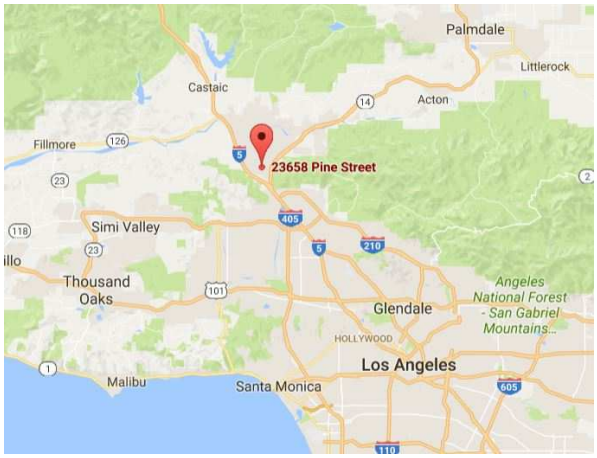
California Star Oil Works ca 1877 – photo courtesy the Santa Clarita Valley Historical Society (This is the only know image which shows the Tail House – in the background)

HISTORY:

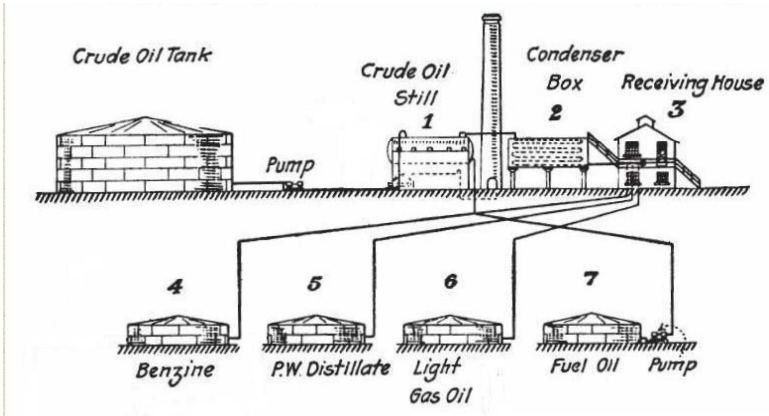
Oil was discovered by two Mexican hunters in the Santa Susana Mountains, north-east of Los Angeles, in February of 1865. The first commercially producing well - Pico Canyon No. 4 – began pumping oil in 1875. In 1876 stills were set up in the town of Lyon to refine the oil from this and other wells being sunk in the canyon. These stills were moved to a site in Newhall Ranch in 1877 because of the availability of "an abundant supply of water from nearby springs"



and – more importantly - access to an adjacent Southern Pacific railroad spur called Andrew's Station. Originally, oil was brought by wagon in wooden barrels from the wells, but by the summer of 1879 two-inch pipes were laid to bring the oil the seven miles from the canyon to the refinery.

Two additional stills, a "tail house" or "receiving house", a pump house, a warehouse, and several tanks were added to this refinery. (See diagram from an early book on refining below to see relationships of structures in refining process.) It continued refining oil from Pico Canyon into benzene and high grade kerosene (some sources say "low" grade) until April 1885, after which it concentrated on light refined products which were either sold directly from this location as fuel, or shipped to Alameda for further refining. By the late 1880's advances in refining technology had rendered it obsolete, and refining operations were shut down in 1888 (1890 according to some sources). However, the site remained active as a shipping point for the crude oil coming out of Pico Canyon with the construction of a tank car loading platform (RLW kit 1681) on the Andrew's spur. This remained active until sometime in 1943. For more historical information, see "References".

The existing site; the Tail House, railroad spur and Warehouse locations are approximations.



(from Hager, 1921)

Although only stills 3 and four, the pump house, and a few tanks remain of the original plant, this complex is a California Historical Site, regarded as the oldest existing oil refinery in California. In creating this model kit, numerous historical resources were investigated, the site visited and measurements of existing structures taken. The historical record is sketchy on some details, incomplete on some, and includes conflicting information on others. While every effort has been made to create a reasonably faithful representation of the facility, some assumptions and some compromises had to be made:

- If laid out per the vague survey information and Google Earth aerial photos, modeling the refinery including the Andrew's spur warehouse and tank car loading platform would require a space about four feet by four feet (4' X 4') in N scale. Condensed site plans are included which compress the plant to a space more usable on model railway layouts and modules.
- The SP plat of Andrew's shows the warehouse on the west side of the spur, while a photograph of the warehouse from around 1880 taken from the hill above the refinery shows the warehouse on the east side of the spur; the provided site plan follows the evidence of the photo. See "SITE" section for dimensioned site plan showing existing and assumed structures and contours.
- The pump engine in the existing pump house is a Fairbanks Morse 12HP single cylinder internal combustion "hit and miss" engine fired by natural gas and made in 1908. It is assumed the previous engine was steam-powered from the adjacent boiler. A single cylinder steam engine approximately the same size and of the same general configuration of the F-M engine is provided in the kit and instructions are provided on how to modify this to simulate the F-M engine if you want to model the later installation.
- There are currently two steel storage tanks on the site, but are reportedly not original to the refinery operations. Multiple and conflicting information is provided on the sizes and number of crude oil tank(s) which were on the site during the period of significance. There was also a water storage tank on the site. Two steel storage tanks of dimensions and capacities similar to the existing tanks are included in the kit: one 2,750 gallon (65 bbl.) capacity and one 6,900 gallon (164 bbl.) capacity. For purposes of these instructions, the larger is assumed to be the water tank.
- The website www.elsmerecanyon.com suggests piping supplying the oil storage tanks originally ran through the small existing building on the hill between the oil and water tanks. The interior photo shows what appears to be the top of a well – perhaps the source of the water pumped from this site to the wells in Pico Canyon – and it is labeled "Well House" in these instructions. Whatever the use, the framing of the window suggests it was built prior to 1900. However, the cement board siding does not appear to be original. Based on the corrugated iron roofing, and similarity of interior framing, it is assumed the exterior of this building was corrugated iron siding similar to the Pump House construction during the period of significance.
- The location of the Tail House is derived from a historic photo taken from beyond Still 4; there is no remaining traces of this building.
- The product tanks currently appear to be resting on the ground, but in fact are partially enveloped in dirt washing down the hill side. Brick is visible in a hole at one side of one of the tanks, leading to the assumption the tanks were originally supported on a brick base or brick piers. There are no known photos of these tanks during the period of significance, so the configuration represented in the model is pure supposition.
- A tank car loading platform was built on the Andrew's/SP spur sometime after 1882 and is barely visible through the trees beyond the refinery in a photo taken in 1930, showing a wood-framed structure. Plans for the separate tank car loading platform kit (RLW-1681) were developed from another historic photo of a Standard Oil Company wood-framed tank car loading and unloading platform of the same period. It is not known if the warehouse and tank car platform were on the site at the same time, or if the warehouse was demolished before the tank car loading platform was constructed. It is likely there was overlap, as some products were still refined here and shipped to Alameda for further refining after tank car shipments of crude had started from Andrew's spur.
- Piping beyond what is shown in the few historic and the current photos, and as diagrammed by Don Ball in his article in Model Railroader is conjectural; the historic documents – while describing the refining process used at this site – do not go into details of the piping. The only description of how refinery products got from the two storage tanks between the Tail House and Pump House to the Warehouse, where it was loaded into box cars for shipment (presumably in smaller containers) is as shown on a model in the Heritage Junction Historic Park Inside William S. Hart Park in Newhall, Santa Clarita, California. (See "PIPING".)

Acknowledgements:

Thanks to: Don Ball, whose *Model Railroader* article inspired this kit, and who supplied several previously unpublished photos; Leon Worden, Santa Clarita Valley Historical Society; Rick Gould, Director of Parks, Recreation, and Community Services, and Tom Reilly, Park Development Administrator, City of Santa Clarita, who provided access to the site and survey information; Stan Walker, whose web site www.elsmerecanyon.com is an invaluable resource.

References:

- Stan Walker's Elsemere Canyon Web Site: http://www.elsmerecanyon.com/pioneerrefinery/pioneerrefinery.htm
- "Pioneer Oil Refinery, Registered Landmark #172 – California Historical Landmark Series" by Lois Ann Woodward, 1936, State of California Department of Natural Resources Division of Parks under auspices of Works Progress Administration District #8, Project #65-3-3218 symbol #1873
- The Santa Clarita Valley Historical Society: http://www.scvhistory.com/
- "Build an 1880's Oil Refinery" by Don Ball, *Model Railroader* August 2012, pg. 28
- *Oil refinery, Erie, Pa.* [New York: Surdam & White, 305 Broadway, 187] Image. Retrieved from the Library of Congress, <https://www.loc.gov/item/2008679002/>

GENERAL:

This is a craftsman kit consisting of cast urethane resin, white metal, and brass parts, laser-cut wood and paper, 3D printed acrylic plastic parts, brass wire, embossed foil, and paper templates.

Included in this kit are resin and white metal castings, 3D printed acrylic plastic parts, laser-cut wood, wire, etched ladder stock, shingle and corrugated roofing materials to build the following (see "Parts Identification" for images of included parts):

- ☐ Stills 1, 2, 3 & 4
- ☐ Three (3) chimneys
- ☐ Boiler
- ☐ Tail House
- ☐ Condenser
- ☐ Optional Retaining Wall
- ☐ Product Tanks on base
- ☐ Two (2) Storage Tanks
- ☐ Residium Tank (2 versions)
- ☐ Pump House
- ☐ Well House
- ☐ Warehouse
- ☐ Outhouse

- Some resin castings may contain minor flash or small bubble holes. Otherwise good castings will NOT be rejected for small flaws; it is assumed the modeler will have the skill to fill these small flaws. Finishing recommendations are included under "WORKING WITH RESIN CASTINGS" below.
- The laser-cut wood parts include many very thin parts; handle carefully. Also, three thicknesses and two types of wood materials are used for the laser-cut parts: 1/64" (.016") plywood, 1/32" (.032") plywood, and 1/16" (.063") bass wood. The latter is not plywood, and care must be taken not to break these parts. Finishing recommendations are under "WORKING WITH LASER-CUT WOOD" below.
- The 3D printed parts are an acrylic plastic. While strong, these are not as strong nor as flexible as the engineering plastic or styrene you may be used to working with. Carefully remove parts from attached sprues. Parts should be carefully washed with isopropyl alcohol or mild dishwashing detergent before painting with acrylic paints.
- Every different procedure or method is discussed in detail in the instructions; however, once it has been discussed, it may not be repeated in detail again.
- This kit is not intended for use by novice modelers, or individuals under the age of 18 without the supervision of an adult. Additionally, the modeler assumes all liability regarding the proper use of this product or any product suggested. The user must become familiar with the kit instructions, and instructions on any product used to complete this kit. Please read and follow all safety procedures for all products used to finish this kit. Details may vary between scales and from the sample model shown.
- Follow safety requirements and manufacturer's requirements as stated on all paint, chemical blackener, and adhesive containers.
- **WARNING: Pursuant to California Health and Safety Code section 25249.6, the manufacturer and distributor of this product warns you that this product may contain substances known by the state of California to cause cancer, birth defects and/or reproductive toxicity.**

Tools & Materials:

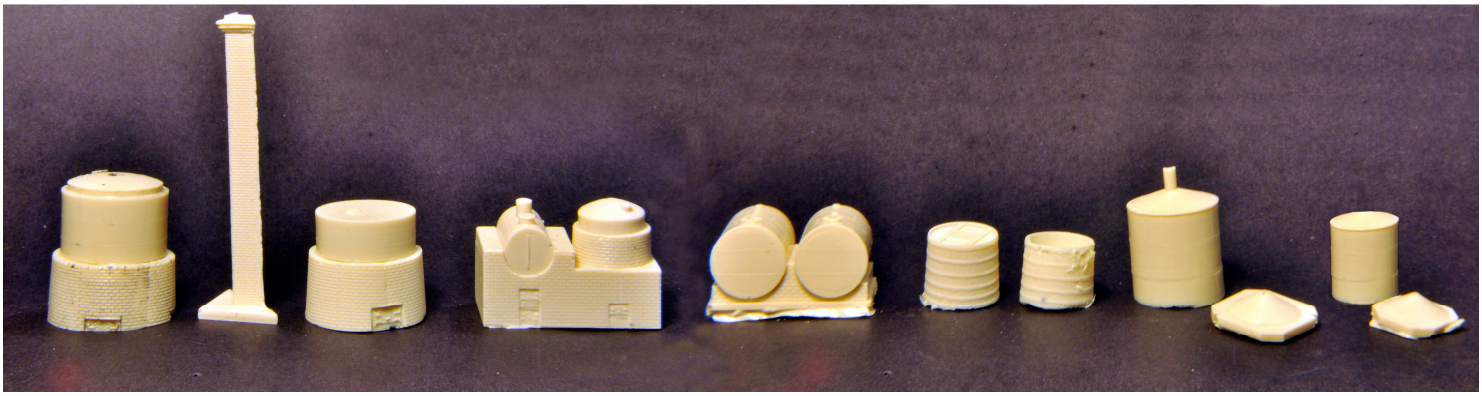
- ☐ small drills, including #80, #76, #67
- ☐ flat file - Nicholson 6" Mill Bastard
- ☐ small files - Micro Mark #83180
- ☐ model building knife – Xacto or equal, with #11 blades
- ☐ finger-nail clippers or Xuron flush rail cutters
- ☐ Tweezers and smooth-jawed needle-nose pliers
- ☐ Sanding board (make by gluing sandpaper to piece of wood)
- ☐ clips for holding parts together – Mueller Electric BU34
- ☐ magnification such as Optivisor or Edroy Opticaid
- ☐ paint brushes and air-brush
- ☐ paints – see detailed instructions
- ☐ Rustall and Weather All (www.rustall.com)
- ☐ Birchwood Casey Brass Black
- ☐ glues – CA, carpenter's glue or "white" glue, two-part epoxy, Walther's "Goo" and Acetone (for thinning Goo)

Optional:

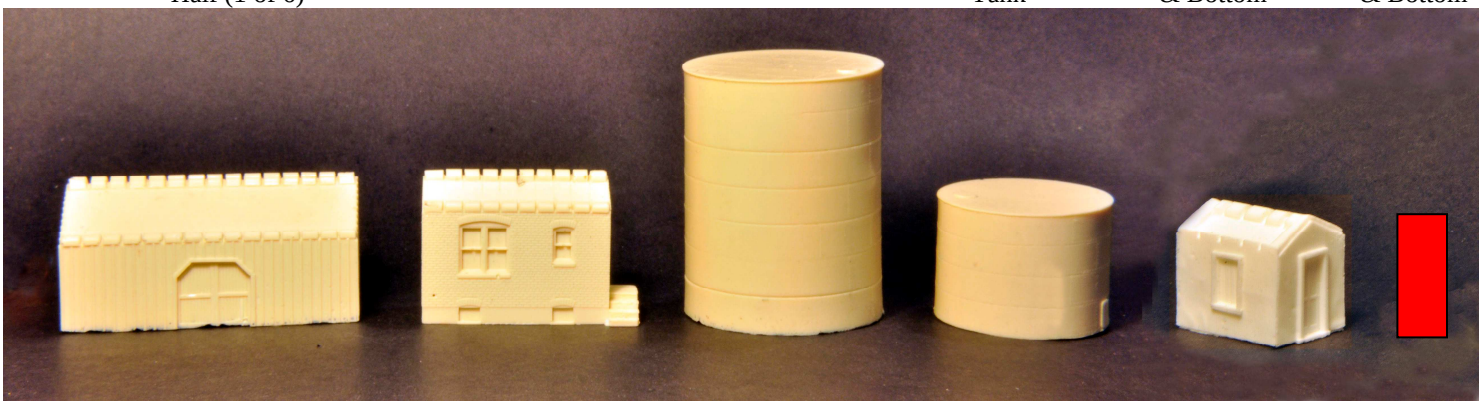
- ☐ Tank Car Loading Platform (RLW-1681)
- ☐ outhouse(s) (RLW-211N – includes parts for two outhouses)
- ☐ figures
- ☐ horse-drawn wagons – Musket Miniatures, Langley, Republic Locomotive Works
- ☐ hit-and-miss gasoline engine (alternate to steam engine in Pump House) – Republic Locomotive Works
- ☐ miscellaneous details: tools, fly-wheels, oil barrels and drums (wood barrels for pre-1905, steel drums thereafter), etc. – Republic Locomotive Works

