Appendix F

Applicable Facility Determination Methodology

Proposed Amendments to the Airborne Toxic Control Measure for In-Use Diesel-Fueled Transport Refrigeration Units (TRU) and TRU Generator Sets, and Facilities Where TRUs Operate

Date of Release: July 27, 2021
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I. Summary and Background

California Air Resources Board (CARB) staff are proposing amendments to the Airborne Toxic Control Measure for In-Use Diesel-Fueled Transport Refrigeration Units (TRU) and TRU Generator Sets, and Facilities Where TRUs Operate (TRU ATCM; title 13, California Code of Regulations, section 2477), hereafter referred to as the "Proposed Amendments." CARB adopted the TRU ATCM in 2004 (amended in 2010 and 2011) to reduce diesel particulate matter (PM) emissions from diesel-powered TRUs and TRU generator sets (gen set), as well as near source health risk at facilities where TRUs operate.

Despite the progress made, the emission reductions achieved under the TRU ATCM are not sufficient to protect communities from near source pollution impacts, or to help meet the current health based ambient air quality standards across California or the State's climate goals. The Proposed Amendments are needed to achieve additional emission reductions by requiring diesel-powered truck TRUs to transition to zero-emission technology, newly-manufactured TRU engines in the remaining categories to meet a PM emission standard, and the use of lower global warming potential refrigerant. The Proposed Amendments also include requirements for applicable facilities to ensure that only compliant TRUs operate on their property.

This appendix summarizes the data sources, process, rationale, and assumptions used in the development of a facility inventory, as well as the methodology used to determine the applicable facilities subject to the Proposed Amendments.

II. Refrigerated Facility Inventory

To determine the number of facilities that would be subject to the Proposed Amendments, staff analyzed the statewide population and distribution of facilities where TRUs operate, as well as the amount of TRU activity that occurs at those facilities.

A. Refrigerated Facility Inventory Data Sources

CARB staff reviewed facility datasets from various sources, including CARB, other State departments, contracted businesses, and online refrigerated business sites. CARB staff identified seven data sources with information on approximately 80,000 facilities with potential TRU activity. To validate the data from each data source, CARB staff reviewed the facilities using Google Maps and Google Earth to determine facility characteristics, including facility type, building size, and number of dock doors (CARB, 2019c).

Table 1 shows the number of facilities obtained from each data source and the number reviewed by CARB staff as of February 2020. With the exception of the Dun & Bradstreet (D&B) data set, staff reviewed all of the facilities from each source. Due to the large number of facilities from the D&B data source, staff reviewed only a subset

of the data from that source. Staff expect to complete review of the remaining D&B facilities prior to implementation of the Proposed Amendments.

Table 1. Total Number of Refrigerated Facilities and Number of Facilities Reviewed by Source (as of February 2020)[1]

Data Source	Number of Refrigerated Facilities	Number of Facilities Reviewed by Staff
CARB Refrigerant Management Program	6,775	6,775
Air Resources Board Equipment Registration Program	2,250	2,250
Manta	275	275
California Department of Public Health	150	150
Caltrans Truck Stop Directory	200	200
Dun & Bradstreet (Motel, Hotel, and Fast Food)	38,500	100
Dun & Bradstreet (Refrigerated Facilities)	31,625	12,575
CARB Staff Manual Additions	25	25
Total	79,800	22,350

Each data source used to develop the refrigerated facility inventory for the Proposed Amendments is described below.

1. CARB Refrigerant Management Program

Staff included all facilities subject to CARB's Refrigerant Management Program (RMP), which requires registration and annual reporting of all stationary refrigeration facilities with more than 50 pounds of high global warming potential refrigerant.[2] Staff used the RMP data as the base dataset due to the completeness of reported data, frequency of reporting, and the high likelihood that it contained facilities with TRU operations (CARB, 2018b).

2. Air Resources Board Equipment Registration (ARBER)

Staff included all facilities in the Air Resources Board Equipment Registration (ARBER) program that submitted a TRU operator report. The current TRU ATCM requires operators of terminals where TRUs or TRU generator sets are garaged, maintained, operated, or dispatched from to submit an operator report. Operator reports are required to be updated within 30 days of any changes (CARB, 2011).

[1] Staff used the February 2020 facility estimates (see Table 5) to analyze the cost impacts of the Proposed Amendments.
[2] For reference, most residential houses use less than 50 pounds of refrigerant.

3. Manta

Staff included all of the facilities listed as a cold storage warehouse in California on the Manta website. Manta is a nationwide marketing business listing website that can be searched by business type and state. It is a marketing platform that provides service listings for a wide range of both small and large business types (Manta, 2020).

4. California Department of Public Health

Staff included cold storage facilities registered with the California Department of Public Health, which requires annual registration and updates for facilities that store refrigerated foods at temperatures less than 45° F. These facilities generally do not own any of the products stored, but provide care, custody, and control of other company's products (CDPH, 2018).

5. Caltrans Truck Stop Directory

Staff included truck stops listed on the Caltrans Truck Stop Directory (Caltrans, 2020).

6. Dun & Bradstreet

D&B Corporation is a company that provides a wide range of business data for private companies, government agencies, and other industries. The database contains more than 300 million business records. Staff obtained information for all California businesses with refrigerated operations based on their North American Industry Classification System (NAICS) codes. Table 2 lists the NAICS codes staff used to identify facilities with potential TRU activity (Dun & Bradstreet, 2018).

Table 2. NAICS Codes for Refrigerated Transport

CARB Category	NAICS Code	NAICS Title
Food manufacturing	311411	Frozen fruit, juice, and vegetable manufacturing
	311412	Frozen specialty food
	311511	Fluid milk manufacturing
	311512	Creamery butter manufacturing
	311513	Cheese manufacturing
	311520	Ice cream and frozen desert manufacturing
	311611	Animal (except poultry) slaughtering
	311612	Meat processed from carcasses
	311615	Poultry processing
	311712	Fresh and frozen seafood processing
	311813	Frozen cakes, pies, and other pastries manufacturing
	311991	Perishable prepared food manufacturing
	312113	Ice manufacturing
	312120	Breweries

