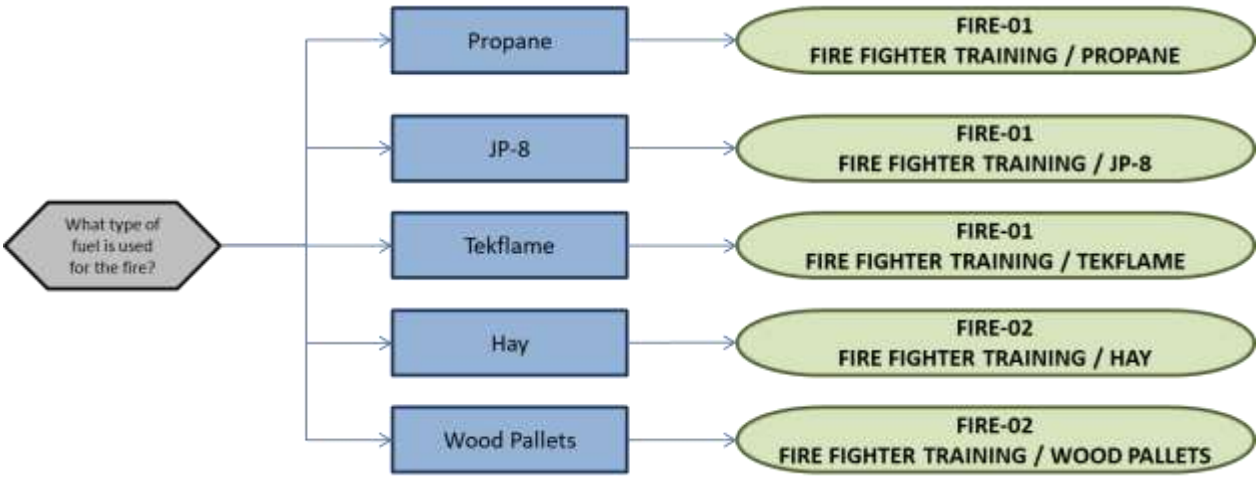
The next tab is the *Calculations* tab.



To associate an algorithm to the process, click on the Create Process Algorithm Assignment hyperlink.

For fire training there are two standard calculation methodologies recommended by the Air Force. The first (FIRE-01) is used to calculate emissions from liquid fuel combustion with the usage tracked in gallons. The second (FIRE-02) is used to calculate emissions from the burning of materials such as wood with the usage tracked in pounds.

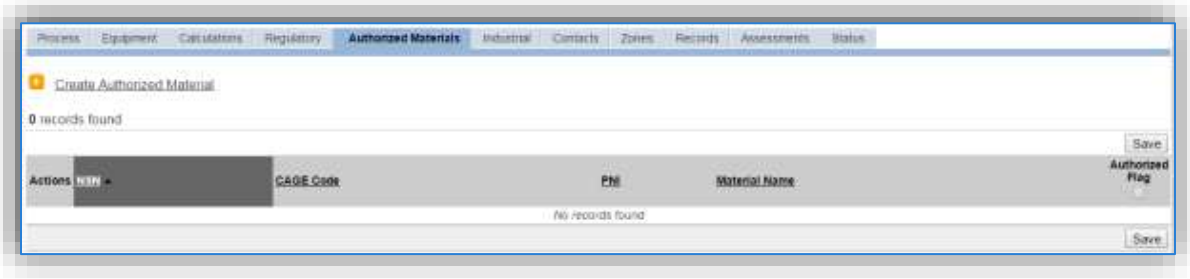
Use the flowchart below to find the correct Algorithm Code and Emission Factor Characteristic.



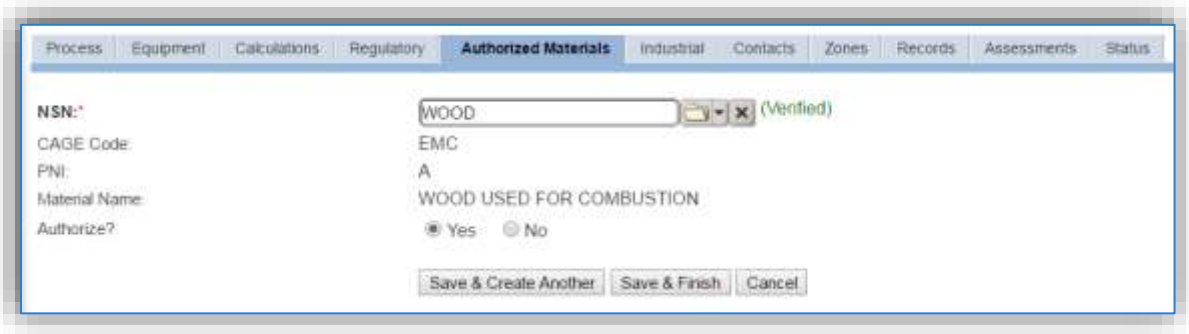
If your permit requires a different type of calculation, contact the Air Force Air Quality Subject Matter Expert for approval of the alternative method.

3.14.3.1.6 Materials

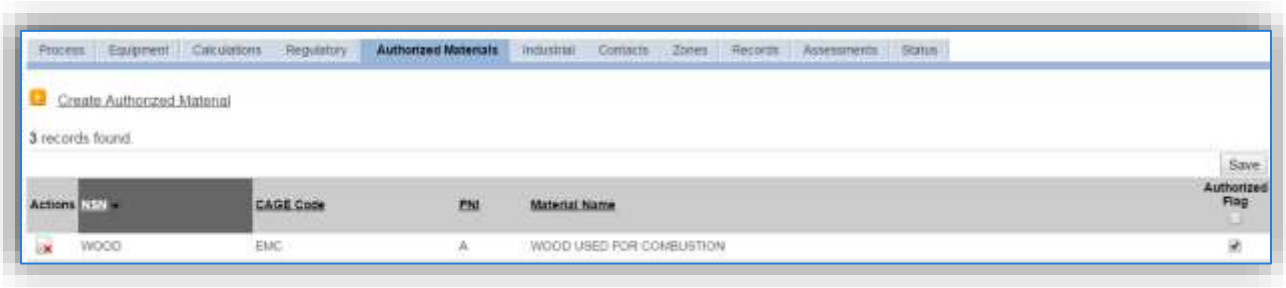
The last step in setting up the Unique Process record is to add the fuel as the authorized material on the *Authorized Materials* tab.



To authorize a material for the process, click on the Create Authorized Material hyperlink.



Select the fuel (i.e. WOOD, HAY, JP-8, PROPANE, or TEKFLAME) from the list of values. If the fuel is not available, the material record will need to be created. Next select "Yes" to **Authorize** the material, then **Save & Finish**.



3.14.3.2 New Sources

3.14.3.2.1 Data Collection Sheet

The form on the next page is a printable guide that can be taken out to the location of the source and used to gather all the necessary information from the shop personnel. It can then be used as a guide to help configure the data in APIMS when you return to your office.

Fire Data Collection Worksheet

GENERAL INFORMATION

Building Number_____ Mission/Purpose_____

Shop Name/Function_____ Management Organization_____

Coordinates: Latitude: _____ Longitude: _____

UTM: _____ Zone _____ Easting _____ Northing ☐ Feet ☐ Meters

Is this source in any of your permits? ☐ Yes ☐ No

If yes, does it have an emission unit number or other designation? _____

USAGE INFORMATION

What type of fuel or fuels are burned?

- ☐ Propane
- ☐ JP-8
- ☐ Tekflame
- ☐ Hay
- ☐ Wood Pallets

Do they know the total amounts of each fuel burned during the year?

If yes, collect the data

Fuel: ☐ Propane ☐ JP-8 ☐ Tekflame ☐ Hay ☐ Wood Pallets

Amount Used _____ ☐ Lbs ☐ Gal

If no, do they know how often they conduct fire training and an estimate of the materials and amounts used each time?

Fuel: ☐ Propane ☐ JP-8 ☐ Tekflame ☐ Hay ☐ Wood Pallets

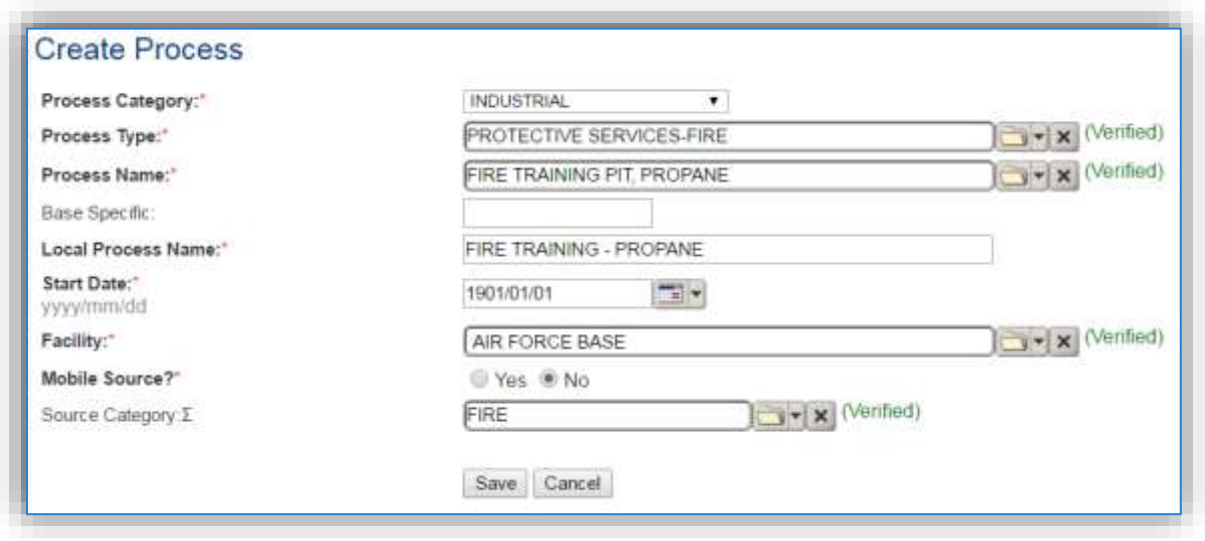
Amount Used _____ ☐ Lbs ☐ Gal

Frequency_____

3.14.3.2.2 New Source Configuration

In order to properly document this emission source in APIMS, there will need to be a Unique Process record for each type of fuel.

Navigate to the Unique Process module in APIMS and click the Create New Process hyperlink.



Process Category	Process Type	Process Name	Process ID
INDUSTRIAL	PROTECTIVE SERVICES-FIRE	FIRE TRAINING PIT, JP-8	IPF1462
INDUSTRIAL	PROTECTIVE SERVICES-FIRE	FIRE TRAINING PIT, PROPANE	IPF1463
INDUSTRIAL	PROTECTIVE SERVICES-FIRE	FIREFIGHTING TRAINING	IPF1465

Use the table above to determine the appropriate **Process Category**, **Process Type** and **Process Name**. For the JP-8 and Propane, select the specific Process Name that applies, for Tekflame, wood pallets or hay, choose the generic Firefighting training.

The **Base Specific** field can be used to enter a standard convention identifier that will best help identify the source. If the source is permitted, enter the emission unit ID as designated in the permit.

The **Local Process Name** should be in a standard naming convention for all sources that helps to quickly identify, what the process is, where it is and any other unique attribute. For example, FIRE TRAINING – HAY.

The **Start Date** should be the date the source became operational, if this date is not known, enter 1901/01/01 as a default start date.

The **Facility** should be the facility name that is responsible for the source.

The **Mobile Source?** flag should be "NO" as this is considered as stationary source.

All fire training emission units are assigned to the FIRE **Source Category**.

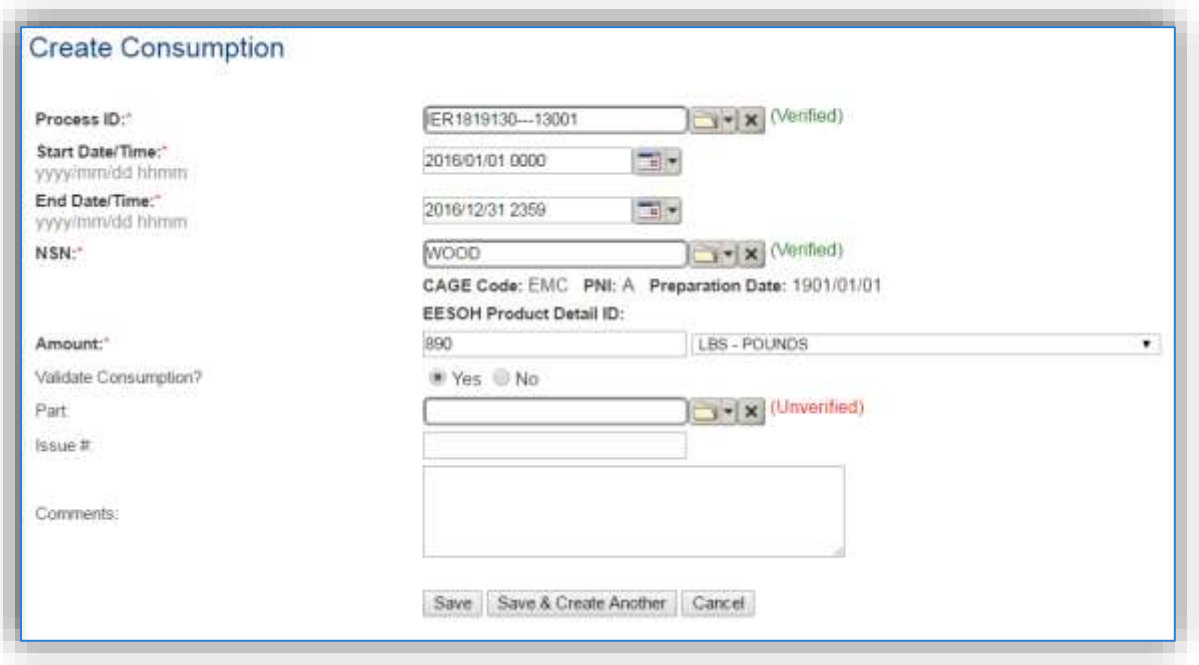
For the population of all other tabs, refer to the Existing Sources sections.

3.14.4 Year-to-Year Maintenance

3.14.4.1 Usage

The usage for fire training sources will need to be tracked annually or more frequently if required by a regulatory agency. To correctly document the annual usage for this emission source the consumption should be entered in the Consumption log.

Navigate to the Consumption module and click the Create Consumption hyperlink.



The consumption record should span the entire reporting period as shown above. The material should be the fuel and the amount should be the amount of liquid fuel in gallons or solid fuel in pounds. Make sure to select "Yes" to validate the consumption. If the consumption is not validated it will not be included in the emissions calculation.

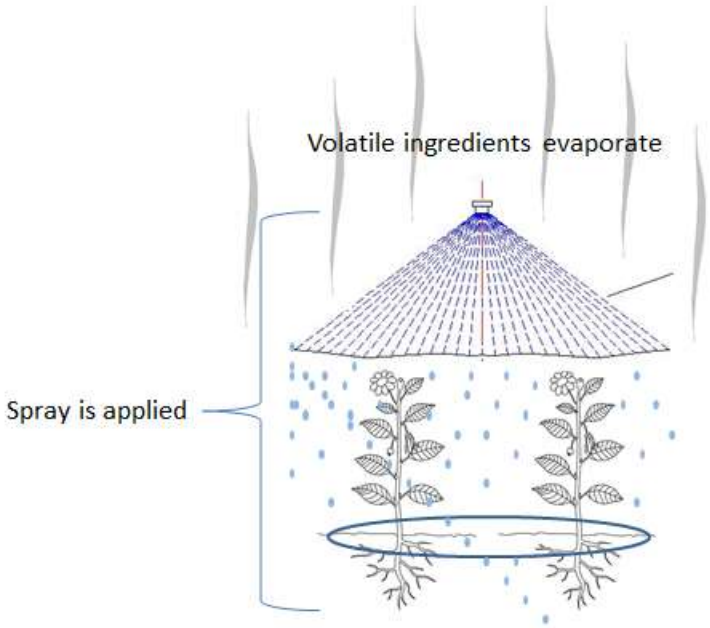
3.14.4.2 Emissions Calculations

To correctly calculate emissions, this emission source should be included in a **Stationary Source Calculation** that calculates controlled emissions. Reference Section 2.7 Emissions Calculations for additional instructions and details.

3.15 Pesticide/Herbicide Application (PEST)

3.15.1 Source Types

This source category includes the application of pesticides, herbicides, insecticides, fungicides, and rodenticides. Throughout this document the term pesticide will include all of the above mentioned eradication applications. These operations are conducted at most Air Force installations to control weeds, insects and occasionally rodents. Among others, these applications come in a variety of formulations, such as a solution/liquid (ready to use), emulsifiable concentrate, aqueous suspension, granular/flake, dust/powder, and aerosol sprays. The method of application varies according to the target pest and the crop or item to be protected. The pesticide may be applied in a variety of ways, including directly on the pest, on the host plant, on the soil surface, beneath the soil surface, or in an enclosed air space. Pesticides usually contain an active ingredient that is defined in 40 CFR Part 152.3 as any substance that will prevent, destroy, repel or mitigate any pest, or that functions as a plant regulator, desiccant, or defoliant. An inert or inactive ingredient is any substance other than an active ingredient, that is intentionally included in the pesticide product. Air pollutants may be emitted during the pesticide application or up to 30 days after the application. Pesticide application results in emissions of VOCs and organic HAPs. These emissions are a function of the vapor pressure of the active ingredients, as it is indicative of the evaporation rate of the pesticide. The most conservative calculation method is a mass balance method, which assumes all VOCs and HAPs are emitted to the atmosphere. This is the calculation method preferred by the Air Force for pesticide emissions.



3.15.2 Potential Data Sources

Pesticides are generally considered hazardous materials and are typically procured through the Hazardous Materials Management System (EESOH-MIS). The best method for collecting usage data is through the EESOH-MIS to APIMS interface. To do this it is important to work with the Hazardous Materials Management personnel to segregate pesticide materials into distinct processes. The EESOH-MIS process

should track only the pesticides and not any other materials in the shop. If the pesticides are authorized to a process that is also authorized for other materials such as solvents the process cannot be accounted for under the PEST source category and must be calculated under the CHEM source category. If the pesticides are separate processes in EESOH-MIS, the processes, materials and consumption data will be automatically populated in APIMS.

When pesticides are not tracked in EESOH-MIS the total amount in gallons or pounds of pesticides used, along with the Safety Data Sheets for the materials used during application is needed. This information is usually tracked by the Entomology shop in the IPMIS system. Pesticide usage is usually only required to be tracked on an annual basis.

The most common shops that have significant pesticide operations fall under the following office symbols:

- Entomology Shop CEOIE
- Golf Course

The material information is essential to the pesticide application emissions calculations. For all usage information that is imported from EESOH-MIS there should also be material records that contain most if not all the required information. For manually entered usage, the Safety Data Sheets will need to be obtained. Most shops maintain Hazard Communication folders that contain all the Safety Data Sheets for materials used. If the Safety Data Sheets are not available in the shop, most are available on manufacturer websites. All materials will need the following information populated in APIMS.

- Product Name
- Density
- Ingredient Name and % by weight
- VOC content

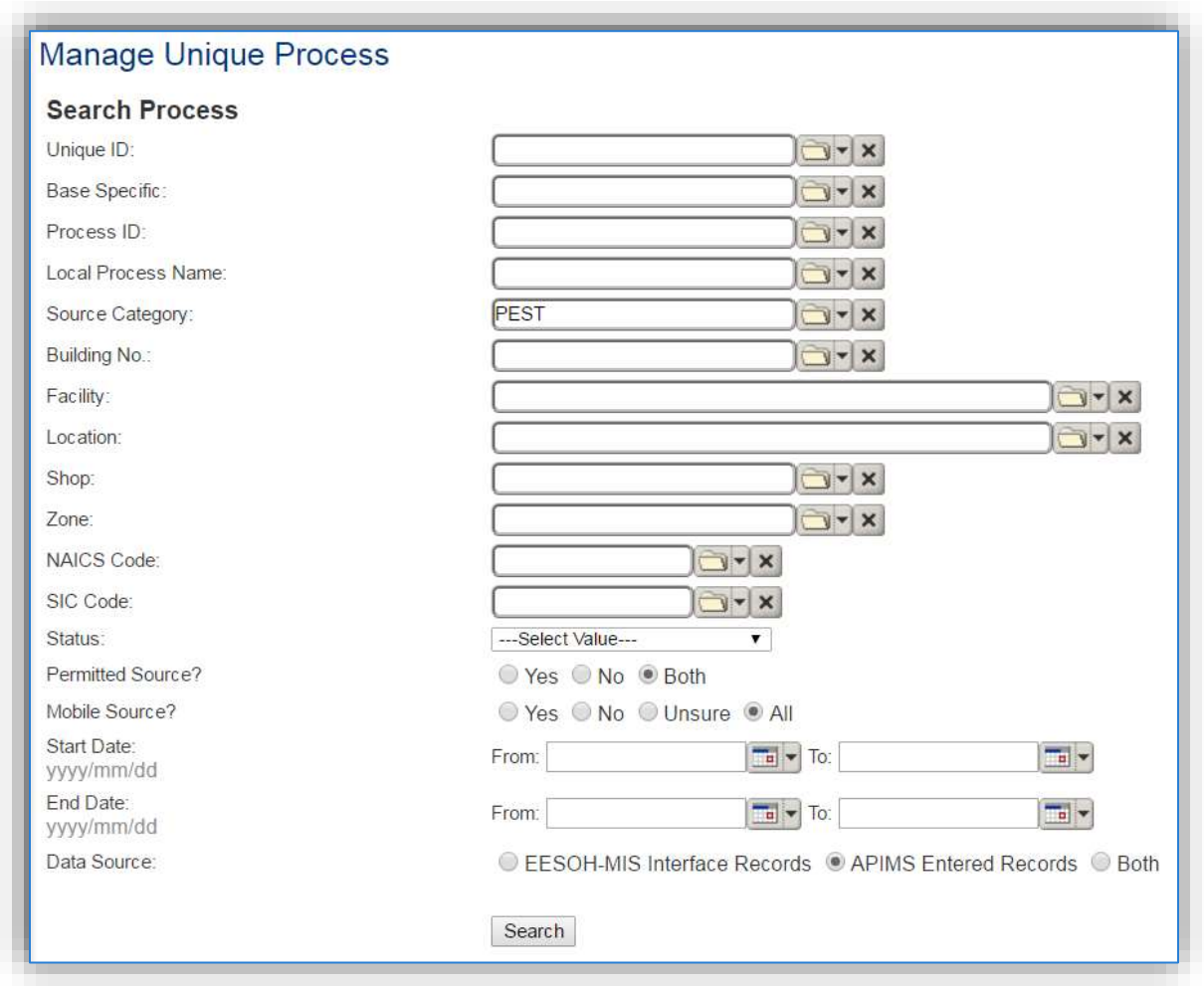
The EESOH-MIS interface will populate most of this data. However, if the VOC is not readily available on the SDS it may not be entered into EESOH-MIS. Since the EESOH-MIS interface inserts so many material records at one time it is not feasible to review each record for completeness. Therefore, it is recommended to initially assume the data required is present and run the initial calculations. Once the calculations have been run, there is a tab that will provide error messages that will identify all the records that are missing VOC or ingredient information. Refer to Section 2.7 Emissions Calculations for details on the calculation error messages. For these materials the VOC can be calculated based on the ingredients. A general knowledge of chemistry will be required for this. If the VOC or % Solids cannot be obtained from the SDS or the manufacturer the Air Emissions Guide for Air Force Stationary Sources provides estimated values in Table 22-1.

3.15.3 Standard Source Identification/Characterization

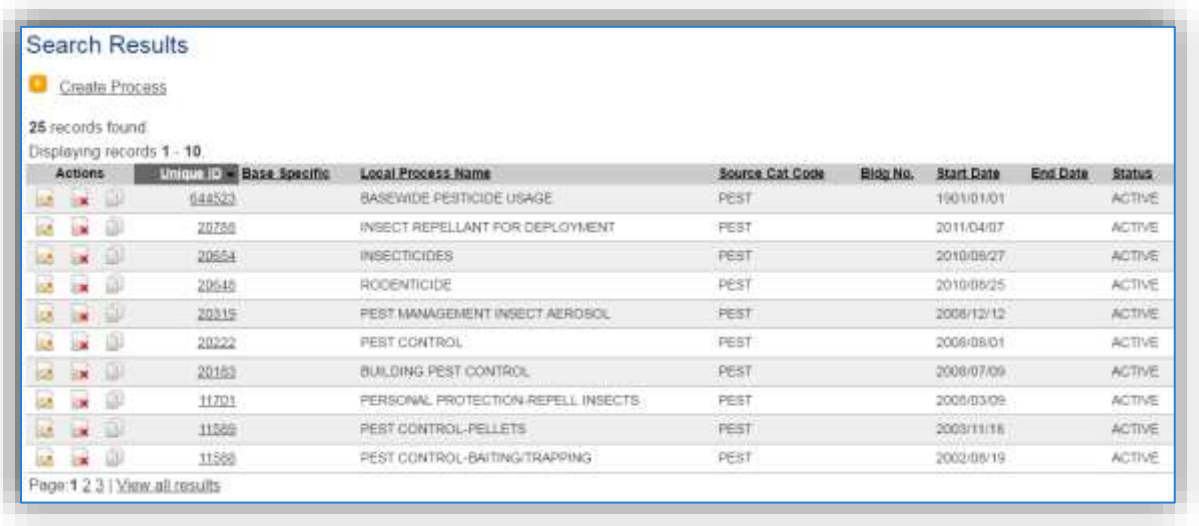
3.15.3.1 Existing Sources

It is important to review the existing sources in each source category on an annual basis at a minimum. Most regulatory agencies require an up to date source and equipment inventory.

Navigate to the Unique Process module of APIMS by clicking on **Unique Process** under the **Emission Unit** tab.



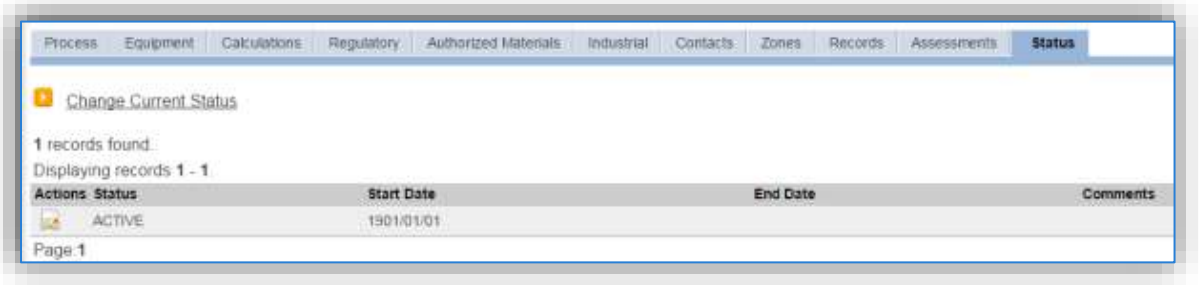
In the **Source Category** search field, type “PEST” then select the row for Herbicide/Pesticide Application from the dropdown results. Click the **Search** button.



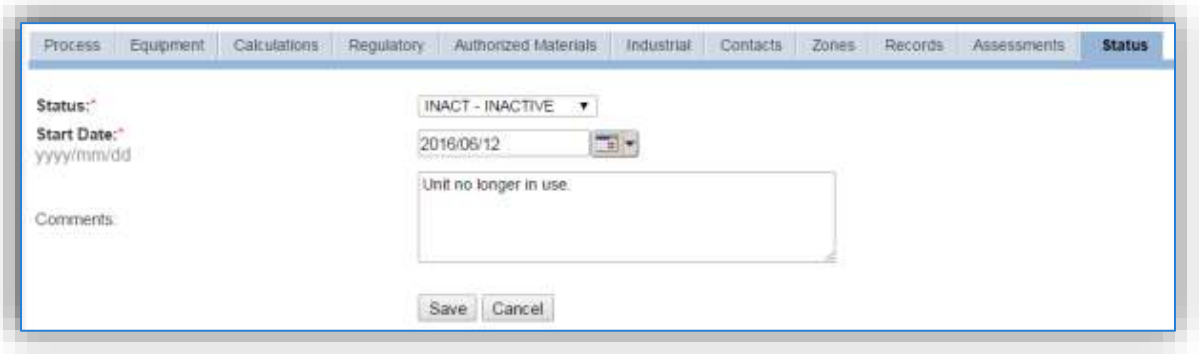
The search results grid will now display all the pesticide application processes currently in APIMS. To further filter out the EESOH-MIS processes, use the APIMS Entered Records radio button on the Data Source field in the Search criteria. This will then only display the Next Higher Process.

3.15.3.1.1 Status

If the status of a process needs to be changed, click the edit icon next to the process. If this is a process that was entered into APIMS via the EESOH-MIS interface, the process status must be altered in EESOH-MIS.



Navigate to the *Status* tab. Click the Change Current Status hyperlink.



Select the appropriate status from the **Status** dropdown (i.e., ACTIVE, REMOVED or INACTIVE).

For the **Start Date** enter the date at which the status changed.

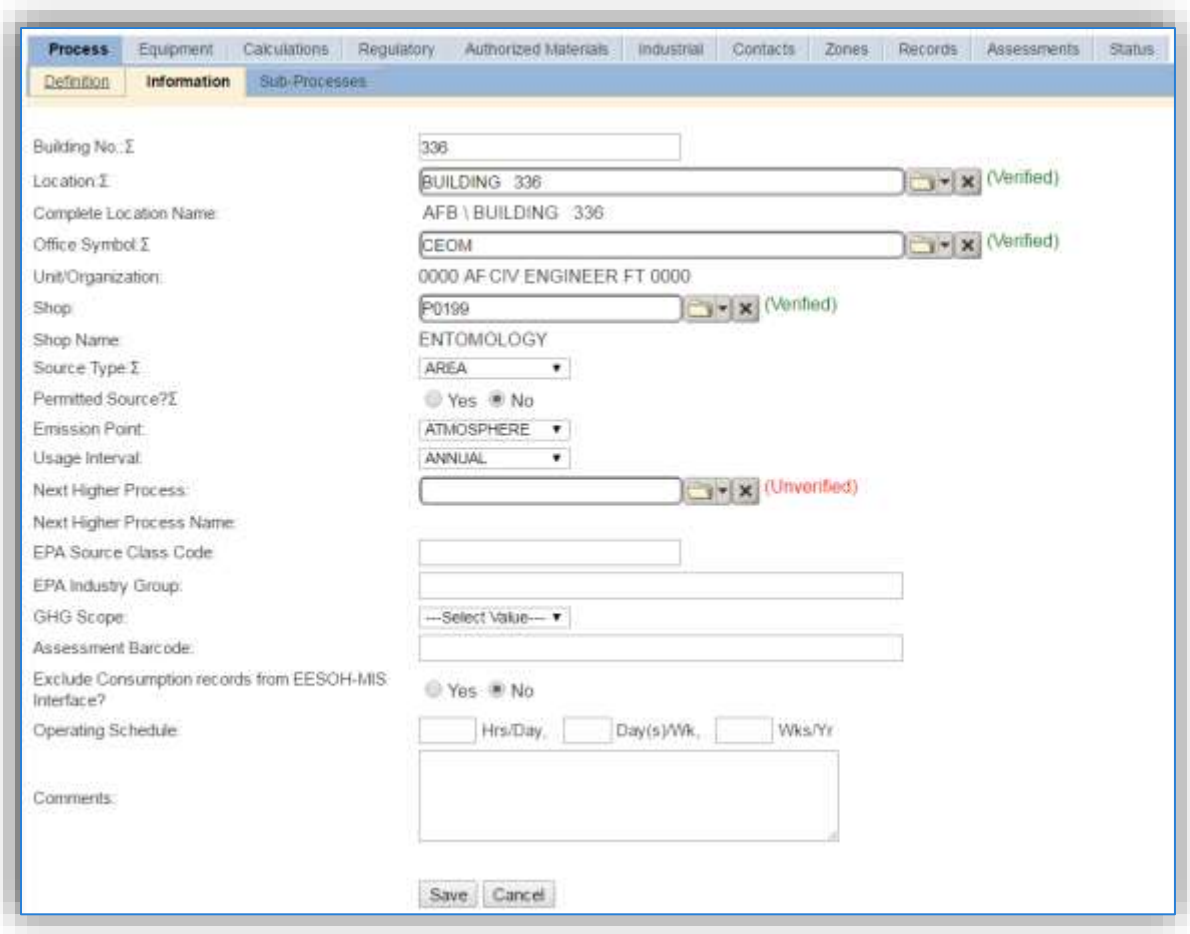
Enter **Comments** that provide insight into why the status changed. These can be very useful for equipment inventories, permit renewals and regulatory reporting. Most regulatory agencies require reporting on unit operation status; this includes any potential time spent offline and reasons for the outage.

Click the **Save** button.

The emissions for a process will only be calculated for the dates the process was in an ACTIVE status. If a source is removed in the middle of a year, the emissions will only be calculated for the part of the year the source was active.

3.15.3.1.2 Information

There are basic data elements that are important to track and maintain for new and existing sources, such as location and source type. This data can be maintained in the Unique Process record on the *Information* sub tab.



The **Building No**. field can be used to specify a general location or area of the emission source. If this is a next higher process or a process for all pesticide application across the base, specify BASEWIDE.

The **Location** field is very important to effectively manage the location and mission of the emission source. This documents where the source is located, in case it needs to be inspected or if the source owner needs to be contacted for pertinent information. For the instructions on how to create a location reference Section 2.2 Location.

The **Shop** is important as it establishes the personnel that are utilizing the equipment on a regular basis and will be the best source of information regarding the unit.

Pesticide applications are categorized as an AREA source in the **Source Type**.

The **Emission Point** should be ATMOSPHERE.

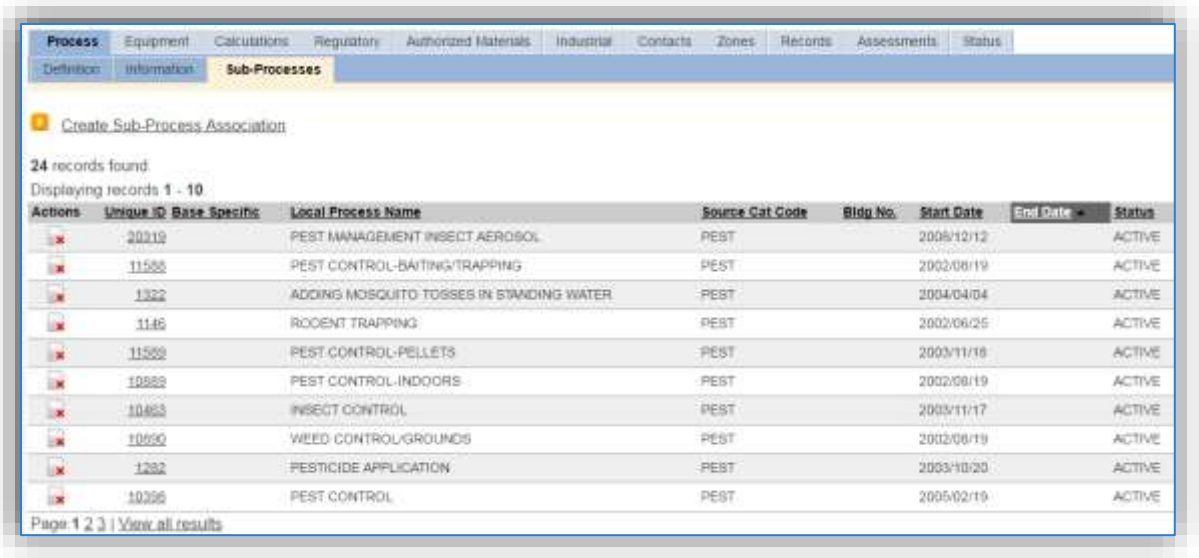
The **Permitted Source** flag should also be populated to accurately reflect the current regulatory status of the emission source. This flag can be an invaluable tool in roll-up reporting.

The **Usage Interval** should be designated. This source is usually documented on an ANNUAL basis but may be a different time interval if it is a permitted source. It is important to populate this field correctly as it will affect how it is documented in the AEI Throughputs module.

The **EPA Source Class Code** is a process level EPA code that describes the equipment and/or operation that is the source of the emissions. Source Classification Codes for pesticide application is 2465800000.

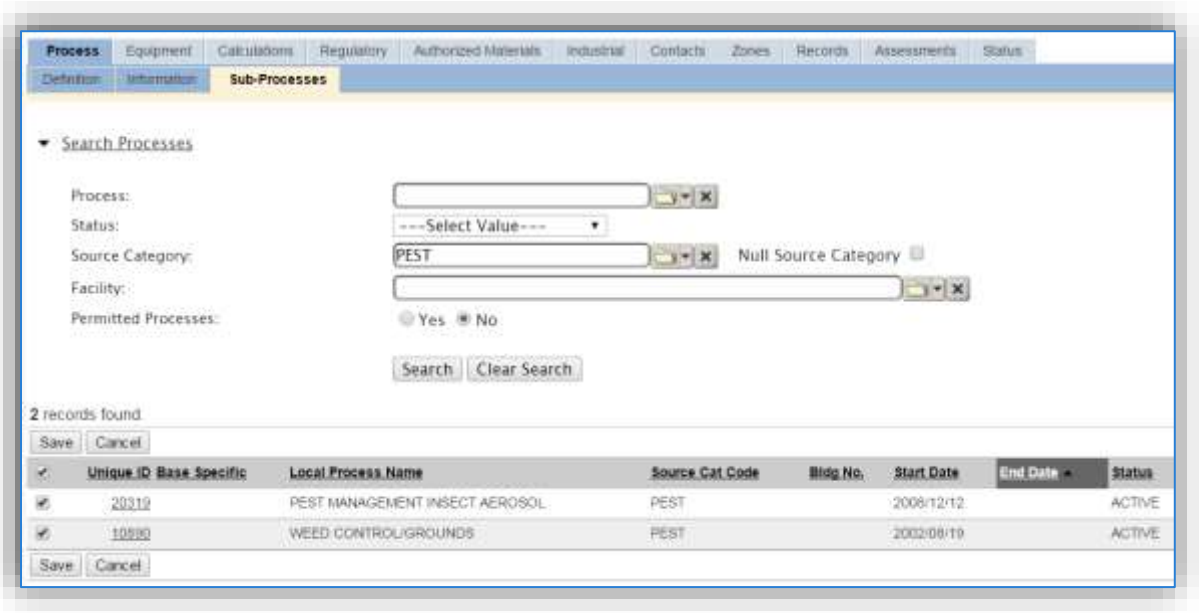
3.15.3.1.3 Sub-Processes

For Next Higher Process configuration, navigate to the *Sub-Processes* sub tab.



This sub tab is used to specify which processes should have their consumption rolled up to this next higher process. This list should only include the pesticide processes that were imported from EESOH-MIS and that have only pesticide material authorized, if other chemicals are authorized to the process, do not

associate them to this pesticide process. To add a process, click the Create Sub-Process Association hyperlink.



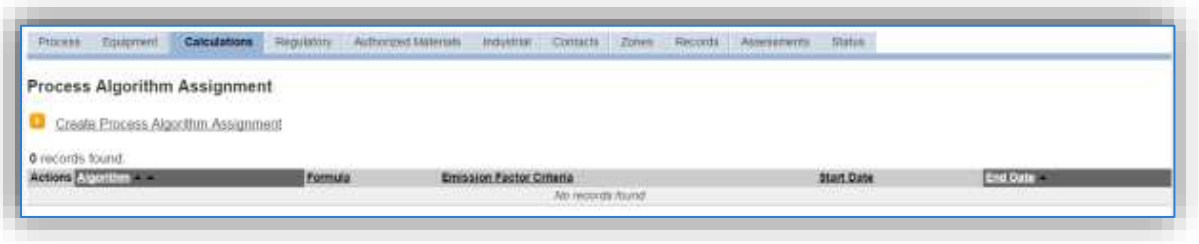
Use the Search Processes fields to refine the search to find only the pesticide processes. Select the checkbox next to the appropriate process(es), then click the **Save** button.

3.15.3.1.4 Equipment

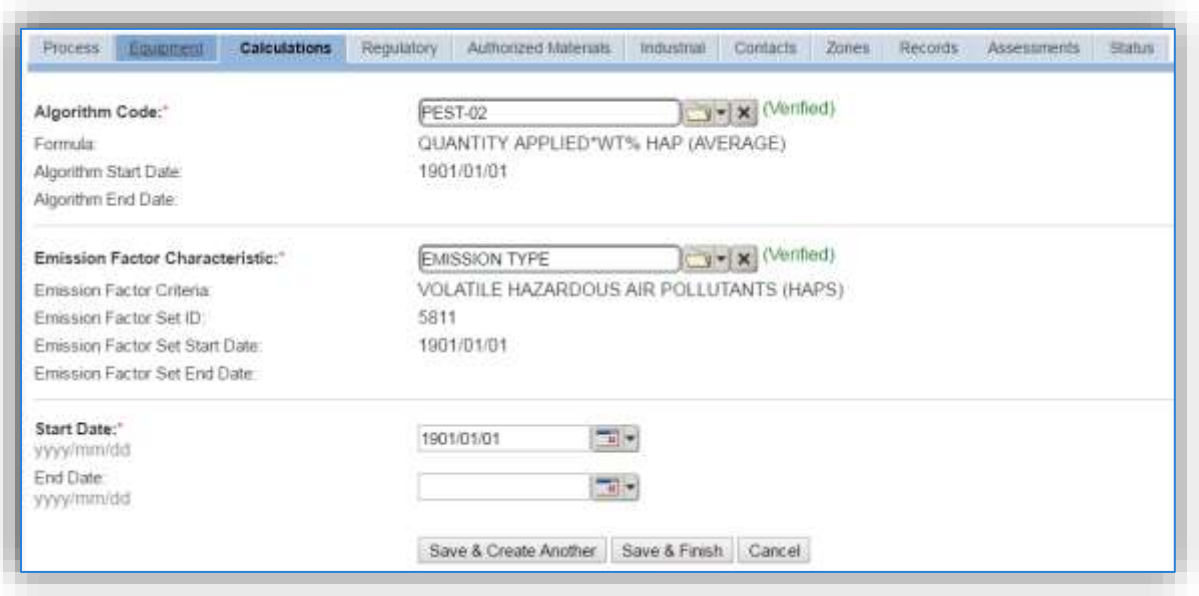
Pesticide operations do not have equipment associated.

3.15.3.1.5 Calculations

The next tab is the *Calculations* tab.



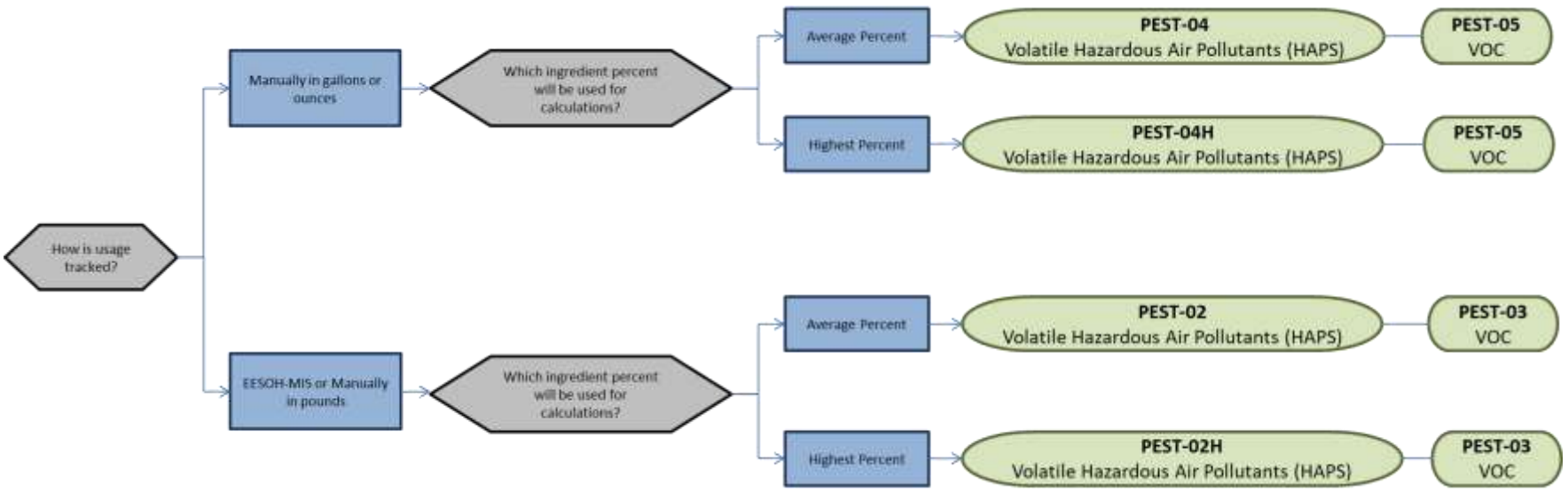
To associate an algorithm to the process, click on the Create Process Algorithm Assignment hyperlink.



Select the **Algorithm Code** and the **Emission Factor Characteristic** that most closely matches the activity. Use the flowchart below to find the correct Algorithm Code and Emission Factor Characteristic. Enter the **Start Date** to match the start date of the process.

For pesticide processes a mass balance calculation methodology is recommended by the Air Force. Pesticide emissions are calculated utilizing the material VOC and a mass balance based on ingredients. Therefore, there are TWO algorithms that need to be associated to each pesticide process, one for VOC and one for HAPS.

Use the flowchart below to find the correct Algorithm Code and Emission Factor Characteristic.

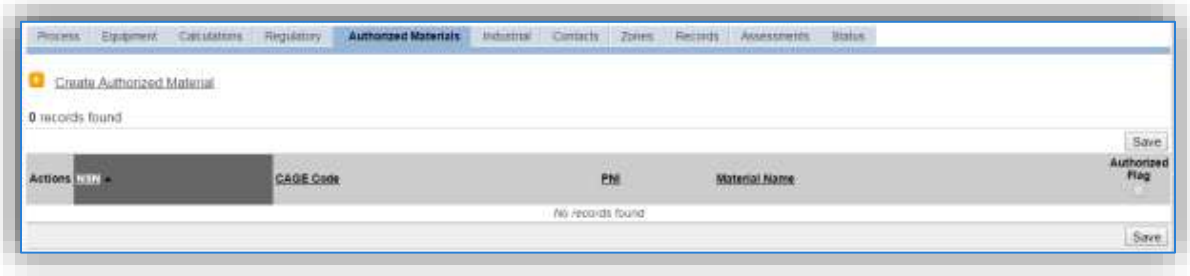


If your permit requires a different type of calculation, contact the Air Force Air Quality Subject Matter Expert for approval of the alternative method.

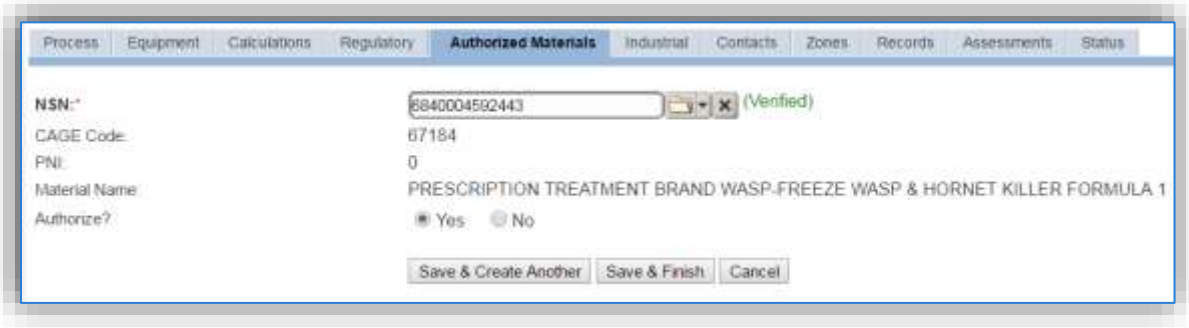
3.15.3.1.6 Materials

The last step in setting up the Unique Process record is to authorize materials on the *Authorized Materials* tab. This step is only required for processes that use manual logs to track usage in APIMS.

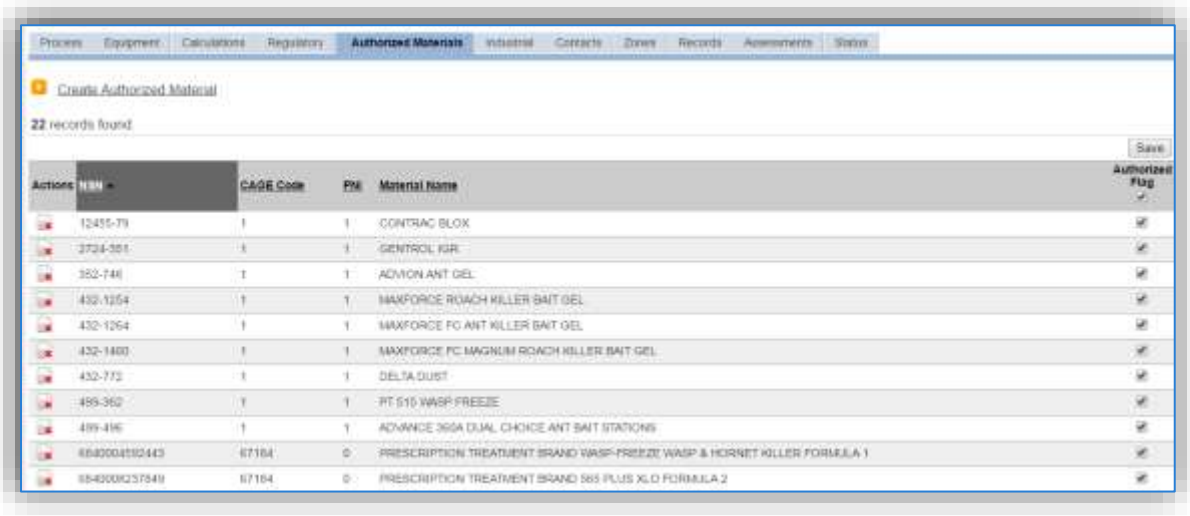
All processes that use the consumption data from EESOH-MIS are automatically configured at the sub-process level by the interface.



To authorize a material for the process, click on the Create Authorized Material hyperlink.



Select the material record from the list of values, using the **NSN** or **Material Name**. If the material is not available the material record will need to be created. Next select "Yes" to **Authorize** the material, then **Save & Finish** or **Save & Create Another**. Repeat this step for all materials used by the process.



3.15.3.2 New Sources

3.15.3.2.1 Data Collection Sheet

The form on the next page is a printable guide that can be taken out to the location of the source and used to gather all the necessary information from the shop personnel. It can then be used as a guide to help configure the data in APIMS when you return to your office.

Pesticide Data Collection Worksheet

GENERAL INFORMATION

Building Number_____ Mission/Purpose_____

Shop Name/Function_____ Management Organization_____

Coordinates: Latitude: _____ Longitude: _____

UTM: _____ Zone _____ Easting _____ Northing ☐ Feet ☐ Meters

Is this source in any of your permits? ☐ Yes ☐ No

If yes, does it have an emission unit number or other designation? _____

USAGE INFORMATION

Are the pesticides/herbicides/rodenticides purchased through EESOH-MIS? ☐ Yes ☐ No

If Yes, specify the shop and process designation in EESOH-MIS
Shop Code _____ Process Code/Name _____

If No, do you know the total amount of materials purchased in the last year? ☐ Yes ☐ No

If yes, do you have usage records? ☐ Yes ☐ No

If yes, collect the usage records.

If no, ask the shop personnel to estimate how often they apply pesticides, what types and how much is used each time? (The fields below provide a guideline of information that must be collected for each material.

Material Name _____

Amount Used _____ ☐ Lbs ☐ Gal

Frequency_____

Do they have Safety Data Sheets for the materials used? ☐ Yes ☐ No

If yes, collect copies.

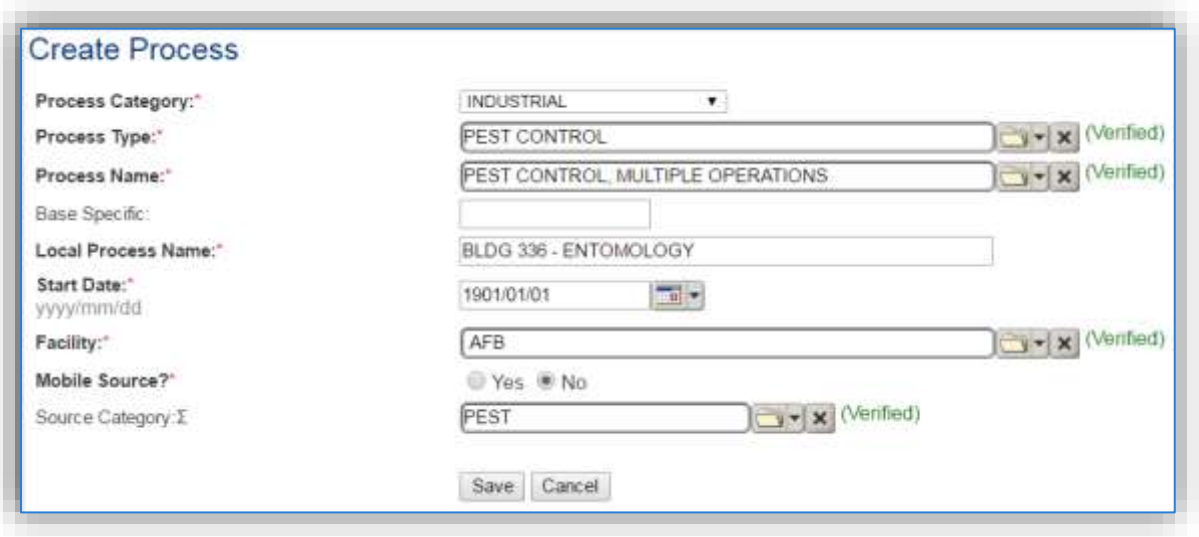
If no, collect the name and manufacturer of the product. This can be used to contact the manufacturer to obtain a Safety Data Sheet.

3.15.3.2.2 New Source Configuration

In order to properly document this emission source in APIMS, there will need to be at least one Unique Process record. If the EESOH-MIS processes are configured correctly to have pesticides separated from other chemicals, a next higher process needs to be configured. If the data is not configured that way then a pesticide process can be configured for each shop that conducts pesticide applications or a single process that tracks all pesticide applications basewide.

3.15.3.2.2.1 *Shop Specific Process Configuration*

Navigate to the Unique Process module in APIMS and click the Create New Process hyperlink.



Process Category	Process Type	Process Name	Process ID
INDUSTRIAL	PEST CONTROL	PEST CONTROL, MULTIPLE OPERATIONS	IPC1772

Use the values provided in the table above to enter the **Process Category**, **Process Type** and **Process Name**.

The **Base Specific** field can be used to enter a standard convention identifier that will best help identify the source. If the source is permitted, enter the emission unit ID as designated in the permit.

The **Local Process Name** should be in a standard naming convention for all sources that helps to quickly identify, what the process is, where it is and any other unique attribute. For example, BLDG 336 – ENTOMOLOGY.

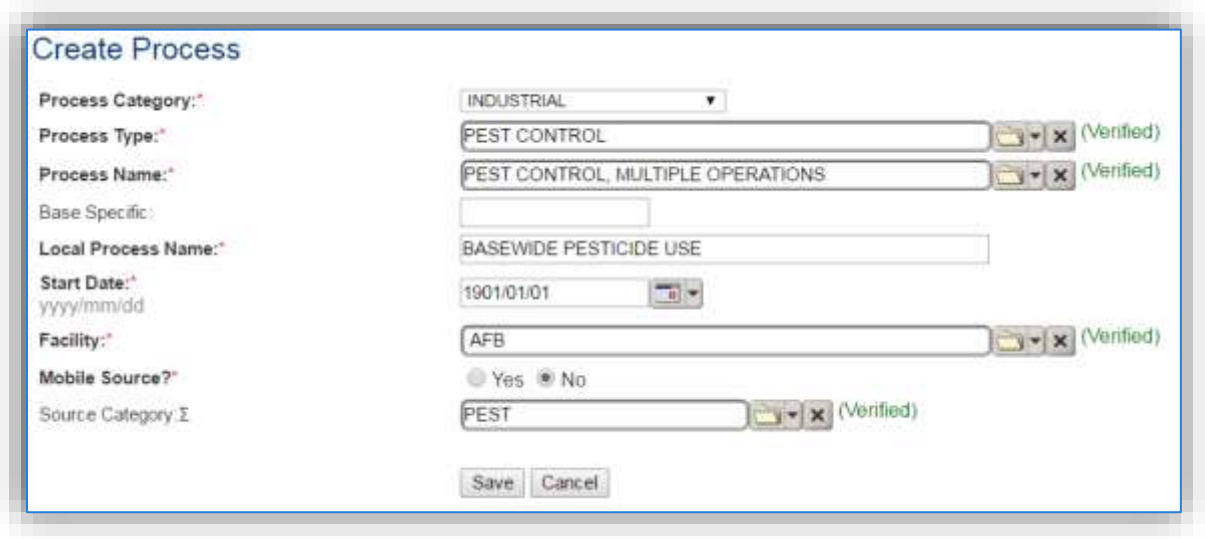
The **Start Date** should be the date the unit became operational, if this date is not known, enter 1901/01/01 as a default start date.

The **Facility** should be the facility name that is responsible for the source or sources.

All pesticide activities are stationary sources that are assigned to the PEST **Source Category**.

3.15.3.2.2.2 Next Higher Process Configuration

Navigate to the Unique Process module in APIMS and click the Create New Process hyperlink.



Process Category	Process Type	Process Name	Process ID
INDUSTRIAL	PEST CONTROL	PEST CONTROL, MULTIPLE OPERATIONS	IPC1772

Use the values provided in the table above to enter the **Process Category**, **Process Type** and **Process Name**.

The **Base Specific** field can be used to enter a standard convention identifier that will best help identify the source. If the source is permitted, enter the emission unit ID as designated in the permit.

The **Local Process Name** should be in a standard naming convention for all sources that helps to quickly identify what the process is for example, BASEWIDE PESTICIDE USE.

The **Start Date** should be the date the unit became operational, if this date is not known, enter 1901/01/01 as a default start date.

The **Facility** should be the facility name that is responsible for the source or sources.

The **Mobile Source?** flag should be "NO" as this is considered as stationary source.

All pesticide activities are assigned to the PEST **Source Category**.

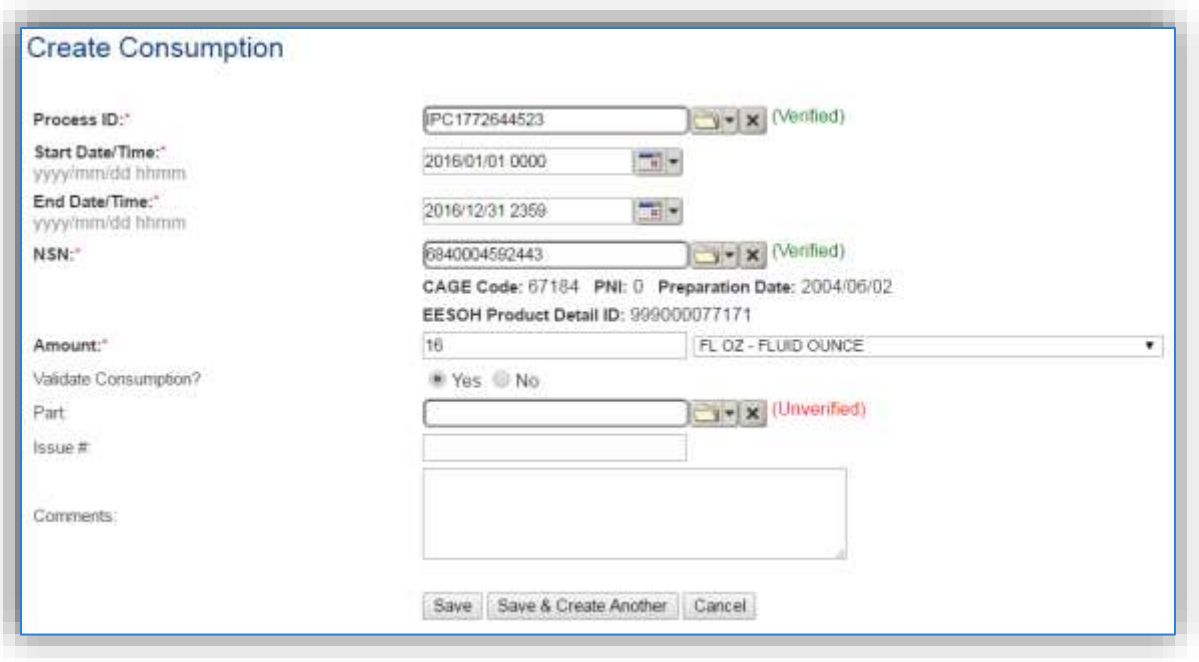
3.15.4 Year-to-Year Maintenance

3.15.4.1 Usage

3.15.4.1.1 Shop Specific Process Configuration

The consumption for pesticide emissions usually needs to be tracked annually or as required by a regulatory agency. To correctly document the usage for this emission source the consumption should be entered in the Consumption log.

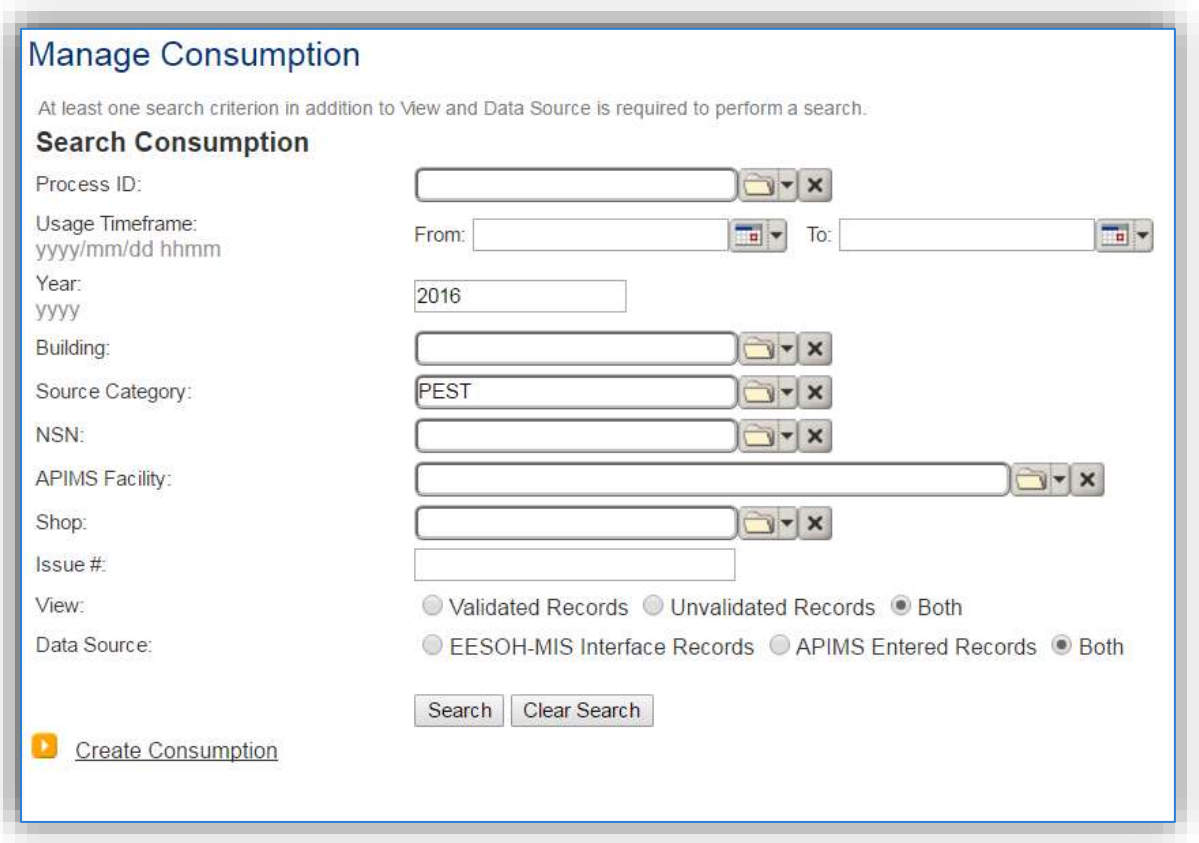
Navigate to the Consumption module and click the Create Consumption hyperlink.



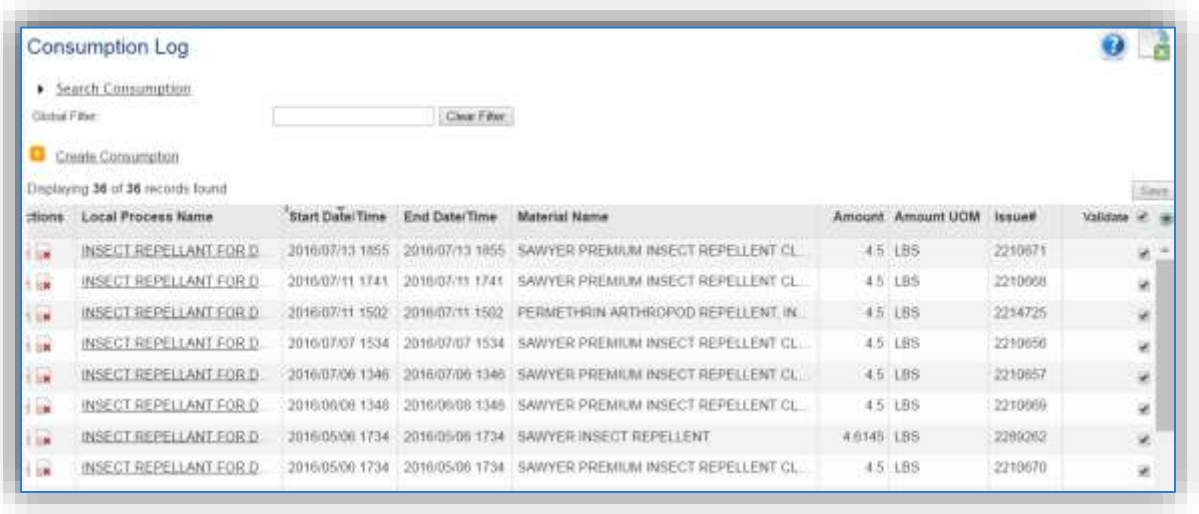
The consumption record should span the entire reporting period as shown above. The **Amount** should be recorded according to the algorithms selected. Make sure to select "Yes" to **Validate Consumption**. If the consumption is not validated it will not be included in the emissions calculation. Repeat this step for all the different materials used during the reporting period.

3.15.4.1.2 Next Higher Process Configuration

The consumption for pesticide emissions usually needs to be tracked annually or as required by a regulatory agency. For the Next Higher Process configuration, the consumption is imported from the EESOH-MIS interface with each interface run, however it is not validated. The consumption must be validated in the Consumption log.



Use the search criteria to narrow the search results. It is suggested to use the Source Category, Data Source and Year or Usage Timeframe to filter the results.



Check the checkbox next to each material then click **Save** to validate the consumption. Only consumption that is validated will be included in emissions calculations. The simplest use case for validating rows is to start by checking the top box in the grid to validate all rows present. After all boxes are checked, click **Save**.

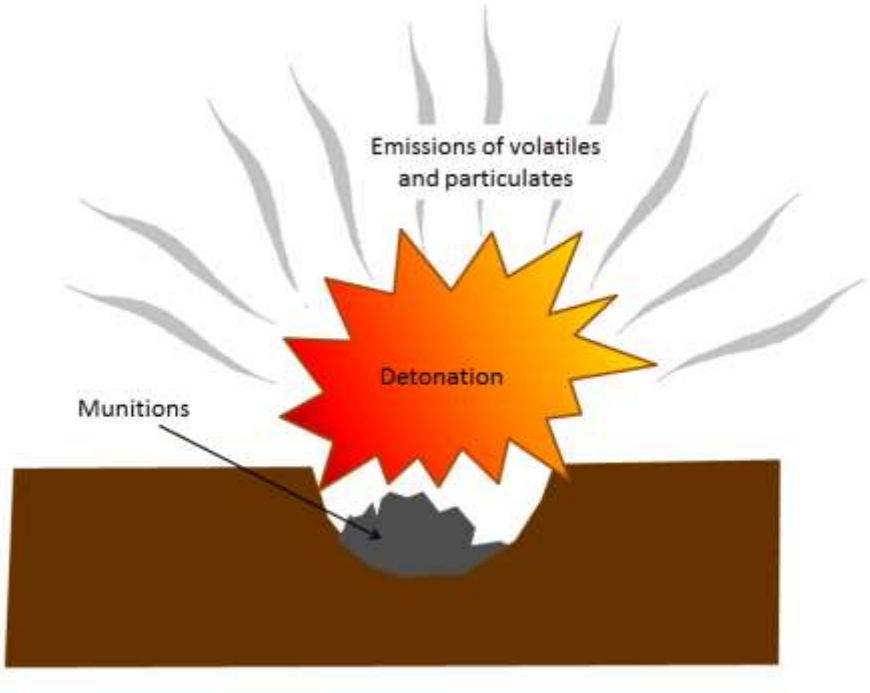
3.15.4.2 Emissions Calculation

If the process utilizes EESOH-MIS data then it should be included in the **EESOH-MIS Calculation**, otherwise this emission source should be included in a **Stationary Source Calculation** that calculates controlled emissions. Reference Section 2.7 Emissions Calculations for additional instructions and details.

3.16 Munitions Open Burn / Open Detonation (OBOD)

3.16.1 Source Types

This source category includes the open burning and/or open detonation of munitions. This is often utilized as a means of disposing of bulk explosives, bulk propellants, small arms ammunition, highly explosive incendiary (HEI) cartridges, bomb fuses, mines, flares/signals, other bulk, obsolete, or unserviceable munitions and energetic materials. Munitions and assembled energetic materials are defined as items in which the explosive materials are contained within a metal casing. Munitions include small arms ammunition and HEI cartridges. Assembled energetic materials include bomb fuses, mines, flares/signals, and other similar items. Bulk energetic materials include bulk explosives (e.g., TNT, Composition B, RDX, smokeless powder) and bulk propellants (e.g., ammonium perchlorate, M-3, M-9, M-43, MK-6). This activity is usually completed on a periodic or as needed basis and generates emissions of criteria pollutants, organic and inorganic HAPs, and greenhouse gases.



3.16.2 Potential Data Sources

Part of effective munitions storage and maintenance requires the detonation of expired munitions; therefore, any shop or area that uses munitions will most likely also have open burning/open detonation activities. Some shops utilize a popping furnace to destroy powder charges and primers of small arms ammunition. The most common shops that conduct munitions and energetic material burning/detonations fall under the following office symbol:

- Operations Flight (CEO)
- Explosive Ordnance Disposal Flight (CED)
- Military Police
- Gun range

- Test and Training Range
- Security Forces

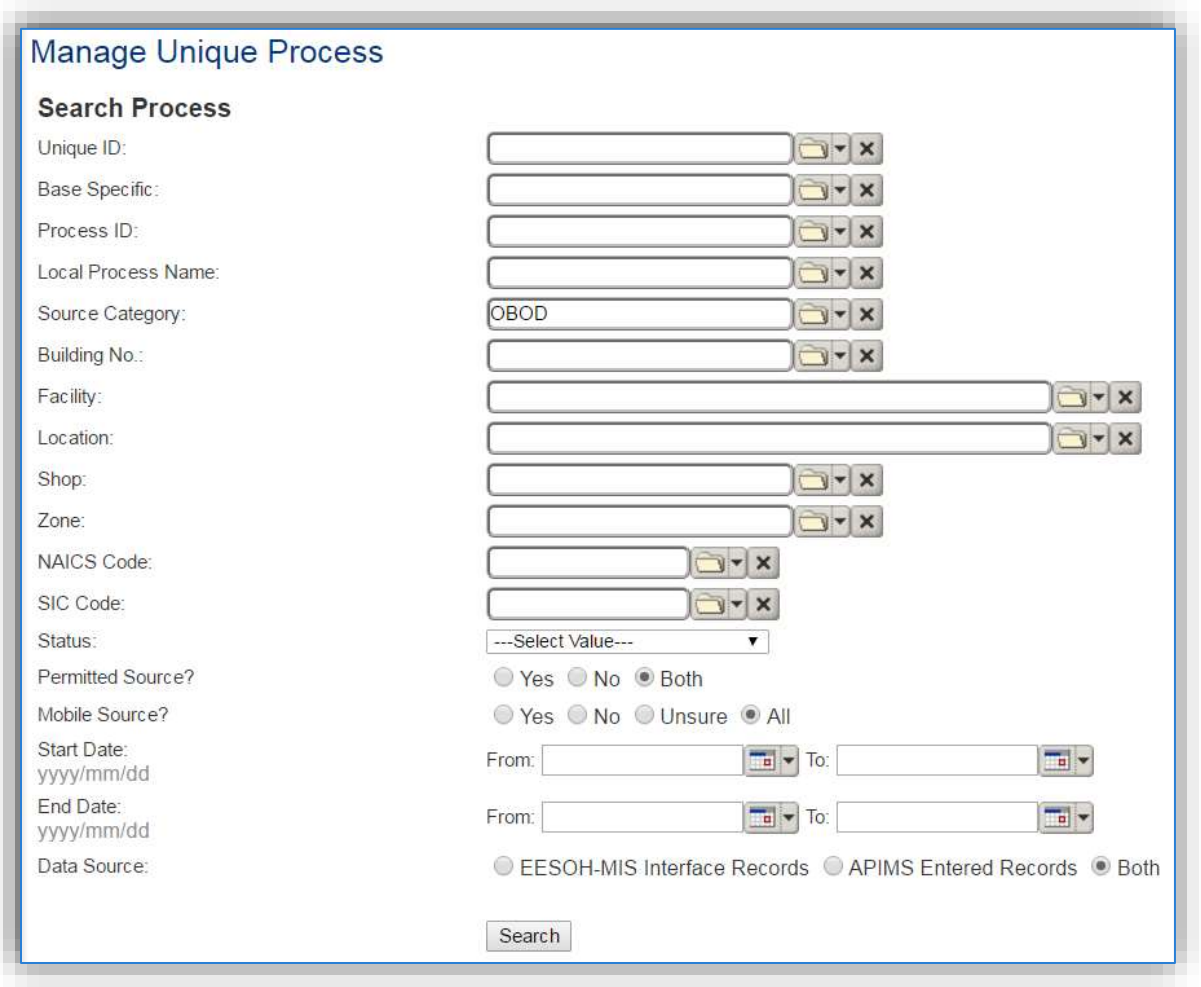
There are two different quantities that must be tracked to calculate the emissions from open burning/open detonation. The first is the specific munition by Department of Defense Identification Code (DODIC) or energetic material that was burned/detonated. The second is the amount of material burned or detonated, usually in rounds or pounds. These amounts are usually readily available from the organization conducting the open burn/open detonation. Emissions from open burn/open detonation are usually conducted on a periodic basis and are therefore tracked on an annual basis, unless otherwise specified by permits or regulations.

3.16.3 Standard Source Identification/Characterization

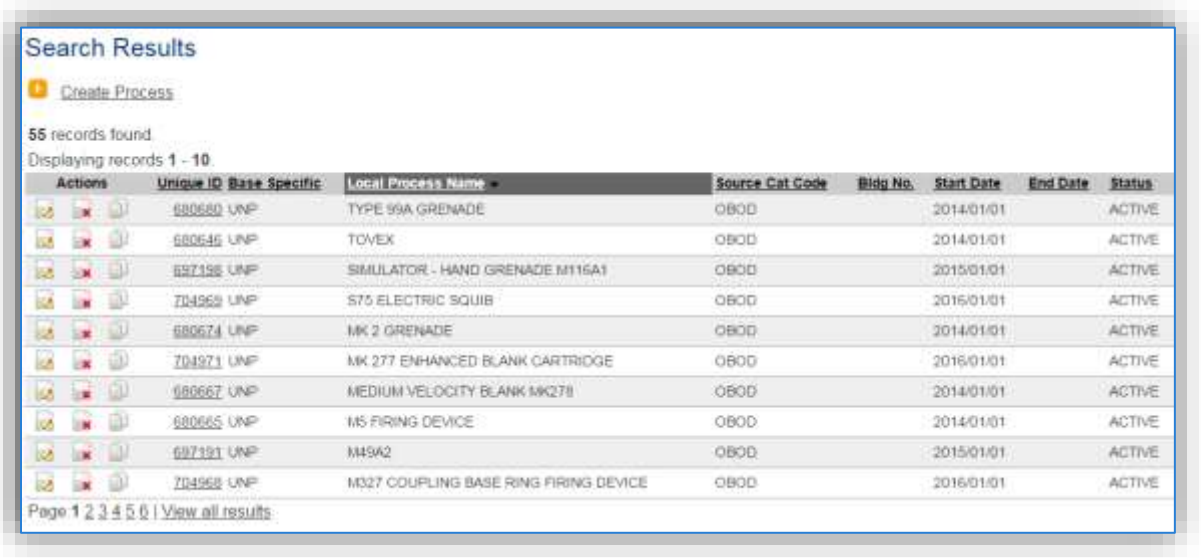
3.16.3.1 Existing Sources

It is important to review the existing sources in each source category on an annual basis at a minimum. Most regulatory agencies require an up to date source and equipment inventory.

Navigate to the Unique Process module of APIMS by clicking on **Unique Process** under the **Emission Unit** tab.



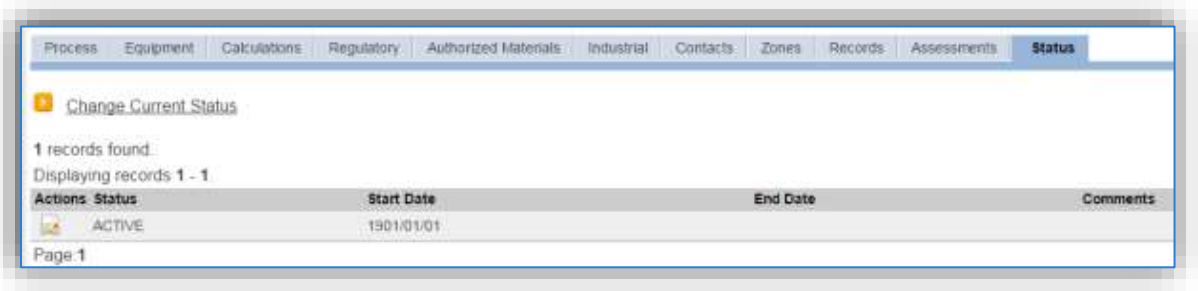
In the **Source Category** search field, type “OBOD” then select the row for Open Burn / Open Detonation from the dropdown results. Click the **Search** button.



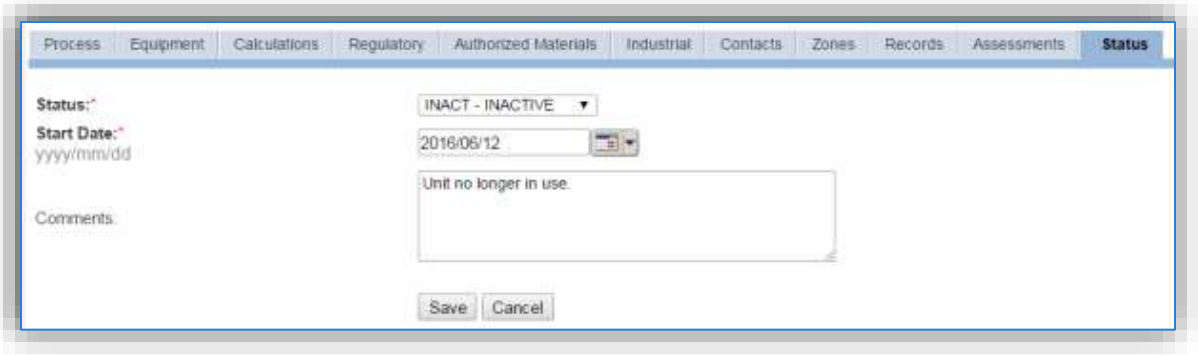
The search results grid will now display all the open burn/open detonation processes currently in APIMS.

3.16.3.1.1 Status

If the status of a process needs to be changed, click the edit icon next to the process.



Navigate to the *Status* tab. Click the Change Current Status hyperlink.



Select the appropriate status from the **Status** dropdown (i.e., ACTIVE, REMOVED or INACTIVE).

For the **Start Date** enter the date at which the status changed.

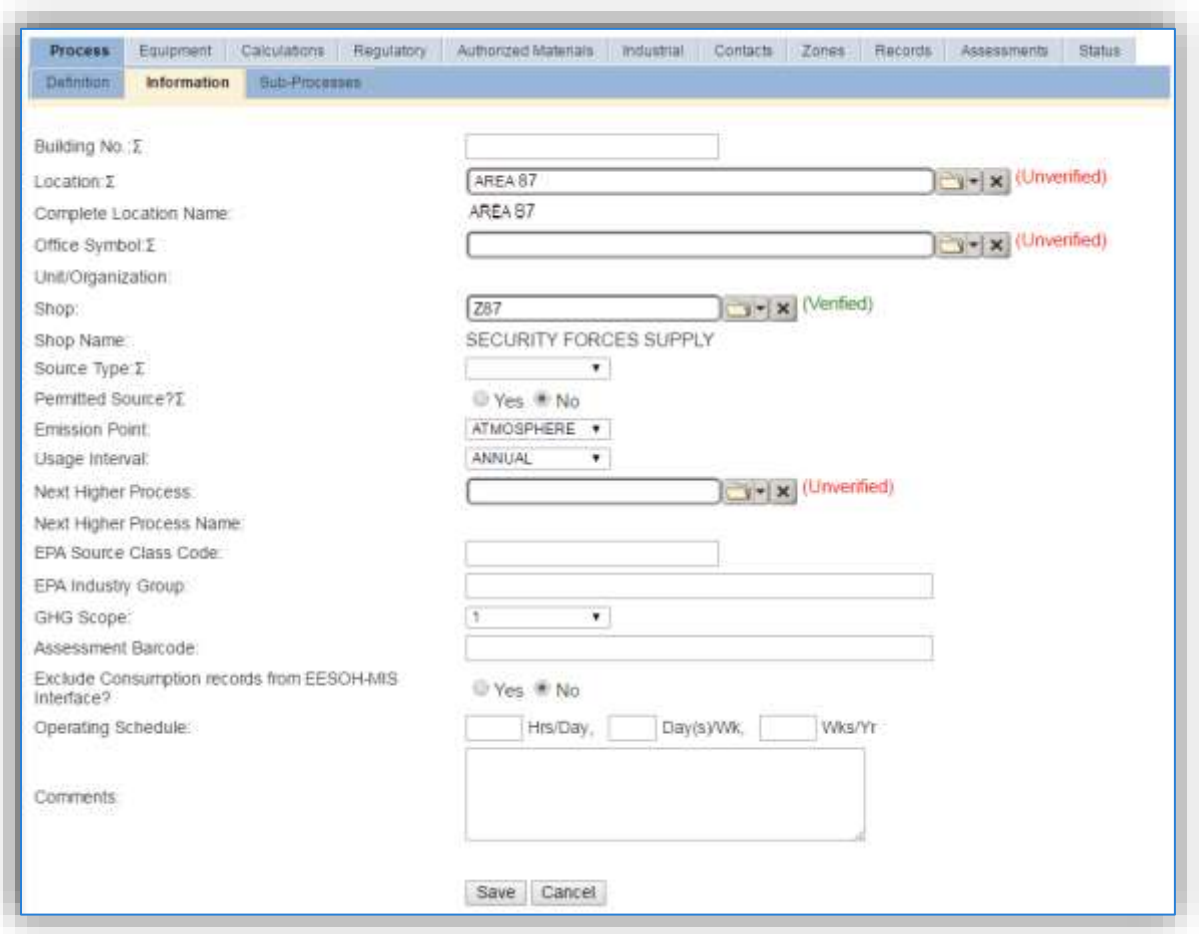
Enter **Comments** that provide insight into why the status changed. These can be very useful for equipment inventories, permit renewals and regulatory reporting. Most regulatory agencies require reporting on unit operation status; this includes any potential time spent offline, reasons for the outage.

Click the **Save** button.

The emissions for a process will only be calculated for the dates the process was in an ACTIVE status. If a source is removed in the middle of a year, the emissions will only be calculated for the part of the year the source was active.

3.16.3.1.2 Information

There are basic data elements that are important to track and maintain for new and existing sources, such as location and source type. This data can be maintained in the Unique Process record on the *Information* sub tab.



The **Building No**. field can be used to specify a general location or area of the emission source, for example, RANGE.

The **Location** field can be very important to effectively manage the location and mission of the emission source. This documents where the source is located, in case it needs to be inspected or if the source owner needs to be contacted for pertinent information. For the instructions on how to create a location reference Section 2.2 Location.

The **Shop** is important as it establishes the personnel that are conducting the training and will be the best source of information regarding the activity.

Fire training operations are categorized as an AREA source in the **Source Type**. Since these activities are conducted in an open-air pit the **Emission Point** would be ATMOSPHERE.

The **Permitted Source?** flag should also be populated to accurately reflect the current regulatory status of the emission source. This flag can be an invaluable tool in roll-up reporting.

The **Usage Interval** should be designated. This source is usually documented on an ANNUAL basis but may be different if it is a permitted source. It is important to populate this field correctly as it will affect how it is documented in the AEI Throughputs module.

3.16.3.1.3 Sub-Processes

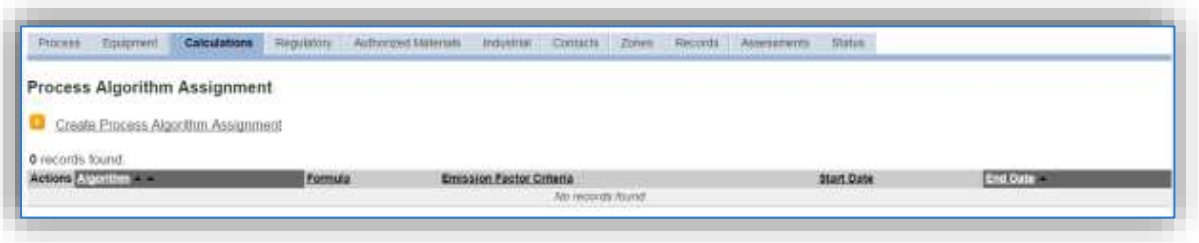
This source does not utilize this functionality.

3.16.3.1.4 Equipment

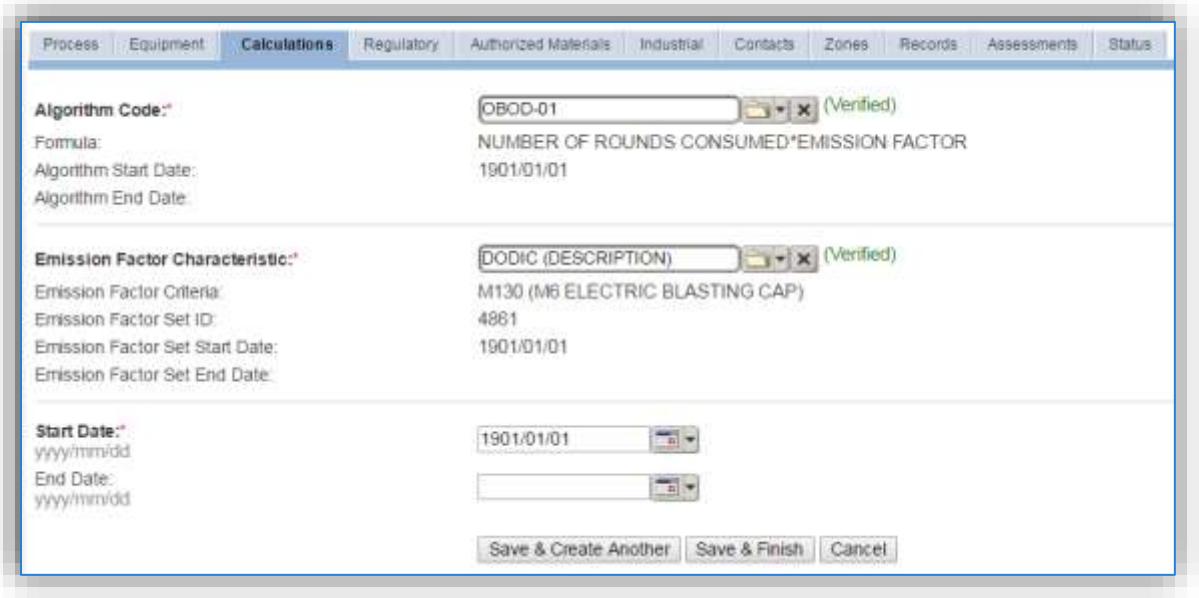
This source does not utilize this functionality.

3.16.3.1.5 Calculations

The next tab is the *Calculations* tab.



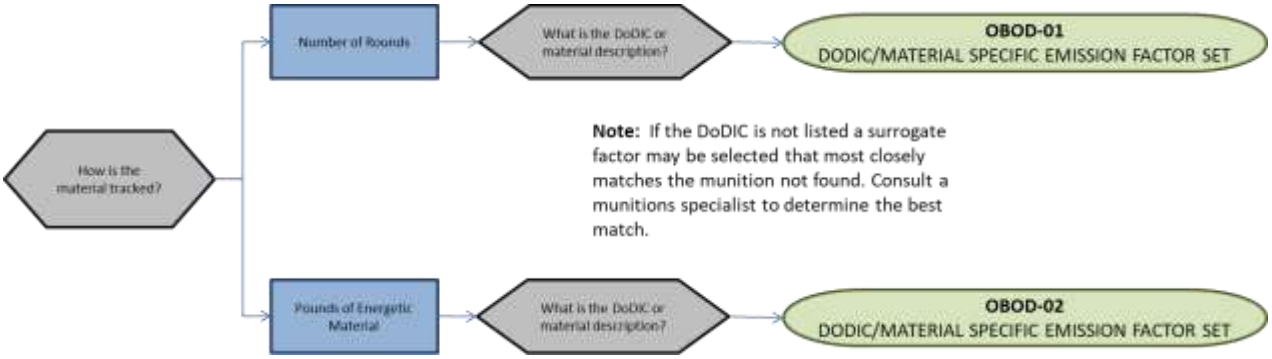
To associate an algorithm to the process, click on the Create Process Algorithm Assignment hyperlink.



For open burning/open detonation there are two standard calculation methodologies recommended by the Air Force. The first (OBOD-01) is used to calculate emissions by DODIC (Department of Defense Identification Codes) with the usage tracked in rounds. The second (OBOD-02) is used to calculate emissions by DODIC with the usage of NEW (Net Explosive Weight) tracked in pounds.

Select the **Algorithm Code** and the **Emission Factor Characteristic** that most closely matches the activity. Use the flowchart below to find the correct Algorithm Code and Emission Factor Characteristic. Enter the **Start Date** to match the start date of the process.

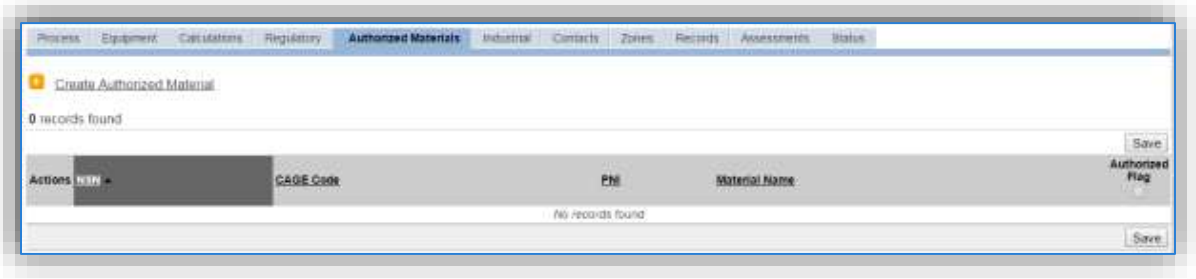
Use the flowchart below to find the correct Algorithm Code and Emission Factor Characteristic.