Parts Identification

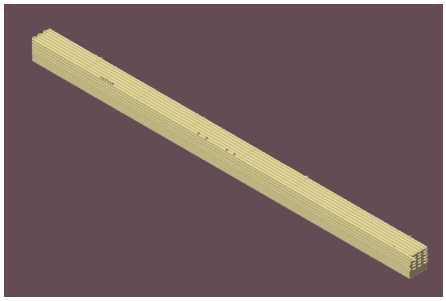
Resin Castings:



Still #4 | Chimney Half (1 of 6) | Still #3 | Stills 1 & 2 | Product Tanks | Residium Tank | Acid Wash Tank & Bottom | Wash Tank & Bottom

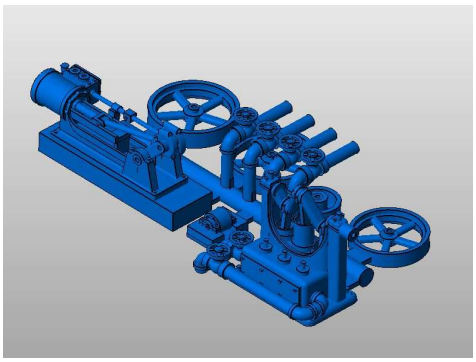


Warehouse | Tail House | 6,900 Gal. Tank | 2,750 Gal. Tank | Well House | Outhouse

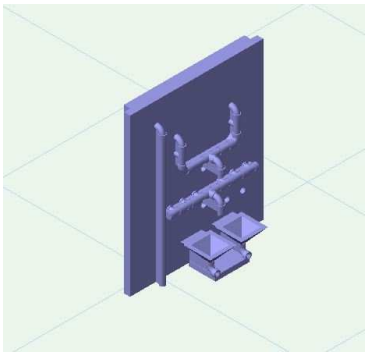


Condenser Piping

3d Printed Parts:



Triplex Pump, Steam Engine, Valves

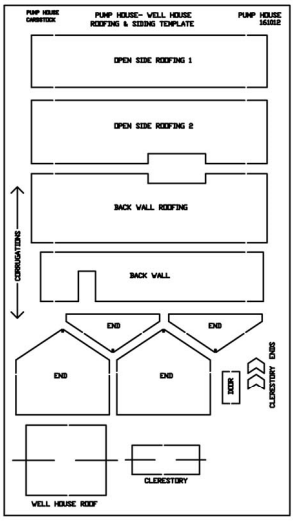


Condenser bulkhead

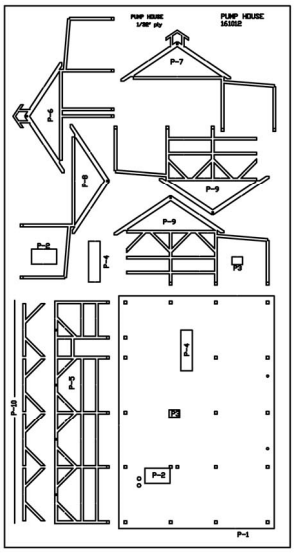
Laser-Cut Parts Frets:
Parts are organized by structure and by material thicknesses. The structure code is as follows:

C-#	Condenser	WH-#	Well House
P-#	Pump House	TS-#	Acid Tank and Wash Tank Support Frames
T-#	Tail House	W-#	Warehouse

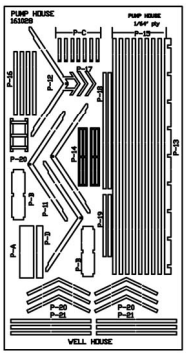
A number adjacent each part corresponds to numbers in these instructions. Parts on the fret containing "SITE BASES" are individually identified as to associated structure, and do not have numbers. ALL 1/16" parts are on one fret. Images below are not to scale.



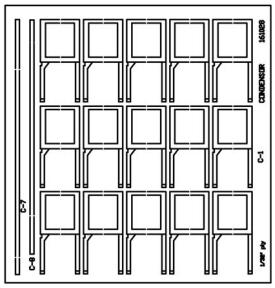
Corrugated Siding
/



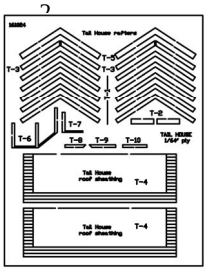
Pump House 1 of 2



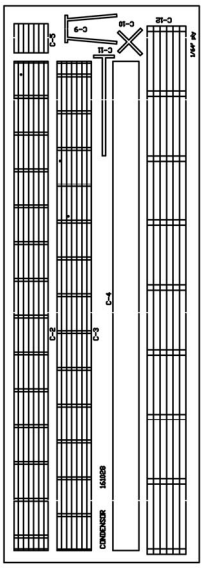
Pump House 2 of 2
+ Well House



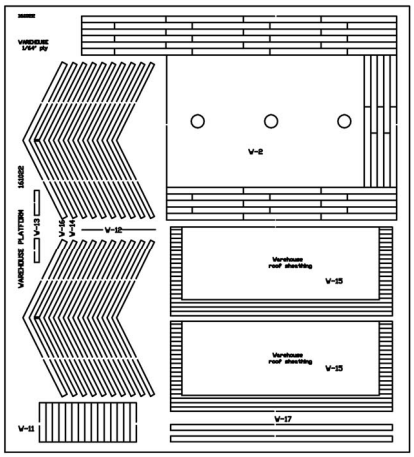
Condenser 1 of
2



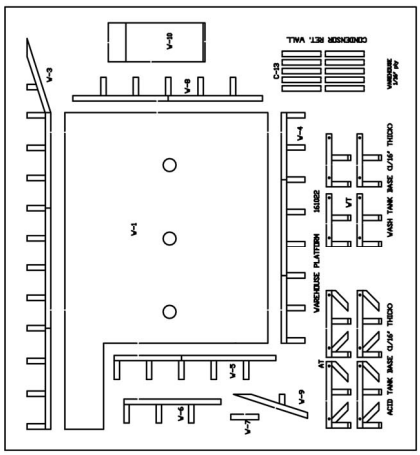
Tail House



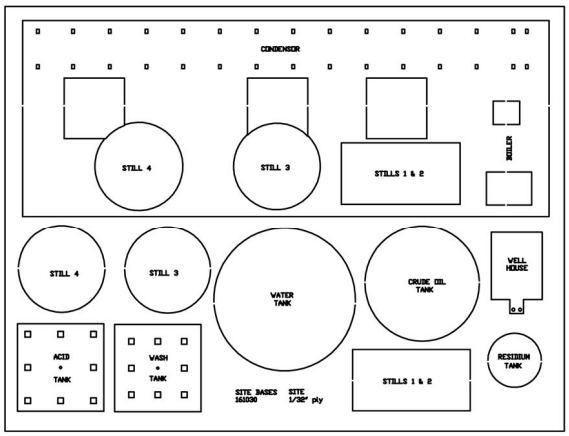
Condenser 2 of
2



Warehouse 1 of 2



Warehouse 2 of 2 + other 1/16



Site

Other

Also included are:

- ☐ Brass wire for piping & other applications (80")
- ☐ Brass ladder stock
- ☐ White metal castings: Gooseneck condenser (Still 1), Manifold & Tray (Still 4), Boiler, wood and steel drums; cast brass valves (4)
- ☐ Laser-cut roof shingle material
- ☐ Printed paper belt material
- ☐ Corrugated metal siding & roofing

Working With Laser-Cut Wood

The laser-cut sheets may look like pieces are missing, but these holes are intentional. The opening for windows, doors, etc., are removed by the laser to make building this kit easier. These waste pieces, called drop outs, may still be clinging to the sheet, and fall out when touched. Save them for use as clutter and scraps when doing the final detailing.

The laser-cut wood parts include many very thin parts; handle carefully. Also, three thicknesses and two types of wood materials are used for the laser-cut parts: 1/64" (.016") plywood, 1/32" (.032") plywood, and 1/16" (.063") bass wood. The latter is not plywood, and care must be taken not to break these parts.

It is recommended that the wood parts receive an initial staining prior to removing from the carrier sheets. For the model photographed, the wood parts were first airbrushed with a thinned (1:1) mix of Floquil Railroad Tie Brown solvent-based paint. The Warehouse deck and the Tank Car Loading Platform deck received a lighter coat than other parts. The inside of the Condenser received an additional coat of full-strength brush-applied Floquil Railroad Tie Brown. Rafter tails and the underside of roof overhangs should be brush painted the color you decide to use for trim on the affected structure.

Remove the pieces from the carrier sheets with a sharp hobby knife as they are needed, and lightly sand off the remainder of the tabs. On the thicker pieces, there is a slight draft angle caused by the laser. This angle can be removed with a pass or two of a fine sanding block.

Identify all the parts, checking them against the parts list. Most wood parts have a number either on them or nearby. Do not remove the parts from the carrier yet!

Wood and paper products are effectively live materials on which humidity and temperature changes will change the size of parts slightly. Our climate is moist so you may find minor changes in the proportion of the parts when moved to a dryer climate.

Working With Metal Castings

All the metal parts should be handled with care as denting and breakage may occur if they are dropped. Cleaning the metal castings is quite easy. Several jewelers' files and a sharp hobby knife work well for this procedure. After you have completed the initial cleanup of parting lines, sprues and flash, wash all the castings in lacquer thinner, or denatured alcohol, and allow them to dry. Handle these after washing by wearing gloves to avoid getting them contaminated with the oils from your hands.

Sometimes the metal castings in the scene were treated with Blacken-It per the product instructions. The chemical reaction between the Blacken-It and the metal creates a very realistic weathered-metal finish. Additionally, all metal castings can be treated in this manner to provide greater paint adhesion.

Painting the castings is quite easy and can be accomplished with a brush or airbrush. A good base coat will be created by airbrushing your castings with Floquil Earth or light gray paint. Krylon gray primer in a spray can works well as an alternative to an airbrush. Choose relatively dull colors for your castings. Models tend to look more realistic using shades such as Mud, Grimy Black, etc. by Floquil, or similar dull shades. Rarely should you consider using bright colors in model scenes. Vallejo acrylic (Microlux from Micro Mark) water-base colors work well for this

Working With Resin Castings

Some resin castings may contain minor flash or small bubble holes. There may be small bubbles inside recesses. Otherwise good castings will NOT be rejected for small flaws; it is assumed the modeler will have the skill to fix these small flaws. It is recommended you make a paste filler for this purpose from styrene shavings dissolved in liquid styrene glue. Wash resin castings with soap and water or isopropyl alcohol prior to painting. Examine the drawings, and drill holes where required. Glue resin castings together with CA adhesive or two-part epoxy. Urethane parts may be sanded and filed easily, but the dust should not be inhaled! The base of each casting should be flat. If not, dress the surface on a sanding board. (Make a sanding board by gluing a piece of 200 grit emery cloth to a flat piece of wood.) Urethane parts may be directly painted with Floquil solvent-based paints or Vallejo acrylic paints.

It is recommended that all the resin castings be sprayed with an undercoat of flat black acrylic modeler's paint such as Vallejo NATO Black. For steel vessels and tanks, then airbrush lightly and randomly with Badger Modelflex Weathered Black to create subtle highlights. The apply a few drops of Rustall which will settle into joints and around rivets. For brick structures: airbrush with Vallejo 71.080- Rust (Micro Mark 29015X2 – Box Car Red). After this has dried for 24 hours, use a 20-00 brush to randomly paint bricks with burnt umber and burnt sienna. When thoroughly dry, sprinkle small amounts of talcum powder (such as Johnson & Johnson Baby Powder) on surface and wipe across brick joints. (See images below.)

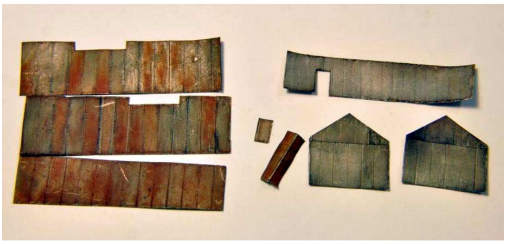

Wall on left has been airbrushed with Vallejo _____, then individual bricks painted with ___ and ___; the wall on the right has had talcum powder "mortar" applied.

Working With 3d Printed Acrylic Plastic Parts

The 3D printed parts are an acrylic plastic. While strong, these are not as strong nor as flexible as the engineering plastic or styrene you may be used to working with. Carefully remove parts from attached sprues. Parts should be carefully washed with isopropyl alcohol before painting. For fragile parts, such as the delivery pipes at the tank car loading platform, lightly coat the 3D printed part with a low viscosity CA adhesive to strengthen the part. Examine the drawings, and drill holes where required. Glue 3D printed parts together with CA adhesive. It is recommended that all the 3D parts be sprayed with an undercoat of flat black acrylic modeler's paint such as Vallejo NATO Black. These parts can have undercuts and recesses, so be sure the spray penetrates all areas.

Working Corrugated Metal Siding and Roofing

Included in the kit are sheets of metal foil embossed with scale corrugations. Handle these carefully. It is recommended both sides of these be air-brush painted with a flat light gray primer. After this thoroughly dries, cut individual pieces of foil following the included template, using a NEW, SHARP blade. Weather the siding with a very thin wash of Vallejo NATO Black, and when thoroughly dry, "rust" with Rustall. Note in the prototype photos on the website, the roof was heavily rusted, while the sides were much less so. Glue the corrugated metal to the wood framing using thinned Walther's Goo (1-part Goo to 1 part acetone.).



Working With Site And Building Bases

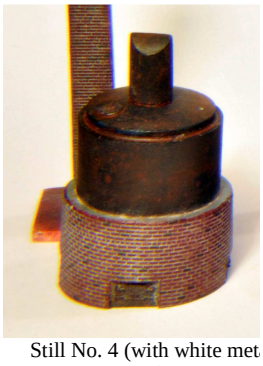
The kit is designed to facilitate the assembly of some of the separate structures on individual bases prior to installing on the layout. These bases are thin laser-cut plywood. To increase the dimensional stability of the base as well as make things easier to handle during construction, it is suggested these bases be glued to a substrate of larger dimensions made from 1/8" tempered hardboard. For other structures (such as the various tanks) individual bases or pads are provided which are to be installed on the layout prior to installing the structure, to allow leveling of the base or pad and the installation of basic scenery materials adjacent the base or pad prior to installing the structure. After gluing in place, it is suggested these be painted the same color as your "earth" base color. For the prominent still/condenser/boiler/tail house complex, a base incorporating all these structures is included. It is suggested basic scenery be installed on this base prior to fitting the structures to the base, then the base with structures be installed on the layout. This process is described more fully in the "SITE" section of the instructions.

ASSEMBLY INSTRUCTIONS

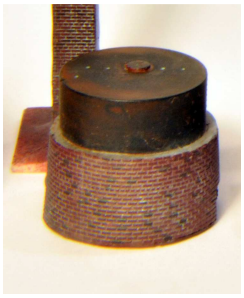
STILLS

From left to right: still 4, still 3, stills 1&2, boiler, "residium" tank (SCVHS)

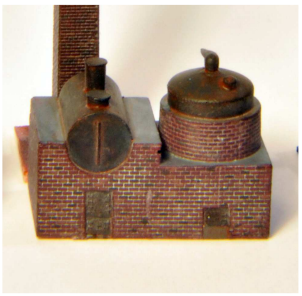
There were four stills at the refinery during its period of significance. Stills 1 and 2 were originally located at Lyons in Stevenson Ranch but soon were relocated about two miles to the Star Oil Works site because of the adjacent Southern Pacific Railroad spur (Andrew's Station) and an abundant water supply. Still 1 is a "goose neck" still; still 2 is a "pot" or "cylinder" still. Stills 3 and 4 are "cheese box" stills. They all were fired with the waste oil sludge left from the refining process. Standard Oil restored the stills in 1930. In the 1960's Standard Oil disassembled stills 1 and 2 and moved them to their property in Richmond, CA. Stills 3 and 4 remain on the site.