CARB Category	NAICS Code	NAICS Title
Grocery distribution	424210	Drugs and druggist sundries merchant wholesalers
	424410	General line grocery merchant wholesalers
	424420	Packaged frozen food merchant wholesalers
	424430	Dairy product (except dried or canned) merchant wholesalers
	424440	Poultry and poultry product merchant wholesalers
	424450	Confectionery merchant wholesaler
	424460	Fish and seafood merchant wholesalers
	424470	Meat and meat product merchant wholesalers
	424810	Beer and ale merchant wholesalers
Produce distribution	424480	Fresh fruit and vegetable merchant wholesalers
	424930	Flower, nursery stock, and florists' supply merchant wholesalers
Produce packing houses	115114	Fruit and vegetable grading, sorting, and packaging, fruit and vegetable pre-cooling
Grocery stores/markets	445110	Supermarkets and other grocery (except convenience) stores
	445210	Meat markets
	445220	Fish and seafood markets
	445230	Fruit and vegetable markets
	445292	Confectionery and nut stores
	452311	Warehouse Clubs and Supercenters
Grocery stores/markets	446110	Pharmacies and drug stores
Retail foodservices	488119	Other airport operations
	722212	Cafeterias
	722310	Food service contractors
	722330	Mobile food services
	922140	Correctional institutions
Fleet terminals	482111	Line-haul railroads
	482112	Short line railroads
	484220	Specialized freight (except used goods), local
	484230	Specialized freight (except used goods), long distance
Seaport terminals	488320	Marine cargo handling
Cold storage warehouses	493120	Refrigerated warehousing and storage
Other	325411	Medicinal and botanical manufacturing

CARB Category	NAICS Code	NAICS Title
	325412	Pharmaceutical preparation manufacturing
	325414	Biological product (except diagnostics) manufacturing
	722513	Limited service restaurants (fast food)
	325992	Photographic film, paper, plate, and chemical manufacturing
	336414	Guided missile and space vehicle manufacturing
	721110	Hotels and motels (except casino hotels)

7. CARB Staff Manual Additions

CARB staff added 25 facilities to the refrigerated facility inventory that were not included in the seven data sources. These facilities were discovered through communication with electric utilities and manual inspection of satellite imagery.

B. Refrigerated Facility Inventory Methodology

CARB staff performed the following steps to identify the number of unique facilities in the refrigerated facility inventory.

1. Identify datasets. Staff identified seven data sets with information (name, location, type) on facilities where TRU activity occurs.
2. Combine into one dataset. Staff combined the individual data sets into one dataset for ease of processing.
3. Normalize data. The various data sources did not contain the same fields and information was not formatted consistently. Staff normalized the data to organize the data in a single master dataset.
4. Standardize addresses and remove duplicates. Staff standardized facility addresses using the United States Postal Service (USPS) website and removed duplicate facility address records.
5. Divide the master dataset into smaller datasets. Staff split the master dataset into smaller datasets (subsets) based on NAICS code for business type: refrigerated WHDCs, grocery stores, seaport facilities and intermodal railyards, truck stops, fast food restaurants, motels and hotels, convenience stores, pharmacies, and other facilities.
6. Analyze subsets. Staff reviewed the subsets using Google Maps and Google Earth to determine facility characteristics, including facility type, building size, and number of dock doors.

III. Refrigerated Facility Types

Staff analyzed refrigerated WHDCs, grocery stores, seaport facilities, intermodal railyards, truck stops, fast food restaurants, motels, hotels, convenience stores, pharmacies, and other facility types with TRU activity. A description of each of the facility types analyzed and their operational characteristics is provided below.

A. Refrigerated Warehouses or Distribution Centers

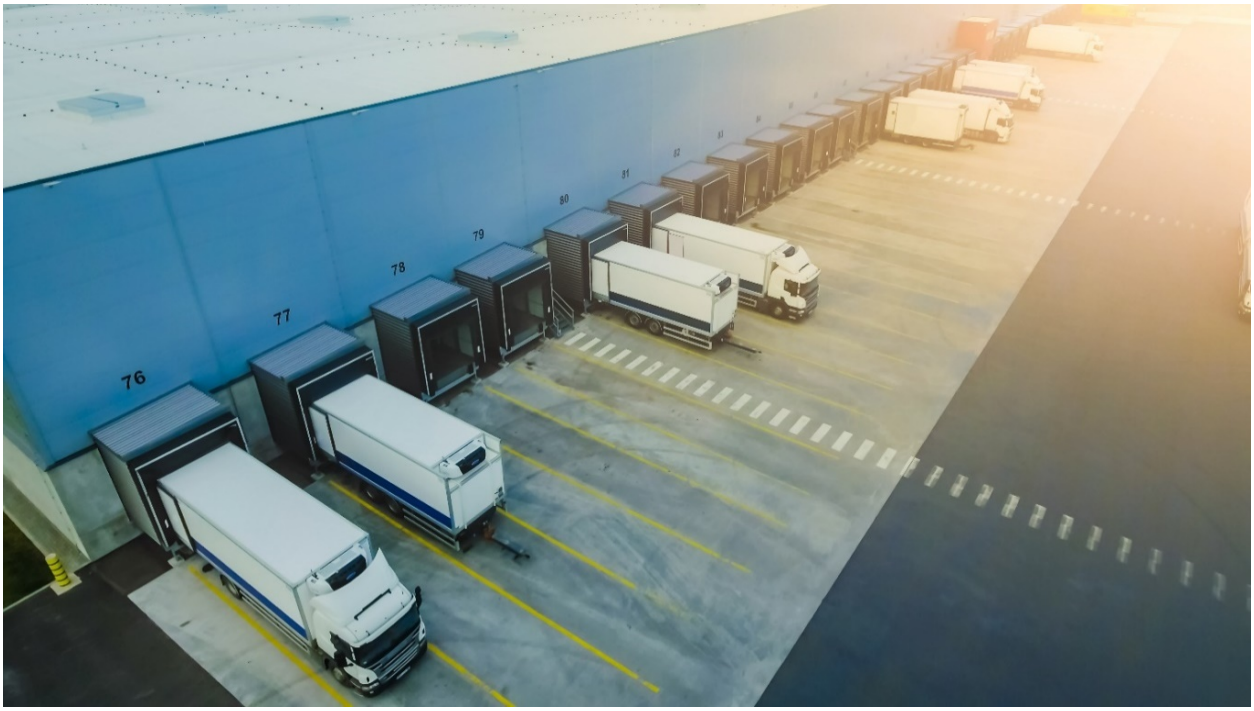
Refrigerated WHDCs include a wide variety of facility types and are generally located in industrial areas. These facilities include, but are not limited to, refrigerated warehouses, distribution centers, cold storage warehouses, packing houses, and trans-loading facilities where a load is transferred from one mode of transportation to another. Refrigerated WHDC operations can include a variety of activities from the storage of food products to secondary services such as processing, preparing, or packaging. These facilities typically accommodate the loading and unloading of trucks and trailers with dock doors at or above grade level. Refrigerated WHDCs generally have more trailer TRU than truck TRU activity.