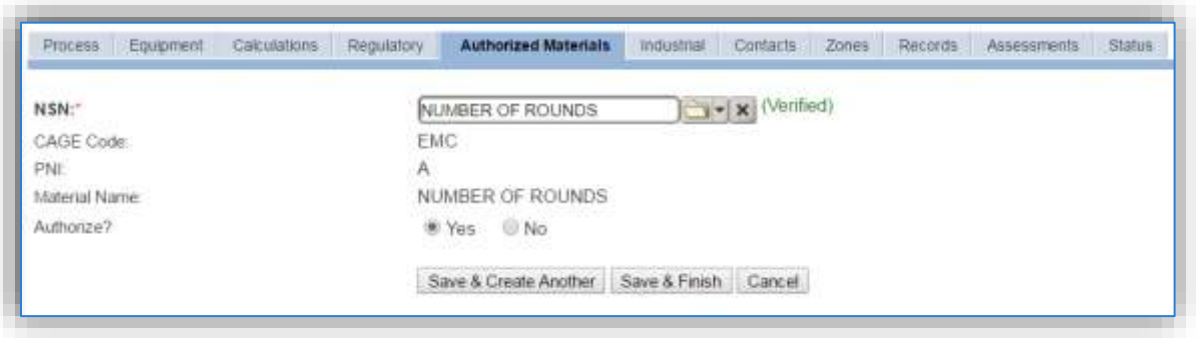
If your permit requires a different type of calculation, contact the Air Force Air Quality Subject Matter Expert for approval of the alternative method.

3.16.3.1.6 Materials

The last step in setting up the Unique Process record is to add the munition as the authorized material on the *Authorized Materials* tab. For ease of use and to minimize maintenance time it is recommended to create a generic material record for NUMBER OF ROUNDS or MUNITIONS that is associated to all OBOD processes. The calculations for open burning/open detonation does not utilize any material record attributes so a single record will suffice.



To authorize a material for the process, click on the Create Authorized Material hyperlink.



Select the munition record (i.e. NUMBER OF ROUNDS or MUNITIONS etc.) from the list of values. If the munition record is not available, the material record will need to be created. Next select "Yes" to **Authorize** the material, then **Save & Finish**.

3.16.3.2 New Sources

3.16.3.2.1 Data Collection Sheet

The form on the next page is a printable guide that can be taken out to the location of the source and used to gather all the necessary information from the shop personnel. It can then be used as a guide to help configure the data in APIMS when you return to your office.

Open Burn / Open Detonation Data Collection Worksheet

GENERAL INFORMATION

Building Number_____ Mission/Purpose_____

Shop Name/Function_____ Management Organization_____

Coordinates: Latitude: _____ Longitude: _____

UTM: _____ Zone _____ Easting _____ Northing ☐ Feet ☐ Meters

Is this source in any of your permits? ☐ Yes ☐ No

If yes, does it have an emission unit number or other designation? _____

USAGE INFORMATION

What types of munitions are burned/detonated?

How much of each munition was burned/detonated?
If the exact amount is not known, an estimate will suffice.

DoDIC/Description_____

Total Amount Burned/Detonated _____ ☐ Rounds ☐ Lbs

****

DoDIC/Description_____

Total Amount Burned/Detonated _____ ☐ Rounds ☐ Lbs

****

DoDIC/Description_____

Total Amount Burned/Detonated _____ ☐ Rounds ☐ Lbs

****

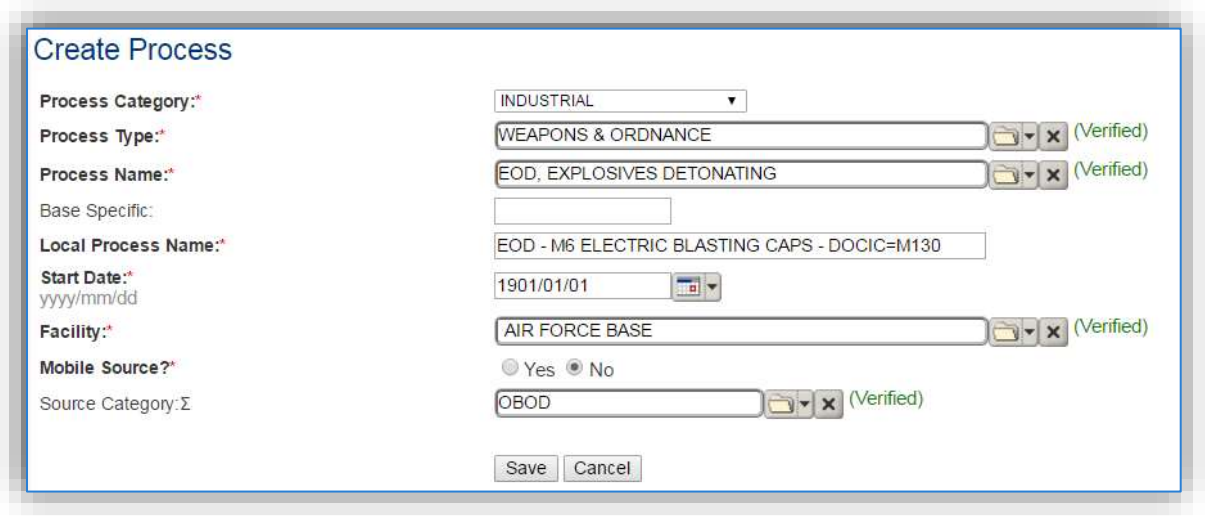
DoDIC/Description_____

Total Amount Burned/Detonated _____ ☐ Rounds ☐ Lbs

3.16.3.2.2 New Source Configuration

In order to properly document this emission source in APIMS, there will need to be a Unique Process record for each type of material detonated.

Navigate to the Unique Process module in APIMS and click the Create New Process hyperlink.



Process Category	Process Type	Process Name	Process ID
INDUSTRIAL	WEAPONS & ORDNANCE	EOD, EXPLOSIVES DETONATING	IWP1433
INDUSTRIAL	WEAPONS & ORDNANCE	ROCKET MOTOR DETONATION	IWP1874
INDUSTRIAL	WEAPONS & ORDNANCE	ORDNANCE TESTING	IWP1749

Use the table above to determine the appropriate **Process Category**, **Process Type** and **Process Name**.

The **Base Specific** field can be used to enter a standard convention identifier that will best help best identify the source. If the source is permitted, enter the emission unit ID as designated in the permit.

The **Local Process Name** should be in a standard naming convention for all sources that helps to quickly identify, what the process is, where it is and any other unique attribute. For example, EOD – CARTRIDGE 12 GAUGE MK275 or EOD – M6 ELECTRIC BLASTING CAPS – DODIC M130.

The **Start Date** should be the date the source became operational, if this date is not known, enter 1901/01/01 as a default start date.

The **Facility** should be the facility name that is responsible for the source.

The **Mobile Source?** flag should be "NO" as this is considered as a stationary source.

All open burn/open detonation emission units are assigned to the OBOD **Source Category**.

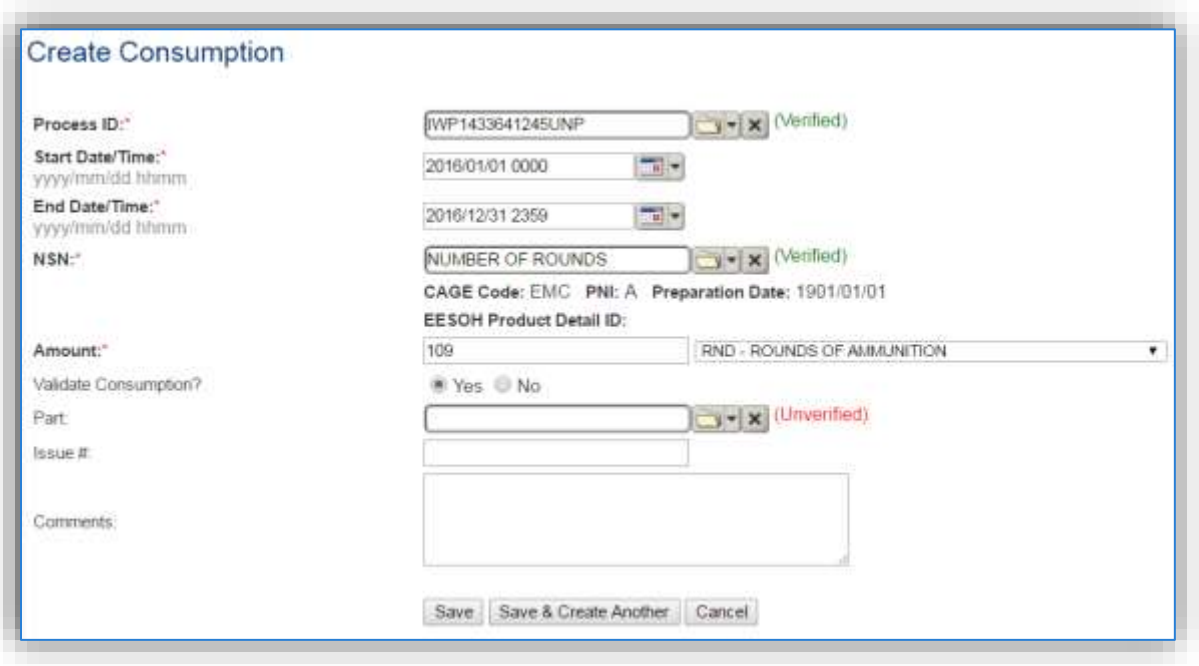
For the population of all other tabs, refer to the Existing Sources sections.

3.16.4 Year-to-Year Maintenance

3.16.4.1 Usage

The usage for open burn/open detonation sources will need to be tracked annually or more frequently if required by a regulatory agency. To correctly document the annual usage for this emission source the consumption should be entered in the Consumption log.

Navigate to the Consumption module and click the Create Consumption hyperlink.



The consumption record should span the entire reporting period as shown above. The material should be the NUMBER OF ROUNDS or other generic material record and the amount should be the amount of rounds or pounds of energetic material. Make sure to select "Yes" to validate the consumption. If the consumption is not validated it will not be included in the emissions calculation.

3.16.4.2 Emissions Calculations

To correctly calculate emissions, this emission source should be included in a **Stationary Source Calculation** that calculates controlled emissions. Reference Section 2.7 Emissions Calculations for additional instructions and details.

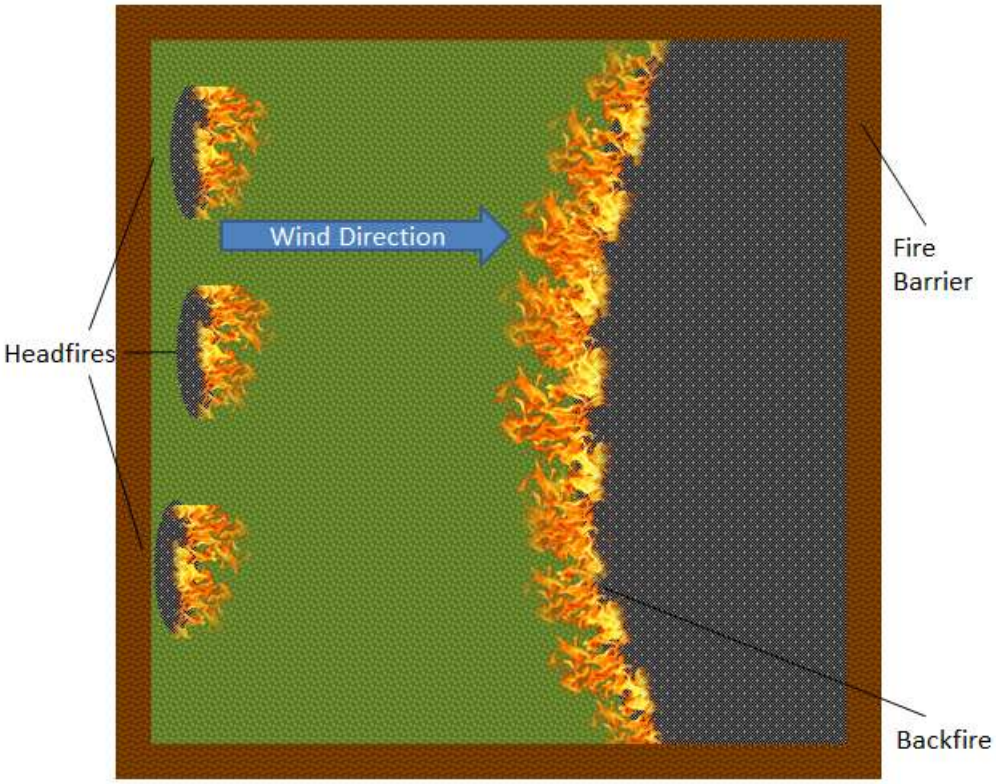
3.17 All Other Sources

3.17.1 Prescribed Burning (BURN)

3.17.1.1 Source Types

Prescribed burns and open burning occurs at some Air Force installations on a periodic basis. This classifies it as a transitory source for the purposes of air quality. As such, it should not be included in the standard Air Force AEI.

Prescribed burning is defined as the management of forests, ranges, and wetlands to accomplish natural resource management objectives. This is a cost effective method that includes the following objectives: treatment of an area for the purpose of reducing the potential for wildfires, removing logging residues, controlling insects and disease, increasing water yield, or controlling insect population and plant overgrowth without the use of herbicides and pesticides.



Prescribed burns usually have four phases of combustion: preheating, flaming, glowing and smoldering. Each phase produces different amounts of emissions relative to each other due to the combustion temperatures and combustion efficiencies. Therefore, the total emissions from prescribed burning depend on the time spent in each phase. The preheating phase is typically the “cleanest” phase since few pollutants are emitted into the atmosphere. In contrast, the smoldering phase describes the portion of the process in which combustion is incomplete and inefficient, resulting in a much higher ratio of emitted pollutants per fuel consumed. The combustion efficiency varies in the flaming and glowing phases which, in turn, lead to varying amounts of emitted pollutants.

It is common for an area to have multiple types of vegetation; in this case each type of vegetation and combustion phase will need to be accounted for.

Open burning is defined as the combustion of materials in unenclosed areas such as in open drums, baskets, fields, or pits. Materials commonly disposed of in this manner include municipal waste, auto body components, landscape refuse, agricultural field refuse, wood refuse, bulky industrial refuse, and leaves.

Emissions from the open burning of agricultural materials are dependent on the moisture content and compactness of the material.

3.17.1.2 Potential Data Sources

Base Civil Engineers conducts the open burning and prescribed burning of agricultural materials on Air Force installations. These activities are usually coordinated with regulatory agencies and the fire department. Usually, the burning only occurs during certain weather conditions. The Civil Engineer office should be able to provide the data on vegetation type and combustion phases. However, the U.S. Forest Service also may be able to provide the typical vegetation found in the area for prescribed burns.

The data elements required to accurately calculate emissions are as follows:

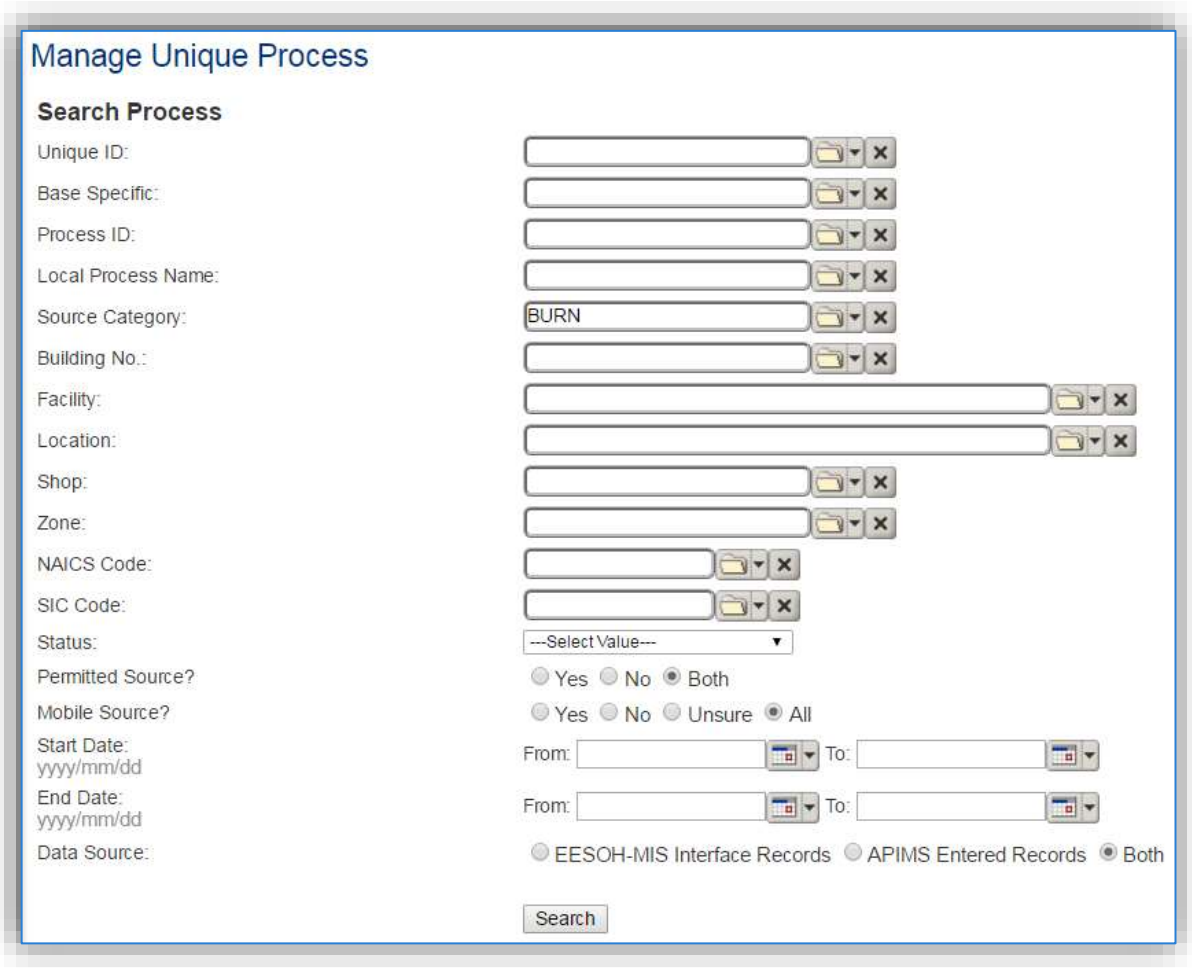
- Acres or tons of material burned
- Type of burning (open or prescribed)
- Agricultural material(s) – if multiple materials are burned, estimate the amount of each material on a percent of total material basis
- Combustion phases and the percent of total burn that was spent in each phase (prescribed burning only)

3.17.1.3 Standard Source Identification/Characterization

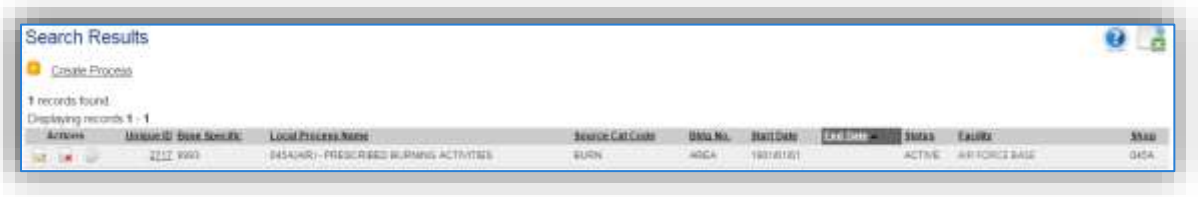
3.17.1.3.1 Existing Sources

It is important to review the existing sources in each source category on an annual basis at a minimum. Most regulatory agencies require an up to date source inventory.

Navigate to the Unique Process module of APIMS by clicking on **Unique Process** under the **Emission Unit** tab.



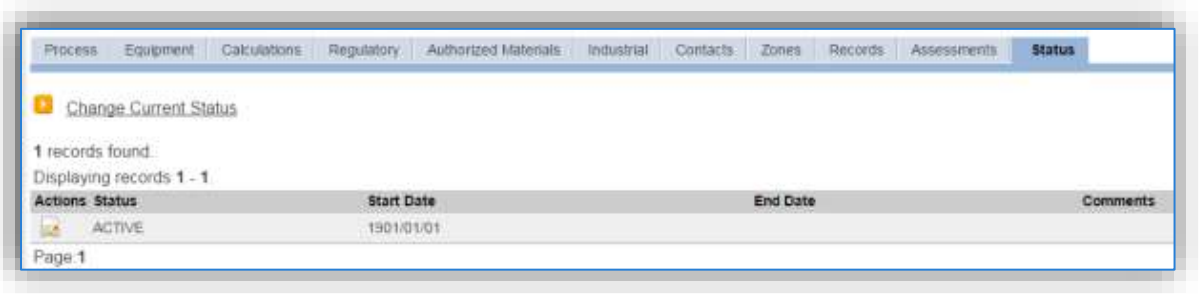
In the **Source Category** search field, type "BURN" then select the row for PRESCRIBED BURN from the dropdown results. Click the **Search** button.



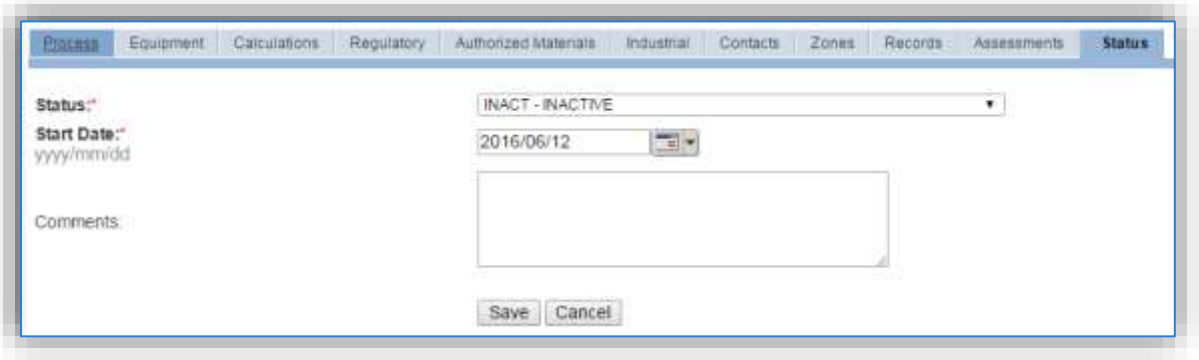
The search results grid will now display all the prescribed and open burning processes currently in APIMS.

3.17.1.3.2 Status

If the status of a process needs to be changed, click the edit icon next to the process.



Navigate to the *Status* tab. Click the Change Current Status hyperlink.



Select the appropriate status from the **Status** dropdown (i.e., ACTIVE, REMOVED or INACTIVE).

For the **Start Date** enter the date at which the status changed.

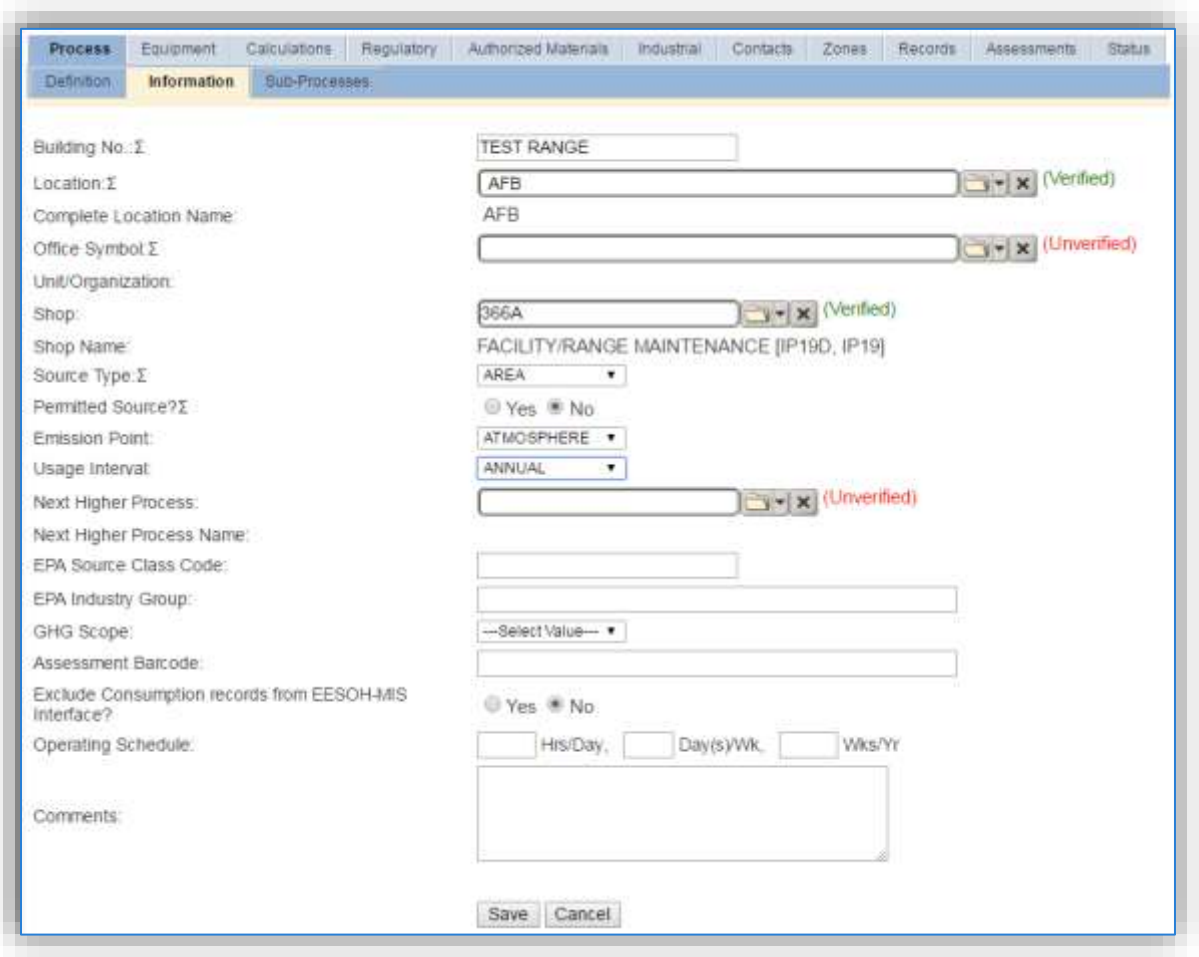
Click the **Save** button.

The emissions for a process will only be calculated for the dates the process was in an ACTIVE status. If a source is removed in the middle of a year, the emissions will only be calculated for the part of the year the source was active.

If prescribed burning activities are conducted occasionally it is recommended to leave the process(es) active as long as there is the possibility of this activity. This will ensure it is still considered when determining overall base air emissions.

3.17.1.3.3 Information

There are basic data elements that are important to track and maintain for new and existing sources, such as location and source type. This data can be maintained in the Unique Process record on the *Information* sub tab.



The **Building No**. field can be used to specify a general location or area of the emission source, for example, TEST RANGE.

The **Location** field can be important to effectively manage the location and mission of the emission source. Since burning activities are conducted in outdoor areas, a general description of the area will suffice. For the instructions on how to create a location reference Section 2.2 Location.

The **Shop** is important as it establishes the personnel that are responsible for the activity and will be the best source of information regarding the activity.

Prescribed burn and open burning activities should be designated as an AREA in the **Source Type** field.

The **Emission Point** should be ATMOSPHERE for all activities.

The **Permitted Source** flag should also be populated to accurately reflect the current regulatory status of the emission source. This flag can be an invaluable tool in roll-up reporting.

The **Usage Interval** should be designated. This source is usually documented on an ANNUAL basis unless specified differently by a regulatory requirement. It is important to populate this field correctly as it will affect how it is documented in the AEI Throughputs module.

3.17.1.3.4 Sub-Processes

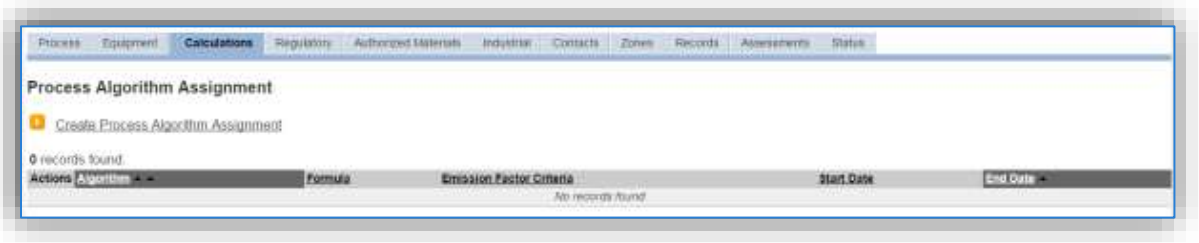
This source does not utilize this functionality.

3.17.1.3.5 Equipment

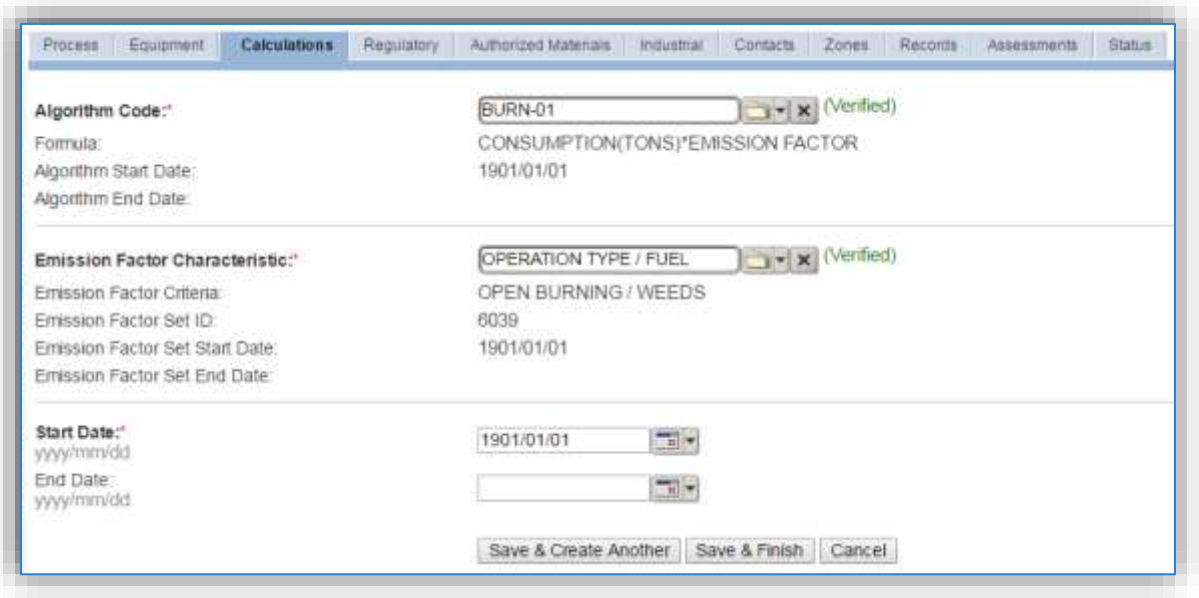
This source does not utilize this functionality.

3.17.1.3.6 Calculations

The next tab is the *Calculations* tab.

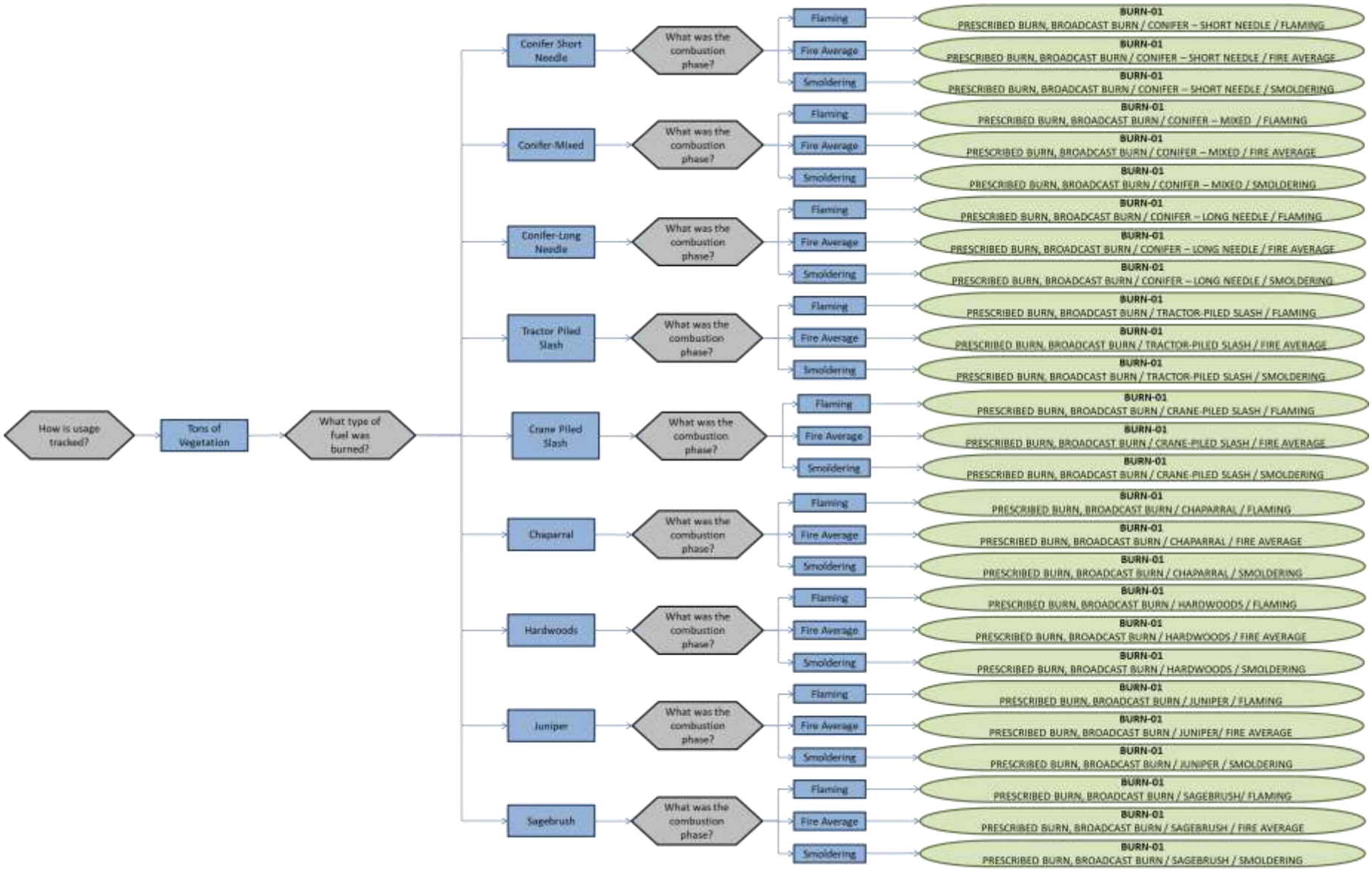


To associate an algorithm to the process, click on the Create Process Algorithm Assignment hyperlink.



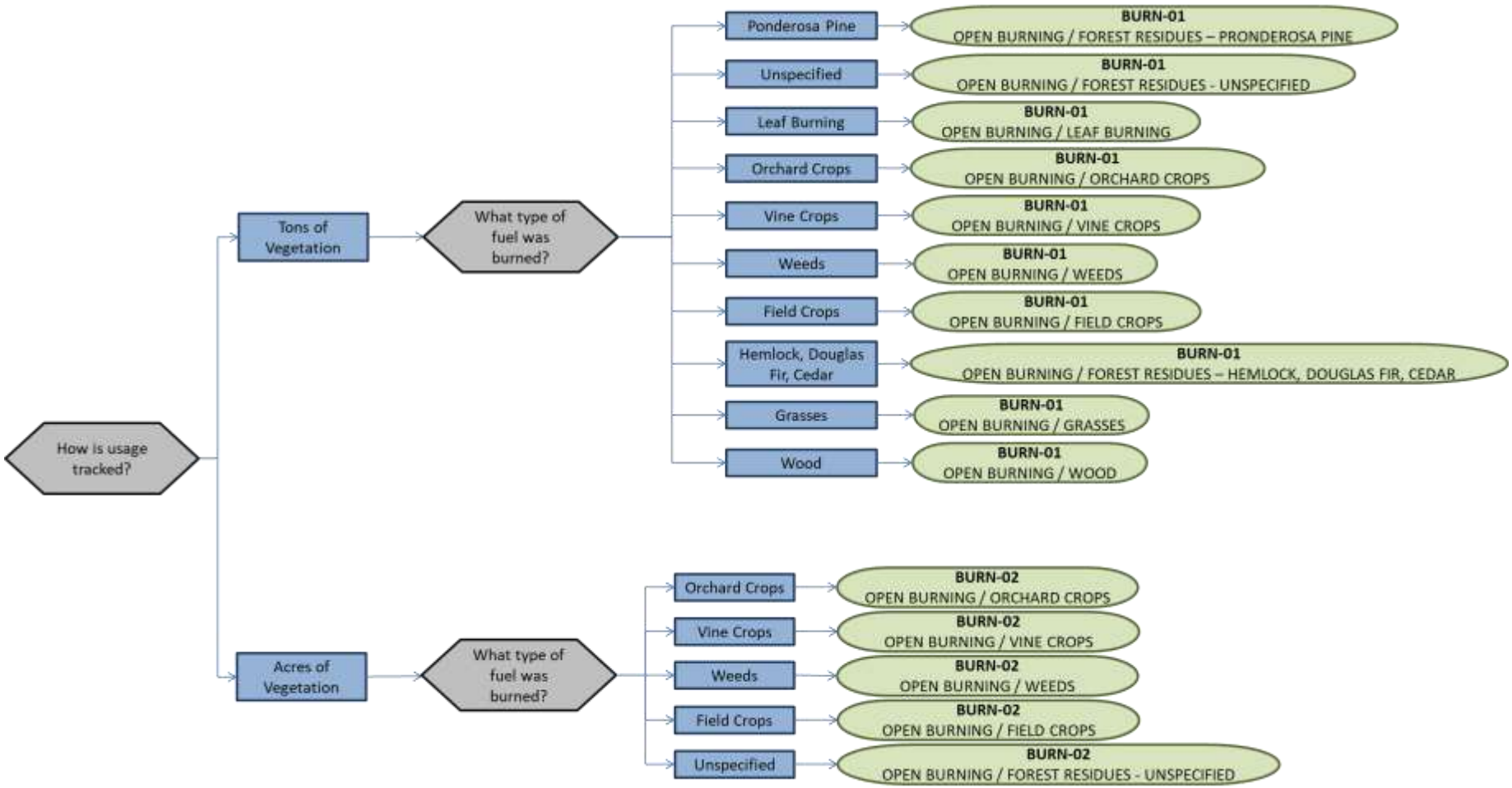
Select the **Algorithm Code** and **Emission Factor Characteristic** from the list of values that matches the correct scenario. Enter the **Start Date** to match the start date of the process. Click **Save & Finish** button to save and return to the Calculations tab.

Use the flowchart below to find the correct Algorithm Code and Emission Factor Characteristic.



Prescribed Burning

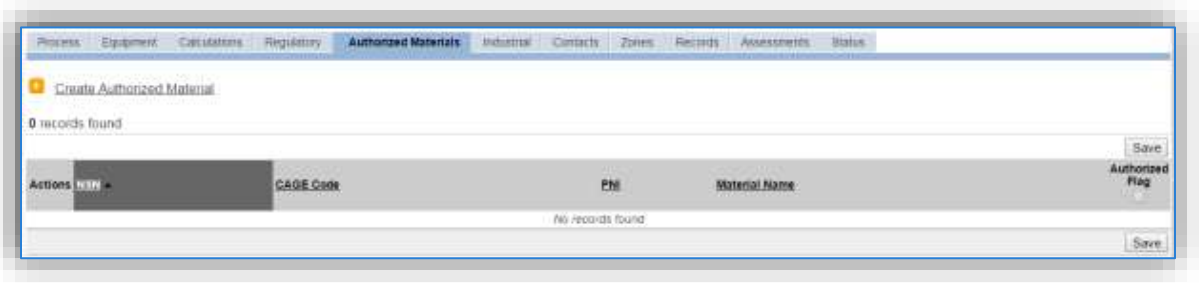
Open Burning



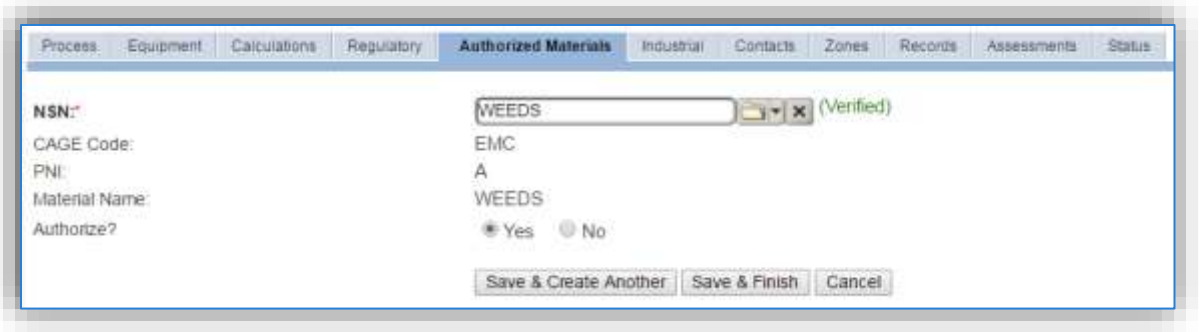
If your permit requires a different type of calculation, contact the Air Force Air Quality Subject Matter Expert for approval of the alternative method.

3.17.1.3.7 Materials

The last step in setting up the Unique Process record is to the authorized materials on the *Authorized Materials* tab.



To authorize a material for the process, click on the Create Authorized Material hyperlink.



Select the material record from the list of values, using the **NSN** or **Material Name**. If the material is not available the material record will need to be created.

It is suggested to use a material name that describes the material that is burned or a generic material record such as ACRES OF VEGETATION or TONS OF VEGETATION.

Next select "Yes" to **Authorize** the material, then **Save & Finish**.

Since the emission factors utilized for burning activities are dependent upon the material burned, there should only be one material per process.

3.17.1.4 New Sources

3.17.1.4.1 Data Collection Sheet

The form on the next page is a printable guide that can be taken out to the location of the source and used to gather all the necessary information from the shop personnel. It can then be used as a guide to help configure the data in APIMS when you return to your office.

Prescribed Burn / Open Burn Data Collection Worksheet

GENERAL INFORMATION

Building Number_____ Mission/Purpose_____
Shop Name/Function_____ Management Organization_____
Coordinates: Latitude: _____ Longitude: _____
UTM: _____ Zone _____ Easting _____ Northing ☐ Feet ☐ Meters
Is this source in any of your permits? ☐ Yes ☐ No
If yes, does it have an emission unit number or other designation? _____

USAGE INFORMATION

How much total material was burned?

Amount _____ ☐ Acres ☐ Tons of Vegetation

What type of burning is conducted? ☐ Prescribed Burn ☐ Open Burn

For open burning, what type of material was burned and what percent of the total amount was each material? (check all that apply)

- ☐ Forest Residues – Ponderosa Pine _____%
- ☐ Forest Residues – Unspecified _____%
- ☐ Orchard Crops _____%
- ☐ Leaves _____%
- ☐ Forest Residues – Hemlock, Douglas Fir, Cedar _____%
- ☐ Vine Crops _____%
- ☐ Weeds _____%
- ☐ Field Crops _____%
- ☐ Wood _____%

For Prescribed Burning what type of material was burned and what percent of the total amount was each material? (check all that apply)

- ☐ Conifer – Short Needle _____%
- ☐ Conifer – Mixed _____%
- ☐ Conifer – Long Needle _____%
- ☐ Dozer-piled Conifer – No Mineral Soil _____%
- ☐ Chaparral _____%
- ☐ Hardwoods _____%
- ☐ Juniper _____%
- ☐ Sagebrush _____%

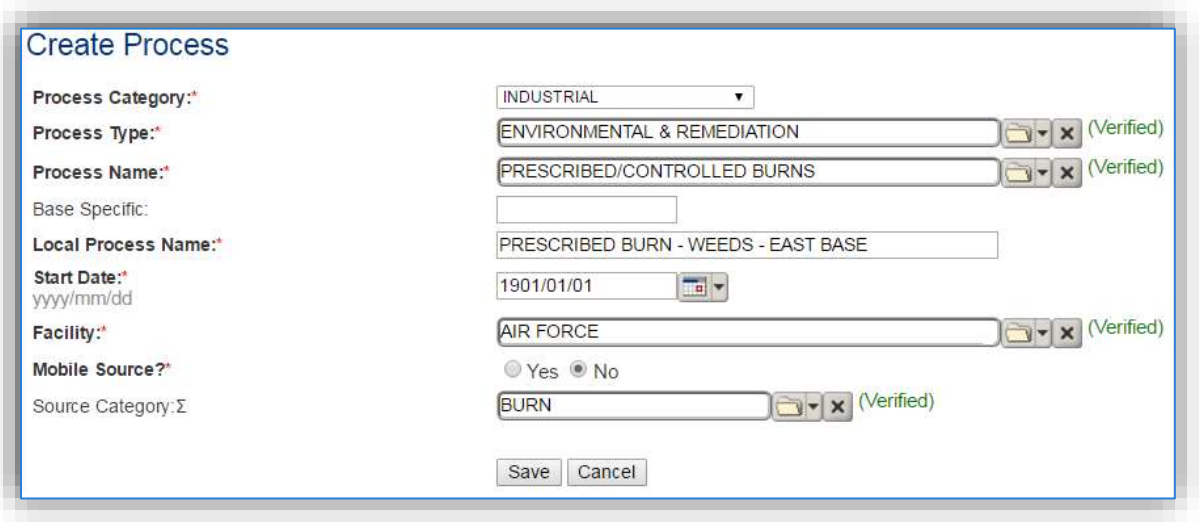
For Prescribed Burning what percentage of the time was spent in each combustion phase?

- ☐ Flaming _____%
- ☐ Smolder _____%
- ☐ Unknown – Fire Average

3.17.1.4.2 New Source Configuration

In order to properly document this emission source in APIMS, there will need to be a Unique Process record for each type of material burned and each phase of burning if applicable.

Navigate to the Unique Process module in APIMS and click the Create New Process hyperlink.



Process Category	Process Type	Process Name	Process ID
INDUSTRIAL	ENVIRONMENTAL & REMEDIATION	PRESCRIBED/CONTROLLED BURNS	IER1819

Use the values in the table above to appropriately populate the **Process Category**, **Process Type** and **Process Name**.

The **Base Specific** field can be used to enter a standard convention identifier that will best help identify the source. If the source is permitted, enter the emission unit ID as designated in the permit.

The **Local Process Name** should be in a standard naming convention for all sources that helps to quickly identify, what the process is, where it is and any other unique attribute. For example, OPEN BURN – LEAVES.

The **Start Date** should be the date the first time the activity occurred. If this date is not known, enter 1901/01/01 as a default start date.

The **Facility** should be the facility name that is responsible for the source.

The **Mobile Source?** flag should be "NO" as this is considered as a stationary source.

All open burn and prescribed burn activities are assigned to the BURN **Source Category**.

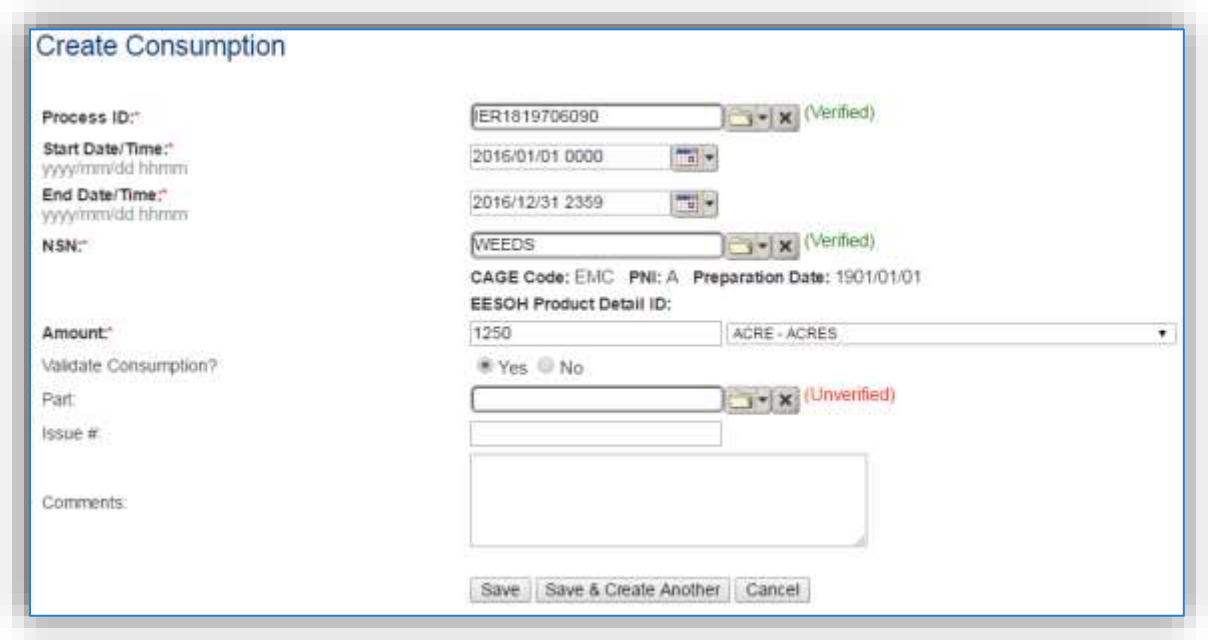
For the population of all other tabs, refer to the Existing Sources sections.

3.17.1.5 Year-to-Year Maintenance

3.17.1.5.1 Usage

The consumption for prescribed and open burning sources will need to be tracked annually or each time the activity occurs. To correctly document the usage for this emission source the consumption should be entered in the Consumption log.

Navigate to the Consumption module and click the Create Consumption hyperlink.

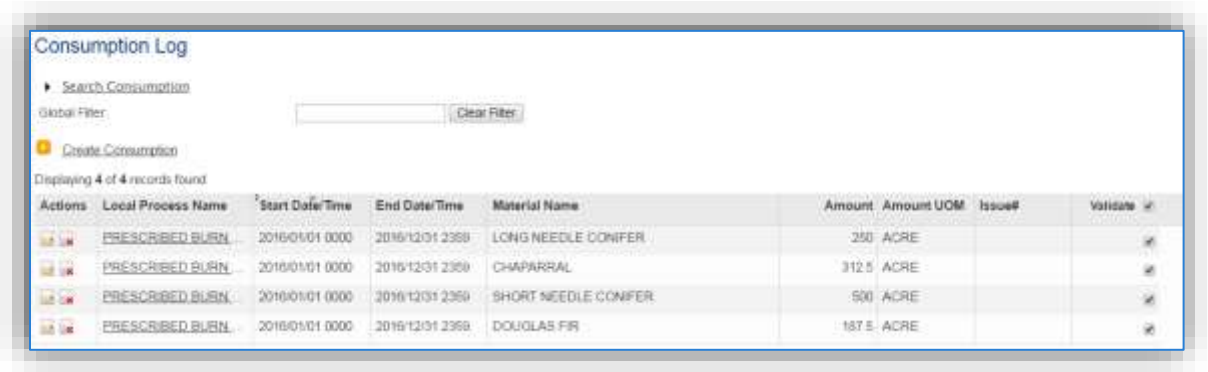


The consumption record should span the entire reporting period or the duration of the activity as shown above. The material should be the material burned or the generic tons or acres material record, whichever is associated to the process record.

For prescribed burns where multiple types of vegetation are burned there will need to be a breakdown of the composition of the area. For example, 20% Long Needle Conifer, 25% Chaparral, 40% Short Needle Conifer and 15% Douglas Fir. In cases described in this way, the total acres burned will need to be multiplied by the composition fraction (percent / 100) of the material.

1250 acres x 0.2 = 250 acres Long Needle Conifer
1250 acres x 0.25 = 312.5 acres Chaparral
1250 acres x 0.4 = 500 acres Short Needle Conifer
1250 acres x 0.15 = 187.5 Acres Douglas Fir

An example of the completed consumption is shown below.



This same principle applies to the prescribed burns that have different burn phases such as smoldering and flaming.

The amount should be the tons of material burned for BURN-01 or acres burned for BURN-02. Make sure to select "Yes" to validate the consumption. If the consumption is not validated it will not be included in the emissions calculation. Repeat this step for all the different media used.

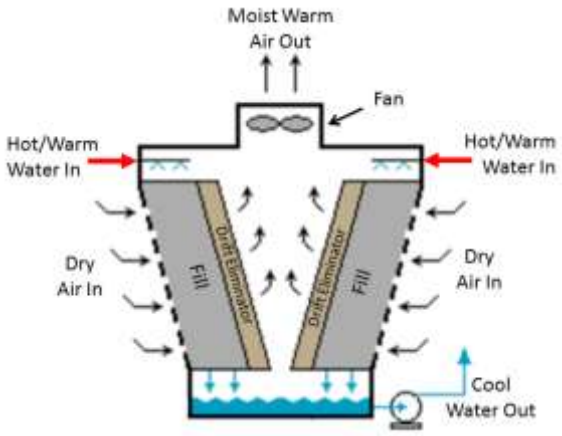
3.17.1.5.2 Emissions Calculation

To correctly calculate emissions this emission source should be included in a **Transitory Source Calculation**. Reference Section 2.7 Emissions Calculations for additional instructions and details.

3.17.2 Cooling Towers (COOL & PWCT)

3.17.2.1 Source Types

A wet cooling tower relies on the latent heat of water evaporation to exchange heat between an industrial or commercial process and the air passing through the tower. In a cooling tower, warmer water is brought into direct contact with the cooler air. When the air enters the cooling tower, its moisture content is generally below saturation. When the air exits, it emerges at a higher temperature and with its moisture content at or near saturation. Even when the air is at saturation, cooling can still take place due to a rising temperature which results in an increase in heat capacity that allows more sensible heat to be absorbed.



There are two main types of cooling towers: natural draft and mechanical draft cooling towers. A natural draft cooling tower receives its air supply from natural wind currents that generates a convective flow up the tower; this air convection cools the water on contact. A mechanical draft cooling tower is much more widely used and employs large fans to either force or induce a draft, which increases the contact time between the water and the air, effectively maximizing the heat transfer. Virtually all Air Force cooling towers are the induced (mechanical) draft type.

Since wet cooling towers provide direct contact between the cooling water and the air passing through the tower, some of the liquid water may be entrained in the air stream and be carried out of the tower as "drift" droplets. These "drift" droplets from cooling towers may contain dissolved solids (e.g., mineral matter, chemicals for corrosion inhibition, ambient air dust, etc.). Therefore, the emissions are not from the drift droplets themselves, but rather the minerals or other particulate matter found within the drift droplets. The particulate matter that is suspended in the drift droplet has the same chemical makeup as the cooling water and is assumed to become suspended particulate matter (PM) once the water contained in the drift droplet evaporates.

To reduce the drift from cooling towers, drift eliminators are usually incorporated into the tower design to remove as many droplets as practical from the air stream before exiting the tower. The drift eliminators used in cooling towers rely in inertial separation caused by direction changes while passing through the eliminators. Types of drift eliminator configurations include herringbone (blade-type), wave form, and cellular (or honeycomb) designs.

The emissions of PM, PM_{10} and $PM_{2.5}$ from wet cooling towers are dependent upon the water flow rate, the total drift factor and the amount of dissolved solids. The water flow rate is the amount hot water that is circulated into the cooling tower. The total liquid drift is water droplets entrained in the cooling tower exit stream. The total drift factor is the fraction of the circulating water flow that results in liquid drift in the cooling tower exit stream. This factor is dependent upon the cooling tower design and configuration and therefore should be obtained from the manufacturer. Typical values are between 0.0005 – 0.001. The total dissolved solids should be measured using gravimetric analysis or conductivity methods. Gravimetric methods are direct measurements of total dissolved solids (TDS) and are the most accurate. TDS measurements are performed in a laboratory which involves evaporating the liquid and measuring the mass of residue left. The conductivity method involves measuring the specific conductance of an electrolyte solution. The electrical conductivity of a solution is a measure of the solution's ability to carry and electric current. The greater the concentration of particles, the more electrically conductive the solution becomes.

3.17.2.2 Potential Data Sources

The best source for information relating to cooling towers used for comfort cooling is the base HVAC shop, office symbol CEOFA. If the base has any cooling towers used for industrial processes the specific shops responsible for the process would be the best resource for data. The data required for both types of cooling towers is:

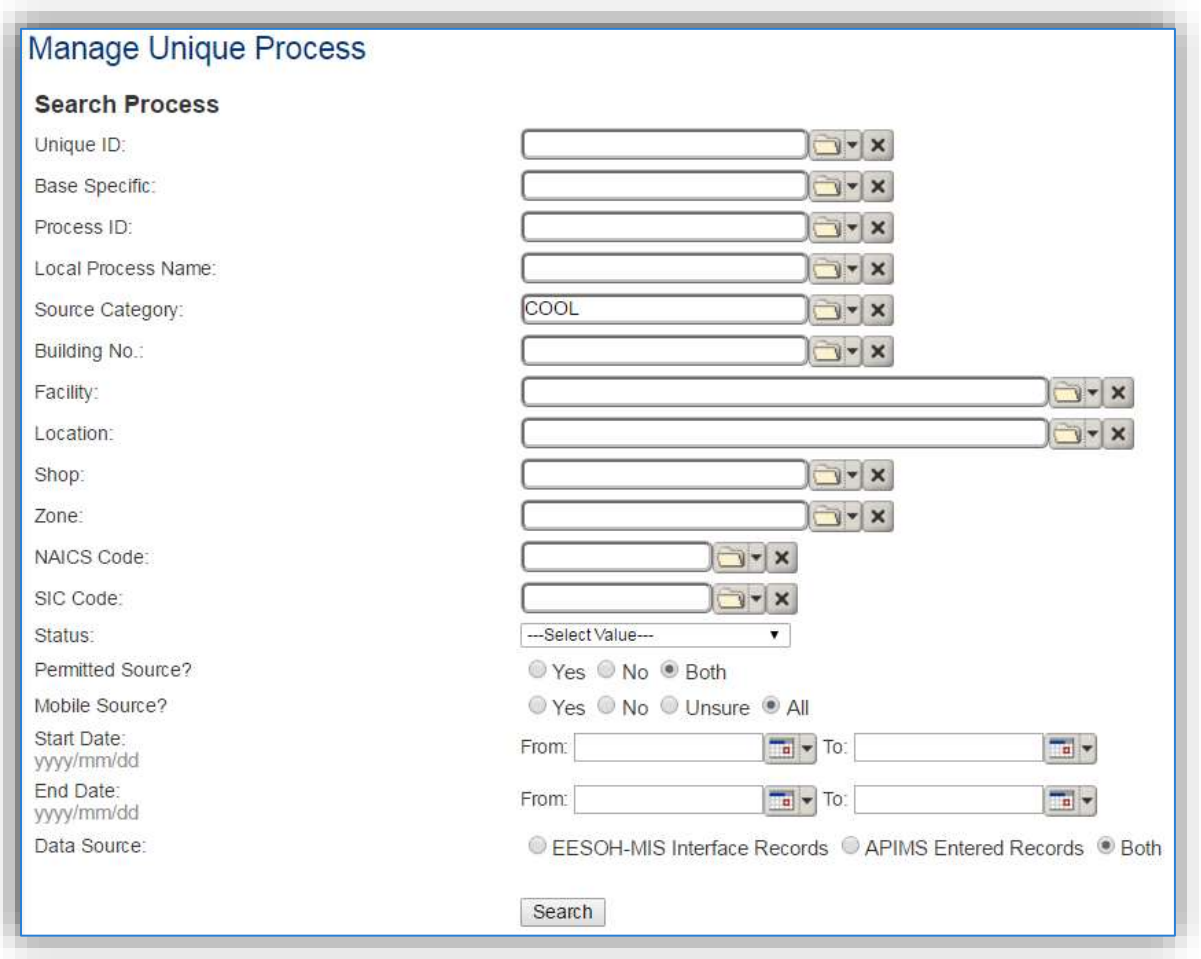
- Number of days operated
- Water flow rate in gallons per day
- Total Dissolved Solids (TDS) in ppm
- Total Liquid Drift Factor (TLD) in pounds per thousand gallons

3.17.2.3 Standard Source Identification/Characterization

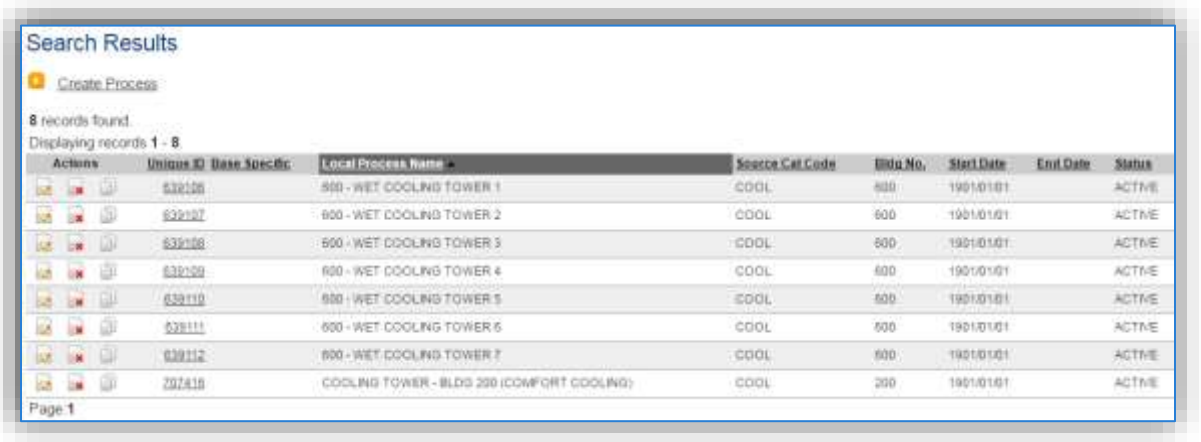
3.17.2.3.1 Existing Sources

It is important to review the existing sources in each source category on an annual basis at a minimum. Most regulatory agencies require an up to date source and equipment inventory.

Navigate to the Unique Process module of APIMS by clicking on **Unique Process** under the **Emission Unit** tab.



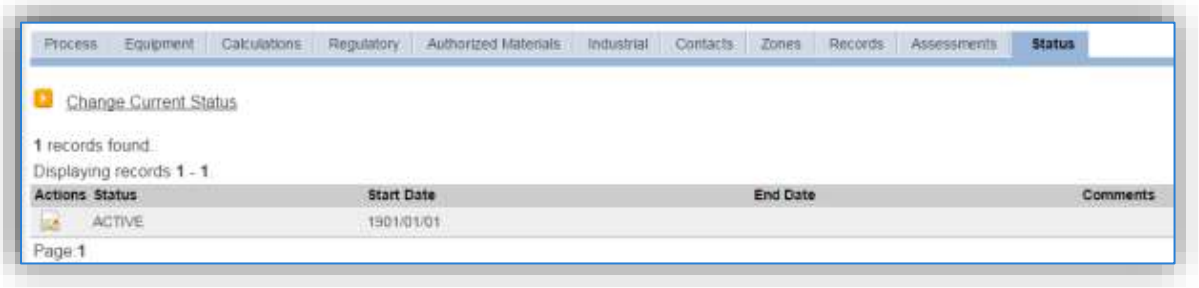
In the **Source Category** search field, type "COOL" for comfort cooling towers or "PWCT" for process cooling towers then select the corresponding row from the dropdown results. Click the **Search** button.



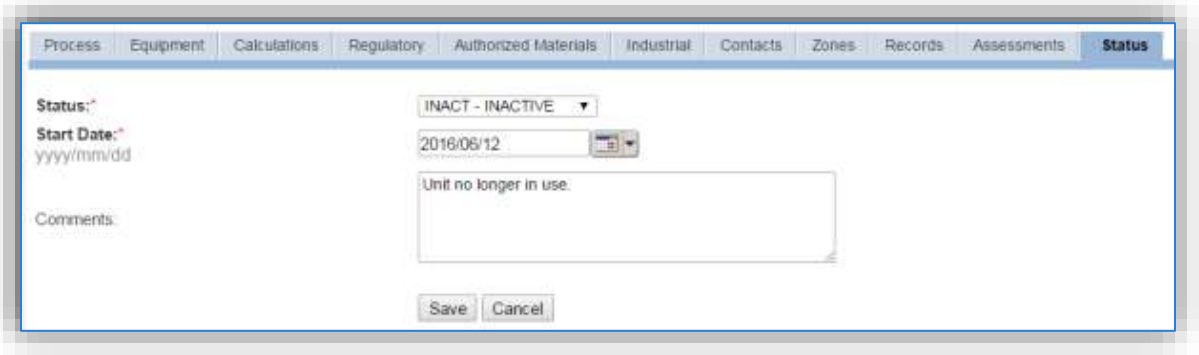
The search results grid will now display all the processes for cooling towers used for comfort cooling or process cooling that are currently in APIMS.

3.17.2.3.1.1 *Status*

If the status of a process needs to be changed, click the edit icon next to the process.



Navigate to the *Status* tab. Click the Change Current Status hyperlink.



Select the appropriate status from the **Status** dropdown (i.e., ACTIVE, REMOVED or INACTIVE).

For the **Start Date** enter the date at which the status changed.

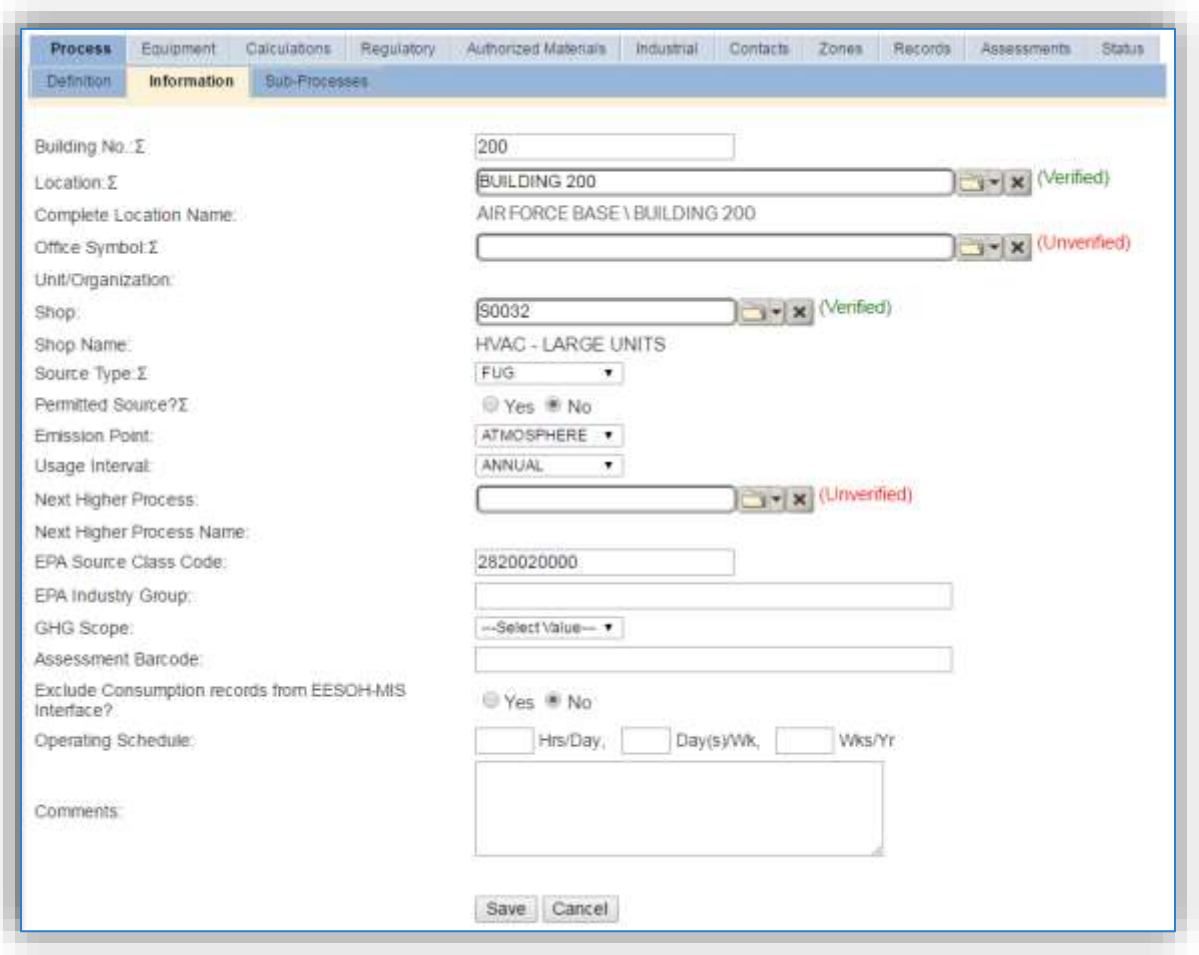
Enter **Comments** that provide insight into why the status changed. These can be very useful for equipment inventories, permit renewals and regulatory reporting. Most regulatory agencies require reporting on unit operation status. This includes any potential time spent offline and reasons for the outage.

Click the **Save** button.

The emissions for a process will only be calculated for the dates the process was in an ACTIVE status. If a source is removed in the middle of a year, the emissions will only be calculated for the part of the year the source was active.

3.17.2.3.1.2 Information

There are basic data elements that are important to track and maintain for new and existing sources, such as location and source type. This data can be maintained in the Unique Process record on the *Information* sub tab.



The **Building No**. field can be used to specify the building number or a general location or area of the emission source, for example, EAST SIDE.

The **Location** field is very important to effectively manage the location and mission of the emission source. This documents where the source is located, in case it needs to be inspected or if the source owner needs to be contacted for pertinent information. For the instructions on how to create a location reference Section 2.2 Location.

The **Shop** is important as it establishes the personnel that are utilizing or maintaining the equipment on a regular basis and will be the best source of information regarding the unit. This is especially important for process cooling towers as they will be managed by the shop and not the centralized HVAC function on an installation.

Cooling towers are categorized as a fugitive source, FUG, in the **Source Type**.

The **Permitted Source** flag should also be populated to accurately reflect the current regulatory status of the emission source. This flag can be an invaluable tool in roll-up reporting.

The **Emission Point** for cooling towers is usually ATMOSPHERE.

The **Usage Interval** should be designated. Cooling towers are usually documented on an ANNUAL basis but may be different time intervals if a permitted source. It is important to populate this field correctly as it will affect how it is documented in the AEI Throughputs module.

The **EPA Source Class Code** is a process level EPA code that describes the equipment and/or operation that is the source of the emissions. Source Classification Codes for cooling tower operations are:

Process Type	SCC
Comfort Cooling Towers	2820020000
Process Cooling Towers	2820010000

3.17.2.3.1.3 Sub-Processes

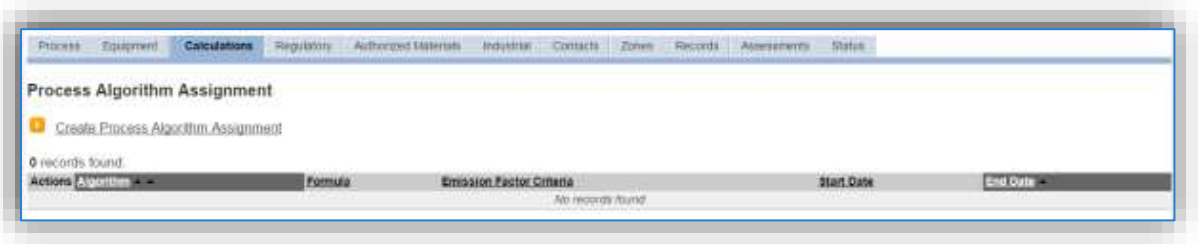
This source does not utilize this functionality.

3.17.2.3.1.4 *Equipment*

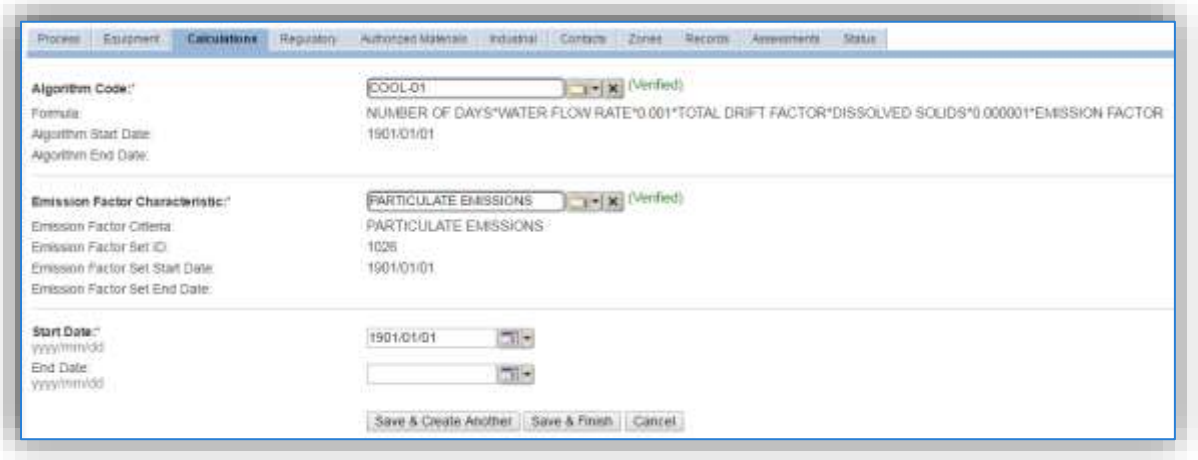
This source does not utilize this functionality.

3.17.2.3.1.5 Calculations

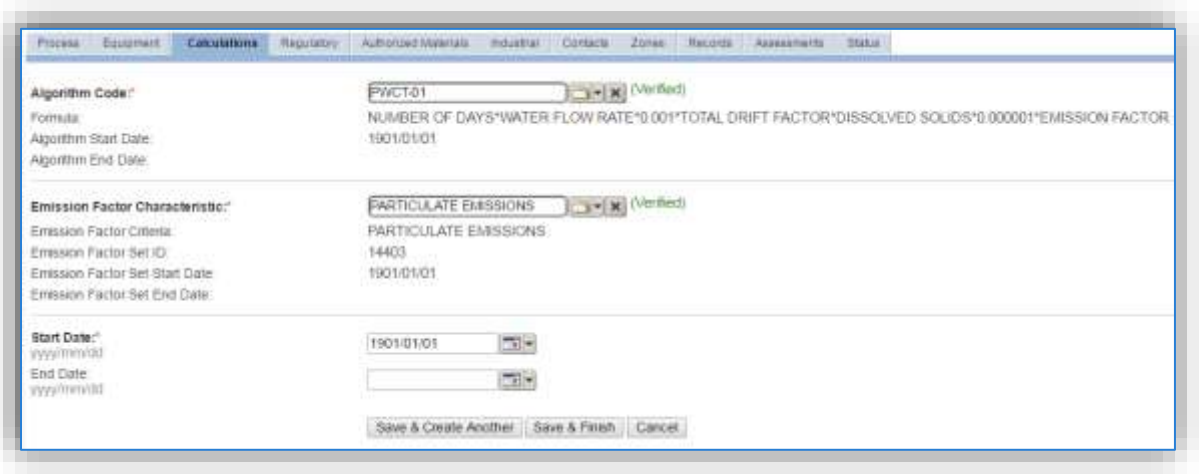
The next tab is the *Calculations* tab.



To associate an algorithm to the process, click on the Create Process Algorithm Assignment hyperlink.



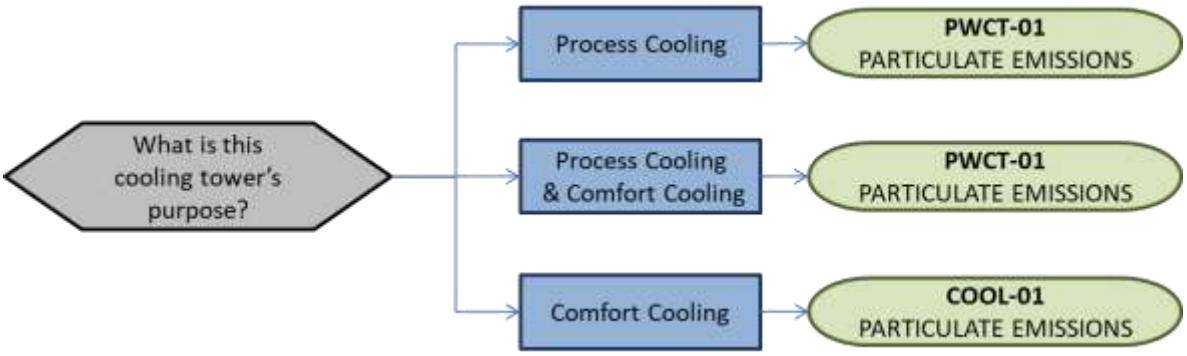
Comfort Cooling Tower



Process Cooling Tower

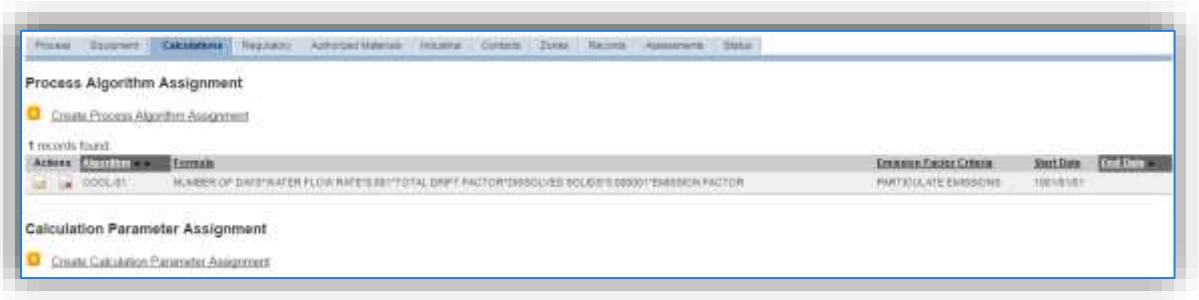
Select the **Algorithm Codes** from the list of values that matches the correct scenario. Next select the **Emission Factor Characteristic** available. Enter the **Start Date** to match the start date of the process. Click the **Save & Finish** button to save and return to the Calculations tab.

Use the flowchart below to find the correct Algorithm Code and Emission Factor Characteristic.

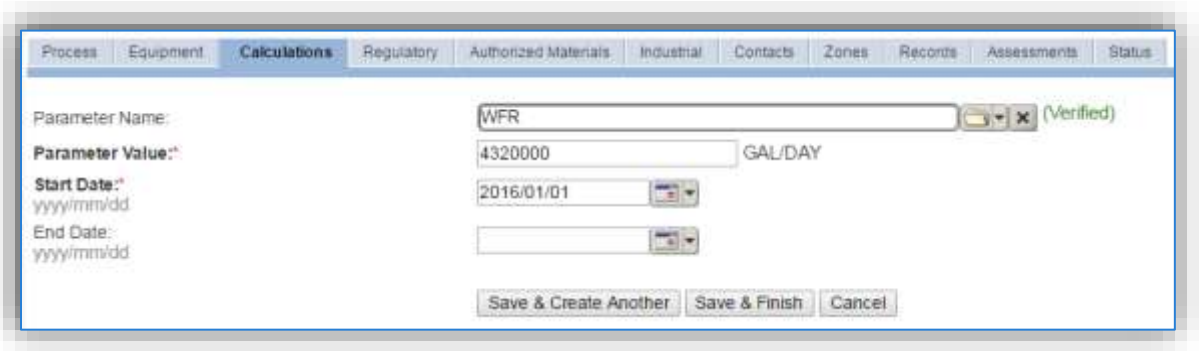


If your permit requires a different type of calculation, contact the Air Force Air Quality Subject Matter Expert for approval of the alternative method.

The next step on this tab is to enter the Calculation Parameters: WATER FLOW RATE, TOTAL DRIFT FACTOR and DISSOLVED SOLIDS. These parameters are required for both comfort cooling (COOL-01) and process cooling (PWCT-01).



To add a calculation parameter to the process, click on the Create Calculation Parameter Assignment hyperlink.

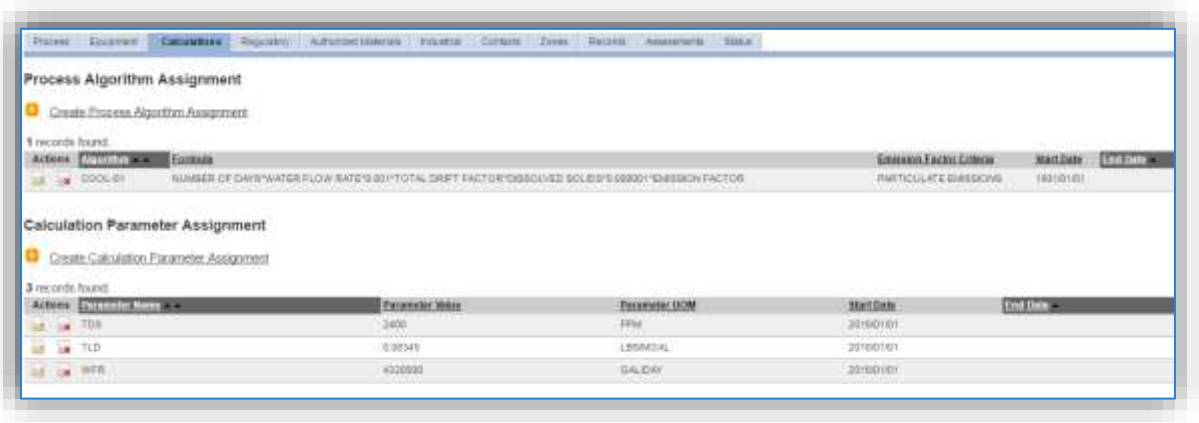


Select the **Parameter Name** from the list of values and the corresponding number in the Parameter Value field. Use the table below for guidance on parameters and the parameter values.

Parameter Name	Parameter Description	Unit of Measure	Information Source
WFR	CIRCULATING WATER FLOW RATE	GAL/DAY	Shop Personnel
TLD	TOTAL LIQUID DRIFT FACTOR	LBS/MGAL	Manufacturer
TDS	TOTAL DISSOLVED SOLIDS	PPM	Testing Analysis

Enter the **Start Date** for the parameter. This date should match the start date of the algorithm or use 1901/01/01 as a default. However, for the TDS which may change based on new tests and analysis, the start date should match the test date.

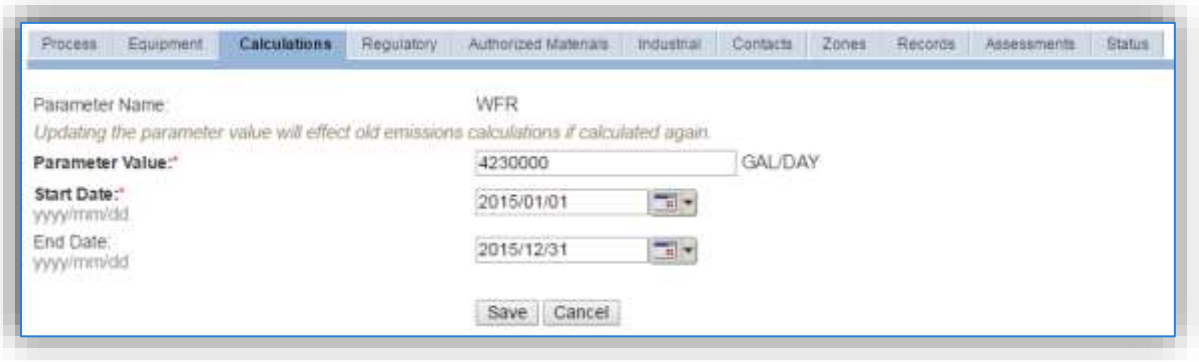
Click the **Save & Create Another** button until the parameter is entered then click the **Save & Finish** button to return to the Calculations tab.



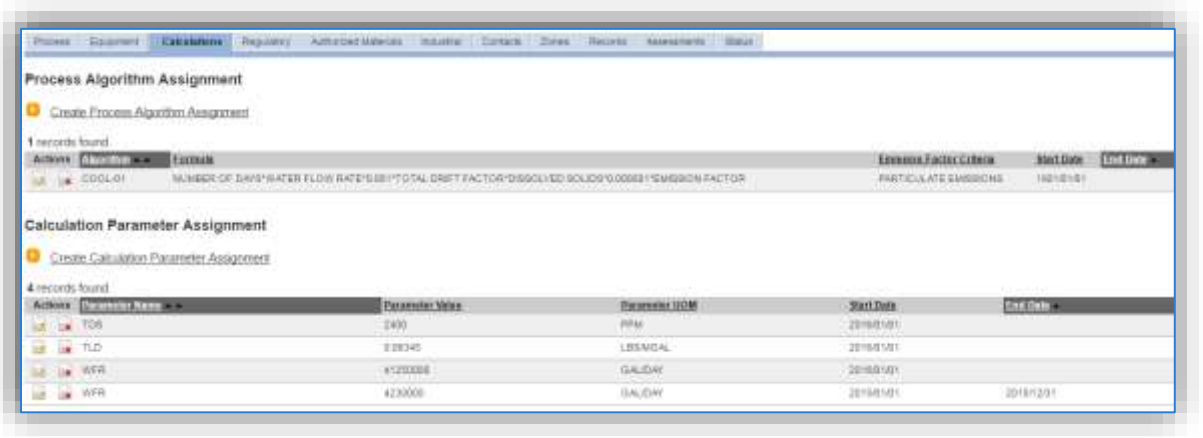
If the TDS changes it is important not to edit or delete the value of the existing parameter. A best practice is to end date the parameter record and create a new one with the new value.

To end date a parameter, click the edit icon  next to the parameter that needs to be end dated.

This will open the parameter, enter the last date of the year in the **End Date** field and click **Save**. This will allow for the creation of a new parameter value.



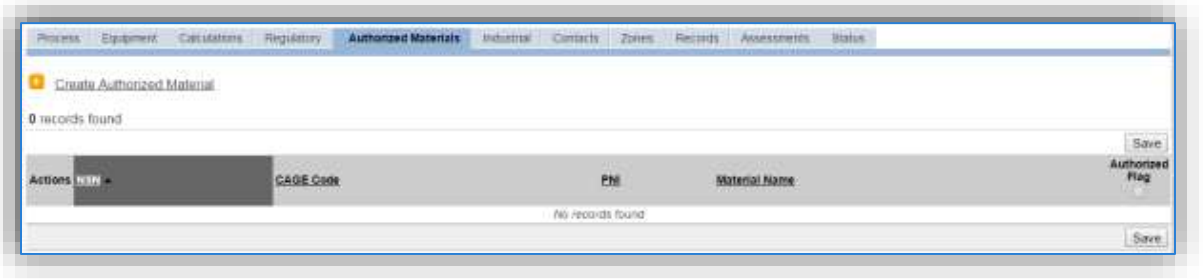
Enter the last date of the year in the **End Date** field and click **Save**. This will allow for the creation of a new parameter value.



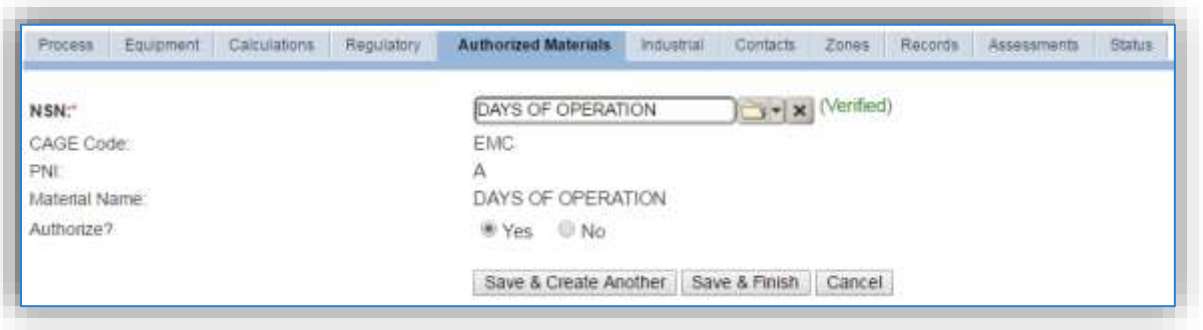
As shown above, all the parameters will appear in the grid with the active parameters at the top. This maintains all the data used in AEIs for previous years.

3.17.2.3.1.6 Materials

The last step in setting up the Unique Process record is to add the operating time or days of operation as the authorized material on the *Authorized Materials* tab.



To authorize a material for the process, click on the Create Authorized Material hyperlink.



Select **NSN** of DAYS OF OPERATION or OPERATING TIME from the list of values. Next select "Yes" to **Authorize** the material, then **Save & Finish**.

3.17.2.3.2 New Sources

3.17.2.3.2.1 *Data Collection Sheet*

The form on the next page is a printable guide that can be taken out to the location of the source and used to gather all the necessary information from the shop personnel. It can then be used as a guide to help configure the data in APIMS when you return to your office.

Wet Cooling Tower Data Collection Worksheet

GENERAL INFORMATION

Building Number_____ Mission/Purpose_____

Shop Name/Function_____ Management Organization_____

Coordinates: Latitude: _____ Longitude: _____

UTM: _____ Zone _____ Easting _____ Northing ☐ Feet ☐ Meters

Is this source in any of your permits? ☐ Yes ☐ No

If yes, does it have an emission unit number or other designation? _____

USAGE INFORMATION

What is the purpose of the cooling tower? ☐ Comfort Cooling ☐ Process Cooling

What is the water flow rate? _____ Gal/Day

How many days did the tower operate during the year? _____ Days

What is the Total Dissolved Solids? _____ ppm

What is the liquid drift factor for the tower? _____ lbs/mgal

If not known, find out the manufacturer and model/serial number so the liquid drift factor can be obtained from the manufacturer.

Manufacturer _____

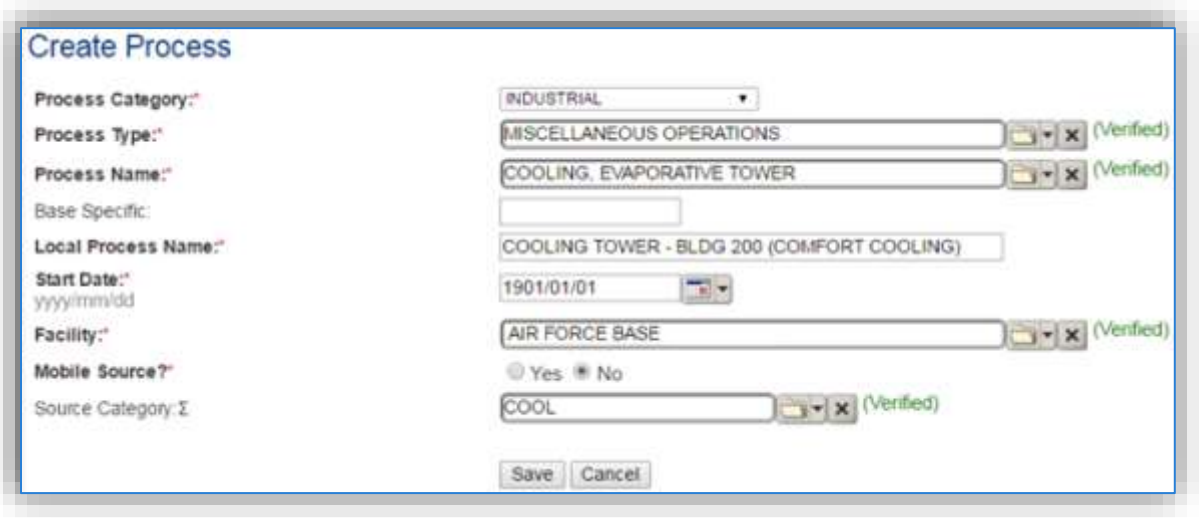
Model/Serial Number_____

3.17.2.3.2.2 *New Source Configuration*

In order to properly document this emission source in APIMS, there will need to be at a minimum a Unique Process record for each cooling tower.