Still No. 4 (with white met manifold)

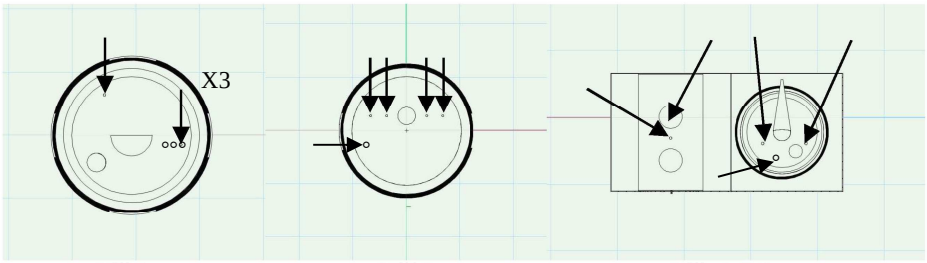


Still No. 3



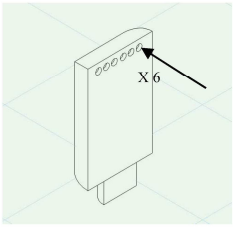
Stills. 1 & 2 (with white metal "goose neck")

Wash the resin castings in soap and water or isopropyl alcohol. Examine the castings and fill any small bubble holes which you might find. Drill the holes for piping where shown on the right with a #76 drill (there are dimples where holes are required.) Drill four holes around perimeter for fuel oil as noted in "PIPING" section. Drill out holes in white metal manifold and "gooseneck" castings where shown below (six holes in the manifold). Glue the white metal goose neck to Still 1 and the manifold to Still 4 with CA adhesive. Spray all three assembled castings with Vallejo NATO Black and allow to dry 24 hours. Use paper to mask the steel vessels (avoid taping to painted surfaces) and spray the brick with Vallejo 71.080- Rust (Micro Mark 29015X2 – Box Car Red). Detail the brick as described in "Working With Resin Castings". Apply Rustall to "steel" vessels – one application for stills in use, multiple applications for abandoned stills. Piping and pipe trough installation will be covered in "PIPING" section.

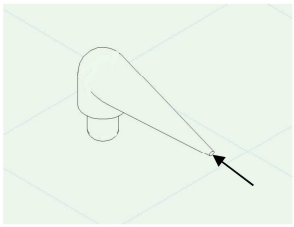


Still 4 Still 3 Stills 1 & 2

Drill #76 holes where shown; see "PIPING" section for additional holes.



Still 4 "Manifold"



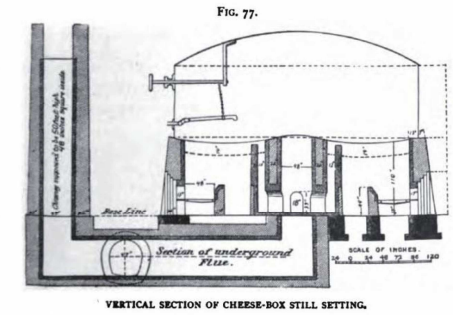
Still 3 "Gooseneck"

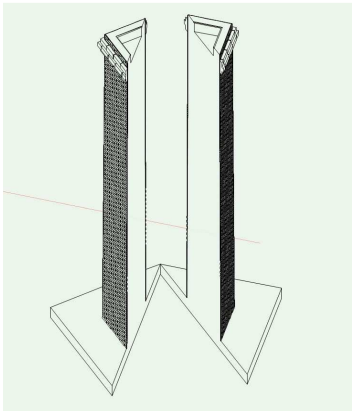
See "Site" section for instructions on installing the stills on the site base.

CHIMNEYS

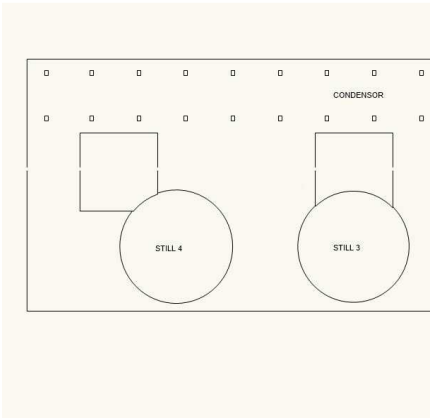
The stills had three brick chimneys – one for Stills 1 & 2 (which are on a common brick base) and one each for Still 3 and Still 4. The flues for these were underground (see diagram at right). All three were of similar construction although the chimney for Still 4 was somewhat larger. The chimneys in this kit are all the same size.

Wash the resin castings in soap and water or isopropyl alcohol. Examine the castings and fill any small bubble holes you may find. Test fit the chimney halves and sand backs if necessary for an aligned fit, then glue halves together with two-part epoxy or slow setting CA adhesive.





Glue chimney halves together after checking for alignment



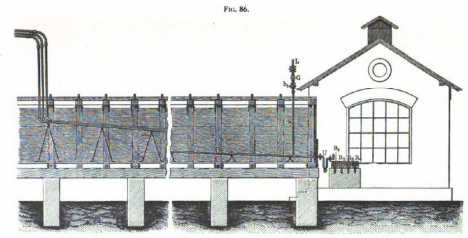
Trim Still 3 & 4 chimney bases using site base as template

After the adhesive sets, check for verticality when placed on a flat surface, and sand base on your sanding board as required. Note where two of the stack bases must be trimmed to fit "site" base, and cut away that portion of the chimney base, clean sanding dust off, and paint as described in "Working With Resin Castings".

Before and after applying "mortar" to joints.

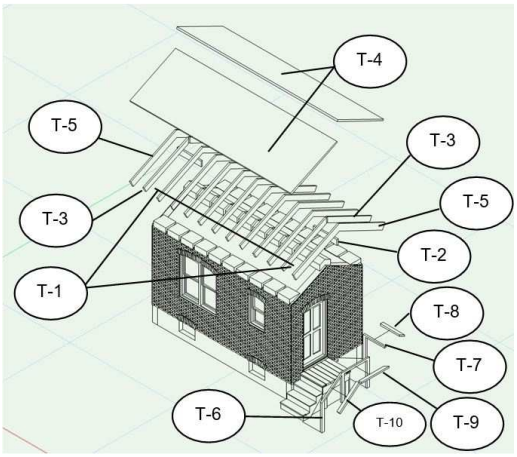
TAIL HOUSE or RECEIVING HOUSE

The Output from the condenser was tested for specific gravity in the Tail House (sometimes referred to as the Receiving House) and characterized as either Kerosene, Benzene, or Lubricating Oil. From there, the output was directed to the appropriate storage tank.

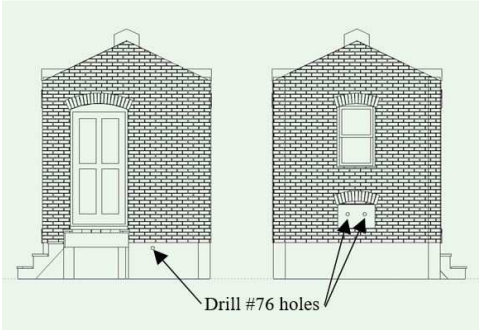


Tail House, on right
(from Brannt, William T., 1895, Petroleum: Its History, Origin, Occurrence, Production, Physical and Chemical Constitution, Technology, Examination and Uses)

Wash the resin castings in soap and water or isopropyl alcohol. If you use screws to hold your buildings in place, drill and tap a hole for the size screw you use in the bottom of the casting now. Examine the castings and fill any small bubble holes which you might find. Drill three #76 holes as shown below. Paint casting Vallejo NATO Black. After dry, paint and detail brickwork as described in "Working With Resin Castings". Paint foundation a flat concrete gray. Paint the steps with Floquil Railroad Tie Brown. Paint the door and window frames and sash – I prefer a very light gray instead of white. OPTIONAL: Cut clear plastic sheet (not included) into window glazing and glue into window openings with Pacer Canopy Glue.



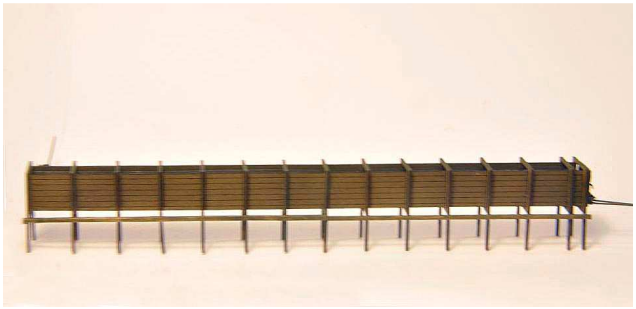
Paint the rafters and the exposed underside of the roof sheathing the same trim color used for the windows and door, Glue rafters T-1 in slots in top of resin castings as shown in the diagram at left. Glue ridge pole T-2 in end slots, then glue rafters T-3 in place. Test fit roof sheathing T-4 and sand top (ridge) edge if necessary so bottom (eave) edge aligns with the ends of the rafters then glue in place. Use weathering chalks to add final patina to roofing.



Air-brush the peel-and-stick shingles with grays and browns, then apply to roof. Finally, glue stair railing T-6 and T-7 into recesses on stairs, and add railing caps T-8, T-9 & T-10 (bevel ends of T-10 to fit).

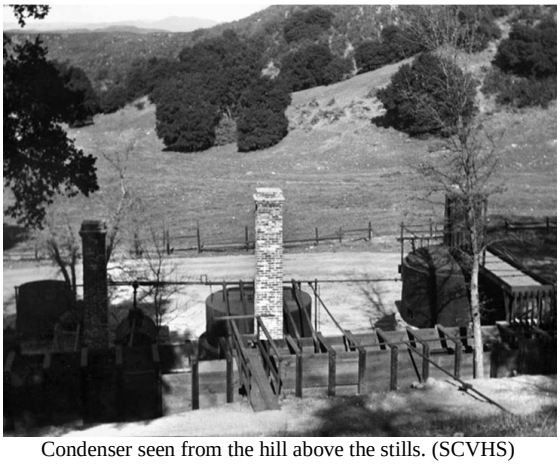
See "SITE" section for instructions on placing the Tail House, and "PIPING" for notes on connecting the Tail House to the Condenser and the Product Tanks.

CONDENSER

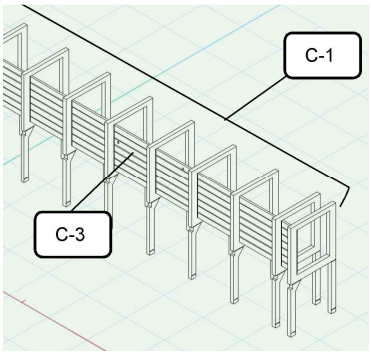


Assembled Condenser; pipes at right go to Tail House; legs are "sacrificial."

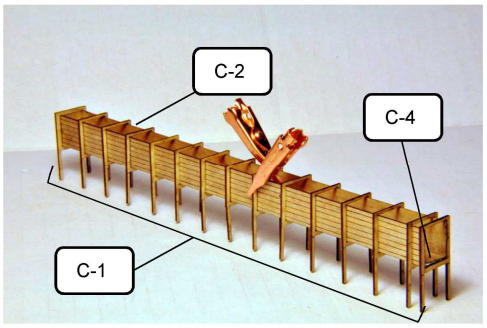
The condenser was a seventy-five-foot long trough containing four hundred feet of iron pipe. Each still was connected to this piping and vapor from the stills was passed into and through these pipes condensing into liquid, which passed from the condenser piping to the Tail House. Water entered the trough at the east end (beyond Still No. 4) and there was an exit pipe on the west end (Tail House end.) It is unclear where the water went from this point, but it may have been some of the water pumped from the site to the wells in Pico Canyon. Prior to beginning assembly, paint or stain the laser-cut wood parts (recommend Floquil Railroad tie Brown or equal) and the condenser piping and metal bulkhead (flat black, with dry-brush highlighting, and application of Rustall on the bulkhead.) Note: The "legs" are sacrificial. (See "Site" section.)



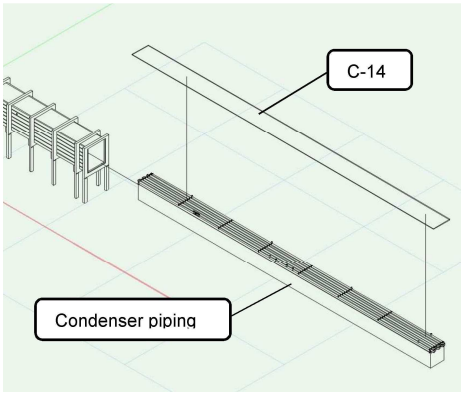
Condenser seen from the hill above the stills. (SCVHS)



Glue frames C-1 to side C-3, which is the side which faces the stills, aligning with vertical score marks. Note the orientation: the notch in the frames goes on the C-3 side, and the closely spaced pair of frames are on the right end when viewed from the C-3 side. After frames are glued in place one side, slip opposite side (C-2) into opening and glue to other side of frames. Use clips as shown to assure frames are square with sides. Then add bottom of trough (C-4), sliding in from the end and turning to fit tightly between the sides and tight to the bottom of the frames.



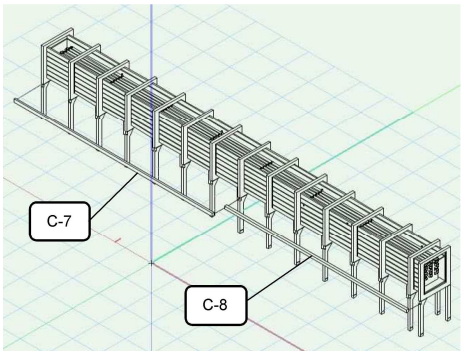
Glue clear plastic "water" (C-) to top of nubs on the top of the resin piping casting with small droplets of CA glue. When set, apply a few drops of white glue into bottom of trough and slide piping into condenser. Make sure the row of pipe ends facing upwards are on the C-3 side (still side) of the trough as shown.

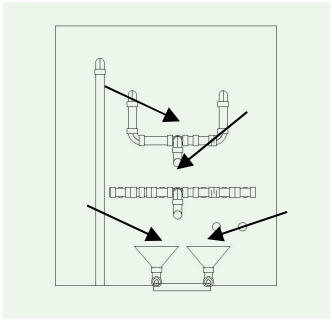


Drill #76 holes in the Condenser Bulkhead where shown on right. Paint the bulkhead flat black (Vallejo NATO Black) then add an application of Rustall after paint thoroughly dries. Bend brass wire to form the two spouts and glue in place in the upper two holes. (Remaining piping will be installed when condenser is fitted to "site".)

Glue in place in last frame of Condenser.

Add stringers C-7 & C-8 as shown.





.Drill #76 holes where shown; work carefully in 3D printed acrylic plastic. Form brass wire "faucet spouts" and install in upper two holes.

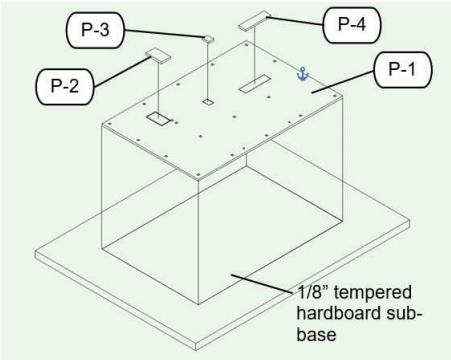
Parts C-9 & C-10 will be installed later after Condenser and Stills are placed on the Site Base. (See "SITES" section of instructions.)

PUMP HOUSE

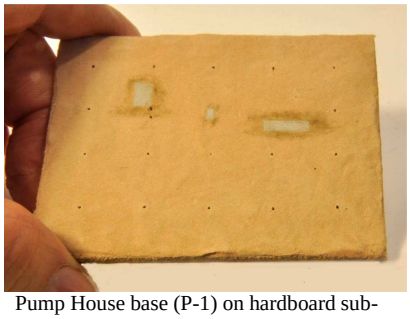
The Pump House pumped water to the wells in Pico Canyon using a belt-driven triplex pump. The engine driving this pump in the existing pump house is a Fairbanks Morse 12HP single cylinder internal combustion "hit and miss" engine fired by natural gas and made in 1908. It is assumed the previous engine was steam-powered from the adjacent boiler.

Existing Pump House – May 2016 (Knapp)

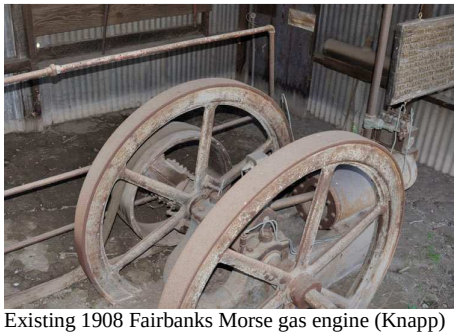
The existing canopy on the front of the open-air building is currently supported by four pipe-posts. These do not line up with any of the interior framing. The kit includes laser-cut roof and canopy framing with posts (five) aligned with the interior roof framing to facilitate the laser cutting process, but holes are provided in the base for those wishing to model the pipe posts.