Staff identified two subcategories of refrigerated WHDCs based on size: 1) standard refrigerated WHDCs with a building size less than 199,999 square feet and 2) high-cube refrigerated WHDCs with a building size greater than or equal to 200,000 square feet. High-cube refrigerated WHDCs are usually associated with a higher level of activity, throughput, and automation with a minimum ceiling height of 24 feet (Jaller, 2017).

Based on warehousing vehicle trip studies, facility sizes generally correlate with a facility's heavy-duty truck trip rate and therefore the number of TRU loads (ITE, 2016). Trailer TRUs spend an average of 3.3 hours stationary per load at a refrigerated WHDC facility. Stationary operation can include any combination of loading, unloading, staging, or waiting to be dispatched (CARB, 2011) (CARB, 2018a).

The amount of daily TRU activity varies at refrigerated WHDCs. These facilities are usually gated or fenced, and closely monitor truck traffic entering and exiting the facility. Figure 1 shows an example of a high-cube refrigerated WHDC with multiple TRU equipped trailers being loaded or unloaded at the facility dock doors.

Figure 1. Refrigerated High-Cube Warehouse or Distribution Center



B. Grocery Stores

Grocery stores are generally located in commercial shopping centers near residential areas and sell food and other household merchandise directly to the public. Grocery stores carry refrigerated and frozen foods, meats, dairy, poultry, fresh fruits, vegetables, and other temperature sensitive products. These facilities typically accommodate the loading and unloading of trucks and trailers with at least one dock door or grade level door at the rear or side of the building, or through the front door when parking or building space is limited (CARB, 2019c).

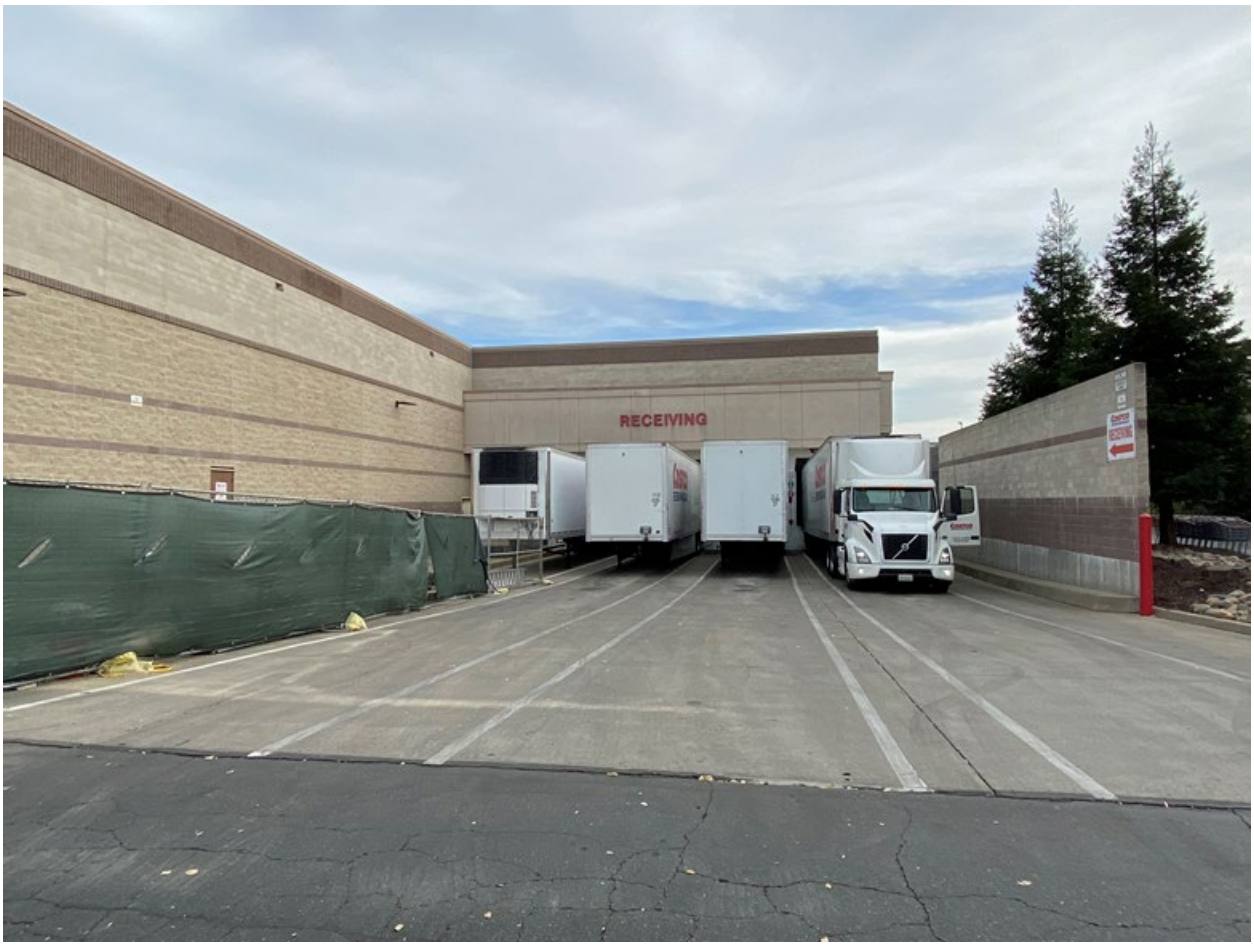
Staff identified two subcategories of grocery stores based on size: 1) standard grocery stores (e.g., Ralphs and Safeway) with a building size less than 89,999 square feet and 2) supercenters (e.g., Walmart and Costco) with a building size greater than or equal to 90,000 square feet.

Grocery stores receive deliveries from both truck TRUs and trailer TRUs. Trailer TRU deliveries are regularly scheduled by the store and typically range from 2 to 4 trailer TRUs per day (CARB, 2019c). Trailer TRUs spend an average of 1.7 hours per delivery at the store and deliver 6 days per week (McCormack et al., 2010). In addition, approximately 17 percent of grocery stores report using trailer TRUs for additional cold storage during peak or holiday seasons and generally park them near the dock doors or parking lot (CARB, 2016).