3.17.2.3.2.2.1 *Comfort Cooling*

Navigate to the Unique Process module in APIMS and click the Create New Process hyperlink.



Process Category	Process Type	Process Name	Process ID
INDUSTRIAL	HVAC	NOC	IHV1559
INDUSTRIAL	MISCELLANEOUS OPERATIONS	COOLING, EVAPORATIVE TOWER	IMI1260
INDUSTRIAL	MISCELLANEOUS OPERATIONS	COOLING, NATURAL CONVECTION	IMI1262

Use the table above to determine the appropriate **Process Category**, **Process Type** and **Process Name**.

The **Base Specific** field can be used to enter a standard convention identifier that will best help identify the source. If the source is permitted, enter the emission unit ID as designated in the permit.

The **Local Process Name** should be in a standard naming convention for all sources that helps to quickly identify, what the process is, where it is used for. Examples of process names are as follows:

- COOLING TOWER - BLDG 328
- WET COOL TOWER - BLD 1530 - HOSPITAL ASF - INDUCED
- BLDG 1 - INDUCED DRAFT - COOLING TOWER
- COOLING TOWER - BLDG 200 (COMFORT COOLING)

The **Start Date** should be the date the unit became operational, if this date is not known, enter 1901/01/01 as a default start date.

The **Facility** should be the facility name that is responsible for the source or sources.

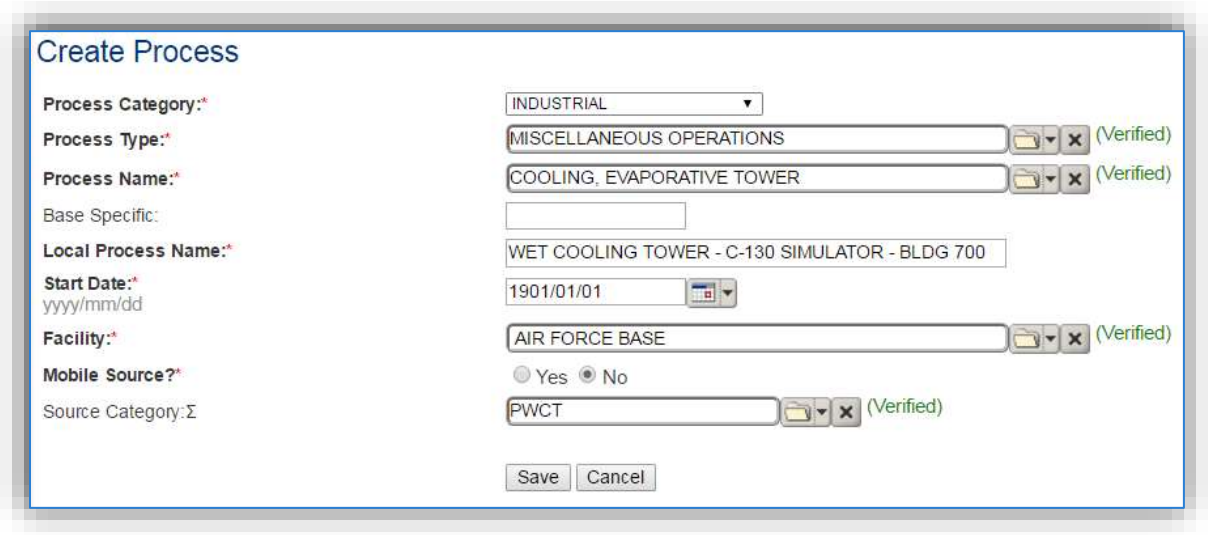
The **Mobile Source?** flag should be “NO” as this is considered as stationary source.

All cooling towers used for comfort cooling are assigned to the COOL **Source Category**. Process cooling towers and comfort cooling towers use the same emissions calculation methodology for actual emissions. However, when calculating PTE emissions, the potential differs. Comfort cooling towers potential use is dependent upon the weather and possible days that cooling would be required, whereas process cooling towers will be dependent upon the process workload. Therefore, these need to be placed in separate source categories.

For the population of all other tabs, refer to the Existing Sources sections.

3.17.2.3.2.2.2 *Process Cooling Towers*

Navigate to the Unique Process module in APIMS and click the Create New Process hyperlink.



Process Category	Process Type	Process Name	Process ID
INDUSTRIAL	HVAC	NOC	IHV1559
INDUSTRIAL	MISCELLANEOUS OPERATIONS	COOLING, EVAPORATIVE TOWER	IMI1260
INDUSTRIAL	MISCELLANEOUS OPERATIONS	COOLING, NATURAL CONVECTION	IMI1262

Use the table above to determine the appropriate **Process Category**, **Process Type** and **Process Name**.

The **Base Specific** field can be used to enter a standard convention identifier that will best help identify the source. If the source is permitted, enter the emission unit ID as designated in the permit.

The **Local Process Name** should be in a standard naming convention for all sources that helps to quickly identify, what the process is, where it is used for. Examples of process names are as follows:

- COOLING TOWER - BLDG 328
- BLDG 1 - INDUCED DRAFT - COOLING TOWER
- WET COOLING TOWER - C-130 SIMULATOR - BLDG 700
- 2265 - CRS FLW INDCD DRAFT (WET) - TDS 569

The **Start Date** should be the date the unit became operational, if this date is not known, enter 1901/01/01 as a default start date.

The **Facility** should be the facility name that is responsible for the source or sources.

The **Mobile Source?** flag should be "NO" as this is considered as stationary source.

All cooling towers used for process cooling are assigned to the PWCT **Source Category**. Process cooling towers and comfort cooling towers use the same emissions calculation methodology for actual emissions, however when calculating PTE emissions the potential differs. Comfort cooling towers potential use is dependent upon the weather and possible days that cooling would be required, whereas process cooling towers will be dependent upon the process workload. Therefore, these need to be placed in separate source categories.

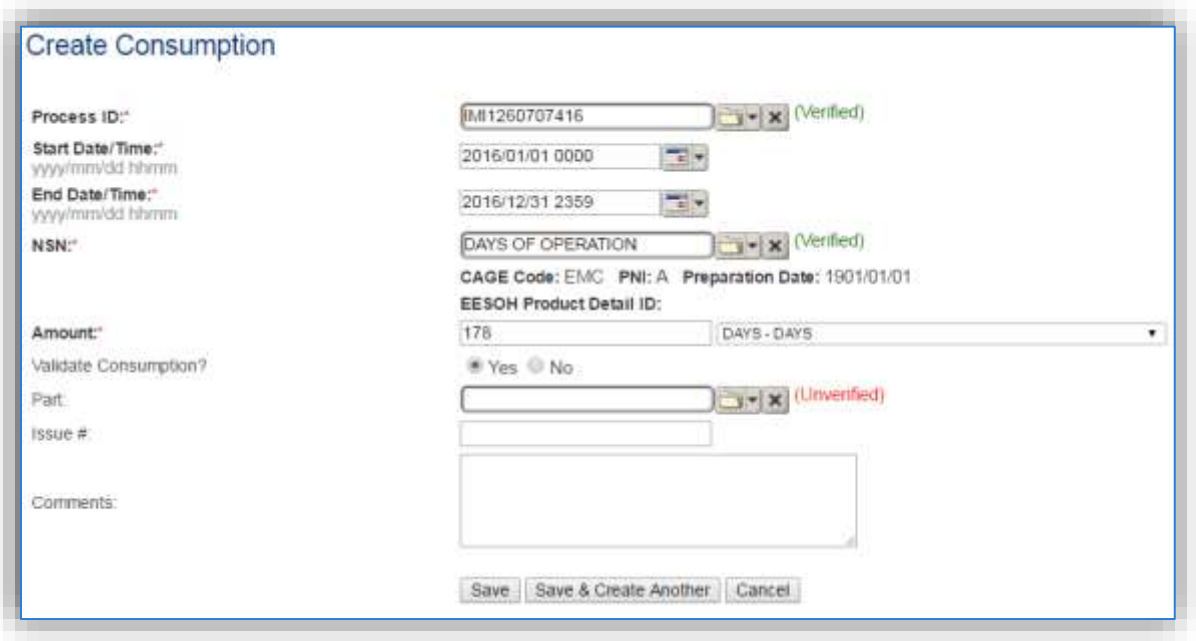
For the population of all other tabs, refer to the Existing Sources sections.

3.17.2.4 Year-to-Year Maintenance

3.17.2.4.1 Usage

The consumption for cooling towers will need to be tracked annually or more frequently if required by a regulatory agency. To correctly document the usage for this emission source the consumption should be entered in the Consumption log.

Navigate to the Consumption module and click the Create Consumption hyperlink.



The consumption record should span the entire reporting period as shown above. The material should be days of operation. The amount should be the total days of operation. Make sure to select "Yes" to validate

the consumption. If the consumption is not validated it will not be included in the emissions calculation. Repeat this step for all the process and comfort cooling towers.

If the unit did not operate during the year but was still and active source, enter a consumption record with zero usage and a comment as to why it did not operate to track negative documentation. This type of documentation ensures that all equipment is accounted for from year to year and can be used to account for differences in AEI reporting from year to year.

3.17.2.4.2 Emissions Calculation

To correctly calculate emissions this emission source should be included in a **Stationary Source Calculation**. Reference Section 2.7 Emissions Calculations for additional instructions and details.

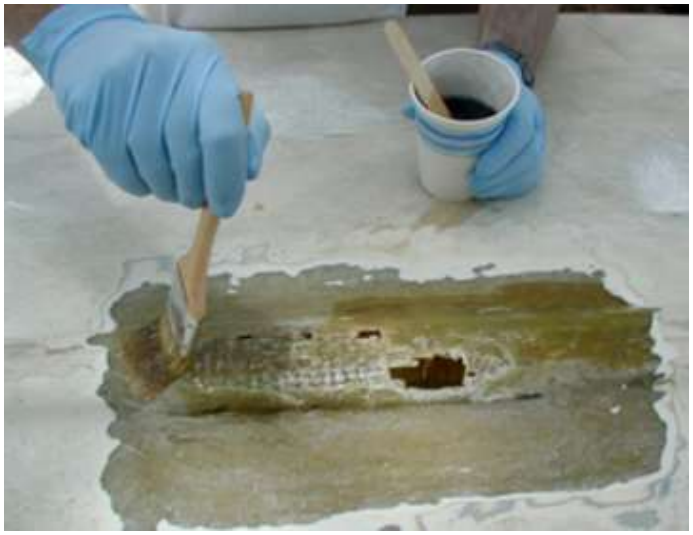
3.17.3 Fiberglass (FIBR)

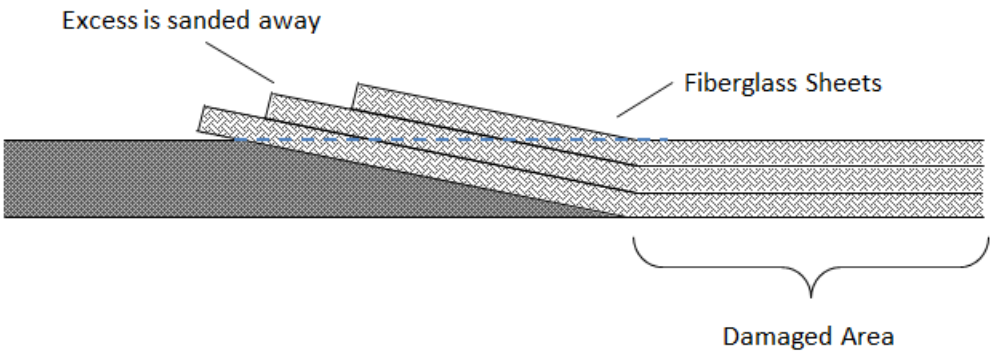
3.17.3.1 Source Types

Air Force installations with aircraft maintenance operations typically have Fiberglass repair operations in the aircraft repair shops. Fiberglass is made of plastic reinforced with thin glass filaments that are woven together which makes it a high strength, light weight material that is able to be molded into complex shapes.

Fiberglass repair is essentially a hazardous material use process in that the emissions are a result of solvent evaporating from the applied materials. It is often accounted for under the Miscellaneous Chemical (CHEM) source category. However, it can be separated out for tracking purposes.

A typical fiberglass repair will involve identifying the area that needs to be repaired and removing the damaged portion. The surrounding area will then be sanded then cleaned with a solvent to remove any grease or debris that may affect the adhesion bond. The next step will mix fiberglass fibers with resin to create a patch to fill the damaged area. A backer sheet may be needed until the filler can dry and harden. The damaged area is then filled and hardened. Once the filling has hardened the backer sheet can be removed. The next step is to apply the fiberglass sheets.





Epoxy resin is brushed onto the repair area and fiberglass sheets are applied. This step is repeated as necessary to ensure the repair has the required strength. As the resin cures and dries the solvent evaporates as VOC emissions. The area can them be sanded smooth and painted.

3.17.3.2 Potential Data Sources

Fiberglass repair chemicals are considered hazardous materials and are typically procured through the Hazardous Materials Management System (EESOH-MIS). The best method for collecting usage data is through the EESOH-MIS to APIMS interface. To do this it is important to work with the Hazardous Materials Management personnel to segregate fiberglass repair materials into distinct processes. The EESOH-MIS process should track only the fiberglass repair related materials and not any other materials in the shop. If the fiberglass repair materials are authorized to a process that is also authorized for other materials used in the shop the process cannot be accounted for under the FIBR source category and must be calculated under the CHEM source category. If the fiberglass repair materials are separate processes in EESOH-MIS, the processes, materials and consumption data will automatically populate in APIMS.

When fiberglass repair materials are not tracked in EESOH-MIS, then the total amount in gallons or pounds of materials used, along with the Safety Data Sheets for the materials used during repair is needed.

The most common shops that have fiberglass repair operations fall under the following office symbols:

- Maintenance Squadron Fabrication Flight (MXMF)

The material information is essential to the fiberglass repair emissions calculations. For all usage information that is imported from EESOH-MIS there should also be material records that contain most if not all the required information. For manually entered usage, the Safety Data Sheets will need to be obtained. Most shops maintain Hazard Communication folders that contain all the Safety Data Sheets for materials used. If the Safety Data Sheets are not available in the shop, most are available on manufacturer websites. All materials will need the following information populated in APIMS.

- Product Name
- Density
- Ingredient Name and % by weight
- VOC content

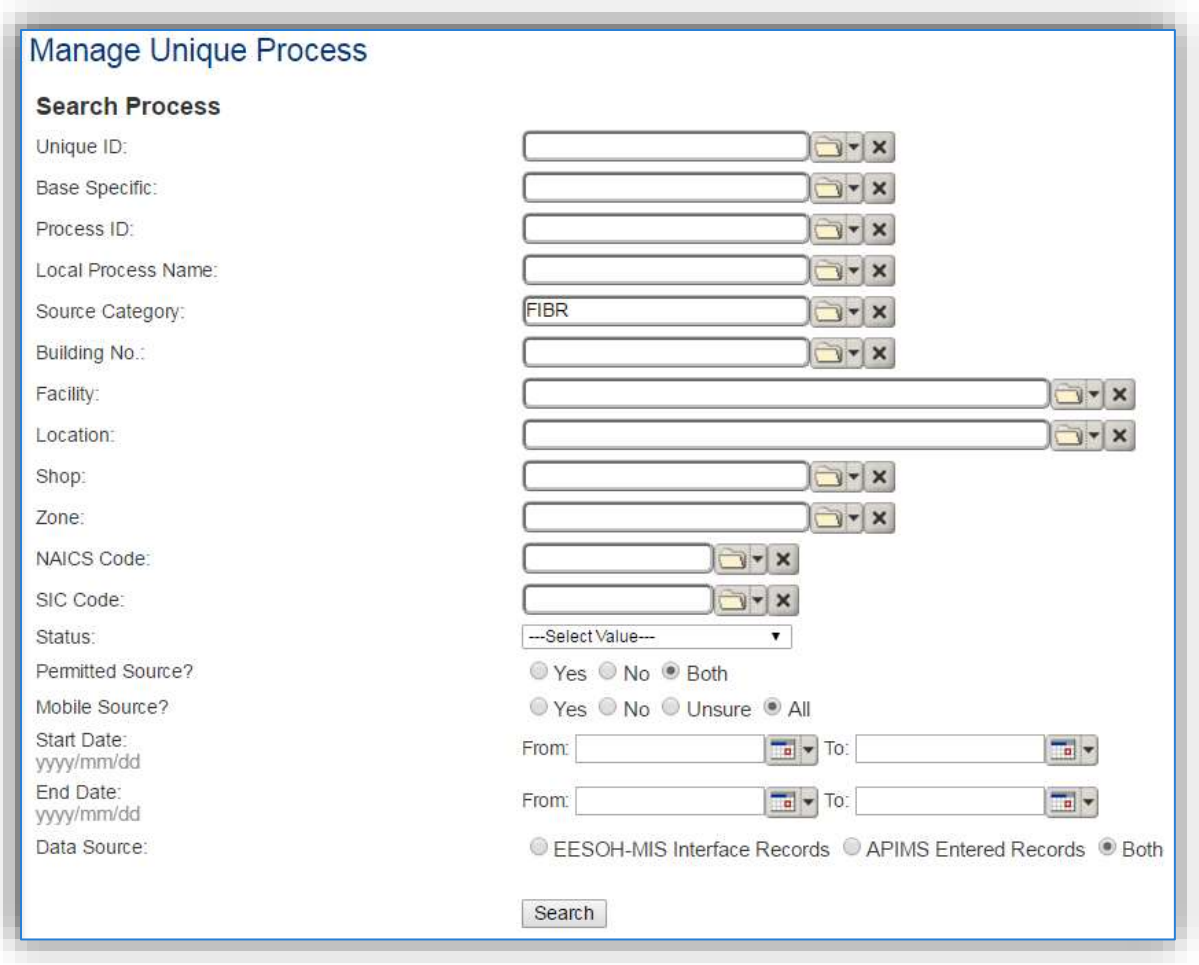
The EESOH-MIS interface will populate most of this data, however if the VOC is not readily available on the SDS it may not be entered into EESOH-MIS. Since the EESOH-MIS interface inserts so many material records at one time it is not feasible to review each record for completeness. Therefore, it is recommended to initially assume the data required is present and run the initial calculations. Once the calculations have been run, there is a tab that will provide error messages that will identify all the records that are missing VOC or ingredient information. Refer to Section 2.7 Emissions Calculations for details on the calculation error messages. For these materials the VOC can be calculated based on the ingredients. A general knowledge of chemistry will be required for this. If the VOC or % Solids cannot be obtained from the SDS or the manufacturer the Air Emissions Guide for Air Force Stationary Sources provides estimated values in Table 22-1.

3.17.3.3 Standard Source Identification/Characterization

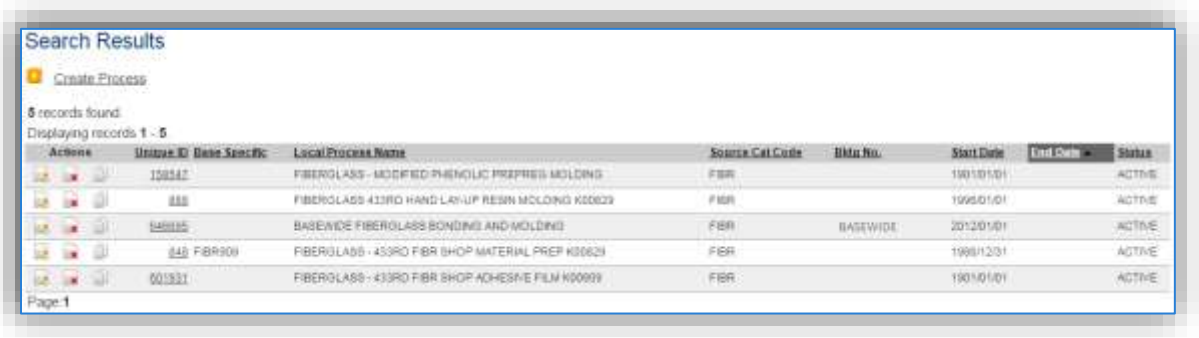
3.17.3.3.1 Existing Sources

It is important to review the existing sources in each source category on an annual basis at a minimum. Most regulatory agencies require an up to date source and equipment inventory.

Navigate to the Unique Process module of APIMS by clicking on **Unique Process** under the **Emission Unit** tab.



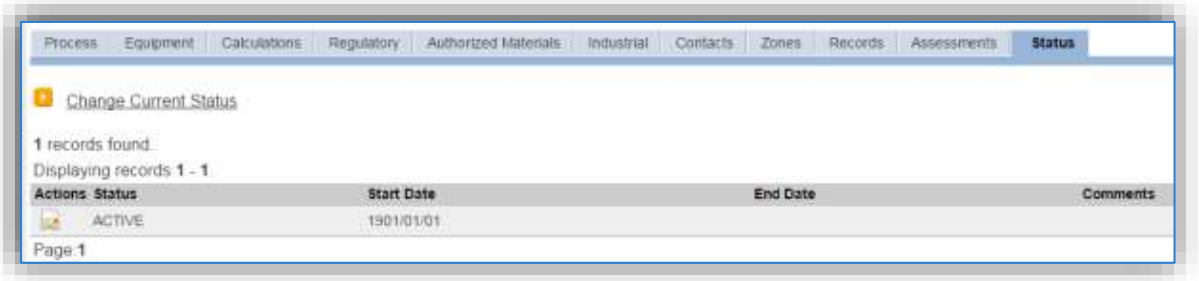
In the **Source Category** search field, type “FIBR” then select the row for FIBER GLASS from the dropdown results. Click the **Search** button.



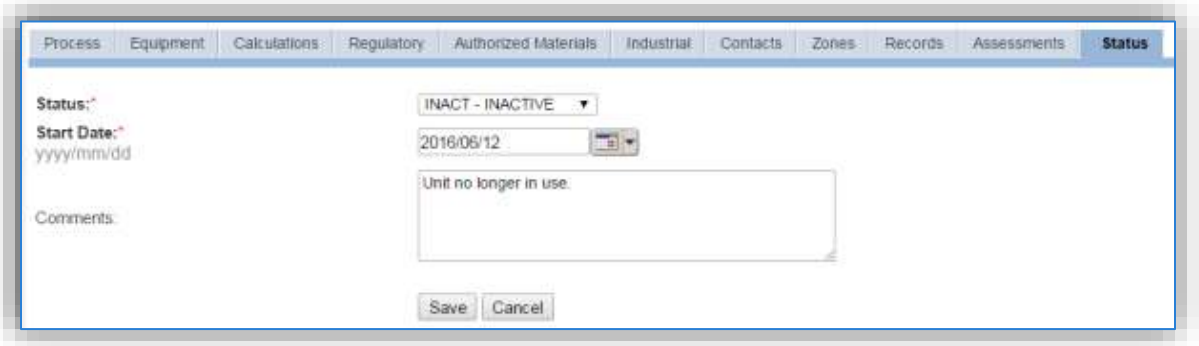
The search results grid will now display all the fiberglass repair processes currently in APIMS. This may include processes created by the EESOH-MIS interface and APIMS created processes including a roll up Next Higher Process. To further filter out the EESOH-MIS processes, use the APIMS Entered Records radio button on the Data Source field in the Search criteria. This will then only display the APIMS created processes.

3.17.3.3.2 Status

If the status of a process needs to be changed, click the edit icon next to the process. If this is a process that was entered into APIMS via the EESOH-MIS interface, the process status must be altered in EESOH-MIS.



Navigate to the *Status* tab. Click the Change Current Status hyperlink.



Select the appropriate status from the **Status** dropdown (i.e., ACTIVE, REMOVED or INACTIVE).

For the **Start Date** enter the date at which the status changed.

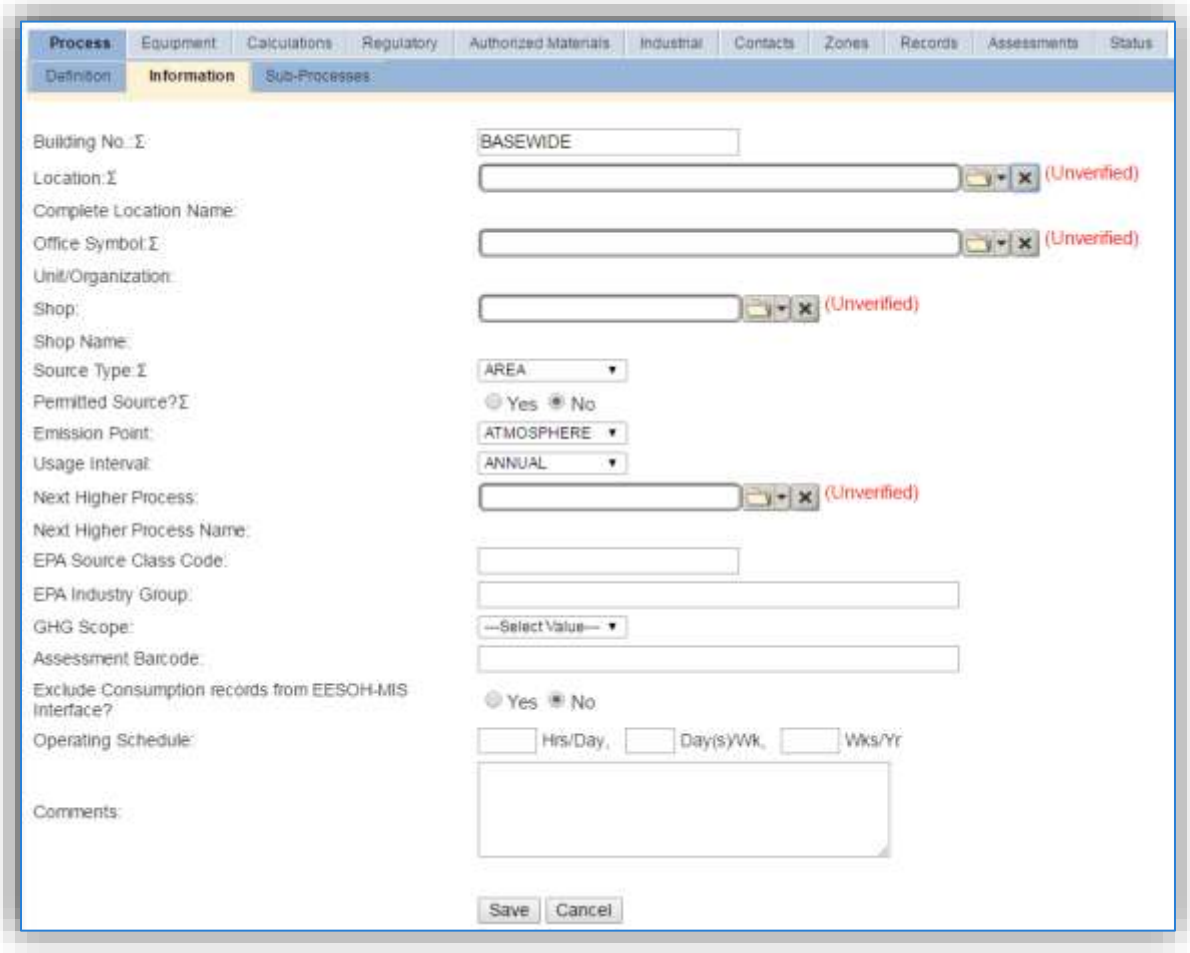
Enter **Comments** that provide insight into why the status changed. These can be very useful for equipment inventories, permit renewals and regulatory reporting. Most regulatory agencies require reporting on unit operation status; this includes any potential time spent offline and reasons for the outage.

Click the **Save** button.

The emissions for a process will only be calculated for the dates the process was in an ACTIVE status. If a source is removed in the middle of a year, the emissions will only be calculated for the part of the year the source was active.

3.17.3.3.3 Information

There are basic data elements that are important to track and maintain for new or existing sources, such as location and source type. This data can be maintained in the Unique Process record on the *Information* sub tab. This data only needs to be populated for records that were created and maintained in APIMS, such as the next higher process used for data rollup. Any records that are created by the EESOH-MIS interface do not require this data.



The **Building No**. field can be used to specify a general location or area of the emission source. If this is a next higher process for basewide emissions, BASEWIDE should be entered.

The **Location** field is very important to effectively manage the location and mission of the emission source. This documents where the source is located, in case it needs to be inspected or if the source owner needs to be contacted for pertinent information. For the instructions on how to create a location reference Section 2.2 Location.

The **Shop** is important as it establishes the personnel that are utilizing the equipment on a regular basis and will be the best source of information regarding the unit. This field is not applicable to basewide next higher processes.

Fiberglass repair operations should be designated as an AREA in the **Source Type** field.

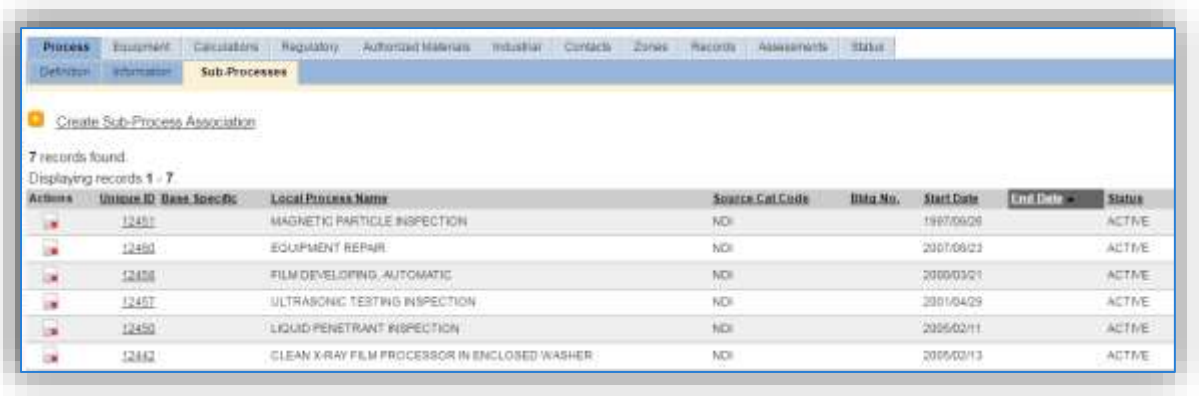
The **Emission Point** should be ATMOSPHERE for all operations.

The **Permitted Source** flag should also be populated to accurately reflect the current regulatory status of the emission source. This flag can be an invaluable tool in roll-up reporting.

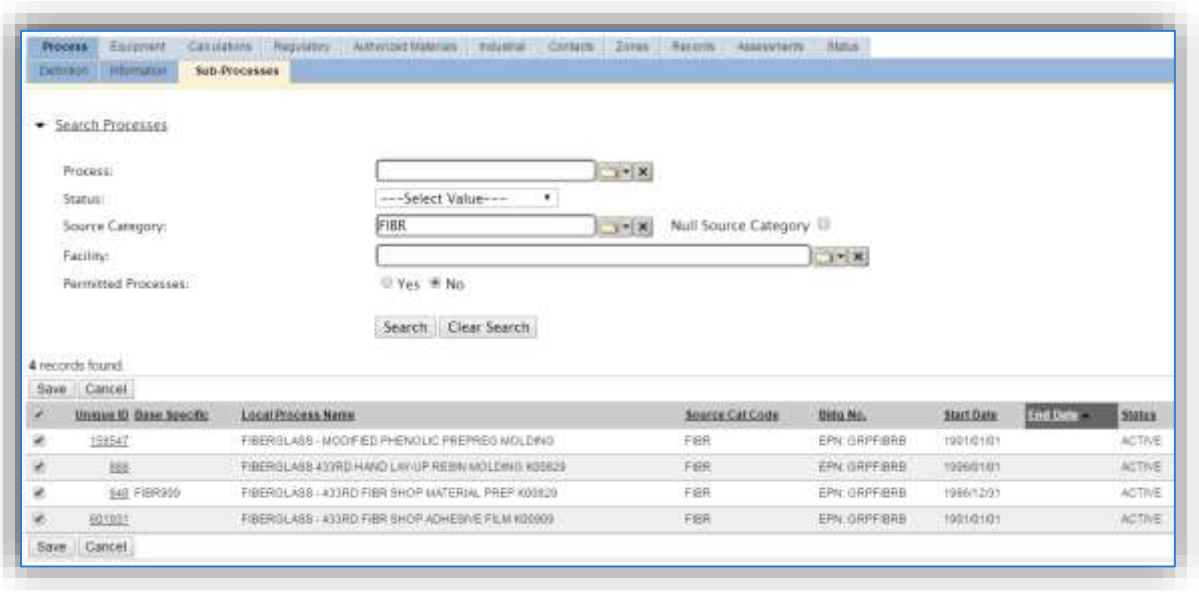
The **Usage Interval** should be designated; this source is usually documented on an ANNUAL basis unless specified differently by a regulatory requirement. It is important to populate this field correctly as it will affect how it is documented in the AEI Throughputs module.

3.17.3.3.4 Sub-Processes

For Next Higher Process configuration, navigate to the *Sub-Processes* sub tab.



This sub tab is used to specify which processes should have their consumption rolled up to this next higher process. To add a process or processes, click the Create Sub-Process Association hyperlink.



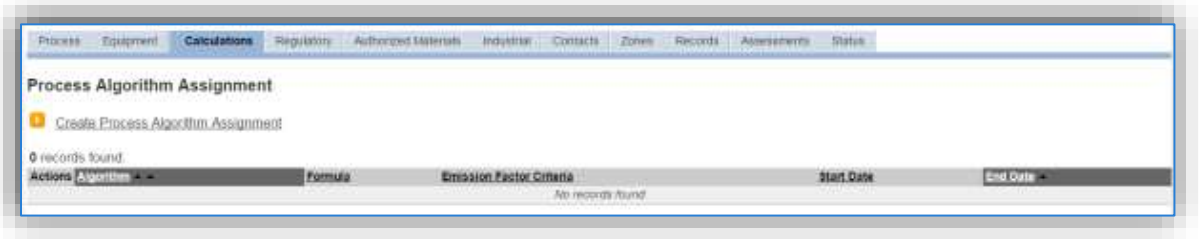
Use the Search Processes fields to refine the search to find only the FIBR processes. Select the checkbox next to the appropriate process(es), then click the Save button.

3.17.3.3.5 Equipment

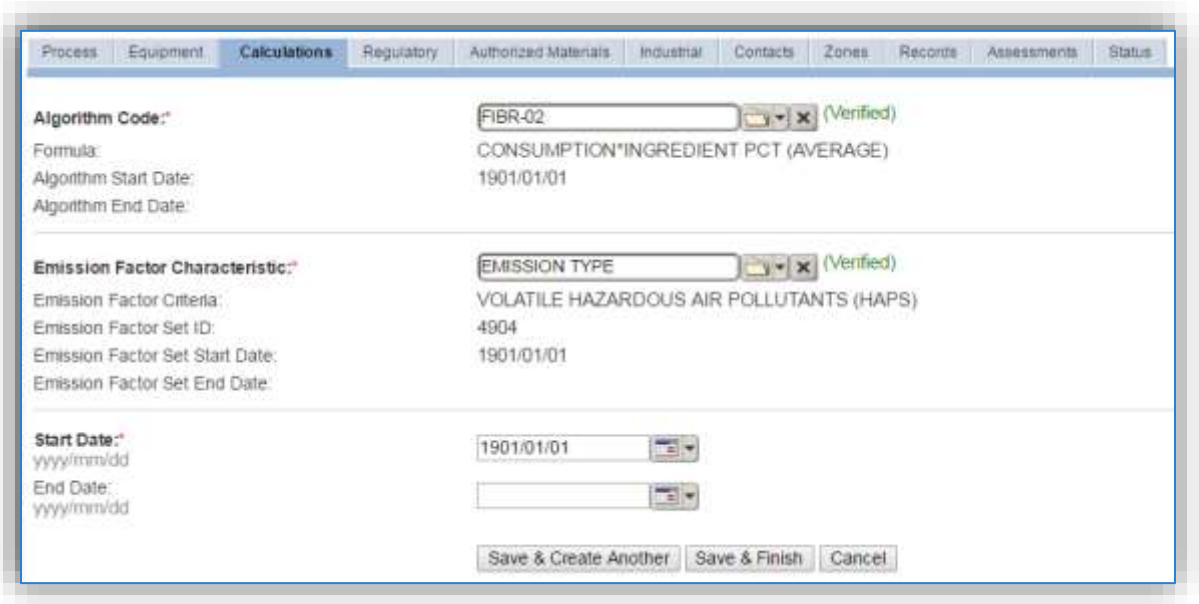
This source does not utilize this functionality.

3.17.3.3.6 Calculations

The next tab is the *Calculations* tab.



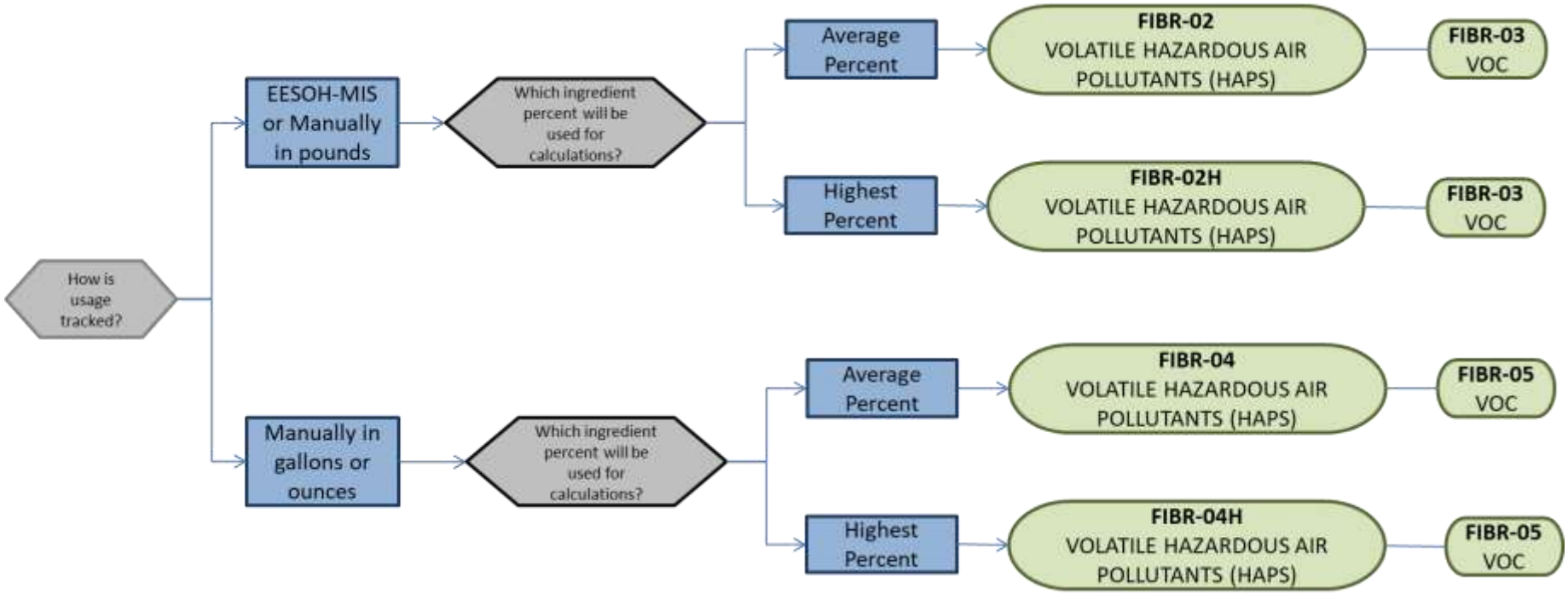
To associate an algorithm to the process, click on the Create Process Algorithm Assignment hyperlink.



Fiberglass repair operation emissions are calculated utilizing the material VOC and a mass balance based on ingredients. Therefore, there are TWO algorithms that need to be associated to each FIBR process.

Select the **Algorithm Codes** from the list of values that matches the correct scenario. Next select the **Emission Factor Characteristic** available. Enter the **Start Date** to match the start date of the process. Click the **Save & Create Another** button to associate another algorithm or click **Save & Finish** button to save and return to the Calculations tab.

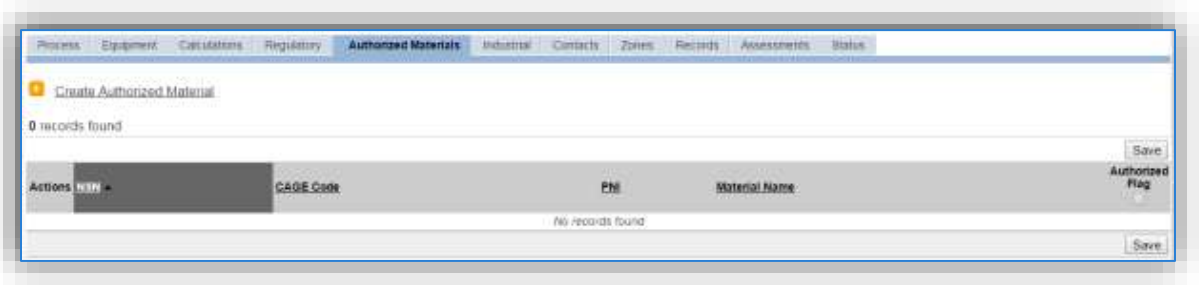
Use the flowchart below to find the correct Algorithm Code and Emission Factor Characteristic.



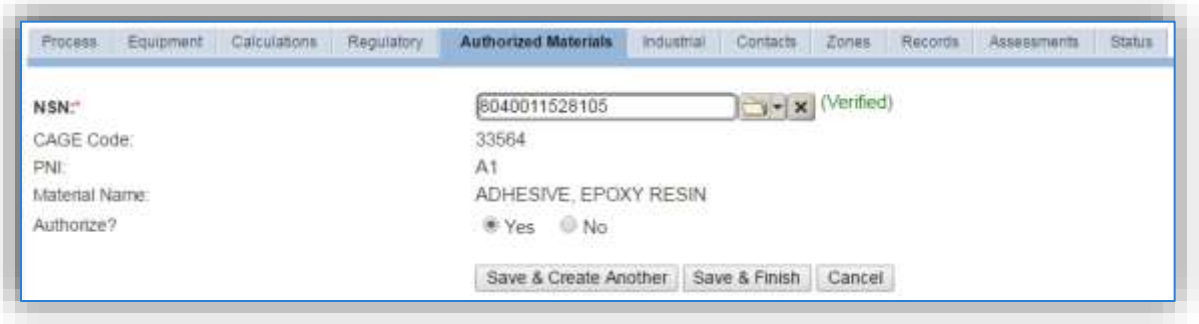
If your permit requires a different type of calculation, contact the Air Force Air Quality Subject Matter Expert for approval of the alternative method.

3.17.3.3.7 Materials

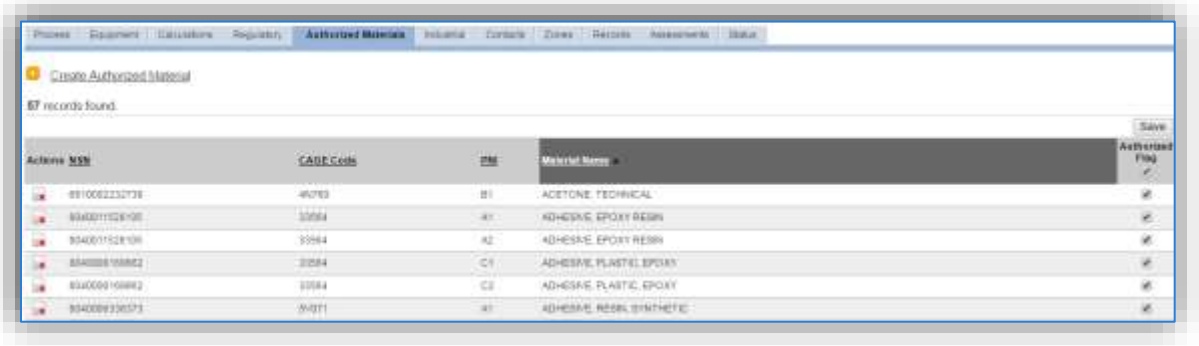
The last step in setting up the Unique Process record is to the authorized materials on the *Authorized Materials* tab. This step is only required for processes that use manual logs to track usage in APIMS. All processes that use the consumption data from EESOH-MIS are configured at the sub-process level by the interface.



To authorize a material for the process, click on the Create Authorized Material hyperlink.



Select the material record from the list of values, using the NSN or Material Name. If the material is not available the material record will need to be created. Next select "Yes" to **Authorize** the material, then Save & Finish or Save & Create Another. Repeat this step for all materials used by the process.



3.17.3.4 New Sources

3.17.3.4.1 Data Collection Sheet

The form on the next page is a printable guide that can be taken out to the location of the source and used to gather all the necessary information from the shop personnel. It can then be used as a guide to help configure the data in APIMS when you return to your office.

Fiberglass Repair Data Collection Worksheet

GENERAL INFORMATION

Building Number_____ Mission/Purpose_____

Shop Name/Function_____ Management Organization_____

Coordinates: Latitude: _____ Longitude: _____

UTM: _____ Zone _____ Easting _____ Northing ☐ Feet ☐ Meters

Is this source in any of your permits? ☐ Yes ☐ No

If yes, does it have an emission unit number or other designation? _____

USAGE INFORMATION

Are the materials purchased through EESOH-MIS? ☐ Yes ☐ No

If Yes, specify the shop and process designation in EESOH-MIS
Shop Code _____ Process Code/Name _____

If No, do you know the total amount of materials purchased in the last year? ☐ Yes ☐ No

If yes, do you have usage records? ☐ Yes ☐ No

If yes, collect the usage records.

If no, ask the shop personnel to estimate how often they conduct fiberglass repair operations, what materials and how much is used each time? (The fields below provide a guideline of information that must be collected for each material.

Material Name _____

Amount Used _____ ☐ Lbs ☐ Gal

Frequency_____

Do they have Safety Data Sheets for the materials used? ☐ Yes ☐ No

If yes, collect copies.

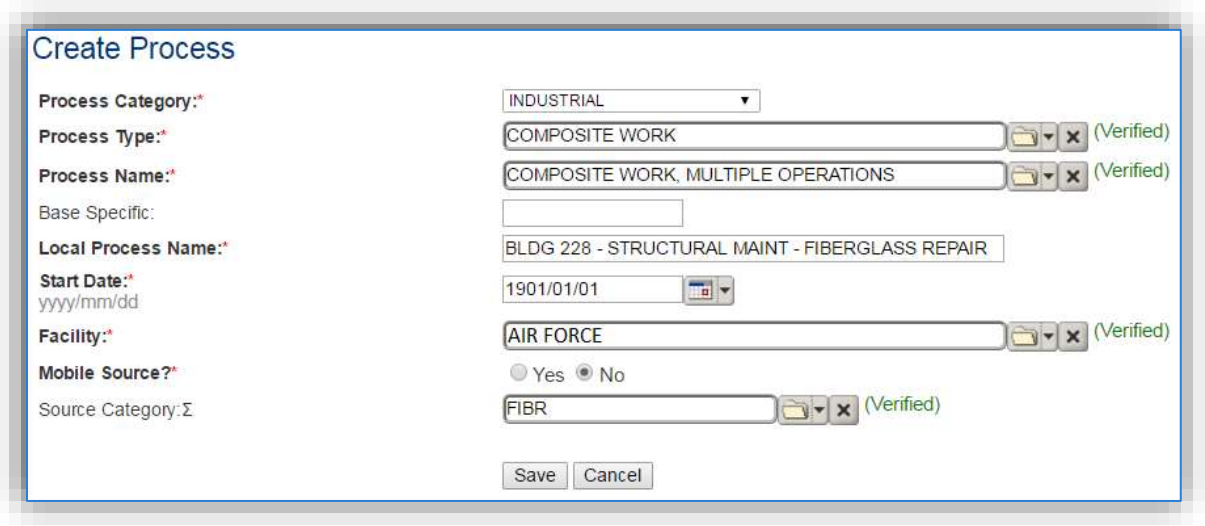
If no, collect the name and manufacturer of the product. This can be used to contact the manufacturer to obtain a Safety Data Sheet.

3.17.3.4.1.1 *New Source Configuration*

In order to properly document this emission source in APIMS, there will need to be at least one Unique Process record. If the EESOH-MIS processes are configured correctly to have fiberglass repair chemicals separated from other chemicals, a next higher process needs to be configured. If the data is not configured that way, then a nondestructive inspection process can be configured for each shop that conducts nondestructive inspection applications. A single process that tracks all nondestructive inspection applications basewide for manual APIMS tracking may also be used.

3.17.3.4.1.2 *Shop Specific Process Configuration*

Navigate to the Unique Process module in APIMS and click the Create New Process hyperlink.



Process Category	Process Type	Process Name	Process ID
INDUSTRIAL	COMPOSITE WORK	MULTIPLE OPERATIONS	ICW1239

Use the value provided in the table above to enter the **Process Category**, **Process Type** and **Process Name**.

The **Base Specific** field can be used to enter a standard convention identifier that will best help identify the source. If the source is permitted, enter the emission unit ID as designated in the permit.

The **Local Process Name** should be in a standard naming convention for all sources that helps to quickly identify, what the process is, where it is and any other unique attribute. For example, BLDG 336 – FIBERGLASS REPAIR.

The **Start Date** should be the date the unit became operational, if this date is not known, enter 1901/01/01 as a default start date.

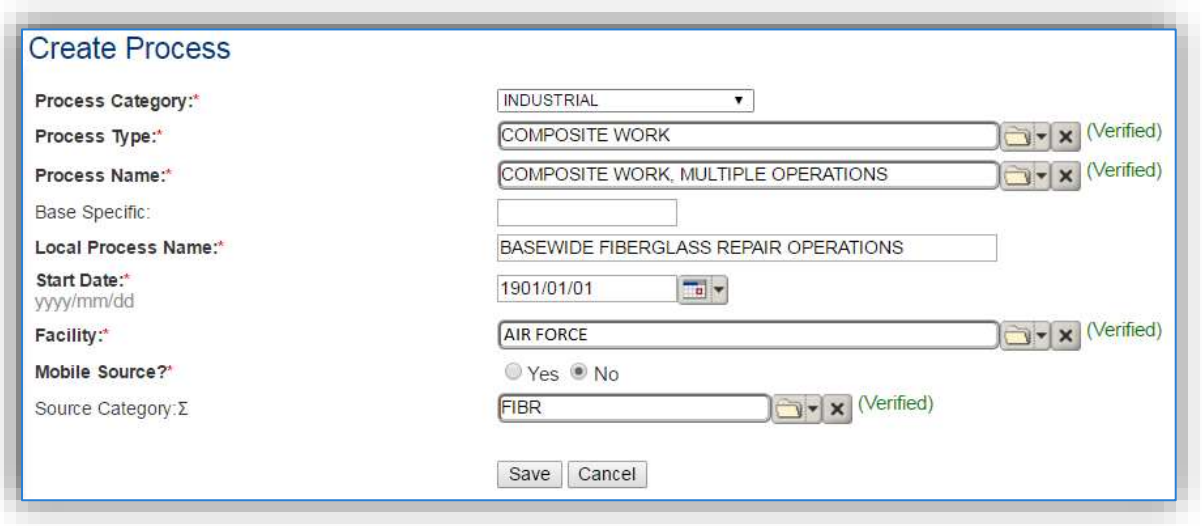
The **Facility** should be the facility name that is responsible for the source or sources.

The **Mobile Source?** flag should be “NO” as this is considered as stationary source.

All fiberglass repair activities are assigned to the FIBR **Source Category**.

3.17.3.4.1.3 *Next Higher Process Configuration*

Navigate to the Unique Process module in APIMS and click the Create New Process hyperlink.



Process Category	Process Type	Process Name	Process ID
INDUSTRIAL	COMPOSITE WORK	MULTIPLE OPERATIONS	ICW1239

Use the values provided in the table above to enter the **Process Category**, **Process Type** and **Process Name**.

The **Base Specific** field can be used to enter a standard convention identifier that will best help identify the source. If the source is permitted, enter the emission unit ID as designated in the permit.

The **Local Process Name** should be in a standard naming convention for all sources that helps to quickly identify what the process is for example, BASEWIDE FIBERGLASS REPAIR OPERATIONS.

The **Start Date** should be the date the unit became operational, if this date is not known, enter 1901/01/01 as a default start date.

The **Facility** should be the facility name that is responsible for the source or sources.

The **Mobile Source?** flag should be "NO" as this is considered as stationary source.

All fiberglass repair activities are assigned to the FIBR **Source Category**.

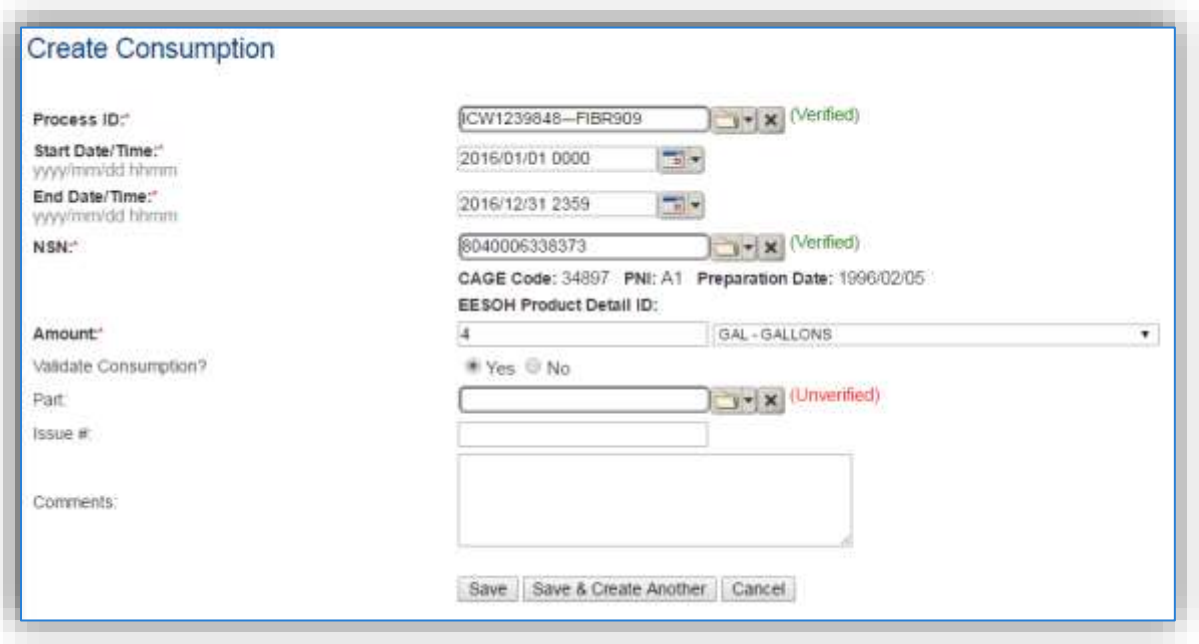
3.17.3.5 Year-to-Year Maintenance

3.17.3.5.1 Usage

3.17.3.5.1.1 Shop Specific Process Configuration

The consumption for FIBR emissions usually needs to be tracked annually or as required by a regulatory agency. To correctly document the usage for this emission source the consumption should be entered in the Consumption log.

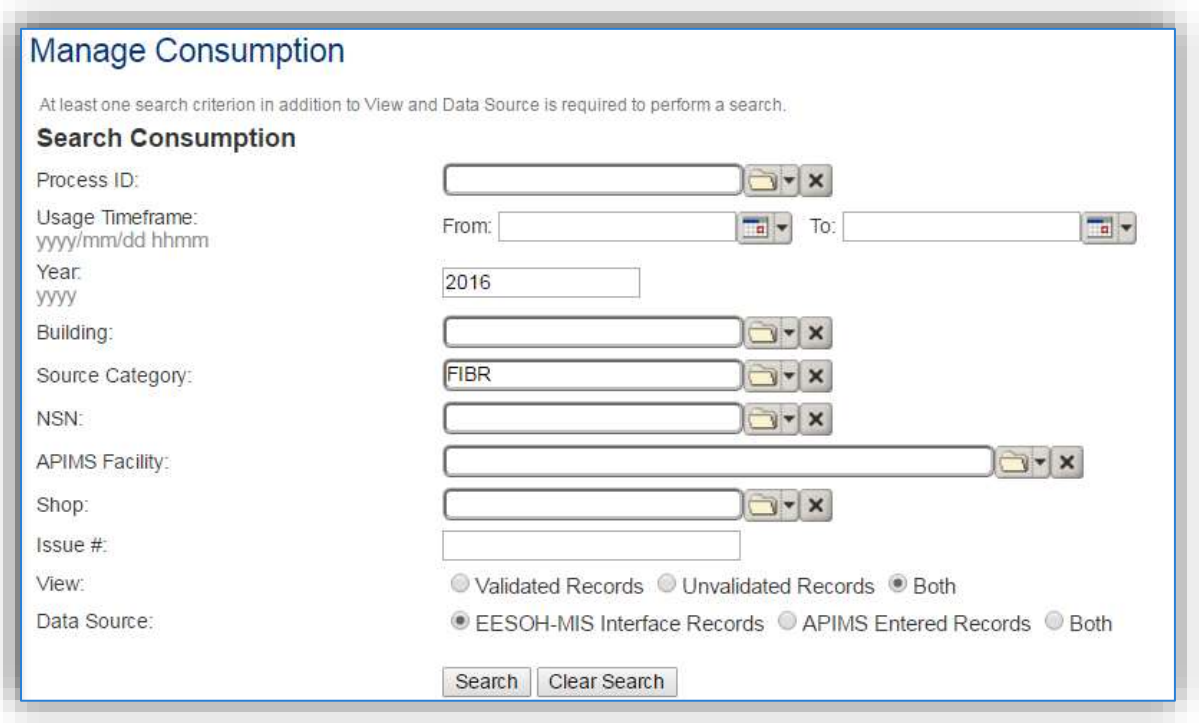
Navigate to the Consumption module and click the Create Consumption hyperlink.



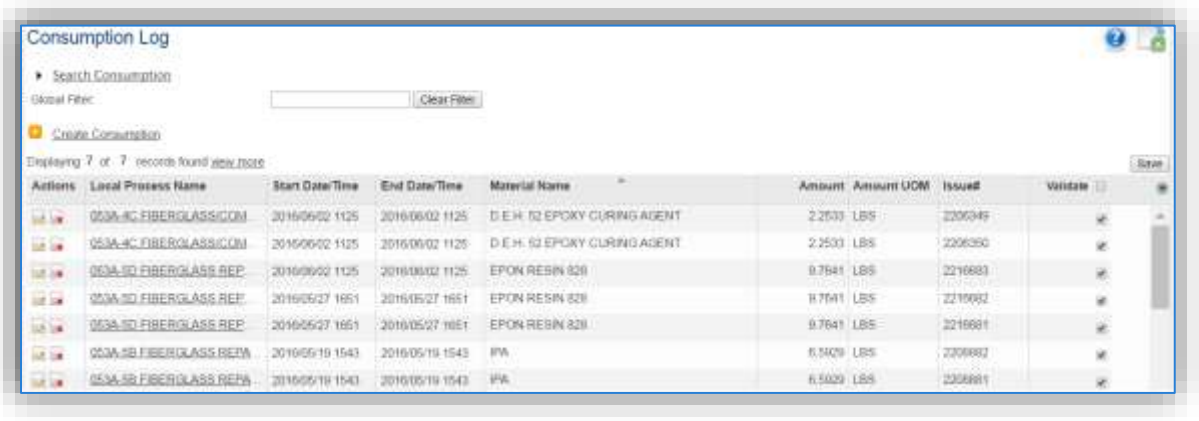
The consumption record should span the entire reporting period as shown above. The **Amount** should be recorded according to the algorithms selected, in pounds or gallons. Make sure to select "Yes" to **Validate Consumption**. If the consumption is not validated it will not be included in the emissions calculation. Repeat this step for all the different materials used during the reporting period.

3.17.3.5.1.2 Next Higher Process Configuration

The consumption for FIBR emissions usually needs to be tracked annually or as required by a regulatory agency. For the Next Higher Process configuration, the consumption is imported from the EESOH-MIS interface with each interface run, however it is not validated. The consumption must be validated in the Consumption log. Navigate to the Consumption log.



Use the search criteria to narrow the search results. It is suggested to use the Source Category, Data Source and Year or Usage Timeframe to filter the results.



Check the checkbox next to each material then click **Save** to validate the consumption. Only consumption that is validated will be included in emissions calculations. The simplest use case for validating rows is to start by checking the top box in the grid to validate all rows present. After all boxes are checked, click **Save**.

3.17.3.6 Emissions Calculation

If the process utilizes EESOH-MIS data then it should be included in the **EESOH-MIS Calculation**, otherwise this emission source should be included in a **Stationary Source Calculation** that calculates controlled emissions. Reference Section 2.7 Emissions Calculations for additional instructions and details.

3.17.4 Heaters / Ovens / Dryers (HEAT)

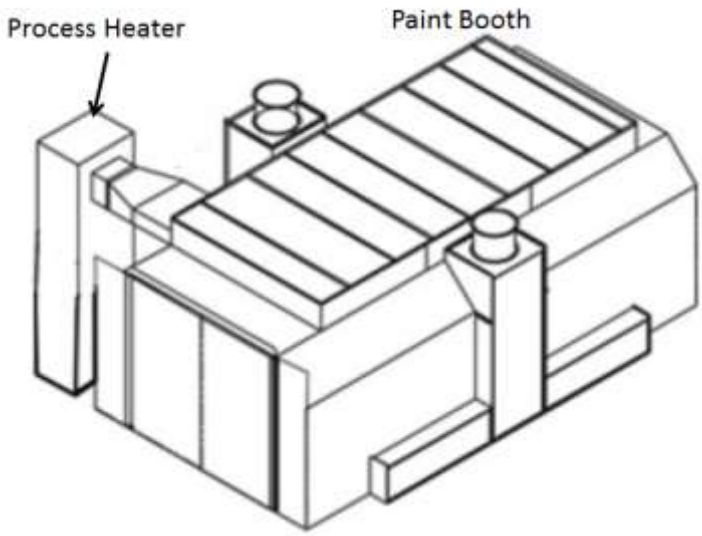
3.17.4.1 Source Types

This source category includes external combustion equipment used to provide heat for industrial processes. The most common instances of process heaters are paint booth air intake preheaters and driers or kilns. While these sources are essentially external combustion sources, the potential to emit calculations are treated differently. Therefore, it is essential to segregate the different applications into their own source categories.

Emissions from external combustion engines will vary depending on several factors including the configuration, the size of the combustor, the firing configuration, the fuel type, the control devices used, and a variety of different design configurations.

The majority of process heaters used by the Air Force are fueled by natural gas and the only ones discussed in this section. Natural gas boilers used for process heating are usually smaller boilers, less than 100 MMBtu/hr and are often package units that are constructed off site and shipped to the location.

The example shown below is an externally mounted natural gas heater providing air flow into the paint booth inside the building. The best way to determine if the paint booth has a heater is to look for any type of natural gas line leading to an air intake for the paint booth.



If there are other types of process heaters, coordinate with the AFCEC Air Quality SME for proper configuration. Reference the External Combustion chapter of this document for more details.

3.17.4.2 Potential Data Sources

Process heaters are usually only going to be in the industrial areas of the base, specifically where paint booths are located. These boilers are usually managed by the shop personnel at each location. The Base Supply Fuels Maintenance office may know the location of all-natural gas delivery. The shops listed below are the most common shops with information for process heaters:

- Aircraft Structural Maintenance (MXS)
- CE Structures (CEOHS)
- CE Pavements and Equipment (CEOHP)
- Corrosion Control (MXS)
- Vehicle Maintenance (LGRV)
- Repair and Reclamation
- Aerospace Ground Equipment (MXMG)
- Base Supply Fuels Management (LGRF)

The data elements that are needed are as follows:

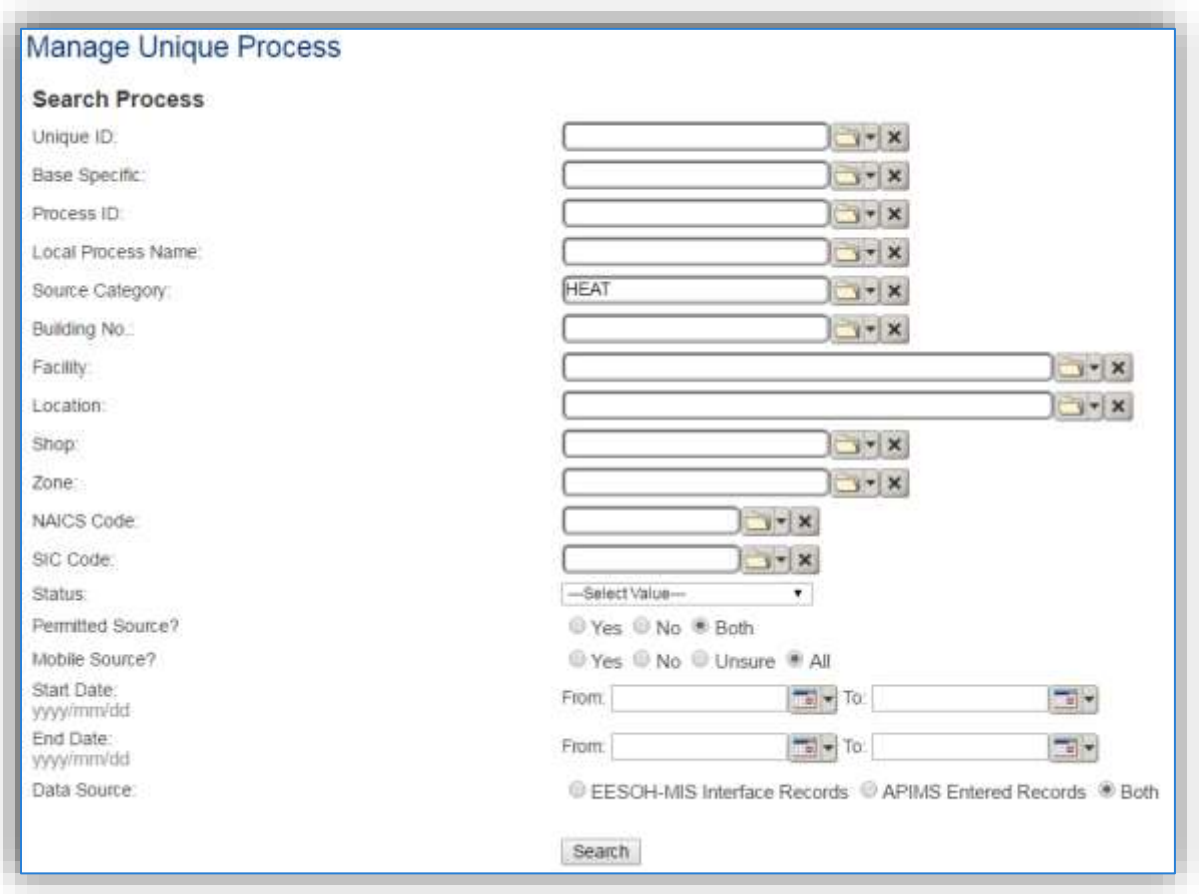
- Type of fuel combusted, usually natural gas.
- Total amount of fuel combusted in million cubic feet or the hours of operation.
- Size of boiler (heat input)

3.17.4.3 Standard Source Identification/Characterization

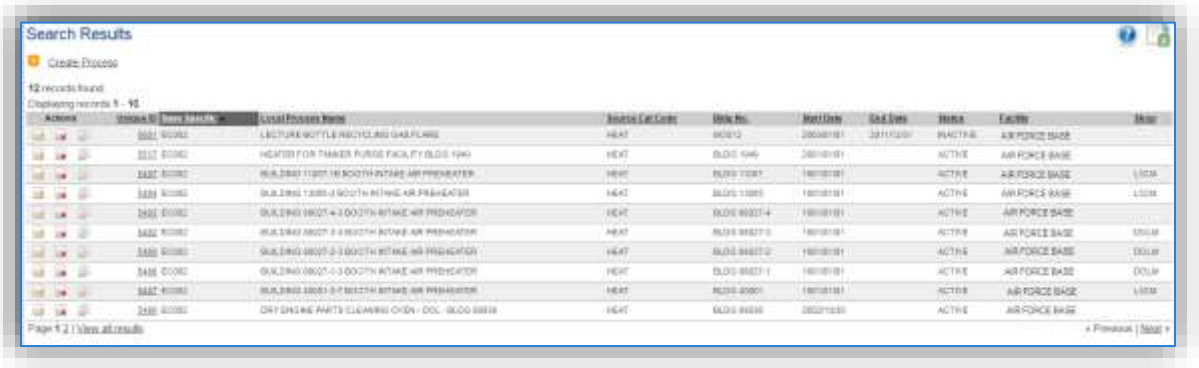
3.17.4.3.1 Existing Sources

It is important to review the existing sources in each source category on an annual basis at a minimum. Most regulatory agencies require an up to date source and equipment inventory.

Navigate to the Unique Process module of APIMS by clicking on **Unique Process** under the **Emission Unit** tab.



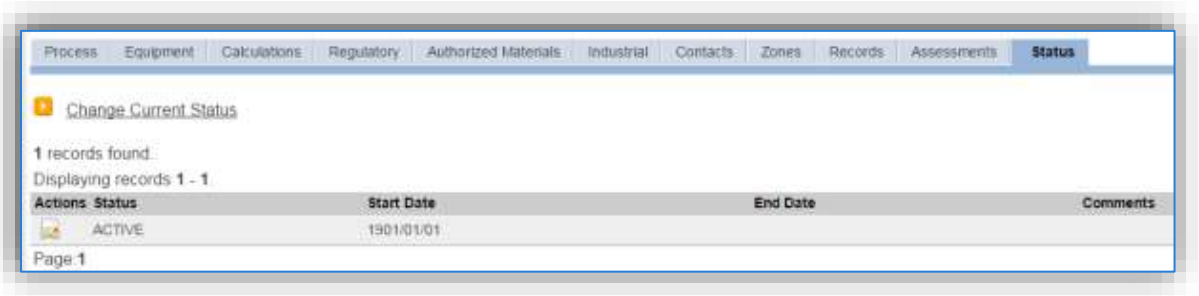
In the **Source Category** search field, type "HEAT", then select the row for Heaters/Ovens/Dryers from the dropdown results. Click the **Search** button.



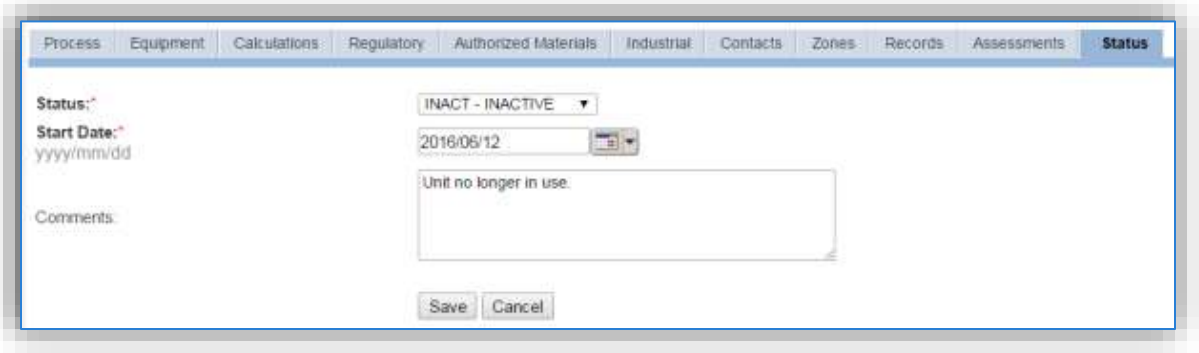
The search results grid will now display all the process heater, oven, and dryer processes currently in APIMS.

3.17.4.3.1.1 *Status*

If the status of a process needs to be changed, click the edit icon next to the process.



Navigate to the *Status* tab. Click the Change Current Status hyperlink.



Select the appropriate status from the **Status** dropdown (i.e., ACTIVE, REMOVED or INACTIVE).

For the **Start Date** enter the date at which the status changed.

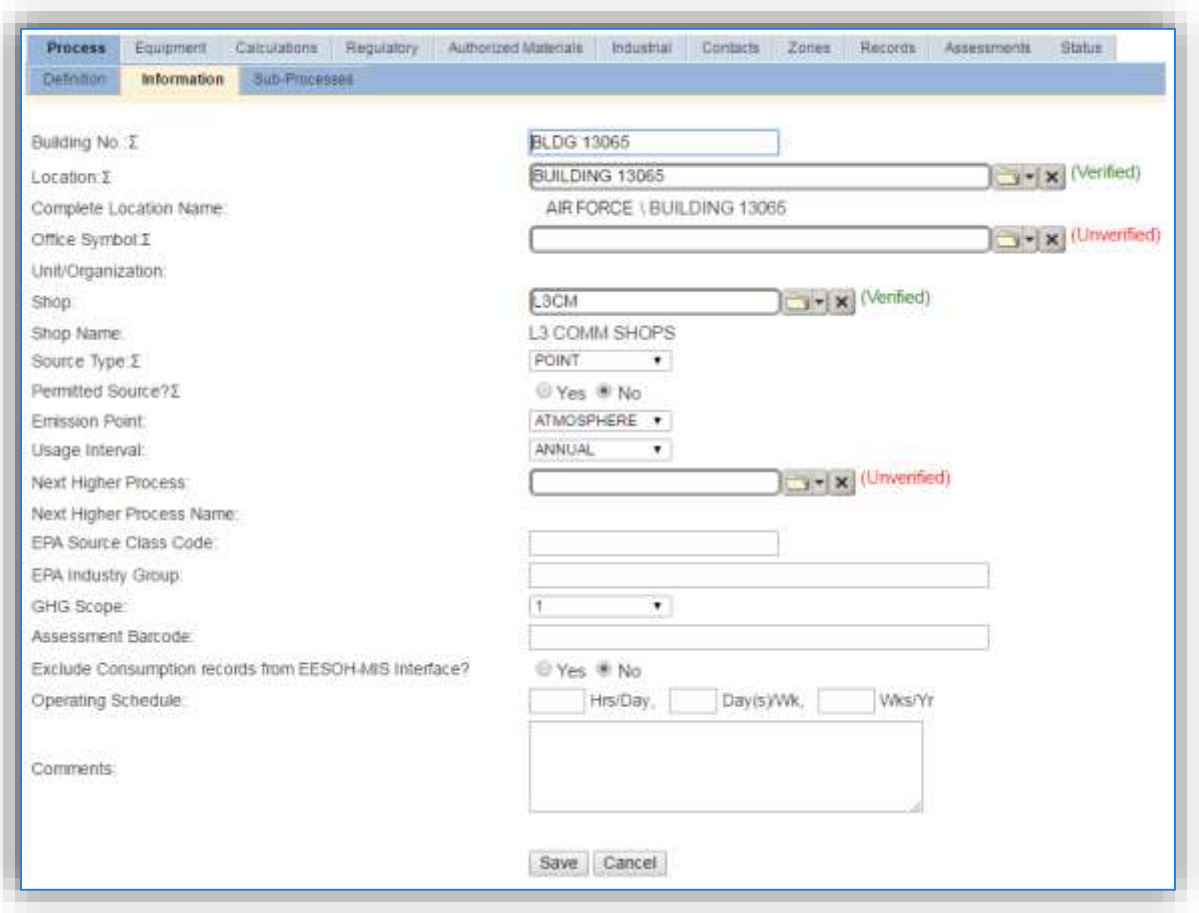
Enter **Comments** that provide insight into why the status changed. These can be very useful for equipment inventories, permit renewals and regulatory reporting. Most regulatory agencies require reporting on unit operation status. This includes any potential time spent offline and the reasons for the outage.

Click the **Save** button.

The emissions for a process will only be calculated for the dates the process was in an ACTIVE status. If a source is removed in the middle of a year, the emissions will only be calculated for the part of the year the source was active.

3.17.4.3.1.2 *Information*

There are basic data elements that are important to track and maintain for new and existing sources, such as location and source type. This data can be maintained in the Unique Process record on the *Information* sub tab.



The **Building No**. field can be used to specify a general location or area of the emission source. If the process is for multiple heaters, enter a description of the area such as, BASEWIDE, EAST SIDE, etc.

The **Location** field is very important to effectively manage the location and mission of the emission source. This documents where the source is located, in case it needs to be inspected or if the source owner needs to be contacted for pertinent information. For the instructions on how to create a location reference Section 2.2 Location.

The **Shop** is important as it establishes the personnel that are utilizing or maintaining the equipment on a regular basis and will be the best source of information regarding the unit.

Process heater, oven and dryer operations are categorized as a POINT source in the **Source Type**.

The **Emission Point** for process heater, oven and dryer equipment is usually STACK.

The **Permitted Source** flag should also be populated to accurately reflect the current regulatory status of the emission source. This flag can be an invaluable tool in roll-up reporting.

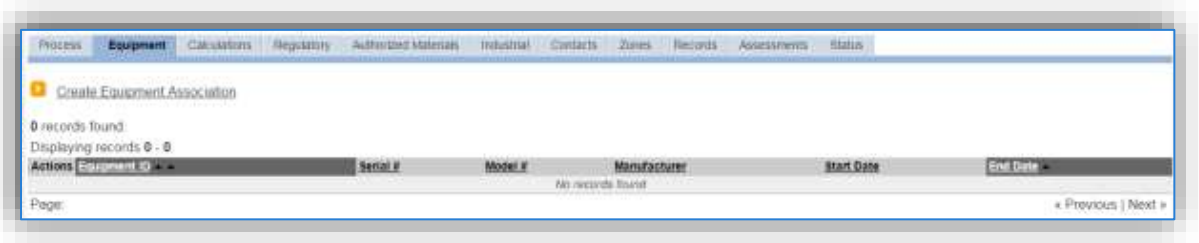
The **Usage Interval** should be designated. This source is usually documented on an ANNUAL basis but may be a different time interval if it is a permitted source. It is important to populate this field correctly as it will affect how it is documented in the AEI Throughputs module.

3.17.4.3.1.3 *Sub-Processes*

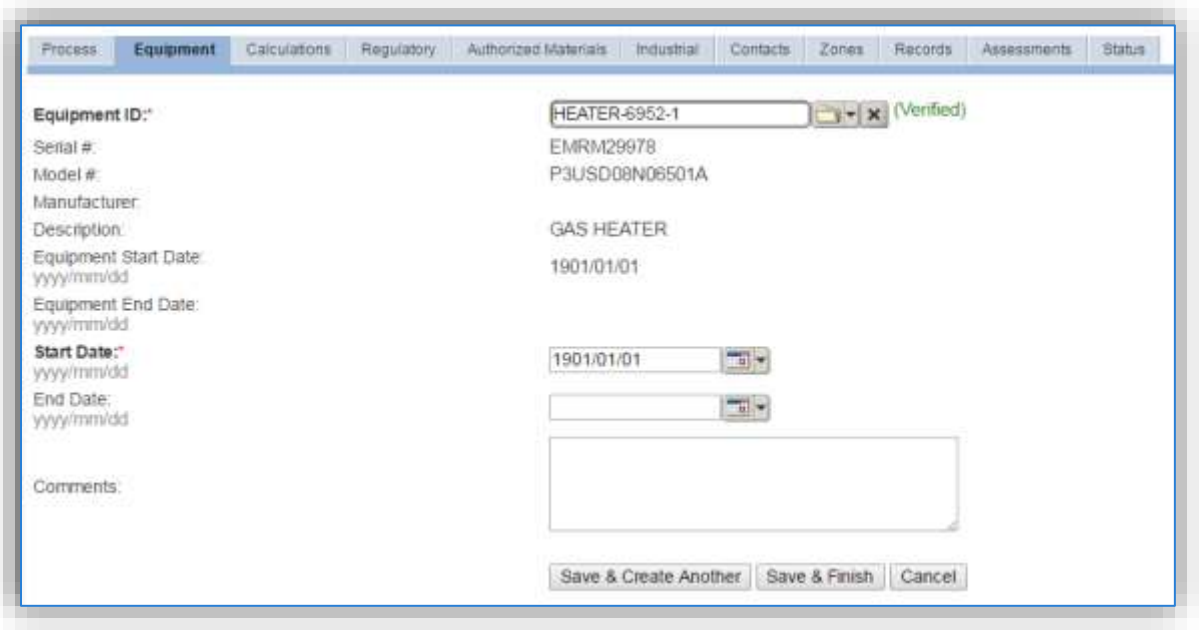
This source does not utilize this functionality.

3.17.4.3.1.4 *Equipment*

The next tab is the *Equipment* tab. This is completely dependent upon how your installation is regulated by the regulatory agencies. For installations that are required to track dryers, ovens, and heaters this tab can be used to associate the boilers to the process. If there is no regulatory requirement by the local regulatory agency, then this tab does not need to be configured. To link the equipment to the process the equipment must already be entered in APIMS. Refer to Section 2.4 Equipment for specifics on how to properly document equipment in APIMS.



To link the equipment, click on the Create Equipment Association hyperlink.

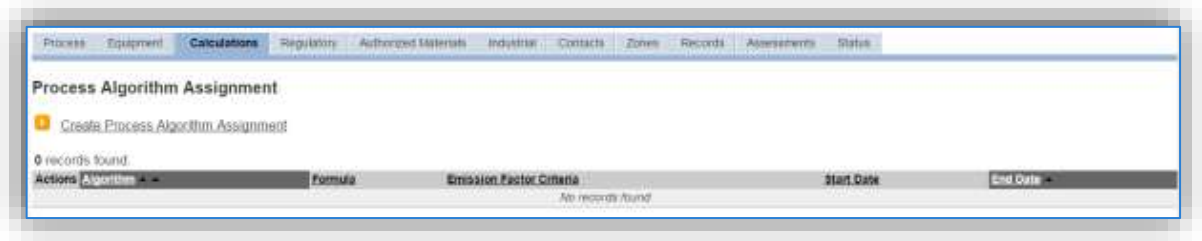


Search for the **Equipment ID** in the list of values, enter the start date and click the **Save & Finish** button.

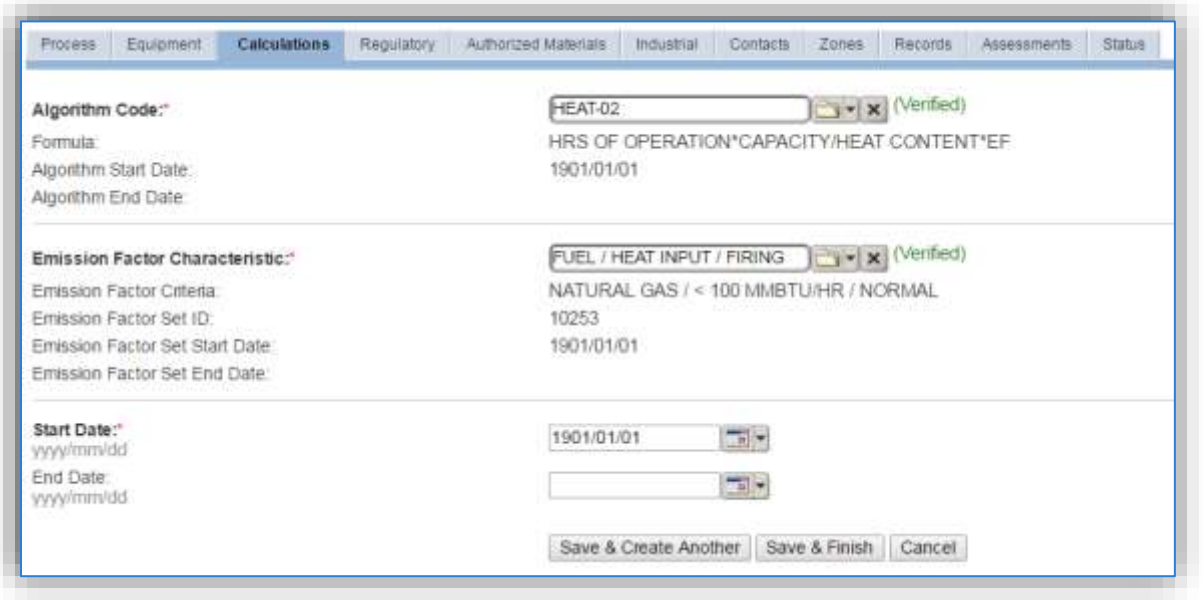
If the process is for a group of boilers, multiple boilers can be associated on this tab by using the **Save & Create Another** button.

3.17.4.3.1.5 *Calculations*

The next tab is the *Calculations* tab.

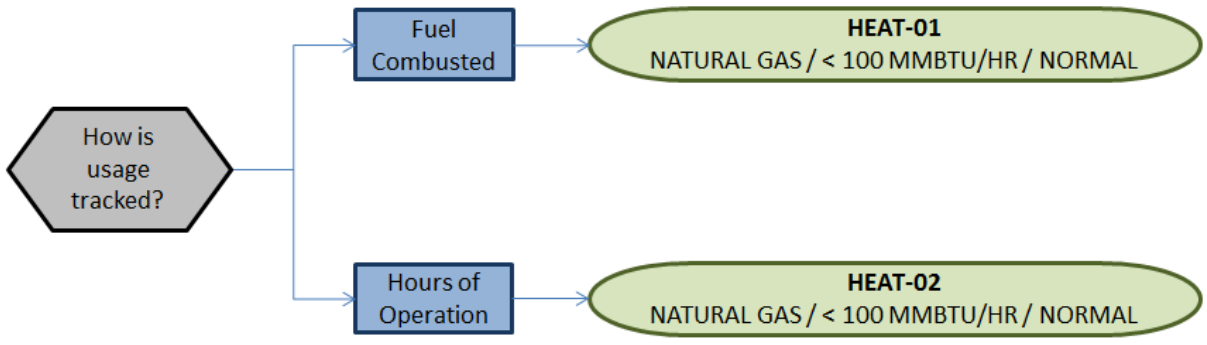


To associate an algorithm to the process, click on the Create Process Algorithm Assignment hyperlink.



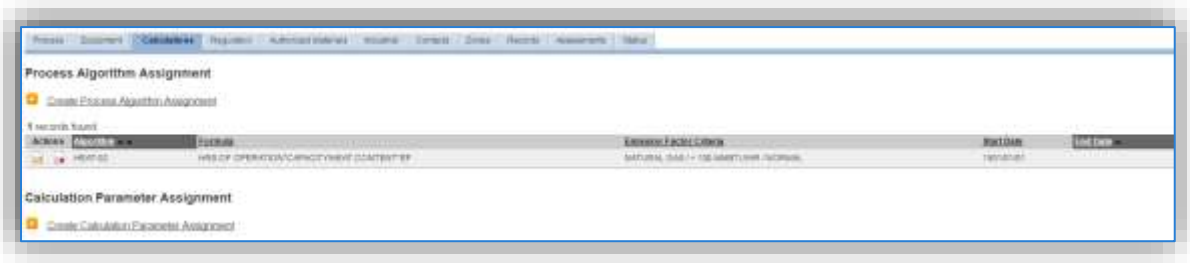
Select the **Algorithm Codes** from the list of values that matches the correct scenario. Next select the **Emission Factor Characteristic** available. Enter the **Start Date** to match the start date of the process. Click the **Save & Finish** button to save and return to the Calculations tab.

Use the flowchart below to find the correct Algorithm Code and Emission Factor set.

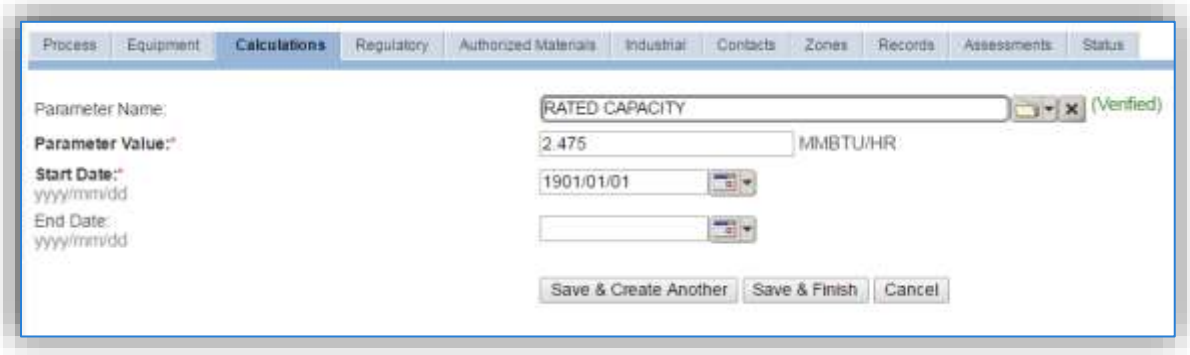


If your permit requires a different type of calculation, contact the Air Force Air Quality Subject Matter Expert for approval of the alternative method.

If using the HEAT-02 algorithm, the Calculation Parameter, RATED CAPACITY is required.



To add a calculation parameter to the process, click on the Create Calculation Parameter Assignment hyperlink.



Select the **Parameter Name**, RATED CAPACITY from the list of values.

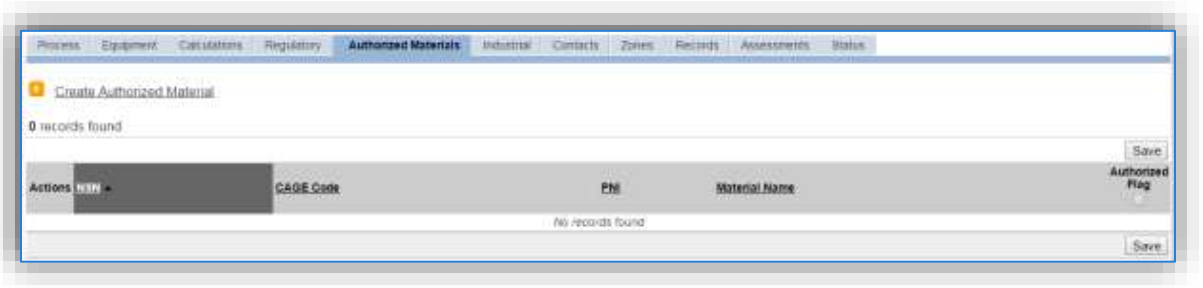
Enter the rated capacity (heat input) of the heater, oven, or dryer in the **Parameter Value** field.

Enter the **Start Date** for the parameter, this date should match the start date of the algorithm or use 1901/01/01 as a default.

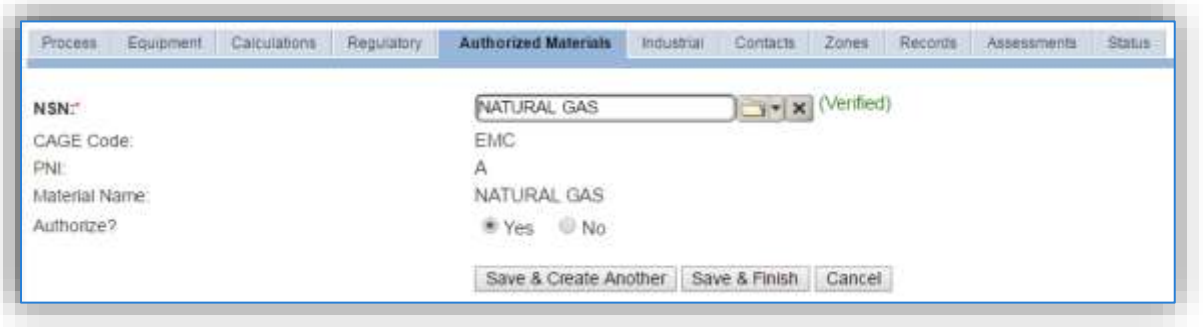
Click the **Save & Finish** button.