A laser-cut plywood base (P-1) is included for constructing this building with holes in which the wood framing is placed. To prevent warping of this base, and to make construction of the building easier, it is suggested this base be glued to a sub-base of 1/8" tempered hardboard ("Masonite") larger in size than the laser-cut base. After the glue sets, drill down through each post hole and through the hardboard with a #68-#70 drill. If you will be lighting the structure, drill holes through both layers for your wiring now. Included are pads for the pump, the engine, and an intermediate roller (parts P-2, P-3 and P-4). Paint the top surface of these a concrete gray, then glue them to the base. Apply a thin layer of your scenery base flush with the tops of these pads. (Pre-tinted Synkloid Spackle was used as a scenery base in construction photos.)

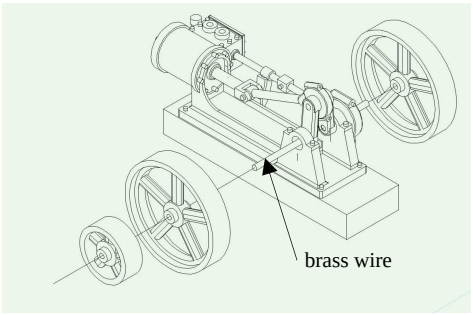


Pump House base (P-1) on hardboard sub-base with a layer of scenery base coat applied flush with equipment pads



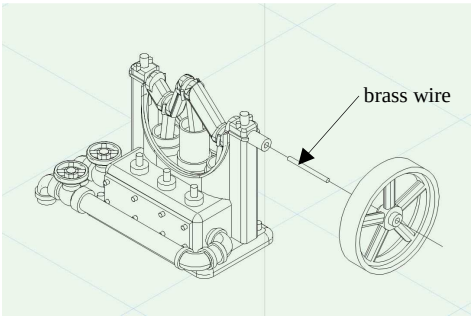
Existing 1908 Fairbanks Morse gas engine (Knapp)

The pump and engine 3D printed parts with the kit may include thin shafts for the flywheels and pulleys. It is recommended these be removed and the parts be drilled with a #80 drill and .010" brass wire be used for the shafts. After inserting and gluing the brass wires in place, paint the pump and engine parts (the existing units are gray, but green was chosen for the photographed assembled parts).

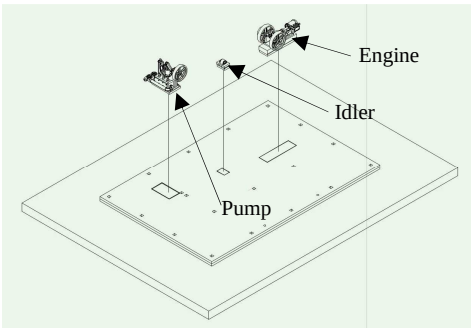


Steam engine assembly

Assemble the pump and engine as shown below and glue to the equipment pads with CA adhesive. Note that the driven wheel for the pump is centered between two post holes, and the driven wheels and rollers must be in line for the belt. Glue the roller that is between the pump and engine (identified as "idler" in the parts for lack of a better term) to the small pad provided for that purpose, and in line with the driven wheels of both the engine and pump.



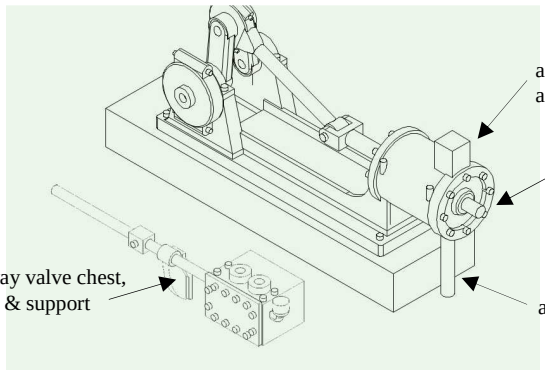
Triplex pump assembly



(Spackle layer omitted for clarity)

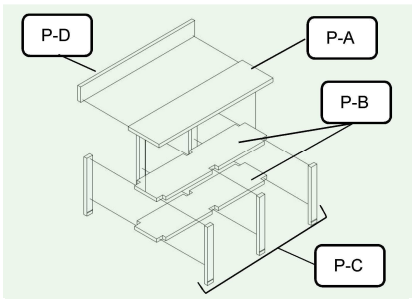
For those wanting to model the later internal combustion engine, RLW has a white metal "hit-and-miss" engine, or you can modify the 3D printed steam engine as shown in the image on the following page.

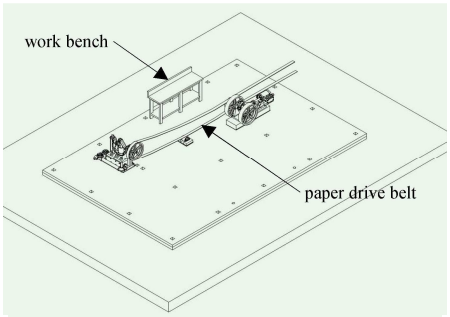
FM gas-fired engine showing spark plug, gas pipe, and electrical (?) box

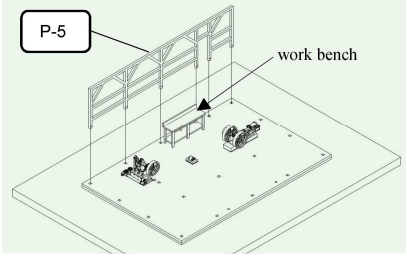


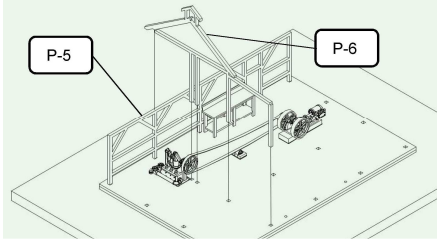
Triplex pump assembly

Pre-stain all the wood framing as described in "Working With Laser Cut Wood". If you will be including a work bench (not currently in the existing pump house, but probably there at one time) now is the time to assemble and install it against the back wall. Use shelf P-B as a template and poke holes through the scenery layer with a pin at each leg notch. Glue one P-B to the top (P-A), then three legs (P-C) along one side of the bench. When dry, glue the shelf P-B to the legs, then add the remaining three P-C legs. Finally, add P-D along the back. When the glue sets, apply small droplets of white glue to the bottoms of the legs and install in the holes just made.

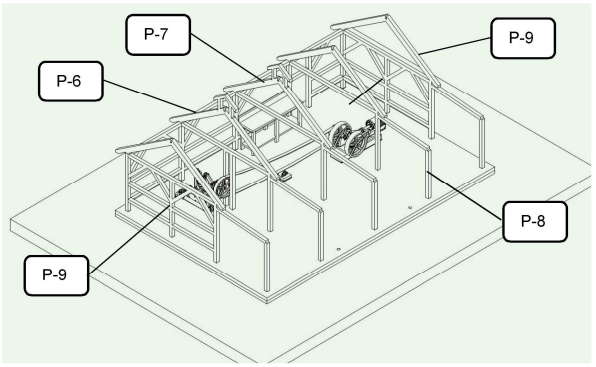




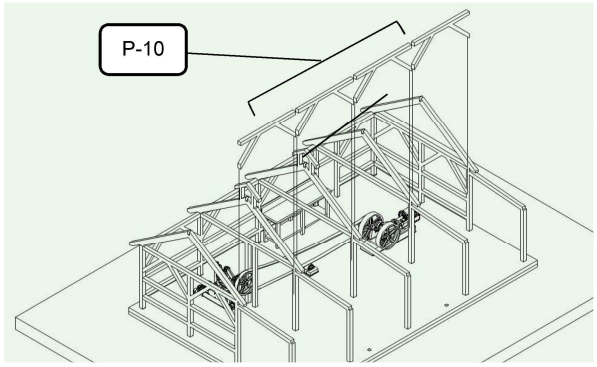


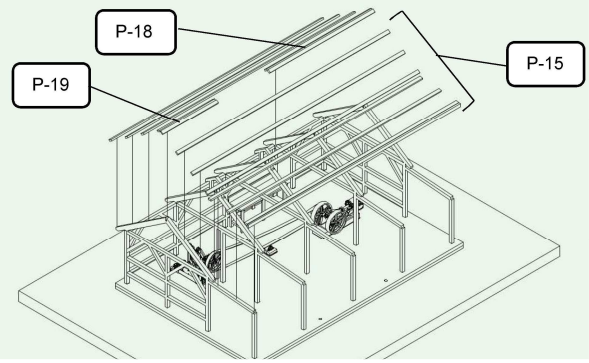


Before proceeding with the rest of the building framing, install the belt that drives the pump. Cut this from the printed sheet provided for this purpose. Apply a VERY SMALL amount of white glue to the half of the rem of the drive wheel on the pump which the belt will contact, loop the belt over the drive wheel and hold in place on the engine drive wheel while the glue sets. When the glue is dry, trim the loose ends of the belt and glue to the engine drive wheel leaving a little slack so the belt hangs slightly.

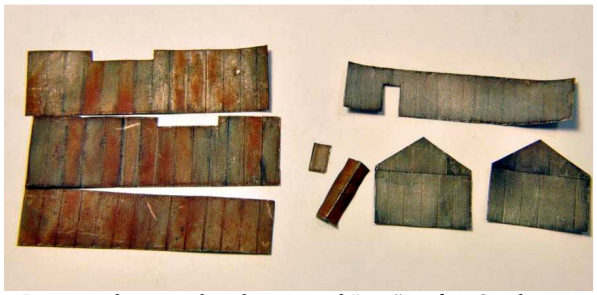


Begin assembly of the structural frame with the back wall, applying a SMALL droplet of white glue to the ends of the posts then inserting them firmly in through the scenery base coat into the laser-cut wood base. Next, install the truss and frame with the two center posts at the triplex pump taking care not to damage the belt. Continue from there to install the rest of the roof truss and post frames. (Note that the clerestory roof vent is NOT centered on the building.) After these are installed, add the "K" shaped front wall knee braces. Add one P-15 along the front top edge of the open canopy. Add the intermediate main roof rafters P-11 and P12. Install the ridge pole by turning it sideways and sliding in through the clerestory framing, then turning vertically so the slots face downwards and engage the slots in the tops of the rafters and trusses; glue in place. Install the roof vent louvers P-14 each side of the clerestory roof vent. Add a .015" diameter wire overhead steam feed line to the engine and an exhaust stack up to above the rafter line. At this time, add any additional interior details you want to include. Also, install wiring and lamps if the building is to be lit.

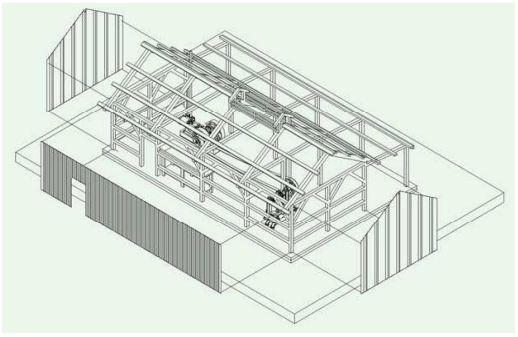




Glue roofing purlins P-15, P-18, P-19 in place on top of the rafters.

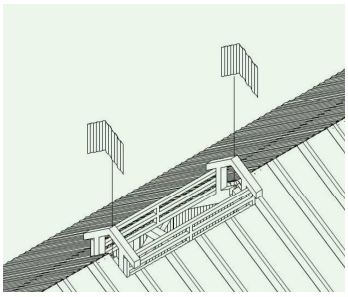

Pre-cut and pre-weathered corrugated “iron” roofing & siding.

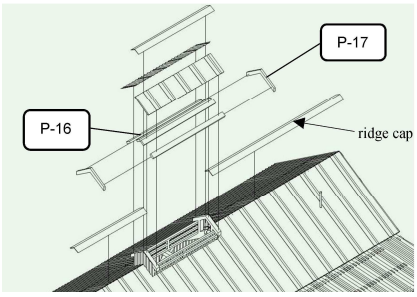
It is recommended the provided corrugated material be airbrushed Use the “Corrugated Metal Template” to cut pieces of corrugated siding and roofing material to size and shape. Use a NEW sharp blade for this. See “Working With Corrugated Metal Siding and Roofing” for finishing recommendations. Follow those recommendations and finish all the pieces of corrugated iron before proceeding to install on the structure. The ends of the building had eight foot sheets of siding at ground level, and another row of siding material above that. The provided template has full end pieces plus pieces for the upper portion. Laminate these together to create effect of two levels of siding (see image above.) Attach the siding and roofing using Walther’s Goo thinned 1:1 with Acetone. Use a toothpick to apply sparingly to the wood framing, then lightly press the siding in place. Install the back wall first, followed by the end walls, then the lowest roof followed by the two large upper roof areas.

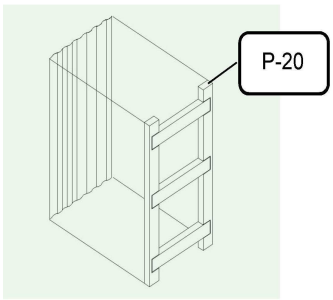


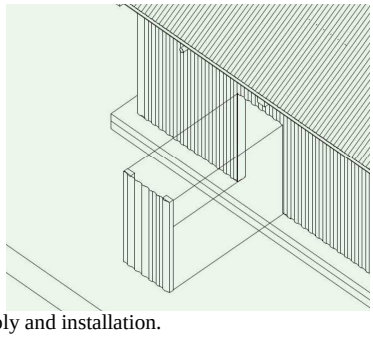
After these areas are clad, install the rest of the clerestory roof framing (P-16 and P-17) before installing the clerestory roofing. Make ridge caps by folding scrap corrugated material along a sharp right-angle edge or using an etching bender, then trim to width with a fine pair of scissors, using the blade width as a guide to keeping the width uniform. This will curl the cap, so you will need to reform it along the right angle surface used for bending.

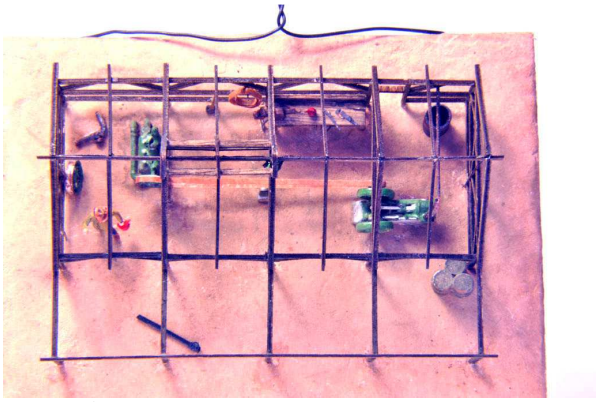
Finally, add corrugated metal to the short (yes, it really is this short) door on the back of the building and then glue the door in place – slightly ajar.








Door assembly and installation.

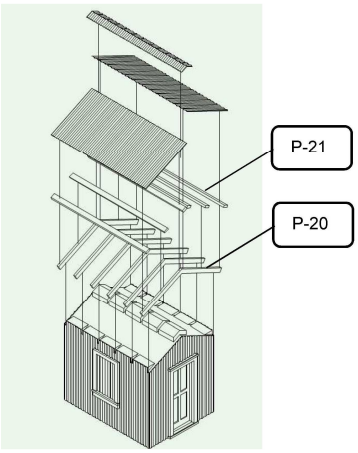

View before cladding shows some detailing possibilities, with tools, spare belt, oil & trash drum, spare valves, etc.

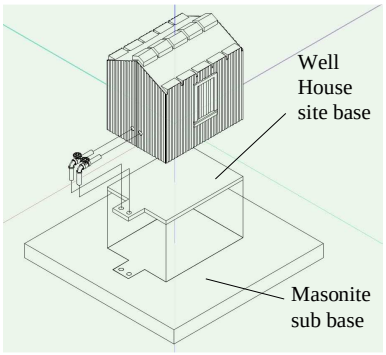
WELL HOUSE

This small building is on the hillside above the stills, between the two large existing tanks. Piping and valves running in/out of the building have not been identified, and Stan Walker – and authority on the site – has proposed they were used to control the flow of the oil. Electrical conduits in the building suggest a previous presence of a pump. However, in the center of the room there is a corrugated pipe casing extending up from the ground which may have been a casing for water well equipment. Whichever, the structure is called the Well House in these instructions.