The amount of daily TRU activity varies at grocery stores. Due to their close proximity to residential areas, emissions and health risk associated with TRU operations are significant from a health risk perspective (CARB 2019b). Figure 2 shows an example of

TRU equipped trailers at a supercenter docking area and a seasonal cold storage trailer unit (left trailer).

Figure 2. Grocery Store Dock and Seasonal Cold Storage Trailer TRU



C. Seaport Facilities

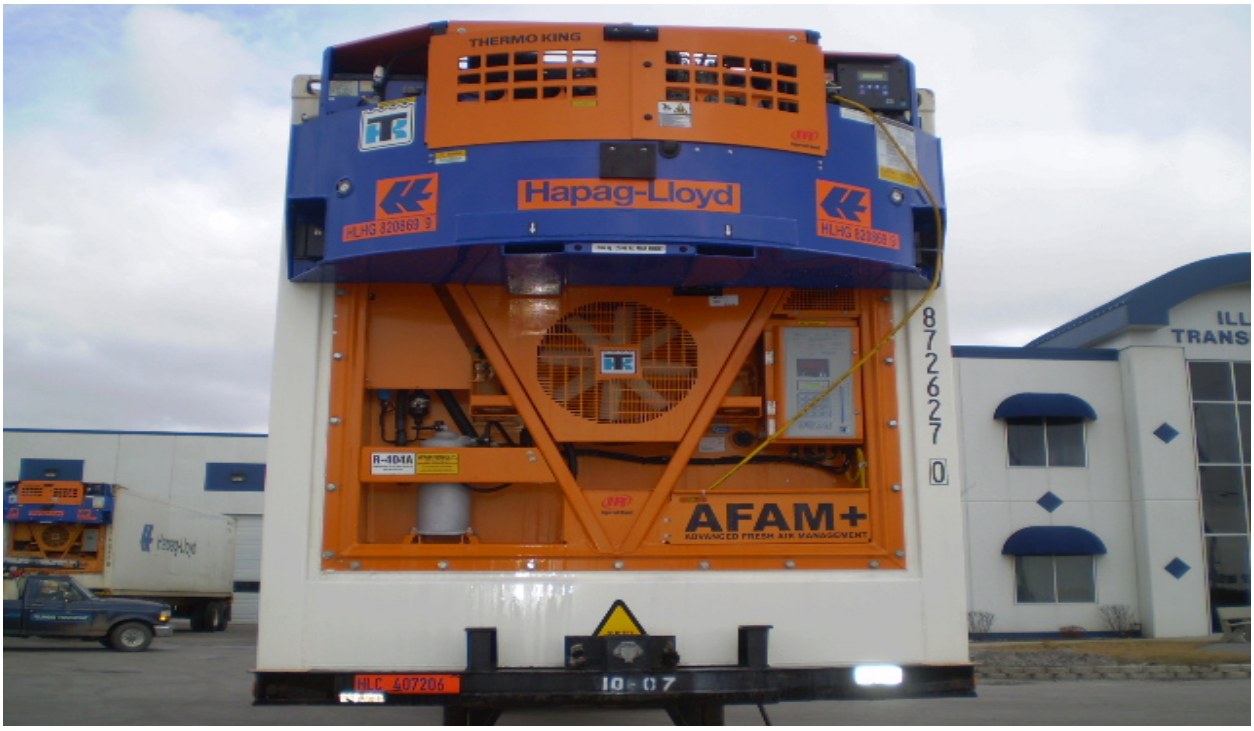
Seaport facilities are a component in the transportation of refrigerated cargo, typically within refrigerated intermodal international shipping containers or trailers. For staff's analysis, refrigerated WHDCs located on seaport property were included in the refrigerated WHDC category. Refrigerated ocean-going intermodal containers are usually 20 or 40 feet long and can be transported by ship, rail, or heavy-duty truck. Refrigerated international shipping containers have electrically driven refrigeration systems with plug-in capability and utilize ship power when on the ship (plugged into ship electric grid) or landside shore power at the docks (plugged into port electrical outlets). When electrical outlets are not available (e.g., traveling to an overland destination), TRUs draw power from diesel powered TRU generator sets that attach to the container or container chassis.

Approximately 3 percent of seaport cargo is refrigerated at the Port of Oakland and 4 percent at the San Pedro Bay Ports (POAK, 2018) (SPBP, 2020). However, based on

conversations with seaport staff, these percentages vary depending on the specific port and seasonal increases for agricultural products or other perishable goods. Seaports are generally located in industrial areas, nearby residential communities, are gated or fenced, and closely monitor truck traffic entering and exiting the facility.

Figure 3 shows a container with a diesel-powered pin-on generator set that provides electrical power to the TRU when it is not plugged into shore power. TRU generator sets are typically used when containers need to be transported long distances or wait for a time before being off-loaded or delivered to the next destination (e.g., warehouse or intermodal railyard). Some refrigerated marine containers do not require generator sets when the destination is close by and can be offloaded quickly (e.g., warehouses located near the seaport).

Figure 3. Refrigerated Container Equipped with a Generator Set



An example of a seaport facility is shown in Figure 4.

Figure 4. Seaport Facility

D. Intermodal Railyards

Intermodal railyards are another component in the transportation of refrigerated freight. These facilities have distinct areas for incoming and outgoing cargo, cargo staging, loading and unloading of trains, maintenance, and other activities.

Intermodal railyards primarily attract international refrigerated shipping containers with TRU generator sets, domestic shipping containers, and trailer TRUs. As described in the seaport facility discussion, international shipping containers have electrically-driven refrigeration units that can be powered by ship electrical power, seaport shore power, or a diesel-powered generator set. Domestic shipping containers and trailers differ from international shipping containers in that they have an extended length of 53 feet and are equipped with an integral TRU. Domestic shipping containers can be double stacked on a single flatbed railcar. Containers and trailers are transported to and from intermodal railyards by heavy-duty trucks or by connecting trains.

According to an industry source, the fraction of cargo handled at California intermodal railyards that is refrigerated ranges from less than 1 percent to 9 percent, depending on the railyard and seasonal increases for agricultural or other perishable products. Container and trailer TRUs spend an average of 24 hours at an intermodal railyard. Intermodal railyards are associated with elevated near-source health risk and are often located within or near California's disadvantaged communities. These facilities are often gated or fenced, and closely monitor truck traffic entering and exiting the facility. An example of an intermodal railyard with intermodal containers is shown in Figure 5.