3.17.4.3.1.6 Materials

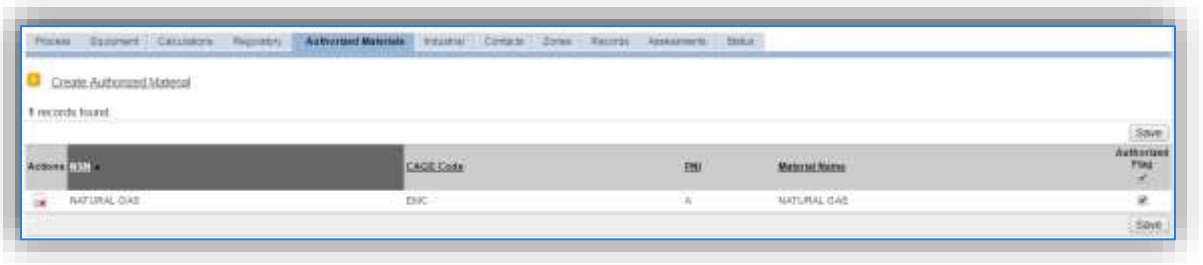
The last step in setting up the Unique Process record is to add the fuel as the authorized material on the *Authorized Materials* tab.



To authorize a material for the process, click on the Create Authorized Material hyperlink.



Select the fuel used (e.g. NATURAL GAS) or HRS OF OPERATION from the list of values. Next select "Yes" to **Authorize** the material, then **Save & Finish**.



3.17.4.3.2 New Sources

3.17.4.3.2.1 Data Collection Sheet

The form on the next page is a printable guide that can be taken out to the location of the source and used to gather all the necessary information from the shop personnel. It can then be used as a guide to help configure the data in APIMS when you return to your office.

Heaters, Ovens and Dryers Data Collection Worksheet

GENERAL INFORMATION

Building Number_____ Mission/Purpose_____

Shop Name/Function_____ Management Organization_____

Coordinates: Latitude: _____ Longitude: _____

UTM: _____ Zone _____ Easting _____ Northing ☐ Feet ☐ Meters

Is this source in any of your permits? ☐ Yes ☐ No

If yes, does it have an emission unit number or other designation? _____

EQUIPMENT INFORMATION

Manufacturer _____ Heat Input _____ MMBtu/hr
Model Number_____ Serial Number _____
Manufacture Date _____ Installation Date _____

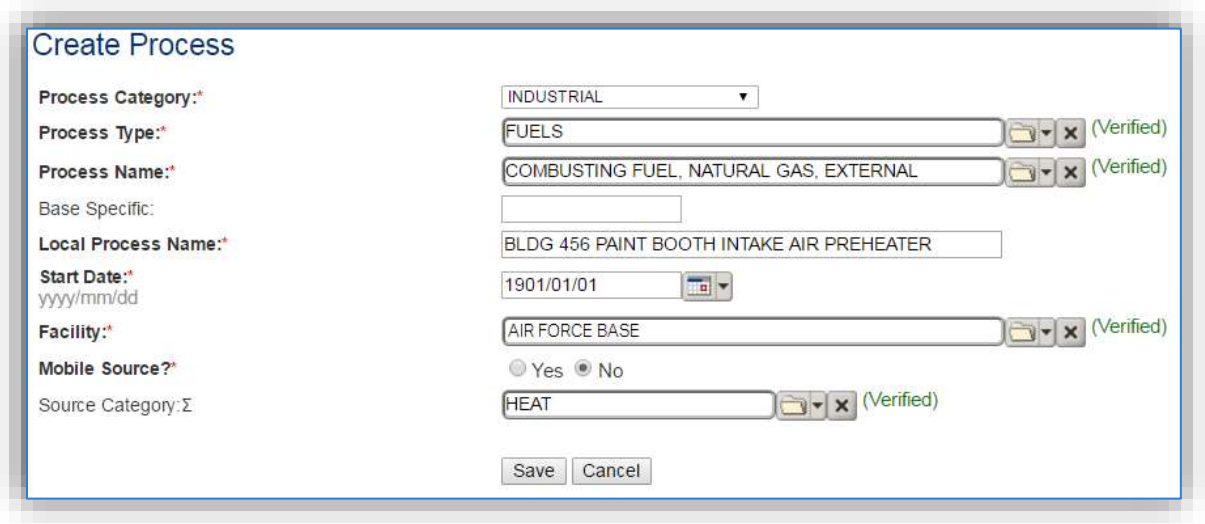
USAGE INFORMATION

How is usage tracked? ☐ Total Fuel Used ☐ Hours of Operation
Total Fuel Used _____MMCUFT
Hours of Operation _____Hrs

3.17.4.3.2.2 *New Source Configuration*

In order to properly document this emission source in APIMS, there will need to be at a minimum a Unique Process record for each fuel type and usage tracking method.

Navigate to the Unique Process module in APIMS and click the Create New Process hyperlink.



Process Category	Process Type	Process Name	Process ID
INDUSTRIAL	FUELS	COMBUSTING FUEL, NATURAL GAS, EXTERNAL	IFU1218
INDUSTRIAL	METALS TREATMENT	HEAT TREATING/HARDENING, NOC	IMT1548
INDUSTRIAL	MISCELLANEOUS OPERATIONS	CURING/DRYING/BAKING, AUTOCLAVE	IMI1284
INDUSTRIAL	MISCELLANEOUS OPERATIONS	CURING/DRYING/BAKING, DRYER	IMI1285
INDUSTRIAL	MISCELLANEOUS OPERATIONS	CURING/DRYING/BAKING, OVEN	IMI1286

Use the table above to determine the appropriate **Process Category**, **Process Type** and **Process Name**.

The **Base Specific** field can be used to enter a standard convention identifier that will best help identify the source. If the source is permitted, enter the emission unit ID as designated in the permit.

The **Local Process Name** should be in a standard naming convention for all sources that helps to quickly identify, what the process is, where it is, fuel used and size. Examples of process names are as follows:

- BLDG 7437 – PROCESS HEATER – NATURAL GAS – 4.4 MMBTU/HR
- OVEN, NATURAL GAS, 2.75 MMBTU/HR
- AUTOCLAVE – NATURAL GAS – 12 MMBTU/HR

The **Start Date** should be the date the unit became operational, if this date is not known, enter 1901/01/01 as a default start date.

The **Facility** should be the facility name that is responsible for the source or sources.

The **Mobile Source?** flag should be "NO" as this is considered as stationary source.

All process heater, dryer and oven sources are assigned to the HEAT **Source Category**.

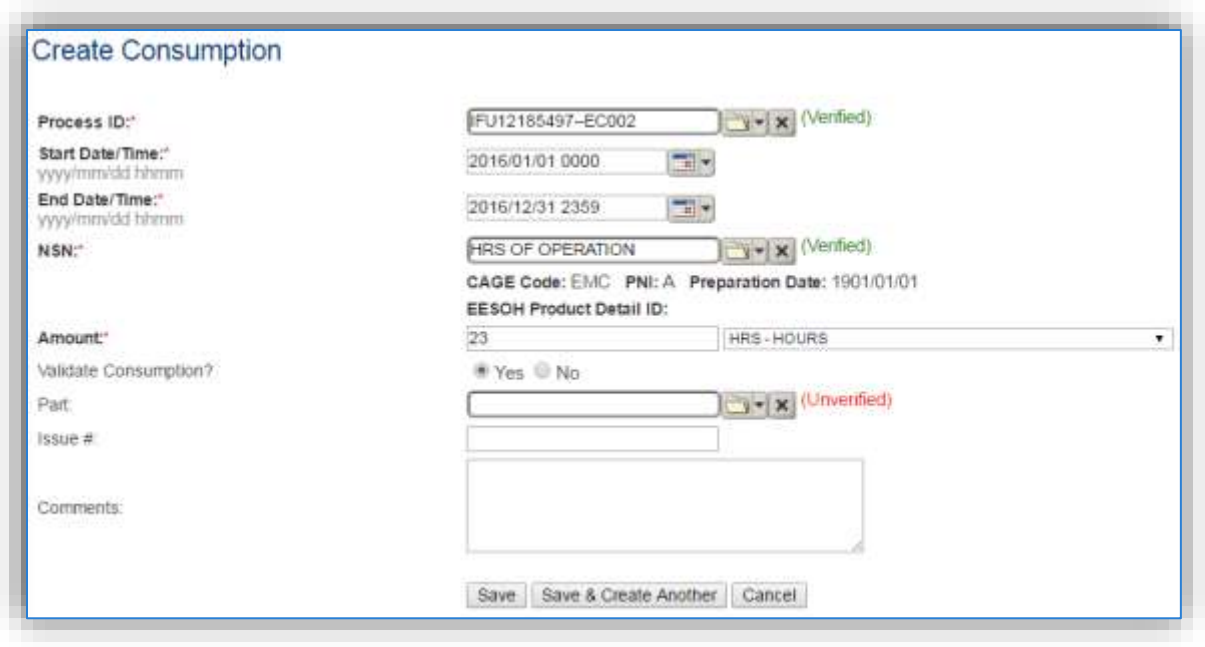
For the population of all other tabs, refer to the Existing Sources sections.

3.17.4.4 Year-to-Year Maintenance

3.17.4.4.1 Usage

The consumption for the process heater, oven and dryer sources will need to be tracked annually or more frequently if required by a regulatory agency. To correctly document the usage for this emission source the consumption should be entered in the Consumption log.

Navigate to the Consumption module and click the Create Consumption hyperlink.



The consumption record should span the entire reporting period as shown above. The material or **NSN** should be the fuel combusted or hours of operation. The **Amount** should be the value for the total amount of fuel combusted or hours of operation. Make sure to select "Yes" to validate the consumption. If the consumption is not validated it will not be included in the emissions calculation. Repeat this step for all the process heater, oven, and dryer processes. If the unit did not operate during the year but was still an active source, enter a consumption record with zero usage and a comment as to why it did not operate to track negative documentation. This type of documentation ensures that all equipment is accounted for from year to year and can be used to account for differences in AEI reporting from year to year.

3.17.4.4.2 Emissions Calculation

To correctly calculate emissions this emission source should be included in a **Stationary Source Calculation**. Reference Section 2.7 Emissions Calculations for additional instructions and details.

3.17.5 Incinerators (INCN)

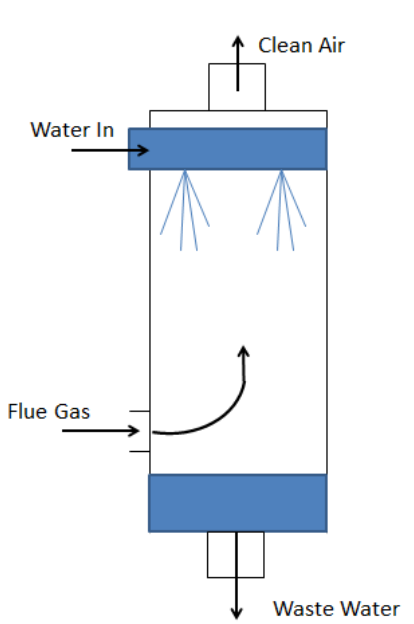
3.17.5.1 Source Types

There are several types of incinerators likely to be found on Air Force installations including classified waste incinerators, and medical waste incinerators.

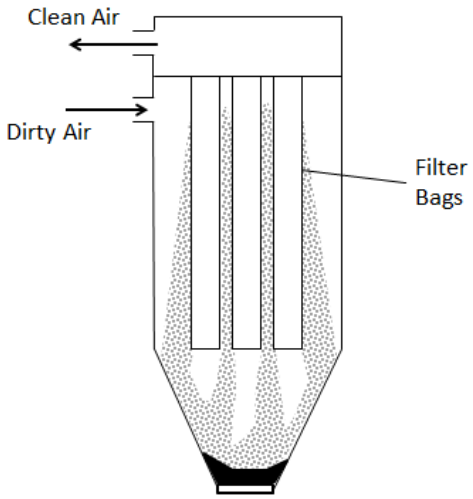
Classified waste incinerators are used to dispose of classified information. This information is typically in the form of paper documents, plastic (microfiche) sheets, or computer tapes/discs. For emissions estimation purposes, "industrial/commercial" incinerator emission factors are used as a surrogate for classified waste incinerators. Classified waste incinerators have either a multiple chamber or single chamber design.

Medical waste incinerators are used to burn wastes produced by hospitals, clinics, veterinary facilities, and medical research facilities. The wastes burned may include both infectious (i.e., red bag) wastes as well as non-infectious (e.g., general housekeeping) wastes. There are three major types of medical waste incinerators used: controlled-air incinerators, excess-air incinerators, and rotary kiln incinerators. The most common type used by the Air Force is the controlled-air incinerator.

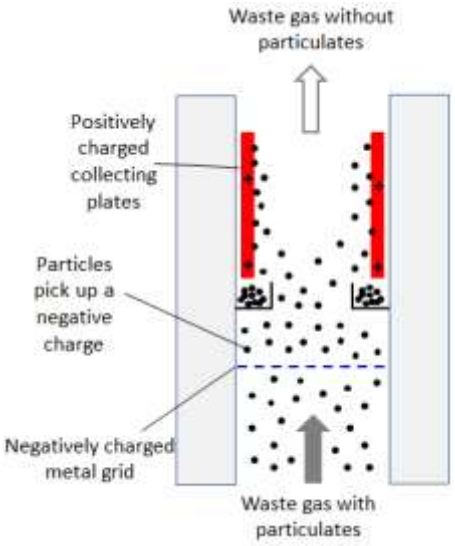
Incinerator often have control devices such as wet scrubbers, fabric filters, electrostatic precipitators, dry sorbent injection and carbon injection. All of these control devices will be external to the incinerator. The stack from the incinerator will route the off gas through these control devices prior to release to the atmosphere.



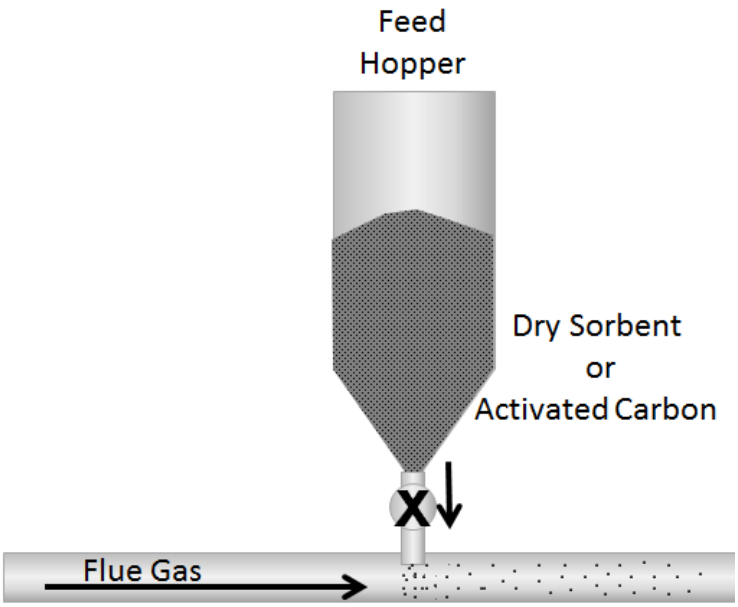
In a wet scrubber, flue gas enters through an inlet at the bottom of the column. Liquid enters through a nozzle or pipe at the top. As the gas flows up through the scrubber it is contacted by a liquid mist, often water, flowing down. Particulates are either formed into droplets or are forced against the wall much like in a cyclone and drop to the bottom. In addition to the particulate removal, acidic gases react with the water to become salts that also fall out to the bottom. There are three energy usage levels for wet scrubbers: low, medium, and high. A low energy wet scrubber, such as a spray tower, utilizes pressure drops less than 5 inches of water column and are capable of removing particles greater than 5-10 micrometers in diameter. A medium energy scrubber has a pressure drop form 5-25 inches of water column and is capable of removing micrometer-sized particles. A high energy scrubber, such as a venturi scrubber, expends the most energy and has a pressure drop of 25 to over 100 inches of water column, which can remove sub-micrometer particles.



A Fabric Filter (FF) is used to separate dust particles from dusty gases. Flue gas passes through fabric filter and the particulates collect on the filter pack crated on the surface of the filter and fall to the bottom during cleaning cycles and the clean air exits through the top. This type of control will only control the emissions of PM, PM_{10}, $PM_{2.5}$.



Electrostatic Precipitator is an electrostatic device that uses an induced charge to remove particulates. The flue gas flows over highly charged electrodes becoming ionized and in turn contacts the particles inducing a charge. As the charged particles pass the plates, the electrostatic forces cause the particles to collect on the plates and are removed from the gas. The plates are then rapped, vibrated, or washed with water to dislodge the particles, which fall into a hopper to be disposed. Electrostatic precipitators control emissions of PM, PM_{10} and $PM_{2.5}$.



Dry sorbent injection (DSI) systems remove hydrogen chloride (HCl) and other acid gases through a two-step process. The first step injects a powdered sorbent into the flue gas where it reacts with the HCl. The most common sorbents used are trona (sodium sesquicarbonate), sodium bicarbonate and hydrated lime. The second step uses a downstream control device such as an ESP or fabric filter.

Carbon Injection (CI) systems are similar to DSI systems as they inject powdered activated carbon from a storage silo or feed hopper into the flue gas stream. The activated carbon can adsorb many contaminants such as vaporized mercury from the flue gas and is then collected by the particulate matter control system.

3.17.5.2 Potential Data Sources

Most Air Force installations that have a hospital or clinic will have a medical waste incinerator. The medical facility manager should be able to provide the information required for emissions calculations. Classified waste incinerators are usually operated by the base Information Systems office.

The information required for emissions calculation is as follows:

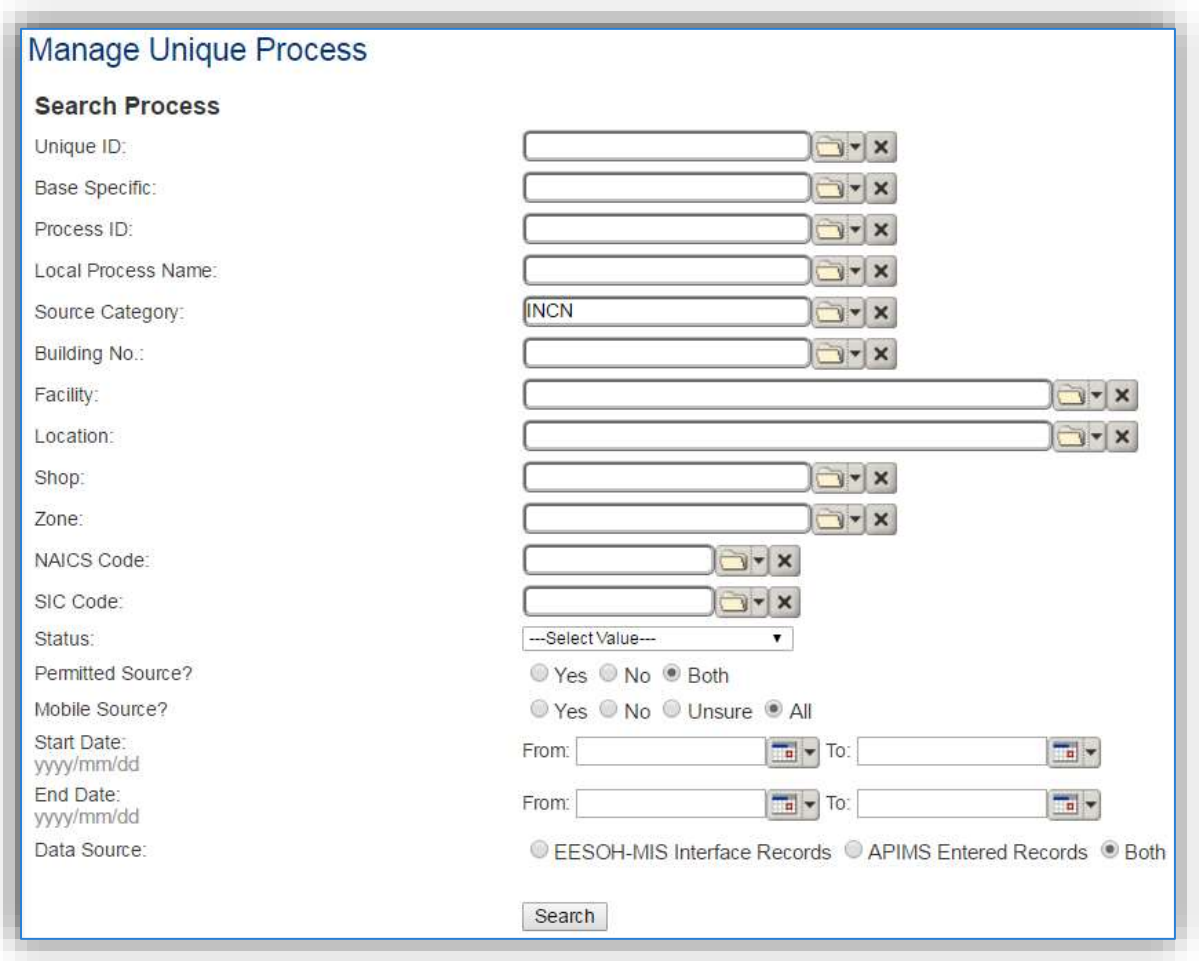
- Type of incinerator (MSW, medical waste, single chamber or multiple chamber classified waste)
- Emissions test data (if available)
- Control devices (if applicable)
- Control device chemical removal efficiencies (if available)
- Tons of waste incinerated

3.17.5.3 Standard Source Identification/Characterization

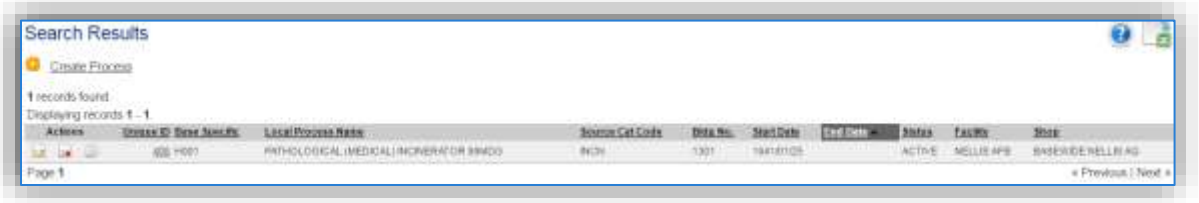
3.17.5.3.1 Existing Sources

It is important to review the existing sources in each source category on an annual basis at a minimum. Most regulatory agencies require an up to date source and equipment inventory.

Navigate to the Unique Process module of APIMS by clicking on **Unique Process** under the **Emission Unit** tab.



In the **Source Category** search field, type "INCN" then select the row for INCINERATOR from the dropdown results. Click the **Search** button.

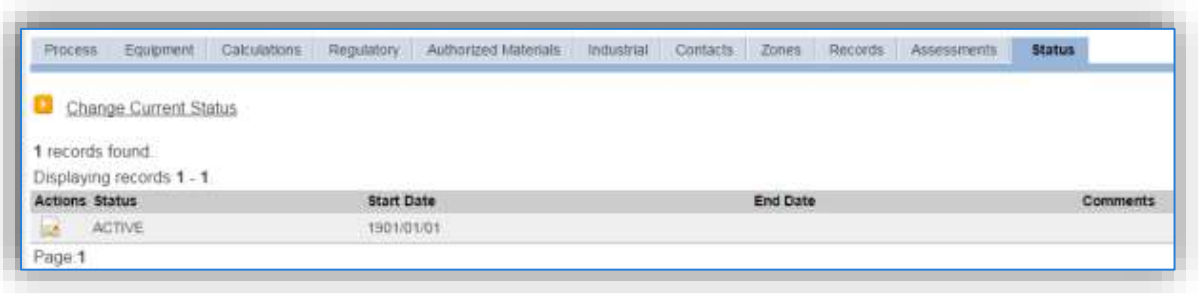


The search results grid will now display all the woodworking processes currently in APIMS.

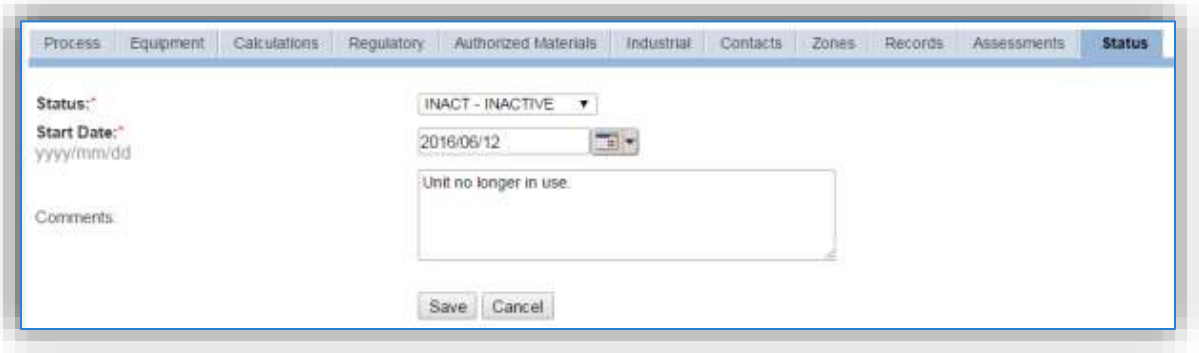
The **Local Process Name**, **Base Specific** and **Bldg No**. can all be used to identify a specific source. This list should be reviewed to make sure the source is configured in a way that it is easy to identify and locate. The status of each source should also be reviewed and kept current.

3.17.5.3.2 Status

If the status of a unit needs to be changed, click the edit icon next to the process.



Navigate to the *Status* tab. Click the Change Current Status hyperlink.



Select the appropriate status from the **Status** dropdown (i.e., ACTIVE, REMOVED or INACTIVE).

For the **Start Date** enter the date at which the status changed.

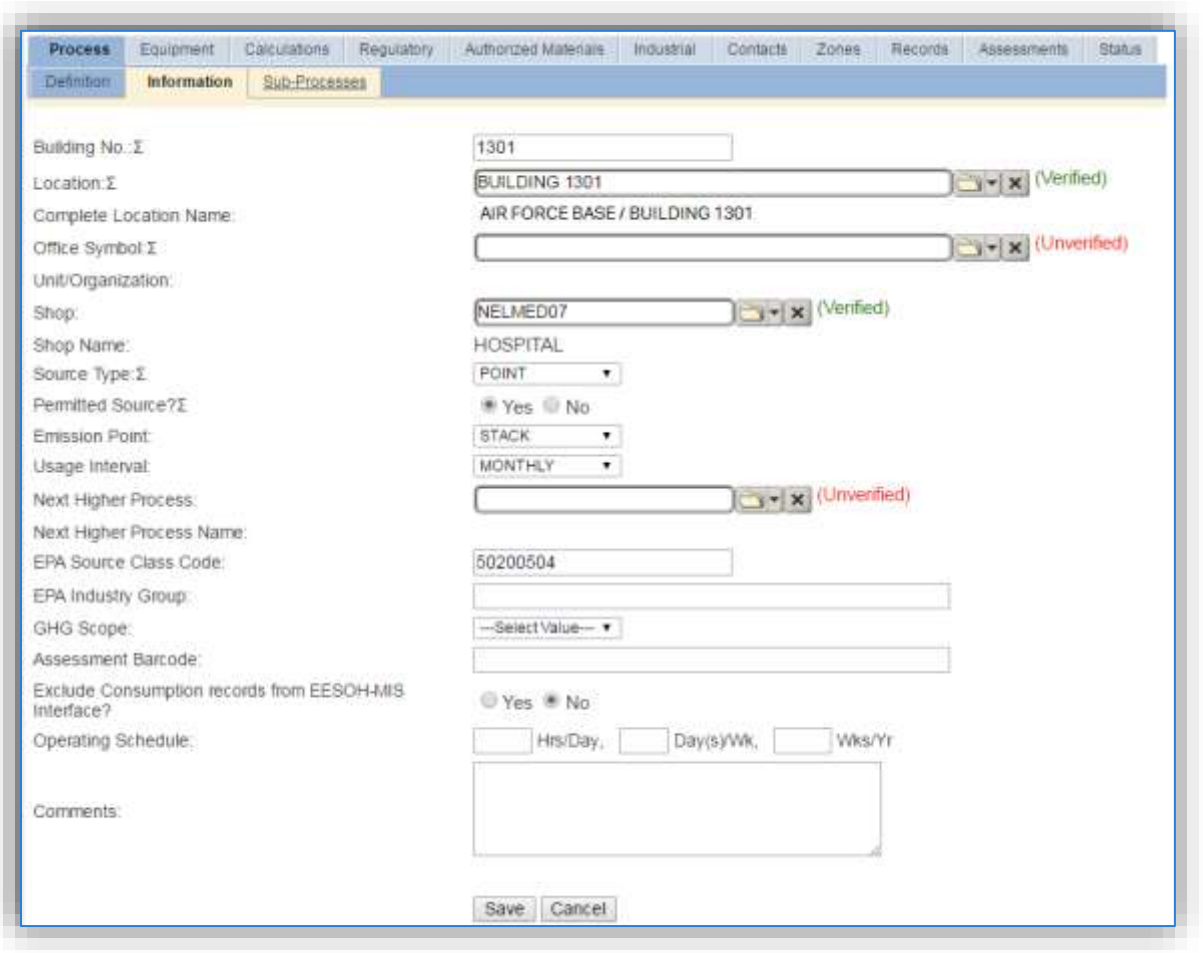
Enter **Comments** that provide insight into why the status changed. These can be very useful for equipment inventories, permit renewals and regulatory reporting. Most regulatory agencies require reporting on unit operation status; this includes any potential time spent offline, reasons for the outage.

Click the **Save** button.

The emissions for a process will only be calculated for the dates the process was in an ACTIVE status. If a source is removed in the middle of a year, the emissions will only be calculated for the part of the year the source was active.

3.17.5.3.3 Information

There are basic data elements that are important to track and maintain for new and existing sources, such as location and source type. This data can be maintained in the Unique Process record on the *Information* sub tab.



The **Building No**. field can be used to specify a general location or area of the emission source, for example, EAST SIDE.

The **Location** field is very important to effectively manage the location and mission of the emission source. This documents where the source is located, in case it needs to be inspected or if the source owner needs to be contacted for pertinent information. For the instructions on how to create a location reference Section 2.2 Location.

The **Shop** is important as it establishes the personnel that are utilizing the equipment on a regular basis and will be the best source of information regarding the unit.

Incinerators are categorized as a point source in the **Source Type**, since a stack or control device with a stack is typically utilized. This also means that the **Emission Point** would be a STACK.

The **Permitted Source** flag should also be populated to accurately reflect the current regulatory status of the emission source. This flag can be an invaluable tool in roll-up reporting.

The **Usage Interval** should be designated. Incinerators are usually documented on an ANNUAL basis. However, documentation time intervals may be different if it is a permitted source. It is important to populate this field correctly as it will affect how it is documented in the AEI Throughputs module.

The **EPA Source Class Code** is a process level EPA code that describes the equipment and/or operation that is the source of the emissions. Source Classification Codes for incinerators are:

Process Type	SCC
Solid Waste Disposal – Commercial/Institutional, Incineration, Single Chamber	50200102
Solid Waste Disposal – Commercial/Institutional, Incineration, Multiple Chamber	50200101
Medical Waste Incinerator, Unspecified Type	50200504

3.17.5.3.4 Sub-Processes

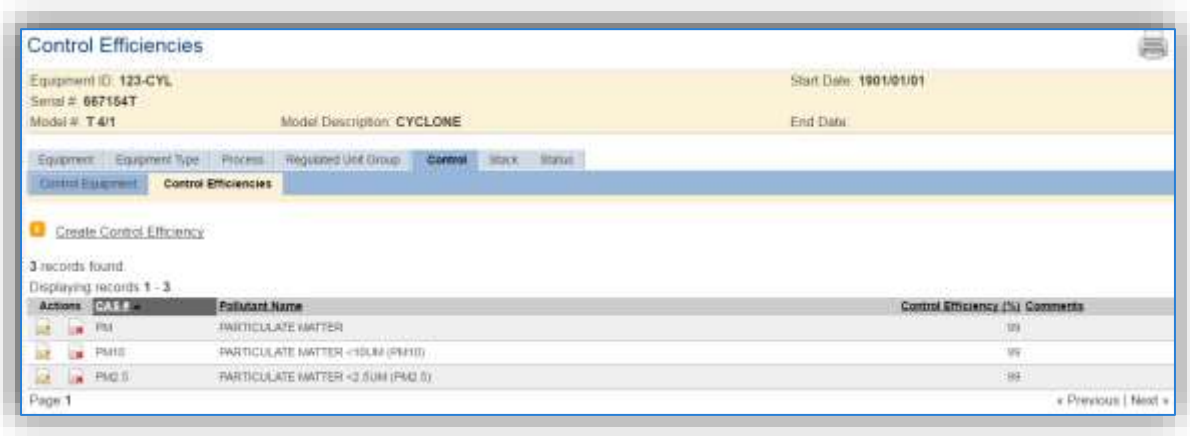
This source does not utilize this functionality.

3.17.5.3.5 Equipment

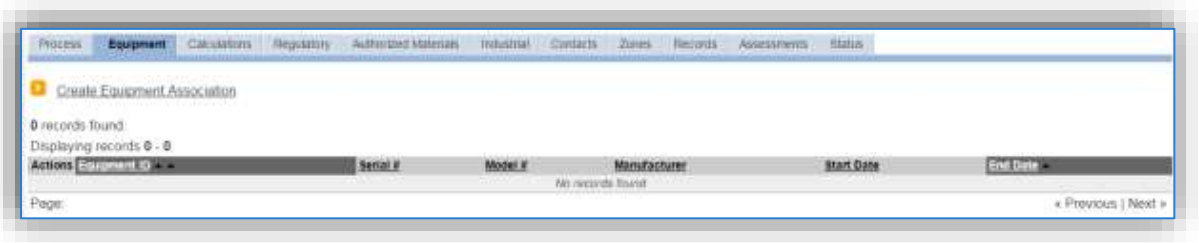
The next tab is the *Equipment* tab. This can be used to link the equipment record in APIMS to the process, which is not required if utilizing the standard calculation methodologies that include different control efficiencies in the emission factors.

This step is only needed for incinerators if there are specific control devices that have documented pollutant removal efficiencies.

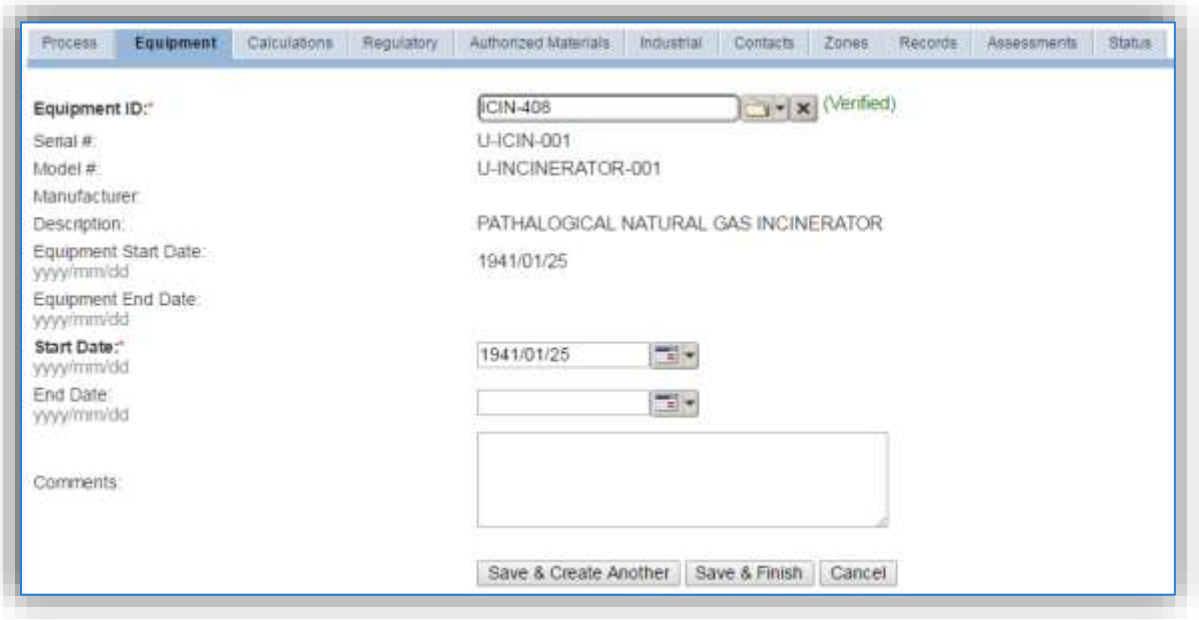
APIMS uses the control efficiency on the equipment associated to the process to accurately account for these pollutant control efficiencies in emission calculations. To link the equipment to the process, the equipment must already be entered in APIMS.



In the control tab of the equipment record, the control efficiency for the device needs to be created for each specific pollutant, as shown in the equipment screen below. Refer to Section 2.4 Equipment for specifics on how to properly document equipment in APIMS.



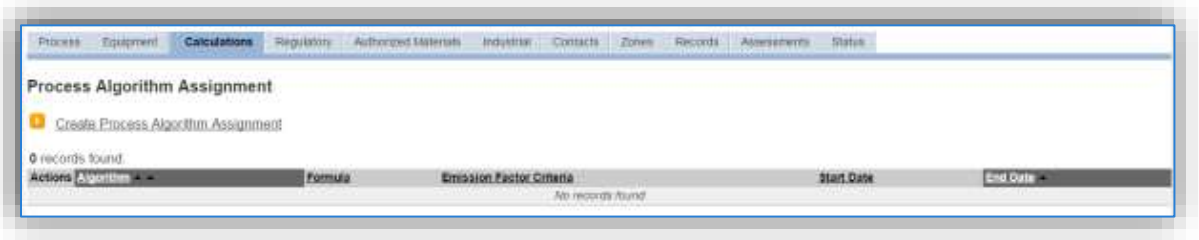
To link the equipment, click on the Create Equipment Association hyperlink.



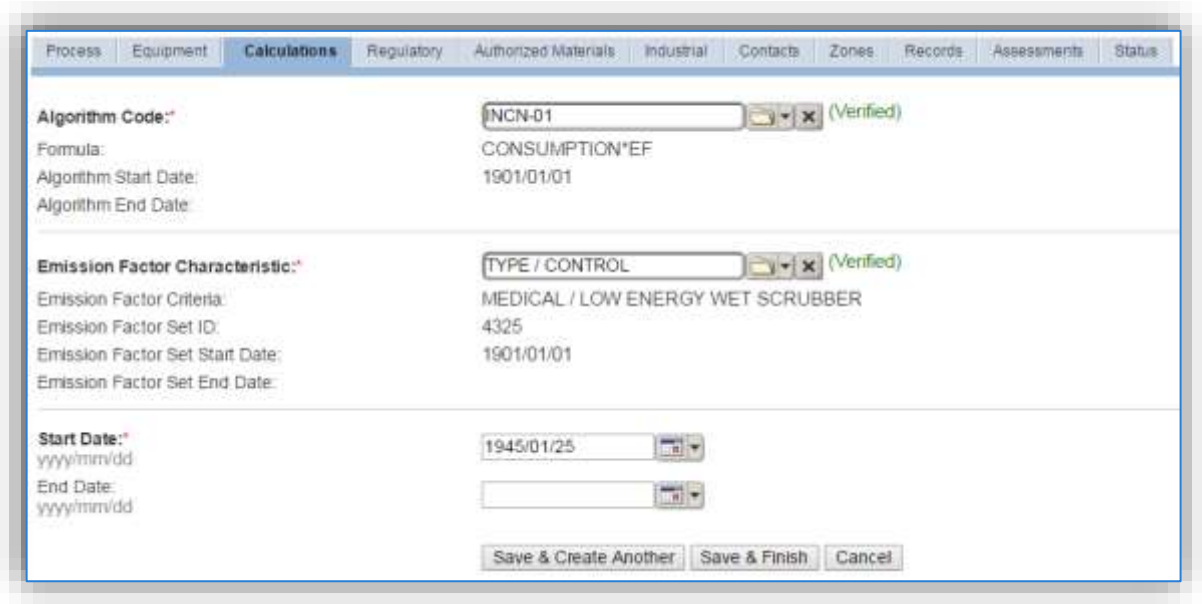
Search for the **Equipment ID** in the list of values, enter the start date and click the **Save & Finish** button.

3.17.5.3.6 Calculations

The next tab is the *Calculations* tab.



To associate an algorithm to the process, click on the Create Process Algorithm Assignment hyperlink.

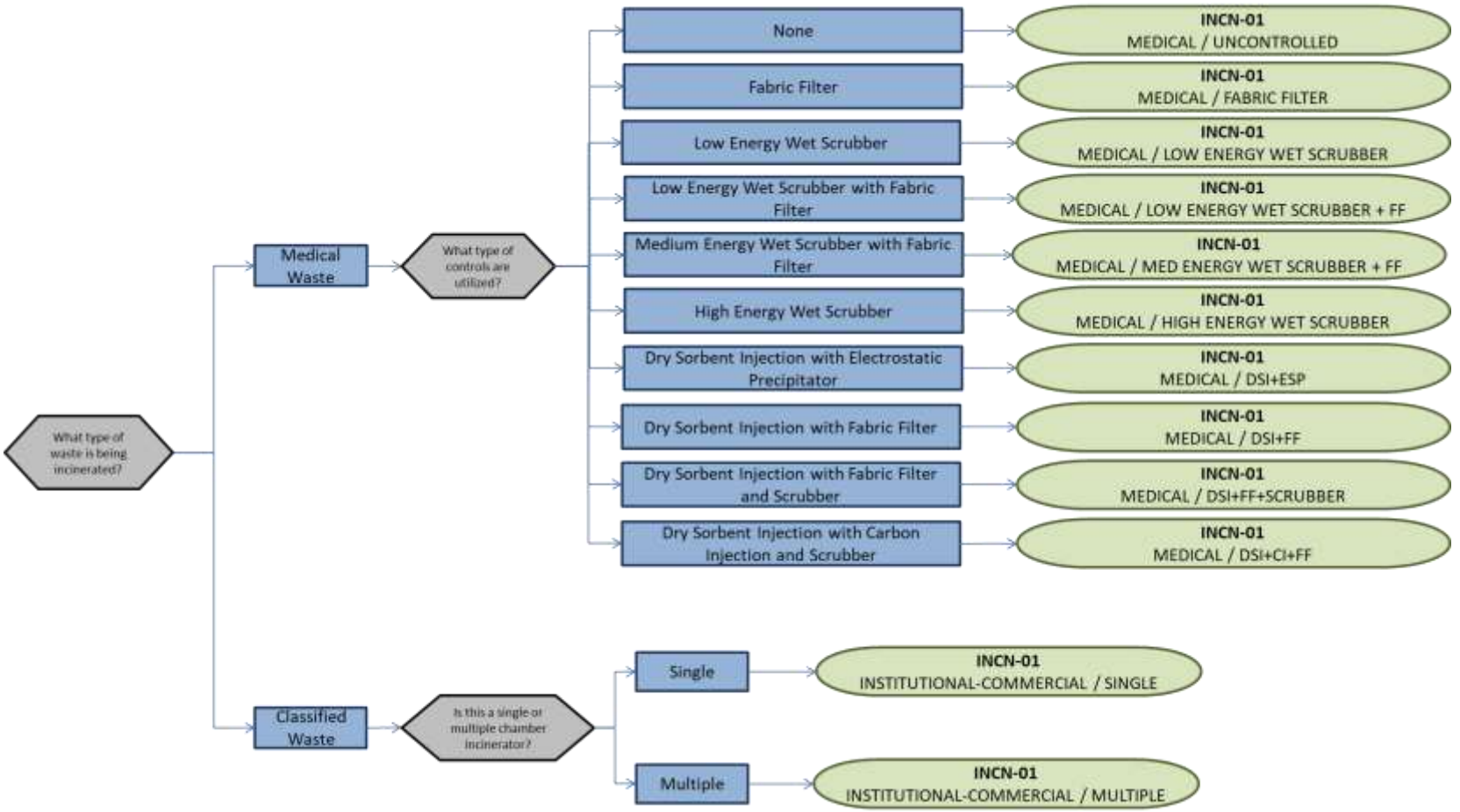


For incinerator processes it is highly recommended to use incinerator specific emission factors based on test data and documented control efficiencies.

In the absence of site-specific data, there is only one standard calculation methodology recommended by the Air Force. This calculation is based on the amount of waste incinerated in tons and the type of control equipment.

Select the **Algorithm Code** and the **Emission Factor Characteristic** that most closely matches the type of incinerator and associated control equipment. Enter the **Start Date** to match the start date of the process.

Use the flowchart below to find the correct Algorithm Code and Emission Factor Characteristic.

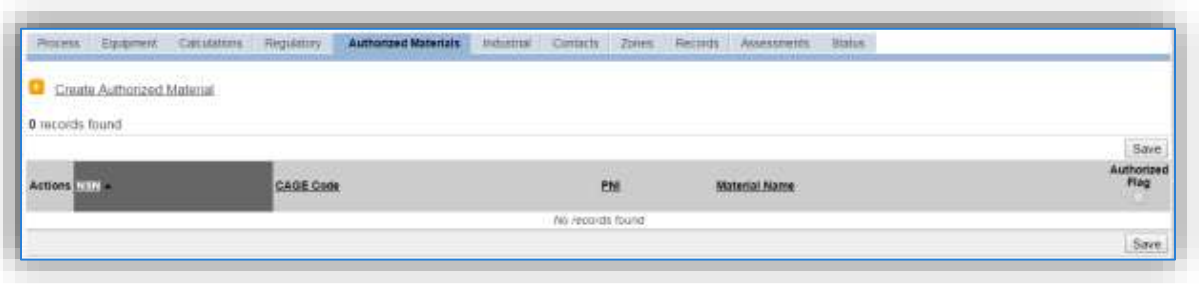


If your permit requires a different type of calculation, contact the Air Force Air Quality Subject Matter Expert for approval of the alternative method.

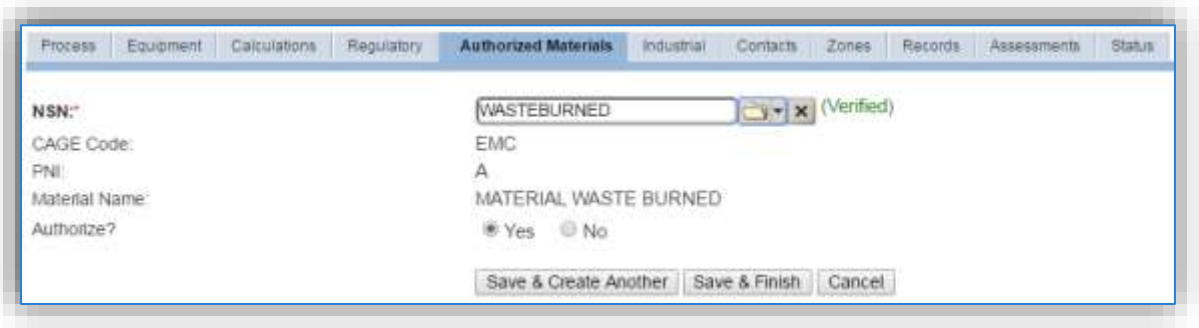
If the specific control efficiencies of the control devices are known, it is recommended to select the uncontrolled emission factor set and associate the equipment with these control efficiencies configured. This will then apply the known control to the emission calculations.

3.17.5.3.7 Materials

The last step in setting up the Unique Process record is to add WASTEBURNED or anther generic material as the authorized material on the *Authorized Materials* tab.



To authorize a material for the process, click on the Create Authorized Material hyperlink.



Select WASTEBURNED or another generic material name from the list of values. If there are no generic materials matching this available, the material record will need to be created. Next select "Yes" to **Authorize** the material, then Save & Finish.

3.17.5.4 New Sources

3.17.5.4.1 Data Collection Sheet

The form on the next page is a printable guide that can be taken out to the location of the source and used to gather all the necessary information from the shop personnel. It can then be used as a guide to help configure the data in APIMS when you return to your office.

Incinerator Data Collection Worksheet

GENERAL INFORMATION

Building Number_____ Mission/Purpose_____

Shop Name/Function_____ Management Organization_____

Coordinates: Latitude: _____ Longitude: _____

UTM: _____ Zone _____ Easting _____ Northing ☐ Feet ☐ Meters

Is this source in any of your permits? ☐ Yes ☐ No

If yes, does it have an emission unit number or other designation? _____

EQUIPMENT INFORMATION

What is the incinerator type?

- ☐ Single Chamber for Classified Waste
- ☐ Multiple Chamber for Classified Waste
- ☐ Medical Waste

Manufacturer _____

Model Number_____ Serial Number _____

Does the incinerator have any of the following control devices? (check all that apply)

☐ Fabric Filter
☐ Low Energy Wet Scrubber
☐ Medium Energy Wet Scrubber
☐ High Energy Wet Scrubber
☐ Dry Sorbent Injection
☐ Carbon Injection
☐ Electrostatic Precipitator

Is the control efficiency of any of these control devices known? ☐ Yes ☐ No
If yes, collect the data.

Has any testing or analysis been conducted to capture the emissions profile from this incinerator?
☐ Yes ☐ No If yes, collect the emissions profile data.

USAGE INFORMATION

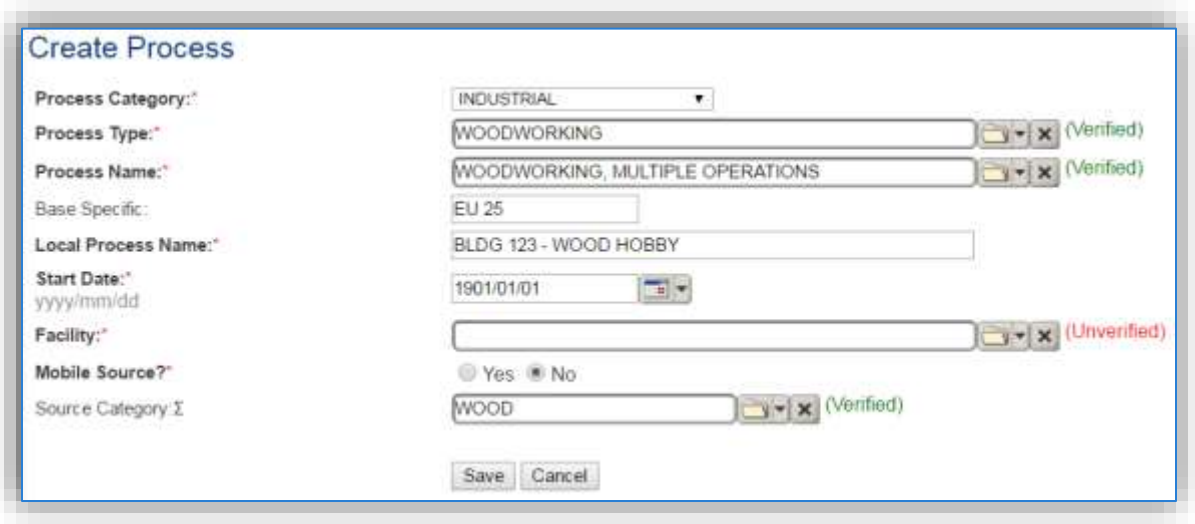
What type of material is incinerated? ☐ Medical Waste ☐ Classified Waste

How much material was incinerated? _____ tons

3.17.5.4.2 New Source Configuration

In order to properly document this emission source in APIMS, there will need to be a Unique Process record for each incinerator.

Navigate to the Unique Process module in APIMS and click the Create New Process hyperlink.



Process Category	Process Type	Process Name	Process ID
INDUSTRIAL	INCINERATING	INCINERATION, MULTIPLE CHAMBER	IIN1565
INDUSTRIAL	INCINERATING	INCINERATION, SINGLE CHAMBER	IIN1566
INDUSTRIAL	MISCELLANEOUS OPERATIONS	DISPOSING/RECYCLING, NOC	IMI1359

Use the table above to determine the appropriate **Process Category**, **Process Type** and **Process Name**.

The **Base Specific** field can be used to enter a standard convention identifier that will best help identify the source. If the source is permitted, enter the emission unit ID as designated in the permit.

The **Local Process Name** should be in a standard naming convention for all sources that helps to quickly identify, what the process is, where it is and any other unique attribute. For example, BLDG 123 – MEDICAL WASTE INCINERATOR or CLASSIFIED WASTE INCINERATOR – BLDG 156.

The **Start Date** should be the date the unit became operational, if this date is not known, enter 1901/01/01 as a default start date.

The **Facility** should be the facility name that is responsible for the source.

The **Mobile Source?** flag should be "NO" as this is considered as stationary source.

All incinerator emission units are assigned to the INCN **Source Category**.

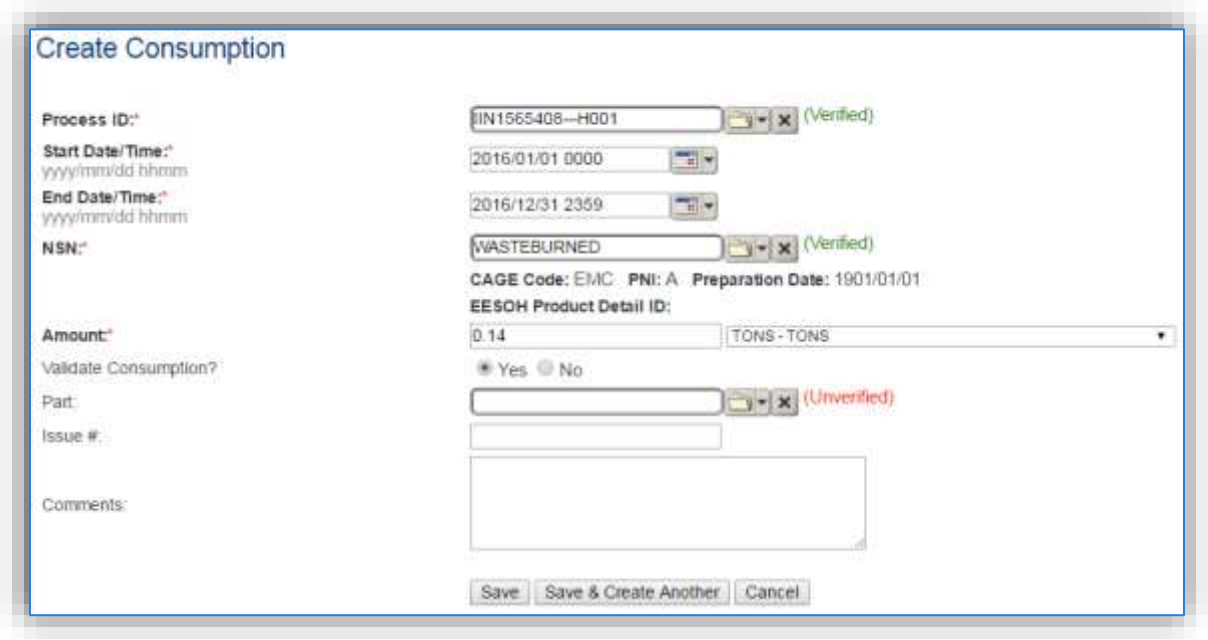
For the population of all other tabs, refer to the Existing Sources sections.

3.17.5.5 Year-to-Year Maintenance

3.17.5.5.1 Usage

The consumption for incinerators will need to be tracked annually or more frequently if required by a regulatory agency. To correctly document the annual usage for this emission source the consumption should be entered in the Consumption log.

Navigate to the Consumption module and click the Create Consumption hyperlink.



The consumption record should span the entire reporting period as shown above. The material, **NSN** should be WASTEBURNED or the generic material authorized to the process. The **Amount** should be the amount of waste incinerated in tons. Make sure to select "Yes" to validate the consumption. If the consumption is not validated it will not be included in the emissions calculation.

3.17.5.5.2 Emissions Calculations

To correctly calculate emissions this emission source should be included in a **Stationary Source Calculation** that calculates controlled emissions. Reference Section 2.7 Emissions Calculations for additional instructions and details.

3.17.6 Landfills (LAND)

3.17.6.1 Source Types

A landfill is a defined area of land, used explicitly to deposit wastes. Both active landfills (wastes currently being deposited) and closed landfills (wastes no longer being deposited) are significant sources of air pollution. While there are only a few active landfills at Air Force installations, there are several Air Force bases that have closed landfills on their property.

There are a variety of different wastes which may be deposited in landfills, including municipal solid waste (MSW), construction and demolition wastes, commercial and industrial organic wastes, agricultural wastes, etc. All landfills containing any organic wastes will generate and release gaseous emissions.

In general, a three-step process is followed when depositing waste into an active landfill. The waste is spread over an area, compacted, and then covered with a layer of soil. The covering of the waste is typically performed using heavy equipment (e.g., bulldozers, graders). The use of heavy equipment results in the generation of fugitive dust emissions coming from the ground surface. However, the primary source of emissions at landfills comes from the generation of landfill gas. VOC, HAP and GHG emissions are calculated using the Landfill Gas Emissions Model (LandGEM). The LandGEM is an automated tool developed by the EPA for estimating emissions from the MSW landfills. The model can be used to estimate uncontrolled pollutants of concern, including CH_4, CO_2, NMOCs, and individual air pollutants from landfills by using a first order decay equation rate. The model requires users to input data such as the year the landfill opened and closed, the waste design capacity, and the annual waste deposited in the landfill.

3.17.6.1.1 Regulatory Applicability

MSW landfills primarily receive household wastes, but may also receive commercial solid waste, nonhazardous sludge, and industrial solid waste. MSW landfills are required to comply with the federal regulations promulgated under subtitle D of the Resource Conservation and Recovery Act (RCRA). These regulations describe location restrictions, detail emissions modeling and corrective actions, and provide design and operating criteria applicable to MSW landfills. The landfills subject to the regulations promulgated under RCRA are required to monitor methane emissions and prevent off-site migration for active landfills and for a period of 30 years after landfill closure. Details regarding these requirements are provided in 40 CFR 258, Criteria for Municipal Solid Waste Landfills. In Subpart C of this CFR, the operating

criteria include stating that owners and operators of all MSW landfills must not violate SIP requirements. Landfills are primarily the responsibility of state and local governments, therefore stricter regulations may vary from state to state.

Several NSPS have been developed to aid in the reduction of pollution from active and closed landfills. Emission guidelines for MSW landfills are provided in 40 CFR 60 Subpart CC, Emission Guidelines and Compliance Times for Municipal Solid Waste Landfills. These standards are applicable to landfills whose construction, reconstruction, or modification commenced before May 30, 1991. According to this Subpart, any landfill with a design capacity greater than or equal to 2.5 million megagrams and 2.5 million cubic meters that also has a non-methane organic compound (NMOC) emission rate of at least 50 megagrams per year must have control devices installed to monitor and control the amount of NMOC released to the atmosphere. For those landfills whose construction, reconstruction, or modification occurred on or after May 30, 1991, the air emissions standards are provided in 40 CFR 60 Subpart WWW, Standards of Performance for Municipal Solid Waste Landfills.

In addition to the NSPS described in part 60 of 40 CFR, there are also NESHAPs applicable to landfills. 40 CFR 63 Subpart AAAA, National Emission Standards for Hazardous Air Pollutants: Municipal Solid Waste Landfills, applies to any MSW classified as a major source of HAPs or is an area source with a design capacity equal to or greater than 2.5 million megagrams and 2.5 million cubic meters that is estimated to produce 50 megagrams or more of NMOC annually. For more information regarding the requirements of the standards applicable to landfills, including reporting requirements and minimum control efficiencies, refer to 40 CFR 60 Subparts CC and WWW, and 40 CFR 63 Subpart AAAA.

According to 40 CFR 98.2, any facility located in the United States or attached to the Outer Continental Shelf that has a municipal solid waste landfill that generates 25,000 metric tons or more of equivalent CO_2 (CO_2e) per year is subject to the greenhouse gas (GHG) reporting rules as outlined in 40 CFR 98. CH_4 generation from landfills as well as CH_4 destruction resulting from landfill gas collection and combustion systems are required to be reported. The calculation of the methane generated is described in detail in 40 CFR 98 Subpart HH, though the use of modeling software, as described below, may be used for this calculation. Note that the mandatory reporting rule applies to municipal solid waste landfills which generate 25,000 or more metric tons of CO_2e per year and accepted waste on or after January 1, 1980 unless: 1) The landfill did not receive waste on or after January 1, 2013; 2) The CH_4 generation was less than 1,190 metric tons in the 2013 reporting year; and 3) An annual report was not required under any requirement in 40 CFR 98 Subpart HH in any reporting year prior to 2013.

3.17.6.2 Potential Data Sources

Base Civil Engineering is typically responsible for operating and maintaining on-base landfills. Base weather may be contacted to determine the annual average rainfall received by the base. The average rainfall is required to determine the proper *k* value (CH_4 generation rate constant) to use when calculating uncontrolled emissions

The data elements that are needed are as follows:

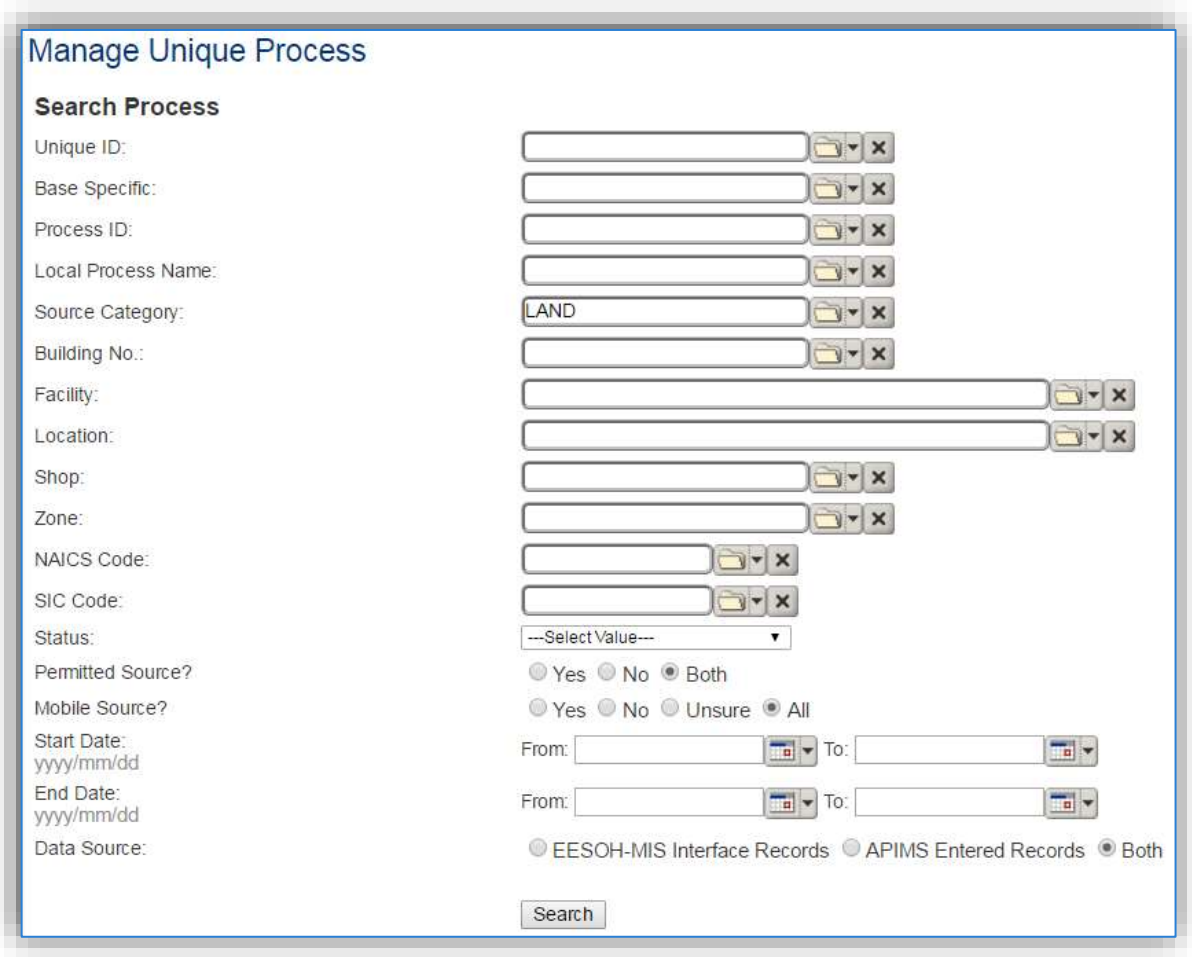
- Tons of refuse accepted during the year

- Years closed (number of years the landfill been closed or no longer accepting waste)
- Years since opening (number of years since first opened or first accepted waste)
- Ambient Temperature in degrees Fahrenheit
- Average rainfall

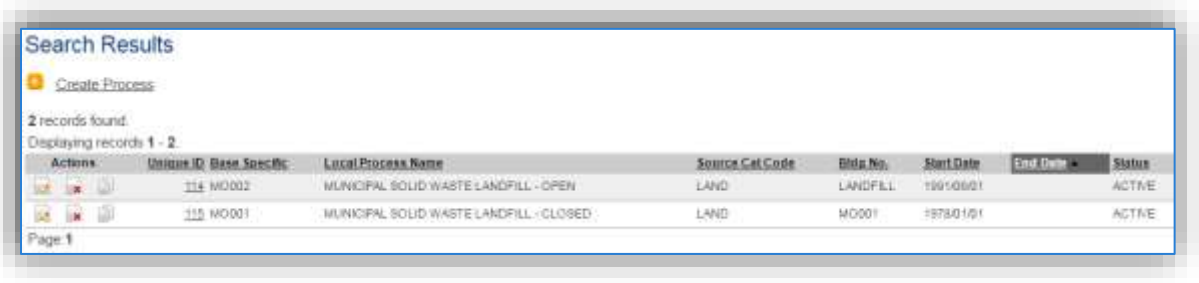
3.17.6.3 Standard Source Identification/Characterization

3.17.6.3.1 Existing Sources

Most installations will only have one landfill and therefore have only one process. However, if there is more than one landfill there will need to be a process for each landfill. To view the current process configuration, navigate to the Unique Process module of APIMS by clicking on **Unique Process** under the **Emission Unit** tab.



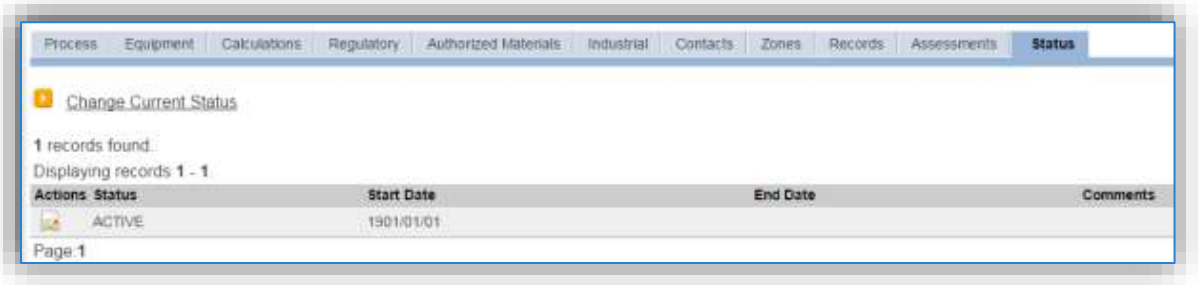
In the **Source Category** search field, type "LAND" then select the row for LANDFILLS from the dropdown results. Click the **Search** button.



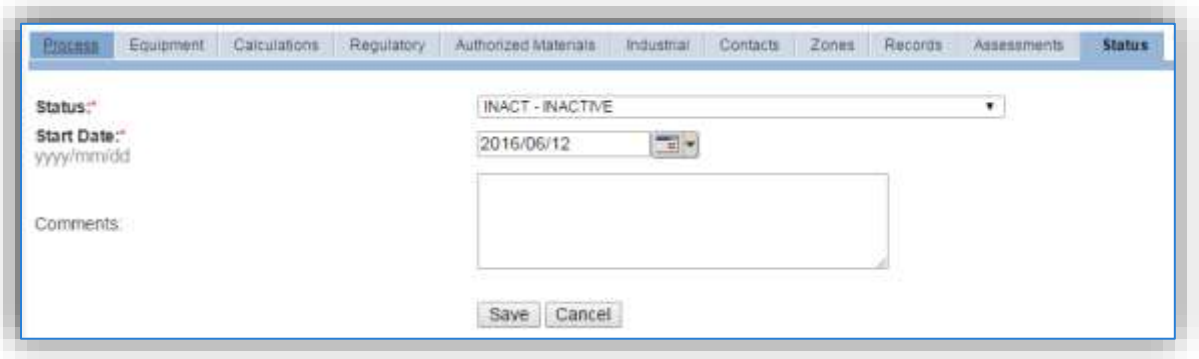
The search results grid will now display all the landfill processes currently in APIMS.

3.17.6.3.2 Status

If the status of a process needs to be changed, click the edit icon next to the process. Remember even if the landfill is not currently accepting refuse, there are still emissions associated that will need to be calculated, so those processes should remain active.



Navigate to the *Status* tab. Click the Change Current Status hyperlink.



Select the appropriate status from the **Status** dropdown (i.e., ACTIVE, REMOVED or INACTIVE).

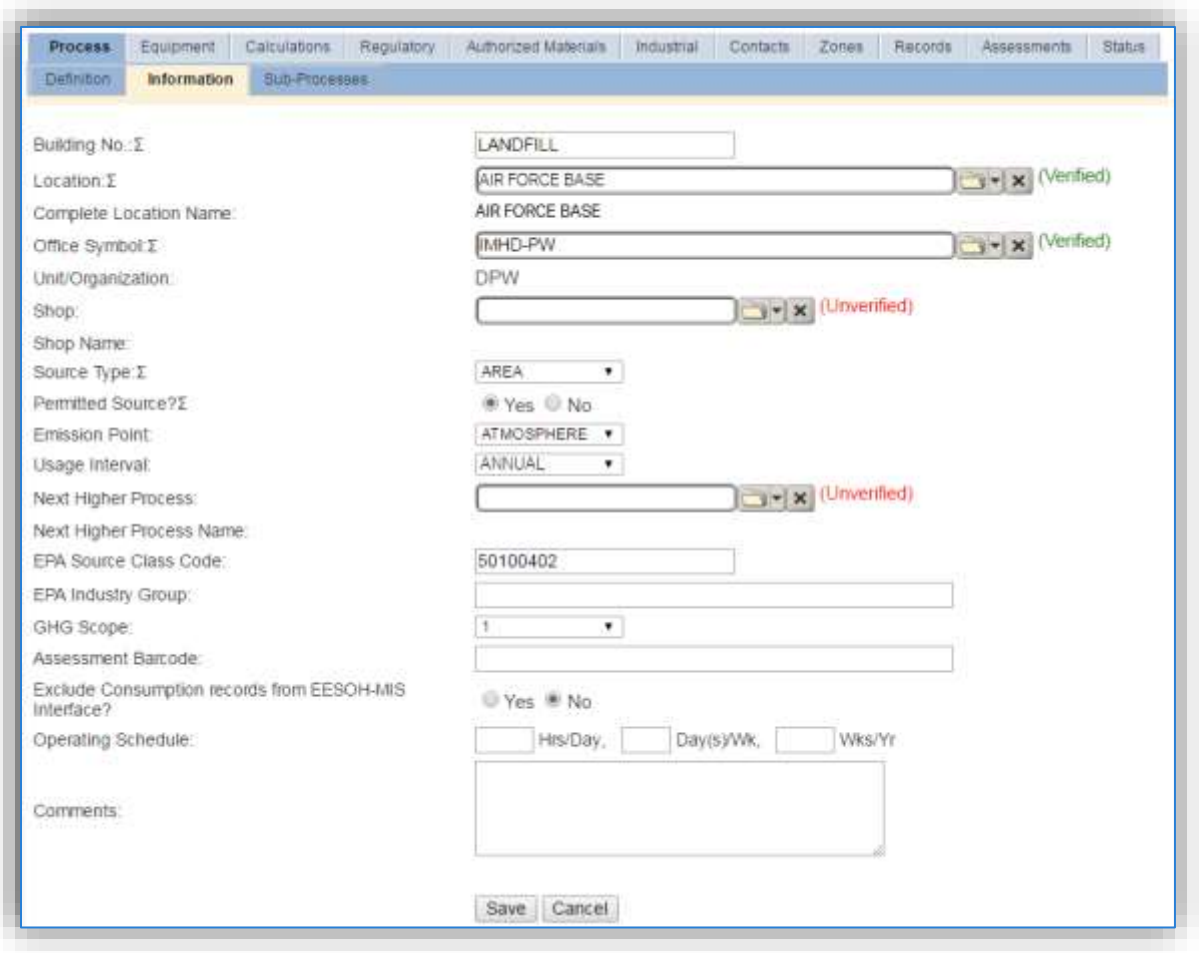
For the **Start Date** enter the date at which the status changed.

Click the **Save** button.

The emissions for a process will only be calculated for the dates the process was in an ACTIVE status. If a source is removed in the middle of a year, the emissions will only be calculated for the part of the year the source was active.

3.17.6.3.3 Information

There are basic data elements that are important to track and maintain for new and existing sources, such as location and source type. This data can be maintained in the Unique Process record on the *Information* sub tab.



The **Building No**. field can be used to specify a general location or area of the emission source, for example, EAST SIDE.

The **Location** field is very important to effectively manage the location and mission of the emission source. This documents where the source is located, in case it needs to be inspected or if the source owner needs to be contacted for pertinent information. For the instructions on how to create a location reference Section 2.2 Location.

The **Shop** can be used to indicate the personnel that are responsible for the activity and will be the best source of information regarding the activity.

Landfill emissions should be designated as AREA in the **Source Type** field, since they are considered stationary area emissions.

The **Permitted Source** flag should also be populated to accurately reflect the current regulatory status of the emission source. This flag can be an invaluable tool in roll-up reporting.

The **Emission Point** should be ATMOSPHERE for all activities.

The **Usage Interval** should be designated, this source is usually documented on an ANNUAL basis however may be different if it is a permitted source. It is important to populate this field correctly as it will affect how it is documented in the AEI Throughputs module.

The **EPA Source Class Code** is a process level EPA code that describes the equipment and/or operation that is the source of the emissions. The Source Classification Code for municipal solid waste landfills is 50100402.

3.17.6.3.4 Sub-Processes

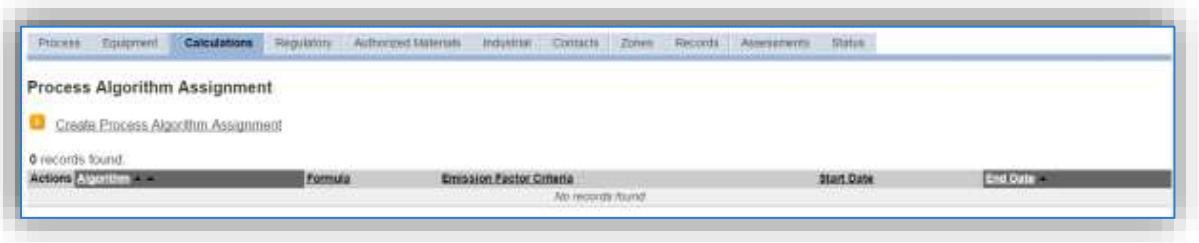
This source does not utilize this functionality.

3.17.6.3.5 Equipment

This source does not utilize this functionality.

3.17.6.3.6 Calculations

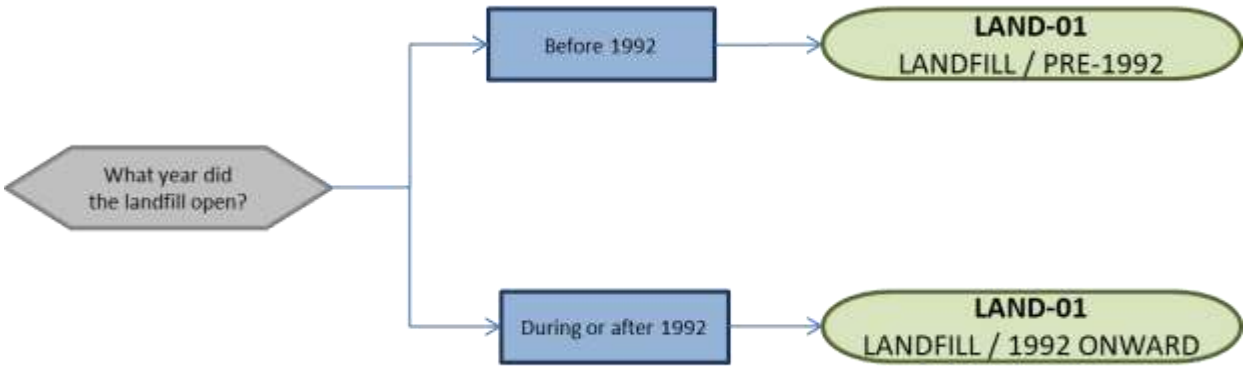
The next tab is the *Calculations* tab.



To associate a new algorithm to the process, click on the Create Process Algorithm Assignment hyperlink.

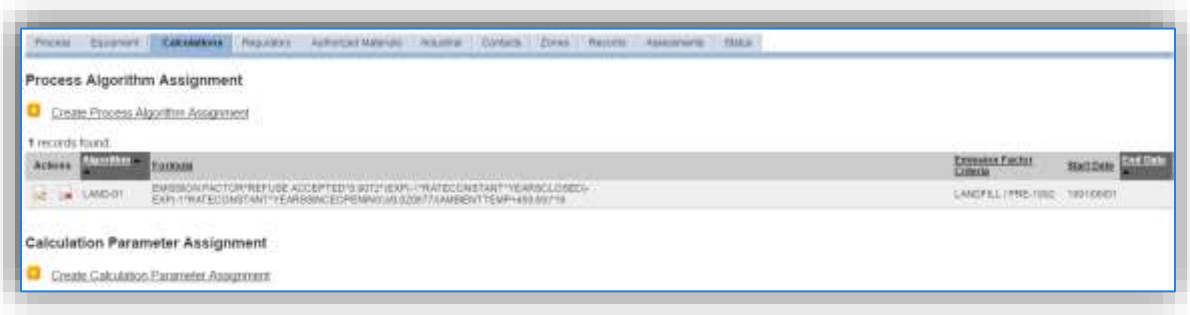
Select the **Algorithm Code** and **Emission Factor Characteristic** from the list of values that matches the correct scenario. Enter the **Start Date** to match the start date of process, which should also be the date the landfill opened. Click **Save & Finish** button to save and return to the Calculations tab.

Use the flowchart below to find the correct Algorithm Code and Emission Factor Set.

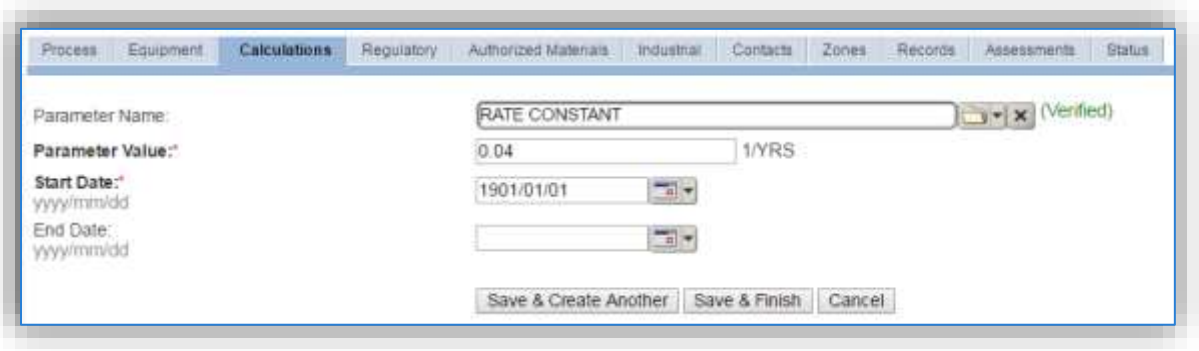


If your permit requires a different type of calculation, contact the Air Force Air Quality Subject Matter Expert for approval of the alternative method.

The next step on this tab is to enter the Calculation Parameters required to complete the calculations. The RATE CONSTANT, YRS CLOSED, YRS SINCE OPENING and AMBIENT TEMPERATURE are required by the algorithm to complete the emissions calculations for landfills.



To add a calculation parameter to the process, click on the Create Calculation Parameter Assignment hyperlink.



Select the **Parameter Name** from the list of values.

The **Parameter Value** should be entered according to the following guidance for each parameter required by the algorithm.

The RATE CONSTANT value should be entered according to the following table.

k Value	Landfill Conditions
0.02	Areas receiving <25 inches/yr rainfall
0.04	Areas receiving >25 inches/yr rainfall

For the YRS CLOSED parameter value, enter the number of years the landfill has been closed or zero for active landfills that are accepting waste.

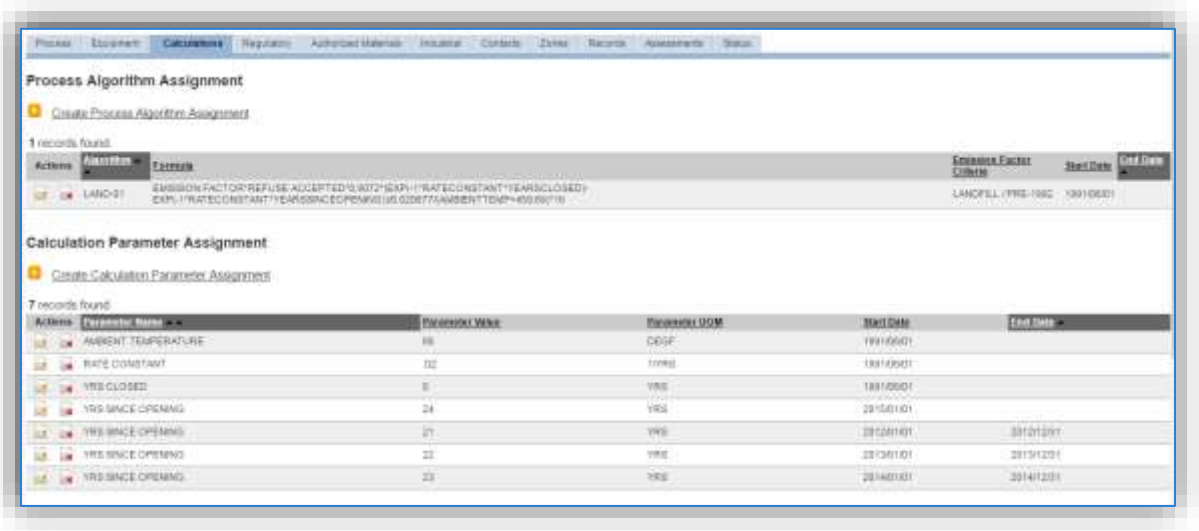
For the YRS SINCE OPENING parameter value, subtract the year the landfill opened from the AEI year to get the years since opening.

For the AMBIENT TEMPERATURE parameter value, utilize the average annual temperature in degrees Fahrenheit as obtained by the weather service.

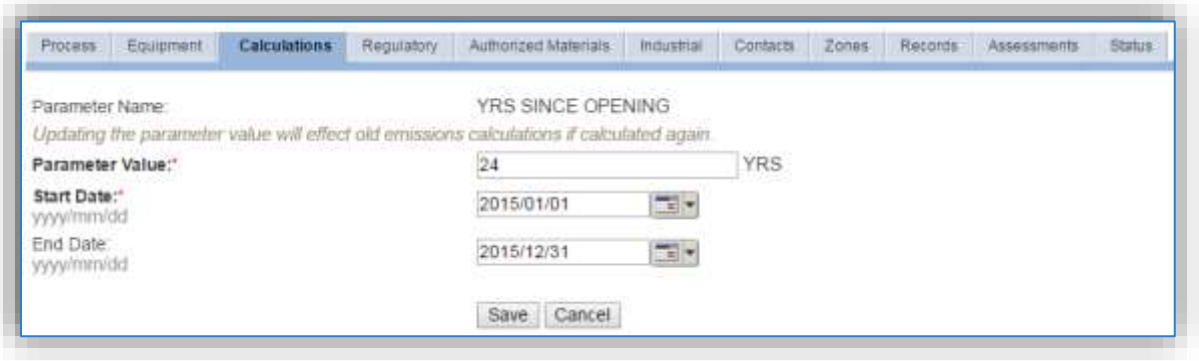
The **Start Date** for the RATE CONSTANT and AMBIENT TEMPERATURE parameters should match the start date of the algorithm and process. The YRS CLOSED should be specific to the AEI year with a new parameter record for each year. If the landfill is active and the YRS CLOSED parameter is 0, then there can be one parameter record with the **Start Date** matching the process start date. The YRS SINCE OPENING parameter needs to be specific to the AEI year with a Start Date at the first of the year and the End Date at the end of the year.

Click the **Save & Create Another** button to add another parameter or **Save & Finish**.

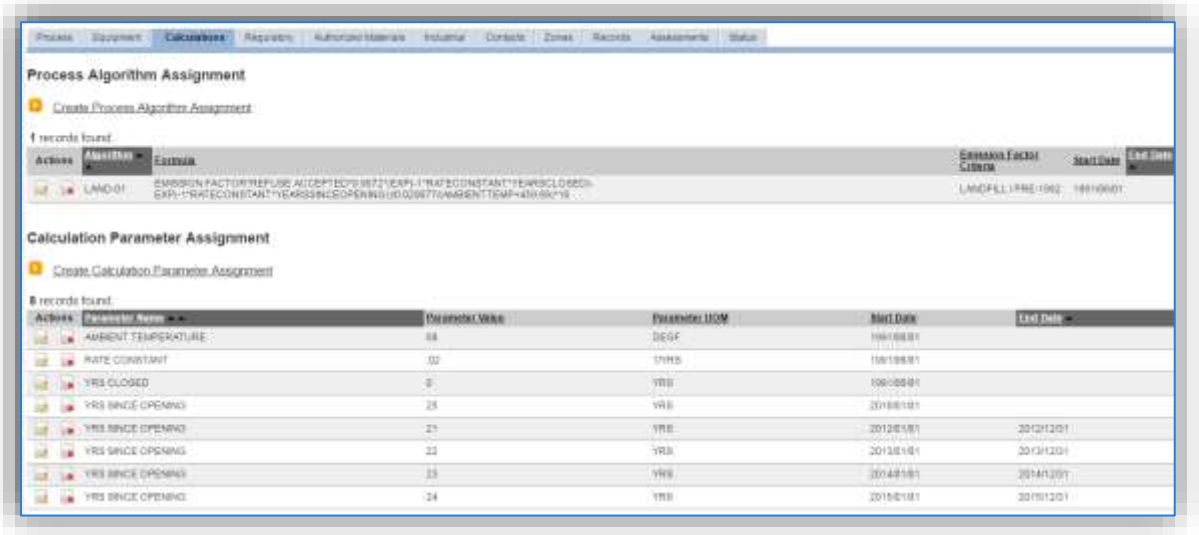
If this process already has parameters entered, the YRS SINCE OPENING for the previous AEI year will need to be end dated prior to entering a new parameter.



Click the edit icon  next to the parameter that needs to be end dated.



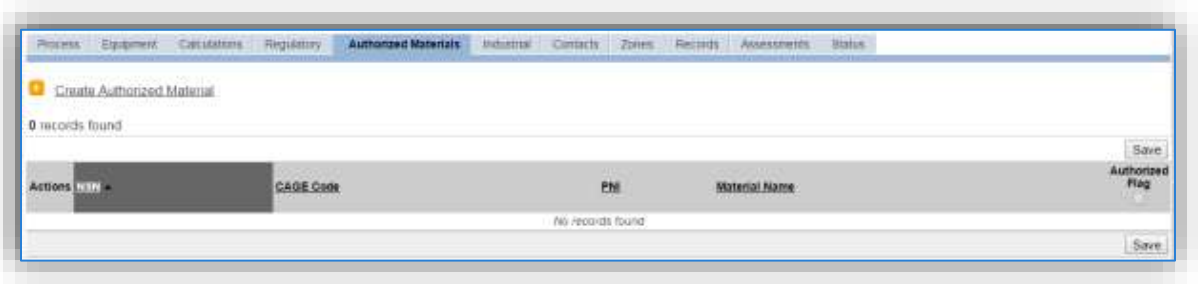
Enter the last date of the year, click **Save**. This will allow for the creation of a new YRS SINCE OPENING parameter for the current AEI year.



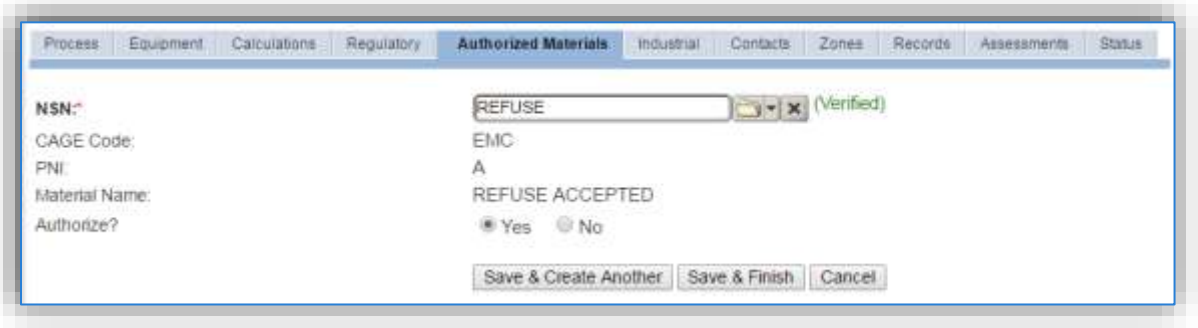
As shown above, all the parameters will appear in the grid with the active parameters at the top. This maintains all the data used in AEIs for previous years.

3.17.6.3.7 Materials

The last step in setting up the Unique Process record is to authorize materials on the *Authorized Materials* tab.



To authorize a material for the process, click on the Create Authorized Material hyperlink.



Select the material record from the list of values, using the **NSN** or Material Name. If the material is not available, the material record will need to be created.

Next select “Yes” to **Authorize** the material, then **Save & Finish**.

3.17.6.4 New Sources

3.17.6.4.1 Data Collection Sheet

The form on the next page is a printable guide that can be taken out to the location of the source and used to gather all the necessary information from the shop personnel. It can then be used as a guide to help configure the data in APIMS when you return to your office.