Another anomaly is the current exterior siding, which appears to be some sort of cement board. The interior framing dates the building from the same period as the Pump House, so for purposes of this kit it is assumed the structure was re-sided, and originally had a corrugated siding exterior, as it has on the roof.

This structure is composed of a solid resin casting to which roof details and roof cladding are to be applied. The exterior of the building is molded in the same corrugations as the corrugated "iron" material to be used for the roof. Drill one or two #67 holes where shown for pipe and valve 3D printed assembly. If you intend to attached the building to your layout with a screw from the bottom, drill for that now. After thoroughly washing the casting, spray with Vallejo NATO Black and allow to dry thoroughly. When dry, spray with a light gray primer. After that is dry, apply very thin acrylic washes of black to the metal siding to bring out the corrugations, and Railroad Tie Brown to the door, door frame, window frame and boards at window opening. When all paints are thoroughly dry, flood the exterior siding with Rustall and let dry.





Glue rafters (P-20) into the notches on the top of the casting. After the glue sets, lightly sand with an emery board or sanding stick to assure all are in the same plane. Glue on purlins (P-21). Cut the roofing corrugated "iron" using the template, and fold along a straight right angle edge. Unfold slightly to fit the roof profile, and paint as described in "Working With Corrugated Siding & Roofing." Glue in place using Walther's Goo thinned 1"1 with acetone.

An optional laser-cut base is included in the kit. You may glue this to your layout surface, or glue it to a sub-base of hardboard ("Masonite") and in turn glue that to the layout surface and finish with scenery material up to the level of the laser-cut building base.

Paint two of the valve-elbow-pipe 3D acrylic parts black, and when dry, apply a layer of Rustall. When dry, glue into the two holes on the building and the two holes on the laser-cut base.

WASH TANKS

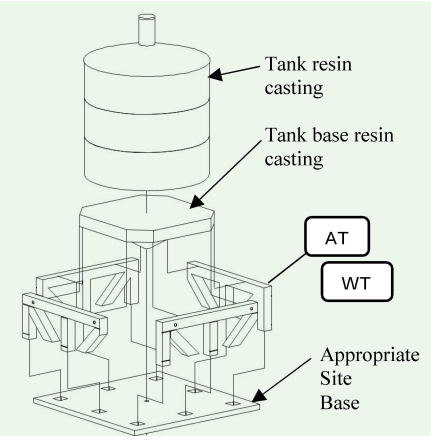
The Wash Tank and Acid Wash Tank were used to clean the refined products. The Acid Wash Tank had a lead lined interior and an agitator. How these tanks were incorporated into the refining process is beyond the scope of these instructions, and how they were piped (with the exception of a pipe running from the cone-shaped bottom underground) is not known to this modeler.

Acid Wash Tank Wash Tank

The two wash tanks are composed of a tank body resin casting and a conical bottom resin casting incorporating a collar which represents the wood platform framing. Sand the mating surfaces flat and smooth then glue together using two-part epoxy or slow-setting CA. When the adhesive sets, paint the resin castings as described in "Working With Resin Castings." Paint the collar with Floquil Railroad Tie Brown.

Locate and remove the laser-cut wood tank supports (marked "AT" for the Acid Wash Tank and "WT" for the

Acid Wash Tank, 2016 (Knapp)



Wash Tank) from the Warehouse fret after pre-painting with Floquil Railroad Tie Brown. Glue the support frames together in adjacent pairs, and when the glue dries, assemble the pairs around the collar. The use of the laser-cut base is optional but recommended as it will protect the vertical posts from being broken off during subsequent handling. If the base is used, paint it an earth color before gluing the posts in the square holes.

The two wash tanks were located between the Product Tanks and the Warehouse, and near the Pump House (see "Site" section.)

RESIDIUM TANK

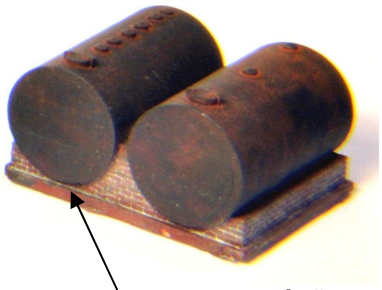
The Residium Tank collected residue from the refinery process. This residue was used to fire the stills. The existing tank is open-topped and may have been thus during the period of significance. However, it is also possible it may have had a closed top. Resin castings are provided for both an open- and a closed-top version of this tank. A dimple is provided in the upper side of this casting for the pipe which connected the tank with the stills. (See "PIPING section.) Drill this out with a number 76 drill. Paint the tank and the timber frame base with Floquil Railroad Tie Brown, dry-brush weather with a gray, then paint the steel bands with a contrasting (color such as burnt umber) with a 20-00 brush. If using the open-top version, float a drop of clear gloss on the top of the residue inside the tank.


Open Top Closed Top


Residium Tank, 2016 (Knapp)

PRODUCT TANKS

The Product Tanks collected Benzene and Kerosene from the Condenser. Currently, the tanks sit embedded in dirt which has eroded from the hillside above. No photos have been found which show how these tanks were supported during the period of significance, but setting steels tanks directly on the ground was not a common or logical practice, and evidence at the site suggests these tanks are supported on a brick base currently buried under the dirt which has eroded from the hillside.

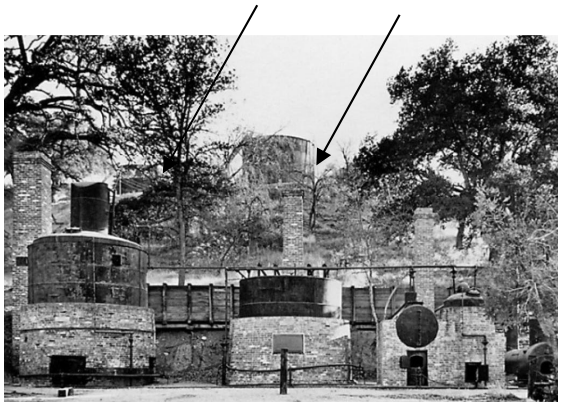

Bring scenery "dirt" up to bottom of brick supports.

Drill a hole in the top of each end on the back of the tanks and connect with .015" brass wire "pipe" as shown in the photo on the right. Paint the tanks and brickwork of the resin castings as described in the section "Working With Resin Castings". When installed on your layout, bring the "dirt" up to the bottom of the first course of bricks, concealing the base part of the resin casting


Product Tanks, 2016 (Knapp)

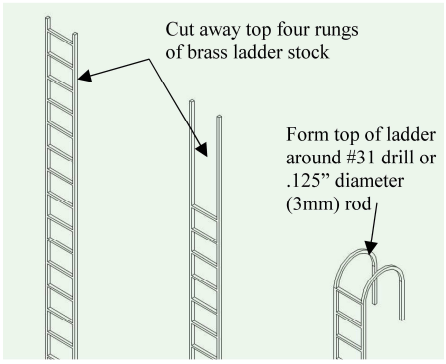
STORAGE TANKS

The storage tanks currently on the hillside above the stills are reported to not be from the period of significance. The historic record varies from vague to contradictory in its description of the crude oil storage tanks on site during the refinery's operations. Early accounts state the oil storage tanks capacity at 20 and 100 barrels were on the hillside above the stills; another source states these were 50 barrel tanks. Probably the tanks were replaced and upgrade more than once during the active use of the site, either as a refinery in the early years or as a transfer point from storage from the Pico Canyon oil field output to loading to tank cars. Additional to the crude oil storage tanks, there was apparently a water storage tank from which the pump house drew its supply which was pumped the 600 feet up and seven miles to the Pico Canyon field.

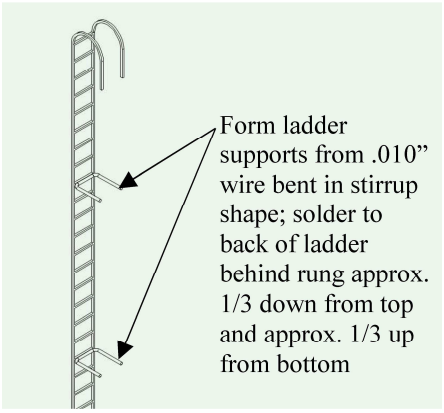


Two storage tanks are visible through the trees on the hillside above the stills in this photo taken after the 1930 restoration. (Photo courtesy SCVHC.)

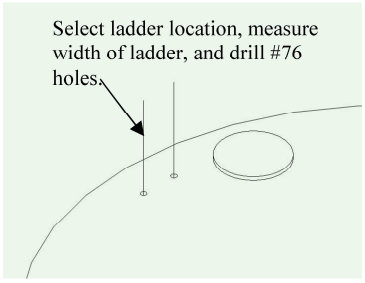
Two cast resin storage tanks are provided in this kit. The dimensions of each were derived from aerial and photo images of the existing tanks. One has a calculated capacity of 2,750 gallons (or 65 bbl. of crude oil) and one a capacity of 6,900 gallon (or 164 bbl. crude oil) capacity. For purposes of these instructions, the larger is assumed to be the water tank. The larger tank may be cut down to suit the builder and the site context; each course of riveted steel plate is approximately 1,000 gallons. It will be important for the refinery scene to include a crude oil storage tank, but it is less important to have a water storage tank in the scene as it can be implied as off-scene.



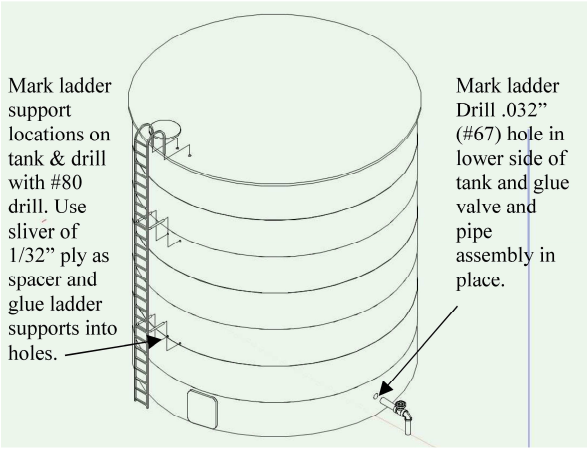
Etched brass ladder stock is included for use with the storage tanks. Trim four rungs from the top of the ladder stock and form into hand holds as shown. Measure against tank and trim off the bottom of the ladder to match (allowing for the embedment of the top in holes to be drilled in the tank.) Form supports from brass wire and solder in place approximately one-third up from the bottom and one third down from the top of the tank. After soldering the supports to the ladder and before gluing in place on the tank clean thoroughly and blacken using Birchwood Casey Brass Black. Drill the tank for these ladder supports and an output pipe.



Glue the ladder and output pipe in place using CA adhesive and paint assembly with an undercoat of flat black or Vallejo NATO Black. Follow with weathering and Rustall as described in the section "Working With Resin Castings".

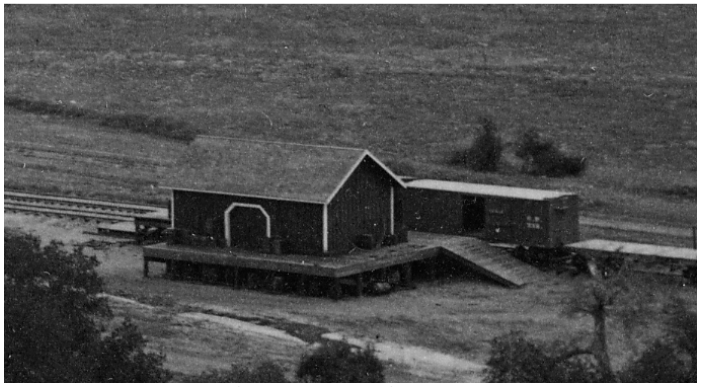


Site bases are included for the two tanks provided. Install these on your layout making sure they are level. It is suggested a true cylindrical object of 6" or more in length be placed on the base while installing and visually observed from different locations to assure the base is level. (Alternatively, use a small bulls-eye level.) When assured the base is level, and any adhesive used has dried, being your base-course of scenery material up to level with the pad before installing tank.



WAREHOUSE

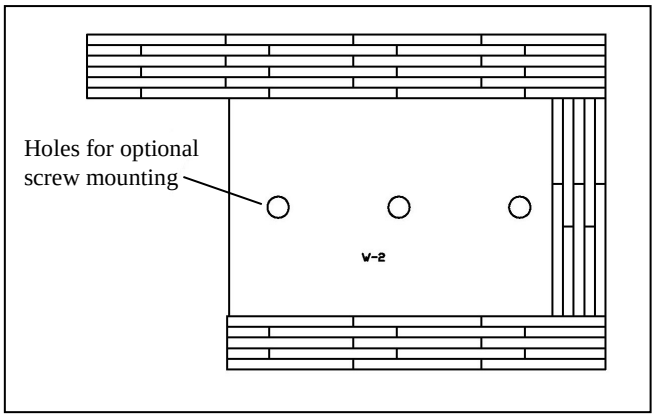
The refined products included kerosene, benzene, and lubricating oil. According to one historic document, in the 1870's these products were loaded into metal tanks inside boxcars using an arrangement of metal pipes. It is also possible smaller metal containers were filled locally and shipped from this warehouse on the SP spur called "Andrew's Station."



Warehouse in photo taken from hill above refinery in 1870's (courtesy Don Ball.)

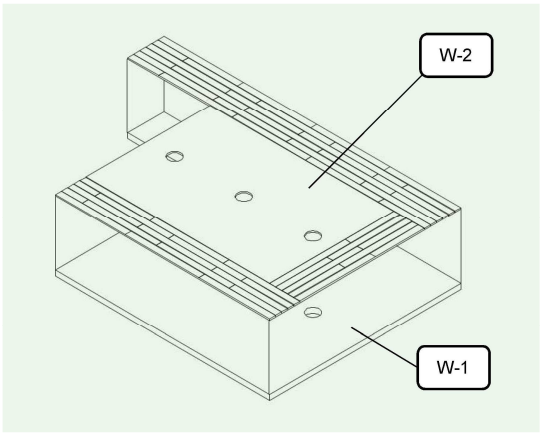
After 1888 (1895?) crude oil from the Pico Canyon wells was loaded on tank cars and shipped from this site to refineries elsewhere in the state. It is not known when this warehouse was demolished or if it was co-located on the site with the tank car loading platform for a time.

Holes are provided in the laser cut platform for optional screw fasteners to secure the resin casting to the platform, and holding the assembly onto the layout. If these are to be used, use the deck (part W2) as a template to mark the hole locations on the bottom of the resin casting, drill the outer two holes with a #____ drill, and the center with a pilot drill for the size screw you use for attaching structures to your layout. Tap the center hole accordingly. (I use long 6-32 screws and fender washers up through the bottom of the layout for this.) Then wash the resin castings in warm soapy water or isopropyl alcohol and allow to dry thoroughly before painting. The early black-and-white print above-right shows what appears to be white trim; the model above is painted box-car red.

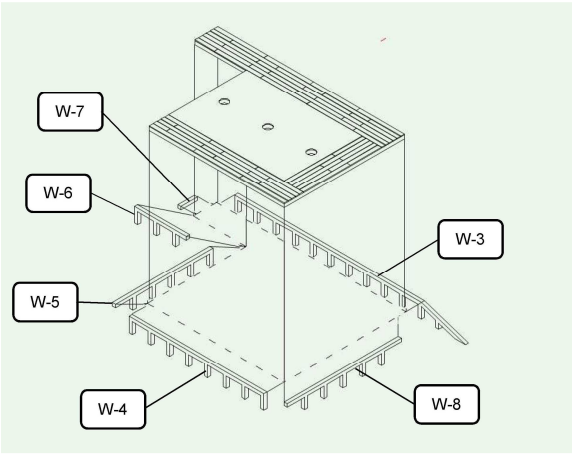


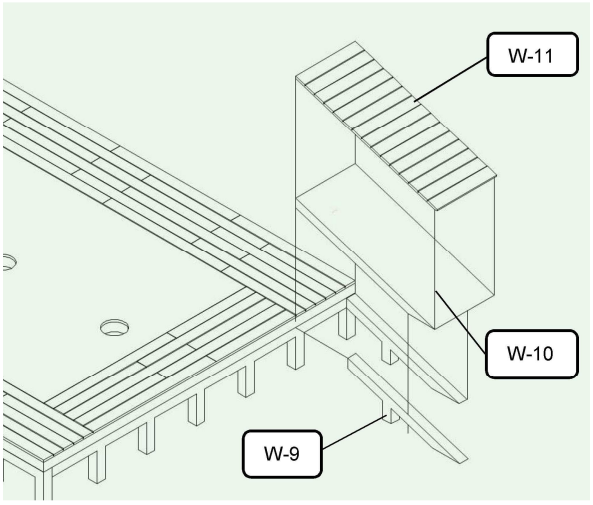
Pre-stain the wood parts as described in the section "Working with Laser Cut Wood. If you are painting the trim on the warehouse, paint the rafter tails before installing the rafters.