Figure 5. Intermodal Railyard

E. Truck Stops

Truck stops are used by drivers transporting freight long distances and provide general services for both the driver and the truck. They generally operate 24 hours a day, 7 days a week to accommodate the variety of schedules and needs of truck drivers. Truck stop services vary depending on the ownership, location, and size of the truck stop. Basic services include restaurants, truck refueling and maintenance, and large parking areas that truck drivers may use for sleeping. Truck stops provide a rest area that accommodates larger trucks and their trailers, allowing drivers to comply with federal rest requirements. Truck stops are not directly part of the freight chain given that truck drivers visit them voluntarily.

Truck stops vary in size and the types of driver or truck services they provide. They range from less than 1 acre with no parking spaces to over 23 acres with over 540 parking spaces and accommodate a wide variety of heavy-duty truck types (CARB, 2019c). Depending on the driver's needs, the length of time the trailer TRU remains stationary will vary from a short refueling stop up to the 10 hours needed to meet mandatory rest requirements (FMCSA, 2016). These facilities are generally located in mixed commercial or industrial areas near major highways and provide easy access for truck drivers traveling major freight corridors. Figure 6 shows an example of trucks parked and refueling at a truck stop.

Figure 6. Truck Stop

F. Fast Food Restaurants

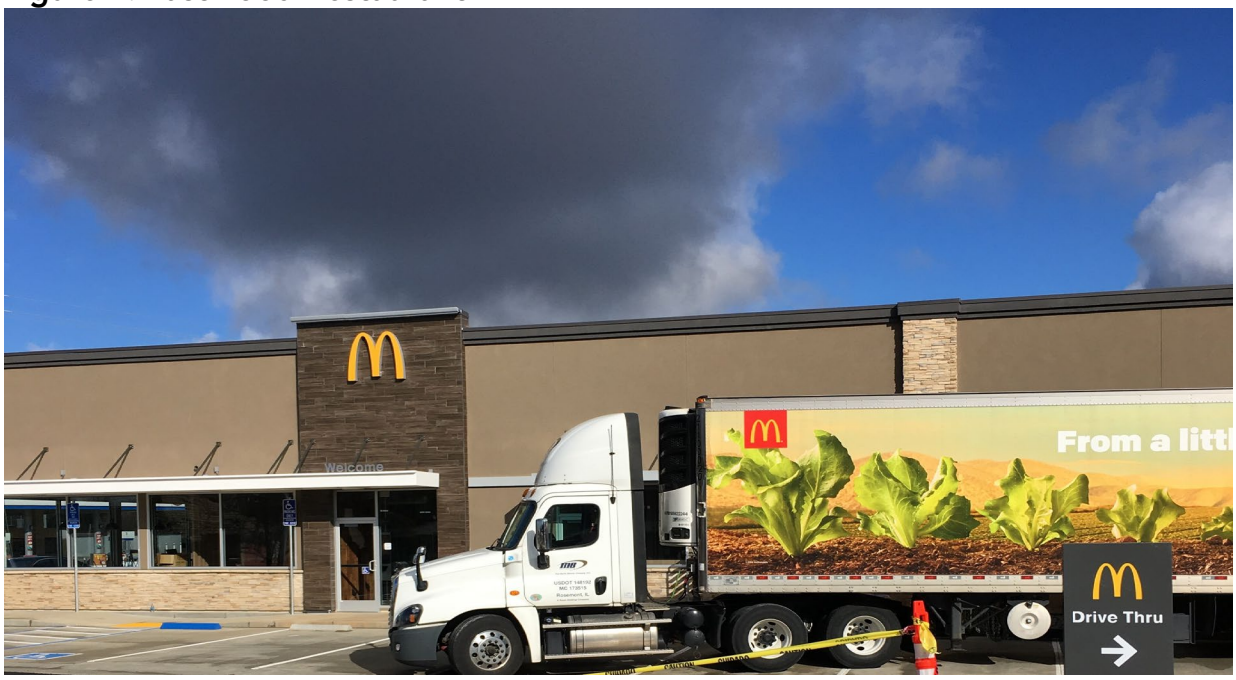
Fast food restaurants prepare food and drinks for on site or takeaway consumption. These facilities generally do not have dock doors, and receive deliveries through a grade-level door at the rear of the building or through the customer entrance. These deliveries are generally smaller than deliveries at other facility types and are completed in 30 minutes or less three days per week (Anderson, personal communication, January 2019).

Staff estimated that over 30,400 fast food facilities operate statewide, with an average facility size of approximately 3,400 square feet (CARB, 2019c). They are generally located within densely populated commercial and residential areas and often in clusters (multiple locations within a mile of each other).

Due to infrequent and short deliveries, fast food facilities and other restaurants typically have lower TRU activity compared to other facility types. Restaurants other than typical fast food types were assumed to have similar operational characteristics. Staff did not analyze an additional restaurant category based on similarities to fast food. Also, data was not available to suggest that the amount of stationary TRU activity that occurs at other restaurant types is different than fast food restaurants.

Figure 7 shows an example of a fast food restaurant accepting a delivery from a TRU equipped trailer through a customer entrance.