Landfill Data Collection Worksheet

GENERAL INFORMATION

Building Number_____ Mission/Purpose_____

Shop Name/Function_____ Management Organization_____

Coordinates: Latitude: _____ Longitude: _____

UTM: _____ Zone _____ Easting _____ Northing ☐ Feet ☐ Meters

Is this source in any of your permits? ☐ Yes ☐ No

If yes, does it have an emission unit number or other designation? _____

USAGE INFORMATION

What year did the landfill open? _____

Is the landfill currently open and accepting waste? ☐ Yes ☐ No

If Yes, how much refuse was accepted this year? _____ tons

If No, what year did the landfill close? _____

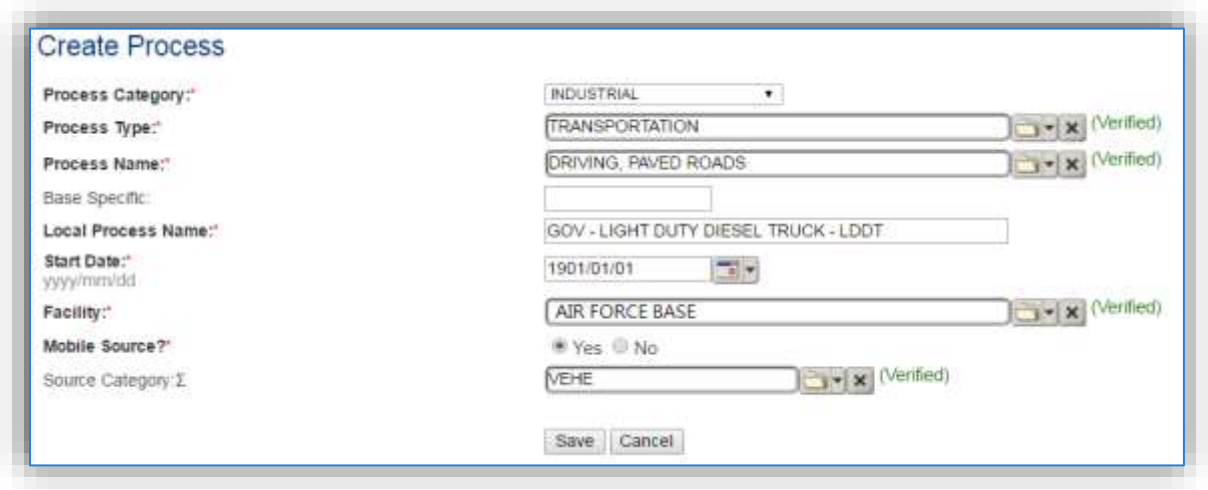
What is the average ambient temperature? _____ ^{o}F

What is the average annual rainfall? _____ inches

3.17.6.4.2 New Source Configuration

In order to properly document this emission source in APIMS, there will need to be a Unique Process record for each landfill.

Navigate to the Unique Process module in APIMS and click the Create New Process hyperlink.



Process Category	Process Type	Process Name	Process ID
INDUSTRIAL	MISCELLANEOUS OPERATIONS	SANITATION LANDFILL OPERATION	IMI1892

Use the values in the table above to appropriately populate the **Process Category**, **Process Type** and **Process Name**.

The **Local Process Name** should be in a standard naming convention for all sources that helps to quickly identify, what the process is. For example, LANDFILL – MUNICIPAL SOLID WASTE, LANDFILL OPERATIONS – ACTIVE, LANDFILL SITE – CLOSED.

The **Start Date** should be the date the landfill opened or first accepted waste. This date is very important for landfill sources as it is utilized to properly calculate emissions.

The **Facility** should be the facility name that is responsible for the source.

The **Mobile Source?** flag should be "NO" as this is considered a stationary source.

All landfill operations should be assigned to the LAND **Source Category**.

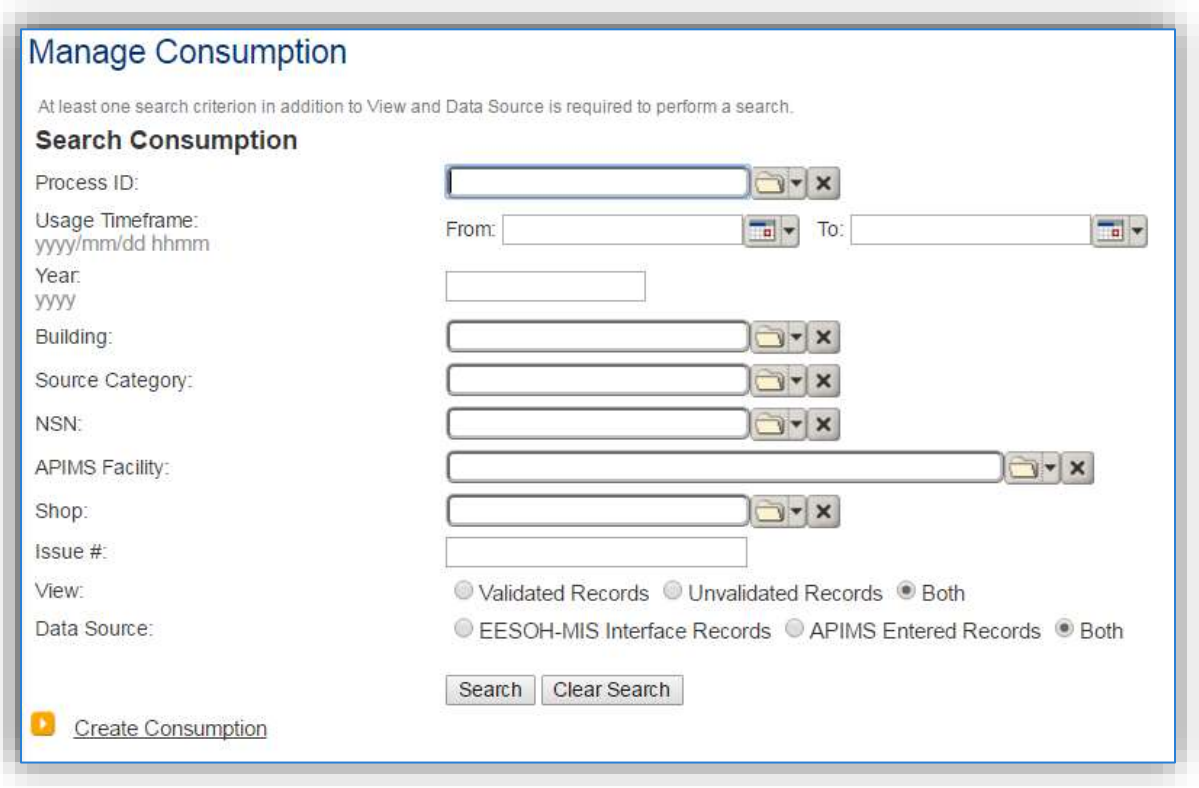
For the population of all other tabs, refer to the Existing Sources sections

3.17.6.5 Year-to-Year Maintenance

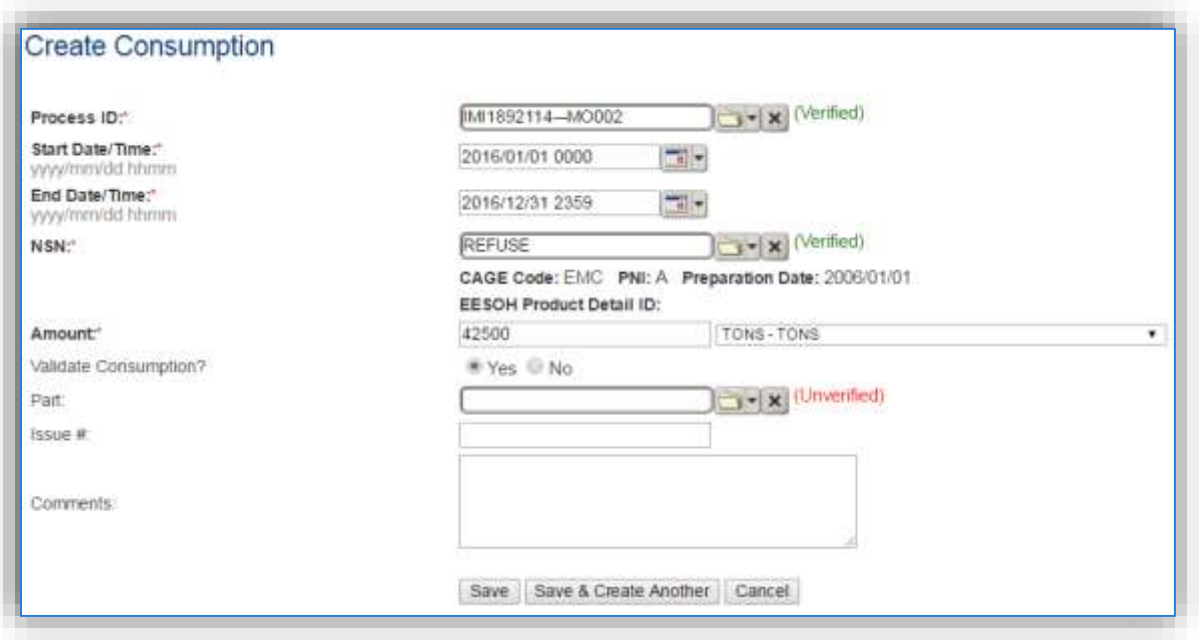
3.17.6.5.1 Usage

The consumption for landfill operations will need to be tracked annually or more frequently if required by a regulatory agency. To correctly document the usage for this emission source the consumption should be entered in the Consumption log.

Navigate to the Consumption module and click the Create Consumption hyperlink.



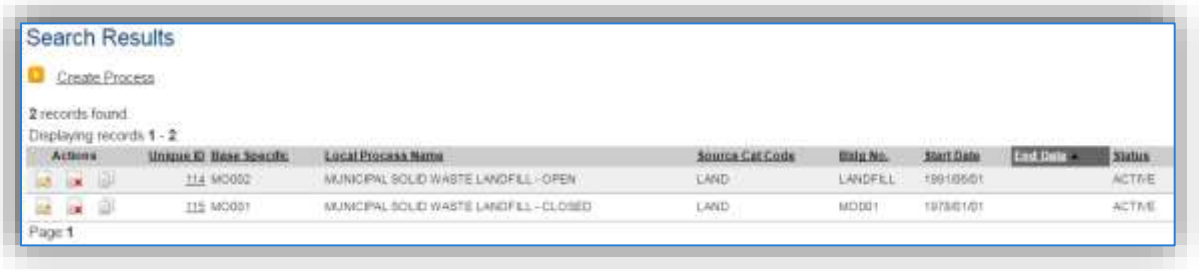
To create a consumption record, click the Create Consumption hyperlink.



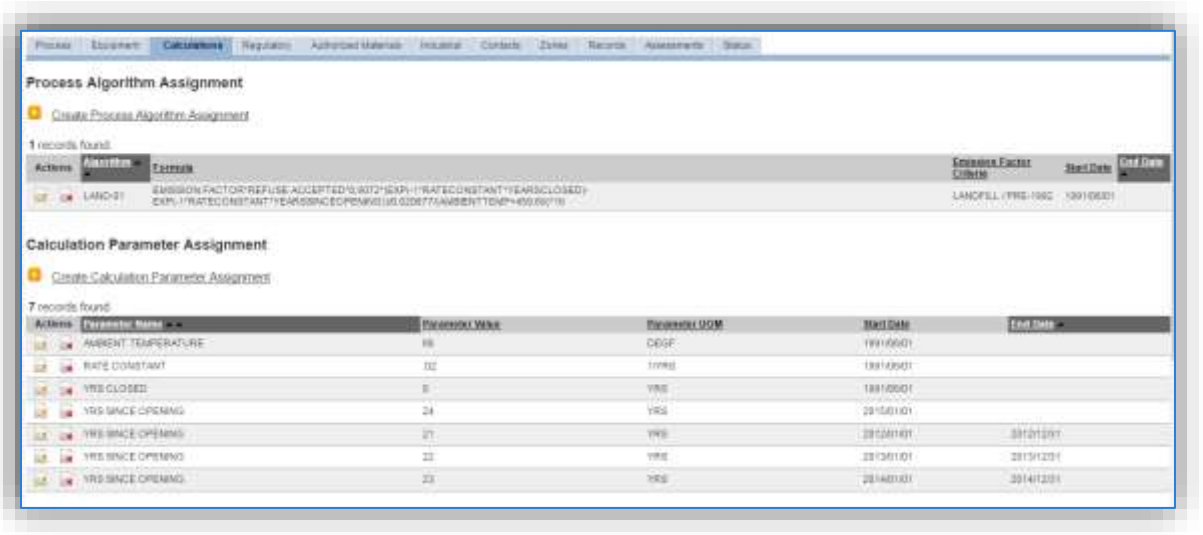
The consumption record should span the entire reporting period or the duration of the activity as shown above. Click the **Save** button to complete the entry.

3.17.6.5.2 Parameters

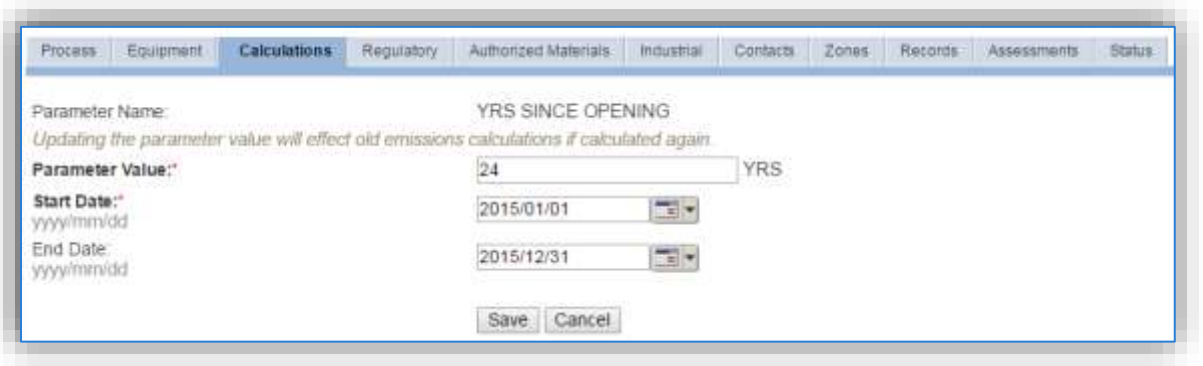
Landfill operations require parameter values to properly complete the emissions calculations. The parameter values are entered into the Unique Process record. Search for the correct record in Unique Process and click the edit icon next to the process.



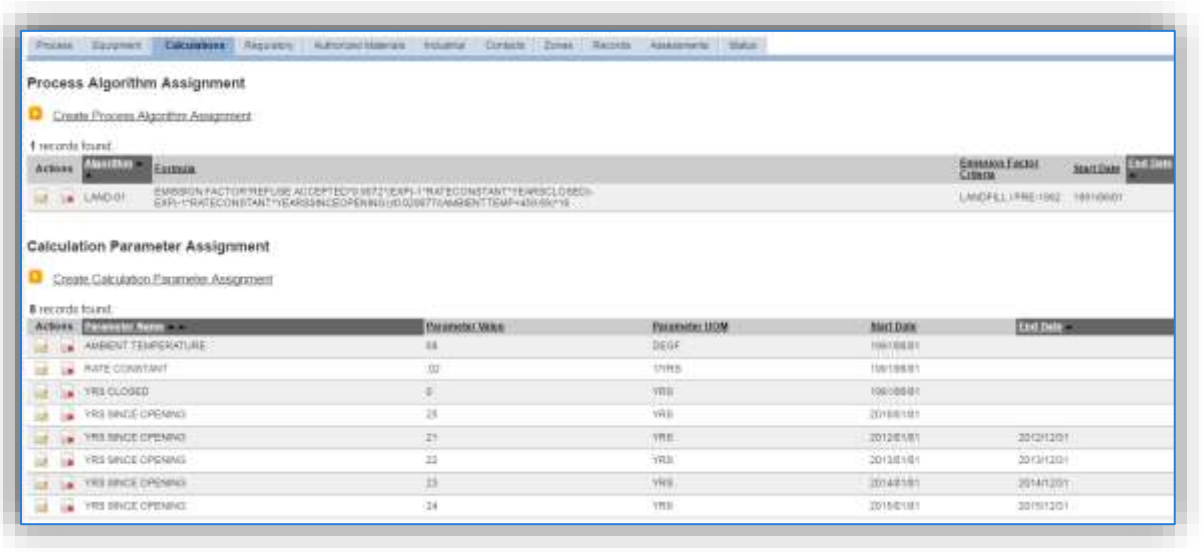
Once in the process record, click the Calculations tab.



For landfills the YRS SINCE OPENING should have multiple parameter records. The parameter for the previous AEI year will need to be end dated. Click the edit icon next to the parameter that needs to be end dated.



Enter the last date of the year, click **Save**. This will allow for the creation of a new YRS SINCE OPENING parameter for the current AEI year.



For active landfills the YRS CLOSED parameter can be used from the previous years as it will be 0 until the landfill closes. If the landfill is closed this parameter will need to be end dated for the previous AEI year and a new parameter entered for the current AEI year using the same process utilized for the YRS SINCE OPENING parameter.

3.17.6.5.3 Emissions Calculation

To correctly calculate emissions this emission source should be included in a **Stationary Source Calculation**. Reference Section 2.7 Emissions Calculations for additional instructions and details.

3.17.7 Munitions (MUN)

3.17.7.1 Source Types

This source category includes both indoor and outdoor firing ranges used for small arms training. Indoor firing ranges are usually exhausted to the atmosphere and are therefore considered stationary point sources.

Indoor Firing Range

Outdoor firing ranges, which are the most common, can be either stationary or mobile depending upon the shooter position. If the shooter always located is at a fixed position the range is considered stationary. However, if the shooter is moving around the range, that would be considered a mobile source and should not be included in calculations.

Outdoor Range - Stationary Source

Outdoor Range - Mobile Source

Munitions and assembled energetic materials are defined as items in which the explosive materials are contained within a metal casing. Munitions include small arms ammunition and HEI cartridges. Emissions are generated when the energetic material within ammunition is detonated. This is caused by both the projectile and primer. This results in the emission of criteria pollutants, GHGs and HAPs.

3.17.7.2 Potential Data Sources

The most common shops that conduct small arms training fall under the following:

- Gun range
- Test and Training Range
- Security Forces
- Munitions Accountability (MUNS)

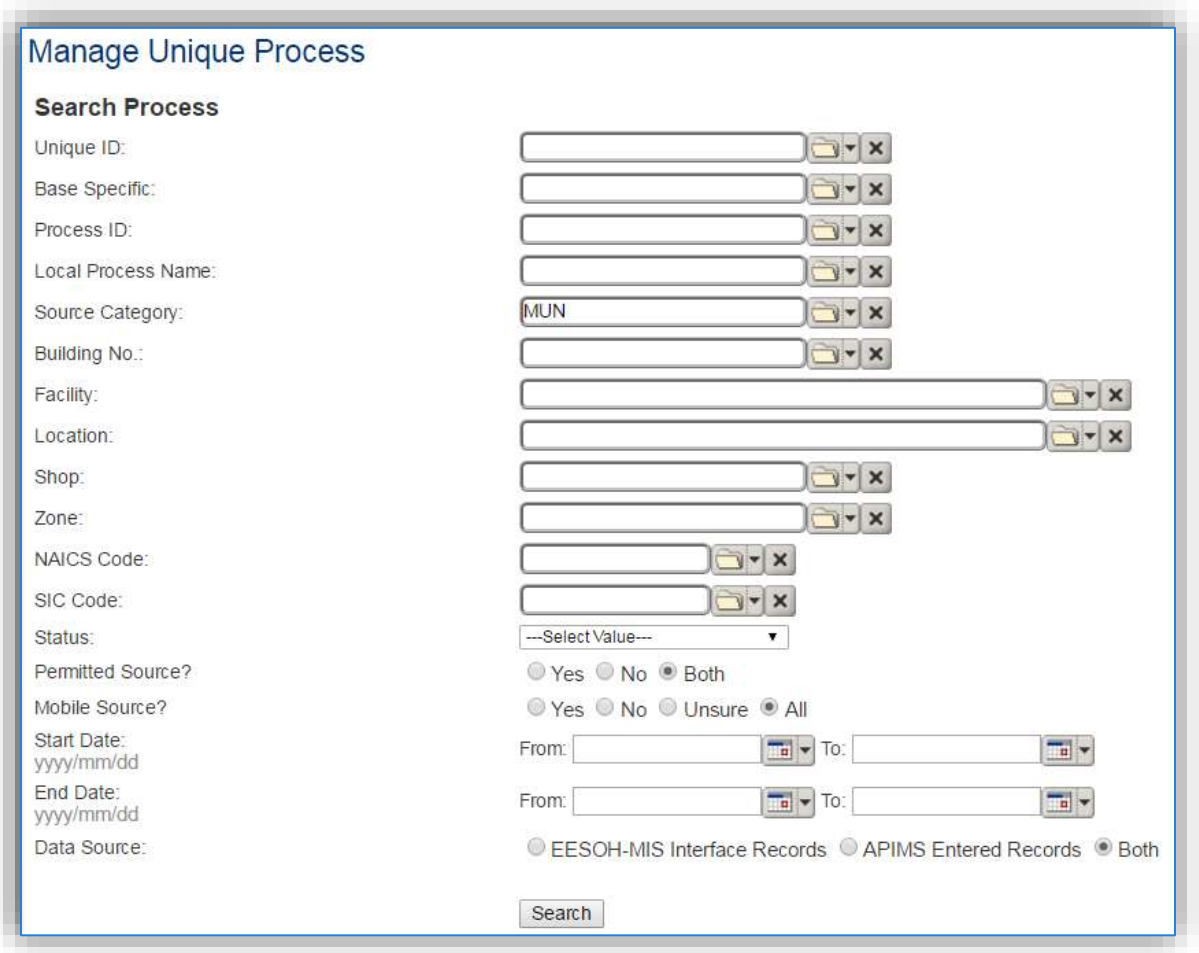
The total number of rounds fired for each type of munition identified by the Department of Defense Identification Code (DODIC) is required to properly calculate emissions. These amounts are usually readily available from the organization conducting the small arms training.

3.17.7.3 Standard Source Identification/Characterization

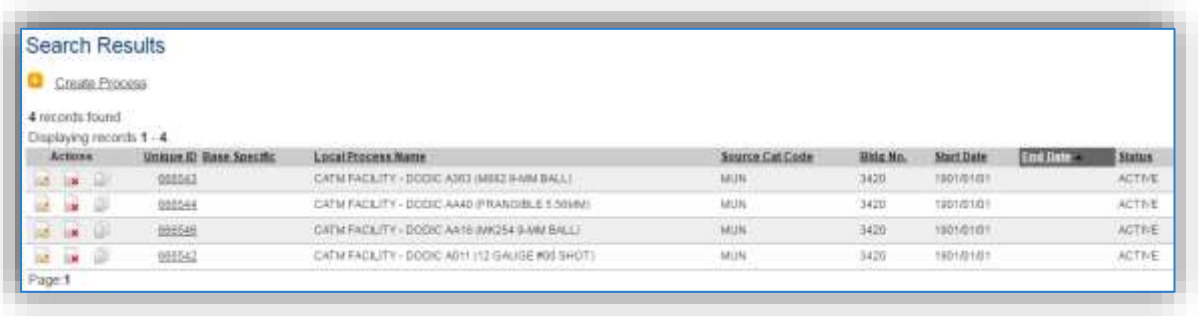
3.17.7.3.1 Existing Sources

It is important to review the existing sources in each source category on an annual basis at a minimum. Most regulatory agencies require an up to date source and equipment inventory.

Navigate to the Unique Process module of APIMS by clicking on **Unique Process** under the **Emission Unit** tab.



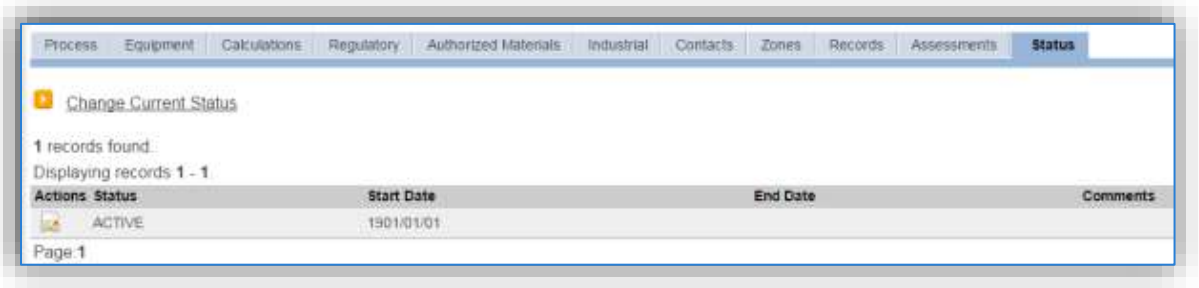
In the **Source Category** search field, type "MUN" then select the row for Munitions from the dropdown results. Click the **Search** button.



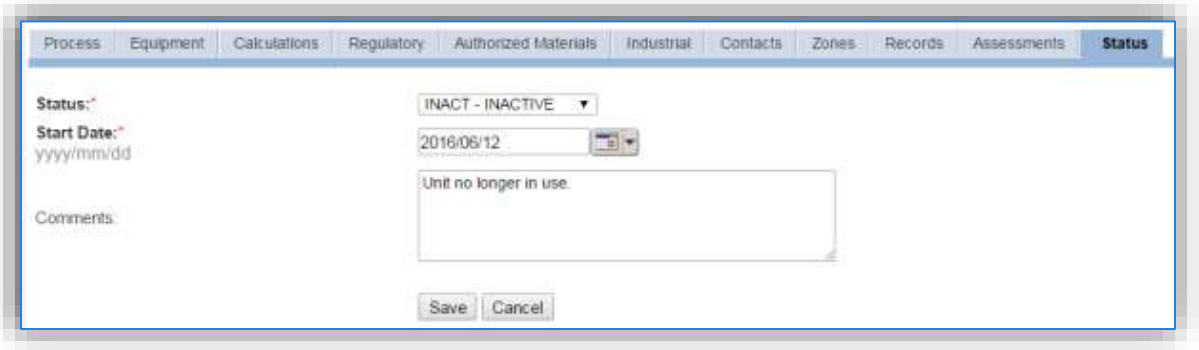
The search results grid will now display all the fire training processes currently in APIMS.

3.17.7.3.1.1 *Status*

If the status of a process needs to be changed, click the edit icon next to the process.



Navigate to the *Status* tab. Click the Change Current Status hyperlink.



Select the appropriate status from the **Status** dropdown (i.e., ACTIVE, REMOVED or INACTIVE).

For the **Start Date** enter the date at which the status changed.

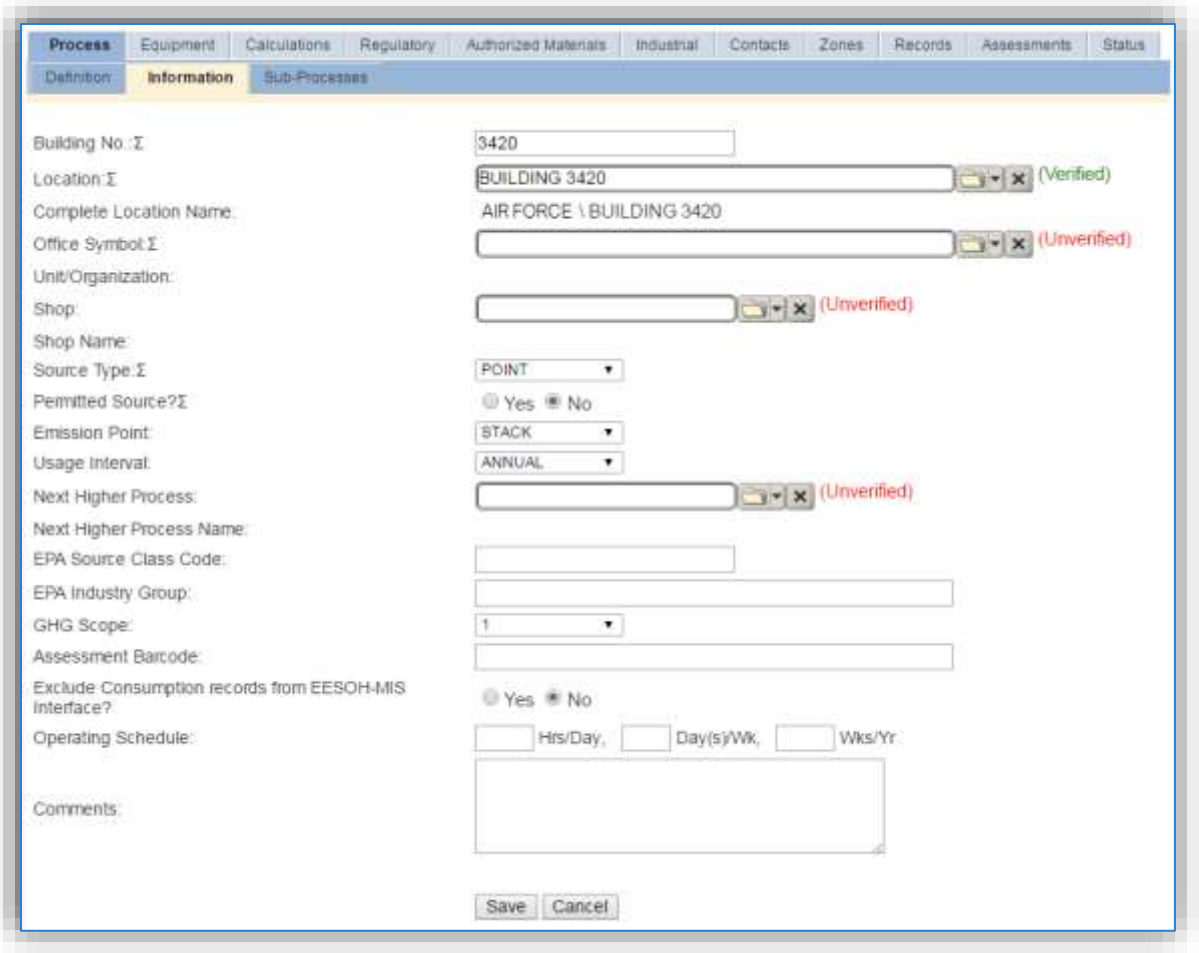
Enter **Comments** that provide insight into why the status changed. These can be very useful for equipment inventories, permit renewals and regulatory reporting. Most regulatory agencies require reporting on unit operation status. This includes any potential time spent offline and reasons for the outage.

Click the **Save** button.

The emissions for a process will only be calculated for the dates the process was in an ACTIVE status. If a source is removed in the middle of a year, the emissions will only be calculated for the part of the year the source was active.

3.17.7.3.1.2 Information

There are basic data elements that are important to track and maintain for new and existing sources, such as location and source type. This data can be maintained in the Unique Process record on the *Information* sub tab.



The **Building No**. field can be used to specify a general location or area of the emission source. For example, EAST SIDE if this is an outdoor firing range.

The **Location** field is very important to effectively manage the location and mission of the emission source. This documents where the source is located, in case it needs to be inspected or if the source owner needs to be contacted for pertinent information. For the instructions on how to create a location reference Section 2.2 Location.

The **Shop** is important as it establishes the personnel that are conducting the training and will be the best source of information regarding the activity.

Small arms training operations are categorized as a POINT source for indoor ranges and a FUGITIVE source for outdoor ranges in the **Source Type**.

Indoor ranges would have an **Emission Point** of STACK and outdoor ranges would be ATMOSPHERE.

The **Permitted Source?** flag should also be populated to accurately reflect the current regulatory status of the emission source. This flag can be an invaluable tool in roll-up reporting.

The **Usage Interval** should be designated. This source is usually documented on an ANNUAL basis but may be a different time interval if it is a permitted source. It is important to populate this field correctly as it will affect how it is documented in the AEI Throughputs module.

3.17.7.3.1.3 Sub-Processes

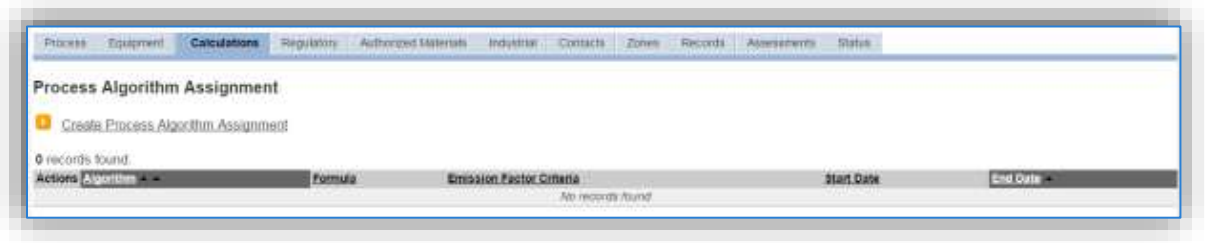
This source does not utilize this functionality.

3.17.7.3.1.4 Equipment

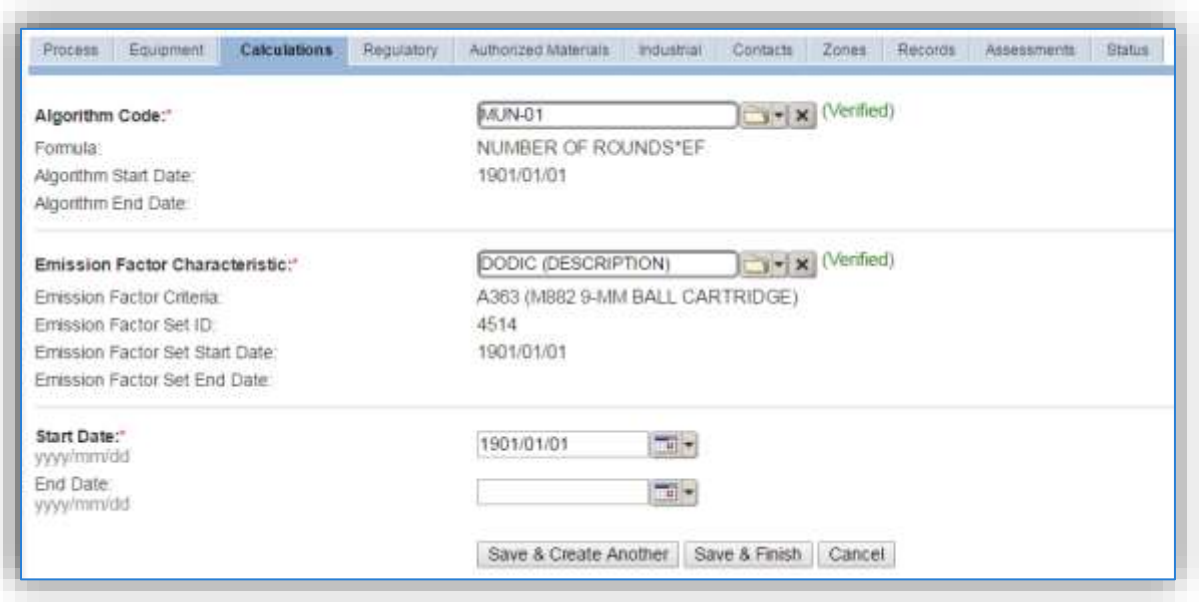
This source does not utilize this functionality.

3.17.7.3.1.5 *Calculations*

The next tab is the *Calculations* tab.

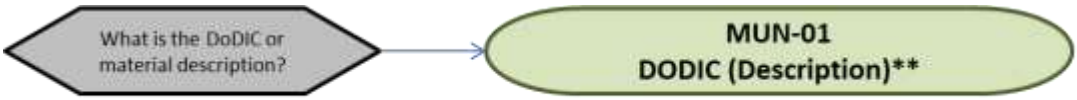


To associate an algorithm to the process, click on the Create Process Algorithm Assignment hyperlink.



Select the **Algorithm Code** MUN-01 from the list of next select the **Emission Factor Characteristic** that matches the DODIC. If the DODIC used does not have an emission factor set in APIMS, contact the munitions personnel to find a surrogate that has an emission factor set that most closely matches the munition used. Enter the **Start Date** to match the start date of the process.

For small arms firing there is only one standard calculation methodology recommended by the Air Force.



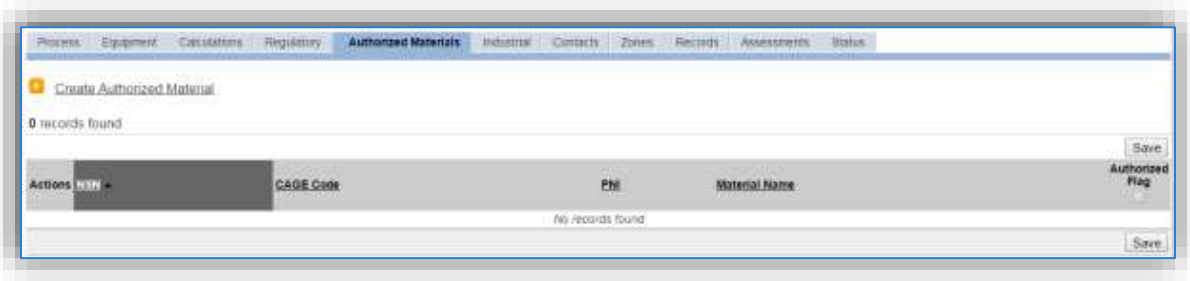
**Each DODIC has it's own specific emission factor set.

Note: If the DoDIC is not listed a surrogate factor may be selected that most closely matches the munition not found. Consult a munitions specialist to determine the best match.

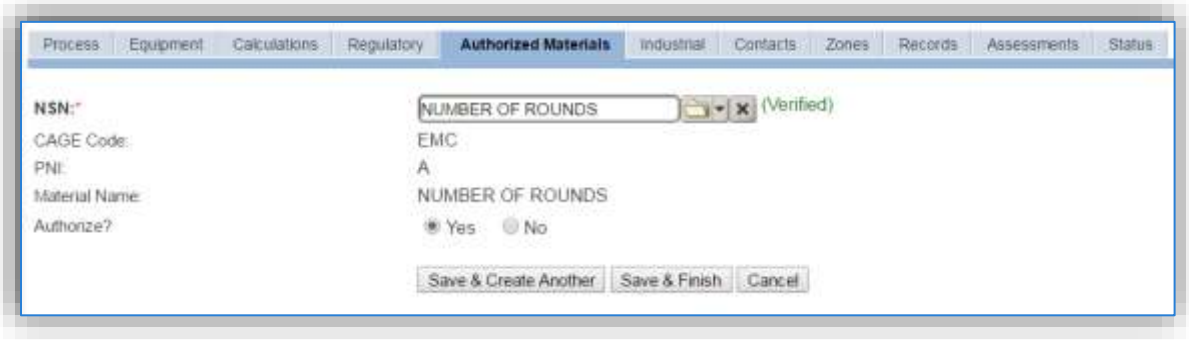
If your permit requires a different type of calculation, contact the Air Force Air Quality Subject Matter Expert for approval of the alternative method.

3.17.7.3.1.6 *Materials*

The last step in setting up the Unique Process record is to add the munition as the authorized material on the *Authorized Materials* tab. For ease of use and to minimize maintenance time it is recommended to create a generic material record for NUMBER OF ROUNDS or MUNITIONS that is associated to all MUN processes. The calculation for munitions does not utilize any material record attributes so a single record will suffice.



To authorize a material for the process, click on the Create Authorized Material hyperlink.



Select the munition record (i.e. NUMBER OF ROUNDS or MUNITIONS etc.) from the list of values. If the munition record is not available, the material record will need to be created. Next select "Yes" to **Authorize** the material, then **Save & Finish**.

3.17.7.3.2 New Sources

3.17.7.3.2.1 Data Collection Sheet

The form on the next page is a printable guide that can be taken out to the location of the source and used to gather all the necessary information from the shop personnel. It can then be used as a guide to help configure the data in APIMS when you return to your office.

Small Arms Firing Data Collection Worksheet

GENERAL INFORMATION

Building Number_____ Mission/Purpose_____

Shop Name/Function_____ Management Organization_____

Coordinates: Latitude: _____ Longitude: _____

UTM: _____ Zone _____ Easting _____ Northing ☐ Feet ☐ Meters

Is this source in any of your permits? ☐ Yes ☐ No

If yes, does it have an emission unit number or other designation? _____

Is the range indoor or outdoor? ☐ Indoor ☐ Outdoor

Are the shooters in a fixed position? ☐ Yes ☐ No

USAGE INFORMATION

DODIC/Description: _____ Total Rounds:_____

DODIC/Description: _____ Total Rounds:_____

DODIC/Description: _____ Total Rounds:_____

DODIC/Description: _____ Total Rounds:_____

DODIC/Description: _____ Total Rounds:_____

DODIC/Description: _____ Total Rounds:_____

DODIC/Description: _____ Total Rounds:_____

DODIC/Description: _____ Total Rounds:_____

DODIC/Description: _____ Total Rounds:_____

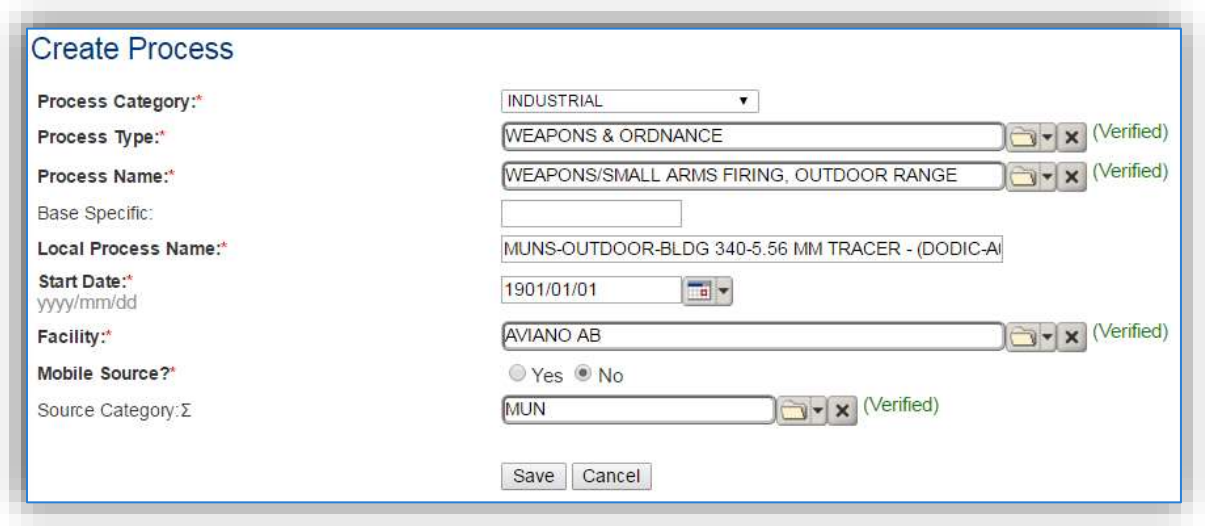
DODIC/Description: _____ Total Rounds:_____

DODIC/Description: _____ Total Rounds:_____

3.17.7.3.2.2 *New Source Configuration*

In order to properly document this emission source in APIMS, there will need to be a Unique Process record for each type of material detonated.

Navigate to the Unique Process module in APIMS and click the Create New Process hyperlink.



Process Category	Process Type	Process Name	Process ID
INDUSTRIAL	PROTECTIVE SERVICES-SECURITY	SMALL ARMS FIRING	IPS1928
INDUSTRIAL	WEAPONS & ORDNANCE	WEAPONS/SMALL ARMS FIRING, INDOOR RANGE	IWP2114
INDUSTRIAL	WEAPONS & ORDNANCE	WEAPONS/SMALL ARMS FIRING, NOC	IWP2115
INDUSTRIAL	WEAPONS & ORDNANCE	WEAPONS/SMALL ARMS FIRING, OUTDOOR RANGE	IWP2116

Use the table above to determine the appropriate **Process Category**, **Process Type** and **Process Name**.

The **Base Specific** field can be used to enter a standard convention identifier that will best help identify the source. If the source is permitted, enter the emission unit ID as designated in the permit.

The **Local Process Name** should be in a standard naming convention for all sources that helps to quickly identify, what the process is, where it is and any other unique attribute. For example, MUN – CARTRIDGE 12 GAUGE MK275 or MUN, INDOOR, BLDG 1200, M6 ELECTRIC BLASTING CAPS, DODIC-M130.

The **Start Date** should be the date the source became operational, if this date is not known, enter 1901/01/01 as a default start date.

The **Facility** should be the facility name that is responsible for the source.

The **Mobile Source?** flag should be "NO" for all ranges that are indoor or are outdoor with fixed shooter positions as these are considered stationary sources. Outdoor ranges that do not have fixed shooter positions are considered mobile sources and should not be included in calculations.

All small arms firing activities are assigned to the MUN **Source Category**.

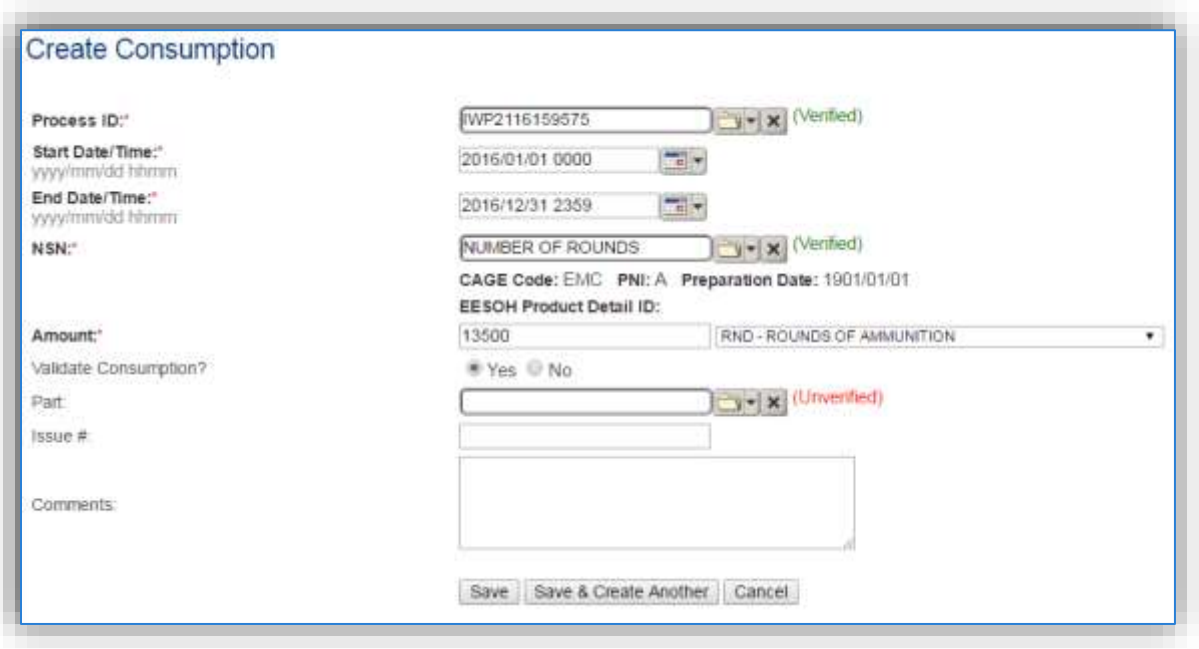
For the population of all other tabs, refer to the Existing Sources sections.

3.17.7.4 Year-to-Year Maintenance

3.17.7.4.1 Usage

The usage for small arms firing sources will need to be tracked annually or more frequently if required by a regulatory agency. To correctly document the annual usage for this emission source the consumption should be entered in the Consumption log.

Navigate to the Consumption module and click the Create Consumption hyperlink.



The consumption record should span the entire reporting period as shown above. The material should be the NUMBER OF ROUNDS or other generic material record and the amount should be the total rounds of ammunition. Make sure to select "Yes" to validate the consumption. If the consumption is not validated it will not be included in the emissions calculation.

3.17.7.4.2 Emissions Calculations

To correctly calculate emissions, this emission source should only include **Stationary Source Calculations** as described above.

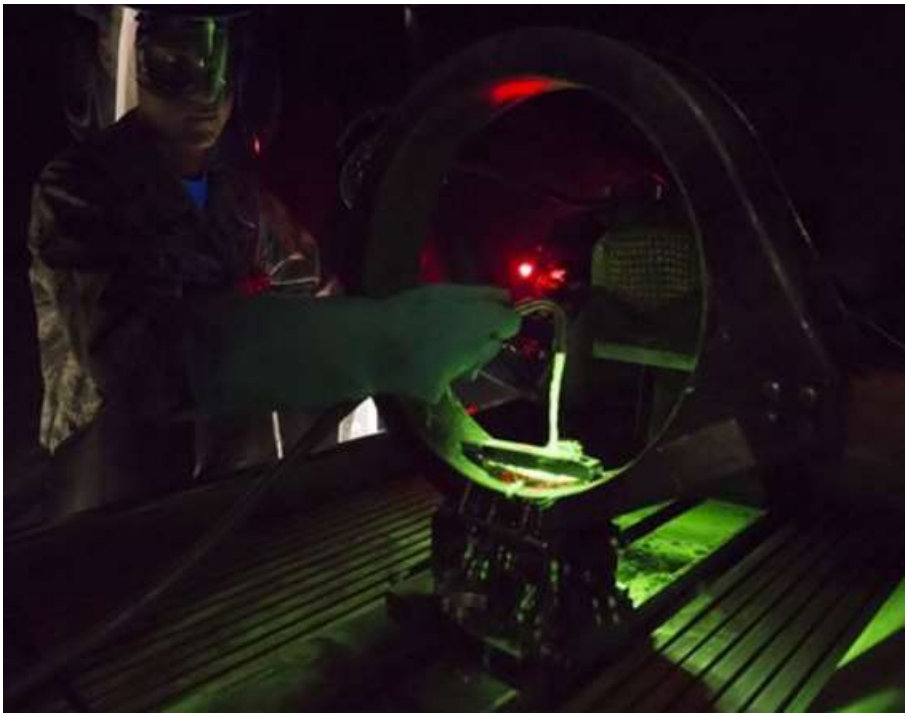
3.17.8 Nondestructive Inspection (NDI)

3.17.8.1 Source Types

Air Force installations with aircraft maintenance operations typically have a Non-Destructive Inspection (NDI) shop where metal parts are inspected for cracks, fractures, and other flaws. NDI shops use a variety of chemicals to inspect and clean metal parts such as inspection penetrants, penetrant removers, penetrant developers, alcohol cleaners (e.g., isopropyl, denatured ethanol, methanol), and other cleaning compounds. NDI is calculated the same way as miscellaneous chemical use and is often accounted for under the CHEM source category, however if the processes need to be separated for regulatory purposes or other tracking purposes this source category can be used.

Generally, there are two methods used at NDI shops to inspect and clean mechanical parts. The first method involves placing chemicals into a tank in which the parts to be inspected are submerged/soaked. These chemicals are periodically replaced as they become dirty or no longer meet specifications. Any waste chemicals are collected and sent off-site for disposal. Pollutants are emitted as the chemicals vaporize when loaded into the tank, during use within the tank, and as they evaporate off the parts removed from the tank. To quantify these emissions, the volume of chemical removed from the tank during the year may be subtracted from the volume of chemical added to the tank during the year. This difference is assumed to completely evaporate into the air. The resultant emissions are a function of the volume evaporated and the density of the chemical.

The second method involves the application of chemicals onto parts with the use of a spray can or bottle. Emissions from this technique are conservatively estimated by assuming the entire amount of chemical applied is emitted to the atmosphere. To calculate the emissions of a particular pollutant for the spraying method, the volume of chemical used is multiplied by its density and the weight percent of the pollutant in the chemical.



3.17.8.2 Potential Data Sources

NDI chemicals are considered hazardous materials and are typically procured in one of two ways. The first is to have an independent contractor that services the various inspection tanks on base. The contractor usually comes and collects the waste solvent and refills the tank with new chemicals to the level required. A report that documents the amount of chemical added and amount of chemical removed as hazardous waste. The other way chemicals are procured is through the Hazardous Materials Management System (EESOH-MIS). It is important to work with the Hazardous Materials Management personnel to configure the processes and material authorizations to separate the non-destructive inspection chemicals from other material and activities. The data required for NDI processes is the net loss of chemical; this is the amount of new chemicals added minus the amount of waste collected or the total amount used. The specific chemical used and the SDS for the chemical that should include the following information:

- Product Name
- Density
- Ingredient Name and % by weight
- VOC content

For all usage information that is imported from EESOH-MIS there should also be material records that contain most if not all the required information. For manually entered usage, the Safety Data Sheets will need to be obtained. Most shops maintain Hazard Communication folders that contain all the Safety Data Sheets for materials used. If the Safety Data Sheets are not available in the shop, most are available on manufacturer websites.

The most common shop that has NDI operations is:

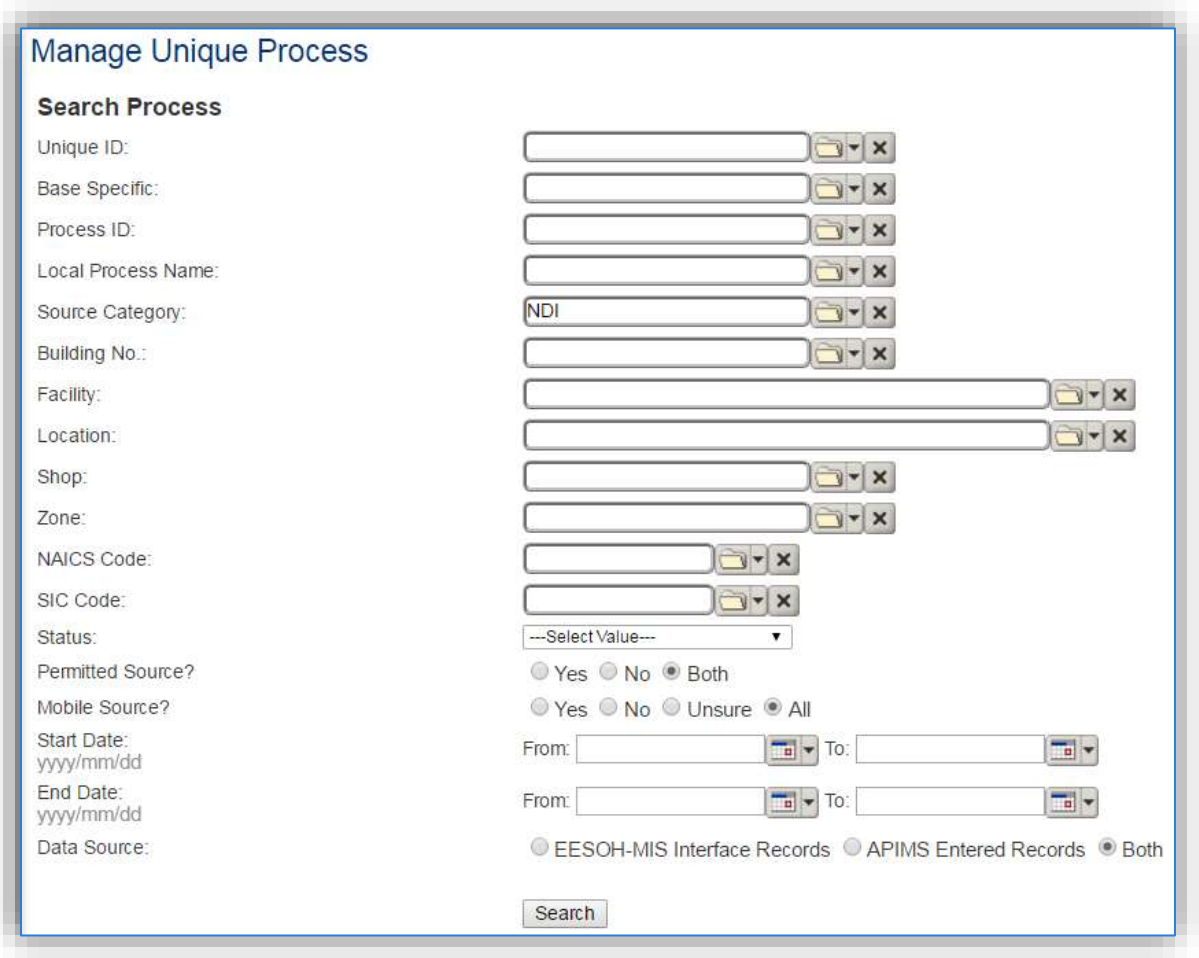
- Maintenance Squadron Fabrication Flight (MXMF)

3.17.8.3 Standard Source Identification/Characterization

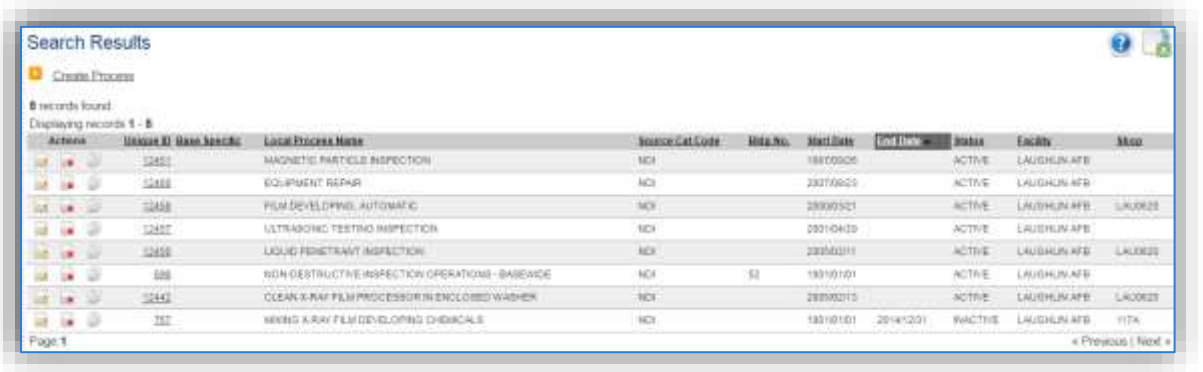
3.17.8.3.1 Existing Sources

It is important to review the existing sources in each source category on an annual basis at a minimum. Most regulatory agencies require an up to date source and equipment inventory.

Navigate to the Unique Process module of APIMS by clicking on **Unique Process** under the **Emission Unit** tab.



In the **Source Category** search field, type "NDI" then select the row for NONDESTRUCTIVE INSPECTION from the dropdown results. Click the **Search** button.

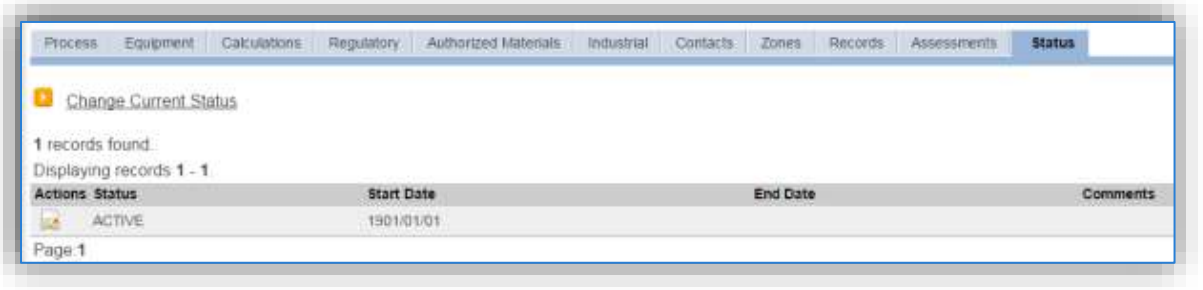


The search results grid will now display all the nondestructive inspection processes currently in APIMS. This may include processes created by the EESOH-MIS interface and APIMS created processes including a roll up Next Higher Process. To further filter out the EESOH-MIS processes, use the radio button next to APIMS Entered Records on the Data Source field in the Search criteria. This will then only display the APIMS created processes.

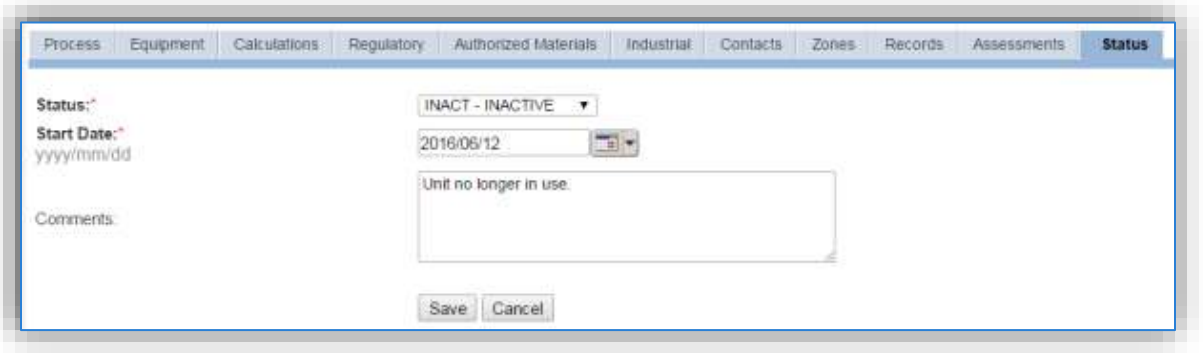
3.17.8.3.2 Status

If the status of a process needs to be changed, click the edit icon next to the process.

If this is a process that was entered into APIMS via the EESOH-MIS interface, the process status must be altered in EESOH-MIS.



Navigate to the *Status* tab. Click the Change Current Status hyperlink.



Select the appropriate status from the **Status** dropdown (i.e., ACTIVE, REMOVED or INACTIVE).

For the **Start Date** enter the date at which the status changed.

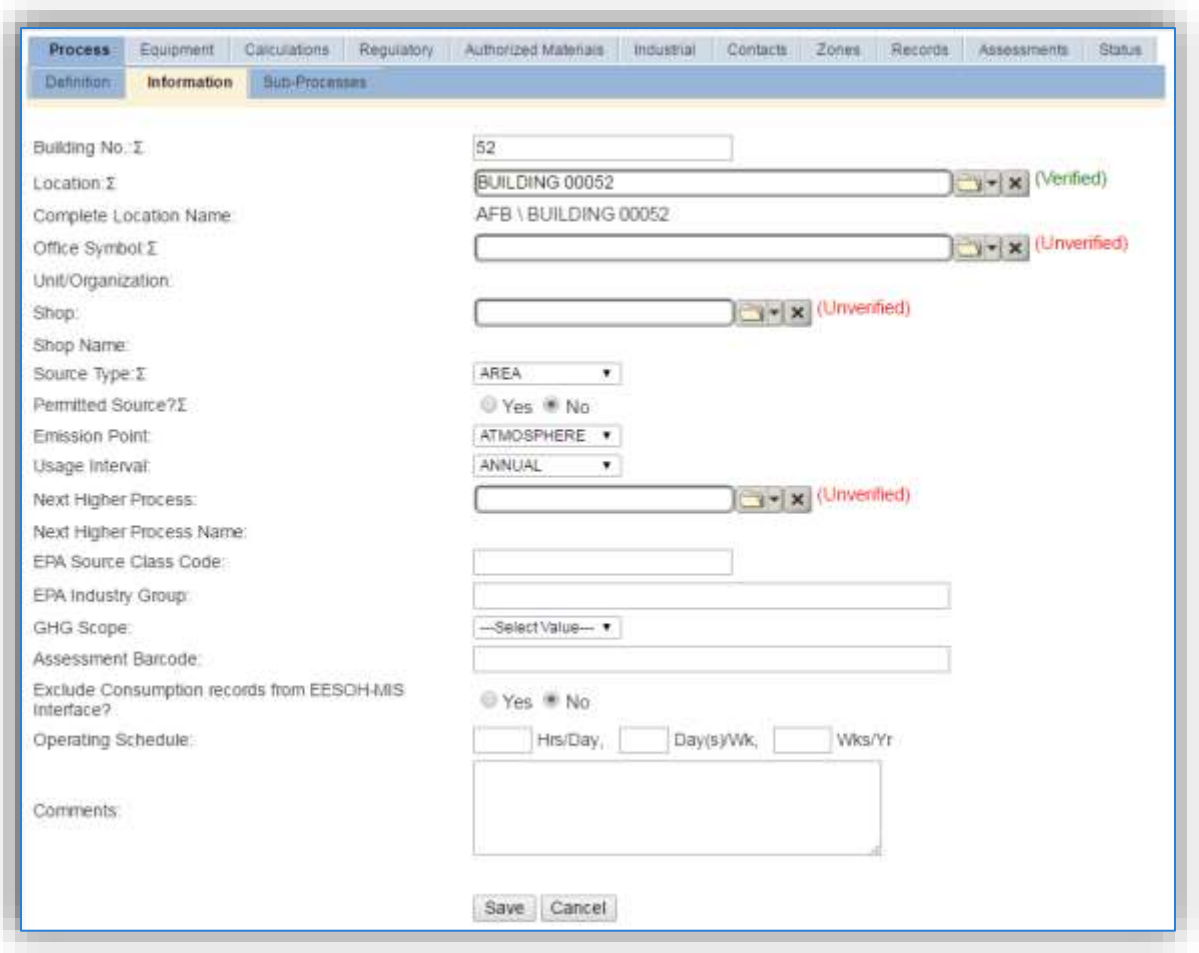
Enter **Comments** that provide insight into why the status changed. These can be very useful for equipment inventories, permit renewals and regulatory reporting. Most regulatory agencies require reporting on unit operation status; this includes any potential time spent offline and reasons for the outage.

Click the **Save** button.

The emissions for a process will only be calculated for the dates the process was in an ACTIVE status. If a source is removed in the middle of a year, the emissions will only be calculated for the part of the year the source was active.

3.17.8.3.3 Information

There are basic data elements that are important to track and maintain for new and existing sources, such as location and source type. This data can be maintained in the Unique Process record on the *Information* sub tab.



The **Building No**. field can be used to specify a general location or area of the emission source, for example, EAST SIDE.

The **Location** field is very important to effectively manage the location and mission of the emission source. This documents where the source is located, in case it needs to be inspected or if the source owner needs to be contacted for pertinent information. For the instructions on how to create a location reference Section 2.2 Location.

The **Shop** is important as it establishes the personnel that are utilizing the equipment on a regular basis and will be the best source of information regarding the unit. This field is not applicable to basewide next higher processes.

Nondestructive inspection operations should be designated as an AREA in the **Source Type** field.

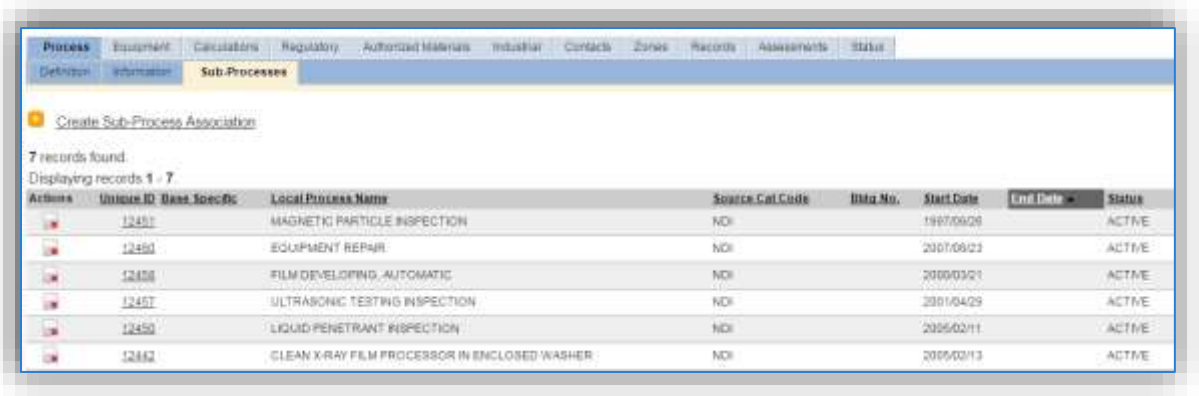
The **Emission Point** should be ATMOSPHERE for all operations.

The **Permitted Source?** flag should also be populated to accurately reflect the current regulatory status of the emission source. This flag can be an invaluable tool in roll-up reporting.

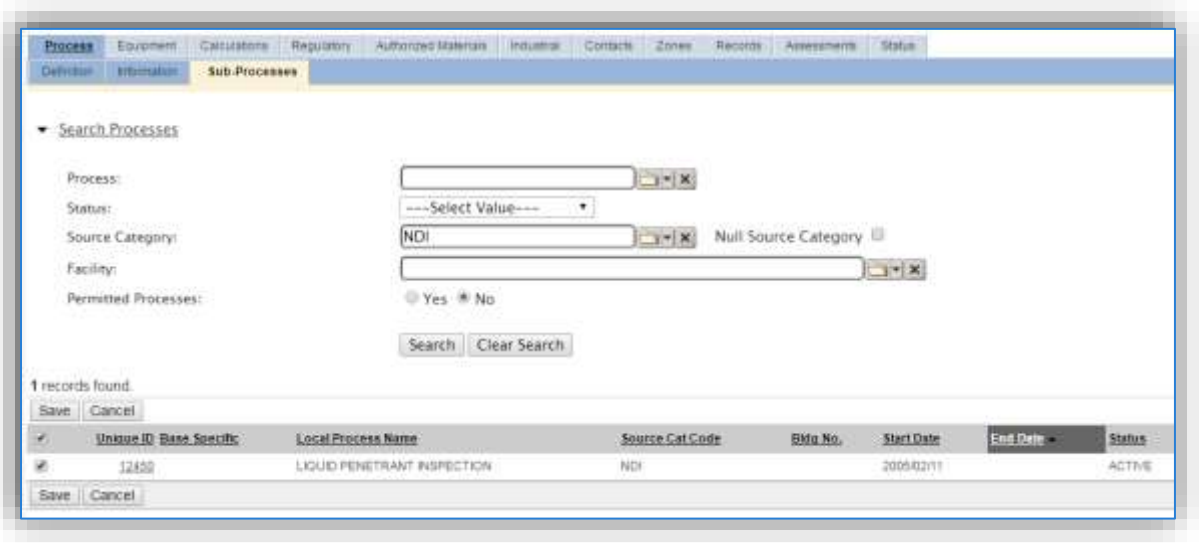
The **Usage Interval** should be designated. This source is usually documented on an ANNUAL basis unless specified differently by a regulatory requirement. It is important to populate this field correctly as it will affect how it is documented in the AEI Throughputs module.

3.17.8.3.4 Sub-Processes

For Next Higher Process configuration, navigate to the *Sub-Processes* sub tab.



This sub tab is used to specify which processes should have their consumption rolled up to this next higher process. To add a process or processes, click the Create Sub-Process Association hyperlink.



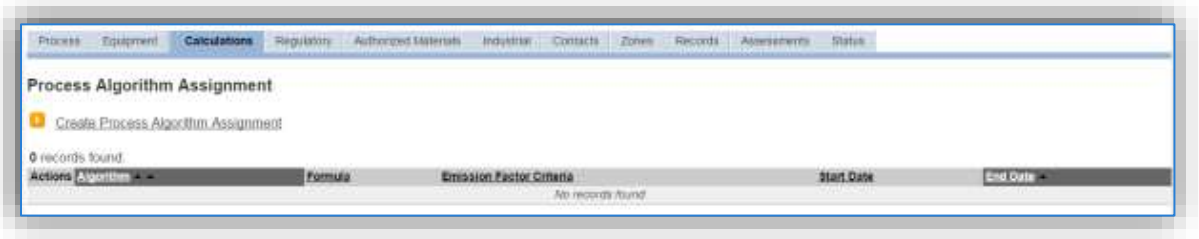
Use the Search Processes fields to refine the search to find only the NDI processes. Select the checkbox next to the appropriate process(es), then click the **Save** button.

3.17.8.3.5 Equipment

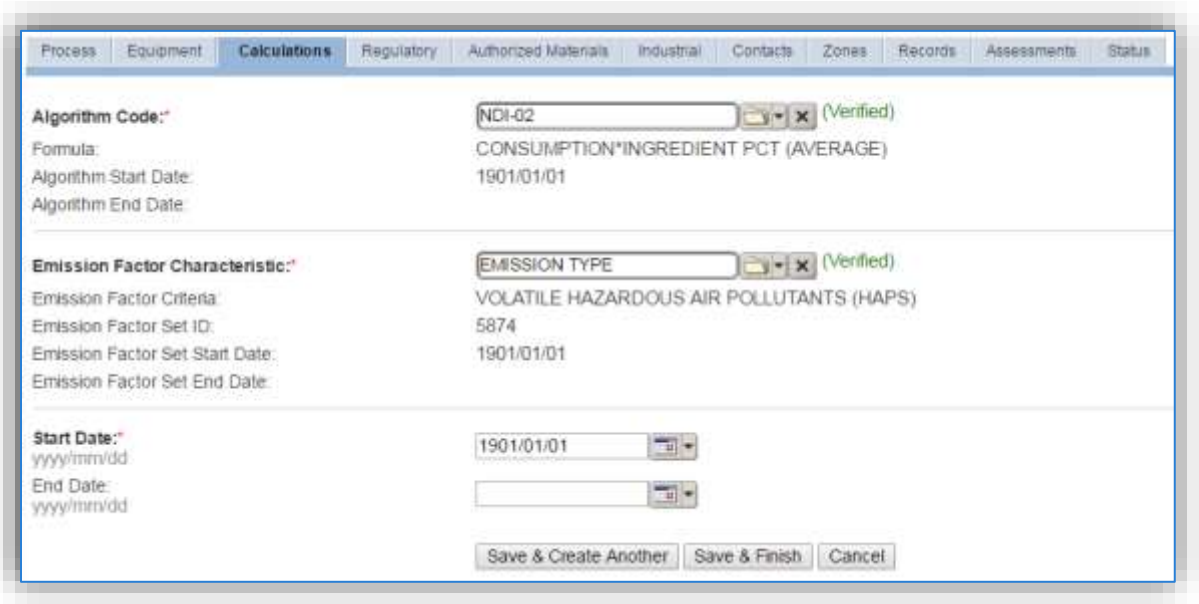
This source does not utilize this functionality.

3.17.8.3.6 Calculations

The next tab is the *Calculations* tab.



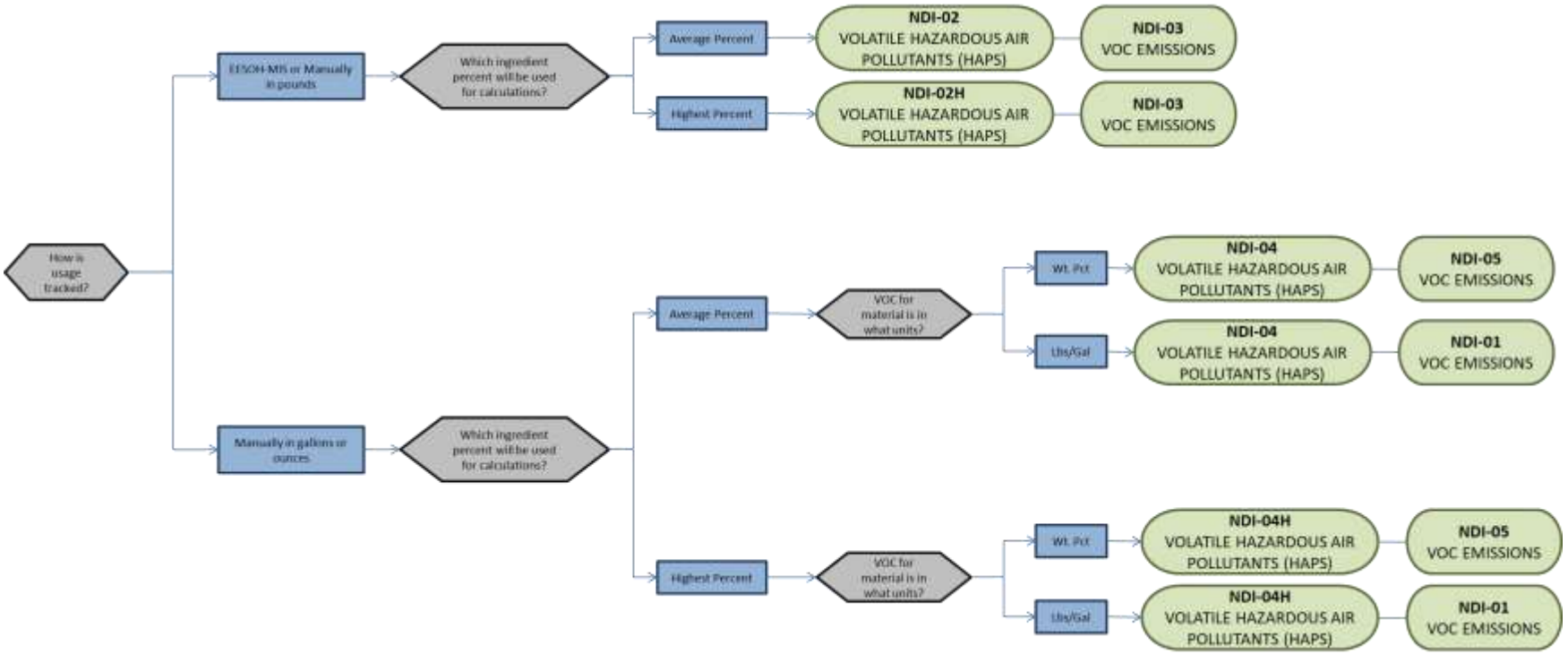
To associate an algorithm to the process, click on the Create Process Algorithm Assignment hyperlink.



Select the **Algorithm Codes** from the list of values that matches the correct scenario. Next select the **Emission Factor Characteristic** available. Enter the **Start Date** to match the start date of the process. Click the **Save & Create Another** button to associate another algorithm or click **Save & Finish** button to save and return to the Calculations tab.

NDI emission calculations utilize the material VOC and a mass balance based on the ingredients in the material used for the NDI. Therefore, TWO algorithms need to be associated to each NDI process.

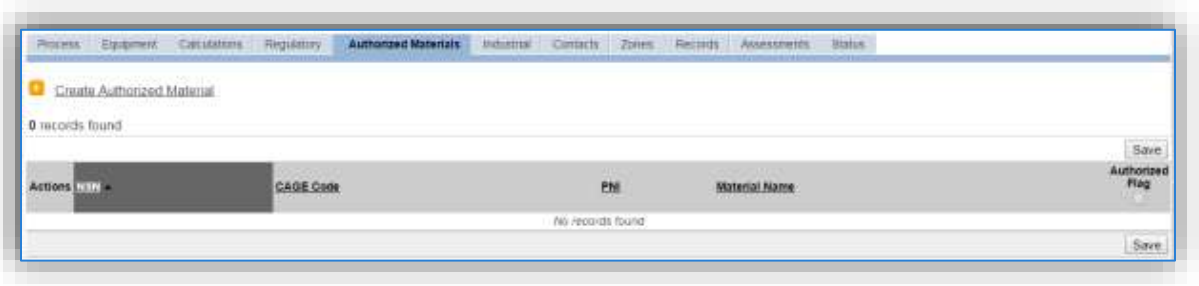
Use the flowchart below to find the correct Algorithm Code and Emission Factor Set.



If your permit requires a different type of calculation, contact the Air Force Air Quality Subject Matter Expert for approval of the alternative method.

3.17.8.3.7 Materials

The last step in setting up the Unique Process record is to authorize the materials on the *Authorized Materials* tab. This step is only required for processes that use manual logs to track usage in APIMS. All processes that use the consumption data from EESOH-MIS are configured at the sub-process level by the interface.



To authorize a material for the process, click on the Create Authorized Material hyperlink.

Select the material record from the list of values, using the **NSN** or Material Name. If the material is not available, the material record will need to be created. Next select "Yes" to **Authorize** the material, then **Save & Finish** or **Save & Create Another**. Repeat this step for all materials used by the process.

3.17.8.4 New Sources

3.17.8.4.1 Data Collection Sheet

The form on the next page is a printable guide that can be taken out to the location of the source and used to gather all the necessary information from the shop personnel. It can then be used as a guide to help configure the data in APIMS when you return to your office.

Nondestructive Inspection Data Collection Worksheet

GENERAL INFORMATION

Building Number_____ Mission/Purpose_____
Shop Name/Function_____ Management Organization_____
Coordinates: Latitude: _____ Longitude: _____
UTM: _____ Zone _____ Easting _____ Northing ☐ Feet ☐ Meters
Is this source in any of your permits? ☐ Yes ☐ No
If yes, does it have an emission unit number or other designation? _____

USAGE INFORMATION

Are the inspection chemicals purchased through EESOH-MIS? ☐ Yes ☐ No

If Yes, specify the shop and process designation in EESOH-MIS
Shop Code _____ Process Code/Name _____

If No, collect the following information.

Material Name _____
Amount Used _____ ☐ Lbs ☐ Gal
Frequency_____

Do they have Safety Data Sheets for the materials used? ☐ Yes ☐ No
If yes, collect copies.
If no, collect the name and manufacturer of the product. This can be used to contact the manufacturer to obtain a Safety Data Sheet.

What method is used for inspection? ☐ Immersion ☐ Spray/Pour

If immersion, collect the following: Total Amount Added _____ gal
Total Waste Collected _____ gal

If spray/pour, do you have usage records? ☐ Yes ☐ No
If yes, collect the usage records.

If no, ask the shop personnel to estimate how often they conduct inspections and how much is used each time?

Frequency _____

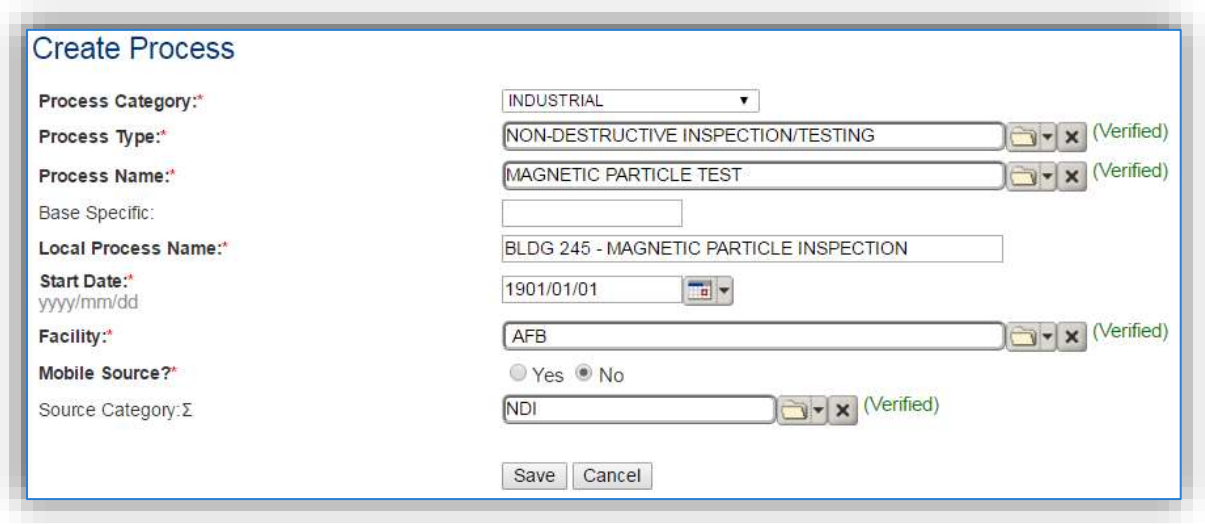
Amount used _____

3.17.8.4.2 New Source Configuration

In order to properly document this emission source in APIMS, there will need to be at least one Unique Process record. If the EESOH-MIS processes are configured correctly to have nondestructive inspection chemicals separated from other chemicals, a next higher process needs to be configured. If the data is not configured that way, then a nondestructive inspection process needs to be configured for each shop that conducts nondestructive inspection applications or a single process that tracks all nondestructive inspection applications basewide for manual APIMS tracking.

3.17.8.4.2.1 *Shop Specific Process Configuration*

Navigate to the Unique Process module in APIMS and click the Create New Process hyperlink.



Process Category	Process Type	Process Name	Process ID
INDUSTRIAL	NON-DESTRUCTIVE INSPECTION/TESTING	LIQUID PENETRANT TEST	IND1620
INDUSTRIAL	NON-DESTRUCTIVE INSPECTION/TESTING	MAGNETIC PARTICLE TEST	IND1633
INDUSTRIAL	NON-DESTRUCTIVE INSPECTION/TESTING	MULTIPLE OPERATIONS	IND1710
INDUSTRIAL	NON-DESTRUCTIVE INSPECTION/TESTING	RADIOGRAPHY	IND1846
INDUSTRIAL	NON-DESTRUCTIVE INSPECTION/TESTING	ULTRASONIC TEST	IND2069
INDUSTRIAL	NON-DESTRUCTIVE INSPECTION/TESTING	VISUAL INSPECTION	IND2093

Use the values provided in the table above to enter the **Process Category**, **Process Type** and **Process Name**.

The **Base Specific** field can be used to enter a standard convention identifier that will best help identify the source. If the source is permitted, enter the emission unit ID as designated in the permit.

The **Local Process Name** should be in a standard naming convention for all sources that helps to quickly identify, what the process is, where it is and any other unique attribute. For example, BLDG 336 –LIQUID PENETRANT INSPECTION.

The **Start Date** should be the date the unit became operational, if this date is not known, enter 1901/01/01 as a default start date.

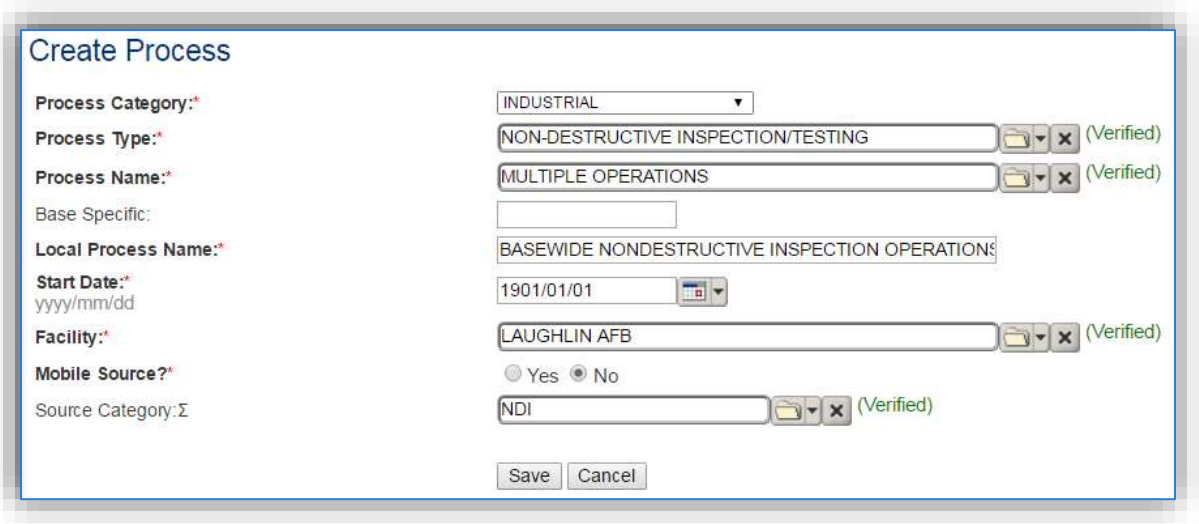
The **Facility** should be the facility name that is responsible for the source or sources.

The **Mobile Source?** flag should be "NO" as this is considered as stationary source.

All nondestructive inspection activities are assigned to the NDI **Source Category**.

3.17.8.4.2.2 *Next Higher Process Configuration*

Navigate to the Unique Process module in APIMS and click the Create New Process hyperlink.



Process Category	Process Type	Process Name	Process ID
INDUSTRIAL	NON-DESTRUCTIVE INSPECTION/TESTING	MULTIPLE OPERATIONS	IPC1710

Use the values provided in the table above to enter the **Process Category**, **Process Type** and **Process Name**.

The **Base Specific** field can be used to enter a standard convention identifier that will best help identify the source. If the source is permitted, enter the emission unit ID as designated in the permit.

The **Local Process Name** should be in a standard naming convention for all sources that helps to quickly identify what the process is for example, BASEWIDE NONDESTRUCTIVE INSPECTION OPERATIONS.

The **Start Date** should be the date the unit became operational, if this date is not known, enter 1901/01/01 as a default start date.

The **Facility Name** should be the facility that is responsible for the source or sources.

The **Mobile Source?** flag should be "NO" as this is considered as stationary source.

All pesticide activities are assigned to the NDI **Source Category**.

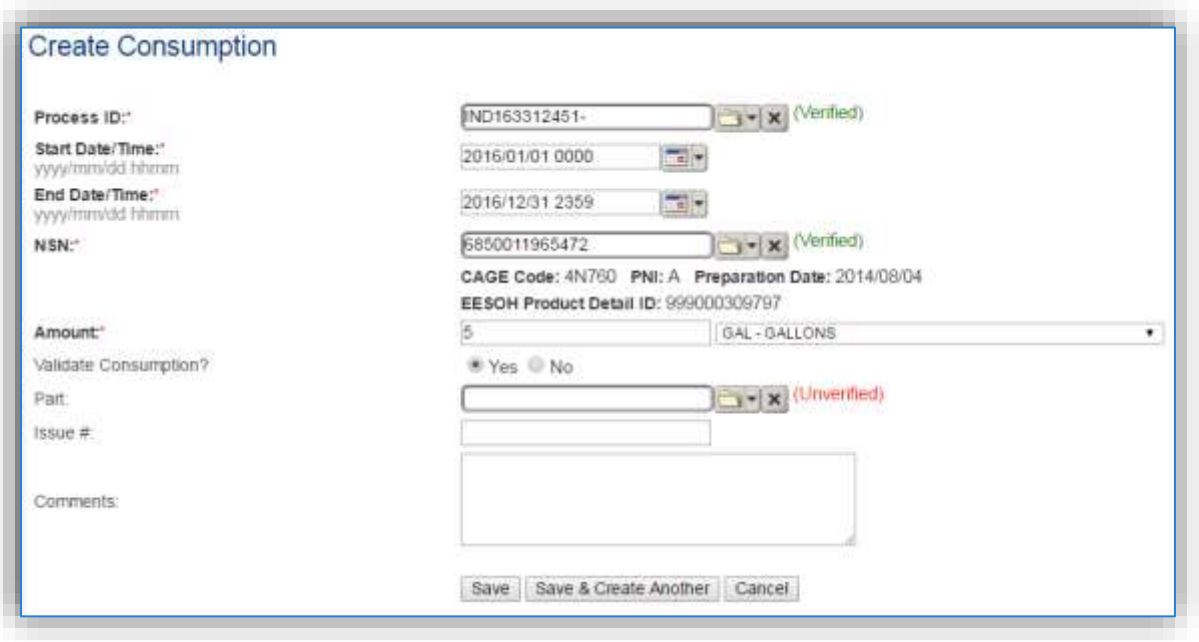
3.17.8.5 Year-to-Year Maintenance

3.17.8.5.1 Usage

3.17.8.5.1.1 Shop Specific Process Configuration

The consumption for NDI emissions usually needs to be tracked annually or as required by a regulatory agency. To correctly document the usage for this emission source the consumption should be entered in the Consumption log.

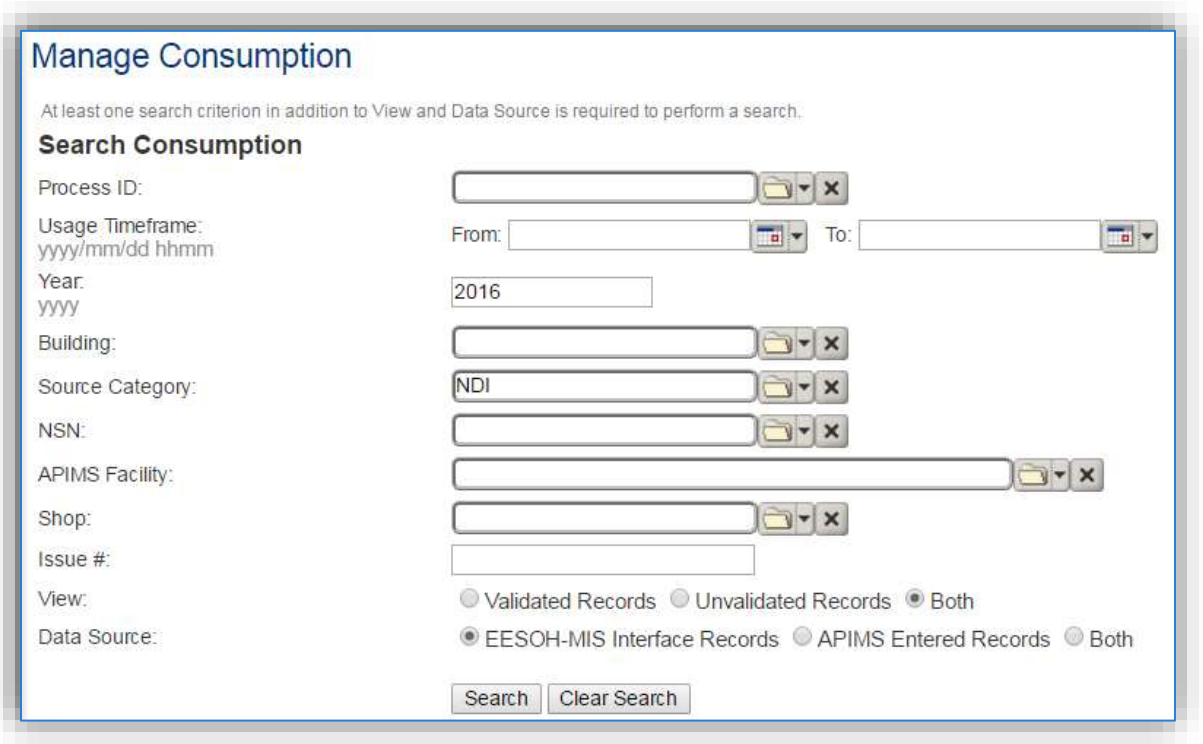
Navigate to the Consumption module and click the Create Consumption hyperlink.