Assemble the platform first. To prevent warpage, it is recommended parts W-1 and W-2 be glued together with two-part epoxy. Place the parts between two flat surfaces and weight to hold flat while the epoxy sets.



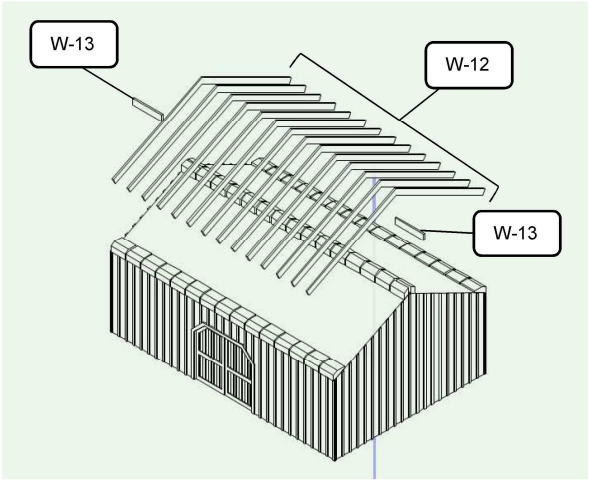
Then glue the heavy timber supports (parts W-3, W-4, W-5, W-6, W-7 and W-8) under the platform deck using white glue or carpenter's glue. Handle carefully as the basswood for the posts can break at the post-to-beam joint. If necessary, you can reinforce the laser cut part with a bead of CA adhesive or white glue on the back side of the part. Set the assembly on a flat surface with a weight on top until the glue dries.



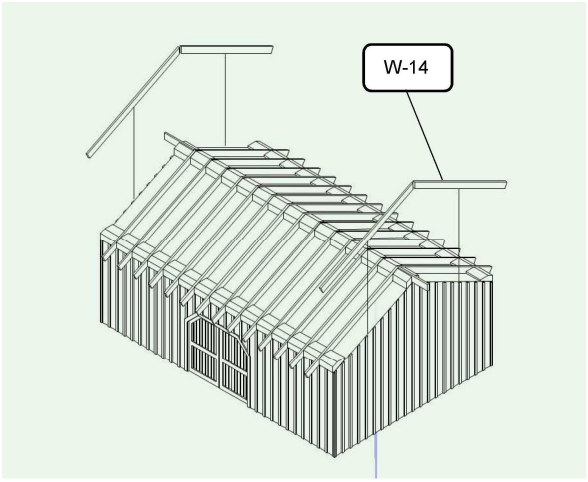


Add the ramp, parts W-9, W-10 and W-11. Note the score lines on W-10, and sand or cut the wood to a taper as shown before gluing in place. Also, bevel the top and bottom edges of W-11 to fit the sloped condition of the ramp.

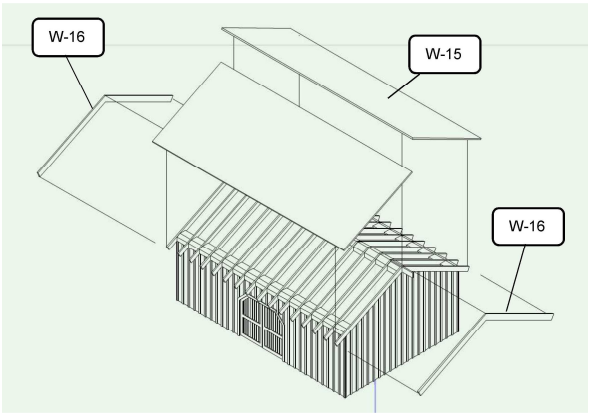
Although not visible in the historic photo, it was common practice to install a wood “curb” along the sloping edges of ramps to keep wheeled or rolled items from rolling off the edge of the ramp. If you want to include this detail, cut pieces of scale 4 x 4 or a strip of the plywood laser-cut fret and glue in place at these locations (see photo of finished model.)

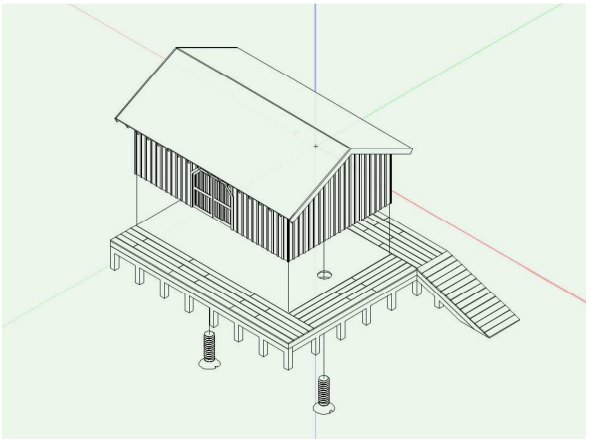


Glue the rafters (W-12) into the slots provided on the top of the resin casting with white glue or CA adhesive. Then glue the ends of the ridge pole (W-13) into the slots at the top of the ends of the casting, taking care to keep these level, followed by the last rafters (W-14). After the glue sets, lightly sand across the tops of the rafters with an emery board, sanding stick, or your sanding board to assure all the rafters are flush.



Test fit the roof sheathing (W-15) in place and sand the top edge to a bevel until you get a tight fit between the two halves. Run a small ribbon of white glue along the tops of the rafters. Lay one of the roof sheathing pieces on a flat surface, scribed boards up, and then place the building – upside down – on the sheathing so you can see the building is centered on the sheathing. Do the same with the other piece of sheathing before the glue sets on the first, then turn the building over and adjust the sheathing pieces so the ridge is a tight joint. Apply the rake trim (W-16). Set aside and let the glue dry thoroughly.





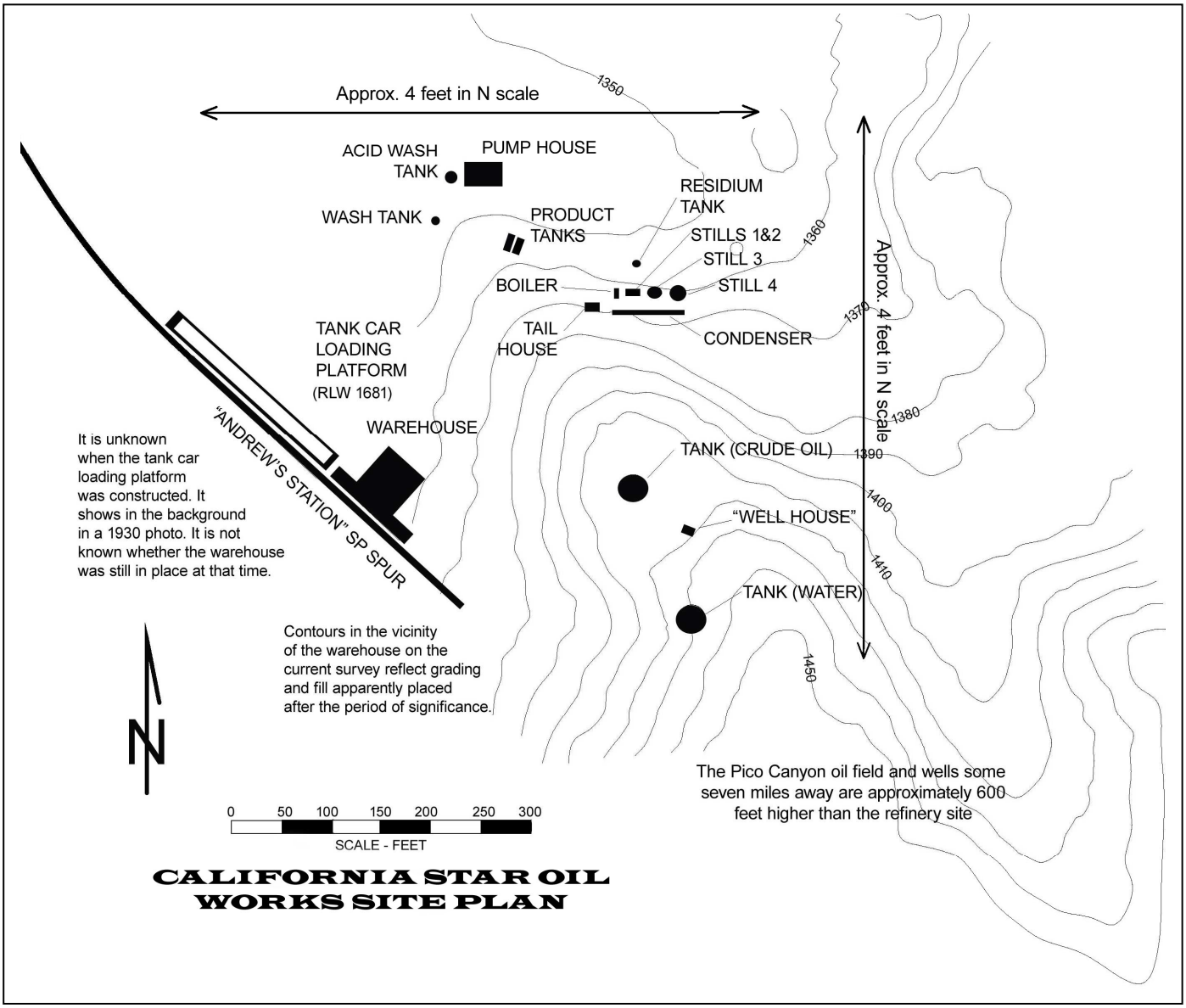
Airbrush the sheet of peel-and-stick shingles with the stain you used for the wood parts, followed by a light coat of a suitable flat gray. After the paint dries, apply the shingle strips to the roof sheathing.

Glue the warehouse to the platform with two-art epoxy. Alternatively, use two short pan-head sheet metal screws (not included) to hold the building in place on the platform. (Or do both if you are a belt-and-suspenders advocate.)

There as a low platform at track level off one end of the Warehouse platform (see historic photo.) The use of this is unknown. If you wish to include it, decking for this is provided (part W-X); use surplus fret material for framing under the decking.

SITE

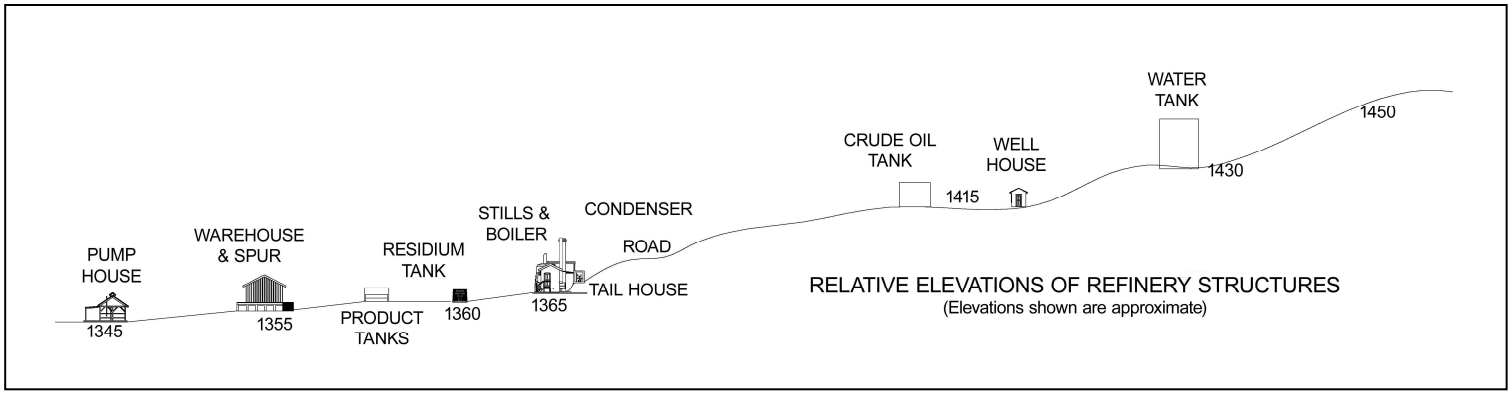
The Site Plan below was developed from multiple information sources including the City of Santa Clarita Parks, Recreation & Community Services topographic survey and plans for a future park at the site, Google Earth images, Southern Pacific "Newhall Tract" plat CA45001 dated December 1992, and a copy of the "Andrew's Station" plat from the 1870's provided by Don Ball. While aligning the existing structures with the topography and the aerial images was relatively easy, aligning these with the former SP right-of-way and overlaying the long-gone Andrew's Station spur was more difficult, and the location shown can only be assumed as "approximate" as no traces of the spur, warehouse, or tank car loading platform remain. To model all the parts of the site located per this plan would require a space about four-foot square in N scale. Certain components of the facility have fixed arrangements due to interconnections with piping and flues. Those components include the stills, the chimneys, the boiler, the condenser, and – with a more flexible degree of placement – the Tail House. The various components were interconnected with a network of pipes. Gravity was used to move the crude oil to the site (Pico Canyon was 600 feet above the refinery) and crude oil and refined products around the site. Alternative plans are presented in the following pages for a more compact arrangement of the other components which still maintain the relative arrangement, and suggested construction techniques. However, beyond the fixed relationships noted above, the modeler can arrange the parts of the refinery to suit their own space.



Elevation Changes

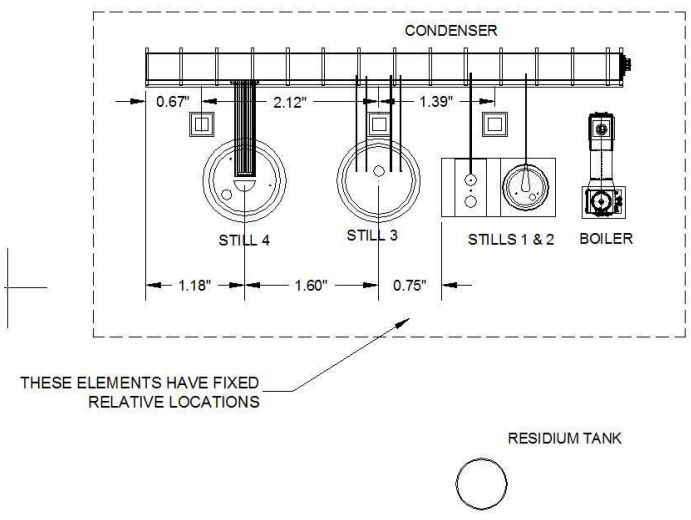
The crude oil and water storage tanks are located on the hill above the stills approximately fifty (50) feet above the stills. The product tanks are located about five feet below the level of the stills, and the pump house another ten feet below that. These are not the original tanks. Since several tank sizes are referred to in the historical record (ranging from relatively small up) there may have been tanks on the hillside between the stills and the current tanks, as there is a flat area which extends across and winds up the hill which in the past has been used as a road to the uppermost tanks. It is known that at the start of operations oil was brought by wagons in barrels from Pico Canyon and transferred to storage tanks, making this road a plausible location for those early tanks. For the compressed site plans shown, the slopes indicated in the section below have been maintained to recreate the appearance of the prototype, but elevation changes reduced.

Photo taken from Residium Tank shows stills and hillside behind. The Tail House would have been just to the right of this photo.