Figure 7. Fast Food Restaurant



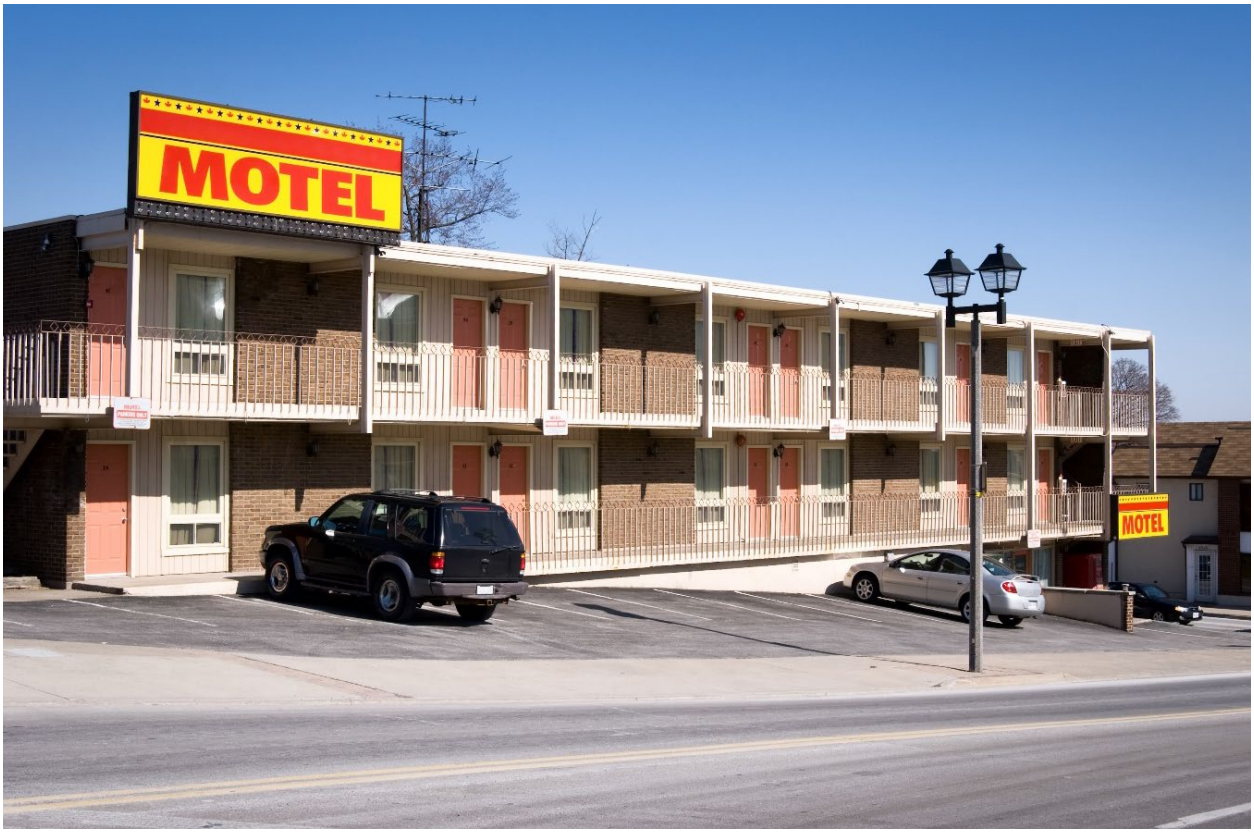
G. Motels and Hotels

Motels and hotels provide short-term lodging accommodations for travelers, including truck drivers transporting TRU equipped trailers or containers. While staff assumed most truck drivers rest at truck stops or other locations in the sleeper cab of their trucks to minimize cost, some truck drivers do utilize motels and hotels.

Based on staff's analysis, motels and hotels are generally located along highways and range in size and room capacity with an average building size of 33,300 square feet (CARB, 2019c). Motels and hotels are usually visible from nearby highways or major thoroughfares for ease of access.

Depending on the length of the driver's stay, TRUs can be stationary at a motel or hotel for up to 10 hours needed to meet mandatory rest requirements (FMCSA, 2016). However, staff assumed that both motels and hotels typically have minimal overnight truck visits with TRU activity. Like fast food restaurants, these facilities have lower TRU activity compared to other facility types. An example of a roadside motel is shown in Figure 8.

Figure 8. Motel



H. Convenience Stores

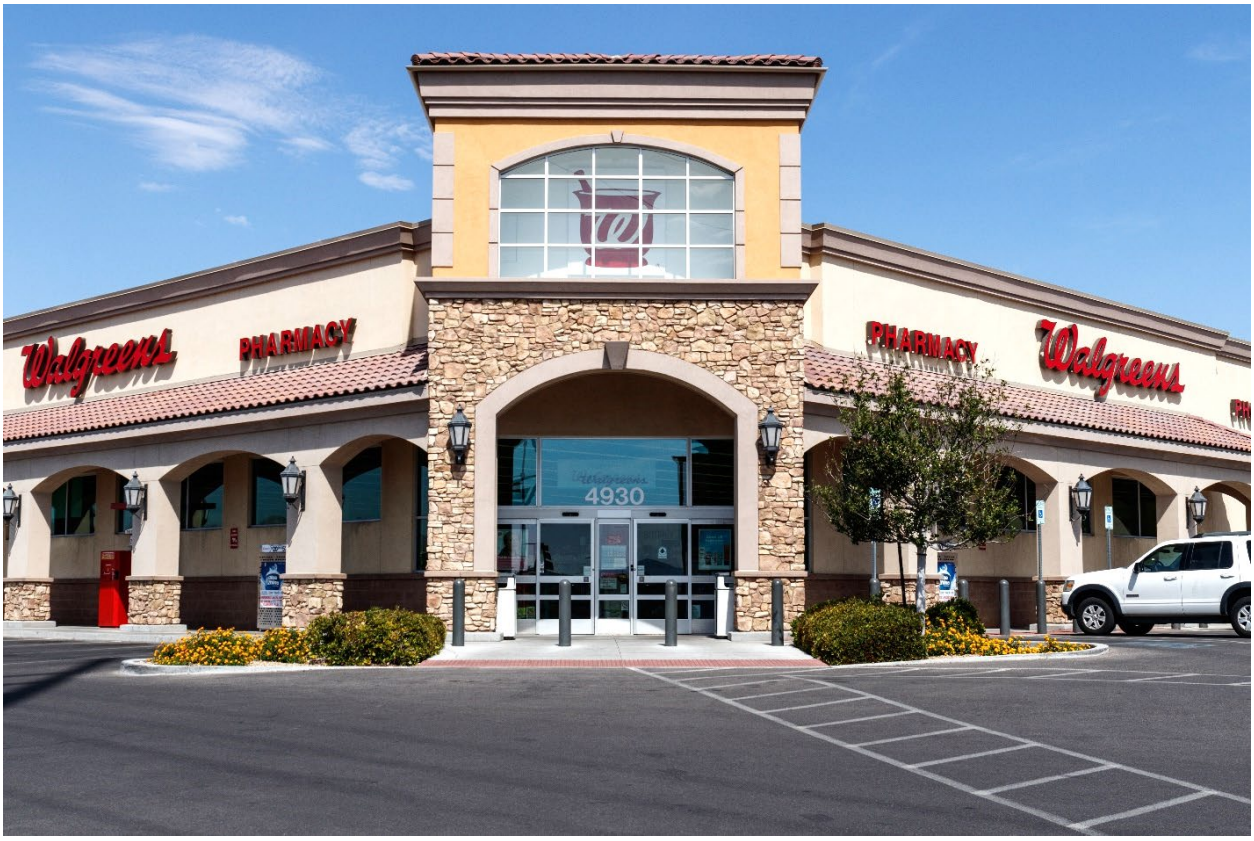
Convenience stores are generally located in residential or mixed commercial areas. They are open for extended hours and sell a limited selection of household goods and groceries. They carry a small selection of refrigerated goods, such as drinks and produce. Convenience stores typically do not have dock doors and receive deliveries through a rear or side grade level door or through the customer entrance. Convenience stores generally have lower TRU activity compared to other facility types since they have smaller deliveries and shorter unloading times. Figure 9 shows an example of a convenience store.