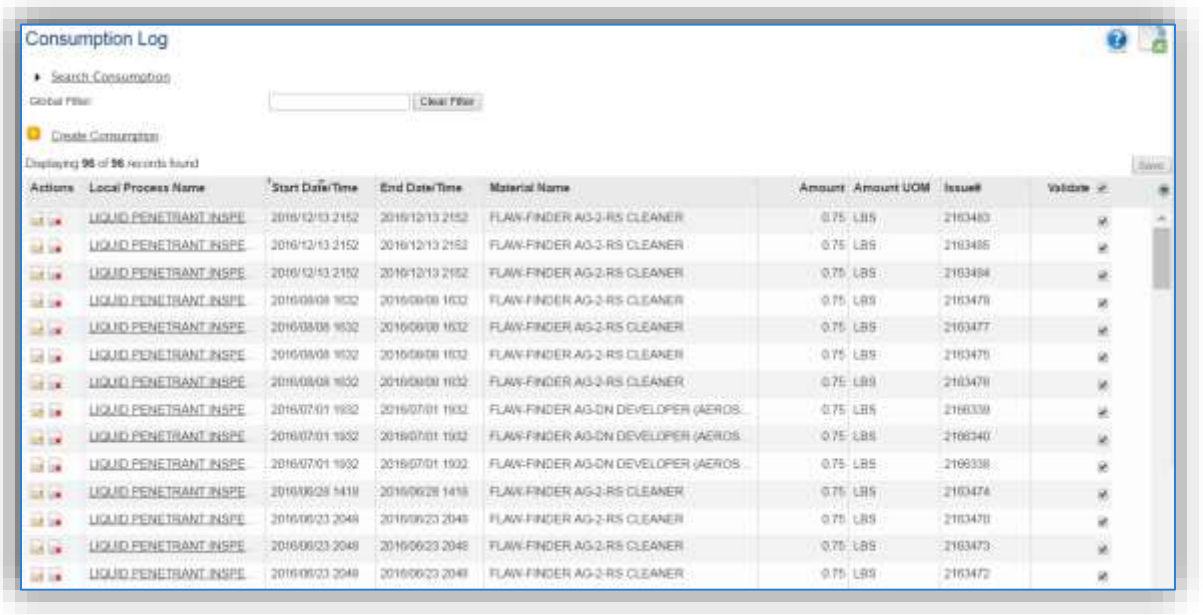
The consumption record should span the entire reporting period as shown above. The **Amount** should be recorded according to the algorithms selected. Make sure to select "Yes" to **Validate Consumption**. If the consumption is not validated it will not be included in the emissions calculation. Repeat this step for all the different materials used during the reporting period.

3.17.8.5.1.2 Next Higher Process Configuration

The consumption for NDI emissions usually needs to be tracked annually or as required by a regulatory agency. For the Next Higher Process configuration, the consumption is imported from the EESOH-MIS interface with each interface run, however it is not validated. The consumption must be validated in the Consumption log.



Use the search criteria to narrow the search results. It is suggested to use the Source Category, Data Source and Year or Usage Timeframe to filter the results.



Check the checkbox next to each material then click **Save** to validate the consumption. Only consumption that is validated will be included in emissions calculations. The simplest use case for validating rows is to start by checking the top box in the grid to validate all rows present. After all boxes are checked, click **Save**.

3.17.8.6 Emissions Calculation

If the process utilizes EESOH-MIS data then it should be included in the **EESOH-MIS Calculation**, otherwise this emission source should be included in a **Stationary Source Calculation** that calculates controlled emissions. Reference Section 2.7 Emissions Calculations for additional instructions and details.

3.17.9 Ozone Depleting Chemicals (ODC)

3.17.9.1 Source Types

Ozone Depleting Chemicals (ODCs) are reactive substances that cause depletion of the stratospheric ozone layer within the atmosphere. ODCs are categorized as being either Class I or Class II based on their ozone depleting potential (ODP) value. The ODP is the ratio of the impact on ozone of a chemical compared to the impact of a similar mass of CFC-11. Class I substances are those ODCs that have an ODP of 0.2 or higher and include chlorofluorocarbons (CFCs), halons, carbon tetrachloride, methyl chloroform, methyl bromide, and hydrobromofluorocarbons (HBFCs). All hydrochlorofluorocarbons (HCFCs) are Class II substances and have an ODP of less than 0.2. These chemicals have dangerous health and environmental effects, making the estimation of emissions significant for not only AEIs but also for Toxic Release Inventory (TRI) reporting.

One very important quality of the ozone layer is its ability to reduce solar UV radiation that is considered harmful to life on Earth above certain thresholds. In the stratosphere, ODCs catalyze ozone-degrading reactions in the presence of UV radiation, thus reducing the concentration of beneficial ozone.

At Air Force installations, refrigerants represent a significant source of ODCs. The use of refrigerants is regulated by Section 608 of the Clean Air Act (CAA). Section 608 regulates the production, purchase, use and disposal of ODCs. Recent changes to the regulations have expanded the tracking to also include chemicals with a high potential to contribute to the effects of Global Warming as measured by the Global Warming Potential (GWP). This will mostly impact the Refrigerant Management Programs on an Air Force Installation. However, it will benefit the Air Quality Program with increased visibility and tracking of chemicals that should be accounted for in a Greenhouse Gas Emissions Inventory.

Gases in this category are widely used in refrigerators, air conditioners, and fire extinguishers. The most common uses on Air Force installations are for the comfort cooling of buildings. Often these refrigeration units are located externally on the roof or side of the building.

The emission of ODCs and greenhouse gases used for cooling and refrigeration are estimated using a mass balance approach. When a unit is worked on, often gas is removed from the unit prior to repairs. This gas is either reinjected into the unit after the repair is complete, reclaimed or disposed of. After the repair is complete, gas is added back to the system until the system has a full charge. The amount of refrigerant

emitted is the net loss and equal to the total amount of material used minus the amount recovered for disposal, recycling, or reclamation.

3.17.9.2 Potential Data Sources

The HVAC shop manages all the refrigerants on an Air Force installation. The HVAC shop may be utilizing APIMS to track the maintenance and repair of all refrigeration equipment with a capacity of greater than 50 lbs. If APIMS is being utilized no additional data collection is required. If APIMS is not being utilized for refrigerant management tracking, contact the HVAC shop and request the following information.

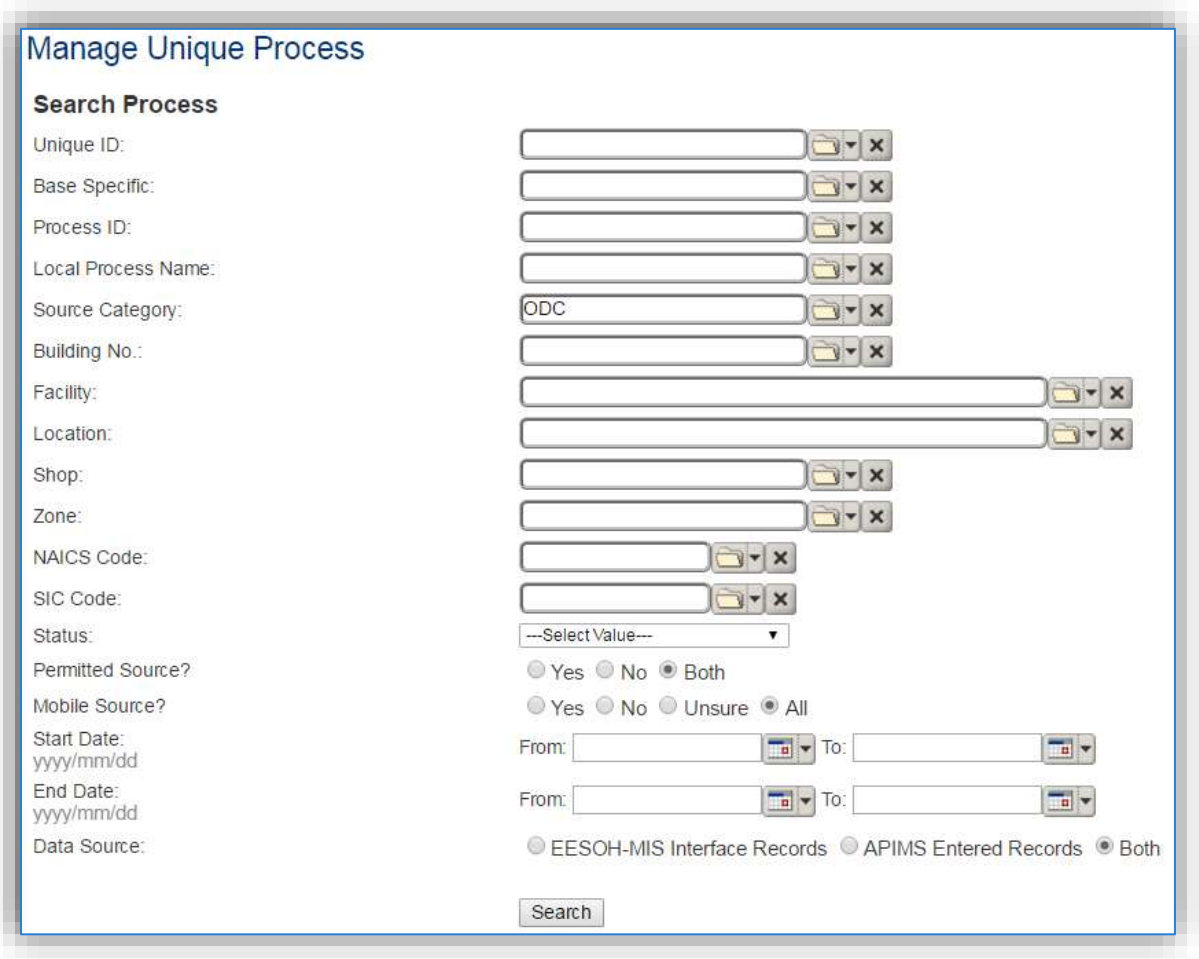
- Refrigerant Name
- Total Net Loss

3.17.9.3 Standard Source Identification/Characterization

3.17.9.3.1 Existing Sources

It is important to review the existing sources in each source category on an annual basis at a minimum. Most regulatory agencies require an up to date source and equipment inventory.

Navigate to the Unique Process module of APIMS by clicking on **Unique Process** under the **Emission Unit** tab.

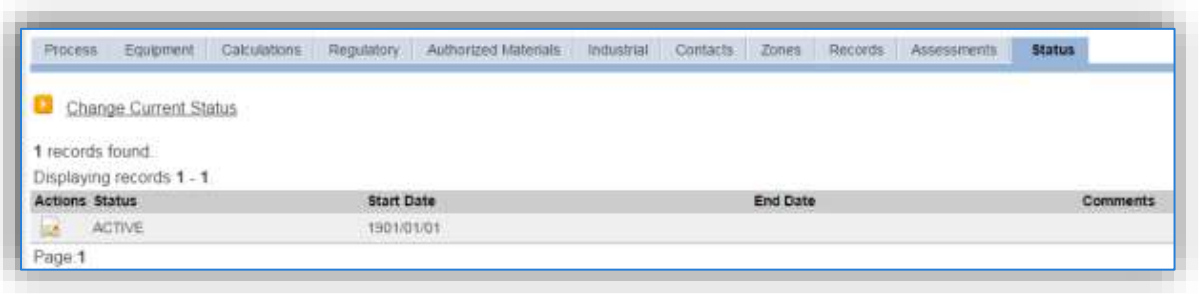


In the **Source Category** search field, type "ODC" then select the row for Ozone Depleting Chemicals from the dropdown results. Click the **Search** button.

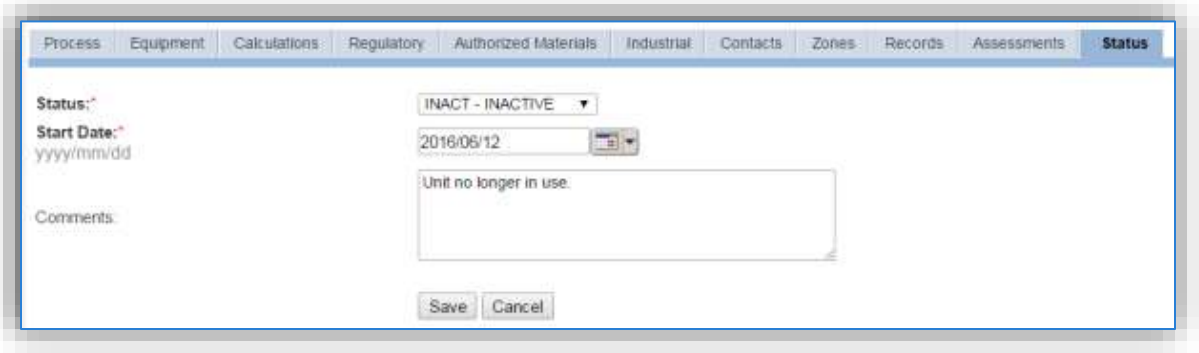
The search results grid will now display all the ozone depleting chemical processes currently in APIMS.

3.17.9.3.1.1 *Status*

If the status of a process needs to be changed, click the edit icon next to the process.



Navigate to the *Status* tab. Click the Change Current Status hyperlink.



Select the appropriate status from the **Status** dropdown (i.e., ACTIVE, REMOVED or INACTIVE).

For the **Start Date** enter the date at which the status changed.

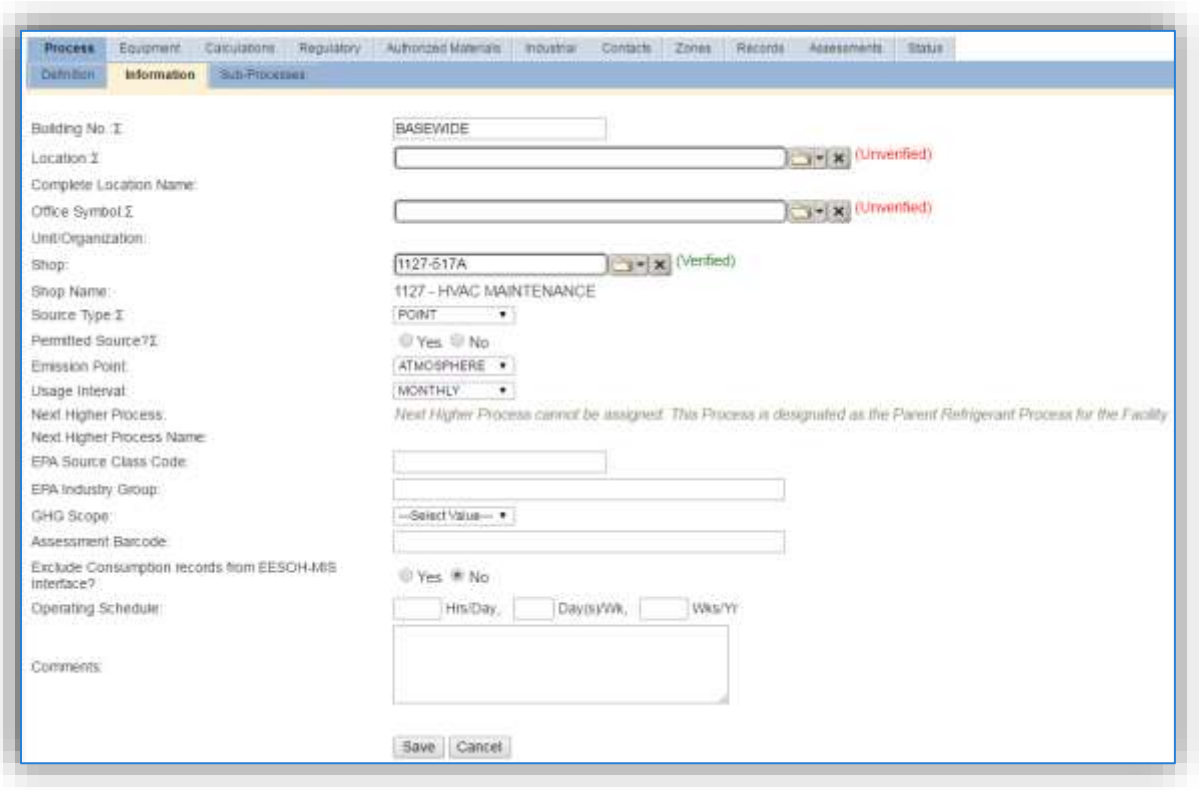
Enter **Comments** that provide insight into why the status changed. These can be very useful for equipment inventories, permit renewals and regulatory reporting. Most regulatory agencies require reporting on unit operation status which includes any potential time spent offline and reasons for the outage.

Click the **Save** button.

The emissions for a process will only be calculated for the dates the process was in an ACTIVE status. If a source is removed in the middle of a year, the emissions will only be calculated for the part of the year the source was active.

3.17.9.3.1.2 Information

There are basic data elements that are important to track and maintain for new and existing sources, such as location and source type. This data can be maintained in the Unique Process record on the *Information* sub tab.



The **Building No**. should indicate this process covers all source of this type on a BASEWIDE basis.

The **Shop** is important as it establishes the personnel that are conducting the training and will be the best source of information regarding the activity.

ODC emissions are categorized as a FUGITIVE release in the **Source Type**.

The **Emission Point** would be ATMOSPHERE.

The **Permitted Source** flag should also be populated to accurately reflect the current regulatory status of the emission source. This flag can be an invaluable tool in roll-up reporting.

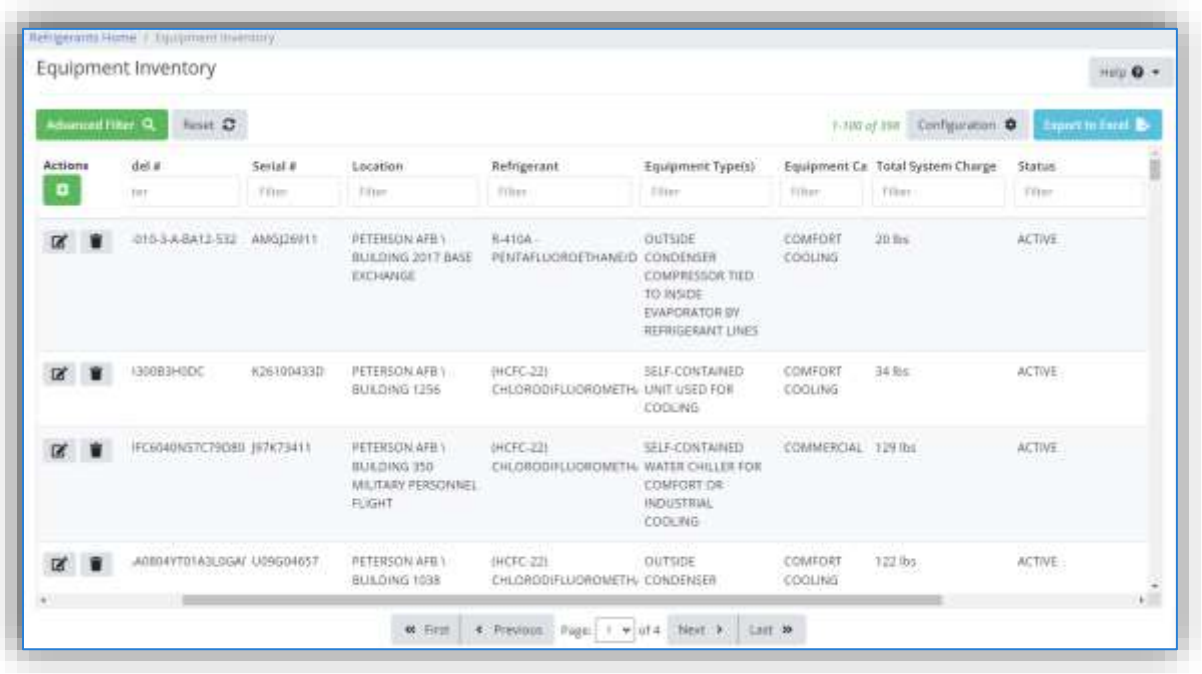
The **Usage Interval** only needs to be designated if APIMS is not being used as the refrigerant management system. If the data is entered manually this source is usually documented on an ANNUAL basis. It is important to populate this field correctly as it will affect how it is documented in the AEI Throughputs module.

3.17.9.3.1.3 Sub-Processes

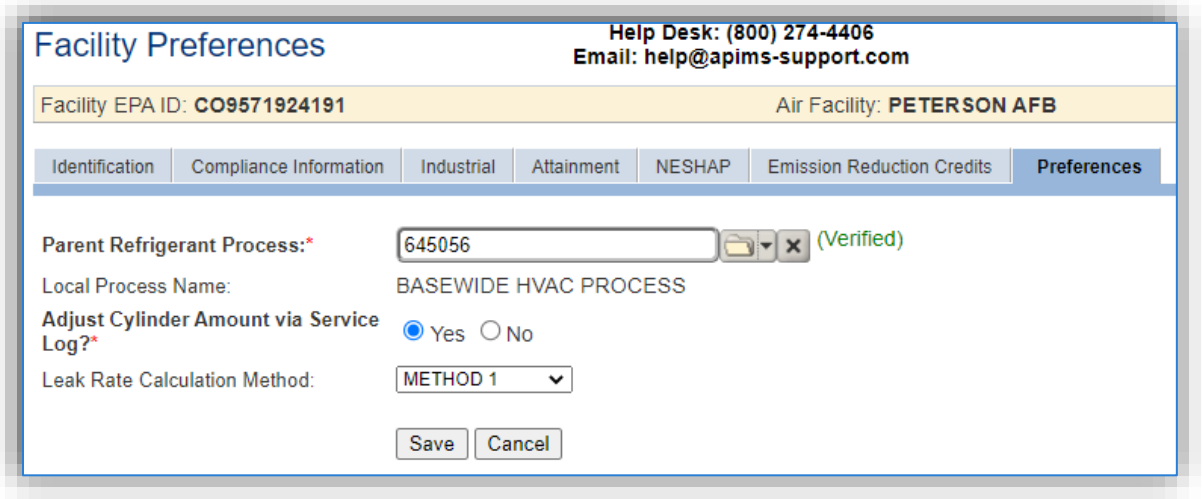
This source does not utilize this functionality.

3.17.9.3.1.4 Equipment

This tab is configured automatically when the Refrigerant Module of APIMS is configured. The equipment that will be associated will match the equipment entered in the Equipment Inventory screens of the Refrigerants Home.

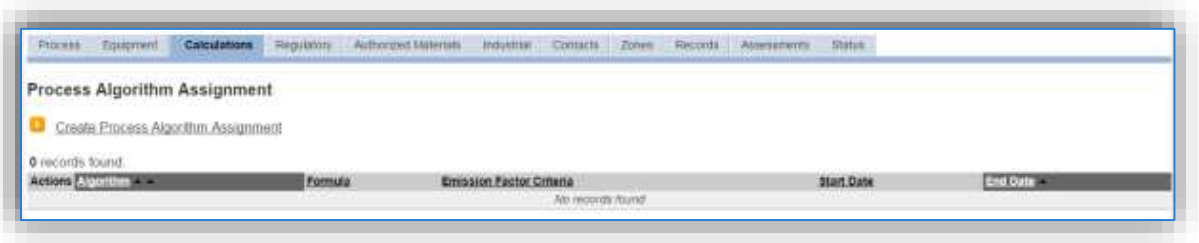


The equipment in the Refrigerant Module is automatically associated to the process that is designated as the Parent Refrigerant Process in the Preferences tab of the Air Facility as shown below.

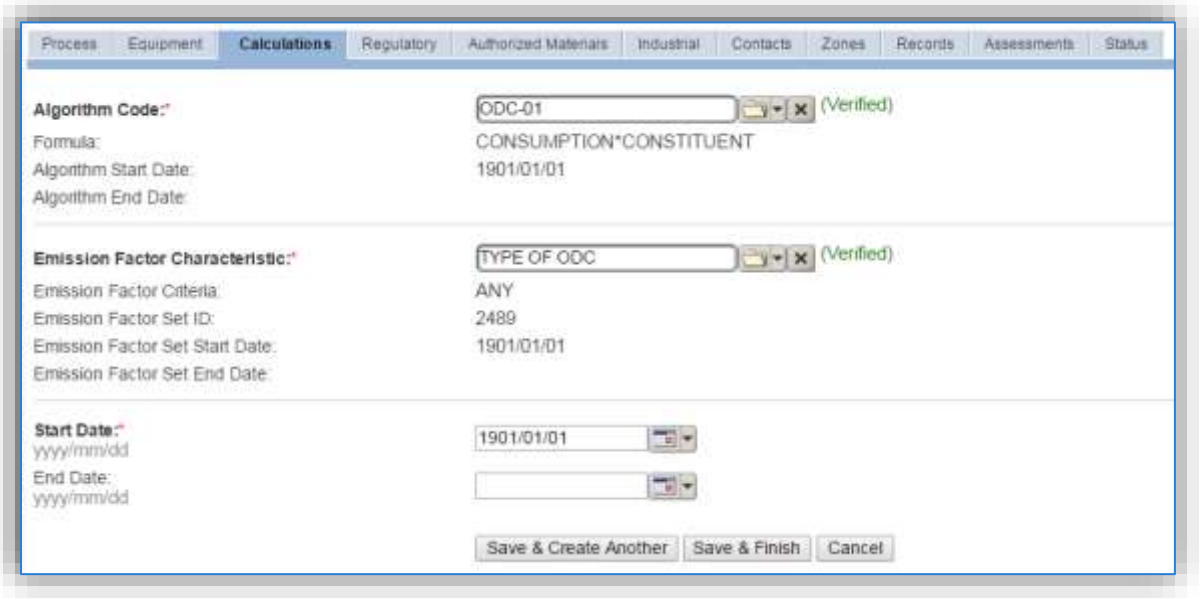


3.17.9.3.1.5 *Calculations*

The next tab is the *Calculations* tab.

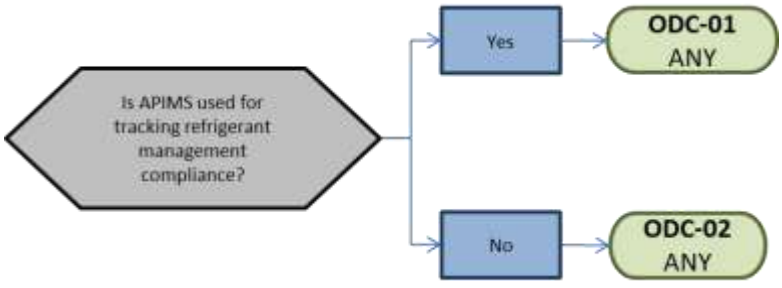


To associate an algorithm to the process, click on the Create Process Algorithm Assignment hyperlink.



For refrigerant units there is only one standard calculation methodology recommended by the Air Force. Select the **Algorithm Code** ODC-01 for installations that utilize APIMS for refrigerant management compliance and ODC-02 for installations that manually enter the net loss of refrigerant. Next select the **Emission Factor Characteristic** and enter the **Start Date** to match the start date of the process. Click the **Save & Finish** button to return to the Calculations tab.

Use the flowchart below to find the correct Algorithm Code and Emission Factor Set.

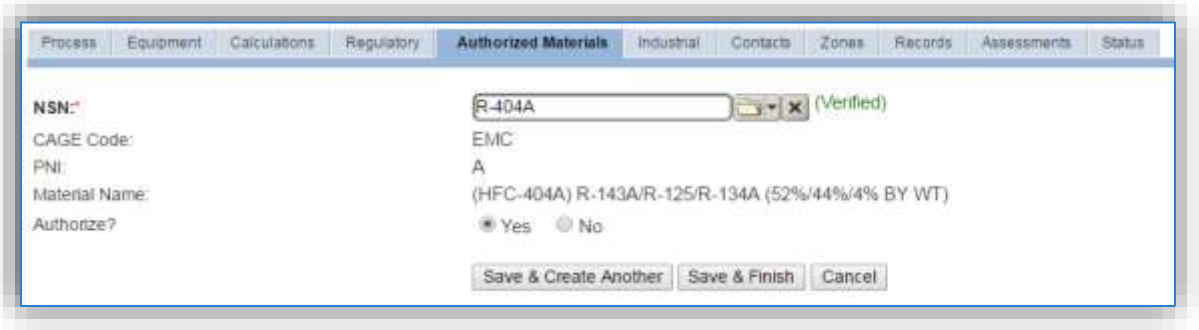


If your permit requires a different type of calculation, contact the Air Force Air Quality Subject Matter Expert for approval of the alternative method.

3.17.9.3.1.6 *Materials*

This tab is only needed for installations that **do not** use APIMS for refrigerant compliance. The last step in setting up the Unique Process record is to add the refrigerants used as the authorized materials on the *Authorized Materials* tab.

To authorize a material for the process, click on the Create Authorized Material hyperlink.



Select the refrigerant material record from the list of values. If the refrigerant record is not available, the material record will need to be created. Next select "Yes" to **Authorize** the material, then **Save & Finish**.

3.17.9.3.2 New Sources

3.17.9.3.2.1 Data Collection Sheet

The form on the next page is a printable guide that can be taken out to the location of the source and used to gather all the necessary information from the shop personnel. It can then be used as a guide to help configure the data in APIMS when you return to your office.

Refrigerant Management Data Collection Worksheet

USAGE INFORMATION

Is APIMS utilized for tracking refrigerant compliance? ☐ Yes ☐ No

If yes, no more data is required.

If no, the following information is required. This should include all refrigerant losses from cylinders and equipment.

Type of Refrigerant: _____ Total Net Loss: _____ lbs

Type of Refrigerant: _____ Total Net Loss: _____ lbs

Type of Refrigerant: _____ Total Net Loss: _____ lbs

Type of Refrigerant: _____ Total Net Loss: _____ lbs

Type of Refrigerant: _____ Total Net Loss: _____ lbs

Type of Refrigerant: _____ Total Net Loss: _____ lbs

Type of Refrigerant: _____ Total Net Loss: _____ lbs

Type of Refrigerant: _____ Total Net Loss: _____ lbs

Type of Refrigerant: _____ Total Net Loss: _____ lbs

Type of Refrigerant: _____ Total Net Loss: _____ lbs

Type of Refrigerant: _____ Total Net Loss: _____ lbs

Type of Refrigerant: _____ Total Net Loss: _____ lbs

Type of Refrigerant: _____ Total Net Loss: _____ lbs

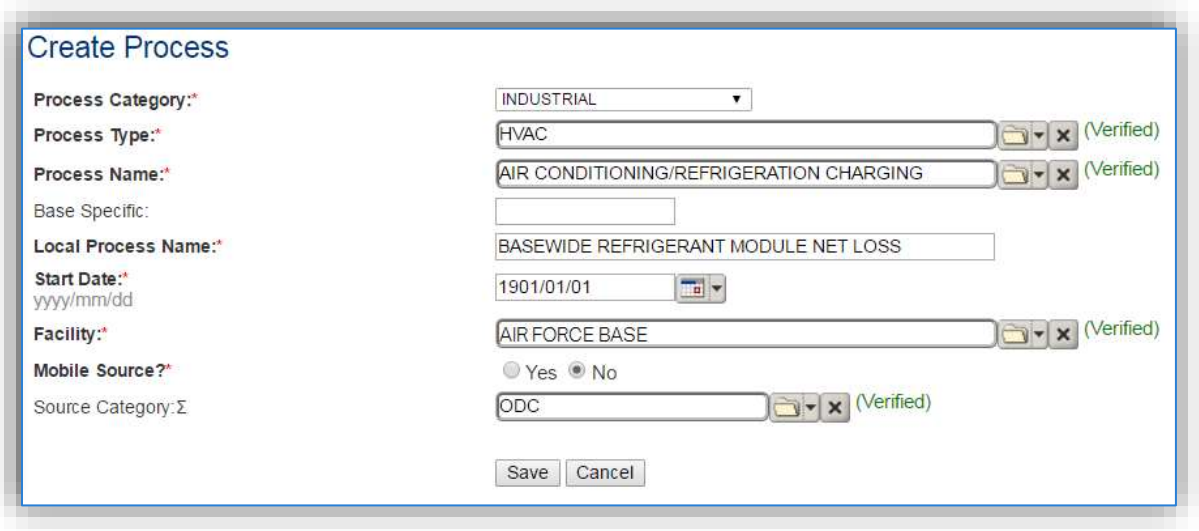
Type of Refrigerant: _____ Total Net Loss: _____ lbs

Type of Refrigerant: _____ Total Net Loss: _____ lbs

3.17.9.3.2.2 New Source Configuration

In order to properly document this emission source in APIMS, there will need to be a single Unique Process record.

Navigate to the Unique Process module in APIMS and click the Create New Process hyperlink.



Process Category	Process Type	Process Name	Process ID
INDUSTRIAL	EQUIPMENT REPAIR/PREV. MAINTENANCE	CHARGING/RECHARGING, NOC	IEQ1126
INDUSTRIAL	EQUIPMENT REPAIR/PREV. MAINTENANCE	CHARGING/RECHARGING, R22 LEAK CHECK	IEQ1127
INDUSTRIAL	HVAC	AIR CONDITIONING/REFRIGERATION CHARGING	IHV1030
INDUSTRIAL	PROTECTIVE SERVICES-FIRE	FILLING FIRE EXTINGUISHERS	IPF1457

Use the table above to determine the appropriate **Process Category**, **Process Type** and **Process Name**.

The **Base Specific** field can be used to enter a standard convention identifier that will best help identify the source. If the source is permitted, enter the emission unit ID as designated in the permit.

The **Local Process Name** should be in a standard naming convention for all sources that helps to quickly identify, what the process is, where it is and any other unique attribute. If using APIMS for refrigerant compliance the name should be BASEWIDE REFRIGERANT MODULE NET LOSS. If manually tracking refrigerant net loss, use as standard format such as, OZONE DEPLETING CHEMICALS – BASEWIDE, CE HVAC REFRIGEANT LOSSES or AIRCRAFT FIRE SUPPRESSION.

The **Start Date** should be the date the source became operational, if this date is not known, enter 1901/01/01 as a default start date.

The **Facility** should be the facility name that is responsible for the source.

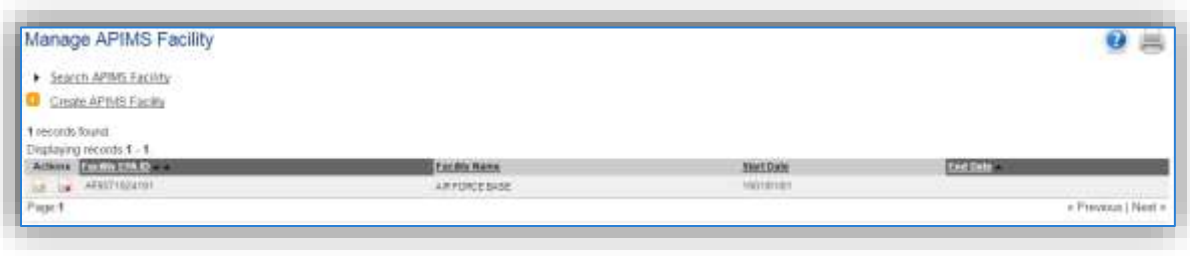
The **Mobile Source?** flag should be "NO" for all refrigerant losses.

All refrigerant losses are assigned to the ODC **Source Category**.

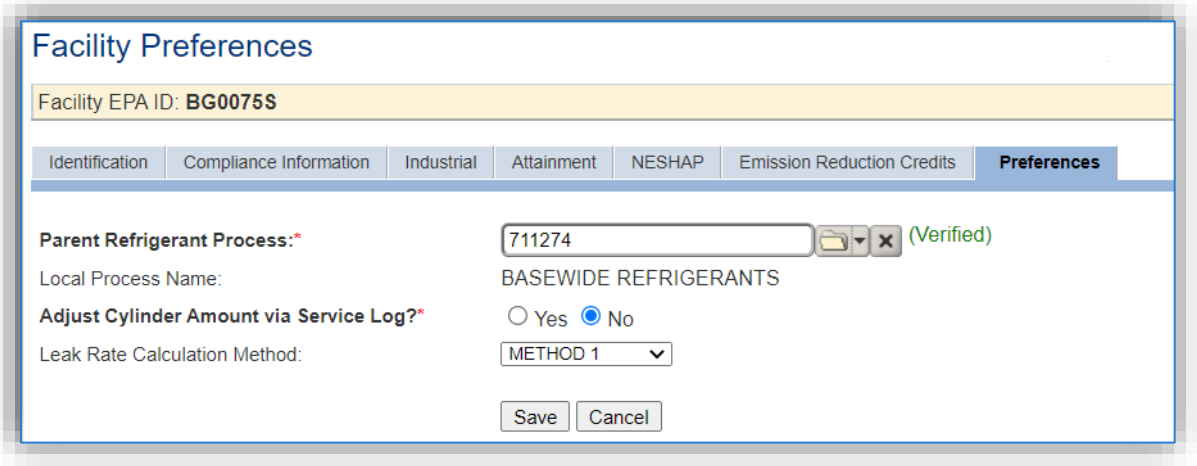
For the population of all other tabs, refer to the Existing Sources sections.

If this is a new process that will utilize the refrigerant module from APIMS for net loss data and additional step is required.

Navigate to the APIMS Facility screen.



Click the edit icon next to the facility. This will open the Edit APIMS Facility screen. Next navigate to the *Preferences* tab.



Select the **Parent Refrigerant Process** from the list of values. Next select Yes or No according to the following guidance:

Yes – The service record for a refrigerant unit will require the specific cylinders from the cylinder inventory to be specified that were used during the repair to bring the unit up to full pressure. This will then automatically decrement that amount of refrigerant from the cylinder.

No – There will be no link between the service record and the cylinder inventory.

If you are not sure about the answer to this question it is recommended you work with the HVAC shop to best understand their business practices. This will affect the way they enter date in the Refrigerant Compliance module of APIMS.

Select the **Leak Rate Calculation Method** for the installation. This will either be Method 1 or Method 2 as detailed below.

Method 1

$$\text{Leak rate (\% per year)} = \frac{\text{pounds of refrigerant added}}{\text{pounds of refrigerant in full charge}} \times \frac{\text{365 days/year}}{\text{shorter of: \# days since refrigerant last added or 365 days}} \times 100\%$$

Method 2

$$\text{Leak rate (\% per year)} = \frac{\text{pounds of refrigerant added over past 365 days (or since leaks were last repaired, if that period is less than one year)}}{\text{pounds of refrigerant in full charge}} \times 100\%$$

Once the calculation method is selected it must be used for all equipment on the installation for the entire life of the equipment. Per regulations an installation cannot change the calculation method for a piece of equipment and all equipment at a single installation must use the same calculation method. Therefore, if this field is configured for any individual piece of equipment in the Refrigerant Module, this field should be selected to match.

Click **Save**. This will now automatically pull all the net loss data from the Refrigerant Compliance module for use in emission calculations.

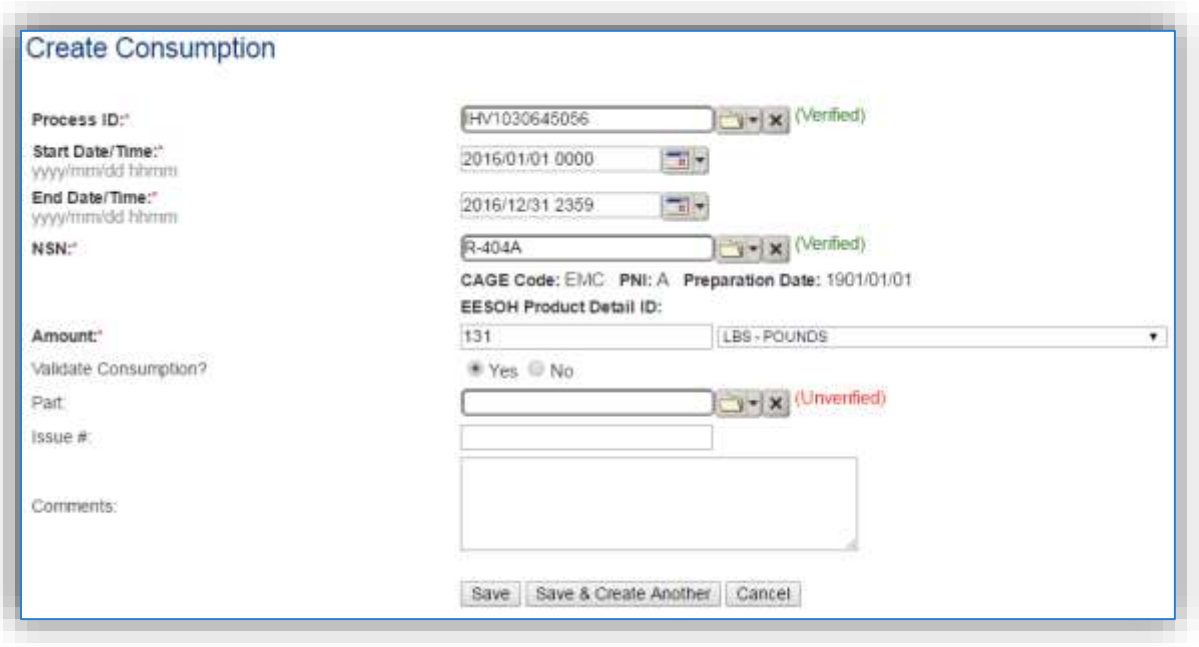
3.17.9.4 Year-to-Year Maintenance

3.17.9.4.1 Usage

If the installation is using the Refrigerant Compliance module of APIMS, this step is not required. This step is only for installations manually tracking the net loss of refrigerants.

The net loss of ODC should be tracked annually or more frequently if required by a regulatory agency. To correctly document the annual usage for this emission source the consumption should be entered in the Consumption log.

Navigate to the Consumption module and click the Create Consumption hyperlink.



The consumption record should span the entire reporting period as shown above. The material should be the type of refrigerant used and the amount should be the net loss in pounds. Make sure to select "Yes" to validate the consumption. If the consumption is not validated it will not be included in the emissions calculation.

Click the **Save** button to finish or the **Save & Create Another** button to enter the loss for another type of refrigerant. Repeat this step until all refrigerant losses are recorded.

3.17.9.4.2 Emissions Calculations

To correctly calculate emissions, this emission source should be included in a **Stationary Source Calculation** and be included in the Greenhouse Gas reporting. Reference Section 2.7 Emissions Calculations for additional instructions and details.

3.17.10 Rocket Motor Testing (RTST)

3.17.10.1 Source Types

Rocket motor testing is performed at certain Air Force installations on a routine basis. A typical solid-fuel rocket motor consists of a motor body, a nozzle, igniter assembly, and a propelling charge. Most rocket motor testing by the Air Force is conducted at outdoor test range facilities. However, there are a few sites that conduct enclosed rocket motor tests. Emissions from static rocket engine testing are regarded as a stationary source since the rocket is affixed to a test stand. Emissions of concern from rocket engine testing include criteria pollutants, HAPs and GHGs.

Some typical rocket emission factors are provided by AP-42; however, this is not all the rockets that are tested at Air Force installations. Most commonly, if rocket motor testing is conducted there are specific emission factors and test data that provide a more accurate emission profile. It is suggested to use the more accurate data than the factors provided in AP-42.

3.17.10.2 Potential Data Sources

This type of testing is usually a function of the Air Force Research Laboratory on an installation. The data required to calculate emissions is as follows:

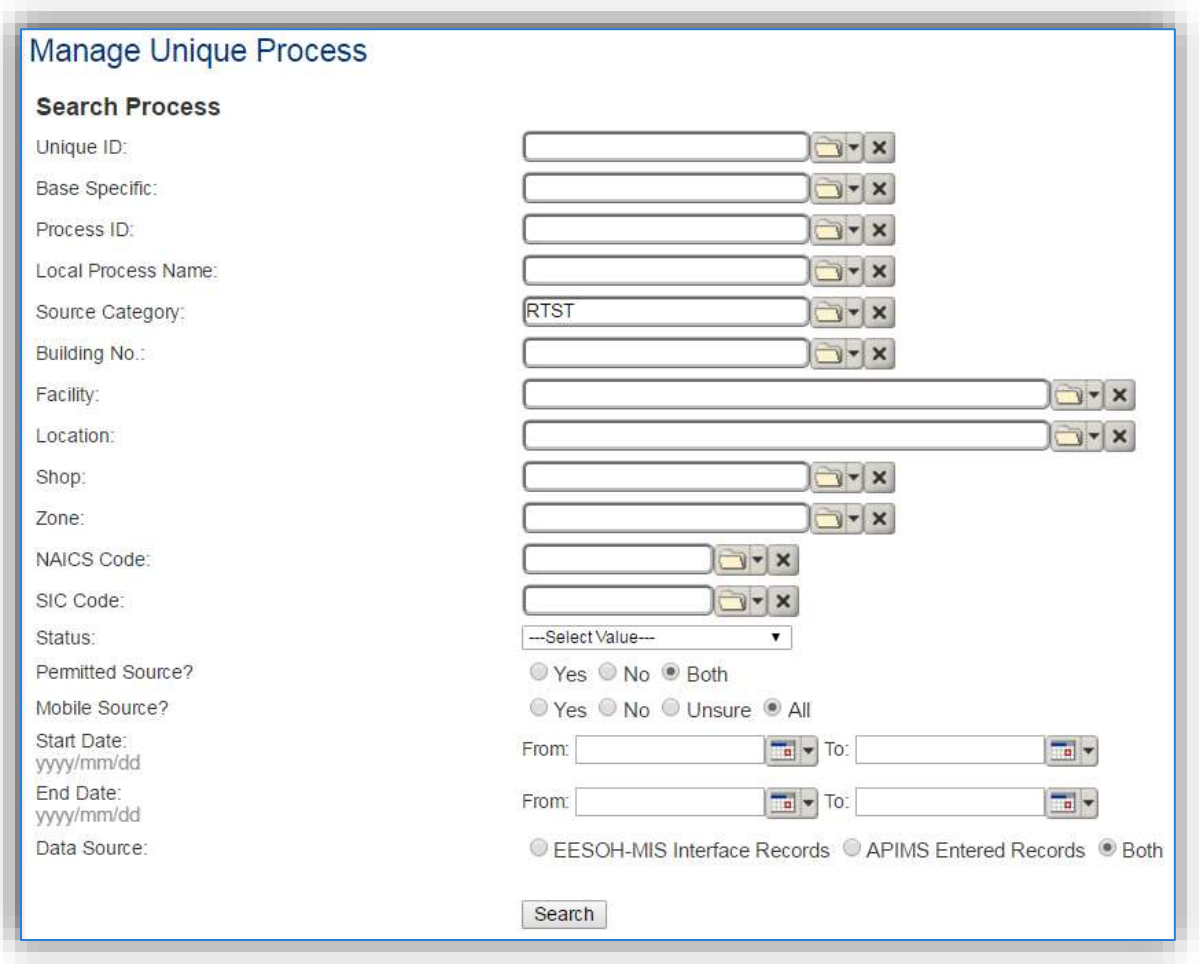
- Amount of fuel consumed
- Type of fuel used
- Emission profile (usually based on test data)

3.17.10.3 Standard Source Identification/Characterization

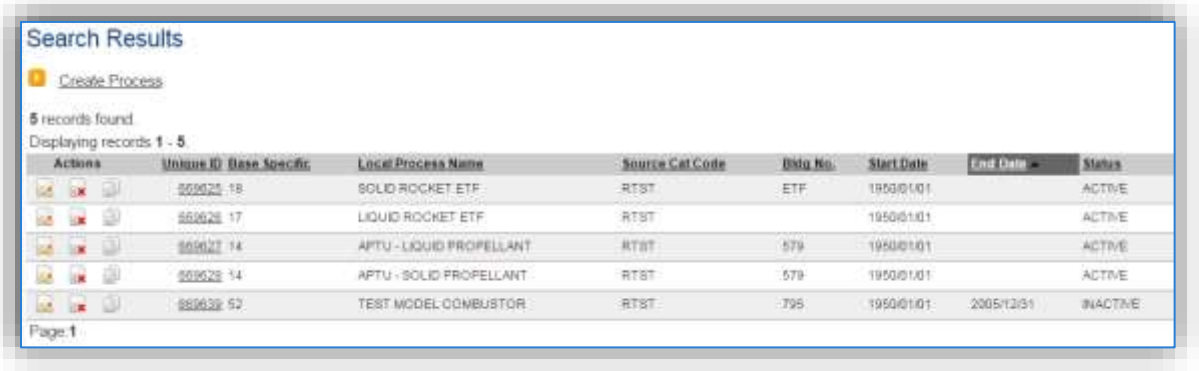
3.17.10.3.1 Existing Sources

It is important to review the existing sources in each source category on an annual basis at a minimum. Most regulatory agencies require an up to date source inventory.

Navigate to the Unique Process module of APIMS by clicking on **Unique Process** under the **Emission Unit** tab.



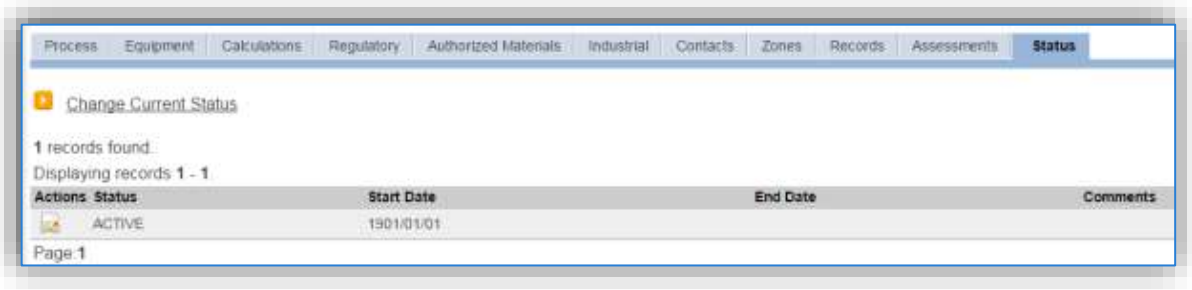
In the **Source Category** search field, type "RTST" then select the row for ROCKET MOTOR TESTING from the dropdown results. Click the **Search** button.



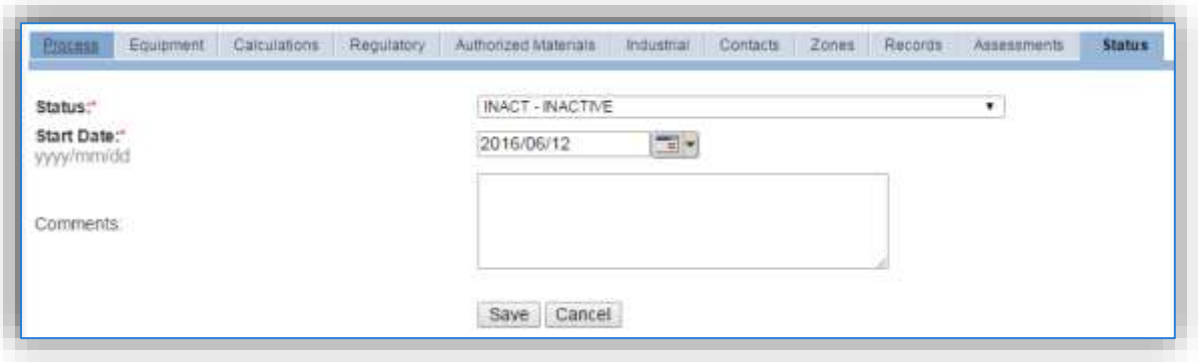
The search results grid will now display all the rocket motor testing processes currently in APIMS.

3.17.10.3.2 Status

If the status of a process needs to be changed, click the edit icon next to the process.



Navigate to the *Status* tab. Click the Change Current Status hyperlink.



Select the appropriate status from the **Status** dropdown (i.e., ACTIVE, REMOVED or INACTIVE).

For the **Start Date** enter the date at which the status changed.

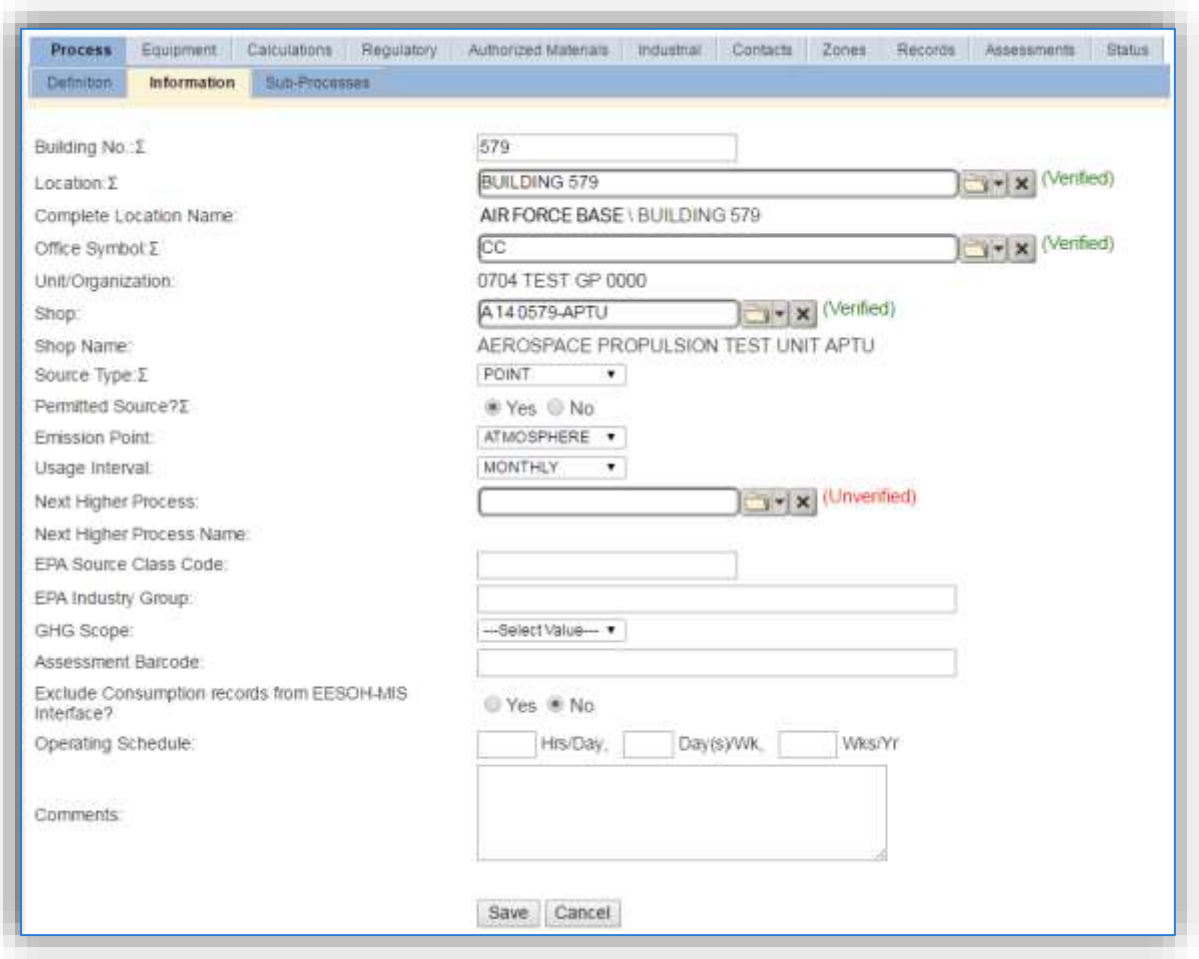
Click the **Save** button.

The emissions for a process will only be calculated for the dates the process was in an ACTIVE status. If a source is removed in the middle of a year, the emissions will only be calculated for the part of the year the source was active.

If rocket motor testing activities are conducted occasionally it is recommended to leave the process(es) active as long as there is the possibility of this activity. This will ensure it is still considered when determining overall base air emissions.

3.17.10.3.3 Information

There are basic data elements that are important to track and maintain for new and existing sources, such as location and source type. This data can be maintained in the Unique Process record on the *Information* sub tab.



The **Building No**. field can be used to specify a general location or area of the emission source, for example, EAST SIDE.

The **Location** field is very important to effectively manage the location and mission of the emission source. This documents where the source is located, in case it needs to be inspected or if the source owner needs to be contacted for pertinent information. For the instructions on how to create a location reference Section 2.2 Location.

The **Shop** is important as it establishes the personnel that are responsible for the activity and will be the best source of information regarding the activity.

For rocket motor testing activities conducted in enclosed areas, a POINT source should be selected in the **Source Type** field. For outdoor rocket motor tests, select the FUG source type for fugitive.

The **Permitted Source** flag should also be populated to accurately reflect the current regulatory status of the emission source. This flag can be an invaluable tool in roll-up reporting.

The **Emission Point** should be ATMOSPHERE for all activities.

The **Usage Interval** should be designated. This source is usually documented on an ANNUAL basis unless specified differently by a regulatory requirement. It is important to populate this field correctly as it will affect how it is documented in the AEI Throughputs module.

3.17.10.3.4 Sub-Processes

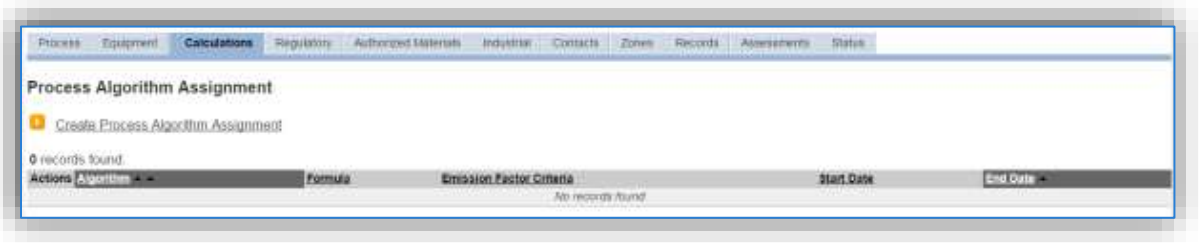
This source does not utilize this functionality.

3.17.10.3.5 Equipment

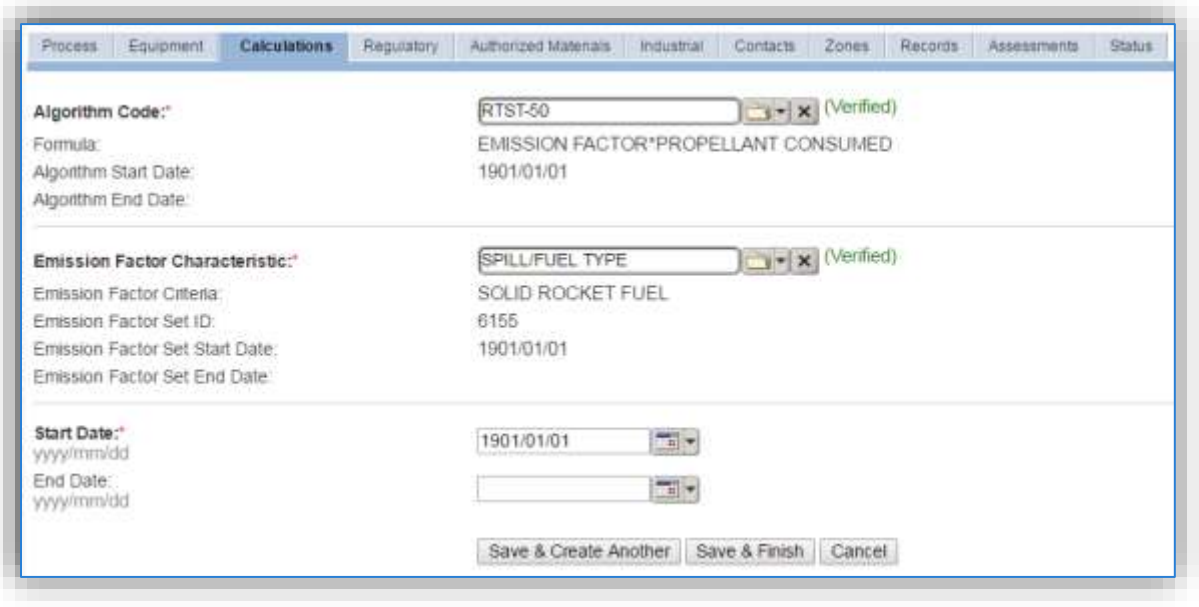
This source does not utilize this functionality.

3.17.10.3.6 Calculations

The next tab is the *Calculations* tab.



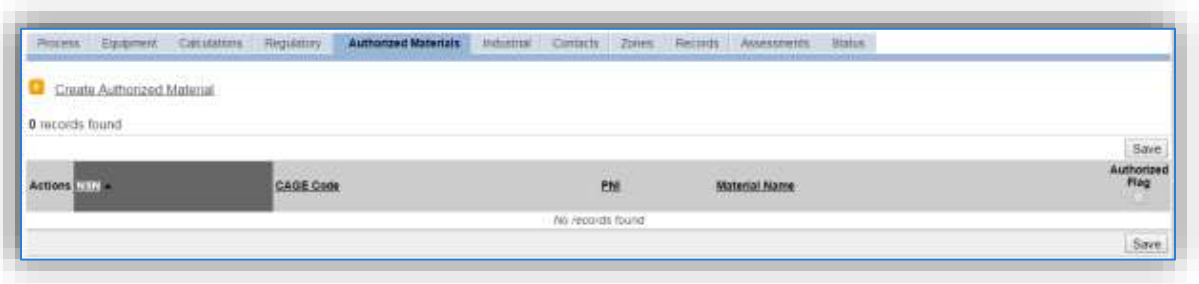
To associate an algorithm to the process, click on the Create Process Algorithm Assignment hyperlink.



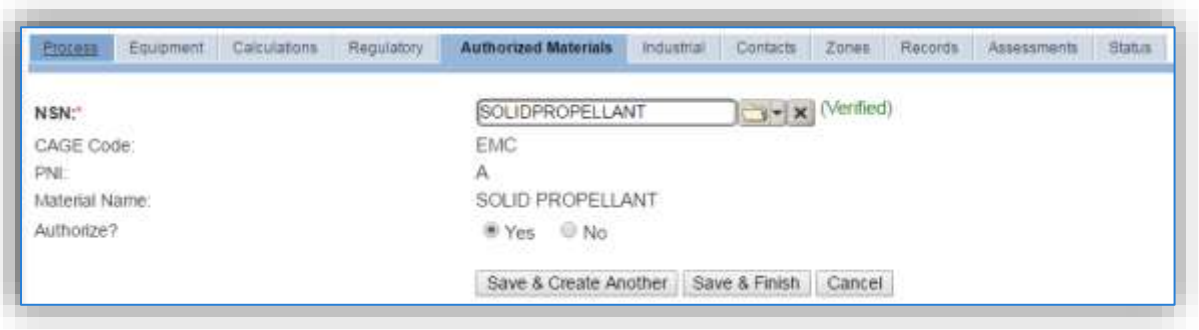
Select the **Algorithm Code** and **Emission Factor Characteristic** from the list of values that matches the correct scenario. For rocket motor testing this should be a base specific algorithm used to calculate emissions based upon fuel usage or the number of tests using the emission profile based on emission testing conducted. Contact the AFCEC Air Quality SME to configure this in APIMS. Enter the **Start Date** to match the start date of the process. Click **Save & Finish** button to save and return to the Calculations tab.

3.17.10.3.7 Materials

The last step in setting up the Unique Process record is to the authorized materials on the *Authorized Materials* tab.



To authorize a material for the process, click on the Create Authorized Material hyperlink.



Select the material record from the list of values, using the **NSN** or Material Name. If the material is not available the material record will need to be created. It is suggested to use a material name that describes the material that is burned or a generic material record such as SOLID PROPELLENT or PROPELLANT O2/FUEL. Next select "Yes" to **Authorize** the material, then **Save & Finish**.

3.17.10.4 New Sources

3.17.10.4.1 Data Collection Sheet

The form on the next page is a printable guide that can be taken out to the location of the source and used to gather all the necessary information from the shop personnel. It can then be used as a guide to help configure the data in APIMS when you return to your office.

Rocket Motor Testing Data Collection Worksheet

GENERAL INFORMATION

Building Number_____ Mission/Purpose_____

Shop Name/Function_____ Management Organization_____

Coordinates: Latitude: _____ Longitude: _____

UTM: _____ Zone _____ Easting _____ Northing ☐ Feet ☐ Meters

Is this source in any of your permits? ☐ Yes ☐ No

If yes, does it have an emission unit number or other designation? _____

USAGE INFORMATION

How is usage tracked? ☐ Number of Tests ☐ Fuel used

How many tests were conducted? _____

What type of fuel was used? _____

How much fuel was used? _____

Have emission tests been conducted that provide an emission profile for the fuel or tests? ☐ Yes ☐ No

If Yes, has this been configured in APIMS? ☐ Yes ☐ No

If No, collect the emission profile and submit to the AFCEC Air Quality SME for inclusion in APIMS

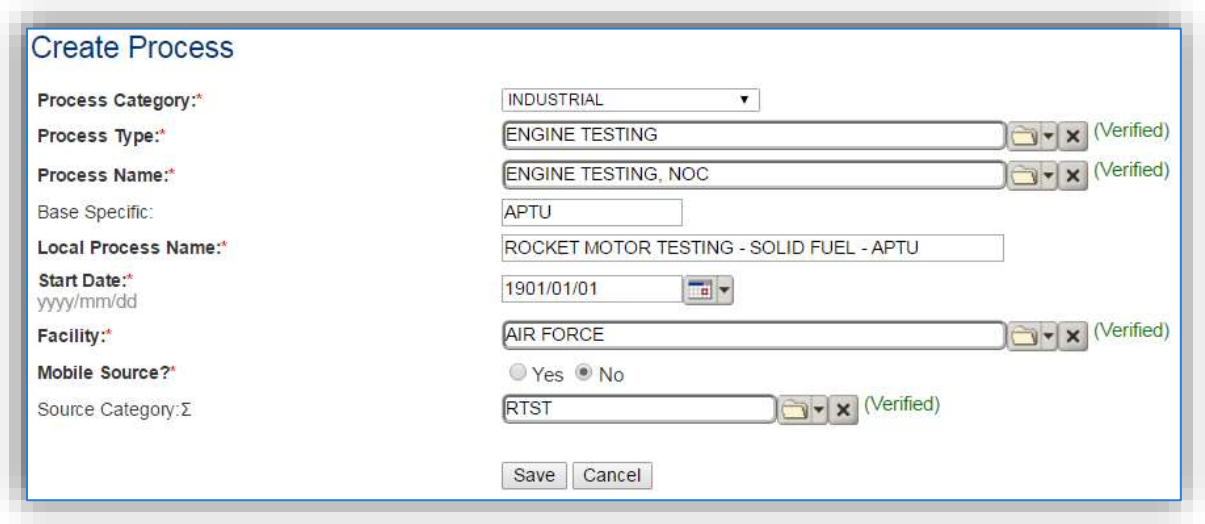
If No, how are emissions estimated?

_____
_____
_____
_____
_____

3.17.10.4.2 New Source Configuration

In order to properly document this emission source in APIMS, there will need to be a Unique Process record for each type of rocket motor tested.

Navigate to the Unique Process module in APIMS and click the Create New Process hyperlink.



Process Category	Process Type	Process Name	Process ID
INDUSTRIAL	ENGINE TESTING	ENGINE TESTING, NOC	IET1426
INDUSTRIAL	FUELS	FUELS, NOC	IFU1501

Use the values in the table above to appropriately populate the **Process Category**, **Process Type** and **Process Name**.

The **Base Specific** field can be used to enter a standard convention identifier that will best help identify the source. If the source is permitted, enter the emission unit ID as designated in the permit.

The **Local Process Name** should be in a standard naming convention for all sources that helps to quickly identify, what the process is, where it is and any other unique attribute. For example, MINUTEMAN MISSILE TESTING or ROCKET MOTOR TESTING AREA 1-32 PAD 1.

The **Start Date** should be the date the first time the activity occurred. If this date is not known, enter 1901/01/01 as a default start date.

The **Facility** should be the facility name that is responsible for the source.

The **Mobile Source?** flag should be "NO" as this is considered as stationary source.

All rocket motor testing activities are assigned to the RTST **Source Category**.

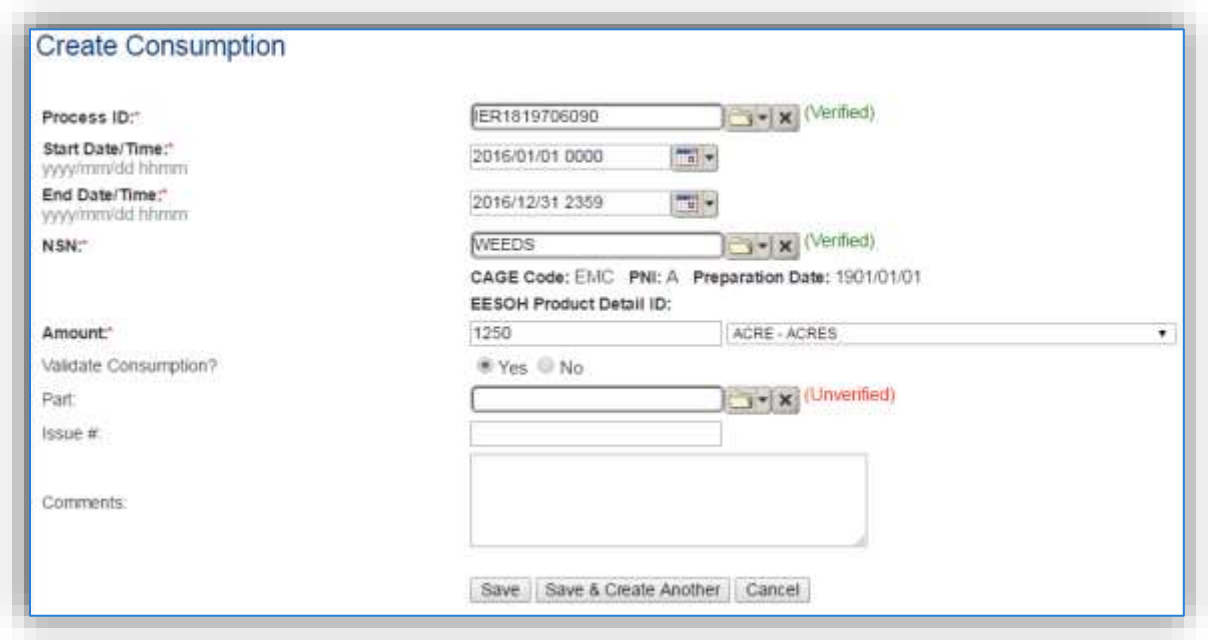
For the population of all other tabs, refer to the Existing Sources sections.

3.17.10.5 Year-to-Year Maintenance

3.17.10.5.1 Usage

The consumption rocket motor testing will need to be tracked annually, each time the activity occurs or more frequently if required by a regulatory agency. To correctly document the usage for this emission source the consumption should be entered in the Consumption log.

Navigate to the Consumption module and click the Create Consumption hyperlink.



The consumption record should span the entire reporting period or the duration of the activity as shown above. The material should be the fuel or the number of tests depending upon the calculation methodology.

The **Amount** should be the total fuel used or the total number of tests. Make sure to select "Yes" to validate the consumption. If the consumption is not validated it will not be included in the emissions calculation. Repeat this step for all the different media used.

3.17.10.5.2 Emissions Calculation

To correctly calculate emissions this emission source should be included in a **Stationary Source Calculation**. Reference Section 2.7 Emissions Calculations for additional instructions and details.

3.17.11 Wildfires (WILD)

3.17.11.1 Source Types

A wildfire is an uncontrolled fire that burns a variety of vegetation types ranging in age, size, and density. Wildfires are potential sources of large amounts of fugitive emissions of criteria pollutants and Greenhouse Gases (GHG).

Wildfires are affected by meteorological conditions, species of vegetation, moisture content and amount of consumable fuel per acre (fuel loading). In addition, the ambient temperature, wind velocity, relative humidity, and topographic features can all interact to modify the burning behavior causing different degrees of combustion efficiency. Each region of the country will have a varying fuel load due to the landscape and vegetation type. The U.S. Forest Service (USFS) has developed a map of regions associated with wildfires, shown below.

National Region	States
Rocky Mountain	AZ, CO, ID, KS, MT, ND, NE, NM, NV, SD, UT, WA, WY
Region 1: Northern	Northern ID, MT, ND, Northwestern SD, Northeast WA
Region 2: Rocky Mountain	CO, KS, NE, parts of SD, parts of WY
Region 3: Southwestern	AZ, NM
Region 4: Intermountain	Southern ID, NV, UT, Western WY
Pacific	AK, CA, HI, OR, WA
Region 5: Pacific Southwest	CA, HI
Region 6: Pacific Northwest	OR, WA
Region 10: Alaska	AK
Coastal	AK
Interior	AK
Southern	AL, AR, FL, GA, KY, LA, MS, NC, OK, SC, TN, TX, VA
Region 8: Southern	AL, AR, FL, GA, KY, LA, MS, NC, OK, SC, TN, TX, VA
North Central	CT, DE, IA, IN, IL, MA, MD, ME, MI, MN, MO, NH, NJ, NY, OH, PA, RI, VT, WI, WV
Region 9: Conifers	CT, DE, IA, IN, IL, MA, MD, ME, MI, MN, MO, NH, NJ, NY, OH, PA, RI, VT, WI, WV
Hardwoods	CT, DE, IA, IN, IL, MA, MD, ME, MI, MN, MO, NH, NJ, NY, OH, PA, RI, VT, WI, WV

3.17.11.2 Potential Data Sources

On Air Force installations where wildfires could occur, there is usually forestry or natural resources offices that will track the number of fires and the total acres burned.

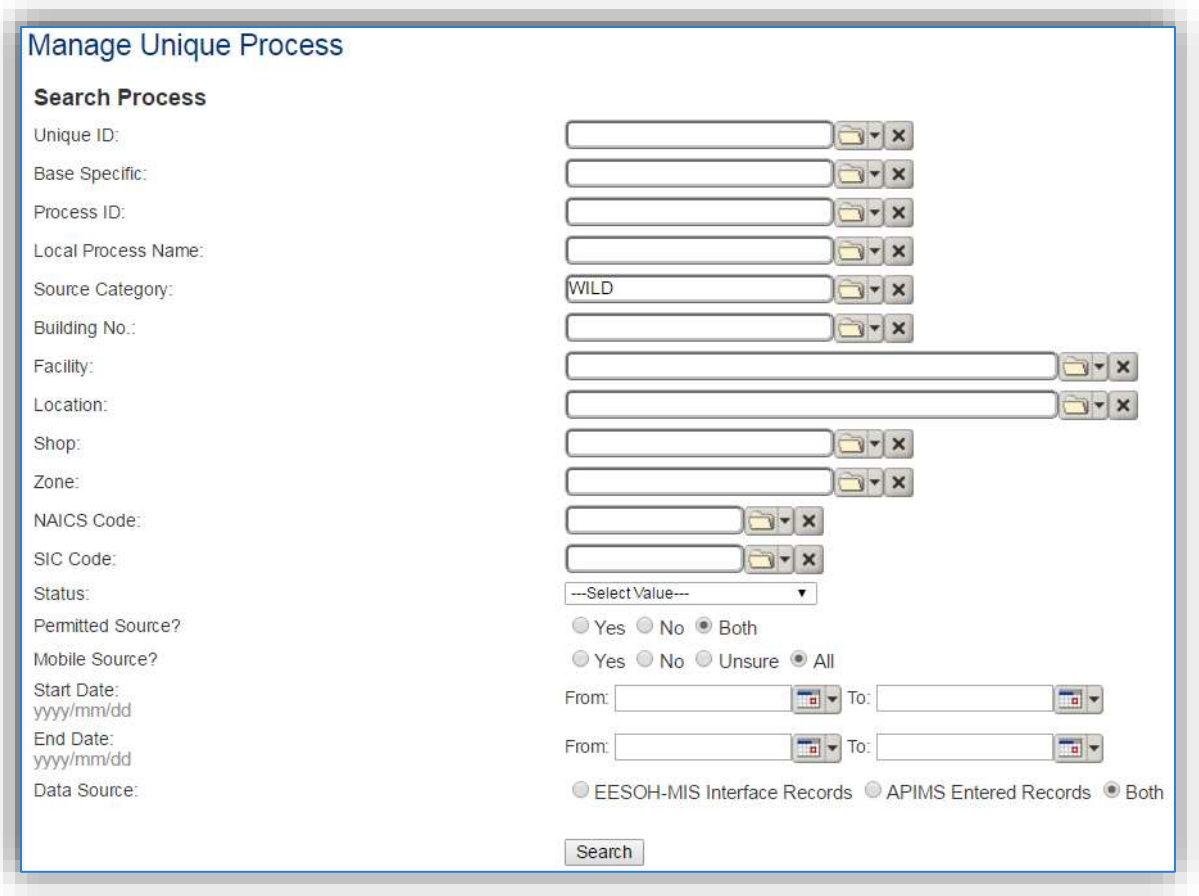
The data elements required to accurately calculate emissions are as follows:

- Acres or tons of material burned

3.17.11.3 Standard Source Identification/Characterization

3.17.11.3.1 Existing Sources

It is important to review the existing sources in each source category on an annual basis at a minimum to prevent outdated invalid data from accumulating. Navigate to the Unique Process module of APIMS.

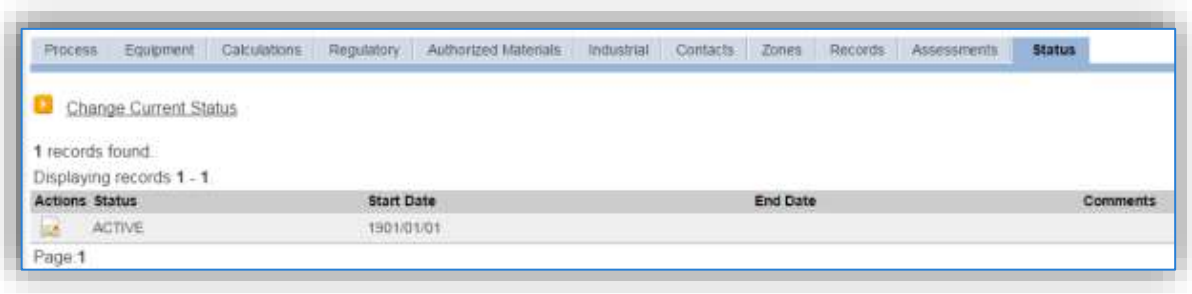


In the **Source Category** search field, type "WILD" then select the row for WILDFIRES from the dropdown results. Click the **Search** button.

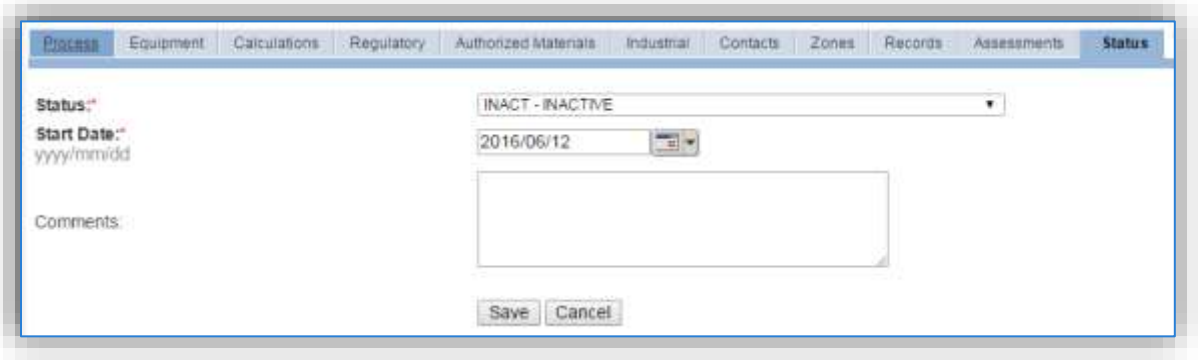
The search results grid will now display all the wildfire processes currently in APIMS by clicking on **Unique Process** under the **Emission Unit** tab.

3.17.11.3.2 Status

If the status of a process needs to be changed, click the edit icon next to the process.



Navigate to the *Status* tab. Click the Change Current Status hyperlink.



Select the appropriate status from the **Status** dropdown (i.e., ACTIVE, REMOVED or INACTIVE).

For the **Start Date** enter the date at which the status changed.

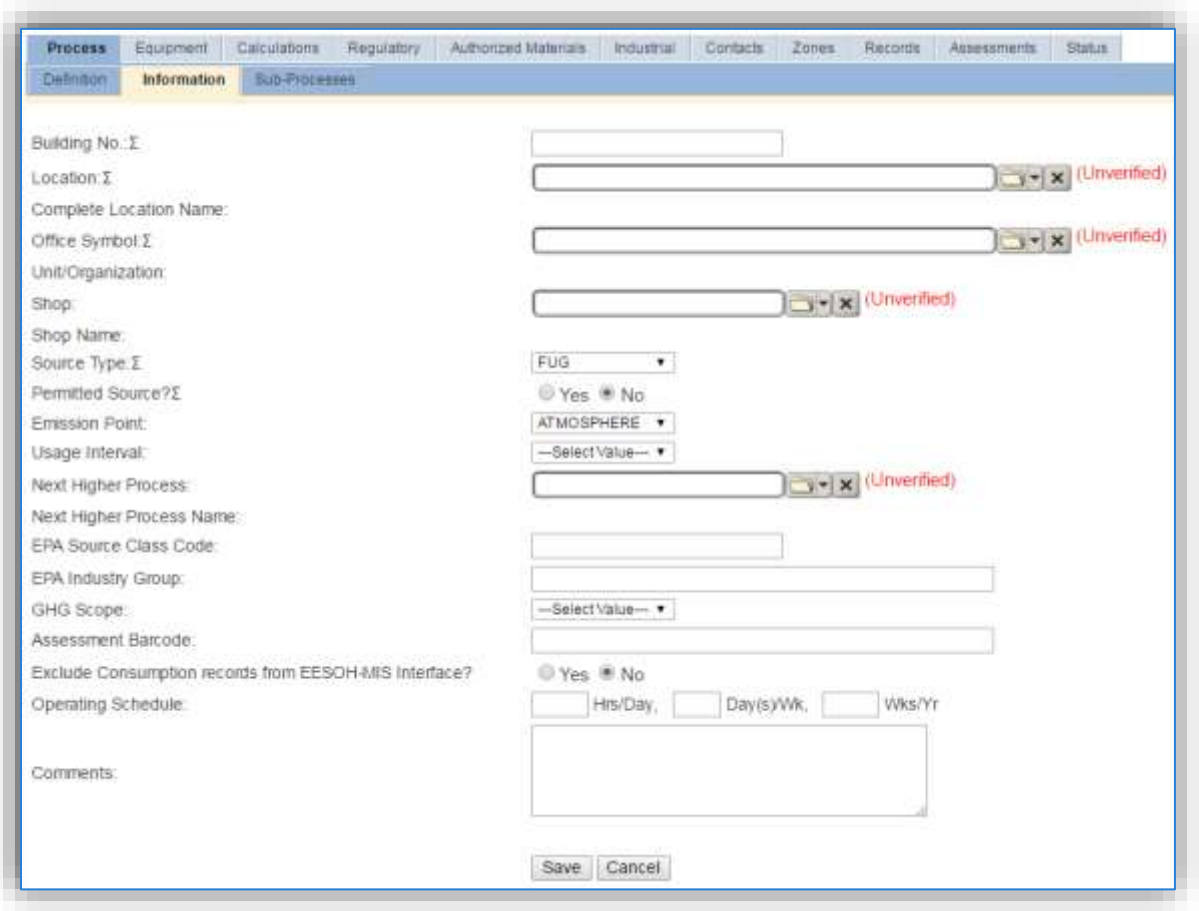
Click **Save**.

The emissions for a process will only be calculated for the dates the process was in an ACTIVE status. If a source is removed in the middle of a year, the emissions will only be calculated for the part of the year the source was active.

If wildfires occur occasionally it is recommended to leave the process active as long as there is the possibility of this activity. This will ensure it is still considered when determining overall base air emissions.

3.17.11.3.3 Information

There are basic data elements that are important to track and maintain for new and existing sources, such as location and source type. This data can be maintained in the Unique Process record on the *Information* sub tab.



Wildfires should be designated as AREA in the **Source Type** field.

The **Emission Point** should be ATMOSPHERE for all activities.

The **Permitted Source** flag should also be populated to accurately reflect the current regulatory status of the emission source. This flag can be an invaluable tool in roll-up reporting.

3.17.11.3.4 Sub-Processes

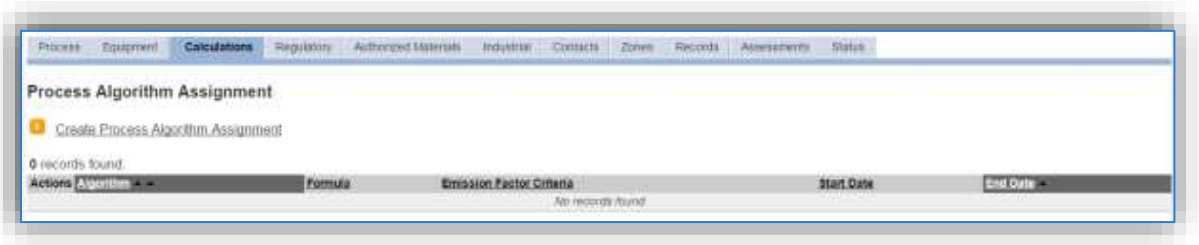
This source does not utilize this functionality.

3.17.11.3.5 Equipment

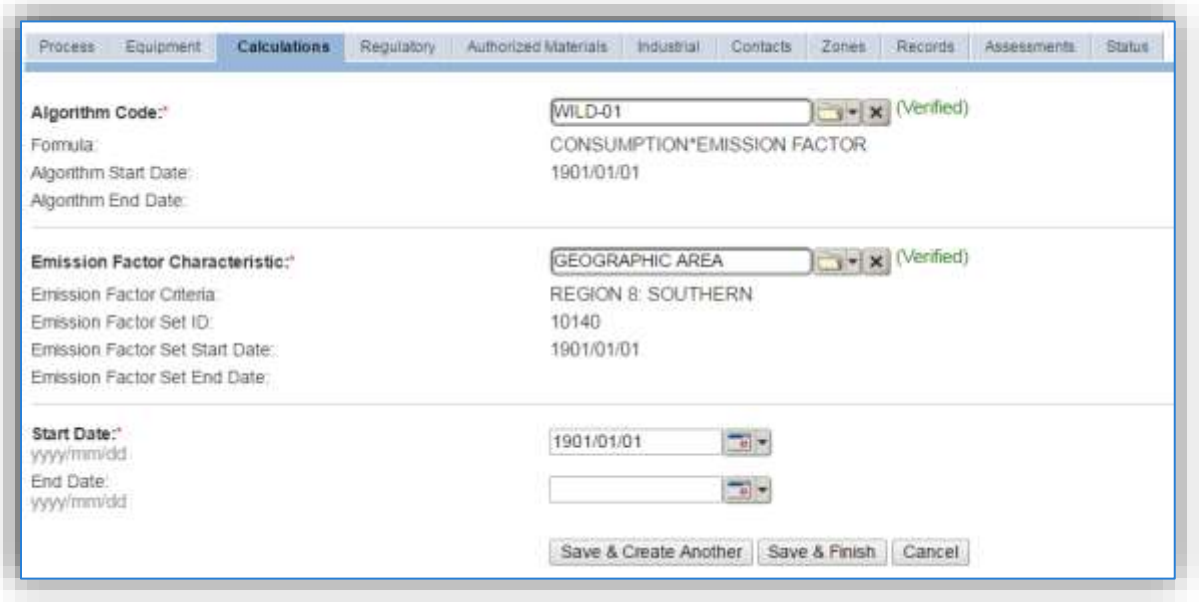
This source does not utilize this functionality.

3.17.11.3.6 Calculations

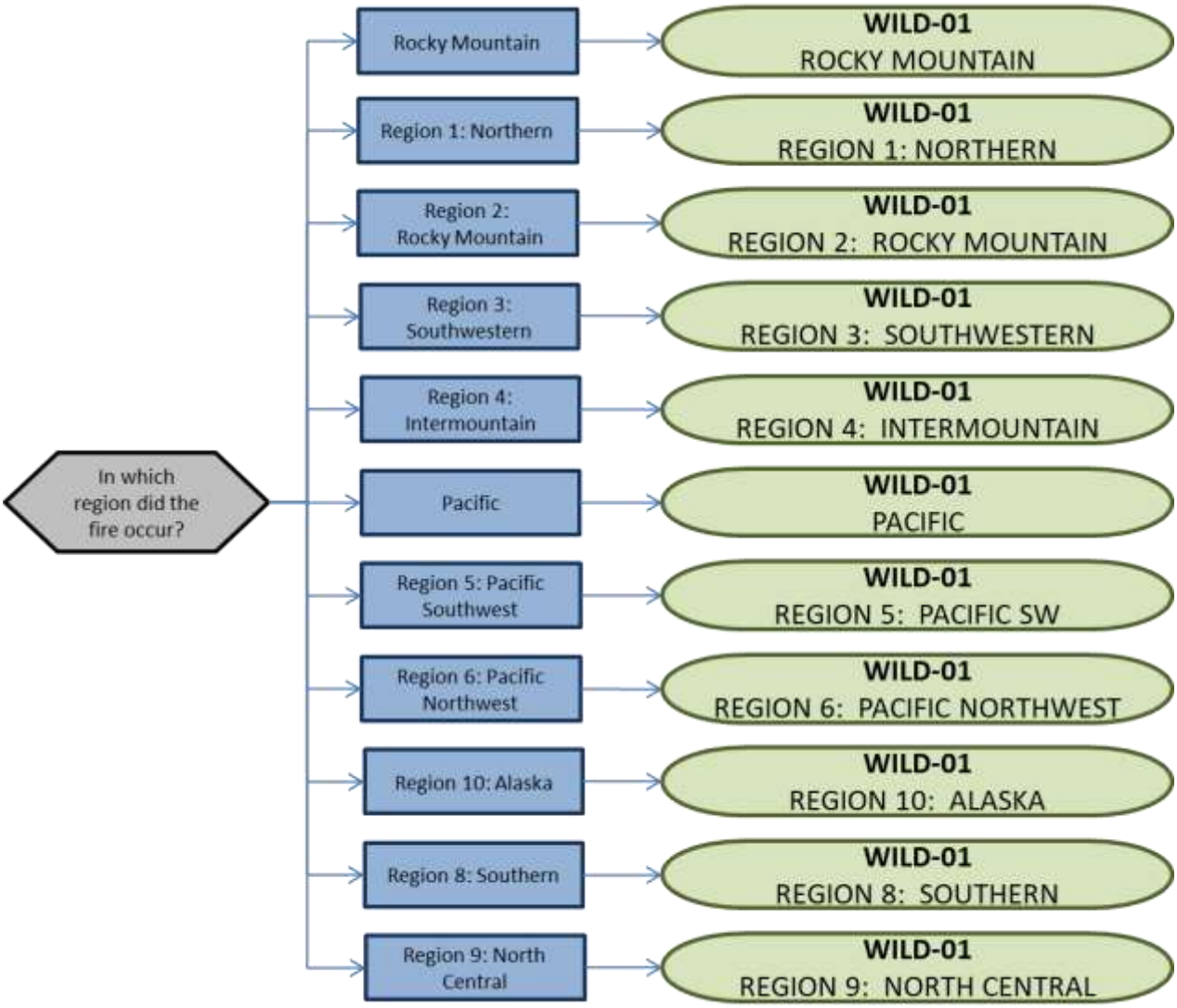
The next tab is the *Calculations* tab.