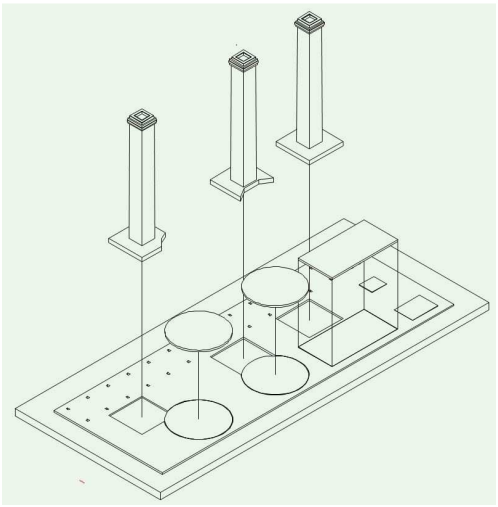


The Fixed "Core"

The Condenser, Stills, Chimneys, and Boiler have fixed relationships due to piping and site slope. These relationships are fixed by the laser-cut site base template for these elements. Close to and adjacent these elements are the Tail House, which is connected to both the condenser and the Product Tanks by piping. Also connected is the Residium Tank which held waste oil from the refinery process which was used to fuel the stills.



Begin by gluing the laser-cut base to a slightly larger substrate of 1/8" tempered hardboard ("Masonite"). To avoid any warping, it is suggested this be done using a two-part epoxy or a contact cement. Weight the assembly down for 24 hours. Glue the three chimneys in place, then glue the round still bases to the locations marked for them. Once the glue is dry, it is suggested the tops of the still bases be painted a concrete gray to help them show up during later steps.



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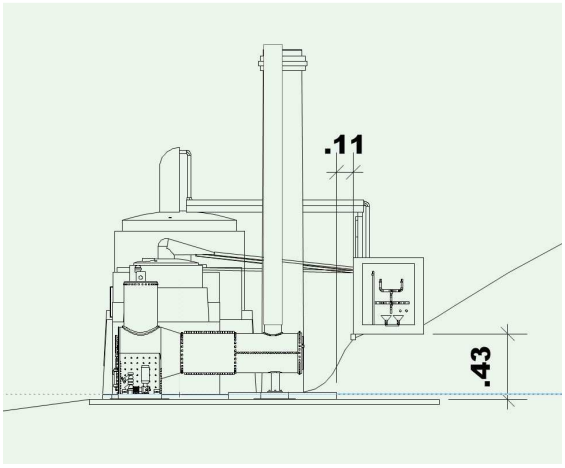
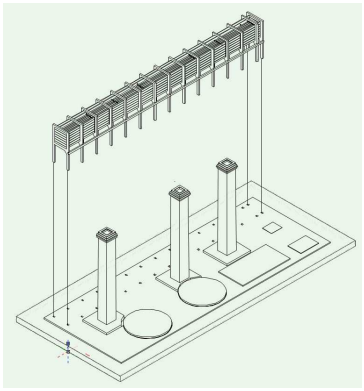


There are two ways to proceed with adding the Condenser to the site: use the sacrificial legs to assure vertical and horizontal alignment with the other parts, or – if you feel this is too cumbersome – build the hillside up and add the Condenser, having clipped off the sacrificial legs in advance. For those that want to do the later, the diagram at the left shows the height and spacing from the chimney footings for locating the Condenser. The diagram on the preceding page gives horizontal "east-west" dimensions. Build up a shelf on the hillside for the condenser using two layers 3/16" or one layer 3/8" foam-core board, and finish to elevation with a scenery base such as tinted spackle. When the spackle is dry, glue the Condenser in place, carefully measuring the horizontal and vertical spacing. (Good luck.)

For those using the legs and holes in the base for locating the Condenser (wise choice) next, glue the Condenser in place, inserting the ends of the "legs" into the holes provides. Some of the legs on the laser-cut wood frames around the condenser are sacrificial. They serve to position the Condenser at the right height and locate it horizontally with respect to the stills. After the glue has dried, clip away most of the legs on the back (side away from the stills) and slide in a piece of slotted 3/8" foam core which has been "buttered" with your favorite base course of scenery "dirt" or terrain. (I use pre-tinted smooth spackle.) Apply more of this base course of scenery "dirt" or terrain flush to the top of the still bases and the tops of the chimney bases. (Photo on right.)



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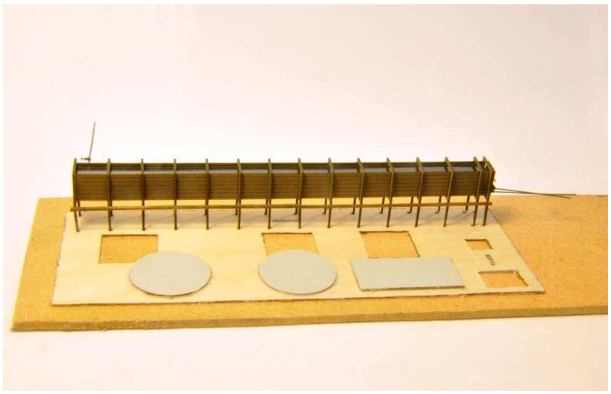
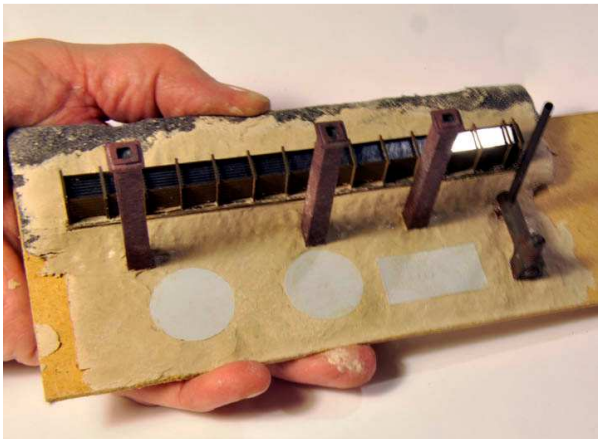

Test fitting the Condenser in the base holes; note the painted still bases.



At this point you can add talus and gravel at the toe of the slope, or a retaining wall (C-12 for horizontal boards and C-13 posts, NOT prototypical, but provided just in case you want to use it.) Glue the stills and boiler in place using two-part epoxy. At this point, it is suggested you work in your next level of "oily dirt" scenery treatment round the stills, chimneys & boiler. Final scenic treatment can be accomplished after this portion of the refinery is installed on your layout.


Condenser, Chimneys, Stills and Boiler installed on laser-cut site base with basic "dirt" scenery base, prior to installation on layout. Piping has not yet been installed.

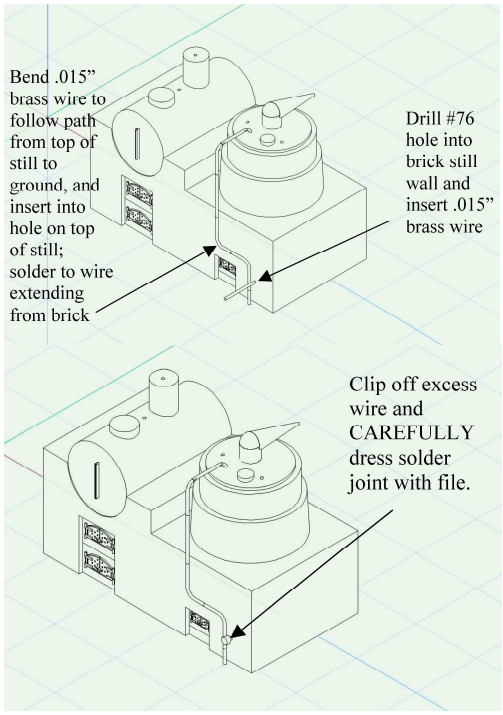
Install the "Core" on your layout of modules after "roughing in" terrain using your favorite construction methods. As previously noted, the refinery used gravity to move crude oil and refined products around the site, so be aware output from one location needs to be above the input of the next stop on the way to being loaded and transported away from the site. The following sections shows an example of elevations – these achieved bay layers of 3/16" foam-core board.

See "PIPING" section for instructions on plumbing the site.

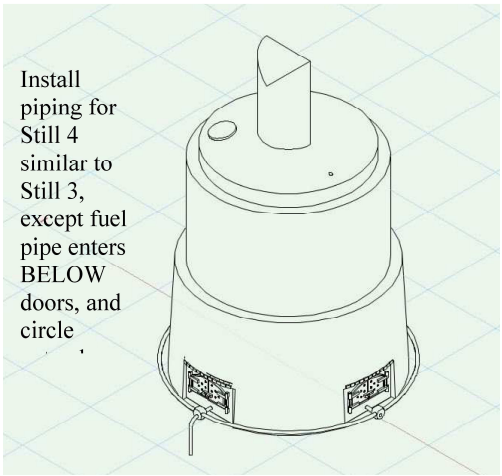
PIPING

General

Piping was generally 2", and .015" brass wire is included for this purpose. It is recommended the brass wire be chemically blackened with Birchwood Casey Brass Black prior to cutting and bending. Scrape blackening away at points where you intend to solder wire together. Use smooth-jaw pliers for bending the wire. The piping included many valves and fittings, most of which are impractical to model in N scale. . Some brass valves are provided, which can be drilled out with a #76 drill and installed on the wire "pipe". These would represent large valves. For smaller valves, a simple blob of solder or glue will suffice at this scale.



Stills 1 & 2

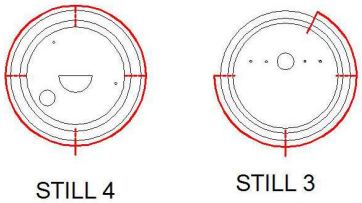


Still 4

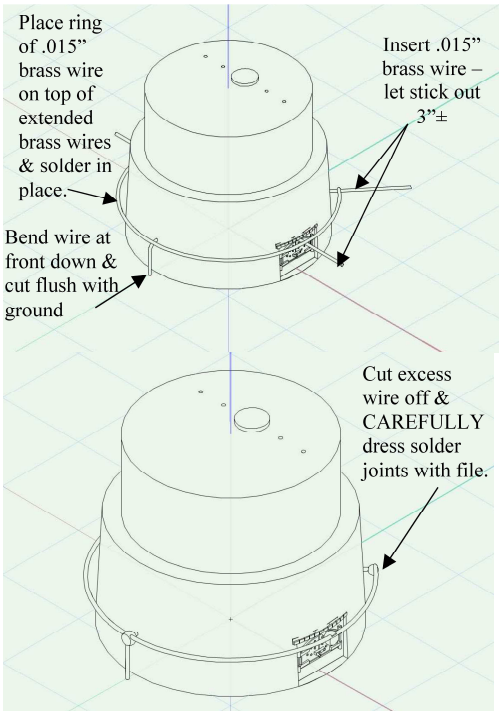
Piping in Core

Since most of the piping on the site has been removed or is laying around in disarray, exactly how the refinery was piped is not precisely known. The best references are (1) the historic photos, (2) Stan Walker's web site (see "References") and (3) Don Ball's article in *Model Railroader*. This section relies heavily on the diagrams, description, and photos in Don Ball's article.

Piping was generally 2", and .015" brass wire is included for this purpose. The first piping to model is the fuel line which ran around each of the circular stills, as well as feeding Stills 1 & 2. The fuel was the waste product left after distilling the crude oil. It was piped from the stills to the "Residium Tank" and back to the stills, or – inferred from the piping diagrams – may have been piped from one still to the firebox of the adjacent still. This piping is to be installed prior to fixing the stills to the Site Base. It is recommended the joints for this piping be soldered for strength; follow-on pipe joints can be glued. The pipe for Stills 1 & 2 is a simple dog-leg arrangement as shown on the left.



Drill #76 holes around periphery of Stills 3 & 4



Still 3

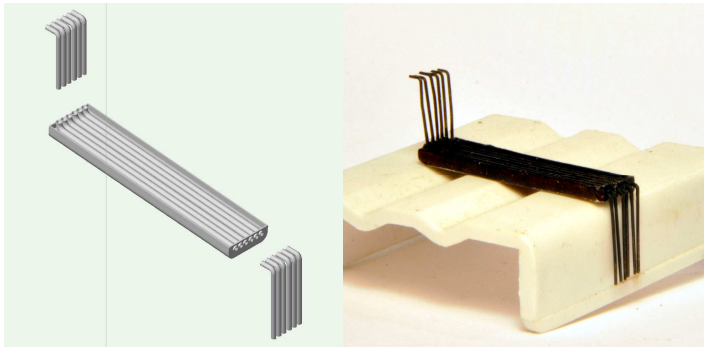
Stills 3 & 4 had fuel supply lines which encircled the outside of the brick bases and entered the firebox at multiple points. The first step in installing this piping is drilling holes in the resin castings as shown in the diagram in the upper right. Drill in approximately 3/16" to assure the wire stays in place during the soldering operation. The fuel pipe enters Still 3 at the TOP of the doors, just under the brick arch, or on the wall along the same line. The fuel pipe enters Still 4 BELOW the doors. Form chemically-blackened .015" brass wire into two circles of 1" diameter. Scrape off the blackening where you will be soldering, then clip a circle of this wire to the top of the wire protruding from the resin casting, using 1/64" laser cut wood scraps to space the circular wire out from the resin casting. Solder in place with a SMALL fillet of solder. After soldering, clip off the excess


Stills 1-4 with fuel piping installed

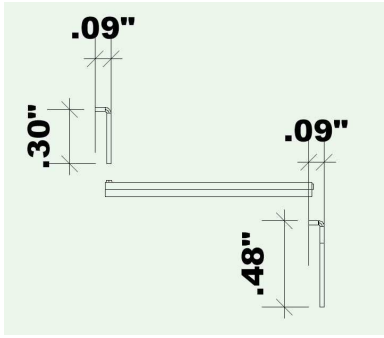
wire and CAREFULLY dress the solder joint with a file. At many of these joints there was a valve. You may or may not wish to simulate these valves. Touch-up the piping, then glue the stills to the Site Base using two-part epoxy glue (to allow positioning of the stills.)

Still #4 trough with condensate pipes. (SCVHS)

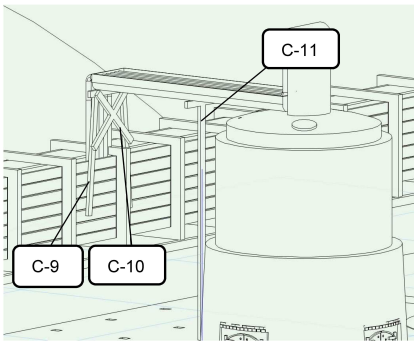
Condensate pipes from Still #4 emerge from the still at the top of a monitor-like manifold, turn downwards into a trough, then cross the gap between the still and the Condenser inside that trough. (The trough may have contained water to aid in condensing the vapor.) A white metal casting is provided for this trough. Drill out the six holes at each end with a #76 drill, and fit them with .015" brass wire pipes with right-angle bends as shown. Glue this in place on the top of Still #4, with the upper pipes in the holes on the manifold, and the ends of the bottom pipes inside the Condenser resting on the "water". Make sure the trough is level while the adhesive sets, then glue in parts C-9, C-10 and C-11 to support the trough. Depending on the final alignment of parts, it may be necessary to trim away part of C-9 or C-10 to clear the Condenser frame.



Still #4 condensate pipe troughs assembly



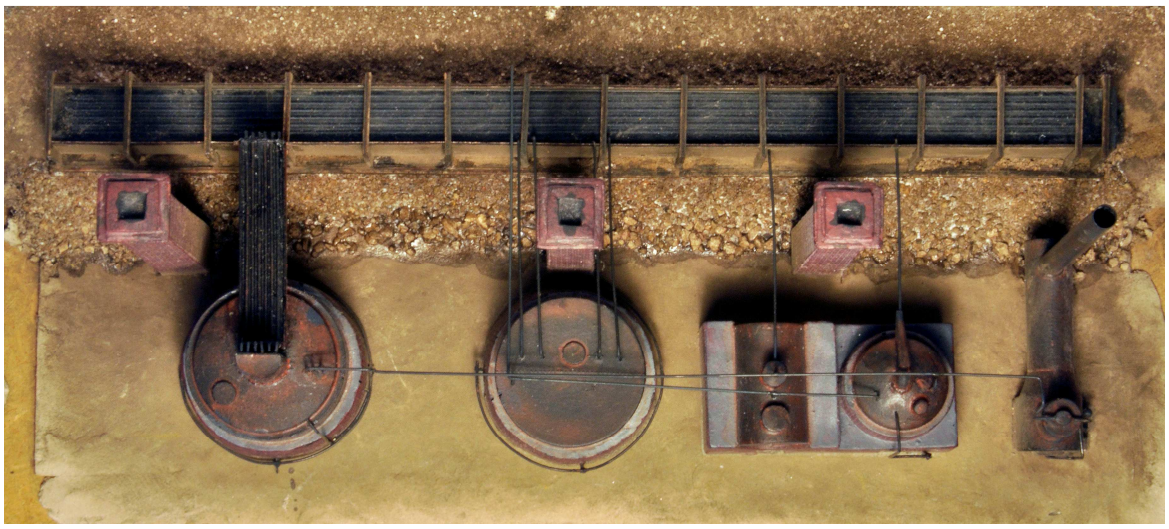
Approx. pipe dimensions; measure on your model to verify.