Figure 9. Convenience Store

I. Pharmacies

Pharmacies are generally located in residential or mixed commercial areas. They primarily engage in the retail of prescription and non-prescription medicines. Pharmacies range in size and are often operated within larger grocery stores or supercenters. In addition, pharmacies also carry general merchandise such as cosmetics, toiletries, tobacco, and novelty merchandise. Cargo is typically unloaded through a single dock door, at or above grade-level. Staff assumed that refrigerated deliveries are infrequent or done by smaller truck TRUs at pharmacies due to the generally smaller volumes of refrigerated goods. Staff were not able to identify data or research in this category, but assumed lower TRU activity due to size and throughput of refrigerated goods. Pharmacies have limited refrigerated space and, as a result, lower TRU activity compared to other facility types. Figure 10 below shows a dedicated pharmacy facility located within a strip mall.

Figure 10. Pharmacy



J. Other Facility Types

Other facility types staff identified in the refrigerated facility inventory include hospitals, prisons, floral stores, cosmetics stores, and facilities where TRUs visit but did not fall into the above categories. Staff were unable to find data specific to these other types of facilities due to the diverse range of activities. Staff assumed that refrigerated deliveries at these facility types were infrequent and on average have shorter delivery times compared to refrigerated WHDCs and grocery stores.

IV. Applicable Facility Determination

A. Included Facility Types

Based on their TRU activity, the Proposed Amendments include refrigerated WHDCs, grocery stores, seaport facilities, and intermodal railyards. These facility types have the highest estimated contribution of statewide diesel PM emissions from TRUs and typically attract trailer TRUs that congregate and operate while stationary, which contributes to localized health risk. In addition, these facilities are generally gated or fenced (except grocery stores), and closely monitor truck traffic entering, exiting, or operating at the facility. Staff determined it would be feasible for these facility types to comply with the Proposed Amendments, which will require them to monitor TRU compliance.

B. Excluded Facility Types

The Proposed Amendments do not include truck stops as an applicable facility type. Truck stops are an optional destination for truck drivers, are not gated or fenced, and do not monitor truck traffic entering and exiting the facility. They have parking areas for overnight use, but it may be difficult for these facilities to ensure TRU compliance without unintentionally deterring drivers to park in nearby streets, neighborhoods, or disadvantaged communities.

Fast food restaurants, motels, hotels, convenience stores, pharmacies, and other facility types are also not included as applicable facility types based on their TRU activity. These facilities have less TRU activity with infrequent or short visits compared to the included facility types.

C. Applicable Facility Size Threshold Determination

To determine the building size thresholds, staff analyzed the operational characteristics (e.g., truck trips, load times, and location) for each included applicable facility type, as well as the variability of activity (e.g., size and type of facility) within each category. Staff quantified TRU emissions associated with each applicable facility type at a proposed threshold to determine the appropriateness of that size threshold. Staff also considered the general proximity to nearby communities (e.g., seaport facilities and intermodal railyards). The following describes the approach staff used to determine facility size thresholds for refrigerated WHDCs, grocery stores, seaport facilities, and intermodal railyards.

1. Refrigerated Warehouses or Distribution Centers

Refrigerated WHDCs primarily attract trailer TRUs, with a small percentage of domestic shipping containers and TRU generator sets. Staff estimated TRU activity using truck trip and building square footage metrics. Staff assumed that building square footage correlates with the number of heavy-duty truck trips per day and therefore the estimated number of refrigerated loads. TRUs spend an average of 3.3 hours stationary per load at refrigerated WHDCs, which could include any combination of loading, unloading, staging, or waiting to dispatch (CARB, 2011) (CARB, 2018a).

Using emission and health risk estimates, which are based on estimated TRU activity relative to the facility size, staff are proposing a facility size threshold for refrigerated WHDCs at 20,000 square feet or greater (CARB, 2019b). Staff analysis indicated that a small percentage of trailer TRUs visit smaller facilities, while greater TRU stationary activity occurs at larger WHDCs.

Staff used the equation below and the metrics provided in Table 3 to estimate statewide stationary trailer TRU emissions at refrigerated WHDCs.

$$Statewide\ Refrigerated\ WHDC\ TRU\ PM2.5\ Emissions\ (tpy)$$

$$= Total\ Building\ Square\ Footage \times \frac{Number\ of\ Truck\ Trips}{1{,}000\ Square\ Feet} \times \frac{Number\ of\ Loads}{Truck\ Trip\ Rate\ Final} \times \frac{TRU\ hours}{Load} \times \frac{Operating\ Days}{Year} \times TRU\ Emission\ Factor \times 62.5\%\ Engine\ Cycle \times \frac{Tons}{Gram}$$

Table 3. Refrigerated Warehouse or Distribution Center Metrics

Parameter	Description	Metric	Source/Reference/Notes
Total statewide building square footage	The total square footage of refrigerated WHDC facilities statewide	Sq. ft.	Building size. (CARB, 2019c).
Standard Refrigerated WHDC Truck-trip rate for facilities < 200k sq. ft.	TT rate is every time the truck crosses facility boundary	0.233 TT per 1,000 sq. ft.	SCAQMD/ITE Warehouse Vehicle Trip Generation Analysis 2016. (ITE, 2016)
High-Cube Refrigerated WHDC Truck-trip rate for facilities >200k sq. ft.	TT rate is every time the truck crosses facility boundary	0.749 TT per 1,000 sq. ft.	SCAQMD/ITE Warehouse Vehicle Trip Generation Analysis 2016. (ITE, 2016)
Loads per truck trip (TT) rate final	It takes two truck trips for a single load as TT is defined as every time the truck crosses facility boundary	1 TRU load per 2TT	SCAQMD/ITE Warehouse Vehicle Trip Generation Analysis 2016. (ITE, 2016)
Average time to load/unload and or stage, wait or dispatch	Average hours the TRU is at facility	3.3 hours per load	Ammendments for the Toxic Control Measure or In-Use Diesel-Fueled Transport Refrigeration Units (TRU) and TRU Generator Sets, and Facilities Where TRUs Operate (CARB, 2011) Cold Storage Food/Distribution Questionnaire. (CARB, 2018a)