To associate an algorithm to the process, click on the Create Process Algorithm Assignment hyperlink.



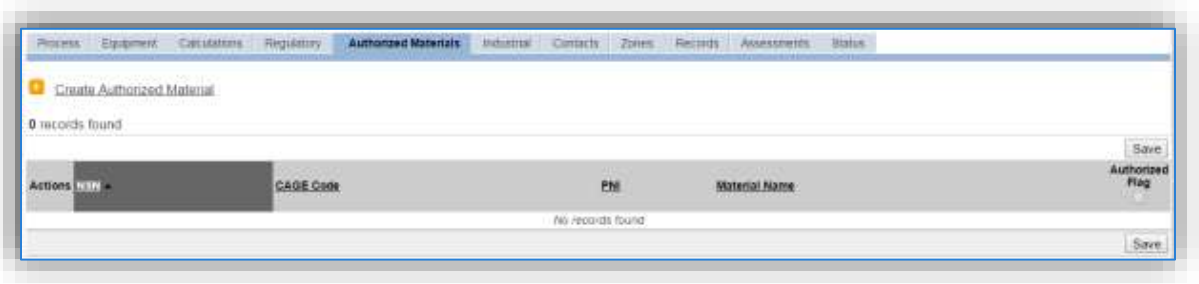
Select the **Algorithm Code** and **Emission Factor Characteristic** from the list of values that matches the correct scenario. Enter the **Start Date** to match the start date of the process. Click **Save & Finish** to save and return to the Calculations tab. Use the flowchart below to find the correct Algorithm Code.



If your permit requires a different type of calculation, contact the Air Force Air Quality Subject Matter Expert for approval of the alternative method.

3.17.11.3.7 Materials

The last step in setting up the Unique Process record is to the authorized materials on the *Authorized Materials* tab.



To authorize a material for the process, click on the Create Authorized Material hyperlink.

Select the material record from the list of values, using the **NSN** or Material Name. If the material is not available, the material record will need to be created.

It is suggested to use a material name that describes the material that is burned or a generic material record such as ACRES WILDFIRE or ACRES.

Next select "Yes" to **Authorize** the material, then **Save & Finish**. Since the emission factors utilized for burning activities are dependent upon the material burned, there should only be one material per process.

3.17.11.4 New Sources

3.17.11.4.1 Data Collection Sheet

The form on the next page is a printable guide that can be taken out to the location of the source and used to gather all the necessary information from the shop personnel. It can then be used as a guide to help configure the data in APIMS when you return to your office.

Wildfire Data Collection Worksheet

USAGE INFORMATION

How many acres burned? _____

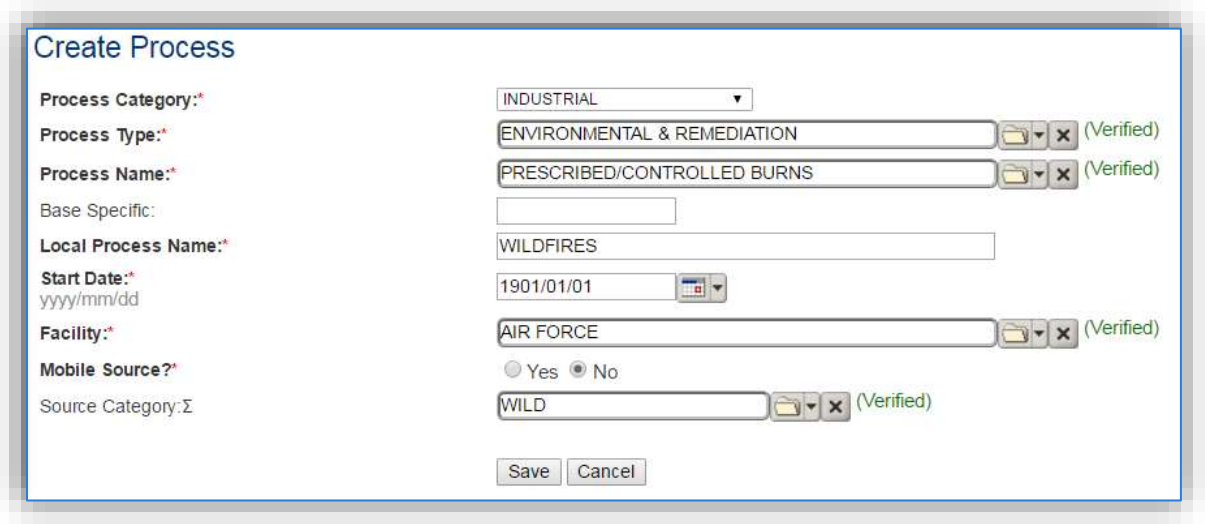
According to the map below, in which region did the fire occur?

- ☐ R1 – Northern
- ☐ R2 – Rocky Mountain
- ☐ R3 – Southwestern
- ☐ R4 – Intermountain
- ☐ R5 – Pacific Southwest
- ☐ R6 – Pacific Northwest
- ☐ R8 – Southern
- ☐ R9 – Conifers
- ☐ R10 - Alaska

3.17.11.4.2 New Source Configuration

In order to properly document this emission source in APIMS, there will need to be a Unique Process record for each type of material burned and each phase of burning if applicable.

Navigate to the Unique Process module in APIMS and click the Create New Process hyperlink.



Process Category	Process Type	Process Name	Process ID
INDUSTRIAL	ENVIRONMENTAL & REMEDIATION	PRESCRIBED/CONTROLLED BURNS	IER1819

Use the values in the table above to appropriately populate the **Process Category**, **Process Type** and **Process Name**.

The **Local Process Name** should be in a standard naming convention for all sources that helps to quickly identify, what the process is, where it is and any other unique attribute. For example, WILDFIRES.

The **Start Date** should be the date the first time the activity occurred. If this date is not known, enter 1901/01/01 as a default start date.

The **Facility** should be the facility name that is responsible for the source.

The **Mobile Source?** flag should be "NO" as this is considered as fugitive stationary source.

All wildfires are assigned to the WILD **Source Category**.

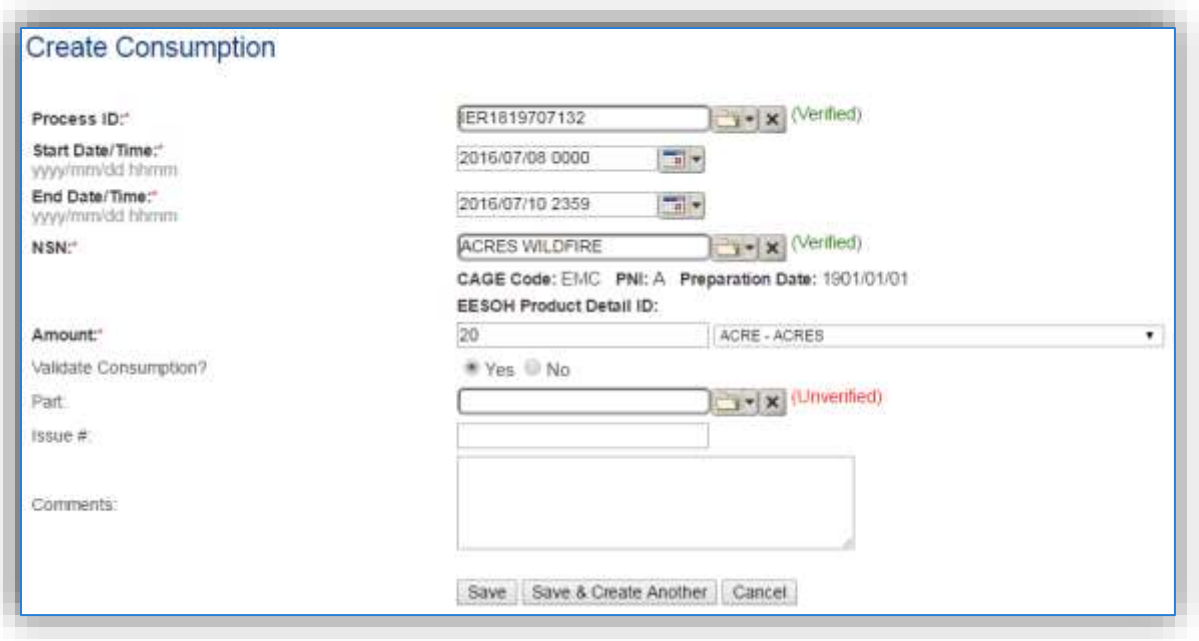
For the population of all other tabs, refer to the Existing Sources sections.

3.17.11.5 Year-to-Year Maintenance

3.17.11.5.1 Usage

The consumption for wildfires should only be tracked on an as needed basis. To correctly document the usage for this emission source the consumption should be entered in the Consumption log.

Navigate to the Consumption module and click the Create Consumption hyperlink.



The consumption record should span the entire reporting period or the duration of the activity as shown above. The material should be the acres material record.

3.17.11.5.2 Emissions Calculation

To correctly calculate emissions this emission source should be included in a **Transitory Source Calculation**. Reference Section 2.7 Emissions Calculations for additional instructions and details.

4. Quality Assurance of AEIs

Installations can use this section of the guide to ensure the AEI being submitted is complete and accurate. There are several data issues that can cause an incorrect or incomplete AEI, such as:

- Discrepancies between operating data units and calculation methodologies
- Use of EESOH-MIS data
- Gross fluctuation of emission from year to year
- Non-routine source categories submitted as stationary sources
- Duplication of sources/calculations

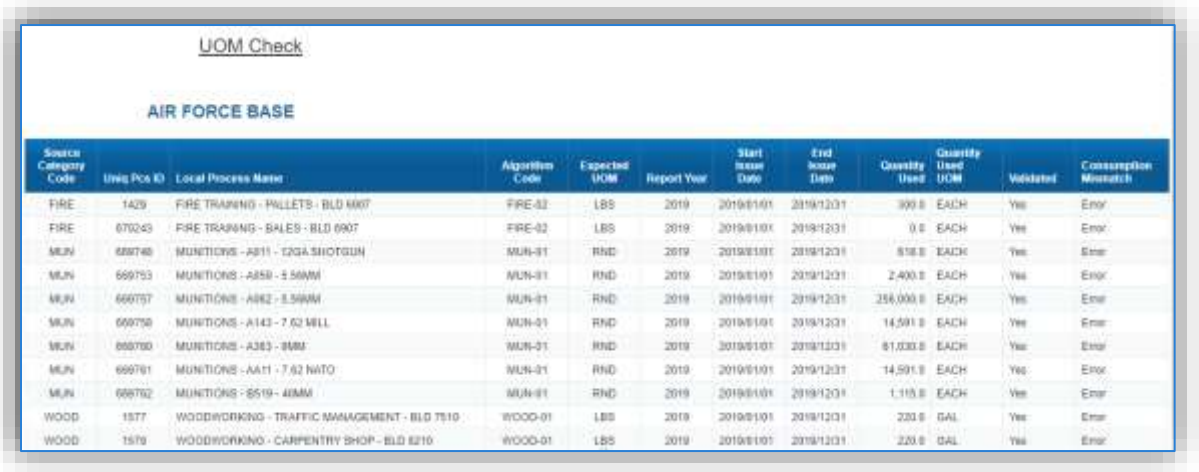
This section will utilize standard Business Objects reports to help identify potential data issues and areas of concern. Additionally, this section will show how to correct some of the most commonly occurring errors.

4.1 Incorrectly Documented Usage

4.1.1 Incorrect Units of Measure

Usage that is entered in the wrong units of measure according to what the algorithm is expecting, is a very common mistake. Often times the operators will provide the usage data in the terms or units that best match their tracking and business practices. This data is then entered into APIMS, calculations are run, and results are generated with no error messages. There is nothing in screens of APIMS that will let a user know their usage was entered in the wrong units of measure for the algorithm assigned to the process. For this reason, a Business Objects report has been created to identify any usage records that fall into this category. The report is located in the following folder, PMO Reports >> Air Quality >> AEI Quality Assurance folder, Usage Summary – Stationary. For guidance on using Business Objects to utilize reports, refer to Section 5 Custom Reporting.

In this report workbook there is a report called UOM Check. This report will display all the usage records entered into APIMS in the Consumption log for a specified time period.

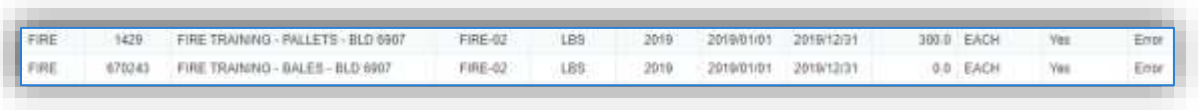


UOM Check

AIR FORCE BASE

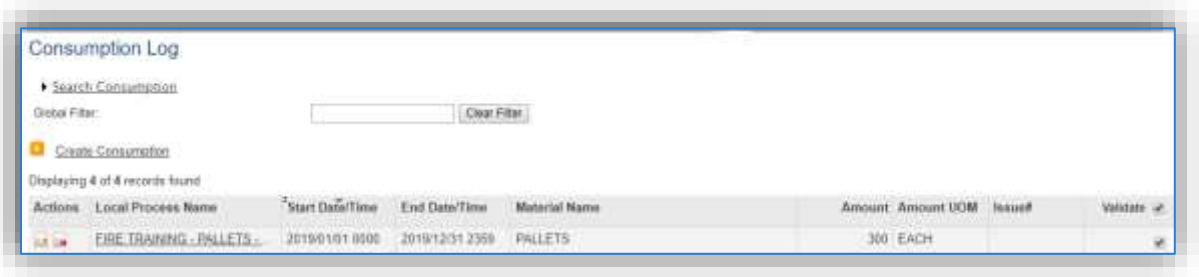
Source Category Code	Uniq Pcs ID	Local Process Name	Algorithm Code	Expected UOM	Report Year	Start Issue Date	End Issue Date	Quantity Used	Quantity Used UOM	Validated	Consumption Mismatch
FIRE	1429	FIRE TRAINING - PALLETS - BLD 6907	FIRE-02	LBS	2019	2019/01/01	2019/12/31	300.0	EACH	Yes	Error
FIRE	670243	FIRE TRAINING - BALES - BLD 6907	FIRE-02	LBS	2019	2019/01/01	2019/12/31	0.0	EACH	Yes	Error
MUN	669748	MUNITIONS - A811 - 12GA SHOTGUN	MUN-01	RND	2019	2019/01/01	2019/12/31	516.0	EACH	Yes	Error
MUN	669753	MUNITIONS - A858 - 5.56MM	MUN-01	RND	2019	2019/01/01	2019/12/31	2,400.0	EACH	Yes	Error
MUN	669757	MUNITIONS - A862 - 5.56MM	MUN-01	RND	2019	2019/01/01	2019/12/31	256,000.0	EACH	Yes	Error
MUN	669758	MUNITIONS - A143 - 7.62 MILL	MUN-01	RND	2019	2019/01/01	2019/12/31	14,591.0	EACH	Yes	Error
MUN	669760	MUNITIONS - A383 - 9MM	MUN-01	RND	2019	2019/01/01	2019/12/31	61,030.0	EACH	Yes	Error
MUN	669761	MUNITIONS - AA11 - 7.62 NATO	MUN-01	RND	2019	2019/01/01	2019/12/31	14,591.0	EACH	Yes	Error
MUN	669762	MUNITIONS - B519 - 40MM	MUN-01	RND	2019	2019/01/01	2019/12/31	1,115.0	EACH	Yes	Error
WOOD	1577	WOODWORKING - TRAFFIC MANAGEMENT - BLD 7510	WOOD-01	LBS	2019	2019/01/01	2019/12/31	220.0	GAL	Yes	Error
WOOD	1578	WOODWORKING - CARPENTRY SHOP - BLD 6210	WOOD-01	LBS	2019	2019/01/01	2019/12/31	220.0	GAL	Yes	Error

This report is not a definitive list of errors but can help identify potential errors. The first Source Category shown is FIRE.



FIRE	1429	FIRE TRAINING - PALLETS - BLD 6907	FIRE-02	LBS	2019	2019/01/01	2019/12/31	300.0	EACH	Yes	Error
FIRE	670243	FIRE TRAINING - BALES - BLD 6907	FIRE-02	LBS	2019	2019/01/01	2019/12/31	0.0	EACH	Yes	Error

As shown above, the algorithm assigned to the two processes is FIRE-02, the report shows that the expected unit of measure for the algorithm is LBS but the consumption was entered as EACH. The next step is to find the usage record in the Consumption Log; use the Process ID and date range to find the matching record(s).



Consumption Log

Search Consumption

Global Filter: Clear Filter

Create Consumption

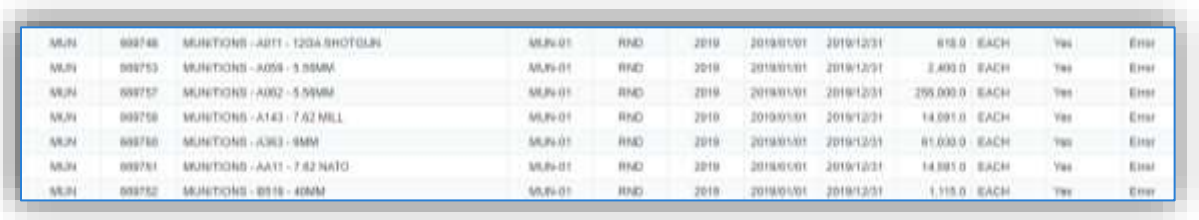
Displaying 4 of 4 records found

Actions	Local Process Name	Start Date/Time	End Date/Time	Material Name	Amount	Amount UOM	Issue#	Validate
	FIRE TRAINING - PALLETS -	2019/01/01 0000	2019/12/31 2359	PALLETS	300	EACH		

The Consumption Log shows that the usage was recorded as 300 pallets. Since each pallet weighs approximately 40 pounds, the usage for this process is significantly under reported and the emission will be significantly lower than they should be. The usage should be 12,000 LBS which as shown by the emission calculation example below will result in significantly higher emissions.

Consumption	*	EF	=	LBS of Emissions
300	*	0.002 LBS/LB (NOx)	=	0.6
12000	*	0.002 LBS/LB (NOx)	=	24

The next Source Category shown is MUN for munitions. In this scenario, the report shows that the unit of measure expected does not match the unit of measure recorded in the Consumption Log.



MUN	669748	MUNITIONS - A011 - 12GA SHOTGUN	MUN-01	RND	2019	2019/01/01	2019/12/31	610.0	EACH	Yes	Error
MUN	669753	MUNITIONS - A059 - 5.56MM	MUN-01	RND	2019	2019/01/01	2019/12/31	2,400.0	EACH	Yes	Error
MUN	669757	MUNITIONS - A062 - 5.56MM	MUN-01	RND	2019	2019/01/01	2019/12/31	255,000.0	EACH	Yes	Error
MUN	669758	MUNITIONS - A143 - 7.62 NILL	MUN-01	RND	2019	2019/01/01	2019/12/31	14,081.0	EACH	Yes	Error
MUN	669760	MUNITIONS - A363 - 9MM	MUN-01	RND	2019	2019/01/01	2019/12/31	61,000.0	EACH	Yes	Error
MUN	669761	MUNITIONS - AA11 - 7.62 NATO	MUN-01	RND	2019	2019/01/01	2019/12/31	14,081.0	EACH	Yes	Error
MUN	669762	MUNITIONS - B519 - 40MM	MUN-01	RND	2019	2019/01/01	2019/12/31	1,115.0	EACH	Yes	Error

The expected unit of measure is RND for round and the usage is recorded as EACH. For this, the emission calculation will remain the same as they are both recording a single unit of the munition. No further action is required.

The last Source Category shown is WOOD for woodworking operations. In this scenario, the expected unit of measure is LBS but the usage was recorded in GAL.

WOOD	1577	WOODWORKING - TRAFFIC MANAGEMENT - BLD 7510	WOOD-01	LBS	2019	2019/01/01	2019/12/31	220.0	GAL	Yes	Error
WOOD	1578	WOODWORKING - CARPENTRY SHOP - BLD 8210	WOOD-01	LBS	2019	2019/01/01	2019/12/31	220.0	GAL	Yes	Error

Most likely the shop reported in gallons because they use a 55-gallon drum to collect the waste and the barrel was emptied 4 times during the year for a total of 220 gallons. However, this number then should be converted to LBS using an approximate density of the sawdust. The AFCEC Stationary Source Guide specifies the following:

Table 26-2. Typical Sawdust Densities

Wood (Air dried)	Sawdust Density (lb/ft^3)
Elm	14.0
Fir, Balsam	10.0
Fir, Douglas	12.8
Hemlock	11.6
Hickory	19.2
Maple, Sugar	17.2
Maple, White	13.2
Oak, Red	16.8
Oak, White	19.2
Pine, Southern	16.0
Average	**15.0**

If the 220 gallons of sawdust was multiplied by the average density of sawdust specified in the guide, 15 lbs/ft^3.

$$110 \text{ gallons} * 1 \text{ ft}^3/7.48 \text{ gal} = 14.7 \text{ ft}^3$$

$$14.7 \text{ ft}^3 * 15 \text{ lbs/ft}^3 = 220 \text{ lbs of sawdust}$$

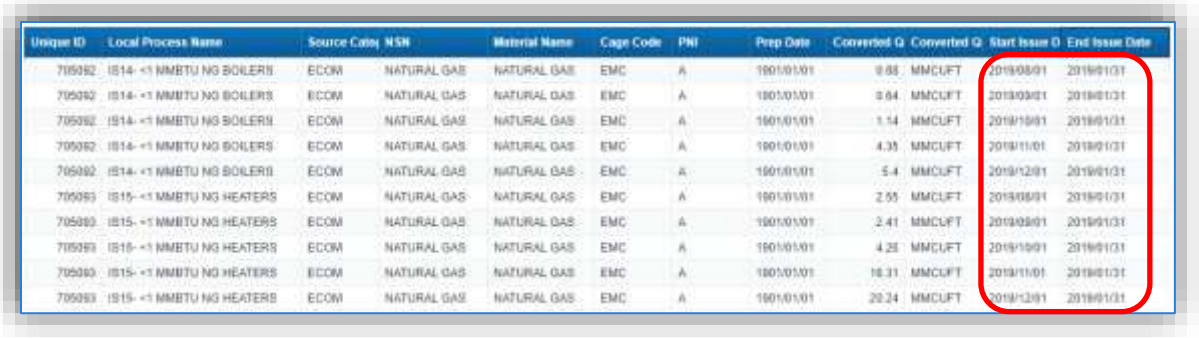
(Waste Collected	/	Control Efficiency)	-	Waste Collected	*	EF	=	LBS of Emissions
110	/	0.95	-	110	*	1 LBS/LB (PM)	=	5.79
220	/	0.95	-	220	*	1 LBS/LB (PM)	=	11.58

As shown above, the emissions are actually double the amount originally calculated. These are examples of sources with a small amount of emissions, however errors like this can be compounded to cause significant changes to an overall AEI.

4.1.2 Incorrect Usage Dates

In APIMS, emission calculations utilize the usage that is entered for the specific time period. For example, if usage is entered spanning from January 1 to December 31 as a single usage record and emission calculations are run monthly, APIMS will prorate the usage for each month. For example, if 120 is the annual usage 10 will be used for each monthly calculation. For this reason, it is important to make sure the dates entered in the consumption log are entered correctly. Several reports have been generated to help diagnose these types of errors. Navigate to the PMO Reports >> Air Quality >> AEI Quality Assurance folder, Usage Summary – Stationary report in Business Objects.

The *Usage with End Date Before Start Date* report, will display any usage records that have an end date that occurs before the start date. This is usually caused by records that have been input into APIMS utilizing the API interface as manually entered records cannot have this problem due to controls on the input screens.

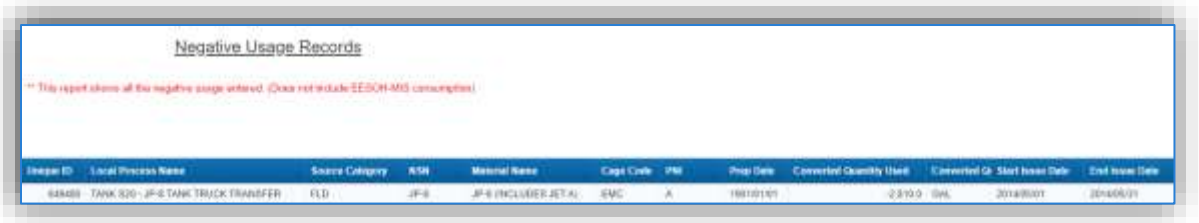


Unique ID	Local Process Name	Source Categ	NSN	Material Name	Cage Code	PNI	Prep Date	Converted Q	Converted Q	Start Issue D	End Issue Date
705092	IS14- <1 MMBTU NG BOILERS	ECOM	NATURAL GAS	NATURAL GAS	EMC	A	1901/01/01	0.68	MMCUFT	2018/08/01	2018/01/31
705092	IS14- <1 MMBTU NG BOILERS	ECOM	NATURAL GAS	NATURAL GAS	EMC	A	1901/01/01	0.64	MMCUFT	2018/09/01	2018/01/31
705092	IS14- <1 MMBTU NG BOILERS	ECOM	NATURAL GAS	NATURAL GAS	EMC	A	1901/01/01	1.14	MMCUFT	2018/10/01	2018/01/31
705092	IS14- <1 MMBTU NG BOILERS	ECOM	NATURAL GAS	NATURAL GAS	EMC	A	1901/01/01	4.35	MMCUFT	2018/11/01	2018/01/31
705092	IS14- <1 MMBTU NG BOILERS	ECOM	NATURAL GAS	NATURAL GAS	EMC	A	1901/01/01	5.4	MMCUFT	2018/12/01	2018/01/31
705093	IS15- <1 MMBTU NG HEATERS	ECOM	NATURAL GAS	NATURAL GAS	EMC	A	1901/01/01	2.55	MMCUFT	2018/08/01	2018/01/31
705093	IS15- <1 MMBTU NG HEATERS	ECOM	NATURAL GAS	NATURAL GAS	EMC	A	1901/01/01	2.41	MMCUFT	2018/09/01	2018/01/31
705093	IS15- <1 MMBTU NG HEATERS	ECOM	NATURAL GAS	NATURAL GAS	EMC	A	1901/01/01	4.28	MMCUFT	2018/10/01	2018/01/31
705093	IS15- <1 MMBTU NG HEATERS	ECOM	NATURAL GAS	NATURAL GAS	EMC	A	1901/01/01	16.31	MMCUFT	2018/11/01	2018/01/31
705093	IS15- <1 MMBTU NG HEATERS	ECOM	NATURAL GAS	NATURAL GAS	EMC	A	1901/01/01	20.24	MMCUFT	2018/12/01	2018/01/31

As shown in the example above the End Issue Date is several months before the Start Issue Date. To correct the error, navigate to the Consumption Log module and edit the record. It is best to use the Process ID and NSN in the Search Criteria to find the records. Once the records have been corrected the calculations will need to be re-run for the changes to the emission results to take effect.

4.1.3 Negative Usage Records

Another issue with usage records that can affect the emission results is negative usage. This can be the result of the EESOH-MIS interface or incorrectly entered API data.



Negative Usage Records

Unique ID	Local Process Name	Source Category	NSN	Material Name	Cage Code	PNI	Prep Date	Converted Quantity Used	Converted Q	Start Issue Date	End Issue Date
648488	TANK 920 - JP-8 TANK TRUCK TRANSFER	FLD	JP-8	JP-8 (INCLUDES JET A)	EMC	A	1901/01/01	-2,910.0	GAL	2014/08/01	2014/08/31

If records with negative usage are included in an emission calculation, they will give a negative emission result, which when combined into an AEI will cause a falsely low emission number. To correct the error, navigate to the Consumption Log module and edit the record. It is best to use the Process ID and NSN in the Search Criteria to find the records. If several results are return, enter the usage timeframe for the

selected record. Once the records have been corrected the calculations will need to be re-run for the changes to the emission results to take effect.

4.1.4 Usage Spanning More Than a Year

Usage that spans more than a year will greatly affect emission results as only the usage prorated to that year will be included in the emission calculation for that year. This can cause annual AEI data to be incorrect and falsely low for one year and falsely high for the next. The Usage Spanning Over 365 Days and the Usage in Multiple Years report will identify these records. The example report below shows most likely there was a typo in the End Issue Date year. This usage is probably supposed to account for the emissions during March of 2017, however only a fraction of the usage will be included in the emission calculations for March of 2017 as the usage is entered currently.

Unique ID	Local Process Name	Source Category	NSN	Material Name	Cage Code	PWI	Prop Date	Converted Quantity Used	Converted Quantity Used UOM	Start Issue Date	End Issue Date	Usage Over 365 days
649721	BLDG. 1838 - DIESEL BC	ECOM	DIESEL	DIESEL FUEL (INC	EMC	A	1901/01/01	3.0	GAL	2015/06/01	2016/06/30	Y
649723	BLDG. 3828 - NATURAL (	ECOM	NATUR	NATURAL GAS	EMC	A	1901/01/01	0.144947	MMCUFT	2017/03/01	2018/03/31	Y
649724	BLDG. 3828 - NATURAL (	ECOM	NATUR	NATURAL GAS	EMC	A	1901/01/01	0.144947	MMCUFT	2017/03/01	2018/03/31	Y
649725	BLDG. 2202 - NATURAL (	ECOM	NATUR	NATURAL GAS	EMC	A	1901/01/01	0.00285	MMCUFT	2017/03/01	2018/03/31	Y
649726	BLDG. 2202 - NATURAL (	ECOM	NATUR	NATURAL GAS	EMC	A	1901/01/01	0.00285	MMCUFT	2017/03/01	2018/03/31	Y
649727	BLDG. 2253 - NATURAL (	ECOM	NATUR	NATURAL GAS	EMC	A	1901/01/01	0.19755	MMCUFT	2017/03/01	2018/03/31	Y
649728	BLDG. 2253 - NATURAL (	ECOM	NATUR	NATURAL GAS	EMC	A	1901/01/01	0.19755	MMCUFT	2017/03/01	2018/03/31	Y

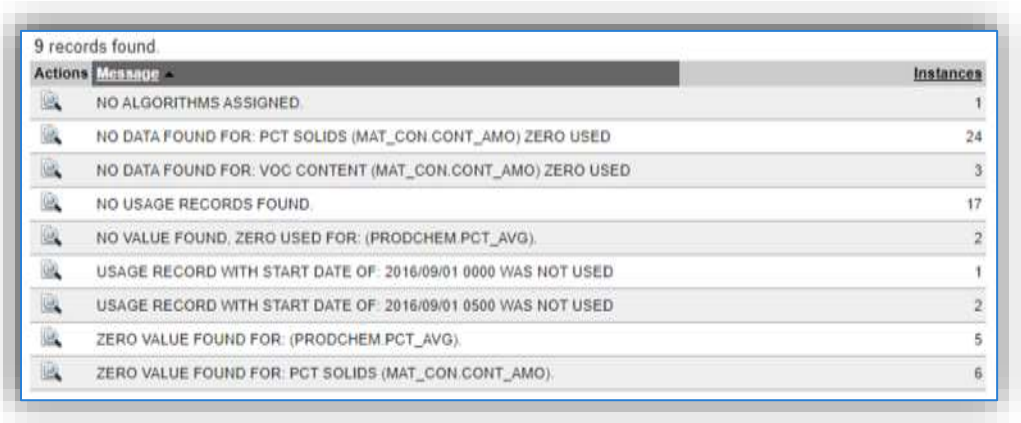
To correct the error, navigate to the Consumption Log module and edit the record. It is best to use the Process ID and NSN in the Search Criteria to find the records. Once the records have been corrected the calculations will need to be re-run for the changes to the emission results to take effect.

4.1.5 Missing Usage Records

Usage that is missing can lead to under reporting emissions for specific source categories and total facility emissions. There may be several reasons why no usage was recorded for the report year, however installation permits may require the documentation to prove usage did not occur. The Missing Usage report will identify these records. The example report below shows several processes with the expected usage interval which are missing usage records.

Source Category Code	Uniq Pcs ID	Local Process Name	Bldg No	Process Location Complete Name	Usage Interval	Process Status	Process Status Date
AST	635776	HFR-2000 GALLONS			ANNUAL	ACT	1901/01/01
AST	635775	HFR-275 GALLONS			ANNUAL	ACT	1901/01/01
AST	635769	HFR-1000 GALLONS			ANNUAL	ACT	1901/01/01
AST	635868	HFR-2000 GALLONS			ANNUAL	ACT	1901/01/01
AST	635854	HFR-750 GALLONS			ANNUAL	ACT	1901/01/01
BURN	671496	PRESCRIBED BURNING ACTIVITIES			ANNUAL	ACT	1901/01/01
CELL	641005	C-100 FUEL CELL MAINTENANCE			MONTHLY	ACT	1901/01/01
CELL	641006	A-10 - FUEL CELL MAINTENANCE			MONTHLY	ACT	1901/01/01
CELL	641007	HH-60 - FUEL CELL MAINTENANCE			ANNUAL	ACT	1901/01/01
CNST	674835	CONSTRUCTION - CROSS COUNTRY WALKING TRAIL			ANNUAL	ACT	2012/01/01
CNST	674836	CONSTRUCTION - JOGGING TRAIL			ANNUAL	ACT	2012/01/01
MUN	641796	MUNITIONS ACTIVITIES - 7.62MM DODIC A130			ANNUAL	ACT	1901/01/01
MUN	641797	MUNITIONS ACTIVITIES - 5.56MM M855 - DODIC A059			ANNUAL	ACT	1901/01/01
MUN	641798	MUNITIONS ACTIVITIES - 9MM - DODIC A363			ANNUAL	ACT	1901/01/01
MUN	641799	MUNITIONS ACTIVITIES - 12GA 00 BUCK - A011			ANNUAL	ACT	1901/01/01
MUN	641802	MUNITIONS ACTIVITIES - 40M TP M781 - DODID B519			ANNUAL	ACT	1901/01/01
WOOD	1500	WOODWORKING - WOOD HOBBY SHOP	840		ANNUAL	ACT	1901/01/01
WOOD	1936	WOODWORKING - CIVIL ENGINEERING WOOD SHOP	915		ANNUAL	ACT	1901/01/01

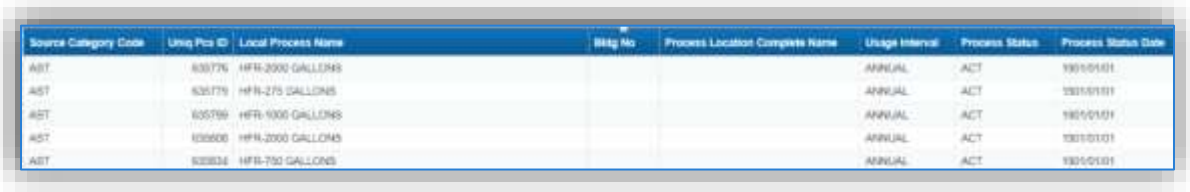
Additionally, the Messages tab associated to the calculation will identify the number of instances in which no usage records found.



9 records found.

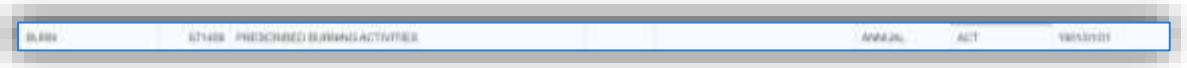
Actions	Message	Instances
	NO ALGORITHMS ASSIGNED.	1
	NO DATA FOUND FOR: PCT SOLIDS (MAT_CON.CONT_AMO) ZERO USED	24
	NO DATA FOUND FOR: VOC CONTENT (MAT_CON.CONT_AMO) ZERO USED	3
	NO USAGE RECORDS FOUND.	17
	NO VALUE FOUND, ZERO USED FOR: (PRODCHEM.PCT_AVG).	2
	USAGE RECORD WITH START DATE OF: 2016/09/01 0000 WAS NOT USED	1
	USAGE RECORD WITH START DATE OF: 2016/09/01 0500 WAS NOT USED	2
	ZERO VALUE FOUND FOR: (PRODCHEM.PCT_AVG).	5
	ZERO VALUE FOUND FOR: PCT SOLIDS (MAT_CON.CONT_AMO).	6

While the report shows all the active processes that did not have a usage record during the specified time frame not all will require a usage record to be entered. For example, storage tanks that are small organizational tanks cannot calculate emission because they are below the size threshold. Also these tanks are often difficult to track usage for and have deminimus emissions. These tanks are in APIMS with processes configured but will not usually have usage associated, therefore no action is required for these missing usage records.

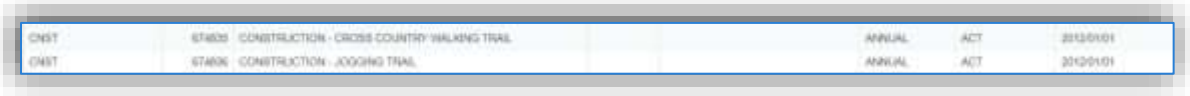


Source Category Code	Uniq Pcs ID	Local Process Name	Bldg No	Process Location Complete Name	Usage Interval	Process Status	Process Status Date
AST	635776	HFR-2000 GALLONS			ANNUAL	ACT	1901/01/01
AST	635779	HFR-275 GALLONS			ANNUAL	ACT	1901/01/01
AST	635799	HFR-1000 GALLONS			ANNUAL	ACT	1901/01/01
AST	639600	HFR-2000 GALLONS			ANNUAL	ACT	1901/01/01
AST	639834	HFR-750 GALLONS			ANNUAL	ACT	1901/01/01

The next set of processes that are missing usage records are in the BURN and CNST source categories.



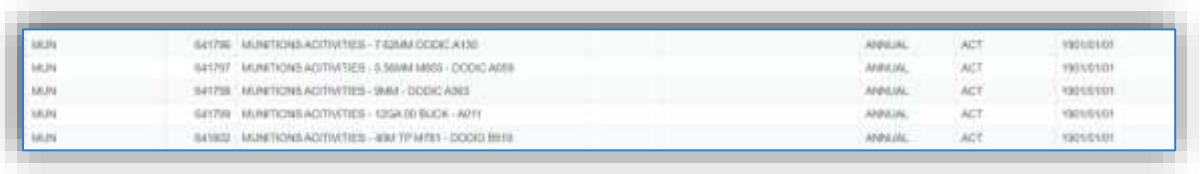
BURN	671458	PRESCRIBED BURNING ACTIVITIES			ANNUAL	ACT	1901/01/01



CNST	674839	CONSTRUCTION - CROSS COUNTRY WALKING TRAIL			ANNUAL	ACT	2012/01/01
CNST	674836	CONSTRUCTION - JOGGING TRAIL			ANNUAL	ACT	2012/01/01

These sources are usually considered transitory sources, meaning they are non-routine and/or seasonal sources that are short term in nature. Before determining if a source is transitory, consult all applicable regulations as in some areas these sources may be regulated. For this example, if at this installation these sources are considered transitory, these processes may not have usage every year but will remain active as they may occur in the future. In this case, a usage record with “0” usage may be entered or these records may be left as is.

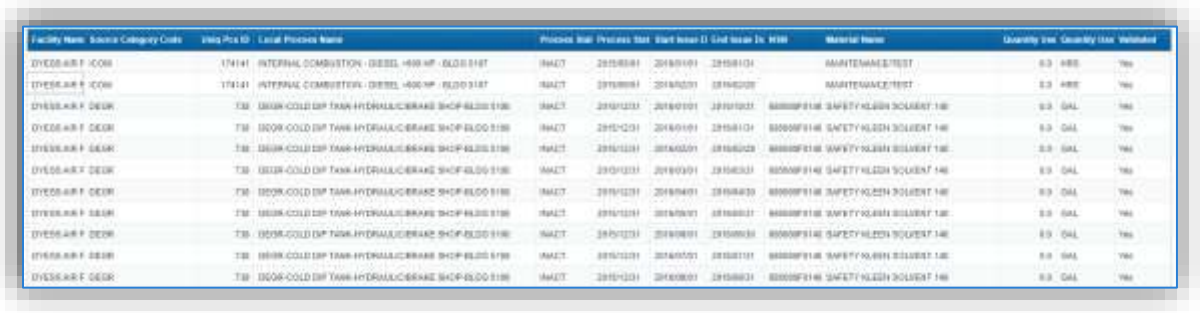
The munitions processes listed below may not have usage entered because that particular round of munitions was not used during this reporting period. In that case it is a best practice to enter a record with "0" usage. By documenting a 0 usage record it confirms that the process was reviewed and confirmed to not have any usage. If no usage record at all is entered it leaves the question of whether the process usage was missed or if it was found to have no usage.



If the process usage was accidently missed, then the correct usage should be entered into APIMS. Additionally, if the process is no longer active, navigate to the Status tab of the process record and enter a start date for the inactive status.

4.1.6 Inactive Process Usage

Another issue with usage records that can affect the emission results is inactive process usage. This can be the result of incorrectly entered API data.

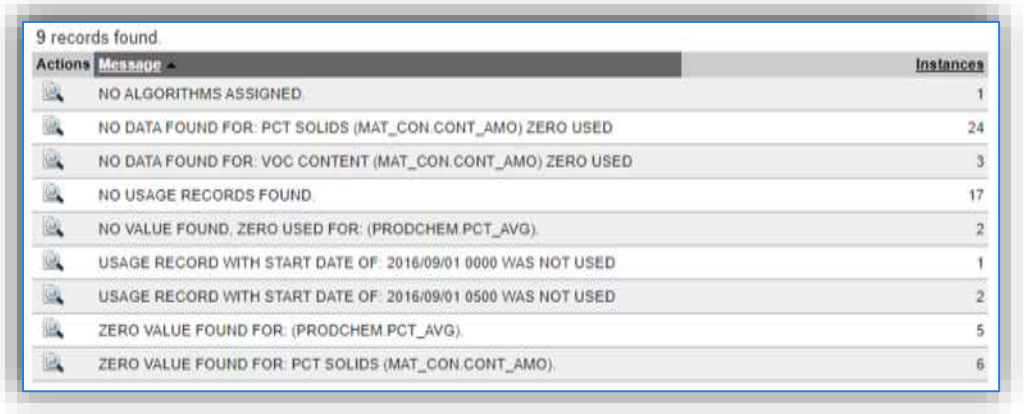


To correct the error, navigate to the Unique Process module and edit the record. It is best to use the Process ID in the Search Criteria to find the record. Update the process status record to Active. Additionally, if the consumption record was entered erroneously, navigate to the Consumption Log, and delete the record. It is best to use the Process ID and NSN in the Search Criteria to find the record. Once the records have been updated/deleted the calculations will need to be re-run for the changes to the emission results to take effect.

4.1.7 Usage Missing Emissions

A final example that may cause lower than expected emissions is related to processes not calculating emissions based on usage during the selected time span. The most common mistake is that the process is missing algorithm associations. Additionally, this anomaly will occur when an inactive process has usage and emissions are calculated for a selected time span which is after the inactive date of the process. Refer to the section above to correct this error.

The Messages tab related to the calculation can also be utilized to identify the number of instances where a process does not have an active algorithm association for the specified time period.



9 records found.

Actions	Message	Instances
	NO ALGORITHMS ASSIGNED.	1
	NO DATA FOUND FOR: PCT SOLIDS (MAT_CON.CONT_AMO) ZERO USED	24
	NO DATA FOUND FOR: VOC CONTENT (MAT_CON.CONT_AMO) ZERO USED	3
	NO USAGE RECORDS FOUND.	17
	NO VALUE FOUND, ZERO USED FOR: (PRODCHEM.PCT_AVG).	2
	USAGE RECORD WITH START DATE OF: 2016/09/01 0000 WAS NOT USED	1
	USAGE RECORD WITH START DATE OF: 2016/09/01 0500 WAS NOT USED	2
	ZERO VALUE FOUND FOR: (PRODCHEM.PCT_AVG).	5
	ZERO VALUE FOUND FOR: PCT SOLIDS (MAT_CON.CONT_AMO).	6

To update the Unique Process algorithm association, navigate to the Unique Process module and edit the record. It is best to use the Process ID in the Search Criteria to find the record. Associate the correct process algorithm assignment, based on the source category code and usage unit of measure. Once the records have been updated the calculations will need to be re-run for the changes to the emission results to take effect.

4.2 Incorrectly Documented EESOH-MIS Data

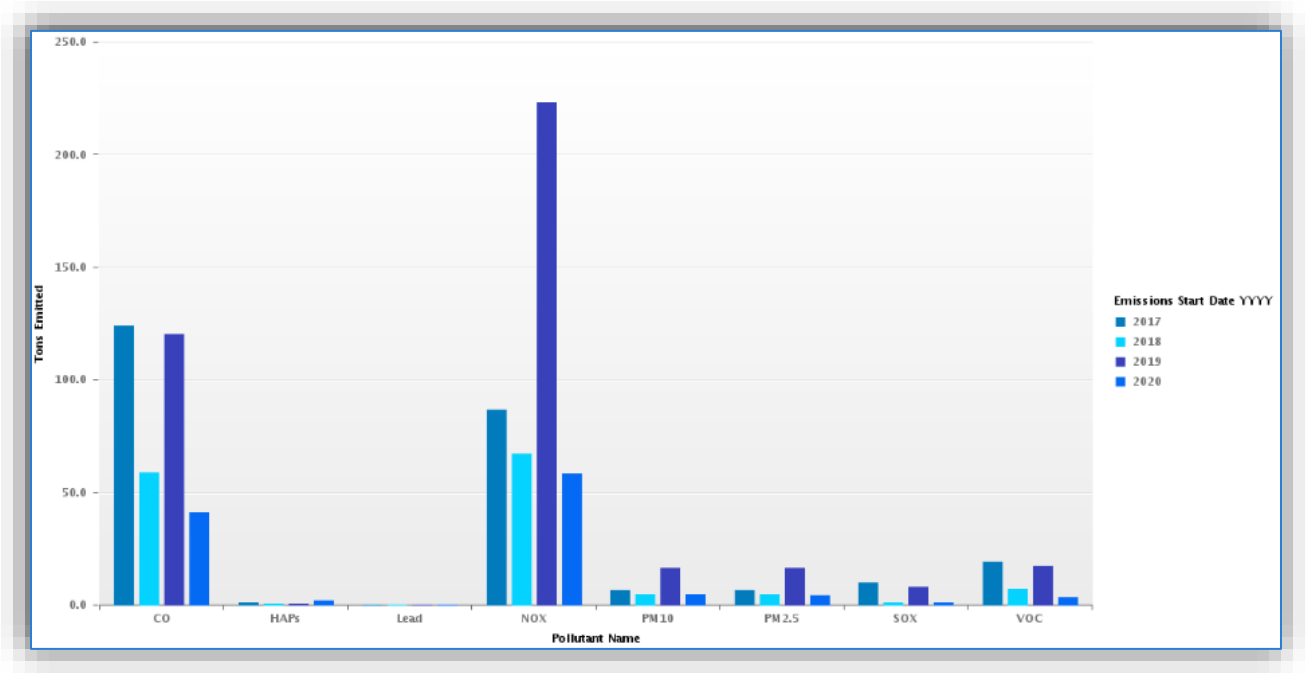
Depending on the size and mission of your installation, EESOH-MIS data may contribute to 30-50% of your total data in APIMS. With such a large set of data it may be cumbersome to identify and resolve issues with the data that result in lower/higher emissions for the installation. Therefore, it is recommended that all messages associated to the calculation be reviewed and updated (if applicable). Additionally, there is nothing in the front end of APIMS that will let a user know of additional data anomalies. For this reason, a Business Objects report has been created to identify any usage records that fall into this category, PMO Reports >> Air Quality >> AEI Quality Assurance folder, EESOH Data QA. Refer to Section 2.6 on how to configure EESOH-MIS data.

4.3 Inconsistent Year-to-Year Emissions

4.3.1 Source Specific Inconsistencies

While emissions from EESOH-MIS sources may have frequent highs and lows, year-to-year emissions from other stationary sources should remain consistent. If the installation's mission changes or there is a change in manpower, then a new baseline will be utilized. To analyze the emissions for an installation on a year to year basis, a Business Objects report has been created. The report is located in the

following folder, PMO Reports >> Air Quality >> AEI Quality Control >> Emissions Year to Year with HAPs.



In the example above, the emissions are represented by stationary sources with usage for calendar years 2017-2020. Based on the data provided, emissions in 2019 are exponentially higher than in 2020.

Specifically focusing on NOx emissions, the 2019 value is more than triple any other year. A further breakdown of the data provides the following details of the source(s) which accounted for the higher NOx emissions in 2019.

Source Category	Process ID	Process Name	2017 Tons Emitted	Percent Change	2018 Tons Emitted	Percent Change	2019 Tons Emitted	Percent Change	2020 Tons Emitted	Percent Change
		Total tons of NOX for ECOM	17.640941		60.051112	240%	113.235632	89%	46.05171	-59%
		Total tons of NOX for HEAT	0.128507		0.903776	603%	2.914401	222%	4.964755	70%
		Total tons of NOX for ICOM	4.759034		3.392853	-29%	105.208279	3003%	8.32847	-94%
		Total tons of NOX for JET	63.393724		2.561836	-96%	1.640351	-36%	1.064767	-35%
		Total tons of NOX for OBOD			0.000015					
		Total (tons) of NOX	86.522206		66.909592	-23%	223.070943	233%	58.409702	-74%

In this example, NOx emissions were 3003% higher and 222% higher for ICOM and HEAT, respectively. Reviewing the IC Usage Log, identified numerous issues with the data. Refer to Section 4.1 Incorrectly Documented Usage on steps to update these records. Additionally, the usage for HEAT was entered in the wrong unit of measure.

When there are large fluctuations in the emission profile it is most likely due to a calculation or data entry error. However sometimes there are large fluctuations but there are no errors in the data. In this

situation it is important to understand what caused the significant increase or decrease. For example, did a new workload come onto the installation, or was there a significant event. One such significant event could be a flood that caused a prolonged power outage, resulting in significant use of the emergency generators.

4.3.2 Process Specific Inconsistencies

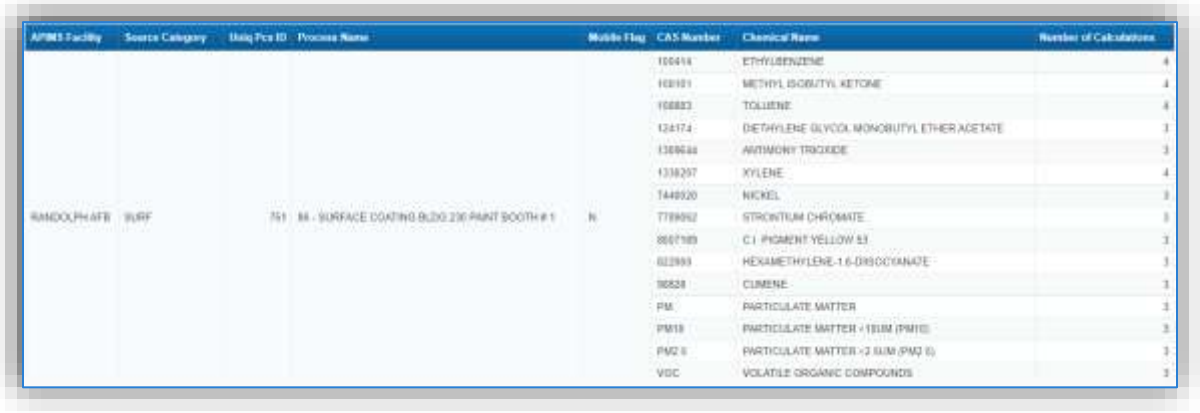
In addition to source specific inconsistencies, process data should also be reviewed. Refer to Section 4.1 Incorrectly Documented Usage if the inconsistencies are related to usage.

ICOM	614655	518-DIESEL GENERATOR - 4023 HP ENGINE - UNIT 6	0.472882		0.925769	95.77%	-100.00%
	614656	518-DIESEL GENERATOR - 4023 HP ENGINE - UNIT 7	0.499871		0.831176	66.28%	-100.00%
	665082	304 - DIESEL FIRE PUMP - 270 HP ENGINE - UNIT 1	0.006216		0.000622	-89.99%	0.00632	916.08%
	665084	492-DIESEL FIRE PUMP-270 HP ENGINE - UNIT 3	0.00518		0.000047	-99.09%	0.002647	5,531.91%
	683980	706 (SCRIBNER) - DIESEL GENERATOR - 151 HP ENGINE	0.004007		0.004006	-0.02%	0.022352	457.96%
	713733	75 - DIESEL GENERATOR - 38 HP ENGINE	0.000866		0.000256	-70.44%	0.000197	-23.05%
	713734	76 - DIESEL GENERATOR - 27 HP ENGINE	0.00116		0.006107	426.47%	0.000259	-95.76%
	713735	301 - DIESEL GENERATOR - 145 HP ENGINE	0.004681		0.002509	-46.40%	0.002745	9.41%
	713739	1004 - DIESEL GENERATOR - 3641 HP ENGINE - UNIT 4	0.011112		0.162105	1,358.83%	0.152069	-6.19%
	713740	1004 - DIESEL GENERATOR - 3641 HP ENGINE - UNIT 5	0.011112		0.163648	1,372.71%		-100.00%
	713741	1004 - DIESEL GENERATOR - 3641 HP ENGINE - UNIT 3	0.011112		0.174454	1,469.96%		-100.00%
	713742	1004 - DIESEL GENERATOR - 3641 HP ENGINE - UNIT 1	0.011112		0.155157	1,296.30%		-100.00%
	713743	1004 - DIESEL GENERATOR - 3641 HP ENGINE - UNIT 2	0.011112		0.146666	1,219.89%		-100.00%
	713744	1022 - DIESEL GENERATOR - 3641 HP ENGINE - HEMP #3	0.011112		0.113473	921.18%		-100.00%
	713745	1022 - DIESEL GENERATOR - 3641 HP ENGINE - HEMP #2	0.011112		0.184491	1,560.29%		-100.00%
	713746	1022 - DIESEL GENERATOR - 3641 HP ENGINE - HEMP #1	0.011112		0.088773	698.89%		-100.00%
	714547	304 - DIESEL FIRE PUMP - 270 HP ENGINE - UNIT 2	0.006735		0.000622	-90.76%	0.016067	2,483.12%
	714633	523-DIESEL GENERATOR-676 HP ENGINE - UNIT 2	0.013837		0.000495	-96.42%		-100.00%
	714654	598-DIESEL GENERATOR-970 HP ENGINE - UNIT 2	0.0		0.006744	#DIV/0		-100.00%
	714655	598-DIESEL GENERATOR-970 HP ENGINE - UNIT 1	0.023188		0.005042	-78.26%		-100.00%
	714656	524-DIESEL GENERATOR-762 HP ENGINE	0.0		0.487934	#DIV/0		-100.00%
	714658	598-DIESEL GENERATOR-970 HP ENGINE - UNIT 3						
	714665	457 - FIRE PUMP - 400 HP ENGINE - UNIT 1	0.004608		0.0	-100.00%		#DIV/0
	714666	457 - FIRE PUMP - 450 HP ENGINE - UNIT 2	0.002838		0.000103	-96.37%		-100.00%
	714667	457 - FIRE PUMP - 450 HP ENGINE - UNIT 3	0.007095		0.0	-100.00%		#DIV/0
	714668	492-DIESEL FIRE PUMP-270 HP ENGINE - UNIT 1	0.00518		0.000103	-98.01%	0.004144	3,923.30%
	714669	492-DIESEL FIRE PUMP-270 HP ENGINE - UNIT 2	0.00518		0.0	-100.00%	0.003315	#DIV/0
	714680	200 - DIESEL GENERATOR - 280 HP ENGINE	0.009888		0.005415	-45.24%	0.003907	-27.85%
	719875	500-DIESEL GENERATOR - 1341 HP ENGINE			0.034816			-100.00%
	723910	500-DIESEL GENERATOR - 1341 HP ENGINE			0.040457			-100.00%
	725417	2108A - DIESEL GENERATOR - 173 HP					0.001193	
	725422	105-DIESEL GENERATOR-69 HP ENGINE					0.000757	
		Total tons of CO for ICOM	2.24788		4.594369		0.436666	

In the example above, the emissions related to the runtimes of IC engines were significantly higher in 2019. However, after reviewing the log, it was determined that these emissions were a result of a loss of power and are therefore a correct representation of this installation's emissions profile.

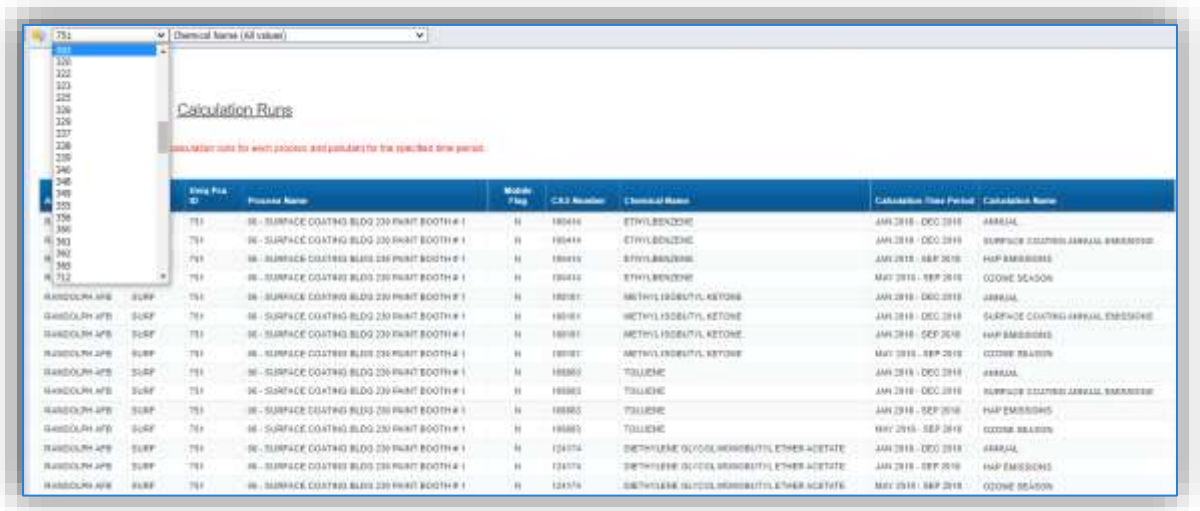
4.3.3 Incorrectly Documented Emission Calculations

Another common mistake is to associate to a process to more than one calculation associated to an AEI submittal. There are a few methods to identify and correct this issue. First, Section 2.7 Emission Calculations, outline the correct process calculation assignment. However, if there are inconsistencies with emissions, then the Duplicate Calculations report located in the PMO Reports >> Air Quality >> AEI Quality Assurance >> Duplicate Calculations can be utilized to identify the number of occurrences a process is associated to a calculation, for the specified time period.

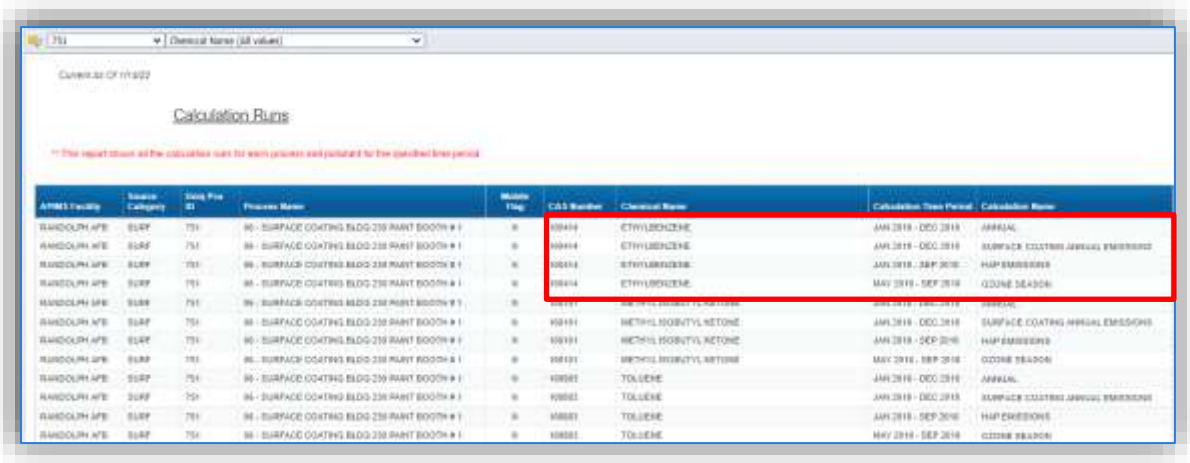


In the example above, on the Calculation Duplication report lists the pollutants that have been calculated for in more than one calculation for the specific time frame. The number in the last column shows how many different calculations have calculated emissions for this pollutant for this time frame. This means there is a chance the emissions for these pollutants have been reported to be 2, 3 and even 4 times causing falsely high emissions.

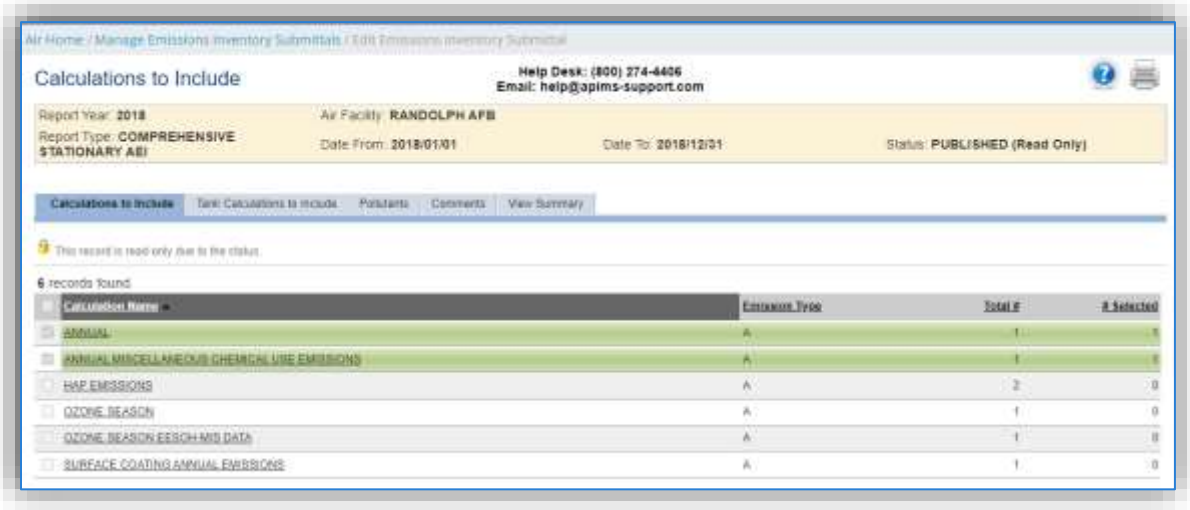
To determine which calculations need to be examined, the Calculation Runs report should be used. The Uniq Pcs ID from the Duplicate Calculations report can be used to filter the results of this report by using the drop-down box at the top of the page.



Once the process has been selected it will display all the calculations completed with the process and pollutant for the specific time frames. It is important to make sure that if there are multiple calculations, only one is associated to the AEI submittal.



In the scenario shown above, Ethylbenzene emissions from Process ID 751 has been calculated for up to 4 times depending upon the specific month. To make sure this did not affect the overall Air Emission Inventory submitted, navigate to the Manage Emissions Inventory Submittals screen, Calculations to Include tab.



As shown, only one of the calculations completed was associated to the AEI submittal so this AEI is accurate. However, it is a better practice to only complete one calculation for the time period and utilize reports to filter the results to the desired items. This particular process was associated to 3 other calculations (OZONE SEASON, HAP EMISSIONS, and SURFACE COATING ANNUAL EMISSIONS). The results for these calculations could easily be obtained filtering a sub-set of months, processes or pollutants.

4.3.4 Non-Routine Source Categories Associated

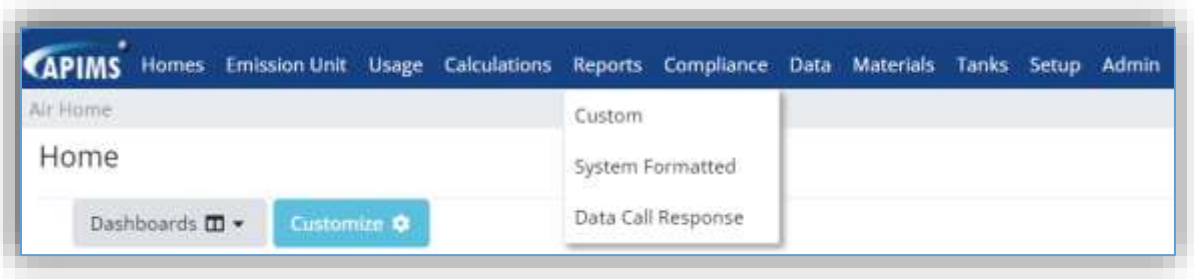
There are several source categories which are not required to be included in an Air Force Stationary AEI. However, depending on the processes associated to the emissions calculations, these sources may be included. Some examples of sources which should not be included in a Stationary AEI are Construction, Hot Mix Asphalt Plants, Site Remediation, Aircraft Operations, Aerospace Ground Equipment, Portable Engines, and Spills and Releases. When submitting an AEI in APIMS it is a best practice to consult the Air Force Stationary Source for guidance in exactly which sources should be included.

5. Custom Reporting

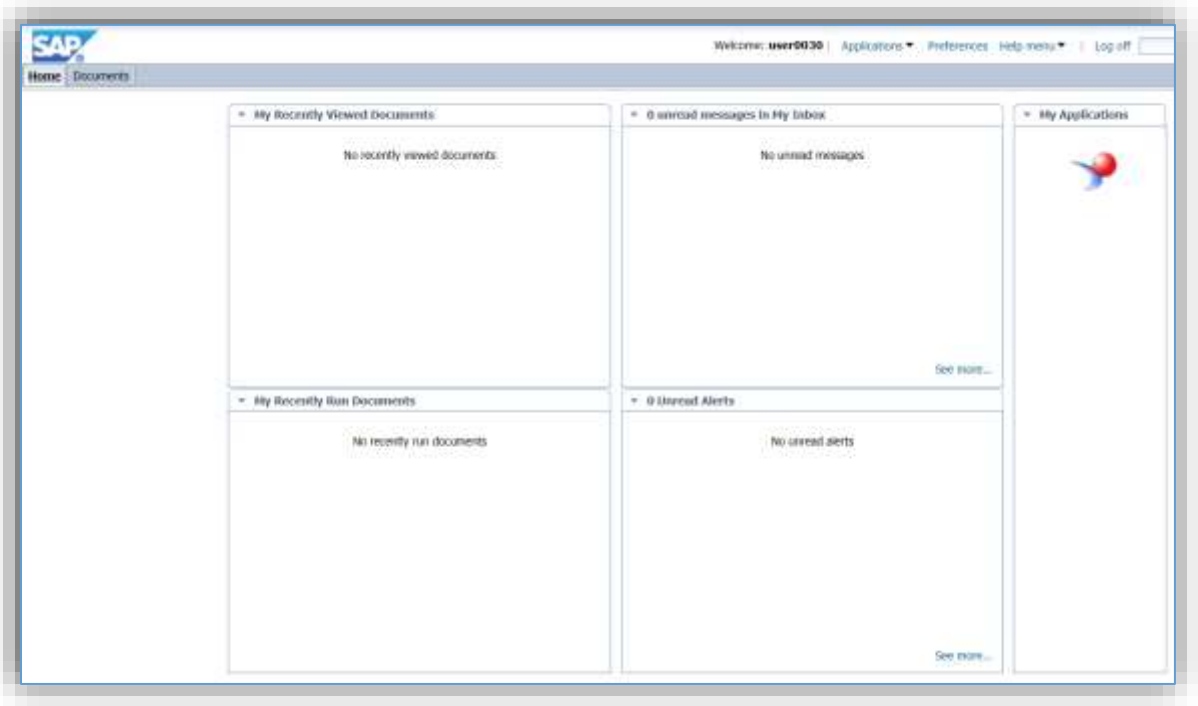
5.1 Custom Reporting – SAP BusinessObjects

SAP Business Objects is an ad-hoc reporting layer that allows users to create or run reports that pull the data currently in APIMS into a report that can then be exported to excel or pdf. These types of reports can be used to help with state or regulatory reporting, AEI quality assurance and monitor the air quality program and data in APIMS.

To open the SAP Business Objects application, click on the Custom hyperlink under the Reports Menu on the top navigation bar.



This will open a new tab in the web browser.

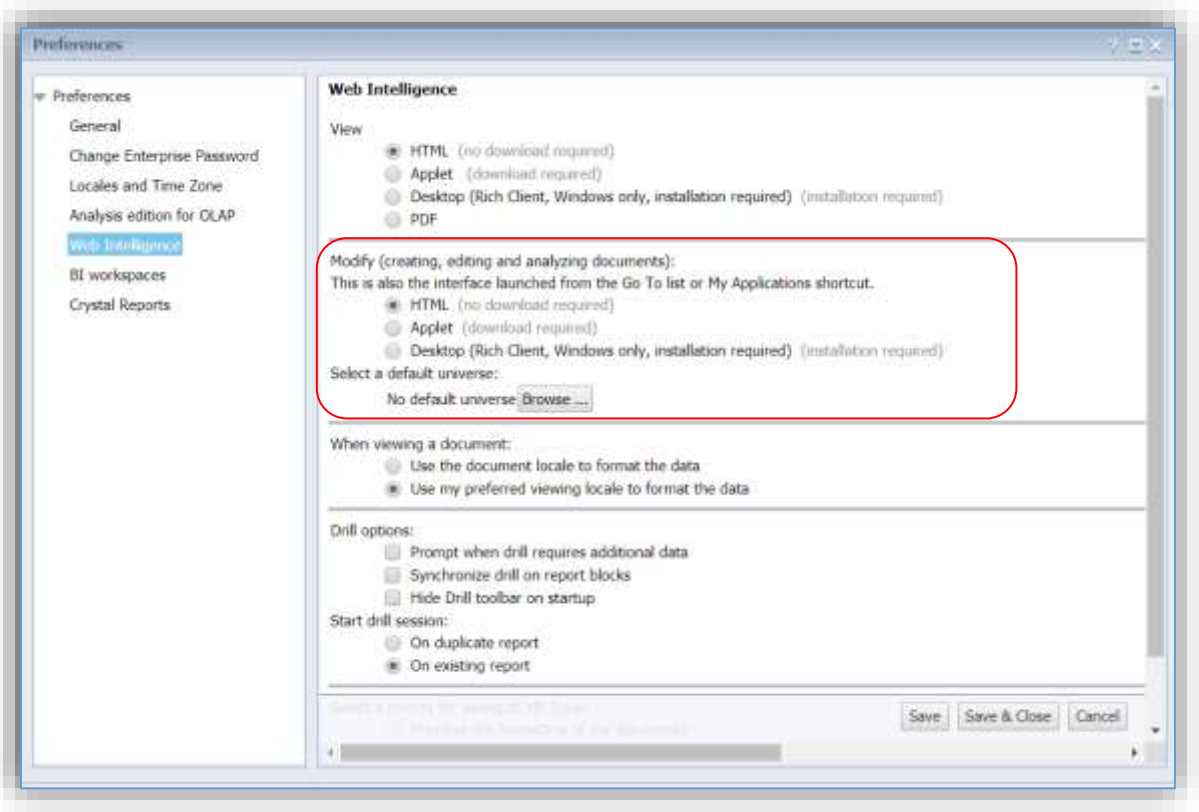


This Home page will display any reports that have been recently viewed and any reports that have been run recently (this is for scheduled reports). From this page the application can be accessed by clicking the  icon.

5.1.1 Initial Configuration

The first time Business Objects is opened, the settings need to be edited to ensure the application is configured correctly going forward. This is a one-time only activity and does not need to be repeated.

On the Home page, click the Preferences hyperlink on the upper right corner.

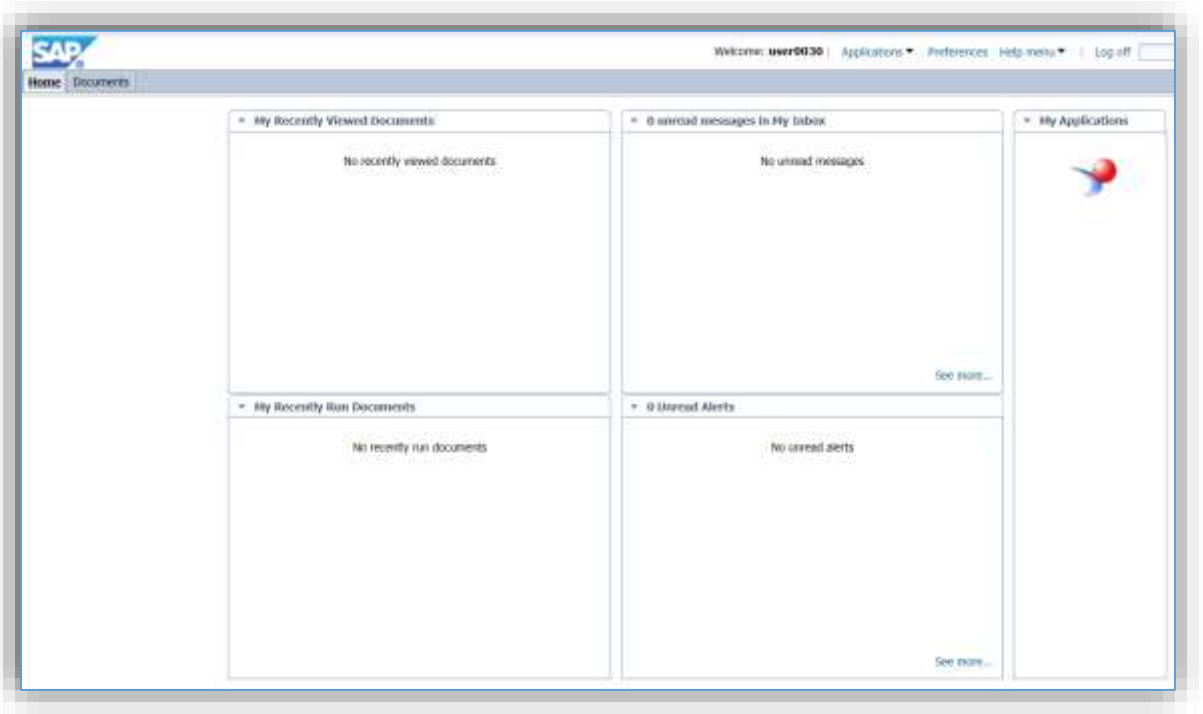


Once in the Preferences pop-up window, select Web Intelligence on the left side menu. Once in the menu, make sure the HTML option is selected for the Modify section. Once the correct radio button is selected, click the **Save & Close** button.

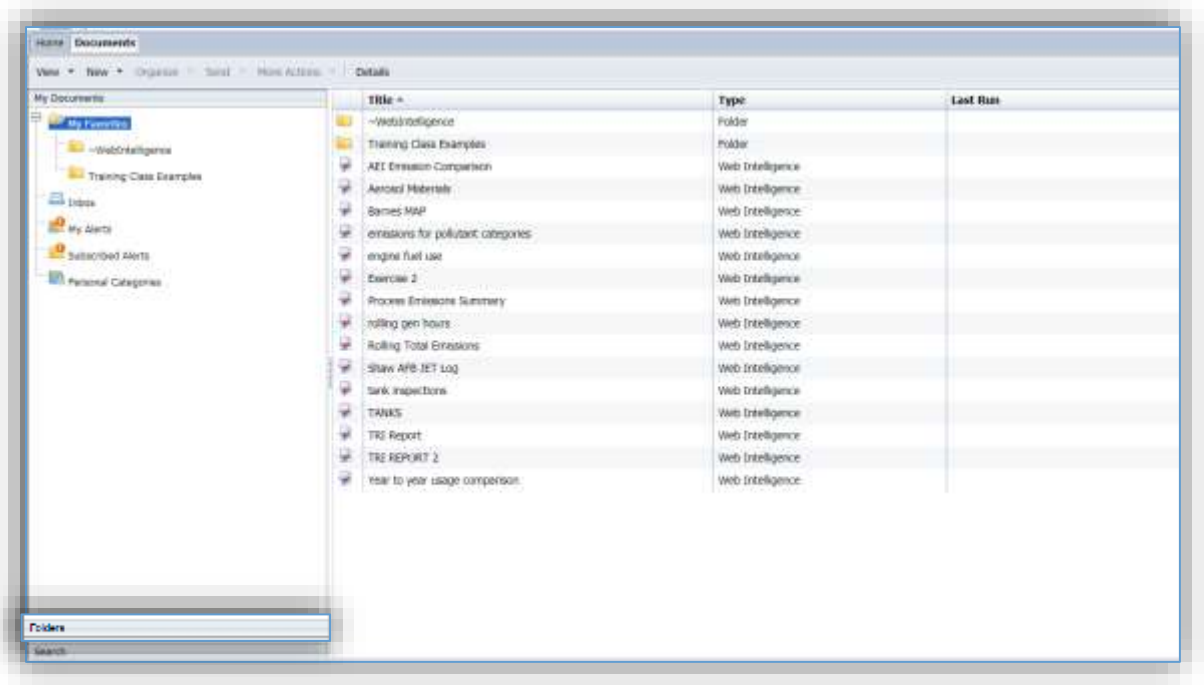
The application will now default to these settings from this point forward.

5.1.2 Viewing Existing Reports

The Home page will display any reports that have been recently viewed and any reports that have been run recently (this is for scheduled reports).

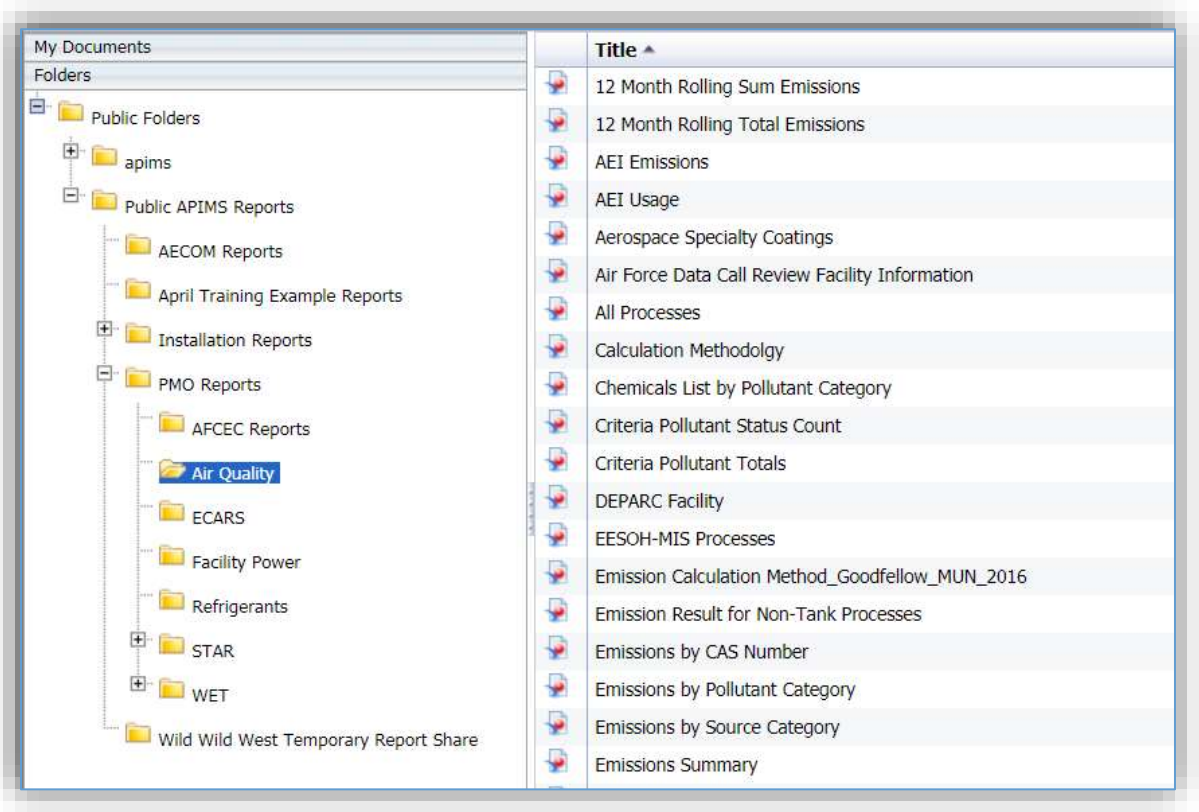


To view existing reports, click the *Documents* tab.

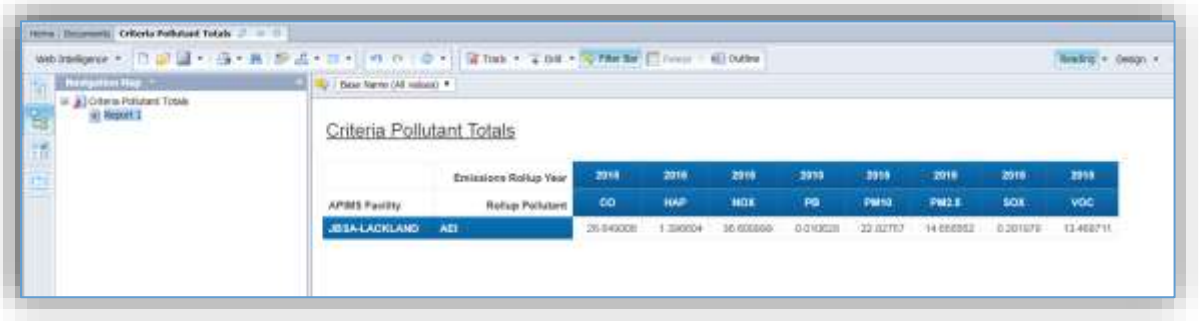


Under the *Documents* tab is a file explorer where user specific reports, base specific reports, PMO reports and shared reports can be viewed. When in the My Documents >> My Favorites folder the user can see all the reports they have created and/or saved to their user account. If there is a report that was

automatically saved in case the application timed out, it would be accessible in the WebIntelligence folder. To view the shared reports, click the **Folder** bar at the bottom of the window.

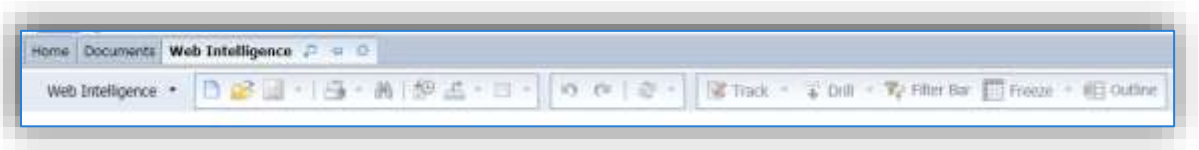


Once the Folders bar has been clicked, the Public Folders will be displayed. To view the sub-folders, click the  icon to expand the selection. As shown above there are already several reports available for use by all installations. To run a report, simply select the Title as displayed on the right side and double click. This will then run the report in a new tab.

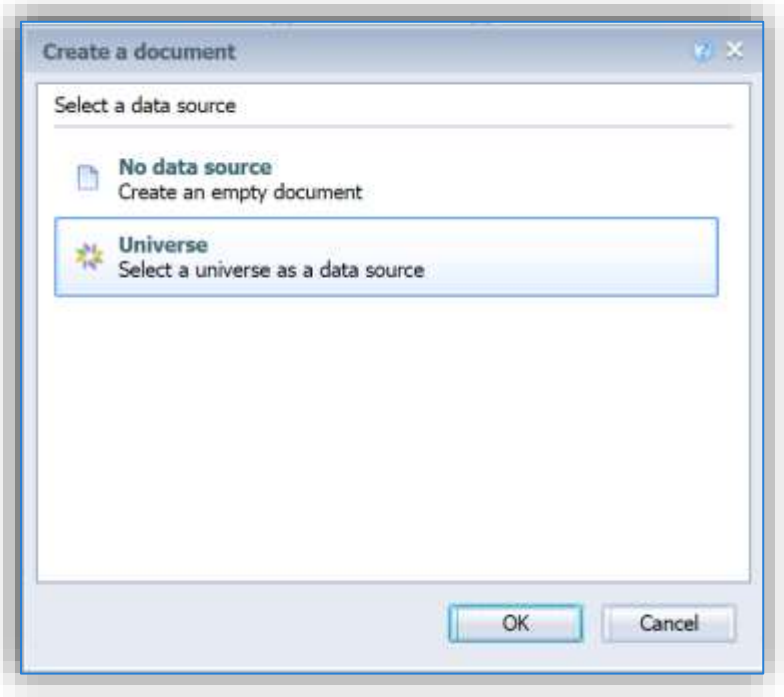


5.1.3 Create a New Report

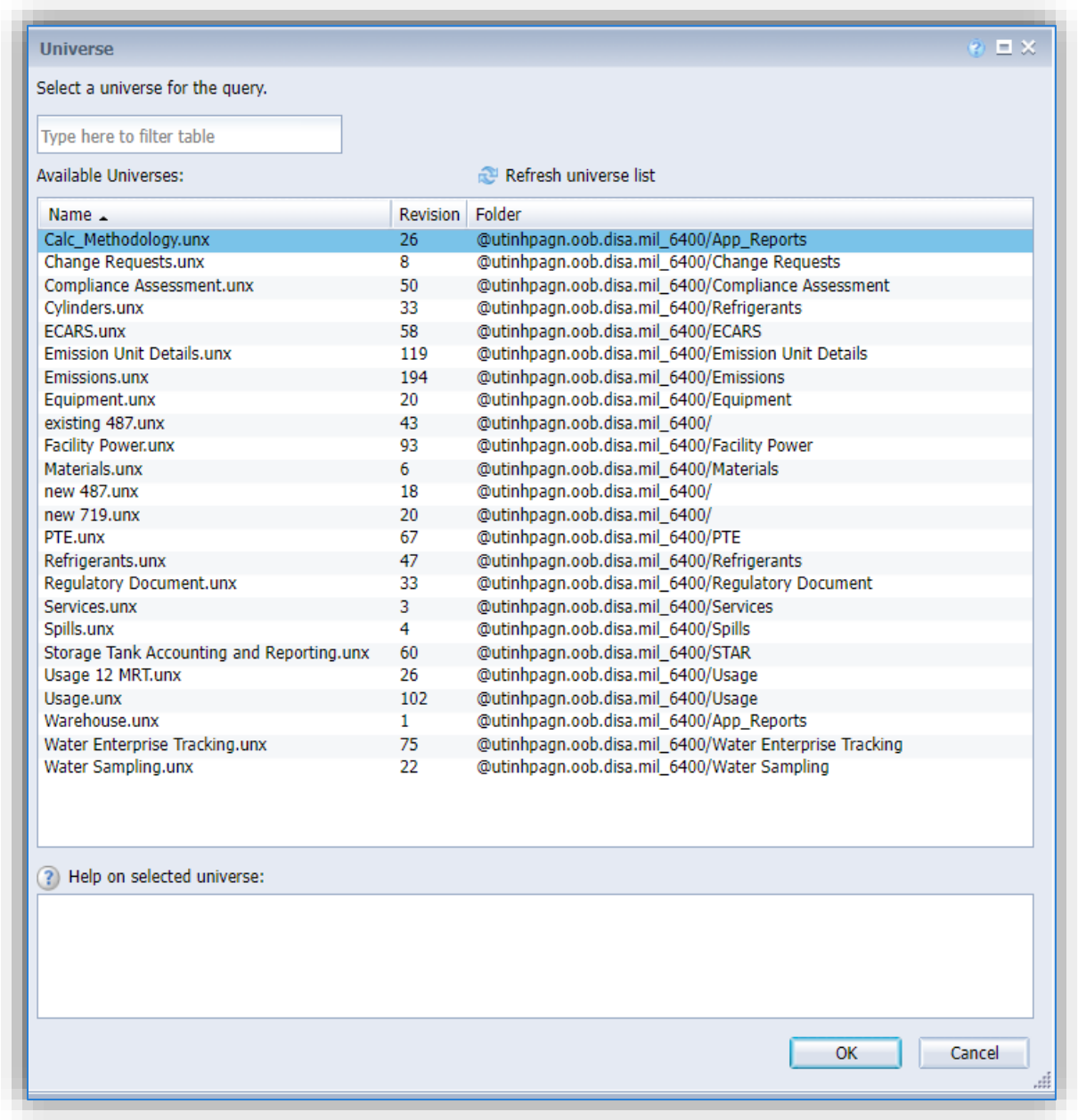
From the SAP Business Objects Home page, click the  icon to access the application.



From this page, user can navigate from the Home page and the Documents page by clicking on the tabs. The icon can be used to open an existing report, and the icon can be used to create a new report. Click the icon to create a new report. This will prompt the Select a data source pop-up window.



Select Universe and click OK. This will bring up a selection of Available Universes:



Select the appropriate Universe for the report to be created and click OK. A brief description of each Universe provided below:

Calc Methodology – This Universe contains all the emission calculation data including basic process information, algorithms, emission factors, and references.

Change Requests – This Universe contains the change requests and related information entered in the Suggestions area of APIMS.

Compliance Assessment – This Universe contains the data from the Regulatory Document and Compliance Assessment areas of APIMS.

Cylinders – This Universe provides data based on the cylinders tracked in the Refrigerant Module. This universe contains equipment and service log data as centered around the cylinder transactions.

ECARS – This Universe contains the data from the ECARS module of APIMS.

Emission Unit Details – This Universe contains the data from the Unique Process and Equipment areas of APIMS.

Emissions – This Universe contains all the data from the Emissions Calculations areas, including some process information, calculation methodology and emissions.

Equipment – This Universe contains all the Equipment data along with associated processes. This Universe has data centered around the Equipment record.

Existing 487 – This Universe contains all the date on the Form 487 contained in the Facility Power module.

Facility Power – This Universe contains all the data from the Facility Power module in APIMS.

Materials – This Universe contains all the material and chemical data. Users will need to specify if they want all chemical data and only the associated material data or if they want all material data and only associated chemical data.

new 487 – This Universe contains all the date on the Form 487 contained in the Facility Power module.

new 719 – This Universe contains all the date on the Form 719 contained in the Facility Power module. This form is the maintenance record for the engine.

PTE – This Universe contains all the data associate to the PTE module, including usage and emission results.

Refrigerants - This Universe provides data based on the equipment tracked in the Refrigerant Module. This universe contains equipment and service log data as centered around the equipment.

Regulatory Document – This Universe contains the data from the Regulatory Document area of APIMS.

Storage Tank Accounting and Reporting – This Universe contains all the storage tank information from the STAR module of APIMS.