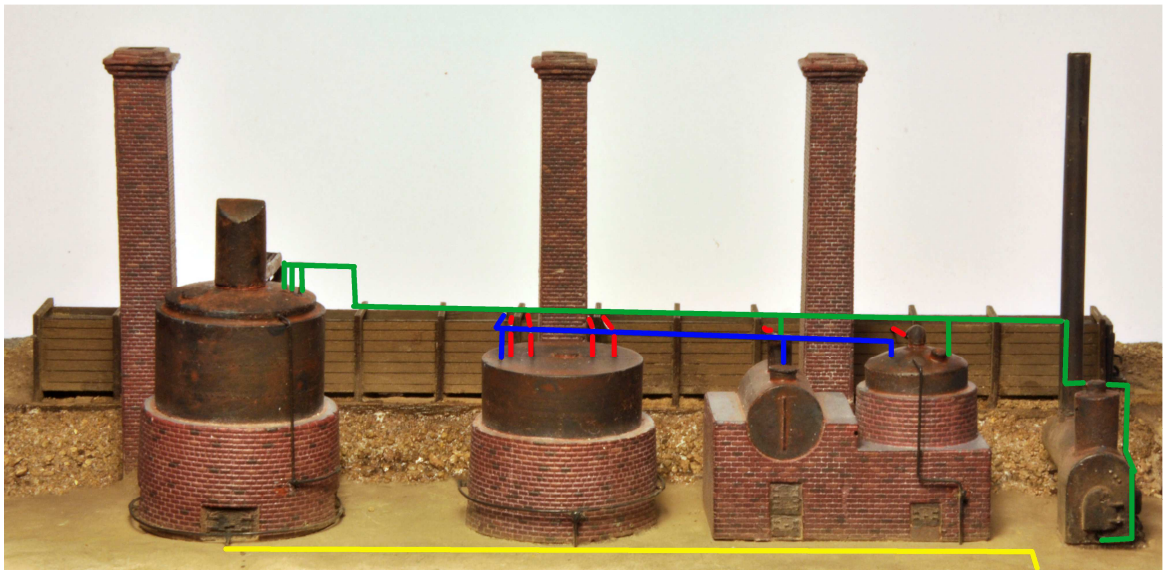
Still #4 condensate pipe trough supports

With the exception of the crude oil supply to Still #4, the water supply to the Condenser, the pipe to the Residium Tank, and the two pipes to the Tail House, the remainder of the piping at the core can be installed before the core base is installed on your layout. It is recommended the piping be installed with the lowest layer (red) first, then proceeding upwards through the middle (blue) and upper (green) layers. The piping coded yellow should be installed after the Core is installed on your layout. THE FOLLOWING DOES NOT INCLUDE ALL THE PIPING THAT WAS PRESENT ON THE STILLS DURING THEIR PERIOD OF USE. Not all the piping remains. Only the main piping is included, as best as can be determined from the historic photographs, photos by Stan Walker and Don Ball, and as described by Don Ball in his magazine article.

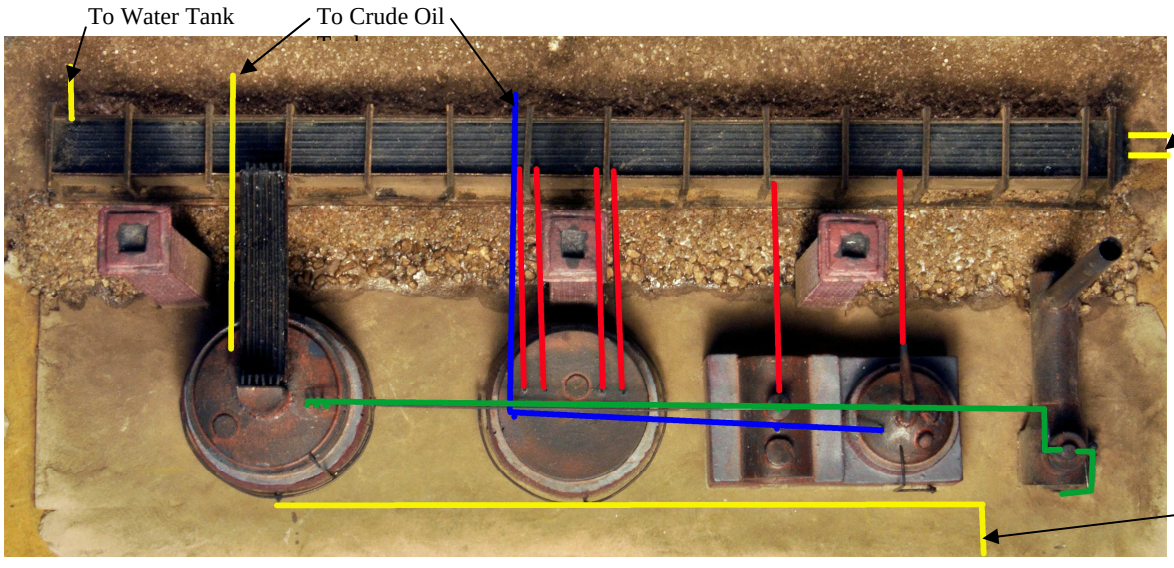
Front view of Core with piping installed on stills & boiler (see color-coded photo on following page for suggested installation sequence)



Top view of Core with piping installed on stills & boiler (see color-coded photos below for suggested installation sequence)



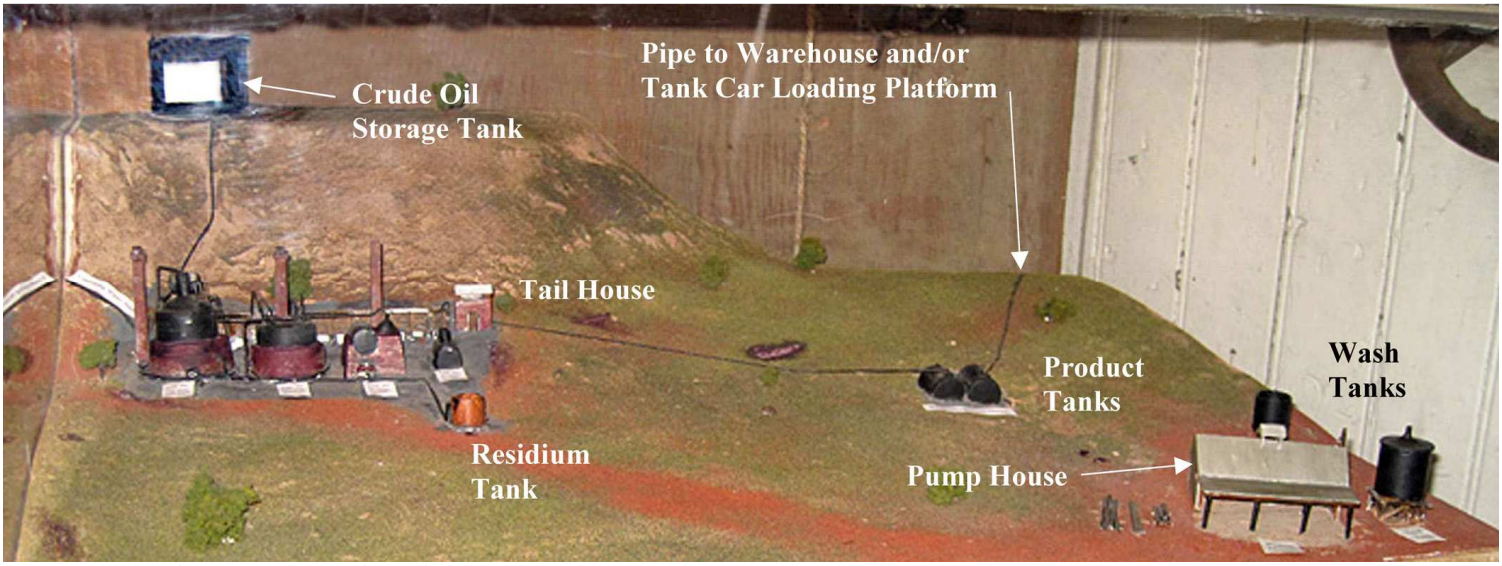
Color-coded front view: install red-coded piping first, followed by blue, then green. Yellow-coded piping is to be installed after Core is fitted to layout.



Color-coded top view: install red-coded piping first, followed by blue, then green. Yellow-coded piping is to be installed after Core is fitted to layout.

Piping Around Site

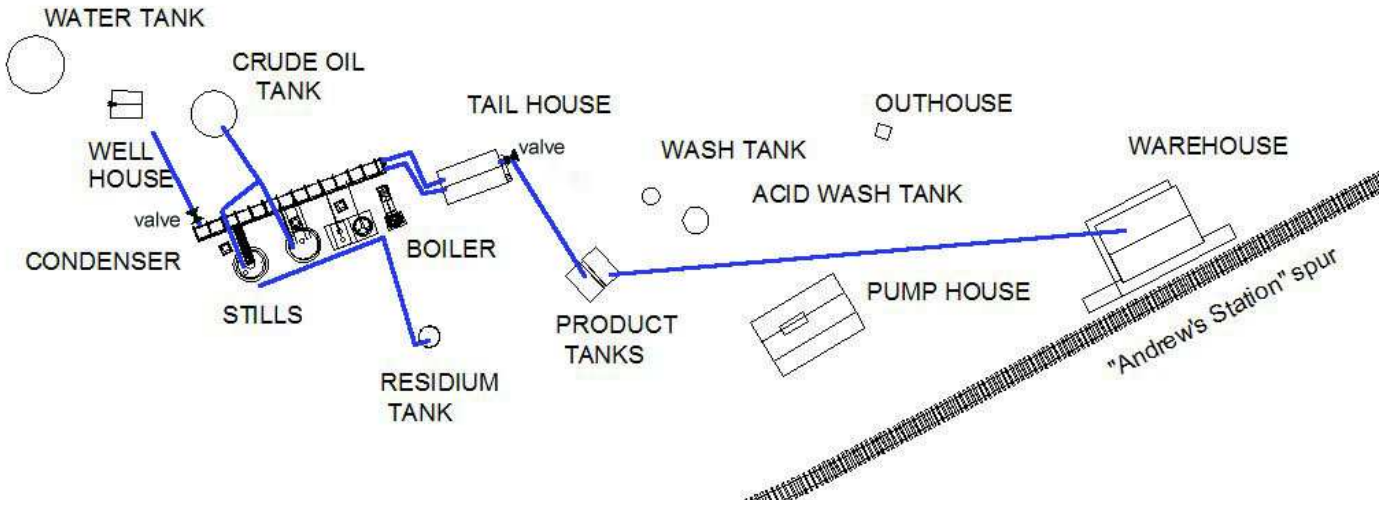
Piping beyond what is shown in the few historic and the current photos, and as diagrammed by Don Ball in his article in Model Railroader is conjectural; the historic documents – while describing the refining process used at this site – do not go into details of the piping. The only description of how refinery products got from the Tail House to the Product Tanks and from there to the Warehouse, where it was loaded into box cars for shipment (presumably in smaller containers) is as shown on a model in the Heritage Junction Historic Park inside William S. Hart Park in Newhall, Santa Clarita, California (below). While much of the piping was on the surface of



Model, presumably from about the time of the refinery's restoration in 1930*, on display at the Heritage Junction Historic Park, William S. Hart Park. This shows the piping between the various components of the refinery laying on the ground, as well as the crude oil storage tank on the hillside above the stills. (Don Ball)
[* The "zip texturing" scenery technique may indicate a mid-1960's construction date.]

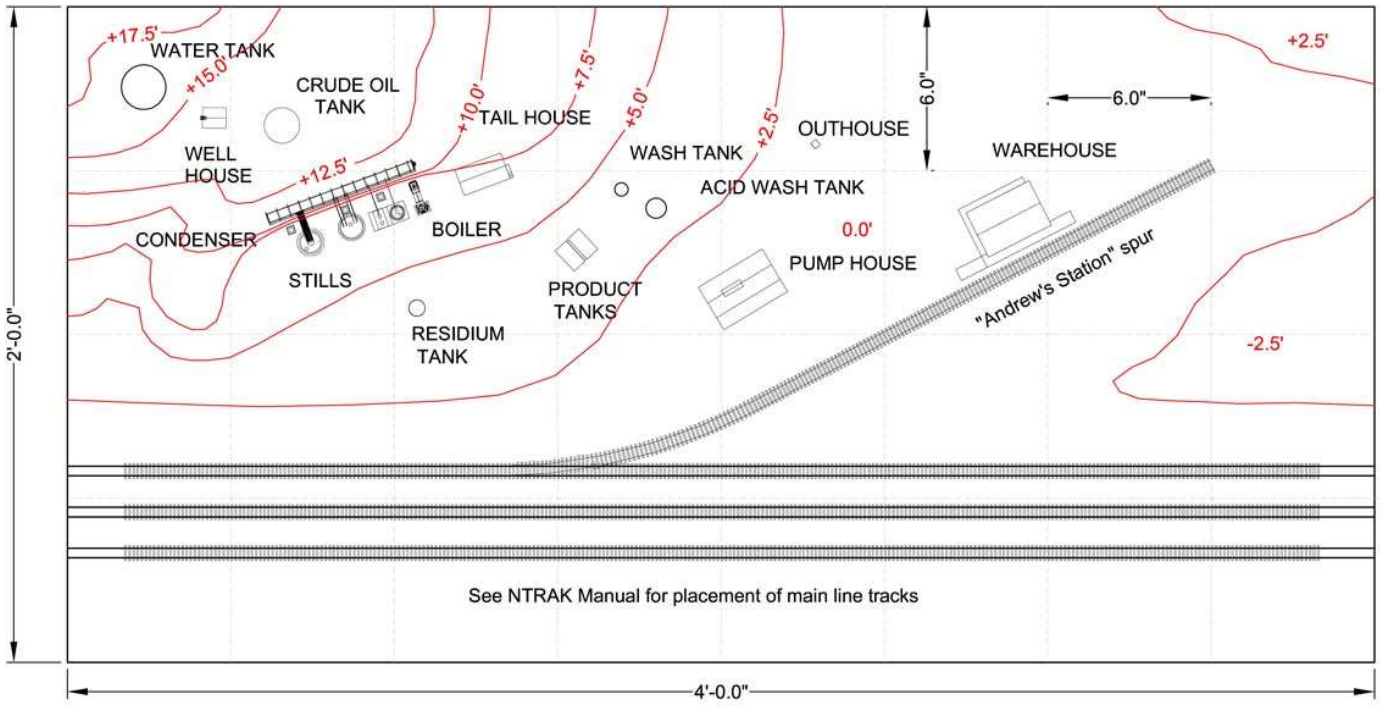
the ground, other piping was buried, including water piping to and from the Pump House and Water Tank. Also, no above-ground piping is shown for the wash tanks. It is also assumed piping installed later from the Crude Oil Tank to the Tank Car Loading Platform was buried.

After installing the Core base and other structures on your layout, complete the scenery treatment of the area prior to installing the above-ground piping. The plan below shows the known above ground piping connections between facilities on the site; your arrangement of the facilities may differ.



Example Site Layout – NTRAK Module

The plan below shows one potential condensed arrangement of elements – this on an NTRAK module. The elevations are given in increments of 2'-6" in N scale, or 3/16" – the thickness of the typical Elmer's foam-core sheets available at stationary and art supply stores. From the mid-to-late 1880s until sometime in 1943 there was a tank car loading platform on the spur from which crude oil and some refined products were shipped to Alameda, Ca. If you wish to include this, use Republic Locomotive Work's kit RLW-1681.



For assistance in assembly or interpretation of instructions, contact:

info@trknappmodelengineering.com

For all other enquiries:

Republic Locomotive Works
16 Little Cape Horn, Cathlamet, WA. 98612
360-577-6479