Parameter	Description	Metric	Source/Reference/Notes
Facility operating days	6 days per week, 52 weeks per year	312 days per year	Staff assessment. Facilities generally operate 5-7 days per week. Staff used 6 days per week as an average.
CA trailer TRU PM 2.5 emission factor	Weighted trailer TRU emission factor by population and year	2.08 grams per operating hour	2019 Emissions Inventory Update. (CARB, 2019a)
TRU diesel engine cycling percentage	Amount of time diesel engine is running when TRU is on	62.5%	2019 Emissions Inventory Update. (CARB, 2019a)
Gram to Ton Conversion	Conversion rate	0.0000011 tons per gram	Conversion rate.

2. Grocery Stores

Staff estimated trailer TRU activity at grocery stores using an average load per day metric. Trailer TRU deliveries typically range from 2 to 4 refrigerated trailer TRUs per day based on recent environmental planning document review (e.g., CEQA) and the average number of dock doors at grocery stores (CARB, 2019c). These TRUs spend an average of 1.7 hours per delivery and deliver on average 6 days per week (McCormack et al., 2010). Approximately 17 percent of grocery stores utilize stationary trailer TRUs for additional cold storage during busy seasons for an average of 89 days per year per facility (CARB, 2016). Unlike delivery trailers, cold storage trailers operate while stationary for weeks or months at a time.

Using the emission and health risk estimates, with consideration of the close proximity of these facilities to residential communities, and use of seasonal TRU units for additional cold storage, staff are proposing a facility size threshold for grocery stores at 15,000 square feet or greater.

Staff used the equations below and the metrics provided in Table 4 to estimate statewide stationary trailer TRU emissions at grocery stores.

$$Statewide\ Grocery\ Store\ TRU\ PM2.5\ Emissions\ (tpy) = Grocery\ Store\ Emissions\ + Seasonal\ Cold\ Storage\ Emissions$$

$$Where: Grocery\ Store\ Emissions = Number\ of\ Facilities\ \times (TRU\ Loads)/Day \times Hours/Load \times (Operating\ Days)/Year \times Trailer\ TRU\ Emission\ Factor \times 62.5\%\ Engine\ Cycle \times Ton/Gram$$

$$Seasonal\ Cold\ Storage\ Emissions = Number\ of\ Facilities \times \%\ of\ Facilities\ with\ Seasonal\ Cold\ Storage \times OperatingHours/year \times Trailer\ TRU\ Emission\ Factor \times 62.5\%\ Engine\ Cycle \times Ton/Gram$$

Table 4. Grocery Store Metrics

Parameter	Description	Metric	Source/Reference/Notes
Standard grocery trailer TRUs per day	Number of trailer TRUs at grocery stores <90K sq. ft.	2 trailers per day	(McCormack et al., 2010). Staff analysis based on averages and CEQA document reviews.
Supercenter trailer TRUs per day	Number of trailer TRUs at grocery stores >90K sq. ft.	4 trailers per day	(McCormack et al., 2010). Staff analysis based on averages and CEQA document reviews.
Hours per load	Average load time of a refrigerated trailer at grocery store	1.68 hours per load	(McCormack et al., 2010).
Facility operating days	6 days per week	6 days per week	(McCormack et al., 2010).
CA trailer TRU PM 2.5 emission factor	Weighted trailer TRU emission factor by population and year	2.08 grams per operating hour	2019 Emissions Inventory Update. (CARB, 2019a)
TRU diesel engine cycling percentage	Amount of time diesel engine is running when TRU is on	62.5%	2019 Emissions Inventory Update. (CARB, 2019a)
Gram to Ton Conversion	Conversion rate	0.0000011 tons per gram	Conversion rate.

Parameter	Description	Metric	Source/Reference/Notes
% of grocery stores with seasonal cold storage	Percentage of grocery stores that report using a trailer TRU for seasonal cold storage	17%	TRU Grocery Store Survey (CARB, 2016).
Operating Hours of trailer TRUs used for seasonal cold storage	89 days per year, 24 hours per day	2,136 hours per year	TRU Grocery Store Survey (CARB, 2016).

3. Seaport Facilities

Seaport facilities primarily attract international refrigerated shipping containers that use electric power while at the port and are generally equipped with a TRU generator set for over the road transport. On average, approximately 3 to 4 percent of port cargo is refrigerated, with seasonal increases for agricultural products or other perishable goods.

Staff are proposing to include all seaport facilities (no building size threshold) since activity is not based on facility size and TRUs operate for longer periods of time at these facility types compared to refrigerated WHDCs and grocery stores. In addition, many of California's seaport facilities are located within or near California's disadvantaged communities.

4. Intermodal Railyards

Intermodal railyards primarily attract trailer TRUs, domestic shipping containers, and international refrigerated shipping containers with generator sets. On average, the fraction of cargo handled at California intermodal railyards that is refrigerated ranges from less than 1 percent to 9 percent, depending on the railyard and seasonal increases for agricultural products or other perishable goods according to industry (CARB, 2020). Container and trailer TRUs spend an average of 24 hours at an intermodal railyard.

Staff are proposing to include all intermodal railyards (no building size threshold) since activity is not based on facility size and TRUs operate for longer periods of time at these facility types compared to refrigerated WHDCs and grocery stores. In addition, many of California's railyards are located within or near California's disadvantaged communities.

D. Estimated Applicable Facility Population

Staff estimated the statewide number of applicable facilities by determining the number of facilities above the proposed size threshold for each facility type in the

refrigerated facility inventory. Table 5 shows the applicable facility type, size threshold, and estimated statewide population of facilities subject to the Proposed Amendments.

Table 5. Estimated Statewide Applicable Facility Population in 2020

Facility Type	Population
Refrigerated WHDC (Building size greater than or equal to 20,000 square feet)	2,167
Grocery Store (Building size greater than or equal to 15,000 square feet)	3,918
Seaport Facility (No size threshold)	25
Intermodal Railyard (No size threshold)	9
Total	6,119

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