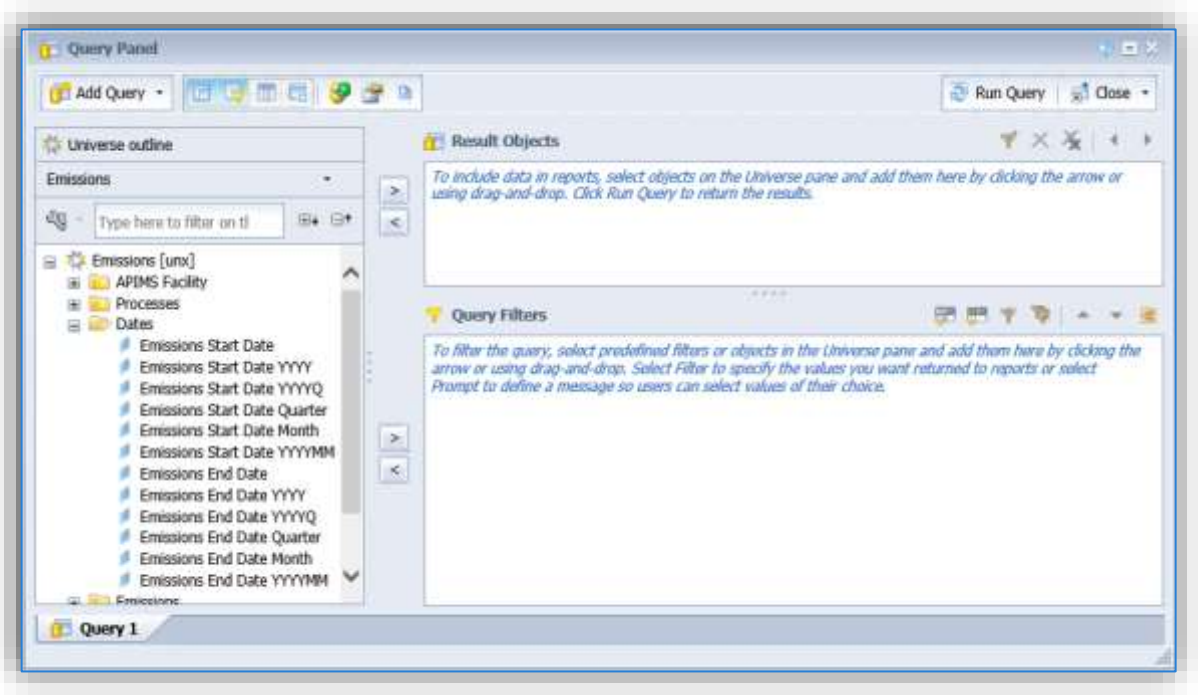
Usage 12 MRT - This Universe contains all the usage information from the Consumption Log, IC Engine Log, JET Usage Log and Tank Usage Log in APIMS.

Usage – This Universe contains all the usage information configured to report as monthly usage or as 12 month rolling totals.

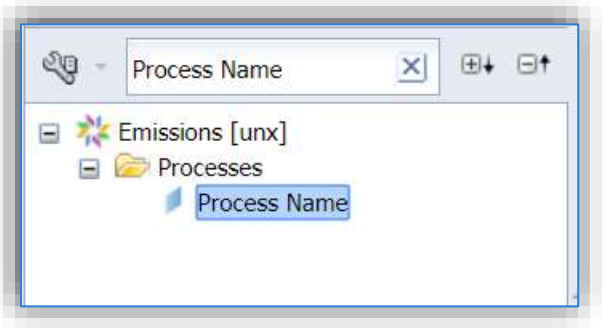
Water Enterprise Tracking – This Universe contains all the data from the WET module of APIMS.

Water Sampling – This Universe contains all the data related to sampling as contained in the WET module of APIMS.

5.1.3.1 Selecting Data



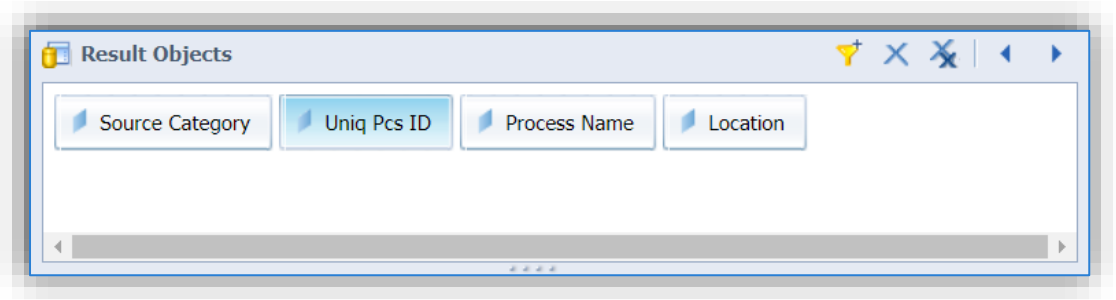
The Query Panel will now display all the fields available for the report. Use the  and  icons to expand and collapse the folders. Some of the folders can be quite large making it hard to find a specific field. In this case, use the search function to easily locate a field.



To add a field to the query, there are three methods.

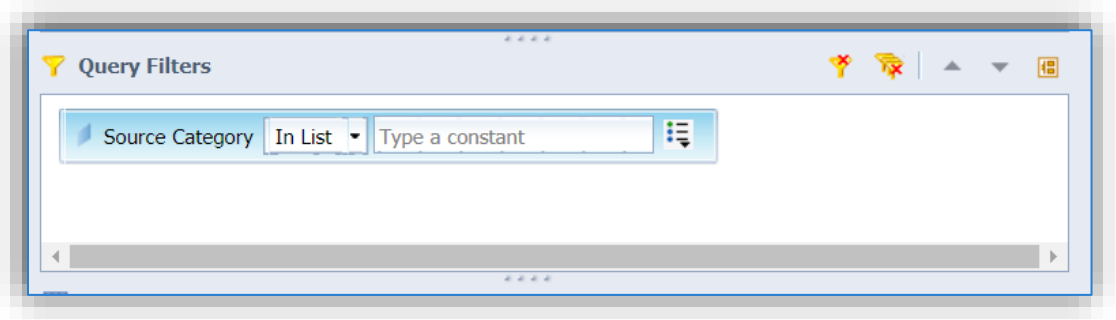
1) Use the  button next to the Results Objects box to add a field to the report.
2) Click on the field and drag it to the Results Objects box.
3) Double click on the field.

Once there are objects added to the Results Objects window, they can be clicked and dragged to put in the desired order.

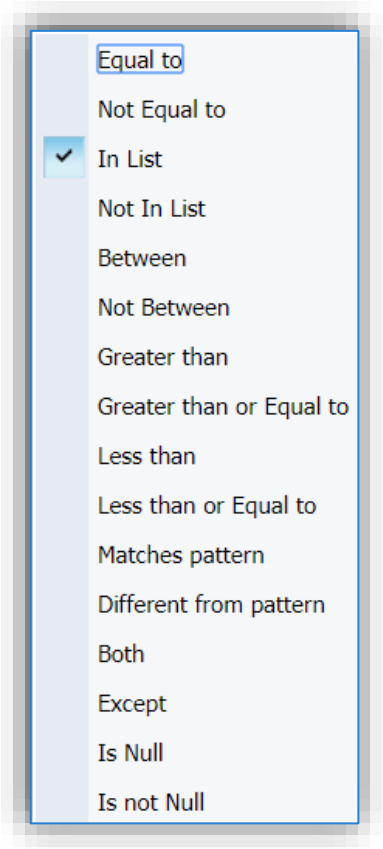


5.1.3.2 Query Filters

To add a Query Filter, use the > button next to the Query Filter window, or click and drag the field from the universe or the Results Objects window.



The drop-down list can be used to define the filter, for example if the value is equal to, greater than etc.



Equal to – This is used when you want to specify an exact value.

Not Equal to – This is used when you want everything except a certain value.

In List – This is used when there are several exact values that you would like included in the results.

Not In List – This is used when there are several exact values that you would like to exclude from the results.

Between – This is used when there is a set range, this is mostly used for dates and numbers. However, it will work for text based on alphabetic order.

Not Between – This is used when there is a set range that you would like excluded from the results, this is mostly used for dates and numbers. However, it will work for text based on alphabetic order.

Greater than – This is used when the minimum number is specified and you want the query results to only include values that are larger than the number specified.

Greater than or Equal to – This is used when the minimum number acceptable is specified and you want the query results to only include values that are equal to or larger than the number specified.

Less than - This is used when the maximum number is specified and you want the query results to only include values that are smaller than the number specified.

Less than or Equal to - This is used when the maximum number acceptable is specified and you want the query results to only include values that are equal to or smaller than the number specified.

Matches pattern – This is used when you know some of the data point you want to include but not all of it, for example I want to find all processes with Booth in the name. This criteria can be used with the wildcard % symbol (Example: %Booth%).

Different from pattern – This is used when you know some of the date point you want to exclude but not all of it, for example I want to exclude all processes with Booth in the name. This criteria can be used with the wildcard % symbol (Example: %Booth%).

Both - This is used when you have two distinct values that you would like to include in the query results.

Except – This is used when you want the query results to include everything except a specific value.

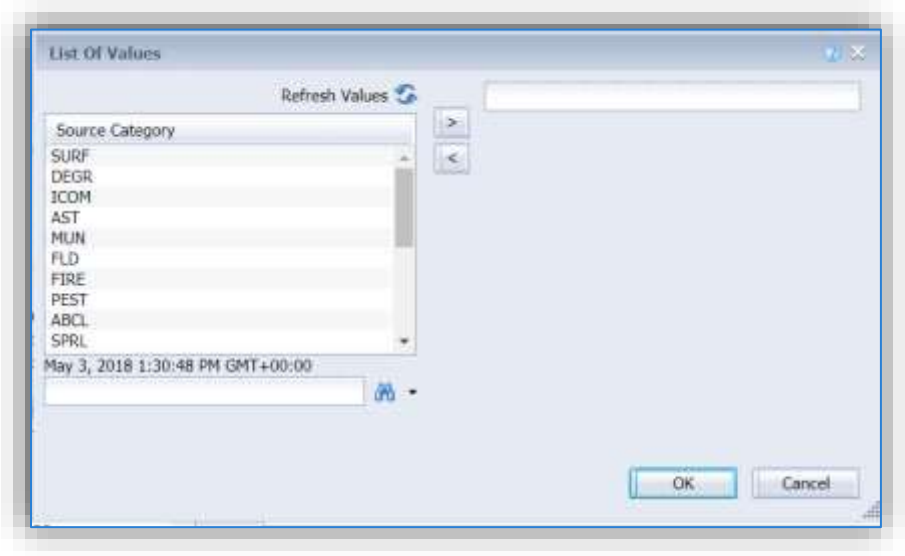
Is Null – This is used when you want to see all the results that do not have data in the specified fields. This is especially useful when there are folders that have outer joins on tables that would include a lot of blanks. For example, processes and equipment.

Is not Null – This is used when you want to see all the results that have values in the specified fields. This is especially useful when there are folders that have outer joins on tables that would include a lot of blanks. For example, processes and equipment.

Once the query filter option is selected, the next step is to enter the value for the filter. Click the Define filter type icon  to choose from the following options:

Constant – This should be used when the exact value is known. If you are not sure it is best to use the Value(s) from list option.

Value(s) from list – This will display a List of Values pop-up window.



This window will show all the available values for this particular field. This is not a good option when filtering on fields with a lot of text, such as process name.

Also, if the query option is not In List, only one value can be selected. The In List will allow for multiple selections.

Prompt – This allow the user to select the value each time the report is ran. This is the most useful as it allows a single report to meet multiple query needs.

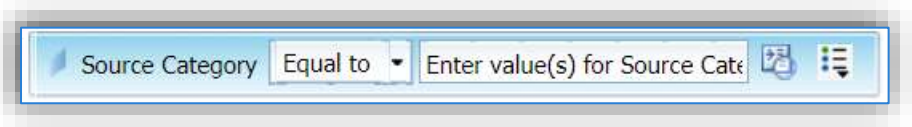
Object from this query – This option is used the least often and is for more complex queries. This will state that the value of this field must match the value of another field.

Result from another query (Any) – This option allows this query to use the results of another query as a filter. This is very useful when multiple queries are

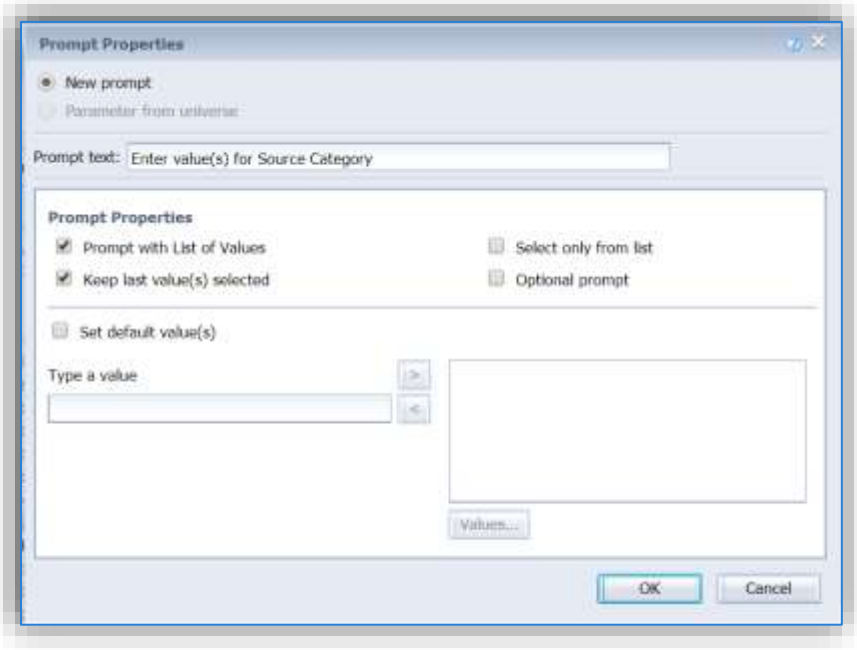
needed to filter the results. This also requires another query in this workbook to be created.

5.1.3.2.1 Prompts

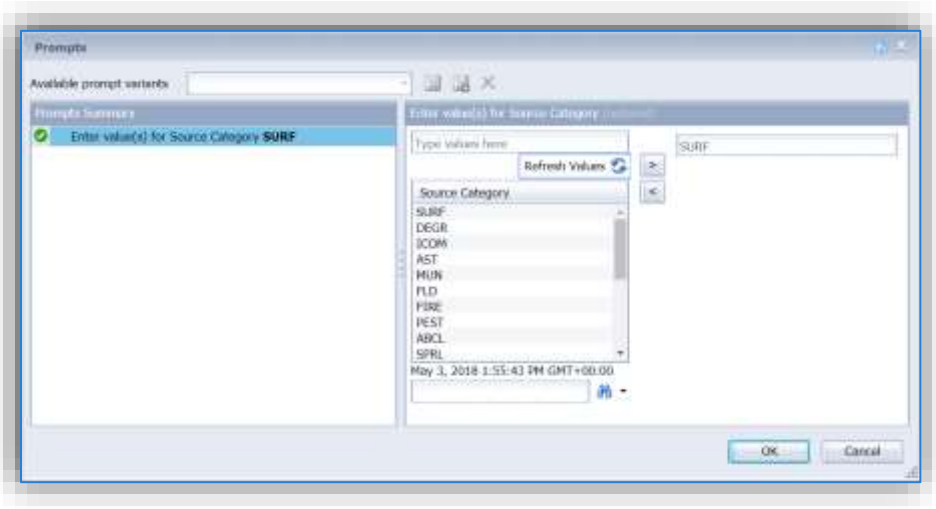
If prompt is selected, a second icon Show prompt properties  icon will appear.



Click on it to open the Prompt Properties pop-up window.



The **Prompt text** field can be used to specify the prompt the user will see when running the report. The screen below shows the prompt screen with the Prompt text displayed in the Prompts Summary window.

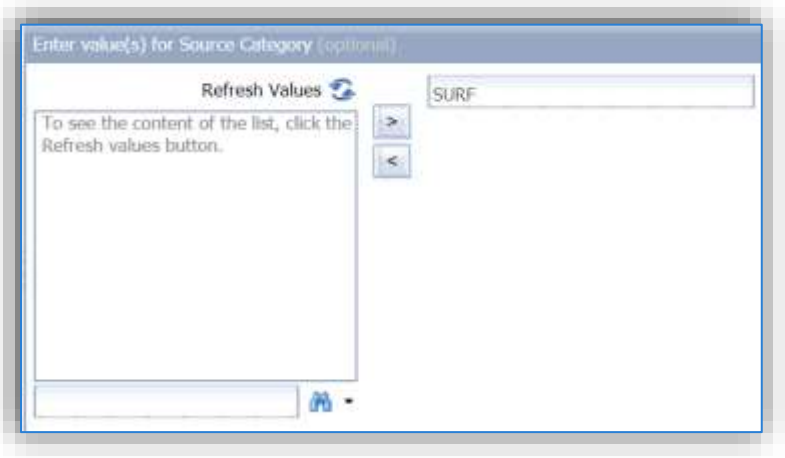


The Prompt Properties section is used to specify various options for the prompt.

Prompt with List of Values – This allows the user to select from a list of values. This option is shown above. The list of values will be displayed.

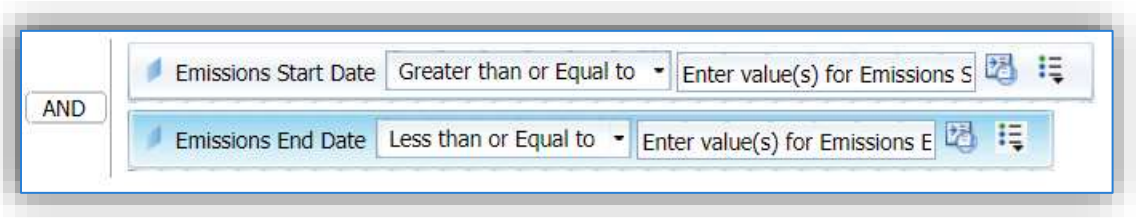
Keep last value(s) selected – This keeps the values specified the last time the report was run.

Select only from list – This restricts the user to only select values from a list and not enter their own value. If this option is selected the text box above the values list will not be displayed.

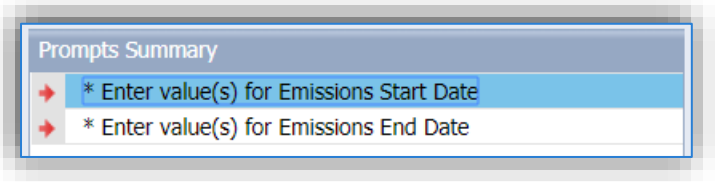


Set default value(s) - This allow the report writer to select a default value for the filter.

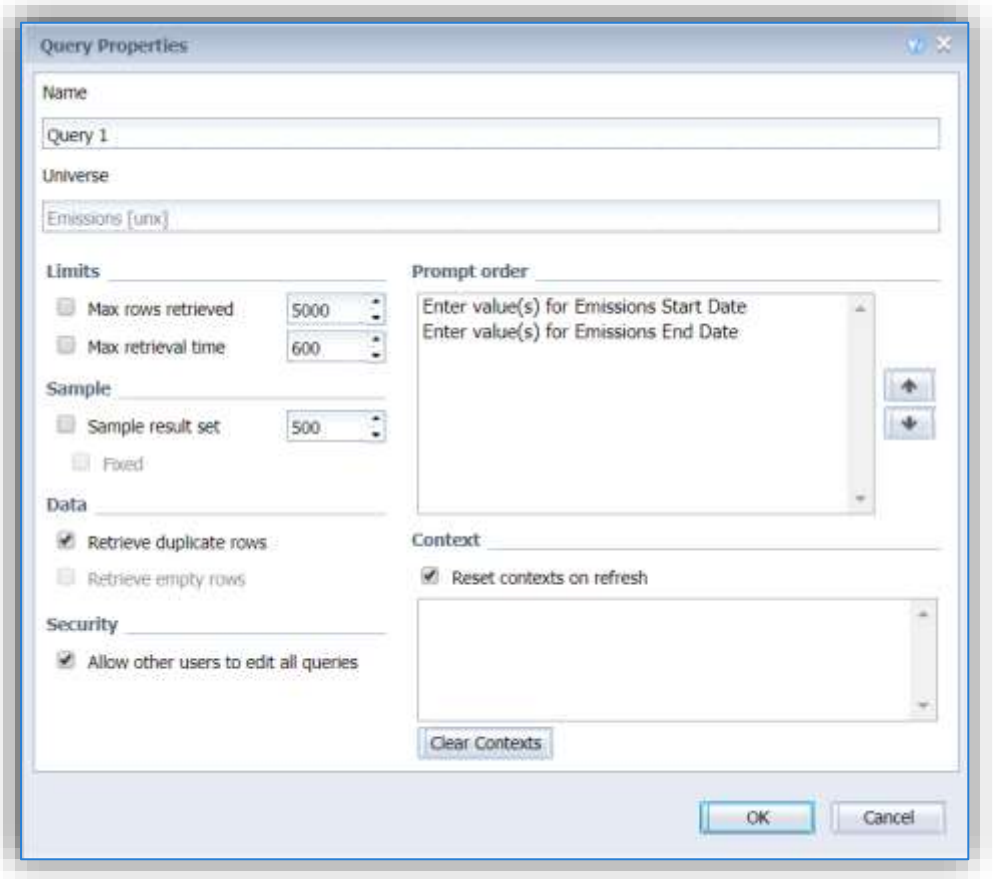
A query can have multiple prompts, for example a separate prompt for start date and end date.



These will then appear in the order they were set up in the query window. Be careful to make sure the start date is always the prompt before the end date. This is a very common way to confuse the users of the report and have the report not produce any results.



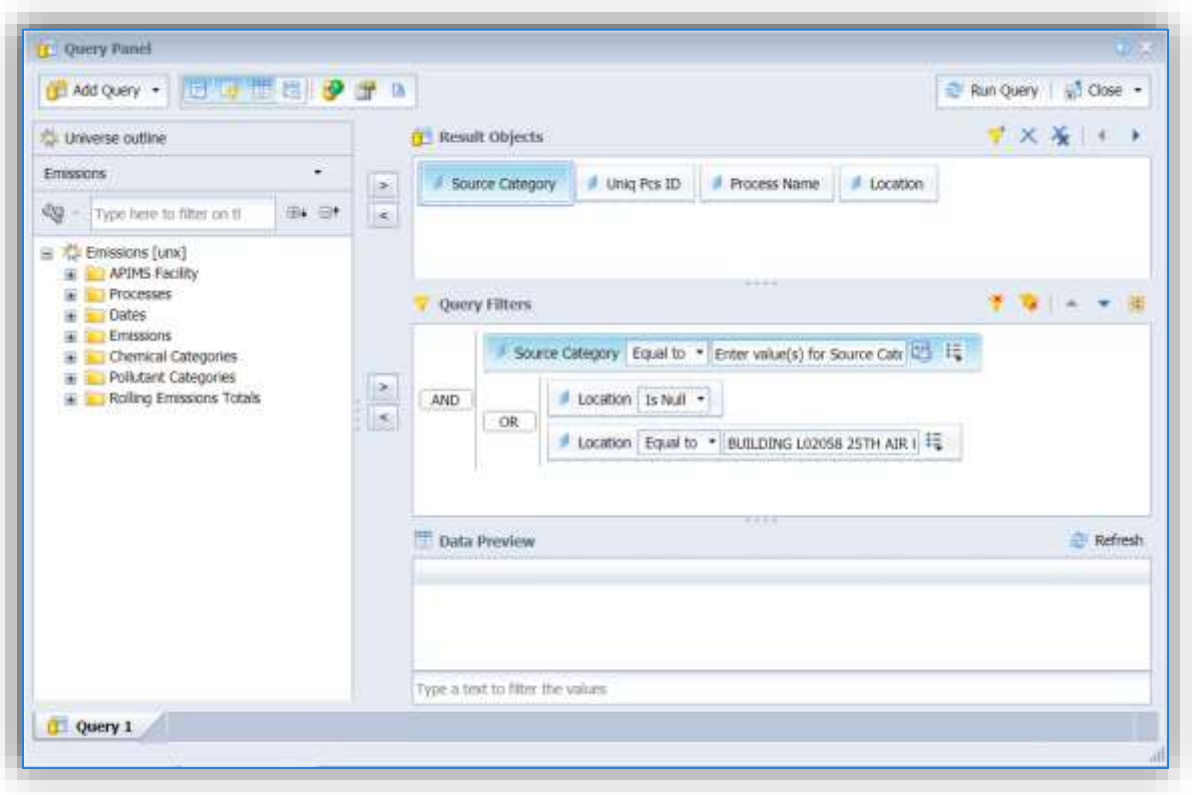
To change the order of the prompts, click the Query Properties icon at the top left of the Query Panel window.



To move a prompt, click on it to select it, then use the  and  buttons to move the prompts to the desired order.

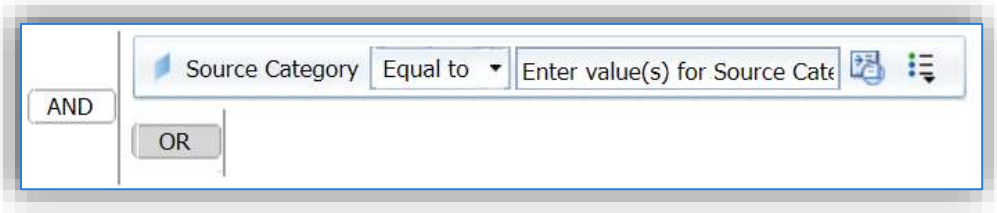
5.1.3.2.2 Multiple Filters and Nested Filters

Additional filters can be added to the report in the same manner.

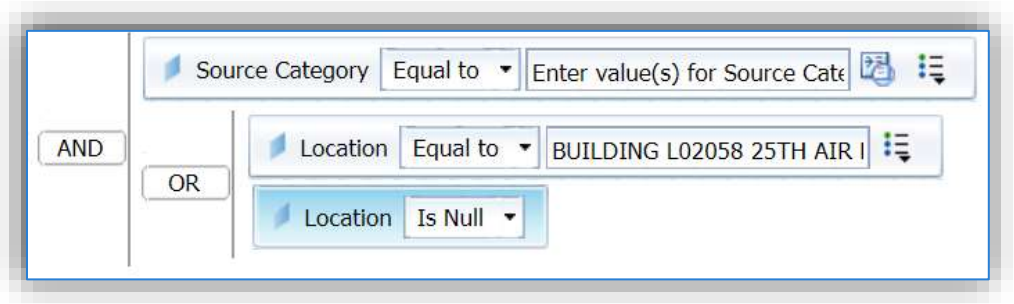


As shown above this query has a filter on the Source Category and Location fields, however the Location filter is a Nested filter. To create a nested filter, click the  icon.

This will add an OR statement inside the AND statement. To change the OR to an AND, double click it.



Then select the field you would like to filter and move it to the OR line.



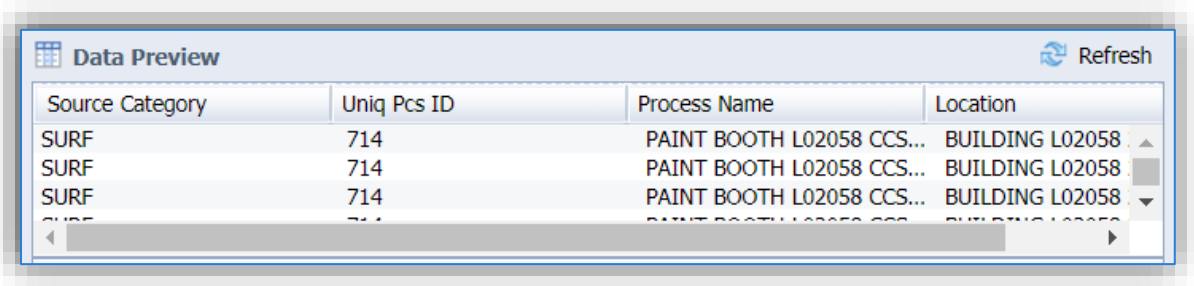
This example of a nested filter will return all the surface coating processes **AND** that are in BUILDING L02058 **OR** do not have a location specified.

To move the filters to a different order or level, click and drag.

The lines in front of the AND/OR criteria show the level at which the filters will be applied. If the query is not yielding any results it may be an error in the level of filters.

5.1.3.3 Query Results

To view the results before running the full query, the Data Preview window can be used.



Click the Refresh icon to view the results or refresh the results based on changes.

To run the full query and leave the Query Panel, click the Run Query button.

5.1.4 Report Design

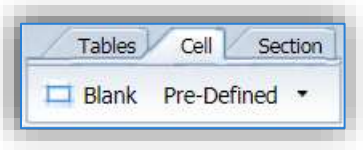
This next section will discuss common functionality utilized in the Design window to format the report.

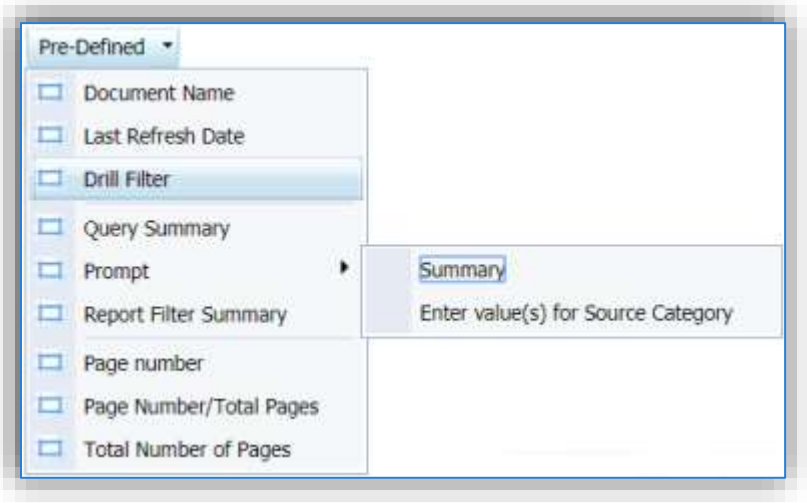
5.1.4.1 Report Elements

The Report Elements tab has several sub tabs, in this section specific but not all formatting functionality will be discussed.

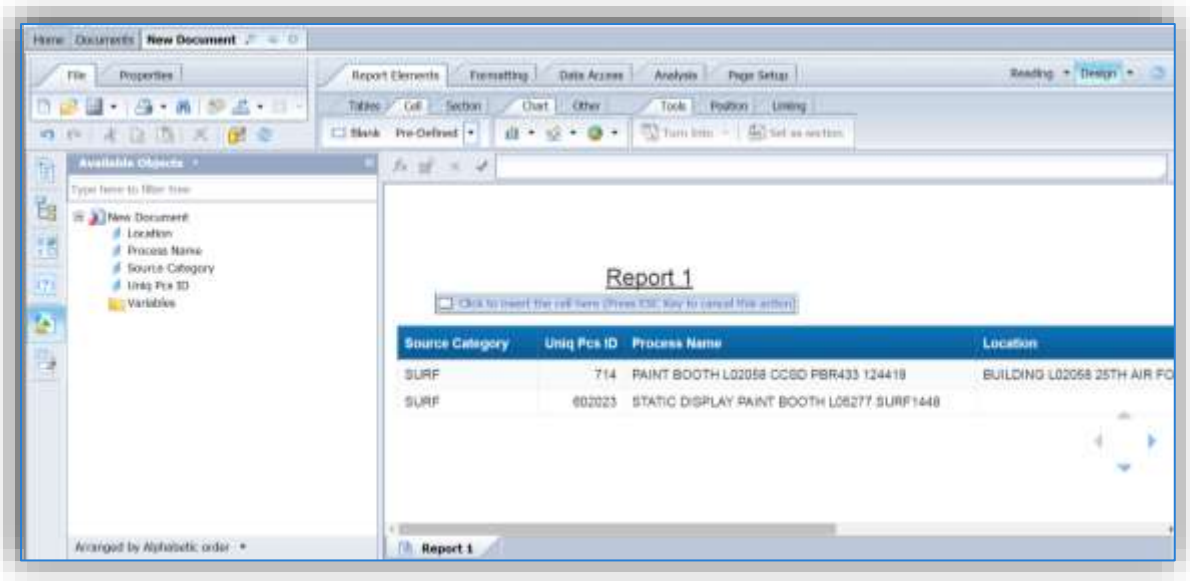
5.1.4.1.1 Display Report Details

To add information about the report, such as the last refresh date, query prompts etc. Click the Cell sub tab.





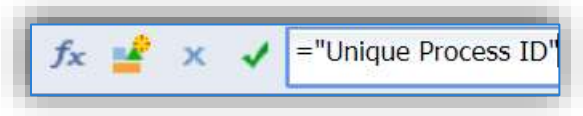
Use the Pre-Defined drop down to add any of the following information to the report page. Once the Pre-Defined field is selected, you will need to move your mouse down to the report window and click where the field should be displayed.



5.1.4.1.2 Edit Column Headers

To edit a column header, click on the field to select it, this will then show the field properties in the formula bar.

This shows that the column header is displayed as the name of the field selected for that column. To create a custom name, click in the field and type the name inside “marks.

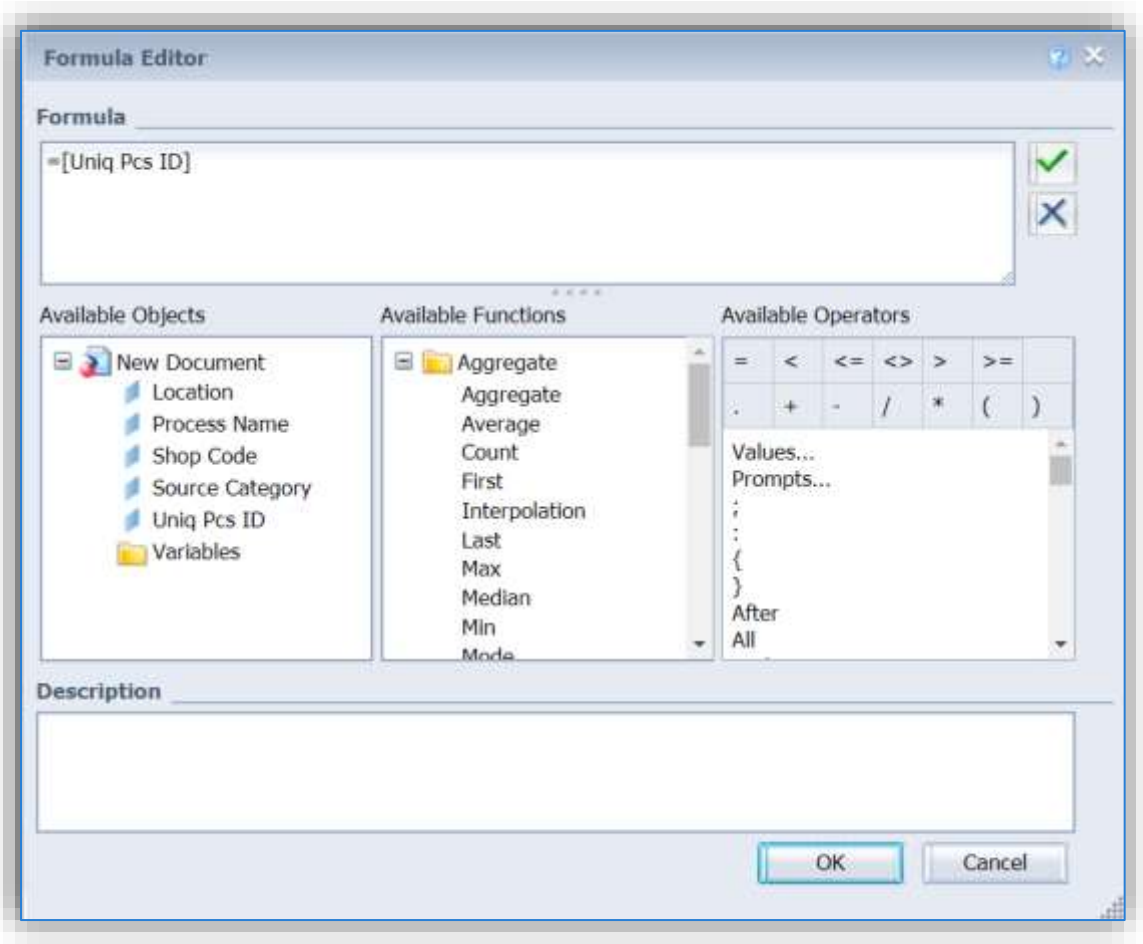


Additionally, a specific text in combination with the field name can also be entered by using a + sign. For example,

“APIMS” + NameOf([Uniq Pcs ID])

Once the desired name has been entered, click the green check.

Additional functionality is available by clicking the icon. This will open the Formula Editor pop-up window.

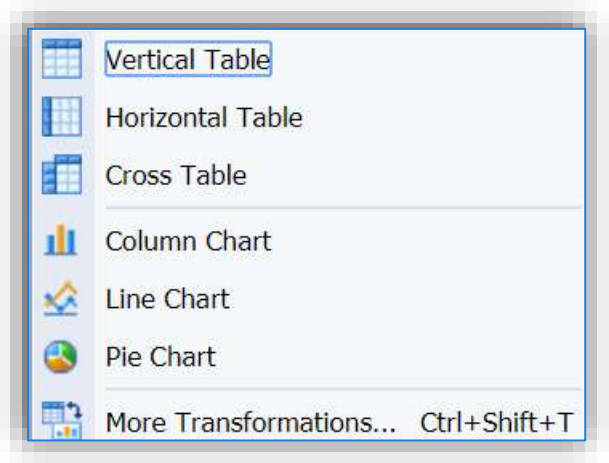


From this window there are several available functions with instructions and formats listed in the Description field. Use the  button to validate the formula before clicking the OK button.

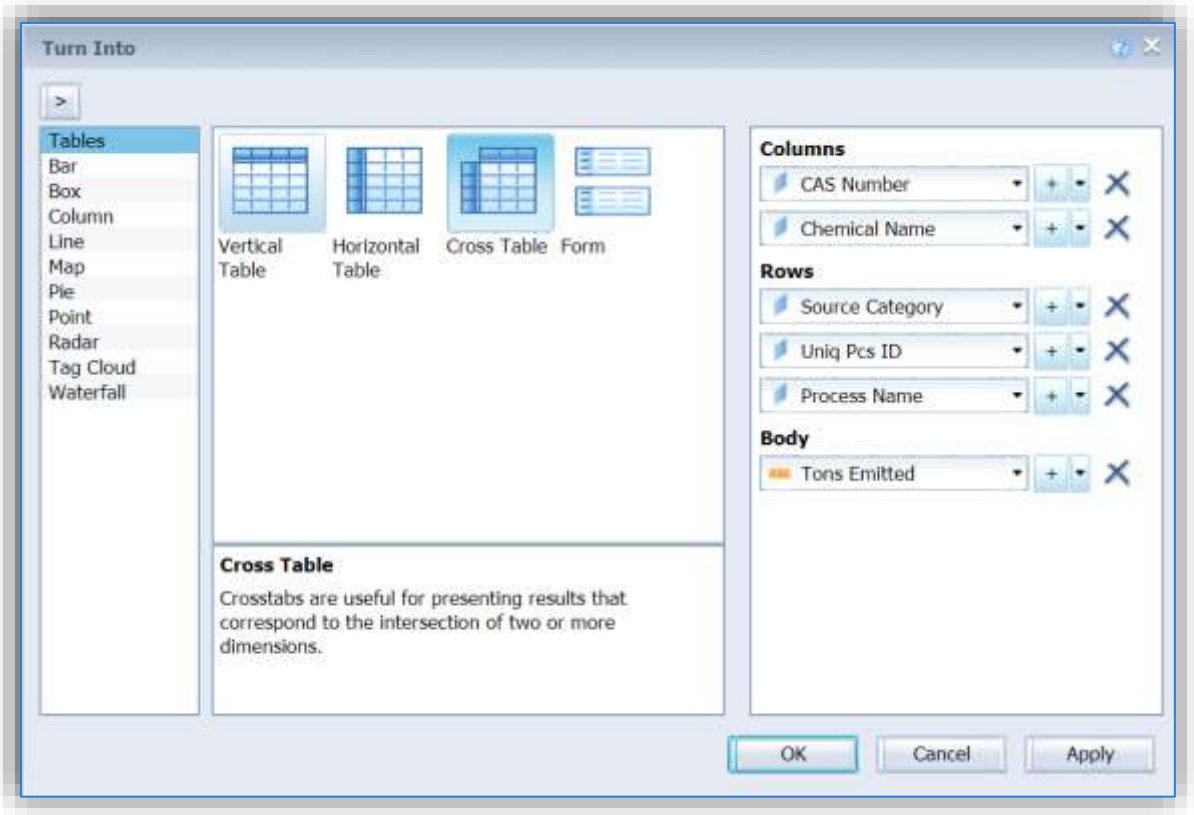
5.1.4.2 Crosstab Tables

To create a cross tab table it is easiest to create the query and have it displayed in the Design window as a normal table. The next step is to click the 

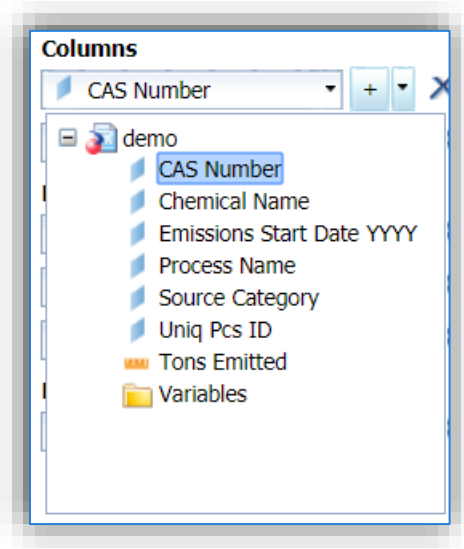
button on the Tools sub tab. This button will not be active unless the current table has been selected.



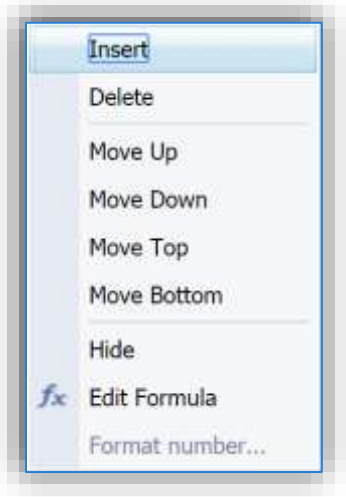
This drop-down list lets you select the type of table you wish to transform the current table into. However, if you select one of the specific tables here, the application will guess how you want the fields configured. It is a best practice to instead always select the More Transformations option. This will then open the Turn Into pop-up window.



This screen can be used to change the display order of the fields for any type of table. To turn the table into a Cross Table, select the cross-table icon. This will then divide the current data elements into Columns, Rows and Body.



To change the fields, click the picklist arrow to select a different field. To add a field, click the + button. This will add a blank row, which you can then use the picklist arrow to select a data point. Use the ✕ to delete a data point. To change the order the data points are displayed in, click the button.



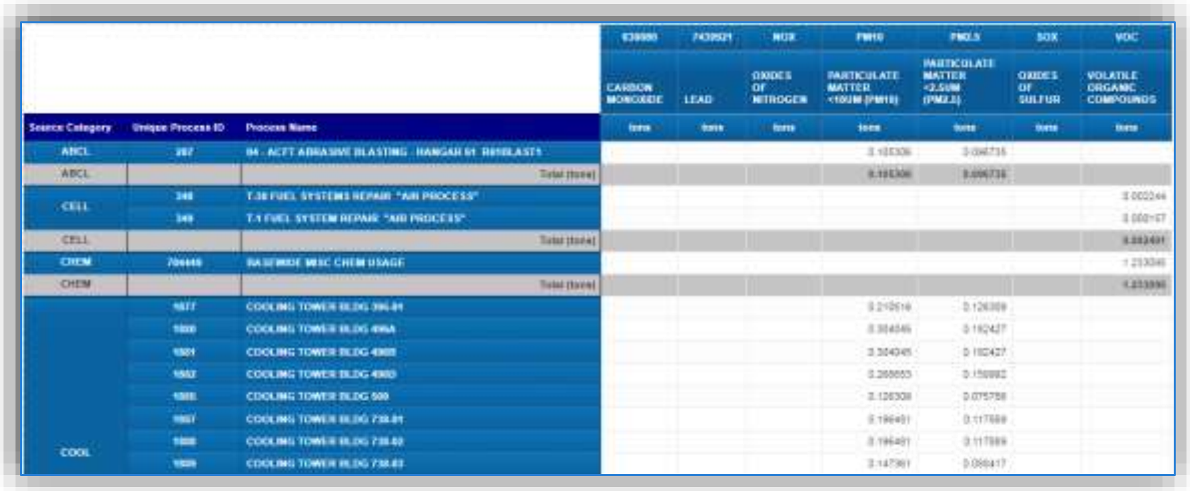
This will then open a list of values, where you can move the data element around in the list. Additionally you can elect to have the data element remain in the table but be hidden from view. This can be useful when you want to keep the sort order that field allows but don't want to see the field on the report.

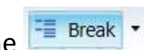
Click OK once the fields are configured as desired.

5.1.4.3 Breaks

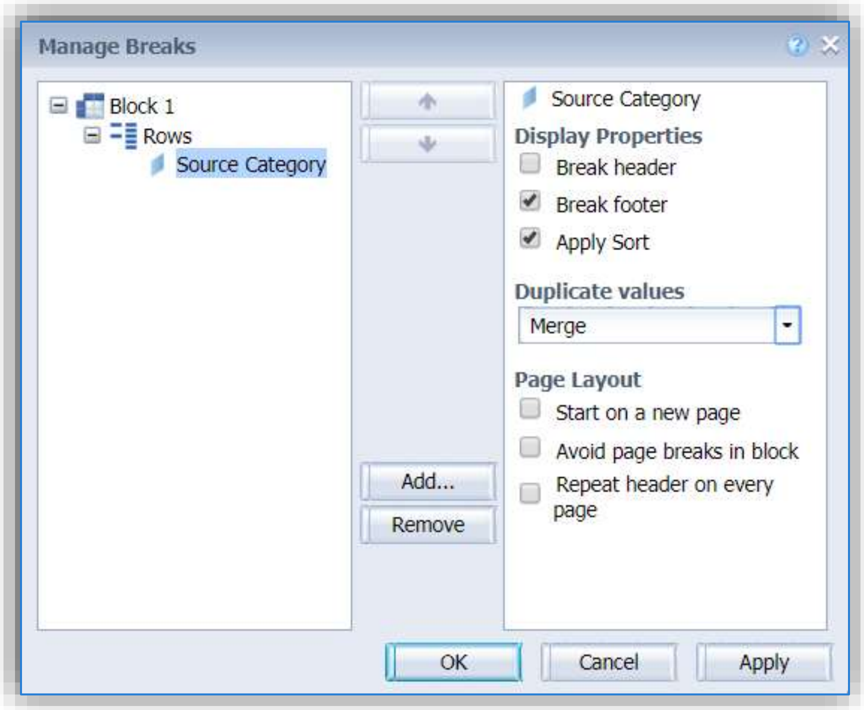
Breaks can be used to segregate data in a logical manner without separating into a different query or table. For example, if there is a query that reports emissions by process, this functionality will allow you to group

the emissions by source category and even total the emissions. The report below shows an example of a break.



To insert a break, select the field by clicking in it. Go to the Table Layout sub tab and select the 

button. This will then segregate the data and add some unwanted formatting and rows. The next step is to format the break in the way you would like it displayed, to do this click the arrow next to the Break button. This will show a menu, Select Manage Breaks. This will open a Manage Breaks pop-up menu.



This window will allow you to add additional breaks, using the Add… button. If there are additional breaks the order can be adjusted using the up and down arrows. Each item that has a break will need the fields displayed on the left configured. Don't forget to configure each break.

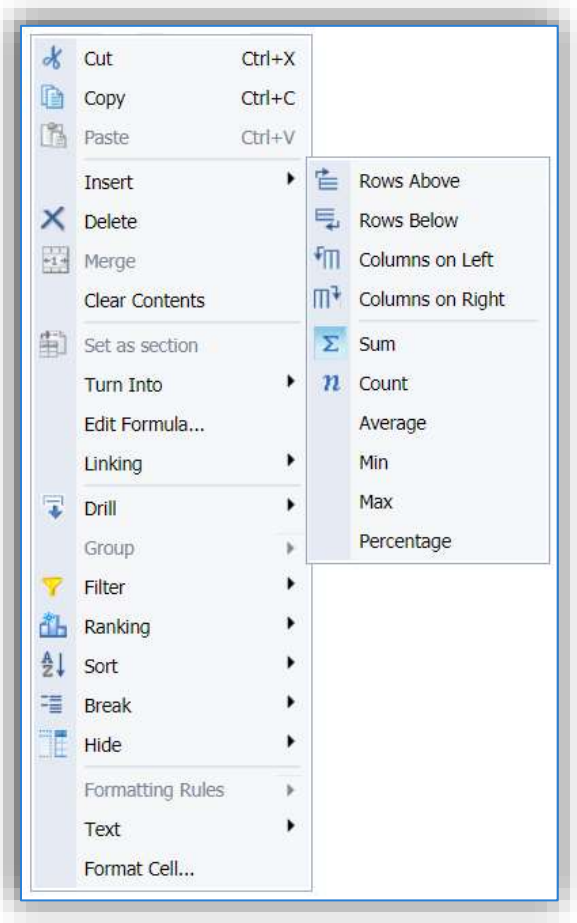
The Display Properties allow a header row, a footer row and a sort. It is recommended to uncheck the header and footer rows, unless a total for each break is desired. In that case a footer row is advised.

The Duplicate values drop down will allow the following options: Display all, Display first, Merge, and Repeat first on new page.

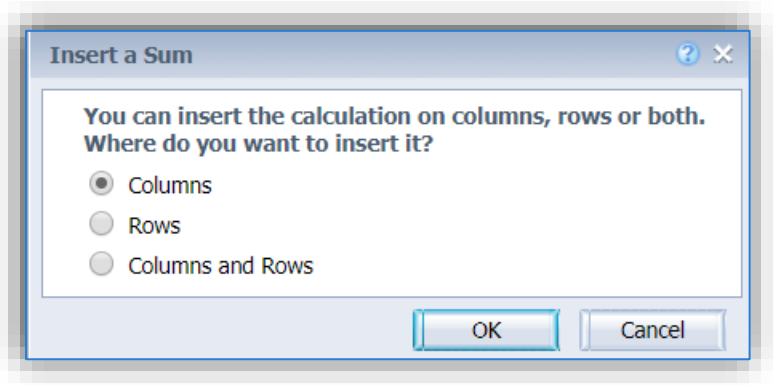
The Page Layout section selections vary from report to report. However, it is recommended to repeat the header on every page.

5.1.4.4 Totals and Counts

To insert a function to total or a count, right click on the data element in the table. This will bring up a large pop-up menu. Click the Insert option, then select Sum.

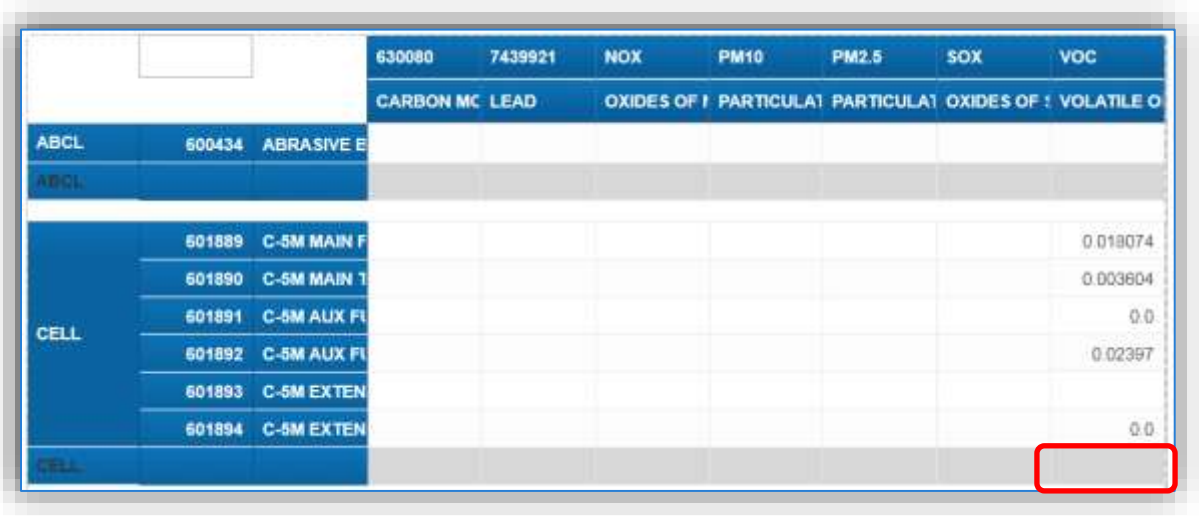


This will bring up a menu that lets the user specify where to insert the total.

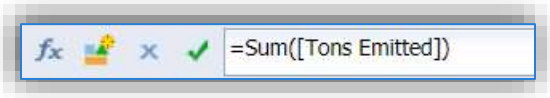


Once the selection has been made the row with the total will be inserted into the report.

If the report has breaks, and you would like a total at the end of each break you will need to add the break with a footer row. Once the footer row is visible; click in the empty cell below the data, as circled in red below.



To add a sum, click in the formula bar and use the following function.

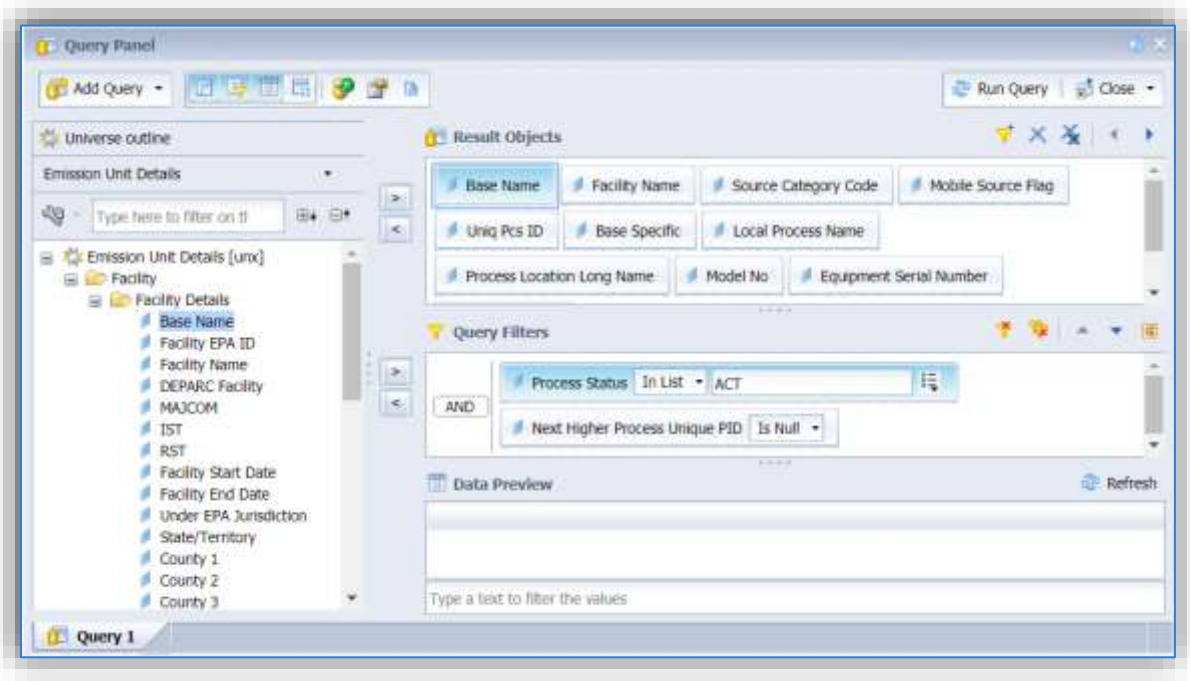


The syntax is the function, Sum() with the field name inside the parentheses in brackets. This will add the total to all breaks and all columns.

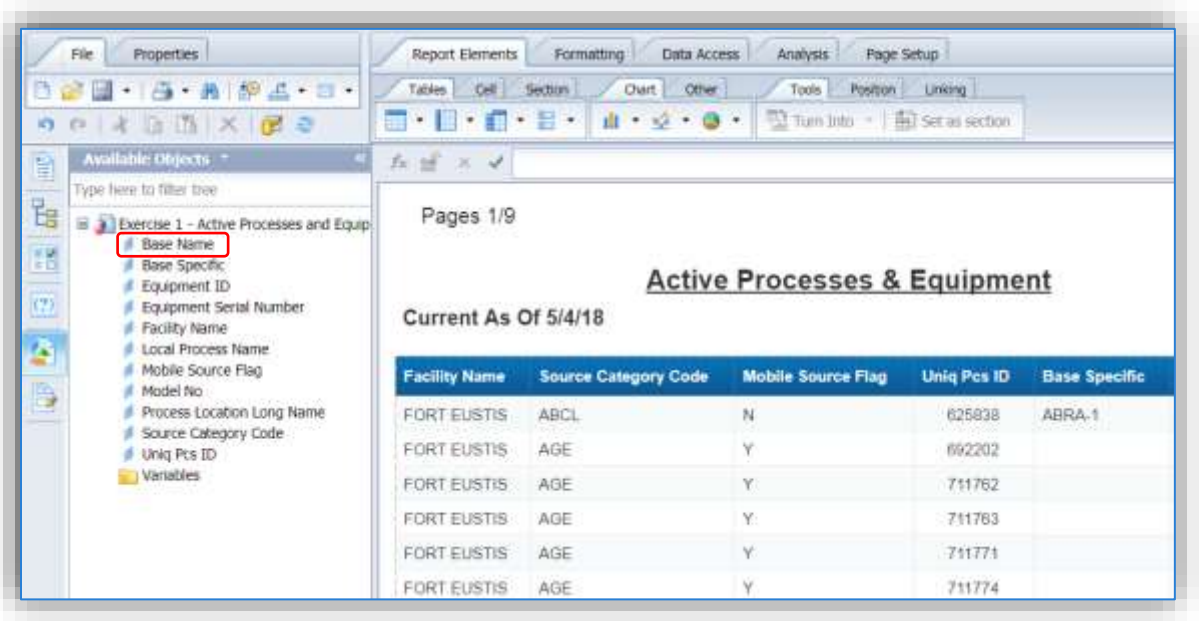
5.1.4.5 Add fields to a report

To add additional fields to a report it is a two-step process. First, click on the Edit Data Provider  icon at the top of the left side window.

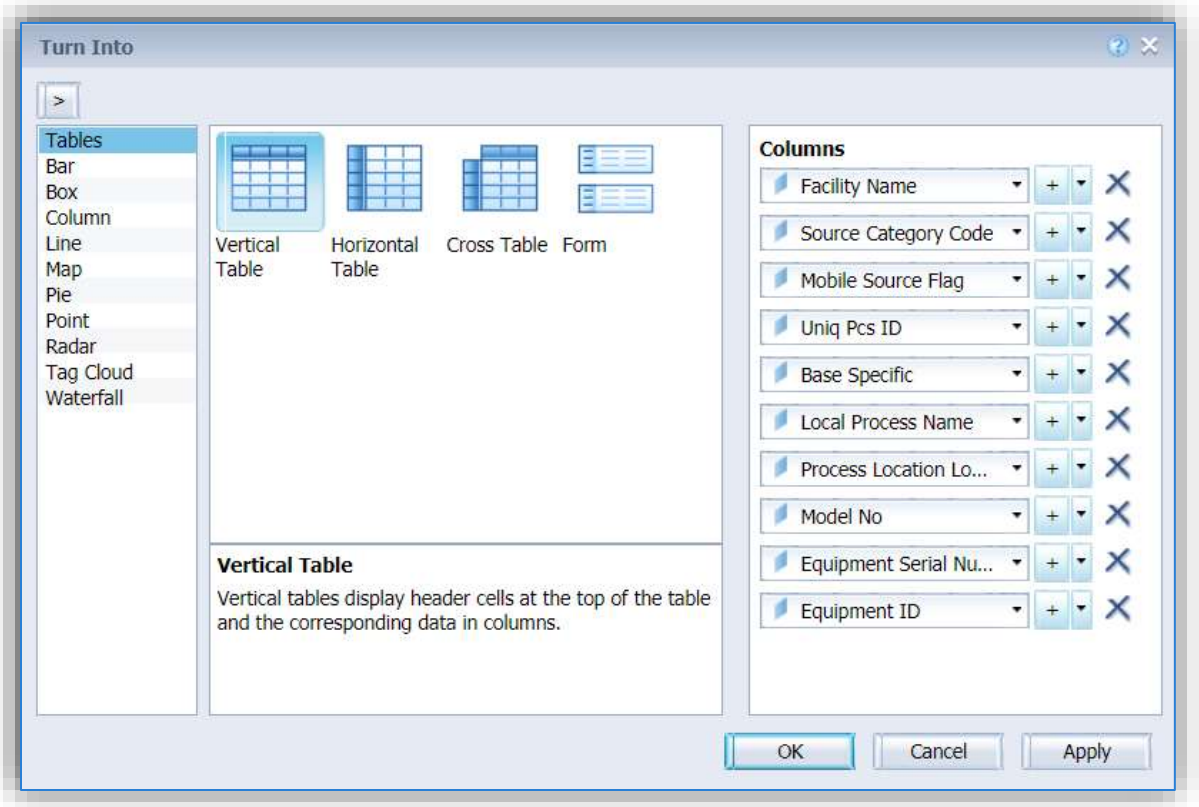
This will open up the Query Panel. From there the field you would like to add will have to be selected from the universe and added to the Results Objects window.



Once all the changes have been completed, click the **Run Query** button at the top right corner.



As shown in the screen above, the new field(s) do not appear in the report results. However, the field has been added to the Available Objects window. To view all of the fields, select the current table, which will active the Turn Into button. Click the button then select More Transformations. This will open the Turn Into pop-up window.



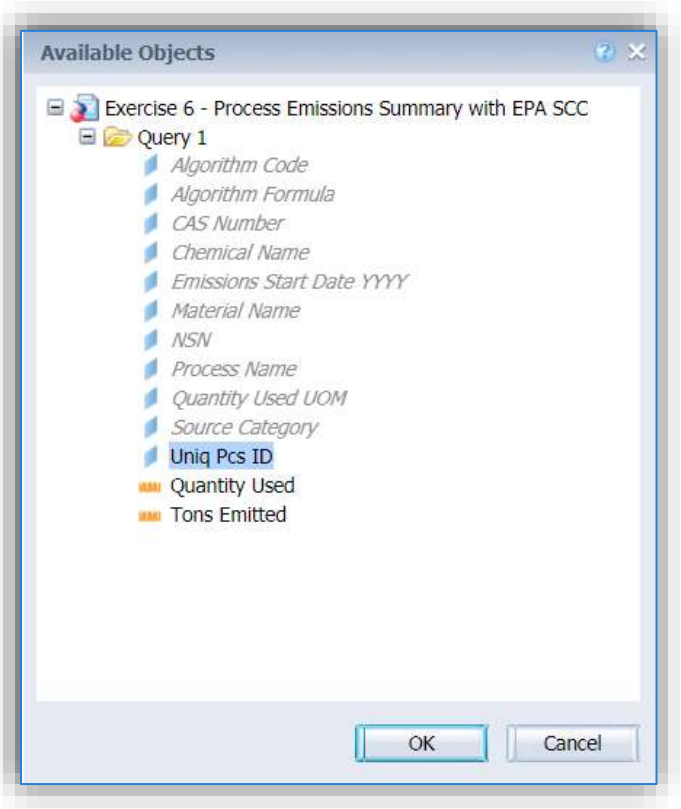
To add the field, click the + icon for the field above where you want the field to be displayed. This will add a blank field, which then can be used to select the new data point. Once this is complete, click OK and the field will now appear in the results.

5.1.4.6 Multiple Queries

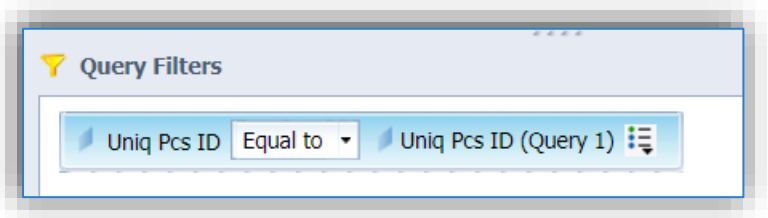
SAP can be used to write multiple queries in the same report workbook. This can be useful when looking at related data or when trying to merge one universe to another. To create multiple queries, it is advised to create a single query and run the query so there are results. Then go back to the Query Panel to generate the second query.

Once in the query panel, click the Add Query  button. From here you will be able to select any universe, it does not have to be the same as Query 1.

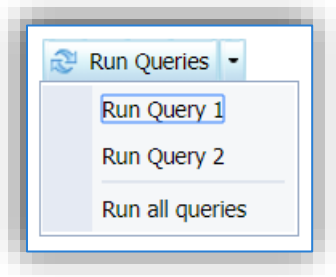
Now Query 2 can be created the same as any other query. There is an additional option available in the Query Filters, Result from another query (Any). When you select this option a list of queries and data points available will be listed in the Available Objects pop-up window.



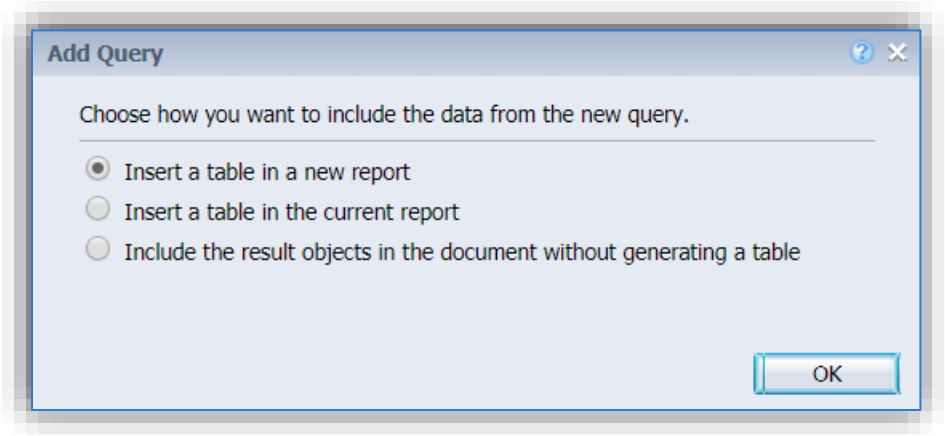
In this case we only want the unique process records that meet the criteria specified in Query 1. So, we will link Unique Process from the Emission Unit universe to the Uniq Pcs ID from the Emissions universe in Query 1.



Once the data points have been selected and the filters configured, it is time to run the queries. There is an option to Run Query 1, Run Query 2 or Run all queries.



Depending upon the size and complexity of the queries it may be best to run large queries separately. Once the selection has been made to run the query, an Add Query window will appear the first time Query 2 is ran.

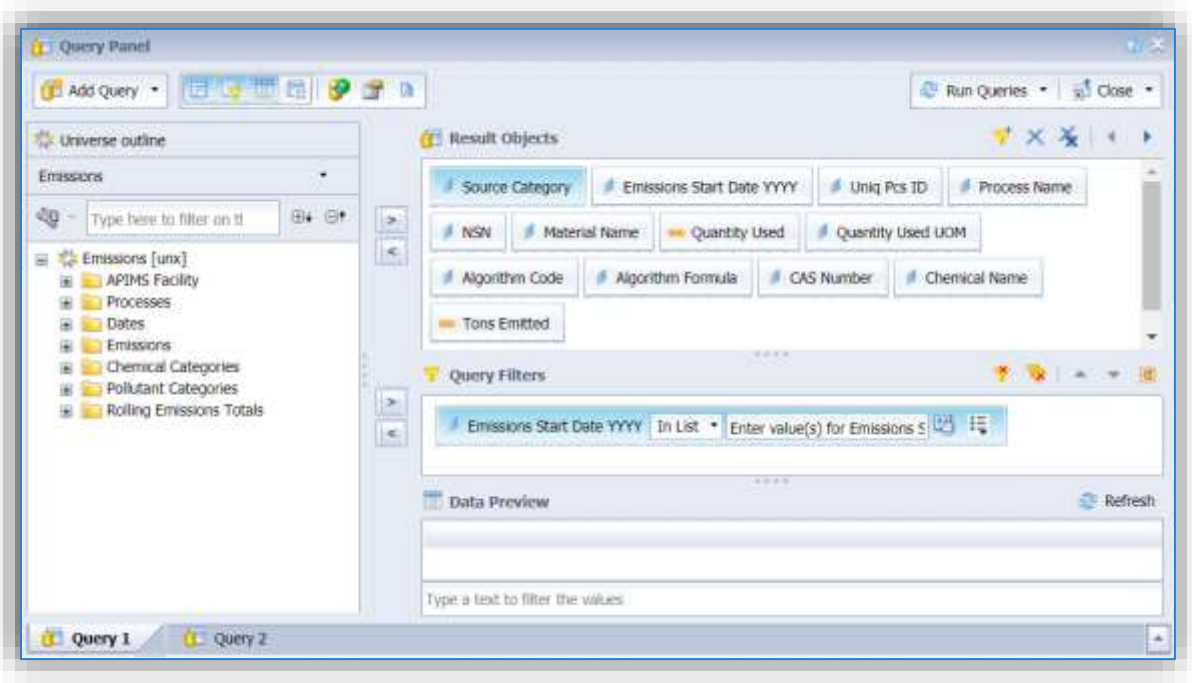


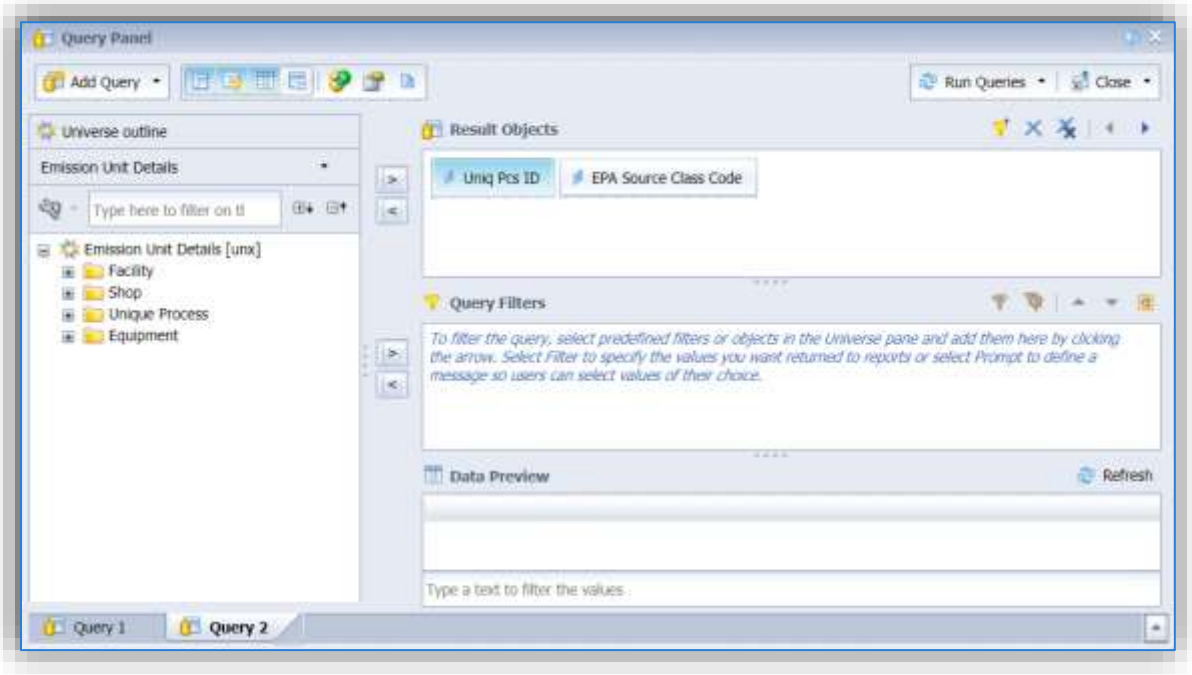
There are three options available and will vary depending upon the needs of the report. If the first option, Insert a table in a new report, is selected it will be displayed in a new tab. The second option, Insert a table in the current report, will add another table to the current tab. The third option, Include the results object in the document without generating a table, will show any visible results but will make the fields available for other uses, such as merges for variables.

5.1.4.7 Merging Universes

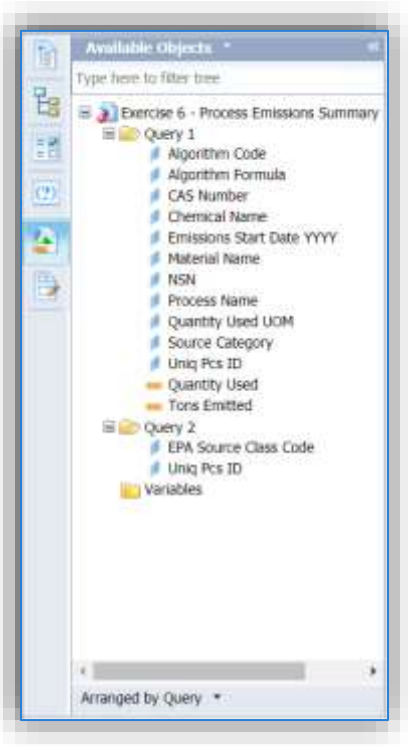
Occasionally there are instances when a specific data point is not included in the universe used for a query and needs to come from a different universe; to do this a Merge is required. To create a merge, two queries will need to be created, one with the main structure of data required and an additional query that uses the other universe and a data point shared between the universes, such as Uniq Pcs ID.

An example would be emission results summarized by EPA Source Classification Code. To obtain the emission results the Emissions universe will need to be queried, however the EPA Source Classification Code is not available in the Emissions universe. A second query that pulls the Uniq Pcs ID and the EPA Source Classification Code from the Emission Unit universe will need to be created.



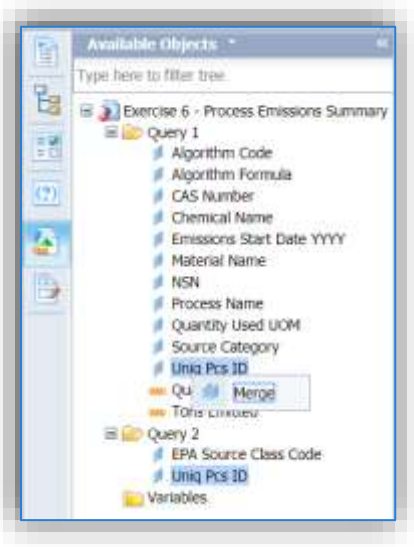


The next step is to run the queries and view the results. Once in the Design window the Available Objects window will viewable, if the window does not default to the Available Objects, select the  icon.

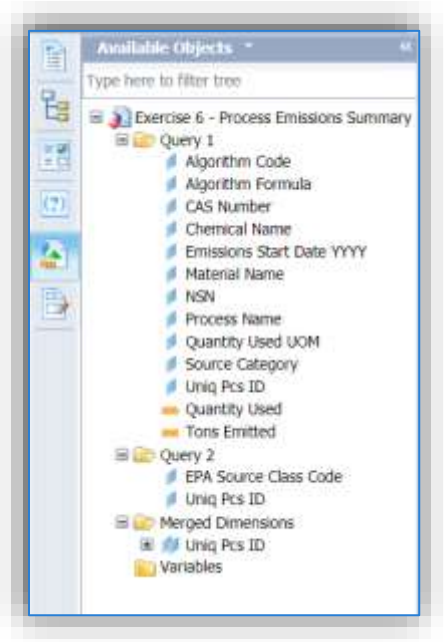


At the bottom of the window, you can select to arrange the objects in Alphabetic order or Arranged by Query. Select Arranged by Query.

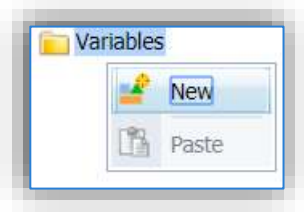
Click on the data element in Query 1, hold down the control key and click on the data element in Query 2 that is the same in both queries, in this instance Uniq Pcs ID. Once both data points are highlighted, right click.



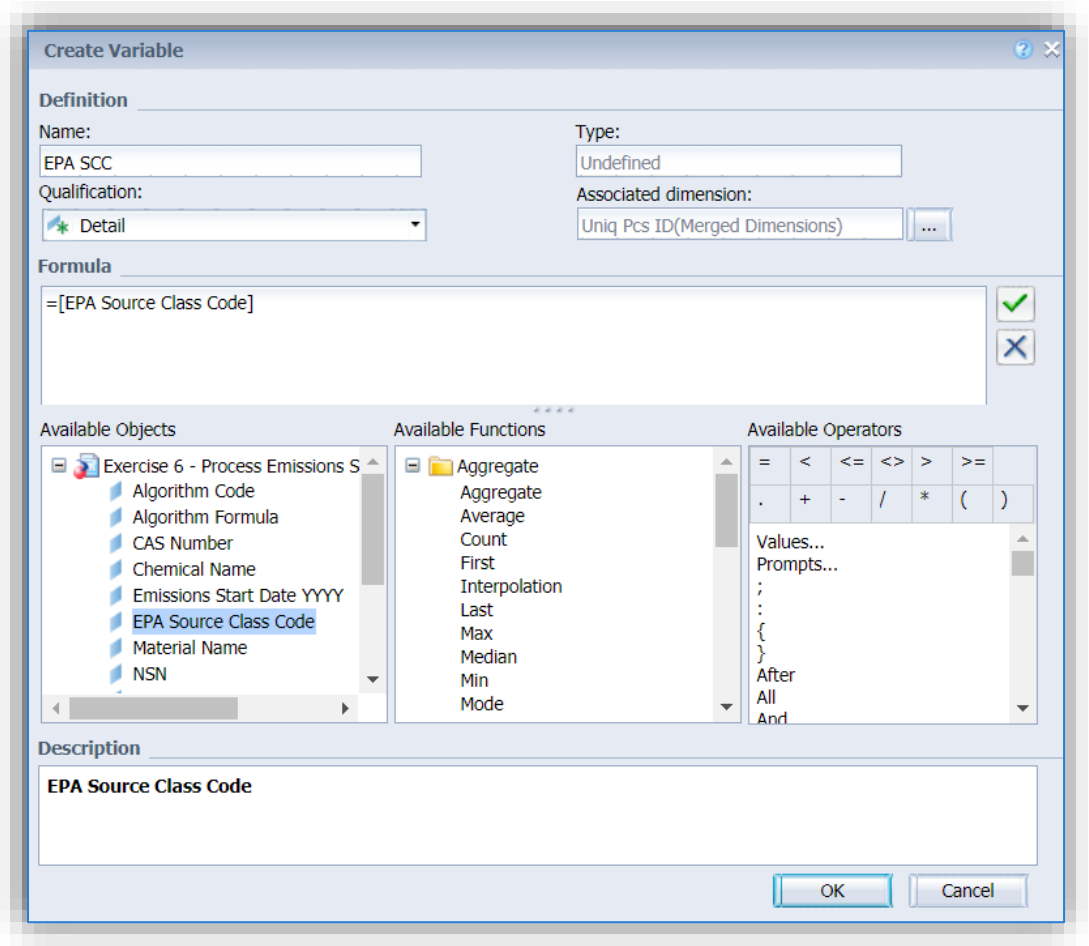
Click to merge the two data points. This will create a Merged Dimension with Uniq Pcs ID.



The next step is to create a variable for the merged EPA Source Class Code. To do this, right click on the variables folder, select New.



This will open the Create Variable pop-up window. Once in the window, create a Name for the data point. This cannot be the same name as it appears in Query 2. The Qualification field must be Detail and the Associated dimension must be the merged dimension as shown below.

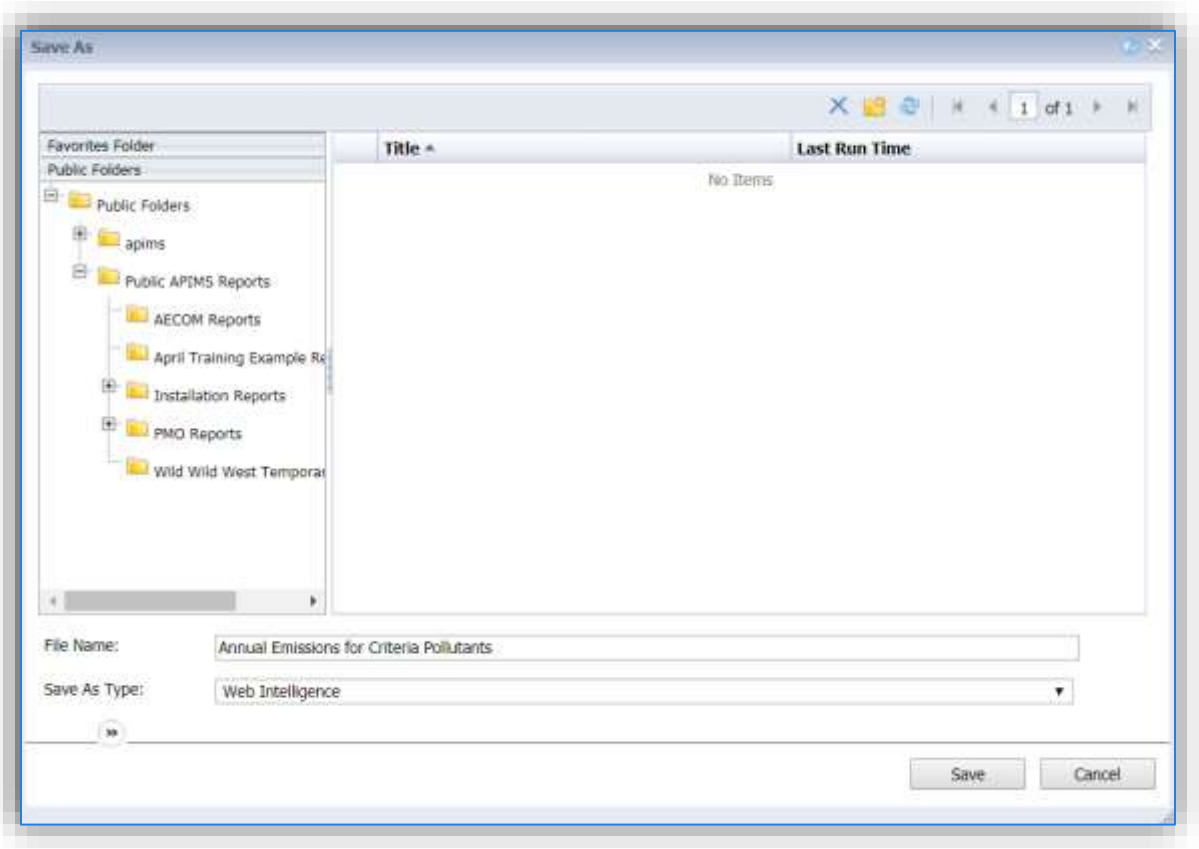


The last step is to select the data point from the list of available objects by double clicking it. This will create the formula, then click OK.

The last step is to add the new variable to the results table.

5.1.4.8 Saving a Report

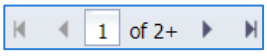
To save a report, use the Save button to either Save or Save As. When using an existing report to modify to meet your needs, remember to use the Save As option. This will allow you to specify the location and name of the file.



The left side window can be used to navigate between the Favorites Folder or the Public Folders.

The Favorites Folder is a personal folder that can be used to save reports that will only be viewable by your user profile.

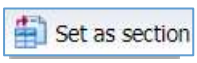
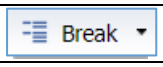
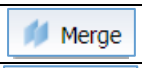
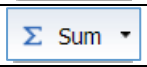
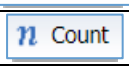
The Public Folders contain PMO (Program Management Office) Reports that are available to all users. The Installation Reports folder contains sub-folders for each installation that contain reports that can be viewed by any user with access to the installation. The Wild Wild West is a temporary folder used to share reports with anyone. This folder is often purged, so be careful when saving reports to this location.

At the top of the right window there are icons that can be used to  create folders,  delete files or  view additional reports.

5.1.4.9 Exporting a Report

To export a report, use the Export  button. This button allows you to export the report in multiple formats such as, PDF, Excel (.xlsx), Excel (.xls), CSV Archive and Text.

5.1.5 Common Icon Definitions

Icon	Name	Description
	Edit Data Provider	This will open the Query Panel that allows for the query data points and filters to be edited.
	Refresh All	This will refresh the query results by running the query.
	Available Objects	Shows the data points and variables available for inclusion in the report.
	Turn Into	This icon can be used to open a window that allows the user to change the order of fields and change the table type. This is most commonly used when creating a cross table.
	Set as section	This will create a separate section for each unique data point under a specified field.
	Break	This allow the user to set up data groupings.
	New Variable	This is used to create a custom field that uses functionality. For example, a Sum, Concatenation for different date format.
	Merge	This is used to merge two data points from different universes.
	Sum	This is used to create a total at the end of a column or row of data.
	Count	This is used to create a count at the end of a column or row of data.
	Function	This opens the Formula Builder and allows the user to create a more complex function.
	Sort	This allows the user to apply the desired sort order to a field.
	Export	This will export the report results to the specified format.
	Filter Bar	This will insert a page filter on the report for a specified data point.

APPENDIX

1. ACRONYMS

(Word formed from the initial letters of a name or parts of a series of words.)

AAFES	Army & Air Force Exchange Service
AFCEC	Air Force Civil Engineer Complex
AGE	Aerospace Ground Equipment
AOPS	Aircraft Operations
APIMS	Air Program Information Management System
BURN	Prescribed or Open Burning
CAS	Chemical Abstract Service
CEMS	Continuous Emissions Monitoring System
CHEM	Miscellaneous Chemical Use
COOL	Comfort Cooling Towers
DODIC	Department of Defense Identification Codes
ECOM	External Combustion
EAID	Equipment Authorized Inventory Data
eDASH	The Air Force-Wide Environmental Management System
EESOH-MIS	Enterprise Environmental, Safety, Occupational and Health Management Information System
FAR	Fly-Ash Reinjection
FERF	Fuel Emission Reduction Factors
FIBR	Fiberglass Repair
FIRE	Fire Training
GSOL	General Solvent Use
HAP	Hazardous Air Pollutant
HAZMART	Hazardous Materials Pharmacy
HEAT	Process Heaters, Dryers and Ovens
HVAC	Heating, Ventilating and Air Conditioning
ICOM	Internal Combustion Engine
JET	Jet Engine Testing
LAB	Laboratory Chemical Use
LAND	Landfills
LandGEM	Landfill Gas Emissions Model
LIMS-EV	Logistics, Installations and Mission Support Enterprise View
LOV	List of Values
MACT	Maximum Achievable Control Technology
MOGAS	Automotive Gasoline
MUN	Munitions
NAAQS	National Ambient Air Quality Standards

NESHAP	National Emission Standards for Hazardous Air Pollutants
NEW	Net Explosive Weight
PEST	Pesticide, Herbicide and Rodenticide Use
RCRA	Resource Conservation and Recovery Act
RICE	Reciprocating Internal Combustion Engine
RPIE	Real Property Installed Equipment
SEAD	Sealant and Adhesive Use
SGUN	Spray Gun Cleaning
SIP	State Implementation Plan
SME	Subject Matter Expert
STAR	Storage Tank Accounting and Reporting
SURF	Surface Coating
VEHE	On Road Vehicles
VFR	Virtual Flight Rule
VMT	Vehicle Miles Traveled
VOC	Volatile Organic Compound
WELD	Welding
WILD	Wildfires
WOOD	Woodworking

2. BREVITY CODES

(Shortened form of a frequently used group of words, phrases, or sentences consisting of entirely upper-case letters. Each letter is spoken individually.)

ABCL	Abrasive Blasting and Abrasive Cleaning
AEI	Air Emissions Inventory
AFB	Air Force Base
AFI	Air Force Instruction
ANG	Air National Guard
APU	Auxiliary Power Unit
AST	Aboveground Storage Tank
BGH	Baghouse
BLDG	Building
BSFC	Brake-Specific Fuel Consumption
CAA	Clean Air Act
CE	Civil Engineering
CFC	Chlorofluorocarbon
CFR	Code of Federal Regulations
CI	Compression Ignition
CLN	Cleaning
CNG	Compressed Natural Gas
CPMS	Continuous Parameter Monitoring System
DEGR	Degreasing
DLA	Defense Logistics Agency
DoD	Department of Defense
DSI	Dry Sorbent Injection
EF	Emission Factor
EOD	Explosive Ordnance Disposal
EPA	Environmental Protection Agency
ESP	Electrostatic Precipitator
FAA	Federal Aviation Administration
FCLN	Flush Cleaning
FDSP	Gasoline Fuel Dispensing
FF	Fabric Filter
FGR	Flue Gas Recirculation
FLD	Fuel Loading
GHG	Greenhouse Gases
GIS	Geographic Information System
GOV	Government Owned Vehicle
GSE	Ground Support Equipment

GSU	Geographically Separated Unit
GVWR	Gross Vehicle Weight Rating
GWP	Global Warming Potential
HBFC	Hydrobromofluorocarbons
HCFC	Hydrochlorofluorocarbons
HCLN	Hand Wipe Cleaning
HDDV	Heavy Duty Diesel Vehicle
HDGV	Heavy Duty Gasoline Vehicle
HEI	Highly Explosive Incendiary
HEV	Hybrid Electric Vehicles
HFC	Hydrofluorocarbons
VLP	High Volume Low Pressure
INCN	Incinerator
LDDT	Light Duty Diesel Truck
LDDV	Light Duty Diesel Vehicle
LDGT	Light Duty Gasoline Truck
LDGV	Light Duty Gasoline Vehicle
LFB	Low Fly By Cycles
LIMS-EV	Logistics, Installations and Mission Support Enterprise View
LNB	Low NO_x Burner
LOV	List of Values
LPG	Liquified Petroleum Gas
LTO	Landings and Takeoffs
MC	Motorcycle
MCL	Multi-Cyclone
MRR	Mandatory Reporting Rule
MSW	Municipal Solid Waste
NDI	Non-Destructive Inspection
NMOC	Non-Methane Organic Compounds
NRDE	Non-Road Equipment
NSN `	National Stock Number
NSPS	New Source Performance Standards
OBOD	Open Burning/Open Detonation
ODC	Ozone Depleting Chemicals
ODP	Ozone Depleting Potential
PFC	Perfluorocarbons
PM	Particulate Matter – Aerodynamic diameter unspecified
PM_{10}	Particulate Matter – Aerodynamic diameter < 10 micrometers
$PM_{2.5}$	Particulate Matter – Aerodynamic diameter < 2.5 micrometers
POL	Petroleum, Oil and Lubricant

POV	Privately Owned Vehicle
PTE	Potential-To-Emit
PWCT	Process Wet Cooling Towers
RPM	Revolutions Per Minute
RTST	Rocket Engine Testing
SCB	Scrubber
SCC	Source Classification Code
SDS	Safety Data Sheets
SI	Spark Ignition
TDS	Total Dissolved Solids
TGO	Touch and Go
TIM	Time In Mode
TLD	Total Liquid Drift
TRI	Toxic Release Inventory
TSE	Tactical Support Equipment
UOM	Unit of Measure
USAF	United States Air Force
UST	Underground Storage Tank
UV	Ultraviolet
VFR	Virtual Flight Rule
VMT	Vehicle Miles Traveled
VOC	Volatile Organic Compound

3. ABBREVIATIONS

(Shortened form of a word or phrase.)

Btu	British Thermal Unit
^{o}C	Degrees Celsius
CH_4	Methane
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CO_{2e}	Carbon Dioxide Equivalent
^{o}F	Degrees Fahrenheit
ft	Foot (Feet)
g/L	Grams per Liter
gal	Gallon(s)
gal/hp	Gallons per Horsepower
HCl	Hydrogen Chloride
hp	Horsepower
hr	Hours
kg	Kilogram
KW	Kilowatt
L	Liter
lb	Pound(s)
lbs/gal	Pounds per Gallon
lbs/hr	Pounds per Hour
lb/lbmol	Pound per Pound Mole
Mg	Megagram(s) [i.e., metric ton]
MMBtu	Million British Thermal Units
$MMBtu/ft^3$	Million British Thermal Unit per Cubic Foot
MMBtu/gal	Million British Thermal Unit per Gallon
MMBtu/hr	Million British Thermal Units per Hour
MMcuft	Million Cubic Foot
mmHg	millimeters of Mercury
NO_x	Nitrogen Oxides
O_3	Ozone
Pb	Lead
PCT	Percent
ppm	Parts per Million
SO_x	Sulfur Oxides
tpy	Tons per Year
wt%	Weight Percent